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Editor V.L. Komarov

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PREFACE

The third volume of the "Flora of the U.S.S.R." continues the description of monocotyledons, families XXV-XXXII, genera 215-251, and species 1319-1968; this represents 8 families, 36 genera, and 650 species. Of the species, 102 are described as first determinations. If these numbers are compared with what was published for the corresponding fragment of the system in the fourth volume of Ledebour's "Flora Rossica" (1853) which included descriptions of only 4 families, 23 genera, and 293 species, it will be realized that the overall increment for the intervening period amounts to 75 % for families, 56 % for genera, and 122 % for species. This great increase is due not only to the greater size and diversity of the territory of the Soviet Union, as compared with that of tsarist Russia in 1853, but also to the fact that our botanical determination is now greatly perfected and we are in a better position to distinguish between species than were botanists of the earlier period.

The family of palms has also been included in the present volume. Even though there are no wild palms in this country, many of them have become acclimatized in Abkhaziya and Adzhariya to such an extent that they produce seeds in profusion, and when these fall on the soil they give rise to plants which seem to be reverting to the wild state. These palm species are, moreover, of economic value. Other species occurring in cultivation fall into the category of cultivated, not wild flora.

The most complicated treatment included in this third volume is that of sedges, i. e. the genus *Carex*. So far the largest of the genera dealt with has been *Poa* with its 107 species, followed by *Calamagrostis* with a count of only 59 species. As against this there are 392 species of *Carex* (130 in Ledebour's work), and this calls for a very exact study and a thoroughly worked out classification. The author V. I. Krechetovich has broken away from the existing tradition of classifying the species according to the system adopted in the last completed monograph of this genus, i. e. that of Kükenthal, and has worked out his own system of classification which differs markedly from Kükenthal's system. Independence in scientific investigation is important; the people using our Flora should therefore not complain about the unfamiliar order in the classification of sedges. The same goes vi for deviations from the customary names of many plants. The general revision of the flora of the U.S.S.R. demanded a thorough verification of synonymy, based on international rules of botanical nomenclature, particularly as regards the priority rule. The revision necessitated a change of many of the generally accepted names.

It is expected that the fourth volume which completes the treatment of monocotyledons, including orchids, will be published soon, in any case before the end of this year.

The editors

Family XXV. CYPERACEAE J. ST. HIL.

Flowers perfect or unisexual, monoecious or (rarely) dioecious, destitute of perianth or perianth represented by 1-6 or (rarely) numerous bristles (in *Eriophorum*). Sometimes (in *Carex*) pistillate flowers inclosed in a pouchlike prophyll (perigynium). Flowers usually arranged in many-flowered spikelets or (in Rhynchosporoideae) in 2-3-flowered false spikelets. In Caricoideae (*Carex*, *Cobresia*) each flower corresponds to a spikelet with a reduced or mostly suppressed rachilla, more rarely the spikelet consists of one staminate and one pistillate flower. Spikelets or individual flowers are borne in the axils of chaffy scales; spikelets are grouped in spikes, heads, or clusters, which may be disposed in turn in racemose, umbellate, paniculate, capitate, or spicate inflorescences. Stamens mostly 3, more rarely 2; ovary unilocular, with a single ovule and a single 2- or 3-fid style. Fruit a trigonous or globular, often flattened nutlet (achene). Perennial, rarely annual, herbaceous plants, with mostly 3-angled, leafy or leafless stems (culms); leaves narrow, linear or setaceous, flat or involute, often strongly reduced, sheaths nearly always closed.

Remnants occurring in Tertiary layers can be identified at the most as belonging to the sedge family. In Quaternary layers, the presence of seeds and fruits makes it possible to determine more reliably the distribution of a number of genera as well as some cyperaceous species of the genera *Cyperus*, *Eriophorum*, *Scirpus*, and *Carex*.

Key to the Genera

1. Flowers perfect, often with a perianth consisting of bristles. 2.
- + Flowers unisexual, monoecious or (rarely) dioecious; perianth-bristle wanting 22.
2. Scales of the spikelet 2-ranked; spikelets rather flat 3.
- + Scales of the spikelet spirally arranged, regularly surrounding the rachilla; spikelets terete. 10.
3. Spikelets 1-3-flowered; inflorescence always capitate 4.
- + Spikelets many-flowered 5.
- 2 4. Spikelets 1-flowered; bristles none; style bifid; achene flattened 220. *Kyllingia* Rottb.
- + Spikelets 2-3-flowered, with numerous empty basal scales; style bifid; achene trigonous or subterete, porcelaneous-white. 231. *Schoenus* L.
5. Rachilla jointed, inflated above the two lower scales, disarticulating after flowering. 222. *Torulium* Desv.
- + Rachilla not disarticulating after flowering. 6.

6. Stigmas 3; achene trigonous. 217. *Cyperus* L.
+ Stigmas 2; rachis flattened, 2-edged. 7.
7. The flattened achene turned edgewise to the rachilla.
. 215. *Pycneus* Beauv.
+ Achene turned with its broad side to the rachilla 8.
8. Involucral leaves short, usually 2, one longer, erect, seemingly extending the culm; spikelets short-pedicel, in a simple umbel
. 220. *Acorellus* Palla.
+ Involucral leaves long, 3-7, considerably overtopping the terminal umbellate or capitate inflorescence 9.
9. Perennial with culms 30-100 cm tall; inflorescence a compound umbel.
. 216. *Juncellus* (Kunth) C. B. Clarke.
+ Annual with culms 5-15 cm tall; inflorescence a compact spherical head 10-12 mm in diameter. 227. *Dichostylis* P. B.
10. Spikelets 2-3-flowered, the empty basal scales shorter than the other scales. 11.
+ Spikelets many-flowered, the lower scales as long as the others or longer. 12.
11. Hypogynous bristles 5-13; style distinctly separated from the achene; leaves narrow, setaceous. 233. *Rhynchospora* Vahl.
+ Hypogynous bristles none; style continuous with the achene; leaves 10-15 mm broad, scabrous on the margin . . . 232. *Cladium* Schrad.
12. Inflorescence terminal. 13.
+ Inflorescence seemingly lateral, the lower involucral leaf appearing as an extension of the culm. 21.
- 3 13. Hypogynous bristles numerous (except *E. japonicum* in which there are 6 bristles; the numerous spikelets arranged in this species on branching peduncles gathered at the top of the culm), elongating in maturity into silky threads which greatly exceed the scales
. 221. *Eriophorum* L.
+ Bristles wanting or 6 in number, small, only rarely elongating into silky threads (and then spikelets solitary at the top of the culm) . . 14.
14. Spikelets clustered at the top of the culm in a short, 2-ranked spike
. 226. *Blysmus* Panz.
+ Spikelets disposed in a compound umbellate or capitate inflorescence, or solitary. 15.
15. Spikelets terminal and solitary 16.
+ Spikelets numerous, arranged in an inflorescence 17.
16. Upper leaf sheaths with a short blade . . 222. *Trichophorum* Pers.
+ Upper sheaths bladeless or blades obsolete
. 228. *Heleocharis* R. Br.
17. Spikelets large, 10-20 mm long; inflorescence contracted, composed of few spikelets 225. *Bolboschoenus* Palla.
+ Spikelets small, 1-4 mm long, in a loose inflorescence, or inflorescence a compact head 18.
18. Style swollen at the base 19.
+ Style not swollen at the base 20.
19. Style smooth, its swollen part (tubercle) persistent in maturity on the apex of the achene. 230. *Bulbostylis* Nees.

- + Style hairy, its thickened part deciduous in maturity. 229. *Fimbristylis* Vahl.
- 20. Stigmas 3, hypogynous bristles usually 6; perennial with large loose inflorescences. 224. *Scirpus* L.
- + Stigmas 2-3; hypogynous bristles none; annual with spikelets gathered in a compact head. 227. *Dichostylis* P.B.
- 21. Hypogynous bristles none; spikelets arranged in spherical heads 223. *Holoschoenus* Link.
- + Hypogynous bristles mostly present; spikelets grouped in one or numerous lobate heads 224. *Scirpus* L.
- 22. Achene inclosed in a pouch (perigynium). 237. *Carex* L.
- + Achene free. 236. *Cobresia* Willd.

4

Subfamily I. Scirpoideae Pax—Flowers perfect, often
with a perianth of bristles

Genus 215. *Pycreus** Beauv.**

Beauv. Fl. Owar. II (1807) 48, tab. 86, f. 2.

Scales obtuse or short-tipped, 2-ranked. Flowers perfect; stamens 1-3; anthers obtuse or obscurely pointed. Stigmas 2. Achene more or less compressed, its margin turned toward the rachilla; spikelets many-flowered (5-60); rachilla 4-angled, the angles not winged or with a very narrow wing. Annuals, rarely biennials or perennials, with smooth 3-angled culms and linear leaves.

- 1. Achenes oblong, 2-2.5 times as long as broad 2.
- + Achenes obovoid or sometimes subglobose, only slightly longer than broad 3.
- 2. Spikelets 3-5 mm long; scales rounded-ovate, ca. 1 mm long; stamens 2 8. *P. limosus* (Turcz.) B. Schischk.
- + Spikelets 5-15 mm long; scales elliptical, 2.5-2.75 mm long; stamens 3. 9. *P. colchicus* (C. Koch) B. Schischk.
- 3. Spikelet solitary on the culm; involucre leaf seemingly extending the culm 2. *P. setiformis* (Korsh.) B. Schischk.
- + Spikelets numerous on the culm, arranged in fascicles or heads, often forming a compound umbellate inflorescence; leaves linear, usually flat 4.
- 4. Scales large, 3-3.5 mm long; spikelets lance-ovate, 3-4.5 mm broad 7. *P. pratorum* (Korotk.) B. Schischk.
- + Scales 2-2.5 mm long; spikelets linear-oblong, 2-3 mm broad 5.
- 5. Scales dark red or purplish-red on the margin; spikelets 5-15-flowered. 6.
- + Scales of a different color on the margin; spikelets many-flowered 7.

* Anagrammatized form of *Cyperus*.

** Arranged by B. K. Shishkin.

6. Plants 5-25 cm tall; achenes ca. 1 mm long 5. *P. eragrostis* (Vahl) Palla.
 + Plants 20-50 cm tall; achenes ca. 1.5 mm long 6. *P. Rehmanni* (Boiss.) Palla.
 7. Annuals with slender roots; culms 5-30 cm tall; stamens 3 8.
 + Perennials; culms 10-75 cm tall; stamens 2 9.
 5 8. Scales ovate, dark purple, ca. 1.5 mm long. Achene obovoid, ca.
 3/4 mm long, yellowish-brown 4. *P. nilagiricus* (Hochst.) B. Schischk.
 + Scales broadly elliptical, yellowish or yellowish-brown, ca. 2 mm
 long; achene subglobose, ca. 1 mm long, reddish-brown
 1. *P. flavescens* (L.) Beauv.
 9. Culms 50-80 cm tall; inflorescence with numerous long (6-9 cm) rays
 10. *P. tremulus* (Poir.) C. B. Clarke.
 + Culms 10-50 cm tall; inflorescence with short rays, often closely
 crowded 2. *P. globosus* (All.) Rchb.

1. *P. flavescens* (L.) Beauv. ex Rchb. Fl. germ. excurs. (1830)

72. - *Cyperus flavescens* L. Sp. pl. (1753) 46; Ldb. Fl. Ross. IV, 239; Boiss. Fl. Or. V, 364; Shmal'g. Fl. II, 540. - *C. flavescens* var. *caucasicus* C. Koch in Linnaea XXI (1848) 622. - Ic.: Rchb. Ic. Fl. Germ. VIII, tab. 278. - Exs.: HFR No 35.

Annual. Culms tufted, rarely solitary, 5-40 cm tall, 3-angled, smooth; leaves linear, acuminate, 1-2 mm broad; inflorescence with linear-lanceolate sessile spikelets crowded in spherical heads, forming a compound umbel with rays of unequal length; involucre leaves 2-3 unequal in length, much exceeding the inflorescence; spikelets 5-12 mm long and 2-3 mm broad; scales broadly elliptical, ca. 2 mm long, or terminating in a very short, slender mucro, yellowish or dark brown, with a green midrib; stamens 3; stigmas 2; achene reddish-brown, flattened, broadly ovate to suborbicular, short-pointed, smooth, ca. 1 mm long and just as broad. July-October.

Margins of rivers and lakes, in wet sandy places. - European part: sparse in all regions, except Kar.-Lap., Dv.-Pech. and Lad. Il'm.; Caucasus: Ciscauc., West., East. and South. Transcauc., Tal.; Centr. Asia: Syr-Dar. (Tashkent, Namangan). Gen. distr.: Europe, except the north, Afr., Asia, Amer., Austral. Described from Germany. Type in London.

2. *P. setiformis* (Korsh.) B. Schischk. comb. nov. - *Cyperus setiformis* Korsh. in A.H.P. XII (1892-93) 405; Kom. Fl. Manchzh. (Fl. of Manchuria) I, 328.

Annual. Culms solitary or several, 5-12 cm tall, slender, 3-angled, smooth; leaves capillary, 1-2 on the lower part of the culm, 1-6 cm long and 0.2-0.3 mm broad, with brownish-red sheaths. Inflorescence usually consisting of a solitary spikelet, a single filiform involucre leaf, 2-4 cm long, appearing as an extension of the culm, hence the spikelet seemingly lateral; beside the long involucre leaf there is often an additional short
 6 one, not exceeding the spikelet; spikelet ovate or lanceolate, 4-10 mm long and 2-3 mm broad, scales reddish-brown, ovate, obtuse, ca. 3 mm long; stamens 2; styles 2; achene dark brown, subspherical, ca. 1 mm long, transversely wrinkled. July.

Very wet meadows. - Far East: Ze.-Bur. Described from surroundings of the village Ivanovskoe, between Zeya and Bureya. Type in Leningrad.

3. *P. globosus* (All.) Rchb. Fl. germ. excurs. (1830), Addenda, p. 140. — *P. capillaris* Nees in Linnaea IX (1834) 283. — *Cyperus globosus* All. Fl. Pedemont. VII (1789) 49; Boiss. Fl. Or. V, 364. — *C. capillaris* Roxb. Fl. Ind. I (1820) 198. — *C. vulgaris* Sieb. ex Kunth, Enum. II (1837) 4; Lb. Fl. Ross. IV, 239. — Ic. Fl. Germ. VII (1846) 279.

Perennial, biennial or annual. Culms tufted, very rarely solitary, 10-50 cm tall, 3-angled, smooth; leaves linear, acuminate, 0.5-2.5 mm broad, smooth. Inflorescence with linear-lanceolate, subsessile spikelets crowded in spherical heads, forming a compound umbel, with usually very short rays, hence the entire inflorescence shaped like a compact head, rarely with elongate rays; involucreal leaves 2-3, unequal, two considerably and one slightly overtopping the inflorescence. Spikelets 5-20 mm long and 2-2.5 mm broad; scales oblong-ovate, obtuse, 2-2.25 mm long, reddish-brown, white-hyaline-margined; stamens 2; stigmas 2; achene oblong-ovoid; ca. 1 mm long and 0.7 mm broad, flattened, punctulate. June—September.

Wet places, margins of rivers and irrigation ditches, and ricefields. — Caucasus: West., East., and South. Transcauc., Tal.; Centr. Asia: Syr-Dar., Tyan'-Shan. Gen. distr.: Atl. Eur., West. and East. Medit., Jap. — Chin., Afr., Austral. Described from Piedmont.

4. *P. nilagiricus* (Hochst.) B. Schischk. comb. nov. — *Cyperus nilagiricus* Hochst. ex Steud. Cyp. (1855) 2. — *C. fusco-ater* Meinsh. ex Korsh. in A.H.P. XII (1893) 406; Kom. Fl. Manchzh. (Fl. of Manchuria) I, 322. — *C. vulgaris* Rgl. Fl. Ussur. (1861) 159 non Sieb. — *Pycneus capillaris* var. *nilagiricus* C. B. Clarke in Hook. Fl. of Brit. Ind. (1894) 591. — *P. globosus* var. *nilagiricus* C. B. Clarke in Journ. Linn. Soc. XXXVI (1903) 204.

Annual. Culms tufted, very rarely solitary, 5-25 cm tall, 3-angled, erect, smooth, with few leaves in lower part, at base clothed with 2-3 bladeless, usually purple-tinged sheaths; leaves linear, flat or involute, 2-9 cm long, 0.5-2 mm broad. Spikelets linear-lanceolate, sessile, crowded in clusters, forming in more developed specimens a compound umbel with unequal rays; involucreal leaves 2, rarely 3, usually one as long as the inflorescence or shorter, the others 2-3 times as long as the inflorescence; spikelets 5-17 mm long, subobtuse to acuminate; scales ovate, dark purple, 7 green on the midrib, white-hyaline on the margin, ca. 1.5 mm long; stamens 2. 3; style 2-fid; achene flattened, 0.75 mm long, yellowish-brown, obovoid. July—September. (Plate I, Figure 7 a-c).

Wet sandy banks, wet meadows. — Far East: Ussur.; Centr. Asia: Pribalkh., Tyan'-Shan. Gen. distr.: India, China, Manchuria, North Korea, south, and trop. Africa, Australia. Described from India (Nilgiri).

5. *P. eragrostis* (Vahl) Palla in Ann. Naturh. Hofmus. XXIII (1909) 204. — *Cyperus eragrostis* Vahl, Enum. pl. (1806) 322; Kom. Fl. Manchzh. I, 334. — *C. sanguinolentus* Vahl, l. c. (1806) 351. — *C. Korshinskyi* Meinsh. in A.H.P. XVIII, 3 (1901) 235. — *C. rubro-marginatus* Meinsh. l. c. (1901) 236. *C. rubro-marginatus* Drob. in Opredelit. rast. okr. Tashkenta (Key to Plants of Surroundings of Tashkent) I (1923) 46. — *C. flavescens* var. *rubro-marginatus* Schrenk, Enum. pl. nov. I (1841) 3; Ldb. Fl. Ross. IV, 239. — *Pycneus sanguinolentus* Nees in Linnaea IX (1834) 283. — Ic.: Kom. and Alic. Opred. rast. Dalynest. kraya (Key to Plants of the Far Eastern Area I, 1931), Plate 71.

Perennial, biennial or annual. Culms several, rarely solitary, 5-25 cm tall. 3 angled, smooth; leaves linear, acuminate, 1-3 mm broad. Inflorescence a head or a compact umbel with sessile spikelets; involucre leaves unequal, exceeding the inflorescence 2-4 times; spikelets lanceolate, subacute, 5-13-flowered, 5-10 mm long and 2.5-3 mm broad; scales broadly elliptical, subobtuse, ca. 2 mm long, dark red on the margin, green on the midrib, light brown elsewhere; stamens 2; achene whitish, broadly obovoid or subglobular, ca. 1 mm in diameter. August.

Boggy places and ricefields. —Caucasus: West. Transcauc., Tal.; Far East: Uss.; Centr. Asia: Pribalkh., Tyan'-Shan., Dzh.-Tarb., Syr-Dar., Amu-Dar. Gen. distr.: trop. zone of the Old World, As. Min., Jap.-Chin. Described from Southern India (Tranquebar).

6. *P. Rehmanni* (Boiss.) Palla ex Grossg. Fl. Kavk. I (1928) 152. — *Cyperus Rehmanni* Boiss. Fl. Or. V. (1884) 364; Fom. and Voron. Oprod. rast. Kavk. I, 161.

Perennial. Rhizome thin, creeping culms several, rarely solitary, 3-angled, leafy 1/3 to 1/5 its length, 20-50 cm tall; leaves linear-lanceolate, usually shorter than the culm, acuminate, 2-4 mm broad. Inflorescence an umbel with 3-4 short rays; involucre leaves 3-4, linear, unequal, 2-8 times as long as the inflorescence; spikelets oblong, 8-10-flowered, 7-9 mm long; scales ovate-oblong, subobtuse, ca. 2.5 mm long, obscurely 5-nerved, rose-colored on the margin, green on the midrib, stramineous elsewhere; achene smooth, suborbicular, ca. 1.5 mm in diam. August.

Boggy places. —Caucasus: West. Transcauc. Endemic. Described from Poti. Type in Geneva.

8 7. *P. pratorum* (Korotk.) B. Schischk. comb. nov. — *P. dentifer* Kom. in Bull. du Jard. bot. princ. URSS XXX (1932) 198. — *Cyperus pratorum* Korotk. in Fedde, Repert. sp. nov. XIII (1914) 292. — *C. dentifer* Kom. l. c. (1932) 198.

Perennial. Culms tufted, 7-25 cm tall, glabrous, covered at the base with dark purple sheaths; leaves linear, acuminate, 3-15 cm long, 0.5-1.5 mm broad, flat or folded. Inflorescence consisting of 1 or 2 clusters of spikelets, one of the clusters sessile, the other on a long peduncle; involucre leaves 1-3, usually exceeding the inflorescence; spikelets ovate or oblong, acute, 5-8 mm long and 4-5 mm broad; scales broadly ovate, rufous or pale green, 3-3.5 mm long, with a dark-brown, narrowly white-hyaline-margined fringe, the green midrib excurrent into a very short, sometimes recurved tooth; achene broadly ovate, flattened, 1.5 mm long, somewhat lustrous, blackish-brown. August-September.

Margins of mossy marshes. —Far East: Ze.-Bur., Uss.-Endemic. Described from the valley of Amur river, vicinity of Nikolaevskoe. Type in Leningrad.

8. *P. limosus* (Maxim.) B. Schischk. comb. nov. — *Cyperus limosus* Maxim. Primit. Fl. amuren. (1859) 294; Kom. Fl. Manchzh. I, 331.

Perennial, biennial or annual. Culms solitary or several (2-4), 10-40 cm tall, smooth, leafy at the base; leaves linear, 4-20 cm long and 1-3.5 mm broad, flat or folded, with numerous veins, glabrous, barely scaberulous at the tip. Spikelets linear or linear-oblong, 3-5 mm long and 1-15 mm broad, 16-30-flowered, in glomerules of 20-30, forming a compound umbel

with unequal rays; involucreal leaves 1-4, of these 1 or 2 exceeding the inflorescence, the others shorter; scales orbicular-ovate, obtuse or subemarginate, 3-nerved, the midnerve more pronounced, excurrent into a very short tooth, darkish greenish-brown, ca. 1 mm long, devoid of a green midrib; stamens 2, stigmas 2, rarely 3; achene oblong, scarcely shorter than the scales, pale stramineous, plano-convex. August–September.

Silt-covered and wet sandy margins of lakes and rivers. —Far East: Ze.-Bur., Uss. Endemic. Described from the river Amur. Type in Leningrad.

9. *P. colchicus* (C. Koch) B. Schischk. in Grossg. Fl. Kavk. i (1928) 152. —*Cyperus colchicus* C. Koch in Linnaea XXI (1848) 623. —*Pycnus Woronowii* Palla in Mon. du Jard. Bot. de Tiflis 21 (1912) 21.

Perennial. Culms 25-70 cm tall, 1-4 mm thick, smooth; leaves linear, shorter than the culm, 3-8 mm broad at the base, scabrous on the margin and midrib. Inflorescence with acute, 20-40-flowered spikelets 0.5-1.5 cm long and 2-2.5 mm broad, aggregated in spherical heads, forming an umbel with unequal rays; involucreal leaves 3-7, unequal, exceeding the inflorescence; scales elliptical, tawny to rufous, 2.25-2.75 mm long, subobtusely, with a green midrib and in upper part with a broad hyaline margin; stamens 3, stigmas 2; achene oblong-elliptical, 1.25-1.5 mm long and 0.6-0.75 mm broad. July–September. (Plate I, Figure 4 a-c).

Boggy places. —Caucasus: West. Transcauc. Gen. distr.: Turkish Lazistan. Described from the vicinity of Poti. Type in Berlin, cotype in Leningrad.

10. *P. tremulus* (Poir.) C. B. Clarke ex Dur. et Schinz. Consp. Fl. Afr. V (1894-5) 542. —*Cyperus tremulus* Poir. Encycl. VII (1806) 264; Boiss. Fl. Or. V, 365. —(?) *C. stachyophorus* C. Koch in Linnaea XXI (1848) 623.

Perennial. Culms 50-75 cm tall; leaves linear, shorter than the culm. Inflorescence an umbel with numerous rays 6-9 cm long; spikelets sessile, narrowly linear, many-flowered, loose, aggregated in heads; involucreal leaves 2-4, broadly linear, unequal, much exceeding the inflorescence; scales obovate, obtuse, stramineous, with a green midrib, broadly white-membranaceous on the margin; stamens 2; achene obovate, somewhat flattened, puncticulate.

Boggy places. —Caucasus: West. Transcauc. Gen. distr.: Ind.-Him., Trop. Afr., Amer. Described from Madagascar. Type in Paris.

Genus 216. *Juncellus* † (Kunth) C. B. Clarke ††

C. B. Clarke in Hook. Fl. of Brit. Ind. VI (1894) 594; Kunth, Enum. II (1837) 19 (pro sect. Gen. *Cyperus* L.)

Scales obtuse, 2-ranked. Flowers perfect; stamens 3, stigmas 2. Achene dorsally flattened, the broad side turned toward the rachilla. Culms destitute of bladeless sheaths at the base. Spikelets numerous, in glomerules, forming a compound umbel.

† Indicating similarity to the genus *Juncus*.

†† Arranged by B. K. Shishkin.

1. Spikelets 4-6 mm long, tightly arranged in oblong or ovaloid, compact spikes, these in turn disposed in a compact umbel 2. *J. alopecuroides* (Rottb.) C. B. Clarke.
 + Spikelets longer (5-20 mm), arranged in rather loose clusters, forming a compound umbel. 1. *J. serotinus* (Rottb.) C. B. Clarke.
- 10 1. *J. serotinus* (Rottb.) C. B. Clarke in Hook. Fl. of Brit. Ind. VI (1894) 594. — *Cyperus serotinus* Rottb. Descr. gram. (1772) 18; Kom. Fl. Manchzh. I, 332. — C. Monti L. fil. Suppl. (1781) 102; Ldb. Fl. Ross. IV, 240; Boiss. Fl. Or. V, 366; Shmal'g. Fl. II, 541. — *Pycneus Monti* Rchb. Fl. germ. excurs. (1830) 72. — *Chlorocyperus serotinus* Palla in Allg. bot. Zeitschr. VI (1900) 201. — Duval-Jouvea *serotina* Palla in Koch, Synops. 3 Aufl. (1907) 2556. — Ic.: Rchb. Ic. Fl. Germ. VIII (1846) tab. 279, f. 666.

Perennial. Culms usually solitary, sharply triquetrous, 30-100 cm tall, leaves linear, 5-9 mm broad, finely long-acuminate, with a prominent midrib underneath, scabrous toward the tip on the margins and midrib. Inflorescence an umbel; rays unequal, often branching, usually much exceeding the inflorescence; spikelets oblong-lanceolate, acute, 5-20 mm long; scales orbicular-ovate, obtuse, many-nerved, rufous, with green midnerve and narrowly hyaline margins, 2.25 mm long; stamens 3, 1 mm long; stigmas 2; achene strongly flattened, brown, 1.25-1.5 mm long. August-September. (Plate I, Figure 6 a-c).

Margins of swamps and canals, estuaries and floodlands, ricefields. — European part: Low. Don., Low. Volga.; Caucasus: Ciscauc., Dag., West. and East. Transcauc., Tal.; Far East: Uss.; Centr. Asia: Syr-Dar., Amu-Dar., Pam.-Al., Tyan'-Shan., Pribalkh. Gen. distr.: Medit., N. Ind., E. Chin. Described from India.

J. alopecuroides (Rottb.) C. B. Clarke in Hook. Fl. of Brit. Ind. VI (1894) 595. — *Cyperus alopecuroides* Rottb. Descr. et Ic. (1773) 38; Boiss. Fl. Or. V, 367. — *Chlorocyperus alopecuroides* Grossh. Fl. Kavk. I (1928) 150. — Ic.: Rottb. 1. c., tab. 8, f. 2.

- Perennial. Roots fibrous; culms solitary or 2-3, firm, 20-100 cm tall, 3-angled above, glabrous; leaves linear, nearly as long as the culm, 2-15 mm broad, scabrous on the margins. Inflorescence a compound umbel; primary rays 5-10, 5-15 cm long, divided into secondary rays, these terminating in crowded, oblong or ovaloid spikes consisting of numerous spikelets, firmly set at a right angle; spikelets 4-6 mm long, 1-2 mm broad, lanceolate-linear, flattened, subtetragonous, 12-24-flowered; rachilla 4-angled, not winged; scales pale- or dark-brown, oblong-ovate to broadly ovate, dorsally flattened, ecarinate; stamens 3; stigmas 2; styles with stigmas slightly exceeding scales; achene elliptical, flattened, fuscous when ripe ca. 1 mm long. July.
- 13

Ricefields and wet places. — Caucasus: West. and South. Transcauc. Gen. distr.: East Medit., Ind.-Him., Africa. Described from India.

Genus 217. *Cyperus*† L.††

L. Gen. Ed. 1 (1737) 12.

Scales 2-ranked, 1-many-nerved. Flowers perfect; stamens 3; stigmas 3. Achene trigonous. Rachilla mostly winged.

† From Greek *cyperos* or *cypeiros* — names for *C. longus* and *C. rotundus*.

†† Arranged by B. K. Shishkin.



Records of extinct genera obtained in Tertiary layers in the U.S.S.R. :
 Cyperites Deucalionis Heer—in the Lower Don Sarmat (Krynka), in
 Transcauc. (at the foot of Ararat). —Cyperacites paucinervis (Heer)
 Schimp. —in Prichern. Sarmat (Krynka). —C. canaliculatus Heer—in
 Tertiary layers of Transcauc. (foot of Ararat).

1. Spikelets aggregated in compact, spherical or oblong heads. 2.
 Spikelets in rather loose clusters. 5.
2. Scales blackish-brown; inflorescence containing 1-2 rays.
 2. *C. soongoricus* Kar. et Kir.
 + Scales greenish or greenish-rufous; inflorescence of numerous rays
 3.
3. Spikelets 10-15 mm long; scales mucronate, with distinct lateral nerves;
 achenes ovate, 1.5 mm long 6. *C. glaber* L.
 + Spikelets 2-8 mm long; scales obtuse, lateral nerves wanting or obso-
 lete; heads very compact, spherical or ovaloid. 4.
4. Scales greenish or greenish-rufous, 0.5 mm long; stamens 1-2; achenes
 darkish, 0.5 mm long. 3. *C. difformis* L.
 + Scales rufous or light brown, obscurely 7-9-nerved, 2 mm long, hori-
 zontally truncate; stamens 3; achenes oblong-linear, 1-1.4 mm long
 9. *C. glomeratus* L.
5. Scales extending into a green mucro, attaining 0.4 mm in length.
 13. *C. amuricus* Maxim.
 + Scales not mucronate or with a very short, obsolete mucro. 6.
6. Scales only with a green midrib, without lateral nerves 7.
 + Scales with faint lateral nerves. 9.
7. Scales blackish-brown, rarely brown or greenish-brown; achenes
 yellowish, barely shorter than the scales, ca. 1 mm long
 1. *C. fuscus* L.
 + Scales light green, reddish on the margins; achenes $1\frac{1}{3}$ to $1\frac{1}{2}$ as long
 as the scales. 8.
8. Perennial with a short creeping rhizome; achenes yellowish, 0.5-
 0.7 mm long. 4. *C. haspan* L.
 + Annual; achenes 0.3 mm long. 5. *C. flavidus* Retz.
9. Achenes as long as the scales or nearly so; scales 1.5-1.75 mm long
 10.
 + Achenes $1\frac{1}{2}$ as long as the scales; scales 2.5-3.5 mm long 11.
10. Spikelets 3-8 (12)-flowered, 4-6 mm long, arranged at the ends of rays
 in compound spikes; scales yellowish; achenes ovate-oblong, as long
 as the scales. 7. *C. iria* L.
 + Spikelets many-flowered, 7-15 mm long; spikelets in glomerules at the

Explanation to Plate I

1. *Cyperus fuscus* L. — 2. *C. longus* L. — 3. *Acorellus distachyus* (All.) Palla. — 4. *Py-
 creus colchicus* (Koch) B. Schischk. — 5. *Torulium caucasicum* Palla. — 6. *Juncellus
 serotinus* (Rothb.) C.B. Clarke. — 7. *Pycreus nilagiricus* (Hochst.) B. Schischk.

In all figures: a—spikelet, b—scale, c—achene.

- ends of rays; scales purplish-brown or dark yellowish-brown, barely shorter than the scales. 8. *C. truncatus* Turcz.
11. Scales dark-rufous; spikelets 5-10 mm long; the green midrib often evident only in upper part of scales. 11. *C. badius* Desf.
+ Scales golden-yellow or rufous; spikelets usually larger, 10-20 mm long; the green midrib evident all the way down the scales 12.
12. Culms 50-100 cm tall; leaves 4-7 mm broad, covering the culm in lower 1/3; rays of the umbel 10-40 cm long 10. *C. longus* L.
+ Culms 7-50(60) cm tall; leaves crowded at the very base of the culm, 2-4(5) mm broad; rays of the umbel 1-10(12) cm long 13.
13. Scales rufous, 3-3.5 mm long; style with stigma 6-7 mm long; achenes fuscous, ca. 1.5 mm long. 12. *C. rotundus* L.
+ Scales stramineous or golden-yellow, 2-2.5 mm long; achenes rufous, lustrous, ca. 1 mm long 14.
14. Plants with rather large ovaloid tubers, 10-15 mm long; leaves 5-10 mm broad. A cultivated plant. **C. esculentus* L.
+ Plants with small tubers; leaves 2-4 mm broad
. 14. *C. aureus* Ten.

Subgenus 1. *Eucyperus* Griseb. Spicil. Fl. Rum. et Bith. II (1844) 420; Rikli in Jahrb. Wiss. Bot. XXVII (1895) 568. —Scales without lateral nerves. The green tissue of the culm in two or more cell layers is situated immediately below the epidermis and is not connected with the fibro-vascular bundles.

- 15 Series 1. *Fusci* B. Schischk. —Annuals. Scales usually dark, rarely greenish-brown or rufous. Spikelets often gathered in rather compact heads.

1. *C. fuscus* L. Sp. pl. (1753) 46; Ldb. Fl. Ross. IV, 241; Boiss. Fl. Or. V, 370; Shmal'g. Fl. II, 541; Kryl. Fl. Zap. Sib. III, 380. —*Eucyperus fuscus* Rikli, Jahrb. Wiss. Bot. XXVII (1895) 568. —*Cyperus fusciformis* Drob. in Opred. rast. okr. Tashkenta I (1923) 46. —Ic.: Rchb. Ic. Fl. Germ. VIII (1846) t. 280. —Exs.: HFR No 1044.

Annual. Culms tufted, sharply triquetrous with concave sides, 5-30 cm tall; leaves 1/3-1/2 the length of the culm to nearly as long as the culm, 1-3 mm broad, acuminate, scaberulous on the margins near the apex. Inflorescence of several glomerules, of these one sessile, the others on peduncles to 12 mm long; involucreal leaves 3, unequal, 2-3 times as long as the inflorescence; spikelets linear-oblong, slightly flattened, 3-8 mm long; scales broadly ovate, blackish-brown or dark red, rarely greenish-brown (var. *virescens* Hoffm.), obtuse, sometimes slightly mucronulate, 1-1.3 mm long and nearly as broad; stamens 2; stigmas 3; achenes yellowish-green, sharply trigonous, short-pointed, ca. 1 mm long. July—August. (Plate I, Figure 1 a-c).

Damp meadows, margins of rivers, lakes and swamps. —European part: except Kar. —Lap., Dv. —Pech.; Caucasus: Everywhere except the alpine zone; West. Siberia: Ob. (south), Upp. Tob., Irt., Alt. (rarely); East. Siberia: Ang. —Sayan., Daur.; Centr. Asia: —everywhere except the alpine zone. Gen. distr.: Scand. (south), Centr. Eur., Atl. Eur., Medit., Balk. —As. Min., Arm. —Kurd., Iran, Ind. —Him., North. and Centr. China, North Afr., North Amer. (adventive). Described from Central Europe. Type in London.

2. *C. soongoricus* Kar. et Kir. in Bull. Soc. Nat. Mosc. XIV,

3 (1841) 57; Ldb. Fl. Ross. IV, 241; Kryl. Fl. Zap. Sib. III, 381.

Annual. Culms erect, 15-25 cm tall, solitary or several; leaves narrowly linear, 1-2 mm broad, with long sheaths. Inflorescence of 1-3 compact, spherical glomerules consisting of numerous spikelets, one of the glomerules sessile, the others on short peduncles; involucreal leaves 1, of these one exceeding the inflorescence several times and extending the culm, the other divergent, short; spikelets linear, 3-6 mm long, ca. 1 mm broad; scales suborbicular, obliquely truncate, green midrib, blackish-brown on the sides in upper part, with a narrow whitish hyaline fringe on the margins, 0.6 mm long; rachilla not winged; stamens 2-3; stigmas 3; achene broadly ovate or suborbicular, trigonous, ca. 0.5 mm long. August-September.

Damp meadows. —West. Siberia: Alt. (to Chern. Irt. at the Tas-Batyr 16 ferry and at the foot of Kurchumskii Range). Endemic. Described from south-western Altai (Kurchumskie foothills). Type in Moscow, cotype in Leningrad.

3. *C. difformis* L. Amoen. Acad. IV (1750) 302; Ldb. Fl. Ross. IV, 242; Boiss. Fl. Or. V, 370; Kom. Fl. Manchzh. I, 351. —*C. oryzetorum* Steud. Syn. Cyp. (1855) 24. Ic: Rchb. Ic. Fl. Germ. VIII, tab. 284; Kom. and Alis. Oprod. rast. Dal'nev. kraya I (1931) tab. 70. —Exs.: Herb. Fl. Cauc. No. 658.

Annual. Culms tufted, saliently 3-angled, 20-60 cm tall. Leaves usually shorter than the culm, rarely longer, 2-4 mm broad, acuminate, scabrous on the margin toward the apex. Inflorescence an umbel, the rays unequal, 0.2-6 cm long, bearing linear, sessile spikelets 2-8 mm long, aggregate in heads; involucreal leaves 2-3, unequal, the lower strongly elongate (sometimes to 20 cm long); scales obovate, suborbicular, rounded-tipped, ca. 0.5 mm long, rufous, with a green midrib; stamens 1-2; achene yellowish, trigonous, ca. 0.5 mm long. August.

Ricefields and boggy places. —Caucasus: Dag., West. and East. Transcauc., Tal.; Far East: Uss.; Centr. Asia: Amu-Dar., Syr-Dar. Gen. distr.: West. and East. Medit., Balk. —As. Min., Iran, Ind. —Him., Jap. —Chin., Afr., Austral. Described from India. Type in London.

Series 2. *Haspani* B. Schischk. —Perennials with creeping rhizome, or annuals. Scales brownish-green or reddish. Spikelets disposed in open compound umbel.

4. *C. haspani* L. Sp. pl. (1753) 45; C. B. Clarke in Hook. Fl. of British Ind. VI (1894) 600. —Ic.: Rottb. Descr. Ic. Pl. (1773) t. 6.

Perennial. Rhizome creeping, with somewhat remote culms; culms 10-50 cm tall, 3-angled above; leaves linear, 3-5 mm broad, much shorter than the culm, flat, smooth. Inflorescence a compound umbel; rays of first order 4-12, 4-12 cm long; sheaths 5-10 mm long; rays of second order 3-8, often producing in turn rays of third order, terminating in 3-10 spikelets in digitate arrangement; involucreal leaves 2-3, usually shorter than the inflorescence; spikelets 10-15 mm long and 1-2 mm broad, strongly flattened, 10-40-flowered; rachilla with a very narrow wing; scales ovate, obtuse, obscurely mucronulate, brownish-light-green or rufous, 1-3-nerved on the back, 1-1.5 mm long; stamens 3 or 2; stigmas 3; style with stigmas ca. 1.5 mm long; achene obscurely trigonous, light brown or yellowish when ripe, ca. 0.7 mm long.

Ricefields. —Centr. Asia: Amu-Dar. —Khiva (Paulsen). Gen. distr.:

Ind. -Him., Jap. -Chin., Trop. Afr., Asia, America, Australia. Described from India and Abyssinia. Type in London.

- 17 5. *C. flavidus* Retz. Obs. V (1790) 13; C. B. Clarke in Hook. Fl. of Brit. Ind. VI, 600—Ic: Retz. Journ. Linn. Soc. Bot. XXI (1884) t. 3, figure 25.

Annual. Culms solitary or several, smooth, weak, leafy in lower 1/4-1/3, 12-25 cm tall, 1-2 mm thick; leaves ca. 5-30 cm long, 2-4 mm broad, often exceeding the culm, flat, smooth. Inflorescence a compound umbel; rays of first order 6-15, divaricate, extending into 4-8 rays of second order, these developing at their ends short rays of third order terminating in 2-5 linear spikelets in flabelliform arrangement; spikelets at the base of inflorescence 4-6 mm long and ca. 1 mm broad, on short pedicels; scales ovate, obtuse, sometimes brownish-red on the margins below, slight greenish above, green on the midrib, 0.8 mm long; stamens 1-2; stigmas 3; style with stigmas ca. 0.7 mm long; achene faintly trigonous, whitish when ripe, ca. 0.3 mm long. October.

Ricefields. —Centr. Asia: Amu-Dar. (near the village Yurchi). Gen. distr.: Ind. -Him., Jap. -Chin., Austral., Trop. Afr. Type in Lund.

Subgenus 2. *Chlorocyperus* (Rikli) B. Schischk. —Gen. *Chlorocyperus* Rikli in Jahrb. Wiss., Bot. XXVII (1895) 561. —Scales with distinct lateral nerves. The green tissue of the culm, represented by two single-layer envelopes, united with fibro-vascular strands.

Series 1. *Glabri* B. Schischk. —Rachilla obscurely winged. Annuals, rarely perennials.

6. *C. glaber* L. Mant. II (1771) 179; Boiss. Fl. Or. V, 37; Shmal'g. Fl. II, 541; Kryl. Fl. Zap. Sib. II, 379. —*C. patulus* Kit. in Host, Gram. austr. III (1805) 49; Ldb. Fl. Ross. IV, 379. —*Chlorocyperus glaber* Palla in Allg. bot. Zeitschr. VI (1900) 201. —*Dichostylis glabra* Palla in Monit. du Jar. bot. de Tiflis, livr. 21 (1912) 24. —Ic.: Rehb. Ic. Fl. Germ. VIII, tab. 280.

Annual. Culms tufted, 3-angled, smooth, 20-60 cm tall, rather thickened at base; leaves long, attenuated, barely shorter than the culm, 3-5 mm broad, scabrous on the margins and midnerve. Inflorescence an umbel, rays numerous, unequal, 0.3-4 cm long; spikelets aggregate in heads, sessile, linear, 10-15 mm long; involucreal leaves 2-3, of these 2 usually several times longer than the inflorescence; scales rufous, with a green midrib and numerous nerves, white membranaceous-margined above, 2.5 mm long; stamens 2-3; style deeply 3-fid; achene trigonous, dark brown, 1.5 mm long. August.

Wet meadows, margins of rivers, lakes, and swamps. —European part: Crimea, Low. Don., Low. Volg.; Caucasus: Dag., West., East. and South. 18 Transcauc.; Centr. Asia; Kara-Kum., Mount. Turkm., Amu-Dar., Syr-Dar., Pribalkh. Gen. distr.: Centr. Eur. (south), West. Medit. (South Italy), East, Medit., Balk. -As. Min., Iran. Described from Verona (Italy). Type in London.

7. *C. iria* L. Sp. pl. (1753) 45; Boiss. Fl. Or., V, 370; Kom. F. Manchzh. I, 334—*C. Santonici* Rottb. Descr. et ic. (1773) 41, t. 9, fig. 1. —Ic.: C. B. Clarke, Illustr. Cyperac. (1909) t. 14.

Annual. Roots profusely fibrous; culms tufted, 3-angled, leafy below, 15-50 cm tall; leaves linear, nearly as long as the culm, smooth, 1-5 mm broad. Inflorescence an umbel; rays 6-8, unequal, 0.3-8 cm long, branching

in clusters toward the ends; involucre leaves 3-6, unequal, linear or broadly linear, usually greatly exceeding the inflorescence; spikelets loose, linear-oblong, strongly flattened, 6-12-flowered, 4-6 mm long, sessile or short-pedicelled; rachilla wingless; scales suborbicular-obovate, 1.5 mm long and nearly as broad, 5-nerved, yellowish-drab, white-membranaceous-margined, terminating in a short green mucro; stamens 3; stigmas 3; achene trigonous, ovoid-oblong, ca. 1.5 mm long and 0.5 mm broad. August.

Ricefields. —Centr. Asia: Pam. —Al. (Kabadian, near Kokaity; Shirabads-kii District along the river Sirkan at the village Kum-Kurgan). Gen. Distr.: Iran, Ind. —Him., Jap. —Chin., N. Amer., Trop. As., Afr., Austral. Described from India. Type in London.

8. *C. truncatus* Turcz. Catal. in Bull. Soc. Nat. Mosc. XII (1838) 103 nom. nud.; Descr. apud Ldb. Fl. Ross. V (1853) 241 et in Turcz. Fl. baic. —dahur. II (1856) 310; Kom. Fl. Manchzh. I, 329. —Ic.: Kom. and Alis. Opred. rast. Dal'nevost. kraja I (1931), tab. 72.

Annual, biennial or perennial. Culms several to numerous, 6-30 cm tall, 3-gonous, smooth, with leaves crowded in lower part; leaves linear, 5-25 cm long and 6 mm broad, flat, scabrous on the margin. Spikelets linear or linear-lanceolate, sessile or subsessile, 10-15 mm long, obtuse, in glomerules of 6-23 disposed in a compound umbel; rays 3-8, unequal, sometimes ciliate above among the spikelets; involucre leaves 3-5, broadly linear, of these 1 or 2 twice as long as the inflorescence, the others shorter; scales elliptical, purplish-brown, castaneous, or greenish, obscurely nerved, 1.75 mm long, subobtuse, the midrib green above; stamens 3; stigmas 3; achene obovoid, trigonous, minutely papillose, dark gray, 1.5 mm long. August—September.

West shores of rivers and lakes, ricefields, and roadsides. —Far East: Daur.; Far East: Ze. —Bur., Uss. Gen. distr.: Jap. —Chin. Described from Zabaikal'e (confluence of Shilka and Argun'). Type in Leningrad.

9. *C. glomeratus* L. Cent. pl. II (1756) 5; Ldb. Fl. Ross. IV, 242; 19 Boiss. Fl. Or. V, 372; Shmal'g. Fl. II, 541; Kom. Fl. Manchzh. I, 333; Kryl. Fl. Zap. Sib. III, 381. —*Chlorocyperus glomeratus* Palla in Allg. Bot. Zeitschr. VI (1900) 6. —*C. congestus* Boiss. Fl. Or. V. (1884) 373 quoad pl. cauc; Voron. in Fom. and Voron. Opred. rast. Kavk. i Kryma, 162 non Vahl. —Ic.: Rchb. Ic. Fl. Germ. VIII, t. 284.

Annual. Culms sharply 3-angled, 10-80 cm tall, usually solitary, grayish green; leaves linear, 2-10 mm broad, mostly shorter than the culm, glabrous on the margin. Inflorescence an umbel, the rays numerous, unequal, 0.3-10 cm long, bearing numerous, sessile, spikelets, aggregate in elongate or spherical heads; spikelets linear, 7-8 mm long and 1-2 mm broad; involucre leaves usually 2-3, 2 of these or all 3 slightly or considerably longer than the inflorescence; scales linear-lanceolate, truncate, 2 mm long, ca. 0.75 mm broad, reddish-brown or light brown, with a green midrib, obscurely 7-9-nerved; stamens 3, anthers 0.5 mm long; style 3-fid; achene oblong-linear, trigonous, 1-1.4 mm long and about 0.5 mm broad. July—September.

Wet meadows, river banks, flats, ricefields. —European part: Prichern., Low. Don., Low. Volg., Zavolzh.; Caucasus: Ciscauc., Dag., West. and East. Transcauc.; West. Siberia: Upp. Tob. (south), Irt.; Far East: Uss.; Centr. Asia: Aral-Casp., Pribalkh., Kyz. —Kum. Gen. distr.: Centr. Eur.

(south), Medit. (Italy), Balk. -As. Min., Ind. -Him., North China. Described from Italy. Type in London.

Series 2. Longi B. Schischk. -Rachilla distinctly winged. Perennials.

10. *C. longus* L. Sp. pl. (1753) 45; Ldb. Fl. Ross. IV, 242; Boiss. Fl. Or. V, 375; Shmal'g. Fl. II, 542. -*Chlorocyperus longus* Palla in Allg. bot. Zeitschr. VI (1900) 201. -Ic.: Rchb. Ic. Fl. Germ. VIII, tabl. 282, fig. 673.

Perennial. Culms 50-100 cm tall, sharply 3-angled, glabrous, mostly scabrous below the inflorescence on the angles; leaves linear-acuminate, 4-7 mm broad, scabrous on the margin and midrib. Inflorescence an umbel, rays 10-40 cm long, unequal, bearing glomerules of spikelets at the ends; spikelets linear-lanceolate, acute, 10-20 mm long and 1-1.5 mm broad; involucre leaves 3-6, of these the lower exceeding the inflorescence; scales oblong-linear, obtuse, short-mucronate, rufous, the margin lighter and midrib broad, green; the middle scales 2.5-3 mm long and 1.5-2 mm broad; anthers 1.25-2 mm long; style with stigmas 3-4 mm long; achene trigonous, ovoid-oblong, 1-1.5 mm long. June-September. (Plate I, figure 2 a-c).

Swampy and wet meadows, near canals. -European part: Low. Volg. (Volga delta), Crimea; Caucasus: Dag., West. East. and South. Transcauc., Tal.; Centr. Asia: Kyz. -Kum, Kara-Kum., Amu-Dar. Gen. distr.: 20 Centr. Eur. (south), Atl. Eur., West. and East. Medit., Balk. -As. Min., Arm. -Kurd., Iran., Ind. -Him., North Afr. Described from South Europe (Italy, France). Type in London.

11. *C. badius* Desf. Fl. atl. I (1798) 45, tab. 7, figure 2; Boiss. Fl. Or. V, 376. -*Chlorocyperus badius* Palla in Allg. bot. Zeitschr. VI (1900) 61 et 201. -Ic.: Rchb. Ic. Fl. Germ. VIII, tab. 283. -Exs.: Fl. cauc. exs. No. 102.

Perennial. Culms thickened at the base, 20-80 cm tall, usually several, smooth, leafy to 1/4-1/3; leaves linear, smooth, mostly shorter than the culm, 1-10 mm broad. Inflorescence an umbel, 0.2-8 cm long; rays bearing at their ends loose clusters of spikelets; spikelets oblong-linear, 5-10 (12) mm long and 1-2 mm broad; involucre leaves 2-3, of these the lower 20-40 cm long; scales ovate, obtuse, not mucronate, dark reddish-brown, with or without a scarious marginal fringe, often with a green midrib only in upper part, 5-9-nerved, 2-2.5 mm long and 1.5 mm broad at the middle of the spikelet; anthers 1.5-2 mm long; style with stigma 3-4 mm long; achene trigonous, ovoid or oblong-ovoid, ca. 1 mm long. July-September.

Moist meadows, near canals. -European part: Crimea; Caucasus: West. Transcauc., Tal. Gen. distr.: Atl. Eur., West. and East. Medit., Balk. -As. Min., Canary Islands. Described from Algeria. Type in Paris.

12. *C. rotundus* L. Sp. pl. (1753) 45; Ldb. Fl. Ross. IV, 242; Boiss. Fl. Or. V, 376. -*Chlorocyperus rotundus* Palla in Allg. Bot. Zeitschr. VI (1900) 61. -Ic.: Husnot, Cyperac. (1905-06) t. 23.

Perennial with tuber-bearing stolons; culms 7-35 cm tall, solitary, leafy at base, 3-angled, glabrous; leaves linear, smooth, mostly shorter than the culm, 2.5 mm broad, usually with short sheaths crowded at the base of the plant. Inflorescence an umbel; rays 0.3-10 cm long, bearing loose clusters of spikelets at the ends; spikelets oblong-linear, 10-20 mm long and 1-2 mm broad; involucre leaves 2-3, much exceeding the inflorescence. Scales broadly-ovate, obtuse or subobtuse, often minutely mucronulate,

distinctly nerved, rufous, with a green midrib and a lighter margin, ca. 3 mm long; style with stigma 6-7 mm long; achene trigonous, fuscous, ca. 1.5 mm long. June-September.

Sandy places, moist river shores, cottonfields and ricefields. -Caucasus: Ciscauc., West., East. and South. Transcauc., Tal.; Centr. Asia: Aral-Casp., Kara-Kum., Kyz.-Kum., Syr-Dar., Amu-Dar., Gen. distr.: Atl. Eur., West. and East. Medit., Balk.; As. Min., Iran, Ind.-Him., Jap.-Chin., Trop. Arabia, Afr., N. and S. Amer., Austral. Described from India. Type in London.

- 21 13. *C. amuricus* Maxim. Prim. Fl. amur. (1859) 296; Kom. Fl. Manchzh. I, 330. -*C. Iria* var. *amabilis* C. B. Clarke in Journ. Linn. Soc. Bot. XXI (1884) 138. -*C. aristatus* var. *Maingayi* C. B. Clarke, l. c. (1884) 94.

Perennial, annual, or biennial. Culms tufted, often solitary, 3-30 cm tall, 3-angled, smooth, with leaves crowded in lower part; leaves linear, long-attenuate, 0.5-2.5 mm broad, flat, 2-10 cm long. Spikelets 0.5-10 mm long, linear-lanceolate, acute, sessile, in glomerules of 6-20, disposed in a compound umbel with unequal rays; involucre leaves 3-5, slightly exceeding or (some) twice as long as the inflorescence; scales broadly ovate, many-nerved brownish-red, 2 mm long, with a green midrib excurrent in a green point ca. 0.4 mm long; stamens 3; stigmas 3; achene ovoid, trigonous, brownish-red, 1.2 mm long. August-September.

Gravels, sandy flats, osier thickets, moist sandy river banks, and rock fissures near water. -Far East: Uss. (Amur valley near Kharabovsk, Pos'et Bay). Gen. distr.: Manch., Jap.-Chin. Described from Amur river. Type in Leningrad.

14. *G. aureus* Ten. Fl. Nap. I (1811) VIII. -*C. esculentus* L. Sp. pl. (1753) 45 ex parte; Ldb. Fl. Ross. IV, 242; Boiss. Fl. Or. V, 377. -*C. Tenorii* Presl. Fl. sic. (1826) XLVI. -*Chlorocyperus aureus* Palla in Allg. Bot. Zeitschr. VI (1900) 69. -Ic.: Rchb. Ic. Fl. Germ. VIII, t. 281, f. 670.

Perennial. Culm slightly thickened at base, with lateral offshoots bearing oblong or globular tubers, leafy only at base, 20-60 cm tall; leaves shorter than the culm, flat, 2-4 mm broad, scabrous on the margins above. Inflorescence an umbel; rays unequal, 0.2-12 cm long, each bearing a very loose cluster of spikelets; spikelets oblong-linear, 0.5-1.6 cm long and 1-2.5 mm broad, acute; involucre leaves 3, unequal, one slightly exceeding the inflorescence, the others shorter. Scales ovate or ovate-oblong, distinctly 5-7-nerved, stramineous or golden-yellow, green midrib subobtusate, 4-5 mm long at the middle of the spikelet; achene rufous, lustrous, trigonous, ca. 1 mm long. April-July.

Wet meadows, borders of canals. -Caucasus: West. Transcauc., Tal. Gen. distr.: West. and East. Medit., Balk.-As. Min., Ind.-Him., Afr., Amer. Described from Italy.

**C. esculentus* L. Sp. pl. (1753) 45. -*Chlorocyperus esculentus* Palla in Koch's Synops. ed. 3, III (1907) 2553.

Annual. Similar to the preceding species, but tubers larger, ovate, yellowish-brown, transversely striped, attaining 10-15 mm in length; leaves usually broader (5-10 mm); rarely flowering. Described from Marseilles. Type in London.

22 NOTE: Not occurring in wild state in this country; cultivated in the Caucasus and in Central Asia.

ECONOMIC IMPORTANCE: Cultivated in the southern districts of the Union on account of the tubers which are rich in starch, sugars and fats. In many countries abroad cultivated and sold as a delicacy. The tubers are used dry for food, and are known to have been used in ancient times: they were found in Egyptian tombs from the 12th Dynasty, i. e. more than 2,000 years before the Christian era. The tubers may be used as substitute for almonds in confectionery and a source of oil (dry tubers contain 21.84% of oil) which does not solidify at 0° C. and does not acquire a bitter taste after prolonged storage.

Genus 218. *Acorellus*† Palla††

Palla in Koch's Synops. 3. Aufl. III (1907) 2557.

Scales short-acuminate, many-nerved, 2-ranked. Flowers perfect. Stamens 3; stigmas 2; achene flattened, turned with its face to the rachilla. Culm with 3-4 sheaths at base, usually only the uppermost bearing a blade, this flat or subterete, sulcate. Spikelets on very short pedicels, gathered in small numbers at the end of the culm into a lateral inflorescence, turned with their broad side to the main axis. Perennials, rarely annuals, with slender, rather short culms.

1. Lower involucral leaf dilated at the base; spikelets 3-12; scales broadly lanceolate, as broad or broader than long; achene nearly as long as the scale 1. *A. pannonicus* (Jacq.) Palla.
 - + Lower involucral leaf not dilated at the base; spikelets 1-3; scales lanceolate, longer than broad; achene half as long as the scale 2.
 2. Scales oblong, blackish-brown; achene ovoid-ellipsoid, short-pointed; spikelets 2-4. 3. *A. distachyus* (All.) Palla.
 - + Scales ovate, orbicular, pale green or barely reddish-brown; achene obovoid, blunt, punctulate; spikelets 3-8 2. *A. laevigatus* (L.) Palla.
1. *A. pannonicus* (Jacq.) Palla in Koch, Synops. ed. 3, III (1907) 2557. — *Cyperus pannonicus* Jacq. Fl. austr. VI, App. (1778) 24, tab. 6; Boiss. Fl. Or. V, 367; Shmal'g. Fl. II, 540; Kryl. Fl. Zap. Sib. III, 378. — *C. tataricus* Less. in Linnaea IX (1834) 211; Ldb. Fl. Ross. IV, 23 240. — *C. mucronatus* Ldb. 1. c. non Roth. — *Pycneus pannonicus* Beauv. ex Rchb. Fl. germ. excurs. (1830) 72. — *Chlorocyperus pannonicus* Rikli in Jahrb. Wiss. Bot. XXVII (1895) 563. — Ic.: Rchb. Ic. Fl. Germ. VIII, tab. 278, f. 660.

Annual. Roots slender, fibrous; culms tufted, numerous, 5-40 cm tall, 3-angled, glabrous, with 3-4 sheaths at base, only the uppermost sheath bearing a blade; leaves linear, to 5 cm long, 0.5-1 mm broad, smooth.

† Implying a certain resemblance to *Acorus* L.

†† Arranged by B. K. Shishkin.

Inflorescence a cluster of spikelets at the end of the culm; involucreal leaves 2, the lower strongly dilated at base and seemingly extending the culm, hence inflorescence turned sideways; spikelets broadly linear-lanceolate, 2-12, acute or subobtusate, 5-12 mm long and 2-3 mm broad; scales broadly ovate, 2.5 mm long and nearly as broad, many-nerved, short-mucronate, reddish- to blackish-brown; stamens 3; stigmas 2; achene obovoid to subglobular, plano-convex, rounded at the top, lustrous, 1.5-1.75 mm long and 1-1.25 mm broad. July—August.

Damp solonetz meadow, sandy and gravelly river shores.—European part: Upp. Dnepr, Mid. Dnepr., Prichern., Lower Don., Low. Volga.; Caucasus: Ciscauc., Dag., East. Transcauc.; West. Siberia: Upp. Tob., Irt.; Centr. Asia: Aral.-Casp., Pribalkh., Kyz.-Kum., Kara-Kum, Mount. Turkm., Tyan'-Shan. Gen. distr.: Centr. Eur. (south-east), Balk. Described from Hungary.

2. *A. laevigatus* (L.) Palla in Koch, Synops. ed. 3, III (1907) 2558.—*Cyperus laevigatus* L. Mant. (1771) 179.—*C. mucronatus* Rottb. Progr. (1771) 17.—*Pycnus mucronatus* Nees in Linnaea IX (1834) 283.—*P. laevigatus* Nees in Linnaea X (1836) 130.—*Juncellus laevigatus* C. B. Clarke in Hook. Fl. of Brit. Ind. VI (1894) 596.—Ic.: Rchb. Ic. Fl. Germ. VIII, tab. 278, f. 661.

Perennial. Rhizome horizontally creeping; culms erect, 3-angled above, 15-40 cm tall, covered at base with 2-3 sheaths, usually only the uppermost bearing a blade; leaves narrowly linear, 3-11 cm long and 1-2 mm broad, glabrous. Inflorescence consisting of a dense cluster of spikelets at the end of the culm; involucreal leaves 1-2, scarcely dilated at the base, one seemingly forming an extension of the culm, hence inflorescence divergent; spikelets lanceolate, 3-8, subacute, 4-10 mm long, 1.5-3.5 mm broad; scales ovate-orbicular, obtuse, pale green on the midrib, whitish to light reddish elsewhere, 2.5 mm long; stamens 3; stigmas 2; achene obovoid, blunt, minutely punctulate, 1.25-1.4 mm long. July—August.

Margins of rivers and canals.—Centr. Asia: Pam.-Al. (Shirabadano, Bondakhan stream, left bank of Vakhsh near Zengtod, Kabadian between Bondakhan and Basun). Gen. distr.: West. Meidt., tropics and subtropics of Afr., As., and Amer. Described from the Cape of Good Hope. Type in London.

3. *A. distachyus* (All.) Palla ex Kneuck, in Allg. bot. Zeitschr. 24 (1903) 68.—*Cyperus distachyos* All. Fl. Pedemont. (1789) 48, t. 2, f. 5; Boiss. Fl. Or. V, 368.—*C. junciformis* Desf. Fl. atl. I (1798) 42, tab. 7, fig. 1.—*C. laevigatus* var. *junciformis* C. B. Clarke in Journ. Linn. Soc. XXI (1886) 79.—Ic.: Desf. 1. c.; All. 1. c.

Perennial. Rhizome horizontally creeping; culms erect, 3-angled above, 20-40 cm tall, covered at the base with 2-4 sheaths, usually only the uppermost bearing a blade; leaves narrowly linear, 3-11 cm long and 1-2 mm broad, glabrous, inflorescence consisting of a loose cluster of spikelets (2-4) at the end of the culm; involucreal leaves usually 2, one very short, the other 1.5 times as long as the inflorescence and seemingly extending the culm, hence the inflorescence in lateral position. Spikelets linear, 2-5, subacute, 6-20 mm long and 2-2.5 mm broad; scales oblong, subobtusate, blackish-brown, 2-2.5 mm long; stamens 3; stigmas 2; achene ovoid-ellipsoid, short-pointed, plano-convex, with a raised longitudinal

line on the ventral side, 1.4 mm long. April-May. (Plate I, figure 3).

Shores of saline lakes and marshes. — Centr. Asia: Kara-Kum (near lake Molla-Kara, near the railroad station Dzhebel), Pam.-Al. (vicinity of Kulyab, between Bukhara and Samarkand). Gen. distr.: West. and East. Medit., North Afr., Balk.-As. Min., Iran. Described from Piedmont.

Genus 219. *Torulium*† Desv.††

Desv. in Ham. Prodr. Fl. ind. occ. (1825) 15.

Scales ovate-elliptical, obtuse, 2-ranked. Flowers perfect; stamens 3; stigmas 3; achene trigonous; rachilla articulated, with a swelling above the 2 lower scales, readily disarticulating at the joints after flowering.

1. *T. caucasicum* Palla in Monit. du Jard. bot. de Tiflis, fasc. XXX (1913) 27; Grossg. Fl. Kavk. I (1928) 154. — Exs.: Pl. or exs. No. 201.

Perennial, biennial or annual. Culms solitary or several, 5-45 cm tall, 1-4 mm thick sharply 3-angled, leafy in lower third or up to the middle; leaves linear, glabrous, as long as the culm or longer, 1-7 mm broad. Inflorescence a usually dense umbel; rays unequal, branching at the ends; involucre leaves 4-8, scabrous on the margin, much exceeding the inflorescence; spikelets flattened, linear, 1-1.5 cm long and 1.5-2 mm broad, 10-15-flowered; rachilla winged; scales ovate-elliptical, obtuse or minutely mucronulate, with a broad green midrib, 5-7-nerved, inequilateral, rufous on the sides, 2.5-3 mm long and 1.3-1.5 mm broad; stamens 3, 25 anthers 1/3 mm long; stigmas 3; achene trigonous, light brown, 1-1.25 mm long, one face 0.5-0.75 mm broad, the other two narrow. August-September.

Moist sandy places and ricefields. — Caucasus: East. Transcauc. Endemic. Described from Eastern Transcaucasia (Al'dzhigan-chai river, near Geoktapy). Type in Tiflis.

Genus 220. *Kyllingia* † Rottb.††

Rottb. Descr. et icon. pl. (1773) 12, tab. IV.

Inflorescence a head consisting of numerous spikelets, surrounded by long involucre leaves. Spikelets 1-flowered, perfect, sometimes with a second, staminate flower. Scales 2-4. Stamens 2-3. Style bifid. Achene flattish, falling together with scales.

1. Leaves ca. 2 mm broad, long, equaling the culm or longer; achene oblong-ovoid. Style with stigmas shorter than the achene.
. 1. *K. brevifolia* Rottb.
- + Leaves rarely more than 1 mm broad, always shorter than the culm; achene globular-ovoid; style with stigmas nearly 3 times as long as the achene. 2. *K. kamtschatica* Meinsh.

† From Latin *torulus*—knot, swelling.
†† Arranged by B. K. Shishkin.
† Named for the Danish scientist Kylling, who died in 1696.
†† Arranged by R. Yu. Rozhevits.

1. *K. brevifolia* Rottb. Descr. et ic. pl. (1773) 12, tab. IV. — Kom. and Alis. Opred. rast. Dal'nevost. kraya I, 248.

Perennial. Plants forming small tufts; rhizomes creeping; culms 3-15 cm tall, slender, soft, 3-angled, leafy only in lower part; leaves linear, acuminate, to 2 mm broad, flat, with midrib, as long as the culm or slightly longer. Inflorescence a dense, spherical to ovoid head, containing numerous spikelets; involucreal leaves very long, to 12 cm; spikelets ca. 2 mm long, lanceolate, long-tipped, compressed; scales whitish, finally brunescent, the green keel densely bristly in lower part, smooth or sparsely bristly in upper part; stamens 2-3; the bifid style half as long as the achene; achene oblong-ovoid, ca. 1.5 mm long, rounded at the apex, with a spinule. July—September.

Dry gravelly water-ways. —Caucasus: West. Transcauc. (Chavka—adventive; Far East: Ze.-Bur., Uss. Gen. distr.: all hot countries, except Mediterranean. Described from India.

2. *K. kamtschatica* Meinsh. in A.H.P. XVIII (1901) 229; Kom. Fl. Kamch. I, 200. —*Kyllingia Riederiana* Meinsh. in sched.

Annual. Forming dense tufts with short stolons; roots thin, fibrous; culms numerous, 7-20 cm tall, slender, soft, 3-angled, scantily leafy in 26 lower part; leaves linear, thin, flat, with midrib, shorter than the culm. Inflorescence a rather dense, spherical head, containing numerous spikelets; involucreal leaves very long; scales ovate-lanceolate, long-tipped, compressed, coriaceous, whitish, finally brunescent, the green midrib densely bristly; achene globose-ovoid, obtuse but mucronulate, half as long as the scales. The bifid style nearly 3 times as long as the achene. June—September. (Plate III, figure 1).

Far East: Kamch., Malkinsie mountain springs (Rider, Komarov). Endemic. Described from Kamchatka. Type in Leningrad.

Genus 221. *Eriophorum*† L.††

Sp. pl. (1753) 52; Gen. pl. ed. 5, p. 27.

Numerous perfect flowers set singly in the axils of spirally arranged hyaline scales, forming compact spikes arranged singly at the end of the culm or disposed in an umbel. Lower scales mostly abortive (not containing flowers). Hypogynous bristles numerous, rarely 6, smooth and soft, becoming greatly elongated in fruit and many times longer than the achene, forming a so-called "powder-puff". Stamens and stigmas 3. Anthers trigonous. —Perennial herbaceous bog plants with creeping rhizome or forming tufts or tussocks with longer basal leaves and short culm-leaves, the latter sometimes reduced to bladeless sheaths.

ECONOMIC IMPORTANCE: Certain species, notably *E. vaginatum* L. play an important part in the process of peat formation, representing the main constituent of "cotton-grass peat". This peat, owing to its fibrous structure, can be processed in various ways to provide threads that may

† From Greek *eriphoros* — bearing down.

†† Arranged by S. V. Yuzepchuk.

be used as such or in mixture with wool, cotton, etc., for production of rugs, mats, all kinds of covers (e.g. blankets), and sanitary clothing. In the form of so-called "peat-wad" it may be used as fuel, either directly or upon processing into carbolic acid. Finally, the fiber obtained from cotton-grass peat is also used in the production of paper pulp. The "wool" of various species of *Eriophorum* yields fibers for stuffing cushions, for use in the paper industry and for making wicks, tinders and millinery. They are also used as an admixture to sheep's wool in the manufacture of woollen materials and are mixed with cotton and silk in cotton and silk textiles, etc. All cotton-grass species serve as indicators of peaty soil and poor quality of hay. Cotton-grass is eaten unwillingly by livestock, and even so only in early spring. In the tundra *Eriophorum vaginatum* L. often provides the main forage for deer in spring, after the melting of snow. Other cotton-grass species are eaten by deer to a much smaller extent. The culms of *E. angustifolium* Roth are grazed by geese.

In fossilized state found only in Quaternary layers, namely *Eriophorum* sp. in interglacial strata of Upp. Dnepr. (Minsk, Smolensk).

1. Spikelets several or numerous, peduncled, subtended at base by one or several involucral leaves. 2.
- + Spikelets solitary; involucre wanting. 6.
2. Peduncles (rays) simple, each bearing a solitary spikelet. Perianth-bristles numerous 3.
- + Peduncles branching, bearing 1-6 spikelets. Perianth-bristles 6. 1. *E. japonicum* Maxim.
3. Peduncles flattened, smooth; anthers 2.7-5 mm long; plants stoloniferous 2. *E. angustifolium* Roth.
- + Peduncles terete or 3-angled, scabrous; anthers 1.4-2 mm long. 4.
4. Plants without stolons; leaves flat 3. *E. latifolium* Hoppe.
- + Plants stoloniferous; leaves narrow, trigonous. 5.
5. Achenes not narrowed or only slightly narrowed at the apex, without an evident vestige of style, ca. 3 mm long. 4. *E. gracile* Koch.
- + Achenes narrowed at the apex, with a distinct vestige of style, to 4 mm long (sometimes even longer). 5. *E. coreanum* Palla.
6. Plants tufted; culms several 7.
- + Plants with a creeping rhizome; culms solitary 9.
7. Scales cinereous, paler on the margins, thin, transparent, the outer ones reflexed; anthers 2.5-3 mm long 6. *E. vaginatum* L.
- + Scales dark gray or blackish, 1-flowered, rather thick, opaque, the outer ones erect or divaricate; anthers 0.5-2 mm long. 8.
8. Culm 30-70 cm long, slender, usually with 2, rarely 3, slightly inflated bladeless sheaths, the uppermost situated above the middle of the culm; scales lanceolate; bristles sordid. 8. *E. brachyantherum* Trautv.
- + Culm squat, 6-22 cm tall, firm, with sheaths confined to the lower part; uppermost sheath much inflated, bearing a short blade; scales ovate, rounded at the summit; bristles pure white. 9. *E. callitrix* Cham.
9. Bristles more or less reddish 10.
- + Bristles white 11.
10. Fruiting spikelet obovoid; intermediate scales broad, ovate-lanceolate,

- 28 obtuse, broadly fringed; anthers 2-3 mm. 10. *E. russeolum* Fries.
 + Fruiting spikelet globose-obovoid; intermediate scales rather narrow, triangular-lanceolate, acute or acuminate, usually narrowly fringed; anthers 1.3-1.7 mm long 11. *E. Chamissonis* C.A.M. f. *rufescens* Lindb.fil.
 11. Scales of spikelets cinereous, 1-flowered, the lower ones reclinate 7. *E. humile* Turcz.
 + Scales of spikelets blackish, with a narrow light margin, the lower ones erect or divaricate 12.
 12. Culm relatively tall, attaining 15-60 cm; fruiting spikelet globose-ovoid; intermediate scales narrow, subacute or acute; anthers 1.3-1.7 mm long. 11. *E. Chamissonis* C.A.M.
 + Culm usually squat, 10-30 cm tall; fruiting spikelet compressed-globose; intermediate scales narrow, long-acuminate; anthers 0.8-1 mm long 12. *E. Scheuchzeri* Hoppe.

Section 1. *Phyllanthela* Anderss. Cyp. Scand. (1849) 12. — Spikelets several (very rarely 1), with one or more involucreal leaves at the base of peduncles.

1. *E. japonicum* Maxim. in Bull. Ac. St.-Petersb., XXXI (1886) 111; idem in Mel. Biol. XII (1886) 558. — *Scirpus japonicus* Fernald in *Rhodora* vol. 7 (1905) 130, adnot.

Perennial, with a sloping thick rootstock, without stolons; culm 13-32 cm tall, 3-angled, scabrous toward the end, 5-7-leaved; leaves linear-lanceolate, 4-7 mm broad, rather short, flat, 3-angled only near the apex, scabrous on the margin. Spikelets numerous, 15-40 in the entire inflorescence; peduncles very unequal, the shortest simple, each bearing a solitary spikelet, the longer ones branching, bearing up to 6 spikelets, these sessile or short-pedicelated; outer involucreal bracts with blackish, hyaline sheaths, the inner ones entirely squamaceous; spikelets small, in anthesis 6-10 mm long, ovoid, finally elongate-ovoid, often curved; scales ca. 4 mm long, ovate-oblong, obtuse, greenish-black, delicately hyaline; bristles 6, roughened in upper part with antrorse barbs, straight-tipped; fruits so far unknown. Flowering July.

Mountainous tundras, bogs, and moist rocks in alpine zone of mountains. Far East: Okhotsk. (Dzhugdzhur and Uiskii ranges), Uss. (Suchanskii District). Gen. distr.: Japan. Described from Nambu Province. Type in Leningrad.

29 NOTE: A species differing strikingly from all other representatives of the section in structure of inflorescence, and in the number of characteristics of perianth-bristles. The position of this species among the others included in this section can hardly be considered as natural. The renowned expert on the genus *Eriophorum* L., M.L. Fernald, objected in fact to the inclusion of *E. japonicum* Maxim. in this genus. The problem requires further study.

2. *E. angustifolium* Roth, Fl. Germ. II (1789) 63; Ldb. Fl. Ross. IV, 254; Kryl, Fl. Zap. Sib. III, 388. — *E. polystachion* α L. Sp. pl. ed. 1 (1753) 52. — Ic.: Rchb. Ic. Fl. Germ. VIII (1846) t. 291. — Exs.: HFR No. 190; Pl. Finl. exs. No. 506.

Perennial with short rhizomes and creeping stolons; culm 15-75 cm tall, subterete, slightly 3-angled only toward the end, leafy; leaves linear, 3-4.5 mm broad, channeled on the upper side, ribbed underneath, scabrous, long-acuminate. Spikelets 3-7; peduncles unequal, often dropping, flattened, smooth, bearing 1-2 short involucral leaves; spikelets ovoid, 10-15 mm long, 5-7 mm broad; scales brownish-gray, hyaline, ovate or lanceolate, subobtusate; bristles white and soft, with an undivided tip; fruit dark brown, elongate-obovoid, flattened-trigonal, 1-2.5 mm long, 0.75-1 mm broad. May-June. (Plate II, figure 1 a-d).

Mossy and meadow bogs, tundras, lake and river shores, swampy meadows, and boggy, mostly coniferous forests. — Arctic: Arct. Eur., Arct. Sib., Chuk.; European part: nearly all, except southern regions (Prichern., Low. Don., Low. Volg., Crimea); Caucasus: Ciscauc., West. Transcauc.; all Siberia; Centr. Asia: Tarb.; Far East: Crimea, Okhot., Ze.-Bur., Uss. Gen. distr.: West. Eur., North. Mong., Manch., Korea, North Amer. Described from Germany.

3. *E. latifolium* Hoppe, Bot. Taschenb. (1800) 108; Ldb. Fl. Ross., IV, 254; Kryl. Fl. Zap. Sib. III, 390. — *E. polystachion* L. Fl. Suec. ed. 2 (1755) 17 pro parte. — Ic.: Rchb. Ic. Fl. Germ. VIII (1846) t. 292. — Exs.: HFR No. 1693; P. Finl. exs. No. 100.

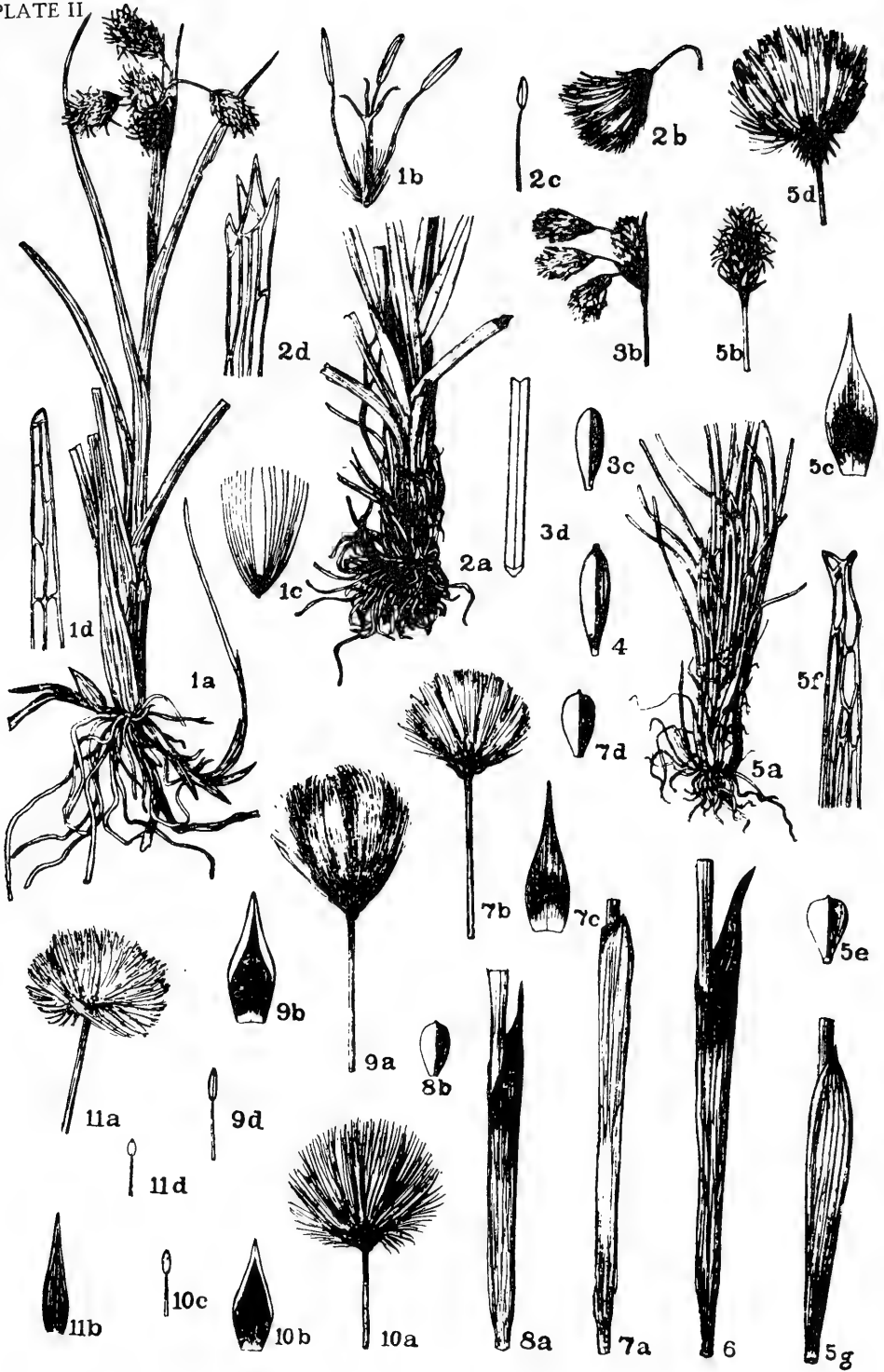
Perennial with a short rhizome, without creeping stolons; culm 25-70 cm tall, obtusely 3-angled, leafy; leaves broadly linear, 3-8 mm broad, shortish, subplane, slightly ribbed on the underside, scaberulous, terminating in a short point. Spikelets 3-12; peduncles unequal, more or less drooping, terete or 3-angled, scabrous; the 2-3 involucral leaves with blackish sheaths; spikelets ovoid to ellipsoid, in anthesis 6-10 mm long and 3-5 mm broad; scales dark gray, hyaline, ovate-lanceolate, subobtusate; bristles white, branching at the ends; fruit brown, elongate-ovoid, trigonal 3 mm long and 1.35 mm broad. May-June. (Plate II, figure 2 a-d).

30 Bogs and boggy meadows. — European part: nearly everywhere except southern regions (Prichern., Low. Don., Low. Volg., Crimea); Caucasus: Ciscauc., West. and East. Transcauc.; (?) East. Siberia: Yenis., Ang.-Sayan., Len.-Kol., Daur.; (?) Far East: Ze.-Bur., Uss., Okhotsk., Sakh. Gen. distr.: West. Eur., As. Min., North Amer. Described from Germany.

4. *E. gracile* Koch in Roth, Cat. II (1800) 259; Ldb. Fl. Ross. IV, 255; Kryl. Fl. Zap. Sib. III, 390. — *E. triquetrum* Hoppe Taschenb. (1800) 106. — Ic.: Rchb. Ic. Fl. Germ. VIII, t. 290. — Exs.: Fries, Herb. norm., No. 14, 79.

Explanation to Plate II

1. *Eriophorum angustifolium* Roth; a) habit, b) flower, c) fruit, d) end of a bristle. — 2. *E. latifolium* Hoppe: a) lower part of the plant, b) a detached spikelet, c) stamen, d) end of a bristle. —
3. *E. gracile* Koch: a) portion of a leaf, b) inflorescence, c) fruit. — 4. *E. coreanum* Palla, fruit. —
5. *E. vaginatum* L.: a) lower part of the plant, b) flowering spikelet, c) scale, d) fruiting spikelet, e) fruit, f) end of a bristle, g) sheath of upper cauline leaf. — 6. *E. humile* Turcz., sheath of upper cauline leaf. — 7. *E. brachyantherum* Trautv.: a) sheath of upper cauline leaf, b) fruiting spikelet, c) scale, d) fruit. — 8. *E. callitrix* Cham.: a) sheath of upper cauline leaf, b) fruit. — 9. *E. russeolum* Fries. a) fruiting spikelet, b) scale, c) stamen. — 10. *E. Chamissonis* C.A.M.: a) fruiting spikelet, b) scale, c) stamen. — 11. *E. Scheuchzeri* Hoppe: a) fruiting spikelet, b) scale, c) stamen.



Perennial with creeping rhizome; culm slender, slightly 3-angled, 25-60 cm tall, smooth, or sometimes scaberulous below the inflorescence; leaves narrowly linear, 3-angled, channeled on the upper side only in lower part, often scabrous; upper cauline leaf with blade 1-4.5 cm long. Spikelets 3-6 ovoid, 7-9 mm long and 3-4 mm broad, peduncles unequal, scabrous, partly drooping; involucre leaves 1-2, very small brownish; scales greenish, hyaline-margined, ovate, subobtusate; bristles whitish, unbranched at the ends; fruit ca. 3 mm long, yellowish-cinnamon-colored, linear-oblong, slightly narrowed or not at all, obliquely flattened at the apex, with an indistinct vestigial style. June. (Plate II, figure 3, 1-c).

Mossy and meadow bogs, swampy forests. —Arctic: Arct. Sib.; European part: nearly everywhere, except Prichern., Low. Don., Low. Volg., Crimea; West. Siberia: Ob., Alt., Irt.; East Siberia: Yenisei. Gen. distr.: West. Eur., North Amer. Described from Germany.

5. *E. coreanum* Palla in Oesterr. Bot. Zeitschr. LIX (1905) 190. — *E. gracile* subsp. *coreanum* Hulten., Fl. Kamtch. I (1927) 160. — Ic.: Palla, 1. c., tab. III, figure 4-a.

Perennial. Very similar to the preceding species; distinguished by the smooth culm, blade of upper cauline leaf not exceeding 3 mm in length, and above all the reddish-cinnamon-colored fruits 4 mm long or slightly longer, narrowed at the apex, with a distinct vestigial style. July. (Plate II, figure 4.).

33 Peat bogs. —Arctic: Anad.; East. Siberia: Yenisei., Ang.-Savan., Len.-Kol., Daur.; Far East: Kamch., Uss., Ze.-Bur., Sakh. Gen. distr.: Korea, Manchuria (?), Japan (?). Described from Quensan (Korea).

Section 2. *Vaginata* Anderss. Cyp. Scand. (1849) 13. —Spikelet solitary; leafy involucre wanting; the lowest scale usually larger than the others, many-nerved [the spathe]. Cauline leaves with reduced blades or bladeless.

Subsection *Multivacua* (Norman in Christ. Vidensk.-Selsk. Forh. 16 (1893) 45 pro sect.) Fernald Rhodora 27 (1925) 206 em. —Empty basal scales usually 10-15.

6. *E. vaginatum* L. Sp. pl. (1753) 521; Ldb. Fl. Ross. IV, 252; Kryl. Fl. Zap. Sib. III, 387. —*E. caespitosum* Host., Gram. austr. I (1801) 30. —Ic.: Rchb. Ic. Fl. Germ. VIII, t. 289. —Exs.: HFR No. 6311; Pl. Finl. exs. No. 97.

Perennial. A densely caespitose plant, forming large tussocks; culms numerous, erect, (15)-30-100 cm tall, obtusely trigonous; basal leaves with brown, long-persistent, fibrillose sheaths, very narrow, trigonous, smooth, or scabrous, shorter than the culm; cauline leaves 2-3, reduced to conspicuously inflate, reticulate-veined sheaths with obliquely truncate, dark membranaceous tip. Flowering spikelet oblong, 1-3 cm long, in fruit subglobose to broadly obovoid, as long as broad, 4-4.5 cm in length; scales grayish or dark gray, somewhat lighter-margined, thin, transparent, ovate-lanceolate, long-acuminate; lower empty scales 10-20, with no flowers in their axils, reflexed after anthesis; anthers 2.5-3 mm long, linear; bristles white; achene flattened-trigonous, ca. 2 mm long and 1 mm broad. April–May. (Plate II, figure 5, a-g).

Bogs (mostly sphagnum), tundras. —Arctic; European part: nearly everywhere except southernmost regions (Prichern., Low. Don., Low.

Volg. Crimea); Caucasus: Ciscauc., Dag., East. Transcauc. (Nakuri-ani); Siberia and Far East. Gen. distr.: Eur., North. Mongolia, Japan, North Amer. ? Described from Europe. Type in London.

NOTE: R. R. Pohle mentioned at one time (in schedis) a distinct variety of this species, *E. vaginatum* var. *boreale* Pohle, most probably of hybrid origin (*E. vaginatum* L. × *E. opacum* (Björn.) Fern.?). Arct. Eur.

7. *E. humile* Turcz. Cat. baic.-dah. (1838) No. 1199 nomen nud.; H. Lindb. Sched. Pl. Finl. exs. fasc. I-VIII (1906), pp. 31-32.—*E. Chamissonis* α *humile* Turcz. Fl. baic.-dahur. vol. II, fasc. 2 (1856) 252.—*E. Chamissonis* Ldb. Fl. Alt. I, 70 et Fl. Ross. IV. 253, quoad pl. altaicam? non C.A.M.—*E. altaicum* auct. plur. non Meinsh.; Kryl. Fl. Zap. Sib. III, 386.—*E. equisetiforme* Turcz. ined.?

Perennial with creeping rhizome; culms solitary; rather squat, 12-25 cm tall, thick and firm, subterete; basal leaves with light brown or almost stramineous, persistent, fibrillose sheaths, trigonous, channeled, bluntish-tipped; cauline sheaths 2, inflated toward the apex, with a broad, usually blackish, hyaline margin; upper sheath pointed or bearing a short blade. Fruiting spikelet subglobose; scales gray, rather compact, transparent, very long-acuminate; the basal empty scales finally reflexed; anthers so far unknown; perianth-bristles white; achenes brown, trigonous, 2.5-3 mm broad. June. (Plate II, figure 6).

Mountainous tundras, bogs, shores of lakes and streams in the alpine zone.—West. Siberia: Alt.; East. Siberia: Ang.-Sayan., Len.-Kol. (Yablon. Range), Duar.; Far East: Ud. (Udskoi bland); Centr. Asia: Dzh-Tarb. Gen. distr.: Northern Mongolia. Described from the towns Urgudei and Shebel. Cotype in Leningrad.

8. *E. brachyantherum* Trautv. Fl. Ochot. phaenog. (1856) 98 ampl. *E. callitrix* auct. plur., non Cham. ex C.A.M.—*E. opacum* Fernald, Rhodora VII (1905) 85.—*E. vaginatum* var. *opacum* Björnstr. Grunddr. af Pitea Lapp. växtfys. (1856) 35.—*E. vaginatum* var. *brachyantherum* Kryl. Fl. Alt. (1914) 1437.—Ic.: Fl. Dan. Suppl. (1874) t. 122; Lindm. Sv. Fanerogamfl. (1918) 111.—Exs.: Pl. Finl. exs. No. 49.

Perennial, loosely to rather compactly cespitose, fibrous-rooted, without stolons; culms flattened, 30-70 cm tall, erect or slightly bent, terete, 3-angled toward the end, smooth; basal sheaths brown, split; basal leaves stiff, narrowly linear, conduplicate, about half as long as the culm; cauline leaves ascending above the middle of the culm, the uppermost consisting of a barely inflated, bladeless, brown-tipped sheath. Spikelet ovoid-ellipsoid to obovoid, 1.5-2.5 cm long; scales dark gray or blackish, 1-flowered, thickish, opaque, erect or ascending; spathe lance-ovate, subamplexicaul; intermediate scales lanceolate; anthers short, narrowly-elliptical, 0.5-1.5 mm long; bristles dingy; achenes oblong-ovoid to subcuneate, trigonous, 2-2.3 mm long and 0.5-1.2 mm broad. May-June. (Plate II, figure 7 a-d).

Bogs and tundras.—Arctic: Arct. Eur., Arct. Sib.; East. Siberia: Yenisei, Len.-Kol., Ang.-Sayan., Duar.; Far East: Kamch., Okhot., Ud., Ze.-Bur., Uss. Gen. distr.: Scand., North Amer. Described from Udskoi Island. Type in Leningrad.

NOTE: An arctic plant of this type, usually named *E. opacum* (Björnstr.) Fernald, differs somewhat from the typical (Far Eastern) *E. brachyantherum* Trautv. in its lower growth and darker scales. As the

differences between these two forms are rather indecisive (they are often
35 indiscernible in the herbarium) and their hereditary permanence is doubtful, we have preferred to unite them. It should be noted in this connection that Fernald, in setting up *E. opacum* as a distinct species, did not compare it with *E. brachyantherum* Trautv. (of which he apparently had not seen any specimens), but with *E. callitrix* Cham.

9. *E. callitrix* Cham. ex. C.A.M. in Mem. Sav. etrang. Ac. St. Petersb. I (1831) 203; Ldb. Fl. Ross. IV, 253 p. p.; Fernald in Rhodora 7 (1905) 208, non aliorum. —Ic.: C.A.M., 1. c., t. 2.

Perennial. Similar to *E. brachyantherum* Trautv., from which it is distinguished by lower, stiffer culms, cauline leaves confined to the lower part of the culm, the uppermost leaf with a rather ampliate-inflated sheath mostly bearing a short blade, ovate spathe, and pure white bristles. (Plate II, 8 a-b).

Tundras. —Arctic: Arct. Sib. (eastern part), Chuk. (St. Lawrence Bay and Creek, Provideniya Bay, Dezhnev Cape). Gen. distr.: recorded for North America (Newfoundland). Described from St. Lawrence Bay. Type in Leningrad.

NOTE: The record for Karaskaya Tundra in Arct. Sib. (of Kryl. Fl. Sib. III, 387) needs confirmation.

Subsection *Paucivacua* (Norman in Christ. Vidensk. -Selsk. Forh. 16 (1893) 45 pro sect.) Fernald in Rhodora 27 (1905) 206, em. —Empty basal scales 7 or fewer.

10. *E. russeolum* Fr. Nov. mant. III (1842) 170. —Kryl. Fl. Zap. Sib. III, 384. —*E. Chamissonis* auct. mult. non C.A.M.; Ldb. Fl. Ross. IV, 253 pp. —*E. Chamissonis* β *elongatum* Turcz. Fl. baic.-dah. II, 2 (1856) 252. —*E. manshuricum* Meinsh. in A.H.P. XVIII, 3 (1901) 26. —Ic.: Lindm. Sv. Fanerogamfl. III (1918). —Exs.: Fries, Herb. norm. III No. 67; Pl. Finl. exs. No. 98, 499, 500 (501-var. *subalbidum* Lindb. fil.).

Perennial; stoloniferous; leaves as long or longer than the culm, narrowly linear, channeled on the upper side near the base; culms few, solitary, 10-80 cm tall, slender, erect, terete, covered up to the middle with slightly inflated sheaths, of these the lower blade-bearing, the upper bladeless. Flowering spikelet oblong-cylindrical, 1.5-2 cm long; fruiting spikelet obovoid, fairly loose, 2.5-4 cm long; scales fuscous to blackish, with broad whitish margins, intermediate ones ovate to ovate-lanceolate, subobtuse; the lowest scale usually much larger than the others; anthers linear, 2-3 mm long; bristles usually ferruginous or reddish; achenes flattened-triangular, ca. 2 mm long and 1 mm broad. June-July. (Plate II, figure 9 a-c).

Mossy bogs, tundras, boggy meadows, wet shore sands. —Arctic: Arct. Eur., Arct. Sib.; West. Siberia: Ob., Alt.; East. Siberia: Yenis., Len.-Kol., Duar.; Far East: Ze.; Bur., Uss., Kamch. Gen. distr.: Scand., North Amer. Described from Sweden.

36 11. *E. Chamissonis* C.A.M. ex Ldb. Fl. Alt. I (1829) 70, excl. pl. *altaica*; C.A.M. in Mém. Sav. étrang. prés. à l'Ac. St. Pétersb. I (1831) 204. —*E. intermedium* Cham. in litt. non Bart. —*E. medium* Anderss. Bot. Notis. (1857) 62; Kryl. Fl. Zap. Sib. III, 385. —*E. rufescens*

Anderss. Bot. Notis. (1857) 79.—*E. intercedens* Lindb. fil., Schedae Pl. Finl. exsicc. fasc. I-VIII (1906) 32-33.—Ic.: C.A.M. 1.c. (1831) t. 3; Lindm. Sv. Fanerogamfl. (1918) 111.—Exs.: Pl. Finl. exs. No. 99 a, b, 502, 503, 504.

Perennial, occupying in respect of all characters an intermediate position between *E. Scheuchzeri* and *E. russeolum*. Culms rather low, thickish. Fruiting spikelet dense, subglobose-obovoid; scales triangular-lanceolate, subacute to acute, more or less hyaline-margined; anthers 1.3-1.7 mm long; bristles usually pale rusty or rusty (*f. rufescens* Lindb. fil.), rarely whitish. June—July. (Plate II, figure 10 a-c).

Bogs and tundras.—Arctic: Arct. Eur., Arct. Sib., Chuk. East. Siberia: Yenis., Len.-Kol.; Far East: Kamch. Gen. distr.: Scand., North Amer. Described from Chukotskii Peninsula. Type in Leningrad.

NOTE: This species is probably more widespread than is known at present, but it is usually taken for either *E. Scheuchzeri* or *E. russeolum*.

12. *E. Scheuchzeri* Hoppe, Bot. Taschenb. (1800) 104, App. t. 7; Ldb. Fl. Ross. IV, 253; Kryl. Fl. Zap. Sib. III, 383.—*E. capitatum* Host, Gram. I (1801) 30, t. 38.—*E. leucocephalum* Bckl. Flora XLI (1858) 418.—Ic.: Rchb. Ic. Fl. Germ. VIII (1846) t. 289, f. 505.—Exs.: Pl. Finl. exs. No. 505.

Perennial, with long stolons; leaves narrowly linear, channeled at the base, arranged on lower part of the culm; culms solitary, 8-30 cm tall, stoutish, erect, terete; uppermost cauline leaf with a narrow sheath, slightly inflated in upper part and a very short, obsolete blade. Flowering spikelet broadly ovoid to subglobose, 0.8-1.2 cm long, in fruit depressed-globose, very dense, 2-2.5 cm long; scales dark gray to blackish, often with narrow whitish margins; intermediate scales narrowly lanceolate, gradually long-acuminate; the outermost scales longer than the others, broadly ovate, subobtuse or short-acuminate, with amplexicaul base; anthers ca. 1 mm long; bristles pure white; achenes oblong, subterete, ca. 2 mm long and 0.5 mm broad. June—July. (Plate II, figure 11 a-c).

Mossy bogs, tundras, and swampy coniferous forests.—Arctic: Arct. Eur., Arct. Sib., Chuk.; West. Siberia: Ob.; East. Siberia: Yenis., Ang.-Sayan., Len.-Kol.; Far East: Kamch., Sakh., Okhot.; Centr. 37 Asia: Dzh.-Tarb. Gen. distr.: Arct. Eur., alpine zone of Pyrenees, Apennines, Transylvania, etc., North Amer., Greenl. Described from Tyrol (Fuscher Tanern). Cotype in Leningrad.

NOTE: Barely distinguishable from *E. Scheuchzeri* is *E. altaicum* Meinsch. in A.H.P. (1901) 267 (excl. syn. *E. Chamissonis* Ldb. Fl. alt. I, 70?), described, in spite of name, from Dzhung. Alatau—the sheath of its uppermost leaf somewhat inflated.—Dzhung.-Tarbagat. A critical form, requiring study. Type in Leningrad.

Genus 222. *Trichophorum*† Pers.††

Pers. Syn. I (1805) 70.

Inflorescence a solitary terminal spikelet. Uppermost involucre leaf not exceeding the spikelet. Scales spirally arranged, 3-5-nerved. Perianth-bristles 6-0. Stamens 3; stigmas 3. Achene trigonous.

1. Perianth-bristles white, very long, to 2 cm, 2-4 times as long as the spikelet. 3. *T. alpinum* (L.) Pers.
- + Perianth-bristles short, inconspicuous or non 2.
2. Spikelet 6-8-flowered, to 7 mm long; perianth-bristles equaling the achene, smooth 1. *T. caespitosum* (L.) Hartm.
- + Spikelet 2-4-flowered, 3-4 mm long; perianth-bristles none 2. *T. pumilum* (Vahl) Schinz et Thell.

1. *T. caespitosum* (L.) Hartm. Handb. 5. Uppl. (1849) 259; Palla in Engl. Jahrb. X (1889) 296. — *Scirpus caespitosus* L. Sp. pl. (1753) 48; Ldb. Fl. Ross. IV, 246; Shmal'g. Fl. II, 544; Kryl. Fl. Zap. Sib. III, 397. — *Scirpus uniflorus* Trautv. in A.H.P.V. (1877) 120. — *Trichophorum germanicum* Palla et *T. austriacum* Palla in Ber. d. Deutsch. Bot. Gesellsch. XV (1897) 468. — Ic.: Rchb. Ic. Fl. Germ. VIII (1846) t. 300, f. 710. — Exs.: HFR no. 1536.

Perennial, very densely caespitose; culms 10-30 cm tall, numerous, naked, invested at base with squamaceous, smooth, whitish-yellow or bladeless sheaths; the two upper basal sheaths green, with subulate blade 2-7 mm long; orifice of uppermost leaf-sheath obliquely truncate, hyaline, yellowish-white or light brown (var. *austriacum* Asch. et Gr.) or bright red owing to numerous minute red dots (var. *germanicum* Asch. et Gr.) Spikelet oblong-ovoid, to 7 mm long, 6-8 flowered; scales oblong, yellowish-to reddish-brown, the 2 lowest prolonged into obtuse tips, as long as the spikelet, readily deciduous in fruit; perianth-bristles about equaling the achene, smooth, barbless; achene ca. 2 mm long, obovoid. May-July. (Plate III, figure 7).

38 Tundras; also mossy and peat bogs. — Arctic: Arct. Eur., Nov. Zem., Arct. Sib.; European part: Kar. -Lap., Dv. -Pech., Lad. -Il'm., Upp. Volg. (?), Volg. -Kam., Upp. Dnepr (?); West. Siberia: Ob., Irt., Alt.; East. Siberia: Len. -Kol., Ang. -Sayan.; Far East: Kamch., Sakh. Gen. distr.: Scand., Centr. and Atl. Eur., West. Medit., Balk. -A. Min., Ind. -Him., Jap. -Chin. Described from Europe. Type in London.

2. *T. pumilum* (Vahl) Schinz et Thell. In Vierteljahrsschrift d. Naturf. Gesellsch. in Zurich LXVI (1921) 265. — *Scirpus pumilus* Vahl, Enum. II (1806) 243. — *S. alpinus* Schleich, in Gaud. Fl. Helv. I (1828) 103 non L.; Meinsh. in A.H.P. XVIII (1900) 257 non L. — *Isolepis pumila* Roem. et Schult. Syst. II (1817) 196. — *I. oligantha* C.A.M. in Ldb. Fl. Alt. I (1829) 64; Ldb. Fl. Ross. IV, 255. — *Trichophorum atrichum* Palla in Engl. bot. Jahrb. X (1889) 296. — Ic.: Rchb. Ic. Fl. Germ. VIII (1846) 6. 300, f. 709 (sub *Sc. alpino* Schleich); Mem. Ac. Sc. Petersb. Sav. Etr. I (1831) 197, tab. I. — Exs.: Rchb. Fl. Germ. exs. No. 1841.

† From Greek *thrix*, hair, and *phoreo*, bear.

†† Arranged by R. Yu. Rozhevits.

Perennial, densely cespitose, but sometimes forming long rhizomes; culms 10-25 (-30) cm tall, slender, invested at base with sheaths, the lower squamaceous, bladeless, the upper tubular, with narrow, obtusely-subulate blade 7-20 mm long. Spikelets 3-4 mm long, ovoid, 2-4-flowered; scales 2-3 mm long, ovate, rufous, short-acuminate or obtuse, the two lowest somewhat shorter than the spikelet; perianth wanting; achene obovoid, trigonous, blackish-brown, lustrous, ca. 1.5 mm long. May-August. (Plate II, figure 8).

Boggy, sometimes solonetz meadow. --European part: Zavolzh.; West. Siberia: Upp. Tob., Irt., Alt.; East. Siberia: Ang.-Sayan., Daur.; Centr. Asia: Aral.-Casp., Pribalkh., Syr-Dar., Tyan'-Shan. Gen. distr.: Centr. Eur., Iran., Dzhung.-Kashg., Mong. Described from Switzerland. Type in Copenhagen.

3. *T. alpinum* (L.) Pers. Syn. I (1805) 70. --*Eriophorum alpinum* L. Sp. pl. (1753) 53; Ldb. Fl. Ross. IV, 252; Shmal'g. Fl. II, 548. --*E. hudsonianum* Michx. Fl. bor.-amer. I (1803) 34. --*Linagrostis alpina* Scop. Fl. carn. ed. 2, I (1772) 48. --*Limnochloa alpina* Drejer, Fl. excurs. Hafn. (1838) 18. --*Scirpus trichophorum* Asch. et Gr. Syn. II, 2 (1903) 302. --*S. hudsonianus* Kryl. Fl. Zap. Sib. III (1926) 399. --Ic.: Rchb. Ic. Fl. Germ. VIII (1846), t. 288, f. 633-634.

- 41 Perennial, rather densely cespitose, with creeping rhizomes; culms 8-25 cm tall, numerous, 3-angled, scaberulous, invested at base with sheaths, of these only the upper ones bearing blade to 1 cm long. Spikelet solitary, oblong, 5-8 mm long and to 3 mm broad, few-flowered; scales ovate, obtuse, 1-nerved, fulvous, the lowest one prolonged into an obtuse awn; perianth-bristles 4-6, in fruit attaining 2 cm in length, finally crisped; achene ca. 1-1.5 mm long and 0.5 mm broad, oblong-obovoid, dark brown, short-pointed. May-July. (Plate III, figure 9).

Peat bogs, in the lower part of the alpine zone and on bare Siberian hills. Arctic: Arct. Sib.; European part: Kar.-Lap., Dv.-Pech., Lad.-Il'm., Volg.-Kam., Upp. Dnep., Zavolzh.; West. Siberia: Ob., Irt.; East. Siberia: Ang.-Sayan.; Far East.: Ze.-Bur., Uss. Gen. distr.: Scand., Centr. Eur., Atl. Eur., North Amer. Described from Europe. Type in London.

Genus 223. *Holoschoenus* † Link ††

Link, Hort. Berol. I (1827) 293.

Inflorescence a compact, subspherical head, consisting of numerous small spikelets. Involucral leaf erect, forming a continuation of the culm. Spikelets small, sessile. Perianth-bristles wanting. Stamens 3. Style short, with 3 villous stigmas. Achene trigonous.

† Name for a kind of rush, used by Theophrastus and Pliny.

†† Arranged by R. Yu. Rozhevits.



1. Heads 4-8 mm in diameter; scales 1.5-2.25 mm long; anthers 1-1.5 mm long. 1. *H. vulgaris* Link
 + Heads 8-10 mm in diameter; scales 2-3 mm long; anthers 1.5-2.5 mm long. 2. *H. romanus* (L.) Fritsch.
 1. *H. vulgaris* Link, Hort. Berol. I (1827) 293. — *Scirpus Holoschoenus* L. Sp. pl. (1753) 49. — *Isolepis Holoschoenus* Roem. et Schult. Syst. II (1817) 115; Ldb. Fl. Ross. IV, 256; Shmal'g. Fl. II, 546. — Ic. Fl. Germ. VIII (1846), t. 317, f. 737-738 (sub *H. australi* Rchb.). — Exs.: HFR No. 792.

Perennial. Rhizome firm, creeping; culms compactly arranged in dense tufts; 30-90 cm tall and to 3 mm thick; sheaths of lower leaves short, subovate, split, the others much longer, broadly scarious-margined, split, 42 the veins forming a fibrous network, bearing a filiform, grooved blade; the lower involucral leaf long, erect, seemingly forming a continuation of the culm, the other smaller, spreading. Spikelets small, 2.5-3.5 mm long, ovoid, numerous, arranged in heads of 1-4, (2-)4-8(-12) mm in diameter, 8-12-flowered, one of the heads larger, sessile, the lateral heads (if present) peduncled; scales 1.5-2.25 mm long, obovate, strongly convex, mucronate, fimbriate-margined; perianth-bristles none; anthers 1-1.5 mm long; achene ca. 1 mm long and 2/3 mm broad, obovoid, trigonous. June-September. (Plate III, figure 6).

Shore sands and boggy meadows. — European part: Upp. Dnepr., Mid. Dnepr., Prichern., Crimea, Low. Don., Low. Volg.; Caucasus: Ciscauc., Dag., West. and South. Transcauc.; West. Siberia: Irt., Alt.; Centr. Asia: Aral.-Casp., Pribalkh., Kara-Kum., Mount. Turkm., Syr.-Dar., Pam.-Al. Gen. distr.: Medit., Northern Persia, North-West India. Described from Southern Europe. Type in London.

2. *H. romanus* (L.) Fritsch, Exkursionsfl. f. Oesterr. (1897) 80. — *Scirpus romanus* L. Sp. pl. (1753) 49. — *S. holoschoenus* γ *romanus* Koch, Syn. ed. 2 (1845) 857. — Ic.: Rchb. Ic. Fl. Germ. VIII (1846) t. 318, f. 740 (sub *H. Linnaei et romano*).

Distinguished from the preceding species by stronger growth, attaining 100 cm in height, larger inflorescence heads, (4-)8-10(-15) mm in diameter, scales 2-3 mm long and 1-2 mm broad, and anthers 1.5-2.5 mm long. May-July.

Sandy places. — Recorded for Caucasus: Ciscauc., Dag., West. and South. Transcauc. Gen. distr.: Mediterranean. Described from Southern Europe. Type in London.

Explanation to Plate III

1. *Kyllinga kamtschatica* Meinsh. — 2. *Scirpus silvaticus* L. — 3. *S. radicans* Schkuhr. — 4. *S. Wichurii* Bcklr. — 5. *S. avatschensis* Kom. — 6. *Holoschoenus vulgaris* Link. — 7. *Trichophorum caespitosum* (L.) Hartm. — 8. *T. pumilum* (Vahl) Schinz et Thell. — 9. *T. alpinum* (L.) Pers. — 10. *Bolboschoenus maritimus* (L.) Palla. — 11. *B. affinis* (Roth) Drob. — 12. *B. compactus* (Hoffm.) Drob. — 13. *Bolboschoenus compactus* (Hoffm.) Drob. var. *orientalis* Litw.

Genus 224. Scirpus† L.††

L. Gen. pl. ed. 5 (1754) 26.

Inflorescence strongly branching, containing many spikelets, or simple, with a solitary spikelet. Spikelets containing many perfect flowers, sessile, or lateral peduncled, often seemingly lateral because of involucre leaf appearing like a continuation of the culm. Scales spirally imbricated, entire or emarginate, mucronate, sometimes keeled, fimbriate-margined. Perianth bristles 6-1 (sometimes wanting). Stigmas 2-3. Achene 2-3-angled. Stamens 3.

1. Inflorescence terminal, strongly branching, containing numerous spikelets (Sect. *Taphrogiton* Aschers). 2.
- + Inflorescence seemingly lateral, as the lower involucre leaf appears like a continuation of the culm, weakly branching, with few spikelets or with a solitary spikelet (Sect. *Schoenoplectus* Rchb.). 5.
- 43 2. Spikelets short, ovoid, ferruginous, in glomerules of 1-5. 3. *S. Wichurai* Bcklr.
- + Spikelets elongate, acute, blackish. 3.
3. Spikelets solitary at the ends of branches. Culms with long, arched offshoots rooting at the tips 2. *S. radicans* Schkuhr.
- + Spikelets several at the ends of branches. Culms without arched rooting offshoots. 4.
4. Spikelets ovoid-lanceolate, in small glomerules of 3-5. Style 3-fid. Achene obovoid 1. *S. silvaticus* L.
- + Spikelets ovoid, in rather large glomerules of up to 16. Style 2-fid. Achene spherical or spherical-ovoid 4. *S. avatschensis* Kom.
5. A small plant, rarely exceeding 15 cm. Spikelets small, 2-3(-4) mm long. 5. *S. setaceus* L.
- + Plants usually taller, with spikelets 4.5-10 mm long. 6.
6. Perennials, often with creeping rhizomes. 7.
- + Annuals with fibrous roots. 13.
7. Culm terete 8.
- + Culm distinctly 3-angled 9.
8. Scales smooth on the back. Achene subtrigonus. 6. *S. lacustris* L.
- + Scales with minute reddish-brown tubercles on the back in upper part. Achene flattish, plano-convex. 7. *S. Tabernaemontani* Gmel.
9. Inflorescence consisting of a solitary spikelet. Occurring in this country only in Sakhalin. 8. *S. planiculmis* F. Schmidt.
- + Inflorescence consisting of several or numerous spikelets. 10.
10. Involucre leaf 15-20 cm long and 4-6 mm broad 10. *S. Ehrenbergii* Bcklr.
- + Involucre leaf rarely attaining 7 cm in length, always narrow 11.
11. Inflorescence loosely paniculate. All spikelets peduncled. 12. *S. litoralis* Schrad.

† Name for bulrush used by ancient authors.

†† Arranged by R. Yu. Rozhevits.

- + Inflorescence capitate or slightly branching. Spikelets sessile or in glomerules on branches. 12.
- 12. Culms stout, about 5 mm in diameter even below the inflorescence. Inflorescence a stellate head. Involucral leaf broad, mucronate. 11. *S. mucronatus* L.
- + Culms 1-2.5 mm in diameter. Inflorescence capitate, or spikelets borne on short branches 9. *S. triqueter* L.
- 44 13. Inflorescence branching, containing few spikelets. Occurring in this country only in the Far East. 13. *S. depauperatus* Kom.
- + Inflorescence always capitate. 14.
- 14. Perianth-bristles none; achene always with prominent transverse corrugations 15.
- + Perianth-bristles always present. 16.
- 15. Spikelets loose, with 2-ranked scales; involucral leaf 10-20 cm long, in dry state rather distinctly septate-nodulose. 14. *S. lupulinus* (Nees) Roshev.
- + Spikelets loose, with spirally arranged scales; involucral leaf to 10 cm long, never nodulose 15. *S. supinus* L.
- 16. Perianth-bristles as long as or shorter than the achene 17.
- + Perianth-bristles twice as long as the achene 18.
- 17. A dwarf plant, 5-10 cm tall; achene ca. 1 mm long, with prominent transverse corrugations 16. *S. melanospermus* C.A.M.
- + A plant 25-60 cm tall; achene ca. 2 mm long, globular-ovoid, obscurely corrugated or nearly smooth. 17. *S. erectus* Poir.
- 18. Inflorescence consisting of 3-4 spikelets; spikelets ovoid, 5-7 mm long; achene globular-ovoid, plano-convex, almost perfectly smooth 18. *S. Komarovii* Roshev.
- + Inflorescence consisting of 5-15 spikelets; spikelets oblong-ovoid, 7-10 mm long; achene obovoid, subtrigonus, with 2 acute and 1 obtuse angle, with fine transverse corrugations 19. *S. bucharicus* Roshev.

Section 1. *Taphrogiton* Aschers. Fl. Brand. I (1864) 754. —Inflorescence terminal, strongly branching, containing numerous spikelets.

1. *S. silvaticus* L. Sp. pl. (1753) 61; Ldb. Fl. Ross. IV, 250; Shmal'g. Fl. II, 547; Kryl. Fl. Zap. Sib. III, 408. —Ic.: Rchb. Ic. Fl. Germ. VIII (1846) t. 313, f. 731. —Exs.: HFR No. 1691 a, b (var. *dissitiflorus*) Sond.

Perennial, with a short branching rhizome giving rise to leafy shoots; culms 40-120 cm tall, leafy, obtusely 3-angled, glabrous, prominently scabrous on the angles below the inflorescence; leaves broadly linear, to 2 cm broad, long, flat, scabrous on the margins and midrib. Inflorescence 10-20 cm long, ovoid, either rather compact with short branches (var. *compactus* C. Klinggr.) or loose with long branches (var. *dissitiflorus* Sond.), subtended by 3-4 involucral leaves; spikelets 3-5 in glomerules ovoid, subobtuse, 3-4 mm long; scales oblong-ovate, acuminate-tipped, blackish; perianth-bristles 6, retrorsely barbed, equaling or slightly exceeding the achene; achene obovoid, ca. 1 mm long, short-pointed. May—July. (Plate III, figure 2).

Wet meadows, bogs, coppices, forests, and shores. —European part: all regions (except Low. Volg); Caucasus: Ciscauc., West., East., and South. Transcauc.; West. Siberia: all regions; East. Siberia: Yenis., Ang. -Sayan., Daur.; Far East: Ze. -Bur., Uss., Sakh.; Centr. Asia: Aral. -Casp., Pribalkh., Dzh. -Tarb. Gen. distr.: all Europe (except extreme north and south), As. Min., Mong., Jap. -Chin., North Amer. Described from Europe. Type in London.

ECONOMIC IMPORTANCE: A favorite forage plant of deer.

2. *S. radicans* Schkuhr in Usteri Ann. IV (1793) 48; Ldb. Fl. Ross. IV 250; Shmal'g. Fl. II, 547; Kryl. Fl. Zap. Sib. III, 409. —Ic.: Rchb. Ic. Fl. Germ. VIII (1846) t. 314, f. 732.

Perennial with a short rhizome; culms 40-100 cm tall, leafy, with arched offshoots rooting at the tips; leaves broadly linear, to 2 cm broad, flat, scabrous on the margins and midrib. Inflorescence 10-20 cm long, broad, open, with smooth branches; spikelets solitary at the ends of branches, lanceolate, acuminate, 5-8 mm long; scales ca. 2 mm long, oblong-ovate, blackish; perianth-bristles 6, smooth, rarely retrorsely barbed (var. *Maximowiczii* Rgl.), 2-3 times as long as the achene (ca. 3-4 mm long), strongly and repeatedly bent, implexed; achene obovoid, ca. 1 mm long, short-pointed. June—July. (Plate III, figure 3).

Shores and boggy meadows. —European part: Kar. -Lap., Dv. -Pech., Lad. -Il'm., Upp. Volg., Volg. -Kam., Upp. Dnepr., Mid. -Dnepr., Volg. -Don., Zavolzh.; West. Siberia: Upp. Tob., Irt., Alt.; East. Siberia: Yenis., Ang. -Sayan., Daur.; Far East: Ze. -Bur., Ud., Uss., Sakh. Gen. distr.: Scand., Centr. Eur., Balk. -As. Min., Jap. -Chin. Described from Germany.

3. *S. Wichurai* Bcklr. in Linnaea XXXVI (1869-70) 729; Maxim. in Mel. Biol. XII, 557. —*Scirpus eriophorum* Michx. in Hook. Fl. of Br. Ind. VI (1893) 661; Meinsh. in A.H.P. XVIII (1901) 249. —*S. eriophorum* var. *nipponica* Franch., Japon. II (1879) 545.

Perennial, with fibrous roots; culms 60-120 cm tall, erect, firm, 3-angled, indistinctly noded, glabrous, smooth, lustrous, somewhat thickened at base; leaves broadly linear, to 1.3 cm broad, long-acuminate, prominently scabrous on the margins and midrib. Inflorescence to 15 cm long, ovoid or flabelliform, subtended by several linear-lanceolate, flat involucreal leaves; spikelets 1-5 in glomerules, ovoid, ca. 3 mm long, rufous. Scales oblong-ovate, with a green midnerve excurrent into a small tip; perianth-
46 bristles flexuous, much longer than the achene; achene ellipsoid, ca. 1 mm long, compressed-trigonous, short-pointed. August-September. (Plate III, figure 4).

Clay pits and wet clay meadows. —Far East: Uss. Gen. distr.: Jap. -Chin., Ind. -Him. Described from India. Type in Berlin.

4. *S. avatschensis* Kom. in Fedde, Report. spec. nov. XIII (1914) 163; Kom. Fl. Kamch. I, 210.

Perennial, with a stout short rhizome, cespitose; culms 60-120 cm tall, leafy, erect, faintly 3-angled in upper part, glabrous; basal leaves gray or purple, squamaceous; cauline leaves ca. 1 cm broad and 10-30 cm long, flat, long-acuminate, smooth. Inflorescence 15-20 cm long, broadly ovoid, with numerous 3-angled branches 3-12 cm long, bearing at their ends spikelets arranged in irregular umbels; spikelets in glomerules of 1-16, ca.

4 mm long, ovoid; scales membranaceous, dark green, finally gray or pale brown, the tips becoming black; perianth-bristles 6, about as long as the achene, retrorsely barbed; style 2-fid; achene obovoid, slightly trigonous or terete, whitish, smooth, spinule-tipped. August–September. (Plate III, figure 5).

River shores, under willows. —Far East: Kamch. Endemic. Described from Kamchatka. Type in Leningrad.

Section 2. *Schoenoplectus* Rchb. Ic. Fl. Germ. VIII (1846) 40. — Inflorescence weakly branching, with a small number of spikelets or a solitary spikelet, seemingly lateral, the involucral leaf appearing as continuation of the culm.

5. *S. setaceus* L. Sp. pl. (1753) 49; Shmal'g. Fl. II, 545; Kryl. Fl. Zap. Sib. III, 400. —*Isolepis setacea* R. Br. Prodr. (1810) 78; Ldb. Fl. Ross. IV, 246. —*Schoenoplectus setaceus* Palla in Koch's Synops. ed. 3 III (1907) 2538. —Ic.: Rchb. Ic. Fl. Germ. VIII (1846) tab. 301, fig. 711, 712. —Exs.: Herb. Fl. Cauc. No. 159.

Annual, with slender roots, tufted; culms 3-15(-30) cm tall, numerous, slender; sheaths of lower leaves purple, the others brownish or grayish-green, with narrow, conduplicate blades. Inflorescence capitate, containing 1-4 spikelets, small; involucral leaf narrow, erect, appearing as continuation of the culm, to 2.5 cm long; spikelets oblong-ovoid, 2-4 mm long; scales oblong-ovate, keeled, dark purple, with a broad green stripe, 1.5-2 mm long; perianth-bristles none; stamens 2; stigmas 3; achene ca. 1 mm long, obovoid, trigonous, prominently longitudinally ribbed, short-pointed. July–September. (Plate IV, Figure 1).

Near water and on wet sandy soil. —European part: Zavolzh., Low. Don., Prichern., Crimea; Caucasus: Ciscauc., West., East., and South. Trans-47 cauc., Tal.; West. Siberia: Irt.; Centr. Asia: Aral-Casp., Pribalkh., Dzh.-Tarb., Syr-Dar., Pam.-Al. Gen. distr.: Centr. and Atl. Eur., Medit., Iran., Ind.-Him. Described from Europe. Type in London.

6. *S. lacustris* L. Sp. pl. (1753) 48; Ldb. Fl. Ross. IV, 248; Shmal'g. Fl. II, 544; Kryl. Fl. Zap. Sib. III, 404. —*S. macrophyllus* Bess. in Schult. Addit. I ad Mant. (1827) 535, 536. —*S. Rothii* Meinsh. Fl. Ingr. (1878) 385. —*Schoenoplectus lacustris* Palla in Engl. Bot. Jahrb. X (1889) 299. —Ic.: Rchb. Ic. Fl. Germ. VIII (1848), tab. 306, figure 722. Syreish. Ill. Fl. Mosk. gub. I, p. 172. —Exs.: Meinsch. Fl. Ingr. No. 679.

Perennial with a thick creeping rootstock; culms 100-250 cm tall and to 2 (-3) cm thick, terete, green, smooth; sheaths glabrous, the lower ones brownish, the upper two bearing a subulate or linear blade 1-10 cm long. Inflorescence 5-8 cm long, corymbose-paniculate, the central spikelets on short peduncles, the outer on elongated ones; involucral leaves 1-2, subulate, the lower channeled at base, equaling or slightly exceeding the inflorescence; spikelets oblong-ovoid, acuminate, 8-10 (-12) mm long, rufous. Scales ovate, ciliate on the margin, smooth on the back, retuse, the mid-nerve excurrent into a short awn; perianth-bristles 6, retrorsely barbed; stigmas 3; achene obovoid, ca. 3 mm long, grayish, compressed-trigonous. June–August. (Plate IV, figure 2).

Shores, in water, rarely on grassy swamps and boggy meadows. — European part: all regions; Caucasus: Ciscauc., Dag., West., East., and

South. Transcauc.; West. Siberia: all regions; East. Siberia: all regions (rarely); Gen. distr.: nearly all Europe (except Arctic); North Amer. Described from Europe. Type in London.

ECONOMIC IMPORTANCE: Hardly eaten in hay. Experiments have recently been conducted with silage, but without successful results, since the presence of air spaces made it impossible to exclude air from the silage material by ramming.

7. *S. Tabernaemontani* Gmel. Fl. Bad. I (1805) 101; Ldb. Fl. Ross. IV, 248; Kryl. Fl. Zap. Sib. III, 406. — *S. lacustris* var. *Tabernaemontani* Döll. Rhein. Fl. (1843) 165; Shmal'g. Fl. II, 545. — *S. lithuanicus* Bess., *S. Wolfgangii* Bess., *S. Andrzejowski* Bess., et *S. Janii* Bess. in Schult. Addit. I ad Mant. (1827) 535-536. — *S. uliginosus* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 291; Ldb. Fl. Ross. IV, 247. — *Schoenoplectus Tabernaemontani* Palla in Engl. bot. Jahrb. X (1889) 299. — Ic.: Rchb. Ic. Fl. Germ. VIII (1846) tab. 307, fig. 723. — Exs.: HFR No. 594 a, b.

Perennial. A grayish-green plant with creeping rootstock; culms 100-150 cm tall and to 1.5 cm thick, terete, smooth; sheaths glabrous, the lower ones brownish, usually bladeless or rarely the upper ones with a narrow linear blade; inflorescence 1.5-5 cm long, corymbose-paniculate, usually
48 with short peduncles; involucreal leaves 1-2, about as long as the inflorescence. Spikelets oblong-ovoid, 4-7 mm long, rufous; scales ovate, ciliate on the margin, retuse, the midrib excurrent into a short awn, covered all over with minute dark purple papillae; perianth-bristles 6, retrorsely barbate; stigmas usually 1; achene ca. 2 mm long, plano-convex, dark olive-colored. July-September. (Plate IV, figure 3).

Shores, in water, particularly brackish. -European part: all regions; Caucasus: all regions; West. Siberia: all regions; East. Siberia: Ang. - Sayan., Daur.; Far East: Kamch., Ze.-Bur., Ud., Uss., Sakh.; Centr. Asia: all regions. Gen. distr.: Scand. (southern part), Centr. and Atl. Eur., Medit. Described from Germany. Type in Karlsruhe (Germany).

8. *S. planiculmis* F. Schmidt in Mem. Acad. Sc. Petersb. ser. 7, XII (1868) 190.

Perennial, with slender, short stolons; culms 20-35 cm tall, 3-angled in upper part, glabrous, smooth; sheaths glabrous, smooth, the upper ones bearing a linear blade to 3 mm broad, 15 cm long, the lower ones with a shorter blade, and lowest bladeless. Inflorescence consisting of a solitary spikelet; involucreal leaf to 10 cm long, erect, trigonous, constituting a direct extension of the culm; spikelets broadly lanceolate, 6-8 mm long and 3-4 mm broad, brownish; scales broadly lanceolate, the two lowest resembling the involucreal leaves, subulate-or laminar-tipped, more rarely thinner, hyaline-margined, mucronate; perianth-bristles about as long as the achene, retrorsely barbed; stamens 3; style 2-fid; achene oblong-ellipsoid, ca. 2.5 mm long. August. (Plate IV, figure 4).

Far East: Sakh. (estuary of river Sussuya, on the clay bottom of the estuary). Endemic. Described from the location indicated. Type in Leningrad.

9. *S. triqueter* L. Mant. I (1767) 29; Ldb. Fl. Ross. IV, 248; Shmal'g. Fl. II, 544. — *Schoenoplectus triqueter* Palla in Engl. Bot. Jahrb. X (1889) 299. 1-Ic.: Rchb. Ic. Fl. Germ. VIII (1846) tab. 305, f. 719-721.

Perennial, with creeping, often very long, reddish rhizome; culms 50-100 cm tall, 3-angled, glabrous; sheaths glabrous, only the uppermost with a small, ribbed blade. Inflorescence unilateral, with rather elongated branches bearing spikelets in glomerules; more rarely with subsessile
51 crowded spikelets; involucreal leaves fairly broad, 3-5 cm long, appearing like continuation of the culm; spikelets ovoid, obtuse, 5-10 mm long and 4-5 mm broad, reddish or yellowish brown; scales oblong-elliptic, retuse, mucronate, ciliate on the margin; perianth-bristles slender, retrorsely barbed, anthers papillate at the apex; achene 2-3 mm long and 1.25-1.75 mm broad, ellipsoid to obovoid, yellowish or brown. June-September. (Plate IV, figure 5).

Shores and bogs. —European part: Low. Don., Low. Volg.; Caucasus: Ciscauc., East. Transcauc., Tal.; Far East: Uss.; Centr. Asia: Aral. -Casp., Pribalkh., Kara-Kum, Mount. Turk., Syr.-Dar., Pam.-Al., Tyan'-Shan. Gen. distr.: Centr. Eur., Atl. Eur., Medit., North Amer. Described from southern Europe. Type in London.

10. *S. Ehrenbergii* Bcklr. in *Linnaea* XXXVI (1870) 712; Meinsh. in *A.H.P.* XVIII (1900) 253; Litv. in *Fl. Yugo-Vost.* (Flora of the South-East) III, 271; Kryl. *Fl. Zap. Sib.* III, 406. —*S. Ewersmanni* Fisch. in *Herb. Petr.* —*Eriophorum Ehrenbergii* Siaz. *Tabl. Rast. Zap. Sib.* (1911) 28. —*Scirpus maritimus* × *triqueter* Korsh. *Tent. Fl. Ross.* (1898) 434.

Perennial, with fibrous roots, stoloniferous; culms 100-150 cm tall, flattened, 3-angled, slightly winged on the angles, to 10 mm in diameter; sheaths glabrous, prolonged into blade 40-60 cm long and 6-8 mm broad, conduplicate at base, ribbed in lower part; involucreal leaf 15-20 cm long and 4-6 mm broad, greatly exceeding the inflorescence, erect, forming continuation of the culm. Inflorescence 1.5-2.5 cm long, rather dense, consisting of 3-5 glomerules; spikelets 10-13 mm long, oblong-ovoid; scales elliptic, 6-7 mm long, ferruginous, scarious-margined, retuse, awn-pointed; perianth-bristles 6, nearly twice as long as the achene; stigmas 2-3; achene ca. 2 mm long, broadly obovoid, plano-convex. June-August. (Plate IV, figure 6).

Shores. —European part: Zavolzh. (Orenburg); West. Siberia: Irt. (near Semipalatinsk); Centr. Asia: Pribalkh. (Zaisanskii Krai). Endemic. Described from Orenburg. Type in Leningrad.

11. *S. mucronatus* L. *Sp. pl.* (1753) 50; Ldb. *Fl. Ross.* IV, 247; Boiss. *Fl. Or.* V, 382. —*Schoenoplectus mucronatus* Palla in *Engl. Bot. Jahrb.* X (1889) 299. —*Ic.*: *Rchb. Ic. Fl. Germ.* VIII (1846) tab. 203, fig. 716.

Perennial, forming small dense tufts; culms 30-100 cm tall, prominently triquetrous, erect; sheaths bladeless, the lower ones dark brown. Inflorescence dense, capitate, usually with 5-15 spikelets; involucreal leaf trigonous, greatly exceeding the inflorescence, subobtuse, initially erect,
52 finally strongly divergent; spikelets ovoid to oblong-ovoid, ca. 1 cm long and to 0.5 cm broad; scales obovate, attenuate into a mucronate tip, light green, with a darker midnerve and reddish-brown margins; perianth-bristles 6, retrorsely barbed; stamens 3; stigmas 3; achene obovoid, ca. 2 mm long, horizontally rugose, trigonous, blackish-brown. August-September. (Plate IV, figure 7).



Boggy places, shores, and ricefields. —Caucasus: West., East., and South. Transcauc.; Far East: Uss.; Centr. Asia: Kara-Kum., Syr-Dar. Gen. distr.: Medit., Iran., Ind.-Him., Jap.-Chin. Described from southern Europe. Type in London.

12. *S. litoralis* Schrad. Fl. Germ. I (1806) 142; Ldb. Fl. Ross. IV, 249; Boiss. Fl. Or. V, 383. —*Schoenoplectus litoralis* Palla in Engl. Bot. Jahrb. X (1889) 299. —Ic.: Rchb. Ic. Fl. Germ. VIII (1846) tab. 39, f. 765.

Perennial. Rootstock creeping, sometimes fairly long; culms 50-120 cm tall, 3-angled, smooth; sheaths glabrous, smooth, the upper ones with narrow ribbed blade. Inflorescence open, with rather elongated branches, each bearing 1 to many spikelets; involucreal leaves trigonous, appearing as an extension of the culm; spikelets oblong-ovoid, 6-12 mm long and 1.5-3 mm broad, rufous; scales broadly elliptic, scarious-margined, ciliate, the green midnerve excurrent in a mucro; perianth-bristles dilated; anthers bluntish, strongly ciliate at the apex; achene globular-ovoid, lenticular. May–August. (Plate IV, figure 8).

Bogs; stagnant, sometimes brackish, water; estuaries. —Caucasus: Ciscauc., East. Transcauc., Tal.; Centr. Asia: Aral. —Casp., Kyz. —Kum., Kara-Kum., Amu-Dar., Pam.—Al. Gen. distr.: Medit., India. Described from Germany. Type in Munich.

13. *S. depauperatus* Kom. in A.H.P. XX (1901) 345. —Ic.: Kom. and Alis. Opred. rast. Dal'nevost. kraya I (1931) tab. 75.

Annual with dense fibrous roots; culms 3-angled, erect, glabrous, 30-40 cm tall, leafy; leaves narrowly linear, to 2 mm broad, long-acuminate, glabrous, channeled in lower part, flat above, with long sheaths. Inflorescence weakly branching, containing few spikelets, terminal; involucreal leaves forming an extension of the culm; spikelets oblong-lanceolate, 9-13 mm long and 5-6 mm broad, 1-3 per inflorescence branch; scales golden-ferruginous, hyaline, lanceolate, acuminate, with a green scabrous midrib; perianth-bristles 4, retrorsely barbed, much longer than the achene; stigmas 2; achene oblong-fusiform, ca. 1 mm long, plano-convex, smooth, whitish. July–August. (Plate IV, figure 9).

53 Boggy meadows, oxbow lakes, shores. —Far East: Ze.-Bur., Uss. Gen. distr.: Jap.-Chin. Described from the Amur. Type in Leningrad.

14. *S. lupulinus* (Nees) Roshev. comb. nov. —*S. quinquefarius* Hamilt. in Wall. Cat. No. 3465 (1828) nomen nudum; Bcklr. in Linnaea XXXV (1869-70) 701 descript. —*Isolepis lupulina* Nees in Wight Contrib. (1834) 107. —*I. Roylei* Nees l.c. —*Scirpus melanospermus* β major Rgl. A.H.P. VII (1880) 558. —*S. lupulinus* var. *Roylei* Kuk. in sched.

Annual with fibrous roots, forming small tufts; culms numerous, 10-30 cm tall, slender, glabrous, smooth, invested at the base with long, obliquely truncate bladeless sheaths. Inflorescence consisting of 1-9

Explanation to Plate IV

1. *Scirpus setaceus* L. — 2. *S. lacustris* L. — 3. *S. Tabernaemontani* Gmel. — 4. *S. planiculmis* F. Schmidt. — 5. *S. triqueter* L. — 6. *S. Ehrenbergii* Bcklr. — 7. *S. mucronatus* L. — 8. *S. litoralis* Schrad. — 9. *S. depauperatus* Kom. — 10. *S. lupulinus* (Nees) Roshev. — 11. *S. supinus* L. — 12. *S. melanospermus* C.A.M. — 13. *S. erectus* Poir. — 14. *S. Komarovii* Roshev. — 15. *S. bucharicus* Roshev.

spikelets; involucre leaf 10-20 cm long, much longer than the inflorescence, erect, continuing the culm, hollow, rather closely septate, hence nodose when dry; spikelets many-flowered, to 1 cm long, oblong-ovoid; scales ovate-lanceolate, with numerous nerves, ferruginous, green midrib; perianth-bristles none; achene ca. 1 mm long, broadly ovoid, trigonous, transversely rugose, short-pointed. August. (Plate IV, figure 10).

Ricefields; near water. —Centr. Asia: Syr-Dar., Pam.-Al. Gen. distr.: Iran, Ind.-Him. Described from India. Type in London.

15. *S. supinus* L. Sp. pl. (1753) 49; Shmal'g. Fl. II; Kryl. Fl. Zap. Sib. III, 401. —*Isolepis supina* R. Br. Prodr. I (1810) 77; Ldb. Fl. Ross. IV, 256. —*Schoenoplectus supinus* Palla in Engl. Bot. Jahrb. X (1889) 290. —Ic.: Rchb. Ic. Fl. Germ. VIII (1846) tab. 202, fig. 715. — Exs.: HFR No. 37.

Annual, with slender fibrous roots, cespitose; culms 5-25 cm tall, rarely 40-50 cm (f. *robustus* Roshev.), numerous, erect or procumbent; lower sheaths purple, bladeless, upper ones green, with narrowly linear, channeled blade 1-10 mm long. Inflorescence capitate, consisting of 1-10 spikelets; involucre leaf to 10 cm long, much exceeding the inflorescence, usually erect, continuing the culm, subcylindrical; spikelets oblong-ovoid, 5-8 mm long; scales elliptic, brownish, with a green central strap, mucronulate; perianth-bristles none; stamens 3; stigmas 3; achene obovoid, ca. 1-1.5 mm long, subtrigonal, prominently transversely rugose, brownish-black. June—August. (Plate IV, figure 11).

Silted sandy shores of rivers and lakes, sometimes in water. —European part: Mid. Dnep., Volg. Don., Prichern., Low. Don., Low. Volg.

Caucasus: Transcauc.; West. Siberia: Irt., Alt.; East. Siberia: Ang. - 54 Sayan.; Centr. Asia: Aral.-Casp., Pribalkh., Pam.-Al. Gen. distr.: Centr. Eur., West. Meidt., Balk. —As. Min., Ind.-Him., North Amer. Described from the vicinity of Paris. Type in London.

16. *S. melanospermus* C.A.M. in Mém. Acad. Sc. Sav. Etr. Pétersb. I (1831) 199, tab. II; Ldb. Fl. Ross. IV, 247. —*S. supinus* var. *melanospermus* Schmalh. Fl. II (1897) 545. —*Schoenoplectus melanospermus* Grossh. Fl. Kavk. (1928) 146.

Annual, with slender, fibrous roots, growing in small tufts; culms 5-20 cm tall, several, rarely numerous, erect or slightly nodding; lower sheaths brownish, bladeless, the upper ones green, with narrowly linear or subulate blade to 2.5 cm long. Inflorescence capitate, consisting of 1-3 spikelets; involucre leaf to 9 cm long, greatly exceeding the inflorescence (but shorter than the culm), erect, continuing the culm, subcylindrical; spikelets oblong, acuminate, 4-6 mm long; scales short-pointed; perianth-bristles 6, retrorsely barbed, as long as the achene; stamens 3; stigmas 3; achene obovoid, ca. 1 mm long, subtrigonal, transversely rugose, blackish-brown. July—August. (Plate IV, figure 12).

Flood plains and wet, sandy places. —European part: Mid. Dnepr., Low. Don., Low. Volg.; Caucasus: Tal.; West. Siberia: Irt.; Centr. Asia: Aral.-Casp. Endemic. Described from Volga lowlands, Astrakhan. Type in Leningrad.

17. *S. erectus* Poir. in Lam. Encycl. VI (1804) 761. —*S. debilis* Pursh, Fl. Amer. sept. I (1814) 55. —*S. juncoides* Roxb. Hort. Bengal. (1814) 81. —*Schoenoplectus erectus* Palla in Monde des Plantes XII (1910) 40.

Annual, tifted, with slender, fibrous roots; culms 25-60 cm tall, several to many, erect, 3-angled in upper part; sheaths always bladeless, the lower brownish or blackish. Inflorescence capitate, consisting of 1-6 spikelets; involucre leaf 2-7 cm long, 1.5-4 times longer than the inflorescence, erect, continuing the culm, subcylindrical; spikelets oblong-ovoid, 8-12 mm long; scales broadly elliptic, whitish at first, finally brownish, with a green keel, subobtusate or mucronulate; perianth-bristles 6, slightly shorter than the achene; stigmas 2-3; achene globular-ovoid, ca. 2 mm long, faintly trigonous, obscurely rugose or nearly smooth, brownish-black. August-September. (Plate IV, figure 13).

Bogs and ricefields. -Caucasus: Tal.; Far East: Uss. - Centr. Asia: Syr-Dar. Gen. distr.: Trop. and Subtrop. Asia, North Amer. and Austral. Described from Madagascar. Type in Paris.

18. *S. Komarovii* Roshev. sp. nova in Addenda, II, 579. -*Scirpus supinus* var. *leiocarpus* Kom. in A.H.P. XX (1901) 344. -Ic.: Kom. and Alis. Opred. Rast. Dal'nevost. kraya I (1931) 265, tab. 77.

55 Annual, cespitose, with fibrous roots; culms 15-30 (-50) cm tall (including involucre leaf), several, erect, flattened; upper sheaths with narrow, reduced blade; the lowest sheaths brunescent. Inflorescence capitate, consisting of (1-)3-4(-8) spikelets; involucre leaf always 1, very long, attaining up to 20 cm, erect, continuing the culm, subcylindrical, slightly enlarged only at base; spikelets ovoid, 5-7 mm long; scales orbicular-elliptic, with a broad hyaline margin, faint midrib, mucronate, green on the keel, whitish elsewhere, becoming brown; perianth-bristles nearly twice as long as the achene, with large retrorse barbs. Style 2-fid; achene orbicular-ovoid, ca. 1.5 mm long, plano-convex, almost entirely smooth, dark brown. July-August. (Plate IV, figure 14).

Shallows. -Far East: Ze. -Bur., Uss. Gen. distr.: Jap. -Chin. Described from the Amur valley (Innokent'evka). Type in Leningrad.

19. *S. bucharicus* Roshev. sp. nova in Addenda, II, 579.

Annual, cespitose, with fibrous roots; culms 35-70 cm tall (including involucre leaf), numerous, erect, subcylindrical; upper sheaths with narrow reduced blade, the lowest sheaths brunescent. Inflorescence capitate, consisting of 5-15 spikelets; involucre leaf 1, very long (10-30 cm), erect, continuing the culm, subcylindrical, slightly enlarged only at base; spikelets oblong-ovoid, 7-10 mm long; scales lance-acuminate, with a distinct green midrib in upper part, mucronate, whitish, becoming brown; perianth bristles twice as long as the achene, retrorsely aculeolate; style 2-fid; achene obovoid, subtrigonus, (two angles acute, the third obtuse), transversely rugose, nearly black. July-August. (Plate IV, figure 15).

Ricefields. -Caucasus: Tal.; Centr. Asia: Syr-Dar., Pam. -Al. Endemic. Described from Gissar. Type in Leningrad.

Genus 225. *Bolboschoenus* † Palla ††

Palla in Koch. Syn. ed. 3, III (1907) 2531.

† From the Greek words: *bolbos*, bulb, and *schoenus*, a generic name.

†† Arranged by R. Yu. Rozhevits.

Inflorescence terminal or seemingly lateral, compound or simple or consisting of a solitary spikelet. Spikelets all sessile or the lateral ones peduncled, 1-2 cm long. Scales emarginate, with a short awn from the notch. Perianth-bristles 6 or fewer or wanting. Stigmas 2-3, smooth. Achene 2-3-angled.

1. Rhizome usually without corms. Spikelets light yellow. Stigmas 2.
 56 Achenes lenticular 3. *B. affinis* (Roth) Drob.
 + Rhizome always with corm-like enlargements. Spikelets dark brown or ferruginous. Stigmas 2-3 2.
 2. Spikelets aggregated several per head, partly sessile and partly peduncled (compound panicle). Stigmas 2-3. Achene plano-convex, faintly trigonous, dark brown 1. *B. maritimus* (L.) Palla.
 + Spikelets aggregated in a single head subtended by the involucre. Stigmas 2. Achene plano-convex or flat on both sides or concave, dark brown or grayish 2. *B. compactus* (Hoffm.) Drob.

1. *B. maritimus* (L.) Palla in Koch, Synops. ed. 3, III (1907) 2352. — *S. maritimus* L. Sp. pl. (1753) 50; Ldb. Fl. Ross. IV, 249; Shmal'g. Fl. II, 547; Kryl. Fl. Zap. Sib. III, 406, excl. var. *compactus*. — *S. macrostachys* Willd. Enum. I (1809) 78. — *Bolboschoenus macrostachys* Grossh. Fl. Kavk. I (1928) 145. — Ic.: Rchb. Ic. Fl. Germ. VIII (1846) tab. 286, fig. 310, 311. — Exs.: Herb. Fl. Cauc. No. 13.

Perennial. Rhizomes creeping with spherical corms at their ends; culms 50-80(-100) cm tall, 3-angled, leafy; leaves linear, flat, 3-8 mm broad, scabrous; involucre bracts usually 3. Spikelets ovoid or oblong, dark brown, 1-2 cm long (rarely 2-3 cm long—var. *macrostachys* Vis.), in glomerules of 2-5 on unequal rays, more rarely inflorescence consisting of a solitary sessile spikelet (var. *monostachys* Sond.); scales deeply notched, the midnerve excurrent in a short awn; perianth-bristles 1-6; achene plano-convex, obscurely trigonous; stigmas 2-3. June—September. (Plate II, figure 10).

Bogs, shores, very often in saline soil. —European part: all regions; Caucasus: all regions; West. Siberia: all regions; East. Siberia: Yenisei, Ang.-Sayan, Daur.; Far East: Kamch., Ze.-Bur., Ud., Uss., Sakh.; Centr. Asia: all regions. Gen. distr.: all over the globe, except the Arctic. Described from Europe. Type in London.

ECONOMIC IMPORTANCE: Forage of low quality; poorly grazed in pasture, but satisfactory in hay, provided it is cut early. It provides satisfactory silage. Of considerable importance in semideserts and northern parts of deserts. Nutritional value much lower compared with grasses. Yields of hay range from 20 to 50 centners per hectare, silage material 70-150 centners per hectare. As it stands up to high salinity of soil and water, it may play a considerable role as a cultivated silage plant for plots on which irrigation water collects (Zavolzh'e, Kazakhstan). The tubers are edible. Suitable as weaving material.

- 57 2. *B. compactus* (Hoffm.) Drob. in Trav. Mus. bot. Acad. Petersb. XI (1913) 92. — *Scirpus compactus* Hoffm. Deutsch Fl. II (1804) 25. — *S. maritimus* var. *compactus* Ldb. Fl. Ross. IV (1853) 249. — *S. Koshewnikowii* Litw. in Spisok dik. rast. Tamb. gub. (1888) 142. — Exs.: HFR No. 2792 (var. *orientalis* Litw.).

Perennial. Rhizomes creeping, with corm-like enlargements at their ends; culms 50-80(-100) cm tall, 3-angled, leafy; leaves flat or somewhat conduplicate, 3-5 mm broad, linear, smooth. Involucral bracts 2-3, unequal, the lowest erect; inflorescence a compact head of 1-5 (-7) crowded spikelets in the axil of the involucre; spikelets ovoid or oblong, dark brown, 1-1.5 cm long and 5-8 cm broad, sessile or peduncles to 3 mm long; scales deeply notched, the midnerve excurrent in a short awn; perianth-bristles 1-6; achene obovoid, plano-convex, subtrigonus, dark brown; ovary with 3 stigmas (the typical form predominant in the west) or achene more or less globular, ovary with 2 stigmas (var. *orientalis* Litw.), the dominant form in the eastern part of the Union. June-September. (Plate III, figures 12, 13).

Bogs, mainly brackish shores. -European part: all regions; Caucasus: Ciscauc., East. and South. Transcauc., Tal.; West. Siberia: all regions; East. Siberia: all regions; Far East: Kamch., Uss., Sakh.; Centr. Asia: all regions. Gen. distr.: Centr. Eur., Balk.-As. Min., Arm.-Kurd., Iran. (?), Dzhung.-Kashg., Mong., Jap.-Chin. Described from Germany.

3. *B. affinis* (Roth) Drob. in Trav. Mus. bot. Acad. Petersb. XVI (1916) 139. -*Scirpus affinis* Roth, Nov. pl. (1821) 30.

Perennial. Rhizomes creeping with or without globular corms at their ends; culms 20-60(-80) cm tall, 3-angled, leafy, entirely smooth; leaves linear, flat or somewhat channeled, 2-8 mm broad, smooth; involucral bracts usually 2, rarely 3; spikelets ovoid-oblong-acuminate, whitish-yellow or stramineous, aggregated in heads, more rarely peduncled (var. *maritimoides* Drob.), or inflorescence with a solitary spikelet (var. *monostachys* Drob.); scales broadly ovate, the central nerve prolonged into an awn to 2 mm long; perianth-bristles usually 6; achene rounded, lenticular; stigmas 2. May-August. (Plate III, figure 11).

Wet and boggy, more or less saline places. -European part: Zavolzh.; Caucasus: Tal. (Sara Island); Centr. Asia: Aral.-Casp., Pribalkh.; Dzhung.-Tarb., Kyz.-Kum., Kara-Kum., Mount. Turkm., Amu-Dar., Syr.-Dar. Gen. distr.: Iran., Ind.-Him., Dzhung.-Kashg. Described from India. Type in Germany.

ECONOMIC IMPORTANCE: Of little importance as forage; corms edible.

Inflorescence a terminal, 2-ranked, simple or compound spike. Spikelets few-flowered, more or less dark brown. Scales without a notch at the summit. Hypogynous bristles 3-6, rarely wanting. Stigmas 2, ciliate. Stamens 3, terminating in a tooth-like appendage to commissure. Achene 2-angled, flattened from the back.

† From Greek *blyso*—flow, alluding to growth near water.

†† Arranged by R. Yu. Rozhevits.

1. Culm 3-angled in upper part. Leaves ribbed. Achene ca. 2 mm long. Hypogynous bristles twice as long as the achene, retrorsely aculeate
 1. *B. compressus* (L.) Panz.
 + Culm subterete. Leaves chaneled, not ribbed. Achene ca. 4 mm long. Hypogynous bristle shorter than the achene or frequently wanting
 2. *B. rufus* (Huds.) Link.

1. *B. compressus* (L.) Panz. in Link, Hort. Berol. I (1827) 278; Ldb. Fl. Ross. IV, 260. —*Schoenus compressus* L. Sp. pl. (1753) 43. —*Scirpus compressus* Pers. Syn. I (1805) 66; Shmal'g. Fl. II, 548; Boiss. Fl. Or. V, 385. —Ic.: Rchb. Ic. Fl. Germ. VIII (1846) tab. 293, fig. 693; Syreish. Ill. Fl. Mosk. gub. I, 175. —Exs.: HFR No. 89.

Perennial. Rootstock creeping, stoloniferous; culms 15-40 cm tall, slightly flattened, obtusely 3-angled above; lower sheaths brown, bladeless, upper sheaths 5-8, with linear, ribbed, scabrous-margined blade to 5 mm broad, always shorter than the inflorescence. Inflorescence consisting of 5-12 spikelets, arranged in a simple, rarely compound (var. *compositus* Rgl.), 2-ranked spike, 2-3 cm long; involucre bract usually much longer, rarely shorter, than the inflorescence; spikelets ovoid-lanceolate, 4-10 mm long, 5-8(-12)-flowered; scales oblong-lanceolate 5-nerved, golden-brown, with a green midrib; hypogynous bristles 3-6, retrorsely aculeate, twice as long as the achene; achene ovoid-ellipsoid, ca. 2 mm long and 1 mm broad, blackish-brown, with a persistent long style. June—August. (Plate V, figure 1).

Wet meadows. —European part: all regions, except Low. Volg.; Caucasus: Ciscauc., Dag., East. and South. Transcauc.; Centr. Asia: Aral.-Casp., Pribalkh., Dzhung.-Tarb., Mount. Turkm., Syr-Dar., Pam.-Al., Tyan'-Shan. Gen. distr.: Scand., Centr. and Atl. Europe, Medit., Balk.-As. Min., Irn., Dzhung.-Kashg. Described from England. Type in London.

2. *B. rufus* (Huds.) Link. Hort. Berol. I (1827) 278; Ldb. Fl. Ross. IV, 261; Kryl. Fl. Zap. Sib. III, 410. —*Schoenus rufus* Huds. Fl. angl. (1762) 15. —*Scirpus rufus* Schrad. Fl. Germ. I (1806) 133, tab. I, 59 fig. 3; Shmal'g. Fl. II, 548; Meinsh. in A.H.P. XVIII, 3 (1901) 254. —Ic.: Rchb. Ic. Fl. Germ. VIII (1846) tab. 293, fig. 694. —Exs.: HFR No. 539.

Perennial rhizome slender, creeping; culms 10-30 cm tall, subterete, several lower sheaths brown, bladeless; upper sheaths linear-filiform, channeled, not ribbed, bluntly callous-tipped, shorter than or nearly as long as the culm. Inflorescence consisting of (1-)4-8 spikelets arranged in a 2-ranked spike 1.2-2 cm long; involucre bract shorter than the inflorescence; spikelets oblong-ovoid, obtusish, longitudinally nerved, 4.5-6 mm long or 2.5-3 mm (in the eastern race subsp. *exilis* Printz), castaneous; hypogynous bristles usually none or shorter than the achene; achene oblong-ellipsoid, ca. 4 mm long and 1.75 mm broad, yellowish, with vestige of style at the top. June—August. (Plate V, figure 2).

Sea shore and wet saline meadows and bogs. —European part: Kar.-Lap., Dv.-Pech., Lad.-Il'm.; West. Siberia: Irt., Alt.; East. Siberia: Ang.-Sayan., Daur.; Centr. Asia: Dzhung.-Tarb., Syr-Dar., Tyan'-Shan. Gen. distr.: Scand., Centr. and Atl. Eur. Described from England. Type in London.

Inflorescence consisting of spikelets arranged in a single sessile compact, slightly lobed head, or of several heads, of these 1-2 lateral ones peduncled. Spikelets small, greenish. Involucral bracts long. Scales arranged spirally or 2-ranked, awn-tipped. Hypogynous bristles none. Stigmas 2-3. Achene trigonous.

1. Scales spirally arranged, hence spikelets terete 2.
- + Scales 2-ranked, hence spikelets laterally compressed.
- 2. *D. pygmaea* (Rottb.) Nees.
2. Inflorescence consisting of a single sessile head. Scales with awn 1/4-1/3 the length of the body. Stigmas 2 . . . 1. *D. Micheliana* (L.) Nees.
- + Inflorescence consisting of several heads, of these 1-2 lateral ones peduncled. Scales with awn as long as the body. Stigmas 3
- 3. *D. hamulosa* (M.B.) Nees.

1. *D. Micheliana* (L.) Nees in *Linnaea* IX (1834) 289. —*Scirpus Michelianus* L. Sp. pl. (1753) 32; *Shmal'g. Fl.* II, 546; *Boiss. Fl. Or.* V, 385; *Kryl. Fl. Zap. Sib.* III, 401. —*Isolepis Micheliana* Roem. et Schult. *Syst.* II (1817) 114; *Ldb. Fl. Ross.* IV, 257. —*Cyperus Michelianus* Link, *Hort. Berol.* I (1827) 303. —*l.c. Rchb. l.c. Fl. Germ.* VIII (1846) tab. 312, fig. 729, 730. —*Exs: HFR No.* 593.

Annual with slender fibrous roots; culms 3-15 cm tall, numerous, 3-angled, leafy at base; leaves narrowly linear, about as long as the culm, smooth, flat or more or less conduplicate; sheaths of lower leaves dark purple. Inflorescence a dense, spherical or broadly ovoid head, to 1 cm long, subtended by 3-7 subhorizontally spreading involucral bracts 1-10 cm long, resembling the culm-leaves but slightly broader; spikelets oblong-ovoid, 2.5-3.5 mm long, 10-20-flowered; scales greenish, becoming rufous, with a narrow green stripe, oblong, to 2 mm long, gradually tapering into awn 1/2 mm long; hypogynous bristles none; stamens 2, rarely 1 or 3; stigmas 2; achene ca. 1 mm long, oblong-ovoid, plano-convex, smooth. July-September. (Plate V, figure 3).

Silty and sandy shores of rivers and lakes. —European part: Mid. Dnepr., Volg. Don., Prichern., Low. Volg.; Caucasus: Ciscauc., West.-Transcauc.; Tal.; West. Siberia: Irt.; Far East: Uss. ?; Centr. Asia: Aral. -Casp. (Gur'ev.), Pribalkh. Gen. distr.: Centr. and Atl. Eur., Medit., Balk. —As. Min., Jap. —Chin. Described from Italy. Type in London.

2. *D. pygmaea* (Rottb.) Nees in *Linnaea* IX (1834) 289. —*Cyperus pygmaeus* Rottb. *Descr. Gram.* (1772) 20, tab. 14, fig. 4, 5; *Boiss. Fl. Or.* V, 368.

Annual, with slender fibrous roots; culms 5-20 cm tall, numerous, 3-angled, leafy at base; leaves linear, acuminate, often exceeding the culm. Inflorescence a dense spherical head, 12-15 mm in diameter, subtended by long, subhorizontally spreading involucral bracts; spikelets oblong-lanceolate, 2.5-3.5 mm long, 12-20-flowered, laterally compressed; scales linear-lanceolate, prolonged into a bent awn, subdistichous-imbricate, 5-7

† From Greek *dicha*, parted, and *stylos*, style

†† Arranged by R. Yu. Rozhevits.

PLATE V

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nerved, yellowish-green, with a darker midnerve; hypogynous bristles none; stamen often 1; stigmas 2, rarely 3; achene ca. 1-1.25 mm long, oblong, smooth, plano-convex, July-August. (Plate V, Figure 4).

Sandy places. —Caucasus: East. Transcauc., Tal. Gen. distr.: East. Medit., Arm. -Kurd., Ind. -Him. Described from India.

- 63 3. *D. hamulosa* (M.B.) Nees in *Linnaea* IX (1834) 289. —*Cyperus hamulosus* M.B. *Fl. taur.-cauc.* I (1808) 35. —*Isolepis hamulosa* Kunth, *Enum.* IX (1837) 209; Ldb. *Fl. Ross.* IV, 257. —*Scirpus hamulosus* Stev. in *Mém. Soc. Nat. Mosc.* V (1814) 356; *Shmal'g. Fl.* II, 546; *Kryl. Fl. Zap. Sib.* III, 402. —Exs. HFR No. 995.

Annual with slender fibrous roots; culms 5-15 cm tall, several to many, 3-angled, erect; leaves narrowly linear, shorter than the culm, flat or conduplicate, the lower leaf sheaths dark brown or purple. Inflorescence consisting of spikelets arranged in spherical, oval heads 3-6 mm in diameter, the lateral ones on peduncles 5-12 mm long; involucre bracts subtending the inflorescence attaining 5 cm in length, resembling the culm-leaves, but subhorizontally spreading; spikelets broadly ovoid, 3-4 mm long, many-flowered; scales ovate, sometimes light purple, ca. 1.5-2 mm long, prolonged into awn nearly as long as the body; hypogynous bristles none; stigmas 3; achene 0.75-1 mm long, oblong-ovoid, trigonous, minutely dotted, brownish. July-September. (Plate V, Figure 5).

Shore sands. —European part: Upp. Dnepr., Mid. Dnepr., Volg. -Don., Prichern., Low. Don., Low. Volg.; West. Siberia: Irt.; Centr. Asia: Aral-Casp., Pribalkh., Kyz. -Kum., Kara-Kum., Amu-Dar. Gen. distr.: Balk. -As. Min. Described from Dneper lowlands. Type in Leningrad.

Genus 228. *Heleocharis* † R.Br. ††

R. Br. *Prodr.* I (1810) 80.

Spikelets solitary, terminating the culm. Perianth of thin, retrorsely barbed bristles (sometimes bristles wanting). Stamens 3. Stigmas 2 or 3; achene trigonous, lenticular or globular. Style base thickened (tubercle) and persistent upon the apex of the achene. Perennial plants with creeping rhizomes and tufted culms, or cespitose annuals. Culms unbranched, sheathed at the base; blades wanting.

ECONOMIC IMPORTANCE: Representatives of this genus approach *Carex* spp. in chemical composition, but with a somewhat higher mineral

† From Greek helos, marsh, and charis, lure.

†† Arranged by Yu. D. Tsinzerling.

Explanation to Plate V

1. *Blysmus compressus* (L.) Panz. — 2. *B. rufus* (Huds.) Link. — 3. *Dichostylis Micheliana* (L.) Nees. — 4. *D. pygmaea* (Rottb.) Nees. — 5. *D. hamulosa* (M.B.) Nees. — 6. *Rhynchospora alba* (L.) Wahl. — 7. *R. fusca* (L.) Roem. et Schult. — 8. *R. caucasica* E. Palla. — 9. *R. Faurieri* Franch. — 10. *Claudium Mariscus* (L.) R.Br. — 11. *Schoenus nigricans* L. — 12. *S. ferrugineus* L.

content. Grazed poorly, rarely satisfactorily (little-developed specimens of *H. palustris*, *H. oxylepis*, and some others). Nearly all species eaten readily in hay by cattle and horses, less so by sheep, goats and camels. Used for silage; but as the culms contain numerous air spaces, 64 the material should be rammed down as much as possible. Some of the species occur as weeds of ricefields (*H. ussuriensis*, *H. atropurpurea*, *H. Svensonii*, *H. ovata*, *H. Maximoviczi*, etc.).

NOTE: The genus *Heleocharis* is represented by many species (their number has not yet been ascertained), distributed all over the earth (except most of the Arctic and Antarctic areas), particularly in tropical and subtropical countries. Out of the 11 sections into which H.K. Svenson divides this genus (he calls the section *Rhodora* 31, and we adopt this classification) 8 occur in this country; of these 7 are represented by not more than 1 to 3 species, and only in the section *Palustriformes* there is a wide range (25 species). Spike rushes are anemogamous plants, hence there are often hybrids between related species their distribution areas overlap frequently, and this renders identification difficult. Characters of particular importance for identification purposes are: shape and size of the tubercle (style base persistent upon the fruit), number and length (in relation to the achene) of bristles as well as features of their barbs; ripe achenes are therefore indispensable for precise determination of most species. It should be noted that where length of bristles is conveyed, the relative length of achene referred to includes the tubercle. Indications concerning sulcate culms apply to dried plants. Margin of scales is here referred to as broad hyaline (transparent-membranaceous) in those instances where it equals or exceeds 1/3 of half the width of the scale, and as narrow when it amounts to less.

- 1. Achenes ca. 4 mm long (including tubercle), white, lustrous; Kamchatka 37. *H. margaritacea* Hultén.
- + Achenes shorter (rarely exceeding 2 mm) 2.
- 2. Tubercle not differentiated from the summit of achene (confluent with it); achene trigonous 3.
- + Tubercle sharply differentiated from the summit of achene 5.
- 3. A very small plant (1.5-7 cm tall), spikelets light greenish-brown, 1.5-3 mm long; scales ovate, obtuse to subacute. 1. *H. parvula* (Roem. et Schult.) Link.
- + A larger plant (3-30 cm tall), spikelets brown to castaneous, 3-7 mm long; scales ovate-lanceolate, acute 4.
- 4. Bristles (up to 5) relatively short, equaling or exceeding the achene, or wanting; tubercle acicular or acutely triangular, from 1/4 (rarely less) to 1/2 as long as the achene (a plant of the European part of the Union, Siberia, and Caucasus) 2. *H. pauciflora* (Light.) Link.
- + Bristles 4-6 (very rarely 0), longer than the achene; tubercle acutely triangular, rarely acicular, usually much less than 1/4 the length of achene (a plant of Turkestan and Transcaucasia) 3. *H. meridionalis* Zinserl.
- 65 5. Annual plants; scales obtuse 6.
- + Perennials with creeping rootstock; if annuals, then scales acute .. 7.

6. Achene brown, pyriform; tubercle mammiform-conical. Bristles 5-7, exceeding the achene (very rarely bristles wanting) 6. *H. ovata* (Roth) Roem. et Schult.
+ Achene black, obovoid, broadest at the summit; tubercle saucer-shaped, knobbed. Bristles none or translucent. 7. *H. atropurpurea* (Retz.) Kunth.
7. Achenes narrow, oblong-obovoid, with longitudinal ridges separated by trabeculae. Small plants; lowest scale fertile 8.
+ Achenes obovoid, without longitudinal ridges. Lowest scale empty. 9.
8. Bristles none or relatively short, equaling or slightly exceeding the achene. (A plant of the European part of the U.S.S.R., Siberia, and Central Asia) 4. *H. acicularis* (L.) Roem. et Schult.
+ Bristles 4, greatly exceeding the achene (up to 1.5-2 times as long). (A plant of the Far East) 5. *H. Svensonii* Zinserl.
9. Bristles with very large, variously directed, seemingly implexed, barbs, hence appearing shaggy. (A plant of the Far East) 38. *H. petasata* (Maxim.) Zinserl.
+ Bristles not having a shaggy appearance. 10.
10. Achenes with 3 prominent ridges (rounded-trigonus). 11.
+ Achenes lenticular, without prominent ridges. 13.
11. Plants with filiform culms (Far Eastern plants). 12.
+ Culms never filiform (a plant of southern Ural and Central Asia) 33. *H. Korshinskyana* Zinserl.
12. Tubercle shorter than broad; bristles usually much shorter than the achene. 34. *H. Maximoviczii* Zinserl.
+ Tubercle longer than broad; bristles as long as the achene, or slightly shorter or longer. 35. *H. afflata* Steud.
13. Basal scale encircling base of spikelet completely or at least to the extent of $2/3$ 14.
+ Basal scales 2, each enclosing approximately half the base of spikelets (not more than $2/3$) 27.
14. Achene flattened, distinctly ancipital; culms slender; plants caespitose; spikelets pointed 36. *H. carniolica* C. Koch.
+ Achene not distinctly angled. 15.
15. Tubercle very long, from $2/3$ the length of achene to more than the length of achene (plants of the Far East). 16.
+ Tubercle shorter (not exceeding $1/2$ the length of achene) 18.
16. Spikelets small, 1-3-flowered; tubercle about equaling the achene in length and width. 23. *H. Komarovii* Zinserl.
+ Spikelets larger, containing more flowers 17.
17. Tubercle longer than or as long as the achene (rarely shorter), equaling or exceeding the achene in width. 21. *H. sachalinensis* (Meinsh.) B. Fedtsch.
+ Tubercle shorter than or nearly as long as the achene, but narrower 22. *H. kamschatica* (C. A. M.) Kom.
18. Tubercle conical, as long as, longer or slightly shorter than broad 19.
+ Tubercle short-conical, mammiform or mitriform, much shorter than broad 24.

19. Tubercle narrowly conical, about half as long as the achene 24. *H. transcaucasica* Zinserl.
+ Tubercle shorter 20.
20. Basal scale acute; spikelets blackish-brown, with a narrow hyaline margin; bristles 4-6 or 0 28. *H. septentrionalis* Zinserl.
+ Basal scale obtuse 21.
21. Bristles 5-6, greatly exceeding the achene 27. *H. multiseta* Zinserl.
+ Bristles 4 (very rarely 5) or 0, shorter than the achene, as long, or slightly longer. 22.
22. Tubercle very small (see figure 6, Table VII). Basal scale 1/4 to 1/2 the length of spikelet 29. *H. oxylepis* (Meinsh.) B. Fedtsch. var. *typica* Zinserl.
+ Tubercle larger; basal scale usually not exceeding 1/4 the length of spikelet 23.
23. Spikelets plump (width usually about 3 times the length), many-flowered (20-25). Scales brown, mostly transparent 26. *H. Klingei* (Meinsh.) B. Fedtsch.
+ Spikelets narrower, 10-25-flowered; scales blackish-brown to brown 25. *H. euuniglumis* Zinserl.
24. Tubercle very small (see figure 5, Plate VII). 29. *H. oxylepis* (Meinsh.) B. Fedtsch. var. *applanata* Zinserl.
+ Tubercle larger 25.
25. Bristles shorter than the achene, or as long, or wanting. Spikelets light-colored. Scales with a broad hyaline margin 30. *H. scythica* Zinserl.
- 67 + Bristles longer than the achene or wanting (in the latter case spikelets blackish-brown). 26.
26. Bristles wanting or 4-5. Slightly exceeding the achene, their barbs profuse and large. 31. *H. fennica* Palla.
+ Bristles 4, greatly exceeding the achene, with sparse barbs 32. *H. paucidentata* Zinserl.
27. Barbs of bristles large, profuse, partly divaricate, often retrorse; bristles 4-8, exceeding the achene (sometimes breaking off at the ends and thus appearing shorter) 28.
+ Barbs of bristles retrorse; if partly divaricate in upper part, then sparse; bristles 4 or 0 (very rarely 5) 30.
28. Tubercle mammiform, much broader than long; bristles 5-8 8. *H. mammillata* Lindb. fil.
+ Tubercle differently shaped, longer than broad, rarely about as long. 29.
29. Tubercle short-conical, with a broad base, 1.2-1.5 times as long as broad, rarely about as long; bristles 5 (a plant of the Far East) 9. *H. ussuriensis* Zinserl.
+ Tubercle narrowly conical, 2-3 times as long as broad; bristles 4-5(-6), often breaking off at the ends and thus appearing shorter than the achene (actually exceeding it). 10. *H. leptostylopodiata* Zinserl.

30. Tubercle long-conical, longer than broad, rarely about as long . . . 31.
 + Tubercle differently shaped, shorter than, as long as, or slightly longer than broad. 34.
31. Scales acute, with a narrow hyaline margin, hence spikelets dark . . . 32.
 + Scales acute or (in lower part of spikelet) subobtusate, with a broad hyaline margin, hence spikelets whitish 33.
32. Spikelets globular or globular-cylindric, 5-12 mm long; bristles exceeding the achene; barbs in upper part of bristles partly divaricate (a plant of Kamchatka). 14. *H. globularis* Zinserl.
 + Spikelets cylindric, rarely ovoid-cylindric, 5-20 mm long; bristles shorter than the achene or as long (rarely exceeding the achene); barbs retrorse. 12. *H. eupalustris* Lindb. fil.
33. Scales in lower part of spikelet acute or slightly obtusish; spikelets 8-25 mm long; culms green (rarely glaucous-green) 13. *H. crassa* Fisch. et Mey.
- 68 Scales in lower part of spikelet subobtusate; spikelets 5-12 mm long; culms glaucous-green. 15. *H. kasakstanica* Zinserl.
34. Scales with a narrow hyaline margin; culms green or grayish-green, Tubercle mammillate-conical or short-conical 35.
 + Scales with a broad hyaline margin; culms glaucous-green; tubercle cylindric-subglobular, mammillate-conical, or subglobular-short-conical (often knobbed at the summit) 36.
35. Bristles exceeding the achene (often breaking and thus appearing shorter). Tubercle fairly large (see Plate VI, Figure 11), mammillate-conical or short-conical (longer than or as long as broad, rarely slightly longer). Culms green. 11. *H. intersita* Zinserl.
 + Bristles shorter than the achene; tubercle very small (see Plate VI, Figure 16), slightly longer than broad. Scales without a light median band, or with an obsolete one. 16. *H. ecarinata* Zinserl.
36. Bristle 1.5-2 times as long as the achene. Barbs profuse, retrorse 20. *H. equisetiformis* (Meinsh.) B. Fedtsch.
 + Bristles shorter than the achene, or as long; if longer than the achene then their barbs divaricate 37.
37. Bristles with profuse retrorse barbs, shorter than the achene (rarely as long as or slightly longer than the achene). 19. *H. argyrolepidoides* Zinserl.
 + Bristles with sparse barbs divaricate in upper part, as long as or longer (rarely shorter) than the achene 38.
38. Bristles as long as or slightly longer (rarely shorter) than the achene 17. *H. argyrolepis* Kjerulf.
 + Bristles much longer than the achene; tubercle mammiform. 18. *H. turcomanica* Zinserl.

Section 1. *Pauciflorae* Svenson in *Rhodora* 31 (1929) 127. —Tubercle confluent with summit of achene. Achenes greenish, gray, or reddish-brown, distinctly trigonous. Stigmas 3. Species of this section distributed mainly in extratropical parts of Eurasia and America (only three species reaching south as far as the northern part of Mexico, West India, and Himalayas), also in southern parts of the Andes.

1. *H. parvula* (Roem. et Schult.) Link in Bluff et Fingerh. Comp. Fl. Germ. ed. 2, I (1836) 93; Kom. and Alis. Opred. rast. Dal'nevost. Kraya I, 266. —*Scirpus parvulus* Roem. et Schult. Syst. II (1817) 124; Shmal'g. Fl. II, 544. —Ic.: Svenson, *Rhodora* 32, Pl. 189, f. 18.

Perennial, with filiform stolons, cespitose; culms slender (but thicker than in *H. acicularis*), ascending, weakly furrowed, 1.5-7 cm tall. 69 Spikelets small, ovoid to subglobular, 1.5-3 mm long, 2-9-flowered; basal scale encircling the spikelet at base, light-colored, obtuse, about half as long as the spikelet; fertile scales ovate, obtuse to subacute, greenish-brown; achene obovoid; tubercle triangular-acicular, very small (usually less than 1/4 the length of achene); bristles usually 5-7, equaling or exceeding the achene, minutely and rather sparsely retrorsely barbellate, more rarely bristles wanting. July—August. (Plate VI, Figure 3).

Sea shores, solonchaks, and bottom of dry estuaries. —European part: Lad. -Il'm. (Kronshtadt), Low. Don., Prichern. (Odess), Low. Volg. (estuary of river Baksan); Caucasus: Ciscauc. (Kuban' estuary); Far East: Ze. -Bur. (western part), Uss. (Tumyn-gan estuary; Vladivostok Bay); Centr. Asia: Aral. -Casp. Gen. distr.: Scand., Centr. and Atl. Eur., South. Eur., North Amer., North Afr., Atlantic and Pacific coast of North America, Brasil, South Africa (?), Japan (?). Described from Western Europe.

2. *H. pauciflora* (Lightf.) Link, Hort. Berol. I (1827) 284; Kom. Fl. Kamch. I, 208; Grossg. Fl. Kavk. I, 147 pp. —*Scirpus pauciflorus* Lightf. Fl. Scot. II (1777) 1078; Ldb. Fl. Ross. IV, 246; Shmal'g. Fl. II, 543; Litv. in Fl. Yugo-Vost. II, 267; Kryl. Fl. Zap. Sib. III, 397. —Ic.: Rchb. Ic. Fl. Germ. VIII, 38, fig. 707, 708; Svenson in *Rhodora* 31, Pl. 189, f. 23; Syreish. Ill. Fl. Mosk. gub. I, 171. —Exs.: HFR No. 1692.

Perennial, with slender rhizomes, with culms in tufts; culms erect to ascending, slender, grayish-green, weakly furrowed, 3-30 cm tall, with brownish or reddish sheaths at base. Spikelets ovoid to globose, 4-7 mm long, 2-7-flowered; lowest scale encircling the spikelet, obtuse or acute, brownish, half as long to fully as long as the spikelet; fertile scales ovate-lanceolate, acute, brown to castaneous, without a light median band, with a broad hyaline margin (sometimes the entire scale hyaline except a narrow central part), the hyaline margin rarely narrow; achene gray, obovoid; tubercle narrow, acicular to acutely triangular, 1/4 (rarely less) to 1/2 as long as the achene, profusely retrorsely barbed. June (in mountains July). (Plate VI, Figure 1).

Shores of lakes and rivers, lowland marshes, and wet meadows; in the Caucasus alpine and subalpine meadows. —Arctic: Arct. Eur. (north-east of Kol'skii Peninsula); European part: Kar. -Lap., Lad. -Il'm., Dv. -Pech., Upp. Dnepr. Upp. Volg., Volg. -Kam., Mid. Dnepr., Volg. -Don., Prichern. (Elisavetgradka), Zavolz., Caucasus: Dag., Gr. Cauc., East. Transcauc.; West. Siberia (rarely): Irt. (Baraba); East. Siberia: Ang. -Sayan., Irk.; Far East: Kamch. Gen. distr.: Scand., Centr. and Atl. Eur., Balk. -As. Min., Syria (?), North Amer. Described from Scotland.

3. *H. meridionalis* Zinserl. sp. n. in Addenda II, 580. —*H. pauciflora* Grossg. Fl. Kavk. I (1928) 147 pp. —*Scirpus pauciflorus* Fedch. Rast. turk. 161 non Lightf.

70 Perennial, with slender rhizomes; culms rather densely tufted, slender, erect to ascending, grayish-green, subsulcate, 4-20 cm tall. Spikelets few-flowered, ovoid to globose, 3-7 mm long; lowest scale obtuse or acute, encircling the spikelet at base, $1/2$ to $3/4$ (and more) as long as the spikelet; scales ovate-lanceolate, acute, light brown to blackish-castaneous, with a broad hyaline margin (rarely narrow); achene gray, obovoid; tubercle minute, usually less than $1/4$ the length of achene, acutely triangular to acicular; bristles 4-6 (vary rarely 0), longer than the achene, profusely retrorsely barbed. April-July. (Plate VI, Figure 2).

Shores of rivers and lakes, marshes, near melting snow. —Caucasus: South. Transcauc.; Centr. Asia: Dzhung. -Tarb., Tyan'-Shan., Syr-Dar., Pam. -Al. Gen. distr.: known from Kul'dzha and Kashgar. Described from Kirgiziya. Type in Leningrad.

Section 2. *Aciculares* Svenson in *Rhodora* 31 (1929) 128. —Achene obscurely trigonous to subglobular, oblong to fusiform-obovoid, with longitudinal ridges. Lowest scale fertile. Stigmas 3. —Most species of this section occur in North, Central, and South America, and only few species in Europe, and northern and eastern Asia (a single species occurring in Australia, possibly introduced).

4. *H. acicularis* (L.) Roem. et Schult. Syst. II (1817) 154 non R. Br.; Shmal'g. Fl. II, 543; Tsinzerl. in Fl. Yugo-Vost. III, 276,; Kryl. Fl. Zap. Sib. III, 394; Kom. Fl. Kamch. I, 209; Kom. Fl. Manchzh. I, 350 pp; Kom. and Alis. Opred. rast. Dal'nevost. Kraya I, 265 pp.; Svenson in *Rhodora* 31, 184. —*Scirpus acicularis* L. sp. pl. (1753) 48; Ldb. Fl. Ross. IV, 243; Meinsh. in A.H.P. XVIII, 3, 259. —*S. parvulus* Meinsh. l. c. pp. -l. c.: Syreish. III. Fl. Mosk. gub. I, 170.

Perennial with a slender, creeping rootstock, forming dense tufts; culms very slender, erect to ascending, 4-angled, rarely 3-angled, subfalcate, green, 2-20 cm long (in the form associated with running water —var. *fluitans* —to 30 cm). Spikelets 3-15-flowered, small, ovoid ovoid-cylindric, 2-7 mm long; lowest scale encircling base of spikelet, obtuse, the length amounting to $1/4$ - $1/3$ the length of spikelet; scales ovate-lanceolate to ovate, obtuse to acutish, dark brown to light brown, with a green median band, the hyaline margin narrow to broad, more rarely the green median band bordered directly by a wide hyaline margin; achene narrow, obovoid; oblong; tubercle mammillate-conical; bristles 0 or 3-4, shorter than, or as long as the achene, or slightly exceeding it, with retrorse, rarely divaricate barbs. June—July. (Plate VI, Figure 4).

Shores, shallow water. —Arctic: Arct. Sib. (Lena estuary); Kar. -Lap. 71 (northward to Imandra Lake), Lad. -Il'm., Dv. -Pech. (northward to Arkhangel'sk), Upp. Volg., Volg. -Kam., Upp. Dnepr., Mid. Dnepr., Volg. -Don., Prichern., Crimea, Low. Don., Low. Volg., Zavolzh.; Caucasus: Ciscauc., East. and South. Transcauc.; West. and East. Siberia: all regions; Far East: Kamch., Ze. -Bur., Ud., Uss. (rarely); Centr. Asia: Aral. -Casp., Pribalkh. Gen. distr.: Scand., Centr. and Atl. Eur., Medit., Mong., East. Asia (rarely in Northern Manchuria, North Amer., Iceland. Described from Western Europe. Type in London.

5. *H. Svensonii* Zinserl. sp. n. in Addenda II, 580. —*H. acicularis* var. *longiseta* Svenson, *Rhodora* 31 (1929) 189. —*H. acicularis* Kom. Fl. Manchzh. I, 350 pp; Kom. and Alis. Opred. rast. Dal'nevost. Kraya I, 265 pp.

Perennial, with slender, creeping rhizome, forming dense tufts; culms very slender, erect to ascending, subsulcate, green, 2-15 cm tall. Spikelets small, ovoid to cylindrical, 2-5 mm long; lowest scale encircling base of spikelet, obtuse, attaining 1/3 to 1/2 the length of spikelet; scales ovate, obtuse (the upper ones acute), green, with a broad hyaline margin, more rarely dark brown, with a green median band with hyaline margin; achene narrow, oblong-obovoid; tubercle conical-mammillate; bristles 4, considerably exceeding the achene (usually 1.5 to 2 times as long) retrorse-barbed. July-September. (Plate VI, Figure 5).

Shores, ricefields, burnt marshes, wet roadsides. —East. Siberia: Daur. (very rarely); Far East.: Ze.-Bur., Uss. Gen. distr.: Mong. (eastern part), Jap. -Chin. Described from Ussuriiskii Krai. Type in Leningrad.

Section 3. *Ovata* e Svenson in *Rhodora* 31 (1929) 128. —Tubercle flattened. Achene lenticular, lustrous, rufous. Stigmas 2. Annual plants.

6. *H. ovata* (Roth) Roem. et Schult. Syst. II (1817) 152 non R. Br.; Svenson in *Rhodora* 31, 211; Shmal'g. Fl. II, 543; Tsinslerl. in Fl. Yugo-Vost. III, 275; Grossg. Fl. Kavk. I, 147; Kom. Fl. Manchzh. I, 320; Kom. and Alis. Opr. rast. Dal'nevost. kraya I, 266; Korsh. Tentam. Fl. Ross. or. 432. —*Scirpus ovatus* Roth, Tent. Fl. Germ. II (1793) 562; Ldb. Fl. Ross. IV, 245; Meinsh. in A.H.P. XVIII, 3, 259. —Ic.: Rchb. Ic. Fl. Germ. VIII, t. 295, fig. 700-701; Syreish. Ill. Fl. Mosk. gub. 170. —Exs.: HFR No. 393.

Annual, tufted; culms grayish-green, arched-ascending, very slightly furrowed, 5-30 cm tall, with green sheaths. Spikelets globose, ovoid or ovoid-cylindrical, obtuse to subacute, 2-7 mm long; lowest scale encircling 1/2 the base of spikelet, minute; scales oblong-ovate, obtuse, ranging from light green to dark brown, with a narrow median band and broad hyaline margin; achene pyriform; tubercle minute, mammillate-conical, much broader than long [sic]; bristles 5-7 (very rarely 0), exceeding the achene, densely retrorse-barbed. June-July. (Plate VI, Figure 7).

Lowland swamps and wet meadows, shallows, shores, damp (especially forest) roads. —European part: Lad. -Il'm. (to the north of Luga and Tikhvina), Upp. Dnepr., Upp. Volg. -Kam., Volg. -Don., Zavolzh.; Caucasus: Ciscauc., East. Transcauc; East. Siberia: Ang. -Sayan. (northern shore of Baikal); Far East: Ze.-Bur., Uss. Gen. distr.: Scand. (south), Centr. and Atl. Eur., Medit., Ind. -Him., Manch., North Amer. Described from Germany.

7. *H. atropurpurea* (Retz.) Kunth, Enum. II (1837) 151; Svenson, *Rhodora* 31, 227. —*Scirpus atropurpureus* Retz. Obs. V (1789) 14. —Ic.: Rchb. Ic. Fl. Germ. VIII, t. 295, f. 699.

Annual, caespitose; culms erect to arched-ascending, green, subsulcate, slender, 3-5 cm tall, with reddish-brown or brown sheaths at base. Spikelets ovoid to ovoid-cylindrical, 2-8 mm long, blunt-tipped; basal scale covering half the base of spikelet, minute; fertile scales ovate, blackish-brown, with a green median band and broad hyaline margin; stamens 1-3; achene obovoid, broadest at summit, black, lustrous; tubercle saucer-shaped, knobbed, minute; bristles transparent, shorter than the achene or none (var. *a setis* Kük. —the only form so far known in this country). July (?). (Plate VI, Figure 6).

Ricefields. — Centr. Asia: Syr-Dar., Amu-Dar. Gen. distr.: Centr. Eur. (by the Lake of Geneva), Medit. (North Italy), North Afr., Ind. — Him., tropics of the Old and the New World, North Amer. Described from India.

Section 4. Palustriformes Svenson in Rhodora 31 (1929) 128. — In this country only subsection Palustres Svenson. — Stoloniferous plants. Achenes ranging in color from light yellow to olivaceous, biconvex, lenticular (only in *H. Korshinskyana* rounded-trigonous), thus coming close to subsection Truncatae). Stigmas 2. Sheaths obliquely truncate at the summit. Culms erect or ascending.

- 75 Series 1. *Biglumes* Zinserl. — Two lowest scales, each encircling approximately half the spikelet. The light median band of scales usually distinct, or wanting, or obsolete.

NOTE: Species of this series often form interspecific hybrids, and sometimes hybridize with species of the series *Uniglumes*.

8. *H. mamillata* Lindb. fil. Acta soc. pro fauna et flora fennica 23, 7 (1902) 7; Zinslerl. in Fl. Yugo. Vost. III, 276. — *H. palustris* var. *mamillatus* Syreish. Fl. Mosk. gub. I, 169. — *H. palustris* var. *communis* f. *mamillatus* Kryl. Fl. Zap. Sib. III (1929) 393. — Ic.: Lindb. fil., l. c. tab. I, fig. 1-18; Syreish. l. c. — Exs.: HFR. No. 1996.

Perennial. Culms erect, fairly stout, green, subsulcate, 10-50 cm tall. Spikelets 8-15 mm long, ovoid to ovoid-cylindric, much thicker than the culm, usually separated from the culm by a distinct constriction; scales ovate-lanceolate, acute, dark brown, with (occasionally without) a green median band and narrow hyaline margin; tubercle mammiform, slightly broader than long; bristles (4)-5-8, much longer than the achene (up to 1.5 times its length), the dense large barbs partly retrorse, partly spreading. June—July. (Plate VI, Figure 8).

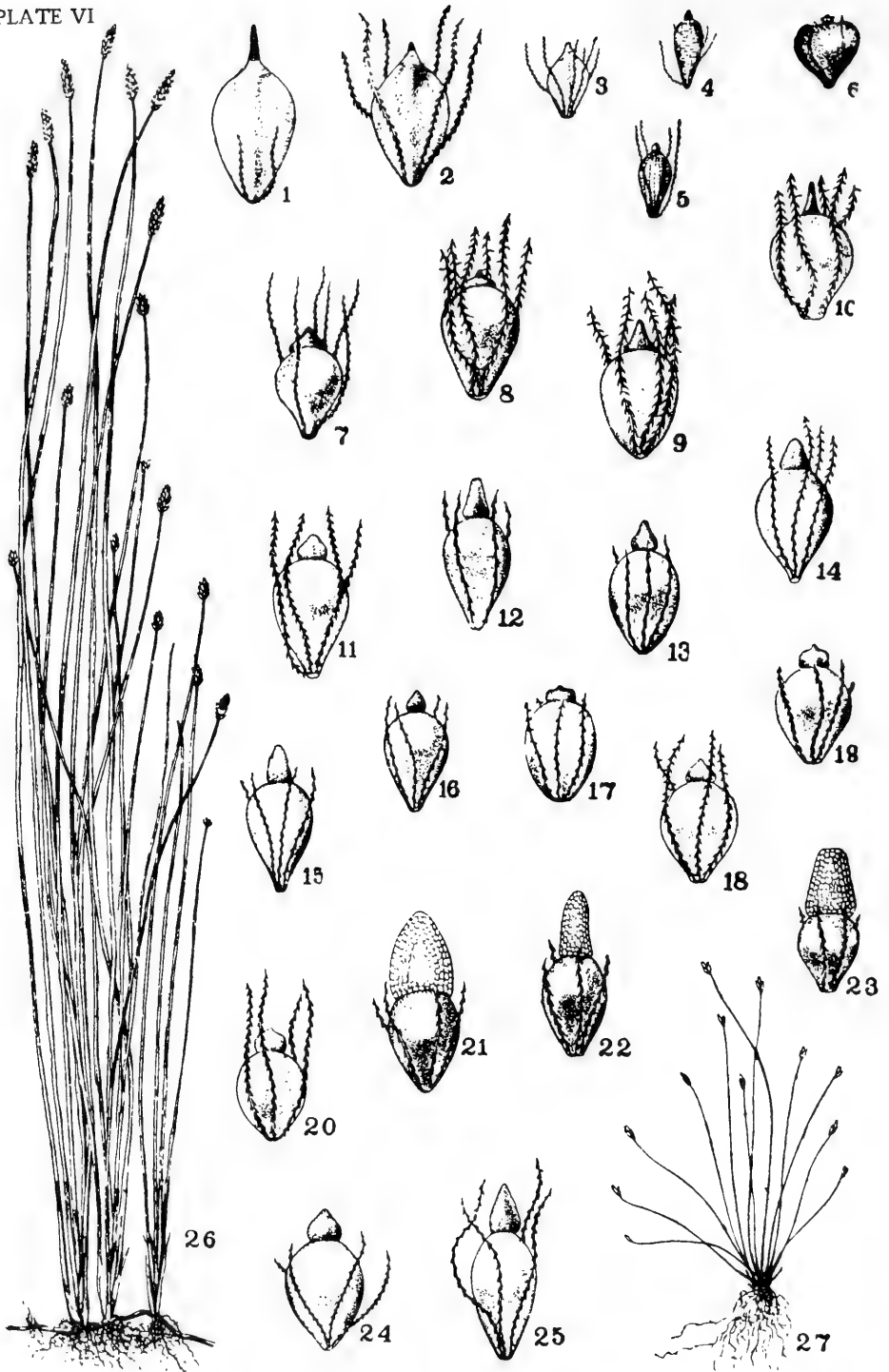
Shores, lowland marshes, damp roadsides in the forest zone. — European part: Kar. — Lap. (to the latitude of Segozer), Dv. — Pech. (as far as Arkhangel'sk, Pinega, and Syktyvkar), Lad. — Il'm., Upp. Dnepr., Upp. Volg., Volg. — Kam., Volg. Don. (rarely); West. Siberia: Ob.; East. Siberia: Ang. — Sayan., Daur. (rarely: Upp. Angara and form. Verkhneud. rur. distr.); Far East: Ze. — Bur. (Ust' — Strelka). Gen. distr.: Scand. (distribution in Europe little known). Described from Finland. Type in Helsinki, cotype in Leningrad.

9. *H. ussuriensis* Zinserl. sp. n. in Addenda II, 581.

Perennial. Culms erect, green, subsulcate, 7-50 cm tall. Spikelets 7-15 cm long, cylindric to ovoid-cylindric; constriction at base rather indistinct; scales ovate-lanceolate, acute, dark brown, with green median band and narrow hyaline margin; tubercle short-conical, with broad base, 1.2-1.5 times longer than broad (rarely about as long as broad); bristles 5, much longer than achene, with rather abundant large spreading and curved, often retrorse, barbs. June-July. (Plate VI, Figure 9).

10. *H. leptostylopodiata* Zinserl. sp. n. in Addenda II, 581.

- 76 Perennial. Culms erect, 10-50 cm tall, green, subsulcate. Spikelets 8-12 mm long, ovoid to ovoid-cylindric; constriction below the spikelet usually rather indistinct; scales ovate-lanceolate, acute, dark brown; green median band present (sometimes evanescent), hyaline margin narrow; tubercle narrowly conical (2-3 times as long as broad), sometimes attenuate-tipped; bristles 4-5(-6), exceeding the achene (often breaking at the ends and



thus appearing as long as or shorter than the achene), with abundant, large, partly spreading and partly retrorse barbs. June—July. (Plate VI, Figure 10).

Shores of rivers and lakes, in mountains up to 1,500m. —European part: Volg. -Don. (near Elyuzan' station of the Syzran'-Vyazovka railroad), Volg. -Kam. (Ural and Cisuralia), Zavolzh. (near Ufa); Caucasus: Ciscauc. (western part), West. Transcauc., Dag. (Samur river basin), East. Transcauc. (form. Zakatal'skii distr.); West. Siberia: Upp. Tob. (Ural), Alt. (Kuznetskii Alatau); Far East: Ze. -Bur. Gen. distr.: not ascertained. Described from Bashkiriya (Irendyk). Type in Leningrad.

11. *H. intersita* Zinserl. sp. n. in Addenda II, 581. —*H. mamillata* × *H. eupalustris*. Tsinzerl. in Fl. Yugo. Vost. III(1929)277.

Perennial. Culms erect, more rarely arched-ascending (f. *curvata* Zinserl.), slender or of medium thickness, 5-50 cm tall, green, subsulcate. Spikelets 5-15 mm long, cylindric, rarely ovoid-cylindric; constriction at base of spikelet none or obsolescent; scales ovate-lanceolate, acute, dark brown, the green median band and margin both narrow; tubercle conical-mammiform (broad at base and abruptly narrowed toward the summit) or short-conical, shorter than broad (to 0.7), as long, or longer (to 1.2-1.3 times) than broad; bristles 4 (very rarely none), exceeding the achene (often breaking at the ends and thus appearing shorter than the achene), sometimes very considerably (up to 1.5 times and more), with fairly large, moderately dense, retrorse barbs. June—July. (Plate VI, Figures 11, 26).

Wet meadows, lowland marshes, and shores in the forest zone. —Arctic: Anad.; European part: Kar. -Lap. (southern part), Dv. -Pech. (southern part), Lad. -Il'm., Upp. Dnepr., Mid. Dnepr., Upp. Volg., Volg. -Kam., Volg. -Don. (east), Zavolzh.; Caucasus: Ciscauc. (Stavropol'), West., East., and South. Transcauc.; West. Siberia: Ob., Irt.; East. Siberia: Ang. -Sayan., Len. -Kol.; Far East: Ze. -Bur., Uss., Sakh. Gen. distr.: (insufficiently ascertained) Centr. Eur., North Amer., East. As. (Manchuria). Described from Belorussia (Rechitskii Distr.). Type in Leningrad.

12. *H. eupalustris* Lindb. fil. in Acta soc. pro fauna et flora fennica 27, 7 (1902) 5; Tsinzerl. in Fl. Yugo. Vost. III, 276. —*H. palustris* 77 var. *eupalustris* Syreish. Ill. Fl. Mosk. gub. I (1906) 169. —*H. palustris* var. *communis* f. *eupalustris* Kryl. Fl. Zap. Sib. III (1929) 312. —Ic.: Lindb. fil. 1. c. 23, No. 7, tab. I, fig. 19, tab. II, fig. 21-35; Syreish. 1. c. I, 169.

Explanation to Plate VI

1. *Heleocharis pauciflora* (Light.) Link. — 2. *H. meridionalis* Zinserl. — 3. *H. parvula* (Roem. et Schult.) Link. — 4. *H. acicularis* (L.) R. Br. — 5. *H. Svensonii* Zinserl. — 6. *H. atropurpurea* (Retz.) Kunth. — 7. *H. ovata* (Roth.) Roem. et Schult. — 8. *H. mamillata* Lindb. fil. — 9. *H. ussuriensis* Zinserl. — 10. *H. leptostylopodiata* Zinserl. — 11. *H. intersita* Zinserl. — 12. *H. eupalustris* Lindb. fil. — 13. *H. crassa* Fisch. et Mey. — 14. *H. globularis* Zinserl. — 15. *H. kasakstanica* Zinserl. — 16. *H. ecarinata* Zinserl. — 17. *H. argyrolepis* Kjerulff. — 18. *H. turcomanica* Zinserl. — 19. *H. argyrolepidoides* Zinserl. — 20. *H. equisetiformis* (Meinsh.) B. Fedtsch. — 21. *H. sachalinensis* (Meinsh.) Kom. — 22. *H. kamtschatica* (C. A. M.) Kom. — 23. *H. Komarovii* Zinserl. — 24. *H. euuniglumis* Zinserl. — 25. *H. transcaucasica* Zinserl. — 26. *H. intersita* Zinserl. — 27. *H. Komarovii* Zinserl. Achenes enlarged 10 times.

Perennial. Culms ranging from slender to stout (in specimens growing in water), erect (very rarely arched-ascending), 5-120 cm tall, green to glaucous-green, subsulcate or nearly smooth. Spikelets 5-20 mm long, cylindrical (rarely ovoid-cylindric); constriction at base none or evanescent; scales ovate-lanceolate, acute (the lowest ones sometimes subobtuse), dark brown, with or without a green median band and with a narrow hyaline margin; tubercle conical, longer than broad; bristles 4 (sometimes wanting, very rarely 5), shorter than, as long as, or (rarely) slightly longer than the achene, the barbs small to medium, retrorse. June-July. (Plate VI, Figure 12).

In or near water, wet meadows, canals, solonchaks (mainly var. *glaucescens* Asch. et Gr.), -European part: Kar. -Lap. (as far as the southwestern part of Kol'skii Peninsula), Dv. -Pech. (as far as Pinega and Il'ma), Lad. -Il'm., Upp. Volg., Volg. -Kam., Upp. Dnepr., Mid. Dnepr., Volg. -Don., Zavolsh., Low. Volg. (along Ural and Volga rivers), Prichern., Crimea; Caucasus: Ciscauc., West., East., and South. Transcauc., West. Siberia: Upp. Tob., Ob., Irt.; East. Siberia: Ang. -Sayan. (very rarely, east of Irkutsk); Centr. Asia: Pribalkh. (Black Irtysh, Kal'dzhir). Gen. distr.: Scand., Centr. Eur., Atl. Eur., Iceland, Faeroe Islands, North Amer., Mong. (north-east). Described from Finland. Type in Helsinki, cotype in Leningrad.

NOTE: A variety without a green median band on scales and with green stems, var. *nigrispicata* Zinserl. is distributed in the northern part of the forest zone; var. *glaucescens* Asch. et Gr., with a green median band on scales, in the forest-steppe and steppe zones; var. *genuina* Zinserl., with green culms and a green median band on scales, mainly in the forest zone, but also penetrating into the steppe zone.

13. *H. crassa* Fisch. et Mey. (nom. nud.) ex Becker in Bull. Soc. Mosc. I (1858) 75; Tsinzerl. in Fl. Yugo-Vost. III, 277; in Addenda II, 582.

Perennial. Culms stout, to 0.5 in diameter (below), erect, 20-90 cm tall, green, rarely glaucous-green (var. *glaucescens* Zinserl.), smooth to subsulcate. Spikelets cylindrical to ovoid-cylindric, 8-25 mm long, usually with distinct constriction at base; scales acute to obtusish, the green median band bordered with dark brown bands (sometimes the median band absent in lower part), hyaline margin broad; tubercle conical, longer than broad, as long, or slightly shorter; bristles 4 (rarely none), shorter than the achene or as long (rarely exceeding the achene), retrorse-barbed. June-August. (Plate VI, Figure 14).

74 Wet meadows, willow woods, and shores. -European part: Low. Don., Volg.; Caucasus: Ciscauc., South. Transcauc.; West. Siberia: Upp. Tob., Irt.; Centr. Asia: not known. Described Low. Volg. (Krasnoarmeisk). Type in Leningrad.

14. *H. globularis* Zinserl. sp. n. in Addenda II, 582. -*H. palustris* Kom. Fl. Kamch. I, 206.

Perennial. Culms of medium thickness, light green, subsulcate, 30-80 cm tall. Spikelets globular-cylindric, 5-10(-12) mm long, constriction at base more or less pronounced; scales ovate-lanceolate, acute, blackish-brown, green median band lacking or evanescent, hyaline margin narrow; tubercle conical, as long as or longer (up to 1.5 times as long), rarely shorter than broad; bristles 4, exceeding the achene; barbs retrorse in lower part, sparser and partly spreading, partly retrorse in upper part. July-

August. (Plate VI, Figure 14).

Marshes, hot springs. —Far East: Kamch. Endemic. Described from Avachinskaya Inlet. Type in Leningrad.

15. *H. kasakstanica* Zinserl. sp. n. in Addenda II, 583.

Perennial, rather densely caespitose; culms slender, erect, glaucous-green, 20-50 cm tall, subsulcate. Spikelets cylindrical to ovoid-cylindrical, 5-12 mm long, inconspicuously constricted at base. Scales ovate-lanceolate, the lower obtusish, others acute, the light median band narrow (sometimes evanescent), bordered with dark or light brown bands, hyaline margin broad; tubercle conical, longer than broad; bristles none or 4, shorter than the achene, retrorse-barbed. May-June. (Plate VI, Figure 15).

Shores and meadows. —West. Siberia: Upp. Tob., Irt. Gen. distr.: unknown. Described from vicinity of Ural'sk. Type in Leningrad.

16. *H. ecarinata* Zinserl. sp. n. in Addenda II, 583.

Perennial. Culms glaucous-green, erect, 25-45 cm tall, subsulcate; spikelets cylindrical to ovoid-cylindrical, 5-13 mm long; scales ovate-lanceolate, the lower ones obtusish, dark brown, median band lacking or very obscure; hyaline margin rather narrow; tubercle minute ($1/5$ - $1/3$ the length of achene), conical, as long as or slightly longer than broad; bristles 4, shorter than or as long as the achene, retrorse-barbed. June (?). (Plate VI, Figure 16).

Found in Bukhtarma river valley (Alt.) and in an unknown locality in Semirech'e Province (Dzhung.-Tarb. or Pribalkh.). Gen. distr.: Mong. Described from the valley of river Bukhtarma. Type in Leningrad.

79 17. *H. argyrolepis* Kjerulff ex Bunge in Mém. Ac. Petersb. Sav. Etr. VII (1851) 518; Fedch. Rast. Turk. 165. —*Scirpus argyrolepis* Meinsh. in A.H.P. XVIII, 3 (1901) 262. —Exs.: HFR No. 1390.

Perennial, loosely to rather densely caespitose; culms erect to arched-ascending, 5-75 cm tall, glaucous, furrowed (nearly smooth in specimens growing in water). Spikelets cylindrical, 5-30 mm long; scales ovate-lanceolate, acute, the light median band narrow, bordered with narrow blackish-brown bands, hyaline margin broad; tubercle short-conical to short-cylindrical, rounded and usually knobbed at the summit; broader than, as broad, or slightly narrower than long; bristles 4 or none, shorter than, as long as, or slightly exceeding the achene, barbs sparse, spreading in upper part, retrorse below. April-June. (Plate VI, Figure 17).

Marshes, lakes, saline meadows, and reed thickets. —Caucasus: Ciscauc. (Kizlyar); Centr. Asia: Pribalkh., Dzhung.-Tarb., Tyan'-Shan., Aral.-Casp., Kyz.-Kum., Amu-Dar., Syr-Dar., Pam.-Al. Gen. distr.: Kul'dzha. Described from Central Asia (Syr-Dar'ya basin). Type in Leningrad.

18. *H. turcomanica* Zinserl. sp. n. in Addenda II, 583.

Perennial. Culms stout (to 5 mm thick at base), nearly smooth, glaucous, 20-50 cm tall. Spikelets ovoid-cylindrical to cylindrical, 5-30 mm long, separated from the culm by distinct constriction; scales ovate-lanceolate, acute, or the lower ones obtusish, the green median band broad, bordered with narrow dark bands, hyaline margin broad; tubercle mammiform-conical, broader than or as broad as long; bristles 4, much longer than the achene, barbs flexuous-spreading in upper part, retrorse below. May. (Plate VI, Figure 18).

River shores and borders of irrigation canals. —Centr. Asia: Mount. Turkm. Pam.-Al., Syr. Dar., Gen. distr.: unknown. Described from Bagir (Turkmeniya). Type in Leningrad.

19. *H. argyrolepidoides* Zinserl. sp. n. in Addenda II, 584.

Perennial, loosely caespitose; culms erect, from slender to fairly thick, glaucous-green, furrowed (in stout specimens smooth below), 10-60 cm tall. Spikelet cylindrical to ovoid-cylindrical, 7-15 mm long, constriction at base very inconspicuous; scales ovate-lanceolate, acute, median band fairly broad, bordered with narrow brown bands, hyaline margin broad; tubercle short-conical, rounded and knobbed at the summit, 80 as long as or shorter than broad; bristles 4 (5), shorter, rarely longer, than the achene, densely retrorse-barbed. June (?). (Plate VI, Figure 19).

Marshes, meadows, and margins of streams. —European part: Volg. - Don., Zavolzh., Crimea (Baidary); Caucasus: Ciscauc. (Kizlyar). Gen. distr.: unknown. Described from Veidelevka (former Valuiskii rur. distr.). Type in Leningrad.

20 *H. equisetiformis* (Meinsh.) B. Fedtsch. in Rast. Turkest. (1915) 165. —*Scirpus equisetiformis* Meinsh. in A.H.P. XVIII, 3 (1901) 261.

Perennial, loosely caespitose; culms glaucous, erect (rarely somewhat ascending), 20-80 cm tall, deeply furrowed. Spikelets cylindrical, 7-20 mm long; scales ovate-lanceolate, acute, the rather broad light median band bordered with narrow blackish-brown bands, hyaline margin broad; tubercle cylindrical, rounded and knobbed at the summit, or short-conical, broader than, rarely as broad as long; bristles 4, 1.5-2 times as long as the achene, profusely retrorse-barbed. May-June. Plate VI, Figure 20.

Borders of rivers and irrigation canals, bottomland osier-beds. —Centr. Asia: Pribalkh., Dzhung.-Tarb., Tyan'-Shan., Syr-Dar., Pam.-Al. Gen. distr.: Kulja. Described from Kulja. Type in Leningrad.

Series 2. *Uniglumes* Zinserl. Basal scale solitary, covering two-thirds or more of the spikelet. Median band of scales lacking or very narrow (rarely fairly broad).

NOTE: Beside readily distinguishable species, *H. sachalinensis*, *H. kamtschatica*, *H. Komarovii*, and *H. Korshinskyana*, contains a number of closely related species, often grouped together under the name *H. uniglumis* (Link.) Schult. These species often have overlapping distribution areas and form hybrids among each other, hence their determination frequently involves considerable difficulties.

21. *H. sachalinensis* (Meinsh.) Kom. in Kom. et Aliss. Opred. rast. Dal'nevost. kraya (1931) 266. —*Scirpus sachalinensis* Meinsh. in A.H.P. XVIII, 3 (1901) 260. —Ic.: Kom. and Alis., l.c., tab. 79, fig. 1, 2, 4, 8, 9.

Perennial. Culms green or glaucous-green, erect (rarely arched-ascending), 5-50 cm tall, very slightly furrowed or smooth. Spikelets cylindrical to ovoid-cylindrical, 4-12 mm long; basal scale obtuse, attaining at most 1/4 the length of spikelet; fertile scales ovate, lower ones obtuse, others acute, blackish-brown (very rarely brown), median band lacking or very narrow, hyaline margin narrow; tubercle inflated, conical, rounded at the summit, longer than or as long as the achene (very rarely shorter), breadth of tubercle exceeding or equaling that of achene; bristles 4 (or none), shorter than the achene, retrorse-barbed. June-July. (Plate VI, Figure 21).

81 Shores of rivers, lakes, and sea, meadow-bogs, and hot springs. — East. Siberia: Ang.-Sayan (river Angara); Far East: Okhot. (Shantarskie Islands), Uss., Kamch. (hotsprings near the village of Pushchino), Sakh. Gen. distr.: not ascertained. Described from Sakhalin. Type in Leningrad.

22. *H. kamtschatica* (C.A.M.) Kom. Fl. Kamch. I (1927) 207. — *Scirpus kamtschaticus* C.A.M. in Mém. Acad. Petersb. Sav. Etr. I (1831) 198; Meinsh. in A.H.P. XVIII, 3, 263 pp.

Perennial. Culms erect to somewhat arched-ascending, 5-15 cm tall, grayish-green, very slightly furrowed. Spikelets small, globular to ovoid, 3-8 mm long, 3-6-flowered; basal scale obtuse, attaining $1/4$ — $1/3$ the length of spikelet; fertile scales obtusish or acuminate, ovate, blackish-brown, without median band, hyaline margin narrow; tubercle large, narrowly conical, length attaining $2/3$ to nearly full length of achene, but breadth less than that of achene; bristles 4, shorter than the achene, retrorse-barbed. July—August. (Plate VI, Figure 22).

Hotsprings (probably also other habitats). — Far East: Kamchatka. Gen. distr.: Aleutian Islands, Alaska. Described from Kamchatka. Type in Leningrad.

23. *H. Komarovii* Zinserl. (nom. nov.). — *H. triflora* Kom. in Fedde Repert. sp. n. 1914, XIII, 162; Fl. Kamch., 208 non Bcklr. (1880). — *Scirpus kamtschaticus* Hultén, Fl. of Kamtch. I, 166 non C.A.M.

Perennial, with a very short rootstock; culms slender, subsulcate, 5-17 cm tall. Spikelets ovoid, 1-3-flowered, 3-4 mm long; basal scale obtuse, usually about $1/3$ the length of spikelet; fertile scales obtuse, reddish-brown or blackish-brown, median band indistinct, hyaline margin broad; tubercle distinctly inflated, conical, rounded at the summit, length and breadth more than, as much as, or less than those of the achene; bristles 4, shorter than the achene, sparsely retrorse-barbed. July (?). (Plate VI, Figures 23, 27).

Far East: hotsprings of the crater of Uzon volcano in Kamchatka. Endemic. Type in Leningrad.

24. *H. transcaucasica* Zinserl. sp. n. in Addenda II, 585.

Perennial. Culms erect, 12-55 cm tall, glaucous-green, subsulcate. Spikelets cylindrical to ovoid-cylindrical, 6-12 mm long; basal scale obtuse, not exceeding $1/4$ the length of spikelet; fertile scales lanceolate, acute, blackish-brown (very rarely light brown), median band narrow, rarely lacking; hyaline margin broad or narrow; tubercle narrowly conical, 1.5-2 times as long as broad, about $1/3$ — $1/2$ as long as the achene; bristles 4, 82 exceeding or equaling the achene (often breaking and thus appearing shorter), profusely retrorse-barbed (barbs at the ends of bristles sometimes spreading). May—June. (Plate VI, Figure 25).

Shores of rivers and lakes, meadows. — European part: Prichern. (Dnieper estuary), Low. Don. (Don estuary); Caucasus: South. Transcauc., Tal. Gen. distr.: Balk.-As. Min., Turk. Arm., near the village Sary-Kamysh. Described from lake Gilli (Armenian SSR). Type in Leningrad.

25. *H. euuniglumis* Zinserl in Fl. Yugo-Vost. III (1929) 278; in Addenda II, 584; Maevsk. Fl. Sr. Ross., ed. VI, 168. — *H. uniglumis* auct. pp. — *H. Klingei* Tsinzerl. l.c. (1929); Maevskii l.c. non B. Fedtsch.

Perennial. Culms green, erect or subscescending, 5-70 cm tall, subfalcate. Spikelets cylindric to ovoid, 10-25-flowered, 5-12 mm long; basal scale obtuse, attaining $1/4$ – $1/3$ the length of spikelet; fertile scales ovate to ovate-lanceolate, acute or obtusish (often in upper and lower part of spikelet, respectively), brown to blackish-brown, median band narrow or lacking, hyaline margin from obsolete to $1/3$ half-breadth the scale; tubercle conical, slightly shorter than, as long as, or slightly longer than broad; bristles 4 (very rarely 5) or none; bristles shorter than, as long as, or slightly longer than the achene, retrorse-barbed. May–June. (Plate VI, Figure 24).

Wet, especially saline, meadows, solonchaks, river shores, coasts, spring outlets. —European part: Kar. -Lap. (White Sea coast), Lad. -Il'm., Dv. -Pech., Upp. Volg., Volg. -Kam., Upp. Dnepr., Volg. -Don., Prichern., Low. Don., Low. Volg., Zavolzh., Crimea; Caucasus: Cis-cauc., Dag., East. and South. Transcauc.; West. Siberia: Ob. -Alt., Upp. Tob., Irt.; East. Siberia: Yenis., Len. -Kol., Angl. -Sayan., Daur.: Far East: Kamch.; Centr. Asia: Pribalkh., Tyan'-Shan., Syr. Dar., Pam. -Al. Gen. distr.: Scand., Centr. Eur., Atl. Eur., Ind. -Him., Mong. Described from vicinity of Leningrad (Lakhta). Type in Leningrad.

NOTE: A very polymorphic species which will be probably broken up into several species. Of wide occurrence in the southern part of its distribution area in the U.S.S.R. are forms with light-colored scales and broad hyaline margin, sometimes with a light median band; in the more northerly parts dark-colored forms prevail, the hyaline margin being narrow or wanting.

26. *H. Klingei* (Meinsh.) B. Fedtsch. Rast. Turkest. (1915) 165. — *Scirpus Klingei* Meinsh. in A.H.P. XVIII, 3 (1901) 262.

Perennial. Culms green, with light brown, somewhat reddish sheaths at base, erect, very slightly furrowed, 35-70 cm tall. Spikelets cylindric to ovoid-cylindric, plump (usually about 3 times as long as broad), 5-13 mm long, (15-)20-25-flowered; basal scale light brown, obtuse, not exceeding $1/4$ the length of spikelet; fertile scales ovate-lanceolate, subobtuse, light brown, transparent, hyaline margin rather broad ($1/4$ – $1/2$ half-breadth of scale), median band wanting or very inconspicuous; tubercle conical, slightly longer than, as long as, or slightly shorter than broad; bristles 4-5, shorter than the achene (rarely as long as the achene or slightly longer), with abundant retrorse barbs of medium size. June (?). (Plate VII, Figure 15.)

River shores. —Centr. Asia: Kazakhstan, Dzhung. -Tarb. Gen. distr.: not ascertained. Described from Kazakhstan. Type in Leningrad.

27. *H. multiseta* Zinserl. sp. n. in Addenda II, 586. Perennial. Culms erect, glaucous-green, subsulcate, 15-20 cm tall. Spikelets ovoid-cylindric to cylindric, 5-15 mm long; basal scale rarely exceeding $1/4$ the length of spikelet, obtuse; fertile scales ovate-lanceolate to lanceolate, subobtuse or acute (especially the upper ones), light to dark brown, median band absent or very narrow (rarely rather broad), hyaline margin ranging from very narrow to $1/4$ the breadth of scale; tubercle conical, as long as broad or longer (up to 1.5 times), rarely slightly shorter than broad; bristles 5-6 (very rarely 4), exceeding the achene

(usually much so), rarely as long as the achene to slightly shorter, the large or medium barbs retrorse, or at the ends spreading. May-June. (Plate VII, Figure 4).

Wet meadows (often saline) and river shores. -West. Siberia: Upp. Tob. (southern part), Irt. Gen. distr.: Dzhung. -Kashg. Described from Kazakhstan (Ters-bulak river in Mugodzhary). Type in Leningrad.

28. *H. septentrionalis* Zinserl. sp. n. in Addenda II, 586.

Perennial. Culms green, erect, rarely subascending, 15-60 cm tall, very slightly furrowed. Spikelets ovoid-cylindric to cylindric, 4-15 mm long; basal scale ovate-lanceolate, acute, attaining $1/4-1/2$ the length of spikelet; fertile scales ovate-lanceolate, acute or subobtusate, without median band, hyaline margin narrow; tubercle short-conical, slightly shorter than, as long as, or slightly longer than broad; bristles 4-6 (or none), shorter than, as long as, or slightly longer than the achene, the fairly abundant barbs spreading in upper part. (Plate VII, Figure 16).

Seashore, coastal meadows, and swamps. -Arctic: Arct. Europe (Kol'skaya Bay, Kanin Peninsula); European part: Kar. -Lap. (Solovetskie Islands, Terskii coast), Dv. -Pech. (Onega estuary). Gen. distr.: not ascertained. Described from Solovetskii Peninsula. Type in Leningrad.

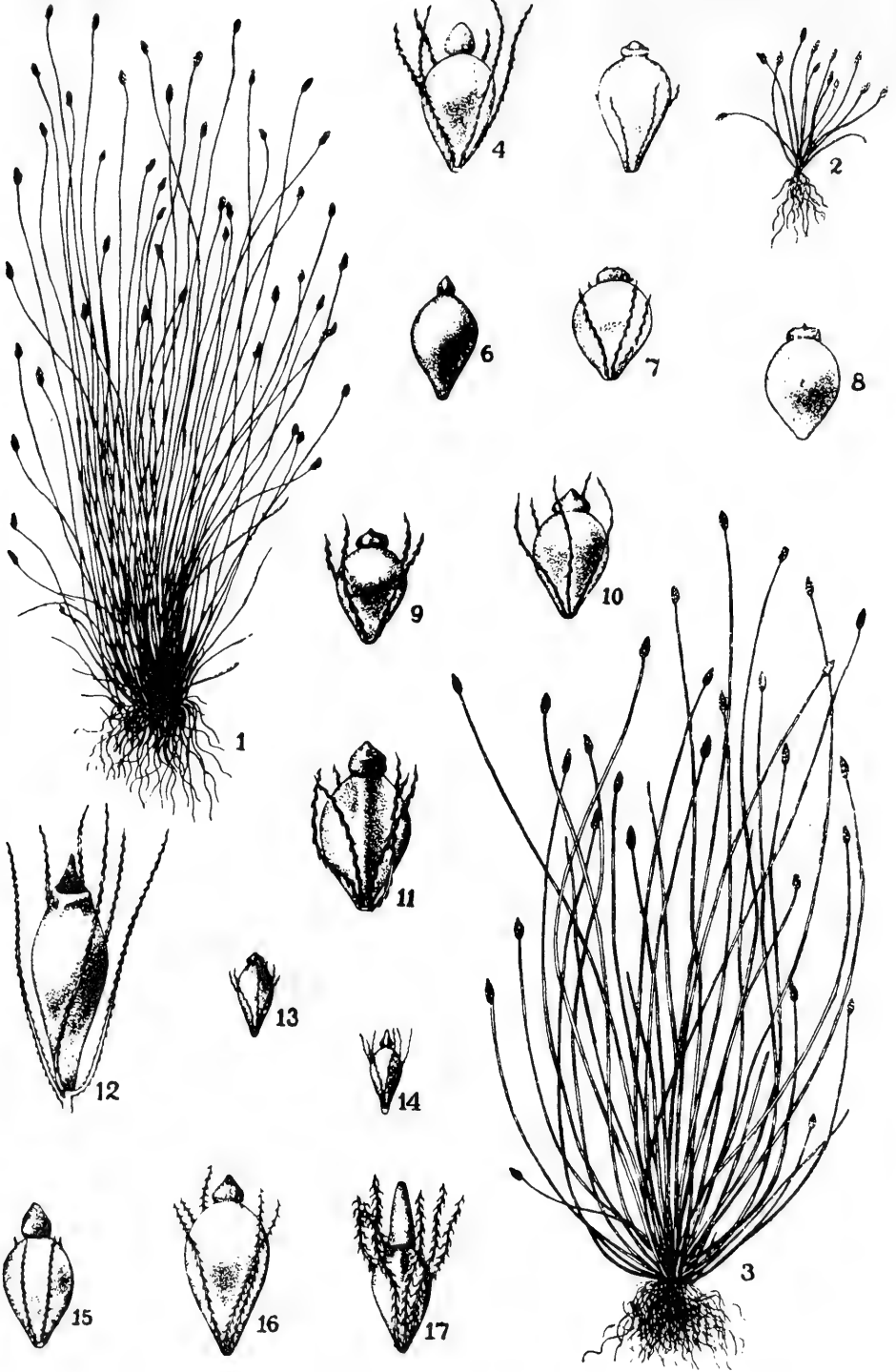
29. *H. oxylepis* (Meinsh.) B. Fedtsch. Rast. Turkest. (1915) 165; Tsinzerl. in Fl. Yugo-Vost. III, 279. -*Scirpus oxylepis* Meinsh. in A.H.P. XVIII, 3 (1901) 263.

84 Perennial, forming compact tufts. Culms erect, rarely arched-ascending, very slender, 10-50 cm tall, glaucous-green, subsulcate. Spikelets narrowly cylindric to ovoid-cylindric, 4-12 mm long; basal scale light-colored, obtuse to subacute, attaining $1/4-1/2$ the length of spikelets (rarely obtusish), yellowish-brown (more rarely dark brown), median band lacking or yellowish-brown, hyaline margin from very narrow to broad; achene strongly attenuate toward the base; tubercle minute (much smaller than in other species of the series), mammiform (var. *applanata* Zinserl.) to conical (var. *typica* Zinserl.), in the latter case rarely longer than broad; bristles usually wanting, more rarely 4, from very short to as long as the achene, with small retrorse barbs. May-June. (Plate VII, Figures 5, 6).

Solonchak and solonetz soils, boggy meadows, and shores. -European part: Low. Dnepr. (near the village Pavlovka), Low. Volg.; West. Siberia: Upp. Tob., Irt.; Centr. Asia: Aral. -Casp., Pribalkh., Syr-Dar. Gen. distr.: not ascertained. Described from Western Kazakhstan (between Tarantol and Yaman Lake). Type in Leningrad.

30. *H. scythica* Zinserl. in Fl. Yugo-Vost. III (1929) 279; in Addenda II, 586.

Perennial. Culms erect, glaucous-green, very slightly furrowed, 20-35 cm tall. Spikelets cylindric to ovoid-cylindric, 5-17 mm long; basal scale obtuse, usually not exceeding $1/4$ the length of spikelet; fertile scales ovate-lanceolate, acute, light brown (very rarely dark brown), with or without median band, hyaline margin broad; tubercle tablet-shaped or mammiform, sometimes approaching conical, up to 2.5 times as broad as long; achene slightly attenuate; bristles none or 4, as long as the achene or shorter, barbs sparse to moderately profuse, retrorse. May-June. (Plate VII, Figure 7.)



Mud flats and river shores. —European part: Prichern., Volg. -Don., Low. Volg., Zavolzh.; West. Siberia: Upp. Tob., Irt., Centr. Asia: Aral. -Casp. Gen. distr.: not ascertained. Described from the Ukraine (Dnepropetrovsk District). Type in Leningrad.

- 87 31. *H. fennica* Palla ex Kneuck. in Allg. Bot. Zeitschr. Jahrg. 1901 (1902) 212. —*H. sareptana* Zinserl. in Fl. Yugo-Vost. III (1929) 279; in Addenda II, 587. —Exs.: Kneuck., Cyp. et Jund. exs. III (1920) No. 73.

Perennial. Culms erect, glaucous-green to green, very slightly furrowed, 10-50 cm tall. Spikelets globose, ovoid-cylindric, or cylindric, 2-15 mm long; basal scale obtuse, usually not exceeding $1/4$ the length of spikelet (in very small spikelets up to $1/2$); fertile scales ovate-lanceolate, acute or obtusish, blackish-brown, median band lacking or very narrow, hyaline margin from very narrow to broad; achene obovoid, sometimes globular; tubercle short, mammiform (more rarely pastilliform or very short-conical), much broader than long; bristles none (var. *baltica* Zinserl.) or 4-5 (var. *sareptana* Zinserl.), longer than the achene (sometimes breaking at the ends and thus appearing shorter), barbs dense to rather sparse, retrorse (sometimes spreading at the ends). May—June. (Plate VII, Figures 8, 9).

Coasts, mud flats, shores of rivers and mountain streams, irrigation canals, and solonetz soils. —European part: Lad. -Il'm. (Gulf of Finland coast), Zavolzh., Low. Volg.; Caucasus: East. Transcauc.; West. Siberia: Upp. Tob., Irt.; East. Siberia: Ang. -Sayan, Len. -Kol., Daur.; Centr. Asia: Aral. -Casp., Pribalkh., Tyan'-Shan. Gen. distr.: Scand. (coasts of Baltic Sea), Centr. Eur., Atl. Eur., Mong. Described from Finland (near Jakobstadt). Cotype in Leningrad.

NOTE: In central Asia and in the south-east of the European part of the U.S.S.R., as well as in Siberia, the dominant variety has bristles exceeding the achene (var. *sareptana* Zinserl.); in the variety dominating along the coast of the Gulf of Finland the bristles are absent or very short (var. *baltica* Zinserl.), var. *sareptana* occurring here very rarely. The distribution area of this species in this country is split into two parts—the Baltic and the southern (south of the European part of the U.S.S.R. Southern Siberia, and Kazakhstan).

32. *H. paucidentata* Zinserl. sp. n. in Addenda II, 588.

Perennial. Culms glaucous-green, subsulcate, 10-40 cm tall. Spikelets cylindric to ovoid-cylindric, 6-13 mm long; basal scale obtuse, usually less than $1/4$ the length of spikelet; fertile scales ovate-lanceolate (the upper ones acute), light to dark brown, median band from evanescent to

Explanation to Plate VII

1. *Heleocharis Maximoviczii* Zinserl. — 2. *H. parvula* (Roem. et Schult.) Link. —
3. *H. ovata* (Roth) Roem. et Schult. — 4. *H. multiseta* Zinserl. — 5. *H. oxylepis* (Meinsh.) B. Fedtsch. var. *applanata* Zinserl. — *H. oxylepis* (Meinsh.) B. Fedtsch. var. *typica* Zinserl. —
6. *H. scythica* Zinserl. — 7. *H. fennica* Palla var. *sareptana* Zinserl. — 8. *H. fennica* Palla var. *sareptana* Zinserl. — 9. *H. fennica* Palla var. *sareptana* Zinserl. — 10. *H. paucidentata* Zinserl. — 11. *H. Korshinskyana* Zinserl. — 12. *H. margaritacea* Hultén. — 13. *H. Maximoviczii* Zinserl. — 14. *H. afflata* Steud. — 15. *H. Klingei* (Meinsh.) B. Fedtsch. — 16. *H. septentrionalis* Zinserl. — 17. *H. petasata* (Maxim.) Zinserl. Achenes enlarged 10 times. (Figure 12 after E. Hultén).

prominent, hyaline margin narrow to broad; tubercle mammiform, pastiliform, or very short-conical (much broader than long); bristles 4, much longer than the achene, barbs sparse, small, retrorse (sometimes horizontal at the ends). May-June. (Plate VII, Figure 10).

Borders of rivers and irrigation canals, meadows. — West. Siberia: Upp. Tob.; Centr. Asia: Aral.-Casp., Pribalkh., Tyan'-Shan. Gen. distr.: not ascertained. Described from Aulié-ata (Kazakhstan). Type in Leningrad.

88 33. *H. Korshinskyana* Zinserl. in Fl. Yugo-Vostoka III (1929) 280; in Addenda II, 588.

Perennial. Culms glaucous-green, subsulcate, 35-50 cm tall. Spikelets globular, 5-7 mm long; basal scale light-colored, obtuse, attaining $1/4$ — $1/3$ the length of spikelet; fertile scales ovate-lanceolate, acute, light brown, median band evanescent, hyaline margin broad; achene obovoid, rounded-trigonus; tubercle short-conical; bristles 5-8, shorter than or as long as the achene, rather densely retrorse-barbed. June. (Plate VII, Figure 11).

So far found in European part: mud flat of river Ika (Volg.-Kam., at the southern boundary) and Centr. Asia: near Kara-Kala mountain in Turkestan (Mount. Turk.). Gen. distr.: not ascertained. Described from river Ika. Type in Leningrad.

Section 5. *Intermediae* Svenson, *Rhodora* 31 (1929) 129. — Cespitose plants. Culms slender, weak. Spikelets usually pointed. Achenes oliveaceous-brown, oblong-obovoid, lenticular or trigonus. Tubercle conical. Stigmas 2-3.

34. *H. Maximoviczii* Zinserl. sp. n. in Addenda, II, 588. — *H. japonica* Kom. Fl. Manchzh. 1 (1901) 351 non Miq., Kom. Fl. Kamch. I, 209; Kom. and Alis. Opr. rast. Dal'nevost. Kraya I, 266 (pp. ?) non Miq.

Perennial. Culms ascending, rarely erect, very slender, 4-angled, furrowed, 10-35 cm tall, green, with light, reddish sheaths at base. A pedicel bearing a second, sterile spikelet sometimes arising at base of spikelet; spikelets ovoid to ovoid-cylindric, acute (rarely blunt-tipped), 2.5-6 mm long; basal scale covering more than $1/2$ the base of spikelet, pale, obtuse, usually attaining $1/4$ — $1/3$ the length of spikelet; fertile scales ovate, subacute, the broad green median band bordered with dark brown bands, hyaline margin broad; stigmas 3; achene rounded-trigonus; tubercle short-conical (broader than long), minute; bristles 6, shorter than the achene, with short retrorse barbs. June-July (?). (Plate VII, Figure 13).

Swamps, wet meadows, ricefields, damp roadsides, and hot springs. — Far East: Kamch. (Nachikinskie springs), Ze.-Bur. (eastern part), Uss. Gen. distr.: East. Asia (Manchuria, Korea). Described from Ussuri region. Type in Leningrad.

35. *H. afflata* Steud. Syn. pl. Cyp. (1855) 76. — *H. japonica* Miq. Prolusio Fl. Jap. (1866-67) 142. — *Scirpus japonicus* Franchet et Sav. Enum. pl. Jap. II (1876-79) 109. — *S. afflatus* Benth. Fl. Hongkong. (1861) 394.

Perennial. Culms ascending, slender, furrowed, green, 10-35 cm tall. One or several pedicels very often arising at base of spikelet, each bearing

89 a sterile spikelet; spikelets ovoid, pointed, 3-8 mm long; basal scale covering more than half the base of spikelet, obtuse, attaining $1/4$ to $1/3$ the length of spikelet; fertile scales obtuse, upper ones acutish, blackish-brown, light median band narrow (so far only this form found in the U.S.S.R.), or broad, bordered with narrow dark bands, hyaline margin rather narrow; stigmas 3; achene oblong-obovoid, rounded-trigonous, olivaceous-brown; tubercle enlarged at base, abruptly attenuate into a rather long beak, longer than broad; bristles 5-6, equal, slightly shorter or longer than the achene, with short retrorse barbs. July (?). (Plate VII, Figure 14).

Far East: Found by M. Cherskaya on the shore of river Tumin-Gana, near the village Chakesemi (Uss.). Gen. distr.: East. Asia (Japan, China, Korea), Trop. Asia (Java). Described from Java. Cotype in Leningrad (Java No. 405, Zollinger).

36. *H. carniolica* C. Koch, Syn. ed. 2 (1844) 853. — *Scirpus carniolicus* Neilr. Nachtr. (1861) 39.

Perennial. Culms ascending, slender, furrowed, glaucous-green to green 10-35 cm tall, sometimes arched-reflexed after anthesis and producing offshoots from base of spikelets. Spikelets cylindrical to ovoid-cylindrical, acute or obtusish, 3-10 mm long; basal scale covering more than half the base of spikelet, obtuse, pale, attaining less than $1/4$ the length of spikelet; fertile scales subobtuse to acute, the upper ones acute, the pale median band bordered with narrow black bands (these rarely wanting), hyaline margin narrow; stigmas 2-3; achene oblong-ovoid, olivaceous-brown, flattened, prominently angled; tubercle enlarged at base, abruptly attenuate into a rather long beak or conical, longer than broad; bristles 6-8, exceeding the achene, rarely as long as the achene or even slightly shorter, barbs fairly long, retrorse. July-August.

European part: found by D. M. Zerov in meadows and forest in Markhlevskii District in Volyn' (Mid. Dnepr.). Gen. distr.: Centr. Eur. (Hungary, Rumania, Czechoslovakia, Austria, Yugoslavia), West. Medit. (Northern Italy), Balk. -As. Min. (Yugoslavia). Described from Kraina (Yugoslavia).

Section 6. *Sulcata* e † Svenson in *Rhodora* 31 (1929) 129. — Achenes white, distinctly or obscurely trigonous, usually more than 1 mm long. Culms usually erect. Stigmas 3.

37. *H. margaritacea* Hultén, Fl. of Kamtch. (1927) 166. — Ic.: Hult. 1. c. fig. 12; Svenson in *Rhodora* 36 (1934). pl. 320, f. 7.

90 Perennial. Culms tufted, 25-45 cm tall, deeply furrowed, with fuscous sheaths. Basal sheath encircling base of spikelet, broadly ovate; fertile scales 1-nerved, obtuse to acutish, in old specimens yellowish-brown (in young specimens apparently darker); stigmas 3; achene, including tubercle, ca. 4 mm long, trigonous, strongly attenuate toward the base, white, lustrous, terminating in an inflated spine; tubercle conical, pointed, ca. $1/2$ – $2/3$ mm long, blackish-brown; bristles 6, exceeding the achene, with short retrorse barbs. Flowering time unknown. (Plate VII, Figure 12).

† The position of the species, provisionally included here, is not clear; Svenson (*Rhodora* 36, 1934) places it in the section *Pauciflorae*.

Far East: Kamch. (in a swamp, in the *Pinus pumila* zone, by the path from Petropavlovsk—Avachinskaya knoll, alt. about 250 m). Described from Kamchatka. Type in Stockholm, cotype in Leningrad.

Section 7. *Tuberculosae* Svenson in *Rhodora* 31 (1929) 129. — Achenes obscurely trigonous; tubercle dilated, long-conical, or oblong-conical, large, sometimes equaling or even exceeding the achene.

38. *H. petasata* (Maxim.) Zinserl. comb. n. — *Scirpus petasatus* Maxim. in Bull. Soc. Moscou (1879) 64; Meinsh. A.H.P. XVIII, 3 (1901) 260. — *H. tetraquetra* Kom. Fl. Manchzh. I (1901) 351; Kom. and Alis. Opr. rast. Dal'nevost. Kraya I, 366. — Ic.: Kom. and Al., l.c. tab. 79, Figure 11.

Perennial. Plants with creeping rootstock, cespitose; culms grayish-green, slender, 3-angled, subsulcate, 25-65 cm tall. Spikelets ovoid-cylindric to cylindric, 7-15 mm long; basal scale obtuse; fertile scales elliptic, obtuse, with a broad pale median part, bordered with brown, and hyaline margin; stigmas 3; achene obovoid, faintly trigonous; tubercle conical to oblong-conical, as long as the achene or shorter (2/3 its length or more); bristles 6, equaling the achene or slightly shorter or longer, barbs very long, thick, transparent, spreading, curved and implexed, hence bristles appearing woolly. June—July. (Plate VII, Figure 16).

Wet meadows and lowland swamps, canals, and ricefields. — Far East: Kamch. (near the village of Apacha), Ze. -Bur. (rarely in eastern part), Uss. Gen. distr.: East. Asia (Manchuria, North China). Described from Northern China (Peiping region). Type in Leningrad.

NOTE: A closely related species—*H. tetraquetra* Nees, with which *H. petasata* is often identified, is distributed in India and is distinguished by retrorse non-implexed barbs and 4-angled culms.

Genus 229. *Fimbristylis* † Vahl, ††

Vahl, Enum. II (1806) 285.

Inflorescence a compound or simple umbel, with sessile spikelets at the base of the main and secondary umbels, rarely a solitary spikelet terminating the culm. Scales spirally arranged, mostly with a green midrib. Flowers perfect; stamens 3, rarely 2-1; bristles none. Style 2-cleft, 91very rarely 3-cleft, with spreading hairs in upper part below the stigmas, enlarged at base. Annual, very rarely perennial plants, with numerous rather short culms; leaves narrowly linear, crowded at culm base.

- | | | |
|----|---|--|
| 1. | Stigmas 3; achene tuberculate | 9. <i>F. quinquangularis</i> (Vahl) Kunth. |
| + | Stigmas 2; achene rugose or smooth | 2. |
| 2. | Scales smooth, often lustrous | 3. |
| + | Scales covered with short hairs on the back, especially in upper part | 8. |

† From Greek *fimbria*, a fringe, and *stylos*, style, i. e. fringed style.

†† Arranged by B. K. Shishkin.

3. Achene linear-oblong, 3.5 times as long as broad; spikelets ovoid-globular, many-flowered, small, 2-5 mm long; scales ca. 1 mm long 1. *F. verrucifera* Maxim.
- + Achene subglobular, barely longer than broad; spikelets lanceolate or oblong-lanceolate; scales ca. 2 mm long 4.
4. Scales prolonged into spreading tip their own length; the enlarged style base clothed with ragged hairs partly covering the achene 8. *F. squarrosa* Vahl.
- + Scales with very minute tips; no ragged hairs at base of style 5.
5. Achene smooth, minute, 0.5 mm long. 4. *F. leiocarpa* Maxim.
- + Achene with fine longitudinal ribs and cross-ribs, usually somewhat larger, 0.5-1 mm long. 6.
6. Inflorescence a compound umbel, with 5-8 primary rays; involucre mostly of 5 bracts; achene 0.5-0.75 mm long 2. *F. dichotoma* (L.) Vahl.
- + Inflorescence mostly a simple umbel; involucre of 2-3 bracts; achene 1 mm long 7.
7. Leaves narrowly linear, 0.5-1 mm broad; umbel usually with 1-3 rays; spikelets 12-15-flowered 3. *F. annua* (All.) Roem. et Schult.
- + Leaves linear, 1-2.5 mm broad; umbel with 3-6 rays; spikelets 18-22-flowered 5. *F. ochotensis* Meinsh.
8. Culms slender; leaves usually divergent and often reflexed, with pubescent sheaths; spikelets obtusish 7. *F. Sieberiana* Kunth.
- + Culms strong; leaves usually erect, with glabrous sheaths; spikelets pointed 6. *F. ferruginae* (L.) Vahl.

92 Section 1. *Dichelostylis* Benth. Fl. Austral. VII (1874) 309. — Style 2-cleft; annuals.

1. *F. verrucifera* (Maxim.) Mak. Tokyo Bot. Mag. (1895) 259. — *Isolepis verrucifera* Maxim. Prim. Fl. Amurens. (1859) 300. — *Scirpus verruciferus* Meinsh. in A.H.P. XVIII, 3 (1901) 26. — *Fimbristylis dipsacea* Kom. in Fl. Manshur. I, 346 non Benth. — Ic.: Kom. and Alis. Opređ. rast. Dal'nevost. Kraya I (1931) tab. 78 (subtus).

Annual. Culms numerous, tufted, erect, sometimes decumbent, 2-18 cm tall, obtusely 3-angled; leaves setaceous, channeled, pale-green, much shorter than the culm. Inflorescence umbellate, with a solitary sessile spikelet, at the base of which arise 1-9 unequal rays, each terminated by a single sessile spikelet or by 2 spikelets, of which the second short-pedicel; involucre bracts 3-6, unequal, the longest twice as long as the inflorescence. Spikelets ovoid-globular to ovoid, densely many-flowered, 2-5 mm long; scales oblong, the inner ones ca. 1 mm long, glabrous, membranaceous, the green midrib exerted into a short tip. Achene oblong, 1/2 mm long, 2.5 times as long as broad, transversely rugose. End of May, June-August. (Plate VIII, Figure 5 a-c).

Damp silty and sandy margins of rivers and canals. — Far East: Ud., Uss. Endemic (?). Described from the lowlands of Amur River. Type in Leningrad.

2. *F. dichotoma* (L.) Vahl, Enum. II(1806)287; Ldb. Fl. Ross. IV, 258; Boiss. Fl. Or. V, 398. —*S. cirpus dichotomus* L. Sp. pl. (1753) 50. —Exs.: HFR No. 943; Herb. Fl. cauc. No. 14.

Annual. Culms tufted, numerous, erect or ascending, 5-15 (35) cm tall, obtusely 3-angled; leaves with pubescent sheaths, narrowly linear, 0.5-1 mm broad, flat or conduplicate, long-acuminate, puberulent to glabrescent. Inflorescence containing numerous spikelets, umbellate, 5-8 rays arising at the base of a sessile spikelets, each ray terminating in a spikelet or secondarily divided, again with a sessile spikelet and one to several branches, each bearing a solitary spikelet; involucre bracts usually 5, foliaceous, the lowest often longer than the inflorescence; spikelets oblong-lanceolate to lanceolate, 1-5 mm long, 18-22-flowered; scales ca. 2 mm long, broadly ovate to suborbicular-ovate, brownish, the light green midnerve excurrent into a short tip; achene yellowish-white, obovoid, 0.5-0.75 mm long, with 5-7 longitudinal bands, transversely rugose. August-September. (Plate VIII, Figure 5 a-c).

Boggy places, wet sands, and margins of streams. —Caucasus: West., East., and South. Transcauc.; Centr. Asia: Kara-Kum., Kyz.-Kum., 93 Amu-Dar., Syr-Dar. Gen. distr.: West. and East. Medit., Balk.-As. Min., Ind., Jap.-Chin., Austral., Afr. Described from India. Type in London.

3. *F. annua* (All.) Roem. et Schult. Syst. II (1817) 95; Fomin and Voron. Oprel. I (1909) 170. —*Scirpus annuus* All. Fl. Pedem. II (1785) 277. —Exs.: Kneuck. VI Lf. (1907) No. 160.

Annual. Culms tufted, erect or ascending, 4-15 cm tall, obtusely or acutely 3-angled; leaves with puberulent to glabrescent dark brown sheaths, narrowly linear, 0.5-1 mm broad, flat or conduplicate, slender-pointed, glabrous or puberulent only at base, scabrous on the margins. Inflorescence an umbel, containing numerous spikelets, 1-3 rays arising at the base of a sessile spikelet, each ray terminating in a solitary sessile spikelet or secondarily divided, again with a sessile spikelet and 1 or 2 pedicelled spikelets; involucre bracts usually 2, the lower nearly as long as the inflorescence; spikelets ovoid to oblong-ovoid, 4-8 mm long, 12-15-flowered; scales ca. 2.5 mm long, broadly ovate, short-tipped, dark brown, with a green midnerve, narrowly white-hyaline-margined; achene yellowish-brown, ca. 1 mm long, with 7-9 longitudinal bands, transversely rugose. August-September.

Wetish shores. —Caucasus: West. Transcauc. Gen. distr.: West. and East. Medit., southern part of Centr. Eur., Balk.-As. Min. Described from Piedmont.

4. *F. leiocarpa* Maxim. Prim. Fl. Amur. (1859) 301 non Miq. (1866); Meinsh. in A.H.P. XVIII, 3 (1901) 29. —*F. aestivalis* Kom. Fl. Manchzh. I, 347 non Vahl. —Ic.: Kom. and Alis. Oprel. rast. Dal'nevost. Kraya I (1931) tab. 78 (upp.).

Annual. Culms tufted, numerous, filiform, obtusely 3-angled, finely edged, 4-15 cm tall, leafy at base; leaves narrowly linear, subfiliform, 0.5 mm broad, erect or reflexed, mostly half as long as the culm, blades and sheaths puberulent. Inflorescence an umbel, with 3-12 unequal rays arising at the base of a sessile spikelet, each ray terminating in a single spikelet, or dividing in turn into 1-5 branches, with a sessile spikelet at their base; involucre bracts 4-7, foliaceous, 1 or 2 of them equaling or

slightly exceeding the inflorescence, the others short; spikelets 18-20-flowered, pale brown, ovoid to ovoid-oblong, 2-4 mm long and 1.5 mm broad; scales broadly oval, membranaceous, the green midrib excurrent into a short tip; stamen solitary; achene rounded-obovoid, 0.5 mm long, lustrous-white, smooth, obscurely hatched. (Plate VIII, Figure 3, a-c).

Silty river shores. —Far East: Ud., Uss., Endemic. Described from the Amur River. Type in Leningrad.

- 94 5. *F. ochotensis* (Meinsh.) Kom. Fl. Kamtsch. I (1927) 212. —
Scirpus ochotensis Meinsh. in A.H.P. XVIII, 3 (1901) 248.

Annual. Culms tufted, numerous, filiform, finely furrowed, glabrous, leafy at base, 4-20 cm tall; leaves linear, 1-2.5 mm broad, soft-hairy or glabrescent, half as long to as long as, or slightly exceeding the culm; sheaths ferruginous-brown, glabrous below, pubescent above. Umbel mostly simple with 3 rays from the base of a sessile spikelet, more rarely the culm terminating in a solitary spikelet; involucre of 3 bracts of which one usually overtopping the inflorescence, the other two short; spikelets ovoid, ferruginous-brown, obtusish, 2-6 mm long and 1-3 mm broad, 18-22-flowered; scales broadly ovate, smooth, lustrous, with a green midrib whitish or dark red on the margins, mucronulate, ca. 2 mm long; achene broadly ovoid, flattened, with fine longitudinal ribs, transversely rugose between the ribs, ca. 1 mm long. July—August. (Plate VIII, figure 2 d-e).

Wet borders of mountain springs. —Far East: Kamch. Endemic. Described from Kamchatka (Malka). Type in Leningrad.

NOTE: Unknown from Okhotskii coast.

6. *F. ferruginea* (L.) Vahl, Enum. II (1806) 291. —*Scirpus ferrugineus* L. Sp. pl. (1753) 50. —*Isolepis turkestanica* Rgl. in A. H. P. VII (1881) 561. —*Scirpus turkestanicus* Meinsh. in A. H. P. XVIII, 3 (1901) 247. —*Fimbristylis turkestanica* B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 181. —*F. vittata* C. B. Clarke in Kew Bull. Misc. Inform. Addit. Ser. VIII (1908) 24. —*F. ciliata* Drobov in Opred. rast. okr. Tashkenta I (1927) 49. —Exs.: Kneuck., Cyperac. et Junc., exsicc. No. 196 a.

Annual. Culms numerous, forming dense tussocks, erect, 15-30 cm tall, obtusely 3-angled, furrowed, more or less flattened, culm and leaves glabrous, glaucescent; leaves narrowly linear, erect, usually flat, 4-15 (22) mm long and ca. 1 mm broad, acute, very finely reticulate, with ferruginous-brown, glabrous sheaths. Inflorescence umbellate, rays 4-6, unequal, 4-15 mm long, arising at the base of a sessile spikelet, each usually terminating in a solitary spikelet; involucral bracts 2, of which one short, the other longer or equaling the inflorescence; spikelets ovoid to oblong, subacute, many-flowered, 5-8 mm long, scales scarious, ovate to orbicular-ovate, 2 mm long, dark ferruginous-brown, convex on the back, in upper part copiously short-pubescent and green-midribbed, mucronulate; stamens 3; achene broadly obovoid, glabrescent, ca. 1 mm long. June—August.

River banks. —Centr. Asia: Amu-Dar. (along river Pyandzh), Syr-Dar. (Aim). Gen. distr.: Ind. -Him, Jap. -Chin., North and South Amer. Described from Jamaica. Type in London.

- 95 NOTE: Poorly developed specimens were described by Regel as a distinct species (*Isolepis turkestanica* Rgl. l.c.).

7. *F. Sieberiana* Kunth, Enum. pl. II (1837) 237; Grossg. Fl. Kav. I (1928) 149.

Annual. Resembling the preceding species, but culms more slender, leaves reflexed, with pubescent sheaths, spikelets obtusish. June—July.

Sandy coastal places. —Indicated for the Caucasus: East. Transcauc. (Gandzha). Gen. distr.: Trop. Amer., As. Min., Ind.-Him. Described from Mauritius.

NOTE: Occurrence of this species in the U.S.S.R. needs confirmation.

Section 2. *Pogonostylis* (Bertol.) Pax in Engl. u. Prantl. Die naturl. Pflanzenfam. II, 2 (1887) 113. —Gen. *Pogonostylis* Bertol. Fl. Ital. I (1833) 312. —Base of style clothed with ragged hairs which cover the ovary.

8. *F. squarrosa* Vahl, Enum. II (1806) 289; Boiss. Fl. Or. V, 390; Kom. Fl. Manchzh. I, 347; Grossg. Fl. Kavk. I, 149. —*Pogonostylis squarrosa* Bertol. Fl. Ital. I (1833) 312. —Ic.: Rchb. Fl. Germ. VIII (1846) tab. 315. —Exs.: Herb. Fl. cauc. No. 203.

Annual. Culms numerous, filiform, obtusely 3-angled, finely edged, 4-10 cm tall, leafy at base; leaves shorter than the culm or nearly as long, narrowly linear, setaceous-acuminate, flat or conduplicate, ca. 0.5 mm broad, glabrous, with pubescent or glabrescent sheaths. Inflorescence an umbel, rays 10-12, unequal, arising at the base of a sessile spikelet, each terminating in a spikelet or forking again; involucreal leaves 3-4, setaceous, arising from an enlarged, short, pubescent base, often exceeding the inflorescence; spikelets 18-21-flowered, oblong-fusiform, 2.5-5 mm long; scales oblong-ovoid (excluding tip ca. 1.5 mm long), light brown, the green midrib excurrent into a spreading tip 1-2 mm long; base of style enlarged, clothed with ragged hairs partly covering the achene; achene broadly obovoid to suborbicular, 0.5-0.6 mm long, pale yellow, smooth, lustrous. September. (Plate VIII, Figure 8, a-e).

Ricefields and wet meadows. —Caucasus: Tal.; Far East.: Ud., Uss. Gen. distr.: West. Medit., North and South Afr., Ind.-Him., Jap.-Chin., trop. Amer. Described from South America.

Section 3. *Trichelostylis* (Lest.) C. B. Clarke in Fl. of Brit. Ind. VI (1894) 641. —Gen. *Trichelostylis* Lest. Essai Fam. Cyper. (1819) 40. —Style 3-cleft; perennials.

96 9. *F. quinquangularis* (Vahl) Kunth, Enum. pl. II (1837) 229. —C. B. Clarke in Fl. of Brit. Ind. VI, 644. —*Scirpus quinquangularis* Vahl, Enum. II (1806) 279.

Perennial. Culms leafy at base, ascending to erect, glabrous, glaucescent, scaberulous on the margins above, often longer than the culm; sheaths rufous, glabrous. Inflorescence an umbel, spreading, rays of first order 8-12, unequal, scabrous, forking into rays of second order, and these in turn into rays of third order; involucreal bracts 3-5, narrowly linear, scabrous, unequal, not exceeding the inflorescence; spikelets ovoid, acute, 2-4 mm long, the central spikelets sessile; scales broadly ovate, ca. 1 mm long, ferruginous-brown, carinate, glabrous; stamen solitary; achene subglobular, trigonous, lustrous, tuberculate and transversely rugose, 0.6 mm long. July—August. (Plate VIII, Figure 7, a-e).

Ricefields, margins of swamps, and wet places. —Centr. Asia: Syr.-Dar. Gen. distr.: Ind.-Him., Malay Archipelago, Philippines, trop. Austral., and Mauritius. Described from East India.

Genus 230. *Bulbostylis* † Kunth. ††

Kunth, Enum. plant. II (1837) 205.

Inflorescence a compound or simple umbel, with a sessile spikelet at the base of rays. Scales spirally arranged, the 1-2 lowest empty. Bristles none. Stamens 2-3, rarely 1. Style 3-cleft, smooth, swollen at base. Achene broadly ovoid, obtusely trigonous, more or less transversely puckerred. Annual plants with rather low culms and filiform leaves crowded at base.

1. Spikelets 4-8 mm long; scales ca. 3 mm long; the enlarged base of style falling in maturity together with style 3. *B. Woronowii* Palla.
- + Spikelets small, 2-4 mm long; scales 1.5-2 mm long; the enlarged base of style persistent upon the achene 2.
2. Scales dark brown to blackish, usually minutely puberulent, the lower pointed, the upper obtusish; achene transversely puckerred 1. *B. capillaris* (L.) Nees.
- + Scales ferruginous-brown, usually glabrous, all with a very short, sometimes spreading, tip; achene nearly smooth 2. *B. tenerrima* (Fisch. et Mey.) Palla.

97 1. *B. capillaris* (L.) Nees in Mart. Fl. Bras. II, 1 (1842) 84 in obs.; Kunth ex C.B. Clarke in Hook. Fl. Brit. Ind. VI, 652; Kom. Fl. Manchzh. I, 345. —*Scirpus capillaris* L. Sp. pl. (1753) 49 s. str.

Annual. Culms numerous, tufted, erect, setaceous, 3-15 cm tall, 3-angled, leafy at base; leaves capillary, half as long to nearly as long as the culm, glabrous. Inflorescence an umbel; rays 1-3 from base of a sessile spikelet, each usually terminating in a solitary spikelet; involucre bracts 2, one short and the other nearly as long as the inflorescence or longer, setaceous; spikelets ovoid-oblong, 6-8-flowered, acute, 2-4 mm long; scales ovate, with a green midrib, dark (nearly blackish) brown, the lower short-tipped, the upper obtuse, ca. 2 mm long and 2 mm broad; achene dark brown, trigonous, broadly ovoid, prominently cross-wrinkled, 0.8 mm long. August-September. (Plate VIII, Figure 1, a-e).

Wetish shores, wet coastal sands, solonetz meadows. —Far East: Uss. (Vladivostok District), Gen. distr.: North and South America. Described from Virginia. Type in London.

2. *B. tenerrima* (Fisch. et Mey.) Palla in Monit. Jard. Bot. Tiflis. livr. XXI (1912) 21. —*Isolepis tenerrima* Fisch. et Mey. ex Kunth, Enum. pl. II (1837) 212, nom. nud. —*I. capillaris*, f. *europaea* Kunth l.c. (1837). —*I. capillaris* Ldb. Fl. Ross. IV (1853) 257 non Roem. et Schult. —*Fimbristylis capillaris* Boiss. Fl. Or. V (1884) 390 non Asa Gray. —*Bulbostylis capillaris* Woron. in Fom. and Voron. Opredelitel', 170, non Nees. —Exs.: Herb. Fl. caus. No. 15; Pl. orient. exs. No. 128.

Annual. Culms tufted, numerous, filiform, 3-angled, glabrous, 5-25 cm tall, leaves capillary, mostly half as long, more rarely nearly as long as

† From Greek *bolbos* — bulb, and *stylos*, style.

†† Arranged by B. K. Shishkin.

the culm, glabrous. Inflorescence an umbel; rays 1-4 from the base of a sessile spikelet, each usually terminating in a solitary spikelet, rarely forming 1-2 secondary rays with a sessile spikelet at base; involucre bracts 2, one short and the other nearly as long as the inflorescence, setaceous; spikelets ovoid, 2-4 mm long, acute, 6-8-flowered; scales ovate, all acute, with a mostly somewhat spreading short tip, light or dark brown, glabrous, ca. 1.5-2 mm long; stamens 2, rarely 1 or 3; achene light brown, broadly ovoid, trigonous, slightly cross-wrinkled, 0.8 mm long. July-September.

Wet meadows and ricefields. -Caucasus: West. Transcauc. Gen. distr.: Turkish Lazistan. Described from the Caucasus. Type in Leningrad.

3. *B. Woronowii* Palla in Monit. Jard. bot. Tiflis, livr. XXI (1912) 22. -Exs.: Herb. Fl. cauc. No. 16.

Annual. Culms numerous, tufted, 7.5-20 cm tall, 0.5 mm thick, 3-angled, glabrous or with short rough hairs above; leaves crowded at base of culm, filiform, 0.2-0.4 mm broad, smooth or in upper part scabrous-margined, usually much shorter than the culm; sheaths short-pubescent. Inflorescence an umbel of 1-4 spikelets, of which one sessile, 1-2 prominently scabrous rays, 4-12 mm long, arising at its base, terminating in 1-2 spikelets, of the 2 one sessile, the other pedicelled; involucre bracts 2, one long, often considerably exceeding the inflorescence, the other short; spikelets ovoid-elliptic, 4-8 mm long and 2-2.5 mm broad, acute; scales navicular, broadly ovate, ca. 3 mm long and 2-2.5 mm broad, short-acuminate, very copiously short-pubescent, dark purple-brown, with narrow whitish margin and a green midrib, 3-nerved; stamens 3; style strongly enlarged at base, falling in maturity together with the enlarged part; achene globular-obovoid, trigonous, fulvous, transversely wrinkled, ca. 1 mm long. October. (Plate VIII, Figure 4, a-e).

Wet sandy and clay soil, cornfields. -Caucasus: South-West. Transcauc. Gen. distr.: Turkish Lazistan. Described from Western Transcaucasia (near the village Makrial). Type in Tiflis, cotype in Leningrad.

Genus 231. *Schoenus* † L. ††

L. Gen. Pl. ed. 5 (1754) 26.

Inflorescence a terminal head of several to many spikelets, surrounded by terminal involucre bracts. Spikelets 2-3-flowered. Scales midribbed, 2-ranked. Hypogynous bristles 3-5, equal. Stamens 3, more rarely up to 6. Achene trigonous.

1. Inflorescence consisting of 5-10 spikelets; involucre leaf with a subulate blade at least twice as long as the inflorescence 1. *S. nigricans* L.
- + Inflorescence consisting of 2-3 spikelets; involucre leaf with a short blade only slightly exceeding the inflorescence 2. *S. ferrugineus* L.

† From Greek *schoinos*, a rush, mentioned by Homer and others.

†† Arranged by R. Yu. Rozhevits.

101 1. *S. nigricans* L. Sp. pl. (1753) 43; Shmal'g. Fl. II, 551. —
Chaetospora nigricans Kunth, Enum. II (1837) 323; Ldb. Fl. Ross.
IV, 260. —Ic.: Rchb. Ic. Fl. Germ. VIII, tab. 286, f. 579.

Perennial, tufted, with short branching rootstock, culms 20-50 cm long, glabrous, twice as long as the leaves; lowest leaf sheaths blackish-brown, others reddish-brown or yellowish-brown, lustrous, with fugacious, narrowly canaliculate blade. Inflorescence capitate, consisting of 5-10 spikelets; involucre bracts 2, the lower with narrow subulate-canaliculate blade, greatly exceeding the inflorescence (often several times as long), the other with subulate blade shorter than the inflorescence, both blackish-cinnamon-brown; spikelets lance-acuminate, 2-3-flowered. Scales ovate-lanceolate, scabrous on the midrib, blackish-brown, paler toward the summit and margins; hypogynous bristles 3-5, shorter than the achene, sometimes wanting; achene ovoid to oblong, ca. 1.5 mm long, trigonous, lustrous-white. June—August. (Plate V, Figure 11).

Boggy meadows and sea coast. —European part: Prichern., Crimea; Caucasus: Ciscauc., Dag., West., East., and South. Transcauc., Tal.; Centr. Asia: Syr-Dar., Pam.-Al. Gen. distr.: Scand., Centr. Eur., Atl. Eur., Medit. Described from Europe. Type in London.

2. *S. ferrugineus* L. Sp. pl. (1753) 43; Shmal'g. Fl. II, 550. —
Chaetospora ferruginea Rchb. Fl. Germ. excurs. (1830) 74;
Ldb. Fl. Ross. IV, 260. —Ic.: Rchb. Ic. Fl. Germ. VIII, tab. 285, fig. 676. —Exs.: HFR No. 140.

Perennial, densely tufted; rootstock short-creeping; culms 10-30 cm tall, glabrous, surrounded at base with dark reddish-brown sheaths, of these the upper 1-2 with thin subulate blade. Inflorescence capitate, consisting of 2-3 spikelets and involucre of 2 bracts; lower involucre bract with small subulate-canaliculate blade, barely exceeding the inflorescence, the upper short-subulate-tipped, shorter than the inflorescence; spikelets narrowly lanceolate to lanceolate, acuminate, 2-3-flowered; scales lanceolate, acuminate, smooth on the midrib; hypogynous bristles usually 6, longer than the achene; achene obovoid, ca. 1.5 mm long, grayish, lustrous, with small apiculation derived from style base. June—August. (Plate V, Figure 12).

Peat swamps, boggy meadows, and sandy or stony sea coast. —European part: Kar. -Lap., Lad. -Il'm., Upp. Volg., Mid. Dnepr. (Kursk), Zavolzh. Gen. distr.: Scand., Centr. Eur., Atl. Eur., Balk. -As. Min. Described from Gotland. Type in London.

Genus 232. *Cladium* † Schrad. ††.

Schrad. fl. Germ. I (1896) 74.

102 Inflorescence consisting of a terminal compound panicle, and numerous axillary panicles shorter than the terminal panicle. Spikelets borne in glomerules, small, brown. Lower scales empty, those above them with

† From Greek *clados*, branch.

†† Arranged by R. Yu. Rozhevits.



staminate flowers, and the terminal ones with perfect flowers. Hypogynous bristles none. Stamens 2, rarely 3. Style filiform, enlarged at base, with 3-2 villous stigmas. Achene ovoid, short-pointed.

1. *C. mariscus* (L.) R. Br. Prodr. I (1810) 92; Ldb. Fl. Ross. IV, 259; Boiss. Fl. Or. V, 392; Shmal'g. Fl. II, 551. — *Schoenus Mariscus* L. Sp. pl. (1753) 42. — *S. Medwedewi* Meinsh. In A.H.P. XVIII, 3 (1901) 272. — Ic.: Rchb. Ic. Fl. Germ. VIII, tab. 287, fig. 682. — Exs.: HFR No. 36.

Perennial; a grayish-green plant, with thick rootstock, stoloniferous-culms 1-1.5 m tall, terete, leafy; leaves linear, trigonous in upper part, 10-15 mm broad, serrate-scabrous on the margins and midrib. Inflorescence paniculate, long, consisting of spikelets borne in numerous glomerules, terminal or axillary; involucre bracts considerably exceeding the inflorescence; spikelets to 4 mm long, ovoid-lanceolate, clustered in heads, sessile or pediceled; scales lanceolate, acute, with distinct midrib, yellowish-brown; hypogynous bristles none; achene 3-3.5 mm long, ovoid or obovoid, blackish-cinnamon-brown; stigmas 3, slender, short. June-August. (Plate V, Figure 10).

Sandy and silty ground, lakes and swamps. — European part: Lad. - Il'm., Upp. Volg., Volg. - Kam., Zavolzh., Crimea, Low. Don.; Caucasus: Ciscauc., West. and East. Transcauc.; Centr. Asia: Mount. Turkm., Syr-Dar., Pam. - Al. Gen. distr.: Scand. (southern part), Centr. and Atl. Eur., Medit., Balk. - As. Min., Iran. Described from Europe. Type in London.

233. *Rhynchospora* † Vahl ††

Vahl, Enum. II (1806) 236.

Flowers in clusters, arranged terminally or in the axils of upper leaves on long peduncles. Spikelets with spirally imbricated scales, the 2-4 basal scales and the apical scales infertile, the middle ones bearing 2-3 perfect flowers. Hypogynous bristles 5-13, barbed. Stamens 2-3. Style enlarged at base, 2-fid. Achene flattened, with persistent style-base tubercle.

1. Plants 40-80 cm tall, with spreading inflorescence; bristles (1-3)(-5)
..... 3. *R. caucasica* Palla.

† From Greek *rhynchos*, beak, and *spora*, seed, referring to the beaked achenes.

†† Arranged by R. Yu. Rozhevits.

Explanation to Plate VIII

1. *Bulbostylis capillaris* (L.) Nees: a) spikelet, b) scale, c) achene. — 2. *Fimbristylis ochotensis* (Meinsh.) Kom.: a) spikelet, b) scale, c) achene. — 3. *F. leiocarpa* Maxim.: a) spikelet, b) scale, c) achene. — 4. *Bulbostylis Woronowii* Palla: a) spikelet, b) scale, c) achene. — 5. *Fimbristylis dichotoma* (L.) Vahl.: a) spikelet, b) scale, c) achene. — 6. *F. verrucifera* (Maxim.) Mak.: a) spikelet, b) scale, c) achene. — 7. *F. quinqueangularis* (Vahl.) Kunth.: a) spikelet, b) scale, c) achene. — 8. *F. squarrosa* Vahl.: a) spikelet, b) scale, c) achene.

- 103 + Plants to 40 cm tall, with subcapitate or cymose inflorescence; bristles 5-13. 2.
2. Involucral bract not exceeding or slightly exceeding the inflorescence; spikelets whitish; bristles 9-13. 1. *R. alba* (L.) Vahl.
- + Involucral bract considerably exceeding the inflorescence; spikelets more or less brownish; bristles 5-6. 3.
3. Plants stoloniferous; spikelets ca. 5 mm long; bristles 5-6, antrorsely barbed. Occurring only in the European part of the U.S.S.R. 2. *R. fusca* (L.) Ait.
- + Plants not stoloniferous; spikelets ca. 3 mm long; bristles 6, retrorsely barbed. Occurring in the Far East. 4. *R. Fauriei* Franch.

1. *R. alba* (L.) Vahl, Enum. II (1806) 236; Ldb. Fl. Ross. IV, 259; Shmal'g. Fl. II, 550; Kryl. Fl. Zap. Sib. III, 411. —*Schoenus albus* L., Sp. pl. (1753) 44. —Ic.: Rchb. Ic. Fl. Germ. VIII, tab. 285, f. 676; Syreish. Ill. Fl. Mosk. gubern. I, 168. —Exs.: HFR No. 87.

Perennial, loosely tufted; with short stolons; culms 15-40 cm tall, slender, leafy, 3-angled; leaves narrowly linear, to 2 mm broad, subconduplicate, with entire tubular sheaths; involucral bracts not exceeding or slightly exceeding the inflorescence. Inflorescence 7-10 mm long and nearly as broad; scales ovate-elliptic, 4-5 mm long and ca. 2 mm broad, with midrib, hyaline-margined, subulate-acuminate, whitish, brunescent in fruit; bristles 9-13, retrorsely barbed, ciliate at base, about equaling the achene; achene obovoid, 1.5-2 mm long and ca. 1 mm broad, tapering above to a beak ca. 1 mm long, finally brunescent. July-August.

Mossy peat bogs. —European part: Kar. -Lap., Dv. -Pech., Lad. -Il'm., Upp. Volg., Volg. -Kam., Upp. Dnepr., Mid. Dnepr., Volg. -Don., Zavolzh. (?), Low. Don (only north); Caucasus: West. Transcauc.; West. Siberia: Ob., Irt.; East. Siberia: Daur.; Far East: Kamch. Gen. distr.: all Europe (except extreme North and extreme South), Chin. -Jap., North Amer. Described from northern Europe. Type in London.

2. *R. fusca* (L.) Ait. ex Roem. et Schult. Syst. II (1817) 88; Ldb. Fl. Ross. IV, 259; Shmal'g. Fl. II, 550. —*Schoenus fuscus* L. Sp. pl. II (1763) 1664. —*Rhynchospora alba* var. *fusca* Vahl, Enum. II (1806) 236. —Ic.: Rchb. Ic. Fl. Germ. VIII (1846), tab. 285, fig. 677. —Exs.: HFR No. 1695.

104 Perennial, loosely tufted, with long stolons; culms 10-30 cm tall, slender, leafy, more or less distinctly 3-angled; leaves narrowly linear, ca. 1-1.5 mm broad, involute, with fuscous, closed sheaths. Involucral bracts considerably exceeding the inflorescence. Inflorescence 8-10 mm long and nearly as broad; scales ovate, 4-5 mm long, brownish, thin-hyaline, with midrib, subulate-acuminate; bristles 5-6, antrorsely barbed, much longer than the achene; achene obovoid, to 1.5 mm long, reddish brown, tapering into a beak to 1 mm long, thicker at base than in the preceding species. July-August. (Plate V, Figure 7).

Boggy places and damp sandy soil. —European part: Kar. -Lap., Lad. -Il'm., Volg. -Don. (?), Mid. Dnepr. Gen. distr.: Scand., Centr. Eur., Atl. Eur. Described from Sweden. Type in London.

3. *R. caucasica* Palla in Monit. Jard. Bot. Tiflis XXX (1913) 26.

Perennial, compactly tufted. Rootstock short-creeping; culms 40-80 cm tall, firm, leafy, 3-angled; leaves narrowly linear, to 3 mm broad, subinvolute, very long; involucre bracts not exceeding the inflorescence. Inflorescence spreading, with spikelets in small fascicles; scales dark brown, ca. 4 mm long, broadly lanceolate, hyaline, midrib excurrent into a short tip, the 3 basal scales empty, much smaller than other scales; bristles (1)3(-5), 1/4 shorter than achene including tubercle, antrorsely barbed; achene obovoid, ca. 2.5-5 mm long excluding tubercle, laterally compressed, the pyramidal beak ca. 1 mm long. August-September. (Plate V, Figure 8).

Swamps. -Caucasus: West. Transcauc. (Batum Distr.). Endemic. Described from the vicinity of the village Smekalovka (Bat.). Type in London.

4. *R. Fauriei* Franch. in Bull. Soc. Philom. Paris, Sér. 7X (1886) 104.

Perennial, forming small loose tufts; roots fibrous; culms 15-35(-60) cm tall, several, erect, slender; leaves stiff, to 2 mm broad, subinvolute to flat, triangular-tipped, scabrous-margined, shorter than the culm; involucre bracts very long, the upper bearing a short blade. Inflorescence consisting of 3-5 simple, more rarely paired, fascicles, of these the lower peduncled, distant from the upper ones; spikelets 2-flowered, 6-9, erect, rufous, linear-lanceolate, acuminate; 3 basal scales empty, ovate, the floriferous upper ones lanceolate; bristles 6, retrorsely barbed; stamens 3; style 2-fid; achene obovoid, 1.5-2 mm long, transversely rugulose, the gray conic beak ca. 1 mm long. August. (Plate V, figure 9).

River banks and marshes. -Far East: Uss. (Khabarovsk, Vladivostok). Gen. distr.: Japan, China. Described from Japan. Type in Paris (?).

Subfamily II. *Caricoideae* Pax. - Flowers unisexual, monoecious or dioecious; perianth bristles wanting.

Genus 234. *Cobresia* † Willd. (*Kobresia*) ††

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Willd. Sp. pl. IV (1805) 205.

Flowers unisexual, monoecious. Inflorescence a simple or compound spike, consisting of numerous spikelets, subtended by scale of spikelet; flowers 1-7 per spike, the pistillate flowers arranged in lower part of the spike, 1-3, surrounded by a glume with margins mostly connate only at base (very rarely to the summit). Stigmas 2-3. Staminate flowers 1-4, arranged in upper part of the spike, or together with the pistillate flowers on a short peduncle. Stamens 3. Fruit an achene. Perennial, compactly tufted plants, with creeping rhizomes giving rise to numerous cord-like strands of roots.

ECONOMIC IMPORTANCE: Species of the genus *Cobresia*, occurring widely in alpine pastures, are important pasture plants, particularly in alpine tundra. The best forage species are: *Cobresia Bellardi* (All.) Degl., *C. schoenoides* C.A.M., and *C. capillifolia* (Decne) C.B. Clarke. Eaten very rapidly by all kinds of livestock, recover quickly after

† Named for Cobres, a naturalist of the early 19th century, who made extensive scientific collections.

†† Arranged by L. P. Sergievskaya.

grazing and stand up well to trampling. According to the data of the Omsk Agricultural Institute, they contain at the post-flowering and fruiting stage, in percentages of dry matter: crude protein—11.13, fats—3.0-4.0, cellulose—24-25, nitrogen-free extractable substances—51.53, minerals—7.9. Hay, at 18 per cent moisture, contains in percentages: 3.5-4 digestible protein, 26-32 starch equivalent, and 43-53 feed units. Fresh herbage yield 20-25 centners, dried—4-6 centners per hectare.

1. Inflorescence a simple, narrow, linear spike, 1-2.5 cm long and 2-2.5 mm broad. Spikelets 2-flowered, with 1 pistillate and 1 staminate flower 4. *C. Bellardi* (All.) Degl.
- + Inflorescence a compound, ovoid or oval (rarely oblong-linear), rather broad spike 2.
2. Outer sheaths, surrounding the culm, leaf-bearing 3.
- + Outer sheaths bladeless. 6.
3. Spikelets consisting of 1 pistillate and 1 staminate flower 5. *S. simpliciuscula* (Wahlenb.) Mack.
- + Spikelets usually 3-7-flowered, comprising 1(2) pistillate and 2-5 staminate flowers. 4.
4. Inflorescence paniculate, 4-4.5 cm long; lower spikelets subdistant and borne on short pedicels; culms 30-40 cm tall 8. *C. paniculata* Meinsh.
- 106 + Inflorescence a compact, branched spike, 1-3 cm long; culms shorter, 3-30 cm tall. 5.
5. Culms 15-30 cm tall; leaves 1/4-1/2 as long as the culm 6. *C. Royleana* (Nees) Bcklr.
- + Culms short, 3-10(13) cm tall; leaves nearly as long as the culm, narrower, 1-2 mm broad 7. *C. humilis* (C.A.M.) L. Serg.
6. Sheaths stramineous-brown, very large, to 10 cm long; spike ovoid to oval, 5-10 mm broad; leaves 1-2 mm broad 1. *C. schoenoides* (C.A.M.) Steud.
- + Sheaths mostly dark reddish-brown or nearly cinnamon-brown, to 6 cm long; spike mostly linear-oblong, 2.5-5 mm broad; leaves narrower, to 1 mm broad. 7.
7. Leaves very narrow, 0.25-0.5 mm broad; culm slender, to 0.5 mm thick; sheaths 1-3(4) cm long. 3. *C. filifolia* Meinsh.
- + Leaves 0.5-0.75(1) mm broad; culm stouter; sheaths to 6 cm long *C. capillifolia* (Decne) C. B. Clarke

Section 1. *Elyna* (Schrud.) C. B. Clarke in Hock, f. Fl. Brit. Ind. (1894) p. 696. —Spike simple. Culm base covered with bladeless sheaths.

1. *C. schoenoides* (C.A.M.) Steud. Synops. Cyper. (1855) 246; Kük. in Engl. Pflzr. IV, 20 (1909) 35; Kryl. Fl. Zap. Sib. III, 412. —*Elyna schoenoides* C.A.M. Verzeichn. Pfl. Cauc. (1831) 29 et in Ldb. Fl. alt. IV (1833) 235 in adnot.; Ldb. Fl. Ross. IV, 262. —*Cobresia sibirica* Turz. ex Bess. in Flora XVIII, Beibl. 1 (1834) 26 et in Bull. Soc. Natur. Mosc. XI (1838) 103 nomen. —*Elyna sibirica* Turcz. ex Ldb. Fl. Ross. IV (1853) 262 et in Fl. baic.-dahur. II, 1 (1856) 287. —*Carex curvula* M. B. Fl. taur.-cauc. III (1819) 611 (excl. syn.), non Bell.

Perennial; culms 10-50 cm tall, stout, firm, 1-2 mm thick, covered at base with numerous, long (3-10 cm), brownish-stramineous, shining sheaths; leaves linear-filiform, involute, 1-2 mm broad, about as long as the culm or slightly shorter. Inflorescence a compact oval to ovoid spike, 2 cm long

and 5-13 mm broad, consisting of numerous spikelets; each spikelet consisting of 1, rarely 2-3 pistillate and 2-5 staminate flowers; achene trigonous, dull, 2-3 mm long and ca. 1-5 mm broad. June-July. (Plate IX, Figure 3 a-f).

109 Alpine and arctic meadows. —Arctic: Arct. Sib., Chuk.; Caucasus: Gr. Cauc., Dag.; West. Siberia: Alt.; East. Siberia: Ang.-Sayan., Len.-Kol.; Centr. Asia: Dzhung.-Tarb., Pam.-Al., Tyan'-Shan. Gen. distr.: As. Min., Arm.-Kur., Iran, Ind.-Him. Described from the Caucasus (Shakhdag Mountains). Type in Leningrad.

2. *C. capillifolia* (Decne) C.B. Clarke in Journ. Linn. Soc. XX (1883) 378. —*C. macrolepis* Meinsh. in A.H.P. XVIII, 3 (1901) 276. —*Elyna capillifolia* Decne in Jacq. Voy. Bot. IV (1844) 173, t. 174. —*E. spicata* Boiss. Fl. Or. V (1884) 394 partim non Schrad. —Ic.: Journ. Russ. bot. (1910) 16.

Perennial. Culms to 40 cm tall and ca. 1 mm thick; sheaths rather large, 4-6 cm long; leaves filiform, scabrous-margined, 0.5-1 mm broad. Spike oblong-linear, 1-3 cm long and 4-5 mm broad, branching in lower part; scales ovate to oblong-ovate, obtuse; stigmas 2 or 3; achene oblong. June-July. (Plate IX, Figure 1 a-e).

Alpine meadows. —Centr. Asia: Dzhung.-Tarb., Tyan'-Shan, Pam.-Al. Gen. distr.: Ind.-Him., Tib., Centr. China. Described from the Himalayas (from alt. 4,000 m). Type in Paris.

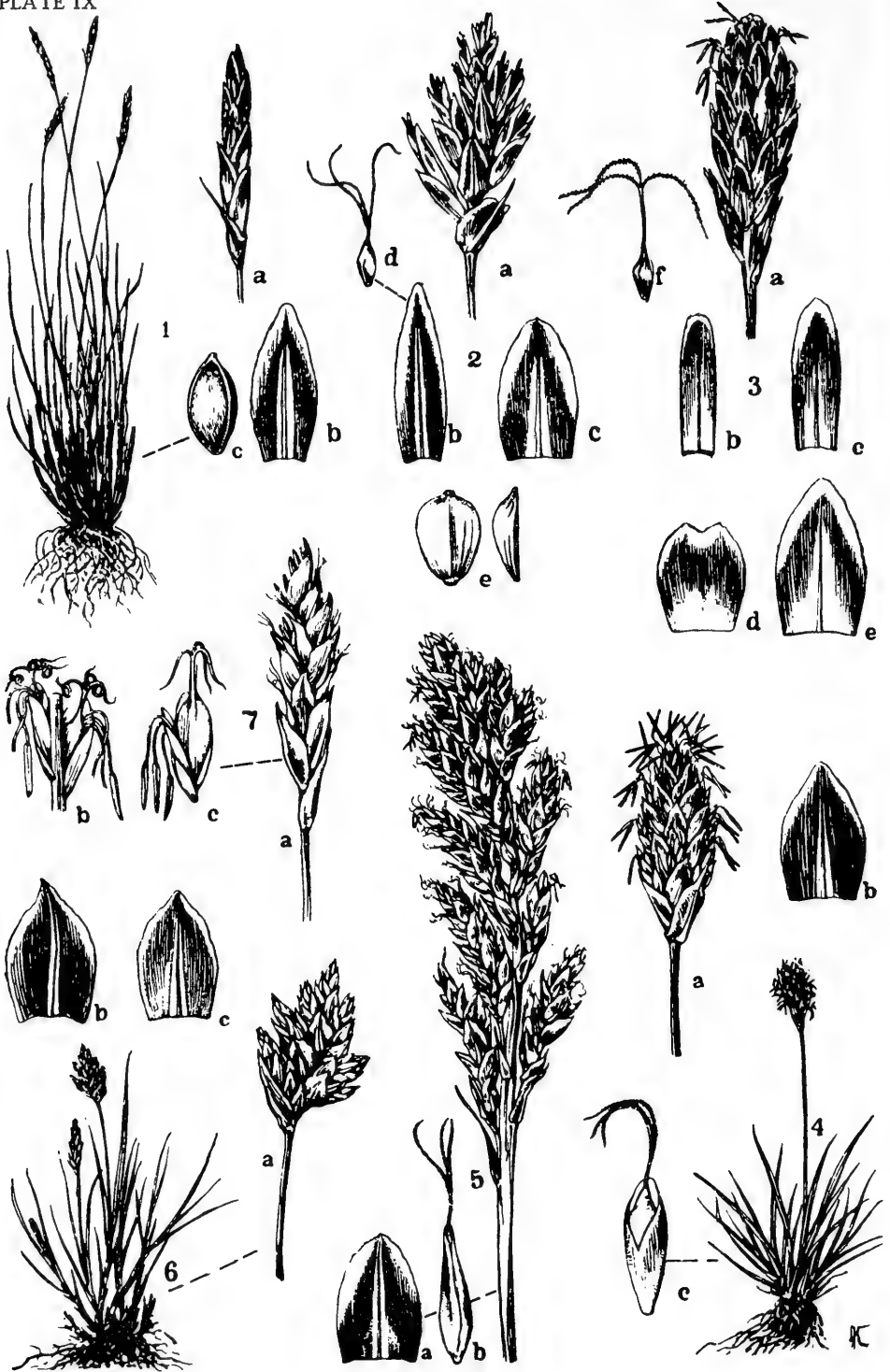
3. *C. filifolia* (Turcz.) Meinsh. in A.H.P. XVIII, 3 (1901) 275. —*C. gracilis* Meinsh. *ibid.*, 276. —*C. capillifolia* var. *filifolia* Kük. in Finska Vet. Soc. Förh. XLV (1902-1903) 1 et in Pflzr. IV, 20 (1909) 36; Kryl. Fl. Zap. Sib. III, 414. —*Elyna filifolia* Turcz. in Bull. Soc. Nat. Mosc. XXVIII, 1 (1855) 353 et in Fl. baic.-dahur. II (1856) 288.

Perennial. Culms slender, to 0.5 mm thick and 10-45 cm tall; sheaths 1-3(4) cm long; leaves filiform, 0.25-0.5 mm broad, slightly shorter than the culm or about as long; spike 1-2 cm long and 2.5-5 mm broad, oblong-elliptic, branching and broader in lower part; spikelets 5-10, 3-7-flowered, lower florets pistillate, other florets staminate; stigmas 3 or 2; achene oblong-ovoid, 2.5 mm long. June-July.

Boggy meadows. —West. Siberia: Alt.; East. Siberia: Yenis., Ang.-Sayan., Len.-Kol., Daur.; Centr. Asia: Dzhung.-Tarb., Tyan'-Shan., Pam.-Al. Gen. distr.: Iran. Described from Ulatinskije mineral springs in Transbaikalia. Type in Leningrad.

4. *C. Bellardi* (All.) Degl., in Lois. Fl. Gall. I (1807) 626; Kryl. Fl. Zap. Sib. III, 413. —*Carex Bellardii* All. Fl. Pedem. II (1785) 264. —*C. scirpina* Willd. Sp. pl. IV (1805) 205. —*Carex myosuroides* Vill. Prosp. (1779) 170 nom. nud. —*Elyna Bellardii* C. Koch in Linnaea, XXI (1848) 616. —*E. spicata* Schrad. Fl. Germ. I (1806) 155; Ldb. Fl. Ross. IV, 262. —Ic.: Kük. in Engl. Pflzr. IV, 20, figure 8.

110 Perennial. Culms 5-30(40) cm tall and 1/2-2/3 mm thick, invested with numerous old bladeless, brown or subferruginous sheaths; leaves very narrow, straight, slightly shorter than the culm or about as long, 1/4-1/2 mm broad. Inflorescence a linear spike, 1-2 cm long and 2-2.5 mm broad, containing 7-15 spikelets; spikelets consisting of 1 pistillate and 1 staminate floret; stigmas 3; achene oblong-obovoid, obtusely trigonous, ca. 2 mm long. June. (Plate IX, Figure 7, a-c).



Moss-lichen tundra, and wet, sometimes saline, meadows. —Arctic: Arct. Eur., Sib.; Caucasus: Gr. Cauc., Dag.; West. Siberia: Alt.; East. Siberia: Yenis., Len.-Kol, Ang.-Sayan., Daur.; Far East: Kamch.; Centr. Asia: Dzhung.-Tarb., Pam.-Al. Gen. distr.: Scand., mountains of Centr. Europe, Balk., Northern Mongolia, Greenl., North Amer. Described from northern Italy.

Section 11. *Eucobresia* C.B. Clarke in Hook. f. Fl. Br. Ind. VI (1894) 698. —Spike branching. All sheaths blade-bearing.

5. *C. simpliciuscula* (Wahlb.) Mack. in Bull. Torr. Club I (1920) 349. —*C. caricina* Willd. Sp. pl. IV (1805) 206; Kük. in Engl. Pflzr. IV, 20 (1909) 45 et in Journ. Bot. Russ. 3-6 (1911) 77, f. 4. —*C. bipartita* Dalla-Torre Anleit. Beob. Alpenfl. II (1882) 330; Kryl Fl. Zap. Sib. III, 413. —*Carex simpliciuscula* Wahlenb. in Sv. Vet. Ak. Nya Handl. XXIV (1803) 151. —*Elyna caricina* Mert. et Koch, Deutschl. Fl. I (1823) 458; Ldb. Fl. Ross. IV, 262. —Ic.: Rchb. Ic. Fl. Germ. VIII, tab. 193.

Perennial. Culms 3-20 cm tall, invested at base with brown blade-bearing sheaths; leaves involute or partly flat, 0.5-1.5 mm broad, slightly shorter than the culm or about as long. Spike compound, 1-2.5 cm long and 4-7 mm broad, oblong-ovoid to oblong, sublobate; spikes of second order 6-8 mm long, bearing 4-8 spikelets; each spikelet consisting of 1 pistillate and 1 (2) staminate florets, the terminal spikelet usually staminate. Stigmas 3; achene oblong-elliptic, ca. 3 mm long. June—July. (Plate IX, Figure 6, a-c).

Alpine zone, in moss-lichen tundra. —Caucasus: Dag., East. Cauc., Tal.; West. Siberia: Alt.; East. Siberia: Daur.; Centr. Asia: Dzhung.-Tarb., Tyan'-Shan. Gen. distr.: Scand., northern British Islands, mountains of southern Europe, Balk., As. Min., North Amer. Described from England (Westmorland). Type in Sweden.

6. *C. Royleana* (Nees) Bcklr. in Linn. XXXIX (1875) 8; Kük. in Engl. Pflzr. IV 20 (1909) 45. —*Trilepis Royleana* Nees in Edinb. New phil. Journ. XVII (1834) 267. —*Elyna stenocarpa* Kar. et Kir. in Bull. Soc. Natur. Moscou XV (1842) 526; Ldb. Fl. Ross. IV, 262. —*E. kokanica* Rgl. in A.H.P. VII (1880) 463. —*Cobresia Royleana* var. *kokanica* Kük. in Engl. Pflzr. IV, 20 (1909) 46. —Ic.: C.B. Clarke, Illustr. Cyperac. (1909), t. 143.

Perennial. Culms 15-30 cm tall, invested at base with brown blade-bearing sheaths, 1.5-2 cm long; leaves reflexed, flat, trigonous in upper

Explanation to Plate IX

1. *Cobresia capillifolia* (Decne) C.B. Clarke: a) spike, b) scale, c) achene. — 2. *C. Royleana* (Nees) Bcklr.: a) spike, b) and c) scales, d) ovary with 3 stigmas, e) achene. — 3. *C. schoenoides* (C. A. M.) Steud.: a) spike, b), c), d) and e) scales, f) ovary with 3 stigmas. — 4. *C. humilis* (C. A. M.) L. Serg.: a) spike, b) scale, c) young achene with stigmas. — 5. *C. paniculata* Meinsh.: a) scale, b) pistillate flower with 3 stigmas. — 6. *C. simpliciuscula* (Wahlb.) Mack.: a) spike, b), c) two scales. — 7. *C. Bellardii* (All.) Degl. a) spike, b) portion of spike with two perfect flowers, c) perfect flower.

part, acuminate, serrulate-margined, $1/4-1/2$ the length of culm. Inflorescence a branching, rather compact, ovoid spike, 1.5-3 cm long and 6-15 mm broad; spikes of second order consisting of 5-12 spikelets, of which
111 the terminal staminate, the lateral ones bisexual, consisting of 1 pistillate and 2-3 staminate florets, more rarely reduced to staminate florets along; scales broadly ovate, obtusish to short-acuminate; achene oblong, ca. 3.5 mm long. June-July. (Plate IX, Figure 1, a-e).

Var. *kokanica* Kük. —with a tall culm (40-50 cm long) and a looser inflorescence.

Subalpine meadows and slopes, river valleys and lake shores. —Centr. Asia: Dzhung.-Tarb., Tyan'-Shan., Pam.-Al. Gen. distr.: Iran., Tib., Ind.-Him., Centr. China. Described from the Himalayas.

7. *C. humilis* (C.A.M.) L. Serg. comb. nov. —*C. Royleana* var. *humilis* Kük. in Engl. Pflzr. IV, 20 (1909) 46. —*Elyna humilis* C.A.M. apud. Trautv. in A.H.P. 1 (1871) 21.

Perennial. Culms 3-13 cm tall and 0.5-1 mm thick; leaves mostly as long as the culm, reflexed, 1-2 mm broad. Spike 1-1.5 cm long and 0.4-1 cm broad, mostly compact. Otherwise resembling the preceding species. June-July. (Plate IX, Figure 4, a-e).

Subalpine meadows, morenes, screes, stony slopes, damp shores of rivers and lakes. —Caucasus: Dag.; Centr. Asia: Dzhung.-Tarb., Pam.-Al., Syr-Dar. Endemic. Described from Dzhung. Alatau. Type in Leningrad.

8. *C. paniculata* Meinsh. in A.H.P. XVIII, 3 (1901) 279. —*C. Royleana* var. *paniculata* Kük. in Engl. Pflzr. IV, 20 (1909) 46. —*C. uncinoides* Kük. in Engl. Pflzr. IV, 20 (1909) 46 quoad pl. As. Med. —*Carex paniculata* Rgl. in A.H.P. VII (1880) 563 non L., nomen.

Perennial. Culms 30-40 cm tall, invested at base with large, stramineous-reddish-brown sheaths, 4-5 cm long; leaves flat, 3-5 mm broad, $1/2-2/3$ the length of culm or about as long as the culm. Inflorescence fairly large, subpaniculate, lobate, 4-4.5 cm long, the spikes in lower part remote, short-peduncled; spikelets on lower spikes 8-12, the terminal staminate, the lateral ones with 1 staminate and 1 pistillate floret or, more rarely, unisexual, with pistillate florets only. Achene oblong, attenuate at both ends. June. (Plate IX, Figure 5, a-c).

Mud flats. —Centr. Asia: Tyan'-Shan., Pam.-Al. Gen. distr.: Tibet. Described from Trans-Ili Alatau (upper course of river Chilik). Type in Leningrad.

Genus 235. *Carex* † L. ††

Gen. pl., ed. 1 (1737) 280 et Sp. pl., ed. 1 (1753) 972.

Plants monoecious, more rarely dioecious; flowers arranged in spikelets. Spikelets solitary or numerous, containing only pistillate or only
112 staminate flowers, androgynous (i. e. with staminate flowers in upper part

† Name for sedge used by ancient authors (Virgil, Catullus, and others).

†† Arranged by V. I. Krechetovich.

of the spikelet, and pistillate in lower part) or gynecandrous (with staminate and pistillate flowers arranged in reverse order), sessile or pedunculate, forming simple or compound inflorescences; spikes borne in axils of foliaceous or reduced scale-like bracts. Flowers unisexual, destitute of perianth, borne singly in the axils of scales. Staminate flowers with 3 (rarely 2) stamens; stamens with free filaments and linear anthers. Pistillate flowers enclosed in a modified bractlet—a perigynium; ovary with a bifid or trifid style. Achene trigonous, lenticular, or plano-convex, sessile or stalked, sometimes bearing at the base a bristle-like extension of floral rachilla. Perigynium membranaceous, subcoriaceous or coriaceous (sometimes becoming corneous or suberous); sessile or stalked, occasionally spongy-based; nerved or ribbed or nerveless; smooth, pubescent, scabrous, or finely mammillate; biconvex, plano-convex, inflated, or trigonous, sometimes flat or winged, with smooth, scabrous or serrate margin; beak wanting, entire or variously split. Perennial plants with underground rhizomes, giving rise to sterile (leaf-bearing) and floriferous stems (culms). Culms usually triangular, more rarely terete or subterete, solid or somewhat hollow, central or lateral, simple or rarely forking, leafy. Sheaths investing the culm base blade-bearing or bladeless, squamaceous, and then usually colored. Leaves linear, rarely lanceolate.

The following species have been found in Quaternary deposits: *C. acutiformis* Ehrh. ? — in Upp. Dnepr. (Murava, Minsk District) and Low. Volg. (Raigorod and Semirublevaya, Astrakhan District); *C. inflata* Huds. — in interglacial deposits of Upp. Dnepr. (Kletsovo and Mikhulino, Smolensk District) and Volg. - Kam. (Galich, Kostroma District); *C. caespitosa* L. — in interglacial deposits of Upp. Dnepr. (Mikulino, Smolensk District); *C. chordorrhiza* Ehrh. — in interglacial deposits of Upp. Dnepr. (Smolensk and Minsk Distr.); *C. lasiocarpa* Ehrh. — in interglacial deposits of Upp. Dnepr. (Mikulino, Smolensk District); *C. leporina* L. — in Quaternary deposits of Lad. -Il'm. (Luga tuffs); *C. limosa* L. — in interglacial deposits of Upp. Dnepr. (Drozhzhino, Smolensk District); *C. appropinquata* Shum. — in interglacial deposits of Upp. Dnepr. (Mikulino, Smolensk District); *C. pseudocyperus* L. ? — in interglacial deposits of Volg. -Kam. (Galich) and Quaternary deposits of Low. Don. (Archeda); *C. elata* Bell. — in interglacial deposits of Upp. Dnepr. (Minsk and Smolensk Distr.); *C. gracilis* Curt. — in Quaternary deposits of Low. Volg. (Nicol'skaya and Raigorod, Astrakhan District); *C. cfr. acuta* L. — same location (Nicol'skaya).

NOTE: The genus *Carex* L., comprising at present about 2,000 species, constitutes such a rich and varied group that taxonomists have long been inclined to regard it as an aggregate of a large number of genera. Indeed, certain authors, such as Rafinesque, considered it a distinct family—see his paper "The Natural Family of Carexides" in *Amenities of Nature*, I (1840) 23-28.

113 The present treatment represents an attempt to present a more natural outline of the subdivisions of the genus *Carex* L., while retaining the old framework of the genus for the sake of convenience and tradition. The presentation eliminates the occasionally very considerable artificiality of the last monograph of the genus by Kükenthal. The system of subdivision adopted below is by no means an innovation; it merely represents a revised version of the already published systems of Ehrhart (1789), Reichenbach (1836), Rafinesque (1840), Tuckermann (1843), Heuffel (1844), Drejer (1844), Kirschleger (1854), Schur (1866), Gandoger (1890), Holm (1903), C. B. Clarke (1908), and the more recent ones of Boerner (1913) and Mackenzie (1931). In the first place, the present system cuts out the entirely

artificial separation of all the single-spike sedges in a distinct subgenus *Primocarex* Kük., by relegating them to their natural positions among related forms (the considerable extent of frequently occurring interhybridization provides an indication that genetic links between them are as yet retained). Further, the classification adopted also eliminates the artificial disruption between sections containing bistigmatic and tristigmatic sedges of the subgenus *Eucarex* Kük., not to mention a large number of minor amendments, such as unification of *C. pachystylis* Gay and *C. physodes* M.B. into one group, or the transfer of certain species (*C. enervis* C.A.M., *C. arenicola* F. Schmidt, *C. glauciformis* Meinsh., etc.) into other parts of the system which are in better agreement with their historically conditioned morphological structure.

The new classification system is not devoid of various shortcomings, as it has not been possible to embrace fully the global range of sedges; it does, however, represent a critical revision of previously proposed systems on the basis of phylogenetic and adaptive interrelationships, as far as they are expressed in spatial and ecological formative types.

ECONOMIC IMPORTANCE: Apart from limited use as material for matting and various kinds of weaving, as well as serving as ornamental and sand-fixing plants, nearly all sedges have a definite forage value. The role of sedges in the range management of the U.S.S.R. is considerable, as they occupy not less than 5% of hay and pasturage.

Most sedges (particularly the large marsh-meadow species, such as *C. gracilis*, *vesicaria*, *vulpina*, *caespitosa*, etc.), because of their coarse and rough parts, as well as the low content of salts, sugars, calcium, etc., are not acceptable to livestock or only slightly so. However, all of them (especially in wet solonchak meadows) yield fully edible hay, if cut before flowering. They are also readily consumed as silage. The importance of sedges as silage material increases in drought years, in view of their consistent yields. On the other hand, sedges of dry sites in the
114 forest zone, steppes, deserts, and many mountain areas, are excellent pasture plants, not inferior to best grasses as regards nutritive value. Such are: *Carex stenophylla*, *C. stenophylloides*, *C. uralensis*, *C. duriuscula*, *C. pachystylis*, *C. physodes*, *C. tristis*, *C. humilis*, *C. praecox*, *C. pediformis*, and some others. In respect of chemical composition sedges approach grasses, and contain at the flowering stage (on abs. dry matter basis): minerals—6-8%, crude protein—11-13%, fats—3-3.5%, cellulose—28-30% (steppe species—25-27%), non-extractable substances—46-50%. Nutritive value of farm-sedge hay: feed units 36-40, digestible protein 2.5-3%. Sedge hay should be fed during the coldest part of winter. Sedges are most readily eaten by cattle, but the steppe, desert and mountain sedges provide very acceptable forage for sheep, goats and horses. It is not advisable to feed sedges from dry locations in the north to young stock, as the deficiency of calcium salts and partial deficiency of phosphorus often brings about rickets and greatly weakens the bones of animals. The nutritive value of sedges has so far been very insufficiently investigated.

Key to Sections†

1. Dioecious plants 2.
- + Monoecious plants 4.
2. Spikes numerous, disposed in a large, oblong-capitate inflorescence; stigmas 3 (p.124) Subgenus I, 1. *Megalocranion* V. Krecz.
- + Spikes solitary, terminal 3.
3. Stigmas 2; perigynia glabrous. (Subgenus II, *Vignea* Kük.) (p.163). 9. *Physiglochis* (Neck.) V. Krecz.
- + Stigmas 3; perigynia pubescent. (Subgenus III. *Eucarex* Coss. et Germ.) (p.303) 24. *Thyrzanolepis* V. Krecz.
4. Spikes solitary, terminal (androgynous) 5.
- + Spikes numerous 13.
5. Stigmas 2. (Subgenus II. *Vignea* Kük.) 6.
- + Stigmas 3, more rarely 2, or variably 2-3 (series *Micropodae* of *Callistachys* Heuff.) and then soon caducous and perigynia membranaceous, oblong, stalked. (Subgenus III. *Eucarex* Coss. et Germ.) 7.
6. Perigynia coriaceous, with entire, obliquely truncate beak, aggregated in a sparse spike, drooping (Plate XIV, Figure 9) (p.198). 13. *Psyllophora* (Ehrh.) Kirschl. s. str.
- + Peryginia membranous, with weak bidentate beak, aggregated in a dense, compact or loose spike (Table XIV, Figures 1 and 2) (p.186). 11. *Ulvella* V. Krecz.
7. Stigmas 2 (p.296). 22. *Callistachys* (Heuff.) V. Krecz.
- + Stigmas 3 8
8. Pistillate scales persistent on mature achenes 9.
- 115 + Pistillate scales promptly deciduous 12.
9. Perigynia lanceolate, uninterruptedly prolonged into cuneate beak (Plate XVIII, Figure 5, p.294) 21. *Leptograstis* V. Krecz.
- + Perigynia ovoid or obovate, with distinctly separated short beak 10.
10. Lower scales foliaceous, greatly exceeding the perigynia (Caucasus). (p.357). 33. *Caryotheca* V. Krecz.
- + Scales membranous, shorter than perigynia 11.
11. Perigynia obcordate, notched at apex, rough-setulose, membranous. Densely cespitose, without stolons (Bukhara) (p.305). 26. *Cardiopera* V. Krecz.
- + Perigynia obovate, rounded-tipped, smooth or even lustrous, coriaceous. Rootstock creeping, stoloniferous (p.389). 36. *Genersichia* (Heuff.) V. Krecz.
- 12 (8). Perigynia subulate-lanceolate; achene with rudimentary rachilla (this sometimes wanting—*C. panciflora* Lightf.) (p.301). 23. *Leucoglochis* (Ehrh.) V. Krecz.
- + Perigynia ovoid to oblong-ovoid (sometimes ovate-lanceolate); achene without rudimentary rachilla (p.296). 22. *Callistachys* (Heuff.) V. Krecz.
- 13 (4). All spikes sessile, bisexual-androgynous or gynecandrous (sometimes exclusively staminate spikes only in part of inflorescence, others

† Correct determination of sedges is conditioned by a plentiful supply of complete plants with ripe achenes and well excavated underground parts.

†† [The page numbers in this key refer to pages of the Russian original appearing in the left-hand margin of the translation.]

- being bisexual, more rarely the middle spikes staminate, the lower and upper pistillate—*C. disticha* Huds.); stigmas 2. (Subgenus II. *Vignea* Kük.) 14.
- + All spikes unisexual (and then the terminal ones staminate, the lower pistillate) or mixed: the terminal ones gynecandrous and (rarely) androgynous, the others pistillate, sessile or peduncled. Stigmas 3, rarely 2. (Subgenus III. *Eucarex* Coss. et Germ.) 28.
14. All spikes androgynous 15.
- + All spikes gynecandrous or variously sexed: the middle ones (sometimes also the terminal) staminate throughout, the others androgynous, gynecandrous, or staminate throughout 23.
15. Rhizome short, forming tufts; culms and stolons forming dense tussocks† (Plate X, Figures 15, 16 and 14 [sic]) 16.
- + Rhizome long, creeping; culms in rows or cluster from ends of stolons. (Plate X, Figures 1 and 10) 20.
16. Perigynia wingless, with rounded margins (or ribbed), smooth above (Plate XI, Figure 1; Plate XII, Figure 19) 17.
- + Perigynia with serrate-winged margins (Plate XI, Figure 2; Plate X, Figures 10-11), sometimes pronounced only at the junction between perigynium and beak (beak bidentate—Plate X, Figures 14-17), or perigynia serrate-scabrous toward the apex on the pronounced ribbed margins (Plate XI, Figures 5-10; Plate X, Figures 4, 12, 13) 18.
17. Perigynia with short, obliquely truncate or slightly notched beak; inflorescence consisting of 2-6 few-flowered spikes (Plate XII, Figure 19) (p.167). 10. *Leptovignea* (Boern.) V. Krecz.
- + Perigynia with long bidentate beak; inflorescence dense, consisting of many spikes, spiciform (Plate XI, Figure 1) (p.143). 4. *Phyllothyrsa* V. Krecz.
18. Perigynia coriaceous, widely ovoid, 2.5-3 mm long, knobby-biconvex, with narrow winged scabrous margin, pronounced only at the curved juncture between perigynium and beak (see Plate X, Figures 14-17). Inflorescence mostly branching (p.157). 6. *Rhynchopera* (Boern). V. Krecz.
- + Perigynia membranous, ovoid or lanceolate, 3-6 mm long, planoconvex, broadly or almost imperceptibly winged-serrate above. Inflorescence simple (rarely branching) 19.
19. Inflorescence dense, oblong-spiciform, with numerous bracts overtopping the inflorescence; spikelets compact; perigynia abruptly broadly winged from the middle (Plate XI, Figure 2) (p.143). 4. *Phyllothyrsa* V. Krecz.
- + Inflorescence mostly interrupted below; leafy bracts wanting or very short; spikelets mostly radiate-spreading; perigynia gradually tapering to a point, narrow-winged. (Plate XI, Figures 5-10) (p.149). 5. *Desmiograstis* (Boern). V. Krecz.
- 20 (15). Rhizomes cord-like, producing dense leafy tufts and culms at the ends. (Plate X, Figure 1). 21.

† Species associated with this stage are easily confounded with desert-species with creeping rhizome giving rise to dense clusters of offshoots at the end; plants with carefully excavated underground parts are necessary for precise determination.

- + Rhizomes creeping, with culms and leafy shoots in rows, 1-2 per node. (Plate X, Figure 10) 22.
21. *Perigynia subcoriaceous*, plano-convex, with scabrous beak, caducous. (Plate X, Figures 1-3) (p.139). 3. *Boernera* V. Krecz.
- + *Perigynia membranous*, lenticular (or strongly inflated and then to 2 cm long), with smooth beak, tardily separating from rachis (Plate XIII, Figures 7 and 8) (p.187). 12. *Olotrema* (Rafin.) V. Krecz.
22. *Perigynia membranous* (or rarely coriaceous), nerveless or with faint nerves on outer face, with ribbed (not winged) margin and obliquely truncate, membranous-bordered, obscurely bidentate beak. (Plate XIII, Figures 1-9) (p.187). 12. *Olotrema* (Rafin.) V. Krecz.
- + *Perigynia subcoriaceous* or thin-coriaceous, with nerves pronounced on both faces, markedly serrate-winged, beak distinctly bidentate. (Plate X, Figures 4, 11, 12) (p.125). 2. *Vignea* Nees s. str.
- 23 (14). *Perigynia* small, 2.5-3.5 mm long, membranaceous, entirely filled by the achene, with winged margin, beak obliquely truncate or slightly bidentate. (Plate XII, Figures 2-19) (p.167). 10. *Leptovignea* (Boern.) V. Krecz.
- 117 + *Perigynia* larger, 3-5(6-8) mm long, membranaceous or subcoriaceous, twice or more as long as the achene, with margin serrulate-winged nearly down to base, beak conspicuous, bidentate. (Plate XI, Figures 4-13) 24.
24. Rhizome stocky; tussock-forming; spikelets gynecandrous 25.
- + Rhizome long-creeping; loosely cespitose plants; culms and offshoots arising in rows; inflorescence with mixed spikelets, the middle (and terminal) ones staminate, the lower ones pistillate throughout, or gynecandrous (p.125). 2. *Vignea* Nees s. str.
25. *Perigynia* linear-lanceolate, 5-8 mm long, long-stalked, with a narrow distinct subulate beak, disposed in a green hemispherical inflorescence. (Plate XIII, Figure 10) (p.162). 8. *Schellhammeria* (Moench.) Kunth.
- + *Perigynia* ovoid, 3-5 mm long, obscurely stalked, with short-bidentate beak, disposed in a dark capitate or spiciform, continuous or interrupted inflorescence 26.
26. Spikelets very remote (2-6 cm apart), with long foliaceous bracts exceeding or at least equaling the inflorescence (Plate XII, Figure 1) (p.143). 4. *Phyllothyrsa* V. Krecz.
- + Spikelets ± approximate (and if remote, not more than 0.5-1 cm apart), without foliaceous leafy bracts or with a solitary short bract 27.
27. Spikelets radiate-spreading, short, 3-5 in number, all ± apart. (p.149). 5. *Desmiograstis* (Boern) V. Krecz.
- + Spikelets compact, ovoid, aggregated in heads, and if spreading then 10-15 in number. (p.160). 7. *Lonicoperis* (Rafin.) V. Krecz.
- 28 (13). Stigmas 2 29.
- + Stigmas 3 35.
29. Terminal spikelets gynecandrous, lower ones pistillate 30.
- + Terminal spikelets staminate, lower ones pistillate 31.
30. Spikelets peduncled, in fastigiate glomerules, ovoid, 0.5-1 cm long; perigynia grayish-green, papillose (p.246). 17. *Loxaniza* (Rafin.) V. Krecz. (*C. bicolor* Bell.)

- + Spikelets sessile, in digitate glomerules, narrowly cylindrical, to 3 cm long; perigynia green, smooth (p.201). 14. *Leimonastes* Rchb. (*C. eleusinoides* Turcz.).
- 31. Perigynium-beak long and flattened, bidentate-cleft, its margin (often also the surface of perigynium) bristly-scabrous nearly from the base 32.
- 118 + Perigynium beak inconspicuous, cylindrical, smooth, separated, scarcely notched or truncate 33.
- 32. Perigynia lanceolate, hispidulous over the whole surface; spikelets barely 1 cm long, obovoid (p.335). 29. *Edritria* (Rafin.) V. Krecz.
- + Perigynia obovoid, papillose (like the entire plant), rather abruptly attenuate into a scabrous or serrulate, bell-topped, bidentate beak (p.421). 43. *Nothocarex* V. Krecz.
- 33. Pistillate spikelets sessile and only the lowest ones (the most distant) faintly peduncled (p.201). 14. *Leimonastes* Rchb.
- + Pistillate spikelets borne on rather long peduncles, erect or nodding (peduncles sometimes strongly abbreviated, and then perigynia bladder-like-inflated, blackish-brown) 34.
- 34. Perigynia thin-coriaceous, plano-convex, nerved, grayish-green, often ferruginous-spotted; scales ovate to oblong, 3-nerved, acute and awned, longer than perigynium (p.232). 15. *Temnemis* (Rafin.) V. Krecz.
- + Perigynia membranaceous, inflated, lustrous, nerveless, blackish-brown; scales oblong, obtuse to subobtuse, shorter than perigynia (Group of species of barren tundra hills). (p.434). 47. *Pompholyx* V. Krecz.
- 35 (28). Leaves broadly lanceolate (to 3 cm broad); culms flattened, seemingly nodulose, producing nearly from base 1-2 spikelike branches, these often forking again, covered between the "nodes" with much inflated sheaths (similar sheaths covering secondary branches)—Far East (p.356). 32. *Maltrema* (Rafin.) V. Krecz.
- + Leaves braidlike, long, linear; culms triangular, nodeless, with spikelets mostly in upper part; spikelets peduncled, borne singly at the base of bracts (rarely 2-3 together). 36.
- 36. Perigynia serrulate-winged on the margin nearly from base (p.383). 37. *Kükenthalia* (Boern.) V. Krecz.
- + Perigynia winged on the margin, smooth or scabrous 37.
- 37. Terminal spikelets gynecandrous (i.e. pistillate above, staminate below) 38.
- + Terminal spikelets staminate or androgynous 41.
- 38. Lowest bract with developed sheaths (to 1 cm and longer) 39.
- + Lowest bract sheathless, auricled (p.246). 17. *Loxanisa* (Rafin.) V. Krecz.
- 39. Perigynia ovoid, plane, brown, bulging only at the center due to the achene which it exceeds many times (p.279). 19. *Chartoteuchium* (Boern.) V. Krecz. (*C. Oliveri* Bcklr.).
- 119 + Perigynia oblong, triangular, or convex-triangular, largely filled with achene. 40.

40. Perigynia ovoid, 2-3 mm long, convex-triangular, green, with smooth, entire, cylindric beak, disposed in light-colored oblong spikelet (p.425). 45. *Caricella* (Ehrh.)† V. Krecz.
+ Perigynia lanceolate, 4.5-5 mm long, obtusely triangular, brown, beak flattened, scabrous-margined, membranaceous-bordered above; spikelets dark, ovoid (p.284). 20. *Orphinascus* Boern. (*C. misandra* R. Br.)
41. (37). Lower bracts entirely sheathless 42.
+ Lower bracts distinctly sheathing; when sheaths obsolete perigynia hairy, scabrous or grayish-green, in 2-3 drooping spikelets, with long-acuminate dark scales (*Chalciolaena* V. Krecz.), or beakless and then plant hairy (*Olamblis* Rafin.) 50.
42. Perigynia hairy 43.
+ Perigynia glabrous, sometimes scabrous, rarely somewhat hairy toward the apex (this only when spikelets peduncled, nodding, not sessile) 44.
43. Perigynia membranaceous, ± hirtellous, the beak obsolescent, barely notched; leaves dimorphous: juvenile—short, strict, old—many times as long, drooping, implexed. (p.305) 27. *Onkerma* (Rafin.) V. Krecz.
+ Perigynia coriaceous, hairy, with bidentate beak; leaves of one kind (p.403). 41. *Anithista* (Rafin.) V. Krecz.
44. Perigynia membranaceous, subinflated, beak elongate, cylindric to conic, bidentate, more rarely (in mountains and arctic region) short-cylindric, and then spikelets erect, with blackish-brown lustrous perigynia 45.
+ Perigynia thin-coriaceous, subcoriaceous or coriaceous, convex-triangular to flattened-triangular; beak obsolete, or well defined, slightly notched, or wanting 47.
45. Culms almost winged, flattened, prominently scabrous; staminate spikelet solitary in inflorescence 46.
+ Culms triangular, scabrous or obtusely triangular, smooth; staminate spikelets 2-3 per inflorescence (p.434). 47. *Pompholyx* V. Krecz.
46. Plants green, soft; perigynia light-green, smooth, abruptly narrowed into cylindrical beak (p.433.) 46. *Malacocarex* V. Krecz.
+ Plants grayish-green, stiff; perigynia olivaceous, rugulose, gradually tapering to convex-recurved beak (p.399). 39. *Elaeostachys* V. Krecz. (*C. dispalata* Boott.).
47. Spikelets sessile 48.
120 + Spikelets peduncled, drooping (p.246). 17. *Loxaniza* (Rafin.) V. Krecz.
48. Perigynia compressed-trigonous, thin-coriaceous, green, olivaceous-green, or lead-green, dull or minutely papillose, more rarely convex-trigonous, coriaceous and yellowish, and if so—spikelets aggregated in a dense, lobed-capitate inflorescence (Plate XVI, Figure 5.—*C. melanantha* C.A.M.) 49.
+ Perigynia rounded (inflated)-trigonous, coriaceous, honey-colored

† Here, in some species there are gynecandrous terminal spikelets, in addition to staminate.

- or black, lustrous (p. 370). 35. *Lamprochlaenia* (Boern.) V. Krecz.
49. Basal bract overtopping the inflorescence; perigynia olivaceous-lead or olivaceous-green, ribbed, 4 mm long (p. 399). 39. *Elaeostachys* V. Krecz.
- + Basal bract setaceous, inconspicuous; perigynia grayish-green to green, with slender nerves, sometimes beakless (and then inflorescence densely capitate), 3-3.5 mm long (p. 246). 17. *Loxanisa* (Rafin.) V. Krecz.
- 50 (41). Perigynia ± hairy, rough-papillose or bristly-scabrous . . . 51.
- + Perigynia glabrous, smooth, or only margin of beak scabrous . . . 60.
51. Perigynia inflated-ovoid, 5-7 mm long; beak pronounced, strongly cleft at the apex 52.
- + Perigynia ovoid, obovate, or oblong, 2-5(6) mm long; beak obsolescent or short, truncate, scarcely notched or broadly bidentate (sometimes beak elongate, but even then scarcely notched) 53.
52. Perigynia densely or sparsely covered with long hairs; sheaths and lower surface of leaves strongly pubescent (p. 434). 47. *Pompholyx* V. Krecz.
- + Perigynia scabrous; sheaths and leaves glabrous (p. 339). 30. *Campylorhina* V. Krecz.
53. Achene with a disk-like, roller-like or spinose cap supporting the style (p. 305). 27. *Onkerma* (Rafin.) V. Krecz.
- + Achene extending directly into the style. (Plate XX, Figure 7a) . . 54.
54. Lower spikes at the base of culm long-peduncled, terminal ones sessile; perigynia spinulose-scabrous (p. 339). 30. *Campylorhina* V. Krecz. (*C. Hallerana* Asso.).
- + All spikelets on upper part of culm 55.
55. Staminate spikelets (1)2-3; perigynia ovoid, or oblong, hairy, sub-bidentate (with beak cleft in front), triangular-notched, or obovate (with beak barely notched and then papillose-scabrous). 56.
- 121 + Staminate spikelets solitary; perigynia obovate, cuneate toward the base, short-pilose; beak short, recurved, barely notched 59.
56. Spikelets drooping, obovoid; perigynia ovoid, compressed-triangular, nerved, 5.5 mm long (p. 284). 20. *Orphinascus* Boern. (*C. macrogyna* Turcz.).
- + Spikelets strict, and if drooping—cylindric, with obovate nerveless perigynia 57.
57. Perigynia hairy 58.
- + Perigynia papillose-scabrous, prickly-margined (p. 401). 40. *Phaeolorum* (Ehrh.) V. Krecz.
58. Perigynia coriaceous, ovoid, densely pilose, ribbed, with triangular-notched beak; rootstock spreading, with long stolons (p. 403). 41. *Anithista* (Rafin.) V. Krecz.
- + Perigynia membranaceous, oblong, scattered-pilose, cleft in front and slightly bidentate, nerveless or slender-nerved; densely cespitose (p. 335). 29. *Edritria* (Rafin.) V. Krecz.
- 59 (55). Spikelets oblong, loose and remote, with alternately borne florets; perigynia pyriform, obtusely trigonous, yellowish- to brownish-green, hispidulous, 2-5 mm long (p. 358.) 34. *Aunieria* (Gdgr.) V. Krecz.

- + Spikelets ovoid to oblong, rather dense; perigynia obovate, bright-green, silvery-setulose, 2-2.5 long, with a white, finally splitting band on outer face (p. 304). 25. *Schizochlaena* V. Krecz.
- 60 (50). Achene with a disk-like or spinose cap bearing the style (Plate XX, Figures 9a, and 9b); perigynia membranaceous; leaves dimorphous: juvenile—short, erect, and mature—many times as long, implexed 61.
- + Achene extending directly into style (Plate XX, Figure 7a); leaves of one kind 62.
- 61. Culms lateral; leaves braid-like, subcoriaceous, 5-10 mm broad, numerous, exceeding the inflorescence (p. 356). 31. *Sinocarex* V. Krecz.
- + Culms central; leaves linear, to 3-4 mm broad, as long as or shorter than the inflorescence (p. 305). 27. *Onkerma* (Rafin.) V. Krecz.
- 62. Perigynia hard, firmly coraceous 63.
- + Perigynia membranaceous or thin-coriaceous 65.
- 63. Spikelets pendulous; perigynia ± ellipsoid, ± papillose, grayish-green, compressed-trigonous; perigynium-beak obsolescent (p. 241). 16. *Chalciolaena* V. Krecz.
- + Spikelets erect; perigynia ovoid, smooth, often lustrous, yellow, brown or olivaceous, convex and rounded, developing a corneous or suberous coating; perigynium-beak pronounced 64.
- 122 64. Perigynia 4-7 mm long, gradually tapering to a broadly bidentate beak (p. 403). 41. *Anithista* (Rafin.) V. Krecz.
- + Perigynia 2.5-4 mm long; beak cylindrical, obliquely truncate, membranaceous-bordered above (p. 370). 35. *Lamprochlaena* (Boern.) V. Krecz.
- 65. (62). Perigynia lanceolate or oblong, (4)5-10(13) mm long, beak elongate 66.
- + Perigynia ovoid or oblong-ovoid (in this case the margin smooth, not scabrous), 2-5(8) mm long 70.
- 66. Perigynia 10-13 mm long, conic-lanceolate; spikelets with 6-10 remote perigynia (p. 434). 47. *Pompholyx* V. Krecz.
- + Perigynia less than 10 mm long; spikelets with more numerous perigynia 67.
- 67. Perigynium-beak flattened, costate-margined, scabrous (p. 284). 20. *Orphinascus* Boern.
- + Perigynium-beak terete, smooth-margined 68.
- 68. Culms prominently scabrous, grooved-angled; perigynia thin-coriaceous, the beak deeply bidentate, with firm, straight or arched-recurved teeth. (Plate XXIV, Figures 7-8) (p. 434). 47. *Pompholyx* V. Krecz.
- + Culms smooth, obtusely 3-angled; perigynia membranaceous, with obliquely truncate or softly bidentate, membranaceous-bordered beak 69.
- 69. Perigynium beak obliquely truncate, slightly curved; stigmas short; spikelets 2-5 (p. 339). 30. *Campylorhina* V. Krecz.

- + Perigynium-beak bidentate; stigmas long, strongly flexuous; spikelets 5-8 (p.334). 28. *Polyglochis* V. Krecz.
- 70. (65). Perigynium-beak elongate, distinctly bidentate or obliquely truncate (in the latter case the lower sheaths purple) 71.
- + Perigynium-beak inconspicuous, truncate or notched (sometimes elongate and then proboscis-like and \pm strongly notched); rarely perigynium beakless. 74.
- 71. Perigynium-beak obliquely truncate, membranaceous-bordered, \pm scabrous-margined; lower sheaths purple (p.339). 30. *Campylorhina* V. Krecz.
- + Perigynium-beak distinctly bidentate, smooth (rarely barely scaberulous); lower sheaths not purple 72.
- 72. Large plants; spikelets cylindric, rather loose, 3-8cm long, remote, long-peduncled; staminate spikelets 2-3; perigynia convex-trigonus 73.
- + Small plants; spikelets ovoid or globular, dense, 1-2cm long, approximate toward the summit or crowded, subsessile or the lower ones borne on short erect peduncles; staminate spikelet solitary; perigynia inflated-trigonus. . . (p.385). 38. *Nastantha* (Boern.) V. Krecz.
- 123 73. Lower sheaths and underside of leaves hairy, more rarely sheaths and leaves glabrous and then orifice of sheaths hairy; perigynia thin-coriaceous, 5-10 mm long, prominently nerved, gradually tapering into rather deeply bidentate beak. (p.434). 47. *Pompholyx* V. Krecz.
- + Lower sheaths and underside of leaves, as well as orifice of sheaths, glabrous; perigynia membranaceous, 3-6 mm long, nerveless or obscurely nerved, rather abruptly narrowed to a short, softly bidentate beak.(p.242). 44. *Proteocarpus* Boern.
- 74. (70). Leaves and sheaths with scattered hairs (or only sheaths hairy) 75.
- + Leaves and sheaths glabrous 76.
- 75. Perigynia beakless; culms scabrous; spikelets dense, crowded; lower sheaths pale (p.278). 18. *Olamblis* (Rafin.) V. Krecz.
- + Perigynia with curved proboscis-like beak; culms smooth; spikelets loose, remote; lower sheaths purple. (p.339). 30. *Campylorhina* V. Krecz.
- 76. Perigynia flat, finely membranaceous, only at center with a triangular bulge owing to achene, exceeding the achene many times; spikelets variegated or dark brown, disposed in a caniculate inflorescence, nodding, ovoid . . . (p.279). 19. *Chartoteuchium* (Boern.) V. Krecz.
- + Perigynia convex, entirely filled with achene 77.
- 77. Perigynia membranaceous 78.
- + Perigynia thin-coriaceous 79.
- 78. Small, densely caespitose plants, without stolons; staminate spikelets solitary; pistillate spikelets loose, remote, pale, 1-3 cm long, erect or pendulous; perigynia 2-3 mm long, ovoid, finally olivaceous-brunescenscent.(p.425). 45. *Caricella* (Ehrh.) V. Krecz.
- + Large, strong, stoloniferous plants; staminate spikelets 1-2; pistillate spikelets cylindric, loose or dense (and then pendulous, to 15cm long), remote (or the lower remote, the terminal aggregated in glomerules

and erect), pendulous or nodding, 8-15 cm long; perigynia ellipsoid, 2.5-4 mm long, green, becoming yellow. (p. 419). 42. *Agastachys* (Ehrh.) V. Krecz.

79. Spikelets dense, ovoid or oblong; staminate spikelets 1-2; perigynia ovoid, faintly trigonous, 3-4 mm long, thick-nerved, glaucous-green, ferruginous-puncticulate, contracted to a short, straight, smooth or scabrous, weakly notched beak. (p. 385). 38. *Nastantha* (Boern.) V. Krecz.

+ Spikelets loose and remote, oblong; staminate spikelets solitary; perigynia rounded-trigonous or inflated-trigonous, 3-6 mm long, faintly nerved, greenish, oblique, outwardly curved, truncate or notched beak, rarely beakless. (p. 339). 30. *Campylorhina* V. Krecz.

124 Subgenus I. 1. *Megalocranion* V. Krecz. Plants with creeping lig-
neous rhizome, triangular culms, and coriaceous leaves, dioecious (rarely
androgynous in middle part of inflorescence, with staminate flowers above
and pistillate below). Spikelets disposed in a large capitate inflorescence;
scales large, many-nerved, hispid-margined toward the summit. Perigynia
coriaceous, oblong, 10-15 mm long strongly subtrigonous-convex on outer
face, flat on inner face, nerved, unevenly serrate, with thickened winged
margin and long, deeply cleft beak; achene obtusely trigonous; style en-
larged at base, trifid (sometimes bifid ?).

1. Perigynia straight, broadly ovoid, 10-14 mm long, spongy-inflated at
base, 12-16-nerved; spikelets radiate; scales shorter than perigynia;
culms prickly below inflorescence. (Plate XI, Figure 4)
. 2. *C. macrocephala* Willd.

+ Perigynia curved, lanceolate, 10-12 mm long, not spongy at base,
25-30-nerved; spikelets constipate; scales nearly twice as long as
perigynia; culms smooth below inflorescence. (Plate XI, Figure 3).
. 1. *C. kobomugi* Ohwi.

1. *C. kobomugi* Ohwi in Mem. Coll. Sc. Kyoto Univ., ser. B, V,
3 (1930) 281. — *C. macrocephala* Kük. in Engl. Pflzr. IV, 20 (1909)
187; Kom. Fl. Manchzh. I, 356, ex parte, non Willd. — Ic.: Kom. and
Alis. Oprel., tab. 81 and 82.

Perennial. Yellowish-green, rootstock clothed with brown, fibrillose-
splitting, squamaceous sheaths; culms 10-20 cm tall, obtusely triangular,
smooth below inflorescence, invested at base with brown, fibrillose,
marcescent sheaths; leaves coriaceous, 4-6 mm broad, nearly twice the
length of culm, densely hispid on the margin; inflorescence obovoid, con-
tracted, 4-6 cm long; scales ovate to oblong-ovate, sublanceolate, pale-
green, with uniformly colored, entire margin, gradually tapering into a
long, scabrous, ± brunescent tip, nearly twice as long as perigynia; peri-
gynia appressed, 10-12 mm long, lanceolate, brown, curved, strongly
convex, 25-30-nerved on outer face, flat to subconcave, 14-16-nerved on
inner face, narrowly serrulate-winged on the margin, abruptly contracted
into a curved, narrowly bidenticulate beak, this serrulate-margined some
way up; achene oblong-obovoid, olivaceous, somewhat asymmetrically
obtusely-trigonous, 5 mm long, cuneate-based, rounded-tipped. Fl. April-
May, fr. June-July. (Plate XI, Figure 3).

Maritime and lacustrine sands, dunes.—Far East: Uss. Gen. distr.: Japan, Korea, Eastern China, Formosa. Described from Japan: Hondo, Ishikikei in Ise Prov. Type in Kyoto.

2. *C. macrocephala* Willd. ex Spreng. Syst. III (1826) 808; Trev. in Ldb. Fl. Ross. IV, 271; Hultén, Fl. of Kamtch. I, 178; Kom. Fl. Manchzh. I, 356, ex parte; Kom. Fl. Kamch. I, 226.

125 Perennial. Yellowish-green; rootstock clothed with dark brown, fibrillose, squamaceous sheaths; culms 15-30 cm tall, rather acutely triangular, with brown prickles above and on the angles, invested at base with broad, dark brown, often fibrillose sheaths; leaves ± ribbed, with serrulate revolute margins, 5-10 mm broad, longer than the culms. Dioecious, rarely with staminate flowers at the summit; spikelets densely aggregated, disposed in an oblong-ovoid, spreading spike 4-10 cm long, with short bracts at base; scales ovate, yellowish-green at center, ferruginous toward the semirounded margins and summit, abruptly contracted into serrulate-margined tip, shorter than perigynia, the lower ones resembling bracts; perigynia radiate, broadly ovoid, 10-14 mm long, ferruginous-green, straight, plano-convex, on outer face 12-16 thick nerves and 2 spongy thickenings at base, on inner face 8-10-nerved, short-stipitate, broadly serrulate-winged especially below the middle, wing-serrations thickened and wing often revolute, perigynia abruptly contracted into long, narrowly bidenticulate beak, this serrulate only at base; achene obovoid, obtusely trigonous, 5 mm long, transversely helicoid-indent on two of the angles. Fl. April—May, fr. July—August. (Plate XI, Figure 4).

Shore sands.—Far East: Uss., Ud., Sakh., Okhot., Kamch. Gen. distr.: Northern Japan, Alaska, and north-western America down to Washington and Oregon. Described from Siberia. Type in Berlin.

Subgenus II. *Vignea* (P. B.) Kük. in Engl. Pflzr. IV, 20 (1909) 111. — P. B. Lestib. Essai Cyp. (1819) 22, emend. Rchb. Fl. germ. exc. (1830) 55. — Monoecious, rarely dioecious plants. Spikelets solitary or numerous, all bisexual, androgynous or gynecandrous (only occasionally part of inflorescence bearing exclusively staminate spikelets, the rest being bisexual), globular, ovoid or oblong, sessile, disposed in a capitate, spikelike, or paniculate inflorescence. Perigynia plano-convex or lenticular, rarely inflated; achenes plano-convex or lenticular. Stigmas 2.

Section 2. *Vignea* Nees in Linnaea, IX (1834) 305, s. str. — Rafin. Amenit. of Nat. 1 (1848) 26 (pro genere). — Rhizome creeping; leaves narrow 2-5 mm broad. Inflorescence simple, spiciform-crowded, containing flowers of both sexes: either with spikelets gynecandrous or androgynous throughout, or else in middle part, and often above, with staminate flowers, the other spikelets then usually being pistillate. Perigynia semicoriaceous, subcoriaceous or membranaceous, ovoid, or oblong, plano-convex, (3)3.5-5.5(6) mm long, with many thick or slender nerves on both faces, with ± 126 pronounced margin, winged down from the middle, gradually tapering into a beak, this flat, cleft in front, bidentate. Stigmas 2.

1. Spikelets androgynous; sometimes middle and terminal spikelets staminate throughout, and then other spikelets androgynous or the lower ones pistillate throughout (the terminal being androgynous) 2.

- 127
- + Spikelets gynecandrous or mixed: in middle part of inflorescence (and above) pistillate throughout, the terminal and lower ones pistillate throughout or gynecandrous 8.
 - 2. Stolons long (ca. 1 m and longer), flagelliform, triangular in section 17. *C. pseudo-curaica* F. Schmidt.
 - + Stolons short, and if long—round in section and plants arenicolous (not limicolous) 3.
 - 3. Halophytes with ligneous rhizomes perigynia serrulate-margined, scarcely winged. (Plate X, Figure 4a) 4.
 - + Arenarious plants, with flagelliform rhizome; perigynia winged toward summit. (Plate X, Figure 6a) 8. *C. arenaria* L.
 - ++ Limicolous or hycolous plants, with flexible rhizome; perigynia narrowly serrulate-winged on the margin from the middle (Plate X, Figure 11) 5.
 - 4. Grayish-green plants, 25-50 cm tall, with leaves to 2 mm broad; perigynia ovoid, brunescent, equaling the rufous scales 3. *C. divisa* Huds.
 - + Glaucoous-green plants, 60-80 cm tall, with leaves to 4.5 mm broad; perigynia oblong-ovoid, shorter than the light ferruginous, broadly white-membranaceous scales (Tadzhikistan) 4. *C. coarcta* Boott.
 - 5. Hycolous plants, with solid culms and pale, loose inflorescence containing few (5-8) spikelets; perigynia pale, 4-6 mm long. 6.
 - + Limicolous plants with hollow culms and ferruginous or brown, dense inflorescence containing many (10-20) spikelets; perigynia ferruginous, 3-4 mm long 7.
 - 6. Perigynia divaricate, ovoid, rough-papillose, prominently serrulate-winged, with pronounced nerves, 5-6 mm long, the beak curved; leaves 3-5 mm broad, abruptly pointed 13. *C. accrescens* Ohwi.
 - + Perigynia appressed, lanceolate, smooth, faintly prickly-winged, with slender nerves, (3.8)4 mm long, the beak straight; leaves 1.5-2.5 mm broad, long attenuate 14. *C. Iljinii* V. Krecz.
 - 7. Inflorescence an ovoid or lobate spike, often with a short bract below; spikelets oblong; scales light ferruginous, subacute, midribbed, about as long as perigynia; perigynia coriaceous, ovoid, 3.2-4 mm long, brownish or olivaceous-brown, with non-prominent, tinged nerves, gradually tapering into short, scabrous beak 16. *C. pycnostachya* Kar. et Kir.
 - + Inflorescence narrow, oblong, bractless; spikelets ovoid; scales dark brown, obtuse, about half as long as perigynia; perigynia membranaceous, ovoid-lanceolate, 3-3.5 mm long, stramineous, with ribbed nerves, rather abruptly contracted into elongate, narrow-winged beak 15. *C. curaica* Kunth.
 - 8 (1). Inflorescence (2) 5-10 cm long, with many (10-30) spikelets; spikelets in middle part of spike staminate (sometimes staminate up to the summit), above and below pistillate, hence fruiting spike narrower and lighter-colored in middle part 9.
 - + Inflorescence shorter, 2-3 cm long, with few (3-7-10) spikelets; spikelets gynecandrous or differing in sex: middle ones (sometimes also the terminal) with staminate flowers throughout, the terminal and lower ones gynecandrous, or the lowest ones pistillate 11.

9. Tall plants; culms at base to 3-4 mm thick; leaves 3-5 mm broad; orifice of sheaths with undeveloped membranaceous part, deeply notched in front; inflorescence 5-10 cm long, consisting of 20-30 large (1.5-2 cm long) spikelets; perigynia semicoriaceous, 4-5 mm long, with elongate, curved, sharply bidentate beak. (Plate X, Figure 5). 5. *C. disticha* Huds.
- + Low plants; culms at base 1.5-2 mm thick; leaves 1.5-2.5 mm broad; orifice of sheaths with a developed, tubular, membranaceous part; inflorescence 2-5 cm long, consisting of 6-20 small (0.5-1 cm long) spikelets; perigynia membranaceous, 3-4 mm long, with short, weakly bidentate beak 10.
10. Spikelets pale-ferruginous, 10-20, disposed in an elongate (to 5 cm long), rather loose inflorescence; perigynia membranaceous, 3.5-4 mm long, yellowish, with subconic beak (Eastern Siberia). 7. *C. lithophila* Turcz.
- + Spikelets rusty-red, 6-10, disposed in a short (2-3 cm long), dense inflorescence; perigynia semicoriaceous, ca. 3 mm long, rusty-yellow, with rather gradually attenuate beak. (Armenia) 6. *C. Grossheimii* V. Krecz.
11. Arenicolous plants; perigynia coriaceous, strongly convex on outer face, ribbed-nerved, ovoid, the uniformly broad wing beginning almost abruptly at the middle, serrulate all the way down. (Plate X, Figure 7) 9. *C. colchica* Gay.
- + Meadow and forest plants; perigynia subcoriaceous, lenticular or planoconvex, slenderly nerved, oblong, the serrulate winged margin beginning gradually below the middle, broadening toward the summit. . . 12.
12. Forest plants, with pale spikelets and flat, soft, green leaves; perigynia narrow, lanceolate, pale-green. (Plate X, Figure 10) 12. *C. brizoides* Juslen.
- + Meadow-steppe plants with ferruginous-brown spikelets and rather stiff, subinvolute leaves; perigynia oblong-ovoid, yellowish-rusty. (Plate X, Figures 8-9) 14.
13. Perigynia 3.5-4 mm long, ovoid, gradually tapering into a short beak (Plate X, Figure 8a). 10. *C. praecox* Schreb.
- + Perigynia 4.5-5 mm long, lanceolate, contracted into an elongate, cuneate beak (Plate X, Figure 9) 11. *C. diplasiocarpa* V. Krecz.

Cycle 1. *Halovignea* V. Krecz. —Rigid halophytes of medium size, with ligneous abbreviated rhizome; culms leafy in lower part; leaves subinvolute, 2-3 mm broad. Inflorescence spiciform; spikelets androgynous. Perigynia subcoriaceous, 3.5-4 mm long, ribbed; perigynium beak almost wingless, scabrous, shallowly cleft, short-bidentate.

3. *C. divisa* Huds. Fl. angl., ed. 1 (1762) 348; Trev. in Ldb. Fl. Ross. IV, 272. —*Vignea divisa* Rchb. ex Moessl. Handb., ed. 2, III (1829) 1615. —Exs.: HFR No. 1440.

Perennial, grayish-green plants, the creeping, stout, ligneous rhizome covered with appressed fibers; culms scabrous above, 25-60 cm tall, invested at base with broad, brown, leafless sheaths; leaves long, mostly subinvolute, shorter than the culm, 2-2.5 mm broad; spikelets 5-15, ovoid, disposed in an oblong, lobate and often drawn-out spike to 3 cm long; scales

ovate, acuminate-spinescent, rusty-brown, with light-colored midrib and margins, equaling the perigynia; perigynia coriaceous, ovate to ellipsoid, 3.5-4 mm long, inner face flat, outer strongly convex, many-ribbed, round-based, obscurely stipitate, margin narrow, pronounced only toward summit, minutely serrulate, beak short, subconic, bidentate, scabrous. Fl. March-June; Fr. May-August.

Solonetz meadows, coasts. —European part: Crimea; Caucasus: West., East., and South. Transcauc., Dag. Gen. distr.: Europe, As. Min., North Africa. Described from England. Type in London.

ECONOMIC IMPORTANCE: Readily grazed by all kinds of livestock in wet meadow pastures and at swamp margins in spring and summer. If cut before flowering, eaten satisfactorily in hay (Agababyan).

4. *C. coarcta* Boott in Trans. Linn. Soc. XX (1846) 133; V. Krechet. in Fl. Turkm. 1, 2 (1932) 230. —*C. divisa* var. *pallidiflora* Kük. in Engl. Pflzr. IV, 20 (1909) 126.

129 Perennial, glaucous-green plants, with stout, creeping, ligneous rhizome; culms scabrous above, 50-80 cm tall, invested at base with brownish sheaths; leaves flat, 3-4.5 mm broad, half as long as the culm; spikelets 15-25, ovoid, disposed in an oblong, rather dense, lobate-interrupted spike 3-5 cm long; scales ovate, acuminate-spinescent, light ferruginous, with light-colored midrib and a broad white-membranaceous margin, shorter than the perigynia; perigynia subcoriaceous, ellipsoid-ovoid or rather oblong-ovoid, plano-convex, 4 mm long, light-colored, becoming reddish-honey-colored, ribbed, narrowly serrulate-winged on upper part of the margin, gradually tapering into a short, faintly bidentulate beak. Fr. May-July. (Plate X, Figures 4, 4a).

Solonetz meadows. —Centr. Asia: all regions, except Aral. —Casp. and north. Pribalkh. Gen. distr.: Iran. Described from Afghanistan. Type in London.

Cycle 2. *Symmicta* V. Krecz. —Robust bog plants with creeping rhizome; culms hollow below, leafy to considerable height; lower sheaths bladeless, only upper leaves bearing blade to 5 mm broad; inflorescence rather crowded, spikelike; spikelets in upper part (1-2) pistillate, at the middle staminate, 1-2 below androgynous, others pistillate throughout; perigynia semicoriaceous, 3-5 mm long, ribbed, narrowly serrulate-winged on the margin above.

5. *C. disticha* Huds. Fl. angl. ed. 1 (1762) 347; Shmal'g-Fl. Yu. - Zap. Ross. (1886) 629. —*C. intermedia* Good. in Trans. Linn. Soc. II (1794) 154; Trev. in Ldb. Fl. Ross. IV, 273; Kük. in Engl. Pflzr. IV, 20 (1909) 135 et in Journ. Russ. Bot. 3-6 (1911) 51, ex. p.; Kryl. Fl. Zap. Sib. III. 443, non Retz. (1779). —*C. curatica* B. Fedtsch. in A.H.P. XXXVIII (1924) 190, quoad pl. turg., akm. et semipal., non Kunth. —Ic.: Syreish. Ill. Fl. Mosk. Gub. I, 188. —Exs.: Kneuck. No. 166; HFR No. 1497.

Perennial, largely green plants, with long stout rhizome; culms thickened (to 3-4.5 mm across at base), with nodes much exerted above, scabrous toward summit, 50-120 cm tall; leaves flat, 3-5 mm broad, upper ones nearly equaling the culm, long-acuminate; summit of leaf-sheath weakly developed, strongly notched in front; spikelets 20-35, ovoid to oblong, 1.5-2 cm long, the terminal and lower ones pistillate, the middle

ones (often to the summit) staminate, sometimes the middle ones androgynous, the lower spikelets somewhat remote; the oblong spike 5-8 (10) cm long; scales ovate, acute, rusty-brown, slightly shorter than the perigynia; perigynia semicoriaceous, slightly spongy at base, oblong-ovoid to ovoid, (3.8)4-5.2 mm long, stramineous, becoming subferruginous, with prominent nerves (12-14 on outer face, 6-8 on inner face), narrowly serrulate-winged above, gradually tapering into a beak, this elongate, curved, cleft in front, sharply bidentate. Fr. June-August. (Plate X, Figures 5, 5a).

- 130 Swamps, boggy and water meadows, shallow water, and shores. — European part: Kar. -Lap. (south. -Vyazostrov on Svir'), Lad. -Il'm., Upp. Dnep., Mid. Dnep., Prichern. (Zinov'evsk, Dnepropetrovsk, Zmiev), Volg. -Don. (Khar'kov, Belgorod, Dobrinka, Usmanskii Distr. and eastern part), Low. Don. (Northern part and Novocherkassk), Volg. -Kam. (Kazan' and eastern part from Kama, Talitskii works), Zavolzh., Low. Volg. (Chizhinsk. floodlands); Caucasus: boundary of West. and East. Transcauc. (South Osetiya: Ertso); West. Siberia: Ob. (to the longitude of Tobol'sk and Endyrskie nomad camps on the Ob' at 66.5°), Upp. Tob., Irt., Alt.; East. Siberia: Yenis. (s. -w. part), Ang. -Sayan; Centr. Asia: Aral. -Casp. (n. -e. part, Mugodzhary, Ulutau), Pribalkh. (n. part). Gen. distr.: West. and Centr. Europe. Described from England. Type in London.

ECONOMIC IMPORTANCE: In spring grazed satisfactorily in pasture by cattle and camels; acceptable in hay if cut not later than beginning of flowering. According to report of N. A. Ivanova, this is one of the most important forage plants of Western Siberia, especially in drought years. Produces a uniform and dense stand, consisting largely of non-flowering shoots.

6. *C. Grossheimii* V. Krecz. sp. nova in Addenda, II, 589.

Perennial, cineraceous, with creeping rhizome; culms 25-50 cm tall, scabrous above; leaves flat, 2-3 mm broad; spikelets 6-10, ovoid to oblong-ovoid, the terminal and the lowest ones pistillate, those at the middle staminate and androgynous, disposed in a dense spikelike inflorescence 2-3 cm long; scales ovate, subacute, castaneous, shorter than the perigynia; perigynia semicoriaceous, ovoid, ca. 3 mm long, plano-convex, rusty-yellow, slenderly many-nerved on outer face, subsessile, with thickened serrulations on the margin above, gradually contracted into a short, frontally cleft beak.

Meadows. —Caucasus: South. Transcauc. Gen. distr.: Turkish Armenia. Described from Northern Armenia: Nor-Bayazet, river Zanga. Type in Leningrad.

- 133 7. *C. lithophila* Turcz. in Bull. Soc. Nat. Mosc. XI (1838) 103 (nomen) et ib., XXVIII (1855) 328; Fl. baic. -dah, II, 2 (1856) 263. — *C. intermedia* Turcz., l. c., 327 et 262; Kuk. in Engl. Pflzr. IV, 20 (1909) 135 et in Journ. Russ. Bot. 3-6 (1911) 51, ex p. (incl. f. minor Kük., non Peterm.); Kom. Fl. Manchzh. I, 361; Kom. and Alis. Opr. rast. Dal'-nevost. kraya I, 282; V. Krecz. in Fl. transb. II, 115, nec Retz., nec Good.

Perennial; cineraceous plants with long-creeping rhizome; culms slender (to 1.5 mm thick at base), scabrous above; leaves flat to subinvolute,

1.5-2.5 mm broad, shorter than the culm long attenuate; summit of leaf-sheaths well developed, tubular, membranaceous; spikelets 10-20, ovoid, 0.5-0.8(1) cm long, terminal and lower spikelets pistillate, middle ones and part of the upper staminate, or androgynous (or all pistillate), disposed in a narrow spike, this interrupted below, 2-5 cm long; scales ovate, acute, light or pale ferruginous, paler at the center and the margins, slightly shorter than the perigynia; perigynia almost membranaceous, oblong-ovoid to ovoid, 3.5-4 mm long, stramineous, with slender nerves (9-10 on the outer face, 4-6 on the inner face), barely serrulate-winged on the margin above, gradually tapering into a beak, this short, straight, subconic, rusty cleft in front, short-bidentate. June-July.

Wet meadows and coppices. —East. Siberia: Ang. -Sayan (along rivers Angar and upper Lena), Daur., Len. -Kol. (northward to Vilyui and estuary of Aldan); Far East: Ze. -Bur., Uss. Gen. distr.: North-eastern and Central Mongolia, Manchuria, Japan (Nippon). Described from Zon-Murin Pass (South. Pribaikal'e). Type in Leningrad.

Cycle 3. *Psammovignea* V. Krecz. —*Ammorrhiza* Ehrh. Beitr. IV (1789) 146 (nomen). —Robust, rigid plants with faintly triangular culms (below), leafy to a considerable height. Leaves canaliculate. Inflorescence spikelike, crowded; spikelets gynecandrous, or mixed (terminal staminate or pistillate, middle ones staminate or androgynous, lower ones gynecandrous or pistillate); perigynia coriaceous or semicoriaceous, 4-5(6) mm long, ribbed, distinctly winged in upper part, with deeply cleft, pronouncedly bidentate beak.

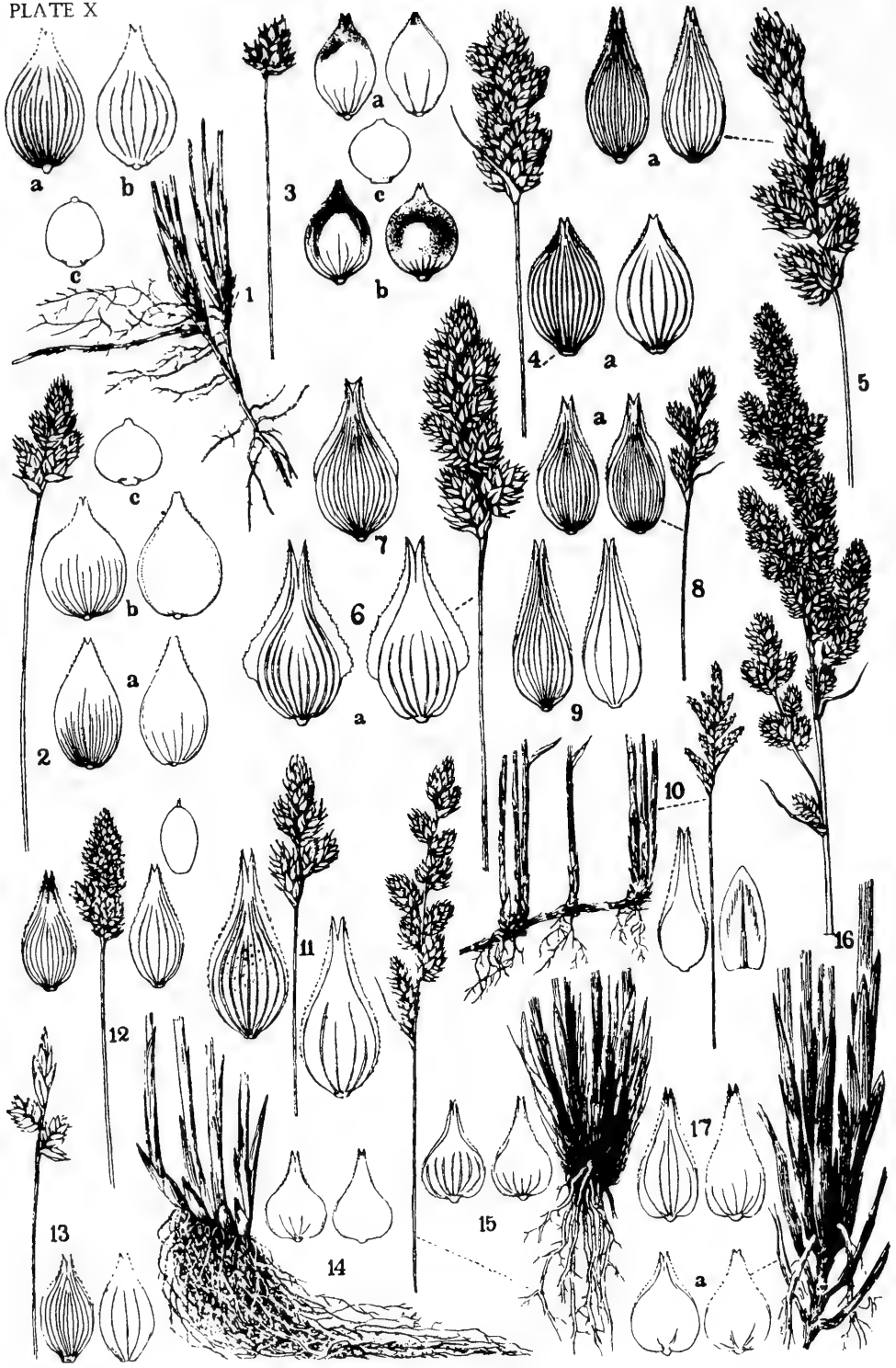
8. *C. arenaria* L. Sp. pl. (1753) 973; Trev. in Ldb. Fl. Ross. IV, 273. —*C. spadicea* Gilib. Exerc. phyt. II (1821) 546. —*Vignea arenaria* Rchb. ex Moessl. Handb., ed. 2, III (1829) 1618. —Exs.: Kneuck. No. 33, 278, 278a; Pl. Finl. exs. No. 105; HFR No. 745.

Perennial; cinearaceous plants, the stout rhizome (to 3-5 mm in diameter), covered with split light brown sheaths; culms slightly curved, scabrous above, invested at base with bladeless ocherous sheaths; leaves equaling the culms or longer, to 3 mm broad, subinvolute, finely long-acuminate, curved; spikelets 10-16, the terminal staminate, narrow, the middle androgynous, the lower pistillate, disposed in an oblong spike, this extended downward, with 1-2 short bracts; scales lanceolate, acute, ferruginous, with green midrib and light margin, longer than the perigynia; 134 perigynia coriaceous, ovoid to oblong-ovoid, 4.5-5 mm long, plano-convex, few-nerved on both faces, broadly serrulate-margined (wing to 1 mm broad) from middle to summit, round-based, short-stipitate, gradually tapering into an elongate, deeply cleft, bidentate beak. May-July. (Plate X, Figures 6, 6a).

Unconsolidated maritime and fluvial sands. —European part: Lad. - Il'm. (coast of the Gulf of Finland, Chudskoe Lake, Ladoga Lake?). — Gen. distr.: Atlantic seaboard of n. -w. and w. Europe. Described from Europe.

NOTE: Forming hybrids with *C. remota* L.

9. *C. colchica* Gay in Ann. Sc. Nat., sér. 2, X (1838) 303. —*C. ligERICA* Kük. in Engl. Pflzr. IV, 20 (1909) 138, quoad. pl. ross. et cauc.; Grossh. Fl. Kavk. I, 160, non Gay. —*C. arenaria* Trev. in Ldb. Fl. Ross. IV (1853) 274. —*C. arenaria* Boiss. Fl. Or. V. (1884) 401, non



L. — *C. dubia* Pacz. in Zap. Kiev. O-va Estv. X (1889) 433, non Hose (1797). — *C. sabuletorum* M.B. ex Ldb., 1.c. (nomen), non Nyl. — Exs.: Kneuck, No. 7; HFR No. 191; Fl. Cauc. Exs. No. 354.

Perennial, cineraceous, the thickened rhizome (to 2-3 mm in diam.) clothed with barely split, brown sheaths; culms scabrous above, slightly curved, 10-50 cm tall, invested at base with lateritious bladeless sheaths; leaves stiff, to 3 mm broad, involute or conduplicate, smooth on the outside, scabrous-margined, rather long-attenuate, spikelets 4-10, to 1-1.2 cm long, 0.8 cm broad, mostly gynecandrous, more rarely in upper part staminate throughout except for the uppermost spikelet, disposed in an oblong, mostly drawn-out spike to 4 cm long; scales ovate, rather long-acuminate, mostly ferruginous, paler on the keel and midrib, as long as the perigynia; perigynia ovoid, semicoriaceous, 4-4.5 mm long, plano-convex, light ferruginous, many-nerved on both faces, round-based, subsessile, narrowly serrulate-winged from middle to summit (wing 0.4-0.5 mm broad), gradually tapering into a bidentate beak. Fr. May-June. (Plate X, Figure 7).

Sands. — European part: Upp. Dnepr. (s. part and Mogilev?), Mid. Dnepr., Prichern., Volg. -Don., Low. Don., Zavolzh., Low. Volg., Crimea; Caucasus: Ciscauc., Dag., East, Transcauc. (Pirsagat), West. Transcauc.; West. Siberia: Upp. Tob.; Centr. Asia: Aral-Casp. Gen. distr.: Balkans, Asia Minor? Described from Abkhaziya (Sukhum-Kale). Type in Leningrad.

ECONOMIC IMPORTANCE: Pioneering plant on shifting sands. Should be tested in cultivation as consolidator of sands.

Cycle 4. *Heleodrymis* V. Krecz. — Small forest and bog-meadow plants with triangular culms leafy to considerable height and flat leaves 2-5 mm broad. Inflorescence spiciform, with gynecandrous or androgynous spikelets (sometimes the middle or terminal spikelets staminate throughout and the lower ones pistillate throughout). Perigynia 3-4.5(5) mm long, subcoriaceous or membranaceous, with pronounced winged margin, mostly slender nerves, and elongate, deeply cleft, bidentate beak.

135 Series 1. *Dolichostachya* V. Krecz. — Slender meadow-forest plants, with slender long-creeping rhizomes, filiform culms and narrow leaves (to 2-2.5 mm broad). Inflorescence of 3-8 loosely disposed spikelets;

Explanation to Plate X

1. *Carex uralensis* C. B. Clarke: rhizome, a) perigynium from the front, b) perigynium from the back, c) achene. — 2. *C. stenophylloides* V. Krecz.: inflorescence, a) and b) two extreme types of perigynia, c) achene. — 3. *C. duriuscula* C. A. M.: inflorescence, a) and b) perigynium, c) achene. — 4. *C. coarcta* Boott: inflorescence, a) perigynium from the front and the back. — 5. *C. disticha* Huds.: inflorescence, a) perigynium from the front and the back. — 6. *C. arenaria* L.: inflorescence, a) perigynium from the front and the back. — 7. *C. colchica* Gay: perigynium. — 8. *C. praecox* Schreb.: inflorescence, a) perigynium from the front and the back. — 9. *C. diplasiocarpa* V. Krecz.: perigynium from the front and the back. — 10. *C. brizoides* L.: rhizome, inflorescence, perigynium, scale. — 11. *C. accrescens* Ohwi: inflorescence and perigynium from the front and the back. — 12. *C. curaica* Kunth: inflorescence, perigynium from the front and the back, achene. — 13. *C. pseudocuraica* F. Schm.: inflorescence, perigynium from the front and the back. — 14. *C. diandra* Schrenk: rhizome, and perigynium from the front and the back. — 15. *C. appropinquata* Schum.: rhizome, inflorescence from the front and the back. — 16. *C. paniculata* L.: rhizome, inflorescence, and perigynium from the front and the back. — 17. *C. Szovitsii* V. Krecz.: perigynium from the front and the back.

spikelets gynecandrous, lanceolate or oblong in anthesis, becoming obovoid. Perigynia oblong, slender-nerved.

10. *C. praecox* Schreb. Spicil. fl. Lips. (1771) 63, non Jacq. — *C. Schreberi* Schrank, Baier. Fl. I (1789) 278. — *C. brizoides* Meinsh. in A.H.P. XVIII, 3 (1901) 317, ex p.; Rgl., ib., VIII (1880) 567, non L. — *C. brizoides a campestris* Wimm. Fl. Schles. I (1844) 401; Trev. in Ldb. Fl. Ross. IV±, 284. — Exs.: Kneuck. No. 8, 81; HFR No 142, 1096.

Perennial cineraceous plants, the slender rhizome, not exceeding 1-1.5 mm in diameter, clothed with brown, fibrillose marcescent sheaths; culms erect, scabrous above, 15-45 cm tall; leaves scabrous, shorter than the culm; spikelets with staminate flowers at base, oblong, to 0.8 cm long, 0.4-0.5 mm broad, 3-7, disposed in an oblong, alternately lobed spike to 2.5 cm long; scales oblong-ovate, acute, ferruginous, as long as the perigynia; perigynia semicoriaceous, ovoid, 3.5-4 mm long, plano-convex, ferruginous, ± scabrous-winged on the margin from the middle to summit, round-based, rather abruptly contracted into a conic, flat, bidentate beak. Fr. April-June. (Plate X, Figures 8, 8a).

Sands, waterless valleys, steppe slopes. — European part: all regions except Kar.-Lap.; Caucasus: Ciscauc., West. Transcauc. (w. part) and South. Transcauc.; West. Siberia: all regions; East. Siberia: Yenis., Ang.-Sayan., Daur., Len.-Kol., Centr. Asia: Aral.-Casp., Pribalkh., Dzhung.-Tarb. Gen. distr.: Europe. Described from surroundings of Leipzig.

NOTE: Forming hybrids with *C. uralensis* C. B. Clarke.

ECONOMIC IMPORTANCE: A satisfactory forage plant on elevated mud flats, meadow steppes, and thinned forests. Often constituting an appreciable admixture in hay. Favored by sheep, readily eaten by cattle, and moderately so by camels. As hay, excellent forage for all kinds of live-stock. Yield of fresh herbage 8-20 centners per hectare, in dry state 2-5 centners.

11. *C. diplasiocarpa* V. Krecz. sp. nova in Addenda, II, 590. — *C. Schreberi* Maxim. Prim. Fl. Amur. (1859) 309; Kom. Fl. Manchzh. I, 361, non Schrank. — *C. praecox* Kom. Key pl. east. reg. U.S.S.R. I (1931) 282, non Schreb.

Perennial, light green, fairly pliant plants, with long creeping rhizome clothed with light brown scale-like sheaths; culms slender, scabrous above, 20-40 cm tall; leaves about as long as the culm, flat to subinvolute, to 2.5 mm broad, linear, long, scabrous. Spikelets ovoid to oblong-ovoid, staminate at base, sometimes the middle ones or even three of the terminal ones also staminate or mostly so, at maturity to 1 cm long, 0.8 cm broad, 5-8 in number, disposed in an ovoid spike 2-2.5 cm long; scales lanceolate, 136 keeled, acute, with light midrib and margins, shorter than the perigynia; perigynia ovoid-lanceolate, subcoriaceous, 4.5-5 mm long, plano-convex, with rather rounded base, sessile, rusty-yellow, many-nerved on outer face, 3-5 nerved on the inner face, narrowly serrulate-margined in upper two-thirds, ± conically contracted into an elongate, bidentate, flat beak. Fr. May-June. (Plate X, Figure 9).

Meadows. — Far East: Ze.-Bur., Ud., Uss. Gen. distr.: Manchuria. Described from village Troitskoe on Lake Khanka. Type in Leningrad.

12. *C. brizoides* Juslen. ex L. *Amoen. acad.* IV (1759) 293. — *C. brizoides* β *nemoralis* Wimm. *Fl. Schles.*, ed. 2, I (1844) 401; *Trev. in Ldb. Fl. Ross.* IV, 284. — *Vignea brizoides* Rchb. ex Moessl. *Handb.*, ed. 2, III (1829) 1611. — Exs.: Kneuck. No. 36; HFR No 2047.

Perennial, light green plants with long creeping rhizome, clothed with brown, usually fibrillose, squamaceous sheaths; culms slender, scabrous above, 30-60 cm tall; leaves thin, flat, 2-3 mm broad, the upper ones longer than the culm; spikelets with staminate flowers at base, sometimes the middle spikelets staminate throughout, oblong-obovoid, becoming clavate, somewhat curved, green, 5-8 aggregated in a loose oblong spike; scales ovate, green, slightly ferruginous, subacute, shorter than the perigynia; perigynia membranaceous, lanceolate, 3-4 mm long, plano-convex, green, with broad denticulate margin and obscure nerves, round-based, cuneately attenuate to a bidentate beak. Fr. June-August. (Plate X, Figure 10).

Shady forests. — European part: Upp. Dnepr., Mid. Dnepr. (n.-w. part). Gen. distr.: Central Europe. Described from Bohemia. Type in London.

NOTE: Forming hybrids with *C. leporina* L. (*C. Filkukae* Podp.) and with *C. remota* L. (*C. Ohmuelleriana* O.F. Lang).

Series 2. *Oostachyae* V. Krecz. — Meadow and bog plants with thickened rhizome, with slender or subfistulous, hollow culms and flat leaves to 5-5.5 mm broad. Inflorescence of 5-15 rather densely aggregated spikelets; spikelets androgynous, ovate during and after anthesis. Perigynia ovoid, with thickened or evanescent nerves.

13. *C. accrescens* Ohwi in *Mem. Coll. Sc. Univ. Kyoto*, ser. B, VI, 5 (1931) 255. — *C. pallida* C.A.M. in *Mem. Ac. St. Petersb. Sav. Etr.* I (1831) 215, tab. VIII; *Trev. in Ldb. Fl. Ross.* IV, 272, non *Salisb.* (1796). — *C. siccata* Boott, *Illustr. Carex*, I (1858) 19, ex p.; *Meinsh. in A.H.P.* XVIII, 3 (1901) 319; *Kom. Fl. Manchzh.* I, 356, non *Dew.*

Perennial, light green plants, with long thickened rhizome clothed with castaneous scale-like sheaths; culms acutely triangular, scabrous nearly all the way down, 25-70 cm tall; leaves flat, thin, 2.5-5 mm broad, prominently scabrous, rather abruptly pointed, as long as or shorter than the culm, papillose. Spikelets ovoid to oblong, 5-10 mm long, the terminal and lower spikelets androgynous, the middle ones often staminate through-
137 out; scales ovate, acute, light ferruginous, with green midrib and light margins, shorter than the perigynia; perigynia divaricate, oblong-ovoid, membranaceous, 5-6 mm long, plano-convex, pale green to yellowish-green, winged 2/3 their length and ciliate-serrulate, 8-16-nerved on the outer face, 3-5-nerved on the inner face, the nerves light only below, tuberculate-glandular, short-stipitate, gradually tapering into an elongate, deeply bidentate, curved beak. June-August. (Plate X, Figure 11).

Light forests. — Arctic: Anad.; East. Siberia: Ang.-Sayan. (e.), Len.-Kol, Daur.; Far East: Kamch., Okhot., Sakh., Ze.-Bur., Ud., Uss. Gen. distr.: n.-e.-Mongolia Manchuria, Korea, Japan (Yezo). Described from Kamchatka, although the plant was probably collected on the way from Irkutsk to Okhotsk. Type in Leningrad.

ECONOMIC IMPORTANCE: In the Far East readily eaten by livestock.

14. *C. Iljinii* V. Krecz. sp. nova in Addenda, II, 590, — *C. pallida* f. *elegans* Kük. in Journ. Russ. Bot. 3-6 (1911) 51. — *C. brizoides* Meinsh. in A.H.P. XVIII, 3 (1901) 217, quoad pl. Martianow., ex Minus-sinsk (sec. sched. Meinsh.), non L.

Perennial, rather flexible, light green plants, with long slender creeping rhizomes; culms scabrous above, 15-45 cm tall; leaves flat, 1.5-2(2.5) mm broad, rather long-attenuate, shorter than the culm, scabrous, not papillose. Spikelets 3-6, androgynous, sometimes the terminal one or the middle ones staminate, ovoid, 5-7 mm long, congested above, remote below, with appressed perigynia at maturity; scales ovate, subacute, keeled, pale ferruginous, white-membranaceous-margined, shorter than the perigynia; perigynia membranaceous, lanceolate or ovoid-lanceolate, 3-8-4.2 mm long, plano-convex, greenish, with slender nerves on both faces (fewer and light on inner face), narrowly setulose-margined from the middle, gradually contracted into a short beak, this cleft in front, barely bidentate. June—July.

Upper zone of cedar woods and bare mountains. — East. Siberia: Ang. - Sayan, Daur. (Akshinskii, Selenginskii, and Barguzinskii districts). Gen. distr.: Northern Mongolia. Described from Tunkinskii District (valley of river Oka, facing Buksoi). Type in Leningrad.

15. *C. curaica* Kunth, Enum. pl. II (1837) 375; Meinsh. in A.H.P. XVIII, 3 (1901) 317; Kük. in Engl. Pflzr. IV, 20 (1909) 124 (incl. var.), ex p. et in Journ. Russ. Bot., 3-6 (1911) 47, fig. 26 (incl. var.). — *C. curaica* α *latifolia* Turcz. in Bull. Soc. Nat. Mosc. XXVIII (1855) 326. — *C. ovata* C.A.M. in Ldb. Fl. Alt. IV (1833) 207; Icon. IV (1833) 10, tab. 323, non Rudge (1804). — *C. incurva* β Trev. in Ldb. Fl. Ross. IV (1853) 270, ex p. — *C. borotalicola* Litw. in Schred. ad HFR V (1905) 15; V. Krecz. in Fl. transb. II (1931) 117 non Rgl. — Exs.: HFR No. 1244.

138 Perennial, light green plants with creeping rhizome; culms slender, subtriquetrous, hollow toward the base, 20-60 cm tall; leaves flat, substrict, long-attenuate, 3-4 mm broad; spikelets androgynous, ovoid, 10-18; inflorescence oblong, narrow, lax toward base, without a foliaceous bract; scales dark brown, obtuse, membranaceous-margined, ecarinate, about half as long as the perigynia; perigynia oblong-ovoid to ovoid-lanceolate, 3-3.6 mm long, stramineous, subconcave on inner face, rather abruptly contracted into an elongate, barely bidentate beak. Fr. June—July. (Plate X, Figure 12).

Wet meadows, bogs and boggy shores of rivers and lakes. — West. Siberia: Irt. (e. part), Alt.; East. Siberia: Yenis. (s. part), Ang. - Sayan., Daur., Len. - Kol. Centr. Asia: Dzhung. - Tarb. Gen. distr.: Northern Mongolia. Described from Altai (islands of river Chui, near Kuraiskaya Steppe). Type in Leningrad.

16. *C. pycnostachya* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 522. non Desv. (1853). — *C. commutata* Turcz. ex Stschegl., ibid., XXVII, 1 (1854) 205, non Gay (1839). — *C. borotalicola* Rgl. in A.H.P. VII (1880) 566, non Litw. — *C. incurva* β Trev. in Ldb. Fl. Ross. IV (1853) 270, quoad pl. Karel. — *C. curaica* Kük. in Engl. Pflzr. IV, 20 (1909) 124, quoad pl. ex "Centralasien," incl. var. *pycnostachya* Kük.; B. Fedtsch. in A.H.P. XXXVIII (1924) 192 (incl. var.) — *C. pallida*

C. B. Clarke ex B. Fedtsch. Rast. Rurk. (1915) 175 (excl. fig.) et in A.H.P. XXXVIII (1924) 192, nec C.A.M., nec Salisb. — *C. intermedia* var. *abbreviata* Kük. in Engl. Pflzr. IV, 20 (1909) 136, quoad pl. turkest. — *C. vulpinaris* Kük., ibid. 117, quoad pl. Semenov.

Perennial, light green plants with creeping rhizome; culms thickened, faintly triangular, subterete, 10-50 cm tall, pseudonodulose below the sheaths; leaves flat, gradually acuminate, subfalcate, 4-6 mm broad; spikelets androgynous (sometimes the middle ones staminate throughout), 6-12(15), oblong, disposed in a dense ovoid or lobate inflorescence, often with a foliaceous bract at base; scales light brown, ± keeled, acuminate, somewhat shorter than the perigynia; perigynia semicoriaceous, ovoid to ovoid-ellipsoid, 3.2-4 mm long, plano-convex, brownish or finally olivaceous, with 5-8 tinged, finally evanescent nerves, scarcely scabrous-winged on the margin, gradually contracted into a short, slightly bidentate beak. Fr. July.

Mountain meadows. — West. Siberia: Alt. (?); Centr. Asia: Aral.-Casp. (Mugodzhary), Pribalkh. (Karkaraly), Dzhung. — Tarb., Tyan'-Shan (e. part). Gen. distr.: Kul'dzha, n.-w. Mongolia, Tannu-Tuva Republic. Described from Alatau Mountains (upper reaches of river Lepsa). Type in Moscow.

17. *C. pseudo-curaica* F. Schmidt in Mem. Ac. St. Pétersb., VII ser., XII, 2 (1868) 67, tab. V, fig. 8-14. — *C. chordorrhiza* var. *pseudo-curaica* Trautv. in A.H.P. V (1887) 123. — *C. curaica* Maxim. Prim. Fl. Amur. (1859) 304, ex parte, non Kunth. — *C. chordorrhiza* β major Bcklr. in Linnaea XXXIX (1875) 55. — *C. curaica* var. *extipitata* Litw. in Sched. ad HFR VI (1908) 136. — Exs.: HFR No. 1943.

139 Perennial; rhizome short; with long, triquetrous, horizontal, rather thickened offshoots, giving rise to leafy bunches and culms; culms scabrous above; leaves flat, to 4 mm broad; spikelets 7-10, disposed in a loose lobed spike to 2-2.5 cm long; terminal spikelets often staminate throughout; scales ovate, acute, ferruginous, shorter than the perigynia; perigynia subcoriaceous, ovoid to ovoid-ellipsoid, 3-3.5 mm long, plano-convex, above slightly winged and erose-margined, nerved (the nerves numerous, obscure, slender on outer face, few on inner face), cuneate-based, gradually contracted into a flattened, serrulate, narrowly winged, bidentate beak. Fr. June. (Plate X, Figure 13).

Bogs and shores. — East. Siberia: Ang.-Sayan, (e. part), Yenis. (e.), Daur., Len.-Kol; Far East: Ze.-Bur., Ud. Uss., Sakh. Gen. distr.: Northern Japan (Yezo and Kunashir). Described from upper reaches of river Amur (Alyn). Type in Leningrad.

Section 3. *Boerneria* V. Krecz. — *Pseudovignea* Boern. in Abhandl. Naturw. Ver. Brem. V (1913) 275, ex p. (pro subgenere). — Xerophytes with slender, cord-like underground shoots, giving rise at the tips to dense, compact tussocks; culms obscurely 3-angled, with narrow leaves; spikelets androgynous, disposed in an oblong, capitate inflorescence; perigynia subcoriaceous or semicoriaceous, ovoid, 3-4.5 mm long, plano-convex, with fairly pronounced thickened nerves on both faces, gradually contracted into a short, scabrous, shallowly cleft, short-bidentate beak. Stigmas 2.

ECONOMIC IMPORTANCE: Species of this subgenus are among the most important forage sedges, as they are extremely widespread early spring

pasture plants of dry steppes, semi-deserts, and deserts. In many desert localities they are the principal forage plants. Eaten most readily by large and small cattle, and somewhat less acceptable only to camels. They are considered as fattening forage. Yield per hectare: fresh herbage 3-5 centners, in dry state 1-2 centners. Fresh herbage in fruiting stage (according to data of Katta-kurganskaya Experiment Station) is distinguished by a very high nutritional value and contains: water 62.7%, minerals 3.55%, cellulose 10.55%, fats 1.73%, protein 4.4%, nitrogen-free extractable substances 17.09%, starch equivalent 21.96, feed units 36.6. One of the principal foods of the marmot. Not eaten by rabbits. (Larin).

NOTE: The data given are apparently generalized for *C. stenophylla* in the wide earlier connotation, including also *C. pachystylis* Gay (No. 90) which is one of the most valuable forage plants of the semideserts of Central Asia, and ought to be checked for this extensive group of species (V. Krechetovich).

- 140 1. Scales large, usually longer than the perigynia or as long, subobtusely, broadly white-membranaceous, hence the entire inflorescence whitish (Far East). **C. rigescens* (Franch.) V. Krecz.
 + Scales usually shorter than the perigynia, rarely as long, brownish-ferruginous, with a narrower membranaceous margin; inflorescence brown. 2.
 2. Small plants, with 3-6 small, few-flowered spikelets aggregated in a small capitate or interrupted spike. Leaves setaceous-involute, crisp 3.
 + Large plants, with 6-10 large spikelets disposed in a dense large spike. Leaves flat, canaliculate or subinvolute, to 2-3 mm broad. 4.
 3. Perigynia 3 mm long, broadly ovate, suborbicular, with obsolescent broadly conic beak, almost nerveless on outer face (Plate X, Figures 3 a, b, c); scales shorter than perigynia, faintly membranaceous on the margin. A plant of the forest-steppe part of Siberia 18. *C. duriuscula* C.A.M.
 + Perigynia 3.2-3.7(4) mm long, ovoid, with an extended beak, nerved on the outer face; scales about as long as perigynia, rather prominently white-membranaceous on the margin. A mountain-steppe plant of Central Asia 21. *C. duriusculiformis* V. Krecz.
 4. Perigynia rather broadly ovoid, rounded at the broad base, subsessile, with an abbreviated, obscurely bidentate beak, outer face with 12-18 nerves distinct only toward base, inner face usually nerveless. Large, cineraceous solonchak plants, with leaves to 3 mm broad and large open heads. (Plate X, Figures 2 a, b) 20. *C. stenophylloides* V. Krecz.
 + Perigynia ovoid, distinctly stipitate, with an extended prominent beak, both faces distinctly 5-7-nerved. Smaller, green steppe plants, with looser inflorescences and subinvolute leaves to 2 mm broad. (Plate X, Figures 1 a, b, c) 19. *C. uralensis* C.B. Clarke.

18. *C. duriuscula* C.A.M. in Mem. Ac. St. Petersburg. Sav. Etr. I (1830) 214, tab. VIII. — *C. stenophylla* Trev. in Ldb. Fl. Ross. IV (1853) 270. — *C. stenophylla* C.A.M. in Ldb. Fl. Alt. IV (1833) 208; Turcz. in Bull. Soc. Nat. Mosc. XXVIII (1855) 325; Kom. Fl. Manchzh.

I, 360; Kom. and Alis. Opr. rast. Dal'nevost. Kraya I, 282; Kük. in Journ. Russ. Bot. 3-6 (1911) 46, ex p., non Whlb. —*C. stenophylla* var. *duriuscula* Trautv. in A.H.P. X (1887-1889) 537; Kük., l.c. —*C. stenophylla* var. *humilis* Meinsh. in A.H.P. XVIII, 3 (1901) 316.

141 Perennial, cineraceous plants with slender rhizomes and bunches of shoots, forming loose tufts; culms smooth, 5-20 cm tall, invested at base with dense, light brown or cinereous-brown sheaths, these more or less fibrillose on the outside; leaves setaceous-involute (to 1.5 mm broad), stiff, somewhat crisp, shorter than the culm, triangular-subulate above; spikelets 3-6, aggregated in a short, usually dense, ovoid or spherical head 0.7-1.2 cm long and 0.5-1 cm broad; scales broadly ovate to broadly elliptic, subacute to obtusish, ferruginous-brown, white membranaceous on the margin and at the summit, shorter than perigynia; perigynia subcoriaceous, broadly ellipsoid to broadly ovoid, suborbicular at maturity, 3 mm long, plano-convex, roundish-based, on a short thickened stipe, nerveless or very indistinctly 1-5-nerved, ferruginous or honey-brown, rather lustrous at maturity, cuneately contracted into a short, scaberulous-margined, frontally shallow-cleft beak. April—May. (Plate X, Figures 3 a, b, c.).

Steppes and steppe slopes. —West. Siberia: Upp. Tob., Irt., Alt.; East. Siberia: Ang.-Sayan., Daur., Len.-Kol.; Far East: Ze.-Bur., Uss.; Centr. Asia: Pribalkh. (e.); Gen. distr.: Northern Mongolia, Manchuria. Described from Kamchatka (?—probably from Irkutsk Province, considering that the collector, Redovskii, did not visit Kamchatka). Type in Leningrad.

19. *C. uralensis* C. B. Clarke in Kew Bull. Misc. Inf., Addit. ser., VIII (1908) 76. —*Carex stenophylla* Kük. in Engl. Pflzr. IV, 20 (1909) 120, quoad pl. ross., non Whlb. —Ic.: Fl. Yugo-Vost. III, Figure 150.

Perennial, green plants with slanting rhizome giving rise to 3-10 bunches of compactly set shoots; culms mostly scabrous, 10-40 cm tall, invested at base with compact, smooth, lateritious-brown (sometimes to blackish-brown) sheaths; leaves shorter than the culm, mostly setaceous-involute or flat, 1.5-2.5 mm broad; spikelets 5-10, disposed in an oblong spike often drawn-out toward base, 1-3 cm long, 0.5-1 mm broad; scales ovate, acute or awned, reddish-ferruginous, toward summit rounded, white membranaceous, shorter than the perigynia; perigynia subcoriaceous, broadly ovoid, (3)4-4.5 mm long, plano-convex, rounded to subcordate at base, distinctly stipitate, yellowish to ferruginous-brown, ± lustrous, more or less ribbed on both faces (10-nerved on outer face, 5-7-nerved on inner face), gradually tapering to a deeply bidentate, scaberulous beak; achene lenticular. May—June. (Plate X, Figures 1 a, b, c).

Needlegrass and fescue-sagebrush steppes, steppe slopes, grass-covered sands. —European part: Prichern., Volg.-Don. (Khar'kov, Dobrinka, Umanskii Distr., Khvalynskii Distr.), Zavolzh. (Stavropol'-Sterlitamak-Orsk), Low. Don., Low. Volg., Crimea; West. Siberia: Upp. Tob., Irt. (s.); Centr. Asia: Aral.-Casp., Pribalkh. (n.) Gen. distr.: Mong., Dzhung. Described from the vicinity of Inderskoe Lake. Type in Leningrad.

NOTE: Forms hybrids with *C. praecox* Schreb.

20. *C. stenophylloides* V. Krecz. in Fl. Turkm. 1, 2 (1932) 230, tab. 93 et in Addenda, II, p. 592. —*C. stenophylla* Kük. in Engl. Pflzr. IV, 20 (1909) 120, ex p., non Whlb. —*C. stenophylla* var. *pellucida*

Litw. in Trav. Mus. Bot. St. Petersb. VII (1910) 84, ex p. —? *C. dimorphotheca* Stschegl. in Bull. Soc. Nat. Moscou XXVII (1854) 206 (pl. morbida!)—Exs.: H. Kron. No. 71.

Perennial, cineraceous or glaucescent plants, with thickened creeping rhizome producing densely aggregated clusters of offshoots; culms mostly smooth, 15-45 cm tall, invested at base with cinereous sheaths; leaves stiff, erect, about as long as the culm, flat to subinvolute, 2-3 mm broad; spikelets 4-10, disposed in a dense, compact, inequilateral, triangular-conic spike, with divaricate spikelets and perigynia, 1-2.5 cm long; perigynia ovoid, acute to subacute, castaneous, hyaline-margined, as long as or shorter than the perigynia; perigynia semicoriaceous, mostly broadly ovate or broadly ellipsoid, 3-4 mm long, plano-convex, 12-18-nerved on the outer face, 3-5-nerved on the inner face, barely stipitate, with an abbreviated, subcuneate, scabrous, short-bidentate beak. April-June. (Plate X, Figures 2 a, b, c.).

Saline meadow sites (waterlogged in spring), river valleys, drying springs.—Centr. Asia: Aral.-Casp. (s. -e.), Pribalkh. (s.), Dzhung, -Tarb., Tyan'-Shan., Pam.-Al., Amu-Dar, Syr-Dar., Mount. Turkm., Kyz.-Kum.; Caucasus: East. and South. Transcauc. Gen. distr.: Afghanistan, Northern Persia, Turkish Armenia. Described from Kazakhstan (surroundings of Kopal). Type in Leningrad.

21. *C. duriusculiformis* V. Krecz. sp. nova in Addenda II, 952. *C. duriuscula* var. *interrupta* Litw. in Trav. Mus. Bot. St. Petersb. VII (1910) 85.—*C. stenophylla* var. *duriuscula* B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 184, non Trautv.

Perennial, cineraceous, rigid plants, densely caespitose; culms slender, faintly 3-angled, rather smooth, 5-25 cm tall; leaves initially canaliculate, becoming setaceous-involute; lower sheaths grayish-brown, splitting into fibers; spikelets 3-7, few-flowered, disposed in an oblong spike 0.7-1.8 cm long, loose or interrupted in lower part; scales ovate, acute, brownish, pronouncedly hyaline-margined, as long as the perigynia; perigynia ovoid, plano-convex, (3)3.2-3.7 mm long, ferruginous-yellow to ferruginous (finally blackish-brown and lustrous), short-stipitate, 5-7-nerved on both faces (finally smooth), gradually contracted into an elongate, scabrous, finely bidentate beak. Fr. June-July.

Alpine steppes, dry meadows, at altitude 3,000-4,500 m; apparently spreading northward (Zaisan, Mongolia) into the sandy-saline part of semi-deserts.—Centr. Asia: (Zaisan), Tyan'-Shan., Pam.-Al. Gen. distr.: Afghanistan, Kashgar, Tibet, Turkish Turkestan, Western Mongolia. Described from Alai: valley of river Dara and Chapkan-Deves winter station. Type in Leningrad.

**C. rigescens* (Franch.) V. Krecz., sp. nova in Addenda, II, 592. *C. stenophylla* var. *rigescens* Kük. in Engl. Pflzr. IV, 20 (1909) 121, quoad pl. David.

143 Perennial, cineraceous plants with rhizome producing solitary offshoots, loosely caespitose; culms slightly thickened, smooth, 10-25 cm tall, loosely invested at base with light rusty-brown, subfibrillose sheaths; leaves flat to subcanaliculate, cineraceous, 1.5-2.5 (3) mm broad, thickened, rather stiff; spikelets 4-8, pyramidal-ovoid, containing a rather large number of staminate flowers, the staminate scales forming terminal tufts; spike oblong-ovoid, whitish, 1-2.5 cm long; scales ovate, acute, pale ferruginous,

with a very wide hyaline margin, sometimes whitish throughout, as long as or longer than the perigynia; perigynia subcoriaceous, ellipsoid or ovoid, 3-4 mm long, plano-convex, immature few-ribbed on outer face, nerves coalescing at maturity, dull, gradually contracted into a short, slightly bidentate, scabrous beak.

Dry forest dales. — Far East: Uss.: Possibly in the vicinity of Lake Khanka and Suifun River. Gen. distr.: Manchuria, Northern China. Described from Jehol in eastern Mongolia. Type in Leningrad.

Section 4. *Phyllothyrsa* V. Krecz. — *Vigneandra* C. B. Clarke in Journ. Linn. Soc. (Bot.) XXXVII (1904) 3., exp. — Meadow and forest plants with short creeping rhizome, scapitose; culms triangular, hollow. Leaves flat, soft. Inflorescence congested or with distant spikelets. Spikelets androgynous or gynecandrous, with long foliaceous bracts of which the lowest overtops the inflorescence. Perigynia ovoid or oblong, membranaceous, 3-4 mm long, plano-convex, nerved on both faces, with pronounced, often broadly winged margin, more rarely smooth on the conspicuous margin, the beak bidentate, cleft in front. Stigmas 2.

1. Staminate flowers in upper part of the spikelet; inflorescence spiciform 2.
- + Staminate flowers in lower part of the inflorescence; inflorescence consisting of very remote spikelets 3.
2. Inflorescence with 1-3 foliaceous bracts at base, these several times longer than inflorescence; perigynia serrulate-winged (Plate XI, Figure 2) 23. *C. neurocarpa* Maxim.
- + Inflorescence with very short bract at each spikelet; culms scabrous; perigynia not winged, smooth-margined (Plate X, Figure 1) 22. *C. leiorhyncha* C. A. M.
3. Bract overtopping inflorescence; lower spikelets set 2-6 cm apart; scales and perigynia pale 4.
- + Bract scarcely half as long as inflorescence; lower spikelets set 1-2 cm apart; scales and perigynia ferruginous (Plate XII, Figure 1c) 24. *C. laeviculmis* Meinsh.
- 144 4. Perigynia ovoid, 3-3.5 mm long, the nerves distant from margin; spikelets oblong, 6-10 mm long, the lower ones 3-6 cm apart. Europe. (Plate XII, Figure 1a) 25. *C. remota* L.
- + Perigynia lanceolate, to 3 mm long, the nerves evenly distributed over the entire surface; spikelets smaller, ovoid, to 5 mm long, the lower ones less remote (not more than 2-3 cm apart). Far East. (Plate XII, Figure 1b) 26. *C. remotiuscula* Whlb.

Cycle 1. *Sychnostachys* V. Krecz. — Inflorescence spikelike, with numerous bracts and a large number (30-40) of androgynous spikelets. Perigynia ovoid or oblong, 3-5 mm long, membranaceous, plano-convex, with variously winged, rarely smooth, margin, many-nerved (10-15 nerves on outer face, 6-10 on inner face), beak elongate, deeply bidentate.

22. *C. leiorhyncha* C.A.M. in Mém. Ac. St. Petersb. Sav. Etr. I (1831) 217, tab. IX; Trev. in Ldb. Fl. Ross. IV, 274. — *C. setariaeformis* Turcz. ex Boott, Illustr. Carex IV (1867) 189 (nomen). — *C. albata* Meinsh. in A.H.P. XVIII, 3 (1901) 322; Kom. Fl. Manchzh. I, 358, non Boott. — *C. nubigena* var. *albata* Kük. in Engl. Pflzr. IV,

20 (1909) 146, ex p. et in Journ. Russ. Bot. 3-6 (1911) 54; Kom. and Alis. Opr. rast. Dal'nevost. Kraya I, 281, tab. 84 (dextra). — Exs. Kneuck. No. 154.

Perennial, light green plants with short rhizome, cespitose; culms scabrous above, 25-50 cm tall; leaves flat, 2-4 mm broad, shorter than the culm; spikelets numerous (to 30-40), ovoid, divaricate, with awn-shaped bract at base of each spikelet, bract exceeding the spikelet; spike oblong-cylindric, looser at base, 5-10 cm long; scales ovate, subacute, pinkish-rusty, narrower and shorter than perigynia; perigynia oblong-ovoid to ovoid, 3-3.5 mm long, yellowish-green or pale green, purple-punctulate toward summit, many-ribbed on both faces, spongy-thickened at base, short-stipitate, obscurely smooth-margined, gradually contracted into a smooth, short-bidentate beak. Fr. June—July. (Plate XI, Figure 1).

Wet meadows and forests. — East. Siberia: Daur.; Far East: Ze.-Bur., Uss. Gen. distr.: Manchuria, Korea, Northern China. Described from Dauriya (road from Chita and Nerchinskii works). Type in Leningrad.

ECONOMIC IMPORTANCE: Readily eaten by all kinds of livestock.

23. *C. neurocarpa* Maxim. Prim. Fl. Amur. (1859) 306; Kük. in Journ. Russ. Bot. 3-6 (1911) 53; fig. 33; — Exs.: Karo, Fl. Am.-Zeaen. No. 15.

145 Perennial, light green or cineraceous, cespitose plants; culms thickened, rigid, flattened, smooth, invested at base with pinkish-ocher-colored bladeless sheaths; leaves as long as or longer than the culm, subinvolute, 2-3 mm broad, rather stiff; spikelets numerous, ovoid; bracts at base of each spikelet awn-shaped, the lower ones larger, foliaceous (to 3 mm broad), several times as long as inflorescence; spikelets disposed in a pyramidal-cylindric, dense inflorescence 3-6 cm long; scales ovate, pinkish-rusty, long-attenuate, shorter and narrower than the perigynia; perigynia ovoid to broadly ovoid, 3.5-4 mm long, many-ribbed on both faces, in upper part broadly (to 1 mm) unequally winged, greenish, brown-punctulate above, gradually contracted into a short-bidentate, narrowly denticulate-winged beak. June—July. (Plate XI, Figure 2).

Wet meadows, near water. — Far East: Ze.-Bur. (s. part), Uss. Gen. distr.: Northern China, Korea, Manchuria, Japan. Described from Da village on Amur, above Dondon estuary. Type in Leningrad.

ECONOMIC IMPORTANCE: Eaten by all kinds of livestock.

Cycle 2. *Diastatostachys* V. Krecz. — Inflorescence long, containing few (6-10) spikelets, 5-15 cm long, the upper spikelets approximate, the lower very remote. Spikelets gynecandrous, with long foliaceous bracts, these disappearing toward the apex. Perigynia ovoid, 3-3.5 mm long, membranaceous, plano-convex, narrowly and obscurely winged on the margin, scabrous in upper one-third, with slender nerves (6-8 on outer face, 2-6 on inner face), the beak medium, bidentate.

24. *C. laeviculmis* Meinsh. in Bot. Centralbl. LV (1893) 195 et in A.H.P. XVIII, 3 (1901) 326. — *C. remota* Trev. in Ldb. Fl. Ross. IV (1853) 283, quoad pl. kamtsch., non L.

Perennial, green plants, with ligneous rhizome; culms slender, smooth or somewhat scaberulous, 30-50 cm tall; leaves narrow, flat, rather lax, scaberulous, 1/3 to 1/2 as long as the culm; spikelets 3-6, ovoid, subappressed, the 2-3 upper ones approximate, the lower ones 1-2 cm apart, the lowest often with bract to 2-3 cm long; scales ovate, acute, castaneous or

ferruginous, lighter at center, narrowly hyaline on the margin, slightly shorter than the perigynia; perigynia oblong-ovoid, membranaceous, 2.7-3.5(4) mm long, rusty yellow, slenderly nerved, with 8-10 nerves on outer face, 2-3 on inner face, rounded at base, discretely short-stipitate, gradually contracted into a scabrous, reflexed, rather strongly cleft, ferruginous beak. Fr. August. (Plate XII, Figure 1c).

Grassy bogs, coppices.—Arctic: Anad.; Far East: Kamch. (Kronotskoe Lake, Petropavlovsk). Gen. distr.: Northern Japan (Hondo, or Honshu), North America—from Alaska to California and Montana. Described from Kamchatka (Petropavlovsk). Type in Leningrad.

25. *C. remota* L. Amoen. acad. IV (1759) 293; Trev. in Ldb. Fl. Ross. IV, 283; Grossh. Fl. Kavk. I, 162.—Exs.: HFR No. 240; Pl. Finl. Exs. No. 524.

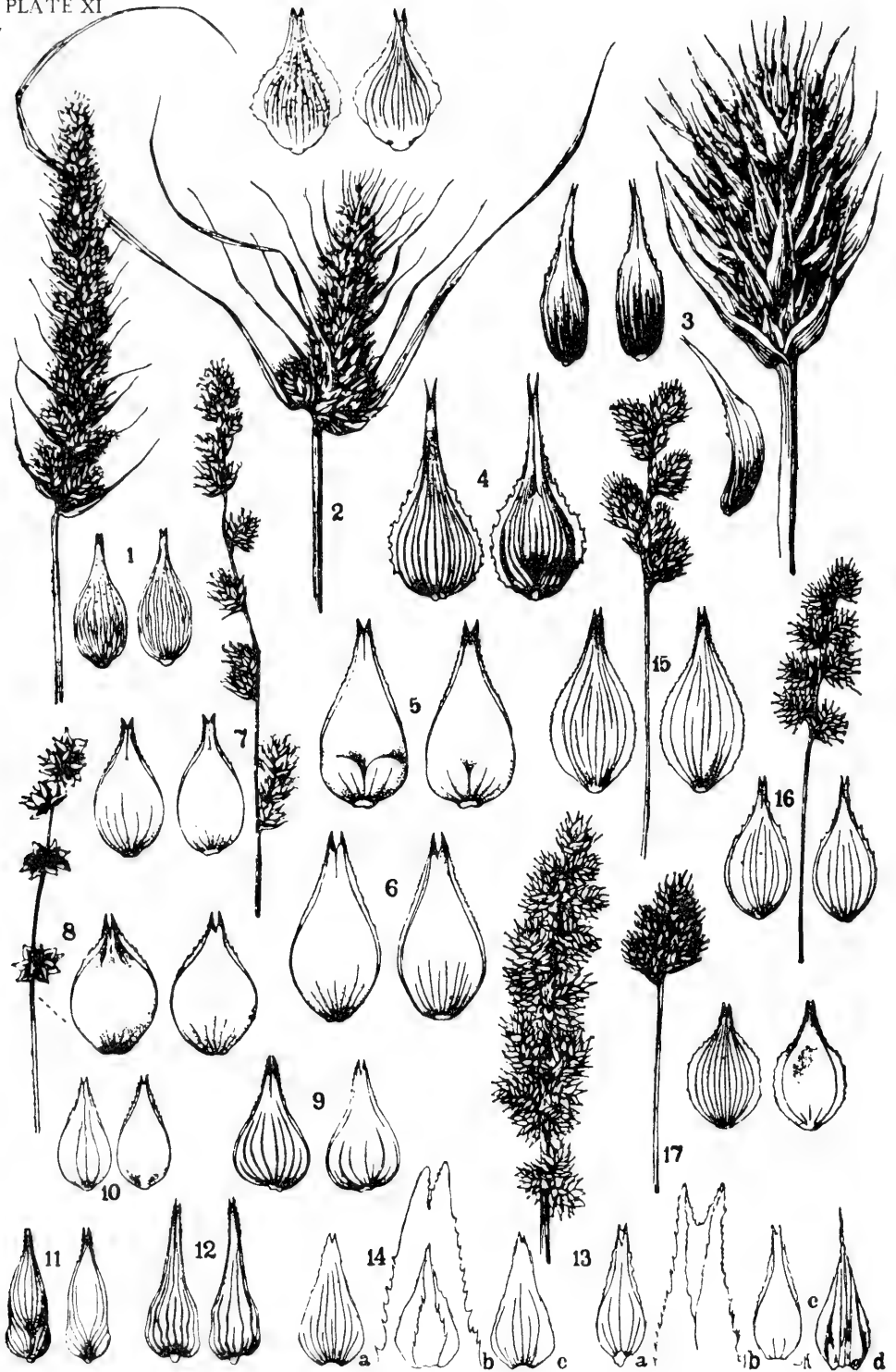
146 Perennial, light green, cespitose plants; culms slender, scabrous to nearly smooth above, leafy to considerable height, 30-60 cm tall, rachis flexuous; leaves flat, lax, 1.5-2 mm broad, shorter than the culm; spikelets 4-10, oblong to ovoid, compact, 0.6-1 cm long, the 2-4 upper ones approximate, bractless, the others very remote (3-6 cm apart), with long, foliaceous bracts; scales ovate, acute, whitish or light ferruginous, with midrib and white-hyaline margin, shorter than the perigynia; perigynia ovoid, membranaceous, 3-3.5 mm long, light green, finally flavescent, the slender nerves (6-7 on outer face, 3-4 on inner face) evident only in middle part, margin from the middle with narrow scabrous wing, the broad base rounded, the short-stipitate perigynium gradually contracted to a flat, bidentate, dorsally deep-cleft beak. Fr. May-June. (Plate XII, Figure 1a).

Wet soil, near springs and river sources.—European part: Lad.-II'm., Upp. Dnepr., Upp. Volg., Volg.-Kam. (possibly in w. part; Kazan'-Klaus), Mid. Dnepr., Volg.-Don. (Kaluga, Tambov, Khar'kov), Low. Don. (n.), Crimea; Caucasus: all regions. Gen. distr.: Europe, Northern Persia, North Africa (Algeria). Described from Germany.

NOTE: Forming hybrids: × *brizoides* L.; × *arenaria* L.; × *spicata* Huds. (*C. pseudoaxillaris* Richt.); × *vulpina* L. (*C. axillaris* Gay); × *appropinquata* Schum. (*C. Boeninghausiana* Weihe); × *leporina* L. (*C. Ilseana* Ruhmer); × *canescens* L. (*C. Arthuriana* Beckm.); × *elongata* L. (*C. Ploettneriana* Beyer); × *muricata* L. (*C. Gerhardti* Fig.); × *compacta* Lam. (*C. Kneuckeriana* Zahn).

26. *C. remotiuscula* Whlb. in Sv. Vetensk. Ak. Nya Handl. XXIV (1803) 147.—*C. remotaeformis* Kom. in A.H.P. XVIII, 6 (1901) 444 et in Fl. Mandsh. I (1901) 364.—*C. remota* ssp *Rochebruni* var. *remotaeformis* Kük. in Engl. Pflzr. IV, 20 (1909) 235 et in Journ. Russ. Bot. 3-6 (1911) 75.—Exs.: HFR No. 1392.

149 Perennial, light green, lax, cespitose plants; culms slender, often weak, prominently scabrous, 40-60 cm tall; leaves flat, lax, 1.2-1.8 mm broad, shorter than the culm; spikelets 4-8, ovoid (0.5 cm long), the 3-5 upper ones spicately congested, the others remote (2-3 cm apart), with very long bracts; scales narrowly ovate, acute, light ferruginous, with a green or light-colored center, broadly white-hyaline-margined, shorter than the perigynia; perigynia lanceolate, 3-3.5 mm long, membranaceous, plano-convex, green, becoming stramineous, with slender distinct nerves



on both faces (8-9 on outer face, 4-5 on inner face), finely serrulate-margined in terminal one-third, gradually contracted into a cuneate, flat, dorsally rather strongly cleft beak. Fr. June-July. (Plate XII, Figure 1b).

Among stones and in rock fissures, near mountain streams, and in shade.—Far East: Ze.-Bur., Uss., Sakh. Gen. distr.: Japan, Manchuria, Korea, Northern China. Described from Eastern Siberia (after Laksman's specimen). Type in Stockholm.

Section 5. *Desmiograstis* (Boern.) V. Krecz.—Boern. in Abhandl. Naturw. Ver. Brem. XXI (1913) 274 (pro genere).—Plants with creeping rhizome, this and culms at base invested in remains of bladeless sheaths. Culms triangular; leaves flat. Inflorescence spikelike, sometimes short-branched below. Perigynia ovate or oblong, subcoriaceous or membranaceous, nerveless or few-nerved, spongy-thickened at base, narrowly serrulate-winged on the margin toward summit, tapering to an elongate, flat, deep-cleft, bidentate beak. Culms ± thickened at base. Stigmas 2.

1. An arenicolous plant with long creeping rhizome; perigynia lagenarious-lanceolate (Plate XI, Figure 11). *C. arenicola* F. Schmidt.
- + Plants of swamps, meadows, and forests, with short compact rhizome; perigynia ovoid, ovoid-lanceolate, or conic-lanceolate 2.
2. Staminate flowers at base of spikelets; spikelets remote to the summit of inflorescence; leaves more or less canaliculate, 1.5-2 mm broad 3.
- + Staminate flowers terminal; spikelets crowded toward summit of inflorescence, crowded or distant below; leaves flat, 3-10 mm broad 4.

Explanation to Plate XI

1. *Carex leiorhyncha* C.A.M.: inflorescence, perigynium in front and back view. — 2. *C. neurocarpa* Maxim.: inflorescence, perigynium in front and back view. — 3. *C. kobomugi* Ohwi: inflorescence, perigynium in front, back and side view. — 4. *C. macrocephala* Willd.: perigynium in front and back view. — 5. *C. spicata* Huds.: perigynium in front and back view. — 6. *C. polyphylla* Kar. et Kir.: perigynium in front and back view. — 7. *C. divulsa* Stokes: inflorescence, perigynium in front and back view. — 8. *C. cuprina* (Sand.) Nendtv.: inflorescence, perigynium in front and back view. — 9. *C. muricata* L.: perigynium in front and back view. — 10. *C. angustior* Mack: perigynium in front and back view. — 11. *C. arenicola* F. Schmidt: perigynium in front and back view. — 12. *C. stipata* Muehbl.: perigynium in front and back view. — 13. *C. vulpina* L.: inflorescence, perigynium in front and back view, perigynium-beak, scale (ex Lindberg fil.). — 14. *C. compacta* Lam.: perigynium in front and back view, perigynium-beak, scale (ex Lindberg fil.). — 15. *C. leporina* L.: inflorescence, perigynium in front and back view. — 16. *C. Maackii* Maxim.: inflorescence, perigynium in front and back view. — 17. *C. pachystachya* Cham.: inflorescence, perigynium in front and back view.

3. Perigynia 3.5-4 mm long, 10-12-nerved, the nerves on inner face distinct only at base (Plate XI, Figure 9) *C. muricata* L.
- + Perigynia 3 mm long, or obscurely 1-2-nerved on outer face (Plate XI, Figure 10) *C. angustior* Mack.
4. Perigynia nerved; culms bulbous-inflated at base; scales terminating in a serrate spine; leaves 6-10 mm broad 5.
- + Perigynia nerveless (sometimes nerved, and then spongy-thickened below); culms not thickened at base; scales acute; leaves 3-5 mm broad 7.
5. Inflorescence loose, spikelets remote at base; perigynia membranaceous, cuneate-lanceolate, with a cuneate beak (Plate XI, Figure 12) 29. *C. stipata* Muehlb.
- + Inflorescence congested; perigynia subcoriaceous, ovoid, gradually tapering into an elongate beak 6.
- 150 6. A green plant; spike brown, usually bractless; perigynia coriaceous, 4-5 mm long, dull, ribbed only dorsally, brownish; beak deep-cleft dorsally, with narrowly serrulate-winged margin (Plate XI, Figures 13 a, b, c, d) 27. *C. vulpina* L.
- + A light green plant; spike pale green, bracteate in lower part; perigynia membranaceous, 4-4.5 mm long, lustrous, slenderly nerved on both faces; beak shallowly bidentate, sharply serrate margined but wingless (Table XI, Figures 14 a, b, c,) . . . 38. *C. compacta* Lam.
7. Perigynia spongy gibbous at base to nearly the middle (Plate XI, Figure 5) 8.
- + Perigynia not spongy at base or roller-thickened only below at the very margin (Plate XI, Figures 6-7-8) 9.
8. Forest (sciophilous), light green plants, with pale scales and lax inflorescences; perigynia oblong-ovoid to lance-ovoid, 5-5.5 mm long, dorsally 4-6-nerved 33. *C. Lumnitzeri* Rouy.
- + Cineraceous plants of exposed sites and light forests, with honey-colored to ferruginous scales and dense inflorescences; perigynia ovoid, 4.5-5.5 mm long, nerveless or nearly so 32. *C. spicata* Huds.
9. Perigynia broadly ovoid, with a short conic beak; spike \pm crowded, 1.5-3 cm long (Plate XI, Figure 8) 35. *C. cuprina* (Sand.) Nendtv.
- + Perigynia ovoid or oblong-ovoid, with an elongate, gradually attenuate beak; spikelets remote below, sometimes inflorescence branching at base, 3-10 cm long 10.
10. Perigynia 3.5-4.5 mm long, subdivergent; inflorescence interrupted, \pm branching at base, 5-10 cm long (Plate XI, Figure 7) 36. *C. divulsa* Stokes.
- + Perigynia 5-6 mm long, subradiate; inflorescence less interrupted, simple, 3-6 cm long (Plate XI, Figure 6) 34. *C. polyphylla* Kar. et Kir.

Cycle 1. *Acanthophora* V. Krecz. — Vigorous meadow plants with short ligneous rhizome; culms angled with concave sides. Leaves flat, 5-10 mm broad. Inflorescence spiciform, simple or short-branched. Spikelets androgynous, the foliaceous bracts often long (nearly equaling the inflorescence). Perigynia 4-5.5 mm long, oblong-ovoid or lanceolate, nerved, narrowly serrate-winged on the margin, tapering into a long, deeply bidentate beak. Base of culm enlarged, bulbous or fusiform.

27. *C. vulpina* L. Sp. pl. (1753) 973; Trev. in Ldb. Fl. Ross. IV, 275. — *C. glomerata* Gilib. Exerc. phyt. II (1792) 545. — Exs.: Pl. Fin. 1. Exs. No. 509.

151 Perennial, green plants, with short rhizome, cespitose; culms scabrous, 50-100 cm tall, with black fibrillose remnants of sheaths at base; leaves 5-10 mm broad, shorter than the culm; spikelets 8-15, ovoid, to 1.5 cm long, with rather strongly divaricate perigynia; forming a dense spike, this lobed below, brownish-green, 3-8 cm long, with obsolescent bracts in lower part; scales ovate, with an elongate scabrous awn at summit, ferruginous, green-keeled, shorter than or as long as the perigynia; perigynia oblong-ovoid, dull coriaceous, 4.5-5 mm long, rusty-brown, straight-based, dorsally distinctly ribbed, ventrally nerveless or nerved only at base, the margin near the summit narrowly winged, spinulose-serrate, gradually attenuate into an elongate, dorsally deeply cuneate-cleft, bidentate beak. Fr. May-June. (Plate XI, Figure 13).

Boggy meadows, river banks. — European part: all regions (except Kar. - Lap., Prichern., and southern Low. Don. and Low. Volg.), Crimea (Mount. part: Tentek-Shumi); Caucasus: Ciscauc. (Krasnodar); West. Siberia: Ob., Upp. Tob., Irt., Alt.; East. Siberia: Ang.-Sayan.; Centr. Asia: Pribalkh. (Zaisan). Gen. distr.: Europe. Described from Europe.

NOTE: Forming hybrids with *C. appropinquata* Schum. (*C. pseudovulpina* Richt.) and *C. cuprina* Nendtv. (*C. Otrubae* Podp.).

ECONOMIC IMPORTANCE: Practically not grazed in pasture. Eaten in hay, if cut prior to flowering.

28. *C. compacta* Lam. Fl. Fr. II (1778) 172. — *C. nemorosa* Rebert. Prodr. fl. Neomarch. (1804) 21, nec Lumn. (1791), nec Schrank (1789). — *C. vulpina* var. *nemorosa* Koch, Synops., ed. 2 (1844) 866. — *C. vulpina* β *tenuior* Trev. in Ldb. Fl. Ross. IV (1853) 275. — *C. vulpina* β *pallidior* Meinsh. in A.H.P. XVIII, 3 (1901) 323. — *C. vulpina* var. *orientalis* Pacz. Kherson, Fl. I (1914) 304. — *C. vulpinoidea* Boiss. Fl. Or. V (1884) 402, non Mchx. — Exs.: Pl. Finl. Exs. No. 510; Kneuck. No. 155.

Perennial, cineraceous, cespitose plants; culms scabrous, 50-70 cm tall, with black fibers at base; leaves 3-5 mm broad, shorter than the culm; spikelets 5-10, ovoid, to 1 cm long, forming a loose, oblong, pale-green to yellowish-green spike, this 3-4 cm long, with long, narrow bracts at the base of spikelets; scales ovate, pale ferruginous or whitish, with a short scabrous mucro, shorter than the perigynia; perigynia ovoid, (3.5)4-4.5 mm long, shining, membranaceous, stramineous, with a broad rounded base, with distinct slender nerves on both faces, gradually tapering into a subconic, serrate-margined, shallowly bidentate beak. Fr. April-June. (Plate XI, Figure 14).

Meadows and light forests in the steppe zone. —European part: Upp. 152 Dnepr. (Kiev), Mid. Dnepr., Prichern., Upp. Don. (Kursk, Tambov), Low. Don., Amu-Dar., Mount. Turkm., Pam.-Al., Pribalkh. (submont. part). Gen. distr.: Western and southern Europe, Mediterranean, Asia Minor, northern Persia. Described from vicinity of Paris.

NOTE: Forming hybrids with *C. remota* L. (*C. Kneuckeriana* Zahn).

29. *C. stipata* Muehlb. ex Willd. Spec. pl. IV (1805) 233.

Perennial, light green, cespitose plants; culms flattened, prominently scabrous toward the summit, 50-80 cm tall, leafy to a rather considerable height; leaves lax, 6-8 mm broad, abruptly attenuate toward the apex, scabrous underneath and on the margin, longer than the culm, the membranaceous band of the sheath corrugated (cross-rugulose); spikelets radiate, bracteate, 6-20, disposed in a simple (sometimes slightly branching) spike, this more open toward base, 4-8 cm long, with rather long bracts at base; scales lanceolate, spinescent-tipped, pale ferruginous, green-keeled and light-margined, shorter than the perigynia; perigynia cuneate-lanceolate, membranaceous, 4-5.5 mm long, on a short stipe which appears to be imbedded in the straight or subconcave, broad base, nerves 7-10 on outer face, 2-5 on inner face, the margin narrow, serrate, gradually tapering into a cuneate, serrate-margined, dorsally cleft, bidentate beak. Fr. July. (Plate XI, Figure 12).

Wet and boggy meadows. —Far East: Uss. Gen. distr.: North America, northern Japan. Described from Pennsylvania.

Cycle 2. *Asterisca* V. Krecz. —Small paludose plants; culms angled with flat sides. Leaves subcanaliculate, 1.5-2 mm broad. Inflorescence interrupted all the way up. Spikelets gynecandrous (i. e., staminate flowers at base of spikelet), more or less radiate, bractless. Perigynia (2.7)3-4 mm long, ovoid, nerved, tapering into a scabrous, bidentate beak. Culms with a sleeve-like thickening at base.

30. *C. muricata* L. Sp. pl. (1753) 974 (quoad fig. 12, tab. 32 et descr. Mich. Gen. nov. 69.) —*C. echinata* Murr. Prodr. Stirp. Gotting.; (1770) 76; Shmal'g. Fl. Yu.-Zap. Ross., 632; Kük. in Journ. Russ. Bot. 3-6 (1911) 72, tab. 57. —*C. stellulata* Good. in Trans. Linn. Soc. II (1794) 144; Trev. in Ldb. Fl. Ross. IV, 282 (excl. var. β) —Exs.: HFR No. 1643, 1794; Pl. Finl. Exs. No. 107; Fl. Pol. Exs. No. 585.

Perennial, cineraceous, densely cespitose plants; culms scabrous above, 15-45 cm tall; leaves plane to subcanaliculate, rather stiff, 1.5-2 mm broad, shorter than the culm; spikelets 3-6, radiate, hemispherical, approximate to subdistant, bractless, the terminal spikelet on a pseudo-peduncle formed by empty staminate scales; scales ovate, subacute, ferruginous, with a green midrib and white hyaline margin, shorter than the perigynia; perigynia ovoid, 3.5-4 mm long, membranaceous, plano-convex, curved toward the summit, greenish-brown, dorsally distinctly 10-12-nerved, ventrally nerved only at base, with broad rounded base, more or less spongy, sessile, gradually contracted into a beak, this flat, scabrous from base, deeply cleft. Fr. May-June. (Plate XI, Figure 9).

Wet places, marshes, boggy meadows and forests. —European part: Kar. -Lap. (s.), Dv. -Pech. (w.), Lad. -Il'm., Upp. Dnepr., Mid. Dnepr., Prichern. (Ekaterinoslav, Izium), Upp. Volg., Volg. -Don., Volg. -Kam. (w. part and Kazan!); Caucasus: Ciscauc. (w., subalpine meadows), West. and South. Transcauc., Tal. Gen. distr.: West. Europe, North America. Described from northern Europe (according to Fl. suecica of Linnaeus, from Nordland in Sweden). Type in Kew.

NOTE: Concerning adoption of name, see Mackenzie in Bull. Torrey Club I, (1923) 346. —Forming hybrids: \times dioica L. (C. Gaudiniana Guthnik); \times canescens L. (C. tetrastachya Traunst.; C. biharica Simonk.); \times remota L. (C. Gerhardtii Fig.).

31. *C. angustior* Mack. ex Rydb. Fl. Rocky Mts. (1917) 124. —
C. stellulata Kom. Fl. penins. Kamtsch. I (1927) 232, non Good.

Perennial, cineraceous, caespitose plants; culms scaberulous above, 15-30 cm tall; leaves erect, rather stiff, flat to subcanaliculate, 1.5-2 mm broad, as long as or shorter than the culm; spikelets 3-4, ovoid, divaricate, subapproximate, the terminal on a pseudopeduncle formed by empty scales; scales ovate, subobtusate, ferruginous, with a green median band and white-hyaline margin, shorter than the perigynia; perigynia lanceolate or ovoid-lanceolate, 2.7-3.6 mm long, light green, becoming brown, nerveless on both faces, rarely 1-2-nerved on outer face, ovoid-rounded at base, gradually tapering into a beak, this flat, scabrous throughout, bidentate, rather deeply cleft. Fr. June—August. (Plate XI, Figure 10).

Boggy and peaty meadows. —Far East: Kamch., Sakh. (n. part). Gen. distr.: Northern Japan, Korea, North America. Described from North America (Fairfield in New York State).

Cycle 3. *Muehlenbergia* V. Krecz. —Forest plants with short ligneous rhizome; culms with flat sides. Leaves flat, 2-5 mm broad. Inflorescence simple or short-branched below, the spikelets subremote in lower part. Lower spikelets bractless or with obsolescent filiform bracts. Spikelets with staminate flowers above and pistillate below (androgynous). Perigynia 3-5(6.5) mm long, ovoid, mostly nerveless, subsessile, serrate narrow-winged above, contracted into a short bidentate beak, style not enlarged at base.

32. *C. spicata* Huds. Fl. angl. (1762) 349 (sec. fig. 14, tab. 33 Mich. Gen. nov. 69), excl. syn. —*C. contigua* Hoppe in Sturm, Deutschl. Fl. Heft 61 (1835) tab. 2. —*C. muricata* Trev. in Ldb. Fl. Ross. IV 154 (1853) 276 (ex p., excl. var. β et γ), non L. —*C. fraterna* Rupr. in Beitr. Pflzr. russ. Reich. IV (1845) 84. —Exs.: Kneuck. No. 157; HFR No. 2048, a and b; Pl. Finl. Exs. No. 511; Pl. Pol. Exs. No. 692, 794; HFR No. 306.

Perennial, light green, caespitose plants; culms scabrous above, 20-80 cm tall, with blackish-brown fibers of old sheaths at base; leaves flat, 2-3 mm broad, shorter than the culm; spikelets 5-12, approximate, ovoid, with subdivaricate perigynia; spike loose, more or less interrupted below, to 5 cm long; scales ovate, finely acuminate, light ferruginous, green-keeled, shorter than the perigynia; perigynia ovoid, 4.5-5 mm long, with spongy, with slightly inflated, broadly rounded base, nerveless or few-nerved, with an obscure margin, gradually contracted into a bidentate beak of medium length. Fr. May—June. (Plate XI, Figure 5).

Light forests, coppices. —European part: all regions, except n. Kar. - Lap. and Dv. - Pech. (here only Ukhita — Andreev!); Caucasus: all regions; East. Siberia: Ang. - Sayan. (Minusinsk, Irkutsk). Gen. distr.: Europe and e. part of North America, Canary Islands, North Africa, Asia Minor. Described from England. Type in London.

NOTE: Concerning adoption of name, see Mackenzie in North Amer. Fl. XVIII, 1 (1931) 55. —Forming hybrids: \times *cuprina* Nendtv.; \times *divulsa* Stokes; \times *remota* L. (*C. pseudoaxillaris* Richt.).

33. *C. Lumnitzeri* Rouy ex Rouy et Fouc. Fl. Fr. XIII (1912) 412 (excl. syn. *C. nemorosa* Lumn.). —*C. muricata* β *virens* Rchb. Ic. Fl. Germ. VIII (1846) 9, tab. CCXV, fig. 562 (sec. utr. nervosus!), non Koch. —*C. contigua* var. *longissima* Vollm. in Denkschr. bot. Ges. Regensb. VIII (1903) 81; Kük. in Engl. Pflzr. IV, 20 (1909) 156.

Perennial, bright green plants with loose, much-branched rhizome; culms nodding at the top, 35-60 cm tall; leaves soft, nearly as long as the culm, 2-2.5 mm broad; spikelets 1½-8, many-flowered, forming a loose spiciform inflorescence, this interrupted and few-flowered below, with well-developed lower bract; scales oblong, subaristate, 3-nerved, with green internerves and whitish or reddish margins, slightly shorter than the perigynia; perigynia oblong-ovoid to lance-ovoid, 5-5.5 mm long (1.5-1.8 mm broad), inflated spongy at base, greenish, becoming brown, dorsally distinctly 4-6-nerved, dorsally nerveless or nearly so, gradually tapering to an elongate (nearly as long as the body), narrow, scabrous-margined, long-bidentate beak. Fr. June—July.

Deciduous forests, shady groves, and old parks. —European part: Lad. - Il'm., Upp. Volg., Volg. - Kam., Upp. Dnepr., Mid. Dnepr., Volg. - Don., Zavolzh., Low. Don.; Caucasus: Ciscauc. (Maikop area). Gen. distr.: Centr. and West. Europe. Described from France. Type in Paris.

NOTE: A race readily distinguishable by its general aspect, shape of perigynia and their nervature, rare in the central part of the U.S.S.R. but of rather common occurrence in the forest-steppe part, is found side by side with *C. argyroglochis* Hornm.

155 34. *C. polyphylla* Kar. et Kir. in Bull. Soc. Nat. Moscou, XIV (1841) 859; V. Krecz. in Fl. Turkm. 1, 2, (1932) 230. —*C. nemorosa* Lumn. Fl. Peson. (1791) 418 m non Schrank (1789). —*C. Leersii* F. Schultz in Flora, LIII (1870) 459 non Willd. (1787). —*C. Pairaei* var. *Leersii* Kük. in Journ. Russ. Bot. 3-6 (1911) 55; B. Fedtsch. in A.H.P. XXXVIII (1924) 194. —*C. echinata* var. *Leersii* Kük. in Engl. Pflzr. IV, 20 (1909) 161, ex p. —*C. muricata* Trev. in Ldb. Fl. Ross. IV (1853) 276, quoad pl. taur. -cauc. (ex p.) et alt; Meinsh. in A.H.P. XVIII, 3 (1901) 323 (pp.) non L. —*C. divulsa* C.A.M. in Ldb. Fl. Alt. IV (1833) 212, non Good.

Perennial, light green or cineraceous-green plants with short rhizome, cespitose; culms prominently scabrous above, 50-100 cm tall, with few brown fibers at base; leaves 3-5 mm broad, shorter than the culm spikelets 5-12, remote below, contiguous above, subglobose (1.2-1.5 cm in diameter), substellate, disposed in a spike 3-6 cm long; scales ovate, finely acuminate, ferruginous, green-keeled, shorter than the perigynia; perigynia ovoid to oblong-ovoid, (4.5)5-5.5 mm long, not spongy at base,

nerveless or few-nerved, green, the pronounced margin scabrous above, gradually tapering to a long beak with spreading cuneate teeth. Fr. May-June. (Plate XI, Figure 6).

Light forests, ravines, mountain meadows. —European part: Crimea (mount.); Caucasus: West. Siberia: Irt. (e. mount. part), Alt.; Centr. Asia: Pribalkh. (submont. s. part), Dzh.-Tarb., Tyan'-Shan., Syr.-Dar., Pam.-Al., Mount. Turkm. Gen. distr.: West. Europe, Mediterranean, north-western Mongolia, northern Persia, Asia Minor. Described from Tarbagatai (Chegarak-Asu Pass). Type in Moscow.

35. *C. cuprina* (Sand.) Nendtv. in Verhandl. Zool.-bot. Ges. Wien XIII (1863) 566. —*C. nemorosa* var. *cuprina* Sand. ex Heuff. in Linnaea, XXXI (1862) 662. —*C. Pairaei* F. Schultz in Flora, LI (1868) 302 et op. cit. LIV, 2 (1871) 27, tab. II, C; ib., 6 (1871) tab. I et II. —*C. muricata* Trev. in Ldb. Fl. Ross. IV (1853) 276, ex p. (excl. var. β et γ), non L. —*C. echinata* Kük. in Engl. Pflzr. IV, 20 (1909) 160 et auct. fl. Ross., non Murr. —Exs.: HFR Nos. 646, 944, 945.

Perennial, light green plants with short creeping rhizome, cespitose; culms scabrous above, 20-60 cm long, with blackish-brown fibers at base; leaves 2-2.5 mm broad, shorter than the culm; spikelets (2)4-7, few-flowered, globose (0.8 cm in diameter) strongly stellate, aggregate in a spike 1.5-3 cm long, the 1-2 lowest spikelets usually remote; scales broadly ovate, subacute, pale or light ferruginous, green-keeled, shorter than the perigynia; perigynia broadly subrhomboid-ovoid (sometimes), 3-4 mm long, nerveless, green, light-margined, not spongy at base, rather abruptly contracted into a cuneate, short, scabrous beak. Fr. May-June. (Plate XI, Figure 8).

156 Forests, coppices, (rarely). —All European part (except n. Kar.-Lap. and Dv.-Pech.); Caucasus; West. Siberia: Alt.; East. Siberia: Ang.-Sayan. (Minusinsk). Gen. distr.: Western Europe, Mediterranean, North Africa, North America (e.). Described from Hungary.

36. *C. divulsa* Stokes ex With. Bot. arr. brit. pl., ed. 2, II (1787) 1035; Good. in Trans. Linn. Soc. II (1794) 160; V. Krecz. in Fl. Turkm. 1, 2 (1932) 340. —*C. virens* Lam. in Encycl. III (1789) 384; C. Koch in Linnaea, XXI (1848) 614. —*C. muricata* Trev. in Ldb. Fl. Ross. IV (1853) 276, quoad pl. ross., taur. (ex p.) et cauc. (ex p.). —Exs.: Kneuck. No. 13.

Perennial, green plants, with an oblique rhizome, loosely cespitose; culms prominently scabrous above, 40-70 cm tall, with brown fibers at base; leaves flat, rather soft, 2-3 mm broad, shorter than the culm; spikelets 5-10, few-flowered, with slightly spreading perigynia, the upper ones contiguous, hemispherical, the lower ones oblong and often pedicellate or short-branched, often with pronounced bracts, disposed in an interrupted spike 5-10 cm long; scales ovate, finely acuminate, whitish, green-keeled, shorter than the perigynia; perigynia oblong-ovoid to lance-ovoid 3.5-4.5 mm long, green, nerveless, not spongy at base, light-margined, gradually tapering into a scabrous beak of medium length. Fr. May-June. (Plate XI, Figure 7).

Light deciduous forests. —European part: Mid. Dnepr. (Slobodka Vinitsk. and Peschanoe Baltsk.), Upp. Don. (Chernetchina, Akhtyr), Crimea;

the whole of the Caucasus; Centr. Asia: Mount. Turkm. (Firyuza). Gen. distr.: Europe (w. and s.), North Africa, Asia Minor, northern Persia, North America (e.). Described from England (Norfolk).

NOTE: Forming hybrids: *X spicata* Huds.; *X remota* L. (*C. Emmae* L. Gross.); *X leporina* L. (*C. treverica* Hausskn.).

Cycle 4. *Herpystera* V. Krecz. —Arenicolous plants with long creeping rhizome, forming loose tufts. Leaves to 2-3 mm broad, abbreviated and thickened, flat, cuneate. Inflorescence congested, spiciform. Spikelets androgynous, bractless. Scales subulate-acuminate. Perigynia lanceolate, 3.5-4 mm long, nerved, spongy at base, gradually tapering into scabrous bidentate beak. Style with a sleeve-like enlargement at base.

37. *C. arenicola* F. Schmidt in *Mém. Ac. St. Pétersb. VII sér.*, XII (1868) 191, tab. VI, fig. 18-24; Kük. in *Journ. Russ. Bot.* 3-6 (1911) 45, fig. 24; Kom. and Alis. *Opr. rast. Dal'nevost. Kraya I*, 282.

Perennial, light or dark green plants with creeping thickened rhizome, with setaceous-fibrillose remnants of sheaths at the nodes; culms scabrous above, 15-25 cm tall, with tall, ochreous-brown, fibrillose-cleft sheaths at base; leaves flat and mostly cuneate toward the base, shorter than the culm, 2-3.5 mm broad, subulate-attenuate above, scabrous on the midrib and 157 margins; spikelets divaricate, disposed in an oblong, rather loose spike 1-2.5 cm long; scales oblong-ovate, mucronate (especially the lower ones), ferruginous, keeled, with a broad hyaline margin, shorter than the perigynia; perigynia oblong-ovoid to lanceolate (lageniform), membranaceous, 3.5-4 mm long, ferruginous-yellow, plano-convex, with broad rounded base, bilaterally spongy-inflated, dorsally nerved all the way up, ventrally only below, the pronounced margin scabrous from the middle to the summit, gradually tapering into an elongate scabrous beak. Fr. June. (Plate XI, Figure 11).

Coastal sands. —Far East: Uss., Sakh. Gen. distr.: Korea, Japan. Described from Sakhalin (Truotoga). Type in Leningrad.

Section 6. *Rhynchopera* (Boern.) V. Krecz. —Boern. in *Abhandl. Naturw. Ver. Brem.* XXI (1913) 272 (pro genere). —Large meadow and bog plants, tufted, usually forming clumps. Culms more or less 3-angled. Leaves narrow. Inflorescence usually branched below or more or less paniculate, with numerous few-flowered androgynous spikelets, bractless. Perigynia coriaceous, mostly broadly ovoid, 2.5-3 mm long, strongly convex on the back, slightly so on the inner face, short-stipitate, with subcordate base, narrowly serrulate-winged from the middle, rather abruptly contracted into a long, scarcely bidentulate, dorsally cleft beak. Stigmas 2.

1. Lower sheaths splitting into blackish-brown capillary fibers; perigynia nerved on both faces (Plate X, Figure 15). 39. *C. appropinquata* Schum.
- + Lower sheaths entire; perigynia nerveless or nerved only on the back 2.
2. Leaves at most 3 mm broad; lower sheaths blackish-brown, narrow; scales with narrow hyaline margin, shorter than the perigynia; rhizome short-creeping (Plate X, Figure 14) 38. *C. diandra* Schrank.

- + Leaves to 10 mm broad; lower sheaths castaneous, broad; scales with very wide hyaline margin, equaling or exceeding the perigynia; cespitose plants 3.
- 3. Perigynia 3 mm long, nerveless or with 1-3 very indistinct nerves on the back; leaves to 5-6 mm broad. (Europe—Plate X, Figure 16). 40. *C. paniculata* Juslen.
- + Perigynia 3.8-4.5 mm long, with 3-5 thick nerves on the back; leaves to 10 mm broad. (Caucasus—Table X, Figure 17) 41. *C. Szovitsii* V. Krecz.

38. *C. diandra* Schrank, Cent. Bot. Anmerk. (1781) 49 et in Acta Ac. Mogunt. (1782) 57. —*C. teretiuscula* Good. in Trans. Linn. Soc. II (1794) 163, tab. 19, fig. 3; Trev. in Ldb. Fl. Ross. IV, 276. —Ic.: Syr., Ill. Fl. Mosc. gub. I, 192. —Exs.: Kneuck. No. 74, 75, 76; HFR No. 1245, a et b.

158 Perennial, cineraceous-green plants, with an elongate, short-creeping rhizome, loosely cespitose; culms with subconvex sides, scabrous above, 40-100 cm tall, covered at base with dark brown, bladeless, entire sheaths; leaves broadly canaliculate, 1-2(3) mm broad, shorter than the culm; spikelets disposed in an oblong inflorescence, this more or less branched below, to 3 mm long; scales ovate, acute, castaneous or ferruginous, with a light-colored midrib and rather broad white-hyaline margin, shorter than the perigynia; perigynia broadly ovoid, (2)2.5-3 mm long, castaneous-brown to nearly black, with a broad subcordate base, more or less lustrous, convex, with 4-5 short nerves at base on the back, subconvex, nerveless, at first abruptly, later gradually, contracted into a long, serrulate-margined and narrow-winged beak, this dorsally cleft nearly from base. Fr. June—July. (Plate X, Figure 14).

Marshes, boggy meadows. —Arctic: Arct. Eur.; European part: (all regions, except s. Prichern., s. Lw. Don, most of Low. Volg., and Crimea); Caucasus: Ciscauc. (s.), West. and South. Transcauc.; West and East. Siberia; Far East; Centr. Asia: Aral.-Casp. (n. and s.-e. part of Kzyl-Ordinsk. region). Gen. distr.: Northern and Central Europe, North America. Described from southern Bavaria.

NOTE: Forming hybrids: X *paniculata* L. (*C. germanica* Richt.); X *appropinquata* Schum. (*C. limnogenena* Appel).

39. *C. appropinquata* Schum. En. pl. Saell. I (1801) 267. —*C. paradoxo* Willd. in Sitzber. Ges. nat. Fer. Berlin (1794) 39, tab. I, fig. 1, non J. F. Gmel. (1791); Trev. in Ldb. Fl. Ross. IV, 277. —Ic.: Syr., Ill. Fl. Mosk. gub. I, 101. —Exs.: Kneuck. No. 71, 72; HFR No. 695.

Perennial, cineraceous-green, tussock-forming; culms with flat sides, prominently scabrous, 50-100 cm tall, covered at base with brown to blackish-brown sheaths, these usually strongly capillary-split below; leaves nearly as long as the culm, flat or conduplicate, to 2 mm broad; inflorescence oblong-paniculate, 4-10 cm long, with a short bract at base, the subdivergent branches attaining 2-3 cm at the base; scales oblong-ovate, acute, reddish-brown, with a light midrib and narrow hyaline margin, as long as the perigynia; perigynia broadly ovoid, 2.5-3 mm long, reddish-brown, very strongly convex on the back, with 7-8 thick nerves on both faces, subcordate at base, rather abruptly contracted into a long, serrate, narrow-winged, frontally cleft beak. Fr. June—July. (Plate X, Figure 15).

Marshes, shores, canals (on peaty soil). —European part: all regions, except n. part of Kar.-Lap., also Prichern., Low. Don. (only Esaulovka and Novocherkassk), Low. Volg. and Crimea; Caucasus: Ciscauc. and West Transcauc.; West. Siberia; East. Siberia: Yenisei and Ang.-Sayan. Gen. distr.: Europe (Northern and Central). Described from Holland (Lingby Lake).

159 NOTE: Forming hybrids: × *diandra* Schrank (*C. limnogenae* Appel.); × *paniculata* L. (*C. Rothae* De-Not.; *C. solstitialis* Fig.); × *canescens* L. (*C. Schultzeana* Fig.); × *remota* (*C. Rieseana* Fig.).

40. *C. paniculata* Juslen. ex L. *Amoen. acad.* IV (1759) 294; Trev. in Ldb. *Fl. Ross.* IV, 277, ex p. —*l.c.*: *Syr. Ill. Fl. Mosk. gub.* I, 192. — *Exs.*: Kneuck, No. 70.

Perennial, cineraceous-green, tussock-forming plants; culms rigid, robust, with convex sides, prominently scabrous, 40-100 cm tall, the basal sheaths broad, entire, castaneous, somewhat lustrous, bladeless; leaves rigid, ribbon-like, flat to sub-conduplicate, 3-5 mm broad, as long as the culm; inflorescence an oblong, loose panicle, 5-10 cm long, the branches subdivergent, often forking below, to 4-5 cm long; scales ovate, acute, light ferruginous, with broad white-hyaline margins (hence the entire inflorescence appearing whitish), as long as the perigynia; perigynia ovoid, 3 mm long, strongly convex on the back, with broad rounded base, nerveless or obscurely 1-3-nerved at the very base, gradually tapering into a serrulate, winged (from the middle), frontally cleft beak. Fr. June—July. (Plate X, Figure 16).

Marshes, canals, shores. —European part: Lad.-Il'm., Upp. Dnepr., Upp. Volg. (w. part), Mid. Dnepr., Volg.-Don. (w.-Belgorod); Caucasus: Ciscauc. (Pyatigorsk and Kislovodsk). Gen. distr.: Centr. Europe, Balkans. Described from Central Europe (Bohemia).

NOTE: Forming hybrids: × *cuprina* Nendtv.; × *vulpina* L. (*C. pseudovulpina* Richt.); × *diandra* Schrank. (*C. germanica* Richt.); × *appropinquata* Schum. (*C. Rothae* De-Not.; *C. solstitialis* Fig.); × *canescens* L. (*C. ludibunda* Gay); × *remota* L. (*C. Boenninghausiana* Weihe); × *elongata* L. (*C. Fussii* Simonk.).

41. *C. Szovitsii* V. Krecz. sp. nova in *Addenda*, II, 593. —*C. paniculata* Trev. in Ldb. *Fl. Ross.* IV (1853) 277, pro pl. cauc.; Meinsh. in *A.H.P.* XVIII, 3 (1901) 313, ex p.; *Grossh. Fl. Kavk.* I, 161; *Boiss. Fl. Or.* V, 404, non L. —*C. paniculata* var. *Favrati* *Grossh.*, *l.c.* — *C. paniculata* var. *Favrati* f. *robustior* Kük. in *Engl. Pflzr.* IV, 20 (1909) 182, quoad pl. caucas. —*C. paniculata* var. *caucasica* Lesk. in *Journ. Soc. Bot. Russ.* XVI, 1 (1931) 70, fig. 1.

Perennial, dark cineraceous-green, densely cespitose plants; culms robust, triangular, prominently scabrous, 60-120 cm tall, covered at base with castaneous, broad, somewhat split-fibrillose, bladeless sheaths; leaves flat, 5-10 mm broad (the young abbreviated leaves particularly broad), cuneate-attenuate toward apex, becoming enlarged short-subulate, shorter than the culm; inflorescence a large, ovoid to rhomboid, crowded panicle 6-8 cm long and 3-4 cm broad, branches forking, the lower ones nodding;

scales ovate, acute, ferruginous-rufous, with a broad white-hyaline margin, shorter than the perigynia; perigynia ovoid, plano-convex, 3.8-4.5 mm long, with a broad, faintly cordate to rounded base, short-stipitate, slenderly 3-5-nerved to considerable height on the back, practically nerveless on the inner face, ferruginous-brown, more or less lustrous, serrulate-winged from the middle, gradually tapering into a long, frontally deep-cleft beak. Fr. July. (Plate X, Figure 17).

Subalpine meadows, borders of mountain streams, spring bogs, to alt. 2,000 m. European part: Crimea (Chatyrdag); Caucasus: mountains of Ciscauc. and West. Transcauc. Gen. distr.: Asia Minor (Lazistan). Described from Southern Osetiya (Kudar, Segaut Pass). Type in Leningrad.

Section 7. *Lonicoperis* (Rafin.) V. Krecz. —Rafin. in *Amenit. of Nat.* (1840) 27. —*Kolerma* Rafin. 1.c. —*Thysanocarex* Boern. in *Abhandl. Naturw. Ver. Bremen, XXV* (1913) 274 (pro genere). —*Ptacetesia* Ehrh. *Beitr. IV* (1789) 147 (nomen). —Cespitose meadow plants. Culms triangular; leaves flat, narrow. Spikelets gynecandrous, bractless, disposed in capitate or spiciform simple inflorescences. Perigynia ovoid or oblong, thin-membranaceous, 4-8 mm long, plano-convex, obscurely nerved and rather broadly serrulate-winged, extending into a flat, frontally deep cleft, bidentate beak of medium length. Achene plano-convex, half as long and broad as the perigynium. Stigmas 2.

1. Perigynia with equal number of nerves on both faces; lower spikelets remote to subapproximate 2.
- + Perigynia 8-10-nerved on the back, nerveless or 3-4-nerved at base on the inner face; spikelets aggregated in a pyramidal head 43. *C. pachystachya* Cham.
2. Spike to 8 cm long of 10-20 divaricate spikelets; perigynia 3-4 mm long, obscurely winged on the margin, barely serrulate to subentire, 4-5-nerved. (Plate XI, Figure 16) 42. *C. Maackii* Maxim.
- + Spike 2-4 cm long of 4-10 appressed spikelets; perigynia 4-5 mm long, winged on the margin, serrulate, 8-10-nerved. (Plate XI, Figure 15) 3.
3. Hylocolous, loosely tufted to procumbent, soft, light green plants with pale green, silvery, remote spikelets; perigynia oblong-ovoid, devoid of spongy tissue, few-nerved below 45. *C. argyroglochin* Hornm.
- + Densely tufted, rigid, grayish-green meadow plants with ferruginous-brown contiguous spikelets; perigynia ovoid to broadly ovoid, spongy-enlarged above, few-nerved on both faces. 44. *C. leporina* L.

Series 1. *Polystachyae* V. -Krecz. —Spikelets numerous (10-20), subdivaricate, ovoid; inflorescence oblong, interrupted below, spiciform. Perigynia with scaberulous, obscurely winged margin.

161 42. *C. Maackii* Maxim. *Prim. fl. Amur.* (1859) 308; *Kom. Fl. Manchzh. I*, 357; *Kük. in Journ. Russ. Bot.* 3-6 (1911) 61, fig. 63.

Perennial, green, soft, cespitose plants; culms rather slender, 30-60 cm tall, ± concave-triangular, scabrous above, leafy to a considerable height; leaves 3-4 mm broad, shorter than or equaling the culm, soft; spikelets with staminate flowers at base, ovoid to globose, dense, few-flowered,

10-20; the spiciform inflorescence interrupted below, congested above, 3-8 cm long; scales ovate, acute, pale, with a rusty-pink midrib, shorter than the perigynia; perigynia membranaceous, ovoid, (2.5)3-4 mm long, plano-convex, creamy-green, 5-8-nerved on the back, 3-5-nerved on the inner face, with an indistinct, diffusely serrulate, nearly smooth margin, gradually attenuate to a short, bidentate beak; achene ovoid, plano-convex, to 2 mm long. Fr. June. (Plate XI, Figure 16).

Wet silty places. —East. Siberia: Daur. (?); Far East: Ze.-Bur., Uss. Gen. distr.: Manchuria, Korea, Japan. Described from the foothills of Burenskie Mountains. Type in Leningrad.

Series 2. *Petrocarpae* (Holm) V. Krecz. —Spikelets to 4-10, appressed, aggregated in heads or subdistant. Perigynia rather broadly serrulate-winged.

43. *C. pachystachya* Cham. ex Steud. Synops. Cyper. (1855) 197. —*C. festiva* Meinsh. in A.H.P. XVIII, 3 (1901) 324, non Dew. —*C. Macloviana* Kük. in Engl. Pflzr. IV, 20 (1909) 195, ex parte et in Journ. Russ. Bot. 3-6 (1911) 61; Kom. Fl. Kamch. I, 227, non D'Urv. —*C. Macloviana* var. *gracilis* Kük., ib., 197 (quoad pl. Riederianam). —*C. brizoides* Trev. in Ldb. Fl. Ross. IV (1853) 284, quoad. pl. kamtsch. —*C. pyrophila* Gdgr. in Bull. Soc. Bot. Fr. LX (1913) 420; Kom. Fl. Kamch. I, 228.

Perennial, yellowish-green, densely caespitose plants; culms 10-45 cm tall, scabrous; leaves shorter than the culm, 2-3 mm broad; spikelets 4-8, with staminate flowers at base, ovaloid, aggregated in a rather compact pyramidal or slightly lobed head to 1.5 cm long; scales ovate, acute, castaneous, keeled, with an indistinct narrow light margin, shorter than the perigynia; perigynia ovoid, 3.5-4 mm long, plano-convex, greenish-brown, with a narrow, terminally erose, winged margin, 6-8-nerved on the back, nerveless or obscurely nerved at base on the inner face, sessile, rather abruptly contracted into a fairly long, slightly denticulate, flat beak. Fr. July—August. (Plate XI, Figure 17).

Meadows near springs and lakes. —Far East: Kamch. Gen. distr.: Alaska and adjoining islands, w. part of Canada and U.S.A. Described from Unalaska. Type in Berlin, cotype in Leningrad.

44. *C. leporina* L. Sp. pl. (1753) 973; Trev. in Ldb. Fl. Ross. IV, 162 278 (incl. var.). —*C. mollis* Gilib. Exerc. phytol. II (1792) 546. —Ic.: Syr. III. Fl. Mosk. gub. I, 193. —Exs.: Pl. Finl. Exs. No. 513; Fl. Pol. Exs. No. 691; HFR No. 1498.

Perennial, light green, caespitose plants; culms scabrous above, leafy, 10-60 cm tall; leaves to 3 mm broad, shorter than the culm; spikelets 4-10, oblong-ovoid, staminate at base, ca. 1 cm long, aggregated in an oblong, crowded spike 2-4 cm long; scales oblong-ovate, ferruginous-brown, green-keeled, with narrow hyaline margin, as long as the perigynia; perigynia subdivergent, ovoid, 4-5 mm long, plano-convex, brownish, 8-10-nerved on both faces, narrowly serrulate-winged on the margin, rounded-based, gradually tapering into a flat, frontally cleft, short-bidentate beak. Fr. May—July. (Plate XI, Figure 15).

Meadows, forest margins, light forests. —All Europe (except n. Kar.-Lap. and Dv.-Pech., s. Prichern., Low. Don., Low. Volg. and Crimea); Caucasus: (all, except East. Transcauc. and Tal.); West. Siberia:

Ob., Irt. (e. part), Alt.; East. Siberia: Ang.-Sayan. Gen. distr.: all West. Europe, Asia Minor, North America (e. part). Described from Europe.

NOTE: Forming hybrids with *C. remota* L. (*C. ilseana* Ruhmer) and with *C. brizoides* L. (*C. filkukae* Podp.).

45. *C. argyroglochin* Hornm. Plantel. (1821) 927 et in Fl. dan. X, 29 (1821) 7, tab. 1710; Kunth, Enum. pl. II (1837) 396. — *C. leporina* β *nemoralis* Trev. in Ldb. Fl. Ross. IV (1853) 279. — *C. leporina* var. *argyroglochin* Koch, Synops., ed. 1 (1837) 753; Kük. in Engl. Pflzr. IV, 20 (1909) 211.

Perennial, light green, soft, loosely cespitose plants on a creeping rhizome; culms scabrous, 50-100 cm tall; leaves long, soft; spikelets 4.7, obovoid, rather distant, silvery-green; scales membranaceous, silvery, green-keeled, scarcely shorter than the perigynia; perigynia oblong-ovoid, pale stramineous, many-nerved below, with a green winged margin (narrower than in the preceding species), devoid of spongy tissue above, the beak longer than in *C. leporina*; fruiting 1 - 1½ months later than the preceding species. (June - August).

Alder groves, spruce and spruce-fir forests. —European part: Lad.-Il'm.?, Upp. Dnepr., Mid. Dnepr., Prichern., Volg.-Don., Volg.-Kam., Zavolzh.; West. Siberia: Ob., Upp. Tob. Gen. distr.: Central Europe. Described from surroundings of Lauenburg in Germany.

Section 8. *Schellhammeria* (Moench) Kunth, En. pl. II (1837) 392; Moench, Meth. pl. Suppl. (1802) 119 (pro genere). —Cespitose plants; culms triangular, smooth; leaves flat, narrow. Spikelets gynecandrous, oblong, aggregated in heads, bracteate, the 3 lower bracts several times longer than the inflorescence, enlarged below, forming a kind of involucre. 163 Scales lanceolate. Perigynia membranaceous, oblong-lanceolate, 5-8 mm long, plano-convex, nerved, narrowly serrulate-winged on the margin, stipitate, contracted into a long, subulate-tipped beak. Base of style enlarged; achene stalked, plano-convex. Stigmas 2.

46. *C. cyperoides* Murr. Syst. veg., ed. 13 (1774) 703; Trev. in Ldb. Fl. Ross. IV, 271. —*Schellhammeria capitata* Moench, Meth. pl. Suppl. (1802) 119. —*Sch. cyperoides* Rchb. Fl. Germ. exc. (1830) 72. —Exs.: Pl. Finl. Exs. No. 104 and 508; HFR No. 1345.

Perennial, light green, cespitose plants; culms flattened-triangular, smooth, more or less leafy; leaves flat, to 2 mm broad, soft, shorter than the culm; spikelets ovoid-oblong, aggregated in a spherical or ovoid, dense head to 1.5 cm in diameter, with 3 foliaceous involucreal bracts at base, these (especially the lowest) several times longer than the inflorescence; scales lanceolate, awn-tipped, light ferruginous, light-keeled, half as long as the perigynia; perigynia membranaceous, imbricated, oblong-lanceolate, 7-8 mm long, plano-convex, yellowish-green to ferruginous-green, slenderly nerved, rather abruptly contracted at base into a long stipule with a narrow, green, serrulate wing on the margin above, gradually tapering into a long, narrowly cuneate, deeply setaceous-cleft, divergent-toothed beak; achene oblong. Fr. June-September. (Plate XIII, Figure 10).

Rare along sandy and silty shores of lakes and rivers. —European part: Kar.-Lap. (s.), Dv.-Pech. (near Pinega), Lad.-Il'm. (Lake Ladoga and Lake Il'men), Upp. Dnepr. (Kiev), Upp. Volg., Volg.-Kam., Volg.-Don. (Rastyapino, Balakhninskii District), Low. Don. (Khvalynsk);

Caucasus: Transcauc. (?); West. Siberia: Ob., Irt., Alt.; East. Siberia: Yenis., Ang.-Sayan., Daur., Len.-Kol.; Far East: Ze.-Bur., Uss.; Centr. Asia: Dzhung.-Tarb. (Saur). Gen. distr.: Europe, Manchuria, Japan (Yezo). Described from Siberia.

ECONOMIC IMPORTANCE: Not eaten by livestock.

Section 9. *Physiglochis* (Neck.) V. Krecz. — Neck, Elem. bot. III (1790) 245, emend. Rafin. Amenit. of Nat. (1840) 27 (pro genere). — *Maukschia* Heuff. in Flora, XXVII (1844), 527 (pro genere). — *Polyglochis* Ehrh. Beitr. IV (1789) 146 (nomen). — Small dioecious (rarely partially monoecious) plants with slender rhizome, culms and leaves. Leaves linear (not exceeding 1 mm in breadth), canaliculate-involute, obtuse. Spikelets solitary, bractless, with a large scale at the base of spikelet; staminate spikelets sublinear, pistillate spikelets oblong; scales ovate, obtuse to subacute; perigynia oblong, 2.5-4 mm long, with a distinct margin, mostly plano-convex, nerved, very spongy at base, slightly bidentulate-beaked, divergent at maturity; rachilla without appendage; stigmas 2.

- 164
1. Culms terete, obscurely furrowed; perigynia ovoid, with short, strongly scabrous beak 2.
 - + Culm triangular, strongly furrowed. Perigynia oblong-lanceolate or oblong-ovoid, distinctly stipitate, with long, smooth or almost smooth beak 3.
 2. Scales of pistillate spikelets acute; perigynia ellipsoid, ribbed, disposed in a loose spikelet; staminate spikelets clavate. (Plate XIV, Figure 5) 48. *C. gynocrates* Wormskj.
 - + Scales of pistillate spikelets obtuse, slender-nerved, ovate, in a rather dense spikelet; staminate spikelets oblong. (Plate XIV, Figures 3 and 4). 47. *C. dioica* L.
 3. Densely caespitose plants. Perigynia 4-4.5 mm long, lance-bottle-shaped, with mostly scabrous beak. (Plate XIV, Figure 8) *C. Davalliana* Sm.
 - + Plants with creeping stolons. Perigynia 3-4 mm long, with smooth beak 4.
 4. Perigynia (2.8)3-3.5 mm long, with a short straight beak, subdivergent. Culms smooth or nearly so 5.
 - + Perigynia 3.5-4 mm long, with an elongate beak, horizontally spreading. Culms scabrous. (Plate XIV, Figure 7) 49. *C. Redowskiana* C. A. M.
 5. Scales of pistillate spikelets brown, subacute, with distinct narrow hyaline margin, slightly shorter than the perigynia. Pistillate spikelet loose, 5-12-flowered. Leaves abbreviated, thin. Culms rather scabrous above. (Europ. Arctic—Table XIV, Figure 6) 51. *C. parallela* Laest.
 - + Scales of pistillate spikelets ferruginous, subobtuse, with an indistinct broad hyaline margin, half as long as the perigynia. Pistillate spikelet dense, 20-25-flowered. Leaves elongate, thick. Culms smooth. (Sakhalin) 50. *C. Kabanovii* V. Krecz.

47. *C. dioica* L. Sp. pl. (1753) 971; Trev. in Ldb. Fl. Ross. IV, 264 (excl. var.); Gorodk. in Trav. Mus. Bot. Ac. U.S.S.R., XX (1927) 206 (incl. subsp. *asiatica*). — Ic.: Syreish. Ill. Fl. Mosk. Gub. I, 186. — Exs.: HFR No. 843.

Perennial, stoloniferous plants; culms few, terete, smooth, sometimes scabrous, faintly and finely furrowed, 10-40 cm tall; leaves setaceous, smooth, rarely somewhat scaberulous above; staminate spikelets oblong-clavate; scales rounded-obtuse, ferruginous, almost devoid of hyaline margin, sometimes bearing fertile flowers at base (f. *Metteniana* Aschr.); staminate spikelets oblong-ovoid to ovoid, 0.6-1.5 cm long, dense; mature perigynia subdivaricate; scales oval, obtuse to subobtuse, dark brown, with a broad, white-hyaline margin, slightly shorter than the perigynia; perigynia ovoid, 2.5-3.5 mm long, plano-convex, on a distinct enlarged stipe, nerved, gradually tapering into a scabrous, obliquely truncate, hyaline-margined, rather short beak, brown or ferruginous; achene lenticular, obovoid. Fl. April, Fr. May. (Plate XIV, Figures 3 a, b, c and 4 a).

Mossy marshes and boggy meadows. —Arctic: Arct. Eur. and Sib. (w. part); European part: Kar. -Kap., Dv. -Pech., Lad. -Il'm., Upp. Dnepr. Mid. Dnepr., Volg. -Don., Volg. -Kam., Zavolzh. (Sergievsk); West. Siberia: Ob., Upp. Tob. (n.), Alt.; East. Siberia: Yenis., Ang. -Sayan. Gen. distr.: Europe (West. and Centr.). Described from Europe.

NOTE: Forming hybrids: × *muricata* L. (C. *Gaudiniana* Guthnik); × *canescens* L.; × *tripartita* All.; × *tenuiflora* Wahlb. (C. *Almii* Holmb.); × *norvegica* Willd. (C. *Sylvenii* Holmb.); × *loliatea* L. (C. *subcostata* Holmb.); × *heleonastes* Ehrh. (C. *microstachyoides* Montell); × *glareosa* Whlb. (C. *stricticulmis* Holmb.); × *brunnescens* Poir. (C. *tenebricans* Holmb.); × *parallela* Laest. (C. *dioica* ssp. *paralleloides* Lund. ?).

48. *C. gynocrates* Wormskj. apud Drejer, Rev. crit. Car. bor. (1841) 16; Gorodk. in Trav. Mus. Bot. Ac. U.S.S.R., XX (1927) 206. — *C. dioica* β Trev. in Ldb. Fl. Ross. IV (1853) 264. — *C. Redowskiana* F. Schmidt in Mém. Ac. Sc. Pétersb., sér. VII, XII (1868) 66, non C.A.M.

Perennial, stoloniferous; culms terete, smooth, obscurely furrowed; leaves setaceous-involute, smooth, scabrous only at base; staminate spikelets clavate-cylindric, 0.8-2 cm long; scales loose; pistillate spikelets oblong, 0.7-1.6 mm long (terminal flowers often abortive), rather loose, with horizontally spreading perigynia; scales yellowish-brown, acute, equaling or exceeding the perigynia; perigynia ellipsoid to ovoid, broadly ellipsoid at maturity, 2.5-3 mm long, strongly biconvex, many-ribbed, brownish, lustrous, with enlarged base, abruptly tapering into a short scabrous beak. Fr. June—August. (Plate XIV, Figures 5 a, b, c).

Marshes, boggy meadows, and tundras. —Arctic: Arct. Sib. (except w. part), Anad.; East. Siberia: Len. -Kol.; Far East: Kamch., Okhot., Ze. -Bur., Uss. (Sikhote-Alin'), Sakh. Gen. distr.: Canada, western Greenland. Described from Greenland (Egalico Bay).

**C. Davalliana* Sm. in Trans. Linn. Soc. V (1800) 266; Trev. in Ldb. Fl. Ross. IV, 264; Gorodk. in Trav. Mus. Bot. Ac. U.S.S.R., XX (1927) 203. —Exs.: Kneuck. No. 1 and 65.

Perennial, densely caespitose plants; culms numerous, obtusely triangular scabrous, furrowed, 10-50 cm tall; leaves setaceous, scabrous; staminate spikelets 1.2-2.5 cm long, narrowly cylindric; scales oblong-ovate, golden-rusty, sometimes spikelets fertile at the summit (f. *Siberiana* Opiz. pro sp.); pistillate spikelets 0.8-2 mm long, oblong-cylindric, loose,

166 with divaricate and recurved perigynia; scales ovate, acute, with broad hyaline or ferruginous margin, shorter than the perigynia; perigynia oblong-lanceolate (bottle-shaped), 3-4.5 mm long, strongly convex on the back, nerved, castaneous, gradually attenuated into a long, mostly curved, scabrous- or smooth-margined, truncate beak. Fl. April-June, Fr. May-July. (Plate XIV, Figures 8 a, b, c).

Marshes and boggy meadows. —A west European species, possibly occurring in this country in the western part of Mid. Dnep.; Kropachev's collections from the southern shore of Lake Ladoga (Lad. -Il'm.) are dubious; indications of Altai (Ldb.) refer to the next species. Gen. distr.: Europe. Described from Switzerland (Orbe in Vaud canton).

49. *C. Redowskiana* C.A.M. in Mém. Acad. St. Pétersb. Sav. Etr. I (1831) 207, tab. IV; Trev. in Ldb. Fl. Ross. IV, 265; Gorodk, in Trav. Mus. Bot. Ac. U.S.S.R., XX (1927) 203. —*C. Fischeriana* Gay in Ann. Sc. Nat., 2 sér., X (1838) 286. —*C. Davalliana* Trev. in Ldb., l.c., quoad pl. alt. —*C. Davalliana* β *leiocarpa* Bge in Mém. Ac. St. Pétersb. Sav. Etr. VI (1835) 603. —*C. pulicaris* Trautv. in A.H.P.V. (1877) 123, non L.

Perennial, loosely cespitose, stoloniferous plants; culms angled, scabrous, 10-40 cm tall; leaves filiform-involute, to 0.6-0.7 mm broad, angled, scabrous, smooth at base; staminate spikelets narrowly cylindrical, 1-2.1 cm long, their scales ovate, obtuse, loose; pistillate spikelets narrowly oblong, 0.7-1.7 cm long, with strongly elongated subdivaricate perigynia; scales ovate, obtuse, castaneous to light ferruginous, broadly hyaline-margined, about half as long as the perigynia; perigynia ovoid-lanceolate (somewhat bottle-shaped), 3-4(5) mm long, straight or slightly curved, nerved, brownish, gradually tapering into a long, smooth-margined, rarely (in tundra forms) scaberulous beak. June-July. (Plate XIV, Figures 7 a, b, c).

Mossy marshes, boggy meadows, swampy forests, and wet tundras. —Arctic: Arct. Eur. (Pol. Ural), Arct. Sib. (incl. Northern Ural); European part: Dv. -Pech. (between Ural and upper Pechora); Volg. -Kam. (Semichlovechnyi Kamen'); West. Siberia: Ob., Alt.; East. Siberia: Yenis., Ang. -Sayan., Daur. (s. -w.), Len. -Kol. Described from Kamchatka (though the plant probably originates from the Irkutsk-Okhotsk road). Type in Leningrad.

50. *C. Kabanovi* V. Krecz. sp. nova in Addenda, II, 593.

Perennial, cineraceous-green plants, with stout short stolons, forming loose tufts; culms stout (to 1 mm in diameter), flattened and obscurely triangular, erect, furrowed, smooth, 20-35 cm tall; leaves also thickened, canaliculate-triangular, to 1 mm broad, abruptly blunt-tipped, scabrous-margined below; spikelets terminal; the staminate linear, 1-1.5 cm long, with oblong, golden-rusty, whitish-margined, obtuse scales, the pistillate also linear, 1-1.5 cm long, rather dense (20-25-flowered); scales ovate, obtuse, ferruginous, with broad white hyaline margin, half as long as the perigynia; perigynia subdivergent, subcoriaceous, ovoid to ellipsoid, 2.8-3.2 mm long, biconvex, many-nerved, short-stipitate, rather abruptly contracted into a smooth, scarious-tipped, obliquely emarginate-truncate beak. Fr. August.

Peat swamps. —Far East: Sakh. (n. part). Endemic. Described from the eastern coast of northern Sakhalin. Type in Leningrad.

51. *C. parallela* Laest. ex Sommerf. Suppl. fl. lap. (1826) 39; Gorodk. in Trav. Mus. Bot. Ac. U.S.S.R., XX (1927) 205. — *C. dioica* β *parallela* Laest. in Acta Holm. (1822) 338. — *C. dioica* β Trev. in Ldb. Fl. Ross. IV (1852) 263. — *C. dioica* Meinsh. in A.H.P. XVIII, 3 (1901) 85, ex p., non L. — Exs.: Kneuck. Nos. 273, 302.

Perennial, stoloniferous plants; culms angled-furrowed, nearly smooth above, subtriangular, 10-25 cm tall; leaves abbreviated, narrowly linear (to 1.2 mm broad), erect, faintly scaberulous to nearly smooth. Staminate spikelets narrow, 1-1.2 cm long, their scales yellowish-brown, with broad hyaline margin; pistillate spikelets linear to oblong-ovoid, 0.6-1.3 cm long, rather loose, with usually appressed, finally divaricate perigynia; scales ovate, dark brown, subacute, narrowly hyaline-margined, only slightly shorter than the perigynia; perigynia ovoid to oblong-ovoid, 3-3.5 mm long, plano-convex, nerved, reddish-brown, gradually tapering into a short smooth beak. Fr. July–August. (Plate XIV, Figures 6a,b,c).

Mountainous and lowland tundras. — Arctic: Nov. Zem. (s. island of Novaya Zemlya, Vaichag), Arct. Eur.; European part: Kar.-Lap. (Khibiny, Ponoï). Gen. distr.: Scandinavia, Greenland, Spitsbergen. Described from Liule Mountains (Birichaure) in Swedish Lapland.

NOTE: Forming hybrids with *C. brunnescens* Poir. (*C. Fridtzii* Holmb.).

Section 10. *Leptovignea* (Boern.) V. Krecz. — Boern. in Abhandl. Naturw. Ver. Bremen, XXI (1913) 273. — ? *Facolos* Rafin. Amenit. of Nat. (1840) 26 (pro genere). — Small plants, densely caespitose (rarely stoloniferous). Culms triangular, hollow (especially in lower part) or with very loose pith; leaves narrow, thin. Spikelets gynecandrous (rarely androgynous — *C. disperma* — i. e. with pistillate flowers in upper part of inflorescence and staminate flowers in lower part), few, forming a capitate or rather interrupted, spiciform inflorescence. Lowest spikelet with a short bract or bractless. Perigynia ovoid to ovoid-oblong, (2)2.5-3.5(4) mm long, membranaceous, subcoriaceous to semicoriaceous, white-punctulate, plano-convex or biconvex, nerved on both faces, with very narrow margin; perigynium-beak distinct or obsolete, scabrous or smooth, with an entire, obliquely truncate, or subemarginate summit. Stigmas 2.

1. Spikelets with staminate flowers above and pistillate below. (Plate XII, Figure 19) 75. *C. disperma* Dew.
- + Spikelets with pistillate flowers above and staminate below (Plate XII, Figure 7) 2.
2. Stoloniferous plants; perigynium without a distinct beak, conic-or nearly round-tipped. (Plate XII, Figures 4, 5, 6, 7) 3.
- + Plants without stolons, caespitose; perigynia with distinct beak, rarely obsolete-beaked. (Plate XII, remaining figures) 7.
3. Perigynia with slightly raised nerves, obtuse. (Plate XII, Figure 7) 4.
- + Perigynia ribbed, conic-tipped. (Plate XII, Figures 4, 5, 6) 5.
4. Scales 1/3 to 1/2 shorter than mature perigynia; perigynia ovoid, faintly scaberulous above, 2.5-3(3.5) mm long. Low, strong plants, with rather flat leaves to 1-1.5 mm broad 58. *C. tenuiflora* Whlb.

- + Scales as long as perigynia or nearly so; perigynia oblong-ovoid, smooth above, 3-3.5 mm long. Tall, slender plants, with narrow involute leaves 0.5-1 mm broad. 59. *C. arrhyncha* Franch.
- 5. Scales obtuse, shorter by nearly one-half than the perigynia; perigynia rounded-obtuse, 3-3.5 mm long (Plate XII, Figure 6) 57. *C. loliacea* L.
- + Scales acute, only slightly shorter than the perigynia; perigynia conic-tipped, ca. 4 mm long. 6.
- 6. Leaves flat, 2-3 mm broad. Spikelets aggregated in an oblong spike; perigynia lance-ovoid, with somewhat elongate beak, 3.4-4 mm long; scales whitish. (Plate XII, Figure 4) 56. *C. pseudo-loliacea* F. Schmidt.
- + Leaves canaliculate-involute, 1-1.5 mm broad; spikelets distant, disposed in an interrupted inflorescence with often geniculate axis; perigynia lanceolate, conic-tipped, 4-4.1 mm long; scales ferruginous. (Plate XII, Figure 5). 55. *C. diastena* V. Krecz.
- 7. (2) Perigynia lanceolate, often curved, ribbed, arranged in divaricate, oblong (to 1 cm long) spikelets. (Plate XII, Figure 2) 52. *C. elongata* L.
- + Perigynia ovoid, straight, with slender non-raised nerves, arranged in appressed, ovoid or globular spikelets 0.3-0.8 cm long 8.
- 169 8. Plants with culms geniculate in inflorescence; culms with concave sides, acutely angled, narrow-winged. (Plate XII, Figure 3) 9.
- + Plants with culms erect in inflorescence, with flat sides, acutely or subobtusely angled 10.
- 9. Loosely tufted plants with glaucous-green, rather smooth leaves 3-4 mm broad; spikelets globular-ovoid; ellipsoid, 3.5-4 mm long, yellowish, longer than the obtuse, light ferruginous scales 53. *C. traiziscana* F. Schmidt.
- + Densely tufted plants with dark or light green, prominently scabrous leaves 1.5-2.5 mm broad; spikelets ovoid to oblong; perigynia ovoid, ca. 3 mm long, greenish, becoming fuscous, as long as or shorter than the castaneous acute scales 54. *C. nemurensis* Franch.
- 10. Perigynia subcoriaceous, indistinctly enlarged-stipitate, with obliquely truncate, entire-tipped (non-emarginate) beak (Plate XII, Figures 13, 14, 15, 16) 11.
- + Perigynia membranaceous, prominently stipitate, with short-bidentate, emarginate beak (Plate XII, Figures 10, 11, 12) 19.
- 11. Spikelets 4-6, oblong, to 1-1.5 cm long, markedly distant, many-(10-30)-flowered, clavate (especially the lower ones) owing to numerous staminate scales at their base; culms smooth; leaves to 3 mm broad (Plate XII, Figure 16) 71. *C. Mackenziei* V. Krecz.
- + Spikelets 1-6, ovoid, to 0.5-0.8 cm long, approximate and contiguous, few-(10-15)-flowered, usually (except *C. marina*) with few staminate scales; leaves to 2 mm broad 12.
- 12. Spikelet solitary, terminal (rarely with a minute additional spikelet at its base); perigynia suborbicular-ovoid, 2 mm long, with obsolescent beak; scales orbicular, rounded-obtuse (Plate XII, Figure 15). 70. *C. ursina* Dew.

- + Spikelets (2)3-4(6); perigynia ovoid, narrower, 2.5-3.5 mm long (rarely less than 2 mm long—*C. marina*), with a more or less distinct beak; scales ovate or acute 13.
- 13. All spikelets in the inflorescence gynecandrous 14.
 - + Only the terminal spikelets gynecandrous, the others pistillate throughout (without empty scales at base) 17.
- 14. Perigynia subcoriaceous, ferruginous, with a smooth beak 15.
 - + Perigynia coriaceous, yellowish-gray, with a scabrous beak 16.
- 15. Perigynium-beak broad, obtusely conic; spikelets globular, few-flowered; culms triangular, scabrous (Plate XII, Figure 18) 72. *C. amblyorhyncha* V. Krecz.
- 170 + Perigynium-beak narrow, gradually attenuate; spikelets obovoid, many-flowered; culms faintly triangular, smooth (rarely nearly so). (Plate XII, Figure 13) 16. *C. tripartita* All.
- 16. Perigynia cineraceous-green, obsoletely nerved; scales pale; leaves subinvolute, tall; loosely caespitose plants. (Kamchatka) 74. *C. aa* Kom.
 - + Perigynia yellowish-brown, ferruginous toward the apex, obscurely, almost imperceptibly, nerved; scales ferruginous; leaves flat; culms firm, short; caespitose plants. (Plate XII, Figure 17) 73. *C. heleonastes* Ehrh.
- 17. (13) Perigynia lanceolate or oblong-ovoid, gradually tapering into an elongate beak; scales oblong, subobtuse (Plate XII, Figure 14) 68. *C. glareosa* Whlb.
 - + Perigynia ovoid, abruptly contracted into a short, broadly conic beak; scales broadly ovate, obtuse 18.
- 18. Terminal spikelet clavate, with a distinct, empty, staminate part; perigynia 1.5-2.3 mm long, few-nerved; scales shorter than perigynia, clavate (terminal perigynia similarly clavate) 69. *C. marina* Dew.
 - + Terminal spikelet with an indistinct staminate part, not clearly distinguishable from the rest; perigynia 3 mm long, many-nerved, greenish; scales longer than perigynia, greenish-ferruginous 67. *C. pribylovensis* J.M. Macoun.
- 19 (10). Perigynia with a smooth, obsolescent conic beak 20.
 - + Perigynia with a scabrous, conspicuous, conic or elongate beak 21.
- 20. Perigynia 1.5-1.8 mm long, cinereous or cineraceous-rusty; scales castaneous, subobtuse, nearly one-half shorter than perigynia; spikelets numerous (up to 9), many-flowered; leaves to 2 mm broad, lax. (Plate XII, Figure 12) 60. *C. bonanzensis* Britt.
 - + Perigynia 2-2.5 mm long, light green; scales pale green, acute, scarcely shorter than perigynia; spikelets few (3-6), few-flowered; leaves to 1 mm broad, strict 62. *C. lapponica* O.F. Lang.
- 21. Perigynia 2.5-3 mm long, the beak conic, shallowly cleft on the back (Plate XII, Figures 8 and 9) 22.
 - + Perigynia 2-2.5(2.8) mm long, the beak gradually attenuate, deeply cleft (to 1/3 of the body of perigynium). (Plate XII, Figures 10 and 11) 23.

- 171 22. Cineraceous-green plants growing in exposed places, with strict culms and leaves; spikelets oblong, to 8 mm long, many-flowered; scales shorter than perigynia by 1/4-1/3 the length; perigynia 2.5-3 mm long, with faint ferruginous nerves (Plate XII, Figure 8) 61. *C. canescens* L.
- + Bright green, umbraticolous plants, with flaccid culms and leaves; spikelets mostly globular, few-flowered; scales nearly one-half shorter than perigynia; perigynia 2.5-2.8 mm long, with distinct lighter nerves. (Plate XII, Figure 9) 63. *C. hylaea* V. Krecz.
23. Cineraceous-green plants of peat marshes, with strict culms and leaves; terminal spikelets approximate, the lower ones distant; scales ferruginous-brown. Perigynia 2-2.3 mm long, ferruginous above, dorsally with distinct nerves only in lower part, ventrally without distinct nerves. (Plate XII, Figure 10). 64. *C. brunnescens* (Pers.) Poir.
- + Bright green umbraticolous plants of mineral soils, with flaccid elongated culms and leaves; all spikelets distant; scales white. Perigynia 2.5-2.8 mm long, with few prominent nerves on both faces (Plate XII, Figure 11) 65. *C. vitilis* Fries.

Cycle 1. *Euleptovignea* V. Krecz. —Slender plants with oblong spiciform, crowded or interrupted inflorescences. Spikelets usually more or less spreading and few-flowered (5-18 flowers). Scales shorter than perigynia, sometimes as long, mostly acute, more rarely subobtuse to obtuse. Perigynia membranaceous, oblong, 3.5-4 mm long, usually more or less lanceolate, usually with numerous rather prominent nerves and mostly with obsolescent, smooth, rarely scabrous, usually obscurely emarginate beak.

52. *C. elongata* L. Sp. pl. (1753) 973; Trev. in Ldb. Fl. Ross. IV. 278 (excl. var. β). —Ic.: Syr. III. Fl. Mosk. gub. I, 195. —Exs.: Kneuck. No. 94; HFR No. 1640, 1045; Fl. Pol. Exs. No. 889.

Perennial, bright green cespitose plants; culms scabrous, (20) 50-80 cm tall; leaves flat, 2-3 (in Siberia to 4-6) mm broad, soft, as long as or slightly shorter than the culm; spikelets 6-12, oblong (from 0.5-1 cm long), the lower ones sometimes slightly forking and loose, the terminal ones crowded; inflorescence long, more or less nodding, 5-8 cm long; bract usually wanting; scales ovate, acute, ferruginous, with a green midrib and light margins, shorter than perigynia; perigynia lanceolate, membranaceous, 3.5-4 mm long, plano-convex, slightly curved above, brownish green or green, becoming ferruginous-yellow, with distinct nerves on both faces (10-12 on the back, 6-8 on the inner face) round-based, scabrous-margined in upper one-third, tapering into a cuneate, faintly bidentulate, frontally shallow-cleft beak. Fr. May-June. (Plate XII, Figure 9).

172 Forest, forest margins, coppices, and forest glades. —European part, except n. Kar. -Kap., n. Dv. -Pech., s. Prichern., Low. Don., Low. Volg. and Crimea; Caucasus: Ciscauc. (w. mount. part), West. Transcauc. (Poti); West. Siberia: Ob., Upp. Tob., Irt., Alt.; East. Siberia: Yenis., Ang.-Sayan. Gen. distr.: Europe (West. and Centr.). Described from Europe.

NOTE: Forming hybrids: \times *paniculata* L. (*C. Fussii* Simonk.); \times *canescens* L.; \times *remota* L. (*C. Ploettneriana* Beyer).

53. *C. traiziscana* F. Schmidt in Mém. Ac. Sc. Pétersb., VII sér., XII (1868) 192, tab. VII, fig. 11-15. — *C. laeviculmis* Kom. Fl. penins. Kamtsch. I (1927) 233, ex p., non Meinsh.

Perennial, rather soft, green, loosely caespitose plants; culms triangular, with concave sides, slender, pliant, scabrous above, 50-70 cm tall; leaves flat, 2.5-4 mm broad, faintly scaberulous only on the margin, soft, shorter than the culm; spikelets 3-5, globular to globular-ovoid, terminal spikelets 2, approximate, the lower ones 2-3 cm apart above a geniculation of the culm; bracts subtending the lowest spikelet often 2-3 times as long as the spikelet; scales ovate, obtuse to subobtusely, ferruginous, scarious-margined, shorter than perigynia; perigynia subcoriaceous, ellipsoid, 3.2-4 mm long, plano-convex, yellowish-rusty, with 14-18 slender nerves on both faces, attenuate at base into a broad short stipe, rather gradually tapering into a short, conic, shallow-cleft, scabrous beak. (Plate XII, Figure 3).

Peat marshes. — Far East: Sakh. Gen. distr.: Northern Japan. Described from Sakhalin (Traiziska). Type in Leningrad.

54. *C. nemurensis* Franch. in Bull. Soc. Phil Paris, 8 ser., VII (1895) 30; Ohwi in Acta Phytotax, et Geob. I (1932) 69 (excl. C. aa). — *C. traiziscana* Kom. Fl. penins. Kamtsch. I (1927) 233, ex p., non F. Schmidt. — *C. laeviculmis* Kom., ib., 253, ex p., non Meinsh.

Perennial, densely caespitose, light or dark green plants; culms triangular with convex sides, slender, scabrous, 30-40 cm tall; leaves 1.5-2.5 mm broad, subplane, prominently scabrous-margined, shorter than the culm; spikelets 4-7, ovoid or oblong, the 2-3 terminal ones approximate, the others 1.2-3 cm apart; culms geniculate below the spikelets; lowest spikelet often with a rather well developed bract; scales ovate, acute, castaneous, scarious-margined, about equaling or exceeding the perigynia; perigynia subcoriaceous, ovoid, 2.8-7.2 mm long, greenish-yellow, becoming fuscous, nerved on both faces, thick-stipitate, gradually tapering into a rather elongate, scabrous, cleft beak. Fr. July-August.

Peat marshes. — Far East: Kamch., Sakh. Gen. distr.: Kurile Islands, northern Japan. Described from Tomakomai, near Nemuro in Japan (Yezo Island). Type in Paris.

173 55. *C. diastena* V. Krecz, sp. nova in Addenda, II, 594. — *C. laeviculmis* Kom. Fl. penins. Kamtsch. I (1927) 233, ex p., non Meinsh. — *C. laeviculmis* var. *kamtschatica* Kom. in sched. — *C. traiziscana* Hultén, Fl. of Kamtsch. I (1925) 182, ex p., non F. Schmidt.

Perennial, cineraceous-green, stoloniferous, loosely caespitose plants; culms slender, but firm, scabrous above; leaves rather rigid, narrow (1-1.5(2) mm broad), flat to subinvolute, straight, shorter than the culm; spikelets 3-6, mostly divaricate, hemispherical, the terminal approximate, the lower ones distant, bractless; rachis geniculate; scales ovate, acute, ferruginous, keeled, with a lighter or greenish median band, broadly hyaline-margined, shorter than perigynia; perigynia lanceolate, membranaceous, 4-4.2 mm long, plano-convex, glaucous-yellow, with slender raised nerves (10-12 on the back, 6-8 unequal ones on the inner face), with a

thick spongy stipe at base, gradually cuneate-attenuate into a smooth, terminally shallow-cleft beak. Fr. July. (Plate XII, Figure 5).

Peat. —Far East: Kamch. (Paratunka River basin; Bol'sheretsk, Sobolevo), Sakh. (Mitsurioka). Described from Kamchatka (Paratunka River basin, near the village Nikolaevskoe, between the river Tikhaya and the lakelets). Endemic. Type in Leningrad.

56. *C. pseudo-loliacea* F. Schmidt in Mém. Ac. Sc. Pétersb., VII Sér., XII (1868) 193, tab. VI, fig. 7-13; Kom. and Alis. Opr. rast. Dal'nevost. Kraya I (1931) 286.

Perennial, cineraceous-green, caespitose, stoloniferous plants; culms flattened-triangular, erect, thickened, scabrous above, 20-35 cm tall; leaves flat, (2)3-4 mm broad, scabrous, rather soft, nearly as long as the culm; spikelets 2-5, ovoid, subdivaricate, aggregated in an oblong head, the lowest sometimes remote; scales ovate, subacute, whitish, with a green midrib and 2 nerves, shorter by nearly one-half than the perigynia; perigynia lance-ovoid, membranaceous, 3.5-4 mm long, yellowish-green, round-based, short-stipitate, gradually tapering into an obtuse, short, narrowly conic, smooth, frontally deep-cleft beak. Fr. June. (Plate XII, Figure 4).

Peat bogs and forests. —Far East: Uss., Sakh. Gen. distr.: Kurile Islands (Yezo and Honshu). Described from Sakhalin (Dué). Type in Leningrad.

57. *C. loliacea* L. Sp. pl. (1753) 974; Trev. in Ldb. Fl. Ross. IV, 281. —*C. sibirica* Spreng. Syst. III (1826) 809. —Exs.: Pl. Finl. Exs. No. 520, 521 et 522; HFR No. 295; Kneuck. No. 97.

Perennial, light green plants producing creeping stolons; culms slender, but not weak, scabrous, 20-40 cm tall; leaves flat, 1-1.5 mm broad, scabrous, half as long as the culm; spikelets 3-7, divaricate, hemispherical, few-flowered, distant, or only the two terminal ones approximate; scales 174 broadly ovate, obtuse to subobtusate, green-keeled, with broad scarious margin, half as long as perigynia; perigynia oblong-ovoid, subcoriaceous, 3-3.5 mm long, rather strongly convex, brownish-green, with 10-12 strongly raised nerves on the back and 5-7 flatter nerves on the inner face, round-based, obtuse and slightly emarginate-tipped. Fr. May-June. (Plate XII, Figure 6).

Peats, mossy forests. —European part: Kar. -Lap., Dv. -Pech., Lad. -Il'm., Upp. Dnepr., Upp. Volg., Volg. -Don. (n. part), Volg. -Kam.; west. Siberia: Ob. Irt.; East. Siberia: Yenis., Ang. -Sayan., Daur., Len. -Kol.; Far East: Uss., Ud., Sakh., Kamch.; Centr. Asia: Pri-balkh. (Karkaraly). Gen. distr.: West. Europe, Korea, Manchuria, northern Japan. Described from Sweden. Type in London.

NOTE: Forming hybrids: X *canescens* L. (*C. macilenta* Fries; *C. albescens* Nyl.); X *trisperma* Dew.; X *dioica* L. (*C. subcostata* Holmb.).

58. *C. tenuiflora* Whlb. in Sv. Vet. -Akad. Nya Handl. XXIV (1803) 147; Trev. in Ldb. Fl. Ross. IV, 284. —*C. tenuiflora* var. *macilenta* Kük. in Journ. Russ. Bot. 3-6 (1911) 70; Kryl. Fl. Zap. Sib. III, 457. —*C. leucolepis* Turcz. ex Bess. in Flora, XVII, Beibl. 1 (1834) 26 et ex Steud. Nomencl. bot., ed. 2, I (1840) 292 (nomen). —Exs.: Pl. Finl. Exs. no. 518.

Perennial, cineraceous-green plants with creeping rhizome, forming tufts; culms slender but rather firm, smooth or nearly so, 15-50 cm tall; leaves flat to subinvolute, 1-1.5 mm broad, shorter than the culm, scabrous; spikelets 2-4, few-flowered, globular, disposed in a subcapitate or very slightly lobed inflorescence; scales ovate, obtuse, pale yellow, with a greenish median band and 3 brownish lines, broadly hyaline-margined, much shorter than perigynia; perigynia ovoid, subcoriaceous, 2.5-3(3.5) mm long, yellowish-green, plano-convex, slightly curved at the apex, obscurely 5-9-nerved on both faces, round-based, subsessile, terminating in an obsolete cent, scaberulous, bidentate beak. Fr. May-July. (Plate XII Figure 7).

Mossy bogs and wet forest. —Arctic: Anad. (n. part); European part: Kar. -Lap., Dv. -Pech., Lad. -Il'm., Upp. Dnepr. (Bel'skii District), Upp. Volg., Volg. -Kam. (n. -w. part and Ural to Zlatoust and Miyass); West. Siberia: Ob., Irt. (e. part), Alt.; East. Siberia: Yenis., Ang. -Sayan., Daur., Len. -Kol.; Far East: Ze. -Bur., Uss., Ud., Okhot., Sakh., Kamch. Gen. distr.: Scandinavia, North America, northern Korea, Manchuria, northern Japan. Described from northern Sweden (Enontekiö in Lapland). Type in Stockholm.

NOTE: Forming hybrids: \times *canescens* L. (*C. Kyuhkyneni* Hidén); \times *heleonastes* Ehrh. (*C. mucronulata* Holmb.).

175 59. *C. arrhyncha* Franch. in Bull. Soc. Philom. Paris, 8 sér., VII (1895) 30. —*C. tenuiflora* var. *arrhyncha* Kük. in Engl. Pflzr. IV, 20 (1909) 224. —*C. Nakaii* Levl. et Vant. in Bull. Ac. Geogr. Bot. XIX (1909) 33.

Perennial, light green, caespitose plants; culms scaberulous, 50-60 cm tall; leaves narrow, 0.5-1 mm broad; spikelets 2-3, few-flowered, disposed in a capitate inflorescence; scales ovate, silvery-green, lighter at the margin, keeled, equaling the perigynia; perigynia oblong-ovoid, 3-3.5 mm long, plano-convex, rather distinctly nerved on both faces, obtuse, bidentulate, smooth.

Peat. —Far East: Sakh. —Possibly in Uss. Described from Japan (Yezo, Akkeshi). Type in Paris.

Cycle 2. *Cephalidostachys* V. Krecz. —Rather robust (not slender) plants; spikelets crowded or distant, rather many-flowered (10-30 flowers). Scales shorter than perigynia, acute or subobtus. Perigynia membranaceous and subcoriaceous, (2)2.5-3-3.5 mm long, ovoid, with numerous, slightly raised nerves, distinctly stipitate, with elongate, frontally cleft, mostly scabrous beak.

Series 1. *Diaeretostomae* V. Krecz. —Spikelets distant, numerous (from 6 to 12), many-flowered; perigynia 2-2.8(3) mm long, membranaceous, the very distinct stipe slightly imbedded in base of perigynium, the beak short-bidentate.

60. *C. bonanzensis* Britt. ex Britt. et Rydb. in Bull. N. Y. Bot. Gard. II (1901) 160. —*C. Cajanderi* Kük. in Oefvers. Finska Vet. -Soc. Förhandl. XLV, 8 (1903) 3. —*C. gracilis* Meinsh. in A. H. P. XVIII, 3 (1901) 328, quoad. pl. ex Tunguska, non Schkuhr.

Perennial, cineraceous-green, mostly densely caespitose plants; culms flattened-triangular, scabrous above, 20-45 cm tall; leaves flat, 1-2 mm broad, scaberulous, shorter than or as long as the culm; spikelets (4)6-9, ovoid or oblong, 3-6 mm long (2.5-3 mm broad), the upper approximate, the lower (one or two) distant; scales ovate, obtuse, ferruginous, green

keeled and white-margined, about half as long as the perigynia; perigynia ellipsoid to obovate-ellipsoid, membranaceous, 1.5-1.8 mm long, grayish-green, ferruginous above, with 6-8 brownish nerves on both faces, somewhat spongy-thickened at base, rather abruptly contracted into a very short, subconic, smooth, frontally slightly cleft beak. Fr. June-July. (Plate XII, Figure 12†).

Wet meadows. — Arctic: Anad. West. Siberia: Ob. (eastward from the Ob'); East. Siberia: Yenis., Ang. -Sayan., Daur., Len. -Kol.; Far East: Ze. -Bur., Okhot., Ud., Sakh. (n. part), Kamch. Gen. distr.: North America (Alaska). Described from North America (Yukon, estuary of Bonanza Creek). Type in New York.

176 61. *C. canescens* L. Sp. pl. (1753) 974; Trev. in Ldb. Fl. Ross. IV, 280 (excl. var. β et γ). — *C. curta* Good. in Trans. Linn. Soc. II (1794) 145; C. A. M. ex Ldb. Fl. Alt. IV (1833) 211. — Ic.: Syreish. III. Fl. Mosk. gub. I 195-196. — Exs.: HFR No. 238; Pl. Finl. Exs. No. 515; Fl. Pol Exs. No. 587.

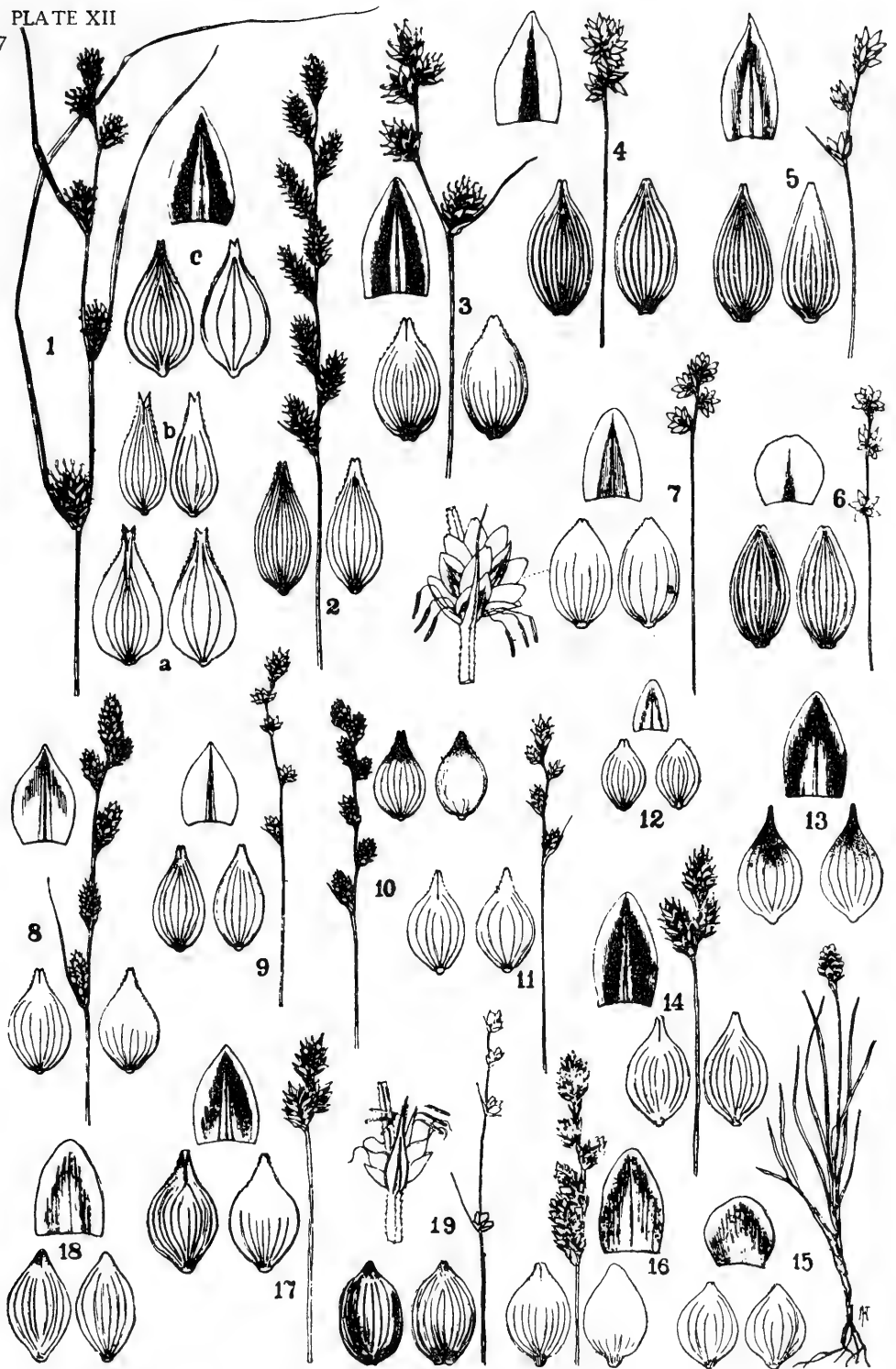
Perennial, cineraceous-green, cespitose plants; culms erect, scabrous above, 20-50 cm tall; leaves flat, 2-3 mm broad, straight, shorter than the culm; spikelets 3-7, ovoid or oblong, 5-8 mm long, distant below, the lowest sometimes with a weak bract; scales ovate, acute, pale green, membranaceous, keeled, shorter than perigynia; perigynia ovoid, membranaceous, 2.5-3 mm long, plano-convex, light green, becoming pale yellow, with 8-10 slender, brunescent, obscure nerves on both faces, short-stipitate, the stipe very distinct from the broad cuneate base, the beak subcuneate, scabrous, shallowly cleft. Fr. May-June. (Plate XII, Figure 8).

Wet meadows, bogs, canals. — All European part, except Prichern., Low. Don., Low. Volg. and Crimea; Caucasus (n. and w.); all Siberia and Far East; Centr. Asia: Dzhung. -Tarb., Tyan'-Shan. (Alamedin in Kirg. Alatau). Gen. distr.: Northern and Central Europe, North America, Korea, Manchuria, Japan. Described from Northern Europe.

† Due to oversight, the perigynium appears scabrous in the drawing.

Explanation to Plate XII

1. *Carex remota* L.: inflorescence, a) perigynium — outer and inner face, scale; b) *C. remotiuscula* Whlb.: perigynium — outer and inner face; c) *C. laeviculmis* Meish.: perigynium — outer and inner face. — 2. *C. elongata* L.: inflorescence, perigynium — outer and inner face. — 3. *C. traiziscana* F. Schmidt.: inflorescence, perigynium — outer and inner face, scale. — 4. *C. pseudololiacea* F. Schmidt.: inflorescence, perigynium — outer and inner face, scale. — 5. *C. diastena* V. Krecz.: inflorescence, perigynium — outer and inner face, scale. — 6. *C. loliacea* L.: inflorescence, perigynium — outer and inner face, scale. — 7. *C. tenuiflora* Whlb.: spikelet, inflorescence, perigynium — outer and inner face, scale. — 8. *C. canescens* L.: inflorescence, perigynium — outer and inner face, scale. — 9. *C. hylaea* V. Krecz.: inflorescence, perigynium — outer and inner face. — 10. *C. brunne-scens* (Pers.) Poir.: inflorescence, perigynium — outer and inner face. — 11. *C. vitilis* Fr.: inflorescence, perigynium — outer and inner face. — 12. *C. bonanzensis* Britt.: perigynium — outer and inner face, scale. — 13. *C. tripartita* All.: perigynium — outer and inner face, scale. — 14. *C. glareosa* Whlb.: inflorescence, perigynium — outer and inner face, scale. — 15. *C. ursina* Dew.: plant, perigynium — outer and inner face, scale. — 16. *C. Mackenziei* V. Krecz.: inflorescence, perigynium — outer and inner face, scale. — 17. *C. heleonastes* Ehrh.: inflorescence, perigynium — outer and inner face, scale. — 18. *C. amblyorhyncha* V. Krecz.: perigynium — outer and inner face, scale. — 19. *C. disperma* Dew.: inflorescence, spikelet, perigynium — outer and inner face.



NOTE: Forming hybrids: \times *dioica* L. (*C. microstachya* Ehrh.); \times *paniculata* L. (*C. ludibunda* Gay); \times *appropinquata* Schum. (*C. Schultziana* Fig.); \times *tripartita* All. (*C. helvola* Blytt.); \times *norvegica* Willd. (*C. pseudohelvola* Kihlm.); \times *loliacea* L. (*C. Mithala* Callm.); \times *elongata* L.; \times *remota* L. (*C. Arthuriana* Beckm.); \times *muricata* L. (*C. tetrastachya* Traunst.; *C. biharica* Simonk.); \times *lapponica* O. F. Lang (*C. clausa* Holmb.); \times *brunnescens* Poir. (*C. abortiva* Holmb.); \times *heleonastes* Ehrh. (*C. heterophyta* Holmb.); \times *trisperma* Dew. (*C. tenelliformis* Holmb.); \times *tenuiflora* Whlb. (*C. Kyyhkyneni* Hidén.).

ECONOMIC IMPORTANCE: Of some economic importance, as the plant is eaten by cattle.

179 62. *C. lapponica* O. F. Lang in Linnaea, XXIV (1851) 538; Holmb. in Bot. Notis. (1929) 11, fig. 3; 1:4. — *C. canescens* sub*loliacea* Laest. in Nov. Acta Soc. Sc. Upsal. XI (1839) 282.

Perennial, cineraceous-green, somewhat loosely caespitose plants; culms slender but strict, scabrous above, 10-35 cm tall; leaves flat, narrow, 0.6-1.2 mm broad, strict; spikelets 3-6, globular, subdistant, 0.4-0.5 cm long, the lowest often with a developed bract; scales ovate, acute, pale ferruginous or (more often) pale green, membranaceous, slightly shorter than perigynia; perigynia ellipsoid-ovoid, membranaceous, 2-2.3 mm long, plano-convex, obscurely nerved, light green, rather rounded-tipped, with an obsolescent, conic, smooth beak. June-July.

Marshes and boggy meadows. — Arctic: Arct. Eur., Arct. Sib. (Polar Ural; Dudino-Brenner); West. Siberia: Ob., Alt.; East. Siberia: Far East. Gen. distr.: Northern Fenno-Scandia, North America. Described from Scandinavian Lapland.

NOTE: Forming hybrids: \times *canescens* L. (*C. clausa* Holmb.); \times *brunnescens* Poir. (*C. subpatula* Holmb.).

63. *C. hylaea* V. Krecz. sp. nova in Addenda, II, 594. — *C. gracilis* Meinsh. in A. H. P. XVIII, 3 (1901) 328, ex p., non Schkuhr. — *C. canescens* var. *subtenella* Kük. in Engl. Pflzr. IV, 20 (1909) 218. *C. canescens* var. *tenuis* O. F. Lang in Linnaea, XXIV (1851) 538. — *C. canescens* var. *laetevirens* Aschers. Fl. Brand. I (1864) 71 et Syn. II, 2 (1902) 61, ex p.

Perennial, bright green, weak, loosely caespitose plants; culms slender, weak, decumbent, scaberulous above, 30-50 cm tall, leafy to a considerable height; leaves thin, long, lax, 1-1.6 mm broad, filiform-attenuate above, shorter than the culm; spikelets 3-6, rather distant (the two terminal ones approximate), globular to broadly ovoid, 0.4-0.5 mm long, the lowest often with a filiform bract attaining up to 3 cm in length; scales ovate, acute, cuneate, with a narrow median band, with broad scarious margin, about half as long as the perigynia; perigynia oblong-ovoid, membranaceous, 2.5-2.8 mm long, light green, plano-convex, with slender nerves, distinct to the summit, on both faces, on a short, well defined stipe, gradually tapering into a short, subconic, scaberulous, frontally shallow-cleft beak. Fr. June-July. (Plate XII, Figure 9).

Wet shady forests. — European part: Kar. -Lap. (s. part), Lad. -Il'm. Dv. -Pech. (forest zone), Upp. Dnepr., Upp. Volg., Volg. -Kam.; West. Siberia: Ob., Irt., Endemic. Described from Leningrad Province (Obla, near Luga). Type in Leningrad.

64. *C. brunnescens* (Pers.) Poir. *Encycl. Suppl.* III (1813) 286. — *C. curta* var. *brunnescens* Pers. *Syn.* II (1807) 539. — *C. canescens* β *alpestris* Trev. in Ldb. *Fl. Ross.* IV (1853) 281. — *C. vitilis* Litw. in *Maevsk. Fl. Sr.*, ed. 5 (1917) 681 (excl. var.); V. Krecz., *Ib.*, ed. 6 (1933) 179 (var. *eu-vitilis*), non Fries. — *C. vitilis* b. *spic. lutescenti brunneis* Fries, *Mant.* III (1842) 134. — *C. Persoonii* Sieb. *Herb. Fl. Austr.* (1821) No. 282 (nomen) et in *Flora*, V (1822) 652; *Nyl. Spicil. fl. fenn.* II (1846) 34 (excl. var.); *Meinsh. in A.H.P.* XVIII, 3 (1901) 328. — Exs.: HFR No. 996, 996a; *Pl. Finl. Exs.* No. 110; Kneuck. No. 100a.

Perennial, cineraceous-green, cespitose plants; culms scabrous above, slender, but firm and erect, 10-40 cm tall; leaves flat, stiffish, 1.5-2 mm broad, shorter than the culm, scabrous; spikelets 5-10, globular, ovoid, or oblong, 3-6 mm long, the 3-4 terminal ones approximate, the lower remote, the lowest with a short bract, to 2 mm long; scales ovate, acute, ferruginous to ferruginous-brown, with a light midrib and scarious margin, shorter than perigynia; perigynia ovoid to subglobular ellipsoid membranaceous, 2-2.3 mm long, greenish, ferruginous above, finally brunescent, on the back with 6-8 obscure nerves, evident only at base, nerveless on the inner face; on a short, indistinct stipe, rather abruptly contracted into an elongate scabrous beak, cleft to upper third of the perigynium. Fr. May-June. (Plate XII, Figure 10).

Peat bogs, meadows, swampy forests. — Arctic: Arct. Eur., Arct. Sib. (to Lena); European part: Kar. -Lap., Dv. -Pech., Lad. -Il'm., Upp. Dnepr. (except Ukraine), Upp. Volg., Volg. -Kam.; West. Siberia: Ob., Upp. Tob. (n. part), Irt. (e. part), Alt.; East. Siberia: Ang. -Sayan., Daur. (Upp. Angara-Yakchii), Len. -Kol (w. part); Far East: Kamch. ?; Centr. Asia: Dzhung. Tarb. (Saur). Gen. distr.: West. Europe, North America, northern Japan. Described from Swiss Alps (Tuli or Fuli mountain).

NOTE: Forming hybrids: \times *tripartita* All. (*C. Zahnii* Kneuck.); \times *lapponica* O.F. Lang. (*C. subpatula* Holmb.); \times *canescens* L. (*C. abortiva* Holmb.); \times *trisperma* (*C. leptoblasta* Holmb.); \times *dioica* L. (*C. tenebricans* Holmb.); \times *parallela* Laest. (*C. Fridtzii* Holmb.).

65. *C. vitilis* Fries, *Nov. Fl. Suec. Mant.* III (1842) 137 (sec. var. α *spiculis virescentibus* et *Herb. Norm.* VIII No. 85). — *C. gracilis* Ehrh. ex Schkuhr, *Riedgr.* I (1801) 48, tab. E., fig. 24, non Curt. (1783). — *C. Persoonii* var. *laetior* *Nyl. Spicil. fl. fenn.* II (1846) 34. — *C. vitilis* var. *silvatica* *Meinsh. Fl. Ingr.* (1878) 402; Litw. in *Maevsk. Fl. Sredn. Ross.*, ed. 5 (681). — *C. brunnescens* var. *sphaerostachya* Kük. in *Engl. Pflzr.* IV, 20 (1909) 220 (excl. pl. amer.). — Exs.: HFR No. 1537; Kneuck. No. 100a.

Perennial, bright green, flaccid plants, forming loose tufts; culms slender, weak, decumbent, scabrous, 20-50 cm tall; leaves long (though not exceeding the culm), flaccid, scabrous, 1.5-1.8 mm broad, spikelets 4-8, subglobular-ovoid, all rather distant, the lowest short-bracteate; scales ovate, acute, green-centered, broadly pale-hyaline-margined,

181 shorter than perigynia; perigynia oblong-ovoid, membranaceous 2.5-2.8 mm long, plano-convex, pale green, with 5-6 prominent nerves on the back and 3-4 on the inner face, abruptly contracted into a scabrous beak of medium length, cleft on the back. Fr. June-July. (Plate XII, Figure 11).

Wet mineral (not peaty) soil of shady forests. —European part: Kar. -Lap. (s. part), Lad. -Il'm., Dv. -Pech., Upp. Dnepr., Upp. Volg., Volg. -Kam. (w. part). Gen. distr.: Scandinavia, Western Europe (n. part). Described from southern Norway.

Series 2. *Holostomae*. V. Krecz. —Spikelets mostly contiguous, few (from 1 to 5-6), mostly few-flowered; perigynia subcoriaceous, (2)3-3.5 mm long, more or less enlarged toward the base, stipitate, with a mostly smooth, obliquely truncate, entire, non-emarginate beak.

66. *C. tripartita* All. Fl. Pedem. II (1785) 265, tab. 92, fig. 51. —*C. bipartita* All., l.c., tab. 89, fig. 5. —*C. Lachenalii* Schkuhr, Riedgr. I (1801) 51, tab. Y, fig. 79; Kryl. Fl. Zap. Sib. III, 450. —*C. lagopina* Whlb. in Sv. Vet.-Akad. Nya Handl. XXIV (1803) 145; Trev. in Ldb. Fl. Ross. IV, 279. —Exs.: Kneuck. No. 13; Dörf. No. 3288.

Perennial, green, loosely caespitose plants; culms erect or somewhat nodding, smooth or scaberulous above, 10-30 cm tall; leaves flat to sub-involute, to 2 mm broad, shorter than the culm, scabrous; spikelets 2-5, obovoid, all gynecandrous, aggregated in short (1.5-2 cm long), lobed head; scales ovate, subobtuse, blackish-brown, with a light midrib and margin, slightly shorter than perigynia; perigynia ovoid, membranaceous, 2.5-3.5 mm long, plano-convex, light ferruginous, obscurely nerved on both faces, round-based, obscurely stipitate, rather gradually tapering into an elongate, terete, smooth, sometimes slightly scaberulous, frontally cleft, blackish beak. Fr. July-September. (Plate XII, Figure 13).

Arctic and alpine moss-lichen tundra. —Arctic: Nov. Zem., Arct. Eur., Sib., Chuk., Anad.; European part: Dv. -Pech. (Ural); West. Siberia: Ob. (n.), Alt.; East. Siberia: mountains of Yenis., Len.-Kol, Ang. -Sayan., Daur. (n. part—Mount Kiren); Far East: Ze. -Bur., Ud., Okhot., Kamch. Gen. distr.: circumpolar and alpine species of the northern hemisphere. Described from the Alps (Great St. Bernard).

NOTE: Forming hybrids: \times *dioica* L.; \times *canescens* L. (*C. helvola* Blytt et Fries); \times *brunnescens* Poir.

67. *C. pribylovensis* J.M. Macoun ex D.S. Jordan, Fur Seals Isl. N. Pacif. Ocean. III (1899) 572. —*C. lagopina* var. *pribylovensis* Kük. in Engl. Pflzr. IV, 20 (1909) 214.

182 Perennial, yellowish-green, loosely caespitose plants; culms scabrous, 25-40 cm tall; leaves flat, 1.5-2.5 mm broad; spikelets 3-6, dense, obovoid, the terminal ones contiguous, with 10-30 perigynia, the terminal spikelet gynecandrous; scales ovate, obtuse to subobtuse, light ferruginous, scarious-margined, with a light midnerve, broader and longer than the perigynia; perigynia coriaceous, broadly ovoid, biconvex, 3 mm long, yellowish-green, nerved on both faces, subsessile, round-based, rather abruptly contracted into a short, smooth to more or less scabrous beak.

Arctic: Anad. (river Kanchalan). Described from upland peat of St. Paul's Island (Pribilof Islands).

68. *C. glareosa* Whlb. in Sv. Vet.-Akad. Nya Handl. XXIV (1803) 146; Trev. in Ldb. Fl. Ross. IV, 284. —Exs.: Pl. Finl. Exs. No. 113.

Perennial, light green, caespitose plants; culms faintly triangular, attenuate toward apex (hence inflorescence often nodding), rather smooth, 10-30 cm tall; leaves narrow, 1-2.5 mm broad, canaliculate-folded, shorter than the culm; spikelets 1-5, ovoid to oblong, containing 5-20 perigynia, subdistant; terminal spikelet particularly large, often drooping; scales lanceolate, subobtusate, ferruginous, light-centered, broadly scarous-margined, shorter than perigynia; perigynia lanceolate to oblong-ellipsoid, membranaceous, 2.5-3(3.5) mm long, plano-convex, grayish-green, with 8-10 distinct thickened nerves on both faces, short-stipitate, gradually tapering into a conic, somewhat flattened, smooth, frontally obscurely cleft beak. Fr. July-September. (Plate XII, Figure 14).

Coastal gravels and sands. —Arctic: Nov. Zem. (Koguev and the southern island of Novaya Zemlya), Arct. Eur.; European part: Kar. -Lap., Dv. -Pech. (White Sea coast), Lad. -Il'm. (Kronshtadt and Baltic seaboard in Luzhskii District). Gen. distr.: Fenno-Scandia, n. part of North America, including Alaska. Described from northern Norway. Type in Stockholm.

NOTE: Forming hybrids: \times *canescens* L.; \times *dioica* L. (*C. stric-ticulmis* Holmb.).

69. *C. marina* Dew. in Am. Journ. Sci. XXIX (1836) 247; Mack, in North. Am. Fl. XVIII, 2 (1931) 90. —*C. glareosa* f. *elegantissima* Kük. in Allg. Bot. Zeitschr. XV (1909) 35 et in Journ. Russ. Bot. 3-6 (1911) 65. —*C. soriiofkensis* Lévl. et Vant. in Bull. Ac. Géogr. Bot. XIX (1909) 35.

Perennial, light green or cineraceous-green, loosely caespitose plants; culms very slender, weak, often bent, obtusely triangular, scaberulous at the summit, 15-40 cm tall; leaves canaliculate, to 1.5 mm broad; spikelets 2-4 (rarely solitary), approximate, loose, elongate, containing 5-10 perigynia; scales ovate, obtuse, reddish-brown, light-centered, thinly membranaceous above and on the margin, somewhat shorter than the perigynia; perigynia ellipsoid-obovate, plano-convex, 1.5-2.3 mm long, whitish, distinctly nerved on both faces, obsoletely stipitate, spongy and rounded at base, abruptly contracted into an obsolescent, smooth, entire, obliquely truncate beak. Fr. July-August.

183 Coastal sands. —Arctic: Nov. Zem., Arct. Eur. (Kol'skii Peninsula, Svyatoi Nos), Chuk., Anad.; Far East: Kamch., Okhot., Ud., Sakh. Gen. distr.: n. part of North America, Alaska, St. Lawrence Island. Described from the arctic seaboard of North America.

70. *C. ursina* Dew. in Amer. Journ. Sc. XXVII (1835) 240, tab. U, fig. 68; Kük. in Engl. Pflzr. IV, 20 (1909) 74 et in Journ. Russ. Bot. 3-6 (1911) 31, fig. 7.

Perennial, rather densely caespitose plants; culms faintly triangular, bent, smooth, 3-10 cm tall, concealed among the leaves or slightly overtopping them; leaves narrow, to 1 mm broad, canaliculate, more or less scabrous; spikelets solitary, terminal, or rarely 2, ovoid to rounded, contiguous, the terminal spikelet large; scales broadly ovate, rounded-obtusate, brown or brownish throughout, shorter than perigynia; perigynia rounded-ovoid, thickly membranaceous, 2 mm long, plano-convex, very faintly 4-6-nerved on both faces, grayish-yellow, obsoletely stipitate, the beak obsolescent, broadly conic, obtuse, slightly cleft on the back.

Fr. July–August. (Plate XII, Figure 15).

Wet sandy places. —Arctic: Nov. Zem. (Franz Josef Land!, Nov. Zem-lya?), Arct. Sib.: Belyi and Preobrazheniya islands? Gen. distr.: Arct. America, Spitsbergen. Described from the arctic seaboard of North America.

71. *C. Mackenziei* V. Krecz. nom. no. —*C. norvegica* Willd. ex Schkuhr, Riedgr. I (1801) 50, tab. S, fig. 66 et II (1806) 207; Willd. in Sp. pl. IV (1805) 227; Trev. in Ldb. Fl. Ross. IV, 280, non Retz. (1779 et 1795). —Exs.: Fl. Finl. Exs. No. 112 and 523; HFR No. 495.

Perennial, yellowish-green, loosely caespitose plants; culms flattened-triangular, smooth, 10–40 cm tall; leaves flat, 2–3 mm broad, rather soft, as long as the culm; spikelets 3–6, oblong (to 1–1.5 cm long), the terminal spikelets clavate (being staminate 3/4 of its length below), subdistant; scales ovate, obtuse, with a light midrib and margin, brownish, as long as perigynia; perigynia ovoid, semicoriaceous, 3–3.5 mm long, grayish-green, plano-convex, distinctly nerved below on both faces, abruptly contracted to rounded thick-stipitate base and abruptly attenuate into a short, subconic, scaberulous beak. Fr. July–September. (Plate XII, Figure 16).

Wet places and saline coastal meadows. —Arctic: Arct. Eur. (eastward as far as Kanin), Anad.; European part: Kar.-Lap., Dv.-Pech. (White Sea shores), Lad.-Il'm. (Gulf of Finland coast and near Pskov–Ryuzha and Borisovichi); Far East: Ud. (Shantarskie Islands), Sakh., Okhot., Kamch. Gen. distr.: Scandinavia, Iceland, North America. Described from the coast of Norwegian Nordland.

NOTE: Forming hybrids with *C. dioica* L. (*C. Sylvenii* Homb.).

72. *C. amblyorhyncha* V. Krecz. sp. nova. in Addenda, II, 595. —*C. heleonastes* Kük. in Engl. Pflzr. IV, 20 (1909) 214, ex p. et in Journ. Russ. Bot. 3–6 (1911) 64, ex p.; V. Krecz. in Fl. Transb. II (1931) 119, non Ehrh.

Perennial, cineraceous-green, caespitose plants; culms erect, scabrous, 10–30 cm tall; leaves somewhat rigid, flat, keeled, 1.5–2 mm broad, shorter than the culm; spikelets 3–4, globular to ovoid, few-flowered, not exceeding 5 mm in length, somewhat distant; scales ovate, obtuse, ferruginous, with a light midrib and scarious margin, shorter than the perigynia; perigynia more or less oblong-ellipsoid, subcoriaceous, 2.5–3 mm long, plano-convex, yellow, ferruginous at the summit, faintly 6–8-nerved on both faces, contracted at base into a short stipe, broadly conic-tipped, smooth, slightly cleft on the back. Fr. July–August. (Plate XII, Figure 18).

Marshes. —West. Siberia: Alt.; East. Siberia: Yenis. (n.), Ang. - Sayan. (Sayans), Daur., Len.-Kol. Gen. distr.: Northern Mongolia. Described from Sayany (Tunkinskii District, Lake Il'chyr). Type in Lenin-grad.

73. *C. heleonastes* Ehrh. ex L. fil. Suppl. (1781) 414 et Beitr. (1787) 186; Trev. in Ldb. Fl. Ross. IV, 279. —Exs.: Pl. Finl. Exs. No. 514; HFR No. 645; Kneuck. No. 310.

Perennial cineraceous-green, caespitose plants; culms scabrous above, more or less bent, 15–30 cm tall; leaves flattened-caliculate to flat, keeled, 1–2 mm broad, as long as the culm; spikelets 3–6, many-flowered,

† Named for the American caricologist Kenneth Kent Mackenzie.

ovoid, to 8 mm long, approximate; scales ovate, subacute, light ferruginous, light-centered, scarious-margined, shorter than the perigynia; perigynia ovoid to ovoid-ellipsoid, rather thin-coriaceous, 3-3.5 mm long, plano-convex, faintly 8-10-nerved on both faces, yellowish-brown below, contracted into a short stipe, gradually tapering into a short, subconic, scaberulous-margined, shallow-cleft beak. Fr. June-July. (Plate XII, Figure 17).

Peat bogs. —European part: Kar. -Lap., Dv. -Pech., Lad. - Il'm., Upp. Dnepr., Upp. Volg., Volg. -Kam. (including Southern Ural); Caucasus: Ciscauc. (Digoriya); West. Siberia: Ob., Irt. (e. part), Alt.; East. Siberia: Yenisi. (s. -w.), Ang. -Sayan. (n. -w. part). Gen. distr.: Northern and Centr. Europe. Described from Sweden (Uppsala).

NOTE: Forming hybrids: \times *canescens* L. (*C. heterophyta* Holmb.); \times *tenuiflora* Whlb. (*C. mucronulata* Holmb.); \times *dioica* L. (*C. microstachyoides* Montell.).

185 74. *C. aa* Kom. Fl. penins. Kamsch. I (1927) 234.

Perennial, grayish-green, loosely cespitose plants; culms slender but firm, scabrous, 25-45 cm tall; leaves rather stiff, flat to subinvolute, 1-1.5 mm broad, straight, shorter than the culm; spikelets 2-4, globular-ovoid, approximate; scales ovate, subacute, pale castaneous, green-centered and rather broadly scarious-margined, scarcely shorter than the perigynia; perigynia ovoid, thin-coriaceous, 3-3.5 mm long, plano-convex, grayish-green, with 8-10 brownish nerves on both faces, spongy at base around a short stipe, gradually tapering into a short, scabrous, subconic beak.

Far East: Kamch. (swamps in dry beds of river Kamchatka near the village Kirganik; Kronotskoe Lake, by the fourth stream). Endemic. Described from Kamchatka (Kirganik). Type in Leningrad.

Cycle 4. *Anastrephantha* V. Krecz. —Slender green plants with creeping stolons. Spikelets globular, androgynous, loose, few-flowered (1-6 flowers). Scales pale, membranaceous, acute. Perigynia semicoriaceous, 2-5-3 mm long, strongly convex on the back, with obsolescent entire beak.

75. *C. disperma* Dew. in Am. Journ. Sc. VIII (1824) 266. —*C. tennella* Schkuhr, Riedgr. I (1801) 23, tab. Pp, fig. 104, non Thuill. (1799). —*C. Blyttii* Nyl. Spicil. fl. fenn. II (1844) 35. —*C. Dominii* Lévl. et Vant. in Fedde, Repert. sp. nov. VII (1900) 103. —Exs.: Pl. Finl. Exs. No. 111 and 519; Kneuck. No. 96; HFR No. 2390 a and b and 1391.

Perennial plants with slender stolons, forming loose, bright green tufts; culms filiform, weak, decumbent, scabrous toward the summit, 20-50 cm tall; leaves thin, 1-1.5 mm broad, flat, weak, elongated, but shorter than the culm; spikelets 2-6, globular, with 1-2 staminate flowers above and 2-3 pistillate ones below, segregated, and then the lowest with a short slender bract; scales ovate, acute, pale, green-keeled, shorter than the perigynia; perigynia more or less coriaceous, ellipsoid, 2.8-3 mm long, pale green or yellowish, strongly convex on the back, slightly so on the inner side, oval in section, the edges turned inward as ribs, both faces with numerous slender nerves, the base ovate, short-stipitate, the summit rapidly contracted into a short, cylindric, smooth beak. Fr. June-July. (Plate XII, Figure 19).

Wet mossy forests and coppices. —European part: Kar. -Lap., Dv. -Pech., Upp. Dnepr., Upp. Volg., Volg. -Kam; all Siberia and Far East. Gen. distr.: Scandinavia, North America. Described from Massachusetts in North America.

NOTE: Forming hybrids: × *brunnescens* Poir. (*C. leptoblasta* Holmb.); × *loliacea* L.; × *canescens* L. (*C. tenelliformis* Holmb.).

ECONOMIC IMPORTANCE: A satisfactory forage plant.

186 Section 11. *Ulvella* V. Krecz. —Plants with more or less creeping rhizome. Culms triangular; leaves linear, setaceous-folded. Spikelets bisexual, androgynous. Perigynia at length rather spreading, thin-membranaceous, nerveless, subovate or ellipsoid, plano-convex, with distinct margin, usually smooth, short-beaked. Achene lenticular; rachilla nearly as long as the achene. Stigmas 2.

1. Densely caespitose plants; leaves equaling or exceeding the culm; perigynia ellipsoid, stipitate, with a scabrous beak 78. *C. Hepburnii* Boott.
- + Plants with creeping rhizome; leaves shorter than the culm; perigynia ovoid, sessile, with a smooth beak 2.
2. Rhizome obliquely ascending, with purple scales; culms 10-50 cm tall. Spikelets globular, with indistinct staminate part; scales brown, with a broad scarious margin (Plate XIV, Figure 2) 76. *C. capitata* L.
- + Rhizome horizontal, covered with ochreous scales; culms 5-20 cm tall. Spikelets oblong, the pistillate part equaling the staminate; scales dark castaneous throughout (Plate XIV, Figure 1) 77. *C. oreophila* C.A.M.

76. *C. capitata* L. Syst. nat. ed. 10 (1759) 1261; Trev. in Ldb. Fl. Ross. IV, 266. —Exs.: HFR No. 2386 a and b; Pl. Finl. Exs. No. 102, 507.

Perennial, caespitose plants with ascending rhizome; culms subterete-triangular, furrowed, scabrous, 10-50 cm tall, covered at base with purple or brownish-brick-colored sheaths; leaves setaceous, scabrous, usually shorter than the culm; spikelets ovaloid, globular, or oblong, 0.5-1 cm long; scales ovate, obtuse, brown, usually hyaline-margined, shorter than the perigynia; perigynia rounded-ovoid, 2.5-3.7 mm long, plano-convex, green (or brownish at the summit), more or less lustrous abruptly contracted into a short smooth beak. Fr. July–August. (Plate XIV, Figure 2).

Wet meadows, bogs, tundras, damp rocky places. —Arctic: Arct. Eur., Arct. Sib., Anad.; European part: Kar. -Lap., Dv. -Pech., Volg. -Kam. (Ural); West. Siberia: Ob., Alt.; East. Siberia: Yenis., Ang. -Sayan., Daur., Len. -Kol.; Far East: Ze. -Bur., Okhot. Gen. distr.: Arctic and alpine zones of Europe and North America. Described from Northern Europe.

77. *C. oreophila* C.A.M. Verzeichn. Pfl. Cauc. -Casp. (1831) 29; Trev. in Ldb. Fl. Ross. IV, 266. —Ic.: Trav. Mus. Bot. Ac. URSS, XX (1927) 200, Figure 1.

Perennial; rhizome creeping, ligneous; culms triangular, furrowed, scabrous, 5-20 cm tall, covered at base with ochreous scales; leaves 187 setaceous-involute, scabrous, shorter than the culm; spikelets oblong-ovoid, obtuse, dark castaneous, shorter than the perigynia; perigynia rounded-ellipsoid, 2.5-3 mm long, plano-convex, round-based, ferruginous, abruptly contracted into a short, bedentate, smooth beak (Plate XIV, Figure 1).

High-mountain meadows and slopes. —Caucasus: Ciscauc., Dag., West., East, and South Transcauc. Gen. distr.: Asia Minor, Persia. Described from the Caucasus. Type in Leningrad.

78. *C. Hepburnii* Boott in Hook. Fl. bor.-am, II (1839) 209, tab. 207; Gorodk. in Trav. Mus. Bot. Ac. URSS., XX (1927) 201. —*C. nardina* Trev. in Ldb. Fl. Ross. IV (1853) 267; Kom. Fl. penins. Kamtsch. I, 222; Kük. in Journ. Russ. Bot. 3-6 (1911) 30, non Fries. —*C. nardina* var. *Hepburnii* Kük. in Engl. Pflzr. IV, 20 (1909) 70.

Perennial, densely caespitose plants; culms smooth, erect, 2-22 cm tall, covered at base with dark brown sheaths; leaves straight or subfalcate, equaling or exceeding the culm, setaceous-folded. Spikelets ovoid to oblong-ovoid, 0.5-1 cm long; scales ovate, obtuse, brown or castaneous, with a narrow light-colored margin; scales obovate or elliptic, 3-3.5 mm long, plano-convex, on a cuneate stipe, rather abruptly contracted into a short bidentate beak, the beak and margin to the middle scabrous.

Arctic: Chuk. Arakam-chechen Island; possibly in Nov. Zem. (Franz Josef Land). Gen. distr.: western states of North America (Rocky Mountains in North America).

Section 12. *Olotrema* (Rafin.) V. Krecz. —Rafin. in Amenit. of Nat. I (1840) 25. —*Rhaptocalymma* Boern. in Abhandl. Naturw. Ver. Bremen XXI (1913) 272 (pro genere). —Meadow-bog plants with creeping rhizome. Culms more or less triangular only at the summit, sometimes inflate, with narrow linear leaves. Spikelets androgynous, few, arranged in capitate or spiciform inflorescences. Perigynia membranaceous, more rarely thin-coriaceous, 3-5 mm long, ovoid or oblong, mostly plano-convex, with obsolete nerves and ribbed margin, tapering into a mostly smooth, obliquely truncate or obscurely bidentate, hyaline-margined, subcylindric or flattened-terete, frontally cleft beak. Stigmas 2.

1. Plants of mossy swamps, the long, creeping, flagelliform, faintly triangular rhizome rooting at nodes, and giving rise at each node to 1-2 upright, leaf-bearing of cauline shoots. 88. *C. chordorrhiza* Ehrh.
- + Plants of different habit. 2.
2. Desert plants, producing slender, cord-like underground shoots terminating in compact clusters of culms and leafy shoots; perigynia firmly adnate to rachilla, breaking off with difficulty or together with adjoining flowers 3.
- + Bog and meadow plants with short creeping underground rhizome, giving rise to culms and upright shoots arranged in rows, forming loose tufts; perigynia readily deciduous 4.

3. Sand plants; the tall, light ferruginous, loosish old sheaths in conical arrangement at the base. Scales lanceolate, acute, light ferruginous. Perigynia nerved, initially plano-convex, scabrous above, at length strongly inflate, bladderlike, to 2 cm long, reddish-brown, with a smooth membranaceous beak (Plate XIII, Figure 7) 89. *C. physodes* M. B.
- + Plants of forest-covered foothills, densely covered at base with cinnamon-brown fibrillose sheaths. Scales ovate, castaneous. Perigynia nearly nerveless, 4-5.5 mm long, with a smooth bidentate beak, castaneous (Plate XIII, Figure 8). 90. *C. pachystylis* Gay.
4. (2). Perigynia strongly rounded-inflated, initially membranaceous, becoming subcoriaceous; scales obtuse, strongly abbreviated; culms bent 79. *C. maritima* Gunn.
- + Perigynia subplano-convex to biconvex, permanently membranaceous; scales acute, barely shorter than the perigynia; culms suberect (if bent, then perigynia plano-convex). 5.
5. Culms faintly triangular, mostly smooth, subinflate, hollow; leaf sheaths loosely covering the culm. Perigynia ovoid, biconvex, the rounded margin and beak smooth at the summit 6.
- + Culms triangular, scabrous (sometimes deeply furrowed on one side and then smooth), rather compact; sheaths tightly enveloping the culm; perigynia oblong-ovoid or lanceolate, plano-convex, the pronounced margin mostly scabrous at the summit. 10.
6. Leaves flat or subcanaliculate, 3-4 mm broad at base; culms inflated at base (to 2.5 mm thick); spikelets ferruginous-brown. 7.
- + Leaves setaceous-involute, 1.5 mm broad at base; culms 1-1.5 mm thick at base; spikelets light ferruginous 9.
7. Culms smooth; inflorescence a compact head 8.
- + Culms scabrous; inflorescence oblong, loose, often lobed 83. *C. Slobodovii* V. Krecz.
8. Leaves flat, 2.5-3 mm broad; perigynia ovoid, 3.5 mm long, attenuate to a scabrous beak of medium length (Arctic). (Plate XIII, Figure 11) 79. *C. maritima* Gunn.
- + Leaves subinvolute, to 4 mm broad; perigynia broadly ovoid, 3.5-4.5 mm long, attenuate to a long, smooth beak (Central Asia). (Plate XIII, Figure 1). 82. *C. pseudo-foetida* Kük.
- 189 9 (6). Culms slender, to 40 cm tall; perigynia oblong-ovoid, 3.5-4 mm long; spikelets disposed in a loose, sometimes lobed, oblong head (Plate XIII, Figure 3) 81. *C. reptabunda* (Trautv.) V. Krecz.
- + Culms erect, to 20 cm tall, thicker; perigynia ovoid to rounded-ovoid, 2.3-3 mm long; spikelets in a compact capitate inflorescence (Plate XII, Figure 2) 88. *C. sajanensis* V. Krecz.
- 10 (5). Culms 2-7 cm tall, with one side furrowed-concave, faintly triangular, smooth, arched; perigynia 2.5-3 mm long, nerveless (Plate XIII, Figure 10) 84. *C. setina* (Christ) V. Krecz.
- + Culms 10-45 cm tall, triangular, scabrous, erect or flexuous; perigynia 3-4 mm long, faintly nerved 11.

11. Culms slender, filiform, flexuous; leaves filiform, reflexed, (1-1.5 mm broad), flexuous, with a long aristate tip; cineraceous-green plants; perigynia 3-3.3 mm long, ovoid, scarcely scabrous at the summit (Plate XIII, Figure 5—central Tien Shan) 87. *C. hapalotera* V. Krecz.
 + Culms erect, more rigid; leaves flat to subinvolute, to 3 mm broad, abruptly pointed; pale green plants; perigynia lanceolate, 3.5-4 mm long, scabrous at the summit 12.
12. Leaves stiffly erect, abbreviated; perigynia oblong-ovoid, 4-4.5 mm long, rather distinctly nerved on the back (mountainous part of the Caucasus) 85. *C. similigena* V. Krecz.
 + Leaves soft, weak, elongated; perigynia lanceolate, 3-4 mm long, nerveless or, if nerved, margin strongly scabrous long way down (Plate XIII, Figures 4 and 6—Siberia). 86. *C. enervis* C. A. M.

Cycle 1. *Aulocaulon* V. Krecz. —Plants of bogs and meadows, with short creeping rhizomes, forming loose tufts. Culms terete at base, hollow, more or less inflated, subtriangular above; perigynia deciduous, membranaceous (sometimes becoming firmer), biconvex or plano-convex, obscurely nerved, attenuate to a smooth or more or less scabrous, obliquely truncate, hyaline-margined beak.

79. *C. maritima* Gunn. Fl. Norv. II (1772) 131; V. Krecz. in Bull. Jard. Bot. URSS, XXX, 1-2 (1932) 127, tab. 1, fig. 3 a, non C. F. Muell. (1777). —*C. incurva* Lightf. Fl. Scot. II (1777) 544, tab. 24, fig. 1; Trev. in Ldb. Fl. Ross. IV, 269; Kük. in Engl. Pflzr. IV, 20 (1909) 113, ex p. —*C. orthocaula* V. Krecz., l. c., 131, tab. 1, fig. 5 —*C. stenophylla* Ostenf. Fl. arct. I (1902) 50, non Whlb. —*C. stenophylla* var. *duriuscula* Trautv. in A. H. P. X (1888) 57, ex p. —*C. pseudo-foetida* Kük. in Journ. Russ. Bot. 3-6 (1911) 44, quoad pl. Bung.

190 Perennial, light green, loosely caespitose plants; culms rounded-triangular, arched, smooth, 5-15 cm tall; leaves to 1-2 mm broad, folded, shorter than the culm, nearly smooth; spikelets 5-10, arranged in a dense, hemispherical or pyramidal head to 13-15 mm long and 13-15 mm broad; scales broadly ovate, obtuse, brown, broadly hyaline-margined, about half the length of perigynia; perigynia membranaceous at first, becoming subcoriaceous, broadly ovoid, 4-5 mm long (3 mm broad), inflated-biconvex, nerveless or nearly so, brown or reddish (but lighter than the scales), tapering into a short, scaberulous, subconic beak. Fr. July—September. (Plate XIII, Figure 11).

Sandy and gravelly shores, and mountains. —Arctic: Arct. Eur., Arct. Sib., Chukot. Gen. distr.: Scandinavia, Iceland, Arctic America. Described from Norway (Fiorestar).

80. *C. sajanensis* V. Krecz. in Bull. Jard. Bot. URSS, XXX, 1-2 (1932) 133, tab. II, fig. 1. —*C. incurva* Meinsh. in A. H. P. XVIII, 3 (1901) 315; Kük. in Journ. Russ. Bot. 3-6 (1911) 42, quoad pl. baical., non Lightf. —*C. stenophylla* var. *humilis* Meinsh., l. c., 316, quoad pl. angar. Czekanowsk.

Perennial glaucescent, rather densely caespitose plants; culms erect or slightly arching, smooth, 5-25 cm tall; leaves folded, flexuous, as long as the culm; spikelets 4-6, arranged in a dense, spherical or oblong head

0.5-1 cm long and 0.5-1 cm broad; scales ovate, subacute, brownish, hyaline-margined; perigynia membranaceous, ovoid, to rounded-ovoid, 2.3-3 mm long, biconvex or plano-convex, nerveless and devoid of light margin, yellowish-green, ferruginous at the summit, stipitate, gradually tapering into a smooth or nearly smooth, short beak. Fr. June-July. (Plate XIII, Figure 2).

Sandy and gravelly places. —East. Siberia: Yenis. (s.), Ang.-Sayan., Daur. Gen. distr.: Northern Mongolia. Described from Sayans (Irkut River valley, village Monda). Type in Leningrad.

81. *C. reptabunda* (Trautv.) V. Krecz. in Bull. Jard. Bot. URSS, XXX, 1-2 (1932) 134, tab. II, fig. 2. —*C. stenophylla* var. *reptabunda* Trautv. in A. H. P. I, 2 (1872) 30.

Perennial, cineraceous-green, loosely caespitose plants with creeping rhizome; culms slender, smooth or scaberulous, subflexuous, 15-45 cm tall; leaves abbreviated, setaceous-involute, scabrous above; spikelets 2-5, few-flowered, disposed in a loose, ovoid or oblong head 1 cm long and 0.3-0.5 cm broad; scales oblong-ovate, acute, ferruginous, hyaline-margined; perigynia oblong-ovoid to oblong-ellipsoid, 3-3.5(4) mm long and 1.2-1.5 mm broad, plano-convex, nerveless or nearly so, pale, ferruginous at the summit, stipitate, gradually tapering into a short, smooth beak. Fr. June-July. (Plate XIII, Figure 3).

191 Solonchaks, wet places. —East. Siberia: Ang.-Sayan. (Abakano-Sayanskii Lake District), Daur., Len.-Kol. Gen. distr.: North-eastern Mongolia, Manchuria (w. part). Described from Mongolia (Gurbunei-bulak). Type in Leningrad.

82. *C. pseudo-foetida* Kük. in Mitth. Thür. bot. Ver., N. F., XV (1900) 4 (nomen) et ex Ostenf. in Bot. Tidsskr. XXVIII (1908) 225, fig. 1 (descr.). —*C. foetida* Kük. in Bot. Centrbl. LXXV (1898) 108; Meinsh. in A. H. P. XVIII, 3 (1901) 407, non Bell. —*C. curauca* O. Fedtsch. in A. H. P. XXI, 3 (1903) 429; XXIV, 3 (1905) 346; XXVIII, 1 (1908) 123 et 3 (1909) 510; Meinsh. in A. H. P. XVIII, 3 (1901) 316, ex p., non Kunth. —*C. incurva* O. Fedtsch. in Trav. Mus. Bot. St. Pétersb. I (1902) 58; Rgl. in A. H. P. VII, 2 (1881) 564, ex p., non Lightf.

Perennial, glaucescent, plants with slender, ligneous, extensively creeping rhizome; culms inflated-triangular, hollow, 2-2.5 mm thick at base, erect or arched, smooth; leaves thick, stiff, flat or inrolled-margined, 2-3.5 mm broad, shorter than the culm, scaberulous above, rather abruptly pointed; spikelets 5-8, aggregated in a rather dense, spherical or ovoid head 1-2.5 cm long and 0.8-1.5 cm broad; scales ovate, acute, castaneous, membranaceous at the summit, about as long as the scales; scales rather broadly ovate, 3.5-4.5 mm long (to 2 mm broad), rounded-based, stipitate, plano-convex, obscurely nerved, purple-castaneous at the summit, gradually tapering into a smooth beak of medium length, dorsally cleft to base. Fr. June-July. (Plate XIII, Figure 1).

Alpine meadows, and wet mountain sites. —Centr. Asia: Tyan'-Shan., Pam.-Al. Gen. distr.: Afghanistan, Tibet. Described from Terskaya Alatau, Kokbulak (sources of Naryn).

ECONOMIC IMPORTANCE: Of great importance in mountain pastures as a source of pasture feed.

83. *C. Slobodovii* V. Krecz. sp. nova in Addenda II, 595. —*C. pseudo-foetida* Kük. in Engl. Pflzr. IV, 20 (1909) 115, pro min. p.

Perennial, bright-green or light-green plants, with short rhizome, forming loose tufts; culms terete below, more or less hollow, to 1.5 mm broad, triangular and scabrous above, 10-40 cm tall; leaves thin, resilient, mostly flat, 2-4.5 mm broad, shorter than the culm, gradually acuminate, scabrous; spikelets 6-12, disposed in an oblong loose head this often segregated below, 1.5-2 cm long, 1-1.5 cm broad; scales oblong-ovate, acute, ferruginous, equaling the scales, hyaline-margined; perigynia thin-membranaceous, ovoid to oblong-ovoid, 3.5-4 mm long (1.5-1.8 mm broad), plano-convex, obscurely nerved only below on the back, abruptly contracted into a short stipe and gradually tapering into a scaberulous, sometimes nearly smooth, cleft beak. Fr. June—July.

Mountain river beds, at altitude up to 3,500 m. —Centr. Asia: Pam. —Al. Endemic. Described from Zagara range (Dara-Dzhou). Type in Leningrad.

192 84. *C. setina* (Christ) V. Krecz. in Bull. Jard. Bot. URSS, XXX, 1-2 (1932) 139, tab. I, fig. 4. —*C. incurva* β *setina* Christ in Sv. Vet. - Ak. Handl. XXII, 10 (1888) 174; Kük. in Journ. Russ. Bot., 3-6 (1911) 43, quoad pl. Arneil. —*C. incurva* Rupr. in Beitr. Pflznk. russ. Reich. II (1845) 60; Trev. in Ldb. Fl. Ross. IV, 279, quoad pl. Rupr. —*C. arctica* Meinsh. in A. H. P. XVIII, 3 (1901) 315, non Deinb.

Perennial, cineraceous-green plants with extensively creeping rhizome; culms 2-7 cm tall, rigid erect or arched, smooth, mostly with a deep furrow; leaves setaceous-involute, as long as the culm, somewhat tortuous, 1.5-2 mm broad at base, sheaths tightly enveloping the culm; spikelets 3-5, few-flowered, arranged in an oblong head 0.5-1 cm long and 0.5-0.8 mm broad; scales brown, acute; perigynia membranaceous, oblong-ovoid, 3-3.7 mm long or shorter, plano-convex, nerveless, short-stipitate, brownish, gradually tapering into a nearly smooth short beak (Plate XIV, Figure 10).

Stony and clay tundra. —Arctic: Nov. Zem. (Nov. Zem., Kolguev, Vaigach), Arct. Eur. (Kanin and eastward of its shores), Arct. Sib. (Gyda, Yenisei). Described from Tolstoi Nos, on the Yenisei. Type in Stockholm.

85. *C. acrifolia* V. Krecz. sp. nova in Addenda, II, 591. —*C. curaica* var. *rigida* Meinsh. in A. H. P. XVIII, 3 (1901) 317. —*C. curaica* var. *armena* Schischk. in Trans. Tomsk. Univ. LXXXI (1929) 427. —*C. curaica* Grossh. in Fl. Kavk. I (1928) 159, non Kunth. —*C. stenophylla* C. A. M. in Verzeichn. Pfl. Cauc. -Casp. (1831) 30, non Whlb.

Perennial, rather rigid, green plants with creeping rhizome; culms enlarged below, scabrous, erect or arched, 10-25 cm tall, covered at base with broad, light brown, bladeless sheaths; leaves flat, somewhat turned back at the margins, scaberulous, 2.5-4 mm broad, straight, abbreviated, rather abruptly pointed; spikelets numerous (5-10), arranged in an oblong, often trilobed spike to 2 cm long; scales oblong-ovate, acute, ferruginous-brown, equaling the perigynia; perigynia thin-coriaceous, oblong-ovoid, (3.)4-4.5 mm long, plano-convex, ferruginous, round-based, distinctly stipitate, faintly nerved on the back (nerveless on the inner face), gradually tapering into a long, scabrous-margined, bidentate beak.

Alpine meadows. —Caucasus: Dag., West. (South Osetiya), South. and East. Transcauc. (summits of Pirsogat Mountains). Gen. distr.: Persia (Demavend). Described from Tufandag. Type in Leningrad.

86. *C. enervis* C.A.M. in Ldb. Fl. Alt. IV (1833) 209; Trev. in Ldb. Fl. Ross. IV, 272. — *C. stenophylla* var. *enervis* Kük. in Engl. Pflzr. IV, 20 (1909) 122; Kryl. Fl. Zap. Sib. III, 439. — *C. stenophylla* var. *elata* Kük. in Journ. Russ. Bot. 3-6 (1911) 46. — *C. Carlantonia* Gay. in Ann. Sc. Nat., 2 sér., X (1808) 293. — *C. curauca* var. *angustifolia* Turcz. in Bull. Soc. Nat. Mosc. XXVIII (1855) 326. — *C. vulpinaris* f. *angustifolia* Kük. in Journ., 1. c., 44 et in Pflzr., 1. c., 117, quoad. pl. sibir.; Kryl., 1. c., 537. — Ic.: Ldb. Ic. Fl. Ross. IV, tab. 349.

Perennial; rhizome extensively creeping, giving rise to loose tufts; culms slender, triangular, scabrous at the summit, 15-45 cm tall; leaves flat, to 3 mm broad, scabrous, cineraceous-green, shorter than the culm; spikelets 5-10, arranged in a loose, oblong spike 1-2 cm long, the lower spikelets sometimes segregated; scales oblong-ovate, acute, castaneous and ferruginous, slightly shorter than the perigynia; perigynia oblong-ellipsoid to ovoid, 3-4 mm long, plano-convex, semicircular at base, short-stipitate, with a thickened and somewhat recurved margin, nerveless (or nerved at base), gradually tapering into a long, scabrous-margined, short-bidentulate beak, ferruginous. — Fr. June-July. (Plate XIII, Figures 4 and 6).

Wet and boggy meadows, marshes. — West. Siberia: Irt., Alt.; East. Siberia: Yenis., Ang.-Sayan., Daur., Len.-Kol.; Centr. Asia: Dzhung., Tarb., Pribalkh. (n.e.), Syr-Dar., Tyan'-Shan. (s. part), Pam.-Al. (s.-w. part). Gen. distr.: Northern and Western Mongolia. Described from Altai (Charysh River valley). Type in Leningrad.

87. *C. similigena* V. Krecz. sp. nova in Addenda, II, 596.

Perennial, loosely caespitose plants, with creeping, ligneous rhizome; culms filiform, flattened-triangular, subflexuous, scabrous above, 15-30 cm tall; leaves narrow (to 1.5-2 mm broad), setaceous-involute, long-subulate-tipped, flexuous, about as long as the culm, scabrous above; spikelets few-flowered, 2-6, arranged in a narrow inflorescence, this interrupted below, 0.7-1.6 mm long; scales ovate, acute, ferruginous to ferruginous-yellow, broadly hyaline-margined; perigynia oblong-ovoid, to ellipsoid, 3-3.5 mm long, plano-convex, obscurely 4-6-nerved below on the back, more or less rounded-cuneate at base, short-stipitate, gradually tapering into a beak, this smooth or barely scaberulous at base, honey-colored, ferruginous at summit. Fr. July. (Plate XIII, Figure 5).

Mountain river beds. — Centr. Asia: Tyan'-Shan., e. part. Endemic. Described from Karakol'skii District (Konyrten valley). Type in Leningrad.

Cycle 2. *Heleochoorda* V. Krecz. — *Chordorrhiza* Ehrh. Beitr. IV (1789) 148 (nomen). — Bog plants with long cord-like, faintly triangular hollow, smooth; perigynia thick-coriaceous, ovoid, ribbed on the margin, unequally biconvex (more bulging in front), on a broad spongy stipe, nerved, abruptly contracted into a smooth, cylindrical, obliquely truncate, hyaline-margined beak; achene unequally lenticular.

193 88. *C. chordorrhiza* Ehrh. ex L. fil. Suppl. (1781) 414; Trev. in Ldb. Fl. Ross. IV, 271. — Exs.: HFR No. 493; Kneuck. no. 5 et 5-a.

Perennial plants with extensively creeping, flagellate, obliquely ascending rhizome, giving rise to segregated, solitary culms or sterile shoots; culms more or less hollow, terete-flattened, smooth, 15-30 cm tall,

covered at base with long brown sheaths, these bladeless or bearing an abbreviated blade; cauline leaves subplane-canalicate, to 2-2.5(3) mm broad, short, leaves of sterile shoots many times longer; spikelets 3-5, aggregated in a dense, compact, ovoid or triangular head 0.8-2 cm long; scales ovate, acute, ferruginous, about equaling the perigynia; perigynia thick-coriaceous, ovoid to ellipsoid, 3.5-4 mm long, unequally biconvex, spongy at base, 10-15-nerved on the back, 5-8-nerved on the inner face, obsoletely margined above, abruptly contracted into a short, smooth, cylindrical, unequally hyaline-tipped beak. Fr. June-July. (Plate XIII, Figure 9).

Mossy swamps. —Arctic: Arct. Eur. and Sib., Chuk., Anad.; European part: Kar.-Lap., Dv.-Pech., Lad.-Il'm., Upp. Dnepr., Mid. Dnepr. (n. part), Upp. Volg., Volg.-Don. (n. part), Volg.-Kam; West. Siberia: Ob., Upp. Tob. (n.), Irt., Alt.; East. Siberia: Yenis., Ang.-Sayan., Daur (rarely), Len.-Kol; Far East: Ze.-Bur., Ud., Okhot., Sakh. Kamch. Gen. distr.: Northern Europe, North America. Described from Sweden (Uppsala).

ECONOMIC IMPORTANCE: Eaten by deer in southern parts of the tundra.

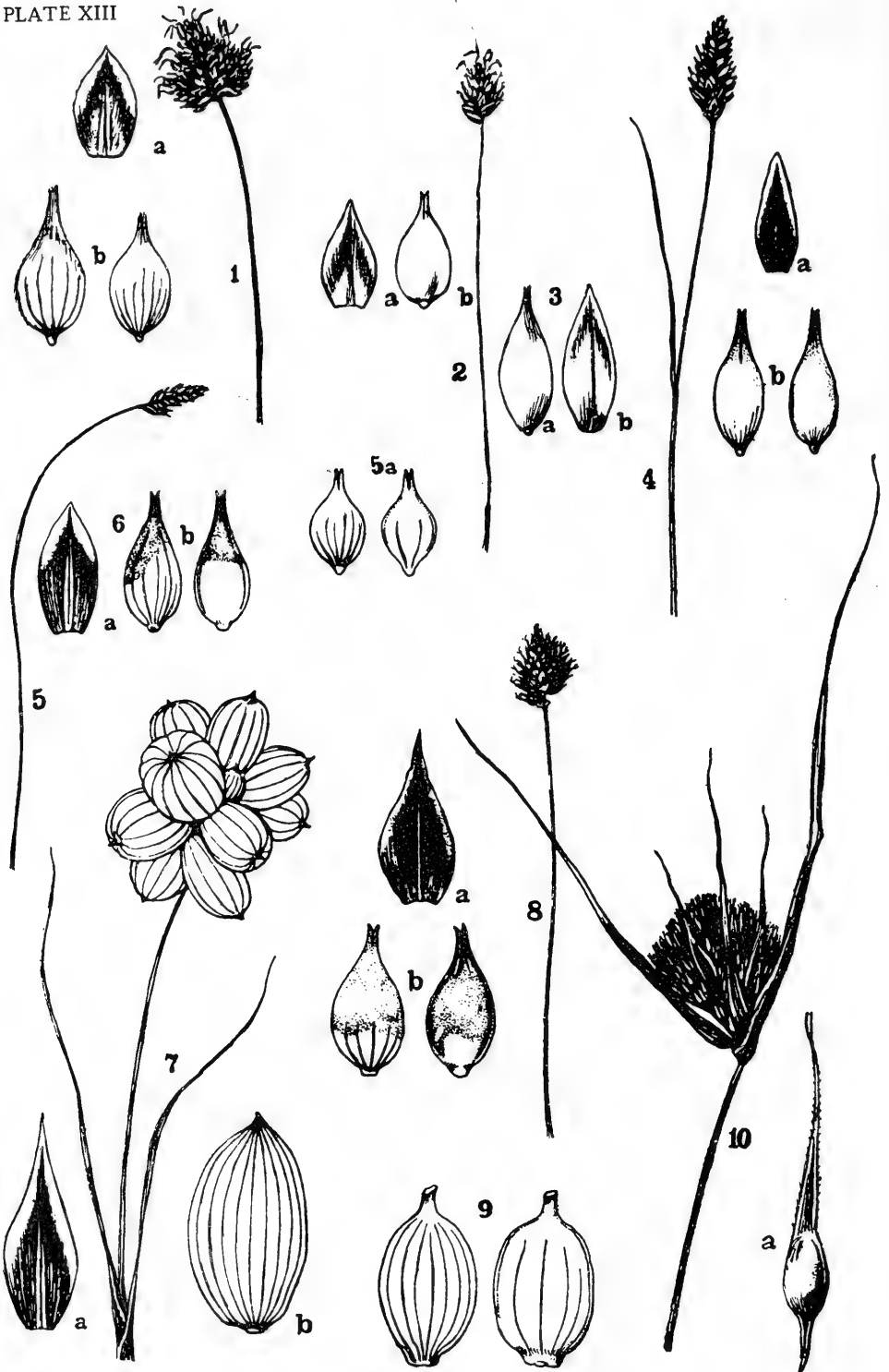
Cycle 3. *Xerochorda* V. Krecz. —Semixerophytic plants with short rhizome producing long underground shoots terminating in compact clusters of culms and leaves which form compact tufts; culms faintly triangular, firm, smooth. Perigynia firmly adnate to rachilla, membranaceous or thin-coriaceous, biconvex, slenderly nerved or nerveless, with a smooth, obsoletely bidentulate beak. Achenes lenticular.

89. *C. physodes* M.B. in Mém. Soc. Nat. Moscou, II (1809) 104, tab. 7; Trev. in Ldb. Fl. Ross. IV, 274. —Exs.: HFR No. 1442, 1443 and 1444; Kneuck. No. 4 and 91.

Perennial, cineraceous-green, rather lax plants, with a slender ascending rhizome producing long offshoots; culms obtusely angled, smooth, the loose, broad, light ferruginous old basal sheaths forming a tall conical envelope around the culm; leaves folded, reflexed or flexuous, nearly smooth, shorter than the culm; spikelets 3-7, disposed in an oblong head, this to 2 cm long, often interrupted, with a short bract at base; scales lanceolate, acute, ferruginous, light-keeled, broadly and unequally hyaline-margined; perigynia initially plano-convex, scaberulous at the summit, at length strongly inflated, bladder-like, to 2 cm long, reddish-brown, nerved abruptly contracted into a short, smooth, cylindrical, hyaline-tipped beak. Fr. April-July. (Plate XIII, Figure 7).

Desert sands. —European part: Low. Volg. (Ryn sands); Centr. Asia: Aral.-Casp., Kara-Kum, Amu-Dar. and Syr-Dar. Pribalkh. Gen. distr.: Eastern Persia, Afghanistan. Described from the area between Volga and Ural. Type in Leningrad.

ECONOMIC IMPORTANCE: The best forage plant of pastures on desert sands. Lean stock improves quickly on this forage. Very readily eaten to the end of flowering by sheep and goats, less readily by other kinds of livestock. Eaten by sheep and goats also in wilted state. Recovers well in spring after grazing. Yields 2-4 centners per hectare of green herbage and 1-2 centners of dry forage. According to the results of experiments conducted by the Turkmenian Forage Institute and the Katta-Kurgan Experiment Station, the hay contains, at flowering time 10-12% protein, 25-28% crude cellulose, 4-5% digestible protein; starch equivalent 40-45. Fresh



herbage at flowering contains 3-4% crude protein and 10-11% cellulose. This is one of the pioneering plants on wind-blown sands, and plays an important role in consolidating sands and turning them into productive areas.

90. *C. pachystylis* Gay in Ann. Sc. Nat., 2 sér., X (1838) 301; V. Krecz. in Fl. Turkm. I, 2 (1932) 228, tab. 92. — *C. desertorum* Litw. in Trav. Mus. Bot. St. Pétersb. I (1902) 19. — *C. stenophylla* var. *desertorum* Litw. in Allg. Bot. Zeit. V. Beih. I (1899) 56; Beih. Kük. in Engl. Pflzr. IV, 20 (1909) 122; Grossh. Fl. Kavk. I (1928) 159. — *C. glomerata* Litw. in Trav. Mus. Bot. St. Petersburg. VII (1910) 83, non Host. — *C. Hostii* Litw., ib. XV (1916) 120, non Schkuhr. — *C. stenophylla* var. *pachystylis* Kük., ib., 121, ex p. — Exs.: Kneuck. No. 153; HFR No. 1441.

Perennial plants; rhizome slender, creeping, covered with fibers, giving rise to discrete clusters forming loose tufts; culms obscurely triangular, mostly smooth, 7-30 cm tall, covered to considerable height with castaneous-brown, loose, split-fibrillose basal sheaths; leaves rather soft, flat to subinvolute, 1-2 mm broad, shorter than the culm, somewhat crisp, scabrous; spikelets 4-6, aggregated in a compact, rhomboid or triangular-ovoid head 0.8-2 cm long and 0.7-1 cm broad; scales ferruginous-brown or castaneous throughout, ovate, acute, about as long as the perigynia; perigynia rounded-ovoid to ellipsoid, 4-5.5 mm long, round-based, short-stipitate, obscurely nerved or nerveless, rather abruptly contracted into a smooth (or slightly scabrous at base), bidentate, dorsally cleft beak, castaneous at the summit. Fr. April-June. (Plate VIII, Figure 8).

198 Loess and clay semideserts and foothills up to 1,500-2,000 m. — Centr. Asia: Dzhung.-Tarb. (s.), Pribalkh. (submont.), Kyz.-Kum. (Bukan Mountains), Tyan'-Shan., Pam.-Al., Syr. Dar., Amu-Dar., Mount. Turkm.; Caucasus: South. Transcauc. Gen. distr.: Kul'dzha, Afghanistan, Persia, eastern Turkey and Syria, and northern Egypt. Described from northern Persia. Type in Leningrad.

ECONOMIC IMPORTANCE: Basis of sown pastures. An excellent forage plant, comparing favorably with best grasses in nutritive value, readily eaten by all kinds of livestock, both in pasture and in the form of hay. Dries off by the end of May, but sprouts again in fall, if warm weather sets in. In years with ample rain-fall it develops so profusely that cutting for hay becomes possible. Beside a low cellulose content (13.28%) it gives 16.2% protein 2.18% fats and 59.94% nitrogen-free extractable substances.

Explanation to Plate XIII

1. *C. pseudo-foetida* Kük.: a) perigynium, b) scale. — 2. *C. sajanensis* V. Krecz.: a) scale, b) perigynium. — 3. *C. reptabunda* (Trautv.) V. Krecz.: a) perigynium, b) scale. — 4 and 6. *C. enervis* C. A. M.: a) scale, b) perigynium. — 5. *C. similigena* V. Krecz.: a) perigynium. — 7. *C. physodes* M. B.: a) scale, b) perigynium. — 8. *C. pachystylis* Gay: a) scale, b) perigynium. — 9. *C. chordorrhiza* Ehrh.: perigynium. — 10. *C. cyperoides* Murr.: a) perigynium.

NOTE: According to observations by M. G. Popov, in the area of convergence of the sand and the clay desert it forms hybrids with the preceding species (*C. subphysodes* M. Pop.).

Section 13. *Psyllophora* (Ehrh.) V. Krecz. —Ehrh. ex Heuff. in *Flora XXVII* (1844) 528 (pro genere); Ehrh. *Beitr.* IV (1789) 146 (nomen); Schur, *En. pl. Trans.* (1866) 696; Boern. in *Abh. Naturw. Ver. Bremen*, XXI, (1913) 264 (pro genere). —Cespitose plants; culms smooth, obtusely angled. Spikelets solitary, terminal, androgynous, segregated; perigynia oblong-ellipsoid, biconvex, nerveless, coriaceous, smooth, at maturity reflexed. Perigynia deciduous in fruit. Style long, mostly included in the perigynium; stigmas 2. Achene with a short, setaceous appendage of rachilla at base.

**C. pulicaris* L. *Sp. pl.* (1753) 972; Trev. in *Ldb. Fl. Ross.* IV, 265. —*Psyllophora vulgaris* Heuff. in *Flora*, XXVII (1844) 528. — *P. pulicaris* Schur., *Enum. pl. Trans.* (1866) 673. —Exs.: *Pl. Finl. Exs.* No. 101.

Perennial, loosely cespitose plants; culms 8-35 cm tall; leaves filiform, scabrous above; spikelets 1.5-2.5 cm long, their staminate part narrow, fusiform, the pistillate part loose, containing 5-13 reflexed perigynia; perigynia deciduous in fruit, oblong-ovoid, ferruginous, subobtuse, hyaline-margined; perigynia oblong-ellipsoid to lanceolate, 4.5-5.5 mm long, brownish-green, becoming blackish-brown, lustrous, biconvex, smooth. (Plate XIV, Figure 9).

201 Boggy meadows. —There are dubious records and collections relating to Mogilev and Lake Ladoga. Possibly in Lad. -Il'm. (w. part). Gen. distr.: West. Europe, Baltic seaboard, Poland. Described from Europe.

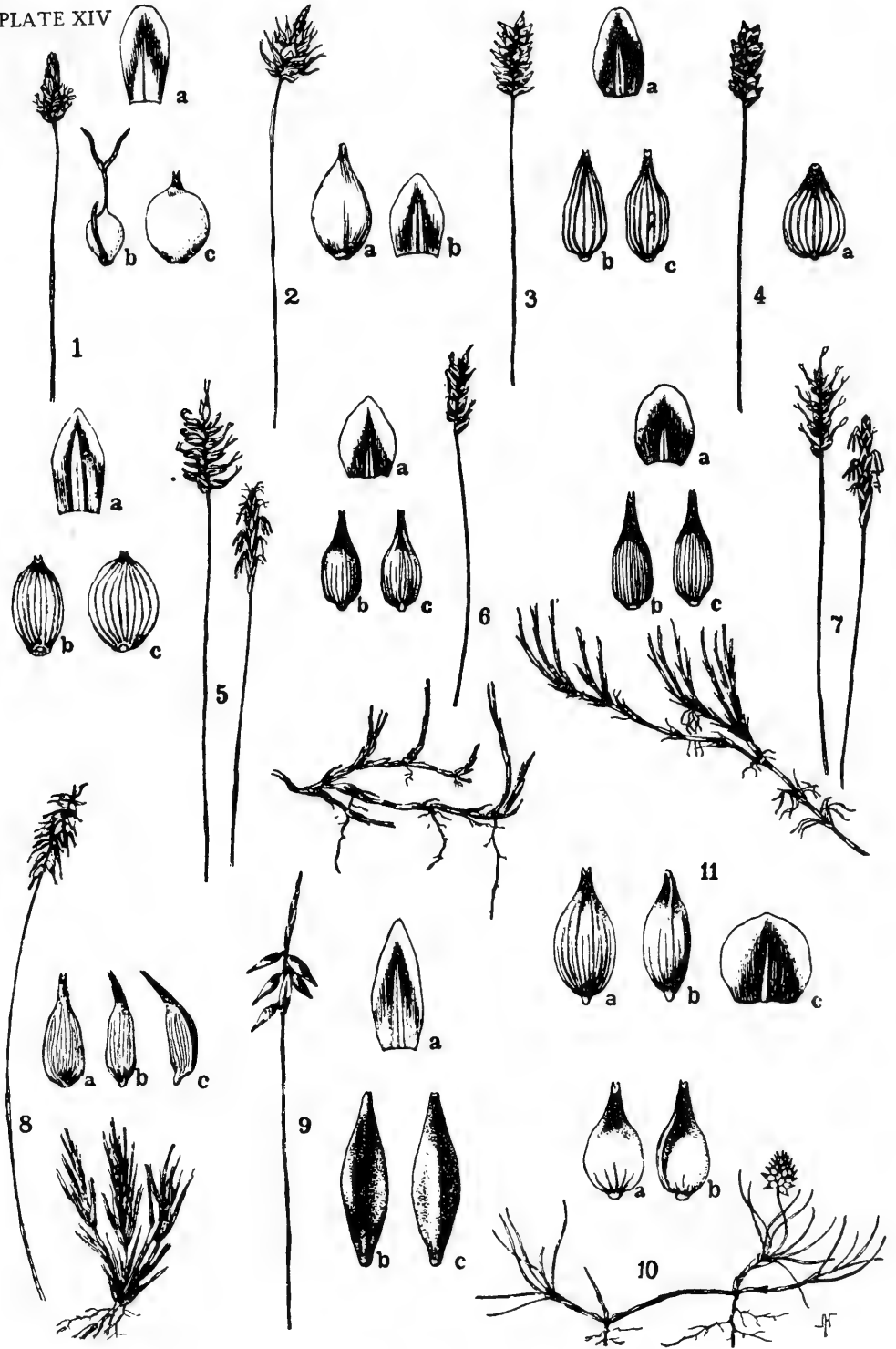
Subgenus III. *Eucarex* Coss. et Germ. *Fl. Paris.* (1845) 744. — *Tristimides* Rafin. *Amenit. of Nat.* (1840) 24, pro max. parte.

Monoecious or dioecious plants. Spikelets solitary or numerous, unisexual: the terminal spikelets staminate, the others pistillate, or the terminal spikelets gynecandrous and (rarely) androgynous, the others pistillate. Globoid, ovoid, or mostly oblong to cylindrical, sessile or, mostly, on more or less developed stipes (especially toward the base), aggregated in heads or segregated in a simple, very rarely somewhat forking, inflorescence; spikelets solitary, sometimes in 2's-5's. Perigynia trigonous, convex or inflated; achene trigonous, more rarely plano-convex. Stigmas 3, more rarely 2.

Section 14. *Leimonastes* Rchb. *Fl. saxon.* (1842) 45. —*Carex* L. (s. str.) *Sp. pl.* (1753) 972. —*Ulvæ* Adans. *Fam. pl.* II (1763) 496. — *Osculisa* Rafin. *Amenit. of Nat.* I (1840) 27. —*Limivasculum* Boern.

Explanation to Plate XIV

1. *Carex oreophila* C. A. M.: a) perigynium, b) achene with appendage of rachilla, c) perigynium. —
2. *C. capitata* L.: a) perigynium, b) scale. — 3 and 4a. *C. dioica* L. a) scale, b), c) perigynium. —
5. *C. gynocrates* Wormskj.: a) scale, b) perigynium. — 6. *C. parallela* Laest.: a) scale, b), c) perigynium. — 7. *C. Redowskiana* C. A. M. a) scale, c) perigynium. — 8. *C. Davalliana* Sm.: a), b), c) perigynium. — 9. *C. pulicaris* L.: a) scale, b), c) perigynium. — 10. *C. setina* (Christ) V. Krecz.: a), b) perigynium. — 11. *C. Maritima* Gunn.: a), b) perigynium, c) scale.



in Abhandl. Naturw. Ver. Bremen, XXI (1913) 268, ex p. —Vignantha Schur, En. pl. Trans. (1866) 705, ex p. (omnia pro genere). —Paludose plants, with triangular culms and linear leaves; rhizome creeping or short-branched and then giving rise to tussocks or dense tufts, stoloniferous or without stolons; lower sheaths mostly bladeless (Plate XV, Figure 1) or transitional toward leaf-bearing. Inflorescence of 2-7(10) oblong spikelets, of these 1-3 terminal ones staminate, the others pistillate. Spikelets sessile, or the lower ones more or less distinctly stipitate, but all erect (rarely drooping). Bract more or less developed, or else obsolescent. Scales 1-nerved, mostly equaling the perigynia or shorter. Perigynia mostly ovoid, plano-convex or biconvex, 2-3.5 mm long, nerved or nerveless, distinctly ribbed on the margin, with a short, truncate or slightly emarginate beak. Stigmas 2.

1. All spikelets gynecandrous, i. e. pistillate flowers above and staminate at base, or at any rate, if there are terminal staminate flowers, all spikelets are essentially fertile128. *C. eleusinoides* Turcz.
- + Terminal 1-3 spikelets staminate, the others pistillate.2.
2. Culms smooth3.
- + Culms scabrous5.
3. Perigynia weakly nerved; culms acutely angled
- 126. *C. Uzoni* Kom.
- + Perigynia nerveless; culms obtusely angled. 4.
4. Cineraceous green plants; culms 50-100 cm tall; leaves rather strongly scabrous. Spikelets narrowly cylindric, 4-6 cm long; perigynia obtuse, much narrower and shorter than perigynia; perigynia 2.5-2.8 mm long, yellowish-green or stramineous
- 202 125. *C. aquatilis* Whlb.
- + Plants light (or yellowish) green; culms 10-60 cm tall; leaves rather smooth, conduplicate, of spongy consistency. Spikelets clavate, 1-3 cm long; perigynia subacute, as long and broad as perigynia, or longer; perigynia 2-2.3 mm long, brownish . . . 127. *C. stans* Drej.
5. Perigynia nerveless 6.
- + Perigynia nerved 25.
6. Plants with rather developed foliaceous lower bracts, these as long or slightly shorter than the inflorescence 7.
- + Plants with weakly developed, short setaceous bracts, these barely equaling their spikelets 10.
7. A large plant with broad (5-8 mm) leaves and strongly reticulate-fibrillose, reddish-brown, keeled lower sheaths (Plate XV, Figure 1) 101. *C. Buekii* Wimm.
- + Smaller plants with leaves 2-3(4) mm broad and weakly fibrillose or entire, weakly keeled lower sheaths 8.
8. Perigynia with scattered bristles on upper margin; lower sheaths castaneous-brown, weakly fibrillose 9.
- + Perigynia smooth; lower sheaths reddish or dark purple, entire 115. *C. aperta* Boott.
- (see also for Centr. Asia—100, *C. Knorringiae* Kük.).
9. Perigynia rounded-ovoid, inflated-biconvex, with an entire beak; scales mostly acutish, overtopping the perigynia, light brown; spikelets rather loose, cylindric, to 4 cm long (East. Siberia)
- 113. *C. Schmidtii* Meensch.

- + Perigynia ellipsoid or ovoid, flat or biconvex (but not inflated), with an emarginate beak; perigynia obtusish, shorter than perigynia, dark brown; spikelets ovoid, rather dense, to 2 cm long (Kamchatka) 114. *C. lineolata* Cham.
10. (6). Plants with creeping rhizome, stoloniferous (Plate XV, Figure 3) 11.
 + Plants with short branching rhizome, not stoloniferous, forming tussocks or dense tufts (Plate XV, Figure 4). 20.
11. Perigynia broadly ovoid to suborbicular 12.
 + Perigynia ovoid, obovate, or ellipsoid 14.
12. Perigynia 2.5-3 mm long, strongly biconvex, forming dense spikelets with horizontally spreading, imbricate perigynia; spikelets shorter than perigynia and 1/3-1/2 as broad 13.
 + Perigynia 1.8-2.3 mm long, in narrow and loose, sometimes pendulous spikelets, segregated; scales mostly longer than perigynia, nearly as broad (East. Siberia) 122. *C. rigidoides* Gorodk.
- 203 13. Leaves 3-5 mm broad, abruptly pointed, with brown or reddish-brown lower sheaths. Spikelets oblong, the staminate to 2 cm long, the pistillate 0.5-1.5 mm long; bract not exceeding the spikelet; scales obtuse 116. *C. orbicularis* Boott.
 + Leaves 2.5-3 mm broad, gradually tapering to a point, with reddish-brown to castaneous lower sheaths. Spikelets cylindric, 1-4 cm long, long-stipitate; bracts nearly twice as long as their spikelets; scales acute 117. *C. arctica* Meinsh.
14. Lower sheaths keeled, slightly fibrillose, bladeless; perigynia grayish-green (plants of the *C. caespitosa* type, but loosely caespitose, growing on plains in forests). 109. *C. inumbrata* V. Krecz.
 + Lower sheaths weakly keeled, not fibrillose and mostly blade-bearing; perigynia brown (mountain plants of the *C. rigida* type) 15.
15. Perigynia 2 mm long; scales longer than perigynia, subacute . . . 16.
 + Perigynia 2.5-3.5 mm long; scales shorter than perigynia, obtuse 17.
16. Staminate spikelets light ferruginous, pale (as compared with the dark pistillate spikelets); lower sheaths brown to castaneous-brown (Tien Shan) 123. *C. taldycola* Meinsh.
 + Staminate spikelets only slightly lighter than the pistillate, nearly of the same color; sheaths reddish-brown (Caucasus) 124. *C. Kotschyana* Boiss. et Hohen.
17. Leaves flat or only slightly turned back at the margins, abruptly pointed, green or dark green 18.
 + Leaves strongly turned back at the margins, rather long-acuminate, cineraceous-green 19.
18. Leaves 3-6(7) mm broad, entirely flat; lower sheaths purple (cherry-colored) or blackish-purple; perigynia ovoid, 3 mm long 121. *C. altaica* Gorodk.
 + Leaves 2.5-4 mm broad, more or less turned back at the margins; lower sheaths castaneous-brown; perigynia obovate, often broadly ovoid, 2.5 mm long 120. *C. ensifolia* Turcz.
19. Culms slender, 10-35 cm tall; leaves equaling the culm; bract obsolete; spikelets rather dense, 0.6-2 cm long. Perigynia obovate or ellipsoid 118. *C. hyperborea* Drej.

- + Culms stout, 40-60 cm tall; leaves shorter than the culm; bract equaling the spikelet; spikelets oblong, not dense, 1.5-3 cm long. Perigynia ellipsoid to ovoid, 3.5 mm long. 119. *C. kamtschatica* Gorodk.
- 20. (10). Cineraceous-green, rigid, large plants, 50-100 cm tall; leaves keeled, canaliculate below, 3-6 mm broad; lower sheaths lustrous, creamy or light brown. Spikelets cylindric, 3-5 cm long, usually 5 in number. 106. *C. omskiana* Meinsh.
- 204 + Light or bright green, rarely cineraceous-green plants, smaller (30-60 cm tall), with slender stems and flat narrow (2-3 mm broad) leaves. Spikelets short-cylindric or oblong, 1-3(4) cm long, usually 3 in number. 21.
- 21. Lower sheaths keeled, short, more or less reticulate-fibrillose, cherry-colored or red. 22.
 - + Lower sheaths weakly keeled (rounded), long, slightly fibrillose, brown to castaneous-brown. 24.
- 22. Spikelets 3-4 cm long, rather loose, drooping; perigynia 3 mm long, ellipsoid, biconvex, grayish-yellow, gradually attenuate to a somewhat elongated beak (Plate XV, Figure 8). 110. *C. retorta* (Fries) V. Krecz.
 - + Spikelets 2-2.5 cm long, rather dense, erect; perigynia 2-2.5 mm long, subplano-convex, yellowish-green or brownish-green (Plate XV, Figure 6) 23.
- 23. Lower sheaths dark purple (cherry-colored), rather strongly splitting-fibrillose; perigynium-beak pale 107. *C. caespitosa* L.
 - + Lower sheaths brightly sanguine, weakly fibrillose; perigynium-beak purple at the summit. 108. *C. rubra* Lévl. et Vant.
- 24. Perigynia 1.8-2.2 mm long, lead-colored; spikelets narrow, loosish, 2-3 mm broad; lower sheaths castaneous-brown. 112. *C. minuta* Franch.
 - + Perigynia 2-2.5 mm long, yellowish- to blackish-brown; spikelets 3-5 mm broad, dense; lower sheaths yellowish-brown to light brown 111. *C. Soczavaeana* Gorodk.
- 25. (5). Rhizome short-creeping, tussock-forming; stolons wanting (Table XV, Figure 4) 26.
 - + Rhizome creeping; loosely or densely cespitose plants, sometimes tussock-forming, always stoloniferous (Plate XV, Figure 3) 28.
- 26. A robust plant, to 100-150 cm tall; leaves keeled below, canaliculate, recurved at the margins, 3-5 mm broad; sheaths lustrous, honey-colored; perigynia 3.5-4 mm long, glaucous or brownish-green, with light marginal ribs, nerved. 105. *C. elata* Bell.
 - + Less vigorous plants; leaves 1-2.5 mm broad; sheaths castaneous or purple; perigynia 2-3(3.5) mm long, yellowish-brown or green, with nerves of same color as perigynia. 27.
- 27. Plants 30-50 cm tall; leaves strongly involute, 1-1.5 mm broad, with castaneous or purplish-brown lower sheaths. Spikelets 0.6-2 cm long; perigynia 2-2.5 mm long, biconvex, yellowish-brown, 5-6-nerved 94. *C. wiluica* Meinsh.

- 205 + Plants to 100 cm tall; leaves subplane (with scarcely revolute margins), 2-2.5 mm broad; lower sheaths reddish-brown. Spikelets to 4-7 cm long; perigynia 2.5-3.5 mm long, plano-convex, pale green, 8-10-nerved 103. *C. appendiculata* (Trautv.) Kük.
28. Perigynia oblong-ellipsoid, 5 mm long, 2-3 times as long as perigynia; spikelets dark-colored, abbreviated, 0.5-1 cm long (Plate XV, Figure 5) 104. *C. descendens* Kük.
 + Perigynia ovoid or ellipsoid, 2-3.5(4) mm long, barely longer than the scales, as long, or shorter; spikelets many-flowered, (1)2-10 cm long 29.
29. Plants with phyllopoies, i. e. the lower sheaths prolonged into leaf-blades (Plate XV, Figure 2) 39.
 + Aphyllopodious plants, i. e. the lower sheaths long-scalelike, point-tipped, bladeless (Plate XV, Figure 1) 32.
30. Leaves revolute-margined, 3-8 mm broad. Large plants, to 100-150 cm tall 31.
 + Leaves involute-margined, 2-3 mm broad. Small plants, 10-50 cm tall 91. *C. acuta* L.
31. Densely-cespitose (tussock-forming) plants; leaves cineraceous-green, narrow, 3-4 mm broad. Perigynia 2.5-2.8 mm long, ellipsoid, rather gradually attenuate to a short beak 95. *C. proluxa* Fries.
 + Loosely cespitose plants (not tussocky); leaves green, 4-8 mm broad. Perigynia 3 mm long, ovoid, rounded at the summit, abruptly contracted into a short beak 96. *C. gracilis* Curt. (see also, for Central Asia—100. *C. Knorringiae* Kük.).
32. Robust plants, to 100-150 cm tall, with leaves to 10 mm broad; spikelets 4-10, cylindric, 5-8 cm long; leaves with revolute margins 33.
 + Smaller plants, 15-70 cm tall, with leaves to 2-3 mm broad; spikelets 3-5, oblong, 0.5-3 cm long; leaves with upturned margins 39.
33. Perigynia very obscurely nerved (almost nerveless), 2-2.3 mm long. Lower sheaths strongly reticulate-split; leaves 5-8 mm broad. 101. *C. Buekii* Wimm.
 + Perigynia distinctly nerved, (2)2.5-3.5(4) mm long; lower sheaths weakly fibrillose; leaves 3-4 mm broad 34.
34. Perigynia biconvex or inflated, (2)2.5-3(3.2) mm long, with 3-7 distinct, but not raised, nerves. 35.
 + Perigynia plano-convex or concavo-convex, 3-3.5 mm long, with 8-10 raised nerves 37.
35. Culms scaberulous; scales of pistillate spikelets thickened at the summit; staminate spikelets prominently 2-flowered, variegated, enlarged (Caucasus). 97. *C. dichroandra* V. Krecz.
 + Culms scabrous; scales of pistillate spikelets not thickened at the summit; staminate spikelets narrow, 1-flowered 36.
36. Subcespitose, glaucous-gray plants, 15-40 cm tall; cauline sheaths and leaf-bases dove-colored to cinereous. Pistillate spikelets abbreviated, dense, to 3 cm long; perigynia ellipsoid-ovoid, plano-convex glaucescent, 2-2.5 mm long longer than scales (Dauriya) 99. *C. erawinensis* Korot.

- + Loosely cespitose, cineraceous-green, more robust plants, to 100 cm tall. Pistillate spikelets 3-8 cm long, rather loose; perigynia broadly ovoid or broadly obovate, biconvex, ferruginous-green, 2.5-3.2 mm long, shorter than the unguiform scales 98. *C. fusco-vaginata* Kük.
- 37. Perigynia broadly ovoid, dorsally convex, concave on the inner face, with thickened nerves (Sakhalin) **C. semiplena* Kük.
- + Perigynia ellipsoid, plano-convex, with slender nerves. 38.
- 38. Scales of pistillate spikelets ferruginous-brown, with a white hyaline appendage at the tip; scales dark, corrugated. Leaves 2-2.5 mm broad, cineraceous-green; lower sheaths reddish-brown. (East. Siberia) 103. *C. appendiculata* (Trautv.) Kük.
- + Scales of pistillate spikelets without appendage, light ferruginous; spikelets greenish or light ferruginous. Leaves 3-4 mm broad, bright green; lower sheaths light brown (?). (Low. Volga). 102. *C. sareptana* V. Krecz.
- 39. (32). Tussock-forming plants; the brown to light brown, lustrous basal sheaths covering the culm to a considerable height; leaves long, strongly involute, 1-1.5 mm broad. 93. *C. juncella* Fries. †
- + Not forming tussocks; leaves subplane, to 2-3 mm broad. 40.
- 40. Lower sheaths lustrous, dark purple (Caucasus) 92. *C. dacica* Heuff.
- + Lower sheaths dull, brown to light brown. 91. *C. acuta* L.

Cycle 1. *Vulgata* V. Krecz. —Cineraceous-green plants, 20-70 cm tall, with firm culms; leaves with uprolled margins, long-acuminate, narrow (1-3 mm broad). Loosely or densely cespitose plants, stoloniferous 207 or without stolons; lower sheaths mixed (bladeless and blade-bearing). Inflorescence of 3-5 short-cylindric spikelet (to 3 cm long); lowest bract equaling or exceeding the inflorescence. Scales ovate, obtuse shorter than the perigynia. Perigynia ovoid or ellipsoid, plano-convex, 2-3 mm long, few-nerved.

91. *C. acuta* L. Sp. pl. (1753) 978 (quoad var. α). —*C. fusca* Bell. ex All. Fl. pedem. II (1785) 269. —*C. Goodenoughii* Gay (err. "Goodenowii") in Ann. Sc. Nat., 2 sér., IX (1839) 191; Kük. in Engl. Pflzr. IV, 20 (1909) 313 et in Journ. Russ. Bot. 3-6 (1911) 84. —*C. vulgaris* Fries, Nov. Fl. Suec. Mant. III (1842) 153; Trev. in Ldb. Fl. Ross. IV, 311. — *C. vulgaris* α communis Meinsh. in A.H.P. XVIII, 3 (1901) 334. — Ic.: Syr. III. Fl. Mosk. Gub. I, 201. —Exs.: Kneuck. No. 259; HFR No. 1540, 1541, 1542.

Perennial, cineraceous-green, cespitose plants, with rather long stolons; culms erect or arched, scabrous at the summit, 10-50 cm tall, covered at base with light or dark-brown, blade-bearing (often also bladeless) sheaths; leaves flat, with more or less uprolled margins, 2-3 mm broad, shorter than the culm. Spikelets 3-5, subapproximate, the terminal 1-2 staminate, oblong or clavate, to 2 cm long, with obovate, scales; others pistillate, ovate to oblong, 1-2 cm long, dense, erect, sessile, only the lowest spikelet occasionally short-peduncled (sometimes peduncle long and spikelets

† Easily confounded with *C. wiliuca* which, however, has tall blackish-purple sheaths.

drawn toward the base of culm), the staminate flowers often at the summit; lowest bract equaling the inflorescence; scales oblong-ovate, obtuse to subacute, dark brown, with a light median band, shorter than perigynia (sometimes less than half as long, hence spikelets appearing green throughout); perigynia ovoid to broadly ovoid, plano-convex, 2.5-3 mm long, 5-8-nerved, the nerves conspicuous on the back and less distinct on the inner face, green, becoming ferruginous or brown, short-stipitate, the back truncate, obsolescent, brownish at the mouth. Fr. May-August. (Plate XV, Figure 7).

Meadows, wet places (both grassy and sandy). —European part: Ubiquitous; West. Siberia: Ob., Upp. Tob., Irt., Alt. ?; East. Siberia: Ang., Sayan. ? Gen. distr.: Western Europe. Described from Northern Europe.

NOTE: Forming hybrids: \times *aquaticus* Whlb.; \times *gracilis* Curt. (*C. elytroides* Fries and *C. praticola* Kük.); \times *caespitosa* L. (*C. peraffinis* App. = ? *C. sororia* Meinsh. Fl. ingr., p. 404, non Kunth.); \times *elata* Bell. (*C. Coukae* Podp.); \times *omskiana* Meinsh.; \times *Buekii* Wimm. (*C. ligniciensis* Fig.).

92. *C. dacica* Heuff. in Flora, XVIII (1835) 247 et in Linnaea, XXXI (1861) 728, tab. IV, fig. 1. —*C. caespitosa* Boiss. Fl. Or. V (1884) 420, non L. —*C. rigida* var. *dacica* Kük. in Engl. Pflzr. IV, 20 (1909) 302. —*C. Goodenoughii* et *C. caespitosa* Grossh. Fl. Kavk. I (1928) 164, p.p., non Gay et L.

208 Perennial, cineraceous-green, rather rigid plants, with short rhizome, with underground offshoots, forming loose tufts; culms rather slender, somewhat arched, scabrous, 15-50 cm tall; leaves linear, 1.5-2 mm broad, flat, with slightly upturned margins, long-acuminate, shorter than the culm; lower sheaths dark purple, lustrous; spikelets 3-4, the terminal spikelet clavate or fusiform, staminate, the others pistillate, pedunculate (peduncle of lowest spikelet to 0.5-0.8 cm long), oblong, 0.5-1.5 cm long, rather dense, loosish below, subdistant; lowest bract nearly reaching the top of inflorescence; scales ovate, obtuse, blackish-purple throughout or with a light midrib and margin, slightly shorter and narrower than the perigynia; perigynia ovoid, 2.5 mm long, blackish-brown at the summit, with few faint nerves, abruptly contracted into a short, smooth, cylindric beak. Fr. July.

Meadows in alpine and subalpine zone (2,000-2,700 m). —Caucasus: Ciscauc., Dag., West. Transcauc., East. Transcauc. (w. part), South. Transcauc. —Gen. distr.: Carpathians, Banat, Balkans, Asia Minor. Described from Banat (Sarko Alps).

NOTE: Readily eaten by cattle (after report of E. A. Bush).

93. *C. juncella* Fries in Bot. Notis. (1857) 105. —*C. vulgaris* ssp. *juncella* Fries in Bot. Notis. (1843) 105; Meinsh. in A. H. P. XVIII, 3 (1901) 334. —*C. vulgaris* var. *juncea* Fries, Nov. Fl. Suec. Mant. III (1842) 154. —*C. Goodenoughii* var. *juncea* Aschers. et Gr. in Syn. II, 2 (1902) 97; Kük. in Engl. Pflzr. IV, 20 (1909) 317. —Exs.: Kneuck. No. 261.

Perennial, cineraceous-green, rather densely caespitose, tussock-forming, stoloniferous plants; culms slender, scabrous, 20-80 cm tall, covered to considerable height with brown to castaneous, lustrous, bladeless basal sheaths; leaves narrowly linear, 1-1.5 mm broad, with rather strongly in-rolled margins, as long as the culm; spikelets 3-5, subapproximate, the

terminal 1-2 staminate, fusiform, with ferruginous scales; the remaining spikelets pistillate, rather narrowly cylindrical, 1-3 cm long, the lowest peduncled; lowest bract equaling or even exceeding the inflorescence; ences; scales ovate, obtuse to subacute, with a light midrib, shorter than the perigynia; perigynia subellipsoid, plano-convex, 2-2.5 mm long, light green at first, becoming yellowish-brown, with 3-5 slender nerves and a short truncate beak. Fr. June-August.

Peat bogs and peat meadows, tussocky thickets. —European part: Kar. -Lap., Lad. -Il'm., Upp. Volg., Upp. Dnepr., Mid. Dnepr., Volg. -Kam. (n. -e. and n. part), Volg.-Don. Gen. distr.: Centr. and North. Europe. Described from Sweden.

NOTE: Forming hybrids with *C. caespitosa* L.

94. *C. wiluica* Meinsh. ex Maack, Vilyuisk. okr. II (1886) 308, tab. I. B. —*C. Maackii* Meinsh. ex Baer et Helmers., Beitr. zur Kentn. russ. Reich. XXVI (1871) 226, non Maxim. —*C. kolymaeensis* Kük. in Finsk. Vetensk. Soc. Förh. XLV (1902-1903) 7.

- 209 Perennial, cineraceous-green, densely caespitose (tussock-forming) plants without stolons; culms slender, scabrous, 30-50 cm tall, covered at base to rather considerable height with reddish-brown or dark purple, bladeless, slightly reticulate-split sheaths; leaves long, 1-1.5(2) mm broad, as long as the culm, canaliculate-involute; spikelets 3-5, remote, the terminal spikelet staminate, oblong-linear, the others pistillate, 0.6-2 cm long, narrowly cylindrical to oblong-lanceolate, the lowest short-peduncled; the lowest bract longer than the spikelet, nearly equaling the inflorescence or shorter; scales oblong-lanceolate, subobtuse, mostly blackish-brown throughout, with a light midrib, narrower than the perigynia; perigynia ellipsoid to oblong-ovoid, 2-2.5(3) mm long, biconvex, yellowish-brown, 5-6-nerved, rather abruptly contracted into a short entire beak. Fr. June-August.

Wet meadows, bogs. —Arctic: Arct. Eur.; European part: Dv. -Pech., Volg.-Kam., Volg. -Don. (Karsunskii District—Staro-Zinov'evka), Zavolzh. (n. part); West. Siberia: Ob.; East. Siberia: Yenis., Ang. -Sayan., Daur. ? Len. -Kolym.; Far East: Kamch. Endemic. Described from Vilyui River (left bank, some 80 km from estuary). Type in Leningrad.

NOTE: A plant from the European part of the U.S.S.R. (Dv. -Pech.), stoloniferous and with sheaths barely reticulate at base, has been separated by B. N. Gorodkov into a distinct race *C. wiluica* ssp. *europaea* Gorodk. in Journ. Soc. Bot. Russ. VII (1922) 300. Specimens from Kamchatka have thickened leaves to 3 mm broad, and possibly they also represent a distinct race.

Cycle 2. *Acuta* V. Krecz. —Green and cineraceous-green, robust plants (to 100-150 cm tall), with firm, thickened culms and flat, 4-10 mm broad, revolute-margined leaves, stoloniferous; lower sheaths bladeless and blade-bearing (transitional). Inflorescence of 4-10 large cylindrical spikelets (to 5-10 cm long), the foliaceous lowest bract equaling or overtopping the inflorescence. Scales of pistillate spikelets narrow, oblong, usually acute. Perigynia (2)2.5-3.5(4) mm long, nerved, green, at length ferruginous or brown.

95. *C. proluxa* Fries, Novit. Fl. Suec. Mant. III (1842) 150. —*C. acuta* α *proluxa* Meinsh. in A. H. P. XVIII, 3 (1901) 335. —*C. strictifolia* Opiz apud Rchb. Ic. Fl. Germ. VIII (1846) 15. —*C. gracilis*

var. *strictifolia* Aschers. Fl. Brand. I (1864) 775.

Perennial, cineraceous-green, rather densely cespitose and tussock-forming plants; culms slender, acutely triangular, scabrous, nodding at the summit, 50-100 cm tall, covered at base with leaden-brown blade-bearing sheaths; leaves narrow, 3-4 mm broad, straight, flattened-canaliculate, with strongly revolute margins, shorter than the culm; spikelets 4-7, the terminal 1-2 staminate, narrow, 2-4 cm long, with linear-lanceolate, dark brown, subobtusate scales, the others pistillate, narrowly cylindrical-clavate, 4-8 cm long, rather loose, segregated below, usually 210 on long peduncles (these to 3 cm and longer), drooping; scales narrowly lanceolate, acute, with a light midrib, much narrower than the perigynia and exceeding them; perigynia ellipsoid to obovate, 2.5-2.8 mm long, weakly biconvex, yellowish or slightly ferruginous, with very faint nerves or nerveless (occasionally 1-2 nerves prominent), abruptly contracted at base into a short stipe, rather gradually tapering into a short, scarcely extended beak. Fr. June-July.

West meadows and bogs. —European part: Lad. -Il'm. Gen. distr.: Baltic seaboard, Scandinavia, Denmark. Described from Sweden (Uppsala).

96. *C. gracilis* Curt. Fl. Londin. IV (1777-87) 282, tab. 62; Kük. in Engl. Pflzr. IV, 20 (1909) 319, ex p. —*C. acuta* L. Sp. pl. (1753) 978 (quoad var β); Good. in Trans. Linn. Soc. II (1794) 203; Trev. in Ldb. Fl. Ross. IV, 313 (α et β); Meinsh. in A.H.P. XVIII, 3(1901) 335, ex p. —*C. striata* Gilib. Exerc. phytol. II (1792) 550. —Ic.: Syreish. III. Mosk. gub. I, 200. —Exs.: HFR No. 846; Pl. Finl. exs. No. 525, 526.

Perennial, green plants with long stout rhizomes; culms acutely angled, strongly scabrous, nodding at the summit, 30-150 cm tall, covered at base with blade-bearing reddish-brown sheaths; leaves flat, 5-8 mm broad, with downrolled margins when dry, equaling the culm; spikelets 4-10, the terminal 2-4 staminate, approximate, oblong, 2-6 cm long, with obovate, obtuse, dark brown scales, the others pistillate, cylindrical, rather loose, 3-10 cm long (0.6-0.8 cm broad), the lowest pedunculate, often long, drooping; lowest bract overtopping the inflorescence; scales lanceolate, acute, blackish-brown, with a white midrib, as long as, longer, or shorter, always narrower than the perigynia; perigynia obovate to ellipsoid, 3 mm long, biconvex, ferruginous or brownish, slenderly 5-6-nerved on both faces, abruptly contracted at base into a short stipe, rapidly attenuate above into a short beak. Fr. May-August.

Bogs, meadows, and river banks. —European part: Kar. -Lap., Lad. -Il'm., Dv. -Pech., Upp. Dnepr., Upp. Volg., Volg. -Kam., Mid. Dnepr., Prichern., Volg. -Don., Low. Don., Crimea; West. Siberia: Ob. (w.part). Gen. distr.: Western Europe. Described from England (surroundings of London). Type in London.

NOTE: Forming hybrids: \times *acuta* L. (*C. elytroides* Fries and *C. praticola* Kük.); \times *elata* Bell. (*C. pseudo-Hudsonii* Podp.); \times *caespitosa* L. (*C. allolepis* Rchb.); \times *Buekii* Wimm. (*C. vratslaviensis* Fig.); \times *aquatilis* Whlb.

ECONOMIC IMPORTANCE: It is made into hay in some localities, but it is not eaten readily by livestock on account of the sharp leaves and culms. It should be cut as early as possible, before flowering. In silage it gives good feed for cattle. Yields of hay 25-35 centners per hectare, silaged material 80-120 centners per hectare.

97. *C. dichroandra* V. Krecz. sp. nova in Addenda II, 596. —
C. acuta Trev. in Ldb. Fl. Ross. IV (1853) 313, quoad pl. caucas., non
211 Good. —? *C. gracilis* var. *libanotica* Kük. in Engl. Pflzr. IV, 20
(1909) 323. —*C. gracilis* var. *angustifolia* et *tricrostata* Grossh.
Fl. Kavk. I (1928) 163, non Aschers.

Perennial, cineraceous-green plants with creeping rhizome and stolons; culms rather scabrous at the summit, sometimes nearly smooth, firm, 30-90 cm tall, covered at base with leaden-brown, somewhat lustrous, bladeless sheaths; leaves flat, 3-5 mm broad, slightly downrolled at the margins, gradually acuminate, as long as or shorter than the culm; spikelets 4-7, distant, the terminal 1-3 staminate, oblong or clavate, 3-8 cm long, the lanceolate, subobtusate, brown scales with a broad white band, the remaining spikelets pistillate, cylindric, 5-7 cm long, dense to fairly loose, the lower ones pedunculate, erect; the lowest bract overtopping the inflorescence; scales lanceolate, acute, blackish-brown, usually longer than the perigynia and half as broad, the strong midrib thickened at the summit; perigynia broadly ovoid, 3 mm long, yellowish-brown, becoming dark brown, with few (3-5) nerves and a short truncate beak. Fr. June—July.

River banks. —Caucasus: West. East. (w. part), and South. Transcauc. Gen. distr.: Turkey. Described from Georgia (Akhalkalaki). Type in Leningrad.

98. *C. fusco-vaginata* Kük. in Bull. Hérb. Boiss., 2 ser., IV (1904) 56 et in Engl. Pflzr. IV, 20 (1909) 338; atque in Journ. Russ. Bot. 3-6 (1911) 92. —*C. acuta* Trev. in Ldb. Fl. Ross. IV (1853) 313, ex p., non Good. —*C. gracilis* Litw. in Fl. Yugo-Vost. III (1929) 297; Kryl. Fl. Zap. Sib. III (1929) 465 (incl. var.). —*C. gracilis* var. *sphaerostachya* et *angustifolia* Litw., l.c., 297, non Uechtr. et Aschers. —*C. graciliformis* V. Krecz. in Maevsk. Fl. Sr. Ross., 6 ed. (1933) 199.

Perennial, cineraceous-green, loosely caespitose plants, with long stolons; culms firm, scabrous at the summit, 45-100 cm tall, covered at base with dark lead-colored to castaneous, lustrous, faintly keeled and bladeless sheaths; leaves stiff, subplane, 3-4(5) mm broad, with downrolled margins, short-acuminate, glaucous underneath, greenish on the upper surface, as long as or shorter than the culm; spikelets 3-6, cylindric to clavate-cylindric, the terminal 1-3 staminate, 3-8 cm long, with reddish-brown (to ferruginous), narrowly lanceolate scales, others pistillate, 3-10 cm long (to 0.6 cm broad), loosish, especially toward base, or rather compact, as the perigynia become inflated at maturity, erect or subdivergent; lowest bract equaling or exceeding the inflorescence; scales oblong-lanceolate, acute to mucronate, blackish-purple, with a light median band, mostly longer than perigynia and then geniculate, more rarely as long or shorter; perigynia broadly ovoid or broadly obovate, 2.5-3.2 mm long (1.7-2.5 mm broad), 212 yellowish-ferruginous, at length brunescent, 3-7-nerved, stipitate, abruptly contracted into an obsolescent, subemarginate beak. Fr. May—July.

Meadows, river banks. —European part: Prichern. (e.), Mid. Dnepr. (e.), Volg.-Kam., Zavolzh., Low. Volg; Caucasus: Ciscauc.; West. Siberia: Upp. Tob., Irt., Alt.; East. Siberia: Yenis., Ang.-Sayan., Daur.,

Len.-Kol.; Centr. Asia: Aral.-Casp. (n. part), Pribalkh. Gen. distr.: Northern Mongolia. Described from Altai (Tikhaya River). Type in Leningrad.

NOTE: Forming hybrids with *C. acuta* L., *C. gracilis* Curt., and *C. omskiana* Meinsh.

99. *C. erawinensis* Korot. in Fedde, Repert. sp. nov. XIII (1913) 293; V. Krecz. in Fl. transb. II (1931) 121.

Perennial, bluish-green plants, with a short-creeping rhizome, rather densely cespitose; culms scabrous nearly all the way down, 15-40 cm tall, covered at base with castaneous to light castaneous, more or less keeled, and more or less split-fibrillose, lustrous, bladeless sheaths; leaves stiffish, flat, 2-3 mm broad, with revolute margins, about as long as the culm, the lower part of blades and sheaths bluish-glaucous; spikelets 3-5, the terminal staminate, oblong-linear, to 3 cm long, with light ferruginous, lanceolate, subacute scales, others pistillate, dense, short-cylindric, 1.5-3 cm long, 0.4-0.5 cm broad, sessile, erect; lowest bract about as long as or shorter than the inflorescence; scales lanceolate to broadly lanceolate, subobtusate, with a light median band, more or less membranaceous above and on the margin, narrower and mostly shorter than perigynia; perigynia ellipsoid-ovate, plano-convex, 2-2.5 mm long, slenderly 6-7-nerved on both faces, glaucous-green, short-stipitate (the stipe somewhat imbedded in the base), rather abruptly contracted into a scaberulous, scarcely emarginate beak.

Wet saline hollows. —East. Siberia: Daur.: Verkhnendinskii and Akshinskii districts. Described from Eravinskii Lakes (surroundings of the village Konstantinovka), Type lost (?).

100. *C. Knorringiae* Kük. ex B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 201 (nomen nudum) et in Addenda, II, 597.

Perennial, green, cespitose plants, with creeping rhizome; culms prominently scabrous nearly all the way down, 50-70 cm tall, covered at base with castaneous-brown (ochreous), bladeless, split-fibrillose sheaths; leaves flat, 2.5-3.5 mm broad, revolute margined, short-pointed, shorter than the culm; spikelets 3-5, narrowly cylindric, erect, the terminal staminate, to 4 cm long, with ferruginous, obtuse scales, the others pistillate, 2-4.5 cm long, narrowly cylindric, 0.4 cm broad, loose, the lowest distant, on a stipe to 1.5 cm long; lowest bract shorter or nearly as long as the culm; scales lanceolate, subacute, dark brown, with a faint light midnerve, narrower and slightly longer than the perigynia; perigynia (when young) subovate, about 3 mm long, nerveless, green, smooth-margined, abruptly contracted into a short, weakly emarginate beak.

213 Near water. —Centr. Asia: Pam.-Al. (Osheskii District, near Charaigyr Lake, 1,800 m). Endemic. Described from the site indicated. Type in Leningrad.

101. *C. Buekii* Wimm. Fl. Schles., ed. 3 (1857) 81. —Exs.: Kneuck. No. 251; Fl. Exs. Austro-Hung. No. 3925.

Perennial, green plants with creeping rhizome producing stout underground offshoots, covered with brown, split remnants of sheaths; culms thickened, sharply 3-angled, prominently scabrous, 45-100 cm tall, the broad, keeled, leaden-brown bladeless basal sheaths strongly reticulate-fibrillose in membranaceous part and at the orifice; leaves flat, 5-8 mm

broad, as long as the culm, with subrevolute margins; spikelets 4-8, the uppermost 1-3 staminate, linear to fusiform, the others pistillate, narrowly cylindrical, 4-10 cm long, 0.4-0.5 cm broad, dense, the lower ones looser and attenuate (often with staminate flowers at the summit), the lowest pedunculate, all approximate, erect; the lowest bract shorter than the inflorescence; scales lanceolate, subacute, dark brown, light-centered, as long as or shorter than the perigynia and half as broad; perigynia small, ovoid to oblong-ovoid, 2-2.3 mm long, plano-convex, yellowish-green or purple-spotted on the back, nerveless or very obscurely nerved, with a short entire beak. Fr. May-June.

Gullies and steppe valleys, forming thickets along canals and dry river-beds, on saline soil. —European part: Prichern., Low. Don. (Pavlovskii District "Dezhursk"—Aleksееvskaya on the Don); Caucasus: Ciscauc., East. and West. Transcauc. Gen. distr.: Southern and Central Europe. Described from Olau (near Zimpel in Silesia).

NOTE: Forming hybrids: \times *acuta* L. (*C. ligniciensis* Fig.); \times *gracilis* Curt. (*C. vratislaviensis* Fig.).

102. *C. sareptana* V. Krecz. in Maevsk. Fl. Sr. Ross. 6 ed. (1933) 1930 et in Addenda, II, 597. —*C. gracilis* Litw. in Fl. Yugo-Vost. III (1929) 297, quoad. pl. Becker., ex p.

Perennial, light or bright green, caespitose plants; culms sharply triangular, scabrous above, 70-85 cm tall; leaves not stiff, flat, 3-4 mm broad, with revolute margins, nearly equaling the culms; lower sheaths light brown, bladeless ?; spikelets 4-6, the terminal 2-3 staminate, approximate, 2-6 cm long, oblong, with lanceolate, obtuse, pale ferruginous scales, the others pistillate, cylindrical, 3-6.5 cm long, 0.4-0.6 cm broad, fairly dense to loosish, the lower ones short-pedunculate, erect or drooping; scales lanceolate, acute, ferruginous, with a very broad light median band and a narrow hyaline margin, shorter than or as long as the perigynia, but much narrower, hence the entire spikelet pale green or light ferruginous owing to the prominent perigynia; perigynia not spreading, oblong-ellipsoid, 3-3.6 mm long (1.3-1.8 mm broad), subplano-convex, greenish-ferruginous, with 7-10 slender nerves on each face, somewhat enlarged at base, abruptly contracted into a short stipe, tapering above into a short, cylindrical, slightly emarginate beak. Fr. June.

Flood meadow, river margins, and old river beds. —European part: Low. Volg. (Krasnoarmeisk, Volga delta: Yandyki). Endemic. Described from Krasnoarmeisk (formerly Sarepta). Type in Leningrad.

103. *C. appendiculata* (Trautv.) Kük. in Bull. Hérb. Boiss., 2 sér., IV (1904) 54 et in Journ. Russ. Bot. 3-6 (1911) 91. —*C. acuta* var. *appendiculata* Trautv. in Middend. Sibir. Reis. I, 2 (1856) 100. —*C. descendens* Kom. Fl. Penins. Kamtsch. I (1927) 237, non Kük.

Perennial, cineraceous-green, caespitose plants, tussock-forming, with short stolons (?); culms scabrous, 30-100 cm tall, converged at base with reddish-brown, slightly lustrous, weakly keeled and slightly split-fibrillose, bladeless sheaths; leaves flat, 2-2.5 mm broad, long-acuminate, equaling the culm, with slightly revolute margins; spikelets 3-7, the terminal 1-3 staminate, fusiform, to 4-7 cm long, the others pistillate, narrowly cylindrical, 2-7 cm long, loose and narrower below; the lower ones on a peduncle to 1-2 cm long, divergent, all subapproximate; the lowest bract equaling the inflorescence; scales lanceolate, subobtuse, with a white hyaline

appendage at the summit, ferruginous-brown to ferruginous, white-centered, shorter and often much narrower than the perigynia; perigynia ellipsoid, 2.5-3.5 mm long, plano-convex, pale green, 8-10-nerved, with a short emarginate beak. Fr. June-July.

River banks, meadow, and marshes. —Arctic: Anad.; East. Siberia: Yenisei (n. part), Daur., Len.-Kol.; Far East: Ud., Ze.-Bur. Uss., Okhot., Kamch., Sakh. (n.). Endemic. Described from the estuaries of Uda River. Type in Leningrad.

NOTE: Forming hybrids with *C. Schmidtii* Meinsh. (*C. descendens* Kom., ex p., non Kük.).

ECONOMIC IMPORTANCE: Leaves are eaten by water fowl (Tikhomirov).

**C. semiplena* Kük. in Bull. Hérb. Boiss., 2 sér., II (1902) 1018 et in Engl. Pflzr. IV, 20 (1909) 339, fig. 52, D-C; Miyabe et Kudo, Fl. Hokk. and Sagh. II (1931) 234.

Perennial, cineraceous-green, caespitose, stoloniferous plants; culms sharply triangular, scabrous above, 60-70 cm tall, covered at base with purplish-brown, lustrous, bladeless sheaths; leaves stiff, flat, 2-3 mm broad, equaling the culm, long-acuminate; spikelets 3-4, subapproximate, the terminal 1-2 staminate, the others pistillate, often staminate at the summit, cylindrical, 2-4 cm long, 0.5 cm broad, dense, erect, the lower ones short-peduncled; lowest bract equaling or overtopping the inflorescence; scales oblong-ovate, obtuse, brown, with dark midrib and scarious margin about half as long as the perigynia; perigynia broadly ovoid, convex on the back, concave below [?], 3-3.5 mm long, stramineous, with numerous thickened nerves, round-based, short-stipitate, rather gradually tapering into a short entire beak.

215 Recorded by Japanese authors for Sakhalin. Gen. distr.: Northern Japan. Described from Japan (Riishiri Island).

104. *C. descendens* Kük. in Finsk. Vetensk.-Soc. Forh. XLV (1902-1903) 6 et in Engl. Pflzr. IV, 20 (1919) 326, atque et in Journ. Russ. Bot. 3-6 (1911) 88.

Perennial, bright green, caespitose plants, with branching, descending rhizome; culms firm, scabrous, 60 cm tall, covered at base with brown bladeless sheaths; leaves green, folded at base, subplane above, 1.5-2.5 mm broad, shorter than the culm; spikelets 3-4, short, the terminal spikelet staminate, abbreviated, the others pistillate, oblong, (the uppermost close to the staminate, the lowest rather distant), few-flowered, 0.5-1 cm long, rather loose; the lowest bract broad, equaling or overtopping the inflorescence; scales small, oblong-ovate, blackish-brown, pale at the center and at the margin, less than half as long and narrower than the perigynia; perigynia oblong-ovoid, 5 mm long, plano-convex, with brownish, lustrous, bladeless sheaths, the membranaceous part split-fibrillose; leaves rather rigid, strict, fairly loose, reticulate below, more or less folded above, with revolute margins, 3-5 long [sic], gradually pointed; spikelets 4-6, approximate, the terminal 1-2 linear-cylindrical, staminate, 6-7 cm long, 216 the others pistillate, cylindrical, 4-6 cm long (the upper ones usually staminate above), sessile, the lowest short-peduncled; lowest bract weakly developed, slightly longer or even shorter than its spikelet; scales lanceolate, blackish-brown, with a green midrib, as long as or shorter, and often

longer than the perigynia, but only half as broad; perigynia ellipsoid or ovoid, 3-5-4 mm long, glaucous-green, at length brownish-green, with 5-7 light prominent nerves and lateral ribs, short-stipitate to sessile, with a short beak. Fr. May-July.

Swamps and muddy shores. —European part: Lad. -Il'm. (possibly in peripheral districts), Mid. Dnepr. (?), Prichern.; Caucasus: West. and East. Transcauc. (w. part). Gen. distr.: West. and South. Europe. Described from Piedmont (Secusu Valley).

NOTE: Forming hybrids: × *acuta* L. (*C. Coukae* Podp.); × *gracilis* Curt. (*C. pseudo-Hudsonii* Podp.); × *caespitosa* L. (*C. Frankii* Podp.); × *Buekii* Wimm.

106. *C. omskiana* Meinsh. in A.H.P. XVIII, 3 (1901) 340. —*C. moskowskensis* C.B. Clarke apud B. Fedtsch. in Journ. Bot. éd. Sect. bot. Soc. Nat. St. Pétersb. I (1906) 191; ejusd., in Kew Bull. Misc. Inform., Addit. ser., VIII (1908) 69. —*C. stricta* Trev. in Ldb. Fl. Ross. IV (1853) 311, ex p., non Lam. —*C. Hudsonii* Litw. in Maevsk. Fl. Sr. Ross. 5 ed. (1917) 694, non A. Benn. —Exs.: HFR No. 241.

Perennial, cineraceous-green, rigid, tussock-forming plants; culms firm, triangular with concave sides, prominently scabrous, 46-100 cm tall, covered at base with light yellow (creamy) or light brown, keeled, lustrous sheaths; leaves rather stiff, strict, keeled, 3-6 mm broad, folded, with revolute margins, prominently scabrous, reticulate below; spikelets 3-5, the terminal 1-2 staminate, linear-cylindric, 3-6 cm long, the others pistillate, cylindric, erect, 2-6 cm long, all subdistant; lowest bract weakly developed, not exceeding its spikelet; scales oblong-ovate, subobtuse, dark brown, faintly light-centered, shorter than perigynia; perigynia ovoid, 2.5-3 mm long, plano-convex, soon deciduous, yellowish-green or brown at the summit, nerveless, with a short entire beak. Fr. May-June.

Swamps and muddy shores. —European part: Kar. -Lap., Lad. -Il'm., Upp. Dnepr., Upp. Volg. Mid. Dnepr., Prichern., Volg. -Don., Vogl. -Kam., Zavolzh.; Caucasus: Ciscauc.; West. Siberia: Ob., Upp. Tob., Irt.; East. Siberia: Ang. -Sayan, Centr. Asia: n. part of Aral. —Casp. and Pribalkh. Gen. distr.: Finland, northern Baltic seaboard, eastern Poland. Described from Sukovki on the Irtysh, some 60 km from Omsk. Type in Leningrad.

NOTE: Forming hybrids with *C. acuta* L., *C. caespitosa* L., and *C. fusco-vaginata* Kük.

ECONOMIC IMPORTANCE: Not used for hay; in silage provides good feed for cattle.

217 Cycle 4. *Caespitosa* V. Krecz. —Light green or bright green, moderately robust plants (to 50-70 cm tall); leaves thin and narrow (2-3 mm broad), with revolute margins; densely cespitose (tussock-forming), without stolons; lower sheaths leafless. Inflorescence of 2-5(6) short-cylindric, 1-4 cm long spikelets; lowest bract weakly developed (not exceeding the inflorescence and often barely equaling its spikelet). Scales of pistillate spikelets ovate or lanceolate, obtuse to subobtuse, shorter than or as long as perigynia. Perigynia (1.8)2-2.5(3) mm long, ovoid, more or less biconvex, nerveless, with a short truncate beak, grayish-green or green, becoming brownish-green or ferruginous.

107. *C. caespitosa* L. Spl. pl. (1753) 978; Trev. in Ldb. Fl. Ross. IV, 310 (excl. var.). —*C. erecta* Gilib. Exerc. phyt. II (1792) 549, non

DC. — *C. Dreijeri* Rupr. in Beitr. Pflzk. russ. Reich. IV (1845) 86, non O.F. Lang. — Ic.: Syreish. Ill. Fl. Mosk. gub. I 199. — Exs.: Kneuck. No. 16; HFR No. 793.

Perennial, dark green plants, forming dense tussocks, without stolons; culms scabrous, 25-50 cm tall, covered at base with cherry-colored (dark purple), more or less keeled, split-reticulate, bladeless sheaths; leaves flat to subinvolute, with revolute margins, 1.5-2.5 mm broad, abruptly pointed, about half as long as the culm; spikelets 2-4, the terminal spikelet oblong, to 2.5 cm long, staminate, the others pistillate, oblong-ovoid to short-cylindric, 1-2 cm long, dense, stiffly erect, all approximate, the lowest short-peduncled; lowest bract filiform, barely overtopping its spikelet; scales ovate, obtuse, blackish-brown, with a narrow hyaline margin, white-centered, shorter and narrower than perigynia; perigynia membranaceous, subdivergent, ovate, plano-convex, 2-2.5 mm long, ferruginous-green to ferruginous-yellow, nerveless, abruptly contracted into an obsolescent green beak. Fr. May-June. (Plate XV, Figure 6).

Swamps, boggy meadows, and alder groves. — Arctic: Arct. Eur.; European part: Kar. -Lap., Dv. -Pech., Lad. -Il'm., Upp. Dnepr., Upp. Volg., Volg. -Kam., Volg. -Don., Zavolzh., Mid. Dnepr., Low. Don. (excl. the part south of the Don), Low. Volg.; Caucasus: Ciscauc. (on the Malka); West. Siberia: Ob., Upp. Tob., Irt., Alt.: East. Siberia: Yenish., Ang. -Sayan.; Centr. Asia: n. part of Aral. -Casp. and Pribalkh. Gen. distr.: all West. Europe. Described from Sweden.

NOTE: Two closely related specimens of the Botanical Institute from the subalpine meadows of Kartaliniya (Ttskhra-tskaro-Bordzilovskii!) and from Balkariya (Suuk-az-E. and N. Bush!) have very broad (3-4.5 mm), abruptly pointed leaves and large (to 3 cm long), loose, pedunculate spikelets, and acute scales exceeding the perigynia; they possibly represent a distinct race. Forming hybrids: \times *acuta* L. (*C. peraffinis* App.); \times *elata* Bell. (*C. Frankii* Podp.); \times *gracilis* Curt. (*C. allolepis* Rchb.); \times *omskiana* Meinsh.; \times *fusco-vaginata* Kük.

218 ECONOMIC IMPORTANCE: Rarely made into hay. Eaten unwillingly by livestock, and only when prepared before flowering. Produces good silage.

108. *C. rubra* Lévl. et Vant. in Bull. Ac. Intern. Géorg. Bot. XIX (1909) 33. — *C. caespitosa* var. *rubra* Lévl. et Vant. in Fedde, Rep. sp. nov. VII (1909) 104. — *C. caespitosa* Kom. Fl. Mandsh. I (1901) 366, non L.

Perennial, bright green, tussock-forming plants, without stolons; culms slender, scabrous, 40-70 cm tall, covered at base with short, lustrous, sanguine-red keeled, scarcely reticulate sheaths; leaves linear, flat, 2-3 mm broad, strongly scabrous, with slightly revolute margins, rather abruptly pointed, shorter than the culm; spikelets 3-4, approximate, the terminal spikelet staminate, obovoid or short-clavate, 0.5-2.5 cm long, with brown scales, the others pistillate, ovoid to short-cylindric, 0.5-2 cm long (0.4-0.5 cm broad), rather loose, short-peduncled (especially the lowest); lowest bract setaceous, barely equaling its spikelet; scales ovate, obtuse, scarious-margined, with a light median band, shorter than perigynia; perigynia ovoid to ellipsoid, plano-convex, 2-2.5 mm long, nerveless, yellowish-green or greenish-brown to greenish-purple, with a short, truncate, purple-tipped beak. Fr. May-June.

Marshes and meadows. —Arctic: Anad.; East. Siberia: Len.-Kol.; Far East: Ze.-Bur., Ud., Okhot., Uss., Sakh. Gen. distr.: Japan, Northern Manchuria. Described from Sakhalin (Vladimirovo).

109. *C. inumbrata* V. Krecz. nom. nov. —*C. neglecta* Peterm. in Flora, XXXVII (1844) 331, nec Tuckerm. (1843), nec Degl. (1807). —*C. caespitosa* var. *retorta* Kük. in Engl. Pflzr. IV, 20 (1909) 329, non Fries. —*Vignea neglecta* Peterm. Fl. des Bien. (1841) 17, in adnot.

Perennial, bright green, loosely caespitose plants, with a somewhat thickened rhizome and short stolons (?); culms slender, weak, often implexed, nodding at the summit, scabrous well down, 50-75 cm tall, covered at base with light cherry-colored, dull, bladeless sheaths; leaves flat to revolute, 1.5-2(2.5) mm broad, weak, interwoven, prominently scabrous, abruptly pointed, shorter than the culm; spikelets 2-4, approximate, the terminal 1-2 staminate, oblong to clavate-lanceolate, to 2-2.5 cm long, with narrow, obovate, obtuse, ferruginous-brown scales, the others pistillate, oblong, 1-2 cm long (not more than 4 mm broad), loose, subdistant below, short-peduncled, erect to subdivergent, more rarely subpendulous; lowest bract setaceous, soft, longer than its spikelet; scales ovate-lanceolate, subacute to acute, ferruginous-brown, with a light midrib, shorter than perigynia; perigynia ellipsoid, unequally biconvex, 1-2.5(3) mm long, greenish, becoming yellowish or dark ferruginous, with a short-truncate beak. Fr. June-July. (Plate XV, Figure 9).

219 Boggy (spruce and mixed) forests, muddy coppices, and alder groves. —European part: Kar.-Lap., Dv.-Pech., Lad.-Il'm., Upp. Dnepr., Upp. Volg., Volg.-Kam. Gen. distr.: Baltic seaboard, Fenno-Scandia. Described from Germany, Schönfeld—Abtnaudorf, near Leipzig. Type in Leningrad.

110. *C. retorta* (Fries) V. Krecz. sp. nova in Addenda II, 598. *C. caespitosa* var. *retorta* Fries in Bot. Notis. (1843) 101. —Exs.: Fries, Herb. norm. fasc. XI (specim. ex Upsaliarum).

Perennial, yellowish-green, densely caespitose plants, without stolons; culms prominently scabrous, slender, 50-80 cm tall, nodding at the summit, covered at base with cherry-colored, dull, rather broad sheaths; leaves flat, 2-2.5 mm broad, long, but shorter than the culm; spikelets 3-4, somewhat segregated, the terminal spikelet staminate, clavate, to 3-4 cm long, with lanceolate, ferruginous scales, the others pistillate, oblong to cylindric, 1.5-3 cm long, loose to distant (especially toward the base), subdivergent, short-peduncled; lowest bract setaceous, longer than its spikelet; scales lanceolate, acute to subacute, ferruginous to ferruginous-brown, with a light median band, equaling or slightly exceeding the perigynia, often also shorter; perigynia ellipsoid, unequally biconvex, 3 mm long, nerveless, yellowish-gray, gradually tapering into a slightly extended, truncate beak. Fr. June. (Plate XV, Figure 8).

Marshes. —European part: Lad.-Il'm. (Leningrad.), Upp. Volg. (El'tsovo marsh in the former Vladimirskaia Province, Melenki). Gen. distr.: Baltic seaboard, Germany, Scandinavia, Finland. Described from Sweden (Uppsala). Type in Leningrad.

111. *C. Soczavaeana* Gorodk. in Journ. Soc. Bot. Russ. XV (1930) 185. — *C. rigida* Trautv. in A.H.P. V (1878) 566 et in A.H.P. X (1889) 538, ex p.; Meinsh. in A.H.P. XVIII, 3 (1901) 336, ex p., non Good. — *C. rigida* f. *infuscata* Kük. in Journ. Russ. Bot. 3-6 (1911) 82, non Drej. — *C. orbicularis* Kük. in Engl. Pflzr. IV, 20 (1909) 303, quoad pl. Kraus. — *C. caespitosa* Trev. in Ldb. Fl. Ross. IV (1853) 311, quoad pl. Am. arct., non L. — *C. hyperborea* Meinsh. in A.H.P. XVIII, 3 (1901) 335, ex p., non Drej. — Ic.: Journ. Soc. Bot. Russ. XV (1930) 184, fig. 1.

Perennial, cineraceous-green, rigid, densely cespitose plants, without stolons; culms rather rigid, scabrous, 10-40 cm tall; leaves with revolute margins, 1.5-3 mm broad, rather abruptly pointed, as long as or slightly shorter than the culm; lower sheaths leafless, slightly keeled, ferruginous-brown, rather lustrous; spikelets 3-4, more or less segregated, the terminal staminate, cylindrical or clavate, the others pistillate, oblong, 0.5-1.5 cm long, rather densely-flowered, the upper ones sessile, the lowest short-peduncled; lowest bract short, setaceous; scales ovate, obtuse, blackish-purple, with a narrow hyaline margin and a light midnerve, as 220 long as or slightly shorter than the perigynia; perigynia ovoid to broadly ovoid, 2-2.5 mm long, biconvex, light yellow below, blackish-brown above, nerveless, with a short smooth beak.

Tundras. — Arctic: Chuk., Anad.; East. Siberia: Len.-Kol. (n. -e. part); Far East: Okhot. Gen. distr.: Alaska and adjoining islands. Type in Leningrad.

NOTE: Resembles *C. stylosa* C.A.M., differing in the triangular culms.

ECONOMIC IMPORTANCE: A principal spring forage for deer in the eastern part of Siberia (Gorodkov, Tikhomirov).

112. *C. minuta* Franch. in Bull. Soc. Philom. Paris, 8 sér., VII (1895) 41 et in Nouv. Arch. Mus. Paris, 3 sér., IX (1897) 125. — *C. caespitosa* var. *minuta* Kük. in Journ. Russ. Bot. 3-6 (1911) 901. — *C. Meyeriana* var. β *scabra* Meinsh. in A.H.P. XVIII, 3 (1901) 350.

Perennial, cineraceous-green or light green plants with ascending rhizome, tussock-forming, without stolons; culms slender, tall, scabrous all the way down, 50-100 cm tall; basal sheaths long, dark leaden-brown to castaneous, narrow, slightly keeled, slightly lustrous, fibrillose at the orifice, bladeless; leaves filiform-linear, narrow, keeled at base, folded, 1-1.5 mm broad, with revolute margins, long, shorter than or as long as the culm; spikelets 2-4(5), slightly segregated, the terminal spikelets staminate, oblong, fusiform, or clavate, 1-2(4) cm long, with ferruginous to ferruginous-brown scales, the remaining 2-3 pistillate, oblong-ovoid, oblong, or narrowly cylindric, 0.5-2 cm long (0.2-0.3 cm broad), loosish, distant below, all short-peduncled, the peduncle longer in the lower spikelets; lowest bract weakly developed, barely equaling its spikelet; scales oblong-ovate, obtuse, dark ferruginous to ferruginous-purple, scarious-margined, especially toward the summit, with a light median band, shorter than the perigynia (sometimes only half as long) and narrower; perigynia ovoid, 1.8-2.2 mm long, biconvex, somewhat outward-bent at the summit, green-

ish-lead-colored, with few (3-5), sometimes indistinct, nerves on the back, or nerveless, short-stipitate, with a short, truncate, ferruginous-tipped beak. Fr. June-July.

Marshes, boggy meadows. —East. Siberia: Daur., Len.-Kol; Far East: Ud., Ze.-Bur., Uss., Sakh. Gen. distr.: Japan, Northern Mongolia. Described from Japan (Yezo, Saru). Type in Paris.

- 223 113. *C. Schmidtii* Meinsh. in Baer et Helmers. Beitr. zur Kennt. russ. Reich. XXVI (1871) 224; Kük. in Journ. Russ. Bot. 3-6 (1911) 88. — *C. Maximoviczii* F. Schmidt in Mém. Ac. St. Pétersb., VII ser., XII (1868) 71, non Miq. (1866). — *C. subvaginata* Meinsh. ex C. B. Clarke in Kew Bull. Misc. Inf., Addit. ser., VIII (1908) 70. — *C. caespitosa* Turcz. Fl. baic.-dah. II, 2 (1856) 272, ex p., non L. — *C. acuta* Turcz., l.c., ex p. non Good. — *C. vulgaris* Maxim. Prim. Fl. amur. (1859) 314, non Fries. — ? *C. oligophylla* Freyn in Oesterr. Bot. Zeitschr. XL (1890) 305. — *C. aperta* β *humilis* Boott, Illustr. Carex IV (1867) 132, ex p. — *C. stricta* Kom. Fl. Mandsh. I (1901) 368, non Good. — *C. vladimiroviensis* Lévl. in Bull. Ac. Intern. Geogr. Bot. XIX (1909) 34.

Perennial, cineraceous-green, cespitose plants, without stolons; culms slender, scabrous, 30-80 cm tall, covered at base with castaneous-brown, narrow, split-reticulate, dull, bladeless sheaths; leaves not rigid, linear, subplane, 2-3 mm broad, with revolute margins; spikelets 3-6, the terminal 1-4 staminate, linear or fusiform, 1.5-3 cm long, approximate, mostly rather loose, erect, the lower ones short-peduncled; lowest bract foliaceous, shorter than the inflorescence; scales lanceolate, subacute, brown, hyaline-margined, with a light midrib and 2 faint lateral nerves, equaling or longer than the perigynia and $1/3-1/2$ as broad; perigynia rounded-ovoid, 2-2.5 mm long, inflated-biconvex, nerveless, brownish-green to ferruginous-yellow, short-stipitate, the entire beak usually somewhat roughened with bristles above on the margin. Fr. June-July.

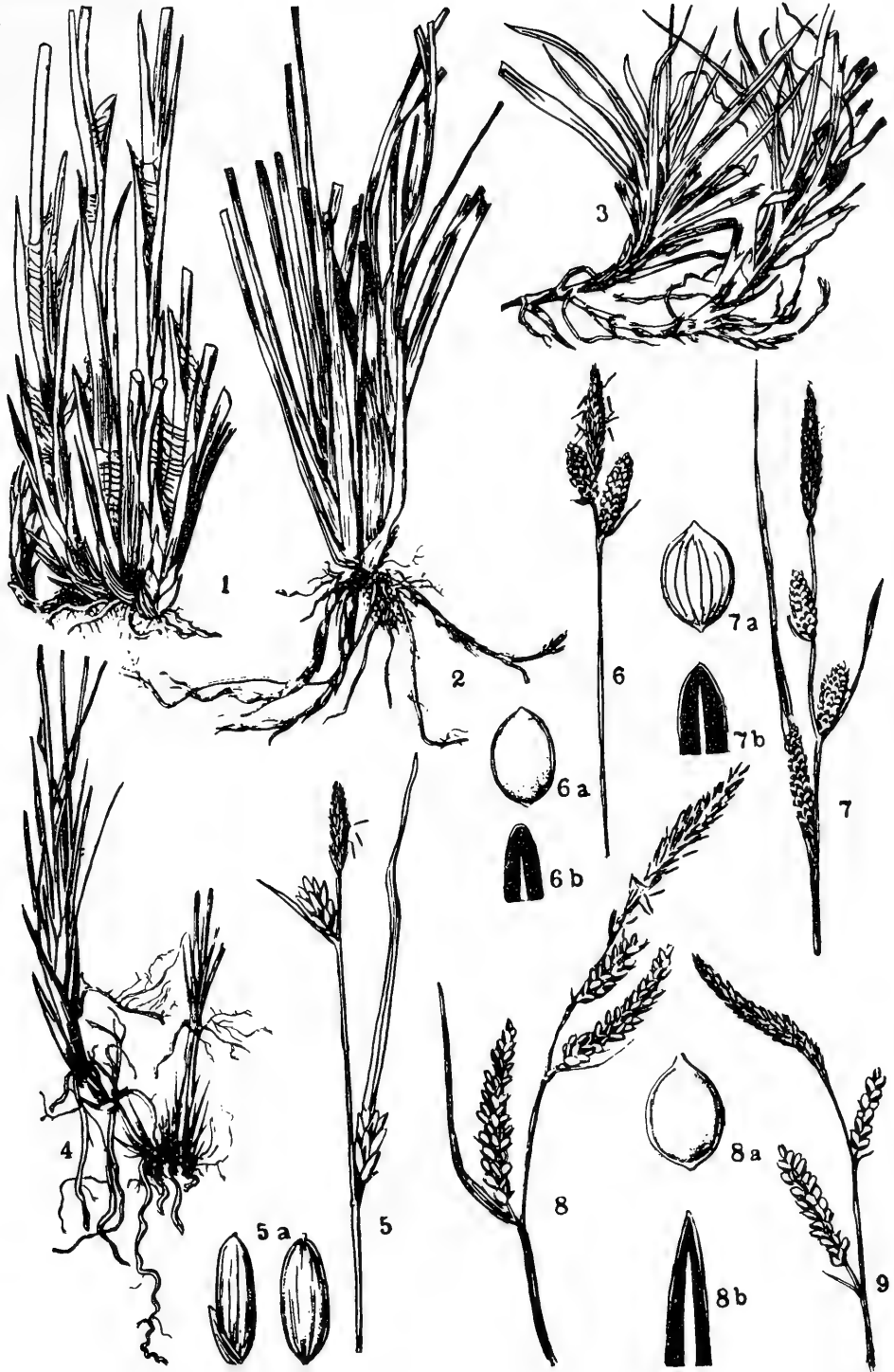
Meadows and marshes. —East. Siberia: Yenisei (s.-e.), Ang.-Sayan., Daur., Len.-Kol.; Far East: Ze.-Bur., Okhot., Ud., Uss., Sakh., Kamch. Gen. distr.: Mongolia, Manchuria. Described from the estuary of Dzheron River on Amgun. Type in Leningrad.

NOTE: Forming hybrids with *C. appendiculata* Kük.

114. *C. lineolata* Cham. ex Meinsh. in A.H.P. XVIII, 3 (1901) 338 (nom., sub *C. Schmidtii*) et in Addenda, II, 598. — *C. lineola* C.A.M. ex Freis, Nov. Fl. Suec. Mant. III (1842) 145 (nomen). — *C. Schmidtii* Kom. Fl. penins. Kamtsch. I (1927) 238 et Hultén, Fl. of Kamtsch. I (1927) 187, ex p., non Meinsh.

Explanation to Plate XV

1. Rhizome of *C. Buekii* with aphyllodium. — 2. Rhizome of *C. gracilis* Curt. with phyllopodium. — 3. Creeping rhizome with offshoots. — 4. Tussock-forming rhizome, without stolons. — 5. *C. descendens* Kük.: a) perigynium. — 6. *C. caespitosa* L.: a) perigynium, b) scale. — 7. *C. acuta* L.: a) perigynium, b) scale. — 8. *C. retorta* (Fries) V. Krecz.: a) perigynium, b) scale. — 9. *C. inumbrata* V. Krecz.



Perennial, green, caespitose plants; culms scabrous, 15-40 cm tall, rather firm, covered at base with short, broad, castaneous, lustrous, bladeless sheaths; leaves 3-4 mm broad, flat, rather abruptly pointed, with revolute margins; spikelets 3-5, the terminal 1-2 staminate, obovoid or thickly clavate, 1-1.5 cm long, the others pistillate, ovoid to short-cylindric, 0.8-2 cm long, all approximate, subsessile; lowest bract shorter than the inflorescence; scales ovate, subobtuse, blackish-brown, with a single faint
224 light nerve, as long as or shorter than the perigynia; perigynia ellipsoid or ovoid, 2-2.5 mm long, plano-convex or biconvex, not inflated, grayish-green, nerveless, the margin smooth or subsetulose above, the beak short, subemarginate, reddish-tipped.

Boggy tundras. — Arctic: Anad.; Far East: Kamch. Endemic. Described from Koraginskii Island. Type in Leningrad.

115. *C. aperta* Boott in Hook. Fl. bor. -am. II (1840) 218, tab. CCXIX; Kük. in Engl. Pflzr. IV, 20 (1909) 818, fig. 49 A-C; Miyabe et Kudo, Fl. Hokk. and Sagh. II (1931) 232.

Perennial, cineraceous-green, stoloniferous plants; culms rigid, 30-50 cm tall, scabrous above, covered at base with reddish, entire, bladeless sheaths; leaves subplane, to 3 mm broad, with revolute margins, shorter than the culm; spikelets 4-5, the terminal 1-2 staminate, the others pistillate, cylindric, rather plump, to 3-4 cm long, the upper sessile, the lower more or less pedunculate and somewhat drooping; bract nearly equaling the inflorescence, foliaceous; scales ovate, acute, dark brown, white-centered, with a narrow scarious margin, narrower and shorter than perigynia, subhorizontally spreading; perigynia subdivaricate, ovoid to rather broadly ovoid, biconvex, 3 mm long, green, becoming stramineous, nerveless, short-stipitate, with a distinct, short, barely emarginate beak; stigmas enlarged.

Reported by Japanese authors on Sakhalin and the Kurile Islands. — Gen. distr.: North America (Canada and western States), the Kurile Islands, northern Japan (Yezo). Described from North America, from Columbia River. Type in London.

Cycle 5. *Rigida* V. Krecz. — Mountainous, rather rigid, grayish-green or yellowish-green plants of moderate vigor (20-80 cm tall) with firm culms and rather flat (3-6 mm broad), revolute-margined leaves and rather stout, creeping rhizome and stolons. Lower sheaths transitional, but mainly blade-bearing. Inflorescence of 2-3 oblong (1-3 cm long) spikelets, these subsessile and approximate; lowest bract weakly developed or obsolescent. Scales of pistillate spikelets equaling the perigynia. Perigynia (1.8)2-3(3.5) mm long, ovoid, subplano-convex, nerveless, dark-colored.

116. *C. orbicularis* Boott in Proceed. Linn. Soc. I (1843) 254 et in Trans. Linn. Soc. XX (1846) 134. — *C. rigida* Meinsh. in A.H.P. XVIII, 3 (1901) 336, quoad pl. turkest.; Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 86, non Good. — *C. Petunnikowi* Litw., ib., 87 (pl. morbida!). — *C. glauca atypica* Rgl. in A.H.P. VII (1880) 572. — *C. caespitosa* β *microstachys* Rgl., l.c., 574. — *C. orbicularis* var. *bulungensis* Ostenf. in Bot. Tidsskr. XXVIII (1908) 230.

Perennial, yellowish-green to cineraceous-green plants with thick stolons
225 and creeping rhizome, producing loose tufts; culms firm, scabrous, 10-40 cm tall; leaves flat, 3-5 mm broad, with revolute margins, rather stiff,

scabrous, abruptly pointed, shorter than the culm; lower sheaths brown to ferruginous-brown, the old ones split-fibrillose; spikelets 3-4, crowded, the terminal staminate, oblong, to 2 cm long, with brown scales, the others pistillate, oblong, dense, 0.6-1.5 cm long, the lowest with peduncle to 0.5-0.8 cm long, the short lowest bract not exceeding the spikelet; scales oblong-ovate, obtuse, blackish-brown, with a light midrib, obscurely white-margined, slightly shorter than the perigynia and 1/3-1/2 as broad; perigynia broadly ovoid to subglobular, 2.5-3 mm long, biconvex, light below, blackish-brown above, nerveless, round-tipped, with a short, cylindrical, smooth beak.

Meadows and wet places in the alpine zone. —Centr. Asia: Pam. -Al., Tyan'-Shan., Dzhung. -Tarb. Gen. distr.: Himalayas (Tibet, Kashmir), Afghanistan. Described from eastern India (Himalayas). Type in London.

117. *C. arcatica* Meinsh. in A. H. P. XVIII, 3 (1901) 336. —*C. arcatica* β *pedunculata* Meinsh., l. c. —*C. taldycola* Meinsh., l. c., 339, ex p. —*C. imbricata* Drob. in Vved. (Introd.), Drob. et alii, Opred. rast. okr. Tashk. I (1923) 51. —*C. glauca* β *brachylepis* Rgl. in A. H. P. VII (1880) 572. —*C. caespitosa* β *vulgaris* Rgl., l. c., 574. —*C. acuta* Rgl., l. c., 575, ex p. —*C. orbicularis* var. *brachylepis* et *taladycola* Kük. in Engl. Pflzr. IV, 20 (1909) 394, ex p.; B. Fedtsch. in A. H. P. XXXVIII (1924) 200, ex p.

Perennial, yellowish-to cineraceous-green plants, with short stolons covered with lustrous scales, forming fairly compact tufts; culms slender, scabrous, 20-70 cm tall; basal sheaths reddish-brown to castaneous, often split-fibrillose, blade-bearing; leaves plano-canaliculate, with strongly revolute margins, 2.5-3 mm broad, elongate, gradually pointed, shorter than to nearly equaling the culm; spikelets 3-4, very distant, the terminal staminate, narrowly fusiform, 1-6 cm long (3 mm broad), with more or less ferruginous, oblong scales, the others pistillate, oblong to cylindrical, 1-4 cm long (0.7-0.8 cm broad), often with staminate flowers at the ends, congested, sometimes segregated below, the lower ones on fairly long (to 1.0-1.5 cm) peduncles; lowest bract nearly twice as long as its spikelet, but shorter than the inflorescence; scales narrowly lanceolate, subacute, dark brown, with a light midrib, slightly membranaceous above, slightly shorter to slightly longer than the perigynia and 1/4-1/3 as broad; perigynia horizontally spreading, broadly ovoid, 2.5 mm long, unequally biconvex, toward end of spikelet subinflated, nerveless, brownish-green to ferruginous-green, rounded at the summit, with a very short cylindrical beak. Fr. June.

226 Wet and boggy places in foothills. —Centr. Asia: Pribalkh., Dzhung. -Tarb., Tyan'-Shan., Syr-Dar., Pam. -Al. Gen. distr.: Kuldja. Described from Dzhungariya, Mount Arkat. Type in Leningrad.

NOTE: Not a homogeneous species; it is possible that the Tien Shan and Alai forms with loose spikelets and long scales represent a distinct race, more or less identical with *C. melanolepis* Bcklr. Cyp. nov. I (1888) 47 from Kashmir.

118. *C. hyperborea* Drej. Revis. Car. bor. (1841) 43. —*C. inferalpina* Gorodk. in Journ. Soc. Bot. Russ. XV (1930) 183. —*C. rigida* var. *inferalpina* Laest. in Nov. Acta Bot. Soc. Ups. XI (1839) 287. —*C. rigida* var. *concolor* Kük. in Engl. Pflzr. IV, 20 (1909) 301, ex p. et in Journ. Russ. Bot. 3-6 (1911) 82.

Perennial, cineraceous-green plants, with long, stout stolons covered with reddish-brown scales; culms firm, but not thickened, more or less scabrous, 10-35 cm tall; leaves 1.5-3(4) mm broad, with revolute margins, flat, straight, stiff, scabrous, mostly equaling the culm; lower sheaths and rhizome scales latericious-castaneous or ochreous, more or less lustrous. Spikelets 2-4 (the terminal staminate), oblong, congested, 0.6-1.2 cm long (0.3-0.4 cm broad), approximate, sessile, the lowest often remote, with peduncle 0.5-0.7 cm long; lowest bract scale-like or short-foliaceous, equaling the lowest spikelet; scales ovate, obtuse, mostly purple-brown to blackish-brown throughout, sometimes hyaline at the summit, with an obscure light midrib, shorter and narrower than the perigynia; perigynia obovate to ellipsoid, 2.5-3 mm long, biconvex, yellowish-green, blackish-brown above, nerveless, on a cuneate stipe, abruptly contracted above into a short smooth beak. Fr. July-August.

Tundras. —Arctic: Nov. Zem., Arct. Eur., Arct. Sib., Anad., Chuk.; European part: Kar.-Lap. (Khibiny), Dv.-Pech. (Timan), Volg.-Kam. (Ural); West. Siberia: Ob. (n.); East. Siberia: Len.-Kol. (n. part). Gen. distr.: Scandinavia, Iceland, North America. Described from Greenland.

119. *C. kamtschatica* Gorodk. in Journ. Soc. Bot. Russ. XV (1930) 183. —*C. rigida* ssp. *kamtschatica* Gorodk., l.c. —*C. rigida* Hultén, Fl. of Kamtch. I (1927) 185, non Good. —*C. rigida* var. *concolor* Kom, Fl. penins. Kamtsch. (1927) 236, non Kük.

Perennial, cineraceous-green plants, with a strong, stout, ascending rhizome and short lateral offshoots; culms strong, scabrous, 25-60 cm tall; leaves flat, 3-4 mm broad, scabrous, with revolute margins, rather abruptly pointed, shorter than the culm; lower sheaths and rhizome scales latericious to light castaneous, bladeless; spikelets 3-4, the terminal staminate, often with pistillate flowers at base; all spikelets somewhat segregated, oblong, obtuse (or acute, when containing staminate flowers at the summit), 1.5-3 cm long, the upper ones sessile, the lowest with peduncle to 0.5-0.8 cm long; lowest bract equaling the spikelet; scales ovate, subobtusely, blackish-brown, often with light-bordered margins, as long as and slightly narrower than the perigynia; perigynia ovoid to oblong-ellipsoid, 227 3.5-3.8 mm long, unequally biconvex, light yellow, ferruginous to blackish-brown above, nerveless, with a short conic stipe, rather gradually tapering into a short, smooth, subconic beak.

Bogs in the alpine zone. —Far East: Kamch. Endemic. Described from Kamchatka (Kronotskii Pass). Type in Leningrad.

120. *C. ensifolia* Turcz. ex Bess. in Flora, XVIII, Beibl. 1 (1834) 26 (nomen); Gorodk. in Journ. Soc. Bot. Russ. XV (1930) 183; V. Krecz. in Fl. Transb. II (1931) 120. —*C. rigida* ssp. *ensifolia* Gorodk., l.c., 182. —*C. saxatilis* Turcz. Fl. baic.-dah. II (1856) 273, non L. —*C. rigida* var. *concolor* Kük. in Journ. Russ. Bot. 3-6 (1911) 82. —*C. orbicularis* Kük., l.c., 83; V. Krecz., l.c., 121, non Boott.

Perennial, green or dark green plants with creeping rhizome and strong lateral offshoots, forming fairly loose tufts; culms rigid, coarse, scaberulous to nearly smooth, 20-60 cm tall; leaves flat, 2.5-4(5) mm broad, with slightly revolute margins, rather gradually pointed; lower sheaths and

rhizome scales castaneous-brown; spikelets 3-5 (the terminal staminate), approximate, oblong, sublanceolate, acutish, somewhat loose below, 0.5-3 cm long (0.4-0.6 cm broad), subsessile, the lowest with peduncle to 1 cm long, the weakly developed bract barely exceeding the spikelet; scales ovate, obtuse, blackish-brown, sometimes with light center and margins, slightly shorter than the perigynia; perigynia ellipsoid, obovate to broadly (rounded)-ovoid, 2.5 mm long, unequally biconvex, nerveless, blackish-purple above, with a short smooth beak. Fr. June-July.

Meadows and bogs of the upper forest limit; bare Siberian hills. —East. Siberia: Ang. -Sayan. (centr. and w. parts), Len. -Kol. (s. -w. corner). Gen. distr.: Northern Mongolia. Described from Transbaikalia (from road between Aksha and Kyakhta). Type in Leningrad.

121. *C. altaica* Gorodk. in Journ. Soc. Bot. Russ. XV (1930) 183. — *C. rigida* ssp. *altaica* Gorodk., ib., 182. — *C. rigida* var. *concolor* Kük. in Journ. Russ. Bot. 3-6 (1911) 82, ex p. — *C. rigida* Kryl. Fl. Sib. Occ. III (1929) 461, non Good. — *C. orbicularis* Kük., l.c., et in Engl. Pflzr. IV, 20 (1909) 303, ex p., non Boott. — *C. saxatilis* C.A.M. in Ldb. Fl. Alt. IV (1833) 223; Trev. in Ldb. Fl. Ross. IV, 309, ex p., non L.

Perennial, robust, cineraceous-green plants with thickened stolons covered with purple scales; culms stout, firm, suberect, scabrous low down, 20-100 cm tall; leaves flat, 3-6(7) mm broad, abruptly pointed, strongly scabrous on the margin and underneath, nearly equaling the culm; lower sheaths and rhizome scales purple to blackish-purple, often bladeless, lustrous; spikelets 3-5, approximate, thickened, dense, subobtuse, 1-2 cm long (0.4-0.6 cm broad), subsessile, the terminal staminate, the lowest with short peduncle (to 0.3-0.5 cm long); lowest bract shorter than to equaling the inflorescence; scales ovate to elliptic, obtuse, blackish-brown, with an obscure light midrib and always distinct hyaline margin, about as long as but narrower than the perigynia; perigynia ovoid, 3 mm long, unequally biconvex, light yellow, blackish-brown above, nerveless, short-pedicel, abruptly contracted into a smooth, short, cylindrical beak. Fr. June-July.

Alpine meadows. —West. Siberia: Alt.; East. Siberia: Ang. -Sayan. (w. part). Endemic. Described from Altai (Yantyg-Khat Mountains). Type in Leningrad.

122. *C. rigidioides* Gorodk. in Journ. Soc. Bot. Russ. XV (1930) 183. — *C. rigida* ssp. *rigidioides* Gorodk., ib., 182. — *C. saxatilis* Rgl., Rach. et Herder in Bull. Soc. Nat. Moscou XXXII, 1 (1859) 209; F. Schmidt in Mém. Ac. St. Pétersb., VII ser., XII, 2 (1868) 70, non L. — *C. rigida* var. *concolor* Kom., Key pl. east. reg. U.S.S.R. I (1931) 291, non Kük.

Perennial, cineraceous-green, rather densely caespitose plants, with creeping sloping rhizomes and short stolons; culms rather slender, scaberulous, 15-40 cm tall; leaves flat, 2-4 mm broad, with revolute margins, gradually pointed, straight, often with wilted tips, at first longer than the culm, later somewhat shorter; lower sheaths and rhizome scales castaneous, mostly bladeless, sublustrous; spikelets 3-5, the terminal staminate, the next 1-2 often also staminate at the summit, somewhat segregated, rather distinctly pedunculate (peduncle of the lowest spikelet from 0.3 to 2-3 cm long), the lower ones often pendulous, narrow, lanceolate, subacute, loose, 1-2.5 cm long; lowest bract not exceeding its spikelet; scales ovate to

oblong-ovate, acutish to subobtuse, blackish-brown, with a rather distinct hyaline margin and a light median band, equaling or exceeding the perigynia; perigynia broadly ovoid, 1.8-2.3 mm long, biconvex, nerveless, indistinctly stipitate, yellow, blackish-brown at the summit, very abruptly contracted into a short, smooth beak.

Screes and bogs near bare Siberian hills. —East. Siberia: Daur. (e. part), Len.-Kol. (s.-e. part); Far East: Uss. (n. part), Okhot. (s. part). Endemic. Described from hills of Tukuringra Range, on the watershed of Ukran and Gilyui. Type in Leningrad.

123. *C. taldycola* Meinsh. in A. H. P. XVIII, 3 (1901) 339. —*C. orbicularis* var. *taldycola* Kük. in Engl. Pflzr. IV, 20 (1909) 304, ex p. —*C. heterolepis* et *platylepis* Meinsh. in herb.

Perennial, yellowish-green to grayish-green plants with sloping rhizome and short stolons covered with castaneous scales; culms erect, scabrous, 15-30 cm tall, with fibrillose, brown to castaneous, marcescent remnants of sheaths; leaves flat, slightly revolute at the margins, 2.5-3.5 mm broad, abruptly pointed, about half as long as the culm; spikelets 2-3, approximate, the terminal oblong or clavate, staminate, 1-2 cm long, with pale ferruginous scales, the others pistillate, often staminate above, oblong to ovoid, 0.8-1.5 cm long, dense, subsessile (at any rate, the peduncle of the lowest spikelet not exceeding 2-3 mm in length); bract setaceous, shorter than the 229 spikelet; scales ovate, ferruginous-brown, the middle ones with a light linear band, equaling to usually exceeding the perigynia and as broad to slightly narrower; perigynia ovoid, 2 mm long, unequally biconvex, nerveless, greenish- to yellowish-brown above, abruptly contracted into a short, smooth beak. Fr. June-July.

Mountain meadows. —Centr. Asia: Dzhung. -Tarb., Tyan'-Shan. (w. part: Naiza Pass along Chatkal River). Gen. distr.: Kulja (Central Taldy, 2,100 m). Type in Leningrad.

124. *C. Kotschyana* Boiss. et Hohen. Diagn., ser. 1, XIII (1853) 38. —*C. rigida* Boiss. Fl. Or. V (1884) 419, ex p., non Good. —*C. orbicularis* Kük. in Engl. Pflzr. IV, 20 (1909) 303, ex p.; Grossh. Fl. Kavk. I (1928) 164, non Boott.

Perennial, light green, caespitose plants, with short stolons covered with purple scales; culms rather slender, scabrous, 15-50 cm tall, covered at base with reddish-brown leafy sheaths; leaves flat, 2.5-3 mm broad, with revolute margins, elongate, but abruptly pointed. Spikelets 3-4, the terminal staminate, 1-1.5 cm long, light brown to ferruginous-brown, the others pistillate, oblong, 1-2 cm long, rather dense, the lowest with pedicel to 5-6 mm long; bract equaling the spikelet; scales ovate, subacute, rusty-reddish, with a light linear median band, equaling to exceeding the perigynia; perigynia ovoid, membranaceous, 2 mm long, biconvex, ferruginous-brown above, abruptly contracted into a short, smooth beak. Fr. June.

Wet mountain meadows. —Caucasus: Dag., East. Transcauc. Gen. distr.: Persia. Described from southern Persia (Ku-Daena Mountains). Type in Geneva.

Cycle 6. *Aquatica* V. Krecz. —Rather robust (50-100 cm tall), light green plants, with firm, obtusely triangular, usually smooth culms, and scaberulous; the lax leaves 3-6 mm broad, with involute margins. The

creeping rhizome giving rise to loose tufts, with rather long stolons; lower sheaths blade-bearing. Inflorescence of 3-8 narrowly cylindrical spikelets; the lowest bract overtopping the inflorescence. Scales of pistillate spikelets ovate, obtuse or subobtuse, shorter than the perigynia. Perigynia ovoid, 2-3 mm long, faintly biconvex or plano-convex, nerveless, light green, becoming brown.

125. *C. aquatilis* Whlb. in Sv. Vetensk. Akad. Nya Handl. XXIV (1803) 165; Trev. in Ldb. Fl. Ross. IV, 312 (excl. var.); Kük. in Journ. Russ. Bot., 3-6 (1911) 83. —Exs.: HFR No. 540.

Perennial, cineraceous-green, cespitose plants, with long horizontal stolons; culms obtusely angled, smooth, 50-150 cm tall, covered at base with blade-bearing reddish sheaths; leaves flat, 3-5 mm broad, about equaling the culm, with involute margins, rather strongly scabrous, long-acuminate; spikelets 5-8, the terminal 2-3 staminate, approximate, fusiform-cylindric, 2-5 cm long, the others pistillate, often staminate at the summit, distant, cylindrical, 4-6 cm long, 3-4 mm broad, the upper ones sessile, the lower with peduncles to 1 cm long; bracts foliaceous, the lowest longer than the inflorescence; scales small, ovate, obtuse, brown, with a green midrib, shorter and narrower than the perigynia, sometimes very much so (and then spikelets appear green throughout); perigynia ellipsoid or obovate, 2.5-2.8 mm long, faintly biconvex, nerveless, yellowish-green or stramineous, terminating in a short smooth beak. Fr. May-August.

In water, by the side of rivers and ponds; marshes. —Arctic: Arct. Eur. and Sib.; European part: Kar.-Lap., Dv.-Pech., Lad.-Il'm., Upp. Dnepr. (n. part, in s. part—only the estuary of river Sozh), Upp. Volg., Volg.-Kam.; West. Siberia: Alt. (n. part); East. Siberia: Yenis., Ang.-Sayan., Daur., Len.-Kol. Gen. distr.: Western Europe. Described from Swedish Lapland. Type in Stockholm.

NOTE: Forming hybrids: \times *acuta* L.; \times *gracilis* Curt.; \times *discolor* Nyl. (*C. halophila* Nyl.).

ECONOMIC IMPORTANCE: This species, like *C. stans* Drej. (see below), is of outstanding importance for our arctic and northern livestock husbandry, as it occurs in large concentrations. It equals clover hay in nutritional value (even exceeds it in protein content); it is, however, more difficult to domesticate. Hay yields 25-35 centners per hectare.

126. *C. Uzoni* Kom. in Fedde, Repert. spl. nov. XIII (1914) 165 et in Fl. penins. Kamtsch. I (1927) 236. —*C. aquatilis* Hultén, Fl. of Kamtsch. I (1927) 186, non Whlb.

Perennial, cineraceous-green plants with creeping rhizomes and stolons; culms sharply angled, but smooth, 30-60 cm tall, covered at base with reddish-brown to red sheaths; leaves erect, rather stiff, flat to subinvolute, 2-4 mm broad, long-acuminate, shorter than the culm; spikelets 3-6, approximate, long, the terminal 1-2 staminate, linear-lanceolate, long, with ferruginous scales, the other pistillate, narrow or narrowly clavate, 3-4.5 cm long, not dense, loose toward the base, all pedunculate (peduncle) of lowest spikelets sometimes to 2-3 cm long; lowest bract overtopping the inflorescence; scales oblong-ovate, acute, blackish-brown, with a light median band, as long as or shorter and usually narrower than the perigynia; perigynia ovoid, plano-convex or unequally biconvex, 2 mm long,

yellowish, ferruginous above, very faintly 3-5-nerved on the outer face, with an obsolescent truncate beak.

Far East: Kamch. Endemic. Described from wet meadows of Uzon crater. Type in Leningrad.

127. *C. stans* Drej. Revis. Car. bor. (1841) 40. — *C. aquatilis* β et γ Trev. in Ldb. Fl. Ross. IV (1853) 312, ex p., non Whlb. — *C. aquatilis* var. *stans* Kük. in Engl. Pflzr. IV, 20 (1909) 311 et in Journ. Russ. Bot. 3-6 (1911) 84. — *C. rigida* var. *concolor* Kük., l.c., 301 et 82, p.p. (quoad pl. arcticam).

231 Perennial, light green to yellowish-green, caespitose plants, with short lateral offshoots; culms thickened, obtusely angled, smooth, 10-60 cm tall, covered at base with loose, ochreous to brownish-red sheaths; leaves flat, canaliculate or conduplicate, of spongy consistency, rather smooth, 3-5 mm broad, equaling the culm; spikelets 3-5, approximate, the terminal staminate, subclavate, 1-2 cm long, the others pistillate, oblong-clavate, 1-3 cm long (to 5 mm broad), subsessile; lowest bract ovate, dark brown, subacute, with a light midrib, about equaling to exceeding the perigynia and as broad; perigynia ellipsoid to ovoid, 2-2.3 mm long, nerveless, brownish, with a short smooth beak. Fr. June-July.

Sandy and mossy tundras and bare Siberian hills. — Arctic: Nov. Zem., Arct. Eur. and Sib., Chuk., Anad.; East. Siberia: Daur., Len.-Kol. Gen. distr.: circumpolar. Described from Greenland.

ECONOMIC IMPORTANCE: A good forage plant for all kinds of livestock in the tundra, where it has great economic importance. Readily eaten by reindeer during nearly the entire growing period. Chemical composition: water 13.53%, protein 16.63%, fats 4.15%, minerals 4.45%, cellulose 23.23, nitrogen-free extractable substances 38.01 (Sochava).

Cycle 7. *Sphacellaria* V. Krecz. — Green, densely caespitose plants, without stolons; leaves 2-2.5 mm broad, flat, slightly revolute at the margins; spikelets narrowly cylindrical, in digitate arrangement, to 3 cm long, all gynecandrous. Bract overtopping the inflorescence. Scales obtuse, shorter than perigynia. Perigynia broadly ovoid, 2-2.8 mm long, plano-convex, with few faint nerves.

128. *C. eleusinoides* Turcz. ex Bess. in Flora, XVIII, Beibl. 1 (1834) 26 (nomen) et ex Kunth, Enum. pl. II (1837) 407 (descr.); Turcz. Fl. baic.-dahur. II, 1 (1856) 391. — *C. caespitosa* β Trev. in Ldb. Fl. Ross. IV (1853) 311. — *C. fascicularis* Sievers ex Trev. in Bull. Soc. Nat. Moscou, XXXVI (1863) 543; Trautv. Incr. fl. Ross. IV (1884) 814, non Sol.

Perennial, green to dark green, densely caespitose plants; culms more or less curved, 20-30 cm tall, covered at base with purple bladeless sheaths; leaves flat, 2-2.5(3) mm broad, rather stiff, scabrous, shorter than the culm; spikelets 2-4, cylindrical, all pistillate above, staminate at base, sometimes with a few staminate flowers at the summit, 1-3 cm long, short-peduncled, forming a more or less digitate panicle; lowest bract equaling or exceeding the inflorescence; scales elliptic, obtuse to subobtuse, rusty-blackish-brown, with a faint, slender, light midrib, often white-hyaline at the summit, shorter and narrower than the perigynia, sometimes equaling to exceeding the perigynia (Kamchatka); perigynia broadly ovoid, sometimes suborbicular, 2-2.5 mm long, plano-convex, glaucescent, with

232 purple-spotted margin above, obscurely 1-3-nerved on both faces of nerve-
less, broadly cuneate at base, abruptly contracted into a barely distinct,
short, cylindric, slightly emarginate beak. Fr. June-August.

Wet places, marshes, bare Siberian hills. —Arctic: Anad.; East. Siberia:
Ang. -Sayan (e. part), Daur., Len. -Kol.; Far East: Ze. -Bur., Uss.,
Okhot., Kamch. Gen. distr.: Northern Mongolia. Described from Khamar-
Daban. Type in Leningrad.

Section 15. *Temnemis* (Rafin.) V. Krecz. —Rafin. in *Amenit. of Nat.*
I (1840) 27—*Neskiza Rafin.*, 1.c. —*Limivasculum Boern.* in *Abh.*
Naturw. Ver. Brem. XXI (1913) 268, ex p. (pro genere). —Plants of saline
coasts and marshes, with creeping rhizomes and stolons, forming loose
tufts, covered at base with ferruginous-brown to rufous, bladeless, more
or less split-fibrillose sheaths. Culms triangular. Inflorescence erect or
paniculately drooping, usually of 3-7 spikelets (more rarely spikelets in
glomerules of 3-4, 15-30 in number); of these 1-3 staminate, erect, oblong,
the others pistillate, oblong or cylindric, with peduncles to 3 cm and longer,
erect, inclined, or pendulous. Lowest bract sheathless, the blade equaling
or exceeding the inflorescence. Scales ovate or oblong, 3-nerved, acute
or aristate, longer than the perigynia. Perigynia thinly coriaceous, ovoid
or broadly ovoid, plano-convex, (2)3-4(5) mm long, short-stipitate, ob-
scurely few-nerved, grayish-green, often ferruginous-spotted, usually
smooth at the summit, abruptly contracted into a short truncate beak.
Stigmas 2.

1. Inflorescence of many (15-30) spikelets; spikelets in glomerules of
2-5 from axils of bracts; perigynia membranaceous 129. *C. tuminensis* Kom.
- + Inflorescence of few (3-7) spikelets; spikelets solitary in axils of
bracts; perigynia thinly coriaceous 2.
2. Scales lanceolate, long-awned, the awns many times exceeding the
body, to 1-1.5 cm long. Achene laterally deep-cleft 134. *C. paralia* V. Krecz.
- + Scales ovate, rarely lanceolate, obtuse, acute or short-awned (in this
case spikelets always erect, not drooping as in preceding species).
Achene regular. 3.
3. Spikelet on straight, thickened, weakly developed peduncles, often sub-
sessile. Perigynia ovoid, leaves usually equaling the culm. 4.
- + Spikelets on long slender peduncles, nodding or pendant. Perigynia
rather broadly rhomboidal-ovoid (rarely oblong, and then scabrous-
margined). Leaves half as long as the culm. 7.
4. Spikelets cylindric to clavate-cylindric, 4-7 cm long, 3-7 in number.
Scales lanceolate, subulate-awned, 2-3 times as long as the perigynia
. 133. *C. kattedagensis* Fries.
- + Spikelets oblong, 0.5-2.5 cm long, 3-5 in number. Scales ovate, ob-
tuse, subobtuse or acute, shorter to longer than the perigynia, but
not 2-3 times as long 5.
5. A small plant, 3-15 cm tall, with arched culms and leaves, the leaves
involute. Spikelets few-flowered, 0.5-1 cm long; lowest bract enlarged
at base, spatheform 130. *C. subspathacea* Wormskj.

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- + Plants 20-50 cm tall, with erect culms and leaves, the leaves flat or revolute. Spikelets dense, many-flowered, 1-2.5 cm long; lowest bract foliaceous 6.
- 6. Perigynia ovoid to oblong-ovoid, 3-4 mm long, without distinct nerves; scales ovoid, obtuse, 1-nerved, shorter than perigynia. Leaves shorter than the culm. (Far East) 131. *C. Ramenskii* Kom.
- + Perigynia ovoid to broadly ovoid, 3 mm long, with rather distinct nerves; scales cuneate-ovate, acute, 3-nerved, longer than or, at least, equaling the perigynia. Leaves equaling the culm. (North-western Europe). 132. *C. discolor* Nyl.
- 7. (3). Rhizome obliquely ascending; culms covered at base with tall, fulvous, keeled sheaths. Scales subobtuse, shorter than perigynia. Perigynia 4-5 mm long 135. *C. Middendorffii* F. Schmidt.
- + Rhizome horizontal; culms covered at base with reddish-brown or purplish-brown, ecarinate or slightly keeled sheaths. Scales acute, exceeding or equaling the perigynia. Perigynia 2-3.5 mm long. 8.
- 8. Perigynia oblong-ovoid, setose-margined; scales shorter than perigynia, obtuse. 140. *C. prionocarpa* Franch.
- + Perigynia broadly ovoid, smooth-margined; scales exceeding or, at least, equaling the perigynia, acute. 9.
- 9. Spikelets 5-7, long, cylindric, loose, 3-8 cm long; scales lanceolate, 2-3 times as long as the perigynia; perigynia glaucous-green 10.
- + Spikelets 3-5(6), short-cylindric, dense, 1.5-3.5 cm long; scales ovate or oblong-ovate, longer than or about equaling the perigynia; perigynia more or less spotted. 11.
- 10. Spikelets loose; scales castaneous to dark brown, broadly lanceolate, long-acuminate, 2-3 times as long as the perigynia. Perigynia 3-3.5 mm long. 136. *C. cryptocarpa* C.A.M.
- + Spikelets rather dense; scales ferruginous, lanceolate, acute, scarcely twice as long as the perigynia. Perigynia 2-3 mm long. 137. *C. Riabushinskii* Kom.
- 11. Large plants, 45-70 cm tall, with dense and plump (0.8-0.9 cm broad), spikelets (to 2 cm long). Scales 3-nerved, oblong-ovate, acute, much longer than the perigynia. Perigynia 2.5-3 mm long, olivaceous-green, ferruginous-spotted 138. *C. suifunensis* Kom.
- 234 + Small (15-40 cm tall) plants, with dense, rather slim (0.5 cm broad), elongate spikelets (to 3.5 cm long). Scales 1-nerved, ovate, subacute, equaling to barely exceeding the perigynia. Perigynia 2.5 mm long, yellowish-ferruginous 139. *C. pedunculifera* Kom.

Cycle. *Tetraplostachys* V. Krecz. — Plants with a long, nodding inflorescence of many spikelets (15-30); the terminal 3-6 spikelets staminate, the others pistillate, arising in glomerules of (2)3-4 from axils or bracts, on long, nodding, scabrous peduncles. Perigynia membranaceous, with slender nerves.

129. *C. tuminensis* Kom. in A.H.P. XVIII, 6 (1901) 444; Fl. Mandsh. I (1901) 368; Kük. in Engl. Pflzr. IV, 20 (1909) 369 et in Journ. Russ. Bot. 3-6 (1911) 97. — *C. ternaria* Meinsh. in A.H.P. XVIII, 3 (1901) 342, non Forst.

Perennial, light-(silvery)-green, caespitose plants, with stout rhizomes and thick stolons; culms numerous, thickened, scabrous above, 60-100 cm tall, leafy to considerable height, the basal sheaths broad, slightly keeled, red, bladeless, reticulate-fibrillose in the split part; leaves flat, 8-12 mm broad, slightly revolute at the margins, shorter than the culm; spikelets numerous, 15-30, in glomerules of 3-4 from axils of bracts, sometimes with forking peduncles, the terminal 3-6 staminate, clavate or fusiform, to 6 cm long, with lanceolate, light brown scales, the others pistillate, narrowly cylindrical or clavate, light-colored, becoming distant toward base (often with a short lateral branch at the base of the lowest, far removed scale), 2-7 cm long, on long (to 10 cm), slender, prominently scabrous peduncles, drooping; lowest bract and the 1-2 above it strong, all three overtopping the inflorescence; scales lanceolate, long-acuminate, light ferruginous to ferruginous, with a light median band, 3-nerved, exceeding the perigynia; perigynia obovate to ellipsoid, unequally biconvex, 2.5-3 mm long, grayish-to brownish-green, with 5-6 slender whitish nerves on both faces, distinctly stipitate, with a pronounced, obliquely truncate beak.

River banks and silty shallows. —Far East: Kamch., Sakh., Ud., Ze.-Bur., Uss. Gen. distr.: Manchuria, Korea. Described from Northern Korea: Kengsong Province; Kursin-buri River (tributary of Tumin-Gan), near Mount Musang. Type in Leningrad.

Cycle 2. *Neskiza* (Rafin.) V. Krecz. —*Neskiza* Rafin. in *Amenit. of Nat.* I (1840) 27 (pro genere). —Plants with erect or nodding inflorescences of 3-7 spikelets; of these 1-3 staminate, erect, the remaining 2-4 pistillate, oblong or cylindrical, solitary, pedunculate, erect, nodding, or pendulous. Perigynia thinly coriaceous, with few indistinct nerves.

Series 1. *Squamatae* V. Krecz. —Perigynia ovoid; achene regular, not 235 concave. Spikelets with straight, usually short, scabrous or smooth peduncles, often sessile; scales ovate, obtuse or acute, shorter to longer than perigynia, but not more than twice as long.

130. *C. subspathacea* Wormsj. ex Hornm. in *Fl. dan.* IX, 26 (1816) 6, tab. 1530; Kük. in *Engl. Pflzr.* IV, 20 (1909) 361 et in *Journ. Russ. Bot.* 3-6 (1911) 95. —*C. salina* f. *nana* Trautv. *Consp. Fl. Nov. Seml.* (1872) 82. —*C. salina* ssp. *mutica* var. *subspathacea* Almq. in *Bot. Not.* (1891) 127. —Exs.: Kneuck. No. 247, 248; Pf. Finl. Exs. No. 118.

Perennial, yellowish-green, loosely caespitose plants, with slender creeping rhizomes and stolons; culms arched, obscurely triangular, smooth, 3-15 cm tall, with few bladeless sheaths or bladeless at base; leaves curved, involute, 1-2 mm broad, smooth, equaling the culm, with laticercious sheaths at base. Spikelets 2-4, the terminal staminate, to 1 cm long, with dark brown, obtuse, obovate scales; the remaining spikelets pistillate, oblong or lanceolate, 0.5-1 cm long, loose, few-flowered, short-peduncled, the upper ones sessile; lowest bract strongly enlarged at base, equaling the inflorescence; scales ovate, obtuse to subobtuse, or cuspidate, dark brown, with a light median band, 3-nerved, shorter than the perigynia; perigynia appressed, oblong ellipsoid, plano-convex, 3-3.5 mm long, grayish-green, becoming dark ferruginous, obscurely nerved, with an indistinct whitish entire beak. Fr. July—August.

Wet and brackish sea shores. —Arctic: Nov. Zem., Arct. Eur., Arct. Sib., Chuk.; Anad. Far. East: Sakh. Gen. distr.: circumpolar. Described from Greenland (Quannesck Bay, Negestlek).

NOTE: Forming hybrids with *C. stans* Drej. (*C. flavicans* Nyl. ?) and *C. discolor* Nyl.

ECONOMIC IMPORTANCE: In some parts of tundra lowlands it has importance as a valuable forage for deer.

131. *C. Ramenskii* Kom. in Fedde, Repert. sp. nov. XIII (1914) 164. — *C. subspathacea* Meinsh. in A. H. P. XVIII, 3 (1901) 340 et Kük. in Engl. Pflzr. IV, 20 (1909) 361, pro pl. sachalin., non Wormskj.

Perennial, yellowish-green, loosely caespitose plants, with creeping rhizomes and stolons; culms erect, triangular, smooth, 35-50 cm tall, covered at base with reddish-purple, dull, bladeless sheaths; leaves straight, rather abruptly pointed, flat, 2-3 mm broad, with slightly revolute margins above, shorter than the culm; spikelets 3-5, erect, the terminal 1-2 staminate, fusiform, 2-2.5 cm long, with lanceolate, ferruginous-brown scales, the others pistillate, ovoid to oblong, 0.8-2.5 cm long, rather plump (0.5-0.6 cm broad), dense, often with staminate flowers at the summit, with short thickened peduncles, subapproximate; the 2 lower bracts strongly developed, the lowest overtopping the inflorescence, the next equaling it; scales ovate, obtuse, toward base of spikelet acutish, dark brown, with a single slight central nerve, as long as or slightly shorter than the perigynia; perigynia semicoriaceous, ovoid to oblong-ovoid, plano-convex, 3-4 mm long, grayish-green, becoming dark ferruginous, the few nerves light at base, the beak indistinct, truncate, purple at the end.

Wet shores and marshes. — Arctic: Anad.; Far East: Kamch. (Avach estuary), (Penzhina), Okhot. (Yana estuary), Sakh. (Truotoga and d'Estaing Bay). Endemic. Described from Kamchatka (Avacha estuary). Type in Leningrad.

132. *C. discolor* Nyl. Spicil. fl. fenn. III (1846) 12; Anderss. Cyp. Scand. (1849) 54. — *C. cuspidata* Whlb. in Sv. Vetensk. Ak. Nya Handl. XXIV (1803) 164, non Host (1801). — *C. salina* var. *cuspidata* Whlb. Fl. lapp. (1812) 246. — *C. salina* Willd. Sp. pl. IV (1805) 301; Schkuhr, Riedgr. II (1806) 29, tab. Cccc, fig. 185; Whlb. Fl. Suec. II (1826) 612; Kük. in Engl. Pflzr. IV, 20 (1909) 361, non Whlb. in Sv. Ak. Nya Handl. XXIV (1803) 165, qua est pl. hybrida aquat. × subspath. — *C. salina* subsp. *cuspidata* var. *borealis* Almq. in Bot. Not. (1891) 126. — *C. salina* ssp. *cuspidata* var. *borealis* f. *discolor* Almq. Consp. Fl. Fenn. III (1895) 281. — *C. trinervis* Perfil. Fl. Sev. Kr. I (1934) 116, non Degl. — Exs.: Kneuck. No. 242.

Perennial, yellowish-green plants, with creeping rhizomes and stolons; culms robust, erect, triangular, more or less scabrous above, 10-30(40) cm tall, covered at base with purplish-brown, broad, faintly keeled sheaths; leaves rather stiff, straight, flat to subinvolute, 2-5 mm broad, with revolute margins above (on stolons, exceeding the culms), rather abruptly pointed; spikelets 3-5, not congested, strict, the terminal 1-2 staminate, oblong, 0.5-1 cm long (sometimes androgynous), with brown scales, the others pistillate, oblong-cylindric, 1-2 cm long (sometimes also androgynous), loose, the uppermost short-peduncled, the lower ones with longer peduncles; lowest bract foliaceous, equaling the inflorescence; scales ovate to oblong-ovate, often emarginate, ferruginous-brown, 3-nerved, with only

the midrib prominent and light internerves, subulate-tipped, equaling to slightly exceeding the perigynia; perigynia ovoid to broadly ovoid, plano-convex, 3 mm long, grayish-green, few-nerved, abruptly contracted into an indistinct, emarginate beak. Fr. June–August.

Brackish coastal shallows. —Arctic: Arct. Eur.; European part: Kar. -Lap. and Dv. -Pech. (White Sea coast). Gen. distr.: Northern Scandinavia. Described from Russian Lapland: Iokonga. Type in Leningrad.

NOTE: Forming hybrids with *C. stans* Drej., *C. subspathacea* Wormskj., and *C. paralia* V. Krecz.

133. *C. kattegatensis* Fries in Ind. sem. Hort. Upsal. (1857), nomen. —*C. salina* var. *kattegatensis* Almq. in Hartm. Handb. Scand. 237 Fl., ed. 11 (1879) 466; Kuk. in Engl. Pflzr. IV, 20 (1909) 362. —*C. salina* ssp. *cuspidata* var. *kattegatensis* Almq. in Bot. Not. (1891) 126. —*C. salina* ssp. *fuliginea* Blytt, Norg. Fl. I (1861) 219. —*C. Lyngbyei* Perfil. Fl. Sev. Kr. I (1934) 119, non Hornm. —Exs.: Kneuck. No. 244; Pl. Finl. Exs. No. 117 a.

Perennial, cineraceous-green to light-green plants, with short rhizomes and short stolons; culms erect, smooth or only at the summit scaberulous, 40-70 cm tall, covered at base with reddish (lateritious)-brown, broad, slightly keeled sheaths; leaves straight, flat, 3-5(6) mm broad, equaling the culm (exceeding it in offshoots), slightly revolute-margined; spikelets 3-7, erect, the terminal 1-3 staminate, fusiform, to 3 cm long, with light ferruginous, linear-lanceolate scales, the others pistillate, narrowly cylindrical or clavate-cylindrical, becoming loose toward the base, 4-7 cm long, often with staminate flowers at the summit, somewhat contracted, rather distinctly pedunculate, the lowest spikelets subdistant, its bract equaling to slightly exceeding the inflorescence; scales lanceolate, ferruginous, 3-nerved, with lighter internerves, subulate-tipped, twice as long as the perigynia; perigynia ovoid, plano-convex, 3 mm long, yellowish-ferruginous, purple-spotted, with few faint nerves at base and a short truncate beak. Fr. June–August.

Mossy bogs and coastal meadows. —Arctic: Arct. Eur.; European part: Kar. -Lap., Dv. -Pech. (White Sea coast). Gen. distr.: Baltic coasts and the Atlantic seaboard of Scandinavia and Great Britain. Described from the Scandinavian coast of Kattegat Bay. Type in Uppsala.

Series 2. *Setiferae* V. Krecz. —Perigynia ellipsoid; achene deeply invaginated on one side. Spikelets with slender, smooth or scabrous, nodding peduncles; scales lanceolate, long-awned, the awn 4-5 times as long as body of scale.

134. *C. paralia* V. Krecz. nom. nov. —*C. maritima* O.F. Muell. in Fl. dan. IV, 12 (1777) 6, tab. 703; Trev. in Ldb. Fl. Ross. IV, 313; Kük. in Engl. Pflzr. IV, 20 (1909) 359, non Gunn. (1772). —Exs.: Pl. Finl. Exs. No. 527, Kneuck. No. 241.

Perennial, yellowish-green plants with creeping rhizome and stout stolons; culms short, slightly enlarged-winged, smooth, 20-50 cm tall, covered at base with broad, blackish-brown, slightly keeled, somewhat lustrous, bladeless sheaths; leaves stiff, flat, 4-8 mm broad, revolute-margined, rather abruptly pointed, usually shorter than the culm, those of offshoots overtopping the culms; spikelets 5-7, scattered, the terminal 1-3 staminate, clavate-cylindrical, with linear-lanceolate, ferruginous scales, to 2-3 cm

long, the others pistillate, oblong-ovoid or clavate, 2-5 cm long, plump, dense, bristly owing to scale awns, long-peduncled; all pendulous; lowest bract foliaceous, considerably overtopping the culm; scales oblong-lanceolate, prolonged into a long scabrous awn, rufous or ferruginous, 3-nerved, twice as long as the perigynia; perigynia obovate or ellipsoid, biconvex, 3-3.5 mm long, grayish-green to yellowish-green, with slender faint nerves, obscurely stipitate, with an indistinct, short, truncate beak. Achene with a deep transverse invagination on one side. Fr. June-August.

Coastal sands and meadows. —Arctic: Arct. Eur. (Kol'skii Peninsula); European part: Kar. -Lap. (White Sea coast), Dv. -Pech. (Dvina delta). Gen. distr.: Atlantic coast of Europe. Described from Denmark (Drobak).

NOTE: Forming hybrids with *C. discolor* Nyl.

Series 3. *Rhomboido-ovatae* V. Krecz. —Perigynia rather broadly rhomboidal-ovoid. Spikelets on long, smooth, drooping or nodding peduncles; scales ovate, acute, usually longer than perigynia (sometimes twice as long).

135. *C. Middendorffii* F. Schmidt in Mém. Ac. St. Pétersb., VII sér., XII, 2 (1868) 70 et 197, tab. VII, fig. 1-5; Kük. in Engl. Pflzr. IV, 20 (1909) 364 et in Journ. Russ. Bot. 3-6 (1911) 97. —*C. Middendorffiana* Meinsh. in A. H. P. XVIII, 3 (1901) 344.

Perennial, cineraceous-green plants, with stout long rhizome and thick stolons; culms scaberulous or smooth above, 30-60 cm tall, covered at base to considerable height with cinnamon-brown, keeled, split-reticulate, bladeless sheaths; leaves stiffish, ribbed below with margins more or less revolute above, 2-4 mm broad, shorter than the culm; spikelets 3-5, the terminal 1-2(3) staminate, oblong, to 2.5 cm long, with ovate ferruginous scales, the others pistillate, ovoid (the upper pyramidal-ovoid) or oblong-ovoid, 1-2.5 cm long, often with staminate flowers down to the middle, dense, segregated, on slender smooth peduncles to 5-6 cm long, erect or nodding, but not pendulous; lowest bract narrow, equaling the inflorescence; scales ovate to oblong-ovate, obtusish, subacute toward the base, ferruginous, brown, or dark brown, with a light median band, somewhat white-hyaline at the margin, shorter than perigynia; perigynia ovoid to rhomboidal-ovoid, 4-5 mm long, plano-convex or rather concave-convex, grayish-green, becoming light ferruginous, with 3-5 stoutish nerves on both faces, subsessile, with a rather indistinct, smooth or scabrous, truncate beak. Fr. June-July.

Mossy bogs. —Far East: Kamch., Okhot., Ud., Sakh., Ze. -Bur., Uss. Gen. distr.: Northern Mongolia, Japan. Described from Udskii Island. Type in Leningrad.

136. *C. cryptocarpa* C. A. M. in Mém. Ac. St. Pétersb. Sav. Etr. I (1831) 226, tab. 14; Trev. in Ldb. Fl. Ross. IV, 313; Meinsh. in A. H. P. XVIII, 3 (1901) 341. —*C. Lyngbyei* Kük. in Engl. Pflzr. IV, 20 (1909) 363, ex p. et in Journ. Russ. Bot. 3-6 (1911) 96; Kom., Fl. Kamch. I, 240, non Hornm. —*C. Lyngbyei* ssp. *cryptocarpa* Hultén, Fl. of Kamtch. I (1927) 196. —*C. Romanzowiana* Cham. ex Steud. Syn. Cyp. (1855) 216.

Perennial, green to dark green plants, with creeping rhizome and thick stolons; culms stout, mostly smooth, pendulous above (in inflorescence), 30-120 cm tall, covered at base with broad, lustrous, lateritious-purple,

slightly keeled, bladeless sheaths, these split-reticulate in the membranaceous part; leaves flat, (3)5-10 mm broad, abruptly pointed, slightly revolute-margined, shorter than the culm; spikelets 5-7, distant, the terminal 2-3 staminate, fusiform or clavate, to 6-7 cm long, with ferruginous, linear-lanceolate scales, the others pistillate, cylindrical, 2-8 cm long (0.8-1.2 cm broad), rather loose, often with staminate flowers at tip, on long (to 8-10 cm), mostly smooth peduncles, all pendulous; lowest bract exceeding the inflorescence; scales lanceolate to oblong-lanceolate, subulate-tipped, castaneous or dark brown, with a light median band, 2-3 times as long as the perigynia; perigynia broadly ovoid, biconvex, 3-3.5 mm long, cinereous-green, at length brunescent, with 6-8 slender nerves on both faces and a short truncate beak. Fr. June-August.

Peat and meadow bogs, meadows, and shores. -Arctic: Chuk., Anad.; Far East: Kamch., Okhot, Ud., Sakh. (n.), Ze.-Bur., Uss. Gen. distr.: Alaska, Manchuria, Japan. Described from Unalaska. Type in Leningrad.

137. *C. Riabushinskii* Kom. in Fedde, Repert. sp. nov. XIII (1914) 163 et in Fl. penins. Kamtsch. I (1927) 244.

Perennial, glaucous-green plants, with a strong rhizome and with stolons; culms robust, thickened and smooth below, scabrous above, slightly nodding in inflorescence, 70-100 cm tall, covered at base with reddish (?) bladeless sheaths; leaves flat, rather abruptly pointed, 5-8 mm broad, revolute-margined, shorter than the culm; spikelets 5-7, the terminal 1-3 staminate, oblong or clavate, to 3-4 cm long, with ovate ferruginous scales, the others loosish, often with staminate flowers at tip, pendulous, the peduncles rather long (to 5-6 cm), scabrous below, slender; lowest bract overtopping the inflorescence; scales oblong-ovate or lanceolate, acute or terminating in a short subulate point, ferruginous, with a light midrib, nearly twice as long as the perigynia; perigynia broadly ovoid, biconvex, 2.2-3 mm long, grayish- to yellowish-green, with 5-8 slender faint nerves on both faces, sessile, with an obsolescent truncate beak.

Peaty shores, quicksands, and water near the shores. -Far East: Kamch. Endemic. Described from Kamchatka (Mashura village). Type in Leningrad.

138. *C. suifunensis* Kom. in A.H.P. XVIII, 6 (1901) 445 et in Fl. 240 Mandsh. I (1901) 373. -*C. pruinosa* ssp. *Maximowiczii* var. *sui-funensis* Kük. in Engl. Pflzr. IV, 20 (1909) 353 et in Journ. Russ. Bot. 3-6 (1911) 94.

Perennial, grayish- to yellowish-green plants, with creeping rhizomes, stoloniferous; culms numerous, firm, more or less triangular with concave sides, prominently scabrous, 45-70 cm tall, covered at base with lateritious-brown, lustrous, faintly keeled, broad, bladeless sheaths; leaves stiffish, flat, 3-5 mm broad, somewhat revolute-margined, abruptly pointed, shorter than the culm; spikelets 3-5, distant, the terminal 1-2 staminate (the lower pedunculate), oblong, 1.5-3 cm long, the others pistillate, oblong, 2-3.5 cm long, 0.8-0.9 cm broad, loosish, all on scabrous peduncles, pendulous; lowest bract foliaceous, equaling the inflorescence; scales oblong-ovate, acute, ferruginous, 3-nerved, with lighter internerves, equaling or exceeding the perigynia; perigynia broadly ovoid, unequally

biconvex, 2.5-3 mm long, grayish-yellow, becoming olivaceous, ferruginous-spotted, with slender, not always distinct, nerves on both faces, sessile, abruptly contracted into a weak truncate beak. Fr. June—August.

Wet sands.—Far East: Uss. (s. part). Gen. distr.: Manchuria. Described from Poltavskoe village on the river Suifun. Type in Leningrad.

139. *C. pedunculifera* Kom. in Fedde, Repert. sp. nov. XIII (1914) 163 et in Fl. penins. Kamtsch. I (1927) 244.

Perennial, cineraceous-green plants with creeping rhizome and short stoutish stolons; culms scaberulous above, subpendulous in inflorescence, 15-40 cm tall, covered at base with reddish-purple, obscurely keeled, slightly lustrous sheaths; leaves stiffish, with strongly revolute margins, 2-4 mm broad, abruptly pointed, equaling the culm; spikelets (3)4-6, the terminal 1-2 staminate, oblong, to 2 cm long, with ovate ferruginous scales, the others pistillate, cylindric, 1.5-2 cm long, 0.5 cm broad, dense, on slender scabrous peduncles (not exceeding 3-4 cm), nodding, but not pendulous; lowest bract scarcely equaling the inflorescence; scales ovate, acute to subacute, ferruginous-brown, light-colored along the prominent midrib, equaling or barely exceeding the perigynia; perigynia broadly ovoid, plano-convex 2.5 mm long, yellowish-ferruginous, obscurely nerved, with a rather indistinct truncate beak.

Wet meadows.—Arctic: Anad.; Far East: Kamch., Sakh. (n.), Okhot. Endemic. Described from Kamchatka (Kronotskoe Lake). Type in Leningrad.

140. *C. prionocarpa* Franch. in Bull. Soc. Philom. Paris, 8 sér., VII (1895) 87 et in Nouv. Arch. Mus. Paris, 3 sér., VIII (1896), tab. 8, fig. 1 et IX (1897) 128; Miyabe et Kudo, Fl. Hokk. and Sagh. II (1931) 239.—*C. Lyngbyei* var. *prionocarpa* Kük. in Engl. Pflzr. IV, 20 (1909) 364.

Perennial, glaucous-green plants, with strong rhizome and strong stolons; culms sharply triangular, strongly scabrous, 50-70 cm tall, leafy up to the middle, covered at base with castaneous, split-reticulate, bladeless 241 sheaths; leaves rigid, flat, 4 mm broad, shorter than the culm; spikelets 5-7, the terminal 3 staminate, subdistant, linear-oblong, with dark brown obtuse scales, the others pistillate, on long slender peduncles, pendulous often with staminate flowers at tip; lowest bract not exceeding the inflorescence; scales dark brown, ovoid, obtuse, narrower than perigynia and as long or slightly shorter; perigynia oblong-ovoid, 2.7-3 mm long, glaucescent, nerved, scaberulous on the margin and above on outer face (along the nerves), round-based, rather gradually tapering into a short beak.

Recorded by Y. Kudo for northern Sakhalin.—Gen. distr.: Japan (Yezo). Described from Japan (Yezo, Nemuro). Type in Paris.

Section 16. *Chalciolaena* V. Krecz.—Paludose, loosely cespitose, stoloniferous plants, with creeping rhizome, more or less triangular culms, and rather finely pointed leaves. Inflorescence lateral, loose, racemose, consisting of a solitary narrow staminate spikelet and 2-3 pistillate spikelets; the latter oblong, loose, pendulous, on slender smooth peduncles; bract with more or less pronounced, closed sheath (from 2 mm to 2 cm long) and a weakly developed blade. Perigynia coriaceous, subellipsoid to ellipsoid, faintly trigonous, more or less flattened, (2.5)3-4 mm long, short-stipitate, with more or less pronounced nerves, rounded at the summit,

usually smooth, with a very short, obsolescent beak. Stigmas 3.

1. Lowest bract with a long sheath (to 2 cm) 143. *C. laxa* Whlb.
+ Lowest bract with a short sheath (2-5 mm long) 2.
2. Culms smooth. Spikelets oblong, few-flowered, loose; scales entirely covering the perigynia; perigynia oblong-ellipsoid, inflated-trigonus 3.
+ Culms scabrous †. Spikelets ovoid, many-flowered, rather dense; scales usually narrower than the perigynia; perigynia ovoid, compressed-trigonus 4.
3. Perigynia 3 mm long, glaucous-green, at length yellowish, essentially beakless; scales brownish, as long as or shorter than perigynia; spikelets 3-8-flowered, 1-1.5 cm long . . . 141. *C. rariflora* Whlb.
+ Perigynia 4 mm long, brunescent, with a very short beak; scales blackish-brown, long-acuminate, longer than perigynia; spikelets 10-15-flowered, 1.5-2 cm long 142. *C. stygia* Fries.
4. Perigynia 4 mm long, costate-nerved, glaucous, with a short beak. Pistillate spikelets 1-2, to 1-1.2 cm broad, to 2.5-3 cm long; scales persistent. Leaves 1-1.5 mm broad 5.
+ Perigynia 2.5-3(3.5) mm long, faintly nerved, greenish-glaucous to pale glaucous, almost beakless. Pistillate spikelets 2-3, to 0.5-0.6 cm broad, 0.7-1.5 cm long; scales promptly deciduous. Leaves to 3-4 mm broad 6.
5. Leaves canaliculate-involute; rhizome long-branched. Scales ovate, abruptly pointed, brownish-honey-colored 144. *C. limosa* L.
+ Leaves flat; rhizome short-branched. Scales oblong, gradually pointed, ferruginous-brown; culms usually smooth 145. *C. fusco-cuprea* (Kük.) V. Krecz.
6. Culms 20-60 cm tall, longer than the leaves. Spikelets pendulous 145. *C. irrigua* Whlb.
+ Culms not exceeding 10 cm in height, shorter than the leaves. Spikelets erect (according to Akiyama) **C. Fudjitae* Kudo.

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141. *C. rariflora* Whlb. in Sv. Vetensk. Ak. Handl. XXIV (1803) 162; Trev. in Ldb. Fl. Ross. IV, 297; Meinsh. in A.H.P. XVIII, 3 (1901) 350; Kom. Fl. Kamch. I, 257; Hultén, Fl. of Kamtch. I, 200. —Ic.: Kük. in Engl. Pflzr. IV, 20 (1909) 503, fig. 80 A-D. —Exs.: Kneuck. VI, No. 172; XII, No. 343.

Perennial, bright green plants, with creeping, rather slender rhizome, forking at right angles, loosely cespitose; culms firm, erect, obtusely triangular, smooth, 10-35 cm tall, covered at base with dark purple, bladeless sheaths; leaves stiffish, flat, 2-2.5 mm broad, long-acuminate, shorter than the culm; spikelets 2-3, somewhat scattered: the terminal erect, staminate, oblong-clavate, 1-1.5 cm long, with ovate, dark brown, round-tipped, but mucronate; other spikelets pistillate, on capillary smooth peduncles, pendulous or erect, oblong, 1-1.5 cm long (0.3-0.4 cm broad), loose and sparsely-flowered below, of 3-8 flowers; lowest bract with a brown sheath to 2 mm long and green blade to 3 cm long; scales rather broadly-ovate, acute, mucronate, dark brown, with a reddish or white midrib,

† Often (especially in old plants) culms smooth; in this case the other characters have to be relied upon.

equaling or shorter than the perigynia; perigynia oblong-ellipsoid, biconvex, 3 mm long, glaucous-green, becoming yellowish, short-stipitate, rounded-cuneate at base, nerves few, stoutish, distinct only at base, summit rounded-conical, beak obsolete, brownish at the mouth. Fr. June—August.

Boggy tundra. —Arctic. Nov. Zem., Arct. Eur., Arct. Sib., Chuk., Anad.; European part: Kar.-Lap. (Kol'sk. coast), Dv.-Pech. (White Sea coast); East, Siberia: Len.-Kol.; Far East: Kamch., Okhot., Sakh. Gen. distr.: Iceland, Scotland, Fenno-Scandia, Arctic America. Described from North Nordland (Norway). Type in Stockholm.

NOTE: Forming hybrids with *C. limosa* L. and *C. irrigua* Whlb.

ECONOMIC IMPORTANCE: Of limited economic importance in the tundra. In reindeer pasture eaten satisfactorily in spring and winter, much less so at other times.

142. *C. stygia* Fries, Nov. Fl. suec. Mant. III (1842) 141. —*C. rariflora* ssp. *stygia* Anderss. Cyp. Scand. (1849) 35, tab. VII, fig. 71. —*C. rariflora* var. *stygia* Kük. in Engl. Pflzr. IV, 20 (1909) 504. —*C. nigrita* Fisch. ex Bcklr. in Linnaea, XLI (1877) 164. —*C. rariflora* β Trev. in Ldb. Fl. Ross. IV (1853) 297.

Perennial, green plants, with a stout creeping rhizome and short, thickened, hooklike offshoots; culms firm, triangular, with concave sides, smooth, 15-35 cm tall, leafy nearly up to the middle with bladeless blackish-purple sheaths at base; leaves stiff, subinvolute, to 3 mm broad; spikelets 2-3, subdistant: the terminal staminate, lanceolate, 1.5 cm long, with blackish-brown, ovate, subacute scales, the others pistillate, oblong-ovoid, 1.5-2 cm long (0.6-0.7 cm broad), loose, 10-15-flowered, on slender smooth peduncles attaining 1.5 cm in length; pendulous; lowest bract with a brownish sheath to 5 mm long and blade to 3 cm long; scales ovate, long-acuminate, blackish-brown, with a ferruginous midrib, longer than perigynia; perigynia ellipsoid, compressed-trigonous or concave-trigonous, 4 mm long, greenish-brown, obscurely nerved, gradually tapering into a very short, slightly emarginate, brown-mouthed beak.

Peat bogs near sea coast. —European part: Kar.-Lap. (Sumskii Posad); Far East: Kamch., Commander Islands, Bering Island. Gen. distr.: Fenno-Scandia, Arctic America. Described from Finmark in Sweden. Type in Uppsala.

143. *C. laxa* Whlb. in Sv. Vetensk. Ak. Nya Handl. XXIV (1803) 156; Fl. lapp. (1812) 237, tab. XV, fig. 1; Trev. in Ldb. Fl. Ross. IV, 297; Meinsh. in A.H.P. XVIII, 3 (1901) 357; Kük. in Engl. Pflzr. IV, 20 (1909) 506 et in Journ. Russ. Bot. 3-6 (1911) 144. —Exs.: Pl. Finl. Exs. No. 127 a, b, c; Dörfl. No. 4795.

Perennial, cineraceous-green plants with very slender rhizomes; culms slender, somewhat pendulous at the summit, obtusely triangular, smooth, leafy in lower third, 25-40 cm tall, covered at base with light brown bladeless sheaths; leaves rather soft, flat, 1-2 mm broad, scaberulous, rather abruptly pointed, shorter than the culm; spikelets 3, distant: the terminal staminate, lanceolate or narrowly clavate, with oblong, ferruginous-brown, obtuse scales; other spikelets pistillate, on long, slender, smooth peduncles, pendulous, oblong, 1-2 cm long, 0.5 cm broad, loose; lowest bract with a green sheath to 2 cm long and blade to 3 cm long; scales ovate, obtuse, or

subacute in lower part of spikelet, light ferruginous, greenish at center, slightly shorter than perigynia; perigynia oblong-ellipsoid to sublanceolate, obscurely trigonous, 3.5-3.8 mm long, glaucous-green, with slender nerves, cuneate-attenuate at base, short-stipitate, smooth at the summit, gradually tapering into a short, obsolescent, truncate, ferruginous beak. Fr. July—August.

Mossy marshes and shores. European part: Kar.-Lap.; West. Siberia: 244 Ob.; East. Siberia: Daur., Len.-Kol.; Far East: Ze.-Bur. (Nemilen), Uss. (Grigor'evka, Lyan'chikhe River valley), Kamch. Gen. distr.: Fenno-Scandia, Manchuria. Described from Sweden (Torn. Lapland, near Enontekiö Lake). Type in Stockholm.

144. *C. limosa* L. Sp. pl. (1753) 977; Trev. in Ldb. Fl. Ross. IV, 307; Meinsh. in A.H.P. XVIII, 3 (1901) 351; Kom. Fl. Kamch. I, 257; Hultén, Fl. of Kamtch. I, 201; Grossh. Fl. Kavk. I, 170. — Ic.: Kük. in Engl. Pflzr. IV, 20 (1909) 503, fig. 80 E—G; Syreish. Ill. Fl. Mosk, gub. I, 205. — Exs. HFR No. 744, 744 a; Pl. Finl. Exs. No. 126; Kneuck. No. 39.

Perennial, glaucous-green, loosely caespitose plants, with long creeping rhizome, forking at right angles; culms erect, triangular, scabrous above, 25-50 cm tall, leafy in lower third, covered at base with reddish-brown entire sheaths; leaves stiff, ribbed, canaliculate-folded, 1.5-2 mm broad, long-attenuate, straight, shorter than the culm; spikelets 2-3, subdistant: the terminal staminate, linear, 1-3 cm long, with lanceolate, acute, brownish scales, the others pistillate, on slender smooth peduncles to 2.5 cm long, pendulous, ovoid to oblong-ovoid, 1-2.5 cm long (to 1 cm thick); lowest bract with sheath barely 2 mm long and blade 2-2.5 cm long; scales ovate, abruptly long-pointed, honey-brown or brownish, with a light midrib, longer than perigynia; perigynia ellipsoid, compressed-trigonous, 4 mm long, glaucous-green, with 7-9 costate, pale nerves, short-stipitate, rounded at base and at summit, smooth-margined, abruptly contracted into a short-cylindric, brownish-mouthed, scarcely emarginate beak. Fr. May—June.

Peat bogs and meadows. — European part: Kar.-Lap., Dv.-Pech., Lad.-Il'm., Upp. Dnepr., Upp. Volg., Volg.-Kam., Mid. Dnepr., Volg.-Don., Zavolzh., Low. Don., Prichern. (Vodyano-Tsybulev); Caucasus: West. Transcauc. (upper reaches of Psezuape; Gr. Cauc.); West. Siberia: Ob., Irt. (Dzholdubai Lake, Kokchetavskii District), Alt.; entire East. Siberia and entire Far East. Gen. distr.: Western Europe, North America, Northern Mongolia, Manchuria. Described from northern Europe (Sweden).

NOTE: Forming hybrids: \times *rariflora* Whlb., \times *irrigua* Whlb.; \times *livida* Whlb. (*C. imandrensis* Khilm.).

145. *C. fusco-cuprea* (Kük.) V. Krecz. sp. nova in Addenda, II, 599. — *C. limosa* var. *fusco-cuprea* Kük. ex Matsum. Ind. pl. Jap. II, 1 (1905) 118 et in Engl. Pflzr. IV, 20 (1909) 505; Miyabe et Kudo, Fl. Hokk. and Sagh. II (1931) 255; Akiyama in Journ. Fac. Sc. Hokk. Univer., ser. V, II, 1 (1932) 160, fig. 106.

Perennial, cineraceous-green plants with short creeping rhizome; culms triangular, smooth 15-50 cm tall, leafy in lower third, covered at base with reddish-brown, entire sheaths; leaves stiffish, long-attenuate, flat, 1-1.5 mm broad, shorter than the culm; spikelets 2-3, subdistant: the 245 terminal erect, staminate, lance-linear, with acute, ferruginous-brown, narrow scales, the others pistillate, on slender peduncles, pendulous, lance-ovoid, to 3 cm long, 1.2 cm thick, nearly always with staminate flowers at tip; lowest bract with rather indistinct sheath 1-2 mm long and blade not

exceeding the spikelet; scales oblong-ovate, gradually pointed, ferruginous-brown, longer than perigynia; perigynia ovoid to broadly ovoid, 4 mm long, glaucous, distinctly ribbed, rounded at base and at summit, smooth, abruptly contracted into a short, barely emarginate beak.

Marshes and wet meadows. — Far East: Sakhalin. Gen. distr.: Kurile Islands, northern Japan. Described from Japan (Yezo, Yubutsu). Type in Leningrad.

146. *C. irrigua* Whlb. in Sv. Vetensk. Ak. Nya Handl. XXIV (1803) 162; Trev. in Ldb. Fl. Ross. IV, 307; Meinsh. in A.H.P. XVIII, 3 (1901) 351. — *C. magellanica* Kük. in Engl. Pflzr. IV, 20 (1909) 505, quoad. pl. eurasiat.; Kom. Fl. Kamch. I, 258; Hulten, Fl. of Kamch. I, 202; Grossh. Fl. Kavk. I, 170, non Lam. — *C. magellanica* var. *planitieii* Aschers. et Gr. Synops. II, 2 (1902) 132. — Ic.: Kuk., l.c., 503, fig. 80 H-K. — Exs.: HFR No. 445.

Perennial, bright green, with short-creeping rhizome, forking at a very acute angle, loosely caespitose; culms slender, more or less drooping at the summit, triangular, scabrous above (sometimes nearly smooth), 20-60 cm tall, leafy in lower third, covered at base with brownish sheaths; leaves flat, moderately stiff, 2-4 mm broad, long-attenuate, about as long as the culm; spikelets 2-4, subdistant: the terminal staminate, clavate-lanceolate, 1-1.5 cm long, with brownish, ovate, acute scales, the others pistillate, oblong to ovoid, 0.7-1.5 cm long (0.6-0.7 cm broad), loose, pendulous, the peduncles slender, smooth, to 3 mm long; lowest bract to 3 mm long, the blade equaling or exceeding the inflorescence; scales lanceolate, long-acute-pointed, brown to dark brown, with midrib of about the same color, nearly twice as long as the perigynia; perigynia broadly ovoid, biconvex, 2.5-3 mm long, greenish-glaucous, brownish-spotted above, nerveless or obscurely 3-4-nerved at the very base, stipitate, rounded at base and summit, with a very short, scarcely evident, truncate, ferruginous beak. Fr. May-July.

Mossy bogs and meadows, tundra. — Arctic: Arct. Eur.; European part: Kar.-Lap., Dv.-Pech., Lad.-Il'm., Upp. Volg., Volg.-Dnepr. (Bel'sk. Rur. Distr., Smolensk Prov.), Volg.-Kam. (Raifskaya Desert, near Kazan'; Ural, Perm District); Caucasus: Gr. Cauc.; West. Siberia: Ob., Alt.; East. Siberia: Yenisei, Ang.-Sayan., Len.-Kol; Far East: Ze.-Bur., Sakh., Kamch. Gen. distr.: mountainous part of Europe, Fenno-Scandia, Baltic seaboard, Poland, Northern Mongolia, North America. Described from northern Sweden. Type in Stockholm.

246 NOTE: Forming hybrids: \times *limosa* L.; \times *rariflora* Whlb.; \times *panicea* L.

* *C. Fujitae* Kudo in Journ. Coll. Agr. Hokk. Univ. XI, 2 (1922) 62; Miyabe et Kudo, Fl. Hokk. and Sagh, II (1931) 255; Akiyama in Journ. Fac. Sc. Hokk. Univ., ser. V, II, 1 (1922) 162. — ? *C. livida* Hultén, Fl. of Kamch. 1 (1927) 202, ex pl. (sec. Kudo).

Perennial, cineraceous-green plants with long, slender stolons; culms slender, sharply angled, densely leafy below, 7-11 cm tall; leaves mostly longer than the culm, stiff, long-acuminate, flat, 2-3, broad; spikelets 3-4: the terminal staminate, linear, 0.8-1 cm long, the others pistillate, oblong, rather loose, short-peduncled, or the uppermost sessile all erect; lowest bract with a short sheath, slightly shorter than the inflorescence;

scales oblong-elliptic, subacute, honey-brown, with a green midrib, hyaline-margined, narrower than the perigynia but equaling them in length; perigynia lance-ovoid, trigonous, 3-3.5 mm long (1.6 mm broad), glaucous-green, nerveless, attenuate toward base, stipitate, with a short entire beak.

Bogs. — Species described from Paramushir, an island very close to Kamchatka; possibly occurs in the southern part of Kamchatka. Gen. distr.: Kurile Islands. Type in Sapporo (Japan).

Section 17. *Loxaniza* (Rafin.) V. Krecz. — Rafin in *Amenit. of Nat. I* (1840) 25 (pro genere) — *Planarex* Rafin., l.c. (pro subgenere gen. *Carex*). — *Limivasculum* Boern. in *Abh. Naturw. Ver. Brem. XXI* (1913) 269 (pro subgenere gen. *Limivasculum* Boern.), ex p. — Mountain-meadow and arcto-alpine plants, with creeping rhizomes and with stolons. Culms sharply 3-angled, covered at base with purplish-brown, more or less split-fibrillose, bladeless sheaths. Leaves more or less flat, with revolute margins, abruptly pointed. Lowest bract with short (3-5 mm), furnished with hyaline auricle. Inflorescence capitate or racemose, of (2)3-5(7) spikelets: of these the terminal 1-2 gynecandrous, rarely staminate, the others pistillate; spikelets dense, sessile or more or less pedunculate. Perigynia membranaceous, subcoriaceous, or coriaceous, ovoid or oblong, (2)3-6 mm long, with slender nerves or nerveless, rather abruptly contracted into a short, cylindrical, smooth, with a funnel-shaped or crescent-shaped notch. Achene usually much shorter and narrower than the perigynium, stalked. Stigmas 3 (rarely 2).

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- 1. Terminal spikelets staminate 2.
- + Terminal spikelets gynecandrous (i. e. with staminate flowers at base of spikelet) 15.
- 2. Perigynia coriaceous 3.
- + Perigynia membranaceous or subcoriaceous† 4.
- 3. Spikelets dense, sessile, forming an oblong-capitate, lobed, compact inflorescence, (with spikelets almost confluent). Perigynia trigonous, sessile, ovoid, very abruptly contracted into a short truncate beak. Leaves 3-6 mm broad, abruptly pointed. (Altai, Turkestan) (Plate XVI, fig. 7). 177. *C. melanantha* C.A.M.
- + Spikelets loose, pedunculate (lowest peduncles to 2 cm long), forming a loose fasciculate inflorescence. Perigynia oblong-elliptic, obscurely trigonous, subbiconvex, distinctly stipitate, gradually contracted into a short truncate beak, usually bearing a subulate, hard remnant of style 1-1.5 mm long. Leaves 2-3 mm broad, long-acuminate. (Kamchatka) 160. *C. stylosa* C.A.M.
- 4. Perigynia without a distinct beak, 2 mm long 5.
- + Perigynia distinctly beaked, 3-5 mm long 6.
- 5. "Perigynia papery, compressed" (C. B. Clarke-Arakam-Chechen Island) 165. *C. arakamensis* C. B. Clarke
- + Perigynia subcoriaceous, minutely granular, inflated-trigonous; staminate spikelet obsolescent 164. *C. holostoma* Drej.
- 6. Scales scabrous-awned; if scales indistinctly awned, then perigynia scabrous on outer face, nerves and margin, nearly from

 † At this stage one should bear in mind species 179. — *C. sabulosa* Turcz., where the terminal spikelet is sometimes staminate throughout, and not gynecandrous. *C. sabulosa* Turcz. is a psammophilous plant, with a long cord-like rhizome and subsetaceous involute leaves (see also Plate XVI, Figures 4 and 4a).

- base 7.
- + Scales obtuse, acute, or subacute, awnless; perigynia smooth or barely scaberulous on the margin at summit 9.
7. Perigynia entirely smooth; scales, awns strongly developed 155. *C. macrochaeta* C.A.M. †
- + Perigynia scabrous on outer face and margin; awns variously developed or sometimes indistinct 8.
8. Perigynia ellipsoid-ovoid, 3-4.5 mm long, with faint smooth nerves; scales of pistillate spikelets more or less awn-pointed, as long as or shorter than perigynia. (Kamchatka, Okhotskoe coast) 153. *C. koraginensis* Meinsh.
- 9(6). Spikelets sessile 10.
- + Spikelets on rather long peduncles, pendulous 12.
10. Spikelets 2-3, crowded at the summit of the culm, 0.5-2 cm long. Perigynia subcoriaceous, grayish-green. Plants forming clumps; lower sheaths brown 11.
- 248 + Spikelets 3-5, distant, narrowly cylindric, 2-4 cm long. Perigynia membranaceous, greenish. Cespitose, stoloniferous plants; lower sheaths purple. 174. *C. Augustinowiczii* Meinsh.
11. Spikelets ovoid, rather loose, 0.5-1 cm long. Perigynia ovoid, glaucous-gray, with faint slender nerves, 3-3.5 mm long, the beak bearing a strong remnant of style. 161. *C. Meyeriana* Kunth.
- + Spikelets short-cylindric or oblong, spreading, dense, 0.8-2 cm long. Perigynia broadly ovoid, grayish-green, nerveless, 3 mm long, with a short truncate beak 162. *C. putjatini* Kom.
- 12(9). Culms and peduncles smooth; perigynia oblong-ellipsoid or oblong-lanceolate, 4.5-5 mm long 159. *C. melanostoma* Fisch.
- + Culms scabrous; peduncles scabrous or smooth; perigynia ellipsoid or ovate, 3-4 mm long 13.
13. Spikelets ferruginous-brown throughout; perigynia nerveless, reddish-ferruginous; scales subobtusate, much shorter than perigynia 157. *C. pauxilla* V. Krecz.
- + Spikelets variegated; perigynia nerved, greenish, more or less spotted; scales acute, equaling or exceeding the perigynia 14.
14. Perigynia yellowish-green, smooth, as long as the perigynia. Peduncles of the crowded spikelets smooth (Turkestan). 158. *C. musartiana* Kük.
- + Perigynia rusty-spotted, light-margined, scaberulous, usually (toward base of spikelet) shorter than their scales. Peduncles of the segregated spikelets scabrous 159. *C. behringensis* C.B. Clarke
- 15(1). Perigynia with 2 stigmas, biconvex 163. *C. bicolor* Bell.
- + Perigynia with 3 stigmas, distinctly or obscurely trigonous 16.
16. Inflorescence racemiform, more or less nodding; lower spikelets on rather developed peduncles (0.8-3 cm long), divergent to pendulous (in doubtful cases, where inflorescence suberect and merely 1-sided-perigynia flat, many times longer than the achenes) 17.

† May be confounded with *C. Gmelini* which sometimes has staminate spikelet, but differs conspicuously in its thin, narrow leaves, ovoid (not oblong) spikelets, and lance-ellipsoid perigynia.

- + Inflorescence suberect, capitate, oblong-crowded or with segregated spikelets; spikelets sessile, or the lowest on an erect peduncle not exceeding 3-5 mm (perigynia always convexly trigonous, scarcely twice as long as the achenes or entirely filled by them) 25.
- 17. Perigynia distinctly nerved all the way up 18.
- + Perigynia nerveless (or faintly nerved only at base) 20.
- 18. Perigynia 4-5 mm long, rusty-yellow, rounded at the summit, with a clearly marked off, weakly developed, crescent-notched beak; scales castaneous, abruptly attenuate into a white scabrous awn, much longer than the perigynium. 183. *C. Gmelini* Hook. et Arn.
- 249 + Perigynia 3-4 mm long, greenish, rather gradually tapering into an extended, deeply bidentate beak; scales ferruginous to pale ferruginous, acute or imperceptibly attenuate into a minute awn, shorter than the perigynium 19.
- 19. Spikelets to 3 mm long, loose, loosely disposed in the inflorescence; scales pale ferruginous to nearly green, awned, about equaling the perigynia; perigynia 4 mm long, subappressed, gradually tapering into an extended beak 175. *C. peiktusani* Kom.
- + Spikelets to 1.5 cm long, dense, in racemiform arrangement; scales ferruginous, long-attenuate, two-thirds the length of perigynia; perigynia 3-3.5 mm long, spreading, abruptly contracted into a short beak 173. *C. Hancockiana* Maxim.
- 20 (17). Spikelets loosely pendulous-spreading in racemiform arrangement, oblong, acute, loose, with golden-yellow perigynia; the lanceolate scales equaling or exceeding the perigynia 21.
- + Spikelets crowded in a 1-sided head, ovoid, obtuse, dense, with brownish to brown, lighter-margined perigynia; the ovate scales shorter than the perigynia 22.
- 21. Low plants (15-40 cm) with usually smooth culms; leaves 3-5 mm broad; spikelets 3-5, suberect, approximate; perigynia rusty-yellow, brunescent, gradually tapering into a short beak shorter than to equaling the scales (Arctic). 147. *C. atrata* L. s. str.
- + Tall plants (40-70 cm), with scabrous culms; leaves 5-8 mm broad; spikelets 4-7, pendulous, distant; perigynia golden-yellow, abruptly contracted into a short beak, longer than the perigynia (Caucasus, Ural, Turkestan). . . . 148. *C. caucasica* Stev.
- 22. Low (15-40 cm), alpine plants, with smooth culms; leaves crowded at base, numerous; perigynia 3-3.5 mm long (Caucasus) 152. *C. aequivoca* V. Krecz.
- + Tall (50-100 cm), subalpine plants, the scabrous culms leafy in lower part; leaves rather few; perigynia 4-4.5 mm long 23.
- 23. Culms slender, leafy only at base; leaves abbreviated, 3-5 mm broad; inflorescence erect, capitate; spikelets 3-4, ovoid, 0.8-1.2 cm long; perigynia golden-rusty (Turkestan) 149. *C. decaulescens* V. Krecz.
- + Culms stout, firm, leafy up to considerable height; leaves long, 4-7 mm broad; inflorescence 1-sided to pendulous, racemiform,

- loose; spikelets 3-7, obovoid or clavate, 1.5-3 cm long;
perigynia ferruginous or brown 24.
24. Leaves gradually tapering; inflorescence suberect, 1-sided;
spikelets 3-5, the terminal 2-3 strongly crowded, obovoid,
1.5-2.5 cm long, 0.8-1 cm broad; perigynia nerveless, ferru-
ginous at base, usually shorter than the scales (Caucasus)
. 151. *C. Medwedewii* Lesk.
- + Leaves abruptly pointed; inflorescence racemiform-pendulous,
loose; spikelets 4-7, oblong-obovoid or clavate, 1.5-3 cm long,
0.7-0.9 cm broad; perigynia few-nerved at base, violet-rusty,
longer than the scales (Siberia, Centr.Asia)
. 150. *C. perfusca* V.Krecz.
- 25 (16). Perigynia coriaceous; scales equaling or exceeding the peri-
gynia (if shorter, then exceeding $1/3$ - $2/3$ their length) 26.
- + Perigynia membranaceous; scales $1/2$ - $2/3$ as long as the
perigynia 30.
26. Inflorescence congested, the upper spikelets contiguous, and
only 1-2 lowest spikelets segregated; perigynia rusty-yellow,
trigonus, spreading, entirely filled with achene; spikelets
and whole inflorescence uniformly brownish 27.
- + Inflorescence more or less interrupted below, with markedly
distant spikelets; perigynia glaucous-green to greenish-ferru-
ginous, plano-convex, appressed, twice as long as achene;
spikelets variegated owing to the dark scales and light perigynia. . 28.
27. A psammophilous plant, with a long cord-like rhizome; leaves
subinvolute, setaceous and crisp at the tip; culms smooth;
perigynia 4-5 mm long, smooth, ovoid, nerved, attenuate into
an extended, deeply notched beak 179. *C. sabulosa* Turcz.
- + Meadow plants with short stolons, straight leaves, and scabrous
culms; perigynia 2.5-3 mm long, minutely granular, pyriform,
with a barely distinct, slightly emarginate beak
. 178. *C. melananthaeformis* Litw.
28. Scales awned, in lower part of spikelet exceeding the perigynia.
Perigynia with a short emarginate beak. (Plate XVI, fig. 1
and 3) 29.
- + Scales acute to subacute, $2/3$ the length of perigynia; perigynia
beakless, merely with a dark notch at the summit. (Plate XVI,
fig. 2. — Arctic) 180. *C. adelostoma* V.Krecz.
29. Spikelets obovoid, 0.5-2 cm long, 0.8-1 cm broad; perigynia
glaucous-green, the beak broadly crescent-notched, with
spreading teeth. (Plate XVI, fig. 1).
. 181. *C. Buxbaumii* Whlb.
- + Spikelets cylindric, 1.5-4 cm long, 0.4-0.6 cm broad; peri-
gynia ferruginous-green, the beak narrowly notched, with erect
teeth. (Plate XVI, fig. 3) 182. *C. emasculata* V. Krecz.
- 30 (25). Stigmas equaling or exceeding the perigynia
. 172. *C. macrostigmatica* Kük.
- + Stigmas about $1/5$ - $1/4$ the length of perigynia 31.
31. Perigynia olivaceous ro brown, nerveless, scaberulous-mar-
gined above 32.

- 251 + Perigynia golden-yellow or green, nerved, smooth-margined above 35.
32. Perigynia greenish-olivaceous, finely granular, 2-2.5 mm long; inflorescence loosely capitate, overtopped by the well-developed bract; spikelets 0.4-0.6 cm thick 33.
- + Perigynia dark brown, not granular, 3-4 mm long; inflorescence compactly capitate, with contiguous spikelets and an obsolescent bract; spikelets 0.6-0.9 cm thick 34.
33. Perigynia 2.5 mm long; scales subobtuse; spikelets 3-5, 0.6-1.2 cm long; culms smooth, firm. (Plate XVI, fig. 10. — Altai) 167. *C. mimula* V. Krecz.
- + Perigynia 2 mm long; scales subacute to acute; spikelets 1-3, 0.3-0.6 cm long; culms scabrous, rather slender. (Plate XVI, fig. 9. — Arctic) 166. *C. Halleri* Gunn.
34. Perigynia 3.8-4.5 mm long, oblong-ellipsoid, rather gradually tapering into an extended beak, scarcely scaberulous above; scales ovate, subacute, barely shorter than perigynia; spikelets plump, 0.8-0.9 cm broad. (Plate XVI, fig. 7. — Siberia) 168. *C. melanocephala* Turcz.
- + Perigynia 3 mm long, obovate, abruptly contracted into a short beak, strongly bristly above; scales broadly ovate, subobtuse to obtuse, about 2/3 the length of perigynia; spikelets oblong, 0.6-0.8 mm broad. (Plate XVI, fig. 8. — Caucasus) 169. *C. oligantha* Steud.
- 35(31). Spikelets crowded in rather dense heads, ovoid or oblong-ovoid 36.
- + Spikelets segregated, cylindric or narrowly cylindric 37.
36. Culms arched, 10-25 cm tall; leaves stiff; perigynia golden-yellow, distinctly nerved only below; scales blackish-brown, scarcely shorter than the perigynia (Pamiro-Alai) 170. *C. infuscata* Nees.
- + Culms erect, 20-60 cm tall; leaves soft; perigynia greenish, yellow, with slender nerves; scales ferruginous, 1/3-1/2 the length of perigynia, often barely visible. (Plate XVI, fig. 11) 171. *C. angarae* Steud.
37. Spikelets narrowly cylindric, 2-4 cm long; perigynia ovoid-ellipsoid; culms scabrous all the way down, triangular 174. *C. augustinowiczii* Meinsh.
- + Spikelets oblong-cylindric, 1-2 cm long; perigynia ovoid; culms scabrous only at the summit, flattened-triangular; culms and leaves minutely papillose 176. *C. soyaensis* Kük.

Cycle 1. Planarex (Rafin.) V. Krecz.—Rafin. in Amenit. of 252 Nat. I (1840) 25 (pro subgenere).—Inflorescence crowded-racemiform, more or less nodding to suberect (1-sided), the lowest bract overtopping the inflorescence; terminal spikelets gynecandrous. Perigynia membranaceous, more or less ellipsoid, imbricate, strongly compressed, abruptly contracted into a short, scarcely emarginate beak; achene 1/4-1/3 the length of perigynium.

Series 1. Atratae V. Krecz.—Spikelets rather distant, loose or loosish, subacute. Scales lanceolate, long-attenuate. Perigynia yellowish-golden to rusty-golden.

147. *C. atrata* L.Sp.Pl. (1753) 976; Trev.in Ldb.Fl.Ross.IV, 287; Kük. in Engl.Pflzr.IV, 20 (1909) 396.—Ic.: Kük., l.c., fig. 62, D—G.—Exs.: Pf.Finl.Exs.No.122.

Perennial, green, densely cespitose, stoloniferous plants, with stout short rhizomes; culms tapering upward and somewhat nodding, usually smooth, 15-40 cm tall, covered at base with broad, slightly keeled, purple bladeless sheaths; leaves 3-5 mm broad, scaberulous, shorter than the culm; spikelets 3-5, largely crowded in glomerules above: the terminal gynecandrous, ovoid, the others pistillate, also ovoid, 1-2 cm long, 0.6-0.8 cm broad, rather dense, subacute, the lowest 2 on peduncles (to 2 cm long), subdivergent, erect to pendulous; scales ovate, acute, ferruginous-brown, with 1 ferruginous nerve, narrower than and as long to longer than the perigynia; perigynia ovoid, compressed-trigonal, 3.5-4 mm long, rusty-yellow, at length brunescent, nerveless, smooth-margined above, rather gradually tapering into a short, bidentate-emarginate, rusty-spotted beak; achene yellow, pyriform-obovoid, 2-2.2 mm long; styles pink. Fr. June—July. (Plate XVII, fig. 6).

Wet places in tundra and the subalpine zone.—Arctic: Arct. Eur. (Murmanskaya Kareliya and Kol'skii Peninsula); European part: Kar.—Lap. (Khibinskie Mountains). Gen.distr.: Fenno-Scandia, mountains of western Europe. Described from Central European Alps.

NOTE: Forming hybrids with *C. Halleri* Gunn. (*C. Candriani* Kneuck.).

148. *C. caucasica* Stev. in Mém.Soc.Nat.Moscou, IV (1813) 108; M.B.Fl.taur.-cauc.III (1819) 612; Boiss.Fl.Or.V, 416; Litw. in Trav. Bot.Mus.Ac.St.Pétersb. VII (1910) 88 (excl.var.).—*C. pseudo-atrata* Meinsh. in A.H.P. XVIII, 3 (1901) 346.—*C. atrata* var. *caucasica* Boott, Illustr.Carex, III (1862) 114.—*C. atrata* ssp. *caucasica* Kük. 255 in Engl.Pflzr.IV, 20 (1909) 400.—*C. ustulata* var. γ *macrogyne* Rgl. in A.H.P. VII (1880) 571.—*C. lonchosaccus* C.B. Clarke in Kew Bull. Misc.Inf., Add.ser., VIII (1908) 77; B.Fedtsch. in A.H.P. XXXVIII, 1 (1924) 206 — Exs.: Kneuck. No. 317.

Perennial, densely cespitose, stoloniferous plants with a short rootstock; culms slender, pendulous at the summit, scabrous above, 40-70 cm tall, covered at base with broad, keelless, lustrous, dark purple, fracturing-fibrillose, bladeless sheaths; leaves 5-8 mm broad, as long as or shorter than the culm; spikelets 4-7, the terminal gynecandrous, obovoid to oblong, 1.5-2.5 cm long, sometimes with 1-2 supplementary, spreading, sessile spikelets at base; other spikelets pistillate, ovoid or oblong to clavate, 1.5-3 cm long, 0.6-0.8 cm broad, all pedicellate, loosish, the lowest subdistant, on pedicel to 4-5 cm long; scales lanceolate to oblong-ovate,

Explanation to Plate XVI

1. *Carex Buxbaumii* Whlb.: inflorescence and perigynium.—2. *C. adelostoma* V. Krecz.: perigynium.—3. *C. emasculata* V. Krecz.: inflorescence and perigynium.—4. *C. sabulosa* Turcz.: inflorescence and perigynium.—5. *C. melanantha* C.A.M.: inflorescence and perigynium.—6. *C. melanantaeformis* Litw.: inflorescence and perigynium.—7. *C. melanocephala* Turcz.: inflorescence, perigynium, and scale.—8. *C. oligantha* Steud.: inflorescence, perigynium, and scale.—9. *C. Halleri* Gunn.: inflorescence, perigynium.—10. *C. mimula* V. Krecz.: perigynium.—11. *C. angarae* Steud.: inflorescence, perigynium, and scale.



acute to cuspidate, dark brown, with lighter or similarly colored midrib, white-hyaline-margined, as long as or shorter than the perigynia; perigynia membranaceous, compressed-trigonous, 3.5-4 mm long, greenish-yellow, at length ferruginous-yellow, obscurely 3-5-nerved at base, smooth-margined at the summit, very abruptly contracted into a short, brown, bidentate-emarginate beak; achene obovoid, 2.5 mm long. Fr. June-July.

Alpine meadows. — European part: Volg.-Kam. (s. part of Ural); the whole of Caucasus; Centr. Asia: Tyan'-Shan. (e. part), Pam.-Al. (e. part and Oshskii District). Gen. distr.: Turkey, Persia, Kulja. Described from Dagestan (Mount Shakhdag). Type in Moscow or Helsinki.

ECONOMIC IMPORTANCE: According to report of E. A. Bush, eaten readily in young state by cattle.

149. *C. decaulescens* V. Krecz. sp. nov. in Addenda, II, 599. — *C. caucasica* B. Fedtsch. in A. H. P. XXXVIII (1924) 207, ex p., non Stev. — *C. caucasica* var. *abbreviata* Litw. in Trav. Mus. Bot. Ac. St. Pétersb. VII (1910) 88. — *C. caucasica* var. *bracteata* Litw., ib., 89.

Perennial, cineraceous-green, cespitose, stoloniferous plants, with a short rootstock; culms slender, scaberulous above, 35-70 cm tall, covered at base with reddish-brown bladeless sheaths; leaves 3-5 mm broad, half as long as the culm, the lower ones approximate; spikelets 3-4, crowded in a head, sessile (sometimes the lowest distant, with a short erect peduncle), ovoid, 0.8-1.2 cm long, 0.5-0.9 cm broad, the terminal gynecandrous, the others pistillate; the lowest bract weak, scale-like or setaceous, not exceeding the inflorescence; scales ovate, acute, ferruginous-brown, with a ferruginous midrib, shorter than the perigynia; perigynia oblong-ellipsoid, compressed-trigonous, golden-rusty, nerveless, short-stipulate, smooth at the summit, the transition to beak not abrupt, beak short, bidentate-emarginate. Fr. June-July.

256 Ravines and brooks, screes, and moraines, at an altitude of 2,000-3,200 m. — Centr. Asia: Tyan'-Shan. (w. part), Pam.-Al. (w. part). Endemic. Described from Western Tien Shan (Andaul'gan River). Type in Leningrad.

Series 2. *Aterrimae* V. Krecz. — Spikelets crowded, dense, obtuse. Scales ovate, acute or subacute. Perigynia yellowish-brown, light margined or brown throughout.

150. *C. perfusca* V. Krecz. sp. nov. in Addenda, II, 600. — *C. atrata* Trev. in Ldb. Fl. Ross. IV (1853) 287, quoad pl. sibir.; Turcz. Fl. baic.-dah. II, 2 (1856) 271; Meinsh. in A. H. P. XVIII, 3 (1901) 347, ex p., non L. — *C. atropurpurea* Fisch. ex Trev. in Bull. Soc. Nat. Moscou, XXXVI, 1 (1863) 538 (sub *C. atrata*, nomen); Trautv. Incr. F. Ross. IV (1884) 812, non Beckl. — *C. atrata* var. *aterrima* Kük. in Engl. Pflzr. IV, 20 (1909) 398, ex p. et in Journ. Russ. Bott 3-6 (1911) 108. — *C. lonchosaccus* C. B. Clarke in Kew Bull. Misc. Inf., Add. ser., VIII (1908) 77, quoad pl. Turczan.

Perennial, green or pale green, densely cespitose plants, with a stout short rootstock; culms firm, scabrous above, 50-80 cm tall, covered at base with purple bladeless sheaths; leaves 4-7 mm broad, more or less scabrous, shorter than the culm; spikelets 4-7, fasciculately aggregated, pendulous, all on short peduncles (to 1 cm long), loosish, with somewhat spreading scales; terminal spikelet gynecandrous, ovoid, the others pistillate, oblong to clavate-obovoid, 1.5-3 cm long, 0.7-0.9 cm broad, rounded at the summit (obtuse); lowest bract overtopping the inflorescence; scales

ovate, subacute, ferruginous-brown to blackish-brown, with a lighter (ferruginous) midrib, narrowly hyaline-margined, shorter than the perigynia; perigynia ellipsoid, compressed-trigonous, 4-4.5 mm long, violet-rusty, obscurely nerved at base, sessile, rounded and smooth at the summit, abruptly contracted into a short, bidentate-emarginate beak; achene obovoid-subelliptic, brownish, barely 2 mm long; styles white. Fr. April-July. (Plate XVII, fig. 7).

Wet arctic and alpine tundra. — Arctic: Arct. Sibl.; West. Siberia: Alt., East. Siberia: Yenis., Ang.-Sayan., Daur., Len.-Kol.; Far East: Ze.-Bur., Okhot., Sakh. (n.-Mount Lopatina); Centr. Asia: Dzhung.-Tarb., Tyan'-Shan. (e. part). Gen. distr.: Northern Mongolia. Described from Alati (watershed of rivers Chernova and Biryuksa, on the Kholzun Range). Type in Leningrad.

151. *C. Medwedewii* Lesk. in Journ. Soc. Bot. Russ. XVI, 1 (1931) 70. — *C. atrata* Trev. in Ldb. Fl. Ross. IV (1853) 287, ex p.; Meinsh. in A. H. P. XVIII, 3 (1901) 347, ex p.; Grossh., Fl. Kavk. I, 165, ex p., non L. — *C. atrata* var. *aterrima* Kük. in Enlg. Pflzr. IV, 20 (1909) 398, quoad pl. caucas. — *C. aterrima* Grossh., l. c., non Hoppe.

Perennial, cineraceous-green, loosely caespitose plants, with short stolons; culms firm, scabrous above, 40-100 cm tall, the lower third leafy; 257 basal sheaths castaneous-brown, bladeless, fracturing-fibrillose; leaves rather stiff, long, 4-7 mm broad, rather gradually pointed, shorter than the culm; spikelets 3-5, congested, especially the terminal 2-3, the lower 1-2 somewhat segregated, on peduncles to 0.5-1 cm long; terminal spikelet gynecandrous, the others pistillate, all obovoid or clavate-oblong, obtusely rounded at the summit, 1.5-2.5 cm long, 0.8-1 cm broad, dense; lowest bract foliaceous, equaling or exceeding the inflorescence; scales oblong-ovate to lanceolate, acute, reddish-blackish-brown throughout or with a light midrib, usually longer to equaling the perigynia and about half as broad; perigynia oblong-ellipsoid to oblong-obovate, compressed-trigonous, 3.8-4 mm long, yellowish-rusty below, brown above, nerveless, sessile, rounded and smooth at the summit, rather abruptly contracted into a short, bidentate, black beak. Fr. June-July.

Grassy places in the subalpine zone. — Caucasus: Gr. Cauc. Endemic. Described from Mount Abago (sources of the river Belaya). Type in Leningrad.

152. *C. aequivoca* V. Krecz. sp. nova in Addenda, II, 600. — *C. atrata* Trev. in Ldb. Fl. Ross. IV (1853) 287, ex p.; Meinsh. in A. H. P. XVIII, 3 (1901) 347; Grossh. Fl. Kavk. I, 165, ex p., non L. — *C. atrata* var. *nigra* Meinsh. in A. H. P., l. c.; Litw. in Sched. ad Herb. Fl. Ross. IV (1902) 69, non Boott. — *C. nigra* Grossh. Fl. Kavk., l. c. non Bell. — *C. atrofusca* Stev. in Mém. Soc. Nat. Moscou, IV (1813) 108; C. A. M. Verzeichn. Pfl. Cauc.-Casp. (1831) 30, non Schkuhr. — Exs.: HFR No. 1141.

Perennial, green to yellowish-green, rather densely caespitose plants, with short stolons; culms thickened above, smooth or nearly so, 15-40 cm tall, covered at base with lateritious-brown, more or less fracturing-fibrillose, bladeless sheaths; leaves rather stiff, 3-5 mm broad; abbreviated, short-acuminate, inserted near the culm-base, half as long as the culm or shorter; spikelets 3-5, contiguous or the lower ones somewhat segregated; the terminal spikelet gynecandrous, the others pistillate, broadly ovoid, 1-2 cm long, 0.6-0.8 cm broad, obtusely rounded at the

summit, dense; the lowest bract setaceous, equaling to slightly exceeding the inflorescence; scales ovate, acutish to subobtusate, blackish-brown, with midrib and margin of same color, as long as to shorter, and slightly narrower, than the perigynia; perigynia ellipsoid to broadly ellipsoid, compressed-triangular, 3-3.5 mm long, nerveless, yellowish, usually brownish above, sessile, rounded and smooth at the summit, abruptly contracted into a short, black, bidentate-emarginate beak. Fr. June-July.

Alpine meadows, at altitude of 2,400-3,000 m. — Throughout the Caucasus, in the alpine zone. Gen. Distr.: Boundary districts of Turkey and Persia. Described from Georgia (Tskhra-Tskharo Mt.). Type in Leningrad.

ECONOMIC IMPORTANCE: As reported by E.A. Bush, readily eaten in young state by cattle.

258 Cycle 2. *Inobasilæna* V. Krecz. — Plants covered at base with ferruginous-brown to reddish, rather strongly fracturing-fibrillose sheaths. Inflorescence loose, pendulous, with distant spikelets; lowest bract not exceeding the inflorescence. Terminal 1-2 spikelets staminate, the others pistillate. Perigynia membranaceous to subcoriaceous, oblong, compressed-triangular, rather gradually tapering into a short, slightly emarginate beak. Stigmas 3 (but often only 2).

153. *C. koraginenensis* Meish. in A. H. P. XVIII, 3 (1901) 351; Kom. Fl. penins. Kamtsch. I (1927) 251 (incl. form.). — *C. scita* Kom., ib., 250; Kük. in Engl. Pflzr. IV, 20 (1909) 414, quoad pl. kamtch. et in Journ. Russ. Bot. 3-6 (1911) 111. — *C. scita* var. *koraginenensis* Kük., l. c., 415 et in Journ. Russ. Bot., 112; Hultén, Fl. of Kamtch. I (1927) 196, tab. 6, fig. C. — *C. podocarpa* Meinsh., l. c., 352, quoad pl. Anadyr. — *C. trachyloma* C. A. M. in herb.

Perennial, yellowish-green, caespitose plants, with short rhizomes and stiff wiry roots; culms rather firm, scabrous above, 10-90 cm tall, covered at base with purplish-brown bladeless sheaths, these with a dense periphery of fibrillose remnants of old sheaths; leaves rather stiff, 3-6 mm broad, scabrous, shorter than the culm; spikelets 3-5, subdistant, the terminal 1-2 staminate, oblong, to 2-2.5 cm long, with ferruginous-brown scales, the others staminate, 2-3.5 cm long, rather dense, loosish below, often pendulous, the scabrous setaceous peduncles 3-4 cm long; scales oblong-ovate to lanceolate, acute to scabrous-cuspidate, rusty-fuscous, with a light midrib, shorter than to as long as the perigynia; perigynia ellipsoid to ovoid, compressed-triangular, 3-4.5 mm long, brown-spotted above, with a green or stramineous margin, slenderly and obscurely 5-6-nerved, distinctly short-stipitate, unevenly setulose-scabrous on the margin, nearly from base and on the outer face near summit, rather abruptly contracted into a short, slightly dilated, emarginate, ferruginous beak. Fr. June-August.

Meadows in subalpine zone. — Arctic: Chuk., Anad.; Far East: Kamch., Okhot. (Onor Bay, Ola district, Okhotsk, Yamskaya and Touiskaya inlets), Uss. (Sikhote-Alin', upper reaches of Left Botcha). Gen. distr.: Kurile Islands. Described from Koraginskii Island off Kamchatka. Type in Leningrad.

154. *C. scabrinervia* Franch. in Bull. Soc. Philom. Paris, 8 sér., VII (1895) 37 et in Nouv. Arch. Mus. Paris, 3 sér., IX (1897) 144. — *C. scita* var. *scabrinervia* Kük. in Engl. Pflzr. IV, 20 (1909) 415.

Perennial, cineraceous-green, with short-creeping ligneous rhizome and wiry roots; culms rather firm, somewhat pendulous above, scabrous, 40-60 cm tall, covered at base with light reddish-brown bladeless sheaths, these with a periphery of fibrillose remnants of old sheaths; leaves not
259 stiff, 4-7 cm broad, shorter than the culm; spikelets 3-5, subdistant; the terminal 1-2 spikelets staminate, oblong-clavate, to 2 cm long, with ferruginous cuspidate scales, the others pistillate, also oblong-clavate, 1.5-3 cm long, loosish, pendulous, on smooth filiform peduncles; scales oblong-ovate to lanceolate, ferruginous-brown, the lighter midrib excurrent in a slender scabrous awn, exceeding the perigynia, but body of scale shorter than the perigynium; perigynia ellipsoid to suboblong-ellipsoid, compressed-trigonus, 5 mm long, purplish-ferruginous, the prominent nerves scabrous nearly all the way down, distinctly short-stipitate, irregularly setulose on the margin nearly from base, rather abruptly contracted into a short, widely emarginate, brown beak.

Far East: Sakh. : N. part (Kabonov!) and Lamoris'er Bay (F. Schmidt!). Gen. distr.: Kuril'skie Islands, northern Japan. Described from Rebunshiri Island. Type in Paris.

155. *C. macrochaeta* C. A. M. in Mém. Ac. St. Pétersb. Sav. Étr. I (1821) 224, tab. XIII; Trev. in Ldb. Fl. Ross. IV, 305; Meinsh. in A. H. P. XVIII, 3 (1901) 353; Kük. in Journ. Russ. Bot. 3-6 (1911) 110; Kom. Fl. Kamch. I, 250; Hultén, Fl. of Kamtch. I, 195. — *C. excurrens* Cham. ex Steud. Syn. Cyp. (1855) 228. — *C. podocarpa* Boott, Illustr. Carex, IV (1867) 197, ex p. — *C. podocarpa* f. *macrochaeta* Kjellm. Komm. faner. fl., p. 305. — *C. trichostachya* Fisch. ex Boott, l. c., 198.

Perennial, green, loosely cespitose plants, with creeping rhizome and short stolons; culms slender, somewhat pendulous and scaberulous to nearly smooth above, 30-60 cm tall, covered at base with purplish-brown bladeless sheaths, these surrounded by abundant fibrillose remnants of old sheaths; leaves 1-3 mm broad, shorter than the culm; spikelets 3-4, subdistant, ovoid to oblong-ovoid or oblong-ellipsoid, 1.5-3 cm long, 0.8 cm broad, the terminal staminate, the others pistillate, on slender smooth peduncles (to 4-5 cm long), the lower ones pendulous; scales lanceolate to oblong-lanceolate, obtuse, dark ferruginous, the light midrib excurrent in a long, light-colored, scabrous awn to 1 cm long, longer but narrower than the perigynia; perigynia lance-ellipsoid, compressed-trigonus, 5-6 mm long, light below, covered above with ferruginous spots and dots, with 5-7 slender nerves, distinctly short-stipitate, gradually tapering into a smooth truncate beak. Stigmas 3 (rarely 2). Fr. June—August. (Plate XVII, Figure 8).

Tundra. — Arctic: Chuk. (St. Lawrence Bay), Anad.; Far East: Kamch. (?) and Commander Islands: Mednyi Island. Gen. distr.: Aleutian Islands; w. arctic America, with adjacent islands, as far as Vancouver. Described from Unalaska. Type in Leningrad.

156. *C. behringensis* C. B. Clarke in Kew Bull. Misc. Inf., Addit. ser., VIII (1908) 81. — *C. podocarpa* Meinsh. in A. H. P. XVIII, 3 (1901)
260 352. — *C. Tolmiei* Boott, Illustr. Carex, II (1860) 100, quoad pl. behring.; Hultén, Fl. of Kamtch. I, 193, quoad pl. Dybowski. — *C. Tolmiei* var. *nigella* Kük. in Engl. Pflzr. IV, 20 (1909) 411, ex max. p. et in Journ.

Russ. Bot. 3-6 (1911) 109; Kom. Fl. Kamch. I, 249.—*C. Tolmiei* var. *invisa* Kük. in Journ. Russ. Bot., 1. c., 110, ex p.; Kom., 1. c., 249.—*C. frigida* Hook. et Arn. in Beech. Voy. III (1834) 119; Trev. in Ldb. IV, 294, quoad pl. kamtsch., non Bell.

Perennial, cineraceous-green plants with short-creeping rhizome and with stolons; culms flexible, scabrous above, 20-60 cm tall, covered at base with ochreous to ferruginous-brown, bladeless sheaths, these surrounded with fibrillose remnants of old sheaths; leaves rather stiff, with strongly revolute margins, 3-5 mm broad, scaberulous, shorter than the culm; spikelets 3-5, subdistant, the lowest especially remote, the terminal 1-(2) staminate, obovoid, 1-1.5 cm long, with brown obtuse scales, the others pistillate, ovoid to oblong, 1.5-2 mm long, rather dense, their peduncles filiform, scabrous above, to 3 cm long; lowest spikelets often pendulous; scales oblong-ovate, subacute to acute, ferruginous-brown, with a faint light midrib, longer than to about as long as the perigynia; perigynia ellipsoid to ovoid, compressed-triangular, 3-3.5 mm long, rusty-yellow below, lighter on the margin, very obscurely 5-6-nerved, somewhat setulose-margined, rather abruptly contracted into a short, truncate, brownish beak. Fr. July—August.

Alpine tundra and tundra.—Arctic: Chuk. (Koniam Bay); Anad.; Far East: Kamch.; Commander Islands: Mednyi Island; Okhot. (Ayan, Dzhugdzhur Ranve, Aldom, Ui rivers, Uiskii Range, Shantarskie Islands). Gen. distr.: Bering Islands, Aleutian Islands. Described from Koniam Chukot Pen.). Type in London.

157. *C. pauxilla* V. Krecz. sp. nova in Addenda, II, 601.—*C. atrofusca* Kük. in Engl. Pflzr. IV, 20 (1909) 553 et in Journ. Russ. Bot. 3-6 (1911) 149, quoad pl. ajan.; V. Krecz. in Fl. transb. II, 122, ex p., non Schkuhr.

Perennial, green plants, with creeping ascending rhizome and short stolons; culms slender, pendulous at the apex, scabrous above, 20-40 cm tall, leafy in lower one-fourth, covered at base with light brown, fracturing-fibrillose sheaths; leaves soft, few, 2-3 mm broad, scabrous, one-third to one-half as long as the culm; spikelets 2-5, approximate; the terminal 1-2 staminate, obovoid to oblong, 0.6-1.3 cm long, with ovate, ferruginous, subacute scales, the others pistillate, obovoid to oblong-clavate, 1-2.2 cm long, 0.5-0.6 cm broad, loosish, pendulous, the slender scabrous peduncles to 3 cm long; scales ovate to oblong-ovate, subobtuse, reddish-rusty, with a light median band, much shorter than the perigynia and half their length; perigynia ovoid to ovoid-ellipsoid, compressed-triangular, 3.5-4 mm long, 261 nerveless reddish-rusty with light-colored base, with a light smooth margin, terminating in a very short, brown, subinfundibular, slightly emarginate beak. Fr. July.

Barren Siberian glades.—East. Siberia: Daur., Len.-Kol; Far East: Okhot. Described from Yakchii-Dzelinda watershed, at the upper reaches of Angar. Endemic. Type in Leningrad.

158. *C. musartiana* Kük. ex B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 206 (nomen) et in Addenda, II, 602, —*C. ustulata* α *typica* Rgl. in A. H. P. VI (1880) 571, ex p.

Perennial, light green, densely caespitose plants, with short-creeping rhizome; culms scabrous above, 30-40 cm tall, leafy nearly to the middle,

covered at base with light castaneous sheaths, these surrounded with fibrillose sheath remnants; leaves rather stiff, 3-4 mm broad, shorter than the culm; spikelets 3-5, subdistant: the terminal staminate, oblong-obovoid, erect, with ovate, brownish, acuminate scales, the others pistillate, ovate to oblong-ovate, 1-2 cm long, 0.5-0.6 cm broad, loosish, pendulous, the slender smooth peduncles to 3 cm long; scales oblong-ovate, acute, ferruginous-brown, with a light midrib, equaling the perigynia; perigynia (immature) oblong-ellipsoid, obscurely trigonous, 4 mm long, yellowish-green, slenderly 5-6-nerved, sessile, smooth-margined above, terminating in a short, ferruginous, cylindric, scarcely emarginate beak.

Centr. Asia: Tyan'-Shan. Described from Muzart Pass. Type in Leningrad.

159. *C. melanostoma* Fisch. (sphalmate-melastoma) ex Boott, Illustr. Carex, II (1860) 100 (sub *C. Tolmiei*); Trautv. Incr. fl. Ross. IV (1884) 818 (nomen) et in Addenda, II, 602. — *C. podocarpa* Meinsh. in A. H. P. XVIII, 3 (1901) 352, quoad pl. kamtsch., non Boott. — *C. Tolmiei* Hultén, Fl. of Kamtsch. I (1927) 193, non Boott. — *C. Tolmiei* var. *longiuscula* Hultén, l. c., 195. — *C. Tolmiei* var. *invisia* Kük. in Journ. Russ. Bot. 3-6 (1911) 110; Kom. Fl. penins. Kamtsch. I (1927) 249, quoad pl. kamtsch. — *C. atrofusca* Kom., l. c. 260, non Schkuhr. — *C. atrofusca* var. *fulvicoma* Kom., l. c., 261 (excl. syn.). — *C. Krascheninnikovii* Kom. in herb. et ex Hultén, l. c., 194 (nomen). — *C. macrochaeta* var. *paramushirensis* Kudo in Journ. Coll. Agr. Hokk. Univ. XI, 2 (1922) 81 (sec. Hultén). — Ic.: Hultén, l. c., tab. 6, fig. b.

262 Perennial, yellowish-green, with short-creeping, ligneous rhizome, stoloniferous; culms firm, sharply triangular, smooth, 20-40 cm tall, leafy in lower one-fourth, covered at base with ochreous-brown to castaneous-brown, rather light, bladeless, more or less fracturing-fibrillose sheaths; leaves rather stiff, 3-5(6) mm broad, nearly smooth, shorter than the culm; spikelets 3-5, approximate: the terminal 1-2 staminate, oblong-lanceolate, 1-2 cm long, with oblong-ovate, castaneous-brown, subobtusate scales, the others pistillate, ovoid to oblong, 1-2.5 cm long, loosish, the smooth peduncles to 2 cm long; lowest spikelet sometimes remote, long-peduncled, more or less pendulous; lowest bract shorter than the inflorescence to nearly as long; scales oblong-ovate, acute, ferruginous to castaneous, with a light midrib, shorter and narrower than the perigynia; perigynia oblong-ovoid to oblong-ellipsoid, 4.5-5 mm long, compressed-trigonous, greenish-rusty-spotted, with 4-5 slender, inconspicuous nerves, round-based, sessile, smooth-margined above, rather gradually tapering into a short, brown, cylindric, broadly emarginate beak. Fr. July.

Tundra. — Arctic: Chuk, Anad.; Far East: Kamch. Gen. distr.: Pribilof Islands, Kurile Islands. Described from the Pribilof Islands: St. Paul Island. Type in Leningrad.

160. *C. stylosa* C. A. M. in Mém. Ac. St. Pétersb. Sav. Étr. I (1831) 222, tab. XII; Trev. in Ldb. Fl. Ross. IV, 305; Meinsh. in A. H. P. XVIII, 3 (1901) 350; Kük. in Journ. Russ. Bot. 3-6 (1911) 105; Kom. Fl. Kamch. I, 192. — *C. beringiana* Cham. ex Steud. Syn. Cyp. (1855) 229. — *C. caespitosa* var. *tristigmatica* Trautv. ex Kük. in Engl. Pflzr. IV, 20 (1909) 396.

Perennial cineraceous-green, densely caespitose plants, with ligneous rhizome and short stolons; culms scabrous above, 20-40 cm tall, densely covered at base with broad, ecarinate, somewhat lustrous, lateritious-brown, bladeless sheaths, these surrounded with abundant fibrillose remnants of old sheaths; leaves rather stiff, 2-3 mm broad, long-acuminate, shorter than the culm; spikelets 2-4, approximate: the terminal staminate, lanceolate, to 1.5 cm long, with ferruginous scales, the others pistillate, ovoid to oblong, 0.8-1.5 cm long, 0.5 cm broad, loose, all pedunculate (peduncle of lowest spikelet to 2 cm long), erect; scales ovate, subacute, ferruginous, with a light midrib, broadly white-hyaline-margined, shorter than the perigynia; perigynia oblong-ellipsoid to oblong-ovoid, coriaceous, obscurely trigonous, 3-3.5 mm long, nerveless, initially yellowish-green, becoming subferruginous, short-stipitate, smooth above, rather gradually tapering into a short, slightly emarginate beak, usually bearing a strong style-base 1-1.5 mm long. Fr. July-August.

Boggy sites.—Arctic: Anad.; East. Siberia: Len.-Kol.; Far East: Kamch.—Commander Islands; Bering Island. Gen. distr.: Alaska and adjacent islands, North America, Greenland, Newfoundland. Described from Unalaska. Type in Leningrad.

161. *C. Meyeriana* Kunth, Enum. pl. II (1837) 438; Trev. in Ldb. Fl. Ross. IV, 304; Turcz. Fl. baic.-dah. II, 2 (1856) 282; Meinsh. in A. H. P. XVIII, 3 (1901) 349 (excl. var β); Kük. in Engl. Pflzr. IV, 20 (1909) 393 et in Journ. Russ. Bot. 3-6 (1911) 104. —*C. asperula* Turcz. in Bull. Soc. Nat. Mosc. XI, (1838) 104 (nomen), non Nees. —*C. platycarpa* Cham. in herb.—Exs.: Karo, Pl. Amur. et Zeaën. No. 26.

263 Perennial, cineraceous-green, densely caespitose plants, growing in clumps; culms slender, obscurely triangular, smooth, 30-50 cm tall, covered at base with castaneous, lustrous, more or less keeled, fracturing-fibrillose sheaths; leaves rather stiff, setaceous, flexuous, folded, barely 1 mm broad, prominently scabrous-margined, ribbed below, long-acuminate, shorter than the culm to nearly as long; spikelets 2-3, constipate, sessile (rarely the lowest spikelet subdistant or short-peduncled): the terminal staminate, 1-2 cm long, with ferruginous obtuse scales, the others pistillate, ovoid to broadly ovoid, 0.5-1 cm long, not dense, obtuse-lowest bract obsolescent, scale-like, with a short bristle; scales ovate to oblong-ovate, subobtuse, blackish-brown, with 3 lighter nerves, narrowly white-hyaline-margined, shorter than the perigynia; perigynia subcoriaceous, ovoid or ellipsoid, compressed-trigonous, 3-3.5 mm long, bluish-green to gray, slenderly 5-6-nerved, finely granular, subsessile, smooth-margined above, with an obsolescent entire beak. Stigmas 3 or 2. Fr. June-July.

Marshes, boggy meadows.—West. Siberia: Irt. (w. part), Alt.; East. Siberia: Ang.-Sayan., Daur., Len.-Kol. (s. part); Far East: Ze.-Bur., Ud., Uss. Gen. distr.: Northern Mongolia, Manchuria, Korea. Described from Irkutsk. Type (or syntype?) in Leningrad.

162. *C. putjatini* Kom. in Bull. Jard. Bot. St. Pétersb. XVI (1916) 154.

Perennial, cineraceous-green, densely caespitose plants, with short-creeping rhizome; culms slender but firm, flexuous, scaberulous above, 30-50 cm tall, covered to somewhat above the base with blackish-brown,

strongly fibrillose, fracturing, slightly keeled, bladeless sheaths; leaves stiff, setaceous, 1-1.5 mm broad, abruptly pointed, short (1/4 to 1/3 the length of culm), contiguous near base; leaves of offshoots only slightly shorter than culms; spikelets 2-3, approximate: the terminal staminate, lanceolate, to 2 cm long, with obovate brown scales, the others pistillate, ovoid to oblong-ovoid, 0.8-2 cm long, dense, sessile; lowest bract obsolete, shorter than its spikelet; scales ovate, subacute, brown to dark brown, with evanescent light median band, somewhat shorter than the perigynia; perigynia broadly ovoid, trigonous, 3 mm long, grayish-green, subferruginous above, nerveless, with a short truncate beak.

Coastal grassy marshes. —Far East: Uss. (s. part: America Bay, Putyatín Island). Endemic. Described from Elizavety Lake on Putyatín Island. Type in Leningrad.

264 Cycle 3. *Aphanolepis* V. Krecz. —Plants covered at base with entire, purple, bladeless sheaths. Inflorescence capitate or racemiform, erect; terminal spikelets gynecandrous, the others pistillate. Scales about half as long as perigynia. Perigynia subcoriaceous, sometimes minutely granular, ovoid, more or less inflated-trigonous, spreading, attenuate at the summit into a cylindrical, hyaline-margined, slightly emarginate beak. Stigmas very short.

Series 1. *Distigmatae* V. Krecz. —Spikelets gynecandrous, short-peduncled, gathered in a glomerule. Perigynia 2-2.5 mm long, biconvex, minutely tuberculate, beakless; stigmas 2.

163. *C. bicolor* Bell. ex All. Fl. Pedem. II (1785) 267; Trev. in Ldb. Fl. Ross. IV, 285; Kük. in Engl. Pflzr. IV, 20 (1909) 297, fig. 45 et in Journ. Russ. Bot. 3-6 (1911) 79, fig. 61. —Exs.: HFR No. 1246.

Perennial, cineraceous-green, short-stoloniferous plants; culms slender, curving, scabrous, compressed-trigonous, 5-25 cm tall; leaves flat or revolute-margined, rather stiff, 1.5-2 mm broad, shorter than the culm; lower sheaths light brown, bladeless; spikelets 2-4, oblong to ovoid, 0.5-1 cm long, approximate, rather dense, short-peduncled, the lowest spikelet on peduncle to 5 mm long; terminal spikelets subclavate, its lower 1/2 to 2/3 staminate; uppermost bract scale-like, the lowest foliaceous, to 1 cm long, short-sheathed; scales ovate, obtuse, purplish-brown, with a light midrib, shorter than the perigynia; perigynia obovate, 2.5-2.8 mm long, light green, membranaceous, biconvex, densely and minutely papillose, with obscure, almost indiscernible nerves, on a short conic stipe, rounded at the summit, beakless. Fr. July.

Banks of rivers and brooks. —Arctic: Arct. Eur., Arct. Sib.; European part: Dv. -Pech. (Pinezhskii district); West. Siberia: Ob. (n. part); East. Siberia: Ang. -Sayan., Len. -Kol. (Olenek). Gen. distr.: Scandinavia, Greenland, Alps of Western Europe, Mongolia. Described from Piedmontese Alps.

Series 2. *Misandrae* V. Krecz. —Terminal spikelet staminate, weakly developed, suppressed by the pistillate. Spikelets sessile; perigynia 2 mm long, beakless and nerveless, subcoriaceous, minutely granulose.

164. *C. holostoma* Drej. Rev. crit. Caric. bor. (1841) 20 (excl. synonym.); Kük. in Engl. Pflzr. IV, 20 (1909) 387, fig. 60, F-G.; Gorodk. ex Soczava in Journ. Soc. Bot. Russ. XV, 4 (1930) 307.

Perennial, yellowish-green plants with short rhizome and long slender stolons; culms slender, scaberulous above, 10-20 cm tall, covered at base with purplish-brown bladeless sheaths; leaves rather stiff, erect, ribbed below, 1.5-2.5 mm broad, mucronulate, shorter than the culm; spikelets 3-4, approximate in a compact inflorescence, or the lowest spikelet apart; terminal spikelet staminate, very short, lanceolate, barely 0.5 cm long, the others pistillate, much longer, narrowly short, cylindrical, 0.6-1 cm long, 0.2-0.3 cm broad, sessile, the lowest (especially when remote) short-peduncled; lowest bract subsetaceous, scarcely longer than its spikelet; 265 scales broadly ovate, subacute, blackish, with a light midrib, narrowly hyaline-margined, shorter than the perigynia; perigynia obovate, inflated-trigonus, 2 mm long, minutely granulose, green, at length brunescent above, nerveless, rounded and smooth at the summit, without a distinct beak.

Wet places in the tundra. — Arctic: Anad. (Belaya River basin, right tributary of Anadyr', near Pukulnya Range); European part: Kar.-Lap.: recorded by Hjelt in Acta Soc. Faun. et Fl. Fenn. V, 3 (1895) 290, for Khibiny. Gen. distr.: Greenland, Norway. Described from western Greenland.

165. *C. arakamensis* C. B. Clarke in Kew Bull. Misc. Inf., Addit. ser., VIII (1908) 82. — *C. leptosaccus* C. B. Clarke in Journ. Linn. XXXV (1902) 404, non C. B. Clarke (1895). — *C. Tolmiei* Boott, Illustr. Carex, II (1860) 100, ex p. — *C. Tolmiei* var. *leptosaccus* Kük. in Engl. Pflzr. IV, 20 (1909) 411 et in Journ. Russ. Bot. 3-6 (1911) 110; Kom. Fl. Kamch. I, 249.

Perennial; culms 20-25 cm tall; spikelets 4, the terminal staminate; pistillate spikelets 3 mm broad, rather dense; perigynia 2 mm long, ovoid, compressed, almost beakless, chartaceous; style 3-fid; achene obovoid, trigonus, somewhat narrower than the perigynia (after C. B. Clarke).

Arctic: Chuk., Arakam-Chechen Island, Uait, No. 23. Endemic. Described from locality indicated. Type in London.

NOTE: A form of preceding species?

Series 3. *Cephalariae* V. Krecz. — Spikelets aggregated in heads, dense; perigynia horizontally spreading, dark (olivaceous or brown), scabrous-margined above, nerveless; scales ovate, subobtusate, uniformly brown, 1-nerved, $\frac{2}{3}$ the length of perigynia.

166. *C. Halleri* Gunn. Fl. Norveg. II (1772) 106 (quoad ic. et specim. Oederi, excl. citat. errone. Haller. et Scheuchz.). — *C. norvegica* Retz. Fl. Scand. Prodr. ed. 1 (1779) 179; ed. 2 (1795) 219, non Willd. (1801). — *C. alpina* Sw. ex Liljebl. Svensk. Fl., ed. 2 (1798) 26, nec Schrank (1789) nec Honck. (1796); Trev. in Ldb. Fl. Ross. IV, 286 (var. α). — *C. alpina* f. *nigrescens* Anderss. Cyp. Scand. (1849) 39. — *C. Vahlia* Schkuhr, Riedgr. I (1801) 87, tab. Gg, fig. 94 et II (1806) 46, tab. Ppp. fig. 154. — Exs.: Kneuck. No. 17 and 26.

Perennial, green, stoloniferous plants, with creeping rhizome; culms rather strongly scabrous above, 10-25 cm tall, covered at base with purple bladeless sheaths; leaves rather stiff, 1.5-3 mm broad, straight to sub-falcate, about half as long as the culms; spikelets 1-3(4), tightly crowded, dense, the terminal gynecandrous, usually ovoid to oblong, 0.5-0.8 cm long, the others pistillate, globose to ovoid, 0.3-0.6 cm long, the lowest usually

on a short scabrous peduncle; scales broadly ovate, subacute to acute, ferruginous-brown (the nerve concolor or lighter, scabrous above), hyaline-margined and often bristly (above), rather shorter than the perigynia 266 (about 2/3 their length); perigynia divergent, obovate, trigonous, 2 mm long, golden-ferruginous, at length brunescent, without distinct nerves, densely and minutely granulose, cuneate-based, abruptly contracted into a short, ferruginous, slightly emarginate beak, margin at summit and base of beak scabrous. Fr. July–August. (Plate XVI, Figure 9).

Mossy slopes of mountains and shores; tundra. — Arctic: Arct. Eur. (Kol'skoe coast, Kanin), Arct. Sib. (?), Anad. Gen. distr.: Alps, Scandinavia, Greenland. Described from Scandinavian Alps.

NOTE: Forming hybrids with *C. atrata* L. (*C. Candriani* Kneuck).

ECONOMIC IMPORTANCE: One of the spring forage plants most favored by reindeer in the tundra.

167. *C. mimula* V. Krecz. sp. nova in Addenda, II, 603. — *C. parviflora* Kryl. Fl. Sib. Occ. III (1929) 476, non Host.

Perennial, yellowish-gray, loosely caespitose plants, with short rhizomes; culms firm, erect, nearly smooth, 20–25 cm tall, covered at base with purple, slightly keeled, bladeless sheaths; leaves strict, rather rigid, 2.5–4 mm broad, scabrous, about half as long as the culm; spikelets 3–5, divaricate, aggregated in a lobed capitate inflorescence, the lowest short-peduncled, sometimes subdistant; the terminal gynecandrous, largest, the others pistillate, dense, ovoid to oblong-ovoid, 0.6–1.2 cm long, 0.4–0.6 cm broad; scales ovate, subobtusate, dark brown, with concolor nerve, narrowly hyaline-margined, slightly shorter than the perigynia; perigynia obovate, tuberculate-granulose, trigonous, 2.5 mm long, nerveless, greenish- to olivaceous-ferruginous, broadly cuneate-based, rounded at the summit, with a distinct abbreviated emarginate erect brown beak, smooth above or sometimes scabrous near the beak. (Plate XVI, Figure 10).

Snow-covered mountains in the moss-lichen tundra. — West. Siberia: Altai. Endemic. Described from Altai. (Talitskie Belki). Type in Lenin-grad.

168. *C. melanocephala* Turcz. ex Bess. in Flora, XVIII, Beibl. 1 (1834) 26 et in Bull. Soc. Nat. Moscou, XI, 1 (1838) 104 (nomen); *ib.*, XVIII, 1 (1855) 334, atque in Fl. baic.-dah. II, 2 (1855) 269 (descr.). — *C. oligantha* Steud. Syn. Cyp. (1855) 203, quoad pl. baical. — *C. alpina* Trev. in Ldb. Fl. Ross. IV (1853) 286, ex p., non Sw. — *C. alpina* var. *parviflora* Boott, Illustr. Carex, III (1862) 113, tab. 360. — *C. parviflora* Kük. in Engl. Pflzr. IV, 20 (1909) 386, ex p. et in Journ. Russ. Bot. 3–6 (1911) 101; V. Krecz. in Fl. Transb. II (1931) 123, non Host.

269 Perennial, yellowish-green, loosely caespitose plants, with short rhizome; culms firm, erect, scaberulous above, 10–35 cm tall, covered at base with light brown, obtusely keeled, bladeless (blades obsolescent) sheaths; leaves straight, rather stiff, 2.5 mm broad, about half as long as the culm; spikelets 3–4(5), aggregated in a compact, 3-lobed, blackish-brown head, dense, globose or ovoid to oblong-ovoid, 0.6–1.2 cm long, 0.8–0.9 cm broad, the terminal gynecandrous, the others pistillate; scales ovate, subacute, blackish-brown, with concolor nerved, narrowly hyaline-margined, slightly shorter than the perigynia; perigynia oblong-obovate

to oblong-ellipsoid, trigonous, subvesicular (not granulose), 3.8-4.5 mm long, nerveless, ferruginous-brown, cuneate-based, rather gradually tapering into an elongate bidentate beak with hyaline orifice, diffusely scarberulous above. Fr. July. (Plate XVI, Figure 7).

Alpine tundra. — West. Siberia: Alt.; East. Siberia: Ang.-Sayan., Daur.; Centr. Asia: Dzhung.-Tarb., Tyan'-Shan. Gen. distr.: Northern Mongolia. Described from the alpine zone of Urgudei and Shibte in the Sayans, near Baikal. Type in Leningrad.

169. *C. oligantha* Steud. Syn. Cyp. (1855) 203. — *C. parviflora* C. A. M. Verz. Pfl. Cauc.-Casp. (1831) 30 (in Steud. syn. erron.: *C. pauciflora*); Kük. in Engl. Pflzr. VI, 20 (1909) 386, quoad pl. cauc., non Host (1801). — *C. alpina* var. γ Trev. in Ldb. Fl. Ross. IV (1853) 286, ex p.

Perennial, yellowish-green to green, caespitose plants, with short rhizome; culms firm, erect, scabrous above, 10-35 cm tall, covered at base with lateritious-brown bladeless sheaths; leaves straight, 3-5(6) mm broad, shorter than the culm; spikelets 3-5, aggregated in a compact lobed capitulate inflorescence, dense, blackish-brown, ovoid to oblong, 0.8-1.5 cm long, 0.6-0.8 cm broad, the terminal gynecandrous, the others pistillate, the lowest sometimes apart, short-peduncled; scales broadly ovate, sub-obtuse (the lower ones obtuse), blackish-brown, with concolor evanescent nerve, faintly hyaline-margined, 1/3 as long as the perigynia; perigynia obovate, compressed-trigonous, 3 mm long, not granulose, blackish-brown at the summit and only on the rib green or yellow, nerveless or very obscurely nerved, broadly cuneate-based, abruptly contracted into a short bidentate beak membranaceous at the orifice, strongly scabrous-margined above. Fr. June. (Plate XVI, Figure 8).

Alpine meadows and bogs. — Caucasus: Ciscauc., Dag., West., East., and South. Transcauc. Gen. distr.: Turkey. Described from the alpine zone of Western Caucasus. Type in Leningrad.

270 Series 4. Botryoideae V. Krecz. — Spikelets aggregated in fascicles, subappressed to ascending, green to golden-green, smooth above, with slender nerves; scales oblong, acute, castaneous or ferruginous, hyaline-margined, 3-nerved, up to half as long as the perigynia.

170. *C. infusata* Nees ex Wight, Contrib. Bot. Ind. (1834) 125 (excl. var. β). — *C. alpina* var. *infusata* Boott, Illustr. Carex. III (1862) 113, tab. 358. — ? *C. trispiculata* Bcklr. Cyp. nov. I (1888) 45.

Perennial, light, cineraceous-green, loosely caespitose plants, with short rhizome; culms arching, scabrous above, 10-25 cm tall, covered at base with light brown, fracturing-fibrillose sheaths; leaves rather stiff, 1.5-3 mm broad, long-acuminate, less than half the length of the culm; spikelets 2-5, rather tightly aggregated, densish, the terminal gynecandrous the others pistillate (sometimes the lateral spikelets also with staminate flowers at base), all subsessile, ca. 1 cm long; scales ovate, acute, blackish-brown, with a lighter midrib, not hyaline-margined, somewhat shorter than the perigynia; perigynia ovoid to ellipsoid, trigonous, 3 mm long, golden-yellow, distinctly 3-5-nerved at base, not granulose, stipitate, smooth above, rather gradually tapering into an emarginate-bidentate ferruginous beak.

Centr. Asia: Pam.-Al. (Shugnan, lower reaches of river Gunt, Rivak).
Gen. distr.: Afghanistan, Kashmir, Himalayas. Described from Nepal.

NOTE: The species is presented in a generalized fashion, as the available collections are insufficient to warrant a definite decision; moreover, the description of the related *C. trispiculata* Bckl. remains unknown.

171. *C. angarae* Steud. Syn. Cyp. (1855) 190 (sec. descript. et specim. Gmelin.). — *C. brachylepis* Turcz. ex Bess. in Flora, XVIII, Beibl. 1 (1834) 26 (nomen) et in Boott, Illustr. Carex, III (1862) 113, tab. 357, fig. 2 et 3; V. Krecz. in Fl. Transb. II (1931) 123. — *C. alpina* Trev. in Ldb. Fl. Ross. IV (1853) 286 (var. δ); Meinsh. in A.H.P. XIII, 3 (1901) 349; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I, 292, non Sw. — *C. Vahlia* C.A.M. in Ldb. Fl. Alt. IV (1833) 217, non Schkuhr. — *C. alpina* var. *inferalpina* Whlb. Fl. lap. (1812) 241; Kük. in Journ. Russ. Bot. 3-6 (1911) 100. — *C. sabulosa* Freyn in Oest. Bot. Zeitschr. XLVI (1896) 132, non Turcz. — Exs.: HFR No. 2387 a, b.

271 Perennial, cineraceous-green to darkish green stoloniferous plants, with creeping rhizome; culms slender, more or less scabrous above, sometimes nearly smooth, 50-60 cm tall, covered at base with purple bladeless sheaths; leaves soft, abundant, only slightly revolute, 2-4.5 mm broad, elongate, but shorter than the culm; spikelets 3-5, loosely aggregated, rather dense, the terminal gynecandrous, the others pistillate, all ovoid to oblong-ovoid, to 1.5-2 cm long, 0.6-0.8 cm broad, the lower ones on a smooth peduncle; scales oblong-ovoid, long-acuminate, ferruginous-brown to ferruginous, with 3 smooth nerves, narrowly hyaline-margined, $1/3-2/3$ the length of perigynia; perigynia oblong-ovovate to oblong-ellipsoid, subinflated-trigonous and hence divaricate, (2.8)3-3.2 mm long, thinly membranaceous, scarcely granulose, light green, becoming yellowish-brown, with slender nerves, stipitate, smooth above, rather gradually tapering into a somewhat curving, emarginate-bidentate beak, this ferruginous between the teeth. Fr. June-July. (Plate XVI, Figure II).

Damp forests and coppices, peat bogs, and boggy meadows. — Arctic: Arct. Eur., Arct. Sib., Anad. (along rivers); European part: Kar.-Lap., Dv.-Pech., Volg.-Kam.; West. Siberia: Ob., Alt.; East. Siberia: Yenisei., Ang.-Sayan., Daur., Len.-Kol.; Far East: Ze.-Bur., Ud., Okhot.; Centr. Asia: Dzhung.-Tarb., Tyan'-Shan. (e. part). Gen. distr.: Fenno-Scandia, Northern Mongolia. Described from Angara (in former Irkutsk Province).

NOTE: Siberian arctic plants of dubious position from Yakutiya and Anadyr' are more closely related to *C. Halleri*, but have smooth perigynia.

172. *C. macrostigmatica* Kük. in Finska Vet. Soc. Forh. XLV (1902-1903) 5 et in Engl. Pflzr. IV, 20 (1909) 386, atque in Journ. Ross Bot. 3-6 (1911) 102, fig. 82.

Perennial, caespitose plants, with descending rhizome; culms slender, scabrous, covered at base with brownish-purple bladeless sheaths; leaves 2 mm broad; spikelets 3-6, oblong to ovoid, the lowest more or less removed, short-peduncled; the terminal gynecandrous, the others pistillate; scales small, oblong-ovate, subacute, blackish, much shorter than perigynia; perigynia broadly ovoid, inflated-trigonous, 2.5 mm long, green, nerveless, not granulose, with a short scabrous-margined, entire beak; style elongate, with long stigmas.



East. Siberia: Swampy larch forest near Zhigansk (Kayander). Endemic. Described from the locality indicated. Type in Helsinki.

173. *C. Hancockiana* Maxim. in Bull. Soc. Nat. Moscou, LIV, 1 (1870) 66. — *C. alpina* var. *longipedunculata* Kük. in Journ. Russ. Bot. 3-6 (1911) 101; Kryl. Fl. Zap. Sib. III, 475.

Perennial, light green plants with short creeping ligneous rhizome and short stolons; culms slender, more or less scabrous above, 40-80 cm tall, leafy up to considerable height, covered at base with purple, fracturing-reticulate bladeless sheaths; leaves rather soft, 2-5 mm broad, prominently scabrous, longer to shorter than the culm; spikelets 3-5, on filiform scabrous peduncles to 3-4 cm long, aggregated, more or less congested, erect to somewhat nodding, loosish: the terminal gynecandrous (with staminate flowers only at base), clavate-cylindric, 1-1.8 cm long; the others pistillate, short-cylindric, 0.6-2 cm long, 0.5-0.6 cm broad; scales lanceolate, cuspidate, ferruginous, with 3 lighter nerves (midnerve 272 scaberulous above), narrowly hyaline-margined, rather shorter than the perigynia and narrower; perigynia oblong-ellipsoid, trigonous, not granulate, 3-3.5 mm long, pale green, with 5-6 slender nerves, more or less rounded at base, smooth above, rather abruptly contracted into a fairly large brown, deeply bidentate beak. Fr. July.

Wet places in forests and coppices, and among rocks. — West. Siberia: Alt.; East. Siberia: Ang.-Sayan. (Baikal, Kultuk). Gen. distr.: Eastern Mongolia, Korea, Northern China. Described from Siao-Vutai-Shan Mountains, some 250 km to the west of Peking. Type in Leningrad.

NOTE: Our plants hardly differ from the Chinese, except that in the latter the spikelets are longer (to 2.5 cm) and scales are nearly as long as perigynia.

174. *C. Augustinowiczii* Meinsh. ex Korsh. in A.H.P. XII (1892) 411 et in A.H.P. XVIII, 3 (1901) 345. — *C. eleusinoides* var. *flaccidior* F. Schmidt in Mém. Ac. St. Pétersb., VII sér., XII, 2 (1868) 196. — *C. flaccidior* Miyabe et Kudo in Trans. Sapporo Nat. Hist. Soc. VII, 1 (1918) 28.

Perennial, green, densely caespitose plants, with short stolons; culms slender, sometimes weak or pendulous at apex, scabrous, 30-60 cm tall, covered at base with purple, fracturing-fibrillose bladeless sheaths; leaves 2-3 mm broad, soft, shorter than the culm; spikelets 3-5, distant, the terminal staminate or gynecandrous, clavate, to 2 cm long, with ferruginous-brown obovate scales; the others pistillate, narrowly cylindric, 2-4 cm long (2-3 mm broad), rather loose, the upper ones sessile, the lowest on a short peduncle (to 1 cm), erect; scales oblong-ovate, subacute, ferruginous or purplish-brown, with a light median band, shorter than the perigynia; perigynia membranaceous, ellipsoid to oblong-ellipsoid, slightly

Explanation to Plate XVII

1. *Carex Griffithii* Boott.: a) habit, b) perigynium. — 2. *C. Oliveri* Bckl.: a) habit, b) perigynium. — 3. *C. coriophora* Fisch.: a) habit, b) perigynium. — 4. *C. stilbophaea* V. Krecz.: inflorescence. — 5. *C. oxyleuca* V. Krecz.: inflorescence. — 6. *C. atrata* L.: inflorescence. — 7. *C. perfusca* V. Krecz.: inflorescence. — 8. *C. macrochaeta* C.A.M.: inflorescence.

curving above, 3 mm long, obscurely trigonous, green, becoming brownish-yellow, with 5-8 slender nerves on both faces, short-stipitate, the beak short, emarginate. Fr. June.

Forest streams. — Far East: Kamch., Sakh., Ud., Ze.-Bur., Uss.
Gen. distr.: Manchuria, Japan, the Kurile Islands. Described from Pil-linga River on Sakhalin. Type in Leningrad.

175. *C. peiktusani* Kom. in A. H. P. XVIII, 6 (1901) 445; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I, 295. — *C. Hancockiana* var. *Peiktusani* Kük. in Engl. Pflzr. IV, 20 (1909) 395.

Perennial, cineraceous-green, caespitose plants, with a short creeping rhizome; culms strongly tapering toward the apex, prominently scabrous nearly from the base, 40-60 cm tall, covered at base with dull red fracturing-reticulate sheaths; leaves rather soft, 2-4 mm broad, prominently tenacious-scabrous, attenuate toward the apex, equaling the culm; spikelets 2-4, loose, on scabrous capillary peduncles to 3 cm long, distant, pendulous: the terminal clavate, gynecandrous (1/2-1/3 pistillate, 2/3-1/2 staminate), 1-3 cm long; the others pistillate, cylindrical, (0.5)1-3 cm long, 0.5 cm
273 broad; scales ovate, mucronate, subferruginous, greenish-whitish, 3-nerved, with light green internerves, shorter than the perigynia; perigynia oblong-ellipsoid, smooth (not granulose), trigonous, 4 mm long, light green, with 6-8 slender nerves, round-based, gradually tapering into a subelongate beak.

Forests, rock crevices, moss-covered ground. — Far East: Uss. (Ol'-ginskii District, Khualaza Knoll; Suchanskii Pit, Kamenka River). Gen. distr.: Manchuria, Korea. Described from Peiktusan Plateau in North Korea. Type in Leningrad.

176. *C. soyaensis* Kük. in Bull. Hérb. Boiss., 2 sér., IV (1904) 53 et in Engl. Pflzr. IV, 20 (1904) 388; Miyabe et Kudo, Fl. Hokk. and Sagh. II (1931) 240; Akiyama in Journ. Fac. Sc. Hokk. Univ., ser. V, II, 1 (1932) 112, fig. 61.

Perennial, green, densely caespitose plants; culms slender, flattened-triangular, 30 cm tall, scabrous above, densely papillose, leafy below; spikelets 5, the terminal ones gynecandrous, the others pistillate nearly throughout, all oblong-cylindric, 1-2 cm long, rather dense, the upper sessile, the lower subdistant, faintly pedunculate; scales small, ovate, obtuse to mucronate, brown, with a green median band and 1-3 nerves, shorter and narrower than the perigynia; perigynia subdivaricate, membranaceous, ovoid, inflated-trigonous, 2.8-3.2 mm long, pale green, glabrous, with rather numerous nerves, short-stipitate, terminating in an obsolescent truncate scarcely emarginate beak.

Far East: Sakh. (n. part, according to Miyabe and Kudo). Gen. distr.: Northern Japan. Described from Japan (Yezo, Cape Soya). Type in Berlin.

Cycle 4. Orthocranion V. Krecz. — Inflorescence erect, oblong, aggregated in heads, the bracts almost scale-like. Spikelets sessile to subsessile, the terminal ones gynecandrous or staminate. Perigynia more or less coriaceous, ovoid, convexly trigonous, gradually tapering into an emarginate beak; achene entirely filling the perigynium.

177. *C. melanantha* C.A.M. in Ldb. Fl. Alt. IV (1833) 216 et Ic. IV, (1833) 8, tab. 317. — *C. melanantha* α *genuina* Turcz. Fl. baic-dah,

II, 2 (1856) 269. — *C. melanantha* var. *Moorcroftii* Kük. in Engl. Pflzr. IV, 20 (1909) 391, quoad pl. turkest. — *C. nigra* var. β Trev. in Ldb. Fl. Ross. IV (1853) 288, exp. — *C. nigra* var. *orientalis* Rgl. in A. H. P. VII (1880) 568. — *C. Moorcroftii* Meinsh. in A. H. P. XXVIII, 3 (1901) 347; Litw. in Sched. ad HFR VI (1908) 115, non Falc. — *C. Rege-
lii* C. B. Clarke in A. H. P. XXI (1903) 430; Ostenf. in Bot. Tidsskr. XXVIII (1907) 230. — Exs.: HFR No. 1897.

274 Perennial, cineraceous-green to yellowish-cinereaceous-green plants with a creeping rhizome and long underground offshoots; culms firm, usually smooth, 10-35 cm tall, covered at base with brownish remnants of bladeless and blade-bearing sheaths; leaves stiff, 3-6 mm broad, as long as or shorter than the culm; spikelets 3-6, aggregated in a dense lobed capitate to spiciform inflorescence; terminal spikelet usually staminate or gynecandrous (rarely mixed), ovoid, 1-2.5 cm long; other spikelets pistillate, ovoid, 1-2 cm long, 0.6-1 cm broad; all dense, sessile, including the occasionally subdistant lowest spikelet; scales ovate, subacute, ferruginous-brown, with a lighter or concolor nerve and lighter margin, as long as the perigynia; perigynia ovoid to ellipsoid, trigonous (flat part on the outside), minutely papillose, 3-3.5 mm long, nerveless, yellowish, ferruginous above, broadly cuneate or rounded at base, mostly smooth above, abruptly contracted into a short cylindrical truncate hyaline-margined beak. Fr. June-July. (Plate XVI, Figure 5).

Alpine meadows and glades. — West. Siberia: Alt.; Centr. Asia: Dzhung.-Tarb., Tyan'-Shan., Pam.-Al. Gen. distr.: Afghanistan, Kashmir, northwestern Mongolia, Dzungaria. Described from Altai (sources of river Charysh). Type in Leningrad.

ECONOMIC IMPORTANCE: Of considerable value in certain places in alpine pastures. Readily eaten by all kinds of livestock.

178. *C. melananthaeformis* Litw. in Trav. Mus. Bot. Ac. St. Pétersb. VII (1910) 90. — *C. melananthoides* Litw. ex V. Krecz. in Fl. Transb. II (1931) 124. — *C. melanantha* β *baicalensis* Turcz. in Bull. Soc. Nat. Moscou, XXVIII, 1 (1855) 335 et Fl. baic.-dah. II, 2 (1856) 270. — *C. melanantha* Meinsh. in A. H. P. XVIII, 3 (1901) 348, ex max. p., non C. A. M. — *C. melanantha* var. *Moorcroftii* Kük. in Engl. Pflzr. IV, 20 (1909) 391, quoad pl. sibiricam et in Journ. Russ. Bot. 3-6 (1911) 104.

Perennial, cineraceous-green, loosely caespitose plants, with a short rhizome and with stolons; culms erect to slightly curving, rather strongly scabrous above, covered at base with brownish-red (ochreous) bladeless sheaths, these loosely surrounded by remnants of marcescent sheaths; leaves stiff, 2-3.5 mm broad, straight to slightly curving, long-acuminate, about as long as or shorter than the culm; spikelets 3-6, disposed in a loose lobed spiciform inflorescence: the terminal gynecandrous, obovoid to oblong-clavate, 1-2.5 cm long; others pistillate, ovoid to oblong, 0.8-1.5 cm long; all 0.6-0.8 cm broad, the lowest on a peduncle to 0.8 cm long, subdistant; scales ovate, the lower obtuse, the upper acute, dark ferrugineous, with a light nerve and light hyaline margin, longer than the perigynia; perigynia obovate (pyriform), convexly trigonous, minutely granulose, with edge turned outward, 2.5-3 mm long, cuneate-based, obscurely 3-4-nerved on both faces, yellowish, ferruginous above, rather abruptly

contracted into a very short obsolescent emarginate beak, margin near the beak smooth. Fr. May–July. (Plate XVII, Figure 6).

275 Meadows, riverside sands, steppe slopes. — West. Siberia: Alt.; East. Siberia: Ang.-Sayan., Daur.; Centr. Asia: Dzhung.-Tarb. Pribalkh. (e.), Tyan'-Shan. (e.). Gen. distr.: Northern Mongolia, Tibet (?). Described from vicinity of Monda village in the Sayans. Type in Leningrad.

179. *C. sabulosa* Turcz. ex Bess. in Flora, XVIII, Beibl. 1 (1834) 26 (nomen) et ex Kunth, Enum. pl. II (1837) 432; Fl. baic.-dah. II, 2 (1856) 270; Meinsh. in A. H. P. XVIII, 3 (1901) 348. — *C. Moorcroftii* Falc. ex Boott in Trans. Linn. Soc. XX (1846) 140 et Illustr. Carex, I (1848) 9, tab. 27. — *C. melanantha* var. *sabulosa* Kük. in Engl. Pflzr. IV, 20 (1909) 392 et in Journ. Russ. Bot., 3-6 (1911) 104. — *C. alpina* var. β Trev. in Ldb. Fl. Ross. IV (1853) 286. — Exs.: HFR No. 2391 a et b.

Perennial, cineraceous-green to yellowish-cineraceous-green plants with long flagellate underground rhizomes; culms arching or flexuose, smooth, covered at base with long, reddish-brown, bladeless and blade-bearing sheaths, these surrounded with a collar of marcescent sheaths; leaves stiff, subinvolute, arching or flexuose, 2-3.5 mm broad, long setaceous-pointed, shorter than the culm; inflorescence loose, spiciform-clavate, often interrupted below; spikelets 2-5, the terminal broadly clavate, gynecandrous, sometimes staminate, 2-2.5 cm long; the others pistillate, ovoid to oblong-ovoid, 1.5-2 cm long; all spikelets 0.8-1 cm broad, the upper congested, the lower 1-2 distant, on peduncles to 1-2 cm long; scales ovate, ferruginous, acute, with a light midrib, rather strongly light-hyaline-margined, narrower than but as long or longer than the perigynia; perigynia coriaceous, ovate, trigonous, smooth (not granulose), 4-5(6) mm long, turned flat side outward, 3-5-nerved, broadly cuneate-based, stipitate, abruptly contracted into a smooth, deeply bidentate beak. Fr. June–July. (Plate XVI, Figures 4 and 4a).

Sands, dunes. — East. Siberia: Ang.-Sayan., Daur., Len.-Kol.; Centr. Asia: Pribalkh. (e. part). Gen. distr.: Mongolia, Tibet. Described from Baikal: Turkinskie mineral waters. Type in Leningrad.

Cycle 5. *Phanerolepis* V. Krecz. — Inflorescence with distant spikelets, subpendulous or 1-sided (not erect), the lowest bract not exceeding the inflorescence. Scales in lower part of spikelet accrescent, awn-pointed, equaling or exceeding the perigynia; perigynia coriaceous, mostly papillose, ellipsoid, convexly trigonous, rounded at the summit, the beak distinct, broadly emarginate, not hyaline-margined; achene half the length of perigynium.

180. *C. adelostoma* V. Krecz. sp. nova in Addenda, II, 603. — *C. Buxbaumii* Whlb. var. *alpicola* Hartm. Hand. Scand. Fl., ed. 1 (1820) 41; Kük. in Engl. Pflzr. IV, 20 (1909) 394. — Exs.: Kneuck. No. 270; Pl. Finl. exs. No. 120.

276 Perennial, glaucous-green plants, with slender and rather soft underground rhizomes; culms slender, strongly scabrous to near the base, 15-35 cm long, covered at base with purplish-red bladeless sheaths; leaves rather stiff, scarcely keeled below, 2-3 mm broad, strict, shorter than the culm; spikelets 3-4, the upper usually approximate, the lowest subdistant, all sessile, rather dense, the terminal gynecandrous, often

staminate throughout, clavate-ovate, 1-1.5 cm long, the others pistillate, ovate to oblong, 0.8-1.5 cm long, 0.6-0.7 cm broad; scales ovate, acuminate, ferruginous-brown, with a green cuneate median band, shorter than to as long as the perigynia; perigynia ellipsoid, roughly granulose, convexly trigonous, 2.5-3 mm long, faintly 3-4-ribbed, grayish-green, rounded at base and summit, smooth-margined, the beak blackish-brown, obsolescent, obscurely orificed. Fr. July-August. (Plate XVI, Figure 2).

Marshes. - Arctic: Arct. Eur. (w. part of Kol'skii Peninsula), Arct. Siberia (northern Sosva basin); European part: Kar. -Lap. (n. part of Kol'skii Peninsula and Khibiny). Gen. distr.: Fennoscandia. Described from Tyuvaguba (near Murmansk). Type in Leningrad.

181. *C. Buxbaumii* Whlb. in Sv. Vetensk. Ac. Nya Handl. XXIV (1803) 163; Trev. in Ldb. Fl. Ross. IV, 285. - *C. Buxbaumii* var. *clavaeformis* Russow in Arch. Naturk. Liv.-Est.-Kurl., 2 ser., III (1862) 102. - *C. Buxbaumii* var. *sibirica* Litw. in Sched. ad Herb. Fl. Ross. VII (1911) 153. - *C. polygama* Schkuhr, Riedgr. I (1801) 84, tab. X, fig. 76, non J. F. Gmel. (1791). - Exs.: HFR No. 91, 2390.

Perennial, cineraceous-green, loosely caespitose plants, with long stolons; culms firm, rather scabrous above, 30-70 cm tall, covered at base with purple, fracturing-reticulate bladeless sheaths; leaves rather stiff, keeled below, 2-3 mm broad, long-acuminate, shorter than the culm; spikelets 3-5, subdistant, erect, rather dense, the lowest 2 on peduncles to 5-8 mm long, the terminal oblong-ovoid, gynecandrous, 1-2 cm long, the others pistillate, ovoid or oblong, 0.5-2 cm long, 0.8-1 cm broad; scales oblong-ovate, rounded at the summit or abruptly truncate, with a subulate scabrous awn, ferruginous to brownish-ferruginous, with 1-3 green nerves, longer than the perigynia; perigynia ellipsoid, minutely granulose, subcoriaceous, obscurely trigonous, turned flat side outward, (3)3.5-4 mm long, bluish-gray, with 4-5 somewhat thickened nerves, rounded at base and summit, smooth-margined, abruptly contracted into a short, broadly crescent-notched beak, with curving teeth. Fr. May-July. (Plate XVI, Figure 1 and 1a).

Marshes and boggy meadows. - European part: Kar. -Lap., Dv. -Pech., Lad. -Il'm., Upp. Dnepr. (n. part), Mid. Dnepr. (Kursk), Volg. -Don. 277 (Epifanskii District), Zavolzh. (Buguruslanskii District; Sergievsk), Volg. -Kam.; West. Siberia: Upp. Tob., Irt., Ob.; East. Siberia: Ang. -Sayan.; Centr. Asia: Aral. -Casp., Pribalkh. Gen. distr.: Western Europe. Described from the vicinity of Leningrad. Type in Stockholm.

182. *C. emasculata* V. Krecz. sp. nova in Addenda, II, 604. - *C. Buxbaumii* var. *australis* Anderss. Cyp. Scand. (1849) 39; Litw. in Sched. ad Herb. Fl. Ross. VII (1911) 152. - *C. Buxbaumii* var. *heterostachya* Litw., ib., 153. - *C. Buxbaumii* var. *macrostachya* Hartm. Handb. Scand. Fl., ed. 5 (1849) 268; Kük. in Engl. Pflzr. IV, 20 (1909) 394. - *C. Buxbaumii* var. *cylindrica* Russow in Arch. Naturk. Liv.-Est.-Kurl., 2 ser., III (1862) 102. - Exs.: HFR No. 2388, 2389; Kneuck. No. 25 (168 a), 168.

Perennial, green plants, with creeping rhizome, stoloniferous; culms slender, more or less scabrous above, 40-70 cm tall, covered at base with lateritious, fracturing-reticulate sheaths; leaves strict, rigid, 2-3 mm broad, setiform-attenuate, shorter than the culm; spikelets 3-5, subdistant,

the lowest 4-6 cm apart, loosish, the terminal gynecandrous, with very few (3-8) staminate flowers at base, narrowly cylindrical, 2-3.5 cm long, usually forking at base, with 2-3 shorter lateral spikelets; other spikelets pistillate, cylindrical, 1.5-4 cm long, 0.4-0.6 cm broad; scales lanceolate, gradually setiform-attenuate, ferruginous-brown, with a light midnerve, equaling to slightly exceeding the perigynia; perigynia ellipsoid, obscurely trigonous, not papillose, 2.5-3 mm long, greenish, becoming yellowish-ferruginous, with 5-6 distinct slender nerves, rounded at summit and base, smooth-margined, abruptly contracted into an attenuate bidentate brown-orificed beak with straight teeth. Fr. June-July. (Plate XVI, Figures 3 and 3a).

Deciduous forests with humus-rich soil, wet coppices, —European part: Lad. -Il'm., Upp. Dnepr., Upp. Volg., Mid. Dnepr., Volg. -Don. (Syzranskii and Lukoyanovskii Districts), Low. Don. (Bobrovskii District, Novocherkassk), Zavolzh. (Argayash Kant., Gorbatovskoe); West. Siberia: Ob. (surroundings of Tyumen'); Caucasus: Ciscauc., West. and South. Transcauc.; Centr. Asia: Aral. -Casp. (along the rivers Ak-Kuchuk and Tyubyulgyly-Tyubyuk). Gen. distr.: West. Europe, Baltic seaboard. Described from Dubki, near Sestoretsk Lenoblast'. Type in Leningrad.

ECONOMIC IMPORTANCE: According to report by E. A. Bush, readily eaten by livestock.

183. C. Gmelini Hook. et Arn. Bot. Beech. Voy. III (1834) 118, tab. 27; Trev. in Ldb. Fl. Ross. IV, 288; Meinsh. in A. H. P. XVIII, 3 (1901) 345; Kom. Fl. Kamch. I, 248; Hultén, Fl. of Kamtch. I, 192. — C. acrolepis Ldb. in Denkschr. Baier. Bot. Ges. III (1841) 56, non Liebm. — C. Buxbaumii Trev. in Ldb. Fl. Ross. IV (1853) 285, quoad pl. kamtsch.

278 Perennial, cineraceous-green plants, with short ligenous ascending rhizome, forming loose tufts, stoloniferous; culms firm, nodding at the apex, scabrous above, 20-70 cm tall, covered at base with dark purple, more or less keeled, fracturing-reticulate bladeless sheaths; leaves straight, rather stiff, 3-7 mm broad, short-acuminate, shorter than the culm; spikelets 3-8, the terminal 3 approximate, sessile, the lower distant, pedunculate (lowest peduncle to 2-3 cm long) more or less pendulous or erect, loosish, the terminal gynecandrous, oblong, 2-3 cm long (sometimes staminate throughout), the others pistillate, oblong or clavate (the lowest), 1.5-3 cm long, 0.6-0.8 cm broad; scales ovate, ferruginous-brown, rather abruptly contracted into a scabrous subulate point, with a broad light dorsal band and a thick distally scabrous midrib (nerves 3 altogether), equaling to slightly exceeding the perigynia; perigynia membranaceous, ovate, obscurely trigonous, 4-5 mm long, yellowish-green, 6-8-nerved, distinctly stipitate, smooth-margined above, abruptly contracted into a short ferruginous scarcely emarginate beak.

Coastal mounds and sands (between coastal ramparts). —Arctic: Anad.; Far East: Kamch., Okhot, Sakh., Ud., Uss. Gen. distr.: Manchuria, North Korea, Northern Japan, Alaska and adjoining Islands; North-Western America (to Oregon). Described from Kamchatka (Avachinskaya inlet). Type in London.

Section 18. *Olamblis* (Rafin.) V. Krecz. —Rafin. in Amenit. of Nat. I (1840) 26. —*Limonaetes* Ehrh. Beitr. IV (1789) 148 (nomen). —*Manochlaenia* Boern. in Abh. Naturw. Ver. Brem. XXI (1913) 271, ex p.

(omnia pro genere). — Tufted forest plants, without stolons. Culms triangular, covered at base with entire reddish sheaths. Leaves flat, short-acuminate, with hairy sheaths. Bract short, scarcely sheathed, with a long blade. Inflorescence of 3-5 spikelets; terminal spikelet staminate, ferruginous-tinged, short; other spikelets pistillate, ovoid or oblong, on slender peduncles, more or less pendulous. Perigynia thinly coriaceous, ellipsoid, in flated-trigonous, 3-3.5 mm long, green slenderly nerved, rounded at summit and base, smooth, almost beakless, obscurely emarginate. Style thickened, short; stigmas 3.

1. Culms scabrous; leaves and sheaths diffusely pilose; bract undulate at base; scales rusty-whitish, pale, shorter than perigynia; perigynia light green, 3-3.5 mm long 184. *C. pallescens* L.
- + Culms nearly smooth; leaves glabrous or only sheaths scarcely pilose; bract not undulate; scales honey-red, equaling and in lower part of spikelet even exceeding the perigynia; perigynia emerald-green, 3 mm long. (Caucasus) 185. *C. chalcodeta* V. Krecz.

184. *C. pallescens* L. Sp. pl. (1753) 977; Trev. in Ldb. Fl. Ross. IV, 139; Kük. in Engl. Pfzr. IV, 20 (1909) 432 et in Journ. Russ. Bot. 3-6 (1911) 113. — Exs.: HFR No. 795; Kneuck. No. 114.

279 Perennial, light green, densely cespitose plants, with a short creeping rhizome; culms slender, scabrous above, 25-60 cm tall, covered at base with reddish-brown bladeless sheaths; leaves rather soft, 2-4 mm broad, shorter than the culm, sheaths and blades pilose spikelets 3-5, approximate, the terminal staminate, linear to clavate-linear, 0.5-1.5 cm long, with ovate acute pale ferruginous scales; other spikelets pistillate, ovoid, oblong-ovoid, or short-cylindric, 0.8-2 cm long, 0.5-0.6 cm broad, on smooth peduncles 1-3 cm long, erect to slightly nodding; lowest bract nearly sheathless, undulate at base; scales ovate, gradually attenuate, cuspidate, whitish to slightly ferruginous, with a green median band, shorter and slightly narrower than the perigynia; perigynia oblong-ellipsoid, inflated-trigonous, 3-3.5 mm long, pale green, with 6-8 very slender nerves, rounded at summit and base, smooth-margined, practically beakless. Fr. May-June.

Light forests. — European part: everywhere except Arctic region; Crimea (mountain forests); Caucasus; West. Siberia: Ob., Upp. Tob., Irt., Alt.; East. Siberia: Ang.-Sayan. (w. part), Yenis.; Centr. Asia: Aral.-Casp., Pribalkh., Dzhung.-Tarb. Gen. distr.: Western Europe, North America. Described from Sweden.

185. *C. chalcodeta* V. Krecz. sp. nova in Addenda, II, 604. — *C. pallescens* β *glaberrima* C. Koch in Linnaea, XXI (1848) 612. — *C. pallescens* Grossh. Fl. Kavk. I (1928) 166 ex p.

Perennial, green, densely cespitose plants with a short rhizome; culms slender, nearly smooth, 20-50 cm tall, covered at base with reddish-brown bladeless sheaths; leaves 3-4 mm broad, glabrous (but sheaths diffusely pilose), shorter than the culm; spikelets 3-5, approximate, the terminal staminate, clavate, to 1.5 cm long, with honey-red or light ferruginous scales; other spikelets pistillate, ovoid to oblong, 0.5-1.5 cm long, on straight peduncles; lowest bract not undulate at base; scales ovate, honey-red, with a lighter band, sub-3-nerved, abruptly attenuate into a rather long subulate often recurved point, equaling to slightly exceeding the

perigynia; perigynia oblong-ellipsoid, turgid-trigonal, 3 mm long, emerald-green, with distinct slender nerves, rounded at summit, the yellowish-margined beak barely evident.

Subalpine meadows and slopes up to 2,500 m alt. — Entire Caucasus. Gen. distr.: Turkey (Lazistan, Armenia). Described from surroundings of Tabistskhuri Lake in Georgia. Type in Leningrad.

Section 19. *Chartoteuchium* (Boern.) V. Krecz. — *Chartoteuchium* Boern. in Abh. Naturwis. Ver. Brem. XXI (1913) 268 (pro subsectione generis *Proteocarpus* Boern.). — Arcto-alpine, more or less caespitose, stoloniferous plants. Culms more or less 3-angled, smooth. Leaves rather flat, abruptly pointed. Inflorescence of 2-7 spikelets; terminal 280 spikelet staminate (or gynecandrous), other spikelets pistillate, pendulous, on rather long scabrous peduncles. Lowest bract with sheath to 2 cm long and blade of about same length; perigynia membranaceous, ovoid or ellipsoid, flat, 4-5 mm long, nerveless, round-based, smooth-margined or diffusely setulose above, rather abruptly contracted into a short, smooth, membranaceous, scarcely emarginate beak. Achene exceeded many times by the perigynium in length and breadth.

1. Terminal spikelets gynecandrous; all clavate-cylindric, to 5 cm long 186. *C. Oliveri* Bcklr.
- + Terminal spikelets staminate; all obovoid or oblong-ovoid, to 3 cm long. 2.
2. Spikelets aggregated in glomerules, nodding, brown, clavate-ovoid, 2.5-3.5 cm long, variegated owing to the white-backed scales and white-hyaline perigynium-beaks (Turkestan) . . . 187. *C. Griffithii* Boott.
- + Spikelets overhanging each other, motley-brown to light brown, or subconcolor blackish-brown, ovoid to oblong-ovoid, 1-2 cm long. 3.
3. Spikelets 5-7, of these 1-2(3) staminate; scales pale ferruginous or tawny; perigynia of same color, with greenish margins, hence spikelets appear reticulate-variegated. 188. *C. coriophora* Fisch. et Mey.
- + Spikelets 2-5, of these only 1 staminate; scales and perigynia blackish-brown, subunicolor 4.
4. Scales of pistillate spikelets almost black, white-tipped; spikelets constipate, on thickened suberect peduncles; cineraceous-green plants 10-30 cm tall (Turkestan) 191. *C. oxyleuca* V. Krecz.
- + Perigynia of pistillate spikelets dark above or merely light-nerved; spikelets on slender peduncles, drooping; taller, green plants 5.
5. Perigynia lustrous at maturity, rather abruptly contracted into beak; lower scales of pistillate spikelets shorter than perigynia (Siberia) 190. *C. stilbophaea* V. Krecz.
- + Perigynia dull at maturity, gradually tapering into beak; lower scales overtopping the perigynia (Arctic). 189. *C. atrofusca* Schkuhr.

Cycle 1. *Craspedoleuca* V. Krecz. — Robust plants, with leaves to 6-8 mm broad. Spikelets 3-7; scales lanceolate, shorter than perigynia, white-keeled. Perigynia with white beak and rather light margin.

186. *C. Oliveri* Bcklr. in Flora, LXIII (1880) 455. — *C. nivalis* f. *cinnamomea* Kük. in Engl. Pflzr. IV, 20 (1909) 553, quoad pl.

281 Aitchison. — *C. nivalis* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 91; B. Fedtsch. in A.H.P. XXXVIII, 1 (1924) 215, non Boott. — *C. nivalis* var. *cinnamomea* Litw., 1. c.; B. Fedtsch., 1. c., non Boott.

Perennial, robust, yellowish-grayish-green plants with stout creeping rhizomes, stoloniferous; culms firm, (30) 60-100 cm tall, subpendulous at the apex, leafy to considerable height, covered at base with ochreous bladeless subtire sheaths; leaves barely papillose, 5-7 mm broad, gradually tapering, scaberulous, shorter than the culm; spikelets 3-5, aggregated in a glomerule: the terminal gynecandrous, staminate from base to above the middle, ca. 3 cm long; others pistillate, cylindric-clavate, 2.5-5 cm long, 0.6-0.8 cm broad, dense, the lower segregated, the peduncles slender, scabrous, long (to 20-25 cm); scales lanceolate, acute, ferruginous-brown, nearly equaling the perigynia, the upper ones somewhat shorter, the prominent light midrib excurrent in a scabrous white awn to 5 mm long; perigynia ellipsoid to oblong-ellipsoid, 4 mm long, castaneous throughout except for the pale yellowish margin, or with a whitish median band, nerveless, more or less rounded at base, sometimes diffusely setulose on the margin above, usually smooth, rather gradually tapering into a short whitish cylindric truncate beak; achene elliptic, 2 mm long, many times exceeded by perigynium in length and breadth. (Plate XVII, Figure 1).

Alpine bogs above 3,000 m. — Centr. Asia: Pam. Al. (Pamir, Darvaz, Shugnan). Gen. distr.: Afghanistan. Described from Afghanistan. Type in Berlin.

187. *C. Griffithii* Boott in Trans. Linn. Soc. XX (1846) 138; Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 91; B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 215. — *C. nivalis* Meinsh. in A. H. P. XVIII, 3 (1901) 355, non Boott. — *C. nivalis* f. *Griffithii* Kük. in Engl. Pflzr. IV, 20 (1909) 553. — *C. ustulata* β *aterrima* Rgl. in A. H. P. VII (1880) 571.

Perennial, light, yellowish-green, rather densely caespitose plants, with a stout creeping rhizome, stoloniferous; culms stout, firm, pendulous at the apex, smooth, to 20-60 cm tall, leafy nearly to the middle, covered at base to considerable height with ferruginous-brown, fracturing-fibrillose sheaths; leaves rather stiff, somewhat thickened, papillose, 5-6 mm broad, gradually tapering, shorter than the culm; spikelets 3-5, subdistant below, aggregated in a glomerule: the terminal staminate, ovoid, 1-2 cm long, with lanceolate acute castaneous-brown scales; the others pistillate, oblong-obovoid or oblong-clavate, 2-3.5 cm long, 1 cm broad, dense, pendulous, the peduncles slender, smooth, to 10 cm long; lowest spikelet sometimes markedly apart; scales lanceolate, acute, dark purple, with a white midrib, the lower longer, the upper shorter than the perigynia and 1/3-

282 1/2 as broad; perigynia broadly obovate to broadly ellipsoid, 5-5.5 mm long, whitish to white toward margin below and above, the margin and center toward summit violet-purple, nerveless, rarely colored throughout (except the beak), rounded at base and summit, smooth-margined, abruptly contracted into a whitish cylindric submarginate short smooth beak; achene oblong-elliptic, 1.8 mm long, many times exceeded by the perigynium in length and breadth. Fr. July. (Plate XVII, Figure 2).

Alpine meadows, gravels, moraines, up to 2,000-3,000 m alt. — Centr. Asia: Tyan'-Shan., Pam. -Al. Gen. distr.: Afghanistan, Kashmir. Described from Afghanistan. Type in London.

188. *C. coriophora* Fisch. et Mey. ex Kunth, Enum. pl. II (1847) 463; Turcz. in Bull. Soc. Nat. Moscou, XXVIII, 1 (1855) 342 et Fl. baic. - dahur. II, 2 (1856) 277; Freyn in Oest. Bot. Zeitschr. XLVI (1896) 133; V. Krecz. in Fl. Transb. II, 123. — *C. ustulata* var. β Trev. in Ldb. Fl. Ross. IV (1853) 293. — *C. ustulata* Boott, Illustr. Carex, I (1858) tab. 193, fig. 1, 2, non Whlb. — *C. ustulata* var. *pallida* Meinsh. in A. H. P. XVIII, 3 (1901) 357. — *C. atrofusca* var. *coriophora* Kük. in Engl. Pflzr. IV, 20 (1909) 554 et in Journ. Russ. Bot. 3-6 (1911) 150.

Perennial, light green plants, with creeping rhizome and short stolons; culms firm, smooth, 30-80 cm tall, leafy up to the middle, covered at base with ferruginous-brown subochreous sheaths; leaves rather stiff, abbreviated 4-6 mm broad, revolute-margined, nearly smooth, many times exceeded by the culm; spikelets 5-7, approximate, or the lower subdistant: the terminal 1-2(3) staminate, oblong-elliptic, 1.5-2 cm long, pendulous, with pale rusty-yellow ovate sharp-angled scales, others pistillate, ovate to oblong-ovate, 1-2.5 cm long, to 0.8 cm broad, dense, pendulous, the slender smooth peduncles to 3-4 cm long, scales oblong-ovate, acute, light rufous, with a green median band, shorter than perigynia; perigynia broadly ellipsoid, 5 mm long, light rufous, rather broadly light-green to yellowish-green-margined above, smooth or sparsely setulose, more or less rounded at base and summit, abruptly contracted into a short, narrowly cylindrical, pale, hyaline-emarginate beak. Fr. June-July. (Plate XVII, Figure 3).

Boggy meadows and coppices. — West. Siberia: Alt.; East. Siberia: Ang. -Sayan., Daur., Len.-Kol. (s. part). Gen. distr.: Northern Mongolia. Described from Transbaikalia (Doroninsk). Type in Leningrad.

Cycle 2. *Holomelaena* V. Krecz. — Moderately sized plants with leaves to 3-5 mm broad. Spikelets 2-5; scales ovate, brown nearly throughout, except the whitish tips, about equaling or just exceeding the perigynia; perigynia dark brown nearly throughout.

189. *C. atrofusca* Schkuhr, Riedgr. I (1801) 106, tab. Y, fig. 82; Kük. in Engl. Pflzr. IV, 20 (1909) 553. — *C. ustulata* Whlb. in Sv. Vetensk. Ak. Nya Handl. XXIV (1803) 156; Trev. in Ldb. Fl. Ross. IV, 295; Meinsh. in A. H. P. XVIII, 3 (1901) 356. — Exs.: Pl. Finl. Exs. No. 531.

283 Perennial, cineraceous-green, with ascending creeping rhizome, stoloniferous; culms faintly triangular, smooth, slightly curving, subpendulous at the apex, 10-30 cm tall, covered at base with light brown sheaths; leaves rather stiff, nearly smooth, 3-4 mm broad, gradually attenuate, up to half as long as the culm; spikelets 2-4(5), subdistant: the terminal staminate, obovoid, 0.5-1 cm long, with ovate acute rufous scales, the others pistillate, ovoid, 1-1.8 cm long, dense, pendulous, on peduncles to 2-3 cm long; scales oblong-ovate, acute, dark rufous throughout, half as broad as the perigynia; perigynia oblong-ovoid to oblong-ellipsoid, 5 mm long, reddish- to blackish-brown nearly throughout (except the base), light-margined, dull, nerveless, round-based, slightly setulose-margined above, gradually tapering into a short bidentate hyaline-margined brown beak. Fr. July.

Wet grassy places. — Arctic: Arct. Eur. (Kol'skii Pen., Orlovo); Chuk. (Arakam-Chechen Isl.), Anad. (middle course of Anadyr'); European part: Dv.-Pech. (Denezhkin Kamen'). Gen. distr.: Mountains of western Europe,

Fenno-Scandia, Scotland, Iceland, Greenland, Arctic America. Described from the Alps (Mt. Triglav).

190. *C. stilbophaea* V. Krecz. sp. nova in Addenda, II, 605. — *C. ustulata* Trev. in Ldb. Fl. Ross. IV (1853) 295, quoad pl. alt.; C. A. M. in Ldb. Fl. Alt. IV, 232; Meinsh. A. H. P. XVIII, 3 (1901) 356, exp.; Turcz. Fl. baic.-dah. II, 2, 277, non Whlb. — *C. atrofusca* Kük. in Engl. Pflzr. IV, 20 (1909) 553, quoad pl. sibiric, et in Journ. Russ. Bot. 3-6 (1911) 149; V. Krecz. in Fl. transb. II, 122, quoad pl. sajan., non Schkuhr.

Perennial, light green to yellowish-green, loosely cespitose plants, with creeping rhizome, stoloniferous; culms faintly triangular, erect, pendulous at apex, smooth, 20-50 cm tall, with light brown sheaths at base; leaves not stiff, 3-5 mm broad, scaberulous, rosette-forming, many times exceeded by the culm; spikelets 2-5, approximate: the terminal staminate, obovoid, 0.7-1.5 cm long, pendulous, with oblong fuscous subacute scales, the others pistillate, obovate to subclavate, 1.2-2.5(3) cm long, 0.8 cm broad, dense, the smooth slender peduncles to 2 cm long; scales lanceolate, subcuspidate, dark rufous, with a light midrib, half as broad as perigynia and exceeding them in length, the terminal ones about equaling the perigynia; perigynia ellipsoid to oblong-ellipsoid, 4-5 mm long, purplish-brown toward summit with lighter base, light-subsetulose-margined above, at length lustrous, nerveless, subsessile, rather abruptly contracted into a short cylindrical-hyaline-margined subemarginate beak. Fr. July. (Plate XVII, Figure 4).

Meadows in the alpine zone. — West. Siberia: Alt.; East. Siberia: Ang.-Sayan. Gen. distr.: Northern Mongolia. Described from the Sayans (Tunkinskii District, upper course of Norin-Khore). Type in Leningrad.

284 191. *C. oxyleuca* V. Krecz. sp. nova in Addenda, II, 605. — *C. ustulata* Meinsh. in A. H. P. XVIII, 3 (1901) 356, quoad pl. turkest., non Whlb. — *C. ustulata* α *typica* Rgl. in A. H. P. VII (1880) 571. — *C. atrofusca* Kük. in Engl. Pflzr. IV, 20 (1909) 553, quoad pl. turkest.; B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 215, non Schkuhr. — *C. atrofusca* var. *minor* Kük., 1. c., 554; B. Fedtsch., 1. c., 216. — Exs.: Herb. Kronenb. No. 79.

Perennial, cineraceous-green to dark green plants with short creeping rhizome; culms firm, stoutish, smooth, 10-30 cm tall, covered at base with light brown sheaths; leaves short, rather stiff, strict, slightly involute-margined, 3-4 mm broad, rather smooth, 1/3-1/2 as long as the culm; spikelets 2-5, approximate: the terminal 1-2 staminate, ovoid, 0.7-1 cm long, pendulous, with ovate, subacute, dark brown scales; others pistillate, ovoid to oblong-ovoid, 1-1.5 cm long, dense, nodding, rarely pendulous, the peduncles fairly thick, smooth, attaining 2-3 cm in length; scales ovate, acute, blackish-brown, whitish on the midrib and margin above, somewhat shorter than the perigynia; perigynia oblong-ellipsoid to oblong-ovate, 5 mm long, blackish-brown throughout or lighter at the margin above, nerveless, scabrous-margined above, gradually tapering into a conic, scabrous-margined, dark brown, white-hyaline-tipped, rather strongly bidentate beak. Fr. July. (Plate XVII, Figure 5).

Alpine meadows.—Centr. Asia: Dzhung.-Tarb., Tyan'-Shan., Pam.-Al. Gen. distr.: Kul'ja, Kashmir, Afghanistan. Described from Fergana (Margelan. Distr., near Ters-Agar Pass). Type in Leningrad.

Section 20. *Orphinascus* Boern. in Abh. Naturw. Ver. Brem. XXI (1913) 268 (pro sectione gen. *Proteocarpus* Boern.).—Arcto-alpine, loosely or densely cespitose plants, with sloping creeping rhizome. Culms faintly triangular; leaves rather flat. Inflorescence racemiform, pendulous, of 3-8 (more rarely 10-15) spikelets; of these the terminal 1-3 staminate (more rarely gynecandrous or androgynous), approximate, sessile; the others pistillate, pendulous, on long scabrous peduncles. Lowest bract with sheaths at least 2-3 cm long and blade rather longer than the spikelet. Perigynia membranaceous, oblong, 3.5-7 mm long, slenderly nerved or nerveless, gradually tapering into an elongate beak, this scabrous on margin and sometimes on outer face, white-hyaline, obliquely truncate. Caryopsis trigonous, oblong. Stigmas 3.

1. Spikelets 10-15, in glomerules of 2-3; from the sheaths the terminal androgynous. 192. *C. pontica* N. Alb.
- + Spikelets 3-8, solitary; the terminal staminate or gynecandrous. . . 2.
- 285 + 2. Perigynia ovoid; pistillate spikelets ovoid or cylindrical, dense. . . . 3.
- + Perigynia lance-ovoid to linear-lanceolate; pistillate spikelets loose or sparse, oblong or linear. 4.
3. Perigynia ferruginous, scabrous above on the outer face, with short beak; staminate spikelets usually 3 (Plate XVIII, Figure 6). 200. *C. macrogyna* Turcz.
- + Perigynia yellowish, brown above, scabrous only on the margin, with gradually tapering, sharply bidentate beak; staminate spikelets solitary. (Caucasus). *C. cilicica* Boiss.
4. Perigynia nerved. 5.
- + Perigynia nerveless. 7.
5. Perigynia narrowly lanceolate to lanceolate, (5)6-7 mm long, greenish; pistillate spikelets subdepauperate scattered. (Plate XVIII, Figures 4 and 5). 6.
- + Perigynia oblong-ovate, 4.5-5 mm long, ferruginous-brown; pistillate spikelets merely loosish. (Plate XVIII, Figure 3.—Caucasus) 196. *C. tristis* M. B.
6. Perigynia narrowly lanceolate, scaberulous above on the outer face, on slender cylindrical stipes; spikelets loose, sublinear, 3-5 cm long, on very long peduncles. (Plate XVIII, Figure 5—Sakhalin) 193. *C. ktausipali* Meinsh.
- + Perigynia lanceolate, scabrous only on the margin, narrowly conic at base; spikelets loose and sparse, 2-3 cm long. (Plate XVIII, Figure 4—Northern Caucasus). 195. *C. Meinshauseniana* V. Krecz.
- 7(4) Terminal spikelets gynecandrous 198. *C. misandra* R. Br.
- + Terminal spikelets (1-2) staminate. 8.
8. Perigynia with conic, rather indefinite beak; spikelets sparse, linear 194. *C. Gorodkovii* V. Krecz.
- + Perigynia with a very definite beak; if spikelets linear and sparse, perigynia lustrous, small, with long narrow beak and scales light . . 9.

9. Spikelets 5-8; staminate spikelets readily distinguishable from the pistillate, variegated; pistillate spikelets narrow linear; perigynia 4 mm long. (Plate XVIII, Figure 7). 199. *C. Regeliana* Kük.
 + Spikelets 3-5; staminate and pistillate spikelets subconcolor; pistillate spikelets ovoid to oblong-ovoid; perigynia 5-6 mm long. (Plate XVIII, Figure 2). 197. *C. stenocarpa* Turcz.

Cycle 1. *Palaeorhinascus* V. Krecz. — Large, loosely caespitose plants, leafy up to a considerable height; the racemiform inflorescence of 10-15 spikelets, these androgynous above. Spikelets in glomerules of 2-3. Perigynia trigonous, 3.5-4 mm long, nerved, scabrous above on the margin and on outer face.

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192. *C. pontica* N. Alb. in Bull. Herb. Boiss. III (1895) 93; Meinsh. in A. H. P. XVIII, 3 (1901) 354. — *C. lazica* Boiss. et Bal. ex N. Alb., 1. c. (sub *C. pontica*); Kük. in Engl. Pflzr. IV, 20 (1909) 543. — *C. tris-tis* β *lazica* Boiss. Fl. Orient. V (1884) 424. — *C. Mertensii* Trev. in Ldb. Fl. Ross. VI (1853) 287, quoad pl. caucas.

Perennial, flavescent pale green plants, with a long creeping ligneous rhizome and stout suberous stolons; culms firm, obtusely triangular, smooth, leafy nearly to the apex, 60-80 cm tall; leaves stiff, subcoriaceous below, 4-6 mm broad, long-attenuate, shorter than the culm, the cauline long-sheathed; lower sheaths brownish; spikelets 10-15, in 2's to 5's from one bract, pendulous, androgynous, cylindric, 1.5-3 cm long, dense, the terminal 4-6 crowded, sessile, the others distant, on scabrous peduncles to 6-7 cm long; scales broadly ovate, obtuse, cuspidate, ferruginous-brown, rather broadly hyaline-margined, shorter than the perigynia, the prominent midrib scabrous light; perigynia obovate, trigonous, 3.5-4 mm long, yellowish-green, becoming ferruginous, with 6-8 slender nerves, scabrous above (dorsally and ventrally) and on the margin, gradually attenuate below into a thickened cuneate base, abruptly contracted at the summit into a short, obliquely truncate, slightly bidentate, hyaline-margined beak.

Alpine meadows. — Caucasus: West. Transcauc. (Abkhaziya, Guriya, Mingreliya), East. Transcauc.: Main range (South Osetiya). Gen. distr.: Turkey, Lazistan. Described from Lazistan (Charanch Mt.) Type in Geneva.

Cycle 2. *Eu-Orhinascus* V. Krecz. — Plants with a sloping, creeping rhizome, densely caespitose. Inflorescence of 1-3 staminate spikelets and 2-3(5) pistillate spikelets, all solitary. Perigynia compressed-trigonous, 4-7 mm long, with slender nerves or nerveless, scabrous on the margin and sometimes on the outer face.

193. *C. Ktausipali* Meinsh. in A. H. P. XVIII, 3 (1901) 359. — *C. Schmidtii* Bcklr. in Flora, LXV (1882) 63, non Meinsh. (1871). — *C. ferruginea* var., F. Schmidt. in Mém. Ac. St. Pétersb., VII sér., XII, 2 (1868) 186. — *C. stenantha* Kük. in Engl. Pflzr. IV, 20 (1909) 565, quoad pl. sachalin. et in Journ. Russ. Bot. 3-6 (1911) 153; Hultén, Fl. of Kamtch. I, 204. — *C. stenantha* var. *taisetsuënsis* Akiyama in Journ. Coll. Sci. Hokk. Univer., ser. V, I (1931) 60, tab. XI, fig. 5 et ib., II, 1 (1932) 176, fig. 122; Miyabe et Kudo, Fl. Hokk. and Sagh. II (1931) 258.

Perennial, light green plants, with a creeping rhizome and short stolons; culms slender, flexuous or pendulous at the apex, faintly triangular, scabrous above, 40-60 cm tall, covered at base with light rufous sheaths; leaves soft, 3-4 mm broad, transversely rugulose, scabrous, long-attenuate, only slightly shorter than the culm; spikelets 3-4, rather distant: the terminal staminate, lance-clavate, 2-3 cm long, with obovate to oblong, acute, ferruginous scales; the others pistillate, linear, 3-5 cm long, loosely-flowered (the lower flowers distant), the peduncles to 5-6 cm long, slender, scaberulous (the lowest spikelet at the base of the culm on a peduncle nearly the length of culm), nutant, but not pendulous; scales narrowly lanceolate, cuspidate, ferruginous, with a light median band, narrowly hyaline above, shorter than the perigynia; perigynia narrowly lanceolate, trigonous, 5-6 mm long, 1 mm broad, pale green, subferruginous above, slenderly many-nerved, gradually tapering at base into a short stipe, diffusely scabrous above, cuneate-attenuate to an elongate beak, this scabrous on margin and outer face, compressed, obliquely truncate, hyaline-notched, ferruginous. (Plate XVIII, Figure 5).

Far East: Sakh.: summit of Mt. Ktauzipal (Lamoris'er Peak), Dué.
Gen. distr.: Northern Japan. Described from Mt. Ktauzipal. Type in Leningrad.

194. *C. Gorodkovii* V. Krecz. sp. nova in Addenda, II, 606.

Perennial, light green to glaucous-green, loosely cespitose, stoloniferous plants, with short creeping rhizome; culms faintly triangular, smooth, with nodding inflorescence, 10-30 cm tall, covered at base with reddish-brown fracturing-fibrillose sheaths; leaves rather stiff, flat, 2.5-4.5 mm broad, falcate, long-attenuate, crisp at the apex, scabrous, nearly equaling the culm; spikelets 3-5, markedly distant: the terminal staminate, lance-ovoid, 1.5-2 cm long, with broadly lanceolate acutish reddish-ferruginous scales, the others pistillate linear-lanceolate, 2-4(5) cm long, loose, the lower sparsely-flowered, nutant, the slender peduncles to 3-4 cm long; lowest bract with sheath to 1-1.3 cm long and blade nearly equaling the spikelet; scales lanceolate to oblong-obovate, obtusish, ferruginous-brown, with a green midrib excurrent in a short scabrous awn, submembranaceous above, about equaling to slightly shorter than the perigynia; perigynia membranaceous, lanceolate, 4-5 mm long, long-stipitate, greenish, brownish setulose above, nerveless, hispidulous-setulose-margined above (nearly from the middle), with a rather indefinite broad entire hyaline-margined beak. Fr. July-August.

Stony deposits. — Arctic: Anad. — Penzhina, Lovat; Far East: Okhot. — Tauskaya inlet, a mound in Nagaev Bay. Endemic. Described from Nagaev. Type in Leningrad.

195. *C. Meinshauseniana* V. Krecz. sp. nova in Addenda, II, 606. — *C. frigida* var. *densa* Meinsh. in A. H. P. XVIII, 3 (1901) 359; Grossh. Fl. Kavk. I, 171. — *C. frigida* N. Alb. Prodr. fl. Colch. (1895) 252 et auct. nonn. fl. Cauc., non Bell. — *C. ferruginea* Stev. in Mém. Soc. Nat. Moscou, IV (1813) 68, non Scop. — *C. capillaris* Boiss. Fl. Orient. V (1884) 414, ex p., non L. — *C. sempervirens* ssp. *tristis* var. *pendulina* Kük. in Bull. Herb. Boiss., 2 sér., IV (1904) et in Engl. Pflzr. IV, 20 (1909) 570. — *C. tristis* var. *pendulina* Gorssh., l. c., 172. — *C. fimbriata* Grossh., l. c., 172, non Schkuhr. — *C. hispidula* ssp.

karaczaica E. Busch. in A.H. Bot. Jurjev. X, 1 (1909) 1, fig. 1. — Exs.: HFR No. 1793.

Perennial, green, densely cespitose plants with a sloping rhizome; culms slender, nodding, triangular, scaberulous above, 30-70 cm tall, covered at base with light brown, strongly fracturing sheaths; leaves soft, long, 1.5-2.5 mm broad, long-attenuate, somewhat shorter than the culm; spikelets 3-5 distant: the terminal 1-2 staminate, lanceolate to lance-clavate, 1.5-2.5 cm long, nutant, with oblong, brownish, acute to subacute, irregularly membranaceous scales; the others pistillate, lance-linear, 1.5-2 cm long, loosely pendulous, the slender scabrous peduncles to 4-5 cm long; scales oblong-ovate, acute or acutish, ferruginous-brown, with a prominent light midrib, rather broadly membranaceous, 1/3 the length of perigynia; perigynia lanceolate to lance-ellipsoid, trigonous, 6-6.5 mm long, greenish, brownish above, with slender prominent nerves, strongly cuneate-based, gradually tapering into a narrowly conic, strongly obliquely truncate, white-hyaline-tipped beak. (Plate XVIII, Figure 4).

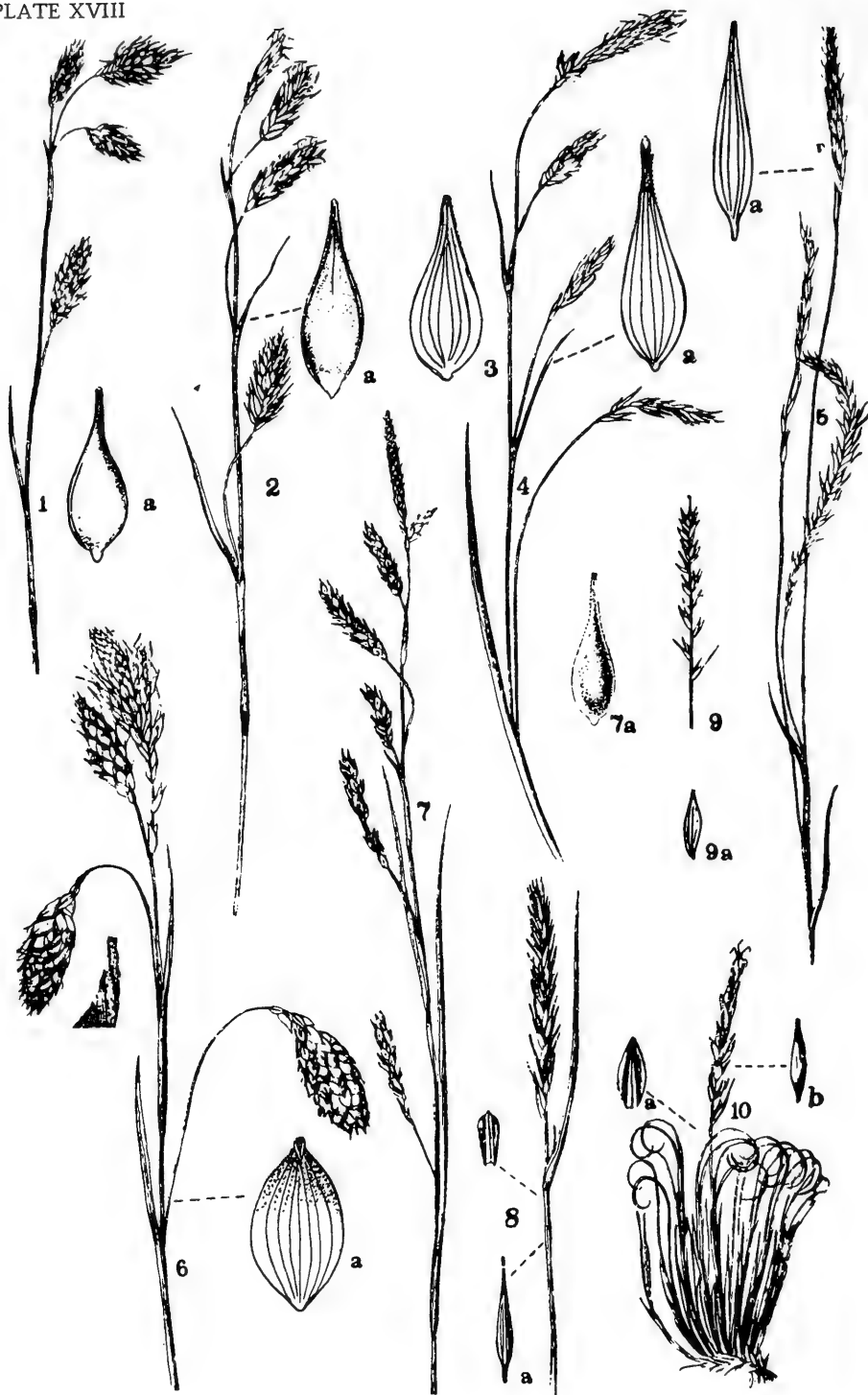
Subalpine meadows and wet places; forests. —Caucasus: Ciscauc. Endemic. Described from the Caucasus, from the Military Georgia Road (between Dar'yal and Lars). Type in Leningrad.

196. *C. tristis* M.B. Fl. taur.-cauc. III (1819) 615; Trev. in Ldb. Fl. Ross. IV, 294; Boiss. Fl. Orient. V, 423, ex p.; Meinsh. in A.H.P. XVIII, 3 (1901) 358; Grossh. Fl. Kavk. I, 172. —*C. sempervirens* var. γ Boott, Illustr. Carex, IV (1867) 218, ex p. —*C. sempervirens* subsp. *tristis* Kük. in Engl. Pflzr. IV, 20 (1909) 569, quoad pl. caucas. —*C. fuliginosa* Grossh., l. c., 171, non Schkuhr. —Exs.: HFR No. 1094; Kneuck. XII, a, No. 42.

Perennial, light green, densely cespitose plants, with a short creeping rhizome; culms firm, somewhat curving, faintly triangular, smooth, 10-30(40) cm tall, covered at base with light brown, more or less fracturing sheaths; leaves stiff, falcate, flat to subcanaliculate, 2.5-4 mm broad, scabrous, 1/3-1/2 the length of the culm; spikelets 2-4, approximate to subcongested: the terminal 1-2 staminate, obovoid to short-lanceolate, 0.8-1.5 cm long, erect, with ovate obtuse, dingy ferruginous, white-
291 hyaline-margined scales; others pistillate, oblong-ovoid to lanceolate, 1-2 cm long, rather loose, usually erect, rarely subnutant, the slender scabrous peduncles to 2-3 cm long; scales ovate, subobtuse, dingy ferruginous-brown, with a light median band or unicolor, rather broadly membranaceous, shorter than perigynia; perigynia ovoid to oblong-ovoid, compressed-trigonous, 4.5-5 cm long, ferruginous-brown throughout or greenish below, faintly 5-8-nerved, contracted into a short stipe below, gradually attenuate into a slightly curving, cuneate, scabrous-margined, obliquely truncate, white-hyaline-tipped beak. Fr. July. (Plate XVIII, Figure 3).

Alpine meadows. —Entire Caucasus. Gen. distr.: Asia Minor, Armenia, northern Persia. Described from Eastern Caucasus (Budukh). Type in Leningrad.

ECONOMIC IMPORTANCE: Together with the preceding species, often an important forage and pasture plant in the alpine and subalpine zones. Eaten very readily, especially by sheep and goats. Apparently a fattening plant. Recovering well after grazing. Yield of fresh herbage 20-30 centners; dry yield 4-7 centners per hectare. The chemical composition of



dry plants in percentages: water—9.89, minerals 7.0, protein—9.43, fats—1.94, cellulose—24.18, nitrogen-free extract—47.56. Forms a compact sward, and thus protects the upper soil layers against disintegration and erosion.

197. *C. stenocarpa* Turcz. ex Bess. in Flora, XVIII, Beibl. 1 (1834) 27 (nomen) et in Addenda, II, 607 (descr.). — *C. tristis* var. α Turcz. Fl. baic.-dah. II, 2 (1856) 284. — *C. tristis* Trev. in Ldb. Fl. Ross. IV (1853) 294, quoad pl. sibir.; C. A. M. in Ldb. Fl. Alt. IV, 205; Meinsh. in A. H. P. XVIII, 3 (1901) 358 (excl. pl. caucas.); V. Krecz. in Fl. Transb. II, 131, non M. B. — *C. tristis* var. *asiatica* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 94. — *C. sempervirens* var. γ Boott, Illustr. Carex, IV (1867) 569, quoad pl. asiat. — *C. sempervirens* ssp. *tristis* Kük. in Engl. Pflzr. IV, 20 (1909) 569, exp., et in Journ. Russ. Bot. 3-6 (1911) 155. — *C. sempervirens* ssp. *tristis* var. *asiatica* B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 217. — *C. frigida* Rgl. in A. H. P. VII (1880) 569, non Bell. — *C. fuliginosa* Kük., 1. c., 556 et 151, quoad pl. Lessing, non Schkuhr. — *C. fuliginosa* var. *pronella* Printz, Veg. Sib. Mong. Front. (1921) 157, tab. V, fig. 2 et 3.

Perennial, light-green, densely cespitose plants, with a short creeping rhizome; culms slender, nodding at the apex, faintly triangular, smooth, 20-50 cm tall, covered at base with light brown fracturing sheaths; leaves rather stiff, 3.5-6 mm broad, somewhat reclinate, rather abruptly pointed, 1/3-1/2 the length of culm; spikelets 3-5, subdistant: the terminal 1-2 staminate, oblong, narrow, 1-1.5 cm long, with ferruginous-brown subacute membranaceous scales; others pistillate, ovoid to oblong-ovoid, 1.5-2.3 cm long, rather loosely pendulous, the slender scabrous peduncles 292 to 5-6 cm long; scales ovate, acute or acutish, castaneous to ferruginous-brown, with concolor midrib, subhyaline-margined, shorter than perigynia; perigynia oblong-ovoid, compressed-trigonous, 5-6 mm long, greenish-yellow at base, brown above, nerveless, subulate-setulose-margined from the middle or even below the middle, rather indefinitely stipitate, gradually tapering above into a conic, compressed, scabrous-margined, obliquely-truncate, hyaline beak. Fr. July-August. (Plate XVIII, Figure 2).

Subalpine meadows. — West. Siberia: Alt.; East. Siberia: Ang.-Sayan., Daur. (s. part); Centr. Asia: Dzhung.-Tarb., Tyan'-Shan., Pam.-Al. Gen. distr.: Northern Mongolia, Kul'ja, Afghanistan. Described from Southern Transbaikalia (Kudun Pass). Type in Leningrad.

198. *C. misandra* R. Br. in Parry Voy. App. (1823) 283; Kom. Fl. Kamch. I, 262; Hultén, Fl. of Kamtch. I, 204. — *C. frigida* var. β Trev. in Ldb. Fl. Ross. IV (1853) 294. — *C. fuliginosa* Meinsh. in A. H. P. XVIII, 3 (1901) 358, non Schkuhr. — *C. fuliginosa* var. *misandra*

Explanation to Plate XVIII

1. *Carex misandra* R. Br.: inflorescence and perigynium. — 2. *C. stenocarpa* Turcz.: inflorescence and perigynium. — 3. *C. tristis* M. B.: perigynium. — 4. *C. Meinshauseniana* V. Krecz.: inflorescence and perigynium. — 5. *C. Ktausipali* Meinsh.: inflorescence and perigynium. — 6. *C. macrogyna* Turcz.: inflorescence and perigynium. — 7. *C. Regeliana* Kük.: inflorescence and perigynium. — 8. *C. hakko-densis* Franch.: inflorescence, perigynium, and scale. — 9. *C. anthoxantha* Presl.: inflorescence and perigynium. — 10. *C. circinata* C. A. M.: habit, scale, and perigynium.

Kük. in Engl. Pflzr. IV, 20 (1909) 557 et in Journ. Russ. Bot. 3-6 (1911) 152.—Ic: Ostenf. Fl. arct. (1902) fig. 67.—Exs.: Kneuck. No. 50.

Perennial, green, densely caespitose plants, with sloping short rhizome; culms slender, erect, nodding or flexuous only in inflorescence, faintly triangular, smooth, 8-30 cm tall, covered at base with light ferruginous to light brown sheaths; leaves congested below, rather stiff, falcate-reclinate, flat to subcanaliculate-conduplicate, 2-3 mm broad, scabrous, gradually attenuate, $1/3-1/2$ the length of culm; spikelets 3-5, the terminal 1-2 gynecandrous, with few staminate flowers at base; others pistillate, all ovoid, 0.5-1.5 cm long, rather loose, nutant, the slender scabrous peduncles to 3-4(5) cm long; scales ovate, acute or acutish, blackish-brown, submembranaceous only above, shorter than perigynia; perigynia lanceolate, obtusely trigonous, 4.5-5 mm long, whitish about the middle and below, ferruginous-brown above and on the margins, nerveless, rather abruptly contracted below into elongate base, gradually tapering above into a narrowly conic, long, scaberulous-margined, brown, hyaline-tipped, submarginate beak. Fr. July—August. (Plate XVIII, Figure 1).

Stony and argillaceous tundra.—Arctic: Nov. Zem., Arct. Europ., Arct. Sib. (Polar Ural, Lowlands of Yenisei, Olenek, and Lena), Chuk., Anad.; European part: Dv.-Pech. (Denezhkin Kamen'); West. Siberia: Ob.; East. Siberia: Yenis. (Turukhanskii Terr.), Len.-Kol. (n. mount. part); Far East: Kamch. Gen. distr.: circumpolar. Described from Arctic America (Melville Isl.). Type in London.

199. *C. Regeliana* Kük. ex Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 94.—*C. ferruginea* Meinsh. in A. H. P. XVIII, 3 (1901) 358, ex p., non Scop.—*C. capillaris* var. *Regeliana* Kük. in Engl. Pflzr. IV, 20 (1909) 591; B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 218.

293 Perennial, light green, densely caespitose plants, with a stout ascending rhizome; culms firm, obtusely triangular, smooth, 40-70 cm tall, covered at base with light brown fracturing sheaths; leaves crowded in basal rosettes, rigid, flat to subcanaliculate, 3-5 mm broad, rather abruptly pointed, $1/4-1/3$ the length of culm; spikelets 5-8, subdistant: the terminal 1-2 staminate, erect, narrowly lanceolate to lance-clavate, 1.5-2.5 cm long, with light ferruginous, broadly-hyaline, obtuse scales; others pistillate, linear, 1-2 cm long, rather sparsely-flowered, especially below, solitary (occasionally in twos from common sheath), nutant, the slender scabrous peduncles to 3-4 cm long; scales ovate, obtusish, subferruginous, with a slender midrib, broadly translucent-hyaline-margined, shorter than perigynia; perigynia oblong-ovoid, faintly trigonous, subplano-convex, 4 mm long, brownish, at length purplish-brown to blackish-brown, lustrous, nerveless, short-stipitate, gradually tapering into an elongate, plano-convex, obliquely truncate, white-hyaline-margined beak. Fr. June—July. (Plate XVIII, Figure 7).

Alpine meadows and bogs.—Centr. Asia: Tyan'-Shan., Pam.—Al. Endemic. Described from Zeravshanskii Range (Kul'-i-Kalan). Type in Leningrad.

**C. cilicica* Boiss. Diagn., ser. 2, VI (1859) 124; Fl. Orient. V, 424; Kük. in Engl. Pflzr. IV, 20 (1909) 555; Grossh. Fl. Kavk. I, 171.

Perennial, pale green, stoloniferous plants, with ligneous rhizome; culms smooth, 30-50 cm tall, covered at base with blade-bearing ferruginous-brown sheaths; leaves rather stiff, 3-4 mm broad, abruptly pointed, shorter than the culm; spikelets 3-4, discrete: the terminal staminate, oblong, to 2.5 cm long, erect, with ovate dark brown scales, the others pistillate oblong-ovoid 1.5-2.5 cm long, congested, the terminal sessile (on a very short peduncle), the lower separate on a peduncle to 5 cm long, all erect, or the lowest subnutant; scales ovate subobtusate, irregularly rufous, with a greenish-yellow median band, about half the length of perigynia; perigynia ovoid, obsoletely trigonous, 4-5 mm long, greenish-yellow, becoming golden-ferruginous, with slender distally evanescent nerves, more or less round-based, gradually tapering into a long, scabrous-margined, medially blackish-brown, acutely bidentate beak.

Along mountain streams. - Possibly to be found in Southern Transcaucasia. Collected in adjoining part of Turkey (Kagyzm. distr., Zarab-Khan-Chai River canyon). Gen. distr.: Armenia, Cappadocia, Cilicia. Described from Cilician Tarv (Mt. Burgar-Dag). Type in Geneva.

294 200. *C. macrogyna* Turcz. ex Bess. in Flora, XVIII, Beibl. 1 (1834) 27 et in Bull. Soc. Nat. Mosc. XI, 1 (1838) 104 (nomen) atque ex Steud. Syn. Cyp. (1855) 236 (descr.); Meinsh. in A. H. P. XVIII, 3 (1901) 357; Kük. in Engl. Pflzr. IV, 20 (1909) 560 et in Journ. Russ. Bot., 3-6 (1911) 150; V. Krecz. in Fl. Transb. II, 131. - *C. ferruginea* var. γ Trev. in Ldb. Fl. Ross. IV (1853) 294. - *C. tristis* var. β Turcz. Fl. baic.-dah. II, 2 (1856) 284. - *C. ustulata* var. γ *macrogyna* Rgl. in A. H. P. VII (1880) 571.

Perennial, light green, densely caespitose plants, with ascending rhizome and short stolons; culms slender, faintly triangular, smooth, leafy below, 40-70 cm tall, covered at base with ferruginous-brown, more or less fracturing sheaths; leaves rather soft, circinate-tipped, flat to subconduplicate, to 2-3 mm broad, scabrous, long-attenuate, half as long as the culm; spikelets 4-7, approximate, of these the terminal 2-3 staminate, congested, lanceolate, to 2 cm long, nutant, with broadly ovate, brownish-ferruginous to ferruginous, mucronate, hyaline-margined scales; others pistillate, obovoid to oblong-obovoid, 1.5-2.5 cm long, contiguous, segregated below, the slender peduncles to 3 cm long; scales ovate, acute, ferruginous, with a lighter median band, subhyaline-margined above, shorter than perigynia; perigynia ovoid to oblong-ovoid, compressed-trigonous, 5-5.5 mm long, yellowish-green below, reddish-ferruginous above, scaberulous on the outer face and margin, 5-7-nerved, round-based, short-stipitate, gradually tapering into a conic, scabrous, frontally obliquely incised; broadly white-hyaline-margined beak. Fr. July-August. (Plate XVIII, Figure 6).

Rocks and screes of the alpine zone. - East. Siberia: Ang.-Sayan., Daur., Len.-Kol.; Centr. Asia: Tyan'-Shan. (Transilian Altai: Talgar Pass). Gen. distr.: Tannu-Tuva, Northern Mongolia. Described from southern Transbaikalia: Kudun Pass (according to Shteidel'-Dzhylgyn). Type in Leningrad (and in Berlin).

Section 21. *Leptograstis* V. Krecz. - Plants with creeping rhizome, 3-angled culms, and rather flat leaves. Spikelets solitary, mostly

androgynous, long, spiciform, rather loose below, with an inconspicuous staminate part. Perigynia ascending, oblong-lanceolate, membranaceous, obsolete trigonous, nerved, stipitate (stipe to 1 mm long), tapering into a long, more or less conic, smooth or scabrous beak. Achene oblong, trigonous, without rachilla; stigmas 3 (sometimes 2).

1. Perigynia 3-5 mm long; scales obtuse to subobtuse. (Plate XVIII, Figures 9 and 10) 2.
- + Perigynia 6-7 mm long; scales acuminate or cuspidate. Plants 40-50 cm long, with leaves to 3 mm broad. (Plate XVIII, Figure 8) 201. *C. hakkodensis* Franch.
2. Perigynia 3-4 mm long, smooth at the summit; rhizome long-creeping; leaves not circinate. (Plate XVIII, Figure 9) **C. anthoxanthea* Presl.
- + Perigynia 4.5-5.5 mm long, scabrous above; densely caespitose plants; leaves setaceous, circinate at the ends. (Plate XVIII, Figure 10) **C. circinata* C.A.M.

201. *C. hakkodensis* Franch. in Bull. Soc. Philom. Paris, 8 sér., VII (1895) 28 et in Nouv. Arch. Mus. Paris, 3 sér., VIII (1896) 204; Kom. Fl. Kamch. I, 223; Hultén, Fl. of Kamtch. I, 173.

Perennial; culms 40-50 cm long, covered at base with bladeless brown sheaths; leaves green, 2-3 mm broad, shorter than to equaling the culm; spikelets androgynous, 2-4 cm long, oblong-clavate, loose below; scales obovate, half as long as perigynia, acuminate or (the lower) rounded, cuspidate, castaneous, green-backed, the lower ones longer than perigynia, awned; perigynia narrowly lanceolate, 6-7 mm long, pale green, with ferruginous-tinged long smooth cuneate beak, tapering at base into an elongate stipe; achene narrowly lanceolate, 2.5 mm long. Fr. July-August. (Plate XVIII, Figure 8).

Mountain, mostly forest, meadows.—Far East: Kamch. Gen. distr.: the Kurile Islands, Northern Japan. Described from Japan (Aomori Province, Mt. Hakkoda). Type in Paris.

**C. anthoxanthea* Presl. Rel. Haenk. I (1828) 203.—*C. leiocarpa* C.A.M. in Mém. Ac. St. Pétersb. Sav. Étr. I (1831) 208, tab. V.—*C. anthoxanthea* var. *leiocarpa* Kük. in Engl. Pflzr. IV, 20 (1909) 97.

Perennials; culms scabrous, 10-55 cm tall, covered at base with ferruginous bladeless sheaths; leaves flat, green 1.5-2 mm broad, scabrous below, equaling the culms; spikelets androgynous, rarely spikelets dioecious, oblong, sparsely flowered, 1.1-1.5 cm long, not congested; scales oblong-ovate, obtuse, the lower often awned, castaneous throughout, slightly shorter than perigynia, the lower ones 2-3 times as long; perigynia lanceolate, 3-4 mm long, yellow to ferruginous, trigonous, recurved-margined below, conic-based, sometimes somewhat curving, the beak bidentate smooth conic; achene oblong-ovoid to 2 mm long. (Plate XVIII, Figure 9).

Possibly in Chuk. and Anad.—Gen. distr.: Pribylovoy and Shumyagin Islands, North America as far as British Columbia. Described from Nootka in North America. Type in Prague.

**C. circinata* C.A.M. in Mém. Ac. St. Pétersb. Sav. Étr. I (1831) 209, tab. VI; Trev. in Ldb. Fl. Ross. IV, 268; Meinsh. in A. H. P. XVIII,

3 (1901) 308; Kük. in Engl. Pflzr. IV, 20 (1909) 97. — *C. arida* Cham. ex Trev., 1. c., non Schw. et Torr. (nomen). — Ic.: Kük., 1. c., 105, fig. 21 A–B.

Perennial, light green, densely caespitose plants, with scarcely creeping rhizome; culms scabrous, 5–20 cm tall, curving; leaves setaceous-involute, circinate at the ends, scaberulous, equaling the culm, with light brown sheaths; spikelets androgynous, sparsely-flowered below, 15–20 mm long; scales oblong-ovate, subobtuse, ferruginous, shorter than perigynia; perigynia lanceolate, obsoletely trigonous, 4.5–5.7 mm long, greenish-yellow to subferruginous, nerveless, conic-based, the beak elongate, conic, scabrous low down; achene oblong-ovoid, trigonous, to 3 mm long. (Plate XVIII, Figure 10).

Rocks. — In the U.S.S.R. — probably in Chuk. and Anad. Gen. distr.: Northern part of North America, from Washington to Alaska and Aleutian Islands. — Described from Unalaska, in North America. Type in Leningrad.

Section 22. *Callistachys* (Heuff.) V. Krecz. — Heuff. in Flora, XXVII (1844) 528. — *Dornera* Heuff. in Z. B. G. Wien, VIII (1858) 217 (pro genere). Small, slender plants, with 3-angled to many-angled culms, and flat to subinvolute leaves. Spikelets solitary, terminal, androgynous, oblong, many-flowered, rather congested. Scales deciduous in fruit. Perigynia thinly membranaceous, ovoid or lanceolate, 1.5–4 mm long, mostly obsoletely trigonous, with a smooth beak. Achene mostly trigonous, without rachilla; stigmas usually 3 (more rarely 2).

1. Perigynia on a definite stipe, to 0.6–1 mm long, nerveless 2.
- + Perigynia sessile, nerved; stigmas always 3 4.
2. Densely caespitose plants. Leaves 1–1.5 mm broad, canaliculate-conduplicate. Scales castaneous. Number of stigmas variable: 2 or 3, or both 2 and 3 3.
- + Plants with creeping rhizome. Leaves flat, 1.5–3 mm broad. Scales blackish-brown. Stigmas 3 204. *C. nigricans* C.A.M.
3. Perigynia biconvex; stigmas usually 2; culms scabrous 202. *C. micropoda* C.A.M.
- + Perigynia obsoletely trigonous or biconvex; stigmas 2 and 3; culms smooth 203. *C. micropodioides* V. Krecz.
4. Culms trigonous; staminate part of spikelet inconspicuous 5.
- + Culms 4–5-angled; staminate part of spikelet conspicuously developed 9.
5. Scales acute; perigynia 3–4 mm long, with a conspicuous beak. Fairly large (20–60 cm tall), rather lax plants of forest and marshes 6.
- + Scales rather obtuse; perigynia 2–3 mm long, with obsolescent beak or beakless. Low alpine plants, 10–20 cm tall 7.
6. Culms prominently scabrous. Spikelets capitate, usually with 5–6 perigynia; perigynia oblong-ovoid, 2.7–3.5 mm long, with subconic beak 210. *C. capituliformis* Meinsh.
- + Culms mostly smooth. Spikelets oblong, usually with 10–15 perigynia. Perigynia lanceolate, 3.5–4 mm long, gradually tapering into a long beak 209. *C. uda* Maxim.
7. Perigynia green, not definitely beaked. Leaves mostly channeled, to 1 mm broad 8.

- + *Perigynia ferruginous*, with a definite conic beak. Leaves flat, 1-2 mm broad 212. *C. capitellata* Boiss. et Bal.
- 8. *Perigynia pale*, 1.5-2 mm long, nerveless. 211. *C. dahurica* Kük.
- + *Perigynia green*, 2.5-3 mm long, distinctly 4-nerved 205. *C. chosenica* Ohwi.
- 9(4) Leaves filiform-involute; perigynia 1.5-2 mm long 10.
- + Leaves flat, 0.6-0.8 mm broad; perigynia 2.5-3 mm long; spikelets 5-10 mm long, usually containing 5-8 perigynia 206. *C. aomorensis* Franch.
- 10. Spikelets oblong, 8-15 mm long, containing 12-15 perigynia. Perigynia faintly 4-nerved on outer face. Culms numerous, firm, 15-40 cm tall 208. *C. Jankowskii* Gorodk.
- + Spikelet ovoid, 5-8 mm long, containing 3-6 perigynia. Perigynia many-nerved. Culms few, soft, 8-15 cm tall. 207. *C. ontakensis* Franch. et Sav.

Series 1. *Arthrochlaena* (Holm) V. Krecz. - Holm, in Am. Journ. Sc. XVI (1903) 459. - *Perigynia lance-ovoid* or lanceolate, trigonous (less often indefinitely biconvex), on pronounced stipe 0.6-1 mm long, recurved at the summit, nerveless, with an elongate, smooth, rather gradually attenuate beak. Achene trigonous or lenticular. Stigmas 3 (and often 2).

202. *C. micropoda* C. A. M. in Mém. Ac. St. Pétersb. Sav. Étr. I (1831) 210, tab. VI. - *C. nivalis* Cham. ex Steud. Syn. Cyp. (1855) 184, exp., non Boott. - *C. pyrenaica* Trev. in Ldb. Fl. Ross. IV (1853) 267; Meinsh. in A. H. P. XVIII, 3 (1901) 308; Kük. in Engl. Pflzr. IV, 20 (1909) 104, exp.; Gorodk. in Trav. Mus. Bot. Ac. URSS, XX (1927) 218; Kom. Fl. Kamch. I, 224; Hülten, Fl. of Kamtch. I, 174, non Whlb.

Perennial, densely caespitose plants; culms triangular, scabrous above, 5-25 cm tall; leaves green, flat to folded, 1-2 mm broad, soft, scabrous-margined, mostly equaling the culm; spikelets androgynous, 0.7-2 cm long, initially contracted oblong-ovoid, at length with horizontally spreading loose perigynia 10-26 in number (mostly 14-16); scales ovate, obtuse to subobtuse, brown to castaneous, hyaline-margined; perigynia lance-ovoid, membranaceous, 3-3.5 mm long, compressed-biconvex, nerveless, gradually tapering into an elongate to conic, smooth, frontally furrowed beak, inserted on a short (0.3-0.6 mm) subglobular stipe; achene lenticular; stigmas usually 2, very rarely 3. Fr. July-August.

298 Alpine meadows. - Arctic: Anad.; Far East: Kamch. Gen. distr.: Alaska from Unalaska to Pribilof Islands. Described from Unalaska (North America). Type in Leningrad.

203. *C. micropodioides* V. Krecz. sp. nova in Addenda, II, 608. - *C. pyrenaica* Grossh. Fl. Kavk. I (1928) 158 et auct. fl. cauc., non Whlb. - *C. pulicaris* Boiss. Fl. Or. V (1884) 397, non L.

Perennial, caespitose plants; culms 5-20 cm tall, smooth or nearly so; leaves mostly folded, glaucescent, 0.8-1.2 mm broad; spikelets androgynous, 0.8-1.4 mm long, containing 10-25 (usually 14-16) perigynia; scales ovate castaneous obtusish; perigynia lance-ovoid, 3-3.5 mm long, unequally biconvex (sometimes faintly trigonous), on stipe 0.5 mm long; achene obovate to elliptic, unequally lenticular, sometimes obsoletely convex-trigonous; stigmas predominantly 2, but not infrequently also 3. Fr. July-August.

Alpine meadows. —Caucasus: Ciscauc., Dag., East. and West. Transcauc. Endemic Described from Sochinskii Distr. (Laptraku Pass). Type in Leningrad.

204. *C. nigricans* C.A.M. in Mém. Ac. St. Pétersb. Sav. Étr. I (1831) 20, tab. VII; Trev. in Ldb. Fl. Ross. IV, 268; Kük. in Engl. Pflzr. IV, 20 (1909) 106. —*C. nivalis* Cham. ex Steud. Syn. Cyp. (1855) 184, ex p., non Boott.

Perennial, green plants, with long-creeping rhizome; culms triangular, smooth, 5-25 cm tall, covered at base with brown scale-like sheaths; leaves flat, 1.5-3 mm broad, equaling to exceeding the culm; spikelets androgynous, 0.7-2 cm long, subcongested, ovoid; scales blackish-brown, the pistillate ovate obtuse nearly equaling the perigynia, the staminate narrower subacute; perigynia lance-ovoid, obsoletely trigonous, 3.5-4 mm long, yellowish-ferruginous, on stipe to 1 mm long, round-based, nerveless, gradually tapering into a long smooth obliquely truncate beak.

Far East: Kamch.: Commander Islands and Siberian coast (?) according to Mackenzie, North Am. Fl. XVII, 1 (1931) 28. Gen. distr.: North America, from Rocky Mountains to Alaska, Aleutian Islands. Described from Unalaska, in North America. Type in Leningrad.

Series 2. *Capitellatae* V. Krecz. —Perigynia ovoid or oblong-ovoid, obsoletely trigonous, without distinct stipe, in rather dense spikelets, at length divaricate, mostly nerved, with obsolescent beak; achene trigonous; stigmas 3.

205. *C. chosenica* Ohwi in Acta Phytotax. et Geobot. I (1932) 73.

Perennial; cineraceous-green, cespitose plants; culms triangular, scaberulous above, 10-20 cm tall; leaves linear, flat to subinvolute, to 1 mm broad, smooth, shorter than the culm; spikelets androgynous, with 5-6 staminate flowers above and 10-20 pistillate flowers below, ovoid, 0.5-0.8 cm long, 0.4-0.5 mm broad; scales ovate, subobtuse to obtuse, slightly shorter than perigynia, the lowest sometimes with a short (to 2 mm) obtuse terminal appendage, light ferruginous, medially green; perigynia ovoid, 2.5-3 mm long, membranaceous, trigonous, dorsally slenderly 4-nerved, ventrally nerveless, short-stipitate, convexely triangular-blunted at the summit, nerveless, subemarginate, green. Fr. June-July.

Mossy marshes. —Far East: Ze.-Bur. —Gilyui valley (Ya. Vasil'ev!), Uss. —Lyan'chikhe River valley in Valdivostok Distr. (M. F. Grishko; No. 107!). Gen. distr.: North Korea, described from North Korea (Teitek). Type in Tokyo.

206. *C. aomorenensis* Franch. in Nouv. Arch. Mus. Paris, 3 sér., VII (1896) 198. —*C. nana* Boott in Mem. Amer. Ac., n. ser., VI (1858) 418; Gorodk. in Trav. Mus. Bot. Ac. USSR, XX (1927) 216, nec Lam. (1789), nec Cham. (1855). —*C. uda* var. *sachalinensis* F. Schmidt in Mém. Ac. St. Pétersb., VII sér., XII (1568) 191. —*C. rara* ssp. *capillacea* var. *nana* Kük. in Engl. Pflzr. IV, 20 (1909) 103 et in Journ. Russ. Bot. 3-6 (1911) 39.

Perennial, cineraceous-green, slender, cespitose plants; culms irregularly 4-angled, furrowed, slender, smooth, 20-35 cm tall; leaves flat, short, 0.6-0.8 mm broad; spikelets androgynous, 0.6-0.9 cm long, the staminate part 0.4-0.6 mm long, the pistillate part containing 5-7 divaricate

perigynia; scales ovate, obtuse, light castaneous, much shorter than perigynia; perigynia ovoid, 2.5-3 mm long, obsoletely trigonous, distinctly 5-6-nerved on the outer face, with only 2 marginal nerves on the inner face, ferruginous-green, broadly round-based, the beak short-conic bedentate, smooth. Fr. June.

Boggy forests. — Far East: Sakh. Gen. distr.: Northern Japan. Described from Aomori Province in Japan. Type in Paris.

207. *C. ontakensis* Franch. et Sav. En. pl. Jap. II (1879) 123 et 550. — *C. rara* subsp. *capillacea* Kük. in Engl. Pflzr. IV, 20 (1909) 102, ex p.

Perennial, cineraceous-green, densely caespitose plants; culms filiform, irregularly 4-5-angled, scaberulous above, 8-15 cm tall; leaves setaceous-involute, at most 0.5-0.6 mm broad, shorter than the culm, scabrous; spikelets androgynous, 5-8 mm long, with staminate and pistillate parts of equal length, containing 3-6 rather loosely set perigynia; scales pale ferruginous, triangular-tipped, but obtuse, shorter than perigynia; perigynia spreading at a right angle, ovoid, 2 mm long, greenish, many-nerved, gradually tapering into a short smooth entire beak.

Mountainous peat bogs. — Far East: Sakh. (reported by Kudo and Muryabe). Gen. distr.: Japan. Described from Nippon (Mt. Ontake). Type in Paris, syntype in Leningrad.

300 208. *C. Jankowskii* Gorodk. in Trav. Mus. Bot. Ac. URSS, XX (1927) 216, fig. 5; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I, 274. — *C. nana* Meinsh. in A.H.P. XVIII, 3 (1901) 309, ex p., non Boott. — *C. capillacea* Meinsh., ib., 310, Kom. Fl. Manshur. I, 353, non Boott. — *C. rara* Kom., ib. (1901) 353, non Boott. — *C. rara* ssp. *capillacea* Kük. in Engl. Pflzr. IV, 20 (1909) 102 et in Journ. Russ. Bot. 3-6 (1911) 38, ex p.

Perennial, slender, cineraceous-green, densely caespitose plants; culms slender, 4-5-angled, furrowed, smooth, 15-40 cm tall; leaves narrow (to 1 mm broad), filiform-involute, shorter than the culm, scaberulous; spikelets androgynous, 0.6-1.5 cm long, with a long (to 8 mm) narrow staminate part and a rather congested oblong pistillate part, including 8-20 (usually 12-14) divaricate perigynia; scales ovate, obtuse, light ferruginous, shorter than perigynia; perigynia broadly ovoid, 1.5-2 mm long, obsoletely trigonous, dorsally 2-4-nerved, ventrally smooth, broadly round-based, gradually tapering into a short smooth subconic bidentulate beak. Fr. May-June.

Wet and boggy meadows. — Far East: Uss., Ze.-Bur. Gen. distr.: Manchuria. Described from the Zeya-Bureya Region (Tolstovka valley). Type in Leningrad.

209. *C. uda* Maxim. in Mém. Ac. St. Pétersb. IX (1854) 303; Prim. Fl. Amur. (1859) 300; Meinsh. in A.H.P. XVIII, 3 (1910) 310; Kom. Fl. Manchzh. I, 353; Kük. in Engl. Pflzr. IV, 20 (1909) 103 et in Journ. Russ. Bot. 3-6 (1911) 39, fig. 18.

Perennial, light green, loosely caespitose, soft plants; culms triangular, soft, usually smooth, 20-60 cm tall; leaves flat, 1.5-3.5 mm broad, somewhat shorter than the culm, scabrous; spikelets androgynous, with an inconspicuous staminate part, initially oblong-ovate, 6-12 mm long, finally

with 8-18 horizontally spreading perigynia (usually 10-12); scales ovate, acute, ferruginous; perigynia lanceolate, 3.5-4 mm long, light green, with distinct slender nerves, obsoletely trigonous, round-based, gradually tapering into a long smooth beak. Fr. May-June.

Boggy meadows, wet forest. — Far East: Uss., Ze.-Bur. Gen. distr.: Manchuria, North Korea, Japan. Described from lower reaches of Amur (Geong Range, near Tsianka village). Type in Leningrad.

210. *C. capituliformis* Meinsh. ex Maxim. Mélang. Biol. (1887) 563 in A. H. P. XVIII, 3 (1901) 310; Kom. Fl. Manchzh. I, 354. — *C. perpusilla* Meinsh. in herb. — C. Onoei Kük. in Engl. Pflzr. IV, 20 (1909) 101, ex p. et in Journ. Russ. Bot. 3-6 (1910) 37; Gorodk. in Trav. Mus. Bot. Ac. URSS, XX (1927) 214, non Franch. et Sav.

301 Perennial, pale green, sparsely caespitose, soft; culms triangular, prominently scabrous, 1-2 mm broad, nearly equaling the culm; spikelets androgynous, with inconspicuous staminate part, initially ovoid, becoming globose to broadly ovoid, 3-7 mm long, containing 3-8 (usually 5) horizontally spreading perigynia; scales ovate acute light-ferruginous; perigynia oblong-ovate to lance-ovate, 2.7-3.5 mm long, thinly membranaceous, obsoletely trigonous, with faint slender nerve, round-based, dark green, gradually tapering into a smooth subconic bidentate beak. Fr. May.

Deciduous and mixed forests. — Far East: Uss., Ze.-Bur. Gen. distr.: Manchuria, Japan. Described from Mt. Nikko in Nippon (Japan). Type in Leningrad.

211. *C. dahurica* Kük. in Fedde, Repert. sp. nov. VIII (1910) 326 et in Journ. Russ. Bot. 3-6 (1911) 38; Gorodk. in Trav. Mus. Bot. Ac. URSS, XX (1927) 214, fig. 4; V. Krecz. in Fl. transb. II (1931) 114. — *C. acicularis* Turcz. ex Bess. in Flora, XVIII, Beibl. 1 (1834) 264 (nomen), non Boott.

Perennial, very slender, caespitose plants; culms erect, triangular, scaberulous above; leaves to 1 mm broad, canaliculate; spikelets androgynous, rather sparsely-flowered, 2-5 mm long with few divergent to reflexed perigynia; scales deciduous in fruit, ovate, subobtuse, light castaneous, somewhat shorter than perigynia; perigynia ovoid to ellipsoid, 1.5-2.2 mm long, obsoletely trigonous, light green or cinereous, faintly nerved, round-based, the beak obsolescent, semitransparent-membranaceous. Fr. June.

Wet meadows and marshes. — East. Siberia: Daur., Len.-Kol. (s. part). Gen. distr.: Northern Mongolia. Described from Nerchinsk area (Itakenda River, facing the estuary of river Shaverna). Type in Leningrad.

212. *C. capitellata* Boiss. et Bal. ex Boiss. Fl. Or. V (1884) 399; Kük. in Engl. Pflzr. IV, 20 (1909) 102; Grossh. Fl. Kavk. I (1928) 157.

Perennial, green, caespitose plants; culms flattened-triangular, scabrous, curving, 7-15 cm tall; leaves flat, 1-2 mm broad, scabrous, soft; spikelets androgynous, few-flowered, ovoid, 0.5-0.8 cm long, not congested, with subdivaricate perigynia; scales deciduous in fruit, ovate, subobtuse, castaneous, shorter than perigynia; perigynia ovoid, 2.5-3 mm long, obsoletely trigonous, round-based, faintly nerved, gradually tapering into a smooth cuneate beak, the body yellowish, subferruginous above. Fr. July-August.

Alpine meadows. —Caucasus: West. Transcauc., Dag. Gen. distr.: Turkey and western Persia. Described from Mt. Dzhimil in Lazistan (Turkey). Type in Geneva.

Section 23. *Leucoglochin* (Ehrh.). V. Krecz. —Ehrh. ex Heuff. in Flora XXVII (1844) 528 (pro genere); Ehrh. Beitr. IV (1789) 146 (nomen). — 302 Rather small plants with a creeping rhizome. Culms subterete, smooth. Leaves obtuse, to 1.5 mm broad, mostly involute, smooth, spikelets androgynous, loose, initially obovoid-conic, at length with reflexed perigynia. Scales deciduous in fruit. Perigynia lance-conic to subsubulate, thinly coriaceous, obsoletely trigonous, faintly nerved, with long subulate smooth beak, short-stipitate; achene trigonous, oblong, usually with a well developed axial process [the rachilla], this nearly twice as long as the body. Stigmas 3.

1. Stigmas placed on the side of the rachilla projecting beyond the perigynium; perigynia 3-5 mm long. 214. *C. microglochin* Whlb.
- + Rachilla not exerted from the perigynium or wanting; stigmas terminating the beak; perigynia 6-8 mm long. 2.
2. Leaves flat to subinvolute, scabrous-margined; perigynia faintly nerved, 6-7 mm long; achene without rachilla. 213. *C. pauciflora* Lightf.
- + Leaves smooth; perigynia 7-8 mm long, distinctly many-nerved; achene with ciliate rachilla. 214. *C. parva* Nees.

213. *C. pauciflora* Lightf. Fl. Scot. II (1777) 543, tab. 6, fig. 2; Kük. in Engl. Pflzr. IV, 20 (1909) 110; Trev. in Ldb. Fl. Ross. IV, 268. — *C. leucoglochin* Ehrh. in L. fil. Suppl. (1781) 413. — Ic.: Syreish. III. fl. Mosk. g. I, 186; Hegi, Ill. Fl. II, Tab. 45, fig. 3. — Exs.: HFR No. 545; Pl. Finl. Exs. No. 103.

Perennial plants, with long stolons; culms obtusely triangular, scabrous above, 5-40 cm tall; leaves 1-1.5 mm broad, mostly involute, obtuse, scabrous-margined; spikelets 0.7-1 cm long, androgynous, of 1-3 staminate and 2-5 pistillate flowers, initially obconic, at length loose, with reflexed perigynia; scales lanceolate, acutish, pale ferruginous, shorter than perigynia; perigynia lance-conic, 6-7 mm long, plano-convex, round-based, faintly nerved, conic-beaked, stramineous. Fr. May-June.

Peat bogs of the forest zone. —Arctic: Arct. Eur.; European part: Kar.-Lap., Dv.-Pech., Lad.-Il'm., Upp. Dnepr., Upp. Volg., Volg.-Don. (Krapivenskii, Tula, Pavlovskii, Arzamas and Gorki districts), Volg.-Kam. (except s.); West. Siberia: Ob., Alt.; East. Siberia: Yenis., Ang.-Sayan., Len.-Kol., Daur.; Far East: Ze.-Bur., Ud., Uss., Okhot., Sakh. (n. part), Kamch.; Centr. Asia: Pribalkh. (Bien-Aksuiskii Distr. —n. part, Myn-Chokur Range—N. Smyrnov). Gen. distr.: Northern and Central Europe, North America. Described from Scotland (Arran Isl.).

214. *C. microglochin* Whlb. in Sv. Vetensk. Ak. Nya Handl. XXIV (1803) 140; Trev. in Ldb. Fl. Ross. IV, 269. — *Uncinia microglochin* Spreng. Syst. veg. III (1826) 830; C. A. M. in Ldb. Fl. Alt. IV (1833) 234. — Exs.: Kneuck. No. 31.

303 Perennial plants, with short stolons; culms flattened-terete, smooth, many-leaved, 5-25 cm tall; leaves filiform-involute (0.8-1 mm broad),

smooth obtuse; spikelets androgynous, 0.8-1.2 cm long, initially ovoid-contracted, becoming loose, with reflexed perigynia; staminate flowers 5-7, pistillate 5-17; scales ovate, obtuse, ferruginous, deciduous in fruit; perigynia lance-conic, 3-5 mm long, with exserted rachilla 5-7 mm long, biconvex, yellowish-green faintly nerved, with obtuse base; stigmas pushed sideways by the much exserted rachilla. Fr. May-July.

Mossy marshes; boggy and alpine meadows, and river banks. —Rare. —Arctic: Arct. Eur.; European part: Kar.-Lap.; Caucasus: Dag., Cis-cauc. (mount. part); West. Siberia: Ob. (Tarsk. Distr.), Alt.; East. Siberia: Yenis., Ang.-Sayan., Daur., Len.-Kol.; Centr. Asia: Dzhung.-Tarb., Tyan'-Shan., Pam.-Al. Gen. distr.: Arcto-alpine Europe, Asia and North America. Described from the alps of Swedish Lapland.

215. *C. parva* Nees in Wight, Contrib. Bot. Ind. (1834) 120; Kük. in Engl. Pflzr. IV, 20 (1909) 110; B. Fedtsch. in A. H. P. XXXVIII (1924) 187. —*C. macrorrhyncha* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 521; Trev. in Ldb. Fl. Ross. IV, 266. —*Chaetospora tenella* Rupr. in Mém. Ac. St. Pétersb. sér. 7, XIV (1869) 34. —Ic.: Boott, Illustr. gen. Carex I (1858) tab. 148.

Perennial plants, with creeping rhizome; culms flattened-terete, furrowed, smooth, 10-40 cm tall, with ovate scales at base; leaves laxly thickened, to 1 mm broad, obtuse, smooth; spikelets androgynous, to 1.5 cm long, containing 8-12 staminate and 3-8 pistillate flowers, initially obovoid-conic, becoming loose, with reflexed perigynia; scales lanceolate, acute, ferruginous-brown, shorter than perigynia; perigynia lance-linear, 7-8 mm long, biconvex, on curving stipe, ferruginous-brown, with a long subconic beak and distinct slender nerves; achene with a long rachilla, the latter ciliate above. Fr. July.

Marshes of the subalpine zone. —Centr. Asia: Dzhung.-Tarb., Tyan'-Shan., Pam.-Al. Gen. distr.: Afghanistan, Kashmir, India (Himalayas), Mongolia. Described from Nepal (India).

Section 24. *Thyrzanolepis* V. Krecz. —Plants with stout creeping ligneous rhizome, this and culm base covered with purplish-brown scale-like sheaths. —Plants dioecious; spikelets solitary, sometimes with a supplementary spikelet at base, and a usually appressed short bract; scales fringed-ciliate. Perigynia membranaceous, nerved, abruptly contracted into a short truncate beak. Achene trigonous, ribbed on the angles. Rachilla usually wanting. Stigmas 3.

216. *C. scirpoidea* Mchx. Fl. bor.-am. II (1803) 171; Kük. in Engl. Pflzr. V, 20 (1909) 81 et in Journ. Russ. Bot. 3-6 (1911) 34.

304 Perennial; culms coarse, scabrous, 10-35 cm tall; leaves flat, revolute-margined; pistillate spikelets 1.4-2 cm long, looser below, cylindrical; staminate spikelets 1-1.2 cm long; scales oblong-ovate, acutish, dark brown; perigynia obovate, 2-2.5 mm long, obsoletely trigonous, cuneate-attenuate below, pale green, brownish above, rather densely hairy right up to orifice of beak.

Sedge tundra; gravels. —Arctic: Anad., Chuk. Gen. distr.: North America, Norway. Described from the shores of Hudson Bay.

Section 25. *Schizochlaena* V. Krecz. —Densely cespitose plants, with 3-angled culms and flat leaves, covered at base with purplish-brown,

fracturing-fibrillose sheaths. Bract rather long-sheathed. Inflorescence of 4-6 segregated spikelets, the terminal staminate, the others pistillate. Scales membranaceous, 3-nerved. Perigynia thinly coriaceous, trigonous, nerved, laterally softly silvery-setulose above, frontally splitting along a white median band, abruptly contracted into a short infundibuliform-emarginate beak. Stigmas reddish-ferruginous, long.

217. *C. Grioletii* Roem. ex Schkuhr, Riedgr. I (1806) 76, tab. Rrrrr., fig. 209. — *C. tomentosa* C.A.M. Verz. Pflz. Cauc.-Casp. (1831) 31, non L. — *C. tomentosa* var. γ Trev. in Ldb. Fl. Ross. IV (1853) 303. — *C. tomentosa* var. *longipedunculata* Trautv. in herb. — *C. Hohenackeriana* C.A.M. in herb. — Exs.: Herb. Fl. Cauc. No. 307.

Perennial, cineraceous-green plants, with ligneous rhizome and short stolons, rather densely caespitose; culms slender, scabrous low down, 40-60 cm tall, leafy up to considerable height; leaves 2-4.5 mm broad, sub-revolute-margined, short-acuminate, equaling the culm; spikelets 4-6, subdistant below: the terminal staminate, fusiform to linear-cylindric, 1.5-5 cm long, with firmly appressed obtuse-truncate yellowish-ferruginous scales; the others pistillate, ovoid to short-cylindric, 0.6-1.5 cm long, congested, the uppermost subsessile, others on slender scabrous peduncles; peduncle of the lowest, often very distant, spikelet often upward to 5 cm long; lowest bract with sheath to 1.5 cm long, overtopping the inflorescence; scales obovate, acute, pale ferruginous, medially green, about half as long as and narrower than perigynia; perigynia subcoriaceous, obovate, obtusely trigonous, turned flat side out, 2-2.5 mm long, stramineous in lower part, glabrescent, rather densely and softly silvery-setulose above, green, with a smooth darkish median band, cuneate-based, smooth-margined, rather abruptly contracted into a short, slightly curving, weakly emarginate infundibuliform-orificed beak.

Forests. — Caucasus: West. and East. Transcauc. (Kakhetiya), Tal. Gen. distr.: Southern France, Spain, Italy, Turkish Lazistan, northern Persia. Described from Italy (Western Liguria: Peli).

305 Section 26. *Cardiopera* V. Krecz. — Densely caespitose plants with obliquely ascending rhizome. Culms terete, sulcate, densely covered at base with fracturing sheaths. Spikelets androgynous, staminate in upper part, pistillate below. Perigynia membranaceous, obovate, conic-based, cordate-emarginate at the summit, trigonous, with furrowed scabrous nerves. Achene trigonous, without rachilla. Stigmas 3.

218. *C. bucharica* Kük. in Fedde, Repert. sp. nov. XVI (1920) 433; B. Fedtsch. in A. H. P. XXXVIII (1924) 186; A. Gorodk. in Trav. Mus. Bot. Ac. URSS (1927) 210, fig. 2.

Perennial; culms smooth, 25-35 cm tall, slender, covered at base with castaneous to purplish-brown, at length fibrillose sheaths; leaves filiform-involute, shorter than the culm; spikelets lance-linear, 1-2.5 cm long, with 2-5 loosely set perigynia; scales obovate, rounded-obtuse, ferruginous, shorter than perigynia; perigynia grayish-green, 4 mm long.

Centr. Asia: Pam.-Al. Endemic. Described from Mt. Khodzha-Kaz'yan, near Kabadian. Type in Leningrad.

Section 27. *Onkerma* Rafin. in Amenit. of Nat. I (1840) 27 (pro genere). — *Lasiopera* Boern. in Abh. Naturw. Ver. Brem. XXI (1913)

270 (pro subgenere). — Desert-steppe and wood plants, with creeping rhizome and more or less fracturing-fibrillose basal sheaths, 3-angled culms, and largely flat dimorphous leaves (young leaves shorter than the culm, straight; those of the previous season long, flexuous, dying off at the tips). Bracts scale-like, or with a short sheath and a blade. Inflorescence of 2-5(6) spikelets: of these the terminal staminate, the others pistillate, sessile or borne on variously developed peduncles. Perigynia thinly coriaceous or membranaceous, obtusely or convexly trigonous, 1.5-6 cm long, nerved or nerveless, variously vestured; gradually or abruptly contracted into a short, or more or less oblique, conic, more or less emarginate beak. Achene convexly trigonous, with a disk-like cap, annulus, or thickening at the summit, or directly terminating in a 3-fid style.

1. Spikelets sessile; lowest bract sheathless, scale-like, or barely sheathed, nearly bladeless or with a more or less developed blade; perigynia rather densely hairy, contracted into a conic, scarcely emarginate or obsolescent beak; achene gradually tapering into the style. (Plate XIX, Figure 7 b) 2.
- + Spikelets (the lower ones or all) rather distinctly pedunculate; lowest bract with sheath (3)4-10(15)mm long and a blade; perigynia with scattered or sparse hairs, contracted into a conic, more or less emarginate beak; achene with a disk-like, shaft-like, or ring-like, style-bearing cap at the summit (Plate XIX, Figures 9 a and 9 b. In doubtful cases decision is based on examination of the achene for presence of disk or shaft) 13.
2. Perigynia prominently nerved 3.
- 306 + Perigynia nerveless or faintly nerved 5.
3. Densely caespitose plants; rootstock covered with reddish-ferruginous fibrillose sheaths; spikelets congested; bract broadly scale-like, brown, awned 4.
- + Rhizome extensively creeping; rhizome and the entire basal sheaths entire; spikelets segregated; bract foliaceous, green 225. *C. globularis* L.
4. Old basal leaves crisp; scales of staminate spikelets obtuse, those of pistillate spikelets white-hyaline-margined; bract similarly hyaline-margined; perigynia oblong-ellipsoid, 4.5-5 mm long, as long as the scales (Far East) 220. *C. ulobasis* V. Krecz.
- + Old basal leaves not crisp; scales of staminate spikelets acute, those of pistillate spikelets not hyaline-margined; bract brown membranaceous; perigynia obovate, 3.5-4 mm long, shorter than the scales (Europe) 219. *C. montana* L.
5. (2). Lowest bract scale-like, colored, terminating in a subulate, sometimes green, awn 6.
- + Lowest bract obsoletely sheathing, the sheath and blade green 9.
6. Basal sheaths purple (cherry-colored); pistillate scales acute, dark purple; staminate scales obtuse; perigynia 2.5-3 mm long, with a distinct conic beak; leaves green, rather soft, nearly equaling the culm 224. *C. Vanheurckii* Muell. Arg.

- + Basal sheaths brown or reddish-brown; both staminate and pistillate scales obtuse, brown, the pistillate sometimes acutish; perigynia 1.5-2.5 mm long, with obsolescent beak; leaves grayish-green, rigid, falcate, half as long as the culm or even shorter 7.
- 7. Cespitose plants with narrow (1-2 mm broad), strongly abbreviated leaves; pistillate spikelets narrowly oblong, 0.3-0.7 cm long (0.3 cm broad), few-flowered, more or less separate from staminate spikelet; scales covered above with golden hairs, largely 1-flowered (especially those of pistillate spikelets); perigynia 1.5-2 mm long 221. *C. melanocarpa* Cham.
- + Reptant plants, with leaves 2-4 mm broad; pistillate spikelets globular or ovoid, large, 0.5-2 cm long (7.5 cm [sic] broad), inserted at the very base of staminate spikelet; scales glabrous, white-hyaline-margined (especially those of staminate flowers); perigynia 2-2.5 mm long 8.
- 8. Scales of staminate spikelets white-hyaline nearly throughout, all scales non-ciliate; pistillate spikelets mostly 2, predominantly globular, 0.5-0.8 cm long, with blackish-brown acutish scales; perigynia 2 mm long, ovoid, brown; culms 5-20 cm tall; leaves 1/4-1/3 the length of culm. (Arctic) 223. *C. approximata* Bell.
- 307 + Staminate scales white-hyaline only at the margin, all scales ciliate; pistillate spikelets 2-4, to 2 cm long, with rounded-obtuse, light castaneous scales; perigynia 2.5 mm long, obovate, yellowish-green, slightly ferruginous; culms 15-30 cm tall; leaves usually half as long as the culm 222. *C. ericetorum* Poll.
- 9 (5). Staminate spikelets large, lanceolate to clavate-cylindric, 1.5-2.5 cm long, with obtusish scales; pistillate spikelets ovoid to short-cylindric, 0.6-1.5 cm long, markedly separate from each other and from the staminate spikelet; perigynia 2 mm long, with an obsolescent beak 226. *C. tomentosa* L.
- + Staminate spikelets narrow, lance-linear, 0.5-0.8(1) cm long, inconspicuous, usually suppressed by terminally approximate and there often contiguous pistillate spikelets; pistillate spikelets usually hemispherical, globular, or ovoid-globular; perigynia 2-3.5 mm long, with a conspicuous elongate conic beak 10.
- 10. Leaves 2-3 mm broad; spikelets 3-5, congested; perigynia green, nerveless 11.
- + Leaves 1-1.5 mm broad; spikelets 2-3, the lower distant; perigynia yellowish-green, faintly nerved 12.
- 11. Perigynia broadly subglobular-ovoid, 2.5-3 mm long, convexly trigonous, densely hirsute, contracted at the summit into a short emarginate beak; spikelets congested above, but not confluent 227. *C. pilulifera* L.
- + Perigynia oblong-obovate, 3-3.5 mm long, trigonous, diffusely short-pilose above, contracted into a long ferruginous bidentate beak; spikelets confluent above into a pyramidal head 228. *C. oxyandra* (Franch. et Sav.) Kudo.
- 12. Perigynia 2 mm long, obovate; scales lanceolate, castaneous, equaling the perigynia; spikelets subdistant (especially the lower ones), the staminate spikelet conspicuous, dark, linear; leaves 1-1.5 mm broad; culms 20-50 cm tall 230. *C. chinganensis* Litw.

- + Perigynia 3-3.5 mm long, ovoid; scales pale, shorter than the perigynia; spikelets congested above, the staminate spikelet inconspicuous, lanceolate, often pushed aside by pistillate spikelets, pale; leaves 1.5-2 mm broad; culms 15-30 cm tall 229. *C. amgunensis* F. Schmidt.
- 13 (1). Perigynia 5-6.5 mm long, lanceolate or lance-ovoid; spikelets distant, rarely on peduncles to 4-6 cm long 14.
- + Perigynia (1.8)2-3.5(4) mm long, ovoid or oblong-ovoid, spikelets approximate (rarely distant), the peduncles not exceeding 1-1.5 cm and often shorter 15.
14. Spikelets very distant, linear, to 4 cm long, rather loose; perigynia lanceolate, obsoletely trigonous, nerveless, cuneate-attenuate above, 5-5.5 mm long; leaves shorter than the culm. (Ussuri Territory) 249. *C. tasorum* Kom.
- 308 + Spikelets approximate above, oblong, 2.5 cm long, loose; perigynia oblong-obovate, distended-trigonous, slenderly nerved, gradually tapering into beak 5-6.5 mm long; leaves longer than the culm (Sakhalin) 228. *C. blepharicarpa* Franch.
15. Staminate spikelet pale, narrow, suppressed, sublaterally set in relation to adjacent pistillate spikelet; spikelets green, congested, aristate owing to the elongate bracts and awned lower scales 233. *C. leucochlora* Bge.
- + Staminate spikelet colored, well developed, surmounting the pistillate spikelets; spikelets with colored scales, not aristate below 16.
16. Lower spikelets crowded toward the culm base; lowest bract equaling to exceeding the inflorescence 17.
- + All spikelets on upper part of the culm; bract barely exceeding its spikelet 18.
17. Perigynia glabrescent or very sparsely and minutely pilose in upper part, obsoletely nerved; scales brownish, usually exceeding the perigynia. (Sakhalin, Kamchatka) 232. *C. subumbellata* Meinsh.
- + Perigynia diffusely long-pilose above, especially on the ribs, with 5-6 slender nerves; scales pale, equaling the perigynia. (Crimea, Caucasus) 231. *C. euxina* Marc.
18. Compactly and densely cespitose plants; basal sheaths rather strongly fracturing-fibrillose; leaves abruptly subtriangular-pointed†; perigynia covered with long villous-curly scattered hairs 19.
- + Reptant, stoloniferous, loosely cespitose plants (sometimes somewhat densely cespitose, but then perigynia 1.8-2, and not 2.5-3.5 mm long); basal sheaths rather dense or scarcely fracturing; leaves long attenuate†; perigynia diffusely or sparsely hirtellous 22.
19. Beak scarcely emarginate, erect 20.
- + Beak rather deeply bidentate, sloping. 21.
20. Culms smooth, obtusely triangular; leaves half as long as the culm, 2-3.5 mm broad; perigynia 2.5-2.8 mm long, nerveless, tinged above. (Caucasus) 241. *C. Huetiana* Boiss.
- 309 + Culms scabrous, triangular; leaves about equaling the culm, 1.5-2 mm broad; perigynia 3 mm long, distinctly 3-4-nerved, bright green, becoming yellowish. (Europe) 250. *C. umbrosa* Host.

† This can be readily seen in young leaves.

21. Perigynia 2.5(3) mm long, broadly obovate, bright green, abruptly contracted into a short, barely sloping beak; spikelets rather dense and congested. (Far East). 243. *C. hypochlora* Freyn.
 + Perigynia (3.3)3.5-4 mm long, oblong-obovate, pale green, gradually attenuate into an elongate proboscis-like curving beak; spikelets rather loose and subdistant, long-peduncled. 242. *C. sabynensis* Less.
- 22 (18). Perigynia nerveless or very faintly nerved, rather strongly pubescent 23.
 + Perigynia distinctly nerved, scarcely puberulent to glabrous above (if nerves indistinct, inflorescence with very distant, linear spikelets). 26.
23. Perigynia 1.8-2.3(2.5) mm long, densely pubescent; pistillate scales subobtuse, shorter than perigynia 24.
 + Perigynia 2.8-3(3.5) mm long, with scattered pubescence; pistillate scales acute cuspidate, equaling to exceeding the perigynia 25.
24. Perigynia 1.8-2 mm long, subglobular, with obsolescent beak; compactly cespitose plants; leaves thin, 1-2 mm broad; culms slender, smooth. (Eastern Siberia). 237. *C. conspissata* V. Krecz.
 + Perigynia 2.3-2.5 mm long, distinctly beaked; rhizome creeping; leaves subrigid, to 3 mm broad; culms scabrous. (Eurasia). 236. *C. ruthenica* V. Krecz.
25. Compactly cespitose mountain plants; culms smooth; leaves 1/3-1/2 the length of culm; perigynia 2.3-3 mm long, nerveless. (Caucasus) 235. *C. scabricuspis* V. Krecz.
 + Loosely cespitose plants; culms scabrous; leaves half as long as the culm; perigynia 2.8-3(3.5) mm long, faintly nerved. (Crimea). 234. *C. verna* Chaix.
- 26 (22). Sheaths of lower bracts short (3 to 7-8 mm long) 27.
 + Sheaths of lower bracts long (1-2.5 cm); spikelets linear-cylindric, loosish, long-peduncled, very distant 28.
27. Pistillate spikelets oblong, 1-1.5 cm long, rather dense, congested; perigynia obovate, 2-2.5 mm long 238. *C. nervata* Franch. et Sav.
 + Pistillate spikelets cylindric, rather loosely-flowered, subdistant; perigynia ovoid-fusiform, 3 mm long 239. *C. microtricha* Franch.
28. Perigynia 3.5-4 mm long, with a straight bidentate beak, glabrous to glabrescent; staminate spikelets plump, with acute scales 29.
 + Perigynia 2.5-3 mm long, with slanting, barely emarginate beak, and scattered hairs; staminate spikelets narrowly lanceolate, with obtuse scales 30.
29. Basal sheaths light brown; perigynia 3.5-4 mm long, glabrous, serrulate-scabrous between the teeth 246. *C. sikokiana* Franch. et Sav.
 + Basal sheaths castaneous; perigynia 3.5 mm long, diffusely pilose above, smooth between the teeth 247. *C. sachalinensis* F. Schmidt.
30. Sheaths of lowest bract bladeless, ferruginous-margined, sometimes cuspidate; pistillate spikelets 0.5-1 cm long, 5-12-flowered, with ferruginous obtuse scales; perigynia nearly smooth. (Yakutiya). 245. *C. Trautvetteriana* Kom.

+ Sheath of lowest bract bearing a small blade to 0.5-1 cm long; pistillate spikelets 1-2 cm long, 10-20-flowered, with pale cuspidate scales; perigynia with short hairs above. (Far East). 244. *C. subebracteata* (Kük.) Ohwi.

Cycle 1. *Apomitra* V. Krecz. —Lowest bract sheathless, scale-like, nearly bladeless or with a more or less developed blade. Pistillate spikelets from globular to oblong, fairly dense or loose, sessile; scales obtuse to somewhat acutish, shorter than to as long as perigynia. Perigynia obovate, rather densely hirtellous, contracted into a conic scarcely emarginate beak. Achene not capped at the summit, terminating directly in the style.

Series 1. *Macrolepidae* V. Krecz. —Densely cespitose plants. Bract broadly scale-like. Staminate scales without a hyaline margin. Perigynia trigonous, oblong, ellipsoid-ovoid, 3.5-5 mm long, nerved, covered with soft hairs. Leaves with scattered hairs below.

219. *C. montana* L. Sp. pl. (1753) 975; Trev. in Ldb. Fl. Ross. IV, 301. —*C. pubescens* Gilib. Exerc. phyt. II (1792) 547, non Muehleb. — Ic.: Syreish. Ill. Fl. Mosk. gub. I, 203. —Exs.: HFR No. 39; Kneuck. No. 45.

Perennial, bright green, densely cespitose plants, with obliquely ascending rhizome; culms curving to flexuous, scabrous at the apex, 10-30 cm tall, covered at base with red sheaths, these surrounded by fibrillose remnants of old sheaths; leaves soft, flat, 1-2 mm broad, short-acuminate, about half as long as the culm; spikelets 2-3, congested: the terminal staminate, lanceolate to obovoid, 1-2 cm long, with ferruginous-brown to 311 ferruginous obovate acutish scales, others pistillate, globular to ovoid, few-flowered, dense, 0.5-0.8 cm long, spreading; lowest bract scale-like, terminating in a brown hyaline-margined point; scales broadly ovate to obovate, truncate to emarginate, often mucronate, ciliate-margined, shorter than perigynia; perigynia membranaceous, obovate, trigonous, 3.5-4 mm long, pale green, later flavescent, covered with sparse soft hairs, with 2-3 basally thickened nerves in addition to 2 lateral ribs, rather abruptly terminating in a short, ferruginous-brown, white-hyaline-tipped, slightly emarginate beak. Fr. second half of April—May. (Plate XIX, Figures 6 and 6a).

Dry slopes and open woods. —European part: Upp. Dnepr., Upp. Volg. (s. part), Volg.-Kam. (south of Kazan'-Sverdlovsk line), Mid. Dnepr., Volg.-Don., Zavolzh.; Caucasus: Ciscauc. (Medvezh'e, near Stavropol' ?); West. Siberia: Ob. (Turinsk), Irt. (Yur'evskoe). Gen. distr.: West. Europe, southern Scandinavia, Aland Islands, Baltic seaboard. Described from Europe.

NOTE: Forming hybrids: \times ericetorum Poll.; \times umbrosa Host. (*C. pseudopolyrrhiza* Waisb.); \times pilulifera L. (*C. ginsiensis* Waisb.).

220. *C. ulobasis* V. Krecz. sp. nova in Addenda, II, 608. —*C. montana* var. *manshuriensis* Kom. Fl. Manshur. I (1901) 396; Kük. in Engl. Pflzr. IV, 20 (1909) 442 et in Journ. Russ. Bot. 3-6 (1911) 119. — Ic.: Kom. and Alis. Opr. rast. Dal'nevost. Kr. I (1931) tab. 89.

Perennial, light green plants with ligneous rhizome, forming dense compact tufts; culms erect, scaberulous above, 15-25 cm tall; leaves soft,

flat, 1-2.5 mm broad, the young straight, the old crisped at base, long-attenuate, as long as or shorter than the culm; basal sheaths purple, densely surrounded with remnants of old reddish-brown, more or less fracturing-fibrillose sheaths, terminating in crisped thickened remnants of old leaves; spikelets 2-3, congested: the terminal staminate, lanceolate to lance-clavate, 0.8-1.5 cm long, with ferruginous subobtusely irregularly emarginate scales; the others pistillate, ovoid, 1-1.5 cm long, rather dense, sessile; the lowest bract scale-like, amplexicaul, with a broadly ovate white-hyaline wing and a mucro; scales broadly ovate, acutish or emarginate, ferruginous-brown, broadly hyaline-winged, ciliate-margined above, with a light median band, faintly nerved, equaling to exceeding the perigynia, the midrib excurrent in a scabrous awn 5 mm long; perigynia oblong-ellipsoid, compressed-trigonal (only the 2 lateral edges distinct), 4.5-5 mm long, yellowish-green, ferruginous at the base and summit, with 3-5 thickened nerves, diffusely long-pilose, gradually tapering into a short brown bidentate beak. Fr. April-May.

- 312 Dry slopes, coppices, and oak woods. —Far East: Ze. -Bur., Ud., Uss., Okhot. (Okhotsk). Gen. distr.: Manchuria, North Korea. Described from Babstov on southern Amur. Type in Leningrad.

Series 2. *Lepidocoleae* V. Krecz. —Stoloniferous plants. Bract scale-like, awn-pointed. Staminate scales obtuse, white-hyaline-margined. Perigynia pyriform, nerveless, hirtellous.

221. *C. melanocarpa* Cham. ex Trautv. Fl. taimyr. In Middend. Sibir. Reis. I, 2 (1847-56) 21, tab. 4; Trev. in Ldb. Fl. Ross. IV, 302; Meinsh. in A. H. P. XVIII, 3 (1901) 400. —*C. ericetorum* ssp. *melanocarpa* Kük. in Engl. Pflzr. IV, 20 (1906) 440 et in Journ. Russ. Bot. 3-6 (1911) 117. —*C. inornata* Turcz. in Fl. baic.-dah. II, 2 (1856) 282. —*C. indecora* Turcz. in herb. —*C. brachyphylla* Turcz. in Bull. Soc. Nat. Mosc. XI, 1 (1838) 104 (nomen); Fl. baic.-dah. II, 2 (1856) 281.

Perennial, cineraceous-green, loosely caespitose plants, with short stolons; culms somewhat curving, obsoletely triangular, smooth, 5-15 cm tall, covered at base with 3-4 reddish-brown sheaths, with short-subulate blades; leaves rigid, coriaceous, straight from curving base, flat or folded, 1-2 mm broad, scabrous, long-triangular-pointed, 1/3-1/2 the length of culm; spikelets 2-3: the terminal staminate, linear-cylindrical-clavate, 0.6-1.3 cm long, with obovate, obtusely truncate, brownish, distally irregularly white-hyaline-margined scales; the others pistillate, remote from base of the staminate spikelet, oblong, 0.3-0.7 cm long, 0.3 cm broad, rather loose, 5-12-flowered, sessile; lowest bract scale-like, cuspidate; scales broadly ovate, truncate, brown, 1-flowered, covered (like staminate scales) with golden hairs, lighter above, serrulate-hyaline-margined, ciliolate, shorter than perigynia; perigynia ovoid to subovoid, rounded-trigonal, 1.5-2 mm long, darkish ferruginous below, ferruginous-brown above, with scattered short hairs on the margins and on the beak, nerveless, rather abruptly terminating in a short, cylindrical, slightly emarginate, white-hyaline-margined beak.

Stony and gravelly mountain slopes in the alpine zone, stony tundra, and pine woods. —Arctic: Arct. Sib. (from polar Ural), Anad., Chuk.; East Siberia: Yenisei, Len.-Kol., Daur. (Mt. Kavokta); Far East: Okhot.

Endemic. Described from the shores of St. Lawrence Gulf. Type in Leningrad.

222. *C. ericetorum* Poll. Hist. pl. Palat. II (1777) 580; Trev. in Ldb. Fl. Ross. IV, 303. —*C. ciliata* Willd. in Acta Ac. berol. (1794) 47, tab. 3, fig. 2. —*C. ericetorum* spp. *baicalensis* Gorodk. ex Krecz. 313 in Fl. Transb. II (1831) 126. — *Ic. : Syreish. III. Fl. Mosk. gub. I (1905) 204. — Exs. : HFR No. 344; Pl. Finl. Exs. No. 124 et 350; Fl. Pol. Exs. No. 289, 289 b; Kneuck. No. 20.*

Perennial, drab green, caespitose plants, with short underground off-shoots; culms slender but firm, curving to flexuous, smooth, 10-30 cm tall; leaves rigid, curving, 2-4 mm broad, revolute-margined, long-acuminate, half as long as the culm; spikelets 2-4, the terminal staminate, clavate to oblong-elliptic, compact, 1-2 cm long, with obovate, broadly hyaline-margined ciliate-fringed, brown, obtuse scales; the others pistillate, the uppermost at the base of the staminate spikelet, the others distant, ovoid to oblong-ovoid, 0.5-1.5 cm long, dense, sessile; lowest bract scale-like; scales broadly obovate, rounded-obtuse, castaneous to ferruginous, with a light median band, broadly and irregularly white-hyaline, ciliate-fringed, shorter than perigynia; perigynia subcoriaceous, obovate, rounded-trigonal, 2-2.5 mm long, yellowish-green, subferruginous above, densely short-pubescent, nerveless, rather abruptly terminating in a short conic submarginate beak. Fr. April-May. (Plate XIX, Figure 7, 7a and 7b).

Sands, dry slopes, dry waterways, wooded locations, moorlands, and pine woods. —European part: Kar. -Lap., Dv. -Pech., Lad. -Il'm., Upp. Dnepr., Upp. Volg., Volg. -Kam., Mid. Dnepr., Upp. Volg. Volg. -Kam., Mid. Dnepr., Volg. -Don., Zavolzh., Prichern., Low. Don. (n. part); Caucasus: Ciscauc. (Stavropol'); West. Siberia: Ob., Upp. Tob., Irt., Alt.; East. Siberia: Yenis. (Lower Tunguska), Ang. -Sayan., Daur.; Centr. Asia: Aral. -Casp. (n. part), Pribalkh. (n. part). Gen. distr.: Western Europe, Baltic seaboard. Described from Austria (Palatinate, Lautkren).

NOTE: Forming hybrids: \times *ruthenica* V. Krecz.; \times *pilulifera* L. (*C. Lackowitziana* Paul); \times *montana* L.

223. *C. approximata* Bell. ex All. pedem. II (1785) 267, non Hoppe. —*C. membranacea* Hoppe in Sturm, Deutsch. Fl. Heft 61 (1835); Trev. in Ldb. Fl. Ross. IV, 303 (var. β). — *Ic. : Rchb. Fl. Germ. VIII, tab. 257, fig. 637. — Exs. : Fl. exs. aust.-hung. No. 1066.*

Perennial, yellowish-green to light green, with short ascending stolons; culms curving, smooth, 5-20 cm tall; leaves rigid, more or less curving, 1/4-1/3 the length of culm; spikelets 2-3, approximate, the terminal staminate, obovoid to clavate, 0.5-1 cm long, compact; scales with a narrow brown median band, light membranaceous nearly throughout (hence spikelets pale stramineous), obtuse, not ciliate; other spikelets pistillate, spherical to ovoid, 0.4-0.8 cm long, dense, sessile; lowest bract membranaceous; scales ovate, acute, with a cuneate castaneous-brown to dark brown median band, rather broadly white-hyaline above, without a 314 ciliate fringe, about as long as or slightly shorter than perigynia; perigynia suboblong-obovate to ovoid, rounded-trigonal, 2 mm long, brownish-green, at length brunescent, nerveless, diffusely pubescent, rather broadly ovoid at base, gradually tapering into a short cuneate beak. Fr. June.

Mountain slopes, sand and stone tundra. —Arctic: Arct. Eur. (Murmanskaya Kareliya and Kol'skii Pen.); European part: Kar. -Lap.: Khibiny? —Gen. distr.: Fenno-Scandia, Alps, Carpathians, Pyrenees. Described from Piedmont (Mont Cenis).

224. *C. Vanheurckii* Muell. Arg. in Van. Heurck, *Observ. bot. I* (1870) 30. —*C. amblyolepis* Trautv. et Mey. *Flor. ochot. phaen.* in *Middend. Sibir. Reis. I*, 2 (1847-56) 99; Maxim. *Prim. Fl. Amur.* (1854) 312; Meinsh. in *A. H. P. XVIII*, 3 (1901) 398; Kom. *Fl. Kamch. I*, 253; Hultén, *Fl. of Kamtch. I*, 198, non Peterm. (1844). —*C. pennsylvanica* var. *amblyolepis* Kük. in *Finsk. Vet. Soc. Förh. XLV*, 8 (1902-03) 8 et in *Engl. Pflzr. IV*, 20 (1909) 446 atque in *Journ. Russ. Bot.* 3-6 (1911) 120. —*C. gifuensis* Kük. in *Journ. Russ. Bot.* 3-6 (1911) 119, non Franch. *C. pilulifera* Trev. in *Ldb. Fl. Ross. IV* (1853) 302; Ostenf. *Fl. arct. I* (1902) 83, quoad pl. kamtsch.

Perennial, light green, somewhat grayish plants, with creeping branching rhizome, caespitose, stoloniferous; culms setiform, obtusely triangular, scabrous above, 15-40 cm tall; leaves subrigid, flat, 1-2 mm broad, slightly revolute-margined, minutely tuberculate underneath, long-attenuate, strongly scabrous, shorter than the culm; basal sheaths purple; spikelets 2-3, approximate: the terminal staminate, linear to fusiform, compact, often more or less curving, 1.5-2.5 cm long, its scales obtuse, obovate, dark brown, white-hyaline-margined at the summit; other spikelets pistillate, spherical-ovoid to ovoid, 0.4-1 cm long, rather loose, sessile; lowest bract narrowly scale-like; scales ovate, dark brown, subcuspidate, with a light midrib, irregularly white-hyaline-margined above, nearly equaling the perigynia; perigynia rounded-obovate, rounded-biconvex, 2.5-3 mm long, yellowish-green, ferruginous and diffusely short-pilose above, nerveless, setulose margined above, abruptly terminating in a brown, cylindrical, slightly emarginate, light-margined, short beak. Fr. May-June.

317 Open dry forests and coppices, grassy slopes. —Arctic: Arct. Sib., Anad.; East. Siberia: Yenis. (Nizhn. Tunguska), Ang. -Sayan., Daur., Len. -Kol.; Far East: Ze. -Bur., Uss., Ud., Sakh., Okhot, Kamch. Gen. distr.: Northern Mongolia, Manchuria, North Korea. Described from Kamchatka (vicinity of Petropavlovsk). Type in Leningrad.

Series 3. *Chordatae* V. Krecz. —Plants with a long rhizome and long purple stolons. Bract obsoletely sheathing, well developed. Staminate spikelet with obtuse scales. Perigynia nerved, densely covered with hairs.

Explanation to Plate XIX

1 and 1a. *Carex digitata* L.: inflorescence and perigynium. —2. *C. lanceolata* Boott: inflorescence. —3 and 3a. *C. pediformis* C. A. M.: inflorescence and perigynium. —4. *C. macroura* Meinsh.: inflorescence. —5. *C. pilulifera* L.: inflorescence. —6 and 6a. *C. montana* L.: inflorescence and perigynium. —7, 7a and 7b. *C. ericetorum* Poll.: inflorescence, perigynium, and achene. —8 and 8a. *C. ruthenica* V. Krecz.: inflorescence and perigynium. —9a. Achene with a shaft at the base of style. —9b. Achene with a disk at the base of style. —10. *C. alba* Scop. —11. *C. oxyandra* (Franch. et Sav.) Kudo: perigynium. —12. *C. sabyensis* Less.: perigynium. —13. *C. nervata* Franch. et Sav.: perigynium. —24. *C. sachalinensis* F. Schmidt: perigynium. —15. *C. blepharicarpa* Franch.: perigynium.



225. *C. globularis* L. Sp. pl. (1753) 976; Trev. in Ldb. Fl. Ross. IV, 304. — *C. mitsuriokensis* Lévl. et Vant. in Bull. Ac. Intern. Géogr. Bot. XIX (1909) 33. — *C. globularis* var. *mitsuriokensis* Lévl. et Vant. in Fedde, Repert. sp. nov. VII (1909) 104. — *C. oligogyna* Less. ex Kunth, En. pl. II (1837) 442 (nomen, sub *C. globularis*); Trautv. Incr. fl. ross. IV (1884) 820. — *C. incerta* Steud. Syn. Cyper. (1855) 210. — Ic.: Syreish. III. Fl. Mosk. gub. I, 202; Kük. Engl. Pflzr. IV, 20 (1909) 435, fig. 69 D—F. — Exs.: HFR No. 346; Kneuck. No. 44, 44a; XIIa, 29.

Perennial, cineraceous-green, loosely caespitose plants, with long slender purple stolons; culms setiform, scaberulous at the apex, 20-50 cm tall, covered rather high up at base with narrow purple bladeless sheaths; leaves soft, flat, 1-2 mm broad, subrevolute-margined, long-acuminate, equalling the culm; spikelets 2-4, distant: the terminal staminate, linear, 0.5-1.5 cm long, with narrow, obtuse, obovate, light ferruginous scales; the others pistillate, the uppermost at the base of the staminate spikelet, others separated, spherical to ovoid, 0.4-0.8 cm long, loose, few-flowered, subsessile, or the lowest short-peduncled; lowest bract nearly sheathless, shorter than the inflorescence; scales broadly ovate, subobtuse, ferruginous, the middle ones with a light band, white-hyaline-margined, about half the length of perigynia; perigynia membranaceous, obovate, obtusely trigonous, 3 mm long, olivaceous to brownish-green, densely covered with translucent lustrous hairs, slenderly 8-10-nerved, gradually tapering into a very short, whitish, slightly emarginate beak. Fr. May—June.

Forests and peaty marshes. — European part: Kar. -Lap., Dv. -Pech., Lad. -Il'm., Upp. Dnepr. (n. part), Upp. Volg., Volg. -Don., Volg. -Kam.; the whole of Siberia and the Far East. Gen. distr.: Western Europe, Manchuria, North Korea. Described from Northern Europe and Alps of Dalecarlia, in Sweden).

NOTE: Plants from Kamch., Okhot. Sakh., and partly, from Uss., have loose, long (to 1.5 cm), sparsely flowered spikelets; pedunculate staminate spikelet; dark-colored, more acute scales; — they form here a distinct race, recorded at one time as *C. mitsuriokensis* Lévl. et Vant.

318 Series 4. *Nomostachyae* V. Krecz. — Caespitose plants. Bract with a short sheath and a distinct blade. Staminate spikelets markedly separated, large, with acutish scales; pistillate spikelets cylindrical. In other characters resembling *Lepidocoleae*.

226. *C. tomentosa* L. Mant. I (1767) 123; Trev. in Ldb. Fl. Ross. IV, 303. — *C. tomentosa* f. *nigrescens* Kük. et Litw. in Engl. Pflzr. IV, 20 (1909) 436. — Ic.: Kük., l. c., 435, fig. 69 A—C. — Exs.: Kneuck. No. 42; Fl. exs. Boh. No. 149.

Perennial, cineraceous-green, caespitose plants, with long slender stolons; culms slender, scabrous above, 15-35 cm tall, covered at base with purplish-brown to purple sheaths; leaves flat to subrevolute 1.5-3 mm broad, short-triangular-pointed, shorter than the culm; spikelets 2-3, approximate: the terminal staminate, clavate-cylindrical, 1-2.5 cm long, with light ferruginous subobtuse scales; the others pistillate, ovoid to short-cylindrical, 0.6-1.5 cm long, sessile, dense, erect; lowest bract merely exceeding its spikelet; scales ovate, cuspidate, ferruginous-brown to brown (in Siberian plants), with a light median band, narrowly hyaline-margined,

obsoletely nerved, somewhat shorter than perigynia; perigynia coriaceous, broadly obovate, rounded-trigonous, 2 mm long, grayish-green, at length brunescent, nerveless, densely covered with short whitish bristles, nearly beakless, bidentate, colored between the teeth. Fr. May.

Steppe and grassy slopes. —European part: Upp. Dnepr. (Mogilev), Mid. Dnepr., Prichern., Volg.-Don., Low. Don., Volg.-Kam. (Southern Ural), Zavolzh., Crimea; Caucasus: Ciscauc., Dag., East. and South. Transcauc.; West. Siberia: Upp. Tob., Irt., Alt.; East. Siberia: Ang.-Sayan.; Centr. Asia: Aral.-Casp., Pribalkh. Gen. distr.: Western Europe. Described from Austria.

Series 5. *Anomalostachya* V. Krecz. —Plants with a creeping rhizome, but forming fairly compact tufts. Bract with a scale-like sheath and a thin green blade. Staminate spikelet loose, narrow, very inconspicuous, suppressed by the approximate, subconfluent, hemispherical to semiovoid pistillate spikelets; scales acute. Perigynia obovate, nerveless or obsoletely nerved, with short scattered hairs above.

227. *C. pilulifera* L. Sp. pl. (1753) 976; Trev. in Ldb. Fl. Ross. IV, 302. —Exs.: HFR No. 41; Pl. Finl. Exs. No. 528, 529; Fl. Pol. exs. No. 584; Kneuck. No. 76, 104, 105; Dörf. No. 4794.

319 Perennial, green, densely caespitose plants, with branching rhizome; culms curving, scabrous above, 10-30 cm tall; leaves flat, 2-3 mm broad, long-acuminate, subrevolute-margined, half as long as the culm; spikelets 3-5, the upper ones approximate, the lowest distant: the terminal staminate, 0.5-1 cm long, with lanceolate acute hyaline-margined scales; others pistillate, globular to ovoid, 0.5-1 cm long, dense, sessile; lowest bract more or less developed, equaling or exceeding the inflorescence; scales ovate, cuspidate, castaneous-brown, with a green or light-colored distally scabrous midrib, narrowly hyaline-margined, equaling the perigynia; perigynia suborbicular-obovate, rounded-biconvex, 2.5-3 mm long, greenish, at length flavescent, densely hirtellous, nerveless, rather abruptly terminating in a short conic brown bidentate beak. Fr. May. (Plate XIX, Figure 5).

Dry open forests, dry slopes, and dry water-courses. —European part: Lad. -Il'm. (surroundings of Leningrad and Pskov), Upp. Dnepr (Vitebsk), Upp. Volg. (Rybinsk. Distr.), Volg.-Don (Khar'kov?). Gen. distr.: Central Europe, southern Scandinavia and Finland, Baltic seaboard, Poland. Described from Europe.

NOTE: Forming hybrids with *C. ericetorum* Poll. (*C. Lackowitziana* Paul.) and *C. montana* L. (*C. ginsiensis* Waisb.).

228. *C. oxyandra* (Franch. et Sav.) Kudo, Rep. Veg. North. Sagh. (1923) 72; Ohwi in Mem. Coll. Sc. Kyoto Univ., ser. B., V, 3 (1930) 275. —*C. montana* var. *oxyandra* Franch. et Sav. En. pl. Jap. II (1879) 141 et 565. —*C. Wrightii* Franch. in Bull. Soc. Philom. Paris, 8 sér., VII (1895) 47; Kük. in Engl. Pflzr. IV, 20 (1909) 443, non Dew. (1858). —Ic.: Kük., 1. c., IV, 20 (1909) 444, fig. 70.

Perennial, light green subflavescent plants, with a flagelliform rhizome and stoloniferous, forming fairly compact tufts; culms setiform, 10-30 cm tall; leaves soft, flat, 1.5-3 mm broad, long-attenuate, glabrous, smooth, shorter than the culm; basal sheaths purple; spikelets 3-5, the terminal ones tightly contiguous, the lowest 1-2 separated: the terminal spikelet staminate, short-lanceolate, 0.4-0.8 cm long, often shorter than the surrounding pistillate spikelets, with ovate ferruginous acute hyaline-margined

scales; other spikelets pistillate, spherical-ovoid to ovoid, 0.4-0.6 cm long, fairly loose, sessile, few-flowered; lowest bract short-setaceous; scales oblong-ovate, acute, ferruginous, with a light midrib, hyaline-margined, shorter than perigynia; perigynia oblong-obovate, obtusely trigonous, 3-3.5 mm long, yellowish-green, with short scattered hairs above, nerveless, rather abruptly contracted into a long (to 1.5 mm) ferruginous bidentate narrowly conic beak. (Plate XIX, Figure 11).

Far East: Sakh. (Reported by Kudo for northern Sakhalin). Gen. distr.: the Kurile Islands, Japan. Described from Kyushu (Nakano onwen, on Mt. Kugosan). Type in Kyoto.

229. *C. amgunensis* F. Schmidt, in Mém. Ac. St. Pétersb., VII Sér., XII (1868) 69, tab. 1, fig. 4-5; Meinsh. in A.H.P. XVIII, 3 (1901) 399. —*C. chloroleuca* Meinsh. in Bot. Centralbl. LV (1893) 196 et in A.H.P. XVIII, 3 (1901) 398; V. Krecz. in Fl. Transb. II (1931) 126. — *C. mucronata* Turcz. in Bull. Soc. Nat. Moscou, XI, 1 (1838) 104 (nomen); Trev. in Ldb. Fl. Ross. IV, 308, quoad pl. baic., non Bell. — *C. pilulifera* Turcz. in Bull. Soc. Nat. Mosc. XXVIII, 1 (1855) 345 et Fl. baic. -dah., 280, non L. — *C. amgunensis* var. *chloroleuca* Kük. in Engl. Pflzr. IV, 20 (1909) 447 et in Journ. Russ. Bot., 3-6 (1911) 121. — Exs.: HFR No. 1942.

Perennial, pale, yellowish-green, rather densely caespitose plants, with branching creeping rhizome and with stolons; culms setiform, nodding, scabrous above, 15-30 cm tall, leafy at base; leaves fairly soft, thin, flat to subsetaceous-involute, 1.5-2 mm broad, more or less revolute-margined, minutely tuberculate (especially on the upper side), long-acuminate, shorter than the culm; basal sheaths narrow, purplish-brown to lateritious; spikelets 2-3, congested: the terminal staminate, clavate to lanceolate, 0.5-1.1 cm long (sometimes deflected by the pistillate spikelets), with lanceolate pale yellowish-ferruginous acute scales; others pistillate, 6-10-flowered, loose, sessile, hemispherical, 0.5-0.6 cm long; lowest bract scale-like, with broad hyaline wings and a thin setaceous blade, exceeding the spikelet; scales ovate, awn-pointed, light ferruginous, with a pale midrib and broadly hyaline margin, shorter than the perigynia; perigynia ovoid, convexly trigonous, 3-3.5 mm long, greenish-stramineous, subferruginous near the summit and at base, diffusely hirtellous in upper part, nerveless, or sometimes obsoletely 1-2-nerved at base, with a thickened cuneate base, rather abruptly terminating in a moderately long, cylindrical, brownish, obliquely truncate, slightly bidentulate membranaceous beak. Fr. May-June.

Pine woods; stony and sandy slopes. — European part: Dv. -Pech. (region of Ukhta and Shugor), Volg. Kam. (Bogoslovsk works; Knyas'pinskaya mound); East. Siberia: Yenisei. (s. part), Ang. -Sayan., Daur., Len. -Kol. (reported by Kayander for upper Lena); Far East: Ze. -Bur., Ud., Uss. Gen. distr.: Northern Mongolia, Manchuria. Described from Amgun' River, between the estuaries of Agnekan and Omal' in Ud. region. Type in Leningrad.

230. *C. chinganensis* Litw. in Sched. ad Herb. Fl. Ross. VI (1909) 135. — Exs.: HFR No. 1941.

Perennial, cineraceous-green, rather densely caespitose plants, with creeping rhizome; culms slender, setiform, 20-50 cm tall, scaberulous at the apex, covered at base with remnants of old leaves and reddish-brown

(lateritious) bladeless sheaths; leaves soft, flat, 1-1.5 mm broad, finely pointed, about half as long as the culm; spikelets 2-4(5), approximate, only the lowest somewhat separated, the terminal staminate, linear, barely 1 cm long, with acutish lanceolate whitish-ferruginous scales; others pistillate, 321 few-flowered, sessile, crowded against the staminate spikelet, spherical to hemispherical, 0.4-0.5 cm in diameter; lowest bract setaceous, equaling the inflorescence; scales lanceolate, gradually and long-attenuate, light castaneous, with a broad median band and a broad white-hyaline margin, equaling the perigynia; perigynia obovate, rounded-trigonous, 2 mm long, yellowish-green, densely hispidulous, with numerous faint nerves, rather abruptly terminating in a conic ferruginous, hyaline-margined, obliquely truncate beak.

Forest-covered mountain slopes. —Far East: Uss.: Vladivostok, vicinity of the village Pokrovka. Gen. distr.: Manchuria. Described from Manchuria (mountains near the Khingan railroad station. Type in Leningrad.

Cycle 2. *Discomitra* V. Krecz. —Lowest bract with sheath to 5-8-10(15) mm long and a rather distinct setaceous or foliaceous blade, the latter equaling the spikelet or even the inflorescence. Pistillate spikelets oblong, loose and sparsely-flowered, the lowest or all on fairly distinct peduncles; scales acute, cuspidate to awned, scarcely shorter to longer than the perigynia. Perigynia obovate or oblong-obovate, with scattered or sparse, short or long hairs; the beak pronounced, conic, more or less emarginate. Achene capped by a shaf-like thickening or disk bearing the style, the latter enlarged toward the base.

Series 1. *Bracteatae* V. Krecz. —Cespitose plants. Leaves long-attenuate. Bract with a developed blade, this exceeding the spikelet and the inflorescence. Spikelets (2)3-5(6), dense; perigynia bilateral-conic, with scarcely emarginate straight beak.

231. *C. auxina* Marc. in Sched. ad Exs. Kneuck. XIIa (1904) No. 30 et in Allg. Bot. Zeitschr. (1905) 33, in nota (nomen) et in Addenda II, 609. —*C. depressa* var. *euxina* Woron. et Marc. in A. H. P. XXIV (1905) 564 and Opredeľ. rast. Kavk. i Kryma I (1909) 190; Grossh. Fl. Kavk. I, 168. —*C. depressa* var. *transsilvanica* Kük. in Engl. Pflzr. IV, 20 (1909) 463, quoad pl. caucas. et pers. —*C. transsilvanica* Boiss. Fl. Or. V (1884) 410, non Schur. —*C. pilulifera* Grossh. Fl. Kavk. I (1928) 167, non L. —Exs.: Fl. cauc. exs. No. 27; Kneuck. XIIa, No. 30.

Perennial, cineraceous-green, densely cespitose plants, with a short rhizome, without stolons; culms slender, faintly triangular, smooth, nutant, 10-25 cm tall, leaves rigid, flat, 2-3.5 mm broad, revolute-margined, scabrous, shorter than the culm; spikelets 3-6: the terminal staminate, lanceolate to clavate, 0.6-1.3 cm long, with lanceolate subobtuse rufous scales; others pistillate, the terminal (1-2) inserted at the base of the staminate spikelet, subsessile or short-peduncled, the lower (1-2) subradical, on long (to 8 cm) filiform smooth peduncles, all oblong, 0.5-1.2 cm long, 322 rather loose; lowest bract (subtending the upper spikelets) equaling or exceeding the inflorescence; scales ovate, acuminate, with a light median band, greenish, light ferruginous-margined, equaling the perigynia, the midnerve prominent, scabrous above; perigynia oblong-obovate (subpyriform) convexly to subrotund-trigonous, 3-3.3 mm long, greenish, at length

fulvescent, slenderly 5-6-nerved, with scattered long hairs above (especially on the angles), abruptly contracted to stipe, gradually tapering above into a broadly conic, slightly emarginate, short beak. Fr. April.

Grassy slopes and open forests. —European part: Crimea (near Chatyrdag); Caucasus: Ciscauc. (Stavropol', Maikop), West. and East. Transcauc. (Tiflis, according to Grossheim). Gen. distr.: Turkey, northern Persia. Described from Abkhaziya (Sukhum. Kale). Type in Leningrad.

232. *C. subumbellata* Meinsh. in A. H. P. XVIII, 3 (1901) 395; Kük. in Engl. Pflzr. IV, 20 (1909) 453; Ohwi in Mem. Coll. Sc. Kyoto Univ., ser. B, VI, 5 (1931) 260 (emend.). —*C. depressa* var. *subumbellata* Kük. in Journ. Russ. Bot., 3-6 (1911) 125. —*C. multifiliculmis* Lévl. et Vant. in Bull. Ac. Intern. Géogr. Bot. XIX (1909) 34. —*C. caryophyllea* Kom. Fl. penins. Kamtsch. I (1927) 254, non Latour. —*C. caryophyllea* ssp. *nervata* f. *dissita* Kük. in Allg. Bot. Zeitschr. (1909) 36. —*C. verna* Hultén, Fl. of Kamtsch. I (1927) 199, non Chaix. —*C. sabinensis* Meinsh. in A. H. P. XVIII, 3 (1901) 396, quoad pl. kamtsch. et sachal. —*C. umbrosa* subsp. *sabynensis* Kük. in Engl. Pflzr. IV, 20 (1909) 468 et in Journ. Russ. Bot. 3-6 (1911) 128, quoad pl. kamtsch. —*C. pediformis* var. *pedunculata* F. Schmidt in Mém. Ac. St. Pétersb., VII sér., XII, 2 (1868) 194, ex p., non Maxim.

Perennial, light green to cineraceous-green, rather compactly caespitose plants, with a flagelliform rhizome, without stolons; culms scaberulous above, 10-30 cm tall; leaves flat, 2.5-4 mm broad, revolute-margined, shorter than the culm; basal sheaths light ferruginous-brown; spikelets 2-4(5), subdistant: the terminal staminate, 1-2 cm long, with ovate, acutish, subferruginous, slightly hyaline-margined scales; others pistillate, 1-2 above, somewhat separated from the staminate spikelet and from each other, on more or less developed peduncles to 3 cm long, and usually 1-2 subradical, long-peduncled, oblong, 0.5-1.5 long; bract with sheaths to 1.5 cm long and a blade nearly twice as long as the spikelet, often equaling to exceeding the inflorescence; scales oblong-ovate, cuspidate-acuminate, ferruginous to light castaneous, 3-nerved, medially green, scabrous on the nerves above, equaling to exceeding the perigynia; perigynia obovate, rounded-trigonal, 3-3.3 mm long, yellowish-green, slightly short-pilose above, at length glabrous or [?] faintly slender-nerved, gradually tapering into a conic, basally distended, ferruginous, obliquely truncate, moderately long beak. Fr. June—August.

323 Dry sandy and stony slopes; open forests. —Far East: Kamchatka (and Commander Islands), Sakh. Gen. distr.: N. Japan, N. Korea. Described from Sakhalin (Due). Type in Leningrad.

233. *C. leucochlora* Bge. in Mém. Ac. St. Pétersb. Sav. Étr. II (1835) 142; Meinsh. in A. H. P. XVIII, 3 (1901) 360. —*C. breviculmis* Kom. Fl. Mandsh. I (1901) 374, non R. Br. —*C. breviculmis* ssp. *Royleana* Kük. in Engl. Pflzr. IV, 20 (1909) 469, ex p., et in Journ. Russ. Bot. 3-6 (1911) 132.

Perennial, light green, flavescent, densely caespitose plants, with ascending rhizome; culms scabrous above, 20-40 cm tall; leaves yellowish, flat to subinvolute, 2-3 mm broad, shorter than the culm; spikelets 2-4, congested: the terminal staminate, lance-linear, 0.5-1 cm long, often not exceeding the uppermost pistillate spikelet and deflected by it, with pale

yellow oblong-ovate acute scales; the others pistillate, ovoid or oblong-ovoid to oblong, 0.6-1.5 cm long, loose, sessile or nearly so; bracts well developed, exceeding the spikelets, the lowest usually overtopping the inflorescence, nearly sheathless; scales ovate to oblong-ovate, acute, pale green to yellowish, longer than the perigynia, the prominent scabrous green midrib excurrent in a scabrous awn nearly as long as the body; perigynia obovate, rounded-trigonous, 2-2.3 mm long, green or pale green, slenderly 4-5-nerved, diffusely short-pilose above to glabrescent or glabrous, gradually tapering into a beak, this cuneate, somewhat contracted at base, slightly emarginate, pale. Fr. May-June.

Exposed grassy slopes and dry water courses. —Far East: Ze. -Bur., Uss. Gen. distr.: Northern China, Korea. Described from northern China (Tsiui-Vei-Shan Mts.). Syntype in Leningrad.

NOTE: Our plants are not quite identical with the type species (which has more densely hairy perigynia) and call for collation with some Japanese and Korean species of the same group which are not present in Leningrad.

Series 2. *Caryophyllea* V. Krecz. —Non-cespitose to loosely cespitose plants, with long stolons; basal sheaths more or less fracturing; leaves long-attenuate. Spikelets 2-4, loose. Scales acute, scarcely shorter than the perigynia to nearly as long. Perigynia pyriform, with a short, broadly conic, scarcely emarginate, straight beak.

234. *C. verna* Chaix ex Vill. Hist. pl. Dauph. I (1786) 312; ib. II (1787) 204. —*C. caryophyllea* Latour., Chlor. lugdun. (1785) 27 (nomen nudum); Vass. ex Wulff, Fl. taur. I, 2 (1929) 27. —*C. praecox* Jacq. Fl. Austr. V (1778) 23, ex p.; Trev. in Ldb. Fl. Ross. IV, 301; Meinsh. in A.H.P. XVIII, 3 (1901) 397, pro pl. taur., non Schreb. —*C. subvillosa* M.B. Fl. taur.-cauc. II (1808) 386 et sec. herb., propr. M.B.; 324 *Stev. Verzeichn. taur. Pflz.* (1857) 350. —Exs.: Kneuck. XIIa, No. 27, 28; Dörfel. No. 4389; Callier, It. III, No. 753; P. Finl. Exs. No. 125.

Perennial, light green to cineraceous-green, loosely cespitose plants, with lateral offshoots; culms firm, more or less curving, faintly triangular, scaberulous to nearly smooth above, 10-20 cm tall; leaves ribbed, folded below, subplane above, 2-3.5 mm broad, curving or flexuous, revolute-margined, about half as long as the culm; basal sheaths castaneous-brown; spikelets 2-4, approximate: the terminal staminate, obovoid, 1-1.5 cm long, with light-ferruginous, narrowly hyaline-margined, acutish scales; the others pistillate, ovoid to oblong-ovoid, 0.5-1 cm long, 0.6-0.6[sic] cm broad, rather dense, the upper sessile, the lowest short-peduncled; lowest bract short-sheathing, the blade shorter than the inflorescence; scales rather broadly ovate, convex, the lower (or all) cuspidate, with a green terminally scabrous midrib, not hyaline-margined, equaling or exceeding the perigynia; perigynia obovate, convexly trigonous, 2.8-3(3.5) mm long, initially greenish-stramineous, at length brunescens, diffusely short-pubescent above, obsoletely 6-7-nerved, glabrescent at base, rather abruptly terminating in a short conic beak. Fr. March-May.

Grassy and steppe mountain slopes, on stony soils; bare situations. —European part: Low. Don.: shores of Azov Sea (Kleopov); Crimea (mountainous part). Gen. distr.: Scandinavia, Finland (Åland Isls. and Åbo), Northern Europe. Described from France (Dauphine, Grenoble district).

fracturing-fibrillose; spikelets 2-4, subapproximate: the terminal staminate, lanceolate to clavate, 1-2 cm long, with ferruginous or light ferruginous, acutish to subobtusate, ovate to subovate scales; the others pistillate, 0.6-2 cm long, 0.4-0.5 cm broad, loose or rather sparsely flowered (especially toward the base), the lowest to 1-1.5 cm long, sometimes distant; lowest bract with sheath to 5-7 mm long, the short blade equaling the spikelet; scales broadly ovate, the lower acutish, the upper obtuse, castaneous-brown, with a green median band, distinctly 1-nerved, subinvolute-margined, shorter than the perigynia; perigynia suborbicular-obovate, convexly trigonous, (2)2.3-2.5 mm long, greenish-yellow, at length brunescent, rather densely covered above with long white hairs, obsoletely nerved, rather gradually tapering into a short, subcuneate-cylindric, brownish, scarcely emarginate beak. Fr. April-May. (Plate XIX, Figure 8 and 8a).

Grassy slopes, dry water courses, coppices, clearings, and open forests; bare places. —European part: Lad. -il'm. (west of Leningrad-Luga line), Upp. Dnepr., Upp. Volg. (south of Vyaz'ma-Moscow Kazan' line), Mid. Dnepr., Prichern., Volg. Don., Low. Don. (n. part), Volg.-Kam. (south of Kazan'-Perm' line), Zavolzh. (n. e. part); West. Siberia: Ob. (not extending northward beyond Tobol'sk-Tomsk line), Upp. Tob., Irt., Alt.; East. Siberia: Ang.-Sayan. (w. steppe part); Centr. Asia: Aral.-Casp. (n. part), Pribalkh. (n. part). Gen. distr.: Baltic countries, Poland, Germany, Hungary. Described from the village Elanskoe (Tyukalinskii Distr., West. Siberian Province). Type in Leningrad.

NOTE: Densely caespitose forest forms with fairly abundant (not sparse) fibers at culm base in this species recall the western *C. umbrosa*, from which, however, they are readily distinguishable by the short, broadly conic beak of the perigynium, its more copious short compact pubescence, absence of prominent nerves, and long-attenuate leaves. Hybridizes with *C. ericetorum* Poll. —In the mountains of Tien Shan and Kulja it forms apparently a distinct race, with broader leaves (to 4 mm), thickened culms and plumper spikelets.

ECONOMIC IMPORTANCE: An excellent forage plant in pastures, but occurs in small quantities.

237. *C. conspissata* V. Krecz, sp. nova in Addenda, II, 611. —*C. caryophyllea* Kük. in Engl. Pflzr.: IV, 20 (1909) 463, quoad pl. sibir., et in Journ. Russ. Bot. 3-6 (1911) 126, exp., non Latour. —*C. caryophyllea* var. *caespitosa* Kük., l. c., 465, exp. et 128. —*C. pediformis* var. *brevis* Drob. in Trav. Mus. Bot. St. Pétersb., XII (1914) 107, tab. 14; Podp. in Publ. Fac. Sc. Univ. Masaryk, 101 (1928) 21.

Perennial, light green, with a creeping rhizome and very short stolons, hence forming rather dense and compact tufts; culms filiform, faintly triangular, smooth, subflexuous, 5-20 cm tall; leaves soft, 1-2 mm broad, usually subinvolute, short-acuminate, shorter than the culm; basal sheaths castaneous-brown, densely covered with fracturing fibrillose leaf remnants; spikelets 2-3, subdistant: the terminal staminate, obovoid or clavate, 0.5-1 cm long, with obovate, rounded-obtusate, light ferruginous, hyaline-margined scales; the others pistillate, ovoid to subspherical, 0.3-0.8 cm long, 0.3 cm broad, rather loose, pedunculate, the lowest peduncle 1 cm long; lowest bract with colored sheath to 8 mm long and an abortive setiform blade; scales ovate, acute, subobtusate, ferruginous to brunescent-ferruginous, with a light midrib and subhyaline margin, shorter than perigynia;

perigynia obovate (rotund-pyriform), rounded-trigonous, 1.8-2 mm long, greenish to cineraceous-green, rather densely short-pilose, nerveless, rather abruptly terminating in an obsolescent, broadly conic, ferruginous, scarcely emarginate beak. Fr. May.

Wet solonetz meadows. — East. Siberia: Ang. -Sayan., Daur., Len. -Kol. Gen. distr.: Northern Mongolia. Described from the village Shcherbakovo (Balaganskii Distr., East Siberian Province). Type in Leningrad.

238. *C. nervata* Franch. et Sav. En. pl. Jap. II (1879) 141 et 566. — *Carex caryophyllea* ssp. *nervata* Kük. in Engl. Pflzr. IV, 20 (1909) 465 et in Journ. Russ. Bot. 3-6 (1911) 128.

Perennial, light green, loosely caespitose plants, with slender, short
327 stolons; culms faintly triangular, smooth or nearly so, 10-25 cm tall; leaves not rigid, flat, 1.5-2.5 mm broad, subacute, straight, shorter than the culm; basal sheaths brown; spikelets 2-3, approximate: the terminal staminate, lanceolate to oblong-clavate, 0.8-1.5 cm long, with ovate, obtusely triangular-tipped, hyaline-margined, light ferruginous scales; the others pistillate, ovoid to oblong-ovoid, 0.5-0.8(1) cm long, 0.3 cm broad, rather loose, on short peduncles (to 5-8 mm long); lowest bract with sheaths to 5-8 mm long and a setaceous short blade; scales ovate, acutish, pale light-ferruginous, with a green median band, shorter than perigynia; perigynia obovate, obtusely triangular, 2-2.5 mm long, pale green, at length flavescens, diffusely pilulose above (pilulose throughout when young), with distinct slender nerves, terminating in a short, conic, obliquely truncate beak. Fr. May-June. (Plate XIX, Figure 13).

Dry slopes, open forests, and coppices. — Far East: Ze. -Bur., Uss. Gen. distr.: Japan, Manchuria, North Korea. Described from Nippon, near Hakone. Type in Paris.

239. *C. microtricha* Franch. in Nouv. Arch. Mus. Paris, 3 sér., IX (1897) 189; Miyabe et Kudo, Fl. Hokk. and Sagh. II (1931) 248; Akiyama in Journ. Fac. Sc. Hokk. Univ., ser. V, II, 1 (1932) 131. — *C. caryophyllea* ssp. *nervata* var. *microtricha* Kük. in Engl. Pflzr. IV, 20 (1909) 466.

Perennial, with creeping rhizome; culms erect, scabrous above, 30-50 cm tall, with 1-2 short leaves at base; leaves shorter than to exceeding the culm, 3 mm broad, scabrous; spikelets usually 2, occasionally 3, the terminal staminate, oblong, obtuse, long-peduncled; the tawny obovate obtuse staminate scales with concolor, terminally evanescent nerve; other spikelets pistillate, short-ovoid (thin, cylindrical—according to Kükenthal and Akiyama), few-flowered, loose, subdistant, the lower pedunculate; lowest bract short, membranaceous nearly throughout, with a subulate blade; scales lance-ovate light brown or short-setiform, slightly shorter than perigynia; perigynia ovoid-fusiform to subovoid, distended-trigonous, 3 mm long, 1.5-1.8 mm broad, stramineous-green, at length ferruginous, many-nerved, almost imperceptibly puberulent to virtually glabrous, subrotund-based, gradually tapering into a short-conic, scarcely emarginate beak. (Description after Franchet and Akiyama).

Dunes and sandy coasts. — Far East: Sakh. (according to Miyabe and Kudo). Gen. distr.: Japan (Yezo and Nippon). Described from Nippon (dunes of Niigata). Type in Paris.

Series 3. Polyrhizae V. Krecz. -Plants forming dense and compact tufts; basal sheaths fracturing-fibrillose; leaves abruptly pointed. Spikelets 2-3(4), approximate, loose. Perigynia oblong, diffusely long-pilose and a short, sometimes somewhat oblique and more or less bidentate beak.

- 328 240. *C. umbrosa* Host, Gram. Austr. I (1801) 52, tab. 69; Kük. in Engl. Pflzr. IV, 20 (1909) 466, ex p. -*C. longifolia* Host, Gram. Austr. IV (1809) 48, tab. 85. -*C. praecox* var. γ Trev. in Ldb. Fl. Ross. IV (1853) 301. -*C. polyrrhiza* Wallr. Sched. crit. (1822) 492; Meinsh. in A. H. P. XVIII, 3 (1901) 397, quoad pl. ex Shitomir. -Ic.: Kük., l. c., 467, fig. 74 A-E; Syreish. Ill. Fl. Mosk. gub. IV (1914) 33. -Exs.: Kneuck. No. 48.

Perennial, light green, densely and compactly caespitose plants, without stolons; culms scabrous above, 25-40 cm tall; leaves long, not rigid, flat, 1.5-2.5 mm broad, straight, nearly equaling the culm; basal sheaths ferruginous-brown, profusely surrounded by brown fibrillose remnants of old sheaths; spikelets 2-4, approximate: the terminal staminate, lanceolate to lance-clavate, 0.8-1.5 cm long, with lanceolate, subobtuse-based, acutish, light ferruginous scales; other spikelets pistillate, oblong, 0.6-2 cm long, 0.4-0.5 cm broad, loose, short-peduncled, the lowest subdistant (on a peduncle to 1 cm long); lowest bract with sheath 5-8 mm long and a short setiform blade equaling the spikelet; scales ovate, acute or (the lower ones) sub-setaceous, castaneous-brown, not hyaline-margined, shorter than perigynia the midrib light-colored or green; perigynia oblong-obovate, obtusely trigonous, 3 mm long, bright green, becoming yellowish-green, with long scattered soft whitish hairs, more or less distinctly 3-4 nerved, rather gradually tapering into a long, narrowly conic, slightly emarginate beak. Fr. April-May.

Open forests, ravines.-European part: Mid. Dnepr. (Zhitomir); possibly in s.-w. part of Upp. Dnepr. Gen. distr.: Centr. Europe. Described from Austria.

NOTE. Forming hybrids with *C. montana* L. (*C. pseudo-polyrrhiza* Waisb.).

241. *C. Huetiana* Boiss. Diagn., ser. 2, IV (1856) 123; Fl. Or. V, 411; Grossh. Fl. Kavk. I, 169. -*C. umbrosa* var. *Huetiana* Kük. in Allg. Bot. Zeitschr. VII (1901) 193 et in Engl. Pflzr. IV, 20 (1909) 468. - Exs.: Kneuck. X, No. 290.

- Perennial, yellowish-green, densely caespitose in compact tufts, without stolons; culms curving, faintly triangular, smooth, 5-15 (20) cm tall; leaves numerous, crowded in a rosette, subreflexed, rigid, flat, 2-3.5 mm broad, scabrous, half as long as the culm; basal sheaths light brown, surrounded by fibrillose remnants of old sheaths; spikelets 2-4, congested: the terminal staminate, obovoid, 0.6-1 cm long, with obovate obtuse tawny scales; other spikelets pistillate, ovoid, 0.5-0.8 cm long, rather dense, sessile, or the lowest (if separated) short peduncled; lowest bract with a short sheath (3-4 mm long), with a short rather narrow blade exceeding the spikelet; scales ovate, with a subobtuse to obtuse base, acute, castaneous to ferruginous, somewhat shorter than perigynia, the midrib light-colored, rarely green, scaberulous above; perigynia, obovate, obtusely trigonous, 2.5-2.8 mm long; green, ferruginous above, covered with scattered long soft hairs, nerveless, gradually tapering into an elongate, narrowly cylindrical, ferruginous, scarcely emarginate beak. Fr. May-July.

Subalpine meadows and glades. -Caucasus: Gr. Cauc. (w. part). Gen distr.: Turkey. Described from Armenia (Sazalarkhane). Type in Geneva.

ECONOMIC IMPORTANCE. According to a report by E.A. Busch, a good forage plant.

242. *C. sabynensis* Less. ex Kunth, Enum. pl. II (1837) 440; Meinsh. in A.H.P. XVIII, 3 (1901) 396; V. Krecz. in Fl. Transb. II, 126. - *C. obliqua* Turcz. ex Bess. in Flora, XVIII, Beibl. 1 (1834) 27 et in Bull. Soc. Nat. Moscou, XI, 1 (1838) 104 (nomen). - *C. pediformis* β *obliqua* Turcz. Fl. baic. dah. II, 2 (1856) 274. - *C. pediformis* var. *rostrata* Maxim. Prim. Fl. Amur. (1859) 310, ex p. - *C. pediformis* var. *caespitosa* F. Schmidt in Mém. Ac. St. Pétersb., 7 sér., XVIII (1872) 127. - *C. Brenneri* Christ in Vet. Akad. Handl. Stockholm, XXII (1887) 178, atque in A.H.P. XVIII (1901) 411; Ostenf. Fl. Arct. I, 84, fig. 61. - *C. Sadae* Levl. et Vant. in Bull. Ac. Intern. Geogr. Bot. XIX (1909) 33. - *C. Cordouei* Lévl., l. c., 34. - *C. eriandrolepis* Lévl., l. c. - *C. umbrosa* ssp. *sabynensis* Kük. in Engl. Pflzr. IV, 20 (1909) 468, ex p. et in Journ. Russ. Bot. 3-6 (1911) 128. - *C. pisiformis* var. *subebracteata* Kük., l. c., 477 et 132, pro pl. Maxim. et F. Schmidt. -

Perennial, light green, densely and rather compactly caespitose, plants, with short creeping rhizome; culms slenderly setiform, flexuous, faintly triangular, smooth, 15-30 cm tall; leaves fairly soft, long, flat to subconduplicate, 1.5-2 cm broad, curving sideways, shorter than the culm; basal sheaths light brown, rather profusely covered with fibrillose remnants; spikelets 2-3, subdistant: the terminal staminate, obovoid to clavate, 0.6-1 cm long, with ovate acutish light brown scales; other spikelets pistillate, ovoid to oblong, 0.4-0.8 (1) cm long, 0.3 cm broad, rather sparsely flowered, pedunculate; lowest bract with sheath to 7-8 mm long, short-setiform; scales ovate, subacute to acute, scaberulous below on the light midrib, subferruginous, shorter and narrower than perigynia; perigynia oblong-obovate, obsoletely trigonous, (3.3)3.5-4 mm long, light green, covered with scattered long soft hairs, distinctly 5-8-nerved, narrowly cuneate-based, rather gradually tapering into the beak; beak long, ferruginous, reflected in a somewhat proboscis-like fashion, rather deeply bidentate. Fr. June-July. (Plate XIX, fig. 12).

Subalpine and alpine meadows, mossy marshes, and damp forests; also boggy and shrubby tundra. -Arctic: Arct. Eur. (polar Ural), arct. Sib. (lower Yenisei); European part: Dv. -Pech. (upper reaches of the Ussa River; Khanavei; upper reaches of river Shchugor), Volg. -Kam. (Centr. Ural); West. Siberia: Alt.; East. Siberia: Yenisei, Ang. -Sayan., Daur., Len. -Kol.; Far East: Okhot., Ze. -Bur., Sakh. Gen. distr.: Northern Mongolia and Northern Manchuria. Described from Sayans (Mt. Shubin-Daban). Type in Berlin, type duplicate in Leningrad.

243. *C. hypochlora* Freyn in Öster. Bot. Zeitschr. LIII (1903) 26. - *C. umbrosa* subsp. *sabynensis* Kük. in Engl. Pflzr. IV, 20 (1909) 468, ex p. - *C. sabinensis* Kom. Fl. Mandsh. I (1901) 395, exp., non Meinsh. - *C. pisiformis* var. *subebracteata* Kük., l. c., 477 et in Journ. Russ. Bot. 3-6 (1911) 132, pro pl. Komar. -

Perennial, light yellowish-green, non-stoloniferous, densely and compactly caespitose plants; culms scabrous above, 10-40 cm tall; leaves somewhat rigid, flat, 1.5-2.5 cm broad, straight, shorter than the culm; basal sheaths light brown, densely covered with marcescent remnants of fracturing-

fibrillose sheaths; spikelets 2-3, subapproximate; the terminal staminate, obovoid or clavate, 0.6-1 cm long, with ovate triangular-tipped subacute light ferruginous-brown scales; other spikelets pistillate; spherical or ovoid to ovoid-oblong, 0.4-1 cm long, 0.4 cm broad, rather dense, pedunculate (especially the lowest); lowest bract with sheath to 5-6 mm long a short blade scarcely exceeding the spikelet; scales ovate, cuspidate, scabrous on the point, buff, medially green, shorter than perigynia; perigynia broadly obovate (rounded-pyriform), convexly trigonous, 2.5(3) mm long, green to grayish-green, becoming yellowish-green, covered with scattered soft short hairs, prominently 4-5-nerved; abruptly terminating in a moderately long, cylindrical, ferruginous, rather deeply bidentate beak. Fr. May-June.

Dry slopes and open forest. - Far East; Ze. -Bur., Uss. Gen. distr.: Manchuria. Described from Blagoveshchensk. Type in Austria.

Series 4. *Chloroticae* V. Krecz. - Loosely caespitose plants with creeping rhizome; basal sheaths scarcely fracturing. Spikelets segregated, narrow, to 2 cm long, loose and sparsely flowered, on slender peduncles exceeding 1-1.5 cm in length. Perigynia 2-4 mm long, more or less obovate, slightly vested with scattered short hairs, the beak short, conic, scarcely emarginate.

244. *C. subbracteata* (Kük.) Ohwi in Mem. Coll. Sc. Kyoto Univers., ser. B, VI (1931) 252. - *C. pisiformis* var. *subbracteata* Kük. in Engl. Pflzr. IV, 20 (1909) 477 et in Journ. Russ. Bot. 3-6 (1911) 132, ex p. - *C. ebracteata* Meinsh. in A.H.P. XVIII, 3 (1901) 391, ex p.; Kom. Fl. Manchzh. I, 393, non Trautv. - *C. pediformis* var. *rostrata* Maxim. Prim. Fl. Amur (1859) 310, pro max. parte.

331 Perennial, light green, loosely caespitose, with long horizontal stolons; culms slender, faintly triangular, smooth, 15-40 cm tall; leaves soft, long, straight, flat, 2-3 mm broad, scabrous, rather abruptly pointed, shorter than the culm; spikelets 2-3, 1-2 cm apart: the terminal staminate, lance-linear to clavate, 1-2 cm long, with ovate, obtuse, mucronate, ferruginous-rufous, irregularly hyaline-margined scales; other spikelets pistillate, cylindrical to oblong-cylindrical, 1-2 cm long, 0.3 cm broad, loosely 10-20-flowered, on peduncles to 1 cm long included in bracteal sheaths of equal length, these bearing blades to 0.5-1 cm long; scales obovate, acute to cuspidate, ferruginous, somewhat shorter than perigynia, the midrib light, prominent, scaberulous above; perigynia reflexed, obovate, obsoletely trigonous, 2.5 mm long, pale green to ferruginous green, obsoletely many-nerved, hispidulous above, gradually tapering into a slightly curving short conic subemarginate-bidentate ferruginous beak. Fr. May.

Forests. - East. Siberia: Daur.; Far East: Ze. -Bur., Ud., Uss. Gen. distr.: Manchuria, Korea. Described from Poddale on the Aur. Type in Leningrad.

245. *C. Trautvetteriana* Kom. Fl. Mandsh. I (1901) 393 (in nota). - *C. ebracteata* Trautv. in A.H.P.V (1877) 125; Meinsh. in A.H.P. XVIII, 3, (1901) 391, quoad pl. Czekanowsk., non Philip. (1864). - *C. pisiformis* var. *ebracteata* Kük. in Engl. Pflzr. IV, 20 (1909) 477 et in Journ. Russ. Bot. 3-6 (1911) 133. -

Perennial, cineraceous-green loosely caespitose plants, with creeping rhizome; culms slender, faintly triangular, smooth, somewhat curving, 5-15 cm tall; leaves falcate, rigid, aggregated at base, flat, 2-3 cm broad, or folded with revolute margins, scaberulous, long-attenuate, one-third to

half as long as the culm; spikelets 2-3, 1-2 cm apart: the terminal lanceolate, 1-1.5 cm long, with ovate, rufous, irregularly hyaline-tipped sub-obtuse scales; other spikelets pistillate, linear to linear-oblong, 0.5-1 cm long, 0.2-0.3 cm broad, loosely few-(5-12)-flowered, the slender peduncles 5-15 mm long; lower (and upper) bracts sheathing, the sheath 5-10 mm long, ferruginous-margined above, the blade replaced by a short, often obsolete, bristle; scales ovate, convex, subobtuse to obtuse, reddish-ferruginous, with a green midrib, rather broadly rounded-hyaline on the margin above, shorter than perigynia; perigynia obovate, obsoletely trigonous, 2.5 mm long, greenish-yellow, ferruginous at summit, smooth, obsoletely nerved, gradually tapering into a broad, conic, ferruginous, straight-truncate beak. Fr. June.

East. Siberia: Len. -Kol. Described from the sources of river Velingna in the Olenek river basin. Type in Leningrad.

246. *C. sikokiana* Franch. et Sav. En. pl. Jap. II (1879) 146 et 572; Franch. in Nouv. Arch. Mus. Paris, 3 sér. X (1898) 64; Miyabe et Kudo, 332 Fl. Hokk. and Sagh. II (1931) 251; Akiyama in Journ. Fac. Sc. Hokk. Univ., ser. V, II, 1 (1932) 145, fig. 92. -*C. tenuissima* var. *sikokiana* Kük. in Engl. Pflzr. IV, 20 (1909) 475. -

Perennial, rather soft stoloniferous plants, with creeping rhizome; culms 15-20 cm tall, smooth, leafy nearly up to the middle; leaves 3-4 mm broad, shorter than the culm; spikelets 3-4, distant: the terminal staminate, oblong, to 2 cm long, with obovate obtuse cuspidate reddish-brown white-hyaline-tipped scales; other spikelets ca. 2 cm long, loose, all pedunculate, erect; lowest bract with a long sheath and short blade; scales broadly obovate, reddish, pale-margined; with a green midrib, truncate or emarginate, mucronate, shorter than perigynia; perigynia ellipsoid-ovoid, distended trigonous, 3.5-4 mm long, pale green, glabrous, slenderly nerved, the beak long, slightly inflated at base, conic, bidentate, scabrous between the teeth.

Reported by Japanese authors (Miyabe and Kudo) for Sakhalin. Gen. distr.: Japan. Described from Sikoku Island. Type in Paris.

247. *C. sachalinensis* F. Schmidt in Mém. Ac. St. Pétersb., VII sér., XII (1868) 194, tab. VI, fig. 14-17; Meinsh. in A.H.P. XVIII, 3 (1901) 360. -*C. pisiformis* var. *sachalinensis* Kük. in Engl. Pflzr. IV, 20 (1909) 477 et in Journ. Russ. Bot. 3-6 (1911) 132. -*C. korsakoviensis* Lévl. in Bull. Ac. Intern. Géogr. Bot. XIX (1909) 34. -

Perennial, light green, loosely caespitose plants, with creeping rhizome and slender stolons; culms scaberulous above, 15-35 cm tall, leafy nearly up to the middle; leaves soft, 3-4.5 mm broad; scabrous on the revolute margins, abruptly pointed, equaling to exceeding the culm; basal sheaths castaneous-brown, slightly fracturing-fibrillose; spikelets 2-3, very distant (2-3 cm apart): the terminal staminate, narrowly lanceolate to lance-clavate, 1.5-2 cm long, the staminate scales oblong-ovate, subacute, pale yellow, with a green midrib; other spikelets pistillate, linear-cylindric to linear, 1-1.5 cm long, loosely 10-15-flowered, on slender peduncles 2-3 cm long, inclosed to above the middle by the tail, to 2.5 cm long bracteal sheath; bract with a short blade, equaling to exceeding the spikelet; scales oblong-ovate, obliquely truncate and subcuspidate, yellowish- to pale green, with a green midrib, somewhat shorter than perigynia; perigynia lanceolate to oblong-obovate, obtusely trigonous, 3.5 mm long, light green, diffusely ciliate above, slenderly nerved, narrowly long-cuneate-attenuate below, gradually tapering

into a cuneate, somewhat inflated-based, obliquely truncate, bidenate, pale, flattened, ciliate-margined beak. Fr. June. (Plate XIX, fig. 14).

- 333 Mossy coniferous forests. -Far East: Sakh. (s. part: Korsakovo, Kussunai). Gen. distr.: the Kurile Islands, northern Japn. Described from Sakhalin (Kussunai). Type in Leningrad.

Cycle 3. *Hypomitra* V. Krecz. -Densely cespitose plants; basal sheaths fracturing-fibrillose. Spikelets subdistant; narrow (to 2-4 cm long), loose and sparsely flowered, long-peduncled, the peduncles attaining 4-6 cm. Perigynia 5-6.5 mm long, sublanceolate, regularly short-ciliate, with brownish broadly conic, slightly emarginate beak. Achene capped by an obsolete point (forming as light thickening).

248. *C. blepharicarpa* Franch. in Bull. Soc. Philom. Paris, 8 sér. VII (1895) 46; Kük. in Engl. Pflzr. IV, 20 (1909) 468 et in Journ. Russ. Bot. 3-6 (1911) 129. -*C. dueensis* Meinsh. in A.H.P. XVIII, 3 (1901) 387. -*C. pediformis* var. *pedunculata* F. Schmidt in Mém. Ac. St. Pétersb., VII sér, XII (1868) 194, ex p., non Maxim. -*C. Sadae* Lévl. et Vant. in Bull. Ac. Intern. Géogr. Bot. XIX (1909) 33, ex p. -*C. blepharicarpa* f. *distenta* Lévl. in Fedde, Repert. sp. nov. VII (1909) 104. -*C. mira* Meinsh. in herb., non Kük. -

Perennial, light cineraceous green, densely cespitose plants, with obliquely ascending rhizome; culms weak, flattened-triangular, scaberulous above, 30-50 cm tall, leafy in lower one-fourth; cauline leaves very short, other leaves long, soft, narrowly strap-shaped, flat, 2-4 mm broad, abruptly and obtusely attenuate at the apex; spikelets 2-4, subdistant: the terminal staminate, clavate, 1-2 cm long, with obovate obtuse pale-yellow scales; other spikelets pistillate, linear-oblong, 1-1.5 cm long, 0.3-0.4 cm broad, loosely 5-10-flowered, the peduncle filiform, to 4-5 cm long (sometimes the lowest spikelet subradical or forking); lowest bract with a sheath to 2-2.5 cm long and a short blade (1-1.5 cm long); scales rather broadly obovate, obliquely truncate, ferruginous, broadly hyaline above, shorter than perigynia, the light midrib excurrent in a point; perigynia oblong-obovate, distended-trigonal, subfalcate, 5-6.5 cm long, with slender prominent nerves, light green, at length ferruginous-yellow, uniformly setulose over the entire surface, long-cuneate-attenuate at base, gradually tapering into a reflexed, flattened, narrowly cuneate, long, slightly emarginate beak. Fr. May-June. (Plate XIX, fig. 15).

Dry wooded slopes. -Far East: Sakh. (Due, and other localities); Kamch. (in Kükenthal: Lewicky). Gen. distr.: northern Japan. Described from Japan. Type in Paris.

249. *C. tasorum* † Kom. in Bull. Jard. Bot. St. Pétersb. XVI (1916) 153; Kom and Alis. Opr. rast. Dal'nevost. Kraja, I (1931) 311.

- 334 Perennial, green, densely cespitose plants with obliquely ascending rhizome; culms obtusely triangular, smooth, 20-35 cm tall, leafy up to considerable height, covered at base with reddish, strongly fracturing sheaths; leaves rather soft, flat, 2.5-4 mm broad, strongly scabrous, abruptly and obtusely attenuate at the apex, nearly equaling the culm; spikelets usually 3, distant: the terminal staminate, clavate-linear to lance-clavate, 2-3 cm long, loosely flowered below, erect, with golden-ferruginous obovate-obtuse scales; other spikelets pistillate, linear, 2-4 cm long, loosely flowered

† Collected in the region inhabited by the Tungus tribe "Tasa".

(especially below), the slender, prominently scabrous peduncles to 5-6 cm long; lowest spikelet sometimes with 1-3 short branches at base; lowest bract with sheath to 2-2.5 cm long and a foliaceous blade exceeding the spikelet; scales obovate, involute at base, subferruginous, scabrous above, shorter than perigynia, the midrib excurrent in a point; perigynia lanceolate, obsoletely trigonous, 5-5.5 mm long, light green, nerveless, covered with whitish soft bristles above and on the margins, gradually tapering into a long, cuneate, paler, slightly emarginate, sloping beak. Fr. June.

Grassy slopes. -Far East: Uss. (river Tyuyikhe). Described from the village Vladimir-Monomakh on the river Tyutikhe. Type in Leningrad.

Section 28. *Polyglochis* V. Krecz. -Cespitose plants, with faintly 3-angled culms, these leafy up to considerable height; rhizome sloping, ligneous. Leaves flat. Lower bracts with long sheath and weak blade. Spikelets numerous (4-8-10), the terminal staminate, the others pistillate, linear, their peduncles enlarged below. Perigynia lance-ovoid, obsoletely trigonous, 5-10 mm long, obsoletely and slenderly nerved, the beak elongate, conic, obliquely truncate, strongly bidentate, white-hyaline.

250. *C. bostrichostigma* Maxim. in Bull. Ac. Sc. St. Pétersb. XXXI (1887) 118 et in Mélang. biol. XII (1887) 568; Kom. Fl. Manchzh. I, 374; Meinsh. in A.H.P. XVIII, 3 (1901) 359; Kük. in Engl. Pflzr. IV, 20 (1909) 593 et in Journ. Russ. Bot. 3-6 (1911) 159; Kom. and Alis. Opr. rast. Dal'nevost. Kraya, I, 315. -*C. rufidula* Meinsh. in sched.

Perennial, pale green, densely cespitose plants, with slanting ligneous rhizome; culms smooth, 30-50 cm tall, covered at base with reddish-brown fracturing-fibrillose sheaths; leaves soft, 3-5 mm broad, rather abruptly pointed, somewhat shorter than the culm; spikelets 5-8, the lower ones distant: the terminal staminate, 1.5-2.5 cm long, with ovate light ferruginous subobtuse white-hyaline-margined scales; other spikelets narrowly lanceolate, 2-3.5 cm long, loose, erect, the short peduncle nearly enclosed in the bracteal sheath; lowest bract with sheath to 1 cm long and blade 2-3 335 times as long as the spikelet; scales lance-ovate, acute, carinate, greenish-ferruginous, white-hyaline-margined above, shorter than perigynia, perigynia narrowly lanceolate, trigonous, 7-9 mm long, pale, green, slenderly many-nerved, on a short attenuate stipe, the beak conic, equaling the body, smooth, ferruginous, strongly bidentate, white-hyaline. Stigmas long, ringlike-coiled. Fr. June.

Damp grassy forests. -Far East: Uss. -Gen. distr.: Manchuria, North Korea, Japan. Described from vicinity of St. Olga's Bay. Type in Leningrad.

Section 29. *Edritria* (Rafin.) V. Krecz. -Rafin. in Amenit. of Nat. I (1840) 26 (pro genere). -*Orphinascus* Boern. in Abh. Naturw. Ver. Brem. XXI (1913) 268, ex p. (pro subsectione). -Cineraceous-green, densely cespitose plants of mountains and steppes, with obtusely triangular smooth culms; the narrow leaves attenuate toward base. Inflorescence of 2-5 approximate spikelets, of these the terminal 1-3 staminate, the others pistillate. Perigynia membranaceous, lanceolate or oblong-ovoid, plano-convex or obtusely compressed-trigonous, 4-7 mm long, nerved or nerveless, with rather scattered hairs or bristles, cuneate-based, the beak distinct, frontally cleft, weakly bidentate. Stigmas 2 or 3.

- 336
1. Stigmas 2; perigynia plano-convex; spikelets congested, sessile; bract scale-like; leaves setaceous, crisped; basal sheaths fracturing-reticulate. (Caucasus). 251. *C. mucronata* Bell.
 - + Stigmas 3; perigynia trigonous; spikelets on more or less developed peduncles; bract consisting of sheath and blade; leaves narrowly linear, rather flat; basal sheaths fracturing-fibrillose 2.
 2. Scales oblong, rather gradually pointed or obtusish, cuspidate; perigynia trigonous. 3.
 - + Scales (especially the staminate) broadly ovate, subcordate-emarginate at the summit, cuspidate in the notch; perigynia distended-trigonous 255. *C. Alexeenkoana* Litw.
 3. Small plants, 20-30 cm tall, with strong erect culms; scales obtusish, cuspidate; perigynia 4-4.5 mm long, glabrous, setulose only on the margin 252. *C. kencolensis* Litw.
 - + Large plants, to 60 cm tall, with gradually attenuate curving culm.; scales acuminate; perigynia 4-6 mm long, rather strongly pilose . . . 4.
 4. Perigynia (4)4.5-5 mm long, obsolete nerved, oblong-obovate, uniformly short-pilose, gradually tapering into a short, scarcely emarginate beak; scales rather abruptly pointed; leaves setaceous. 254. *C. Litwinowii* Kük.
 - + Perigynia 5-6 mm long, lanceolate, nerveless, densely covered with long appressed hairs, cuneate-attenuate to a beak, this short, bristly-bidentate, bearing a remnant of the style; scales gradually pointed; leaves subinvolute, to 2.5 mm broad. 253. *C. Koschewnikowii* Litw.

Cycle 1. *Oxytecta* V. Krecz. -Plants with smooth setaceous leaves; basal sheaths fracturing-fibrillose. Lowest bract scale-like, scarcely sheathing, with an awn-like blade. Inflorescence of 2-3 congested sessile spikelets, of these the terminal staminate, narrowly short-lanceolate, the others pistillate, obovoid, scarcely 1 cm long. Perigynia lanceolate, plano-convex, diffusely setulose on outer face. Achene plano-convex, sometimes with rachilla; stigmas 2.

251. *C. mucronata* Bell. ex All. Fl. pedem. II (1785) 268; Trev. in Ldb. Fl. Ross. IV, 308; C. Koch in Linnaea, XXI (1848) 613; Boiss. Fl. Or. V, 420; Meinsh. in A.H.P. XVIII, 3 (1901) 315; Grossh. Fl. Kavk. I, 171. -Ic.: Kük. in Engl. Pflzr. IV, 20 (1909) 533, fig. 85 A-C. -Exs.: Kneuck. X, No. 297; Dörfel. No. 4488.

Perennial, cineraceous-green, densely caespitose plants, with branching ligneous ascending rhizome; culms setiform, slightly curving, obtusely angled, 10-30 cm tall, covered at base with lateritious-brown, fracturing-reticulate bladeless sheaths; leaves setaceous-involute, rigid, crisp or flexuous at the apex, smooth, shorter than the culm; spikelets 2-3, congested; the terminal staminate, 0.5-1 cm long, with oblong acute ferruginous-brown scales; other spikelets pistillate obovoid, 0.5-0.8 cm long, few-flowered, dense, sessile, the terminal at base of the staminate spikelet, the lowest subdistant; lowest bract scale-like, brown, its awn exceeding the spikelet; scales ovate, acute, castaneous, with a green midrib, subhyaline-margined, shorter than perigynia; perigynia lanceolate, plano-convex, 5 mm long, yellowish-green, at length brunescent, with 4-5 prominent slender nerves, cuneate-based, short-stipitate, elongate-cuneate at summit, scabrous above on the outer face, setulose, the bidentate beak frontally cleft. Fr. May-August.

Rocky slopes. —Reported by Koch for the Caucasus (Kazbek), the specimen seen by Kükenthal; doubtful collections of Lagovskii extant (Alagir!). — Gen. distr.: mountains of western Europe. Described from Piedmont.

Cycle 2. *Hypolasia* V. Krecz. —Plants with narrowly linear rather flat leaves; basal sheaths fracturing-fibrillose. Bracts with sheath to 1-1.5 cm long and more or less developed blade; inflorescence of 2-5 spikelets, of these the terminal 1-2(3) staminate, lanceolate, large. The others pistillate, oblong, 1-3 cm long, the lower more or less pedunculate. Perigynia lanceolate or oblong-ovoid, more or less convexly trigonous, rather diffusely hairy. Achene trigonous; style subfusiform above the base; stigmas 3.

337 252. *C. kenkolensis* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 88; B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 203. — *C. bordabensis* Litw., l. c., 100; B. Fedtsch., l. c., 212.

Perennial, cineraceous-green, densely caespitose plants; culms firm, strict, 20-30 cm tall; leaves rigid, involute, 1.5-2.5 mm broad, curving, long-attenuate, half the length of culm; spikelets 2-3, distant: the terminal 1-2 staminate, exceeding the pistillate, 1-2.5 cm long, with oblong-ovate, terete-tipped, cuspidate scales; other spikelets pistillate, lanceolate, 0.8-1.5 cm long, on peduncles to 2-3 cm long; bract with sheath to 1-1.5 cm long, the lowest with setiform blade nearly twice as long as the spikelet; scales ovate, cuspidate, ferruginous-brown, carinate, with a light prominent midrib, thinly translucent-hyaline-margined, equaling the perigynia; perigynia oblong-obovate, trigonous, 4-4.5 mm long, greenish-yellow, subferruginous above, nerveless, glabrous, smooth, cuneate-based, scabrous above on the outer face and margin, gradually tapering into a blackish-purple submarginate beak; Styles 3 (erroniously reported as 2 by Litwinov). Fr. July.

Dry slopes in the alpine zone (3,000-3,100 m). —Centr. Asia: Tyan'-Shan. Fergana Range, at the Kenkol Pass), Pam. —Al. (Trans-Alai Range, at the Bordaba station). Endemic. Described from Kenkol. Type in Leningrad.

253. *C. Koschewnikowii* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 92; B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 214. — *C. Litwinowii* var. *grandispica* Kük. ex B. Fedtsch., l. c., — *C. Litwinowii* var. *Koshewnikowii* Kük. ex B. Fedtsch., l. c., — Exs.: HFR No. 2796.

Perennial, light (cineraceous)-green, loosely caespitose plants, with creeping rhizome and long stolons; culms rather slender, flexuous, triangular, 30-60 cm tall, covered at base with light brown sheaths; leaves rigid, curving or flexuous, folded to subinvolute, 1.5-2.5 mm broad, long-attenuate, shorter than the culm; spikelets 2-4, subdistant; rachis geniculate below the spikelets; terminal spikelets 1-2, staminate, lanceolate or clavate, 1.5-3 cm long, with lanceolate acute ferruginous-brown scales; other spikelets pistillate, ovoid, 0.8-2 cm long, dense sessile, or the lowest on a very short peduncle; lowest bract scale-like, sheathing, broadly enclosing the the base of spikelet (up to some 5-8 mm), with blade 2-3 times the length of spikelet; scales ovate, rather gradually tapering into a point, light ferruginous carinate, with a light midrib, shorter than perigynia, the lighter margins hyaline; perigynia lanceolate, trigonous, 5-7 mm long, grayish-green, subferruginous above, densely covered with long appressed hairs, nerveless, cuneate-based, cuneate-tapering at summit into a setiform bidentate beak bearing the style-base. Fr. June.

338 Dry alpine slopes and meadows at alt. 3,000-4,000 m. - Centr. Asia: Pam. -Al. Endemic. Described from Alai range (Tengiz Pass). Type in Leningrad.

254. *C. Litwinowii* Kük. in Bull. Hérb. Boiss., 2 sér., IV (1904) 59 et in Engl. Pflzr. IV, 20 (1909) 534; Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 92; B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 214. -

Perennial, cineraceous-green, rather densely caespitose plants, with short creeping ligneous rhizome and short stolons; culms slender, 30-50 cm tall, covered at base with reddish-brown (lateritious) sheaths; leaves rigid, ribbed, flattened-canaliculate, 1-1.5 mm broad, long-attenuate, shorter than the culm; spikelets 2-4, approximate, the terminal 1-2 staminate, ovoid, 2-2.5 cm long, with ovate to oblong, brownish, obtuse, cuspidate scales; other spikelets pistillate, ovoid to oblong-ovoid, 0.8-2 cm long, rather dense, sessile, or only the lowest short-peduncled; lowest bract with sheath to 6 mm long and blade often slightly exceeding the inflorescence; scales ovate to broadly ovate, abruptly cuspidate-pointed, castaneous-brown, with a greenish-yellow midrib and hyaline margin, somewhat shorter than perigynia; perigynia oblong-obovate, trigonous, 4-4.5(5) mm long, yellowish-green, ferruginous above, regularly and rather loosely appressed-hairy, obsolete nerved, cuneate-attenuate at base, gradually tapering into a short, scarcely bidentulate, ferruginous, beak with membranaceous orifice. Fr. June.

Gravelly places. -Centr. Asia: Tyan'-Shan. (Nanai, near Pskem; Ketmen'-Tyubin. Distr., Ish-sai Gorge; Fergana: Pasha-ata, Arslanbob). Ebdemic. Described from Arslanbob. Type in Leningrad.

255. *C. Alexeenkoana* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 98. -*C. ustulata* var. *brevipedunculata* Rgl. in A. H. P. VII (1880) 571. -*C. ustulata* var. *macrogya* Rgl., l. c., exp. -*C. macrogya* B. Fedtsch. in A. H. P. XXXVIII (1924) 216. -*C. pseudo-macrogya* Kük. in Bull. Jard. Bot. URSS, XXVIII, 1-3 (1929) 220. -*C. tristis* C. B. Clarke ex B. Fedtsch. in A. H. P. XXI (1903) 430, non M. B.

Perennial, cineraceous-green, densely caespitose plants, with ascending ligneous rhizome; culms firm, faintly triangular, smooth or slightly scaberulous above, to 40-50 cm tall; leaves rigid, canaliculate-conduplicate, to 4 mm broad, long-attenuate, shorter than the culm; basal sheaths light brown, covered high up with remnants of old sheaths; spikelets 3-5, the lower remote; the terminal 1-3 staminate, narrowly lanceolate, 1-2.5 cm long, often pistillate at base, the staminate scales broadly obovate, broadly hyaline at the summit, subterete, light ferruginous, carinate, faintly cuspidate scales; other spikelets pistillate, obovoid to oblong-clavate, 1-3 cm long, loose, the upper subsessile, close to the staminate, the lower erect, on peduncle to 1 cm long, these included in bracteal sheath; sheath of the 339 bract to 1.5 cm long, broadly cordate-membranaceous above, blade or the lowest bract exceeding the spikelet; scales broadly elliptic to subovate, reddish-ferruginous, broadly rounded-membranaceous at the summit, with a prominent terminally scabrous midrib, excurrent in a mucro exerted before the summit of the body, often scabrous along the midrib, equaling the perigynia; perigynia oblong-obovate, convexly trigonous, 5-6 mm long, darkish green, dark brown above, slenderly 5-7-nerved, hispidulous above and on the margin, cuneate-based, rather gradually tapering into a short, obscurely bidentate, obliquely truncate, white-hyaline-margined beak. Fr. June-July.

Stony slopes and screes in the alpine zone; usually - Centr. Asia: Tyan'-Shan. Gen. distr.: Kashmir. Described from Tugdumbash-Pamir (Pistan Gorge in the Sary-Kol Range). Type in Leningrad.

Section 30. *Campylorhina* V. Krecz. -*Proteocarpus* Boern. in Abhandl. Naturw. Ver. Brem. XXI (1913) 267, ex p. (pro sectione generis *Proteocarpus* Boern.). -Forest and meadow-forest, caespitose, stoloniferous plants. Culms obtusely 3-angled, mostly covered at base with bladeless purple or pale sheaths. Leaves prominently 3-veined, plicate along 2 of the veins, abruptly pointed, rather broad (5-10 mm). Bracts long-sheathing, with well-developed blade. Inflorescence of 2-5 distant or approximate spikelets; staminate spikelet solitary; pistillate spikelets loosely few-flowered, oblong, on erect or nodding peduncles. Perigynia membranaceous to thinly coriaceous, ovoid or oblong-ovoid, obtusely rounded-trigonal, 3-8 mm long, distinctly nerved, the beak straight or curving, more or less developed, obliquely truncate; bidentate or more or less emarginate, smooth or scaberulous, with a white-hyaline or ferruginous margin; style curved or spirally coiled; stigmas 3.

1. Plants covered with purple bladeless sheaths at culm base and rootstock 2.
+ Plants without purple sheaths 6.
2. Perigynia 3.5-5 mm long, ovoid, with a rather short, proboscis-like reflexed, crescent-notched beak; leaves subcoriaceous, more or less hairy. (Plate XX, fig. 10a) 3.
+ Perigynia 6-8 mm long, oblong, with a prolonged straight obliquely truncate beak 4.
3. Green plants, 30-50 cm tall, with distant loose spikelets of 15-20 perigynia (the spikelets 2-4 cm long); scales to half as long as perigynia; perigynia distended-ovoid, 4.5-5 mm long, the beak suboblique, ferruginous-margined. (Europe) 257. *C. pilosa* Scop.
+ Light green plants, 40-70 cm tall, with distant interrupted 5-10-flowered spikelets (the spikelets 3-6 cm long); scales just reaching the base of perigynium-beak; perigynia prominently trigonal, 3.4-4 mm long, the beak strongly curving, purple-margined. (Far East) 256. *C. campylorhina* V. Krecz.
- 340 4. Pistillate spikelets on long slender capillary coiled nutant peduncles; perigynia membranaceous, the beak smooth, 6-7 mm long. 267. *C. oligostachys* Meinsh.
+ Pistillate spikelets on long non-capillary erect (not nutant) peduncles; perigynia thinly coriaceous, the beak scaberulous 5.
5. Staminate spikelet narrowly clavate, pale; bracts 2-3 times as long as their spikelets and overtopping the inflorescence; perigynia 8 mm long, rounded-trigonal, abruptly contracted into a short stipe and strongly attenuate to a narrow cylindrical membranaceous-cleft beak; scales pale, greenish. (Plate XX, fig. 3) 268. *C. depauperata* Good.
+ Staminate spikelet thickened, castaneous; bracts scarcely exceeding trigonal, cuneate-based, obscurely broad-stipulate, gradually tapering into a subconic ferruginous-cleft beak; scales ferruginous. (Plate XX, fig. 4) 269. *C. mingrellica* Kük.

6. Perigynia scattered-hispidulous over the entire surface. 7.
 + Perigynia smooth or scaberulous only on the beak margin 10.
7. Perigynia thinly coriaceous, with a short curving beak and costate nerves; of pistillate spikelets the upper sessile, the lower on long subradical peduncles 270. *C. Hallerana* Asso.
 + Perigynia membranaceous, with long straight beak, obsoletely nerved or nerveless; pistillate spikelets all on upper part of culm, their peduncles distinct, mostly included in sheaths 8.
8. Perigynia 5 mm long, nerveless; scales of staminate and pistillate spikelets dark-colored 273. *C. alajica* Litw.
 + Perigynia 6-7 mm long, with obsolescent nerves; scales pale-colored 9.
9. Rather densely cespitose plants; rootstock covered with black fibrillose sheath remnants; perigynia 6.5-7 mm long, the beak strongly scabrous-margined, deep-cleft, divaricate, with reflexed teeth, (Far East). 272. *C. longirostrata* C.A.M.
 + Loosely cespitose plants, with creeping rhizome and long stolons; perigynia 6-6.5 mm long, the beak cleft, scarcely scaberulous. (Europe, Caucasus) 271. *C. Michellii* Host.
- 10 (6). Perigynia obovate, suboblong, 5-6.5 mm long, with prolonged straight beak 11.
 + Perigynia ovoid, distended-trigonus, 3.5-5 mm long, the beak proboscis-like curved, well developed obsolescent (rarely straight and then scaberulous) 13.
11. Perigynia obtusely trigonus, the beak conic-attenuate, smooth, obliquely truncate 12.
 + Perigynia rounded-trigonus, rather abruptly contracted into a flattened-cylindric, scaberulous, strongly bidentate beak 264. *C. xyphium* Kom.
12. Spikelets approximate to each other and to staminate spikelet; staminate spikelets narrow and pale; pistillate scales membranaceous, whitish, shorter than perigynia; leaves soft, to 10 mm broad; forest plants 266. *C. Glehni* F. Schmidt.
 + Spikelets strongly segregated from each other and from staminate spikelets, the latter plump, ferruginous-tinged; pistillate scales green, ferruginous-margined, broad and long, nearly covering the equilateral perigynia; leaves rigid, to 5 mm broad, meadow plants 263. *C. nikolskensis* Kom.
13. Perigynia membranaceous, broadly ellipsoid, many-nerved, scaberulous above, with a short straight broadly bidentate beak 265. *C. brevicollis* DC.
 + Perigynia thin-coriaceous, ovoid, obsoletely nerved or nerveless, the beak proboscis-like, curved, well developed or obsolescent, truncate or submarginate 14.

14. Perigynia with a short, truncate or barely emarginate beak, or beakless, 3.5-4.5 mm long. (Plate XX, fig. 5 and 6) 15.
+ Perigynia with prolonged, distinctly crescent-notched beak, 4-6 mm long. (Plate XX, fig. 7 and 8). 17.
15. Perigynia glaucous-green, broadly and obliquely conic-tipped, without a distinct beak; glaucous plant. 16.
+ Perigynia grayish-green or brownish-green, with a distinct ferruginous beak; cineraceous-green or green plants. 258. *C. livida* Whlb.
16. Perigynia 3-3.5 mm long, greenish-brown; pistillate spikelets mostly 1-2, containing 3-8 perigynia; small arctic and alpine plants. (Plate XX, fig. 6) 261. *C. algida* Turcz.
+ Perigynia 4 mm long, cineraceous to yellowish-green; pistillate spikelets 2-3, containing 10-15 perigynia; mostly large meadow plants. (Plate XX, fig. 5) 259. *C. panicea* L.
17. Perigynia 4 mm long, without distinct nerves, with a crescent-notched beak of medium length; pistillate scales obtuse, ferruginous throughout. (Plate XX, fig. 8) 260. *C. vaginata* Tausch.
+ Perigynia 5-6 mm long, with slender nerves and a deeply emarginate bidentate beak; pistillate scales acute, thinly white-hyaline-margined. (Plate XX, fig. 7) 262. *C. falcata* Turcz.

Cycle 1. Archeoproboscidea V. Krecz. -Culm bases covered with purple bladeless sheaths. Leaves subcoriaceous, flat, to 10 mm broad; pistillate spikelets, long, few-flowered. Perigynia distinctly nerved, with an oblique bidentate beak.

256. *C. campylorhina* V. Krecz. sp. nova in Addenda, II, 612. -
C. pilosa Kom. Fl. Mandsh. I (1901) 388; Kük. in Engl. Pflzr. IV, 20 (1909) 636, quoad pl. extr. -orient. et in Journ. Russ. Bot. 3-6 (1911) 167; Kom. and Alis. Opred. rast. Dal'nevost. kr. I, 312 (excl. tab.), non Scop. -
C. pilosa f. *gracilior* Meinsh. in A. H. P. XVIII, 3 (1901) 385. -
C. falcata F. Schmidt in Mém. Ac. Sc. St. Pétersb., sér. 7, XII (1868) 194, ex p., non Turcz. -

Perennial, light green plants with long slender stolons; culms triangular, smooth, 40-70 cm tall; leaves soft, 5-8 (12) mm broad, abruptly pointed, shorter than the culm, their margins scattered-pilose on both sides; spikelets 3-4, very distant; terminal spikelet staminate, oblong-clavate, 2-3 cm long, with oblong obtuse reddish-ferruginous scales; other spikelets pistillate, linear, 3-6 cm long (sometimes forking at base), of 5-10 strongly separated flowers, hence interrupted, their stalks erect, smooth, the lower ones 10-12 cm long; bracts with sheath to 2-3 cm long and blade barely twice as long as the sheath; pistillate scales ovate, subacute to obtuse, ferruginous, with a broad light yellow median band and green midrib, about half the length of perigynia (barely reaching base of beak); perigynia obovoid, obtusely trigonous, 3.5-4 mm long, greenish, becoming yellow, with numerous slender nerves, rather abruptly contracted into a short, rather strongly curved, conic-cylindric, short-bidentulate, broadly purple-margined beak.

Forest. - Far East: Okhot., Sakh., Ze.-Bur., Uss., Ud. Gen. distr.: Manchuria, North Korea. Described from Bolon'-Odzhai Lake (Nergul' nomad camp). Type in Leningrad.

257. *C. pilosa* Scop. Fl. carn., ed. 2, II (1772) 226; Trev. in Ldb. Fl. Ross. IV, 290; Meish. in A.H.P. XVIII, 3 (1901) 385; Kük in Engl. Pflzr. VI, 20 (1909) 636, ex p. - *C. Beckeri* C.A.M. ex Claus in Beitr. Pflzrk. russ. Reich. VIII (1851) 55; Trautv. Incr. fl. ross. IV (1884) 812 (nomen). - *C. pilosa* β *Beckeri* C.A.M. ex Claus, l. c., 162 (descriptio). Exs.: HFR No. 743; Kneuck. No. 26; XIII, 37.

Perennial green plants, with creeping rhizomes and long slender ligneous stolons; culms triangular, smooth, 30-50 cm tall; leaves soft, paler underneath, 4-10 mm broad, scattered-pilose at the margin on both sides (later glabrescent), short-acuminate, equaling the culm; spikelets 3-4, distant; terminal spikelet staminate, oblong-clavate, 2-3 cm long, with obovate obtuse castaneous scales; other spikelets pistillate, cylindrical, 2-4 cm long, loosely 15-20-flowered, erect, their stalks, especially the lower ones, long 343 (to 8-10 cm), thickened, smooth; lowest bract with sheath to 3-4 mm long and blade merely reaching the base of spikelets; pistillate scales ovate, short-acuminate-cuspidate, reddish-ferruginous, medially light green, shorter than perigynia (reaching middle of beak); perigynia obovoid, distended-trigonous, 4.5-5 mm long, light green, becoming yellow, with numerous slender nerves, rather abruptly terminating in a subdivergent subcylindrical; bidentulate, ferruginous-orificed beak. Fr. April-May. (Plate XX, fig. 10).

Deciduous and mixed forests. - European part: Lad.-Il'm. (w. Pskov-Novgorod part), Upp. Volg., Volg.-Kam. (Kazanskii and Laishevskii distr., s. Ural), Upp. Dnepr., Mid. Dnepr., Prichern., Volg.-Don., Low. Don. (Shipov forest, Pavlovskii Distr.), Zavolzh. Gen. distr.: Western Europe (except western Atlantic coast and Mediterranean). Described from Austria (Kraina, Idria).

Cycle 2. Proboscidea V. Krecz. - Culm bases covered pale, more or less blade-bearing sheaths. Leaves to 5-6 mm broad, thin, but more or less rigid. Pistillate spikelets loose, short. Perigynia obsoletely nerved or nearly nerveless, with a rather distinct, oblique, more or less emarginate beak.

258. *C. livida* Whlb. in Sv. Vetensk. Ak. Nya Handl. XXIV (1803) 162; Trev. in Ldb. Fl. Ross. IV, 292; Meish. in Bot. Centralbl. XXX (1887) 52 et in A.H.P. XVIII, 3 (1901) 391; Kük. in Engl. Pflzr. IV, 20 (1909) 510; ? Hultèn, Fl. of Kamtsh. I, 202; Kom. Fl. Kamch. I, 260. - Exs.: HFR No 794; Pl. Finl. Exs. No. 130; Kneuck. No. 27; XII, a, 36. -

Perennial, glaucescent plants, with slender stolons; culms flattened-triangular, smooth, 15-50 cm tall; leaves stiffly erect, canaliculate-folded, 2-3 mm broad, scaberulous, subulate-pointed, shorter than the culm; spikelets 2-3, subapproximate: the terminal spikelet staminate, linear to lance-linear, 1.5-2 cm long, with ovate obtuse ferruginous scales; other pistillate, ovoid to oblong, 1-2 cm long, loose, on a stalk to 2-2.5 cm long, strict; lowest bract with sheath to 2 cm long and blade nearly equaling the inflorescence; pistillate scales ovate, obtuse, ferruginous-brown to brown, with a broad green median band, narrowly hyaline-margined, shorter than perigynia; perigynia ellipsoid to ellipsoid-ovoid, obsoletely trigonous, 4-4.5 mm long, glaucous-green, at length flavescent, without distinct nerves, short-stipitate, rounded-attenuate above, without a distinct beak, ferruginous at orifice. Fr. June-July.

Silty marshes. - European part: Kar.-Lap., Dv.-Pech. (Solza valley near Arkhangel'sk), Lad.-Il'm. (vicinity of Leningrad); Far East: Kamch. (?). Described from Sweden (Enontekiö district). Type in Stockholm.

NOTE. Forming hybrids: × *panicea* L. (*C. Langii* Steud.); × *limosa* (*C. imandrensis* Kbiln.); × *vaginata* Tausch.

344 259. *C. panicea* L. Sp. pl. (1753) 977; Trev. in Ldb. Fl. Ross. IV, 300; Meinsh. in A.H.P. XVIII, 3 (1901) 390; Grossh. Fl. Kavk. I, 170. - Ic. U Syreish. Ill. Fl. Mosk. gub. I, 206. - Exs.: HFR No. 1642; Pl. Finl. Exs. No. 129; Kneuck. No. 110.

Perennial, cineraceous-green plants with an ascending rhizome and long slender stolons; culms obtusely triangular, smooth, 10-40 cm tall; leaves rigid, flat, 2-4 mm broad, long-acuminate, shorter than the culm; spikelets 2-4, distant; the terminal spikelet staminate, clavate, 1.2-2.5 cm long, with ferruginous ovate obtuse scales; other spikelets pistillate, oblong, 1-2.5 cm long, loosish, stiffly erect, on smooth stalks to 2-3 cm long; lowest bract with sheath to 1 cm long and blade at least twice as long as the spikelet; pistillate scales broadly ovate, acute, the upper ones subacute, blackish-brown to ferruginous-brown, medially light, narrowly and faintly hyaline-margined, shorter than perigynia; perigynia ovoid, distended-triangular, 3.5-4 mm long, yellowish-green, at length brunescent, faintly slender-nerved, attenuate at base, sessile, abruptly contracted into a short oblique blackish-brown truncate beak. Fr. April-May. (Plate XX, fig. 5).

West meadows, marshes, boggy coppices. - European part; Kar.-Lap., Dv.-Pech., Lad.-Il'm., Upp. Dnepr., Mid. Dnepr., Upp. Volg., Volg.-Don. (Tula District), Low. Don. (Khvalynskii District), Volg.-Kam., Zavolzh. (Sergievsk); West. Siberia: Ob., Irt., Alt., East. Siberia: Ang.-Sayan.; Caucasus: Ciscauc., West. East. and South. Transcauc.; Centr. Asia: Pribalkh., Tyan'-Shan. (e. part), Pam.-Al. Gen. distr.: West. Europe, Armenia, Lazistan, Kulja. Described from Europe (Sweden).

NOTE. Forming hybrids: × *diversicolor* Crantz (*C. Fontis Sancti Podp.*); × *livida* Whlb. (*C. Langii* Steud.); × *irrigua* Whlb.; × *vaginata* Tausch.; × *Hostiana* DC. (*C. Duereriana* Kük.).

ECONOMIC IMPORTANCE. Eaten unsatisfactorily in pasture, satisfactorily in hay.

260. *C. vaginata* Tausch in Flora, IV (1821) 557; Trev. in Ldb. Fl. Ross. IV, 291; Meinsh. in A.H.P. XVIII, 3 (1901) 383. - *C. panicea* β *sparsiflora* Whlb. Fl. lapp. (1812) 236. - *C. sparsiflora* Steud. Nom. bot., ed. 2, I (1841) 296; Kük. in Engl. Pflzr. IV, 20 (1909) 511 et in Journ. Russ. Bot. 3-6 (1911) 146, ex p., Grossh. Fl. Kavkaz. I, 170. - Ic.: Kük., l. c., 512, fig. 81 A-D; Syreish, Ill. Fl. Mosk. g. I, 207. - Exs.: HFR No. 38; Kneuck. No. 113; Dörfl. No. 5359. -

Perennial, bright green plants with ascending long slender stolons; culms obtusely triangular, 30-50 cm tall; leaves 3-5 mm broad, short-acuminate, shorter than the culm; spikelets 2-4, strongly separated: the terminal staminate, subclavate, 1-1.5 cm long, with light ferruginous ovate subacute scales; other spikelets pistillate, oblong, 1-2.5 cm long, few flowered (especially below), erect, on stalks to 3-5 cm long; lowest bract with spathiform sheath to 2-3 cm long, and a short (to 2-2.5 cm long) broad abruptly pointed blade; pistillate scales broadly ovate, obtuse, the lower subacute, ferruginous-brown, with a broad green median band, hyaline-margined, shorter than perigynia; perigynia ovoid, distended-triangular, 4 mm long, greenish-yellow, faintly slender-nerved, sessile, abruptly terminating in a moderately long, curved, cylindrical, brownish, terminally crescent-notched beak. Fr. May-June. (Plate XX, fig. 8).

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Wet forests, borders of meadows and forests. - European part: Kar. Lap., Dv.-Pech., Lad.-Il'm., Upp. Dnepr., Upp. Volg., Volg.-Kam., Volg.-Don., Zavolzh. (Ufimskii Distr.); West. Siberia: Ob., Irt.(Kokchetavskii Distr.); East. Siberia: Ang.-Sayan (Krasnoyarsk area - valley of the Kas River); Caucasus: Ciscauc.: Kuban', Balkariya, and Digoriya. Gen. distr.: Western Europe. Described from Germany (Riesengebirge).

NOTE. Hybridizing with *C. livida* Whlb. and *C. panicea* L.

261. *C. algida* Turcz. in Bull. Soc. Nat. Moscou, XI, 1 (1838) 104 (nomen) et in Addenda, II, 612. - *C. panicea* Turcz. ib. XXVIII, 1 (1855) 341, quoad pl. kawoktanam. - *C. panicea* β Trev. in Ldb. Fl. Ross. IV (1853) 291. - *C. depauperata* Hornm. Plantel. II (1806) 829, non Good. - *C. pinacea* γ pauciflora Whlb. Fl. suec. II (1826) 602. - *C. sparsiflora* var. *pauciflora* Anderss. Cyp. Scand. (1849) 34; Kük. in Engl. Plzr. IV, 20 (1909) 511. - *C. vaginata* Trautv. ex Middend., Sib. Reis. I, 2 (1847) 99, non Tausch. - *C. quasivaginata* C. B. Clarke in Kew Bull. Misc. Inf., Addit. ser., VIII (1908) 79. -

Perennial, light green to yellowish-green plants, with long and slender rhizomes and stolons; culms slender, faintly triangular, smooth, 5-20 cm tall, leafy only below; leaves rigid, reflexed, ribbed and subcanaliculate, revolute-margined, 2-3.5 mm broad, abruptly pointed, one-third to one-half as long as the culm; spikelets 2-3, distant: the terminal spikelets staminate, oblong-ovoid, 0.7-1 cm long, with ovate, dark, honey-red, obtuse to subacute scales; other spikelets pistillate, 0.5-1 cm long, loosely 3-8-flowered, erect, on slender stalks to 1-1.5 cm long; lowest bract with sheath to 1 cm long, ferruginous-membranaceous at the end, and a spathiform blade of same length; pistillate scales ovate, obtuse to subacute, honey-red to reddish-brown, unicolor, about half the length of perigynia; perigynia thin-coriaceous, oblong-ovoid, convexly trigonous, 3-3.5 mm long, greenish-brown, without distinct nerves, cuneate-based, terminating in a nearly straight, short, cylindrical, brown, crescent-notched beak. Fr. July-August. (Plate XX, fig. 6).

Arctic and alpine tundra. - Arctic: Nov. Zem., Arct. Eur. (Kol'skii Pen. and Kanin), Arct. Sib. (Polar Ural, Gydanskaya Tundra, Taimyr); European part: Kar.-Lap. (Kandalaksha, Khibiny), Volg.-Kam. (Mt. Sizhun in Ural); East. Siberia: Yenis., Len.-Kol (Olenek and Kolyma systems), Ang.-Sayan. (bare mountains of Tunkinskii Distr.). Gen. distr.: Fenno-Scandia, Iceland, 346 Northern Mongolia. Described from Sayans (Kavotka Mts.). Type in Lenin-grad.

262. *C. falcata* Turcz. in Bull. Soc. Nat. Moscou, XI, 1 (1838) 104 (nomen) et ib., XXVIII, 1 (1855) 341, atque Fl. baic.-dah. II, 2 (1856) 276; V. Krecz. in Fl. Transb. II 132. - *C. vaginata* Trev. in Ldb. Fl. Ross. IV (1853) 291, quoad pl. udsk.; Meinsh. in A. H. P. XVIII, 3 (1901) 385, ex p.; Hultén, Fl. of Kamtch. I, 203, non Tausch. - *C. Petersii* C. A. M. ex F. Schmidt in Mém. Ac. St. Pétersb., sér. VII, XII (1868) 194 (nomen). - *C. sparsiflora* Kom. Fl. penins. Kamtsch. I (1927) 259, non Steud. - *C. sparsiflora* var. *Petersii* Kük. in Engl. Pflzr. IV, 20 (1909) 513. - *C. sparsiflora* var. *falcata* Kük. in Journ. Russ. Bot. 3-6 (1911) 146. - *C. nematostachya* Cham. in herb. (nemostachys, nec. Meinsh., l. c., 386). -

Perennial, light green, with slender ascending rhizomes and stolons; culms obtusely triangular, smooth, 30-60 cm tall; leaves 2.5-6 mm broad, abruptly pointed, shorter than to nearly equaling the culm; spikelets 3-4,

very distant; the terminal spikelets staminate, obovoid or clavate, 0.8-1.5 cm long, with ovate ferruginous subacute scales; other spikelets pistillate, oblong, 1-1.5 cm long, few-flowered, erect or subnutant, on long slender smooth stalks; lowest bract with sheath to 2 cm long and a broad blade or same length; pistillate scales ovate, acute, reddish to light ferruginous, with a broad greenish-yellow median band, slightly hyaline-margined, shorter than perigynia; perigynia thin-coriaceous, ovoid, subinflated-trigonous, 5-6 mm long, yellowish-green, prominently slender-nerved, sessile, rather abruptly terminating in a reflexed, prolonged (to 1.5 mm long), cylindrical, bidentate, ferruginous-orificed, obliquely low-truncate beak. Fr. June-July. (Plate XX, fig. 7).

Meadows, forests, and coppices. - East. Siberia: Yenis., Ang.-Sayan., Daur., Len.-Kol.; Far East: Ze.-Bur., Ud., Uss., Sakh., Okhot., Kamch. Gen. distr.: Northern Mongolia, Manchuria. Described from Mount Ukal'-kit (between the Barguzin and Upp rivers. Angara). Type in Leningrad.

263. *C. nikolskensis* Kom. in Bull. Jard. Bot. St. Pétersb. XVI (1916) 154; Kom. and Alis. Opr. rast. Dal'nevost. kr. I, 312.

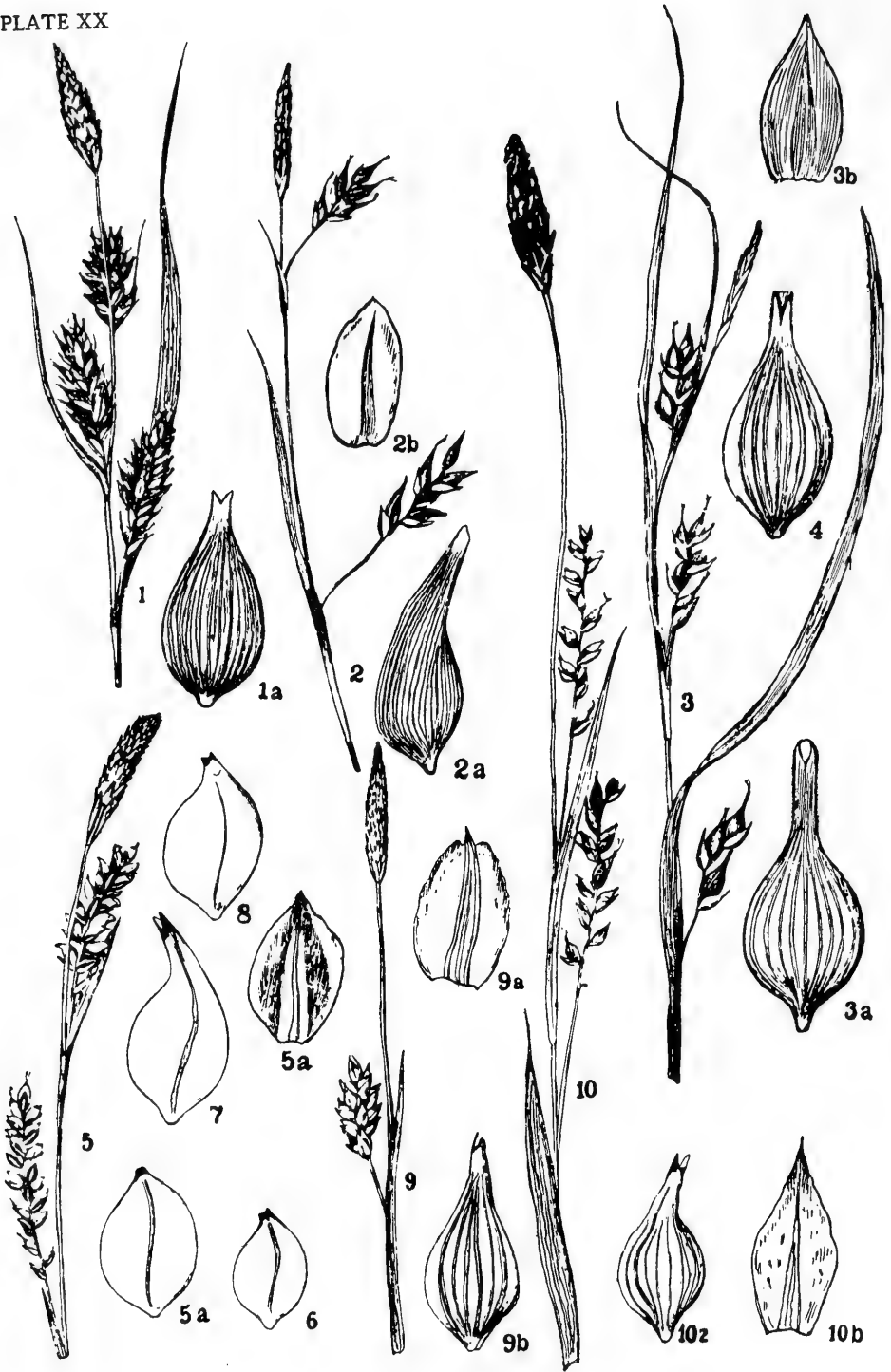
349 Perennial, light to glaucescent-green caespitose plants with a short creeping rhizome; culms sharply triangular, smooth, 20-40 cm tall; leaves stiffish, straight, revolute-subcanaliculate along 2 prominent veins, 3-6 mm broad, abruptly pointed, shorter than the culm; spikelets 2-3, distant: the terminal spikelet staminate, oblong-clavate, 1.5-2.5 cm long, with drab obtuse ovate scales; other spikelets pistillate, oblong, 0.8-2 cm long, ca. 0.7 cm broad, loose, few-flowered below, more or less drooping, the thickened scabrous stalks 2-6 cm long; lowest bract with sheath to 2-3 cm long and a short blade barely reaching middle of spikelet; pistillate scales broadly ovate, abruptly terminating in a subulate scabrous-margined point, 3-nerved, with broad green internerves, light ferruginous on the margins; perigynia thin-coriaceous, oblong-ovoid to oblong-elliptic, obtusely trigonous, 6-6.5 mm long, green, at length flavescent, obsolete slender-nerved, cuneate-based, short-stipitate, gradually tapering into a moderately long, cuneate, slightly curved, smooth, obliquely truncate, scarcely emarginate beak, with ferruginous-margined orifice. Fr. May. (Plate XX, fig. 9).

Drying-out meadows. - Far East: Uss. Endemic. Described from river Rakovka (near Nikol'sk-Ussuriiskii). Type in Leningrad.

Cycle 3. *Hypaphyllocolea* V. Krecz. - Rootstock slanting, short, giving off ascending stolons; rootstock and caul bases covered with brownish bladeless sheaths. Leaves thin-coriaceous, nearly smooth. Inflorescence of 2-3 spikelets, of these one staminate, plump, ferruginous, the others pistillate, rather dense, on short erect stalks. Bracts with spathiform sheath and abortive blade. Perigynia broadly ellipsoid, or broadly ovoid, more or less definitely stipitate, with a scabrous, rather shallowly bidentate beak.

264. *C. xyphium* Kom. in A.H.P. XVIII, 6 (1901) 446 et in Fl. Mandsh. I (1901) 387; Kük. in Engl. Pflzr. IV, 20 (1909) 636 et in Journ. Russ. Bot. 3-6 (1911) 166; Kom. and Alis. Opr. rast. Dal'nevost. kr. I, 311.

Perennial, light green plants, with a long creeping ligneous rhizome; culms triangular, scaberulous above, 30-50 cm tall; leaves stiffish, 5-10 mm broad abruptly pointed, equaling to exceeding the culm; spikelets 3-4, distant: the terminal spikelet staminate, oblong-clavate, 1.5-2.5 cm long, with oblong, acute, ferruginous-brown scales; other spikelets pistillate,



oblong, 1.5-2 cm long, loosish, the straight thickened peduncles to 3 cm long; lowest bract to 2 cm long, with blade barely equaling the spikelet; pistillate scales oblong-ovate, subulate-tipped, light ferruginous, medially light, with a green midrib, scabrous above, nearly equaling the perigynia; perigynia obovoid, rounded-trigonous, 6-6.5 mm long, light green, at length flavescent, obsolete many-nerved, rather gradually tapering into a prolonged, compressed-cylindric, diffusely scabrous-margined, divaricately short-bidentate, beak. Fr. June.

350 Forests. - Far East: Ze.-Bur., Uss. Gen. distr.: Manchuria. Described from Bureinskie Mts. Sutar River valley, Kazan' mine). Type in Leningrad.

265. *C. brevicollis* DC. ex. Lam. et DC. Fl. Franc., ed. 3, V (1815) 295; Meinsh. in A.H.P. XVIII, 3 (1901) 386; Kük. in Engl. Pflzr. IV, 20 (1909) 634; Grossh. Fl. Kavk. 1, 173. - *C. Michelli* β Trev. in Ldb. Fl. Ross. IV (1853) 293.

Perennial, light green, densely caespitose plants, with a long rhizome; culms flattened-triangular, scabrous above, 30-45 cm tall, covered at base with brown sheaths disintegrating into fibers; leaves rather soft, 3-5 mm broad, revolute-margined, rather abruptly pointed, equaling the culm; spikelets 2-3, distant: the terminal spikelet staminate, clavate to obovoid, 1.5-2.5 cm long, with oblong-ovate acute ferruginous scales; other spikelets pistillate, ovoid to oblong-ovoid, 1.5-2.5 cm long, erect; lowest bract with spathiform sheath 1.5-2 cm long and a blade of equal length; pistillate scales abruptly attenuate into a subulate point, castaneous, 3-nerved, with green internerves, shorter than to nearly as long as perigynia; perigynia obovoid or broadly ellipsoid, terete, 5 mm long, yellowish-green, scattered setulose to glabrescent, obsolete many-nerved, rather abruptly terminating in a broad, short, scabrous-margined, bidentate, subferruginous beak with spreading teeth. Fr. May.

Open forests, coppices, and mountain slopes. - European part: Mid. Dnepr. and Prichern. (between Dniester and Dnieper); Caucasus: West. and South. Transcauc. Gen. distr.: Western Europe, Asia Minor. Described from France (Belley, near Lyon - on Mt. Parve).

NOTE. Hybridizing with *C. Michellii* Host (*C. Turuli* Simonk.).

ECONOMIC IMPORTANCE. Not eaten by livestock. In some localities in Transcaucasia it is called rabid grass and is considered to be poisonous (Magakyan).

Cycle 4. *Ochreopoda* V. Krecz. - Loosely caespitose plants; root-stock and culm bases covered with pale brown bladeless sheaths. Leaves thin, scabrous. Bract with long sheath and blade. Perigynia suboblong, 5-6 mm long, cuneate-based, with prolonged, narrowly cuneate, curved, obliquely truncate beak.

266. *C. Glehni* F. Schmidt in Mém. Ac. St. Pétersb., sér. 7, XII (1868) 194, tab. VII, fig. 16-21; Meinsh. in A.H.P. XVIII, 3 (1901) 362;

Explanation to Plate XX

1. *Carex latisquamea* Kom.: a) perigynium. - 2. *C. oligostachys* Meinsh.: a) scale, b) perigynium. - 3. *C. depauperata* Good.: 3a) perigynium, 3b) scale. - 4. *C. mingrellica* Kük.: perigynium. - 5. *C. panicea* L.: 5a) perigynium, 5b) scale. - 6. *C. algida* Turcz.: perigynium. - 7. *C. falcata* Turcz.: perigynium. - 8. *C. nikolskensis* Kom.: 9a) scale, 9b) perigynium. - 10. *C. pilosa* Scop.: 10a) perigynium, 10b) scale.

Kom. and Alis. Opr. rast. Dal'nevost. kr. I, 312, -C. *Jackiana* ssp. *parciflora* Kük. in Engl. Pflzr. IV, 20 (1909) 638, quoad pl. sachalin, et in Journ. Russ. Bot. 3-6 (1911) 168.

- 351 Perennial, light green, loosely caespitose plants; culms flattened-triangular, smooth, 60-90 cm tall; leaves soft, 5-10 mm broad, short-acuminate, shorter than the culm; spikelets 4-5, the upper 2-3 approximate, the lower very distant: the terminal spikelet staminate, narrowly short-clavate, 1-1.5 cm long, only slightly overtopping the adjoining pistillate spikelet, with oblong subacute light ferruginous scales; other spikelets pistillate, oblong, 1-2 cm long, loose, few-flowered below, the upper ones sessile, the lower on erect smooth peduncles to 3-4 cm long bracts with sheath to 3 cm long (the lowest) and a long blade, those of the upper spikelets overtopping the inflorescence; pistillate scales ovate, acute, dingy whitish, shorter than perigynia; perigynia obovoid or ellipsoid, obtusely trigonous, 5-5.5 mm long, light green, becoming ferruginous, glabrous, slenderly nerved, gradually tapering into a cuneate, slightly curved, smooth, obliquely truncate beak. Fr. June-July.

Damp forest margins and mossy marshes. - Far East: Sakh. (s. part). Endemic. Described from Sakhalin (Oko). Type in Leningrad.

Cycle 5. *Haematopoda* V. Krecz. - Caespitose plants; the rootstock and culm bases covered with purple bladeless sheaths. Perigynia ovoid, 6-8 mm long, on a cuneate, more or less definite stipe; beak rather straight, narrow, membranaceous at summit, obliquely truncate.

267. *C. oligostachys* Meinsh. ex Maxim. in Bull. Ac. Sc. St. Pétersb. XXXI (1887) 117 et in A.H.P. XVIII, 3 (1901) 363; Kom. Fl. Manchzh. I, 377; Kom. and Alis. Opr. rast. Dal'nevost. kr. I, 312. - *C. filipes* var. *oligostachys* Kük. in Engl. Pflzr. IV, 20 (1909) 641 et in Journ. Russ. Bot. 3-6 (1911) 170, fig. 140.

Perennial, light green, loosely caespitose plants, with a short creeping rhizome; culms strongly flattened-triangular, winged on two angles, smooth, nodding at the end, 50-70 cm tall, covered at base with bright purple, obtusish, bladeless sheaths; leaves soft, 4-9 mm broad, abruptly pointed, somewhat shorter than the culm; spikelets 5, distant, the lower especially so: the terminal spikelet staminate, lance-oblong, with ovate obtuse reddish-ferruginous scales; other spikelets pistillate, oblong, 1.5-2 cm long, loosely 2-6 flowered (the lower flowers often strongly separated), on capillary scabrous peduncles 2 to 8-12 cm long, drooping; lowest bract with sheath to upward of 3-4 cm long, its foliaceous blade exceeding the spikelet; pistillate scales ovate, acute, medially dingy whitish, 3-nerved, with green internerves, reddish-ferruginous-margined, about half as long as perigynia; perigynia oblong-ovoid to ellipsoid-ovoid, obtusely trigonous, 6-7 cm long, light green, at length flavescent, with numerous slender prominent nerves, short-stipitate, gradually tapering into a slightly curved, conic, obliquely truncate beak. Fr. May. (Plate XX, fig. 2).

- 352 Deciduous forests. - Far East: Uss. Gen. distr.: Manchuria, North Korea. Described from Ussuri (at the confluence of Li-fudin). Type in Leningrad.

268. *C. depauperata* Good. in Curtis, Cat. (1783) 92 (nomen) et in With. Bot. Arr. brit. pl., ed. 2, II (1787) 1049; Trev. in Ldb. Fl. Ross. IV, 292; Meinsh. in A.H.P. XVIII, 3 (1901) 384; Kük. in Engl. Pflzr. IV, 20 (1909) 641; Grossh. Fl. Kavk. I, 173; Vass. in Wulff, Fl. taur I, 2 (1929) 32. - Exs.: Kneuck, No. 30; XIIa, 49, 50. -

Perennial, cineraceous-green, loosely caespitose plants; culms obtusely

triangular, smooth, 40-60 cm tall, covered at base with reddish-brown bladeless sheaths; leaves stiffish, 2-4 mm broad, strongly scabrous at the end, smooth below, rather long-acuminate, shorter than the culm; spikelets 2-4, distant, the terminal spikelet staminate, narrowly clavate, 2-3.5 cm long, with oblong obtuse fulvous scales; other spikelets pistillate, ovoid to oblong, 1-2.5 cm long, 4-10-flowered, the lower ones with fewer flowers, on thickened smooth erect peduncles of which the upper scarcely 0.5 cm, the lower to 5-7 cm long; bracts to 2.5 cm long, with blade 1/2-2/3 the length of inflorescence, the upper ones overtopping the inflorescence; pistillate scales ovate, membranaceous, acuminate to a scabrous-margined point, two-thirds as long as perigynia, the 3 nerves scabrous above, internerves green, margins lurid; perigynia ovoid to ellipsoid, obtusely trigonous, 8 mm long, light green, becoming brownish and lustrous, slenderly many-nerved, rounded-attenuate at base to a short stipe, gradually tapering into a somewhat flattened, setulose-margined, narrowly conic, deeply bidentate, hyaline-margined beak. Fr. April-June. (Plate XX, fig. 3).

Open forests. - European part: Crimea, Caucasus: Dag. and East. Transcauc. Gen. distr.: Western and southern Europe. Described from England (Kent, Charlton Wood).

269. *C. mingrelica* Kük. in Engl. Pflzr. IV, 20 (1909) 574; Grossh. Fl. Kavkaz. I, 172. - "*C. sp. nov. ? No. 252*" N. Alb. Prodr. Fl. Colch. (1895) 252. - *C. Albovii* Lesk. in Journ. Soc. Bot. Russ. XVI (1931) 72, fig. 3.

Perennial, light green, densely caespitose plants; culms triangular, smooth, 70-80 cm tall, covered at base with dark purple bladeless sheaths; leaves soft, 3-6 mm broad, smooth on both sides, rather abruptly pointed, shorter than the culm; spikelets 3-4, very distant: the terminal spikelet staminate, clavate, 1.5-2 cm long, with ovate obtuse castaneous-brown scales; other spikelets pistillate, oblong, 1.5-2.2 cm long, loosely 7-10-flowered (more sparsely-flowered below), peduncles thickened smooth erect, the upper ca. 2 cm long, the lower to 10-12 cm long; lower bracts to 3 cm long, with blade exceeding the spikelet; pistillate scales ovate, acute or 353 terminating in a short scabrous point, rufous, with a green median band, half as long as perigynia; perigynia oblong-ellipsoid, rather sharply trigonous, 7-7.5 mm long, greenish-ferruginous to reddish-ferruginous, lustrous, slenderly many-nerved, cuneate-based, gradually tapering into a prolonged, flattened, scabrous-margined, ferruginous-tipped, short-bidentate, conic beak. (Plate XX, fig. 4).

Subalpine forest glades. - Caucasus: Ciscauc. (Mt. Nagoi Chuk, by the upper course of the Tsetse River), West. Transcauc.: Kernaktoni. Endemic. Described from Mingreliya (Kernaktoni). Type in Leningrad.

Cycle 6. *Hyporrhyncha* V. Krecz. - Inflorescence of 3-6 spikelets, the terminal staminate, the others pistillate, few-flowered, the upper sessile, the lower subradical, on long scabrous peduncles. Bract with a short sheath (3-5 mm long) and an obsolescent blade. Perigynia thin-coriaceous, obovoid, 5-5.5 mm long, costate, scabrous, cuneate-based, with a short, slightly curved, shallowly bidentate beak.

270. *C. Hallerana* Asso, Syn. stirp. Arag. (1779) 133, tab. 9, fig. 2; Grossh. Fl. Kavkaz 1, 169. - *C. alpestris* Bell. ex All. Fl. pedem. II (1785) 270. - *C. gynobasis* Chaix in Vill. Hist. pl. Dauph. II (1787) 206; Boiss. Fl. Or. V, 409. - *C. anomala* Pall. ex M. B. Fl. taur. cauc. II (1808) 389, non Boott, non Janka. - Exs.: HFR No. 1093; Kneuck No. 23; Dörfl. No. 4388. -

Perennial, cineraceous-green, densely caespitose plants, with a stout branching rhizome; culms triangular, slender, curving, scabrous at the end, 10-40 cm tall; leaves stiffish, strongly revolute-margined, shorter than the culm; lower sheaths castaneous-brown, fracturing-reticulate; spikelets 3-6; the terminal spikelet staminate, lanceolate to oblong, sub-obtuse, 1-1.5 cm long, with obovate subobtusely brownish hyaline-margined scales; other spikelets pistillate (often staminate at summit), subspherical to ovoid, 0.8-1.5 cm long, densely few-flowered, the upper 1-3 sessile or the lowest of these short-peduncled, crowded at base of staminate spikelet; the other 1-2 spikelets subradical, their peduncles scabrous, filiform, 5-10 cm long; bracts setiform, with a short sheath (3-5 mm long) and blade not exceeding the inflorescence; pistillate scales oblong-ovoid, subacute; castaneous-brown, medially 3-nerved and green, white-hyaline-margined, somewhat shorter than perigynia; perigynia oblong-obovoid, thin-coriaceous, obtusely trigonous, 5-5.5 mm long, grayish-green, appressed-puberulent, many-costate, cuneate-based, rather gradually tapering into a short, slightly curved, conic, obliquely truncate, shallowly bidentate beak. Fr. April-May.

- 354 Stony slopes, exposed places. - European part: Crimea; Caucasus: Ciscauc., West., East., and South. Transcauc., Tal. Gen. distr.: entire Mediterranean, Asia Minor. Described from Aragonia in Spain.

NOTE. Hybridizing with *C. Michellii* Host.

Cycle 7. *Trachycarpa* V. Krecz. - Spikelets 2-3, distant. Lower bracts with a short blade. Perigynia membranaceous, obovoid, distended-trigonous, 5-10 mm long, diffusely hirsute, obsoletely nerved or nerveless, the beak distinct (nearly as long as body), deeply cleft, scabrous, suboblique.

271. *C. Michellii* Host, Synop. pl. Austr. (1797) 508; Trev. in Ldb. Fl. Ross. IV, 293; Meinsh. in A.H.P. XVIII, 3 (1901) 386; Kük. in Engl. Pflzr. IV, 20 (1909) 635. - Exs.: Kneuck. No. 60, 60 a et b.

Perennial, light green plants with a creeping rhizome and long slender stolons; culms erect, faintly triangular, smooth to scaberulous, 15-50 cm tall, covered at base with brownish bladeless sheaths; leaves soft, 2-3 mm broad, abruptly pointed, shorter than the culm; spikelets 2-3, distant: the terminal spikelet staminate, obovoid to clavate, 1-2 cm long, with oblong acuminate light brown scales; other spikelets pistillate, obovoid to oblong-obovoid, 1.5-2 cm long, dense, erect, the thickened scabrous peduncles 2-3 cm long; lower bracts with a subspathiform sheath to 1.5 cm long and a blade equaling the spikelet; pistillate scales oblong-ovate, pale ferruginous, medially green, shorter than to equaling the perigynia, subulate-pointed and scabrous-margined; perigynia obovoid, rounded-trigonous, 6-6.5 mm long, light green, at length flavescent, scattered-setulose, faintly many-nerved, rather abruptly terminating in a prolonged, subconic, scabrous-margined, deeply bidentate beak, the teeth setiform-divaricate. Fr. May.

Forests and coppices. - European part: Mid. Dnepr., Volg. - Don., Prichern., Low. Don., Crimea; Caucasus: Ciscauc., Dag., West., East., and South. Transcauc. Gen. distr.: Upper and central Italy, Tyrol, Austria, Yugoslavia, Hungary, Czechoslovakia, Rumania, Balkan Pen., southern Poland. Described from Austria.

NOTE. Hybridizing with *C. brevicollis* DC (*C. Turuli* Simonk.) and *C. Hallerana* Asso.

272. *C. longirostrata* C.A.M. in Mém. Ac. St. Pétersb. Sav. Etr. I (1831) 220, tab. XI; Trev. in Ldb. Fl. Ross. IV, 293; Meinsh. in A.H.P.

XVIII, 3 (1901) 386; Kom. Fl. Manchzh. I, 389; Kük. in Engl. Pflzr. IV, 20 (1909) 636 et in Journ. Russ. Bot. 3-6 (1911) 165; Kom. Fl. Kamch. I, 263; Hulten, Fl. of Kamtch. I, 205. — *C. bispicata* Hook. et Arn. in Beechy's Voy. Bot. III (1834) 118, tab. 28. — *C. camschatcense* Kunth, Enum. pl. II (1837) 477. — *C. depauperata* Erman, Verzeichn. (1835) 55; Trev. in Ldb., 1. c., 292, quoad pl. kamtschat., non Good. — *C. macrorhyncha* Fisch. in herb. — Ic.: C. A. M., 1. c., Kük., 1. c., 633, fig. 108 E-G; Kom and Alis. Opred. rast Dal'nevost. kr. I, 311, tab. 93, dextra.

Perennial, pale green, caespitose plants, with a long, obliquely creeping rhizome; culm flattened-triangular, scabrous above, 15-40 cm tall, covered at base with castaneous fracturing-fibrillose sheaths; leaves stiffish, subrevolute-margined, 2-4 mm broad, abruptly pointed, equaling to exceeding the culm; spikelets 2-3, distant: the terminal spikelet staminate, obovoid to clavate, 1-2 cm long, with oblong emarginate mucronate rufous scales; other spikelets pistillate, oblong to ovoid, 0.8-1.8 cm long, rather dense, on erect peduncles to 3 cm long; lower bracts with sheath to 1.5 cm long and blade equaling the spikelet; pistillate scales lanceolate, long-pointed, ferruginous, becoming pale, shorter than to nearly equaling the perigynia, the green midrib scabrous above, the point scabrous-margined; perigynia obovoid, terete, 6.5-7 mm long, light green, at length flavescent, scattered-setulose, slenderly nerved, abruptly terminating in a long, compressed-cylindric, scabrous-margined, deeply setiform-cleft, subdivaricate beak. Fr. May-June.

Forests and coppices on mountain slopes. — Far East: Kamch., Sakh., Ud., Ze.-Bur., Uss. Gen. distr.: Manchuria, Korea, northern Japan. Described from Kamchatka. Type in Leningrad.

273. *C. alajica* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 99; B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 208.

Perennial, light green plants, with a short ascending rhizome, stoloniferous, forming rather dense compact tufts; culms triangular, scabrous above, somewhat curving, 15-25 cm tall; leaves stiffish, straight, 1.5-2.5 mm broad, long-attenuate, about half as long as the culm; lower sheaths brown, densely covered with fibrillose remnants of old sheaths; spikelets 2-3: the terminal spikelet staminate, lanceolate to lance-clavate, 1-1.5 cm long, with lanceolate subobtuse rufous hyaline-margined scales; other spikelets pistillate, obovoid, 1-1.5 cm long, loose, somewhat spreading, the upper sessile at base of staminate spikelet, the other distant, short-peduncled (peduncle to 5-8 mm long); lower bracts with sheath to 5-8 mm long and blade twice as long as its spikelet; pistillate scales ovate, rather long-attenuate reddish-ferruginous, with a light prominent midrib and light hyaline margins, much shorter than perigynia; perigynia obovoid-lageniform, thin-coriaceous, compressed-trigonous, 5 mm long, yellowish or grayish-green, frontally scattered-setulose (setae often colored), nerveless, scabrous-margined above, abruptly terminating in a long (2 mm), flattened, deep-cleft, basally scabrous-margined beak. Fr. June.

356 Centr. Asia: Pam.-Al.: Alaiskaya Valley, borders of Tarash and Aram-Kungei, 2,700-3,400 m; n. slope of Shivali Pass. Endemic. Described from border of Tarash. Type in Leningrad.

NOTE. The plant is called "Ran" and according to the report of S. Korzhinskii, it provides good forage.

Section 31. *Sinocarex* V. Krecz. — Caespitose plants with creeping rootstock; the short culm not exceeding the broad, subcoriaceous, ensiform, abruptly pointed leaves; basal sheaths broad, bladeless. Inflorescence of

one staminate spikelet and 3-5 pistillate spikelets: the staminate long, narrow, with linear anthers 6-8 mm long, the pistillate narrowly cylindrical, loose, on erect smooth peduncles. Bract with a long sheath and short blade. Perigynia membranaceous, oblong, trigonous, 3-4 mm long, slender-nerved, with a smooth, slightly oblique, narrowly cylindrical, short-bidentate beak. Achene concave-edged. Stigmas 3.

274. *C. foliosissima* F. Schmidt in Mém. Ac. St. Pétersb., sér. VII, XII (1868) 195, tab. VI, fig. 1-6; Meinsh. in A.H.P. XVIII, 3 (1901) 385. non Franch. - *C. Morrowii* Kük. in Engl. Pflzr. IV, 20 (1909) 626 et in Journ. Russ. Bot. 3-6 (1911) 163, non Boott. - *C. Morrowii* ssp. *foliosissima* Ohwi in Mem. Coll. Sc. Kyoto Univ., ser. B, VI (1931) 251.

Perennial, light green, densely cespitose plants, with a creeping rhizome and long stolons; culms erect, triangular, smooth, 15-30 cm tall, covered at base with castaneous-brown, fracturing-fibrillose, bladeless sheaths; leaves numerous, 5-10 mm broad, prominently 2-ribbed, scaberulous, abruptly obtusish-tipped, longer than the culm; spikelets 3-4, distant: the terminal spikelet staminate, lanceolate, 2-3 cm long, with oblong acute buff scales; other spikelets pistillate, oblong to short-cylindric, 1.5-4 cm long; lowest bract broadly sheathing, the sheath to 2.5-3 cm long and the broad blade twice as long as the sheath; pistillate scales lanceolate, acute, carinate, 3-nerved, buff, medially pale green, longer than perigynia, perigynia divaricate, ovoid, inflated-trigonous, 3 mm long, greenish-ferruginous, slenderly many-nerved, short-stipitate, gradually tapering into a moderately long, reflexed, smooth, whitish-tipped, obliquely truncate beak. Fr. July.

Open coniferous forests. - Far East: Sakh. (s. part). Gen. distr.: Japan. Described from Sakhalin (Okol). Type in Leningrad.

Section 32. *Maltrema* (Rafin.) V. Krecz. - Rafin. in Amenit. of Nat. I (1840) 26. - *Deweya* Rafin., 1. c., nec Eaton, nec Torr. et H. Gray. - *Pseudocarex* Miq. in Ann. Mus. Lugd. Bat. II (1865-1866) 146. - *Mano-chlaenia* Boern. in Abh. Naturw. Ver. Brem. XXI (1913) 271, ex p. (omnia pro genere). - Forest plants with creeping rhizome or cespitose. Culm lateral, flattened, smooth, with false nodes, producing from the
357 "nodes" from base 1-2 spikelet-bearing branches, these often secondarily branching, covered between the nodes by spathiform blade-bearing sheaths (similar sheaths on secondary branches). Leaves flat, lanceolate, abruptly pointed, 3-veined. Spikelets androgynous, loosely few-flowered, the lower scales sometimes subfoliaceous. Perigynia membranaceous, obovoid to ellipsoid, trigonous, nerved, 3-5(6) mm long, with a rather definite, slightly curved, obliquely truncate, short beak. Stigmas 3.

275. *C. siderosticta* Hance in Journ. Linn. Soc. XIII (1873) 89 et in Journ. of Bot. II (1879) 560; Meinsh. in A.H.P. XVIII, 3 (1901) 388 (excl. syn.); Kom. Fl. Manchzh. I, 390; Kük. in Engl. Pflzr. IV, 20 (1909) 523 et in Journ. Russ. Bot. 3-6 (1911) 147; Kom. and Alis. Opr. rast. Dal'-nevost. kr. I, 306. - *Pseudocarex plantaginea* Miq. in Ann. Mus. Lugd. Bat. II (1865-66) 146. - Ic.: Kük., 1. c., 524, fig. 83 A-C; Kom. and Alis., 1. c., tab. 93. - Exs.: HFR No. 2385.

Perennial, light green plants, with ascending creeping rhizome and long stolons; culms pseudo-nodiferous, weak, subflexuous, covered between the "nodes" with spathiform reddish-glaucous leaves, these with diffusely hairy sheaths; basal sheaths few, glaucous-brown, bladeless; leaves soft, lance-

oblong, 1-3 cm broad, glabrous on the upper surface, lighter and scattered-pilose along the veins underneath, long-acuminate, shorter than the culm; spikelets androgynous, arising alternately in 1's-2's in the "nodes" nearly from base of the culm, borne on flattened peduncles to 4-5 cm long, 5-10 in number, lance-linear, 1.5-3 cm long, loose, erect, sometimes secondarily branching; bracts spathiform, acuminate, covering the spikelets; scales oblong-ovate to lanceolate, acute, buff or greenish, 3-nerved, subhyaline-margined, slightly shorter than to as long as the lower ones sometimes longer than, the perigynia; perigynia obovoid or ellipsoid, trigonous, 3-3.5 mm long, greenish, with slender prominent nerves, attenuate at base to stipe ca. 1 mm long, abruptly contracted into an inconspicuous cylindrical truncate beak. Achene often with green rachilla at base. Fr. May.

Mixed forests with humus-rich soil. - Far East: Ze.-Bur., Uss. Gen. distr.: Northern and Central China, Manchuria, Korea, Japan. Described from Northern China (Jehol). Type in London.

Section 33. *Garyotheca* V. Krecz. - Frequently caespitose plants, with short creeping rhizome. Culms geniculate in inflorescence, winged with concave sides, culm-base and rootstock covered with colored scale-like sheaths. Spikelets androgynous, with a narrow staminate part at the top and a loosely spread-out pistillate part. Scales prolonged into foliaceous processes, the lower ones leaflike. Perigynia 5-7 mm long, trigonous, 358 thin-membranaceous, nerved, attenuate below to a broad spongy stipe, contracted at summit into a short smooth beak. Style conic-based; stigmas 3.

276. *C. phyllostachys* C.A.M. in Verzeichn. Pflzr. Cauc.-Casp. (1831) 30; Trev. in Ldb. Fl. Ross. IV, 269; Grossh. Fl. Kavk. I, 163.

Perennial; culms sharply triangular, scabrous above, 30-60 cm tall, cartilaginous-angled above, with lateritious sheaths at base; leaves flat, soft, equaling to exceeding the culm, 2-3 mm broad, scabrous; spikelets 2-3 cm long, loose, distant, the lower perigynia often strongly separated; scales ferruginous-spotted, subfoliaceous; perigynia ellipsoid to ovoid, 5-6 mm long, olivaceous, ferruginous-punctulate, somewhat lustrous, with a subconic beak.

Shady deciduous forests. - Caucasus: Dag. (s.), East. Transcauc. (Mtskhet, Dushet), Tal. Gen. Distr.: Balkans, northern Persia. Described from Talysh. Type in Leningrad.

Section 34. *Aunieria* (Gdgr.) V. Krecz. - Gdgr. in Fl. Eur. terr. adj. XXIV (1890) 54, s. str. - *Bitteria* Boern. in Abh. Naturw. Ver. Brem. XXI (1913) 269, ex p. (pro genere). - Forest and meadows-steppe plants, with creeping rootstock, forming loose or dense tufts; culms 3-angled; leaves abruptly pointed; basal sheaths colored, fracturing-fibrillose. Inflorescence racemiform or fasciculate, 1-sided, of 2-4 (5) spikelets, the terminal staminate, the others pistillate, loosely-flowered, all distinctly pedunculate. Bracts spathiform, acute or bearing a distinct setiform blade. Perigynia membranaceous, pyriform-obovoid, trigonous or rounded-trigonous, 2-5 mm long, mostly puberulent above, rounded at summit, with a short, obscurely cuneate, more or less oblique, truncate beak. Stigmas 3.

1. Culms covered at base with dilated colored bladeless sheaths; perigynia trigonous. 2.
- + Culms covered at base with normal leaves; perigynia inflated or rounded-trigonous 4.
2. Spikelets in racemiform arrangement, distant; perigynia 4-5 mm long 3.

- + Spikelets clustered (digitate), their bases approximate; perigynia 2.5-3 mm long 279. *C. pedata* L.
- 3. Staminate spikelet large, situated at about the same level as the nearest pistillate spikelet; pistillate spikelets 5-10-flowered, their scales scarcely shorter than perigynia, acuminate; perigynia 4 mm long, short-pilose above 277. *C. digitata* L.
- 359 + Staminate spikelet small, situated below the base of the nearest pistillate spikelet; pistillate spikelets 3-5 (mostly 4)-flowered; their scales half as long as perigynia, obtuse; perigynia 4.5-5 mm long, very slightly puberulent (Far East) 278. *C. quadriflora* (Kük) Ohwi.
- 4. Axis of pistillate spikelet geniculate; bracts infundibuliform, acute, bladeless; old leaves longer than the culm 5.
- + Axis of pistillate spikelet straight; bract with a definite setiform blade; leaves shorter than the culm 9.
- 5. Perigynia costate-nerved 280. *C. lanceolata* Boott.
- + Perigynia nerveless 6.
- 6. Forest plants with long slender creeping castaneous-purple rhizome; the thin bright green capillary leaves 3-4 times as long as the short few-flowered culm (Ussuri Province) 283. *C. callitrichos* V. Krecz.
- + Steppe plants, densely cespitose, with rusty to reddish-brown rhizome; leaves subrigid, linear, grayish, shorter, the culm long or short . . 7.
- 7. Culms short, 2-6 (rarely 10) cm tall, enclosed in base of long old leaves; perigynia 2-2.5 mm long 8.
- + Culms 10-25 cm tall (of the *C. lanceolata* Boott. type), equaling or at least half as long as the leaves; perigynia ca. 3 mm long (Transbaikal Reg.) 281. *C. pseudo-lanceolata* V. Krecz.
- 8. Staminate spikelet linear, 3-4 flowered, 0.6-0.8 mm long, its scales lanceolate, acute, ferruginous, but with margins hyaline (Transbaikal Reg., Far East) 282. *C. nanella* Ohwi.
- + Staminate spikelet lanceolate, many-flowered, to 2 cm long, its scales broadly ovate, obtuse, hyaline nearly throughout (hence spikelet often silvery). (Eurasia) 284. *C. humilis* Leyss.
- 9. Mountain-steppe cineraceous-green densely cespitose plants with brown to ferruginous-brown fracturing-fibrillose basal sheaths 10.
- + Forest green loosely cespitose plants with creeping rhizome, with purple or castaneous practically non-fracturing basal sheaths . . . 13.
- 10. Perigynia with costate nerves 11.
- + Perigynia nerveless or obsoletely nerved 12.
- 11. Leaves subinvolute, half as long as the culm, with tawny basal sheaths, staminate spikelet slightly raised above the pistillate spikelet or actually overtopping them. Pistillate scales obovate, obtuse, mucronate, longer than perigynia; perigynia obovoid, 2.8-3 mm long, regularly pubescent, 2-3-nerved (bare-hill zone of Transbaikal Region) 291. *C. Kirilowii* Turcz.
- 360 + Leaves flat or revolute, half as long to nearly as long as the culm; basal sheaths ferruginous-brown; staminate spikelet not exceeding the

- pistillate, by which it is often pushed sideways; pistillate scales ovate, acute, equaling the perigynia; perigynia obovoid-conic, 3-3.5 mm long, 5-6-nerved, with long hairs along the nerves. (Steppe slopes) 289. *C. pediformis* C.A.M.
12. Culms smooth; staminate spikelet slightly overtopping the pistillate spikelets, well developed. (Far East) 288. *C. sutschanensis* Kom.
 + Culms scabrous; staminate spikelet usually not overtopping the pistillate spikelets or but slightly so, reduced. (Turkestan) 290. *C. aneurocarpa* V. Krecz.
13. Staminate spikelet oblong-lanceolate, overtopping the pistillate spikelets 287. *C. macroura* Meinsh.
 + Staminate spikelet linear or lance-linear, weakly developed, not overtopping the pistillate spikelets and suppressed by the latter 13.
14. Bright green plants; scales shorter than perigynia; nerves and beak of perigynia obsolescent. (Europe) 285. *C. rhizina* Blytt.
 + Pale green plants; scales exceeding perigynia; perigynia with prominent nerves and well developed beak. (Far East) 286. *C. reventa* V. Krecz.

Cycle 1. *Bitteria* (Boern.) V. Krecz. -Boern. in Abh. Naturw. Ver. Brem. XXI (1913) 270 (pro sectione generis *Bitteria* Boern.), ex p. -

Culms lateral, covered at base with dilated bladeless colored sheaths. Staminate spikelets compact, narrowly lanceolate, placed below the adjoining pistillate spikelet. Pistillate scales obovate, obtuse, round-tipped or mucronate. Perigynia trigonous, with flat or concave sides, nerveless, glabrous, short pilose on the angles above, smooth-ribbed, with a weak, faintly conic, nearly straight beak.

277. *C. digitata* L. Sp. pl. (1753) 975; Trev. in Ldb. Fl. Ross. IV, 289; Meinsh. in A.H.P. XVIII, 3 (1901) 401; Kük. in Engl. Pflzr. IV, 20 (1909) 496 et in Journ. Russ. Bot. 3-6 (1911) 138. - Ic.: Syreish. Ill. Fl. Mosk. gub. I, 208. - Exs.: HFR No. 693; Pl. Finl. Exs. No. 133; Kneuck. VI, No. 174; XIIa, No. 32, 33.

Perennial, bright green, caespitose plants, with a creeping rhizome; culms flattened-triangular, scaberulous above, 10-30 cm tall; leaves rather soft, 3-6 mm broad, the young shorter, the old longer than the culm; spikelets 2-4, approximate: the terminal spikelet placed slightly below the adjoining pistillate spikelet, lance-linear, 1-1.5 cm long, with oblong obtuse
 361 ferruginous hyaline-margined scales; other spikelets pistillate, linear, 1.5-3 cm long, loosely 5-10-flowered, on peduncles to 3-4 cm long; bract with sheath to 2 cm long, castaneous-ferruginous throughout, narrowly membranaceous at summit, acute or bearing a blade to 1 cm long; pistillate scales oblong-obovate (cup-shaped), rounded at the summit or subemarginate, ferruginous, shorter than perigynia, the light midrib excurrent into a short

point; perigynia oblong-obovoid, cuneate-based, trigonous, 4 mm long, greenish, at length subferruginous, regularly puberulent above, nerveless, rather abruptly contracted into a short conic suboblique brownish entire-tipped beak. Fr. April-May. (Plate XIX, fig. 1).

Forests, on humus-rich soil. - European part: Kar.-Lap., Dv.-Pech., Lad.-Il'm., Upp. Dnepr., Upp. Volg., Volg.-Kam., Mid. Dnepr., Prichern. Volg.-Don., Zavolzh., Crimea; Caucasus: Ciscauc., Dag. West. and East. Transcauc.; West. Siberia: Ob., Upp. Tob. Gen. distr.: West. Europe. Described from Western Europe (Sweden). Type in London.

278. *C. quadriflora* (Kük.) Ohwi in Acta Phytotax. et Geob. I, 1 (1932) 74. - *C. digitata* spp. *quadriflora* Kük. in Engl. Pflzr. IV, 10 (1909) 497 et in Journ. Russ. Bot. 3-6 (1911) 139; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I, 305. - *C. digitata* β *pallida* Meinsh. in A. H. P. XVIII, 3 (1901) 401. - *C. digitata* Kom. Fl. Mandsh. I (1901) 398, non L.

Perennial, pale green, caespitose plants, with obliquely ascending rhizome; culms filiform, scabrous above, 15-30 cm tall; leaves soft, flat, 2-4 mm broad, the young leaves shorter than the culm, the old ones exceeding the culm; spikelets 2-3, subdistant: the terminal spikelet staminate, placed below the base of the adjoining pistillate spikelet, linear, 0.5-1 cm, long, with oblong-obovate, obtuse, ferruginous, rather broadly hyaline scales; other spikelets pistillate, few (mostly 4)-flowered, on a subflexuous axis, borne on peduncles to 3 cm long; bract with sheath to 5 mm long, ferruginous, obliquely truncate, slightly membranaceous-margined, subobtuse; scales obovate, broadly rounded at summit with an obtuse process, pale pinkish-ferruginous, obsoletely narrow-hyaline, about half as long as perigynia, the faint midrib green; perigynia obovoid, abruptly attenuate to an extended conic base, subconcave-trigonous, 4.5-5 mm long, diffusely short-pilose above, nerveless, greenish-yellow, rusty-spotted, abruptly terminating in a short, ferruginous, cylindrical, entire-tipped beak. Fr. May.

Forests with humus-rich soil. - Far East: Uss. Gen. distr.: Northern Manchuria., North Korea. Described from the upper course of river Li-fudina. Type in Leningrad.

279. *C. pedata* L. Sp. pl. ed 2 (1763) 1384, non Whlb. /sec. C. B. Clarke in Journ. of Bot. XXVI (1883) 322 et auct. vetust. / - *C. ornithopoda* Willd. Sp. pl. IV (1805) 255; Trev. in Ldb. Fl. Ross. IV, 290; Meinsh. in A. H. P. XVIII, 3 (1901) 401. - Exs.: HFR No. 643; Pl. Finl. Exs. No. 534; Kneuck. No. 175, 176.

Perennial, bright green, densely caespitose plants, with ascending rhizome; culms flexuous at the ends, flattened-triangular, scabrous above, 5-20 cm tall; leaves soft, flat, 2-4 mm broad, the young shorter, the old equaling to exceeding the culm; spikelets 3-4, arranged in a digitate cluster; the terminal spikelet placed laterally below the other spikelet, staminate, lance-linear, 0.4-0.8 cm long, smooth, with obovate, obtusely truncate, light ferruginous, subhyaline-margined scales, other spikelet pistillate, linear, 0.8-1.5 cm long, with flexuous axis, loosely few-(3-6)-flowered, subsessile to short-peduncled, divergent to reflexed, the lowest sometimes subdistant and then on a peduncle to 1 cm long; bract with a short sheath (ca. 5 mm) ferruginous- or hyaline-margined, acute or mucronulate; pistillate scales obovate, broadly rounded, often obtusely tipped, light ferruginous, angled-hyaline on the margin, shorter than perigynia, the green midrib not exceeding the summit; perigynia obovoid, rather gradually attenuate

to base, trigonous, flat-sided, 2.5-3 mm long, greenish, at length somewhat brunescent, diffusely pilulose, nerveless, rather abruptly contracted into a short to slightly curved, ferruginous, conic-cylindric, entire beak. Fr. May-June.

Peat bogs, coppices, exposed places. - European part: Kar.-Lapl., Dv. - Pech., Lad.-Il'm. Gen. distr.: West. Europe, Poland, Baltic States, Finland. Described from Switzerland.

Cycle 2. *Baeochortus* (Ehrh.) V. Krecz. - Ehrh. Beitr. IV (1789) 149 (nomen). - *Lasioperula* Boern. in Abh. Naturw. Ver. Brem. XXI (1913) 270 (pro sectione generis *Bitteria* Boern.). - Culms central, covered at base with leaves of normal type. Staminate spikelets loose, exceeding the pistillate (and then lanceolate, many-flowered) or not exceeding them (and then linear, weakly developed). Pistillate scales lanceolate, oblong-ovate, acute-mucronate. Perigynia convexly to rounded-trigonous nerved or nerveless, regularly puberulent, rounded at summit, with a rather definite short-cuneate oblique beak.

Series 1. *Polycamptorachis* V. Krecz. - Axis of spikelet geniculate; pistillate spikelets loosely few-flowered. Bract infundibular, broadly membranaceous, without a distinct blade. Leaves usually much longer than the culm.

280. *C. lanceolata* Boott in A. Gray, Narr. Exped. Perry, II (1857) 326; Kük. in Engl. Pflzr. IV, 20 (1909) 493 et in Journ. Russ. Bot. 3-6 (1911) 136; V. Krecz. in Fl. Transb. II, 128. - *C. pediformis* var. genuina F. Schmidt in Mém. Ac. St. Pétersb., VII sér., XII (1868) 193, non Maxim. - *C. floribunda* Meinsh. in A. H. P. XVIII, 3 (1901) 402. - *C. longisquamata* Meinsh. ex Kom. Fl. Mandsh. I (1901) 399, non Bcklr. - Ic.: Kük., l.c., 492, fig. 78 G.

Perennial, pale green, densely caespitose plants, with an ascending branching short-creeping rhizome; culms scabrous nearly to base, 10-35 cm tall; leaves soft, at first straight, shorter than the culm, becoming elongated, reflexed, flexuous at the ends, longer than the culm, flat, 1-2 mm broad; lower sheaths castaneous or rufous; spikelets 3-5, subdistant, the terminal spikelet staminate, lance-linear, 0.5-1 cm long, inserted below the adjoining pistillate flower, few-(5-6)-flowered, with lanceolate, acute, ferruginous or castaneous, very broadly hyaline scales; other spikelets pistillate, oblong, with geniculate axis, 0.5-1.2 cm long, loosely few-flowered, the peduncle to 1 cm long, almost entirely enclosed in the bract; bract dilated above, to 1-1.5 cm long, obliquely truncate, acuminate, ferruginous, broadly hyaline at apex; pistillate scales lanceolate to lance-ovate, acuminate, ferruginous-brown, with a green midrib, broadly hyaline-margined, twice as long as perigynia, perigynia obovoid, rounded-trigonous, 3 mm long, greenish, becoming drab, regularly puberulent (pubescence longer above), many-ribbed, on a long conic spongy slope, rounded at summit, rather abruptly terminating in a reflexed entire short beak. Fr. May. (Plate XIX, fig. 2).

Steppes and mountain slopes. - East. Siberia: Ang.-Sayan. (s.-e. part), Daur., Len.-Kol. (Oleminskii Distr.); Far East: Ze.-Bur., Ud. (s. part), Sakh., Uss. Gen. distr.: Northern Mongolia, Northern China, Manchuria, Korea, Japan. Described from Japan. Type in London.

281. *C. pseudo-lanceolata* V. Krecz. sp. nova in Addenda II, 613. - *C. lanceolata* Poplaw. in Trav. Mus. Bot. St. Pétersb. XII (1914) 199, quoad pl. nertschin. non Boott.

Perennial, light green, densely caespitose plants, with a ligneous, short-branching rhizome; culms scabrous, 10-25 cm tall; leaves initially erect and shorter than the culm, at length decumbent, twice as long as the culm, 2 mm broad; lower sheaths castaneous-red; spikelets 3-4, distant: the terminal spikelet staminate, lance-linear to linear-clavate, 0.8-1 cm long, with lanceolate, acute, rufous, broadly hyaline scales; other spikelets pistillate, 0.8-1.5 cm long, loosely few-(3-5)-flowered, with geniculate axis, peduncle inclosed in bract sheath; lowest bract with sheath to 1.5 cm long, ferruginous and broadly hyaline above, acute; pistillate scales oblong-ovate, acute, reddish-ferruginous, with a green midrib, broadly hyaline, nearly twice as long as perigynia; perigynia obovoid, rounded-trigonous, 2.5-3 mm long, greenish-yellow, regularly puberulent above, nerveless, on curved cuneate stipe, more or less rounded at summit, with a short oblique entire slender beak. Fr. June.

364 Dry slopes, rocks, and open forests. - East. Siberia: Daur.: Nerchinskii Distr. and generally the e. part of Transbaikal Region. Endemic. Described from Sedlovoi Raz'ezd Stn. Type in Leningrad.

282. *C. nanella* Ohwi in Mem. Coll. Sc. Kyoto Univ., Ser. B, V, 3 (1930) 263. - *C. lanceolata* var. *nana* Lévl. et Vant. in Bull. Ac. Inter. Geogr. Bot., 3 ser., XI (1901) 269; Kük. in Engl. Pflzr. IV, 20 (1909) 493; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I, 305. - *C. humilis* f. *brevimascula* Kük. in Journ. Russ. Bot. 3-6 (1911) 137. -

Perennial, light green plants, with a short creeping rhizome, forming dense compact tufts; culms rounded-triangular, smooth, erect, 3-6 cm tall; leaves soft, flat, 1-1.5 mm broad, scaberulous, rather long-attenuate, 2-3 times as long as the culm; lower sheaths ferruginous-purple or purplish-brown, slightly fracturing-fibrillose; spikelets 2-4, distant, the terminal staminate, markedly overtopping the pistillate, lance-linear, 0.6-0.8 cm long, 3-4-flowered, with lanceolate, ferruginous, hyaline-margined, acute scales; other spikelets pistillate, separated from the staminate spikelet and from each other, linear, 0.5-0.7 cm long, 2-5-flowered, loose, the peduncle to 5 m long, inclosed in the bracteal sheath; bracts ferruginous, broadly white-hyaline at summit, acuminate, 0.5-0.7 cm long; pistillate scales ovate, acute to short-awned, ferruginous, with a light midrib, scabrous above, white-hyaline-margined, slightly longer than perigynia; perigynia obovoid, obtusely trigonous, 2-2.5 mm long, with nearly flat sides, regularly pubescent (short-pubescent below, long-pubescent above), pale green, nerveless, gradually tapering into a short curved entire beak. Fr. May.

East. Siberia: Daur. (mound on watershed of rivers Davenda and Chernyi Uryum); Far East: Uss. (sound in Nikol'sk-Ussuriiskii Distr.). Gen. distr.: Manchuria, Korea, Japan (Hondo and Yezo). Described from Korea (Sui-nando in Kvainei Prov.). Type in Kyoto (Japan).

283. *C. callitrichos* V. Krecz. sp. nova in Addenda, II. 613. - *Carex tenuissima* Boott simillima, Kom. Fl. Mandsh. I (1901) 402.

365 Perennial, bright green, loosely caespitose plants, with long creeping branching rhizome; culms rounded-triangular, 2-6 cm tall, smooth; leaves long, capillary, 0.2-0.8 mm broad, soft, decumbent, rather long-attenuate, 5-6 times as long as the culm; lower sheaths castaneous or reddish-brown; spikelets 2-4, distant; the terminal spikelets staminate, lance-linear, 0.5-0.8 cm long, overtopping the pistillate spikelet, with acute, lanceolate, pale

ferruginous, hyaline-margined scales; other spikelets pistillate, linear, 0.5-0.7 cm long, loosely 1-3-flowered, with flexuous axis, short-peduncled, the peduncle inclosed in bracteal sheath; bracts sheathing, to 8 mm long, ferruginous, acute, hyaline-margined; pistillate scales lanceolate, acute, ferruginous to pale ferruginous, with light midrib and broadly hyaline margin, much longer than perigynia; perigynia (immature) oblong-obovoid, trigonous, 2.5-2.8 mm long, greenish, short-puberulent, nerveless, cuneate-based, more or less rounded at summit, terminating in short entire brownish beak. Fr. June.

Spruce-fir forests and predominantly coniferous taiga.— Far East: Uss. - between the rivers Sutar and Khingan, on the pass from Lyubavinskii mine to Khinganskoe winter-hut; valley of river Botcha in Northern Sikhote-Alin. Gen distr.: Northern Manchuria. Described from the pass between rivers Sutar and Khingan. Type in Leningrad.

284. *C. humilis* Leyss. Fl. halen. (1761) 175; Trev. in Ldb. Fl. Ross. IV, 289; Meinsh. in A. H. P. XVIII, 3 (1901) 402; Chitrowo in Izv. issled. Orl. gub. I (1907) 97-127 cum tab. 2; Kük. in Journ. Russ. Bot. 3-6 (1911) 137. — *C. clandestina* Good. in Trans. Linn. Soc. II (1794) 167; M. B. Fl. taur.-cauc. II (1808) 384; C. A. M. in Ldb. Fl. Alt. (1833) 224. — Ic.: Chitrowo, in Izv. issled.— Exs.: HFR No. 2049; Kneuck. VI, No. 177 and 177a.

Perennial, green, compactly caespitose plants, with ligneous short-branching rhizomes; culms 2-10 (15) cm tall, faintly triangular, smooth; leaves stiffish, subcanaliculate (initially flat), 1-1.5 mm broad, prostrate, 5-10 times longer than the culm; lower sheaths reddish-brown, fracturing-fibrillose; spikelets 3-5, distant: the terminal spikelet staminate, lanceolate, 0.5 cm long, with broadly ovate, rufous, broadly and often almost entirely hyaline scales, hence staminate spikelet sometimes silvery; other spikelets pistillate, 0.5-1 cm long, loosely few-(2-5)-flowered, the short geniculate peduncle inclosed in bracteal sheath; bract with sheath to 5-8 mm long, ferruginous and broadly hyaline above, with or without a short point at summit, obtuse; pistillate scales ovate to broadly ovate, mucronate, reddish- or light-ferruginous, with a broad green median band, with a fairly broad hyaline margin, equaling to slightly exceeding the perigynia; perigynia obovoid, convexly trigonous, 2.5 mm long, yellowish-green, ferruginous above, regularly short-pilose, nerveless, attenuate to a curved cuneate base, rounded at summit, rather abruptly terminating in a rather indefinite oblique entire brownish beak. Fr. April-mid May.

Steppes, exposed and wooded mountain slopes, grass-covered barren spots. — European part: Mid. Dnepr., Volg.-Don., Prichern., Low. Don., 366 Crimea: Caucasus: Ciscauc., Dag., East. and South. Transcauc., West. Siberia: Alt. Gen. distr.: West. and Centr. Europe, Asia Minor. Described from Germany (surroundings of Halle, Liskau).

ECONOMIC IMPORTANCE. In the Caucasus, on dry mountain pastures, often the basis of grazed forage. Eaten readily by livestock, especially by sheep and horses. Stands up well to trampling and recovers satisfactorily after grazing.

Series 2. *Orthorachis* V. Krecz. — Axis of spikelet straight; pistillate spikelets usually many-flowered, loose. Bracts with a distinct setiform blade. Leaves about half as long as the culm.

285. *C. rhizina* Blytt. ex Lindblom in Bot. Notis. (1839) 98. — *C. pediformis* Trev. in Ldb. Fl. Ross. IV (1853) 290, quoad. pl. Ross. septentr.

et med.; Syreish. Ill. Fl. Mosk. gub. I (1906) 208. - *C. obovata* Goldb. ex Rupr. in Beitr. zur Pflanzenk. russ. Reich. IV (1845) 86 (nom. nudum). - *C. rhizodes* Meinsh. in A. H. P. XVIII, 3 (1901) 403, ex p. - *C. pediformis* var. *rhizina* Kük. in Engl. Pflzr. IV, 20 (1909) 491. - *C. pediformis* var. *rhizodes* Lindb. fil. in Sched. ad Pl. Finl. exs. IX-XX (1916) 35. - *C. rhizodes* var. *Andrejewi* Litw. in Sched. ad Herb. Fl. Ross. IV (1902) 56. - Ic.: Kük., I. c., fig. 78 A-F.; Syreish., 1. c. - Exs.: Pl. Finl. Exs. No. 124, 532, 533; HFR No. 143, 1095.

Perennial, bright green or pale green, loosely caespitose plants, with branching stout creeping rhizomes; culms nodding, scabrous nearly down to base, 15-50 cm tall, leafy in lower one-fourth; leaves long, rather soft, flat, 2-3 mm broad, wilting at the ends, equaling to exceeding the culm; lower sheaths castaneous-purple to castaneous, fracturing-reticulate-fibrillose; spikelets 2-4, distant: the terminal spikelet staminate, usually not overtopping the adjoining pistillate spikelet (often situated below it), narrowly lanceolate to narrowly cuneate, 0.6-1.2 cm long, with light castaneous oblong-ovate hyaline-margined subacute scales; other spikelets pistillate, linear, 1.5-3 cm long, few-flowered, subnutant, the scabrous peduncles to 5-6 cm long; bracts with conic sheaths, brownish membranaceous-edged at apex, awn-pointed, 1-2.5 cm long; pistillate scales ovate to obovate, obtuse, green at center, hyaline-margined above, somewhat shorter than perigynia, the terminally scabrous midrib excurrent; perigynia obovoid-cuneate, convexly trigonous, 4 mm long, greenish, becoming yellowish or subferruginous, rather densely short-hyaline, with thickened basally distant nerves, rather abruptly contracted into a subconic curved short-bidentulate beak. Fr. May-June.

Forests and wooded situations. - European part: Lad.-Il'm., Dv.-Pech., Upp. Dnepr. (Mogilev), Upp. Volg., Volg.-Kam., Mid. Dnepr. (w.-Rozhkov on Dniester), Volg.-Don, Low. Don, Zavolzh.; West. Siberia: ob. Gen. distr.: Fenno-Scandia, Baltic States, Poland, Central Europe. Described from Scandinavia.

367 286. *C. reventa* V. Krecz. sp. nova in Addenda II, 614. - *C. pediformis* α *genuina* et β *pedunculata* Maxim. Prim. fl. Amur. (1859) 309. - *C. pediformis* var. *rhizina* Kük. in Engl. Pflanzr. IV, 20 (1909) 491 et in Journ. Russ. Bot. 3-6 (1911) 135, quoad pl. Orient. Extr.; Hultén, Fl. of Kamtch. I (1927) 200. - *C. pediformis* f. *parviflora* Kük. in Fedde, Repert. sp. nov. XIII (1910) 7. - *C. rhizina* Kom. Fl. penins. Kamtsch. I (1927) 255, non Blytt.

Perennial, green or light green, loosely caespitose plants, with long creeping branching rhizome; culms scabrous nearly down to base, 30-50 cm tall; leaves soft, long, flat, 2-3.5 mm broad, rather long-attenuate, somewhat shorter than the culm; lower sheaths castaneous-red; spikelets 2-4, distant: the terminal spikelet staminate, scarcely overtopping or not overtopping the adjoining pistillate spikelet, lanceolate, 1-1.2 cm long, with ovate acute ferruginous or light ferruginous broadly hyaline-margined scales; other spikelets pistillate, linear, 1-1.5(2) cm long, few-flowered, on peduncles to 2 cm long; bracts sheathing, 1-2 cm long, cuspidate; pistillate scales ovate, cuspidate, ferruginous, with a light terminally scabrous midrib, hyaline-margined, about equaling to exceeding the perigynia; perigynia obovoid, rounded-trigonous, 3-3.8 mm long, green, at length flavescent, prominently thick-nerved, regularly short-puberulent, or a cuneate somewhat spongy stipe, terminating in a short-oblique entire beak. Fr. June.

Forests. - Far East: Kamch., Ud., Ze.-Bur., Uss. Gen. distr.: Manchuria. Described from Mariinsk on the Amur. Type in Leningrad.

287. *C. macroura* Meinsh. in A.H.P. XVIII, 3 (1901) 404; V. Krecz. in Fl. Transb. II (1931) 127. - *C. pediformis* var. *macroura* Kük. in Engl. Pflzr. IV, 20 (1909) 491 et in Journ. Russ. Bot. 3-6 (1911) 135. - *C. pediformis* var. *rhizina* Kük., 1. c., pro pl. *sibiricam*.

Perennial, light green, loosely caespitose plants, with creeping branching rhizome; culms nodding, scabrous nearly down to base, 30-50 cm tall; leaves flat, soft, 2-3 mm broad, long-attenuate, equaling the culm; lower sheaths castaneous; spikelets 2-4, distant: the terminal spikelet staminate, always overtopping the pistillate, lance-linear to lance-clavate, 1-2.5 cm long, with ovate, ferruginous, broadly hyaline-margined, subacute to subobtusate scales; other spikelets pistillate, linear, 1-2 cm long, few-flowered, on peduncles to 3-4 cm long; bracts sheathing, 1-2 cm long, ferruginous and membranaceous-margined at summit, cuspidate; pistillate scales ovate, subobtusate, rufous, with a light midrib and broad hyaline margin, as long as perigynia; perigynia obovoid, rounded-trigonus, 3-3.5 mm long, greenish-yellow, regularly short-pilulose, without distinct nerves, rather abruptly contracted into a very short, oblique, slightly bidentulate beak. Fr. May-mid June. (Plate XIX, fig. 4).

368 Forests. - European part: Volg.-Kam. (Ural); West. Siberia: Ob., Irt., Alt.; East. Siberia: Yenis., Ang.-Sayan., Daur., Len.-Kol; Centr. Asia: Dzhung.-Tarb. (Daur.). Gen. distr.: Northern Mongolia. Described from Tobol'sk. Type in Leningrad.

288. *C. sutschanensis* Kom. in Bull. Jard. Bot. Pétersb. XVI (1916) 155; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I, 306. - *C. pediformis* Kom. et Alis. Key pl. east.reg. USSR, I (1931) 306, non C.A.M. - *C. pediformis* var. *macroura* Kük. in Engl. Pflzr. IV, 20 (1909) 491 et in Journ. Russ. Bot. 3-6 (1911) 135, quoad pl. *amur.* - *C. pediformis* var. *intermedia* inter α et β Maxim. Prim. fl. Amur. (1859) 310. - *C. oblique* Freyn. in Oester. Bot. Zeitschr. LIII (1903) 28, non Turcz. - *C. pediformis* var. *floribunda* Korsh. in A.H.P. XII (1892) 409.

Perennial, cineraceous-green plants with short creeping ascending rhizome, forming dense tussocks; culms faintly triangular, smooth, 15-35 cm tall; leaves subcanaliculate, erect (becoming flexuous, decumbent), flat, 2-3 mm broad, or subrevolute-margined, shorter than the culm (the old ones longer and crisped at base), lower sheaths brown; spikelets 2-3, distant: the terminal spikelet staminate, clavate, plumpish, 1.5-2 cm long, with oblong-ovate obtuse tawny hyaline-margined scales; other spikelets pistillate, linear oblong, 1-1.8 cm long, contracted, loose, on peduncle 0.5-1.5 cm long; bract with truncate sheath to 1 cm long, bearing a setiform blade; pistillate scales ovate, convex, rounded at summit, mucronate, ferruginous, hyaline-margined, shorter than perigynia, the midrib prominent, scabrous above; perigynia obovoid, convexly trigonus; 3.5 mm long, at length flavescent, regularly short-puberulent, obsoletely nerved, cuneate-based, on a cuneate spongy curved stipe, abruptly contracted into a very short curved subemarginate beak. Fr. June.

Dry steppe slopes and dunes. - Far East: Ze.-Bur., Uss. Gen. distr.: Manchuria. Described from estuary of river Suchan, near the village Amerikanka. Type in Leningrad.

289. *C. pediformis* C.A.M. in Mém. Ac. St. Pétersb. Sav. Étr. I (1831) 219, tab. X, fig. infer.; Trev. in Ldb. Fl. Ross. IV, 290, ex p.; Meinsh. in A.H.P. XVIII, 3 (1901) 402; Kük. in Engl. Pflzr. IV, 20 (1909) 490 et in Journ. Russ. Bot. 3-6 (1911) 135, ex p. - *C. pellucida* Turcz. ex Trev. in Ldb., l.c. - *C. pediformis* β *pellucida* Meinsh., l.c. 403 (excl. synonym.). - *C. rhisodes* var. *abbreviata* Meinsh., l.c., 404. - *C. Chamissoi* Bcklr. in Linnaea, XLI (1877) 145.

369 Perennial, cinereous-green plants, with ascending short ligneous rhizome, forming dense tussocks; culms erect, firm, obscurely triangular, scaberulous above, nearly smooth, 10-35 cm tall; leaves rigid, erect or curving, flat to revolute-margined, 1.5-2.5 mm broad, long-attenuate, shorter than the culm; lower sheaths ferruginous-brown or ochreous-brown; spikelets 2-3, distant, or the 2 uppermost approximate: the terminal spikelet staminate, not exceeding or shorter than the adjoining pistillate spikelet, often deflected by it, clavate to obovoid, 0.6-1 cm long, with tawny or ferruginous hyaline-margined ovate subacute scales; other spikelets pistillate, oblong-linear, 1-2.5 cm long, few-flowered, on peduncle to 2-2.5 cm long; bracts with sheath 1-2.5 cm long, ferruginous and hyaline-margined at the summit, awn-pointed, pistillate scales ovate, acute, convex, carinate, scabrous on the midrib, green at center, broadly hyaline-margined, as long as perigynia; perigynia obovoid-conic, convexly trigonous, 3-3.5 mm long, yellowish or at summit rusty-green, sparsely long-pilose along the stoutish nerves, gradually tapering into a short conic obsolete bidentulate beak. Fr. May. (Plate XIX, fig. 3, 3a).

Steppe and stony slopes. - Arctic: Arct. Eur. (upper course of Ussa-Adak); European part: Vlg.-Kas. (from Kazan along Kama; Ural), Volg.-Don. (Zhiguli), Zavolzh.; West. Siberia: Ob. (along the Irtysh River) in Tyukalinskii Distr.), Upp. Tob., Irt., Alt., East. Siberia: Yenis. (s), Ang.-Sayan., Daur., Len.-Kol. (s. part); Far East: Ze.-Bur. Gen. distr.: Mongolia. Described apparently from former Irkutsk Prov. (or Dauriya?), although Tilesius, on whose specimen the description was based, had not been there. Type in Leningrad.

ECONOMIC IMPORTANCE. Excellent spring forage for all kinds of livestock. Approaches *C. pachystylis* Gay. in feed value.

290. *C. aneurocarpa* V. Krecz. sp. nova in Addenda, II, 614. - *C. pediformis* Meinsh. in A.H.P. XVIII, 3 (1901) 402 et β *pellucida* Meinsh., ib., 403, quoad pl. As. med. - *C. pediformis* Kük. in Engl. Pflzr. IV, 20 (1909) 490, quoad pl. As. med. et Dshungar, non C.A.M. - *C. cardiolepis* C.B. Clarke ex B. Fedtsch. in A.H.P. XXXVIII, 1 (1924) 212, non Nees. - *C. pediformis* var. *nana* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 101.

Perennial, glaucous-green plants, with oblique short rhizome, forming dense tussocks; culms firm, curving, obscurely triangular, scaberulous above, 10-40 cm tall; leaves rigid, strict or falcate, flat to subplicate, 2-3 mm broad, rather long-attenuate, 1/3-1/2 the length of culm; lower sheaths brown, strongly fracturing-fibrillose; spikelets 2-3, distant: the terminal spikelet staminate, clavate to obovoid, 1-1.5 cm long, with oblong-ovate tawny broadly hyaline scales; other spikelet pistillate, remote from the staminate spikelet (thus often overtopped by the latter), oblong, 1-2.5 (3) cm long, sparsely flowered, on peduncle to 4-5 cm long; bracts with sheath to 2 cm long, ferruginous and broadly hyaline at apex, nearly straight-

370 truncate, with awn to 1 cm long, pistillate scales broadly ovate, subobtusate, mucronate, ferruginous or tawny, with a light terminally scabrous midrib, and hyaline margin, slightly longer than perigynia; perigynia obovoid, convexly trigonous, 3.5-3.8 mm long, rather densely short-pilose on the angles and near the summit, glabrous on the ribs, brownish-green, at length brunescent and somewhat lustrous, nerveless, rather gradually tapering into a barely definite oblique entire beak. Fr. May.

Alpine and subalpine meadows. - West. Siberia: Irt. (Kokchetavskie Mountains); Centr. Asia: Pribalkh., Dzhung. - Tarb., Tyan'-Shan. (Ketmen', Talass. Alatau, Kenkol.). Gen. distr.: Kulja. Described from Kulja, Horgos. Type in Leningrad.

291. *C. Kirilowii* Turcz. in Bull. Soc. Nat. Moscou, XXVIII (1855) 340; Fl. baic.-dah. II, 2 (1856) 275; V. Krecz. in Fl. Transb. II, 128. - *C. amblocarpa* Turcz. in Bull. Soc. Nat. Moscou, XI, 1 (1838) 103 (nomen), non Willd. - *C. glauca* Trev. in Ldb. Fl. Ross. IV (1853) 297, ex p., non Scop. - *C. pediformis* Kuk. in Engl. Pflzr. IV, 20 (1909) 490 et in Journ. Russ. Bot. 3-6 (1911) 135, ex p., non C. A. M. - *C. pediformis* β *pellucida* Meinsh. in A. H. P. XVIII, 3 (1901) 403, ex p.

Perennial, yellowish to pale green, densely caespitose plants, with short creeping branching rhizome; culms slenderly setiform, scabrous above, flexuous, 10-30 cm tall; leaves stiffish, flat to subinvolute, 1-2 mm broad, long-attenuate, erect, about half as long as the culm; lower sheaths rufous; spikelets 2-3, distant: the terminal spikelet staminate, slightly exceeding the others, lanceolate or clavate, 0.8-1.2 cm long, its scales oblong, setiform, tawny, hyaline at margins and summit; other spikelets pistillate, linear, 1.5-2 cm long, few-flowered, on peduncles to 2 cm long; bracts with sheaths to 2 cm long, the lowest bearing a blade to 2-2.5 cm long; pistillate scales obovate, rounded-truncate to emarginate, ferruginous, equaling to exceeding the perigynia, the midrib light, scabrous above, excurrent in a short point; perigynia obovoid, rounded-trigonous, 2.8-3 mm long, greenish-brown, regularly short-puberulent, with 2-3 stoutish nerves, cuneate-based, gradually tapering into a barely definite, slightly emarginate, brown beak. Fr. June.

Rocks and screes in bare mountain zone. - East. Siberia: Ang. - Sayan (Nukhu-Daban), Duar., Len.-Kol. (s. part). Endemic. Described from Nukhu-Daban Mountains (near Dzhylygn Pass). Type in Leningrad.

Section 35. *Lamprochlaenia* (Boern.) V. Krecz. - Boern. in Abh. Naturw. Ver. Brem. XXI (1912) 272 (pro genere). - Meadow-steppe plants, loosely or densely caespitose, with creeping rhizomes; culms in clumps (rarely in rows), covered at base with purplish-brown or reddish-brown sheaths. Culms triangular. Bracts scale-like or consisting of a distinct

371 sheath and blade. Inflorescence of 2-5 spikelets, of these 1 (2-3) staminate, the others pistillate. Perigynia coriaceous, ovoid, rounded-trigonous, (2) 2.5-4 mm long, nerveless or more or less ribbed, gradually tapering into a smooth, cylindrical, hyaline-tipped, obliquely truncate beak. Style enlarged at base; stigmas 3.

1. Rhizomes slender, creeping; culms arranged in rows, smooth; leaves thin, 1-1.2 mm broad; spikelets silvery-green, on long slender peduncles, sparsely flowered; bracts bladeless, consisting merely of a long sheath 2.

- + Rhizomes short, giving rise to loose or compact tufts; culms in clumps, scabrous; leaves stiffish, to 3.5 mm broad; spikelets colored, sessile or the lower ones short-peduncled, loose or dense; bracts scale-like or with weakly developed sheath and blade 3.
- 2. Leaves to 1 mm broad, half as long as the culm; staminate spikelet usually not exceeding the pistillate spikelets; pistillate spikelets 2-6-flowered, their scales shorter than perigynia; perigynia 3.5-4 mm long, olivaceous, lustrous, invaginated on one side. . . 292. *C. alba* Scop.
- + Leaves barely 0.5 mm broad, as long as the culm; staminate spikelet exceeding the pistillate spikelets; pistillate spikelets 2-4-flowered, their scales as long as perigynia; perigynia 3 mm long, dark brown, dull (?), not invaginated 293. *C. ussuriensis* Kim.
- 3. Spikelets with perigynia loosely arranged on a geniculate axis; perigynia rounded-ovoid, 2-2.5 mm long, the upper perigynia and scales purple; culms smooth; lower sheaths sanguine lustrous. (Arctic). 294. *C. glacialis* Mackenzie.
- + Spikelets rather dense, with straight axis; perigynia ovoid, (2.5)2.8-4 mm long, honey yellow or brownish, lustrous; culms scabrous; lower sheaths reddish-brown 4.
- 4. Bract scarious, awned; spikelets 2-3, sessile, few (3-15)-flowered, more or less globular 5.
- + Bract with sheath 8-15 mm long, blade-bearing, spikelets (2)3-5, the lower peduncled, many-flowered, oblong 7.
- 5. Perigynia 3.5-4 mm long, ribbed; pistillate spikelets 6-15-flowered; plants 20-40 cm tall. (Siberia). 296. *C. Korshinskyi* Kom.
- + Perigynia 2.5-3 mm long, smooth; pistillate spikelets 2-7-flowered; plants 5-15 cm tall. 6.
- 6. Spikelets 3-7-flowered; perigynia yellow to honey-colored, rather dull, at length brunescent, rounded-obovoid, abruptly contracted into a short beak; scales up to 2/3 the length of perigynia, broad-ovoid, obtuse to acuminate; densely caespitose plants; culms erect, in clumps 297. *C. supina* Willd.
- 372 + Spikelets 2-5-flowered; perigynia ferruginous-brown above, lustrous, oblong-ovoid to ovoid, gradually tapering into a somewhat prolonged beak; scales nearly equaling the perigynia, ovate, acute; loosely caespitose plants; culms solitary, ascending 295. *C. spaniocarpa* Steud.
- 7 (4). Perigynia with a straight beak of medium length; spikelets oblong, 1-2 cm long, rather dense, the lower pedunculate 8.
- + Perigynia with a short, slightly curved beak; spikelets elongate, 1.5-3 cm long, rather loose, long-peduncled 10.
- 8. Pistillate scales broad-ovate, obtuse or nearly so, much shorter than perigynia. (Crimea) 298. *C. nitida* Host.
- + Pistillate scales oblong-ovate, acute, equaling or exceeding the perigynia 9.

9. Compactly cespitose plants; culms and leaves papillose; scales castaneous, exceeding the perigynia; perigynia obovoid, abruptly contracted into beak with distinct, finally evanescent nerves. (Centr. Asia) 299. *C. turkestanica* Rgl.
- + Loosely ferruginous plants; culms and leaves not papillose; scales ferruginous, equaling to slightly exceeding the perigynia; perigynia oblong-ellipsoid, gradually tapering into a beak, with 5-6 costate nerves. (Caucasus, Crimea) 300. *C. Bordzilowskii* V. Krecz.
- 10 (7). Spikelets 3-5, of which 1-3 staminate; pistillate spikelets rather loosely few-flowered, usually staminate at summit. (Turkestan). 11.
- + Spikelets 2-3; staminate spikelet solitary; pistillate spikelets rather dense above, many-flowered, without staminate flowers at summit. (Transbaikal Reg.) 301. *C. relaxa* V. Krecz.
11. Culms scabrous, weak; leaves nearly as long as the culm, weak, green; scales longer than perigynia; perigynia (immature) 2.5(3) mm, long, smooth; forest plants 302. *C. unguurensis* Litw.
- + Culms nearly smooth, firm; leaves stiffish, half as long as the culm, grayish-green; scales shorter than to as long as perigynia; perigynia (mature) 4 mm long, scaberulous-margined above; saxicolous steppe plants 303. *C. minutiscabra* Kük.

Cycle 1. *Leucophaea* C. Krecz. - Rhizomes slender, creeping; culms arising in rows, obtusely 3-angled, slender, smooth. Leaves setaceous, 1-1.2 mm broad. Inflorescence of 2-4 distant spikelets: the terminal spikelet staminate, silvery, not exceeding the pistillate, other spikelets pistillate, linear, loosely few-(2-6)-flowered, peduncles long, erect, slender, the lower to 3 cm long. Lowest bract with a long sheath (to 2 cm), bladeless. Perigynia coriaceous or thin-coriaceous, obovoid, sulcate, contracted into a truncate beak.

292. *C. alba* Scop. Fl. carn., ed. 2, II (1772) 216; Trev. in Ldb. Fl. Ross. IV, 288; Meinsh. in A. H. P. XVIII, 3 (1901) 361; Kük. in Journ. Russ. Bot. 3-6 (1911) 139; Grossh. Fl. Kavk. I, 170. - Kük. in Engl. Pflzr. IV, 20 (1909) 501, fig. 79 A-E. - Exs.: Kneuck. No. 116.

Perennial, light, stramineous plants, with long creeping slender brown stolons; culms arranged in rows, 10-25 cm tall; leaves stiffish, falcate, to 1.5 mm broad, setaceous-involute, short-acuminate, scabrous, half as long as the culm; spikelets 2-4, subdistant: the terminal spikelet staminate, short-peduncled, often placed below the base of adjoining pistillate spikelet, lance-linear, 0.5-1.5 cm long, with lanceolate, obtuse, tawny or stramineous scales; other spikelets pistillate, linear, 0.5-1 cm long, loosely 2-6-flowered along a flexuous axis, peduncles slender, erect, to 3 cm long; lowest bract to 1 cm long, ferruginous-green, hyaline-tipped, sub-obtuse; pistillate scales ovate, acute, tawny to almost stramineous, with a green midrib, hyaline-margined, shorter than perigynia; perigynia coriaceous, ellipsoid or obovoid, rounded-trigonous, invaginated on one side, 3.5-4 mm long, stramineous, smooth, sulcate, sessile, rather gradually

tapering into a narrowly conic, hyaline-tipped, obliquely truncate, light-colored beak. Fr. June-July.

Gypseous and calcareous rock faces, sands, peat bogs. - European part: Dv.-Pech. (Pinega, Timanskie Mts), Volg.-Kam. (Centr. Ural); Caucasus; Dag.; West. Siberia: Ob. (Saratovo, on the Irtysh), Alt.; East. Siberia: Yenis. (Low. Tunguska), Ang.-Sayan. (Tunkinsk. Rgn. and Baikal), Daur. (Cisbaikal Rgn.), Len.-Kol. (Khatanga-Aldan). Gen. distr.: West. Europe. Described from Austria (Kraina, Idria).

293. *C. ussuriensis* Kom. in A. H. P. XVIII, 6 (1901) 443 et Fl. Mandsh. I (1901) 375; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I, 306. - *C. alba* subsp. *ussuriensis* Kük. in Engl. Pflzr. IV, 20 (1909) 500 et in Journ. Russ. Bot. 3-6 (1911) 140. - *C. alba* Korsh. in A. H. P. XII (1892) 409, non Scop.

Perennial, light green, loosely cespitose plants, with creeping rhizome and long slender stolons; culms 20-35 cm tall; leaves long, flexuous, stiffish, setaceous-involute and hence only 0.5 mm across, long-attenuate, as long as the culm or nearly so; spikelets 2-3, distant: the terminal spikelet staminate, exceeding the pistillate, lance-linear, 1-2 cm long, with oblong obtuse stramineous hyaline-margined scales; other spikelets pistillate, loosely 2-4-flowered along a subflexuous axis, peduncles slender, erect, 374 to 3 cm long; bract with a sheath to 2 cm long, greenish, hyaline-margined, subobtuse; pistillate scales ovate, abruptly pointed, pale yellow, with a slender midnerve, rather broadly hyaline-margined, nearly equaling the perigynia; perigynia obovoid, convex-trigonal, 3 mm long, yellowish-green, becoming blackish-brown, sulcate, sessile, rather gradually tapering into a conic, moderately long, hyaline-tipped, light-colored beak. Fr. June.

Forests, mostly coniferous. - Far East: Ze.-Bur., Uss. Gen. distr.: Manchuria. Described from Kazan' mine in the Sutar River valley. Type in Leningrad.

Cycle 2. *Liparichlaena* V. Krecz. - Culms arising in bunches, firm, 3-angled, scabrous. Leaves flat or subinvolute, to 3.5 mm broad. Inflorescence of 2-5 approximate spikelets; the terminal spikelet (or 2-3-terminal ones) staminate, dark-colored, exceeding the pistillate; pistillate spikelets globose to oblong, fairly dense to fairly loose, sessile, or the lower pedunculate. Lowest bract scarious, bladeless or with more or less distinct sheath and blade. Perigynia coriaceous, ovoid, mostly without distinct nerves, attenuate to somewhat obliquely truncate beak.

Series 1. *Pseudo-pedatae* V. Krecz. - Lower sheaths sanguine-purple; spikelets small, 2-6-flowered; perigynia 2-2.5 mm long, globose-ovoid. Plants 5-20 cm tall; culms smooth.

294. *C. glacialis* Mackenzie in Bull. Torr. Bot. Club. XXXVII (1910) 244. - *C. pedata* Whlb. Fl. lapp. (1812) 239, tab. 14; Trev. in Ldb. Fl. Ross. IV, 236; Kük. in Engl. Pflzr. IV, 20 (1909) 495 et in Journ. Russ. Bot. 3-6 (1911) 137, nec L., nec Bell-Exs: Pl. Finl. Exs. No. 535, 536; Kneuck. No. 24; Dörf. No. 4793.

Perennial, light green, densely cespitose plants, with short creeping rhizome; culms strict, smooth, 5-20 cm tall; leaves channeled, 1-1.5 mm broad, hispid-margined, somewhat thickened, slender above, crisped, about half as long as the culm; lower sheaths purple, sublustrous; spikelets 2-3, approximate: the terminal spikelet staminate, linear, 0.4-0.8 cm long, with

oblong, obtuse, ferruginous, narrowly hyaline-margined scales; other spikelets pistillate, 0.5-0.8 cm long, loosely (2-5)-flowered along a flexuous axis, on peduncles to 5 mm long; lowest bract short-sheathing, scarious, acute, barely 2-3 mm long; pistillate scales broadly ovate, abruptly pointed, purplish-brown, light-centered, broadly hyaline above, shorter than perigynia; perigynia obovoid, rounded-trigonous, 2-2.5 mm long, greenish, nerveless, purple above, broadly cuneate-based, sessile, rather abruptly contracted into a short, straight, obliquely truncate, hyaline-margined beak. Fr. June-July.

375 Stony tundra.- Arctic: Arct. Sib., Anad., Chuk., European part: Dv.-Pech.: upper course of river Ussa; Ural-Denezhkin, Sukhoi, Semigolovyi and Konzhakovskii Kamin, and other places in Centr. and Northern Ural; East. Siberia: Yenis. and Len.-Kol. (n. part). Gen. distr.: circumpolar. Described from Swedish Lapland.

295. *C. spaniocarpa* Steud. Syn. Cyp. (1855) 225. - *C. oligocarpa* Hornm. Plantel., ed. 3, II (1837) 270, non Schkuhr, nec Muehleb. - *C. supina* Gorodk. ex Soczava in Journ. Soc. Bot. Russ. XV, 4 (1930) 308, non Willd.

Perennial, cineraceous-green, loosely caespitose plants, with rather long, slender, horizontally spreading, reddish-brown rhizomes; culms slender, scabrous above, 5-15 cm tall, covered at base with reddish entire sheaths; leaves curving or flexuous, plicate, 1-1.5 mm broad, long-attenuate, shorter than the culm; spikelets 2-3: the terminal spikelet staminate, lance-linear, 0.5-1 cm long, with ferruginous lanceolate acute scales; other spikelets sessile at the base, pistillate, hemispherical, barely 0.5-0.6 cm in diam., containing 2-5 divaricate spikelets; lowest bract scarious, short-aristate, scarcely sheathing, ferruginous; pistillate scales ovate, acute, ferruginous, with a lighter midrib, white-hyaline-margined, nearly equaling the perigynia; perigynia ovoid to oblong-ovoid, rounded-trigonous, 2.8-3.5(4) mm long, ferruginous-brown above, lustrous, nerveless, subsessile, rather gradually (not abruptly) tapering into a short cylindrical white-hyaline-tipped truncate beak. Fr. July-August.

Dry and sandy exposed places.- Arctic: Anad. (in the valley or river Belaya, left tributary of Anadyr, near Drakliv Cape; *ibid.* facing Bitcho Mts). Gen. distr.: Greenland, Labrador. Described from Greenland.

296. *C. Korshinskyi* Kom. Fl. Mandsh. I (1901) 394. - *C. costata* Turcz. ex Bess. in Flora XVIII, Beibl. 1 (1834) 27 (nomen); V. Krecz. in Fl. Transb. II (1931) 126, nec Presl. nec Schw. - *C. aprica* Turcz. ex Bess., l. c., ex p.; Korsh. in A. H. P. XII (1892) 410 (nomen). - *C. supina* Trev. in Ldb. Fl. Ross. IV (1853) 305, ex p.; Turcz. Fl. baic.-dah. II, 2 (1856) 283, non Willd. - *C. supina* var. *costata* Meinsh. in A. H. P. XVIII, 3 (1901) 392; Kük. in Engl. Pflzr. IV, 20 (1909) 457 et in Journ. Russ. Bot. 3-6 (1911) 123. - *C. supina* var. *Korshinskii* Kük. in Engl. Pflzr., l. c., et in Journ. Russ. Bot. l. c. - *C. Turtschaninofii* Steud. Nomencl. bot., ed. 2, I (1841) 297 (nomen). - Exs.: HFR No. 494, 1946 a et b.

Perennial, cineraceous-green, densely caespitose plants, with slender creeping rhizomes; culms scabrous above, 20-40 cm tall; leaves flat to subplicate, 1-2 mm broad, revolute-margined, long-attenuate, about equaling the culm; lower sheaths reddish-brown, fracturing reticulate-fibrillose; spikelets 2-3, subdistant: the terminal spikelet staminate, linear-clavate,

376 1.5-2.5 cm long, with oblanceolate subacute tawny white-hyaline-margined scales; other spikelets pistillate, globular, globular-ovoid, or ovoid, 0.6-1.3 cm long, densely 6-15-flowered, sessile; lowest bract scarious, with an awn barely equaling the spikelet; pistillate scales ovate, acute, narrowly brownish, with a light median band and broadly white-hyaline margins, as long as perigynia; perigynia ovoid to ellipsoid, convex-trigonus, 3.5-4 mm long, golden-yellow, becoming lustrous, 5-6-ribbed, subcuneate-based, smooth at summit, rather gradually tapering into a short, hyaline-tipped, obliquely truncate beak. Fr. May.

Slopes, coppices, sands, and sandy steppes; - East. Siberia: Ang.-Sayan., Daur., Len.-Kol. (s.w. part); Far East: Ze.-Bur., Uss. Gen. distr.: Northern Mongolia, Manchuria. Described from Suifun River valley (between Nikol'sk-Ussuriiskii and Poltavskaya). Type in Leningrad.

297. *C. supina* Willd. ex Whlb. in Sv. Vetensk. Ak. Nya Handl. XXIV (1803) 158; Trev. in Ldb. Fl. Ross. IV, 305; Kük. in Journ. Russ. Bot. 3-6 (1911) 122, ex p. - *C. Schkuhrii* Willd. Sp. Pl. IV (1805) 264; M. B. Fl. taur.-cauc. II, 387. - *C. supina* ssp. *eurasiatica* V. Krecz. in Fl. Transb. II (1831) 125. - Ic.: Kük. in Engl. Pflzr. IV, 20 (1909) 456, fig. 72 A-G. - Exs.: Kneuck. No. 18, 19.

Perennial, cineraceous-green, densely caespitose plants, with creeping rhizome and slender stolons; culms erect, arising in bunches, scabrous above, 5-15(20) cm tall; leaves narrow, flat to setaceous-involute, 1-1.5 mm broad, long-attenuate, shorter than the culm; lower sheaths purplish-brown, fracturing reticulate-fibrillose; spikelets 2-3, congested; the terminal spikelet staminate, lanceolate to lance-clavate, 0.8-1.3 cm long, with lance-linear acute tawny scales; other spikelets pistillate, globose to globose-ovoid, 0.5-0.8 cm in diam., sessile, densely 3-7-flowered; lowest bract scarious, short-aristate; pistillate scales broadly ovate, acuminate, tawny at center, with broad light or white hyaline margins and a yellow midnerve, to 2/3 as long as perigynia; perigynia subcoriaceous, globular-ovoid, rounded-trigonus, 3 cm long, golden or honey-yellow, at length lustrous and somewhat brunescent, nerveless, broadly rounded-subcuneate at base, abruptly contracted at summit into a very short cylindrical, obliquely truncate, white-hyaline-tipped beak. Fr. May.

Steppes and steppe slopes. - European part: Mid. Dnepr., Prichern., Volg. Don., Low. Don., Zavolzh., Low. Volg., Crimea; Caucasus: Cis-cauc., Dag., East. and South. Transcauc., West. Siberia: Ob., Upp. Tob., Irt., Alt., Centr. Asia: Aral.-Casp., Pribalkh. Gen. distr.: Tyrol, Austria, Hungary, Czechoslovakia, Silesia. Described from Central Europe.

ECONOMIC IMPORTANCE. A good pasture plant, but of no great economic importance, due to its small proportion in the grass-stand.

377 298. *C. nitida* Host, Gram. Austr. I (1801) 53; Trev. in Ldb. Fl. Ross. IV, 306, quoad pl. ross. et taur.; Vass. ex Wulff, Fl. taur. I: 2, 26. - *C. nitida* var. *conglobata* Vass., l.c., 27. - *C. obesa* Meinsh. in A. H. P. XVIII, 3 (1901) 392, quoad pl. taur., non Bell. - Ic.: Kük. in Engl. Pflzr. IV, 20 (1909) 456, fig. 72 H-L. - Exs.: Kneuck. No. 102; XII a, No. 39.

Perennial, cineraceous-green, loosely caespitose plants, with slender rhizomes; culms erect, scaberulous above, 8-15 (20) cm tall; leaves stiffish, strongly involute-margined, curving or flexuous, 1.5-3.5 mm broad,

scaberulous, long-attenuate or often withered at the ends, nearly equaling the culm; lower sheaths lateritious, slightly reticulate, the terminal spikelet staminate, clavate, 1-2 cm long, with oblong-ovate, subobtuse, tawny, rather broadly hyaline-margined scales; other spikelets pistillate, ovoid or oblong, 0.8-1.5 cm long, few-flowered, pedunculate, the lowest peduncle to 1 cm long; lowest bract with sheath to 5-8 mm long and blade shorter than to as long as inflorescence; pistillate scales broadly ovate, subacute (at base of spikelet) to subacute and obtuse (toward summit), ferruginous, with a light midrib, broadly hyaline-margined, shorter than perigynia; perigynia subcoriaceous, ovoid, convex-trigonous, 3.5-4 mm long, smooth above, initially yellowish-olivaceous, becoming olivaceous-brown, lustrous, with 3-5 costate basally distinct nerves, round-based, subsessile, rather abruptly tapering into a smooth cylindrical hyaline-margined moderately long beak. Fr. April-May.

Dry and stony mountain slopes, exposed places. - European part: Low. Don (northern coast of Azov Sea), Crimea (mountainous part). Gen. distr.: mountainous part of Western Europe, Balkan Pen. Described from Weinhaus (near Vienna).

299. *C. turkestanica* Rgl. in A.H.P. VII (1880) 570. - *C. nitida* var. β Trev. in Ldb. Fl. Ross. IV (1853) 306; C.A.M. in Ldb Fl. Alt. IV (1833) 226. - *C. nitida* var. *aspera* Kük. in Engl. Pflzr. IV 20 (1909) 458 et in Journ. Russ. Bot. 3-6 (1911) 124. - *C. obesa* Meinsh. in A.H.P. XVIII, 3 (1901) 392 (excl. syn. *C. borotalicola* - *calami lapsu!*), quoad pl. alt. et turkest. - *C. obesa* var. *aspera* Bcklr. in Linnaea, XLI (1877) 185. - *C. conglobata* var. *acuta* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 99. - *C. orientalis* Meinsh. in A.H.P. XVIII, 3 (1901) 393. - *C. heterostachya* var. *minor* Kük. in Engl. Pflzr. IV, 20 (1909) 721, quoad pl. turk.; B. Fedtsch. in A.H.P. XXXVIII (1924) 228. - Exs.: Herb. Kronenb. No. 76, 77.

378 Perennial, cineraceous-yellowish-green plants, with long rhizomes, forming compact tufts; culms firm, papillose nearly to base (becoming more or less smooth), erect or arched, 15-35 cm tall; leaves rigid, curving or flexuous, flat, 2-3.5 mm broad, revolute-margined, finely triangular-pointed, wilting at the tips, strongly crowded at culm base, half as long as the culm; lower sheaths reddish-brown, tightly covered to considerable height with split remnants of old sheaths; spikelets 3-5, the lower distant: the terminal 1-2 staminate, lance-clavate, 1-2.5 cm long, with castaneous acute white-hyaline-margined scales; other spikelets oblong, 1-2 cm long, loosely-flowered (especially below), short-peduncled, the lowest sometimes divergent; lowest bract with sheath to 8 mm long and blade shorter than inflorescence; pistillate scales oblong-ovate, long-acuminate, with a light midnerve, subhyaline-margined, mostly longer than perigynia; perigynia obovoid, convex-trigonous, 3.5-4 mm long, yellowish- or brownish-green, scaberulous, becoming tawny, rather smooth and somewhat lustrous (or the nerves light-colored only at first, at length concolor), subsessile, rather abruptly tapering into a moderately long, cylindrical, obliquely bidentate-emarginate, hyaline-tipped beak. Fr. April-June.

Mountain steppes, stony slopes, juniper groves (up to 2,700 m. alt.). - West. Siberia: Alt.; Centr. Asia: Dzhung.-Tab., Pribalkh. (e.), Tyan'-Shan., Pam.-Al. Gen. distr.: Kulja, Dzungaria, Kashmir, Afghanistan. Described from Aleksandrovsii Range (Aishmara). Type in Leningrad.

300. *C. Bordzilowskii* V. Krecz. sp. nova in Addenda, II, 615. - *C. nitida* Trev. in Ldb. Fl. Ross. IV (1853) 306; Kük. in Engl. Pflzr. IV, 20 (1909) 457, quoad pl. cauc.; Grossh. Fl. Kavk. I, 166. - *C. nitida* var. *iberica* Bordz. in herb. - *C. obesa* Boiss. Fl. Or. V. (1884) 414, Meinsh. in A.H.P. XVIII, 3 (1909) 392, quoad. pl. cauc.

Perennial, cineraceous-green, loosely caespitose plants with long stolons; culms erect to slightly curving, rather firm, scabrous above, 10-25 cm tall; leaves rather rigid, scabrous, rather strongly revolute, 1.5-3 mm broad, curved or flexuous, long-attenuate, shorter than the culm; lower sheaths purplish-brown, reticulate; spikelets 2-4, subdistant; the terminal spikelet staminate, oblong-clavate, 1-2 cm long, its scales lanceolate, subacute, ferruginous, with lighter-colored or hyaline margins; other spikelets pistillate, ovoid or oblong, 1-2 cm long, rather loosely flowered, pedunculate, the lowest peduncle to 2 cm long; lowest bract with sheath to 1-1.5 cm long and blade shorter than to equaling the inflorescence; pistillate scales oblong-ovate, gradually subcuneate-pointed, ferruginous, 2-nerved, with a light internerve, hyaline-margined, equaling to slightly exceeding the perigynia; perigynia semicoriaceous, oblong-ellipsoid, convex-trigonal, 3.8-4 mm long, greenish-yellow and scattered-setulose, becoming smooth olivaceous-brown sublustrous, with 5-6 costate nerves, round-based, subsessile, rather gradually tapering into a moderately long smooth cylindrical hyaline-tipped bidentate beak. Fr. April.

379 Stony mountain slopes. - European part: Crimea (Yaltinskaya Yaila, Alliya-Sarym, 1,100-1,290 m); Caucasus: all regions. Gen. distr.: Turkey, northern Persia. Described from surroundings of Tiflis (Telety Range). Type in Leningrad.

301. *C. relaxa* V. Krecz. sp. nova in Addenda, II, 616.

Perennial, cineraceous-green plants with ascending rhizome and slender stolons; culms slender, faintly triangular, scaberulous above to nearly smooth, 10-35 cm tall; leaves rigid, setaceous-convolute, crisp and flexuous at the tips, 1-1.5 cm broad, scabrous, long-attenuate, shorter than the culm; lower sheaths brown, with dark brown fibrillose remnants of old sheaths; spikelets 2-3, distant: the terminal spikelets staminate, lance-linear, 1.2-2.5 cm long, with light-ferruginous (fulvous) obtusish scales; other spikelets pistillate, 1-2 cm long, loosely few flowered, especially below, erect, on stout peduncles to 3 cm long; lowest bract with subferruginous-tipped sheath to 8-10 mm long and a setiform-convolute blade, this usually equaling to exceeding the spikelet; pistillate scales ovate, subulate-pointed, tawny, with a prominent white nerve, nearly equaling the perigynia; perigynia obovoid, obsoletely subconvex-trigonal, 3 mm long, greenish-ferruginous, smooth, obsoletely few-costate, broadly cuneate-based, sessile, rather abruptly contracted into a slightly developed, suboblique, scarcely emarginate, light-colored beak. Fr. June.

Wet grassy sites. - East. Siberia: Daur.: between rivers Nercha and Kuenga, in the vicinity of the village Staroe Olovo, on the way to N. Klyuchi. Endemic. Described from the vicinity of St. Olov. Type in Leningrad.

302. *C. unguurensis* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 93; B. Fedtsch. in A.H.P. XXXVIII, I (1924) 217.

Perennial, green plants, with creeping rhizome and slender stolons; culms slender, rather weak, scabrous, 20-40 cm tall, leafy in lower part, covered at base with reddish-brown sheaths; leaves soft, long, 1.5-2 mm broad, long-attenuate, somewhat shorter than the culm; spikelets 3-5,

approximate: the terminal 1-3 staminate, linear, 1-1.5 cm long, with lanceolate, subulate-pointed drab scales; other spikelets pistillate, linear, 1.5-2 cm long, loosely flowered, erect, the slender scaberulous peduncles to 2-3 cm long; lowest bract with a sheath 0.5-0.8 cm long and narrow blade twice as long as the spikelet; pistillate scales ovate, rounded at summit, mucronate, ferruginous, broadly hyaline above, equaling to exceeding the perigynia; perigynia (immature) oblong-ovoid, trigonous, 2.5 (3?) mm long, lurid, nerveless, smooth-margined above, conic-based, rather abruptly terminating in a short entire truncate beak. Fr. May-June.

Centr. Asia: Tyan'-Shan.: Andizhanskii Distr., in the Kara-Ungur river valley (1,800m/alt.), in a spruce forest. Described from the site indicated. Type in Leningrad.

380 303. *C. minutiscabra* Kuk. ex. B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 212 (nomen) et in Addenda, II, 616.

Perennial, cineraceous-green plants, with a slender creeping rhizome and long stolons; culms faintly triangular, scaberulous above, nearly smooth, 30-50 cm tall; leaves rigid, straight, flat with strongly revolute margins, 2-3 mm broad, long-attenuate, half as long as the culm; lower sheaths light brown, fibrillose; spikelets 3-4, subdistant; the terminal 1-2 staminate, lance-linear to lance-clavate, 2-2.5 cm long, with lanceolate acute tawny hyaline-margined scales; other spikelets pistillate, staminate in upper part, loosely few-flowered below, 2-3 cm long, the short peduncles (to 1 cm) included in the bract sheaths; bracts with sheaths 0.4-1 cm long, the lowest with blade twice as long as the spikelet; pistillate scales ovate, acute, ferruginous, hyaline-margined, equaling the perigynia, the midnerve scabrous above; perigynia ellipsoid to obovoid, obsoletely trigonous, 4 cm long, yellowish-green, scaberulous only on the margin above, nerveless, broadly cuneate-based, rather abruptly terminating in a cuneate, fairly deep-bidentate brown-orificed beak.

Centr. Asia: Tyan'-Shan.?: Mt. Aktasty-tau in Dzharkent Distr. Thence described. Type in Leningrad.

Section 36. *Generisichia* (Heuff.) V. Krecz. - Heuff. in Flora, XXVII (1844) 528 (pro genere). - Rootstock creeping; culms 3-angled. Spikelets solitary, androgynous. Perigynia coriaceous or thin-coriaceous, broadly ellipsoid or obovoid, more or less trigonous, rather prominently nerved, short-stipitate, with a short, cylindrical, smooth or scaberulous beak. Achene trigonous, with or without rachilla. Stigmas 3.

1. Rhizome extensively creeping; leaves thin, scabrous; scales acute; perigynia coriaceous, ellipsoid, rounded-trigonous, round-based, sulcate-nerved 304. *C. obtusata* Liljeb.
- + Rhizome creeping; leaves thickened, rather smooth; scales obtuse; perigynia thin-coriaceous, obovoid, gradually attenuate at base, obsoletely nerved or nerveless 2.
2. Culms to 30 cm tall; spikelets 1-3 cm long, plumpish, oblong-clavate in staminate part, spherical to obovoid in pistillate part, containing 6-20 perigynia; plant of foothills 307. *C. argunensis* Turcz.
- + Culms 5-10 cm tall; spikelets 0.5-1.5 mm long, rather narrow, lanceolate in staminate part, oblong in pistillate part, containing 3-10 perigynia; plant of high mountains 3.
3. Perigynia 3-4.5 mm long; scales dark brown; lower sheaths entire 305. *C. rupestris* Bell.

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+ *Perigynia* 2-2.5 mm long, scales tawny; lower sheaths fracturing-fibrillose 306. *C. alticola* Popl.

Cycle 1. *Eu-Generisichia* V. Krecz. - Rhizome extensively creeping; leaves thin; scales acute; perigynia coriaceous, sulcate; achene with a long, often scale-like rachilla.

304. *C. obtusata* Liljeb. in Acta Holm. XIV (1793) 69, tab. 4; Trev. in Ldb. Fl. Ross. IV, 267. - *C. microcephala* C.A.M. in Ldb. Fl. Alt. IV (1833) 205; Ic. tab. 319. - *C. spicata* Schkuhr, Riedgr. I (1801) 11, tab. D, f. 15. - *C. decipiens* Turcz. in Bull. Soc. Nat. Moscou, XI, 1 (1838) 103 (nomen), non Gay. - Ic.: Syreish. Ill. Fl. Mosc. gub. I, 186. - Exs.: Kneuck. No. 62; HFR No. 1944a, 1944b.

Perennial; the extensively creeping rhizome and culm base covered with purple or purplish-brown scale-like sheaths; culms scaberulous above, 6-35 cm tall, leaves 1.5-2 mm broad, cineraceous, shorter than the culm, scabrous and subrevolute at the margins; spikelet dense, 0.5-2 cm long, with well developed staminate and pistillate part, the latter bearing (1)3-10(15) divaricate-tipped perigynia; scales ovate, acute, ferruginous, with a broad hyaline margin; perigynia ovoid to broad-ovoid, 2.5-3.5 mm long, inflated-trigonous, rounded, sulcate, rounded-cuneate at base, buff, finally blackish-brown, lustrous, abruptly terminating in a short cylindrical smooth beak; achene ovoid, trigonous, with rachilla its own length. Fr. May-June.

Dry grassy slopes, dry deciduous and pine forests, also mountains up to upper forest line. - European part: Dv. -Pech. (riv. Yula), Upp. Volg. (Serpukhovskii Distr.), Volg. -Kam. (Ural); Caucasus: Ciscauc. , Dag.; West. Siberia: Ob., Irt., Alt.; East. Siberia: Yenis., Ang. -Sayan, Daur., . Len. -Kol.; Far East: Uss.; Centr. Asia: Pribalkh. (Mt. Kent), Dzhung. -Tarb. (Saur). Gen. distr.: Centr. Europe, North America. Described from Sweden (Oland Isl. Köping). Type in Stockholm.

Cycle 2. *Petrograstis* V. Krecz. - Rhizome short-creeping; leaves thickened. Scales obtuse; perigynia thin-coriaceous, obsoletely nerved or nerveless. Achene without rachilla at base, or with an abbreviated rachilla.

305. *C. rupestris* Bell. ex All. Fl. Pedem. II (1785) 264, tab. 92, f. 1; Trev. in Ldb. Fl. Ross. IV, 267. - *C. petraea* Whlb. in Sv. Vetensk. Ak. Nya Handl. XXIV (1803) 139.

382 Perennial; rhizome short-creeping; culm scaberulous, 5-20 cm tall; culm base and offshoots covered with ochreous or castaneous-brown sheaths; leaves 2-2.5 mm broad, thin and crisp at the tips; spikelets 1-2.5 cm long, the pistillate part with 3-10 scattered perigynia; scales obovate, obtuse to subacute, castaneous-brown; perigynia oblong-obovoid, trigonous, 3-4 mm long, obsoletely nerved, attenuate long-tapering at base, ferruginous-green, finally brown, abruptly contracted into a short, smooth or scabrous beak; achene usually without rachilla.

Rocks and stony slopes. - Arctic: Nov. -Zem., Arct. Eur., Arct. Sib.; European part: Kar. -Lap. (n. part), Dv. -Pech. (Ural), Volg. -Kam. (Ural); Caucasus: East. Transcauc. (Mt. Atsunta); West. Siberia: Alt.; East. Siberia: Yenis., Ang. -Sayan., Daur., Len. -Kol; Far East: Ze. -Eur. (?). Gen. distr.: Europe, North America, Mongolia. Described from Piedmont. (Alps at Otare).

306. *C. alticola* Popl. ex Sukatshev, Tr. Amur. eksp. 1910, I, 2 (1912) 277 et in Trav. Mus. Bot. St. Pétersb. XII (1914) 178; Gorodk. in

Trav. Mus. Bot. Ac. URSS, XX (1927) 210, fig. 3; V. Krecz. in Fl. Transb. II, 114. - *C. obtusata* var. *tungirica* Popl., ib., 277.

Perennial; rhizome short-creeping; culms more or less curving, scaberulous, 2.5-10 cm tall, covered at base with castaneous or ferruginous, more or less fracturing sheaths; leaves 1.5-1.8 mm broad, equaling the culm; spikelets 6-12 mm long, the staminate part not readily distinguishable from the pistillate part; perigynia appressed, 5-8 in number, scales obovate, obtuse, ferruginous; perigynia obovoid, convex-trigonus, 2-2.5 mm long, yellowish-green, with prolonged, abruptly attenuate base, gradually tapering into a short scabrous or smooth beak; achene with a short rachilla. Fr. June.

Mountains. - East. Siberia: Daur. (n.-e.), Len. Kol. (s.-e.); Far East: Okhot. (Dzhugdzhur.), Ze.-Bur. (n.-w.). Described from the range between Tungir and Olekma (facing Tungirikan estuary). Type in Leningrad.

307. *C. argunensis* Turcz. ex Bess. in Flora, XVIII, Beibl. 1 (1834) 27 (nomen) et ex Trev. in Ldb. Fl. Ross. IV (1853) 267; Fl. baic.-dah. II (1856) 258. - *C. rupestris* var. *Turcz.* in Bull. Soc. Nat. Moscou, XI (1838) 103.

Perennial; rhizome thick, creeping; culms curving, scaberulous, 10-30 cm tall, covered at base with castaneous to ochreous, basally fibrillose sheaths; leaves 2-3 mm broad, equaling the culm, rather smooth; spikelets 1-3 cm long, the staminate part large, broadly clavate, tawny, the pistillate part dense, containing 6-18 perigynia; scales broadly obovate, obtusely round-tipped, yellowish-castaneous to ferruginous; perigynia obovoid, convex-trigonus, 2.5-3 mm long, cuneate-attenuate at base, obsoletely nerved, rounded at summit, yellow to subferruginous, with a very short, smooth or scabrous beak; achene with a short rachilla. Fr. May.

Steppe, sandy, or stony slopes, sometimes dunes or woods. - East. Siberia: Ang.-Sayan. (e.), Daur. Gen. distr.: Northern Mongolia, Western Manchuria. Described from river Argun (near Tsurukhait). Type in Leningrad.

383 Section 37. *Kükenthalia* (Boern.) V. Krecz. - Boern. in Abhandl. Naturw. Ver. Brem. XXI (1913) 266 (pro genere). - Densely cespitose plants of sandy solonchaks, with a short rhizome. Culms 3-angled, smooth even in the inflorescence, covered at base with bladeless sheaths; leaves flat. Bracts sheathing. Inflorescence of 1-3 staminate and 2-5 pistillate spikelets, the latter scattered nearly down to culm base. Perigynia more or less coriaceous, lanceolate or oblong-ovoid, plano-convex, 6-12 mm long, nerved on outer face, short-stipitate, narrowly serrulate-winged on the margin from the base, gradually tapering into a prolonged, frontally strongly cleft, slightly inward-curved beak. Achene trigonus, free. Stigmas 3.

1. Perigynia in ranks, 10-12 mm long, scabrous on outer face, forming oblong-ovoid spikelets 2.5-4 cm long and 1 cm broad (or even broader) 308. *C. hordeistichos* Vill.
- + Perigynia not in ranks, 5-7 mm long, smooth, forming oblong-clavate spikelet 1-3 cm long and 0.6-0.7 cm broad 2.
2. Perigynia 5-6 mm long, 3-4 nerved on outer face, nerveless on inner face; scales not exceeding half the length of perigynia; pistillate spikelets 1-1.5 cm long, staminate spikelets on peduncles 0.5-0.8 cm long, barely exceeding the nearest pistillate spikelets; small plants, 5-20 cm tall 310. *C. eremopyroides* V. Krecz.

- + *Perigynia* 6-7 mm long, 5-7-nerved on outer face, 2-3-nerved on inner face; scales $\frac{2}{3}$ the length of perigynia; pistillate spikelets 1.5-3 cm long, the pistillate separated, on peduncles to 2-3 cm long; larger plants, 10-40 cm tall 309. *C. secalina* Willd.

308. *C. hordeistichos* Vill. Hist. pl. Dauph. II (1787) 221, tab. 6; Boiss. Fl. Or. V, 431; Meinsh in A.H.P. XVIII, 3 (1901) 380, ex p.; Kük. in Engl. Pflzr. IV, 20 (1909) 679; Grossh. Fl. Kavk. I, 176; Vass. ex Wulff, Fl. taur. 1:2, 31. - *C. secale* Trev. in Ldb. Fl. Ross. IV (1853) 300, ex p. - Ic.: Kük., l.c., 680, fig. 116. - Exs.: HFR No. 946; Kneuck. No. 55.

Perennial, cineraceous-green, densely caespitose plants; culms firm, 10-40 cm tall, leafy in lower third, covered at base with ferruginous-brown sheaths; leaves folded at base, subplane above, 3-5 mm broad, long-acuminate, longer than culm; spikelets 4-7, the terminal 1-3 approximate, staminate, narrowly clavate-cylindric, 1-2.5 cm long, with oblong obtuse drab hyaline-margined scales; other spikelets pistillate, oblong-ovoid, 2.5-4 cm long, dense, separated from the staminate, but mutually approximate, the upper ones sessile, the lower on peduncles to 1.5 cm long; lowest bract with a sheath to 1.5 cm long and an erect blade several times as long as the inflorescence; pistillate scales ovate, scute (the lower ones cuspidate), 384 carinate, scabrous above on the midrib, buff-green, 3-nerved, white-hyaline-margined, shorter than perigynia; perigynia arranged in 4-5 ranks, subdivergent, lanceolate, plano-convex, 10-12 mm long, stramineous becoming brownish-orange, sparsely scabrous, many-nerved, contracted from rounded base into a short stipe, narrowly serrulate-winged on the margin from base, gradually tapering into a prolonged, deeply membranaceous cleft, flattened, slightly inward-curved beak. Fr. May-July.

Near marshes, in gullies. - European part: Mid. Dnepr. (on the right side of Dnieper), Volg. - Don. (Khar'kovshchina), Low. Volg. (Astrakhan'), Crimea; Caucasus: All regions. Gen. distr.: Centr. and West. Europe, Mediterranean, Asia Minor (as far as Persia), North Africa. - Described from France (Dauphine, Gap in Hautes Alpes).

309. *C. secalina* Willd. ex Whlb. in Sv. Vetensk. Ak. Nya Handl. XXIV (1803) 151; Kük. in Engl. Pflzr. IV, 20 (1909) 681 et in Journ. Russ. Bot. (3-6) (1911) 174, quoad pl. altaicam et occid. -sibir.; Grossh. Fl. Kavk. I, 176. - *C. secale* Trev. in Ldb. Fl. Ross. IV (1853) 300, ex p. - *C. hordeistichos* Meinsh. in A.H.P. XVIII, 3 (1901) 380. - Exs.: HFR No. 1945 b; Kneuck. No. 56.

Perennial, cineraceous-green, densely caespitose plants; culms more slender than in preceding species, 10-40 cm tall, covered at base with pinkish-brown sheaths; leaves 2-3 mm broad, long-attenuate, exceeding the culm; spikelets 4-8, the terminal 1-3 staminate, approximate, lance-clavate, 1-2 cm long, on peduncles to 2-3 cm long, with obovate, subobtusate to obtuse, pale green scales; other spikelets pistillate, distant, oblong-clavate, 1.5-3 cm long, dense, loose below, the lower ones sometimes forking at base, on peduncles to 2.5 cm long; lowest bract with a broad hyaline-tipped sheath to 4 cm long and blade exceeding the inflorescence; pistillate scales ovate, acute, green at center, whitish-margined, $\frac{2}{3}$ the length of perigynia, the midrib scabrous above; perigynia not ranked, appressed, lanceolate, plano-convex, 6-7 mm long, light green, at length flavescent,

smooth, with 5-7 slender nerves on outer face and 2-3 on the inner face, rather abruptly contracted at base into a short stipe, narrowly serrulate-winged from base, gradually tapering into a flat, frontally cleft, bidentate beak. Fr. May-June.

Swampy situations, shores. - European part: Mid. Dnepr., Prichern., Zavolzh., Low. Volg.; Caucasus: (reported by Grossheim for Tiflisskii Distr.); West. Siberia: Upp. Tob., Irt., Alt.; East. Siberia: Ang.-Sayan. (Minusinskii Distr., Lake Krugloe); Centr. Asia: Aral.-Casp.; Pribalkh. Gen distr.: e. part of Western Europe, Kulja. Described from Austria. Type in Stockholm?

310. *C. eremopyroides* V. Krecz. sp. nova in Addenda, II, 617. - *C. secalina* Kük. in Engl. Pflzr. IV, 20 (1909) 681, quoad pl. sibir., ex p. et in Journ. Russ. Bot. 3-6 (1911) 174, quoad. pl. transb. et jakut.; V. Krecz. in Fl. transb. II (1931) 133, non Willd. - Exs.: HFR No. 1945a.

385 Perennial, cinereous-green, densely caespitose plants; culms 5-20 cm tall, covered at base with light pinkish-brown sheaths; leaves 2-3.5 mm broad, long-acuminate, longer than the culm; spikelets 4-6, the lower distant: the terminal 1-2 staminate, short-clavate, 0.8-1.2 cm long, with stipe barely 5-8 mm long, only slightly exerted from behind the adjoining pistillate spikelet, with oblong-ovate to lanceolate, acute, pale, green-centered scales; other spikelets pistillate, 1-1.5 cm long, rather dense, the lowest peduncle to 2 cm long, included in sheath; lowest bract with sheath to 2 cm long and blade exceeding the inflorescence; pistillate scales ovate, acute, whitish, at most half the length of perigynia, the green mid-rib scabrous above; perigynia not ranked, appressed, lance-ovoid to oblong-ovoid, plano-convex, 5-6 mm long, pale green, becoming pinkish-ferruginous, smooth, 3-4-nerved on outer face, nerveless on inner face, with broader margin (this serrulate from base), abruptly contracted from rounded base into a short stipe, gradually tapering into a prolonged, flat, membranaceous-cleft, bidentate, beak. Fr. June.

Sandy banks and brackish meadows. - East. Siberia: Ang.-Sayan., Daur., Len.-Kol. Gen. distr.: Northern Mongolia. Described from Selenginskaya Dauriya (Lake Gusinoe). Type in Leningrad.

Section 38. *Nastanthe* (Boern.) V. Krecz. - Boern. in Abhandl. Naturw. Ver. Erem. XXI (1913) 267 (pro subgenere generis *Proteocarpus* Boern.). - Plants of meadows and saline meadows, densely caespitose, devoid of stolons or nearly so. Culms 3-angled or obtusely 3-angled; leaves rather flat, short-acuminate. Bracts rather long-sheathing. Inflorescence of 1 (2) staminate and 2-5 pistillate spikelets, these crowded or scattered, the pistillate dense, the lower ones pedunculate. Perigynia divaricate, membranaceous or thin-coriaceous, ovoid or obovoid, inflated-triangular, 3-6 mm long, 5-8 nerved, round-based, subsessile, tapering into a straight or oblique, terminally bidentate-cleft or bidentate-emarginate, narrow beak. Stigmas 3.

1. Spikelets crowded in a head; the staminate spikelet subsessile, barely exceeding the pistillate spikelets (except *C. pulchella* Loenr. - see stage 4); lowest bract 3-4 times as long as inflorescence 2.
- + Spikelets distant; the staminate spikelet on a peduncle to 3 cm long, remote from the nearest pistillate spikelet; lowest bract shorter to slightly longer than the inflorescence (not more than twice as long) 9.

2. Perigynium-beak straight, short-bidentate, abbreviated (barely 1/4-1/3 the length of perigynium) (Plate XXI, fig. 4a, 5a) 3.
- + Perigynium-beak oblique (at least on lower part of spikelet), rather deeply cleft, at least half as long as perigynium body (Plate XXI, fig. 1a, 3a) 7.
- 386 3. Perigynia grayish-green, rusty-spotted, 3.5-4 mm long; scales rusty-spotted, obtuse, with a broad subulate tip; coastal plants 321. *C. extensa* Good.
- + Perigynia yellowish- to golden-green, not spotted, 2.5-3.5 mm long; scales ferruginous, acute; plants of meadows, marshes, and coast 4.
4. Perigynia 2.5 mm long, obsoletely 2-3-nerved, the beak 1/5-1/4 the length of body; the staminate spikelet often separated from the pistillate spikelets, on a peduncle to 1-1.5 cm long; sandy coasts 317. *C. pulchella* Loennr.
- + Perigynia 3-3.5 mm long, 4-5-nerved, the beak 1/3 the length of body; the staminate spikelet sessile, barely overtopping the pistillate spikelets; meadows and marshes. 5.
5. Bracts straight, not reflexed; light green plants; leaves canaliculate, nearly smooth, as long as the culm; perigynia bright green (Kamchatka) 314. *C. viridula* Mchz.
- + Bracts reflexed; cinereous-green to green plants; leaves flat, scabrous, shorter than the culm; perigynia yellowish or light green 6.
6. Cinereous-green plants, with 4-6 spikelets; staminate scales narrowly lanceolate, subacute; pistillate scales pale; perigynia distinctly bidentate, yellowish-green (Turkestan) 316. *C. philocrena* V. Krecz.
- + Green plants, with 2-4 spikelets; staminate scales oblong-ovate, obtuse; pistillate scales ferruginous; perigynia obscurely bidentate, light green (Eurasia) 315. *C. Oederi* Retx.
- 7(2). Staminate spikelet on peduncle 1-1.5 cm long (Plate XXI, fig. 3) 313. *C. lepidocarpa* Tausch.
- + Staminate spikelet sessile (Plate XXI, fig. 1) 8.
8. Bright green plants; the spherical or ovoid spikelets 0.7-1 cm long, 0.8-0.9 cm broad; perigynia 3.5-4 mm long, with nearly straight beak (Plate XXI, fig. 2) 312. *C. flavella* V. Krecz.
- + Yellowish-green plants; spikelets oblong, 1-2 cm long, 1-1.2 cm broad; perigynia 5-6 mm long, with strongly reflexed beak (Plate XXI, fig. 1) 311. *C. flava* L.
- 9(1). Perigynia with scabrous-margined bidentate-cleft beak; spikelets very distant; lowest bract shorter than the inflorescence (Plate XXI, fig., 6a, 7a) 10.
- + Perigynia with smooth, obscurely bidentate-notched beak; upper spikelets approximate; bract equaling to exceeding the inflorescence (Plate XXI, fig. 8a, 9a) 12.
10. Green plants, with short stolons and flat leaves; perigynia bright yellowish-green 322. *C. Hostiana* DC.
- 387 + Cinereous-green, caespitose, non-stoloniferous plants, with sub-involute leaves; perigynia grayish-green, more or less rusty-spotted. 11.

11. *Perigynia* broadly obovoid, 3-3.3 mm long, 2-4-nerved, with short subconic beak; pistillate scales half as long as perigynia; upper spikelets contiguous; lowest bract nearly equaling the inflorescence (Plate XXI, fig. 7 - Western Siberia) 324. *C. aspratilis* V. Krecz.
- + *Perigynia* ovoid, 4-4.3 mm long, 5-6-nerved, rather abruptly contracted into a somewhat prolonged, compressed-cylindric beak; pistillate scales 2/3 the length of perigynia; spikelets very distant; lowest bract less than half the length of inflorescence (Plate XXI, fig. 6 - European part of USSR) 323. *C. distans* L.
12. Yellowish-green plants with short and plump (1-2 cm long and 0.7 cm broad) pistillate spikelets, these approximate to the short staminate spikelet (1-1.5 cm long); perigynia subdivaricate, ovoid, yellowish-green (sometimes slightly spotted), with a broad beak (Plate XXI, fig. 9) 320. *C. Karelini* Meinsh.
- + Cinerous-green plants, with long cylindric (to 3-4 cm long) and narrow (0.5-0.6 cm broad) pistillate spikelets, these scattered and separated from the 2.5-4 cm-long staminate spikelet; perigynia appressed, oblong-ovoid, grayish-green, rusty-spotted, with narrow beak (Plate XXI, fig. 9) 13.
13. Culms 100-120 cm tall; pistillate spikelets numerous (6-8), long-peduncled (the lower peduncles to 6-7 cm long) (Plate XXI, fig. 10 a-b) 319. *C. czarwakensis* Litw.
- + Culms 50-70 cm tall; pistillate spikelet 3-6, short-peduncled (Plate XXI, fig. 8 - Caucasus) 319. *C. diluta* M.B.

Cycle 1. *Mytiskis* V. Krecz. - Rafin. in *Amenit. of Nat.* I (1840) 26 (pro subgenere gen. *Anithista* Raf.), - *Perigynia* membranaceous, obovoid, spreading or reflexed, 2.5-6 mm long, ranging in color from green to golden-yellow, slenderly nerved, rather abruptly contracted into a more or less prolonged, smooth, bidentate-cleft beak. Scales acute, narrow. Inflorescence congested, consisting of a single staminate and 2-5 pistillate spikelets. Culms 3-angled.

Series 1. *Flavae* V. Krecz. - *Perigynia* with a long deep-cleft, oblique, smooth beak, (3.5)4-6 mm long. Leaves short-acuminate.

311. *C. flava* L. *Sp. pl.* (1753) 975; Trev. in *Ldb. Fl. Ross.* IV, 299 (cum var. β); Meinsh. in *A.H.P.* XVIII, 3 (1901) 384; Kük. in *Engl. Pflzr.* IV, 20 (1909) 671; Vass. in *Wulff, Fl. taur.* I:2, 32. - *Ic.*: *Syreish. Ill. Fl. Mosk. gub.* I (1906) 210. - *Exs.*: *HFR* No. 1641; *Pl. Finl. Exs.* No. 136; *Palmgr. Car. fulv.* No. 17 a-b, 18; *Fl. Pol.*: *exs.* No. 888.

- 388 *Perennial*, light green (yellowish when dry), densely caespitose plants; culms smooth, 20-60 cm tall, leafy at base; leaves 3-5 mm broad, shorter than the culm; spikelets 2-4, aggregated: the terminal spikelet staminate, lance-linear, 0.7-1.5 cm long, on peduncle 0.3 cm long, with obtuse rufous scales; other spikelets pistillate, globose, ovoid, or oblong-ovoid, 0.8-2 cm long, dense, the upper sessile, the lowest sometimes remote and borne on peduncle to 2 cm long, nearly included in the bract sheath; lowest bract with sheath to 1.5 cm long and a long divergent blade, this many times the length of inflorescence; pistillate scales ovate, acute, ferruginous, green-centered, half as broad as and shorter than perigynia; perigynia oblong-ovoid, curving, inflated-trigonus, 5-6.5 mm long, yellowish-green, becoming yellow, many-nerved, round-based, sessile, gradually tapering

into a long deflexed smooth, terminally deeply rufous-cleft bidentate cylindrical beak half as long as the body. Fr. April-May. (Plate XXI, fig. 1).

Wet and marshy meadows. - European part: Kar. -Lap., Dv. -Pech., Lad. -Il'm., Upp. Volg., Volg. -Kam. (w. part of Kama), Mid Dnepr., Prichern. (Kremenchugskii Distr.), Vilg. -Don., Crimea (mountainous part). Recorded for the Caucasus (West. Transcauc.), but except for the discredited Ladovskii collections there is no *C. flava* from the Caucasus Botanical Institute. - Gen. distr.: Western Europe. Described from Europe (Lappland).

NOTE: Forming hybrids: × *Hostiana* DC. (*C. xanthocarpa* Degl.); × *distans* L. (*C. luteola* Sendtner, non Nees); × *lepidocarpa* Tausch. (*C. Pieperiana* P. Junge); × *Oederi* Retz. (*C. alsatica* Zahn).

312. *C. flavella* V. Krecz. in Maevsk. Gl. Sr. Ross. 6 ed. (1933) 185 sub *C. flava*) et in Addenda, II, 617.

Perennial, green, densely caespitose plants, culms smooth, 15-30 cm tall; leaves 2-3 mm broad, shorter than the culm; spikelets 2-4, subcongested, the lowest often remote; terminal spikelet staminate, lanceolate, 0.5-1 cm long, with ferruginous oblong obtuse scales; other spikelets pistillate, globose to ovoid, 0.7-1 cm long, 0.8-0.9 cm broad, dense, the lowest on peduncle to 1.5 cm long; lowest bract with sheath to 1 cm long and blade several times the length of inflorescence; pistillate scales ovate, acute, ferruginous, green-centered, shorter than perigynia; perigynia obovoid, inflated-trigonous, 3.5-4 mm long, light green, becoming yellowish, nerved, sessile, abruptly terminating in a long smooth, terminally deeply ferruginous-cleft, bidentate beak nearly half as long as the body. Fr. May. (Plate XXI, fig. 2).

Boggy meadows and coppices. - European part: Kar. -Lap. (s. part), Dv. -Pech. (s. -w. part), Lad. -Il'm., Upp. Dnepr., Upp. Volg. Gen. distr.: Poland (e.). Described from former Melenkov and Vladimir provinces, (village Zakolp'e). Type in Leningrad.

389 313. *C. lepidocarpa* Tausch in Flora, XVIII (1834) 179; Kük. in Engl. Pflzr. IV, 20 (1909) 672. - *C. flava* Trev. in Ldb. Fl. Ross. IV (1853) 300. - Exs.: Kneuck. V, No. 124 a-b.

Perennial, green, densely caespitose plants; culms slender, obtusely triangular, usually scabrous above, 30-60 cm tall; leaves subplano-canaliculate, 2-3 mm broad; rather long-attenuate, shorter than the culm; spikelets 2-4, scattered: the terminal spikelet staminate, cylindrical-clavate, 1.2-2.5 cm long, on peduncle (1)1.5-3(3.5) cm long, with ferruginous obtuse scales; other spikelets pistillate, globose ovoid or oblong-ovoid, 0.7-1.5 cm long, 0.6-0.7 cm broad, the lowest on peduncle to 2 cm long; lowest bract with sheaths to 0.8 cm long and blade many times the length of inflorescence; pistillate scales ovate, acute, tawny, yellowish-green at center, slightly hyaline-margined, shorter than perigynia; perigynia ovoid, inflated-trigonous, 3.5-4.3 mm long, greenish-yellow, 4-5-nerved, abruptly deeply ferruginous-cleft, bidentate, about half as long as the body. Fr. May. (Plate XXI, fig. 3).

Marshes and swampy situations. - European part: Kar. -Lap., Lad. -Il'm., Dv. -Pech. (Vologda). Gen. distr.: c. and N. part of Western Europe. Described from Austria (Eral-Himburg-Lachsenburg region).

NOTE: Forming hybrids: \times *Hostiana* DC. (*C. Leutzii* Kneuck.); \times *flava* L. (*C. Pieperiana* P. Junge); \times *Oederi* Retz. (*C. Schatzii* Kneuck.).

Series 2. *Parviflavae* V. Krecz. - Perigynia with straight, slightly bidentate beak, 2.3-3.5 mm long. Leaves long-acuminate.

314. *C. viridula* Mchx. Fl. bor.-amer. II (1803) 170. - *C. Oederi* var. *viridula* Kük. in Engl. Pflzr. IV, 20 (1909) 674; Hultén, Fl. of Kamtch. I (1927) 206.

Perennial, light green, densely caespitose plants; culms obtusely triangular, smooth, 10-30 cm high; sheath long, not rigid, turned or grooved; 1.5-2 mm broad, nearly smooth, rather long-attenuate, as long as the culm; spikelets 4-5, aggregated above, more rarely the lowest remote: the terminal spikelets sessile, staminate (often gynecandrous), lance-linear, 0.8-1.5 cm long, with oblong subobtuse tawny scales; other spikelets pistillate, oblong-ovoid or short-cylindric, 0.6-1.2 cm long, 0.5 cm broad, dense, on peduncle to 1 cm long; lowest bract with sheath to 0.5-0.8 cm long; bract sheaths erect, not reflexed, many times the length of inflorescence; pistillate scales ovate, subobtuse, drab, green-centered, shorter than perigynia; perigynia obovoid, inflated-trigonous, 3 mm long, green, becoming light-green, slenderly 3-4-nerved, subsessile, rather abruptly beaked; beak short, smooth, emarginate-bidentate, one-third the length of the body.

390 Far East: Kamch. (s. part: Central Ksudach), Sakh. (according to Japanese authors). Gen. distr.: Kurile Islands, Japan (Yezo) and North America, from Alaska to Newfoundland and from the arctic region to northern California-Pennsylvania. Described from Canada.

315. *C. Oederi* Retz. Fl. Scand. Prod. (1779) 179; Meinsh. in A. H. P. XVIII, 3 (1901) 384; Kük. in Engl. Pflzr. IV, 20 (1909) 673 et in Journ. Russ. Bot. 3-6 (1911) 173. - *C. flava* δ Trev. in Ldb. Fl. Ross. IV (1853) 300. - *C. flava* var. *Oederi* Litw. in Sched. ad. Herb. Fl. Ross. II (1900) 69. - Ic.: Syreish. Ill. Fl. Mosk. gub. I (1906) 210. - Exs.: HFR No. 444, Fl. Pol. Exs. No. 492.

Perennial, green, densely caespitose plants; culms obtusely triangular, smooth, 5-20 cm tall; leaves subrigid, flat to subinvolute, 2-3 mm broad, long-attenuate, shorter than the culm; spikelet 2-4, congested: the terminal spikelet staminate, lance-obovoid or linear-clavate, 1-2 cm long, with obtuse tawny scales; other spikelets pistillate, globose or ovoid to oblong-ovoid, 0.6-1 cm long, 0.5-0.6 cm broad, dense, sessile, the uppermost at base of the pistillate spikelet, the lowest sometimes remote and borne on a peduncle not exceeding 1 cm in length; lowest bract with sheath 0.5-1 cm long and blade many times the length of inflorescence; pistillate scales ovate, subacute, ferruginous, green-centered, narrowly hyaline-margined, about half the length of perigynia; perigynia divaricate, obovoid, inflated-trigonous, 3-3.5 mm long, green, becoming paler, slenderly 4-5-nerved, subsessile, gradually tapering into beak, this straight or nearly so, smooth, short, slightly and obliquely ferruginous-emarginate, one-third the length of the body. Fr. May-June. (Plate XXI, fig. 4).

Peaty and mossy marshes and meadows. - European part: Kar. -Lap., Dv. -Pech. (Vologda), Lad. -Il'm., Upp. Dnepr., Mid. Dnepr., Prichern. (Kremenchugskii Distr.) and Volg. Don. (Khar'kov), Volg. -Kam. (S. Ural, Lake Teptyargi); East. Siberia: Ang. -Sayan., Daur. (Baikal, Sosnovka); Caucasus: records for W. Caucasus (Ladovskii collections) unreliable,



for *E. Caucasus* reported by K. A. Meier. Gen. distr.: Western Europe, Fenno-Scandia, Baltic States, Poland. Described from Sweden (Stockholm).

NOTE: Forming hybrids: \times *distans* L. (*C. Gogelana* Podp.); \times *Hostiana* DC. (*C. Pauliana* F. Schultz); \times *flava* L. (*C. alsatica* Zahn); \times *lepidocarpa* Tausch (*C. Schatzii* Kneuck.); \times *extensa* Good.

316. *C. philocrena* V. Krecz. sp. nova in *Addenda*, II, 618. - *C. Oederi* Meinsh. in *A. H. P.* XVIII, 3 (1901) 384, quoad pl. songor.; Kük. in *Engl. Pflzr.* IV, 20 (1909) 673, quoad pl. turkest., non Retz. - *C. flava* var. *Oederi* Rgl. in *A. H. P.* VII (1880) 573, non DC.

Perennial, light green to cineraceous-green, densely caespitose plants; culms obtusely triangular, smooth, 10-25 cm tall; leaves stiffish, subplane, 2-4 mm broad, scabrous, long-attenuate, somewhat shorter than the culm; spikelets 4-6, the upper strongly congested, the lowest remote, often very much so: terminal spikelet staminate, short-clavate, 0.8-1.5 cm long, with tawny lanceolate subacute scales; other spikelets pistillate, ovoid to short-cylindric, 1-1.8 cm long, 0.7 cm broad, dense, the lowest pedunculate, the peduncle sometimes to 3-4 cm long; lowest bract with sheath to 1 cm long and blade many times the length of inflorescence; pistillate scales oblong-ovate, acute, drab to slightly ferruginous, green-centered, shorter than perigynia; perigynia divaricate, obovoid, inflated-trigonous, 3.5 mm long, greenish, becoming yellow, 4-5-nerved, subsessile, rather abruptly beaked, the beak short, smooth, short bidentate-cleft at the end. Fr. June-July.

Mountain-spring bogs and streams. - Centr. Asia: Dzhung. Tarb., Tyan'-Shan., Pam.-Al. Endemic. Described from Darvaz (s. slope of Peter the Great Range - Arzyng). Type in Leningrad.

317. *C. pulchella* Loenrr. *Observ. crit. pl. suec. illustr.* (1854) 24, nec Holm (1903) nec Berggr. (1878). - *C. Oederi* var. *pulchella* Lindb. fil. in *Sched. ad. pl. Finl. exs.* IX-XX (1916) 37. - *C. Oederi* var. *microcarpa* Meinsh. in *herb. Fl. Ingr.* - Exs.: HFR No. 192; Pl. Finl. Exs. No. 138, 543, 544.

Perennial, cineraceous-green, caespitose plants; culms obtusely angled, smooth, 5-30 cm tall; leaves subinvolute, 1.5-2 mm broad, nearly smooth, long-acuminate, shorter than the culm; spikelets 2-3, subdistant: terminal spikelet staminate, usually on peduncle to 1.5 cm long, linear-clavate, 1.5-2.5 cm long, with obovate obtuse tawny scales; other spikelets pistillate, ovoid to oblong-ovoid, 0.5-1 cm long, 0.5 cm broad, dense, the lowest short-peduncled; lowest bract with sheath to 8 mm long and blade several times the length of inflorescence; pistillate scales broadly ovate, subobtusate to acutish, ferruginous, yellowish-green at center, shorter than perigynia; perigynia divaricate, cuneate-obovoid, 2.5 mm long, bright green, at length bright golden-yellow, obsoletely 2-3-nerved, subsessile, abruptly contracted into beak, this short, straight, smooth, obliquely submarginate, barely one-fourth the length of the body. Fr. June-July. (Plate XXI, fig. 5).

Explanation to Plate XXI

1. *Carex flava* L.: inflorescence, 1 a) perigynium. - 2. *C. flavella* V. Krecz.: perigynium. -
3. *C. lepidocarpa* Tausch: 3a) perigynium. - 4. *C. Oederi* Retz.: 4a) perigynium. - 5. *C. pulchella* Loenrr.: 5a) perigynium. - 6. *C. distans* L.: 6a) perigynium. - 7. *C. aspratilis* V. Krecz.: a) perigynium, b) scale. - 8. *C. diluta* M. B.: 8a) perigynium, 8b) scale. - 9. *C. Karelinae* Meinsh.: 9a) perigynium. - 10. *C. czarwakensis* Litw.: 10a) perigynium, 10b) scale.

Maritime and lacustrine sands, gravels, stony places. - European part: Kar.-Lap., Lad.-Il'm. Gen. distr.: Scandinavia. Described from Gotland (Gammars).

394 Cycle 2. *Planeuris* (Rafin.) V. Krecz. - Rafin. in Amenit. of Nat. I (1840) 55 (pro subgenere gen. *Carex* Raf.). - Perigynia thin-coriaceous, ovoid, 3-4 mm long, glaucescent, usually rusty-punctulate, with rather thickened nerves, gradually tapering into a short bidentate scabrous smooth straight beak. Scales round-tipped, obtuse, or terminating in a broad scabrous point. Inflorescence of 1-2 staminate and 2-4 pistillate spikelets, these scattered. Culms obtusely 3-angled.

Series 1. *Dilutiformes* V. Krecz. - Spikelets approximate or subdistant, the upper sessile. Bract equaling or exceeding inflorescence. Scales ovate, obtuse, with a rather long broad scabrous point, rusty-punctulate. Perigynia ovoid, gradually tapering into smooth, subemarginate, obscurely bidentate beak.

318. *C. diluta* M. B. in Fl. taur.-cauc. II (1808) 388 et III (1819) 614; Trev. in Ldb. Fl. Ross. IV, 299; Boiss. Fl. Or. V, 425; Meinsh. in A. H. P. XVIII, 3 (1901) 382; Kuk. in Engl. Pflzr. IV, 20 (1909) 659, ex p.; Grossh. Fl. Kav. I, 174. - *C. laevigata* Grossh., l. c., ex p., non Sm. - *C. extensa* C. A. M. Verzeichn. Pfl. Cauc.-Casp. (1831) 31, non Good. - *C. Aitchisonii* Bcklr. in Flora, LXIII (1880) 456. - *C. chorgosica* Meinsh. in A. H. P. XVIII, 3 (1901) 381. - *C. diluta* var. *chorgosica* Kük. in Engl. Pflzr. IV, 20 (1909) 660. - *C. binervis* Meinsh., l. c., 383, quoad pl. samark., non Sm. - *C. distans* Meinsh., l. c., quoad pl. Russow., non L. - Exs.: HFR No. 1792; Kük. No. 147; XIIa, No. 47.

Perennial, glaucous-green, densely caespitose plants; culms smooth, 20-70 cm tall; leaves flat to subinvolute, 2-6 mm broad, prominently scabrous, long-attenuate, shorter than the culm; spikelets 3-5, approximate above, remote below: the terminal 1 (2) staminate, linear-cylindric, 1.5-2.5 cm long, with tawny obovate obtuse scales; other spikelets pistillate, oblong to cylindrical, 0.8-3 cm long, 0.5 cm broad, dense, the upper subsessile, the lower on smooth flattened peduncles 5-6 cm long, erect; lowest bract with sheath to 3 cm long and blade many times the length of spikelet; upper bracts not exceeding the inflorescence; pistillate scales ovate, obtuse but with a scabrous-margined point, light rusty-spotted, light green at center, 3-nerved, subhyaline-margined above, half as long as perigynia; perigynia ovoid or ellipsoid, inflated-trigonous, 3 mm long, cineraceous to yellowish-green, punctate and light rusty-spotted below, 5-8-ribbed on both sides, with smooth costated margin, more or less spongy rounded at base, weakly stipitate, rather gradually tapering into beak, this short smooth compressed-conic, semirounded-emarginate, barely bidentulate, short ciliate at orifice. June-July. (Plate XXI, fig. 8).

Solonetz meadows and wet places, water-meadows in the lower reaches of mountain streams and rivers. - European part: Crimea (Sudak, Kadykoi); Caucasus: all regions, Centr. Asia.: Dzhung.-Tarb. (Dzhung. Alatau), 395 Pribalkh. (Chu river valley, and adjoining mountains), Tyan'-Shan., Pam.-Al., Mount. Turkm. Gen. distr.: Turkey, eastern Persia, Afghanistan. Described from Georgia. Type in Leningrad.

NOTE: The Crimean plants are very distinctive, with perigynia to 4.5 mm long; the two known specimens were with fruits almost completely shed, and this makes precise determination difficult.

319. *C. czarwakensis* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 97; B. Fedtsch. in A. H. P. XXXVIII (1924) 219.

Perennial, cinereous-green, cespitose plants; culms triangular, smooth, 100-120 cm tall, leafy up to considerable height; leaves ribbon-like, rather smooth, flat, 4-6 mm broad, scaberulous, long-attenuate, shorter than the culm; spikelets 6-8, the lower ones remote; the terminal spikelet staminate, 2-5 cm long, with oblong obtuse tawny scales; other spikelets pistillate, cylindric, 1.5-4 cm long, 0.6-0.7 cm broad, dense, the upper sessile, the lower on thickened scabrous peduncles to 6-7 cm long, all erect; lowest bract with sheath to 1.5 cm long and prolonged blade exceeding the inflorescence; pistillate scales ovate, subobtuse to obtuse, the lower ones with a more or less developed scabrous-margined blunt point, pinkish-ferruginous, 3-nerved, light at center, shorter than perigynia; perigynia oblong-ovoid to oblong-ellipsoid, convex-trigonus, 3.6-4 mm long, grayish-green, pinkish-rusty-spotted below, obsoletely 6-7-nerved on the outer face, round-based, sessile, gradually tapering into a smooth, attenuate-cuneate, faintly ciliate-emarginate beak. Fr. June. (Plate XXI, fig. 10).

Near sources and mountain streams. - Centr. Asia: Syr.-Dar. (Charvak). Endemic. Described from Charvak in Andizhanskii Distr. Type in Leningrad.

NOTE: Perhaps merely a vigorous form of *C. diluta* B.M. ?

320. *C. Karelini* Meinsh. in A. H. P. XVIII, 3 (1901) 380. - *C. diluta* var. *Karelini* Kük. in Engl. Pflzr. IV, 20 (1909) 660. - *C. diluta* Kük., l. c., 659, quad. pl. austro-ross. et austro-sibir., et in Journ. Russ. Bot., 3-6 (1911) 171; V. Krecz. in Fl. Transb. II (1931) 133, non M.B. - *C. diluta* var. *chorgosica* Kük. in Journ. Russ. Bot. 3-6, (1911) 173. - *C. diluta* var. *bessarabica* Savul. et Rayss. Mat. fl. Bess. I (1924) 50. fig. 7. - Exs.: HFR No. 193.

Perennial, yellowish-green, cespitose plants; culms triangular, smooth, 20-50 cm tall; leaves rigid, flat, 3-6 mm broad, scaberulous, long-attenuate, slightly shorter than the culm; leaf sheaths and bracts with more or less developed colored ligules; spikelets 3-5, the upper approximate, the lower remote; the terminal spikelet staminate, clavate or oblong-obovoid, 1-1.5 cm long, with yellowish obtuse scales; other spikelets pistillate, abbreviated, ovoid or oblong, 1-2(2.5) cm long, 0.6-0.7 cm broad, erect, the lower on peduncles to 3-4 cm long, lowest bract with sheath to 3 cm long and blade equaling to exceeding the inflorescence; pistillate scales ovate, scabrous-pointed, pinkish-spotted, 3-nerved, greenish-yellow at center, at most half as long as perigynia; perigynia ovoid, convex-trigonus, 3-3.5 cm long, subdivaricate, yellowish-green, sometimes slightly rusty-spotted, with 5-6 faint thickened nerves, sessile, rather abruptly contracted into short smooth dilated bidentate beak. Fr. April-May. (Plate XXI, fig. 9).

Saline and brackish meadows. - European part: Upp. -Volg. (Kaluga), Volg. Kam. (except w. third), Upp. Dnepr. (s.-e. part), Mid-Dnepr. (except w. part), Volg. -Don. (except n.-w. part), Zavolzh., Prichern., Low. Don., Low. Volg.; Caucasus: Ciscauc., Dag.; West. Siberia: Upp. Tob., Irt., Alt., East. Siberia: Ang.-Sayan., Daur. (Verkhneudinsk); Centr. Asia: Aral.-Casp., Pribalkh. Gen. distr.: North-western Mongolia. Described from Semirech'e (river Lepsa steppes). Type in Leningrad.

ECONOMIC IMPORTANCE: A typical plant of wet saline meadows. Grazed readily in pasture by cattle, and fairly satisfactorily to other kinds of livestock.

321. *C. extensa* Good. in Trans. Linn. Soc. II (1794) 175, tab. 21, fig. 7; Trev. in Ldb. Fl. Ross. IV, 299; Meinsh. in A. H. P. XVIII, 3

(1901) 383; Grossh. Fl. Kavk. I, 175. — Exs.: HFR No. 1639; Kneuck. No. 57; Pl. Finl. Exs. No. 540.

Perennial, cinereous-green, densely caespitose plants; culms obtusely triangular, smooth, 10-50 cm tall; leaves rigid, straight, thickened, channeled, 2-3 mm broad, smooth, setiform-thickened, nearly equaling the culm; spikelets 3-5, the upper aggregated, the lower scattered; the terminal spikelet staminate, linear, 1-2.5 cm long, with ovate to oblong-ovoid (sometimes globose), 0.6-2 cm long, dense, the upper sessile, the lower on peduncles to 1 cm long; lowest bract with inconspicuous sheath (barely 0.3-0.4 cm long) and setaceous-involute blade longer than inflorescence; pistillate scales ovate, cuspidate, rusty-spotted, narrowly hyaline-margined, yellowish at center, shorter than perigynia; perigynia rather broadly ovoid, compressed-trigonous, 3.5-4 mm long, grayish-green, slightly rusty-spotted, at length brunescent, 6-7-nerved, round-based, sessile, rather abruptly contracted into short smooth cuneate, tightly bidentate beak. Fr. June-July.

Saline situations along sea coast. — European part: Prichern., Crimea; Caucasus: West. Transcauc. (Anapa, Novorosiisk), Tal. (Sara Is.). Gen. distr.: along the entire Atlantic seaboard and Mediterranean. Described from England (Harwich).

NOTE: Hybridizing with *C. Oederi* Retz.

397 Series 2. *Distantiformes* V. Krecz. — Spikelets rather strongly scattered, on more or less distinct peduncles, of these the lowest to 3 cm long. Bracts not exceeding inflorescence. Scales subobtusate or obtuse, castaneous. Perigynia ovoid or subovoid, gradually tapering into attenuate short-bidentate scabrous beak.

322. *C. Hostiana* DC. Cat. Hort. Monsp. (1813) 88. — *C. fulva* Trev. in Ldb. Fl. Ross. IV (1853) 297; Meinsh. in A. H. P. XVIII, 3 (1901) 383, non Good. — *C. Hornschuchiana* Hoppe in Flora, VII (1824) 599; Kük. in Engl. Pflzr. IV, 20 (1909) 665. — Exs.: HFR No. 1142; Palmgr. Car. fulv. No. 27.

Perennial, green, loosely caespitose plants, with short stolons; culms obtusely-triangular, smooth to scaberulous above, 25-45 cm tall; leafy up to the middle; leaves subrigid, flat, 2-3 mm broad, abruptly attenuate, one-third to half as long as the culm; spikelets 3-5, scattered; the terminal spikelet staminate, 1.5-2.5 cm long, with oblong obtuse castaneous white-hyaline-margined scales; other spikelets pistillate; ovoid to oblong-ovoid, 0.8-2.5 cm long, dense, the uppermost subsessile, approximate to staminate spikelet, the lowest peduncle to 5 cm long completely included within bract sheath; lowest bract with sheath to 2.5 cm long and blade twice the length of spikelet; pistillate scales broadly ovate, obtuse, brown-castaneous, green at center, narrowly hyaline-margined, shorter than perigynia; perigynia ovoid to ovoid-ellipsoid, compressed-trigonous, 4 mm long, bright green, yellowish below, with numerous slender yellowish nerves, round-based, sessile, rather abruptly beaked; beak compressed, of medium length, scabrous-margined, deeply bidentate, ferruginous-cleft. Fr. May-June.

Mossy marshes. — European part: Lad.-Ul'm., Prichern. ? (Elisavetgrad. Lindeman — perhaps an accidentally encountered specimen from his Baltic herbarium?). Gen. distr.: Flenno-Scandia, Baltic States and the whole of Atlantic Europe, northern Italy, Yugoslavia. Described from Yugoslavia.

NOTE: Forming hybrids: \times *flava* L. (*C. xanthocarpa* Degl.);

× *lepidocarpa* Tausch. (C. *Leutzii* Kneuck.); × *C. Oederi* Retz. (C. *Pauliana* F. Schultz); × *panicea* L. (C. *Duereriana* Kük.).

323. *C. distans* L. Syst. veg. × (1759) 1263; Trev. in Ldb. Fl. Ross. IV, 298; Meinsh. in A. H. P. XVIII, 3 (1901) 383; Schmalh. Fl. 571; Kük. In Engl. Pflzr. IV, 20 (1909) 663. - *C. binervis* Meinsh., l. c., quoad pl. taur.; Vass. in Wulff, Fl. taur. I:2, 33, non Sm. - *C. laevigata* Boiss. Fl. Or. V (1884) 427; Vass., l. c., 31, non Sm. - *C. helodes* Grossh. Fl. Kavk. I, (1928) 174, non Link. - *C. diluta* Vass., l. c., 33, pro. max. p., non M. B. - Exs.: Fl. Pol. Exs. No. 792; Kneuck. V, No. 148, 149; XIIa, No. 46.

Perennial, cinereous-green, densely caespitose plants; culms obtusely triangular, smooth, 30-70 cm tall; leaves rigid, flat to subinvolute, 2-5 mm broad, divergent, long-attenuate, shorter than the culm; spikelets 2-5, the lower very remote: terminal spikelet staminate, plump, cylindrical to clavate, 1.5-3 cm long, 0.5 cm broad, with obtuse castaneous-ferruginous scales; other spikelets pistillate, ovoid, oblong to cylindrical, 1.3 cm long, to 0.8 cm broad, dense, the upper sessile, the lower on peduncles 5-6 cm long; lowest bract with sheath to 2.5 cm long, half the length of inflorescence; pistillate scales ovate, obtuse, the lower often terminating in scabrous point, castaneous-ferruginous, 3-nerved, with green internerves, two-thirds the length of perigynia; perigynia broadly ovoid, obtusely trigonous, 4-4.3 mm long, dark green, yellowish and brownish-spotted below, with 5-6 thickened yellowish nerves, round-based, subsessile, abruptly beaked; beak short, compressed, scabrous above, bidentate with spreading teeth, subferruginous at orifice, occasionally pointed. Fr. April-May. (Plate XXI, fig. 6).

Wet saline places. - European part: Upp. Dnepr. (Ukraine), Mid. Dnepr., Prichern., Upp. Volg. (near Orel, along railroad), Low. Don. (Eiskii Division), Crimea; Caucasus: West. Transcauc. (Anapa, Novorossiisk). Gen. distr.: Western Europe, Mediterranean. Described from southern Europe. Type in London.

NOTE: Hybridizing with *C. Karelinae* Meinsh. (widespread in Kievshchina, Poltavshchina, and southward down both sides of Dnieper), usually distinguished by mixed, often underdeveloped perigynia. Also hybridizing with *C. Oederi* Retz. (*C. Gogelana* Podp.) and *C. flava* L. (*C. lutea* Sendtner, non Nees).

324. *C. aspratilis* V. Krecz. sp. nova in Addenda, II, 618. - *C. diluta* Meinsh. in A. H. P. XVIII, 3 (1901) 382, quoad pl. Goldeanam; Kük. in Engl. Pflzr. IV, 20 (1909) 659, quoad pl. ex "Westibirien" et Omsk; in Journ. Russ. Bot. 3-6 (1911) 171, quoad pl. omsk.; Kryl. Fl. Zap. Sib. III, 515, non M. B. - *C. binervis* Meinsh., l. c., 383, quoad pl. omsk., non Sm. - *C. diluta* var. *badia* Kük. ex B. Fedtsch. in A. H. P. XXXVIII (1924) 219. - *C. distans* B. Fedtsch., l. c., quoad pl. omsk., non L.

Perennial, cinereous-green, densely caespitose plants; culms triangular, smooth, 20-60 cm tall; leaves rigid, straight, flat to subconvolute, 2-4 mm broad, prominently scabrous, rather abruptly pointed, half as long as the culm; spikelets 3-4, the lower remote: terminal spikelet staminate, obovoid to enlarged-clavate, 1.5-2.5 cm long, with obtuse obovate ferruginous-fulvous scales; other spikelet pistillate, ovoid or oblong-ovoid, very dense, 1-2 cm long, 0.7 cm broad, the upper sessile, the lower on peduncles not

399 exceeding 0.5-2 cm, included in bract sheaths, erect; lowest bract with sheath to 1.5 cm long and blade equaling the inflorescence; pistillate scales ovate, subobtuse to obtuse, light castaneous, 3-nerved, with yellowish-green internerves, just over half as long as perigynia; perigynia dilated-obovoid, obtusely trigonous, 3-3.3 mm long, greenish-yellow, rusty-spotted below, with 2-4 thickened nerves, attenuate at base, sessile, rather abruptly contracted into short, densely setulose-margined, compressed, bidentate beak. Fr. April-May (Plate XXI, fig. 7).

Wet solonchak and solonetz meadows. - European part: Volg.-Kam., Volg.-Don., Zavolzh., West. Siberia: Upp. Tob. (except w. part), Irt., Alt. (n. part); East. Siberia: Ang.-Sayan. Described from Kustanaiskii Distr. (Beloe Lake - Ata-Karachai forest). Type in Leningrad.

Section 39. *Elaeostachys* V. Krecz. - Rather large palustrine plants, with stout and long stolons. Culms flattened-triangular, with sharp angles and channeled sides, tightly covered at base with smooth, keeled, reticulate, rufous, bladeless sheaths. Leaves rigid, flat, subreticulate below, long-attenuate. Bracts sheathless. Inflorescence of 1-3 staminate, narrow-clavate spikelets and 3-5 pistillate, rather long narrowly cylindrical spikelets; scales lanceolate, aristate. Perigynia subcoriaceous, ovoid, leaden-olivaceous to olivaceous-green, 3-4 mm long, with slender prominent nerves, obsolete stipitate, rather abruptly contracted into short cylindrical smooth semicircular-notched beak.

1. Perigynia spreading to reflexed, inflated, obsolete slender-nerved, rugose, gradually tapering into curved conic obliquely emarginate beak 325. *C. dispalata* Boott.
- + Perigynia subappressed, trigonous with flat to convex sides, ribbed, smooth, abruptly contracted into straight definite short-conic, semicircular-notched beak. 2.
2. Spikelets 4-7, the terminal 2-3 staminate; robust plants to 120 cm tall, with broad leaves; pistillate spikelets cylindrical, 2-7 cm long; perigynia oblong-ovoid, compressed-trigonous, trigonous with flat sides, leaden-olivaceous, smooth 326. *C. acutiformis* Ehrh.
- + Spikelets 3, the terminal spikelet staminate; plants of medium size, 30-60 cm tall, with narrow leaves; pistillate spikelets ovoid to oblong, 1-2.5 cm tall; perigynia ovoid; trigonous with convex sides, olivaceous-green, more or less rough-papillose 327. *C. glaucaeformis* Meinsh.

325. *C. dispalata* Boott ex A. Gray, Narr. Exp. Perry, II (1856-57) 325 et in Illustr. Carex IV (1867) 205; F. Schmidt in Mém. Ac. St. Pétersb., sér. VII, XII (1868) 196, tab. VII, fig. 6-10; Meinsh. in A. H. P. XVIII, 3 (1901) 388; Kom. Fl. Manchzh. I, 391; Kük. in Engl. Pflzr. IV, 20 (1909) 616 et Journ. Russ. Bot. 3-6 (1911) 161; Kom. and Alis. Oprod. rast. Dal'nevost. Kr. I, 315, tab. 95 (sinistra).

400 Perennial, cinereous-green plants, with stout and long stolons; culms flattened, acutely (subalate)-trigonous, scabrous above, 60-100 cm tall, covered at base with red reticulate, obtusely keeled bladeless sheaths; leaves accrescent, subrigid, prominently 2-ribbed, 4-8 mm broad, nearly equaling the culm; spikelet 4-7, scattered, especially the lower ones: terminal spikelet staminate, cylindrical, 3-6 cm long, with narrow subobtuse

reddish-ferruginous scales; other spikelets pistillate, clavate-cylindric to cylindrical, 2-10 cm long, loose, the upper sessile or subsessile, sparsely flowered below, the lower on scabrous 3-angled peduncles to 5-10 cm long, all erect; lowest bract exceeding the inflorescence, sheathless; pistillate scales lanceolate, truncate but mucronate, with 3 distally scabrous nerves and green internerves, narrowly white-hyaline-margined, shorter than perigynia; perigynia spreading to reflexed, ovoid, inflated-trigonous, 3-3.5 mm long, dark green to olivaceous, obsoletely nerved, subrugulose, round-based, short-stipitate, gradually tapering into beak, this curved, conic, obliquely subemarginate, with purple or white-hyaline-margined tip.

Marshes, river banks. - Far East: Uss., Sakh. Gen. distr.: Manchuria. Korea, Japan. Described from Japan (Hakodate).

326. *C. acutiformis* Ehrh. Beitr. IV (1789) 43; Kük. in Engl. Pflzr. IV, 20 (1909) 733 et in Journ. Russ. Bot. 3-6 (1911) 187. - *C. paludosa* Good. in Trans. Linn. Soc. II (1794) 202; Trev. in Ldb. Fl. Ross. IV, 315; Meinsh. in A. H. P. XVIII, 3 (1901) 377; Grossh. Fl. Kav. I, 178. - *C. Olgaë* Rgl. in Izv. O-va Lyub. Estv. Antr. i Etn. (Proc. Soc. Nature Lovers, Anthropol. and Ethnol.) XXXIV, 2 (1882) 83. - *C. spadicea* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 97, non Roth. - Exs.: Kneuck. VI, No. 179; HFR No. 597.

Perennial, cinereous-green plants, with stout and long stolons; culms sharply triangular, scabrous above, 50-120 cm tall, tightly covered at base with reddish or purplish-brown reticulate sheaths; leaves 3-8 mm broad, keeled below, equaling the culm; spikelets 4-7, the terminal 2-3 approximate, oblong to lance-cylindric, 2-4 cm long, plumpish, with lanceolate acute castaneous scales; other spikelets distant, pistillate, cylindrical, 2-7 cm long, 0.6 cm broad, dense, erect, the upper subsessile, the lower on peduncles to 1 cm long; lowest bract exceeding inflorescence; pistillate scales lanceolate to narrowly lanceolate, acuminate, castaneous, with a pale midrib, scabrous-pointed, half as long as to longer than perigynia; perigynia oblong-ovoid, compressed-trigonous, 4 cm long, leaden-olivaceous to leaden-green, at length brunescent, with light thickened nerves, round-based, short stipitate, abruptly beaked; beak yellowish, smooth (occasionally scaberulous), short, semicircular-notched. Fr. May-June. (Plate XXII, fig. 14).

Marshes and shores. - All European part: (except Arct., Kar.-Lap. and 401 Dv.-Pech.), Crimea; Caucasus: (all regions); West. Siberia: Ob., Upp. Tob., Irt., Alt.; East. Siberia: Ang.-Sayan.; Centr. Asia: Aral.-Casp., Pribalkh., Syr-Dar. Gen. distr.: West. Europe, Asia Minor, Iran, Kashmir. Described from Luneburg (Braunschweig).

NOTE: Hybridizing with *C. diversicolor* Crantz (*C. Jaegeri* F. Schultz).

327. *C. glaucaeformis* Meinsh. in A. H. P. XVIII, 3 (1901) 389; Kük. in Engl. Pflzr. IV, 20 (1909) 434 et in Journ. Russ. Bot. 3-6 (1911) 113; Kom. Fl. Manchzh. I, 393.

Perennial, glaucous-green, densely cespitose, stoloniferous plants; culms triangular, scaberulous to nearly smooth, 30-60 cm tall, covered, at base with narrow, tall, keeled, strongly reticulate-fibrillose, bladeless sheaths; leaves subrevolute, 2-3 mm broad, shorter than the culm; spikelets 3, scattered: the terminal spikelet staminate, oblong-linear, to 2.5-3 cm long, with oblong obtuse brownish scales; other spikelets pistillate,

ovoid to oblong, 1-2.5 cm long, erect, the upper sessile, the lower on peduncle to 5-8 mm long; lowest bract barely equaling the inflorescence, usually shorter; pistillate scales oblong-ovate, cuspidate, dark purple, with a light midnerve, scabrous above, slightly shorter than to about as long as perigynia; perigynia spreading, subcoriaceous, ovoid, inflated-trigynous, 4 mm long, olivaceous-green, ribbed, subcuneate-attenuated, weakly spongy-based, somewhat strigulose, gradually tapering into a slightly curved, short-campanulate, emarginate, purple beak. Fr. June.

Meadows and grassy slopes on argillaceous soil. - East. Siberia: Daur. (surroundings of Chita); Far East: Uss. Gen. distr.: Manchuria, North Korea. Described from Grigor'evak on the river Sakheza. Type in Leningrad.

Section 40. *Phaeolorum* (Ehrh.) V. Krecz. - Ehrh. Beitr. IV (1789) 149 (nomen). - Plants with creeping rhizome, stoloniferous. Culms obtusely 3-angled, smooth, covered at base with brown bladeless sheaths. Leaves more or less rigid, channeled, long-acuminate. Lower bracts short, frontally with colored auricle, bearing a long blade. Inflorescence of 4-8(12) spikelets, of these 2-6 staminate, approximate, the others pistillate, cylindrical, dense, the lower on more or less developed peduncles, erect or pendulous. Scales acute, awned. Perigynia subcoriaceous, ovoid or oblong, 2-4 mm long, papillose, nerveless or very obscurely nerved, with a short, weakly emarginate beak. Stigmas 3.

- 1. Perigynia 2.5-3 mm long, nerveless, papillose, scabrous-margined, obovoid, inflated, hence spikelets rather dense; spikelets 1.5-3 cm long, to 0.5 cm broad, drooping; scales 1-nerved, shorter than perigynia. 328. *C. diversicolor* Crantz.
- + Perigynia 3.5-4 mm long, smooth or sparsely scaberulous, obsoletely 3-4-nerved, oblong-obovoid, not inflated; spikelets rather loose, stiffly erect, 2.5-5 cm long, to 0.7 cm broad; scales 3-nerved, equaling the perigynia or barely shorter 329. *C. cuspidata* Host.

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328. *C. diversicolor* Crantz, Inst. rei herb. I (1766) 405. - *C. glauca* Scop. Fl. carn. II (1772) 223; Trev. in Ldb. Fl. Ross. IV, 296; Kük. in Engl. Pflzr. IV, 20 (1909) 416. - *C. flacca* Schreb. Spicil. fl. Lips. App. (1771) 669. - Exs.: HFR No. 40; Pl. Finl. Exs. No. 128.

Perennial, cinereous-green, with long creeping rhizomes; culms smooth, or slightly scaberulous above, 15-40 cm tall, covered at base with purplish-brown, non-fibrillose, bladeless sheaths; leaves ribbed, 2.5-5 mm broad, revolute-margined, scabrous, divergent, shorter than the culm; spikelets 4-6, the terminal (1)2-3 staminate, oblong to narrowly cylindrical, approximate, to 2-3 cm long, with fuscous or ferruginous subobtusate scales; other spikelets pistillate, cylindrical, 1.5-3(4) cm long, 0.4-0.5 cm broad, dense, subdistant, on slender scabrous peduncles to 3 cm long, erect or finally drooping; lowest bract foliaceous, exceeding the inflorescence; pistillate scales ovate, obtuse to subacute, dark reddish, with a broad white median band, shorter than perigynia, the midrib often excurrent into very short point; perigynia subcoriaceous, obovoid, inflated-trigynous, 2.5-3 mm long, yellowish-green to orange, reddish-spotted, finally subferruginous, nerveless (except the two marginal nerves), with papillose surface, scaberulous-margined, with indefinite curved truncate beak. Fr. May-June.

Wet places (with sandy or marly soil). - European part: Lad. -II'm. (Narva coast), Mid. Dnepr. (w. border part), Prichern, (Dnepropetrovsk), Crimea (coast). Gen. distr.: Western Europe, Baltic States. Described from Italy (Scandici).

NOTE: Forming hybrids: \times panicea L. (C. Fontis Sancti Podp.); \times acutiformis Ehrh. (C. Jaegeri F. Schultz); \times riparia Curt. (C. Lausii F. Schultz).

329. *C. cuspidata* Host, Gram. Austr. I (1801) 71, tab. 97, non Whlb. (1803), nec Bertol. (1803). - *C. serrulata* Biv. Stirp. rar. IV (1806) 9. - ? *C. dinarica* Simonk. En. pl. Transs. (1886) 553. - *C. glauca* Grossh. Fl. Kavk. I (1928) 167, non Scop. - *C. glauca* var. *cuspidata* Kük. in Engl. Pflzr. IV, 20 (1909) 418; Grossh., l.c. - *C. glauca* var. *cuspidata* f. *leiocarpa* Kük. in Engl. Pflzr., l.c., 419, exp. - *C. Mariae* Marcowicz ex Kneuck. Sched. ad Cyp. exs. (1904) sub No. 38 (nomen). - Exs.: Kneuck. XIIa, No. 38.

403 Perennial, glaucous-green plants with creeping rhizomes and long stolons; culms slender, 40-70 cm tall, covered at base with lateritious-brown bladeless sheaths; leaves flat, 1.5-4 mm broad, rather strongly revolute-margined, scabrous, shorter than the culm; spikelets 2-4; the terminal 2 staminate, narrow-cylindric to linear (the second spikelet sessile, shorter, inserted at base of the uppermost), to 4-6 cm long, with lanceolate ferruginous subobtuse scales; other spikelets pistillate, cylindric, 2.5-5 cm long (to 0.7 cm broad), rather loose (especially the lower ones) on peduncles to 3 cm long, stiffly erect; lowest bract longer than inflorescence; pistillate scales oblong-ovate, acute, ferruginous, 3-nerved, with yellowish-green, internerves, as long as to slightly shorter than perigynia; perigynia subcoriaceous, oblong-subellipsoid to oblong-obovoid, obscurely trigonous, 3.5-4 mm long, glaucous-green, becoming subferruginous, obsoletely 3-4-nerved, smooth or (more rarely) sparsely scaberulous on the margin and back, with a short subemarginate brown beak.

Deciduous forests, coppices, ravines, and gullies. - European part: Crimea (mountainous part); Caucasus: Ciscauc. (w. part), West. and East. Transcauc. Gen. distr.: Northern Persia, Balkans, Asia Minor, Italy. Described from the coast of Istrian Peninsula.

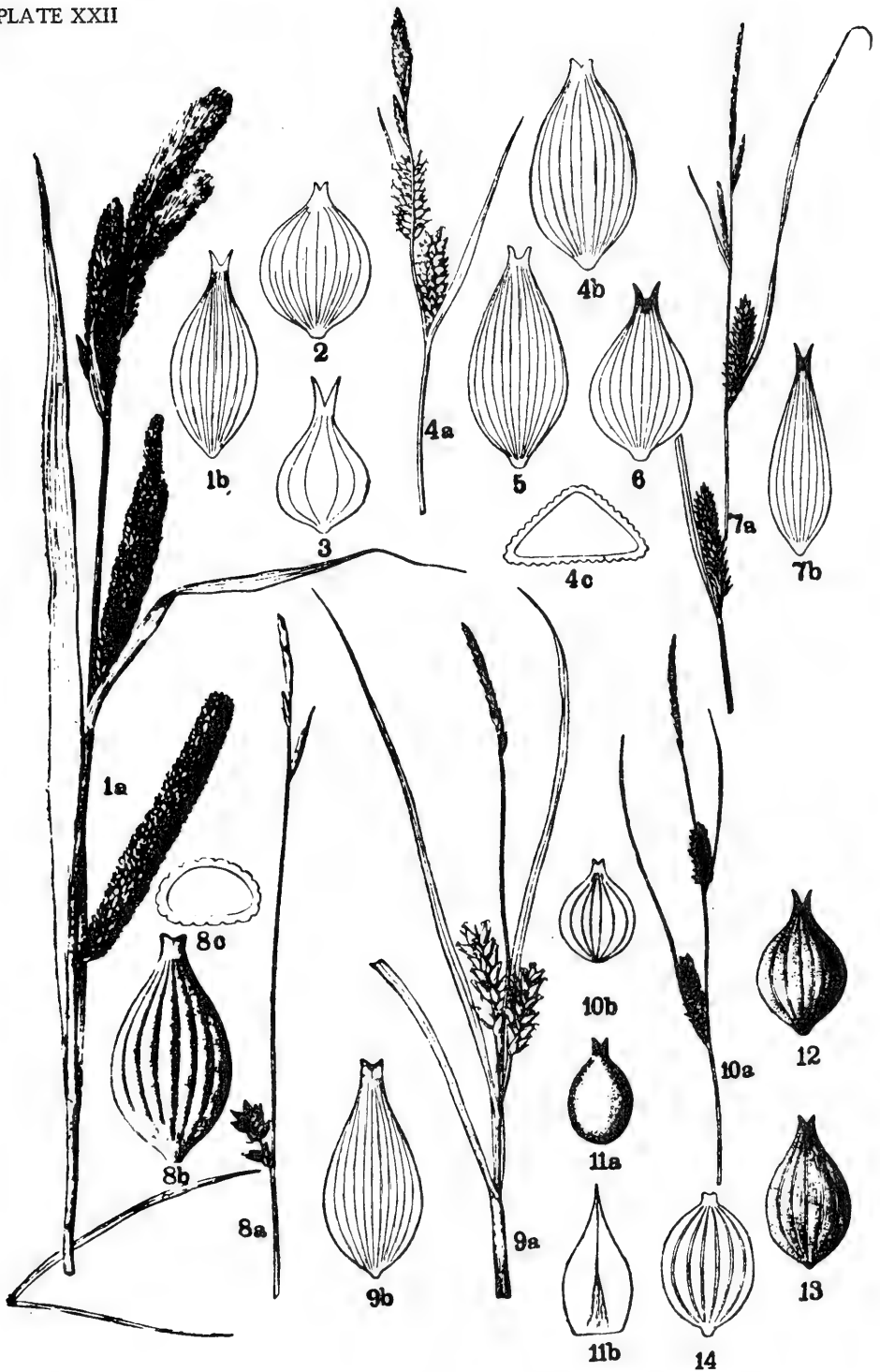
Section 41. *Anithista* (Rafin.) V. Krecz. - Rafin. in Amenit. of Nat. I (1840) 26 (pro genere). Loosely caespitose plants of marshes and meadows, producing rather long rhizomes. Culms 3-angled, covered at base with ribless or faintly ribbed, reticulate, bladeless sheaths. Leaves mostly flat, long-acuminate. Lowest bract short-sheathed. Inflorescence of 2-4 approximate staminate spikelets and 1-5 segregated pistillate spikelets; pistillate spikelets loose erect, the lower ones short-peduncled. Perigynia coriaceous (sometimes becoming suberous), ovoid or oblong, round-based, rounded-trigonous, 4-7 mm long, 5-10-nerved, subsessile, attenuate, with a more or less compressed, short, broadly short-bidentate, mostly divaricate beak. Stigmas 3.

1. Perigynia densely covered with short hairs 2.
- + Perigynia glabrous 5.
2. Perigynia 3 mm long, with gradually attenuate beak; lowest bract sheathless; leaves short-attenuate 347. *C. mandshurica* Meinsh.
- + Perigynia 4-5 mm long, with short definite beak; lowest bract sheathed; leaves long-acuminate 3.

3. Leaves rather flat, 2-5 mm broad; staminate and pistillate scales pale, silvery; spikelets cylindric, dense, to 5 cm long 346. *C. fedia* Nees.
- + Leaves setaceous-convolute or channeled, to 2-3 mm broad; staminate and pistillate scales castaneous; spikelets oblong-clavate or ovoid, loose, to 3-4 cm long 4.
- 404 4. Pistillate scales as broad as and longer than perigynia; perigynium-beak very definite, glabrous; leaves subinvolute, to 3 mm broad, culms scabrous 345. *C. occultans* (Franch.) V. Krecz.
- + Pistillate scales half as broad as and shorter to nearly as long as perigynia; perigynium-beak indefinite, deeply imbedded in the body of perigynium, bidentate, hairy; leaves setaceous-convolute, 1-2 mm broad; culms usually smooth 344. *C. lasiocarpa* Ehrh.
- 5(1). Beak nearly one-third the length of perigynium, scabrous-margined (Plate XXII, fig. 3) 339. *C. ripariaeformis* Litw.
- + Beak at most one-sixth to one-fifth the length of perigynium, smooth 6.
6. Perigynia globular, broad-ovoid or ovoid, 3-4.5(5) mm long, blackish-brown, reddish-brown, red, or honey-yellow, mostly lustrous 7.
- + Perigynia ovoid, oblong-ovoid, or lanceolate, or grayish-yellow, dull 10.
7. Perigynia nerveless or with very slender inconspicuous nerves, blackish-brown or honey-yellow 8.
- + Perigynia prominently ribbed, sanguine or reddish-brown 9.
8. Perigynia with slender inconspicuous nerves, aggregated in rather dense cylindric spikelets, exceeding the scales; leaves subinvolute, 2-3 mm broad (Plate XXII, fig. 10b) 341. *C. songorica* Kar. et Kir.
- + Perigynia nerveless (?), shorter than the awned scales; spikelets loose, sparsely flowered below; leaves subplane, 3-5 mm broad (Plate XXII, fig. 11 - Shugnan). 340. *C. Fedtschenkoana* Kük.
9. Perigynia broad-ovoid to ovoid, 4 mm long, only old ones distinctly nerved; leaves rigid (Plate XXII, fig. 12) 342. *C. Sukaczovii* V. Krecz.
- + Perigynia oblong-ovoid, 4.5-5.5 mm long, even young ones distinctly nerved; leaves rather soft (Plate XXII, fig. 13). 343. *C. haematostachys* Lévl. et Vant.

Explanation to Plate XXII

1. *Carex riparia* Curt.: a) habit, b) perigynium.—2. *C. anisoneura* V. Krecz.: perigynium.—3. *C. ripariaeformis* Litw.: perigynium.—4. *C. Smirnovii* V. Krecz.: a) habit, b) perigynium, c) perigynium in section.—5. *C. rugulosa* Kük.: perigynium.—6. *C. melanostachya* M.B.: perigynium.—7. *C. kirganica* Kom.: a) habit, b) perigynium.—8. *C. scabrifolia* Steud.: a) habit, b) perigynium, c) perigynium in section.—9. *C. pumila* Thunb.: a) habit, b) perigynium.—10. *C. songorica* Kar. et Kir.: a) habit, b) perigynium.—11. *C. Fedtschenkoana* Kük.: a) perigynium, b) scale.—12. *C. Sukaczovii* V. Krecz.: perigynium.—13. *C. haematostachys* Lévl.: perigynium.—14. *C. acutiformis* Ehrh.: perigynium.



- 10(6). *Perigynia* finally suberous, concave-nerved (Plate XXII, fig. 8 c).
 11.
- 407 + *Perigynia* with slightly thickened prominent nerves (Plate XXII,
 fig. 4 c) 14.
11. *Perigynia* ovoid, ca. 5-6 mm long, gray, with acutely bidentate
 divaricate purple-notched beak 12.
- + *Perigynia* oblong-ovoid, ca. 6-7 mm long, yellowish-brown, with
 obtusely short-bidentate, shallowly discolor-notched beak (Plate
 XXII, fig. 8 and 9) 13.
12. Pistillate spikelets 1-3.5 cm long; scales 1-nerved, shorter than
perigynia; *perigynia* gray, dull, ovoid, ca. 5 mm long (Plate XII,
 fig. 6 - Eurasia) 338. *C. melanostachya* M.B.
- + Pistillate spikelets 2-5 cm long; scales 3-5-nerved, equaling to
 exceeding *perigynia*; *perigynia* brownish, lustrous, oblong-ovoid,
 ca. 6 mm long (Sakhalin)
 337. *C. platyrhyncha* Franch. et Sav.
13. Meadow plants, 40-60 cm tall, with purplish-red sheaths and short
 stolons; leaves shorter than culms; pistillate spikelets 1-2, strong-
 ly separated from the 2-3 staminate spikelets, 1.5-2 cm long
 330. *C. scabrifolia* Steud.
- + Dwarf sand plants, 5-25 cm tall, with brownish sheaths and long
 flagelliform stolons; leaves several times as long as culms; spike-
 lets approximate, the pistillate oblong-clavate, 2-4 cm long
 331. *C. pumila* Thunb.
14. *Perigynia* lanceolate, 6-7.5 mm long (Plate XXII, fig. 7)
 336. *C. kirganica* Kom.
- + *Perigynia* ovoid or oblong-ovoid, 5-6 mm long. 15.
15. Inflorescence containing 3-6 staminate and 2-4 pistillate spikelets;
 pistillate scales terminating in long scabrous awn, exceeding the
perigynia; rather large plants (80-150) cm tall), with spikelets to
 10 cm long. 16.
- + Inflorescence containing 2-3 staminate and 1-3 pistillate spikelets;
 pistillate scales acute or barely awned, shorter than the *perigynia*;
 plants of medium size (50-70 cm tall), with spikelets to 5-6 cm long
 17.
16. *Perigynia* 5-6 mm long, ovoid to oblong-ovoid, olivaceous, with
 uniform nerves (Plate XXII, fig. 1) .. 332. *C. riparia* Curt.
- + *Perigynia* 4.5 mm long, broad-ovoid, drab, with alternately unequal
 nerves (Plate XXII, fig. 2) .. 333. *C. anisoneura* V. Krecz.
17. *Perigynia* gray or drab, ovoid, ca. 5 mm long; scales half as long
 as *perigynia*; spikelets ovoid to ovoid-oblong, 1.5-3 cm long; leaves
 3-4 mm broad; plants of meadows and peat bogs (Plate XXII, fig. 4)
 335. *C. Smirnovii* V. Krecz.
- 408 + *Perigynia* olivaceous, oblong-ovoid, ca. 6-6.5 mm long; scales slight-
 ly shorter than *perigynia*; spikelets oblong, 3-6 cm long; leaves
 4-8 mm broad; plants of dunes and coastal sands (Plate XXII,
 fig. 5) 334. *C. rugulosa* Kük.

Cycle 1. *Eu-Anithista* V. Krecz. - *Perigynia* thick-coriaceous or
 suberous-coriaceous, oblong-ovoid or oblong, 4-7.5 mm long, with more
 or less thickened, prominent or concave nerves, glabrous, contracted

into broad, triangular- or crescent-cleft or emarginate beak; lowest bract short-sheathed (sheath to 5 mm long). Leaves more or less reticulate below; lower sheaths weakly keeled.

Series 1. *Phellinae* V. Krecz. - Perigynia tawny, with rather thickened walls and thickened nerves, at first raised, finally concave.

330. *C. scabrifolia* Steud. Syn. Cyper (1855) 237; Kük. in Engl. Pflzr. IV, 20 (1909) 737 et in Journ. Russ. Bot. 3-6 (1911) 189; Kom. and Alis. Opred. rast. Dal'nevost. Kr. I, 316. - *C. Pierotii* Miq. in Annal. Mus. Lugd. Bat. II (1865-66) 148; Kom. Fl. Kavk. I, 386; Meinsh. in A. H. P. XVIII, 3 (1901) 379.

Perennial, cinereous-green plants, with short stolons; culms arising in rows, slender, usually smooth above, 40-60 cm tall, covered at base with reddish sheaths; leaves narrow, rigid, channeled or subinvolute, 2-3 mm broad, longer than culms; spikelets 3-5, the lower distant; the terminal 2-3 spikelets staminate, congested, linear, 2-3.5 cm long, with linear subobtuse light brown scales; the remaining 1-2 spikelets pistillate, ovoid, 1.5-2 cm long, 0.7 cm broad, loose, few-flowered, short-peduncled; lowest bract nearly sheathless, narrow, exceeding the inflorescence; pistillate scales ovate, acute to cuspidate, pale brown, white-centered, shorter than perigynia; perigynia suberified, ovoid or ellipsoid to subglobose, 5-6(7) mm long, yellowish-green, at length brunescent, with concave nerves, sessile, abruptly contracted into dilated, smooth, weakly divaricate-emarginate, thickened beak. (Plate XXII, fig. 8).

Coastal meadows. - Far East: Uss. Gen. distr.: Manchuria, Korea, Japan. Described from Japan (erroneously reported for Java).

NOTE: Our plants distinguishable from the Japanese by dimensions of perigynia.

331. *C. pumila* Thunb. Fl. Jap. (1784) 39; Meinsh. in A. H. P. XVIII, 3 (1901) 378; Kom. Fl. Manchzh. I, 385; Kük. in Engl. Pflzr. IV, 20 (1909) 738 et in Journ. Russ. Bot. 3-6 (1911) 190; Kom. and Alis. Opred. rast. Dal'nevost. Kr. I, 316. - Ic.: Kük., l. c., 739, fig. 126.

409 Perennial, cinereous-green plants, with strongly branching rhizomes and long stolons; culms 5-25 cm tall, leafy all the way up; lower sheaths brownish, reticulate-fibrillose; leaves rigid, falcate, plicate, 2-3 mm broad, several times the length of culms; spikelets 3-6, approximate: the terminal 2-3 staminate, lanceolate, 2-3.5 cm long, with narrow obovate subobtuse tawny scales; the remaining 1-3 spikelets pistillate, oblong-clavate, 1.5-4 cm long, loose, on erect peduncles to 1 cm long; lowest bract with sheath to 4 mm long, much longer than inflorescence; pistillate scales ovate, acute to subaristate, pale brown to castaneous, green at center, more or less hyaline-margined, shorter than perigynia; thick-coriaceous, ovoid to subglobose, 5-7 mm long, brownish-green, gradually beaked, the nerves thickened, costate, concave above, confluent; beak prolonged, smooth, bidentate, the teeth acute, suberect. (Plate XXII, fig. 9).

Coastal sands. - Far East: Uss. Gen. distr.: Japan, Korea, Manchuria. Described from Japan (Nippon).

Series 2. *Cirrochlaenae* V. Krecz. - Perigynia oblong, 5-7 mm long, olivaceous or gray, with prominent, slightly thickened nerves, gradually tapering into crescent-notched beak.

332. *C. riparia* Curt. Fl. Lond. IV (1783) tab. 60; Trev. in Ldb. Fl. Ross. IV, 314; Meinsh. in A. H. P. XVIII, 3 (1901) 376; Kük. in Engl. Pflzr.

IV, 20 (1909) 735 et in Journ. Russ. Bot. 3-6 (1911) 188. - *C. striata* Gilib. Exerc. phyt. II (1792) 350, non Mchx. - *C. gracilentia* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 95, quoad pl. ulutavicam, non Boott. - Exs.: Pl. Finl. exs. No. 549; Dörf. No. 4789, 5356; Kneuck. VIII, No. 232.

Perennial, cinereous-green plants, with strong stout rhizomes; culms scabrous above, 60-150 cm tall, covered at base with thickened brownish to reddish-brown sheaths; leaves rigid, flat, 5-15 mm broad, equaling to exceeding the culms; spikelets 5-10, the lower distant: the terminal 3-6 staminate, approximate, plumpish oblong-cylindric, 2-6 cm long, with lanceolate acute castaneous-ferruginous scales; other spikelets pistillate, cylindric, 2-10 cm long, 1 cm thick, dense, erect, the lower on thickened smooth peduncles to 5 cm long, sometimes pendulous; lowest bract overtopping the culm; pistillate scales ovate, rather abruptly terminating in an elongated subulate scabrous-margined point, castaneous, 3-nerved, with light internerves, longer than perigynia; perigynia ovoid-conic, coriaceous, convex-trigonus, 5-6 mm long, olivaceous, many-nerved, more or less spongy at base, gradually tapering into short, smooth, broad, semicircular-notched, divaricate-bidentate beak. Fr. May.-June. (Plate XXII, fig. 1).

Marshes and shores. - All European part (except Arctic, Kar.-Lap. and Dv.-Pech.), Crimea; all Caucasus; West. Siberia: Upp. Tob., Ob. (w. 410 part), Irt., Alt.; East. Siberia: Ang.-Sayan; Centr. Asia: Aral.-Casp., Pribalkh., Syr-Dar. Gen. distr.: West. Europe, Asia Minor, Persia, Kulja. Described from vicinity of London.

NOTE: Forming hybrids: \times *inflata* Huds. (*C. Beckmanniana* Fig.), \times *vesicaria* L. (*C. csomadensis* Simonk.); \times *lasiocarpa* Ehrh. (*C. evoluta* Hartm.); \times *melanostachya* M.B. (*C. toezensis* Simonsk.).

Perennial, cinereous-green plants with stout rhizomes; culms scabrous, 50-80 cm tall, covered at base with reddish-brown reticulate sheaths; leaves rigid, reticulate, flat, 8-10 mm broad, nearly equaling the culms; spikelets 5-7, distant below: the terminal 3-4 staminate, approximate, 2.5-4 cm long, plump, attenuate-clavate, with lanceolate awn-pointed buff scales; other spikelets pistillate, cylindric, 4-6 cm long, 0.8-1 cm broad, rather loose, sparsely flowered below, the lower ones often on smooth peduncles to 5-6 cm long, drooping; lowest bract exceeding the inflorescence; pistillate scales ovate to oblong-ovate, with long reflexed subulate scabrous-margined awn, castaneo-ferruginous, 3-nerved, light brown between the nerves, longer than perigynia; perigynia coriaceous, broad-ovoid, rounded-biconvex, 4-5 mm long, drab, at length brunescent, with thickened unequal nerves, subsessile, abruptly contracted into short straight-bidentate smooth beak. (Plate XXII, fig. 2).

Marshes. - Centr. Asia: Tyan'-Shan.: Arslanbob - Charvak (Litvinov). Endemic. Described from the location indicated. Type in Leningrad.

334. *C. rugulosa* Kük. in Bull. Herb. Boiss., 2 sér., IV (1904) 58; Kom. and Alis. Opred. rast. Dal'nevost. Kr. I, 329, ex p. - *C. riparia* var. *rugulosa* Kük. in Engl. Pflzr. IV, 20 (1909) 736.

Perennial, light green plants, with stout rhizomes; culms scaberulous above, 50-80 cm tall, covered at base with reddish-brown bladeless reticulate sheaths; leaves rigid, flat, 4-8 mm broad, as long as the culms; spikelets 4-6, the lower distant, the terminal 2-3 staminate, congested,

lance-linear, 2-4 cm long, with oblong-ovate subobtusate castaneous scales; other spikelets pistillate, cylindrical to clavate-cylindric, 2-6 cm long, 0.9-1 cm broad, rather loose, the lower ones on peduncles to 2.5 cm long, erect; lowest bract with sheath to 1 cm long, exceeding inflorescence; pistillate scales ovate to oblong-ovate, acute to subaristate, castaneous, 3-nerved, with light internerves, narrowly hyaline-margined, shorter than perigynia; perigynia coriaceous, ovoid-ellipsoid, obsoletely convex-trigonous, 5.5-6.5 cm long, olivaceous-green, becoming brownish-olivaceous, with numerous slender nerves, minutely sulcate when young, subsessile, rather abruptly beaked; beak short, smooth, broad, crescent-notched, divaricate, bidentate beak. (Plate XXII, fig. 5).

Coastal maritime sands and meadows. - Far East: Uss. Gen. distr.: Northern Japan. Described from Japan (Yezo, Hakodate), Type in Leningrad.

335. *C. Smirnovii* V. Krecz. sp. nova in Addenda, II, 619.

Perennial, cinereous-green, with stout stolons; culms scabrous above, 50-70 cm tall, covered at base with reddish-brown, non-splitting sheaths; leaves rigid, flat, 3-5 mm broad, as long as or shorter than the culm; spikelets 3-5, the lower rather distant: the terminal 2-3 staminate, approximate, lanceolate to lance-clavate, 2-2.5 cm long, with oblong-elliptic subobtusate light brown scales; other spikelets ovoid, oblong-ovoid, or clavate-oblong, 1.8-3 cm long, 0.8 cm broad, loose (especially below), the lower ones on peduncles to 1 cm long; lowest bract equaling the inflorescence, with sheaths to 1 cm long; pistillate scales ovate, acute, light castaneous, 3-nerved, with light internerves, about half as long as perigynia; perigynia coriaceous, oblong-ovoid to ovoid, obtusely trigonous, 5-6 mm long, light olivaceous-green, with prominent (especially in old perigynia) thickened nerves, subsessile, rather abruptly beaked; beak short, smooth, subferruginous, broadly and shallowly emarginate, with straight teeth. Fr. June. (Plate XXII, fig. 4).

Meadows and peat bogs. - West. Siberia: Irt. (Omsk), Alt., East. Siberia: Ang.-Sayan., Daur. (Staryi Durulgui-Liski). Gen. distr.: Northern Mongolia. Described from Irkutsk Province, Balaganskii Distr., Ust'-Osinskoe. Type in Leningrad.

336. *C. kirganica* Kom. in Fedde, Repert. sp. nov. XIII (1914) 164; Fl. penins. Kamtsch. I (1927) 268; Hultén, Fl. of Kamtch. I, 212. - *C. rugulosa* Kom. et Alis. Key pl. east. reg. USSR I (1931) 329, ex p.; V. Krecz. in Fl. transb. II (1931) 136, non Kük. - *C. aristata* ssp. *Raddei* var. *vix-vaginans* Kük. in Journ. Russ. Bot. 3-6 (1911) 197.

Perennial, cinereous-green, loosely exstipitate, stoloniferous plants; culms smooth, 50-70 cm tall, covered at base with purplish-brown non-splitting bladeless sheaths; leaves narrow, subinvolute, 2-4 mm broad, rigid, nearly as long as the culm; spikelets 4-7, the lower scattered, the terminal 3-4 staminate, congested above, lanceolate, 3.5 cm long, with lanceolate, acute to cuspidate, castaneous, light brown scales; other spikelets pistillate, oblong to cylindric, 3-4.5 cm long, 0.8-1.1 cm broad, dense, the lower ones on peduncles to 1.5 cm long; lowest bract with sheath 5 to 10 mm long, barely equaling the inflorescence; pistillate scales lanceolate, acute, the lower cuspidate, castaneous, light-centered, shorter than perigynia; perigynia coriaceous, lanceolate, obtusely trigonous, 6-7.5 mm long, olivaceous or brownish-green, with prominently thickened nerves, cuneate-

based, subsessile, gradually tapering into short, broad, smooth, more or less square-notched, bidentate, ferruginous beak. Fr. June (Plate XXII, fig. 7).

Marshes and boggy meadows. — East. Siberia: Ang.-Sayan. (on the Angara, above Irkutsk), Daur. (s. shore of Baikal and Nerchinskii Distr. along river Kudikan, right tributary of Bushulei); Far East: Kamch., Okhot., Ud., Ze.-Bur., Uss. Endemic. Described from Kamchatka (Kirganik). Type in Leningrad.

337. *C. platyrhyncha* Franch. et Sav. Enum. pl. Jap. II (1879) 154 et 582; Franch. in Nouv. Arch. Mus. Paris, sér. 3, X (1898) 90. — *C. nutans* var. *japonica* Franch. et Sav., l.c. — *C. nutans* var. *platyrhyncha* Kük. in Engl. Pflzr. IV, 20 (1909) 740; Miyabe et Kudo, Fl. Hokk. and Sagh. II (1931) 274; Akiyama in Journ. Fac. Sci. Hokk. Univ., ser. V, II, 1 (1932) 230.

Perennial, light green plants with long stolons; culms smooth, 30-50 cm tall, covered at base with lateritious reticulate bladeless sheaths; leaves flat to subinvolute, 3-4 mm broad, loosely reticulate-spongy below, equaling to exceeding the culm; spikelets 4-6, the terminal 3 staminate, somewhat distant, oblong or oblong-clavate, 3-5 cm long with castaneous, obtuse, broadly ferruginous-hyaline scales; other spikelets pistillate, clavate-cylindric, 2.5 cm long, loose, sparsely flowered below, scattered, on erect thickened peduncles to 4 cm long; lowest bract with sheath to 1-1.5 cm long and blade exceeding inflorescence; pistillate scales lance-ovate, acute, light, 3-5-nerved, with light internerves and margins, equaling perigynia; perigynia oblong-ovoid, coriaceous, becoming spongy, compressed-triangular, 5.5-6 mm long, reddish-brown, ribbed, round-based, with widely spreading, flat, purple-orificed, acutely bidentate beak.

Wet places. — Far East: Sakh. (reported by Japanese authors). Gen. distr.: Northern Japan. Described from Nippon (Yokoska). Type in Paris, cotype in Leningrad.

338. *C. melanostachya* M.B. ex Willd. sp. pl. IV (1805) 299 et Fl. taurcauc. II (1808) 391. — *C. nutans* Host, Gram. Austr. I (1801) 61, tab. 83; Trev. in Ldb. Fl. Ross. IV, 315; Meinsh. in A.H.P. XVIII, 3 (1901) 378; ex p.; Kük. in Engl. Pflzr. IV, 20 (1909) 740, ex p., et in Journ. Russ. Bot. 3-6 (1911) 191; Vass. in Wulff, Fl. taur.I, 2, 34; Grossh. Fl. Kavk. I, 177, non J.F. Gmel. (1791). — *C. Ledebourii* Boiss. et Buhse in Nouv. Mém. Soc. Nat. Moscou, XII (1860) 222. — *C. bicuspidata* Rgl. in herb. — *C. tatarica* Fisch. in herb. — Exs.: Kneuck. VIII, No. 238.

413 Perennial, cinereous-green plants with ligneous stolons; culms slender, scaberulous above, 15-60 cm tall, covered at base with lateritious to reddish-brown reticulate sheaths; leaves rigid, channeled, revolute-margined, 2-4 mm broad, nearly equaling the culm; spikelets 3-7, the lower distant: the terminal 1-3 approximate, staminate, long-clavate, 1.5-3 cm long, with lanceolate acute subferruginous scales; other spikelets pistillate, ovoid to oblong, 1-3.5 cm long, rather loose, the lower ones on peduncles to 1 cm long, erect; lowest bract with a short sheath (to 3-5 mm long), equaling the inflorescence; pistillate scales ovate, attenuate to subaristate-long-acuminate, dark castaneous, light-centered, shorter than perigynia; perigynia coriaceous, ovoid, strongly convex on the outer face, flattened on the inner face, 5-6 mm long, brownish-green, with imbedded nerves, subsessile, rather abruptly beaked; beak short, straight, smooth, short-bidentulate, ferruginous at the orifice. Fr. May. (Plate XXII, fig. 6).

Steppes, meadows, and grassy places, on saline soils. - European part: Mid. Dnepr., Prichern., Volg.-Don., Low. Don., Zavolzh., Volg.-Kam. (s.e. part), Low. Volg., Crimea; all Caucasus; West. Siberia: Upp. Tob., Irt., Alt., all Centr. Asia. Gen. distr.: Central Europe, Mediterranean, Balkans, Asia Minor, Iran, Kulja. Described from the Caspian coast of the Caucasus. Type in Berlin, cotype in Leningrad.

NOTE: Hybridizing with *C. riparia* Curt. (*C. toezensis* Simonsk.).

ECONOMIC IMPORTANCE: Fruiting culms eaten satisfactorily only up to flowering time. Young aftergrowth eaten readily in early fall. Readily eaten in hay. Does not produce a compact cover, and thus enters into the composition of hay in insignificant amounts.

339. *C. ripariaeformis* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 96; B. Fedtsch. in A. H. P. XXXVIII (1924) 225.

Perennial, cinereous-green, densely cespitose plants, with short stolons; culms smooth above, 30-50 cm tall, covered at base with reddish-brown sheaths; leaves narrow, flat to subinvolute, 2.5-3.5 mm broad, rigid, straight, rather short-attenuate, shorter than the culm; spikelets 3-4, segregated, the terminal 1-2 staminate, clavate, 1-2 cm long, with narrowly lanceolate tawny scales; other spikelets pistillate, oblong-ovoid to subclavate, 1.5-3 cm long, 0.6-0.7 cm broad, rather loose, sparsely flowered below, the upper sessile, the lower on peduncles to 3-4 cm long; lowest bract longer than inflorescence; pistillate scales oblong-ovate, awned (the awn scabrous-margined), ferruginous-castaneous, subhyaline-margined, light-centered, 3-nerved, as long as perigynia; perigynia coriaceous, ob-ovoid, strongly biconvex, 4-4.5 mm long, brownish-olivaceous, with 4 thickened subconvex nerves on both sides, short peduncled, rather abruptly beaked; beak long (more than one-third the length of the body), deeply bidentate, subdivaricate, scaberulous-margined, scabrous-orificed beak. (Plate XXII, fig. 3).

414 Saline meadows. - Centr. Asia: Tyan'-Shan. (along river Chatkal, near Nazar-Magomet), Pam.-Al. (Gissar, Khodzha-Imat), Endemic. Described from Nazr-Magomet. Type in Leningrad.

Series 3. *Phaeochlaena* V. Krecz. - Perigynia rounded-ovoid or ovoid, 3-4.5 mm long, reddish-brown to blackish-brown, with prominent nerves, abruptly contracted into triangular-notched beak.

340. *C. Fedtschenkoana* Kük. in Fedde, Report. sp. nov. VIII (1910) 327; B. Fedtsch. in A. H. P. XXXVIII (1924) 226.

Perennial, cinereous-green plants, with long stout stolons; culms scabrous above, 30-50 cm tall, covered at base with reddish or ferruginous, reticulate sheaths; leaves rigid, subplane, 3-5 mm broad, slightly revolute-margined, rather abruptly attenuate, slightly shorter than the culm; spikelets 3-4, segregated, the terminal 1-2 staminate, oblong-clavate, 2-3 cm long, with narrowly lanceolate subacute rufous scales; other spikelets pistillate, clavate-cylindric, 1.5-3 cm long, 0.5 cm broad, sparsely flowered (especially below), on peduncles to 1 cm long, erect; lowest bract sheathless, shorter than inflorescence; pistillate scales oblong-ovate, awned, brownish, light-centered, with thickened midnerve; with translucent hyaline margin, equaling to exceeding the perigynia; perigynia (not fully mature) ovoid, biconvex, 3-3.5 mm long, reddish-brown, nerveless, subsessile, rather abruptly contracted into short, smooth, bidentate, slightly spreading beak. (Plate XXII, fig. 11).

Centr. Asia: Pam.-Al. Endemic. Described from Shugnan; Vir-Dzhilandy. Type in Leningrad.

341. *C. songorica* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 525; Trev. in Ldb. Fl. Ross. IV, 316; Meinsh. in A.H.P. XVIII, 3 (1901) 377. - *C. songorica* var. *atrata* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 97. - *C. Gebleri* Prescott ex Boott in Proceed. Linn. Soc. I (1845) 285. - *C. heterostachya* Kük. in Engl. Pflzr. IV, 20 (1909) 741 et in Journ. Russ. Bot. 3-6 (1911) 192, ex p.; B. Fedtsch. in A.H.P. XXXVIII (1924) 226; Grossh. Fl. Kavk. I, 177, non Bge.

Perennial, cinereous-green plants, with long stout stolons; culms slender, scabrous above, 30-70 cm tall, tightly covered at base with sublustrous, latericious, reticulate, bladeless sheaths; leaves rigid, flat to channeled, 2-3 mm broad, thickened below, reticulate, rather abruptly attenuate, shorter than the culm; spikelets 3-4, the lower distant: the terminal 1-2 staminate, approximate, narrowly clavate, 2-3 cm long, with oblong-obovate subobtuse tawny scales; other spikelets pistillate, cylindrical, 2-4 cm long, 0.5-0.6 cm broad, loose (especially below), the lower ones on peduncles to 1 cm long; lowest bract with sheath not exceeding 3-5 mm and 415 blade exceeding the inflorescence; pistillate scales ovate, terminating in a thickened scabrous point, brownish, light-centered, shorter than perigynia; perigynia coriaceous, ovoid to broad-ovoid, strongly biconvex, 3-4 mm long, orange- to brownish-ferruginous, lustrous, prominently slender-nerved, sessile, rather abruptly contracted into short smooth slightly bidentulate beak. Fr. May-June. (Plate XXII, fig. 10).

Saline meadows. - Caucasus: South. Transcauc.; West. Siberia: Alt.; East. Siberia: Ang.-Sayan.; Centr. Asia: Aral.-Casp., Pribalkh., Dzhung.-Tarb., Tyan'-Shan., Syr.-Dar., Amu-Dar., Pam.-Al., Mount. Turkm. Gen. distr.: North-western Mongolia, Kulja, Afghanistan, northern Persia. Described from Semirech'e (islands on river Lepsa). Type in Leningrad.

ECONOMIC IMPORTANCE: When young, grazed by cattle in pasture.

342. *C. Sukaczovii* V. Krecz. in Fl. transb. II (1931) 136 et in Addenda, II, 620. - *C. heterostachya* Kük. in Engl. Pflzr. IV, 20 (1909) 741, quoad pl. mandsh. et in Journ. Russ. Bot. 3-6 (1911) 192, quoad pl. transb.

Perennial, light green plants, with long and strong stolons; culms slender, usually smooth, 50-80 cm tall, covered at base with somewhat lustrous, reddish-brown, reticulate, bladeless sheaths; leaves subrigid, flat or channeled, 2-4 mm broad, long-attenuate, shorter than the culm; spikelets 3-6, the lower segregated: the terminal 2-3 staminate, approximate, lanceolate to clavate, 1.5-3 cm long, with lanceolate acute ferruginous scales; the remaining 1-2 spikelets pistillate, cylindrical, 2-3.5 cm long, 0.6 cm broad, rather dense, the lower on peduncle to 1 cm long; lowest bract sheathless, longer than inflorescence; pistillate scales oblong-ovate, terminating in scabrous thickened awn, castaneous, with a light prominent midrib, shorter than perigynia; perigynia coriaceous, ovoid to broad-ovoid, biconvex, 4 mm long, rufous, sublustrous, ribbed, short-stipitate, rather abruptly beaked; beak somewhat attenuate, smooth, acutely bidentate, ferruginous. Fr. June-July. (Plate XXII, fig. 12).

Steppes and meadows. - East. Siberia: Ang.-Sayan. (e. part), Daur. Gen. distr.: Northern Mongolia. Described from Shilka, between Nercha and Kuenga. Type in Leningrad.

343. *C. haematostachys* Lévl. et Vant. in Bull. Ac. Intern. Georg. Bot., 3 sér., XI (1902) 305. - *C. heterostachya* f. *minor* Kük. in Engl. Pflzr. IV, 20 (1909) 741, quoad pl. korean. - *C. heterostachya* Kom. et Aliss. Key pl. east. reg. USSR I (1931) 316, non Bge.

Perennial, light green, stoloniferous plants; culms smooth above, 50-70 cm tall, covered at base with reddish-brown, reticulate sheaths; leaves 416 rigid, flat or channeled, 2-3 mm broad, rather abruptly attenuate, shorter than the culm; spikelets 3-5, the lower ones segregated; the terminal 1-3 staminate, approximate, linear-clavate, 2-3 cm long, with lanceolate subacute ferruginous scales; other spikelets pistillate, cylindrical to clavate-cylindrical; 1.5-4 cm long, 0.7 cm broad, dense, rather loose below, erect, the lower short-peduncled; lowest bract short-sheathed (sheath to 5-7 mm long), longer than inflorescence; pistillate scales oblong-ovate to ovate, broadly subulate at summit, subferruginous, light at center and on the margin, 3-nerved, shorter than perigynia; perigynia oblong-ovoid to ovoid, coriaceous, plano-convex, 4.5-5 mm long, rusty brownish-green, ribbed, short-stipitate, gradually tapering into smooth broad flat bidentate ferruginous-orificed beak. (Plate XXII, fig. 13).

Far East; Uss. (Khankaiskii Distr.). Gen. distr.; Manchuria, northern China, Japan. Described from Japan (Yokoska).

Cycle 2. *Diemisa* (Rafin.) V. Krecz. - Rafin. in Amenit. of Nat. I (1840) 27 (pro genere). - Perigynia thick-coriaceous, ovoid, 3-5 mm long, obsolete ribbed, densely covered with short hairs, contracted into a compressed, triangular-cleft, bidentate beak. Lowest bract obscurely sheathed; leaves not reticulate; lower sheaths ecarinate.

Series 1. *Cataschistae* V. Krecz. - Lowest bract with sheath 3-5 mm long. Perigynia with deeply triangular-notched beak, the teeth strong and glabrous. Spikelets ovoid to oblong-ovoid. Loosely caespitose plants. Leaves channeled.

344. *C. lasiocarpa* Ehrh. in Hannoev. Magaz. IX (1784) 132 et in Beitr. III (1788) 73; Kük. in Engl. Pflzr. IV, 20 (1909) 747 et in Journ. Russ. Bot. 3-6 (1911) 193. - *C. lasiocarpa* var. *occultans* Kük. in Journ., l.c. 195; Kom. and Alis. Opred. rast. Dal'nevost. Kr. I, 315, tab. 96 (sinistra), non Franch. - *C. filiformis* Good. in Trans. Linn. Soc. II (1794) 172; Trev. in Ldb. Fl. Ross. IV, 319; Meinsh. in A. H. P. XVIII, 3 (1901) 379, non L.

Perennial, cinereous-green, more or less tufted plants, with short, rather stout stolons; culms slender, but firm, faintly triangular, nearly smooth above, 50-100 cm tall, tightly covered at base with lustrous subreticulate, honey-colored to reddish-brown bladeless sheaths; leaves long, setaceous-convolute, somewhat thickened below, 1-2 mm broad, scabrous, nearly equaling the culm; spikelets 3-5, the lower segregated; the terminal 1-3 spikelets staminate, approximate, linear, 2-4 cm long, with lanceolate acute ferruginous-brown scales; other spikelets pistillate, ovoid to oblong-ovoid, 1-3 cm long, 0.8 cm broad, dense, sessile or nearly so, erect; lowest bract with sheath to 3-5 mm long, exceeding inflorescence; pistillate scales oblong-ovate to lanceolate, awn-pointed, ferruginous-castaneous, light-centered, 3-nerved, narrowly hyaline-margined, shorter than to nearly as long as perigynia and about half as broad; perigynia coriaceous, 417 ovoid, obsolete convex-trigonus, 4.5-5 mm long, yellowish-green, covered over the whole surface as far as the beak teeth with dense brownish-gray

hairs, with rather distinct thickened nerves, short-stipitate, rather abruptly contracted into short definite acutely bidentate beak. Fr. May-June.

Marshes, boggy meadows, and shores. - All European part, except the Arctic region, part of Kar. -Lap. Dv. -Pech., and Crimea; Caucasus: Ciscauc., West. Transcauc. (Kobulety); all West. and East. Siberia and Far East (except Sakhalin); Centr. Asia: n. part of Aral.-Casp. and Pri-balkh. Gen. distr.: Western Europe, Northern Mongolia. Described from Sweden.

NOTE: Forming hybrids: \times *riparia* Curt. (*C. evoluta* Hartm.); \times *vesicaria* L.; \times *inflata* Huds.

345. *C. occultans* (Franch) V. Krecz. sp. nova in Addenda, II, 620. - *Carex filiformis* var. *occultans* Franch. in Nouv. Arch. Mus. Paris, 3 sér., \times (1898) 89. - *C. lasiocarpa* var. *occultans* Kük. in Engl. Pflzr. IV, 20 (1909) 747 (excl. pl. mandsh.); Akiyama in Journ. Fac. Sc. Hokk. Univ., sér. V, II, 1 (1932) 232, fig. 170. - *C. filiformis* F. Schmidt in Mém. Ac. St. Pétersb., VII sér., XII (1847-1868) 198, non L. nec Good.

Perennial, cinereous-green, loosely caespitose, stoloniferous plants; culms slender, triangular and scabrous above, 50-70 cm tall, with reddish-brown, lustrous, compact sheaths; leaves long, subinvolute, to 3 mm broad, slightly shorter than the culm; spikelets 3-5, the lower segregated: the terminal 1-3 spikelets staminate, approximate, lance-linear, 2.5-4 cm long, with castaneous lanceolate acute scales; other spikelets pistillate, oblong, to 4 cm long, rather loose below, the lower short-peduncled; lowest bract with sheath to 5 mm long, equaling to exceeding inflorescence; pistillate scales oblong-ovate, acute to cuspidate, 3-nerved, white at center, slightly white-hyaline-margined, nearly as broad as perigynia and exceeding them in length; perigynia oblong-ovoid, flat-sided-trigonous, 5 mm long, grayish-green, with 5-6 rather distinct nerves, covered with short spreading hairs (these becoming sparse above), subsessile, gradually tapering into a very definite smooth glabrous short-bidentulate beak. Fr. June.

Far East: Sakh. (s. and c. part). Gen. distr.: Northern Japan. Described from Yezo (Mororan). Type in Paris.

Series 2. *Ectomae* V. Krecz. - Lowest bract with sheath to 1.5 cm long. Perigynia 4-5 mm long, with broadly crescent-notched bidentate pubescent beak. Spikelets long, cylindric. Densely caespitose plants. Leaves flat, long-staminate.

346. *C. fedia* Nees ex Wight, Contr. Bot. Ind. (1834) 129. - *C. Wallichiana* Prescott ex Wall. List. pl. East Ind. Comp. Mus. (1828) 118 (nomen); Nees in Wight, Contrib. Bot. Ind. (1834) 129; Kük. in Engl. Pflzr. 418 IV, (20) (1909) 749; B. Fedtsch. in A. H. P. XXXVIII (1924) 228, non Spreng. (1826).

Perennial, light green, rather densely caespitose plants, with strong stout stolons; culms smooth, 40-70 cm tall, covered at base with blackish-purple bladeless sheaths; leaves flat, rather stiff, 2-5 mm broad, equaling the culm; spikelets 3-6, the lower segregated; the terminal 1-2 spikelets staminate, narrowly lanceolate, with tawny oblong acute scales; other spikelets pistillate, cylindric, 3.5 cm long, 0.6-0.8 cm broad, loose, the lower on short erect peduncle; lowest bract with sheath to 1.5-2 cm long, exceeding inflorescence; pistillate scales lanceolate, cuspidate, pale brown, green at center, 3-nerved, shorter than perigynia; perigynia ellipsoid-ovoid,

coriaceous, convex-trigonus, 4-5 mm long, grayish-brown to olivaceous-brown, densely short-pubescent, obsolete nerved, spongy-based, rather abruptly contracted into a short, somewhat spreading, short-bidentate, broadly crescent-notched, pubescent beak. Fr. April.

Centr. Asia: Pam.-Al. (Kizyl-kutal'Pass in Karatau Mts., between Dilankur and Sarai, 900 m alt.). Gen. distr.: Afghanistan, Kashmir, Himalaya (s. slopes). Described from Nepal. Type in London.

Series 3. Onkermoideae V. Krecz. - Lowest bract nearly sheathless. Perigynia 3 mm long, gradually tapering into prolonged cleft scabrous beak. Spikelets oblong. Plants with creeping rhizomes. Leaves revolute, short-acuminate.

347. *C. mandshurica* Meinsh. in Bot. Centrbl. LV (1893) et in A.H.P. XVIII, 3 (1901) 394; Kom. Fl. Manchzh. I, 394; Kük. in Engl. Pflzr. IV, 20 (1904) 434 et in Journ. Russ. Bot. 3-6 (1911) 114.

Perennial, cinereous-green plants with creeping rhizome and long stout stolons; culms firms, scabrous to low down, 30-60 cm tall, covered at base with tall, rather broad, reddish-brown, rather strongly reticulate, slightly keeled, bladeless sheaths; leaves rigid, subrevolute, 2.5-4 mm broad, rather short-acuminate, shorter than the culm; spikelets 3-5, approximate, the lowest distant: the terminal spikelet staminate, linear-oblong to narrowly cylindrical, 1-2.5 mm long, with buff obtuse scales; other spikelets pistillate, globose-ovoid to oblong-ovoid, 0.8-2.3 cm long, 0.8-1 cm broad, dense, the upper sessile, the lower on a peduncle to 5 mm long, all erect; lowest bract about half as long as inflorescence; pistillate scales oblong-ovate, cuspidate; buff, light-centered, 3-nerved, as long as perigynia; perigynia coriaceous, ovoid, trigonus, 3 mm long, grayish-ferruginous, densely hispidulous, with 3 thickened nerves, gradually tapering into a long, bidentate-emarginate, scabrous beak. Fr. June.

419 Forest glades (on argillaceous soil), forest margins. - Far East: Uss. Gen. distr.: Manchuria. Described from the river Vai-Fudin (near St. Olga Bay). Type in Leningrad.

Section 42. *Agastachys* (Ehrh.) V. Krecz. - Ehrh. Beitr. IV (1789) 146 (nomen). - *Leptostachys* Ehrh. (nomen), l.c., 147. - *Manoch-laenia* Boern. in Abh. Naturw. Ver. Brem. XXI (1913) 271, pp. (pro genere). - Forest plants with creeping rhizome or caespitose, stoloniferous. Culms 3-angled, leafy to high up, covered at base with entire bladeless sheaths. Leaves flat, 3-nerved, abruptly attenuate. Bract sheathed and bearing a long blade. Inflorescence of 4-7 segregated spikelets, of these the terminal 1-2 staminate, long, linear, the others pistillate, long (up to 15 cm), narrow-cylindric, many-flowered, on rather long smooth peduncles, drooping to pendulous. Perigynia membranaceous, ellipsoid to ovoid-ellipsoid, faintly trigonus, 2.5-4 mm long, slenderly few-nerved, glabrous, cuneate, with short, subemarginate or truncate beak. Stigmas 3.

1. Upper spikelets subsessile, erect, crowded around the staminate spikelet; lower spikelets segregated, on rather long peduncles, more or less drooping; sheath of lowest bract barely 5 mm long; leaves 3-6 mm broad. 350. *C. jaluënsis* Kom.
- + All spikelets segregated, on rather long peduncles, pendulous; bract sheaths to 3-4 cm long; leaves 6-15 mm broad 2.

2. Spikelets exceptionally long, attaining up to 15 cm, cylindric, dense; perigynia with ciliate-margined beak; cinereous-green, stiffish plants 349. *C. pendula* Huds.
- + Spikelets 3-6 cm long, sparsely flowered and narrow, sublinear; perigynia with smooth beak; herbaceous-green soft plants 348. *C. strigosa* Huds.

Cycle 1. *Myriopera* (Boern.) V. Krecz. - All spikelets segregated, pedunculate, long, pendulous. Bracts long-sheathed, with a membranaceous auricle in front. Leaves 6-15 mm broad.

348. *C. strigosa* Huds. Fl. angl. ed. 2 (1778) 411; Boiss. Fl. Or. V, 418; Meinsh. in A. H. P. XVIII, 3 (1901) 363; Kük. in Engl. Pflzr. IV, 20 (1909) 584; Grossh. Fl. Kavk. I, 173.

Perennial, green, loosely caespitose plants, with short stolons; culms slender, nodding at the ends, compressed-triangular, smooth, 30-80 cm tall, covered at base with bladeless sheaths; leaves soft, weak, 6-10 mm broad, scabrous, shorter than the culm; spikelets 4-7, segregated, the terminal spikelets staminate, lance-linear, 2-3.5 cm long, with oblong sub-obtuse green broadly hyaline-margined scales; other spikelets pistillate, linear, 3-6 cm long, loose, on slender smooth peduncles, these almost entirely included in bract sheaths, erect to subnutant; lowest bract with sheath to 3-4 cm long and foliaceous blade twice the length of its spikelet; pistillate scales ovate, subacute, 3-nerved, with green internerves, whitish-hyaline and finely ferruginous-spotted at the margin, about half the length of perigynia; perigynia oblong-ovoid, trigonous, 3-3.5 mm long, green, ferruginous-lined, distinctly many-nerved, cuneate-based, stipitate, smooth above, cuneate-attenuate into short white straight-truncate cylindric beak. Fr. April-May.

Forests. - Caucasus: Tal. (Lenkoran'; between Alyazapin and Mt. Tevileband). Gen. distr.: Northern Persia, Central Europe. Described from England (Essex, Black Nortley). Type in London.

349. *C. pendula* Huds. Fl. angl. ed. 1 (1762) 352; Trev. in Ldb. Fl. Ross. IV, 296. - *C. maxima* Scop. Fl. carn., ed. 2, II (1772) 229; Boiss. Fl. Or., V, 418. - Exs.: Kneuck. VI, No. 178.

Perennial, glaucous-green, caespitose plants, with ligneous rhizome; culms robust, slender and somewhat nodding at the ends, smooth, 70-150 cm tall, covered at base with brownish-red keeled reticulate bladeless sheaths; leaves 8-16 mm broad, subrevolute-margined, culm-like, segregated, long-sheathed; leaves of offshoots congested, shorter than culms; spikelets 4-7, segregated, linear-cylindric to clavate-cylindric, 5-15 cm long, 0.5 cm broad, arching-pendulous; the terminal 1-2 spikelets staminate, with narrowly lanceolate ferruginous sheaths; other spikelets pistillate, loosish, on peduncles to 5-8 cm long, rather sparsely flowered below; bracts with tall sheaths (to 4 cm), the lowest slightly shorter than inflorescence; pistillate scales ovate, brown, 3-nerved, terminating in a sharp point 1.5-2 mm long, with light internerves, shorter than perigynia; perigynia membranaceous, ovoid-ellipsoid, inflated-trigonous, 2.5-3 mm long, pale green, slenderly 3-4-nerved, slightly curved at summit, sessile, gradually tapering into cylindric subemarginate ciliate-margined beak. Fr. May.

Forests (near streams), shady gorges. - European part: Crimea; all Caucasus. Gen. distr.: Western Europe, Mediterranean, Asia Minor. Described from England (between Hampstead and Highgate). Type in London.

Cycle 2. *Acrothyrsa* V. Krecz. - Terminal spikelets subsessile, erect, crowded around the staminate, spikelet; lower spikelets segregated, long-peduncled, more or less pendulous; bract sheath devoid of auricle, weakly developed. Leaves 3-6 cm broad.

350. *C. jaluënsis* Kom. Fl. Mandsh. I (1901) 369; Kük. in Engl. Pflzr. IV, 20 (1909) 426; Kom. and Alis. Opred. rast. Dal'nevost. Kr. I, 295.

421 Perennial, green, loosely caespitose plants, with short stolons; culms slender, scaberulous above, 50-70 cm tall, with low cover of light castaneous-brown broad bladeless basal sheaths; leaves 3-5 mm broad, subrevolute-margined, stiffish, shorter than the culm; spikelets 5-7, the upper sub-approximate, the lower distant; the terminal spikelet staminate, clavate-cylindric, to 5-6 cm long, with obtuse narrow obovate, tawny scales; other spikelets pistillate, cylindric to clavate-cylindric, 3-7 cm long, 0.5 cm broad, sparsely flowered below, on peduncles to 4 cm long, drooping; lowest bract twice the length of inflorescence; short-sheathed; pistillate scales lance-ovate, narrowly tawny, with a broad light-green center, 3-nerved, terminating in a short awn-point (to 1-3.5 mm long), as long as perigynia; perigynia membranaceous, ellipsoid, obscurely trigonous, 3 mm long, pale green, slightly ferruginous-spotted, with 2 lateral nerves and 1-2 faint nerves in between, smooth-margined, terminating in short discolor obsolete-ly emarginate beak. Fr. June.

Ravines, valleys (in deciduous forests, near water). - Far East: Uss. Gen. distr.: Manchuria, Korea, n.-e. China. Described from river Yalu, near Sang-Su-U. Type in Leningrad.

Section 43. *Nothocarex* V. Krecz. - Caespitose plants; culms 3-angled, papillose, covered at base with bladeless keeled reticulate sheaths. Leaves flat, ribbed below, also papillose. Bracts sheathless. Inflorescence of 4-5 spikelets: the terminal staminate, linear; other spikelets pistillate, cylindric, subsessile, distant. Perigynia membranaceous, obovoid, compressed-biconvex, 4 mm long, papillose, obsolete-ly nerved, with long spreading-bidentate beak, the margin and beak serrulate-scabrous. Achene plano-convex. Stigmas 2.

1. Perigynia 4 mm long, stramineous-green, exceeding the scales, with a long serrulate-margined beak; stigmas moderately long 351. *C. forficula* Franch. et Sav.

+ Perigynia 2.5-3 mm long, reddish-ferruginous, with a short, nearly smooth beak; stigmas very long 352. *C. sadoënsis* Franch.

351. *C. forficula* Franch. et Sav. Enum. pl. Jap. II (1879) 131 et 557; Kük. in Engl. Pflzr. IV, 20 (1909) 342. - Ic.: Kom. and Alis. Opred. rast. Dal'nevost. Kr. I, 291, tab. 85.

422 Perennial, robust, cinereous-green plants, forming large clumps; culms prominently scabrous, sparsely verrucose, 50-100 cm tall, covered at base with argillaceous-brown keeled reticulate bladeless sheaths, leaves 3-5 mm broad, subrevolute-margined, verrucose on the lower surface, equaling the culm; spikelets 4-5, the terminal staminate, linear, to 3 cm long, pedunculate, the others pistillate, narrowly cylindric, 1.5-5 cm long, dense, the lowest distant, pedunculate; lowest bract foliaceous, shorter than inflorescence; pistillate scales lanceolate, terminating in a scabrous point,

dark ferruginous, green between the 3 unequal nerves, shorter and narrower than to equaling the perigynia; perigynia obovoid, 4 mm long, compressed-biconvex, greenish, glandular, ribbed at the margins, hispid from the middle on the midrib and on the prolonged spreading-bidentate beak, sometimes both faces with slender nerves covered with whitish bristles. Fr. June-July.

Marshes, river banks. - Far East: Uss. (Ussuri, Daubikhe and Suifun river basins). Gen. distr.: Japan, Korea. Described from Kobe distr. in northern Nippon. Type in Paris.

352. *C. sadoënsis* Franch. in Bull. Soc. Philom. Paris, 8 sér., VII (1895) 42; Kük. in Engl. Pflzr. IV, 20 (1909) 344; Miyabe et Kudo, Fl. Hokk. and Sagh. II (1931) 235; Akiyama in Journ. Fac. Sc. Hokk. Univ., Ser. V, II, 1 (1932) 96, fig. 46. - Ic.: Kük., l. c., 343, fig. 53, E-G.

Perennial, green, caespitose, stoloniferous plants; culms sharply flattened-triangular, minutely papillose, smooth, 40-60 cm tall, covered at base with ochreous-brown, somewhat lustrous bladeless sheaths; leaves 3-5 mm broad, minutely papillose underneath; spikelets 4-6, the terminal staminate, ovoid-cylindric, pedunculate, the others pistillate, linear-cylindric to clavate-cylindric, 2-6 cm long, dense, erect, the upper approximate, sessile, the lower distant, pedunculate; lowest bract nearly equaling the inflorescence; pistillate scales oblong-lanceolate, truncate, with a scabrous point, sanguine-ferruginous-black, green on the back, 1-3-nerved, nearly twice as long as but narrower than perigynia; perigynia membranaceous, ovoid to oblong-ovoid, compressed-biconvex, 2.5-2.8 mm long, green ferruginous-blackish-tinged, distinctly margined, nerveless, short-stipitate, abruptly contracted into a terminally cleft, bidentate, rather diffusely scabrous-margined beak.

Shores of rivers and lakes. - Recorded by Japanese authors for Sakhalin. Gen. distr.: Japan. Described from Japan (Sado Is.). Type in Paris.

Section 44. *Proteocarpus* Boern. in Abhandl. Naturw., Ver. Brem. XXI (1913) 267, ex p. - *Drymeia* Ehrh. Beitr. IV (1789) 148 (nomen). - Forest plants, caespitose or with loosely creeping rhizome. Culms obtusely 3-angled, leafy to high up, covered at base with bladeless sheaths. Leaves flat, 3-veined, abruptly pointed; bract bearing a long blade. Inflorescence loose, with 1-3 staminate and 3-5 pistillate spikelets, the pistillate spikelets cylindric, drooping, pedunculate, loose. Perigynia membranaceous, ovoid or ellipsoid, trigonous or obtusely trigonous, 3-6 mm long, nerveless, or slenderly nerved, contracted into a long, frontally cleft, rather smooth, bidentate beak. Stigmas 3.

1. Caespitose plants, without stolons; leaves linear, 5-8 mm broad; inflorescence loose; pistillate spikelets on rather long scabrous peduncles 2.
- + Plants with a creeping rhizome and with stolons, leaves to 2 cm broad, inflorescence crowded above, loose below; terminal spikelets subsessile, the lower on long smooth peduncles . . . 356. *C. latifrons* V. Krecz.
2. Rhizome and culm bases densely covered with fibrillose sheath remnants; staminate spikelets 2-3 355. *C. Arnellii* Christ.
- + Rhizome and culm bases covered with entire non-splitting sheaths; staminate spikelets solitary 3.

3. Bright green plants, with leaves 4-8 mm broad; perigynia 5-6 mm long, nerveless, with smooth beak; fruits falling in June. (Europe, Caucasus). 353. *C. silvatica* Huds.
- + Pale green plants with leaves 3-4 mm broad; spikelets narrower; perigynia 4.5-5 mm long, with slender, basally distinct nerves and a more or less scabrous-margined beak; fruits falling from June to August. (Western Transcaucasia). 354. *C. hypaneura* V. Krecz.

Series 1. *Scrabripedicellatae* V. Krecz. - Cespitose plants, without stolons. Leaves linear, 5-8 mm broad. Inflorescence loose; pistillate spikelets on rather long scabrous peduncles.

353. *C. silvatica* Huds. Fl. angl., ed. 1 (1762) 353; Trev. in Ldb. Fl. Ross. IV, 295; Meinsh. in A. H. P., 3 (1901) 363. - *C. Drymeia* Ehrh. in L. fil. Suppl. (1781) 414; M. B. Fl. taur. cauc. II (1808) 390; III (1819) 618; Grossh. Fl. Kavk. I, 173, ex max. p. - *C. loncholepis* Less. in herb. - Exs.: HFR No. 844; Kneuck. No. 89; XIIa, No. 48.

Perennial, green to bright green plants with ligneous rhizome, forming loose tufts; culms slender and drooping above, smooth, 30-80 cm tall, covered at base with light brown entire sheaths; leaves soft, 4-8 mm broad, shorter than the culms; spikelets 4-6, the lower distant; the terminal spikelets staminate, lance-linear, 2-3.5 cm long, with ovate acute yellowish-green scales; other spikelets pistillate, linear, 3-4.5 cm long, loose, sparsely flowered below, on slender, prominently scabrous peduncles, 4-5 cm long, drooping; lowest bract with sheath to 2.5 cm long and blade exceeding the spikelets; pistillate scales ovate, abruptly sharp-pointed, with cuneate green center, whitish-hyaline-margined, shorter than perigynia; perigynia ellipsoid, obtusely trigonous, 5-6 mm long, pale green, at length brunescent, nerveless, gradually tapering into long smooth whitish-bidentate beak. May-June.

Shady deciduous forests. - European part: Lad. - Il'm. (s. -w. part), Upp. Dnepr., Upp. Volg., Mid. Dnepr., Volg. - Don., Zavolzh., Volg. - Kam. 424 (s. -e. part), Crimea; Caucasus: Ciscauc., Dag., East. and West. Transcauc., Tal., West. Siberia: Alt. Gen. distr.: West. Europe. Described from England.

354. *C. hypaneura* V. Krecz. sp. nova in Addenda, II, 621. - *C. silvatica* var. *angustifolia* Litw. in Sched. ad Herb. Fl. URSS, IX (1932) 63, - *C. silvatica* Grossh. Fl. Kavk. I (1928) 173, ex min. p., non Huds.

Perennial, pale green, loosely cespitose plants; culms slender, drooping at the ends, 30-60 cm tall, covered at base with light brownish bladeless sheaths; leaves rather smooth, 3-4 mm broad, shorter than the culm; spikelets 4-6, the lower distant; terminal spikelets staminate, linear-clavate, 2-4 cm long, with oblong acute ferruginous-green pale scales; other spikelets pistillate, narrowly linear to linear-clavate, 2-3.5 cm long, loosely flowered (especially below), on slender, prominently scabrous, to 5-6 cm long peduncles, drooping; lowest bract with sheath to 3 cm long and blade the length of inflorescence; pistillate scales oblong-ovate, gradually attenuate to an awn-point, scabrous on the midrib above, 3-nerved, with green internerves, whitish-margined, somewhat shorter than perigynia; perigynia obovoid, obtusely trigonous, 4.5-5 mm long, initially pale green, at length brunescent, with very slender, basally distinct nerves, rather abruptly

beaked; beak prolonged, frontally deep-cleft, bidentate, with somewhat spreading teeth, scaberulous-margined, subferruginous. June-July.

Dry deciduous forests, coppices, and forest margins. - Caucasus: West. Transcauc. (Abkhaziya, Mingreliya). Endemic. Described from Western Transcaucasia (Novyi Afon). Type in Leningrad.

355. *C. Arnellii* Christ ex Scheutz in Sven. Vet. Akad. Handl., N. F., XXII (1887) 177; Kük. in Engl. Pflzr. IV, 20 (1909) 609 et in Journ. Russ. Bot. 3-6 (1911) 159. - *C. silvatica* β Turcz. Fl. baic.-dah. II, 2 (1856) 279. - *C. silvatica* Trev. in Ldb. Fl. Ross. IV (1853) 295, quoad pl. sibiricam; Maxim. Prim. fl. Amur. (1859) 312, non Huds. - *C. Maximowiczii* Bcklr. in Linnaea XLI (1877) 237, nec Miq. (1865), nec. F. Schmidt (1868). - *C. Turczaninowiana* Meinsh. ex Korsh. in A. H. P. XII (1892) 411 et in A. H. P. XVIII, 3 (1901) 363. - Ic.: Kük., l. c., 603, fig. 103. - Exs.: HFR No. 1194.

Perennial, pale green, caespitose plants, with oblique ligneous elongated rhizome; culms slender, scabrous and drooping above, 30-70 cm tall, densely covered at base with brown fibrillose sheath remnants; leaves soft, 3-4 mm broad, long-acuminate, nearly equaling the culm; spikelets 4-5, distant: the terminal 2-3 staminate, congested, lance-clavate, 1.5-3 cm long, with ovate subobtuse tawny green-centered scales; other spikelets 425 pistillate, cylindric, 2-5 cm long, loose, sparsely flowered below, on filiform scabrous peduncles to 5-6 cm long; lowest bract short-sheathed (sheath to 1.5 cm long) and bearing a blade nearly equaling the inflorescence; pistillate scales lance-ovate, awn-pointed, with a green terminally scabrous midrib, tawny-margined, shorter than perigynia; perigynia obovoid, obtusely trigonous, 4.5-5 mm long, greenish, becoming yellowish-green, nerveless, rather abruptly contracted into a moderately long, frontally ferruginous-cleft, smooth, bidentate, beak. Fr. June-July.

Forests. - European part: Volg.-Don. (Elyuzan', Lyskovo), Zavolzh., Volg.-Kam. (Kazan' and e. of Kama); West. Siberia: Ob., Upp. Tob., Irt., Alt.; East. Siberia: Yenis. (s. part), Ang.-Sayan., Daur., Len.-Kol.; Far East: Ze.-Bur., Uss., Ud., Sakh. Gen. distr.: Northern Mongolia, Manchuria, North Korea, Japan. Described from Yenisei (Shumikha, between Krasnoyarsk and Eniseisk). Type in Stockholm, cotype in Leningrad.

Series 2. *Laevipedicellatae* V. Krecz. - Plants with creeping rhizome and with stolons. Leaves to 2 cm broad. Inflorescence crowded above, loose below; terminal spikelets subsessile, the lower on long smooth peduncles.

356. *C. latifrons* V. Krecz. nom. nov. - *C. latifolia* Boiss. et Bal. in Fl. Or. V (1884) 421; N. Alb. Prodr. fl. Colch. (1895) 251; Kük. in Engl. Pflzr. IV, 20 (1909) 607; Grossh. Fl. Kavk. I, 172, nec Moench (1794), nec Schkuhr (1801).

Perennial, pale green plants with creeping rhizome, stoloniferous (?); culms firm, smooth, 60-100 cm tall, covered at base with light brown bladeless sheaths; leaves soft, broadly lance-linear, 0.8-1.8 cm broad, shorter than the culm; spikelets 3-7, the terminal 3-5 crowded, the others strongly separated below: the upper 1-3 barely exceeding the others, staminate, lance-linear, 3-4 cm long, with ovate subobtuse tawny scales; other spikelets pistillate, linear, 4-6.5 cm long, loose, sparsely flowered below, on thickened smooth peduncles, of these the upper barely 0.5 cm long, the lower to 10-12 cm and even longer; upper spikelets erect, the lower

drooping; lowest bract with 4-5 cm long (or longer) sheath and a broad blade exceeding the spikelet; pistillate scales oblong-ovate, setiform, acute, with a scabrous green midrib, lurid-margined, shorter than perigynia; perigynia obovoid, obtusely trigonous, 4-4.5 mm long, greenish, at length, brunescent; nerveless, rather abruptly beaked; beak smooth, subcylindric, frontally deep membranaceous-cleft, weakly bidentulate.

Alpine and subalpine meadows. - Caucasus: West. Transcauc.: Abkhaziya, Mingreliya. Gen. distr.: Asia Minor. Described from Lazistan (Dzhimil). Type in Geneva.

Section 45. *Caricella* (Ehrh.) V. Krecz. - Ehrh. Beitr. IV (1789) 146.
 426 *Proteocarpus* Boern. in Abhandl. Naturw. Ver. Brem. XXI (1913) 267 (pro sectione generis *Proteocarpus* Boern.), ex p. - Slender, cespitose plants of marshes and meadows. Culms slender, obtusely angled, smooth; leaves narrow, short-acuminate. Inflorescence of 1 staminate spikelet and 2-5(7) pistillate spikelets; pistillate spikelets rather loosely flowered, short-peduncled, pendulous. Perigynia membranaceous, ovoid to oblong, obtusely rounded-trigonous, 2-4 mm long, nerveless or obsoletely nerved, rather gradually tapering into moderately long, scabrous or smooth, oblique-truncate, membranaceous beak.

1. Terminal spikelet androgynous (i. e. partly staminate and partly pistillate); perigynia nerved and smooth-beaked; slender filiform plants with short stolons. 357. *C. Sedakowii* C. A. M.
- + Terminal spikelets staminate (more rarely gynecandrous); perigynia nerveless, with scabrous (rarely smooth) beak; plants mostly flat-leaved, cespitose 2.
2. Terminal spikelet ferruginous or golden, markedly overtopping the pistillate spikelets; pistillate scales ferruginous or golden; perigynia obtusely trigonous, yellowish or subferruginous at maturity, dull. . 3.
- + Terminal spikelet pale, not overtopping the pistillate spikelets or barely so; pistillate scales pale; perigynia rounded-trigonous, olivaceous-brown at maturity, lustrous. 5.
3. Perigynia 3 mm long, oblong-ovoid, gradually tapering into smooth golden beak; staminate spikelet small, narrowly lanceolate, barely 5 mm long; leaves setaceous-convolute
 365. *C. Novograbenovii* Kom.
- + Perigynia (2.8)3-4 mm long, ovoid, abruptly contracted into scabrous beak; staminate spikelet oblong, to 1.5 cm long; leaves flat, to 4 mm broad. 4.
4. Staminate spikelet clavate, bright orange; scales ovate, rounded-obtuse, the pistillate castaneous to ferruginous; pistillate spikelets loose; perigynia ovoid, 2.8-3 mm long, the beak short, scabrous only at summit; green plants with leaves to 2-2.5 mm broad, one-third to half the length of culm 363. *C. Ledebouriana* C. A. M.
- + Staminate spikelet lanceolate, golden-ferruginous; scales oblong to lanceolate, subacute, tawny; pistillate spikelets with subdistant perigynia; perigynia oblong-ovoid, 3.5-4 mm long, abruptly beaked, the beak scabrous from the middle; pale green plants with leaves 3-4 mm broad, nearly as long as the culm 364. *C. koreana* Kom.

- 427 5(2). Perigynia oblong-ovoid, (2.8)3-3.8 mm long, gradually tapering into long attenuate beak, staminate spikelet small, narrowly lanceolate, usually exceeding the pistillate spikelets; pistillate spikelets loosely flowered, with 5-15(18) perigynia 6.
- + Perigynia ovoid, 2-2.5 mm long, rather abruptly contracted into short conic beak; staminate spikelet oblong-clavate, slightly exceeding the spikelets; pistillate spikelets rather dense, with 15-30 perigynia. .8.
6. Perigynia ovoid, olivaceous-brown at maturity; scales obtuse, half the length of perigynia, soon falling; staminate spikelet whitish; pistillate spikelets loose, with 8-10 more or less spreading perigynia; leaves half as long as the culm 7.
- + Perigynia sublanceolate, rusty-yellow at maturity; scales oblong, subacute, two-thirds the length of perigynia, persistent; staminate spikelet dingy-brown; pistillate spikelets loose, linear, with 10-18 appressed perigynia; leaves one-fourth as long as the culm, crowded at base 360. *C. lenaeensis* Kük.
7. Dwarf (arcto-alpine) plants; perigynia 2.8-3 mm long, smooth at summit or nearly so 358. *C. capillaris* L. s. str.
- + Large forest plants; perigynia 3.5-4 mm long, scabrous at summit 359. *C. chlorostachys* Stev.
8. Small plants, 10-15 cm tall, with soft, 1-2 mm broad leaves nearly as long as the culm; pistillate scales acute; perigynia greenish. (Okhotskoe coast, Beringiana) . . 362. *C. Chamissonis* Meinsh.
- + Larger plants, 15-40 cm tall, with rather stiff, 2-4 mm broad leaves half as long as the culm; pistillate scales obtuse; perigynia olivaceous-brown, lustrous. (Eastern Siberia, Turkestan) 361. *C. Karoi* Freyn.

Series 1. Nematodae V. Krecz. - Terminal spikelet androgynous; peduncles of staminate spikelets smooth; perigynia slenderly nerved, green, at length lutescent, smooth-beaked. Plants with slender filiform leaves and short stolons.

337. *C. Sedakowii* C. A. M. ex Meinsh. in A. H. P. XVIII, 3 (1901) 360; Kom. Fl. Manchzh. I, 376; Kük. in Engl. Pflzr. IV, 20 (1909) 588 et in Journ. Russ. Bot. 3-6 (1911) 156; V. Krecz. in Fl. Transb. II (1931) 129. - *C. capillaris* var. *paludosa* F. Schmidt in Mém. Ac. St. Pétersb., sér. VII, XII (1868) 69. - Ic.: Kük., l. c., 589, fig. 99, A-C. - Exs.: HFR No. 1346 a et b.

428 Perennial, pale green, caespitose plants, with short stolons; culms filiform, somewhat drooping at the ends, 10-50 cm tall, leafy in lower one-third; leaves filiform-convolute (at most 1 mm broad when unrolled), scabrous, long-attenuate, not exceeding half the length of culm; spikelets 2-4, distant; terminal spikelet androgynous, 0.7-1 cm long, erect, with 1-5 perigynia at base, its scales obtuse, yellowish-ferruginous; other spikelets pistillate, narrowly oblong, 0.6-1 cm long, loosely 3-8-flowered, on very slender smooth peduncles to 2 cm long; lower bracts with narrow long sheath to 2.5 cm long and a setiform blade barely as long; scales oblong-ovate, obtuse, tawny, white-hyaline-margined, with a green midrib, about half the length of perigynia; perigynia obovoid, rounded-trigonous, 2.5-2.8 mm long, pale green, becoming lustrous, few-nerved on the outer face, weakly stipitate, smooth at summit, rather abruptly beaked; beak short, oblique, cylindric, subferruginous, white-hyaline at summit, truncate, Fr. July.

Mossy marshes. - West Siberia: Ob. (vicinity of Tobol'sk), Alt., East Siberia: Ang.-Sayan., Daur., Len.-Kol. (s.); Far East: Ze.-Bur., Ud., Uss., Okhot. Gen. distr.: Northern Mongolia, Manchuria, North Korea. Described from Transbaikalia - Kul'skie Vody. Type in Leningrad.

Series 2. *Chloroticae* V. Krecz. - Terminal spikelets staminate, pale, not exceeding the pistillate spikelets or barely so; pistillate scales pale; perigynia rounded-trigonal, nerveless, green, becoming olivaceous-brown, lustrous, with scabrous beak; leaves flat, to 3-4 mm broad; caespitose plants.

358. *C. capillaris* L. Sp. pl. (1753) 977 (s. str.); Trev. in Ldb. Fl. Ross. IV, 295; Meinsh. in A. H. P. XVIII, 3 (1901) 362, ex p. - Exs.: Kneuck. No. 210 and 210 a.

Perennial, cineraceous-green plants, with slender culms 3-15 cm tall leaves abbreviated, stiffish, flat to subinvolute, to 2 mm broad; spikelets 3-5, aggregated in a glomerule; terminal spikelet staminate, not exceeding the pistillate spikelets, with obtuse tawny scales; other spikelets pistillate, oblong, 0.5-1 cm long, 4-8-flowered, drooping; pistillate scales subacute, tawny, broadly hyaline-margined, shorter than perigynia; perigynia ovoid, 2.8-3 mm long, brownish-green, gradually tapering into a nearly smooth beak. Fr. June-July.

Tundra. - Arctic: Arct. Eur., Chuk. Gen. distr.: Arctic region and mountains of Europe and North America. Described from Europe.

359. *C. chlorostachys* Stev. in Mém. Soc. Nat. Moscou, IV (1813) 68; M. B. Fl. taur. cauc. III (1819) 615; V. Krecz. in Fl. Transb. II (1931) 129, non Don (1825). - *C. capillaris* Trev. in Ldb. Fl. Ross. IV, 295 (excl. var. β); Meinsh. in A. H. P. XVIII, 3 (1901) 262, ex p.; Grossh. Fl. Kavk. I, 172, non L. - *C. capillaris* f. *major* Kük. in Engl. Pflzr. IV, 20 (1909) 590 et in Journ. Russ. Bot. 3-6 (1911) 157, ex p.; Litw. in Sched. ad. Herb. Fl. Ross. VI (1908) 134, non Drejer. - Exs.: HFR No. 596 1940 a; Pl. Finl. Exs. No. 132 a, b.

429 Perennial, green, densely caespitose plants, with short creeping rhizome; culms slender, setiform, 15-50 cm tall; leaves soft, flat, 1.5-3 mm broad, short-acuminate, half as long as the culm; spikelets 3-5, the lower sub-distant: the terminal spikelet staminate, often not exceeding the adjoining pistillate spikelets, lance-linear, 0.5-0.7 cm long, 0.2 cm broad, with obtuse tawny broadly hyaline-margined scales; other spikelets pistillate, linear-oblong, 0.7-1.5 cm long, loosely 6-12-flowered (usually 9-10-flowered), on slender scabrous peduncles, 2-3 cm long, drooping; lowest bract with sheath to 1.5 cm long and a blade exceeding the spikelet; pistillate scales ovate, obtuse, soon deciduous, tawny, green-centered, with broad whitish or hyaline margins, about half the length of perigynia; perigynia ovoid, rounded-trigonal, (3)3.2-3.8(4) mm long, initially green, becoming somewhat brownish-green, lustrous, nerveless, distinctly stipitate, gradually beaked; beak moderately long, scabrous-margined, conic, hyaline-tipped, obliquely truncate. Fr. May-June.

Marshes, wet meadows, coppices, boggy forests. - Arctic: Arct. Eur.; European part: Kar.-Lap., Dv.-Pech., Lad.-Il'm., Upp. Volg., Volg., Kam., Volg.-Don., Zavolzh.; Caucasus: Ciscauc., Dag., East. Transcauc. (Kubinskii Distr.); West. Siberia: Ob., Irt. (e.), Alt.; East. Siberia: Yenis., Ang.-Sayan., Len.-Kol.; Centr. Asia: Dzhung.-Tarb., Pribalkh. (n. part), Tyan'-Shan., Pam.-Al. (Zeravshan). Gen. distr.:

Scandinavia, Baltic States, Poland. Described from Eastern Caucasus (near Yukharibash Pass). Type in Leningrad.

360. *C. lenaeensis* Kük. in Finsk. Vet. Soc. Förhandl. XLV, 8 (1902-1903) 10. - *C. capillaris* var. *Ledebouriana* Kük. in Engl. Pflzr. IV, 20 (1909) 501, ex p., et in Journ. Russ. Bot. 3-6 (1911) 157, quoad pl. jakut. - *C. capillaris* Kom. Fl. penins. Kamtsch. I (1927) 262; Hultén, Fl. of Kamtch. I, 204, ex p.

Perennial, green, densely caespitose plants; culms slender but firm, 20-40 cm tall, with leaves congested below; leaves rather soft, flat to sub-involute, 1.5-2.5 cm broad, scabrous, rather short-attenuate, 1/4-1/3-1/2 the length of the culm; spikelets 4-6, the upper approximate, the lower distant: the terminal spikelet not exceeding the adjoining pistillate spikelets or even shorter, staminate, lance-linear, 0.6-1.2 cm long (0.2 cm broad), erect, with narrow obtuse rufous scales; other spikelets pistillate, narrowly linear, 1-1.5 cm long, loose (the lowest sometimes with 1-2 branches at base), containing 10-18 perigynia, on capillary peduncle to 3-4 cm long, erect to slightly nodding; lowest bract with light green sheath to 3-3.5 cm long and blade of same length; pistillate scales ovate, pointed, tawny, green-centered, broadly white-hyaline-margined, two-thirds the length of perigynia; perigynia oblong-ovoid to lanceolate, rounded-trigonous, 3-3.5 cm long, green, becoming yellowish-ferruginous and lustrous, nerveless, stipitate, rather gradually beaked; beak prolonged, slightly oblique, sub-ferruginous, scaberulous, nearly smooth, white-hyaline-tipped, obliquely truncate. Fr. June-July.

430 Boggy tundra. - Arctic: Arct. Siberia, Anad., Chuk. (St. Lawrence Bay, Arakan-Chechen Is.); East. Siberia: Ang.-Sayan (Tunkinskie hills), Len.-Kol. (n. part); Far East: Ze.-Bur. (a peak of the Tukuringra range), Sakh. (n. part). Gen. distr.: Alaska, Aleutian Islands. Described from Yakutiya (Tit-ary). Type in Helsinki.

361. *C. Karoi* Freyn. in Öster. Bot. Zeitschr. XL (1890) 303 et XLVI, (1896) 132; V. Krecz. in Fl. Transb. II, 129. - *C. delicata* C.B. Clarke in Kew. Bull. Miscell. Inform., Addit. Ser., VIII (1908) 72. - *C. capillaris* C.A.M. in Ldb. Fl. Alt. IV (1833) 227, non L. - *C. capillaris* f. *major* Kük. in Engl. Pflzr. IV, 20 (1900) 590 et in Journ. Russ. Bot. 3-6 (1911) 157, ex p., non Drej. - *C. capillaris* ssp. *densiflora* Printz, Veg. Sib. Mong. Front. (1921) 158, fig. 79 et 80. - *C. displodens* Printz, l.c., 142, fig. 77. - Exs.: HFR No. 1940.b.

Perennial, pale green to cineraceous-green, densely caespitose plants; culms stronger than in the preceding species, 15-40 cm tall; leaves sub-rigid, flat, 2-4 mm broad, short-acuminate, shorter than the culm (two-thirds as long); spikelets 4-6, the upper approximate, the lower distant: the terminal spikelet usually equaling to slightly exceeding the adjoining pistillate spikelets, staminate, oblong-obovoid to short-lance-clavate, 0.6-0.8 cm long (sometimes gynecandrous), 0.2-0.3 cm broad, with rufous hyaline-margined obtuse scales; other spikelets pistillate, narrowly cylindrical, 0.8-2 cm long, loosely 15-30 flowered, on capillary scabrous peduncle to 2-2.5 cm long, drooping; lowest bract with sheath to 2-2.5 cm long and blade exceeding the spikelet; pistillate scales broadly ovate, obtuse, tawny, with green midrib, terminating in an obtuse tip, broadly whitish-hyaline-margined, shorter than perigynia; perigynia ovoid, rounded-trigonous, 2-2.5 mm long, green, becoming brownish-green and lustrous, nerveless,

short-stipitate, rather abruptly beaked; beak short, conic, scaberulous-margined, whitish-hyaline, obliquely truncate, frontally cleft down to the base. Fr. June-August.

Saline marshes and meadows. - West. Siberia: Irt. (e. part), Alt.; East. Siberia: Ang.-Sayan., Daur., Len.-Kol.; Far East: Ze.-Bur.; Centr. Asia: Dzhung.-Tarb., Tyan'-Shan., Pam.-Al. Gen. distr.; Kulja, Northern Mongolia, Manchuria. Described from the vicinity of Irkutsk (a forest on the Irkut). Type in Austria.

362. *C. Chamissonis* Meinsh. in A.H.P. XVIII, 3 (1901) 361. - *C. nana* Cham. ex Steud. Syn. Cyp. (1855) 228, nec Lam. (1789), nec Boott (1858). - *C. capillaris* var. *nana* Kük. in Engl. Pflzr. IV, 20 (1909) 591. - *C. capillaris* Trev. ex Ldb. Fl. Ross. IV, 295; Hultén, Fl. of Kamtch. I, 204, quad pl. Redowskianam, non L.

431 Perennial, green, caespitose plants; culms triangular, leafy to high up, 5-10 cm tall (when young); leaves soft, flat, 1-2 mm broad, short-acuminate, equaling to exceeding the culm; spikelets 6-7, often in 2's or 3's from same bract, the terminal spikelet staminate, narrowly lanceolate, ca. 1 cm long, with obovate tawny obtuse scales; other spikelets pistillate, linear, 1-1.5 cm long, loosely flowered, on slender scabrous peduncles to 1.5-2 cm long, erect or slightly drooping; lowest bracts with sheath to 1 cm long and blade nearly equaling the inflorescence, pistillate scales ovate, carinate, subacute, tawny, pale-margined, as long as or shorter than perigynia; perigynia (partly mature) ovoid, trigonous, 2-2.5 mm long, nerveless, pale, green, conically attenuate into short hispidulous-margined beak.

Far East: (Okhotskoe coast, - along the road from Okhotsk to Gizhiga, Ayan). Endemic. Described from the Okhotskoe coast (erroneously recorded for Kamchatka). Type in Leningrad.

Series 3. *Chalcandrae* V. Krecz. - Terminal spikelets staminate, ferruginous or golden-colored, overtopping the pistillate spikelets; pistillate scales ferruginous or golden. Perigynia obtusely trigonous, nerveless, green, becoming yellowish, with scaberulous or smooth beak. Leaves more or less flat. Caespitose plants.

363. *C. Ledebouriana* C.A.M. et Trev. in Bull. Soc. Nat. Mosc. XXXVI, 1 (1863) 540; V. Krecz. in Fl. Transb. II, 129. - *C. capillaris* var. *C.A.M.* in Ldb. Fl. Alt. IV (1833) 228. - *C. capillaris* β Trev. in Ldb. Fl. Ross. IV (1853) 295. - *C. capillaris* var. *Ledebourii*. F. Schmidt in Mém. Ac. St. Pétersb., sér., VII, XII (1868) 69. - *C. capillaris* var. *Ledebouriana* Kük. in Engl. Pflzr. IV, 20 (1909) 591 et in Journ. Russ. Bot. 3-6 (1911) 157. - *C. fraudulans* Printz, Veg. Sib. Mong. Front. (1921) 160, fig. 82 et tab. IV, fig. 1. - *C. davurica* Stev. in herb.

Perennial, green, densely caespitose plants; culms slender, 6-25 cm long; leaves rather stiff, flat, 1.5-3 mm broad, short-acuminate, half as long as the culm; spikelets 2-4, distant: the terminal spikelet staminate, considerably exceeding the others, staminate, oblanceolate, to clavate, plumpish, 0.6-1.5 cm long, 0.3-0.5 cm broad, with rufous obtuse scarcely hyaline-margined scales; other spikelets pistillate, ovoid to oblong, 0.7-1.5 cm long, loosely 5-10-flowered (sparsely below), on filiform scabrous peduncles, to 2.5-3 cm long, drooping; lowest bract with subferruginous sheath to 1.5 cm long and blade barely as long; pistillate scales ovate, obtusely-tipped, convex, rufous, with concolor or lighter nerve, narrowly hyaline-

margined, shorter than perigynia; perigynia ovoid to ellipsoid, obtusely trigonous, 2.8-3 mm long, greenish-yellow, becoming subferruginous above, nerveless, on conically attenuate stipe, rather abruptly contracted into ferruginous hyaline-tipped scaberulous-margined beak. Fr. June-August.

Wet places in alpine and subalpine zone. - Arctic: Anad.; West. Siberia: 432 Alt.; East. Siberia: Ang.-Sayan., Daur., Len.-Kol. (s. and e. parts)-Dzhugdzhur range). Gen. distr.: Northern Mongolia. Described from Altai (Kuraiskii range). Type in Leningrad.

364. *C. koreana* Kom. in A.H.P. XVIII, 6 (1901) 446 et in Fl. Mandsh. I (1901) 399; Kük. in Engl. Pflzr. IV, 20 (1909) 591 et in Journ. Russ. Bot. 3-6 (1911) 157; V. Krecz. in Fl. Transb. II, 129; Kom. and Alis. Opred. rast. Dal'nevost. Kr. I, 315, tab. 94 (dextra).

Perennial, pale green, densely caespitose plants; culms slender, 20-40 cm tall; leaves soft, flat, 3-4 mm broad, short-acuminate, slightly shorter than the culm; spikelets 2-4, the lower distant: terminal spikelet staminate, exceeding the others, lanceolate, 0.6-1.5 cm long, with oblong subobtuse rufous white-hyaline-margined scales; other spikelets pistillate, linear, 0.5-1.5 cm long, loosely 5-10-flowered, on filiform scabrous peduncles to 3-3.5 cm long, erect to more or less drooping; lowest bract sheath to 1.5 cm long and blade 2-3 times as long (but not exceeding the spikelet); pistillate scales ovate, the lower acute, the upper subobtuse, mucronate, ferruginous, hyaline at summit, carinate, scabrous on the midrib above, shorter than perigynia; perigynia ovoid, obtusely trigonous, 3.5-4 mm long, nerveless, light green, stipitate, rather abruptly contracted into narrowly conic, somewhat spreading, scabrous-margined, prolonged, ferruginous-tipped beak. Fr. May.

Forests, rock crevices (on humus), meadows. - East. Siberia: Daur.-Nerchinskii Distr., river Itakenda above the estuary of river Shaverna; Far East: Uss. Gen. distr.: Manchuria, Korea. Described from North Korea: near Chaor'en Pass, Kensong Province. Type in Leningrad.

365. *C. Novograbenovii* Kom. in Bull. Jard. Bot. URSS, XXX, 1-2 (1932) 199.

Perennial, pale green to yellowish-green, caespitose plants; culms slender, 5-15 cm tall, with leaves crowded at base; leaves suberect, at most 1 mm broad, setaceous-convolute, nearly smooth, short-acuminate, one-third to half as long as the culm; spikelets 2-4, the lower distant: the terminal spikelet staminate, overtopping the others, lanceolate, barely 0.5 cm long, with oblong-ovate, subobtuse, rufous, white-hyaline-tipped scales; other spikelets pistillate, linear, 0.5-1 cm long, loosely 5-8-flowered, on filiform scaberulous peduncles to 1 cm long; lowest bract with brownish to 0.5-0.7 cm long and setiform blade barely equaling its spikelet; pistillate scales early deciduous, obovate, obtuse, rusty-rufous, with white-hyaline irregular margin, about half the length of perigynia; perigynia; oblong-ovoid, obtusely trigonous, 3 mm long, brownish-green, sublustrous, conically attenuate at base, smooth at summit, gradually tapering into moderately long conic golden-rufous hyaline-tipped smooth beak. Fr. July.

Arctic: Arct. Sib., Anad. (river Osnovaya), Chuk. (Arakan-Chechen 433 Is.); Far East: Kamch. (Pinachevo-Kalachevskii Pass), Okhot. (coast, on the road from Okhotsk to Gizhiga), Ze.-Bur. (sources of Bureya). Endemic. Described from Kamchatka (Pinachevo-Kalachevskii Pass). Type in Leningrad.

Section 46. *Malacocarex* V. Krecz. - *Proteocarpus* Boern. in Abh. Naturw. Ver. Brem. XXI (1913) 267 (pro sectione generis *Proteocarpus* Boern.), ex p. - Meadow and forest plants, with long slender stolons; culms more or less flattened-triangular, with winged prominently scabrous angles, leafy to high up, covered at base with bladeless or blade-bearing sheaths; leaves flat, soft, 3-veined, short-acuminate. Bracts sheathless. Inflorescence of 1 staminate spikelet and 3-5 cylindric pistillate spikelets; spikelets distant, the lower pedunculate, erect or drooping; perigynia membranaceous, ovoid or oblong-ovoid, 4-6 mm long, with smooth, terete, truncate or more or less emarginate, hyaline-tipped beak. Stigmas 3.

1. Perigynia 5-5.5 mm long, more or less horizontally spreading, on curved stipe, abruptly contracted into cylindric bidentate-emarginate beak (Northern Europe) 366. *C. mollissima* Christ.
- + Perigynia 3.5-4 mm long, ascending, on straight stipe, gradually tapering into a more or less obliquely truncate beak (Far East) 367. *C. planiculmis* Kom.

366. *C. mollissima* Christ ex Scheutz in Vet. Akad. Handl. Stockholm, XXII (1887) 181 et in A. H. P. XVIII, 3 (1901) 413; Kük. in Engl. Pflzr. IV, 20 (1909) 719 et in Journ. Russ. Bot. 3-6 (1911) 179; V. Krecz. in Fl. Transb. II, 133. - *C. divaricata* Kük. in Finska Vetensk. Soc. Förh. XLV (1902-03) 12. - *C. vesicaria* var. *alpigena* et var. *reflexa* Meinsh. in A. H. P. XVIII, 3 (1901) 373. - Ic.: Kük., l. c., 721, fig. 124 A-D.

Perennial, green plants, with long slender stolons; culms 25-40 cm tall, covered at base with light brown blade-bearing sheaths; leaves 3-7 mm broad, scabrous, exceeding the culm; spikelets 3-5, approximate: the terminal spikelet staminate, linear, 2-3 cm long, on peduncle barely 0.5 cm long, with ovate subobtusate tawny scales; other spikelet pistillate, cylindric, 1.2-3 cm long, 0.7 cm broad, loose, the upper sessile, the lower on peduncle to 3 cm long, erect; lowest bract sheathless, with blade 2-3 times the length of inflorescence, pistillate scales ovate, subacute, reddish-ferruginous, with a narrow green center, half the length of perigynia; perigynia horizontally spreading, ovoid, inflated-terete, 5-5.5 mm long, stramineous, lustrous, slenderly nerved, round-based, on slender oblique stipe ca. 1 mm long, rather abruptly contracted into cylindric, smooth, obliquely truncate, weakly bidentulate beak measuring to one-fourth the length of the body. Fr. July. (Plate XXIII, fig. 13).

Marshes, in water. - European part: Dv. - Pech. (river Ilych), Volg. - Kam. (Centr. Ural and Solikamsk); West. Siberia: Ob. (Sosva river basin, between Shchekut'inskii and Izhma, on river Enkorpiya); East. Siberia: Yenis., Daur., Len.-Kol.; Far East: Ze.-Bur., Uss. Endemic. Described from Azinov on the Yenisei. Type in Stockholm.

367. *C. planiculmis* Kom. in A. H. P. XVIII, 6 (1901) 448 et in Fl. Mandsh. I (1901) 392; Kük. in Engl. Pflzr. IV, 20 (1909) 621; Kom. and Alis. Opred. rast. Dal'nevost. Kr. I, 315.

Perennial, pale green plants, with long slender stolons; culms firm, flattened winged-triangular, with emarginate sides, scabrous above, 40-50 cm tall, covered at base with light brown bladeless sheaths; leaves 5-12 mm broad, with 3 prominent scabrous veins, somewhat shorter than the culms; spikelets 4-6, distant, especially the lower ones: the terminal

spikelet staminate, 2-4 cm long, with oblong-ovate obtuse light brown, green-ribbed scales; other spikelets pistillate, cylindric, 2-4.5 cm long, dense, the upper sessile, the lower on erect scabrous peduncles to 3 mm long; lowest bract longer than inflorescence; pistillate scales oblong-ovate, cuspidate, lurid, 3-nerved, with green internerves, shorter than perigynia, the midrib scabrous above, perigynia spreading, ovoid, inflated-trigonous, 3.5-4 mm long, pale green, many-ribbed, round-based, short-stipitate, smooth above, rather abruptly contracted into moderately long, curved, whitish-tipped, obliquely truncate, smooth beak. Fr. June-July.

Forests. - Far East: Uss. Gen. distr.: Manchuria, Korea, Japan. Described from Manchuria (Kirin Province, Ninguta [Ningan] - Tai-ma-gou distr.). Type in Leningrad.

Section 47. *Pompholyx* V. Krecz. - *Carex* Rafin. Amenit. of Nat. I (1840) 25, ex p. (incl. subg. *Carex* et *Costularia*); Boern. in Abh. Naturw. Ver. Brem. XXI (1913) 265, pro max. parte, non L. - Loosely caespitose paludose plants of meadows and forests, with creeping rhizome and long stolons. Culms covered at base with reddish reticulate bladeless sheaths. Leaves ribbon-like, reticulate below, the leaf bases and sheaths glabrous or more or less pubescent. Bract sheathless; inflorescence of (1)-2-4-(7) approximate staminate spikelets and 2-5 distant pistillate spikelets; pistillate spikelets oblong or cylindric, rather dense, rarely loose, erect, rarely drooping. Perigynia membranaceous or subcoriaceous, ovoid, oblong-ovoid, or conic-lanceolate, inflated-trigonous, from 3.5 mm to 15-18 mm long, nerved, glabrous or more or less hairy, more or less distinctly stipitate, contracted into smooth, strongly bidentate or emarginate beak. Stigmas 3, rarely 2.

1. Lowest bract with well developed sheath 1.5-2-3 cm long [sic] (rarely - *C. latisquamea* Kom. - 0.5-0.6 cm long) 2.
- + Lowest bract sheathless or with scarcely developed sheath (2-3 mm long) 12.
2. Spikelets short, barely 2-2.5 cm in length and thickness, containing 435 6-10 spreading conic-lanceolate perigynia 10-13 mm long 390. *C. dolichocarpa* C. A. M.
- + Spikelets oblong, 2-8 cm long, 0.8-1.5 cm broad, containing numerous variously shaped perigynia not exceeding 9-10 mm in length 3.
3. Culms prominently scabrous, with channeled sides and rather prominently scabrous angles; staminate spikelet barely exceeding the dense and approximate pistillate spikelets; perigynia conic-lanceolate. . . 4.
- + Culms obtusely triangular, with smooth angles; pistillate spikelets loose, sparsely flowered below, strongly separated from the staminate and from each other; perigynia ovoid or conic-ovoid (rarely oblong-conic-ovoid, and then beak furcate-dilated. (Plate XXIV, fig. 3) . . . 5.
4. Spikelets cylindric, 3-6 cm long, 0.8-1 cm broad, on long scabrous peduncles, drooping; perigynia subreflexed, 4.5-5.5 mm long, with straight bidentate beak. (Plate XXIV, fig. 8) 392. *C. pseudo-cyperus* L.
- + Spikelets oblong-ovoid, 1.5-3 cm long, 1.5 cm broad, horizontally or obliquely spreading, 8-9 mm long; teeth of perigynium-beak arching-reflexed. (Plate XXIV, fig. 7) . . . 391. *C. capricornis* Meinsh.
5. Staminate spikelet solitary; sheath of lowest bract barely 0.5-0.6 cm long 382. *C. latisquamea* Kom.

- + Staminate spikelets 2-5; sheath of lowest bract from 1 cm to 2.5 cm long 6.
6. Perigynia with divergent teeth, these 2.5-3 mm long, strong, subulate, somewhat arching. (Plate XXIV, fig. 1) 383. *C. Siegertiana* Uechtr.
- + Perigynia with straight cuneate often soft teeth 1-1.5(2)mm long, usually purple-tinged at the orifice 7.
7. Perigynia glabrous, oblong-conic-ovoid, 8-10 mm long, the beak furcate-cleft at base. (Plate XXIV, fig. 3) 389. *C. Raddei* Kük.
- + Perigynia glabrous or hairy, ovoid or conic-ovoid, 5-8 mm long, with straight or spreading beak. 8.
8. Perigynia entirely glabrous and smooth, pale or yellowish-green. 9.
- + Perigynia hairy over the whole surface or only in upper part, or ciliate-margined above 10.
9. Leaves glabrous underneath, their sheaths glabrous or slightly hairy only at the throat 384. *C. orthostachys* C.A.M.
- + Leaves underneath and their sheaths densely covered with curly hairs 385. *C. eriophylla* (Kük.) Kom.
10. Perigynia subcoriaceous, rather densely hairy all over the surface, sometimes subferruginous. (Plate XXIV, fig. 6). Rigid plants, growing in exposed and wet sandy situations. 386. *C. hirta* L.
- 436 + Perigynia membranaceous, sparsely hairy above, with a more or less ciliate beak; soft forest plants 11.
11. Leaves glabrous underneath, their sheaths glabrous or hairy only on the membranaceous part; staminate spikelets shaggy owing to the spreading brown anthers; perigynia 5-6 mm long, with ciliate-margined beak. (Plate XXIV, fig. 4) 387. *C. drymophila* Turcz.
- + Leaves sparsely hairy underneath, their leaves rather densely short-pubescent; staminate spikelets lance-linear; perigynia 7-8 mm long, diffusely pubescent above, with hairy and ciliate beak. (Plate XXVI, fig. 5) 388. *C. amurensis* Kük.
- 12 (1). Culms 3-angled, rather strongly scabrous on the angles above; leaves flat, green. 13.
- + Culms obtusely 3-angled, smooth; leaves channeled, pale green or cinereous-green 23.
13. Perigynium-beak distinctly subulate- or cuneate-bidentate, the teeth from 0.5-0.8 to 1-1.2 mm long. (Plate XXIII, fig. 1, 2, 4, 8) 14.
- + Perigynium-beak entire or only slightly emarginate. (Plate XXIII, fig. 5-7 and 9-12) 18.
14. Perigynia horizontally spreading, broadly inflated-ovoid, retort-shaped, aggregated in compact spikelets and abruptly contracted into prolonged cylindrical beak. (Plate XXIII, fig. 4 and 8) . . . 15.
- + Perigynia obliquely divergent, arranged in loose spikelets, ovoid or conic-ovoid, rather gradually tapering into abbreviated beak. (Plate XXIII, fig. 1 and 2) 16.
15. Vigorous plants, with culms to 100-120 cm tall and ribbon-shaped leaves 8-15 mm broad; pistillate spikelets 5-8 cm long; perigynia 6 mm long, green. (Plate XXIII, fig. 4) 368. *C. rhynchophysa* C.A.M.

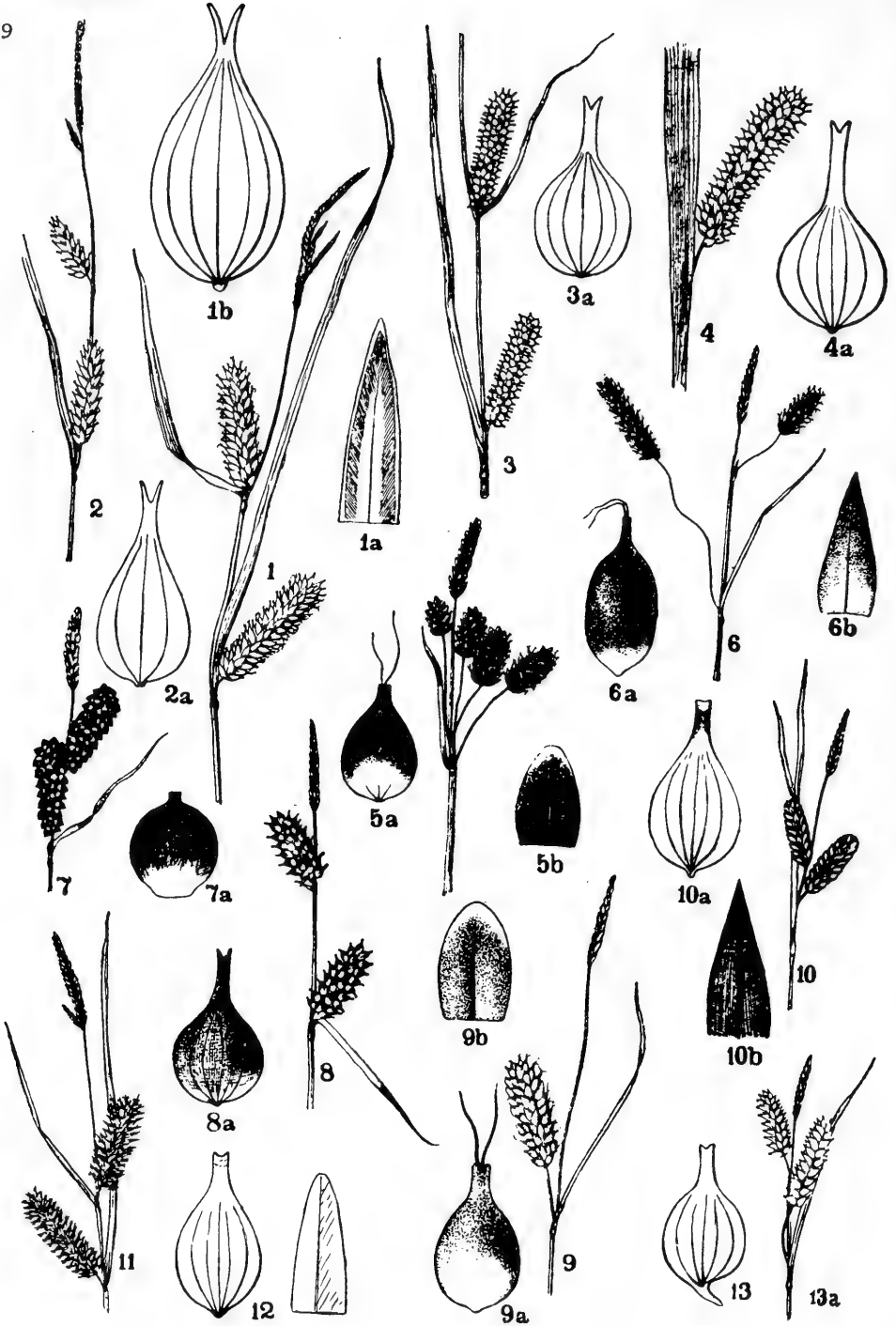
- + Small plants, 10-40 cm tall, with leaves 1.5-3 mm broad; pistillate spikelets 1-2.5 cm long; perigynia 4-4.5 mm long, brownish. (Plate XXIII, fig. 8) 369. *C. jacutica* V. Krecz.
16. Green plants, with flat and narrow leaves; basal sheaths red, narrow, tightly investing the culm, reticulate, bladeless 17.
- + Cineraceous-green plants, with ribbon-shaped, flat to subinvolute, loosely reticulate leaves; basal sheaths brownish to reddish-brown, broad, loosely investing the culm, free, non-fibrillose, bladeless sheaths 373. *C. utriculata* Boott.
17. Pistillate spikelets 4-7 cm long, 1.5 cm broad; perigynia flavescent; 7-8 mm long, ovoid. (Plate XXIII, fig. 1) 374. *C. vesicaria* L.
- + Spikelets 2-3 cm long, 1 cm broad; perigynia 5.5-6 mm long, conic-ovoid, green or brunescent. (Plate XXIII, fig. 2) 375. *C. vesicata* Meish.
- 437 18(13). Plants of mountains and meadows, 20-70 cm tall, with variegated spikelets, due to dark white-centered scales and yellowish-green or brownish-yellow perigynia; perigynia 4-6 mm long, sessile, slenderly nerved, rather gradually tapering into short, shallowly-ferruginous-emarginate beak. (Plate XXIII, fig. 10-11-12) . . . 19.
- + Plants of Siberian heights, 10-40 cm tall, with entirely black or blackish-brown spikelets; scales without a light band; perigynia lustrous, black or brownish-black, 3.5-4.5 mm long, short-stipitate, nerveless, rather abruptly contracted into short, scarcely emarginate beak. (Plate XXIII, fig. 5, 6, 7) 21.
19. Pistillate scales narrowly lanceolate, acute, equaling to exceeding the perigynia; perigynia 5-5.5 mm long; plants to 70 cm tall, with large spikelets to 4.5 cm long and 1.5 cm broad 378. *C. pamirensis* C.B. Clarke.
- + Pistillate scales ovate, subobtusate, about half the length of perigynia; perigynia 4-4.5 mm long; plants 15-50 cm tall, with spikelets 1.5-2.5 cm long and 0.8-1 cm broad 20.
20. Leaves flat, to 5 mm broad; perigynia ovoid; staminate scales castaneous, occasionally whitish only at summit. (Siberia) 377. *C. dichroa* Freyn.
- + Leaves subinvolute, to 3 mm broad; perigynia ellipsoid-ovoid; staminate scales white-hyaline-margined. (European Arctic) 376. *C. Grahamii* Boott.
- 21(18). Style 3-fid; erect robust plants; spikelets strict, on thickened peduncles, oblong (to 3 cm long and 1 cm broad), dense, with strongly inflated, horizontally spreading perigynia 381. *C. membranacea* Hook.
- + Style 2-fid (rarely 3-fid); plants with rather slender, terminally nodding culms; spikelets more or less drooping or pendulous, on slender filiform peduncles, loose, ovoid or narrowly cylindrical (0.6-0.7 cm broad); perigynia biconvex, obliquely divergent 22.
22. Tall (to 70 cm) slender plants; spikelets cylindrical, 1.5-3 cm long, suspended on slender, to 5-6 cm long peduncles; pistillate scales lanceolate, subacute; perigynia ovoid-ellipsoid, 4-4.5 mm long. (Plate XXIII, fig. 6) 380. *C. procerula* V. Krecz.
- + Plants 10-40 cm tall, with more or less curving culms; spikelets ovoid, 0.8-1.8 cm long, the lower ones on peduncles to 1-2 cm long,

- more or less drooping; pistillate scales ovate, subobtusate; perigynia ovoid, 3.5-4 mm long. (Plate XXIII, fig. 5) 379. *C. saxatilis* L.
- 438 23 (12). Large plants (to 100-150 cm tall); pistillate spikelets cylindrical, 5-12 cm long; perigynia pale green, with subulate-bidentate beak. (Plate XXIII, fig. 3) 24.
- + Dwarf, mountain-arctic plants, 15-50 cm tall; spikelets ovoid or oblong, 1-3.5 cm long; perigynia more or less rusty-yellow, with slightly emarginate beak. (Plate XXIII, fig. 9) 25.
24. Plants with channeled leaves 2-4 mm broad; pistillate spikelets dense, with inflated rounded-ovoid (flask-shaped), horizontally spreading perigynia, these abruptly contracted into prolonged cylindrical beak 370. *C. inflata* Huds.
- + Plants with flat leaves 4-7 mm broad; pistillate spikelets loosish, with obliquely divergent perigynia, these gradually tapering into abbreviated beak 373. *C. utriculata* Boott.
25. Perigynia 4 mm long, yellowish-ferruginous, devoid of distinct nerves, with short, scarcely emarginate beak; scales ferruginous, subobtusate, broadly ovoid; spikelets 1-2 cm; lowest bract not exceeding inflorescence; plants 15-35 cm tall 372. *C. rotundata* Whlb.
- + Perigynia 4.5-5.5 mm long, yellowish-green, distinctly nerved, with prolonged bidentate crescent-notched beak; scales light, acute, oblong-ovate; spikelets 2-3.5 cm long; lowest bract exceeding inflorescence; plants 25-50 cm tall 371. *C. stenolepis* Less.

Cycle 1. *Ampullaria* V. Krecz. - Perigynia membranaceous, broadly short-ovoid, more or less rounded-inflated (flask-shaped), 4-6 mm long, abruptly beaked; beak cylindrical, smooth, bidentate-emarginate or bifid. Bracts sheathless or with scarcely pronounced sheath; culms obtusely 3-angled, usually smooth; leaves subinvolute or more or less flat, pale green or green.

368. *C. rhynchophysa* C. A. M. in Suppl. Ind. Sem. H. B. Petrop. IX (I- $\frac{1}{2}$ II 1844) 9; Trev. in Ldb. Fl. Ross. IV, 318; Turcz. in Bull. Soc. Nat. Mosc. XXVIII (1855) 250; Meinsh. in A. H. P. XVIII, 3 (1901) 375; Kom. Fl. Manchzh. I, 381. - *C. laevirostris* Blytt ex Blytt et Fries in Bot. Notis. 1-2 (III 1844) 24 (nomen); Kük. in Engl. Pflzr. IV, 20 (1909) 724 et in Journ. 441 Russ. 3-6 (1911) 182; V. Krecz. in Fl. Transb. II, 136. - *C. bullata* b. *laevirostris* Blytt ex Fries, Nov. Fl. Suec. Mant. II (1839) 59. - *C. ampullacea* β *robusta* Weinm. En. stirp. petrop. (1837) 92. - *C. robusta* Nyl. Spic. fl. fenn. (1844) 16 (sub *C. rhynchophysa*). - Exs.: HFR No. 694; Kneuch. VII, No. 231.

Perennial, intensely green plants, with long thickened stolons; culms stout, sharply triangular, scabrous above, 60-120 cm tall, covered at base with thickened, light, brownish, terminally reddish sheaths; leaves ribbon-shaped, rather smooth, reticulate below, flat, 0.8-1.5 cm broad, rather short-acuminate, nearly as long as the culm; spikelets 5-11, distant, the terminal 3-7 staminate, fusiform-linear, 3-6 cm long, with ovate obtuse drab hyaline-margined scales; other spikelets cylindrical, 5-8 cm long, 1-5 cm broad, very dense, subnutant; peduncles scabrous, the lower ones 2.5-3 cm long; lowest bract longer than inflorescence; pistillate scales lanceolate, acute, brownish-castaneous, green-centered, hyaline-margined, narrower and shorter than perigynia; perigynia horizontally spreading,



globular-ovoid, rounded-inflated, 6 mm long, greenish-stramineous, lustrous, slenderly few-nerved, round-based, on short curved definite stipe, abruptly contracted into prolonged (one-third the length of the body) smooth subulate-bidentate beak. Fr. June-July. (Plate XXIII, fig. 4).

Marshes, river banks, and ponds. - European part: Kar. -Lap., Dv. -Pech., Lad. -Il'm., Upp. Dnepr. (n. part), Upp. Volg., Volg. -Kam., Volg. -Don. (e. corner); West. Siberia: East. Siberia and Far East: all regions. Gen. distr.: Fenno-Scandia, Northern Mongolia. Described from specimens from Daurian seeds. Type in Leningrad.

NOTE. Forming hybrids. × *vesicaria* L., × *inflata* Huds.; × *hirta* L. (*C. pilosiuscula* Gobi).

ECONOMIC IMPORTANCE. Used in Altai as a highly valuable forage plant, comparing favorably with grasses in feed value. Elsewhere not eaten readily, but leaves are eaten by water fowl (geese).

369. *C. jacutica* V. Krecz. sp. nova in Addenda II, 621. - *C. pulla* var. *tristigmatica* Trautv. in A. H. P. V (1877) 130. - *C. rotundata* Meinsh. in A. H. P. VIII, 3 (1901) 376, quoad pl. Czekanowsk., non Whlb. - *C. rostrata* ssp. *rotundata* Kuk. in Engl. Pflzr. IV, 20 (1909) 723, ex min. parte, et in Journ. Russ. Bot. 3-6 (1911) 182, quoad pl. jacut. - *C. dichroa* Freyn in Oesterr. Bt. Zeitschr. XL (1290) 304, ex p.

442 Perennial, pale green plants, with short stolons; culms triangular, scabrous above, 10-40 cm tall, with reddish ferruginous sheaths at base; leaves rigid, flat or slightly involute-margined, 1-3 mm broad, long-attenuate, as long as the culm; spikelets 3-5, the terminal (1)2-3 staminate, approximate, 1-2 cm long, with castaneous or brown ovate acute white-hyaline-margined scales; other spikelets pistillate, distant, but the uppermost approximate to staminate spikelets, oblong-ovoid to short-cylindric, 1-2.5 cm long, 0.9-1 cm broad, dense, erect, the lower on peduncle to 0.5 cm long (the very distant spikelets) with peduncles to 2 cm long; lowest bract shorter than inflorescence; pistillate scales ovate, acute or subacute, castaneous, with obsolete nerve, light-margined, membranaceous, shorter and somewhat narrower than perigynia; perigynia horizontally spreading to slightly reflexed, obovoid, inflated, 4-4.5 mm long, greenish, brownish at summit, lustrous, with distinct slender nerves, round-based, short-stipitate, abruptly contracted into smooth cylindrical shallowly bidentate-emarginate beak (nearly one-third the length of the body). Fr. July. (Plate XXIII, fig. 8).

Wet forest situations, on limestone and trap granulites. - East. Siberia: Daur. (Vitim Plateau), Len. -Kol. (Aldan basin); Far East: Okhot. Endemic. Described from river Olenek, between the rivers Lower Tomba and Upper Maigda. Type in Leningrad.

370. *C. inflata* Huds. Fl. angl. ed. 1 (1762) 354, non Suter. (1802). - *C. rostrata* Stokes in With. Bot. arrang. Veg. Great-Brit. ed. 2 (1787) 1059; Kuk. in Engl. Pflzr. IV, 20 (1909) 720 et Journ. Russ. Bot. 3-6 (1911) 181; V. Krecz. in Fl. transb. II, 153. - *C. ampullacea* Good. in

Explanation to Plate XXIII

1. - *Carex vesicaria* L.: a) scale, b) perigynium. - 2. *C. vesicata* Meinsh.: a) perigynium. - 3. *C. inflata* Huds.: a) perigynium. - 4. *C. rhynchophysa* C. A. M.: a) perigynium. - 5. *C. saxatilis* L.: a) perigynium, b) scale. - 6. *C. procerula* V. Krecz.: a) perigynium, b) scale. - 7. *C. membranacea* Hook.: a) perigynium. - 8. *C. jacutica* V. Krecz.: a) perigynium. - 9. *C. rotundata* Whlb.: a) perigynium, b) scale. - 10. *C. dichroa* Freyn.: a) perigynium, b) scale. - 11. *C. paimirensis* C. B. Clarke. - 12. *C. Grahamii* Boott.: perigynium, scale. - 13. *C. mollissima* Christ.: a) scale.

Trans. Linn. Soc. II (1794) 207; Trev. in Ldb. Fl. Ross. IV, 318; Turcz. in Bull. Soc. Nat. Moscou, XXVIII (1855) 351; Meinsh. in A. H. P. 3 (1901) 375. - Exs.: HFR No. 644; Fl. Finl. exs. No. 545; Kneuck. VIII, No. 224.

Perennial, cinereous-green plants, with stoutish stolons; culms obtusely triangular, smooth, 30-100 cm tall, covered at base with reddish-brown subreticulate sheaths; leaves stiffish, nodular-reticulate, canaliculate, 2-4 mm broad, scabrous, long-attenuate, exceeding the culm; spikelets 3-6, subdistant: the terminal 1-3(?) linear, 3-6 cm long, with lance-linear acute subferruginous scales; other spikelets pistillate, cylindrical, 4-10 cm long, 0.8-0.9 cm broad, loosish, sparsely flowered below, erect, on peduncles 0.3 to 3 cm long; lowest bract sheathless, with blade exceeding inflorescence; pistillate scales lanceolate, acute, ferruginous or light-ferruginous, with a light linear midrib, shorter and narrower than perigynia; perigynia somewhat obliquely divergent, rounded-ovoid, inflated, 5-5.5 mm long, stramineous-green, lustrous, slenderly many-nerved, round-based, on a definite short stipe, abruptly beaked; beak smooth, subcylindrical, sharply short-bidentate. Fr. May-June. (Plate XXIII, fig. 3).

Marshes, boggy meadows, coppices, shores, and canals. - The entire European part; Caucasus; the whole of West. Siberia; East. Siberia: Ang.-Sayan., Daur., Len.-Kol., Centr. Asia: Aral.-Casp., Pribalkh. Gen. distr.; West. Europe, North America, Northern Mongolia. Described from Wales in England [sic].

443 NOTE. A hybrid *C. vesicaria* × *inflata* (*C. Pannewitziana* Fig.) occurs very frequently; it resembles *C. utriculata* Boott in its thicker spikelets, larger perigynia (some 6 mm long), partially unrolled leaves and, finally, in the slightly scabrous culms; it is readily distinguished by the entirely infertile perigynia which are gradually (not abruptly) beaked. *C. inflata* Huds. also forms hybrids: × *rhyngophysa* C. A. M., × *lasiocarpa* Ehrh., × *hirta* L., × *pseudocyperus* L. (*C. Schmidtiana* F. Schultz), and × *riparia* Curt. (*C. Beckmanniana* Fig.)

371. *C. stenolepis* Less. Reis. Loffod. (1831) 301, non Torr. (1836). - *c. hymenocarpa* Drej. Revis. crit. Car. bor. (1841) 58. - *C. rostrata* var. *borealis* Kuk. in Engl. Pflzr. IV, 20 (1909) 723. - Exs.: Kneuck. XII, 536.

Perennial, light green plants with creeping stolons; culms obtusely triangular, smooth, firm, 25-50 cm tall, covered at base with reddish-brown to ferruginous-brown sheaths; leaves subrigid, subinvolute or unrolled, 3-4 mm broad, more or less scabrous, long-attenuate, exceeding the culm; spikelets 2-4, distant: the terminal 1-2 staminate, lance-linear to linear, 2-3 cm long, with oblong-ovate subacute ferruginous-brown hyaline-margined scales; other spikelets pistillate, oblong-ovoid or short-cylindrical, 2-3.5 cm long, 0.8-0.9 cm broad, dense, the lowest on peduncle to 1.5 cm long; lowest bract exceeding inflorescence; pistillate scales oblong-ovate to ovate, subacute, ferruginous-brown, light-centered, hyaline-tipped, shorter than perigynia; perigynia horizontally spreading, obovoid, inflated, 4.5-5 mm long, brownish-green to pale green, lustrous, slenderly nerved, short-stipitate, abruptly contracted into smooth ferruginous-brown spinulate-bidentate beak. Fr. July.

Sphagnum and meadow bogs. - Arctic: Arct. Eur.; European part: Kar.-Lap. (Kol'skii Pen., Solovetskie Isles), Dv.-Pech. (White Sea Coast, Ussa river basin). Gen. distr.: Fenno-Scand., Iceland, Greenland. Described from Lofoten Islands.

NOTE. Possibly a hybrid between *C. inflata* and *C. rotunda*? - considering that the plant is intermediate in respect of its characters and the perigynia are usually infertile.

372. *C. rotundata* Whlb. in Sv. Vetensk. Ak. Nya Handl. XXIV (1803) 153; Trev. in Ldb. Fl. Ross. IV, 300; Meinsh. in A. H. P. XVIII, 3 (1901) 376. - *C. rostrata* subsp. *rotundata* Kük. in Engl. Pflzr. IV, 20 (1909) 723 et in Journ. Russ. Bot. 3-6 (1911) 182. - *C. rotundata* f. *Sommieri* Christ. in Somm. Fl. delli Ob infer. (1896) 203. - ? *C. ruesanensis* Kudo in Journ. Coll. Agr. Hokk. Univ. XI, 2 (1922) 83 et Contr. Know. Fl. North Saghal. (1923) 25. - Exs.: Pl. Finl. Exs. No. 547; Dörfl. No. 5196.

444 Perennial, green to pale green plants, with slender stolons; culms rounded-triangular, smooth, 15-35 cm tall, covered at base with ferruginous-brown to reddish-brown bladeless sheaths; leaves subrigid, canaliculate-setaceous, 1-1.5 mm broad, long-acuminate, but obtuse-tipped, nearly smooth, shorter than the culm; spikelets 2-3, distant: the terminal 1-2 staminate, oblong, 1.5-2.5 cm long, with ferruginous-brown ovate sub-obtuse to obtuse scales; other spikelets pistillate, globular, ovoid or oblong-ovoid to subcylindric, 1-2 cm long, 0.6-0.7 cm broad, dense, sessile or the lowest on peduncle to 5-8 mm long; lowest bract not exceeding inflorescence; pistillate scales broad-ovate, obtuse or subobtuse, white-hyaline-tipped, ferruginous-brown, with lighter midrib and margins, shorter than perigynia; perigynia divaricate, obovoid, inflated, 4 mm long, with very faint nearly obsolete nerves, brownish-green, reddish-brown-tipped, lustrous, short-stipitate, abruptly contracted into short smooth cylindrical straight ferruginous subemarginate beak. Fr. July-August. (Plate XXIII, Figure 9).

Tundra and mossy marshes, bare heights. - Arctic: Nov. Zem. (Vaigach Is.), Arct., Eur., Arct. Sib., Anad.; European part: Kar. -Lap. (n. part), Dv. -Pech. (n. part); West. Siberia: Alt.; East. Siberia: Len. -Kol.; Far East: Ze. -Bur., Uss. (Sikhote-Alin), Sakh., Okhot., Kamch. Gen. distr.: Fenno-Scandia, Iceland, Alaska, Kurile Islands, Canada. Described from Swedish Lapland. Type in Stockholm.

ECONOMIC IMPORTANCE. Rather readily grazed by reindeer in the tundra.

373. *C. utriculata* Boott in Hook. Fl. bor. amer. II (1840) 221 et Illustr. Carex I (1858) 14, tab. 39; Meinsh. in A. H. P. XVIII, 3 (1901) 373; V. Krecz. in Fl. Transb. II, 133. - *C. ampullacea* var. *altissima* Anderss. Cyp. Scand. (1849) 20. - *C. rhynchophysa* Trautv. in Midd. Sib. Reis, I, 2 (1847) 102, non C. A. M. - *C. rostrata* var. *utriculata* Kük. in Engl. Pflzr. IV, 20 (1909) 722 et in Journ. Russ. Bot. 3-6 (1911) 182. - *C. bongardiana* Trautv. Incr. fl. Ross. IV (1884) 312, non C. A. M. - *C. pinguipes* C. B. Clarke in Kew Bull. Misc. Infl., Addit. ser., VIII (1908) 85.

Perennial, pale green plants, with creeping stolons; culms triangular, smooth or (usually) somewhat scabrous above; 90-150 cm tall, covered at base with very broad, reddish, brown-based sheaths; leaves subrigid, flat to subinvolute, 4-7 mm broad, long-acuminate, scabrous, reticulate at base, equaling the culm; spikelets 5-8, the terminal 2-4 staminate, congested, linear, 4-8 cm long, oblong-lanceolate, drab; other spikelets pistillate, cylindrical to subclavate-cylindric, 5-12 cm long, 1 cm broad, dense, loosely few-flowered below, on peduncles to 2 cm long, erect; lowest bract exceeding inflorescence; pistillate scales ovate to broadly ovate, acute or aristate, tawny, with yellowish-green midrib and hyaline margin,

shorter than perigynia; perigynia ascending, ellipsoid-ovoid, inflated, 6 mm long, stramineous-green, prominently nerved, round-based, short-stipitate, rather gradually tapering into a smooth cylindrical strongly bidentate beak. Fr. June-August.

- 445 Marshes and shores. -European part: Kar. -Lap. ? Dv. -Pech. ?; West. Siberia; Yenisei.; East. Siberia: Ang. -Sayan., Daur., Len. -Kol.; the whole of Far East. Gen. distr.: Fenno-Scandia, Alaska, Canada, n. part of the United States. Described from British North America. Type in London.

ECONOMIC IMPORTANCE. Eaten satisfactorily by deer, also by geese and other water fowl.

Cycle 2. *Vesicularia* V. Krecz. -Perigynia membranaceous, ovoid to conic-ovoid or oblong-ovoid, (3.5)4-8 mm long, short-stipitate, subsessile, rather gradually tapering into a short bidentate or more or less emarginate beak; bract sheathless. Culms sharply 3-angled, scabrous on the angles; leaves flat, green.

Series 1. *Chlorostachya* V. Krcz. -Perigynia pale green or yellowish-green, oblong-ovoid to conic-ovoid, 5-8 mm long, prominently nerved, subsessile, gradually tapering into a short bidentate beak (teeth to 1-1.2 mm long). Large meadow plants up to 100 cm tall.

374. *C. vesicaria* L. Sp. pl. (1753) 979 (excl. var β); Trev. in Ldb. Fl. Ross. IV, 319; Turcz. in Bull. Soc. Nat. Mosc. XXVIII (1855) 350; Meinsh. in A. H. P. XVIII, 3 (1901) 372; Kük. in Engl. Pflzr. IV, 20 (1909) 726 et in Journ. Russ. Bot. 3-6 (1911) 183. -Exs.: Pl. Finl. Exs. No. 548; Fl. Pol. Exs. No. 1007; Kneuck. VIII, No. 221.

Perennial, green, stoloniferous plants; culms scabrous above, 40-100 cm tall, covered at base with red to reddish-brown sheaths; leaves 3-5 mm broad, scabrous, equaling the culm; spikelets 4-6, the terminal 2-4 staminate, subapproximate, linear, 4-7 cm long, with tawny lanceolate subobtusate scales; other spikelets pistillate, cylindrical, 4-7 cm long, 1.5 cm broad, loose, on peduncles to 1 cm long, somewhat drooping; lowest bract longer than inflorescence; pistillate scales lanceolate, acute tawny to drab, green-centered, shorter and narrower than perigynia; perigynia ascending, ovoid, inflated, 7-8 mm long, green, becoming stramineous to orange-yellow, lustrous, prominently nerved, round-based, short-stipitate, subcuneate above, gradually tapering into a short, strongly spinulose-bidentate beak. Fr. May-August. (Plate XXII, Figure 1).

Marshes, wet meadows, and shores. -European part; Caucasus; West. Siberia; East. Siberia; Ang. -Sayan.; Centr. Asia: Aral. -Casp., Pribalkh. Gen. distr.: Western Europe. Described from Sweden.

NOTE. Forming hybrids: \times *rhyrachophysa* C.A.M.; \times *inflata* Huds. (*C. Pannewitziana* Fig.); \times *pseudo-cyperus* L. (*C. Wolteri* Gross.); \times *riparia* Curt. (*C. csomadensis* Simonk.); \times *hirta* L. (*C. Grossii* Fiek); \times *lasiocarpa* Ehrh.

ECONOMIC IMPORTANCE. Practically uneaten in pasture and in hay; readily acceptable in silage. Yield of silage 100-150 centners per hectare.

- 446 375. *C. vesicata* Meinsh. in A. H. P. XVIII, 3 (1901) 367. -*C. vesicaria* Maxim. Prim. fl. Amur. (1859) 315; Kom. Fl. Manchzh. I, 380; Kom. Fl. Kamch. I, 266; Hultén, Fl. of Kamtch. I, 210; V. Krecz. in Fl. Transb. II, 136, ex p. -*C. vesicaria* var. *tenuistachya* Kük. in Engl. Pflzr. IV, 20 (1909) 726 et in Journ. Russ. Bot. 3-6 (1911) 185. -*C. vesicaria* var. *monile* Kük. in Journ. l. c., ex p. -*C. bongardiana* var. *gracilis* Trautv. et Mey. in Middend. Sib. Reis. I, 2 (1847-56) 101, ex p.

Perennial, pale green, stoloniferous plants; culms scabrous above, 30-70 cm tall, covered at base with reddish-brown sheaths; leaves long, sub-rigid, 3-4 mm broad, long-attenuate, shorter than the culm; spikelets 3-6, distant, the terminal 1-3 staminate, 2-4 cm long, with lanceolate sub-acute tawny hyaline-margined scales; other spikelets pistillate, ovoid to oblong, 2-3 (4) cm long, 1 cm broad, dense, erect, the lower short-peduncled; lowest bract exceeding inflorescence; pistillate scales lanceolate, acute, ferruginous to ferruginous-brown, white-hyaline-margined especially at the summit, with a light midrib, much narrower and shorter than perigynia; perigynia ascending, conic-ovoid, inflated, 5.5-6 mm long, pale green, sometimes brownish, 4-5-nerved, round-based, short-stipitate, rather abruptly contracted into smooth, divergent, subulate-bidentate beak. Fr. June. (Plate XXIII, fig. 2).

Marshes and shores. -East. Siberia: Ang. -Sayan. (Baikal, Padun), Daur., Len. -Kol. and the whole of Far East. Gen. distr.: Northern Mongolia, Manchuria, Kurile Islands, northern Japan. Described from river Amur. Type in Leningrad.

NOTE. Plants from Sakhalin and Kamchatka have larger and broader perigynia and spikelets, thus coming close to the American species *C. monile* Tuckerm.

Series 2. *Poecilostachyae* V. Krecz. -Perigynia yellowish-green to brownish-yellow, more or less lustrous, ovoid, 4-6 mm long, with slender non-prominent nerves, subsessile, rather gradually tapering into a short cylindrical more or less emarginate beak. Plants of mountains and meadows, 15-50 (70) cm tall.

376. *C. grahamii* Boott in Trans. Linn. Soc. XIX (1845) 215. -*C. vesicaria* var. *Grahami* Kük. in Engl. Pflzr. IV, 20 (1909) 727. -*C. vesicaria* Trev. in Ldb. Fl. Ross. IV (1853) 317, ex p., non L. - *C. vesicaria* var. *dichroa* Anderss. Cyp. Scand. (1849) 18. -*C. vesicaria* var. *alpigena* Anderss., l. c.; Kük., l. c., ex p.; Meinsh. in A. H. P. XVIII, 3 (1901) 373, quoad pl. lappon. -*C. Schrenkiana* C. A. M. ex Ldb. Fl. Ross. IV (1853) 317 (sub *C. vesicaria*) et in herb. Ledebour (nomen).

447 Perennial, green, stoloniferous plants; culms scabrous above, 35-50 cm tall, covered at base with reddish-brown sheaths; leaves flat to subinvolute, 3-4 mm broad, long-attenuate, equaling to exceeding the culm; spikelets 3-5, the lower distant: the terminal 1-2 staminate, approximate, lance-oblong, 2-3 cm long, their scales ovate subacute castaneous-brown, white-hyaline at summit and on the margin; other spikelets pistillate, oblong-ovoid to short-cylindric, 1.5-2.5 cm long, 0.8-0.9 cm broad, dense, the lower on peduncle to 2 cm long, subdivergent; lowest bract exceeding inflorescence; pistillate scales oblong-ovate, subobtuse, castaneous, subhyaline-tipped, shorter and narrower than perigynia; perigynia ellipsoid-ovoid, inflated, ascending, 4-4.5 mm long, greenish, becoming yellowish-green, somewhat brownish at summit, slender-nerved, round-based, rather abruptly contracted into a short brown smooth distinctly spinulose-bidentate beak. Fr. July. (Plate XXIII, fig. 12).

Alpine and tundra bogs. -Arctic: Arct. Eur. (Kol'skii Pen.); European part: Kar. -Lap. (Khibiny). Gen. distr.: Scandinavia, Scotland. Described from Scotland (Clova, Glen Fee). Type in London.

377. *C. dichroa* Freyn in Österr. Bot. Zeitschr. XL(1890) 304. - *C. vesicaria* Trev. in Ldb. Fl. Ross. IV (1853) 317, ex p., non L. - *C. vesicaria* var. *Turcz.* in Bull. Soc. Nat. Mosc. XXVIII (1855) 350. - *C. vesicaria* var. *alpigena* Meinsh. A. H. P. XVIII, 3 (1901) 373, quoad pl. sibir.; Kük. in Engl. Pflzr. IV, 20 (1909) 727, quoad pl. sibir. et in Journ. Russ. Bot. 3-6 (1911) 185; B. Fedtsch. in A. H. P. XXXVIII (1924) 223, quoad pl. Schrenk.; Kryl. Fl. Alt., 1527, non Fries. - *C. vesicaria* var. *Grahamii* Kük. in Journ. Russ. Bot. 3-6 (1911) 185, quoad pl. ircuitens. - *C. Kryloviana* Schischk. et Sergievsk. in Animadv. syst. Herb. Univ. Tomsk. 6 (1928) 1.; Krylov. Flora Zapadnoi Sibiri, III, 526.

Perennial, green, stoloniferous plants, with branching rhizome; culms scabrous above, 15-50 cm tall, covered at base with ochreous bladeless sheaths; leaves 2-5 mm broad, long-attenuate, equaling to exceeding the culm; spikelets 2-5, the lower distant; the terminal 1-2 staminate, linear, 1.5-3 cm long, with light brown, sometimes sublurid, lanceolate subacute scales; other spikelets pistillate, lance-oblong to oblong, 1.5-3 cm long, dense, pedunculate, lowest peduncle to 2(3) cm long; lowest bract exceeding inflorescence; pistillate scales ovate to oblong-ovate, castaneous-brown, with a light midrib, obtusely white-hyaline-tipped, shorter and narrower than perigynia; perigynia ovoid, ascending, inflated-biconvex, 4-4.8 mm long, greenish, becoming yellowish or at summit brownish, more or less lustrous, slender-nerved, round-based, gradually tapering into a somewhat prolonged slightly emarginate beak. Fr. July. (Plate XXIV, fig. 10).

Subalpine and alpine meadows and shores. - West. Siberia: Alt., Ang.-Sayan., Daur. (s. part); East. Siberia: Yenis. (Lower Tunguska); Centr. Asia: Dzhung.-Tarb. (Dzhung. Alatau). Gen. distr.: Northern Mongolia, Kulja, Dzhungaria. Described from vicinity of Irkutsk. Type in Austria (in Freyn's herbarium).

448 378. *C. pamirensis* C. B. Clarke ex B. Fedtsch. in Journ. Bot. éd. Sect. bot. Soc. Nat. St. Pétersb. I (1906) 19 et in Kew Bull. Misc. Inf., Addit. ser., VIII (1908) 87. - *C. pamirica* (O. Fedtsch) B. Fedtsch. in A. H. P. XXVIII, 1 (1908) 70 et 123 et in A. H. P. XXXVIII, 1 (1924) 222. - *C. vesicaria* var. *pamirica* O. Fedtsch. in A. H. P. XXI, 3 (1903) 432. - *C. vesicaria* var. *alpigena* B. Fedtsch. in A. H. P. XXXVIII (1924) 225, ex p., non Kük. - *C. obscuriceps* var. *pamirica* Kük. in Engl. Pflzr. IV, 20 (1909) 724. - *C. ampullacea* Duthie, Alcock's pl., p. 27, non Good. - *C. rostrata* O. Fedtsch. in A. H. P. XXI, 3 (1903) 433; Hook. fil. in Fl. Brit. Ind. VI (1894) 740, non Stokes.

Perennial, pale green plants, with stout underground offshoots; culms firm, stout, scabrous above, 70-100 cm tall, covered at base with light lateritious-brown sheaths; leaves thickened reticulate below, flat or toward base folded, 5-10 mm broad, scabrous, long-acuminate, equaling the culm; spikelets 4-5, the terminal 1-3 staminate, congested, lance-oblong, plump, 2-5 cm long, 0.8 cm broad, with lance-ovate obtuse rufous scales; other spikelets pistillate, distant, oblong-ovoid to short-cylindric, 2.5-4.5 cm long, 1.2-1.4 cm broad, on short straight peduncles to 2 cm long; lowest bract exceeding the inflorescence; pistillate scales lanceolate to narrowly lanceolate, subacute, castaneo-ferruginous, with a light midrib, equaling to exceeding perigynia; perigynia ascending, ovoid, rounded-inflated, 5-5.5 mm long, brownish-green, becoming yellowish-brown, lustrous, obsoletely few-nerved, round-based, sessile, gradually tapering

into an abbreviated smooth cylindric scarcely emarginate beak. Fr. July-August. (Plate XXIII, fig. 11).

Alpine bogs. -Centr. Asia: Pam. -Al., Tyan'-Shan. Gen. distr.: Afghanistan, Kulja (s. part), Kashgar. Described from Pamir (Rang-Kul). Type in Lenin-grad.

Series 3. *Melanostachyae* V. Krecz. -Perigynia black to blackish-brown, lustrous, ovoid to ellipsoid, 3.5-4.5 mm long, nerveless, short-stipitate, abruptly contracted into a short slightly emarginate beak. Stigmas 2-3. Plants of tundra heights, 10-50 cm tall.

379. *C. saxatilis* L. Sp. Pl. (1753) 976. -*C. pulla* Good. in Trans. Linn. Soc. III (1797) 78, tab. 14; Trev. in Ldb. Fl. Ross. IV, 308; Meinsh. in A. H. P. XVIII, 3 (1901) 343. -*C. vesicaria* ssp. *saxatilis* Kük. in Engl. Pflzr. IV, 20 (1909) 727 et in Journ. Russ. Bot. 3-6 (1911) 186.

Perennial, green plants, with slender stolons; culms 10-30 cm tall, with reddish-brown sheaths at base; leaves rigid, subinvolute, 2-3 mm broad, long-attenuate, shorter than the culm; spikelets 2-3, distant: the terminal spikelet staminate, 1-2 cm long, with ovate obtuse dark brown scales; other spikelets pistillate, ovoid to oblong-ovoid, 0.8-1 cm long, 0.7-0.8 cm broad, dense, the lower on peduncle to 1 cm long; lowest bract usually not 449 exceeding the inflorescence; pistillate scales ovate, subobtusate to obtuse, purplish-brown, white-hyaline only at summit, shorter than perigynia; perigynia subhorizontally spreading, ovoid, inflated-biconvex, 3.5-4 mm long, yellow below, reddish-brown above, lustrous, very faintly nerved, round-based, short-stipitate, abruptly contracted into a short smooth scarcely bidentate-emarginate beak; stigmas usually 2. Fr. June-August. (Plate XXIII, fig. 5).

Tundra. -Arctic: Nov. Zem., Arct. Eur., Arct. Sib., Anad., Chuk.; European part: Volg. -Kam. (Central Ural); West. Siberia: Ob.; East. Siberia: Yenisei; Far East: Kamch. Gen. distr.: circumpolar. Described from Sweden.

380. *C. procerula* V. Krecz. sp. nova in Addenda, II, 622. -*C. pulla* var. *laxa* Trautv. in A. H. P. V (1877) 130. -*C. pulla* f. *pedunculata* Kjellmann in Vega-Exped. Vet. Jaktag. Stockholm, I (1882) 560. -*C. pulla* var. *sibirica* Christ in Vet. Ak. Handl. Stockholm. XXII (1887) 181. -*C. vesicaria* ssp. *saxatilis* f. *laxa* Kük. in Engl. Pflzr. IV, 20 (1909) 728 et in Journ. Russ. Bot. 3-6 (1911) 186.

Perennial, pale green plants with underground offshoots; culms slender, somewhat drooping at the ends, scabrous above, 40-70 cm tall, covered at base with reddish sheaths; leaves 2-3 mm broad, long, long-attenuate, slightly shorter than the culm; spikelets 3-5, the terminal 1-2 staminate, approximate, segregated from the others, linear, 1-2.5 cm long, with lanceolate subacute brown to light brown scales; other spikelets pistillate, oblong to cylindric, 1.5-3 cm long, 0.6-0.7 cm broad, dense, distant, pendulous, the peduncles slender, smooth, capillary, sometimes twisted, from 1 cm (the upper) to 5-6 cm (the lower) long; lowest bract shorter than inflorescence, rarely as long; pistillate scales lanceolate, subacute, castaneous, with subconcolor midrib, lurid-hyaline-tipped, narrower and shorter than perigynia; perigynia subhorizontally spreading, oblong-ellipsoid, 4-4.5 mm long, reddish-brown, lustrous, nerveless, short-stipitate, abruptly contracted into a short smooth emarginate short-bidentate beak. (Plate XXIII, fig. 6).

Marshes, overgrown shores. - West. Siberia: Alt.; East. Siberia: Yenis., Ang. - Sayan., Daur. (n. - w. part), Len. - Kol.; Far East: Ze. - Bur. Endemic. Described from Zeya river basin (Lake Okonon). Type in Leningrad.

381. *C. membranacea* Hook. in Parry's 2 Voy. App. (1825) 406; Kunth, Enum. pl. II (1837) 522, non Hoppe (1835). - *C. compacta* R. br. in App. Ross. Voy. (1819) CXLIII (nomen); Boott, Illustr. Carex, IV (1867) 156, tab. 502, non Krocker (1826). - *C. saxatilis* var. *compacta* Dew. in Am. Journ. Sci. XI (1826) 310. - *C. vesicaria* ssp. *saxatilis* var. *compacta* Kük. in Engl. Pflzr. IV, 20 (1909) 728. - *C. membranopacta* Bail. in Bull. Torr. Bot. Club, XX (1893) 428. - *C. pulla* var. *tristigmatica* Trautv. in A. H. P. (1877) 130. - *C. ambusta* Meinsh. in A. H. P. XVIII, 3 (1901) 343, quoad pl. ins. St. Laurentii, non Boott. - 450 *C. acroleuca* Cham. et Meinsh., l. c. (sub praeced.). - *C. ochroleuca* (sphalmate!) Steud. Syn. Cyp. (1855) 216.

Perennial, pale green plants, with short stout purple stolons; culms scabrous above, 20-40 cm tall, covered at base with reddish-purple, more or less lustrous sheaths; leaves 2.5-4 mm broad, rather short-acuminate, scaberulous, slightly shorter than the culm; spikelets 2-4, approximate, the terminal 1-2 staminate oblong, 1.5-3 cm long, with ovate subobtuse to obtuse castaneous-brown, subhyaline-tipped scales; other spikelets pistillate, close to the staminate, oblong to short-cylindric, 1-3 cm long, 0.6-1 cm broad, compact, erect, the lower on thickened 3-angled peduncle barely attaining 5 mm in length; lowest bract shorter than inflorescence; pistillate scales ovate, subobtuse, brown, whitish- or ferruginous-hyaline-tipped, shorter than perigynia; perigynia divaricate, ellipsoid to ovoid-ellipsoid, strongly inflated, 4-4.5 mm long, reddish-brown at summit, lustrous, without distinct nerves, short-stipitate, rather abruptly contracted into a short smooth emarginate obliquely bidentate beak; stigmas 3. Fr. July. (Plate XXIII, fig. 7).

Tundra. - Arctic: Chuk., Anad. Gen. distr.: Aleutian and Pribylov Islands, Alaska. Described from Alaska (Kotzebue Sound).

Cycle 3. *Lanaria* V. Krecz. - Perigynia subcoriaceous, ovoid or conic-ovoid, subinflated-trigonus, 5-10 mm long, glabrous or more or less hairy, with 5-7 thick prominent nerves, short-stipitate, gradually tapering into a long, rather strongly bidentate beak. Bracts with sheath to 2-3 cm long; culms 3-angled, usually smooth. Leaves rather flat, with pubescent base and sheath, rarely glabrous (with glabrous sheaths), but always hairy at orifice of sheath.

Series 1. *Monandrae* V. Krecz. - Staminate spikelet solitary; pistillate spikelets 2-3, abbreviated, more or less approximate and contiguous with staminate spikelet. Lowest bract with poorly developed sheath (to 5 mm long).

382. *C. latisquamea* Kom. in A. H. P. XVIII, 6 (1901) 447 et in Fl. Mandsh. I (1901) 386; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I, 311. - *C. villosa* var. *latisquamea* Kük. in Engl. Pflzr. IV, 20 (1909) 641 et in Journ. Russ. Bot. 3-6 (1911) 171, fig. 141.

Perennial, pale green, loosely caespitose plants, with a short creeping rhizome; culms smooth, sparsely hairy below, 30-50 cm tall, covered at base with reddish-brown, short-pilose, obtusish sheaths; leaves 4-7 mm broad, sparsely hairy, short-acuminate, shorter than the culm, the sheaths covered with silky hairs. Spikelets 3-4, the lower segregated; the terminal

spikelet staminate, oblong-clavate, 1.5–2 cm long, with rufous ovate sub-acute scales; other spikelets pistillate, ovoid to oblong-ovoid, 1–2.5 cm long (to 1 cm broad), rather dense, the upper sessile, the lowest on peduncle to 2 cm long, erect; lowest bract with sheath 0.5–1 cm long and sheath nearly equaling the inflorescence; pistillate scales broad-ovate, acute or setiform, scabrous-pointed, pale to nearly whitish-green, 3-nerved, tawny-margined, about half the length of perigynia; perigynia ovoid, inflated-trigynous, 5 mm long, pale green, at length flavescent, many-ribbed, round-based, short-stipitate, conic-tipped, gradually tapering into a short smooth broadly bidentate-emarginate subdivaricate ciliate-orificed beak. (Plate XX, fig. 1).

Forest meadows and damp coppices. -Far East: Ze. -Bur., Uss. Gen. distr.: Manchuria. Described from Amur valley (Mar'ino village). Type in Leningrad.

Series 2. *Oligandrae* V. Krecz. -Staminate spikelets 2–5; pistillate spikelets 3–5, elongated, more or less segregated from the staminate spikelet. Lowest bract with sheath from 1 cm to 2.5–3 cm long.

383. *C. siegertiana* Uechtr. in Verhandl. Bot. Ver. Brandenb. VIII (1866) 103 (nomen) et 92 (descriptio, sub *C. aristata* Siegert.). -*C. orthostachys* Trev. in Ldb. Fl. Ross. IV (1853) 316, quoad pl. petrop.; Rupr. in Beitr. Pflzk. russ. Reich., IV (1845) 87; Meinsh. Fl. ingr. (1878) 421; Litw. in Sched. ad. Herb. Fl. Ross. V (1905) 155, non *C. A. M.* -*C. aristata* Kük. in Bot. Centrbl. LXXVII, 1 (1899) 89; Meinsh. in A. H. P. XVIII, 3 (1901) 151, ex p.; Kük. in Engl. Pflzr. IV, 20 (1909) 751, quoad pl. ross. et in Journ. Russ. Bot. 3–6 (1911) 195, ex p., non R. Br. -Ic.: Kük., l.c., 722, fig. 128. -Exs.: HFR No. 1594a et b; Pl. Finl. Exs. No. 141; Kneuck. VII, No. 239.

Perennial, pale green plants, with thickened firm stolons; culms stoutish, faintly triangular, smooth, 50–120 cm tall, covered at base with purplish-brown, compact, reticulate, bladeless sheaths; leaves rather loosely reticulate, revolute-margined especially below, 4–7 mm broad, glabrous above, the lower part of blade and upper part of sheath sparsely hairy, long-acuminate, shorter than the culm; spikelets 6–10, the lower distant: the terminal 2–5 (7) staminate, approximate, lance-linear, 3–5 cm long, with ferruginous-brown lanceolate scabrous-awned scales; other spikelets pistillate, cylindric to clavate-cylindric, 4–8 cm long, 1–1.2 cm broad, loose, sparsely flowered below, erect or the lower ones subdivergent, pedunculate, the lower peduncles to 3 cm long; lowest bract with pubescent sheath to 2–3 cm long, equaling to exceeding inflorescence; pistillate scales oblong-ovate, rather obtusely tipped, terminating in a rather long scabrous awn, tawny, pale-centered, somewhat shorter to longer than perigynia; perigynia ovoid, inflated-trigynous, 7.5–8–9 mm long, pale green, glabrous or covered with few scattered hairs, thick-nerved, round-based, so stipitate, gradually tapering into a moderately long, deeply split, divaricate, bidentate beak, the teeth narrow, to 2.5–3 mm long, arching. Fr. May–June. (Plate XXIV, fig. 1).

Marshes and shores. -European part: Kar. -Lap. (except Kol'skii Pen.), Dv. -Pech. (s. and s. -e. -part), Lad. -Il'm., Upp. Volg., Volg. -Kam., Mid. Dnepr. (left bank of Dnieper, Uman'), Pritchern. (Dnepropetrovshchina), Upp. Don., Low. Don. (Khrenovskii Forest), Zavolzh.; West.

Siberia: Ob., Upp. Tob., Irt. Gen. distr.: West. Europe, Baltic States, Fenno-Scandia (in s. part). Described from Germany (Neudorf, near Koslau).

384. *C. orthostachys* C. A. M. in Ldb. Fl. Alt. IV (1833) 231 et Ic. IV (1833) tab. 324; Trev. in Ldb. Fl. Ross. IV, 316, quoad pl. alt., baic. et dah.; Turcz. Fl. baic. dah. II, 283 (excl. var.). - *C. trichocarpa* β *orthostachys* Kük. in Bot. Centralbl. LXXVII (1899) 92. - *C. glaber- rima* Meinsh. in A. H. P. XVIII, 3 (1901) 369, pro max. parte. - *C. aris- tata* Meinsh., l. c., 370, quoad pl. sibir., non R. Br. - *C. aristata* ssp. *orthostachys* Kük. in Engl. Pflzr. IV, 20 (1909) 753 et in Journ. Russ. Bot. 3-6 (1911) 195, ex p. - *C. marginata* Fisch. ex; Kük, Bot. Centrbl., l. c. (nomen).

Perennial, cineraceous-green to yellowish-green plants, with long under- ground offshoots; culms often scabrous above, 30-70 cm tall, covered at base with reddish or ochreous reticulate bladeless sheaths; leaves rather strongly revolute-margined, 2-4 mm broad, glabrous below or hairy only at base, short-acuminate; leaf sheaths glabrous or more or less hairy; spikelets 3-7, the lower distant: the terminal 1-3 staminate, clavate-lance- olate, 2-4 cm long, with tawny lanceolate cuspidate scales; other spikelets pistillate, oblong-clavate, 2.5-5 cm long, 0.9-1 cm broad, erect, the lower on peduncle to 1.5 cm long; lowest bract with smooth sheath to 1 cm long, exceeding inflorescence; pistillate scales oblong-ovate, subobtuse, ter- minating in a scabrous point, tawny, shorter than to as long as perigynia; perigynia conic-ovoid, inflated-trigonous or plano-convex, 6-7 mm long, smooth, greenish, with somewhat evanescent costate ribs, short-stipitate, gradually tapering into a subulate-bidentate beak; teeth straight, ca. 1 mm long. Fr. May-July. (Plate XXIV, fig. 2).

Marshes, boggy meadows and shores. - European part: Volg. -Kam. (s. part of Ural); West. Siberia: Alt.; East. Siberia: Ang. -Sayan., Len. - Kol. Gen. distr.: Northern Mongolia. Described from lake Nor-Zaisan. Type in Leningrad.

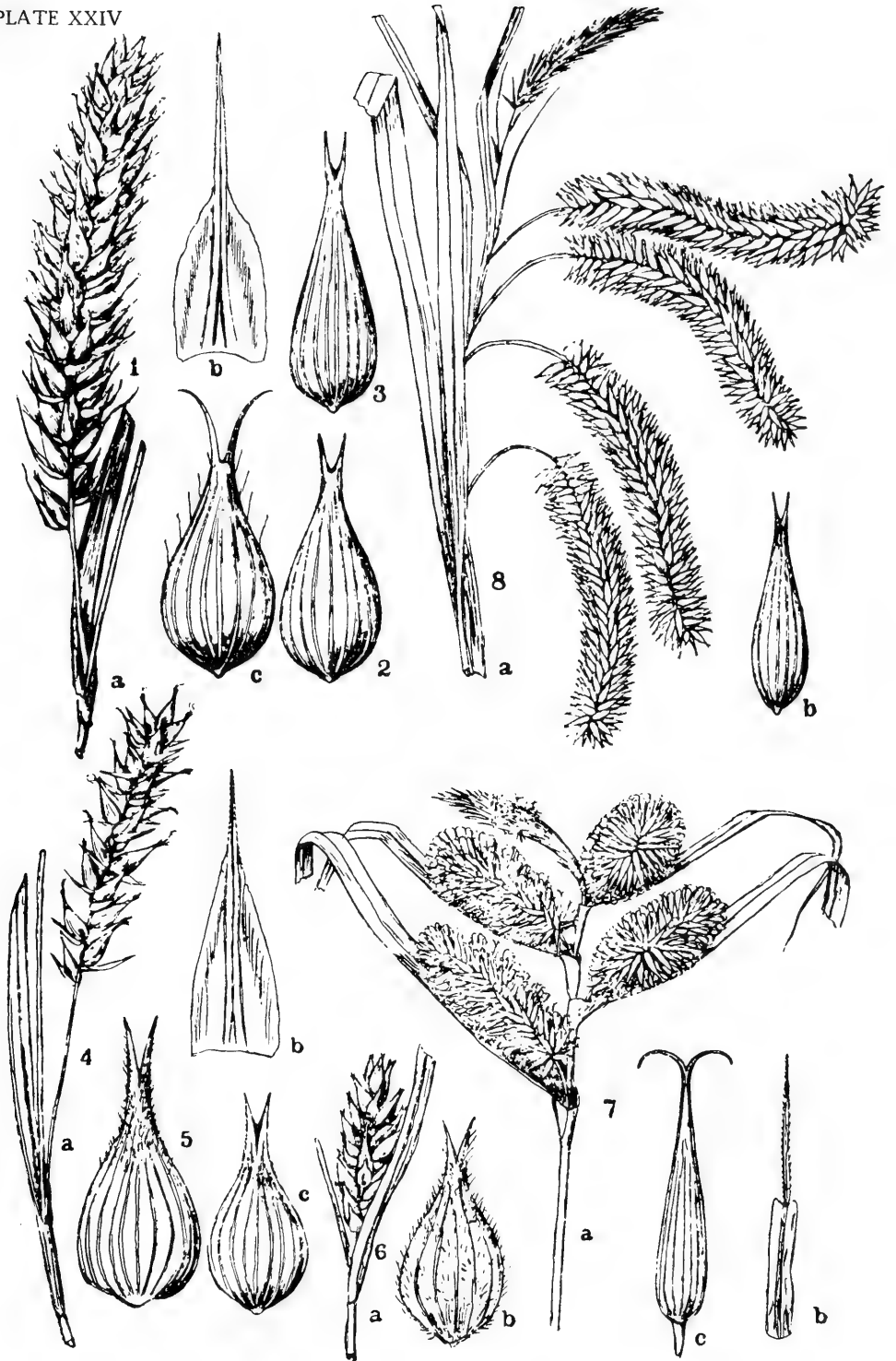
ECONOMIC IMPORTANCE. It plays a certain role as a forage plant in wet saline pastures, where it is satisfactorily grazed by all kinds of live- stock. Eaten readily in hay cut before flowering.

455 387. *C. eriophylla* (Kük.) Kom. Mal. opr. rast. Dal'nevost. Kr. (1925) 135; Opr. rast. Dal'nevost. Kr. I (1931) 316. - *C. aristata* ssp. *Raddei* var. *eriophylla* Kük. in Engl. Pflzr. IV, 20 (1909) 755.

Perennial, pale green plants, with stout underground offshoots; culms stout, obtusely triangular, smooth, 70-100 cm tall, covered at base with lateritious-brown smooth bladeless sheaths; leaves 5-8 mm broad, more or less involute-margined, glabrous on the upper side, the underside and sheaths densely covered with curly hairs, long-acuminate, shorter than the culm; spikelets 5-7, the lower distant: the terminal 2-4 staminate, narrow-cylindric, 2-4 cm long, with tawny oblong acute scales; other spike- lets pistillate, 3-7 cm long, 1-1.2 cm broad, loose, sparsely flowered

Explanation to Plate XXIV

1. *Carex Siegartiana* Uechtr.: a) spikelet, b) scale, c) perigynium. -2. *C. orthostachys* C. A. M.: perigynium. -3. *C. Raddei* Kük.: perigynium. -4. *C. drymophila* Turcz.: a) spikelet, b) scale, c) peri- gynium. -5. *C. amurensis* Kük.: perigynium. -6. *C. hirta* L.: a) spikelet, b) perigynium. -7. *C. capricornis* Meinsh.: a) inflorescence, b) scale, c) perigynium. -8. *C. pseudo-cyperus* L.: a) in- florescence, b) perigynium.



below, the lower ones on peduncle to 2 cm long; lowest bract with densely pubescent sheath to 2 cm long, exceeding inflorescence; pistillate scales oblong-ovoid, subobtuse, light-colored, 3-nerved, with spinelike scabrous awn, shorter than perigynia; perigynia conic-ovoid, inflated-trigonus, 6-7 mm long, greenish, thick-nerved, glabrous, round-based, short-stipitate, gradually tapering into a smooth straight-bidentate beak; teeth about 1 mm long, narrow. Fr. June-July.

Marshes and shores. - Far East: Uss. Gen. distr.: Manchuria and North Korea. Described from Korea (Chinampo). Type in Leningrad.

386. *C. hirta* L. Sp. pl. (1753) 975; Trev. in Ldb. Fl. Ross. IV, 319; Meinsh. in A. H. P. XVIII, 3 (1901) 372; Kük. in Engl. Pflzr. IV, 20 (1909) 750; Vass. in Wulff, Fl. taur. I: 2, 34; Grossh. Fl. Kavk. I, 176. - Ic.: Syreish. III. Fl. Mosk. gub. I, 215. - Exs.: HFR No. 845; Fl. Pol. exs. No. 687; Pl. Finl. Exs. No. 550; Herb Fl. Cauc. No 308.

Perennial, green, loosely caespitose plants, with long stoutish stolons; culms smooth, 10-60 cm tall, covered at base with smooth castaneous-brown bladeless sheaths; leaves 2-4 mm broad, more or less covered with scattered hairs on both sides, long-attenuate, shorter than the culm; spikelets 3-5, the lower rather strongly segregated: the terminal 2-3 approximate, staminate, lance-clavate, 1.5-3 cm long, with obovate cuspidate tawny more or less hairy scales; other spikelets pistillate, oblong to oblong-clavate, 1.5-4 cm long, 0.8 cm broad, loose, sparsely flowered below, on straight peduncles to 2 cm long; bracts nearly equaling inflorescence; pistillate scales oblong-ovate, rather long-awned, tawny, sparsely hairy, light green at center, 3-nerved, shorter than perigynia; perigynia subcoriaceous, oblong-conic-ovoid, inflated-trigonus, 5.5-7 mm long, greenish or ferruginous-spotted, more or less hairy, with prominent somewhat thickened nerves, subsessile, gradually tapering into a prolonged setulose deeply subulate-bidentate subdivaricate beak. Fr. May-July. (Plate XXIV, fig. 6).

Shores, sands (with a high water table), sandy meadows. - European part: (except Arctic and n. part of Kar.-Lap. and Dv. -Pech.); the whole of Caucasus. Gen. distr.: Western Europe, North America, Asia Minor. Described from Sweden.

NOTE. Forms hybrids: \times *vesicaria* L. (*C. Grossii* Fiek); \times *inflata* Huds.; \times *rhynchophysa* C.A.M. (*C. pilosiuscula* Gobi).

387. *C. drymophila* Turcz. in Bull. Soc. Nat. Mosc. XI, 1 (1838) 104 (nomen); Trev. in Ldb. Fl. Ross. IV (1853) 317 (descr., sub *C. orthostachys*); Steud. Syn. Cyp. (1855) 238; Kom. Fl. Manchzh. I, 383; Kük. in Engl. Pflzr. IV, 20 (1909) 755 et in Journ. Russ. Bot. 3-6 (1911) 197; V. Krecz. in Fl. Transb. II, 136. - *C. orthostachys* var. *Turcz.* Fl. baic. -dah. II, 2 (1856) 284. - *C. orthostachys* var. *drymophila* Maxim. Prim. fl. Amur. (1859) 316. - *C. amurensis* var. *drymophila* Kük. in Bot. Centralbl. LXXVII (1899) 96. - *C. pseudo-hirta* Meinsh. in A. H. P. XVIII, 3 (1901) 371, pro parte. - *C. udensis* Trautv. ex Meinsh. in A. H. P. XVII, 3 (1901) 366; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I, 316. - *C. drymophila* var. *udensis* Kük. in Engl., 755, et in Journ., 198. - *C. Bongardiana* var. *gracilis* Trautv. et Mey. in Middend. Sib. Reis. I, 2 (1847-56) 101, ex p. - *C. burejana* Meinsh. in A. H. P. XVIII, 3 (1901) 368, ex min. p. - Ic.: Kük., l. c., 752, fig. 128, J-K.

Perennial, green plants, with long creeping cord-like rhizome; culms slender, not firm, often scaberulous above, 30-70 cm tall, covered at base

with lateritious-red fibrillose sheaths; leaves 3-5 mm broad, rather short-acuminate, shorter than the culm, the sheaths glabrous or only near the membranaceous part puberulent; spikelet 5-8, the lower ones rather strongly segregated: the terminal 2-4 staminate, approximate, lanceolate, shaggy with persistent dark anthers, 2-5 cm long, the scales tawny to light brown ovate subacute; other spikelet pistillate, clavate-cylindric, loosely few-flowered especially below, 2-5 cm long, 0.8 cm broad, the lower on slender peduncle sometimes to 4-5 cm long, erect or nutant; lowest bract with sheath to 1.5-2 cm long, exceeding inflorescence; pistillate scales lanceolate, long-acuminate to acute, ferruginous, with a pale green center, scarcely hyaline-margined, shorter than perigynia; perigynia membranaceous, ovoid, inflated-trigonous, 5-6 mm long, olivaceous-green, thick-nerved, round-based, short-stipitate, gradually beaked, the beak long, subcylindric, sparsely setulose at margin and center, bidentate, ferruginous, its teeth broad, straight, soft, ferruginous, about 0.7-1 mm long. Fr. June-July. (Plate XXIV, fig. 4).

Damp forests and shore thickets. -East. Siberia: Daur., Len.-Kol.; Far East: Ze.-Bur., Uss., Ud., Okhot., Kamch. Gen. distr.: North-eastern Mongolia, Manchuria. Described from Dauriya (Khara-Murin Pass). Type in Leningrad.

388. *C. amurensis* Kük. in Bot. Centralbl. LXXVII (1899) 94; Kom. Fl. Manchzh. I, 382. -*C. hirta* var. γ Trev. in Ldb. Fl. Ross. IV (1853) 319. -*C. hirta* var. *glabrata* Turcz. in Bull. Soc. Nat. Mosc. XI, 1 (1838) 104. -*C. orthostachys* var. *hirtaeformis* Maxim. Prim. fl. Amur. (1859) 316. -*C. Bongardiana* F. Schmidt in Mem. Ac. St. Petersb., sér. VII, XII (1868) 197. -*C. pseudo-hirta* Meinsh. in A. H. P. XVIII, 3 (1901) 371, ex p. -*C. burejana* Meinsh., l. c., 368, pro max. p. -*C. drymophila* var. *akanensis* Kük. in Engl. Pflzr. IV, 20 (1909) 756 et in Journ. Russ. Bot. 3-6 (1911) 199. *C. akanensis* Kom. Mal. opr. rast. Dal'nevost. Kr. (1925) 135; Opr. rast. Dal'nevost. Kr. I, 316, non Franch.

Perennial, green plants, with stout underground offshoots; culms smooth, 50-100 cm tall, covered at base with reddish-brown bladeless sheaths; leaves 5-10 mm broad, short-acuminate, sparsely short-pubescent below, their sheaths densely short-pubescent; spikelets 5-8, the lower ones distant: the terminal 2-4 staminate, narrow-cylindric, 1.5-3.5 cm long, with ferruginous oblong subacute scales; other spikelets pistillate, 3-6 cm long, 1-1.2 cm broad, loosely few-flowered, especially below, the lower peduncles to 3-4 cm long; lowest bract with short-pubescent sheath, to 2-3 cm long, exceeding the inflorescence; pistillate scales lanceolate to oblong-ovoid, short-pilose on awn and midrib, light-colored, subferruginous-margined, shorter than perigynia; perigynia ovoid, inflated-trigonous, 7-8 mm long, olivaceous to dark green, with slender prominent nerves, glabrous or pubescent at summit, round-based, short-stipitate, gradually beaked, the beak prolonged (upward of one-third the length of body), short-pilose, cylindric, ferruginous-margined at summit, strongly bidentate, the teeth to 2 mm long, narrow. Fr. June-July. (Plate XXIV, fig. 5).

Forest glades, birch-wood thickets and wet places. -East. Siberia: Daur., Len.-Kol.; Far East: Ze.-Bur., Ud., Sakh., Kamch. Gen. distr.: North-eastern Mongolia, Manchuria. Described from Amur (Bélér). Type in Leningrad.

ECONOMIC IMPORTANCE. According to B.A. Tikhomirov's observations, the leaves are readily eaten by wild water fowl, especially by geese.

389. *C. Raddei* Kük. in Bot. Centralbl. LXXVII (1899) 97; Kom. Fl. Manchzh. I, 381. - *C. glaberrima* Meinsh. in A.H.P. XVIII (1901) 369, quoad pl. Or. Extr. - *C. aristata* ssp. *Raddei* Kük. in Engl. Pflzr. IV, 20 (1909) 755 et in Journ. Russ. Bot. 3-6 (1911) 197-Ic.: Kük. in Engl., l.c., 752, fig. 128, H.

Perennial, pale green plants, with creeping stolons; culms obtusely
458 triangular, more or less flexuous, smooth, 30-50 cm tall, covered at base with smooth compact reddish-brown fibrillose splitting bladeless sheaths; leaves with strongly involute margins, 2-4 mm broad, accrescent, long-attenuate, shorter than the culm; lower sheaths glabrous or only on membranaceous part pillulose; spikelets 4-5, the lower distant: the terminal 2-3 staminate, narrowly lanceolate, 1.5-4 cm long, with tawny lanceolate aristate scales; other spikelets pistillate, oblong-ovoid to oblong, 2-4 cm long, 1-1.2 cm broad, loose, sparsely flowered below, the lower short-peduncled, erect; lowest bract with sheath to 1 cm long, shorter than to as long as inflorescence; pistillate scales oblong-ovate to lanceolate, acute to aristate, ferruginous, with a broad light median band, narrowly white-hyaline-margined, shorter than perigynia; perigynia conic-oblong-ovoid, inflated-trigonous, 8-9 (10) mm long, glabrous, greenish, ribbed, rounded-based, short-stipitate, gradually beaked, the beak dilated, subulate-bidentate at base, ferruginous at the orifice, the teeth straight to 1 mm long. (Plate XXIV, fig. 3).

Sandy river shores, shallows. - Far East: Ze.-Bur., Uss. Gen. distr.: Manchuria. Described from Amur (between Zeya estuary and Ust'-Strelochnaya). Type in Leningrad.

Cycle 4. *Costularia* (Rafin.) V. Krecz. - Rafin. in Amenit. of Nat. I (1840) 25 (pro subgenere). - Perigynia subcoriaceous, conic-lanceolate, 10-18 mm long, short-stipitate, with numerous (12-18) prominent nerves, gradually tapering into a prolonged bidentate smooth beak; scales ovate, acute, about half the length of perigynia, many-nerved. Staminate spikelet solitary. Bracts sheathed; culms obtusely 3-angled, usually smooth.

390. *C. dolichocarpa* C.A.M. ex Kom. Fl. penins. Kamtsch. I (1927) 264 (nomen) et in Addenda, II, 623. - *C. rostrata* Meinsh. in A.H.P. XVIII, 3 (1901) 316, non Stokes. - *C. Michauxiana* Bcklr. in Linnaea, XLI (1877) 336; Kük. in Engl. Pflzr. IV, 20 (1909) 705, quoad pl. asiat. et in Journ. Russ. Bot. 3-6 (1911) 178; Kom., l.c. - *C. Michauxiana* ssp. *asiatica* Hultén, Fl. of Kamtch. I (1927) 207, fig. 14-C. *Fischeriana* C.A.M. in herb. et ex Hultén, l.c. (nomen), non Gay.

Perennial, pale green, cespitose plants; culms obtusely triangular, smooth, leafy to high up, 25-60 cm tall, covered at base with light brown blade-bearing sheaths; leaves 3.5-4.5 mm broad, abruptly pointed, scaberulous, as long as the culm; spikelets 2-4, distant: the terminal spikelet staminate, on peduncle 1-1.5 cm long, exceeding the nearest pistillate spikelet, lance-linear, 1.5-2 cm long, with narrow acutish tawny scales; other spikelets pistillate, hemispherical, 1.5-2 cm long, loose, on peduncles from 0.5-3 cm long; lowest bract with sheath to 2 cm long and a straight blade 2-3 times as long as inflorescence; pistillate scales ovate, subobtuse, tawny, greenish-centered, 4-5-nerved, less than half the length of perigynia;
459 perigynia divaricate, narrowly lanceolate, obtusely trigonous, 12 mm long,

green, becoming yellowish-green, slenderly many-nerved, abruptly attenuate at base into a stipe 1.5 mm long, cuneate-tipped, diffusely asperous-margined, aculeate-bidentate at apex. Fr. July-August.

Mossy marshes. -Far East: Kamch. (s. part). Gen. distr.: Kurile Islands, northern Japan (Yezo, Nippon). Described from Kamchatka. Type in Leningrad.

Cycle 5. *Cyperocarex* V. Krecz. -Perigynia conic-lanceolate, 5-10 mm long, with numerous (10-15) thickened prominent nerves, more or less distinctly stipitate, gradually tapering into a smooth strongly bidentate spreading beak, its teeth subulate, firm; scales lanceolate, pale, long-aristate. Inflorescence congested, of 1 staminate and 3-5 pistillate spikelets; pistillate spikelets cylindrical, dense, pedunculate, often nutant. Bracts sheathed; culms sharply 3-angled, with canaliculate sides and scabrous angles.

391. *C. capricornis* Meinsh. ex Maxim. in Bull. Ac. Sc. St. Pétersb. XXXI (1887) 119 et in A. H. P. XVIII, 3 (1901) 365; Kom. Fl. Manchzh. I, 379; Kük. in Engl. Pflzr. IV, 20 (1909) 697 et in Journ. Russ. Bot. 3-6 (1911) 176; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I, 329. -*C. pseudo-cyperus* var. *brachystachya* Rgl. et Maack, Tent. fl. ussur. (1861) 165, tab. XII, fig. 13-17. -*C. brachystachya* Akiyama in Journ. Fac. Sc. Hokk. Univ., ser. V, II, 1 (1932) 219, fig. 161, non Schranck et Moll (1785). -Ic.: Kük., l. c., 698, fig. 119; Kom. and Alis., l. c., tab. 98.

Perennial, pale green, caespitose plants; culms scabrous above, leafy up to the middle, 30-70 cm tall, covered at base with reticulate purplish-brown sheaths; leaves ribbon-like, subrigid, flat, 6-12 mm broad, with two scabrous prominent nerves on upper side, reticulate on lower side and at base, long-acuminate, usually longer than the culm; spikelets 3-6, crowded: the terminal usually not exceeding the nearest pistillate spikelet, staminate, linear, 2-3.5 cm long, with lanceolate aristate tawny scales; other spikelet pistillate, oblong-ovoid to short-cylindric, 1.5-3 cm long, 1.5 cm broad, dense, divaricate, pedunculate, the lower peduncles to 1.5 cm long; lowest bract nearly sheathless, with erect blade, many times the length of inflorescence; pistillate scales linear-subulate, slenderly long-awned, greenish, scabrous on midrib and margin, about one-third the length of perigynia; perigynia subulate-lanceolate, compressed-trigonous, 8-9 mm long, stramineous-green, lustrous, slenderly many-nerved, abruptly attenuate at base into a stipe to 1 mm long, cuneate-attenuate at summit into subulate-cleft smooth beak, the teeth smooth to 1.5-2 mm long, arcuate-divergent. Fr. June. (Plate XXIV, fig. 7).

460 River shores and stagnant ponds. -Far East: Ze. -Bur., Uss. Gen. distr.: Manchuria, Korea, northern and central Japan. Described from Ussuri Province, n. -e. shore of lake Khanka. Type in Leningrad.

392. *C. pseudo-cyperus* L. Sp. pl. (1753) 978; Trev. in Ldb. Fl. Ross. IV, 308; Meinsh. in A. H. P. XVIII, 3 (1901) 365; Kük. in Engl. Pflzr. IV, 20 (1909) 695 et in Journ. Russ. Bot. 3-6 (1911) 175; B. Fedtsch. in A. H. P. XXXVIII (1924) 221; Grossh. Fl. Kavk. I, 176; Vass. in Wulff. Fl. taur. I, 2, 34; V. Krecz. in Fl. transb. II, 133. -*C. reversa* Gilib. Exerc. phyt. II (1792) 549. -Exs.: Pl. Finl. exs. No. 139.

Perennial, light green, caespitose plants; culms sharply triangular, prominently scabrous, 40-80 cm tall, leafy to high up, with brownish sheaths at base; leaves ribbon-like, subrigid, flat, 5-10 mm broad, long-attenuate,

prominently scabrous, longer than the culm; spikelets 3-6, crowded: the terminal spikelet staminate, linear-cylindric, 3-6 cm long, with lanceolate subulate-pointed scabrous tawny scales; other spikelet pistillate, cylindric, 3-6 cm long, 0.8-1 cm broad, dense, pendulous, on scabrous peduncles, the lowest of these to 4-5 cm long; lowest bract with sheath barely 5 mm long and blade 1-3 times the length of inflorescence; pistillate scales subulate-lanceolate, with a long scabrous awn, green, hirtellous, 3-nerved, shorter than perigynia; perigynia reflexed, lance-ovoid, convex-trigonous, 4.5-5.5 mm long, pale green, becoming stramineous, with 5-6 costate nerves, abruptly attenuate at base into a short stipe, gradually tapering at summit into a prolonged smooth light subulate-bidentate beak. Fr. May-June. (Plate XXIV, fig. 8).

Marshes, shores and canals. -The whole of European part (except Arctic); the whole of Caucasus; the whole of West. Siberia: East. Siberia: Ang.-Sayan., Daur (upper Angara); Centr. Asia: Aral.-Casp., Pribalkh., Syr-Dar., Tyan'-Shan. (Arslanbob). Gen. distr.: Western Europe, Mediterranean, Northern Mongolia, Kashmir, North America. Described from Sweden. (Dannemora).

NOTE. Hybridizing with *C. vesicaria* L. (*C. Wolteri* Gross.) and *C. inflata* Huds. (*C. Schmidtiana* Junge).

ECONOMIC IMPORTANCE. Hardly eaten in hay, but readily eaten in the form of silage.

Species of Doubtful Position

1. *C. Brotherorum* Christ in A. H. P. XVI (1900) 434; Kük. in Engl. Pflzr. IV, 20 (1909) 174; Grossh. Fl. Kavk. I, 160.

"A species that deserves to be mentioned, allied to the *C. vulpina* L. group, but distinguished from it by the narrower subulate perigynia, more distant spikelet, and leaves which are not flat but convolute, narrow, and many times the length of the culm which is leafy only at base; the number of leaves is also different, being 2 or 3."

Caucasus: East. Transcauc. (Gori). Described from Gori. Type in Helsinki.

NOTE. Possibly identical with *C. divulsa* Stokes? *C. secalina* Whlb. may also be suspected (leaves many times the length of culm).

2. *C. amphilogos* C. Koch in Linnaea XXI (1848) 615; Steud. Syn. Cyper. (1855) 198. -*C. incurva* Trev. in Ldb. Fl. Ross. IV (1853) 270; Kük. in Engl. Pflzr. IV, 20 (1909) 113, quoad pl. caucas.

"Plant naked, stoloniferous. Spike simple, ovoid or oblong; spikelets androgynous, staminate at base, furnished with lance-ovate scales which resemble the bracts but are broader. The plant was collected in juvenile state and it has therefore been impossible to give a better description. Most closely related to *C. curvula* All., but in view of the position of staminate flowers at the base of spikelet referred to the *C. brizoides* L. group from which it differs, however, in general habit."

Described from Caucasus. Type in Berlin.

NOTE. Treviranus and Kükenthal consider this species as synonymous with *C. incurva* Lightf. This view is unacceptable, since this (or any related) species does not occur in the Caucasus, and, moreover, the spikelets in *C. amphilogos* are gynecandrous. From among gynecandrous species,

C. Koch proposes *C. leporina*, *arenaria* (= *colchica* Gay), *praecox* and *brozoides*, but *C. amphilogos* unquestionably differs from them and represents a new species that needs clarification.

3. *C. burjatorum* Korotk. in Fedde, Reprt. sp. nov. XIII (1914) 293; V. Krecz. in Fl. Transb. II (1931) 118.

"Cespitose plants with ligneous rhizome; culms about 10 cm tall, covered at base with yellowish-brown sheaths; leaves as long as the culm, flat, 2-3 mm broad, scabrous (especially on the margins); sheaths with thickened orifice, not overtopping the base of blade or barely so (?); ligule short, broader than long; spikelets 5-6, ovoid, androgynous, crowded into a dense oblong-ovoid head about 1 cm long; scales about 3 mm long, broad, ovate, acute to subobtuse, ferruginous, with a green midrib, white-hyaline-margined; perigynia (young) plano-convex, ovoid, without a distinct margin, obscurely and sparsely denticulate in upper part, beakless, emarginate at summit; anthers about $2\frac{1}{4}$ mm long; stigmas 2."

"Transbaikal area. The region of Eravinskies Lakes, near the lake and village Itsinga. On a steppe-like slope of a hill with a Buddhist temple. - 15 June 1912." Type lost (?).

NOTE. Probably a Transbaikal form of *C. duriusculae* C. A. M., but it is so far impossible to understand why it has been placed by the author in the section *Mühlenbergianae* Kük.

462 4. *C. sordida* Cham. ex van Huerck et Muell. Arg. Observ. bot. I (1870) 33; Kük. in Engl. Pflzr. IV, 20 (1909) 480; Kom. Fl. Kamch. I, 225.

"Rhizome horizontal; culms erect, triangular, scabrous on the angles, $1\frac{1}{2}$ foot long, covered below with loose reticulate scales; leaves about 5, mostly 20 cm long, 5 mm broad, white-woolly at the throat of the free sheaths; staminate spikelet solitary, to 3 cm long, pistillate spikelet 3, distant, loosely flowered, the lower on peduncle exerted from sheath, the others subsessile, nearly erect; bract foliaceous, the lowest with sheath to 15 mm long, the others sheathless; pistillate scales lanceolate (4 mm long), staminate spikelets spatulate, one-third longer than the pistillate (6 mm long), all with a green dorsal band, hyaline-tipped, rounded-obtuse, ciliate; perigynia lanceolate, long-acuminate, strongly bidentate, glabrous, with hispid teeth; stigmas 3, exerted.

"Reported for Kamchatka (Chamisso, in van Huerck's herbarium under the name indicated above)."

NOTE. G. Kükenthal places this species, among those unknown to him, in his section *Mitratae* (according to our classification *Onkerma* Raf. - *Discomitra* V. Krecz.). V. L. Komarov regards it erroneously as "nomen nudum". Considering the hairy sheath throat and the perigynia with strongly bidentate, ciliate-tipped, scabrous beak, as well as the characteristic appearance of the plant (which accounts for the specific name), the species is related to *C. drymophila* Turcz., if not identical with it.

5. *C. jungenda* Steud. Syn. Cyp. (1855) 210.

"Culm covered at base with more or less purple sheathless bladeless scales; spikelets 3, approximate, sessile, bracteate; pistillate spikelets ovoid, obtuse, staminate spikelets oblong; lowest bract bladeless, simple, castaneous; scales castaneous, broadly hyaline-margined. Apparently closely affiliated to the preceding species (i. e. to *C. incerta* Steud.). *C. saxatilis* Linn. var. Gmel., Fl. sib. No. 73. Siberia; (or more exactly after Gmelin - to the east of river Ob', near the rivers Argun' and Lena).

NOTE. In view of the presence of purple scales at the culm base and the affinity (manifestly in respect of perigynium vesture) to *C. incerta* Steud., *C. tomentosa* L. or *C. Vanheurckii* Muell. Arg. (*C. amblyolepis* Trautv. et Mey.) suggest themselves here; in both species, however, the bract is blade-bearing! The problem can only be solved if the original specimen from Gmelin's herbarium is found.

6. *C. plumbea* Whlb. in Vetensk. Ac. Nya Handl. XXIV (1803) 163 (sub *C. vesicaria*).

463 "Spikelets plump, subdistant; bracts very long, foliaceous; scales oblong-ovate, pointed, exceeding perigynia; perigynia ellipsoid-ovoid, with 2-fid beak (ore bifurcato).

"Caucasus, Steven (in Schwarz's herbarium)." Type in Stockholm.

NOTE. Taking into account the name, the plant under consideration may be *C. melanostachya* M.B. (1805) or *C. riparia* Curt. (1783) which have leaden-gray perigynia and a forked beak. Another possibility is *C. acutiformis* Ehrh. (1789), as according to Wahlenberg's drawing, *bifurcatus* is characterized by a bidentate beak with straight teeth. The problem could only be solved with the type at hand.

7. *C. seiskoënsis* Freyn in Oesterr. Bot. Zeitschr. LIII (1903) 27; Kük. in Engl. Pflzr. IV, 20 (1909) 576.

"Loosely caespitose plants with extensively branching rhizome and apparently producing short stolons; culms with dense fibrillose sheath remnants at base, from which arise clusters of leaves and culms; culms 22-27 cm tall or taller, considerably exceeding the leaves, slender, finely sulcate, leafy below, scabrous above; leaves flat, exasperate on the margin and midrib on upper side, smooth underneath, the cauline straight, soft, narrowly linear, long-attenuate (acutissimis), long-sheathed, the radical $1/5$ to $1/3$ as long, cucullate, 1-2 close to culm base, the third (when present) inserted above the middle of the culm; inflorescence elongate, very loose, containing (2)3-4(5) spikelets, the terminal 1(-2) spikelets staminate, congested, 1.2-1.5 cm long (2.5 mm in diameter), dense, subferruginous, oblong-cylindric; other spikelets pistillate, on very slender peduncles, loosish, bearing up to 12 flowers, ca. 1.4 cm long (4 mm broad, or narrower), brownish-green; all spikelets erect, with foliaceous long-sheathed bracts; lower bracts narrowly linear, barely equaling the spikelets, the others setiform, sheathless; scales smooth, broadly elliptic, obtuse, brownish, white-hyaline-tipped, with concolor midrib; perigynia smooth, grayish-green, broadly lanceolate, 2.5-3 mm long, long-attenuate at both ends, trigonous, mostly 3-nerved on both faces; beak one-third the length of perigynium-body, brownish, more or less oblique, dorsally asperous, hyaline-tipped, acutely bidentate, markedly exceeding the scales; achene ellipsoid, not filling up the perigynium; style with much exerted stigmas.

"Blagoveshchensk, in meadows. June-July, 1898. Karo [transliteration-?]."

NOTE. G. Kükenthal refers this species with a question mark to *C. stenantha* Franch. et Sav., but in the latter and related species perigynia are twice as long, attaining 6-7 mm. The description applies most likely to one of the species of the *Caricella* Ehrh. group and recalls in many respects (except the number of staminate spikelets) *C. ledbouriana* C.A.M. and *C. novograbenovii* Kom. which have 2.5-3 mm long perigynia and obtuse scales. The position could be clarified by comparison with type plants of Karo's collections.

1. *C. astracanica* Willd. ex Kunth. Enum. pl. II (1837) 385 (sub. *C. muricata*); Steud. Nomencl. bot. I (1841) 286; Trautv. Incr. fl. Ross. IV (1884) 812 (nomen). - *C. muricata* β . Steud., l. c., 293.

Possibly one of the synonyms of *C. polyphyllae* Kar. et Kir. ?

2. *C. congesta* C. A. M. (in sched. herb. Heward.) ex Boott, Illustr. Carex, I (1858) 17 (sub *C. Hoodii*, nomen). - *C. Hoodii* Trautv. Incr. fl. Ross. IV (1884) 816, non Boott. - According to Boott, a plant from Kamchatka. - Perhaps one of the synonyms of *C. pachystachyae* Cham?

3. *C. pentastachys* Fisch. ex Steud. Nomencl. bot. I (1841) 294 (nomen); Trautv. Incr. fl. Ross. IV (1884) 320.

4. *C. eriophora* Fisch. ex Steud. Nomencl. bot. I (1841) 289 (nomen). - Trautv., l. c., 814.

5. *C. sublivida* Norrl. Fl. Kar. - oneg. in Not. ur Sälsskr. pro Fauna et Fl. fenn. Förh., Ny ser., Hæft 10, p. 51; Trautv., l. c., 824. - *C. panicea* var. *sublivida* Hartm., sec. Norrl., l. c., p. 77, non Nyl. et Sael. Herb. mus. fenn., 13. - "Tractus onegensis".

A Species Subject to Exclusion from the Flora of USSR

1. *C. abbreviata* Prescott ex Boott in Ann. nat. hist. XVII (1846) 57; in Trans. Linn. Soc. XX (1846) et in Walp. Ann. bot. I (1848-49) 914; Steud. Syn. Cyp. (1855) 226; Trautv. Incr. fl. ross. IV (1884) 810. - *C. Torreyi* Tuckerm. - An American species erroneously described from the Altai.

ORDER 5. PRINCIPES

Flowers unisexual or more rarely bisexual, actinomorphic, disposed in large inflorescences, surrounded by a spathe; perianth trimerous, of two or many whorls; stamens 6, sometimes 3 or 9. Ovary 3-celled, each cell with a solitary ovule. Fruit a berry, drupe or nut. Monopodially branching trees, with large, palmately or pinnately veined leaves.

FAMILY XXVI. PALMAE* JUSS

Flowers usually unisexual, small, in simple or compound inflorescences, initially surrounded by large bracts [spathes]. Perianth in 2 series, persistent in fruit, consisting of two whorls, all segments alike or differentiated into calyx and corolla. Stamens usually 6 in two whorls, rarely 9 or more, or 3. Ovary consisting of 3 carpels, these often confluent and united by abortion of 1 or 2 cells; ovule solitary in each locule. Style mostly 3-fid at apex or bearing 3 sessile stigmas. Fruit simple, with 1-3 compartments, rarely 3-merous, in the form of a drupe or a berry with 1, 2 or 3 seeds. Seeds albuminous; endosperm more or less compound, corneous or osseous, rarely amygdaline. Embryo lateral, seated close to seed base, small. Arborecent land plants, often of considerable size. Stem ligneous, terete, usually simple or sparsely branching. Leaves rather large; leaf sheaths

* Arranged by I. V. Palibin.

fully amplexicaul, leaving spiny scars on the bole. The leaf sheath prolonged into a petiole and a compound, palmatifid or pinnatifid blade; occasionally the blade entire or notched.

Fossilized remains of palms are known in the USSR from the Paleocene to the Oligocene. Species known from the Volga Paleocene are *Palmacites nipoides* Brongn. Volg.-Don. (Saratov) and *Palmoxylon variabile* Sterz. -Low. Don.; a *Palmoxylon* sp. is known from the Oligocene of Mid. Dnepr. (Lava Kursk.).

Nipa. The occurrence of an allied genus, such as *Nipadites Burtinii* Brongn., is known from the Eocene of Prichern. (near Voznesensk), Mid. Dnepr. (Kiev); its variations *N. umbonatus* Bow. and *N. ellipticus* Bow. in the Eocene of Mid. Dnepr. (Kiev).

Sabal. This genus, notably *S. Haeringiana* (synonymous with *S. ucrainica*) was widespread in the Eocene of Mid. Dnepr. (Ekaterinopol'e, Kiev) and South. Transcaucasia (Dzhul'fa), in the Oligocene of Prichern. (Adzhanka) and Mid. Dnepr. (Volyn'), in the Pliocene of West. Transcauc. (Goderskii Pass); *S. major* Heer (Goderskii Pass).

Amesoneuron. Of dubious status as a palm, this genus has been located in Prichern. Sarmat. (Krynka). - *A. Noeggerathiae* Goepp.

NOTE. Palms are distributed mainly in the tropics and only a few genera have representatives outside the tropical countries.

No wild-growing palms occur in the flora of the U.S.S.R. They are raised as cultivated plants in gardens of the Black Sea coast of the Caucasus, from the Turkish border to Tuapse and then here and there along the southern seaboard of Crimea. Certain palm species in this country are escapes from cultivation and reproduce without the agency of man (such as representatives of the genera *Trachycarpus* and *Chamaerops*). The more important palms cultivated in the Caucasus and Crimea are included in this work. All palms grown along the Black Sea coast of the Caucasus and Crimea are described in the study by S.G. Ginkul: "Palms of the Black Sea Coast of the Caucasus", *Trudy po prikl. bot., genet. i selektsii*, Vol. 24 (1929-1930), pp. 95-230, Leningrad, 1931.

Key to Genera

1. Leaves pinnatifid 2.
- + Leaves palmately compound 4.
2. Leaves irregularly arranged in groups along the stem; petioles spiny or prickly 3.
- + Leaves nearly equidistant petioles devoid of spines and prickles;
- 466 Stems naked, very thick at base *Jubaea* H.B. et K.
3. Leaf petioles armed with strong long pugioniform spines; drupe unilobular *Phoenix* L.
- + Leaf petioles armed with strong, antrorsely curved spines; drupe trilobular *Butia* Becc.
4. Leaf petioles devoid of strong spines, finely serrulate-margined, slightly convex on upper side; leaf blades without white filaments on the margins *Trachycarpus* H. Wendl.
- + Leaves armed with strong spines 5.
5. Leaf blades with long white filaments on the margins *Washingtonia* H. Wendl.
- + Leaf blades without white filaments on the margins; usually a low plant *Chamaerops* L.

Genus Phoenix* L.

L. Sp. pl. (1753) 1188.

Flowers sessile, coriaceous; staminate flowers oblong or ovoid, with toothed cup-shaped calyx; lobes 3, subconnate at base, obliquely oblong or ovate. Stamens 6, rarely 3 or 9; filaments subulate, connate at base, bearing linear-oblong anthers. Pistillate flowers spherical, as large as the staminate. Calyx cup-shaped, 3-lobed. Corolla 3-lobed, the lobes orbicular. Carpels 3, free, with sessile uncinata stigmas. Ovules straight, only one maturing. Fruit cylindrical, with a fleshy pericarp and thin membranaceous endocarp. Seed straight, linear-oblong, with a deep longitudinal groove; endosperm horny. Trees with pinnatifid, spreading-recurved, unequally pinnate leaves; segments rigid, elongate-lanceolate or ensiform, acuminate, V-shaped in cross-section. Spadices borne in leaf axils, erect; peduncle compressed, with umbellate branches at the end. Spathes coriaceous, strongly compressed.

NOTE. Phoenix palms grow wild only in countries of the Old World, from Canary Islands, in the southern part of the Mediterranean region, all over Africa, Mesopotamia, Asia Minor, Persia, Baluchistan, Afghanistan, the southern slopes of Himalayas, Assam, as far as Upper Burma and China. In the Tertiary, palms very similar to Phoenix grew in many 467 parts of central and southern Europe as well as in Transcaucasia (Western Georgia).

1. Leaf blades curved to reflexed, usually light green; corolla as long as the calyx *Ph. canariensis* Hort.
- + Leaf blades slightly curved or barely so, glaucous; corolla twice the length of calyx *Ph. silvestris* Roxb.

Ph. canariensis Hort. Chabaud. in "La Province agricole No. 19 (1882) 293". -Beccari in Malesia III (1886) 347-369; Bailey, Cyclop. of Hort. III (1927) 2594; Ginkul l. c., 118. -*Ph. tenuis* Hort. -*Ph. dactylifera* var. *Jubae* Welb. et Berth. (non L.) Hist. natur. des Canaries III, 289. -*Ph. Jubae* Christ in Engl. Bot. Jahrbuch. IX (1887) 170.

Tree; trunk erect, solitary, covered with scars - remains of shed leaves; height of stem to 12-15 m (in this country not exceeding 2.5-3 m); coma containing numerous leaves, from 150 to 200 in number; leaves pinnate, arcuate, light green; leaf petioles with strong acicular spines at base; leaf segments on lower part of rachis aggregated in fascicles of 2-3, the fascicles rather distant; pinnae above the middle of rachis parallel in one plane; maximum length of leaflets 45-50 cm, breadth 3-5 cm; pistillate inflorescences to 2 m long, the staminate shorter; peduncles flat, ribbon-like, to 5.5 cm broad and 1.5 cm thick; rachillae tetragonous, very numerous (up to 200); spathes navicular, compressed, ferruginous-brown, to 45-50 cm long; staminate flowers angled, 9-10 mm long, cup-shaped, trigonous, short-tridentate; petals subobtusate; stamens 6, slightly shorter than the petals; pistillate flowers spherical; calyx cup-shaped, 3-lobed; corolla about equaling the calyx; petals reniform, twice as broad as long;

* Named after the country Phoenix, i. e. Phoenicia, whence the ancients first became acquainted with the phoenix palm.

fruit ovoid, obtuse at both ends, about 2 cm long and 1.5 cm thick; mesocarp thin, tough; seed ovoid, rounded at the ends, about 1.5 cm long, grooved on the ventral side (Plate XXV, figs. 16 - 21).

P. canariensis is cultivated as an ornamental plant in gardens of the subtropical region; takes first place in the gardens of Sochi, Sukhum and Batum. Provenance - Canary Islands (27-29° N.lat. at Caldera di Palma).

Ph. silvestris Roxb. Fl. Ind. III (1832) 787; Beccari in Malesia III (1886) 347-364; Brandis, Ind. Trees (1921) 645; Ginkul l. c., 109.

Tree; trunk erect, solitary, covered with light gray remains of leaf bases, to 5-6 m tall; leaves numerous (120-150), pinnate, arcuate, cinereous-gray on the upper surface, intensely green underneath, covered
468 with mealy bloom; segments grouped in 3's or 4's, rather closely set along the rachis, 30-32 cm long and 4-5 cm broad; petiole armed along about 1 m with strong pugioniform spines 3-15 cm long; pistillate inflorescences to 1.5 m long, the staminate shorter; peduncles smooth, flat, ribbon-shaped, about 4.5 cm broad and 1 cm thick; branches numerous (150-200); spathes coriaceous, navicular, densely covered with rusty scales; staminate flowers angled, ovoid, 7-8 mm long; calyx short, cup-shaped, obtusely 3-lobed; stamens 6; pistillate flowers spherical, yellowish, crowded, in 2's or 3's or solitary; calyx cup-shaped, 3-lobed; petals obtuse; corolla twice the length of the calyx; style subulate, with a curved stigma; fruit cylindrical, rounded at the ends, yellowish-red to orange-colored, with easily separating mesocarp; seed cylindrical, rounded at both ends, 20 mm long and 10 mm broad, narrowly grooved on the ventral side (Plate XXV, figs. 10, 11).

Occurring in gardens of Sukhum and Batum. Provenance - eastern India, in parts adjoining the Himalayas, as well as in the lowland parts of Deccan and Mysore. Cultivated in many tropical and subtropical countries.

ECONOMIC IMPORTANCE. The boles of this palm are used in India as building material. The leaves are used for making sacks and bags; the petioles are employed in basketry; the leaves serve for covering huts. The sweet sap furnishes syrup, sugar, and a potent alcoholic arak-like liquor ("toddy", or palm wine). In our climatic conditions only of decorative value.

Genus *Jubaea** H. B. et K.

Humb. Bonpl. et Kunth. Nov. gen. et sp. pl. I (1815) 247, tab. 96; Martius, Hist. nat. Palm. III, 294, 324 tab. 161 f. III.

Staminate flowers in upper part of spadix, borne on short pedicels; calyx of 3 linear-lanceolate carinate sepals; petals ovate, subobtusely, coriaceous; stamens 13-27; filaments subulate, united at base. Pistillate flowers on the lower one-third of the branches, ovoid-conic, angled; calyx broadly ovoid; Petals as long as the sepals, imbricate. Fruit large, broad, attenuate to a point at the apex, fleshy. Seeds globular, pointed at the apex. Endosperm cartilaginous. A tree with a massive thick cylindrical trunk and broad-based pinnatifid leaves; spadices up to 1 m and longer, densely panose.

J. spectabilis H. B. et K., l. c.; Ginkul, l. c., 182-199.

Tree; trunk thick, up to 10 m tall, cylindrical, somewhat distended in its
469 middle part, nearly smooth, covered with long transverse scars, sometimes attaining in this country 3½ m in height; leaves pinnate, forming a

* Named after Juba, king of Numidia.

strong coma, erect in the middle part, reflexed at the margins; petioles of many leaves with broad triangular base, ribbed, to 1–2.5 m long; segments lance-linear, rigid, somewhat irregularly arranged along the petiole, reversed V-shaped in cross-section, to 75 cm long, 30 mm broad, bisected at apex, lustrous dark green on upper surface, dull underneath; spathe ligneous, to 1 m long, navicular, covered with tobacco-colored panniform pubescence; peduncle of spadix branched, laterally compressed, densely pannose; flowers subsessile, clustered or solitary; staminate flowers vinaceous-brown on the outside, grayish-red on the inside, with a light yellow spot at the base of petals; pistillate flowers dark purplish-gray; ovary pale lemon-colored, with short thick stigmas; fruit yellowish, flattened at base, 3–4 cm long, enclosed by mesocarp to 1 cm thick at base; seeds with 3 pores in upper part, these covered with a cinnamon-colored film.

Occurring in gardens of Sukhum and Batum. Originating in South America (Chile), where it grows between 31 and 35° S. lat. Also cultivated in some subtropical countries. Almost entirely extinct in its native country.

ECONOMIC IMPORTANCE. The palm was used in Chile for extraction of sap which yielded syrup and a kind of brandy. Fruit pulp edible; seeds containing up to 35 per cent oil. Leaves were used for covering huts and for fiber production. In our climate this palm can only be of ornamental base.

Genus *Butia** Becc.

Becc. *Malpigia* (1887) 347, 442. – *Cocos* Mart. p. pt.

Staminate flowers in upper part of spadix, pistillate flowers below. Calyx of staminate flower trigonous, small, valvate. Petals obliquely elongate; Stames 6, with subulate filaments. Pistillate flowers spherical-ovoid; calyx lobes ovate, coriaceous, imbricated. Petals coriaceous, broad-based, imbricated. Ovary ovoid, prolonged into a short style. Low, rarely tall, trees; trunks covered with distant spines or scars left by fallen leaves. Leaf petioles vested with prickles or rarely spines, clasping only a portion of the trunk periphery. Leaves pinnatisect; segments ensiform or lanceolate, fasciculate. Rachis nearly 3-sided, acute above, convex on the back underneath. Spathe fusiform, coriaceous. Spadices initially erect, becoming 470 nutant in fruit, sublanate. Fruits surrounded by juicy pulp; drupe globose to oblong, containing 3 seeds separated by ligneous partitions.

B. capitata (Mart.) Becc. in *Agric. colon.* X (1916) 489 t. 5; Ginkul l. c., 195–197, figs. 26, 27. – *Cocos capitata* Mart. *Hist. Nat. palm.* II, 114, t. 78–79. – *C. australis* Hort. – *C. campestris* Hort.

Tree to 4–5 m tall; leaves pinnatifid, very rigid, glaucescent or cinereous-green, arching, with raised segments to 2.5 m long; petioles flat to slightly concave above, studded with firm recurved spines, these replaced toward the base by progressively longer ligneous thick elongated fibers; leaf segments arranged along the rachis in groups of 2–3 (sometimes 5), ensiform, rigid, darker on the upper side than on the back, to 60–75 cm long; lower part of young leaves tomentose, soon glabrescent. Spathes fusiform, light green, pruinose, to 1.25 m long. Spadices several, to 110 cm long,

* A local South American name of the palm.

strongly branching, the branches compressed-angled, lanate, naked. Flowers pistillate and staminate, sessile, arranged on the same spadix, the former placed nearer the peduncle, the latter on the middle and terminal part of the spadix. Sepals of staminate flowers lanceolate, acuminate, carinate, about 1/3 the length of flower. Petals 3, lanceolate, concave, asymmetrical, lemon-colored. Pistillate flowers with obtuse sepals and broad-based petals. Ovary ovoid, glabrous. Fruit ovoid-globose, yellow, juicy, sweet, edible, to 25 mm long and 20 mm broad. Seed globose, 18-20 mm long and 10-14 mm broad.

473 Southern Brazil. Cultivated in subtropical regions; often occurring in gardens of Sukhum and Batum. Has industrial and ornamental value. Seeds contain up to 44 per cent of liquid palm oil. In addition to *B. capitata* (Mart.) Becc. species occasionally cultivated on the Black Sea coast are *B. eriospatha* Becc. and *B. Y atay* Becc.

Genus *Washingtonia** Wendl.

Wendl. in Bot. Zeit. XXXVII (1879) 68.

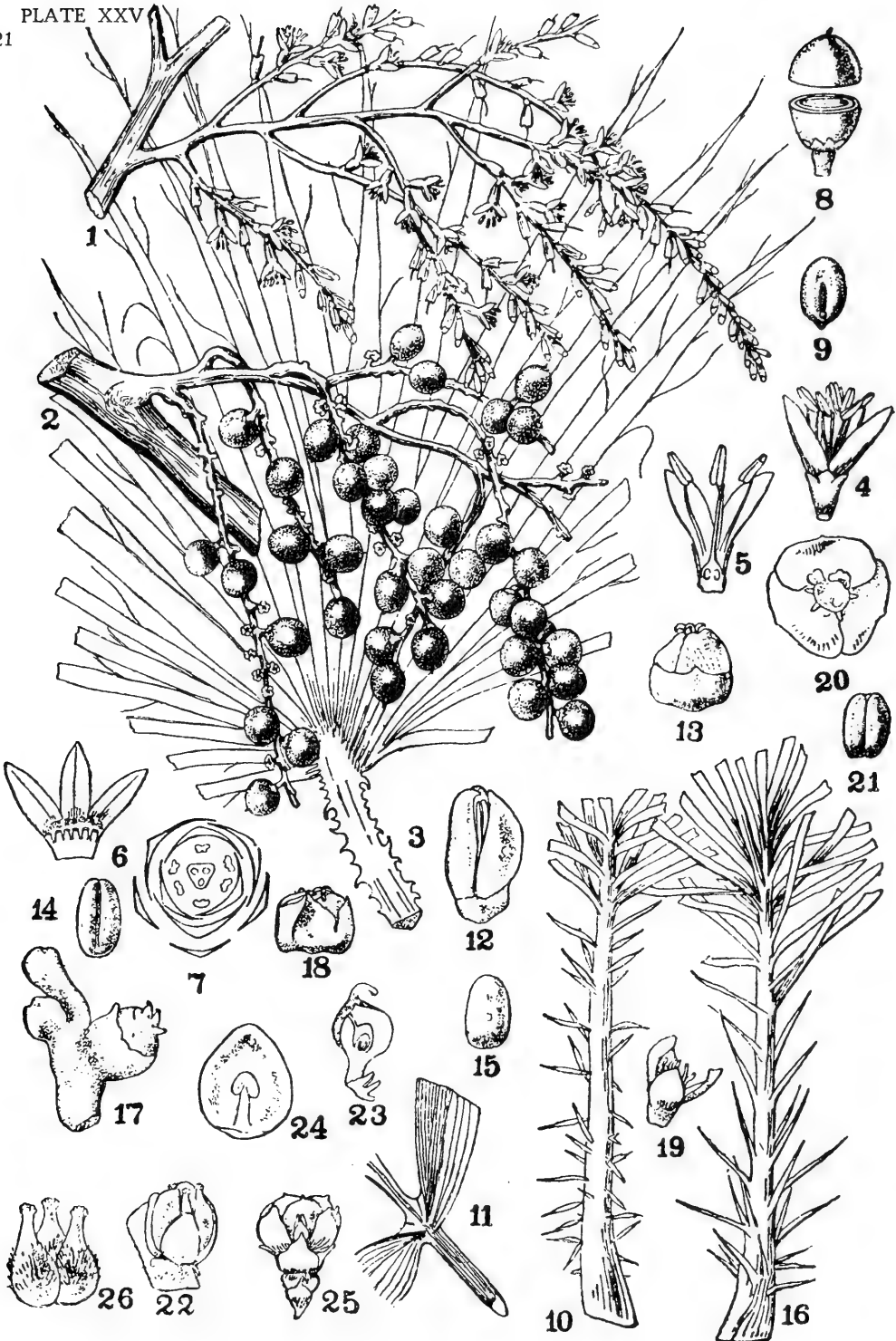
Flowers borne on branching peduncles; calyx tubular, cup-shaped, deeply trilobed; corolla 3 times as long as the calyx, with narrow lobes. Stamens 6, their filaments free, fusiform. Fruit ovoid-oblong, baccate, with thin dry pericarp. Seed small, oblong, concave at base; endosperm horny; ovary very small. Palms with robust trunks attaining up to 25 m in height; trunks covered with scars in lower part, in upper part clothed with remnants of shredded petioles interwoven with cinnamon-colored threads. Leaves forming a large coma at the summit of the trunk; leaf blades orbicular-peltate, deeply dissected into segments; rachis and ligule short or lacking; segments bifid at the ends, furnished on the margins with long whitish filaments; leaf petioles as long as the blades, thick, glabrous, armed with strong recurved spines.

Occurring in the south-western part of the United States, notably in the desert parts of California and Arizona, as well as in Mexico (Sonora State).

Explanation to Plate XXV

Washingtonia filifera H. Wendl.: -1. Part of flowering inflorescence. -2. Part of fruiting inflorescence. -3. Leaf blade with filaments on the margins. -4. Flower magnified. -5. Same in longitudinal section. -6. Inside view of corolla, showing glands. -7. Flower diagram. -8. Fruit cut in half. -9. Seed (figures 1-9 after Sargent). -*Phoenix silvestris* Roxb.: -10. Leaf petiole with pugioniform spines (after Ginkul). -11. Attachment of blade to petiole (after Schnizlein). -12. Staminate flower partly open. -13. Pistillate flower at the time of pollination. -14. Seed from ventral side. -15. Same from dorsal side (figures 12-15 after Beccari). -*Ph. canariensis* Host: -16. Leaf petiole with terete prickles. -17. Part of peduncle with two pistillate flowers (figures 16-17 after Ginkul). -18. Pistillate flower (after Beccari). -19. Open staminate flower (after Ginkul). -20. Perianth of mature fruit, with four out of the six staminodia visible. -21. Seed from ventral side (figures 20-21 after Beccari). -*Chamaerops humilis* L.: 22. Pistillate flower magnified 3 times (after Schnizlein). -23. Ovary in longitudinal section (after Schnizlein). -*Trachycarpus excelsa* H. Wendl.: -24. Staminate flower: petal with stamen. -25. Pistillate flower with calyx and corolla. -26. Pistillate flower with perianth removed (figures 24-26 after Hooker). -27. Bisexual flower with one stamen and one petal removed (after Beccari).

* Named for Washington, the first president of the U. S. A. (1732-1799).



1. Leaf petioles armed with strong spines only along the lower one-third
 *W. filamentosa* (Wendl.) O. Ktze.
- + Leaf petioles armed with strong spines all the way up
 *W. robusta* H. Wendl.

W. filamentosa (Wendl.) O. Ktze. Rev. pl. gen. II (1891) 737; Sargent, Silva of N. America, X.47, fig. DIX; Ginkul l. c., 158. - *W. filifera* H. Wendl. Bot. Zeit. (1879) 68. - *Pritschardia filamentosa* Wendl. Bot. Zeit. XXIV (1876) 807. - *P. filifera* Linden, III. hort. XXIX (1877) 32, 105. - *Neowashingtonia filifera* Sudw. Forest Trees Pacif. Slope (1908) 199.

Tree, up to 25 m tall, with cineraceous-green, glabrous, multisect leaves, the elliptic blade split into 75-80 segments attaining up to 1.5 m in
 474 length; segments to 5-6 cm broad, bisected at the ends, furnished with whitish threads on the margins; leaf petioles as long as the blades, armed in lower one-third with strong yellowish antrorsely curved spines, these to 1 cm long in lower part and gradually disappearing in upward direction; ligule oblong-triangular, to 12-14 cm long; rachis 15-16 cm long, elongate-triangular; spadices long, arching, covered with numerous spathes, outer spathe tubular-elongate, glabrous; bracts on branches of second order coriaceous; flowers in loose racemes, numerous, subsessile; calyx tubular-cup-shaped, divided nearly to the middle into 3 ovate lobes; corolla with lanceolate acuminate lobes; stamens free to the base; anthers lance-globose; ovary turbinate, contracted at summit into a filiform style; fruit baccate, to 9 mm long and to 6 mm broad; seed ovoid-ellipsoid, 5-6 mm long and 4-5 mm broad (Plate XXV, figs. 1-9).

Originating in North America - desert parts of Southern California and western Arizona. Very common in cultivation throughout the subtropical parts of southern Europe, where it ranks as one of the most beautiful ornamental plants. Often cultivated in gardens of Sukhum and Batum.

W. robusta H. Wendl. Berl. Garten. Zeit. II (1883) 198; Orcutt. Botan. Gazette IX (1885) 262; Ginkul, l. c., 162. - *W. filifera* S. Wats. in Proceed. of the Americ. Acad. XXV (1890) 136 (non H. Wendl.). - *Neowashingtonia robusta* Britt. N. Amer. Trees (1908) 138.

Tree, up to 30 m tall; leaves light green, circular in outline, consisting of 75 segments to 130 cm long; segments bisected at the ends, furnished with whitish threads on the margins; ligule equilateral-triangular, with a strap-shaped appendage on the margins, to 1 cm long; rachis very short, elongate-triangular; blade beneath the rachis covered with grayish-white flaky tomentum forming below a light spot; petiole armed throughout on the margins with large, antrorsely curved, light yellow spines; spadices longer than the leaves; inflorescences dense; calyx campanulate truncate trilobed; corolla twice as long as the calyx, consisting of 3 lance-subulate acuminate petals; stamens 6, in 2 series, with linear-hastate anthers; ovary turbinate, with trifid stigma; fruit black, lustrous, with thin pericarp, to 10 cm long and 8 cm broad; seed 6-7 mm long and 5 mm broad.

Distributed in the U. S. A., in California, in the Colorado Desert, and in the adjoining parts of Arizona. Commonly occurring in gardens of the subtropical zone of southern Europe. Often grown in gardens of Sukhum and Batum, although much less hardy than *W. filamentosa* (Wendl.) O. Ktze. A good plant for parks, but quite unsuitable for indoor and greenhouse cultivation.

Flowers polygamo-dioecious. Inflorescence branching, rather small, the peduncles short, the spathe large, sessile; flowers small, yellow; perianth of staminate flowers in two series: the outer segments shorter than the inner, trifold; stamens 6, with short hastate filaments, connate from the middle; fruit ovaloid, with 3 globose stigmas, containing 1 seed; seed with compound horny endosperm. Usually a bushy plant; caudices from 2 to 3, sometimes to 6 m tall, covered with stiff fibers formed by dead leaf sheaths; petioles rough with thickened straight or slightly recurved spines; leaf blade compound, suborbicular, cuneate-emarginate at base, deeply lacinate, the segments deeply bifid.

Ch. humilis L. Sp. pl. (1753) 1187; Martius, Hist. nat. Palmarum (1823-1850) 248, t. 120, 124; Curtis, Bot. Mag. (1860) t. 2152; Bailey, Cyclop. of Hort., 1 (1927) 733; Ginkul, l. c., 165.

Caudices usually low, rarely tall, usually arising from a common root-stock; lower leaf sheaths densely hairy, to 10-15 cm long and 3.5 cm broad; petioles to 70-80 cm long, convex on both sides, sparsely armed with retrorse spines to 1.5 cm long; leaf blade dissected into segments to one-third, rigid, grayish-dark-green on the upper side, cineraceous beneath, covered on both sides with fugacious hairs; blade 50-60 cm long, with bifid segments; rachis none; ligule rudimentary; spadices several per caudex, 12-25 cm long, borne in clusters at the base of caudex; peduncles flattened; perfect flowers subsessile or short-pedicelated; calyx with strongly acuminate segments; petals acute, golden-yellow; fruit yellowish, fleshy, spherical-ovoid, from 1.5 to 2 cm long (Plate XXV, figs. 22, 23).

With us, in the gardens of Sukhum, Sochi and Batum, being a xerophytic plant, it finds the conditions of Sukhum most congenial; in the Crimea it suffers badly from cold weather. Originates in the western part of the Mediterranean region; southern Italy, Balearic Islands, southern France, Sicily, eastward to the shores of the Adriatic and Albania; North Africa: Algeria, Morocco, and Tripolitania. Cultivated in gardens of southern Europe since ancient times.

ECONOMIC IMPORTANCE. In southern Europe, especially in Italy, it
476 has long been used as a fiber plant, for various kinds of baskets, mats, hats, brooms, etc. In North Africa it is gathered and carded by special machines into fibers which find a good market in North America as filling material, known under the trade term "Grin végétal".

Genus *Trachycarpus*** H. Wendl.

H. Wendl. in Bull. Soc. bot. d. France VIII (1861) 429; Beccari in Webbia, I (1905) 41-53, Dalla Torre et Harms, Gen. siphon. (1900-1907) 37.

Inflorescence borne on short peduncles, with coriaceous spathes, racemiform, dense, to 1 m long; calyx 3-fid, small; petals 3. Flowers polygamo-dioecious [sic] (perfect and staminate flowers borne on the same or different peduncles); stamens 6-9, short; ovary trilocular, 1-seeded by abortion;

* From Greek *chamai*, low, and *rops*, shrub, alluding to the low growth.

** From Greek *trachys*, rough, and *carpos*, fruit.

fruit fleshy, olive-shaped, slightly curved; seeds reniform, the endosperm dark gray, horny. Trunk tall, slender, clothed with cinnamon-colored fibers; leaves in an apical tuft, flabellate, pinnatisect along the margin; petioles serrate-margined, several times the length of blade.

T. excelsa (Thunb). H. Wendl. in Soc. bot. d. France VIII (1861) 429 Beccari in Webbia I (1905) 41; Ginkul, l. c., 141. - *Chamaerops excelsa* Thunb. Fl. jap. (1784) 130. - *Ch. Fortunei* Hook. in Bot. Mag. (1860) t. 5221.

Tree. Trunk shapely (to 10 m tall), coated with a thick layer of cinnamon-colored strong fibers and remnants of petioles; petioles to 70-75 cm long, serrulate-margined; leaf blades flabellate, dissected, dark green on the upper surface, glaucescent beneath, the segments bidentate at the ends, devoid of whitish threads on the margins; staminate flowers borne in leaf axils, disposed in a racemiform, yellow to yellowish-green inflorescence, this sometimes attaining 1 m in length, branching, the small flowers in clusters of three, the petals ovate, subobtuse, 4 mm long and 3 mm broad; pistillate inflorescences fleshy, resembling the staminate, the calyx green, acuminate, the sepals broadly oval; petals one-third longer than the sepals, resembling them in shape; ovary pubescent at base; stigmas 3, slightly shorter than the ovary; anthers grayish-black; epicarp thin, mesocarp blackish-purple, glutinous, endocarp firmly united with the seed; seed reniform, 10 mm long and 7 mm broad (Plate XXV, figs. 24 - 27).

This species includes the so-called Chusan palm, imported by Fortune from eastern China; it had been described under the name *Chamaerops fortunei* Hook. (Bot. Mag. t. 5221), but evidence was later provided by Beccari that it hardly differs from *T. excelsa*. Often cultivated in Crimea and in the Caucasus, where it is regarded as one of the most hardy palms.

In gardens of Crimea, from Alushta to Tesseli; along the Black Sea coast from Tuapse southward down to the Turkish border. Also occurring in gardens of Trabzon, in the Pontic region, and in Sukhum and Batum districts where it also comes up spontaneously from seed. Streets of towns on the Black Sea coast are occasionally planted with this palm. It is likely that *T. excelsa* H. Wendl will also enter into cultivation in certain districts of Uzbekistan and possibly also of Tadzhikistan. Grows in subtropical areas of eastern Asia, from Japan, across the islands of Kyushu and Formosa, down to the central and southern provinces of China and beyond to the borders of Tibet, i. e. in the region situated between 27 and 35° N. lat. - *T. excelsa* H. Wendl. is widely cultivated throughout the subtropical regions of the world.

ECONOMIC IMPORTANCE. The fibers of this palm find extensive application in the life of the rural population of China. The workers make hats from them for protection against the rain, mattresses, mats, strings, and ropes. The fiber is also very suitable for brush making, and it is widely used for this purpose in our industry.

Besides the palm species here described, the following species are also cultivated in gardens of Abkhaziya, Georgia and Adzharistan, according to data supplied by S. G. Ginkul (l. c.): 1) *Phoenix reclinata* Jacq. (central and southern Africa) Sukhum; 2) *Sabal palmetto* Lodd. (southern states of North America) Sukhum; 3) *Sabal Adansoni* Gaertn. (same provenance) Sukhum and Batum; 4) *Rhapidophyllum hystrix* H. Wendl. et Drude (same provenance) Sukhum and Batum; 5) *Livistona*

australis Mart. (eastern Australia) Batum and Sukhum; 6) *Livistona chinensis* R. Br. (southern China, Bonin-Sima and Liu-Kiu Islands) Batum and Sukhum; 7) *Erythea edulis* S. Wats. (California, Arizona) Batum, Sukhum; 8) *Erythea armata* S. Wats. (Guadalupe in the Pacific Ocean) Sukhum, Batum; 9) *Arecastrum romanzoffianum* Cham. (subtropical South America) Sukhum, Batum; 10) *Butia eriospatha* (same provenance) Sukhum; 11) *Butia yatay* Becc. (subtropical Brazil, Argentine, Uruguay) Sukhum, Batum; 12) *Butia bonneti* Becc. (southern Brazil) Sukhum.

ECONOMIC IMPORTANCE. All the species listed above have decorative value. The fruits of *Butia* species are edible. Some palms may also be cultivated for production of liquid oil; the oil content amounts to 64 per cent in the seeds of *Butia capitata* Becc. and may be used as substitute for the more common coconut-oil. The seeds of *Livistona chinensis* R. Br. also yield a fatty oil (up to 70 per cent) and leaves of this palm are also widely used in China and Japan for the production of palm fans which are exported in large quantities to all parts of the world.

ORDER 6. SPATHIFLORAE

Flowers bisexual or, more frequently, unisexual, often reduced to a single stamen and a single pistil, regular, with simple perianth, or devoid of perianth as a result of reduction, sometimes forming a simple spike (spadix), enclosed by a spathe. Herbaceous plants of dry or marshy habitats, or plants with reduced stem, floating on the water surface.

FAMILY XXVII. ARACEAE* NECK.

Flowers unisexual, destitute of perianth, or bisexual with choripetalous perianth, small, numerous, inserted on the fleshy scape axis and forming a dense spiciform inflorescence, a so-called spadix, subtended by a spathe; spathe inclosing the spadix or adhering to it on one side only. Stamens with short filaments or destitute of filaments. Ovary 1-locular or 3-locular, with numerous ovules and a small sessile stigma. Fruit baccate or dry. Seeds containing endosperm and a straight embryo. Perennial, rather large plants, with a tuber-like rootstock or a stout creeping rhizome. Leaves mostly basal, long-peduncled, cordate, oval, sagittate, rarely not differentiated into petiole and blade.

ECONOMIC IMPORTANCE. Most representatives of this family contain saponin or related substances, as well as alkaloids, nitroglycosides, essential oils, and tannin-like substances, and are considered as poisonous. Some of them are used for medicinal purposes. They are often rendered innocuous by drying or boiling, while the rootstocks, which contain a large amount of starch, may actually be used for food.

Key to the Genera

- 1. Leaves not differentiated into petiole and blade; limb of spathe resembling the foliage leaves 1. *Acorus* L.

* Arranged by O. I. Kuzeneva.

- + Leaves differentiated into petiole and blade; limb of spathe differing from the foliage leaves 2.
- 2. Leaves oval or cordate 3.
- + Leaves sagittate, hastate, lanceolate, or dissected 5.
- 3. Leaves oblong or broadly oval, very large (to 1 m long) 2. *Lysichitum* Schott.
- + Leaves oval or cordate 4.
- 479 4. Limb of spathe red; rootstock short, tuberlike 3. *Symplocarpus* Salisb.
- + Limb of spathe white; rootstock creeping 4. *Calla* L.
- 5. Spadix without abortive flowers between the staminate and pistillate flowers, or unisexual 7. *Arisaema* Martius.
- + Abortive flowers inserted between the staminate and the pistillate flowers 6.
- 6. Placentation parietal; ovules 6 to many; leaves sagittate or hastate 5. *Arum* L.
- + Placentation basal; ovules 2; leaf blades divided into 3 leaflets or triangular-lanceolate 6. *Eminium* Schott.

Genus 236. *Acorus** L.

L. Gen. pl. ed. (1737) 434.

Flowers bisexual, with a perianth of 6 segments; stamens 6, opposite the sepals; ovary 2- or 3-loculed; fruit a dry berry; spathe linear, prolonged beyond the spadix.

1. *A. calamus* L. Sp. pl. (1753) 324; Ldb. Fl. Ross. IV, 13; Shmal'g. Fl. II, 525; Kryl. Fl. Zap. Sib. III, 538. - *A. aromaticus* Gilib. Exerc. phytol. (1792) 205. - *A. vulgans* Simonk. Enum. p. Transs. (1886) 514. - *A. triqueter* Turcz. ex Schott, Prodr. Aroid. (1860) 578. - Ic.: Rchb. Ic. Fl. Germ. X, 1, 429. - Exs.: HFR No. 2374.

Perennial; rhizome stout (to 3 cm in diameter), creeping, covered with long fiber roots; leaves narrowly linear, ensiform (1-2 or more cm broad in var. *vulgaris* L. and 5-8 mm in var. *angustatus* Bess.); stem 60-100 cm tall, grooved on one side and sharp-ribbed on the opposite side, the rib extending into the leaf-like spathe; spadix cylindrical, conical, attenuate at the summit, obtuse, divergent, 4-12 cm long, covered throughout with greenish-yellow perfect flowers; perianth segments hyaline, oblong, somewhat thickened and incurved at the summit. Flowering in the second half of May.

Shores of rivers, streams, stagnant waters, and marshes. - European part: Lad. - Il'm., Upp. Volg., Volg. - Kam., Upp. Dnepr., Mid. Dnepr., Volg. - Don., Prichern., Low. Don., Low. Volg.; Caucasus: Ciscauc., West., East., and South. Transcauc.; West. Siberia: Ob., Irt., Alt.; East. Siberia: all regions; Far East: Okhot., Ze. - Bur., Uss. Gen. distr.: Scand., Centr. Eur., Balk. - As. Min., Jap. - Chin., North Amer. Described from Europe. Type in London.

NOTE. The plant became established in Europe only at the middle of the XVI century. Live rootstocks were first introduced to Prague and 480 Vienna from Constantinople, then the plant found its way into other botanical

* From Greek acoron, name of a plant with a scented root.

gardens and gradually attained wide distribution. The seeds do not mature. In addition to natural distribution, it is spread by artificial propagation.

ECONOMIC IMPORTANCE. For medicinal purposes, an essential oil, called "flagroot oil" is extracted from dried rootstocks. This oil is also used in the manufacture of soap, toilet creams, etc., but it finds its principal application in the liqueur industry (export). Also employed in cooperage, for sealing fissures between staves of tubs, and for starch production. In the Caucasus the plants are generally used for tanning of hides. Not eaten by livestock.

SUBFAMILY CALLOIDEAE

Engl. in Engl. et Prantl Pflanzenf. II 3 (1887) 112.

Genus 237. *Lysichitum** Schott.

Schott in Oesterr. Bot. Wochenbl. (1857) 62.

Inflorescence bisexual: perianth tetramerous, the segments linear-oblong, arching. Stamens 4, the filaments slightly dilated, compressed, shorter than the pistil. Ovary elongate-ovaloid, the stigma sessile. Fruit a bilocular berry.

1. *L. camtschaticum* (L.) Schott in Oesterr. Bot. Wochenbl. (1857) 62; Krause in Engl. Pflzr. IV 23 B (1908) 148; Kom. Fl. Kamch. I, 272. - *Dracontium camtschaticum* L. Sp. pl. (1753) 968. - *Symplocarpus kamtschaticum* Salisb. in Mém. Acad. Petrop. 6 sér. II (1833) 169; Ldb. Fl. Ross. IV, 12. - Ic. : Schott Gen. Aroid. (1858) t. 91. - Local name in Kamchatka, "chkau" or "tskavuch".

Perennial; rootstock thick, subterranean, creeping; leaves all basal, forming a rosette, prostrate, rather thick, entire, glaucous on the upper surface, pale green beneath, elliptic to oval elliptic, rarely oval-elongate or elongate-lanceolate, subobtuse to subacute, with a thickened midrib; leaf blades 30-100 cm long and to 30 cm broad; the petiole broad, winged, 15-45 cm long; scape green, to 30 cm long, 1-2 cm thick; spathe elongate-lanceolate, white, 20-30 cm long, 4-10 cm broad, cucullate at apex, initially covering the entire inflorescence, later enclosing only the spadix base, at length gradually disintegrating and disappearing at fruiting time; spadix cylindrical, blunt to slightly attenuate; perianth segments 4-6 mm long, oblong; fruit a bilocular berry; seeds ellipsoid to ovaloid, 4-5 mm long. April-June. (Plate XXVI, Figure 1).

481 Marshes, boggy meadows, lowland swamps, and more rarely moss-covered places. - Far East: Kamch., Okhot., Ud., Sakh. Gen. distr. : Japan. Described from Kamchatka. Type in London.

ECONOMIC IMPORTANCE. In Sakhalin the leaves of *Lysichitum* are gathered and serve as feed for pigs.

* From Greek *lio* = flow, dissolve, and *khiton* = clothing, alluding to spathe deliquescent at maturity.

Genus 238. *Symplocarpus** Salisb.

Salisb. in Nuttall, Gen. of Am. pl. I (1818) 105.

Flowers bisexual; perianth tetradid, the segments gradually broadening toward apex, arching; stamens 4, the filaments slightly dilated (compressed), the anthers short; ovary elongate, unilocular, containing a single ovule; ovule suberect, short ovoid; seeds spherical, plump, without endosperm.

1. *S. foetidus* (L.) Salisb. in Nuttall, Gen. of Am. pl. (1818) 105; Krause in Engl. Pflzr. IV, 23 B (1908) 151. - *Dracontium foetidum* L. Sp. pl. (1753) 967. - Ic.: Krause l. c. 151, fig. 2. Hooker, Botan. Magaz. tab. 3224; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I, plates 100, 101.

Perennial; rootstock stout (2-7 cm thick), short; roots arising from the rootstock thick (2-5 mm in diam.) cordlike, alliaceous; leaves thick, the blades subcordate to cordate-oval, acute to rounded-obtuse, 20-40 cm long, 15-35 cm broad, the lateral veins of the first order thick, arcuate at apex, these of the second order slender, the petiole 10-40 cm long; spathe to 20 cm long and 1-1.2 cm thick; spathe blackish-purple, spotted and striped with purple on the outside, 10-16 cm long, 4-5 cm in diameter; spadix globose to broad-ellipsoid, purple, 2.5-3 cm in diameter, the stalk 0.5-0.1 [sic] cm long. April-June. (Plate XXVI, Figure 2).

Damp coniferous and mixed forests. - Far East: Uss., Ud., Sakh. Gen. distr.: Japan, North America. Described from North America. Type in London.

Genus 239. *Calla*** L.

L. Sp. pl. (1753) 968.

Flowers without a perianth, perfect, with 6 or more stamens; ovary short ovoid, unilocular, containing several ovules, the stigma sessile, dark; stamens with flattened filaments, the anthers with broadly elliptical locules, dehiscing lengthwise. Spathe ovate, nearly flat; spadix short-cylindric.

482 1. *C. palustris* L. L. Sp. pl. (1753) 968; Ldb. Fl. Ross. IV, 11; Shmal'g. Fl. II, 11; Krause in Engl. Pflzr. IV, 23 B (1908) 154; Kryl. Fl. Zap. Sib. III, 536. - Ic.: Bot. Mag. XLIII, t. 1831; Rchb. Ic. Fl. Germ. VII, t. 13; Schott, Gen. Aroid. (1858) t. 69; Bull. Soc. Nat. Moscou L III No. 4 (1877) t. 4, fig. 21-34; Syreish. Ill. Mosk. gub. I, 217. - Exs.: HFR No. 2536; Pl. Finl. exs. No. 552.

Perennial; rootstock stout, creeping, articulate, with numerous long fibrous roots at the joints; leaves long-petioled, the blade cordate to broad-cordate, acuminate, smooth, lustrous, 6-14 cm long, 5-11 cm broad, the petiole of fully grown leaves 8-24 cm long; scape terminal, about as long as the leaves; spathe flat, ovate, terminating in a narrow linear tip, green on the outer side, white on the inside, 4-7 cm long, 3-4.5 cm broad; spadix 1.5-3 cm long, rounded at apex, shorter than the spathe, short cylindric, greenish-yellow, firm at flowering, ovaloid at maturity; fruits bright red, baccate, 6-8 mm across, becoming slimy, containing 6-8 seeds. May-July.

Muddy shores of stagnant ponds, lakes, and rivers; meadow-bogs, more rarely mossy marshes. - European part: Kar. -Lap., Dv. -Pech., Lad. -Il'm.,

* From Greek symplekein to tie, and carpos fruit, alluding to coalescence of the berries.

** A plant name used by Pliny.

Upp. Volg., Volg. Kam., Upp. Dnepr., Mid. Dnepr., Volg.-Don., Zavolzh., Low. Don.; West Siberia: all regions; East. Siberia: all regions; Far East: Kamch., Ze.-Bur., Ud., Sakh. Gen. distr.: Scand., Centr. Eur., Jap., North Amer. Described from Europe. Type in London.

ECONOMIC IMPORTANCE. All parts of the plant are poisonous in fresh condition and contain a sharply caustic saponin-like substance, but become innocuous when dried or boiled. The rootstock contains a large quantity of starch; this, when dried and crushed, may be used as admixture in feeding products. Not eaten by livestock.

Genus 240. *Arum** L.

L. Sp. pl. (1753) 964.

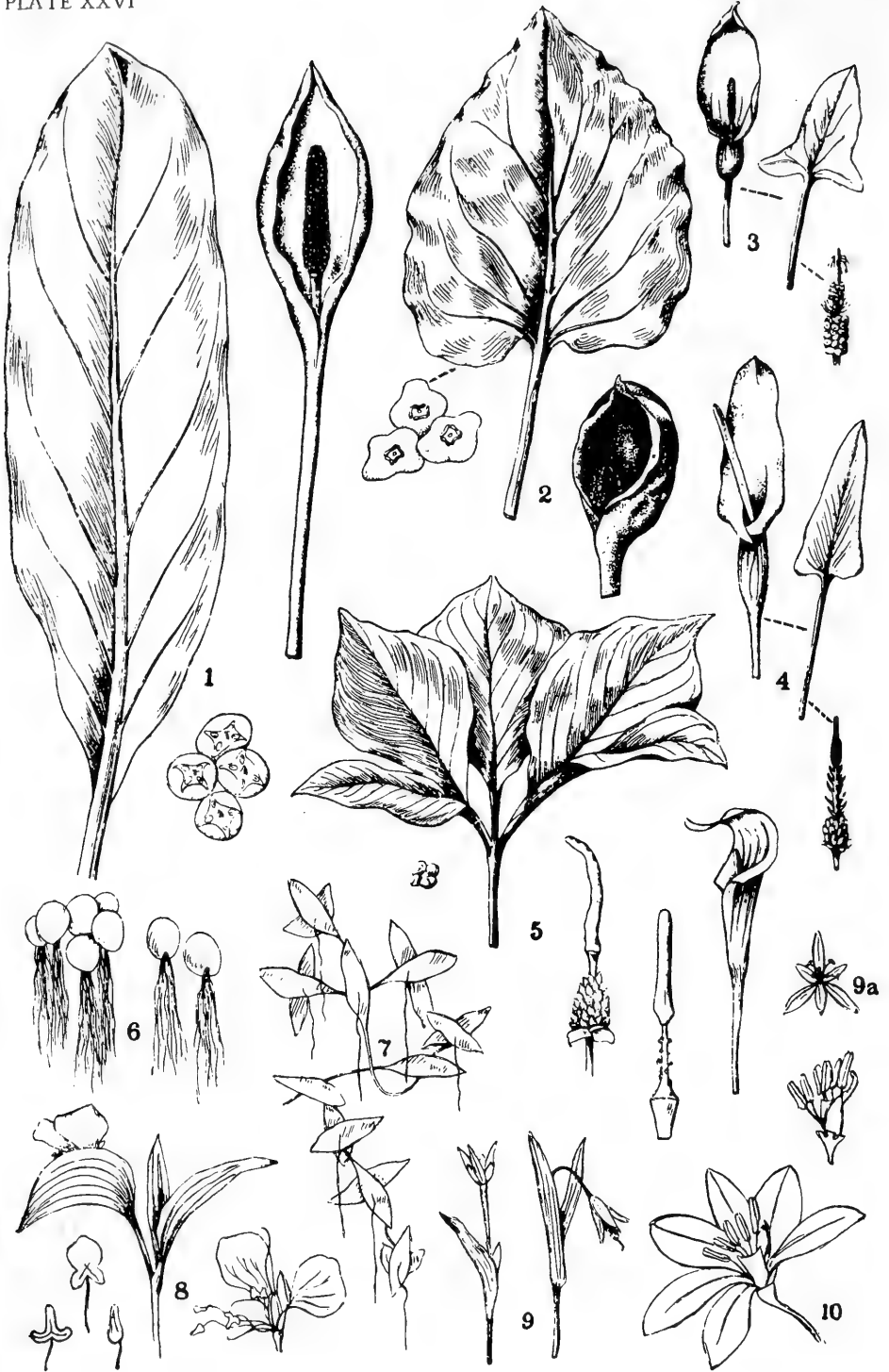
Flowers unisexual, devoid of perianth, covering the lower part of the spadix. Pistillate flowers, consisting of unilocular pistils, inserted on the lower part of spadix, surmounted by abortive flowers reduced to filiform appendages, dilated at base, upright; above them 3-4-androus staminate flowers, in clusters; staminate flowers surmounted by completely reduced flowers directed downwards; summit of spadix more or less elongated, clavate. Spathe large, tubular at base, investing the lower part of the spadix with the pistillate and staminate flowers, somewhat contracted above the staminate portion of the spadix; the upper portion of spadix exerted from the spathe. Perennial plants, with a globular or ovoid tuber and numerous, spirally arranged sheathing leaves and 2-3 petioled leaves; petiole vaginately enlarged at base; leaf blade sagittate or hastate; leafless.

- 1. Tuber ovoid or oblong; stem and leaves arising from a raised portion of the tuber 2.
- + Tuber flattened, rounded; stem and leaves arising from a cavity in the tuber 3.
- 2. Leaves appearing in spring; spadix mostly as long as the leaves; scape of spadix purple, borne on a slender pale yellow stalk 5. *A. maculatum* L.
- + Leaves appearing in fall; spadix half as long as the leaves; scape of spadix yellow 4. *A. albispatum* Stev.
- 3. Spathe ovate to elliptical, more or less dilated 1. *A. orientale* M. B.
- + Spathe lanceolate, elongated, acuminate 4.
- 4. Leaf blade elongate, hastate, the central leaflet subobtusely, oblong *A. elongatum* Stev.
- + Leaf blade cordate-hastate to triangular, larger 3. *A. Korolkowii* Rgl.

1. *A. orientale* M. B. (s. str.) Fl. taur.-cauc. II (1808) 407; Ldb. Fl. Ross. IV, 9, pro parte; Vul'f, Fl. Kryma I, 2, 49; Hraby in Bull. Soc. Bot. de Genève, sér. II, IV (1912) 147. -*A. orientale* var. *typicum* Zelenetsky, Prodr. Fl. taur. (1906) 324; -*A. orientale* ssp. *euorientale* var. *typicum* Engl. Pflzr. IV, 23 F (1920) 78. -Ic.: Hraby l. c. fig. 3.

486 Perennial; tuber globular-flattened; leaf blade broadly hastate-cordate, about half as long to as long as the petiole, 7-7.5 cm in length, the lateral leaflets 2.4-4.4 cm, the blade often broader than long; spadix longer than the leaf petiole; spathe ovate to elliptical, more or less dilated (to 10 cm

* From the Greek word aron, which appears as the name of one species of the genus *Arum* in Theophrastus.



long), dark brownish-purple, greenish-white at base; summit of spadix cylindrical (to 2 cm long), dark reddish-purple, shorter than to equaling its slender stalk. April-May. (Plate XXVI, Figure 3).

Shady forests. -European part: Mid. Dnepr., Prichern., Crimea; Caucasus: Csicauc., West. and East. Transcauc. Gen. distr.: Centr. Eur., Balk. -As. Min., Iran. Described from Crimea. Type in Leningrad.

2. *A. elongatum* Stev. in Bull. Soc. Nat. Moscou XXX (1857) 67; Schott, Prodr. Aroid. (1860) 100; Hruby in Bull. Soc. bot. de Genève IV (1912) 140. -*A. orientale* var. *elongatum* Boiss. Fl. Or. V (1884) 39; Shmal'g. Fl. II, 524. -*A. orientale* M. B. Fl. taur. -cauc. II (1808) 407 ex parte; Ldb. Fl. Ross. IV, 9 part. -*A. orientale a caucasicum* Asch. et Graebn. Synops. II, 2 (1902-1904) 374. -*A. orientale* ssp. *elongatum* var. *Stevenii* Engl. Pflzr. IV, 23 F (1920) 79. -*A. Nordmanni* Schott, Prodr. Aroid. (1860) 88. -Ic.: Hruby l. c., 141. -Exs.: Engl. Araceae No. 176.

Perennial; tuber globular-flattened; leaf blade elongate-hastate, the central leaflet subobtusely, oblong (10-20 cm long), the lateral lobes one-third to one-half as long (5-9 cm long), divergent or reflexed; spadix longer than the leaf petiole; spathe lanceolate, elongate, acute-tipped (to 26 cm long), green or purple on the outside; summit of spadix dark reddish-purple to purple, to 10 cm long, 2-3 times as long as its short stout stalk; staminate flowers surmounted by neuter flowers. April-May.

Among bushy undergrowth in forests and between rocks. -European part: Prichern., Crimea; Caucasus: Ciscauc., West. and East. Transcauc., Tal. Gen. distr.: Balk. -As. Min., Arm., Kurd., Iran. (N. Persia). Described from vicinity of Simferopol'. Type in Leningrad.

NOTE. A plant with a strong unpleasant odor.

3. *A. Korolkowii* Rgl. in A. H. P. II (1877) 407; O. Fedtschenko in Allg. Bot. Zeitsch. (1906) 198; Engl. Pflzr. IV, 23 F (1920) 93. -*A. orientale* Rgl. in A. H. P. VI, 489 et VIII, 681, non M. B. -*A. elongatum* Fedchenko Rast. Turk. (1915) 205, non Stev. -*Biarum Sewerzowii* Rgl. in A. H. P. VI (1880) 489 et VIII (1884) 682.

Perennial; tuber flattened-globular; leaf petiole enlarged in its lower one-third, somewhat longer than to twice as long as blade; latter cordate-hastate to triangular, obtuse to acute; scape longer than the leaf petiole (or as long), 50-60 cm long; spathe green, narrowly inrolled-tubular, nearly twice as long as the spadix, the hood elongate-lanceolate, acuminate, whitish on the inside; summit of spadix cylindrical, reddish, $1\frac{1}{2}$ -2 times as long as the fertile portion of the spadix; sterile flowers flattened at base, 3-ranked; fruits red. April-May.

Mountains, shady situations, rock crevices, and in the shade of trees. -Centr. Asia: Kara-Kum, Mount. Turkm., Amu-Dar., Pam. -Al., Tyan'-Shan. Gen. distr.: Iran (n.), Dzung. -Kashg. Described from specimens grown in

Explanation to Plate XXVI

1. *Lysichitum camtschatcense* (L.) Schott: leaf and spadix with spathe. -2. *Symplocarpus foetidus* (L.) Salisb.: leaf and spadix with spathe. -3. *Arum orientale* MB.: leaf and spadix with spathe; lower part of scape and flowers. -4. *Eminium Lehmannii* (Bge) O. Ktze.: spadix with spathe and leaf; lower part of spadix. -5. *Arisaema amurense* Maxim.: spadix with spathe and leaf; spadix (with spathe removed), with flowers and fruits. -6. *Spirodela polyrrhiza* (L.) Schleid.: enlarged 2 1/2 times. -7. *Lemna trisulca* L.: enlarged 2 1/2 times. -8. *Commelina communis* L.: habit; flower enlarged 2 1/2 times; stamens. -9. *Aneilema Keisak* Hassk.: flowers enlarged 2 1/2 times. -10. *Monochoria Korsakowii* Rgl.

the botanical garden from tubers supplied from Central Asia by Korol'kov. Type in Leningrad.

NOTE. Contains alkaloids.

4. *A. albispatum* Stev. in Bull. Soc. Nat. Moscou XXX (1857) 66; Ldb. Fl. Ross. IV, 9; Hruby in Bull. Soc. Bot. de Genève IV (1912) 150; Grossg. Fl. Kavk. I, 179; Vul'f, Fl. Kryma, I, 2, 49. - *A. italicum* Fom. and Voron. Opred. rast. Kavk. i Kryma I, 203, non Mill.

Perennial; tuber ovoid to elongate; leaves very large, to 70 cm long, the blade to 23 cm long, with short obtusish lateral leaflets, the petioles very long (twice as long as the blades), forming a short broad sheath at base; scape half as long as the leaf petiole; spathe with an ovate to oblong acuminate limb, very large, white, greenish on the back; spadix half as long as the spathe; summit of spadix cylindrical, yellow, shorter than the stalk. April-May.

Shady forests of the lower mountain zone. - European part: Crimea; Cauc. West. Transcauc., Tal. Gen. distr.: Asia Minor. Described from Crimea. Type in Leningrad.

5. *A. maculatum* L. Sp. pl. (1753) 966; Miller, Gard. dict. ed. VIII (1768); Ldb. Fl. Ross. IV, 9; Hruby in Bull. Soc. Bot. de Genève IV (1912) 124-128; Shmal'g. Fl. II, 524. - *A. maculatum* var. *vulgare* Engl. Pflzr. IV, 23 F (1920) 87. - *A. Besserianum* Schott in Oesterr. bot. Zeitschr. VIII (1858) 349. - Ic.: Rchb. Ic. Fl. Germ. VII, t. 8; Engl. Pflanzenfam. III, 2 (1889) fig. 94 A-C; Hruby l. c. 139, fig. I, 160, fig. 6; Engl. Pflzr. IV, 23 F (1920) 87 fig. 13 A-E; 100 fig. 14 A-C. - Exs.: HFR No. 2537.

Perennial; tuber ovaloid to cylindrical; leaf petiole twice as long as the blade, the blade hastate to sagittate-hastate, the elongate central leaflet twice as long as the ones divergent to reflexed lateral leaflets; scape as long as the leaf petiole, or slightly shorter to slightly longer; spathe with its long tube one-third the length of the hood; limb of spathe oval-lanceolate, greenish on the inside, dingy to bright purple and dark-spotted on the mar-
488 gins; spadix half as long as the spathe; pistillate portion of spadix 3-4 times as long as the staminate portion; neuter flowers above and below the staminate portion numerous; summit of spadix purple or yellow, thickened, but both the summit and its stalk long; fruits bright red. April-May.

Shady forests and damp places in coppices. - European part: Mid. Dnepr.; Caucasus: Ciscauc., West. Transcauc. (Dzhugba). Gen. distr.: Scand. (S. Sweden), Centr. and Atl. Eur., West. Medit., Balk. Described from Europe. Type in London.

NOTE. Poisonous in fresh state, but loses its poisonous properties upon drying. In Dalmatia, flour made from the dried tubers is mixed with wheat flour. In England and Belgium, the leaves are used in the washing of linen. The tubers contain up to 25 per cent of starch and are edible when baked.

Genus 241. *Eminium** (Blume) Schott.

Schott, Synops. Aroid. (1856) 16. - Arum sect. 2. *Eminium* Blume in Rumphia (1835) 121.

Perennial; flowers unisexual, devoid of perianth; pistillate flowers with unilocular ovary, 2 ovules, and a sessile stigma inserted on the lower

* An old plant name used by Dodoneus.

part of the inflorescence; rudimentary subulate flowers placed above the pistillate and surmounted by staminate flowers, these containing 2 stamens with subsessile anthers; spadix terminating in a clavate or short-cylindric summit; spathe with long tube and elongate or ovoid limb. Scape leafless. A tuberous plant.

1. Leaves entire 1. *E. Lehmannii* (Bge) O. Ktze.
+ Leaves lobed 2. *E. Alberti* (Rgl.) Engl.

1. *E. Lehmannii* (Bge) O. Ktze. Rev. gen. (1891) 741. - *Biarum Lehmannii* Bge in Mém. Ac. Pétersb. Sav. Etrang. (1851) 327. - *Helicophyllum Lehmannii* Rgl. in A. H. P. VII (1880) 549; VIII (1884) 682. - *Typhonium crassifolium* Ldb. Fl. Ross. IV (1853) 10. - *Helicophyllum crassifolium* Engl. in D. C. Mon. Phan. II (1879) 597. - *Eminium Ledebourii* Schott, Synops. Aroid. (1856) 17, tab. 22; Rgl. in A. H. P. VI (1879) 489. - Ic.: Rgl. Gartenflora (1881) 291, tab. 1756 (f. foliis lanceolatis, basi non sagittatis); Opred. rast. okr. Tashkenta, I, Plate 96. - Exs.: HFR No. 1893.

Perennial; tuber flattened-globular, ca. 2 cm in diameter; leaves all basal, long-petioled, the petioles vaginately enlarged in lower part, the blade entire, very variable in shape, narrowly lanceolate, lanceolate, oblong long, or triangular lanceolate, mostly terminating in a sharp point, more rarely obtusish, the base of blade truncate, obtuse, subcordate, or subsagittate; scape 15-30 (50) cm long, about equaling the leaves, covered at base with bladeless membranaceous sheaths as well as blade-bearing sheaths, embedded deep in the ground; tube of spathe oblong-cylindrical, ca. 4 cm long, bearing an oblong elliptical limb; limb of spathe velutinous blackish-purple on the inside, 10-11 cm long, ca. 4 cm broad; spadix shorter than the spathe; pistillate and staminate portions of the spadix each ca. 4 cm long, the summit cylindrical, dark purple, 7-10 cm long, 2-3 mm thick; fruits white. End of March, April-May. (Plate XXVI, Figure 4).

Sandy deserts, loess and gravel-covered slopes. - Centr. Asia: Kyz.-Kum, Kara-Kum, Amu-Dar., Syr-Dar., Pam.-Al., Tyan'-Shan Gen. distr.: Afghanistan. Described from Karachata and Batkakum (Kara-Kum Distr.). Type in Leningrad.

NOTE. Contains poisonous alkaloids. The plant has an unpleasant odor.

2. *E. Alberti* (Rgl.) Engl. Pflzr. IV, 23 F (1920) 131. - *Helicophyllum Alberti* Rgl. in A. H. P. VIII (1884) 683. - Ic.: Rgl. l. c. tab. IX; Bot. Mag. CXIII (1887) t. 6969; Fedch. Rast. Turk. (1915) 206.

Perennial; tuber flattened-globular, ca. 2.5 cm in diameter; leaves all basal, long-petioled, the petiole 15-20 cm long, vaginately enlarged in lower part, several times as long as the blade, pale green or slightly purplish; leaf blade trilobed, the central lobe sagittate at base, larger than the lateral lobes, lanceolate, linear-lanceolate, or oblong, entire, gradually attenuate toward the apex, 6-11 (14) cm long; lateral lobes shorter than to nearly as long as the central lobe, disposed in different planes than the central lobe; scape 10-15 cm long, more or less thickened in upper part, corrugated, deeply embedded in the ground, covered at base with bladeless membranaceous sheaths as well as blade-bearing sheaths; spathe 14-20 (26) cm long, the tube cylindrical, somewhat inflated at base, 4-5 (7) cm long and ca. 2.5 cm broad, the limb twice as long as the tube, ovate-elongate or (rarely) ovate,

to 10 cm broad, velutinous blackish-purple on the inside; spadix about two-thirds the length of the spathe, the pistillate portion 10-15 mm long, the infertile portion 20-30 mm long, the staminate portion slightly shorter than the pistillate; summit cylindrical, to 7 cm long (twice as long as the lower part of spadix). April-May.

Argillaceous slopes. -Centr. Asia: Kara-Kum, Mount. Turkm. Endemic. Described from Bukhara. Type in Leningrad.

NOTE. Recently Vvedenskii identified *E. Regelii* Vved. from Karatau (Pavl. and Lipsh. Sov. Bot. No. 1 (1934) 20. His description has not been published, and the material in the herbarium of the Botanical Institute of the Academy of Sciences is insufficient.

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Genus 242. *Arisaema** Mart.

Mart. in Flora XIV (1831) 458-459.

Flowers unisexual, monoecious or often dioecious. Staminate flowers of 2-5 stamens, sessile or pediceled. Pistillate flowers each of a 1-locular ovary. Seeds spherical-ovoid. Plants with tubers or, more rarely, horizontal rhizomes, and 1-2, rarely 3, leaves.

1. Leaves divided into 3-5 leaflets, these oboval to oval-lanceolate 1. *A. amurense* Maxim.
2. Leaves divided into 5-11 leaflets, these narrow, oblong to elongate-lanceolate 2. *A. japonicum* Blume.

1. *A. amurense* Maxim. Prim. Fl. Amur. (1959) 264; Kom. Fl. Manch. I, 414; Engl. Pflzr. IV, 23 F (1920) 203 et Arac. excis. et illustr. (1884) No. 52; Kom. and Alis. Oprod. rast. Dal'nevost. Kr. I, Plate 103.

Perennial; tuber spherical; leaf petiole 30-35 cm long, the blade divided into 5 leaflets (3 in young specimens), the central leaflet borne on a petiole of varying length (0.5-3 cm), the leaflets obovate to lance-obovate, or the lateral ones elongate-lanceolate, entire (var. *denticulatum* Makino with irregularly serrate-dentate leaves), cuneate-based, cuspidate, ca. 10 cm long and 4-7 cm broad (in var. *robustum* Engl. larger, the petiole to 55 cm long, leaflets to 20 cm long and 10 cm broad); scape short, not exceeding 20 cm; tube of spathe infundibular, pale green, ca. 5 cm long; hood erect at base, arching above, terminating in an upturned tip, lance-ovate, green, or scarlet-striped between the green veins, 5-6 cm long, 3 cm broad; staminate portion of spadix to 2 cm long, thickened at the summit, with distant flowers, the summit slender-staked, the base truncate-cylindrical, blunt, ca. 3.5 cm long, 4 mm broad, end of April, May, beginning of June (Plate XXV, Figure 5).

Virgin forests, mountains and river banks. -Far East: Uss., Ud. (lower reaches of Amur). Gen. distr.: Jap. -Chin. Described from the lower reaches of the Amur. Type in Leningrad.

NOTE. In Engler Araceae exsic. b, c, the hood is represented as being erect, such as it appears in herbarium specimens, but in living plants it is arched over the spadix and upturned at the summit.

ECONOMIC IMPORTANCE. All parts of the plants, and especially the rootstock, are considered to be poisonous.

* From Greek *aris*, a plant name, and *haima*, blood (related by blood).

2. *A. japonicum* Blume in Rumphia I (1835) 106; Kom. Fl. Manch. I, 415. - *Arum serratum* Thunb. in Trans. Linn. Soc. II (1794) 338. - *A. serratum* var. *Blumei* Makino in Tokyo Botan. Mag. XV (1901) 129; Engl. Pflzr. IV, 23 F (1920) 206; Kom. and Alis. Opred. rast. Dal'nevost. Kr. (1931) 339. - Ic.: Engl. l. c. fig. 48 A-C; Kom. and Alis. l. c., Plate 101, 102, 103.

Perennial; leaf petiole 20-40 cm long, long-sheathing; leaflets 5-11, oblong, lance-oblong, or lanceolate, entire, the central leaflet 6-16 (25) cm long, 2-6 cm broad; scape 30-50 cm long; tube of spathe green, infundibular, 3-4.5 cm long, the hood elongate, arching, 5-8 cm long, 2-3.5 cm broad, greenish, pale; staminate spadix conical, with distant flowers, ca. 2 cm long and ca. 4-5 mm thick at base; summit borne on a slender stalk 6-7 mm thick, 4-5 cm long; staminate flowers short-pedicelated, of 3-4 stamens; pistil ovoid, with spherical stigma; fruit ovoid. May to beginning of June.

Shady forests. - Far East: Uss. (s. part). Only in the Pos'etskii District. Gen. distr.: Jap. - Chin. Described from Japan.

FAMILY XXVIII. LEMNACEAE* DUMORT.

Flowers unisexual, monoecious, inserted in a lateral basal pouch. Pistillate flower consisting of a bottle-shaped pistil with a short style and simple stigma; ovary 1-locular, containing 1-6 ovules; staminate flower of a single stamen with filament. A solitary pistillate flower and 1 or 2 staminate flowers usually enclosed together by a common membranaceous sheathing spathe. Fruit non-dehiscent, 1-6-seeded. Minute water plants, floating or submerged. Stem reduced to a small orbicular or oblong, green frond, flat or rarely strongly convex on the underside. Leaves mostly lacking or represented by minute hyaline scales at the base of the frond. Rootlets filiform, wanting in some species. Flowering scarce; reproduction mostly vegetative, the fronds proliferating by formation of minute new fronds in marginal clefts at the base of the maternal frond and their gradual emergence from the cleft. Young plants remain united with the parent-plant or eventually become separated from it.

ECONOMIC IMPORTANCE. Lemna and Spirodela contain a small amount of cellulose and very large amount of protein, and hence constitute a highly valuable food material. Very readily eaten in dry state by all kinds of animals, especially by pigs and poultry. In fresh condition eaten only by pigs and poultry.

1. Plants without rootlets, with a single reproductive pouch at base . . .
 3. Wolffia Horkel et Schleid.
 492 + Plants with small rootlets and 2 reproductive pouches, these turned toward the base and giving rise to proliferations 2.
 2. Rootlets in clusters 1. Spirodela Schleid.
 + Rootlets solitary 2. Lemna L.

*Arranged by O. I. Kyzeneva.

Genus 243. *Spirodella** Schleid

Schleid. in *Linnaea* XIII (1839) 391.

Inflorescence inserted in a marginal cleft, consisting of 2 staminate and 1 pistillate flower; fruit 1-seeded; 2 very minute hyaline leaflets at base of the thallus; 2 lateral nerves in addition to central nerve; rootlets several, clustered.

1. *S. polyrrhiza* (L.) Schleid. in *Linnaea* XIII (1839) 392; Ldb. Fl. Ross. IV, 18; Kryl. Fl. Zap. Sib. III, 541. -*Lemna polyrrhiza* L. Sp. pl. (1753) 970; Shmal'g. Fl. II, 527. -Ic.: Hegelmaier, Die Lemnaceen (1868) tab. XIII, fig. 10-16, XIV, XV. -Exs.: Pl. Finl. exs. No. 144, 554.

Perennial; fronds floating on the water surface, orbicular to subovate, entire, thickish, flat, 3-6 mm long and to 5 mm broad, green on the upper surface, reddish to reddish-purple beneath, rootlets in a cluster of 3-5; proliferation usually on one side only, the lateral offshoots soon separating from the mother-plant; overwintering brownish-red lenticular buds produced in fall and sinking to the bottom. May-June. (Plate XXVI, Figure 6).

Standing and slow-moving water. -European part: all regions except Crimea; Caucasus: Ciscauc., West. Transcauc., Tal.; West. and East. Siberia; Far East: Kamch., Ud., Uss., Sakh.; Centr. Asia: Pribalkh. Gen. distr.: West. Europe except Scand., Japan, Manchuria, North America. Described from Europe. Type in London.

Genus 244. *Lemna*** L.

Sp. pl. (1753) 970.

Inflorescence in a lateral cleft, of 2 staminate flowers and 1 pistillate; ovary with 1-6 ovules; anthers 2-loculed; base of thallus without hyaline leaflets; rootlet solitary; central nerve faint, lateral nerves sometimes 1-2.

1. Fronds flat on the upper side, convex below; fruit 2-7-seeded 3. *L. gibba* L.
 + Fronds flat on both sides; fruit 1-seeded
 2. Fronds submerged in the water, rising to the surface only at flowering time, slender, green, semitransparent, oblong to sub lanceolate
 493 1. *L. trisulca* L.
 + Fronds floating on the water surface, elliptical, obovate, or ovate, thickish, non-transparent 2. *L. minor* L.

1. *L. trisulca* L. Sp. pl. (1753) 970; Ldb. Fl. Ross. IV, 17; Shmal'g. Fl. II, 526; Kryl. Fl. Zap. Sib. III, 543. -Ic.: Hegelmaier, Die Lemnaceen (1868) tab. V, VI, fig. 1-18. -Exs.: HFR No. 1681; Pl. Minusinenses exs. No. 916; Pl. Finl. exs. No. 142.

Perennial; fronds 5-10 mm long, and 2-3 mm broad, 1-nerved on either side, attenuate and sometimes irregularly denticulate at the summit; fully grown fronds attenuate at base into a stalk to 10 m long extending from the

* From Greek *speira*, a fold, and *delos*, evident.

** From Greek *lemna*, name of a water plant used by the Greeks possibly derived from the Greek *limne*, bog, lake.

mother plant; offshoots connected with each other for a long time and forming rather large aggregations.

Frequently occurring in quiet waters of the forest and steppe zone. - European part: all regions; Caucasus: all regions; West. and East. Siberia: all regions; Far East; Kamch., Ze. -Bur., Uss., Sakh.; Centr. Asia: Pribalkh., Tyan'-Shan. Gen. distr.: Western Europe except arct. Scand., Arm.-Kurd., Iran (Persia), Jap. -Chin., N. Amer. Described from Europe. Type in London.

2. *L. minor* L. Sp. pl. (1753) 970; Ldb. Fl. Ross. IV, 16; Shmal'g. Fl. II, 526; Kryl. Fl. Zap. Sib. III, 540. -Ic.: Hegelmaier, Die Lemnaceen (1868) tab. IX, X. -Exs.: HFR No. 1386; Fl. pol. exs. No. 789; Pl. Finl. exs. No. 143.

Perennial; fronds elliptical to obovate, 2-4.5 mm long, 2-3 mm broad, entire, subconvex on upper side or subcuneate and prolonged into a humped point, green, flat on the underside, yellowish-green or whitish-green, usually forming groups of 3-6 offshoots; proliferation usually occurring on one side of the thallus. Flowering from May to fall.

Quiet waters of the forest and steppe zone, more widespread than other species. -European part: all regions; Caucasus; West. and East. Siberia; Far East: Kamch., Ze. -Bur., Ud., Uss., Sakh.; Centr. Asia: Aral. -Casp., Pribalkh., Kyz. -Kum., Pam. -Al., Tyan'-Shan. Gen. distr.: all Europe except Arct., Mong. (n.), Jap. -Chin., N. Amer. Described from Europe. Type in London.

3. *L. gibba* L. Sp. pl. (1753) 970; Shmal'g. Fl. II, 526. -Telmatophace *gibba* Schleid. in Linnaea XIII (1839) 391; Ldb. Fl. Ross. IV, 17. -Ic.: Hegelmaier, Die Lemnaceen (1868) t. XI, XII, XIII, fig. 1-9; Rchb. Ic. Fl. Germ. VII, tab. 14. -Exs.: Pl. Finl. exs. No. 553.

Perennial; fronds rounded-ovate to obovate, to 7 mm long, subcuneate above, with or without an obscure point at the apex, with numerous air spaces; the frontal side of offshoots with 2 lateral nerves on each side.

494 Quiet waters; scarce. -European part: Lad. -Il'm., Upp. Dnepr., Mid. -Dnepr., Volg. -Don., Prichern., Low. Volg.; Caucasus: all regions. Gen. distr.: West. Eur. to 60°, Arm. -Kurd., Iran, N. Amer. Described from Europe. Type in London.

Genus 245. *Wolffia** Horkel et Schleid

Horkel et Schleid. in Linnaea (1839) 389.

Flowers from a cleft on the upper side of the frond; inflorescence destitute of spathe, of 1 staminate and 1 pistillate flower. Ovary with 1 ovule. Fronds devoid of leaflets, proliferous from a single cleft at base.

1. *W. arrhiza* (L.) Wimmer, Fl. Schles. (1857) 140. -*Lemna arrhiza* L. Mant. (1767) 194; Shmal'g. Fl. II, 526. -Ic.: Hegelmaier, Die Lemnaceen tab. II, fig. 6-17; tab. III, fig. 1-12. -Exs.: HFR No. 135.

Perennial; fronds floating, very small, 1-1.5 mm long, orbicularoval, flattish, light green, with many large stomata on the upper side, strongly convex, whitish-green beneath, solitary or in pairs.

Quiet water; scarce. -European part: Upp. Dnepr.; Caucasus: Tal. Gen. distr.: Centr. and Alt. Eur., Medit., India. Described from Europe. Type in London.

* Named for the physician J. Wolff of Schweinfurt (1778) 1806.

ORDER 7. FARINOSAE

Flowers bisexual or unisexual; perianth of 2 series, sometimes differentiated into 2- or 3-merous calyx and corolla; stamens 6-4 or 2. Ovary superior, 2- or 3-loculed, 1-3-carpelled, the placentae orthotropous. Fruit a capsule. Endosperm mealy. Herbaceous cheraophilous or limnodophilous plants.

FAMILY XXIX. ERIOCAULACEAE* RICH.

Flowers unisexual, aggregated in capitate inflorescences. Perianth in 2 series, the inner series sometimes lacking. Stamens 4 or 6. Pistil 1, with style and 2- or 3-fid stigma. Fruit a 2-3-celled capsule.

Genus 246. *Eriocaulon*** L.

L. Gen. pl. ed. 2 (1742) 35.

495 Inflorescence capitate, containing staminate and pistillate flowers, subtended by an involucre formed by subcoriaceous, probably orbicular to narrowly lanceolate bracts. Involucre regular, exceeding or shorter than the inflorescence. Perianth usually of 2 series, both series 2-3 merous; outer perianth segments of staminate flowers free or united at base into a cupular structure; inner perianth segments united into a tube, each segment bearing a black gland at the apex. Stamens 4 or 6; staminate flowers bearing a minute black vestigial gynoeceum [pistillodium]. Segments of the outer perianth series of pistillate flowers free or united into an involucre; segments of the inner series always free, terminating in a black gland, or segments wanting. Ovary 2- or 3-loculed, stigmas 2 or 3. Seeds tawny, naked, with a striped surface. Annuals, with whitish fibrous, often jointed roots; leaves linear, usually shorter than the peduncle.

1. Heads spherical; involucre bracts much shorter than the head; anthers whitish 1. *E. Sieboldianum* Sieb. et Zucc.
- + Heads hemispherical or cup-shaped; involucre bracts much longer than, as long as, or shorter than the head; anthers black 2.
2. Involucre bracts oblong to lanceolate, much longer than the flowers; leaves linear, many times exceeded in length by the scape; both outer and inner perianth series 2-merous; stamens 1-4 (often irregular); heads narrow, cup-shaped 2. *E. decemflorum* Maxim.
- + Involucre bracts oval or orbicular, obtuse, shorter than or as long as the head; both outer and inner perianth series 3-merous; stamens 6; heads hemispherical 3.
3. Outer perianth segments in staminate and pistillate flowers free, in staminate flowers only slightly coherent at base 3. *E. ussuriense* Koern.
- + Outer perianth segments in staminate and pistillate flowers united into a cupular involucre 4.
4. Heads many-flowered (30-80 flowers); scapes exceeding 0.3 mm in thickness; leaves to 7 mm broad; involucre one-fourth to half the length of fruiting head 4. *E. robustius* Makino.

* Arranged by E. I. Shteinberg.
 ** From Greek erios, down, and caulon, a stalk.

+ Heads of up to 10 flowers; scapes filiform (less than 0.3 mm thick); leaves few and at most 2 mm broad; involucre equaling or just shorter than the head 5. *E. chinorossicum* Kom.

1. *E. Sieboldianum* Sieb. et Zucc. ex Steud. Syn. pl. Cyp. II (1855) 272; Hook, Fl. Brit. India VI, 577; Ruhland in Engl. Pflzr. IV, 30 (1903) 111.

E. sexangulare Mart. in Wall. Pl. as. rar. III (1832) 28, non L. - *E. heteranthum* Benth. Fl. Hongkong. (1861) 382; Maxim. Diagn. pl. as. VIII (1893) 12; Kom. Fl. Manchzh. I, 418. - *E. bucharicum* Bornm.*? nomen nudum in Fedch. Rastit. Turk. (1915) 811. - Ic.: Ruhland l. c. 112, fig. 15 a-g.

496 Annual; leaves basal, narrowly linear, subulate-tipped, glabrous, pellucid, few-nerved, to 6 cm long, ca. 1-2 mm broad; peduncles 5-angled, aggregated in a rosette, 2-3 times the length of leaves, attaining up to 10 cm; sheaths obliquely truncate, glabrous, shorter than the scapes, to 1.5 long; heads ovaloid-spherical, grayish, to 4 mm broad; involucre bracts oblong to lance-oblong, glabrous, obtuse, much shorter than the head, chaff pointed, embracing the flowers; in staminate flowers the outer perianth segments united into a closed wing, irregularly 3-dentate at apex, glabrous, the tube of inner perianth series with 3 unequal teeth terminating in a black gland; stamens 6, with globose whitish anthers; in pistillate flower outer perianth segments 2, narrowly linear, acuminate, somewhat unequal, the inner perianth series wanting; ovary 3-loculed; style long, with 3 filiform stigmas. June-October. (Plate XXVII, Figure 3, a-d).

Ricefields and truck farms, as a weed. - Centr. Asia: Pam. - Al. Gen. distr.: Africa, Ind. - Him., Jap. - Chin., Australia. Described from Japan. Type in Berlin.

2. *E. decemflorum* Maxim. Diagn. plant. nov. as. VIII (1893) 7; Ruhland l. c., 37; Kom. Fl. Manchzh. I, 418; Kom. and Alis. Opređ. rast. Dal'nevost. Kr. I, 340.

Annual. Leaves basal, linear, acuminate, flat, 3-5-veined, to 4 cm long, 1-1.5 mm broad; scapes to 25 cm tall, 4-angled, few (3-6), with weakly developed sheaths; heads cup-shaped, 5-6 mm broad, few-flowered (ca. 10); involucre bracts lance-ovate, acuminate, glabrous, 3-4 mm long, 1-1.5 mm broad, twice as long as the flowers; chaff whitish, lance-linear, 1-nerved, as long as the flowers, with whitish (when dry) trichomes at the summit; in staminate flowers the inner perianth segments 2, connate below, lance-linear, slender, the inner segments united into a 2-fid tube, the lobes terminating in a black gland; stamens 1-4, often irregular; in pistillate flowers the outer perianth segments 2, free, narrowly spatulate-linear, glabrous, inner segments 2, terminating in a black gland; inner perianth segments of both pistillate and staminate flowers bearded with whitish (in dry state) trichomes on the outer side at the summit; ovary 2-loculed, stigmas 2, sometimes 4. July-August. (Plate XXVII, Figure 1, a-d).

Wet meadows and flood valleys. - Far East: Uss., Ze. - Bur. Gen. distr.: Japan. Described from Japan (Nippon). Type in Leningrad.

3. *E. ussuriense* Koern. ex Rgl. Tent. Fl. Ussur. (1861) 157; Maxim. Diagn. plant. nov. as. VIII (1893) 16; Kom. Fl. Manch. I, 419; Kom. and Alis. Opređ. rast. Dal'nevost. Kr. I, 340; Ruhland, l. c. 100.

* All specimens named by Bornmüller *E. bucharicum*, which are to be found in the herbarium of the Botanical Institute of the U. S. S. R. Academy of Sciences, were collected in juvenile condition, and this makes it extremely difficult to arrive at a clear picture concerning this species.

497 Annual; leaves basal, ensiform-lanceolate, obtuse, ca. 10 cm long, 4 mm broad, thin, glabrous; scapes 4-5-ribbed, to 12 cm tall; sheaths loosely adhering, obliquely truncate, to 5 cm long; heads hemispherical; involucre bracts few, rounded-oblong to ovate, glabrous, yellowish, about as long as the head; chaff cuneate-ovate, pointed, covered with few hairs; receptacle naked; staminate flowers: outer perianth segments 3, free, united only at base, oblong, obtuse to subacuminate, glabrous, incurved; inner segments 3, forming a tube with 3 equal teeth bearing black glands; stamens 6, the anthers black; pistillate flowers: outer perianth segments 3, free, oblong, incurved; inner segments 3, thickish, whitish, dentate, with long trichomes on the inner side and a gland at the summit; ovary 3-loculed, the stigma 3-lobed. August. (Plate XXVII, Figure 5, a, b).

Silty, alluvial shores of rivers and lakes. - Far East: Uss. Endemic. Described from the shores of Lake Khanka. Type in Leningrad.

4. *E. robustius* (Maxim.) Makino in Nippon Shokubatsu (1926) 725. - *E. alpestre* var. *robustus* Maxim. Diagn. pl. nov. as. VIII (1893) 24; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I (1931) 340. - Kom. and Alis., l. c., tab. 105 (sub *E. ussuriensis*); Makino, l. c., 725.

Annual; leaves 10-20, 4-15-veined, to 13 cm long and to 7 cm broad, obtuse, half as long to as long as the scapes; scapes 18 cm tall, numerous sheaths loose, 2-7 cm long, obliquely truncate; heads hemispherical when young, ellipsoid at flowering, compact, to 5 mm broad, many-flowered (30-80); involucre bracts rounded-oval, compact, all glabrous, light-colored, one-third to half as long as the flowers, 1-1.5 mm long and 1-1.5 mm broad; chaff elongate-oval, slightly short-pubescent in upper part; staminate flowers 4-6 per inflorescence, the outer perianth segments united into a broad cupular structure inverting the flower; inner perianth segments forming a thick whitish tube, each of the 3 teeth bearing a black gland; stamens 6, the anthers black; outer perianth segments of pistillate flowers united into a navicular involucre inverting the flower; inner segments of pistillate flowers 3, free, spatulate, whitish, spongy, with a black gland at the summit and long hairs on the inner surface; ovary 3-loculed, the style long, the stigma 3-lobed. August-September. (Plate XXVII, Figure 4, a, b).

Sandy shallows. - Far East: Uss. (Lake Khanka). Gen. distr.: Japan. Described from the Far East (Lake Khanka). Type in Leningrad.

5. *E. chinorossicum* Kom. in Bull. Jard. Bot. de Pierre le Grand XVI (1916) 156. - Exs.: HFR No. 2373 (sub *E. ussuriensis*).

498 Annual; leaves linear, acuminate, pellucid-septate at base, 3-10-veined, to 10 cm long and to 2 mm broad; scapes numerous, to 12 cm long; heads hemispherical, few-flowered (to 10), naked, to 5 mm broad; involucre bracts orbicular, to 2 mm long, whitish, subcoriaceous, about as long as the head; torus naked; chaff glabrous; staminate flowers 3 or 4, the outer perianth segments united into a wing-like involucre investing the flower, the inner segments united into a tube, the 3 teeth each bearing a black gland; stamens 6, the anthers black; pistillate flowers 5-6, the outer perianth segments united into an involucre terminating in 3 teeth and investing the flower; inner segments of pistillate flowers free, white, spongy, terminating in a black gland, with long trichomes on the inner side; ovary 3-loculed; style 1; stigmas 3. August. (Plate XXVII, Figure 2, a-e).

Tidal mud. - Far East: Uss. Endemic. Described from the coast of Vostok Bay. Type in Leningrad.

FAMILY XXX. COMMELINACEAE* RCHB.

Flowers bisexual, regular or slightly irregular. Perianth of 2 series; outer series of 3 green sepals, inner series of 3 colored petals. Stamens 6, of which only 3 fully developed. Ovary trilocular, each locule with 1 to several ovules; style filiform, with a capitate stigma. Fruit a capsule.

1. Inflorescence subtended by a spathe or foliaceous, broadly ovate bract 1. *Commelina* L.
 + Inflorescence without a spathe or foliaceous bract 2. *Aneilema* R. Br.

Genus 247. *Commelina*** L.

L. Sp. pl. (1753) 40.

Sepals 3, the outer cucullate, free, elongate-elliptical, the 2 inner ones approximate, obovate, green, sometimes persistent in fruit. Petals 3, free, the outer ovate, short-ungulate, the 2 inner ones often long-ungulate; stamens 3, all fully developed, free, with long slender naked filaments, 2 facing the inner sepals, the anthers with parallel locules, the third facing the outer sepal, with locules divergent in lower part; staminodes 3, with 3-lobed limb; ovary glabrous, 3- or 2-loculed; capsule dry; seeds small, subpyramidal to ellipsoid, more or less flattened.

1. *C. communis* L. Sp. pl. (1753) 40; Kryl. Fl. Zap. Sib. II, 543. -Ic.: Kom. and Alis. Oprod. rast. Dal'nevost. Kr. I (1931), tab. 106. -Exs.: HFR No. 1344.

Annual; roots fibrous; stem mostly branching, ascending to erect, smooth, 15-40 cm tall; leaves lance-ovate, 2-8 cm long, 0.6-2 cm broad, acuminate, folded, the sheaths broad, membranaceous, mostly covered on the underside with scattered short hairs; inflorescences borne on long peduncles, in the axils of upper leaves; a foliaceous, broadly cordate spathe subtending the inflorescence and inclosing it before emergence; flowers somewhat irregular; sepals greenish, membranaceous, ovate, 2 of them united at base; corolla of 3 unequal petals, of which 2 large, dark blue, rounded-obovate, short-clawed at base, the third smaller, lance-ovate, pale; stamens 3; staminodes 3; pistil with 3-loculed ovary and style recurved at the summit. July-September. (Plate XXVI, Figure 8).

Rocks, dry mountain slopes, and river banks; as weed in fields and gardens. Caucasus: West. Transcauc. -Batum (naturalized); West. Siberia: Alt. -Barnaul (naturalized); East. Siberia: Daur. (naturalized); Far East: Kamch. (naturalized), Ze. -Bur., Ud., Uss., Sakh. Gen. distr.: China, Japan; in North America considered as naturalized. Described from America. Type in London.

NOTE. Cultivated by the Goldi Tribe † who extract a bright blue dye from the petals. Its distribution area as a weed is greatly increasing.

Genus 248. *Aneilema* †† R. BR.

R. Br. Prodr. (1810) 270.

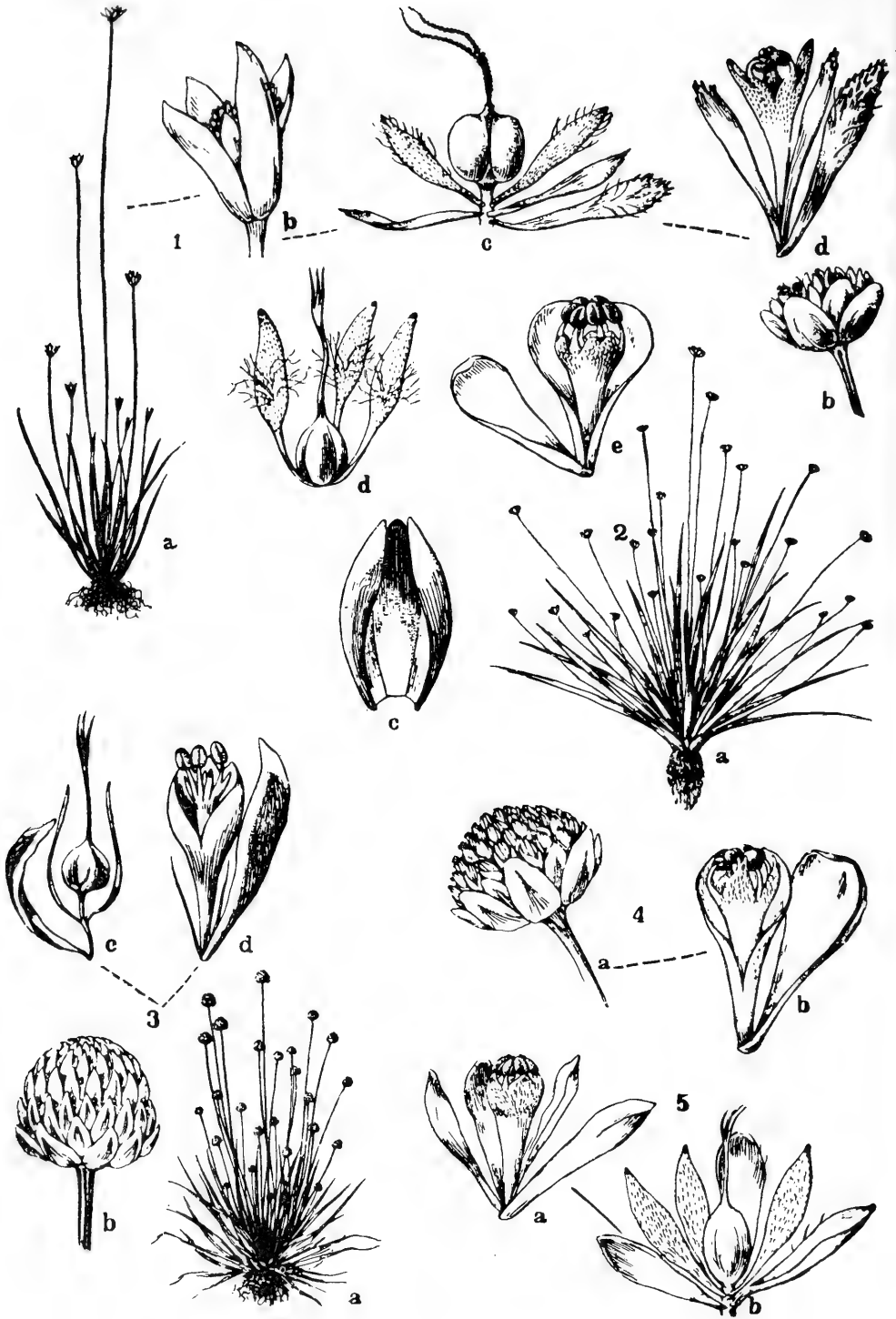
Sepals 3, free, the outer elongate-elliptical, cucullate, the 2 inner ones obovate to oblong, all green or hyaline, subpetaloid, persistent; petals

* Arranged by O.I. Kuzeneva.

** Dedicated to the professor of botany, N. Commelin (Amsterdam, 1667-1771 [should be 1731]).

† [The old Russian for the Nogai tribe.]

†† From the Greek aneu, without, and eilema, cover, envelope.



3, alternating with the sepals, free; stamens 6, of these 3 or 2 fully developed, free; filaments of stamens hairy or naked. Ovary sessile, naked or covered with short glandular hairs, 3- or 2-loculed, each locule containing 1-20 ovules. Seeds small.

502 1. *A. Keisak* Hassk. Commel. Ind. (1870) 31. - Ic. : Kom. and Alis. Oprod. rast. Dal'nevost. Kr. I, tab. 106.

Perennial; stem weak, ascending, sometimes rooting at the nodes, (15) 25-40 (75) cm tall (f. minor Kom. 10 cm): branches erect; leaves amplexicaul, oblong to narrowly lanceolate, 3-5 (8) cm long, 4-5 (8) mm broad, acute, attenuate at base; peduncles bearing single flowers, terminal or axillary, in 1's-2's (3's), thickened at apex in fruit, 3-angled; sepals green, foliaceous, longer than the petals; petals membranaceous, thin, white or rose-colored; fertile stamens 3, staminodes 3; capsule hard, lustrous, 3-loculed, 3-valvate, each locule containing 3 to many seeds; seeds flattened. July-August. (Plate XXVI, Figure 9).

Silty shores of lakes and rivers. - Far East: Uss. Gen. distr. : Japan, China. Described from Japan.

FAMILY XXXI. PONTEDERIACEAE*DUMORT.

Flowers bisexual, nearly regular or bilabiate. Perianth tubular, 6-merous, or tube undeveloped and the petaloid segments essentially distinct. Stamens 6, of which 3 sometimes reduced. Ovary superior, 3-loculed or 1-loculed. Style filiform; stigma 3-lobed or entire. Fruit a capsule, 3-celled, with numerous seeds in 2 ranks, or 1-celled; embryo cylindrical. Aquatic or palustrine plants, with leaves sheathing at base and paniculate inflorescence.

Genus 249. *Monochoria*** Presl.

Presl., Rel. Hoenkean. I (1830) 127.

Flowers more or less regular, in stellate arrangement; perianth 6-merous, corolla-like, without a distinct tube. Stamens 6, subequal, or the inner ones longer than the others. Fruit an elongated coriaceous capsule.

- 1. Leaves petioled, cordate, fleshy; flowers large; inflorescence many-flowered 1. *M. Korsakowii* Rgl. et Maack.
- + Leaves long-petioled, lanceolate; flowers few, smaller
- 2. *M. plantaginea* (Roxb.) Kunth.

* Arranged by O.I. Kuzeneva.

** From Greek monos, single, and chorion, envelope.

Explanation to Plate XXVII

1. *Eriocaulon decemflorum* Maxim.: a) habit, b) inflorescence, c) pistillate flower, d) staminate flower. - 2. *E. chinorossicum* Kom.: a) habit, b) inflorescence, c) outer perianth of pistillate flower, d) pistillate flower with outer perianth segments removed, e) staminate flower. - 3. *E. Sieboldianum* Sieb. et Zucc.: a) habit, b) inflorescence, c) pistillate flower, d) staminate flower. - 4. *E. robustius* (Maxim) Makino: a) inflorescence, b) staminate flower. - 5. *E. ussuriense* Koem.: a) staminate flower, b) pistillate flower.

1. *M. Korsakowii* Rgl. et Maack in Mém. Acad. Sc. Petersb. sér. VII IV, No. 4 (1861) 170. — *M. vaginalis* Kom., Fl. Manchzh. I, 422 non Presl. — Ic.: Rgl. et Maack op. cit., tab. XII, f. 1-7; Gartenflora (1862) tab. 374; Kom. and Alis. Oprod. rast. Dal'nevost. Kr. I, tab. 107.

503 Perennial; stems solitary or several, (20) 40-60 cm tall, erect or ascending, smooth; leaves cordate-ovate or sublanceolate, acute; basal leaves long-petioled, the petiole (10) 20-40 cm long, exceeding the blade, the sheath amplexicaul, membranaceous, auriculate above, the blade (3) 6-12 cm long, (1.5) 4-7 cm broad; cauline leaves alternate, approximate near the inflorescence, the petiole (4) 6-12 cm long, with a broad foliaceous inflated sheath, the blade (2.5) 8-10 (13) cm long, (2) 5-10 cm broad; raceme terminal, many-flowered (rarely 3-4-flowered), simple or few-branched at base, exceeding the leaves; flowers large, blue; perianth 6-merous at base, the segments subdivergent, 1.2-1.8 cm long, with a yellow median band; stamens 6, of these 1 larger than the others; ovary free, 3-loculed, many-seeded; style 1, slightly longer than the stamens, with a capitate stigma; capsule ovoid, rounded-3-angled. July-September, rarely beginning of October. (Plate XXVI, Figure 10).

Silty soil at the shores of still water. Far East: Uss., mainly s. part. Gen. distr.: Manch., N. China. Described from Ussuri (Lake Khanka). Type in Leningrad.

2. *M. plantaginea* (Roxb.) Kunth, Enum. pl. IV (1843) 135. — *Pontederia plantaginea* Roxb. Fl. Indica II (1832) 123.

Perennial; stem decumbent, slightly ascending; leaves petioled, lanceolate, obtusely tipped, narrowly cordate, with lobes rounded at base, smooth, obscurely 5-veined on the underside, the blade 10-15 cm long, 0.8-1.8 cm broad, the petiole 10-20 cm long; inflorescence 2-4-flowered, erect, at length nodding; flowers short-pedicelled, bright blue; perianth strongly 6-fid, colored, the segments lanceolate, the inner ones narrower than the outer; stamens 6, of these 1 larger than the others; anthers of the larger stamen rounded; ovary 3-loculed, the locules containing numerous ovules; style shorter than the stamens; capsule 3-celled, 3-valved, many-seeded. August-September.

Far East: Uss. (s. part). Gen. distr.: Japan, e. India. Described from India. Type in London.

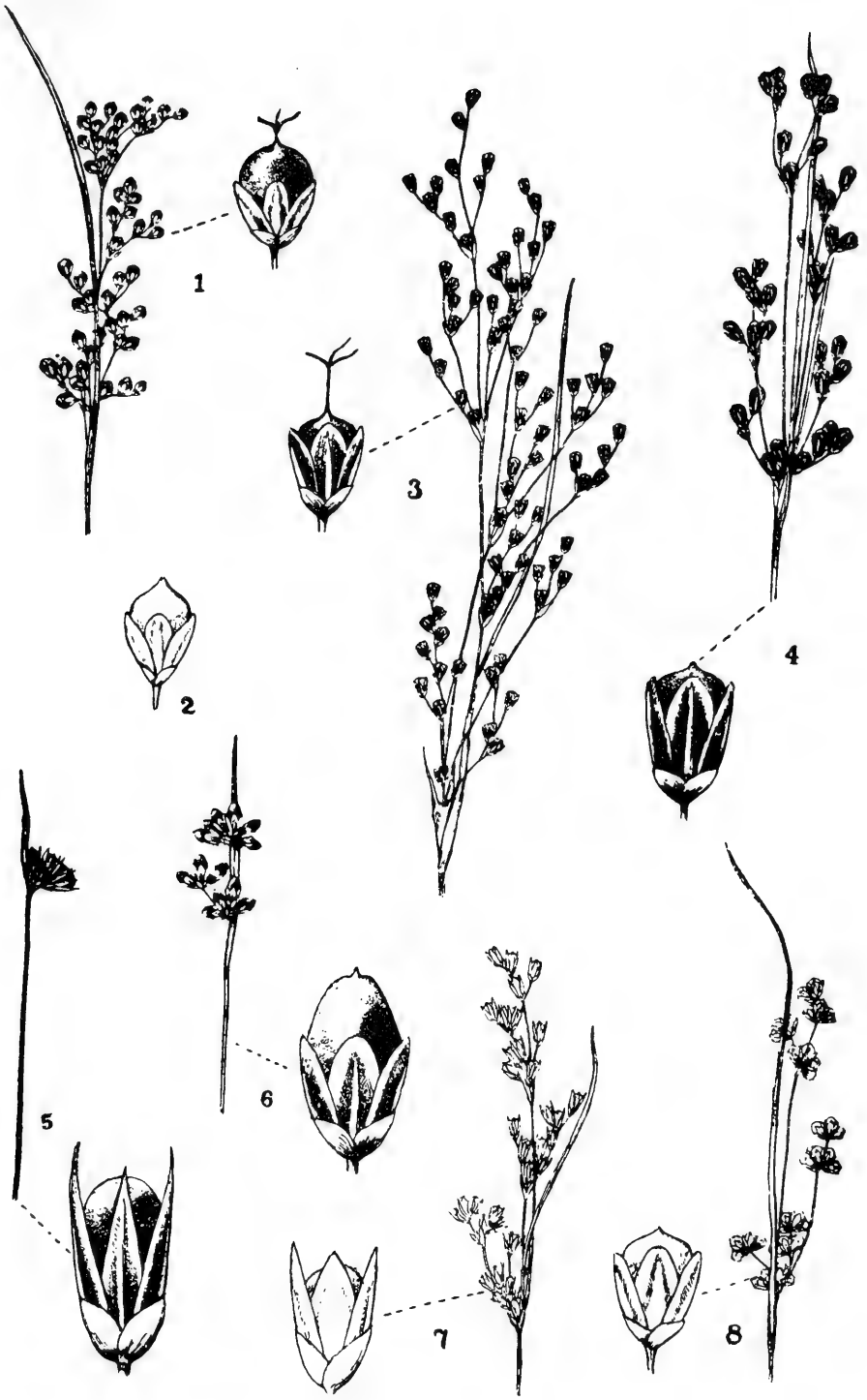
NOTE. Our specimens are characterized by leaves which are longer and are borne on longer petioles as compared with specimens from Japan and India.

ORDER 8. LILIIFLORAE

Flowers predominantly bisexual; perianth in 2 series, all the segments alike, usually petaloid, more rarely sepaloid, mostly 3-merous; stamens 6, rarely fewer. Pistil 3-carpellate; ovary 3-loculed, rarely 1-loculed, with anatropous ovules. Endosperm fleshy or horny, rarely mealy. Fruit 504 a capsule or a berry. Herbaceous, mostly terrestrial, perennial plants, often with bulbs, corms, or rhizomes, rarely annuals.

Explanation to Plate XXVIII

1. *Juncus compressus* Jacq.: inflorescence, flower. — 2. *J. gracillimus* (Buch.) V. Krecz. et Gontsch.: flower. — 3. *J. Gerardi* Lois.: inflorescence and flower. — 4. *J. atrofuscus* Rupr.: inflorescence and flower. — 5. *J. salsuginosus* Turcz.: inflorescence and flower. — 6. *J. epimetrocarpus* V. Krecz. et Gontsch.: inflorescence and flower. — 7. *J. jaxarticus* V. Krecz. et Gontsch.: inflorescence and flower. — 8. *J. soranthus* Schrenk: inflorescence and flower.



FAMILY XXXII. JUNCACEAE VENT.*

Perianth 6-merous, biseriate, with 3 outer and 3 inner segments; perianth segments glumaceous or, more rarely, coriaceous; individual flowers prophyllate or with a common bract for a group of flowers. Stamens 6, more rarely 3; anthers oblong, basifixed, with parallel locules, dehiscing by vertical slits. Ovary superior, unilocular or trilocular; style reduced or well developed, with 3 stigmas. Fruit a 1- or 3-celled, loculicidal capsule. Seeds 3 or numerous, more or less tailed at one or both ends. Annual or, more often, perennial plants, with a creeping rhizome or forming dense tussocks, sometimes stoloniferous. Culms terete, more rarely somewhat flattened, simple, leafy or covered with bladeless sheaths in lower part, hollow or filled with spongy or cobwebby pith. Leaves reduced to bladeless sheath, or bearing a blade, the blade rudimentary or fully developed, flat, canaliculate, or terete, septate or aseptate; sheaths open, membranaceous-margined and often auricled, or closed and hairy at the orifice. Inflorescence corymbose, umbellate, variously paniculate, or racemose.

1. Leaf sheaths always open, more or less membranaceous-margined; leaves glabrous; capsule trilocular, many-seeded 1. *Juncus* L.
 + Leaf sheaths closed; leaves more or less hairy-margined; capsule unilocular, 3-seeded 2. *Luzula* DC.

Genus 250. *Juncus*** L.

Gen. pl. ed. I (1737) 104.

507 Inflorescence of various kinds, ranging from a simple head to a compound panicle; flowers solitary on the inflorescence branches, subtended by a pair of bracteoles, or clustered in heads, surrounded by a ring of bracts (i. e. without bracteoles at the individual flowers). Perianth segments thin-coriaceous, rarely membranaceous, more or less hyaline-margined. Ovary 1-locular, or incompletely to completely 3-locular; style terete, sometimes very short, obsolescent; stigmas 3, covered with long papillae, mostly exserted. Fruit a 3-valved capsule. Seeds oblong or ovaloid, often with rather long tail-like hyaline appendages. Perennial rhizomatous plants, rarely annuals. Leaves with open sheaths, without auricles or auricled; leaf blades flat, grasslike or terete, stemlike, or tubular, septate.

ECONOMIC IMPORTANCE. In spite of the fact that some representatives of this genus often comprise a sizable proportion of hay and of pasture vegetation, hardly anything is known about their nutritional value. According to the scanty data available, they resemble grasses in their chemical composition. Their acceptability in pasture is poor, rarely fair or good. Eaten satisfactorily in the form of hay.

* Arranged by V. I. Krechetovich and N. F. Goncharov.

** Name of rush mentioned by Virgil and other Roman authors; from Latin *jugere*, to tie, unite, interlace, as the plants were used for weaving baskets, mats, etc.

1. Individual flowers subtended by a pair of hyaline bracteoles 2.
- + Flowers without bracteoles, in clusters surrounded by an involucre of hyaline bracts 37.
2. Annuals 3.
- + Perennials 11.
3. Leaf sheaths distinctly auricled (Plate XXX, Figure 15) 2. *J. tenageia* Ehrh.
- + Leaf sheaths without auricles, gradually prolonged into blade . . . 4.
4. Extremely small plants, not exceeding 0.8-5 cm in height, with 1 or 2 flowers at the end of the culm 10. *J. minutulus* V. Krecz. et Gontsch.
- + Larger plants, with umbellate many-flowered inflorescences . . . 5.
5. Capsule spherical or subspherical, 2-2.5 mm long (Plate XXX, Figure 17) 6.
- + Capsule ovaloid or ellipsoid, 3.5-4.5 mm long (*J. bufonius* s.lat. - Plate XXX, Figure 16) 7.
6. Outer perianth segments gradually attenuate into a short point; culm erect, with divaricate branches; capsule spherical 3. *J. sphaerocarpus* Nees.
- + Outer perianth segments abruptly contracted into an elongated, indurate, outward-curved point; culms prostrate, ascending, with nodding flexuous branches; capsule ovoid-spherical 4. *J. amuricus* (Maxim.) V, Krecz. et Gontsch.
- 508 7. Flowers to 6 or more mm long 8.
- + Flowers usually not exceeding 5 mm in length 9.
8. Rather tall, few-stemmed plants, with open, divaricate-branched inflorescence; perianth segments 6.5-7.5 mm long, strongly segregated, the inner ones greatly exceeding the ellipsoid capsule 5. *J. bufonius* L. s. str.
- + Dwarf, many-stemmed plants, with congested abbreviated inflorescence; perianth segments 6-6.5 mm long, clustered in 2's or 3's, the inner ones only slightly exceeding the ovoid-cylindrical capsule 6. *J. nastanthus* V. Krecz. et Gontsch.
9. Plants forming spreading tussocks, with arcuate-ascending culms, branching from close to base; flowers 5-5.5 mm long, with unequal perianth segments; capsule shorter than the inner perianth segments 8. *J. Juzepczukii* V. Krecz. et Gontsch.
- + Erect plants, with upright branches, branching only at the upper part of culms; flowers 4-5 mm long; capsule usually equaling (or exceeding) the inner perianth segments 10.
10. Culms and branches stout; perianth segments and capsule of about the same length; perianth segments broadly dull silvery-hyaline, the outer acute, the inner obtuse, lance-ovate; flowers 4.5-5 mm long; seeds globose-ovoid, 0.3-0.4 mm long 9. *J. turkestanicus* V. Krecz. et Gontsch.
- + Culms and branches slender; perianth segments unequal, lanceolate, the outer cuspidate, the inner subobtuse, shorter than or as long as the capsule; flowers 4-5 mm long; seeds ovoid, 0.5 mm long 7. *J. ambiguus* Guss.
- 11 (12). Culms destitute of cauline and basal leaves, bearing only foliaceous obtuse sheaths (rarely the upper sheath with a short blade - *J. filiformis* L.). 12.

- + Culms with 1 to several blade-bearing leaves 25.
- 12. Seeds with hyaline, narrow, long, winglike appendages at the ends; flowers blackish-purple throughout (Plate XXIX, Figure 13) 63. *J. beringensis* Buch.
- + Seeds without winglike appendages, ovoid; perianth segments pale- or greenish-banded on the back (Plate XXIX, Figure 12) 13.
- 13. Culms (including sheaths) 1-1.2 mm thick at base 14.
- + Culms more than 2 mm thick at base 17.
- 14. Flowers 2 mm long; inflorescences capitate-paniculate, many-flowered; culms crowded, tussock-forming 53. *J. decipiens* (Buch.) Nakai.
- 509 + Flowers 3-4 mm long; inflorescences few-flowered, fascicled, loose; culms arising in rows from the creeping rhizome, distant 15.
- 15. Capsule spherical-ovoid; bracteal leaf as long as the culm or nearly so; perianth segments light green, spreading in fruit 55. *J. filiformis* L.
- + Capsule oblong-ovoid; bracteal leaf exceeded several times by the culm; perianth segments ferruginous or brown, appressed 16.
- 16. Capsule longer than the perianth segments, cylindrical-oblong, 4-4.3 mm long; flowers 1-5 (Plate XXIX, Figure 6) 59. *J. Muelleri* Trautv.
- + Capsule shorter than the perianth segments, oblong-obovoid, 3 mm long; flowers 10 or more 58. *J. inundatus* Drej.
- + Capsule about as long as the perianth segments, ellipsoid, 3-5 mm long; flowers 3-5 (Sakhalin) 56. *J. curvatus* Buch.
- 17 (13). Culms scattered, arising in regular rows from elongated rhizomes; perianth dark, brown or castaneous, 4-5 mm long 18.
- + Culms crowded, arising irregularly from a short oblique rhizome; perianth light-colored, sometimes ferruginous or brownish, but flowers 2.5-3 mm long 20.
- 18. Inner perianth segments subobtuse to obtuse; inflorescence of 4-8 + flowers (Plate XXIX, Figure 4) 60. *J. arcticus* Willd.
- Inner perianth segments, like the outer ones, acute; inflorescence of 6-20 flowers 19.
- 19. Capsule oblong-obovoid; flowers 5 mm long; perianth segments usually longer than the capsule (Plate XXIX, Figure 5) 62. *J. Haenkei* E. Mey.
- + Capsule ovoid; flowers 4-4.5 mm long; perianth segments shorter than to equaling the capsule (Plate XXIX, Figure 3) 61. *J. balticus* Willd.
- 20. Capsule ovoid, mucronate; stamens always 6; lower sheaths cherry-colored or orange-red (Plate XXIX, Figure 10 and 11). 21.
- + Capsule obovoid, emarginate or obtuse at the summit, bearing a tubercle and then flowers not exceeding 2 mm in length; stamens usually 3 (rarely more); lower sheaths ferruginous-brown or brownish (Plate XXIX, Figures 7, 8 and 9). 23.
- 21. Lower sheaths cherry or dark cherry-colored; culms not exceeding 3-5 mm in thickness at base; capsule shorter to slightly longer than the perianth segments 22.
- + Lower sheaths orange-red; culms to 1 cm thick at base; capsule much longer than the perianth segments (flowers 3 mm long, capsule 4 mm

- long) (Plate XXIX, Figure 14)
- 510 22. Culms firm, subligneous, with continuous pith; perianth segments pale, shorter than the dark capsule (flowers 3 mm long, capsule 3-3.5 mm long); inflorescence a spreading panicle (Plate XXIX, Figure 11) 51. *J. brachyterpalus* (Trautv.) V. Krecz. et Gontsch.
- + Culms flaccid, with interrupted spongy pith; perianth segments ferruginous, shorter than the capsule (flowers 3-4 mm long, capsule 2.8-3 mm long); inflorescence a contracted panicle (Plate XXIX, Figure 10) 50. *J. paniculatus* Hoppe.
23. Capsule emarginate at the summit; lower sheaths dull, ferruginous-brown or brownish 49. *J. inflexus* L.
- + Capsule obtuse, surmounted by a tubercle; lower sheaths lustrous, ferruginous (Plate XXIX, Figure 9) 24.
24. Culms (both in fresh and dried state) strongly sulcate, especially near the inflorescence; bract much inflated in inflorescence; flowers 3 mm long, usually in a capitate inflorescence (Plate XXIX, Figure 7) 53. *J. decipiens* (Buch.) Nakai.
- + Culms finely sulcate (smooth in living plants), sublustrous; bract not inflated in inflorescence; flowers 2-2.5 (2.8) mm long, usually in a fasciculate-paniculate inflorescence (Plate XXIX, Figure 8) 54. *J. Leersii* Marss.
- 25 (11). Leaves terete, smooth 52. *J. effusus* L. s. str.
- + Leaves flat, sometimes canaliculate 63. *J. subulatus* Forsk. 26.
26. Leaves rigid, arcuate, canaliculate, mostly basal, their sheaths broadly short-ovoid 29. *J. squarrosus* L.
- + Leaves soft, erect, flat, few; culms bearing 1-3 leaves; their sheaths narrow, long 27.
27. Inflorescence subtended by 2 or 3 bracteal leaves 28.
- + Inflorescence subtended by a solitary bracteal leaf 29.
28. Inflorescence capitate, of 1-3 dark flowers; auricles fimbriate, silvery 31. *J. trifidus* L.
- + Inflorescence corymbose-paniculate, many-flowered; perianth greenish, at length stramineous-green; auricles rounded-obtuse 30. *J. tenuis* Willd.
29. Inflorescence fasciculate, of 1-6 flowers, inserted at the side of the involucre bract, this 3-4 times as long as the inflorescence 56. *J. brachyspathus* Maxim.
- + Inflorescence capitate or paniculate, in latter case many-flowered; involucre bract not exceeding or only slightly exceeding the inflorescence 30.
30. Capsule considerably longer than the perianth 31.
- 511 + Capsule shorter than or equaling the perianth 33.
31. Inflorescence contracted, few-flowered; flowers and capsules dark brown; capsule 4-5 mm long (Plate XXVIII, Figure 6) 25. *J. heptopotamicus* V. Krecz. et Gontsch.
- + Inflorescence spreading or fasciculate-paniculate, many-flowered; flowers and capsules light-colored; capsule 2.8-3 mm long . . . 32.
32. Inflorescence spreading, with long slender branches; capsule ovoid, more or less pointed at the summit 22. *J. gracillimus* (Buch.) V. Krecz. et Gontsch.

- + Inflorescence fasciculate-paniculate, with unequal abbreviated branches; capsule rounded-trigonus, subspherical (Plate XXVIII, Figure 1) 21. *J. compressus* Jacq.
- 33. Inflorescence capitate, of many sessile purplish-brown flowers, these 4-5 mm long (Plate XXVIII, Figure 5) 25. *J. salsuginosus* Turcz.
- + Inflorescence paniculate or few-branched; flowers 3-4 mm long . . 34.
- 34. Bracteoles and perianth segments acute, silvery-green; capsule shorter than the perianth segments (Plate XXVIII, Figure 7) 28. *J. jaxarticus* V. Krecz. et Gontsch.
- + Bracteoles and perianth segments obtuse, colored; capsule as long as or slightly longer than the perianth segments 35.
- 35. Flowers in glomerules of 2 or 3 at the ends of branches and in axils of ramifications; perianth segments ovate (Plate XXVIII, Figure 8) 27. *J. soranthus* Schrenk.
- + Flowers solitary at the ends of branches (sometimes - *J. atrofuscus* - in 2's, but then flowers blackish-brown); perianth segments lanceolate 36.
- 36. Flowers 2.5-3.2 mm long, subferruginous; inflorescence loosely paniculate (Plate XXVIII, Figure 4) 24. *J. atrofuscus* Rupr.
- + Flowers 4 mm long, dark brown; inflorescence contracted-paniculate (Plate XXVIII, Figure 3) 23. *J. Gerardi* Lois.
- 37 (1). Plants without rhizome or stolons 38.
- + Plants with rhizome or stolons (perennials) 41.
- 38. Inner perianth segments much shorter than the outer; capsule much shorter than the inner perianth segments . . 1. *J. capitatus* Weig.
- + Perianth segments equal; capsule longer than the perianth or nearly as long 39.
- 39. Capsule $1\frac{1}{2}$ -2 times as long as the perianth; inflorescence simple or of 2 or 3 heads on short branches; seeds fusiform, 2-2.4 mm long 15. *J. stygius* L.
- 512 + Capsule about as long as or slightly longer than the perianth; inflorescence more or less umbellately branched; seeds ovoid, 0.5-0.6 mm long 40.
- 40. Outer perianth segments acute, the inner subobtuse; heads compact, hemispherical; culms mostly decumbent, rooting; leaves filiform 32. *J. bulbosus* L.
- + All perianth segments subulate-pointed; heads fasciculate-stellate; culms erect; leaves linear, to 1.5 mm broad (Plate XXX, Figure 2) 38. *J. Leschenaultii* Gay.
- 41 (37). Plants bearing bladeless sheaths at base 42.
- + Plants bearing blade-bearing leaves 46.
- 42. Perianth segments obtuse, brown; anthers reddish 43.
- + Perianth segments lanceolate, the outer acute, the inner subobtuse, pale; anthers yellow 45.
- 43. Capsule 5 mm long; involucrel bract exceeding the inflorescence 44. *J. acutus* L.
- + Capsule 3-3.5 mm long; involucrel bract shorter than the inflorescence 44.
- 44. Capsule oblong-ovoid, pointed at the summit; inflorescence spreading, loose, slender-branched; anthers red . . 47. *J. littoralis* C. A. M.

- + Capsule ellipsoid, obtusish; inflorescence compact, though loosely branched; anthers reddish 45. *J. tyraicus* Pacz.
- 45. Capsule ovoid, about equaling the perianth; rhizome creeping, with culms arranged in sparse rows, inflorescence spreading; a maritime plant 47. *J. maritimus* Lam.
- + Capsule oblong-conic, longer than the perianth; tussock-forming plants; inflorescence contracted, with upright branches 48. *J. Nevskii* V. Krecz. et Gontsch.
- 46 (41). Seeds distinctly caudate at both ends 47.
- + Seeds not caudate 56.
- 47. Capsule trifid-emarginate at the summit (Plate XXX, Figure 9) 11. *J. biglumis* L.
- + Capsule acute or obtuse 48.
- 48. Leaves flattened-cylindrical, distinctly nodose-septate 43. *J. kamschatcensis* (Buch.) Kudo.
- + Leaves flat or subplane-caliculate, not septate 49.
- 49. Inflorescence simple, capitate; lowest bract shorter than the inflorescence, bracteole-like 50.
- 513 + Inflorescence of 2-5 heads and if simple, capitate, the lowest bract exceeding the inflorescence 51.
- 50. Perianth leaves ferruginous-brown, ovate, obtuse, 4 mm long; capsule about twice as long as the perianth (Plate XXX, Figure 12) 12. *J. triglumis* L.
- + Perianth segments lanceolate, acute, white or lurid, 4.5-5 mm long, the inner shorter than the outer; capsule barely exceeding the perianth. (Plate XXX, Figure 14) 13. *J. Schischkini* Kryl. et Sumn.
- 51. Anthers (2.5) 3-3.5 (4) mm long, 3-3.5 times the length of the filaments 16. *J. macrantherus* V. Krecz. et Gontsch.
- + Anthers shorter, as long as or shorter than the filaments 52.
- 52. Anthers exserted; prophylla divaricate (Plate XXX, Figure 7) 14. *J. Thomsonii* Buch.
- + Stamens slightly shorter than the perianth and included in it; prophylla appressed to flower 53.
- 53. Anthers nearly as long as the filaments; capsule nearly twice as long as the perianth, its upper part pyramidal-conic 17. *J. himalensis* Klotzsch.
- + Anthers one-third to half as long as the filaments; capsule ovoid or ellipsoid, not pyramidal-conic in upper part 54.
- 54. Flowers 6-8 mm long; inner segments of the perianth shorter than the outer (Plate XXX, Figure 12) 19. *J. triceps* Rostk.
- + Flowers 4-5 mm long; perianth segments equal or subequal 55.
- 55. All perianth segments acute; capsule at least twice the length of the perianth, 8-10 mm long, subferruginous, pale below, abruptly contracted at the summit into an elongated beak; inflorescence branching, of 5 to 12 heads; prophylla whitish (Plate XXX, Figures 10 and 10a) 20. *J. leucochlamys* Zing.
- + Inner perianth segments obtuse; capsule 1.5 times the length of the perianth, 6-7.5 mm long, castaneous, obtuse; inflorescence of 1-3 heads; prophylla brown (Plate XXX, Figure 11) 18. *J. castaneus* Sm.

- 56 (46). Leaves tubular, more or less distinctly nodose-septate* (Plate XXX, Figure 1) 57.
 + Leaves flat, aseptate 64. *J. prominens* (Buch.) Miyabe et Kudo.
 57. Inflorescence capitately congested. (Plate XXX, Figure 6) 42. *J. alpigenus* C. Koch.
 + Inflorescence not congested, umbellate-paniculate 58.
 58. All perianth segments rounded-obtuse, the outer ones faintly mucronulate (Plate XXX, Figure 4) 33. *J. alpinus* Vill.
 514 + All perianth segments or at least the outer ones, acute 59.
 59. Inner perianth segments longer than the outer 60.
 + Perianth segments equal or subequal (the inner slightly shorter than the outer) 62.
 60. Plants finely papillose, with short underground offshoots 61.
 + Plants smooth, destitute of papillae, with long rooting stolons 35. *J. Kotschyi* Boiss.
 61. Inflorescence with short contracted branches, abbreviated on one side; culms 10-40 cm tall; capsule broadly lanceolate, 3 mm long, rather abruptly contracted into a short beak (Plate XXX, Figure 3) 40. *J. virens* Buch.
 + Inflorescence broadly and somewhat umbellately spreading; culms 50-70 cm tall; capsule lanceolate, 3.5-4 mm long, gradually attenuate into a long beak (Plate XXX, Figure 8) 39. *J. niponensis* Buch.
 62. All perianth segments awn-pointed, divergent; capsule gradually long-pointed; leaves strongly sulcate (Plate XXX, Figure 5) 41. *J. atratus* Krock.
 + Outer perianth segments acute, the inner obtuse or subacute; capsule obtusely tipped, distinctly short-beaked; leaves scarcely sulcate, nearly smooth 63.
 63. Cinereous-green plants, with long rooting stolons 37. *J. arianus* V. Krecz.
 + Green or pale green, rather large plants, with short underground offshoots 64.
 64. Outer perianth segments acute, the inner obtuse (rarely subobtuse); flowers 2.5-3 mm long; capsule 3.5-4 mm long, nearly 1½ times the length of the perianth; leaves prominently nodose-septate, long auricled (Plate XXX, Figure 1) 34. *J. lampocarpus* Ehrh.
 + All perianth segments acute or the inner ones subacute; flowers 2-2.3 mm long; capsule 2.8-3 mm long, only slightly longer than the perianth; leaves faintly septate, weakly auricled 35. *J. Turczaninowii* (Buch.) V. Krecz.

Subgenus 1. *Juncinella* (Fourr.) V. Krecz. et Gontsch. - *Juncinella* Fourr. in Ann. Soc. Linn. Lyon., n. ser., XVII (1869) 172 (pro genere). - *Junci graminifolii* Buch. in Engl. Pflzr. IV, 36 (1906) 101 (pro pl. annuis). - Annuals with filiform canaliculate leaves destitute of auricles. Inflorescence simple, capitate. Flowers 4-5 mm long, in a glomerule subtended by an involucre; perianth segments lanceolate, unequal (the inner shorter than the outer). Seeds nutlike.

* Septa are discernible only on dried plants; in the case of live plants sectioning of the leaves is necessary.

1. *J. capitatus* Weig. Obs. bot. (1772) 28, tab. II, Fig. 5; E. Mey. in Ldb. Fl. Ross. IV, 228; Buch. in Engl. Pflzr. IV, 36 (1906) 256. -Exs.: HFR No. 1193, 1686; Pl. Finl. Exs. No. 152.

Annual, green plants, with fibrous roots; culms slender, 3-15 (20) cm tall; leaves filiform or canaliculate-linear, one-third to half the length of the culm; inflorescence simple or with 2 or 3 short branches; involucre bract as long as to longer, rarely shorter, than the inflorescence; flowers 4-4.5 mm long, crowded in stellate heads of 3-6 (8); prophylla ovate, awn-pointed, as long as the flowers, rarely slightly longer; perianth segments stramineous-green, unequal; the outer broad-lanceolate, broadly membranaceous-marginal, awn-pointed, the inner markedly shorter (by 1-1.5 mm), ovate, acute, membranaceous; stamens 3, ca. 1.8 mm long, the anthers linear-oblong, as long as the filaments; capsule trigonous, ovoid, obtuse, short-beaked, shorter than the inner perianth segments; seeds oblong, 0.3-0.4 mm long, light brown. June-September.

Cultivated fields, on sand. -European part: Lad. -Il'm., Upp. Dnepr., Upp. Volg., [?] Prichern., Volg. -Don., Low. Don. (Luganskaya, Starobel'sk, Nizh. -Kurmoyarskaya). Gen. distr.: West., South., and Centr. Europe, North Africa. Described from Pomerania.

Subgenus 2. *Tenageia* (Dumort.) O. Ktze in Post et O. Ktze Lex. gen. phan. (1904) 303. -*Tenageia* Dumort. (pro genere, ex Post, l. c.). -*Iso-phyllum* Koch in Linnaea, XXI (1848) 628 (pro sectione). -*Junci poio-phylli* Buch. in Engl. Pflzr. IV, 36 (1906) 100 (pro sp. annuis). -Annuals, with fibrous roots, without rhizomes or stolons. Leaves flat, linear (to 1 mm broad), mostly without distinct auricles. Inflorescence simple or dichotomously branching, subtended by a short bract. Flowers from 2 to 7 mm long, each with a pair of bracteoles; perianth segments unequal - the inner shorter than the outer, lanceolate. Seeds nutlike.

Series 1. *Tenageii* V. Krecz. et Gontsch. -Flowers 2-3 mm long; capsule ovoid, as long as the perianth; leaf sheaths auricled.

2. *J. tenageia* Ehrh. ex L. fil. Suppl. (1781) 208; R. Mey, in Ldb. Fl. Ross. IV, 232; Buch. in Engl. Pflzr. IV, 26 (1906) 109; Grossh. Fl. Kavk. I, 183. -Ic.: Hegi, Ill. Fl. II, 154, fig. 282, F-J; 157, fig. 285. -Exs.: HFR No. 842; Kneuck. III No. 76.

Annual, glaucescent-green plants, with fibrous roots; culms firm, erect, 5-40 cm tall, 0.5-1 mm in diameter, covered at base with reddish leaf sheaths, branching only near the top, bearing 1 leaf about the middle; basal leaves flat, narrowly linear, 0.5-1 mm broad, subulate-tipped, short; sheaths furnished with rounded auricles; inflorescence terminal, compound, contracted umbellate-paniculate, the branches few, unequal, erect, with 516 short secondary branches, these bearing subdistant solitary flowers 2-3 mm long; prophylla ovate, hyaline, subobtuse, one-third to half as long as the perianth; perianth segments equal, ovate, the outer acute, the inner sub-obtuse, greenish-brown, with a narrow white-membranaceous margin; stamens two-fifths to half as long as the perianth, the anthers about as long as the filaments; capsule as long as the perianth, trigonous, ovoid, brown; seeds 0.3-0.4 mm long, lurid (waxy). June-July. (Plate XXX, Figure 15).

Shallows, flood plains, and coastal sands. -European part: Prichern., Mid. Dnepr., Upp. Dnepr. (Kiev), Low. Don. (?); Caucasus: East. Transcauc. (Kodi, near Tiflis? Lagovskii's collections); West. Siberia: Altai (Ledebour's collection, 1826). Gen. distr.: Western Europe. Described from Germany.

Series 2. *Sphaerocarpi* V. Krecz. et Gontsch. - Flowers 2.4-4 mm long; capsule spherical, shorter than the perianth segments; leaf sheaths without distinct auricles.

3. *J. sphaerocarpus* Nees in Flora I (1818) 521; Buch. in Engls. Pflzr. IV, 36 (1906) 108; Grossh. Fl. Kavk. I, 183; Tsyryna in Wulff, Fl. taur. I, 2, 53. - *J. tenageia* E. Mey. in Ldb. Fl. Ross. IV (1853) 232, quoad pl. caucas. - Ic.: Hegi, Ill. Fl. II, 154, fig. 282, K-L.

Annual, pale green, tussocky plants, with fibrous roots; culms setaceous, erect, sulcate, 8-25 cm tall, branching nearly from base; leaves flat, linear, to 0.7 mm broad, shorter than the culms, subulate-tipped; basal sheaths rather broad, acute, light-colored; upper sheaths attenuate into blade, practically exauriculate; inflorescence dichotomously branching below, forming a lax panicle, the slender flexuous branches bearing solitary subdistant flowers; flowers 3-4 mm long; prophylla white-hyaline, ovate, subacute, one-third to two-fifths as long as the perianth; perianth segments lance-ovate, subequal, gradually acuminate, broadly white-membranaceous; stamens half the length of the perianth, the anthers one-fourth to two-fifths as long as the filaments; capsule convexly-trigonous, subspherical, green, becoming stramineous to brownish, shorter than the perianth, beakless; seeds small, ca. 0.2 mm long, ellipsoid, with short bristle-like appendages at both ends. May-June. (Plate XXX, Figure 17).

Damp shores, flood meadows, and cultivated fields. - European part: Prichern., Low. Don., Low. Volg., Zavolzh., Crimea; Caucasus: Ciscauc., West. Transcauc.; West. Siberia: Upp. Tob., Irt.; Centr. Asia: Aral. - Casp. (n. part), Pribalkh., Mount. Turkm. (Ashkhabad), Pam. - Al. (Karatyube). Gen. distr.: West. Europe, Asia Minor. Described from Wirzeburg.

4. *J. amuricus* (Maxim.) V. Krecz. et Gontsch. sp. nova in Addenda, II, 623. - *J. bufonius* var. *amuricus* Maxim. Prim. Fl. Amur. (1859) 296. - *J. bufonius* Kom. Fl. Mandsh. I (1901) 425. - *J. sphaerocarpus* var. *amuricus* Buch. in Engl. Pflzr. IV, 36 (1906) 108; Kom. and Alis. Oprod. rast. Dal'nevost. kr. I, 344.

Annual, green, somewhat tufted plants; culms filiform, decumbent, 3-10 cm tall, branching from base or simple; leaves linear, flat, barely 0.3-0.4 mm broad, short; inflorescence weakly branching to nearly simple, with slender capillary elongated drooping flexuous branches bearing very remote flowers; flowers 2.5-3 mm long; prophylla white-hyaline, lanceolate, acute, half as long as the perianth; perianth segments lanceolate (the inner shorter), rather abruptly contracted into a subulate recurved elongated point, green, subferruginous above, broadly hyaline-margined; stamens two-fifths the length of perianth; anthers oblong, one-third as long as the filaments; capsule rounded-ovoid, dark green, becoming brown, beakless, only slightly shorter than the perianth segments.

Far East: Uss. Mudflats of river Amur - islands between Chora and Buri; Pul'sa village. Described from the river Amur (opposite the village Mong-lomai). Type in Leningrad.

Series 3. *Bufonii* V. Krecz. et Gontsch. - Flowers 6-7.5 mm long; capsule oblong, shorter than or as long as the inner perianth segments.

5. *J. bufonius* L. (s. str.) Sp. pl. (1753) 328; E. Mey. in Ldb. Fl. Ross. IV, 231, exp. - *J. divaricatus* Gilib. Exerc. Phyt. II (1792) 506. - *J. bufonius* var. *genuinus et tuberiferus* Kryl. Fl. Alt. (1912) 1405. - Ic.: Hegi, Ill. Fl. II, tab. 56, fig. 5; p. 155, fig. 213 c, d.; Syreish. Ill. Fl. Mosk. gub., I, 221. - Exs.: HFR No. 537; Fl. Pol. Exs. No. 1004.

Annual, pale green plants with fibrous roots; culms few, slender, 10-50 cm tall, branching nearly from base or from the middle; basal sheaths yellowish-orange to light lateritious, blade-bearing; leaves narrow, filiform, 1-1.5 mm broad, shorter than the culm; inflorescence spreading, dichotomously branching, the branches divaricate to drooping, elongated (somewhat curved below each flower); flowers solitary, remote, (6) 6.5-7.5 mm long; prophylla to 2.5 mm long, hyaline, subobtusate; perianth segments narrowly lanceolate, green, broadly hyaline-margined, unequal: the outer subulate-tipped 6.5-7.5 mm long, the inner shorter and slightly broader, acute, 5-6 mm long; stamens 2 mm long, the anthers and the filaments subequal; capsule oblong-ellipsoid, 4-4.5 mm long, broadly pointed at the summit, yellowish to buff, shorter than the inner perianth segments; seeds reddish-brown, ca. 0.3 mm long, ovoid-ellipsoid. Flowering June-August, fruiting July-September.

Damp shady situations, canals, fields. -All European part (except Arctic); all Caucasus, all Siberia (except Arctic); Far East and Centr. Asia (submontane part). Gen. distr.. West. Europe, Asia Minor, South. and Centr. Asia, North America. Described from Western Europe (Sweden). Type in London.

6. *J. nastanthus* V. Krecz. et Gontsch. sp. nova in Addenda, II, 624. - *J. ranarius* Aschers. et Gr. Syn. II, 2 (1904) 423, non Song. et Perr. - *J. bufonius* var. *ranarius* Syreish. Ill. Fl. Mosk. gub., I (1906) 221, ex p. - *J. mutabilis* Savi, Fl. Pis. I (1798) 364, non Cav. (1794). - *J. bufonius* var. *mutabilis* Aschers. et Gr. Syn. II, 2 (1904) 422, ex p. - *J. bufonius* η *congestus* Whlb. Fl. Gothob. (1820) 38. - *J. bufonius* β *fasciculatus* Koch. Syn. ed. 1 (1837) 732. - *J. bufonius* α *compactus* Čelak. Prodr. Fl. Böhm. (1869) 83. - *J. bufonius* var. *glomeratus* Rgl. in A. H. P. VII (1880) 554. - ? *J. congestus* Schousb. ex E. Mey. Syn. Junc. (1822) 40 (nomen). - ? *J. querioides* Pourr. ex Willk. et Lange, Pr. Fl. Hisp. 1 (1861) 181. - Exs. Kneuck. IV, No. 120.

Annual, green, fasciculate-cespitose plants; culms firm, many, radiant, decumbent, 3-10 (15) cm tall, branching nearly from base; basal sheaths reddish, blade-bearing; leaves filiform, short; inflorescence dichotomous, the flowers in dense glomerules of 2 or 3 alternately disposed at the ends of abbreviated, often recurved branches; lowest bract equaling to often exceeding the inflorescence; flowers 6-6.5 mm long; prophylla lanceolate, ca. 2 mm long, obtuse; perianth segments lanceolate, green, broadly hyaline-margined, unequal: the outer subulate-tipped, 6-6.5 mm long, the inner slightly broader, acute, 4.5-5 mm long; stamens 1.5 mm long; anthers and filaments subequal; capsule cylindric-obovoid, 4 mm long, equaling the inner tepals, flattened at the summit, beaked; seeds broadly ellipsoid, flat-based, 0.5 mm long, brownish-amber-colored, smooth. May-August. (Plate XXX, Figure 18).

Coastal sands, shallows, and damp sandy situations. -All European part, except Arctic; Caucasus; West. Siberia; East. Siberia: Ang. -Sayan., Daur.; Centr. Asia: Pribalkh., Aral. -Casp. Gen. distr.: West. Europe, Northern Mongolia. Described from Leningrad (Detskoe Selo, gravels of river Kuzminka). Type in Leningrad.

Series 4. *Ranarii* V. Krecz. et Gontsch. -Flowers 4-5.5 mm long; capsule longer than the inner perianth segments, about as long as the outer ones.

7. *J. ambiguus* Guss. Fl. Sicul. prodr. I (1827) 425. - *J. ranarius* Song. et Perr. ex Billot, Annot. fl. Fr. et Allem. (1855) 192, non Aschers, et Gr. - *J. bufonius* var. *ranarius* Syreish. III. Fl. Mosk. gub., I (1906) 221, exp. - *J. bufonius* var. *fasciculatus* Kryl. Fl. Sib. Occ. III (1929) 561. - Ic.: Hegi, Ill. Fl. H., 155, fig. 285, e-i. - Exs.: Pl. Finl. Exs. 151 b et a (in part); Kneuck. II, 46; V, 46a II; VI, 46b II; HFR No. 537 (in part).

Annual, pale green plants, becoming brownish, with fibrous roots; culms fasciculate, erect, 10-40 cm tall, branching from the middle; basal sheaths reddish-brown, partly leaf-bearing; leaves narrowly linear, sub-plane, 0.5-0.7 mm broad, short; inflorescence weakly contracted-dichotomous, with erect or subdivaricate branches; flowers 4-5 mm long, oblong, borne on one side of the branches, remote or approximate only at the ends; 519 prophylla hyaline, obtuse, ca. 2 mm long; perianth segments pale green, broadly hyaline-margined, unequal: the outer lanceolate, mucronate, 4-5 mm long, longer than the inner, the latter broader, usually subobtuse, 3.5-4 mm long; stamens 2 mm long; anthers one-third to half as long as the filaments; capsule convexly trigonous, oblong-ellipsoid, rounded at the summit, beaked, 3.5-4.5 mm long, becoming brown, as long as the inner tepals or nearly so, shorter than the outer ones; seeds smooth, ovoid, 0.5 mm long, brownish. Flowering and fruiting about a month earlier than *J. bufonius* L. - Flowering May-July, fruiting July-August.

Flood plains, roadsides, wet argillaceous-silty and sandy-silty places, cultivated fields. - European part: Kar. -Lap., Lad. -Il'm., Upp. Volg., Volg.-Kam. (s. part), Upp. Dnepr., Mid. Dnepr., Volg. -Don., Prichern., Low. Don. (?), Low. Volg., Crimea; Caucasus: Ciscauc., West. Transcauc. (n. part); West. Siberia: Ob. (s.), Upp. Tob., Alt.; East. Siberia: Ang. -Sayan., Daur., Len. -Kol (Yakutsk); Far East: Ze. -Bur.; Centr. Asia: Pribalkh. (Kal'dzhir). Gen. distr.: Baltic States (inc. Finland), Poland, West. and South. Europe. Described from Sicily (Spaccaforno).

8. *J. Juzepczukii* V. Krecz. et Gontsch. sp. nova in Addenda, II, 625.

Annual, green, fasciculate-cespitose plants; culms many, radiant, ascending, 5-20 cm tall, branching nearly from base; basal sheaths lateritious-brown, blade-bearing; leaves filiform, short; inflorescence branching, the branches incurved at the ends; flowers remote or approximate only at the ends, borne on one side of branches; lowest bract short; flowers 5-5.5 mm long; prophylla hyaline, obtuse, ca. 2 mm long; perianth segments lanceolate, green, broadly hyaline-margined, unequal: the outer subulate-tipped, 5-5.5 mm long; anthers about half as long as the filaments; capsule oblong-obovoid, nearly 4 mm long, about as long as the inner tepals; seeds 0.5 mm long, ellipsoid, slightly flattened at the ends. Flowering May-June, fruiting June-July. (Plate XXX, Figure 16).

Gravels and coastal sands. - European part (except Arctic); Caucasus: Ciscauc., East. Transcauc.; West. Siberia: Ob., Alt.; East. Siberia: Ang. -Sayan. Gen. distr.: Western Europe. Described from the neighborhood of Detskoe Selo (river Kuzminka). Type in Leningrad.

9. *J. turkestanicus* V. Krecz. et Gontsch. sp. nova in Addenda, II, 625. - *J. bufonius* Vved. in Drob. et al. Opr. rast. okr. Tashk. I (1923) 55, non L. - Exs.: Sintenis, Iter. transcasp. -pers. 1900, No. 524 b.

Annual, glaucescent-green, rather strongly fasciculate plants; culms rather numerous, thickened, erect or slightly recurved at the ends, 10-30 cm tall, branching from the middle; basal sheaths tawny, rather broad,

blade-bearing; leaves subconvolute, to 1 mm broad, reaching inflorescence; 520 inflorescence inequilaterally branched, contracted, the branches erect, slightly curved at the ends; lowest bract half as long as the inflorescence; flowers 4.5-5 mm long, remote below, subcongested above; prophylla ovate, 2-2.5 mm long, hyaline, subacute; perianth bracts broadly lanceolate to subovate-lanceolate, with a narrow dorsal band, very broadly silvery-hyaline-margined, subequal: the outer acute, 4.5-5 mm long, the inner sub-obtuse to obtuse, 4-4.7 mm long, not broader or even narrower than the outer ones; stamens 1.5 mm long, the anther and filaments subequal; capsule oblong-ellipsoid, ferruginous, rounded at the summit, 4-4.8 mm long, equaling to often exceeding the inner tepals; seeds subspherical-ovoid, 0.3-0.4 mm long, tawny, lustrous. Fruiting June.

Borders of springs, meadows. -Centr. Asia: Aral. -Casp., Pribalkh., Dzhung. -Tarb., Syr-Dar., Kara-Kum, Kyz. -Kum., Amu-Dar., Mount. Turkm. Gen. distr.: Kulja, Persia. Described from Kazakhstan (Bien-Aksuiskii District, Istyk Plain). Type in Leningrad.

Series 5. *Minutuli* V. Krecz. et Gontsch. -Small plants, bearing 1-3 flowers. Flowers 2.5-3.5 mm long.

10. *J. minutulus* V. Krecz. et Gontsch. sp. nova in Addenda, II, 625. -
J. bufonius var. *parvulus* Hartm. Handb. Skand. Fl. Uppl. 7 (1858) 241.

Annual, pale green, very small and soft plants; culms 0.8-5 cm tall, filiform, erect, simple or scarcely branching at the ends; basal sheaths tawny; leaves capillary, reaching the middle of culms, soft; inflorescence bearing a solitary terminal flower or including a single branch also terminating in 1 or 2 flowers, in the former case the bract 3-5 times as long as the flower, erect; flowers 2.5-3.5 mm long; prophylla barely 1 mm long, hyaline, obtuse; perianth segments lanceolate, broadly hyaline-margined, unequal: the outer acute, 2.5-3.5 mm long, the inner shorter, subobtuse, 2-3 mm long; stamens 1-1.2 mm long, the anthers two-thirds the length of the filaments; capsule oblong-ellipsoid, brownish-green, rounded at the summit, 1.5-2.5 mm long, shorter than the inner segments; seeds ovoid, 0.3 mm long, with a dark terminal appendage. May-June.

Shores and wet depressions. -European part: Low. Don. (Krasnoarmeisk); West. Siberia: Ob.: near (?) Lake (?) districts); Medvedchikovo (?); Centr. Asia: Pribalkh. (shore of one of the saline lakes of Chiili-kop; Ayagus). Gen. distr.: West. Europe. Described from Krasnoarmeisk. Type in Leningrad.

NOTE. The plant probably tends to be overlooked on account of its insignificant size, and its distribution is undoubtedly much wider.

Subgenus 3. *Stygiopsis* (Gdgr.) O. Ktze in Post et O. Ktze, Lex. gen. phan. (1904) 303; Gdgr. in Fl. Eur. terr. adj. XXVIII (1890) 231 (pro genere). - 521 *Junci alpini* Buch. in Engl. Pflzr. IV, 36 (1906) 101. -Perennials, with short rootstocks, loosely tufted, often stoloniferous. Leaves applanate-tubular, canaliculate or flat, rarely setiform, without distinct septa, distinctly auriculate. Inflorescence simple, capitate or weakly compound, the flowers crowded in heads subtended by a common involucre. Flowers (3) 4-8 mm long, with oblong, equal or unequal perianth segments. Seeds chaffy (i. e. hyaline-margined) or caudate at both fusiform-falcate.

Cycle 1. *Biglumia* V. Krecz. et Gontsch. -Inflorescence simple, of 1-3 flowers borne on unequal pedicels; bract exceeding the inflorescence. Capsule trifid-emarginate at the summit. Flowers 3 mm long (capsule 5 mm);

perianth segments brownish, obtuse, equal or the inner ones slightly longer; stamens equaling the perianth, the filaments many times longer than the anthers.

11. *J. biglumis* L. Sp. pl. (1753) 328; E. Mey. in Ldb. Fl. Ross. IV, 2 233; Buch. in Engl. Pflzr. IV, 36 (1906) 223; Kom. Fl. Kamch. I, 282; Hultén, Fl. of Kamtch. I, 218. - Exs.: Pl. Finl. Exs. No. 559; Dörf. No. 5346.

Perennial, loosely tufted, green plants, with a short oblique rootstock; culms terete, erect, 3-15 (20) cm tall, bearing 1 or 2 leaves below; basal sheaths brownish, bladeless; leaves flattened, to 1 mm broad, half as long as the culms; inflorescence capitate, of 1-3 (4) flowers, lateral; bract short, but exceeding the inflorescence, ferruginous-brown below, spathiform; flowers 3 mm long, the terminal short-pedicelated, the lower ones sessile; prophylla ferruginous-brown, hyaline-margined, ovate, obtuse, one-third to two-thirds the length of perianth; perianth segments equal or the inner ones slightly longer, oblong-ovate, rounded-obtuse, ferruginous-brown, the margin and the summit lighter; stamens 6, as long as the perianth, the filaments many times longer than the ovoid anthers; capsule ellipsoid to obovoid, subterete-trigonus, to 5 mm long, trifid-emarginate at the summit, purplish-brown or light-colored and purple only at the angles; seeds oblong, to 1 mm long, with white appendages at both ends. June-August. (Plate XXX, Figure 9).

Peaty situations in the tundra and the alpine zone. - Arctic: Nov. Zem., Arct. Eur., Arct. Sib., Chuk., Anad.: West. Siberia: Alt.; East. Siberia: Ang. - Sayan., Daur., Len. - Kol; Far East: Kamch. Gen. distr.: Northern Europe (including Scotland) and the Alps, arctic part of North America. Described from the alpine region of Lapland.

Cycle 2. *Triglulia* V. Krecz. et Gontsch. - Inflorescence simple, of 3-6 (8) flowers, corymbose-capitate; pedicels equal, hence all flowers in terminal position; bracteoles not exceeding the perianth. Capsule obtuse or acute. Flowers 4-6 mm long (capsule 5-7 mm long); perianth segments mostly white, subequal, oblong, subobtuse or subacute; stamens as long as 522 the perianth or somewhat exserted, the anthers 0.7-2 mm long, the filaments several times longer.

Series 1. *Triglumes* V. Krecz. et Gontsch. - Perianth ferruginous-brown, its segments lance-ovate, obtuse, two-thirds the length of the capsule. Stamens not exserted.

12. *J. triglumis* L. Sp. pl. (1753) 328; E. Mey. in Ldb. Fl. Ross. IV, 233, Buch. in Engl. Pflzr. IV, 36 (1906) 214.

Perennial, green, loosely tufted plants, with a short rootstock; culms erect, terete, 5-15 cm tall, dark-colored above, leafy only at base, the basal sheaths reddish, bladeless; leaves subcanaliculate, barely 0.5-0.8 mm broad, at most half as long as the culm, with obtuse auricles; inflorescence simple, capitate, 3-5-flowered; bracts [?] subequal, broadly lanceolate, obtuse to mucronulate, ferruginous-brown, about two-thirds the length of the perianth; flowers 4 mm long; perianth segments equal, lance-ovate, obtuse, ferruginous-brown; stamens about as long as the perianth, the anthers oblong-ovoid, 0.5-0.7 mm long, the anthers several times longer; capsule trigonus, ellipsoid, dark brown, short-beaked, 6.5-7.5 mm long, i. e. nearly twice as long as the perianth; seeds to 2 mm long, white-caudate at both ends. July-August. (Plate XXX, Figure 13).

Wet places in the tundra and in the alpine zone. -Arctic: Arct. Eur., Arct. Sib.; European part: Kar. -Lap. (Khibiny); Volg. -Kam. (n. part of Ural); Caucasus; West. Siberia: Alt.; East. Siberia: Ang. -Sayan.; Centr. Asia: Dzhung. -Tarb., Tyan'-Shan, Pam. -Al. Gen. distr.: Arctic region and mountains of Western Europe. Described from the alpine zone of Lapland.

Series 2. *Leucomelani* V. Krecz. et Gontsch. -Perianth light-colored, the segments lanceolate, acute to subobtuse, only slightly exceeding the capsule; stamens more or less exerted.

13. *J. Schischkini* Kryl et Sumn. in Animad. Herb. Univ. Tomsk. 7 (1928); Kryl. Fl. Zap. Sib. III (1929) 579. -*J. triglumis* E. Mey in Ldb. Fl. Ross. IV (1853) 233. -*J. candidus* Turcz. et *J. fuscatus* Turcz. ex E. Mey in Ldb., l. c., ex p. nom. nud. (in syn.).

Perennial, pale green, loosely tufted plants, with a short rhizome; culms terete, erect, 10-25 cm tall, green all the way up, leafy below; basal sheaths brownish-ferruginous, bladeless, fibrillose; leaves applanate-setiform, to 1 mm broad, half as long as the culm with ferruginous, obtuse, obsolescent auricles; inflorescence capitate, of 3-6 (8) flowers, simple or sometimes composed of 2 or 3 subdistant heads (the lower bract sometimes longer than the head); flowers 4.5-5 mm long; prophylla ovate, tawny, subacute, as long as the perianth; perianth segments lanceolate, white to lurid, acute, unequal, the inner tepals shorter; stamens equaling to slightly exceeding the perianth; anthers ca. 0.8-0.9 mm long, oblong, the filaments many times longer; capsule trigonous, ellipsoid, tawny, 5-5.8 mm long, scarcely exceeding the perianth, mucronulate; seeds ca. 1.8 mm long, amber-colored, slenderly white-caudate. July-August. (Plate XXX, Figure 14).

Wet subalpine meadows. -West. Siberia: Alt.; East. Siberia: Ang. -Sayan, Daur., Len. Kol. Gen. distr.: Northern Mongolia, Manchuria. Described from Bashkaus river valley, between the rivers Kavuri and Mokor-Achik (Altai). Type in Tomsk.

14. *J. Thomsonii* Buch. in Bot. Zeit. XXV (1867) 148 et in Engl. Pflzr. IV, 36 (1906) 224.

Perennial, cineraceous-green, rather densely cespitose plants, with a short rootstock; culms slender, erect, 5-15 cm tall, terete, leafy at base (with 1 or 2 leaves); leaves applanate, narrowly linear, 0.5-0.8 mm broad, obtuse, not exceeding half the length of culm; lower sheaths with brownish obtuse auricles; inflorescence simple, capitate, 4-6 (8)-flowered; prophylla broadly lanceolate, subobtuse, ferruginous-brown, about as long as the perianth; flowers short-pedicel, 5-6 mm long, pale, rarely brownish; perianth segments membranaceous, lanceolate, subobtuse, equal or subequal, lurid or brownish on the back; stamens exerted, the anthers 1.5-2 mm long, linear-oblong, grayish-yellow, half as long as the filaments; capsule trigonous, ovoid, beaked, lustrous, castaneous, exceeding the perianth; seeds chaffy, 2-2.5 mm long. (Plate XXX, Figure 7).

Meadows and alpine bogs. -Centr. Asia: Pam. -Al.: river Murgab; Muskol between Chatyr-tash and Sassyk-kul; Karasu survey mark. Gen. distr.: Tibet, Mongolia. Described from north-western Himalayas.

Cycle 3. *Stygia* V. Krecz. et Gontsch. -Inflorescence 1-3-headed; flowers in heads of 1-3 (5), 3-3.5 mm long (capsule 5-6 mm long); perianth segments equal, subacute. Stamens two-thirds the length of perianth, with very small stigmas. Capsule ellipsoid.

15. *J. stygius* L. Syst. nat., ed. 10, II(1759) 987; E. Mey. in Ldb. Fl. Ross. IV, 232; Buch. in Engl. Pflzr. IV, 36 (1906) 225. — Ic.: Rchb. III. Fl. Germ. (1847), tab. 393, fig. 867. — Exs.: HFR No. 538; Pl. Finl. Exs. No. 561.

524 Perennial, green plants, forming small tufts; culms erect, terete, very slender, 10–25 cm tall, leafy up to or above the middle, solitary or several; basal sheaths few, brownish, bladeless; leaves filiform, laterally flattened, the radical leaves shorter than the culm (reaching to the middle or slightly above), the cauline mostly 2; auricles short, obtuse; inflorescence simple, capitate or comprising 2 or 3 remote heads; flowers (capsule excluded) 3–3.5 mm long, in heads of 1–5; prophylla ovate, acute, half (rarely two-thirds) as long as the perianth; bract shorter to longer than the inflorescence; perianth segments lance-oblong, equal, obtuse to subobtuse, stramineous, often reddish on the back, hyaline-margined; stamens 2–2.7 mm long, the anthers very small, the slender filaments many times longer; capsule 5–6 mm long, 1.5–2 times the length of perianth, contracted at the summit, very short-beaked, mostly stramineous; seeds few, fusiform, 2–2.4 mm long, very thick-coated. June–July.

Mossy marshes, mainly in the subarctic region. — European part: Kar. — Lap., Dv. — Pech., Lad. — Il'm., Upp. Dnepr. (Vitebsk Distr., village Artemovo), Upp. Volg. (Vishnevolotskii and Vetluzhskii districts), Volg. — Kam. (Zlatoust); West. Siberia: Ob.; Far East: Kamch. (Petropavlovsk), Uss. (Botchi river valley; Ol'ginskii Distr., vicinity of Veselyi Yar). Gen. distr.: Scandinavia, Finland, Alps. Described from Northern Europe.

Cycle 4. *Castanea* V. Krecz. et Gontsch. — Inflorescence branching, slightly compound, of (1) 2–8 (12) corymbose heads, each of (2) 5–12 (15) flowers, with a strongly developed bract. Flowers 4–8 mm long (capsule 6–10 mm); perianth segments brownish, narrow. Stamens $2/3$ – $3/4$ the length of perianth, the anthers 0.7–2–3.5 mm long. Capsule oblong to cylindrical-ellipsoid.

Series 1. *Sphacellati* V. Krecz. et Gontsch. — Anthers 2–3.5 mm long.

16. *J. macrantherus* V. Krecz. et Gontsch. sp. nova in Addenda, II, 626. — *J. castaneus* B. Fedtsch. Rust. Turk. (1915) 214 (excl. fig. 149), non Sm. — *J. sphacellatus* Buch. in Engl. Pflzr. IV, 36 (1906) 233, quoad pl. ex Tschirtschik.

Perennial, green plants with creeping rhizome and long stolons; culms terete, slightly compressed, 30–60 cm tall, with 2–3 cauline leaves; basal sheaths broad, brownish, bladeless, dull; leaves rather soft, canaliculate-folded, semilunate in cross-section, to 4 mm broad, obsoletely septate; inflorescence short-branched, comprising 2–6 heads borne on erect branches; bract equaling to exceeding the inflorescence; flowers 6–7 mm long, short-pedicelated, in corymbose fascicles of 3–10; prophylla broadly lanceolate to ovate, membranaceous, tawny, nearly equaling the perianth; perianth segments unequal: the outer lanceolate, acute, brownish-margined, green-backed, the inner narrowly lanceolate, brownish, more or less membranaceous-tipped, subobtuse, longer than the outer; stamens 5–6 mm long, the anthers linear-oblong, yellow, (2.5) 3–3.5 (4) mm long, 3–3.5 times as long as the filaments; capsule oblong-ellipsoid or oblong-ovoid; castaneous, 7–9 mm long, abruptly contracted into a beak 1–1.8 mm long; style to 2.5–3 mm long, strongly exerted; seeds oblong, light brown, 0.6–0.7 mm long, with long narrow white appendages, the overall length 3.5–4 mm long. Flowering June.

525 Wet boggy meadows, springs and streams, in the subalpine zone. - Centr. Asia: Tyan'-Shan, (w. part), Pam. - Al. Endemic. Described from Zeravshan (vicinity of Novobad). Type in Leningrad.

17. *J. himalensis* Klotzsch in Klotzsch et Garcke, Reis. Prinz. Waldem. Preus. (1862) 60, tab. 97. - *J. himalensis* var. *genuinus* Buch. in Bot. Jahrbüch, XII (1890) 405 et in Engl. Pflzr. IV, 36 (1906) 234.

Perennial, cineraceous-green plants, with creeping rootstock and slender stolons; culms rather slender, terete, 20-40 cm tall, with 1 or 2 leaves well up the culm; basal sheaths brownish, fibrillose; leaves subrigid, setaceous-canaliculate, 1.5-2 mm broad, long-acuminate, shorter than the culm, with short rounded auricles; inflorescence short-branched, contracted, comprising 1-3 (5) congested corymbose heads; bract equaling to exceeding the inflorescence; flowers 4.5-5 mm long, in 3's - 6's, distinctly pedicelled; prophylla membranaceous, acute, tawny, two-thirds the length of perianth; perianth segments unequal (the inner slightly longer), lanceolate, light brown, ferruginous-margined, the outer acute, the inner submembranaceous-tipped, subobtuse; stamens 4 mm long, the anthers 2 mm long, about equaling the filaments; capsule oblong-ovoid, pyramidal-conic at the summit, 8-9 mm long, dark castaneous, abruptly contracted into a slender subulate beak to 2 mm long; seeds oblong, 0.6 mm long, with long narrow white appendages, the inclusive length 3-4 mm long.

Centr. Asia: Pam. - Al. (Shugnan). Gen. distr.: Himalayas, from Tibet to Sikkim. Described from the western Himalayas.

Series 2. *Castanei* V. Krecz. et Gontsch. - Anthers 0.7-1.2 mm long.

18. *J. castaneus* Sm. Fl. brit., ed. 1, I (1800) 383; E. Mey. in Ldb. Fl. Ross. IV, 232, ex p.; Buch. in Engl. Pflzr. VI, 36 (1906) 233, ex p.

Perennial, green, stoloniferous plants; culms terete, erect, 10-30 cm tall, leafy at base; leaves convolute-canaliculate, to 2 mm broad, the rather broad sheaths light brown below, without auricles; inflorescence of 1-3 heads, the fairly long bract barely exceeding the inflorescence, split and brownish at base; flowers 4-4.5 mm long, aggregated 2 to 8 in hemispherical heads; prophylla ovate, finely long-acuminate, brownish, about equaling the flowers; perianth bracts subequal, lanceolate, castaneous, the outer acute, the inner subobtuse; stamens about as long as the perianth, the anthers 0.8-1 mm long, oblong, at most half as long as the filaments; capsule rounded-trigonous, oblong-ellipsoid, castaneous, obtuse, 6-7.5 mm long, mucronulate, nearly half as long again as the perianth; seeds oblong, light cinnamon-colored, caudate (the appendages at both ends long and white), 2.5-3 mm long. July. (Platé XXX, fig. 11).

526 Tundra. - Arctic: Nov. Zem., Arct. Eur. and Sib., Chuk., Anad.; Far East; Kamch. Gen. distr.: mountains of Europe, Feno-Scandia, Scotland, Iceland, North America. Described from England.

19. *J. triceps* Rostk. Monogr. gen. Junci (1801) 48, tab. I, fig. 4. - *J. castaneus* E. Mey. in Ldb. Fl. Ross. IV, 232, ex p.; Buch. in Engl. Pflzr. IV, 36 (1906) 233, ex p.; Kryl. Fl. Zap. Sib. III, 580, non Sm.

Perennial, cineraceous-green plants with creeping rootstock and rather long stolons; culms erect, 20-50 cm tall, enlarged below, leafy in basal part (lower third); basal sheaths brownish, bladeless; leaves tubular-canaliculate, to 3 mm broad, shorter than the culm, broad-sheathed, essentially exauriculate; inflorescence scantily divided, consisting of 2-5 unequal, rather stiffly erect branches bearing cymose heads of 7-15 flowers; bracts

exceeding the heads, the lower bract overtopping the inflorescence; flowers 6 – 8 mm long; prophylla ovate, tawny, subacute, two-thirds the length of perianth; perianth segments unequal, lanceolate, acute, castaneo-ferruginous, the inner shorter, submembranaceous above; stamens two-thirds as long as the perianth; anthers linear, 1 – 1.2 mm long, two-fifths to half the length of filaments; capsule rounded-trigonous, ellipsoid to oblong-ellipsoid, 7 – 9 mm long, dark brown, lustrous, short-conic at the summit, mucronulate, exceeding the perianth by merely one-fourth to one-third; seeds 2.5 – 3 mm long, whitish-caudate. June – July. (Plate XXX, fig. 12).

Meadows in the high-mountain zone. – West. Siberia: Alt. (?); East. Siberia: Yenisei, Ang. -Sayan, Daur, Len. -Kol. Gen. distr.: Northern Mongolia. Described from Siberia.

NOTE. The description applies solely to Sayan plants. It is possible that plants of the Altai constitute a distinct race.

20. *J. leucochlamys* Zing. ex V. Krecz. in Fl. transb. II (1931) 141, fig. 98 et in Addenda, II, 627. – *J. castaneus* Turcz. Fl. baic. -dah, II (1856) 241, ex p., non Sm.

527 Perennial, cineraceous-green plants, with rather long stolons; culms erect, rather firm, terete, 50 – 80 cm tall, leafy up to or above the middle; leaves accrescent, applanate-canaliculate, to 5 mm broad, broad-sheathed, exauriculate; basal sheaths bladeless, free, brownish; inflorescence a simplified umbel, with straight divaricate unequal, simple or divided branches bearing from 5 to 12 cymose fascicles; bracts long, the two lower ones greatly exceeding the inflorescence; flowers 4 – 5 mm long, aggregated in heads of 5 – 12; prophylla ovate to oblong-ovate, subobtuse, whitish, one half to two-thirds as long as the perianth; perianth segments equal, lanceolate, acute, light castaneous; stamens two-thirds the length of perianth; anthers linear, ca. 1 mm long, one-third to half as long as the filaments; capsule convexly trigonous, cylindric-ellipsoid, subferruginous, pale at base, lustrous, abruptly contracted into an extended beak, 8 – 10 mm long, at least twice as long as the perianth; seeds 3 – 3.5 mm long, caudate, the appendages long, slender, whitish. June. (Plate XXX, fig. 10, 10a).

Marshy meadows and damp forests of the subalpine zone. – East. Siberia: Ang. -Sayan, Daur, Len. -Kol. Gen. distr.: Northern Mongolia. Described from Transbaikalia (Darasun mineral waters). Type in Lenin-grad.

Subgenus 4. *Pseudo-Tenageia* V. Krecz. et Gontsch. – *Tenageia* Dumort. et *Isophyllum* Koch, ex Post et O. Ktze, supra cit., ex p. – *Junci poiophylli* Buch. in Engl., supra cit. (pro sp. perennibus). – Perennial caespitose plants. Leaves flat or channeled, linear, at most 2 – 2.5 mm long [should presumably be broad], more or less distinctly auriculate. Inflorescence sparsely branched, rarely capitate, bracteate. Flowers 2 – 5 (6) mm long, solitary, with 2 bracteoles; perianth segments mostly ovate, obtuse or subobtuse, subequal. Seeds nutlike (rarely chaffy).

Cycle 1. *Hypura* V. Krecz. et Gontsch. – Leaves with more or less distinct entire auricles. Inflorescence branching, rarely capitate, usually with a single involucral bract. Seeds nutlike, destitute of appendages, 0.3 – 0.5 mm long.

Series 1. *Compressi* V. Krecz. et Gontsch. – Flowers 2 – 3 mm long, light-colored; perianth segments obtuse, much shorter than the capsule.

21. *J. compressus* Jacq. Enum. stirp. Vindob. (1762) 60; E. Mey. in Ldb. Fl. Ross. IV, 229; Kryl. Fl. Zap. Sib. III, 565. - *J. bulbosus* L. Sp. pl. ed. 2 (1762) 466, non L. Sp. pl. ed. 1 (1753); Ldb. Fl. Alt. II, 48. - Ic.; Syreish. Ill. Fl. Mosk. gub. I, 222. - Exs.: HFR No. 1687; Pl. Finl. exs. No. 149; Fl. Pol. exs. No. 884.

Perennial, green, densely caespitose plants, with horizontally creeping rootstock; culms erect, terete or flattened, 10-30 cm tall; basal sheaths light brown, blade-bearing; leaves flat, smooth, linear, to 1 mm broad, elongate, shorter than the culm, subulate-tipped; auricles obtuse, short, membranaceous; inflorescence cymose-paniculate, rather dense, open, 5-8 cm long, with unequal abbreviated branches; bract exceeding the inflorescence; flowers 2-3 mm long, in cymose fascicles at the ends of branches; prophylla hyaline, ca. 1 mm long, obtuse; perianth segments oblong-ovate, 2 mm long, convex, obtuse, with a greenish-yellow median band, ferruginous-bordered, membranaceous-margined, subequal, the inner more rounded and more broadly hyaline, the outer more or less inrolled at the summit; stamens nearly 2 mm long, the anthers barely exceeding the filaments; capsule rounded-trigonous, subspherical, turning brown, lustrous, rounded at summit, 3 mm long, bearing a short vestige of stigma; seeds ferruginous, obovoid, to 0.3 mm long; style very short, barely reaching 0.5 mm. July - September. (Plate XXVIII, fig. 1).

528 Wet places (with consolidated soil), roadsides, streets, courtyards, marshes, flood plains, boggy meadows, borders of rivers, streams, and canals, etc. - Throughout the European part (except Arctic); Caucasus: Ciscauc., Dag., and East. Transcauc.; West. Siberia (except Arctic); East. Siberia: Yenisei, Ang.-Sayan., Daur., Len.-Kol. (s.-w. part). Gen. distr.: Western Europe, Northern Mongolia. Described from Austria (vicinity of Vienna).

22. *J. gracillimus* (Buch.) V. Krecz. et Gontsch. sp. nova in Addenda, II, 627. - *J. compressus* var. *gracillimus* Buch. in Engl. Pflzr. IV, 36 (1906) 112. - *J. compressus* Kom. Fl. Mandsh. I (1901) 427; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I, 344, non Jacq.

Perennial, light green, caespitose plants, with ligneous rhizome; culms erect, appanate-terete, (30) 50-70 cm tall, with 2 or 3 cauline leaves; basal sheaths brownish, bladeless, terminating in a point to 3 mm long; leaves linear, canaliculate, barely 1 mm broad, long, reaching the middle of the culm, abruptly attenuate, subobtuse; auricles very short, rounded; inflorescence oblong-paniculate, effuse, 10-15 cm long, with long, slender, terminally branching, erect to subnutant branches; lower bract longer than inflorescence, slender; flowers (excluding anthers) 2 mm long, disposed at the ends of branchlets; prophylla hyaline at summit, rounded, barely 1 mm long; perianth segments rounded-obtuse, convex, equal, greenish-brown, green-centered, hyaline-margined, the outer lance-elliptic, broadly hyaline-margined; stamens 1-1.5 mm long; anthers equaling the filaments, linear-oblong; capsule ovoid, 2.8-3 mm long, castaneous-brown, lustrous, subabruptly short-beaked; seeds ovoid, ca. 0.3 mm long. Flowering June, fruiting July - August. (Plate XXVIII, fig. 2).

Wet saline meadows, roadsides, and wet coastal situations. - Far East: Sakh., Ud., Ze.-Bur., Uss. Gen. distr.: Manchuria, Korea, north-eastern China, Japan. Described from the surroundings of Okeanskaya Station, by the seaside. Type in Leningrad.

Series 2. *Atrofusci* V. Krecz. et Gontsch. — Flowers 2.5–4 mm long, dark brown, the obtuse perianth segments nearly as long as the capsule (or half its length).

23. *J. Gerardi* Lois. Journ. de Bot. II (1809) 284; E. Mey. in Ldb. Fl. Ross. IV, 229. — *J. bottnicus* Whlb. Fl. lapp. (1812) 11; Ldb. Fl. Alt. II (1830) 49. — Exs.: HFR No. 741; Pl. Finl. Exs. No. 150.

Perennial, cinereous-green, loosely caespitose plants, with creeping rootstock; culms subterete, 30–50 cm tall, bearing one leaf; basal sheaths long, broad, tawny, blade-bearing; leaves smooth, canaliculate, to 2 mm broad, half as long as the culm; auricles obtuse, short; inflorescence oblong-paniculate, contracted, with unequal strict branches; lower bract shorter than to equaling the inflorescence (rarely just exceeding it); flowers 2.5–3.2 mm long, borne on the branchlet (towards its end), ranged one behind the other, but not crowded; prophylla membranaceous, light or ferruginous, barely 1 mm long, obtuse; perianth segments 2.5–3.2 mm long, broadly ferruginous, with a narrow yellowish-green median band, narrowly hyaline-margined, obtuse, subequal, the outer slightly incurved; stamens 2 mm long, the anthers three times as long as the filaments; capsule convexly trigonous, obovoid, 3–3.2 mm long, abruptly short-beaked; seeds ovoid, ferruginous, to 0.5 mm long; style to 1–1.5 mm long. June–August. (Plate XXVIII, fig. 3).

Arctic: Arct. Eur. (Murmansk); European part: Kar.-Lap., Lad.-Il'm., Upp. Volg. (Lake Nero), Mid. Dnepr., Volg.-Don., Volg.-Kam. (s. part), Prichern., Low. Don., Zavolzh., Low. Volg., Crimea; Caucasus (exc. high-mountain zone); West. Siberia: Upp. Tob., Irt., Alt.; Centr. Asia: Aral.-Casp., Pribalkh., Syr-Dar., and Amu-Dar., Kara-Kum., Mount. Turkm. Gen. distr.: Western and Southern Europe, Mediterranean, Asia Minor, Iran. Described from Provence in France.

ECONOMIC IMPORTANCE. Widely distributed in the forest-steppe, steppe and semidesert regions, where, on saline soils, it often forms solid strips of vegetation in marshes and estuaries. Reports concerning feed value are contradictory. In Kalmukiya it is made into hay and is believed to equal quackgrass in quality and to be of high lactiferous value. In other parts of the USSR its feeding value is regarded as medium or low. In pasture and in hay it is eaten more readily by cattle, much less so by other kinds of livestock. Readily eaten by rabbits at flowering time (especially the flowers).

24. *J. atrofusci* Rupr. in Beitr. Pflanzk. russ. Reich, II (1845) 59. — *J. Gerardi* var. *atrifusci* Trautv. in Bull. Soc. Nat. Moscou XL, 2 (1867) 110; Buch. in Engl. Pflzr. IV, 36 (1906) 113. — *J. Gerardi* E. Mey. in Ldb. Fl. Ross. IV (1853) 229, quoad pl. arct. et Ruprecht., non Lois. — *J. bulbosus* var. *atrofuscus* Rgl. in Bull. Soc. Nat. Mosc. XLI, 4 (1868) 172.

Perennial, rigid, cinereous-green, loosely caespitose plants, with long creeping rootstock; culms stoutish, firm, erect, 30–50 cm tall, bearing 1 or 2 leaves; basal sheaths loose, ferruginous-brown; leaves flattened, to 2 mm broad, abruptly acuminate, reaching the inflorescence; inflorescence oblong-paniculate, rather strongly contracted, with unequal erect branches; bract shorter than the inflorescence; flowers 4 mm long, borne one behind the other at the ends of branchlets; prophylla membranaceous, light brown, 1.5 mm long, rounded-obtuse, lustrous and compact below;

perianth segments lanceolate, obtuse, subreflexed, equal, dark reddish brown practically throughout or ferruginous-banded on the back, lustrous, subferruginous-margined at summit, stamens 2 mm long, the anthers lurid, 530 5—6 times as long as the filaments; capsule obovoid, 3.8—4 mm long, brownish, abruptly contracted into a short beak; seeds obovoid, ca. 0.5 mm long, subferruginous. Fruiting June—July. (Plate XXVIII, fig. 4).

Saline coastal places. — Arctic: Arct. Eur.; European part: Kar.—Lap. and Dv.-Pech. (coast and islands of the White Sea); West. Siberia: Ob. (s.-e. part), Irt. (s.-e. part), Alt.; East. Siberia: Yenis., Ang.-Sayan., Daur., Len.-Kol. (w. part); Centr. Asia: Pribalkh. (e. part), Dzhung.-Tarb., Tyan'-Shan. (e.). Gen. distr.: Northern Mongolia. Described from the estuary of river Indiga. Type in Leningrad.

NOTE. Hybridizing with *J. salsuginosus* Turcz., giving rise to intermediate forms.

25. *J. heptopotamicus* V. Krecz. et Gontsch. sp. nova in Addenda II, 628. — *J. bulbosus* var. *salsuginosus* Rgl. in Bull. Soc. Nat. Moscou, XLI, 4 (1868) 272. — *J. bulbosus* var. *nigricans* Rgl., l. c., exp. — *J. Gerardi* var. *salsuginosus* Buch. in Engl. Pflzr. IV, 36 (1906) 113, exp.

Perennial, cinereous-green (yellowish) plants, with creeping rootstock; culms erect, terete, 10—30 (40) cm tall; basal sheaths brownish, bladeless; leaves canaliculate, applanate, 1—1.3 mm broad, abruptly obtuse-tipped, two-thirds the length of the culm; auricles obsolescent, rounded; inflorescence subcymose-capitate, congested, with 2—5 short divaricate branches; bract equaling to exceeding the inflorescence, erect; flowers (excluding anthers) 3.5—4 mm long, aggregated in glomerules of 2—5 at ends of branches; prophylla ferruginous-brown, ca. 1.5 mm long, rounded, hyaline-margined; perianth segments oblong-elliptic to lance-elliptic, rounded-obtuse, applanate-cuneate, broadly subferruginous-green on the back, with a broad purplish brown margin, essentially non-membranaceous, equal; stamens ca. 2 mm long, the anthers 3—4 times the length of the filaments; capsule oblong-ovoid, 4—5 mm long, brown, rounded at summit, beaked, much longer than the perianth; seeds ferruginous, 0.5 mm long, ovoid. Fruiting June—July. (Plate XXVIII, fig. 6).

Sasa, solonchaks. — Centr. Asia: Pribalkh. (s), Dzhung.-Tarb. (Dzhungarian Alatau), Tyan'-Shan. (e.), Pam.-Al. (Ara-bulak Pass). Gen. distr.: Dzhungariya. Described from Dzharkentskii District (Kara-Saz survey point). Type in Leningrad.

Series 3. *Salsuginosi* V. Krecz. et Gontsch. — Flowers 4—5 mm long, few, the blackish-brown acute perianth segments exceeding the capsule; inner perianth segments shorter than the outer.

26. *J. salsuginosus* Turcz. in Bull. Soc. Nat. Moscou XI (1838) 103, nomen et ib., XXVIII, 1 (1855) 304; E. Mey. in Ldb. Fl. Ross. IV, 230; V. Krecz. in Fl. transb. II, 142, exp. — *J. Gerardi* var. *salsuginosus* Buch. Monogr. Junc. (1890) 189 et in Engl. Pflzr. IV, 36 (1906) 113.

531 Perennial, cinereous-green plants, with creeping ligneous rootstock; culms erect, 10—30 cm tall; basal sheaths brownish, fibrillose, bladeless; leaves thickened towards the apex, canaliculate-convolute, 1—1.5 mm broad; half as long as the culm, abruptly obtuse-tipped; inflorescence subcymose-capitate, the few flowers congested to subdistant; lower bract suberect, rigid, exceeding the inflorescence; flowers 4—5 mm long, aggregated in capitate glomerules of 2—3; prophylla ca. 2 mm long, ferruginous,

rounded-truncate, membranaceous; perianth segments lance-cuneate, subcarinate, acute, purplish-brown or blackish-purple, with a narrow subferruginous membranaceous margin, the outer somewhat longer, slightly reflexed at the summit; stamens 3—4 mm long, with obsolescent filaments; capsule ovoid or ellipsoid, 3.5—4.5 (5) mm long, blackish-purple, flattened at the summit, short-beaked; seeds ovoid-cylindric, 0.8 mm long, ferruginous. June—July. (Plate XXVIII, fig. 5).

Wet solonetz soils and saline mountain bogs. — East, Siberia: Daur. (parts adjoining Mongolia). Gen. distr.: Mongolia. Described from river Temnik (Borgo desert). Type in Khar'kov.

Series 4. *Soranthi* V. Krecz. et Gontsch. — Flowers 3—4 mm long, ferruginous or light-colored, with obtuse or subacute segments. Flowers more or less fasciculate. Leaves channeled, flattened, with narrow sheaths.

27. *J. soranthus* Schrenk in Bull. phys.-math. Ac. St. Pétersb. II (1843) 194; Becker in Bull. Soc. Nat. Moscou, XXXI (1858) 75. — *J. compressus* var. *coarctatus* Buch. in Engl. Pflzr. IV, 36 (1906) 112. — *J. Gerardi* E. Mey. in Ldb. Fl. Ross. IV (1853) 229, ex p. — *J. Gerardi* var. *soranthus* Trautv. in Bull. Soc. Nat. Moscou XL, 2 (1867) 110; Buch., l. c., 113. — *J. bulbosus* var. *soranthus* Rgl. in Bull. Soc. Nat. Moscou XLI, 4 (1863) 272.

Perennial, cinereous-green, caespitose plants, with short creeping rootstock; culms erect, firm, 30—50 cm tall, leafy only at base; basal sheaths scale-like or nearly so, light brown, subfibrillose; leaves canaliculate-convolute, 2—2.5 mm broad, long-acuminate, reaching the inflorescence; auricles short, subobtuse; inflorescence cymose, with few, rather short, markedly unequal, erect branches; bract shorter than to equaling the inflorescence, rarely longer (and then inflorescence rather strongly congested); flowers 3—4 mm long, crowded in glomerules of 2—4 at the ends of branches and in branch axils; prophylla subcoriaceous, ferruginous, to 1 mm long, obtuse, narrowly hyaline-margined; perianth segments subferruginous-stramineous on the back, ferruginous-banded, narrowly white-hyaline-margined, equal; stamens nearly 2 mm long, the anthers 5—6 times as long as the filaments; capsule obovoid, 3.7—4 mm long, subferruginous-honey-colored to ferruginous, lustrous, slightly exceeding the perianth, rounded at summit, short-cuspidate-beaked; seeds ovoid, ca. 0.5—0.6 mm long, ferruginous. Fruiting June—July. (Plate XXVIII, fig. 8).

Saline situations. — European part: Low. Don., Low. Volg., Crimea (Biyuk-Kara-su); Caucasus: Ciscauc.; West, Siberia: Upp. Tob., Irt.; Centr. 532 Asia: Aral.-Casp., Pribalkh., Syr-Dar. Gen. distr.: Kulja, Dzhungariya. Described from the Semipalatinsk District (Ters-Akkan). Type in Lenin-grad.

28. *J. jaxarticus* V. Krecz. et Gontsch. sp. nova in Addenda II, 628. — *J. Gerardi* B. Fedtsch. Rast. Turk. (1915) 212, ex p., non Lois. — *J. Gerardi* var. *soranthus* Drob. in herb., non Trautv.

Perennial, glaucous-green, rather densely caespitose plants, with a creeping rootstock; culms firm, erect, 30—60 cm tall, usually bearing one leaf at the middle; basal sheaths brownish, scale-like, subfibrillose; leaves canaliculate-applanate, to 2 mm broad, abruptly acuminate, barely half as long as the culm; inflorescence oblong-paniculate, with erect branches; flowers 4 mm long, aggregated at the ends of branches, the 2 terminal ones

sometimes glomerate; prophylla membranaceous, pale, ovate, acute, 1.5 mm long, perianth segments broadly lanceolate to lanceolate, with a broad light-green center, becoming stramineous, slightly ferruginous-bordered, hyaline-margined, especially the often somewhat longer outer ones; stamens nearly 2 mm long, the anthers 3—4 times the length of filaments; capsule obovoid, 3.5 mm long, greenish-brown, subabruptly contracted to a short beak, exceeded by the perianth; seeds ferruginous, ovoid, ca. 0.5 mm long. Flowering May, fruiting June. (Plate XXVIII, fig. 7).

Solonchaks. — Centr. Asia: Syr-Dar., Kyz.-Kum., Aral.-Casp. beyond Syr-Dar. and south of Sary-Su), Amu-Dar. (Farab), Pribalkh. (Ak-kul' Oasis and to the south of the Ul'kun-Burul Range). Endemic. Described from Fergana (river Khan-aryk). Type in Leningrad.

Series 5. *Squarrosi* V. Krecz. et Gontsch. — Flowers 5—6 mm long; perianth segments acute, shorter than the capsule. Leaves thickened; basal sheaths broad.

29. *J. squarrosus* L. Sp. pl. (1753) 327; E. Mey. in Ldb. Fl. Ross. IV, 231; Buch. in Engl. Pflzr. IV, 36 (1906) 110. — Ic.: Hegi, Ill. Fl. II, 161, fig. 289. — Exs.: HFR No. 86; Kneuck. II, No. 48.

Perennial, cinereous-green, densely caespitose plants, with a short rootstock; culms erect, firm, obtusely angled, 15—35 cm tall, leafy only at base; basal sheaths tawny, broadly scale-like, blade-bearing; leaves many, rigid, crowded at culm base, arcuately spreading, setaceous-folded, 1—1.5 mm broad, smooth, acuminate, reaching the middle of the culm; sheaths broadly scale-like, the auricles membranaceous, rounded; inflorescence contracted-umbellate, with many unequal erect branches, hence interrupted; bract nearly equaling the inflorescence; flowers 5—6 mm long, forming cymose clusters of glomerules at the ends of branches; prophylla membranaceous, acute, 3—3.5 mm long; perianth segments lanceolate, subcarinate, tawny, hyaline-margined, subacute, equal; stamens ca. 3 mm long, linear, the anthers 3 times the length of the filaments; capsule obovoid, 4—5 mm long, brownish, rounded at summit, obscurely beaked, shorter than the perianth; seeds ellipsoid, brownish, 1 mm long. Fruiting June.

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Mossy and peaty bogs. — European part: Lad.-Il'm., Upp. Dnpr. (w. part), Mid. Dnepr. (n. - w. part). Gen. distr.: Baltic States, Poland, Western Europe. Described from Northern Europe (Sweden).

Series 6. *Tenuis* V. Krecz. et Gontsch. — Flowers 4—5 mm long; perianth segments light-colored, lanceolate, finely pointed. Involucral bracts 2.

30. *J. tenuis* Willd. Sp. pl. II (1799) 214; Buch. in Engl. Pflzr. IV, 36 (1906) 115. — Ic.: Hegi, Ill. Fl. II, fig. 228 (p. 160).

Perennial, green, densely caespitose plants, with a short rootstock; culms slender, obtusely angled, 10—40 cm tall, leafy below; basal sheaths brownish; leaves linear, subflaccid, applanate-caniculate, 1-1.3 mm broad, half length of culm or more; sheaths with auricles 3 mm long, oblong rounded-obtuse; inflorescence subcymose-paniculate, with unequal, abbreviated, divaricate branches; inflorescence subtended by 2 involucral bracts, of these one nearly equaling the inflorescence, the other nearly twice as long; flowers 4—5 mm long, crowded in rows or in glomerules at the ends of branches; prophylla membranaceous, oblong-ovate, acute, ca. 2 mm long; perianth segments lanceolate, finely pointed, yellowish-green, hyaline-margined, the inner ones slightly shorter; stamens ca. 1.5 mm long, oblong, one-third

to half the length of filaments; capsule ovoid, brownish-yellow, 3.5—4 mm long, obtuse, obscurely beaked, shorter than the perianth; seeds oblong, brownish, ca. 0.3 mm long, short-mucronate. Fruiting June—July.

Meadows, forest roads. — European part: possibly in w. part of Mid-Dnepr.; Upp. Volg. (Sergievo-Shapilovo), Volg.-Don. (Khar'kov), Crimea (Sivash, Steven. ?); Caucasus: Ciscauc., West. Transcauc. (Novorossiisk). Gen. distr.: Poland, Western Europe. Described from North America.

NOTE. *Tsirina*'s specimen from Biyuk-Kara-Su (see Wulff, Fl. taur. I, 2, 54), if labels have not been mixed up, is actually Schrenk's *J. soranthus*.

Cycle 2. *Thysanura* V. Krecz. et Gontsch. — Leaves with fimbriate auricles. Inflorescence more or less simple, of 1—4 flowers; involucrel bracts 2—3, very long. Seeds chaffy, to 1.5 mm long, hyaline-margined.

31. *J. trifidus* L. Sp. pl. (1753) 326; E. Mey. in Ldb. Fl. Ross. IV, 233; Buch. in Engl. Pflzr. IV, 36 (1906) 109. — Exs.: Pl. Finl. exs. No. 148a, 148b.

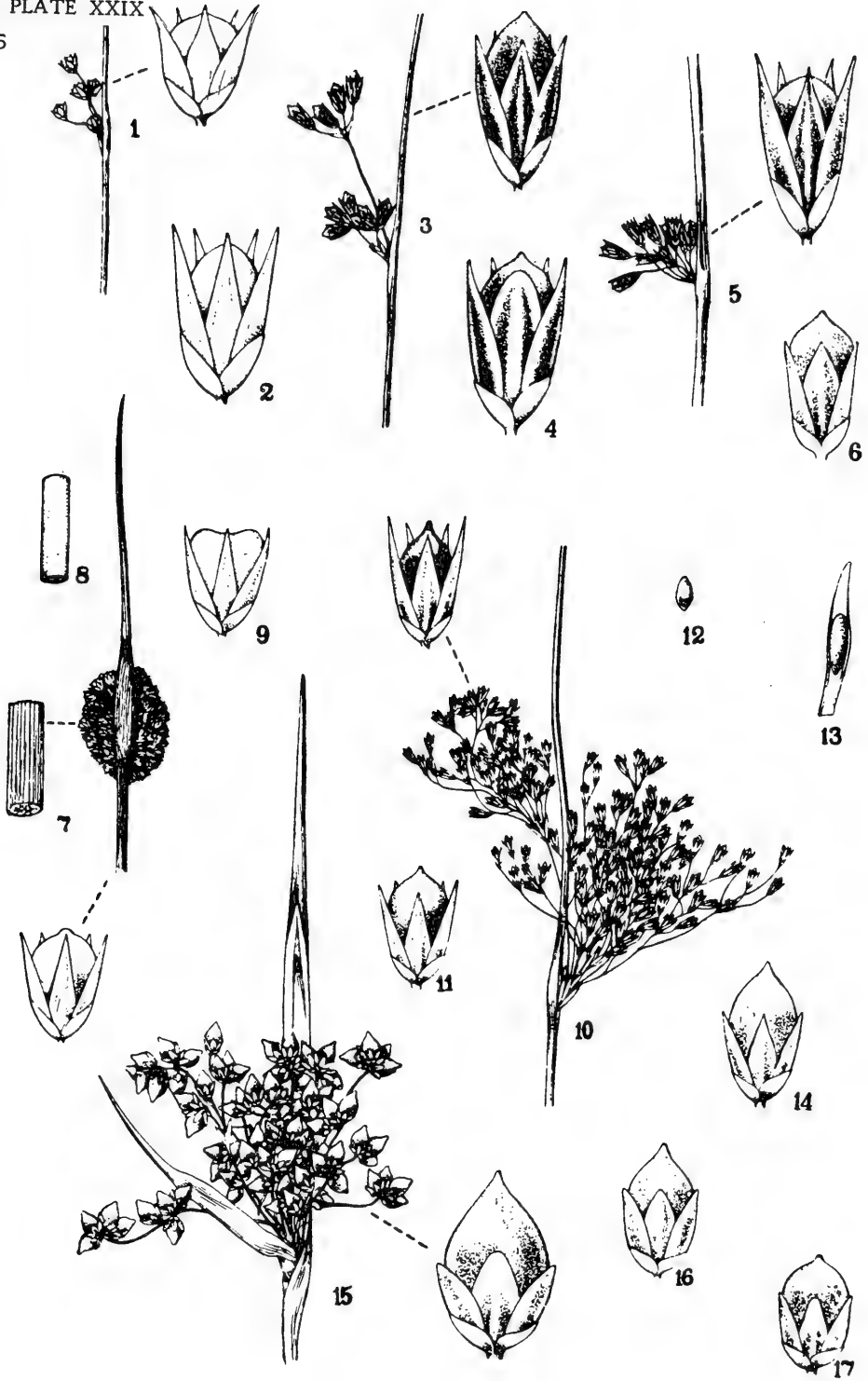
Perennial, glaucescent-green, densely caespitose plants, with a creeping rootstock; culms numerous, arising in rows, erect, subapplanate-terete, 10—30 cm tall, bearing 1—3 leaves; basal sheaths scale-like, the 534 upper ones tubular, yellowish-gray, bladeless; leaves linear, the radical very short, the cauline borne near the apex, applanate-canaliculate, 0.5—0.8 mm broad, finely pointed, equaling the involucrel bracts, becoming brown above; auricles membranaceous, long-fimbriate, 5—6 mm long, inflorescence capitate, of 1—4 flowers, sometimes one of the flowers remote; bracts foliaceous, very long, resembling the upper cauline leaves, and similarly furnished with fimbriate auricles; flowers (excluding capsule) 2.5—3 mm long, congested; prophylla ovate, ferruginous, obtusely hyaline-tipped, to 2 mm long; perianth segments broadly lanceolate, acuminate, equal or subequal, narrowly hyaline-margined; stamens ca. 1.5 mm long, the anthers linear-oblong, twice the length of filaments; capsule longer than the perianth, ovaloid-trigonus, rather abruptly contracted into a long beak, castaneous or ferruginous, 3—4 mm long; seeds irregular, chaffy, to 1.5 mm long, hyaline-margined. July.

Arctic and high-mountain tundra. — Arctic: Nov. Zem. (Kolguev), Arct. Eur., Arct. Sib. (Nakhodka Creek in the Ob Bay, Nadym river basin); European part: Kar.-Lap. (Khibiny, Kol'skii Peninsula), Dv.-Pech. (n.-e. Cisuralian part; Mt. Sablya), Volg.-Kam. (beyond Ural, southward of Kerlygan Mts. and Kress-Taskyl). Gen. distr.: European and American arctic region, mountains of Europe and Asia. Described from the Alps of Lapland [sic].

Subgenus 5. *Ozophyllum* (Dumort.) O. Ktze in Post et O. Ktze Lex. gen. phan. (1904) 303. — *Ozophyllum* Dumort. ex O. Ktze, l.c. (progenere). — *Phylloschoenus* Fourr. in Ann. Soc. Linn. Lyon, n. sér. XVII (1869) 172 (progenere). — *Arthrophyllon* C. Koch in Linnaea XXI (1848) 627 (pro sectione).

Explanation to Plate XXIX

1. *Juncus filiformis* L.: inflorescence and flower. — 2. *J. brachyspathus* Maxim.: flower. — 3. *J. balticus* Willd. — 4. *J. arcticus* Willd. — 5. *J. Haenkei* E. Mey. — 6. *J. Muellieri* Trautv. — 7. *J. Leersii* Marss.: inflorescence, flower, and portion of culm. — 8. *J. effusus* L.: portion of culm. — 9. *J. decipiens* (Buch.) V. Krecz. et Gontsch. — 10. *J. inflexus* L.: inflorescence and flower. — 11. *J. paniculatus* Hoppe: flower. — 12. *J. filiformis* L.: seed. 13. *J. beringensis* Buch.: seed. — 14. *J. brachytepalus* (Trautv.) V. Krecz. et Gontsch. — 15. *J. acutus* L.: inflorescence and flower.



— *Junci septati* Buch. in Engl. Pflzr. IV, 36 (1906) 101. — Perennials (rarely annuals), loosely caespitose, with a short rootstock, sometimes stoloniferous. Leaves tubular, more or less flattened, nodose-septate (hence dry leaves articulate), with short obtuse auricles. Inflorescence subcompound to strongly compound, bracteate. Flowers 2-4 mm long, gathered in glomerules, with common bracteate involucre. Perianth segments lanceolate, equal or unequal. Seeds nutlike (rarely caudate).

Cycle 1. *Nomalosperma* V. Krecz. et Gontsch. — Seeds nutlike, non-caudate, 0.4-0.7 mm long.

537 Series 1. *Supini* V. Krecz. et Gontsch. — Culms decumbent, rooting; leaves filiform. Flowers 3.5-4 mm long, green; outer perianth segments acute, the inner obtuse.

32. *J. bulbosus* L. Sp. pl. (1753) 327, non L. Sp. pl., ed. 2. — *J. supinus* Moench, Enum. pl. Hassiae I (1777) 167. — *J. setifolius* Ehrh. Calam. exs. Dec. XII No. 86 et Beitr. VI (1791) 83; E. Mey. in Ldb. Fl. Ross. IV, 227. — Ic.: Hegi Ill. Fl. II, 168, fig. 296. — Exs.: HFR No. 169, No. 154 (var. *pygmaeus*); Pl. Finl. Exs. No. 562 (f. *fluitans*).

Perennial, green, non-rhizomatous plants, forming fasciculate tufts, usually flowering in their first year; culms very slender, terete, erect or ascending (and rooting at the nodes), more or less branching in upper part, 2-15 (25) cm tall; radical leaves shorter than the culm, the lower reduced to bladeless, broadly hyaline-margined sheaths, the upper long-sheathing, with a slender, narrowly linear, filiform or capillary, obscurely nodose-septate blade; auricles long, obtuse; cauline leaves 1 or 2, shorter than the inflorescence; inflorescence slightly forking, umbellate, rarely simple, subpaniculate, containing few remote heads; heads 2-6-(8)-flowered, to 8 mm broad, often viviparous or leafy-tufted; prophylla broadly hyaline-margined, oval, acuminate to subobtuse, mostly one-half to two-thirds the length of the perianth; flowers 3.5-4 mm long; perianth segments lance-oblong, subequal, the outer acute, the inner subobtuse to obtuse, broadly hyaline-margined; stamens mostly 3, 1.5-1.7 mm long, half as long as the tepals; anthers ovaloid-oblong, about as long as (rarely shorter than) filaments; style short; capsule barely or slightly exceeding the perianth, oblong-ovaloid, obtuse, mucronulate, brown; seeds 0.5-0.6 mm long, obovaloid, acute, subferruginous. June-July.

Forest bogs, meadows, canals, and shores. — European part: Lad.-Il'm., Upp. Dnepr., Mid. Dnepr. (n.-w. part). Gen. distr.: Western and Central Europe (except n. and s.), Algeria, Tunisia, Madeira, Azores. Described from Hessen (Mt. Tammelsberg, near Marburg).

NOTE. Of frequent occurrence are aquatic forms (f. *fluitans*) with strongly elongated culms, capillary leaves, and few-flowered, very lax heads.

Series 2. *Alpini* V. Krecz. et Gontsch. — All perianth segments obtuse, the outer mucronulate. Flowers 2.5-3 mm long.

33. *J. alpinus* Vill. Hist. pl. Dauph. II (1787) 233; E. Mey. in Ldb. Fl. Ross. IV, 224. — *J. fusco-ater* Turcz. et auct. nonn. fl. Ross. non Schreb. — *J. erectus* Bess. Prim. fl. Gal. I (1809) 241. — *J. Fischeri* Turcz. in Bull. Soc. Nat. Moscou III (1855) 303. — *J. Fischerianus* V. Krecz. in Fl. transb. II (1931) 142. — Exs.: HFR No. 1684 a et b; Pl. Finl. exs. No. 563, 564.

538 Perennial, green, caespitose plants, with a short creeping rootstock; culms erect appanate-terete, 15-50 cm tall, leafy; basal sheaths light

brown, essentially bladeless; leaves applanate-terete, obscurely articulate, shorter than the culm; auricles rounded, to 1.5 mm long; inflorescence compound, umbellate-paniculate, with obliquely rising branches; involucreal leaves poorly developed, short; flowers 2.5–3 mm long (excluding capsule), in glomerules of 3–8, pale, castaneous to blackish-brown; prophylla ovate, acute, hyaline or ferruginous, reaching the middle of perianth; perianth segments equal, ovate to oblong-ovate, hyaline-margined, obtuse, the outer mucronate; stamens 6, to 1.5 mm long, the anthers about as long as the filaments, white, oblong; capsule trigonous, oblong-ovoid to ovoid, obtuse, castaneous to blackish-brown, 2.8–3.5 mm long, slightly exceeding the perianth, short-pointed; seeds castaneous, 0.4–0.7 mm long, oblong-ovoid, reticulate. June – July. (Plate XXX, fig. 4).

Wet meadows, roadways, shores, and sands.— Throughout Arctic; European part: throughout (scarcer towards s.-e.), except Low. Volg.; all Caucasus; all West and East Siberia; Far East: Kamchatka. Gen. distr.: Europe, Asia Minor, North America. Described from France (Dauphine, mountains of Briançon).

Series 3. *Articulati* V. Krecz. et Gontsch. — Flowers 2.5–3 mm long, the outer perianth segments always acute, the inner obtuse or subacute.

34. *J. lampocarpus* Ehrh. Calam. No. 126 (ca. 1791) et ex Davis in Trans. Linn. Soc. X (1810) 135; Buch. in Engl. Jahrb. XII (1890) 376.— *J. articulatus* L. Sp. pl. (1753) 465, ex p.; E. Mey. in Ldb. Fl. Ross. IV, 225, ex p.— *J. acutiflorus* auct. nonn. fl. ross., non Ehrh.— Ic.: Syreish. Ill. Fl. Mosk. gubern. I, 227.— Exs.: HFR No. 1689.

Perennial, green plants, with a short rhizome; culms terete, faintly sulcate, 20–60 cm tall; basal sheaths reddish-brown; leaves terete, prominently septate-nodose, shorter than the culm; sheaths broad, with elongated obtuse auricles; inflorescence subcymose, the branches few, terminally divaricate, dichotomously forking two or three times; bract erect, half as long as the inflorescence; flowers 2.5–3 mm long, crowded in spherical glomerules of 8–12 in axils and at the ends of branches; prophylla lanceolate, acute; perianth segments lanceolate, equal, greenish-centered, with brownish periphery and white-hyaline-margined, the outer subacute to acute, the inner subobtuse to obtuse; stamens 1.8 mm long, the anthers about equaling filaments; capsule trigonous, oblong-ellipsoid, distinctly short-beaked, brownish, lustrous, 3.5–4 mm long, nearly one and a half times the length of perianth segments; seeds light brown, 0.5 mm long, ovoid. June – August. (Plate XXX, fig. 1a).

Marshes, wet situations, and shores.— European part (except the Arctic region); Caucasus; East Siberia: Ob., Irt., Alt.; Centr. Asia (except high mountains). Gen. distr.: Western Europe, North Africa, Asia Minor, Iran, north-western Mongolia. Described from northern Europe.

35. *J. Turczaninowii* (Buch.) V. Krecz. sp. nova in Addenda, II, 629.— *J. lampocarpus* var. *Turczaninowii* Buch. in Engl. Bot. Jahrb. XII (1890) 378 et in Engl. Pflzr. IV, 36 (1906) 219.— *J. virens* V. Krecz. in Fl. transb. II (1931) 142, ex p., non Buch.— *J. lampocarpus* Kom. et Alis. Key pl. east. reg. USSR I (1931) 353, ex p., non Ehrh.

Perennial, light green plants, with a short creeping rhizome; culms terete, finely sulcate, 20–50 cm tall; leaves rather soft, applanate-terete, obscurely septate, with weakly developed suborbicular auricles and broad

sheaths; inflorescence compound-umbellate, somewhat compact, many-branched; bract erect, shorter than the inflorescence; flowers 2–2.3 mm long, in hemispherical glomerules of 6–9 at ends of branches and in axils; prophylla ovate, acute; perianth segments equal, lanceolate, acute or the inner ones subacute, greenish, scarcely brownish and hyaline-margined; stamens 1.5 mm long, the anthers oblong-ellipsoid, about half the length of filaments; capsule oblong-ellipsoid, 2.8–3 mm long, distinctly short-beaked, brownish, lustrous, slightly longer than the perianth; seeds to 0.4 mm long, ovoid. July–August.

Marshes and wet places. — East. Siberia: Daur. (Nerchinskii District); Far East: Ze.-Bur., Ud., Uss., Sakh. Gen. distr.: North-eastern Mongolia, Manchuria. Described from Nerchinsk. Type in Leningrad.

Series 4. *Pyramidati* V. Krecz. et Gontsch. — Plants producing rooting stolons. Flowers 3 mm long; perianth segments unequal, acute; flowers aggregated in many-flowered heads.

36. *J. Kotschyi* Boiss. Diagn. ser. 1, VII (1846) 101; B. Fedtsch. et Gontsch. in Fl. Turkm. 1, 2 (1932) 245. — *J. pyramidatus* var. *Kotschyi* Boiss. Fl. Or. V (1884) 356. — *J. Fontanesii* var. *Kotschyi* Buch. in Engl. Pflzr. IV, 36 (1906) 192.

Perennial, green plants, with rooting stolons; culms erect, 10–35 cm long; basal sheaths hyaline-margined, rounded at apex, short-cuspidate; leaves flattened, subfalcate, distinctly septate; inflorescence subcompound to compound, the subdivaricate branches bearing 4–10 heads; bract much shorter than the inflorescence; flowers 3 mm long (including capsule), 8–10 per head; inner perianth segments broadly lanceolate, longer than the lanceolate outer segments, acute, yellowish-green; stamens 6, the anthers linear, longer than filaments; capsule trigonous, ovoid, 4 mm long, green, at length reddish, abruptly short-beaked; seeds pyriform, 0.4–0.5 mm long, apiculate, golden-yellow. Fruiting June.

Centr. Asia: Mount. Turkm. (Kushka). Gen. distr.: Persia. Described from Persia (Mt. Sabst-Bushom, near Shizar). Type in Geneva.

540 37. *J. arianus* V. Krecz. in Bull. Jard. Bot. URSS, XXX, 1–2 (1931) 99; B. Fedtsch. et Gontsch. in Fl. Turkm. 1, 2 (1932) 245.

Perennial, cinereous-green plants, the procumbent stolons rooting at the nodes; culms suberect to erect, 8–10 cm long; basal sheaths reddish-purple, white-membranaceous, rounded at apex, bladeless; leaves subfalcate, distinctly septate; auricles ovate, obtuse; inflorescence of 1–3 approximate heads, the heads spherical, many-flowered, to 1 cm in diameter; bract longer than the inflorescence, inflated at base; flowers 3 mm long, the segments equal, lanceolate, acute, hyaline-margined, purplish-brown, more or less green-backed; capsule trigonous, ovoid, gradually attenuate to a short beak, 4.5 mm long, purplish-brown, lustrous; seeds pyriform to fusiform. Fruiting September.

Wet saline places. — Centr. Asia: Mount. Turkm. (Kushka river valley, near Chil'dukhter). Endemic. Described from location indicated. Type in Leningrad.

Series 5. *Prismatocarpus* V. Krecz. et Gontsch. — Flowers 3–4 mm long, aggregated in fasciculate-stellate heads, pale green; all perianth segments acuminate. Capsule equaling to slightly exceeding the outer perianth segments.

38. *J. Leschenaultii* Gay in Laharpe, Monogr. Jonc. (1827) 137. — *J. prismatocarpus* var. *Leschenaultii* Buch. in Engl. Pflzr. IV,

36 (1906) 152 (incl. var. *thermalis* Buch.); Kom. Fl. Kamch. I, 280. — *J. prismatocarpus* var. *thermalis* Hultén, Fl. of Kamtch. I (1927) 222.

Annual or perennial, green plants, forming small tufts; culms slender, rather weak, flattened, 15–30 cm tall; leaves flat, slender, obscurely septate, 0.7–1.5 mm broad, shorter than the culm; auricles of basal sheaths rounded, to 1 mm long; inflorescence umbellate-paniculate, with long slender branches; flowers 3–4 mm long, congested in fasciculate-stellate heads of 3–12, the heads 8–10 mm in diameter, very remote; prophylla membranaceous, oval, acute, reaching the middle of perianth; perianth segments narrowly lanceolate, subulate-tipped, terminating in a slightly reflexed point, subequal, green, indurated, scarcely hyaline-margined; stamens 3, half as long as the perianth, the anthers oblong, half the length of filaments; capsule oblong in lower part, trigonous-conic above, equaling to exceeding the outer tepals, lustrous, castaneous; seeds light castaneous, ellipsoid-ovoid, acute, 0.5–0.6 mm long. Fruiting July. (Plate XXX, fig. 2).

Borders of springs and shores. — Far East: Kamch., Okhot., Ud. Gen. distr.: India, China, Japan. Described from India (Nilgiri Hills).

Series 6. *Papilloso* V. Krecz. et Gontsch. — Plants minutely papillose. Inner perianth segments longer than the outer.

39. *J. nipponensis* Buch. in Engl. Bot. Jahrb. XII (1899) 340 et in Engl. Pflzr. IV, 36 (1906) 198.

- 341 Annual or perennial, green (turning blackish upon drying), stoloniferous plants; culms appanate-terete, (25) 50–70 cm tall, leafy up to the middle; leaves soft, appanate, faintly septate, 1.5–2 mm broad, with more or less free sheaths, the auricles subobtusate, short; inflorescence widely spreading, compound umbellate-paniculate, with numerous, ascending, repeatedly and compactly forking branches; bract one-third to half the length of inflorescence; flowers 2.5 mm long, in few-flowered glomerules (1–3–5 flowers), these thinning out gradually towards the ends of branches to paired or solitary flowers; prophylla membranaceous, ovate, acute, half as long as the perianth; perianth segments green, hyaline-margined, narrowly lanceolate, acute, the inner ones shorter; stamens ca. 2 mm long, the ellipsoid anthers greatly exceeded by the filaments; capsule trigonous-prismatic, lanceolate, gradually attenuate to an elongated point, 3.5–4 mm long, one and a half times the length of perianth, stramineo-ferruginous; seeds ca. 0.4 mm long, obovoid, tawny. July–September. (Plate XXX, fig. 8).

Wet places. — Far East: Uss. (Murav'ev-Amurskii Peninsula, near Vladivostok-Transhel'). Gen. distr.: Japan. Described from Nippon (Yokohama). Type in Leningrad.

40. *J. virens* Buch. in Engl. Pflzr. IV, 36 (1906) 220. — *J. nipponensis* Kom. Fl. Mandsh. I (1901) 429, non Buch. — *J. papillosus* Kom. et Alis. Key pl. east. reg. USSR I (1931) 353, non Franch. et Sav.

Perennial, light green, short-stoloniferous plants; culms terete, rather firm, 10–40 cm tall, leafy to fairly high up; leaves rather firm, appanate-terete, distinctly septate, more or less free-sheathing; inflorescence compound, compactly paniculate-umbellate, subsecond-lobate, with abbreviated erect branches; bract shorter than to equaling the inflorescence; flowers 2–2.3 mm long, in glomerules of 2–5, in pairs at the ends of branches,

the ultimate ramifications drawn out in a line and hence ramifications and flowers appearing unilateral; prophylla membranaceous, ovate, acute, half as long as the perianth; perianth segments coriaceous, thickened, green, hyaline-margined, acute, unequal, the inner slightly longer; stamens 3, 1.8 mm long, the anthers oblong, one-half to two-thirds the length of filaments; capsule trigonous, broadly lanceolate, rather abruptly short-beaked, 3 mm long, brownish; seeds 0.4—0.5 mm long, lanceolate, tawny. Fruiting June—August. (Plate XXX, fig. 3).

Shallows and peaty meadows.—Far East: Ze.-Bur., Ud., Uss., Sakh. Gen. distr.: Japan. Described from vicinity of Blagoveshchensk.

Series 7. *Acutiflori* V. Krecz. et Gontsch.—Flowers 3 mm long, aggregated in fasciculate heads, dark; all perianth segments long-acuminate; capsule elongate-beaked, longer than the perianth.

41. *J. atratus* Krock. Fl. siles. I (1787) 562.—*J. acutiflorus* Litw. in Maevsk. Fl. Sr. Ross. 5th ed. (1917) 662, non Ehrh.—*J. sylvaticus* Schmalh. Fl. Yu.-Z. Ross. (1886) 601, non Ehrh.—Exs.: HFR No. 492; Kneuck. II, No. 52.

Perennial, dull green plants, with a creeping rootstock; culms terete, subsulcate to smooth, 50—120 cm tall, leafy nearly up to the middle; basal sheaths brownish; leaves subcylindric-prismatic, strongly sulcate when dry, shorter than the culm, obscurely septate, with broad hyaline-margined sheaths, the auricles subobtuse; inflorescence compound, irregularly umbellate-paniculate, the branches numerous, erect or drooping (in shade); flowers 3 mm long, in hemispherical heads of (2) 6—10; prophylla membranaceous, ovate, acute, up to half the length of perianth; perianth segments equal or subequal, blackish-brown, scarcely hyaline-margined, apiculate, slightly reflexed; stamens ca. 2 mm long, anther nearly as long as filament; capsule trigonous, subabruptly elongate-beaked, castaneous, 3.5—3.8 mm long; seeds lanceolate, black-apiculate at the ends, 0.5—0.6 mm long. June—July. (Plate XXX, fig. 5).

Woods, forest glades and margins, shores.—European part: Upp. Dnepr., Upp. Volg. (Melenkovskii District), Volg.-Kam., Mid. Dnepr., Volg.-Don., Prichern., Low. Don., Low. Volg., Zavalzh.; Caucasus: West. Transcauc., Dag., East. Transcauc.; West. Siberia: Upp. Tob., Irt., Alt.; East. Siberia: Ang.-Sayan.; Centr. Asia: Aral.-Casp., Pribalkh. Gen. distr.: Western Europe; Chinese Dzhungaria. Described from Silesia.

Series 8. *Cephalophori* V. Krecz. et Gontsch.—Inflorescence compactly capitate; flowers dark brown, with acute perianth segments.

42. *J. alpigenus* C. Koch in Linnaea XXI (1848) 627; E. Mey. in Ldb. Fl. Ross. IV (1853) 227; Buch. in Engl. Pflzr. IV, 36 (1906) 213.—*J. melanocephalus* Boiss. Fl. Or. V (1884) 360.—Exs.: HFR No. 1761; Fl. Cauc. exs. No. 154.

Perennial, green plants, with a short creeping rootstock; culms terete, erect, 15—45 cm tall, leafy; basal sheaths broad, tawny, obtusish, bladeless; leaves terete, faintly sulcate, shorter than the sheaths; auricles obtuse; inflorescence capitate, to 2 cm in diameter; bracts divergent, one of them many times longer than the inflorescence; flowers 2.5—3 mm long; perianth segments lanceolate, mucronate, equal, castaneous to blackish-castaneous, scarcely hyaline-margined; stamens 3 (6), ca. 1.5 mm long, the anthers nearly equaling the filaments; capsule trigonous, ovoid to ovoid-ellipsoid, castaneous, shorter than the perianth segments, short-beaked; seeds oblong, ca. 0.5 mm long, light brown. June. (Plate XXX, fig. 6).

Alpine bogs and peats. — Caucasus: Ciscauc., West., South. and East. Transcauc. Gen. distr.: Asia Minor, Armenia, Greece, Macedonia, Bulgaria. Described from Turkish Armenia (Mt. Mush). Type in Berlin.

Cycle 2. *Urosperma* V. Krecz. et Gontsch. — Seeds caudate, fusiform-falcate, to 1.5 mm long.

43. *J. kamschatcensis* (Buch.) Kudo, Fl. Peramush. (1922) 88; Miyabe et Kudo, Fl. Hokk. and North. Sagh. III (1932) 301. — *J. Fauriense* var. *kamschatcensis* Buch. in Pflzr. IV, 36 (1906) 159; Hultén. Fl. of Kamtch. I, 219.

Perennial, green, compactly caespitose plants; culms erect, subterete, 15—32 cm tall; basal sheaths 2—3, bladeless or bearing a reduced blade (1—10 mm long), brownish; leaves 1—2, erect, remotely septate, the auricles oblong, obtuse; inflorescence terminal, comprising 2—6 distant heads, of these the central sessile, the others borne on long strict peduncles; bract equaling to exceeding, rarely shorter than the inflorescence; flowers 3—3.5 mm long, in congested heads of 3—5; prophylla oval, obtuse, white-membranaceous, mostly reaching the middle of perianth; perianth segments equal, lanceolate, castaneous to light castaneous, the outer acute, the inner subobtuse, hyaline-margined; stamens 3—6, half as long as the perianth, the anthers linear-oblong, as long as the filaments or nearly so; capsule ellipsoid, 3.5—5 mm long, dark castaneous, mostly much longer than the perianth; seeds 1.4 mm long, fusiform-oblong, the lower appendage short, the upper longer, slender, tail-like.

Far East: Kamch. Gen. distr.: Northern Japan, Kurile Islands. Described from Kamchatka (Petropavlovsk). Type in Leningrad.

Subgenus 6. *Juncastrum* (Fourr.) O. Ktze in Post et O. Ktze Lex. gen. phan. (1904) 303; Fourr. in Ann. Soc. Linn. Lyon., n. sér., XVII (1869) 172 (pro genere). — *Junci thalassii* Buch. in Engl. Pflzr. IV, 36 (1906) 100. — Densely caespitose perennials, with a short rootstock; basal sheaths blade-bearing or bladeless. Leaves cylindric, the cauline firm, spiny, without auricles. Inflorescence terminal or seemingly lateral, paniculate, strongly compound; lower bract spiny. Flowers 2—3.5 mm long, in glomerules; prophylla forming an involucl; involuclral bracts mostly equal. Seeds with a terminal caudate appendage.

Series 1. *Acuti* V. Krecz. et Gontsch. — Anthers reddish; flowers dark. All perianth segments obtuse.

44. *J. acutus* L. Sp. pl. (1753) 325 (quoad var. a); ed. 2 (1762) 463; E. Mey. in Ldb. Fl. Ross. IV, 243; Grossh. Fl. Kavk. I, 185 (incl. var.).

Perennial, cinereous-green, densely caespitose plants, with a short oblique rootstock; culms terete, firm, (2.5)—3—4 mm thick, with solid pith, 50—150 cm tall; basal sheaths broad, tall, firm, more or less lustrous, 544 argillaceous or castaneous-brown, blade-bearing or bladeless; leaves cylindric, firm, spiny-pointed, about equaling the culm; inflorescence lateral, contracted ovaloid-paniculate, often with elongated lower branches bearing similarly compact secondary inflorescence; bract erect, prolonging the culm, rigid, spiny-pointed, usually exceeding the inflorescence, dilated at base, hyaline-margined; flowers 2.5—3 mm long (excluding capsule), in clusters of 2—5 at ends of branches; prophylla ovate, long-acuminate, subferruginous, broadly hyaline-margined; perianth segments equal, the outer broadly lanceolate, mucronate, the inner ovate, obtuse to retuse, all broadly hyaline-tipped, ferruginous to brown, greenish at base; stamens 6, the

anthers 2 mm long, oblong, reddish, 3—4 times the length of filaments; capsule ovoid-conic, apiculate, olivaceous or fulvous, lustrous, 5 mm long, twice the length of perianth; seeds oblong, to 1.5 mm long, castaneous, with short white appendages (the upper longer). Fruiting June—July. (Plate XXIX, fig. 15).

Coastal sands and wet saline places. — Caucasus: West. Transcauc. (Poti, Grigoleti), East. and South. Transcauc., Tal. Gen. distr.: Atlantic Europe from western coast of Iceland and England, Mediterranean, northern Persia. Described from England.

45. *J. tyraicus* Pacz. Fl. Chers. I (1914) 381 (nomen sub sequente). — *J. acutus* ssp. *tyraicus* Pacz., l. c., 380; Tsyrina ex Wulff, Fl. taur. 1, 2 (1929) 55. — *J. Tommasinii* Pacz. in Zap. Novor. Est. XXXIV (1909) 103; Shesterikov, Oprod. (1912) 111, non Parl.

Perennial, flavescent cinereous-green, densely caespitose plants, with a strong rootstock; culms firm, terete, 50—80 cm tall; basal sheaths profuse, castaneous, lustrous, blade-bearing and bladeless; leaves cylindrical, equaling to exceeding the culm; inflorescence umbellate-paniculate, forking compact to dense, erect (not lateral), with recurved branches; bract overtopped by inflorescence; flowers 2 mm long, in 2's or 3's; prophylla ovate, acute; perianth segments ovate, equal, brownish, light-centered, hyaline-margined, the outer subacute, the inner obtuse; anthers 1.8 mm long, reddish-yellow, 4—5 times the length of filaments; capsule ellipsoid, obtusish, short-beaked, 3—3.2 mm long, ferruginous, lustrous; seeds resembling those of *J. acutus* L. Fruiting June—July.

Sandy coasts and shores of saline lakes. — European part: Prichern., Crimea (Evpatorskii District—Donuzlayskoe Lake). Gen. distr.: Rumania (Dobruja), Bulgaria. Described from the Dniester estuary. Type in Leningrad.

46. *J. littoralis* C. A. M. Verzeichn. Pflz. Cauc.-Casp. (1831) 34. — *J. acuto-maritimus*? E. Mey. in Ldb. Fl. Ross. IV (1853) 234. — *J. acutus* var. *littoralis* Trautv. in. A. H. P. V (1878) 480. — *J. Karelini* Steud. Syn. Cyp. (1855) 297.

545 Perennial, cinereous-green, densely caespitose plants, with an oblique ligneous rootstock; culms terete, firm, 1.5—2 mm thick, with uninterrupted pith, 40—80 cm tall; basal sheaths lustrous, castaneous-brown, blade-bearing or bladeless; leaves cylindrical, shorter than the culm; inflorescence lateral, forming an open panicle with long drooping branches; bract mostly shorter than the inflorescence or as long; flowers 2.5 mm long, crowded in 2's—5's at the ends of branches; prophylla ovate, acute, about equaling the perianth; perianth segments equal, greenish below, hyaline-margined, the outer lanceolate, carinate, subacute, the inner ovate, rounded at summit; anthers 1.5 mm long, dark, much longer than filaments; capsule oblong-ovoid, apiculate, 3.5—3.8 mm long, ferruginous-brown, one and a half times to twice as long as the perianth; seeds as in *J. acutus* L. Fruiting May.

Coastal and saline situations. — Caucasus: Dag., East. Transcauc., Tal.; Centr. Asia: Kara-Kum. (Blumbash), Amu-Dar. (Katta-Kurgan), Pam.-Al. (Peishambe). Gen. distr.: Northern Persia. Described from Sari Is. (Caspian Sea). Type in Leningrad.

Series 2. *Maritimi* V. Krecz. et Gontsch. — Anthers yellow. Flowers light-colored, the outer perianth segments acute, the inner subacute to acute.

47. *J. maritimus* Lam. in *Encycl. Méth. bot.* III (1789) 264; E. Mey. in *Ldb. Fl. Ross.* IV, 234. — *J. ponticus* Stev. in *Bull. Soc. Nat. Moscou* XX, 2 (1857) 94; Boiss. *Fl. Or.* V, 354. — *J. maritimus* β *ponticus* Aschr. et *Gr. Syn.* II, 2 (1904) 456.

Perennial, cinereous-green plants, with a creeping rootstock; culms in rows, distant, firm, to 2.5–3 mm thick, 50–100 cm tall; basal sheaths light brown to light castaneous-brown, obtuse, bladeless; leaves cylindrical, firm, equaling to exceeding the culm; inflorescence paniculate, compound, lobate, lateral, 10–20 cm tall, with erect, slightly forking, unequal branches; lower bract erect, equaling to exceeding the inflorescence; flowers 3–3.8 mm long, in 2's–3's (5's) at the ends of branches; prophylla ovate, acute, reaching up to and above the middle of perianth; perianth segments lanceolate, greenish-yellow, becoming stramineous, hyaline-margined, subequal, the outer acute, the inner subobtuse; anthers ca. 2 mm long, twice the length of filaments, yellow; capsule ovoid-prismatic, equaling to barely exceeding the perianth, acuminate, short-beaked; seeds ca. 3 mm long, ovoid, ferruginous, with oblique whitish tails. Fruiting June–July.

Wet saline and coastal situations. — European part: Prichern., Low. Don (Azov coast), Crimea; Caucasus: Dag., East. Transcauc., Tal.; Centr. Asia: Kara-Kum (Dzhebel). Gen. distr.: Atlantic Europe, Mediterranean, Asia Minor, Persia. Described from England.

48. *J. Nevskii* V. Krecz. et Gontsch. sp. nova in *Addenda*, II, 629. — *J. maritimus* B. Fedtsch. *Rast. Turk.* (1915) 213, non Lam.

546 Perennial, glaucous-green, densely caespitose plants, with an oblique rootstock; culms crowded, firm, sulcate, sublustrous, to 2 mm thick, 50–80 cm tall; basal sheaths lateritious-brown, bladeless, more or less lustrous; leaves cylindrical, firm, spiny-pointed, shorter than the culm; inflorescence lateral, contracted fasciculate-paniculate, 5–10 cm long, the erect branches slightly forking at the ends; bract erect, shorter than to equaling (rarely exceeding) the inflorescence; flowers 2.5–3 mm long, solitary or in 2's (3's); prophylla broadly lanceolate, acute, ca. 2.5–3 mm long, barely reaching the middle of perianth; perianth segments unequal, stramineous, subferruginous above, slightly carinate, hyaline-margined, the outer acute, the inner shorter, subobtuse; anthers 1.8 mm long, dark, slightly exceeding the filaments; capsule oblong-ovoid to conic, acute, beaked, 3.2–4 mm long, greenish-brown, lustrous, much longer than the perianth; seeds brownish, 0.8 mm long, oblong, slightly curved, with short whitish unequal tails. Fruiting June.

Wet saline depressions. — Centr. Asia: Kara-Kum., Mount. Turkm., Amu-Dar., Pam.-Al. (w. part). Described from Kugitang (at the sources of Kara-su). Type in Leningrad.

Subgenus 7. *Juncotypus* (Dumort.) O. Ktze. in *Post et O. Ktze. Lex. gen. phan.* (1904) 303. — *Juncotypus* Dumort. (pro genere) ex *Post.*, l. c. — *Junci genuini* Buch. in *Engl. Pflzr.* IV, 36 (1906) 100. — Perennials, with indurate rootstocks. Culms usually leafless; basal sheaths colored, more or less coriaceous, obtuse, sometimes bearing a rudimentary blade. Inflorescence lateral, paniculate or subpaniculate-fasciculate; bract continuing the culm, acute. Flowers 2–5 mm long, solitary, with a pair of bracteoles; perianth segments lanceolate, unequal, the outer always acute. Seeds ovoid, with a small appendage (rarely with two caudate appendages).

Cycle 1. *Steirocaula* (Griseb.) V. Krecz. et Gontsch. — *Steirocaulos* Griseb. in *Spicil. fl. Rum.* II (1845) 407. — Large, densely caespitose plants. Inflorescence paniculate, many-flowered. Flowers pale, 2–3 (4) mm long.

Series 1. *Glauci* V. Krecz. et Gontsch. — Lower sheaths purple, cherry-colored, or orange; capsule oblong, attenuate into a short beak, about equaling to exceeding the perianth segments.

49. *J. inflexus* L. *Sp. pl.* (1753) 326, non L. *Sp. pl. ed. 2.* — *J. glaucus* Ehrh. *Beitr.* VI (1791) 83; E. Mey. in Ldb. *Fl. Ross.* IV, 222, ex p. (quoad pl. ex Ross. med. et austr.); Tzyrina in Wulff, *Fl. taur.* I, 2, 55. — *J. glaucus* ssp. *longicornis* Tzyrina, l. c. (sec. descriptionem et localisationem), non Bast. — Exs.: Kneuck. I, No. 19; Dörf. No. 4780.

547 Perennial, cinereous-green densely caespitose plants, with a ligneous rootstock; culms terete, sulcate, smooth, subapplanate, 50–90 cm tall, 3–4 mm thick at base; basal sheaths dark purple, prolonged into a reduced, obtuse, paler blade; interruptions in the spongy culm tissue to 1 cm long; inflorescence contracted-paniculate, lateral, 3–7 cm long, the branches unequal, repeatedly and compactly forking at the ends; bract erect, one-fourth to one-third the length of the culm; flowers 3–4 (4.5) mm long, distant, borne at the ends of branches; prophylla lanceolate, acute, greenish-ferruginous, ca. 1 mm long; perianth segments subulate-lanceolate, slenderly point-tipped, broadly green-ribbed, ferruginous-bordered and narrowly hyaline-margined, the inner nearly 1 mm shorter than the outer; anthers ca. 2 mm long, linear, slightly longer than filaments; capsule oblong to ellipsoid-ovoid, 2.8–3 mm long, rather abruptly short-beaked, usually equaling to exceeding the inner tepals but always shorter than the outer ones; seeds brown, obovoid, with a rather small appendage, ca. 0.4 mm long. June–July. (Plate XXIX, fig. 10).

River banks and wet sandy places. — European part: Upp. Dnepr., Mid. - Dnepr., Upp. Don., Prichern., Low. Don., Zavolzh. (Sergievsk), Crimea; throughout the Caucasus; Centr. Asia: Kara-Kum. Gen. distr.: Western Europe, Asia Minor, Persia. Described from southern Europe.

50. *J. paniculatus* Hoppe ex Mert. et Koch, *Deutschl. Fl.* II (1816) 574; Roem. et Schult. *Syst.* VII, 1 (1829) 183. — *J. glaucus* var. *paniculatus* Buch. in *Bot. Jahrb.* VII (1886), 162. — *J. glaucus* var. *longicornis* Buch. in *Engl. Pflzr.* IV, 36 (1906) 134, ex p. — *J. longicornis* Bast. in *Journ. de bot.* III (1814) 21. — Exs.: *Fl. exs. austr.-hung.* No. 1865.

Perennial, glaucous-green, compactly caespitose plants, with a short rootstock; culms terete, with a thickened lignified rind and uninterrupted spongy tissue, 50–80 cm tall; basal sheaths brownish-purple, bladeless, lustrous; inflorescence open-paniculate, forking, nodding, to 10–12 cm long, with erect, rather short bracts; flowers 3 mm long, distant; prophylla ovate-triangular, to 1 mm long, acute; perianth segments lanceolate, acute, pale, stramineous at summit, scarcely ferruginous-bordered, narrowly hyaline-margined (paler than the dark capsules), the inner shorter; stamens ca. 2 mm long, anther equaling to exceeding filament; capsule ellipsoid, brown, lustrous, 3–3.5 (4) mm long, pointed, short-beaked, usually longer than the outer perianth segments; seeds ferruginous, obovoid, to 0.5 mm long. Fruiting June–July. (Plate XXIX, fig. 11).

Coasts. — European part: Crimea (Massandra and Alupka). Gen. distr.: Mediterranean. Described from the Mediterranean coast, between Duino and Monfalcone (Istria).

51. *J. brachyterpalus* (Trautv.) V. Krecz. et Gontsch. sp. nova in Addenda, II, 630. — *J. glaucus* B. Fedtsch. Rast. Turk. (1915) 213, pro max. p.; Buch. in Engl. Pflzr. IV, 36 (1906) 153. — *J. glaucus* var. *brachyterpalus* Trautv. in herb.

Perennial, cinereous-green, densely caespitose, with creeping rootstock; culms terete, slightly compressed, 50–90 cm tall, thickened at base (to 1 cm in diameter); basal sheaths broad, lateritious or orange, sublustrous; inflorescence lateral, rather densely paniculate, to 5–7 cm long; bract strongly abbreviated, indurate-tipped and spine-pointed; flowers (excluding capsule) ca. 3 mm long, congested; prophylla membranaceous, ovate, ca. 1 mm long, acute; perianth segments lanceolate, acute, green, at length stramineous, more or less hyaline-pointed, subequal; stamens 1.5 mm long, the anthers as long as the filaments; capsule ellipsoid, 4 mm long, brownish or subferruginous, short-beaked, exceeding the perianth; seeds ovoid, 0.3–0.4 mm long. Fruiting June. (Plate XXIX, fig. 14).

Wet saline places. — Centr. Asia: Dzhung.-Tarb., Pribalkh., Tyan'-Shan., Pam.-Al., Syr -Dar., Mount. Turk. Gen. distr.: Kulja, Afghanistan. Described from Dzhungariya (Kantau). Type in Leningrad.

Series 2. *Effusi* V. Krecz. et Gontsch. — Basal sheaths light brown or reddish-brown; capsule emarginate or rounded-obtuse; culms smooth; inflorescence more or less open.

52. *J. effusus* L. Sp. pl. (1753) 326 (s. str.); Buch. in Engl. Pflzr. IV, 36 (1906) 135. — *J. communis* α *effusus* E. Mey. in Ldb. Fl. Ross. IV (1853) 221. — Ic.: Syreish. Ill. Fl. Mosk. gub. I (1906) 224. — Exs.: HFR No. 1688.

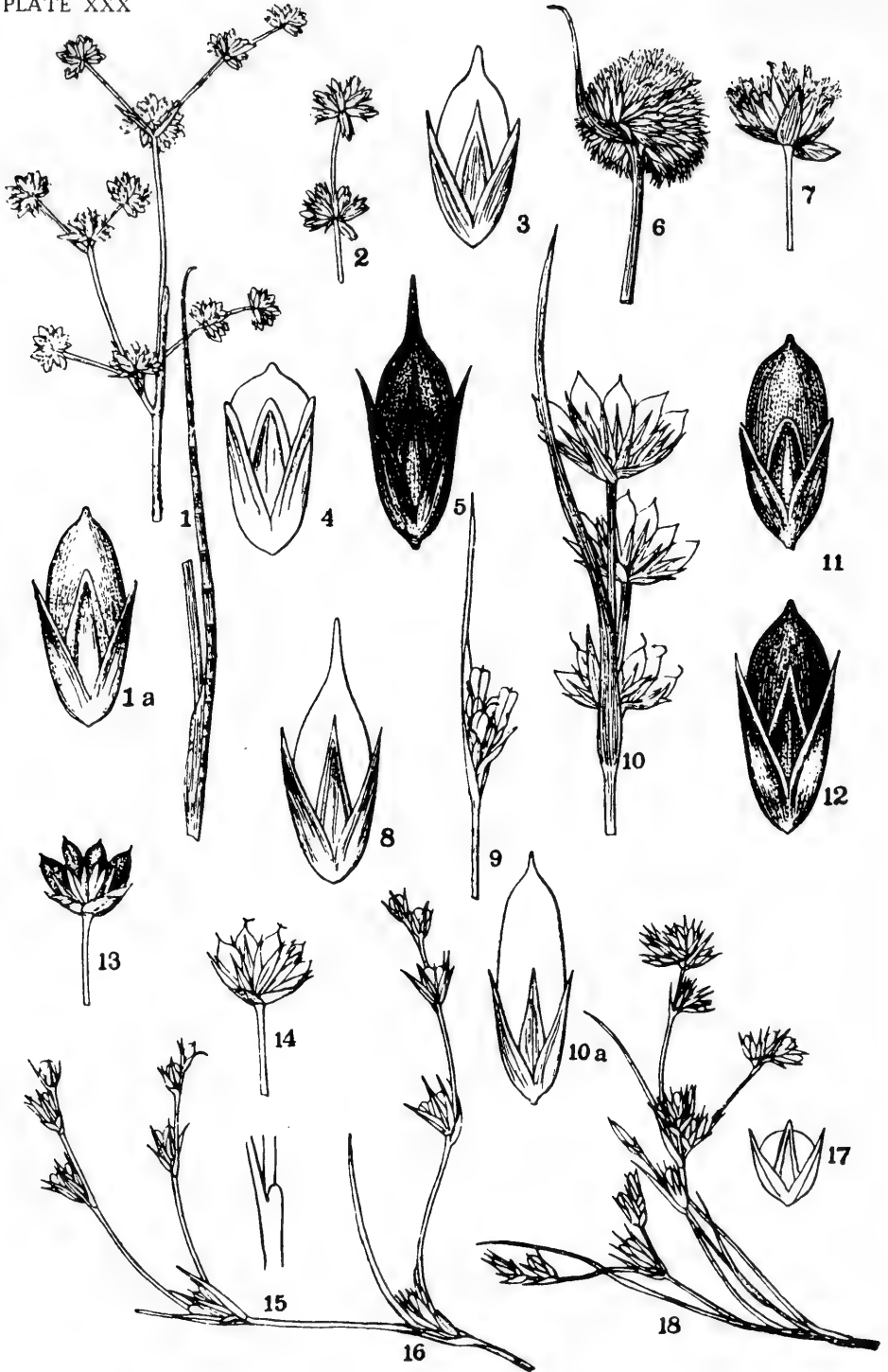
Perennial, green, densely caespitose plants, with creeping rootstock; culms firm, finely sulcate (smooth in live specimens), sublustrous, 50–120 cm tall, prolonged almost imperceptibly (without any definite enlargement and separated merely by a faint flange) into an acute bract (to 12–25 cm long); basal sheaths light brown, bladeless; inflorescence lateral, umbellate-paniculate to subcapitate or compactly lobate-capitate, with unequal, repeatedly forking branches; flowers 2–2.5 (2.8) mm long, solitary, distant or at ends of branches approximate; prophylla small, ca. 1 mm long, membranaceous, ovate, subacute; perianth segments lance-linear, acute, subequal or the outer ones somewhat longer, greenish, with a faint ferruginous periphery, narrowly hyaline-margined; stamens 1.5 mm long, anthers nearly as long as filaments; capsule obovoid, brownish, lustrous, emarginate at summit, about as long as or slightly shorter than the perianth; seeds oblong-ovoid, ca. 0.5 mm long, ferruginous. Fruiting June–July. (Plate XXIX, fig. 8).

Marshes, boggy meadows, shores, and canals. — Throughout the European part (except Arctic). Gen. distr.: Europe, Asia Minor. Described from Western Europe (Sweden).

NOTE. Forms occur with capitate inflorescences, and these might be confounded with *J. Leersii* Marss., but they can be readily distinguished from the latter species by their smooth, non-ribbed culms.

53. *J. decipiens* (Buch.) Nakai, Rep. Veg. Kamikoti (1928) 35; Satake in Journ. Fac. Sci. Univ. Tokyo (bot.) IV, 2 (1933) 177. — *J. effusus* var. *decipiens* Buch. in Bot. Jahrb. XII (1890) 229 et in Engl. Pflzr. IV, 36 (1906) 136; Kom. and Alis. Opred. rast. Dal'nevost. Kr. I (1931) 344.

Perennial, cinereous-green, densely caespitose plants, with an oblique, ligneous rootstock; culms terete, slender (ca. 1 mm thick – Sakhalin) or stoutish (2 mm thick), 40–80 cm tall; basal sheaths reddish-brown or pur-



plish-brown, rarely light brown, obtuse, bladeless; inflorescence a spheroid panicle, lax, 2–3 cm long, with numerous slender branches; bract softly spiny, one-fourth to one-third the length of inflorescence; flowers 2 mm long, solitary; prophylla membranaceous, to 1 mm long, acute; perianth segments narrowly lanceolate, finely pointed, subequal, pale, stramineous-green, slightly ferruginous to hyaline-margined; stamens 1.5–1.7 mm long, the linear anthers somewhat shorter than the filaments; capsule obovoid, truncate and apiculate, light brown, equaling to slightly exceeding the perianth segments; seeds oblong, ca. 0.5 mm long, brownish. Fruiting July. (Plate XXIX, fig. 9).

Wet places, meadows, and marshes. — Far East: Ze.-Bur., Ud., Uss., Sakh. Gen. distr.: Japan, Manchuria. Described from Japan.

NOTE. The Sakhalin plants are more slender, with blackish-purple sheaths; they represent perhaps a distinct strain.

Series 3. *Conglomerati* V. Drecz. et Gontsch. — Capsule retuse; culms sulcate; inflorescence compact.

54. *J. Leersii* Marss. Fl. Neu-Vorpomm. Rüg. (1869) 451; Buch. in Engl. Pflzr. IV, 36 (1906) 138. — *J. communis* β . *conglomeratus* E. Mey. in Ldb. Fl. Ross. IV (1853) 221. — *J. conglomeratus* L. Sp. pl. (1753) 356, ex p.; Asch. et Gr. Syn. II, 2 (1904) 444. — Ic.: Syreish. Ill. Fl. Mosk. gub. I (1906) 224. — Exs.: HFR No. 592.

552 Perennial, cinereous-green, densely caespitose plants, with a creeping rootstock; culms slightly compressed, strongly sulcate, the furrows most pronounced above near inflorescence (both in fresh and dry condition), 30–75 cm tall; basal sheaths ferruginous-brown bladeless; culms prolonged into abbreviated spiny bract (5–15 cm long) strongly inflated in flowering, the bulge membranaceous-margined; inflorescence lateral, capitate, sometimes short-branched, the branches very short, divided; flowers 3 mm long, congested; prophylla membranaceous, soft, subacute; perianth segments linear-lanceolate, subulate, acute, ferruginous or castaneous, green on the inside, narrowly hyaline-margined, the outer slightly longer than the inner; stamens 1.5 mm long, anthers almost as long as filaments or slightly longer; capsule obovoid, emarginate, mucronulate, brownish, lustrous, equaling the perianth; seeds obovoid, oblong, ca. 0.5 mm long, ferruginous. June–July. (Plate XXIX, fig. 7).

Marshes, wet places, and canals. — European part: Kar.-Lap., Lad.-Il'm., Upp. Dnepr., Upp. Volg., Mid. Dnepr., Volg.-Don., Prichern., Low. Don., Crimea. Gen. distr.: Europe. Described from Pomerania Stralsund, Tribsees).

Cycle 2. *Herporrhiza* V. Krecz. et Gontsch. — Plants of moderate size, with creeping rootstock; culms and offshoots in rows; inflorescence fascicular-paniculate, few-flowered; flowers 3–5 mm long, green or more often dark-tinged.

Explanation to Plate XXX

1. *Juncus lampocarpus* Ehrh.: inflorescence and leaf, a) perianth with fruit. — 2. *J. Leschenaultii* Gay: portion of inflorescence. — 3. *J. virens* Buch.: perianth with fruit. — 4. *J. alpinus* Vill.: same. — 5. *J. atratus* Krock.: same. — 6. *J. alpigenus* C. Koch.: inflorescence. — 7. *J. Thomsonii* Buch.: same. — 8. *J. niponensis* Buch.: perianth with fruit. — 9. *J. biglumis* L.: inflorescence. — 10 and 10a. *J. leucochlamys* Zing.: same. — 11. *J. castaneus* L.: perianth with fruit. — 12. *J. triceps* Rostk.: inflorescence, a) perianth and fruit. — 13. *J. triglumis* L.: inflorescence. — 14. *J. Schischkini* Kryl. et Sumn.: same. — 15. *J. Tenageja* Ehrh.: leaf sheaths. — 16. *J. Juzepczukii* V. Krecz. et Gontsch.: portion of plant. — 17. *J. sphaerocarpus* Nees.: perianth with fruit. — 18. *J. nastanthus* V. Krecz. et Gontsch.: portion of plant.

Series 1. Filiformes V. Krecz. et Gontsch. - Culms slender, in dense rows; flowers green, 3 - 5 mm long, exceeding the capsule.

55. *J. filiformis* L. Sp. pl. (1753) 326; E. Mey. in Ldb. Fl. Ross. IV, 223; Buch. in Engl. Pflzr. IV, 36 (1906) 127; Grossh. Fl. Kavk. I, 184; Kom. Fl. Kamch. I, 277; Sam. in Hultén, Fl. of Kamtch. I, 220. - Ic.: Syreish. Ill. Fl. Mosk. gub. I, 223. - Exs.: HFR No. 491; Pl. Finl. exs. No. 558; Fl. Pol. exs. No. 1003; Kneuck. II, No. 51.

Perennial, light green, loosely caespitose plants, with long creeping rather slender rootstock; culms slender, distant, compressed-terete, prolonged into an erect bract, 25 - 70 cm tall including bract; covered at base with subferruginous narrow bladeless sheaths, terminating in abbreviated slender obtuse-pointed blade; inflorescence loosely fasciculate, lateral in relation to bract, few-flowered (4 - 12 flowers); bract as long as the culm; flowers 3 mm long, subsessile or borne on short pedicels not exceeding 2 - 2.5 cm; prophylla hyaline, ovate, ca. 1.5 - 2 mm long, obtuse, the outer narrowly lanceolate, slenderly pointed, the inner short, lanceolate, acutish; stamens ca. 1.5 mm long, the anthers one-third to two-thirds the length of filaments; capsule spherical-ovoid, round-tipped, barely mucronulate, 3 - 3.2 mm long, about equaling the outer tepals; seeds ob-
553 long-ovoid, subferruginous, ca. 0.5 mm long. June - July. (Plate XXIX, fig. 1, 12).

Marshes, wet meadows, and shores. - European part: Kar.-Lap., Dv.-Pech., Lad.-Il'm., Volg.-Dnepr., Upp. Volg., Mid. Dnepr., Volg.-Don., Prichern. (Nenasytets); Caucasus: Ciscauc., West. and South. Transcauc.; West. and East. Siberia; Far East. Gen. distr.: Western Europe. Described from Western Europe (Sweden).

56. *J. brachyspathus* Maxim. Prim. Fl. Amur. (1859) 293; Buch. in Engl. Pflzr. IV, 36 (1906) 128; Kom. Fl. Manch. I, 426; Kom. and Alis. Opr. rast. Dal'nevost. Kr. I, 344. - *J. filiformis* var. *brachyspathus* Rgl. in Mém. Ac. St. Pétersb., sér. VII, IV (1861) 157. - *J. filiformis* var. *uralensis* Pohle in sched.

Perennial, green, densely caespitose plants, with short creeping rootstock; culms slender, densely tufted, compressed-terete, 15 - 30 cm tall; basal sheaths brownish; leaves filiform-linear, to 1 mm broad, nearly reaching the inflorescence; inflorescence lateral, few flowered (1 - 6 flowers), capitate or fasciculate; bract merely 3 - 4 times the length of inflorescence; flowers 5 mm long, subsessile or borne on pedicels to 1.5 cm long; prophylla hyaline, ovate, subacute, to 3 mm long; perianth segments lanceolate, acute, greenish, broadly hyaline-margined, the inner rather shorter than the outer; stamens 2 - 2.3 mm long, the anthers nearly twice the length of filaments; capsule ellipsoid, 4.5 mm long, brownish, round-tipped, mucronulate, equaling the outer tepals; seeds glutinous, ovoid, ca. 0.5 mm long, subferruginous. Fruiting June - July. (Plate XXIX, fig. 2).

Shallows, shores, and water meadows. - European part: Dv.-Pech. (river Usa; Adak; river Shchugor; Vel'dar-Kyrta); West. Siberia: Ob.; East. Siberia; Yenisei. (Turukhansk region and Lower Tunguska), Ang.-Sayan. (Kirensk region), Daur., Len.-Kol.; Far East: Ze.-Bur., Okhot., Sakh., Ud., Uss. Gen. distr.: Northern Mongolia, Manchuria. Described from Chikrak Isthmus, below Nikolaevsk on the Amur. Type in Leningrad.

57. *J. curvatus* Buch. in Engl. Pflzr. IV, 36 (1906) 128; Miyabe et Miyake Fl. Saghal. (1915) 490; Miyabe et Kudo, Fl. Hokk. and North. Saghal. III (1932) 298; Satake in Journ. Fac. Sc. Univ. Tokyo (bot.) IV, 2 (1933), 176.

Perennial, densely caespitose plants, with horizontally creeping rootstock; culms approximate, slender, 50 – 90 cm tall, subcompressed (slightly sulcate when dry); basal sheaths brown, dull. Inflorescence lateral, of 3 – 5 flowers, fasciculate, to 2 mm long; bract shorter than the culm; flowers 3 – 5 mm long, the lower borne on slender curved pedicels to 1.8 cm long, the others subsessile to sessile; perianth segments narrowly lanceolate, 554 the outer longer, acute, slightly involute-margined above, the inner shorter, subobtuse; stamens 6, half as long as the perianth, the anthers half as long as filaments; capsule about as long as the inner tepals, ellipsoid, stramineous, lustrous; seeds obovoid, brownish, slightly reticulated, 0.6 – 0.7 mm long.

Marshes. – Far East: Sakh. Gen. distr.: Kurile Islands, Northern Japan (Jusan saki [?], Yezo [Hokkaido]).

Series 2. *Inundati* V. Krecz. et Gontsch. – Culms slender (to 1 – 1.5 mm thick), arranged in wide rows; flowers brownish, 3 – 4 mm long, shorter than the capsules.

58. *J. inundatus* Drej. in Kröger's Tidsskr. II (1838) 181. – *J. balticus* var. *inundatus* Trautv. in A. H. P. V (1877) 119. – *J. balticus* × *filiformis* Buch. Bot. Jahrb. XII (1890) 216 et in Engl. Pflzr. IV, 36 (1906) 146. – Ic.: Rchb. Ic. Fl. Germ. IX, tab. 410, fig. 916. – Exs.: Pl. Finl. exs. Nos. 147, 556, 557.

Perennial, cinereous-green, the stout creeping rootstock covered with brown scales; culms slender, 25 – 60 cm tall; basal sheaths narrow, honey-brown, lustrous, firm, bladeless (the upper ones merely bearing a slender bristle); inflorescence lateral, fasciculate-paniculate, with slender lax branches, few-flowered, 2 – 3 cm long; bract one-third to one-half the length of culm; flowers 4 mm long, distant, at the ends of branches; bracts membranaceous-tipped, ovate, subacute to subobtuse; perianth segments lanceolate, acute, ferruginous, greenish on the inside, white-hyaline-margined, the inner ones slightly shorter and more obtuse; stamens 1.8 mm long, the anthers as long as the filaments; capsule oblong-obovoid, light brown, apiculate, 3 mm long, shorter than the perianth; seeds ovoid, 0.5 – 0.7 mm long, brownish. Fruiting July.

Shores and wet sandy places. – European part: Lad.-Il'm. (along the shores of the Gulf of Finland). Gen. distr.: Baltic States, Scandinavia, Germany, Denmark. Described from Denmark.

59. *J. Muelleri* Trautv. in A. H. P. V (1877) 119 et X (1889) 536. – "Forma gracilis *J. arctici*"? Buch. in Engl. Pflzr. VI, 36 (1906) 147. – *J. filiformis* α *arcticus* Pohle in schedul.

Perennial, light green loose plants, with creeping rootstock; culms slender; basal sheaths light brown, rather soft, bladeless; inflorescence lateral, fasciculate, to 1 cm long, few-flowered (1–4 flowers), the feeble pedicels not exceeding the flowers; bract slightly spiny, four-fifths as long again as the inflorescence; flowers 3.2 – 4 mm long, oblong; prophylla broadly ovate, obtuse, to 1.5 mm long; perianth segments linear-lanceolate, ferruginous-brown, light-centered, narrowly hyaline-margined, about equal or the inner ones somewhat shorter; outer perianth segments apiculate, the 555 inner acute; stamens 1.8 mm long, the anthers half as long again as the filaments; capsule linear-oblong, 4 – 4.3 mm long, slightly longer than the perianth, brownish, subobtuse, barely mucronulate; seeds oblong-ellipsoid, 0.6 – 0.7 mm long, tawny to dark yellow, without distinct appendages. Fruiting July. (Plate XXIX, fig. 6).

Stony and sandy shores. - East Siberia: Yenisei (river Chuna, Lower Tunguska), Ang.-Sayan. (Kirensk. and river Ilim), Len.-Kol. (Zhigansk. river Olenek). Endemic. Described from river Olenek (above river Dalgas). Type in Leningrad.

Series 3. *Arctici* V. Krecz. et Gontsch. - Culms 2 - 2.5 mm thick; flowers 4 - 5 mm long, castaneous, about equaling to exceeding the capsule (rarely shorter).

60. *J. arcticus* Willd. Sp. pl. II (1799) 206; E. Mey. in Ldb. Fl. Ross. IV, 223; Buch. in Engl. Pflzr. IV, 36 (1906) 147. - *J. arcticus* var. *depauperata* Trautv. in A. H. P. V (1877) 118.

Perennial, green plants, with stout creeping rootstock; culms firm, terete, erect (ca. 2 - 2.5 mm thick, 10 - 30 cm tall); basal sheaths subferruginous or light brown, bladeless; inflorescence lateral, fasciculate-capitate, of 4 - 8 flowers; bract rigid, spiny, much shorter than the culm, 3 - 5 cm long; flowers 4 - 5 mm long, short-pedicel to practically sessile; prophylla broadly ovate, hyaline-tipped, obtuse, 1.5 mm long; perianth segments castaneous, pale-green on the back, hyaline-margined, unequal: the outer lanceolate, acute, the inner shorter, oblong-ovate, broadly hyaline-margined, obtuse to subobtuse; stamens 1.5 mm long, the anthers at least twice as long as the filaments; capsule ellipsoid, blackish-brown, equaling to slightly exceeding the perianth; seeds ovoid, 0.4 mm long, ferruginous. Fruiting July - August. (Plate XXIX, fig. 4).

Wet and sandy places in tundra; mountainous tundra. - Arctic: Nov.-Zem. (Kolguev), Arct. Europe, Arct. Siberia; European part: Dv.-Pech. (Upper Pechora Basin); East Siberia: Yenisei, Ang.-Sayan. (Tunginsk Distr.), Len.-Kol. Gen. distr.: Fenno-Scandia, Iceland, Greenland, and Alps. Described from Lapland.

61. *J. balticus* Willd. in Magaz. Naturf. Fr. Berl. II (1809) 298; E. Mey. in Ldb. Fl. Ross. IV, 222; Buch. in Engl. Pflzr. IV, 36 (1906) 144. - *J. balticus* var. *europaeus* Engelm. in Trans. Ac. St. Louis, II (1866) 441. - *J. arcticus* var. *baltica* Trautv. in A. H. P. V (1878) 119. - Exs.: HFR No. 791; Pl. Finl. exs. Nos. 146a, 146b, 555; Kneuck. II, No. 49.

Perennial, cinereous-green plants, with ligneous creeping stout rootstock; culms firm, terete, finely sulcate, 30 - 50 cm tall, arising in rows, subdistant; basal sheaths light brown to brown, somewhat lustrous, bladeless; inflorescence lateral, tightly-paniculate, 2 - 5 cm long, the branches unequal, divided at the ends into short branchlets; bract indurate, spiny, one-fourth to one-third the length of inflorescence; flowers (3.5) 4 - 4.5 (5) mm long, in corymbose fascicles at the ends of short branchlets; prophylla subcoriaceous below, ferruginous, whitish-hyaline above, ovate, ca. 1.5 mm long; perianth segments ferrugineo-castaneous, pale-centered, hyaline-margined; the outer lanceolate, mucronate, the inner somewhat broader, shorter, acute; stamens 1.8 - 2 mm long, the anthers twice as long as the filaments; capsule ovoid-ellipsoid, 5 mm long, brown, somewhat lustrous, longer than the perianth; seeds subferruginous, obovoid, ca. 0.7 - 0.8 mm long. Fruiting July - August. (Plate XXIX, fig. 3).

Sandy shores, beaches. - European part: Kar.-Lap. (shores of Lake Onega), Dv.-Pech., Lad.-Il'm. (Baltic seaboard, Lake Ladoga). Gen. distr.: shores of the Baltic Sea and adjoining lakes. Described from the Baltic seaboard (Warnemünde).

62. *J. Haenkei* E. Mey. Syn. Juncor. (1822) 10; Kom. Fl. Kamch. I, 278. - *J. balticus* Sam. in Hultén, Fl. of Kamtch. I, (1927) 216, non Willd. - *J. balticus* var. *Haenkei* Buch. in Pflzr. IV, 36 (1906) 145. - *J. arcticus* Bong. in Mém. Ac. St. Petersb., ser. 6, II (1831) 167, non Willd.

Perennial, cineraceous-green densely caespitose plants, with long creeping rootstock; culms erect, 40 - 65 cm tall, firm, terete, finely sulcate, 1.5 - 2.5 mm in diameter below; basal sheaths indurate, stramineous to light brown, lustrous, bladeless, obtuse, mostly terminating in a short bristle; upper bract greatly exceeding the inflorescence, 6 - 20 cm long, subulate-pointed; inflorescence a lateral tightly fasciculate panicle, not exceeding 2.5 cm (very rarely to 4.5 cm long), many-flowered; flowers 5 mm long, terminal sessile or lateral on pedicels 1 - 4 mm long; prophylla membranaceous, oval, 1.5 - 2.5 mm long, acute to subacute; perianth segments narrowly lanceolate, greenish on the back, brown to castaneous at the margin, hyaline-bordered, the outer markedly longer than the inner, subulate-tipped, the inner acute; stamens ca. 2 mm long, the anthers linear-oblong, equaling to slightly exceeding the filaments (at most twice as long); capsule trigonous, oblong-obovoid, shorter to barely longer than the perianth, cinnamon-colored, mucronulate; seeds ovaloid, 0.7 - 0.8 mm long, brown. Fruiting July. (Plate XXIX, fig. 5).

Meadows, sandy shores, and shallows. - Arctic: Anad. (Gizhiginskaya estuary); East. Siberia: Len.-Kol. (Boru on the Aldan); Far East: Sakh., Uss., Ud., Okhot., Kamch. Gen. distr.: North America, Pacific seaboard (Sitka, Unalaska). Described from North America (British Columbia, Nutka Bay).

Cycle 3. *Caudata* V. Krecz. et Gontsch. - Seeds caudate, 2 - 2.5 mm long.

63. *J. beringensis* Buch. in Engl. Bot. Jahrb. XII (1890) 226 et in Engl. Pflzr. IV, 36 (1906) 129; Kom. Fl. Kamch. I, 278. - *J. Drummondii* 557 E. Mey. in Ldb. Fl. Ross. IV (1853) 235, quoad pl. kamtsch. - Ic.: Buch. in Engl. Pflzr. 129, fig. 69.

Perennial, green plants, forming small dense tufts, often with creeping rootstock; culms erect, flattened, soft, finely sulcate, 20 - 35 cm tall, 1.5 - 2.5 mm thick; basal sheaths bladeless, indurate, obtuse to short-tipped, castaneous below, stramineous above; inflorescence lateral, umbelliform, to 2 cm long, 2 - 6 (- 8)-flowered; terminal flowers sessile, the lateral ones on pedicels to 10 mm long; bract short, slightly exceeding the inflorescence, 2 - 4.5 cm long, subulate-tipped; flowers ca. 5 mm long; prophylla broadly oval, obtuse, 1.5 - 2 mm long, membranaceous, purple; perianth segments lanceolate, blackish-purple, hyaline-margined above, the inner acute, slightly shorter than the outer; stamens ca. 3 mm long, the anthers large, linear-oblong, at least 3 times as long as the filaments; style cylindrical, to 1.5 mm long; capsule exceeding the perianth, 5 - 6 mm long, trigonous-ovaloid, obtuse, short-mucronate, blackish-purple, lustrous; seeds 2 - 2.5 mm long, planiform, containing a ferruginous kernel, caudate at both ends, the appendages long, slender, lurid-hyaline. Fruiting July. (Plate XXIX, fig. 13).

Alpine meadows and meadow-covered slopes. - Far East: Kamch., Okhot. (Yamskaya estuary), Sakh. Gen. distr.: Islands of the Bering Sea, Japan (in mountains). Described from Koraginskii Island. Type in Leningrad.

Subgenus 8. *Forskalina* O. Ktze in Post et O. Ktze. Lex. gen. phan. (1904) 303. - *Junci subulati* Buch. in Engl. Pflzr. IV, 36 (1906) 99. - Perennials with strong creeping rootstocks. Culms in rows, leafy. Leaves cylindrical, hollow, non-septate. Inflorescence paniculate; flowers to 3.5 mm long, with unequal perianth segments. Seeds few, ovoid, weakly caudate.

64. *J. subulatus* Forsk. Fl. aegypt.-arab. (1775) 75; Boiss. Fl. Or. V, 748; Buch. in Engl. Pflzr. IV, 36 (1906) 102. - Exs.: HFR No. 329.

Perennial, cinereous-green plants, with creeping ligneous rootstock; culms terete, smooth, finely sulcate, to 100 cm and upward tall; basal sheaths purplish-brown, bladeless, acute; leaves cylindrical, hollow, smooth, subulate-tipped; ligules small, semicircular; inflorescence large, paniculate, subcontracted, the solitary flowers borne on unequal branches; lower bracts subulate, overtopped by inflorescence; prophylla ovate, subulate-tipped, membranaceous, pale, shorter than the perianth; flowers 2 - 2.5 mm long; perianth segments unequal, abruptly apiculate, the outer longer, lanceolate, more coriaceous, the inner shorter, broadly lanceolate and broadly hyaline-margined; stamens half the length of perianth, the ovaloid anthers longer than the filaments; capsule equaling the perianth, trigonous, ovoid, cinnamon-brown, lustrous, mucronate; seeds 0.6 - 0.7 mm long, subferruginous. Flowering June, fruiting July - August.

Saline places. - Centr. Asia: Pam.-Al. (surroundings of Shirabad), Mount. Turkm. (Khodzha-Kala). Gen. distr.: Mediterranean (eastward as far as Syria and Mesopotamia). Described from Egypt (Alexandria).

Subgenus 9. *Cephaloxys* (Spreng.) O. Ktze in Post et O. Ktze, Lex. gen. phan. (1904) 303, ex p. - *Cephaloxys* Spreng. ex Desv. (1808), sec. Buch. (pro genere). - *Junci graminifolii* Buch. in Engl. Pflzr. IV, 36 (1906) 101 (pro pl. perenn.). - Cespitose perennials, the culms leafy at base. Leaves grasslike, flat. Inflorescence capitate, few-flowered. Flowers in fascicles, subtended by a common bract. Seeds nutlike, without appendages.

65. *J. prominens* (Buch.) Miyabe et Kudo in Trans. Sapporo Nat. Hist. Soc. V, 1 (1913) 40; Hulten, Fl. of Kamtch. I, 222. - *J. falcatus* E. Mey. in Ldb. Fl. Ross. IV (1853) 228, ex p. - *J. falcatus* var. *prominens* Buch. in Engl. Pflzr. IV, 36 (1906) 247.

Perennial, green plants, with creeping horizontal rootstocks; culms erect, terete, distinctly sulcate, 15 - 40 cm tall, leafy at base (with 1 or 2 leaves); basal sheaths distinctly brownish, bladeless; leaves falcate, acute, mostly shorter than the culm, 1 - 3 mm broad, half as long as the culm; inflorescence little divided, mostly containing 3 heads, of these the central sessile, the lateral ones borne on branches; bract shorter than to equaling the inflorescence; flowers 5 - 5.5 mm long, on pedicels to 2.5 mm long, aggregated in hemispherical heads of 6 - 10; prophylla membranaceous, obovate, apiculate, 3.5 mm long; perianth segments unequal, the inner shorter, oblong, obtuse, 4 mm long, green on the back, dark ferruginous towards the periphery and ferruginous-hyaline-margined, the outer elliptic, acute, 3.5 mm long, otherwise resembling the inner segments; stamens 6, half the length of the outer tepals; anthers linear, white, equaling to slightly exceeding the filaments; capsule considerably longer than the perianth, trigonous, ovoid, obtuse; seeds 0.5 - 0.7 mm long, ovoid.

Wet places. - Possibly occurs at the southern extremity of Kamchatka, as it is to be found on the adjoining island of Paramushiro. Gen. distr.:

Japan (Yezo), Kurile Islands, North America. Described from Japan (Yezo), Oshima Province, Hakodate). Type in Sapporo (Japan).

Species of Dubious Position in the Flora of the USSR

J. trichodes Steud. Syn. Cyp. (1855) 306; Buch. in Engl. Pflzr. IV, 36 (1906) 128 (in nota sub *J. filiformis*).

Perennial. "Rootstock creeping, entangled, covered with fibers; plants cespitose; culms very slender, terete, leafy (up to 2 feet tall); leaves soft, very slender, canaliculate, smooth, both the radical and cauline nearly as long as the culm; inflorescence terminal, compound; flowers pedicelled and sessile, small, subtended at base by two ovate pellucid scales; 559 perianth segments green and ferruginous, variable, oblong, obtuse, barely equaling the oblong capsule. - *J. filiformis* Stev. Hrbr. - A very remarkable plant, collected by Sanson as far back as 1836; it is commended to the attention of Russian taxonomists. St. Petersburg region (Regio Petropolit)".

The species can be determined solely by a study of Steven's specimen. The naming of Sanson as collector of the St. Petersburg flora raises doubts (might not the species have simply been obtained by Steven "ex herb. Petropolit" and the annotation in Steven's unclear handwriting interpreted by Steudel as "regio Petropolit. "?).

Genus 251. - *Luzula** DC.

D.C. in Lam. et DC. Fl. franc. I (1805) 198 et III (1805) 158.

Inflorescence paniculate, umbellate, or capitate; flowers solitary or crowded in glomerules, with hyaline ciliate prophylla. Perianth hexamerous, the segments connate at base, subcoriaceous, acute, dentate or lacerate, mostly equal and dark-colored. Ovary unilocular; style filiform or obsolescent; stigmas 3; ovules 3. Fruit a trigonous 1-celled loculicidal 3-valved capsule. Seeds 3, ovoid, oblong, or spherical, with a more or less developed mealy appendage [caruncle] at one end. Perennial grass-like plants; culms leafy all the way up; leaves flat, with whitish ciliate hairs on the margin; leaf sheaths closed; auricles lacking; cauline leaves shorter than the radical.

Economic importance. Little is known about the nutritive value of the genus, and reports are often conflicting. Readily eaten by deer in the tundra (*L. Wahlenbergii*, *L. spicata*, *L. parviflora*, and certain other species). In forest and mountain regions eaten unwillingly by cattle or not at all. Since species of *Luzula* hardly ever form pure stands, they are of little importance as fodder.

1. Inflorescence with solitary flowers on the branches 2.
Inflorescence with flowers crowded in glomerules of 2, 3, or more, and if flowers solitary, they do not exceed 2 mm and their seeds are devoid of a large caruncle (in other cases the caruncle may be nearly as large as the seed itself) 6.

* From the Italian name *Lucciola* and the Latin *luceo* - to shine, sparkle, as most European species of this genus have inflorescences with lustrous silvery flowers; according to a different interpretation, from *lucus* - coppice, referring to the usual habitat of the European species.

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2. Capsule shorter to slightly longer than the perianth; leaves linear, 1 – 3 (5) mm broad. 3.
 - + Capsule much longer than the perianth; leaves from 5 to 10 mm broad. 4.
 3. Flowers 2.5 mm long; outer perianth segments acute, the inner obtuse or subobtus, rufous or stramineous (Siberia) 2. *L. rufescens* Fisch.
 - + Flowers 3.5 – 4.5 (5) mm long, all the segments aristate, castaneous (Caucasus). 1. *L. Forsteri* (Sm.) DC.
 4. Flowers 2.5 mm long (capsule to 4 mm long); perianth segments acute; leaves to 4 – 5 mm broad. 3. *L. macrocarpa* (Buch.) Nakai.
 - + Flowers 3 – 4 mm long; leaves (4) 5 – 10 mm broad 5.
 5. Densely cespitose plants; perianth segments acute (Eurasia) 4. *L. pilosa* (L.) Willd.
 - + Plants with long stolons; perianth segments dentate above, mucronate, (Kamchatka). 5. *L. japonica* Buch.
 - 6 (1). Inflorescence cymose; flowers 2.5 – 3 mm long, silvery-white, rarely pinkish or yellowish; leaves slenderly pointed 6. *L. nemorosa* E. Mey.
 - + Inflorescence paniculate, umbellate or capitate; flowers usually dark-colored, rarely golden or light-colored, never exceeding 2 mm in length; leaves abruptly pointed and often terminating in a callosity 7.
 7. Inflorescence diffusely paniculate, with long filiform drooping branches, each bearing 1 – 2 (3) flowers; flowers ca. 2 mm long 8.
 - + Inflorescence paniculate, umbellate or congested, with rather thick branches, each bearing from 2 or 3 to 15 – 20 or more flowers in glomerules; flowers (1.5) 2 – 4 mm long 10.
 8. Large, non-tufted plants; leaves 6 – 10 mm broad; flowers ca. 2 mm long; anthers equaling filaments 9.
 - + Cespitose plants, not exceeding 30 cm in height; leaves ca. 2 – 4 mm broad (the cauline even narrower, at most 2.5 mm broad); flowers 2 – 2.5 mm long; anthers exceeding the filaments 10. *L. Wahlenbergii* Rupr.
 9. Capsule longer than the castaneous perianth segments; flowers often solitary or in 2's or 3's at the ends of branches. (Eurasia) 8. *L. parviflora* (Ehrh.) Desv.
 - + Capsule as long as the light perianth segments, at length blackish; flowers solitary. (Far East) . . . 9. *L. melanocarpa* (Mchx.) Desv.
 10. Large forest plants; leaves ribbon-like, to 15 mm broad; flowers 3.5 – 4 mm long, inner perianth segments longer than the outer; seeds 1.4 – 1.7 mm long, but without a distinct caruncle 7. *L. silvatica* (Huds.) Gaud.
 - + Mountain-meadow plants of moderate size; leaves at most 5 – 6 mm broad; flowers 1.5 – 3.5 mm long; perianth segments equal or the inner shorter 11.
 - 561 11. Prophylla strongly fimbriate, nearly equaling and sometimes exceeding the flower (and then the inflorescence spicate, nodding); seeds not carunculate; lower bract poorly developed 12.
 - + Prophylla scarcely fimbriate, ciliate, shorter than flower; seeds distinctly carunculate; lower bract leaf-like, well developed . . . 16.

12. Prophylla longer than flower, silvery, hence inflorescence somewhat whitish; inflorescence spicate, nodding, the culm being very slender at base. 15. *L. spicata* (L.) DC.
+ Prophylla equaling the flower; inflorescence capitate or oblong, simple or branching 13.
13. Densely cespitose plants; basal sheaths light brown; leaves flat, rather broad 14.
+ Creeping, loosely cespitose plants; basal sheaths purplish-brown, lustrous; leaves canaliculate, narrow (at most 3 mm broad) . . . 15.
14. Inflorescence capitate, rarely with 1 or 2 subsidiary branches; flowers 1.5 - 1.7 mm long, the perianth segments slightly dissected above; capsule somewhat exceeding the perianth; leaves 2 - 3 mm broad. (Eurasian Arctic) 11. *L. nivalis* Laest.
+ Inflorescence branched; flowers 2 mm long, pointed; capsule equaling the perianth; leaves 4 - 8 mm broad (East Siberian Arctic) 12. *L. kamtschadalorum* (Sam.) Gorodk.
15. Culms slender; inflorescence diffuse, nodding, the numerous slender branches bearing flowers in small clusters (0.4 - 0.5 mm in diameter); flowers 2 mm long; capsule shorter than the perianth; prophylla obsolete; leaves convolute, 1 - 2 mm broad. (Lapland) 13. *L. arcuata* Whlb.
+ Culms stout; inflorescence sparingly branched, the stout, erect or curved branches bearing dense many-flowered heads to 1 cm in diameter; flowers 2 - 2.3 mm long; capsule equaling to slightly exceeding the perianth; prophylla conspicuously fimbriate; leaves canaliculate, 2 - 3 mm broad. (Eurasia) 14. *L. confusa* Lindb.
- 16(11). Inflorescence compactly capitate 17.
+ Inflorescence branched 18.
17. Flowers 3 - 3.5 mm long; perianth segments prominently hyaline-margined; leaves flat, to 5 mm broad; anthers as long as filaments; seeds with large caruncle to 0.7 - 0.8 mm long. (Far East) 18. *L. capitata* (Miq.) Nakai.
+ Flowers 2.5 - 3 mm long; perianth segments with light brown or ferruginous margins; leaves 1.5 - 2.5 mm broad; anthers at least twice as long as filaments; seeds with indistinct caruncle (0.1 - 0.2 mm long). (Caucasus) 17. *L. pseudo-sudetica* V. Krecz.
18. Inner perianth segments markedly shorter than the outer; flowers not exceeding 2.5 mm in length 19.
562 + All perianth segments equal; flowers exceeding 2 - 2.5 mm in length 20.
19. Flowers blackish-brown; inflorescence rather crowded, containing 2 - 5 (7) ovoid or spherical glomerules; seeds obsolete carunculate, narrowly ovoid (Lapland) 24. *L. sudetica* (Willd.) DC.
+ Flowers tawny, rarely pale; inflorescence umbellate, containing 5 - 12 or more usually short-cylindric glomerules; seeds with caruncle ca. 0.2 - 0.3 mm long, oblong-ovoid 25. *L. pallescens* (Whlb.) Bess.
20. Loosely cespitose stoloniferous plants; seeds with large caruncle (nearly half the length of the seed, ca. 0.5 - 0.7 mm long); anthers 3 - 4 times as long as filaments 16. *L. subpilosa* Gilib.

- + Tussock-forming plants, without stolons; seeds with small caruncle to 0.5 mm long; anthers merely $1\frac{1}{2}$ –2 times as long as or equaling the filaments 21.
- 21. Anthers as long as or shorter than filaments; flowers reddish-ferruginous; inflorescence rather congested, few-flowered 23. *L. sibirica* V. Krecz.
- + Anthers twice as long as filaments; flowers blackish-brown . . . 22.
- 22. Capsule more or less exceeding the perianth; inner perianth segments truncate or obtuse mucronate 20. *L. frigida* (Buch.) Sam.
- + Capsule shorter than the perianth; all perianth segments equal, slenderly pointed 23.
- 23. Flowers 2–2.3 mm long; inflorescence containing numerous (from 10 to 20) small capitate glomerules 0.4–0.5 cm in diameter 22. *L. oligantha* Sam.
- + Flowers 3–3.8 mm long; inflorescence containing 5–15 oblong many-flowered glomerules (0.6–1.7 cm long, 0.5–0.7 cm broad) 24.
- 24. Flowers 3–3.8 mm long; perianth segments prominently white-hyaline-margined; leaves to 3 mm broad, the cauline even narrower 19. *L. multiflora* (Ehrh.) Lej.
- + Flowers 3–3.2 mm long; perianth segments indistinctly light-margined; radical leaves 2–4 mm long, cauline leaves broader (3–6 mm) 21. *L. Kjellmanniana* Miyabe et Kudo.

Subgenus 1. *Pterodes* Griseb. Spicil. Fl. Rum. (1845) 404. — Tufted stoloniferous plants with creeping rootstock; basal sheaths colored, bladeless, terminating in a callosity; leaves flat, from 3 to 10 mm broad, ciliate-margined, obtusely callous-tipped. Inflorescence simple or slightly compound, umbelliform, the solitary distant flowers borne on filiform branches. Caruncle large, cap-shaped, nearly equaling the seed.

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Series 1. *Rufescentes* V. Krecz. — Capsule about equaling the perianth. Leaves 1.5–4 (5) mm broad; caruncle large, but shorter than the seed.

1. *L. Forsteri* (Sm.) DC. Syn. Fl. Gall. (1806) 150; E. Mey. in Ldb. Fl. Ross. IV, 216; Miscz. in Fl. cauc. crit. II, 4 (1906) 9. — *L. vernalis* Koch in Linnaea. XXI (1845) 625, non DC. — *Juncus Forsteri* Sm. Fl. brit. III (1804) 1395. — *J. pilosus* M. B. Fl. taur.-cauc. I (1808) 286, pro max. p. — Exs.: Fl. cauc. exs. No. 4; HFR No. 1092.

Perennial, green, rather densely caespitose plants; culms slender, 20–40 cm tall, leafy; basal sheaths dark purple, callous-tipped, bladeless; leaves flat, linear, abruptly pointed, 1.5–3 (5) mm broad; sheaths pilose on margin and at orifice; inflorescence umbelliform-paniculate, with erect forking slender branches; bract one-third to half the length of inflorescence; flowers 3.5–4.5 (5) mm long, solitary; prophylla ovate, acute, more or less ciliate-fimbriate, reddish, hyaline-tipped, nearly half as long as the perianth; perianth segments lanceolate, equal, or the inner ones longer, aristate, castaneous, narrowly white-hyaline-tipped; stamens 6, ca. 2 mm long, the anther linear, twice as long as the filaments; capsule broadly ovoid-conic, yellowish-green, mucronate, shorter than to rarely slightly exceeding the perianth; seeds oblong-ovoid, reddish-castaneous, 2–2.5 mm long, with a short straight caruncle. Fruiting June.

Forests in the foothills. - European part: Crimea; Caucasus: Ciscauc., West. and East. Transcauc., Dag., Tal. Gen. distr.; West. and South. Europe, Asia Minor, Syria, Persia, Algeria. Described from England.

2. *L. rufescens* Fisch. ex E. Mey. in *Linnaea* XXII (1849) 385; E. Mey. in *Ldb. Fl. Ross.* IV, 215; Turcz. in *Bull. Soc. Nat. Moscou* XXVII (1855) 298; V. Krecz. in *Fl. transb.* II, 143; Maxim. *Prim. fl. Amur.* (1859) 292.

564 Perennial, green, loosely caespitose plants; culms slender, 10-30 cm tall, leafy; basal sheaths ferruginous-red; leaves flat, linear, 2-3 (4) mm broad, pilose-margined below, abruptly pointed, obtusely callous-tipped; inflorescence mostly simple, umbellate, with few slightly forking branches; bract at most half as long as the perianth; perianth segments equal or unequal, lanceolate, the outer long-acuminate, flat, the inner subcuneate, obtusish, stramineous, rufous on the back, white-hyaline-margined; stamens 6, ca. 2 mm long, the anthers rather longer than the filaments; capsule trigonous-ovoid, 2.5-4 mm long, stramineous, nearly equaling to exceeding the perianth, mucronulate; seeds ovoid, 2-2.5 mm long, pale castaneous, the whitish curved caruncle two-thirds the length of seed. Fruiting May - June.

Forests. - East. Siberia: Yenis., Ang.-Sayan., Daur., Len.-Kol.; Far East: Ze.-Bur., Okhot., Ud., Uss., Sakh., Kamch. (Tymlat). Gen. distr.: Northern Mongolia, Manchuria. Described from Siberia (surroundings of Irkutsk). Type in Leningrad.

3. *L. macrocarpa* (Buch.) Nakai, *Rep. Veg. Quelp.* (1914) 30. - *L. rufescens* var. *macrocarpa* Buch. in *Engl. Pflzr.* IV, 36 (1906) 47.

Perennial plants, resembling the preceding species, but differing in looser tufts, taller stature (culms to 40 cm tall), larger branched inflorescence, and above all in the size of capsule attaining 4-4.3 mm in length and greatly exceeding the perianth; perianth segments more pointed, notably the very slenderly pointed outer segments. Fruiting June.

Forests. - Far East: Okhot., Ud., Sakh., Ze.-Bur., Uss. Gen. distr.: Manchuria, Korea, Northern Japan. Described from Amur. Type in Leningrad.

Series 2. *Pilosae* V. Krecz. - Capsule longer than the perianth; leaves 5-10 mm broad; caruncle equaling to exceeding the seed.

4. *L. pilosa* (L.) Willd. *En. pl. hort. Berol.* (1809) 393; E. Mey. in *Ldb. Fl. Ross.* IV, 214; Misch. in *Fl. cauc. crit.* II, 4 (1906) 11. - *Juncus pilosus* L. *Sp. pl.* (1753) 329 (quoad var. α); M. B. *Fl. taur.-cauc.* I, 216, ex min. p. - Exs.: HFR No. 189.

Perennial, bright green, rather densely caespitose plants; culms erect, 15-30 cm tall, leafy; basal sheaths reddish-castaneous, callous-tipped, bladeless; leaves linear-lanceolate, flat, 5-10 mm broad, abruptly pointed, shorter than the culm, hairy at margin and at orifice; inflorescence umbelliform-paniculate, with somewhat spreading at length reflexed branches; bract very much shorter than the perianth; flowers solitary, 3-4 mm long; prophylla ovate, acute, often slightly fimbriate, brownish, hyaline-tipped, at most half as long as the perianth; perianth segments lanceolate, unequal (the inner somewhat longer), acute, castaneous, broadly hyaline-margined; stamens 6, ca. 2 mm long, the anthers linear, at least twice as long as the filaments; capsule spheroid-conic, mucronate, markedly exceeding the perianth; seeds ca. 3 mm long, castaneous, broadly ovoid, with a large curved caruncle. Fruiting April - May.

Shady forests. - Throughout the European part, except Arctic and Crimea; Caucasus: Ciscauc. (w. part), West. Transcauc.; West. Siberia: Ob., Upp. Tob., Irt., Alt.; East. Siberia: Yenis., Ang.-Sayan. Gen. distr.: North. and Centr. Europe, North America. Described from Western Europe.

5. *L. japonica* Buch. in Bot. Jahrb. XII (1890) 82; Hultén, Fl. of Kamtsch. I, 224. - *L. pilosa* E. Mey. in Ldb. Fl. Ross. IV (1853) 214, quoad 565 pl. kamtsch. - *L. rufescens* Kom. Fl. penins. Kamtsch. I (1927) 283, non Fisch. - *L. saltuensis* Fernald in Rhodora V (1903) 194, quoad pl. kamtsch.

Perennial, light green, scarcely caespitose, long-stoloniferous plants; culms slender, erect to ascending, 10-20 cm tall, leafy; basal sheaths faintly reddish, bladeless; leaves flat, linear-lanceolate, 4-7 mm broad, abruptly pointed, shorter than the culm; inflorescence mostly simple, umbellate, the branches slender, erect to spreading; bract broad, half the length of inflorescence; flowers 3-3.5 mm long, solitary; prophylla broadly ovate, membranaceous, truncate to subacute, ciliate-fimbriate; perianth segments lanceolate, pale castaneous, subequal, obtusish, unevenly acuminate, terminating in a white long mucro, white-hyaline-margined; stamens 6, to 2 mm long, anthers nearly twice as long as filaments; capsule ovoid-conic, to 4.5 mm long, mucronulate; seeds castaneous, broadly ovoid, 3-3.5 mm long, the curved caruncle equaling to exceeding the seed. Fruiting June.

Open forests. - Far East: Kamch., Commander Islands, Sakh., Gen. distr.: Kurile Islands, Northern Japan. Described from Japan (Hakodate). Type in Leningrad.

Subgenus 2. *Anthelaea* Griseb. Spicil. fl. Rum. (1845) 404. - Rather loosely tufted plants, with oblique or creeping rootstock. Basal sheaths acute, without callosity. Leaves flat, pointed, 4-15 mm broad, mostly weakly ciliate. Inflorescence decomposed, paniculate or cymose, the flowers solitary or in glomerules of 2-5. Seeds weakly carunculate or without caruncle, with a tuft of short bristles at base.

Series 1. *Nemorosae* V. Krecz. - Inflorescence cymose; flowers silvery, pale, 2.5-3 mm long; loosely caespitose stoloniferous plants.

6. *L. nemorosa* E. Mey. in Linnaea XXII (1849) 394; E. Mey. in Ldb. Fl. Ross. IV, 216; Schamllh. Fl. II, 514. Exs.: HFR No. 1535.

Perennial, light green, loosely caespitose, sometimes short-stoloniferous plants; culms erect, ascending below, thickened at base, 30-70 cm tall, leafy; basal sheaths fibrillose; leaves linear, flat, 3-4 (5) mm broad, rather long-acuminate, densely white-ciliate on the margin, the cauline leaves elongated; inflorescence compound, contracted-paniculate or subpaniculate-cymose; bract slender, exceeding the inflorescence; flowers 2.5-3 mm long, crowded at ends of branches in glomerules of (3) 5-6; prophylla ovate, acute, white-hyaline; perianth segments lanceolate, acute, the inner markedly longer than the outer, stramineous to whitish, sometimes reddish on the back; stamens 1.5-1.8 mm long, the anthers very much longer than filaments; capsule trigonous, ovoid-conic, castaneous, 566 as long as the perianth; seeds 1.2 mm long, obliquely ovoid, castaneous, with a distinct gray or yellowish caruncle. Fruiting May-June.

Open forests and parks. - European part; Lad.-Il'm., Upp. Volg. (near Rybinsk and Moscow), Mid. Dnepr. (w. part). Gen. distr.: Centr. Europe, Baltic States. Described from Germany.

Series 2. *Silvaticae* V. Krecz. - Inflorescence a lax panicle; flowers castaneous, 3.5 - 4 mm long; densely caespitose plants.

7. *L. silvatica* (Huds.) Gaud. *Agrost. helv.* II (1811) 240; E. Mey. in *Ldb. Fl. Ross.* IV, 216; *Miscz. in Fl. cauc. crit.* II, 4 (1906) 13. - *Juncus silvaticus* Huds. *Fl. angl. ed.* 1 (1762) 151. - Exs.: Kneuck. (1911) No. 57.

Perennial, bright green or evergreen, densely caespitose plants, with an oblique rootstock; culms erect, thickened at base, 30 - 70 cm tall, leafy throughout; basal sheaths pale brown, pointed, bladeless; radical leaves flat, subcoriaceous, long, to 15 mm broad, abruptly attenuate, shorter than the culm, white-ciliate on the margin, the cauline much smaller; inflorescence a lax compound panicle, with slender often drooping branches; bract much shorter than the inflorescence; flowers 3.5 - 4 mm long, crowded in heads of 2 - 3 (4) at ends of branches; prophylla ovate, acute, ciliate, hyaline; perianth segments lanceolate, mucronate, the inner longer, castaneous to light castaneous, broadly hyaline-margined; stamens ca. 3 mm long, the anthers several times the length of filaments; capsule trigonous, spherical-conic, mucronate, nearly as long as the perianth, castaneous; seeds 1.5 - 1.7 mm long, ovoid, castaneous, with a grayish caruncle. Fruiting June.

Shady forests. - Caucasus: Ciscauc. (w. part), West. Transcauc. Gen. distr.: West., Centr., and South. Europe, Asia Minor. Described from England.

Series 3. *Parviflorae* V. Krecz. - Inflorescence an open panicle; flowers dark, 2 - 2.3 mm long; stoloniferous plants.

8. *L. parviflora* (Ehrh.) Desv. in *Journ. bot.* I (1808) 144; Buch. in *Engl. Pflzr.* IV, 36 (1906) 61. - *L. spadicea* & *parviflora* E. Mey. in *Ldb. Fl. Ross.* IV (1853) 217, ex p. - *L. tenuissima* Turcz. in *Ldb.*, l. c. (ex syn.). - *Juncus parviflorus* Ehrh. in *Beitr.* VI (1791) 139.

Perennial, bright green, non-tufted plants; culms rather strong, attenuate above and somewhat nodding in inflorescence, 30 - 60 cm tall, the lower two-thirds leafy; basal sheaths brownish, bladeless; radical leaves lance-linear, flat, to 6 - 10 mm long, subglabrous on the margin, abruptly acuminate; cauline leaves shorter and narrower (to 5 - 6 mm broad), 4 - 5, decreasing upward; inflorescence congested to open-paniculate, the branches slender, drooping; bract obsolescent; flowers 2 mm long, solitary or in 2's (3's) at ends of branches; prophylla ovate, acute, faintly ciliate; perianth 567 segments equal, broadly lanceolate, acute, light castaneous to ferruginous, light-margined; stamens ca. 1 mm long, the anthers about as long as filaments; capsule trigonous, ovoid, dark brown, mucronate, 3 mm long, exceeding the perianth; seeds oblong, 1 - 1.2 mm long, rusty brown. Fruiting June - July.

At the forest limit in the tundra and in the alpine zone. - Arctic: Eur. and Arct. Siberia; European part: Kar.-Lap., Dv.-Pech., Volg.-Kam. (Konzhakovskii Kamen' and other peaks); West. Siberia: Ob. (n.), Alt.; East. Siberia: Yenisi., Ang.-Sayan., Daur., Len.-Kol.; Far East: Ze.-Bur., Ud., Okhot., Uss. Gen. distr.: West. Europe, North America, Northern Mongolia. Described from Sweden (Lapland alps).

9. *L. melanocarpa* (Mchx.) Desv. in *Journ. bot.* I (1808) 142, tab. 5, fig. 2. - *L. spadicea* & *parviflora* E. Mey. in *Ldb. Fl. Ross.* IV (1853) 217, ex p. - *L. spadicea* ζ *melanocarpa* E. Mey., l. c., ex p. - *L. parviflora* var. *melanocarpa* Buch. in *Engl. Pflzr.* IV, 36 (1906) 62.

L. parviflora Hultén, Fl. of Kamtch. I (1927) 229; Kom. Fl. Kamch. I, 284, non Desv. - *Juncus melanocarpus* Mchx. Fl. bor. am. I (1803) 190.

Perennial, light green non-cespitose plants; culms attenuate above, 30-60 cm tall, leafy; leaves flat, linear-lanceolate, 6-8 mm broad, glabrous on the margin, cauline leaves 3; inflorescence open paniculate, the branches slender, capillary, drooping; flowers 2 mm long, solitary, long-pedicelled, rarely crowded in short-peduncled cymes; bracts obsolescent; prophylla ovate, fimbriate above; perianth segments equal, broadly lanceolate, acute, reddish-ferruginous, ferruginous or golden, with lighter margins; stamens 1 mm long, the anthers as long as filaments; capsule ovoid, dark purple, at length dark brown, equaling or shorter than the perianth; seeds oblong, brown, 1.2 mm long. Fruiting June - July.

Sea coast. - Arctic: Anad.; Far East: Kamch. and Commander Islands, Okhot. (?), Sakh., Ud. (?). Gen. distr.: North America. Described from Hudson Bay in North America.

10. *L. Wahlenbergii* Rupr. in Beitr. Pflanzk. russ. Reich. II (1845) 58; Hultén, Fl. of Kamtch. I, 230; Kom. Fl. Kamch. I, 285. - *L. spadicea* Kunthii E. Mey. in Ldb. Fl. Ross. IV (1853) 217. - *L. borealis* Fries, Summ. Veg. I (1846) 219. - Exs.: Kneuck. (1903) No. 49.

Perennial, green, caespitose, rarely stoloniferous plants; culms slender, nodding above, 10-30 cm tall, leafy to above the middle; basal sheaths light brown; radical leaves crowded, linear, flat, 2-4 mm broad, subcoriaceous, subglabrous on the margin; cauline leaves 2 or 3, shorter and narrower (at most 2.5 mm broad), decreasing up the culm; inflorescence loosely paniculate, spreading, few-flowered, the branches filiform, subnutant; bracts obsolescent; flowers 2-2.3 mm long, solitary or in 2's (3's) at ends of branches; prophylla oblong-ovate, subacute, ciliate; perianth segments subequal, broadly lanceolate, subacute, ferruginous-brown with lighter margins; stamens ca. 1 mm long, the anthers slightly exceeding the filaments; capsule trigonous, ovoid-ellipsoid, brown, lustrous, about equaling to slightly exceeding the perianth, 2.5-2.8 mm long, subobtuse; seeds 1-1.2 mm long, oblong-ovoid, ferruginous-brown, subacute. Fruiting July.

Boggy tundra; moss and sphagnum marshes. - Arctic: Nov. Zem., Arct. Eur., Arct. Sib., Chuk., Anad.; European part: Kar.-Lap. (Khibiny); Far East: Kamch. (?). Gen. distr.: Scandinavia (arct.). Described from Bol'shezemel'skaya Tundra (Kambal'nitsa). Type in Leningrad.

Subgenus 3. *Gymnodes* Griseb. Spicil. fl. Rum. (1845) 405. - Caespitose, rarely stoloniferous plants; leaves narrow, terminating in callosity, 1.5-5 mm broad. Inflorescence compound, umbellate, spicate, or capitate. Flowers in glomerules of (3) 5 to 20 or more. Seeds with a more or less developed caruncle.

Cycle 1. *Thyrsochlamydea* V. Krecz. - Inflorescence irregularly branching; bracts obsolescent. Flowers 1.5-2.3 mm long; prophylla strongly ciliate-fimbriate, about equaling the flower. Seeds without a distinct caruncle.

Series 1. *Arcticae* V. Krecz. - Densely caespitose plants; basal sheaths pale; leaves flat, from 3 to 8 mm broad.

11. *L. nivalis* Laest. in Vet. Ak. Handl. Stockh. (1822) 334. - *L. arctica* Blytt in Norges Fl. I (1861) 299; Buch. in Engl. Pflzr. IV, 36 (1906) 68. - *L. arcuata* β E. Mey. in Ldb. Fl. Ross. IV (1853) 218.

Perennial, pale green, densely caespitose plants; culms erect, slender, 6 - 15 (20) cm tall, often becoming red, bearing 1 or 2 leaves barely reaching the middle of the culm; leaves flat, 2 - 2.5 mm broad, linear-lanceolate, long-attenuate, subobtuse, weakly ciliate-margined; basal sheaths light brown; inflorescence capitate, sometimes with 1 or 2 short erect branches; bract obsolescent; flowers 1.5 - 1.7 mm long, crowded; prophylla membranaceous, light, ovate, fimbriate at summit; perianth segments equal, ovate-lanceolate, somewhat dissected at summit or acute, reddish-ferruginous to brown, lighter at margin and summit; stamens 0.7 mm long, the oblong anthers equaling the filaments; capsule trigonous, ovoid, short-beaked, to 2 mm long, slightly exceeding the perianth, reddish-brown; seeds ovoid, ca. 1 mm long, brown. Fruiting July.

Tundra (stony and grass-covered places). - Arctic: Nov. Zem., Arct. Eur., Arct. Sib., Chuk.; East. Siberia; Yenisei, Len.-Kol. (n. part). Gen. distr.: Scandinavia, Arctic North America. Described from Sweden.

12. *L. kamtschadalarum* (Sam.) Gorodk. ex Kryl. Fl. Sib. occid. III (1929) 551. - *L. arcuata* var. *kamtschadalarum* Sam. in Hultén, Fl. of Kamtch. I (1927) 223. - *L. arcuata* E. Mey. in Ldb. Fl. Ross. IV 569 (1853) 218 ex p.; Buch. in Engl. Pflzr. IV, 36 (1906) 70, quoad. pl. kamtschat.; Kom. Fl. Kamch. I, 285, non Whlb. - *L. arcuata* f. *latifolia* Kjellm. in Vega Exped. (1883) 374. - *L. arctica* var. *latifolia* Buch., l. c., 69.

Perennial, green, loosely caespitose plants; culms erect, 10 - 20 cm tall, bearing 1 or 2 leaves; leaves flat, lanceolate, 4 - 8 mm broad (cauline leaves to 3 - 4 mm broad), abruptly attenuate, obtusely callous-tipped, glabrous-margined; basal sheaths broad, pale brown to drab; inflorescence few-branched, spreading, the branches filiform, arcuate; flowers 2 mm long, crowded at ends of branches and at axils in dense many-flowered corymbose clusters to 1 cm broad; bract distinct, leaf-like, several times the length of inflorescence; prophylla ovate, membranaceous, subacute, more or less fimbriate-ciliate-tipped; perianth segments equal, lanceolate, acute, ferruginous to subferruginous; stamens 0.8 - 1 mm long, the anthers slightly shorter than filaments; capsule ovoid, greenish-ferruginous, as long as the perianth; seeds oblong, dark brown, to 1.2 mm long. Fruiting June - July.

Tundra. - Arctic: Arct. Eur. (n. Yamal), Arct. Sib. (eastward from Yenisei estuary), Chuk.; Far East; Kamch. Gen. distr.: Alaska and adjoining islands. Described from Koraginskii Island.

Series 2. *Arcuatae* V. Krecz. - Caespitose plants, with creeping rootstock; basal sheaths lustrous, cherry-colored to brown; leaves narrow, canaliculate, 1.5 - 3 mm broad.

13. *L. arcuata* Whlb. Fl. suec. I (1824) 218; E. Mey. in Ldb. Fl. Ross. IV, 218 (quoad var. α); Buch. in Engl. Pflzr. IV, 36 (1906) 70.

Perennial, cineraceous-green to light green, subcaespitose plants; culms slender, often curved, 8 - 15 cm tall, bearing a solitary leaf below or about the middle; leaves setaceous-convolute, 1 - 2 mm broad, the more or less ciliate margin at length glabrescent, falcate or flexuous, at most half as long as the culm; basal sheaths purplish-red, more or less lustrous; inflorescence sparingly divided, paniculate, the 5 - 10 branches slender, arcuate, simple or forking at the ends; flowers 2 mm long, crowded in glomerules of 3 to 10, 0.4 - 0.5 cm in diameter; prophylla membranaceous, light,

oblong-ovoid, acute, ciliate; perianth segments equal, lanceolate, rather finely pointed, ferruginous to ferruginous-brown, whitish at margin and summit; stamens ca. 1 mm long, the oblong anthers as long as filaments; capsule trigonous, broadly ovoid, subferruginous, dull, shorter than the perianth; seeds oblong-ovoid, ca. 1 mm long, brown. Fruiting June - July.

Grassy and stony sites in the arctic and subalpine zones. - Arctic; Arct. Eur. (Kol'skii Pen. and Kanin, in the PaiKhoi range); European part: Kar.-Lap. (Khibiny). Gen. distr.: Scandinavia. Described from the Swedish alps.

14. *L. confusa* Lindb. in Nya Botan. Notis. (1855) 9. - *L. arcuata* γ E. Mey. in Ldb. Fl. Ross. IV (1853) 218. - *L. hyperborea* β *angustifolia* Fisch. et Mey. in Ind. Sem. H. P. VIII (1842) 66. - *L. arcuata* * *subdetico-arcuata* Rupr. in Beitr. Pflanzk. russ. Reich. II (1845) 58. - *L. arcuata* var. *lanuginosa*. Rupr. *ibid.*, 59.

Perennial, yellowish-green, subcespitose plants; culms erect, stoutish, 10 - 25 cm tall, bearing a solitary leaf; leaves narrow, flat to canaliculate, 2 - 3 mm broad, long-acuminate, glabrescent-margined, reaching the inflorescence; basal sheaths reddish-brown, lustrous, tall; inflorescence few-branched, spreading, the branches rather stout, erect to flexuous; bract obsolescent; flowers 2 - 2.3 mm long, crowded in dense many-flowered heads 1 cm in diameter, borne at ends of branches and in axils; prophylla membranaceous, broadly ovoid, the margins densely white-ciliate to white-pilose; perianth segments equal, lanceolate, subacute, ciliolate, reddish-brown, lighter at the margin and summit; stamens ca. 1 mm long, the oblong anthers equaling to exceeding the filaments; capsule ovoid, light, dull, equaling to slightly exceeding the perianth; seeds oblong, brown, to 1 - 1.2 mm long. Fruiting July.

Mounds and borders of brooks in the alpine zone; elevated sites in the tundra. - Arctic: Nov. Zem., Arct. Eur., Arct. Sib., Chuk.; European part: Kar.-Lap. (Khibiny), Dv.-Pech. (Ural); West. Siberia: Ob. (n.), Alt.; East. Siberia; Yenisei., Ang.-Sayan., Daur., Len.-Kol.; Far East: Okhot. Gen. distr.: Scandinavia, Iceland, Greenland, and Northern Mongolia. Described from Sweden (Dovre).

Cycle 2. *Stachyophora* V. Krecz. - Inflorescence capitate; prophylla elongate, strongly ciliate, exceeding the flower; leaves without terminal callosity; caruncle obsolescent.

15. *L. spicata* (L.) DC. Fl. franc. III (1805) 161; E. Mey. in Ldb. Fl. Ross. IV, 220 (incl. var., β); Mischz. in Fl. cauc. crit. II, 4 (1906) 14. - *J. spicatus* L. Sp. pl. (1753) 330.

Perennial, light green, cespitose plants; culms strongly attenuate, nodding beneath and within inflorescence, 10 - 40 cm tall, leafy nearly to the top (3 or 4 leaves); basal sheaths light brown; leaves canaliculate, 1.5 - 3 mm broad, long-ciliate on the margin, subobtuse, short; inflorescence spicate, oblong, sublobate, nodding; bract shorter than the inflorescence; flowers 2.5 - 3 mm long, crowded in glomerules; prophylla membranaceous, elongate, white-hyaline at margin and at summit, finely pointed, long-ciliate; perianth segments equal, lanceolate, aristate, castaneous-brown, hyaline at margin and at summit; stamens 6, barely half the length of perianth, the anthers oblong, equaling or slightly shorter than the filaments; capsule trigonous-spheroid, obtuse, castaneous, shorter than to equaling the perianth; seeds ca. 1.2 - 1.3 mm long, obovoid, with a small grayish projection. Fruiting June - July.

Rocks and stony sites in high-mountain and arctic regions. - Arctic: Arct. Eur., Arct. Sib.; European part: Kar.-Lap. (Khibiny), Dv.-Pech. (Ural), Volg.-Kam. (Ural); Caucasus: West. Siberia; Ob. (Ural), Alt.; 571 East. Siberia: Ang.-Sayan., Daur.; Centr. Asia: Tyan'-Shan, Pam.-Al. Gen. distr.: Arct. and mount. Europe, North America, Himalayas. Described from Western Europe (Sweden).

Cycle 3. *Nomochlamydea* V. Krecz. - Inflorescence umbellate or compactly umbelliform, with a developed bract. Leaves terminating in callosity. Flowers 2 - 4 mm long; prophylla scarcely ciliate, shorter than the flower. Seeds more or less distinctly carunculate.

Series 1. *Eu-campestres* V. Krecz. - Loosely caespitose, stoloniferous plants; anthers 3 - 4 times as long as filaments.

16. *L. subpilosa* Gilib. Exerc. phytol. II (1792) 507. - *L. vulgaris* Buch. in Bot. Jahrb. VII (1886) 175. - *L. campestris* E. Mey. in Ldb. Fl. Ross. IV (1853) 219 (quoad var. *a*); V. Krecz. in Journ. Soc. Bot. Russ. XII (1928) 488. - 489 (incl. ssp. *taurica*). - *L. campestris* var. *vulgaris* Gaud. Fl. helv. II (1828) 572; Buch. in Engl. Pflzr. IV, 36 (1906) 861 - ? *L. Althii* Herbich, Sel. pl. rar. Galic. (1836) 12. - *Juncus campestris* L. Sp. pl. (1753) 329, ex p. - Exs.: Pl. Finl. exs. Nos. 565, 566; HFR No. 1683.

Perennial, green, loosely caespitose, short-stoloniferous plants; culms few (1 - 4), erect, ascending at base, (5) 10 - 20 (30) cm tall; leaves soft, linear, flat, 2 - 3 mm broad, usually hairy on the margin, shorter than the culm, abruptly pointed; inflorescence umbellate, spreading, the branches erect, horizontal, or reflexed, the 3 - 6 heads spherical, rarely ovoid, 0.5 - 1.2 cm long, 0.6 - 0.9 cm broad; bract leaf-like, always shorter than the inflorescence; flowers 3 - 3.8 mm long, in glomerules of (3) 5 - 9 (11); perianth segments lanceolate, finely pointed, equal, blackish-brown, broadly white-hyaline at margin and at summit; stamens ca. 2 mm long, the anthers 3 - 4 times as long as filaments; capsule broadly ovoid, rounded at summit, shorter than the perianth; style to 4 - 5 mm long, persistent, nearly twice the length of ovary (1 - 1.5 mm long); seeds 1.5 - 2 mm long, broadly ovoid, the caruncle 0.5 - 0.7 mm long (half the length of seed in fresh material). Fruiting May - June.

Dry grassy and sandy places, slopes, fallows, clearings, pine woods, and oak thickets. - European part: Lad.-Il'm. (w. part), Upp. Dnepr., Pri- chern., Low. Don. (st. Tarasovka), Crimea; throughout the Caucasus. Gen. distr.: West. Europe, Baltic States, Asia Minor. Described from Lithuania (Grodno).

NOTE. Caucasian and Crimean plants differ from the European and represent a distinct race.

17. *L. pseudo-sudetica* V. Krecz. nom. nov. - *L. angustifolia* C. Koch in Linnaea, XXI (1848) 625, nec Poir. (1813), nec Wedenr. (1823). - *L. sudetica* Grossh. Fl. Kavk. I (1928) non DC. - *L. campestris* var. *sudetica* Miscz. in Fl. cauc. crit. II (1906) 25. - *L. multiflora* ssp. *pseudo-sudetica* V. Krecz. in Journ. Soc. Bot. Russ. XII (1928) 490.

572 Perennial, light green, loosely caespitose, non-stoloniferous plants; culms erect, 5 - 25 cm tall, leafy; leaves flat, 1.5 - 2.5 mm long, elongate, one-third to nearly half the length of culm, glabrescent, with hairs only at the sheath orifice; inflorescence dense capitate-spicate, 1 - 2 cm long, over-topped by the bract; flowers 2.5 - 3 mm long; perianth segments equal, lanceolate, bristle-tipped, blackish-brown, the margin light brown to ferruginous; stamens to 1.5 mm long, the anthers at least twice the length of

filaments; capsule ellipsoid, greenish-ferruginous, obtuse, slightly shorter than the perianth; seeds ca. 1 - 1.1 mm long, brownish, ellipsoid, with appendage 0.1 - 0.2 mm long. Fruiting June.

Alpine meadows. - Caucasus: Ciscauc., Dag., West. and South. Transcauc. Gen. distr.: Turkey. Described from the Caucasus. Type in Berlin.

Series 2. *Comosae* V. Krecz. - Flowers 3 - 3.5 mm long, prominently and broadly white-hyaline margined, crowded in heads; anthers as long as filaments. Caruncle very large.

18. *L. capitata* (Miq.) Nakai, Rep. Veg. Apoi (1930) 76. - *L. campestris* var. *capitata* Miq. in Ann. Mus. Lugd. Bat. III (1867) 165 (nomen); Franch. et Sav. En. pl. Jap. II (1879) 97; Buch. in Engl. Pflzr. IV, 36 (1906) 92.

Perennial, light green, densely cespitose, non-stoloniferous plants; culms stoutish, erect, 10 - 25 cm tall, leafy; leaves flat, to 5 mm broad, elongate (reaching half way to two-thirds up the culm), rather strongly hairy; inflorescence capitate, overtopped by the bract; flowers 3 - 3.5 mm long, in 3 - 6 glomerules of 5 - 10; prophylla hyaline; perianth segments equal, lanceolate, mucronate, castaneous, with a broad, light or white-hyaline margin; stamens ca. 2 mm long, the anthers equaling to slightly exceeding the filaments; capsule obovoid, obtuse, ferruginous-green, shorter than the perianth; seeds to 1.8 - 2 mm long, ferruginous, the caruncle 0.7 - 0.8 mm long. Fruiting July.

Grassy sites. - Far East: Sakh. Kamch. Gen. distr.: Japan, Kurile Islands, Korea. Described from Japan. Type in Leiden.

Series 3. *Multiflorae* V. Krecz. - Tussock-forming plants; inflorescence umbelliform, with erect branches; perianth segments equal; anthers $1\frac{1}{2}$ - 2 times as long as the filaments; caruncle small.

19. *L. multiflora* (Ehrh.) Lej. Fl. env. Spa I (1811) 169. - *L. multiflora* ssp. *occidentalis* V. Krecz. in Journ. Soc. Bot. Russ. XII (1928) 490. - *L. campestris* β E. Mey. in Ldb. Fl. Ross. IV, (1853) 219, ex p. - *L. campestris* var. *multiflora* Buch. in Engl. Pflzr. IV, 36 (1906) 84. - *L. campestris* var. *congesta* Litw. in Maevsk. Fl. Sr. Ross. (Flora of Central Russia), 5 ed. (1917) 657, non Lej. - *Juncus multiflorus* Ehrh. Calam. (1791) No. 127. - Exs.: Pl. Finl. exs. No. 567.

Perennial, green, non-stoloniferous plants, forming dense tussocks; culms numerous, erect, 20 - 50 cm tall, leafy; leaves flat, to 3 mm broad, hairy; inflorescence umbellate, with stiffly upright or oblique branches, the 5 - 10 (14) oblong-ovoid to ovoid glomerules 0.6 - 1.3 cm long, 0.5 - 0.7 cm thick; bract equaling or more often exceeding the inflorescence; flowers 3 - 3.8 mm long, in glomerules of 3 - 14; perianth segments lanceolate, finely pointed, subequal, castaneous to castaneous-brown, lighter and white-hyaline margined; stamens ca. 2 mm long, the anthers about twice the length of the filaments; capsule obovoid, greenish-brown, two-thirds as long as the perianth, rounded-obtuse; style soon falling, 2 - 3 mm long, its columnar part 0.3 - 0.8 mm long, shorter than the ovary; seeds ovoid-ellipsoid, 1.4 - 1.7 mm long, the caruncle 0.4 - 0.6 mm long (in fresh state nearly half as long as the seed). Fruiting May - June.

Meadows, peat bogs, grassy sites, and woods. - European part (except Arctic); Caucasus; West. Siberia. Gen. distr.: West. and Centr. Europe. Described from Western Europe.

NOTE. When more ample material is available, it will probably be possible to divide the Caucasian plants into at least two strains; the Colchidian (forest) and high-mountain strain, respectively.

20. *L. frigida* (Buch.) Sam. ex Lindm. Sv. Fanerogamfl. (1918) 161. - *L. campestris* var. *frigida* Buch. in Österr. Bot. Zeitschr. (1898) 284 et in Engl. Pflzr. IV, 36 (1906) 93, fig. 55. - *L. multiflora* ssp. *frigida* V. Krecz. in Journ. Soc. Bot. Russ. XII (1928) 490. - *L. multiflora* ssp. *Pohleana* V. Krecz. in sched. et in litter. (quoad pl. Pohlean. ex litt. maris Alb.).

Perennial, light green, cespitose, non-stoloniferous plants; culms slender, reddish, 10-30 cm tall, leafy; leaves linear, flat to subconvolute, 1.5-3 mm broad, sparsely hairy on the margin, reddish-green; inflorescence densely umbelliform, with few (1-5(7)) glomerules, sometimes subcapitate or capitate, branched (capitate-lobate); glomerules few-flowered, 0.5-0.8 cm long, 0.5-0.6 cm thick; bract shorter to longer than the inflorescence; flowers 2-2.5 mm long; perianth segments lanceolate, equal, the outer finely pointed, the inner obtuse or truncate, mucronate, blackish-purple, diffusely ferruginous at margin and at summit, white-hyaline-bordered; stamens 1.8-2 mm long, the anthers at least twice the length of filaments; capsule ellipsoid, blackish-brown, equaling to exceeding the perianth; seeds 1.6 mm long, oblong, the caruncle 0.3 mm long. Fruiting July.

Grassy and boggy tundra; wet sands; - Arctic: Arct. Eur., Arct. Sib. (down to Yenisei estuary); European part: Kar.-Lap. (n. part), Dv.-Pech. (n. part and Ural); West. Siberia: Ob. (Ural). Gen. distr.: Scandinavia. Described from Norway, Dovrefjell, Drivatal.

21. *L. Kjellmanniana* Miyabe et Kudo in Trans. Sapporo Nat. Hist. Soc. V (1913) 38 (excl. syn.). - *L. multiflora* var. *Kjellmanniana* Sam. in Hultén, Fl. of Kamtch. I (1927) 227. - *L. multiflora* Kom. Fl. 574 penins. Kamtsch. I (1927) 287, non Lej. - *L. sudetica* Kom., l.c. ex p., non DC. - *L. multiflora* ssp. *incrassata* V. Krecz. in Journ. Soc. Bot. Russ. XII (1928) 490.

Perennial, densely cespitose non-stoloniferous plants; culms firm, 10-40 cm tall, leafy; leaves flat, the radical long, reaching the middle of the culm, 2-4 mm broad, the cauline often equaling the inflorescence, 3-6 mm broad, all diffusely hairy below, with a more or less developed callosity at summit and at margin above; inflorescence densely umbellate or obliquely umbellate, the branches markedly unequal, 1-3 lateral ones 5-6 times as long as the others), the 5-15 ovoid or spherical glomerules (0.6-1 cm long × 0.5-0.7 cm broad) often crowded in clusters of 2-4; bract usually equaling to exceeding the inflorescence; flowers 3-3.2 mm long, in 5's - 12's; perianth segments equal, lanceolate, finely pointed, dark castaneous to brown, obsoletely and very narrowly light-margined; stamens to 1.5 mm long, the anthers one and a half times to twice as long as the filaments; capsule ellipsoid, short-beaked, brownish, barely equaling or shorter than the perianth; seeds 1.3-1.4 mm long, ferruginous, the caruncle 0.2-0.3 mm long. Fruiting July - August.

Meadows. - Arctic: Anad.; Far East: Kamch. and adjoining islands, Okhot., Ud., Sakh. Gen. distr.: Kuril'skie Islands, Northern Japan, Alaska. Described from n. part of the Kurile Islands (Shimushu [sic] Island, Kataoka Bay). Type in Sapporo (Japan).

22. *L. oligantha* Sam. in Hultén, Fl. of Kamtch. I (1927) 227. - *L. campestris* var. *pauciflora* Buch. in Engl. Pflzr. IV, 36 (1906) 88. - *L. multiflora* f. *gracilis* Buch. ex Kom. Fl. penins. Kamtsch. I (1927) 288.

Perennial, bright green, loosely cespitose plants; culms erect, slender above, 10–30 cm tall, long-leaved; leaves flat, 2–4 (5) mm broad, reaching up to or above the middle of the culm, faintly hairy; inflorescence umbelliform-paniculate, the branches erect or spreading, often with short secondary branches at the ends, the glomerules small, 0.3–0.5 cm long, 0.4 cm thick, numerous (from 10 to 20); bract half the length of inflorescence; flowers 2–2.3 (2.5) mm long, in glomerules of 2–7; perianth segments equal, lanceolate, castaneous-brown, with a faint subconcolor membranaceous margin; stamens to 1.6 mm long, the anthers twice the length of filaments; capsule obovoid, pointed, beaked, brownish, about equaling the perianth; seeds oblong-ellipsoid, 1.2 mm long, with obsolescent appendage. Flowering and fruiting July.

Grassy sites and gravels. – Far East: Kamch. (s. part). Gen. distr.: Kurile Islands, Japan. Described from South Kamchatka (Mid. Kidipal-ok). Type in Stockholm.

23. *L. sibirica* V. Krecz. in Fl. Transb. II (1931) 144 et in Addenda, II, 631. – *L. campestris* var. *sudetica* auct. fl. Sib. non Willd. – *L. campestris* var. *alpina* Ldb. Fl. Alt. II (1830) 45. – *L. campestris* Turcz. in Bull. Soc. Nat. Moscou, XXVIII (1855) 300, non DC. – *L. multiflora* ssp. *asiatica* Kryl. et. Serg. in Kryl. Fl. Sib. occ. III (1929) 556 (incl. var. et ff.).

Perennial, light green to reddish-green, cespitose, non-stoloniferous plants; culms erect, 10–40 cm tall, leafy; leaves flat, somewhat thickened and crowded below, 1.5–2.5 mm broad, with scattered hairs; inflorescence abbreviated-umbellate, subcapitate, or capitate, bearing 3 to 10 spherical to ovoid glomerules 0.5–0.8 (1) cm long, 0.5 cm thick; bract longer than inflorescence; flowers 2.3–2.8 mm long, in glomerules of 5–12; perianth segments equal, lanceolate, reddish-ferruginous, golden or white-hyaline at margin and at summit, the outer mucronate, the inner acute; stamens 1.4–1.5 mm long, the anthers somewhat shorter than to as long as the filaments; capsule broadly ovoid, reddish-brown, pointed, shorter than the perianth (rarely as long); seeds ferruginous, 1.2–1.3 mm long, oblong-ovoid, with caruncle 0.2–0.3 mm long. Fruiting June–July.

Alpine tundra. – West. Siberia: Alt.; East. Siberia: Yenis., Ang.-Sayan., Daur., Len.-Kol.; Far East: Ze.-Bur., Uss.; Centr. Asia: Dzhung.-Tarb., Tyan'-Shan. Gen. distr.: Northern Mongolia. Described from Kitiskie Gol'tsy (upper reaches of river Osna). Type in Leningrad.

NOTE. The Tien Shan plants constitute apparently a distinct race which requires further study.

Series 4. *Sudeticae* V. Krecz. – Flowers 1.8–2.5 mm long; perianth segments unequal, the inner shorter than the outer.

24. *L. sudetica* (Willd.) DC. Fl. franc. V (1815) 306; V. Krecz. in Journ. Soc. Bot. Russ. XII (1928) 483–489. – *L. campestris* E. Mey. in Ldb. Fl. Ross. IV (1853) 220, non DC. – *L. campestris* var. *sudetica* Fellm. ex Ldb., l. c.; Buch. in Engl. Pflzr. IV, 36 (1906) 89, ex p. – Exs.: Pl. Finl. exs. No. 157.

Perennial, green, non-stoloniferous plants; culms few, 10–35 cm tall, leafy; leaves linear, flat, 1.5–2.5 mm broad, hairy, at most half as long as the culm; inflorescence rather congested, the abbreviated branches bearing (1) 2–5 (7) ovoid to spherical glomerules 0.4–0.7 cm long, 0.4–0.6 cm thick; bract longer than inflorescence; flowers in few-flowered glomerules, 2–2.5 mm

long; perianth segments unequal, the inner shorter, lanceolate, bristle-tipped, blackish-brown, prominently white-hyaline-margined; stamens ca. 1 mm long, the anthers slightly shorter than filaments; capsule ovoid, cuspidate, brownish, shorter than the perianth; style persistent in maturity, to 1.5 mm long, divided from near the base; seeds narrowly ovoid, 1 - 1.2 mm long, barely appendaged. Fruiting July.

Mountains and peat meadows of the arctic region. - Arctic: Arct. Eur. (Murmansk and Kol'skii Pen.); European part: Kar.-Lap. (White Sea islands, as far as 63° N. lat.-Segozero Lake, Orchon inlet). Gen. distr.: Scandinavia, mountains of West. Europe. Described from Sudeten Mountains in Silesia.

NOTE. Hybridizing with *L. multiflora* (Ehrh.) Lej. (*L. hybrida* Lindb. fil.).

25. *L. pallescens* (Whlb.) Bess. Enum. pl. Volhyn. (1822) 15; V. Krecz. in Journ. Soc. Bot. Russ. XII (1928) 488 - 499. - *L. campestris* var. *pallescens* Whlb. Fl. suec. I (1824) 218; Buch. in Engl. Pflzr. IV, 36 (1906) 88. - *L. campestris* β β E. Mey. in Ldb. Fl. Ross. IV (1853) 220. - Exs.: Pl. Finl. exs. No. 568.

Perennial, light green, tussock-forming, non-stoloniferous plants; culms numerous, 10 - 50 cm tall, leafy; leaves linear, 1.5 - 3 mm broad, rather hairy; inflorescence umbellate-paniculate, the erect short branches often forking; glomerules 5 - 12 (27 - 40), spherical to short-cylindric, 0.3 - 1.2 cm long, 0.3 - 0.4 cm broad; bract equaling to exceeding the inflorescence; flowers 1.8 - 2.5 mm long, in glomerules of 6 - 14; perianth segments lanceolate, mucronate, tawny to ferruginous, sometimes rusty-stramineous or whitish, unequal, the inner shorter than the outer; stamens 1 - 1.2 mm long, the anthers equaling to one and a half times as long as the filaments; capsule spherical, light, about as long as the inner perianth segments; style soon falling; seeds 1 - 1.3 mm long, oblong-ovoid, light brown, the caruncle 0.2 - 0.3 mm long. Fruiting May - June.

Grassy sites, fallows, meadows, and woods. - European part: (except Arctic and Crimea); throughout the Caucasus; throughout Siberia; throughout the Far East; Centr. Asia. Gen. distr.: West. Europe, Asia Minor, Alaska. Described from Sweden.



ADDENDA II

DIAGNOSES PLANTARUM NOVARUM IN TOMO III FLORAE URSS COMMÉMORATARUM

(DIAGNOSIS OF NEW SPECIES AND GENERA MENTIONED IN THE THIRD
VOLUME OF THE FLORA OF THE U.S.S.R.)

Aprili 1935.

SCIRPUS L.

1. **S. Komarovii** Roshev. sp. nov. — *Scirpus supinus* var. *leiocarpus* Kom. in A. H. P. XX (1901) 344.

Planta annua 15—30 (—50) cm alta, caespites parvos formans; radix fibrosa; caules 1—5, erecti, planiusculi, glabri; vaginae foliorum inferiorum sine lamina, brunnescentes; laminae foliorum superiorum \pm angustae, rudimentariae. Inflorescentia capitata, (1—) 3—4 (—8)-spiculata; bractea 1, ad 20 cm longa, erecta, fere cylindrica, basi paulo dilatata; spiculae 5—7 mm longae, ovatae; glumae steriles rotundato-ellipticae, margine late-scariosae, paulo carinatae, apice breviter acuminatae, virides, margine hyalinae albae, demum brunnescentes. Setae hypogynae retrorsum aculeolatae, caryopsidem fere duplo superantes; stigmata 2. Caryopsides rotundato-ovatae, fere 1.5 mm longae, planocompressae fere laeves brunneae.

Typus: Asia orientalis. Distr. Amur. In paludibus circa Innokentjevka. 21 VII 1895 Leg. V. Komarov.

Affinitas: Differt a *Scirpo supino* L. setis hypogynis praesentibus.

2. **S. bucharicus** Roshev. sp. nova.

Planta annua, 35—70 cm alta, caespites formans; radix fibrosa; caules plures, erecti, \pm cylindrici; vaginae foliorum inferiorum \pm brunnescentes; laminae foliorum superiorum \pm angustae, rudimentariae. Inflorescentia capitata 5—15-spiculata; bractea 1, 10—30 cm longa, erecta, fere cylindrica, basi paulo dilatata; spiculae elongato-ovatae, 7—10 mm longae; glumae steriles lanceolato-acuminatae, tenuiter scariosae, apice carinatae, mucronatae, virides, margine albae, tunc demum brunnescentes; setae hypogynae caryopsidem duplo superantes, retrorsum aculeolatae. Stigmata 2. Caryopsis obovata, subtrigona (carinis duabus acutis, tertia—obtusa) transverse rugulosa, fere nigra.

Typus: Asia media. Tadshikistania, Hissar, Ladshak in oryzetis. 24 VI 1913 № 557. B. Fedtschenko.

Affinitas: Differt a *Scirpo Komarovii* Roshev. inflorescentia 5—15 spiculata, 7—10 mm longa et caryopside obovata, transverse rugulosa (nec rotundato-ovata sublaevi).

HELEOCHARIS R. BR.

3. *H. meridionalis* G. Zinserl. sp. nov. (Sect. *Pauciflorae* Svenson, Rhodora 31). — *H. rhizomatibus tenuibus*; caules in fasciculis satis densis, tenues, erecti vel adscendentes, griseo-virides, subsulcati, 4—20 cm longi. Spiculae pauciflorae, ovatae v. globosae, 3—7 cm longae; squama infima spiculam amplectens, obtusa vel acuta, $\frac{1}{2}$ — $\frac{3}{4}$ (plusque) longitudinis spiculae longa; squamae ovato-lanceolatae, acutae, pallido-fuscae usque ad atro-castaneas, margine hyalino lato (rare angusto); achenium griseum, obovatum, triquetrum; stylopodium minutum, acute-triangulare vel aciculare, longitudine minore quam $\frac{1}{4}$ longitudinis achenii; setae hypogynae 4—6 (rarissime nullae), achenium (cum stylopodio) superantes, dentibus retrorsis.

Typus in Instituto botanico Ac. Sc. URSS: Fergana, prope pag. Ak-sai, № 569, 1913, leg. Dessjatova.

Hab. ad ripas, in paludibus pratisque humidis et apud nives alpinas Transcaucasiae et in regionibus montanis territoriisque adjacentibus Asiae Mediae soveticae (Alatau songoricum, Tian-Schan occidentalis, Pamiro-Alai) atque Turkestaniae chinensis (Kuldsha, Kaschgar).

Affinitas: A proxima specie *H. pauciflora* (Lightf.) Link. stylopodiis minoribus (longitudine minore quam $\frac{1}{4}$ longitudinis achenii nec non $\frac{1}{4}$ — $\frac{1}{2}$ longitudinis achenii) et setis hypogynis achenium superantibus differt.

4. *H. Svensonii* G. Zinserl. sp. nov. (Sect. *Aciculares* Svenson). — Syn. *Eleocharis acicularis* var. *longiseta* Svenson Rhodora 31 p. 189. — *H. rhizomatibus tenuibus*; caules in caespites, filiformes, erecti v. adscendentes, subsulcati, virides, 2—15 cm longi. Spiculae parvulae, ovatae v. cylindricae, 2—5 mm longae; squama infima spiculam amplectens, obtusa, $\frac{1}{3}$ — $\frac{1}{2}$ longitudinis spiculae longa; squamae ovatae, inferiores obtusae, superiores acutae, virides, margine hyalino lato vel (rarius) fuscae cum stria mediana viridi (margineque hyalino); achenium angustum oblongo-obovatum; stylopodium conicum v. conico-mamillatum; setae hypogynae 4, achenium valde, usque duplo, superantes, dentibus retrorsis.

Typus in Inst. Bot. Acad. Sc. URSS: Reg. Ussuriensis, distr. Vladivostok, pr. pag. Gaivoron ad fl. Santacheza, 1927. leg. P. Virscho.

Hab. ad ripas, in oryzetis, ad vias humidis etc. in Dahuria (rarissime), regione Amurensi atque Ussuriensi, Mongolia orientali, Mandshuria, Korea, China, Japonia, ins. Liu-Kiu.

Affinitas: A proxima specie *H. acicularis* (L.) R. Br. setis hypogynis achenium valde superantibus differt.

Nomen in honorem monographi huius generis cl. H. K. Svenson datum est.

5. *H. ussuriensis* G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Palustres* Svenson). — Caules erecti virides subsulcati 7—50 cm longi. Spiculae 7—15 cm longae, cylindricae v. ovato-cylindricae. Squamae infimae 2 spiculam semiamplectentes; squamae ovato-lanceolatae, acutae, fuscae cum stria mediana viridi angusta margineque hyalino; stylopodium breviconicum basi latum, longitudo stylopodii = 1.2—1.5 latitudinis (rarius aequilonga); setae hypogynae 5, achenium valde superantes dentibus satis crebris, partim patentibus flexuosis, partim retrorsis.

Typus in Inst. Bot. Ac. Sc. URSS: In valle fl. Rakovka, prope Nikolsk-Ussurijsk, № 907, 1913, leg. V. L. Komarov.

Hab. ad ripas et in pratis humidis reg. Amurensis neque Ussuriensis.

Affinitas: Ab *H. mamillata* Lindb. fil. stylopodio brevi-conico (non mamillato), longitudine latitudinem superanti, ab *H. leptostylopodiatata* G. Zinserl. stylopodio latiore, ab *H. intersita* Zinserl. forma stylopodii setisque 5 differt.

6. *H. leptostylopodiatata* G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Palustres* Svenson). — Caules erecti virides subsulcati, 10—50 cm longi. Spiculae 8—12 mm longae, ovatae v. ovato-cylindricae; squamae infimae 2 spiculam semiamplectentes; squamae ovato-lanceolatae, acutae, fuscae cum stria mediana viridi (interdum evanescente) margineque hyalino angusto; stylopodium angustissime conicum (longitudine latitudinem duplo-triplo superante), interdum apice aciculare; setae hypogynae 4—5 (6), achenium superantes dentibus crebris partim patentibus partim retrorsis.

Typus in Inst. Bot. Ac. Sc. URSS: Baschkiria, Canton Zalair, jug. Irendyk, № 515, 1929, leg. O. E. Knorring.

Hab. ad ripas in Rossia europaea (ad Volgam mediam), in montibus Uralensibus territoriisque adjacentibus, in Sibiria (Kusnetzkiy Alatau), reg. Amurensi et in montibus Caucasiacis (aream disjunctam habet).

Affinitas: A proximis *H. mamillata* Lindb. fil. et *H. ussuriensi* G. Zinserl. stylopodio angustissime conico differt. Ab *H. eupalustri* Lindb. fil. setis longioribus dentibus majoribus partim patentibus atque forma stylopodii differt.

7. *H. intersita* G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Palustres* Svenson). — Caules erecti, rarius curvato-ascendentes, 5—50 cm longi, virides, subsulcati. Spiculae 5—15 mm longae, cylindricae, rarius ovato-cylindricae; squamae infimae 2 spiculam semiamplectentes; squamae ovato-lanceolatae acutae, fuscae cum stria viridi mediana angusta margineque hyalino angusto; stylopodium conico-mamillatum (a basi lato sursum subito attenuatum) vel breviter conicum (longitudo = 0.7—1.3 latitudinis); setae hypogynae 4 (rarissime 0), achenium superantes (interdum usque ad 1.5 et plus) dentibus satis magnis crebrisque retrorsis.

Typus in Inst. bot. Ac. Sc. URSS: Alborossia, distr. Rjecziza № 343. 1927, N. M. Savicz.

Hab. in pratis humidis paludibusque et ad ripas per totam fere zonam silvaticam Eurasiae a Germania usque ad reg. Ussuriensi, in Caucaso et in America boreali.

Affinitas: Haec species formam stylopodii inter *H. mamillatam* Lindb. fil. et *H. eupalustrem* Lindb. fil. intermediam habet. A prima specie forma stylopodii, setis 4 dentibus retrorsis, a secunda forma stylopodii setis longioribus differt. Ab *H. ussuriensi* G. Zinserl. forma stylopodii setisque 4 dentibus retrorsis differt.

8. *H. eupalustris* Lindb. fil. Varietates novas describo:

Var. **genuina** G. Zinserl. var. nov. — Caules virides. Squamae fuscae cum stria viridi mediana margineque hyalino.

Hab. praecipue in partibus mediis et septentrionalibus (rarius australibus) areae speciei.

Var. **nigrispicata** G. Zinserl. var. nov. — Caules virides. Squamae fuscae, stria viridi mediana nulla v. evanescente.

Hab. praecipue in Sibiria et in partibus septentrionalibus areae speciei in Rossia europaea.

9. *H. crassa* Fisch. et Mey. ex Becker in Bull. Soc. Moscou 1858, I, p. 75 (nom. nudum). — Caules crassi (basi usque ad 5 mm lati), erecti, 20—90 cm longi, virides (rarius glauco-virides), teretes v. subsulcati ad basin spiculae constricti. Spiculae cylindricae v. ovato-cylindricae; squamae infimae 2, spiculum semiamplectentes; squamae acutae v. apice obtusiusculae, cum stria mediana viridi striis angustis fuscis cincta, margine hyalino lato; stylopodium conicum, longitudine latitudinem superante, rarius aequilonga v. minore; setae hypogynae 4 (rare 0), acheniis minores v. aequilongae (rare achenium superantes), dentibus retrorsis.

Typus in Inst. Bot. URSS: Sarepta 1857 leg. Becker.

Hab. ad ripas, in pratis humidis et in salicetis inundatis in parte austro-orientali Rossiae europaeae, in Kasakstania, Asia Media et Caucaso.

Affinitas: a proxima specie *H. eupalustris* Lindb. fil. squamis margine hyalino lato (quod spiculae pallescentes sunt) differt.

Varietates:

var. **typica** G. Zinserl. — Caules virides.

var. **glaucescens** G. Zinserl. — Caules glauco-virides.

10. *H. globularis* G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Palustres* Svenson). — Caules erecti, pallide-virides, subsulcati, 30—80 cm longi,

ad basin spiculae plus minus constricti. Spiculae globoso-ovatae, 5—10 (—12) mm longae; squamae infimae 2 spiculam semiamplectentes; squamae ovatolanceolatae, acutae, atro-fuscae, stria viridi mediana nulla v. evanescente, margine hyalino angusto; stylopodium conicum longitudine latitudini aequilonga v. latitudinem usque ad 1.5 superante, rarius minore; setae hypogynae 4, achenium superantes, dentibus in partibus inferioribus setarum retrorsis, in superioribus partim patentibus partim retrorsis.

Typus in Inst. Bot. Ac. Sc. URSS: Avatschinskaja Guba 1910 № 168 leg. B. V. Perfiliev.

Hab. in paludibus et ad thermas Kamtschatkae.

Affinitas: Ab *H. eupalustri* Lindb. fil. spiculis globoso-ovatis seti-achenium superantibus dentibus in partibus superioribus patentibus, ab *H. intersita* G. Zinserl. forma stylopodii spiculisquae globoso-ovatis differt.

11. **H. kasakstanica** G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Palustres* Svenson). — Caules tenues, in fasciculis satis densis, erecti, glaucovirides, subsulcati 20—50 cm longi, ad basin spiculae inconspicue constricti. Spiculae cylindricae v. ovato-cylindricae, 5—12 mm longae; squamae infimae 2 spiculam semiamplectentes; squamae ovato-lanceolatae, inferiores obtusiusculae, superiores acutae, stria viridi mediana angusta (interdum evanescente), striis fuscis cincta, margine hyalino lato; stylopodium conicum, longitudine latitudinem superante; setae 4 vel 0 achenii breviores dentibus retrorsis.

Typus in Inst. Bot. Ac. Sc. URSS: pr. Uralsk, 1910, № 54-a, leg. V. Borodin.

Hab. ad ripas et in pratis Kasakstaniae borealis.

Affinitas: Ab *H. eupalustri* Lindb. fil. squamis margine hyalino lato, inferioribus obtusiusculis, ab *H. crassa* Fisch. et Mey. squamis inferioribus obtusiusculis, dimensione plantae minore differt.

12. **H. ecarinata** G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Palustres* Svenson). — Caules glaucescenti-virides, erecti, subsulcati, 25—45 cm longi. Spiculae cylindricae v. ovato-cylindricae, 5—13 mm longae; squamae infimae 2 spiculam semiamplectentes; squamae ovato-lanceolatae, inferiores obtusiusculae, aliae acutae, fuscae, stria viridi mediana nulla v. evanescente, margine hyalino satis angusto; stylopodium minutum, conicum, longitudine atitudinem paulo superante v. aequilonga; setae hypogynae 4, achenio breviores v. aequilongae, dentibus retrorsis.

Typus in Inst. Bot. Ac. Sc. URSS: in valle fl. Buchtarma (Sibiria altaica) № 103 leg. D. I. Jakovlev.

Hab. in Sibiria altaica (in parte austro-orientali) et in montibus partis borealis provinciae Semiretschensk (olim) et in Mongolia (pr. Lugan-Churen).

Affinitas: Ab *H. eupalustri* Lindb. fil. stylopodio minuto, ab *H. crassa* Fisch. et Mey. et *H. kasakstanica* G. Zinserl. stylopodio minuto, margine hyalino squamarum angustiore, stria viridi mediana nulla v. evanescente differt.

13. **H. turcomanica** G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Palustres* Svenson). — Caules crassi (ad basin usque ad 5 mm latae), subteretes glauci, 20—50 cm longi, ad basin spiculis plus minus constricti. Spiculae ovato-cylindricae v. cylindricae, 5—30 mm longae; squamae infimae obtusae spiculam semiamplectentes; squamae ovato-lanceolatae acutae v. inferiores obtusiusculae stria mediana viridi lata striis fuscis angustis cincta margine hyalino lato; stylopodium mamillato-conicum, latitudine longitudinem superante v. aequilonga; setae hypogynae 4, achenio longiores, dentibus flexuoso-patentibus, in parte inferiore retrorsis.

Typus in Inst. Bot. Ac. Sc. URSS: Transcaspia, distr. Aschabad, Bagir № 1221 leg. V. Lipsky.

Hab. ad ripas in Turkestanica australi.

Affinitas: A proximis speciebus *H. crassa* F. et M. et *H. kasakstanica* G. Zinserl. stylopodiis mamillato-conicis dentibus flexuoso-patentibus in parte inferiore retrorsis (nec omnino retrorsis), ab *H. kasakstanica* G. Zinserl. autem caulibus crassis, spiculis valde longioribus differt. Ab *H. argyrolepide* Kjerulff setis longioribus caulibusque crassis differt.

14. **H. argyrolepidoides** G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Palustres* Svenson). — Caules erecti sulcati (apud specimina crassiora ad basin teretes), 10—60 cm longi, ad basin spiculae inconspicue constricti. Spiculae cylindricae v. ovato-cylindricae, 7—15 mm longae; squamae infimae 2 spiculam semiamplectentes; squamae ovato-lanceolatae acutae stria viridi mediana satis lata striis fuscis angustis cincta margine hyalino lato; stylopodium brevi-conicum, ad apicem rotundatum tuberculoque praeditum, latitudine longitudinem aequilonga v. superante; setae hypogynae 4 (5), achenio breviores (rare superantes) dentibus crebris retrorsis.

Typus in Inst. Bot. Ac. Sc. URSS: prov. Voronesh distr. Valujsk, Veidelevkà 1911 leg. V. A. Dubjanski.

Hab. ad ripas, in paludibus pratisque Rossiae europeae austro-orientalis, Tauriae et Caucasi (Kisljar).

Affinitas: A proximis speciebus *H. argyrolepide* Kjerulff setis dentibus crebris retrorsis (sed non raris in parte superiore setae patentibus, inferiore retrorsis), ab *H. equisetiformi* (Meinsh.) B. Fedtsch. forma stylopodii setisque achenio brevioribus (sed non valde superantibus) differt.

15. **H. eu-uniglumis** G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Palustres* Svenson). — *H. uniglumis* (Link) Schult. pp. — Caules virides, erecti v. adscendentes, 5—70 cm longi, subsulcati. Spiculae cylindricae v. ovatae, 10—25-florae, 5—15 mm longae; squama infima spiculam amplectens, obtusa, $\frac{1}{4}$ — $\frac{1}{3}$ longitudinis spiculae longa; squamae ovatae v. ovato-lanceolatae, acutae v. inferiores obtusiusculae fuscae v. atrofuscae stria viridi mediana angusta, evanescente v. nulla, margine hyalino evanescente, angusto usque ad satis lato; achenium obovoideum lenticulare; stylopodium conicum, latitudine latitudinis longiore, aequilongo v. paulum minore; setae hypogynae 4

(rarissime 5) v. 0, achenio breviores aequilongae v. paulum eum superantes.

Typus in Inst. Bot. Ac. Sc. URSS: Ingria, Lachta 1 VII 1866 leg. Meinshausen.

Hab. in pratis humidis, praecipue salsugineis, ad ripas, litora marina et ad fontes in Europa occidentali, URSS parte Europaea, Sibiria (usque ad Baicalem et Jacutiam), Kamtschatka, Tauria, Caucaso et Transcaucasia, Asia media et Mongolia.

Affinitas: Ab *H. transcaucasica* G. Zinserl. stylopodiis minoribus, ab *H. Klingei* (Meinsh.) B. Fedtsch. spiculis rite angustioribus squamis rite obscurioribus, a *H. multiseta* G. Zinserl. setis 4 (non 5—6) brevioribus, ab *H. septentrionali* G. Zinserl. squama infima obtusa (sed non acuta) brevior, ab *H. oxylepide* (Meinsh.) B. Fedtsch. squamis obscurioribus, acheniis basi non valde attenuatis dimensioneque stylopodii, a caeteris proximis speciebus hoc loco descriptis forma stylopodii differt. Species polymorpha.

16. **H. transcaucasica** G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Pulustres* Svenson).—*H. uniglumis* (Link) Schult. pp.—Caules erecti glauco-virides, 12—55 cm longi subsulcati. Spiculae cylindricae v. ovato-cylindricae, 6—12 mm longae; squama infima spiculam amplectens obtusa longitudine minus quam $\frac{1}{4}$ longitudinis spiculae; squamae lanceolatae acutae atrofuscae (rarissime pallide-fuscae) stria mediana angusta (rarius nulla), margine hyalino lato; achenium obovoideum lenticulare; stylopodium angusticonicum longitudine $1\frac{1}{2}$ —duplo latitudinem superante longitudinis achenii dimidio subaequali; setae hypogynae 4 achenium superantes vel aequilongae dentibus satis crebris retrorsis (in parte superiore setae interdum patentibus).

Typus in Inst. Bot. Ac. Sc. URSS: Armenia, pr. lac. Gilli 22 VII 1928 leg. O. Zedelmejer et T. Heidemann.

Hab. ad ripas et in pratis Transcaucasiae (et Turciae regionum adjacentium) et ad ostia Borystheni atque Tanaitis.

Affinitas: A caeteris speciebus proximis (*H. uniglumis* (Link) Schult. coll.) dimensionibus stylopodii differt.

17. **H. Klingei** (Meinsh.) B. Fedtsch. In diagnosi a cl. C. Meinshausenio dato emendo: Spiculae cylindricae v. ovato-cylindricae, crassae (latitudinem rite circa triplo longiores), 5—13 mm longae, (15—)—20—25-florae; squama infima pallide-fusca, obtusa, longitudine $\frac{1}{4}$ longitudinis spiculae non superante; squamae ovato-lanceolatae, obtusiusculae, fulvidae pellucidae, margine hyalino lato, stria mediana nulla v. evanescente; stylopodium conicum, longitudine latitudinem paulum superante, aequilonga v. paulum minore; setae hypogynae 4—5 achenio breviores (rarius aequilongae v. eum paulum superantes), dentibus crebris retrorsis.

Hab. in Kasakstania orientali.

Affinitas: A proxima specie *H. eu-uniglumi* G. Zinserl. spiculis rite latioribus squamis pallidioribus pellucidis, ab *H. multiseta* G. Zinserl. setis brevioribus (sed non achenium rite valde superantibus) differt.

18. ***H. multiseta*** G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Palustres* Svens.). — *H. uniglumis* (Link) Schult. pp. — Caules erecti, glaucovirides, subsulcati, 15—50 cm longi. Spiculae ovato-cylindricae v. cylindricae, 5—15 mm longae; squama infima spiculam amplectens obtusa, rite $\frac{1}{4}$ longitudinis spiculae non superans; squamae ovato-lanceolatae v. lanceolatae, obtusiusculae v. (praecipue superiores) acutae, fuscae stria viridi mediana nulla v. angusta (rarius latiore) margine hyalino angusto v. lato; achenium obovoideum lenticulare; stylopodium conicum longitudine latitudinem superante, aequilonga v. (rare) paulum minore; setae hypogynae 5—6 (rarissime 4) achenium (rite valde) superantes, rarius aequilongae v. breviores dentibus retrorsis (interdum in parte superiore setae patentibus).

Typus in Inst. Bot. Ac. Sc. URSS: Mugodshary, ad rip. fl. Ters-bulak, № 915, 1927 leg. H. Krascheninnikov.

Hab. in pratis humidis (praecipue salsugineis) et ad ripas in Kasakstania, Kirghisia et Turkestanica chinensi:

Affinitas: A speciebus proximis *H. Klingei* atque *H. eu-uniglumi* setis achenium rite valde superantibus, ab *H. paucidentata* G. Zinserl. forma stylopodii setisque dentibus crebrioribus differt.

19. ***H. septentrionalis*** G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Palustres* Svenson). — *H. uniglumis* (Link.) Schult. pp. — Caules erecti, rarius adscendentes, virides, subteretes, 15—60 cm longi. Spiculae ovato-cylindricae v. cylindricae, 4—15 mm longi; squama infima ovato-lanceolata, acuta, $\frac{1}{4}$ — $\frac{1}{2}$ longitudinis spiculae longa, spiculam amplectens; squamae ovato-lanceolatae, acutae v. obtusiusculae, atrofuscae stria mediana viridi nulla margine hyalino angusto; achenium obovoideum lenticulare; stylopodium breviter conicum, longitudine latitudinem paulo superante aequilonga v. paulo minore; setae hypogynae 4—6 (v. 0) achenium paulum superantes, aequilongae v. paulo minores dentibus satis crebris in parte superiore setae patentibus.

Typus in Inst. Bot. Ac. Sc. URSS: Insulae Solovetzkenses leg. Bjalinitzky-Birulja.

Hab. ad litora maris Albi atque maris Glacialis (sinus Kolaensis).

Affinitas: A proximis *H. eu-uniglumi* G. Zinserl. et *H. fennica* Palla squama infima acuta longiore differt.

20. ***H. oxylepis*** (Meinsh.) B. Fedtsch.

Varietates:

var. **typica** G. Zinserl. (var. nov.) Stylopodium conicum.

Per totam aream speciei crescit.

var. **applanata** G. Zinserl. (var. nov.). *Stylopodium mamillatum*.
Per totam fere aream speciei crescit.

21. **H. scythica** G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Palustres* Svenson). — *H. uniglumis* (Link) Schult. pp. — Caules erecti glauco-virides 17 mm longae; squama infima spiculam amplectens obtusa, rite $\frac{1}{4}$ longitudinis spiculae non superans; squamae ovato-lanceolatae acutae pallide-fuscae (rarissime fuscae) stria mediana viridi praeditae v. stria mediana nulla, marsubsulcati, 20—35 cm longi. Spiculae cylindricae v. ovato-cylindricae, 5—6 mm longae hyalino lato; stylopodium pastilliforme v. mamillatum (interdum ad breviter conicum vergens) latitudine longitudinem valde superante; achenium obovoideum lenticulare ad basin paulo attenuatum; setae hypogynae 0 v. 4, achenio breviores v. aequilongae dentibus raris v. satis crebris retrorsis.

Typus in Inst. Bot. Ac. Sc. URSS: Prov. et distr. Jekaterinoslav (olim) 1895, № 72, leg. S. Grigorjev.

Hab. in pratis inundatis et ad ripas Ucrainiae australis, Rossiae europaeae austro-orientalis et Kasakstaniae occidentalis.

Affinitas: A proximis speciebus *H. fennica* Palla squamis pallidis. setis (si adsunt) brevioribus, ab *H. oxylepide* (Meinsh.) B. Fedtsch. acheniis basin paulo (sed non valde) attenuatis squama infima longiore, ab *H. paucidentata* G. Zinserl. setis nullis v. brevioribus differt.

22. **H. fennica** Palla (in Kneuck. Allg. Bot. Zeitschr. 1901, 212) (Sect. *Palustriformes* subsect. *Palustres* Svenson). — *H. uniglumis* (Link) Schult, pp.; diagnosem a cl. Palla datam emendo:

Caules erecti virides v. glauco-virides subsulcati, 10—50 cm longi. Spiculae globosae, ovatae v. cylindricae 2—15 mm longae; squama infima spiculam amplectens, obtusa, rite $\frac{1}{4}$ (apud spiculis minimis $\frac{1}{2}$) longitudinis spiculae non superans; squamae ovato-lanceolatae acutae v. obtusiusculae, atrofuscae stria mediana nulla v. angustissima margine hyalino angusto v. lato; achenium obovoideum (interdum globosum) lenticulare; stylopodium breve, mamillatum (rarius pastilliforme v. breviter conicum), latitudine longitudinem valde superante; setae hypogynae 0 v. 4—5, achenio longiores dentibus retrorsis.

Descripta ex Fennia. Cotypus in Inst. Bot. Ac. Sc. URSS: Fennia, prope Jacobstadt leg. Palla (Kneucker, Cyperac. et Juncac. exsiccatae № 73).

Affinitas: A proximis speciebus *H. scythica* G. Zinserl. et *H. oxylepide* (Meinsh.) B. Fedtsch. squamis atrofuscis setisque (si adsunt) longioribus, ab *H. oxylepide* autem acheniis basi paulo (nec valde) attenuatis, ab *H. paucidentata* G. Zinserl. setis brevioribus dentibus crebrioribus differt.

Varietates:

var. **baltica** G. Zinserl. Setae hypogynae nullae v. evanescentes.

Hab. ad litora maris Baltici (frequenter), rarissime in pratis humidis Sibiriae orientalis.

Var. **sareptana** G. Zinserl. (pr. sp. in Fl. Ross. austroorient. III, p. 279). Setae hypogynae 4—5, achenium superantes.

Hab. in pratis inundatis ad ripas et in locis salsugineis Europae atlanticae et mediae, Rossiae europeae austroorientalis, Sibiriae (praecipue in partibus australibus), Kasakstaniae borealis, Mongoliae borealis, Transcaucasiae orientalis et rarissime ad litora maris Baltici.

23. **H. paucidentata** G. Zinserl. sp. nov. (sect. *Palustriformes* subsect. *Palustres* Svenson). — *H. uniglumis* (Link) Schult. pp. — Caules glauco-virides, subsulcati, 10—40 cm longi. Spiculae cylindricae v. ovato-cylindricae 6—13 mm longae; squama infima spiculam amplectens, obtusa, rite $\frac{1}{4}$ longitudinis spiculae non superans; squamae ovato-lanceolatae, inferiores obtusiusculae superiores acutae pallide-fuscae stria mediana nulla v. angusta margine hyalino angusto v. lato; achenium obovoideum lenticulare; stylopodium mamillatum, pastilliforme v. brevissime conicum, latitudine longitudinem multo superante; setae hypogynae 4 achenium multo longiores dentibus raris parvis retrorsis (in parte superiore setae interdum patentibus.).

Typus in Inst. Bot. Ac. Sc. URSS: pr. Aulie-ata, 1916 № 586, leg. M. Sovetkina.

Hab. ad ripas et in pratis humidis Kasakstaniae et Kirghisiae.

Affinitas: A proximis speciebus *H. oxylepide*, *H. fennica* et *H. scythica* setis achenio multo longioribus, ab *H. oxylepide* autem acheniis ad basin paulo (nec valde) attenuatis differt.

24. **H. Komarovii** G. Zinserl. nom. nov. — *H. triflora* Kom. in Fedde Rept. XIII (1914) 162. — Nomen *H. triflora* a cl. V. L. Komarovio datum delendum est, quod anno 1880 cl. Böckeler (Flora XXXVIII) sic plantam mexicanam nominavit.

25. **H. Korshinskyana** G. Zinserl. sp. nov. (Sect. *Palustriformes* subsect. *Palustres* Svenson). — Caules glauco-virides subsulcati, 35—50 cm longi. Spiculae globosocylindricae, 5—7 mm longae; squama infima spiculam amplectens obtusa, $\frac{1}{4}$ — $\frac{1}{3}$ longitudinis spiculae longa; squamae ovato-lanceolatae acutae pallidifuscae stria mediana evanescente margineque hyalino lato; achenium obovoideum rotundato-triquetrum; setae hypogynae 5—8, achenio breviores v. aequilongae dentibus crebris retrorsis.

Hab. in Ural australi (in prato inundato fl. lk, leg. Korshinsky — typus!) et in Turkomania (pr. opp. Kara-Kala).

Affinitas: A caeteris speciebus sect. *Palustriformes* florum URSS, quae squamam infimam spiculam amplectentem habent, achenio rotundato-triquetro (nec lenticulari) differt.

26. **H. Maximoviczii** G. Zinserl. sp. nov. (Sect. *Iatermediae* Svenson).—Caules adscendentes, rarius erecti, tenuissimi, sulcati, 10—35 cm longi, virides; ad basin spiculae interdum ramulus cum spicula minuta sterili adest. Spiculae ovatae v. ovato-cylindricae, apice acutae (rarius obtusiusculae) 2.5—6 mm longae; squama infima spiculam amplectens pallida obtusa, rite $\frac{1}{4}$ — $\frac{1}{3}$ longitudinis spiculae aequilonga; squamae ovatae, acutiusculae, stria viridi mediana lata striis fuscis angustis limbata margineque hyalino lato; stamina 3; achenium elongato-obovoideum rotundato-triquetrum; stylopodium minutum breviter (usque ad brevissime) conicum latitudine longitudinem superante; setae hypogynae 6, achenio breviores dentibus parvis retrorsis.

Typus in Inst. Bot. Ac. Sc. URSS: Reg. Ussuriensis, distr. Olga pr. pag. Vasilkovo, 1930 № 946 leg. I. K. Schischkin.

Ha b. in paludibus, pratis humidis oryzetisque, ad vias humidas reg. Ussuriensis atque Amurensis (in parte orientali), Mandshuriae et Koreae et ad thermas Natschikinenses in Kamtschatka.

Affinitas: A proxima *H. afflata* Steud. (*H. japonica* Miq.), qua in Korea, Mandshuria, Japonia, China, Java et uno solum loco (ad fl. Tuman-gan) reg. Ussuriensis crescit; stylopodio breviter conico latitudine longitudinem superante (non basi lato subito sursum attenuato latitudine latitudinem superante) setis achenii brevioribus (non superantibus, aequilongis v. rarius paulo brevioribus) differt.

27. **H. petasata** (Maxim.) G. Zinserl. comb. nov.—*Scirpus petasatus* Maxim. in Bull. Soc. Moscou LIV, 1 (1879) 64.—Haec species ab *H. tetraquetra* Nees, specie indica, a qua nostram plantam auctores nonnulli non distinguerunt, caulibus triquetris (non tetraquetris) tenuioribus dentibus setarum hypogynarum flexuosis partim patentibus (non retrorsis) differt.

Ha b. in reg. Ussuriensi et Amurensi (rare in parte orientali), in Mandshuria, China boreali et ad thermas pr. pag. Apacza in Kamtschatka.

CAREX L.

28. **C. Grossheimii** V. Krecz. sp. nova.

Planta cinerascens, rhizomate repente, culmo 25—50 cm alto foliato, foliis planis 2—3 mm latis. Inflorescentia compacta abbreviata 2—3 cm longa, spiculis 6—10 ovatis vel oblongoovatis apice et in parte maxima infima femineis, media superneque masculis, inferne androgynis, squamis ovatis acutiusculis fulvo-castaneis utriculo brevioribus. Utriculi semicoriaceis ovati circiter 3 mm longi plano-convexi ferrugineo-flavi dorso valde elevati et multinervulosi ventre paucinervulosi superne marginibus vix scarioso erosi basi rotundati (vix stipitati) in rostrum breve antice fissum subsensim contracti.

In pratis subalpinis Armeniae sovieticae et turcaicae (inter decurs. super. flumin. Cyri et Araxis).

Typus: Armenia sovietica, distr. Nor-Bajazet, ad ripam fluminis Zanga, 16 VII 1928, O. Zedelmeyer et T. Heidemann leg., in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. disticha* Huds., cui consanguinea, habitu humiliore, foliis angustioribus, utriculis minoribus rostro breve et orificio vaginorum evoluto tubuliformi facile distinguitur, atque a *C. lithophila* Turcz. sibirica, cui habitu proxima, differt inflorescentia compacta paucispiculosa spiculorum utriculorumque coloratione et utriculis minoribus semicoriaceis subsessilibus rostroque forma.

29. **C. diplasiocarpa** V. Krecz. sp. nov. — *C. Schreberi* Kom. Fl. Mandsh. I (1901) 361, non Schrank. — *C. praecox* Kom. et Klob.-Aliss. Key plants East. Reg. URSS I (1931) 282.

Planta virescens non rigida, rhizomate longe repente, caulibus tenuibus trigonis superne scabris 20—40 cm altis, foliis planis subplanisve ad 2.5 mm latis culmo subaequilongis. Spiculae 5—8 ovatae vel oblongo-ovatae gynecandrae (non raro mediae atque interdum supremae ex tot masculae vel submasculae) ad 1 cm lg. 0.8 cm lat. spicam ovatam ad 2—2.5 cm longam formantes, squamis lanceolatis carinantibus acutis utriculis brevioribus. Utriculi lanceolato-ovati, teniter coriacei, 4.5—5 mm lg. plano-convexi basi ± rotundati sessiles ferrugineo-flavi e ventre multinerves e dorso 3—5-nervii superne (ad $\frac{2}{3}$ partem) anguste serrulato-alati in rostrum conicum elongatum bidentatum recte (lateribus esinuatis) contracti.

Ha b. in pratis Orientis Extremi URSS et Mandshuriae adjacentis.

Typus: in viciniis pag. Troitzkoje prope lacum Chanka, № 78, 21 V 1909 (pl. florif.) et 10 VI 1909 (pl. fructif.), A. Czerski et M. Czerska legērunt — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. praecoce* Schreb., utriculis subduplo longioribus lanceolatis conico-longerostriatis atque squamis brevioribus, spiculis longioribus coloratione pallescente et mollitia distinguitur.

30. **C. Iljinii** V. Krecz. sp. nova. — *C. pallida* f. *elegans* Kük. in Journ. Russ. Bot. 3—6 (1911) 51. — *C. brizoides* Meinsh. in A. H. P. XVIII, 3 (1901) 317, quoad pl. Martianow, ex Minussinsk (sec. sched. Meinsh.).

Planta laete virens, rhizomate repente tenui, culmis gracilibus triquetris 15—45 cm altis, foliis planis epapillois 1.5—2 (2.5) mm latis apice longe attenuatis. Spiculae in numero 3—6, androgynae vel mediae (raro aut terminales) masculae vel mere masculae ovatae 5—7 mm lg. appressae superne congestae, squamis ovatis acutiusculis carinatis subferrugineis marginibus hyalinis utriculis brevioribus. Utriculi membranacei lanceolati vel oblongo-lanceolati 3.8—4.2 mm longi plano convexi tenuiter nervulosi (praecipue e dorso), supra basin ad apicem angustissime setuloso-alati in rostrum abbreviatum rectum antice ferrugineum fissum et hyalino marginatum sensim contracti.

In silvis coniferis subalpinis praeterea in nano-pinetis (ex quibus enim in tundra alpina progredit) montium Sajanensium et Baicalensium ab jugo Abakanensi orientem versus usque ad Dahuriam selenghensem et akschaensem et Mongoliam kenteicam.

Typus: Montes Sajanenses, regio Tunka, in valle fl. Oka superior, adversus Buksoi, 7 VIII 1902, V. Komarov legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. accrescenti* Ohwi (*C. pallida* C. A. M. olim) bene differt utriculis et follis epapillosis, foliis angustioribus longe attenuatis, utriculis haud divaricatis minoribus angustioribusque tenuiter nervulosis vix alatis atque rostro brevi rectoque.

Nomen in honorem cl. M. M. Iljin, florum sajanensis exploratoris, datum est.

31. ***C. acrifolia*** V. Krecz. sp. nova. — *C. curaica* var. *rigida* Meinsh. in A. H. P. XVIII, 3 (1901) 317. — *C. curaica* Crossh. Фл. Кавк. I (1928) 159, non Kunth. — *C. stenophylla* C. A. M. in Verzeichn. Pflz. Cauc.-Casp. (1831) 30, non Whlb.

Planta rhizomate repente, culmis trigonis basi incrassatis superne scabris ± rectis 10—25 cm altis, basi vaginis latis fuscescentibus aphyllis vestitis, foliis planis margine subrevolutis 2.5—4 mm latis abbreviatis, rigidis subito acutatis substrictis. Spiculae numerosae (10—15) spicam oblongam interdum trilobam ad 2 cm lg. formantes, squamis oblongo-ovatis acutis ferrugineo-fuscis utriculis aequilongis. Utriculi oblongo-ovati tenuiter coriacei 3.5—4 mm lg. plano-convexi ferruginei basi rotundati stipitati ventre nervis inconspicuis instructi (e dorso enervi) marginibus vix alati superne scabri in rostrum elongatum scabrum bidentatum sensim contracti.

Hab. in pratis humidisque subalpinis Caucasi austro-orientalis et centralis (Daghestaniae, Atropataniae borealis, Armeniae et Ossetiae australis) usque ad 2000—2500 m. s. m. atque Persiae borealis.

Typus: Daghestania australis, m. Tufandagh. 31 VII 1830, n° 181, C. A. Meyer legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. curaica* Kunth, qua cum auctores nonnulli hanc speciem unificant, utriculis obsolete nervosis vix alatis oblongis, spicae forma atque foliis rigidioribus substrictis bene differt.

32. ***C. duriusculiformis*** Krecz. sp. nova. — *C. duriuscula* var. *interrupta* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 85. — *C. stenophylla* var. *duriuscula* B. Fedtsch. in A. H. P. XXXVIII, 1 (1925) 189, non Trautv.

Planta cinerascens viridis, rhizomate ramoso, caespites subdensos formans, culmis tenuibus obsolete trigonis sublaevibus 5—25 cm altis, foliis primum canaliculatis demum setiforme convolutis flexuosis, vaginis griseo-fuscis dilatatis subfibrillosis. Inflorescentia oblongo-ovata 0.7—1.8 cm lg. basi relaxata, spiculis 3—7 parvis paucifloris, squamis ovatis acutis infuscatis margine late hyalinis utriculos aequilongis. Utriculi ovati (3) 3.2—3.7

(4) mm lg. plano-convexi mellinei vel ferruginei basi rotundati breviter stipitati utrinque 5—7-nervi (maturi — subnervi fuscis nitidi) in rostrum sublongum clare bidentatum scabrellum sensim contracti.

In stepposis alpinis vario-herbosis, festucaceis vel schistosis et in pratis alpinis siccis in altitud. 3000—4500 m s. m. montium Tian-Schan, Pamiro-Alaj, Hindukusch, Karakorum et Kwen-Lun nec non in excelsioribus Serindiae et Tibetiae totae.

Typus: montes Alajici — in collibus prope hibernaculum Tschapkan-Deves in valle flum. Dara, 23 VI 1913, sub n° 1333 N. A. Dessiatova legit (fr. immat.) et ib., in valle Alajico ripa sinistra rivuli Bir-dshar (in declivitate ad flum. Kisyl-ssu) n° 29, VI 1913, sub n° 1464, eadem legit — ambae in Herb. Inst. Bot. Ac. Sc. URSS conservantur.

A *C. uralensi* C. B. Clarke et sequente habitu humiliore, foliis setiformi convolutis, spica minus relaxata, utriculis minoribus oblongis, squamis minime hyalinis, angustioribus et a *C. duriuscula* C. A. M., cui habitu simillima, differt utriculis nervosis rostratis spica longiore squamis longioribus.

33. **C. stenophylloides** V. Krecz. in Фл. Туркм. I, 2 (1932) 230, tabl 93. — *C. stenophylla* Kük. in Engl. Pflzr. IV, 20 (1909) 120, quoad pl. As. Med., ex p.; B. Fedtsch. in A. H. P. XXXVIII (1924) 188, (excl. var.) ex p. — *C. stenophylla* var. *pellucida* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 84, ex p.

Planta rigida glaucescenti-viridis, rhizomate incrassato funiculiformi surculos densos aggregatos gerente, culmis obtusato-trigonis sublaevibus 15—45 cm alt. basi vaginis solidis cinereo fuscis obtectis, foliis rigidis subplanis vel subconvolutis culmo aequilongis 2—3 mm lat. Spiculae 4—10 divaricatae in spicam densam divaricatam oblique pyramidatam 1—2.5 cm lg. congestae, squamis ovatis acutis castaneo-fuscis margine hyalinis utriculis subaequilongis. Utriculi semicoriacei late ovati vel late-elliptici 3—4 mm lg. plano-convexi ventre nervis 12—18 tenuibus superne evanescentibus percursi dorso subnervi subsessiles in rostrum abbreviatum subconicum scabrum breviter bidentatum subsensim contracti.

Hab. in locis salsis et subsalsis desertis et deserto-steppaceis submontanis usque ad 1500 m. alt. Asiae Mediae, Affghaniae, Persiae borealis, Armeniae turcicae nec non Transcaucasiae.

Typus: Asia Media (Heptapotamia), in viciniis urbis Kopal, n° 2658, 22 VI 1909 (fructif.), V. Lipsky legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. stenophylla* Whlb. et *C. uralensi* C. B. Clarke, quibus proxima, utriculis late ovatis (fere subrotundatis) subsessilibus brevirostratis evanescenti-nerviis (dorso subnerviis) spica densa divaricata et structura robustiore et squamis fere toto pellucidis majoribus differt.

34. **C. rigescens** (Franch.) V. Krecz. sp. nova. — *C. stenophylla* var.

rigescens Franch. Pl. David. I (1884) 318. — *C. stenophylla* var. *pachystylis* Kük. in Engl. Pflzr. IV, 20 (1909) 121, quoad. pl. David.

Planta cinereo-viridis, rhizomate surculos singulos gerente, caespites laxos formante, caulibus robustis trigonis laevibus 10—25 cm altis basi vaginis \pm fibrillosis fuscescentibus vestitis, foliis planis vel subcanaliculatis 2—3 mm latis rigidiusculis scabriusculis. Spica 4—8-spiculata pyramidato-ovata, 1—2.5 cm longa pallescens sicut squamis vix ferrugineis marginibus latissime albo hyalinis, utriculis aequilongis vel longioribus. Utriculi tenuiter coriacei elliptici vel ovati 3—4 mm lg. primum ventre paucinervi demum subnervi breviter pedunculati in rostrum breve bidentatum scabrum sensim contracti.

Hab. in locis flavo-argillosis subhumidis apertis Mongoliae interioris sinensis, Mandshuriae et Chinae borealis.

Typus: Mongolia orientalis „Géhol, bords des chemins“, n° 1786, M. l'abbé A. David legit — in Herb. Inst. Ac. Sc. URSS, duplicatus in Herb. Musei Parisiensis conservatur.

A speciebus collimitaneis *C. duriuscula* C. A. M. et *C. stenophylloides* mihi differt: a prima — utriculis oblongis majoribus, foliis planis, squamis pallidioribus longioribusque, a secunda — squamis dilatatis elongatis spica pallida utriculis elongatis subnerviis, habitu utriculorum *C. stenophyllae* Whlb. similibus.

35. *C. Szovitsii* V. Krecz. sp. nova. — *C. paniculata* Trev. in Ldb. Fl. Ross. IV (1863) 277, pro pl. cauc.; Meinsh. in A. H. P. XVIII, 3 (1901) 313, ex p.; Grossh. Фл. Кавк. I (1928) 161; Boiss. Fl. Or. V (1884) 404, non L. — *C. paniculata* var. *Favrati* Grossh., l. c. — *C. paniculata* var. *Favrati* f. *robustior* Kük in Engl. Pflzr. IV, 20 (1909) 182, quoad pl. cauc. — *C. paniculata* var. *latifolia* C. A. M. in herb. — *C. paniculata* var. *caucasica* Lesk. in Journ. Soc. Bot. Russ. XVI, 1 (1931) 70, fig. 1.

Planta cinerascenti-viridis dense caespitosa, culmis robustis trigonis scaberrimis 60—120 cm altis basi vaginis castaneo fuscis subfibrillosis aphyllis late vestitis, foliis planis 5—10 mm latis (specialiter juvenalibus) apice cucullato contractis deinde breviter incrassato subsubulatis scabris culmo brevioribus. Inflorescentia magna rhomboideo vel ovato paniculata (6—9 cm lg. \times 3.4 cm lat.), spiculis numerosissimis ramosa, ramis infimis declinatis vel subpatentibus, squamis ovatis acutis ferrugineo-rufis margine late hyalinis utriculis brevioribus. Utriculi coriacei ovati 3.8—4.5 mm lg. plano-convexi basi subcordati vel late rotundati brevipedunculati antice nervibus 3—5 evanescentibus postice — subnervi ferrugineo-fusci sublucidi a medio anguste serrulato-alati in rostrum curvulum antice profunde fissum sensim contracti.

Hab. in pratis subalpinis et paludibus aut secus rivulos usque ad 2000 m altit. in Caucaso centrali et occidentali atque in Lazistania turcica.

Typus: Ossetia australis regionis Kudar, in prato humido loci Segaut, 1850 m alt., n° 28, 30 VII 1928. leg. E. et N. Busch — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. paniculata* L. et *C. Favrati* Christ, quibus proxima, differt: a prima utriculis majoribus (3.8—4.5 mm nec 3 mm lg.) antice \pm nervulosis, squamis brevioribus minime hyalinis, foliis latioribus (5—10 mm nec 4—5 mm lat.) a secunda — magnitudine characteribusque praecedentibus.

36. *C. Kabanovii* V. Krecz sp. nova.

Planta cinerascens laxae caespitosa, rhizomate stolonibus incrassatis brevibus emittens, culmis crassiusculis (ad 1 mm crassis) rectis compresso obsoleteque trigonis sulcatis laevibus 20—35 cm altis, foliis aut crassiusculis canaliculato-triquetris 1 mm latis apice subabrupte obtusatis basi marginibus scabris. Planta dioëca, spiculis solitariis: masculis — linearibus 1—1.5 cm lg., squamis oblongis aureo-rufis obtusis instructis, femineis — aut linearibus 1—1.5 cm lg. \pm densis 20—25-floris, squamis ovatis obtusis ferrugineis marginibus late hyalinis utriculo duplo brevioribus. Utriculi oblique erecti semicoriacei ovati vel elliptici 2.8—3.2 mm lg. inaequaliter biconvexi multinervi breviter stipitati. in rostrum subbreve laeve apice albo-hyalinum ore oblique emarginato subabrupte contracti.

Typus: In sphagnosis litoris orientalis ins. Sachalin adversus sinum maritimum Odoptu, 4 VIII 1930, n° 3428—29 a cl. N. Kabanov lecta:

A *C. Redowskiana* C. A. M., cui consanguinea, stolonibus culmis foliisque crassioribus (ad 1 mm nec 0.4 mm crassis), culmo recto laevi, spiculis multifloris (20—25-floris nec 5—12-floris) densioribus, utriculis latioribus minoribusque non declinatis differt.

Nomen in honorem cl. N. E. Kabanov, florum sachalinensis investigatoris, datum est.

37. *C. diastena* V. Krecz. sp. nova. — *C. laeviculmis* Kom. Fl. penins. Kamtsch. I (1927) 233, ex p. non Meinsh. — *C. laeviculmis* var. *kamtschatica* Kom. in sched. — *C. traiziscana* Hultén, Fl. of Kamtsch. I (1927) 182, non F. Schmidt, ex p.

Planta cinereo-viridis stolonifera laxae caespitosa, culmis trigonis tenuibus superne scabris, foliis rigidulis 1—1.5 (2) mm lat. subcanaliculatis rectis culmo brevioribus. Spiculae in numero 3—5 hemisphaericae divaricatae gynocandrae apice aggregatae, rachide inflorescentiae geniculatim flexuoso, squamis ovatis acutis ferrugineis carinatis \pm late hyalinis utriculis brevioribus. Utriculi membranacei lanceolati 4—4.2 mm lg. plano-convexi glaucescenti-flavidi nervis tenuibus elevatis (antice 10—12, postice 6—8) percursi, pedicellis incrassatis subspongiosis, in rostrum laeve apice haud profunde fissum conico contracti.

Hab. in turfosis peninsulae Kamtschatka nec non insulae Sachalin (Mitsuriyoka).

Typus: In decursu fl. Paratunka, prope pag. Nikolajevskoje, in tundra muscosa inter fl. Tichaja et lacunas Paratunkae, 9 VII 1908 (fructif.), V. Komarov legit — in Herb. Inst. Bot. Ac. Sc. URSS. conservatur.

A *C. pseudo-loliacea* F. Schmidt, cui consanguinea, differt foliis subcalliculatis 1—1.5 mm (nec 2—3 mm) latis, inflorescentia interrupta, rachide flexuoso, urticulis lanceolatis, rostro conico, squamis ferrugineis (nec pallidis); a *C. traiziscana* F. Schmidt rhizomate stolonifero, utriculorum forma et a *C. laeviculmi* Meinsh. inflorescentiae forma, rhizomate stolonifero et utriculis minoribus distinguitur.

38. **C. hylaea** V. Krecz. sp. nova. — *C. gracilis* Trev. in Ldb. Fl. Ross. IV (1853) 281 (excl. syn.); Meinsh. in A. H. P. XVIII, 3 (1901) 328, non Schkuhr. — *C. canescens* var. *subloliacea* Kük. in Engl. Pflzr. IV, 20 (1909) 217, ex p., non Laest. — *C. canescens* var. *subtenella* Kük., ib., 218. — *C. canescens* var. *tenuis* O. F. Lang in Linnaea XXIV (1851) 538 — *C. canescens* var. *laetevirens* Aschr. in Fl. Brand. I (1864) 770.

Planta debilis laetevirens laxae caespitosa, culmis tenuibus trigonis decumbentibus superne scabriusculis 30—50 cm altis, foliis tenuibus elongatis mollibus 1—1.6 mm latis culmo brevioribus. Spiculae in numero 3—6 subdistantes sphaericae vel late-ovatae 0.4—0.6 cm lg., inferiores bractea filiformi instructae, squamis ovatis acutis carinatis, carina anguste viridi, marginibus late albo-hyalinis utriculis subduplo brevioribus. Utriculi obiongo-ovati membranacei 2.5—2.8 mm lg. plano-convexi virentes utrinque tenuiter nervulosi breviter stipitati in rostrum breve fere conicum subscabrum antice vix fissum sensim contracti.

Hab. in silvis umbrosis subhumidis Europae orientalis nec non Sibiriae occidentalis.

Typus: Ingria, Obla, in pratis humidis umbrosis, 26 VI 1874 (fructif.), C. Meinshausen legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Videtur *Carici canescenti* L. species oecologica parallela est et ab ea coloratione laetevirente, mollitie, spiculis subglobosis paucifloris, squamis utriculis subduplo (nec vix $\frac{1}{4}$ — $\frac{1}{8}$) brevioribus, nervulis utriculi conspiciendis pallidis (nec obsoletis fusciscentibus) distinguitur.

39. **C. amblyorhyncha** V. Krecz. sp. nova. — *C. Heleonastes* Kük. in Engl. Pflzr. IV, 20 (1909) 215, ex p. et in Journ. Russ. Bot. 3—6 (1911) 64, ex p.; V. Krecz. in Fl. transb. II (1931) 119, non Ehrh.

Planta cinereo-viridis caespitosa, caulibus trigonis rectis scabris 10—30 cm alt., foliis rigidulis planis subcarinatis 1.5—2 mm latis culmo brevioribus. Spiculae 3—4 globosae vel ovatae pauciflorae vix 5 mm lg. paulo distantes, squamis ovatis obtusis ferrugineis carina pallida marginibus hyalinis utriculis brevioribus. Utriculi tenuiter coriacei oblongo-elliptici 2.5—3 mm lg. plano-convexi flavidi apice ferruginei utrinque inconspicue 6—8-nervosi stipitati apice late conici suberostrati laeves antice vix fissi.

Hab. in paludibus subalpinis Sibiriae altaicae, angaro-sajanensis, jacticae et dahuricae nec non Mongoliae borealis.

Typus: Irkutia in regione Tunca — montes Sajanenses, ad ripam lacus Iltschir, 19 VIII 1902 (fructif.), V. Komarov legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A. C. Heleonaste Ehrh., cui habitu similis, squamis obtusis, rostro utriculorum conico obtusato laevi, utriculis minoribus et spiculis aggregatis differt.

40. **C. Slobodovii** V. Krecz. sp. nova. — *C. ps eudo-foetida* Kük. in Engl. Pflzr. IV, 20 (1909) 115, ex. p.

Planta laete-viridis, rhizomate breve repente laxè caespitoso, caulibus basi rotundatis \pm fistulosis superne trigonis et scabris 10—30 cm altis, foliis tenuibus flexilibus planis 2—4.5 mm latis culmo brevioribus longe attenuatis scabris. Spiculae in numero 6—12, spicam oblongam laxam basi interdum relaxam 1.5—2 cm lg. 1—1.5 cm lat. formantes, squamis oblongo-ovatis acutis ferrugineis marginibus hyalinis utriculis aequilongis. Utriculi membranacei ovati vel oblongo-ovati 3.5—4 mm lg. (1.5—1.8 mm lat.) plano-convexi antice obsolete nervosi breviter stipitati, in rostrum fissum vix scabrellum vel fere laeve sensim contracti.

Hab. in declivibus paludosis alpinis salsugineis usque ad 3500 m alt. montium Pamiro-Alai occidentalium (in regionibus Zerawschan et Hissar, Sogdiana antiquorum).

Typus: Tadschikistania, reg. Tavil-Dara, decliv. borealioccident. jugi Zagara, in clivo meridionali adversus p. Dara-Dshou, 3020 m alt. s. m., in prato humido caricineo, n° 112, 9 VIII 1933, a cl. A. Slobodov lectus.—in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A. C. pseudo-foetida Kük., cui consanguinea, caulibus scabris tenuibus (basi ad 1.5 mm nec 2—2.5 mm crassis) elongatis, foliis mollioribus planis, spica laxa relaxaque, utriculis oblongis et rostro scabrello differt.

Nomen in honorem A. A. Slobodov florum Asiae Mediae investigatoris diligentissimi.

41. **C. similigena** V. Krecz. sp. nova. Planta cinereo-viridis, rhizomate repente laxè caespitoso, culmis filiformibus appanato-trigonis flexuosis superne scabris 15—30 cm lg., foliis 1.5—2 mm latis setiformi-convolutis longe attenuatis flexuosis culmo subaequilongis superne scabris. Spiculae 2—5 pauciflorae spicam angustam basi subinterruptam, 0.7—1.6 cm lg. formantes, squamis ovatis acutis ferrugineis marginibus late hyalinis. Utriculi oblongo-ovati vel elliptici 3—3.5 mm lg. mellineo-flavi plano-convexi antice ad basin vix 3—4-nervulosi stipitati, in rostrum medium sublaeve vel vix scabrum sensim contracti.

Hab. in salsis alpinis montium Tian-Schan Asiae Mediae.

Typus: Tian-Schan centralis, reg. Przewalsk, in valle fl. Konurulen, n° n° 862 et 863, 1 VII 1908 (fr. immat. et matur.), R. Roshevitz legit — in Herb. Inst. Bot. Ac. URSS conservatur.

A. C. enervi C. A. M. coloratione, habitu tenuiore gracillimo, foliis setiformibus longe attenuatis, utriculis minoribus \pm ovalibus apice vix scabrellis differt.

42. **C. dichroandra** V. Krecz. sp. nova. — *C. acuta* Trev. in Ldb. Fl. Ross. IV (1853) 313, quoad pl. cauc. — ? *C. gracilis* var. *libanotica* Kük. in Engl.

Pflzr. IV, 20 (1909) 323. — *C. gracilis* var. *angustifolia* et *tricostata* Grossh.
Фл. Кавк. I (1928) 163.

Planta cinereo-viridis stolonifera, culmis robustis trigonis superne scabriusculis interdum sublaevibus 30—90 cm altis, basi vaginis aphyllis latericeo-fuscis subnitidis obtectis, foliis planis 3—5 mm latis marginibus subrevolutis sensim attenuatis culmo subaequilongis. Spiculae in numero 4—7, terminales 1—3 — ♂ oblongae vel clavatae 3—8 cm lg., squamis lanceolatis obtusatis fuscis carina late alba, ceterae — ♀ cylindricae 5—7 cm lg. densae vel subdensae rectae, inferiores — pedunculatae, bracteis imis inflorescentiam superantibus, squamis lanceolatis acutis atro-fuscis, carina pallida valida apice incrassata, utriculis lingioribus et subduplo angustioribus. Utriculi late ovati 3 mm lg. biconvexi flavidofusci demum atro-fusci 3—5-nerves, rostro brevi truncato.

Hab. ad ripas fluviorum Transcaucasiae et Turciae adjacentis.

Typus: Transcaucasia, Dshawakhetia. Prope oppidum Akhalkalaki (Prov. Tiflis), ad ripam fluminis Toporovan-tschaj, 10 VI 1907, E. Bordzinski legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. gracili* Curt., cui proxima, coloratione cinerascens, aphyllipodia, spiculis masculis incrassatis variegatis, squamis femineis incrassatis, culmo subglabro differt.

43. **C. Knorringiae** Kük. (inedit.) ex B. Fedtsch. in A.H.P. XXXVIII. 1 (1924) 201 — nomen nudum.

Planta viridis, rhizomate repente, culmis trigonis scaberrimis 50—70 cm altis basi vaginis aphyllis ochraceis subfibrillosis obtectis, foliis accrescentibus planis 2.5—3.5 mm latis marginibus subrevolutis subito acutatis culmo brevioribus. Spiculae 3—5 angustae cylindricae rectae, superior — ♂ ad 4 cm lg., squamis ferrugineo-fuscis obtusis, caeterae — ♀ 2—4.5 cm lg. laxae, inferior — pedicellis ad 1.5 cm lg., bractea ima inflorescentiae subaequilonga, squamis lanceolatis acutatis atro-fuscis utriculis sublongioribus. Utriculi (in statu juvenali) obovati ca 3 mm lg. enerves, rostro brevi vix emarginato.

Ad aquam in loco unico Asiae Mediae regionis Osch: ad lacum Tscharajgyr, 5960 ped. alt. disposito, n° 140, 8 V 1913 (fr. immat.), O. Knorring legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. gracili* Curt. aphyllipodia, utriculis enerviis differt et a *C. fuscovaginato* Kük., cui collimitanea, utriculis enervibus distinguitur.

44. **C. sareptana** V. Krecz. (indescrip.) in Маевск. „Фл. Средн. Росс.“, 6 изд. (1933) 190. — *C. gracilis* Litw. in Fl. Ross. Austr.-Or. III (1929) 297, quoad pl. Becker. ex p.

Planta virescens vel laetevirens caespitosa, culmis acute trigonis superne scabris 70—85 cm altis, vaginis inferioribus brunnescentibus aphyllis (?), foliis non rigidis planis 3—4 mm latis marginibus revolutis culmo subaequilongis. Spiculae in numero 4—6, terminales 2—3 — ♂ condensatae 2—

6 cm lg. oblongae, squamis lanceolatis obtusis pallide ferrugineis, caeterae — ♀ cylindratae 3—6.5 cm lg. (0.4—0.6 cm lat.) densae vel subdensae rectae vel declinatae, imae — pedicellatae, squamis lanceolatis acutis ferrugineis dorso late pallido-carinatis marginibus anguste hyalinis utriculis subaequilongis vel brevioribus et multiplo angustioribus. Utriculi oblongo-elliptici 3—3.6 mm lg. (1.3—1.8 mm lat.) plano-convexi virentes vel virenti-ferruginei utrinque 7—10-nervi stipitati rostro brevi cylindrico subemarginato.

Hab. ad ripas in decursu inferiore fl. Volga.

Typus: Sarepta. Tausch. leg. (fr. mat.) — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. fusco-vaginata* Kük. utriculis oblongis plano convexis (nec subinflato-biconvexis) majoribus (3—3.6 mm lg. nec 2.5—3.2 mm lg.), spiculis femineis pallidis et coloratione bene differt et a *C. appendiculata* (Trautv.) Kük., cui videtur magis proxima, foliis latioribus viridioribus, spiculis pallidis, squamis non appendiculatis diversa est.

45. *C. lineolata* Cham. ex Meinsh. A. H. P. XVIII, 3 (1901) 338 (sub *C. Schmidtii*) nomen — *C. lineola* C. A. M. ex Fries, Nov. fl. suec. Mant. III (1842) 145 nomen — *C. Schmidtii* Kom. Fl. penins. Kamtsch. I (1927) 238; Hultén, Fl. of Kamtsch. I (1927) 187, ex p., non Meinsh.

Planta viridis, rhizomate caespitoso, caulibus trigonis scabris validulis 15—50 cm alt., basi vaginis brevibus latis castaneis subnitentibus vestitis, foliis 3—4 mm latis planis apice ± subito acuminatis marginibus revolutis. Spiculae 3—5 approximatae subsessiles: terminales 1—2 — ♂ obovatae vel incrassato-clavatae 1—15 cm lg., caeterae (1—2) — ♀ ovatae vel breviter cylindratae 0.8—2 cm lg., bractea ima inflorescentia brevior, squamis ± ovatis obtusatis atro-fuscis, nervo dorsali pallido inconspicuo percursis, utriculis aequilongis vel brevioribus. Utriculi membranacei elliptici vel ovati 2—2.5 mm lg. plano-convexi vel biconvexi (sed non turgidi) cinerascensivirides enervi rostro brevi vix emarginato, ore purpureo, marginibus laevibus vel subsetulosulis.

Habitat in tundra paludosa Anadyrensi et Kamtschatica.

Typus: Insula Koraginsk (ex herb. Chamisso) — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. Schmidtii* Meinsh., cui proxima, utriculis ellipticis applanatis (nec inflatis) rostro emarginato, squamis obtusatis brevioribus atricoloribus, spiculisque atris ovatis densis ad 2 cm lg.

46. *C. retorta* (Fries) V. Krecz. sp. nova. — *C. caespitosa* var. *retorta* Fries in Bot. Notis. (1843) 101.

Planta flavescenti-viridis dense caespitosa, culmis scabris tenuibus 50—80 cm altis apice subnutantibus, basi vaginis purpureis opacis vestitis, foliis accrescentibus planis 2—2.5 mm latis elongatis culmo brevioribus. Spiculae 3—4 subdistantes: terminalis — ♂ clavatus ad 3—4 mm lg., squamis lanceolatis ferrugineis, caeterae — ♀ oblongae vel cylindricae 1.5—3 cm lg.

relaxae vel basi rariflorae subdeclinatae brevipedunculatae, bractea ima spiculam suam superantibus, squamis lanceolatis acutis vel acutatis ferrugineis et ferrugineo-fuscis, carina pallida, utriculis vulgariter subaequilongis vel sublongioribus. Utriculi elliptici inaequaliter biconvexi 3 mm lg. enerves cenerascenti-virides, in rostrum abrupte subsensim contracti.

In paludosis Europae boreali-occidentalis.

Typus: Upsala in Säby-träsk. E. Fries, Herb. norm. fasc. XI. (fr. mat.) in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. caespitosa* L. rhizomate dense caespitoso spiculis elongatis, utriculis magis elongatis, squamis acutatis longioribus differt.

47. **C. fusco-cuprea** (Kük.) V. Krecz. sp. nova. — *C. limosa* var. *fusco cuprea* Kük. ex Matsum. Ind. pl. Jap. II, 1 (1905) 118 et in Engl. Pflzr. IV, 20 (1909) 505; Miyabe et Kudo, Fl. of Hokk. and Sagh. II (1931) 255; Akiyama in Journ. Fac. Sc. Hokk. Univ., ser. 5, VI, 1 (1932) 160, fig. 106.

Planta cinereo-viridis, rhizomate breviter repente, culmis trigonis laevibus 15—30 cm altis inferne foliiferis, basi vaginis integris rubro-fuscis vestitis, foliis rigidulis longe attenuatis planis 1—1.5 mm latis culmo brevioribus. Spiculae in numero 2—3 subdistantes: terminalis — ♂ recta lineari-lanceolata, squamis angustis ferrugineo-fuscis acutisque, caeterae — ♀, ovato-lanceolatae ad 3 cm lg. (1.2 cm lat.) apice fere semper masculae pedunculis tenuibus nutantes, bractea ima vaginis vix 1—2 mm lg. lamina spiculam suam non superante, squamis oblongo-ovatis sensim acutatis ferrugineofuscis utriculos longioribus aequilatis. Utriculi ovati vel late ovati 4 mm lg. caesii costato nervosi basi apiceque rotundati laeves, rostro brevi vix emarginato.

Hab. in paludibus et pratis humidis insulae Sachalin nec non insularum Kurilensium.

Typus: Japonia, Yeso, Jubutsu — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. limosa* L., cui consanguinea, foliis, planis, squamis oblongis sensim (nec subito) acutatis ferrugineo-fuscis (nec cupreis), rhizomate breviter stolonifero differt.

48. **C. decanlescens** V. Krecz. sp. nova. — *C. caucasica* B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 207, ex p. — *C. caucasica* var. *abbreviata* Litw. in Trav. Mus. Bot. Ac. St. Pétersb. VII (1910) 88 — *C. caucasica* var. *bracteata* Litw., ibid., 89.

Planta procera cinereo-viridis, rhizomate caespitante breviter stolonifero, culmis tenuibus trigonis superne scabris 35—70 cm lg., basi vaginis aphyllis rubrofuscis obtectis, foliis accrescentibus 3—5 mm lg. marginibus revolutis breviter acutatis culmo duplo brevioribus basi demotis. Spiculae in numero 3—4 capitato-condensatae rectae sessiles (interdum ima distanti brevi pedunculata) ovatae 0.8—1.2 cm lg. 0.5—0.9 cm lat.: terminalis — gynecandra caeterae — ♀, bractea infima vix evoluta seti-vel squamiformi, squamis ovatis acutis ferrugineo-fuscis nervo dorsali ferrugineo utriculis

brevioribus. Utriculi oblongo-elliptici, 4—4.5 mm lg. applanato-trigoni ferrugineo-aurei enervii stipitati, in rostrum breve bidentato-emarginatum subsensim contracti.

Hab. in schistosis et lapidosis humidis et in angustiis ad rivulos in alt. ca 2—3000 m partis occidentalis Asiae Mediae alpinae.

Typus: Tian-Schan occidentalis, ad riv. Andaulgan, infra confluvionem, 23 VII 1897 (fr. submatur.), B. Fedtschenko legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. caucasica* Stev., cui consanguinea, culmo valde elongato, spiculis capitato-condensatis densis ovatis apice obtusis, utriculis oblongioribus, enervibus fuscescentibus, squamis ovatis utriculo brevioribus differt.

49. **C. perfusca** V. Krecz. sp. nova. — *C. atrata* Trev. in Ldb. Fl. Ross. IV (1853) 287, quoad pl. sibir.; Turcz. Fl. baic.-dah. II, 2 (1856) 271; Meinsh. in A. H. P. XVIII (1901) 347, ex p., non L. — *C. atropurpurea* Fjisch. ex Trevir. in Bull. Soc. Nat. Mosc. XXXVI 1 (1863) 538 (nomen), non Bcklr.; Trautv. Incr. fl. Ross. IV (1884) 812. — *C. atrata* var. *aterrima* Kük. in Engl. Pflzr. IV, 20 (1909) 398, ex p., et in Journ. Russ. Bot. 3—6 (1911) 108 — *C. lonchosaccus* C. B. Clarke in Kew. Bull. Misc. Inf., Add. ser., VIII (1908) 77, quoad pl. Turczan.

Planta viridis vel pallide viridis, rhizomate crasso brevique dense caespitoso, culmis validis superne scabris 50—80 cm altis basi vaginis purpureis aphyllis obtectis, foliis planis 4—7 cm latis breviter acutatis culmo brevioribus. Spiculae 4—7, fasciculatim congestae nutantes relaxae brevipedunculatae, terminalis — gynecandra ovata, caeterae — ♀ oblongae vel clavato-obovatae 1.5—3 cm lg. 0.7—0.9 cm lat. apice rotundatae, bractea ima inflorescentiam superante, squamis ovatis acutulis ferrugineo-fuscis vel atro-fuscis nervo dorsali pallidiore marginibus anguste hyalinis utriculis brevioribus. Utriculi elliptici 4—4.5 mm lg. applanato-trigoni violascenti-ferruginei basi obsolete nervulosi sessiles, rostro bidentato emarginato.

Hab. in humidis alpinis Sibiriae, Mongoliae et Asiae Mediae boreali-orientalis nec non Arcticae sibiricae orientalis.

Typus: Sibiria, prov. Tomsk, distr. Zmeinogorsk, in partibus superioribus fluminum Czernovaja et Birjuksa, in tundra alpina, n° 355, 4 VIII 1910 (fr. mat.), M. P. Fomin legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. Medwedewii* Lesk., cui proxima, foliis breviter acutatis, inflorescentia racemosa nutanti laxa, spiculis 4—7 (nec 3—5) clavato-oblongis majoribus, utriculis basi evanescenti-nervibus violascentibus, squamis longioribus et a *C. aterrima* Hoppe, cui autem proxima, foliis breviter acutatis pallescentibus, spiculis atro-purpureis (nec atratis), squamis brevioribus, utriculis basi nervulosis differt.

50. **C. aequivoca** V. Krecz. sp. nova. — *C. atrata* Trev. in Ldb. Fl. Ross. IV (1853) 287, ex p.; Meinsh. in A. H. P. XVIII (1901) 347, ex p.; Grossh. Фл. Кавк. I (1928) 165, ex p., non L. — *C. atrata* var. *nigra* Meinsh., l c.;

Litw. in Sched. ad H. F. R. IV (1902) 69, non Boott. — *C. nigra* Grossh., l. c., non Bell. — *C. atrofusca* Stev. in Mém. Soc. Nat. Mosc. IV (1813) 108; C. A. M. Verzeichn. Pflz. Cauc.-Casp. (1831) 30, non Schkuhr.

Planta rigida vel flavo-viridis + dense caespitosa breviter stolonifera, culmis superne attenuatis laevibus vel sublaevibus 15—40 cm altis, basi vaginis latericeis subfibrillosis aphyllis obtectis, foliis rigidulis planis 3—5 mm latis marginibus revolutis abbreviatis breviter acutatis basi congestis culmo duplo brevioribus. Spiculae 3—5 congestae vel subcongestae, terminalis — gynecandra, caeterae — ♀ late ovatae 1—2 cm lg. 0.6—0.8 cm lat. densae apice obtusae, bractea ima setiformi inflorescentiam subaequilonga, squamis ovatis acutatis vel obtusatis atro-fuscis nervo dorsali marginibusque concoloribus utriculis subaequilongis et ± angustioribus. Utriculi elliptici vel late elliptici 3—3.5 mm lg. applanato-trigoni enervii flavidi subsessiles, rostro breve atro bidentato-emarginato.

Hab. in pratis alpinis alt. 2400—3000 m Caucasi.

Typus: Prov. Tiflis distr. Gori (Cartalinia) in declivio occid. mont. Tskhra-Tskharó, 1—2 VI 1916 (fr. mat.), P. N. Krylov et E. I. Steinberg legerunt atque in prato alpino montis Tskhra-Tskhro-mta, 12 VI 1907 (flor. et fr. immat.), E. Bordzilowski legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. atrata* L., *C. perfusca* m. et *C. Medwedewij* Lesk., quibus similis et proxima, his characteribus differt: a prima — spiculis unilateraliter capitato-congestis apice obtusis densis, squamis latioribus et obtusioribus utriculo brevioribus, utriculis apice rotundatis, in rostrum subito contractis, a secunda — culmo brevioris, foliis basi congestis spiculis brevioribus, utriculis pallidis et squamis longioribus aut a tertia — statura minore, culmo sublaevi utriculis minoribus.

51. **C. pauxilla** V. Krecz. sp. nova. — *C. atrofusca* Kük. in Engl. Pflzr. IV, 20 (1909) 553 et in Journ. Russ. Bot. 3—6 (1911) 149, quoad pl. ajan.; V. Krecz. in Fl. transb. II (1931) 122, ex p.

Planta viridis, rhizomate repente ascendente breviter stolonifero, culmis tenuibus apice nutantibus trigonis superne scabris 20—40 cm altis in parte inferiore foliatis, basi vaginis brunnescentibus fibrillosis obtectis, foliis planis mollibus paucis 2—3 mm latis breviter acutatis culmo duplo-triplo brevioribus. Spiculae in numero 2—5 subcongestae: terminales 1—2 — ♂, obovatae vel oblongae 0.6—1.3 cm lg., squamis ovatis acutiusculis ferrugineis, caeterae — ♀ obovatae et oblongo-clavatae 1—2.2 cm lg. (0.5—0.6 cm lat.) laxulae nutantes pedunculis tenuibus scabris ad 3 cm lg., bractea ima foliata inflorescentiae subaequilonga, squamis ovatis vel oblongo-ovatis obtusatis rubro-ferrugineis dorso pallido utriculis perbrevis et angustioribus. Utriculi ovati vel ovato-elliptici 3.5—4 mm lg. plano-convexi enervii superne rubro-ferruginei basi et ad margines pallidi, rostro perbrevis fusco scyphiformi vix emarginato.

Hab. in pratis alpinis dahurico-jacuticis et montium Ochotensium: Sibiriae Orientalis.

Typus: Dauria, Angara Superior, in loco humido trajectus Jaktshij-Dzelinda, n° 923, 24 VII 1912 (fr. submat), V. Sukatshev et H. Poplavska legerunt — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. behringensi* C. B. Clarke et *C. musartiana* Kük., quibus collimitanea, utriculis enervibus rubro-ferrugineis, squamis obtusatis perbrevibus, spiculis ferrugineo-fuscis concoloribus, culmo elongato differt.

52. **C. musartiana** Kük. sp. nova (inedit.) ex B. Fedtsch. XXXVIII, 1 (1934) 206, nomen solum — *C. ustulata* a *typica* Rgl. in A. H. P. VI (1808) 571, ex p.

Planta virescens, rhizomate brevi ± caespitoso, culmis trigonis scabris 30—40 cm altis, basi vaginis subcastaneis fibrillosis obtectis, foliis rigidulis planis 3—4 mm latis breviter acutatis culmo brevioribus. Spiculae 3—5 subdistantes: terminalis — ♂ oblongo-obovata recta, squamis ovatis fusciscentibus subacutis, ceterae — ♀ ovatae et oblongo-ovatae 1—2 cm lg. 0.5—0.6 cm lat. laxulae nutantes pedunculis tenuibus laevibus ad 3 cm lg., bractea ima inflorescentiae subaequilonga, squamis oblongo-ovatis scutis ferrugineo-fuscis nervo pallido utriculis aequilongis. Utriculi (immaturi) oblongo-elliptici obsolete trigoni 4 mm lg. flavo-virides 5—6-nervii sessiles, rostro brevi ferrugineo cylindrico vix emarginato.

Typus: Asia Media, m. Tian-Schan, Issyk-kul, Musart, VIII 1877 (fr. immat.), A. Regel legit. — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. behringensi* C. B. Clarke, cui proxima, utriculis apice laevibus, squamis aequilongis, pedunculis spicularum laevibus differt et a praecedente utriculis nervosis, squamis acutis, pedicellis spicularum laevibus diversa est.

53. **C. melanostoma** Fisch. (errore — melastoma) ex Boott, Ill. gen. Carex II (1860) 100 nomen sub *C. Tolmiei*; Trautv. Incr. Fl. Ross. IV (1884) 318. — *C. podocarpa* Meinsh. in A. H. P. XVIII, 3 (1901) 352, quoad pl. kamtsch. — *C. Tolmiei* Hultén, Fl. of Kamtch. I (1927) 193. — *C. Toimiei* var. *longiuscula* Hultén, ib., 195. — *C. Tolmiei* var. *invisa* Kük. in Journ. Russ. Bot. 3—6 (1911) 110; Kom. Fl. penins. Kamtsch. I (1927) 249. — *C. atrofusca* Kom., ib., 194. — *C. atrofusca* var. *fulvicoma* Kom., ib., 261 (excl. syn.) — *C. Krascheninnikovii* Kom., ex Hultén., l. c., 194 (nomen). — ♀ *C. macrochaeta* var. *paramushirensis* Kudo in Journ. Coll. Agr. Hokk. Univ. XI, 2 (1922) 81.

Planta flavo-viridis, rhizomate brevi lignoso stolonifero, culmis validulis acute trigonis laevibus 20—40 cm altis in parte inferiore foliatis basi vaginis ochraceis vel castaneis fibrillosis obtectis, foliis rigidulis planis 3—5 (6) mm latis marginibus revolutis sublaevibus breviter acutatis culmo brevioribus. Spiculae 3—5 subcongestae: terminales 1—2 — ♂, oblongo-lanceolatae 1—2 cm lg., squamis oblongo-ovatis obtusatis spadiceo-fuscis, caeterae — ♀ ovatae vel oblongae 1—2.5 cm lg. laxulae, pedicellis ad 2 cm lg., interdum spicula infima distans longepedunculata nutans, bractea ima vix inflorescentiae aequilonga, squamis oblongo-ovatis acutis ferrugineis vel

castaneis nervo pallido utriculis brevioribus angustioribusque. Utriculi oblongo ovati vel oblongo-elliptici 4.5—5 mm lg. appanato-trigoni viriduli ferrugineo-maculati 4—5-nervulosi sessiles apice laeves, rostro cylindrico fusco dilatato-emarginato.

Hab. in herbosis peninsulae Kamtschatka et insularum adjacentium (Pribylovensium et Kurilensium nec non Unalashka).

Typus: Ins. Pribylovenses, ins. Sancti Pauli. Langsdorff communicavit in Herb. Fischer., (pl. florif.) — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A praecedentibus similibus culmo, pedicellis spiculorum et utriculis majoribus oblongioribus differt et a *C. Tolmiei* Boott utriculis majoribus imprimis diversa est.

54. *C. mimula* V. Krecz. sp. nova. — *C. parviflora* Kryl. in Fl. Sib. Occ. III (1929) 476, non Host.

Planta flavescenti-viridis, rhizomate brevi caespitoso breviter stolonifero, culmis validulis trigonis rectis sublaevibus 20—25 cm altis, basi vaginis purpureis vix carinatis aphyllis vestitis, foliis rigidulis strictis planis 2.5—4 mm lat. margine revolutis breviter acutatis culmo subduplo brevioribus. Spiculae 3—5 capitulam lobatam divaricatam formantes, interdum inferior — brevipedunculata subdistans, terminalis — gynecandra majuscula, caeterae — ♂ dense ovatae vel oblongo-ovatae 0.6—1.2 cm lg. 0.4—0.6 cm lat., bractea ima foliacea inflorescentiam superante, squamis ovatis obtusatis atrofusciis nervo concolore marginibus anguste hyalinis utriculis subbrevioribus. Utriculi obovati tuberculato-granulosi trigoni 2.5 mm lg. enervii virescenti-vel olivaceo-ferruginei basi late cuneati apice rotundati laeves vel vix scabrelli, rostro brevi recto emarginato.

Hab. in regione alpina muscoso-lichenosa monitum Altaicorum Sibiriae.

Typus: Altai, reg. Bijsk, in parte superiore fl. Anni Niger, in tundra muscoso-lichenosa cacuminis Talitski bielok, n° 118 b, 12 VII 1928 (fr. matur.), E. G. Pobedimova legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. Halleri* Retz., cui consanguinea, utriculis majoribus, squamis obtusatis, spiculis 3—5 (nec 1—3) majoribus, culmis validioribus laevibus differt et a *Caricibus: malanocephala* Turcz., *oligantha* Steud. et *Angarae* Steud., quibus habitu proxima, characteribus sequentibus diversa est: a prima et secunda — utriculis minoribus, granulosis et a tertia — utriculis enervibus

55. *C. adelostoma* V. Krecz. sp. nova. — *C. Buxbaumii* var. *alpicola* Hartm. Handb. Scand. Fl. ed. 1 (1820) 41; Anderss. Cyp. Scand. (1849) 39. Kük. in Engl. Pflzr. IV, 20 (1909) 394.

Planta coerulescenti-viridis, stolones tenues emittens, culmis tenuibus trigonis scaberrimis 15—35 cm lg. basi vaginis purpureo-rubris aphyllis vestitis, foliis rigidulis planis (basi subcarinatis) 2—3 mm latis breviter acutatis strictis culmo brevioribus. Spiculae 3—4, superiores — congestae, inferiores —

subdistantes sessiles densae, terminalis — gynecandra vel tota mascula clavato-ovata 1—1.5 cm lg., caeterae — ♀ ovatae vel oblongae 0.8—1.5 cm lg. 0.6—0.7 cm lat., bractea ima inflorescentiam aequilonga, squamis ovatis acuminatis ferrugineo-fuscis dorso cuneatim viridi utriculis brevioribus vel aequilongis. Utriculi elliptici vel late elliptici papilloso trigono-convexi 2.5—3 mm lg. nervis 3—4 costatis obsolete cinereo-virides basi apiceque rotundati, rostro Subnullo fusco emarginato.

Hab. in paludosis arcticis et alpinis Fenno-Scandiae, Kareliae (in m. Chibiny) et URSS polaris oriente usque ad peninsulam Jamal.

Typus: Lapponia murmanica, Tjuva-guba prope urb. Murmansk, ad ripam fluvii, n° 7762, 25 VI 1921, M. I. Nasarov legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. Buxbaumii* Whlb., cui consanguinea, utriculis erostratis, squamis acutis (nec aristulatis) minoribus utriculo brevioribus (nec ± longioribus) differt

56. **C. emasculata** V. Krecz. sp. nova. — *C. Buxbaumii* var. *australis* Anderss. Cyp. Scand. (1849) 39; Litw. in Sched. ad H. F. R. VII (1911) 152. *C. Buxbaumii* var. *heterostachya* Litw., ib., 153. — *C. Buxbaumii* var. *macrostachya* Hartm. Handb. Scand. Fl. ed. 5 (1849) 268; Kük. in Engl. Pflzr. IV, 20 (1909) 394. — *C. Buxbaumii* var. *cylindrica* Russow in Arch. Naturk. Liv. Est. Kurl., 2 ser., III (1862) 102.

Planta viridis, stolones repentes emittens, culmis tenuibus trigonis superne scabris 40—70 cm altis basi vaginis latericeo-rubris reticulatim fissis vestitis, foliis strictis rigidulis 2—3 mm lat. marginibus revolutissimis setiforme attenuatis culmo brevioribus. Spiculae 3—5 subdistantes laxulae, terminalis — gynecandra basi pauci mascula vel vix mascula, anguste cylindrica basi interdum ramosa, caeterae — ♀ cylindricae 1.5—4 cm lg. 0.4—0.6 cm lat., bractea ima inflorescentiam subaequilonga, squamis lanceolatis sensim setoso-acutatis ferrugineo-fuscis nervo pallido utriculis aequilongis vel vix longioribus. Utriculi elliptici obsolete trigoni epapilloso 2.5—3 mm lg. viriduli demum flavido-ferruginei, nervis 5—6 tenuibus conspicuis percursi, basi apiceque rotundati, rostro angustato emarginato, dentibus rectis, ore fusco.

Hab. in silvis et silvulis frondosis, fruticetisque solo humoso Europae totae, Sibiriae occidentalis et Caucasi nec non in silvaticis Kasakstaniae.

Typus: Ingria, Sestroretsk — Dubki, in silvis frondosis solo humoso, 3 VII 1888 (fr. mat), C. Meinshausen legit — sub nomine *C. Buxbaumii* var. *polygama* in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. Buxbaumii* Whlb., cui similis, spiculis cylindraceutis angustioribus (0.4—0.6 cm nec 0.8—1 cm lat.) utriculis viridulis vel fuscescenti-viridulis, rostro anguste (nec late) emarginato, denticulis rectis (nec divaricatis) differt.

57. **C. chalcodeta** V. Krecz. sp. nova. — *C. pallescens* β *glaberrima* C. Koch in Linnaea, XXI (1848) 612. — *C. pallescens* Grossh. Фл. Кавк. I (1828) 106 et auct. fl. Cauc., ex. p.

Planta viridis, rhizomate brevi dense caespitosa, culmis tenuibus trigonis sublaevibus 20—50 cm altis, vaginis basalibus rubescenti-brunneis aphyllis, foliis planis 3—4 mm latis glabris (sed vaginis eorum plus minusve sparse pilosulis) breviter acuminatis culmo brevioribus. Spiculae 3—5, subcongestae: terminalis — ♂ clavata ad 1.5 cm lg., squamis acutis cupreo-rubris vel pallide ferrugineis, caeterae — ♀ ovatae vel oblongae 0.5—1.5 cm lg., pedunculis rectis, bractea ima basi non undulata inflorescentiam superante, squamis ovatis cupreo rubris subtrinervibus, nervo centrali pallido in aristulam setuliformem subrecurvam abeunte, utriculis aequilongis vel paululo longioribus. Utriculi oblongo-elliptici turgidulo-trigoni 3 mm lg. smaragdinei tenuiter nervosi, apice erostrati vel rostro vix conspicuo ore flavo.

Hab. in pratis subalpinis, decliviis, fruticetis silvisque usque ad alt. 2500 m. Caucasi, Lazistaniae et Armeniae.

Typus: prov. Tiflis, reg. Akhalkalaki, in decliviis meridionalibus lacus Tabistskhuri, 6 VII 1916 (fr. mat.), P. Krylov et E. Steinberg legerunt — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. pallescenti* L., cui consanguinea, culmis sublaevibus et laevibus, foliis glabris, bractea non undulata, squamis intense cupreis longioribus, utriculis smaragdineis 3 mm (nec 3—3.5 mm) longis distinguitur.

58. ***C. stilbophaea*** V. Krecz. sp. nova. — *C. ustulata* Trev. in Ldb. Fl. Ross. IV (1853) 295, quoad pl. alt.; C. A. M. in Ldb. Fl. Alt. IV (1833) 232; Meinsh. in A. H. P. XVIII, 3 (1901) 356, ex p.; Turcz. in Bull. Soc. Nat. Mosc. XXVIII (1855) 342; Fl. baic.-dah. II, 2 (1856) 277, non Whlb. — *C. atrofusca* Kük. in Engl Pflzr. IV, 20 (1909) 553, quoad pl. sibir. et in Journ. Russ. Bot. 3—6 (1911) 149; V. Krecz. in Fl. transb. II (1931) 122, quoad pl. sajan.

Planta pallide vel flavido-viridis, rhizomate stolonifero laxo caespitosa, culmis obsolete trigonis rectis apice nutantibus laevibus 20—50 cm altis, basi vaginis brunnescentibus, foliis non rigidis planis 3—5 mm latis breviter acuminatis scabriusculis subrosulatis culmo multo brevioribus. Spiculae 2—5, subcongestae, terminalis — ♂ obovata 0.7—1.5 cm lg. nutans, squamis oblongis atrifuscis acutiusculis; caeterae — ♀ obovatae vel subclavatae 1.2—2.5 (3) cm lg. 0.5 cm lat. densae, pedunculis tenuibus laevibus ad 2 cm lg., bracteis imis cum vaginis ad 1—1.5 cm lg. laminisque inflorescentiam superantibus, squamis lanceolatis setuloso-acuminatis atrifusco-rubris, nervo pallido utriculis duplo angustioribus et longioribus apice subaequilongis. Utriculi elliptici vel oblongo-elliptici plani 4—5 mm lg. in parte superiore purpureo-fusci demum nitentes enerves subsessiles apice rotundati marginibus subsetulosi, rostro brevi vix emarginato hyalino-coronato.

Hab. in pratis alpinis m. Altaicorum et Sajanensium Sibiriae.

• Typus: Ircutia, m. Sajanenses regionis Tunka, in valle Norin-Chore, 3 VIII 1902 (fr. mat.), V. Komarov legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. atrofusca* Schkuhr, cui consanguinea, utriculis maturis nitidis

subito in rostrum abeuntibus, squamis brevioribus foliis breviter acuminatis abbreviatis, coloratione differt.

-59. **C. oxyleuca** V. Krecz. sp. nova. — *C. ustulata* Meinsh. in A. H. P. XVIII, 3 (1901) 356, quoad pl. turkest. — *C. ustulata* α *typica* Rgl. in A. H. P. VII (1880) 571. — *C. atrofusca* Kük. in Engl. Pflzr. IV, 20 (1909) 552, quoad pl. turkest.; B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 215 — *C. atrofusca* var. *minor* Kük., l. c., 554; B. Fedtsch., l. c., 216.

Planta cinerascenti-viridis breviter stolonifera, culmis validulis trigonis laevibus 10—30 cm alt., foliis abbreviatis rigidis strictis planis paulo revolutis 3—4 mm lat. breviter acuminatis sublaevibus culmo duplo-triplo brevioribus. Spiculae 2—5 subcongestae, terminales 1—2 — ♂ ovatae 0—1 cm lg. nutantes, squamis ovatis acutatis atrifuscis, caeterae — ♀ ovatae vel oblongo-ovatae 1—1.5 cm lg. densae declinatae vel nutantes, pedunculis incrassatis 2—3 cm lg., bractea vagina ad 1—1.5 cm lg. et lamina inflorescentiae aequilonga, squamis ovatis acutis atro-fuscis carina in parte superiore albida utriculis subbrevioribus. Utriculi oblongo-elliptici vel oblongo-ovati plani 5 mm lg. atro-fusci vel apice pallescentes enervii marginibus scabrellis, in rostrum subconicum scabrellum apice albo-marginatum subsensim contracti.

Hab. in pratis alpinis montium Asiae Mediae.

Typus: Fergana, reg. Marghelan, in prato humido salebroso alpino prope trajectum Ters-Agar, n° 1354, 24 VI 1913 (fr. submat.), N. Dessiatova legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. stilbophaea* mihi et *atrofusca* Schkuhr, quibus consanguinea, squamis apice albo-apiculatis, spiculis magis congestis rectoribusque, pedunculis vix declinatis et incrassatis, altitudine et coloratione differt.

60. **C. Gorodkovii** V. Krecz. sp. nova.

Planta dilute vel caesio-viridis, rhizomate subrepente stolonifero laxo caespitoso, culmis subtrigonis laevibus 10—30 cm altis basi vaginis rubro-brunneis dissolutis obtectis, foliis rigidulis planis 2.5—4.5 mm latis marginibus scabris apice attenuatis circinantibus culmo subaequilongis. Spiculae in numero 3—5 distantes, terminalis — ♂ ovato-lanceolata 1.5—2 cm longa, squamis late lanceolatis acutatis ferrugineo-rubris, caeterae — ♀ lineari-lanceolatae 2—4 (5) cm longae relaxae basi rariflorae, pedicellis tenuibus scabris usque ad 3—4 cm longis nutantibus, bractea ima vaginis 1—1.2 cm longis laminae spiculae aequilongis, squamis lanceolatis vel oblongo-obovatis obtusatis ferrugineo-fuscis carina viridi \pm aristulatis apice albo-marginatis utriculis subaequilongis vel brevioribus. Utriculi membranacei trigoni lanceolati, 4—5 mm longi virescentes demum apice infuscati enervii pedicellati superne et ad margines \pm setulosi in rostrum perbreve dilatatum subintegrum albo marginatum subsensim contracti.

In schistosis Ochotiae Orientis Exstremi URSS. (Nagajevo, Penshina).

Typus: Sinus Touj, in schistosis montanis prope Nagajevo, 4 VII 1932,

61. **C. Meinshauseniana** V. Krecz. sp. nova. — *C. frigida* var. *densa* Meinsh. in A. H. P. XVIII, 3 (1901) 359; Grossh. Фл. Кавк. I (1928) 171. — *C. frigida* Alb. Prodr. Fl. Colch. (1895) 252. — *C. ferruginea* Stev. in Mém. Soc. Nat. Moscou, IV (1813) 68, non Scop. — *C. capillaris* Boiss. Fl. Or. V (1884) 414, ex p., non L. — *C. sempervirens* ssp. *tristis* var. *pendulina* Kük. in Bull. Hérb. Boiss., 2 sér., IV (1904) 58 et in Engl. Pflzr. IV, 20 (1909) 570. — *C. tristis* var. *pendulina* Grossh., l. c., 172. — *C. tristis* var. *orthostachya* Bordz. in herb. — *C. fimbriata* Grossh., l. c., 172. — *C. hispidula* var. *karaczaica* E. Busch. in Act. Hort. Bot. Jurjev, X, 1 (1909) 1, fig. 1.

Planta viridis, rhizomate obliquo dense caespitoso, culmis tenuibus nutantibus trigonis superne scabriusculis 30—70 cm lg., basi vaginis brunnescentibus valde fibrillosis vestitis, foliis mollibus elongatis planis 1.5—2.5 mm latis tenuiter acutatis culmo subbrevioribus. Spiculae 3—5 distantes, terminales 1—2 — ♂ lanceolatae vel lanceolato-clavatae 1.5—2.5 cm lg. nutantes, squamis oblongis acutis vel acutatis fuscescentibus marginibus irregulariter hyalinis, caeterae — ♀ lineolato-lanceolatae 1.5—2 cm lg. laxae nutantes, pedunculis tenuibus scabris ad 4—5 cm lg., bractea ima vagina ad 2 cm lg. lamina inflorescentiae aequilonga instructa, squamis oblongo-ovatis acutis vel acutatis ferrugineo fuscis, nervo prominulo pallido, marginibus plus minusve late hyalinis, ad $\frac{1}{3}$ utriculi brevioribus. Utriculi lanceolati vel lanceolato-elliptici trigoni 6—6.5 mm lg. viriduli apice ferruginei tenuiter nervosi basi cuneati, in rostrum elongatum anguste conicum marginibus setulosum apice albo-hyalinum valde oblique sectum sensim abeuntes.

Hab. in pratis subalpinis locis humidis et silvis montanis declivium borealium Caucasi occidentalis et centralis.

Typus: Caucasus, inter Darial et Lars, 14 V 1861 (fr. mat.) Ruprecht, — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Habitu *C. frigidae* Bell. *C. ferrugineae* Scop. et *C. tristis* M. B. similis, sed species hae a specie nostra differunt: prima — spiculis densioribus majoribus fuscisque, utriculis coloratis vix nervulosis, secunda — utriculis latioribus subduplo brevioribus, autem ambae — rhizomatibus laxis stoloniferis et tertia — utriculis minoribus, spiculis densioribus rectoribusque, pedunculis brevibus.

62. **C. stenocarpa** Turcz. ex Bess. in Flora XVIII, Beibl. 1 (1834) 27 (nomen). — *C. tristis* Turcz. in Bull. Soc. Nat. Mosc. XXVIII (1855) 349; Fl. baic.-dah. II, 2 (1856) 234; C. A. M. in Fl. Alt. IV (1833) 205; Trev. in Ldb. Fl. Ross. IV (1853) 294, quoad pl. asiat.; Meinsh. in A. H. P. XVIII, 3 (1901) 358 (excl. pl. caucas.); V. Krecz. in Fl. transb. II (1931) 131, non M. B. — *C. tristis* var. *asiatica* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 94. — *C. sempervirens* var. γ . Boott, Ill. gen. Carex, IV (1867) 569 (quoad pl. asiat.). — *C. sempervirens* ssp. *tristis* Kük. in Engl. Pflzr. IV, 20 (1909) 569 et in Journ.

Russ. Bot. 3—6 (1911) 155. — *C. sempervirens* ssp. *tristis* var. *asiatica* B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 217. — *C. frigida* Rgl. in A. H. P. VII (1880) 569, non Bell. — *C. fuliginosa* Kük., l. c., 556 et 151, quoad pl. Lessing. — *C. fuliginosa* var. *pronella* Printz, Veg. Sib. Mong. Front. (1931) 157, tab. V, fig. 2 et 3.

Planta virescens, rhizomate denso brevique, culmis tenuibus apice subnutantibus obsolete trigonis laevibus 20—50 cm altis, vaginis basalibus fuscescentibus et fissis, foliis rigidulis planis 3.5—6 mm latis reclinatis breviter acuminatis culmo duplo-triplo brevioribus. Spiculae 3—5 subdistantes: terminales 1—2 — ♂ oblongae angustatae 1—1.5 cm lg., squamis ferrugineo-fuscis acutatis et membranaceis, caeterae — ♀ ovatae vel oblongo-ovatae 1.5—2.3 cm lg. laxae nutantes, pedunculis tenuibus scabris ad 5—6 mm lg., bracteis imis cum vaginis ad 2 cm lg. laminisque vix longioribus, squamis ovatis acutis vel acutatis spadiceis vel ferrugineo-fuscis nervo concolore marginibus ± hyalinis utriculis brevioribus. Utriculi oblongo-ovati plano-trigoni 5—6 mm lg. enervii apice ferruginei marginibus subulato-setulosi stipitati, in rostrum conicum applanatum oblique retusum ore hyalino sensim abeuntes.

Hab. in pratis et rupibus subalpinis Asiae Mediae et montium Altai-corum et Sajanensium Sibiriae Mongoliaeque.

Typus: In rupibus subalpinis ad torrentem Kudun m. Sajanensium, 1830, (fr. mat.), Turczaninov legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. tristi* M. B., cui proxima, magnitudine, foliis latioribus, spiculis majoribus longepedunculatis nutantibus, squamis acutis, utriculis enervibus magis setulosis differt.

63. **C. micropodioides** V. Krecz. sp. nova. — *C. pyrenaica* Grossh. Фл. Кавк. I (1928) 158 et auct. fl. cauc., non Whlb. — *C. pulicaris* Boiss. Fl. Orient. V (1884) 397, non L.

Planta cinerascens-viridis caespitosa, culmis trigonis laevibus vel sublaevibus 5—20 cm altis, foliis plicatis 0.8—1.2 mm latis culmo duplo brevioribus. Spicula androgyna 0.8—1.5 cm lg., squamis ovatis spadiceis obtusatis. Utriculi in numero 10—25 (vulgariter 14—16) ovato-lanceolati 3—3.5 mm lg. inaequaliter biconvexi vel obsolete trigoni pedicellis 0.5 mm lg., enervii flavido-virides demum reclinati, in rostrum laeve sensim contracti, nucibus obovatis vel ellipticis biconvexis vel obsolete convexiusculo-trigonis, stigmatibus vulgariter 2, sed non raro 3.

Hab. in pratis alpinis Caucasi nec non Lazistaniae turcaicae.

Typus: Transcaucasia, in regione Sotschi, in parte inferiore fl. Bzyb prope trajectum Laptrachu, n° 8514 (fr. mat.), G. Woronow legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. micropoda* C. A. M., cui proxima, culmis laevibus et utriculis metabolistylis subtrigonis differt.

64. **C. ulobasis** V. Krecz. sp. nova. — *C. montana* var. *manshuriensis* Kom. Fl. Mandsh. I (1901) 396; Kük. in Engl. Pflzr. IV, 20 (1909) 442 et in Journ. Russ. Bot. 3—6 (1911) 114; Kom. et Klob.-Alis. Key plants East. Reg. USSR I (1931) tab. 89.

Planta virescens, rhizomate lignoso dense caespitoso, caulibus rectis superne scabriusculis 15—25 cm alt., foliis 1—2.5 mm latis planis culmo subaequilongis rectis tardius basi circinatis, vaginis basalibus purpureis apice foliis vetustis crispatis dense instructis. Spiculae 2—3 congestae, terminalis — ♂ lanceolata vel lanceolato-clavata 0.8—1.5 cm lg., squamis obtusatis ferrugineo-incisis, caeterae — ♀ ovatae 1—1.5 cm lg. sessiles, bracteis squamiformibus, squamis late ovatis acutatis vel subincisis ferrugineo fuscis marginibus late hyalinis et ciliolatis setuliferis utriculis sublongioribus. Utriculi oblongo-elliptici trigoni appanati 4—4.5 mm lg. flavescenti-virides superne ferruginei nervulis 3—5 incrassatis percursi sparse pilosuli basi cuneati et subspongiosi, apice in rostrum breve fuscum bidentato-emarginatum sensim contracti.

Hab. in declivibus siccis, fruticetis et quercetis Orientis Extremi URSS nec non Mandshuriae et Koreae borealis.

Typus: in pratis elevatis prope pag. Babstova (in decursu austr. fl. Amur), in fruticeto querceo, 26 V 1891 (cal. vet., fr. mat.), S. Korshinsky legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. montana* L., cui consanguinea, foliis vetustis basi valde circinantibus, squamis masculis obtusatis (nec acutatis), femineis (ut bracteis) margine albo-hyalinis atque utriculis oblongo-ellipticis (nec obovatis) majoribus squamis subaequilongis imprimis differt.

65. **C. euxina** Marc. in Sched. Caric. exs. Kneuck. Xlla (1904) n° 30 et in Allg. Bot. Zeit. XV (1905) 33 (sub *C. transsylvanica*), nomen. — *C. depressa* var. *euxina* Woron. et Marc. in N. Busch., Marc. et Woron. Sched. ad Fl. Cauc. exs. I—II (1905) 8; Grossh. Фл. Кавк. I (1928) 168. — *C. depressa* var. *transsylvanica* Kük. in Engl. Pflzr. IV, 20 (1909) 463, quoad pl. cauc. et pers. — *C. transsylvanica* Boiss. Fl. Or. (1884) 410; Kük. in Allg. Bot. Zeit. XI (1905) 33, non Schur. — *C. pilulifera* Grossh., ib., 167, non L. — *C. debilis* Boiss. et Bal. in sched. 1866, non Mi hx. nec Sol.

Planta cinerascens dense caespitosa, caulibus laxissimis laevibus decumbentibus 10—25 cm alt., foliis rigidis planis 2—3 mm lat. apice attenuatis culmo brevioribus, vaginis basalibus fulvis fibrillosis. Spiculae 3—6, terminalis — ♂ lanceolata vel clavata 0.6—1.3 cm lg., squamis lanceolatis obtusatis fulvisque; caeterae — ♀ superiores 1—2, spiculae approximatae imae 1—2 subradicales longe capillari-pedunculatae, omnes — oblongae 0.5—1.2 cm lg. laxulae, bractea inflorescentiae aequilonga, squamis ovatis acuminatis fulvis utriculis aequilongis nervo medio apice prominulo scabro. Utriculi oblongo-obovati (subpyrifformes) subrotundato-trigoni 3—3.3 mm lg. virescentes demum fulvescentes 5—6-nervulosi superne sparse (praesertim ad angulos) pilosiusculi basi cuneati stipitati in rostrum late conicum vix emarginatum breve sensim attenuati.

Hab. in decliviis herbosis et silvaticis montanis Tauriae et Caucasi borealis (Stavropol, Majkop) et occidentalis nec non Turciae adjacentis.

Typus: Abchasia. In collibus graminosis circa Suchum-Kale, 17.30 IV 1905, leg. G. Woronow, n° 27 Ff. cauc. exs. — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. transsylvanica* Schur, cui proxima, culmis laxissimis decumbentibus, foliis angustioribus, utriculis angustioribus longioribusque densius et longius pilosulis differt.

66. **C. scabricuspis** V. Krecz. sp. nova. — *C. praecox* Trev. in Ldb. Fl. Ross. IV (1853) 301, pro pl. caucas.; Meinsh. in A. H. P. XVIII, 3 (1901) 397, pro pl. cauc, non Jacq. — *C. caryophyllea* Kük. in Engl. Pflzr. IV, 20 (1909) 463, pro pl. cauc.; Grossh. Фл. Кавк. I (1928) 168, non Lat. — *C. caryophyllea* var. *caespitosa* Kük., l. c., 465, pro pl. cauc.; Grossh., l. c., 168.

Planta pallida cinerascenti-viridis caespitosa, stolones breves emittens, culmis tenuibus subcurvatis obsolete trigonis laevibus 20—35 cm altis, foliis rigidulis basi rosulatum congestis planis 2—3 mm latis longe attenuatis marginibus subrevolutis culmo duplo-triplo brevioribus, vaginis basalibus atro-spadiceis subfibrillosis. Spiculae 2—4 subdistantes: terminalis — ♂ obovata obtusa 0.6—2 cm lg., squamis obovatis acutatis ferrugineis marginibus hyalinis, caeterae — ♀ ovatae vel oblongae 0.6—1.2 cm lg. 0.5 cm latae subdensae, ima pedunculis ad 1 cm lg. instructa, bractea inferiore vagina brevi laminam setiformem gerente, squamis ovatis setuloso-acutatis carinatis carina superne scabra, ferrugineis dorso pallido utriculis aequilongis. Utriculi late obovati (pyriformes) convexo-trigoni 2.3—3 mm lg. flavescenti-virides demum ferruginei enervii superne sparse breveque pilosiusculi basi cuneati, apice in rostrum late conicum breve vix emarginatum subito abeuntes.

Hab. in pratis subalpinis (usque ad 2700 m) Caucasi et Armeniae turciae.

Typus: Caucasus, Carthalinia, Abastuman, n° 871, 9 VI 1881 (fr. mat.), A. H. et V. F. Protherus legerunt — in Herb. Inst. Bot. Ac. Sc. URSS duplicatus typi in Mus. Helsingfors. conservantur.

A *C. verna* Chaix, cui consanguinea, rhizomate magis caespitoso, culmis laevibus, vaginis spadiceis, utriculis enerviis, densius pilosis, squamis carinatis, carina scabra differt.

67. **C. ruthenica** V. Krecz. sp. nova — *C. praecox* Trev. in Ldb. Fl. Ross. IV (1853) 301 (excl. var.), pro pl. ross. et occid.-sibir., non Jacq. — *C. praecox* var. *umbrosaeformis* Fleisch. Riedgr. (1832) 18. — *C. caryophyllea* Kük. in Engl. Pflzr. IV, 20 (1909) 463 et in Journ. Russ. Bot. 3—6 (1911) 126, ex p.; Litw. in Fl. Ross. Austr. Or. III (1929) 303; V. Krecz. in Маев. Фл. Ср. Росс., 6 изд. (1933) 199, non Lat. — *C. caryophyllea* var. *umbrosaeformis* Kük., l. c., 464; Litw., l. c. — *C. umbrosa* Kük., l. c., 466, ex p. (quoad pl. „Mittelrussl. Mosk., Mohil., Dago“); V. Krecz. in Маевк., l. c., 199,

non Host. — *C. polyrhiza* Meinsh. in A. H. P. XVIII, 3 (1901) 397 quoad pl. mosq. et Mohil., non Host.

Planta virescens, rhizomate repente laxe caespitoso, stolonifero, culmis tenuibus curvulatis trigonis superne scabris 15—35 cm altis, foliis longis rigidulis reflexis 1—3 mm lat. marginibus revolutis longe attenuatis culmo subaequilongis, vaginis basalibus spadiceis fibrillosis. Spiculae 2—4, congestae: terminalis — ♂ lanceolata vel clavata 1—2 cm lg., squamis ovatis vel obovatis ferrugineis obtusatis vel acutiusculis, caeterae — ♀ oblongae 0.6—2 cm lg. (0.4—0.5 cm lat.), laxiusculae vel basi rariflorae, inferior — pedunculo ad 1—1.5 cm lg. instructa subdistans, bracteis imis cum vaginis 5—7 mm lg., et lamina spiculae aequilonga, squamis late ovatis, imis — acutulis, superioribus — obtusis spadiceo-fuscis nervo viridi marginibus subrevolutis utriculis brevioribus. Utriculi subrotundato-obovati convexo-trigoni (2) 2.3—2.5 mm lg. flavido virentes demum brunnescentes superne ± dense et longiuscule pilosuli nervis obsolete basi cuneati apice in rostrum abbreviatum subcuneato-cylindricum fuscum vix emarginatum subsensim abeuntes.

Hab. in decliviis herbosis, fruticetis et silvis collucatis Europae orientalis silvatico-stepposae stepposaeque (a Germania et Pannonia usque ad montes Uralenses) nec non Sibiriae occidentalis, altaicae, angaro-sajanensis et kasakstanicae.

Typus: Sibiria occidentalis, in reg. Tjukulinsk, prope p. Jelanskoje, in loco depresso steppaceo, n^o 145, 28 V 1902 (fr. mat.), N. Skalosubov legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. verna* Chaix (*C. caryophyllea* Lat.), cui similis, gracilitate, foliis virescentibus (nec cinerascensibus) longioribus angustioribusque, spiculis angustatis et laxiusculis, squamis obtusioribus utriculo brevioribus, utriculis minoribus vix nervulosis densius pilosulis, rostro brevioris latioreque differt, et a *C. umbrosa* Host., cui formis silvaticis caespitosis proxima, foliis longe attenuatis et utriculorum rostro brevioris latioreque, pubescentia densiore brevioris atque nervulis vix elevatis diversa est.

68. *C. conspissata* V. Krecz. sp. nova. — *C. caryophyllea* Kük. in Engl. Pflzr. IV, 20 (1909) 463, quoad pl. sibir. et in Journ. Russ. Bot. 3—6 (1911) 126, ex p. — *C. caryophyllea* var. *caespitosa* Kük., l. c., 465, ex p., et 128. — *C. pediformis* var. *brevis* Drob. in Trav. Mus. Bot. St. Pétersb. XII (1914) 107, tab. 14; Podp. in Publ. Fac. Sc. Univ. Masaryk, 101 (1928) 21.

Panta virens, rhizomate vix repente dense caespitoso, culmis filiformibus subtrigonis laevibus flexuosis 5—20 cm altis, foliis mollibus 1—2 mm latis subconvolutis apice breviter acutatis culmo brevioribus, vaginis basalibus spadiceo-fuscis perfibrillosis. Spiculae 2—3 subdistantes: terminalis — ♂ obovata vel clavata 0.5—1 cm lg., squamis obovatis obtusis pallide ferrugineis marginibus hyalinis, caeterae — ♀ ovatae vel subglobulares 0.3—0.8 cm lg. (0.3 cm lat.) laxiusculae pedicellatae (ima ad 1 cm lg.), bractea ima cum vagina colorata ad 8 mm lg. et lamina setiformi abortiva, squamis ovatis

acutis apice obtusatis ferrugineis vel brunnescenti-ferrugineis nervo pallido marginibus subhyalinis utriculis brevioribus. Utriculi late obovati (rotundato-pyriformes) rotundato-trigoni 1.7—2 mm lg. viriduli vel cinerascanti-viriduli dense brevique pilosuli nervii basi late cuneati apice in rostrum perbreve late conicum ferrugineum vix emarginatum \pm subito contracti.

Hab. in pratis humidiusculis salsuginosis Sibiriae centralis orientali-sque (angaro-sajanensis, dahuricae et jacuticae), nec non Mongoliae adjacentis.

Typus: Irkutia, in reg. Balagansk., in prato fluminis Uda prope pag. Stscherbakowo, n^o 671 et 770, 3, VI 1908 (fr. mat.), N. Maltzev legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A praecedente, cui consanguinea, culmis tenuioribus laevibus, foliis mollioribus angustioribusque, rhizomate caespitoso, utriculis subglobosis minoribus vix rostratis brevius pilosulis enerviisque differt.

69. **C. campylorhina** V. Krecz. sp. nova. — *C. pilosa* Kom. Fl. Mandsh. I (1901) 388; Kük. in Engl. Pflzr. IV, 20 (1909) 636, quoad pl. extr. orient., et in Journ. Russ. Bot. 3—6 (1911) 167; Kom. et Alis. Key pl. East. Reg. USSR I (1931) 312 (excl. tab.), non Scop. — *C. pilosa* f. *gracilior* Meinsh. in A. H. P. XVIII, 3 (1901) 385. — *C. falcata* F. Schmidt in Mém. Ac. St. Pétersb., ser. 7, XII (1866) 194, ex p., non Turcz.

Planta virescens, stiones longos tenues emittens, culmis trigonis laevibus 40—70 cm altis alte foliatis basi vaginis purpureis aphyllis vestitis, foliis mollibus planis 5—8 (12) mm lat. breviter acutatis marginibus et utrinque sparse pilosis culmo brevioribus. Spiculae 3—4 valde distantes: terminalis — ♂ oblongo-clavata 2—3 cm lg., squamis oblongis obtusis rubro-ferrugineis, caeterae — ♀ lineares 3—6 cm lg. (interdum basi ramosae) 5—10-florae, floribus distantibus, pedunculis rectis laevibus imis ad 10—12 cm lg., bractea infima cum vagina ad 2—3 cm lg., lamina ea vix duplo longiore, squamis ovatis acutiusculis vel obtusis ferrugineis dorso late flavescens nervo viridi, utriculis subduplo brevioribus. Utriculi obovati obtusotrigoni 3.5—4 mm lg. virescentes demum flavidi laeves multinervulosi basi late cuneati apice in rostrum breve valde curvatum laeve conico-cylindricum subbidentulatum et late purpureo marginatum subito abeuntes.

Hab. in silvis Orientis Extremi URSS partis meridionalis, nec non Mandshuriae et Koreae borealis.

Typus: Regio Chabarovsk (in ripa sinistra fl. Amur) ad lacum Bolonj-Odschal prope hospitium Iergul, n^o 62, 22 V 1910 (fr. mat.), I. W. Kuznetzow legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. pilosa* Scop., cui consanguinea, coloratione pallidiore et magnitudine spiculis rari-et paucifloris, squamis brevioribus (3.5—4 mm, nec 4.5—5 mm lg.), rostro magis curvato purpureo marginato differt.

70. **C. algida** Turcz. in Bull. Soc. Nat. Moscou XI (1838) 104, nomen. — *C. panicea* Turcz., ib., XXVIII, 1 (1853) 341, quoad pl. Kawoktanam. —

C. panicea β . Trev. in Ldb. Fl. Ross. IV (1853) 291. — ? *C. depauperata* Hornem. Plantel. II (1806) 829, non Good. — *C. panicea* γ *pauciflora* Whlb. Fl. suec. II (1826) 602. — *C. sparsiflora* var. *pauciflora* Anderss. Cyp. Scand. (1849) 34; Kük. in Engl. Pflzr. IV, 20 (1909) 511. — *C. vaginata* Trautv. ex Middend. Sib. Reis. I, 2 (1874—1856) 99, non Tausch. — *C. quasivaginata* C. B. Clarke in Kew. Bull. Misc. Inf., Addit. Ser. VIII (1908) 79.

Planta flavescenti viridis, stolones subterraneos longos emittens, culmis tenuibus obsolete trigonis laevibus 5—20 cm alt., foliis rigidiusculis declinatis carinatis canaliculatis marginibus revolutis 2—3.5 mm latis breviter acutatis culmo duplo-triplo brevioribus. Spiculae 2—3 distantes: terminalis — δ oblongo-ovata 0.7—1 cm lg., squamis ovatis atro-cupreis obtusiusculis, caeterae — φ 0.5—1.3 cm lg. rariflorae 3—8-florae, pedunculis rectis ad 1—1.5 cm lg., bractea ima cum vagina ad 1 cm lg. apice ferrugineo et hyalino marginata, lamina dilatata eae vix aequilonga, squamis ovatis obtusis vel obtusatis cupreis vel rubro-fuscis concoloribus utriculis subduplo brevioribus. Utriculi membranacei oblongo-ovati convexo-trigoni 3—3.5 mm lg. viriscenti-fusci subnerves in rostrum perbreve subrectum fuscum vix emarginatum contracti.

Hab. in tundra Arcticae eurasiaticae (Islandia inclus.) nec non regionum excelsiorum montium Sibiriae et Mongoliae.

Typus: In alpe Kawokta, 1834, Kusnetzov legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Species a collimitaneis *C. vaginata* Tausch. et *C. falcata* Turcz. habitatione et characteribus numerosis differt; imprimis statura minore, inflorescentia spiculisque depauperatis et utriculis minoribus rostratis, rostro vix emarginato.

71. ***C. pseudo-lanceolata*** V. Krecz. sp. nova. — *C. [lanceolata* Poplaw. in Trav. Mus. Bot. St. Pétersb. XII. (1914) 199, quoad. pl. nertschin.

Planta virescens, rhizomate lignoso breviramoso caespites densos formante, culmis trigonis scabris 10—25 cm altis, foliis primum rectis culmo brevioribus demum decumbentibus et culmo subduplo longioribus 2 mm latis, breviter acutatis, vaginis basalibus spadiceo-rubris. Spiculae in numero 3—4 distantes: terminalis — δ lineari-lanceolata vel lineari-clavata 0.8—1 cm lg., squamis lanceolatis rubro-ferrugineis late hyalinis, caeterae — φ 0.8—1.4 cm lg. relaxae pauci (3—5)-florae, axi flexuoso, pedunculis vaginis bracteatis vestitis, bractea ima cum vagina ad 1.5 cm lg. apice late ferruginea et hyalina acuta, squamis oblongo-ovatis acutis rubro-ferrugineis carina viridi, late hyalinis utriculis subduplo longioribus. Utriculi obovati rotundato-trigoni 2.5—3 mm lg. virescenti-flavi enervi superne regulariter breviter pilosuli, pedicellis cuneatis curvatis, apice \pm rotundati, rostro obliquo integro atricolorato.

Hab. in declivibus siccis, silvis collucatis et in saxosis Dahuriae.

Typus: Dahuria orientalis, prope stationem viae ferreae Sedlovoj Razjezd, n^on^o 295 et 316, 12—13 VI 1903 (fr. mat.), D. Litwinow legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. lanceolata* Boott vera differt imprimis utriculis enervibus et a *C. nanella* Ohwi, cui magis proximia, differt culmis evolutis longioribus et utriculis majoribus.

72. **C. callitrichos** V. Krecz. sp. nova. — „*Carex* ad *C. tenuissimam* Boott simillima“ Kom. Fl. mandsh. I (1901) 402.

Planta splendide viridis, rhizomate longo repente ramoso, caespites laxos formante, culmis rotundato-trigonis 2—6 cm altis laevibus, foliis longis capilliformibus 0.2—0.8 mm latis mollibus decumbentibus longe attenuatis culmo 5—6-plo longioribus, vaginis basalibus castaneis vel rubro-fuscis vix fibrillosis. Spiculae in numero 2—4 distantes: terminalis — ♂ lineari-lanceolata 0.5—0.8 cm lg. spiculam femineam superans, squamis lanceolatis acutis pallide ferrugineis marginibus hyalinis, caeterae — ♀ lineares 0.5—0.7 cm lg. rariflorae 1—3-florae, axi flexuoso, pedunculis brevibus vaginis bracteatis vestitis, bracteis ad 8 mm lg. acutis hyalino-marginatis, squamis lanceolatis acutis ferrugineis vel pallide ferrugineis carina pallida marginibus hyalinis utriculos superantibus. Utriculi (immaturi) oblongo-obovati trigoni 2.5—2.8 mm lg. viriduli enervii breviter pilosuli basi cuneati apice ± rotundati, rostro brevi integro infuscato.

Hab. in silvis piceo-abietinis et mixtis subconiferis URSS prov. Ussuriensis et Mandshuriae borealis.

Typus: in piceetis inter fluv. Sutar et Chingan in trajectu Lubawinski priisk — hospitium Chinganskoje, orientem versus a pag. Paschkowa, 14 VI 1895 (fr. immat.), V. L. Komarov legit — in Herb. Inst. Bot. Ac. Sc URSS conservatur.

A *C. nanella* Ohwi rhizomate longe repente castaneo-purpureo, foliis tenuibus capilliformibus sordide viridibus culmum longe superantibus et oecologia alia facile dignoscitur.

73. **C. reventa** V. Krecz. sp. nova. — *C. pediformis* a genuina et β *pedunculata* Maxim. Prim. fl. Amur. (1859) 309. — *C. pediformis* var. *rhizina* Kük. in Engl. Pflzr. IV, 20 (1909) 491 et in Journ. Russ. Bot. 3—6 (1911) 135, quoad pl. Or. Extr.; Hultén, Fl. of Kamtch. I (1927) 200. — *C. pediformis* f. *parviflora* Kük. in Fedde, Repert. sp. nov. XIII (1910) 7. — *C. rhizina* Kom. Fl. penins. Kamtsch. I (1927) 255, non Blytt.

Planta viridis vel virescens, rhizomate ramoso longe repente, culmis tenuibus trigonis toto scabris 30—50 cm altis, foliis mollibus longis planis 2—3.5 mm latis ± tenuiter acutatis culmo subbrevioribus, vaginis basalibus spadiceo-rubris subfibrillosis. Spiculae in numero 2—4 distantes: terminalis — ♂ lanceolata 1—1.2 cm lg. spiculam femineam vix superans vel non superans, squamis ovatis acutis ferrugineis vel pallide ferrugineis marginibus late hyalinis, caeterae — ♀ lineares 1—1.5 (2) cm lg. rariflorae, pedicellis ad 2 cm lg., bracteis setuloso-acutatis cum vagina 1—2 cm longa, squamis ovatis setuliferis ferrugineis carina pallida apice scabrella marginibus hyalinis utriculis longioribus vel subaequilongis. Utriculi obovati rotundato-trigoni 3—3.8 mm

lg. viriduli demum flavidi nervis incrassatis regulariter breve pilosuli pedicellis cuneatis subspongiosis, rostro brevi obliquo integro.

Hab. in silvis Orientis Extremi URSS a Kamtschatka usque ad Koream borealem et Dahuriam, nec non Mandshuriae et Jacutiae australis.

Typus: in silva collucata frondosa prope Mariinsk Amurensis, 11 VI 1856 (fr. mat.), C. Maximovicz legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. rhizina* Blytt, cui consanguinea, coloratione pallidiore, squamis longioribus, utriculorum nervis validioribus et rostro magis evoluto differt.

74. **C. aneurocarpa** V. Krecz. sp. nova. — *C. pediformis* Meinsh. in A. H. P. XVIII, 3 (1901) 402. — *C. pediformis* β *pellucida* Meinsh., ib., 403, quoad pl. turkest. — *C. pediformis* Kük. in Engl. Pflzr. IV, 20 (1909) 490, quoad pl. turkest. et dshung.; B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 212 — *C. cardiolepis* C. B. Clarke ex B. Fedtsch., l. c., non Nees. — *C. pediformis* var. *nana* Litw. in Trav. Mus. Bot. St. Pétersb. VII (1910) 101.

Planta caesio-viridis, rhizomate brevi obliquo, caespites densos formante, culmis validis curvulis obsolete trigonis superne scabris 10—40 cm altis, foliis rigidis strictis vel falcatis subplanis vel plicatis 2—3 mm latis \pm tenuiter acutatis culmo duplo-triplo brevioribus, vaginis basalibus fuscis fibrillosissimis. Spiculae in numero 2—3 distantes: terminalis — δ clavata vel obovata 1—1.5 cm lg., squamis oblongo-ovatis obtusis pallide ferrugineis late hyalinis, caeterae — φ a spicula mascula remotae (admodum spicula mascula spiculas femineas saepius superans) oblongae 1—2.5 (3) cm lg. rariflorae, pedunculis ad 4—5 cm lg., bracteis apice ferrugineis et late hyalinis cum vagina ad 2 cm g. retusis aristuliferis, squamis late ovatis obtusatis setuliferis ferrugineis vel pallide ferrugineis carina pallida apice scabrella marginibus hyalinis utriculos subsuperantibus. Utriculi obovati convexo-trigoni 3.5—3.8 lg. ad latera apicemque densius breviter pilosuli ad angulos denudati fusciscenti-virides demum fuscati et subnitentes enervii pedicellis elongatis cuneatis, in rostrum obliquum perbreve integrum subsensim abeuntes.

Hab. in pratis subalpinis et alpinis montium Alatau Kazakstaniae et m. Tian-Schan orientalis atque in montibus Koktschetau.

Typus: Kuldsha, Chorgos, 5—6000 ped., 15 V 1878 (fr. mat.), A. Regel legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. pediformi* C. A. M., cui collimitanea, utriculis enervibus, spiculis masculis excedentibus et squamis obtusis differt.

75. **C. Bordzilowskii** V. Krecz. sp. nova. — *C. nitida* Trev. in Ldb. Fl. Ross. IV (1853) 306 et in Kük. in Engl. Pflzr. IV, 20 (1909) 457, quoad pl. cauc.; Grossh. Фл. Кавк. I (1924) 166. — *C. obesa* Boiss. Fl. Or. IV (1884) 414; Meinsh. in A. H. P. XVIII, 3 (1901) 392, quoad pl. cauc. — *C. nitida* var. *iberica* Bordz. in herb.

Planta cinereo-viridis, stolones elongatos emittens caespites laxos formans, culmis rectis vel vix incurvis validulis trigonis superne scabris 10—25 cm

altis, foliis rigidulis scabris marginibus revolutis 1.5—3 mm latis flexuosis vel curvatis longe attenuatis culmo brevioribus, vaginis basalibus purpureo-fuscis fibrillosis. Spiculae in numero 2—4 subdistantes: terminalis — ♂ oblongo-clavata 1—2 cm lg., squamis lanceolatis acutis ferrugineis ad margines pallidioribus et hyalinis, caeterae — ♀ ovatae vel oblongae 1—2 cm lg. rariflorae pedunculatae, pedunculis imis ad 2 cm lg., bracteis infimis vagina ad 1—1.5 mm lg. et lamina inflorescentiae subaequilonga instructis, squamis oblongo-ovatis cuneato-acutis ferrugineis trinerviis inter nervos pallidis marginibus hyalinis utriculis aequilongis vel eos subsuperantibus. Utriculi semicoriacei oblongo-elliptici convexo-trigoni 3.8—4 mm lg. primum virescenti-flavi et sparsim breves setulosi demum olivaceo-fusci et glabri subnitidi 5—6-nerviis nervis subcostatis basi rotundati subsessiles apice in rostrum mediocre laeve cylindricum ore hyalino oblique secto et emarginato subsensim contracti.

Hab. in decliviis saxosis montium Caucasi, Turciae et Persiae borealis, nec non in Jails Tauriae.

Typus: Iberia, Tiflis, in jugo Telety, 28 IV 1908 (fr. matur.), legit T. Roop — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A. C. nitida Host. squamis femineis late ovatis obtusis utriculo brevioribus differt et a *C. turkestanica* Rgl. cui consanguinea, caespitibus relaxis, culmis et foliis haud papillosis, utriculis costato-nervosis, squamis brevioribus pallidioribusque diversa est.

76. *C. relaxa* V. Krecz. sp. nova.

Planta cinereo-viridis, rhizomate adscendente, stolonibus tenuibus, culmis tenuibus subtrigonis sublaevibus 10—35 cm altis, foliis rigidis setiformi-convolutis apice crispatis 1—1.5 mm latis scabris longe attenuatis culmo brevioribus, vaginis basalibus fuscis fibrillis atro-fuscis obtectis. Spiculae in numero 2—3 distantes: terminalis — ♂ lineari-lanceolata 1.2—2.5 cm lg., squamis pallide ferrugineis (fulvis) lanceolatis obtusatis, caeterae — ♀ oblongae 1—2 cm lg. laxae basi rariflorae, pedunculis rectis ad 3 cm lg., bracteis imis vagina ad 8—10 mm lg. apice subferruginea et lamina setiformi-convoluta spiculae subaequilonga munitis, squamis ovatis subulato-acutatis pallide ferrugineis nervo albo utriculis subaequilongis. Utriculi obovati obsolete trigoni 3 mm lg. virescent-ferruginei laeves obsolete costato-nervosi basi late cuneati sessiles apice in rostrum vix evolutum subobliquum vix emarginatum decoloratum abrupte contracti.

Hab. in herbosis humidis Dahuriae.

Typus: Transbaicalia, territ. inter fl. Nertscha et Kuenga, in paludosis loci Suchaja Balka in via ad p. Novyje Klutschi, n° 812, 18 VI 1911 (fr. mat.), V. Sukatschew et H. Poplawska legerunt — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Species *C. nitidam* Host in mentem revocat.

77. *C. minutiscabra* Kük. ex B. Fedtsch. in A. H. P. XXXVIII, 1 (1924) 212 (nomen nudum).

Planta cinereo-viridis, rhizomate repente tenui longe stolonifero, culmis obsolete trigonis superne scabriusculis sublaevibus 30—50 cm lg., foliis rigidis rectis planis vel marginibus revolutis 2—3 mm lg. longe attenuatis culmo duplo brevioribus, vaginis basalibus fuscescentibus subfibrillosis. Spiculae in numero 3—4 vix distantes: terminales 1—2 — ♂ lineari-lanceolatae vel clavato-lanceolatae 2—2.5 cm lg., squamis lanceolatis acutis pallide ferrugineo-fuscis marginibus hyalinis, caeterae — ♀ in parte superiore ♂, basi rariflorae 2—3 cm lg. brevipedunculatae, pedunculis ad 1 cm lg. vaginis vestitis, bracteis vagina 0.4—1 cm lg. et lamina spiculam duplo superante instructis, squamis ovatis acutis ferrugineis carina pallida apice scabrella marginibus hyalinis utriculis aequilongis. Utriculi elliptico-obovati obsolete trigoni 4 mm lg. flavescenti-virides glabri vel ad margines apiceque vix scabriusculi enervii basi late cuneati apice in rostrum conicum ore fusco ± bidentato subarupte contracti.

Typus: Asia Media, Heptopotamia, in regione Dsharkent, in monte Ak-tasty-tau, n° 1563, 23 VI 1910 (fr. mat.), A. Michelson legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A praecedente foliis latoribus, spiculis masculis subbinis, femineis paucifloris, utriculis enerviis et a *C. Alexeenkoana* Litw., cui similis, diversa vaginis bractearum, quae in *C. Alexeenkoana* laminae basi auriculatis, sed in specie hac — abruptis.

78. *C. eremopyroides* V. Krecz. sp. nova. — *C. secalina* Kük. in Engl. Pflzr. IV, 20 (1909) 681, quoad pl. sibir., ex p., et in Journ. Russ. Bot. 3—6 (1911) 174, quoad pl. transb. et jakut.; V. Krecz. in Fl. transb. II (1930) 133, non Willd.

Planta cinereo-viridis dense caespitosa, culmis trigonis laevibus 5—20 cm altis, basi vaginis rosaceo-fuscescentibus obtectis, foliis rigidulis planis 2—3.5 mm latis longe attenuatis scabris culmo longioribus. Spiculae in numero 4—6, inferne distantes: terminales 1—2 — ♂ breviter clavatae 0.8—1.2 cm lg. pedunculatae (pedunculis vix 5—8 mm lg.) supra spiculam femineam sequentem vix excedentes, squamis oblongo-ovatis et lanceolatis acutis pallidis nervo viridi, caeterae — ♀ oblongae 1—1.5 cm lg. ± densae, pedunculis imis ad 2 cm lg. vaginis subvestitis, bracteis infimis vagina ad 2 cm lg. et lamina inflorescentiam superante instructis, squamis ovatis acutis albicantibus nervo viridi apice scabrello utriculos duplo-multotiesque superantibus. Utriculi haud seriati appressi ovato-lanceolati vel oblongo-ovati plano-convexi 5—6 mm lg. virescentes demum rosaceo-ferruginei utrinque glabri antice 3—4-nervulosi postice — enervii marginibus serrulato-alati basi rotundati breviter stipitati, in rostrum elongatum planum membranaceo fissum bidentatum sensim abeuntes.

Hab. in ripis arenosis solo salsuginoso Cis- et Transbaicaliae, Mongoliae et Jacutiae.

Typus: Dahuria selengensis, ripa lacus Gussinoje, n° 1617, 22 VI 1915

(fl. mat.), V. Sukatschew legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. secalina* Willd., cui vicaria, dimensione, spiculis masculis brevipedunculatis, squamis earum longioribus acutis femineisque abbreviatis et utriculo duplo (nec $\frac{1}{3}$) brevioribus, utriculis oblongo-ovatis (nec lanceolatis) abbreviatis ventre 3—4-nervibus dorso enervibus differt.

79. **C. flavella** V. Krecz. (indescr.) in Маевск. Фл. Ср. Росс., 6 изд. (1933) 184 (in nota sub *C. flava* L.).

Planta viridis, culmis trigonis laevibus 15—30 cm altis, foliis mollibus planis 2—3 mm latis breviter acutatis culmo brevioribus. Spiculae 2—4 subcongestae interdum inferior subdistans: terminalis— δ sessilis lanceolata 0.5—1 cm lg., squamis oblongis ferrugineis obtusis, caeterae— φ globulares vel ovatae 0.7—1 cm lg. 0.8—0.9 cm lat. densae inferior pedunculis ad 1.5 cm lg. instructa, bracteis culmos multo superantibus, squamis ovatis acutis subferrugineis dorso viridi utriculis brevioribus. Utriculi obovati subinflato-trigoni 3.5—4 mm lg. virescentes demum flavescentes nervosi subsessiles in rostrum elongatum laeve apice profunde fissum et bidentatum ore ferrugineo subito contractum, rostro $\frac{1}{2}$ utriculi subaequilongo.

Hab. in pratis et fruticetis paludosis Rossiae boreali-occidentalis et occidentalis (in regionibus submontanis Valdaicis et Medio-Rossicis partis boreali-occidentalis) nec non in Alborossia et Polonia adjacenti.

Typus: Prov. Vladimir, distr. Melenki, in fruticetis paludosis fl. Kolpj prope pag. Zakolpje, n° 5469, 15 VI 1914 (fr. mat.), M. I. Nazarov legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. flava* L. coloratione viridi, spiculis minoribus subglobosis (0.7—1 cm \times 0.8—0.9 cm lat., nec 1—2 cm lg. \times 1—1.2 cm lat.), utriculis minoribus (3.5—4 mm, nec 5—6 mm lg.), rostro subrecto differt.

80. **C. philocrena** V. Krecz. sp. nova. — *C. Oederi* Meinsh. in A. H. P. XVIII, 3 (1901) 384, quoad pl. songor.; Kük. in Engl. Pflzr. IV, 20 (1909) 673, quoad pl. turkest.; B. Fedtsch. in A. H. P. XXXVIII (1924) 220. — *C. flava* var. *Oederi* Rgl. in A. H. P. VII (1880) 573.

Planta virescens vel cinereo-viridis, culmis obtusato-trigonis validis laevibus 10—30 cm latis, foliis rigidulis \pm planis 2—4 mm latis scabris longe attenuatis culmo subbrevicribus, vaginis basalibus rosaceo-brunnescentibus. Spiculae 4—6 (superiores congestae, inferior — distans et non raro longe distans), terminalis— δ breviter clavata 0.8—1.5 cm lg., squamis lanceolatis acutis subferrugineis; caeterae— φ ovatae vel breviter cylindricae 1—1.8 cm lg. 0.7 cm lat. densae ima pedunculo interdum ad 3—4 cm lg. instructa, bracteis infimis inflorescentiam multo superantibus, squamis oblongo-ovatis acutis subferrugineis, vel vix ferrugineis dorso flavescenti-viridis utriculis brevioribus. Utriculi divaricati obovati subinflato-trigoni 3.5 mm lg. viriduli demum flavi 4—5-nervii subsessiles in rostrum abbreviatum rectum apice \pm breviter bidentatum subito contracti.

Hab. in paludiculis fontinalibus ets ecus rivulos montium Asiae Mediae, nec non Songoriae.

Typus: Buchara, prov. Darvaz, in decliviis meridionalibus jugi Petri Magni, loco Arzyng, 820 ped. alt., n° 2732, 19 VII 1899 (fr. mat.), V. Lipsky legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. Oederi* Retz., cui consanguinea, coloratione, spiculis 4—6 (nec 2—4), squamis masculis lanceolatis, acutatis (nec obtusis), femineis pallidioribus, utriculis flavo-viridis, rostro evidentius bidentato differt.

81. **C. aspratilis** V. Krecz. sp. nova. — *C. diluta* Meinsh. in A. H. P. XVIII, 3 (1901) 382, quoad pl. Goldean.; Kük. in Engl. Pflzr. IV, 20 (1909) 659, quoad pl. ex Westsibirien et Omsk et in Journ. Russ. Bot. 3—6 (1911) 171, quoad pl. omsk.; Kryl. in Fl. Sib. Occid. III (1929) 515. — *C. binervis* Meinsh., l. c., 383, quoad pl. omsk.; — *C. diluta* var. *badia* Kük. ex B. Fedtsch. in A. H. P. XXXVIII (1924) 219. — *C. distans* B. Fedtsch., l. c., quoad pl. omsk.

Planta cinereo-viridis, culmis trigonis laevibus 20—80 cm altis, foliis rigidis rectis planis vel subconvolutis 2—4 mm latis scaberrimis breviter acutatis culmo subduplo brevioribus. Spiculae 3—4 subdistantes: terminalis — ♂ obovata vel incrassato-clavata 1.5—2.5 cm lg., squamis obovatis ferrugineo fulvis, caeterae — ♀ ovatae vel oblongo-ovatae densae 1—2 cm lg. 0.7 cm lat. inferiores — pedunculatae, squamis ovatis obtusis vel obtusatis subspadiceis trinerviis dorso flavescenti-viridibus utriculis subduplo brevioribus. Utriculi dilatato-obovati obtuso-trigoni 3—3.3 mm lg. virescenti-flavi inferne ferrugineo maculosi nervibus 2—4 incrassatis instructi sessiles in rostrum breve scaberimum bidentatum subito contracti.

Hab. in salsis et pratis salsuginosis Cis- et Transvolgensi-uralensibus nec non Sibiriae et Kasakstaniae occidentalis centralisque usque ad Dahuriam selenghensem.

Typus: Kasakstaniae prov. Turgaj, distr. Kustanaj, in salsis silvae Ara-Karagaj prope lacum Beloje, n° 97, 28 V 1921 (pl. deflor.) et 8 VI 1921 (fr. mat.) N. V. Pavlov legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. Karelini* Meinsh., cui simillima, utriculis apice asperulis et squamis intensius coloratis facile distinguitur atque a *C. distantii* L., cui consanguinea, utriculis minoribus (3—3.3 mm, nec 4—4.3 mm lg.), 3—4 (nec 5—6)-nerviis, rostro brevi conico, squamis femineis utriculis duplo (nec vix $\frac{1}{3}$) brevioribus, spiculis superne collatis, bracteis imis inflorescentiae subaequilongis diversa est.

82. **C. Smirnovii** V. Krecz. sp. nova.

Planta cinereo-viridis stolones incrassatos emittens, culmis trigonis superne scabris 50—70 cm lg. alte foliosis, foliis rigidis planis 3—5 mm latis longe attenuatis culmo subaequilongis, vaginis basalibus rubro-fuscis integris. Spiculae 3—5 inferne subdistantes: terminales 2—3 — ♂ congestae lanceolatae vel clavato-lanceolatae 2—2.5 cm lg., squamis ellipticis obtusatis fuscescenti-

bus, ceterae — ♀ ovatae oblongo ovatae vel oblongo-clavatae 1.8—3 cm lg. 0.8 cm lat. laxiusculae inferiores — pedunculatae, squamis ovatis acutis subspadiceis trinervibus dorso pallidis, utriculis subduplo brevioribus. Utriculi coriacei oblongo-ovati obtuso-trigoni 5—6 mm lg. cinerei vel flavescenti-cinerei nervibus (in statu maturo) elevatis subincrassatis, subsessiles in rostrum breve laeve late haud profunde emarginatum rectidentatum subferrugineum subabrupte contracti.

Hab. in pratis turfosisque Sibiriae occidentalis (a fl. Irtysch orientem versus), altaicis, angaro-sajanensis et austro-baicalensis nec non in Mongolia tota.

T y p u s: Sibiriae prov. Irkutsk, reg. Balagansk, ad ripam humidam turfosa lacus Bolschoje prope pagum Ustj-Ossinskoje, n^on^o 1351 et 1290, 3 VII 1910 (fr. mat.), N. Maltzev legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. riparia* Curt. cui similis, statura minore, foliis angustioribus, spiculis minoribus haud numerosis, squamis femineis acutis vel vix aristulatis utriculo brevioribus facile distinguitur et a *C. rugulosa* Kük., cui proxima, utriculis cinereis vel flavescenti-cinereis ovatis vix 5 mm lg., squamis brevioribus, spiculis abbreviatis et oecologia diversa est.

Nomen in honorem cl. Valent. Iv. Smirnovii florum sibiricorum investigatoris datum est.

83. **C. Sukaczovii** V. Krecz. (indescr.) in Fl. transb. II (1931) 136. — *C. heterostachya* Kük. in Engl. Pflzr. IV, 20 (1909) 741, quoad pl. mandsh. et in Journ. Russ. Bot. 3—6 (1911) 192, quoad pl. transb., non Bge.

Planta virescens, stolones longos emittens, culmis tenuibus trigonis saepius laevibus 50—80 cm altis, foliis rigidulis planiusculis vel canaliculatis 2—4 mm latis longe attenuatis culmo brevioribus, vaginis basalibus aphyllis rubro-fuscis solidis subnitidis reticulatim fissis. Spiculae 3—6 inferne distantes: terminales 2—3 — ♂ approximatae lanceolatae vel clavatae 1.5—3 cm lg., squamis lanceolatis acutis ferrugineisque, caeterae — ♀ cylindricae 2—3.5 cm lg. 0.6 cm lat. ± densae inferiores — pedunculatae, bracteis evaginantibus culmos superantibus, squamis oblongo-ovatis asperulo- et incrassato-aristulatis spadiceis nervo dorsali elevato pallido utriculis brevioribus. Utriculi coriacei ovati vel late ovati biconvexi 4 mm lg. ferrugineo-rubri subnitentes costati basi rotundati breviter stipitati in rostrum sublongum laeve acidentatum ore ferrugineo subabrupte contracti.

Hab. in stepposi et pratis siccis Sibiriae angaro-sajanensis, dahuricis, nec non Mongoliae adjacentis.

T y p u s: Dahuria, territor. inter fl. Nertscha et Kuënga, fl. Gorbizta, in prato sicco prope ostium fl. Gorbitschikan, n^on^o 1882 et 1890, 9 VII 1911 (fl. immat.) V. Sukatshev legit et n^o 737, 2 VII 1911 (fr. mat.), R. Abolin legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. songorica* Kar. et Kir. et *C. haematostachydi* Lévl. et Vant., quibus collimitanea et proxima, differt: a prima — utriculis costatis sanguineo-rubris

et a secunda — utriculis latioribus brevioribus, nervibus utriculorum bene evolutis tantum in utriculis maturis foliisque rigidis.

84. **C. occultans** (Franch.) V. Krecz. sp. nova. — *C. filiformis* var. *occultans* Franch. in Nouv. Arch. Mus. Paris, 3 sér., X (1698) 89. — *C. lasiocarpa* var. *occultans* Kük. in Engl. Pflzr. IV, 20 (1909) 747 (excl. pl. mandsh.); Akiyama in Journ. Fac. Sc. Hokk. Univ., ser. V, II, 1 (1932) 232, fig. 170. — *C. filiformis* F. Schmidt in Mém. Ac. St. Pétersb. VII sér., XII (1867—1868) 198.

Planta cinereo-viridis, rhizomate laxo stolonifero, culmis tenuibus superne trigonis et scabris 50—70 cm altis, foliis elongatis subconvolutis ad 3 mm lat. culmo vix brevioribus, vaginis basalibus rubescenti-fuscis nitidis solidisque. Spiculae 3—5 inferne distantes: terminales 1—3 — ♂ approximatae lineari-lanceolatae, 2.5—4 cm lg., squamis castaneis lanceolatis acutisque, caeterae — ♀ oblongae ad 4 cm lg. basi relaxae inferiores brevipedunculatae, squamis oblongo-ovatis acutis vel aristulatis trinervibus dorso pallido marginibus laevibus hyalinis utriculo subaequilatis et longioribus. Utriculi oblongo-ovati plano-trigoni 5 mm lg. pilis suberectis apice rarioribus obtecti basi rotundati subsessiles in rostrum bene distinctum laeve et glaberrimum breviter dentatum subsensim contracti.

Hab. in paludosis Japoniae borealis nec non insulae Sachalin.

Typus: Japonia, Yeso: Mororan. — in Herb. Mus. Parisiensi conservatur.

A *C. lasiocarpa* Ehrh., cui consanguinea, squamis femineis utriculo aequilatis longioribusque, rostro utriculorum distincto et glaberrimo, foliis subconvolutis culmisque scabris differt.

85. **C. hypaneura** V. Krecz. sp. nova. — *C. silvatica* var. *angustifolia* Litw. in Sched. ad H. Fl. URSS IX (1932) 63.

Planta virescens, rhizomate laxo, culmis tenuibus apice nutantibus obtuse trigonis laevibus alte foliosis 30—60 cm altis, foliis ± mollibus planis 3—4 mm latis breviter acutatis culmo brevioribus. Spiculae 4—6 inferne distantes: terminales — ♂ lineari-clavatae 2—4 mm lg., squamis oblongis acutis ferrugineo virentibus, caeterae — ♀ anguste lineares vel lineari-clavatae 2—3.5 cm lg. rariflorae nutantes, pedunculis pertenuibus scaberrimis ad 5—6 cm lg., squamis oblongo-ovatis sensim in aristam attenuatis carina apice scabra trinervibus dorso viridi in partibus caeteris albescens utriculis subbrevioribus. Utriculi obovati obtuso-trigoni 4.5—5 mm lg. primum virescentes demum brunnescentes tenuiter evanescenti nervosis basi cuneati in rostrum elongatum antice profunde fissum dentibus ± divaricatis laeviter asperulum ore subferrugineo subabrupte contracti, vix in $\frac{2}{2}$ juli caduci.

Hab. in silvis siccis frondosis, in fruticetis et ad margines silvarum Caucasi occidentalis (in Abchasia, Imeretia, Mingrelia et Georgia nec non in Lasistania turcica).

Typus: Abchasia, distr. Suchum. Loco herboso ad marginem silvae

prope monasterium Novo-Athonense, 3 et 10 V 1906 (fr. mat.), E. Bordzowski legit — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. silvatica* Huds., cui consanguinea, coloratione pallida, foliis subduplo angustioribus, utriculis brevioribus subnervulosis, rostro subscabro et foenologia differt.

86. **C. jacutica** V. Krecz. sp. nova.—*C. pulla* var. *tristigmatica* Trautv. in A. H. P. V (1877) 130.—*C. rotundata* Meinsh. in A. H. P. XVIII, 3 (1901) 376, quoad pl. Czekanowsk.—*C. rostrata* ssp. *rotundata* Kük. in Engl. Pflzr. IV, 20 (1909) 723, ex min. p. et in Journ. Russ. Bot. 3—6 (1911) 182, quoad pl. jacut.—*C. dichroa* Freyn in Oesterr. Bot. Zeitschr. XL (1920) 304, ex p.

Planta virescens stolonifera, culmis trigonis apice scabris 10—40 cm altis, foliis rigidulis planis vel marginibus subinvolutis 1.5—3 mm latis longe attenuatis culmo aequilongis, vaginis basalibus ferrugineo-rubris. Spiculae 3—5, terminales (1) 2—3—♂ approximatae 1—2 cm lg., squamis spadiceis vel brunneis ovatis acutis marginibus hyalinis, caeterae—♀ distantes (superior ad basin ♂ disposita) oblongo-ovatae vel breviter cylindricae 2.5 cm lg. 0.9—1 cm lat. densae rectae superiores breviter pedunculatae, squamis ovatis acutis vel acutatis spadiceis nervo inconspicuo marginibus pallidis hyalinis utriculis subangustioribus et brevioribus. Utriculi divaricati obovati inflati 4—4.5 mm lg. virescentes apice brunnescentes nitidi tenuiter nervosi basi rotundati breviter stipitati, in rostrum sublongum cylindricum laeve (= $\frac{1}{3}$ utriculi) breviter bidentatum subito contracti.

Hab. in silvis humidis montanis Sibiriae in elevatione Dahurico-Vitimensi et in Jacutia.

Typus: Sibiria orientalis, ad fl. Olenek. Inter fl. Tomba et fl. Maigda 6 VII 1874 (fr. submat.), A. Czekanowski et F. Mueller legerunt — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. rhynchophysa* C. A. M., cujus verosimiliter forma alpina est, dimensione omnium partium, foliis angustioribus, utriculis minoribus differt, atque a proximis *C. rotundata* Whlb. et *C. saxatili* L. differt characteribus sequentibus: a prima culmo scabro, utriculis minime obscuris rostro elongato, spiculis masculis sessilibus, a secunda—utriculorum forma et coloratione.

87. **C. procerula** V. Krecz. sp. nova.—*C. pulla* var. *laxa* Trautv. in A. H. P. V (1877) 120.—*C. pulla* f. *pedunculata* Kjellm. in Vega Exp. Vet. Jaktag. Stockholm I (1882) 560.—*C. pulla* var. *sibirica* Christ in Vet. Ak. Handb. Stockh. XXII (1887) 181.—*C. vesicaria* ssp. *saxatilis* f. *laxa* Kük. in Engl. Pflzr. IV, 20 (1909) 728 et in Journ. Russ. Bot. 3—6 (1911) 186.

Planta virescens breviter stolonifera, culmis tenuibus apice nutantibus trigonis superne scabris 40—70 cm alt., foliis rigidulis planis 2—3 mm lat. elongatis longe attenuatis culmo subbrevioribus, vaginis basalibus rubescentibus. Spiculae 3—4: terminales 1—2—♂ aggregatae a caeteris distantes

lineares 1—2.5 cm lg., squamis lanceolatis acutatis brunnescentibus, caeterae — ♀ oblongae vel cylindricae 1.5—3 cm lg. 0.6—0.7 cm lat. densae distantes pendulae pedunculatae, pedunculis pertenuibus capillaribus laevibus interdum circinatis ad 5—6 cm lg., squamis lanceolatis acutiusculis spadiceis nervo concolori apice sordido, albo-hyalinis utriculis angustioribus brevioribusque. Utriculi fere horizontales oblongo elliptici vel elliptici 4—4.5 mm lg. rubescenti-fusci nitidi enervii stipitati in rostrum breve laeve vix bidentato-emarginatum subito contracti.

Hab. in paludibus et ripis udis Sibiriae angaro-sajanensis, dahuricae, jacuticae et zeja-burejanae.

Typus: Reg. Amurensis, territor. fl. Zeja. In itinere inter punctum astronomicum prope Vozdvishenskoje et lacum Toko Jakutiae: lacus Okonon, 1293 m alt., ad ripam, n° 516, 18 VIII 1911. N. Prochorov et O. Kuzeneva legerunt — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. saxatili* L., cui consanguinea, culmis elongatis, spiculis cylindricis longioribus longe pedunculatis, squamis femineis lanceolatis acutiusculis, utriculis oblongo-ellipticis longioribus differt.

88. ***C. dolichocarpa*** C. A. M. ex Kom. Fl. penins. Kamtsch. I (1927) 264 (nomen sub *C. Michauxiana*). — *C. rostrata* Meinsh. in A. H. P. XVIII, 3 (1901) 366, non Mchx. — *C. Michauxiana* Bcklr. in Linnaea XLI (1877) 336; Kük. in Engl. Pflzr. IV, 20 (1909) 705, quoad pl. asiat. et in Journ. Russ. Bot. 3—6 (1911) 178; Kom., l. c. — *C. Michauxiana* ssp. *asiatica* Hultén, Fl. of Kamtsch. I (1927) 207, fig. 14 — *C. Fischeriana* C. A. M. in herb. et ex Hultén, l. c. (nomen sub praeced.), non Gay.

Planta virescens, rhizomate caespitoso, caulibus laevibus subtrigonis 25—60 cm altis, foliis planis 3.5—4.5 mm latis subito acuminatis culmo aequilongis. Spiculae in numero 2—4 distantes: superior — ♂ longepedunculata (pedunculis 1—1.5 cm lg.) lineari-lanceolata 1.5—2 cm lg. spicam femineam longe superans, squamis angustis pallidis acutiusculis, caeterae — ♀ hemisphaericae 1.5—2 cm lg. laxae pedunculatae, bractea ima vaginante culmum superante, squamis ovatis obtusatis subferrugineis medio virescentibus 4—5-nerviis utriculis duplo vel $2\frac{1}{2}$ brevioribus. Utriculi divaricati anguste lanceolati obtuso-trigoni 10—13 mm lg. flavescenti-virides multinerviis breviter (ad 1.5 mm lg.) pedunculati superne cuneati marginibus asperulis, apice aculeato bidentati.

Hab. in muscosis peninsulae Kamtschatka, atque in insulis Kurilensibus, Yezo et Chonshiu Japoniae.

Typus: Kamtschatka, Petropavlovsk, Rieder n° 204 — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *C. Michauxiana* Bcklr. foliis latioribus, spiculis masculis longioribus longius pedunculatis spicam femineam longe superantibus, squamis 4—5 (nec 3)-nerviis, nervis medianis praeditis differt.

JUNCUS L

89. **J. amuricus** (Maxim.) V. Krecz. et Gontsch. sp. nova. — *J. bufonius* var. *amuricus* Maxim. Prim. fl. Amur. (1859) 296. — *J. bufonius* Kom. Fl. Mandsh. I (1901) 425, non L. — *J. sphaerocarpus* var. *amuricus* Buch. in Engl. Pflzr. IV, 36 (1906) 108; Kom. et Alis. Key pl. East. reg. USSR I (1931) 344.

Planta annua viridis vix fasciculata, culmis filiformibus decumbentibus 3—10 mm altis e basi ramulosis vel simplicibus, foliis linearibus planis vix 0,3—0,4 mm latis brevibus. Inflorescentia pauciramosa vel subsimplex, ramulis capillariformibus elongatis flexuosis nutantibus, floribus valde distantibus 2,5—3 mm longis. Tepala lanceolata (intima — breviora) apice in mucronem subulatum elongatum recurvum subabrupte contracta viridia superne subferuginea margine late hyalina, staminibus tepalis $2\frac{1}{2}$ -plo brevioribus, antheris oblongis filamento triplo brevioribus. Capsula rotundato-ovata atro-virens, demum fuscescens **erostrata tepalis plus minusve brevior, seminibus circiter 0,2 mm longis ellipticis utrinque breviter subulato appendiculatis.**

In locis inundatis ripariis secus fl. Amur Orientis Extremi Mandshuriaeque.

Typus: „Amur. Zwischen Monglomai, auf dem Sande. 2 IX 1855. Maximowicz.“ (sub nomine *Junco bufonio* var. *amurico* Maxim.) — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Ab *J. sphaerocarpo* Nees, cui consanguineus, culmis decumbentibus vel ascendentibus, ramulis nutantibus, tepalis longius subabrupte mucronatis, recurvatis et capsula subovata differt.

90. **J. nastanthus** V. Krecz. et Gontsch. sp. nova. — *J. ranarius* Aschers. et Gr. Syn. II, 2 (1904) 423; Hegi, Jll. Fl. Mitt. Eur. II, 2, (1909) 156, non Song. et Perr. — *J. bufonius* var. *ranarius* Syr. Илл. Фл. Моск. ryb. I (1906) 221, ex p. — *J. mutabilis* Savi, Fl. pis. I (1798) 364, non Lam. (1794). — *J. bufonius* var. *mutabilis* Aschers. et Gr., Syn. II, 2 (1904) 422, ex p. — *J. bufonius* η *congestus* Whlb. Fl. Gothob. (1820) 38. — *J. bufonius* β *fasciculatus* Koch, Syn. ed. 1 (1837) 732. — *J. bufonius* α *compactus* Čelak. Prodr. Fl. Böhm. (1869) 83. — *J. bufonius* var. *glomeratus* Rgl. in A. H. P. VII (1880) 554. — ? *J. congestus* Schousb. ex E. Mey. Syn. Junc. (1822) 40, nomen nudum. — ? *J. querioides* Pourr. et Willk. Prodr. Fl. Hisp. I (1861) 181.

Planta annua viridis fasciculato-caespitosa, culmis rigidulis numerosis radiantibus et decumbentibus 3—10 (15) cm altis e basi ramulosis, foliis filiformibus brevibus. Inflorescentia dichotoma, ramulis abbreviatis recurvatis floribus 2—3 ad apicem in fasciculos congestis secus ramos alternatim dispositis, floribus 6—6,5 mm longis, bracteis 2 mm lg. obtusis. Tepala lanceolata viridia margine late hyalina inaequalia, intima — latiora 4,5—5 mm lg., externa acutiora 6—6,5 mm lg., staminibus 1,5 mm lg. antheris filamento subaequilongis. Capsula cylindraceo-obovata 4 mm longa tepalis internis aequilonga apice applanata, rostrata, seminibus late ellipticis basi planis 0,5 mm longis fusciscentibus nitidis.

In glareosis, arenis et arenosis ripariis atque in locis humidis, solo arenoso et subsalso, Eurasia orientalis versus ad limites orientales Dahuriae et Mongoliae nec non in Caucaso et Kasakstania.

Typus: „Ingria, in viciniis opp. Tzarskoje Selo, in glareosis ad ripam fl. Kurminka, 15 IX 1915, leg. S. Jusepczuk“, (sub nomine *J. ranario*) in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Ab *J. bufonio* L. s. str. differt anthesi praecociore, habitu humiliore, ramis ramulisque abbreviatis, floribus fasciculatim congestis brevioribus (6—6.5 nec 6.5—7.5 mm lg.), tepalis internis capsulam vix (nec valde) superantibus, capsula cylindrico-ovata (nec elliptica) atque ab *J. ambigu* Guss. (quocum sub nomine *J. ranario* Aschers. et Gr., non Song. et Perr., mixtus est) ramis fasciculiferis et floribus majoribus (6—6.5 nec 4—5 mm lg.), habitu robustiore diversus est.

91. **J. Jusepczukii** V. Krecz. et Gontsch. sp. nova. — *J. bufonius* auct., ex p.

Planta annua viridis fasciculata, culmis numerosis arcuate ascendentibus 5—20 cm altis a basi ramosis, foliis filiformibus abbreviatis. Inflorescentia ramosa, ramis superne incurvatis tantum secus latus internum floribus|distantibus vel superne magis congesti instructa, floribus 5—5.5 mm longis, bracteis obtusis ca 2 mm longis. Tepala lanceolata viridia margine late hyalina, inaequalia externa — acutiora 5—5.5 mm longa, interna — acuta latiora 4 mm longa, staminibus 2 mm longis, antheris filamentis subduplo brevioribus. Capsula, oblongo-obovata circiter 4 mm longa tepalis internis subaequilonga, seminibus 0.5 mm longis ellipticis utrinque appianatis.

In glareosis et arenosis Eurasiae (usque ad Baicalem) et Caucasi.

Typus: „Ingria, in viciniis opp. Tzarskoje Selo, in glareosis ad ripam fl. Kurminka, 15 IX 1915, leg. S. Jusepczuk“ (sub *J. bufonio*) — in Herb. Inst. Ac. Sc. URSS conservatur.

Ab *J. ambigu* Guss. culmis subvaginantibus arcuate adscendentibus a basi ramosis, floribus longioribus (5—5.5 nec 4—5 mm lg.), capsula tepalis internis brevioribus (nec aequilonga vel longioribus) differt.

92. **J. turkestanicus** V. Krecz. et Gontsch. sp. nova. — *J. bufonius* Vved. Drob. et alii, Опр. раст. окр. Ташк. I (1923) 55 et auct. fl. turk., pro max. parte

Planta annua cinerascens-viridis fasciculata, culmis numerosis incrassatis rectis vel superne subcurvatis 10—30 cm altis e medio ramosis, vaginis latis laminiferis, foliis subconvolutis ca 1 mm latis inflorescentiam attigentibus. Inflorescentia inaequilateraliter, ramosa subconstricta, ramis rectis apice subcurvatis, floribus 4.5—5 mm longis inferne remotis superne magis congestis, bracteis acutiusculis 1—2.5 mm longis. Tepala late lanceolata fere ovato-lanceolata dorso anguste viridia margine latissime argenteo-membranacea subaequilonga, externa — acuta 4.5—5 mm longa, interna — obtusiuscula et obtusa 4—4.7 mm longa angustiora, staminibus 1.5 mm longis, antheris filamentis subaequilongis. Capsula oblongo-elliptica ferruginea apice rotundata 4—4.8 mm longa tepalis internis aequilonga vel vix superante,

seminibus rotundato ovatis 0.3—0.4 mm longis pallide ferrugineis nitidis.

In pratis et pratulis fontinalibus Asiae Mediae, Kuldschae et Persiae hyrcanicae.

Typus: „Kasakstaniae pars heptopotamica, reg. Alma-ata, distr. Bien-Aksu, in planitie Istyk, n° 503, 3—21 VII 1928, leg. M. N. Smirnov—in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Ab *J. ambigu* Guss. cui consanguineus, habitu robustiore, tepalis inter se et capsula \pm aequilongis dilatatis latissime argenteo-marginatis, internis—obtusis, seminibus brevioribus rotundato-ovatis bene differt.

93. ***J. minutulus*** V. Krecz. et Gontsch. sp. nova. — *J. bufonius* var. *parvulus* Hartm. Handb. Skand. Fl. 7 Uppl. (1858) 241. — *J. bufonius* f. *dimera* Buch. in herb.

Planta annua virescens mollis minutula 0.8—5 cm alta, culmis filiformibus rectis simplicibus vel vix uniramulosis, foliis capillaribus mollibus culmo duplo brevioribus. Inflorescentia terminalis uniflora vel ramulum unicum uniflorum rectum emittens, floribus 2.5—3.5 mm longis, bracteis vix 1 mm longis, obtusis. Tepala lanceolata margine late hyalina inaequalia, externa—acuta 2.5—3.5 mm longa, interna—breviora obtusata 2—3 mm longa, staminibus 1—1.2 mm longis, antheris filamentis 1.5-plo brevioribus. Capsula oblongo-elliptica fuscescens apice rotundata 1.5—2.5 mm longa tepalis internis brevior, seminibus ovatis 0.3 mm longis apice cum appendiculo obscuro.

In locis humidis ripariis et depressis Eurasiae (usque ad Dahuriam).

Typus: „Sarepta, 24 V 1851, in feuchten Wiesen häufig, A. Becker.“ (sub nom. *J. bufonio* f. *dimera* Buch. teste)—in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Ab omnibus praecedentibus e grege *J. bufonii* L. s. lat. dimensione minima, inflorescentia subuniflora, floribus parvulis bene differt.

94. ***J. macrantherus*** V. Krecz. et Gontsch. sp. nova. — *J. castaneus* E. Fedtsch. Pacr. Typk. (1915) 214, non Sm. — *J. sphacellatus* Buch. in Engl. Pflzr. IV, 36 (1906) 233, quoad pl. ex Tschirtschik.

Planta perennis viridis, rhizomate repente longe stolonifera, culmis teretibus laeviter compressis 30—60 cm altis 2—3-foliatis basi vaginis latis fusciscentibus vestitis, foliis canaliculato-plicatis (in sectione transversa semilunaribus) ca 4 mm latis obsolete articulatis. Inflorescentia breviter ramosa 2—6-capitata, ramis erectis, phyllo inflorescentiam aequante vel superante, floribus 6—7 mm lg. brevipedunculatis in fasciculos 3—10-floros congestis, bracteis late lanceolatis vel ovatis subferrugineis tepala subaequantibus. Tepala inaequalia: externa—lanceolata acuta dorso viridia marginibus infuscata, interna—anguste lanceolata fusciscentia apice \pm membranacea obtusata externis longiora, staminibus 5—6 mm longis, antheris oblongo-linearibus flavis (2.5) 3—3.5 (4) mm longis 3—3.5-plo filamentum superantibus. Capsula oblongo-elliptica vel oblongo-ovata castanea 7—9 mm longa apice in rostrum ca 1—1.8 mm lg. abrupte contracta. Stylus ca 2.5—3 mm lon-

gus ex tepalis valde exsertus. Semina oblonga fuscescentia 0.6—0.7 mm longa cum appendiculis longis angustisque 3.5—4 mm longa.

In pratis subalpinis fontinalibus et ripariis Asiae Mediae.

Typus: „Prov. Samarkand, alpes Serawschan, in valle fluv. Jagnob supra Novobad, 3100 m alt., 31 VII 1913, n° 715 (fr. mat.) atque non procul ap. Novobad in valle Kazandemir alpium Hissar, 3100—3200 m alt., 30 VII 1913, n° 712 (pl. flor.), J. Bornmüller leg. — in Herb. Inst. Bot. Ac. Sc. URSS conservantur.

Ab *J. sphacellato* Decne et *J. himalensi* Klotzsch., quibus proximus, differt: a primo — floribus minoribus, tepalis inaequalibus latioribus haud subulatis, staminibus longioribus, antheris filamentis 3—3.5-plo longioribus, capsula perigonio longiore, a secundo — antheris filamento triplo longioribus capsulaque ex perigonio minime exertis apice non conico-pyramidatis et floribus majoribus.

95. **J. leucochlamys** Zing. (indescr.) ex V. Krecz. in Fl. transb. II (1931) 141, fig. 98. — *J. castaneus* Turcz. Fl. baic.-dah. II (1856) 241, non Sm., ex p.

Planta perennis cinerascens longe stolonifera, culmis rectis rigidis teretibus 50—80 cm altis alte foliatis, foliis accrescentibus applanato-cannaliculatis ca 5 mm latis, vaginis supremis latis exauriculatis, basalibus — aphyllis liberis fuscescentibus. Inflorescentia umbelliformis, ramis rectis divaricatisque inaequalibus simplicibus vel \pm dichotomicis, fasciculos cymosos 5—12 gerens, phyllis 2 imis inflorescentiam superantibus, floribus 4—5 mm longis, in capitula 5—12-flora congestis, bracteis ovatis oblongo-ovatisve obtusatis albicantibus perigonio subduplo brevioribus. Tepala aequalia lanceolata acuta pallide castanea, staminibus $\frac{2}{3}$ tepalorum aequantibus, antheris linearibus ca 1 mm longis, filamento duplo-triplo brevioribus. Capsula convexo-trigona cylindraceo-elliptica subferruginea basi pallida nitida in rostrum elongatum subabrupte contracta 8—10 mm longa perigonium duplo-triplo superans, seminibus 3—3.5 mm longis appendiculis longis angustis caudiculatis instructis.

In pratis et silvis paludosis subalpinis angaro sajanensibus regiomontanis Dahuriae, Jacutiae et Mongoliae adjacentis.

Typus: „Dahuria, distr. Tschita, ad balneas Darassun, VII 1894, n° 101, G. A. Stukow legit (cum nota cl. V. Zinger!) in Herb. Inst. Ac. Sc. URSS conservatur.

Ab *J. castaneo* Sm. et *J. tricipiti* Rostk. quibus proximus, differt a primo — dimensione colorationeque, inflorescentia valde ramosa 5—12 (nec 1—3)-capitata, tepalis omnibus (nec tantum externis) acutis, capsula longiore apice acutata, a secundo — floribus minoribus (4—5 nec 6—8 mm lg.), tepalis aequilongis aut dimensione colorationeque.

96. **J. gracillimus** (Buch.) V. Krecz. et Gontsch. sp. nova. — *J. compressus* var. *gracillimus* Buch. in Engl. Pflzr. IV, 36 (1906) 112. — *J. compressus*

Kom. Fl. Mandsh. I (1901) 427; Kom. et Alis. Key pl. East. reg. USSR I (1931) 344, non Jacq.

Planta perennis virescens, rhizomate repente lignoso caespitoso, culmis compresso-teretibus, rectis (30) 50—70 cm altis 2—3-foliatis, foliis linearibus canaliculatis vix 1 mm latis elongatis apice subito acutatis fere obtusis, vaginis breviter rotundato-auriculatis, basalibus subaphyllis acuminem ca 3 mm longum gerentibus. Inflorescentia oblongo-paniculata effusa 10—15 cm longa, ramis elongatis gracilibus apice ramulosis rectis vel subnutantibus, phyllo imo gracili inflorescentiam superante, floribus 2 mm longis remotiusculis prope apicem ramulorum dispositis, bracteis apice membranaceis rotundatis vix 1 mm longis. Tepala rotundato-obtusa convexa aequalia virescenti-brunnea dorso viridia margine hyalina, externa lanceolato-elliptica late hyalino-marginata, staminibus 1—1.5 mm longis, antheris oblongo-linearibus filamentis aequilongis. Capsula ovata 2.8—3 mm longa castaneo-brunnea nitida apice in rostrum breve subabrupte contracta, seminibus ovatis circiter 0.3 mm longis ferrugineis.

In pratis humidis salsuginosis ad vias littoraque arenosa Orientis Extremi URSS, Mandschuriae, Chinae boreali-orientalis, Koreae et Japoniae.

Typus: „Oriens Extrem. URSS. Peninsula Muravjovi-Amurensis, ad marem in viciniis oppidi Vladivostok prope stationem viae ferreae Okeanskaja, n° 696, 10 VIII 1929, V. A. Transchel leg.—in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Ab *J. compresso* Jacq., cui consanguineus, inflorescentia dispersa, ramis longissimis tenuioribusque et capsula ovata apice acutata (nec rotundato-trigona et apice fere convexa) imprimis differt.

97. **J. heptopotamicus** V. Krecz. et Gontsch. sp. nova. — *J. bulbosus* var. *salsuginosus* Rgl. in Bull. Soc. Nat. Mosc. XVI, 4 (1868) 272. — *J. bulbosus* var. *nigricans* Rgl., l. c., ex p. — *J. Gerardi* var. *salsuginosus* Buch. in Engl. Pflzr. IV, 36 (1906) 113, ex p.

Planta perennis cinereo-viridis, rhizomate repente, culmis rectis teretibus 10—30 (40) cm altis, foliis canaliculatis appianatis 1—1.3 mm latis apice subobtusatis, vaginis vix auriculatis basi aphyllis fuscescentibus. Inflorescentia subcymoso-congesta, ramis 2—5 brevibus divaricatisque, phyllo recto inflorescentiam aequilongo vel superante, floribus 3.5—4 mm longis in fasciculis 2—5-floris ad apicem ramorum congestis, bracteis ferrugineo-fuscis ca 1.5 mm longis rotundis margine hyalinis. Tepala oblongo vel lanceolato-elliptica rotundato-obtusa aequalia dorso late carinata virescenti-infuscata ad margines late purpureo-fusca fere non membranacea, staminibus circiter 2 mm longis, antheris filamentum 3—4-plo superantibus. Capsula oblongo-ovata vel oblongo-elliptica 4—5 mm longa atrofusca apice rotundata et rostrata perigonium valde superans, seminibus 0.5 mm longis ovatis ferrugineis.

In salsis et subsalsis Soongoriae heptopotamicae et sinicae nec non Tian-Schan orientalis.

Typus: „Soongoria, distr. Dsharkent, in loco Kara-Saz, n° 2123, 8 VII 1910 (fr. mat.) atque ibid., non procul fonticulos Arassan, n° 1428, 22 VI 1910 (pl. flor.) A. I. Michelson leg. — in Herb. Inst. Bot. Ac. Sc URSS conservatur.

Ab *J. atrofusco* Rupr., cui proximus, inflorescentia compacta fasciculifera et capsula majore perigonium valde superante aut ab *J. salsuginoso* Turcz. cui, in statu florenti simillimo, differe tepalis obtusis aequalibus (nec acutis inaequalibusque) et capsula longiore.

98. **J. jaxarticus** V. Krecz. et Gontsch. sp. nova. — *J. Gerardi* auct. fl. turk., non Lois., ex p.

Planta perennis cinereo-viridis, rhizomate repente caespitoso, culmis rigidis rectis 30—60 cm altis unifoliatis, foliis applanato-canaliculatis ad 2 mm latis subito acutatis, vaginis basalibus fuscescentibus subfibrillosis. Inflorescentia oblongo-paniculata, ramulis inaequalibus erectis, floribus 4 mm longis ad apicem ramulorum remotis interdum fasciculatim congestis, phyllo brevi, bracteis membranaceis pallidis ovatis acutis 1.5 mm longis. Tepala late lanceolata vel lanceolata acuta late virescentia tardius straminea ad margines apicemque anguste ferruginea marginibus hyalina interna — breviora minime acuta, staminibus ca 2 mm lg., antheris filamentos 3—4-plo superantibus. Capsula obovata 3.5 mm longa virescenti-brunnea in rostrum breve subabrupte contracta perigonio brevior, seminibus ovatis circiter 0.5 mm longis ferrugineis.

In salsis Asiae Mediae pedemontanae boreali-occidentalis.

Typus: „Fergana, distr. Marghelan, in salsis humidis septentrionem versus a can. Chan-aryk, n° 544, 14 V 1913, N. Dessiatowa leg. — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Ab *J. Gerardi* Lois., quo cum mixtus est, bracteis tepalisque acutis, argenteo-virescentibus atque capsula perigonio brevior, floribus majoribus bene differt.

99. **J. Turczaninowii** (Buch.) V. Krecz. sp. nova. — *J. lampocarpus* var. *Turczaninowii* Buch. in Bot. Jahrb. XII (1890) 378 et in Engl. Pflzr. IV, 36 (1906) 219. — *J. virens* V. Krecz. in Fl. Transb. II (1931) 142, non Buch., ex p. — *J. lampocarpus* Kom. et Alis. Key pl. East. reg. URSS I (1931) 353, non Ehrh., ex p.

Planta perennis virescens, rhizomate breviter repente, culmis teretibus striatis 20—50 cm altis, foliis \pm mollibus applanato teretibus inconspicue articulatis basi laeviter rotundato-auriculatis. Inflorescentia umbellata composita, ramis numerosis subcompactis, phyllo brevi floribus 2—2.5 mm longis in fasciculis haemisphaericis 6—9-floris ad apicem et ad basin ramorum congestis, bracteis ovatis, acutis. Tepala aequalia lanceolata acuta (interna — acutiuscula) virescentia vix fuscescenti- et hyalino-marginata, staminibus

1.5 mm longis, antheris oblongo-ellipticis, filametis duplo brevioribus. Capsula oblongo-elliptica 2.8—3 mm longa infuscata nitida rostrata perianthium paullulum superans, seminibus ca 0.4 mm longis ovatis.

In paludosis et locis humidis Dahuriae, Mongoliae, Mandshuriae et Orientis Extremi URSS.

Typus: „In humidis Dahuriae nerczinensis, 1831, Turczaninow“, in herb. Ledebouri et Meyeri (sub nom *J. lampocarpus* var. *Turczaninowii* Buch. teste) in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Ab *J. lampocarpo* Ehrh., cui consanguineus, omnibus tepalis semper acutis, floribus minoribus (2—2.3 nec 2.5—3 mm longis), capsula brevior (2.8—3 nec 3.5—4 mm longa), perianthio paullulo (nec $1\frac{1}{2}$ -plo) longiore, foliis obsolete septatis minime auriculatis differt.

100. **J. Nevskii** V. Krecz. et Gontsch. sp. nova. — *J. maritimus* B. Fedtsch. Ракт. Түрк. (1915) 213, non Lam.

Planta perennis glaucescenti-viridis, rhizomate obliquo dense caespitoso, culmis cumulatis rigidis sulcatis subnitentibus ad 2 mm crassis 50—90 cm altis, basi vaginis testaceo-fuscis subnitentibus aphyllis vestitis, foliis cylindricis rigidis acutis culmo brevioribus. Inflorescentia secunda racemoso-paniculata subcompacta 5—10 cm longa, ramis erectis apice subramulosis, phyllo recto inflorescentiam vix subaequante, floribus 2.5—3 mm longis solitariis vel geminis (trinis), bracteis late lanceolatis acutis 2.5—3 mm longis carinatis. Tepala inaequalia stramineo-flava superne subferruginea subcarinata margine membranacea externa — acuta interna — breviora obtusiuscula, staminibus 1.8 mm longis, antheris atris, filamenta subsuperantibus. Capsula oblongoconico-ovata 3.2—4 mm longa virescenti-fuscescens nitida acutata et rostrata perianthium superans, seminibus 0.8 mm longis infuscatis oblongis subincurvis appendiculis brevibus inaequilongis instructis.

In demissis humidis subsalsis Turcomaniae et Tadshikiae (Buchara olim) Asiae Mediae.

Typus: „Turcomania, ad fonticulum Kara-su prope pag. Kughitang, 12 VII 1031, n° 763, S. A. Nevski leg. — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Ab *J. maritimo* Lam., quo cum mixtus est, rhizomate cumulatum (nec seriatim) caespitoso denso (nec repente), inflorescentia constricta (nec diffusa), capsula oblongo-conica perianthium superanti (nec ovata perianthio subaequilonga) aut oecologia alia bene differt.

101. **J. brachytepala** (Trautv.) V. Krecz. et Gontsch. sp. nova. — *J. glaucus* auct. fl. turk., pro max. p.; Buch. in Engl. Pflzr. IV, 36 (1906) 153. — *J. glaucus* var. *brachytepala* Trautv. in herb.

Planta perennis cinereo-viridis, rhizomate repente dense caespitoso, culmis teretibus laeviter compressis 50—90 cm altis basi usque ad 1 cm incrassatis, vaginis dilatatis testaceo-rubris vel aurantiacis subnitidis aphyllis

vestitis. Inflorescentia secunda subdensa paniculata 5—7 cm longa, phyllo abbreviato apice rigido pungenti, floribus 3 mm longis congestis, bracteis membranaceis ovatis acutis ca 1 mm longis. Tepala lanceolata acuta viridia tardius straminea \pm membranaceo-marginata subaequalia, staminibus 1.5 mm longis, antheris filamentis aequilongis. Capsula elliptica 4 mm longa, fuscescens vel subferruginea breviter rostrata perianthium superans, seminibus ovatis 0.3—0.4 mm longis.

In locis humidis subsalsis Soongoriae et Asiae Mediae montanae (Affghania inclus.).

Typus: „Songoria. — In Kentau, 3 IX 1843, Al. Schrenk leg., n° 58 herb. Trautvetteri (sub nom. *J. glaucus* var. *brachytepala* et *brachyspatha* Trautv. teste) in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Ab *J. inflexo* L. (*J. glauco* Ehrh.), cui consanguineus, vaginis basalibus aurantiaco-rubris (nec purpureis), culmis basi duplo-triplo crassioribus, capsula perianthio valde longioribus differt.

LUZULA DC.

102. ***L. sibirica*** V. Krecz. in Fl. transb. II (1931) 144. — *L. campestris* var. *alpina* Ldb. Fl. Alt. II (1830) 45; Kryl. Фл. Алтая VI (1912) 1400. — *L. multiflora* ssp. *asiatica* Kryl. et Serg. in Kryl. Fl. Sib. Occ. III (1929) 556 (incl. var. et ff.). — *L. campestris* Turcz. in Bull. Soc. Nat. Moscou XXVIII (1855) 300, non DC.

Planta perennis caespitosa virescens vel erubescenti-virescens estolonifera, culmis rectis 10—40 cm altis foliatis, foliis planis crassiusculis 1.5—2.5 mm latis, pilosiusculis basi demotis. Inflorescentia contracta subumbellata vel subcapitata et capitata glomerulos 3—10 sphaericos vel ovales 5—12-floros gerens, phyllo inflorescentiam superante, floribus 2.3—2.8 mm longis. Tepala subaequilonga lanceolata ferrugineo-rubra (fulva) vel castaneo-purpurea ad margines apicemque aureo- et albido-hyalina, exteriora—acutiora, staminibus 1.4—1.5 mm longis, antheris filamentis subaequilongis. Capsula late ovata fulva acutata perianthio brevior (raro subaequilonga), seminibus 1.2—1.3 mm longis oblongo-ovatis appendiculo 0.2—0.3 mm longo.

In alpinis Sibiriae, Mongoliae et Orientis Extremi URSS.

Typus: „M. Sajanenses, reg. Kitoi, hibernacula sojotica ad fontes fl. Osna, n° 494, 11 VII 1873, Czernski et Hartung leg. — in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

A *L. multiflora* Lej., cui proxima, habitu humiliore, inflorescentia compacta pauciglomerata, foliis crassiusculis, floribus aureo-fulvis vel castaneo-purpureis, antheris filamentis aequilongis, capsula perianthio subaequilonga differt.

Explanatory List of the Major Russian References

Fedtsch. Rast. Turk.	Fedtschenko, The Plants of Turkestan
Fl. Turkm.	The Flora of Turkmenistan
Grossh. Fl. Kavk.	Grossheim, Flora of the Caucasus
Kom. Fl. Kamch.	Komarov, Flora of Kamchatka
Kom. Fl. Manchzh.	Komarov, Flora of Manchuria
Kom. and Alis. Opred. rast. Dal'nevost. Kr.	Komarov and Alisov, Key to the Plants of the Far Eastern Region
Kryl. Fl. Zap. Sib.	Krylov, Flora of Western Siberia
Maevsk. Fl. Sr. Ross.	Maevskii, Flora of Central Russia
Opred. rast. okr. Tashk.	Key to the Plants of the Tashkent District
Schmalh. Fl. Yu.-Z. Ross.	Schmalhausen, Flora of South-Western Russia
Syreish. Ill. Fl. Mosk. gub.	Syreishuk, Illustrated Flora of the Moscow Province

Explanatory List of Geographical Names Mostly Abbreviated in This Text

- Alt. — Altai
 Amer. — America
 Amu-Dar. — Amu-Dar'ya
 Anad. — Anadyr'
 Ang. -Sayan. — Angara-Sayans,
 Aral. -Casp. — Aralo-Caspian region
 Asia, Trop. Subtrop. Centr. North.
 South. East. West.
 As. Min. — Asia Minor
 Atl. — Atlantic
 Austral. — Australia
 Balk. -As. Min. — Balkans-Asia Minor
 Batum. — Batumi
 Casp. — Caspian
 Cauc. — Caucasus, North. South.
 East. West. Centr.
 Ciscauc. — Ciscaucasia, North. South.
 East. West. Centr.
 Chuk. — Chukot coast
 Crimea, North. South. East. West.
 Centr.
 Dag. — Dagestan
 Daur. — Dauria
 Dnep. — Dnieper; Upp. Dnep. , Low.
 Dnep. , Mid. Dnep.
 Don — Don; Upp. -Don. Low. -Don,
 Mid. -Don
 Dv. Pech. — Dvina-Pechora [region]
 Dzhung. -Kashg. — Dzungaria-
 Kashgaria
 Dzhung. -Tarb. — Dzungaria-
 Tarbagatai
 Eur. — Europe. Centr. , South. , East. ,
 North. , West. , Atl. , Arct.
 Gr. Cauc. — Greater Caucasus
 Himal. — Himalayas
 Ind.-Him. — India-Himalayas
 Irt. — Irtysh
 Jap.-Chin. — Japan-China
 Kamch. — Kamchatka
 Kar. -Lap. — Karelia-Lapland
 Kop. -Dag. — Kopet-Dagh
 Kyz. -Kum. — Kyzyl-Kum
 Lad. -Il'm. — Ladoga-Il'men'
 Laz. — Lazistan
 Len. -Kol. — Lena-Kolyma region
 Medit. — Mediterranean; East. North
 South. East. Centr.
 Mong. — Mongolia
 Nov. Zem. — Novaya Zemlya
 Ob. — Ob' region
 Okhot. — Okhotsk
 Pam. -Al. — Pamir-Alai
 Pribalkh. — Pribalkhashskii Raion
 [Lake Balkhash region]
 Prichern. — Prichernomorskii Raion
 [Black Sea Region]
 Sakh. — Sakhalin
 Scand. — Scandinavia
 Siberia, East. , West. , South. ,
 North. , Centr.
 Syr-Dar. — Syr-Dar'ya
 Tal. — Talysh
 Tob. — Tobol, Upp. , Mid. , Low.
 Transcauc. — Transcaucasus
 Turk. Arm. — Turkish Armenia
 Turk. Laz. — Turkish Lazistan
 Turkes. — Turkestan
 Turkm. — Turkmenia
 Tyan'-Shan. — Tien Shan
 Ud. — Uda region
 Ussur. — Ussuri
 Volg. — Volga
 Volg. -Don — Volga-Don
 Volg. -Kam. — Volga-Kama
 Yenisei. — Yenisei
 Zabaikal'e — Transbaikalia [Trans-
 baikal region]
 Zavolz. — Zavolzskii Raion
 [Trans-Volga region]
 Ze. -Bur. — Zeya-Bureya

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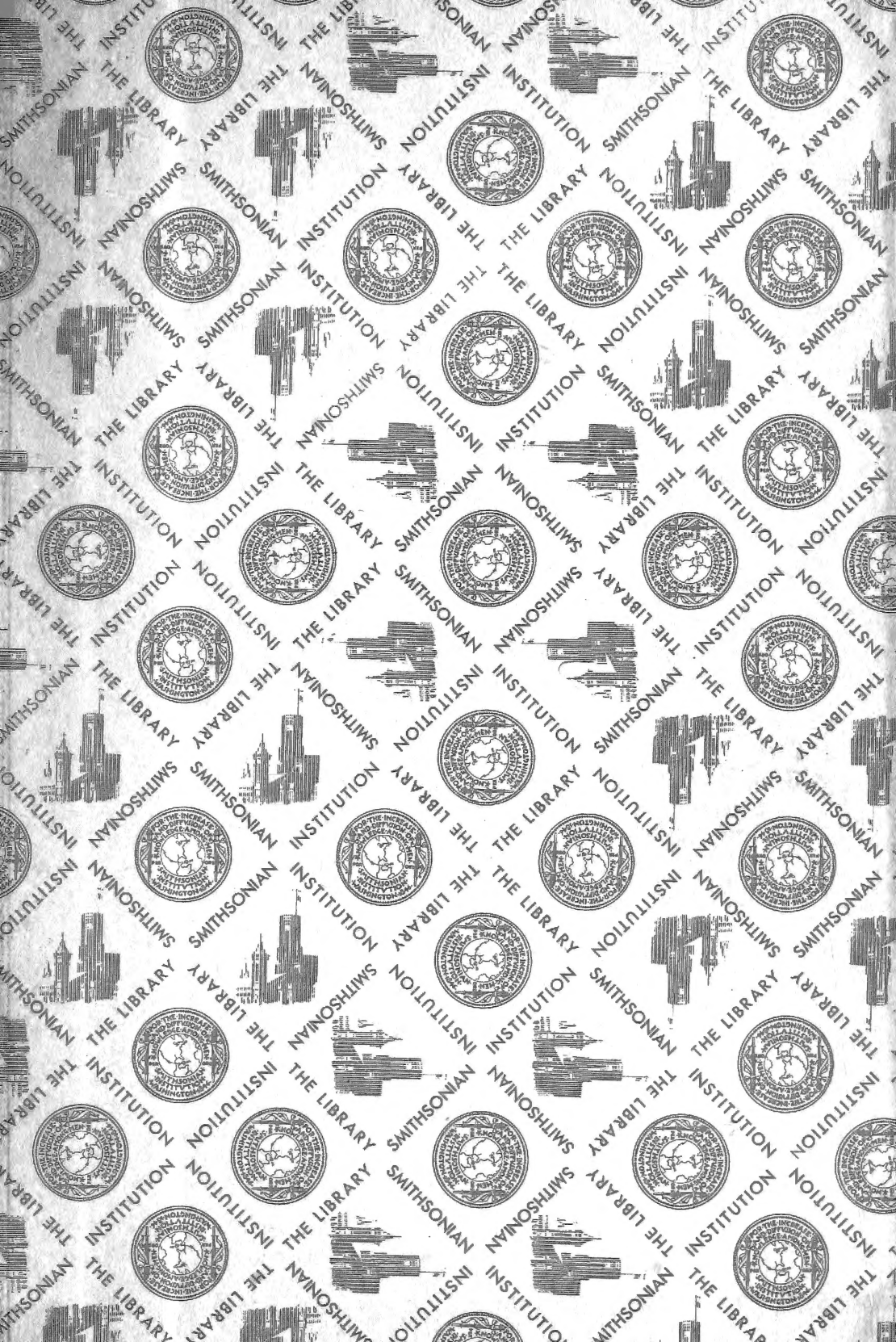
* [These page numbers appear in the left-hand margin of the translation.]

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