





FLORA ARCTICA

CONTAINING DESCRIPTIONS OF
THE FLOWERING PLANTS AND FERNS,
FOUND IN THE ARCTIC REGIONS, WITH THEIR
DISTRIBUTION IN THESE COUNTRIES,

ILLUSTRATED BY NUMEROUS FIGURES IN THE TEXT,

EDITED BY

C. H. OSTENFELD,

INSPECTOR AT THE BOTANICAL MUSEUM OF THE UNIVERSITY OF COPENHAGEN.

PART I.

PTERIDOPHYTA, GYMNOSPERMAE AND MONOCOTYLEDONES,

BY

O. GELERT AND C. H. OSTENFELD.

PUBLISHED BY THE CARLSBERG' FUND.



COPENHAGEN.

DET NORDISKE FORLAG.

BOGFORLAGET ERNST BOJESEN.

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PREFACE.

In the year 1896 Prof. Warming invited the late Mr. O. Gelert to make a revision of the flowering plants and ferns of the Arctic regions, as the many scattered lists and treatises, in which each author used his own nomenclature, made the study of them very troublesome. The knowledge of the Arctic regions was, by that time, so far advanced, that, among the flowering plants and ferns, no considerable additions to the flora, with regard to still unknown species, might be expected. — On that account it would be appropriate to collect all the scattered statements in one work, trying at the same time, if feasible, to revise the statements in such manner, that a flora of this kind might be a reliable proof of those species which were known in the Arctic territory, and of their distribution there. — The Copenhagen-University-Botanic-Museum was, on account of its rich Arctic collections, especially from Greenland, well adapted to form the basis of a critical revision.

To form an idea how great and extensive such a work might prove, Mr. Gelert made a revision of the genus *Draba* and other *Cruciferae*, the result of which was his treatise »Notes on Arctic Plants, I¹. Then he desired me to co-operate with him, a desire with which I complied with pleasure. Through the liberal aid of the Carlsbergfund, during several years, we were enabled to spend a great deal of our time on this revision. Mr. Gelert especially took up the work indefatigably, until overcome by his malady. He suffered from phthisis, and on March 10th, 1899, he died, 37 years old. So I was left alone with the work, of which, however Mr. Gelert

¹ *Botanisk Tidsskrift*, vol. 21, 1898, Kjøbenhavn.

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had done a considerable part, so that half of Part I. published here, is due to his pen, his MS. having had in some measure to be looked over. In him I lost a dear friend and a clever co-operator. Partly on account of his death and partly because of my time being but very limited to work at the Arctic flora in the following years, Part I. has not been published earlier.

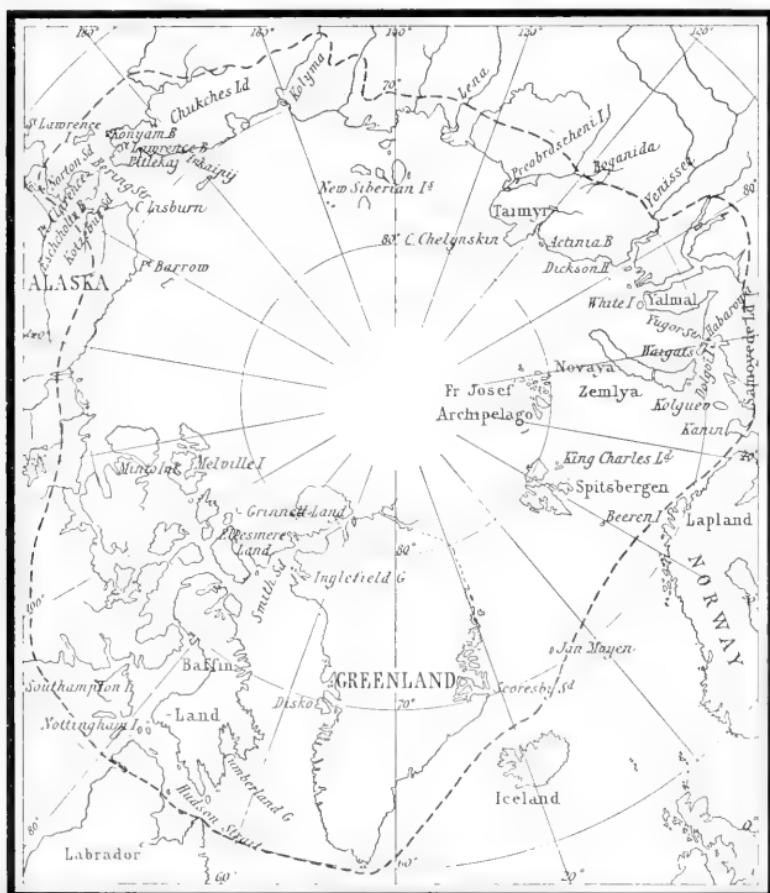
My late friend and I are under great obligations to Prof. Warming, for it was his proposal to start this work, and it was he who placed the collections of the Copenhagen-University-Botanic-Museum at our disposal, and through whose influence we obtained the aid of the Carlsbergfund. To the direction of this fund we tender our cordial thanks for its readiness in rendering us help. Further we offer our thanks to the directors of the various museums from which we have borrowed herbarium specimens for our researches, viz. Prof. V. Wittrock of Stockholm, Prof. N. Wille of Kristiania, Prof. A. Fischer v. Waldheim of St. Petersbourg, Prof. A. Engler of Berlin and Dr. O. Nordstedt of Lund (Sweden).

Further I owe many thanks to Mr. A. Bennett, Croydon, for the revision of MS., to Mr. H. Fisher, Knaresborough, and Mr. Ove Paulsen, Copenhagen, for assisting in proof-reading, as well as to Mr. C. B. Clarke for his valuable informations about the *Cyperaceae*.

I trust the little book will be of benefit to the many who study the plants of the Arctic regions, and that it may be as reliable and accurate as possible, though doubtless there are list of Arctic plants which have not come under my notice. I shall be much obliged for the pointing out of such short-comings, as well as for the sending of treatises, available for the composition of Part II.

Though any botanist, whether English or versed in English, at a glance will see that this work is written by foreigners, I trust the language to be sufficiently comprehensible to convey the use of the work.

The territory, the plants of which are treated in this book, is the Arctic tract of land proper, viz. the regions north of the wood-boundary. — However, as it is not always easy to prove whether or not a certain point is north of the wood-boundary, and as practical



Map of the Arctic regions, showing the limit of the treated area.

considerations must be taken at the same time as to the limitation, we have not minutely followed the line, which is, as a rule, stated on maps as the wood-boundary. The accompanying map will approximately show the boundary which we have followed. As to some of the most important deviations, it may be stated, that the whole of

Greenland is treated, whereas Iceland, in reality belonging to the northern Pine-wood-Region, is omitted. Further, the Scandinavian-Peninsula is entirely left out, though its utmost northern part may looked upon as Arctic.

The localities in the territory in which each species is found, are enumerated. The starting point is the Behring Strait, thence going eastward. A (!) after the locality, states that we have seen specimens from the spot; the other statements rest on literature. Further is stated, under each species, all the lists from the Arctic territory in which it is mentioned, giving the name of it, used there, in such a way though, that where a collective survey is found, e. g. such as *J. Lange: Conspectus Floraæ Groenlandicæ* or *A. G. Nathorst: Spetsbergens kärlväxter*, the preceding lists are not set down, if no particular reasons have necessitated it. The synonyms are only mentioned if they are of particular Arctic interest, and as to the commonly used specific names, the name of the author is added without reference to place or time of publication. The European authors are principally adhered to in nomenclature.

The time for growth and blossoming is not given, as the knowledge of it is too limited.

The name of the author of the revision is attached to each order, so that the sole responsibility rests on him. Nevertheless, after Mr. Gélert's death I have added several localities, taken from lists published after that time, and in one instance (*Calamagrostis hyperborea* Dusén) I have made a correction, while I have changed nothing else, even if I cannot agree with him, e. g. in his view of *Phippsia*'s and *Catabrosa*'s distinction as two genera far removed from each other.

The bulk of figures of the habit is drawn by Mrs. I. Raunkiær, a few by Mr. Thornam, while analyses are by the author.

The consulted works are almost all quoted in an abridged, though easily intelligible form. A bibliography of all the abridgements is given on the following pages.

Copenhagen, May 30th, 1902.

THE EDITOR.

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CLASS I.

PTERIDOPHYTA.

Cryptogamic plants with stems, leaves and roots containing vascular tissues. Spores develop into small, mostly flat green prothallia, which bear archegonia and antheridia.

- A. Stems short, unbranched; fronds large, well-developed, with sporangia on the back or margins.
 - 1. Fronds not circinate in vernation. Sporangia formed of many epidermis-cells, regularly 2-valved, borne on a separate part of the frond. Prothallium subterranean, tuberous, monoecious I. OPHIOGLOSSACEAE.
 - 2. Fronds circinate in vernation, mostly pinnate. Sporangia formed of one epidermis-cell, borne in clusters on the back or margins of the frond, provided with an elastic ring, opening transversally. Prothallium flat green, monoecious II. POLYPODIACEAE.
- B. Stems erect, hollow, jointed, mostly with numerous verticillate branches; leaves reduced to toothed sheaths at the joints. Sporangia borne beneath shield-shaped leaves, which form a terminal spike. Prothallium flat, very small, dioecious III. EQUISETACEAE.
- C. Stems creeping, branched; leaves small, simple, crowded or in ranks. Sporangia solitary in the axils of the leaves.
 - 1. Spores uniform. Prothallium subterranean, tuberous. IV. LYCOPIDIACEAE.
 - 2. Spores partly macrospores, partly microspores. Prothallium minute, few-cellular V. SELAGINELLACEAE.
- D. Stem a fleshy corm with long, subulate leaves; the spore-bearing leaves with sporangia in the dilated bases. Macrospores and microspores. Prothallium minute, few-cellular VI. ISOÉTACEAE.

Order I. OPHIOGLOSSACEAE R. Br. (By O. GELERT).

Only the following genus in the area:

1. BOTRYCHIUM Sw.

Frond consisting of a sterile foliaceous and a fertile spicate part, both more or less pinnate.

- 1. Sterile part of the frond sessile or short stalked, attached at or above the middle of the stalk.

A. Fertile part of the frond long stalked exceeding the sterile part . . . B. *Lunaria*.

- B. Fertile part of the frond short-stalked not exceeding the sterile part.
 a. Lower pinna of the sterile part of the frond broad ovate or cordate
 B. boreale.
 b. Lower pinna of the sterile part of the frond lanceolate *B. lanceolatum*
 2. Sterile part of the frond stalked, attached below the middle of the stalk
 B. simplex.

1. *B. Lunaria* (L.) Sw.

Lge. Consp. Fl. Groenl. p. 190; Ledeb. Fl. Ross. IV, p. 504; Fl. D. t. 18, fig. 2.

Sterile part of the frond sessile or short stalked, in circumference oblong, round at the top, pinnate with 7—15 fan-shaped, entire or sometimes notched pinnae. Fertile part long-stalked, stalk about as long as the sterile part, bipinnate.

Am.: West Greenl. 60° — $69^{\circ} 15'$ (!). East Greenl. 63° — 70° (!). Eur.: Samoyede Land.

Geogr. area: Northern North America, Iceland, Færöes, Europe, Northern and Western Asia, Patagonia, Southeast Australia, Tasmania.

2. *B. boreale* Milde in Nova Acta Acad. Caes. Leop. Carol., XXVI, P. II, p. 672 t. 51 f. 175—177.

B. Lunaria β *divisum* Lge. Consp. Fl. Groenl. p. 190; *B. Lunaria* $v.$ *subincisa* et *v. incisa* Rosenv. Till. p. 740; *B. crassinervium* Rupr. in Milde l. c. p. 763; F. D. Suppl. t. 113.

Sterile part of the frond sessile, in circumference broad ovate-cordate, subacute, pinnate, with 5—9 semi-acute lobed pinnae. Lower pinnae oblique cordate or broadly ovate, generally as broad as long. Fertile part short stalked, stalk not exceeding the sterile part, bipinnate.

Am.: West Greenl. 60° — 61° (!). East Greenl. $61^{\circ} 4'$ (!).

Geogr. area: Unalashka, Norway, Finland, Russian Lapland, Siberia.

3. *B. lanceolatum* (Gmel.) Ångstr.

Milde l. c. p. 674 t. 51 f. 178—181; Fl. D. t. 2922 f. 2; Lge. Consp. Fl. Groenl. p. 190.

Sterile part of the frond sessile, in circumference ovate-triangular, acute, pinnate, with 5—9 lanceolate, lobed, acute pinnae. Fertile part very short stalked, stalk not exceeding the sterile part, bipinnate.



Fig. 1. *Botrychium Lunaria* (L.) Sw.; $\frac{3}{4}$ nat. size. Spec. from West Greenland.

Am.: West Greenl. 60° – 63° (1).

Geogr. area: Unalashka, Northern North America, Iceland, Norway, Sweden, Finland, Northern Russia, The Alps, Saghalin.

4. *B. simplex* Hitchcock.

Milde I.c. p. 664 t. 49, 50.

Sterile part of the frond stalked, in circumference ovate, rounded at the top, attached on the lower part of the stalk, simple or pin-



Fig. 2. *Botrychium boreale* Milde; $\frac{3}{4}$ nat. size. Spec. from West Greenland.

Fig. 3. *Botrychium lanceolatum* (Gmel.) Angstr. $\frac{3}{4}$ nat. size. Spec. from West Greenland.

Fig. 1. *Botrychium simplex* Hitchc.; $\frac{3}{4}$ nat. size. (Spec. to the left hand after Milde, this to the right from West Greenland.)

nate with a few oblique, rhomboidal or obovate stalked pinnae. Fertile part of the frond longstalked, stalk exceeding the sterile part, simple, pinnate or bipinnate.

Only one specimen, collected by J. Vahl in West Greenl. $60^{\circ} 5'$ (sinus Tasermiut, Aug. 1829), in the herbarium of the Botanical Museum at Copenhagen (1).

Geogr. area. North America, Scandinavia, Denmark, Germany, Livonia, Northern Russia, The Alps.

Order II. POLYPODIACEAE R. Br. (By O. GELERT).

- a. Clusters nearly circular without an indusium.
 - 1. Fronds long stalked, nearly triangular in circumference **Aspidium Sect. Phegopteris.**
 - 2. Fronds short stalked, lanceolate in circumference **Athyrium alpestre.**
- b. Clusters with a distinct indusium.
 - 1. Clusters linear or oblong **Asplenium.**
 - 2. Clusters nearly circular.
 - a.* Indusium attached over the cluster, circular or reniform **Aspidium Sect. Lastrea** and **Sect. Hypopeltis.**
 - b.* Indusium attached under the cluster, unilateral **Cystopteris.**
 - c.* Indusium attached under the cluster, divided in capillary segments. **Woodsia.**

1. ATHYRIUM Roth.

5. A. *alpestre* (Hoppe) Ryland.

Aschers. & Gräbner Syn. I p. 13; Lge. Conspl. Fl. Groenl. p. 305; Polypodium alpestre Hoppe, Lge. I. c. p. 186; P. rhæticum (L. p. pt.) Vill. Fl. D. t. 2607.

Fronds dark green, 2—3 pinnate, lanceolate in circumference, with short stalks having brown scales. Clusters at last circular, indusium rudimentary. Rhizome thick, ascending. Fronds about 30 cm. long. Much like A. *Filix foemina*, but separated by more obtuse pinnae, circular clusters without conspicuous indusium.

A m.: W. Greenl. 60° (!), East Greenl. 60° — 61° (!).

Geogr. area: British Columbia?, Iceland, Scotland, Scandinavia, Russian Lapland, Pyrenees, Central European Mountains, The Alps, Caucasus, Asia Minor.

2. ASPIDIUM Sw.

Sect. I. **Phegopteris** Fée. Without indusium.

6. A. *Dryopteris* (L.) Baumg.

Aschers. & Gräbner Syn. I pr. 21. Polypodium Dryopteris L., Lge. Conspl. Fl. Groenl. p. 185. Fl. D. t. 1943.

Rhizome thin and creeping. Fronds long stalked, glabrous, ternate, divisions pinnate, pinnae pinnatifid, clusters near the margin.

A m.: West. Greenl. 60° — $69^{\circ} 15'$ (!). East Greenl. 60° — 63° (!).

Geogr. area. North America, Iceland, Færöes, Europe, Asia Minor, Northern Asia, Northwestern Himalaya.

7. A. *Phegopteris* (L.) Baumg.

Aschers. & Gräbner, Syn. I p. 23; Polypodium Phegopteris L., Lge. Conspl. Fl. Groenl. p. 185. Fl. D. t. 1241.

Rhizome creeping. Fronds long stalked, hairy, in circumference oblong-triangular, pinnate, pinnae pinnatifid. Lower pair of pinnae deflexed. Clusters near the margin.

A m.: West. Greenl. 60° — $65^{\circ} 40'$ (!), East Greenl. 60° — 63° (!).

Geogr. area: North America, Iceland, Færöes, Europe, Asia Minor, Caucasus, Northern Asia, Northwestern Himalaya.

Sect. II. *Lastrea* Bory. Indusium reniform.

8. A. fragrans (L.) Sw.

Hook. Fl. Bor. Am. II p. 261; Trautv. Fl. Terr. Tschuktsch. p. 40; Peary, Auxil. Exped. App. C. p. 8; Macoun, Catalogue V p. 276; Ambrohn, Cumberland Gulf p. 97; *Polyodium fragrans* L.; *Lastrea fragrans* Presl.; Lge. Consp. Fl. Groenl. p. 186; *Polystichum fragrans* Ledeb. Fl. Ross. IV p. 514; *Aspidium rigidum* Fl. D. t. 2187.

Rhizome thick, ascending. Fronds numerous, densely tufted, in circumference lanceolate, short stalked, bipinnate, pinnulae ovate, obtuse, crenulate. Stalk and rachis densely clothed with brown scales. Clusters nearly covering the under side of the fronds, indusium fimbriated. The surface of the fronds is filled with small glands which produces a smell of Sweet Violet.

Am.: Kotzebue Sound, Arctic Coast and Islands, Hudson Strait, Baffin Land; Cumberland Gulf. West Greenl. $67^{\circ} 50'$ — $78^{\circ} 30'$ (!), East Greenl. 60° — $60^{\circ} 41'$ (!) and 70° (!). As: Taimyr Peninsula $73^{\circ} 30'$, Chukches Land (!).

Geogr. area: Northern North America, East Siberia, Kamchatka.

9. A. *Filix mas* (L.) Sw.

Lastrea Filix mas Presl., Lge. Consp. Fl. Groenl. p. 187. Fl. D. t. 2740.

Fronds short stalked, lanceolate, subbipinnate, with clusters in the upper part. Pinnæ declining in size at the base of the frond. Stalk and rachis more or less clothed with brown scales. Indusium entire.

Am.: West Greenl. 60° — 62° (!), East Greenland 60° (!).



Fig. 5. *Aspidium fragrans* (L.) Sw.; $\frac{3}{4}$ nat. size. Spec. from West Greenland.

Geogr. area: North America, South America until Peru, Iceland, Færöes, Europe, North Africa, Asia

10. **A. spinulosum** (Retz.) Sw. subsp. **dilatatum** (Sm.) Roeper.

Lastraea spinulosa β *intermedia* Lge. Consp. Fl. Groenl. p. 187. Fl. D. t. 3055.

Fronds long stalked, ovate or triangular, at the base 3-pinnate, generally with clusters also on the lower pinnae and with few or many short yellow glands on the underside. The inner and upper pinnula on the nethermost pinna smaller than the next following. Stalk almost as long as the frond, covered with brown scales, which are darkest in the middle. Indusium fimbriate.

Am.: Kotzebue Sound, West Greenl. 60° – $69^{\circ} 14'$ (⌚), East Greenl. 60° – $61^{\circ} 40'$ (⌚).

Geogr. area: North America, Iceland, Færöes, Europe, Asia Minor, Northern Asia.

Sect. III. **Hypopeltis** Michx. Indusium circular.

11. **A. Lonchitis** (L.) Sw.

Lge. Consp. Fl. Groenl. p. 186. Fl. D. t. 497.

Fronds linear-lanceolate, rigid, leathery, pinnate with clusters in the upper part. Pinnae serrate spinous, at the base auriculate above and oblique below. Rachis and underside of the fronds with numerous brown scales.

Am.: West Greenl. 60° – $69^{\circ} 14'$ (⌚), East Greenl. 60° – $65^{\circ} 35'$ (⌚).

Geogr. area: North America, Iceland, Færöes, Europe in the mountainous regions, Asia Minor, Caucasus, Siberia, Turkistan, Himalaya.

3. CYSTOPTERIS Bernh.

12. **C. fragilis** (L.) Bernh.

Hook. Coll. of Arct. Pl. p. 123; Hart. Brit. Pol. Exp. p. 142; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 86; Reichardt, Fl. Jan Mayen p. 10; Lge Consp. Fl. Groenl. p. 188, p. 306; Nath., Spetsb. Kärlv. p. 39; Trautv. Consp. Fl. Nov. Semlja p. 87, Fl. Kolym p. 574; Blytt, Bidrag p. 17; Ledeb. Fl. Ross. IV p. 516; Kurtz, Fl. d. Tschuktschenh. p. 482; Peary, Auxil. Exped. App. C. p. 8; Rothrock, Fl. of Alaska p. 460; Feilden, Nov. Zemlya p. 25.

Fronds longstalked, generally bipinnate, lanceolate, pinnae ovate to lanceolate. Stalk reddish-brown below, yellow above, generally with few thin scales. Indusium attached under the cluster, hooded at the base and with a long free point, at first covering the cluster.

Very variable, but the forms pass by numerous intermediate from one to the other. The more common forms are f. *dentata* Hook: fronds pinnate, pinnae pinnatifid; f. *anthriscifolia* Koch: fronds bipinnate to tripinnate, pinnae and pinnulae acute; f. *cynapiifolia* Koch: as f. *anthriscifolia* but pinnae and pinnulae obtuse.

The var. *arctica* Kuhn is only a dwarf form of *f. dentata*, fronds being c. 5 cm. high; the var. *tenuis* Lge Consp., *regularis* et *lingueformis* A. C. Schultz in Lge Consp. belong to the most common form: *dentata* Hook.

Am.: Kotzebue Sound, Minto Inlet, Baffin Land, Grinnell Land to $81^{\circ} 44'$, West Greenl. 60° — $78^{\circ} 30'$ (1), East Greenl. 60° — $74^{\circ} 45'$ (1). Eur.: Jan Mayen, Spitsbergen, Novaya Zemlya to 74° , Waigats. As.: mouth of the Kolyma, Chukches Land.

Geogr. area: North, Central and South America, Iceland, Færöes, Europe, North Africa, Northern Asia, Kerguelen Island, Tasmania, New Zealand.

4. *WOODSIA* R. Br.

13. *W. ilvensis* (L.) R. Br., enlarged.

Rhizome short and densely branched, fronds compact cespitose. Fronds at last articulate at a node on the stipes below the middle, so that the rhizome becomes densely covered with stalk remains. Fronds pinnate, pinnae pinnatifid or lobed. Stalk, rachis and underside more or less covered with scales and long hairs, seldom glabrous, on the upper side hairy or glabrous. Indusium attached under the cluster, divided into numerous capillary segments. Stalk reddish-brown or straw-colored.

α, rufidula (Michx.) Koch.

W. ilvensis (L.) R. Br.; Taylor Pl. coll. at Davis Str. and Baff. Bay p. 86; Lge. Consp. Fl. Groenl. p. 188; Kurtz, Flora d. Tschuktsch. p. 482. Fl. D. t. 2186.

Fronds pinnate, pinnae pinnatifid, oblong or ovate. Frond and stalk densely covered with scales and long hairs, about 15 cm. high.

β, alpina (Bolton) Aschers. & Gräbner, Syn. I p. 46.

W. hyperborea R. Br.; Hook. Fox Exped. p. 85; Hart, Brit. Pol. Exped. p. 142; Macoun, Catalogue V, p. 282; Lge. Consp. Fl. Groenl. p. 189; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 86. Fl. D. t. 2921 fig. 2.

Fronds pinnate, pinnae more or less lobed, triangular. Frond and stalk more or less hairy, about 10 cm. high.

γ, glabella (R. Br.) Trautv. Syll. Pl. Sib. bor. orient. p. 546.

W. glabella R. Br.; Taylor, Pl. coll. at Davis Str. & Baff.



Fig. 6. *Woodsia ilvensis* (L.) R. Br., α, *rufidula* Michx. Koch; $\frac{3}{4}$ nat. size. Spec. from West Greenland.



Fig. 7. *Woodsia ilvensis* (L.) R. Br., β, *alpina* (Bolton) Aschers.; $\frac{3}{4}$ nat. size. (Spec. from Iceland).

Bay p. 86; Hart, Brit. Pol. Exped. p. 143; Lge. Consp. Fl. Groenl. p. 189; Dusén, Ost-Grönl. p. 63; Nath., Spetsb. Kärlv. p. 39; Kurtz, Flora d. Tschuktschenh. p. 482. Fl. D. t. 2921, fig. 1.

Fronds pinnate, pinnae roundish, lobed. Stalk below with a few scales, frond and rachis glabrous, about 5 cm. high. Small forms occasionally look like *Asplenium viride*, but are easily recognisable by the node on the stipes.



Fig. 8. *Woodsia ilvensis* (L.), γ . *glaetula* (R. Br.) Trautv.; $\frac{2}{3}$ nat. size. (Spec from West Greenland).

Obs.: We have followed Trautvetter in combining these plants into one species, but we have chosen the oldest name *silvensis* for this instead of *hyperborea*. Numerous specimens in the Herbarium of the Botanical Museum at Copenhagen from Arctic localities have convinced us that they are connected by transition forms and that dwarf forms of α & β only differ from γ in the covering.

α , Am.: Baffin Land, West Greenl. $60^{\circ} - 72^{\circ} 48'$ (!), East Greenl. $60^{\circ} - 70^{\circ}$ (!). As.: Chukches Land.

β , Am.: Hudson Strait, Baffin Land, Port Kennedy 72° , Ellesmere Land $78^{\circ} 56'$, West Greenl. $60^{\circ} - 74^{\circ} 18'$ (!), East Greenl. $60^{\circ} - 73^{\circ} 20'$ (!).

γ , Am.: Baffin Land, Ellesmere Land $78^{\circ} 56'$, West Greenl. $67^{\circ} - 74^{\circ} 18'$ (!), East Greenl. $61^{\circ} 32'$ and $70^{\circ} - 74^{\circ} 45'$, Eur.: Spitsbergen (!). As.: Mouth of the Lena, Chukches Land.

Geogr. area: α , North America from Great Bear Lake, Hudson Bay and Rocky Mountains to the northern United States and Alleghanies, Iceland, Great Britain, Scandinavia, Finland, Northern Russia, Central European Mountains, The Alps, Asia Minor, Northern Asia. β , North America from the Arctic circle to the Northern United States, Iceland, Scandinavia, Great Britain, Central European Mountains, Pyrenees, The Alps, Northern Russia, Northern Asia. γ , North America from Great Bear Lake to the United States, North Scandinavia, Russian Lapland, The Alps.

5. ASPLENIUM L.

14. A. *viride* Huds.

Berlin Kärlv. fr. Grönl. p. 81; Lge. Consp. Fl. Groenl. p. 305; Rosenv. Till. p. 738. Fl. D. t. 1289.

Fronds linear pinnate, pinnae roundish or rhomboidal, crenate. Sori linear, at last confluent. Rachis green furrowed above, stalk short, brown below.

Am.: West Greenl. $61^{\circ} - 62^{\circ}$ (!), East Greenl. $65^{\circ} 35'$ (!).

Geogr. area: Southeast Canada, Northeastern United States, Europe, Asia Minor, Caucasus, Siberia.

Order III. EQUISETACEAE Michx. (By O. GELERT).

The order consists only of the genus:

1. EQUISETUM L.

Sect. I. *Hiemalia* A. Br. Wintering, scabrous. Spike apiculate.

15. **E. hiemale** L. v. *Doellii* Milde.

Rosenv. Till. p. 741.

Stem simple, with a large central hollow, with 10—12 obtuse ribs separated with slender furrows, sheaths close, at the top black, teeth linear awlshaped, a little rough, persistent. (The typical form is generally larger and thicker, with deciduous, glabrous teeth).

A.m.: West Greenl., Kagsiarsuk in the Igaliko Fjord $60^{\circ} 53'$ (!).

Geogr. area: v. *Doellii* only found at the Rhen (the type in North America, Iceland, North and Central Europe, Northern Asia, Turkistan, Japan).

16. **E. variegatum** Schleicher.

Hook. Fl. Bor. Am. II p. 270; Greely, Lady Frankl. Bay Exp. II, p. 15; Lge. Consp. Fl. Groenl. p. 191; Hartz, Nord-Öst Grönland. p. 353; Nath., Spetsb. Kärlv. p. 39; Trautv. Fl. Terr. Tschukts. p. 40. Fl. D. t. 2490; E. tenellum (Liljeb.) Krok, Andersson & Hesselmann, Spetsberg. Kärlv. p. 85; E. scirpoides Hartz. l. c. p. 353; E. scirpoides Buchenau & Focke in sched.; E. scirpoides Ekstam in sched.

Tufted, stem upright or decumbent, generally unbranched, with a small central hollow and 4—12 ribs, separated with furrows generally half as broad as the ribs, these are flat or slightly furrowed. Sheaths slightly enlarged upwards, teeth ovate or lanceolate, whitemarginated, tipped with a deciduous rough bristle.

Varying much in size, now and then not larger than the following species, f. *anceps* Milde, and often confounded with this, but easily recognisable by the ribs which in *E. variegatum* are only slightly furrowed, in *E. scirpoides* so deeply furrowed that the plant has double as many equal furrows and sharp ribs as teeth.

A.m.: Arctic islands, Baffin Land $67^{\circ} 20'$, Grinnell Land $81^{\circ} 44'$, West Greenl. 60° — 71° (!), East Greenl. 70° — 75° (!). Eur.: Spitsbergen (!), Beeren Island, Novaya Zemlya (Ekstam as *E. scirpoides*, !). As.: Chukches Land.

Geogr. area: Northern North America, Iceland, Scandinavia, Finland, Central Europe, Siberia.

17. **E. scirpoides** Michx.

Macoun, Catalogue V, p. 252; Lge. Consp. Fl. Groenl. p. 191; Th. Fries Beeren Isl. Veget. p. 156; Blytt, Bidrag p. 8; Nath. Spetsb. Kärlv. p. 39; Ledeb. Fl. Ross. IV, p. 491; Trautv. Syll. Pl. Sib. bor. orient. p. 545, Fl. Kolym. p. 573; Schmidt, Fl. Jeniss. arct. p. 130. Fl. D. t. 2923.

Densely tufted, stem upright or decumbent, often tortuous, generally unbranched, without central hollow. Sheaths enlarged

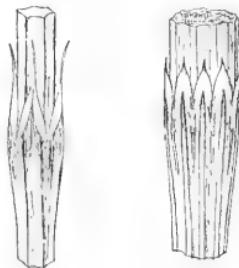


Fig. 9. *Equisetum scirpoides* Michx. to the left, *E. variegatum* Schleich. to the right; magnified.

upwards, with 3—4 teeth, the ribs deeply furrowed so that the stems are regularly 6—8 furrowed with as many sharp ribs. Often confounded with the var. *anceps* of the preceding species.

Am.: Kotzebue Sound, Nottingham Island in Hudson Strait, West Greenl. 60°—70° (!). Eur.: Spitsbergen (!), Beeren Island, Samoyede Land, Kolguev, Novaya Zemlya to 74°. As.: Mouth of the Yenissei, Lena and Kolyma, Chukches Land.

Geogr. area: Northern North America, Northern Scandinavia, Northern Russia, Siberia.

Sect. II. **Subvernalia** A. Br. Summergreen. Fertile and sterile stems contemporaneous, branched, fertile stem at first unbranched whitish, afterwards green and branched. Spike blunt.

18. *E. silvaticum* L.

Rothrock, Fl. of Alaska p. 459; Lge. Consp. Fl. Groenl. p. 193. Fl. D. t. 1182.

Sterile and at last also fertile stems producing compound verticillate spreading or deflexed branches. Sheaths loose with c. 10 teeth, compounded to 3 or 4 irregular blunt lobes.

Am.: Kotzebue Sound, West Greenl. 60°—70° (!). The monstr. *polystachyum* Milde, with small spikes on the upper branches, has been found in West Greenl. 64° 29' (!).

Geogr. area: Northern North America, Iceland, Færöes, Northern and Central Europe, Northern Asia.

Sect. III. **Vernalia** A. Br. Fertile stems vernal, rather succulent and pale, unbranched. Sterile stems aestival, branched. Spike blunt.

19. *E. arvense* L.

Hook. Coll. of Arct. Pl. p. 123; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 87; Lge. Consp. Fl. Groenl. pl. 191; Hart, Brit. Pol. Exped. p. 142; Peary, Auxil. Exped. App. C. p. 9; Macoun, Catalogue V, p. 249; Ledeb. Fl. Ross. IV, p. 486; Trautv. Consp. Fl. Nov. Semija. p. 87, Syll. Pl. Sib. bor. orient. p. 545, Fl. Kolym. p. 573; Kurtz, Fl. d. Tschuktschenh. p. 482; Nath., Spetsb. Kärly. p. 39; Th. Fries, Beeren Isl. Veget. p. 156; Reichhardt, Fl. Jan Mayen p. 10; Feilden, Fl. of Kolguev. p. 184; Nov. Zemlya, p. 25; Schmidt, Fl. Jeniss. arct. p. 130. Fl. D. t. 1942, 2001.

Fertile stems with loose, 5—10 toothed sheaths, sterile stems branched, sheaths slightly enlarged, teeth 6—12 triangular, lanceolate. Branches about 4 ribbed, teeth of the sheaths herbaceous, divergent, lowermost sheath of the branches green or brown opaque.

In Arctic regions forms often occur on which the fertile stems in the lower part are more or less branched, also, but more seldom, sterile fronds with a little spike on the top. The branches are generally simple, but sometimes branched. Teeth on the sheaths of the branches are often 3, varying to 4 or 5. These forms are however not sharply separated from each other.

The forms found in Arctic regions are:

f. boreale Milde. Upright, unbranched below, branches simple with 3-toothed sheaths.

f. decumbens C. F. W. Mey. Decumbent, much branched below. Branches at least partly branched and with 3—5 toothed sheaths. To this form belongs *f. alpestre* Wg. as a dwarf form.

f. rivulare Huth. Fertile stem in the lower part more or less branched. To this form belong *f. riparia* Fr. and *f. arctica* Rupr as dwarf forms.

f. campestre F. Schultz. Sterile frond with a small spike on the top.

Am.: Kotzebue Sound, Arctic coast and islands, Hudson Strait, Grinnell Land to $81^{\circ} 42'$, Ellesmere Land, Baffin Land, West Greenl. 60° — 76° (!), East Greenl. 60° — $63^{\circ} 30'$ (!) and 70° — $74^{\circ} 30'$ (!). Eur.: Spitsbergen (!), Beeren Island, Jan Mayen, Samoyede Land, Habarowa, Waigats (!), Kolguev, Novaya Zemlya to 74° (!), Dolgoi Island. As.: Taimyr Peninsula, Mouths of the Yenissei, Boganida (!), Lena and Kolyma, Chukches Land.

Geogr. area: Northern North America, Iceland, Færöes, Europe, Northern Africa, Asia N. & W. to Himalaya, Cape Colony.

Sect. IV. *Aestivalia* A. Br. Fertile and sterile stems equal, dull green, contemporaneous. Spike black, obtuse.

20. *E. palustre* L.

Hook. Fl. Bor. Am. II, p. 269; Feilden, Fl. of Kolguev p. 184. Fl. D. t. 1183.

Stems upright, deeply furrowed with enlarged 6—10 toothed sheaths, branched; branches simple 4—6 ribbed with straight or slightly incumbent teeth, lowermost sheath of the branches black-whitish.

Am.: Shores of the Arctic sea. Eur.: Kolguev.

Geogr. area: Northern North America, Iceland, Færöes, Europe, Asia Minor, Caucasus, Northern Asia, Japan.

21. *E. limosum* L.

Ledeb. Fl. Ross IV, p. 489; Fl. D. t. 2925. *E. fluviatile* L.; Fl. D. t. 1184. *E. Heleocharis* Ehrh.

Stems upright, slightly many furrowed with appressed 10—20 toothed sheaths, unbranched or usually producing ascending branches.

Eur.: Samoyede Land, Kanin Peninsula.

Geogr. area: North America, Iceland, Færöes, Europe, Northern Asia.

Order IV. LYCOPODIACEAE Michx. (By O. GELERT).

Only the following genus in the area:

1. LYCOPODIUM L.

A. Sterile leaves uniform crowded.

a. Fertile leaves and sterile leaves uniform *L. Selago*.

b. Fertile leaves different from sterile leaves and combined in a spike.

1. Spikes solitary sessile in the top of the branches. Leaves pointed

L. annotinum.

2. Spikes stalked. Leaves incurved, pointed by a long bristle *L. clavatum*.

B. Sterile leaves unequal, on the creeping shoots crowded, on the upright shoots in 4 ranks.

a. Upright shoots more or less flat, spikes stalked *L. complanatum*.

b. Upright shoots evidently 4-edged, spikes sessile. *L. alpinum*.

22. *L. Selago* L.

Ambronn, Cumberland Gulf p. 97; Hook. Fl. Bor. Am. II, p. 266; Hart, Brit. Pol. Exped. p. 143; Lge. Consp. Fl. Groenl. p. 183; Peary, Auxil. Exped. App. C. p. 8; Nath., Spetsb. Kärly. p. 39; Feilden, Fl. of Kolguev p. 184, Nov. Zemlya p. 25; Th. Holm, Nov. Zenit. Veget. p. 26; Ledeb. Fl. Ross. IV, p. 496; Trautv. Syll. Pl. Sib. bor. orient. p. 545, Pl. Sib. bor. p. 145; Schmidt, Fl. Jeniss. arct. p. 150; Fl. D. t. 104.

Stem erect, dichotomous, leaves linear lanceolate, acuminate, crowded. No spikes but some of the unaltered leaves on different parts of the stem bear sporangia.

The f. *appressa* Desv. (= v. *alpestre* Berl.) is a form scarcely differing with shorter more appressed leaves.

Am.: Kotzebue Sound, Arctic coast and islands (!), Hudson Strait; Cumberland Gulf, Ellesmere Land $78^{\circ} 56'$, West Greenl. $60^{\circ}-76^{\circ}$ (!), East Greenl. $60^{\circ}-73^{\circ} 30'$ (!). Eur.: Beeren Island (!), Spitsbergen (!), Novaya Zemlya to 74° (!), Kolguev (!), Waigats, Samoyede Land, Dolgoi Island. As.: Mouth of the Yenissei and Lena, Chukches Land (!).

Geogr. area: North and South America, Iceland, Færöes, Atlantic islands, Europe, Asia Minor, Caucasus, Northern Asia.

23. *L. annotinum* L.

Ledeb. Fl. Ross. IV, p. 498; Lge. Consp. Fl. Groenl. p. 183; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 87. Fl. D. t. 127. *L. annotinum* v. *alpestre* Hartm., Fl. D. t. 2984.

Stem prostrate with ascending branches, leaves linear-lanceolate, scattered, in the typical form spreading, entire or minutely serrulate, acute. Spikes solitary in the top of the branches, oblong, cylindrical, sessile.

The typical form is seldom in Arctic regions, generally there the f. *pungens* Desv. (= v. *alpestre* Hartm.) occurs. This form has shorter and more rigid pointed, erect or appressed leaves.

Am.: Kotzebue Sound, Baffin Land at Cumberland Gulf, West Greenl. $60^{\circ}-72^{\circ} 48'$ (!), East Greenl. $60^{\circ}-61^{\circ}$ (!) and 70° (!). Eur.: Samoyede Land.

Geogr. area: North America, Iceland, Færöes, North and Central Europe, Appenines, Northern Asia, Himalaya.

23. *L. clavatum* L.

Lge. Consp. Fl. Groenl. p. 184. Fl. D. t. 126.

Stem extensively creeping with short ascending branches, leaves linear awlshaped, tipped with a fine bristle. Spikes long-stalked, linear cylindrical.

Am.: West Greenl. 60° — 61° (!).

Geogr. area: North America, Europe, Asia, Africa, Ladronean Islands, Hawaii.

25. *L. complanatum* L.

Rosenv. Till. p. 737; Fl. D. t. 2671. *L. Chamaecyparissus* A. Br., Lge. Consp. Fl. Groenl. p. 184; Fl. D. 2672.

Stem extensively creeping, often subterranean, branches erect many times forked, forming fanlike bushes. Branches flattened. Leaves in 4 ranks, only in the upper third part free, those on the edges keeled, somewhat spreading and with toothlike tips, those on the flat smaller appressed. Spikes stalked cylindrical, generally 2 or more together. Fertile leaves ovate-cordate abruptly short pointed.

The typical form is seldom in Arctic regions, more common is the form, *L. chamaecyparissus* A. Br., with more densely bushy branches, which are narrower, and the leaves on the edges and the flats more similar so that the branches are less flat.

A form with sessile spikes is f. *fallax* Cel.

Am.: West Greenl. 60° — $69^{\circ} 14'$, f. *fallax* at $60^{\circ} 27'$ and $62^{\circ} 58'$ (!).

Geogr. area: North America, North and Central Europe, Appenines, Asia Minor, Northern Asia.

26. *L. alpinum* L.

Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 87; Lge. Consp. Fl. Groenl. 184; Ledeb. Fl. Ross. IV, p. 498; F. Kurtz, Fl. d. Tschuktschenh. p. 482. Fl. D. t. 79.

Stem extensively creeping, generally epiterranean. Branches erect, many times forked, forming dense bushes. Branches almost regularly 4 edged with equal, in the upper half free leaves. Spikes sessile solitary. Fertile leaves ovate, long and obtusely pointed.

Am.: Baffin Land, West Greenl. 60° — 70° (!), East Greenl. 60° — 70° (!). Eur.: Samoyede Land. As.: Chukches Land (!).

Geogr. area: Northern North America, Iceland, Færöes, British Islands, Scandinavia, Northern Russia, Pyrenees, Appenines, Asia Minor, Northern Asia.

Order V. SELAGINELLACEAE Mett. (By O. GELERT).

The order consists only of the genus:

1. SELAGINELLA P. Beauv.

27. *S. selaginoides* (L.) Link.

S. spinosa P. Beauv.; Lge. Consp. Fl. Groenl. p. 183; *Lycopodium selaginoides* L., Fl. D. t. 70.

Stem prostrate, slender. Leaves lanceolate, acute, ciliate. Fertile leaves forming a cylindrical spike in the top of ascending branches, larger than the sterile leaves, spinulose ciliated. Sporangia containing powdery microspores or few larger (about 0,6 mm.) macrospores.

Am.: West Greenl. $60^{\circ} 53'$ — $64^{\circ} 8'$ (!).

Geogr. area: Northern North America, Iceland, Færöes, British Islands, France, Pyrenees, Scandinavia, Denmark, Central European Mountains, Northern Russia, Caucasus, Siberia.

28. *S. rupestris* (L.) Spring.

F. Kurtz, Fl. d. Tschuktschenh. p. 482; Trautv. Fl. Kolym. p. 574.

Stem prostrate much branched, forming close tufts. Leaves crowded, linear lanceolate, appressed imbricated, minutely ciliated,



Fig. 10. *Selaginella rupestris* (L.) Spring.; $\frac{2}{3}$ nat. size. Spec. from Vancouver Island.

tipped with a bristle. Fertile leaves in 4 ranks on ascending branches. Spores as in the preceding.

As.: Mouth of the Kolyma, Chukches Land (!).

Geogr. area: North and South America, Central Africa, Southern and East Asia.

Order VI. ISOËTACEAE Trevisan. (By C. H. OSTENFELD).

The order consists only of the genus:

1. ISOËTES L.

29. *I. lacustre* L.

Fl. D. t. 2712.

Plants growing on the bottom of lakes. Stem short and tuberous with many subulate, dark green, short pointed leaves, which at the base bear sporangia, either containing brownish microspores

or macrospores; the latter are covered with more or less confluent, elevated crests.

Am.: West Greenl., Ilua, c. 60° (!).

Geogr. area: North America, Færöes, British Islands, Scandinavia, Denmark, Northern Central Europe, France, Pyrenees, Northern Russia.

30. I. *echinosporum* Dur.

Lge. Conspl. Fl. Groenl. p. 185; Berlin, Kärlv. f. Grönl. p. 83; Fl. D. t. 2743.

To be separated from the preceding by its plainly pointed lightgreen generally smaller leaves and the macrospores which are covered with elevated, acute or obtuse, easily broken tubercles.

Am.: West Greenl. 60° — $61^{\circ} 35'$ (!) and $68^{\circ} 21'$.

Geogr. area: Northern North America (v. *Braunii* Dur.), Iceland, Færöes, Scandinavia, British Islands, France, Northern Central Europe, Northern Russia.

CLASS II.

GYMOSPERMAE.

Trees or shrubs which produce seeds, containing an embryo; ovules not enclosed in an ovary.

Only the following subclass in the area:

CONIFERAE.

Stem much branched, leaves simple.

Only the following order in the area:

Order VII. PINACEAE Lindl. (By O. GELERT).

Ovules few or several on the surface of a scale. Fruit a cone with woody or fleshy scales.

- A. The cone with many imbricate, spiral scales. Leaves linear needle-shaped, scattered or in fascicles. Suborder **Abietinae** Rich.
 - 1. Leaves in clusters, persistent **Pinus**.
 - 2. Leaves fascicled on short branches, deciduous **Larix**.
- B. The cone small closed or drupelike with few opposite or ternate scales. Leaves subulate or scalelike, opposite or ternate Suborder **Cupressinae** Rich.
 - Juniperus**.

1. PINUS L.

31. **P. Cembra** L. var. **pumila** (Pall.) Chamisso in Linnaea VI, p. 529, 534.

Ledeb. Fl. Ross. III, p. 674.

Leaves 5-clustered. Cone broad ovate, scales slightly thickened at the end. Seeds wingless.

The Arctic form shrubby and with short leaves.

Am.: Kotzebue Sound.

Geogr. area: Northeast Russia, North Siberia; v. *pumila* in Davuria, East Siberia, Kamchatka, Kurile Islands, The Alps, Carpathian Mountains.

2. LARIX L.

32. *L. davurica* (Fisch.) Turez.

Trautv. Fl. boganid. phaenog. p. 148; *Pinus davurica*, Ledeb. Fl. Ross. III, p. 673.

Cone ovoid. Scales broad ovate, attenuate, truncate or emarginate at the apex.

As.: North Siberia at the river Boganida up to $71\frac{1}{4}^{\circ}$ (!) and the river Novaya up to $72\frac{1}{2}^{\circ}$.

Geogr. area: Davuria, East Siberia.

3. JUNIPERUS L.

33. *J. communis* L.

Berlin, Kärlv. fr. Grönl. p. 65; Feilden Fl. of Kolguev p. 184; Lge. Conspl. Fl. Groenl. p. 303; Trautv. Fl. Kolym. p. 561; Scheutz, Pl. vasc. Jeniss. p. 195, Fl. D. t. 1119; *J. alpina* (Clus), Lge. l. c. p. 182; Fl. D. t. 2739. *J. nana* Willd., Ledeb. Fl. Ross. III, p. 684.

Shrub. Leaves 3 in each whorl, linear subulate. Fruit resembling a blackish-blue berry on short axillary branches.

The typical form is found in sheltered localities, the dwarf form is more common in the Arctic regions: *J. nana* Willd (= *J. alpina* J. Gray), with short incurved, appressed leaves.

Am.: West Greenl. 60° – 68° $20'$ (!), East Greenl. 60° – 65° $40'$ (!).

Eur.: Kolguev, Samoyede Land. As.: Mouth of the Yenissei and Kolyma

Geogr. area: North America, Iceland, Færöes, Europe, Temperate and Alpine Asia.

CLASS III.

ANGIOSPERMÆ.

Plants which produce seeds containing an embryo. Ovules enclosed in an ovary, formed of one or more carpels.

Embryo with one cotyledon	MONOCOTYLEDONES.
Embryo with two cotyledons	DICOTYLEDONES.

SUBCLASS I.

MONOCOTYLEDONES.

Leaves usually parallel-veined, mostly alternate. Flowers mostly 3-merous or 6-merous; the bundles of wood-cells irregularly imbedded in the stem.

- A. Perianth coloured, petaloid.
 - a. Flowers regular.
 - aa. Stamens 6. Ovary superior XII. LILIACEAE.
 - bb. Stamens 3. Ovary inferior XIII. IRIDACEAE.
 - b. Flowers irregular, monosymmetrical. Ovary superior. XIV. ORCHIDACEAE.
- B. Perianth of scales or bristles or wanting, not petaloid.
 - a. Marsh or aquatic plants; perianth greenish or wanting, fruit drupe-like or nut-like, endosperm none.
 - aa. Marsh plants, perianth-segments 3—6, stamens 3—6, fruit of 3—6 carpels X. JUNCAGINACEAE.
 - bb. Aquatic plants, perianth of 4 segments or wanting, stamens 1 or 4, fruit drupe-like of 1 or 4 carpels IX. POTAMOGETONACEAE.
 - b. Marsh plants, perianth bristles or scales; flowers crowded in globose monoecious heads; ovary mostly unilocular; fruit drupe-like, endosperm copious VIII. SPARGANIACEAE.
 - c. Perianth glumaceous (or wanting); Stamens 3—6; fruit capsule or nut; endosperm copious.
 - aa. Perianth-segments 6; stamens 3—6; fruit capsule. XI. JUNCACEAE.
 - bb. Flowers in the axil of bracts, arranged in spikelets; perianth composed of bristles or scales or wanting; fruit nut-like (caryopsis, achene).
 - α. Stem solid without nodes; leaves sheathing; the sheaths usually closed; flowers perfect or imperfect, without upper pale (palea); perianth of bristles or scales or wanting; fruit called achene.
 - XV. CYPERACEAE.
 - β. Stem hollow with solid nodes; leaves sheathing; the sheaths usually split to the base; flowers mostly perfect (sometimes stamine, monoecious or dioecious); upper pale (palea) 2-keeled; perianth consisting of 1—3 minute scales (lodiculae); fruit called caryopsis. XVI. GRAMINEAE.

Order VIII. SPARGANIACEAE Agardh. (By C. H. OSTENFELD).

The order consists only of the genus:

SPARGANIUM L.

1. Fruit with short beak; female heads not free from the leaf-angles . . . **S. minimum**.
2. Fruit without beak; female heads free from the leaf-angles . . . **S. submuticum**.
3. Fruit with long beak; female heads free from the leaf-angles **S. affine**.

34. **S. minimum** Fries.

Rosenv. Till. p. 709; Fl. D. t. 260.

Leaves long, 4—5 mm. broad, floating, thin and flat; male head 1 (seldom 2); female heads 1—3, sessile in the angles of the sheaths;

the lower sometimes short-stalked; fruit ovoid, dull, obtusely angled, often slightly contracted below the middle, with a short beak; style short; stigma oval, oblique, at the base distinctly bounded.

Am.: West Greenl. $64^{\circ} 32'$ (!).

Geogr. area: Northern North America, Iceland, Europe, Northern Siberia.

35. **S. submuticum** (Hartm.) Neum.

S. hyperboreum Laest., Lge. Conspl. Fl. Groenl. p. 116; Rosenv. Till. p. 709; Scheutz, Pl. vase. Jeniss. p. 162; Fl. D. t. 2792.

Leaves long, narrow, 2—3 mm. broad, floating, slightly convex below; male head 1; female heads 1—4, the lower stalked and free from the angles of the sheaths; stigma sessile or very short-stalked, at the base not distinctly bounded, fruit ovoid, dull, obtusely angled, without beak.

Am.: West Greenl. $60^{\circ}-68^{\circ} 37'$ (!), A.s.: Mouth of the Yenissei.

Geogr. area: Northern Canada, Iceland, Northern Scandinavia and Finland, Northern Siberia.

36. **S. affine** Schnitzl.

Macoun, Catal. IV p. 71; *S. natans*, Ledeb. Fl. Ross. IV p. 5; Rothr. Fl. of Alaska, p. 455. Fl. D. Suppl. t. 171.

Leaves very long, narrow, 3—5 mm. broad, floating, convex below; stem-leaves with inflated sheaths; male heads 1—5, clustered; female heads 2—4; the lower long stalked and free from the angles of the sheaths; fruit fusiform, more or less contracted below the middle, shining, with rather long beak; style rather long; stigma linear-lanceolate, at the base distinctly bounded and slightly notched.

Am.: Kotzebue Sound, West Greenl. c. 61° (!).

Geogr. area: Unalashka, Northern North America, Iceland, Færöes, North, West and Central Europe, Siberia.

Order IX. POTAMOGETONACEAE Aschs. (By C. H. OSTENFELD).

Flowers perfect, perianth-segments 4, stamens 4, carpels 4; spike cylindrical
Potamogeton.

Flowers monoecious, perianth 0, stamens 1, carpel 1, spadix flat . . . **Zostera.**

1. ZOSTERA L.

37. **Z. marina** L.

Lge. Conspl. Fl. Groenl. p. 117 and p. 282; Kjellm., Vest-Eskim. Land, p. 53; Fl. D. t. 15 and t. 1501.

Rhizome creeping; leaves ribbon-shaped with 3—5 nerves, obtuse, often with a little kerf at the apex; flowers arranged in two rows on

one side of a spadix, which is enclosed in the sheath-like base of a leaf (spathe); male flowers with 1 sessile anther; pollen thread-like; female flowers with 1 ovate-oblong ovary attached near the apex; stigmas 2, long; fruit drupe-like, bursting, enclosing 1 cylindrical, ribbed seed.

Am.: Port Clarence (!), West Greenl. c. $64^{\circ} 30'$ (!).

Geogr. area: Pacific coast of North America to California, Atlantic coast to Florida, Iceland, Færöes, Coasts of Europe and Asia Minor.

2. POTAMOGETON L.

The Potamogeton being in the Arctic countries usually sterile, the characters in the key are always taken from the leaves.

- A. Stipules adnate to the leaves, leaves capillary, obtuse *P. filiformis*.
- B. Stipules free.
 - a. Leaves all alike, linear, entire, with 3—5 nerves.
 - 1. Leaves with 3 (1) nerves, acuminate, acute or subacute *P. pusillus*.
 - 2. Leaves with 3—5 nerves, acuminate, obtuse *P. obtusifolius*.
 - b. Leaves broader with many nerves.
 - 1. Leaves all alike, submerged, sessile.
 - * Leaves ovate or lanceolate-ovate from a cordate-clasping base, obtuse (or subacute) *P. perfoliatus*.
 - ** Leaves lanceolate-ovate, half clasping, cucullate at the apex *P. praelongus*.
 - 2. Upper leaves floating, petioled (sometimes wanting); lower submerged, linear-lanceolate or oblong, sessile.
 - † Submerged leaves linear-lanceolate, attenuated at the base, cuspidate, margin scabrid. *P. gramineus*.
 - †† Submerged leaves long, linear lanceolate, broader at the base, margin smooth *P. alpinus*.

38. *P. alpinus* Balb.

P. rufescens Schrad., Lge. Conspl. Fl. Groenl. p. 116 and p. 282; Rosenv. Till. p. 710; Fl. D. t. 1450, 1635.

Floating leaves obovate or oblong-lanceolate, obtuse, narrowed into a short petiole, passing into the submerged ones; submerged leaves oblong-lanceolate to linear-lanceolate, translucent, obtuse, green (reddish-brown when dried); spike many-flowered; fruits reddish, obovoid or lenticular, keeled; rhizome creeping with robust propagating bud-like stolons.

Am.: West Greenl. 61° — 67° (!).

Geogr. area: Northern North America, Iceland, Færöes, Europe, Northern Asia, Afghanistan, Tibet.

39. *P. gramineus* L.

P. heterophyllus Schreb., Lge. Conspl. Fl. Groenl. p. 117 and 282; Rosenv. Till. p. 710, Nye Bidrag p. 70; Fl. D. t. 222, 1263.

Floating leaves long-petiolated, obovate or elliptic, coriaceous; submerged leaves linear-lanceolate, narrowed at the base, translucent, acute; spikes dense-flowered; peduncles somewhat thickened upwards; fruits small, roundish, compressed; rhizome creeping with robust propagating bud-like stolons.

Am.: West Greenl. 60° — $69^{\circ} 30'$ (!).

Geogr. area: North America, Iceland, Færöes, Northern and Central Europe, Northern Siberia, Japan.

40. **P. perfoliatus L.**

Kurtz, Ber. Pfl. Jenissei, p. 148; Scheutz, Pl. vasc. Jeniss., p. 163; Fl. D. t. 196.

Leaves submerged, obovate or obovate-oblong with cordate-clasping base, obtuse, minutely serrate, tip flat; spike short, dense-flowered; fruits oblique-obvoid, obtusely keeled; rhizome creeping with robust propagating bud-like stolons.

As.: Mouth of the Yenissei (!).

Geogr. area: Northern North America, Iceland, Færöes, Europe, Northern Asia, Northern Africa, Australia.

41. **P. praelongus Wulf.**

Scheutz, Pl. vasc. Jeniss. p. 163; Fl. D. t. 1687; ?P. salicifolia Wolfgang, Scheutz, l. c. p. 163.

Leaves submerged, oblong-lanceolate, bright-green, with half-clasping base and concave, boat-shaped tip; stipules very large; spike dense-flowered; peduncles elongating after the flowering; fruits oblique-obvoid, large, sharply keeled (when dried); rhizome creeping with robust propagating bud-like stolons.

As.: Mouth of the Yenissei (!).

Geogr. area: North America, Færöes, Scandinavia, Central Europe, Western Siberia, Japan.

42. **P. obtusifolius M. & K.**

Kruuse, Veget. i Egedesm. Skjærg., Medd. om Grönland, XIV, 1898 p. 361; Fl. D. t. 2107.

Leaves linear with 3—5 nerves, obtuse, acuminate; peduncles short, as long as the short dense-flowered spikes; fruits oblique-obvoid, 3-keeled; rhizome thin, short, or wanting; propagating by winter-buds from the angles of the leaves on the stem.

Am.: West Greenl. Ikamiut ($68^{\circ} 38'$) (!).

Geogr. area: Northern North America, North and Central Europe, Ural, Western Siberia, Persia.

43. **P. pusillus L.**

Lge. Consp. Fl. Groenl. p. 117 and 282; Rosenv. Till. p. 710; Scheutz, Pl. vasc. Jeniss. p. 163; Fl. D. t. 1451.

Leaves with (1—)3 nerves, acute, acuminate; peduncles 2—3 times longer than the few-flowered spikes; fruits oblique-ellipsoid; rhizome thin, short, or wanting; propagating by winter-buds from the angles of the leaves on the stem.

Am.: West Greenl. 60° — 70° (!). As.: Mouth of the Yenissei.

Geogr. area: North and South America, Iceland, Færöes, Europe, Northern and Western Asia, Africa.

44. *P. filiformis* Pers.

Rosenv. Till. p. 710; Abromeit, Grönlandsexped. p. 78, Fl. D. t. 2106; *P. marinus* L. ex p., Lge. Conspl. Fl. Groenl. p. 117 and p. 282; *P. pectinata* Scheutz, Pl. vasc. Jeniss. p. 164.

Leaves capillary, half-rounded below, obtuse, stipules adnate with the leaf-base into a sheath; stem filiform with short branches; peduncles long; spikes few- and lax-flowered; fruits small; stigma sessile; rhizome creeping with tuberous winter-buds.

Am.: West Greenl. 60° — 70° $30'$ (!). As.: Mouth of the Yenissei (!).

Geogr. area: North America, Iceland, Færöes, North and West Europe, Northern Asia, Africa, Australia.

Order X. JUNCAGINACEAE Lindl. (By C. H. OSTENFELD).

Only the following genus in the area:

TRIGLOCHIN L.

Flowers in a long raceme without bracts; carpels coalesced, separating at maturity, leaving a linear central axis. Leaves basal, linear.

- | | |
|------------------------|----------------------|
| 1. Carpels 3 | T. palustre. |
| 2. Carpels 6 | T. maritimum. |

45. *T. palustre* L.

Lge. Conspl. Fl. Groenl. p. 121, p. 283; Abromeit, Grönlandsexped. p. 78; Hook., Fl. bor. Am. II p. 168; Fl. D. t. 490.

Rhizome short with slender bulbous stolons; stem slender; raceme not dense-flowered; fruit linear-clavate; ripe carpels attenuated and pointed at the base, attached to the central axis by the apex.

Am.: Labrador, West Greenl. 60° — 70° $45'$ (!), East Greenl. 65° $35'$.

Geogr. area: North America, South America, Iceland, Færöes, Europe and Asia.

46. *T. maritimum* L.

Hook., Fl. bor. Am. II p. 168; Trautv., Fl. Kolym. p. 561; Fl. D. t. 306.

Rhizome without stolons, thick, mostly covered with sheaths of old leaves; stem large and stout; raceme dense-flowered; fruit oblong; carpels 6, separating at maturity from the axis.

Am.: Labrador. As.: Mouth of the Kolyma.

Geogr. area: North America, Iceland, Europe, Siberia, Asia Minor to Tibet and Japan.

Order XI. JUNCACEAE Vent. (By O. GELERT).

- A. Capsule with many seeds, Leaves terete or channelled, glabrous, sheaths split *Juncus*.
- B. Capsule with 3 seeds, Leaves flat or channelled, generally hairy with long hairs at the margins, sheaths entire *Luzula*.

1. *JUNCUS* L.

- A. Stem leafless, inflorescence apparently lateral, because the involucral leaf is terete and appears as a continuation of the stem.
 - a. Panicle dense, few-flowered, involucral leaf about as long as the stem. Sepals acuminate longer than the capsule *J. filiformis*.
 - b. Panicle compound many-flowered, involucral leaf about half as long as the stem, sepals about as long as the capsule, the inner obtuse mucronate *J. balticus*.
 - c. Panicle dense, few-flowered, involucral leaf short, sepals shorter than the capsule *J. arcticus*.
- B. Stem leafy, inflorescence terminal.
 - a. Leaves knotted.
 - a. Culms at the base generally bulbous thickened, leaves capillary, panicle loose with few heads *J. bulbosus*.
 - β . Culms not bulbous thickened, leaves not capillary, nearly terete, panicle compound with numerous few-flowered heads on erect branches *J. alpinus*.
 - b. Leaves not knotted.
 - α . Flowers in close heads, culm with leaves at the base
 - 1. Heads 1–3, capsule acute *J. castaneus*.
 - 2. Head solitary, capsule obtuse *J. triglumis*.
 - 3. Head solitary, capsule obtuse emarginate *J. biglumis*.
 - β . Flowers in few-flowered heads, culm leafless at the base, 2–3-leaved at the summit *J. trifidus*.
 - γ . Flowers solitary, paniced.
 - 1. Perennial, densely tufted, only with basal leaves *J. squarrosum*.
 - 2. Annual, stem branched, diffuse, leafy *J. bufonius*.

47. *J. filiformis* L.

Lge. Conspl. Fl. Groenl. p. 124; Ledeb. Fl. Ross. IV p. 223.

Stems densely tufted from the creeping rhizome, pliable, leafless, covered with leafless sheaths at the base, minutely furrowed. Inflorescence apparently lateral, dense, few-flowered, involucral leaf long, about as long as the stem. Sepals lanceolate acuminate, the inner somewhat shorter and less acute, longer than the nearly globose capsule. Anthers shorter than the filaments. Sheaths shining brown, sepals and capsule greenish or pale brown.

Am.: West Greenl. 60° — 61° (I), East Greenl. $60^{\circ} 4'$. Eur.: Samoyede Land.

Geogr. area: Northern North America, Iceland, North and Central Europe, Northern Asia, Patagonia.

48. *J. balticus* Dethard. ap. Willd.

Ledeb. Fl. Ross. IV p. 222; Schmidt, Fl. Jeniss. arct. p. 123; J. glaucus R. Br. in Richardson, Bot. App. p. 11 (non Ehrb., sec. Fr. Buchenau: Monogr. Junc. p. 217); J. balticus v. pacificus Engelm. Rev. Junc. p. 442; J. Lesueurii Bol., Fr. Buchenau I. c. p. 220; J. arcticus v. Sitchensis Engelm. I. c. p. 445; J. balticus v. Haenkei Fr. Buchenau I. c. p. 215; J. arcticus Hook. Fl. Bor. Am. II p. 189 (exc. β).

Stems 30—60 cm., rising from the far creeping rhizome, rigid, leafless, with leafless sheaths at the base. Inflorescence apparently lateral, compound many-flowered, with a long involucral leaf, about half as long as the stem. Sepals ovate-lanceolate, the outer sharp-pointed, the inner obtuse, mucronate, about as long as the elliptical, obtuse and mucronate capsule. Sheaths, sepals, and capsule chestnut-brown.

α , *europaeus* Engelm. I. c. p. 441. Sepals as long as the shortly mucronulate capsule, twice as long as the stamens; anthers and filaments about of equal length.

β , *litoralis* Engelm. I. c. p. 442. Sepals somewhat shorter than the long, mucronate capsule, only a little longer than the stamens; anthers large three or four times longer than the filaments. Stem slender.

γ , *Haenkei* (E. Mey.) Fr. B.

J. arcticus v. *Sitchensis* Engelm. I. c.

Sepals linear-lanceolate, somewhat shorter than the oblong-obovate, shortly mucronate capsule, anthers and filaments about of equal length. Inflorescence short and dense.

δ , *Lesueurii* (Bol.).

J. *balticus*, subsp. *pacificus* Engelm. I. c.

Plant large, about a metre high, inflorescence large, compound. Sepals lanceolate, about as long as the capsule, twice as long as the stamens; anthers large, three or four times as long as the filaments.

α , Am.: West Greenl. very rare, only found on two spots at $60^{\circ} 15'$ and $64^{\circ} 45'$ (I). Eur.: Samoyede Land. As.: Mouth of the Yenissei.

β , Am.: Arctic Sea-coast (?).

γ , Coasts of the Bering Sea on both sides.

δ , Am.: Norton Sound.

Geogr. area: α , Iceland, Færöes, Scandinavia, British Islands, Holland, Denmark, North coast of Germany, Russia, Finland. β , North America on the Atlantic coast, at the Canadian lakes and the upper

Mississipi, South America (?). γ , From the coasts of the Bering Sea to Sitka and Kamchatka, Saghulin (?) and Japan (?). δ , Western coast of America down to Chili.

49. *J. arcticus* Willd.

Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 84; Lge. Conspl. Fl. Groenl. p. 124; Hartz, Nordöst Grön. p. 343; Feilden, Fl. of Kolguev p. 184; Ledeb. Fl. Ross. IV p. 223.

Stems 15—40 cm. high, rising from the creeping rhizome, rigid, leafless, covered with leafless sheaths at the base. Inflorescence apparently lateral, dense, few-flowered with a short, 3—6 cm. long, involucral leaf. Sepals broad ovate-lanceolate, the inner somewhat shorter and broader, shorter than the elliptical, obtuse, shortly mucronate capsule. Anthers about as long as the filaments. Sheaths shining pale brown, sepals and capsule dark brown shining.

Am.: Baffin Land up to 71° , West Greenl. 60° — $70^{\circ} 40'$ (!), East Greenl. 70° — 71° (!). Eur.: Kolguev, Samoyede Land.

Geogr. area: Iceland, Northern Scandinavia, Northern Finland and Russia, Western Siberia, The Alps, Pyrenees, Abruzzi, Asia Minor and Bithynia.

50. *J. bulbosus* L.

J. supinus Moench., Rosenv. Till. p. 714.

Rhizome very short, culms cespitose filiform, at the base often bulbous thickened, leaves capillary, indistinctly knotted. Heads few in a loose panicle, 2—7-flowered, sepals lanceolate, capsule oblong.

Am.: West Greenl. $60^{\circ} 55'$ and $68^{\circ} 37'$ (small, sterile plants) (!).

Geogr. area: Labrador, Newfoundland, Iceland, Færöes, Europe, North-Africa, Caucasus.

51. *J. alpinus* Vill.

Lge. Conspl. Fl. Groenl. p. 124; *J. uliginosus* Sibth. and *J. Richardsonianus* Schult., Hook. Fl. Bor. Am. II p. 191.

Rhizome creeping, culm erect with 1—2 leaves, leaves nearly terete, distinctly knotted. Heads few-flowered in a compound panicle with erect branches. Flowers about 3 mm., sepals lanceolate, obtuse, shorter than the ovate, mucronate capsule.

Am.: Arctic Sea Coast, West Greenl. Igaliko at $61^{\circ} 2'$ (!).

Geogr. area: North America, Iceland, North and Central Europe, Caucasus, Siberia.

52. *J. castaneus* Sm.

Hook. Fl. Bor. Am. II p. 192; Taylor, Pl. coll. Davis Str. and Baff. Bay p. 84; Lge. Conspl. Fl. Groenl. p. 123; Hartz, Nordöst Grön. p. 343; Nath., Spetsb. Kärv. p. 38; Th. Holm, Novaja Zemlia's Veget. p. 18; Trautv. Fl. Terr. Tschuktsch. p. 38, Pl. Sib. bor. p. 118, Syll. Pl. Sib. bor. orient.

p. 537; Schmidt, Fl. Jeniss. arct. p. 123; Kjellm., Vest-Eskim. Land p. 59, As. Beringss. p. 565; Feilden, Nov. Zemlya p. 21; Dusén, Ost-Grönl. p. 52.

Culm slender, 10—30 cm. high, from a slender rhizome, 1—3-leaved in the lower part. Heads 1—3, 4—10-flowered, deeply chestnut-coloured with membranous bracts, the longest more or less leafy awl-shaped. Sepals lanceolate, half as long as the acute, about 8 mm. long capsule.

Am.: Kotzebue Sound, Port Clarence (!), Baffin Land: Cumberland Gulf, West Greenl. $62^{\circ} 30'$ — $70^{\circ} 45'$ (!), East Greenl. 70° — $74^{\circ} 10'$ (!). Eur.: Spitsbergen, Novaya Zemlya 71° — 72° , Waigats, Habarowa (!). As.: Mouths of the Yenissei, Boganida (!) and Lena, Taimyr Peninsula (!), Chukches Land (!).

Geogr. area: Northern North America, Iceland, Scotland, Scandinavia, Northern Russia, The Alps, Transsilvania, Siberia, Central Asia.

53. *J. triglumis* L.

Hook. Fl. Bor. Am. II p. 192; Lge. Consp. Fl. Groenl. p. 123; Hartz, Nordöst Grönl. p. 342; Abromeit, Grönlandsexped. p. 81; Nath., Spetsb. Kärlv. p. 38; Trautv. Fl. Terr. Tschucktsch. p. 38; Schmidt, Fl. Jeniss. arct. p. 122.

Culms loosely cespitose, 5—20 cm. high, heads 2—5-flowered, bracts generally not exceeding the flowers, red-brown. Sepals oblong lanceolate yellowish or chestnut-coloured (var. *Copelandi* Buchenau), shorter than the obtuse mucronate, about 6 mm. long, pale brown capsule.

Am.: Arctic Sea-coast, Labrador (!), West Greenl. 60° — $70^{\circ} 30'$ (!), East Greenl. 70° — $73^{\circ} 20'$ (!). Eur.: Spitsbergen (!). As.: Mouth of the Yenissei, Chukches Land.

Geogr. area: Rocky Mountains to Colorado, Northern Canada to Newfoundland, Iceland, Færöes, England, Scotland, Northern Scandinavia, Northern Russia, Central European Mountains, Caucasus, Siberia, Central Asia and Himalaya.

54. *J. biglumis* L.

Hook. Fl. Bor. Am. II p. 192; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 84; Hart, Brit. Pol. Exped. p. 142; Lge. Consp. Fl. Groenl. p. 122; Hartz, Nordöst Grönl. p. 342; Nath., Spetsb. Kärlv. p. 38; Th. Fries, Beeren Isl. Veget. p. 155; Andersson, König Karls Land p. 557; Trautv., Consp. Fl. Nov. Zeml. p. 80; Ledeb. Fl. Ross. IV p. 233; Kjellm., Sib. Nordk. Fanerogamfl. p. 277, As. Beringss. p. 565, St. Lawrence-ön p. 22, Vest-Eskim. Land p. 59; Trautv. Pl. Sib. bor. p. 118, Syll. Pl. Sib. bor. orient. p. 537; Schmidt, Fl. Jeniss. arct. p. 122; Kjellm. & Lundstr., Nov. Semlja p. 317; Feilden, Nov. Zemlya p. 21.

Loosely cespitose, culms 5—15 cm. high. Heads 1—2-flowered, one bract generally exceeding the flowers. Sepals oblong, brown, shorter than the obtuse, retuse capsule.

Am.: St. Lawrence Island, Port Clarence, Kotzebue Sound, Arctic Coast and Islands, Baffin Land, Grinnell Land to $82^{\circ} 27'$, West Greenl. $60^{\circ}-76^{\circ} 7'$ (!), East Greenl. $65^{\circ} 35'$ and $70^{\circ}-75^{\circ}$ (!). Eur.: Spitsbergen (!), King Charles Land, Franz Josef Archipelago to $80^{\circ} 16'$ (Fisher, in litt.), Beeren Island, Novaya Zemlya to 75° (!), Waigats (!), Habarowa, Dolgoi Island. As.: Arctic Coast (!), Mouths of the Yenissei and Lena, New Siberian Islands, Taimyr Peninsula (!), Chukches Land (!).

Geogr. area: Northern Canada, Iceland, Færöes, Scotland, Northern Scandinavia, Northern Russia, Northern Siberia.

55. *J. trifidus* L.

Lge. Consp. Fl. Groenl. p. 123; Hartz, Nordöst Grönland. p. 343; Ledeb. Fl. Ross. IV, p. 233.

Culms erect 5—25 cm. high, tufted, from matted creeping rhizomes, covered with sheaths at the base and with 2—3 leaves in the upper part, Leaves setaceous exceeding the sessile 1—3-flowered head. Sepals ovate-lanceolate, acuminate, brown, longer than the obovate, dark brown, shining capsule; beak pointed.

Basal leaves varying from mucronate to more or less evident blade-bearing.

Am.: West Greenl. $60^{\circ}-69^{\circ} 45'$ (!), East Greenl. $60^{\circ}-71^{\circ}$ (!). Eur.: Samoyede Land.

Geogr. area: Northern North America, Iceland, Færöes, Scotland, Northern Scandinavia, Finland and Russia, The Alps, Central European Mountains, Caucasus, Ural- and Baikal-Mountains.

56. *J. squarrosum* L.

Lge. Consp. Fl. Groenl. p. 124.

Densely tufted. Basal leaves numerous, 10—30 cm. long, spreading, tenacious, narrow, channelled. Stem rigid, 15—30 cm. high leafless. Flowers solitary, panicled, panicle-branches upright rigid, bracts yellowish-white membranous, sepals lanceolate, 5 mm. long, pale brown, shining, broadly white membranous at the margin, as long as the ovate obtuse capsule.

Am.: West Greenl. $60^{\circ}-60^{\circ} 30'$ (!), East Greenl. $60^{\circ}-60^{\circ} 28'$ (!).

Geogr. area: Færöes, Europe, Western Siberia.

57. *J. bufonius* L.

Lge. Consp. Fl. Groenl. p. 125.

Annual. Stem 2—5 cm. high, branched, from the base diffuse, leafy. Flowers solitary or seldom 2—4 together. Sepals about 5 mm. long, lanceolate, acuminate, green, white membranous at the margin, about as long as the narrow oblong obtuse, chestnut-coloured capsule.

Am.: West Greenl. Igaliko at $61^{\circ} 2'$ (!).

Geogr. area: All over the Earth, following cultivation.

2. LUZULA D. C.

- A. Inflorescence subcymose slightly compound; flowers solitary; leaves somewhat webbed at the base; seeds with large caruncles (Pterodes Griseb.).
 a. Caruncle falcate *L. pilosa*.
 b. Caruncle erect *L. rufescens*.
- B. Inflorescence subcymose, very compound, flowers solitary or 2—3 together; leaves glabrous; seed with a small warty caruncle (Anthelaea Griseb.).
 a. 25—60 cm. high; leaves 6—10 mm. broad; bracts entire; anthers longer than the filaments *L. parviflora*.
 b. 10—25 cm. high; leaves 3—5 mm. broad; bracts fimbriate, anthers shorter than the filaments *L. Wahlenbergii*,
- C. Flowers crowded into clusters, forming spikelike or umbelloid inflorescences (Gymnodes Griseb.).
 a. Leaves channelled (seldom flat, cfr. *L. arcuata* β), narrow.
 1. Clusters forming a somewhat nodding spike-like inflorescence, sepals acuminate, bristle-pointed *L. spicata*.
 2. Clusters forming an umbelloid or capitulate inflorescence, sepals acuminate, not bristle-pointed. *L. arcuata*.
 b. Leaves flat.
 1. Leaves broadly linear-lanceolate, glabrous or very sparingly ciliated. Anthers shorter than the filaments *L. nivalis*.
 2. Leaves linear, long ciliated.
 † Densely caespitose, clusters on erect branches. Anthers as long as the filaments *L. multiflora*.
 ‡ Loosely caespitose and with short stolons, exterior branches of the inflorescence often arching. Anthers longer than the filaments
 L. campestris.

58. *L. pilosa* (L.) Willd.

Ledeb. Fl. Ross. IV p. 215.

Caespitose. Stem erect 10—12 cm. high. Basal leaves about as long as the stem, broad, flat, with few long hairs at the margin and webbed at the base. Stems with 2—4 shorter leaves. Panicle subcymose, slightly compound, upper branches reflexed. Sepals lanceolate acute, chestnut-coloured on the back, white membranous at the margins, shorter than the broadly ovate mucronate capsule. Seed with a large, falcate caruncle.

Am.: Kotzebue Sound.

Geogr. area: Northern North America, North and Central Europe, Caucasus, West Siberia.

59. *L. rufescens* Fisch.

Trautv. Pl. Sib. bor. p. 116; Fl. Kolym. p. 563.

Very like the preceding species. Plant slender, leaves generally narrower, flowers paler. Sepals as long as the capsule. Seed with a large erect caruncle.

As.: Mouths of the Lena and Kolyma.

Geogr. area: East Siberia, Kamchatka, Saghalin, Japan.

60. *L. parviflora* (Ehrh.) Desf.

Lge. Consp. Fl. Groenl. p. 125; Scheutz, Pl. vasc. Jeniss. p. 169; Kjellm., Sib. Nordk. Fanerog. Fl. p. 276; L. spadicea Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 84; L. spadicea v. parviflora and v. melanocarpa Ledeb. Fl. Ross. IV p. 217; L. spadicea v. parviflora Schmidt, Fl. Jeniss. arct. p. 122; L. melanocarpa (Michx.) Desf., Hook. Fl. Bor. Am. II p. 187.

Loosely cæspitose and with short stolons. Stem 25—60 cm. high. Leaves glabrous, 6—10 mm. broad, linear-lanceolate, acuminate. Panicle subcymose, compound, many flowered, generally with nodding branches. Flowers small, solitary or 2—3 together. Bracts ovate, acute, membranous, entire or sometimes slightly lacerate. Sepals ovate-lanceolate, acuminate, pellucid, brown or yellow, somewhat shorter than the shining, chestnut-coloured (often darker, seldom paler) capsule. Anthers longer than the filaments.

Am.: Kotzebue Sound, Labrador (!), Baffin Land; Cumberland Gulf, West Greenl. 60° — $72^{\circ} 20'$ (!), East Greenl. 60° — 61° (!). As.: Mouth of the Yenissei (!), Taimyr Peninsula (!), Chukches Land.

Geogr. area: Northern North America, Northern Scandinavia, Northern Russia, Siberia.

61. *L. Wahlenbergii* Rupr.

Nath., Spetsb. Kärly. p. 37; Kjellm., St. Lawrence-ön p. 22, Sib. Nordk. Fanerogamfl. p. 277, As. Beringss. p. 566; Kjellm. & Lundstr., Nov. Semlja p. 316; Feilden, Fl. of Kolguev p. 184, Nov. Zemlya p. 21; Scheutz, Pl. vasc. Jeniss. p. 169; Blytt, Bidrag p. 8; L. spadicea v. Wahlenbergii Trautv. Fl. Terr. Tschuktsch. p. 38; L. spadicea v. Kunthii E. Mey. in Ledeb. Fl. Ross. IV, p. 217; Schmidt, Fl. arct. Jeniss. p. 122; L. parviflora, subsp. Wahlenbergii Hartm., Scand. Fl. ed. XII p. 125.

Loosely cæspitose and with short stolons. Stem 10—25 cm. high, with few leaves. Leaves 3—5 mm. broad, glabrous, linear acuminate. Panicle subcymose, branches often drooping. Bracts pellucid, fimbriate. Sepals lanceolate acuminate, as long as the capsule. Sepals and capsules dark chestnut-coloured. Anthers shorter than the filaments.

Am.: St. Lawrence Island (!). Eur.: Spitsbergen (!), Kolguev, Novaya Zemlya to 74° (!), Waigats (!), Dolgoi Island (!), Habarowa, Samoyede Land. As.: Mouths of the Yenissei (!) and Boganida (!), Chukches Land (!).

Geogr. area: Northern Scandinavia, Northern Russia, Northern Siberia.

62. *L. spicata* (L.) D. C.

Hook. Fl. Bor. Am. II p. 188; Rothr., Fl. of Alaska p. 456; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 84; Macoun, Catalogue IV p. 68; Lge. Consp. Fl. Groenl. p. 128; Hartz, Nordöst Grönl. p. 84; Kjellm., Nov. Semlja p. 330; Ledeb. Fl. Ross. IV p. 220.

Densely cæspitose. Stem erect 10—30 cm. high. Leaves channeled, narrow, linear, ciliated; the lower obtuse, the upper acuminate sharply pointed. Stem leafy to the top. Lower bracts leaf-like; bractlets ovate acuminate, membranous, lacerate. Clusters sessile, forming an interrupted spike-like somewhat drooping panicle. Sepals ovate-lanceolate acuminate, bristle-pointed, chestnut-coloured, somewhat longer than the darker, broadly ovate, mucronate capsule.

Am.: St. Lawrence Island, Bering Strait, Kotzebue Sound, Hudson Strait, Baffin Land: Cumberland Gulf, West Greenl. 60° — 71° (!), East Greenl. $65^{\circ} 40'$, 70° — 71° (!). Eur.: Habarowa (Fisher, in litt.), Novaya Zemlya at 73° — 74° . As.: Chukches Land.

Geogr. area: Northern North America, Iceland, Færöes, Northern Scandinavia, Finland, Northern Russia, Central European Mountains, Caucasus, Northern Asia to Himalaya.

63. *L. arcuata* (Wg.) Sw.

Hook. Fl. Bor. Am. II p. 189; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 84; Hart, Brit. Pol. Exped. p. 142; Lge. Consp. Fl. Groenl. p. 126; Reichardt, Fl. Jan Mayen p. 11; Nath., Spetsb. Kärlv. p. 37; Th. Holm, Novaja Semlias Veget. p. 25; Th. Fries, Beeren Isl. Veget. p. 155; Ledeb. Fl. Ross. IV p. 218 (excl. β & γ); Schmidt, Fl. Jeniss. arct. p. 122 (excl. β); Kjellm., St. Lawrence-ön p. 22; Vest-Eskim. Land p. 59; L. hyperborea R. Br., Chloris Melvill. p. 25 (p. pt.); Taylor, I. c. p. 84; Feilden, Fl. of Kolguev p. 184; Th. Fries, Nov. Semljas Veget. p. 40; L. hyperborea α major Hook. I. c. p. 188; Macoun, Cat. IV p. 68; L. arcuata v. hyperborea Trautv. Consp. Fl. Nov. Zeml. p. 80, Syll. Pl. Sib. bor. orient. p. 536; Ross. Arct. Pl. p. 554, Fl. Kolym. p. 563; L. confusa Lindeb. Botan. Notiser 1855 p. 9; Lge. Consp. Fl. Groenl. I. c. p. 127; Hartz, Nordöst Grönl. p. 343; Feilden, Nov. Zemlya p. 21; Kurtz, Fl. d. Tschuktschenh. p. 476; L. arcuata v. confusa Kjellm., Sib. Nordkust Fanerogamfl. p. 277, As. Beringss. p. 566, Vest-Eskim. Land p. 59; Kjellm. & Lundstr., Nov. Semlja p. 317; Andersson, König Karls Land p. 557; Nath., I. c. p. 37; Reichardt, I. c. p. 11; Blytt, Bidrag p. 9, L. spicata v. Kjellmani Nath. sec. Buchenau Monogr. Junc. p. 126; Juncus arcuatus α & β Wg. Fl. Lapp. (1812) p. 88.

Loosely tufted and with short stolons. Culms erect or ascending, 10—25 cm. high. Leaves narrow linear, curved or erect, channeled, nearly glabrous, somewhat hairy at the base. Clusters in an umbelliform panicle, exterior branches long, erect or arching; not seldom the inflorescence is contracted and capitate. Bracts chestnut-coloured membranous, long ciliated. Sepals dark chestnut-coloured, acuminate, about as long as the capsule. Anthers about as long as the filaments.

L. arcuata α (Wg.) is the more gracile form with narrow curved leaves, few-flowered clusters on slender arching branches; it is rather seldom. *L. arcuata* β (Wg.) (= *L. hyperborea* R. Br. and *L. con-*

fusa Lindeb.) is the most common form with larger many-flowered clusters, more stout often erect panicle-branches and broader, generally erect, sometimes nearly flat leaves. Not seldom the clusters are contracted to a capitate or subspicate inflorescence (f. *subspicata* Lge. l. c.).

A.m.: St. Lawrence Island (!), Port Clarence, Kotzebue Sound, Point Barrow, Arctic Islands (!), Baffin Land, Grinnell Land up to $81^{\circ} 49'$, West Greenl. $60^{\circ}-78^{\circ} 18'$ (!), East Greenl. $60^{\circ}-75^{\circ}$ (!). Eur.: Jan Mayen (!), Spitsbergen (!), King Charles Land, Franz Joseph Archipelago (Fisher, in litt.), Beeren Island (!), Kolguev, Novaya Zemlya to 73° (!), Waigats (!), Samoyede Land (!). As.: Arctic Coast (!), Mouths of the Yenissei, Lena and Kolyma, Taimyr Peninsula (!), New Siberian Islands, Chukches Land.

Geogr. area: Northern North America, Iceland, Færöes, Scotland, Northern Scandinavia, Finland, Northern Russia, Siberia.

64. *L. nivalis* (Læst.) Beurl. Hartm. Handb. ed. XII p. 126.

L. aretica Blytt, Norges Fl. I p. 299 (1861), Bidrag p. 9; Lge. Conspl. Fl. Groenl. p. 127; Hartz, Nordöst Grön. p. 343; Andersson, König Karls Land p. 557; Nath., Spetsb. Kärlv. p. 37; Feilden, Nov. Zemlya p. 21; Kjellm., Sib. Nordk. Fanerogamfl. p. 277; Kjellm. & Lundstr., Nov. Semlja p. 316; *L. hyperborea* R. Br. β , minor Hook. Fl. Bor. Am. II p. 189; Macoun, Catalogue IV p. 69; *L. arcuata* v. *Hookeriana* Trautv. Conspl. Fl. Nov. Zenl. p. 80, Syll. Pl. Sib. bor. orient. p. 546, Fl. Kolym. p. 563; *L. arcuata* f. *latifolia* Kjellm., As. Beringss. p. 566 tab. X, Vest Eskim. Land p. 59, St. Lawrence-ön p. 22; *L. confusa* v. *latifolia* Buchen., Monogr. Junc. p. 125; *L. hyperborea* R. Br., Chloris Melvill. p. 25, 1823 (p. pt.); Lindeb. in Botan. Notiser 1855 p. 8; Scheutz, Pl. vase. Jeniss. p. 169; *L. hyperborea* v. *extensa* Scheutz, l. c. p. 170; *L. arcuata* v. *procerior* Mey. in Ledeb. Fl. Ross. IV p. 218; Schmidt, Fl. Jeniss. arct. p. 122; *L. campestris* v. *nivalis* Læst. (1822).

Densely caespitose. Basal leaves short and broad, linear-lanceolate, glabrous or very sparingly ciliated, acuminate, obtuse or mucronate at the apex. Stem 5—15 cm., seldom 25 cm. high, with 2—3 shorter leaves. Inflorescence subcapitate, generally supported by a leafy bract; clusters 1—3 approximate, very seldom the inflorescence is umbelliform with a few clusters on erect or somewhat arching branches (*L. arcuata* f. *latifolia* Kjellm., *L. hyperborea* v. *extensa* Scheutz). Bractlets more or less lacerate, not ciliated. Sepals ovate-lanceolate, shorter than the ovate, mucronate capsule. Sepals and capsule dark brown. Anthers shorter than the filaments.

This plant is exceedingly nearly allied to the following species, so that we are greatly in doubt if it would not be better to consider it as a reduced Arctic form of this. Generally *L. nivalis* has been thought to be nearest allied to *L. arcuata* from which the plant always can be separated by the densely caespitose growth, the broad leaves,

not unlike those of *L. Wahlenbergii*, the lower leafy bract, the serrate not ciliated bractlets and the shorter sepals.

A.m.: St. Lawrence Island (!), Kotzebue Sound, Port Clarence (!), Arctic Islands (!), West Greenl. $64^{\circ} 30'$ — 72° (!), East Greenl. 70° — $73^{\circ} 30'$ (!). Eur.: Spitsbergen (!), King Charles Land, Novaya Zemlya to 74° (!), Dolgoi Island, Habarowa, Samoyede Land. As.: Arctic Sea-coast (!), Taimyr Peninsula, Mouths of the Yenissei (!), Lena and Kolyma, New Siberian Islands, Chukches Land (!).

Geogr. area: North Canada, Norway (Dovrefjeld), Sweden (Lapland).

65. *L. multiflora* (Ehrh.) Lej.

Lge. Conspl. Fl. Groenl. p. 125; Hart, Brit. Pol. Exp. p. 142, 240; Hartz, Nordöst Grönl. p. 343; Feilden, Fl. of Kolguev p. 184; *L. campestris* v. β et γ , Ledeb. Fl. Ross. IV p. 219, 220; *L. campestris*, Rosenv., Till. p. 714; *L. campestris* v. *congesta* Taylor, Pl. coll. at Davis Str. and Baffin Bay, p. 84; *L. campestris* v. *alpina* E. Mey., Trautv. Syll. Sib. bor. orient. p. 536, Fl. Kolym. p. 564; *L. campestris* D. C. v. *multiflora* Celak, Buchenau, Monogr. Junc. p. 161, 164; *L. campestris*, subsp. *frigida* Buch., Dusén, Öst-Grönl. p. 53; *Juncus campestris* β et γ L.

Densely caespitose. Leaves linear, flat, long ciliated especially at the insertion of the sheaths, acuminate, obtuse at the apex. Stem 15—30 cm. high. Inflorescence umbelliform with erect branches, sometimes contracted. Bractlets entire or somewhat serrate. Sepals lanceolate long acuminate about as long as the capsule. Anthers as long as the filaments.

In Arctic regions generally the sepals and capsules are dark brown almost black and the clusters short-stalked and often approximated. This form is the *L. campestris* v. *alpina* Gaud, E. Mey. and v. *congesta* Taylor, Lge. (not Thuill, Koch, Buchenau).

A.m.: Kotzebue Sound, Baffin Land; Cumberland Gulf, Grinnell Land to $81^{\circ} 42'$, West Greenl. 60° — $81^{\circ} 40'$ (!), East Greenl. $60^{\circ} 10'$ and 70° — 71° (!). Eur.: Kolguev, Samoyede Land (!). As.: Mouths of the Lena and Yenissei (!).

Geogr. area: America, Iceland, Færöes, Europe, North Africa, Asia, New Zealand.

66. *L. campestris* (L.) D. C.

Hook. Fl. bor. Am. II p. 188; *L. campestris* α , Ledeb. Fl. Ross. IV p. 219; *L. campestris* D. C. v. *vulgaris* Gaud., Fr. Buchenau, Monogr. Junc. p. 157; *Juncus campestris* α L.

Loosely caespitose and with short stolons. Stem 10—15 cm. high. Inflorescence with few clusters, the exteriors on arching branches. Anthers longer than the filaments.

A.m.: Kotzebue Sound. As.: Taimyr Peninsula, Chukches Land.

Geogr. area: North America (rare), Færöes, Central Europe, South Europe (rare), Northern Africa (rare), Northern Asia.

Obs: We have mentioned this plant on the authority of Hooker and Ledebour, but we have much doubt, if it occurs in Arctic regions at all, specimens from these we never saw.

Order XII. LILIACEAE Adans. (By C. H. OSTENFELD).

- A. Styles 3, distinct.
 - a. Leaves ensiform, equitant **Tofieldia.**
 - b. Leaves not ensiform.
 - α . Leaves broad plicate **Veratrum.**
 - β . Leaves linear or linear lanceolate **Zygadenus.**
- B. Style 1, undivided.
 - α . Fruit a berry **Streptopus.**
 - β . Fruit a capsule.
 - I. Flowers numerous, umbellate **Allium.**
 - II. Flowers single or few in a raceme.
 - 1. Nectary transversal, stigma undivided, triangular, perianth broad infundibuliform **Lloydia.**
 - 2. Nectary-groove oblong, stigma tripartite, perianth campanulate **Fritillaria.**

1. **TOFIELDIA** Huds.

67. **T. palustris** Huds. Fl. Angl. ed. 2.

Hook. Fl. bor. Am. II p. 179; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 84; Peary, Auxil. Exp. App. C. p. 7; Abromeit, Grönlands-expedition p. 78; Nath., Spetsb. Kärlv. p. 38; Trautv. Pl. Sib. bor. p. 116; Feilden, Nov. Zemlya p. 20; Anthericum calyculatum Fl. D. t. 36; T. borealis Wg., Lge. Consp. Fl. Groenl. p. 122 and 284; Rosenv., Till. p. 712; Hartz, Nordöst Grönl. p. 342.

Stem erect, slender, without bracts. Flowers in a short raceme, supported by a little involucre consisting of 3 bracts. Flowers yellowish. Capsules erect.

Am.: Port Clarence (!, amongst specimens of *T. coccinea*, in Herb. of the Botan. Mus. at Copenhagen, leg. Kjellman), Labrador (!), Baffin Land, West Greenl. Inglefield Gulf and 60° – $74^{\circ} 18'$ (!); East Greenl. 60° – $65^{\circ} 35'$ (!), 70° – 71° (!). Eur.: Spitsbergen (!), Dolgoi Island. As.: Mouth of the Lena, Konyambay (!, amongst spec. of *T. coccinea*, in Herb. of the Riksmuseum at Stockholm, leg. Kjellman).

Geogr. area: Northern North America, Rocky Mountains, Iceland, Great Britain, Scandinavia, Finland, Lapland, The Alps, Pyrenees, Ural.

68. **T. coccinea** Richardson in R. Brown, Verm. Schrift. I. p. 481.

Hook. Fl. bor. Am. II p. 179; Ledeb. Fl. Ross. IV p. 210; Trautv. Pl. Sib. bor. p. 116; Schmidt, Fl. Jeniss. arct. p. 121; Kjellm., Vest Eskim. Land p. 60, As. Beringss. p. 568; Macoun, Catalogue IV p. 44; Rosenv., Till. p. 712; Hartz, Nordöst Grönl. p. 342; Abromeit, Grönlandsexped. p. 79.

Stem ascending, stout, often tinged with purple, with 1–3 bracts. Flowers nearly sessile, the 3-leaved involucre larger than

in *T. palustris*. Perianth outsides purple-coloured. Fruits purple-coloured, at maturity reflexed.

Am.: Kotzebue Sound (!), Port Clarence (!), Arctic Shores, West Greenl. $70^{\circ} 25' - 70^{\circ} 45'$ (!), East Greenl. $70^{\circ} - 71^{\circ}$ (!). As.: Mouths of the Lena and Yenissei (!), Konyambay (!), Chukches Land (!).

Geogr. area: Alaska, Northern North America, Northern Siberia, Kamchatka, Unalashka.

2. VERATRUM L.

69. *V. album* L.
Ledeb. Fl. Ross. IV p. 208; Blytt, Bidrag p. 19; Kjellm., As. Beringss. p. 568, Vest-Eskim. Land p. 59; Schmidt, Fl. Jeniss. arct. p. 121; Feilden, Nov. Zemlya p. 21; Fl. D. tab. 1120; var. *viridis*, Trautv. Fl. Terr. Tschuktsch. p. 38, Pl. Sib. bor. p. 115, Fl. Kolym. p. 563; *V. viride* Aiton, Hort. Kew. ed. 1, vol. 3, p. 422; Hook. Fl. bor. Am. II p. 178; *V. Lobelianum* Bernhardt in Schrad., Neues Journ. f. d. Botanik II, 2 & 3, p. 356; *V. Eschscholtzii* A. Gray, Melanth. in Ann. Lyc. hist. nat. Novi-Eborae. IV p. 119.

Leaves large, broad-ovate, plicate. Upper part of the stem and the panicle-branches pubescent. Flowers supported by membranous bracts, short-stalked, broadly infundibuliform; sepals free, more or less broad, ovate, attenuate at the base, in the margin erose-dentate, externally somewhat pubescent.

Varying in colour from white to greenish: *V. Lobelianum* Bernh. The American form, *V. viride* Ait., has yellowish-green and broader sepals, so that the flowers are somewhat campanulate.

Am.: Port Clarence (!). Eur.: Samoyede Land, Habarowa (!), Waigats. As.: Konyambay (!), Mouths of the Yenissei (!), Lena and Kolyma, Chukches Land (!).

Geogr. area: North America, East Finmark, Central Europe, Siberia.

3. ZYGADENUS Michx.

70. *Z. elegans* Pursh, Fl. Am. sept. I, p. 241, 1813.

Macoun, Catalogue IV p. 32; Eastwood, Pl. coll. at Nome City, p. 131; *Z. elegans*, chloranthus et glaucus Hook. Fl. bor. Am. II p. 177—78; *Anticlea glauca* Kunth., Ledeb. Fl. Ross. IV p. 207; Kjellm., Vest-Eskim. Land p. 60.

Basal leaves broadly linear to linear-lanceolate, glaucous. Stem with one or two bracts. Inflorescence a simple raceme, but sometimes in the lower part branched. Flowers supported by broadly lanceolate bracts, which are about as long as the pedicels in the least. Sepals ovate, obtuse, white-greenish, with obovate-obcordate, yellow-green nectary-gland inside.

Am.: Port Clarence (!), Kotzebue Sound, Nome City.

Geogr. area: Northern North America.

71. *Z. sibiricus* (L.) Endl.

Anticlea sibirica Kunth., Trautv. Pl. Sib. bor. p. 115; Trautv. Fl. Kolym. p. 563.

Basal leaves linear. Stem with one or two bracts. Inflorescence branched with scattered flowers. Bracts twice or four times shorter



Fig. 11. *Zygadenus elegans* Pursh. $\frac{1}{2}$ nat. size.
(Spec. from Port Clarence).

Fig. 12. *Zygadenus sibiricus* (L.) Endl. $\frac{2}{3}$ nat. size.
(Spec. from North Siberia).

than the pedicels. Sepals linear-lanceolate, acute, reflexed, somewhat twisted, coherent below, with a bipartite obovate nectary-gland.

As.: Mouths of the Lena (!) and Kolyma.

Geogr. area: Siberia.

4. STREPTOPUS Michx.

72. **S. amplexifolius** (L.) D. C.

Lge. Consp. Fl. Groenl. p. 121; Uvularia amplexifolia, Fl. D. tab. 1515.

Plant glabrous. Leaves cordate, clasping, glaucous underneath. Flowers placed nearly opposite the leaves on long pedicels, but turned aside so that they are covered by the leaves. Pedicels with a node in the middle and carrying 1 or 2 campanulate and whitish flowers; anthers ending in a long point. Berry ovate, red.

Am.: West Greenl. 60°—67° (I).

Geogr. area: North America, Central European Mountains, Kamchatka, Unalashka.

5. LLOYDIA Salisb.

73. **L. serotina** (L.) Sweet.

Ledeb. Fl. Ross. IV p. 144; Trautv., Fl. Taimyr p. 24, Fl. Terr. Tschuktsch. p. 38, Pl. Sib. bor. p. 114, Fl. Kolym. p. 561, Syll. Pl. Sib. bor. orient. p. 535; Schmidt, Fl. Jeniss. arct. p. 130; Kjellm. & Lundstr. Nov. Semlja p. 317; Kjellm., Sib. Nordk. Fanerogamfl. p. 277, Vest-Eskim. Land. p. 60; Eastwood, Pl. coll. at Nome City, p. 130.

Lower part of the plant covered with withered leaves. Scape 1- (seldom 2-) flowered. Basal leaves capillary, half round, as long as or longer than the scape. Perianth infundibuliform, sepals white, narrow obovate, obtuse, at the base with a nectary.

Am.: St. Lawrence Island (I), Port Clarence, Kotzebue Sound, Cape Lisburn, Nome City. Eur.: Waigats (I), Habarowa (I). As.: Arctic coast of Siberia to Bering Strait (I), New Siberian Islands.

Geogr. area: Mountains of Wales, Central Europe and Central Asia, Siberia, Unalashka.

6. ALLIUM L.

74. **A. strictum** Schrad.

Ledeb. Fl. Ross. IV p. 178; Trautv. Fl. Kolym. p. 562.

Bulbs rising from a short rhizome. Stem with several leaves. Leaves linear, flat or channelled. Umbel supported by 2 short involucral leaves, many flowered, without bulbils. Pedicels as long as or longer than the purple-coloured flowers. Sepals ovate-lanceolate, obtuse; anthers at first as long as the perianth afterwards considerably longer, the filaments of the exteriors with shortly dentate appendices at the base.

As.: Mouth of the Kolyma.

Geogr. area: Germany, Bohemia, Caucasus, Altai, East Siberia.

75. **A. Schoenoprasum** L.

Ledeb. Fl. Ross. IV p. 166; Trautv. Pl. Sib. bor. p. 114, Fl. Kolym. p. 562; Schmidt, Fl. Jeniss. arct. p. 121; Rothr., Fl. of Alaska p. 456;

Fl. D. tab. 971; *A. sibiricum* L., Kjellm., Vest-Eskim. Land p. 60; Kjellm. & Lundstr., Nov. Seml. p. 317; Blytt, Bidrag p. 19; Feilden, Fl. of Kolguev p. 181, Nov. Zeniya p. 20.

Stem round with 1—2 leaves. Leaves round, hollow. Umbel supported by two large involucral leaves, many flowered and dense, without bulbils. Pedicels shorter than the flowers. Sepals purplish, lanceolate acuminate, longer than the anthers; anthers without cuspidate appendices.

Am.: Norton Sound, Port Clarence, Kotzebue Sound. Eur.: Kolguev (!), Dolgoi Island, Samoyede Land, Habarowa, Waigats (!). As.: Mouths of the Yenissei, Lena and Kolyma.

Geogr. area: Northern North America, Most parts of Europe, Caucasus, Siberia to Kamchatka.

7. FRITILLARIA L.

76. *F. kamtschacensis* (L.) Gauler.

Ledeb. Fl. Ross. IV p. 147; Hook. Fl. bor. Am. II p. 181, tab. 193; Rothr., Fl. of Alaska p. 456.

Bulb with numerous bulbils. Leaves verticillate up to 4's, ovate or lanceolate. Flowers 1—4 with campanulate, unicolored perianth. Sepals inside with lamellous-prominent veins and a necessary groove near the base. Stigma trifid, capsule obtuse, 6-angular.

Am.: Schischmareff Bay, Cape Prince of Wales.

Geogr. area: Alaska, East-Siberia, Kamchatka and Kuril Islands.

Order XIII. IRIDACEAE Juss. (By C. H. OSTENFELD).

Only the following genus in the area:

1. IRIS L.

77. *I. sibirica* L.

Rothr., Fl. of Alaska p. 456 (*I. setosa* Pall. in Ledeb. Fl. Ross. IV p. 96?).

Leaves narrow, ensiform, shorter than the hollow stem. Flowers short-stalked, bluish; the exterior sepals pale blue with dark blue veins, reflexed, broadly obovate with rather long brownish-violet-veined claw, crestless, the interiors erect, shorter than the exteriors, but longer than the stigmas. Capsule 3-angular.

Am.: Norton Sound, Kotzebue Sound.

Geogr. area: Central and East Europe, Sweden, Caucasus, Siberia, Unalashka.

Obs. During the printing I have received *The Botanical Gazette* for Febr. 1902, in which A. Eastwood published an *Iris arctica* n. sp. from Nome City (Eastwood, Pl. coll. at Nome City, p. 132). It has single stems, one-flowered spathes, thin and lax leaves; the exterior sepals are violet with a greenish-yellow spot, the interiors white blotched with purple on the lower half. It seems nearly allied to *I. setosa* Pall and *I. sibirica* L.

Order XIV. ORCHIDACEÆ Lindl. (By C. H. OSTENFELD).

- A. Pale saprophyte, leaves reduced to scales 1. **Coralliorrhiza**.
 B. Green autophytes.
 a. Lip without spur 2. **Listera**.
 b. Lip with spur.
 1. The two disks of the pollinia enclosed in a common pouch 3. **Orchis**.
 2. The two disks naked, 4. **Habenaria**.

1. CORALLIORHIZA R. Br.

78. **C. innata** R. Br.

Lge. Consp. Fl. Groenl. p. 120 and p. 283; Rosenv., Till. p. 711; Ledeb. Fl. Ross. IV p. 49; Rothr., Fl. of Alaska p. 456; C. virescens, Fl. D. tab. 2363; C. ericetorum, Fl. D. tab. 2364.

Scape with pale-brownish scales; rhizome coral-like; raceme few-flowered; perianth yellowish-green, lip oblong with two teeth above the base, whitish with purple dots; spur only a small protuberance.

Am.: Kotzebue Sound, West Greenl. $60^{\circ} 43'$ — $69^{\circ} 50'$ (!).

Geogr. area: Northern North America, Iceland, Most parts of Europe, Siberia.

2. LISTERA R. Br.

79. **L. cordata** (L.) R. Br.

Lge. Consp. Fl. Groenl. p. 120 and p. 283; Rosenv. Till. p. 711; Hook. Fl. bor. Am. II p. 204; Ophrys cordata, Fl. D. tab. 1278.

Stem with two opposite sessile cordate-ovate leaves; rhizome creeping; raceme few-flowered, perianth brownish-green; lip with a tooth on each side at the base, twice as long as the sepals and petals, two-cleft.

Am.: West Greenl. 60° — $69^{\circ} 50'$ (!). East Greenl. 60° — 61° (!).

Geogr. area: Northern North America, Iceland, Færöes, North, East and Central Europe, Siberia.

3. ORCHIS L.

80. **O. rotundifolia** Pursh.

Platanthera rot., Hook. Fl. bor. Am. II p. 200, tab. 201; Lge. Consp. Fl. Groenl. p. 119 and p. 283; Fl. D. tab. 2871.

Stem with 1—2 scales and 1 obovate-orbicular leaf; roots of numerous fleshy fibres; spike few-flowered; perianth rose; lip white, spotted with purple, 3-lobed and the middle lobe larger, obcordate with a notch at the extremity; spur a little shorter than the lip.

Am.: Hudson Bay, West Greenl. 60° — 61° (!).

Geogr. area: Northern North America.

4. HABENARIA Willd.

- A. Lip entire.
- a. Leaf only 1, basal *H. obtusata*.
 - b. Leaves several *H. hyperborea*.
- B. Lip 2—3-toothed or lobed.
- a. Lip linear-oblong *H. viridis*.
 - b. Lip as long as broad. *H. albida*.

81. *H. obtusata* (Pursh.) Rich.

Platanthera obtusata, Hook. Fl. bor. Am. II p. 196, tab. 199; Ledeb. Fl. Ross. IV p. 68; Rothr., Fl. of Alaska p. 456; Fl. D. Suppl. tab. 165.

Stem with 1 obovate obtuse leaf at the base; roots of slender, fleshy fibres; spike few-flowered; perianth greenish-yellow; upper sepal broad, nearly triangular; the others and the petals except the lip, slightly incurved; lip entire about as long as the spur.

Am.: Kotzebue Sound.

Geogr. area: Northern North America, Northern Lapland, Northern Siberia.

82. *H. hyperborea* (L.) R. Br.

Platanthera hyperborea ♂ major, Lge. Consp. Fl. Groenl. p. 128 and p. 283; Fl. D. tab. 2970; *Orchis Koenigii*, Fl. D. tab. 333; *Limnorchis major* (Lge.) Rydb., Bull. Torrey Botan. Club, 1901, 28, p. 617; *L. media* Rydb., I. c. p. 618; *L. hyperborea* (L.) Rydb., I. c. p. 620; *L. huronensis* Nutt. Rydb., I. c. p. 619.

Stem leafy; leaves lanceolate, erect; root-tubers long and slender; spike dense, many-flowered; perianth greenish; lateral sepals spreading or recurved; lip entire, about as long as the incurved spur.

Am.: West Greenl. 60° — $69^{\circ} 30'$ (!), East Greenl. 60° — $60^{\circ} 35'$ (!).

Geogr. area: Northern North America, Iceland.

83. *H. viridis* (L.) R. Br.

Coeglossum viride, Kjellm., As. Beringss. p. 555; *Peristylus viridis*, Ledeb. Fl. Ross. IV p. 72; Trautv. Syll. Pl. Sib. bor. orient. p. 535; *Satyrion viride* L., Fl. D. tab. 77.

Stem about 3-leaved; tubers 2—3-lobed; spike lax; leaves gradually reduced to lanceolate, acute bracts, a little longer than the ovaries or 2—3 times the length of them (*H. bracteata* (Willd.) R. Br.); perianth brownish-green; sepals and petals except the lip incurved; lip long, oblong-linear or slightly spatulate, 3-toothed at the tip; the middle tooth the smallest; spur very short and sac-like.

Eur.: Cap Mikulkin. As.: Mouth of the Lena, Chukches Land (?).

Geogr. area: Northern North America (*H. bracteata*), Iceland, Færöes, Most parts of Europe and Northern Asia.

84. *H. albida* (L.) R. Br.

Lge. Consp. Fl. Groenl. p. 118 and p. 282; *Satyrion albidum* Fl. D. tab. 115

Stem 3—6-leaved; root-fibres 4—5, fleshy; spike dense-flowered: perianth whitish; sepals and petals incurved; lip short, deeply 3-lobed; the middle lobe the longest; spur short, about half as long as the ovary.

Am.: West Greenl. 60°—69° 30' (), East Greenl. 60°—62° ().

Geogr. area: Iceland, Færöes, West and North Europe. Ural.

Order XV. CYPERACEAE St. Hil. (By C. H. OSTENFELD).

- A. Most flowers bisexual (*Scirpeae*).
 - a. Perianth of 6 or numerous filiform smooth bristles¹, which are much exserted at maturity 1. **Eriophorum**.
 - b. Perianth of 1—8 bristles, not exserted at maturity.
 - aa. Style-base bulbiform persistent, separated from the summit of the achene by an articulation 2. **Heleocharis**.
 - bb. Style-base passing gradually continuously into the summit of the achene 3. **Scirpus**.
- B. All flowers unisexual (*Cariceae*).
 - a. Achene not enclosed in an utricle.
 - aa. Spikelets consisting of one male and one female flower 4. **Elyna**.
 - bb. Spikelets unisexual, one-flowered, the upper ones male, the lower ones female 5. **Kobresia**.
 - b. Achene enclosed in an utricle 6. **Carex**.

1. ERIOPHORUM L.

- A. Spikelets several, umbellate; involucrum 1—4-leaved.
 - a. Leaves flat, only triangular-channelled at the apex; peduncles of the spikelets rough **E. latifolium**.
 - b. Leaves flat in the lower part, triangular-channelled from about the middle; peduncles smooth **E. polystachyum**.
- B. Spike solitary, terminal; involucrum short or wanting.
 - a. Tufted without stolons.
 - aa. Large and dense tufts; culms numerous; anthers large, linear **E. vaginatum**.
 - bb. Small and loose tufts; culms few; anthers small, obovate. . **E. callitrichix**.
 - b. Rhizome creeping, culms solitary.
 - aa. Anthers small, obovate; bristles white **E. Scheuchzeri**.
 - bb. Anthers rather large, linear; bristles reddish-brown . . . **E. russeolum**.

85. **E. latifolium** Hoppe.

Ledeb. Fl. Ross. IV p. 254; E. polystachyon Hook. Fl. bor. Am. II Fl. D. tab. 1331.

Culms obtusely triangular above; leaves flat, keeled, triangular-channelled at the apex; peduncles of the spikelets terete, rough; bristles numerous, rather long, white; anthers shorter than the filaments.

We have not seen specimens of this plant from the Arctic regions and we think that the localities cited below should perhaps be classed under the following species, but we have taken it on the authority of Ledebour and Hooker.

¹ The so-called «bristles» setae in Eriophorum are not bristle-formed, they are ligulate.

Am.: Arctic Shores and Islands. As.: St. Lawrence Bay in Chukches Land.

Geogr. area: North America, Europe, Asia Minor, Northern Asia.

86. *E. polystachyum* L.

Peary, Auxil. Exp. App. C. p. 7; Hart, Brit. Pol. Exped. p. 303; *E. angustifolium* Hook. Fl. bor. Am. II p. 231; Taylor, Pl. coll. at Davis Str. and Baffl. Bay p. 84; Lge. Consp. Fl. Groenl. p. 130 and p. 287; Hartz, Nordöst Grönl. p. 344; Ledeb. Fl. Ross. IV p. 254; Blytt, Bidrag p. 19; Feilden, Fl. of Kolguev p. 184, Nov. Zemlya p. 21; Kjellm. & Lundstr., Nov. Semija p. 36; Trauty. Consp. Fl. Nov. Zeml. p. 80, Fl. Kolym. p. 565, Fl. Terr. Tschuktsch. p. 38, Pl. Sib. bor. p. 122; Schmidt, Fl. Jeniss. Kjellm., Sib. Nordk. Fanerogamfl. p. 276, As. Beringss. p. 564, St. Lawrence-ön p. 22, Vest-Eskim. Land p. 58; Eastwood, Pl. coll. at Nome City, p. 130; Fl. D. tab. 1442; f. *tristis* Th. Fr., Nath., Spetsb. Kärlv. p. 36.

Culms nearly terete or obscurely obtuse-triangular above; leaves flat in the lower part, keeled, triangular from above the middle, rough-margined; peduncles of the spikelets smooth (sometimes a little rough) and often flattened; bristles numerous very long, white; anthers about as long as the filaments.

Common in the Arctic regions and very variable in length of the peduncles, number of spikelets and height. Sometimes the scales are dark (f. *tristis* Th. Fries).

Am.: The whole of Arctic North America from Beering Sea to Davis Strait (!), West Greenl. 60° — 82° (!), East Greenl. 60° — 75° (!). Eur.: Spitsbergen (!), Kolguev, Dolgoi Island (!), Waigats (!), Novaya Zemlya to 74° (!), Habarowa (!), Samoyede Land. As.: Arctic Shores and Islands to Chukches Land (!).

Geogr. area: North America, Iceland, Færöes, Europe, Northern Asia.

87. *E. vaginatum* L.

Hart, Brit. Pol. Exped. p. 242 (?); Ledeb. Fl. Ross. IV p. 252; Blytt, Bidrag p. 19; Feilden, Fl. of Kolguev p. 184, Nov. Zemlya p. 21; Trauty. Fl. Taimyr p. 22, Consp. Fl. Nov. Zeml. p. 81, Pl. Sib. bor. p. 121, Fl. Kolym. p. 565, Fl. Terr. Tschuktsch. p. 38; Schmidt, Pl. Jeniss. arct. p. 123; Kjellm., Sib. Nordk. Fanerogamfl. p. 276, As. Beringss. p. 564, Vest-Eskim. Land p. 58; Fl. D. tab. 236; Eastwood, Pl. coll. at Nome City p. 130.

Large and dense tufts with numerous culms; culms obtusely triangular above, with two inflated sheaths; scales obovate-lanceolate, long-pointed, membranous, greyish; anthers long, linear, a little shorter than the filaments; bristles glossy white.

Am.: Port Clarence (!), Nome City, [?West Greenl. 72° — 78°]. Eur.: Kolguev, Waigats (!), Novaya Zemlya to 74° (!). As.: The Arctic Coast from the Yenissei to Chukches Land (!).

Geogr. area: Northern North America, Færöes, North and Central Europe, Caucasus, Northern Asia.

Note. We think it a mistake of Mr. Hart to indicate this species from Greenland, none of the many other botanists and collectors who have visited Greenland, having found it.

88. **E. callithrix** Chamisso in C. A. Meyer, Mém. prés. à l'Acad. de St. Petersb. par div. sav., 1831, p. 203, tab. II.

Ledeb. Fl. Ross. IV p. 254; Kjellm., As. Beringss. p. 564, Vest-Eskim. Land p. 58; Kjellm. & Lundstr., Nov. Semlja p. 316; Feilden, Nov. Zemlya p. 21; Rothr. Fl. of Alaska p. 457; Fl. D. Suppl. tab. 122; E. capitatum β, Hook. Fl. bor. Am. II p. 231.

Tufts small with few culms; culms terete; bracts nearly non-inflated; scales grayish-black, not membranous, long-pointed, narrower than by *E. vaginatum*, the lower much larger than the upper; anthers small, obovate, much shorter than the filaments; bristles white with a reddish tinge.

Am.: Port Clarence (⌚). Eur.: Dolgoi Island, Waigats (⌚), Novaya Zemlya, Habarowa. As.: Mouth of the Yenissei (⌚), Taimyr Peninsula 73° 45' (Middendorf as *E. vaginatum*!), Chukches Land (⌚), St. Lawrence Island.

Geogr. area: Northern Scandinavia, Russia and Siberia.

89. **E. Scheuchzeri** Hoppe.

Rothr. Fl. of Alaska p. 457; Peary, Auxil. Exp. App. C. p. 7; Cornell party, Peary Voy. 1896, p. 419; Lge. Consp. Fl. Groenl. p. 1S9 and p. 286; Hartz, Nordöst Grönl. p. 344; Nath., Spetsb. Kärly. p. 37; Ledeb. Fl. Ross. IV p. 253; Blytt, Bidrag p. 19; Trautv. Fl. Taimyr p. 23, Consp. Fl. Nov. Zeml. p. 81, Fl. Kolym. p. 564, Pl. Sib. bor. p. 121; Pl. Ross. arct. p. 551 and p. 554, Syll. Pl. Sib. bor. orient. p. 537; Feilden, Fl. of Kolguev p. 184, Nov. Zemlya p. 21; Schmidt, Fl. Jeniss. arct. p. 123; Kjellm. & Lundstr., Nov. Semlja p. 316; Kjellm., Sib. Nordk. Fanerogamfl. p. 276, As. Beringss. p. 565, St. Lawrence-ön p. 22; E. capitatum Hook. Fl. bor. Am. II p. 231; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 84; Fl. D. tab. 1502; E. capitatum and var. Scheuchzeri, Hart. Brit. Pol. Exped. p. 242.

Rhizome creeping with solitary culms; culms with non-inflated sheaths; flowering spike obovate; scales dark-gray or dark-brown, not membranous except a narrow margin, long-pointed; the 1—3 lowermost much larger than the other; anthers small, obovate-lanceolate, many times shorter than the filaments; bristles brightly white.

Common in the Arctic regions. Am.: Arctic Coast and Islands (⌚), Big Island in Hudson Strait, West Greenl. 60°—82° (⌚), East Greenl. 60°—74° (⌚). Eur.: Spitsbergen (⌚), Kolguev, Dolgoi Island, Novaya Zemlya to 74° (⌚), Waigats (⌚), Habarowa (Fisher in litt.). As.: Arctic Coast (⌚) and Islands, New-Siberian Islands, Mouths of the Yenissei (⌚), Lena (⌚) and Kolyma, Chukches Land.

Geogr. area: Northern North America, Iceland, Scandinavia, Russia, Central European Mountains, Siberia.

90. **E. russeolum** Fries, Herb. Norm., fasc. III n. 67 and Novit. Fl. Suec. Mant. III p. 170.

Schmidt, Fl. Jeniss. arct. p. 123; Kjellm. & Lundstr., Nov. Semlja p. 316; Kjellm., Sib. Nordk. Fanerogamfl. p. 276, As. Beringss. p. 565, St. Lawrence-ön p. 22; Feilden, Nov. Zemlya p. 21; Fl. D. Suppl. tab. 8; E. Channisonis Fr., Mant. II p. 1, non C. A. Meyer in Ledeb. Fl. Alt., nec Mém. prés. à l'Acad. de St. Petersb. par div. sav., I, 1831, p. 204 tab. 3.

Rhizome creeping with solitary culms, culms with non-inflated sheaths; flowering spike oblong; scales dark-gray or dark-brown, not membranous in the central part, but with a large membranous margin; the lowest largest; anthers rather large, linear, somewhat shorter than the filaments; bristles reddish-brown.

Eur.: Dolgoi Island, Waigats (!), Habarowa. As.: Yalmal (!), White Island (!), Mouth of the Yenissei (!), Pitlekay (!), Chukches Land, St. Lawrence Island (!).

Geogr. area: East Canada, Northern Scandinavia and Russia, Siberia, Kamchatka, Kurile Islands, Unalashka.

2. HELEOCHARIS R. Br.

1. Culms filiform, more or less 4-angular; stigmas 3; achene ribbed **H. acicularis**.
2. Culms robust, terete; stigmas 2; achene smooth **H. palustris**.

91. **H. acicularis** (L.) R. Br. f. **submersa** Hjalm. Nilsson, Botan. Notiser 1888, p. 139—147.

Scirpus parvulus Lge. Consp. Fl. Groenl. p. 128 & p. 286; Rosenv., Till. p. 716; *Juncus triglumis* Abromeit, Grönlandsexp. p. 81 ex parte; *Scirpus acicularis* Fl. D. tab. 287.

Culms filiform or setaceous, more or less 4-angular; rhizome creeping, filiform, bearing bundles of erect culms; spike terminal, stigmas 3, achenes triangular, ribbed.

The arctic specimens are all sterile and submersed (f. *submersa* Hj. Nilss.) and are very like sterile specimens of *Scirpus parvulus* R. & S., for which the previous Danish authors had mistaken the specimens from Greenland; but *S. parvulus* has bulbiform, acute terminal buds on the stolons, and the culms are shorter and a little more robust; (anatomically it is easier to distinguish the two plants, the radial walls of the epidermis-cells in *S. parvulus* being distinctly undulated, in *H. acicularis* straight). It is more surprising that the well-known *Juncus*-specialist Professor Buchenau (Abromeit, i.c.) has confounded such sterile plants with young plants of *Juncus triglumis*, from which they differ much.

Am.: West Greenl. 68° 21' (!), 69° 5' (!), 70° 30' (!).

Geogr. area: North America, Iceland, Europe, Caucasus, East-Siberia.

92. **H. palustris** (L.) R. Br.

Lge. Consp. Fl. Groenl. p. 128; *Scirpus palustris* Fl. D. t. 273.

Rhizome stout, horizontally creeping; culms robust, terete; spike oblong-lanceolate, many-flowered; the two lowest scales largest, half clasping, obtuse, the others smaller, acute; achene obtusely triangular or compressed, smooth; stigmas 2.

Am.: West Greenl. 61° 2' (t).

Geogr. area: Northern North America, Iceland, Færöes, Europe, Caucasus, Siberia to Saghalin.

3. SCIRPUS L.

1. Rhizome short, culms densely tufted without stolons; achene brown, 1.5—2 mm. **S. caespitosus**.
2. Rhizome creeping with stolons; achene grayish, 2—2.5 mm. **S. pauciflorus**.

93. **S. caespitosus** L.

Kjellm., Vest-Eskim. Land, p. 59; Lge. Consp. Fl. Groenl. p. 129 and p. 286; Rosenv., Nye Bidrag p. 70; Meinshausen, Cyperac. Fl. Russl. p. 257; Fl. D. tab. 1861; *Eleocharis caespitosus*, Hook. Fl. bor. Am. II p. 229.

Culms densely tufted, striate; no stolons; upper sheath with short leaf, lower ones leaf-less; one terminal spike; lowest scale sterile, as long as or longer than the ovate spike, mucronate with a long rigid green point; achene smooth; stigmas 2.

The specimens from Greenland agree not well with any of the two species (*austriacum* and *germanicum*) in which Palla (Ber. d. Deutsch. bot. Gesellsch., 1897, p. 468) has divided *Scirpus caespitosus* (*Trichophorum caespitosum* (L.) Hartm.), and we prefer to retain the old collective species.

Am.: Port Clarence, Labrador to the Arctic Sea, West Greenl. 60°—70° J., East Greenl. 60°—63° J. Eur.: Samoyede Land.

Geogr. area: Northern North America, Iceland, Færöes, North and Central Europe, The Alps, Northern Siberia, Saghalin, Unalashka.

94. **S. pauciflorus** Lghtf.

Rosenv., Till. p. 716; Fl. D. tab. 1862.

Rhizome creeping, culms loosely cespitose, smooth (obscurely striate when dry), stolons with bulbs; all the sheaths leaf-less; one terminal spike; the lowest scale somewhat larger than the others, but not as long as the spike, obtuse, not mucronate; achene very finely striate, stigmas 3.

Am.: West Greenl. 61° 2' (t).

Geogr. area: Northern North America, Iceland, Færöes, North and Central Europe, Caucasus, Siberia.

4. ELYNA Schrad.

1. Spike cylindrical, linear, terminal, composed of numerous small spikelets, each consisting of one male and one female flower; leaves setaceous . . . **E. Bellardi.**
2. Spike oblong to ovoid, composed of several spikes which again consist of small spikelets; leaves linear **E. schoenoides.**

95. **E. Bellardi** (All.) C. Koch.

Lge. Consp. Fl. Groenl. p. 130; Hartz, Nordöst Grönl. p. 344; E. spicata Hook. Fl. bor. Am. II p. 228; Trautv., Pl. Sib. bor. p. 122; Fl. D. tab. 2427; Kobresia scirpina Kjellm., Vest-Eskim. Land p. 58; Meinshausen, Cyperac. Fl. Russl. p. 275; Carex parallela Dusén, Ost-Grönl. p. 54 et in sched.



Fig. 13. *a*, *Elyna Bellardi* (All.) C. Koch. *b*, *Elyna schoenoides* C. A. Mey. *c*, *Kobresia bipartita* (All.) Britt. (About 2 times magnified).

Densely tufted; culms slender, smooth, subterete, erect, with numerous brownish fibrillose old sheaths, as long as the leaves when flowering, later longer; leaves setaceous, green with convolute rough margins; spike cylindrical, narrow; spikelets with brown scales; achene obtusely triangular somewhat compressed, lanceolate-ovoid, with short beak.

Am.: Port Clarence, Arctic Sea, West Greenl. c. 60° – 72° (!), East Greenl. 70° – 73° 28' (!). As.: Mouths of the Lena and Uda, St. Lawrence Island.

Geogr. area: Northern North America, Iceland, North Europe, The Alps, Pyrenees, Caucasus, Songaria, Turkestan, Altai, East Siberia.

96. **E. schoenoides** C. A. Mey. in Ledeb., Fl. Alt. IV p. 235.

Ledeb. Fl. Ross. IV p. 262; Trautv., Pl. Sib. bor. p. 122.

Tufted, culms trigonous, robust, much longer than the leaves; leaves linear, green, with convolute margins; spike doubly compound, oblong or oblong-ovoid; scales obtuse, broadly obovate, blackish with brownish middle-vein and paler margins, the innermost with whitish basal-parts; achene obovoid, 3-angular, grayish-brown with rather long beak.

As.: Mouth of the Lena, Chukches Land.

Geogr. area: Caucasus, Altai, Himalaya, East Siberia.

5. KOBRESIA Willd.

97. **K. bipartita** (All.) Britton.

K. caricina Willd., Lge. Consp. Fl. Groenl. p. 130; Hartz, Nordöst Grönl. p. 344; Kjellm., Vest-Eskim. Land, p. 58; Fl. D. tab. 2426.

Tufted, culms smooth, longer than the leaves, covered with brown old sheaths; leaves linear, convolute, glaucous, rough in the margins; spike doubly compound, subtended by a short setaceous leaf, oblong-ovoid, composed of several oblong spikelets, each consisting of 5–6 one-flowered spikelets; the upper male, the lower

female; scales brown; achene obtusely triangular, somewhat compressed, oblong or lanceolate with long beak.

Am.: Port Clarence (I), West Greenl. c. 64° — 73° (I), East Greenl. c. 71° I., $73^{\circ} 20'$ I.

Geogr. area: Northern North America, North Europe, The Alps, Caucasus.

- A. One terminal spike. 6. CAREX L.
- a. Dioecious.
- 1. Stigmas 3; utricle hairy **C. scirpoidea** (136).
 - 2. Stigmas 2; utricle glabrous **C. dioica** (113).
- b. Monoecious.
- 1. Stigmas 3.
 - * The axis of the female flower exserted beyond the utricle **C. microglochin** (148).
 - ** The axis not exserted or wanting **C. rupestris** (140).
 - 2. Stigmas 2.
 - * Spike male at the base **C. ursina** (112).
 - ** Spike male at the summit.
 - a.* Stoloniferous **C. dioica** (113).
 - b.* Cæspitose.
 - + Spike globose, utricles broader than the scales **C. capitata** (99).
 - †† Spike ovate, utricles narrower than the scales **C. nardina** (98).
- B. Spikelets sessile, androgynous (at least some of them), stigmas 2.
- a. Male and female flowers variously mixed in the spikelets **C. siccata** (103).
 - b. Male flowers at the summit of the spikelets.
- 1. Utricle strongly nerved, abruptly tapering in the beak **C. chordorrhiza** (102).
 - 2. Utricle faintly nerved, continuously tapering in the beak.
 - * Leaves flat or plicate, scarious in the margins, beak two-toothed, utricle faintly nerved **C. stenophylla** (101).
 - ** Leaves involute, smooth in the margins, beak oblique, utricle nearly nerveless **C. incurva** (100).
- c. Male flowers at the base of the spikelets.
- 1. Utricles with a membranous winged margin.
 - * Spikelets aggregated in a globose head, scales dark-brown, utricles obovate, brown **C. Macloviana** (105).
 - ** Spikelets remote, scales light-brown, utricles lanceolate-ovate, greenish or whitish **C. pratensis** (104).
 - 2. Utricles without membranous winged margin.
 - * Spikelets dark-brown, utricles brown, with short, but distinct beak (except *C. ursina*).
 - a.* Densely cæspitose, growing on sea-shores.
 - + Utricles with short beak, distinctly nerved **C. glareosa** (111).
 - † Utricles without beak, nearly nerveless **C. ursina** (112).
 - b.* Loosely cæspitose with ascending shoots, utricles nerveless or faintly nerved, not growing on sea-shores.
 - † Leaves plicate, glaucous; mostly male flowers at the bases of all the spikelets **C. heleonastes** (109).
 - †† Leaves flat, green; male flowers only at the base of the terminal spikelet **C. lagopina** (110).

- * Spikelets pale, greenish or light-brown, utricles pale, nearly without beak.
- Loosely cespitose; margins of utricles smooth or nearly so
C. norvegica (108).
 - Densely cespitose, margins of utricles scabrous.
 - Spikelets ovate, beak very short, entire, no fissure on the outer side
C. canescens (106).
 - Spikelets ovate-globose, beak short with fissure on the outer side
C. brunnescens (107).
- C. Spikelets more or less stalked, sexes ordinarily distinct, the upper 1—3 male or seldom androgynous, the lower ones female; stigmas 3 or 2.
- Terminal spikelet male at the base, female at the top.
 - Stigmas 2; small species with ascending culms.
 - Scales red-brown; utricles with short beak, pale or red-brown
C. rufina (132).
 - Scales dark-brown or blackish, with light midvein; utricles whitish, finely papillose, beak-less
C. bicolor (133).
 - Stigmas 3; larger species with erect culms.
 - Utricles beak-less, distinctly nerved, scales awned.
 - Spikelets¹ sessile or nearly so, scales dark with pale-greenish midvein; utricles finely papillose
C. Buxbaumii (119).
 - Spikelets more or less stalked; scales dark; utricles not papillose
C. Gmelini (120).
 - Utricles with beak, scales not awned.
 - Utricles with long beak, lanceolate; bracts sheathing
C. misandra (144).
 - Utricles with short beak; bracts not sheathing.
 - Spikelets erect, very short-stalked; scales obtuse *C. alpina* (114).
 - Spikelets stalked, the lower drooping at maturity, scales acute
C. atrata (118).
 - Terminal spikelet male; stigmas 3.
 - Utricles hairy.
 - Female spikelets globose, sessile or nearly so
C. pilulifera (137).
 - Female spikelets, at least the lowest, distinctly stalked.
 - Spikelets ovate-globose, few-flowered; scales dark-brown
C. melanocarpa (139).
 - Spikelets cylindric, many-flowered; scales light-brown
C. Brenneri (138).
 - Utricles glabrous.
 - Bracts shortly or not sheathing.
 - Utricles with distinct beak.
 - Male spikelets more than one; utricles inflated, with long two-toothed beak
C. rostrata (149).
 - Male spikelet one.
 - Cespitose.
 - Female spikelets few- and lax-flowered; bracts scale-like
C. pedata (142).
 - Female spikelets many-flowered, bracts leafy *C. Oederi* (147).

¹ With »spikelets« here and in the following part of the key female spikelets are meant.

- ^{oo} Stoloniferous.
- § Female spikelets few-flowered, bracts scale-like
C. supina (141).
 - §§ Female spikelets many-flowered, bracts leafy.
 - / Low, robust; leaves flat, 2—4 mm. broad; the stalk of the lowest spikelet long and capillary; mostly 2 stigmas
C. pulla (151).
 - // Tall, slender; leaves involute, 1—3 mm. broad; the stalk of the lowest spikelet short; mostly 3 stigmas
C. rotundata (150).
- β . Utricles nearly beak-less.
- \dagger Female spikelets erect short-stalked, dense-flowered.
 - ^o Male spikelet very small, approximated to the upper female one; style not exerted beyond the utricle **C. holostoma** (115).
 - ^{oo} Male spikelet well-developed, remote from the female ones; style usually exerted beyond the utricle at the maturity
C. stylosa (116).
 - \ddagger Female spikelets more or less drooping, long-stalked, rather lax-flowered.
 - ^o Scales elongated, awned; bracts leafy . . . **C. magellanica** (121).
 - ^{oo} Scales not elongated, acute or obtuse.
 - § Cespitosse, bracts leafy, scales dark, acute or obtuse, spikelets rather many-flowered **C. podocarpa** (117).
 - §§ Stoloniferous, bracts short, subulate.
 - / Leaves flat, 1—3 mm. broad, bright-green; scales dark, obtuse; spikelets few-flowered **C. rariflora** (122).
 - // Leaves involute, 0.5—1 mm. broad, glaucous; scales brownish, acute or obtuse; spikelets rather many-flowered
C. limosa (123).
 - $\ast\ast$ Bracts long-sheathing.
 - a. Beak rather long, more or less two-toothed, margins scabrous; utricles lanceolate to ovate.
 - \dagger Female spikelets few- and lax-flowered, light-brown; beak with membranous margins, indistinctly toothed **C. capillaris** (146).
 - $\ddagger\ddagger$ Female spikelets dense-flowered, dark-brown or blackish; beak distinctly two-toothed.
 - ^o Scales as long as the utricles; utricles ovate **C. ustulata** (145).
 - ^{oo} Scales much shorter than the utricles; utricles lanceolate
C. tristis (143).
 - β . Beak rather short, entire, margins not scabrous; utricles rounded-trigonous or globose.
 - \dagger Glaucous; utricles finely papillose, inflated, faintly nerved
C. panicea (134).
 - $\ddagger\ddagger$ Bright green; utricles smooth, non-inflated, nerve-less
C. sparsiflora (135).
 - c. Terminal spikelet male (seldom female at the base); stigmas 2.
 1. Utricles hairy **C. pilulifera** v. **deflexa** (137).
 2. Utricles glabrous.
 - * Utricles shining, with short beak.
 - a. Low, robust; leaves flat, 2—4 mm. broad; the stalk of the lowest spikelet long and capillary; mostly 2 stigmas . . . **C. pulla** (151).

Subgenus A. VIGNEA Beauv. Spikelets sessile, androgynous, male at the summit or base, seldom male and female flowers variously intermixed. Stigmas 2.

Sect. I. *Capituligerae* Kükenth., Engl. Bot. Jahrb., 37, 1900, p. 495.
Spike terminal, solitary or more spikelets densely aggregated in a globose or ovate head; utricles not winged; male flowers at the summit.

Subsect. 1. *Nardinae* Tuckerm., Enum. method. p. 7. Rhizome cæspitose; small species with terminal, solitary, few-flowered spike; utricles membranous; a rudiment of the axis at the base of the achene.

98. *C. nardjna* Fr.

Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; Greely, Lady Frankl. Bay Exp. p. 15; Peary, Auxil. Exp., App. C. p. 7; Hart, Brit. Pol. Exped. p. 240; Lge. Consp. Fl. Groenl. p. 131 and p. 287; Rosenv., Till. p. 717; Hartz, Nordöst Grönl. p. 345; Dusén, Ost-Grönl. p. 55; Nath., Spetsb. Kärlv. p. 36; Fl. D. tab. 2365; C. Hepburnii Boot in Hook. Fl. bor. Am. II p. 209, tab. 207.

Monoecious; densely cæspitose with numerous brown sheaths; culms low, 5—15 cm. high, often curved; leaves trigonous, at the base channelled, as long as or longer than the culms, often curved. Spike ovoid, few-flowered, dark-brown; scales broader than the utricles, obtuse; utricles obtusely-trigonous with convex sides, somewhat scabrous on the margins, lanceolate-ovoid, faintly nerved; stigmas 2.

Am.: Grinnell Land, Baffin Land, Robertson Bay, West Greenl. $60^{\circ} 53'$ — $81^{\circ} 4'$ (♀), East Greenl. $65^{\circ} 35'$, $70^{\circ}—74^{\circ} 40'$ (♀). Eur.: Spitsbergen (♀).

Geogr. area: Northern British North America, Iceland (rare), Northern Scandinavia and Finland.

99. *C. capitata* Soland.

Hook. Fl. Bor. Am. II p. 208; Lge. Conspl. Fl. Groenl. p. 132; Rosenv., Till. p. 718; Scheutz, Pl. vasc. Jeniss. p. 173; Eastwood, Pl. coll. at Nome City, p. 130; Fl. D. tab. 2060.

Fig. 14. *Carex nardina*
Fr. $\frac{2}{3}$ nat. size.
(Spec. from West Greenland).



Fig. 14. *Carex nardina*
Fr. $\frac{2}{3}$ nat. size.
(Spec. from West Greenland).

Monoecious; cæspitose with stiff erect culms, 10—30 cm. high; leaves channelled, scabrous, trigonous at the summit, shorter than the culms; spike ovate-globose; scales brown, subacute; utricles broadly ovate, plano-convex with smooth margins, as broad as or broader than the scales; stigmas 2.

Am.: Nome City, Hudson Bay, West Greenl. $60^{\circ}—71^{\circ}$ (♀), East Greenl. $60^{\circ}—61^{\circ} 32'$ (♀). As.: Mouth of the Yenissei.

Geogr. area: Northern and Alpine North America, Argentina, Tierra del Fuego, Iceland, Northern and Alpine Europe and Asia.

Subsect. 2. *Foetidae* Tuckerm., l. c., p. 10. Rhizome creeping; more spikelets aggregated into a globose head, without bracts; male flowers at the summit; utricles membranous or at the base spongy-incrassated, obsoletely or distinctly nerved.

100. *C. incurva* Lghtf.

Lge. Conspl. Fl. Groenl. p. 134; Rosenv., Till. p. 719; Hartz, Nordöst Grönl. p. 345; Dusén, Ost-Grönl. p. 55; Kruuse, Jan Mayen, p. 301; Nath., Spetsb. Kärlv. p. 36; Ledeb. Fl. Ross. IV p. 269; Schmidt, Fl. Jeniss. arct.



Fig. 15. *Carex capitata* Soland. $\frac{2}{3}$ nat. size.
(Spec. from West Greenland).

p. 124; Th. Holm, Nov. Zeml. Veget. p. 18; Meinshausen, Cyperac. Russl. p. 315; Kjellm., Vest-Eskim. Land p. 57; Kjellm. & Lundstr., Nov. Seml. p. 316; Hook. Coll. of Aret. Pl. p. 123; Fl. D. tab. 432; var. setina Christ apud Scheutz., Pl. vasc. Jeniss. p. 174; C. duriuscula Lge. Consp. Fl. Groenl. p. 134; Rosenv., Till. p. 719; Fl. D. tab. 2843; non C. A. Meyer.

Rhizome horizontally creeping; culms low, mostly curved, as long as or shorter than the leaves; leaves involute, smooth; spikelets aggregated into a globose head, male at the summit; scales obtuse, mucronate; utricles ovoid-globose, membranous, tapering into a smooth, oblique, entire beak, nerveless or obsoletely nerved, longer than the scales; stigmas 2. Mostly growing on sea-shores.

Am.: St. Lawrence Island, Port Clarence, Arctic Sea-coast, West Greenl. 60°—72° 48' (†), East Greenl. 70°—74° 10' (†). Eur.: Jan Mayen (†), Spitsbergen (†), Novaya Zemlya to 70° 34' (†), Waigats (†), Samoyede Land. As.: Mouth of the Yenissei, Chukches Land.

Geogr. area: Northern North America, Magellan, Tierra del Fuego, Iceland, Færöes, North Europe, Central European Mountains, Caucasus, Northern Siberia, Altai, Himalaya.

101. *C. stenophylla* Wg.

Ledeb. Fl. Ross. IV p. 270; v. *duriuscula* Trautv. Syll. Pl. Sib. bor. orient. p. 537; Kurtz, Fl. d. Tschuktschenh. p. 477; Scheutz., Pl. vasc. Jeniss. p. 174; ?*C. curaica* Trautv. I.e. p. 537.

Rhizome horizontally creeping; culms erect, mostly longer than the plicate, scabrous leaves; spikelets aggregated into a ovoid-globose head, male at the summit or some of them male and others female; scales subacute or acute; utricles plano-convex or biconvex,



Fig. 17. *Carex stenophylla* Wg. $\frac{2}{3}$ nat. size.
(Spec. from Central Europe).

globose head, male at the summit or some of them male and others female; scales subacute or acute; utricles plano-convex or biconvex,



Fig. 16. *Carex incurva* Lgbtf. $\frac{2}{3}$ nat. size.
Spec. from West Greenland.

tapering into a scabrous, two-toothed beak, distinctly many-nerved, longer than the scales; stigmas 2.

As.: Mouths of the Yenissei (!) and Lena, Chukches Land.

Geogr. area: North-western North America, Hungary, East-Europe, Caucasus, Siberia, Himalaya.



Fig. 18. *Carex chordorrhiza* Ehrh. $\frac{2}{3}$ nat. size. (Spec. from Iceland).

102. *C. chordorrhiza* Ehrh.

Hook. Fl. bor. Am. II p. 211; Schmidt, Fl. Jeniss. arct. p. 124; Fl. D. tab. 1408; var. *genuina* Trautv. Pl. Sib. Bor. p. 123.

Rhizome creeping, mostly somewhat obliquely ascending; culms erect, smooth, obtusely trigonous at the summit, longer than the leaves; leaves involute, scabrous at the summit; spikelets aggregated into an ovoid head, male at the summit; scales broader than the utricles, subacute; utricles plano-convex or biconvex, ovoid, strongly

many-nerved, as long as the scales, abruptly tapering into a faintly scabrous, entire beak; stigmas 2.

Am.: Hudson Bay. As.: Mouths of the Yenissei and Lena.

Geogr. area: Northern North America, Iceland, North Europe, Central European Mountains, Spain, Northern Asia.

Sect. II. *Alatae* Kükenth., l.c. p.504. Culms with leaf-less sheaths at the base; rhizome cæspitose or creeping; spikelets more or less aggregated; margins of the utricles winged; wings at maturity somewhat involute.

Subsect. 1. *Distichae* Christ, Bull. Soc. Royal. Bot., Belgique, 1885, p. 8. Rhizome creeping, seldom cæspitose; spikelets male at the base or male and female flowers variously intermixed; utricles subcoriaceous.

103. *C. siccata* Dew., Am. Journ. Science, X p. 278, 1826.

C. pallida C. A. Mey., Mém. prés. à l'Acad. Imp. de St. Petersb. p. div. sav., 1831, p. 215, tab. VIII; Trauty. Fl. Kolym. p. 565.

Rhizome creeping; leaves flat, short, much shorter than the culms; culms erect, scabrous; spikelets 4—10, rather densely arranged in two rows, lanceolate to ovoid, male at the base or at the summit or male and female flowers variously intermixed; scales ovate, light-brown with green midvein and membranous margins, acute, about as long as the utricles; utricles ovate, convex on the outer side, concave on the inner side, distinctly many-nerved with erose-membranous marginal wings and scabrous, two toothed rather long beak; stigmas 2.

As.: Mouth of the Kolyma.

Geogr. area: Northern North America, East Siberia, Kamchatka, Saghalin, Japan.

104. *C. pratensis* Drej., Revis. crit. Car. bor., 1841, p. 442.

Lge. Consp. Fl. Groenl. p. 185; Rosenv. Till. p. 719; Fl. D. tab. 497.

Cæspitose; culms longer than the leaves, slender, trigonous, scabrous, often somewhat drooping; leaves flat, scabrous on the margins; lowest bract bristle-like; spikelets 3—7, oblong or obovate, male at the base; scales lanceolate-ovate, acute, light-brown with greenish midvein and membranous margins, as long as the utricles; utricles convex on the outer side, concave on the inner side, faintly nerved, greenish, lanceolate with membranous marginal wings and scabrous, nearly entire beak; stigmas 2.

Am.: West Greenl. $61^{\circ} 15'$ — $64^{\circ} 48'$ ().

Geogr. area: Northern North America.

Subsect. 2. *Ovalis* Kunth., Enum. Pl. II, 1837, p. 384.

Rhizome cæspitose, spikelets male at the base, brown, mostly aggregated; utricles membranous.



Fig. 19. *Carex siccata* Dew.
 $\frac{2}{3}$ nat. size. (Spec. from
 North America).



Fig. 20. *Carex pratensis* Drej.
 $\frac{2}{3}$ nat. size. (Spec. from West
 Greenland).



Fig. 21. *Carex Macloviana* D'Urv.
 $\frac{2}{3}$ nat. size. (Spec. from West
 Greenland).

105. **C. Macloviana** D'Urv., Mem. Soc. Linn. Paris, IV p. 599, 1826.

Kükenthal, Engl. Bot. Jahrb. 27, 1900, p. 505; C. festiva Dew., Lge. Conspl. Fl. Groenl. p. 134; Hartz. Nordöst Grönl. p. 345; Fl. D. tab. 2367.

Cæspitose, culms longer than the leaves, rigid, stout, trigonous with sharp, scabrous edges; leaves flat, broad; spikelets densely aggregated into a globose head, male at the base; scales ovate, acute or subacute, dark-brown with whitish membranous margins, a little shorter than the utricles; utricles convex on the outer side, concave on the inner side, many nerved, ovate, brown, with membranous marginal wings and two-toothed, scabrous beak.

Am.: West Greenl. 60° — 70° (!), East Greenl.: Gaaseland at c. $70^{\circ} 20'$ (!).

Geogr. area: Unalashka, Northern North America, Southern South America, Tierra del Fuego and Falkland Islands, Iceland, Finnmark and Lapland, Kamchatka.

Sect. III. **Verae** Tuckerm., l. c. p. 10, ex maxima parte. Cæspitose; spikelets aggregated or separated, male at the base; utricles not winged nor spongy at the base, with short beak or nearly beak-less.

Subsect. 1. *Canescentes* Fries, l. c. p. 72 ex parte. Spikelets distinctly separated, mostly pale or light-brown; utricles nearly beak-less.

106. **C. canescens** L.

Lge. Conspl. Fl. Groenl. p. 289; Rosenv., Till. p. 719; var. *robusta*, Lge. l. c. p. 136 and p. 289; Rosenv., l. c. p. 719; Macoun, Catalogue IV p. 123; Fl. D. tab. 285; C. curta Hook. Fl. bor. Am. II p. 214.

Cæspitose, culms erect, trigonous with sharp, scabrous edges; leaves flat, c. 2 mm. broad, bright-green, scabrous on the margins; spikelets 3—8, oblong-ovoid or elliptic, with scale-like bracts; the upper one and sometimes some of the others male at the base, the others female; scales broadly ovate, obtuse or subacute, light-brown or pale with greenish midvein, shorter than the utricles; utricles loosely appressed, ovate, faintly nerved, plano-convex, pale or light-brown, scabrous on the margins at the top, without fissure on the outer side, nearly beak-less; stigmas 2.

Am.: Arctic Sea-coast, West Greenl. 60° — 67° (!), East Greenl. 60° — $61^{\circ} 32'$ (!).

Geogr. area: Northern North America, Argentina, Tierra del Fuego, Falkland Islands, Iceland, Most parts of Europe, Caucasus, Northern Asia, Himalaya, Japan.

C. canescens L. \times *Iagopina* Wg., Kihlman in Soc. p. Fauna et Flora Fennica, 1889, p. 10.

C. *helvola* Blytt apud Fries, Botan. Notiser 1849; Rosenv., Till. p. 719; Fl. D. Suppl. tab. 32.

Intermediate between the parents, sterile; mostly the spikelets



Fig. 22. *Carex canescens* L.
2^{1/2} nat. size. (Spec. from
Lapland).



Fig. 23. *Carex canescens*
L. × *lagopina* Wg.
(*C. helvola* Blytt, 2^{1/2} nat.
size. (Spec. from West
Finmark).



Fig. 24. *Carex brunneo-
canescens* (Pers.) Poir.
2^{1/2} nat. size. (Spec. from
West Greenland).



Fig. 25. *Carex norve-
gica* Wg.
2^{1/2} nat. size. (Spec.
from Iceland).

and the upper part of the culms are straw-coloured and dry; scales yellow-green or straw-coloured with broad membranous margins; utricles ovate, nearly nerve-less; achene not developed; pollen nearly sterile.

Am.: West Greenl. c. 60° — $60^{\circ} 30'$ (!).

Geogr. area: Iceland, Scandinavia, Finland, Scotland.

Obs. It may be supposed that hybrids of others of these nearly allied species of the group *Verae* are to be found in the Arctic regions, as some of them, viz. *C. brunnescens* \times *lagopina* and *C. canescens* \times *norvegica* are found in Scandinavia and Central Europe, but these hybrids can only be distinguished when it is known among which species they are growing.

107. *C. brunnescens* (Pers.) Poir., Encyclop. méthod., Suppl. III, 1813, p. 286.

C. curta, β *brunnescens* Pers., Syn. Plant. II, 1807, p. 539; *C. Personii* Sieb. in Lang, Flora XXV, 1842, p. 95; *C. vitilis* Fries, Mant. III, 1842; Lge. Conspl. Fl. Groenl. p. 136 and p. 289; Rosenv., Till. p. 720; Fl. D. tab. 2973; *C. helvola* Lge. I. c. p. 288, non Blytt.

Cæspitose, culms slender, for the rest as the foregoing species; leaves flat, 1—2 mm. broad, somewhat glaucous; spikelets 4—8, ovate-globose, the lowest with bristle-like bract; scales light-brown, subacute; utricles somewhat spreading, light-brown, ovate, smaller, with short beak and on the outer side a fissure which has membranous margins, faintly nerved, seabrous on the margins.

Nearly allied to the foregoing species.

Am.: West Greenl. 60° — 67° (!), East Greenl. 60° (!).

Geogr. area: Northern North America, Iceland, Scandinavia, Central European Mountains, Ural, Northern Asia, Altai, Japan.

108. *C. norvegica* Wg.

Ledeb. Fl. Ross. IV p. 280; Meinshausen, Cyperac. Russl. p. 330; Fl. D. Suppl. tab. 103.

Loosely cæspitose; culms stout, smooth, trigonous with blunt edges; leaves flat, c. 2 mm. broad; spikelets 3—5, oblong or elliptic, the terminal one male at the base, often club-shaped; scales obtuse, light-brown with green midvein, as long as and enclosing the utricles; utricles ovate with very short beak and an indistinct fissure on the outer side, faintly nerved, smooth or a little seabrous on the margins; stigmas 2.

Exclusively a coast-species.

Am.: Kotzebue Sound (!), Eschscholtz Bay.

Geogr. area: Coasts of Northern North America, Iceland, North Europe, East Siberia and Kamchatka.



Fig. 26. *Carex helenastis* Wg.
nat. size. Spec. from
Dovre, Norway



Fig. 27. *Carex lagopina* Wg.
nat. size. (Spec. from
Iceland)



Fig. 28. *Carex glauca* Wg.
nat. size. (Spec. from
Iceland)

Subsect. 2. *Heleonastee* Tuckerm., l. c. p. 10. Spikelets rather aggregated, dark-brown; utricles with short beak (except *C. ursina*).

109. ***C. heleonastes* Ehrh.**

Schmidt, Fl. Jeniss. arct. p. 124; Fl. D. Suppl. tab. 31.

Loosely cespitose; culms rigid, trigonous with sharp, seabrous edges; leaves glaucous, plicate, c. 1 mm. broad; spikelets 3—5, ovate-globose, aggregated, mostly with male flowers at the base of all the spikelets; the lowest with bristle-like bract; scales dark-brown with paler membranous margins, often obtuse, a little shorter than the utricles; utricles somewhat spreading, brown, ovate with smooth or faintly seabrous margins and a fissure on the outer side, plano-convex, many-nerved; stigmas 2. Marsh-species.

Am.: Mouth of the Yenissei (†).

Geogr. area: Northeastern North America, North and Central Europe, Northern Siberia.

110. ***C. lagopina* Wg.**

Lge. Consp. Fl. Groenl. p. 135 and p. 288; Rosenv., Till. p. 719; Hartz, Nordöst Grönland. p. 345; Dusén, Ost-Grönland. p. 56; Rothr., Fl. of Alaska p. 457; Eastwood, Pl. coll. at Nome City, p. 130; Kruuse, Jan Mayen, p. 301; Nath., Spetsb. Kärlyv. p. 36; Trautv. Consp. Fl. Nov. Semjaja p. 25; Th. Holm, Nov. Zeml. Veget. p. 18; Feilden, Nov. Zemlya p. 22; Ledeb. Fl. Ross. IV p. 279; Kjellm., Sib. Nordk. Fanerogamfl. p. 276; Schmidt, Fl. Jeniss. arct. p. 124; Kurtz, Fl. d. Tschuktschenh. p. 478; Fl. D. tab. 294; C. leporina Hook. Fl. bor. Am. II p. 214; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85.

Cespitose, culms rigid, trigonous with seabrous edges; leaves flat, c. 2 mm. broad, bright-green, much shorter than the culms; spikelets 2—4, densely aggregated, ovoid, only the terminal one male at the base; scales brown with paler midvein and margins, obtuse, shorter than the utricles; utricles ovate, plano-convex with smooth or faintly seabrous margins and short beak with a fissure on the outer side, faintly many-nerved; stigmas 2. Mountain-species.

Am.: Kotzebue Sound, Nome City, Cumberland Gulf, West Greenl. 60° — $71^{\circ} 47'$ (†), East Greenl. 60° — 61° , $65^{\circ} 35'$, 70° — 75° (†). Eur.: Jan Mayen (†), Spitsbergen (†), Novaya Zemlya at $70^{\circ} 30'$ (†), Waigats, Samoyede Land. As.: Mouth of the Yenissei, Pittlekaj (†), Chukches Land.

Geogr. area: Northern and Alpine North America, Iceland, North Europe, Central European Mountains, Northern Siberia, Manchuria, Kamchatka.

111. ***C. glareosa* Wg.**

Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; Cornell Party, Peary Voy. p. 418 and p. 422; Lge. Consp. Fl. Groenl. p. 137 and p. 289; Rosenv., Till. p. 720; Ledeb. Fl. Ross. IV p. 284; Nath., Spetsb. Kärlyv. p. 36; Feilden, Fl. of Kolguev p. 184, Nov. Zemlya p. 22; Kjellm. &

Lundstr., Nov. Seml. p. 316; Kjellm., Sib. Nordk. Fanerogamfl. p. 276, St. Lawrence-ön p. 22, Vest-Eskim. Land p. 57; Fl. D. tab. 2430; *C. ursina*, Hartz, Nordöst Grönl. p. 345; Rosenv., Till. p. 718 ex parte, non Dewey.

Densely cæspitose; culms slender, ascending or decumbent, a little scabrous; leaves narrow, c. 1 mm. broad, mostly plicate, glaucous; spikelets about 3, aggregated, ovoid or globose, only the terminal one male at the base, clup-shaped; scales brown with paler midvein and margins, mostly acute, about as long as the utricles; utricles ovate, brown, plano-convex or biconvex (outer side always more convex than the inner side), distinctly many-nerved, with short, smooth beak with a fissure on the outer side; stigmas 2. Coast-species.

Am.: Port Clarence, Cumberland Gulf, Labrador, West Greenl. 60° – $74^{\circ} 15'$ (†), East Greenl. 60° – 63° (†), $65^{\circ} 35'$, 70° – 71° (†, Hartz, as *C. ursina*). Eur.: Spitsbergen (†), Novaya Zemlya to 74° (†), Kolguev, Dolgoi Island, Samoyede Land. As.: Irkaipi, Pittlekaj, Chukches Land, St. Lawrence Island.

Geogr. area: Unalashka, Coasts of Northern North America, Iceland, North Europe, Kamchatka.

112. *C. ursina* Dew.

Hook. Flor. bor. Am. II p. 211, tab. 210; Lge. Consp. Fl. Groenl. p. 287; Dusén, Ost-Grönl. p. 55; Nath., Spetsb. Kärly, p. 35; Kjellm. & Lundstr., Nov. Seml. p. 316; Kjellm., Sib. Nordk. Fanerogamfl. p. 275; Fl. D. tab. 2429.

Densely cæspitose; culms low, ascending or decumbent, smooth, mostly shorter than the leaves; leaves plicate or involute, scabrous on the margins, at the summit trigonous; mostly one terminal, globose spike with male flowers at the base (rarely a little female spikelet from the lowest bract); scales shorter than the utricles, obtuse, dark-brown with paler midvein and margins; utricles broadly ovate, pale, biconvex, faintly nerved, nearly beak-less; stigmas 2. Coast-species.

Am.: Arctic Coasts, West Greenl. $69^{\circ} 30'$ – $70^{\circ} 47'$ (†), East Greenl.: Hurry Inlet at 71° (†). Eur.: Spitsbergen (†), Novaya Zemlya to 73° (†), Waigats. As.: Bjeli Ostrow (†), Preobrascheni.

Geogr. area: Coasts of Arctic North America.

Sect. IV. **Astrostachyae** Th. Holm, Am. Journ. Science, XI, 1901, p. 215. Spike terminal solitary, dioecious or monoecious (Subsect. *Dioicæ* Tuckerm., l. c. p. 7, ex parte) or more spikelets more or less remote, male at the base (Subsect. *Stellulatae* Kunth, l. c. p. 399, ex parte); utricles



Fig. 29. *Carex ursina* Dew. $\frac{2}{3}$ nat. size.
(Spec. from West Greenland).

horizontally spreading at maturity, spongy at the base, with a distinct beak and mostly with scabrous margins.

113. *C. dioica* L.

Hook. Fl. bor. Am. II p. 208; Nath., Nachtr. zu d. Notizen über die Fanerogamfl. Grönl. p. 132; Feilden, Fl. of Kolguev; *C. dioica* γ , gynocrates Ledeb. Fl. Ross. IV p. 264; *C. gynocrates* Wormsk. in Drey. Revis. crit. Car. bor. p. 434; Lge. Conspl. Fl. Groenl. p. 131; Rosenv. Till. p. 717; *C. parallela* Hartz, Nordöst Grönl. p. 344; Nath., Spetsb. Kärlv. p. 36; Th. Holm, Nov. Zeml. Veget. p. 18; *C. dioica* f. *parallela* Scheutz, Pl. vase. Jeniss.; non *C. parallela* Dusén, Ost-Grönl. p. 54, which is Elyna Bellardi.

Dioecious or monoecious; rhizome more or less stoloniferous; leaves hemi-cylindrical, smooth or a little scabrous on the margins; spike terminal solitary, male linear-oblong, female shortly cylindrical, or spike with mixed sexes more or less ovoid; scales obtuse or acute, light to dark-brown, shorter than the utricles; utricles plano-convex or biconvex, more or less spreading, tapering into a beak with smooth or scabrous margins.

In the Arctic regions the following four geographical races are to be found:

α , *typica*.

Feilden, l. c.; Fl. D. tab. 369.

Dioecious or very seldom monoecious; female scales dark-brown, obtuse; utricles dark-brown spreading, plano-convex, ovate with flat, scabrous beak.

β , *gynocrates* (Wormsk.).

C. gynocrates Lge. l. c.; Rosenv., l. c.; Drey., l. c.; Fl. D. tab. 1529; Kunze, Suppl. Schkuhr's Riedgr. p. 123, tab. XXXI, 1; *C. dioica* Hook. l. c.; Nath., Nachtr. Grönl. p. 132; *C. Redowskiana* Britton and Brown, Ill. Flora I p. 340, non C. A. Meyer.

Monoecious or dioecious; female scales light-brown, acute; utricles paler, horizontally reflexed, curved, biconvex, broadly ovate with nearly smooth, short, terete beak.

γ , *parallela* Læstad., Kgl. Vet. Akad. Handl. p. 338, 1822.

C. parallela Sommerf. Suppl. Fl. Lappon. p. 39; Nath., Spetsb. Kärlv. p. 36; Th. Holm, l. c.; Hartz, l. c.; Fl. D. Suppl. tab. 29.

Dioecious; female scales subacute, dark-brown; female spikelet more lax-flowered, cylindrical; utricles dark-brown, suberect, bi-convex, lanceolate-ovate; beak longer, smooth.

δ , *Redowskiana* (C. A. Mey.).

C. Redowskiana C. A. Mey., Mém. prés. à l'Acad. de St. Petersb. par div. sav., 1831, p. 207, tab. IV; Ledeb. Fl. Ross. IV p. 265; Meinshausen,

Cyperac. Russl. p. 304; Kunze, l. c. p. 126, tab. XXXI, 2; *C. dioica* f. *parallela* Scheutz, l. c. and *C. davalliana*, v. *pallida* Christ apud Scheutz, l. c.

Dioecious or seldom monoecious; female spikelet lax-flowered; female scales subacute, light-brown; utricles paler, horizontally curved, biconvex, lanceolate-ovate; beak longer than in γ , smooth.

α . Eur.: Kolguev.

β . Am.: Arctic Coast, West Greenl. 60° – $69^{\circ} 16'$ (!), $81^{\circ} 30'$.

γ . Am.: East Greenl. 70° – 71° (!). Eur.: Spitsbergen (!), Novaya Zemlya to 71° (!).

δ . As.: Mouth of the Yenisei (!).

Geogr. area: α , Iceland, Færöes, North and Central Europe, Russia. β , Northern North America, (?) East Siberia and Kamchatka. γ , Northern Scandinavia. δ , Siberia, Altai, Kamchatka, Alaska (?).

Subgenus B. EUCAREX Cotton, Flor. Paris. p. 744. Spikelets mostly stalked; the sexes commonly not mixed; the upper spikelets male, the lower female (sometimes with male flowers at the summit), rarely the upper spikelet or all the spikelets female with male flowers at the base. Stigmas 2 or 3.

Sect. I. *Melananthae* Drejer, Symbolae Caric., 1844, p. 9. Spikelets clavate, bracts not or very shortly sheathing, scales more or less blackish; utricles compressed, membranous, nearly beakless; stigmas 3, seldom 2.

Subsect. 1. *Atratae* Kunth, l. c. p. 431. Spikelets erect or somewhat drooping; the terminal one female with male flowers at the base or wholly male, the others female; utricles dark-coloured or straminous; stigmas 3, seldom 2.

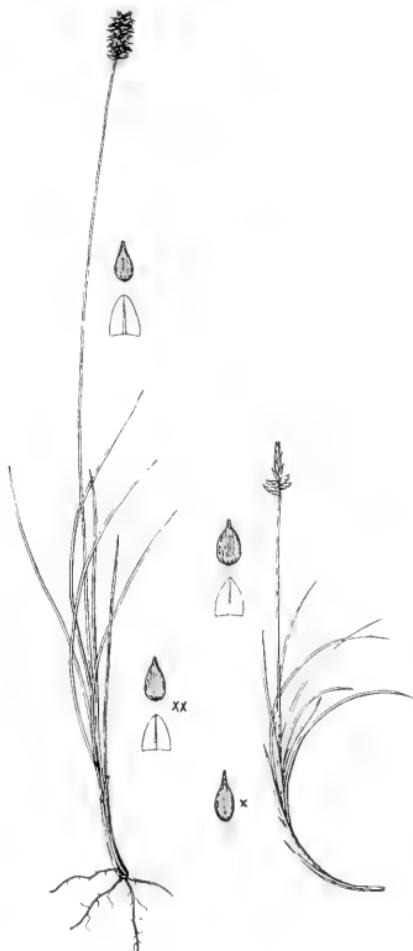


Fig 30. *Carex dioica* L. σ , typica, to the left hand (from Lapland); β , gynocarps (Wormsk.), to the right (from West Greenland) (?) nat. size; x, γ , *parallela* Læstad. (spec. origin.); xx, α , typica, from Denmark.

114. **C. alpina** Sw.

Hart, Brit. Pol. Exp. p. 72 and p. 241; Lge. Conspl. Fl. Groenl. p. 138 and p. 289; Hartz, Nordöst Grönland. p. 346; Trautv. Pl. Sib. bor. p. 125; Kurtz, Fl. d. Tschuktschenh. p. 478; Fl. D. tab. 403; C. Vahlii Hook. Fl. bor. Am. II p. 216; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85.

Cæspitose, culm rigid, erect, trigonous with sharp, scabrous edges, longer than the leaves; leaves flat, 1,5—2,5 mm. broad, scabrous on the margins; lower bract leafy, not sheathing; spikelets 3—4, ovoid-globose, densely aggregated, very short-stalked, terminal spikelet clavate, male at the base, the others female; scales blackish-brown, ovate, obtuse, shorter and narrower than the utricles; utricles ovate, plano-convex, somewhat spreading, pale or blackish-brown above, nerved and faintly papillose, with scabrous margins above and a short, two-toothed beak; stigmas 3.

Am.: Arctic Coasts (!), Cumberland Gulf, Ellesmere Land at $78^{\circ} 52'$, West Greenl. 60° — $72^{\circ} 20'$ (!), East Greenl. c. $70^{\circ} 30'$ (!). As.: Mouths of the Yenissei and Lena, Chukches Land.

Geogr. area: Northern North America, Iceland, Great Britain, North Europe, Central European Mountains, Ural, Siberia, Altai, Himalaya.

115. **C. holostoma** Drej., Revis. crit. Car. bor., 1841, p. 447.

Lge. Conspl. Fl. Groenl. p. 139 and p. 289; Fl. D. tab. 2428.

Rhizome with stolons; culms erect, smooth, trigonous, longer than the leaves; leaves flat, 1—2 mm. broad; terminal spikelet small, few-flowered, linear, male, closely associated to the upper female spikelet; female spikelets 2, short-cylindrical, short-stalked; the lower bract short, leafy; scales ovate, obtuse, blackish-brown, sometimes with paler midvein, shorter than the utricles; utricles ovate-globose, nerve-less, smooth, nearly beak-less and with entire orifice, pale or blackish-brown above; stigmas 3.

Am.: West Greenl. $68^{\circ} 25'$ — $72^{\circ} 20'$ (!).

Geogr. area: West Greenland.

116. **C. stylosa** C. A. Mey., Mém. prés. à l'Acad. Imp. de St. Petersb. par div. sav., 1831, p. 222, tab. XII.

Rosenv., Till. p. 723; C. nigritella Drej., Revis. crit. Car. bor. p. 450; Lge. Conspl. Fl. Groenl. p. 150 and p. 292; Fl. D. tab. 2369.

Cæspitose; culms erect, trigonous with sharp, scabrous edges, a little longer than the leaves; leaves flat with scabrous margins; terminal spikelet well-developed, linear, male, light-brown; female spikelets 2—3, short-cylindrical, the lower one stalked and with a not sheathing leafy bract; scales blackish with paler midvein and margins, obtuse, a little shorter than the utricles; utricles ovate-

globose, biconvex or obtusely trigonous, faintly papillose, pale or blackish above; beak very short with entire orifice; style after flowering mostly exceeding the orifice and persistent; stigmas 3, seldom 2.



Fig. 31. *Carex alpina* Sw. $\frac{2}{3}$ nat. size
(Spec. from Iceland).



Fig. 32. *Carex holostoma* Drej. $\frac{2}{3}$ nat. size.
(Spec. from West Greenland).

Am.: Arctic America, West Greenl. 60° — 62° (†), East Greenl. c. 60° (‡).

Geogr. area: Unalashka, Northwestern North America, Labrador, Arctic Scandinavia (according to C. B. Clarke).

117. *C. podocarpa* R. Br. in Richardson, Append., Franklin Voy.
p. 36. 1823.

Hook. Fl. bor. Am. II p. 224, tab. 224; Bailey, Mem. Torrey Bot. Club. I, 1889, p. 68; Kjellm., As. Beringss. p. 562, Vest-Eskim. Land p. 56;

(?) Meinshausen, Cyperac. Russl. p. 352; non Boeckeler in Linnaea, vol. 41 (1877) p. 165, nec. Bailey, Proc. Amer. Acad., vol. 22, 1886, p. 94, nec. Britton & Brown, Ill. Flora, I, p. 313, fig. 736.

Loosely cæspitose; culms trigonous, a little scabrous above, about as long as the leaves; leaves flat, 2—4 mm. broad, lower leaves on the culms with broad and very short blade; bracts leafy, a little shorter than the culms, non-sheathing with auricled brown base; terminal spikelet male, oblong-ovoid, long-stalked; scales chestnut-brown, obtuse; female spikelets 2, ovoid or short-cylindrical, on long, capillary stalks, more or less drooping, scales dark-brown to blackish, obtuse (subacute) or acute, as long as the utricles; utricles ovate, nerve-less, pale or blackish above, with smooth margins, beak very short, entire or emarginate, terete; stigmas 3.

A.m.: Arctic America, Port Clarence (?). As.: Konyambay in Chukches Land (?), St. Lawrence Island.

Geogr. area: On both sides of the Bering Sea.

Obs. I am following Kjellman l.c. in regarding the specimens collected by him at Port Clarence and Konyambay as the true *C. podocarpa* of R. Brown, and also Mr. C. B. Clarke to whom I sent a specimen from Konyambay, informs me that it may be the fully developed state of *C. podocarpa*; he thinks it nearest allied to *C. stylosa*. It is also related to *C. macrochaeta* C. A. Mey., which just now is found at Nome City, Alaska (Eastwood, Pl. coll. at Nome City, p. 130); this has the female scales awned with a long mucro and larger, faintly nerved utricles; it has about the same geographical area.

118. *C. atrata* L.

Hook. Fl. bor. Am. II p. 216; Greely, Lady Frankl. Bay Exp. II p. 15; Lge. Conspl. Fl. Groenl. p. 139; Rosenv., Till. p. 720; Schmidt, Fl. Jeniss. arct. p. 124; Kurtz, Fl. d. Tschuktschenh. p. 478; Fl. D. tab. 158; C. nigra, Hook. Fl. bor. Am. II p. 216.

Cæspitose; culms trigonous with scabrous or smooth edges, longer than the leaves; leaves flat, 5—9 mm. broad, scabrous on the margins; terminal spikelet male at the base; female spikelets 2—5, ovoid or elliptic; the lowest mostly rather long-stalked with a leafy, not sheathing bract; at least some of the spikelets drooping at maturity; scales broadly ovate, acute, blackish-red or blackish, as long as the utricles; utricles plano-convex or obtusely trigonous, ovate, with very short entire beak, scabrous on the margins above, faintly papillose, pale or seldom blackish above, nerve-less; stigmas 3.

A.m.: Kotzebue Sound, Arctic America (?), Lady Franklin Bay (?), West Greenl. 60° — 62° (?), East Greenl. 60° — 63° (?). As.: Mouth of the Yenissei, Chukches Land

Geogr. area: Northern North America (as *C. atratiformis* Britton), Iceland, Færöes, Great Britain, North Europe, Central European Mountains, Siberia, Songoria, Altai, Himalaya.

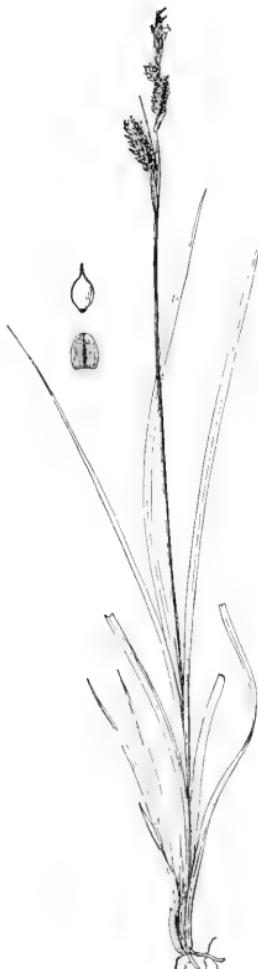


Fig. 33. *Carex stylosa* C. A. Mey. $\frac{2}{3}$ nat. size.
(Spec. from West Greenl.).



Fig. 34. *Carex atrata* L. $\frac{2}{3}$ nat. size.
(Spec. from Iceland).

Subsect. 2. *Buxbaumiae* n. subsect. Loosely cespitose with stolons; terminal spikelet female with male flowers at the base; scales awned; stigmas 3.

119. **C. fusca** All., Fl. Pedem. II p. 267, 1785, according to Bailey, Mem. Torrey. Bot. Club. I p. 63.

C. Buxbaumii Wg., Kgl. Vet. Akad. Handl., 1803, p. 163; Rosenv., Till. p. 721; Fl. D. tab. 1406.

Rhizome loosely caespitose with stolons; culms erect, trigonous with sharp and scabrous edges, longer than the leaves; leaves flat, narrow, scabrous on the margins; lower bract leafy, not sheathing, about as long as the culm; terminal spikelet clavate, male at the base; female spikelets 2—3, ovoid, short-stalked, erect; scales ovate, red- or dark-brown with green midvein, elongated into a scabrous awn, longer than the utricles; utricles pale, broadly elliptic, obtusely trigonous, papillose, distinctly nerved, with a very short beak; stigmas 3.

Am.: West Greenl.: Isaromiut, $61^{\circ} 10'$ (!).

Geogr. area: Northern North America, North and Central Europe, Ural, Siberia, Songoria, China, Kamchatka.

120. **G. Gmelini** Hook. & Arn., Bot. of Beechey Voy. 1832, p. 18, tab. 27.

Hook. Fl. bor. Am. II p. 216; Ledeb. Fl. Ross. IV p. 288; Bailey, Proc. Amer. Acad., 22, 1886, p. 77.

Rhizome loosely caespitose with stolons; culms erect, trigonous with scabrous edges; leaves flat, scabrous on the margins; terminal spikelet clavate, male at the base; female spikelets 3—5, more or less aggregated, short-stalked; lower bract leafy, not sheathing; scales ovate, blackish-brown, elongated into a long hispid awn, longer than the utricles; utricles elliptic, smooth, faintly nerved, with short entire beak; stigmas 3.

Am.: Kotzebue Sound.

Geogr. area: Northwestern North America, East Siberia, Saghalin, Japan (common along the Northern Coasts of the Pacific Ocean).

Subsect. 3. *Limosae* Tuckerm., l.c. p. 12. Stoloniferous; female spikelets drooping; terminal male; utricles mostly papillose; stigmas 3.

121. **C. magellanica** Lam., Dict. de Bot. III p. 385, 1789.

C. limosa, var. *irrigua* Wg., Kgl. Vet. Akad. Handl., 1803, p. 162; *C. irrigua* Smith; Ledeb. Fl. Ross. IV p. 307; Fl. D. Suppl. tab. 106.

Stoloniferous; culms erect, slender, trigonous with sharp and above scabrous edges; leaves flat, scabrous on the margins above, bright-green, 2—3 mm. broad; terminal spikelet male; female spikelets 2, dense-flowered, short, long-stalked; lower bract leafy, longer than the culm; scales brownish with paler midvein, ovate-lanceolate, acuminate, spreading, longer and narrower than the utricles; utricles obtusely trigonous, flattened, broadly elliptic to circular, faintly many-nerved, with very short entire beak.

Eur.: Samoyede Land.

Geogr. area: Northern North America, Chile, Patagonia, Tierra del Fuego, British Isles, North Europe, Central European Mountains, Siberia.



Fig. 35. *Carex fusca* All.
2₃ nat. size.
(Spec. from West Greenland).



Fig. 36. *Carex Gmelini* Hook. &
Arn. 2₃ nat. size.
(Spec. from Alaska).



Fig. 37. *Carex magellanica* Lam.
2₃ nat. size.
(Spec. from Sweden).

122. *C. rariflora* (Wg.) Smith.

Taylor, Pl. coll. at Davis Str. and Baff. Bay; Lge. Conspl. Fl. Groenl. p. 150 and p. 292; Rosenv., Till. p. 724; Hartz, Nordöst Grönl. p. 347; Ledeb. Fl. Ross. IV p. 297; Trautv. Syll. Sib.. bor. orient. p. 538; Kjellm. & Lundstr., Nov. Semilja p. 315; Feilden, Nov. Zemlya p. 21; Kjellm., Sib.

Nordk. Fanerogamfl. p. 275, As. Beringss. p. 562, Vest-Eskim. Land p. 56; Schmidt, Fl. Jeniss. arct. p. 125; Fl. D. tab. 2432.

Stoloniferous; culms erect, obtusely trigonous, smooth; leaves narrow, 1—2 mm. broad, flat, scabrous on the margins above, glaucous; terminal spikelet male, female spikelets 1—3, cylindrical, drooping, few- and lax-flowered; bracts bristle-like with very short, dark-brown sheaths, shorter than the culm; scales broadly ovate, obtuse, sometimes mucronate, blackish-brown with paler midvein, broader than the utricles; utricles obtusely trigonous, flattened, broadly elliptic, faintly nerved, nearly beak-less; stigmas 3.

A.m.: Schischmareff Bay, Port Clarence, Cumberland Gulf, West Greenl. 60° — 73° (!), East Greenl. 60° — 63° (!), $65^{\circ} 35'$ (!), 70° — 71° (!). Eur.: Novaya Zemlya to 73° (!), Waigats, Dolgoi Island, Habarowa, Samoyede Land. As.: Mouths of the Yenissei and Lena, Pittlekaj, Chukches Land.

Geogr. area: Northern North America, Iceland, Mountains of Scotland, Northern Scandinavia and Russia, Northern Siberia.

123. *C. limosa* L.

Feilden, Fl. of Kolguev p. 184; Fl. D. tab. 646.

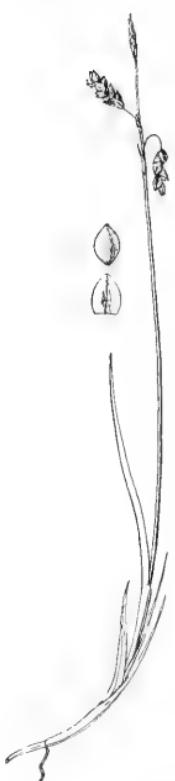


Fig. 38. *Carex rariflora* (Wg.) Sm. $\frac{2}{3}$ nat. size.
(Spec. from West Greenland).

Stoloniferous; culms erect, trigonous with sharp and scabrous edges; leaves narrow, involute, glaucous, 0,5—1,0 mm. broad, scabrous on the margins; terminal spikelet male; female spikelets 1—3, ovoid or elliptic, drooping at length; bracts bristle-like with very short, brown sheaths; scales broadly ovate, acute, brown with paler midvein, about as long and broad as the utricles; utricles obtusely trigonous, flattened, broadly ovate, faintly many-nerved with very short, entire beak; stigmas 3.

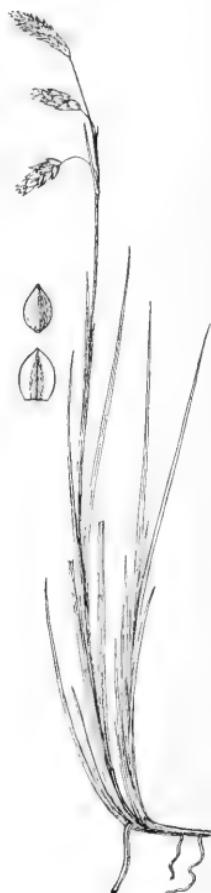


Fig. 39. *Carex limosa* L.
 $\frac{2}{3}$ nat. size.
(Spec. from Iceland).

Eur.: Kolguev.

Geogr. area: Northern North America, Iceland, British Isles, North and Central Europe, Northern Siberia, Saghalin.

Sect. II. *Microrrhynchae* Drejer, Symbolae Caric. p. 9.
Bracts not sheathing; spikelets cylindrical, more or less dense-flowered; utricles smaller, plano-convex, nearly beakless; stigmas 2.

Subsect. 1. *Caespitosae* Fries, Summa Veget. p. 226.
Culms cæspitose, with leaf-less sheaths between the green leaves and the leaves from the foregoing year (*Aphyllopoda*); spikelets short-stalked, erect; leaves with revolute margins; marshes.

124. *C. caespitosa* L.

Hook. Fl. bor. Am. II p. 217; Ledeb. Fl. Ross. IV p. 310;
Fl. D. tab. 2547; var. *typica* Trautv. Fl. rip. Kolym. p. 566.

Cæspitose without stolons; culms erect, trigonous with sharp, scabrous edges, as long as or longer than the leaves; sheaths red-brown, shining; leaf-less sheaths between the green leaves on the culms and the remainders of leaves from the foregoing year; leaves flat with revolute margins; terminal spikelet male; female spikelets 2—3, short-cylindrical, very short-stalked; bracts small, bristle-like, shorter than the culms; scales obtuse, blackish with red-brown midvein, a little shorter than the nerve-less utricles; stigmas 2.

Am.: Kotzebue Sound, Arctic shores. As.: Mouth of the Kolyma.

Geogr. area: Northern North America, British Isles, North and Central Europe, Siberia to Kamchatka.

Obs. We have seen no specimens from the Arctic regions and have mentioned the species on the authority of Hooker and Ledebour; but as we have seen specimens from the northern British North America, we should think that it also is to be found in the Arctic regions.

125. *C. stricta* Good.

Ledeb. Fl. Ross. IV p. 311; Feilden, Fl. of Kolguev p. 184; Fl. D. tab. 2548.

Cæspitose without stolons; culms stout, erect, trigonous with scabrous edges, longer than the leaves; sheaths straw-coloured with fibrillose margins; leaf-less sheaths as in the foregoing species; leaves flat with



Fig. 40. *Carex caespitosa* L.
3/5 nat. size.
(Spec. from
Denmark.)

revolute margins; bracts shorter than the culms, bristle-like. Male spikelets 1—3, female spikelets 2—3, long-cylindrical, often with male flowers at the summit; scales obtuse, blackish, shorter than the nerved utricles; stigmas 2.

Am.: Kotzebue Sound. Eur.: Kolguev.

Geogr. area: Northern North America, British Isles, Central and Southern Scandinavia, Denmark, Central Europe.

Obs. It is doubtfull whether this species is found in the Arctic regions; we have not seen specimens therefrom and suppose that the quoted statements are due to mistakes.

Subsect. 2. *Aquatiles* Fries, l. c. p. 229. Rhizome creeping, culms without leaf-less sheaths above the leaves from the foregoing year; leaves narrow with involute margins; sheaths without fibrillose margins; scales of the female spikelets not elongated; marshes.

126. *C. aquatilis* Wg.

Ledeb. Fl. Ross. IV p. 312; Feilden, Fl. of Kolguev p. 184; Kjellm., Sib. Nordk. Fanerogamfl. p. 276; Schmidt, Fl. Jeniss. arct. p. 125; Fl. D. Suppl. tab. 33; f. typica Kjellm. & Lundstr., Nov. Seml. p. 316.

Culms stout and tall, trigonous with smooth, blunt edges; leaves very long, green, with involute margins, longer than the culms; lower bracts broad and long, leafy, longer than the culms, partly enclosing the spikelets; male spikelets 1—4, female spikelets 2—6, sessile or short-stalked, erect, dense-flowered, long-cylindrical; scales light- or darker-brown with pale midvein, obtuse, shorter than the nerve-less utricles; stigmas 2.

Am.: Port Clarence (!). Eur.: Kolguev (!), Waigats (!), Habarowa, Samoyede Land. As.: Mouth of the Yenissei (!), Dickson Harbour, Actinia Bay, Preobrascheni Bay.

Geogr. area: Northern North America, Great Britain, Ireland, Scandinavia, Northern Russia (and Siberia?).

var. stans (Drej.).

C. stans Drej. Revis. crit. Car. bor. 1841, p. 458; Lge. Conspl. Fl. Groenl. p. 147; Rosenv., Till. p. 723; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; Cornell Party, Peary Voy. 1896, p. 422; Hart, Brit. Pol. Exped. p. 241; Fl. D. tab. 2477; *C. aquatilis* Berlin, Kärlv. f. Grönl. p. 71; Taylor, l. c. p. 85; *C. aquatilis*, var. *epigejos*, Lge. l. c. p. 292; Kjellm., Sib. Nordk. Fanerogamfl. p. 276, As. Beringss. p. 563, Vest-Eskim. Land p. 57; Kjellm. & Lundstr., Nov. Seml. p. 316; Holm, Nov. Seml. Veget. p. 17; *C. salina* Holm, l. c. p. 17, non Wg.; *C. hyperborea* Holm, l. c. p. 17, non Drejer; *C. elytroides* Lge. l. c. non Fries.

In the Arctic regions *C. aquatilis* is commonly replaced by the var. *stans* which differs from the type as follow: culms lower

and more robust; leaves broader, flat, not involute; male spikelet 1, female spikelets 2—4, not so long cylindrical, but thicker; scales



Fig. 41. *Carex stricta* Good.
 $\frac{2}{3}$ nat. size.
 (Spec. from Denmark).

Fig. 42. *Carex aquatilis* Wg.
 $\frac{1}{2}$ nat. size.
 (Spec. from Sweden).

Fig. 43. *Carex aquatilis* Wg., var.
stans (Drej.). $\frac{2}{3}$ nat. size.
 (Spec. from West Greenland).

dark, red-brown to blackish with paler midvein, broader than and as long as the utricles.

A.m.: Kotzebue Sound, Southampton Island (?), Baffin Land, Grinnell

Land, West Greenl. c. 68° — 72° (!), $74^{\circ} 15'$. Eur.: Novaya Zemlya to 74° (!). As.: Yalmal, Irkaipij (!), Pittlekaj, Actinia Bay (!), Boganida-river (!), St. Lawrence Bay (!), Chukches Land.

Geogr. area: Northern Scandinavia (probably circumpolar).

127. *C. Goodenovii* Gay.

C. vulgaris Lge. Consp. Fl. Groenl. p. 144, ex parte; Rosenv., Till. p. 722, ex parte; Fl. D. tab. 2878; var. *trivialis* Trautv. Syll. Pl. Sib. bor. orient. p. 539; *C. cæspitosa*, var. *vulgaris*, Trautv. Fl. Terr. Tschuktsch. p. 39, Fl. rip. Kolym. p. 567; *C. (turfosa, var.?) groenlandica* Lge. l. e. p. 144, ex parte.

More or less loosely cæspitose with stolons; culms slender, trigonous with sharp and above scabrous edges; leaves glaucous, narrow, with involute margins; bracts leafy, the lowest as long as the culm; terminal spikelet male, female spikelets 2—4, short-cylindrical, sessile or short-stalked, erect, dense-flowered; scales obtuse, blackish, often with paler midvein, shorter than the faintly nerved utricles; stigmas 2.

Am.: Kotzebue Sound, West Greenl. 60° — 61° (!). As.: Mouths of the Lena and Kolyma. Chukches Land.

Geogr. area: Northern North America, Chile, Magellan, Iceland, Færöes, Most parts of Europe, Caucasus, Siberia to Himalaya and Japan.

C. Goodenovii Gay \times *rigida* Good.

C. cæspitosa (?) var. *elliptica* Drej., Revis. crit. Car. bor. p. 456; Fl. D. tab. 2845 (Vidi spec. orig.); *C. (turfosa* Fr. var.?) *groenlandica* Lge. Consp. Fl. Groenl. p. 144, ex parte; *C. groenlandica* Rosenv., Till. p. 722, ex parte; *C. hyperborea* Drej., Revis. crit. Car. bor. p. 461, ex parte.

Intermediate between the parents. More slender than *C. rigida* and more robust than *C. Goodenovii*; leaves flat, not revolute nor involute on the margins, broader than in *C. Goodenovii*, narrower than in *C. rigida*; utricles nerve-less.

When the two species are to be found together it is not rare to see the hybrid. We have seen specimens from Am.: West Greenl. c. 61° (!). As.: Konyamby (!), St. Lawrence Bay (!).

Subsect. 3. *Prolixa* Fries, l.c. p. 228. Rhizome more or less creeping; culms large, sheaths as in foregoing subsect.; leaves broader with revolute margins, scales of the female spikelets acute, dark-coloured; marshes.

128. *C. gracilis* Curt., Fl. Lond. 1877—87, p. 282.

C. acuta L. ex parte; Trautv. Fl. Terr. Tschuktsch. p. 39, Pl. Ross. arct. p. 549; Schmidt, Fl. Jeniss. arct. p. 126; Fl. D. tab. 2247; var. *genuina* Trautv. Fl. rip. Kolym. p. 567.

Loosely cæspitose with stolons; culms tall, trigonous with sharp and scabrous edges; leaves broad with revolute margins; bracts

large, broad, the lowest at least as long as the culms; male spikelets 2—4; female spikelets 2—4, long-cylindrical, more or less stalked and often drooping at maturity; scales acute, blackish with pale midvein, longer than the faintly nerved utricles; stigmas 2.

As.: Mouths of the Yenissei (!) and Kolyma, Chukches Land.

Geogr. area: Northern North America, Most parts of Europe, Caucasus, Siberia.

Subsect. 4. *Salinae* Fries, l.c. p. 230. Rhizome creeping; culms (in the Arctic species) short; sheaths as in foregoing subsect.; leaves rather broad, mostly flat, seldom with involute margins; scales of the female spikelets acute and often elongated or obtuse, light-coloured; 3-nerved; sea-shores.

129. *C. salina* Wg.

Hook. Fl. bor. Am. II p. 219; Ledeb. Fl. Ross. IV p. 313; Feilden, Fl. of Kolguev p. 184; f. *nana* Trautv. Conspl. Fl. Nov. Zeml. p. 82, Syll. Pl. Sib. bor. orient. p. 539; Nath., Spetsb. Kärv. p. 35; Kjellm. & Lundstr., Nov. Seml. p. 315; f. *mutica* Trautv. Syll. Sib. bor. orient. p. 539; f. *subspathacea* Kjellm., Sib. Nordk. Fanerogamfl. p. 275; Kjellm. & Lundstr., Nov. Seml. p. 315; Kjellm., St. Lawrence-ön p. 22, Vest-Eskim. Land p. 57; C. *subspathacea* Drej., Revis. crit. Car. bor. p. 452; Lge. Conspl. Fl. Groenl. p. 140 and p. 289; Hartz, Nordöst Grönl. p. 346; Dusén, Ost-Grönl. p. 56; Fl. D.



Fig. 44. *Carex Goodenovii* Gay. $\frac{2}{3}$ nat. size. (Spec. from West Greenland).



Fig. 45. *Carex gracilis* Curt. $\frac{2}{3}$ nat. size. (Spec. from Denmark).



Fig. 46. *Carex salina* Wg., var. *subspathacea* (Wormsk.), nat. size.
(Spec. from East Greenland).



Fig. 47. *Carex salina* Wg., transition
to var. *subspathacea* (Wormsk.), $\frac{2}{3}$ nat.
size. (Spec. from West Greenland).

Fig. 48. *Carex salina*, $\frac{2}{3}$ nat. size.
(Spec. from North Iceland)

tab. 1530; *C. reducta* Drej., l. c. p. 453; Lge. Conspl. Fl. Groenl. p. 141; Fl. D. tab. 2977; *C. Drejeriana* f. *cuspidata* Rosenv., Till. p. 722.

In Arctic regions the forms of this very variable species are low; rhizome creeping; culms low, smooth; leaves flat or with involute margins, as long as or longer than the culms; bracts leafy, the lowest mostly longer than the culm; male spikelets 1—2, female spikelets 1—4, erect, stalked, mostly lax-flowered and thin; scales light or darker brown with paler midvein, acute or obtuse, longer than the nerve-less utricles; stigmas 2.

The most common form in Arctic regions is var. *subspathacea* (Wormsk.): only few cm. high; leaves with involute margins; male spikelet 1, female spikelets 2, few-flowered (1—3-flowered); scales light-brown, obtuse, enclosing the utricles. But also taller forms with acute scales and many-flowered spikelets occur (at least in the most southern part of Greenland) and such a form has L. K. Rosenvinge named *C. Drejeriana*, f. *cuspidata*.

Common on the shores of the whole Arctic Ocean. Am.: Kotzebue Sound, Hudson Bay, West Greenl. 60° — 70° (!), East Greenl. 60° — 61° (!), $65^{\circ} 35'$ (!), 70° — $74^{\circ} 40'$ (!). Eur.: Spitsbergen (!), Novaya Zemlya to 71° !, Shores of the White Sea (!), Kolguev, Wai-gats, Habarowa (Fish., in litt.). As.: Yalmal, Mouth of the Lena, Preobrascheni Bay (!), St. Lawrence Island.

Geogr. area: Coasts of the Northern North America, Iceland, Færöes, Scotland, Scandinavia, Finland, Northern Russia and Siberia.

Subsect. 5. *Cryptocarpa* Tuckerm., l. c. p. 11. Rhizome creeping, without (or seldom with) leafless sheaths above the leaves from the foregoing year; leaves broad with revolute margins; scales of the female spikelets elongated; spikelets long-stalked and drooping; sea-shores and marshes.

130. *C. Lyngbyei* Hornem., Fl. D. tab. 1888 (1827), (vidi spec. orig.).

C. cryptocarpa C. A. Mey., l. c. p. 226, tab. 14 (1831); Lge. Conspl. Fl. Groenl. p. 143; Kjellm., Vest-Eskim. Land p. 57; Ledeb. Fl. Ross. IV p. 313; *C. filipendula* Drej., Revis. erit. Car. bor. p. 464; Fl. D. tab. 2371, 2372; *C. capillipes* Drej., l. c. p. 468 (vidi spec. orig.); Fl. D. tab. 2844.



Fig. 49. *Carex salina* Wg. forma
(*C. Drejeriana* Lge., f. *cuspidata*
Rosenv.). $\frac{2}{3}$ nat. size. (Spec.
from West Greenland).

Rhizome creeping; culms rather high, often robust, trigonous with sharp, but mostly smooth edges; leaves long and broad with revolute margins, green; bracts long and broad, as long as the culms; male spikelets 2-3, yellow-brown; female spikelets 2-4, short cylindrical, long-stalked,

mostly drooping; scales 3-nerved, acuminate with elongated mid-vein, spreading, light- or dark-brown with paler midvein, longer than the faintly nerved utricles; stigmas 2.

Am.: Kotzebue Sound, West Greenl. 60° - 61° (!).

Geogr. area: Northern North America, Iceland, Færöes, Norway (rare), Kamchatka, Saghalin, Coasts of the Sea of Okhotsk.



Fig. 50. *Carex Lyngbyei* Hornem. $\frac{2}{3}$ nat. size.
(Spec. from Iceland.)

Tall and stout with strong stolons; leaves broad with revolute margins; male spikelets 1-2; female spikelets 2-3, cylindrical, lax-flowered, stalked, but erect; scales large, blackish-brown, acute, enclosing the utricles; achenes not developed. Intermediate between the parents.

Am.: West Greenl. 60° - 61° (!).

Geogr. area: Iceland (!).

Subsect. 6. *Rigidae* Fries, l. c. p. 232. Rhizome creeping, culms low, sheaths as in subsect. 2; leaves broader



Fig. 51. *Carex Lyngbyei* Hornem.
× *rigida* Good. (*C. hematolepis* Drej.).
 $\frac{2}{3}$ nat. size. (Spec. from West Greenland).

with revolute margins and without fibrillose margins; scales of the female spikelets not elongated; mountains and marshes.

131. *C. rigida* Good.

Lge. Conspl. Fl. Groenl. p. 145 and p. 291; Rosenv., Till. p. 723; Hartz, Nordöst Grönl. p. 346; Hook. Fl. bor. Am. II p. 217; Eastwood, Pl. coll. at Nome City, p. 130; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; Hart, Brit. Pol. Exp. p. 241; Cornell Party, Peary Voy. 1896, p. 422; Trautv. Conspl. Fl. Nov. Zeml. p. 82; Blytt, Bidrag p. 9; Feilden, Fl. of Kolguev p. 84; Kjellm. & Lundstr., Nov. Seml. p. 316; Kjellm., Sib. Nordk. Fanerogamfl. p. 251, et f. longipes p. 276; Kjellm., As. Beringss. p. 563;



Fig. 52. *Carex rigida* Good. $\frac{2}{3}$ nat. size. (Spec. from Arctic Norway).

Trautv. Fl. rip. Kolym. p. 566; Fl. Taim. faenog. p. 22; Pl. Sib. bor. p. 131; Ekstam, Spitsb. p. 69; Fl. D. tab. 159, 2479, 2480; f. inferalpina Kjellm., Vest-Eskim. Land p. 57; C. Bigelowii Cornell Party, Peary Voy. 1896, p. 419 and p. 422; C. saxatilis Ledeb. Fl. Ross. IV p. 309; Schmidt, Fl. Jeniss. arct. p. 125; C. hyperborea Drej., Revis. crit. Car. bor. p. 461 ex maxima parte; Lge. Conspl. Fl. Groenl. p. 145 and p. 290; Rosenv., Till. p. 722; Hartz, Nordöst Grönl. p. 346; Fl. D. tab. 2482; Trautv. Fl. Terr. Tschuktsch. p. 39 (?); C. limula Lge. l. c. p. 292; C. groenlandica Lge. l. c. p. 290; Rosenv., Till. p. 722, ex parte; C. Drejeriana Lge. l. c. p. 141 and p. 190; C. Fyllae Holm in Lge. l. c. p. 291; C. Warmingii Holm in Lge. l. c. p. 290; C. vulgaris Lge. l. c. p. 144, ex parte; Rosenv., Till. p. 722, ex parte; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; C. stans Lge. l. c. p. 147, ex parte; Rosenv., Till. p. 723, ex parte.

Low, with creeping stolons; culms robust, trigonous with mostly smooth edges, often curved, longer than the leaves; leaves broad

with revolute margins, often curved; bracts short, mostly shorter than the culms, only partly leafy; male spikelet 1; female spikelets

2–3, short-cylindrical, sessile or the lower short-stalked, erect; scales broad, obtuse, blackish, often with paler mid-vein; utricles nerve-less; stigmas 2.

A very variable species; the typical form inhabits rather dry ground; in wet places the species becomes higher and more slender, the leaves longer and more erect and the female spikelets longer and more lax-flowered: f. *Bigelowii* (Torr., 1824) Bail. = f. *inferalpina* Læstad., 1839; C. *hyperborea* Drej. (vidi spec. orig.); C. *Drejeriana* Lge. (vidi spec. orig.); C. *anguillata* Drej. (vidi spec. orig.).

Common in the Arctic regions: Am.: Kotzebue Sound, Nome City, Arctic Shores, Labrador (!), Big Island in Hudson Strait, Baffin Land, Grinnell Land, West Greenl.: 60° – 81° (!) Inglefield Gulf, East Greenl. 60° – 63° (!), 65° – 35° (!), 70° – 73° (!). Eur.: Spitsbergen [very rare] (!), Kolguev (!), Novaya Zemlya to 74° (!), Waigats (!), Habarowa, Samoyede Land. As.: Yalmal, Actinia Bay, Mouths of the Yenissei, Bognida (!), Lena and Kolyma, Taimyr Peninsula (!), New Siberian Islands, Chukches Land.

Geogr. area: Northern North America, Rocky Mountains, Mountains of Chile, Iceland, Færöes, British Isles, Scandinavia, Central Europe, Northern Russia, Caucasus, Ural, Siberia, Songoria, Altai, Himalaya.

Sect. III. *Dactylostachyae* Drejer, Symbolae Caric., p. 10. Spikelets rather short, lax-flowered and slender; bracts sheathing or not; utricles mostly coriaceous, often papillose, scarcely inflated, trigonous, with a short and straight or curved beak; stigmas 2 or 3.

Subsect. 1. *Bicolores* Tuckerm., I. c. p. 12. Small cespitose species with a



Fig. 53. *Carex rigida* Good., f. *Bigelowii*
(Torr.)'Bail. $\frac{2}{3}$ nat. size.
(Spec. from West Greenland).

beak-less, more or less round utricle; terminal spikelet female with male flowers at the base; stigmas 2.

132. **C. rufina** Drej., Revis. crit. Car. bor. p. 446.

Lge. Consp. Fl. Groenl. p. 138; Fl. D. tab. 2481.

Cæspitose; culms low, trigonous with smooth edges, shorter than the leaves; leaves flat with involute margins, glaucous, at the summit scabrous; terminal spikelet male at the base, seldom also male at the summit or male throughout; female spikelets 2—4, densely-aggregated, ovoid-elliptic; bracts not sheathing, leafy, the lower longer than the culms; scales obtuse, red-brown, sometimes

Fig. 54. *Carex rufina* Drej. $\frac{2}{3}$ nat. size. (Spec. from West Greenland).

with paler midvein, as long as and broader than the utricles; utricles plano-convex or biconvex, ovate, with scabrous margins above, nerve-less, pale or red-brown above; beak very short entire; stigmas 2.

A.M.: West Greenl. 60° — 67° (!), East Greenl. 60° — 61° (!).

Geogr. area: Arctic Sweden, Norway.

133. **C. bicolor** All.

Lge. Consp. Fl. Groenl. p. 138; Abromeit, Grönl.-Exped. p. 90; Fl. D. tab. 2122.

Cæspitose; culms slender, often curved, mostly longer than the leaves, trigonous with smooth or above scabrous edges; leaves flat, glaucous, c. 2 mm. broad, scabrous on the margins; terminal spikelet clavate with a few male flowers at the base; female spikelets

mostly 2, the lower sometimes remote from the upper, basal, long-stalked and with a leafy bract; scales obtuse, blackish-brown with

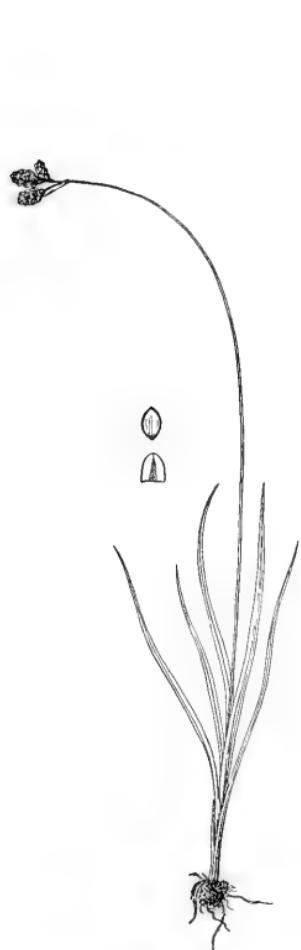


Fig. 55. *Carex bicolor* All. $\frac{2}{3}$ nat. size.
(Spec. from Arctic Norway).

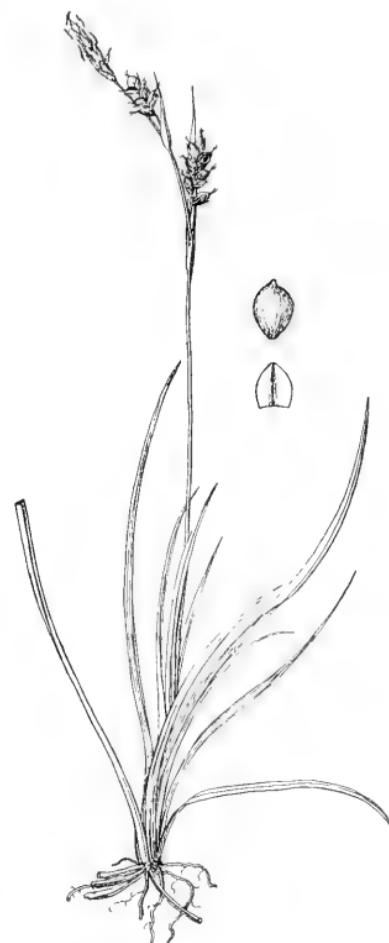


Fig. 56. *Carex panicea* L. $\frac{2}{3}$ nat. size.
(Spec. from West Greenland).

pale midvein, a little shorter and broader than the utricles; utricles elliptic, biconvex, white, nerve-less or very faintly nerved, papillose, nearly without beak; stigmas 2.

Am.: West Greenl. 61° — 69° (!) and $70^{\circ} 30'$.

Geogr. area: Labrador, Iceland, Arctic and Alpine North Europe, Central European Mountains, Siberia (Olenek).

Subsect. 2. *Paniceae* Tuckerm., l. c. p. 15. Rhizome creeping; larger species with globose or rounded-trigonous, beaked utricle; beak short, entire, often curved; terminal spikelet male; stigmas 3.

134. *C. panicea* L.

Fl. D. tab. 261; *C. panicea*, v. *tumidula* Læst., Lge. Conspl. Fl. Groenl. p. 149; Rosenv., Till. p. 292; Fl. D. tab. 3048; *C. phaeostachya* Hook. Fl. bor. Am. II p. 226, excl. Syn. *C. subspathacea*.

Rhizome with stolons; culms erect; leaves flat, glaucous, seabrous on the margins; leaves on the culms somewhat shorter than those on the sterile shoots, sheathing, blades 5—10 cm. long; bracts sheathing, the sheath of the lower shorter than the blade; terminal spikelet male, erect, oblong; female spikelets mostly 2, erect, stalked, cylindrical, rather lax-flowered; scales broadly-ovate, obtuse or acuminate, dark-brown, shorter than the utricles; utricles inflated, ovoid-globose, faintly few-nerved, very finely papillose (only visible with the lens), tapering into a very short, rounded and smooth, somewhat oblique beak with entire or faintly emarginate orifice; stigmas 3.

A.M.: West Greenl. 60°—61° 30' (I).

Geogr. area: Northern North America, Iceland, Færöes, Most parts of Europe, Caucasus, Siberia, Turkistan, Altai, Kamchatka.

135. *C. sparsiflora* (Wg.) Steud.

C. panicea β, *sparsiflora* Wg. Fl. Lappon., 1812, p. 236; *C. vaginata* Tausch.; Trautv. Pl. Sib. bor. p. 126, Fl. rip. Kolym. p. 566; Schmidt, Fl. Jeniss. arct. p. 124; Kjellm., As. Beringss. p. 562, Vest-Eskim. Land p. 57; Hook. Coll. of Arctic Pl. p. 123; Feilden, Fl. of Kolguev p. 184; Fl. D. Suppl. tab. 27; *C. panicea*, v. *pelia*, Scheutz, Pl. vasc. Jeniss. p. 178.



Fig. 57. *Carex sparsiflora* (Wg.) Steud. $\frac{2}{3}$ nat. size.
(Spec. from Iceland).

Rhizome with stolons; culms erect; leaves flat, bright-green; leaves on the culms much shorter than those on the sterile shoots, sheathing, blades only 1.5—3 cm. long, evenly passing into the bracts; blade of the bracts shorter than the sheaths; male spikelet 1; female spikelets mostly 2, narrow-cylindrical, lax- and rather few-flowered; the lower often remote; scales brownish with pale or greenish midvein, obtuse or subacute; utricles non-inflated, ovoid or ellipsoid, nerve-less, smooth (not papillose), tapering into a rather short, rounded, smooth, oblique beak with obliquely cut orifice; stigmas 3.

Nearly allied to the foregoing species.

Am.: Port Clarence. Eur.: Kolguev. As.: Mouths of the Yenissei (!), Lena and Kolyma.

Geogr. area: Iceland, North Europe, Central European Mountains, East Siberia, Kamchatka.



Fig. 58. *Carex scirpoidea* Michx. $\frac{2}{3}$ nat. size. (Spec. $\ddot{\epsilon}$ from East Greenland).

Sect. IV. **Sphaeridiophorae** Drejer, l. c. p. 9. Terminal spikelet male, female spikelets short, ovate to globose, mostly aggregated, seldom one terminal spike; utricles rounded, firm in texture, hairy; beak short, often two-toothed; bracts not or shortly sheathing; stigmas 3.

Subsect. 1. **Filifoliae** Tuckerm., l. c. p. 8. Spike terminal solitary, male at the summit or dioecious; cæspitose.

136. ***C. scirpoidea*** Michx.

Macoun, Catalogue IV p. 112; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; Peary, Auxil. Exp. App. C. p. 7; Lge. Conspl. Fl. Groenl. p. 132 and p. 287; Rosenv., Till. p. 718; Hartz, Nordöst Grönl. p. 345; Hook. Bot. App. to Parry's 2 voyage p. 405; Kjellm., Vest-Eskim. Land p. 57, As. Beringss. p. 568; Eastwood, Pl. coll. at Nome City, p. 130; C. Wormskioldiana Fl. D. tab. 1528; C. podocarpa Kurtz, Fl. d. Tschuktschenh. p. 479 (according to spec. in Herb. Engler), non R. Br.

Loosely cæspitose; culm trigonous with seaceous edges; leaves flat, seaceous on the margins; dioecious; male spike dark-brown, scales oblong-ovate; female spike cylindrical; scales dark-brown with paler midvein, ciliate; utricles ovate, obtusely trigonous, hairy, with short two-toothed beak; stigmas 3.

Seldom a small, few-flowered spikelet is to be found at the base of the spike.

Am.: Port Clarence (!), Nome City, Arctic Sea-coast (!), Baffin Land, West Greenl. 60° – $74^{\circ} 18'$ (!), Cap York, East Greenl. $65^{\circ} 35'$ (!), 70° – 71° (!). As.: Chukches Land (!).

Geogr. area: Northern North America,
Arctic Norway (one spot: Saltdalen).

Subsect. 2. *Montanae* Fries, Corp. Flor. Provincial. I, 1835, p. 188. Spikelets several, utricles rounded, often contracted above and below, mostly with two prominent ribs; cespitose.

137. *C. pilulifera* L.

Trautv. Fl. rip. Kolym. p. 566; Fl. D. tab. 1048, 3050.

Cespitose, with straw-coloured old sheaths at the base; culms slender, ascending, trigonous with scabrous edges, longer than the leaves; leaves flat, keeled; one cylindrical sessile male spikelet; female spikelets 2–4, sessile, ovoid-globose; the lowest bract leafy, mostly shorter than the culms; scales broadly ovate, acute, brown with greenish midvein, as long as the utricles; utricles hairy, pale, broadly obovate to pyriform, with two ribs, abruptly tapering into a short, two-toothed beak; stigmas 3.

As: Mouth of the Kolyma.

Geogr. area: Iceland, Færöes, British Isles, North and Central Europe, East Siberia, Kamchatka, Japan.

var. *deflexa* (Horn.) Drej., Revis. crit. Car. bor. p. 472.

Lge. Conspl. Fl. Groenl. p. 151 and p. 293; Fl. D. tab. 3051; C. deflexa Hornemann, Dansk Plantelære, ed. 3, I, p. 938; Rosenv., Till. p. 724; Nye Bidrag p. 71; C. varia Muhl., β minor Boot in Hook. Fl. bor. Am. II p. 223.

In North America the type is substituted by a variety separated from the main species by following characters: culms mostly curved; old sheaths purplish; male spikelet small, few-flowered; female spike-



Fig. 59. *Carex pilulifera* L. $\frac{2}{3}$ nat. size. (Spec. from Denmark).

lets few-flowered, the lowest stalked; the lowest bract mostly longer than the culms; scales shorter than the utricles; utricles greenish, obovate, more evenly tapering into the beak, stigmas 2 or 3.

If transitory-forms between the type and the variety were not to be found — especially the specimens from Iceland and the Færöes, which e. g. have purplish sheaths —, we should think it better to treat the variety as a distinct species.

Am.: Arctic Coast, West Greenl. 60° — 68° (!), East Greenl. 60° — 61° .

Geogr. area: Northern North America.



Fig. 60. *Carex pitulifera* L., var. *deflexa* (Horn.)
Drej. $\frac{2}{3}$ nat. size. (Spec. from West Greenland).

138. **C. Brenneri** Christ apud Scheutz, Pl. vasc. Jeniss. p. 178.

Cæspitose with straw-coloured old sheaths at the base; culms slender, erect, smooth, longer than the rigid, glaucous leaves; male spikelet one, stalked, lanceolate; female spikelets 2—3, erect, short-cylindrical, lax-flowered, sometimes the lowest issuing from the base of the culm and then long-stalked, the others short-stalked; bracts pale-brownish, short, with a c. 1 cm. long sheath and bristle-like blade; scales obtuse, light-brown with greenish midvein, acute, shorter than the utricles; utricles hairy, oblong-obovate, obtusely trigonous, faintly nerved, with short two-toothed beak; stigmas 3.

As.: Mouth of the Yenissei (!).

Geogr. area: Yenissei-district.

139. **C. melanocarpa** Cham. apud Trautv. Fl. Taimyr. p. 21.

Ledeb. Fl. Ross. IV p. 302; Trautv. Pl. Sib. bor. p. 129; Schmidt, Fl. Jeniss. arct. p. 125; Kjellm., As. Beringss. p. 562; Rothr., Fl. of Alaska p. 457.

Loosely cæspitose with stolons; culms slender, longer than the leaves; male spikelet 1, oblong; female spikelets 1—2, few-flowered, erect, globose; the upper close to the male spikelet, the lower a little remote, stalked, with a short-sheathing, short bract; scales broadly ovate, obtuse, blackish-brown with narrow, membranous, erose margins, faintly hairy on the dorsal side, shorter than the utricles; utricles obovate, biconvex, blackish-brown, faintly hairy; beak short with entire orifice; stigmas 3.



Fig. 61. *Carex Brenneri* Christ. $\frac{2}{3}$ nat. size.
(Spec. from the Yenissei-river).

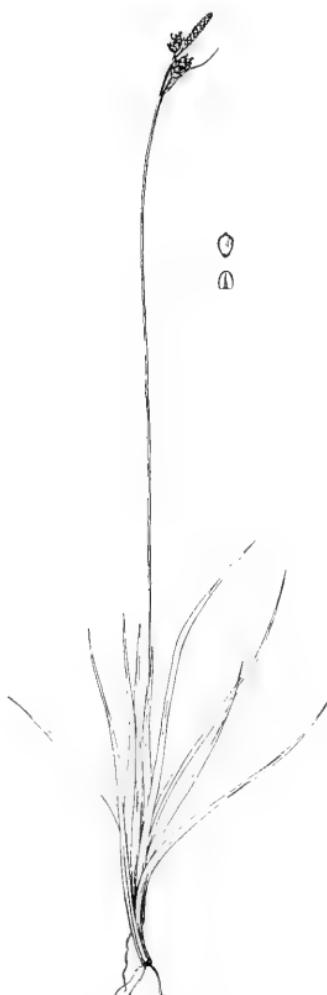


Fig. 62. *Carex melanocarpa* Cham. $\frac{2}{3}$ nat. size.
(Spec. from Siberia).

A.s.: Mouth of the Yenissei, Taimyr Peninsula, Mouths of the Olenek and Jena, Chukches Land, St. Lawrence Island.

Geogr. area: Northern Siberia.

Sect. V. **Lamprochlaenae** Drejer, l. c. p. 10. Utricles smooth, firm in texture, mostly shining, with a short beak; spike solitary terminal with

male flowers at the summit, or several spikelets, the female ones short, ovate or globose, few-flowered, erect; stigmas 3.

Subsect. *Rupestres* Tuckerm., l.c. p. 8. Utricles ovate, appressed to the rachis.

140. *C. rupestris* All.

Lge. Conspl. Fl. Groenl. p. 133 and p. 288; Rosenv., Nye Bidrag p. 70; Hartz, Nordöst Grönl. p. 345; Dusén, Ost-Grönl. p. 55; Greely, Lady Frankl. Bay Exp. p. 15; Nath., Spetsb. Kärv. p. 36; Ledeb. Fl. Ross. IV p. 267; Kjellm. & Lundstr., Nov. Seml. p. 316; Kjellm., Vest-Eskim. Land p. 58; Fl. D. tab. 1401, 2433.

Rhizome creeping; culms erect, trigonous with sharp and scabrous edges, as long as the leaves; leaves flat, scabrous on the margins; old sheaths persistent; one monoecious, oblong-cylindrical terminal spike; female scales obtuse, ovate, brown, broader and longer than the utricles; utricles lanceolate, obtusely trigonous, faintly nerved, dull, scabrous on the margins above and with a very short entire beak.



Fig. 63. *Carex rupestris* All. $\frac{2}{3}$ nat. size.
(Spec. from East Greenland).

Am.: Port Clarence, West Greenl. $64^{\circ} 11'$ — $72^{\circ} 45'$ (\ddagger), East Greenl. 70° — $74^{\circ} 10'$ (\ddagger). Eur.: Spitsbergen (\ddagger), Novaya Zemlya to 74° (\ddagger), Arctic Coast.

Geogr. area: Northern North America, Iceland, North Europe, The Alps, Siberia, Altai.

141. *C. supina* Wg., Kgl. Vet. Akad. Handl., 1803, p. 158.

Lge. Conspl. Fl. Groenl. p. 151; Hartz, Nordöst Grönl. p. 347; Dusén, Ost-Grönl. p. 57; Fl. D. tab. 2181; C. obesa All., var. minor Boot, Macoun, Catalogue IV p. 163; C. glomerata Schkuhr, Riedgräser p. 79, tab. J, f. 41; C. obtusata Trautv. Fl. rip. Kolym. p. 565, non Liljeblad.

Rhizome with stolons; culms erect, trigonous with sharp and scabrous edges; leaves narrow, c. 1 mm. broad, scabrous on the upper side and on the margins; one sessile male spikelet; female ones 2—3, sessile, few(3—5)-flowered, globose, densely aggregated; bracts not sheathing, scale-like, brownish with white membranous margins, the lowest with bristle-like blade; scales broadly

ovate, acute, red-brown, with broad, white membranous margins, a little shorter than the utricles; utricles broadly ovate to globose, brownish, shining, tapering into a two-toothed beak; stigmas 3.

Am.: West Greenl. $60^{\circ}-73^{\circ}$ (!), East Greenl. $70^{\circ}-71^{\circ}$ (!), $73^{\circ} 10'$.
As.: Mouth of the Kolyma.

Geogr. area: Northern North America, Central and East Europe, Caucasus, Songoria, Altai, Himalaya, East Siberia.



Fig. 64. *Carex supina* Wg. $\frac{2}{3}$ nat. size.
(Spec. from West Greenland).



Fig. 65. *Carex pedata* Wg. $\frac{2}{3}$ nat. size.
(Spec. from East Greenland).

Obs. We have not seen the specimens of *C. obtusata* which Trautvetter l.c. indicates from Kolyma, but we should think that they may be *C. supina*, as *C. obtusata* is not at all an Arctic species, and *C. supina* is known from East Siberia according to Meinshausen, Cyperac. Russl. p. 392.

142. *C. pedata* Wg., Fl. Lappon. p. 239, tab. 14.

Lge. Conspl. Fl. Groenl. p. 151; Hartz, Nordöst Grönland. p. 347; Ledeb. Fl. Ross. IV p. 292; Meinshausen, Cyperac. Russl. p. 391; Fl. D. tab. 2431.

Densely cæspitose with numerous rigid shoots; culms smooth, short, about as long as or a little longer than the leaves; leaves narrow, flat, with keel, trigonous above, scabrous on the margins; one

male spikelet, often with some solitary female flowers beneath; female spikelets 2—3, short-stalked, erect, lax- and few(2—6)-flowered; bracts scale-like with bristle-like blade, very shortly sheathing; scales obtuse, broadly ovate, brown with paler midvein and white membranous margins, much shorter and broader than the utricles; utricles broadly ovate, ovoid or obtusely trigonous with two ribs, mostly brown, tapering rather abruptly into a smooth, rounded beak with membranous margins in the orifice; stigmas 3.

Am.: West Greenl. 60°—73° (!), East Greenl. 70°—71° (!). As.: Mouths of the Yenissei and Lena, Chukches Land.

Geogr. area: Alaska, Iceland, Northern Scandinavia, Altai (?), East Siberia.

Sect. VI. **Frigidae** Fries, Summa Veget. p. 70. Spikelets slender, the upper ones sometimes male at the base and female at the summit; utricles tapering into a long beak with a hyaline, two-toothed apex and scabrous margins, often attenuated at the base; stigmas 3; bracts sheathing.

143. **C. tristis** M. Bieb., Fl. Taur. Caucas. III p. 615.

Trautv. Fl. Taimyr. p. 21; Ledeb. Fl. Ross. IV p. 294; C. frigida Trautv. Pl. Sib. bor. p. 127, Syll. Pl. Sib. bor. orient. p. 538, non Allioni.

Cæspitose; culms erect, obtusely trigonous, smooth; leaves flat, 2—3 mm. broad, shorter than the culms; bracts sheathing and with short, leafy blade; male spikelets 1—2, reddish brown; female spikelets 2—3, oblong-ovoid, c. 1 mm. long, on capillary stalks, the lowest often remote and long-stalked; scales obtuse or acute, dark-red-brown with white, membranous margins, shorter than the utricles; utricles dark-red-brown or pale on the lower part, lanceolate-ovate, plano-convex or concavo-convex; beak rather long, scabrous, two-toothed with white, membranous margins on the inner side; stigmas 3.

As.: Mouth of the Lena, Taimyr Peninsula, Chukches Land.

Geogr. area: Caucasus, Siberia, Songoria, Altai, Dauria.

144. **C. misandra** R. Br., Chloris Melvilliana, London, 1823, p. 25.

Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; Peary, Auxil. Exp. App. C. p. 7; Eastwood, Pl. coll. at Nome City, p. 130; Lge. Consp. Fl. Groenl. p. 139 and p. 289; Rosenv., Nye Bidrag p. 71; Hartz, Nordöst Grönl. p. 346; Dusén, Ost-Grönl. p. 56; Nath., Spetsb. Kärlv. p. 35; Trautv. Consp. Fl. Nov. Zeml. p. 81, Pl. Sib. bor. p. 124; Kjellm., Sib. Nordk. Fanerogamfl. p. 275, As. Beringss. p. 561, Vest-Eskim. Land p. 56; Kjellm. & Lundstr., Nov. Semlja p. 315; Macoun, Catalogue IV p. 138; C. fuliginosa Hook. Fl. bor. Am. II p. 224; Hart, Brit. Pol. Exp. p. 241; Taylor, I. c. p. 85; Feilden, Nov. Zemlya p. 21; Fl. D. tab. 2373; C. frigida β, Ledeb. Fl. Ross. IV p. 294.

Densely cæspitose; culms erect, obtusely trigonous, smooth; leaves flat, 2—3 mm. broad, much shorter than the culms; lower

bracts long-sheathing with small, bristle-like blades; upper bracts brownish; terminal spikelet male at the base, female at the summit,



Fig. 66. *Carex tristis* M. Bieb. $\frac{2}{3}$ nat. size.
(Spec. from Siberia).



Fig. 67. *Carex misandra* R. Br. $\frac{2}{3}$ nat. size.
(Spec. from East Greenland).

stalked; female spikelets 3—4, ovoid, on capillary stalks, often drooping; scales obtuse, shorter than the utricles, reddish-brown with white, membranous margins; utricles lanceolate, reddish-brown,

obtusely trigonous with concave immerside; beak long, with seabrous margins, two-toothed with white membranous immerside of the teeth; stigmas 3.

A.m.: Port Clarence, Norton Sound, Nome City, Arctic Coast (!), Grinnel Land, Baffin Land, West Greenl. 67° – 82° (!), East Greenl. 70° – $74^{\circ} 40'$ (!).

Eur.: Spitsbergen (!), Dolgoi Island, Novaya Zemlya to 74° (!), Waigats, Habarowa (!). As.: Irkaipi, Mouth of the Lena, Chukches Land, St. Lawrence Island.

Geogr. area: Northern British North America, Mountains of Scandinavia, Siberia.

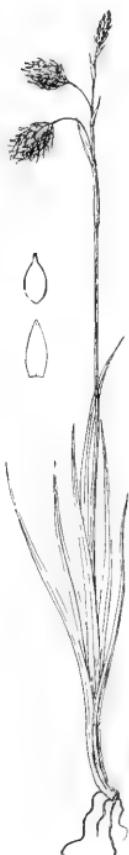


Fig. 68. *Carex ustulata*
Wg. $\frac{2}{3}$ nat. size.
(Spec. from Lapland.)

145. ***C. ustulata*** Wg., Kgl. Vet. Akad. Handl., 1803, p. 156, f. 58.

Hook. Fl. bor. Am. II p. 224; Coll. of Arct. Pl. p. 123; Abromeit, Grön. Exp. p. 91; Dusén, Ost-Grön. p. 56; Schmidt, Fl. Jeniss. arct. p. 125; Kjellm., As. Beringss. p. 561, Vest-Eskim. Land p. 56; Fl. D. tab. 1590; *C. ustulata*, v. *atrofusca* Trautv. Fl. Terr. Tschuktsch. p. 39, Pl. Sib. bor. p. 128.

Cæspitose; culms erect, trigonous with smooth or seabrous margins; leaves flat, 2–3 mm. broad, much shorter than the culms; lower bracts long-sheathing with small bristle-like blades; upper bracts blackish-brown; terminal spikelet stalked, male; female spikelets 2–3, broadly ovoid, on capillary stalks, drooping; scales ovate-lanceolate, acute, blackish-brown, as long as the utricles; utricles ovate, nerve-less, tapering into a two-toothed beak with seabrous margins; stigmas 3.

A.m.: Port Clarence, Arctic Coast, Cambridge-Bay, West Greenl.: Karajak Fjord at $70^{\circ} 25'$ (!), East Greenl.: Hurry Inlet at c. 71° (!). As.: Mouth of the Yenissei, Chukches Land (!).

Geogr. area: Northern North America, North Europe, Central European Mountains, Songoria, Turkistan, Altai, Himalaya, East Siberia.

Sect. VII. ***Hymenochlaenae*** Drejer, l.c. p. 10. Spikelets slender and lax-flowered, more or less drooping; utricles smooth, somewhat inflated, shining, oblong, tapering into a long beak; bracts sheathing; stigmas 3.

Subsect. ***Flexiles*** Tuckerm., l.c. p. 13. Terminal spikelet male; utricles beaked, few-nerved or nerve-less; cæspitose.

146. ***C. capillaris*** L.

Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; Lge. Consp. Fl. Groenl. p. 148 and p. 292; Rosenv., Till. p. 723; Hartz, Nordöst Grönl.

p. 346; Dusén, Ost-Grönl. p. 57; Trautv. Pl. Sib. bor. p. 128; Kjellm., As. Beringss. p. 561; Fl. D. tab. 2374.

Cæspitose: culms slender, erect, longer than the leaves; leaves flat, 0.5—1 mm. broad; lowest bract long-sheathing and with leafy blade; terminal spikelet male, small, exceeded by the female ones; female spikelets 2—4, few (6—10)- and lax-flowered, drooping on capillary stalks; scales broadly ovate, obtuse or subacute, shorter than the utricles, brownish with broad, white, membranous margins,



Fig. 69. *Carex capillaris* L. ♂, nat. size.
(Spec. from Iceland).

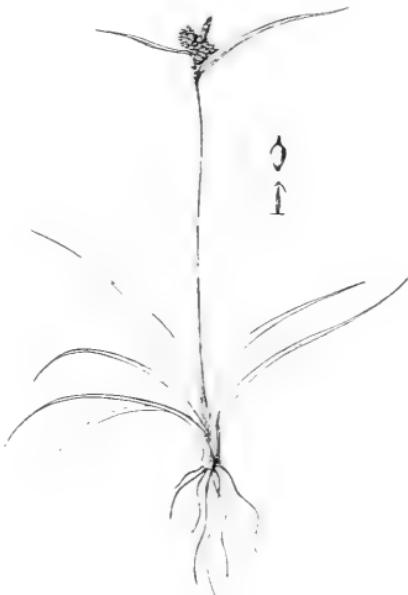


Fig. 70. *Carex Oederi* Ehrh. ♂, nat. size.
(Spec. from West Greenland).

deciduous; utricles lanceolate-ovate, obtusely trigonous or rounded with 3 ribs, tapering into a rather long beak with membranous margins; stigmas 3.

Am.: Cumberland Gulf, West Greenl. $60^{\circ} - 74^{\circ} 18' \text{ N.}$, East Greenl. $60^{\circ} - 63^{\circ} \text{ N.}$, $65^{\circ} 35'$, $70^{\circ} - 71^{\circ} \text{ N.}$, $73^{\circ} 10'$. As.: Mouth of the Lena, Chukches Land.

Geogr. area: Unalashka, Northern North America, Iceland, British Isles, North Europe, Central European Mountains, Siberia, Altai, Kamchatka.

Sect. VIII. **Spirostachyae** Drejer, l.c. p. 10. Spikelets ovate or oblong, sessile or the lowest long-stalked, dense-flowered; utricles membranous smooth, nerved, mostly yellowish, squarrose, with a two-toothed beak.

Subsect. *Fulvellae* Fries, Summa Veget., p. 70. Spikelets aggregated at the summit of the culm (sometimes the lowest long-stalked, issuing from the base of the culm), subtended by a long leafy bract; utricles long-beaked.

147. *C. Oederi* Ehrh.

Lge. Conspl. Fl. Groenl. p. 149; Fl. D. tab. 371.



Fig. 71. *Carex microglochin* Wg.
2/3 nat. size.
(Spec. from West Greenland).

Grönl. Exp. p. 89; Hartz, Nordöst Grönl. p. 345; Fl. D. tab. 1402.

Rhizome with stolons; culms erect, rigid, terete, smooth, longer than the leaves; leaves channelled or hemi-cylindrical; spike few-flowered; scales ovate, obtuse or subacute, deciduous, pale-brown,

Cæspitose; culms erect with smooth and blunt edges; leaves flat, shorter or longer than the culms; bracts long, leafy, spreading, not sheathing; male spikelet 1, oblong; female spikelets 2—3, ovoid-globose, aggregated or sometimes the lowest long-stalked, issuing from the base of the culm; scales ovate, acute, yellowish-brown with greenish midvein, shorter than the utricles; utricles obovoid, nerved, inflated, yellow-green, spreading (but not reflexed), abruptly tapering into a long beak with two teeth, scabrous on the inner side; stigmas 3.

Am.: West Greenl.: Igaliko c. 61° 2' (!).

Geogr. area: Northern North America, Iceland, North, West and Central Europe, Caucasus, Songoria.

Sect. IX. *Physocarpace* Drejer, l. c. p. 10. One or several linear male spikelets and several cylindrical female spikelets, more or less stalked; rarely one solitary spike, male at the summit, female at the base; utricles mostly yellowish, more or less inflated, smooth, nerved, tapering into a long beak; stigmas 3.

Subsect. 1. *Pauciflorae* Tuckerm., l. c. p. 7. Spike solitary, few-flowered; utricles subulate, nearly non-inflated, first erect, but reflexed at maturity; scales deciduous; a rudiment of the axis at the base of the achene.

148. *C. microglochin* Wg.

Lge. Conspl. Fl. Groenl. p. 133; Abromeit,

shorter than the utricles; utricles subulate-lanceolate, at maturity reflexed, faintly nerved at the basal part; the subulate axis exceeds the utricles at maturity; stigmas 3.

Am.: West Greenl. $60^{\circ}-70^{\circ} 30'$ (!).
East Greenl. $60^{\circ} 10'$, $70^{\circ}-71^{\circ}$ (!).

Geogr. area: Northern North America, Iceland, Scandinavia, The Alps, Caucasus, Siberia, Altai, Himalaya; var. *fuegina* Kükenth.: Patagonia, Tierra del Fuego.

Subsect. 2. *Tentaculatae* Tuckerm., l. c. p. 13. Several spikelets of which the upper ones are male, the lower ones female; utricles smooth and shining, globose-inflated, squarrose at maturity, beak long and two-toothed with divergent teeth.

149. *C. rostrata* Stokes.

C. ampullacea Good., Lge. Consp. Fl. Groenl. p. 152; Rosenv., Till. p. 724; Fl. D. tab. 2248; *C. vesicaria* and β *anandra* Lge. Consp. Fl. Groenl. p. 152 and p. 153, non Linné.

Rhizome creeping; culms 25—75 cm. high, erect, obtusely trigonous, smooth (seldom scabrous just below the spikelets); leaves glaucous, 3—4 mm. broad, with involute margins; bracts long, leafy, very short-sheathing; male spikelets 2—3, linear, female spikelets 1—3, cylindrical, stalked, erect (sometimes the lower ones a little drooping); scales acute, lanceolate, brownish; utricles inflated-globose, shining, straw-coloured, nerved, abruptly tapering into a long beak; beak smooth, terete, with divergent teeth; stigmas 3.

Am.: West Greenl. $60^{\circ}-61^{\circ}$ (!).

Geogr. area: North America (*C. utriculata* Boott), Iceland, Europe, Caucasus, Siberia, Altai, Himalaya.

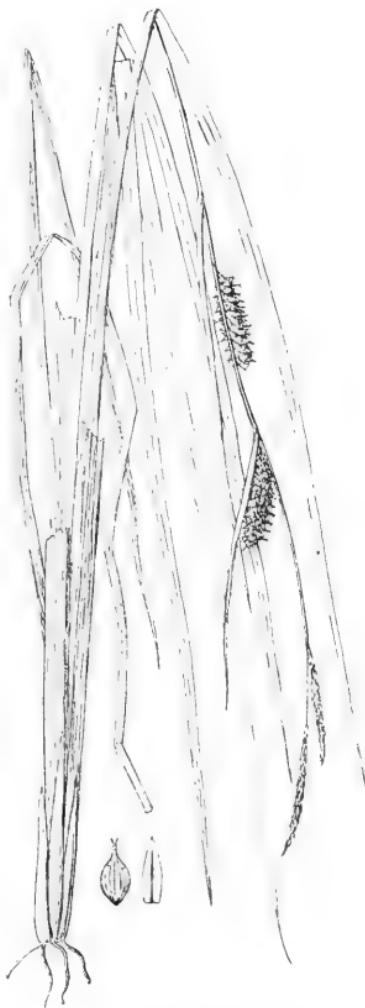


Fig. 72. *Carex rostrata* Stokes. $\frac{1}{2}$ nat. size.
(Spec. from West Greenland).

150. *C. rotundata* Wg., Kgl. Vet. Akad. Handl. 1803, p. 153.

Lge. Consp. Fl. Groenl. p. 152; Rosenv., Till. p. 724; Ledeb. Fl. Ross. IV p. 301; Blytt, Bidrag p. 19; Schmidt, Fl. Jeniss. arct. p. 125; Feilden, Nov. Zemlya p. 21; Meinshausen, Cyperac. Russl. p. 376; Fl. D. tab. 1407, 3049; *C. compacta* Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; Eastwood, Pl. coll. at Nome City, p. 130; *C. membranacea* Hook. Fl. bor. Am. II p. 220; *C. vesicaria*, γ, Ledeb. I. c. p. 317; *C. vesicaria*, γ, alpigena and δ, brachystachys, Lge. I. c. p. 293; Rosenv., I. c. p. 725, *C. pulla* Lge. I. c. p. 293, ex parte; Rosenv., I. c. p. 725, non Good.; *C. membranopacta* Cornell Party, Peary Voy. 1896, p. 419.

In the Arctic regions *C. rostrata* is replaced by this species.

Culms 15—40 cm. high, slender, mostly smooth, longer than the leaves; leaves glaucous, 1.5—3 mm. broad; lowest bract mostly a little longer than the culm; male spikelets 1—2, linear; female spikelets 1—3 (mostly 2), nearly sessile, dense-flowered, ovoid or short-cylindrical; scales acute or obtuse, ovate, blackish-brown and mostly with white, membranous summit; utricles ovoid, faintly nerved, shining, pale or usually dark at the upper part, with rather short, smooth, terete, two-toothed beak; stigmas 3, seldom 2.

Am.: Kotzebue Sound, Nome City, Arctic Shores, Southampton Island (!), North Somerset (!), Big Island in Hudson Strait, West Greenl. 60°—72° (!). Eur.: Dolgoi Island, Waigats, Habarowa, Samoyede Land, Kanin Peninsula. As.: Mouth of the Yenissei, Chukches Land, St. Lawrence Island.



Fig. 73. *Carex rotundata*
Wg. $\frac{2}{3}$ nat. size. (Spec.
from West Greenland).



Fig. 74. *Carex pulla* Wg.
 $\frac{2}{3}$ nat. size. (Spec. from
Iceland).

Geogr. area: Northern North America (very variable: *C. membranopacta*, *C. ambusta* etc.), Northern Scandinavia, Russia and Siberia.

151. ***C. pulla*** Good.

Lge. Conspl. Fl. Groenl. p. 153 ex parte; Hartz, Nordöst Grönl. p. 347; Dusén, Ost-Grönl. p. 57; Nath., Spetsb. Kärly. p. 351; Trautv. Fl. rip. Kolym. p. 566, Conspl. Fl. Nov. Zemlya p. 82; Scheutz, Pl. vase. Jeniss. p. 181; Feilden, Nov. Zemlya p. 21; Fl. D. tab. 2850; f. laxa Trautv. Pl. Sib. bor. p. 130; f. tristigmatica Trautv. Fl. Terr. Tschuktsch. p. 39; f. laxa and f. tristigmatica Kjellm., Vest-Eskim. Land p. 56; f. pedunculata and f. tristigmatica Kjellm., As. Beringss. p. 560; Kjellm. & Lundstr., Nov. Semilja p. 315.

As *C. rotundata* is the Arctic substitute for *C. rostrata*, so *C. pulla* in these regions replaces *C. vesicaria* L.

Rhizome creeping; culms robust, 5—30 cm. high, seabrous above; leaves green, 2—4 mm. broad, mostly flat or a little involute on the margins, rigid, mostly about as long as the culms; bracts small, shorter than the culms; male spikelet 1 (seldom 2), female spikelets 1—2 (seldom 3), ovoid or short-cylindrical; the lower with a capillary stalk and often drooping; scales broadly ovate, obtuse, blackish-brown; utricles blackish-brown, at least at the upper part, shining, ovoid, very faintly nerved, beak short, smooth, terete, two-toothed; stigmas 2, seldom 3.

Am.: Port Clarence, West Greenl. [rare] 64°—70° (!), East Greenl. 70°—71° (!), 72° 30'. Eur.: Spitsbergen (!), Novaya Zemlya to 74° (!). Waigats, Habarowa (!). As.: Arctic Coasts to Chukches Land.

Geogr. area: Northern North America, Iceland, Færöes, Mountains of Scotland, Northern Scandinavia and Russia, Northern Siberia.

Obs. Perhaps some of the statements from Asia (Kjellman and Trautvetter) belong to the foregoing species.

XVI. GRAMINEAE Juss. (By O. GELERT).

A. Spikelets in panicles.

- a. Spikelets with one terminal ♀ flower and two lateral ♂ or sterile flowers (*Phalarideae*).
 - α. Lateral flowers sterile 1. ***Anthoxanthum*.**
 - β. Lateral flowers ♂ 2. ***Hierochloa*.**
- b. Spikelets one-flowered (without ♂ or sterile lateral flowers) (*Agrostideae*).
 - α. Panicle contracted, dense, spike-like.
 - 1. Pale with awn 3. ***Alopecurus*.**
 - 2. Pale without awn 4. ***Phleum*.**
 - β. Panicle not spike-like.
 - 1. Panicle narrow, short. Stigmas filiform with few short side-branches. Fruit at maturity loosely enclosed in the pales 5. ***Phippsia*.**
 - 2. Panicle of various form. Stigmas plumose. Fruit adherent to the pales.
 - § Flowers with long hairs from below the pale 6. ***Calamagrostis*.**
 - \$\$ Flowers without long hairs.
 - † Glumes shorter than the pales 7. ***Arctagrostis*.**
 - †† Glumes longer than the pales. 8. ***Agrostis*.**

- c. Spikelets two- to many-flowered.
 - a. Glumes about as long as or longer than the spikelet; pale with a bent awn from the back (*Avenea*).
 - 1. Pales bidentate 9. **Trisetum.**
 - 2. Pales erose-dentate or entire.
 - § Glumes much longer than the flowers 10. **Vahlodea.**
 - §§ Glumes about as long as the flowers 11. **Aira.**
 - β. Glumes shorter than the spikelets (except *Dupontia*); pale without awn or with an awn at the apex (*Festuceae*).
 - 1. Glumes longer than the spikelet 13. **Dupontia.**
 - 2. Glumes shorter than the spikelet.
 - § Pale one- to three-veined.
 - † Panicle spike-like 14. **Koeleria.**
 - †† Panicle spreading, pyramidal 15. **Catabrosa.**
 - §§ Pale three- to many-veined.
 - † Palet with two setae on each side 16. **Pleurogram.**
 - †† Palet without setae.
 - * Veins on the pale nearly parallel. Pale rounded on the back.
 - / Glumes nearly as long as the lower flower. Pale with 5 obscure veins 17. **Arctophila.**
 - // Glumes shorter than the lower flower. Pale with 5—7 evident veins 19. **Glyceria.**
 - ** Veins on the pale converging.
 - / Pale rounded on the back 20. **Festuca.**
 - // Pale compressed, keeled on the back.
 - ° Pale without awn 18. **Poa.**
 - °° Pale awned 21. **Schedonorus.**
 - B. Spikelets in two rows, forming one-sided spikes in a one-sided spike-like or narrow panicle (*Chlorideae*) 12. **Beckmannia.**
 - C. Inflorescence spike-like (*Hordeae*).
 - a. Spikelets in two rows on one side of the rachis 22. **Nardus.**
 - b. Spikelets solitary or 2—3 together, on opposite sides of the rachis.
 - α. Spikelets solitary 23. **Agropyrum.**
 - β. Spikelets two or more at each node 24. **Elymus.**

1. ANTHOXANTHUM L.

152. **A. odoratum** L.

Lge. Conspl. Fl. Groenl. p. 157; Ledeb. Fl. Ross. IV p. 408.

Culm erect. Panicle spike-like, ovate-lanceolate, dense or interrupted below. Lower glume half as long as the upper one. Spikelets with two sterile flowers below, with ciliate pales, the lower with a geniculate awn about as long as the upper glume, the upper with a short straight awn; the third, uppermost flower fertile; anthers two.

Plant with smell of Coumarin.

Am.: West Greenl. $60^{\circ} 43' - 61^{\circ} (!)$. Eur.: Samoyede Land.

Geogr. area: North America (introduced), Iceland, Færöes, Europe, North Africa, Caucasus, Northern Asia.

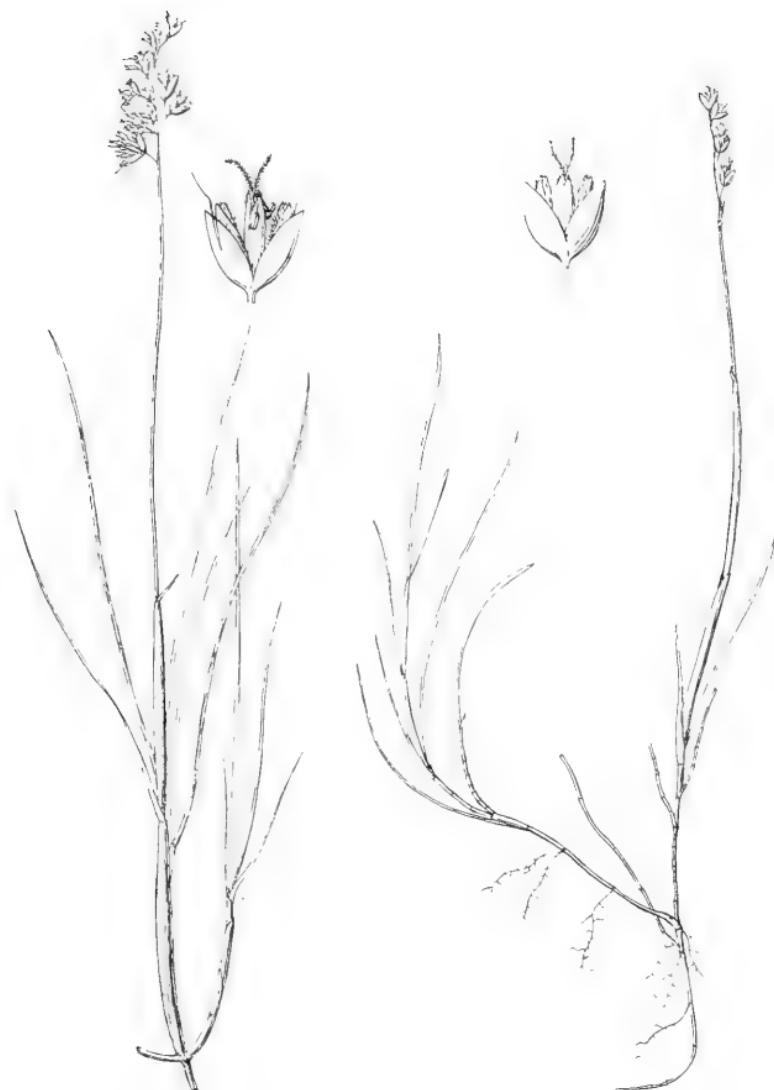


Fig. 75. *Hierochloa alpina* Liljebl. R. & S.
 $\frac{3}{4}$ nat. size. (Spec. from East Greenland).

Fig. 76. *Hierochloa pauciflora* R. Br. $\frac{3}{4}$ nat. size.
 (Spec. from Novaya Zemlya).

2. HIEROCHLOA Gmel.

153. *H. alpina* (Liljebl.) R. & S.

Ledeb. Fl. Ross. IV p. 408; Hook. Fl. bor. Am. II p. 234; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; Hart, Brit. Pol. Exp. p. 143;

J. Hook. Fox Exp. p. 85; Macoun, Catalogue IV p. 187; Lge. Consp. Fl. Groenl. p. 157; Peary, Aux. Exped. App. C. p. 7; Hartz, Nordöst Grönl. p. 348; Nath., Spetsb. Kärlv. p. 34; Trautv. Consp. Fl. Nov. Zemlya, p. 85; Th. Holm, Nov. Zeml. Veget. p. 21; Feilden, Nov. Zemlyia p. 22; Kjellm., Sib. Nordk. Fanerogamfl. p. 275, As. Beringss. p. 560, Vest-Eskim. Land p. 56, St. Lawrence-ön p. 22; Kjellm. & Lundstr., Nov. Semlja p. 315; Trautv. Fl. Terr. Tschuktsch. p. 40, Pl. Sib. bor. p. 140, Syll. Pl. Sib. bor. orient. p. 543, Fl. rip. Kolym. p. 571; Savastana alpina, Cornell Party, Peary Voy. 1896, p. 418 and p. 422; Eastwood, Pl. coll. at Nome City, p. 130; Holcus alpinus Sw., Fl. D. tab. 1508.

Leaves of the sterile shoots narrow. Panicle contracted, c. 3 cm. long. Spikelets 3-flowered, pales of the two lower (staminate) flowers ciliate, awned.

Am.: St. Lawrence Island, Kotzebue Sound, Nome City, Arctic Seashores and Islands (!), Big Island in Hudson Strait, Baffin Land, Ellesmere Land $78^{\circ} 56'$, West Greenl. $61^{\circ}-78^{\circ}$ (!), East Greenl. $61^{\circ} 10'$ and $70^{\circ}-74^{\circ} 32'$ (!). Eur.: Spitsbergen (!), Novaya Zemlya to $74^{\circ} 25'$ (!), Waigats (!), Samoyede Land at Jugor Schar. As.: Mouths of the Yenissei, Lena and Kolyma, Chukches Land (!).

Geogr. area: Northern North America, Iceland, Northern Scandinavia, Russia, Caucasus, Northern Asia.

154. *H. pauciflora* R. Br.

Hook. Fl. bor. Am. II p. 234; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; Ledeb. Fl. Ross. IV p. 407; Kjellm., Sib. Nordk. Fanerogamfl. p. 275, As. Beringss. p. 560, St. Lawrence-ön p. 21, Vest-Eskim. Land p. 56; Kjellm. & Lundstr., Nov. Semlja p. 315; Schmidt, Fl. Jeniss. arct. p. 128; Trautv. Syll. Pl. Sib. bor. orient. p. 543; *H. racemosa* Trin.

Plant very slender. Panicle one-sided, c. 2 cm. long, with only 3—8 spikelets, pales of the staminate flowers ciliate, mucronate.

Am.: St. Lawrence Island (!), Port Clarence, Arctic Islands (!), Baffin Land at Cumberland Gulf. Eur.: Novaya Zemlya to 73° (!), Waigats (!), Samoyede Land. As.: Arctic Coast (!), Mouth of the Yenissei (!), Taimyr Peninsula $73^{\circ} 45'$, Chukches Land.

Geogr. area: Northern Siberia.

155. *H. odorata* (L. p. pt.) Wg.

H. borealis (Schrad.) R. & S., Hook. Fl. bor. Am. II p. 234; Kjellm., Vest-Eskim. Land p. 56; Scheutz, Pl. vasc. Jeniss. p. 188; Trautv. Fl. rip. Kolym. p. 571; Ledeb. Fl. Ross. p. 407; *Holcus borealis* Schrad. Fl. Germ., *Holcus odoratus* L. ex parte, Fl. D. t. 963.

Leaves of the sterile shoots flat, broader than the culm. Panicle somewhat one-sided, pyramidal, c. 3—5 cm. long, pales of the staminate flowers ciliate, mucronate.

Am.: Kotzebue Sound, Port Clarence (!). Eur.: Samoyede Land. As.: Mouths of the Yenissei (!) and Kolyma.

Geogr. area: Northern North America, Iceland, Scotland, North and Central Europe, Caucasus, Northern Asia.

3. ALOPECURUS L.

156. *A. pratensis* L.

Fl. D. tab. 1985; *A. rutenicus* Weinm., Ledeb. Fl. Ross. IV p. 463 p. pt.; Trautv. Ross. Arct. Pl. p. 550; Scheutz, Pl. vasc. Jeniss. p. 193; *A. pratensis* v. *rutenicus* Trin. Spec. Gram. Icon. I tab. 45; *A. pratensis* f. *alpestris* Wg., Kjellm. & Lundstr., Nov. Seml. p. 315.

Culm erect, smooth. Panicle cylindrical. Glumes connected below, acute, ciliate on the back; pale as long as the glumes, with a geniculate awn attached below its middle.

The typical form has been found introduced in West Greenl. $61^{\circ} 13' \text{ N}$.

The Arctic form, *A. rutenicus* Weinm., is 15—30 cm. high, with short leaves and inflated upper sheaths, the panicle short, ovate-oblong and dark-coloured, the glumes somewhat diverging at the apex.

Eur.: Samoyede Land (!), Novaya Zemlya to 74° , Waigats (?). As.: Mouth of the Yenissei (?).

Geogr. area: North America (introduced), Iceland (introduced), Europe, North Africa (introduced). Northern Asia; v. *rutenicus*: Northern Scandinavia, Russia, Caucasus, Siberia.

157. *A. alpinus* Sm.

Fl. D. tab. 1565; Hook. Fl. bor. Am. II p. 234; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; Ledeb. Fl. Ross. IV p. 461; Hart, Brit. Pol. Exp. p. 141 and p. 303; Macoun, Catalogue IV p. 188; Eastwood, Pl. coll. at Nome City, p. 130; Lge. Consp. Fl. Groenl. p. 156; Greely, Lady Frankl. Bay Exp. II p. 15; Nath., Spetsb. Kärlv. p. 34; Andersson, König Karls Land p. 557; Feilden, Fl. of Kolguev p. 184; Nov. Zemlya p. 22; Blytt, Bidrag p. 8; Kjellm., Sib. Nordk. Fanerogamfl. p. 275; Kjellm. & Lundstr., Nov. Semlja p. 315; Schmidt, Fl. Jeniss. arct. p. 129; Trautv. Pl. Sib. bor. p. 144, Syll. Sib. bor. orient. p. 545, Fl. rip. Kolym. p. 572; Alopecurus brevistachya M. B.,

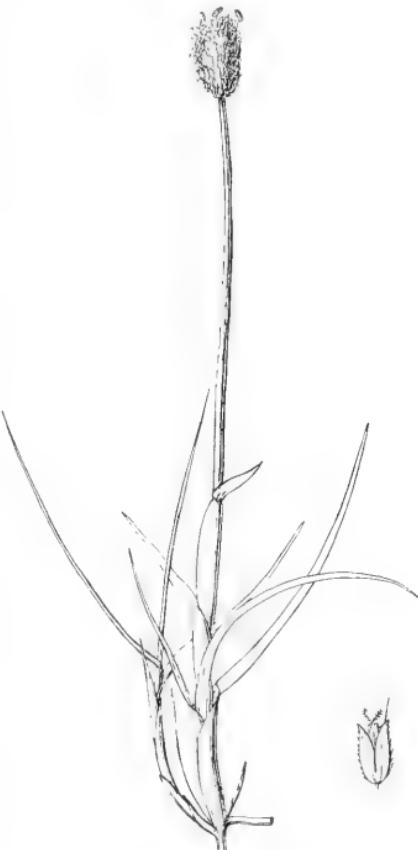


Fig. 77. *Alopecurus alpinus* Sm. $\frac{2}{3}$ nat. size.
(Spec. from East Greenland).

Ledeb. I.c. p. 462; A. alpinus v. brachystachya Trautv. Fl. Terr. Tschuktsch. p. 40; A. ovatus Horn., Fl. D. tab. 1565.

Culm smooth, ascending, stoloniferous. Panicle ovate; glumes connected below, acute, densely hairy; pale as long as the glumes, with a short awn, which sometimes does not exceed the spikelet (f. *mutica* Sommerfelt).

Am.: St. Lawrence Island, Kotzebue Sound, Nome City, Point Barrow, Arctic Sea-shores and Islands (!), Hudson Strait, Baffin Land, Ellesmere Land, Grinnell Land $81^{\circ} 44'$, $83^{\circ} 4'$ (?), West Greenl. $61^{\circ} 53'$ — $81^{\circ} 40'$ (!), East Greenl. 70° — 75° (!). Eur.: Spitsbergen (!), King Charles Islands, Franz Josef Archipelago (!), Kolguev, Novaya Zemlya to $74^{\circ} 25'$, Waigats, Habarowa. As.: Arctic Coast (!), Mouth of the Yenissei, Taimyr Peninsula $73^{\circ} 30'$ — $75^{\circ} 36'$, New Siberian Islands, Chukches Land.

Geogr. area: Northern North America, Rocky Mountains, Scotland, Northern Russia (Samoyede Land).

158. **A. aristulatus** Michx., Fl. Bor. Am. I p. 43 (1803).

A. fulvus Sm. (1805), Lge. Consp. Fl. Groenl. p. 294; Rosenv., Till. p. 727; Fl. D. tab. 1804; Abromeit, Grönl. Exp. p. 96; A. geniculatus Lge. l. c. p. 156, non Linné.

Culm smooth, creeping, ascending, bent at the knots, upper sheaths inflated. Panicle cylindrical; glumes connected below, obtuse, ciliate; pale often shortly exceeding the glumes and with a short awn from about the middle; awn included or only slightly exceeding the pale. Anthers yellowish-brown, short and broad.

Often floating in water.

Am.: West Greenl. 60° — $70^{\circ} 30'$ (!), East Greenl. $65^{\circ} 35'$ (!).

Geogr. area: North America, Iceland, Europe, Northern Asia.

4. PHLEUM L.

159. **P. pratense** L.

Trautv. Ross. Arct. Pl. p. 550; Fl. D. tab. 1984.

Panicle dense, long, cylindrical. Glumes oblong, obtuse, ciliate on the back, with a short, glabrous awn. Upper sheath non-inflated.

Eur.: Novaya Zemlya at 72° — 73° (?), (West Greenl. $61^{\circ} 13'$ introduced).

Geogr. area: North America (introduced), Iceland (introduced), Færöes (introduced), Europe, Northern Africa (introduced), Caucasus, Northern Asia.

160. **P. alpinum** L.

Rothr., Fl. of Alaska p. 459; Lge. Consp. Fl. Groenl. p. 155; Ledeb. Fl. Ross. IV p. 458; Kurtz, Bericht. p. 148; Fl. D. tab. 213.

Culm erect or ascending, 10—40 cm. high; upper sheath inflated. Panicle dense, ovate-oblong; glumes obtuse, ciliate on the back, with a rough awn about as long as the glume.

Am.: St. Lawrence Island, Kotzebue Sound, West Greenl. 60° – 72°
 $23'$ (I), East Greenl. 60° – $65^{\circ} 35'$ (I). Eur.: Samoyede Land. As.: Mouth
of the Yenissei.

Geogr. area: Northern North America, Iceland, Northern Scandinavia, Northern Russia, The Alps, Caucasus, Altai, Kamchatka.

5. PHIPPSIA R. Br.

161. *P. algida* (Soland.) R. Br., *Chloris Melvilliana*, p. 27.

Hook. Fl. bor. Am. II p. 238; Macoun, Catalogue IV p. 196; Hart, Brit. Pol. Exped. p. 142; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 86; Cornell Party, Peary Voy. 1896, p. 418; Feilden, Nov. Zemlya p. 25; *P. monandra* Trin., Hook. I. c. p. 238; *Catabrosa algida* Fr., Lge. Conspp. Fl. Groenl. p. 166; Peary, Auxil. Exped. App. C. p. 8; Hook. Fox Exp. p. 85; Th. Fries, Beeren Isl. Veget. p. 156; Ledeb. Fl. Ross. IV p. 338; Reichardt, Fl. Jan Mayen p. 10; Nath., Spetsb. Kärlv. p. 32; Trautv. Conspp. Fl. Nov. Zeml. p. 84; Andersson, König Karls Land p. 557; Kjellm., Sib. Nordk. Fanerogamfl. p. 273, As. Beringss. p. 559, St. Lawrence-ön p. 21; Schmidt, Fl. Jeniss. arct. p. 128; *Agrostis algida* Wg., Fl. D. tab. 1505.

Cæspitose, 2–15 cm. high. Leaves flat, glabrous, obtuse; ligule long; sheaths somewhat inflated. Panicle contracted, in colour generally green, linear-lanceolate. Spikelets very small, about 1 mm., 1-flowered. Glumes very small, often wanting; pales about equal, membranous margined, glabrous; stamens 1–3; stigmas elongated.

Am.: St. Lawrence Island, Kotzebue Sound, Point Barrow, Arctic Coast and Islands, Hudson Strait, Baffin Land, Ellesmere Land, Grinnell Land to $81^{\circ} 42'$ (I), West Greenl. 60° – $77^{\circ} 12'$ (I), East Greenl. 60° 28' and 70° – $74^{\circ} 32'$ (I). Eur.: Jan Mayen (I), Spitsbergen (I), King Charles Islands, Franz Josef Archipelago (I), Beeren Island (I), Kolguev, Waigats, Novaya Zemlya to 75° (I), Samoyede Land. As.: Arctic Coast (I), Mouth of the Yenissei, Taimyr Peninsula $75^{\circ} 36'$, Chukches Land.

Geogr. area: Iceland, Scandinavia, Northern Russia.

6. CALAMAGROSTIS Adans.

A. Awn evidently exceeding the spikelet. *C. arundinacea*.



Fig. 78. *Phippsia algida* (Soland.) R. Br. $\frac{3}{4}$ nat. size.
(Spec. from West Greenland).

- B. Awn included in the spikelet or slightly exceeding it.
- Culm with 2–3 elongated joints.
 - Glumes ovate-lanceolate, acute.
 - Glumes about 5 mm. long ***C. confinis.***
 - Glumes about 3–4 mm. long ***C. neglecta.***
 - Glumes lanceolate, acuminate.
 - Glumes scabrous on the dorsal vein.
 - * Glumes about 7 mm. long. Pale with a short awn from above the middle ***C. cinnoides.***
 - ** Glumes about 7 mm. long. Pale with a short straight awn from below the middle ***C. strigosa.***
 - Glumes glabrous, shining.
 - * Glumes about 5 mm. long. Pale with a bent awn from below the middle, sometimes slightly exceeding the spikelet ***C. deschampsiodes.***
 - ** Glumes about 3–4 mm. long. Pale with a short awn from above the middle ***C. Holmii.***
 - Culm with 4–6 elongated joints.
 - Glumes about 5 mm. long. Ligules 7–10 mm. long ***C. Langsdorffii.***
 - Glumes about 2 mm. long. Ligules short ***C. canadensis.***

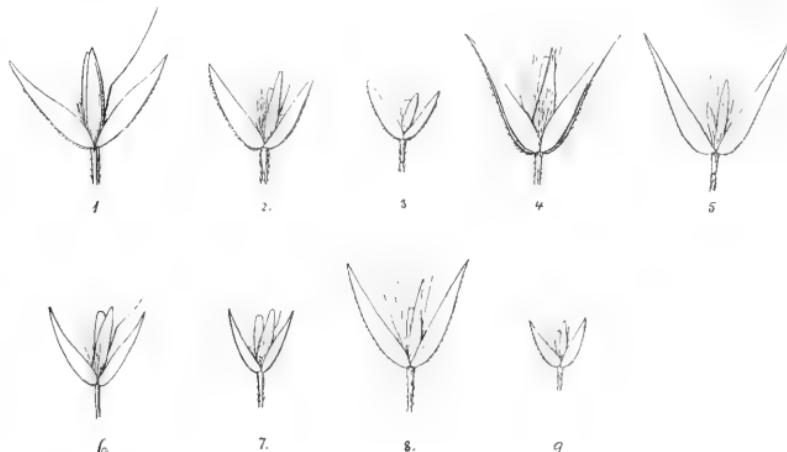


Fig. 79. Spikelets of *Calamagrostis*. 1. *C. arundinacea*. 2. *C. confinis*. 3. *C. neglecta*. 4. *C. cinnoides*. 5. *C. strigosa*. 6. *C. deschampsiodes*. 7. *C. Holmii*. 8. *C. Langsdorffii*. 9. *C. canadensis*. (About 3 times enlarged).

162. *C. arundinacea* (L.) Roth.

C. silvatica D. C., Trautv. Syll. Pl. Sib. bor. orient. p. 544; Fl. rip. Kolym. p. 572; *C. purpurascens* R. Br. in Richardson Bot. App. p. 731; Hook. Fl. bor. Am. II p. 240; Lge. Conspl. Fl. Groenl. p. 160; Hartz, Nordöst Grönl. p. 348; Dusén, Ost Grönl. p. 58; Fl. D. tab. 2523; *C. hyperborea* Dusén l. c. p. 58, non Lge.

Glumes lanceolate, acuminate, with scabrous dorsal vein, the rest glabrous or with very short hairs. Pales about equal, almost as

long as the glumes and of the same texture, lower pale with a bent awn from its lower part, which exceeds the glumes. Hairs very short, about $\frac{1}{4}$ of the length of the pale; the rudiment of the second flower with longer hairs, about half as long as the pale.

The Arctic form (*C. purpurascens* R. Br.) has lower culms, 20—50 cm. high, and a spike-like contracted, 5—8 cm. long panicle, tinged with purple or violet.

Am.: Arctic Sea-shores, West Greenl. $61^{\circ}-70^{\circ} 41'$ (!). East Greenl. $70^{\circ}-74^{\circ} 10'$ (!). As.: Mouths of the Lena and Kolyma.

Geogr. area: Rocky Mountains, North and Central Europe, Russia, Caucasus, Siberia.

Obs. We have seen the specimens in the Herb. of the Riksmuseum at Stockholm from Clavering Island, which Dusen l. c. has quoted as *C. hyperborea*, but they are *C. arundinacea*, f. *purpurascens*.

163. *C. confinis* (Willd.) Nutt., Genera of North Am. Pl. I p. 47.

C. lapponica (Wg. 1812) Hartm. Handb. (ed. I) ed. XI p. 516; Berlin, Kärly. fr. Grönl. p. 75; Ledeb. Fl. Ross. IV p. 429; Scheutz, Pl. vasc. Jeniss. p. 191; Kjellm., Sib. Nordk. Fanerogamfl. p. 275; Fl. D. Suppl. tab. 5 and tab. 6; *C. lapponica* v. *groenlandica* Lge. Consp. Fl. Groenl. p. 296; *C. hyperborea* Lge. l. c. p. 160 and p. 295; Fl. D. tab. 2942 fig. 1; *Arundo confinis* Willd. Enum. I p. 127 (1809).

Loosely caespitose. Culm with about 3 joints, of which the uppermost occupies more than half of the length of the culm, somewhat scabrous in the upper part. Leaves with prominent scabrous veins on the upper surface, sometimes slightly involute; ligule short, obtuse, sheaths slightly scabrous. Panicle narrow, obtuse, generally tinged with violet. Glumes ovate-lanceolate, acute, about 5 mm. long, scabrous on the dorsal vein. Pales unequal, lower pale slightly shorter than the glumes and with a stout, bent or straight awn from below the middle. Hairs as long as the pale or somewhat shorter; rudiment short and with long hairs.

The Arctic form (*C. hyperborea* Lge.) has short, straight awns, and the hairs are not so long as the pale, also the panicle is more contracted.

Am.: West Greenl. $60^{\circ}-70^{\circ} 40'$ (!). As.: Arctic Coast (!), Mouth of the Yenissei, Taimyr Peninsula (!).

Geogr. area: Northern North America, Northern Scandinavia, Northern Russia, Siberia.

164. *C. neglecta* (Ehrh.) Fl. de Wetterau.

Ledeb. Fl. Ross. IV p. 428; Schmidt, Fl. Jeniss. arct. p. 129; Trautv. Syll. Pl. Sib. bor. orient. p. 544; Th. Fries, Beeren Isl. Veget. p. 156; Feilden, Nov. Zemlya p. 22; *C. neglecta*, v. *borealis*, Kruuse, Jan Mayen,

C. stricta v. *borealis* Lge. (non Læst.) *Consp. Fl. Grön.* p. 161; *Fl. D. tab.* 2942, fig. 2—3; *Hartz, Nordöst Grön.* p. 348; *Dusén, Ost-Grön.* p. 58; *C. stricta* (Tim.) *Beauv.*, *Hook., Coll. of Arct. Pl.* p. 123; *Nath., Spetsb. Kärlv.* p. 34; *C. hyperborea* *Berlin, Kärlv. fr. Grön.* p. 75, non Lge.; *C. neglecta* v. *hyperborea* *Scheutz, Pl. vasc. Jeniss.* p. 191.

Culm erect, with 2 or 3 joints, smooth. Leaves generally involute. Glumes ovate-lanceolate, acute, c. 3 mm. long, scabrous on the dorsal vein. Pales unequal, lower pale $\frac{2}{3}$ as long as the glumes, with a short straight awn from below the middle of the pale. Hairs $\frac{2}{3}$ as long as the lower pale.

In Arctic regions the plant generally is only 20—40 cm. high and the panicle is narrow, spike-like and tinged with violet (v. *alpina* Læst. in herb., v. *borealis* Lge. non Læst.).

C. confinis and *C. neglecta* are often rather difficult to separate from each other, and they may perhaps form one species.

Am.: Kotzebue Sound, Point Maitland, West Greenl. $61^{\circ} - 70^{\circ} 40'$ (!), East Greenl. $61^{\circ} 9' - 72^{\circ}$ (!). Eur.: Jan Mayen (!), Spitsbergen (!), Beerens Island (!), Novaya Zemlya to 74° , Kolguev (!), Waigats (!), Samoyede Land (!). As.: Mouths of the Yenissei (!) and Lena, New Siberian Islands.

Geogr. area: Northern North America, Iceland, North and Central Europe, Siberia.

C. cinnoides (Muhl.) Scrib.

Britton & Brown, *Ill. Flora I* p. 165; *C. Nuttaliana* Steud. 1855; *C. canadensis* Nutt. (non Beauv.); ?*C. canadensis*, Taylor, *Pl. coll. at Davis Str. and Baff. Bay* p. 85; ?*C. canadensis* Durand, *Pl. Kaneanae*; ?*C. canadensis* Hook. *Coll. of Arct. Pl.* p. 124; *Arundo cinnoides* Muhl. 1817.

Glumes lanceolate, long acuminate, about 7 mm. long, very rough on the keeled back. Pales equal, $\frac{3}{4}$ as long as the glumes, lower pale with a short awn in the upper part. Leaves with rather long rigid hairs on the veins of the upper surface; ligule long, acute. About 1 metre high with 3 developed joints.

Am.: Arctic Coast (?), Baffin Land at Cap Searle $77^{\circ} 20'$ (?), West Greenl. $65^{\circ} 20'$ (?).

Geogr. area: Northern North America.

Obs. We have not seen Arctic specimens of this plant, which in former times was often confounded with *C. canadensis*. Most likely *C. cinnoides* (*C. canadensis* Nutt.) has been meant in the above mentioned list of Taylor, Hooker and Durand, but it is probable it may have been confounded with either *C. confinis* or *C. Langsdorffii*, at all events neither *C. cinnoides* nor *C. canadensis* have been found in West Greenl. in recent times, although the place (Sukkertoppen) has been often visited by Danish botanists.

165. *C. strigosa* (Wg.) Hartm., *Handb. (ed. 1)* ed. XI p. 517.

Trautv. Ross. Arct. Pl. p. 549; *Arundo strigosa* Wg.

Glumes lanceolate, long acuminate, about 7 mm. long. Leaves with elongated, acute ligules. For the rest as *C. neglecta*, forming a transition between the species and *C. epigejos* (L.) Roth. 50—80 cm. high, with 3 developed joints.

Eur.: Novaya Zemlya at 72°—73°.

Geogr. area: Sitka, Northern Scandinavia, Scotland, Northern Russia, Kamchatka.

Obs. We have not seen Arctic specimens of this plant.

**166. *C. deschampsioides* Trin., Spec.
Gram. Icon. III tab. 354.**

Ledeb. Fl. Ross. IV p. 427; Kurtz, Fl. d. Tschuktschenh. p. 480.

Loosely tufted. Culm ascending with 2—3 joints, smooth, 10—20 cm. high. Leaves involute, smooth, with a short ligule. Panicle 2—5 cm. long, loose, with few spikelets. Glumes lanceolate, acuminate, about 5 mm. long, glabrous, shining (not scabrous on the dorsal vein). Pales almost equal, nearly as long as the glumes, lower pale with a bent awn from somewhat below the middle; awn sometimes slightly exceeding the spikelet. Hairs about half as long as the pale.

Eur.: Samoyede Land (!). As.: Chukches Land (!).

Geogr. area: Kola Peninsula, Siberia, Kamchatka, Alaska.

**167. *C. Holmii* Lge. in Th. Holm,
Nov. Zeml. Veget. p. 16 tab. I fig. 2, tab.
II fig. 9—16.**

Densely tufted. Culm erect or ascending with 2—3 joints, 10—20 cm. high, smooth. Leaves involute, smooth, with a short ligule. Panicle 2—5 cm. long, somewhat contracted. Glumes lanceolate, acuminate, about 3 mm. long, shining, glabrous. Pales almost equal, nearly as long as the glumes, lower pale with a



Fig. 80. *Calamagrostis deschampsioides*
Trin. $\frac{2}{3}$ nat. size.
(Spec. from Chukches Land).

short straight awn from the upper part. Hairs about half as long as the pale.

Eur.: Only found in the tundra at Yugor Schar (!).

Obs. According to Mr. Burkhill (Feilden, Nov. Zemlya, p. 22) *C. Holmii* cannot be separated specifically from *C. neglecta*.



Fig. 81. *Calamagrostis Holmii* Lge. $\frac{2}{3}$ nat. size. Spec. from Yugor Schar).

168. ***C. Langsdorffii* (Link.) Trin., De Graminib. p. 225, tab. 4, fig. 10.**

Ledeb. Fl. Ross. IV p. 430; Schmidt, Fl. Jeniss. arct. p. 129; Fl. D. tab. 2524; *C. phragmitoides* Hartm. (ed. 2) ed. XI p. 518; Lge. Conspl. Fl. Groenl. p. 159; Scheutz., Pl. vase. Jeniss. p. 190; Kjellm., As. Beringss. p. 559; *C. elata* Blytt, Fl. D. Suppl. tab. 63; *C. lanceolata* Rupr. in shed.. Ledeb. Fl. Ross. IV p. 431.

Culm erect, 40—70 cm. high, with about 4 joints. Leaves flat, ligule of the uppermost leaf long, 7—10 mm. long. Panicle about 20 cm. long, slightly drooping. Glumes lanceolate, acuminate, scabrous

on the dorsal vein and covered with short hairs. Pales $\frac{2}{3}$ as long as the glumes, unequal, membranous; awn short, from about the middle. Hairs as long as the pale.

We cannot find any marked difference between *C. Langsdorffii* and *C. phragmitoides*, therefore we have combined them under the older name.

Am.: Kotzebue Sound, West Greenl. $60^{\circ}—69^{\circ} 32'(\text{l})$, East Greenl. $60^{\circ}—61^{\circ}(\text{l})$. Eur.: Samoyede Land (l). As.: Mouth of the Yenissei (l), Chukches Land.

Geogr. area: Northern North America, Northern Scandinavia, Denmark, Northeast Germany [rare], Finland, Russia, Siberia.

169. *C. canadensis* (Michx.) Beauv.

Hook. Fl. bor. Am. II p. 240; J. Hook., Coll. of Arctic Pl. p. 124.

Culm erect, more than 1 metre high, with 5—6 joints. Panicle 10—15 cm. long. Spikelets very small, about 2 mm. long. Glumes broad-lanceolate, acute; pales membranous, lower one with a short awn from below the middle, scarcely stouter than the hairs which are as long as the pale.

Am.: Kotzebue Sound, Arctic Coast.

Geogr. area: North America.

7. ARCTAGROSTIS Griseb.

170. *A. latifolia* (R. Br.) Griseb. in Ledeb. Fl. Ross. IV p. 434.

Pearry, Auxil. Exp. App. C. p. 8; Eastwood, Pl. coll. at Nome City, p. 130; Macoun, Catalogue IV p. 20; Trautv. Conspr. Fl. Nov. Zeml. p. 87, Fl. Terr. Tschuktsch. p. 40, Pl. Sib. bor. p. 143, Fl. rip. Kolym. p. 572; Greeley, Lady Frankl. Bay Exped. p. 15; Schmidt, Jeniss. arct. p. 129; Colpodium latifolium R. Br. Verm. Schr. I p. 414; Hook. Fl. bor. Am. II p. 238; Macoun, Catalogue IV p. 201; Lge. Conspr. Fl. Groenl. p. 166; Hart, Brit. Pol. Exped. p. 142; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 86; Hartz, Nordöst Grönl. p. 349; Dusén, Ost-Grönl. p. 59; Nath., Spetsb. Kärly. p. 32; Feilden, Nov. Zeml. p. 23; Kjellm., Sib. Nordk. Fanerogamfl. p. 274, As. Beringss. p. 559, St. Lawrence-ön p. 21, Vest-Eskim. Land p. 55; Kjellm. & Lundstr., Fanerogamfl. fr. Nov. Semlja

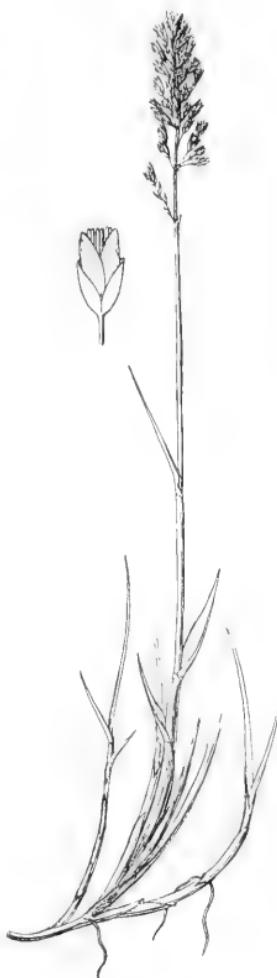


Fig. 82. *Arctagrostis latifolia* (R. Br.)
Griseb. $\frac{3}{4}$ nat. size.
(Spec. from East Greenland).

p. 315; Fl. D. tab. 2341; *Colpodium arundinaceum* Hook. l. c. p. 238; *A. latifolia* v. *arundinacea* Ledeb. l. c. p. 435; Schmidt, l. c. p. 129.

Rhizome creeping. Culm erect, 10—60 cm. high. Leaves short, broad, flat, seabrous, acuminate; ligule obtuse, erose. Panicle lanceolate, often dense, pedicels short. Spikelets one-flowered, glumes almost equal, ovate-lanceolate, shorter than the pales, which are mostly herbaceous, membranous at the top, obtuse, pubescent with minute hairs, awn-less.

Am.: St. Lawrence Island, Port Clarence (!), Kotzebue Sound, Nome City, Point Barrow, Arctic Coast and Islands (!), Baffin Land, Grinnell Land to $81^{\circ} 42'$, Nottingham Island, Hudson Bay, Hudson Strait, West Greenl. 70° — $77^{\circ} 30'$ (!), East Greenl. 70° — $74^{\circ} 20'$ (!). Eur.: Spitsbergen, Novaya Zemlya to 74° (!), Waigats (!), Habarowa, Samoyede Land. As.: Arctic Coast (!), Mouths of the Yenissei, Lena and Kolyma, Taimyr Peninsula $74^{\circ} 75'$, Chukches Land (!).

Geogr. area: Finmarkia, Russian Lapland, Northern Russia, Siberia.

8. AGROSTIS L.

- A. Pales two, the upper (palet) about $\frac{2}{3}$ as long as the lower.
 - a. Ligule long. Panicle after flowering contracted *A. stolonifera*.
 - b. Ligule very short, truncate. Panicle after flowering not contracted *A. vulgaris*.
- B. Only one pale, seldom a very minute upper pale.
 - a. Anthers $\frac{2}{3}$ as long as the pale. Panicle contracted after flowering *A. canina*.
 - b. Anthers $\frac{1}{3}$ as long as the pale. Panicle spreading after flowering *A. borealis*.

171. *A. stolonifera* L.

A. alba L. (?); Lge. Conspl. Fl. Groenl. p. 158; Fl. D. tab. 1623; Ledeb. Fl. Ross. IV p. 436.

Stoloniferous. Panicle oblong, after flowering contracted. Glumes equal, pales two, lower one sometimes with a short awn. Leaves flat, ligule long.

Am.: West Greenl. 60° — $61^{\circ} 9'$ (!). Eur.: Samoyede Land (!).

Geogr. area: North America (introduced), Iceland, Færöes, Europe, North Africa, Northern Asia.

? *A. vulgaris* With.

Taylor, Pl. coll. at Davis Str. and Baff. Land p. 85.

Stoloniferous. Panicle oblong-pyramidal, usually not contracted after flowering. Glumes equal, pales two, lower one sometimes with a short awn. Leaves flat, ligule very short, truncate.

Am.: Baffin Land at Cumberland Gulf (probably a mistake).

Geogr. area: North America (introduced), Iceland, Færöes, Europe, Caucasus.

172. *A. canina* L.

Lge. Conspl. Fl. Groenl. p. 153; Fl. D. tab. 1443.

Stoloniferous. Panicle oblong, contracted after flowering. Glumes unequal, only one pale with a bent awn from below the middle

and somewhat exceeding the spikelet. Leaves narrow, involute. Anthers two thirds as long as the pale, generally violet.

A m.: West Greenl. 60° – $68^{\circ} 42'$ (!).

Geogr. area: North America, Iceland, Færöes, Europe, Caucasus, Northern Asia.

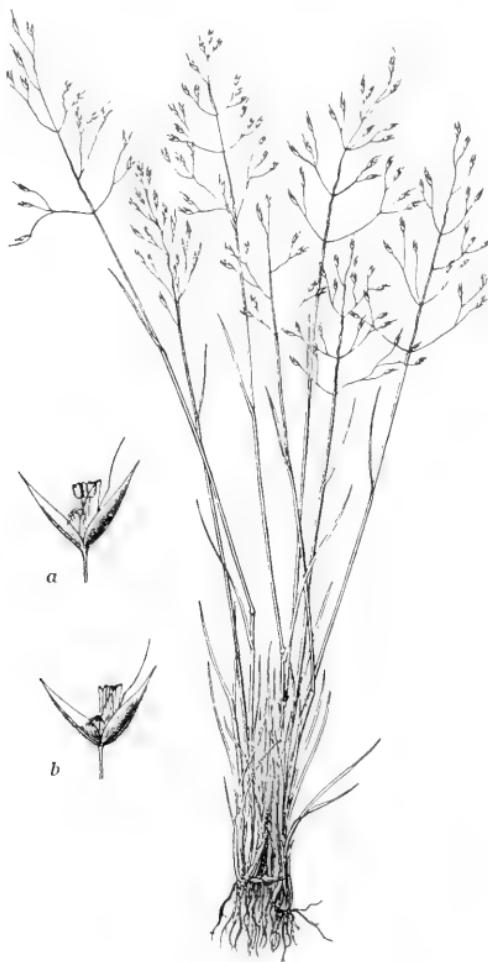


Fig. 83. *Agrostis borealis* Hartm. $\frac{3}{4}$ nat. size. (Spec. from East Greenland).
a, flower. b, flower of *A. canina* L.

173. ***A. borealis* Hartm., Scand. Fl. ed. III, 1838 (ed. XI p. 521).**

Murbeck in Bot. Not. 1898, p. 11; *A. rubra* Wg. (p. pt.); Ledeb. Fl. Ross. IV p. 440; Lge. Conspl. Fl. Groenl. p. 157; Abromeit, Grönland. Exped. p. 97; Hartz,

Nordöst-Grönl. p. 348; Schmidt, Fl. Jeniss. arct. p. 129; Fl. D. tab. 2581; A. rupestris Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85 (?); A. alpina Wg. sec. Murb. l.c.

Cæspitose. Panicle pyramidal, spreading during and after flowering. Glumes unequal, only one pale with a long bent awn from below the middle and much exceeding the spikelet. Leaves narrow, almost flat. Anthers one third as long as the pale, generally yellowish.

Am.: Cumberland Gulf (?), West Greenl. $60^{\circ} - 70^{\circ} 25'$ (!), East Greenl. $60^{\circ} - 61^{\circ} 30'$ (!), $65^{\circ} 35'$, $70^{\circ} - 71^{\circ}$ (!). Eur.: Samoyede Land. As.: Mouth of the Yenissei.

Geogr. area: Northern North America, Northern Scandinavia, Northern Russia, Siberia.

9. TRISETUM Pers.

174. T. subspicatum (L.) Beauv.

Hook. Fl. bor. Am. II p. 244; Macoun, Catalogue p. 212; Hart, Brit. Pol. Exped. p. 142; Cornell Party, Peary Voy. 1896, p. 418; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 86; Lge. Conspl. Fl. Groenl. p. 164; Hartz, Nordöst Grönl. p. 349; Nath., Spetsb. Kärlv. p. 33; Kjellm., Sib. Nordk. Fanerogamfl. p. 274, As. Beringss. p. 559, Vest-Eskim. Land p. 55; Kjellm. & Lundstr., Nov. Semlja p. 315; Feilden, Fl. of Kolguev p. 184; Avena subspicata Clairv., Ledeb. Fl. Ross. IV p. 418; Schmidt, Fl. Jeniss. arct. p. 128; Trautv., Pl. Sib. bor. p. 140; Aira subspicata L., Trautv. Conspl. Fl. Nov. Zemlja p. 86.

Cæspitose, culms erect, 10—20 cm. high. Leaves flat, acuminate. Culm and leaves, especially the sheaths, softly pubescent. Panicle lanceolate-oblong, dense, spike-like, 2—4 cm. long. Spikelets shining, 2—3-flowered. Glumes hispid on the dorsal vein, the lower $\frac{2}{3}$ as long as the upper; lower pales bidentate, glabrous, with long, bent and twisted awns. Pales slightly exceeding the glumes.

Am.: Kotzebue Sound, Port Clarence (!), Point Barrow, Arctic Shores and Islands (!), Big Island in Hudson Strait, Baffin Land, Grinnell Land to $81^{\circ} 42'$, West Greenl. $60^{\circ} - 74^{\circ} 15'$ (!), East Greenl. $60^{\circ} - 75^{\circ}$ (!). Eur.: Spitsbergen (!), Kolguev, Novaya Zemlya to 74° (!), Waigats (!), Samoyede Land. As.: Mouths of the Yenissei (!) and Lena, Chukches Land.

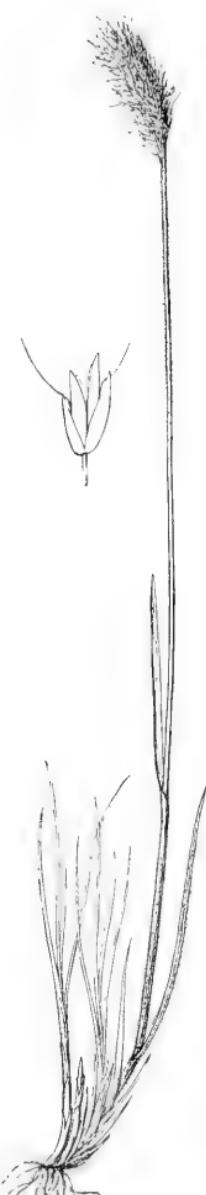


Fig. 84. *Trisetum subspicatum* (L.) Beauv. $\frac{3}{4}$ nat. size.
(Spec. from East Greenland).

Geogr. area: North America, Iceland, Northern Scandinavia, Northern Russia, Caucasus, Siberia, Kamchatka.

175. **T. agrostideum** (Læst.) Fr.

Scheutz. Pl. vasc. Jeniss. p. 189; Fl. D. Suppl. tab. 125; Avena subspicata v. agrostidea Læst.; A. flavesens v. agrostidea Trautv. Syll. Sib. bor. orient. p. 543; T. Friesianum Steud.

Culms erect, 15–35 cm. high, slender, glabrous. Leaves narrow, flat or somewhat involute. Lower sheaths and leaves softly pubescent. Panicle in flower spreading, with short branches, afterwards contracted, but not spike-like, 2–5 cm. long. Spikelets 2–3-flowered, glumes unequal, the lower $\frac{2}{3}$ as long as the upper; lower pales minutely hairy, with long bent and twisted awns. Pales somewhat exceeding the glumes.

In the habit recalling *T. subspicatum*, but surely more nearly allied to *T. flavesens*, to which it may perhaps rightly be placed as a variety.

As.: Mouths of the Yenisei (?) and Lena.

Geogr. area: Lapland, East Siberia, Pyrenees.

176. **T. flavesens** (L.) Beauv.

Trautv. Pl. Sib. bor. p. 141;

Kjellm., Vest-Eskim. Land p. 55; *T. sibiricum* Rupr.; *Avena Ruprechtii* Griseb. in Ledeb. Fl. Ross. IV p. 418.

Culm erect, glabrous. Leaves flat. Lower sheaths and leaves glabrous or pubescent. Panicle in flower spreading. Spikelets



Fig. 85. *Trisetum agrostideum* (Læst.) Fr.
3/4 nat. size.
(Spec. from Lapland).



Fig. 86. *Trisetum flavesens* (L.) Beauv.
3/4 nat. size.
(Spec. from Siberia).

shining, generally 3-flowered. Glumes unequal, the lower half as long as the upper. Lower pales glabrous or minutely hairy, with long bent and twisted awns. Pales only a little longer than the upper glume.

The Arctic form, *T. sibiricum* Rupr., differs from the common plant by shorter (25—40 cm.) and stouter culms, broader leaves, smaller panicle with shorter branches and larger spikelets.

Am.: Port Clarence (!). Eur.: Samoyede Land.
As.: Mouth of the Lena (!).

Geogr. area: North America (introduced), Europe, Caucasus, Siberia, Kamchatka, Japan.

10. VAHLODEA Fr.

177. *V. atropurpurea* (Wg.) Fr.

Lge. Conspl. Fl. Groenl. p. 162 and p. 296; *Aira atropurpurea* Wg., Rothr., Fl. of Alaska p. 459; Hook. Fl. bor. Am. II p. 243; *A. latifolia* Hook. l.c. p. 243, tab. 227.

Culm 20—30 cm. high, smooth. Leaves short, flat, acuminate. Ligule evident, about 2 mm., obtuse. Panicle pyramidal, 5—8 cm., with long capillary branches, two from each node. Glumes broad-lanceolate, acuminate, generally tinged with violet. Flowers 2 or 3, pales only half as long as the glumes. Lower pale erose-truncate with a bent awn, which does not exceed the glumes. Hairs half as long as the pale.

Am.: Arctic Coast from Point Barrow to Mackenzie River, West Greenl. 62° — $65^{\circ} 28'$ (!).

Geogr. area: Unalashka, Northern North America, Northern Scandinavia, Northern Russia.

11. AIRA L.

178. *A. flexuosa* L.

Lge. Conspl. Fl. Groenl. p. 162; Feilden, Fl. of Kolguev p. 184; Fl. D. tab. 1322.

Culms erect. Leaves setaceous, involute, sheaths scabrous. Panicle spreading with flexuous branches. Lower pale with a twisted and bent awn attached near the base and much exceeding the spikelets.

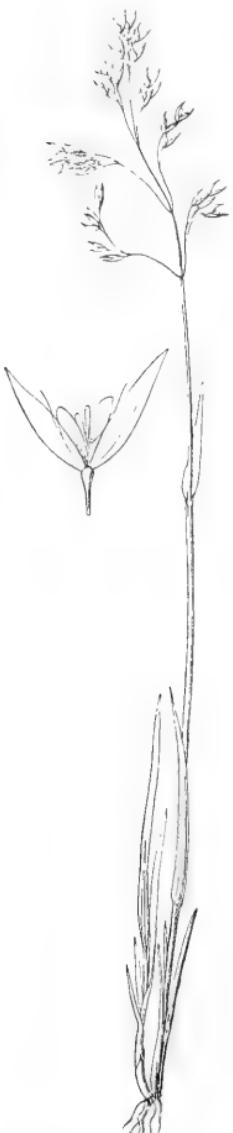


Fig. 87. *Vahlodea atropurpurea* (Wg.) Fr. $\frac{1}{2}$ nat. size.
(Spec. from West Greenland).

The Arctic and mountain form, *A. montana* L., has larger, 5 mm. long spikelets.

Am.: West Greenl. 60° — $69^{\circ} 14'$ (I). East Greenl. $60^{\circ} 10'$ (I). Eur.: Kolguev.

Geogr. area: North America, Iceland, Færöes, Europe, Caucasus, Siberia.

179. ***A. caespitosa*** L. (enlarged), Babington, Manual ed. 8, p. 429.

A. caespitosa, J. Hook. Coll. of Arct. Pl. p. 123; Scheutz, Pl. vasc. Jeniss. p. 189; Blytt, Bidrag p. 8; *A. caespitosa* var. *Feilden*, Fl. of Kolguev p. 184; *A. alpina* L., Lge. Consp. Fl. Groenl. p. 163; Nath., Spetsb. Kärlv. p. 34; Th. Fries, Beerens Isl. Veg. p. 156; Blytt, I. c. p. 8; Trin. Spec. Gramin. Icon. III tab. 254; Fl. D. tab. 1625; *A. caespitosa* v. *borealis*, Trautv. Fl. Terr. Tschuktsch. p. 40, Consp. Fl. Nov. Zeml. p. 86; Ross. Aret. Pl. p. 554; Nath., I. c. p. 34; Kjellm., Sib. Nordk. Fanerogamfl. p. 274; Kjellm. & Lundstr., Nov. Semija p. 315; Scheutz, I. c. p. 189; *A. brevifolia* (R. Br. Lge. I. c. p. 163; Hartz, Nordöst Grön. p. 318; Scheutz, I. c. p. 189; *A. caespitosa* v. *brevifolia* Trautv. Consp. Fl. Nov. Semija p. 86, Pl. Sib. bor. p. 142, Syll. Pl. Sib. bor. orient. p. 544; Kjellm. I. c. p. 274; Kjellm. & Lundstr., I. c. p. 315; *A. caespitosa* var. *Trin.* I. c. tab. 256; Fl. D. tab. 2944; *Aira arctica* *Trin.*; *Deschampsia caespitosa* Beauv., Hart, Brit. Pol. Exped. p. 142; *D. caespitosa* Beauv., *D. alpina* R. & S. and *D. brevifolia* R. Br., Ledeb. Fl. Ross. IV p. 421—422; *D. brevifolia* R. Br. α and β major Hook. Fl. bor. Am. II p. 242; *D. caespitosa* v. *grandiflora* and v. *minor* Trautv. Fl. Taimyr p. 18; *D. brevifolia* R. Br. *Chloris* Melvill. p. 33; Greely, Lady Frankl. Bay Exp. II p. 15; Peary, Auxil. Exped. App. C. p. 8; *D. caespitosa* v. *grandiflora* et *brevifolia* Schmidt, Fl. Jeniss. arct. p. 128.

Cæspitose, culm rigid. Leaves flat or complicate, acute, rough at the edges and often on the upper surface; ligule evident. Panicle spreading or contracted, branches rough or smooth. Glumes lanceolate, flowers 2 or seldom 3, pales somewhat exceeding the glumes, hairs about half as long as the pales; lower pale erose, truncate with an awn from near the base; the straight awn scarcely exceeds the pale.

The Arctic and mountain form, *A. caespitosa* v. *brevifolia* Hartm. Scand. Fl. ed. 2 (1832) (= v. *borealis* Trautv., v. *grandiflora* Trautv. etc.) has (like the Arctic form of the foregoing species) larger spikelets than the form from the level ground, shorter culms, and the leaves are shorter and often complicate or convolute. Often this form is viviparous, *A. alpina* L., then the glumes and pales are more or less elongated and the awn, if evident, attached nearer to the apex. A dwarf form with short contracted panicle is *Deschampsia brevifolia* R. Br. (1824) = *Aira arctica* *Trin.*

Am.: Kotzebue Sound, Arctic Sea-shores and Islands (I), Grinnell Land $81^{\circ} 44'$, West Greenl. 60° — $77^{\circ} 30'$ (I), East Greenl. 60° — $74^{\circ} 56'$ (I).

Eur.: Spitsbergen (!), Beeren Island (!), Kolguev, Novaya Zemlya to 75° (!), Waigats, Samoyede Land. As.: Arctic Coast (!), Mouths of the Yenissei and Olenek, Taimyr Peninsula 74° — 75° , Chukches Land, New Siberian Islands.

The typical form introduced in West Greenl. $61^{\circ} 13'$.

Geogr. area: The Arctic and mountain form is found in Iceland, Færöes, Scotland, Northern Scandinavia, Northern Russia and Siberia, the type in North America, North and Central Europe, Northern Asia.

12. BECKMANNIA Host.

180. *B. erucaeformis* (L.) Host.

Trautv. Fl. Kolym. p. 572.

A tall subaquatic perennial grass, with glabrous, simple culms, and flat, rough leaves. Spikelets laterally compressed, round or obovate, densely imbricated in two rows on one side of the rachis. Spikes in a terminal spicate or narrow spike-like panicle. Spikelets 2-flowered, glumes carinate.

As.: Mouth of the Kolyma.

Geogr. area: North America, South-eastern part of Europe, Siberia, Japan.

13. DUPONTIA R. Br.

181. *D. Fisheri* R. Br., Chloris Melvilliana p. 33.

Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 86; Nath., Spetsb. Kärlv. p. 33; Kurtz, Fl. d. Tschuktschenh. p. 481; Macoun, Catalogue IV p. 228; Hook. Fl. bor. Am. II p. 242; Ledeb. Fl. Ross. IV p. 386; Trautv. Conspl. Fl. Nov. Zeml. p. 85, Pl. Sib. bor. p. 138, Syll. Pl. Sib. bor. orient. p. 541; Kjellm., Sib. Nordk. Fanerogamfl. p. 274, St. Lawrence-ön p. 21, Vest-Eskim. Land p. 55; Kjellm. & Lundstr., Nov. Semlja p. 315; Feilden, Nov. Zemlya p. 22; Schmidt, Fl. Jeniss. arct. p. 128; D. psilosantha Rupr. Fl. Samojed. cisur. p. 62, tab. 6; Ledeb. I.c. p. 386; Lge. Conspl. Fl. Groenl. p. 165; Nath., Nachträge z. Fanerogamfl. Grönl. p. 132; Fl. D. tab. 2521; Colpodium humile Lge. (non Ledeb.) in Th. Holm, Nov. Zeml. Veget. p. 16, tab. I fig. 1, tab. II fig. 1—8 [vidi spec. origin.]

Stoloniferous, glabrous, about 20 cm. high. Panicle short with rather few spikelets. Spikelets shining, 1- or 2-flowered, pales not exceeding the glumes. Glumes ovate-lanceolate, obtuse or acuminate. Pales glabrous or more or less covered with silky hairs, erose, obtuse or bristle-pointed.

D. Fisheri and *D. psilosantha* must form one species in that the pale is variable both in form and in hairiness.

Am.: St. Lawrence Island, Kotzebue Sound, Port Clarence (!), Point Barrow, Arctic Coast and Islands to Hudson Bay and Hudson Strait,

Baffin Land at Cumberland Gulf, West Greenl. $69^{\circ} 20'$ — $70^{\circ} 40'$ (†), $81^{\circ} 30'$. Eur.: Spitsbergen (†), Franz Josef Archipelago (†), Kolguev, Dolgoi Island, Novaya Zemlya to 74° (†), Waigats (†), Habarowa (†), Samoyede Land (†). As.: Arctic Coast (†), Mouths of the Yenissei (†), Olenek and Lena, Chukches Land, New Siberian Islands.

Geogr. area: Northeastern America, Northern Russia at Kanin Peninsula.

14. KOELERIA Pers.

182. *K. hirsuta* Gaud.

Ledeb. Fl. Ross. IV p. 403; Trautv. Fl. Taimyr p. 20, Pl. Sib. bor. p. 139, Syll. Pl. Sib. bor. orient. p. 542; Kjellm., Sib. Nordk. Fanerogamfl. p. 274.

Cæspitose. Culm and leaves, especially the sheaths softly pubescent. Panicle short, oblong, dense, spike-like. Spikelets 2–3-flowered; pales much exceeding the glumes. Glumes unequal, lower pales densely hairy, acuminate, ending in a short awn.

In habit very like *Trisetum subspicatum*.

Eur.: Samoyede Land (†). As.: Dickson Harbour $80^{\circ} 58'$ E. long. (†), Taimyr Peninsula $74^{\circ} 15'$ — $75^{\circ} 15'$ N. lat. (†), Mouth of the Lena.

Geogr. area: The Alps.

183. *K. cristata* (L.) Pers.

Feilden, Nov. Zemlya p. 24; *K. cristata* v. *seminuda* Trautv. Sib. bor. p. 138; *Aira cristata* L.

Cæspitose. Culms in the upper part pubescent. Leaves flat, pubescent or hairy. Panicle oblong, interrupted. Spikelets 2–3-flowered, pales somewhat exceeding the glumes. Glumes unequal, glabrous (or somewhat hairy), lower pales minutely hairy, acute or acuminate, not ending in an awn.

Eur.: Waigats (†). As.: Mouth of the Lena.

Geogr. area: North America, Central Europe, Central Asia.



Fig. 88. *Dupontia Fisheri* R.Br. $\frac{3}{4}$ nat. size.
(Spec. from Spitsbergen).

15. CATABROSA Beauv.

184. *C. aquatica* (L.) Beauv.

Lge. Consp. Fl. Groenl. p. 166 and p. 298; Hook. Coll. of Arct. Pl. p. 123; Ledeb. Fl. Ross. IV p. 387; Macoun, Catalogue IV p. 219; Fl. D. tab. 3002.

Creeping, culms ascending. Leaves flat, glabrous, obtuse; ligules evident. Panicle pyramidal, generally tinged with violet, with half-whorls of spreading branches. Spikelets small, about 2—3 mm. long, generally 2-flowered. Glumes small, obtuse; pales about equal, membranous margined, lower pale three times as long as the glumes, sharply 3-veined. Stigmas short.

Am.: Kotzebue Sound, Banks Land (?), West Greenl. $62^{\circ} 30' (\text{!})$, $65^{\circ} 25' (\text{!})$. As.: Samoyede Land (?).

Geogr. area: North America, Iceland, Færöes, Europe, Northern Asia.

185. *C. concinna* Th. Fries, Till. Spetsb. Fl. p. 140, tab. 5.

Nath., Spetsb. Kärlv. p. 32; Kjellm., As. Nordk. Fanerogamfl. p. 274; Kjellm. & Lundstr., Nov. Semlja p. 315; Trautv. Syll. Pl. Sib. bor. orient. p. 542; Scheutz. Pl. vasc. Jeniss. p. 187; *C. concinna* subsp. *vaccillans* Th. Fr., I. c. p. 142; Nath., I. c. p. 32; *C. algida* Rupr. in exsicc. ex ins. Kolguev (cfr. Th. Fr., I. c. p. 141); *Phippsia algida*, var. *concinna*, Feilden, Nov. Zemlya p. 23.

Cæspitose; culm erect, 2—15 cm. high; leaves flat, glabrous, obtuse; ligule evident, subtriangular. Panicle pyramidal, generally tinged with violet, with half-whorls of spreading branches; spikelets small, about 1—2 mm., 1—2-flowered. Glumes small, obtuse; pales about equal, membranous margined, lower pale 3 or 4 times as long as the glumes, 3-veined, slightly hairy with silky hairs beneath. Anthers 1—3, stigmas elongated.

Eur.: Spitsbergen (?), Franz Josef Archipelago (Fisher, in litt.), Kolguev (?), Waigats (?), Novaya Zemlya (?), Habarowa (?). As.: Yalmal (?), Dickson Harbour (?), Mouths of the Yenissei (?) and Lena, New Siberian Islands.

Geogr. area: Dovre in Norway.

16. PLEUROPOGON R. Br.

186. *P. Sabinii* R. Br., Chloris Melvilliana p. 31, tab. D.

Hook. Fl. bor. Am. II p. 249; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 86; Lge. Consp. Fl. Groenl. p. 297; Dusén, Ost-Grönl. p. 59; Trautv. Consp. Fl. Nov. Zeml. p. 85; Feilden, Nov. Zemlya p. 23; Blytt, Bidrag p. 8; Kjellm., Sib. Nordk. Fanerogamfl. p. 273; Kjellm. & Lundstr., Nov. Semlja p. 314; Trautv. Syll. Pl. Sib. bor. orient. p. 543.

Stoloniferous. Culm 10—20 cm. high, striate, leafy. Leaves soft, flat, glabrous, those on the culm short, on the sterile shoots

longer and narrower; ligule evident, obtuse. Panicle racemose, rachis and pedicels capillary, striate, glabrous. Spikelets drooping, about 10 mm. long, 5—8-flowered. Glumes very small, unequal;



Fig. 89. *Catabrosa concinna* Th. Fr. $\frac{3}{4}$ nat. size.
(Spec. from Spitsbergen). a, flower. b, flower of
Phippia algida (Soland.) R. Br.

Fig. 90. *Pteuropogon Sabinii* R. Br. $\frac{3}{4}$ nat. size.
(Spec. from Waigats).

lower pale oblong-obovate, 5-veined, obtuse, erose, tinged with dark violet and white membranous-margined at the top, hairy with small appressed white hairs; upper pale (palet) with two setæ at the margin on each side opposite each other, the lower ones from near the base and nearly as long as the pale, the upper ones from slight above the middle, not reaching the lower ones.

A m.: Melville Island (!), Southampton Island (!), Baffin Land from Cumberland Gulf to Cape Adair $71^{\circ} 20'$, West Greenl. $76^{\circ} 8'$, East Greenl. 71° .

Eur.: Novaya Zemlya to 75° (!), Waigats, Franz Josef Archipelago (!). As.: Actinia Bay $95^{\circ} 32'$ E. long. (!), Mouth of the Lena, New Siberian Islands.

17. ARCTOPHILA Rupr.

187. **A. fulva** (Trin.) Rupr., Fl. Samojed. cisur. p. 62.



Fig. 91. *Arctophila fulva* (Trin.) Rupr. [*A. pendulina* (Læst.)]. $\frac{3}{4}$ nat. size. (Spec. from Lapland).

Macoun, Catalogue IV p. 229; Kjellm., Sib. Nordk. Fanerogamfl. p. 273; Scheutz, Pl. vasc. Jeniss. p. 186; *A. Læstadii* Rupr., l.c. p. 62; Macoun, l.c. p. 229; *A. pendulina* (Læst.) Anders., Hartm., Scand. Fl. ed. XI p. 501; Kurtz, Fl. d. Tschuktschenh. p. 481; Fl. D. Suppl. tab. 126; *A. effusa* Lge. Adnot ad Fl. D. Suppl. tab. 126, Conspl. Fl. Groenl. p. 167; Scheutz, Pl. vasc. Jeniss. p. 186; Kjellm. & Lundstr., Nov. Semlja p. 313; Kjellm., l.c. p. 273, As. Beringss. p. 588, St. Lawrence-ön p. 21, Vest-Eskim. Land p. 55; A.

ellusa, f. *depauperata* Nath., Spetsb. Kärv. p. 32; *A. Malmgreni* (Ands.) Andersson & Hesselmann, Spetsb. Kärv. p. 74; *A. mucronata* (Hack.) Vasey,

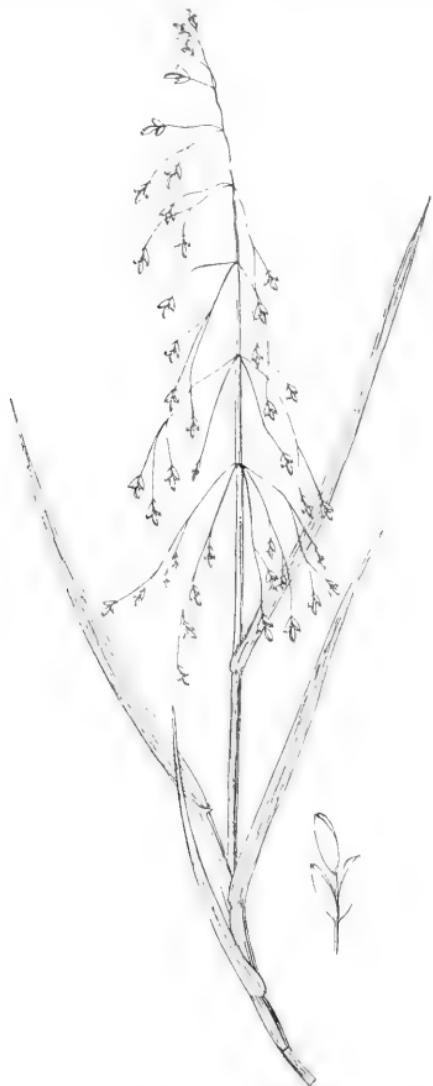


Fig. 92. *Arctophila fulva* (Trin.) Rupr. [*A. effusa* Lge.]. $\frac{3}{4}$ nat. size. (Spec. from West Greenland).

Macoun, l.c. p. 229 ?; *A. trichoclada* Rupr., l.c. p. 62, tab. 4; *A. latiflora* Rupr., l.c. p. 62, tab. 4; *A. poecilantha* Rupr., l.c. p. 63, tab. 5; *A. remotiflora* Rupr., l.c. p. 63, tab. 5; *A. similis* Rupr., l.c. p. 63, tab. 6; Dupon-

tia (?) sceroclada Rupr., I. c. p. 63, tab. 6; *Colpodium fulvum* Ledeb. Fl. Ross. IV p. 385; *C. pendulinum* Ledeb. I. c. p. 386; Schmidt, Fl. Jeniss. aret. p. 127; *C. Malmgreni* Anders. Öfvers. Vetensk. Akad. Förh. 1866, p. 121 tab. 2, f. 1; *Poa fulva* Trin. (1818); Hook. Fl. bor. Am. II p. 247; *Poa pendulina* J. Vahl, Fl. D. tab. 2343; *Glyceria pendulina* Læst. (1833).

Rhizome thick, widely creeping. Culm erect, smooth. Leaves broadly linear, flat, smooth, gradually acuminate; ligule elongate, obtuse. Panicle pyramidal with long capillary branches, spikelets 2—7-flowered, glumes obtuse or acute, somewhat shorter than the pales of the lowermost flowers; pales obtuse with short hairs at the base.

Varying much in size and the form of the panicle; the most remarkable forms is the form from Lapland, *A. pendulina*, with about 70 cm. high culms, narrow and long leaves, arcuate-drooping panicle and many-flowered spikelets, and the form from Greenland, *A. effusa*, with lower culms, broader and shorter leaves, recurved panicle-branches and 2—3-flowered spikelets, but these extremes are gradually combined with each other by the numerous Siberian forms. A form with one-flowered spikelets is *Colpodium Malmgreni* Anders., *Arctophila effusa* f. *depauperata* Nath.

Am.: St. Lawrence Island, Port Clarence, Kotzebue Sound, Point Barrow, Arctic Coast, Nottingham and Mansfield Islands in Hudson Strait, West Greenl. $64^{\circ} 10'$ — $65^{\circ} 20'$ (†). Eur.: Spitsbergen, Kolguev, Dolgoi Island, Novaya Zemlya to 74° , Waigats, Habarowa, Samoyede Land (†). As.: Arctic Coast (†), Boganida (†), Mouths of the Yenissei and Lena, Chukches Land.

Geogr. area: Lapland, Northern Russia, Northern Siberia, Kamchatka.

18. POA L.

- A. Biennial or annual ***P. annua*.**
- B. Perennial.
 - a. Stoloniferous.
 - 1. Spikelets about 1 cm. long ***P. glumaris*.**
 - 2. Spikelets about 5 mm. long.
 - * Pale evidently 5-veined, on the dorsal vein and the marginal veins hairy with long woolly hairs, for the rest glabrous. . . . ***P. pratensis*.**
 - ** Pale indistinctly veined, in the lower part, but especially on the back and the margins hairy with appressed silky hairs ***P. cenisia*.**
 - b. Cespitose.
 - 1. Base of the culm bulbous thickened ***P. bulbosa*.**
 - 2. Base of the culm not bulbous thickened.
 - * Leaves short, abruptly acuminate, three times as broad as the culm ***P. alpina*.**
 - ** Leaves narrower.
 - † Spikelets broad-ovate, about 3-flowered, panicle oblong.
 - ° Culm slender, somewhat arching, leaves flat, soft ***P. laxa*.**
 - °° Culm rigid, straight, leaves convolute, rigid ***P. abbreviata***.

†† Spikelets lanceolate, 3—5-flowered, panicle lanceolate.

^o Culm rigid, only leafy in the lower part, ligule short, but evident *P. glauca*.

^{oo} Culm slender, leafy above the middle, ligule inconspicuous

P. nemoralis.

††† Spikelets linear-lanceolate, 2—5-flowered, panicle lanceolate
P. stenantha.

188. *P. annua* L.

Lge. Consp. Fl. Groenl. p. 172; Fl. D. tab. 1686.

Annual or biennial, cæspitose. Culm smooth, somewhat flattened, soft, leafy nearly to the middle; leaves flat, smooth; ligule evident. Panicle unilateral, pyramidal, with 1—3 branches from the lower node. Panicle-branches capillary, glabrous. Spikelets 3—5-flowered. Glumes unequal, pales distinctly 5-veined, glabrous or a little woolly below.

Am.: West Greenl. 60°—62° (!), acclimatised.

Geogr. area: North America (introduced), Iceland, Færöes, Europe, Africa, Asia.

189. *P. glumaris* Trin., Gramin. genera et spec. p. 379.

Hook. Fl. bor. Am. II p. 247; Glyceria glumaris Ledeb. Fl. Ross. IV p. 392.

With stolons. Culm erect, stout, 1 metre high. Leaves broad, flat; ligule very short. Culm and leaves smooth. Panicle narrow, compact. Spikelets large, about 1 cm. long, 2—5-flowered. Glumes about as large as the lower pales of the flowers. Pale 5—7-nerved, hairy in the lower part, not woolly.

Am.: St. Lawrence Island, Kotzebue Sound.

Geogr. area: Anticosti Island, Sitka, Unalashka, Alaska, Nova Scotia, Quebec, East Siberia, Kamchatka.

190. *P. pratensis* L.

Rothr., Fl. of Alaska p. 458; Lge. Consp. Fl. Groenl. p. 176; Hart, Brit. Pol. Exped. p. 143; Hartz, Nordöst Grön. p. 350; Nath., Spetsb. Kärlv. p. 30; Trautv. Consp. Fl. Nov. Zeml. p. 84; Ledeb. Fl. Ross. IV p. 378; Kjellm., Sib. Nordk. Fanerogamfl. p. 272, As. Beringss. p. 557; Vest-Eskim. Land p. 54; Kjellm. & Lundstr., Nov. Semlja p. 313; Trautv. Syll. Pl. Sib. bor. orient. p. 541, Fl. rip. Kolym. p. 570; Schmidt, Fl. Jeniss. arct. p. 127; Fl. D. tab. 1444 and tab. 2947; P. *stricta Lindeb. Botan. Notiser, 1856, p. 10; Nath., I. c. p. 30; Blytt, Bidrag p. 9; Kjellm. & Lundstr., I. c. p. 313; Fl. D. Suppl. tab. 65; P. stricta *colpodea Th. Fr., Till. till Spetsb. Fl. p. 138; P. flexuosa v. colpodea Nath., I. c. p. 30; Kjellm., I. c. p. 272; P. cenisia var. Th. Fr., Beeren Isl. Veget. p. 155.

With stolons. Culms erect or ascending. Leaves and sheaths smooth; ligule evident. Panicle oblong, often contracted, more rarely pyramidal and spreading. Panicle-branches about 3—5 from

the lower node, often scabrous. Spikelets ovate, acute; lower pale evidently 5-veined, the dorsal vein and the marginal veins hairy of long woolly hairs, otherwise glabrous. Varying much in size. *P. stricta* Lindeb. and *P. colpodes* Th. Fr. are small forms with contracted panicles and more or less viviparous spikelets.

A m.: Port Clarencee, Kotzebue Sound, West Greenl. 60° — $78^{\circ} 18'$ (!), East Greenl. 60° — $61^{\circ} 32'$ (!) and 70° — 75° (!). Eur.: Spitsbergen (!), Beeren Island (!), Franz Josef Archipelago (!), Novaya Zemlya to 75° , Waigats, Samoyede Land. As.: Arctic Coast at Actinia Bay $95^{\circ} 38'$ E. long. (!), Mouth of the Yenissei, Taimyr Peninsula, New Siberian Islands, Mouth of the Kolyma, Chukches Land.

Geogr. area: North America, Iceland, Færöes, Europe, Asia, North Africa.

191. *P. cenisia* All., Auct. Fl. Ped. p. 40 (1789).

Macoun, Catalogue IV p. 224; Peary, Auxil. Exp. App. C. p. 8; Greely, Lady Frankl. Bay Exp. II p. 15; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; Fries, Beeren Isl. Veg. p. 115; Scheutz, Pl. vase. Jeniss. p. 185; Fl. D. tab. 2529; *P. flexuosa* Host, Icon. et descript. gram. austr. IV, tab. 26 (1809); Wg., Fl. carp. p. 22 (1814); Hook. Fl. bor. Am. II p. 245; Lge. Consp. Fl. Groenl. p. 175; Hartz, Nordöst Grön. p. 351; Dusén, Ost-Grön. p. 61; Hart, Brit. Pol. Exp. p. 141; Kjellm., Sib. Nordk. Fanerogamfl. p. 272, Vest-Eskim. Land p. 54; St. Lawrence-ón p. 21; Reichardt, Fl. Jan. Mayen p. 11; Feilden, Fl. of Kolguev p. 184; Nath., Spetsb. Kärv. p. 30; Andersson, König Karls Land p. 557; *P. arctica* R. Br., Chloris Melvill. p. 30 (1823); Hook. l. c. p. 246; Ledeb. Fl. Ross. IV p. 373; Kjellm. & Lundstr., Nov. Semlja p. 313; Trautv. Consp. Fl. Nov. Zeml. p. 84, Syll. Pl. Sib. bor. orient. p. 541; Fl. rip. Kolym. p. 570, Pl. Sib. bor. p. 136, Ross. Arct. Pl. p. 554; Fl. Terr. Tschuktsch. p. 39; Schmidt, Fl. Jeniss. arct. p. 127; Greely, l.c. p. 15; Eastwood, Pl. coll. at Nome City, p. 130; Feilden, Nov. Zemlya p. 24; Taylor, l. c. p. 85; *P. filipes* Lge. l. c. p. 175 [vidi spec. orig.]; *P. trichopoda* Lge. (non Bois.) Fl. D. tab. 2885.

With stolons. Culm short, erect or ascending. Leaves narrow. Culm and leaves smooth. Panicle pyramidal, when flowering. Panicle-branches rarely more than two from the lower node, smooth, and with few spikelets. Spikelets ovate, acute, 3—5-flowered; lower pale without conspicuous veins, with rather long, silky hairs on the dorsal and the marginal veins, otherwise more or less hairy, especially in the lower part. Sometimes viviparous. Generally the spikelets are dark-violet.

Very nearly allied to *P. pratensis* L. and possibly not separable from it as a species, nevertheless the plant is rather striking by the less size, the narrower leaves, the pyramidal form and dark colour of the panicle and the horizontal spreading branches with only a few spikelets, but the chief characters, viz. the inconspicuous veins and the different covering of the pale, are sometimes not quite constant.

Am.: St. Lawrence Island, Port Clarence, Kotzebue Sound, Nome City, Arctic Sea-coast in every direction, Hudson Strait, Baffin Land, Grinnell Land to $82^{\circ} 40'$, West Greenl. 60° – $81^{\circ} 40'$ (!), East Greenl. $60^{\circ} 20'$ (!), 70° – $74^{\circ} 40'$ (!). Eur.: Jan Mayen (!), Beeren Island, Spitsbergen (!), King Charles Land, Franz Josef Archipelago (!), Novaya Zemlya to 74° (!), Waigats (!), Dolgoi Island, Kolguev (!), Habarowa (!). As.: Arctic Coast (!), Mouths of the Yenissei (!), Lena and Kolyma, Taimyr Peninsula (!), New Siberian Islands, Chukches Land.

Geogr. area: Labrador, Northern Scandinavia, Northern Russia, Siberia, Kamchatka.

192. *P. bulbosa* L.

Schmidt, Fl. Jeniss. arct. p. 127; Fl. D. tab. 2606.

Densely cespitose. Culm at the base bulbous thickened. Leaves very narrow, capillary. Panicle oblong. Spikelets very small, 1–2-flowered, generally viviparous.

As.: Yenissei-Islands at Ochotskoje.

Geogr. area: Europe, Northern Africa, Northern Asia.

193. *P. alpina* L.

Macoun, Catalogue IV p. 222; Eastwood, Pl. coll. at Nome City, p. 130; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 85; Hart, Brit. Pol. Exp. p. 142; Greely, Lady Frankl. Bay Exped. II p. 15; Lge. Conspl. Fl. Groenl. p. 176; Hartz, Nordöst Grönland. p. 350; Dusén, Ost-Grönland. p. 61; Nath., Spetsb. Kärly. p. 30; Feilden, Fl. of Kolguev p. 184, Nov. Zemlya p. 24; Trautv. Conspl. Fl. Nov. Zeml. p. 84; Kjellm. & Lundstr., Nov. Semlja p. 313; Reichardt, Fl. Jan Mayen p. 10; Schmidt, Fl. Jeniss. arct. p. 126; Fl. D. tab. 137, Suppl. tab. 66.

Densely cespitose. Base of the culm densely covered with old sheaths. Leaves short, broad, abruptly acuminate. Ligule evident. Culm and leaves smooth. Culm bent ascending with a few leaves. Panicle ovate or pyramidal. Spikelets ovate, 3–6-flowered. Pale hairy in the lower part, especially on the dorsal and the marginal veins, but not woolly. Often viviparous.

Am.: Nome City, Between Repulse Bay and Cape Lady Pelly, Hudson Strait, Baffin Land, Ellesmere Land, Grinnell Land to $81^{\circ} 44'$, West Greenl. 60° – $81^{\circ} 42'$ (!), East Greenl. 60° – $74^{\circ} 40'$ (!). Eur.: Jan Mayen (!), Spitsbergen (!), Kolguev (!), Dolgoi Island, Novaya Zemlya to 74° , Waigats (!), Samoyede Land, Habarowa. As.: Mouth of the Yenissei (!).

Geogr. area: Northern North America, Iceland, Færöes, British Isles, Northern Scandinavia, Finland, Northern Russia, The Alps, Caucasus, Northern Asia.

194. *P. laxa* Haenke.

Host, Icon. et descript. gramin. austr. III tab. 15; Hook. Fl. bor. Am. II p. 246; Macoun, Catalogue IV p. 225; J. Hook. Fox Exped. p. 85; Greely, Lady Frankl. Bay Exped. II p. 15; Kurtz, Fl. d. Tschuktschenh. p. 480; Fl. D. tab. 2342; *P. laxiuscula* Lge. (non Blytt) Conspl. Fl. Groenl.

p. 174 and p. 301, Fl. D. tab. 2946 [vidi spec. orig.]; ? P. bryophila Trin. Gram. Suppl. p. 65; Ledeb. Fl. Ross. IV p. 377.

Cæspitose, but not very densely. Culm somewhat arching with only two leaves in the lower part, more than the upper half of the culm naked, slender, smooth. Leaves smooth, slightly seabrous only at the margin. Panicle oblong, contracted, not spreading. Panicle-branches smooth, erect, two or three from the lower node. Spikelets broad-ovate, 2—4-flowered. Pale obtuse with inconspicuous veins; dorsal vein and marginal veins hairy with silky hairs.

Am.: Arctic Islands, Baffin Land at Ponds Bay and Port Kennedy 72° , West Greenl. 60° — 70° [rare] (!), East Greenl. $61^{\circ} 10'$ (?) and $65^{\circ} 35'$. As.: Bering Strait.

Geogr. area: Northern North America, Iceland, Scotland, Northern Scandinavia, Central European Mountains, Corsica, Altai.

195. **P. abbreviata** R. Br., Chloris Melvilliana p. 29.

Hook. Fl. bor. Am. II p. 247; Ledeb. Fl. Ross. IV p. 377; Macoun, Catalogue IV p. 222; Greely, Lady Frankl. Bay Exp. II p. 15; Lge. Conspl. Fl. Groenl. p. 172; Hartz, Nordöst Grönl. p. 349; Dusén, Ost-Grönl. p. 60; Peary, Auxil. Exp. App. C. p. 8; Nath., Spetsb. Kärlv. p. 31; Feilden, Nov. Zemlya p. 24; Fl. D. tab. 2884.

Densely cæspitose. Culms 5—15 cm. high, straight. Leaves convolute, rigid. Lower pale densely hairy with short appressed hairs. For the rest as *P. laxa* Haenke.

Very nearly allied to *P. laxa* but also approaching *P. glauca* M. Vahl.

Am.: Kotzebue Sound, Melville Island and Igloolek, Hudson Strait, Grinnell Land to $81^{\circ} 44'$, West Greenl. (!) 70° — $81^{\circ} 35'$, East Greenl. 70° — $74^{\circ} 40'$ (!). Eur.: Spitsbergen (!), Franz Josef Archipelago (Fisher, in litt.), Novaya Zemlya at 73° — 74° .

Geogr. area: Labrador.

196. **P. glauca** M. Vahl in Fl. D. tab. 964 (1790).

Lge. Conspl. Fl. Groenl. p. 172; Hartz, Nordöst Grönl. p. 350; Dusén, Ost-Grönl. p. 60; Nath., Spetsb. Kärlv. p. 30; Kjellm., As. Beringss. p. 558, Vest-Eskim. Land p. 55; P. cæsia Sm. (1807); Hart, Brit. Pol. Exped. p. 142; Ledeb. Fl. Ross. IV p. 374; Schmidt, Fl. Jeniss. arct. p. 127; P. Balfourii Parn., Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 86; ? P. attenuata Trin., Trautv. Fl. rip. Kolym. p. 569.

Cæspitose. Culm erect, straight, slightly seabrous, with a few leaves below; nodes covered; more than the upper half of the culm naked. Leaves flat or somewhat convolute, seabrous on the upper side; sheaths slightly seabrous; ligule short, but evident; upper leaf shorter than its sheath. Panicle short-lanceolate, contracted,

panicle-branches scabrous, about 3 from the lower node. Spikelets lanceolate, 2—5-flowered. Pale bluntly acuminate, hairy with silky hairs on the veins, and often with very short appressed hairs all over. Whole plant glaucous, spikelets generally dark-violet coloured.

Am.: Port Clarence, Eschholz Bay, Grinnell Land to $81^{\circ} 44'$, West Greenl. 60° — $74^{\circ} 18'$ (!), East Greenl. 60° — $74^{\circ} 40'$ (!). Eur.: Spitsbergen (!). As.: Mouths of the Yenissei (!) and Kolyma (?), Chukches Land.

Geogr. area: Northern North America, Iceland, Færöes, Scotland, Wales, Northern Scandinavia, Finland, Central European Mountains, Altai.

197. *P. nemoralis* L.

Ledeb. Fl. Ross. IV p. 376; Lge. Conspl. Fl. Groenl. p. 174; Hartz, Nordost Grönl. p. 350.

Cæspitose. Culm erect, slender, slightly scabrous, leafy above the middle; nodes naked. Leaves flat, scabrous on the upper side; sheaths somewhat scabrous; ligule very short, inconspicuous; upper leaf about as long as or longer than its sheath. Panicle narrow, contracted, panicle-branches 3—5 from the lower node, scabrous; spikelets lanceolate, 2—6-flowered. Pale acuminate, hairy on the veins.

Am.: Kotzebue Sound, West Greenl. 60° — $69^{\circ} 20'$ (!), East Greenl. $65^{\circ} 35'$ (!), 70° — $71^{\circ} 40'$ (!).

Geogr. area: Northern North America, Iceland, Færöes, Europe, Asia.

Obs. *Poa laxa*, *abbreviata*, *glauca* and *nemoralis* form a natural group, and although the types are very distinct, they are combined with intermediate forms.

198. *P. stenantha* Trin., Gramin. genera et spec. p. 376.

Ledeb. Fl. Ross. IV p. 372.

Cæspitose. Culm erect, slender, 30—60 cm. high. Leaves short, flat; ligule evident, acute; culm and leaves smooth. Panicle lanceolate with erect, scabrous or smooth branches, 1—3 from the lower node. Spikelets 2—5-flowered, narrow. Pale somewhat hairy, especially in the lower part and on the back; nerves inconspicuous.

As.: Senjawin Strait at Bering Strait.

Geogr. area: Sitka, East Siberia, Kamchatka, Karagin Island, Unalashka.

19. GLYCERIA R. Br.

- A. Glumes unequal, the lower half or two third as long as the upper, not reaching the middle of the opposite pale.
 - a. With creeping shoots, lower glume two third as long as the upper; panicle-branches 2—3 from the lower node *G. maritima*.
 - b. Cæspitose, lower glume generally half as long as the upper.
 - 1. Panicle large, many-flowered, panicle-branches 3—5 from the lower node *G. distans*.

2. Panicle short, narrow, few-flowered; panicle-branches 2—3 from the lower node.

‘ Culms 2 or 3 times larger than the leaves; pales with not much prominent veins, hairy at the base **G. angustata.**

** Culms scarcely exceeding the leaves; pales with very prominent veins, glabrous **G. tenella.**

B. Glumes nearly equal, exceeding the middle of the opposite pale **G. Vahliana.**

199. **G. Vahliana** (Liebm.) Th. Fr., Öfv. Vet. Akad. Förh. 1869, p. 140.

Lge. Conspl. Fl. Groenl. p. 171; Nath., Spetsb. Kärlv. p. 31; Kjellm. & Lundstr., Nov. Sembla p. 313; Feilden, Nov. Zemlya p. 24; Poa Vahliana Liebm. Fl. D. tab. 2401; G. Kjellmani Lge. in Kjellm. & Lundstr. l. c. p. 314; Kjellm., Sib. Nordk. Fanerogamfl. p. 273; Lge. Conspl. Fl. Groenl. p. 299; G. Kjellmani v. angustifolia Lge. in Rosenv., Till. p. 732.

Densely cæspitose, 5—15 cm. high. Leaves flat, narrow, acuminate, mucronate, glabrous, upper sheaths slightly vaginate; ligule evident, acuminate. Culms erect, 2—3 times as long as the leaves. Panicle short, 2—3 cm. long, dense, with 1 or 2 short branches from the lowest node. Panicle-branches smooth. Spikelets 2—4-flowered. Glumes nearly equal, lanceolate or spatulate, acute or blunt, often serrate at the top, exceeding the middle of the opposite flower. Lower pale c. 3 mm. long,



Fig. 93. *Glyceria Vahliana*, Liebm. Th. Fr.
2/3 nat. size. Spec. from West Greenland.

narrow, membranous and serrate at the top, acute or blunt, hairy on the veins at the base. Panicle tinged with violet or yellowish.

Am.: West Greenl. $70^{\circ} 12'$ — $70^{\circ} 47'$ (l), East Greenl. at Cap Stewart $70^{\circ} 25'$ (l). Eur.: Spitsbergen (l), Novaya Zemlya 72° — 74° . As.: Dickson Harbour.

200. **G. maritima** (Huds.) Wg.

Lge. Conspl. Fl. Groenl. p. 168; Fl. D. tab. 2823; G. maritima v. arenaria Fr., Lge. l. c. p. 168; G. vilfoidea (Anders.) Th. Fr., Till. t. Spetsb. Fl. p. 139, tab. 4; Beeren Isl. Veg. p. 155; Lge. l. c. p. 170; Dusén, Ost-Grönl. p. 60; Hartz, Nordöst Grönl. p. 349; Nath., Spetsb. Kärlv. p. 31; Kjellm., As. Nordk. Fanerogamfl. p. 273, St. Lawrence-ön p. 21; Kjellm. & Lundstr., Nov. Sembla p. 313; Kurtz, Fl. d. Tschuktschenh. p. 481; Fl. D. tab. 2883; Catabrosa vilfoidea Anders.; Atropis vilfoidea, Cornell Party, Peary Voy. 1896, p. 422; Glyceria reptans Laestad., Krok, Botan. Notiser, 1899, p. 137.

Loosely cespitose and generally with long creeping shoots. Leaves convolute, glabrous, acute; ligule evident. Culm ascending, glabrous. Panicle lanceolate, generally with 2—3 short branches from the lower node, branches appressed or ascending, generally smooth. Spikelets 3—8-flowered; glumes herbaceous, the lower two third as long as the upper, scarcely reaching the middle of the opposite pale; lower pale herbaceous, ovate-lanceolate, acuminate or somewhat blunt, at the base glabrous or sometimes a little hairy, tinged with violet on the margin; upper pale pectinately hairy at the margins.

G. vilfoidea is a dwarf form with very long creeping stolons, growing especially in clayey soil.

Am.: St. Lawrence Island, West Greenl. 60° — $76^{\circ} 7'$ (!), East Greenl. 60° — $74^{\circ} 35'$ (!). Eur.: Spitsbergen (!), Beeren Island, Novaya Zemlya to 72° . As.: Arctic Coast (!), Chukches Land (!).

Geogr. area: North America, Iceland, Færöes, Europe.

201. *G. distans* (L.) Wg.

Scheutz, Pl. vasc. Jeniss. p. 187; Fl. D. tab. 2222; G. Borreri Lge. Consp. Fl. Groenl. p. 167 (non Bab.); G. Borreri v. islandica Lge. I. c. p. 298; G. maritima v. virescens Lge. I. c. p. 168; G. arctica Hook. Fl. bor. Am. II p. 248; Lge. I. c. p. 169; G. vaginata Lge. I. c. p. 168, Fl. D. tab. 2583 [vidi spec. orig.]; G. conferta Fl. D. tab. 2882; G. (maritima v.) paucistris Fr., F. D. tab. 2582; Atropis distans Griseb. in Ledeb. Fl. Ross. IV p. 388; A. distans v. ambigua Trautv. Syll. Pl. Sib. bor. orient. p. 545 (?); Poa festucaeformis Host, Icon. et descript. gramin. austr. III tab. 17.

Cespitose. Leaves flat, rough on the upper side, seldom convolute, acute; ligule evident, often erose. Culm ascending, glabrous; upper sheaths slightly vaginate. Panicle variously formed, with 3 or more elongated branches from the lower node. Panicle-branches generally rough. Spikelets 3—7-flowered; glumes very unequal, the lower one short, one-veined, not reaching the middle of the opposite pale, the upper twice as long, 3-veined membranous, in the upper part, obtuse, erose; pales obtuse, membranous in the upper part, erose, at the base more or less hairy with silky hairs, upper pale with short erect hairs at the margin.

Varying much. The typical form, which is rare in Arctic regions, has reflexed lower branches of the panicle and small flowers (c. 2 mm.); more commonly the panicle is contracted both in the flowering and the fruiting state and has then generally been called *G. Borreri*. When the flowers are larger (c. 3 mm.), which often is the case with grasses in Arctic regions, the branches are capillary and spreading, but very seldom reflexed, and is then generally called *G. arctica* Hook. or *G. vaginata* Lge. A very large form is

figured in Fl. D. tab. 2582 as *G. arctica*, this form is scarcely different from *G. festucaeformis* Host, Icon. III tab. 17 and *G. distans* β major Bert.

A.m.: Arctic Coast, West Greenl. 60° — $72^{\circ} 23'$ (!). Eur.: Samoyede Land (!). As.: Arctic Coast, Mouth of the Yenissei (!), New Siberian Islands (?).

Geogr. area: North America, Iceland, Færöes, Europe, North Africa, Northern and Central Asia.

202. *G. angustata* (R. Br.) Fr.

Macoun, Catalogue IV p. 229; Hart, Brit. Pol. Exp. p. 142; Lge. Consp. Fl. Groenl. p. 171; Hartz, Nordöst Grön. p. 349; Dusén, Ost-Grön. p. 60; Nath., Spetsb. Kärly. p. 31; Kurtz, Fl. d. Tschuktschenh. p. 481; Fl. D. tab. 3006; *G. maritima* v. *arenaria* Berlin, Kärly. fr. Grön. p. 78; *G. vaginata* v. *eflusa* Rosenv., Till. p. 731; *G. Vahliana* Th. Holm, Nov. Zeml. Veget. p. 15, non Liebm.; *G. vaginata* v. *contracta* Lge. in Kjellm., Sib. Nordk. Fanerogamfl. p. 273; Kjellm. & Lundstr., Nov. Semlja p. 314; *Poa angustata* R. Br., Chloris Melvilliana p. 29; Hook. Fl. bor. Am. II p. 247; Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 86; *Atropis angustata* Ledeb. Fl. Ross. IV p. 390 (?).

Densely cæspitose. Leaves short, acute, generally convolute, glabrous; ligule evident, bluntly acuminate or dentate. Culm erect, 2 or 3 times as long as the leaves, rigid. Panicle short, narrow, with 2 or 3 short, erect branches from the lower node. Panicle-branches smooth, sometimes slightly rough. Spikelets 3—5-flowered. Glumes unequal, not reaching the middle of the opposite pale, acute or blunt. Lower pale acute or blunt, somewhat serrate at the top, hairy at the base. Veins in the glumes and pales not very prominent, generally tinged with violet and membranous at the upper part.



Fig. 94. *Glyceria angustata* (R. Br.) Fr.
 $\frac{2}{3}$ nat. size. (Spec. from East Greenland).

Sometimes robust and with flat leaves (*G. vaginata* v. *contracta* Lge.) and then approaching *G. distans* v. *arctica*, but the panicle is shorter

and more dense. In its typical form the plant is generally slender, but rigid, and with narrower, convolute leaves. Rarely the culms are short, thin and decumbent (v. *decumbens* E. Jörgensen in shed.).

A.m.: Kotzebue Sound (?), Arctic Sea Coast and Islands, Diggis Island in Hudson Strait, Baffin Land, Ellesmere Land, Grinnell Land to $81^{\circ} 42'$, West Greenl. $67^{\circ} 45' - 70^{\circ} 15'$ (!), East Greenl. $65^{\circ} 35'$ (!) and $70^{\circ} - 73^{\circ} 10'$ (!). Eur.: Spitsbergen (!), Novaya Zemlya at 71° (!), Waigats (!). As.: Arctic Coast (!), Chukches Land (!).

Geogr. area: Northeast America to Maine.



Fig. 95. *Glyceria tenella* Lge. $\frac{3}{4}$ nat. size. (Spec. from Novaya Zemlya).

203. **G. tenella** Lge. in Kjellm. & Lundstr., Nov. Semlja p. 313, tab. 6.

G. tenella f. *pumila* Lge. in Th. Holm, Nov. Zeml. Veget. p. 16 tab. 3; *G. Langeana* Berlin, Kärlv. fr. Grönl. p. 79; Lge. Conspl. Fl. Groenl. p. 300; Rosenv., Till. p. 732; Nye Bidrag p. 71; Kruuse, Veget. i Egedesm. Skjærg. p. 355 and p. 360.

Densely caespitose. Leaves narrow, setaceous, convolute, glabrous, acute; ligule slightly prominent, obtuse, erose. Culm 5—15 cm. high, scarcely exceeding the leaves. Panicle narrow, contracted, with 2—3 capillary branches from the lower node, panicle-branches

glabrous. Spikelets 4—6-flowered, small. Glumes unequal, acute, the lower half as long as the upper, not reaching the middle of the opposite pale; lower pale narrow, very small, 1,5—2 mm. long, with 5 prominent veins, green, tinged with violet at the margins, glabrous.

A.m.: West Greenl. $60^{\circ} 25'$ — $68^{\circ} 46'$ in five localities (!). Eur.: Novaya Zemlya to 72° (!), Waigats.

Obs. As the chief difference between *G. tenella* and *G. Langeana* Berlin quotes that the former has extravaginate, the latter intravaginate shoots. This however is a mistake, the intravaginate shoots are common to both and to all the other *Glyceria*-species.

20. FESTUCA L.

- | | |
|--|--------------------|
| A. Cæspitose. | |
| a. Tall, with spreading panicle | F. altaica. |
| b. Low, with contracted, almost spike-like panicle | F. ovina. |
| B. Stoloniferous | F. rubra. |

204. **F. altaica** Trin. in Ledeb. Fl. Altaica I p. 109 (1829), Icon. Fl. Ross. tab. 228.

Scheutz, Pl. vasec. Jeniss. p. 184; Kjellm., As. Beringss. p. 556, Vest-Eskim. Land p. 54; F. searella Torr. in Hook. Fl. bor. Am. II p. 252 tab. 233 (1840).

Cæspitose. Culms 1 metre high, densely covered with old sheaths below. Leaves long, involute; ligule very short, fimbriate. Panicle lax, pyramidal; panicle-branches long, capillary, about two from each node and with few spikelets. Spikelets 3—5-flowered. Glumes unequal, 1- and 3-nerved, acuminate, membranous. Lower pale 0,75—1 cm. long, acuminate, 5-nerved, densely hairy with short appressed hairs.

A.m.: Port Clarence (!). A.s.: Mouth of the Yenissei (!), Chukches Land. Geogr. area: Rocky Mountains, Siberia, Altai.

205. **F. ovina** L.

Taylor, Pl. coll. at Davis Str. and Baff. Bay p. 86; Lge. Conspl. Fl. Groenl. p. 179; Hartz, Nordöst Grönl. p. 351; Feilden, Fl. of Kolguev p. 184, Nov. Zemlya p. 25; Ledeb. Fl. Ross. IV p. 350; Nath., Spetsb. Kärv. p. 29; Blytt, Bidrag p. 9; Schmidt, Fl. Jeniss. arct. p. 126; Trautv. Conspl. Fl. Nov. Zeml. p. 83, Syll. Pl. Sib. bor. orient. p. 540, Pl. Sib. bor. p. 134; Kjellm., As. Beringss. p. 556, Vest-Eskim. Land p. 54; Kjellm. & Lundstr., Nov. Semija p. 313; Fl. D. tab. 2462 and tab. 2043; F. brevifolia R. Br., Chloris Melvill. p. 31; Hook. Fl. bor. Am. II p. 250; Hart, Brit. Pol. Exped. p. 141; Nath., I. c. p. 29; Taylor, I. c. p. 86; Fl. D. tab. 2706; F. ovina *borealis Lge. I. c. p. 179; F. ovina, var. alpina and var. brevifolia, Dusén, Ost-Grönl. p. 62; F. ovina f. alpina, Kurtz, Fl. d. Tschuktschenh. p. 481; F. duriuscula Lge. I. c. p. 180 (p. pt.); F. ovina f. duriuscula Trautv. Fl. rip. Kolym. p. 569; F. Richardsonii Hook.

Fl. bor. Am. II p. 250 tab. 230; Taylor, I. c. p. 86; F. ovina var. supina Reichardt, Fl. Jan Mayen p. 11.

Cæspitose, innovations intravaginate, præfolium long. Leaves involute, setaceous. Culms short, rigid. Panicle short, contracted, dense, somewhat one-sided. Spikes about 5-flowered, glumes unequal, acute, lower pale more or less awned.

The commonest form in Arctic regions, *F. brevifolia* R. Br., has somewhat inflated sheaths on the upper leaves, large flowers (lower pale about 5 mm.), generally tinged with violet, awn half as long or about as long as the pale, short anthers (0,7—1 mm.) and is not seldom viviparous. *F. Richardsonii* Hook. as figured (I. c.) has the same innovation and cæspitose growth (although described with creeping stolons) as *F. ovina* and can certainly not be separated from this species.

The mountain forms of *F. ovina* from Central Europe: *F. supina* Schur, *F. Halleri* All. and *F. alpina* Suter are not very different from the Arctic *F. brevifolia* R. Br.

Am.: Port Clarencee, Kotzebue Sound, Arctic Sea-Coast and Islands (!), Islands in Hudson Strait, Baffin Land, Grinnell Land to 82° 27', West Greenl. 60°—81° 40' (!), East Greenl. 60°—74° 40' (!). Eur.: Jan Mayen (!), Spitsbergen (!), Novaya Zemlya to 75° (!), Kolguev, Habarowa, Samoyede Land. As.: Mouths of the Yenissei, Lena and Kolyma, New Siberian Islands, Chukches Land.

Geogr. area: North America, Iceland, Færöes, Europe, Northern Asia.

206. *F. rubra* L.

Hook. Fl. bor. Am. II p. 250; Greely, Lady Frankl. Bay Exped. II p. 15; Lge. Conspl. Fl. Groenl. p. 180; Blytt, Bidrag p. 8; Ledeb. Fl. Ross. IV p. 352; Scheutz, Pl. vase. Jeniss. p. 183; Reichardt, Fl. Jan Mayen p. 11; Trautv. Fl. rip. Kolym. p. 569; F. rubra v. arenaria (Osb.) Lge. I. c. p. 180; Hartz, Nordöst Grönl. p. 351; Dusén, Ost-Grönl. p. 62; Ledeb. I. c. p. 352; Schmidt, Fl. Jeniss. arct. p. 126; Nath., Spetsb. Kärlv. p. 29; Th. Fries, Beeren Isl. Veget. p. 155; Trautv. Syll. Pl. Sib. bor. orient. p. 540; Kjellm. & Lundstr., Nov. Semlja p. 312; Kjellm., Sib. Nordk. Fanerogamfl. p. 272, As. Beringss. p. 556, Vest-Eskim. Land p. 54; F. rubra v. baicalensis Ledeb. I. c. p. 352; F. duriuseula Lge. I. c. p. 180 p. pt.

With creeping shoots, innovations extravaginate, præfolium short. Culm erect, internodes longer than the sheaths. Leaves of the sterile shoots involute, of the stems generally flat. Panicle somewhat drooping, spikelets 4—10-flowered. Glumes unequal, narrow, acuminate; lower pale about 5—8 mm. long, glabrous or hairy, acuminate, generally with a short awn.

The form with densely hairy spikelets, *F. arenaria* Osb. seems to be the most common in Arctic regions. The v. *baicalensis* Ledeb. is a luxuriant form.

Am.: Port Clarence (!), Kotzebue Sound, Arctic Coast, Grinnell Land to $81^{\circ} 44'$, West Greenl. 60° – $70^{\circ} 40'$ (!), East Greenl. 60° – 61° (!) and 70° – $73^{\circ} 35'$ (!). Eur.: Jan Mayen (!), Spitsbergen, Novaya Zemlya to 75° , Waigats, Samoyede Land. As.: Taimyr Peninsula, Mouths of the Yenissei, Lena and Kolyma, Chukches Land.

Geogr. area: North America, Iceland, Færöes, Europe, Northern Asia.

21. SCHEDONORUS Beauv.

207. *S. ciliatus* (L.) Kjellm., As. Beringss. p. 557.

Bromus ciliatus, Rothr., Fl. of Alaska p. 458; Schmidt, Fl. Jeniss. arct. p. 126; *Bromus purgans* Hook. Fl. bor. Am. II p. 252; *Bromus inermis* v. *ciliatus* Trautv. Fl. Kolym. p. 569; B. Kalmii Torr. & Gray.

A tall grass, about 1 metre high. Leaves broad, flat, rough, more or less hairy. Sheaths often shorter than the internodes, sometimes softly pubescent of recurved hairs. Panicle lax, spreading, generally drooping. Spikelets 4—9-flowered. Glumes linear-lanceolate, acuminate, 1—3-nerved; lower pale compressed, somewhat keeled, acuminate, generally hairy with silky hairs especially at the margins. Awn about one third as long as the pale.

Am.: Kotzebue Sound, Arctic Sea-Coast. As.: Mouths of the Yenissei and Kolyma, Chukches Land.

Geogr. area: North America, Siberia.

Obs. Eastwood (Pl. coll. at Nome City p. 130) mentions *Bromus pacificus* Shear. from Nome City, Alaska.

22. NARDUS L.

208. *N. stricta* L.

Lge. Consp. Fl. Groenl. p. 154; Fl. D. tab. 1022.

Densely cæspitose. Culm and leaves slender, erect, rigid. Spike slender, spikelets sessile in two rows on one side of the rachis. Lower pale keeled with a short rough awn.

Am.: West Greenl. 60° – $60^{\circ} 30'$ (!).

Geogr. area: North America (introduced), Iceland, Færöes, Europe, Northern Asia.

23. AGROPYRUM J. Gaertn.

209. *A. repens* (L.) Beauv.

Triticum repens L., Fl. D. tab. 748; Ledeb. Fl. Ross. IV p. 341; Trautv. Pl. Sib. bor. p. 133; Scheutz., Pl. vasc. Jeniss. p. 183.

Stoloniferous. Culm erect, rigid. Leaves broad, flat, roughish or pubescent above, smooth beneath. Spike dense, spikelets about 5-flowered. Glumes 5—7-nerved, awn shorter than the flower or none.

Am.: Kotzebue Sound. Eur.: Samoyede Land. As.: Mouths of the Yenissei (!) and Lena.

Geogr. area: North America (introduced?), Iceland, Færöes, Europe, Northern Asia.

Obs. Conf. *A. violaceum* (Horn.) Lge.

210. *A. violaceum* (Horn.) Lge. Consp. Fl. Groenl. p. 155.

Triticum violaceum Hornem. in Fl. D. tab. 2044; Scheutz, Pl. vase. Jeniss. p. 183; (?) *T. repens* v. *purpurascens* et *nanum* Hook. Fl. bor. Am. II p. 254; *A. dasystachyum* v. *violaceum* Greely, Lady Frankl. Bay Exp. II p. 15.

Cæspitose. Culm erect, rigid. Leaves broad, flat, roughish on both sides. Spike dense, spikelets 3—5-flowered, generally tinged with violet or purple, more seldom green (f. *virescens* Lge. I. c.), hairy or glabrous. Glumes 5-nerved, abruptly narrowed into a short awn.

Am.: Arctic Sea-Coast (?), Grinnell Land $81^{\circ} 44'$, West Greenl. $60^{\circ} - 70^{\circ} 8'$ (!). As.: Mouth of the Yenissei (!).

Geogr. area: Northern North America, Iceland, Northern Scandinavia, Northern Finland, Kola Peninsula.

Obs. In habit most resembling *A. repens*, but is more related to *A. caninum* (L.) R. & S. (because of the absence of stolons and the leaves being rough on both sides) to which transitory-forms are found in North America and North Scandinavia. Most likely the varieties *purpurascens* and *nanum* of *Triticum repens* mentioned by Hooker I. c. belong to this species.

***A. violaceum* (Horn.) Lge. \times *Elymus arenarius* L.**

Rosenv., Till. p. 726.

Stoloniferous. Habit as *Elymus*, spikes as *Agropyrum*. Glumes 5—7-nerved, as long as the spikelets. Spikelets 2—4-flowered, lower pale often narrowed into a short awn. Spike more or less hairy, partly tinged with violet.

Am.: West Greenl. Igaliko Sound c. 61° in two spots (!).

24. ELYMUS L.

211. *E. mollis* Trin.

Hook. Fl. bor. Am. II p. 255; Eastwood, Pl. coll. at Nome City p. 130; Taylor, Pl. coll. at Davis Str. and Ball. Bay p. 86; Rothr., Fl. of Alaska p. 458; Macoun, Catalogue IV p. 246; Ledeb. Fl. Ross. IV p. 332; Kjellm., Sib. Nordk. Fanerogamfl. p. 272, As. Beringss. p. 556, St. Lawrence-ön p. 21, Vest-Eskim. Land p. 54; Trautv. Fl. Terr. Tschuktsch. p. 39, Syll. Pl. Sib. bor. orient. p. 540.

Stoloniferous. Culm short, hairy in the upper part. Leaves flat, becoming involute on the margins. Spike short, glumes linear-lanceolate, soft of texture, somewhat shorter than the spikelets. Glumes and pales densely and softly hairy.

Very nearly allied to *E. arenarius* L. and may sometimes have been taken for this species, but the flowers are smaller and the glumes narrower and shorter and of softer texture.

Am.: St. Lawrence Island, Port Clarence (!), Schischmareff Bay, Nome City, Norton and Kotzebue Sounds, Arctic Shores (!), Hudson Strait, Baffin Land. As.: Taimyr Peninsula, Mouth of the Lena, Chukches Land (!).

Geogr. area: Northern North America, North-eastern Asia.

212. *E. arenarius* L.

Hook. Fl. bor. Am. II p. 255; Cornell Party, Peary Voy. 1896, p. 418; Macoun, Catalogue IV p. 245; Rothr., Fl. of Alaska p. 158; Lge. Conspl. Fl. Groenl. p. 154; Ledeb. Fl. Ross. IV p. 331; Kjellm. & Lundstr., Nov. Semlja p. 329; Blytt, Bidrag p. 9; Kurtz, Fl. d. Tschuktschenh p. 482 (?); Fl. D. tab. 3003.

Stoloniferous. Culm often more than one metre high. Leaves generally involute. Glumes lanceolate, rigid, as long as the spikelets. Glumes and pales more or less densely hairy. Sometimes the culms are short, only about 20 cm. high, and the spikes short and thick. In Arctic regions the glumes seem always to be hairy (*f. villosa* E. Meyer) and may therefore sometimes have been confounded with *E. mollis* Trin.

Am.: Norton and Kotzebue Sound to Point Barrow, Arctic Shores and Islands, Cumberland Sound, West Greenl. 60° – $70^{\circ} 47'$ (!), East Greenl. 60° – $63^{\circ} 32'$ (!). Eur.: Waigats, Samoyede Land at Yugor Sehar. As.: Chukches Land (?).

Geogr. area: Northern North America, Iceland, Færöes, North and Central Europe, Northern Asia.

CORRIGENDA AND ADDENDA.

- p. 3. >Fig. 1. *Botrychium simplex*< read >Fig. 4<.
p. 4. Under *A. Phegopteris* add >*Phegopteris Phegopteris*, Eastwood, Pl. coll. at Nome City, p. 129<, and after >Am.< add >Nome City<.
p. 5. Under *A. fragrans* add >*Dryopteris fragrans*, Eastwood, Pl. coll. at Nome City, p. 129< and after >Am.< add >Nome City<.
p. 6. Under *C. fragilis* add >*Filix fragilis*, Eastwood, Pl. coll. at Nome City, p. 129<.
p. 7. Line 5, add >Nome City<.
- - After line 12, add: >Eastwood (Pl. coll. at Nome City, p. 129) mentions *Cystopteris montana* (L.) Bernh. and *Gymnopteris triangularis* (Kaulf.) Underw. from Nome City.
p. 9. Under *E. variegatum* add >Eastwood, Pl. coll. at Nome City, p. 129< and after >Am.< add >Nome City<.
p. 10. Line 5, for >Greenl. 60°—70°< read >Greenl. 60°—69° 16'<.
- - Under *E. siliculosum*, line 18, for >60°—70°< read >60°—69° 13'<.
- - After *E. siliculosum* add: Eastwood (Pl. coll. at Nome City, p. 129) mentions *E. pratense* Ehrh. from Nome City.
p. 12. Under *L. Selago* add >Eastwood, Pl. coll. at Nome City, p. 129< and after >Am.< add >Nome City<.
- - Under *L. annotinum* add >Eastwood, Pl. coll. at Nome City, p. 129,< and after >Am.< add >Nome City<.
p. 13. Under *L. alpinum* add >Eastwood, Pl. coll. at Nome City, p. 129<, and after >Am.< add >Nome City<.
p. 20. Line 6, for >69° 30'< read >69° 15'<.
p. 23. Under *J. balticus* add >J. Haenkei, Eastwood, Pl. at coll. Nome City, p. 130< and at γ, add >Nome City<.
p. 24. Under *J. caslaneus* add >Eastwood, Pl. coll. at Nome City, p. 130<.
p. 25. Line 9, add >Nome City<.
p. 26. Under *J. trifidus* add >Rosenv. Till. p. 713<.
p. 28. Under *L. parviflora* add >*Juncoides parviflorum* Eastwood, Pl. coll. at Nome City p. 130< and after >Am.< add >Nome City<.
p. 31. Under *L. nivalis* add >Franz Josef Archipelago (¶)<.
- - Under *L. multiflora* add >*Juncoides campestre sudeticum*, Eastwood, Pl. coll. at Nome City, p. 130<, and after >Am.< add >Nome City<.
p. 32. Under *T. palustris* add >Eastwood, Pl. coll. at Nome City, p. 131< and after >Am.< add >Nome City<.
p. 37. Under *Coralliorhiza*, for >69° 50'< read >69° 15'<.
- - Under *Listera*, for >69° 50'< read >69° 15'<.

- p. 38. under *H. hyperborea*, for >69° 30'< read >69° 15'<.
- p. 48. For >**C. cryptocarpa** (130)< read >**C. Lyngbyei** (130)<.
- - Under *Capituligerae*, for >solitary or more< read >solitary, or several<.
- p. 49. Under *Foetidae* for >more spikelets< read >several spikelets<.
- p. 59. Under *Astrostachyae*, line 2 from bottom, for >more spikelets< read >several spikelets<.
- p. 61. Line 14, add >Habarowa (J)<.
- p. 62. Under *C. holostoma*, after >Geogr. area< add >Arctic Norway<.

Postscriptum. According to a letter from Rev. G. Kükenthal Mr. C. B. Clarke has now examined the type of *Carex podocarpa* of R. Brown and he declares it to be *C. rariflora* Sm. The species which I have treated as *C. podocarpa* (p. 63) is now named *C. macrochaeta* C. A. Mey., var. *Tolmiei* (Boot) Kükenthal.

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