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V. L. Komarov, Editor

Rosaceae – Rosoideae, Prunoideae

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(Flora SSSR)

Volume X

Rosaceae—Rosoideae, Prunoideae

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Addenda IX — Descriptiones plantarum novarum
in tomo X Florae URSS commemoratarum

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—	2. H. <i>persica</i> (Michx.) Bornm.	507
—	× <i>Hulthemosa</i> Juz. gen. hybr.	
—	— H. <i>guzarica</i> Juz.	507
—	— H. <i>kopetdaghensis</i> (Meffert) Juz.	508

Subfamily 4. *Prunoideae* Focke

Genus 762. *Prunus* Mill.

—	1. P. <i>spinosa</i> L.	511
—	★ 2. P. <i>domestica</i> L.	515
6920.	3. P. <i>divaricata</i> Ldb.	516
—	4. P. <i>ferganica</i> Lincz.	519
—	5. P. <i>Simonii</i> Carr.	520
—	6. P. <i>salicina</i> Lindl.	520
—	7. P. <i>ussuriensis</i> Kov. et Kost.	521

Genus 763. *Amygdalus* L.

Section 1. *Euamygdalus* Spach

—	1. <i>A. communis</i> L.	524
—	2. <i>A. bucharica</i> Korsh.	529
—	3. <i>A. Fenzliana</i> (Fritsch) Lipsky	531
—	4. <i>A. zangezura</i> Fed. et Takht.	532
—	5. <i>A. pseudopersica</i> S. Tamamsch.	532

Section 2. *Chamaeamygdalus* Spach

6930.	6. <i>A. nana</i> L.	535
—	7. <i>A. Ledebouriana</i> Schlecht.	537
—	8. <i>A. georgica</i> Desf.	538
—	9. <i>A. Petunnikowii</i> Litw.	539

Section 3. *Lycioides* Spach

—	10. <i>A. spinosissima</i> Bge.	540
—	11. <i>A. turcomanica</i> Lincz.	542
—	12. <i>A. nairica</i> Fed. et Takht.	542
—	13. <i>A. Vavilovii</i> M. Pop.	543

Section 4. *Spartioides* Spach

—	14. <i>A. scoparia</i> Spach	544
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Section 5. *Amygdalopsis* (Carr.) Lincz.

—	15. <i>A. ulmifolia</i> (Franché) M. Pop.	545
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Section 6. *Cerasioides* Lincz.

6940.	16. <i>A. pedunculata</i> Pall.	546
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Genus 764. *Cerasus* Juss.

Subgenus 1. *Typocerasus* Koehne

Section 1. *Mahaleb* Koehne

—	1. <i>C. Maximowiczii</i> (Rupr.) Kom.	550
—	2. <i>C. mahaleb</i> (L.) Mill.	551

Section 2. *Pseudocerasus* Koehne

—	3. <i>C. sachalinensis</i> (Fr. Schm.) Kom. et Klob.-Alis	552
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Section 3. *Hypadenium* (Rupr. et Maxim.) Kom.

—	4. <i>C. glandulifolia</i> (Rupr et Maxim.) Kom.	555
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Section 4. *Eucerasus* Koehne

—	5. <i>C. avium</i> (L.) Moench	556
—	6. <i>C. fruticosa</i> (Pall.) G. Woron.	558
—	7. <i>C. vulgaris</i> Mill.	559
—	8. <i>C. austera</i> (Ehrh.) Roem.	561
—	*9. <i>C. collina</i> Lej. et Court.	561

Subgenus 2. *Microcerasus* Webb.

Section 1. *Spiraeopsis* Koehne

—	10. <i>C. glandulosa</i> (Thunb.) Loıs.	562
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Section 2. *Amygdalocerasus* Koehne

6950.	11. <i>C. microcarpa</i> (C. A. M.) Boiss.	563
—	12. <i>C. araxina</i> Pojark.	567
—	13. <i>C. incana</i> (Pall.) Spach	568
—	14. <i>C. pseudoprostrata</i> Pojark.	568
—	15. <i>C. erythocarpa</i> Nevski	569
—	16. <i>C. amygdaliflora</i> Nevski	570
—	17. <i>C. verrucosa</i> (Franch.) Nevski	571
—	18. <i>C. Jacquemontii</i> (Hook. f.) Buser	572
—	19. <i>C. alaica</i> Pojark	573
—	20. <i>C. tianschanica</i> Pojark.	573
6960.	21. <i>C. turcomanica</i> Pojark.	574

Genus 765. *Padus* Mill.

—	— <i>P. virginiana</i> (L.) Mill.	575
—	— <i>P. ssiori</i> (Fr. Schm.) C. K. Schn.	576
—	1. <i>P. racemosa</i> (Lam.) Gilib.	576
—	2. <i>P. asiatica</i> Kom.	578
—	3. <i>P. Maackii</i> (Rupr.) Kom.	579

Genus 766. *Laurocerasus* Roem.

—	1. <i>L. officinalis</i> Roem.	580
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Genus 767. *Prinsepia* Royle

—	1. <i>P. sinensis</i> (Oliv.) Kom.	583
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Genus 768. *Armeniaca* Mill.

—	1. <i>A. vulgaris</i> Lam.	586
—	2. <i>A. sibirica</i> (L.) Lam.	590
—	3. <i>A. manshurica</i> (Koehne) Skvortz.	596
—	4. <i>A. dasycarpa</i> (Ehrh.) Pers.	598

Genus 769. *Persica* Mill.

6970.	1. <i>P. vulgaris</i> Mill.	601
6971.	2. <i>P. ferganensis</i> (Kost. et Rjab.) Kov. et Kost.	603

PREFACE

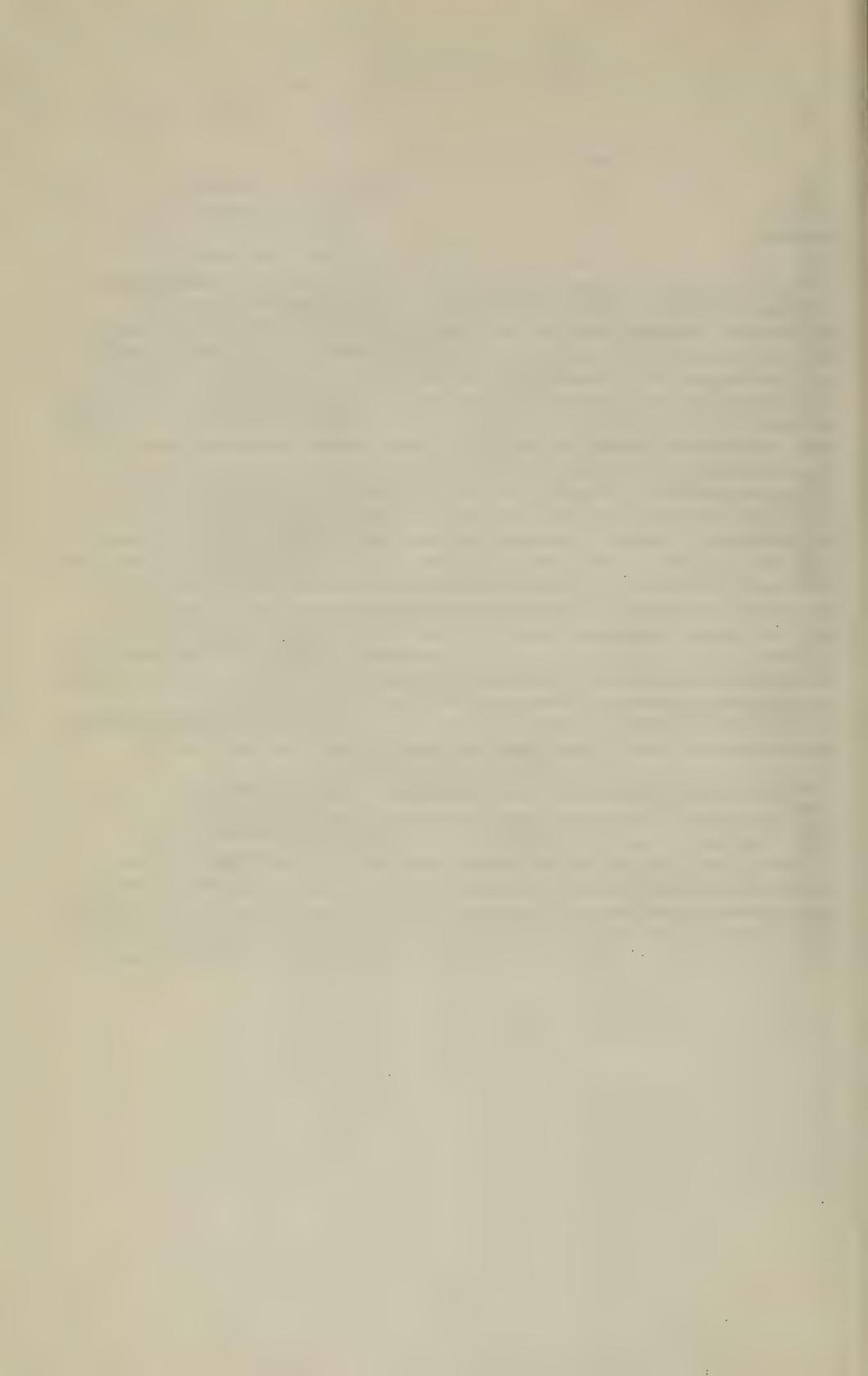
Volume X of the "Flora of the USSR" was published after incorporation of parts of Finnish territory, the western regions of the Ukraine and Belorussia, northern Bukovina and Moldavia, and also Esthonia, Latvia and Lithuania in the USSR. However, since this volume was already in print and rearrangement was nearly impossible, these additions to the territory of the USSR are only partly reflected in it. The next volume (XI) will include material from the new territories, and the new regions will be shown on the map of the Flora regions of the USSR. Work is now proceeding on a supplementary volume in which the distribution in the new regions of those plants described in Volume X will be indicated. Simultaneously, the necessary revisions and additions that the new material entails will also be published. Volume X deals with a large part of the family Rosaceae, with the exception of the subfamilies Spiraeoideae and Pomoideae, which are dealt with in Volume IX. The subfamilies Rosoideae and Prunoideae, described in Volume X, encompass such useful genera as *Rubus*, *Fragaria*, *Rosa* (subfamily Rosoideae) and *Amygdalus*, *Persica*, *Armeniaca*, *Prunus*, *Cerasus*, and others (subfamily Prunoideae). A number of taxonomically difficult genera like *Alchimilla*, *Potentilla*, and the above-mentioned *Rosa* and *Rubus* are described.

The entire subfamily Rosoideae was treated by S. V. Yuzepchuk, possibly the only expert in the Soviet Union on many of the Rosoideae genera (*Alchimilla*, *Rubus*, *Rosa*, *Dryas* and others).

The following genera have been completely revised: *Padus* (V. L. Komarov), *Cerasus* (A. I. Poyarkova), and *Amygdalus* (I. A. Linchevskii and A. A. Fedorov).

Nearly half the flora of the Soviet Union has been described with the publication of this volume. It includes 546 enumerated species, and thus the total number of the species described in the ten volumes of the "Flora of the USSR" is now 6971.

The Editors



1 Subfamily 3. **ROSOIDEAE*** Focke in Engl. u. Prantl, Nat. Pflanzenfam. III, 3 (1888) 27. — Flowers arranged variously; hypanthium varying in shape; outer calyx present or rarely absent; sepals 5 or 4; fruits usually numerous, infrequently connate, not united with the torus; ovary 1–2-ovuled; fruit indehiscent. Shrubs or herbs with leaves mostly divided, rarely entire, stipuled.

- 1. Fruitlets on flat, convex or slightly concave torus 2.
- + Fruitlets enclosed in urceolate, saccate, or tubular hypanthium . . . 24.
- 2. Outer calyx absent 3.
- + Outer calyx present 8.
- 3. Evergreen semishrubs. Sepals and petals 6–10 (usually 8) 753. *Dryas* L.
- + Herbs or shrubs with deciduous leaves. Sepals and petals 5 4.
- 4. Shrubs, without prickles or spinelets 5.
- + Herbs or shrubs with prickles or spinelets 6.
- 5. Flowers yellow; carpels 5–8 **Kerria* DC.
- + Flowers (in our species) pink; carpels numerous . . . **Rubacer* Rydb.
- 6. Fruitlets fleshy, succulent, drupaceous, slightly united above the inflated receptacle 734. *Rubus* L.
- + Fruitlets dry 7.
- 7. Rather large plants with broad leaf lobes (rarely with entire leaves). Filaments tapering at base 754. *Filipendula* Adans.
- + Smaller plants with narrowly linear leaf lobes. Filaments dilated at base 743. *Chamaerhodos* Bge.
- 8. Ovules pendulous; fruitlets drupe-like with deciduous style 9.
- + Ovules erect; fruitlets often with persistent style or at least the lower part of the style persistent 16.
- 9. Receptacle fleshy at ripening, usually readily separated from the inner surface of hypanthium 10.
- + Receptacle dry (sometimes spongy), not separating from hypanthium 11.
- 10. Flowers white, inflorescence corymbiform 735. *Fragaria* L.
- + Flowers yellow, solitary in axils of cauline leaves 736. *Duchesnea* Smith.
- 11. Shrubs (sometimes quite small) with compound articulated leaves 737. *Dasiphora* Rafin.
- + Herbs or semishrubs with nonarticulate leaves 12.
- 12. Petals lanceolate, persistent, often dark purple; receptacle spongy 738. *Comarum* L.

* Treatment by S.V. Yuzepchuk.

- + Petals orbicular or obcordate, usually caducous, yellow, rarely white or red. Receptacle generally dry 13.
- 13. Flowers usually rather large; stamens ca. 20; carpels numerous 739. *Potentilla* L.
- + Flowers small, not conspicuous; stamens usually 5, rarely 4 or 10; carpels 5-12 14.
- 14. Flowers often unisexual, dioecious; sepals and petals usually 4 741. *Dryadanth* Bge.
- + Flowers perfect; sepals and petals 5 15.
- 15. Stamens 5, alternating with petals; styles lateral, clavate 740. *Sibbaldia* L.
- + Stamens 10, opposite to petals; styles nearly basal, fusiform 742. *Sibbaldianthe* Juz.
- 16. Styles wholly falling after anthesis 17.
- + Styles completely or at least the lower part persistent in fruit 18.
- 17. Fruitlets not more than 6; filaments rapidly withering 744. *Waldsteinia* Willd.
- + Fruitlets numerous; filaments persistent 745. *Coluria* R. Br.
- 18. Styles not articulated in the middle 19.
- + Styles with two articulated parts, the upper part falling off at maturity of fruit 22.
- 19. Styles glabrous or glabrescent, slightly elongating in fruit 749. *Acomastylis* Greene.
- + Styles densely plumose-pilose, generally rather elongating in fruit 20.
- 3 20. Leaflets of outer calyx 5 21.
- + Leaflets of outer calyx more numerous 747. *Novosieversia* Bolle.
- 21. Shrubs or semishrubs with pinnate leaves and white flowers 746. *Sieversia* Willd.
- + Herbs with lyrate leaves and yellow flowers 748. *Parageum* Nakai et Hara.
- 22. Lower part of styles not elongating in fruit 750. *Woronowia* Juz.
- + Lower part of styles rather elongating in fruit 23.
- 23. Lower part of styles straight at apex, covered in upper part with retrorse spinescent bristles 752. *Orthurus* Juz.
- + Lower part of style hooked at apex, without retrorse spinescent bristles 751. *Geum* L.
- 24. Herbs. Fruitlets 1-2, enclosed in an urceolate or saccate, dry, often indurated hypanthium 25.
- + Shrubs, furnished with prickles or spinelets. Fruitlets numerous, enclosed in a urceolate or tubular hypanthium, fleshy and usually succulent at maturity 29.
- 25. Outer calyx present; corolla present or absent 26.
- + Outer calyx and corolla absent 28.
- 26. Hypanthium without spines in upper part; corolla absent; stamens and fruitlets 1-4. Leaves palmately divided or entire 27.
- + Hypanthium with many-rowed, hooked spines in the upper part; corolla present; stamens 16-20, fruitlets 2 (one abortive) 757. *Agrimonia* L.
- 27. Perennials. Stamens 4, alternating with sepals 755. *Alchimilla* L.

- + Annuals. Stamens 1 (rarely 2) 756. **Aphanes** L.
- 28. Flowers usually brightly colored, rarely greenish; pistil one; stigma papillate 758. **Sanguisorba** L.
- + Flowers greenish, unisexual, monoecious, often perfect; pistils 2; stigma penicillate 759. **Poterium** L.
- 29. Leaves pinnate-compound, stipulate. Petals white, pink, red or yellow, without basal spot 760. **Rosa** L.
- + Leaves simple, entire, (or) exstipulate. Petals yellow, with a dark purple basal spot 761. **Hulthemia** Dumort.

Tribe 1. **KERRIEAE** Focke in Engl. u. Prantl., Nat. Pflanzenfam. III, 3 (1888) 27.—Hypanthium flat; stamens numerous; fruitlets 4–6, whorled; fruit drupaceous or nearly achene-like. Shrubs, with deciduous, ovate or ovate-lanceolate leaves.

Genus★**KERRIA** * DC.

DC. in Transact. Linn. Soc. XII (1817) 156.

Hypanthium subglobular; calyx persistent; outer calyx absent; sepals and petals 5; sepals entire; petals yellow; stamens numerous; carpels 5–8, free. Fruitlets (in China) succulent at end, drupaceous, yellow (resembling raspberries), edible. Shrub with entire deciduous leaves. A monotypic genus.

★**K. japonica** (L.) DC. in Transact. Linn. Soc. XII (1817) 156.—*Rubus japonicus* L. herb. sec. Smith et in Mant. I (1767) 145.—*Corchorus japonicus* Thunb., Fl. Jap. (1784) 227.—*Ik.*: Bot. Mag. tab. 1296, 1837.

Shrub, up to 3 m high; branches slender, virgate, green; leaves petiolate, ovate-lanceolate, long attenuate, irregularly long serrate-dentate; stipules subulate-linear, dry-scarious, soon deciduous. Flowers pedicellate, apical, yellow, in the USSR usually double; sepals large, spreading, toothed; petals large, oblong or orbicular, short-clawed; filaments thin, flexuous; disk pilose; style filiform; fruitlets orbicular-oblong, glabrous, in the USSR abortive, small, dry. May.

Naturalized in gardens.—Caucasus: W. Transc. **Gen. distr.**: Jap.-Ch. (China). Described from Japan (where well-known in cultivation). Type in London.

Economic importance. An ornamental plant, impressive not only in flower but also in its vegetative parts (because of its light green leaves). Considered as the first Japanese shrub to be introduced into European cultivation.

Tribe 2. **POTENTILLEAE** Spreng., Anleit., ed. 2, II (1818) 863, Benth. et Hook., Gen. I (1865) 603.—Receptacle flat or convex, taking no part in the formation of fruit; filaments tapering, broad at base; carpels numerous, arranged in heads, rarely few (then the number of stamens also small).

* Named after the English horticulturist, William Kerr, who collected plants in China and Ceylon, and who died in 1814 (holding the office of parks inspector in Peradeniya, Ceylon).

5. Genus * **RUBACER** * RYDB.

Rydb., Bull. Torr. Bot. Club XXX (1903) 274.

Flowers large, solitary or in few-flowered inflorescences; sepals 5, ovate, with a long sharp tip; petals 5, purple (in the USSR) or white; stamens numerous; pistils many, on a flat or slightly convex receptacle; styles clavate; stigma slightly bilobate; fruitlets small, connate, separated from the receptacle, covered with dry, hard, thin and densely pubescent cushion. Unarmed more or less glandular shrubs; leaves simple, palmatilobate, with base cordate and lobes acute.

* **R. odoratum** (L.) Rydb. in Bull. Torr. Bot. Club XXX (1903) 274. — *Rubus odoratus* L., Sp. pl. (1753) 494. — *R. grandifolius* Salisb., Prodr. (1796) 364. — *Bossekia odorata* Greene, Leaflets I (1906) 211. — Ic.: Bot. Mag. tab. 323.

Shrub; stem 1–1.5 m high, with peeling bark, young plants villous and glandular; leaves long-petioled, 3–5-lobed, irregularly serrate-dentate, pilose-glandular on both sides; stipules lanceolate. Inflorescence, pedicels and calyx densely covered with long glandular hairs, viscous; flowers large; petals suborbicular, longer than the sepals, purple or pink; stamens shorter than petals; fruit globose. June–July.

Cultivated in gardens and sometimes growing wild. **Gen. distr.:** N. Am. Described from Canada. Type in London.

Economic importance. An ornamental plant.

Genus 734. **RUBUS** ** L.

L., Gen. pl. ed. I (1737) 146.

Flowers often in dichasial, simple or compound racemes, sometimes solitary, perfect or rarely unisexual and dioecious. Hypanthium flat or infundibular; sepals (4) 5 (rarely 6–8), lanceolate, persisting in fruit; petals (4) 5 (rarely 6–8), caducous; stamens indefinite in number; pistils many, on convex receptacle; ovary 1-celled; styles short, filiform, lateral (nearly apical); stigma simple; fruit a succulent drupe, connate at base above inflated torus, rarely separate; ovules resupinate, attached to base of style.

6 Perennial herbaceous plants or shrubs; if shrubby then biennial (in the USSR) with ligneous stems usually covered with prickles or bristles, bearing leaves only in the first year and forming flower-bearing branches in the second. Leaves simple or compound, petiolate, stipulate at base.

Rubus idaeus — in Riss-Würm interglacial, in Riss-Würm U. Dnp. (Mikulino), Lad.-Ilm. (Dvoretz), U. V. (Borok), V.-Kama (Galich, Chukhloma); in Mindel-Riss in V.-Don (Likhvin); interglacial V.-Don (Belolipki). — *R. lasiostylis* — in Pliocene V.-Don. — *R. saxatilis* — in interglacial Riss-Würm Lad.-Ilm. (Dvoretz). — *R. cf. occidentalis* — in Pliocene V.-Don. — *Rubus* sp. — in Tertiary deposits — Kamchatka; in Tertiary deposits of Ob (Tomsk area).

* From the Latin generic name *Rubus* — raspberry and *Acer* — maple because of the resemblance of the leaves to those of some species of maple.

** Ancient Roman name for dewberry.

1. Herbaceous plants 2.
- + Shrubs with two kinds of shoots: annotinous or turions, bearing only cauline leaves, and woody biennials developing flower-bearing branches in axils of the previous year's leaves 6.
2. Dioecious plants with simple-lobed leaves and with yellow fruits when ripe (subgenus *Chamaemorus* Focke) 1. *R. chamaemorus* L.
- + Monoecious plants with red fruits (subgenus *Cylactis* Rafin) 3.
3. Leaves ternate 4.
- + Leaves simple, 3(5)-lobed 5.
4. Flowers in 2-10-flowered inflorescences; petals small, white 4. *R. saxatilis* L.
- + Flowers solitary; petals purple, markedly longer than sepals 2. *R. arcticus* L.
5. Stems ascending, covered, like the petioles, with prickly bristles. Petals white 5. *R. humulifolius* C. A. M.
- + Stems erect, unarmed. Petals purple 3. *R. stellatus* Sm.
6. Fruit red, readily separating from torus; leaves simple, ternate or pinnate (subgenus *Idaeobatus* Focke) 7.
- + Fruit black when ripe, conrescent with torus and separating together with it; leaves usually ternate or palmate (subgenus *Eubatus* Focke) 10.
7. Leaves entire, lobed 6. *R. crataegifolius* Bge.
- + Leaves ternate or imparipinnate 8.
8. Stalks and pedicels with sparse prickly bristles, eglandulose. Leaves often imparipinnate, white-tomentose beneath 7. *R. idaeus* L.
- + Stalks and pedicels covered with many prickly bristles, glandulose. Leaves always ternate 9.
9. Leaves white-tomentose beneath 8. *R. sachalinensis* Lévl.
- + Leaves green on both surfaces 9. *R. komarovi* Nakai.
10. Stipules lanceolate. Fruit with a glaucous bloom, dull (Section *Corylifolii* Focke) 42. *R. caesius* L.
- + Stipules linear. Fruit without bloom, shiny 11.
11. Annotinous shoots (turions) 5-angled at cross section, with equal or subequal prickles along ribs 12.
- + Annotinous shoots orbicular at cross section, if 5-angled then prickles irregular in shape and size arranged along ribs and faces 25.
12. European species with suberect annotinous shoots, leaves green on both surfaces 10. *R. nessensis* Hall.
- + Asiatic and Crimean species with arcuate annotinous shoots, leaves more or less white- or gray-tomentose beneath 13.
13. Annotinous shoots densely covered with thin white tomentum of stellate hairs (mixed with simple); leaves hairy above. Anthers hairy 11. *R. sanguineus* Friv.
- + Annotinous shoots glabrous. Leaves glabrous above or (rarely) hairy. Anthers glabrous 14.
14. Annotinous shoots with equal prickles on ribs only. Inflorescence-axis eglandulose 15.
- + Annotinous shoots somewhat unequal with prickles, often lightly removed, usually also with solitary small prickles at the faces. Inflorescence axis with few or solitary stalked glands, rarely eglandulose 19.

15. Annotinous shoots with plane or slightly concave faces. Flowers pink 16.
 + Annotinous shoots with canaliculate or concave faces. Flowers white 18.
16. Annotinous shoots hairy; leaves sparsely hairy above. Stamens as long as styles 13. *R. discernendus* Sudre.
 + Annotinous shoots glabrous or sparsely hairy. Leaves glabrous above. Stamens longer than styles 17.
17. Apical leaflet broadly ovate or suborbicular, more or less emarginate at base, acute-angular or rectangular at apex. Flowers large, 2.5–4 cm in diameter 12. *R. cyri* Juz.
 8 + Apical leaflet obovate, immarginate at base, rounded and short-acuminate at apex. Flowers of medium size, 1.7–2.2 cm in diameter 14. *R. ibericus* Juz.
18. Annotinous shoots glabrous or glabrescent. Leaves glabrous above
 + Annotinous shoots hairy. Leaves hairy above 16. *R. hyrcanus* Juz.
19. Fruiting sepals recurved 20.
 + Fruiting sepals ascending, more or less adherent to fruit 23. *R. caucasigenus* (Sud.) Juz.
20. Annotinous shoots more or less densely pubescent 21.
 + Annotinous shoots glabrous or glabrescent 24.
21. Annotinous shoots with concave or canaliculate faces. Leaves more or less hairy above 22.
 + Annotinous shoots with flat faces. Leaves glabrous above 23.
22. Petals white. Ovaries pubescent 21. *R. miszczenkoi* Juz.
 + Petals pink. Ovaries glabrous 22. *R. lepidulus* (Sud.) Juz.
23. Leaves densely soft-hairy, grayish-tomentose beneath 18. *R. ossicus* Juz.
 + Leaves thinly white-tomentose beneath 20. *R. georgicus* Focke.
24. Glands on annotinous and flower-bearing shoots long-stalked, dark red; prickles patulous or curved 17. *R. cartalinicus* Juz.
 + Glands present only in inflorescence, short-stalked not longer than the simple hairs; prickles many, falcately curved 19. *R. peruncinatus* (Sud.) Juz.
25. Annotinous and flower-bearing shoots eglandulose or both or only the flower-bearing shoots with glands well-demarcated from the prickles (not connected by transitional formations), differing very little from each other in shape 26
 + Annotinous shoots and flower-bearing branches with numerous stalked glands differing in length, without distinct borders between the glands and the quite unequal bristles (Section *Glandulosi* Focke) 35.
26. Annotinous shoots with canaliculate faces, usually eglandulose (like the flower-bearing shoots) or with solitary small glands. Leaflets irregularly incised-serrate, the terminal cuneately tapering at base. Flowers in dense pyramidal inflorescence small 27.
 9 + Annotinous shoots ribbed or cylindrical, if ribbed then faces flat. Leaflets often more or less regularly and finely serrate-dentate, not cuneately tapering at base. Inflorescence not as above, rarely pyramidal, if so then rather loose 28.

27. Annotinous shoots usually tomentose-hairy, grayish above with more or less dense stellate hairs, white- or gray-tomentose beneath 24. *R. tomentosus* Borkh.
- + Annotinous shoots often glabrous. Leaves completely glabrous above 25. *R. lloydianus* Genuv. ampl.
28. Annotinous shoots and flower-bearing branches eglandulose 29.
- + At least the flower-bearing shoots with numerous or solitary glands 29.
29. Annotinous shoots ribbed, leaves ternate and some quinate; axis of inflorescence, pedicels and calyx villous with long and spreading hairs 26. *R. raddeanus* Focke.
- + Annotinous shoots cylindrical, leaves ternate, axis of inflorescence, pedicels and calyx shortly appressed-pubescent 27. *R. persicus* Boiss.
30. Leaves on annotinous shoots quinate (sometimes some ternate). Glands on flower-bearing branches about as long as the simple hairs and often concealed among them, not exceeding diameter of inflorescence axis in length. 31.
- + Leaves of annotinous shoots ternate. Glands on branches rather distinctly longer than the simple hairs (at least partly so), as long as or longer than the diameter of the axis 34.
31. Leaves densely hairy at both sides, inconspicuously tomentose-pubescent beneath, nearly green 34. *R. lanuginosus* Stev.
- + Leaves sparsely pubescent above or glabrous, with grayish or whitish tomentose hairs beneath 32.
32. Fruiting sepals spreading 33.
- + Fruiting sepals erect, more or less contiguous with fruit 31. *R. abchaziensis* Sud.
33. Annotinous shoots densely hairy, sparsely glandulose or (nearly) eglandulose; leaves with thin appressed hairs above; ovaries glabrous; fruit oblong, subcylindrical, with numerous small drupelets 33. *R. dolichocarpus* Juz.
- + Annotinous shoots glabrous; leaves glabrous above; ovaries hairy; fruit different 32. *R. woronowii* Sudre.
34. Sepals with dispersed or solitary glands 35.
- + Sepals with dense long-stalked glands 30. *R. abnormis* Sudre.
35. Annotinous shoots usually sparsely hairy; flower-bearing branches hairy, with few long-stalked, dark purple glands above. Flowers rather large; petals white or sometimes pink; stamens longer than styles; ovaries sparsely hairy or glabrescent 28. *R. piceetorum* Juz.
- + Annotinous shoots rather densely hairy; flower-bearing shoots densely tomentose-hairy, covered with dense prickles and brownish stalked glands; flowers small; petals white; stamens much shorter than styles; ovaries densely pubescent 29. *R. leptostemon* Juz.
36. Annotinous shoots obtusely ribbed, with flat faces; the largest prickles markedly dilated at base and arranged along the ribs 35. *R. ochthodes* Juz.
- + Annotinous shoots cylindrical or subcylindrical, without those large prickles arranged along the ribs and dilated at base 37.

37. Leaves glabrous above or sparsely hairy, green, all leaves or only the upper densely white- or gray-tomentose beneath 38.
 + Leaves hairy on both sides, green 41.
38. Leaves glabrous or glabrescent above, usually more or less densely white- or gray-tomentose beneath 39.
 + Leaves sparsely hairy above, lower leaves of flower-bearing shoots usually green beneath 39. **R. ponticus** Juz.
39. Annotinous (and flower-bearing) shoots without glaucous bloom, hairy, covered with reddish stalked glands and long, thin but often rather inflated prickles, slightly curved at base; leaves glabrous or glabrescent above. Inflorescence elongated, many-flowered, often somewhat curved; flowers rather large; petals large, spreading; ovaries pubescent 36. **R. caucasicus** Focke.
 + Annotinous (and flower-bearing) shoots with whitish or glaucous bloom, sparingly pubescent or glabrescent, covered with dark purple glands and thin usually straight prickles; leaves thin, completely glabrous above. Inflorescence often nutant, few-flowered; flowers small; petals small, erect; ovaries glabrescent, rarely pubescent 40.
40. Annotinous (and flower-bearing) shoots covered with few stellate and simple hairs and long, thin, erect or slightly bent prickles and dense long-stalked glands; leaves ternate, leaflets large, often shiny above, whitish- or gray-tomentose beneath with slender stellate hairs, finely serrate at margin; terminal leaflet ovate to suborbicular, cordate at apex, covered with white tomentum and thick long-stalked glands, divaricate or appressed in fruit; petals narrowly ovate; stamens equal to or shorter than styles; styles usually purple; ovaries glabrous or with few stellate hairs 37. **R. moschus** Juz.
 + Annotinous shoots glabrous, covered with small spreading prickles flattened at base, long subulate erect bristles and sparse short glands; leaves mostly sparingly grayish- fine-tomentose beneath; flower-bearing shoots tomentose with appressed thin hairs, with short prickles and short, not very dense glands. Inflorescence erect or curved from node to node (usually not drooping); sepals whitish-tomentose, with several short or somewhat short glands; ovaries pubescent 38. **R. platyphyllus** C. Koch.
41. Glands and prickles dark purple; leaves usually ternate, dark green 40. **R. hirtus** W. et K.
 + Glands and prickles yellowish; leaves often quinate, yellowish green 41. **R. serpens** Weihe.

Subgenus 1. **CHAMAEMORUS** Föcke in Abh. Nat. Ver. Bremen IV (1874)

145. — Perennial, dioecious plant, with annual herbaceous 1-flowered spineless stems; leaves simple, reniform, lobed; stipules petioled, slightly adnate to base of petiole, broad, leaflike, upper leaves exstipulate. Flowers unisexual; hypanthium flat, drupelets numerous, forming one aggregate drupe; stone smooth.

1. *R. chamaemorus* L., Sp. pl. I (1753) 494; Ldb., Fl. Ross. II, 71. — *Chamaemorus norvegica* Greene, Leaflets 1 (1906) 245. — Ic.: Schlecht., Lang. et Schenk, Fl. Deutschl. ed. 5, XXV (1886) 2573; Syreishch., Ill. Fl. Mosk. gub. II (1907) 244.

Perennial, dioecious plant with a long creeping branched root; stems annual, simple, erect, 5–30 cm high, covered at base with few squamous leaves, short-hairy and sparsely short-glandular; cauline leaves with short broad stipules and with petioles 1–6 cm long, plicate, reniform, shallowly 5-(7)-lobed, with obtuse crenate-dentate lobes. Flowers solitary, terminal, pediceled, unisexual, the staminate larger than the pistillate (up to 3 cm in diameter); sepals more or less obtuse, hairy, short-glandular; petals large, obovate, white; stamens long, filiform, without anthers in pistillate flowers; style long, filiform; drupelets large, at first red, later orange, finally becoming brown; stone large, smooth. May–July. (Plate I, Figure 1).

Moss (peat) bogs, moss tundras. — Arctic: Nov. Z., Arc. Eur. and Sib., Chuk., An.; European part: northern regions, southward to the U. Dnp., M. Volga, V.-Kama, and Transv. (?); W. Siberia: Ob; E. Siberia: Yenish., Lena-Kol., Ang.-Say., Dau.; Far East: Kamch., Okh., Ze.-Bu., Uda, Uss., Sakh. **Gen. distr.:** N. and Centr. Eur., N. Am. Described from Sweden. Type in London.

Economic importance. The fruit is edible and contains 3 to 6% sugar, malic and citric acids and yellow dyestuff; it is picked for commercial purposes. As food it is served stewed; it is also used in preserves and juices:

× *R. tranzschelii* Juz. nom. nov. (*R. chamaemorus* L. × *R. saxatilis* L.; cfr. Tranzschel in Meddel. Soc. F. et Fl. Fenn. 49 (1925) 111). — Ic.: Tranzschel, l. c., tab. phot. — Distinguished from *R. chamaemorus* by the shape of leaves, sepals and petals, the narrower stipules, the perfect flowers, and the pubescent fruitlets; from *R. saxatilis* by absence of creeping shoots, shape of leaves, larger solitary flowers, numerous fruitlets, entire plant glandulous, and the absence of prickles. — European part: Lad.-Ilm. Described from the vicinity of Krasnolesny. Type in Leningrad.

Subgenus 2. **CYLACTIS** (Rafin. in Am. Journ. Sc. I (1819) 377 pro gen.) Focke in Abhandl. Natur. Ver. Bremen IV (1874) 142. — Perennial herbaceous plants, rarely semishrubs with creeping rhizomes or roots; stems annual, spineless or with spines; stipules stalked, free or slightly adnate to base of leaf petiole, wide or narrow; hypanthium infundibular; filaments flattened; torus flat; drupelets separated or united into an aggregate drupe; stone smooth or slightly rugose.

Series 1. **Arcticae** Focke, Spec. Rubor. I (1910) 23. — Rhizome creeping, proliferating buds; stems spineless; creeping shoots absent.

2. *R. arcticus* L., Sp. pl. 1 (1753) 708; Ldb., Fl. Ross. II, 70. — Ic.: Gartenfl. × (1861) 314; Syreishch., Ill. Fl. Mosk. gub. II (1907) 244. — Arctic bramble.

Perennial; rhizome ligneous, long-creeping, filiform, branching; stems slender, simple, obtusely 3-edged, squamose at base, without prickles, 2-6-leaved; stipules large, obovate, obtuse, rounded at apex; leaves ternate, petioles rather long, pubescent; leaflets thin, green on both sides, glabrescent above, sparsely appressed-hairy beneath, often grossly bidentate, teeth crenate, more or less obtuse; terminal leaflet obovate-rhombic, usually acute at apex, sometimes incised-trilobate, short-petioluled, lateral leaflets obliquely broad-obovate, (often 2-lobed), subsessile. Flowers solitary and terminal, sometimes 1-2 flowers lateral, rather large, often in 6-10 joints [?], perfect or incompletely unisexual and then dioecious; sepals lanceolate, finely hairy, spreading or recurved at anthesis, recurved in fruit; petals obovate, sometimes emarginate at apex, dark pink; stamens many, covering the shorter styles; filaments dilated; pistils ca. 20, less in staminate flowers; fruit dark purple, fruitlets connate; stone smooth. June-July. (Plate I, Figure 2).

Forests (mixed, broad-leaved and coniferous, boggy), open forests, tundra, bogs (*Sphagnum palustre* L.), sedge hummocks, wet meadows and shrubby formations.— Arctic: Arc. Eur. and Sib., Chuk., An.; European part: Kar.-Lap.; Dv.-Pech., V.-Kama, Urals, Lad.-Ilm., U. V., U. Dnp. (?); W. and E. Siberia: entire regions; Far East: entire region. **Gen. distr.:** Scand., N. Am. Described from Sweden. Type in London.

Economic importance. The fruit is edible, delicious and aromatic. Eaten raw and stewed. At present under cultivation; attempts to cultivate it in France have been unsuccessful (D. Bois., *Les plantes alimentaires* II, p. 236, 1928).

× *R. neogardicus* Juz. nom. nov. (*R. arcticus* L. × *R. chamaemorus* L.; cfr. Tranzschel, l. c., p. 113).— Leaves deeply 3-lobed, rigid; fruitlets ca. 25, pubescent.— European part: Lad.-Ilm. Described from Tikhvin district near the village of Pirozero. Type in Leningrad.

× *R. castoreus* Laest. in Nov. Act. Upsal. XI (1839) 246, 296. (*R. arcticus* L. × *R. saxatilis* L.).— Exs.: Fries, *Herb. Norm.* III, No. 43; *Pl. Finnl. exs.* Nos. 263, 722.— Resembles *R. saxatilis* but distinguished by absence of creeping shoots, few prickles or none; flowers larger; erect to spreading. Fruits often well-developed.— European part: Kar.-Lap., Dv.-Pech., U. V. (?) U. Dnp. Described from Sweden. This hybrid is quite often encountered; possibly described (earlier than Laestadius) by Gilibert under the name *R. lithuanicus* Gilib., *Hist. Pl. Eur.* (1798) 321.

3. *R. stellatus* Sm., *Pl. Icon. ined.* III (1791) 64; Ldb., *Fl. Ross.* II, 71.— *R. stenopetalus* Fisch. in *Choris Voyage pittor.* (1822) 10.— Ic.: J. E. Smith, l. c.

Perennial; stems simple, rather densely pubescent, 1-flowered; leaves petiolate, wide, cordate or subreniform, 3-lobed or tripartite, with short, wide, obtuse, entire at base lobes, large and irregularly crenate-serrate, hairy at both sides; stipules acute or subacute. Flowers terminal, short-pedicel, larger than in *R. arcticus*, often in 7-8 joints [?]; sepals large, narrow, linear-lanceolate; petals large, oblong, purple. In all other respects resembles *R. arcticus* L. July.

14 Hills, slopes in tundra. — Arctic: Chuk. (Cape Dezhnev, Commander Islands); Far East: Kamch. (Klyuchevskoe village). Gen. distr.: Ber. (Unalaska, Sikhote, Kad'yak); N. Am. (northwestern Alaska). Described from N. Am. Type in London.

Note. Intermediate forms between *R. arcticus* L. and *R. stellatus* Sm. occur in nature; they are probably hybrids.

Series 2. *Saxatiles* Focke, Spec. Rubor. I (1910) 23. — Roots do not develop bulblets; stems spineless or with spinescent bristles of two kinds: the sterile whiplike, the flower-bearing straight; leaves ternate or quinate.

4. *R. saxatilis* L., Sp. pl. 1 (1753) 434; Ldb., Fl. Ross. II, 69. — *R. ruber* Gilib., Fl. lithuan. V (1781) 243. — Ic.: Sturm, Deutschl. Fl. ed. 2, VIII (1904) 15; Syreishch., Ill. Fl. Mosk. gub. II (19) 7) 245. — Exs.: Baenitz, Herb. europ. No. 9071.

Perennial; rhizome not creeping, bearing annual nonflowering shoots and floriferous stems, the former elongated, prostrate, thin, cylindrical, usually pubescent, sparsely thin-spiculed (like leaf petioles), sometimes rather glandular, branching in the fall and often rooting at summit; flower-bearing stems erect, 10–25 cm high, covered at base with squamose leaves, very leafy from the middle; stipules free, those of nonflowering shoots ovate or broadly elliptical, the upper linear-lanceolate, those flower-bearing shoots wider; leaves long-petioled, ternate, lateral leaflets very short-petioluled, often 2-lobed, the terminal petioluled, rhombic, all double incised-dentate, green on both sides, pubescent. Flowers perfect, small, 3–10 in umbellate or racemose apical inflorescences, sometimes additional 1–2 flowers in axils of branches, pedicellate; sepals lanceolate, recurved; petals erect, small, narrow, spatulate, white; stamens linear, distinctly exceeding the long style; fruitlets few, 1–6, large, hardly connate, bright red; stone large, slightly rugose. May–July. (Plate I, Figure 3).

Forests (usually shady), shrubby formations, bluffs, stony mountain slopes, bogs. — Arctic: Arc. Eur.; European part: absent in southern regions (Bl., Crim., L. V.); Caucasus: Cisc., E. and S. Transc.; W. Siberia: Ob, Alt.: E. Siberia: entire region; Far East: Okh. (Ayan), Ze.-Bu., Uda, Uss. (Khingon River valley). Gen. distr.: Centr. Eur., Scand., Med. (mountains), Jap.-Ch., Ind.-Him., N. Am. (Greenland). Described from Europe. Type in London.

Economic importance. The fruit is edible but of no commercial importance.

× *R. areschougii* A. Blytt. in Bot. Notis. (1875) 42. — (*R. caesius* × *R. saxatilis* L.). This rare hybrid was found in Finland (Aland Islands); it might be found in the USSR.

15 Series 3. *Humulifolii* Focke, Spec. Rubor. I (1910) 24. — Stems with acicular spines; leaves lobed.

5. *R. humulifolius* C. A. M. in Beitr. Pfl. Russ. Reich. (1848) 57. — Ic.: C. A. Meyer, l. c., tab. 7; Sudre, Rubi Eur. (1908–1913) tab. 214. — Exs.: Pl. Finl. exs. No. 262.

Perennial, 10–30 cm high; rhizome creeping; flower-bearing shoots woody at base, the rest herbaceous, simple, erect or ascending, sparsely prickly-bristly, with spreading, straight, thin, unequal bristles, glabrous or pubescent; leaves cordate, wider than long, ca. 8 cm long, 10 cm wide, trifid, often with 2-lobed lateral lobes, large, unequal, often incised-biserrate, bristly-pilose above, bristly and pubescent below, along nerves; the terminal lobe ovate, acute; petioles long, canaliculate, bristly, glabrous or hairy; stipules linear, often inconspicuous. Flowers terminal, solitary or 2–3, pedicellate, nutant; sepals erect to spreading, lanceolate, long-attenuate, pubescent outside; petals longer than sepals, lanceolate, subacute, white; stamens short, filaments of outer stamens dilated; fruitlets 5, glabrous; mature fruitlets often solitary, large, sour; stone netted-wrinkled. July, Fr. August. (Plate I, Figure 4).

Coniferous forests, moist shrubby formations, mossy bogs. — European part: Kar.-Lap., V.-Kama; W. Siberia: Ob, Alt.; E. Siberia: Yenisei, Lena-Kol., Ang.-Say., Dau.; Far East: Ze.-Bu., Uda, Uss. **Gen. distr.:** Jap.-Ch. Described from the Kirov Region. Type in Leningrad.

Subgenus 3. **IDAEOBATUS** Focke in Abhandl. Nat. Ver. Bremen IV (1874) 143. — Stems biennials, furnished with spines, often also with bristles or glands; leaves simple or often ternate or pinnate-compound, rarely palmate and quinate; stipules stalked, linear, persistent. Flowers perfect; hypanthium flat. Fruit red; fruitlets numerous, fusing into an aggregate drupe, easily separating from the conical hollow torus; stone rugose.

Section 1. **CORCHORIFOLII** Focke, Spec. Ruborum II (1911) 129. — Stems erect, rarely prostrate; leaves simple, not coriaceous, often lobate; stipules entire, adnate to petiole or absent on flower-bearing shoots. Flowers medium or large in size; fruitlets 10–60; fruit ovoid or globose; carpophore dry.

6. **R. crataegifolius** Bge., Mém. prés. Acad. St. Pétersb. II. (1835) 98. — **R. Wrightii** A. Gray, Bot. Jap. (1856) 387. — Ic.: Gartenfl. XVII (1868) tab. 591 et XXVII (1878) tab. 924; Nakai, Fl. Sylv. Koreana (1918) 7, tab. 21.

16 Shrub, 1–2 m high; anaromatic shoots vigorous, erect, drooping at apex, branching above, angled, furnished with prickles, pubescent, dark purple; leaves deeply cordate, wide, 5-lobed, palmately nerved, unequally large-serrate, green on both sides, hairy, the lobes usually acute, the terminal usually tapering at base, ovate or ovate-lanceolate, sometimes incised-lobular; petioles pubescent, densely covered with curved prickles; stipules linear-lanceolate; floriferous branches prickly, pubescent, with leaves often 3-lobed. Flowers ca. 2 cm in diameter, terminal or in capitately-crowded slightly drooping inflorescence, short-pedicelled; sepals glabrescent outside, grayish-tomentose at margin, tomentose inside, ovate, subacute, spreading in fruit; stamens at first erect, recurved after anthesis, filaments flattened; ovaries numerous, glabrous; fruit globose, dark red, slightly sweet-sour, shiny; stone small, subglobose. June. (Plate I, Figure 5).

Broad-leaved (oak) forests, shrubby formations. — Far East: Uss. **Gen. distr.:** Jap.-Ch. Described from China, Panshan Mountains. Type in Leningrad.

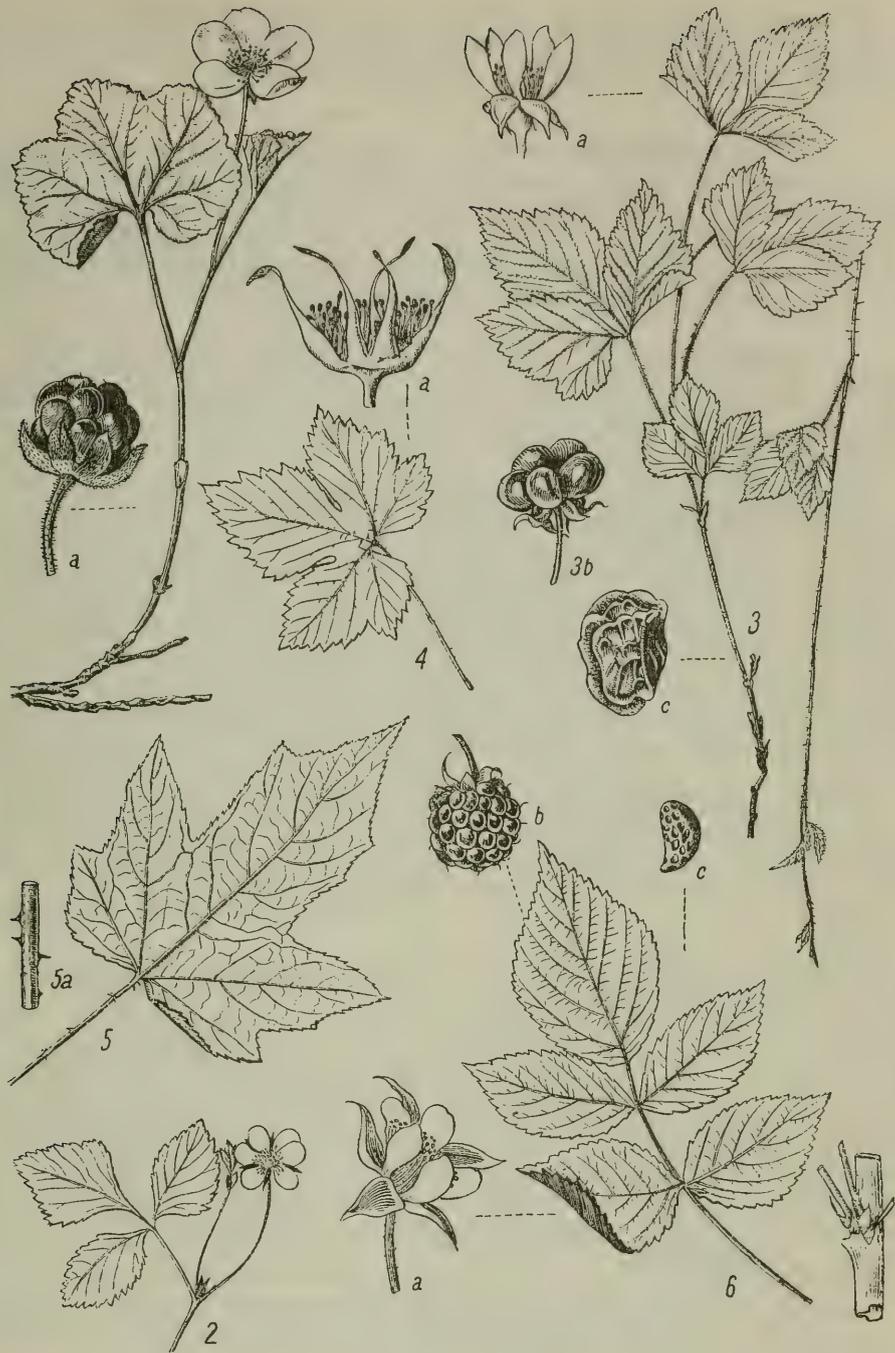


PLATE I. 1 - *Rubus chamaemorus* L., general view; a) fruit; 2 - *R. arcticus* L., upper part of plant with leaves and flowers; 3 - *R. saxatilis* L., general view (sterile); a) flowers b) fruit, c) stone; 4 - *R. humulifolius* C.A.M., leaf, a) flowers; 5 - *R. crataegifolius* Bge., leaf; a) part of shoot with prickles; 6 - *R. idaeus* L., leaf, a) flower, b) fruit, c) stone.

Economic importance. Fruit edible; plant rarely cultivated.

Note. This species is distinguished by marked polymorphism outside the USSR; its abundant synonymy is recorded by Nakai, l. c.

Section 2. **IDAEANTHI** Focke Spec. Ruborum II (1911) 171. — Stems erect or spreading, with spines or spinelets, often bristly and glandular; usually biennial, developing flower-bearing shoots in the second year; leaves ternate or imparipinnate with 2–3 (rarely 4) pairs of lateral leaflets; leaflets usually small, hairy beneath or usually appressed white-tomentose. Flowers small or medium-sized (0.5–2 cm in diameter).

7. *R. idaeus* L., Sp. pl. (1753) 706; Ldb., Fl. Ross. II, 65. — *R. idaeus* subsp. *vulgatus* Arrhen., Rub. succ. Monogr. (1839) 12. — *R. sericeus* Gilib., Fl. lithuan. V (1781) 241. — Ic.: Sturm., Fl. Deutschl. VIII, 2 (1904) 14; Syreishch., Ill. Fl. Mosk. gubern. II (1907) 146. — Exs.: Baenitz., Herb. europ. No. 9534, 9958, 9959.

19 Shrub, 50–120 cm high; annotinous shoots erect, drooping at apex, cylindrical, glaucescent, short-hairy; prickles sparse or usually dense, conical at base, reddish brown; leaflets 3–5, rarely 7; stipules filiform; petioles canaliculate; leaflets glabrescent above or sparsely simple- or stellate-hairy, white-tomentose beneath, rather finely and irregularly serrate; terminal leaflet oblong-ovate, rounded or cordate at base, acuminate, long-petioluled, lateral leaflets subsessile. Flower-bearing branches short, with leaves ternate; flowers in few-flowered axillary racemes and in a terminal corymbiform-paniculate inflorescence; sepals greenish-grayish, recurved in fruit; petals oblong or spatulate, whitish, erect; stamens hardly as long as style; ovaries tomentose-pilose; fruit globose, red, often yellow; drupelets pilose; stones short, rounded. June–July. (Plate I, Figure 6).

Forests and forest stands in the steppe, forest edges, felled areas, forest meadows, inundated forests, riverbanks, ravines, gullies, shrubs. — European part: entire area; Caucasus: entire area; W. Siberia: Ob, Irt., Alt.; E. Siberia: Yenisei, Ang.-Say.; Centr. Asia: Dzu-Tarb., T. Sh. Described from Europe. Type in London.

Economic importance. The fruit is aromatic, delicious, contains 4.5–9.5% sugars (glucose, fructose, saccharose) and is picked for commercial purposes; it is eaten raw and is also used for jams, confectionary, juices, syrups, etc.; the dried fruit is used for medical purposes. The young plant is used as a substitute for tea. The plant is widely cultivated; in the Soviet Union there are over 15,000 ha under cultivation at the present time. The cultivated strains of raspberries differ from the wild-growing berries by their large fruit. It must be said, however, that not all the cultivated strains in the USSR belong to the typical *R. idaeus* L.: many of them are hybrids with the American *R. strigosus* Michx. or other forms.

× *R. digeneus* Lindb. fil. in Meddel. Soc. F. et Fl. Fenn. 35 (1909) 141–144 (*R. idaeus* L. × *R. saxatilis* L.). — Exs.: Pl. Finl. exs. 718. — Known from Finland but may be encountered in the USSR.

8. *R. sachalinensis* Léveillé in Fedde, Repert. Sp. nov. VI (1909) 352. — *R. idaeus* ssp. *sachalinensis* Focke, Spec. Ruborum II (1911) 210. — *R. asperrimus* Stephan in sched., non Ripart. — *R. idaeus* var. *microphyllus* Turcz., Fl. baic.-dah. (1842) 370. — *R. idaeus* var. *aculeatissimus* C. A. M. in sched. saltem p. p.; Rgl. et Tiling, Fl. Ajan. (1858) 187. — *R. aculeatissimus* Gorodkov in sched., non Kalt. — *R. idaeus* var. *sibiricus* Kom. in sched. — *R. idaeus* β . *strigosus* Maxim. in M \acute{e} l. biol. VIII (1872) 394 p. p., non Mic x. — *R. melanolasius* Kom., Fl. Mansh. II, 484, p. p. et auct. Fl. Ross., non Focke. — *R. idaeus* auct. Fl. Sib. Or et Or. Extr. saltem p. p., non L. — *R. idaeus* var. *nipponicus* Palib., Consp. Fl. Cor. I (1898) 78 p. p.?, non Focke. — Ic.: Nakai, Fl. Sylv. Kor. (1918) 7, tab. 33 (*R. i. microphyllus* Turcz.).

20 Shrub, 30 cm to 1 m high; rhizome oblique, nodose, multicipital; shoots with glaucous bloom, more or less pubescent, densely covered with yellowish, brown or reddish spinelets interspersed with pedunculate glands; leaves compound, usually of 3 leaflets; leaflets ovate-cordate or oblong-lanceolate, acuminate or subobtuse, lateral leaflets asymmetrical, sessile or short-petioluled, terminal leaflet petioluled, glandular or just reddish; glabrous or pubescent above, densely white-tomentose or gray-tomentose beneath, spicules along nerves, finely and regularly or sparsely, deeply and irregularly dentate at margin, terminal leaflet large, irregularly biserrate; petioles pubescent and spiculed. Flowers in few-flowered terminal or axillary inflorescences; pedicels hairy, densely covered with spicules and glands; hypanthium pilose, with stalked glands to glabrescent; sepals spiculed and glandular, tomentose, whitish, oblong-triangular or sublinear, long-acuminate; petals liguliform-spatulate, obtuse, shorter than sepals; stamens shorter than style, purple; fruitlets white-tomentose; fruits edible, sweet; stones rugose. June–August.

Forests, clearings, shrubby formations. — European part: V.-Kama (Urals); W. Siberia: Irt., Alt.; E. Siberia: entire area; Centr. Asia: Dzu.-Tarb.; Far East: Kamch., Okh., Ze.-Bu., Uda, Uss., Sakh. **Gen. distr.:** Jap.-Ch. (North Korea). Described from Sakhalin. Type in Paris (isotype and paratypes in Leningrad).

9. *R. komarovi* Nakai, Chosenshokubutsu I, 304 (non vidi). — *R. melanolasius* var. *concolor* Kom., Fl. Mansh. II (1903) 486. — *R. idaeus* subsp. *melanolasius* f. *concolor* Kom. in sched. — *R. idaeus* var. *concolor* Nakai, Fl. sylv. Koreana VII (1918) 77. — Ic.: Nakai, Chosenshokubutsu I, f. 342; id. Fl. sylv. Kor. VII, f. 34.

Shrub, distinguished from *R. sachalinensis* Lévl. by the annotinous shoots often without glaucous bloom or with weak bloom, often with green spicules and glands, in particular by the leaves being green on both sides, glabrous above or slightly pubescent, usually hairy beneath only along nerves; petioles pubescent or glabrous. Fruit aromatic (according to Nakai). The rest similar to *R. sachalinensis*. June–July.

Stony taluses along volcanic slopes, stony places in forests, Siberian stone pine forests, forest edges. — E. Siberia: Dau.; Far East: Ze.-Bu., Uss., Sakh. **Gen. distr.:** Jap.-Ch. (North Korea). Type in Tokyo.

Subgenus 4. **EUBATUS** Focke in Abhandl. Nat. Ver. Bremen IV (1874) 148. — Stems usually biennials; leaves compound, palmate, ternate or quinate, very rarely septenate, middle leaflet long-petioluled; stipules stalked; flowers perfect; hypanthium flat; fruits black or sometimes black-red or with a glaucous bloom; drupelets numerous, adnate to torus in an aggregate 21 drupe separating from the lower part of the receptacle.

Economic importance. Many American and Western European species of this subgenus and their hybrids are widely cultivated in North America and to a lesser degree in Western Europe. In the USSR only sporadic plantings are encountered. The fruit of most of the wild-growing forms in the USSR (with the exception perhaps of only *R. tomentosus* Borkh.) is used mainly for the preparation of preserves, even commercially. — The leaves of the dewberry contain tannic properties and in earlier times were used medicinally.

Note. The subgenus *Eubatus* Focke of the genus *Rubus* L. is justifiably regarded as one of the most systematically intricate taxa of European flora; an enormous amount of study has been dedicated to its West European representatives. The complexity of the group is apparently due to the vast hybridization; intercrossing, even among species that are extremely distant from each other, is facile, and in the offspring there are often sufficient fertile plants which yield a multitude of forms impressive as useful species though mostly narrowly restricted in distribution. These derivatives grow in what is known as "batologic areas" together with other forms that are taxonomically much unlike each other, ranging from the broadly distributed, well-defined ancient types to the original hybrids represented only by solitary specimens. There are several schools of thought on the diversity of forms of this group. One school (founded by P.-J. Müller) tends to describe each form of dewberry observed in nature as a special species without any attempt to clarify its real status; a whole group of West European amateur batologists follow this course. On the other hand, there are those like O. Kuntze who strive to separate from this chaos of forms of dewberry a small number of primary "pure" types which can be accepted as species and to treat all the other forms as their hybrids; however, the determination of these hybrids is of a completely arbitrary nature based on rough morphological analysis. The third school, whose strongest supporter is the French batologist Sudre, established a system of individual sections of the subgenus, which is actually based on a limited number of characters that are acknowledged as the most intrinsic; as a result a certain number of very distinct combinations of these characters is obtained, each of which is recognized as a special species; 22 such species are, of course, devoid of any geographical characteristics. The facility of determination of dewberry on the basis of Sudre's fundamental monograph, "Rubi Europae" (1908—1913), caused many to follow this school, which we cannot help marking as pseudoscientific. The fourth school, which follows the well-known monograph of the genus by W. O. Focke, attempts to separate within the range of the subgenus primarily those well-defined species with a broad distribution range, grouping around them as species of secondary value the different forms of a derivative and intermediate character [close to the subgenus]; the many individual deviations, hybrid forms of vague derivation, are not described. In herbaria they are

tagged as "open nomenclature." Finally, there are efforts, unfortunately sporadic, to decipher the different forms with the aid of the Bengt Lidforss experiment. The Focke school appears to be the most accurate; in any event, it is more reasonable to adhere to this school in the present work. However, in view of the scantiness of information on the flora of dewberry of the Caucasus* — the Caucasus and the Crimea are actually the only batologic areas in the USSR — we have to include in this work all the data on dewberry of the USSR, including many problematical forms whose systematic significance is not quite clear. With reference to our treatment, it must be borne in mind that in the Caucasus (and in the Crimea) it is easy to find many forms not included in this book that are just as important taxonomically as those described in it.

23 The acquisition of information on dewberry of the Caucasus and the Crimea is greatly hampered by the lack in Soviet herbaria of material suitable for determination and study. In order to study dew-berry, for herbaria, it is necessary to collect the following: 1) no less than two or three segments of the annotinous shoot (or turion) with cauline leaves; these segments must be cut (garden scissors are best) from the middle part of the shoot at a right angle to its axis; 2) no less than two flower-bearing branches, and 3) later, from the same bush, the fruiting branch (with immature fruit). Besides this, it will be useful to separate and dry individually some of the petals and also to observe the color of different parts of the flower-petals, filaments and styles — in their live state.

Section 1. **SUBERECTI** P.-J. Müll. in Flora (1858) 129.— Annotinous shoots nearly erect, arcuately curved at apex, angled-ribbed, glabrous; prickles equal, flattened, arranged along ribs; leaves green on both sides; petioles canaliculate above. Inflorescences few-flowered, subracemose; sepals green outside, tomentose at margin; glandular pubescence absent.

10. **R. nessesensis** W. Hall., Transact. Edinb. III (1794) 20.— **R. sub-erectus** Anders., Transact. Linn. Soc. XI (1815) 218.— **R. subinermis** Rupr. in Beitr. Pflanz. Russ. Reich. IV (1845) 66.— **R. fruticosus** Ldb., Fl. Ross. II, 68, p. p. et auct. mult. ross.— Ic.: Syme, Engl. Bot. III (1864) tab. 444; Sudre, Rub. Eur. (1908—1913) tab. 1.— Exs.: Baenitz Herb. Eur. No. 8577, 9082.

Shrub; annotinous shoots erect, drooping at summit, more or less faceted in middle part, with flat or slightly canaliculate faces, green, glabrous; prickles sparse, approximately equal, arranged along ribs, shortish, almost straight, black-purple; leaves of annotinous shoots ternate or more often quinate, in some the terminal leaflet sometimes tripartite, in this case leaves septenate; stipules small, linear; petioles obscurely canaliculate above; leaflets large, thin, flat, green on both sides, glabrous above or sparsely hairy, shiny, somewhat paler beneath, short-hairy only along nerves, irregularly acutely dentate; terminal leaflet long-petioluled,

* For literature on the flora of the Caucasian dewberry, see "Material for the Study of the Caucasian Dewberry," by S.V. Yuzepchuk, which appeared in Tr. po Prikl. Bot., Gen. i Sel., Vol. XXIV, No. 3 (1924—1925). Nothing new on this subject has appeared since then (if we discount the treatment of Rubus in the "Flora of the Caucasus," by A.A. Grossheim, Vol. IV (1934)).

cordate-ovate, long-acuminate, the lowermost leaflets sessile. Flower-bearing branches short, horizontally spreading, few-flowered (5–12), with sparse prickles; leaves ternate; flowers large; sepals green, white-tomentose at margin, spreading in fruit; petals elliptic or obovate, white, divaricate; stamens longer than styles; ovaries glabrous or slightly hairy; fruit relatively small, reddish black when ripe, shiny, many fruitlets often abortive; drupelets small, triangular. June–July. (Plate II, Figure 1).

Forests and forest margins, riverbanks, bog edges. — European part: Lad.-Ilm., U. Dnp., M. Dnp., U. V., V.-Don. **Gen. distr.:** Atl. Eur. (England, Belgium), Scand., Centr. Eur. (Denmark, northern Germany). Described from England. Type in London.

Section 2. **DISCOLORES** P.-J. Müll. in Flora (1858) 133. — Annotinous shoots arcuately spreading, rooting at apex in the fall, glabrous or pubescent, angled-ribbed, with equal, flattened prickles along ribs; leaves white-tomentose beneath. Inflorescences compound, usually attenuate at apex; sepals tomentose outside, recurved in fruit. Glandular pubescence absent.

24 **Economic importance.** The species of this group are often used in the Caucasus as hedges.

Series 1. **Gypsocaulones** P.-J. Müll. in Bonplandia (1861) 309 (nomen); Sudre, Rub. Eur. (1903) 5. — Annotinous shoots arcuately curved, usually covered with a glaucous bloom, in the USSR usually tomentose-pilose; leaves quinate, often some ternate, leaflets relatively small, coriaceous, often irregularly and acutely incised-dentate, short and generally abruptly acuminate. Inflorescences elongated, somewhat attenuate at apex, branchlets rigid, usually many-flowered.

11. **R. sanguineus** Friv. in Flora XVIII (1835) 334; Juz. in Grossh., Fl. Kavk. IV (1934) 294. — *R. sanctus* auct. plur., non Schreb.; Ldb., Fl. Ross. II, 68. — *R. sacer* Georgi, Besch. russ. Reich. III, 4 (1802) 1032 nom. — *R. anatolicus* Focke in Abh. Nat. Ver. Brem. IX (1880) 335. — *R. turcomanicus* Freyn in Bull. Herb. Boiss. VI (1906) 209. — *R. ulmifolius* subsp. *sanctus* Sudre, Rub. Eur. (1913) 76. — *R. discolor* Boiss., Fl. Or. II, 695, salt. p. p. — Ic.: Sudre, Rub. Eur. tab. LXXVIII. — Exs.: Baenitz Herb. eur. No. 9991; Sinten. It. transcasp. pers. 1900–1901, No. 516, 1846b; Edit. H. Bot. Petri magni 70 (nom. *R. karakalensis*).

Shrub; annotinous shoots robust, canaliculate, with glaucous bloom, densely covered with simple and stellate hairs, prickles glabrous only at the apex (the rest of the plant with same pubescence as shoot), and strictly on ribs, equal, large, straight, strongly flattened, broadened at base; stipules linear, densely hairy; leaves quinate or sometimes ternate with deeply bilobed lateral leaflets; terminal leaflet broadly obovate to suborbicular, rounded to cordate at base, leaflets completely obtuse at apex or short-acute, largely and shortly irregularly double-serrate, more or less densely pubescent above, deep white or gray-tomentose beneath, hairy along nerves, lateral leaflets short-petioluled; petioles densely tomentose, armed with

strong and curved prickles. Flowering branch pubescent and prickly like annotinous shoots but prickles slightly curved; leaves ternate; inflorescence short or rather long, dense or loose; flowers small or rather large; sepals more or less obtuse, shortly mucronate, white-tomentose; petals purple or pink; filaments purple; anthers more or less hairy, slightly longer than the red filaments; fruits globose, drupelets rather large, often partly abortive. June–September. (Plate II, Figure 2).

Roadsides, riverbanks and sea shores, open dry slopes, forest clearings, shrubby formations. — European part: Crim.; Caucasus: W. and E. Transc., Tal.; Centr. Asia: Mtn. Turkm. (Kopet Dagh). **Gen. distr.:** Bal.-As. Min., Iran. Described from Macedonia and Rumelia. Cotype in Leningrad.

25 **Note.** A quite polymorphic species which requires special study. It is distinguished from the West European *R. ulmifolius* Schott, an allied species, more than once reported from the Caucasus, with apically glabrous leaves and glabrous anthers; it is not likely to be encountered in the USSR, and in any event, it should be confirmed.

× *R. karakalensis* Freyn in Bull. Herb. Boiss. VI (1906) No. 3, 209. — Exs.: Sinten., It. transc.-pers. 1900–1901, No. 2029. Much resembling *R. caesi* but distinguished from it by the pubescence and shape of the leaflets, often also by the hairy anthers. E. and S. Transc., Kopet Dagh (Ioldere Gorge). Cotype in Leningrad.

Series 2. **Hedycarpi** Focke (pro spec. collect.), Syn. Rub. Germ. (1877) 190; Sudre, Rubi Eur. (1913) 69. — Annotinous shoots arcuately curved, sparsely hairy or (nearly) glabrous; leaves quinately slightly coriaceous, irregularly dentate, generally short-acuminate, the outer shortly but distinctly petioluled. Inflorescence compound, markedly attenuate at apex, its branches strong, many-flowered.

12. **R. cyri** Juz. in Bull. Appl. Bot. et Pl. Breed. XIV, 3 (1925) 151; idem in Grossh., Fl. Kavk. IV (1934) 294.

Shrub; annotinous shoots robust, angled, usually with flat faces, very slightly pubescent; prickles sparse, strong, equal, arranged along ribs, stem broad at base, flattened, usually straight or slightly declinate; leaves often large, quinately; stipules linear, densely hairy, with sessile glands; petioles flat above, with groups of rather dense hairs and sparse curved prickles; leaflets subcoriaceous, slightly crisp at margin, glabrous above, white-tomentose-hairy beneath, densely hairy long nerves, roughly incised serrate-dentate, with erect or spreading acute teeth; terminal leaflet suborbicular, usually (slightly) emarginate at base, pointed or rectangular at apex but not acute, $2\frac{1}{2}$ –5 times longer than petiolule. Flowering shoot long and vigorous, angled, rather densely hairy, armed with strong, curved prickles markedly dilated at base; leaves (sometimes except the lowermost) ternate, sometimes sparsely hairy above; inflorescence large, many-flowered, usually interrupted and leafy at base, main axis densely hairy, branches usually nearly horizontally spreading; flowers large, 2.5–4 cm in diameter; sepals white-tomentose-hairy, recurved, ovate; petals pink, broadly elliptic to suborbicular; filaments white or pink, longer than the green, sometimes reddish styles; ovaries glabrescent; fruits broadly ovoid. July. (Plate II, Figure 3).

Riverbanks, mountain slopes, forest edges, roadsides. — Caucasus: E. Transc. Endemic. Described from the environs of Borzhomi (between Vashlovani and Rveli). Type in Leningrad.

26 × *R. borzhomicus* Juz. in Bull. Appl. Bot. Pl. Breed., Vol. XIV, 3 (1925) 152 (*R. cyri* Juz. × *R. subparilis* Sudre?). — Distinguished from *R. cyri* by the markedly canaliculate faces of the densely pubescent turions, the shape of its inflorescence, by its pale pink petals, and its sterility. — Caucasus: E. Transc. Described from the environs of Borzhomi (Gudzharetki River Gorge). — Type in Leningrad.

13. *R. discernendus* Sudre in Mon. Jard. Bot. Tifl. 20 (1911) 8. — *R. cuspidifer* var. *discernendus* Sudre in Bull. Soc. Bot. Fr. (1911) 34.

Shrub, robust; annotinous shoots sparsely hairy, with weak canaliculate faces, armed with short curved prickles; leaves large, sparsely hairy above, short-hairy beneath, white-tomentose, with wide, equally and finely serrate leaflets; terminal leaflet suborbicular, cordate, shortly notched, twice as long as its petiolule, lower leaflets distinctly petioluled; prickles stalked, dense, short, hamate. Flower-bearing branches pubescent, with geniculate-curved or hamate prickles; inflorescence elongated, leafy up to the top, pubescent, sparsely armed with medium-sized prickles; sepals prickless; petals medium-sized, suborbicular, white or pinkish; stamens white, relatively short, as long as the pale styles; ovaries glabrous. June.

Forest clearings. — Caucasus: W. Transc. (Abkhazia). Endemic. Described from Tsebelda, near the village of Yurevskoe. Type in Tbilisi.

14. *R. ibericus* Juz. in Bull. Appl. Bot. and Pl. Breed., XIV, 3 (1925) 153; idem in Grossh., Fl. Kavk. IV (1934) 295.

29 Perennial; annotinous shoots thinner than in *R. cyri*, angled, with several concave or canaliculate faces, sparingly hairy; prickles sparse, strong, arranged along ribs, broadening at base, straight; leaves medium-sized, quinately; stipules linear, densely hairy, with subsessile glands; petioles flat above, pubescent, beset with curved prickles; leaflets subcoriaceous, glabrous above, whitish-tomentose beneath, densely hairy along nerves, acutely bidentate, with acute, erect teeth, terminal leaflet 4.8–8.3 cm long, 3–6 cm wide, obovate, with rounded or bluntly angled base, rounded at apex or subobtusely, shortly mucronate, twice as long as its petiolule; flower-bearing shoot long, angled, hairy, with sparse curved prickles; upper leaves ternate, with narrowly obovate leaflets. Inflorescence large, paniculate, many-flowered, often interrupted and leafy at base, its branches spreading; flowers medium-sized, 1.7–2.2 cm in diameter; sepals tomentose, without prickles, recurved in fruit; petals elliptic or obovate, pink; filaments white, much longer than the green styles; ovaries glabrescent; fruits broadly ovoid, fruitlets rather large. May–July.

Banks of rivers and streams, mountain slopes, roadsides. — Caucasus: E. Transc. Endemic. Described from the vicinity of Tbilisi (between Tbilisi and Kodzhora). Type in Leningrad.

Note. It might possibly be proved that this taxon is closely related to *R. armeniacus* Focke, which was described from cultivated specimens of unknown origin, but since the latter differs in many ways from the above description, it is now best to refrain from identifying it with the Tbilisi plant.

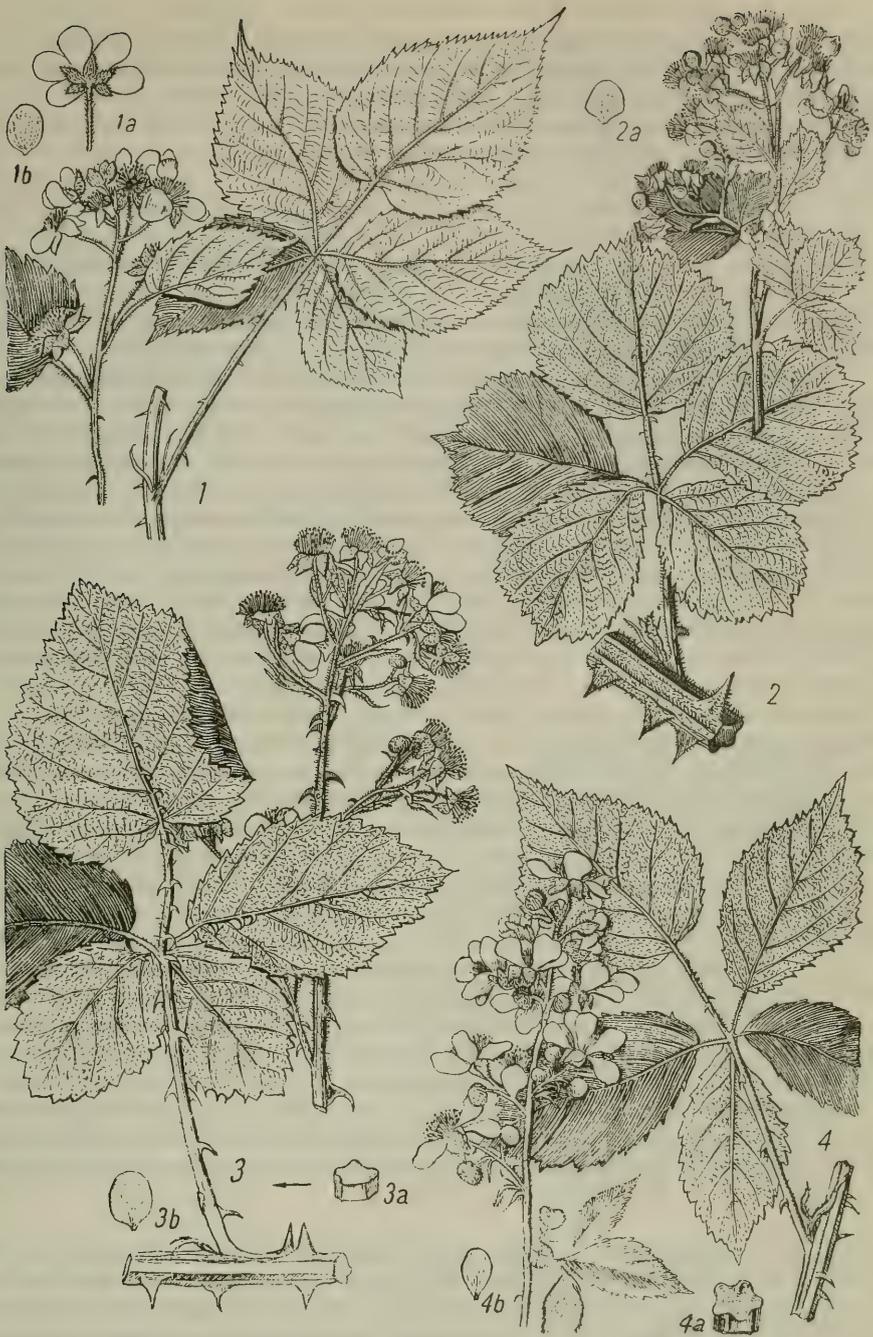


PLATE II. 1 — *Rubus nessensis* W. Hall, branch with flowers and part of turion with leaves, a) flower, b) petal; 2 — *R. sanguineus* Friv., the same, a) petal; 3 — *R. cyri* Juz., the same, a) cross section of turion, b) petal; 4 — *R. candicans* Weihe, the same, a) cross section of turion, b) petal.

Series 3. *Candicans* Focke, Syn. Rub. Germ. (1877) 77, 154 pro max. parte. — Annotinous shoots erect at first, glabrous or sparingly pubescent; leaves quinate, leaflets irregularly but distinctly incised-dentate, gradually acuminate; outer leaflets very short-petiololed or subsessile. Inflorescence elongated, usually narrow, hardly attenuate at apex, pyramidal or subcylindrical, branches 1—few-flowered.

15. *R. candicans* Weihe in Rchb., Fl. Germ. excurs. (1832) 60. — *R. thyrsoides* Wimm., Fl. Schles. (1832) 204 excl. var. β et γ . — *R. tauricus* Schlecht. ex Ldb., Fl. Ross. II (1844) 68. — *R. coarctatus* P.-J. Müll. in Flora XLI (1858) 133. — *R. thyranthus* Focke, Syn. Rub. Germ. (1877) 168. — ? *R. phyllostachys* P.-J. Müll., l. c. — Ic.: Sudre, Rub. Eur. tab. XCV. — Exs.: Baenitz, Herb. Eur. No. 9506, 9586.

Shrub; annotinous shoots arcuate, faceted, more or less canaliculate, glabrous or sparsely hairy, without bloom; prickles medium-sized or rather large, arranged along ribs, slightly dilated at base, straight, slightly spreading below; leaves quinate, glabrous above, gray- or whitish-tomentose beneath, hairy, largely and irregularly biserrate or often incised-serrate, leaflets very short-petiololed or subsessile; terminal leaflet obovate or elliptic or oblong-ovate, emarginate at base or bluntly angled-acute; petioles and stipules armed with curved, rather large prickles, sparingly hairy; stipules linear or linear-lanceolate. Flower-bearing shoots ribbed, often weak, glabrescent at lower part, with remote, patulate or slightly curved, slender or rather large prickles; leaves ternate to quinate, deeply serrate, with obovate leaflets; inflorescence elongated, loose, pubescent, with weakly
30 curved prickles, more or less leafy at base; inflorescence branches elongated, ascending sparingly prickled; flowers ca. 2 cm in diameter; sepals tomentose-hairy, patulate below, ovate-lanceolate, shortly mucronate; petals oblong-obovate, white; stamens less numerous than in *R. hedy carpi*, as long as style or almost so; styles pale; ovaries glabrous; torus glabrous; pollen partly incomplete (abortive). June—July. (Plate II, Figure 4).

Forest clearings among shrubs, mountain slopes, riverbanks and mountain streams. — European part: Crim.; Caucasus: Cisc., W. and E. Transc. Gen. distr.: N. and Centr. Eur. Described from Germany. Type in Berlin.

Note. A polymorphic species, regarded here as a species group. Its Soviet forms have not been thoroughly investigated; apparently they are distinguished from the west European forms. A critical study of these forms would primarily deal with the separation of the form, widely distributed in the Crimea, which corresponds to *R. tauricus* Schlecht.; it is distinguished by the thickness of all its parts (including the inflorescence) and its large and wide leaves reminiscent of certain forms from the series *Hedy carpi* (its flowers, however, always white); the late Ya. I. Medvedev classified it as *R. armeniacus* Focke.

× *P. polyanthus* P.-J. Müll. ap. Wirtg., Herb. Rub. rhen. ed. 1 (1858) No. 76. — (*R. candicans* Weihe × *R. lloydianus* Genev.). — Differs from *R. candicans* by its large-dentate, white-tomentose leaves, many-flowered inflorescences with wide bracts, smaller flowers, yellowish white petals; fruits usually abortive, rarely very well-developed. — Caucasus: Cisc., W. and E. Transc. Described from Germany.

R. collicolus Sudre, reported by this author from Upper Adzhar (near Khulo), is one of the sometimes fertile forms intermediate between *R. candicans* and *R. lloydianus*.

× *R. tzelemiensis* Juz. in Bull. Appl. Bot. and Pl. Breed. XIV, 3 (1925) 158. (*R. candicans* Weihe × *R. piceetorum* Juz.). — Distinguished from *R. candicans* by the slightly ribbed, somewhat variously prickled turions and the ternate cauline leaves; from *R. piceetorum* by the thick, nearly erect turions, large and very loose inflorescence, and the recurved sepals. — Caucasus: E. Transc. Described from vicinity of Borzhomi (near Tsemi). Type in Leningrad.

16. *R. hyrcanus* Juz. in Bull. Appl. Bot. and Pl. Breed. XIV, No. 3 (1925) 149 adnot.; id. in Grossh., Fl. Kavk. IV (1934) 295.

Shrub; flowering branches markedly ribbed, rather densely hairy, with prickles rather long, broad at base, curved; leaves of shoots quinate and ternate, hairy above, gray-tomentose-hairy beneath; terminal leaflet broadly obovate, roundish or cuneate at base, short-acute, largely and very irregularly double serrate-dentate, short-petiololed, lateral leaflets subsessile, sparsely prickled, hairy and slightly tomentose. Inflorescence narrow, leafy in lower part, its branches ascending; flowers few, rather large; sepals tomentose-hairy, short-acute; petals widely obovate; stamens distinctly longer than style. May.

Open slopes. — Caucasus: Tal. Gen. distr.: Iran? Described from Lenkoran. Type in Leningrad.

Note. Turions of this critical taxon have never been collected and thus remain undescribed.

Section 3. *SILVATICI* P.-J. Müll. in Flora (1858) 142. — Annotinous shoots arcuately prostrate, often rooting in the fall at apex, glabrous or pubescent, usually angled; prickles equal or subequal, flattened, arranged along ribs, or sometimes shifted [from ribs]; leaves green beneath or (in the Soviet species) gray-tomentose. Inflorescence compound or racemose tapering upward; sepals usually gray-tomentose outside. Plants often with an inconspicuous glandular pubescence (mainly in inflorescence) consisting of solitary or scattered small glands.

In the USSR, the representatives of the group *Discoloroides* Genev., Mon. Rub. bass. Loire (1880) 213 p. p. (sensu Sudre), are mainly characterized by upper leaves that are gray- or white-tomentose beneath.

Note. The forms mentioned below are just a few of the various forms in this group abundantly represented in the Caucasus and encountered also in the Crimea. (*R. troitzkyi* Juz. ined., *R. undabundus* Juz. ined.). Sudre also reported for the Caucasus the species *R. argenteus* Weihe et Nees, related to this group, but on the basis of an incomplete specimen and, obviously, an erroneous identification.

17. *R. cartalinicus* Juz. in Bull. Appl. Bot. and Pl. Breed. XXIV, No. 3 (1925) 154; idem in Grossh., Fl. Kavk. IV (1934) 297.

Shrub, a large rather thick plant; annotinous shoots arcuately curved, 5–8 mm in diameter in middle part, obtusely ribbed, with flat or very rarely slightly canaliculate faces, sparingly pubescent and glandular, glands long, dark red; prickles sparse, rather thick, slightly spreading or slightly curved, prickles few or nearly none; leaves medium-sized, quinate; stipules linear,

pubescent and glandular; petioles flat above, hairy, sparsely glandular, armed with spreading and curved prickles, dilated at base; leaflets slightly coriaceous, glabrous above, white- or whitish-tomentose beneath, sparsely hairy along nerves, irregularly serrate-dentate, teeth thin, shallow, mucronate at apex; terminal leaflet 6.4–9 cm long, 4.9–7.2 cm wide, broadly obovate or subrhombic, sometimes suborbicular, obtuse or obtusely angled, sometimes weakly emarginate at base, acute, twice as long as its petiolule; lateral leaflets distinctly petioluled. Flower-bearing shoot long, ribbed, pubescent, sparsely glandular, armed with declinate prickles interspersed with small prickles; leaves ternate, partly quinate, with obovate, rhombic, short-acute leaflets; inflorescence elongated, interrupted and leafy at base, densely hairy, with rather dense unequal prickles and sparse glands; lower branches slightly ascending, the middle divergently erect, subcorymbiform-branched, many-flowered; sepals tomentose-hairy, slightly glandular, unarmed, recurved in fruit; petals white; stamens much longer than style; ovaries glabrescent; fruits well-developed, ovoid or broadly ovoid; torus pubescent. July. (Plate III, Figure 3).

Banks of rivers and streams, roadsides, fields. — Caucasus: W. Transc. Endemic. Described from Kvabiskhevi Pass (near Borzhomi). Type in Leningrad.

18. *R. ossicus* Juz. in Bull. Appl. Bot. and Pl. Breed. XIV, No. 3 (1925) 156; idem in Grossh., Fl. Kavk. IV (1934) 297.

Shrub, rather high, not very thick plant; annotinous shoots arcuately curved, 3–6 mm in diameter in middle part, obtusely ribbed, with flat faces or subcylindrical, sparsely or rather densely pubescent, slightly glandular, glands small, short-stalked, brownish; prickles dense, rather large, unequal, the largest arranged along ribs, declinate or curved below, dilated at base, some of the smaller prickles arranged along the faces tubercle-like; leaves medium-sized, quinate; stipules linear, pubescent, beset with subsessile glands; petioles flat above, hairy, slightly glandular, densely armed with falcate or hamately curved prickles, dilated at base; leaves subcoriaceous, glabrous above, ash-gray, tomentose beneath and densely and rather finely pubescent, densely hairy along nerves, irregularly and deeply serrate-dentate with cuspidate teeth; terminal leaflets 7.3–9 cm long, 4–6.6 cm wide, narrowly obovate or elliptic, slightly notched at base, acute, twice as long as its petiolule, pubescent and prickly like petioles; lower leaflets distinctly petiolulate. Flower-bearing branches and inflorescence short, slightly flexuous, ribbed, densely pubescent with a mixture of sparse short-stalked glands, longer simple hairs and prickles rather small, unequal, resembling in shape prickles of annotinous shoots, sparse or rather dense, the smallest usually pointlike; leaves on branches ternate, with obovate, obtuse or very short-acute terminal leaflet; inflorescence loose, interrupted and leafy at base, its lower branches divergently erect, elongated, the middle nearly spreading, corymbiform-branched, many-flowered; sepals ovate or widely ovate, acute, densely white-tomentose-hairy, unarmed, recurved in fruit; petals unknown; fruits long; ovaries glabrescent; fruits globose. Fr. August.

Rocks, roadsides. — Caucasus: W. Transc. (S. Osetiya). Endemic. Described from the Liakhvi River Gorge, between the villages of Chekh and Gupta, Khutse and Vanel. Type in Leningrad.

19. *R. peruncinatus* (Sudre) Juz. in Grossh., Fl. Kavk. (1934) 297. — *R. obvallatus* var. *peruncinatus* Sudre in Bull. Mus. Cauc. VIII, 1–2 (1914) 94.

Shrub; annotinous shoots glabrescent, canaliculate densely armed with oblique, markedly furcately curved prickles along ribs and solitary very minute prickles on ribs and faces, together with solitary very small stalked glands; leaves quinate, glabrous above, finely gray-tomentose beneath, terminal leaflet 10×6.5 cm obovate, entire at base, subrectangular above, subacute at apex, long-petioluled (petiolules 5 cm long), lateral leaflets oblong-obovate, the lowermost petioluled; bristles on petioles scattered, short, very markedly curved. Flower-bearing branches faceted, sparsely hairy, with falcately curved prickles; inflorescence elongated, leafy, sparsely hairy, its middle branches ascending, many-flowered, strongly armed with falcate or hamate prickles, and with rather numerous small stalked glands; petals ovate, white; stamens white, slightly longer than the pale styles; ovaries glabrous. June.

Forest edges. — Caucasus: W. Trans. **Gen. distr.:** former Artvin district [now Turkey]. Described from Kenya Mountain [sic], Khakhauch [Kukurt Tepe]. Type in Leningrad.

Note. Insufficiently studied taxon.

20. *R. georgicus* Focke in Hryniewiecki, Résultats de deux voyages botan. au Cauc. (1903) 34.

Shrub; annotinous shoots obtusely faceted, tomentose-pubescent or glabrescent, armed with unequal falcate or rather straight prickles with a broad flattened base; leaves serrate-quinate, all their leaflets petioluled, armed like petioles with unequal prickles interspersed with stalked glands, glabrous above, finely white-tomentose beneath; terminal leaflet with longer petiolule, narrowly notched at base, rhombic or narrowly obovate or oblong, long-acuminate. Flower-bearing branches with prickles and sparse stalked glands; sepals often armed with glandular pricklets recurved, after anthesis; stamens longer than style; fruits well-developed. Fr. (immature?) July.

Forests, shrubby formations. — Caucasus: E. Transc. Endemic. Described from Lagodekhi.

Note. We limit ourselves here to a translation of the original description of this species whose specimens we have not seen.

21. *R. miszczenkoi* Juz. in Bull. Appl. Bot. and Pl. Breed. XIV, No. 3 (1925) 155; idem in Grossh., Fl. Kavk. (1934) 296. — *R. alterniflorus* Sudre in Monit. Jard. Bot. Tifl. 20 (1911) 7, non Müll. et Lef.

Shrub; annotinous shoots thick, angled, with concave faces, rather densely hairy and with sparse short-stalked or sessile glands; prickles sometimes numerous, strong, slightly unequal, along ribs, some prickles along faces, rather dilated at base, declinate or curved, mixed with solitary spinelets or without them; leaves medium-sized or large, quinate; stipules linear, hairy and glandular; petioles hairy and glandular above, glands (like those of stipules) subsessile, with dense falcately curved prickles; leaflets sparsely hairy above, white-tomentose beneath, biserrate-dentate, with broad teeth, terminal leaflet 7.5–10.5 cm long, 5.4–8.6 cm wide, broadly ovate or suborbicular, cordate at base, short-acuminate at apex, petiolule half as long

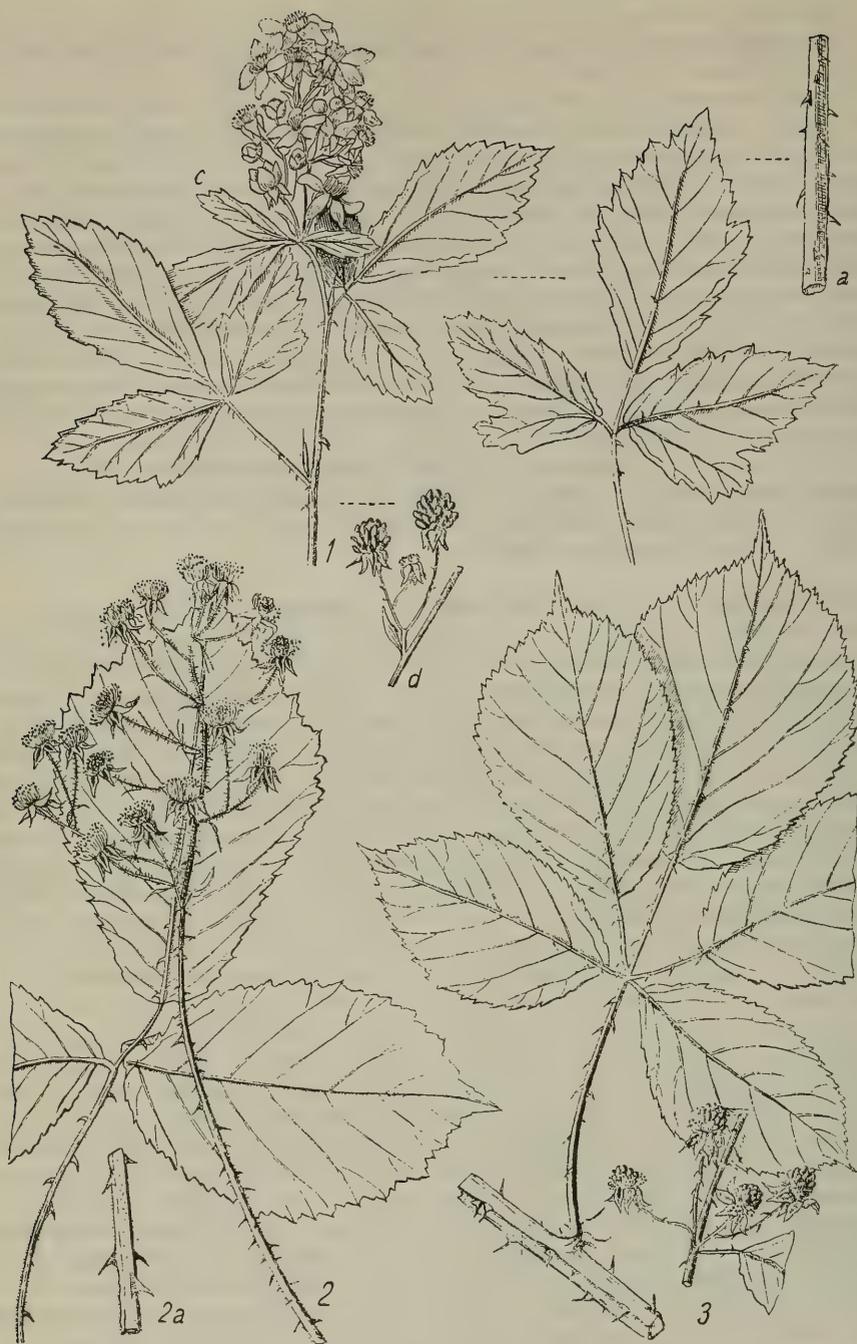


PLATE III. 1 - *Rubus tomentosus* Borkh., a) part of turion, b) leaf, c) branch with inflorescence, d) fruit; 2 - *R. raddeanus* Focke, leaf and inflorescence, a) part of turion; 3 - *R. cartalinicus* Juz., part of turion with leaf and part of inflorescence with immature fruits.

as blade, armed and pubescent like petioles, midrib with markedly ascending prickles. Flower-bearing shoot long, yellowish, with canaliculate faces, densely hairy, furnished often with unequal spreading or curved prickles, sparsely covered with short-stalked glands; leaves ternate, leaflets obovate or suborbicular, hairy above; inflorescence elongated, narrow; pedicels short, erect, spreading; flowers rather crowded, ca. 1.7 cm in diameter; sepals white-tomentose, sparsely or rather densely glandular, with short-stalked dark brown glands, spreading below; petals white; stamens much longer than style; ovaries pubescent; fruits broadly ovoid, fruitlets many, small. July.

Mountain slopes, forest clearings, roadsides. — Caucasus: E. Transc. Endemic. Described from Akhaldaba. Type in Leningrad.

- 37 22. *R. lepidulus* (Sudre) Juz. in Grossh., Fl. Kavk. IV (1934) 296. — *R. uncinatifactus* var. *lepidulus* Sudre in Bull. Soc. Bot. Fr. (1911) 33; idem in Monit. Jard. bot. Tifl. 20 (1911) 7.

Shrub; annotinous shoot canaliculate, hairy; prickles small, unequal, subconical, twisted; leaves pubescent above, gray-tomentose-hairy beneath, acutely serrate; terminal leaflet elliptic or elliptic-obovate, acute, short-petioluled. Flower-bearing branches ribbed, pubescent, with small, unequal, spreading and slightly curved prickles; inflorescence short, leafy, its branches elongated, erect, beset with sessile glands; petals obovate, pink; ovaries pubescent. June.

Forest clearings. — Caucasus: W. Transc. Endemic. Described from the vicinity of Tsebelda. Type in Tbilisi.

Note. Temporarily separated; a problematical taxon requiring further study.

23. *R. caucasigenus* (Sudre) Juz. in Grossh., Fl. Kavk. IV (1934) 295. — *R. subnitens* var. *caucasigenus* Sudre in Monit. Jard. Bot. Tifl. 20 (1911) 6.

Annotinous shoots bluntly angled, without bloom; leaves ternate, tomentose beneath. Main axis hairy; fruiting sepals erect; stamens shorter than style; ovaries pubescent.

Caucasus: W. Transc. Endemic. Described from Sukhumi. Type in Tbilisi.

Note. A little-known taxon, unsatisfactorily described by Sudre, the specimens of which have been inaccessible to us.

Section 4. **TOMENTOSI** Focke, Syn. Rub. Germ. (1877) 225. — Annotinous shoots often nearly erect, partly patulous, canaliculate, with subequal prickles, sometimes interspersed with bristles and glands; leaves ternate or quinate, with canaliculate petioles, their leaflets covered above with stellate hairs, rarely glabrous, white-tomentose beneath. Inflorescence dense, elongated, subcylindrical; fruiting sepals recurved below, tomentose-pubescent; drupes dry, with ellipsoidal stones.

24. *R. tomentosus* Borkh. in Roem., N. Mag. f. Bot. I (1794) 2. — *R. sanctus* Schreb., Icon. et descr. I (1766) 15, tab. VIII. — *R. triphyllus*

Bell., App. fl. Pedem. (1792) 24; non Thunb. — *R. argenteus* Gmel., Fl. bad. ols. II (1806) 434. — *R. canescens* DC., Cat. Hort. monspel. (1813) 30. — *R. cinereus* Rchb., Fl. Germ. exc. (1832) 607. — *R. caucasicus* Godet in sched. sec. Focke, Spec. Rub. III (1914) 143. — *R. australis* Kerner, Nov. pl. sp. III (1871) 32, non Forster. — *R. meridionalis* Kerner ex Focke, Syn. Rub. Germ. (1877) 226. — *R. cedrorum* Kotschy in sched. sec. Focke, l. c. Ic.: Weihe et Nees, Rub. Germ. (1822) tab. 8; 38 Sudre, Rub. Eur. (1908—1913) 98. — Exs.: Billot, Fl. gall. et germ. 3074.

Shrub; annotinous shoots arcuately spreading or nearly erect, up to 4 mm in diameter, ribbed, with flat or usually concave faces, without bloom, appressed tomentose-hairy or rarely glabrous, sometimes with scattered stalked glands; prickles small, unequal, arranged along ribs, the largest curved; leaves usually ternate or partly quinate, i. e., with deeply incised lobes to quinate, covered above with small stellate hairs, ash-gray-tomentose, white-tomentose beneath, prominently netted-veined, roughly and unequally serrate or nearly biserrate, with broad triangular teeth; terminal leaflet rhombic or obovate-rhombic, entire in lower part, with entire or slightly emarginate base, acute or barely acute, short-petiololed, lateral leaflets very short-petiololed or subsessile, ternate leaves usually 2-lobed at base; petioles canaliculate above, armed with very few prickles; stipules linear or linear-lanceolate. Flower-bearing shoots slender, canaliculate, with prickles sparse, small, curved; leaves ternate, their leaflets obovate-cuneate, acute or subacute; inflorescence narrow, rather dense, elongated, subcylindrical, usually leafless, axis tomentose-hairy, eglandulose or rarely slightly glandular; branches ascending, thin, with small, relatively sparse, subulate, yellow, straight or slightly curved prickles; stipules lanceolate, the lower trifid; sepals ash-gray-tomentose, shortly mucronate, spreading below; petals oblong-obovate, yellowish white; stamens white, approximately as long as green style; ovaries glabrous; fruit medium-sized, dry; pollen well-developed. June—August. (Plate III, Figure 1).

Forests (predominantly oak and pine), dry open slopes, among shrubs. — European part: Bl. (?), Crim.; Caucasus: Cisc., E. and W. Transc. **Gen. distr.:** Centr. Eur., Med., Bal.-As. Min., Iran. Described from Germany. Type in Berlin (?).

Note. The Soviet forms of *R. tomentosus* (and also those of Asia Minor and, in part, of *R. cedrorum* Kotschy) are slightly distinguished from the west European forms by the small straight prickles being much looser in blossom than the actual *R. tomentosus* Borkh.

25. *R. lloydianus* G. Genev., Mém. Soc. Main- et -Loire X (1861) 26 ampl. — *R. subparilis* Sudre in Bull. Soc. Bot. Fr. tab. XLVI (1899) 85. — *R. tomentosus* var. *glabratus* Godr., Mon. Rub. Nancy (1843) 27.

Shrub; turions glabrous or (in "*R. subparilis*") pubescent. Leaves glabrous above. In other respects similar to the preceding species. June—August.

39 In the same habitats as the preceding species. — European part: Crim.; Caucasus: Cisc., E. and W. Transc. **Gen. distr.:** Centr. Eur., Med. Described from France. Type unknown.

Note. *R. lloydianus* is actually merely a form (or forms) of the preceding species, which we prefer to call by a special name since its

distribution in the Caucasus does not fully concur with the distribution of *R. tomentosus*; in any event, we observed the species at many points where *R. tomentosus* was absent. The note on the incomplete similarity between Crimean-Caucasian *R. tomentosus* and the West European species refers to this taxon as well.

Section 5. **VESTITI** Focke in Abh. Natur. Ver. Bremen I (1868) 276. — Annotinous shoots densely pubescent or often villous with spreading simple hairs; larger prickles usually narrow, arranged on ribs, the smaller prickles on the faces; leaves usually with coarse hairs above and soft, dense, spreading hairs beneath, often gray- or white-tomentose. Inflorescence straight, usually long and well-developed, the axis long spreading-hairy; glands absent or few.

26. *R. raddeanus* Focke in Abh. Nat. Ver. Bremen IV (1874) 182; Sudre in Monit. Jard. Bot. Tiflis 20 (1911) 11; Juz. in Grossh., Fl. Kavk. IV (1934) 298. — *R. persicus* Focke, Spec. Rub. III (1914) 87, non Boiss.

Shrub; annotinous shoots (according to Focke) erect, up to 2 m tall, branching in upper part, ribbed, loosely villous-pubescent, armed with subequal, strong, flattened prickles; leaves ternate, often mixed with quinate, with long, loosely villous-hairy petioles, sulcate above, armed with curved prickles; stipules at base of petiole, filiform; leaflets thin, regularly serrate, coarsely hairy above, finely tomentose beneath, grayish or whitish; terminal leaflet elliptic, obtuse or subcordate at base, subacute, the lower distinctly petioluled. Flower-bearing branches ribbed, loosely villous-hairy, armed with subequal short to rather long curved prickles; leaves ternate, with the terminal leaflet ca. 8 cm long, 4 cm wide, obovate, often long-acuminate; inflorescence 10–15 cm long, paniculate, many-flowered, its branches elongated, often horizontally spreading; pedicels divergently villous-tomentose, prickly; bracts long, narrow; flowers rather large, ca. 3 cm in diameter; sepals long mucronate, villous-tomentose outside, recurved below in fruit; petals oblong or obovate, white; stamens slightly longer than style; gynophore villous; fruitlets numerous, glabrous. May. (Plate III, Figure 2).

Forests, forest clearings. — Caucasus: Tal. Gen. distr.: Iran. Described from Lenkoran. Type in Leningrad.

Note. The systematic position of *Rubus raddeanus* Focke (like *R. persicus* Boiss.) remains vague. Focke referred it to section *Suberecti*, Sudre to section *Tomentosi*; we feel that neither determination is substantiated. For the time being we prefer to refer this species (for purely formal reasons) to the artificial group *Vestiti*.

27. *R. persicus* Boiss., Fl. Or. II (1872) 693. — ? *R. plicatus* C. A. M., Enum. (1831) 167, non Weihe et Nees.

Shrub; annotinous shoots thin, apparently erect, cylindrical, scarcely tomentose, with prickles dilated at base; leaves always ternate, green, pubescent above, appressed ash-gray-hairy beneath; leaflets small, 2.5–3.75 cm long, ovate-oblong, acute, the lateral sessile. Flower-bearing shoots short, 20–25 cm long, their prickles (like those on petioles)

curved; inflorescence pyramidal, tomentose, short, 8–10-flowered; flowers small, ca. 2 cm in diameter; sepals oblong, subobtuse, rather shortly mucronate, tomentose, subsequently recurved below; petals apparently white; stamens longer than style. May–June.

Forests and shrubby formations. — Caucasus: Tal. **Gen. distr.:** Iran. Described from the coast of the Caspian Sea. Type in Geneva.

Note 1. Focke, in Spec. Ruborum, identified this taxon with *R. raddeanus* Focke, having himself rejected at one time the name of the latter in favor of *R. persicus* Boiss. However, the cylindrical shoots peculiar to this species and the always present ternate leaves, small leaflets, the lateral of which are sessile, the tomentose (and not spreadingly villous) axis and branches of the inflorescence, as well as the sepals repudiate the identification of *R. persicus* as *R. raddeanus*.

Note 2. Other forms which might be referred to this group are encountered in the Caucasus. One of them was found in Upper Adzhar (near the village of Khulo) by Yu. N. Voronov and N. Popov and determined by Sudre as *R. rubellus* P.-J. Müll. var. *callichrous* Sudre; however, in view of the fact that the specimen collected had neither turions nor cauline leaves, this determination is not reliable. Also referred to this group is the yet unpublished *R. saguramicus* Juz. from the Saguram Range near Mtskheta.

Section 6. **APICULATI** Focke in Asch. u. Graebn., Syn. VI (1902) 451. — Annotinous shoots short, arcuate, often spreading, with subequal prickles, usually with an admixture of several bristles and stalked glands; leaves green beneath or — at least the upper leaves of the shoot and also of the flowering branches — usually more or less gray- or white-tomentose. Main axis with prickles, bristles and glands; the inclination of the fruiting sepals differs in the various forms.

41 Note. This group is of a heterogenous composition, including intermediate forms between dewberries devoid of glandular pubescence and the species of section *Glandulosi*.

28. *R. picetorum* Juz. in Bull. Appl. Bot. and Pl. Breed. XIV, No. 3 (1925) 157; idem in Grossh., Fl. Kavk. IV (1834) 300.

Shrub; annotinous shoots usually small, decumbent, cylindrical, more or less pubescent, eglandulose, furnished with sparse to rather dense, subconical, thin, unequal, almost straight prickles, slightly spreading below; leaves always ternate; stipules linear, hairy, slightly glandular; petioles flat above, densely hairy, with same prickles as the shoots; leaflets glabrescent above or sparsely hairy, gray-tomentose beneath, densely pubescent along nerves or over entire surface, usually finely serrate, with unequal acute teeth, the terminal leaflet 9–11.5 cm long, 5.5–8.3 cm wide, broadly obovate or broadly elliptic, notched at base, long-acuminate at apex, three to four times longer than its petiolule, lateral leaflets conspicuously petioluled. Flowering shoot slightly canaliculate, tomentose and pubescent, frequently with few prickles and spinules, eglandulose or with few long-stalked dark red glands above, their leaves resembling those of the annotinous shoots but their petioles usually glandular, leaflets densely hairy above, the terminal leaflet short-acuminate; inflorescence compact, branches few-flowered, divergently

erect; flowers 1.2–1.5 cm in diameter; sepals white-tomentose, sparsely hairy, slightly glandular, adhering to fruit; petals white or sometimes pinkish slightly longer than sepals but longer than styles, the latter greenish or sometimes reddish; ovaries glabrescent; fruit subglobose, with few drupelets, often abortive. July–August.

Spruce forests, rarely mixed or broad-leaved forests. — Caucasus: E. Transc. Endemic. Described from the vicinity of Borzhomi (between Tsemi and Libani stations). Type in Leningrad.

29. *R. leptostemon* Juz. in Bull. Appl. Bot. and Pl. Breed., Vol. XIV, No. 3 (1925) 158; idem in Grossh., Fl. Kavk. IV (1934) 300.

Shrub, small; annotinous shoots arcuately curved at base, spreading above, small, 2–4.5 mm in diameter in middle part, cylindrical, sometimes slightly sulcate, densely covered with fine hairs, without glands; prickles sparse to rather dense, spiculate, thin and small, rather unequal, slightly dilated at base, spreading beneath, almost straight; leaves usually medium-sized, always ternate; stipules usually linear, rather densely hairy, mixed with sessile glands; petioles flat above with the same pubescence and armed like the shoots; leaflets thin; with sparse to rather dense appressed hairs above, grayish- or rarely white-tomentose hairy beneath, finely serrate and in addition incised-dentate; terminal leaflet 6.6–12 cm long, 4.5–9 cm wide, obovate or elliptic, narrowly cordate or subobtusish at base, shortly acute, three to four times longer than its petiolule; lateral leaflets distinctly petioluled. Flower-bearing branches short, densely tomentose-hairy, with rather dense prickles and bristles mixed with few to rather numerous thin brown stalked glands, the largest of which markedly longer than the simple hairs; leaves resembling leaves of annotinous shoots but with stipules linear-lanceolate, petioles more or less glandular, the terminal leaflet more densely hairy above, barely acute; inflorescence very slender, short and compact, often nodding, base interrupted and leafy only in the larger specimens, main axis densely tomentose, with sparse prickles and glands; inflorescence branches straight, spreading, few-flowered; flowers small, 8–12 mm in diameter; sepals white-tomentose, slightly hairy and glandular, sometimes with solitary bristles, long mucronate at apex, appressed in fruit; petals white, small, obovate; stamens considerably shorter than styles; styles greenish or often reddish at base; ovaries densely hairy; fruit small, ovate, with numerous drupelets, often abortive; torus hairy. July.

Forests (mainly spruce). — Caucasus: W. Transc. Endemic. Described from the vicinity of Borzhomi, between Tsemi and Libani. Type in Leningrad.

30. *R. abnormis* Sudre in Monit. Jard. Bot. Tifl., 15 (1909) 49 et 50; *ibid.* 20 (1911) 15.

Shrub; branches angled and pubescent, their prickles long or medium-sized, spreading or slightly curved; leaves large, ternate, gray-tomentose beneath, strongly and unequally serrate. Inflorescence leafy, slightly hairy, furnished with long but sparse purple glands and thin prickles; peduncles thin, ascending 2–3-flowered; sepals erect, densely glandular; flowers white; stamens shorter than the pale styles; ovaries glabrous. Apparently, very fertile. Habitat unknown. June.



PLATE IV. 1 - *Rubus caucasicus* Focke, leaves and part of inflorescence, a) part of turion, b) flower, c) part of inflorescence with fruit; 2 - *R. dolichocarpus* Juz., a) leaves, b) part of turion, c) branch with fruit; 3 - *R. ochthodes* Juz. leaves and part of inflorescence with unripe fruit, a) part of turion.

5 Caucasus; W. Transc.? **Gen. distr.:** Artvin district. Described from places between Machkhatash and Agara. Type in Tbilisi.

Note. A very little-known, meagerly described species.

31. *R. abchaziensis* Sudre in *Monit. Jard. Bot. Tiflis* 15 (1909) 49. — *R. pauciglandulosus* ϵ *abchaziensis* Sudre, *Rub. Eur.* (1908–1913) 136.

Shrub; annotinous shoots angled, small, pubescent, without bloom, with small spreading prickles; leaves quinate, large, thin, unequally subacutely serrate, appressed-tomentose beneath, slightly hairy, terminal leaflet sub-orbicular, notched at base, acuminate, two times longer than its petiolule, lower leaflets distinctly petioluled, 6–9 mm long. Flower-bearing shoots with leaves appressed gray-tomentose beneath; inflorescence narrow, leafy in lower part, densely pubescent, furnished with yellowish prickles and numerous glands; upper branches of inflorescence spreading; fruiting sepals erect; stamens hardly as long as styles; ovaries pubescent. June.

Caucasus; W. Transc. Endemic. Described from Sukhumi. Type in Tbilisi.

Note. A little-known species, thus further study is required.

\times *R. tzebeldensis* Sudre, *Rub. Eur.* (1913) 136. (*R. abchaziensis* Sudre \times *R. sanguineus* Friv.). Distinguished from *R. abchaziensis* Sudre by the subequal prickles, coriaceous leaves pubescent above, white-tomentose below; main axis tomentose, short-hairy, nearly eglandulose; flowers bright pink; anthers slightly pubescent. Described from the vicinity of Tsebelda (Yurevskoe). Type in Tbilisi.

32. *R. woronowii* Sudre in *Monit. Jard. Bot. Tiflis* 15 (1909) 48 (nomen); *ibid.* 20 (1911) 13. — *R. apiculatus* var. *woronowii* Sudre, *l. c.* (1909) 48. — *Ic.:* Sudre, *Rub. Eur. tab. CXXX*, 2.

Shrub; annotinous shoots angled, glabrous; prickles thin, spreading; leaves quinate, large, thin, nearly equally and finely subacutely serrate, glabrous above, short-hairy beneath; terminal leaflet obovate-orbicular, cordate at base, mucronate at apex, two times longer than its petiolule, lower leaflets distinctly petioluled, 5–9 mm long. Inflorescence narrow, short-hairy; peduncles short, 1–2-flowered, spreading; ovaries pubescent; fruit well-developed. June–July.

Habitat unknown. — Caucasus; W. Transc. Endemic. Described from Sukhumi. Type in Tbilisi.

Note. Little-known species, inadequately described.

46 Section 7. **RADULAE** Focke in *Abh. Natur. Ver. Bremen* I (1868) 276. — Annotinous shoots arcuate, rooting at summit in the fall, with rather equal prickles usually arranged along ribs and numerous smaller prickles and tubercles and short stalked glands at faces, sparsely pubescent. Flowers medium-sized or small.

33. *R. dolichocarpus* Juz. in *Bull. Appl. Bot. and Pl. Breed.* XIV, No. 3 (1925) 159; *id.* in *Grossh., Fl. Kavk.* IV (1934) 290. — *Ic.:* Juz., *l. c.* (1925) tab. 1.

Shrub, small or medium-sized with arcuately curved decumbent annotinous shoots, ribbed and slightly canaliculate at faces, densely hairy and usually sparsely glandular; prickles small, dense and unequal, flattened, straight or slightly declinate, the smallest prickles forming pustulate or sometimes spiculate faces; leaves large, quinate, with long pubescent and slightly glandular stipules; petioles flat above, densely hairy, armed with few spreading or curved prickles, with few glands and bristles or without; leaflets thin, appressed-hairy above, ash-gray or whitish beneath with densely fine appressed tomentum, pubescent only along midrib, acutely and unequally biserrate, with shallow nearly upright or spreading teeth, terminating in a sharp point; terminal leaflet 10–13 cm long, 6–8 cm wide, obovate, slightly notched at base, shortly subacute, two times longer than its petiolule; lower leaflets oblong-obovate, almost as long as but narrower than the terminal leaflet, upper leaflets (i. e., middle) long-petioluled, the lowermost with short petiolules half adnate to the middle petiolules. Flower-bearing branches ribbed, densely pubescent, armed like the main axis with prickles spreading below or curved, their leaves ternate with obovate terminal leaflet; inflorescence large, pyramidal in shape, the main axis densely covered with spreading hairs interspersed usually with many short glands often not exceeding the length of the long simple hairs; median branches of inflorescence ascending-erect or subhorizontally spreading, 1–3-flowered; sepals ovate, long mucronate at apex, ash-gray, tomentose-hairy, more or less glandular, spreading below in fruit; petals unknown; stamens long; ovaries glabrous; fruit oblong, subcylindrical, formed of numerous small unsucculent drupelets; torus glabrescent. Fr. August. (Plate IV, Figure 2).

Broad-leaved forests, forest clearings. — Caucasus: E. Transc. Endemic. Described from Saguram Range (near Mtskheta). Type in Leningrad.

34. *R. lanuginosus* Stev. ex Ser. in DC., Prodr. II (1825) 564; Schlecht. ex Ldb., Fl. Ross. II (1844) 69. — *R. hispidus* Hall. in herb. sec. Ldb., l. c. — *R. pastuchovii* Grossh. in Trav. Jard. Bot. Tiflis, II sér., I (1920) 1.

47 Shrub; stems yellowish green; flower-bearing shoots cylindrical, prickly, villous; leaves 3–5-paired, up to 20 cm long (without petioles), dark green and pubescent above, gray-green and densely and finely pubescent beneath; leaflets broadly ovate, slightly cordate, long curved-acuminate at apex, 12–14 cm long, 8–10 cm wide; terminal leaflet resembling the lateral, unequally toothed. Inflorescence large, many-flowered, slightly leafy, long glandular-villous, prickles at main axis few, slender, yellowish; bracts linear, long; pedicels rather long; sepals erect or spreading, dorsally densely glandular-villous, white-tomentose inside; stamens longer than styles; drupelets numerous. June.

Forests. — Caucasus: Tal. Gen. distr.: Iran (Hyrcanian floristic province). Described from Iran ("Likhidishan Mountains near the Caspian Sea"). Type in Berlin.

Note. *R. apiculatus* Weihe, reported for Lower Adzhar by Sudre, is also referred to section *R. adulae*; however, to identify the Caucasian plant with this species is highly inaccurate.

Section 8. **GLANDULOSI** P.-J. Müll. in Pollichia XVI-XVII (1859) 192.— Low plants usually with prostrate annotinous shoots, often covered with a glaucous bloom and armed with numerous, nearly unequal prickles, spicules, and glands, not markedly different from each other. Inflorescence short or medium in length, compound in lower part, racemose in upper part; flowers small or medium-sized; petals narrow; fruiting sepals usually erect.

Economic importance. The fruits of the various species in this section are particularly distinguished by their succulence and taste.

Subsection 1. **KOEHLERIANI** Focke, Spec. Rubor. III (1914) 235, 236.— Annotinous shoots partly armed with large, flattened prickles, dilated at base. Middle branches of inflorescence umbelliform.

35. **R. ochthodes** Juz. in Bull. Appl. Bot. and Pl. Breed. XIV, 3 (1925) 162; idem in Grossh., Fl. Kavk. IV (1934) 301.

Shrub; annotinous shoots strong, bluntly angled, with flat faces or sub-cylindrical, sparingly pubescent, sparsely glandular, with unequal rufous glands; prickles dense and quite unequal, the larger firm, dilated at base, often arranged along ribs, slightly spreading beneath, the smaller many, forming pustulate and spiculate faces, gradually passing over to glands; leaves rather large, usually quinate, rarely ternate; stipules linear, pubescent and glandular; petioles flat above, sparingly pubescent, with sparse retrorsely curved prickles and numerous bristles and glands; leaflets subcoriaceous, glabrous above, whitish-tomentose beneath, with scattered hairs along veins, finely serrate-dentate, with subacute teeth, the terminal
48 leaflet 8.5–13 cm long, 5.3–10 cm wide, elliptical or suborbicular, usually subobtusate at base, long-acuminate, two to three times longer than its petiolule. Flower-bearing shoots long, rather densely pubescent and glandular, with numerous prickles; leaves of shoots ternate and quinate, their leaflets short-acuminate; inflorescence long, interrupted at base, in other parts rather densely appressed-pubescent, peduncles spreading, many-flowered; sepals whitish-tomentose, slightly glandular, recurved in fruit; stamens as long as styles; ovaries pubescent; fruit subglobose. Fl. and unripe fruit July. (Plate IV, Figure 3).

Riverbanks, mountain slopes, roadsides. — Caucasus: E. and W. Transc. Described from the vicinity of Borzhomi (Baniskhevi River Gorge). Type in Leningrad.

Subsection 2. **EUGLANDULOSI** Focke, Spec. Rubor. III (1914) 235, 239.— Annotinous shoots often without large prickles. Inflorescence branches 1-flowered or subracemose.

Group **Platyphylli** Focke, Spec. Rubor. III (1914) 241 (sensu proprio). — Leaves whitish or grayish beneath with fine tomentum.

36. **R. caucasicus** Focke in Abhandl. Natur. Ver. Bremen IV (1875) 183; Juz. in Grossh., Fl. Kavk. IV (1934) 301. — **R. glandulosus** var. **canescens** Boiss., Fl. Or. II (1872) 693, p. p.

Shrub; annotinous shoots arcuate, robust, cylindrical, without bloom, puberulent or glabrescent, sun-exposed specimens intensively brown-lilac, beset with prickles rather unequal, partly rather large and slightly dilated at base, partly spreading or curved, partly long aciculiform, almost straight or slightly curved, smaller prickles poorly differentiated from the stalked glands; glands rather numerous, unequal, partly long, partly short, rufous; leaves ternate or sometimes (usually incompletely) quinate; petioles sub-cylindrical, weakly tomentose, with the same prickles and glands as the shoots; leaflets large, subcoriaceous, glabrous above, finely whitish-tomentose beneath, remotely pilose along nerves, broadly and obtusely serrate-dentate, with unequal, shallow, pointed teeth; terminal leaflet broadly obovate to suborbicular, cordate at base, long-acuminate, two and a half times longer than its petiolule, with prominent lateral nerves beneath, lateral leaflets shortly petioluled, obliquely broad-ovate. Flower-bearing shoots rather long, slightly angular or canaliculate, sparingly tomentose and remotely puberulous, with smaller and less numerous prickles and bristles and many glands; leaves resembling leaves of annotinous shoots but smaller, with narrower leaflets; inflorescence elongated, erect, interrupted and leafy at base, with same pubescence as branches; peduncles ascending-erect, branched, many-flowered and, like pedicels, densely glandular and slightly bristly; flowers medium-sized; sepals long mucronate, spreading or loosely adhering to fruit after anthesis; petals spreading, medium-sized, obovate, white; filaments as long as or slightly longer than styles; ovaries pubescent; fruit broadly ovoid, with rather numerous drupes, medium-sized or rather small, pleasant in taste. June-July. (Plate IV, Figure 1).

Forests, forest edges, clearings. — Caucasus: Cisc. (Besh-Tau), E. and W. Transc. Endemic. Described from Rachin district, Nakkeral village. Type in Leningrad.

Note. Boissier included in his *R. glandulosus* var. *canescens* this species and the completely different *R. ruprechtii* Juz. ined., which belongs to section *Radulae*.

× *R. semicaucasicus* Sudre in Bull. Soc. Bot. Fr. LVIII (1911) 35, idem in Monit. Jard. Bot. Tiflis 20 (1911) 18. (*R. caucasicus* Focke × *R. sanguineus* Friv.). — Distinguished from *R. caucasicus* by flattened prickles, sparser glands, coriaceous leaflets unequally serrate and remotely pubescent above, pink sterile flowers; from *R. sanguineus* by glabrescent annotinous shoots, unequal prickles, more or less glandular inflorescence, sepals spreading after anthesis, glabrescent anthers. — Caucasus: W. Transc. Described from the environs of Tsebelda (Yurevskoe). Type in Tbilisi.

× *R. baniskheviensis* Juz. in Bull. Appl. Bot. Pl. Breed. XIV, No. 3 (1925) 163. — (*R. caucasicus* Focke × *R. ochthodes* Juz.?). — With the exception of narrow leaflets, this taxon occupies a morphological position between the assumed parents. — Caucasus: E. Transc. Described from the vicinity of Borzhomi (Baniskhevi River Gorge). Type in Leningrad.

37. *R. moschus* Juz. in Bull. Appl. Bot. and Pl. Breed. XIV, No. 3 (1925) 163; Grossg., Fl. Kavk. IV (1934) 302. — *R. caucasicus* Focke, Spec. Rub. III (1914) 242, nec alibi. — Ic.: Juz., l. c., tab. 2.

50 Shrub, relatively low, with arcuately curved procumbent annotinous shoots, 3–10 mm thick, cylindrical, slightly sulcate, covered with whitish or glaucous bloom, with remote, simple and stellate hairs or (nearly) glabrous and armed with numerous long thin-acicular usually straight prickles mixed with long-stalked dark purple glands varying in length; leaves ternate; stipules linear-lanceolate; leaflets large, usually rather thin, dentate, finely acutely serrate, often remotely sinuate, dark green above, completely glabrous and often shiny, grayish or whitish beneath with fine tomentum of stellate hairs, with nerves slightly tomentose-pubescent, puberulent, the middle one remotely glandular and prickly in the lower part; terminal leaflet 11–21 cm long, 7–15.5 cm wide, rather long-petioluled, deeply cordate at base, broadly elliptic to broadly ovate, sometimes sub-orbicular, acuminate, with 7–10 pairs of lateral nerves; lateral leaflets distinctly petiolulate, obliquely ovate. Flower-bearing shoot small, similarly pubescent and prickly like annotinous shoots, with similar but smaller leaves; inflorescence leafy, interrupted, racemose-paniculate, usually few-flowered, drooping axis, pedicels and sepals densely covered with long-stalked dark purple glands; flowers rather small; sepals attenuated in a long mucro, at first declinate below, spreading in fruit or nearly appressed to fruit; petals nearly erect, narrowly obovate or subspatulate, small, as long as sepals and stamens or barely longer, white; stamens as long as or usually shorter than styles, filaments white; ovaries glabrous or rarely remotely stellate-hairy; styles reddish (at least at base); fruit rather large, broadly ovoid, with numerous small drupelets, pleasant tasting. June–July. (Plate V, Figure 1).

Coniferous (spruce), mixed and broad-leaved (beech, in particular) forests; forest edges and clearings, banks of streams. — Caucasus: W. Transc. Gen. distr.: Bal.-As. Min.? Described from the vicinity of Borzhomi. Type in Leningrad.

38. *R. platyphyllus* C. Koch, Catal. plant. etc. in Linnaea, XVI (1842) 348, nec alibi, nec Focke, Sp. Rub. III (1914) 242; Juz. in Grossh., Fl. Kavk. IV (1934) 302. — *R. glandulosus* β . *platyphyllus* Boiss., Fl. Or. II (1872) 693, p. p.

53 Shrub; annotinous shoots 3.5–5 mm in diameter, cylindrical, sometimes sulcate, covered with glaucous bloom, glabrous, armed with small spreading prickles flattened at base and longer thin subulate erect prickles, remotely short-glandular; leaves ternate, with petioles 7–10 cm long, densely covered — like petioles — with red prickles and glands longer than on annotinous shoots; leaflets large, rather thin, finely serrate with unequal teeth, dilated at base, mucronate at apex, completely glabrous above, canescent beneath with fine appressed tomentum, simple long hairs absent; midrib prickly beneath (to the middle); terminal leaflet 11–15 cm long, 7–10 cm wide, three times longer than its petiolule (the latter 3–5.5 cm long), broadly ovate, deeply notched at base, rather long-acuminate, lower leaflets distinctly petiolulate (petiolules 6–10 mm long). Flower-bearing branches rather densely thin appressed-tomentose above, covered with small prickles and short red glands (moderately dense); leaves ternate, with elliptic or broadly elliptic or obovate acuminate leaflets, rounded or slightly emarginate at base, glabrous above or sometimes (at least the upper) with solitary hairs,

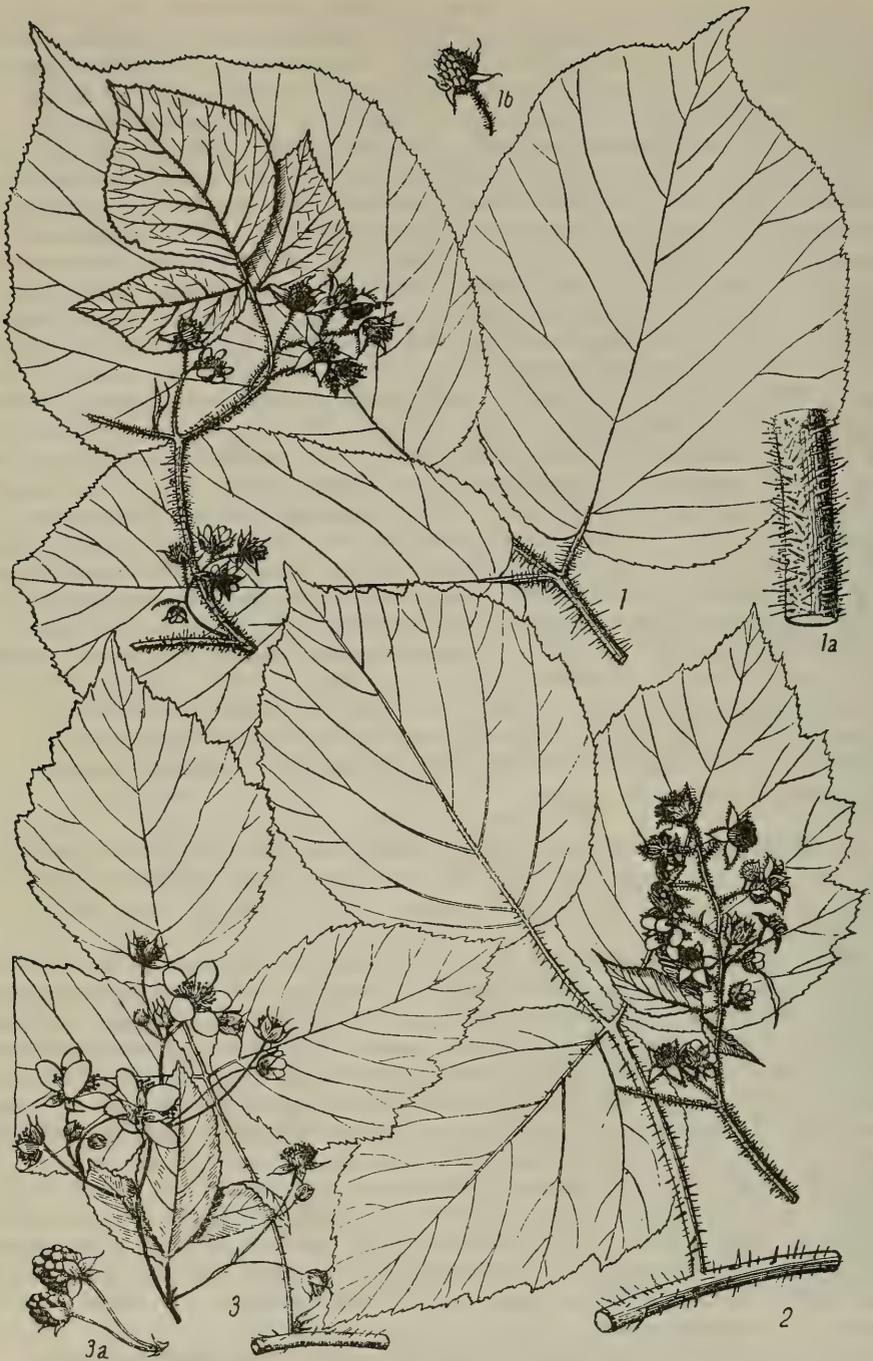


PLATE V. 1 — *Rubus moschus* Juz., leaves and inflorescence, a) part of turion, b) fruit; 2 — *R. hirtus* W. et K., leaves and inflorescence; 3 — *R. caesius* L., leaves and inflorescence, a) fruit.

colored like leaves of annotinous shoots, however often greenish beneath; inflorescence compact, short, leafless or sometimes elongated and leafy in lower part, broad or narrow, suberect or slightly angularly curved but not drooping, finely appressed-tomentose, armed with small prickles and short red glands, lower branches spreading, 1-3-flowered; calyx whitish-tomentose, with sparse short red glands and sparse prickles; sepals ovate or broadly lanceolate, long-acuminate, spreading or nearly recurved below after anthesis, appressed in fruit; petals narrowly obovate, not longer than sepals; stamens shorter than or as long as style; ovaries pilose. June-July.

Mountainous forests.—Caucasus: W. Transc. Endemic. Described from Rachi. Type in Leningrad.

Note. The type of this species was unknown to Focke who classified *R. caroli-kochii* Juz. ined., a completely different plant with leaves green on both sides, as *R. platyphyllus*, predicating his classification on C. Koch's erroneous one.

39. *R. ponticus* Juz. sp. nova in Addenda, p. 449.—*R. hirtus* f. *ponticus* Focke, Spec. Rubor. III (1914) 249.—Exs.: HFR No. 875.

54 Shrub; annotinous shoots prostrate, without bloom, glabrescent, densely beset with long brownish-violet glands interspersed with prickles slightly dilated at base and long thin erect or spreading spinules; leaves ternate, small, thin, remotely pilose above, canescent or whitish beneath with fine appressed tomentum, puberulent only along midribs, serrate-dentate with unequal shallow teeth; terminal leaflet ovate, emarginate at base, gradually attenuate; stipules linear, glandular. Flower-bearing branches sparsely appressed-tomentose-pilose, with numerous dark purple glands and sparse erect or slightly declinate prickles and spicules; upper leaves thin grayish-tomentose below, lower leaves green on both sides and remotely pilose; inflorescence loose, stately, leafless or leafy only at base, erect, with rather densely appressed pilose-tomentose axis, the other parts similar to the branches; peduncles long, spreading, 1-3-flowered; pedicels medium or rather long; sepals lanceolate, long-attenuate, tomentose, greenish, long-glandular, acicular; petals slightly longer than sepals, obovate, white; stamens distinctly longer than style. July.

Forest edges.—Caucasus: Cisc., W. and E. Transc.? Endemic. Described from the vicinity of Alagir. Type in Leningrad.

Note. *R. ponticus* appears to be an intermediate form between *R. caucasicus* Focke (or, possibly, another allied species) and *R. hirtus* W. et K.; this form may be a hybrid-derivative. Besides *R. ponticus* there are in the forests of Transcaucasia many other forms of analogous derivation but far from identical with it; all these forms thus far have not been properly studied.

Group *Hirti* Focke, Spec. Rubor. III (1914) 241.—Leaves green on both sides.

40. *R. hirtus* Waldst. et Kit., Pl. Hung. II (1805) 150.—*R. glandulosus* auct. caucas. saltem p. p.—Ic.: Waldst. et Kit., l. c., tab. 141. Exs.: G. Braun., Herb. rub germ., No. 203.

Shrub, low-growing; annotinous shoots prostrate, strongly arcuately curved at base, rooting and branching in the fall at summit, cylindrical in lower part, often obtusely ribbed above, with inconspicuous glaucous bloom or without it, more or less hairy, densely covered with stalked glands varying in length and thin acicular prickles slightly spreading below, somewhat dilated at base; leaves ternate, rarely quinate; stipules linear; leaflets petiolulate, thin, unequally serrate, hairy on both sides, dark green; terminal leaflet two or three times longer than its petiolule, ovate, oblong or obovate, slightly cordate at base, gradually attenuate at apex. Flower-bearing shoots pubescent and armed like the annotinous shoots, often with very long and flexible glandular bristles; leaves smaller than in annotinous shoots, otherwise similar; inflorescence often elongated, loose or compact, leafy in lower part, tapering above, paniculate with lateral racemose branches and terminal raceme; flowers medium-sized or small, often long pediceled; sepals densely glandular outside and often acicular-bristly, declinate at anthesis, later erect, appressed to fruit, rarely spreading; petals narrow, oblong or spatulate-oblong, white; outer stamens ascending-erect, longer than style, inner stamens erect, shorter than pistils; ovaries glabrous or hairy; styles often reddish; fruit usually small, black. End of June–July. (Plate 5, Figure 2).

Mountainous forests (particularly spruce and beech).— European part: Crim. (between the Crimean State Reserve and Chatyr-Dag).— Caucasus: Cisc., E. and W. Transc. **Gen. distr.:** Centr. Eur., Med., Bal.-As. Min. Described from Hungary.

Note. An extremely polymorphic and, apparently, aggregate species whose forms have not been studied in the USSR. A multitude of elementary [micro-] species within the range of this type has been described from Western Europe, and some of them (in particular: *R. crassus* Holuby, *R. kaltenbachii* Metsch, *R. minutiflorus* P.-J. Müll., *R. tenuidentatus* Sudre, *R. interruptus* Sudre, and *R. declivis* Sudre) are reported for the Caucasus by Sudre (most of them from W. Transc., *R. declivis* from the vicinity of Tbilisi). Whether the Soviet forms are homologous with the West European is problematical (not to mention the vague taxonomic significance of the forms into which *R. hirtus* W.K. is subdivided).

× *R. adenocladus* Juz. in Bull. Appl. Bot. Pl. Breed. XIV, No. 3 (1925) 158, non Borb. (*R. hirtus* W.K. × *R. piceetorum* Juz.). More similar to *R. piceetorum*, distinguished by the pilose turions and the densely glandular axis of inflorescence and sepals. Described from the vicinity of Borzhomi (between Libani and Sakochavi). Type in Leningrad.

41. *R. serpens* Weihe in Lej. et Court., Consp. fl. Belg. II (1831) 172.— Ic.: Sudre, Rub. Eur., tab. CCI.— Exs.: Sudre, Bat. Eur. 192.

Shrub, yellowish green; stems prostrate, cylindrical, usually more or less pubescent, densely beset with pale glands and sparse prickles; leaves 3–5-paired, usually light green, pubescent at both sides (more densely beneath); leaflets finely serrate-dentate, the terminal ovate, acuminate, three to four times longer than its petiolule. Flower-bearing shoots pubescent, pale yellow, sparsely armed with thin prickles; inflorescence short, more or less leafy, long-glandular, yellowish bristly; pedicels and calyx glandular,

without prickles or slightly bristly, greenish; fruiting sepals spreading or ascending; petals medium-sized, pale; stamens longer than style; ovaries often glabrous. July.

Shady mountainous forests. — Caucasus: Cisc., E. and W. Transc.

Gen. distr.: Centr. Eur. Described from Belgium.

Note. In addition to the typical forms of *R. serpens*, there are in the Caucasus forms with stamens shorter than the styles (*R. vepallidus* Sudre, Rub. Pyr. (1901) 175; exs. Baenitz, Herb. eur. 9546) and forms with pedicels and petioles densely armed with acicular prickles (*R. rivularis* P.-J. Müll. et Wirtg., Herb. rib. rhen. ed. I (1858) No. 107; Flora XLII (1859) 237); Sudre referred the Caucasian specimens of this latter type to *R. horridulus* P.-J. Müll.

Section 9. **CORYLIFOLIUM** Focke in Nat. Ver. Bremen I (1868) 277. — Annotinous shoots arcuately prostrate, usually glandular, often with glaucous bloom, glabrous or puberulent, with erect unequal prickles. Leaves green on both sides or canescent beneath, usually ternate; leaflets wide, often overlapping each other at margins, lower leaves very short-petiолuled; stipules lanceolate. Inflorescences reduced; petals wide; drupelets large, fruiting sepals adhering to fruits.

42. *R. caesius* L., Sp. pl. (1753) 483; Ldb., Fl. Ross. II, 66; Kryl., Fl. Zap. Sib. VII (1933) 1472. — ? *R. caesius* var. *turkestanicus* Rgl. in Gartenfl. 41 (1892) 41; *R. caesius* subsp. *turkestanicus* Focke, Spec. Ryb. III (1914) 254. — *R. turkestanicus* Pavlov in Acta Univ. As. Med., ser. VIII b, Bot., fasc. 19 (1935) 17. — *R. caesius* subsp. *leucosepalus* Focke, l. c. — *R. psilophyllus* Nevski in Acta Inst. Bot. Ac. Sc. USSR ser. I, fasc. IV (1937) 247, non R. Kell. — Ic.: Schlecht., Fl. Deutschl. III (1888) tab. 400; Lindm., Bild. Nord. Fl. (1905) tab. 308; Syreishch., III. Fl. Mosk. gub. II (1907) 247. — Exs.: Baenitz, Herb. eur. No. 8541, 9031, 9509.

Shrub, 50–150 cm high; annotinous shoots arcuately spreading, branched and rooting in the fall at summit, cylindrical, with glaucous bloom, usually glabrous; prickles numerous, unequal in size and shape, small, straight or curved, partly setiform, often with stalked glands; leaves ternate; stipules broadly lanceolate; petioles pubescent, aculeate, indistinctly canaliculate above; leaflets pale green, with coarse, irregular and often incised teeth, remotely pilose at both sides; terminal leaflet nearly two times longer than its petiolule, ovate-rhombic, acute, sometimes 3-lobed, lateral leaflets very short-petiолuled, often 2-lobed. Flower-bearing branches rather long, spreading, with rather numerous prickles and glands; inflorescence branches often long and slender; flowers rather large; sepals green, pilose, often glandular, appressed to fruit; petals broadly elliptic, white; stamens nearly as long as style; ovaries glabrous; fruit often abortive, large, black, covered with a glaucous dull bloom; drupelets few, large, flattened, with uncinately curved mucro. June–July, Fr. August. (Plate V, Figure 3).

Forests, ravines, among shrubs, clearings, banks of rivers and streams, forest and inundated meadows, gardens, orchards, roadsides, hedges. — European part: all regions except Kar.-Lap.; W. Siberia: all regions;

Centr. Asia; all regions; Caucasus: all regions. Gen. distr.: all W. Eur. except for N. Scand., As. Min., Iran. Described from Europe. Type in London.

Economic importance. The fruit is very succulent but not tasty and for this reason is not as widely used as the fruits of other species of the dew-berry. The young leaves are a substitute for tea.

× *R. idaeoides* Ruthe sec. Focke, Syn. Rub. Germ. (1877) 411. — *R. idaeo-caesius* et *R. caesio-idaeus* G. F. W. May., Fl. Han. excurs. (1849) 172–173. (*R. caesius* L. × *R. idaeus*). — Exs.: Baenitz, Herb. eur. No. 9508, 9930. — Turions cylindrical; prickles subulate; leaves 3–5-paired. Inflorescence short, corymbiform. — Encountered sporadically in different parts of the general area of the parental species. Described from Germany.

This hybrid has formed beyond the range of the USSR a series of fertile hybrid forms described as independent species. Similar forms may possibly be found even in the USSR (probably one of them is the critical *R. caesius* var. *turkestanicus* Rgl., with stems and fruit without bloom, 3-fid terminal leaflets, narrow limb of petal, and elongated fruit with numerous drupelets).

× *R. suberectiformis* Sudre, Rubi Eur. (1908–1913) 234. — *R. dumentorum* et *R. nemorosus* auct. Fl. Ross. saltem p. p.;? Ldb., Fl. Ross. II, 67 p. p. (*R. caesius* L. × *R. nessensis* W. Hall). — Annotinous shoots indistinctly angled, glabrous, glaucescent; prickles weak, subequal; leaves large; cauline leaves usually quinate, green beneath; terminal leaflet sub-orbicular; cordate, short-acuminate. Main axis puberulous, slightly short-glandular; sepals greenish-tomentose, spreading after anthesis; filaments barely longer than style; fruit usually abortive. — European part: M. Dnp., V.-Don. Described from France.

× *R. virgultorum* P.-J. Müll., Vers. Monogr. Beschr. gallo-germ. Rub. (1859) No. 217 (*R. caesius* L. × *R. candicans* Weihe). — Exs.: Baenitz, Herb. Eur. No. 9028, 9507. — Annotinous shoots angled, without bloom, prickles flattened, subequal, leaves ternate and quinate, strong-toothed, grayish-tomentose beneath. Inflorescence narrow, few-flowered, leafy, its axis pilose, short-glandular; sepals tomentose, spreading; fruit abortive. — Caucasus: W. and E. Transc. Described from Germany.

58 × *R. divergens* P.-J. Müll. in Flora (1858) 182 (*R. caesius* L. × *R. tomentosus* Borkh.). — Annotinous shoots angled, not glandular; leaves ternate-quinate, slightly tomentose above, gray- or white-tomentose beneath; terminal leaflet ovate or rhombic, acute. Inflorescence short, broadly bracteate; sepals tomentose, spreading; ovaries glabrous; fruit not developing. — European part: Crim. Described from Germany.

× *R. deltoideus* P.-J. Müll. in Flora (1858) 181 (*R. caesius* L. × *R. lloydianus* Genev.). — Leaves glabrous or slightly hairy above, the rest like *R. divergens*. — Caucasus: Cisc., W. Transc. Described from Germany.

Doubtful species: *R. oligacanthus* Stev. in Bull. Soc. Nat. Mosc. XXIX (1856) II, 178, described most inadequately and, apparently, only the flower-bearing shoots. — European part: Crim. (between Ai-Vasil and Stili). Type in Helsinki.

Genus 735. **FRAGARIA** * L.

L., Spec. pl. (1753) 494.

Flowers in corymbiform few-flowered or rather many-flowered inflorescences, bisexual or unisexual [then plants dioecious]; sepals and outer sepals 5, the outer shorter than the inner, more or less spreading in aestivation; petals 5, obovate, white; fruitlets numerous, nutlike, disposed on ovate or conical torus developing receptacle after anthesis and becoming fleshy and succulent, falling off toward end. — Perennials; radical leaves rosetted, long-petioled, ternate, pale green beneath; sterile shoots (stolons), rooting at summit, nodular, forming new rosettes; flowering stems with few, often entire, small leaves.

1. Cultivated (rarely wild) forms with more or less coriaceous leaves and large fruit, 2–3 cm in diameter 2.
- + Leaves usually thinner; fruit relatively small 4.
2. Achenes sunken in fruit pulp, lying in deep pits on torus **F. virginiana* Duch.
- + Achenes not sunken 3.
3. Leaves very thick and coriaceous, hairy on both sides, silky-tomentose beneath, distinctly netted with protruding veins **F. chiloensis* Duch.
- + Leaves not as thick and coriaceous, silky beneath but not tomentose or sparsely hairy and with slightly protruding network of veins 7. *F. ananassa* Duch.
4. Fruiting sepals spreading or recurved below 5.
- + Fruiting sepals ascending-erect or appressed to fruit 7.
5. Pedicels appressed-hairy 1. *F. vesca* L.
- + Pedicels spreading hairy 6.
- 59 6. Stem much longer than radical leaves; flowers unisexual (plant dioecious) 2. *F. moschata* Duch.
- + Stem as long as or scarcely longer than radical leaves; flowers bisexual 3. *F. orientalis* Lozinsk.
7. Hairs on pedicels appressed or adhering 8.
- + All pedicels with spreading hairs 5. *F. campestris* Stev.
8. Stem and petioles of radical leaves spreading hairy 4. *F. viridis* Duch.
- + Stem and petioles of radical leaves appressed-hairy 6. *E. bucharica* Lozinsk.

Series 1. *Vescae* Juz. — Pedicels appressed-hairy; fruiting sepals divergent.

1. *F. vesca* L., Sp. pl. ed. I (1753) 494 p. p.; Ldb., Fl. Ross. II, 63. — *F. silvestris* Duch., Hist. Nat. Fraiss. (1766) 61. — *F. vulgaris* Ehrh.,

* From the Latin *fragum* — Virgil's name for the strawberry.

Beitr. 7 (1792) 21. — *F. succulenta* Gilib., Fl. Lithuan. V. (1781) 1247. — *Potentilla vesca* Scop., Fl. Carn. ed. 2, I (1772) 363. — Ic.: Sv., Bot. tab. 16; Fl. Dan. tab. 1235; Schlecht. Lang. et Schenk, Fl. Deutschl. ed. V, XXV (1886) 2581. — Syreishch., Ill. Fl. Mosk. gub. II (1907) 249.

Perennial, 5–20(30) cm high; rootstock horizontal or oblique, densely covered with decayed stipules and leaves, developing in axils of radical leaves, long stolons rooting on nodes; stems erect or ascending, barely exceeding radical leaves, covered in lower part with spreading hairs, more or less appressed in upper part; radical leaves long-petioled, covered with horizontally spreading hairs; leaflets 3, the middle short-petioluled, ovate or rhombic, the lateral obliquely ovate, usually sessile, with 6–13 large triangular-subovate or suborbicular teeth on each side, terminating in a small reddish mucro, terminal tooth smaller than the adjacent teeth but exerted above them, leaflets dark green, diffusely appressed hairy at apex, glaucous-green, diffusely appressed-silky-hairy beneath, with slightly protruding lateral veins; stipules lanceolate, long-acuminate, entire, appressed-hairy beneath. Inflorescence with reduced cauline leaves at base, corymbiform, few-flowered; pedicels long, appressed-hairy; flowers usually not more than 2 cm in diameter, usually bisexual; sepals triangular, acute or short-acuminate, appressed-hairy, spreading or recurved below in fruit, outer sepals linear or lanceolate; petals 4–8(10) mm long, ovate or orbicular, clawed, usually white; stamens as long as or longer than pistil; torus glabrous or slightly hairy; fruit up to 2 cm long, ovoid, turbinate or subglobose, bright red when ripe. End of May, June. (Plate VI, Figure 1).

60

Dry grassy slopes, meadows, forests, among shrubs. — European part: entire region except for Bl., L. V.; W. Siberia: entire region; E. Siberia: entire region (?); Centr. Asia: Dzu.-Tarb., T. Sh.; Caucasus: entire region. **Gen. distr.:** nearly all Europe, N. Africa, growing wild in N. and S. America. Described from Northern Europe. Type in London.

Economic importance. The fruit is eaten raw, dried, and used for jams. The dried fruit is a substitute for tea and serves for medical purposes. The best known strain under cultivation is the "remontant" strawberry which is distinguished by its robust growth, large spreading inflorescence and long flowering and fruiting periods (*F. semperflorens* Duch. Hist. Nat. frais. (1766) 49).

Series 2. **Moschatae** Juz. — Pedicels spreadingly hairy; sepals spreading or declinate in fruit.

2. **F. moschata** Duch., Hist. Nat. Frais. (1766) 145. — *F. pratensis* Duch. in Lam. Encycl. II (1786) 536. — *F. elatior* Ehrh., Beitr. VII (1792) 23; Ldb., Fl. Ross. II, 64. — *F. magna* Thuill., Fl. Paris ed. 2 (1799) 254. — *F. reversa* Kit. in Linnaea XXXII (1863) 595. — Ic.: Schlecht., Lang. et Schenk, Fl. Deutschl. ed. V, XXV (1886) 2582; Rchb., Ic. Fl. Germ. XXV (1909). 2.

Perennial; stem 15–40 cm tall; rootstock horizontal, oblique or suberect, densely covered with relics of stipules and leaves; stolons thin, usually short, often absent; stem erect, usually longer than leaves, densely covered like petioles with horizontally spreading simple and glandular hairs; leaves

large, glaucescent-green beneath, leaflets ovate-rhombic, short-petioluled, hairy above, densely silky-hairy beneath, prominently nerved, large- and broad-toothed; stipules broadly lanceolate, acuminate. Inflorescence corymbiform, 5–12-flowered, pedicels short densely spreadingly hairy, much elongated after anthesis — then covered with hairs spreading below; flowers large, up to 2.5 cm, usually unisexual, often dioecious; petals 5–12 mm long, obovate to orbicular, overlapping at margins, short-clawed; outer sepals shorter and narrower than lanceolate sepals, linear-lanceolate, both considerably shorter than petals, appressed-hairy, spreading or declinate in fruit; stamens as long as or shorter than pistil, up to 5 mm long in staminate flowers; fruit ovoid or globose, tapering to a crown free from achenes, often abortive, white, greenish white, reddening only at one side, pinkish or rarely red, separating with difficulty from the hairy torus; achenes glabrous, sunken. June–July. (Plate VI, Figure 2).

61 Forests, shrubby formations, parks, usually in shady places and among tall grasses. — European part: Dv.-Pech., Lad.-Ilm., U. V., U. Dnp., M. Dnp., V.-Don. **Gen. distr.:** Scand., Centr. Eur., Atl. Eur., rarely Med. Described from Europe. Type unknown.

Economic importance. Fruit eaten raw, used for jams and in confectionery. The plant is seldom cultivated.

3. **F. orientalis** Lozinsk. in Bull. Jard. Bot. Princ. URSS. XXV, livr. I (1926) 70. — *F. collina* et *F. elatior* auct. fl. Sib. p. p. et fl. Orienti Extr., non Ehrh. — Ic.: Lozinsk., l. c., fig. 5 (mediocr.). — Exs.: F. Karo, Pl. Amur. et Zeaënsae, No. 292 (sub nom. *F. neglecta*).

Perennial, 20 cm tall; rootstock usually short, oblique, developing many adventitious roots; stolons long, thin, rarely absent; stem erect, as long as or slightly longer than radical leaves, covered like petioles with spreading hairs; leaves with short sparse hairs above, densely silky-hairy beneath; leaflets ovate-rhombic, subsessile, with 6–9 large, deeply incised teeth on each side. Inflorescence few-flowered, covered at base with long-petioled, rather large cauline leaf with 2–3 leaflets; bracts rather large, often foliaceous, distinctly nerved, hairy; flowers large, 2.5–3 cm, nearly always bisexual; pedicels robust, densely covered beneath with spreading hairs; petals 1 cm long, orbicular, overlapping at margins; calyx densely hairy, spreading in fruit; sepals lanceolate; outer sepals linear-lanceolate, shorter than sepals; fruit conoidal or globose, red; achenes sunken. June. (Plate VI, Figure 3).

Forests, open mountain slopes, often on stony surfaces. — E. Siberia: Lena-Kol., Ang.-Say., Dau. Far East: Ze.-Bu., Uss., Uda. **Gen. distr.:** Mong., Manchuria, Korea. Described from the Maritime Territory. Type in Leningrad.

Economic importance. In the Far East the plant is picked for commercial purposes; it is also eaten raw and used in confectionery. Virtually unknown in cultivation.

Series 3. **Virides** Juz. — Pedicels appressed or spreadingly hairy. Fruiting sepals erect or appressed to fruit.

4. *F. viridis* Duch., Hist. nat. frais. (1766) 135. — *F. collina* Ehrh., Beitr. VII (1792) 26; Ldb., Fl. Ross. II, 64. — Ic.: Schlecht., Lang et Schenk, Fl. Deutschl. ed. V, XXV (1886) 2583; Rchb., Ic. Fl. Germ. XXV (1909) 3.

62 Perennial, 5–20 cm tall; rootstock oblique, simple or few-branched, developing numerous adventitious roots and densely covered with relics of stipules and petioles; stolons often short, filiform, or absent; stem erect, as long as or slightly longer than leaves, rather thin, densely covered with spreading hairs, often erectly spreading in upper part or appressed; stipules rather narrow, brown; radical leaves petioled, villous with densely spreading hairs; median leaflet short-petioluled, ovate or obovate; cauline leaves sessile or very short-petioled, obliquely ovate, with small, obtuse, rarely rounded teeth on both sides, terminal tooth small, markedly shorter than the adjacent ones, green, shiny, appressed-hairy above, canescent beneath with dense appressed, silky-shiny hairs, especially dense on the exerted nerves. Inflorescence small, corymbiform, loose, few-flowered, covered at base with entire or tripartite apical leaves; pedicels short, with appressed or erectly spreading hairs (lower pedicels rarely horizontally spreading); flowers large, 2.5 cm in diameter, usually bisexual; sepals triangular, lanceolate, not longer than corolla, appressed-hairy, appressed in fruit; outer sepals as long as sepals or slightly longer, linear-lanceolate, sometimes bifid at apex; petals 5–10 mm long, orbicular or obovate, overlapping at margins, short-clawed, yellowish white; stamens two times longer than pistil (in sterile flowers) or equal to them (in fertile flowers); torus hairy, ca. 1 cm long; fruit globose or obovoid, tapering at base, usually yellowish-white, reddish only at apex, rarely wholly pink or pale red, with slightly sunken achenes, separating with difficulty from torus, very aromatic. End May, June. (Plate VI, Figure 4).

Open grassy slopes, meadows, meadow steppes, forest edges, among shrubs. — European part: Lad.-Ilm., U. V., Transv., U. Dnp., M. Dnp., Bl., V.-Don, V.-Kama, Crim.; Caucasus: entire region; W. Siberia: entire region; E. Siberia; Lena-Kol., Dau.; Centr. Asia: Dzu.-Tarb., T. Sh. **Gen. distr.:** nearly all Europe (except for the extreme north and south Med.). Described from Europe. Type unknown.

Economic importance. The fruit is eaten raw and used to make jams; it is also of commercial use.

5. *F. campestris* Stev. in Bull. Soc. Nat. Mosc. XXIX, III (1856) 176. — *F. neglecta* Lindem. in Bull. Soc. Mosc. XXVIII, 2 (1865) 218 saltem p. p. — *F. praecox* Lozinsk. in Bull. Jard. Bot. Princ. URSS, XXV, 1 (1926) 59, non Kit.

Perennial; distinguished from *F. viridis* only by the spreading hairs on pedicels and the markedly sunken achenes in fruit pulp. May–June.

In the same places as *F. viridis*. — European part: M. Dnp., Bl., Crim.; Caucasus: W. Transc.; E. Siberia: Yenisi. Endemic? Described from the Crimea. Type in Helsinki, cotype in Leningrad.

63 **Note.** A critical taxon whose specific status has in recent years been sustained by A. S. Lozinskaya. Its distribution is quite sporadic although all localities are found within the distribution area of *F. viridis*, a fact which seems to argue against the independence of this taxon. However, it is impossible not to note that *F. campestris* is more southern in its general distribution.

6. *F. bucharica* Lozinsk. in Bull. Jard. Bot. Princ. URSS, XXV, livr. I (1926) 64. — Ic.: Lozinsk., l. c., f. 2 (mala).

Perennial, 6–15 cm tall; rootstock simple, densely covered with relics of petioles and stipules; stolons long, thin, becoming dark brown; stems longer than radical leaves, thin, covered like petioles of radical leaves with slender appressed hairs; leaves nearly as long as petioles, sparsely hairy, glabrescent above, short-hairy beneath, with longer hairs only along nerves; leaflets broadly obovate, thin, short-petiololed or lateral leaflets usually sessile, with 5–7 large teeth on each side; cauline leaf 1, at inflorescence base, often entire. Inflorescence few-flowered, with 1–3 flowers; pedicels thin, rather long, covered with compactly appressed thin hairs, curved after anthesis; bracts minute; flowers ca. 1 cm in diameter; petals slightly longer than calyx; sepals ovate-lanceolate, finely appressed-hairy; outer sepals lanceolate, nearly as long as sepals; fruit with strongly appressed calyx. July. (Plate VI, Figure 5).

Stream banks in the subalpine mountain zone. — Centr. Asia: Pam.-Al. (Tadzhikistan). Endemic. Described from Khodzha-Obi-Garm. Type in Leningrad.

Note. This species is closely related to the Himalayan *F. nubicola* Lindl., also encountered in Afghanistan.

Series 4. *Neogaeae* Juz. — Large-fruited, multichromosomal (octoploid) species, usually with more or less coriaceous leaves.

7. *F. ananassa* Duch., Hist. nat. des Fraisiers (1766) 190. — *F. grandiflora* Ehrh., Beitr. 7 (1792) 25. — *F. chiloensis* (L.) Ehrh. × *F. virginiana* Duch. — Ic.: Decaisne, Jard. Fruit. Mus. IX (1862–1875); Rchb., Ic. Fl. Germ. XXV (1909) 4.

Perennial; rootstock few-branched or branchless, developing short stolons; stem 10–20(45) cm tall, erect at first, later decumbent, not exceeding radical leaves, covered with long spreading hairs; radical leaves large, long-petioled, 10–30 cm long, covered with erectly spreading hairs, leaflets 4–15 cm long, petiololed, coriaceous, broadly obovate, rounded at apex, strongly short-toothed, slightly glossy at apex, diffusely hairy, pale green and densely hairy beneath (especially along nerves). Inflorescence rather many-flowered; pedicels 2–5 cm long, covered with erectly spreading hairs; flowers large, more than 2 cm in diameter; sepals large, ovate, acuminate, loosely adhering to fruit; outer sepals lanceolate, about as long as sepals, both often increased in number; petals obovate-orbicular, longer than 1 cm; fruit large, 2–3 cm in diameter, red or reddish white, separating from torus with difficulty, often acute at apex, sometimes slightly laterally flattened, irregular in shape; achenes sunken in shallow pits. May–June.

Grown in a multitude of strains, sometimes escaped. **Gen. distr.:** known only as a cultivated plant. Described from cultivated specimens of unknown (unquestionably hybrid) derivation. Type unknown.

Economic importance. One of the more important and more widely distributed cultivated berries in the USSR, absent only in the Far North; more than 24,000 ha are under cultivation in the USSR at the present time. The fruit of the garden strawberry is considerably larger than the wild-growing specimens of the species and is much richer in sugar (5–8%),

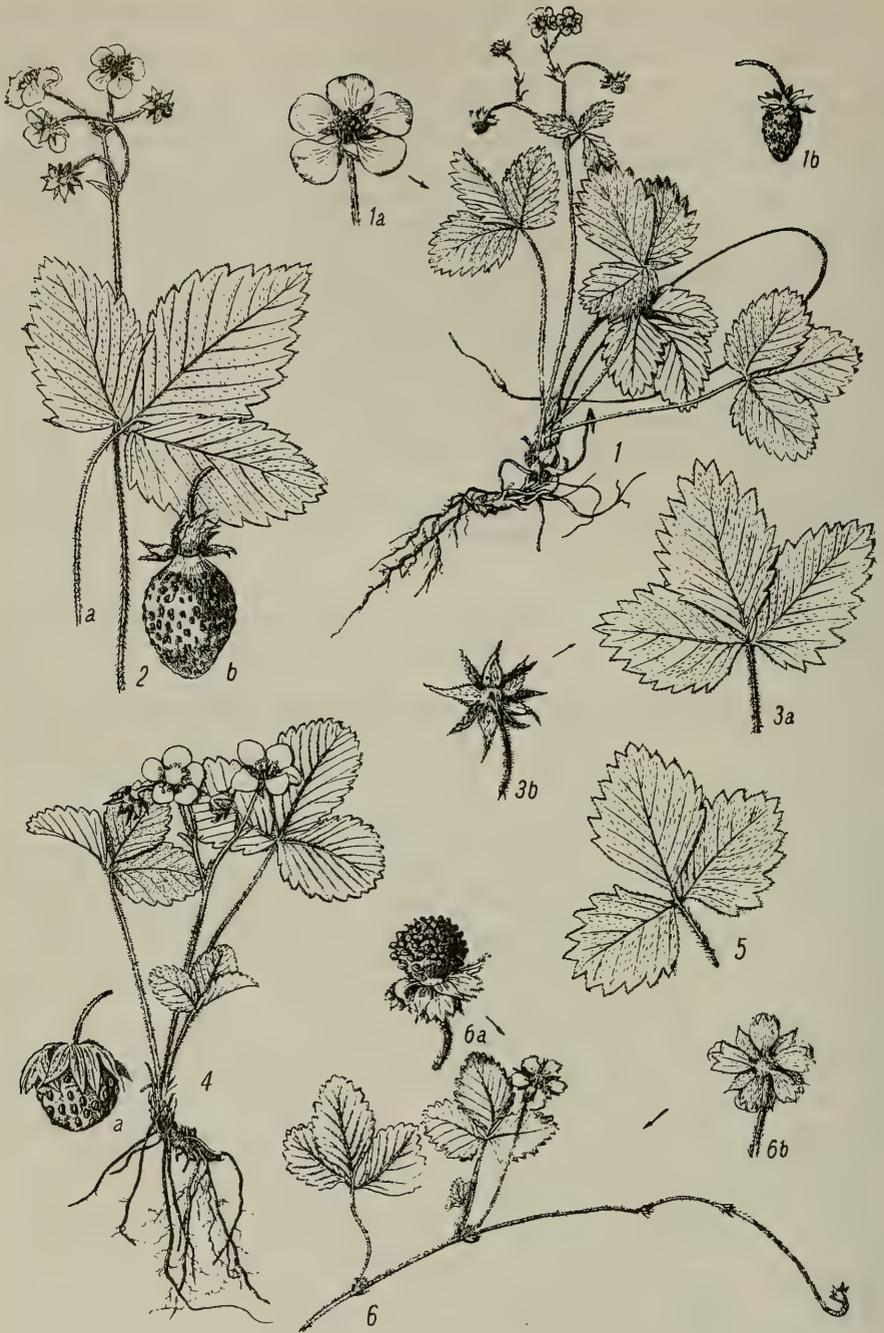


PLATE VI. 1 - *Fragaria vesca* L., general view, a) flowers, b) fruit; 2 - *F. moschata* Duch., a) leaves and scape, b) fruit; 3 - *F. orientalis* Lozinsk., a) leaves, b) calyx; 4 - *F. viridis* Duch., general view, a) fruit; 5 - *F. bucharica* Lozinsk., leaves; 6 - *Duchesnea indica* (Andr.) Focke, general view, a) fruit, b) calyx.

but it contains less acid and is less fragrant. It is eaten raw and used for jams, preserves, other confectioneries, syrups, etc.

Note. Besides the garden strawberries which are hybrid-derivatives, both parental forms (or, at any rate, hybrids very closely related to them) are encountered in cultivation; some of their characteristics are briefly noted below.

* **F. chiloënsis** Duch., Hist. Nat. Frais. (1766) 165.— *F. vesca* γ *chiloënsis* L., Sp. pl. (1753) 495.— *F. chilensis* Molina, Sagg. Chile (1784) 134.— Ic.: Rev. Hort. IV, 2; Decaisne, Jard. Fr. Mus. IX (1862–1875).

Perennial; stems 15–25 cm tall, erect, as long as or longer than radical leaves, stems and petioles of radical leaves spreadingly hairy above; leaflets of radical leaves glossy above, coarse-hairy beneath, with flat wide teeth. Inflorescence usually few-flowered; flowers rather large; pedicels densely spreadingly hairy; sepals loosely adhering to fruit; fruit large (up to 3 cm long) and red. May–June.

Grown. Gen. distr.: N. and S. Am., Sandwich Islands. Described from southern Chile. Type unknown.

* **F. virginiana** Duch., Hist. Nat. Fr. (1766) 204.— Ic.: Britt. et Brown, Ill. Fl. II (1897) 201; Decaisne, Jard. Fr. Mus. IX (1862–1875) tab. 2.

Perennial; stem 15–25 cm tall, erect at first, finally decumbent, shorter than radical leaves, stem and petioles of radical leaves covered with 67 appressed or usually spreading hairs; radical leaves with petiolate, acutely serrate, glabrescent above leaflets, becoming slightly coriaceous. Inflorescence usually few-flowered; pedicels appressed-hairy; flowers not fully dioecious, rather large; fruiting sepals spreading; fruit dark red, large; achenes sunken in deep pits. May–June.

Cultivated. Gen. distr.: N. Am. Described from Virginia and Canada. Type unknown.

Genus 736. **DUCHESNEA** * Smith

Smith in Trans. Linn., Soc. I (1811) 372.

Flowers solitary, axillary in cauline leaves, bisexual; hypanthium flat; outer sepals, inner sepals and petals 5; outer sepals large, 3–5-toothed at apex; petals yellow; stamens 20–25; torus (carpopore) subglobose or conoidal, glabrous, with numerous ovaries, strongly developing in fruit, becoming globose or turbinate, fleshy or spongy, reddening but not separating from hypanthium like the species of *Fragaria*; fruitlets arranged on the fleshy carpophore; styles filiform, slightly dilating at apex, lateral or nearly terminal.— Perennial herbs with short rootstock and long, creeping, filiform stems rooting at nodes; leaves ternate.

1. **D. indica** (Andrews) Focke in Engl. u. Prantl, Nat. Pflanzenfam. III, 3 (1888) 33.— *Fragaria indica* Andrews, Bot. Rep. VII (1807) tab. 479.—

* Named after the French botanist, Antoine Nicolas Duchesne, 1747–1827, author of a monograph on *Fragaria* (1766), which was remarkable for its time.

F. roxburghii Wright et Arn., Prodr. (1834) 300. — *D. fragarioides* Smith, Trans. Linn. Soc. X (1811) 373. — *D. fragiformis* Don, Prodr. Fl. Nep. (1803) 233. — *Potentilla durandii* Torr. and Gr., Fl. N. Am. I (1840) 447. — *P. trifida* Lehm., Add. ad Ind. Sem. Hort. Bot. Hamb. (1851) 10. — *D. chrysantha* Miq., Fl. Ind. bat. I (1855) 372. — *Potentilla indica* T. Wolf in Asch. et Gr., Syn. VI (1904) 64. — Ic.: Bot. Reg. I, pl. 61; Wight., Ic. Pl. Ind. Or. III, tab. 989.

68 Perennial; rootstock fasciculate or nearly simple; rachis developing thin simple leafy creeping stems, 30–100 cm long, covered like petioles and pedicels with spreading hairs, sometimes interspersed with stalked glands, finally reddening; radical leaves numerous, long-petioled, ternate; cauline leaves with shorter petioles; stipules ovate-lanceolate, entire, in upper cauline leaves foliaceous, notched; leaflets petioluled, cuneately obovate or rhombic, up to 2–3 cm long, crenate-dentate, spreadingly hairy on both sides, green. Flowers on long and thin pedicels, 15–20 mm in diameter; outer sepals foliaceous, 3–5-toothed or lobed at apex, recurved after anthesis; inner sepals as long as the outer or almost so, ovate-lanceolate; petals oblong-cuneate, slightly notched; filaments long, anthers ovate; fruitlets oblong-ovate, indistinctly rugose, dark red; styles as long as fruitlet. May–October.

Escape. — Caucasus: W. Transc. **Gen. distr.:** Jap.-Ch., India, Malay Archipelago, growing wild in W. Eur. (Med., Centr. Eur.), N. and S. Am. Described from India. (Plate VI, Figure 6).

Economic importance. Cultivated in gardens as an ornamental plant (especially as a climber).

Genus 737. **DASIPHORA** * RAF.

Raf. Aut. Bot. (1838) 167.

Flowers solitary or in few-flowered inflorescences, rather large or medium-sized; hypanthium patelliform; outer sepals, sepals and petals 5; petals yellow or white, usually orbicular, nearly clawless; stamens ca. 25, disposed on a 5-angled disk encircling torus; torus subglobose; pistils numerous; styles clavate, robust nearly from base of ovary, with large lobate stigma; fruitlets densely long-hairy. — Shrubs with scarious stipules and pinnate, rarely ternate leaves; lower lateral leaves and their terminal leaflets jointed at base; petioles jointed in two places (at base and where the lower pair of leaflets originate); upper pair of leaflets (if present) decurrent at base.

- 1. Flowers yellow; outer sepals acute, as long as or slightly longer than inner sepals; leaves more or less hairy 2.
- + Flowers white; outer sepals obtuse, considerably shorter than the inner; leaves glabrous or silky-villous 5.
- 2. Stipules acute; leaves with 2 pairs of lateral leaflets, rarely with 3 pairs and then the lower pair of leaflets more or less remote. Flowers usually large, up to 3 cm in diameter 3.

* Very probably from *dasy-* thick-haired, and *phoros-* to carry.

- + Stipules obtuse; leaves (at least most of them) with 3 (sometimes even 4) pairs of lateral leaflets, the lower 2 (or 3) pairs of leaflets shifted and appearing as if whorled. Flowers usually small or medium-sized (up to 1.5 cm in diameter) 4.
- 69 3. Erect, rarely prostrate shrub, 15–150 cm high; leaves usually large. Flowers solitary or in few-flowered racemes; calyx usually green; outer sepals entire or sometimes bifid 1. *D. fruticosa* (L.) Rydb.
- + Low, prostrate shrub, 5–20 cm high; leaves small, 5–15 mm long. Flowers solitary; calyx more or less red, outer sepals foliaceous, binate or ternate 2. *D. phyllocalyx* Juz.
- 4. Shrub, 15–80 cm high; leaves usually with 7 linear or linear-lanceolate, acute leaflets, densely appressed-hairy beneath, markedly reflexed at margins 3. *D. parvifolia* (Fisch.) Juz.
- + Prostrate shrub, 3–12 cm high; leaves septenate but many quinate and ternate; leaflets elliptic, obtuse, sparsely spreadingly hairy beneath, often not reflexed at margins 4. *D. dryadanthoides* Juz.
- 5. Leaves glabrous 5. *D. davurica* (Nestl.) Kom.
- + Leaves silky-villous 6. *D. mandshurica* (Maxim.) Juz.

Series 1. **Fruticosae** Juz.— Leaves always quinate. Flowers large; petals yellow; outer sepals usually as long as the inner.

1. *D. fruticosa* (L.) Rydb. in Mem. Dep. Bot. Columbia Univ. II (1898) 188.— *D. riparia* Raf., Aut. Bot. (1838) 167.— *D. floribunda* Raf., l. c.— *Potentilla fruticosa* L., Sp. pl. (1753) 495; Ldb., Fl. Ross. II, 61; Kryl., Fl. Zap. Sib. VII, 1486.— *Fragaria fruticosa* Crantz, Inst. II (1766) 176.— *Potentilla tenuifolia* Willd. ex Schlecht., Mag. Ges. Nat. Freunde Berl. VII (1815) 284.— *P. fruticosa* var. *vulgaris* Willd. ex Schlecht., l. c. 285.— *P. fruticosa* var. *tenuifolia* Lehm., Monogr. Pot. (1820) 32.— *D. fruticosa tenuifolia* Rydb., l. c. (1898) 190.— Ic.: Sv. Bot. 253; Rgl., Gartenfl. IX, tab. 278, f. 3.— Exs.: Siegfr., Pot. spont. cult.: 36a, 355a.

70 Shrub, erect or sometimes prostrate, usually many-branched, 20–150 cm tall, branches covered with reddish brown or gray peeling bark, silky-hairy when young; stipules ovate or lanceolate-ovate, acuminate, membranous, adnate to petiole; leaves pinnate, usually quinate, rarely septenate (if so then leaflets of lower pair separate from the rest), sometimes ternate; leaflets usually oblong, rarely oblong-ovate or lanceolate, entire, usually acute at apex, flat or often more or less reflexed at margins, sparsely or rather densely appressed-hairy above, sparsely or usually more or less densely — often very densely— hairy beneath, whitish, often silky on both sides, especially beneath along veins and leaf margin. Flowers solitary and axillary or in small loose terminal racemose or corymbiform inflorescences, usually large, 1.5–3 cm in diameter; hypanthium hairy or silky-villous; outer sepals linear-lanceolate, usually as long as or slightly longer than the inner, often irregularly bifid at apex, inner sepals ovate, acuminate; petals rounded, yellow, usually twice as long as sepals; anthers oblong; plant nearly dioecious (with androdynamous or gynodynamous flowers). June–August (Plate VII, Figure 2).

Riverbanks, inundated meadows and shrubby formations, stony slopes, exposed places.— Arctic: An., Chuk.; European part: V.-Kama (Urals); Caucasus: Cisc., Dag., S. Transc.; W. Siberia: Ob, Alt.; E. Siberia: entire region; Far East: entire region (except for Uss. ?); Centr. Asia: Dzu.-Tarb., T. Sh. ? **Gen. distr.:** Centr. and Atl. Eur., Scand. (Oland Island), Arm.-Kurd.; Jap.-Ch., Mong., Ber., N. Am. Described from England, Oland Island, Siberia. Type in London.

Note. A highly variable plant. A comparison of forms from different habitats reveals the considerable differences between them; however, on most of these forms, there is not sufficient material and the differing characters require experimental proof of their constancy; thus it is impossible at this time to distinguish more detailed units in the given taxon.

Economic importance. Ornamental. Leaves are a substitute for tea.

2. **D. phyllocalyx** Juz. nov. spec. in Addenda IX, p. 449.— *Potentilla phyllocalyx* Juz. in sched.— *P. fruticosa* var. *pumila* f. *grandiflora* T. Wolf, Mon. Pot. (1908) 59.

Shrub, low, usually prostrate, 5–20 cm high, flower-bearing branches erect, together with stipules and calyx usually purple; stipules ovate-lanceolate, acute; leaves small, together with petioles 0.5–1.5 cm long, but of the same shape as in *D. fruticosa*, quinate; leaflets elliptic or linear-lanceolate, more or less (often just slightly) reflexed at margins, covered on both sides (beneath especially along nerves) with sparse to rather dense, loosely appressed hairs. Flowers solitary at ends of branches, on short to rather long peduncles, very large in comparison with the dimensions of the whole plant, 2–3 cm in diameter; hypanthium densely villous with white spreading hairs; calyx hairy; outer sepals foliaceous, bifid or cleft, or very often compound with (2)3 acute, separate leaflets, as long as or slightly shorter than the wide, short-pointed sepals. Resembling *D. fruticosa* in all other parts. June–August.

71 Banks of mountain rivers, alpine meadows, moraines, rocks.— Centr. Asia: T. Sh. Endemic. Described from Centr. T. Sh. (Trans-Ili Ala-Tau). Type in Leningrad.

Series 2. **Parvifoliae** Juz.— Leaves (at least, most of them) septenate, the lower appear to be whorled (probably due to the cleft leaflets of lower pair). Flowers usually small; outer sepals as long as or shorter than the inner; petals yellow.

3. **D. parvifolia** (Fisch.) Juz. comb. nova.— *P. parvifolia* Fisch. ex Lehm., Pug. III (1831) 6.— *P. fruticosa* var. *parvifolia* T. Wolf, Mon. Pot. (1908) 58 excl. syn. Hook.— *P. fruticosa* var. *microphylla* Rupr., Sert. Tiansch. (1869) 45.— *P. fruticosa* var. *angustifolia* Rgl. et Herd., Pl. Semen. in Bull. Soc. Nat. Mosc. XXXIV, No. 3 (1866) 55.— Ic.: T. Wolf, I. c., 54, fig. 3 d (folium).

Shrub, low, prostrate or often erect, divaricately branched, 15–80 cm high, with branches covered with grayish brown or gray peeling bark, young shrub silky or slightly grayish tomentose-hairy; stipules yellowish, obtuse or rounded at apex; leaves (relatively) small, together with petioles 5–27 mm long, septenate, sometimes some quinate or with 9 leaflets; leaflets linear

or linear-lanceolate, acute, usually strongly reflexed at margins, densely silky-hairy above and very densely beneath, grayish green or usually whitish beneath. Flowers solitary or in few-flowered racemes, on long peduncles, usually 10–15 mm in diameter; hypanthium and sepals pale green, densely covered with appressed silky hairs; outer sepals linear-lanceolate, acutish, often bifid at apex, as long as or slightly shorter than the broadly ovate, pointed or acute inner sepals; petals twice as long as sepals, obovate or suborbicular; anthers ovate. June–July. (Plate VII, Figure 3).

Rocks, stony slopes, steppes. — W. Siberia: Alt., Irt.; E. Siberia: Dau.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. Gen. distr.: Mong., Dzu.-Kash. Described from Dzungaria. Type unknown.

Note. Like *D. fruticosa*, *D. parvifolia* is a rather polymorphic species, comprising a series of geographical races. There are four species in the Soviet Union: the typical *D. parvifolia*, to which the above description mainly refers; a somewhat larger flowered and a broader-leaved form from eastern Transbaikal with pubescence of the whole plant slightly more spreading, peduncles rougher and leaflets usually densely covered on both sides with silky hairs (*D. stepposa* Juz. ined.); the western Transbaikal form (*D. mollicrinis* Juz. ined.) resembles it in all parts, being spreadingly hairy, particularly along peduncles and petioles; and, finally, the high mountain Tien Shan form, parallel to *D. phyllocalyx*, with broader leaflets than the typical *D. parvifolia* Fisch. and solitary, rather large flowers (*D. imitatrix* Juz. ined.).

4. *D. dryadanthoides* Juz. nov. spec. in Addenda IX, p. 450. — *Potentilla dryadanthoides* Juz. in sched.

Shrub, low, prostrate, with ascending branches 3–12 cm long, young shrub soft-hairy and reddish; stipules obliquely ovate, rounded at apex; leaves small, with very slender petioles, septenate but mixed with quinate and ternate; leaflets elliptic, obtuse, often rounded at apex, flat or slightly reflexed at margins, scabrous-silky-tomentose above, with spreading long hairs beneath usually only along veins, often with a prominent network of lateral nerves. Flowers solitary, on very short peduncles, small, 10–15 mm in diameter; hypanthium and calyx densely covered with spreading hairs, dark purple; outer sepals lanceolate or ovate, acutish, slightly shorter and considerably narrower than the broadly ovate, acute or pointed inner sepals; petals nearly two times longer than sepals, broadly elliptic. June–July.

Rocks, stony and grassy slopes. — Centr. Asia: Pam.-Al. (Shugnan, Pamir). Endemic. Described from Pamir, at the source of the Aksai River (Murgab). Type and paratype in Leningrad.

Note. This species distinctly differs from the preceding ones of the same series; it closely resembles the Himalayan *Potentilla fruticosa* var. *pumila* Hook s. str. (*P. ochreata* auct. vix Lehm., *Dasiphora Hookeri* Juz. in sched.), but is markedly distinguished by its different pubescence.

Series 3. *Davuricae* Juz. — Leaves, as a rule, with 5 leaflets. Flowers large; outer sepals shorter than the inner, obtuse; petals white.

5. *S. davurica* (Nestl.) Kom. et Klob.-Alis., Key Pl. Far. East. reg. USSR, II (1932) 641 (quoad nomen).— *P. davurica* Nestl., Monogr. Pot. (1816) 31; Lehm., Rev. Pot. (1856) 15; T. Wolf, Monogr. Pot. (1908) 61.— *P. fruticosa* β *davurica* Lehm., Monogr. Pot. (1820) 32.— *P. glabrata* Willd. ex Schlecht., Mag. d. Nat. Fr. Berl. VII (1816) 285.— *P. glabra* Lodd., Bot. Cab. X (1826) tab. 914.— Ic.: Nestl., l. c., tab. I bis; Loddig., l. c.

73 Shrub; stems woody and the younger branches sparsely pubescent, the older covered with grayish brown peeling pieces of bark; leaves with two pairs of lateral leaflets, the upper ternate or simple, of the same shape as in *P. fruticosa*; stipules ovate or ovate-lanceolate, pointed, adnate at base to the jointed petiole, persistent, lower part of petiole scarious, glabrous or ciliate at margin and with tufts of long hairs at apex; leaflets oblong, often abruptly tapering into a sharp point, entire, glabrous on both sides, sometimes sparsely hairy only along margin, glossy above, glaucous and speckled beneath with reticulate veins, indurate, subcoriaceous. Flowers large, 2–2.5 cm in diameter, usually solitary, terminal in separate branches, long-pediceled, rarely subumbelliferous; pedicels and calyx spreadingly hairy; outer sepals ovate or elliptic, shortly mucronate, usually shorter than the inner; the inner large, broadly ovate (subtriangular), pointed; petals obovate-orbicular, entire, nearly two times longer than sepals, white. Otherwise, flowers and fruit like in *P. fruticosa*. June–August.

Rocky and grassy places along riverbanks, damp meadows.— E. Siberia: Dau.; Far East: Ze.-Bu. **Gen. distr.:** Manchuria. Described from Dauria.

× *D. friederichsenii* (Hort.).— *D. davurica* × *D. fruticosa* (cfr. Koehne, Mitteil. deutsch. dendrol. Ges. 1896, p. 49).— More like *D. fruticosa*, distinguished by the more sparing hairs, dark green leaves, and elliptic outer sepals. Cultivated (ornamental).

6. *D. mandshurica* (Maxim.) Juz., comb. nov.— *D. dahurica* Kom. et Klob.-Alis., Key Pl. Far. East. reg. USSR II (1932) 641, non *Potentilla davurica* Nestl.— *P. fruticosa* var. *mandshurica* Maxim. in Mém. Biol. Acad. Sc. St. Pétersb. IX (1872) 158; Kom., Fl. mandshur. II (1904) 491.— *P. davurica* var. *mandshurica* T. Wolf, Monogr. Pot. (1908) 61.— *P. davurica* var. *villosa* Maxim. in sched. sec. T. Wolf, l. c.

Shrub, distinguished from *D. davurica* by the slightly wider, ovate, whitish-grayish leaflets, densely silky-villous on each side.

Rocks. Far East: Uss. (Olga Bay and northward). **Gen. distr.:** Manchuria. Described from Olga Bay. Type in Leningrad.

Genus 738. **COMARUM** * L.

L., Sp. pl. (1753) 502.

Flowers in corymbiform, few-flowered or relatively many-flowered inflorescences, rather large; hypanthium flat or slightly patelliform, accrescent in fruit, more or less reddish or whitish like calyx;

* From the Greek *komaron* — name for strawberry tree (*Arbutus unedo*) in Theophrastus' work.



PLATE VII. 1 - *Comarum palustre* L., general view, a) flowers, b) aggregate fruit, c) sepals, d) separate fruitlet; 2 - *Dasiphora fruticosa* (L.) Rafin., inflorescence branch, a) calyx, b) fruitlet; 3 - *D. parvifolia* (Fisch.) Juz. leaves; 4 - *Potentilla bifurca* L., general view, a) fruitlet; 5 - *P. imbricata* Kar. et Kir., general view; 6 - *P. biflora* Willd., general view, a) flowers, b) stipules.

74 outer and inner sepals 5; petals red or white, pointed or rounded; stamens 20–25; torus subglobose, accrescent and elongating in fruit, spongy; pistils numerous; styles lateral, filiform; fruitlets glabrous or hairy. — Semishrubs with creeping rhizome and pinnate leaves.

Comarum palustre — in interglacial Riss-Würm: Upper Dnieper (Kopys, Vyshegor), Volga-Kama (Galich), Upper Volga (Prechistaya, Ilya Prorok); Pleistocene — Volga Don (Belolipki); Ladoga-II'men (Dno-Vyaz'e).

1. Leaves with 2–3 pairs of lateral leaflets; calyx without farinaceous bloom, dark purple; petals dark purple, shorter than sepals, pointed; fruitlets glabrous 1. *C. palustre* L.
- + Leaves with 3–4 pairs of lateral leaflets; calyx, young stems and peduncles covered with white farinaceous bloom; petals white, slightly longer than sepals, rounded at apex; fruitlets long-hairy 2. *C. salesovianum* (Steph.) Asch. et Gr.

1. *C. palustre* L., Sp. pl. (1753) 718; Ldb., Fl. Ross. II, 62. — *Fragaria palustris* Crantz, Stirp. Austr. II (1766) 11. — *Potentilla palustris* Scop., Fl. Carn., ed. 2, I (1772) 359; T. Wolf, Mon. Pot. (1908) 75; Kryl., Fl. Zap. Sib. VII (1933) 1492. — *Argentina rubra* Lam., Fl. Franç. III (1778) 120. — *C. rubrum* Gilib., Fl. Lithuan. II (1781) 255. — *Potentilla rubra* Hall. f. in Ser. Mus. Helv. I (1818) 56. — *P. comarum* Nestl., Monogr. Pot. (1816) 36. — *Comarum palustre* α *villosum* Pers., Syn. II (1807) 58. — *C. arcticum* Gandog. in Bull. Soc. Bot. Fr. LVI (1909) 533. — Ic.: Fl. Dan. IV, tab. 636; Schlecht., Fl. Deutschl. ed. 5, XXV, tab. 2583. — Exs.: Herb. Fl. Cauc. No. 272.

77 Perennial, 20–30 [cm] semishrub, with long, branching, woody subterranean stems [rhizomes], rooting at nodes; above-ground shoots (dying in the winter) ascending, straight, glabrous in lower part, hairy glandular above; leaves long-petioled, the lower imparipinnate, with 2(3) pairs of lateral leaflets, upper cauline leaves ternate; stipules auriform with foliaceous, ovate, acute auricles; leaflets sessile, oblong-lanceolate, sharply toothed, green above, glaucous beneath, hairy on each side or only beneath, often closely together so the leaf appears palmate. Inflorescence loose, few-flowered, leafy; pedicels and calyx covered with simple hairs and jointed glands; calyx dark purple, accrescent in fruit; outer sepals small, linear-lanceolate, patulate; the inner large, ovate-mucronate, two times longer than the outer; petals small, shorter than sepals, ovate-lanceolate, dark purple, outside often hairy; stamens 15–25; anthers ovate; torus conical, accrescent in fruit; fruitlets numerous, glabrous, with filiform lateral style two times longer than achenes. May–August. (Table VII, Figure 1).

Tundras, bogs and boggy meadows, shore of lakes and rivers, boggy forests. — Arctic: entire region; European part: entire region except for Bl., L. V., Crim.; Caucasus: Cisc., E. and S. Transc.? (Bichenak); W. Siberia: entire region; E. Siberia: entire region. **Gen. distr.:** Atl. and Centr. Eur., Scand., Mong., Jap.-Ch., N. Am. Described from Europe. Type in London.

Economic importance. Contains tannins; formerly used for medicinal purposes.

2. *C. salesovianum* (Steph.) Aschers. et Gr., Syn. VI (1904) 863. — *Potentilla salesoviana* Steph., Mem. Soc. Nat. Mosc. II (1808) 6; T. Wolf, Mon. Pot. (1908) 74. — *P. salesovii* Steph. ex Willd., Enum. Hort. Berol. (1809) 552; Lehm., Monogr. Pot. (1820) 35; Kryl., Fl. Zap. Sib. VII, 1491. — *Comarum salesovii* Bge., Delect. Sem. H. Dorp. (1839) 8; Ldb., Fl. Ross. II, 63. — Ic.: Steph., l. c., tab. 3; Lehm., l. c., tab. 1.

Perennial, 30–100 cm high; semishrub with stout, woody stem at base, covered with brown peeling bark and developing annual erect flowering shoots, finely appressed-hairy and covered with a white bloom, dying in the fall except for the woody base; leaves short-petioled, imparipinnate, 3–4 pairs of lateral leaflets, the uppermost ternate or simple; stipules scarious, with ovate-lanceolate, long-cuspidate, entire auricles; leaflets very short-petioled, markedly reduced below, oblong, deeply serrate-dentate, stoutish, glabrous above, appressed-hairy beneath, often whitish with farinaceous bloom. Inflorescence loose; flowers short-pedicelated, 3–3.5 cm in diameter; calyx large, appressed-hairy and white with farinaceous bloom; sepals short-villous, reddish; outer sepals linear-lanceolate; inner sepals very large, ovate, cuspidate, two times longer than the outer; petals large, obovate, rounded at tip, slightly longer than the outer sepals, white, sometimes with a pink tinge; filaments long; anthers obovate; stamens and pistils whitish; torus large, subglobose, densely villous-hairy; fruitlets oblong-ovoid, long-hairy; style lateral, very long. June–July.

Stony and rubbly mountain slopes, riverbanks, moraines. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. **Gen. distr.:** Mong., Tib., Him. Described from the Chuya River. Type in Leningrad.

78 Note. This species could be referred to *Comarum* L. only by a stretch of the imagination; perhaps it might be better to regard it as a representative of a separate monotypic genus.

Genus 739. **POTENTILLA** * L.

L., Sp. pl. (1753) 495.

Flowers solitary or often in corymbiform-paniculate or pseudo-umbellate inflorescences, bisexual or seldom nearly unisexual [in dioecious plants]; hypanthium concave, rarely flat; sepals and outer sepals 5, rarely 4; petals 5, rarely 4, usually (almost) clawless, obtuse or notched at apex, yellow, rarely white, pink or dark purple, deciduous; stamens 10–30, usually 20; filaments filiform or subulate; torus (carpophore) subglobose or conical, persistent; sometimes accrescent in fruit but dry, spongy and colorless; fruitlets numerous, 10–80, nut-shaped, usually glabrous, rarely pubescent, falling one by one; style often nearly terminal, rarely lateral or nearly basal, jointed at base, deciduous. — Perennials, rarely annuals, biennials or semishrubs, often with stems erect or ascending, broadened, or rarely creeping, rooting at nodes; leaves ternate or many-lobed, palmate or pinnate.

* From the Latin *potens* — powerful, due to the curative properties attributed to the different species of this genus.

Potentilla anserina — in Quaternary cross-bedded strata of Ob (Kalistratikha, Barnaul); Singil' and cross-bedded strata of Lower Volgian. — *P. silvatica* — in Quaternary Glaciation Würm of Ladoga-II'men (Peschanka, Josno). — *P. supina* — Quaternary Singil' and cross-bedded strata of Lower Volgian. — *P. sp.* — in Quaternary cross-bedded strata of Ob (Kalistratikha, Barnaul); in Singil' and cross-bedded strata of Lower Volgian in Quaternary cross-bedded strata of Yenisei (Elan', Chulym River). — *P. sp.* — in the Interglacial Riss-Würm of the Upper Volgian (Potylikha). — *P. sp.* — in the Tertiary Ob strata.

79 Note 1. The genus *Potentilla* L. is one of the most polymorphic, most difficult and most interesting genera of USSR flora from the systematic point of view. It has attracted botanists for many years; to name just a few, Pallas, Willdenow, Bunge, Ledebour, Turczaninow, and Maximowicz have worked on the species of *Potentilla* in the USSR. However, much of what they accomplished has been forgotten and data on species found in the USSR are often almost wholly extracted from the monograph written by the German botanist T. Wolf (Monographie der Gattung *Potentilla*, Bibl. Bot. Bd. XVI, 1908). It is due to Wolf that there is at present a vast amount of information on this genus in the USSR. He made a careful study of the material at both the large herbaria of Leningrad (now the Herbarium of the Botanical Institute, Academy of Sciences of the USSR), critically classified it, and added his own detailed notes on each specimen. He had the good fortune to discover a number of new distinct species, previously unknown, most of which he described in his monograph. But his major contribution was the establishment of a natural system for the genus and the determination of the place in this system of each of the many earlier described species, whose number he greatly reduced. In this connection, however, we feel that he went too far. Many of the species that were markedly distinguished or many that were not even closely related were reduced to the level of "varieties" or "forms" and ranked in this status together with forms devoid of any systematic importance, or were even undeservedly excluded. Wolf very often came to incorrect conclusions in his study of separate groups, not to speak of his insufficient study of many new undescribed species, which he incorrectly referred to others already known. It is not surprising therefore that many species accepted and reported by him are represented as quite heterogenous forms fused together and rather difficult to explain. The geographic-morphologic method, almost completely ignored by Wolf, has proved of immense service here.

In this context, we, in essence, followed Wolf's order and division of material (although in the evaluation and denomination of different subdivisions of the genus, we departed considerably from the system he proposed), and we made great use of his descriptions of the different species as well as his keys; yet we have tried in this work to separate a number of his collective species into their elementary taxa. Some groups have gone almost untouched and the future investigator is faced with much work to be done along these lines.

In order to determine this genus successfully, low power magnification must be used: firstly, to study the pubescence of the carpels, the shape and position of the style, for which it is best to take the fully developed dehiscent flowers; secondly, to study the character of the plant pubescence. Leaf pubescence is best observed under direct light (at the margin, cross section or fold of the leaflets); however, the upper leaf surface is often visible under reflected light.

Note 2. The species of *Potentilla* (in particular of the subgenera *Hypargyrium* and *Dynamidium*) readily hybridize, and for this reason the systematics of this genus is very complicated; in this work only the most interesting and reliable hybrids are reported. Some of the hybrid forms determined by Wolf appeared rather doubtful to us and, consequently, we have omitted them (for a partial list, see Lipskii's *Materialy dlya flory Srednei Azii III*, Tr. Peterb. Bot. Sada, XXVI, Vol. 2, 1910).

Economic importance. Many plants of this genus contain tannins; however, the majority of the species in the USSR have not been thoroughly studied in this respect.

Key to Subgenera

1. Style lateral or subbasal 2.
+ Style nearly terminal 4.
2. Style subbasal, fusiform, broadest at middle and gradually tapering at both ends (Plate IX, Figure 7b)
. Subgenus 4. **Closterostyles** Torr. et Gr.
- + Style lateral, not fusiform 3.
3. Style clavate, gradually and markedly thickening above, thin below, constricted at base of stigma, as long as fruit
. Subgenus 1. **Schistophyllidium** Juz.
- + Style rodlike, evenly thickened through entire length, shorter than fruit (Plate XVI, Figures 5, 6) Subgenus 7. **Chenopotentilla** Focke.
4. Style filiform, evenly thickened through entire length, usually much longer than fruit (Plate VIII); fruit often more or less hairy 5.
+ Style visibly thickened at base or apex, as long as, or distinctly longer than fruit; fruit always glabrous 6.
5. Semishrubs, with pinnate leaves with 2 pairs of linear leaflets; petals yellow; fruit long, hairy near the hilum and sometimes at apex, otherwise glabrous Subgenus 2. **Micropogon** Bge.
+ Herbs, with ternate or palmate leaves. Petals white or dark red; fruit glabrous or hairy (sometimes only near the hilum)
. Subgenus 3. **Fragariastrum** Ser.
6. Plants more or less distinctly tomentose-pubescent with crisp intertwined hairs (especially at lower side of leaves) or hairless; leaves pinnate, ternate or palmate; style conical, thickened at base or slightly above base, gradually attenuate upwards (Plate X, XI), as long as or distinctly longer than fruitlet Subgenus 5. **Hypargyrium** Fourn.
+ Plants always without real tomentum, pubescent with straight or flexuous (but not curly) or stellate hairs, often admixed with glandular ones; leaves usually ternate or palmate, rarely pinnate (then the 3 terminal leaflets much larger than the others); style claviform, abruptly thickening at apex (below stigma), (Plate XVI, Figure 4a), as long as fruitlet or shorter Subgenus 6. **Dynamidium** Fourn.

Subgenus 1. **SCHISTOPHYLLIDIUM** Juz. — Plants almost dioecious; flowers androdynamic (with few abortive pistils) or gynodynamic (with short stamens and usually abortive anthers); petals yellow, without notch at apex; torus hairy; fruitlets glabrous, but sparingly pubescent near hilum and sometimes

at apex when young; styles lateral, clavate, gradually dilated from the thin base, slightly constricted below the large stigma, barely longer than fruitlet.— Low semishrubs, with stems dying near base in winter; leaves pinnate with usually 2–3 lobed leaflets above.

1. Plant covered with rigid straight hairs, spreading or appressed . . . 2.
- + All green parts of the plant densely covered with soft, flexuous hairs (nearly tomentose-villous) 5. *P. imbricata* Kar. et Kir.
2. Stems, petioles and pedicels covered with spreading or erectly spreading hairs 1. *P. bifurca* L.
- + Stems, petioles and pedicels with appressed hairs 3.
3. Stems glabrous in lower part (often above middle) 4. *P. semiglabra* Juz.
- + Stems appressed-hairy throughout entire length 4.
4. Lateral leaflets oblong, all or usually some 2-fid at apex. Flowers, in comparison with other dimensions of plant, rather small 2. *P. orientalis* Juz.
- + Lateral leaflets ovate-elliptic, often entire; stipules entire. Flowers rather large 3. *P. moorcroftii* Wall.

1. *P. bifurca* L., Sp. pl. ed. 1 (1753) 497; T. Wolf, Mon. Pot. (1908) 62 p.p.; Kryl., Fl. Zap. Sib. VII (1933) 1488 (excl. var. *canescens*).— *P. bifida* Pall., Reise I (1771) 215, 238; II (1773) 447, 523, 676.— *P. bifurcata* Poir., Enc. V (1804) 587 p.p.— *P. trifida* (cit. Pall.) Ldb., Fl. Ross. II, 43 in synonym. (laps. calami).— *P. bifurca* α major Ldb., l.c., p.p.— *P. bifurca* var. *typica* T. Wolf, l.c., 64 p.p.— *P. bifurca* var. *deserticola* Schischk. in Mitteil. Tomsk. Abth. Russ. bot. Gesellsch. III (1931) 118; Kryl., l.c., 1489 (pro f.).

82 Perennial low undershrub, 2–25 cm high, with subterranean parts of woody stems and (their) branches; above-ground stems usually ascending or prostrate, usually branching from the slightly woody base, slightly flexuous, more or less densely or rarely sparsely covered like petioles and pedicels with spreading or often erectly spreading, rarely nearly loosely appressed, rigid hairs along entire length; all leaves cauline with rather long, acute, entire or incised stipules, often biplicate, with 2–7 pairs of lateral leaflets; leaflets oblong or cuneate, all or only few bifid at apex, obtuse or acutish, entire, the upper more or less decurrent; terminal leaflet broadly cuneate, trifid, with shorter terminal lobule; all leaves more or less densely or sometimes sparsely (especially above) covered with loosely appressed or appressed hairs, sometimes glabrous (glabrescent) above. Inflorescence terminal, usually few-flowered; flowers small or medium-sized, 8–15 mm in diameter; hypanthium and calyx densely covered with loosely adjacent hairs; outer sepals lanceolate or oblong-ovate, acutish or acute; inner sepals oblong-ovate to broadly ovate, acutish or somewhat cuspidate, nearly as long as the outer but distinctly wider; petals obovate, entire, one and a half times longer than calyx, yellow; stamens 15–20; anthers ovate; achenes few, slightly hairy at base when young, sometimes also at apex, later glabrous; style lateral or nearly basal, barely longer than achene, thin at base, clavately thickened at apex, slightly constricted under the large stigma. June–August. (Plate VII, Figure 4).

Steppes, dry clayey and stony slopes, gravels, sandy meadows, pastures, fields and fallow fields.— European part: V.-Kama, Transv., L. V.; W. Siberia: U. Tob., Irt., Alt.; E. Siberia: entire region. **Gen. distr.:** Mong. Described from Dauria. Type in London.

Note. Two taxa of the given group from which *P. bifurca* was described are encountered in Dauria, but we are retaining this name (provisionally) because *P. bifurca* is the more widely distributed species. After studying the "type" *P. bifurca*, we can more accurately establish what plant Linnaeus had in hand.

2. ***P. orientalis*** Juz. in The Weeds of USSR III (1934) 124.— *P. bifurca* auct. plur., non L.; Shmal'g., Fl. I, 329, excl. pl. sib.— *P. bifurcata* Poir., Enc. V (1804) 587, p. p. (quoad pl. armeniacam).— *P. bifurca* a major Ldb., Fl. Ross. II, 43 p. p.— ? *P. bidens* Bert., Misc. bot. XXIV (1863) 16 (non *vidi*, nomen prius).— Ic.; Juz., l. c., 122, tab. 241.

Perennial, resembling *P. bifurca* L., s. str. in all parts except for the appressed hairs on all green parts (and this only slightly), particularly on stems, petioles and caudex; area of distribution rather different (more southern and western). June–September.

Dry sandy places, stony and clayey slopes, roadsides, fallow fields.— European part: U. V., M. Dnp., Bl., V.-Kama, Transv., V.-Don, L. V.; Caucasus: Cisc., Dag., E. and S. Transc.; Centr. Asia: entire region (?) except for Mtn. Turkm. **Gen. distr.:** As. Min. (Cappadocia), Turkish Arm., Iran. Described from the Caucasus. Type in Leningrad.

Note. A polymorphic species whose forms deserve a more detailed study. It should be noted that the typical form has narrow, deeply notched leaflets and rather small flowers; in Central Asia the predominating forms have wider, shallowly notched leaflets and larger flowers that are clearly approximate to *P. moorcroftii* Wall.

3. ***P. moorcroftii*** Wall. Cat. pl. Ind. Or. (1829) 28; Lehm. Pug. III (1831) 29.— *P. bifurca* var. *humilior* Rupr. in Rupr. et Osten-Sacken, Sert. Tianschan. (1869) 45.— *P. bifurca* var. *moorcroftii* T. Wolf, Mon. Pot. (1908) 64.— Ic.: Lehm. Rev. Pot. (1856) tab. 3, f. 2.

Perennial; stems 2–12 cm high, often solitary, simple, erect, few-leaved, covered with adjacent or appressed hairs; stipules ovate or ovate-lanceolate, entire, ciliate at margin; leaves thick, nearly coriaceous, with arcuately curved caudex and 3–4 pairs of lateral leaflets densely appressed-hairy on both sides, rarely sparsely hairy, sometimes glabrous above; lateral leaflets ovate-elliptic or oblong-ovate, often overlapping at margins, obtuse, mostly entire, rarely shallowly bifid, the terminal dilated above, trifid. Inflorescence few, usually 3–5(7)-flowered; flowers rather large; hypanthium and calyx often dark purple; outer sepals narrowly ovate or lanceolate, obtuse; the inner ovate, obtuse, nearly as long as outer sepals; petals obovate, longer than sepals. July.

High-mountain deserts, alpine meadows, stony places in the alpine and subalpine mountain belt.— Centr. Asia: T. Sh. (centr.), Pam.-Al. (Pam.). **Gen. distr.:** Him., Tib., Mong. Described from Ladak. Type in London.

4. ***P. semiglabra*** Juz. in The Weeds of USSR III (1934) 124.— *P. bifurca* var. *typica* f. *glabrata* T. Wolf, Monogr. Pot. (1908) 64, saltem pro max. part.

Perennial semishrub, 8–30 cm high; stem completely glabrous below, sparsely appressed-hairy above like petioles and pedicels; leaves often contiguous [subappressed]-hairy along margin and beneath on veins (along leaf margin) or appressed-hairy. Flowers large, up to 2 cm in diameter, on long and thin, often flexuous pedicels; hypanthium and sepals sparsely appressed-hairy; outer sepals usually glabrous. Otherwise like *P. bifurca*. June–August.

Meadows, broadleaf and pine forests, sandy and muddy banks of rivers, streams and lakes, pastures, gravels. — E. Siberia: Dau.; Far East: Ze.-Bu., Uss. **Gen. distr.:** Mong., Jap.-Ch. (Manchuria). Described from the Far East. Type in Leningrad.

- 84 5. *P. imbricata* Kar. et Kir. in Bull. Soc. Nat. Mosc. XIV (1841) 416. — *P. bifurca* var. *canescens* Bong. et Meyer., Suppl. alter. ad Fl. Alt. (1841) 32; Ldb., Fl. Ross. II, 44, p. p.; T. Wolf, Mon. Pot. (1908) 65. — *P. bifurca* δ *rytidocarpa* Ldb., l. c.

Perennial; stems numerous, long, 14–20 cm long, prostrate or ascending, zigzag-like curved, many-branched from base, like all other green parts of plant, evenly and densely pubescent or nearly tomentose-villous with grayish or whitish soft, flexuous hairs; stipules ovate-lanceolate, acute, entire or deeply 2–3-fid; leaves with (3)5–7 pairs of small (2–8 mm long), oblong-lanceolate or cuneate, usually bifid, very acute lateral leaflets, often adjacent and overlapping at margins, and a terminal leaflet. Inflorescence about 10-flowered; flowers smaller than in *P. bifurca*, 5–8 mm in diameter; outer sepals lanceolate or ovate; the inner ovate-lanceolate or ovate, slightly longer and distinctly wider than outer sepals, all acute; petals cuneately obovate; torus villous; fruitlets smooth. July. (Plate VII, Figure 5).

Sandy steppes and deserts. — Centr. Asia: Balkh. (north), Dzu.-Tarb. **Gen. distr.:** Mong. Described from the northern shores of Zaisan-Nor Lake and the Irtysh River above the Kurchum River. Type in Leningrad.

Subgenus 2. **MICROPOGON** Bge., Suppl. Fl. Alt. (1836) 40. — Flowers usually 1–3, on scapoid shoots; petals yellow, slightly notched at apex; stamens ca. 20, arranged in 3 rows; torus long-hairy; fruitlet long-hairy near the hilum and sometimes also at apex, otherwise glabrous; style nearly terminal, usually much longer than fruitlet. — Semishrubs, caespitose or pulvinate, with leaves radical, ternate, the lateral leaflets dissected into 2 segments. One species only.

6. *P. biflora* Willd., Herb. ex Schlecht. in Mag. Ges. naturf. Fr. Berlin VII (1816) 297; Lehm., Mon. Pot. (1820) 192; Ldb., Fl. Ross. II, 61; T. Wolf, Monogr. Pot. (1908) 70; Kryl., Fl. Zap. Sib. VII (1933) 1490. — *P. inglisii* Royle, Illustr. Bot. Himal. mount. I (1839) 207. — *P. biflora* var. *typica* T. Wolf, Mon. Pot. (1908) 71. — *P. biflora* var. *stenopetala* T. Wolf, l. c., 72. — Ic.: Lehm., Monogr. Pot. tab. 20; Rydb., Monogr. tab. 33; Royle, l. c., II (1839) tab. 41, f. 3 (*P. inglisii*).

Perennial; caudex stout, short-branching from base, cauline branches woody in lower part, forming low and compact pulvinate tufts, densely

covered with brownish gray dead stipules and with a rosette of leaves at summit; stem barely longer than leaves, simple, leafless, scaphoid, erect, with 2 bracts on upper third, 1-2-flowered; leaves imparipinnately parted, with 2 pairs of lateral lobes, the lower of which deeply 2-sect, hard and brittle when dry; leaf lobes (leaflets) linear or linear-lanceolate, rolled at margin, upper pair decurrent and often confluent with terminal lobe (leaflet); stipules very wide, adnate for the most part to petioles, with free, lanceolate, entire auricles; leaves, petioles, stems and calyx more or less rigid-hairy. Flowers 10-15(20) mm in diameter; outer sepals oblong or elliptic, obtuse, slightly shorter than the ovate, acute inner sepals; petals obovate, longer than calyx, acute, with orange spot at base; disk not thickened; stamens 20, distinctly longer than style; anthers small, orbicular-ovate; torus flattened-subglobose, densely white-hairy; fruitlets few, oblong-ovoid, covered at base with long hairs, otherwise glabrous and smooth; style nearly terminal, very long, uniform and stout throughout its length or slightly inflated above base or in the middle; stigma hardly thickened. June-August. (Plate VII, Figure 6).

Rocks in the alpine belt. — Arctic: Chuk.; W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau.; Centr. Asia: Dzu.-Tarb., T. Sh. **Gen. distr.:** Mong. (north), N. Am. Described from "East Siberia" (without indication of exact locality). Type in Berlin.

Subgenus 3. **FRAGARIASTRUM** Ser. in DC., Prodr. II (1825) 583, p. p. — Flowers in corymbiform inflorescence; sepals, outer sepals and petals 5; petals white or red, notched at apex or entire; stamens ca. 20, arranged in 3 circles; torus hairy; fruitlets usually hairy (sometimes only near base), rarely glabrous; style nearly terminal, filiform, uniform and thick throughout its length, usually much longer than petals. — Perennial herbs, with woody caudex and ternate or palmate leaves, tomentose-pubescent or not.

- | | | |
|----|---|---|
| 1. | Radical leaves ternate | 2. |
| + | Radical leaves quinately | 6. |
| 2. | Leaves grayish or whitish on both sides with dense silky or (beneath) tomentose hairs | 3. |
| + | Leaves, at least above, sparingly pubescent, green | 4. |
| 3. | Petals distinctly longer than sepals, dark red; fruit hairy | 8. <i>P. divina</i> Alb. |
| + | Petals as long as or hardly longer than sepals, white; fruit glabrous | 9. <i>P. ghalghana</i> Juz. |
| 4. | Leaves densely silky-hairy beneath | 12. <i>P. camillae</i> Kolak. |
| + | Leaves not as above | 5. |
| 5. | Stems tall, much longer than radical leaves | 7. <i>P. elatior</i> Willd. |
| + | Stems very short, shorter than radical leaves | 13. <i>P. micrantha</i> Ramon. |
| 6. | Leaves not silky beneath; petals shorter than sepals | 10. <i>P. brachypetala</i> Fisch. et May. |
| + | Leaves silky-hairy beneath; petals longer than sepals | 11. <i>P. alba</i> L. |

Section 1. **ERIOCARPAE** T. Wolf, Mon. Pot. (1908) 79.— Undershrubs, with tall stem, dying almost at base, without rosette of radical leaves (i. e., with axis of limited growth); lower leaves in Soviet species ternate; leaflets green on both sides, multidentate, the terminal distinctly petioluled. Flowers in Soviet species white.

7. *P. elatior* Willd. ex Schlecht., Mag. d. Ges. naturf. Fr. Berlin VII (1816) 295; Ldb., Fl. Ross. II, 59; Boiss., Fl. Or. II (1872) 723; T. Wolf, Mon. Pot. (1908) 83.— *P. rubiformis* Czern., Mss. ex T. Wolf, Mon. Pot. (1908) 84.— *P. rubifolia* Boiss., Mss. ex T. Wolf, l. c.— Ic.: Lehm., Monogr. tab. 14.

Perennial semishrub with thin rhizome, developing woody, loosely squamose shoots, terminating in few leaves; flower-bearing stems erect, 20–150 cm long, flexuous, leafy, loosely corymbiform-branched in upper part, like petioles, pedicels and calyx covered with thin hairs usually mixed with glandular ones; leaves ternate, the lower long-petiolate, the cauline with shorter petioles; stipules of lower leaves scarious, rufous, with ovate-lanceolate auricles, of cauline leaves herbaceous, broadly ovate, acuminate, 1–2-toothed, of upper cauline leaves lanceolate, entire; leaflets large, broadly ovate-rhombic, elliptic or oblong, the median distinctly petiolulate, the rest short-petiolulate to sessile, all large and very serrate-dentate with pointed teeth, sparingly pubescent on both sides, green. Flowers long-pedicelated, rather small, 10–12 mm in diameter; sepals acuminate, the outer narrowly lanceolate, the inner ovate-lanceolate, slightly longer than the outer; petals obovate, notched, slightly longer than sepals, white; staminal disk narrow, hairy; stamens 20, with long glabrous filaments, small orbicular anthers and dilated connective; torus conical in shape, short-hairy, strongly inflating after flowering; fruitlets oblong-ovoid, glabrous, smooth; style nearly terminal, longer than fruitlets, with stigma not dilated. June–August.

89 Forest edges, meadows, mainly in the subalpine but also in the alpine mountain zone (1,500–2,300 m).— Caucasus: Cisc., W. and E. Transc. **Gen. distr.:** mountains of the Pontic system (Turkey). Described probably from the Caucasus. Type in Berlin.

Section 2. **SPECIOSAE** T. Wolf, Mon. Pot. (1908) 85.— Perennial plants, densely tomentose particularly on lower side of leaves, besides often pubescent with appressed silky hairs. Petals red or white, long-clawed, spatulate. Fruitlet more or less hairy, rarely (nearly) glabrous.

8. *P. divina* Albov in Otchet i Trudy Odessk. otd. Ross. Obshch. Sadov. 1890 g. (1891) 103.— *P. oweriniana* Boiss., Fl. Or. II (1872) 705 p. p. (quoad specim. e "Suania"), nec Rupr. Mss.; R. Keller in A. Engler's Bot. Jahrb. XIV (1892) 496; T. Wolf, Monogr. Pot. (1908) 87.— *P. oweriniana* α *genuina* (pro max. p.) et β *divina* Akinf., Fl. Cauc. Centr. (1894) 169 et 170.— *P. oweriniana* f. *elata* Somm. et Lev. ex R. Keller, l. c. 198; A. H. P. XVI (1900) 147.— *P. speciosa* var. *rubriflora* Focke ex Juz. in Bull. Jard. Bot. Princip. URSS, XXV (1926) 237.— *P. speciosa* β *owerini* Lipsky ex Juz., l. c.— Exs.: HFR No. 814.

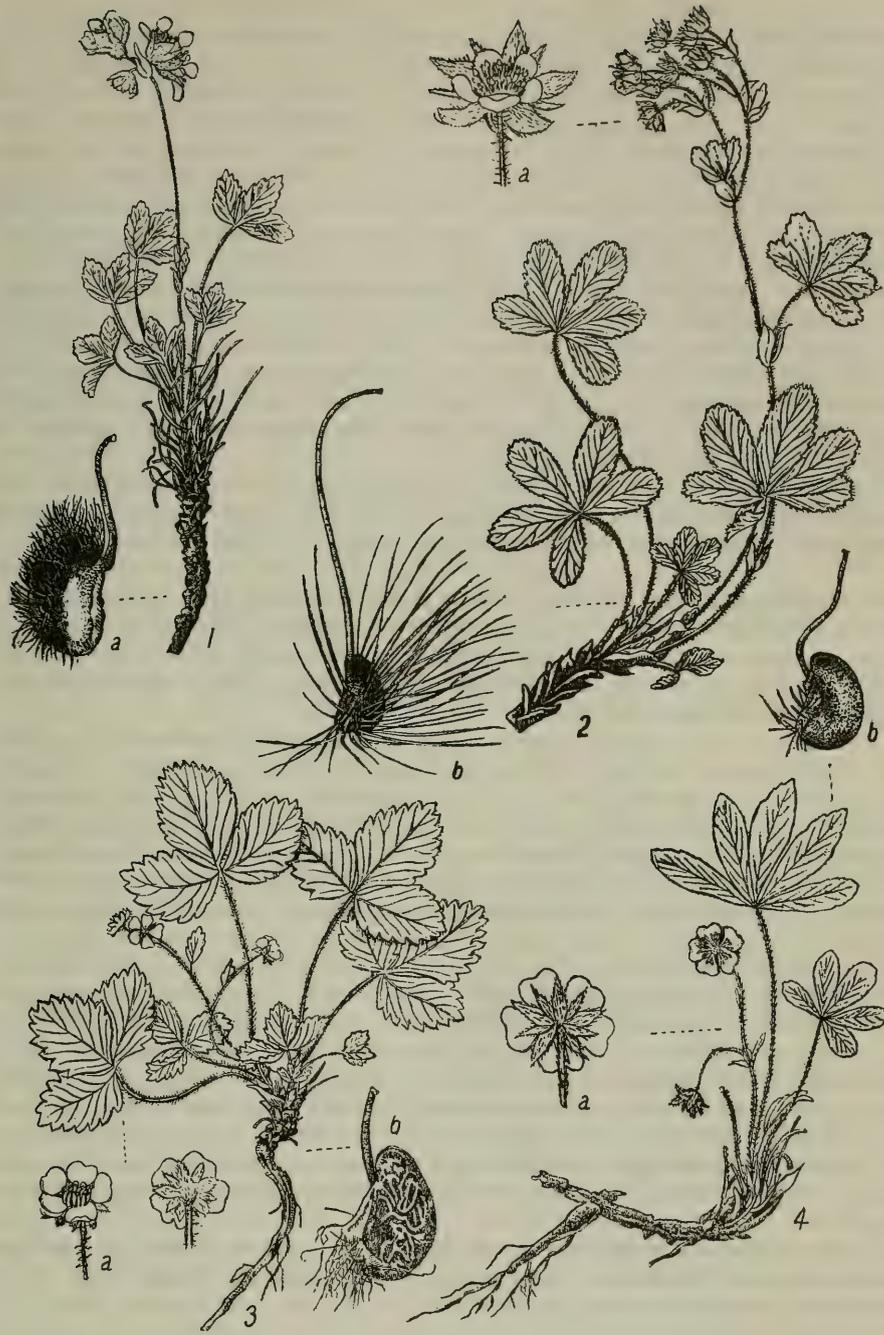


PLATE VIII. 1 - *Potentilla divina* Alb., general view, a) fruit; 2 - *P. brachypetala* F. et M., general view, a) flowers, b) fruit; 3 - *P. micrantha* Ram., general view, a) flowers from above and beneath, b) fruit; 4 - *P. alba* L., general view, a) flowers from beneath, b) fruit.

Perennial; caudex stout, woody, multicapital, densely covered in upper part with relics of stipules; stems 3 cm high, rather slender, nearly erect, few-leaved, like petioles and inflorescence branches loosely covered with white tomentum; radical leaves short- or long-petiolate, ternate, cauline leaves 1-2, strongly reduced, short-petiolate to sessile; stipules of cauline leaves rather large, lanceolate or ovate-lanceolate, acute, sessile, thick, oblong-obovate, cuneate and entire at base, with 3-7 obliquely semi-ovate, obtuse, rarely acute teeth at each side of upper part, densely appressed-silky above, often slightly rugose, white-tomentose beneath with loosely appressed dull or slightly silky hairs. Inflorescence 2-4-flowered; flowers ca. 2 cm in diameter; calyx densely tomentose and slightly silky-hairy, inconspicuously netted-veined; outer sepals linear-lanceolate, acute, hardly as long as the inner; the inner sepals broadly ovate, acuminate, translucent inside, dark purple and glabrous; petals much longer than sepals, with broadly obovate or suborbicular limb, abruptly tapering into a long, claw (almost as long as sepals), dark red; fruitlets hairy. June-August. (Plate VIII, Figure 1).

Alpine meadows and rocky places in alpine zone. — Caucasus: Cis. (western part of Main Range): E. Transc. (Svanetia), W. Transc. (Abkhazia, Mingrelia). Endemic. Described from Abkhazia. Type in Geneva (?).

90 9. *P. ghalghana* Juz. in Bull. Jard. Princip. URSS XXV (1926) 257. — *P. oweriniana* Rupr., Mss., nec aliorum; Boiss., Fl. Or. II (1872) 705 p. p. (quoad specim. e. "distr Galgai"). — *P. oweriniana* α genuina Akinf., Fl. Cauc. Centr. I (1894) 169, pro minima parte. — *Sibbaldia argentea* Owerin Mss. ex Juz., l. c.

Perennial; caudex thick, woody, multicapital, densely covered in upper part with blackish relics of stipules; stems 5-15 cm long, rather slender, nearly erect, few-leaved, like calyx, inflorescence branches and pedicels densely covered with loose tomentum; radical leaves long-petiolate, ternate, cauline leaves 1-2, strongly reduced, short-petiolate; stipules of radical leaves with ovate-lanceolate thinly pointed auricles, stipules of cauline leaves large, lanceolate or ovate-lanceolate, acute; leaflets sessile, stoutish, oblong-obovate, cuneate and entire at base, with 3-9 semi-ovate, usually acutish teeth on each side of upper part, not too densely pubescent above, greenish, often slightly rugose, densely silky white-tomentose beneath, glossy, with prominent lateral nerves. Inflorescence somewhat congested, 3-4-flowered; flowers 10-17 mm in diameter, calyx rather densely appressed-silky-tomentose, prominently netted-veined; sepals subequal in length, the outer linear, the inner broadly ovate, acuminate; petals as long as or slightly longer than sepals, spatulate, long-clawed, white, persistent for a long time; stamens with long filaments and oblong anthers; torus elongated, conical, densely hairy; fruitlets ovoid, glabrous (even when young). July-August.

Rocks in the alpine and subalpine zones. — Caucasus: Cisc. (central part of Main Range). Endemic. Described from Ingushetia (Dzherashki Mountain). Type in Leningrad.

Section 3. **CRASSINERVIAE** T. Wolf, Mon. Pot. (1908) 97. — Perennial not tomentose-pubescent, but spreadingly hairy or villous; stems thick, firm, longer than leaves; leaflets green beneath, thick, usually broadly obovate, with strongly prominent network of veins and numerous remote teeth. Inflorescence congested; fruitlets hairy.

10. **P. brachypetala** Fisch. et Mey. ex Lehm., Add. ad Ind. sem. hort. Hamb. (1849) 9; Boiss., Fl. Or. II (1872) 703. — Ic.: Lehm., Rev. Pot. tab. 47.

91 Perennial; caudex thick, covered with brown-gray and black squamose relics of stipules; flower-bearing stems erect, 10–20 cm long, few-leaved, congested-corymbiform at apex, few-flowered, covered like petioles, pedicels and calyx with horizontally spreading hairs, more or less glandular; radical leaves long-petioled, quinate; stipules large, broadly ovate, with large acute auricles; leaflets thick, subcoriaceous, veined on both faces, sessile or short-petiolulate, broadly obovate, subglabrous and green above, shortly appressed-hairy, greenish-yellowish or grayish beneath, with 7–9 triangular obtuse teeth at both sides and a minute terminal tooth. Flowers short-pediceled, 20–22 mm in diameter; sepals subequal in length, the outer narrowly subulate-linear, the inner lanceolate, acuminate; petals shorter than calyx, obovate-oblong, notched, white; stamens 20, with short and hairy filaments and oblong anthers; torus subglobose, strongly pubescent; fruitlets oblong-ovoid, long-hairy; style nearly terminal, very long. June–August. (Plate VIII, Figure 2).

Alpine zone of the Caucasus, 1,800–2,500 m. — Caucasus: Cisc., E. and W. Transc. Endemic. Described from Leninakan (formerly Aleksandropol County). Type in Leningrad.

Section 3. **CAMPESTRES** Pöevertl. in Asch. u. Graebn., Syn. VI (1904) 647. — **Fragariastra** T. Wolf, Mon. Pot. (1908) 112. — Low herbs, with weak few-flowered stems, usually hardly exceeding leaves in length. Flowers white, petals notched. Fruitlets next to base hairy, otherwise glabrous.

11. **P. alba** L., Sp. pl. ed. 1 (1753) 498; Ldb., Fl. Ross. II, 60; Lehm., Rev. Pot. (1856) 135; T. Wolf, Mon. Pot. (1908) 112. — Ic.: Schlecht., Lang. et Schenk, Fl. Deutschl. ed. 5, XXV (1886) 2612; Rchb., Ic. Fl. Germ. XXV (1909) 15.

Perennial, 8–25 cm high; rootstock thick, few-branched, squamose; stems thin, short, not longer than radical leaves, ascending, few-leaved, branching nearly from base, 2–5-flowered, covered like petioles, leaves, pedicels and calyx with appressed silky hairs; radical leaves long-petioled, quinate, very rarely some ternate; stipules large, dark brown, with lanceolate acute auricles; cauline leaves 1–2, strongly reduced, with small ovate-lanceolate stipules; leaflets or radical leaves oblong-lanceolate, cuneately constricted at base, with few acute convergent teeth at apex, glabrous above, appressed silky-hairy beneath and along margin. Flowers long-pediceled, rather large; outer sepals linear-lanceolate, shorter than the inner, the latter ovate-lanceolate; petals broadly obovate, longer than sepals, notched, white; stamens 20, filaments very thin, glabrous, anthers oblong; achenes ovoid, hairy at base; style nearly terminal, twice as long as achenes, with slightly thickened stigma. May–June. (Plate VIII, Figure 4).

Broad-leaved forests, grassy slopes, steppe shrubby formations. — European part: U. Dnp., U. V. (along Oka River), M. Dnp., V.-Don, Transv. Gen. distr.: Centr. Eur., parts of S. Eur. (SW France, N. Italy, Balkans). Described from Styria and Pannonia. Type in London.

92 12. *P. camillae* Kolakovsky in Journ. bot. de l'URSS, t. 21 (1936) 553. — Ic.: Kolakovsky, l. c., 554.

Perennial; rootstock short, covered above with the black-brown relics of petioles and stipules; radical leaves long-petioled (2–4.5 cm), densely appressed silky-hairy (like stems and pedicels), ternate; leaflets oblong-elliptic or oblong-obovate, 2–3.5 cm long, 0.7–1.2 cm wide, entire or usually with 3–7 small convergent teeth at apex, sparsely appressed-hairy or glabrescent above, densely appressed silvery-hairy beneath and along margin; stems thin, usually ascending, 8–12 cm long, only slightly to twice as long as radical leaves, with few (1–3) cauline leaves; stipules of cauline leaves herbaceous, green, linear-lanceolate, acute, entire. Inflorescence few-flowered (5–7-flowered) pedicels 0.5–1.5 cm long; flowers ca. 2 cm in diameter; outer sepals narrowly lanceolate, the inner distinctly larger, elliptic-lanceolate; petals orbicular, obovate or nearly obcordate, notched at apex, white; stamens ca. 20; filaments long, anthers oblong-ovate; torus globose, hairy; style nearly terminal, filiform, several times longer than fruitlet, with thin stigma; fruitlet oblong-ovoid dorsally and long-hairy apically. July.

Crevices of limestones. — Caucasus: W. Transc. (Abkhazia, Gudauta District). Endemic. Described from the vicinity of Dzyshra Mountain, at the source of the Belaya River (Gipsta). Type in Leningrad.

13. *P. micrantha* Ramon in Lam. et DC., Fl. Fr. IV (1815) 467; Ldb., Fl. Ross. II, 60; Lehm., Rev. Pot. (1856) 147; T. Wolf, Mon. Pot. (1908) 117. — *P. tinei* Tod. ex Lojac., Fl. Sic. III (1895) 197. — *P. fragariastrum* β *micrantha* F. Schulz, Flora (1853) 555. — Ic.: Sturm, Deutschl. Fl. fasc. 92, tab. 11; Schlecht, Fl. Deutschl. ed. 5, XXV, 294, tab. 2614.

93 Perennial; caudex thick, covered with grayish brown scales, developing short congested shoots; flower-bearing stems very short, shorter than leaves at anthesis, filiform, decumbent, 1–2-flowered, densely covered with spreading rigid hairs, eglandulose, rarely glandular; radical leaves long-petiolate, ternate; stipules large, scarious, subferruginous, with ovate-lanceolate auricles; cauline leaves 1–2, small, almost simple; leaflets sessile or short-petiolulate, broadly ovate, the median leaflets with 7–11 large and acute serrate teeth at each side of apex, lateral leaflets with unequal sides, dentate at outer margin nearly from base, glabrescent above, villous and glaucescent beneath, silky when young. Flowers small, 10–12 mm in diameter; calyx purple inside, sepals nearly equal in length; outer sepals linear-lanceolate, the inner triangular-lanceolate; petals small, cuneately obovate, notched, shorter than or as long as sepals, white sometimes pink; staminal disk slightly hairy; filaments 20, whitish, hairy up to middle, strongly dilating, obtuse at apex, with small suborbicular anthers; torus small, hairy; fruitlets ovoid, finely rugose, hairy near hilum; style nearly terminal, hardly as long as the ripe fruitlet, with dilated stigma. April–May. (Plate VIII, Figure 3).

European part: Crim.; Caucasus: W. Transc. Gen. distr.: Centr. Eur., Med., Bal.-As. Min., Arm.-Kurd. Described from France. Type in Paris (?).

Subgenus 4. **CLOSTEROSTYLES** Torr. et Gr., Fl. N. Amer. I (1840)

445. *Drymocallis* Fourr. in Ann. Soc. Linn. Lyon II, 16 (1868) 371 (pro gen.).— Flowers in corymbiform inflorescence; sepals, outer sepals and petals 5 each; petals white or yellowish, not clawed, not emarginate at apex; stamens 20–30 arranged in 5 groups along the thickened margin of a 5-angled disk; anthers oblong, flat; torus subglobose or subellipsoidal; fruitlets numerous, glabrous; styles subbasal, as long as fruitlet or slightly longer, fusiform, more or less thickened (sometimes barely so) in the middle and constricted at both ends.— Perennial herbs, with pinnate leaves, without tomentose pubescence, glandular.

- | | | |
|-------|---|-------------------------------------|
| 1. | Petals white; style distinctly thickened in the middle | 2. |
| + | Petals pale yellow or yellow; style only slightly thickened in the middle | 5. |
| 2. | Lateral leaflets of radical leaves distinctly petioluled. Stems and pedicels (like sepals) covered with appressed, rigid, bristly hairs together with glandular ones | 17. <i>P. jailae</i> Juz. |
| + | Lateral leaflets of radical leaves sessile. Stems and pedicels covered with rather thin spreading hairs together with glandular ones | 3. |
| 3. | Flowers medium-sized (12–15 mm in diameter), in many-flowered inflorescence. Stems markedly reddening at end. | 14. <i>P. rupestris</i> L. |
| + | Flowers large (15–25 mm in diameter), in few-flowered inflorescence. Stems usually pale green | 4. |
| 4. | Hypanthium and calyx densely covered with long, often bristly appressed hairs together with glandular ones. Terminal leaflet of lower leaves much larger than the lateral | 15. <i>P. foliosa</i> Somm. et Lev. |
| + | Hypanthium and calyx sparsely covered with short, thin, more or less spreading hairs together with glandular ones. Terminal leaflet of lower leaves just slightly larger than the lateral | 16. <i>P. inquinans</i> Turcz. |
| 94 5. | Radical leaves with 3–4 pairs of leaflets | 6. |
| + | Radical leaves with 2 pairs of leaflets | 19. <i>P. tianschanica</i> T. Wolf. |
| 6. | Sepals obtuse; petals slightly longer than calyx | 18. <i>P. geoides</i> M. B. |
| + | Sepals acute; petals shorter than calyx | 20. <i>P. kulabensis</i> T. Wolf. |

14. *P. rupestris* L., Sp. pl. (1753) 711; Ldb., Fl. Ross. II, 37 p. p.— *P. rupestris* var. *typica* T. Wolf, Mon. Pot. (1908) 126.— Ic.: Jacq., Fl. Austr. II, tab. 114; Schlecht., Fl. Deutschl. ed. 5, XXV, 227, tab. 2589.

Perennial; rootstock thick, upright; stems solitary or few, (25)30–50 cm high, sulcate, usually reddening, few-leaved, many-branched in upper part, covered like petioles and pedicels with short, spreading, thin, bristly hairs and very long, multicellular stalked glands, usually very numerous; radical and lower cauline leaves long-petiolate, 6–12 cm long, pinnate, with 2–3 remote pairs of lateral leaflets; stipules with short, ovate, obtuse

or acute auricles; stipules of cauline leaves ovate-lanceolate; upper cauline leaves short-petiolate, ternate; lateral leaflets subsessile, 2–5 cm long, ovate or orbicular-ovate, unequal at base, obtuse at apex, bidentate, usually with acute teeth, the lowermost leaflets smaller than the others, the terminal large and wider, often subrounded-cuneate at base, short-petiolulate, green on both sides, sparsely hairy above, more densely covered beneath with short and thin hairs admixed with glandular, rather dense appressed short hairs along veins. Flowers in sparse many-flowered paniculate inflorescence, medium-sized, usually 12–15 mm in diameter; outer sepals lanceolate, sometimes 2-lobed at apex, one-quarter to one-half as long as the inner, the inner oblong-ovate, short-acuminate, accrescent in fruit; hypanthium and sepals usually shortly and sparsely hairy; fruit slightly longer than sepals, subglobose, white; achenes smooth, ca. 1.5 mm long. June.

Rocks, stony slopes. — European part: U. Dnp. **Gen. distr.:** Scand., Centr. and Atl. Eur. Described from Europe. Type in London.

15. *P. foliosa* Somm. et Lev. apud R. Keller in Engl. Bot. Jahrb. XIV (1892) 500 emend. — *P. rupestris* auct. fl. cauc., non L.; Grossh., Fl. Kavk. IV. 304; Ldb., Fl. Ross. II, 37 p.p. — *P. rupestris* f. *orientalis* Keller et Siegfr. ex R. Keller, l. c., 499. — *P. rupestris* var. *foliosa* T. Wolf, Mon. Pot. (1908) 129.

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Perennial; rootstock thick, oblique; stems solitary or few, firm, erect, straight or slightly flexuous, 20–50 cm high, sulcate, few-leaved (usually leafless in lower part), branching from middle or at summit, green or slightly reddening, sparsely hairy in lower part, densely covered above, particularly in inflorescence, with horizontally spreading long-stalked glands and simple hairs; radical and lower cauline leaves long-petiolate; petioles with sparser pubescence than stem; leaves up to 27 mm long, pinnate, with 2–3 remote pairs of lateral leaflets; stipules with ovate acute auricles; stipules of cauline leaves ovate-lanceolate, acute; upper cauline leaves short-petiolate or subsessile, ternate; leaflets short-petioled or subsessile, ovate to suborbicular, obtuse; lateral leaflets markedly unequal at base, the terminal leaflet cuneate or broadly cuneate at base, doubly acute-dentate or cuspidate, the lowermost smaller than the others, the terminal usually (sometimes considerably) larger than the lateral leaflets, up to 6.5 cm long, green on both sides, remotely to usually rather densely covered with simple, longish, often bristly, more or less glandular hairs, with prominent lateral veins beneath. Inflorescence loose, paniculate, often with markedly elongated branches; flowers few, large, 15–25 mm in diameter; calyx large, strongly developed in fruit, densely covered (like hypanthium) with long, appressed, often bristly hairs and long-stalked glands; outer sepals lanceolate, entire or often bidentate at apex, half as long as the ovate, acute or abruptly pointed inner sepals, prominently netted-veined; petals longer than calyx, orbicular, white; achenes smooth. June.

Open mountain pine forests and forest glades, damp rocks, stony slopes, taluses, alpine meadows. — Caucasus: Cisc., Dag., W., E. and S. Transc. **Gen. distr.:** As.-Min., Turkey, Arm. Described from Abkhazia (Klyuch River valley, Klukhor Pass). Type in Florence.

16. *P. inquinans* Turcz. in Bull. Soc. Nat. Mosc. XVI (1843) 624. — *P. rupestris* auct. fl. Sib. et Or. Extr.; Ldb., Fl. Ross. II, 37 p. p.; ? Kryl., Fl. Zap. Sib. VII (1933) 1493. — *P. sawiczii* Schischk. et Kom. in Not. Syst. ex Herb. H. Bot. Princip. URSS VI (1926) 11.

96 Perennial; rootstock thick, oblique; stems 18–40 cm high, usually solitary, erect, straight, sulcate, pale, usually slightly branching in upper half, branches inclined at a very sharp angle, densely covered like petioles and pedicels with spreading, long-stalked glands and long simple hairs; radical and lower cauline leaves long-petiolate, 5–12 cm long, pinnate, with 2–3 pairs of lateral leaflets, the lower pair much smaller than the upper; lateral leaflets broadly ovate, with unequal sides, obtuse, sessile, terminal leaflets hardly larger than the upper lateral, obovate or broadly obovate, cuneate, rather long-petiolulate, all with large, irregular and sharp teeth, green on each side, remotely glandular above, rather densely so beneath, densely pubescent along veins with horizontally spreading simple hairs; stipules of cauline leaves ovate-lanceolate; upper cauline leaves short-petioled, ternate. Flowers in narrow few-flowered paniculate inflorescence, large, 1.8–2.5 cm in diameter; calyx (like hypanthium) densely covered with long-stalked glands and spreading soft simple hairs; outer sepals lanceolate, sometimes 2-lobed at apex, inner sepals one and a half to twice as long as outer sepals, oblong-ovate, short-acuminate, strongly developed in fruit; petals distinctly longer than sepals, orbicular, white; achenes slightly longitudinally rugose, ca. 1 mm long. June. (Plate IX, Figure 1).

Rocks, among stones and stony slopes. — W. Siberia: Alt. (?); E. Siberia: Ang.-Say., Lena-Kol., Dau.; Far East: Okh., Uss. Endemic. Described from Transbaikalia. Type in Leningrad.

Note. Identifying the West Siberian plant with *P. inquinans* Turcz. is somewhat problematical and should be checked more thoroughly. The Far Eastern plant, described under the name *P. sawiczii* Schischk. et Kom., differs from the type by smaller flowers and may turn out to be an independent taxon to which the Yakutsk plant may also be referred.

17. *P. jailae* Juz. sp. nova in Addenda IX, p. 451. — *P. rupestris* Ldb., Fl. Ross. II, 37, p. p. et auct. fl. taur., non L.

97 Perennial; rootstock somewhat thin to rather thick, oblique; stems solitary, sulcate, few-leaved, branching only at the very summit, reddening, sparsely covered with very long-stalked glands and appressed or spreading bristly hairs; hairs scattered or completely absent on lower part of stem, becoming very dense in upper part of inflorescence; radical and lower cauline leaves long-petioled, petioles covered with long-stalked glands, sometimes admixed with appressed bristly hairs; leaves pinnate with 2–3 remote pairs of lateral leaflets; stipules with oblong-ovate acute auricles; stipules of cauline leaves ovate, acuminate; upper cauline leaves ternate, short-petioled; leaflets of radical leaves with distinctly, usually more or less long petiolules, leaflets of cauline leaves short-petioluled or sessile in upper leaves, broadly obovate or suborbicular, lateral leaflets distinctly unequal at base, obtuse at apex, bidentate, broad-toothed, with a small mucro at apex; leaflets of lower pair smaller than the others, the terminal much larger, cuneate, with longer petiolules, green on each side, remotely hairy above, covered beneath with long, appressed hairs admixed

with few glandular hairs, predominantly along veins. Flowers medium-sized in a few-flowered (3–5) inflorescence; hypanthium and sepals densely covered with appressed or spreading, somewhat long bristly hairs admixed with long-stalked glands; outer sepals ovate-lanceolate, often bidentate at apex, one-fourth as long as the oblong-ovate, short-pointed inner sepals, calyx accrescent in fruit; petals much longer than sepals, orbicular, obcordate, white; achenes smooth. June.

Grassy places, forest clearings and among shrubs. — European part: Crim. (Yaila). Endemic. Described from Ai-Petri. Type in Leningrad.

Note. Readily distinguished from *P. rupestris* L. and *P. foliosa* Somm. et Lev. by the bristly pubescence of the stems, hypanthium and calyx and by the distinctly petioluled leaflets of radical leaves.

18. *P. geoides* M. B., Fl. taur.-cauc. I (1808) 404; Ldb., Fl. Ross. II, 37; Boiss., Fl. Or. II, 708; T. Wolf, Monogr. Pot. (1908) 141. — Ic.: Lehm., Monogr. Pot. (1820) tab. 2.

Perennial; caudex robust, multicapital, covered with brownish gray relics of stipules; stems 15–25 cm high, erect, firm, usually leafless in lower part, branching in upper part, densely covered like petioles, pedicels and calyx with spreading simple hairs and multicellular glandular somewhat viscous hairs; radical leaves long-petioled, 16 cm long, with 3–4 pairs of leaflets; stipules wide, scarious, with large usually incised auricles; cauline leaves usually ternate, with herbaceous, ovate, dentate stipules; lateral leaflets sessile, the terminal short-petioluled, broadly cuneate at base, suborbicular, 2–3 cm wide, unevenly incised or nearly lobed, with biserrate lobes and acute or obtuse teeth, viscous-villous on each side. Inflorescence corymbiform, dichasially branching with few-flowered branches; flowers large, on short erect pedicels; calyx ca. 20 mm in diameter, nearly campanulate, outer sepals narrowly lanceolate, obtuse, often 2–3-fid, the inner rounded at apex, 2–4-toothed, twice as long as the outer sepals; petals orbicular-obovate, slightly longer than sepals, upright, persistent; stamens 30, with disciform anthers and broad red connective; torus subglobose, hairy; fruitlets oblong-ovoid, smooth; style subbasal, twice as long as fruitlet, thinly fusiform, with dilated stigma. May–July.

98 Stony places, rocks. — European part: Crim.; Caucasus: Cisc., E. and W. Transc. (according to Grossheim). Endemic. Described from the Crimea. Type in Leningrad.

19. *P. tianschanica* T. Wolf, Monogr. Pot. (1908) 140. — Ic.: T. Wolf, ib. tab. I.

Perennial; rootstock densely covered above with relics of stipules, developing short flowerless shoots with rosetted, long-petioled radical leaves and thin, erect, flower-bearing stems 10–15 cm high; stems covered like petioles and pedicels with short and longer hairs mixed with small sessile glands; radical leaves with only two pairs of lateral leaflets; stipules lanceolate, with acute auricles; cauline leaves 1–2, short-petioled, ternate; stipules oblong-ovate, obtuse; leaflets green on both sides, soft-hairy, with an admixture of small glands, wide, upper three leaflets large, up to 3 cm long, rhombic, ovate or obovate, broadly cuneate at base, the terminal leaflet long-petioluled, the remaining sessile, coarsely

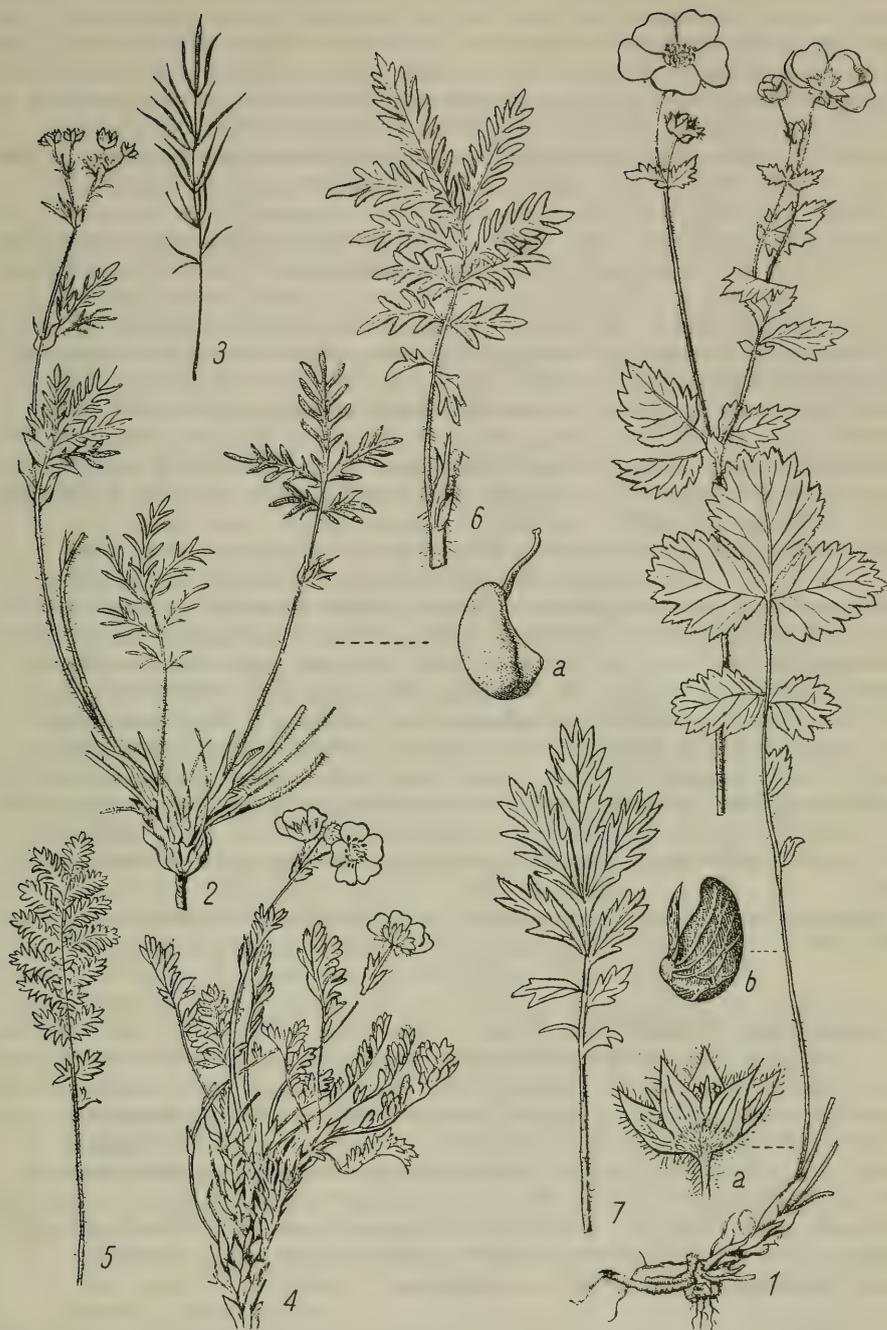


PLATE IX. 1 - *P. inquinans* Turcz., general view, a) calyx, b) fruit; 2 - *P. multifida* L., general view, a) fruit; 3 - *P. verticillaris* Steph., leaves; 4 - *P. pamiroalaica* Juz., general view; 5 - *P. sericea* L., leaves; 6 - *P. conferta* Bge., leaves; 7 - *P. strigosa* Pall., leaves.

and irregularly incised-dentate, with few (2-3 at each side) ovate or oblong, acute, remote teeth, the two lower lateral leaflets remote from the others, much smaller, entire or 2-3-toothed. Flowers in few-flowered (1-5) inflorescence, long-pediceled, 10-12 mm in diameter; outer sepals oblong-linear, slightly shorter than the ovate-lanceolate inner ones; petals apparently pale yellow, as long as or slightly longer than sepals; stamens 20, anthers orbicular-ovate; torus small, conical, strongly pubescent; fruitlets rather large, oblong-ovoid; style subbasal, thinly fusiform, much longer than fruitlets. July?

Mountains. — Centr. Asia: T. Sh. (W.), Pam.-Al. Endemic. Described from the Pskem River valley in Western Tien Shan. Type in Leningrad.

20. **P. kulabensis** T. Wolf in Asarhoje bazaji Tocikiston cildi II 1936) 195.

101 Perennial; caudex developing thin cauline shoots, covered with brown relics of old leaves; stems apical, thin, slightly flexuous, 15-20 cm high, almost simple, few-leaved, furcately branching, sparsely covered like petioles and pedicels with long, curly, simple hairs and very long and thin jointed glandular hairs; radical and lower cauline leaves 3-4(5) paripinnate, short-petioled, 6-9 cm long (without petioles); leaflets oblong-ovate, thin, green above, appressed-bristly-hairy, more densely pubescent and grayish beneath, ciliate at margin, the three upper much larger than the others, 2-3.5 cm long, 1-2 cm wide, terminal leaflet cuneately obovate, the rest broadly ovate, acuminate, deeply incised-subpectinate, segments not uniform in length, lanceolate, acuminate, often 1-2-toothed, the lower leaflets gradually reduced; upper cauline leaves ternate, the uppermost entire. Inflorescence loose, 3-7-flowered, calyx appressed-hairy outside, silky-glossy, ca. 1.5-2 cm in diameter; outer sepals very narrow, oblong-linear, often 2- or 3-fid, inner sepals slightly shorter, lanceolate, acuminate; petals small, cuneately obovate, entire, distinctly shorter than calyx, yellow; stamens short, anthers ovate; carpophore small, densely pubescent; fruitlets oblong-ovoid; style subbasal, subfiliform, two times longer than fruitlet, with a strongly dilated stigma. June.

Banks of streams. — Centr. Asia: Pam.-Al. (Tadzhikistan). Endemic. Described from Kulyabo near Arzanchi. Type in Leningrad.

Subgenus 5. **HYPARGYRIUM** Fourn., Ann. Soc. Linn. Lyon II, 16 (1868) 371. — Flowers usually in corymbiform-paniculate inflorescences; sepals, outer sepals and petals 5; petals yellow, rarely red or white, notched at apex or entire; stamens usually 20, in 3 circles of 10, 5 and 5, sometimes more or less than 20; anthers [flowers] usually didynamous; torus subglobose or conical, with numerous pistils; fruitlet glabrous; style terminal, conoid, gradually tapering to apex from a thickened base, as long as or longer than fruitlets. Annual or often perennial herbs, with pinnate or (more rarely) palmately compound leaves, often with more or less well-developed tomentose pubescence, sometimes without.

1. Plant pubescent with straight or wavy hairs and, in addition, tomentose with very thin, flexuous, intertwined hairs (particularly at lower side of leaves) 2.
- + Plants without real tomentum (sometimes very shortly and partly tomentose) 46.

2. Leaves pinnate (Section 1. Multifidae Rydb.) 3.
+ Leaves ternate or palmate 23.
3. Stem barely longer than radical leaves, 3–10 cm high; radical leaves with 1–2 pairs of lateral leaflets 21. *P. pulchella* R. Br.
+ Stem usually much longer than radical leaves, 10–70 cm high; radical leaves with 2–9 pairs of lateral leaflets 4.
4. Radical leaves nearly bipinnate, leaflets pinnatisect into narrow lobes, usually unequal in length 5.
+ Radical leaves pinnate, leaflets usually deeply dentate or incised-dentate, rarely short-toothed 9.
5. Radical leaves with 2–4 pairs of lateral leaflets 6.
+ Radical leaves with 5–9 pairs of lateral leaflets 26. *P. eversmanniana* Fisch.
6. Leaflets hardly tomentose beneath or nearly without tomentum, lobes flat 25. *P. soongarica* Bge.
+ Leaflets densely white-tomentose beneath, lobes recurved along margin 7.
7. Relics of old stipules at base of plant white-tomentose; leaflets of radical leaves strictly adjacent, segments pseudo-verticillate 24. *P. verticillaris* Steph.
+ Relics of old stipules at base of plant glabrescent; segments of leaflets of radical leaves not pseudo-verticillate 8.
8. Steppe and alpine plants, with remote or adjacent pairs of lateral leaflets and numerous narrowly linear lobes. Flowers small 22. *P. multifida* L.
+ Arctic plants, with 2 pairs of lateral leaflets, strongly adjacent to the terminal (leaf appearing nearly quinate) and with few broadly lanceolate teeth or lobes. Flowers rather large (ca. 1.5 cm in diameter) 23. *P. lapponica* (F. Nyl.) Juz.
9. Leaves with well-developed, usually dingy-white tomentum beneath 10.
+ Leaves with incomplete greenish-yellowish or greenish-whitish tomentum of short and stoutish hairs beneath 20.
10. Leaves with silky hairs beneath, often covering an additional dingy tomentum 11.
+ Silky hairs at lower face of leaf absent or nearly absent 14.
11. Leaves pinnately 2-paired, with strongly adjacent pairs of lateral leaflets (subpalmate) 31. *P. polyschista* Boiss.
+ Leaves pinnately 3–6-paired, with more or less remote pairs of leaflets 12.
12. Stems and midribs at lower face of leaves with appressed or nearly appressed hairs 28. *P. pamiroalaica* Juz.
+ Stems and midribs with more or less spreading straight hairs 13.
13. Tomentose pubescence at lower side of leaves covered by dense silky hairs 27. *P. sericea* Willd.
+ Tomentose pubescence at lower side of leaves clearly visible, silky hairs sparser, arranged along veins 30. *P. alexeenkoi* Lipsky.
14. Leaflets short-toothed 32. *P. discolor* Bge.
+ Leaflets deeply incised-dentate 15.
15. Radical leaves interruptedly pinnately 6–10(15)-paired, segments uniformly remote 16.

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- + Radical leaves 2-3(4)-paired, segments usually strongly adjacent . . . 17.
 - 16. Inflorescence few-flowered, flowers rather large. . . 37. *P. conferta* Bge.
 - + Inflorescence many-flowered, flowers rather small 37. *P. chinensis* Ser.
 - 17. Leaflets flat at margins, usually densely white-tomentose on both sides 36. *P. hololeuca* Boiss.
 - + Leaflets usually recurved at margins, glabrescent above, green . . . 18.
 - 18. Low plant, with stem 5-8 cm high and radical leaves pinnately bipaired 33. *P. baltistana* T. Wolf.
 - + Taller plant, with leaves 3-4-paired 19.
 - 19. Stems covered with short, soft, more or less appressed hairs 34. *P. approximata* Bge.
 - + Stems covered with long, rigid, horizontally spreading hairs 35. *P. fedtschenkoana* Siegr.
 - 20. Whole plant (including leaves) densely covered with soft, spreading hairs 29. *P. malacotricha* Juz.
 - + Pubescence not as above 21.
 - 21. Leaflets of lower leaves in 3-4-pairs, often markedly adjacent so that some leaves appear nearly palmate 41. *P. lomakinii* Grossh.
 - + Leaflets usually not adjacent, often more numerous 22.
 - 22. Leaflets of radical leaves few (4-6 at each side) and wide; petals small, as long as or longer than sepals . . . 38. *P. strigosa* Pall.
 - + Leaflets of radical leaves more in number (7-8 at each side) and narrow; petals large, considerably longer than sepals 40. *P. agrimonioides* M. B.
 - 23. Leaves always ternate (Section 2. *Niveae* Rydb.) 24.
 - + Leaves palmately 5-7 parted (Section 3. *Argenteae* T. Wolf) . . 34.
 - 24. Leaves oblong-lanceolate, coriaceous, glabrous above, glossy 42. *P. leucophylla* Pall.
 - + Leaves ovate or obovate to suborbicular, not coriaceous, usually pubescent above, not glossy 25.
 - 25. All radical leaves rather white-tomentose beneath. Eglandular plants 26.
 - + Radical leaves sparsely white-tomentose beneath, outer leaves often not tomentose. Plant usually more or less glandular at upper part 32.
 - 26. Plant yellow-hairy, silky-villous 49. *P. vahliana* Lehm.
 - + Plant white-tomentose, without glandular hairs 27.
 - 27. Stems thin, ascending 5-20 cm high; leaflets thin, usually with somewhat developed veins, not rounded. Flowers 1-1.5 cm in diameter 26.
 - + Stems thick, upright, 20-30 cm high; leaflets thick, with strongly developed veins, suborbicular-obovate. Flowers large, 2-3 cm in diameter 48. *P. villosa* Pall.
 - 28. Stems and petioles of radical leaves white-hairy, without straight hairs 29.
 - + Stems and petioles of radical leaves tomentose and pubescent with straight, usually thin hairs 30.
 - 29. Leaflets of radical leaves oblong, often closely dentate, with prominent lateral veins beneath, veins usually not tomentose, therefore veins rather distinct 43. *P. nervosa* Juz.

- + Leaflets of radical leaves obovate or ovate with sparser, usually not adjacent teeth; lateral veins at lower side of leaves covered by dense white tomentum, therefore indistinct 44. *P. nivea* L.
30. Stems very low, 3–5 cm high, few-flowered (usually 1–2-flowered); leaflets with few (2–3 at each side) very deep and acute teeth 47. *P. uniflora* Ldb.
- + Stems much taller, 5–30 cm high, usually with more flowers; leaflets with many and shallower teeth 31.
- 105 31. Radical leaves short-petioled, small, with many long, straight, appressed hairs on the upper surface and beneath along veins; stipules of cauline leaves oblong-ovate, usually obtuse. Flowers 8–10 mm in diameter 46. *P. arenosa* (Trucz.) Juz.
- + Radical leaves usually long-petioled, often large, with remote, long, straight hairs on the upper surface and beneath along veins; stipules of cauline leaves ovate, acute. Flowers 10–15 mm in diameter 45. *P. kuznetzowii* (Gowor.) Juz.
32. All leaves sparsely tomentose beneath. Flowers large, 1.5–2 cm in diameter 52. *P. macrantha* Ldb.
- + Outer radical leaves usually not tomentose but villous. Flowers usually up to 1.5 cm in diameter 33.
33. Radical leaves long-petioled, leaflets large, often deeply pectinately incised-dentate, with 5–9 teeth at each side. Inflorescences few-flowered. 50. *P. evestita* Th. Wolf.
- + Radical leaves short-petioled, leaflets small, rather shallowly incised-dentate, with 2–6 teeth at each side. Inflorescence rather many-flowered 51. *P. jacutica* Juz.
34. Plant usually high, without rosette of radical leaves at anthesis . . 35.
- + Plant lower, with more or less well-developed rosette of radical leaves at anthesis 41.
35. Plant tomentose and covered with very short straight hairs. Lower leaves often with rather reflexed outer leaflets. Flowers very small, ca. 7–8 mm in diameter 53. *P. dealbata* Bge.
- + Plant short pubescent mixed with tomentum or at least with sparse, long hairs. Lower leaves always strictly palmate. Flowers at least 10 mm in diameter, usually larger
36. Pubescence (of entire plant) yellowish; stipules of cauline leaves outstandingly large and wide 59. *P. mollissima* Lehm.
- + Pubescence (of entire plant) white or grayish; stipules of cauline leaves not so wide and large 37.
37. Cauline leaves few-toothed, with unequal recurved teeth at margin, dingy-tomentose beneath, without mixture of straight hairs 38.
- + Cauline leaves generally uniformly dentate, flat at margin, with a more or less dense admixture of straight to tomentose hairs beneath 39.
- 106 38. Leaves (nearly) glabrous above, glossy 54. *P. argentea* L.
- + Leaves dull and more or less pubescent above 55. *P. impolita* Wahlenb.
39. Leaflets of radical leaves shortly and broadly obovate, with 2–5 large teeth at each side; leaves densely white-tomentose on both sides 56. *P. meyeri* Boiss.

- + Leaflets of radical leaves narrow, oblong, with numerous teeth; leaves usually gray-tomentose only beneath 40.
40. Leaflets, at least of the lower leaves, obovate or oblong-obovate, evenly dentate 57. *P. canescens* Bess.
- + Leaflets of all leaves narrowly obovate, deeply and unequally incised-dentate 58. *P. eremica* T. Wolf.
41. Plant up to 30 cm high, with weakly developed rosette of radical leaves; terminal tooth of leaflet elongate, usually longer than the neighboring 42.
- + Plant smaller, always with a well developed rosette of radical leaves; terminal tooth of leaflet small, shorter than the neighboring 44.
42. Leaves rather densely white-tomentose beneath, nearly without long straight hairs 60. *P. wibeliana* T. Wolf.
- + Leaves ash-gray or greenish beneath, sparsely tomentose and with straight long hairs 43.
43. Radical leaves 5-paired, acutely dentate 61. *P. svanetica* Siegfr. et Keller.
- + Radical leaves 5-7-paired, obtusely dentate 62. *P. sommieri* Siegfr. et Keller.
44. Radical leaves usually 5-paired, leaflets with 2-5 teeth at each side 65. *P. leucopolitana* P.-J. Müll.
- + Radical leaves 5-7-paired, leaflets with 3-7 teeth at each side 45.
45. Leaflets of lower leaves oblong-obovate, dilated at apex, with 4-6 deep, narrow and often obtuse teeth at each side 63. *P. thyrsoiflora* (Hüls.) Zimm.
- + Leaflets narrowly oblong or obovate, slightly dilated at apex, with 5-8 shallower and wider, acute teeth at each side 64. *P. argenteiformis* Kauffm.
46. Style short, thick, shorter than or as long as the ripe fruitlet 47.
- + Style thin, filiform, two to three times longer than the ripe fruitlet 93.
- 107 47. Leaves pinnate; leaves of inflorescence small, usually simple (Section 4. *Tanacetifoliae* T. Wolf) 48.
- + Leaves palmate or ternate, if, rarely, pinnate, then inflorescence profusely leafy 56.
48. Radical leaves with 2-6 pairs of lateral leaflets; leaflets obovate or oblong, widest above middle; three upper leaflets larger than the rest 49.
- + Radical leaves with 6-12 pairs of lateral leaflets; leaflets usually oblong, widest at or below middle; three upper leaflets equalling or smaller than the rest 54.
49. Plant glabrous, finely glandular 71. *P. sanguisorba* Willd.
- + Plant more or less hairy 50.
50. Leaflets obovate, very deeply (deeper than $\frac{1}{4}$ of width of blade) incised-dentate 70. *P. kryloviana* T. Wolf.
- + Leaflets oblong, not as deeply incised-dentate 51.
51. Plant distinctly glandular-pubescent. Flowers crowded 69. *P. viscosa* G. Don.
- + Plant eglandulose or slightly glandular-pubescent. Inflorescence loose 52.

52. Plant rather incompletely tomentose with short, thick, flexuous hairs beneath, visible only under magnification. Flowers large, in few-flowered inflorescence 68. *P. nudicaulis* Willd.
- + Plant not completely tomentose-pubescent beneath. Flowers rather small (not more than 1.5 cm in diameter), in many-flowered inflorescence 53.
53. Stems and petioles densely covered with long spreading hairs; leaflets pubescent on both sides, terminal leaflet petioluled. Flowers relatively large, up to 1.5 cm in diameter . . . 66. *P. tanacetifolia* Willd.
- + Stems and petioles less densely hairy; leaflets glabrescent above, the terminal often sessile. Flowers usually less than 1 cm in diameter 67. *P. filipendula* Willd.
54. Small plant (3–5 cm high) with leaflets of radical leaves small, subentire or 2–3-lobed 74. *P. astragalifolia* Bge.
- + Larger plant (8–30 cm high) with leaflets of radical leaves dentate 55.
55. Tall (20–30 cm) more or less glandular plant; leaves green, slightly hairy. Flowers large (10–20 mm in diameter) 72. *P. pimpinellaides* L.
- + Low (8–10 cm) eglandulose plant; leaves densely whitish-pubescent with simple white hairs. Flowers small, ca. 7 mm in diameter 73. *P. rigidula* T. Wolf.
56. Leaves pinnate or ternate (Section 5. Rivaies T. Wolf, p. p.) . . . 57.
- + Leaves palmate, 5–9-parted 64.
57. Leaves pinnate 82. *P. supina* L.
- + Leaves always ternate 58.
58. Annual or biennial plant, with many-flowered leafy inflorescence and short petals (usually shorter than sepals) 59.
- + Perennial plant with few-flowered, somewhat leafy inflorescence and rather large petals (as long as or longer than sepals) 62.
59. Flowers axillary, remote; stems weak, prostrate, often rooting at nodes 86. *P. centigrana* Maxim.
- + Flowers in corymbiform-paniculate inflorescence; stems strong 60.
60. Median leaflet of radical leaves deeply trisect or incised (thus leaves often appearing quinate) 83. *P. amurensis* Maxim.
- + Leaflets of radical leaves entire 61,
61. Plant with long rigid hairs; leaflets strongly and irregularly dentate in upper part 84. *P. norvegica* L.
- + Plant finely short-villous; leaves uniformly acutely serrate throughout 85. *P. cryptotaeniae* Maxim.
62. Leaflets deeply (to three-fourths) pinnatifid into linear lobes with reflexed margins, velutinous beneath with dense short spreading hairs 118. *P. anadyrensis* Juz.
- + Leaflets entire, pubescence not as above 63.
63. Plant finely pubescent. Outer sepals shorter than the inner 90. *P. regeliana* T. Wolf.
- + Plant coarsely hairy (nearly prickly). Outer and inner sepals equal in length 89. *P. asperrima* Turcz.
64. Plant without rosette of radical leaves at anthesis 65.

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- + Plant with a more or less distinct rosette of radical leaves at anthesis 73.
- 65. Stems and petioles covered with curly appressed hairs (Section 5. Rivaies T. Wolf, p. p.). 66.
- + Stems and petioles covered with straight spreading hairs (Section 6. Rectae T. Wolf) 67.
- 109 66. Leaves covered on both sides with straight hairs, flat at margin 87. *P. intermedia* L.
- + Leaves with simple hairs beneath in addition to incomplete tomentum of short slightly crispy hairs; margins revolute 88. *P. heidenreichii* Zimm.
- 67. Outer and inner sepals equal in length 68.
- + Outer sepals longer than the inner, at base approximately as wide 71.
- 68. Leaflets usually oblong or oblong-obovate, thick, with distinctly prominent lateral veins beneath; plant often glandular 75. *P. recta* L.
- + Leaflets often linear-oblong, very rarely oblong-obovate, thin, with hardly protruding lateral veins beneath; plant eglandulose 69.
- 69. Rather low slender plant, with 15–30 cm high stem; leaflets of radical leaves oblong-obovate, with few (2–3 at each side) segments 78. *P. nurensis* Boiss. et Hausskn.
- + Taller plant, with more or less thick stems, 30–70 cm high; leaflets of radical leaves oblong-linear with 5–12 segments at each side 70.
- 70. Leaflets densely and deeply incised or dissected nearly to midrib, with 7–12 teeth or lobes at each side of leaflet; stems usually arcuately ascending 77. *P. semilaciniosa* Borb.
- + Leaflets remotely and less deeply incised, with 5–7, rarely 9 teeth at each side; stems often erect 76. *P. transcaspia* T. Wolf.
- 71. Plant very slightly glandular or eglandulose in upper part, long white-hairy; leaves glabrous or remotely hairy above, usually densely pubescent with long hairs only along midrib beneath, short bristles absent or only on veins; inflorescence loose, calyx densely long-hairy; outer sepals slightly longer than the inner 81. *P. taurica* Willd.
- + Plant very glandular in upper part, with long yellowish hairs; leaves densely covered on both sides with rather long hairs, densely short-hispid beneath and sometimes above; inflorescences crowded, often subcapitate at the beginning; outer sepals twice as long as the inner 72.
- 110 72. Sepals wide, obtuse; leaflets of radical leaves broadly obovate, finely appressed-hairy above 79. *P. astracanic* Jacq.
- + Sepals narrow and long, acute; leaflets of radical leaves narrowly obovate, coarsely appressed-hairy above 80. *P. callieri* Juz.
- 73. Three inner leaflets of radical leaves distinctly petioluled (Section 8. Grandiflorae T. Wolf) 74.
- + All leaflets of radical leaves sessile or subsessile 75.
- 74. Crimean plant, pubescent with simple long hairs and small glands; leaflets of radical leaves oblong-obovate, with 8–12 small and shallow teeth at each side 102. *P. umbrosa* Stev.

- + Caucasian plant, less pubescent with simple and glandular hairs; leaflets of radical leaves short-obovate, with 4-8 large and deep teeth at each side 103. *P. nordmanniana* Ldb.
75. Plant covered in upper part with large red glands 76.
- + Plant without large red glands in upper part 77.
76. Plant usually dark red above with many large red glands; leaflets of radical leaves rather strongly serrate-dentate 91. *P. desertorum* Bge.
- + Plant with few glands or nearly eglandulose, hardly reddish in upper part or green; leaflets of radical leaves finely crenate-dentate 92. *P. arnavatensis* T. Wolf.
77. Plant densely covered with long soft hairs, glandless 93. *P. bungei* Boiss.
- + Not as above (Section 9. *Chrysanthae* T. Wolf) 78.
78. Radical leaves 3-5-paired; leaflets pinnatisect nearly to midrib, segments revolute at margin 117. *P. tollii* Trautv.
- + Radical leaves 5-9-paired, leaflets entire 79.
79. Radical leaves 7-9-paired, leaflets 3-7-toothed at apex, otherwise entire; stipules of cauline leaves outstandingly large, wide 119. *P. stipularis* L.
- + Radical leaves 5-7-paired, leaflets large-dentate, with many teeth; stipules of cauline leaves not as large 80.
80. All radical leaves quinate 81.
- + Radical leaves septenate, sometimes quinate mixed with septenate (only in certain forms of *P. adzharica* T. Wolf all radical leaves quinate; inner sepals wide in this species, usually glabrous in the middle, with strongly prominent veins near base. 86.
81. Stems and petioles spreadingly hairy 82.
- + Stems and petioles appressed-hairy 85.
82. Style longer than ripe fruitlet, tapering toward apex, with small stigma 115. *P. lipskyana* T. Wolf.
- + Style shorter than or as long as the ripe fruitlet, with distinctly dilated stigma 83.
83. Stems and petioles of radical leaves covered with very short (visible only under magnification) glandular, straight or nearly straight hairs in addition to long straight ones 113. *P. schrenkiana* Rgl.
- + Stems and petioles long hairy, covered also with finely crisp hairs 84.
84. Leaves more or less hairy, green on both sides. Petals emarginate, longer than sepals; outer sepals entire 104. *P. chrysantha* Trev.
- + Leaves very densely hairy, grayish beneath. Petals not longer than sepals, entire; outer sepals often trifold or tridentate 105. *P. holopetala* Turcz.
85. Leaves remotely or sparsely hairy, green on both sides 106. *P. asiatica* Juz.
- + Leaves densely appressed-silky-hairy, grayish or whitish on both sides (like entire plant) 116. *P. sericata* T. Wolf.
86. Stems and petioles covered with very short glandular bristles, visible only under magnification 112. *P. longipes* Ldb.

- + Stems and petioles covered with long and short visible hairs 87.
87. Stems sturdy, covered with long, white, rigid, appressed — or nearly so — hairs; radical leaves usually quinate interspersed with septenate. Inner sepals very wide, with strong venation in lower part 114. *P. adscharica* T. Wolf.
- + Stems slender, covered with long, yellowish, soft, spreading or appressed hairs; radical leaves usually septenate. Inner sepals not as wide 88.
88. Lower leaves short-petioled, leaflets small (1–1.5 cm long), broadly obovate 111. *P. orbiculata* T. Wolf.
- 112 + Lower leaves long-petioled, leaflets larger (usually 2–4 cm long), oblong or oblong-obovate 89.
89. Lower leaves long-cuneate, with few teeth (5–7) only in upper third or at apex; outer sepals shorter than the inner 110. *P. sphenophylla* T. Wolf.
- + Lower leaves entire only in lower third, with more numerous teeth; outer sepals as long as the inner 90.
90. Stems and petioles appressed-hairy or spreadingly hairy, with short and long hairs. Petals not longer than calyx 109. *P. szovitsii* T. Wolf.
- + Stems and petioles spreadingly hairy with equal long hairs. Petals longer than calyx 91.
91. European or Siberian plants, with tall stems, pedicels erect in fruit, and sepals acute 107. *P. goldbachii* Rupr.
- + Caucasian plants with low stems, pedicels pendant in fruit, and sepals obtuse 108. *P. caucasica* (T. Wolf) Juz.
92. Leaves pinnate or palmate (Section 7. *Persicae* T. Wolf) 93.
- + Leaves ternate (Section 10. *Ranunculoides* T. Wolf) 99.
93. Flowers yellow 94.
- + Flowers of another color 98.
94. Lower leaves pinnate or palmately pinnate 95.
- + Lower leaves palmate 97.
95. Lower leaves palmately pinnate, four lower leaflets disposed at one level, the remaining three 0.5–2 cm higher 96. *P. flabellata* Rgl. et Schmalh.
- + Lower leaves pinnate 96.
96. Leaves silky-appressed-hairy, whitish 97. *P. pamirica* T. Wolf.
- + Leaves with rigid subappressed hairs, greenish 94. *P. raddeana* Juz.
97. Leaves densely appressed-silky-hairy beneath, whitish; leaflets oblong or oblong-lanceolate 98. *P. komaroviana* T. Wolf.
- + Leaves slightly hairy, green on both sides; leaflets obovate 99. *P. ruprechtii* Boiss.
98. Petals purple 100. *P. porphyrantha* Juz.
- 113 + Petals white with purple veins or pinkish 101. *P. cryptophila* Bornm.
99. Terminal leaflet of radical leaves broadly obovate. Flowers not more than 3 cm in diameter; fruitlets slightly carinate 120. *P. fragiformis* Willd.
- + Terminal leaflet of radical leaves obcordate, i. e., notched at apex. Flowers very large, up to 4 cm in diameter; fruitlets winged 121. *P. megalantha* Takeda.

Note. In spite of preserving the division of the given group into sections and the order of species accepted by T. Wolf, we do not agree with his definition. Particularly unnatural is his division of the whole group into two series, based on the presence or absence of a tomentose pubescence: *Eriotrichae* (into which fall sections — in Wolf "greges" — 1–3) and *Orthotrichae* (comprising the rest), a division defining individual sections. There is actually a close relationship between certain species which Wolf referred to different sections based on their pubescence: for example, between *P. strigosa* from Section *Multifidae* and *P. viscosa*, *P. tanacetifolia*, and the last species of Section *Tanacetifoliae*— or between *P. argentea* and *P. canescens* from Section *Argenteae* and *P. intermedia* and *P. heidenreichii* from Section *Rivales*. These same species do not clearly show a close relationship with the other species referred by Wolf to the same sections (for example, *P. intermedia* and *P. supina* from Section *Rivales*).

Wolf himself was compelled at times to deviate from his rigid division, referring, for example, *P. soongorica*, nearly destitute of a real tomentose pubescence, to Section *Multifidae*. The subdivision of the group into sections according to the pinnate, palmate or ternate shape of leaves is not wholly successful either. Thus Wolf was impelled to place such related species (apparently vicarious) as *P. dealbata* and *P. fedtschenkoana* in different groups.

All this prevented us from subdividing the given group into natural sections and series, for this would have revised nearly the entire system of subgenera.

Section 1. **MULTIFIDAE** Rydb. in Bull. Torr. Bot. Club (1896) 262; T. Wolf in Asch. et Graebn., Syn. VI (1904) 800; Mon. Pot. (1908) 147.— Plants conspicuously tomentose-pubescent, particularly on underside of leaves. Style short, thick, hardly longer than ripe fruitlets.

21. *P. pulchella* R. Br. in Ross., Voy. ed. 2 (1819) 193; Lehm., Monogr. Pot. Suppl. I (1835) 14; id. Rev. Pot. (1856) 36; T. Wolf, Mon. Pot. (1908) 151.— *P. keilhavii* Sommerf. in Mag. for Naturvidensk. II (1932) 244.— *P. nivea pulchella* Durand, Proc. Acad. Phil. (1863) 94.— Ic.: Lehm., Monogr. Pot. Suppl. I, tab. 7, f. 1 (malal); Rydb., Monogr. N. Am. Pot. tab. 36, f. 6.

Perennial; caudex thick, multicipital, developing congested short stalks densely covered with decayed stipules; flower-bearing stems prostrate, 5–10(25) cm long, subscahoid, with 1–2(5) flowers, silky-villous; radical leaves short-petioled, with 2 pairs of lateral leaflets, rarely with more than 1–2 small leaflets; lower stipules rufous and scarious, very wide, with large ovate-lanceolate auricles; three upper leaflets much larger than the lower, obovate-cuneate, deeply incised into 2–3 linear-lanceolate acute segments at each side, densely covered — like petioles — with long silky-glossy hairs and sparsely tomentose; cauline leaves submembranous, broadly ovate, acute, sometimes with 1–2 teeth. Flowers medium-sized, ca. 10 mm in diameter; calyx densely villous; outer sepals oblong, obtuse, hardly as long as the ovate acute inner; petals narrowly obovate, emarginate, slightly longer than calyx,

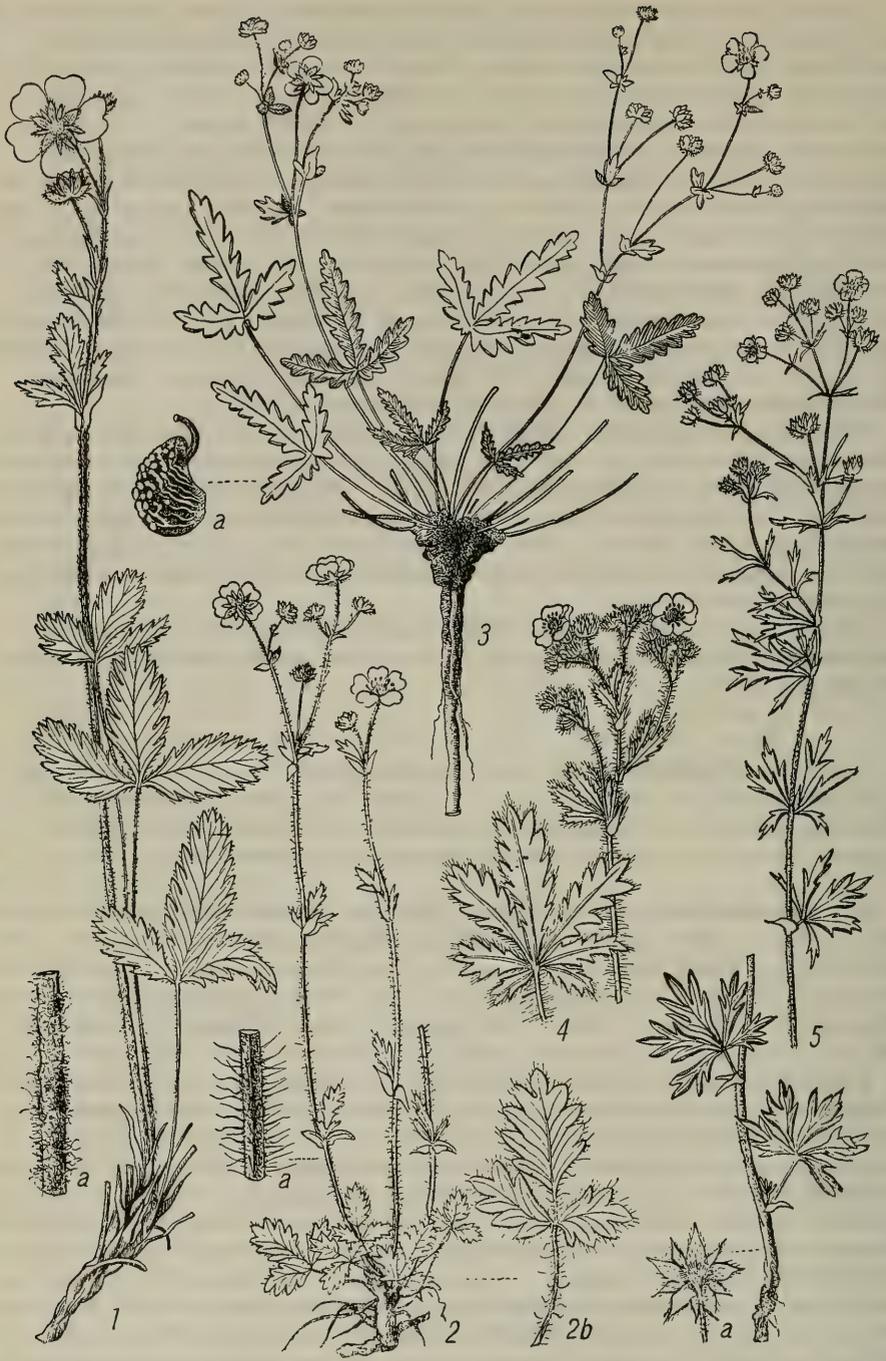


PLATE X. *Potentilla nervosa* Juz., general view, 1) part of stem; 2 - *P. arenosa* Juz., general view, a) part of stem, b) leaves; 3 - *P. leucophylla* Pall., general view, a) fruit; 4 - *P. canescens* Bess., leaves and inflorescence; 5 - *P. argentea* L., general view, a) calyx.

yellow; staminal disk slightly thickened, glabrous, separated from torus by a pilose interspace; stamens 20, with short filaments and orbicular-ovate anthers; torus subglobose, shortly pilose; fruitlets ovoid, few; style nearly terminal, shorter than ripe fruitlet, conoid, strongly thickened at base and covered with papillae, with slightly thickened stigma. July–August.

Tundras (stony, mottled).— Arctic: Nov. Z., Chuk. (Wrangel Island).

Gen. distr.: Arctic, Eur. (Spitsbergen) and Am. Described from Arctic America (Melville Island). Type in London.

22. *P. multifida* L., Sp. pl. (1753) 496; Ldb., Fl. Ross. II, 42; T. Wolf, Mon. Pot. (1908) 154; Kryl., Fl. Zap. Sib. VII (1933) 1494.— *P. ornithopoda* Tausch, Hort. Canal. (1823) tab. 10.— *P. multifida* α minor et β major Ldb., Fl. Ross. II (1844) 43.— *P. multifida* var. *ornithopoda* T. Wolf, l. c., 156.— *P. tenella* Gurcz. in Bull. Soc. Nat. Mosc. XIII (1843) 620.— *P. multifida* var. *angustifolia* Lehm., Mon. Pot. (1820) 64.— *P. multifida* var. *nubigena* T. Wolf, l. c., 155.— *P. hypoleuca* Turcz. in Bull. Soc. Nat. Mosc. XIV (1843) 619.— *P. multifida* var. *hypoleuca* T. Wolf, l. c., 157.— Ic.: Ser. Mus. helv. I, tab. 8; Tausch, l. c.— Exs.: HFR No. 715.

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Perennial; rootstock thick, covered with brown relics of decayed leaves; stems 10–40 cm high, erect or prostrate, densely branching in upper part, usually rather many-flowered, slightly or rather densely pilose and tomentose as well as petioles, pedicels and calyx; radical and lower cauline leaves with few, usually more or less adjacent, pairs of leaflets, ovate in outline; cauline leaves with broadly ovate, usually lacinate stipules; leaflets numerous and irregularly deeply pinnatifid, lobes narrowly linear or sometimes oblong, revolute at margins, green above, appressed-pilose or glabrescent, with thin white or grayish tomentum beneath and usually dingy. Flowers small; pedicels thin; outer sepals oblong-ovate, usually the same length as the ovate-lanceolate inner sepals; petals obovate, slightly emarginate, hardly longer than sepals, pale yellow; stamens 20, with short filaments and orbicular-ovate anthers; fruitlets oblong-ovoid, smooth or slightly wrinkled; style thickened at base, somewhat shorter than ripe achenes. June–August. (Plate IX, Figure 2).

Meadows (mainly steppe), stony slopes, sparse forests and forest edges, roadsides, fallow fields.— European part: Transv., Urals (S.); W. Siberia: entire region; E. Siberia: entire region; Far East: Okh., Uda, Ze.-Bu., Uss.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al., Mtn. Turkm. **Gen. distr.:** Centr. Eur., Iran., Afghanistan, Tib., Him., Mong., Jap.-Ch., N. Am. Described from Siberia. Type in London.

Note. A highly polymorphic and unquestionably collective species, requiring a critical investigation of related forms. For the time being, the Lapland (Arctic) race may be reliably separated as referred here; its characteristics are as follows.

23. *P. lapponica* (F. Nyl.) Juz. comb. nov.— *P. multifida** *lapponica* F. Nyl., Spicil. pl. Fennic. cent. II (1844) 6–7; Bot. Not. 1844, p. 53.— *P. multifida* var. *lapponica* T. Wolf, Mon. Pot. (1908) 156.— Exs.: Pl. Finl. exs. No. 727.

Perennial; stems ascending, 10–20 cm high, shortly and sparingly hairy; leaves with 2 pairs of lateral leaflets strongly adjacent to terminal, often appearing quinate; leaflets deeply incised, with 2–4 broadly lanceolate, acute, dense, straight lobes, rather slightly revolute at margin. Flowers rather large, ca. 1.5 cm in diameter. Otherwise like *P. multifida*. June.

Bluffs, stony slopes, roadsides. — European part: Kar.-Lap. (Kandalaksha District). **Gen. distr.:** Scand. Described from vicinity of Kandalaksha. Type in Helsingfors.

118 24. *P. verticillaris* Steph. ex Willd., Spec. Pl. II (1800) 1096; T. Wolf, Monogr. Pot. (1908) 157. — *P. multifida* a. minor b. *verticillaris* Ldb., Fl. Ross. II 43. — Ic.: Lehm., Rev. Pot. (1856) tab. 10, f. 1.

Perennial; caudex sturdy, multicapital, developing short, thick, crowded, tuftlike, cauline shoots, very densely covered with white-tomentose relics of decayed stipules; flower-bearing stems very thin, filiform, ascending or erect, 3–10 cm high, not or slightly longer than radical leaves, covered — like petioles, pedicels and calyx — with tomentum and long white hairs varying in density; radical leaves long- or short-petioled, oblong-obovate, 3–9 cm long, with 3–5(6) pairs of lateral leaflets; cauline leaves 1–2, subsessile, reduced, ternate or simple; stipules of radical leaves large, scarious, with large lanceolate auricles, densely whitish or yellowish-pubescent and slightly silky outside, stipules of cauline leaves small, ovate or linear-lanceolate, entire; three upper leaflets of lower leaves larger than the others, the lower pairs of leaflets remote, gradually becoming reduced, the lowermost leaflets strongly reduced, often not fully opposite, incised nearly to midrib into 2–3 linear segments, segments involute at margin, directed upwards, often appearing verticillate; all leaflets green above, usually slightly hairy or glabrescent, finely white-tomentose beneath, dingy, sometimes more or less densely covered also with long silky hairs. Flowers 2–5 (in inflorescence), usually short- rarely long-pedicel, small, ca. 10 mm in diameter; outer sepals sublinear, subobtusate, shorter than the oblong-ovate, acute inner sepals; petals broadly obovate, emarginate, nearly twice as long as calyx, yellow; stamens 20, with tiny suborbicular anthers; torus pilose, subglobose or conoid; fruitlets rather large, few, oblong-ovoid, smooth; style subterminal, thickened at base and with dilated stigma, shorter than fruitlet. June–August. (Plate IX, Figure 3).

Stony mountain slopes and steppes. — E. Siberia: Dau. **Gen. distr.:** Mong., Jap.-Ch. (W. Manchuria). Described from Siberia. Type in Leningrad.

25. *P. soongorica* Bge. in Ldb., Fl. Alt. II (1830) 244; Ldb., Fl. Ross. II, 12; T. Wolf, Monogr. Pot. (1908) 159 p. p. (excl. *P. multicaulis* Bge.); Kryl., Fl. Zap. Sib. VII (1933) 1495. — *P. soongorica* var. *viridescens* T. Wolf, l. c., 160. — Ic.: Ldb., Ic. pl. Fl. Ross. tab. 332; Lehm., Rev. Pot. tab. 8.

Perennial; caudex thin, multicapital, covered with few relics of stipules; stems thin, somewhat ascending at base, 8–15 cm high, dichasially branching and forming a loose semiumbelliform inflorescence, covered like petioles, pedicels and calyx with grayish pubescence of short hairs mixed with long spreading ones; radical and lower cauline leaves oblong-obovate, with

19 3-4 remote pairs of leaflets; upper cauline leaves with 2 pairs of leaflets, bracts simple; stipules of radical leaves nearly scarious, with lanceolate auricles, stipules of cauline leaves ovate-lanceolate, acute, entire; leaflets deeply palmatipartite into few (3-4 at each side) unequal, oblong-linear, remote, flat, obtuse segments, grayish-pubescent on both sides or only beneath with short, very thin hairs and long, spreading ones, hardly tomentose. Flowers small, 8-10 mm in diameter, short-pedicel; outer sepals linear, obtuse, inner sepals usually longer, ovate, acute; petals orbicular-obovate, one and a half times longer than calyx, slightly emarginate, yellow; staminal ring glabrous, separated from torus by villous disk; stamens 20, with short filaments and elongate anthers; torus conoid, long-hairy; fruitlets ovoid, finely rugose; style subterminal, slightly thickened at base, shorter than ripe achene, with dilated stigma. May-June.

Steppes, semideserts. — W. Siberia: Irt., Alt.; E. Siberia: Ang.-Say; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. **Gen. distr.:** Dzu.-Kash., Mong. Described from Arkaul and Kara-Dolen. Type in Leningrad.

Note. 1. *P. multicaulis* Bge. in Mem. Ac. Petrop. II (1851) 99 (*P. sericea* var. β *multicaulis* Lehm., Rev. Pot., 1856, 34) was referred to this species (as a variety) by T. Wolf; it represents a critical and apparently independent taxon, requiring further study.

Note 2. T. Wolf recorded Mart'yanov's plant from Ang.-Say. (formerly Minusinsk District) as a hybrid of *P. sericea* L. \times *P. soongorica* Bge.; in shape and dissection of leaves it is more like *P. soongorica* but differs from it by the dense tomentum and silky pubescence at the lower side of leaves (cp. T. Wolf, Mon. Pot. 1908, p. 163; HFR No. 70).

26. *P. eversmanniana* Fisch. ex Claus in Göbel, Reise II (1838) 272; Ldb., Fl. Ross. II, 42; Lehm., Rev. Pot. (1856) 39; T. Wolf, Mon. Pot. (1908) 160. — Ic.: Lehm., l. c., tab. 11.

20 Perennial, 20-30 cm high; rootstock sturdy, multicipital, squamose; stems firm, erect, few-branched above, with few-flowered branches, covered — like branches and petioles — with long, spreading hairs; radical leaves large, oblong-obovate, pinnately 5-9-paired; stipules lanceolate, often incised; leaflets incised to midrib into very long linear lobes (15-20 mm long, 1 mm wide), lobes often 2-3-sect, revolute at margin, white-tomentose beneath and with long spreading hairs at both sides; cauline leaves few, with ovate-lanceolate stipules. Flowers medium-sized; outer sepals oblong-linear, the inner ovate-lanceolate, twice as long as the outer; petals obovate, sinuate at apex, one and a half times longer than sepals, yellow; stamens ca. 20, filaments short, anthers oblong; achenes few; style terminal, slightly thickened at base, as long as achenes. June-July.

European part: V.-Kama (S. Urals). Endemic. Described from the former Orenburg County (Andreevka). Type in Leningrad.

27. *P. sericea* L., Sp. pl. ed. 1 (1753) 495; Ldb., Fl. Ross. II, 41 p. p.; T. Wolf, Mon. Pot. (1908) 161 p. p.; Kryl., Fl. Zap. Sib. VII (1933) 1496. — Ic.: Ldb., Ic. pl. Fl. Ross. IV (1834) 334. — Exs.: HFR No. 1925.

Perennial; caudex stout, multicipital, stalks crowded forming tufts, densely covered with brownish relics of stipules; stems (3)5-20 cm high,

thin, arcuately ascending, rather many-flowered, stems, much like the petioles and the straightly spreading branches of the inflorescence, white-tomentose with short hairs and long spreading or nearly erect ones, particularly profuse in lower part of stem, on petioles and midrib of leaves; radical and lower cauline leaves interruptedly subpinnate, oblong, with (3)5-7 pairs of somewhat remote leaflets; stipules scarious, with long lanceolate auricles, stipules of cauline leaves herbaceous, linear-lanceolate, entire or bipartite; leaflets oblong, very deeply (but not to midrib), uniformly and thinly pinnatisect, with many, adjacent, pectinately (parallel) arranged, oblong-linear, obtuse segments 1-2 mm wide, often slightly falcately curved, directed upwards or outside, recurved at margin, densely covered on both sides or only above with appressed or often loosely spreading, silky hairs, sparsely tomentose. Flowers small, 10-15 mm in diameter, on long, erect to almost spreading pedicels; calyx silky-villous, outer sepals linear-lanceolate, obtuse, slightly shorter than the ovate, acute inner sepals; petals broadly obovate, emarginate, one and a half to two times longer than calyx, yellow; stamens 20, filaments short, anthers nearly oblong; torus small, conoid, pilose; fruitlets few, oblong-ovoid, finely wrinkled, weakly carinate; style subterminal, thickened at base, shorter than fruitlet, with thickened stigma. June-August. (Plate IX, Figure 5).

121 Rocks, dry mountain (usually stony) slopes, steppes. — European part: V.-Kama (Urals); W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau.; Centr. Asia: Dzu.-Tarb., T. Sh. Gen. distr.: Mong. Described from Siberia. Type in London.

Note. The critical *P. dasphylla* Bge. (in Ldb., Fl. alt. II (1830) 243; its description is based on plants from Korgon, Charysh, Koks, Chui-Ldb., Ic. Fl. Ross. IV, tab. 331) is not separated here from *P. sericea* L. s. str. Its leaves are glabrescent above, green, and the segments of the radical and lower cauline leaves are exceptionally narrow and markedly dense. Observations in nature on the distribution and relationships of both forms are required.

28. *P. pamiroalaica* Juz. spec. nov. in Addenda IX, p. 451. — *P. sericea* T. Wolf, Mon. Pot. (1908) 161 et auct. fl. As. Med. p. p., non L. — *P. sericea* var. *genuina* f. *alpina* T. Wolf, l. c., 162 saltem ex max. part. — *P. sericea* f. *akbaitalensis* O. Fedtsch. ex T. Wolf, l. c. — *P. polyschista* Siegf. insched., non Boiss.

Perennial; caudex thick, multicapital, stalks crowded forming tufts, densely covered with brown relics of stipules; stems 5-20 cm long, rather firm, arcuately ascending or nearly prostrate, rarely erect, densely covered — like the elongated, erect branches of the inflorescence and petioles — with white tomentum and with long, thin, usually appressed hairs; lower cauline leaves pinnate or slightly interruptedly pinnate, obovate, with 3-5 pairs of usually adjacent leaflets; stipules of radical leaves with long lanceolate auricles, stipules of cauline leaves ovate-lanceolate, entire; leaflets very deeply pinnatisect, with rather few, proximate, oblong or oblong-linear segments, rounded at apex, often curved, tomentose-pilose at both sides but particularly beneath, in addition densely covered with appressed silky hairs. Flowers usually large, in few-flowered inflorescences, short-pedicel; calyx silky-hairy, outer sepals ovate-lanceolate, shorter than the ovate inner

sepals, all sepals obtuse, rarely the inner acute; petals broadly obovate or cordate, emarginate; filaments short; anthers oblong-ovate; torus small, conoid, pilose. June—July. (Plate IX, Figure 4).

Stony and rocky clayey slopes and meadows, rocks in the subalpine and alpine zones. — Centr. Asia: Dzu.-Tarb., T. Sh. (particularly W.), Pam.-Al. **Gen. distr.:** Dzu.-Kash. Described from the Alai valley. Type in Leningrad.

29. *P. malacotricha* Juz. sp. nova in Addenda IX, p. 452.

122 Perennial, very similar in appearance to the frequently sympatric *P. pamiroalaica*, but differs by the shorter dissection of leaflets, the dense pubescence of spreading, long, soft hairs on stems, petioles and, partially, leaflets, and by the yellowish-greenish strongly glandular calyx. July.

Sands, stony and clayey slopes. — Centr. Asia: Pam.-Al. Endemic. Described from Pamir. Type in Leningrad.

Note. Wolf sometimes referred this curious form to *P. sericea* and other times assumed it to be a hybrid (*P. sericea* × *sibirica*). Not denying the possibility of this form being a hybrid, we prefer to treat it as a separate species since it has been collected more than once and has always retained its characters.

30. *P. alexeenkoi* Lipsky, Fl. cauc. Suppl. I (1902) 52; T. Wolf, Monogr. Pot. (1908) 163. — *P. sericea* Ldb., Fl. Ross. II, 41 p. p. (quoad pl. caucas.). — Ic.: T. Wolf, l. c., tab. III, f. 2.

Perennial; caudex sturdy, developing elongated, cylindrical, cespitosely crowded stalks, densely covered with brownish relics of decayed leaves; stems 10–15 cm high, ascending to nearly erect, thin, dichasially branching nearly from middle into thin erect branches forming a loose corymbiform few-flowered inflorescence, finely pubescent, and in addition sparsely covered with long hairs; radical leaves short-petioled, oblong, up to 5 cm long and 2–2.5 cm wide, with 5–6-pairs of lateral leaflets; cauline leaves 1–2, small, very short-petioled, ternate; stipules of cauline leaves small, ovate-lanceolate, entire; leaflets, 6–7 at each side, adjacent (upper) or alternate (lower), oblong or elliptic, deeply pinnatisect into oblong-linear, obtuse 7–5–3 segments recurved at margin; terminal leaflet sessile, upper lateral leaflets smaller than the terminal, long-decurrent into the winged and dentate rachis, the lower leaflets slightly larger and decurrent at base, the rest gradually becoming reduced toward base of leaves, not decurrent; all leaves slightly hairy, green above, densely covered beneath with very thin silvery tomentum, and with longer, white, straight, rather few hairs along veins (and on calyx). Flowers on long very thin pedicels, small; calyx finely pilose, 7(9) mm in diameter, outer sepals oblong-linear, slightly shorter than the ovate-lanceolate, acute inner; petals unknown; stamens 20, with small orbicular-ovate anthers; fruitlets rather large, oblong-ovoid, finely wrinkled; style slightly thickened at base, with dilated stigma, as long as or slightly shorter than fruitlet. June.

Rock crevices. — Caucasus: Dag., Cisc. Endemic Described from the village of Akucho. Type in Leningrad.

123 31. *P. polyschista* Boiss., Diagn. pl. or. nov. Ser. I, X (1849) 6; Boiss., Fl. Or. II, 710; T. Wolf, Monogr. Pot. (1908) 164. — *P. sericea* var. *polyschista* Lehm., Rev. Pot. (1856) 34.

Perennial; caudex thick, multicipital, developing small crowded cauline shoots, covered with brownish relics of stipules; flower-bearing stems 3–6 cm high, weak, flexuose, ascending or prostrate, covered — together with petioles, branches of inflorescence, pedicels and sepals — with short and appressed white-silky hairs; radical leaves small, up to 2 cm long, ovate (in outline), with 2 pairs of proximate leaflets; stipules scarious with lanceolate auricles; cauline leaves few, ternate or simple, with broadly ovate, usually dentate stipules; leaflets of lower pair small, entire or 2–3-lobed, the three upper pinnatifid into 5–7 short, oblong-linear, flat lobes, with appressed white-silky hairs on both sides. Inflorescence loose, few-flowered; flowers small, 8 mm in diameter, short-pedicelated; calyx blackish-purplish outside; inner sepals oblong, obtuse, shorter than the outer, ovate, subobtuse; petals obovate, emarginate, longer than sepals, golden yellow; stamens 20, filaments short, anthers subglobose; torus small, conoid, pilose; fruitlets ovoid; style subterminal, thin, elongated, with few papillae at base, distinctly longer than fruitlets, hamate, with dilated stigma. July–August.

Alpine zone, at snow line. — Caucasus: S. Transc. (Ararat). **Gen. distr.:** N. Iran. Described from Tachtī Soleiman near Häsartschol. Type in Geneva.

Note. Wolf conjectures that this species could have originated from *P. multifida* var. *nubigena* crossed with *P. argaea* (l. c., p. 165).

32. *P. discolor* Bge. in Mém. Acad. Sc. St. Pétersb. II (1831) 99; T. Wolf, Mon. Pot. (1908) 165. — Ic.: Lehm., Rev. Pot. tab. 12. — Exs.: HFR No. 1922.

124 Perennial; caudex thin, multicipital, covered with relics of stipules; stems 10–40 cm long, thin, arcuately ascending, few-leaved, densely covered — like petioles, inflorescence branches and sepals — with lamelliform tomentum and with scattered long hairs; radical leaves with petioles varying in length, with (2)3–4 pairs of leaflets, stipules small, with lanceolate auricles; cauline leaves subsessile, ternate, the uppermost simple stipules short and wide, entire or incised-dentate; leaflets sessile, coriaceous, oblong, oblong-elliptic or oblong-ovate, 2–4 cm long, 8–10 mm wide (3 upper leaflets much larger than the others), crenulate-serrate, with 6–9 small, obtuse teeth at each side, glabrous or slightly tomentose above, white-tomentose beneath, sparsely ciliate at margin. Inflorescence loose, dichasially paniculate, many-flowered; flowers long-pedicelated, small, 5–7 mm in diameter; sepals acute, the outer oblong, sometimes dentate, inner sepals longer than the outer, ovate; petals obovate, emarginate, yellow; stamens 20, filaments long, thin, anthers oblong-ovate; torus small, conoid, pilose; fruitlets oblong-ovoid, smooth, partly undeveloped; style subterminal, slightly shorter than fruitlets, glandular and thickened almost to apex, stigma slightly dilated. June–July.

Dry meadows, among shrubs. — Far. East: Uss. **Gen. distr.:** Jap.-Ch. Described from N. Korea. Type or cotype in Leningrad.

Note. The type of this species is a small plant with prostrate stem and rather many simple long hairs on the petioles, the lower part of stem

and also on the upper surface of most of the leaves. The Soviet plants, similar in all probability to the Japanese and Manchurian plants, do not, apparently, fully correspond with the type; *P. discolor* may possibly be subdivided in the future into several species. In any event, *P. formosana* Hance, described from Formosa and added to *P. discolor* by T. Wolf, unquestionably represents a separate species.

33. *P. baltistana* T. Wolf, Monogr. Pot. (1908) 171.

Perennial; rootstock thin, densely covered with red-brown relics of decayed stipules, with a rosette of radical leaves at summit; stems few, somewhat prostrate, 5–8 cm long, branching at apex or in upper half, sparsely covered — like petioles, pedicels and calyx — with a tomentum and longer straight hairs; radical leaves short-petioled, 2 cm long, with 2 pairs of very close lateral leaflets; leaflets oblong-obovate, 7–10 mm long, uniformly incised-dentate in upper half, with oblong obtuse teeth, usually recurved at margins, dark green, slightly and shortly appressed-pilose above, densely white-tomentose beneath and with long bristly hairs covering veins; stipules scarious, red-brown, with lanceolate long-acuminate auricles; cauline leaves few, usually ternate, with lanceolate-acuminate entire stipules. Inflorescence 2–5-flowered; flowers rather long- or short-pedicel; calyx canescent outside, 10–12 mm wide; outer sepals oblong-linear, obtuse, half as long as the broadly ovate, acute inner sepals; petals small, obovate, slightly longer than to twice as long as calyx, yellow; stamens 20, with small reniform anthers; torus pilose, conoid; fruitlets numerous, rather large, shortly ovoid, smooth or nearly smooth; style strongly thickened at base and covered with papillae, with slightly dilated stigma, somewhat shorter than fruitlet.

Centr. Asia: Pam.-Al. (Alai Range) (?). Gen. distr.: Ind.-Him. (Kashmir). Described from Baltistan near Skardo. Type in London. (leg. C. B. Clarke).

Note. B. A. Fedchenko's plant from Alai, which T. Wolf tentatively referred to this species, was collected in its vegetative state, and for this reason, its identification cannot be considered as definite.

34. *P. approximata* Bge. in Ldb., Fl. Alt. II (1830) 241; Ldb., Fl. Ross. II, 41; Boiss., Fl. Or. II (1872) 711; T. Wolf, Mon. Pot. (1908) 172; Kryl., Fl. Zap. Sib. VII (1933) 1498.— Ic.: Ldb., Ic. Fl. Ross. IV, tab. 325.

Perennial; caudex sturdy, multicapital, with few brown relics of stipules; stems 15–50 cm high, ascending or nearly erect, rather thick, very leafy, covered — like petioles, inflorescence branches and calyx — with thin, long, more or less spreading hairs and short white tomentum; radical and lower cauline leaves long-petioled, with 2–3 proximate pairs, broadly ovate in outline, median cauline leaves markedly pinnate with 2 pairs of very close leaflets (nearly palmate), upper leaves ternate, sessile; stipules of radical leaves scarious, with lanceolate auricles; stipules of cauline leaves herbaceous, ovate, acute; leaflets oblong, cuneate, the upper 2–3 cm long, pinnatisect, with 5–8 oblong, obtuse, equal segments at each side, green, slightly hairy or glabrescent above, white-tomentose, dingy beneath (without silky hairs). Inflorescence compressedly corymbiform, many-flowered; flowers small, 8–10 mm in diameter, short-pedicel; sepals nearly equal in length, ovate-lanceolate, acute; petals slightly longer than sepals,

obovate, slightly emarginate, yellow; stamens 20, with thin filaments and small orbicular anthers; torus conical-cylindrical; fruitlets numerous, small, ovoid, finely rugose; style subterminal, nearly as long as achene, conoid-thickened at base covered with papillae, and with slightly dilated stigma. Fl. June–August.

Steppe meadows, fallow fields. — European part: V.-Kama; W. Siberia: Ob, U. Tob., Alt., Irt.; Centr. Asia: Dzu.-Tarb., Pam.-Al. (Zeravshan) (?). Reported from the Caucasus (Tal.), but apparently erroneously. Endemic. Described from the Irtysh River. Type in Leningrad.

Note. The Zeravshan plant, referred to *P. approximata* by Wolf, is a very critical form requiring special study; it is unlikely that it belongs here.

126 35. *P. fedtschenkoana* Siegf. ex T. Wolf, Mon. Pot. (1908) 173. — *P. F.* var. *digitata* T. Wolf, l. c., 174 p. p. — Ic.: T. Wolf, l. c., 174, f. 8.

Perennial; rootstock thick, multicapital, covered with relics of stipules; flower-bearing stems 20–50 cm high, erect, very leafy, usually divaricately branching at upper half, covered like petioles and pedicels with fine tomentum and with dense, long, rigid hairs on small tubercles; radical and lower cauline leaves long-petioled, pinnately but irregularly 2–3-paired, very close, lateral leaflets or nearly palmate with 5–7 segments; stipules of cauline leaves brown-scarious, with narrow lanceolate auricles; stipules of radical leaves herbaceous, ovate-lanceolate, entire or 1-toothed; leaflets oblong-lanceolate, the three upper usually long-petioled, pinnatifid or dissected, with numerous proximate linear lobes, segments in larger radical leaves often pinnatifid or dentate, flat along margin, green, long-hairy above, white-tomentose beneath, long-hairy along veins. Flowers in loose inflorescences, thin-pedicled, medium-sized, ca. 1 cm in diameter; sepals gray-tomentose, outer sepals linear, the inner ovate-lanceolate, equal in length; petals somewhat emarginate, slightly longer than sepals, yellow; stamens ca. 20, with small ovate anthers; torus conical, pilose; fruitlets ovoid, rugose; style barely as long as fruitlets. June–August.

Meadows on mountain slopes. — Centr. Asia: T. Sh. Endemic. Described from Chimgan Mountain, on the left bank of the Chirchik River (W. T. Sh.). Type in Leningrad.

Note. This species is described here in the strict sense, referring only to the West Tien Shan (and, in part, the Kara-Tau) plant. Wolf referred to this species a number of readily distinctive forms that have not been fully investigated: *P. musartana*, T. Wolf in sched. (cfr. T. Wolf, l. c.) from Central Tien Shan, *P. sordescens* T. Wolf in sched. (T. Wolf, l. c., p. 174; *P. F.* var. *digitata* T. Wolf, l. c., p. p.) from Fergana, and *P. karatavica* Juz. ined., from the foothills of Kara-Tau.

36. *P. hololeuca* Boiss., in Kotschy, Pl. Pers. bor. (1843) No. 345; Boiss., Fl. Or. II (1872) 710; T. Wolf, Mon. Pot. (1908) 176. — *P. sericea* var. *hololeuca* Hook., f. Fl. Brit. Ind. II (1879) 354? — *P. hololeuca* var. *minor* et var. *calvescens* T. Wolf, l. c., 177. — *P. gerardiana* Bge., in Mém. Acad. St. Pétersb. VI (1854) 284, non Lindl. — *P. lehmanniana* Rupr., Sert. tiansch. (1869) 45. — *P. sarawschanica* T. Wolf in sched. — Ic.: T. Wolf, l. c., tab. III, f. 1.

127 Perennial; caudex sturdy, covered with brown scales; stems 5–30 cm high, erect or ascending, slightly branching at apex, floccose-tomentose and white-villous (like the whole plant); radical leaves with petioles varying in length with 2 pairs of proximate lateral leaflets, the lower of which distinctly smaller than the three upper and not always opposite; leaflets oblong-obovate, incised-dentate up to middle into 3–7 oblong and obtuse teeth at each side, grayish-tomentose above and villous-pubescent, rarely glabrescent; stipules of cauline leaves ovate, acute, entire. Inflorescence few-flowered; flowers usually rather large, up to 2 cm in diameter; outer sepals oblong, obtuse, slightly shorter than the oblong-lanceolate acute inner; petals one and a half to twice as long as sepals, broadly obovate, golden yellow; stamens short, with broadly ovate anthers; fruitlets ovoid, smooth; style slightly shorter than fruitlets. July.

Alpine meadows and among shrubs, high-mountain steppes, rock streams. — Centr. Asia: T. Sh., Pam.-Al. **Gen. distr.:** Iran., Tib.? Described from Iran, Demavand Peak. Type in Geneva.

× *P. subtrijuga* Juz. nom. nov. — *P. hololeuca* var. *subtrijuga* T. Wolf, Mon. Potent. (1908) 177. (*P. hololeuca* Boiss. × *P. pamiroalaica* Juz.). — Resembling *P. hololeuca* from which it is distinguished by the presence of 1–2 additional leaflets on the radical leaves and somewhat silky pubescence of leaves. — Centr. Asia: T. Sh., Pam.-Al.

37. *P. chinensis* Seringe in DC., Prodr. II (1825) 581; Kom., Fl. Manchzh. II, 51; T. Wolf, Monogr. Pot. (1908) 179. — *P. exaltata* Bge. in Mém. Acad. St. Pétersb. II (1831) 98. — Ic.: Lehm., Reivs. Pot. tab. 23. — Exs.: HFR No. 1921.

128 Perennial; caudex thick, multicipital, covered with brown relics of stipules; stems 30–60 cm long, sturdy, erect or ascending, leafy, covered — like petioles and branches of inflorescence — with rigid short bristles and long spreading hairs, rough to the touch; radical leaves large, 25–30 cm long, 8–15 cm wide, oblong-obovate, in outline, slightly interruptedly pinnate into many (7–15) pairs of lateral leaflets; cauline leaves gradually reduced in size, with smaller number of leaflets; stipules of radical leaves subscarios, with long subulate auricles, stipules of cauline leaves oblong-ovate, pinnatisect; leaflets opposite or alternate, linear-oblong in outline, gradually increasing in size toward apex of leaves, the uppermost 5–7 cm long, pinnatisect nearly to midrib, with 9–13 segments at each side, segments oblong-lanceolate or oblong-linear, often curved, acute or obtuse, revolute at margin, green above, with few bristles or glabrous, densely white-tomentose beneath. Inflorescence compressedly corymbiform-paniculate, many-flowered; flowers small, 6–8 mm in diameter, on short pedicels; calyx covered with short bristles and appressed-hairy; outer sepals linear, oblong-ovate, acute, inner sepals slightly longer than the outer; petals about as long as sepals, broadly obovate, emarginate; stamens 20, with short filaments and rather large oblong anthers; torus conical, pilose; fruitlets oblong-ovoid, nearly smooth, with few long hairs near base; style sub-terminal, slightly thickened at base, with strongly dilated stigma, almost as long as fruitlet. June–August.

Riperian meadows and sands, stony slopes. — E. Siberia: Dau.; Far East: Uss., Ze.-Bu. **Gen. distr.:** Jap.-Ch. Described from China. Type in Geneva.

Note. *P. chinensis* Ser. × *P. multifida* L., representing a combination of characters of the parental forms, were, for the most part, collected in the vicinity of Blagoveshchensk on the Amur by F. Karo (cp. T. Wolf Mon. Pot. 1908, p. 182).

38. *P. strigosa* Pall. ex Pursh, Fl. Amer. sept. (1814) 356 p. p. (quoad pl. Pallasii); Bge. in Ldb., Fl. Alt. II (1830) 237. — *P. agrimonioides* Bge. in Ldb., l. c., 239, non MB.; Ldb., Fl. Ross. II, 40 p. p. (quoad pl. altaicam). — *P. pennsylvanica* Ldb., Fl. Ross. II, 40 saltem p. p., non L. — *P. pennsylvanica* var. *agrimonioides* Lehm., Rev. Pot. (1856) 59 p. p. — *P. sibirica* var. *genuina* T. Wolf, Mon. Pot. (1908) 189; Kryl., Fl. Zap. Sib. VII (1933) 1500. — *P. sibirica* var. *genuina* f. *stepposa* T. Wolf, l. c., 190; Kryl., l. c. — *P. pennsylvanica* var. *strigosa* f. *stepposa* Kryl., Fl. Alt. (1903) 380.

131 Perennial; rootstock thick, multicapital, covered with brown relics of stipules; stems 15–30 cm high, thin, usually erect, with few short hairs in upper part, branches few-flowered, forming a compressed inflorescence and like petioles, pedicels and sepals densely tomentose and short-hairy; radical and lower cauline leaves pinnate or slightly interruptedly pinnate, with 3–6 pairs of leaflets; upper cauline leaves with 2 pairs of leaflets and ternate; stipules with linear-lanceolate, entire or incised auricles, stipules of cauline leaves broadly ovate, incised-dentate; leaflets oblong or oblong-obovate, sessile, deeply dentate or subpinnatisect into oblong, obtuse lobes, usually revolute at margin, densely hairy above, densely yellowish-tomentose and sparingly hairy beneath. Flowers on rather long pedicels; fruiting sepals slightly accrescent in fruit, outer sepals oblong and obtuse or ovate and acute, the inner sepals longer than the outer; petals cuneately obovate, somewhat emarginate, as long as sepals or slightly longer, yellow; stamens 20, anthers small, orbicular; achenes small, ovoid, rugose; style subterminal, thickened at base, as long as ripe fruitlet. July–September. (Plate IX, Figure 7).

Steppes, fallow fields, rarely in pine forests or at their edges, stony slopes, roadsides. — European part: S. Urals; W. Siberia: Ob, Alt., U. Tob., Irt.; E. Siberia: Yenis., Ang.-Say., Lena-Kol., Dau.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. Gen. distr.: Mong. Described from W. Siberia. Type unknown (possibly in London).

Note. *P. strigosa* Pall. is related to *P. sericea* L. by intermediate forms that are undoubtedly hybrid derivatives, such forms are known from West Siberia (Altai, Irtysh) and Central Asia (Dzungaria-Tarbagatai, Tien Shan) (cf. T. Wolf, Mon. Pot. 1908, p. 192).

39. *P. conferta* Bge., in Ldb., Fl. Alt. II (1830) 240. — *P. pennsylvanica* β *conferta* Ldb., Fl. Ross. II, 40 p. p. — *P. pectinata* Fisch. ex Lehm., Rev. Pot. (1856) 58, nomen. — *P. pennsylvanica* var. *pectinata* Kryl., Fl. Alt. (1903) 350. — *P. sibirica* var. *pectinata* T. Wolf, Mon. Pot. (1908) 190; Kryl., Fl. Zap. Sib. VII (1933) 1500. — *P. sibirica* var. *longipila* T. Wolf, Mon. Pot. (1908) 191; Kryl., Fl. Zap. Sib. l. c. — Ic.: Ldb., Ic. pl. Fl. Ross. IV, tab. 333.

Perennial; stems 10–50 cm high, erect or often slightly arcuately ascending, usually dark red-purple, covered — like petioles — with sparse

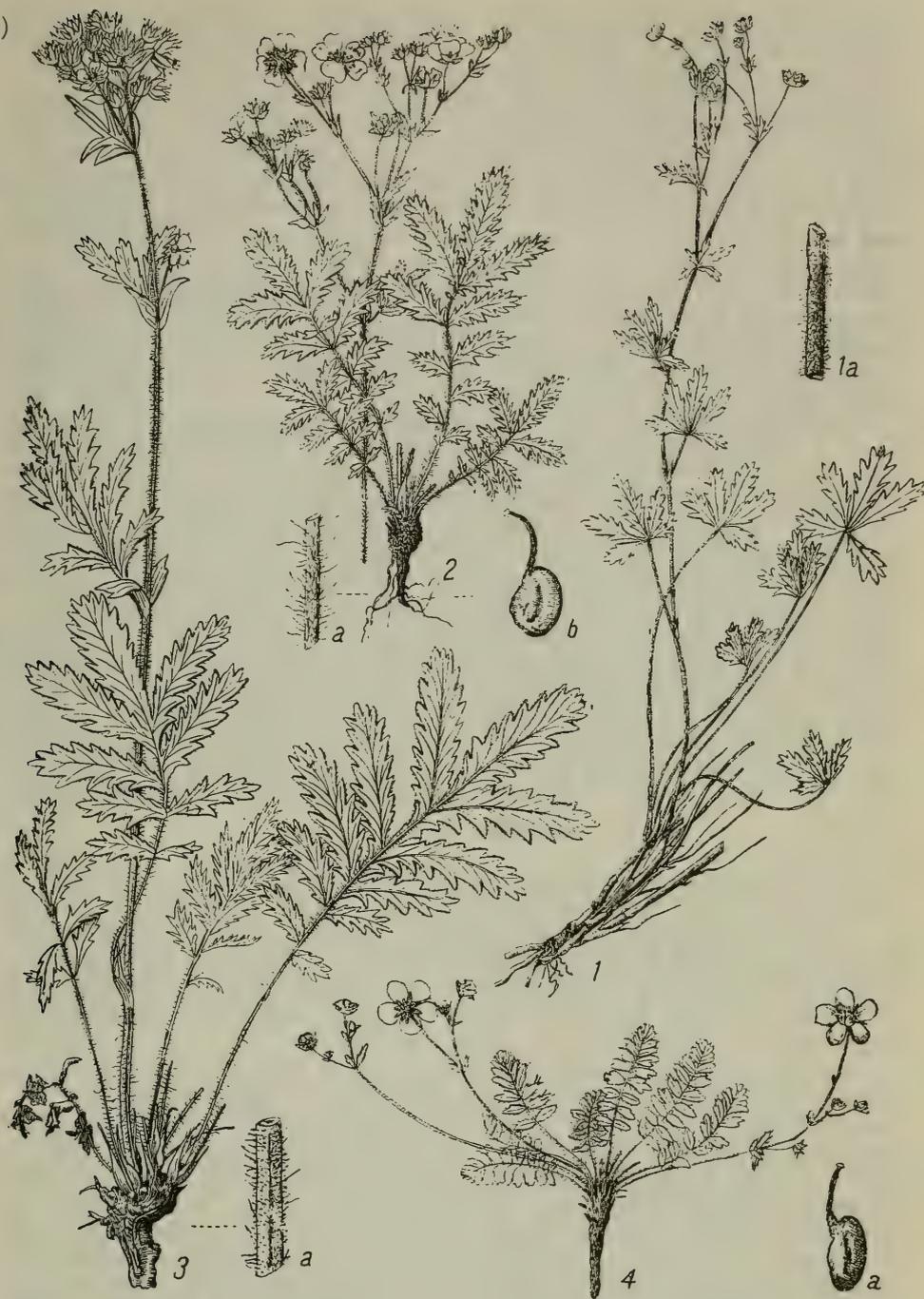


PLATE XI. 1 - *Potentilla argenteiformis* Kaufm., general view, a) part of stem; 2 - *P. filipendula* Willd., general view, a) part of stem, b) fruit; 3 - *P. viscosa* Don., general view, a) part of stem; 4 - *P. astragalifolia* Bge., general view, a) fruit.

tomentum and long, spreading white hairs, especially dense in lower part of stem and on petioles; radical and lower cauline leaves large, wide, with 6 pairs of lateral segments, lower segments horizontally spreading, the upper arcuately curved and slightly decurrent, the two uppermost segments confluent at base with the terminal one, all lobes very deeply (sometimes nearly to midrib), uniformly and pectinately dissected into many (6-10 at each side), narrow, linear or linear-lanceolate, adjacent lobules more or less revolute at margin, densely short-hairy above, white-tomentose beneath, and, in addition, long white-hairy (mainly along the very prominent veins); stipules rather large, ovate-lanceolate, acute, entire or few-toothed. Flowers crowded before flowering and in small abortive specimens, afterwards usually in loose inflorescence, with elongated tomentose and hairy branches and pedicels; calyx slightly pilose-glandular and long white-hairy, with nerves prominent after flowering. Otherwise, like *P. strigosa* Pall. June-August. (Plate IX, Figure 6).

132 Stony mountain slopes and rock streams, steppes, roadsides. — European part: V.-Kama (S. Urals); W. Siberia: Alt., Ob, U. Tob., Irt.; E. Siberia (Ang.-Say., Dau., Lena-Kol.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. **Gen. distr.:** Mong. Described from the Chuya steppe. Type in Leningrad.

Note. A good species, readily distinguishable from the often sympatric *P. strigosa* Pall. with which it was united by T. Wolf. Its habitus and pubescence are often more reminiscent of *P. chinensis* than *P. strigosa*; T. Wolf erroneously classified his particularly luxuriant specimens from the southern Urals (Krasheninnikov) as *P. chinensis*. *P. conferta* cannot be regarded as a successful name since it more properly fits *P. strigosa*; this designation may be explained only by the fact that the "type" specimens of *P. conferta* is a small and badly developed specimen.

The occurrence of intermediate (hybrid) forms between *P. conferta* Bge. ("*P. sibirica*") and *P. chinensis* Ser. is reported by T. Wolf in Mon. Pot. 1908, p. 192. On the other hand, Wolf partly accepted some typical *P. conferta* Bge. as these forms.

40. *P. agrimonioides* M. B., Fl. taur.-cauc. I (1808) 403; Ldb., Fl. Ross. II, 39, p. p.; (excl. pl. altaica); Grossh., Fl. Kavk. IV, 310. — *P. multifida* γ *agrimonioides* Ser. in DC., Prodr. II (1825) 581. — *P. pennsylvanica* var. *agrimonioides* Lehm., Rev. Pot. (1856) 59 p. p. — *P. sericea* β *agrimonioides* Boiss., Fl. Or. II (1872) 709. — *P. hispanica* var. *agrimonioides* T. Wolf, Mon. Pot. (1908) 193. — Exs.: HFR No. 2160; Herb. Fl. Cauc. No. 370.

Perennial; caudex sturdy, covered with brown relics of stipules; stems rather thin, arcuately ascending or usually erect, straight, somewhat branching only in upper part with nearly erect long branches, canescentlike petioles and pedicels with short tomentum and longer spreading soft hairs; radical and lower cauline leaves long-petioled, with 3-5(6) pairs of lateral leaflets, the three upper leaflets confluent at base and shortly decurrent; leaflets obovate, deeply and pectinately incised-dentate, with few — 3-7 at each side — rather remote, rounded or linear segments, revolute at margin, with dense, appressed, short hairs above, green or grayish green, canescent beneath with very dense tomentum and longer hairs mainly along the very prominent veins; median and upper leaves strongly reduced, short-petioled, with 1-3 pairs of lateral leaflets; stipules of cauline leaves oblong,

obtuse, usually entire. Inflorescence few-flowered, branches, pedicels and calyx tomentose and with many glands; flowers up to 2 cm in diameter; calyx slightly (twice) accrescent after flowering, outer sepals narrowly ovate-lanceolate, obtuse, shorter than the inner, inner sepals ovate, acute, prominently veined; petals nearly twice as long as sepals, obovate, yellow; fruitlets oblong or ovoid, nearly smooth; style as long as fruitlet. June–July
 Mountain slopes, rocks, ravines, subalpine meadows, pastures. — Caucasus: Cisc., Dag., E. and S. Transc. Endemic. Described from the Caucasus. Type in Leningrad.

41. *P. lomakinii* Grossh. in Bull. Polytechn. Inst. Tiflis II (1926) 204, nomen; idem. in Journ. Soc. Bot. Russe XIV (1930) 308.

Perennial; stems 40–80 cm high, sturdy, nearly erect, straight, rather few-branched only at summit, rather densely covered — like entire plant — with grayish tomentose hairs and simple, long, subappressed or appressed ones, slightly reddening in the sun; radical and lower cauline leaves long-petioled, 10–25 cm long, pinnately 3–4-paired, often with very adjacent leaflets, thus leaves appearing nearly palmatipartite, terminal leaflet slightly larger than the decurrent neighboring pair, the rest of the leaflets gradually decreasing in size below; all leaflets oblong, widest in upper part, rather deeply incised-dentate, with long and acute teeth, densely appressed-hairy at both sides, slightly silky beneath, with strongly prominent lateral veins; stipules of cauline leaves ovate-lanceolate, acute, nearly entire, the median and upper much reduced. Inflorescence corymbiform, compressed; flowers short-pedicel; hypanthium and sepals with prominent nerves; outer sepals lanceolate, the inner ovate-lanceolate, acute; petals broadly obovate and shallowly but broadly emarginate at apex, nearly twice as long as calyx, yellow; fruitlet small, 1.5 mm long, ovoid, smooth. July–August.

Caucasus: S. Transc. Endemic. Described from Karabakh, Bazar-Chai. Type in Tbilisi? Paratype in Leningrad.

Section 2. *NIVEAE* Rydb. in Bull. Torr. Bot. Club (1896) 262; T. Wolf in Asch. u. Graebn., Syn. VI (1904) 670; Mon. Pot. (1908) 232. — Plants usually low, caespitose, with prostrate or ascending, rarely erect stems, usually distinctly tomentose-pubescent, particularly on underside of leaves; radical leaves rosetted (axis indeterminate), usually ternate (rarely quinate). Inflorescence few-flowered; style thin and long, markedly longer than ripe fruitlets, conoid-thickened at base.

42. *P. leucophylla* Pall., Reise III (1776) 194. — *P. betonicifolia* Poir., Enc. bot. V (1804) 601; Lehm., Rev. Pot., 164; T. Wolf. Monogr. Pot. (1908) 246. — *P. angustifolia* Willd. herb. ex Schlecht. in Mag. Ges. nat. Fr. Berl. VIII (1816) 296; Turcz., Fl. baic.-dahur. I, 375. — *P. nivea* ♂ *angustifolia* Ldb., Fl. Ross. II, 58. — Ic.: Amman, Stirp. ruth. No. 109, tab. 14, f. 2; Gmel., Fl. Sib. III, tab. 87, f. 1 (mala); Lehm., Monogr. Pot., tab. 10. — Exs.: HFR No. 2156.

Perennial; caudex sturdy, multicapital, covered with blackish scales; stems very thin, firm, ascending or nearly erect, 8–15 cm high, nearly leafless, like branches of inflorescence, pedicels and calyx arachnoid-tomentose at first, later glabrescent, brown; radical leaves with long

subfiliform petioles, ternate; stipules scarious, with lanceolate auricles; cauline leaves usually abortive, stipules small, ovate, tomentose beneath; leaflets sessile, coriaceous, oblong-lanceolate, coarsely crenulate-dentate, with 4-7 large, wide, obtuse or acute teeth at each side, glabrous and shiny above, densely white-tomentose beneath, revolute at margin. Inflorescence loosely paniculate, many-flowered; flowers small, less than 10 mm in diameter, long-pedicel; calyx 7 mm in diameter, outer sepals oblong and obtuse, inner sepals longer than outer, ovate and acute; petals cuneately obovate, slightly longer than calyx, emarginate, yellow; stamens 20, with short filaments; torus subglobose, villous; fruitlets oblong-ovoid, smooth; style subterminal, conoid, shorter than fruitlets, with a slightly dilated stigma. June-July. Table X, Figure 3).

Steppes, gravelly steppe slopes, bluffs and stony mountain slopes, thinned out pine and birch forests. — W. Siberia: Alt.? (in the herbarium of the Botanical Institute there is a specimen labeled Altai Koptef; quite possibly, it has been mislabeled since the plant was never again collected in Altai); E. Siberia: Dau. **Gen. distr.:** Mong., W. Manchuria. Described from Dauria. Type in London.

135 Note. In his monograph, T. Wolf, l. c., rejected Pallas' name for this taxon, preferring the much later *P. betonicifolia* Poir., under the pretext that the Pallas name is in itself "nomen seminudum." However, Pallas, l. c., referred to the diagnosis ("name") of this plant made by Amman and to the diagnosis made by Gmelin, cited the two descriptions given by Amman and Gmelin and, finally, described how his *P. leucophylla* differs from *P. nivea* L. Wolf's assertion that Gmelin cited the Pallas' name and drawing as synonymous with *P. nivea*, and that Gmelin identified Amman's plant as *P. nivea* is not true; it is impossible to suppose that Amman could have considered a plant other than *P. leucophylla*; his drawing, which is far from being "poorly" executed, as Wolf commented, undoubtedly corresponds with our plant.

43. *P. nervosa* Juz. nova sp. in Addenda IX, p. 452. — *P. nivea* var. *elongata* T. Wolf. Monogr. Pot. (1908) 237, pro maxima parte.

Perennial; caudex sturdy, multicipital, covered like the cauline shoots with brown relics of stipules; stems 8-40 cm high, firm, upright or arcuately curved at base, few-leaved, few-flowered, like petioles diffusely or densely floccose-tomentose, without straight hairs; radical leaves more or less long-petioled, ternate, cauline leaves with much shorter petioles, the uppermost subsessile; stipules of radical leaves scarious, with lanceolate acute auricles, stipules of cauline leaves herbaceous, obliquely ovate or lanceolate, long-acuminate, entire; lateral leaflets ovate or elliptic, unequal at base, sessile, median leaflets as long as or distinctly longer than the lateral, obovate or oblong, clearly petioluled, usually broadly cuneate at base, 1-4.5 cm long, incised-serrate and serrate-dentate, with numerous, 6-12, narrow and usually acute teeth at each side, often dark green above, covered with scattered to rather dense, short, very thin, compactly appressed, straight hairs, often also floccose-tomentose or sometimes canescent with continuous and rather dense tomentum completely covering the straight hairs; beneath densely white-tomentose or usually slightly canescent, with prominent veins not hidden by tomentum, also covered with

prominent veins not hidden by tomentum, also covered with compactly appressed straight hairs, distinct at base from the white tomentum and forming a darker line. Inflorescence 3–12-flowered; flowers short-pedicelled, large, 1.5–2.5 cm in diameter; calyx slightly silky with appressed, long, straight hairs; sepals nearly equal in length, acute, the outer linear or linear-lanceolate, the inner ovate; petals markedly (one and a half to two times) longer than sepals, broadly obcordate, emarginate, yellow; stamens 20, with short filaments and elliptic or oblong anthers; torus subglobose, hairy; fruitlets ovoid, smooth; style subterminal, shorter than fruitlets, strongly dilated at base, with a dilated stigma. June. (Plate X, Figure 1).

Dry mountain meadows and grassy slopes. — Centr. Asia: T. Sh., Pam.-Al. (Alai Range, Alai valley, Pamir?). Endemic. Described from Alai valley. Type in Leningrad.

44. *P. nivea* L., Sp. pl. (1753) 499 p. p. — *P. nivea* var. *vulgaris* Cham. et Schlecht. in *Linnaea* II (1827) 21; Ldb., *Fl. Ross.* II, 57 p. p.; Kryl., *Fl. Zap. Sib.* VII (1933) 1502. — Ic.: Hultén, *Fl. of Kamtch.* III (1929) f. 8 a, b. — Exs.: HFB No. 170.

Perennial; stems 7–22 cm high, rather thin; radical leaves short- or rather long-petioled; stipules of cauline leaves ovate, obtuse or short-acuminate; leaflets sessile or rarely the median leaflet with a hardly visible petiolule, 0.8–3.5 cm long, lateral leaflets ovate or broadly ovate, often adjoining each other by their outer margin, median leaflet obovate, shallowly incised-crenulate-dentate, with 2–7 large, usually obtuse teeth at each side, covered above with distinct, usually rather dense, short and thin, tightly appressed silky hairs, sometimes hidden by rather dense canescent tomentum, very densely and finely white-tomentose beneath, therefore veins hardly visible. Inflorescence 2–9-flowered; flowers on rather long and thin peduncles, 1–1.8(2.3) cm in diameter; outer sepals shorter than the inner; stamens with suborbicular anthers. Otherwise resembling *P. nervosa*. June–July.

Rocks, taluses, stony slopes, alpine meadows. — Arctic: An.; European part: V.-Kama (C. Urals); Caucasus: Cisc.; W. Siberia: Alt.: E. Siberia: all regions; Far East: Kamch., Okh., Uda, Uss., Ze.-Bu.; Centr. Asia: Dzu.-Tarb. Described from alpine regions of Lapland and Siberia.

Note. In spite of our separating *P. nivea* s. l. from the preceding species and the next three, it still remains (in dimensions) a polymorphic plant, requiring further study.

× *P. altaica* Bge. in Ldb., *Fl. alt.* II (1830) 252. — *P. nivea* var. *altaica* Rydb., *Monogr.* (1898) 86, saltem quoad nomen. — *P. nivea* var. *pinnatifida* f. *altaica* T. Wolf, *Mon. Pot.* (1908) 239. — *P. nivea* L. × *P. multifida* L.? — Ic.: Ldb., *Ic. pl. Fl. Ross.* Illustr. tab. 329. — Leaves ternate, but some quinate; leaflets oblong or obovate, deeply (nearly to midrib) and pectinately incised into linear lobes, slightly silky above, white-tomentose beneath. Petals twice as long as sepals. Otherwise resembling *P. nivea* L., except for its absolutely different habitus (more like that of *P. multifida* L. or even *P. verticillaris* Steph.). Damp alpine meadows. — Altai. Described from Chuya River in Altai. Type in Leningrad.

137 Note. No one other than Bunge has collected this plant; apparently it is some sort of a hybrid of *P. nivea* L. or, more likely, of *P. multifida* L. It should be noted that hybrids analogous to *P. nivea* L. (and its related species) with partly or wholly quinately leaves have also been found in other areas; in addition to the above synonyms for the given forms, they are also called *P. nivea* var. *pentaphylla* Turcz., *P. nivea* var. *subquinata* Lge., *P. nivea* var. *incisa* Turcz. and others. They all require special study (as they are hard to differentiate using herbarium material).

45. *P. kuznetzowii* (Gowor.) Juz. comb. nov. — *P. nivea* var. *kuznetzowii* Gowor., Fl. Ural. (1932) 532, emend. — *P. nivea* L., Sp. pl. ed. 1 (1753) 499 p. p. — *P. nivea* var. 1) *Laponica* Cham. et Schlecht. in *Linnaea* II (1827) 21. — *P. nivea* α *vulgaris* Ldb., Fl. Ross. II, 57 p. p., non Cham. et Schlecht.

Perennial; caudex thin, multicapital; stems covered with brown relics of stipules, cespitose, 5–35 cm high, thin, ascending or nearly erect, few- or many-flowered, together with petioles sparsely tomentose and with thin and fine, usually spreading straight hairs; radical leaves long-petioled, ternate, cauline leaves short-petioled; stipules of radical leaves scarious, with lanceolate acute auricles, stipules of cauline leaves herbaceous, oblong-ovate, acute, entire; leaflets unequal, the lateral sessile, distinctly shorter than the median, the median with a more or less obvious, sometimes rather long petiolule, ovate, obovate or oblong, cuneate, 5–30 mm long, rather deeply incised-dentate into large, ovate or oblong-ovate, obtuse or rather acute teeth, 2–5 at each side slightly revolute at margin, dark green above, sparingly or rarely rather densely covered with thin, straight hairs, densely white-tomentose beneath and with long straight hairs along veins and margin. Inflorescence 1–9-flowered; flowers on long pedicels, not large, 1.0–1.5 cm in diameter; calyx villous; sepals nearly equal in length, the outer linear or linear-oblong, obtuse, the inner ovate-lanceolate, acute; petals slightly longer than sepals, obcordate, emarginate, yellow; stamens 20, with short filaments and suborbicular anthers; torus subglobose, later elongate-conical, slightly hairy; fruitlets oblong-ovoid, nearly smooth; style subterminal, shorter than fruitlets, markedly dilated and covered with papillae at base, stigma dilated. June–July.

Rocks, stony places, mountainous tundras. — Arctic: Nov. Z., Arc., Eur. Arc., Sib. (western part); European part: Kar.-Lap., Dv.-Pech., V.-Kama (N. and C. Urals); W. Siberia: Ob. Gen. distr.: Scand. Described from N. Urals. Type in Leningrad.

46. *P. arenosa* (Turcz.) Juz. — *P. nivea* var. *arenosa* Turcz. in Bull. Soc. Nat. Mosc. XIV (1843) 607; T. Wolf, Mon. Pot. (1908) 237.

138 Perennial; stems 10–20 cm high, very thin, prostrate or ascending, together with petioles sparsely short-tomentose and with rather many horizontally spreading, rigidulous, straight hairs; radical leaves small, rather short-petioled; leaflets 5–20 mm long, lateral leaflets usually ovate, the median distinctly shorter, approximately twice as long as broad, oblong-ovate, narrowly cuneate at base, densely covered above with appressed, long, straight hairs, tomentose beneath, with same hairs as above along midrib and lateral ribs seen prominently against the background of white tomentum (not hidden by it); stipules of cauline leaves large,

ovate, obtuse or acute. Inflorescence 3–7-flowered; flowers on very thin, subfiliform pedicels, 8–10 mm, rarely up to 13 mm in diameter. Other-
wise similar to *P. kuznetzowii* Juz. June–July. (Plate X, Figure 2).

Sandy places. — E. Siberia: Ang.-Say., Lena-Kol., Dau. **Gen. distr.:**
Mong. Described from Transbaikalia. Type in Leningrad.

47. *P. uniflora* Ldb., in Mém. Acad. Sc. St. Pétersb. V (1815) 543.—
P. villosa α *uniflora* Ldb., Fl. Ross. II (1844) 58.—? *P. villosa*
var. *gracilior* Ldb., l.c.—*P. nivea* var. 4) *Arctica* Cham. et
Schlecht. in Linnaea II (1827) 21.—*P. uniflora* var. *ampla* Hultèn, Fl.
kamtch. III (1929) 68.—Ic.: Lehm., Mon. Pot. pl. 18.

Perennial; densely caespitose, caudex covered with dark brown scarious
stipules and relics of leaves; stems 3–15 cm high, erect, thin, slightly
villous and tomentose, subscaiphoid or with few very small strongly reduced
leaves, bearing 1–2 (rarely to 4) flowers; leaves petioled, covered with
long, straightly spreading, thin hairs especially when young, ternate, sparsely
covered above with long, silky hairs, densely white- or usually gray-tomen-
tose beneath and with dense long silky hairs especially along nerves;
leaflets 0.5–1.5 cm long, broadly cuneate or rhombic, obovate, deeply incised-
dentate at apex into few (2–3 on each side) oblong-ovate, obtuse teeth.
Flowers large, 12–22 mm in diameter; hypanthium and calyx white or
grayish, villous or slightly tomentose, 7–12 mm in diameter; outer sepals
lanceolate, about as long as the ovate-lanceolate, acute inner sepals,
3–5 mm long; petals yellow, obcordate, 5–8 mm long; stamens 20; pistils
numerous, style filiform. July.

Rocky places. — Arctic: Arc. Sib., Chuk., An.; Far East: Kamch.

Gen. distr.: N. Am. (from Alaska to Oregon, Colorado and along the Arctic
coast to the Coppermine River; possibly in Greenland). Described from the
Gulf of St. Lawrence, probably from Tilezius' collections (Ledebour, in the
139 first description of the habitat of this plant, erroneously placed it in Dauria;
it is emended, however, in Flora Rossica. Type in Leningrad.

48. *P. villosa* Pall. in Herb. Lambert ex Pursh, Fl. Am. sept. I (1814)
353; Ldb., Fl. Ross. II, 38; T. Wolf, Mon. Pot. (1908) 243.—Ic.: Lehm.,
Mon. Pot. (1820) tab. 16; Rydb., Mon. N. Am. Pot. tab. 34, f. 1.

Perennial; caudex short, multicapital, densely covered — like stems —
with brown relics of stipules; stems many, tuftlike-crowded, thick, firm,
ascending, 10–30 cm high, somewhat leafy, few-flowered, villous like
petioles and pedicels with spreading, white or sometimes yellow hairs;
radical leaves long-petioled, ternate, cauline leaves much smaller, short-
petioled or sessile; stipules of radical leaves scarious, with ovate-
lanceolate auricles, stipules of cauline leaves herbaceous, large (10–15 mm
long), ovate or elliptic, acuminate, of the lower leaves scarious, brown,
the upper silky, white-tomentose; leaflets sessile (the median sometimes
short-petioled), 2–4 cm long, broadly cuneate, obovate or suborbicular,
lateral leaflets strongly tapering, strongly and shortly crenate-dentate,
slightly tapering at margin, sturdy, densely silky above, very densely gray-
tomentose beneath, with prominent veins. Flowers short-pedicel, large,
2–3 cm in diameter; hypanthium and calyx obtuse or acute in fruit 15–20 mm
in diameter, elliptic to broadly ovate, as long as the triangular-ovate inner

sepals or longer; petals 6–12 mm long, one and a half to twice as long as sepals, broadly obcordate, yellow; stamens ca. 20, filaments short, anthers suborbicular; torus large, subglobose, puberulous; fruitlets numerous, ovoid, nearly smooth; style subterminal, as long as fruitlet, filiform, thickened at base. June–July.

Arctic: Chuk., Kamch. (Commander Islands). **Gen. distr.:** Ber., N. Am. (Alaska, in mountains down to British Columbia and the State of Washington). Described from America. Type in London.

49. *P. vahliana* Lehm., Monogr. Pot. (1820) 172; T. Wolf, Mon. Pot. (1908) 247. — *P. hirsuta* Vahl ex Ser. in DC., Prodr. II, 573, non Michx. — *P. jamesoniana* Greville, Mem. Wern. Soc. III (1821) 417. — *P. nivea* var. *vahliana* Seemann, Bot. Herald (1852) 29. — Ic.: Fl. Dan. tab. 1390; Greville, l. c., tab. 20; Rydb., Mon. N. Am. Pot. tab. 35. f. 8–12.

140 Perennial; caespitose plant, with many, often cylindrical, branching stems, densely covered with relics of stipules; flower-bearing stems ca. 5 cm high, nearly leafless or with 1–2 small leaves, tomentose and densely covered — like petioles and other parts of plant — with long yellowish hairs; radical leaves short-petioled, closely crowded, ternate; leaflets usually not longer than 1 cm, cuneate, shortly 3–7 toothed at apex, finely pubescent, slightly silky above, slightly tomentose and rather densely yellow-villous beneath; stipules of cauline leaves ovate. Flowers solitary or 2 on each stem, 15–20 mm in diameter; hypanthium and calyx densely yellowish silky-villous, in fruit ca. 1 cm long; outer and inner sepals nearly equal (4–5 mm) in length, broadly ovate or elliptic, usually obtuse; petals golden yellow, broadly obcordate, approximately twice as long as sepals; filaments short, anthers suborbicular; fruitlets small, oblong-ovoid, smooth; style as long as fruitlets. July–August.

Arctic: Chuk. (Wrangel Island). **Gen. distr.:** N. Am. (Greenland and the Arctic coast). Described from Greenland.

Note. This North American plant was once reported for Herald Island; it was recently found on Wrangel Island by B. N. Gorodkov.

50. *P. evestita* T. Wolf, Monogr. Pot. (1908) 248; Kryl., Fl. Zap. Sib. VI (1933) 1503. — *P. nivea* var. *subviridis* Ldb., Fl. Ross. II (1844) 57, saltem p. p. — *P. nivea* β *macrantha* Ldb., l. c., p. p. — *P. evestita* var. *robusta* T. Wolf, l. c., 249.

Perennial; caudex sturdy, multicapital, covered with brown relics of stipules; stems ascending from base, firm, slightly leafy, usually reddish, more or less densely covered — like petioles and pedicels — with short and longer, soft, spreading hairs, in addition to (at least in upper part) small glands; radical leaves long-petioled, ternate, lower cauline leaves petiolate, the upper simple, sessile; stipules of radical leaves with lanceolate acuminate auricles, stipules of cauline leaves large, broadly ovate, acute, usually entire or rarely with 1–2 teeth; leaflets obovate, 1–3 cm long, lateral leaflets tapering at base, sessile, median leaflet usually distinctly petiolulate, often deeply and pectinately incised-dentate, with 5–9 oblong, usually obtuse teeth, green, remotely pilose and often glandulose above, likewise beneath, pubescence much denser on outer leaves of rosette. Inner leaves also with a thin tomentum, thus appearing glaucous green beneath. Inflorescence

corymbiform-semiumbelliform, few-flowered; flowers long-pediceled, 10–15 mm in diameter; calyx pilose and finely glandulose, green; sepals nearly equal in length, the outer oblong-elliptic, obtuse, the inner ovate, acute; petals longer than sepals, broadly obovate, emarginate, yellow; stamens 20, with short filaments and orbicular-ovate anthers; torus conical, short-hairy; fruitlets oblong-ovoid, smooth; style subterminal, more or less thickened at base, with a slightly inflated stigma. June–August.

141 W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. (Alai valley). **Gen. distr.:** Dzu.-Kash.? Described from Dzungaria-Tarbagatai. Type and paratype in Tomsk.

51. *P. jacutica* Juz. spec. nov. in Addenda IX, p. 453. — ? *P. nivea* var. 3) *camtschatica* Cham. et Schlecht. in Linnaea II (1817) 21.

Perennial; caudex slender or rather sturdy, covered with brown relics of stipules; stems 5–25 cm high, numerous, sturdy or rather slender, arcuately ascending at base, few-leaved, branching in upper part, sparsely covered with soft, spreading hairs mixed with small glands in upper part or sometimes throughout; radical leaves with short, densely spreading-hairy petioles, ternate; cauline leaves few, sessile, uppermost simple; stipules of radical leaves with lanceolate acute auricles, stipules of cauline leaves very large, ovate, acute, entire or often (mainly the upper) deeply dentate; leaflets of radical and lower cauline leaves obovate or sometimes sub-orbicular, overlapping at margins, entire at base, usually sessile, rather shallowly incised-dentate into 2–6 long but rather narrow, usually acute teeth on each side, gray-green above, very appressedly hairy, often also finely glandular, entirely gray-tomentose and villous beneath, with distinct (darker) lateral veins; leaflets of upper cauline leaves cuneate, with many teeth. Inflorescence 3–12-flowered; flowers on short or sometimes rather long pedicels, 8–12 mm in diameter; calyx densely covered with appressed hairs mixed with numerous fine glands; sepals equal, lanceolate or the inner ovate-lanceolate, acute; petals slightly longer than sepals, broadly obovate, yellow; stamens 20, filaments short, anthers elliptic; ripe fruitlet unknown. June.

Meadows. — E. Siberia: Lena-Kol. Endemic. Described from the vicinity of Yakutsk. Type in Leningrad.

52. *P. macrantha* Ldb., in Mém. Acad. Pétersb. V (1812) 542, nec alibi. — *P. nivea* β *macrantha* Ldb., Fl. Ross. II (1844) 57 p. p. — Ic.: Ldb., Ic. pl. Fl. Ross. II (1834) tab. 133?

142 Perennial; caudex weak, with a rosette of long-petioled leaves and 1–2 thin, few-branched stems covered — like petioles and pedicels — with scattered or sparse crisp hairs and more or less copious fine glands, simple or slightly branching; radical and lower cauline leaves ternate, leaflets sessile, rhombic, obovate, entire in lower part, very deeply incised-dentate in upper part, with 3–5 oblong acute teeth on each side, not densely hairy above, densely finely glandulose, evenly gray- or white-tomentose beneath and densely appressed-long-hairy along nerves; middle leaves with trifid leaflets narrowly cuneate at apex, the uppermost simple; stipules of cauline leaves rather small, lanceolate, entire. Inflorescence 1–3-flowered;

flowers large, 1.5–2 cm in diameter; calyx long-hairy and glandular, outer sepals linear-lanceolate, obtuse, the inner ovate-lanceolate, acute, barely longer than the outer; petals twice as long as sepals, obcordate, yellow; anthers oblong-ovate; fruitlets unknown.

E. Siberia: Lena Kol.?, Dau. Endemic. Description based upon specimens probably collected "ad Jellosopka ubi Jellota-Tschekondam influit." Type (and cotype?) in Leningrad.

Note. A problematic species, known only from the type material. Ledebour presented as *P. macrantha* a quite different plant from Altai, which was subsequently described under the name *P. evestita* by T. Wolf. Apparently, the specimen from the Stephan Herbarium from the locality reported above is only a duplicate of the "type" of *P. macrantha* as indicated on the label, in which "circa Jacutiam" should be regarded as erroneous. It is possible that this form is of a hybrid origin (*P. arenosa* Juz. × *P. evestita* T. Wolf).

Section 3. ARGENTEAE T. Wolf, Mon. Pot. (1908) 252.— Plant usually tall, with erect or basally ascending stem; without rosettes of radical leaves at anthesis (axis determinate in growth), very distinctly tomentose-pubescent, particularly at lower side of leaves; leaves palmately 5–7-paired. Inflorescence many-flowered; style thin and long, twice to three times as long as ripe fruitlet, conoid-thickened at base.

53. *P. dealbata* Bge. in Ldb., Fl. Alt. II (1830) 250; Ldb., Fl. Ross. II, 48; T. Wolf, Monogr. Pot. (1908) 254; Kryl., Fl. Zap. Sib. VII (1933) 1504.— Ic.: Ldb., Ic. pl. Fl. Ross. IV, tab. 326.

Perennial; rootstock sturdy, multicapital, covered with brown relics of stipules; stems 20–50 cm high, thin, erect or ascending, branching at apex, covered like petioles and branches of inflorescence with fine tomentum and short silky hairs; radical and lower cauline leaves long-petioled, leaflets 7 (rarely 9), palmately arranged (sometimes in some leaves the marginal leaflets slightly remote beneath); median cauline leaves quinate, the upper ternate or simple, sessile; stipules of lower leaves with short lanceolate auricles, stipules of upper cauline leaves ovate-lanceolate, acuminate; leaflets sessile, oblong, deeply pinnatisect into many linear-oblong, acute segments, recurved at margins, glabrous above or remotely pilose, bright green, white-tomentose beneath. Inflorescence long-branched, slightly compressed in upper part, semiumbelliform, many-flowered; flowers small, on short thin pedicels; calyx shortly silky-hairy, 7–8 mm in diameter, sepals acute, the outer linear-oblong and much shorter than the ovate-lanceolate inner sepals; petals small, obovate, obtuse or slightly emarginate, not exceeding sepals, yellow; stamens 20, filaments long, anthers oblong-ovate; torus small, villous; fruitlets oblong-ovoid, smooth; style subterminal, slightly shorter than fruitlets, thickened at base and often covered with papillae, with a slightly dilated stigma. June–July.

Steppes.— W. Siberia: U. Tob., Irt.; Centr. Asia: Dzu.-Tarb., T. Sh. Gen. distr.: NW Mong. (Tib.? W. Ch.? sp. Wolf, l. c.). Described from the Irtysh, Bukon and Kurchum rivers, from Shulbinskoe and Loktevsk. Type in Leningrad.

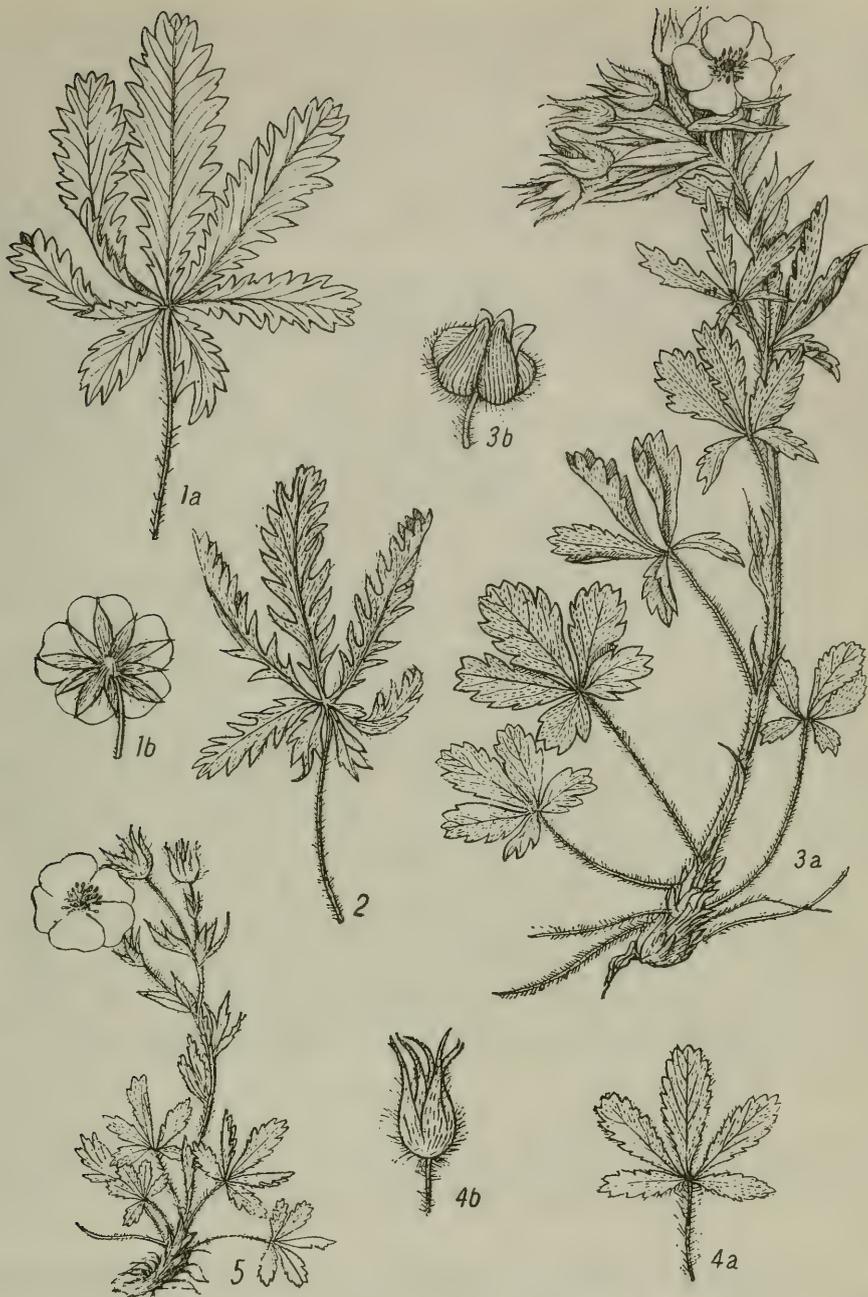


TABLE XII. 1 - *Potentilla recta* L., a) leaves, b) flowers from below; 2 - *P. semilaciniosa* Borb., leaf; 3 - *P. astracanica* Jacq., a) general view, b) calyx in fruit; 4 - *P. callieri* Juz, a) leaves, b) calyx in fruit; 5 - *P. taurica* Willd., general view.

54. *P. argentea* L., Sp. pl. (1753) 473; Ldb., Fl. Ross. II, 47 p. p.; Kryl., Fl. Zap. Sib. VII (1933) 1505 saltem p. p.; Marklund in Mem. Soc. Faun. et Fl. fenn. 9 (1933-1934) 3. — *Fragaria argentea* Crantz, Inst. II, (1766) 177. — *Hypargyrium argenteum* Fourr., App. Soc. Linn. Lyon II, 16 (1868) 371. — *Potentilla argentea* var. *typica* Beck, Fl. N. Oest. (1892) 754; T. Wolf, Mon. Pot. (1908) 260 (cum f. *lati-secta*, *angustisecta*, *septenata*). — *P. argentea* var. *decumbens* Focke in Hall. Wohlf. Kochs Syn. (1892) 811. — Ic.: Sturm, Deutschl. Fl. fasc. 17, tab. 5; Schlecht., Fl. Deutschl. ed. 5, XXV (1881) tab. 2595. — Exs.: HFR No. 2155.

146 Perennial; caudex sturdy, covered with brown relics of stipules; stems arcuately ascending, often weak, thin, 10-30 cm high, very leafy, together with petioles and torus white- or grayish-tomentose and sparsely simple-hairy; radical and lower cauline leaves long-petioled, 5(7)-paired, the middle and upper cauline leaves 3-5-paired, bracteal leaves rather well developed, usually ternate; stipules of radical leaves brown scarious, with long linear-lanceolate auricles, stipules of cauline leaves herbaceous, narrowly ovate, acuminate, entire or dentate; leaflets remote (not adjacent), obovate, narrow at cuneate base, 1-3 cm long, strongly and irregularly incised-dentate at apex, with 2-5 teeth or lobes at each side, median leaflet in leaves of radical rosette, very rarely more than 3-dentate at each side, teeth or lobes acute or often obtuse, usually strongly revolute at margin, sparsely covered above with rather long hairs or glabrous, green, shiny, densely white-tomentose beneath. Inflorescence loosely corymbiform-paniculate, many-flowered, divaricate; flowers usually short-pedicel, small, 10-12 mm in diameter; calyx sparsely grayish-greenish-tomentose mixed with long hairs; outer sepals oblong-linear, obtuse, usually as long as or shorter than the ovate acute inner sepals; petals somewhat divergent, obovate, emarginate, hardly longer than sepals, pale yellow; disk slightly hairy; stamens short; anthers small, orbicular-ovate, pale yellow; fruitlets small, finely rugose; style usually thickened at base and covered with papillae, with broad stigma, slightly shorter than ripe fruitlets. June-July. (Plate X, Figure 5).

Dry valley and forest meadows, pastures, thinned out pine and mixed forests, fields, fallow fields. — European part: reported from all regions but reliably found only in the northern and western regions; Caucasus?; W. Siberia: Ob, Alt.; E. Siberia: reported for Ang.-Say., Yenisei. Gen. distr.: Scand., Centr. Eur. (reported for Atl., Med., and Bal.-As. Min., probably referring to the following species). Described from Europe. Type in London.

Note. A very polymorphic species, within the range of which some authors have distinguished many forms and (elementary) microspecies not investigated as yet in the USSR. A large part of the reported *P. argentea* from the USSR (in particular from the more eastern and southern areas), is actually referred to the following species, with which it is often confused.

55. *P. impolita* Wahlenb., Fl. Carpat. princip. (1814) 155; Marklund in Mem. Soc. Faun. et Fl. fenn. 9 (1933-1934) 3. — *P. cinerea* Willd. ex Schlecht. Mag., Ges. naturf. Fr. Berl. VII (1816) 296, non Chaix. — *P. incanescens* Opiz, Nat. Tausch. (1824) 136. — *P. argentea* var. *incanescens* Focke in Hall. Wohlf. Kochs, Syn. (1892) 811; Kryl., Fl. Zap. Sib. VII (1933) 1506.

Perennial; stems usually higher and coarser than in the preceding species, more erect; leaves dingy gray-green at upper side, more or less pubescent, often whitish gray-tomentose, sometimes glabrescent and slightly glossy in fall, with wider cuneate base, teeth or lobes more numerous, 4–5 at each side of median leaflet of the largest leaves in the radical rosette, sometimes more acute and outwardly directed in comparison with *P. argentea*; stipules of cauline leaves often with 2 teeth or lobes; bracteal leaves simple, usually strongly reduced. Branches of inflorescence inclined at a sharp angle; pedicels long; hypanthium and sepals densely white-gray-tomentose; corolla up to 1.5 cm in diameter; petals adjacent, darker yellow; stamens long, anthers larger, yellow but darker; style slightly thicker, distinctly papillate or villous at the thickened base. Otherwise
147 like *P. argentea*. July–August (flowering somewhat later than preceding species).

Dry valley meadows, pastures, dry hills and slopes, steppes, thinned-out forests and forest edges, fields, fallow fields. — European part: all regions; Caucasus: all regions; W. Siberia: all regions; E. Siberia: Ang.-Say.; Centr. Asia: Dzu.-Tarb., T. Sh. **Gen. distr.:** Scand., Centr. Eur., Atl. Eur., Med., Bal.-As. Min., N. Am. (introduced). Described from Galicia.

56. *P. meyeri* Boiss., Diagn. ser. 1, III (1843) 7; Boiss., Fl. Or. II (1872) 714; T. Wolf, Mon. Pot. (1908) 267. — *P. tommasii* C. A. M., Verz. Pfl. Cauc. (1831) 168, non Ser. — *P. calabra* var.? Hohenack, in Bull. Soc. nat. Mosc. (1838) 365, non Ten.

Perennial; caudex thick, multicapital, covered with brown scales; stems 15–20 cm high, ascending, firm, very leafy, densely covered like petioles, branches of inflorescence and calyx with gray tomentum mixed with longer hairs; radical and lower cauline leaves long-petioled, quinate, upper cauline leaves ternate, sessile; stipules of radical leaves scarious, with long linear auricles, stipules of cauline leaves herbaceous, narrow, linear-lanceolate, acuminate; leaflets shortly and broadly obovate or oblong, obtusely or acutely crenate-dentate or incised-serrate, flat-margined, densely gray-tomentose above or less pubescent, yellowish-green, densely white-tomentose beneath. Inflorescence corymbiform; flowers 10–15 mm in diameter; outer sepals oblong or linear-lanceolate, obtuse, inner sepals ovate-lanceolate, acute, usually as long as or longer than the outer; petals obcordate, longer than sepals; stamens 20, anthers oblong; receptacle conical, hairy; fruitlets small, ovoid, whitish, smooth; style slightly shorter than fruitlets, conoid, with barely visible papillae at base and with a slightly dilated stigma. July–August.

Dry mountain slopes. — Caucasus: Tal. (Zuvant). **Gen. distr.:** Iran. Described from Talysh and N. Iran. Type in Leningrad, paratype in Geneva.

Note. Replaced in Asia Minor by the allied *P. fenzlii* Lehm.

57. *P. canescens* Bess., Fl. Galic. I (1809) 380; T. Wolf, Mon. Pot. (1908) 268; Kryl., Fl. Zap. Sib. VII (1933) 1507. — *P. ascendens* Waldst. et Kit. in Willd., Enum. hort. Berol. I (1809) 554. — *P. inclinata* auct. mult., non Vill.; Ldb., Fl. Ross. II, 47. — Ic.: Schlecht., Fl. Deutschl. ed. 5, XXV (1886) tab. 2594.

Perennial; rootstock sturdy, multicipital, covered with brown relics of stipules; stems 15–50 cm high, erect or ascending at base, covered like petioles and pedicels with long soft hairs, branching above middle; radical and lower cauline leaves palmately 5-(7)-parted; upper cauline leaves 3–5-paired, short-petioled; stipules ovate or ovate-lanceolate, acute; leaflets oblong-obovate, long-cuneate at base, uniformly incised-dentate to the very base, with margins not reflexed, sparsely appressed-hairy and green above, finely gray-tomentose mixed with sparse long straight hairs beneath. Flowers small, 10–15 mm in diameter, in loose corymbiform-paniculate inflorescence, thin-pedicel; calyx densely gray-tomentose and finely pubescent; outer sepals oblong-linear, inner sepals ovate, acute, nearly equal to the outer in length; petals slightly longer than sepals, weakly emarginate at apex, yellow; stamens ca. 20, with oblong-ovate anthers; fruitlets small, longitudinally rugose; style almost as long as fruitlets. June–August. (Plate X, Figure 4).

Steppes and steppe slopes, dry meadows, fields, fallow fields, roadsides. — European part: reported for all regions, but from the north *P. heidenreichii* has been usually erroneously reported instead of this species; Caucasus: all regions; W. Siberia: Ob, Alt., U. Tob., Irt.; E. Siberia: Yenisei, Ang.-Say., Dau.; Centr. Asia: Dzu.-Tarb., T. Sh. Gen. distr: Centr. Eur., Atl. (central and southern France), Med. (Italy), Bal.-As. Min., Arm.-Kurd., Iran.? Described from W. Ukraine. Type in Kiev (?), cotype in Leningrad.

Note. A polymorphic problematic species; in the opinion of some investigators, it is of hybrid origin, possibly derived from the crossing of *P. argentea* L. with *P. recta* L.; numerous "varieties" have been established in this species (cf. T. Wolf, Mon. Pot. 1908, pp. 271–276).

× *P. chulensis* Siegf. et Keller in Engl., Bot. Jahrb. XIV (1891) 504 — problematic plant described from the Caucasus (W. Transc.); presented by some authors as *P. canescens* Bess. × *P. argentea* L.

58. *P. eremica* T. Wolf, Mon. Pot. (1908) 280. — *P. argentea* var. *eremica* T. Wolf ex Lipsky in A. H. P. XXVI (1909) 365.

Perennial; caudex thick, multicipital, covered with relics of stipules; stems 15–30 cm high, nearly erect from arcuate base, tomentose like petioles and pedicels and densely short-hairy; radical and lower cauline leaves long-petioled, 5–7-paired; median cauline leaves short-petioled, quinate, the upper ternate, subsessile; stipules of cauline leaves lanceolate, acute; leaflets sessile, narrowly oblanceolate or linear-lanceolate, green, slightly wavy above, gray-tomentose and long-hairy beneath, deeply incised-dentate or dissected, with 5–7 segments at each side; teeth or segments differing in size, partly dentate by themselves, strongly elongated, acute, nearly flat at margin. Inflorescence compressed-corymbiform, many-flowered; flowers erect, not more than 8–10 mm in diameter; outer sepals oblong-linear, obtuse, inner sepals ovate-lanceolate, acute, slightly longer than the outer; petals obovate, hardly longer than sepals; filaments short, anthers ovate; fruitlets oblong-ovoid, finely rugose; style nearly as long as fruitlets. June–July.

W. Siberia: U. Tob.; Centr. Asia: Ar.-Casp. Endemic. Described from Kazakhstan (Mugodzhur). Type in Leningrad.

59. *P. mollissima* Lehm., Ind. sem. hort. bot. Hamb. (1831) 6; id. Rev. Pot. (1856) 104; T. Wolf, Mon. Pot. (1908) 284.— Ic.: Lehm., Rev. Pot. (1856) tab. 37.

Perennial, yellow-green, very densely finely pubescent plant; stems suberect, many-flowered, covered — like petioles — with spreading hairs and very short tomentum; lower leaves quinate, the upper ternate, sparsely appressed-hairy above, canescent beneath with very short and weakly developed tomentum; leaflets oblong, strongly serrate-dentate, with teeth ovate, obtuse, the terminal tooth larger than the others; stipules of cauline leaves very large, short-ovate, very wide, nearly entire. Sepals equal in length, ovate-lanceolate, acute, the outer narrower than the inner; petals obovate, emarginate, slightly longer than the hairy calyx; stamens and style as in *P. argentea* and *P. canescens*.

Centr. Asia: Pam.-Al. Endemic. Described from the Kara-Tau Mountains (Alexander Lehmann). Type in Paris, parts (fragments) of type in Prague (and in Leningrad?).

Note. An enigmatic species, apparently not found after Lehmann.

Subsection 3a. COLLINAE Zimm. in Bot.-Kal. (1887); T. Wolf, Mon. Pot. (1908) 205.— Not as tall as the typical representatives of section *Argenteae*, often with developed rosettes of radical leaves; style often deviating from the type characteristic to this subgenus (approaching subgenus *Dynamidium*). Otherwise like section *Argenteae*.

60. *P. wibeliana* T. Wolf, Pot. Stud. II (1903) 21; Mon. Pot. (1908) 288.— *P. collina* Wibel, Prim. fl. Werth. (1799) 267 s. str. et auct. mult. p. p.— Ic.: Focke in Abh. naturf. Ver. Bremen X (1889) 413, f. 1; Petunnikov in A. H. P. XIV, 1 (1895) tab. VII, VIII.— Exs.: HFR No. 2174.

Perennial; caudex develops ascending or nearly erect, rather slender stem, with incomplete rosette of radical leaves at base; stems 15–25 cm high, loosely branching in upper part, covered like petioles and pedicels with grayish tomentum mixed with sparse straight long hairs; radical and lower cauline leaves quinate, long-petioled, upper cauline leaves ternate or simple; stipules of radical leaves with lanceolate auricles, those of cauline leaves ovate, acute, usually entire, rarely 1-toothed; leaflets long-cuneate at base, oblong-obovate, with 2–3, shallow, ovate, usually obtuse teeth at each side of apex, flat at margins, white or gray-white-tomentose beneath, 150 shallowly appressed-hairy above or glabrescent. Flowers many, rather long-pedicelled, bent after flowering; calyx grayish-tomentose, rarely densely long-hairy, outer sepals oblong, obtuse, the inner ovate, acute; petals, yellow, obovate, emarginate, slightly longer than sepals; achenes oblong-ovoid, finely rugose; style hardly as long as mature achenes. June–July.

Pine forests on sandy soil.— European part: U. V. (Serpukhov on the Oka River). Gen. distr.: Centr. Eur. Described from Wertheim-on-Main (Baden). Cotype in Leningrad.

61. *P. svanetica* Siegf. et Keller in Engl., Bot. Jahrb. XIV (1891) 507; T. Wolf, Mon. Pot. (1908) 293.

Perennial; stems 40 cm high, ascending, tomentose-pubescent, strongly branching above middle; radical leaves long-petioled (8 cm), quinate or

often with 6 leaflets, cuneate, cauline leaves quinate; leaflets sessile or short-petioled, oblong, uniformly and deeply serrate, with 3-6 divergent acute teeth at each side and an elongated median tooth, green and sparsely appressed-hairy above, densely grayish-tomentose beneath with crisp hairs, veins slightly prominent, covered with long appressed silky hairs, sometimes up-rolled at margin. Petals golden yellow, longer than sepals. July-August.

600-1,200 m. - Caucasus: W. Transc., Mingrelia, Svanetia. Endemic. Described from the upper reaches of the Neskra and Tskhenis-Tskhali rivers (Sommier and Levier). Type in Florence.

62. *P. sommieri* Siegf. et Keller in Engl., Bot. Jahrb. XIV (1891) 506; T. Wolf, Monogr. Pot. (1908) 295.

Perennial; stems procumbent or ascending, finely hairy-tomentose or glabrescent, strongly branching; radical leaves 5-7-paired, lower cauline leaves quinate, the upper ternate; leaflets oblong-obovate, cuneate, green above, glabrous or long appressed-hairy, grayish-tomentose beneath, with 3-7 obtuse teeth at each side and a prominent apical tooth; teeth partly rather deep. Petals golden yellow, longer than sepals. July-August.

Caucasus: W. Transc. (Mingrelia, Svanetia, Ingur River valley, ca. 1,250 m). Endemic. Described from the above locality. Type in Florence.

151 63. *P. thyrsiflora* (Hüls.) Zimm. in Kern., Sched. Fl. exs. austr.-hung. II (1882) 21; id. Eur. Art. Pot. (1884) 11; T. Wolf, Mon. Pot. (1908) 297. - *P. collina* var. *thyrsiflora* Hülsen in sched. ex Zimm., l. c. - *P. wie-manniana* C. P. *thyrsiflora* Asch. et Gr., Syn: VI (1906) 730. - Ic.: Petunnikov in A. H. P. XIV, tab. X. - Exs.: Kern., Fl. exs. Austr. Hung. No. 446.

Perennial; caudex woody; stems 10-30 cm high, prostrate or ascending, branching usually from base, reddening, sparsely covered like petioles and pedicels with fine crispy hairs, with elongated lower branches branching in upper part; radical leaves tufted or rosetted, persistent to the fall, long-petioled, quinate, rarely some septenate; upper cauline leaves ternate, subsessile; stipules of radical leaves with linear-lanceolate, elongated auricles, stipules of cauline leaves ovate-lanceolate, acuminate, entire; leaflets of radical leaves long-cuneate, oblong-obovate, deeply incised-dentate, with 3-7 oblong, subequal teeth at each side, flat at margins, green and sparsely hairy above, grayish-greenish-tomentose beneath and with appressed straight bristly hairs (mainly along veins). Flowers small, ca. 12 mm in diameter, on long thin pedicels, in loose spreading umbelliform inflorescence; calyx densely hairy, greenish gray; outer sepals linear-lanceolate, obtuse, inner sepals ovate, acute, longer than the outer; petals obovate, emarginate, barely as long as calyx, yellow; stamens with long filaments and small ovate anthers; fruitlets ovoid, slightly rugose; style slightly thickened at base, somewhat shorter than mature achenes. June-July.

Thinned out pine forests, dry hills and slopes. - European part: Lad.-Ilm., U. Dnp., U. V., V.-Don, M. Dnp. **Gen. distr.:** Centr. Eur. Described from Germany.

64. *P. argenteiformis* Kauffm., Mosk. Fl. (1869) 159; Petunn. in A. H. P. XIV (1893) 39. — *P. thyrsoiflora* var. *argenteiformis* T. Wolf, Mon. Pot. (1908) 298. — Ic.: Petunn., l. c., tab. IX. — Exs.: Siegfr., exs. Pot. spont. cult. No. 993.

Perennial; leaflets narrowly oblong-obovate, slightly dilated at apex, with 5–8 broad acute teeth at each side, less shallow than in *P. thyrsoiflora*, less bristly-hairy beneath. Otherwise like *P. thyrsoiflora*. June–July. (Plate XI, Figure 1).

Sandy hills. — European part: U. V., V.-Don (?). Endemic. Described from the vicinity of Serpukhov on the Oka River. Type in Leningrad.

65. *P. leucopolitana* P.-J. Müll. ex. F. Schultz, Herb. norm. (1858) et in Arch. de Fl. (1858) 272; T. Wolf, Monogr. Pot. (1908) 302. — Ic.: Petunnikov in A. H. P. XIV, 1 (1893) tab. XI. — Exs.: Schultz, Herb. Norm. 256.

152 Perennial; caudex multicapital, developing sterile shoots and ascending or prostrate leafy stems; stems 10–30 cm long, rather loosely corymbiform-paniculate in upper part, densely gray-tomentose like petioles and branches of inflorescence, often reddening; lower leaves usually quinate, upper cauline leaves ternate; stipules of cauline leaves lanceolate, simple or often with 1–2 lateral teeth; leaflets of lower leaves obovate or oblong-obovate, long cuneate at base, rather deeply dentate at apex, usually with 2–3 ovate or oblong obtuse teeth at each side and a prominent apical tooth, more or less densely covered above with appressed silky hairs, grayish-green, densely white-tomentose beneath, with prominent veins covered with bristly hairs. Flowers medium-sized or small, in rather few-flowered inflorescence; pedicels long after flowering, erect or declinate; calyx somewhat villous-tomentose; outer sepals narrowly ovate, obtuse, usually shorter than the ovate acute inner ones; petals obovate, weakly emarginate, distinctly longer than calyx; stamens with small ovate-orbicular anthers; fruitlets ovoid, rugose; style shorter than ripe fruitlets. May–July.

Sandy and clayey hills and slopes, edges of pine forests, calcareous rocks, dry valley meadows. — European part: U. V. (Serpukhov on the Oka River), M. Dnp. (Belgorod). Gen. distr.: Centr. Eur. (Described from Wissenbourg (Alsace). Cotype in Leningrad.

× *P. tynieckii* Blocki in Oest. Bot. Zeit. (1889) 49. — *P. argentea* L. × *P. leucopolitana* P.-J. Müll. — Reported for Belgorod (Pallon) (cf. T. Wolf, Mon. Pot. 1908, p. 307).

Section 4. **TANACETIFOLIAE** T. Wolf in Asch. et Graebn., Syn. VI (1904); T. Wolf, Mon. Pot. (1908) 312. — Perennials, often glandulose, not tomentose-pubescent; stems tall, rigid; radical leaves pinnate, with 3 or many pairs of lateral leaflets. Inflorescence usually few-flowered, with small, usually simple bracts; style thick and short, shorter than or as long as ripe fruitlets.

66. *P. tanacetifolia* Willd. ex Schlecht. in Mag. d. Ges. naturf. Fr. Berlin VII (1816) 286; Ldb., Fl. Ross. II, 39; T. Wolf, Mon. Pot. (1908)

314 p. p.; Kryl., Fl. Zap. Sib. VII (1933) 1508.— *P. tanacetifolia* f. *erecta* et f. *decumbens* Kryl., Fl. Alt. II (1903) 378; T. Wolf, l. c., 314 p. p. — Ic.: Lehm., Rev. Pot. tab. 20.

153 Perennial; stems several, developed from a sturdy rootstock (caudex), 10–50 cm high, very leafy, erect or ascending from base, branching from middle or slightly higher, densely covered — like petioles — with long spreading rigidulous hairs sometimes mixed with glandular hairs; radical leaves large, long-petioled, pinnate, with 3–6(9) pairs of lateral leaflets and 3–14 cm long blade; leaflets 10–35 mm long, oblong-elliptic or oblong-lanceolate, acute, largely and acutely incised-dentate, gradually reduced toward leaf-base, terminal leaflet petiolulate, sometimes with few small simple intercalary leaflets, i. e., leaves rather interruptedly pinnate; leaves green on both sides, more or less covered with appressed rigidulous hairs, long-ciliate, prominently veined beneath. Flowers large, few, 12–15 mm in diameter, in dense corymbiform paniculate leafy inflorescence; calyx sparsely covered with long rigid hairs mixed with short glandular ones; sepals equal in length or the lanceolate outer sepals slightly shorter than the ovate acuminate inner; petals slightly longer than sepals, broadly obovate or suborbicular, emarginate, yellow; anthers ovate; fruitlets oblong-ovoid, smooth; style shorter than fruitlets. June–August.

Dry meadows, open grassy and stony slopes, forest edges. — W. Siberia: Alt.; E. Siberia: Ang.-Say. **Gen. distr.:** Mong. Described from Siberia. Type in Berlin.

67. *P. filipendula* Willd. ex Schlecht. in Mag. d. naturf. Fr. Berlin VII (1816) 296; Ldb., Fl. Ross. II (1844) 39.

Perennial; stems and petioles less densely hairy than in preceding species; leaves interruptedly pinnate, green on both sides; leaflets glabrous or glabrescent above, long-hairy beneath and along margin; terminal leaflet sessile, upper lateral leaflets decurrent, confluent with each other; stems slightly leafy. Inflorescence broad, loose, leafless; flowers smaller than in preceding species; otherwise very similar (in all other characters). July. (Plate XI, Figure 2).

In same habitats as preceding species. — E. Siberia: Ang.-Say., Dau., Lena-Kol. (southern part); Far East: Ze.-Bu. **Gen. distr.:** Mong., Jap.-Ch. (N. Ch.). Described from Dauria. Type in Berlin.

Note. Not distinguished sharply from the preceding species; it is, nevertheless, retained in view of the existence of evident differences (in extreme forms) and the different geographical distribution.

68. *P. nudicaulis* Willd. ex Schlecht. in Magaz. Naturf. Fr. Berlin VII (1816) 286.

154 Perennial, usually large sturdy plant, very similar to *P. tanacetifolia* Willd., from which it is distinguished mainly by pubescence of stem, branches of inflorescence and lower side of leaflets covered with long, simple, slightly bristly hairs, densely mixed with short, usually slightly flexuous, soft hairs (incomplete tomentum); stem often only slightly leafy, terminal leaflet sessile, upper lateral leaflets decurrent. Flowers usually larger than in *P. tanacetifolia*, 2 cm in diameter; sepals equal in length or the outer very often longer than the inner. June–July.

Mixed forests, grassy slopes. — E. Siberia: Ang.-Say., Dau., Lena-Kol. Endemic? Described from Siberia (exact location not reported). Type apparently lost, neotype in Berlin.

Note. T. Wolf determined this characteristic plant in various ways; in some cases he did not distinguish it from *P. tanacetifolia* W., and in other cases he accepted it as a hybrid of *P. tanacetifolia* × *P. viscosa*. It is very probably a hybrid-derivative; it might be more accurate to regard *P. strigosa* as the second of the assumed parents. The identity of this plant with Willdenow's plant is rather doubtful, and perhaps it would be better to give it another name (*P. pyrethrifolia* Juz. in sched.).

69. *P. viscosa* J. Don, Hort. Cantab., ed. 2 (1800) 68; Ldb., Fl. Ross II, 41; T. Wolf, Monogr. Pot. (1908) 317; Kryl., Fl. Zap. Sib. VII (1933) 1509. — *P. longifolia* Willd. ex Schlecht., Mag. d. Ges. nat. Fr. Berlin, VII (1816) 287. — *P. hispida* Nestl., Monogr. Pot. (1816) 36, non Willd. — *P. viscosa* var. *macrophylla* Kom., Fl. Mansh. II (1904) 501. — Ic.: Ldb., Ic. pl. fl. ross. IV (1833) tab. 343. — Exs.: HFR No. 1927a, b.

Perennial; rootstock thick, covered with brown relics of stipules; stems 20–50 cm high, thick, erect, many-leaved, covered — like the entire plant — with subappressed simple hairs mixed with more or less abundant glands, usually viscous; radical and lower cauline leaves long-petioled, large, pinnately 3–5-paired, sometimes interruptedly pinnate, with scarious brown stipules, attenuate into linear-lanceolate auricle; upper cauline leaves pinnately 2–3-paired, with large ovate acuminate stipules, simple or incised-dentate; leaflets green on both sides, hairy and viscidulous-glandulose, oblong-lanceolate, acutely incised-dentate, lower leaflets smaller than the upper, upper leaflets decurrent at base, terminal leaflet sessile. Inflorescence compressed, at first appearing capitate; flowers short-pedicel; calyx hairy and glandulose; sepals equal or nearly equal in length, outer sepals oblong-linear, the inner ovate-acuminate; petals broadly obovate, emarginate, hardly longer than sepals, yellow; stamens ca. 20, filaments shortish, anthers orbicular-ovate; achenes small, whitish, smooth, very narrowly dorsally keeled; style terminal conoid-thickened at base, covered with papillae, shorter than mature achene. June–August (Plate XI, Figure 3).

Meadows, exposed grassy and stony slopes, forest edges. — European part: V.-Kama (C. Urals); W. Siberia: Ob, U.-Tob., Irt., Alt.; E. Siberia: Ang.-Say., Dau.; Far East: Ze.-Bu., Uss.; Centr. Asia: Dzu.-Tarb. Gen. distr.: Mong., Jap.-Ch. (Korea, Manchuria), N. Tib. Described from Siberia. Type in London.

155 70. *P. kryloviana* T. Wolf, Monogr. Pot. (1908) 322; Kryl., Fl. Zap. Sib. VII (1933) 1510. — Ic.: T. Wolf, l. c., tab. IX, f. 1.

Perennial; caudex developing tightly crowded shoots, with biseriate stipules; stems few, delicate, ascending, 8–20 cm high, simple or few-branched, scarcely longer than radical leaves, usually reddish, covered — like petioles and pedicels — with fine pubescence and longer thin, curved, spreading hairs; radical and lower cauline leaves with petioles varying in length, with 2–3(4) pairs of lateral leaflets, median cauline leaves ternate, the upper (bracts) entire; stipules of cauline leaves large, semioval, simple

or 1-2-toothed; leaflets thin, obovate, the lateral sessile, the terminal short-petiololed, three upper leaflets incised-dentate in upper half, with 4-5 oblong, obtuse teeth at each side, finely pubescent, dingy green, whitish-silkish when young, leaflets of lower pair much smaller than the upper, 3-5-fid. Inflorescence 1-few-flowered; flowers on long erect pedicels, ca. 1.5 cm in diameter; calyx usually slightly long-hairy, outer sepals oblong, obtuse, much shorter than the ovate acute inner ones; petals cuneately obovate, deeply emarginate, hardly longer than calyx, yellow; filaments short, anthers small, suborbicular; fruitlets relatively large, ovoid, smooth; style shorter than fruitlets. July.

Gravels in the alpine zone.— W. Siberia: Alt. Endemic. Described from source of the Kalgutta River. Type in Tomsk.

71. *P. sanguisorba* Willd. herb. ex Schlecht. in Mag. naturf. Fr. Berlin VII (1816) 286; Ldb., Fl. Ross. II, 39; T. Wolf, Monogr. Pot. (1908) 323.— Ic.: Lehm., Monogr. Pot. (1820) tab. 5.

Perennial; caudex thick, covered with brown scales, developing few sterile cauline shoots; stems 15-30 cm high, erect, few-leaved, glabrous like the rest of the plant but more or less densely covered with small sessile and short-stalked glands, visible only under magnification; radical leaves long-petiololed, pinnately 3-paired mixed with pinnately 2-paired ones; cauline leaves 2-3, the lower petiolate, 2-3-paired, the uppermost subsessile, sometimes ternate; stipules of radical leaves with lanceolate auricles, stipules of cauline leaves with sheathlike base, lanceolate, deeply incised-dentate; leaflets sessile, obovate or oblong-obovate, the largest (upper) 1.5-2 cm long, incised-dentate, with 3-5 obtuse spreading teeth at each side, deep green, glabrous (but glandulose), lower leaflets alternate, usually 3-toothed. Inflorescence compressed, few-flowered; flowers 1-3, short-pedicel, 12-15 mm in diameter; calyx glandulose, sepals nearly equal in length, acute, the outer oblong, the inner ovate-lanceolate; petals slightly shorter than sepals, obovate, somewhat emarginate, pale yellow; stamens 20, filaments short, anthers small, suborbicular; receptacle globose, glabrous; fruitlets numerous, rather large, oblong-ovoid, finely rugose, dorsally keeled; style subterminal, distinctly shorter than fruitlets, conoid, strongly thickened at base, and with dilated stigma. June-September.

Rocks.— E. Siberia: Ang.-Say., Lena-Kol., Dau. Gen. distr.: N. Mong. Described from Siberia. Type in Berlin.

72. *P. pimpinelloides* L., Sp. pl. (1753) 497; Shmal'g., Fl. I (1895) 329.— *P. tanaitica* W. Zing. in Bull. Soc. Nat. Mosc. III (1882) 69.— *P. tanaitensis* W. Zing. in sched. olim.— Ic.: Nestl., Comment. bot. de Pot. (1816) 32, tab. 2, f. 1; W. Zinger, l. c.— Exs.: HFR No. 2170.

Perennial; caudex nearly woody, with several erect, branching stems, very leafy in upper part, 20-30 cm high, stems and petioles spreading-hairy-glandulose; radical and lower cauline leaves long-petiololed, oblong-linear, with numerous (15-25) leaflets of which the 3 upper are confluent at base; leaflets proximate, sessile, nearly equal in length, leaflets of radical leaves usually orbicular-ovate, of the cauline leaves much narrower, incised-dentate, with 7-11 obtuse triangular teeth; stipules slightly hairy, not glandulose, palmately incised-dentate, with large linear-lanceolate acute teeth. Inflorescence compressedly paniculate, many-flowered; flowers

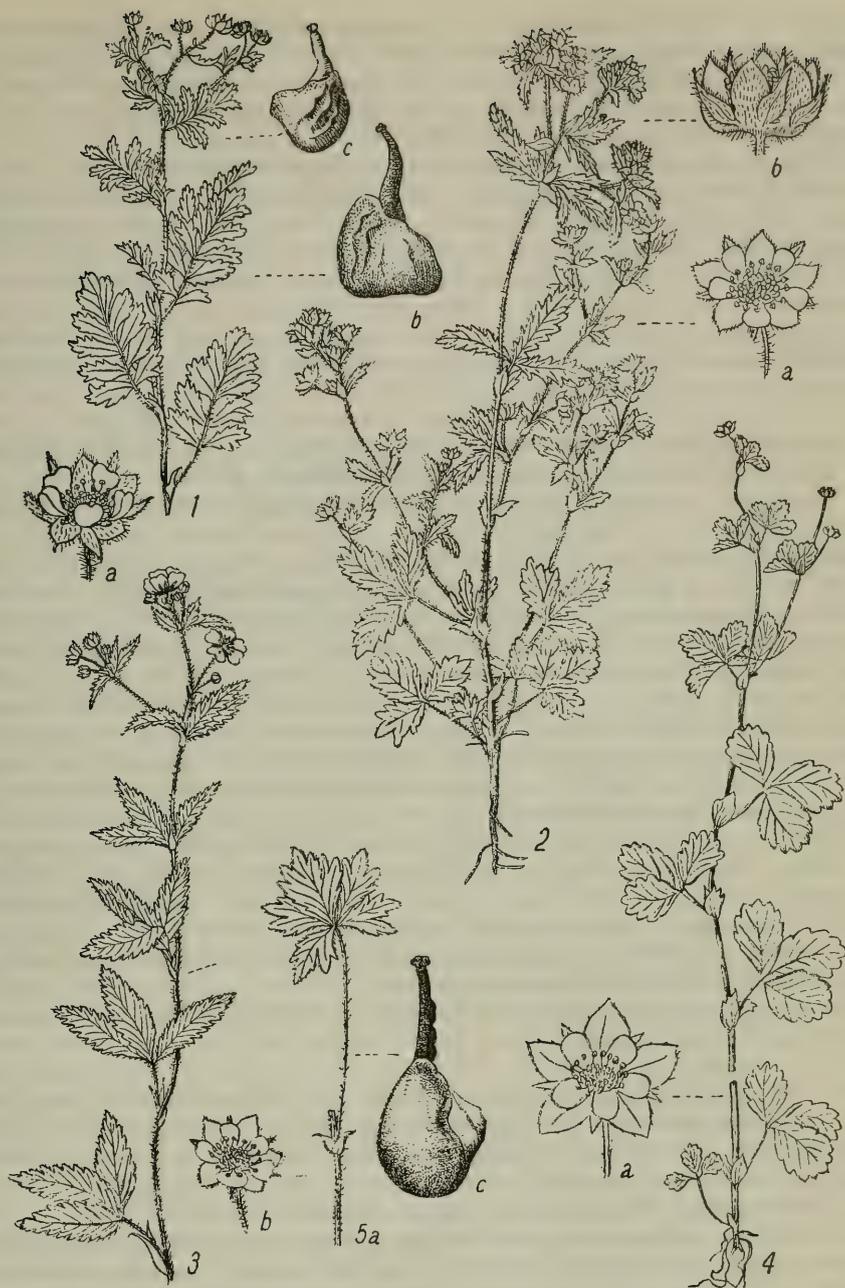


PLATE XIII. 1 - *Potentilla supina* L., stem summit, a) flowers, b) and c) fruitlets of different shapes; 2 - *P. norvegica* L., general view, a) flowers, b) sepals in fruit; 3 - *P. cryptotaeniae* Maxim., stem summit; 4 - *P. centigrana* Maxim., general view, a) flowers; 5 - *P. intermedia* L., a) leaves, b) flowers, c) fruitlets.

ca. 1.5 cm in diameter; calyx hairy and glandulose; outer sepals oblong-lanceolate, usually longer than the ovate-lanceolate acute inner ones; petals broadly obcordate, emarginate, one and a half to twice as long as sepals, pale yellow; anthers oblong-ovate; fruitlets oblong-ovoid, nearly smooth; style nearly as long as mature fruitlets. June–July.

Steppes, steppical slopes, limestone rocks, subalpine meadows, pine forests, grassy mountain slopes. — European part: V.-Don (Galich'ya Peak Gora Khrenovoye steppe); Caucasus: Cisc., Dag., S. Transc. **Gen. distr.:** Arm.-Kurd. Described from Armenia. Type in London.

159 Note. D. I. Litvinov (Sched. ad HFR No. 2170) observed that the southern Russian *P. tanaitica* Zing. differs from the typical *P. pimpinelloides* L. by its shorter and less dense hairs on the upper part of the stem and its smaller flowers; however, examination of more material reveals that these differences are insignificant.

73. *P. rigidula* T. Wolf, Monogr. Pot. (1908) 328; Kryl., Fl. Zap. Sib. VII (1933) 1511. — Ic.: T. Wolf, l. c., tab. VIII, f. 2.

Perennial; caudex multicapital, not very thick, densely covered in upper part with relics of stipules; stems ca. 10 cm high, erect, rigid, much longer than radical leaves, spreadingly branching above, villous below with long white spreading hairs, slightly pubescent in upper part; radical leaves short-petioled, oblong, 2–3 cm wide, with 4–5 pairs of lateral leaflets, cauline leaves usually 2, ternate; stipules of radical leaves scarious, with linear-lanceolate auricles, of cauline leaves small, oblong, obtuse; leaflets oblong, the largest (middle) ca. 8 mm long, 3 upper leaflets confluent at base and decurrent, deeply incised-dentate, with 2–3 oblong obtuse teeth at each side, silky-villous at both sides, whitish. Inflorescence semiumbelliform, many-flowered; flowers small, ca. 7 mm in diameter, thin-pedicel; calyx almost villous, outer sepals small, oblong, obtuse, inner sepals ovate, acute, much longer than the outer; petals narrowly obovate, divergent, hardly longer than the outer; petals narrowly obovate, divergent, hardly longer than sepals, yellow; stamens 20, with small suborbicular anthers; receptacle small, subglobose, hairy; fruitlets rather large, oblong-ovoid, finely rugose; style subterminal, conoid, thickened at base and covered with papillae, distinctly larger than fruitlets, with dilated stigma.

W. Siberia: Alt. Endemic. Described from Altai (exact locality not reported). Type in Tomsk?

74. *P. astragalifolia* Bge. in Ldb., Fl. Alt. II (1830) 246; T. Wolf, Mon. Pot. (1908) 329; Kryl., Fl. Zap. Sib. VII (1933) 1511. — *P. bifurca* β minor Ldb., Fl. Ross. II (1844) 44. — *P. bifurca* ζ *astragalifolia* Lehm., Rev. Pot. (1856) 25. — Ic.: Ldb., Ic. pl. Fl. Ross. IV (1833) tab. 328; Lehm., Monogr. Pot. Suppl. I, tab. 2, f. 1.

Perennial; rootstock thick, developing many tightly crowded or tufted short shoots, covered with relics of stipules, bearing rosettes of radical leaves and axillary thin erect or ascending nearly leafless floriferous stems, 3–9 cm high; radical leaves 2–3 cm long, short-petioled, pinnate, with 5–8 pairs of oblong-ovate entire or 2–3-incised-dentate obtuse leaflets, terminal leaflet often confluent at base with upper pair of lateral leaflets, silky-villous on both sides with long appressed hairs; leaves of inflorescence

160 small, simple or 2-3-paired; stipules of radical leaves brownish-scarious, silky-villous, stipules of cauline leaves herbaceous, ovate, obtuse; stems — like pedicels — densely spreading-hairy. Inflorescence few-flowered (1-4); flowers rather long-pedicel, 8-12 mm in diameter; sepals ovate-lanceolate, the inner acute, wider and slightly longer than the obtuse outer sepals; petals longer than sepals, emarginate, yellow; stamens 20, with suborbicular anthers; fruitlets smooth; style subterminal, conically thickened and tuberculate at base. June-July. (Plate XI, Figure 4).

Gravels on riverbanks in the steppical zone of the desert. — W. Siberia: Alt. **Gen. distr.:** Mong. Described from Chuya steppe. Type in Leningrad.

Section 5. **RECTAE** T. Wolf, Mon. Pot. (1908) 332. — Perennials; often glandulose, not tomentose; stems tall, erect or ascending, at anthesis without rosette of radical leaves (axis determinate), usually developing — like petioles and pedicels — a quite characteristic dense pubescence of very short, rigid, horizontally spreading hairs, in addition to long hairs; style thick and short, shorter than or as long as mature fruitlets.

75. *P. recta* L., Sp. pl. (1753) 497; Ldb., Fl. Ross. II, 45; T. Wolf, Mon. Pot. (1908) 334; Kryl., Fl. Zap. Sib. VII (1933) 1512. — *P. acutifolia* Gilib., Fl. Lith. II (1781) 253. — *P. sulphurea* Lam., Fl. Fr. ed. 1, III (1778) 114. — *P. pallens* Mönch, Meth. (1794) 658. — *P. obscura* Willd., Sp. pl. II (1800) 1100. — *P. corymbosa* Mönch, Meth. Suppl. (1802) 279. — *P. crassa* Tausch in Opiz. Böhm. Gew. (1823) 63. — *P. pilosa* Willd., Sp. pl. II (1800) 1100. — *P. leucotricha* Borbas in ÖBZ. (1886) 292. — *P. herbichii* Blocki in ÖBZ. (1885) 291. — *P. recta* β *obscura* Ldb., Fl. Ross. II (1844) 46. — *P. hirta* Ldb., Fl. Ross. II, 46 et auct. Fl. Ross. saltem pro max. part. — Ic.: Schlecht., Lang. et Schenk, Fl. Deutschl. ed. 5, XXV (1881) tab. 2591; Sturm, Fl. Deutschl. ed. 2, VIII (1904) tab. 32; Rchb., Ic. Fl. Germ. XXV (1910) tab. 25 et 26. — Exs.: HFR No. 2164, 2165.

161 Perennial; rootstock sturdy, multicipital, covered with relics of stipules, bearing thick, erect, very leafy stems dichasially branching in upper part, 30-70 cm high, densely covered — like petioles, pedicels and calyx — with short bristles and long spreading hairs, sessile on tubercles and mixed with jointed glandular ones; radical and lower cauline leaves large, long-petioled, 5-7-paired, upper cauline leaves quinate and ternate, short-petioled and sessile; stipules of cauline leaves ovate-lanceolate, entire or incised-dentate; leaflets oblong-ovate or oblong, cuneately tapering at base and entire, in remaining part equally large-dentate or incised-dentate, with 7-17 ovate or lanceolate, obtuse or acute teeth at each side, green on both sides, rigid-hairy, rugose beneath of prominent lateral branched veins. Flowers in many-flowered inflorescence, large, up to 2.5 cm in diameter; calyx densely villous hairy, prominently veined in fruit; outer sepals sublinear, as long as or slightly longer than the wide ovate-lanceolate inner sepals (rarely slightly shorter), all sepals acute; petals obovate, deeply emarginate, as long as or much longer than sepals, yellow in various shades; stamens 25-30, filaments short, anthers oblong; receptacle prominent, slightly fleshy; achenes many, small, ovoid, rugose, winglike-cuneate, brown; style shorter than mature achenes, somewhat thickened at base. June-July. (Plate XII, Figure 1).

Steppes, steppe slopes, fallow fields, roadsides. — European part: U. Dnp., U. V., V.-Kama and throughout the southern part; Caucasus: all regions; W. Siberia: U. Tob., Irt., Alt. In Centr. Asia is usually replaced by the following species. **Gen. distr.:** Centr. Eur., Med., Bal.-As. Min., Iran. Described from Europe (Italy, Narbonne). Type in London.

Note. *P. recta*, in its range as accepted here, is an extremely intricate and diverse complex of forms, representing a series of smaller taxa which are of sufficiently high systematic importance. Several authors (and collectors) have repeatedly attempted to distinguish within the Soviet population certain forms that refer to the given group, some as species, others as varieties of *P. recta* or, partially, of *P. obscura* Willd., *P. pilosa* Willd., *P. sulphurea* Lam., and *P. leucotricha* Borb., which we had provisionally placed as synonyms (of *P. recta* and some others). The most widely distributed in the Soviet Union and the most easily recognized of these forms is *P. obscura* Willd., which is characterized by the whole plant being sparsely pubescent, the reddening stems, the dark green leaves, the lower of which is 5–7-paired, the oblong tapering at both ends, the rather acutely dentate leaflets, and the dark yellow petals, usually not exceeding sepals in length. It is difficult to distinguish *P. leucotricha* Borb., which has dense whitish pubescence on the entire plant, in particular on stems and calyx (European part of the USSR, southern regions). The forms referred to as *P. sulphurea* Lam. in the USSR are distinguished by sulfur-yellow flowers with petals rather distinctly longer than sepals; they are apparently related to another species-series; anyway, it is doubtful whether they are identical with the real West European *P. sulphurea*. All in all, the entire complex requires a special monographic study; the absence of the authentic West European specimens in the USSR hinders our study.

162 76. *P. transcaspia* T. Wolf, Mon. Pot. (1908) 358. — *P. hirta* var. *transcaspia* T. Wolf in sched. olim ex ips., l. c.

Perennial; stems 30–50 cm high, firm, thick, erect, covered — like the rest of the plant — with long spreading soft hairs, glands absent; radical and lower cauline leaves 5–7-paired, long-petioled; upper cauline leaves subsessile, ternate and simple; stipules entire or 1–2-toothed; leaflets large, with inconspicuous veins, long-cuneate, narrowly oblong-lanceolate, in the upper cauline leaves even linear-lanceolate; remotely few-toothed, with 4–7 rather shallow, triangular, lanceolate teeth at each side. Flowers large, often in somewhat compressed inflorescence; stamens 25–30; petals lemon-yellow, as long as or slightly longer than sepals; achenes larger than in *P. recta*. In all other characters resembling *P. recta*. June–July.

Steppes, steppe slopes. — European part: L. V.; Centr. Asia: nearly all regions. **Gen. distr.:** Iran? Described from the vicinity of Ashkhabad. Type in Berlin (?), cotype and paratype in Leningrad.

77. *P. semilaciniosa* Borb., Budapest. növ. (1879) 164. — *P. recta* β *semilaciniosa* Grecescu, Consp. Fl. Rom. (1898) 205. — *P. pelicanovicii* Petrovic ex Borbas, En. pl. comit. Castrif. (1887) 311. — *P. laciniosa* T. Wolf, Mon. Pot. (1908) 356 p. p. et auct. fl. USSR, non W. K. — Exs.: Schulz, Herb. norm. No. 2825; Fl. exs. Austro-Hung. No. 2831.

Perennial; stems ascending or suberect, not thick, usually reddening, corymbiform-paniculate in upper part, like the whole plant densely covered with long, soft, white hairs; lower leaves septenate, long-petioled, upper cauline leaves quinate and short-petioled or ternate or simple and sessile; stipules deeply dissected into linear elongated lobes; leaflets oblong-linear or oblong-lanceolate, thin, inconspicuously veined, deeply pinnatisect into rather broad-linear or lanceolate acute lobules, 6–12 at each side of leaflet (some of them with lateral teeth). Flowers rather small; outer sepals acute, often longer than the inner and sometimes 2–3-partite, inner sepals wider, ovate-lanceolate; petals almost twice as long as sepals, dark yellow. Otherwise similar to *P. recta* L. June–July. (Plate XII, Figure 2).

Grassy and usually stony slopes, shrubby formations.— European part: Bl., L. V., Crim.; Caucasus: Cisc., E. and W. Trans. Dau. **Gen. distr.:** Centr. Eur. (Hungary), Bal.-As. Mtn. Described from vicinity of Budapest. Cotype in Leningrad.

78. *P. nurensis* Boiss. et Hausskn. in Boiss., Fl. Or. II (1872) 720; T. Wolf, Mon. Pot. (1908) 360.— Ic.: T. Wolf, l. c., tab. XI, f. 1.

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Perennial; stems 13–30 cm high, delicate, ascending from base, very leafy, covered — like the long petioles — with very short rigid bristles and long, white, straightly-spreading hairs; stipules of radical leaves narrow, with linear or lanceolate auricles, stipules of cauline leaves ovate-lanceolate, entire; leaflets subsessile, oblong-cuneate or oblong-obovate, up to 2–3 cm long, cuneately tapering at base, with 2–3 slightly unequal oblong-linear obtuse lobes or teeth at each side of upper part, bright green, glabrescent above, covered along margin and beneath along veins with remote bristles and long hairs. Inflorescence corymbiform, 5–7-flowered; flowers ca. 2 cm in diameter, long-pedicelated; hypanthium and calyx covered with fine bristles and sparse hairs; sepals linear-lanceolate or triangular-lanceolate, nearly equal in length; petals broadly obovate, one and a half times as long as sepals, yellow; stamens with large anthers and very short filaments; fruitlets oblong-ovoid; style noticeably thickened at base, as long as fruitlets. Fl. summer.

Mountains (3,350 m).— Caucasus: S. Transc.? **Gen. distr.:** Iran. Described from Kuh-Nur. Type in Geneva.

Note. T. Wolf identifies one plant in the Fischer Herbarium, collected from the Caucasus (locality not reported), as a hybrid of *P. nurensis* and certain other species (or specific race?); therefore, the possibility of finding *P. nurensis* in Transcaucasia should not be ruled out.

79. *P. astracanica* Jacq., Misc. II (1765) 349; Ic. pl. rar. I (1781) 10.— *P. recta** *astracanica* Ldb., Fl. Ross. II (1844) 46.— *P. taurica* T. Wolf, Mon. Pot. (1908) 377 p.p.— *P. taurica* var. *genuina* T. Wolf, l. c., 380 pro max. p.— Ic.: Jacq., l. c., tab. 62.— Exs.: Lang et Szovits, Herb. ruth. cent. I, 69; Novopokrovsky, Herb. fl. tanait. 135.

Perennial, whole plant spreadingly hairy, covered with large capitate glands; stems developed from a rootstock sturdy, erect, 10–20 cm high, thick, densely leafy, covered like petioles and pedicels with short bristly hairs mixed with jointed glandulose hairs and long white spreading ones; radical and lower cauline leaves long-petioled, usually quinate, rarely septenate,

upper cauline leaves ternate or simple; stipules of cauline leaves large, entire or with 1–2 teeth; leaflets cuneate, broadly obovate, with several large obtuse teeth, densely short-bristly-hairy beneath and sometimes above, in addition with short and thin appressed hairs above, with long and soft flexuous hairs beneath. Flowers short-pedicelled, large, ca. 2–3 cm in diameter, crowded in inflorescence, inflorescence subcapitate at the beginning; calyx densely hairy, strongly accrescent in fruit, with prominent veins, outer sepals narrower than the wide obtuse inner sepals but much longer, usually nearly twice as long, gradually long-acuminate or obtuse; petals broadly obovate, usually much longer than sepals, pale yellow; stamens ca. 30, with large oblong-linear anthers; receptacle subcylindrical; achenes small, ovoid, strongly rugose, broadly keeled dorsally, grayish brown; style subterminal, shorter than mature achenes, thickened at base. June–July. (Plate XII, Figure 3).

Stony and sandy slopes. — European part: Bl., L. V.; Caucasus: Cisc. (Anapa, Kavkaskaya railroad station). Endemic. Described from a cultivated specimen grown from seeds received from Astrakhan. Type unknown.

80. *P. callieri* Juz. comb. nova. — *P. taurica* var. *callieri* T. Wolf, Mon. Pot. (1908) 381. — *P. bornmülleri* var. *superlata* Borbas in sched. ad A. Callier, It. taur. tert. a. 1900 No. 597. — Exs.: Callier, l. c.; Dörfler Herb. norm. 5040; Siegfr., Exs. Pot. spont. cult. 469 (nom *P. lanuginosa* Fisch., minus typica).

Perennial; rootstock sturdy, developing rosette of radical leaves and very strong stems; stems 12–40 cm high, usually erect or suberect, densely leafy, covered like petioles, pedicels and calyx with fine bristly hairs, horizontally spreading, long, rigid hairs and many glands; radical and cauline leaves long-petioled, quinately; stipules of cauline leaves large, ovate-lanceolate or lanceolate, long-acuminate, entire or coarsely toothed; leaflets of radical leaves narrowly obovate, of cauline leaves oblong or oblong-lanceolate, widest in middle part, strongly tapering at both ends, long-cuneate and entire at base, with numerous (9–15 at each side), subequal, proximate, subtriangular, usually acute, straight-spreading teeth, covered above with short but thick bristles directed to side of midribs, scabrous to touch, densely spreading-short-bristly beneath along entire surface, and with rather dense, long, white, appressed hairs. Flowers crowded in capitate inflorescence, similar to the flowers of *P. astracanicum* but sepals long and narrow, thin-acuminate; fruiting calyx densely covered with long and rigid yellowing hairs. Otherwise like *P. astracanicum*. June. (Plate XII, Figure 4).

Stony steppical slopes. — European part: Crim.; Caucasus: W. Transc. (Novorossiisk). Endemic. Described from vicinity of Simferopol, Massanko. Type and cotype in Leningrad.

81. *P. taurica* Willd. apud Schlecht. in Mag. Ges. naturf. Fr. Berlin VII (1816) 291; Ldb., Fl. Ross. II, 46. — *P. marschalliana* Rupr. in sched. Herb. M. B. — *P. taurica* var. *bornmülleri* cum f. *angustissima* T. Wolf, Monogr. Pot. (1908) 382, saltem p. p. (quoad plantam tauricam.), an *P. bornmülleri* Borbas? — Exs.: Dörfler, Herb. Normale No. 5039.

Perennial; rootstock sturdy, developing arcuately ascending or curved, rarely erect or straight, thick or delicate stems, 4–35 cm high (and more), branching approximately from middle, covered with diverging leaves and – like petioles and pedicels – with short bristly hairs and long snow-white straight-spreading, rarely horizontally spreading or declinate hairs, with or without remote glands; radical and lower cauline leaves long-petioled, quinate, upper cauline leaves ternate, 3-lobed and simple, often completely entire margined; stipules of cauline leaves large, usually entire, broadly ovate then long-acuminate at base; leaflets narrowly obovate and narrowly cuneate at base, oblong-linear or linear-lanceolate, usually acutely 3–7-toothed at each side of upper part, glabrous above or sparingly covered with long appressed white hairs, densely pubescent beneath usually only along midribs with long white straight-spreading hairs, short bristles absent or only along veins, very rarely entire surface on both sides densely pubescent with long white hairs. Inflorescence very loose, branches elongated, inclined at a sharp angle; pedicels short to rather long; flowers medium-sized or rather large; calyx very densely long-white-hairy, in fruit slightly or rarely rather much accrescent; outer sepals usually slightly longer than the inner, gradually long-acuminate; petals broadly obovate, emarginate at summit, distinctly longer than sepals, pale yellow; anthers large, oblong; achenes transversely rugose, acutely keeled; style shorter than achenes. June–July. (Plate XII, Figure 5).

Stony mountain slopes and rock streams. – European part: Crim.; Caucasus: Cisc. (Raevskaya railroad station), W. Transc. (Novorossiisk). Endemic? Described from the Crimea (in all probability, from Chatyr-Dag Mountain). Type in Berlin? Cotype in Leningrad.

Section 6. RIVALES T. Wolf, Pot.-Stud. II (1903) 11; Mon. Pot. (1908) 384. – Perennials or biennials, not tomentose; stems often branching from base or from lower third; rosettes of radical leaves developed or absent, leaves pinnate or palmate. Inflorescence usually leafy, many-flowered; anthers usually small, orbicular; style thick and short, shorter than mature fruitlets, often covered with small papillae, often curved at apex, conoid at base and sometimes shortly-cuneate and dilated in lower third.

66 82. *P. supina* L., Spec. pl. (1753) 497; Ldb., Fl. Ross. II, 35; T. Wolf, Mon. Pot. (1908) 389; Kryl., Fl. Zap. Sib. VII (1933) 1513. – *Comarum flavum* Roxb., Cat. hort. Beng. (1814) 39. – *C. supinum* Alef., Bot. Zeit. XXIV (1866) 262. – *P. paradoxa* Nutt. in Torr. et Gr., Fl. N. Amer. I (1840) 437. – *P. nicolletii* Sheldon, Bull. Geol. and Nat. Hist. Surv. Minn. VII (1884) 16. – *P. denticulata* Wall., Cat. pl. Ind. Or. (1825) No. 1029. – Ic.: Fl. Dan. XIII, tab. 2175; Schlecht., Fl. Deutschl. ed. 5, XXV, tab. 2581.

Annual, biennial, sometimes 3- or 4-ennial plants; rootstock simple, slightly fibrose; stems 15–40 cm high, solitary or few, prostrate or ascending, rarely erect, divaricately and furcately branching from base; branches many-flowered, covered – like stems, petioles and receptacle – with spreading soft hairs, sometimes mixed with small glands; radical and lower cauline leaves long-petioled, 2–5-paripinnate, with broadly ovate, entire,

acute stipules; upper cauline leaves sessile, often ternate; leaflets rather equal in dimensions, oblong or obovate, the upper decurrent, the terminal incised-dentate or lobate, usually with obtuse lobes, more or less hairy at both sides, often confluent with leaflets of upper pair, green. Flowers small; pedicels recurved after flowering; outer and inner sepals nearly equal or the outer shorter, foliaceous, obovate-lanceolate, often 2-3-partite; petals obovate-cuneate, slightly emarginate at apex, as long as or much shorter than sepals, yellow; stamens 15-20, filaments short, anthers small, orbicular; achenes sessile on accrescent spongy receptacle, numerous, small, longitudinally rugose, often with a conoid suberous protuberance ventrally, rarely without it; style subterminal, conoid or somewhat fusiform, papillate-thickened in lower third, as long as mature achenes. June-August. (Plate XIII, Figure 1).

Riverbanks, grassy slopes, pastures, roadsides, near dwellings.—European part: U. V., V.-Kama, M. Dnp., V.-Don, Transc., L. V.; Caucasus: Cisc., Dag., E. and W. Transc., Tal.; W. Siberia: all regions; E. Siberia: all regions; Far East: Ze.-Bu., Uss.; Centr. Asia: nearly all regions. Gen. distr.: Centr. and Atl. Eur., Med., Bal.-As. Min., Iran., Tib., Ind.-Him., Dzu.-Kash., Mong., Jap.-Ch., N. Afr., N. Am. Described from Mainz and Siberia. Type in London.

Note. The forms that prevail in the USSR (at least in the Asian parts) have a conoid protuberance on the fruitlets and are regarded (at least by American authors) as independent species (*P. paradoxa* Nutt. and others).

83. *P. amurensis* Maxim., Prim. Fl. Amur. (1859) 98.

167 Perennial; stems 5-30 cm high, delicate, repeatedly loosely spreading-branching, covered with soft flexuous hairs; leaves ca. 2 cm long, ternate, the lowermost much shorter than petioles, the rest as long as or longer; leaflets petiolulate, petiolules of terminal leaflet rather long (up to 5 mm), broadly rhombic, yellowish green, finely and thinly verrucose-hairy on both sides (pubescence visible only under magnification), with longer sparse hairs along veins, beneath, terminal leaflet deeply 3-partite, the lateral 2-partite with an oblique base and spreading or declinate lobes (leaves often appearing quinate), lobes of all leaflets oblong-obovate, incised-serrate to middle, with ovate obtuse teeth; stipules ovate-lanceolate, entire. Inflorescence very broad, strongly branching, with reduced many-flowered branches; flowers ca. 5 mm in diameter; sepals subequal in length, the outer oblong-linear, obtuse, the inner ovate, acute; petals not contiguous with each other, very small, nearly half as long as sepals, inconspicuous, oblong-obovate, entire, yellow; fruiting calyx up to 8 mm in diameter, closed above; fruitlets numerous, slightly longitudinally rugose. July.

Muddy and sandy riverbanks (inundated places).—Far East: Uda, Uss. Endemic? Described from the lower reaches of the Amur River (villages of Kuegra, Dere, Chora, Buri, Khabs Mare, Davunda). Type in Leningrad.

Note. A useful species, unacceptable to Wolf for his purposes but re-established.

84. *P. norvegica* L., Sp. pl. (1753) 499; Ldb., Fl. Ross. II, 36; Lehm., Rev. Pot. (1856) 198; T. Wolf, Mon. Pot. (1908) 401; Kryl., Fl. Zap. Sib. VII (1933) 1514.—*P. varians* Moench, Meth. (1794) 658.—*P. dichotoma* Moench, *ibid*, 659.—*P. trifoliata* Gilib., Exerc. phyt. (1792) 361.—

P. ruthenica Willd., Sp. Pl. II, 2 (1800) 1097.— Ic.: Sturm, Deutschl. Fl. fasc. 92, tab. 1.— Exs.: HFR No. 2158, 2159.

Annual, biennial, sometimes triennial and quadrennial plant; stems 15–50 cm high; rootstock simple, fibrous; stems solitary or few, usually erect, many-leaved, furcately branching above, covered with rigid spreading hairs; leaves usually ternate, rarely lower leaves 5-paired or pinnately 5–7-paired due to dissected terminal leaflet; stipules broadly ovate, rarely lanceolate, acute, entire, rarely strongly toothed; leaflets cuneate, obovate or oblong, strongly and irregularly serrate, with rigidulous spreading hairs on both sides. Flowers many, slightly congested, pedicels erect after flowering; calyx hairy, accrescent after flowering, sepals at first equal in size, oblong-lanceolate, acute, after flowering outer sepals longer and wider than inner, foliaceous, often dissected; petals small, as long as or shorter than sepals, obovate; achenes numerous, small, ovoid, finely rugose; style subterminal, strongly thickened at base, as long as mature achenes or shorter. June–September (Plate XIII, Figure 2).

Field edges and roadsides, fallow fields, gardens, waste lands, river-banks, clearings near dwellings.— European part: most regions except for Crim. and L. V.; W. Siberia: Ob, Alt., U. Tob., Irt.; E. Siberia: Ang.-Say., Dau., Lena-Kol.; Far East: Kamch., Ze.-Bu., Uss. Gen. distr.: Scand., Centr. Eur., N. Mong., Jap.-Ch. In N. Am., replacing the related species *P. monspeliensis* L. Described from Norway. Type in London.

85. *P. cryptotaeniae* Maxim. in Bull. Acad. St.-Pétersb. IX (1874) 162; Kom., Fl. Mansh. II (1904) 510; T. Wolf, Mon. Pot. (1908) 405.

Perennial; rootstock simple, fibrous; stems several, erect or ascending, 30–60 cm long, firm, loosely spreading-branching in upper part, densely covered — like petioles, pedicels and calyx — with soft spreading hairs; leaves mostly ternate, the lower long-petioled and upper short-petioled; stipules of radical and lower cauline leaves with linear-lanceolate, sometimes incised auricles, stipules of upper with ovate-lanceolate, acuminate auricles; leaflets oblong or oblong-lanceolate, cuneate, gradually tapering above and usually long-acuminate, sessile or sometimes short-petiolulate (especially the median), up to 6–8 cm long and 2 cm wide, sub-acutely serrate-dentate throughout entire length except for base, with 10–20 short triangular-ovate teeth at each side, usually sparingly hairy on both sides. Inflorescence corymbiform-paniculate, generally many-flowered; flowers on long thin pedicels, erect or declinate in fruit; calyx accrescent in fruit; outer sepals linear-lanceolate, equal in length, later longer than the narrowly ovate or ovate inner sepals; petals obovate, entire or slightly emarginate, one and a half times longer than calyx, yellow; stamens 20, filaments rather long, anthers ovate-orbicular; receptacle globose, slightly fleshy, hairy; fruitlets numerous, ovoid, rugose; style sub-terminal, slightly thickened at base, as long as or shorter than fruitlets. July–September. (Plate XIII, Figure 3).

Meadows, shrubby formations, forest edges, neglected ploughlands.— Far East: Uss. Gen. distr.: Jap.-Ch. (Manchuria, N. Korea, Japan). Described from Bryusa Bay, vicinity of Vladivostok, and Poseta Bay. Type in Leningrad.

86. *P. centigrana* Maxim.. in Bull. Acad. St. Petersb. XIX (1874) 163; T. Wolf, Mon. Pot. (1908) 406.— *P. reptans* β *trifoliolata* Franch. et Sav., En. pl. Jap. I (1875) 131.

169 Perennial; rootstock weak, fibrous; stems single to several, 30–50 cm long, erect or ascending, often rooting at nodes, simple or furcately branching, with shootlike branches similar to main stem, shortly covered — like petioles and pedicels — with bristly hairs or glabrescent; leaves sessile, ternate, the radical longer petioled; stipules of cauline leaves large, broadly ovate, obtuse or short-acuminate; leaflets short-petioluled, obovate, cuneate and entire at base, with numerous (5–10 at each side) acute or obtuse teeth, remotely short-appressed-hairy on both sides or glabrescent above. Flowers solitary in axils of cauline leaves, on long and thin pedicels, 5–7 mm in diameter; outer sepals elliptic, acute, accrescent in fruit, inner sepals lanceolate, acute; petals small, obovate, shorter than sepals, pale yellow; filaments rather long, anthers subreniform, very small; fruitlets ovoid, longitudinally interrupted-striate; style slightly shorter than fruitlets. June–September. (Plate XIII, Figure 4).

Damp forests, often on stony substrate.— Far East: Uss. Gen. distr.: Jap.-Ch. Described from Japan, Hokkaido in the vicinity of Hakodate (α *japonica* Maxim.) and from the Wai-Fu-din River, Olga Bay (β *mandshurica* Maxim., l. c.). Type in Leningrad.

87. *P. intermedia* L., Mant. I (1767) 76; Rupr., Fl. Ingr. (1860) 322; Ldb., Fl. Ross. II, 49; T. Wolf, Mon. Pot. (1908) 409.— *P. diffusa* Rchb., Fl. Germ. excurs. (1832) 870.— *P. ruthenica* Steud., Nomencl. bot. II (1841) 389.— *P. digitato-flabellata* A. Br., Ind. sem. hort. Berol. (1851) 3.— *P. intermedia* var. *typica* Rupr., l. c.— *P. intermedia* var. *tambovensis*, T. Wolf, Mon. Pot. (1908) 411.— Ic.: Petunn. in Ser. bot. hort. Univ. Petrop. XIII (1896) tab. 3 et 4.

170 Perennial; rootstock thick, branching; stems 15–50 cm high, firm, arcuately ascending at base, erect above, greenish, very leafy, branching from lower third; branches many, straightly spreading, many-flowered, covered — like stems and petioles — with very soft, short, crisp hairs and with longer, soft hairs; radical and lower cauline leaves always quinate, the upper ternate; stipules of cauline leaves broadly ovate, usually dentate at margin; leaflets of lower leaves thin, obovate or oblong-obovate, shortly cuneate at base, coarsely serrate, usually with unequal, ovate or oblong, obtuse or acute teeth, flat at margin, rather densely hairy and green on both sides. Flowers small, rather long pediceled; sepals subequal, acute, the outer narrower than the broadly ovate inner ones; petals obovate, weakly emarginate, as long as or hardly shorter than calyx, yellow; stamens 20, with short filaments and small reniform anthers; achenes ovoid, brown, finely rugose; style subterminal, thickened at base, about as long as mature achenes.— June–August. (Plate XIII, Figure 5).

Fallow fields and crops, roadsides, gardens, meadows, steppes and wastes.— European part: U. Dnp., Lad.-Ilm., U. V., V.-Kama, V.-Don. Gen. distr.: Centr. Eur. Described from Switzerland. Type in London.

88. *P. heidenreichii* Zimm., Eur. Art. Gatt. Potent. (1884) 10.— *P. intermedia* β *canescens* Rupr., Fl. Ingr. I (1860) 322.— *P. digitato-flabellata* Heidenr. in Oest. Bot. Zeit. (1871) 169, (1872) 86, non Al. Br.— Exs.: HFR No. 1570.



PLATE XIV. 1 - *Potentilla umbrosa* Stev., leaves and inflorescence; 2 - *P. chrysantha* Trev., a) leaves, b) stem apex; 3 - *P. longipes* Ldb., leaves and inflorescence, a) part of stem; 4 - *P. goldbachii* Rupr., a) leaves, b) part of stem; 5 - *P. stipularis* L., general view; 6 - *P. fragiformis* Willd., general view.

Biennial, very similar to *P. intermedia* L., distinguished from it mainly by the following characters: stems usually reddening; leaflets denser (thicker), more deeply incised, revolute at margin, slightly silky above, gray-green beneath with loose incomplete tomentum of short, curved or slightly crisp hairs, mainly along nerves, in addition to straight hairs, with prominent lateral veins. Inflorescence denser and less branching, often few-flowered. June—August.

Fallow fields, dry meadows and other places. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., V.-Kama, U. V., V.-Don. U. Dnp. Gen. distr.: Centr. Eur. Described from N. Germany (banks of Memel River near Tilsit).

Note. Sometimes regarded as a hybrid form (*P. argentea* L. × *P. intermedia* L.).

89. *P. asperrima* Turcz. in Bull. Soc. nat. Mosc. XVI (1843) 609; Ldb., Fl. Ross. II, 9; T. Wolf, Mon. Pot. (1908) 415. — Ic.: Lehmann, Rev. Pot. tab. 52.

173 Perennial (and biennial?); rootstock thin, fibrous; stems 10—20 cm high, erect or ascending, thin, few-leaved, once or twice furcately branching in upper half, covered — like the whole plant — with long, rigid, prickly, spreading bristles, sessile on small tubercles, also with few yellow sessile and stalked glands; leaves ternate, radical leaves, long-petioled, cauline leaves short-petioled; stipules of radical leaves with long linear-lanceolate auricles; stipules of cauline leaves lanceolate or ovate, entire; leaflets sessile, broadly ovate, cuneate and entire at base, deeply incised-dentate, with obtuse simple or pinnatifid segments, lateral leaflets oblique at base, spiny-bristly and glandular-viscous on both sides, dark green above, shiny, yellowish green beneath, with prominent veins. Inflorescence few-flowered; flowers long-pedicel, large, 20—25 mm in diameter; sepals nearly equal, ovate-lanceolate, acute, the inner slightly wider than the outer; petals wide, as long as or slightly longer than sepals, obcordate, somewhat emarginate, golden yellow; stamens 20, filaments very short, anthers small, orbicular-ovate; receptacle large, conoid, becoming cylindrical, shortly strigose; fruitlets numerous, oblong-ovoid, transversely rugose, dorsally broadly carinate; style subterminal, shorter than achenes, thickened at base and with dilated slightly declinate stigma. June—September.

Stony places, steep rocks. — E. Siberia: Dau., Lena-Kol. (forest edges in the northernmost region); Far East: Ze.-Bu. Endemic. Described from Dauria, from the Shilka River. Type in Leningrad.

Note. An old specimen labeled "Altai" in the Herbarium of the Botanical Institute of the Academy of Sciences is of a doubtful origin.

90. *P. regeliana* T. Wolf, Mon. Pot. (1908) 414. — Ic.: T. Wolf, l. c., tab. XII, f. 1.

Perennial; caudex sturdy, developing several lateral stems and central rosette of leaves; stems 15—20 cm, arcuate below, erect, with 2 cauline leaves, branching at the upper third or half, with erect long branches, covered — like petioles and pedicels — with very short hairs mixed with many sessile glands and spreading, long, soft hairs; radical and lower cauline leaves long-petioled, ternate, the upper sessile, simple; median leaflet of

lower leaves petiolulate, lateral leaflets sessile, oblong, coarsely serrate, with 5—6 ovate obtuse teeth at each side, green on both sides, long spreading-hairy and weakly glandulose; cauline leaves oblong-lanceolate, with large, ovate, acute stipules. Flowers on long erect pedicels, 12 mm in diameter; outer sepals oblong-linear, obtuse, much shorter than the ovate-lanceolate inner ones; petals obcordate, barely longer than sepals, yellow; anthers ovate; fruitlets small, oblong-ovoid, smooth but slightly transversely rugose; style shorter than fruitlets. August.

Mountains. — Centr. Asia: Dzu.-Tarb. **Gen. distr.:** Dzu.-Kash. Described from Borokhoro Range (north of Kuldja). Type in Leningrad.

91. *P. desertorum* Bge. in Ldb., Fl. Alt. II (1830) 257; Ldb., Fl. Ross. II, 53; T. Wolf, Mon. Pot. (1908) 416; Kryl., Fl. Zap. Sib. VII (1933) 1515. — Ic.: Ldb., Ic. pl. Fl. Ross. IV, tab. 337.

174 Perennial; caudex sturdy, multicipital, densely covered with brown relics of stipules; stems 20—30 cm high, firm, erect or ascending, often very leafy, slightly branching; covered like petioles, branches of inflorescence and calyx with spreading simple hairs and numerous sessile and stalked glands, usually dark red; radical and lower cauline leaves long-petioled, quinate and ternate, upper cauline leaves ternate, short-petioled; stipules of radical leaves with lanceolate auricles, stipules of cauline leaves broadly ovate-lanceolate, acute; leaflets subsessile, cuneately obovate, obtuse, obtusely serrate or incised-serrate, entire at base, hairy and glandulose on both sides, green. Inflorescence at first dense, later loose, many-flowered; flowers 15—20 mm in diameter; calyx slightly accrescent after flowering, outer sepals oblong-linear, obtuse, inner sepals usually as long as the outer, ovate, acute; petals ovate, slightly emarginate, as long as sepals or slightly longer, yellow; stamens 20, with small ovate anthers; receptacle large, conoid, hairy; fruitlets numerous, oblong-ovoid, nearly smooth; style sub-terminal, shorter than fruitlets, strongly thickened at base and covered with elongated papillae, with dilated stigma. June—August.

Mountain steppes and meadows, alpine gravel. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. **Gen. distr.:** N. Mong., W. Him., British Ind. Described from Arkat Mountain in Altai. Type in Leningrad.

92. *P. arnavatensis* T. Wolf, in sched. olim. — *P. desertorum* var. *arnavatensis* T. Wolf, Mon. Pot. (1908) 417. — Ic.: T. Wolf, l. c., tab. XII, f. 2.

Perennial; stems more delicate than in *P. desertorum* Bge., like the whole plant densely grayish-pubescent with simple hairs, without or only with few glands; radical leaves much smaller, leaflets 1—2 cm long, broadly obovate, shortly cuneate at base, thick, with strongly prominent veins beneath crenulate-dentate, with small and dense rounded teeth; fruitlets rugose. Otherwise, resembling *P. desertorum* Bge. June—July.

Mountain steppes and pastures, stony taluses and slopes. — Centr. Asia: Pam.-Al. **Gen. distr.:** Ind.-Him. (Kashmir). Described from the edges of the Arnavat glacier in Darvaza. Type in Leningrad.

93. *P. bungei* Boiss., Fl. Or. II (1872) 718, excl. var. *buhsei*; T. Wolf, Mon. Pot. (1908) 417, excl. var.; Grossg., Fl. Kavk. IV (1934) 317.

Perennial; caudex sturdy, developing many crowded reduced shoots; stems 5–15 cm high, ascending or suberect, thin, few-leaved, nearly simple, densely covered — like petioles, pedicels and calyx — with soft spreading hairs the longest being sessile on small tubercles; radical and lower cauline leaves long-petioled, quinate, orbicular in outline; stipules of lower leaves with lanceolate auricles, stipules of cauline leaves small, ovate-lanceolate; leaflets sessile or subsessile, broadly obovate, short-cuneate and entire at base, obtusely crenulate-dentate, densely spreading-hairy on both sides, dirty yellowish green. Inflorescence few-flowered; flowers short-pedicel, 10–15 mm in diameter; sepals obtuse or short-acuminate, outer sepals elliptic, the inner much larger, broadly ovate; petals about as long as sepals, obovate, slightly emarginate; stamens 20, with small ovate anthers; receptacle conoid, slightly hairy; fruitlets oblong-ovoid, finely rugose, whitish; style subterminal, as long as fruitlets, thickened and tuberculate at base and with dilated stigma. June–July.

Mountains. — Caucasus: S. Transc. (Zangezur). **Gen. distr.:** N. Iran. Described from N. Iran (Siaret). Type in Geneva (?).

Note. Cited for Transcaucasia from A. A. Grossheim's Flora of the Caucasus; we have not seen the material. In any case, the Transcaucasian plant should be carefully compared with the N. Iranian one, since this taxon apparently combines a number of geographical forms. Besides the typical *P. bungei*, *P. leucopsis* Bornm. from Elbrus and *P. hartmanniana* T. Wolf from N. Syria are also known.

Section 7. **PERSICAE** T. Wolf in Bull. Herb. Boiss., Ser. 2, VI (1906) 612; Mon. Pot. (1908) 421. — Low perennial plants, without tomentose pubescence, with well developed rosette of radical leaves; leaves pinnate or palmately quinate or pinnate-palmate, never ternate. Style thin, filiform, long, twice to three times as long as mature fruitlets, thickened short-conoid, at base.

94. *P. raddeana* Juz. sotv. nov. — *P. argaea* var. *raddeana* T. Wolf, Mon. Pot. (1908) 427. — Ic.: T. Wolf, l. c., p. 422, f. 12a (folium).

Perennial; caudex thick, multicipital, densely covered with brown relics of stipules; stems 3–8 cm long, thin, prostrate, simple or furcately branching, 1–5-flowered, moderately pubescent like petioles, pedicels and calyx, more or less densely finely glandulose; radical leaves short-petioled, oblong-linear in outline, pinnate, with 5–9-pairs of lateral leaflets, stipules large, scarious, red-brown, with small lanceolate auricles; cauline leaves few, with 2 pairs of lateral leaflets or ternate, stipules broadly ovate, obtuse, entire; leaflets up to 10 mm long and 5–7 mm wide, irregularly disposed, some remote (the lower), some adjacent (the upper leaflets), often arranged in 4's forming a whorl, or alternate, distinctly petioluled, cuneately obovate, the larger leaflets pinnatisect or pinnate with secondary lobes, sessile or petioluled, less deeply pinnatifid into linear obtuse lobules, all leaflets densely appressed-hairy on both sides and slightly glandulose, green or slightly ash-gray. Flowers short-pedicel, 12–15 mm in diameter; sepals nearly equal in length, the outer elliptic, obtuse, the inner ovate, acute; petals broadly obovate, emarginate, one and a half times as long as calyx, golden yellow; stamens 20, with long filaments and small orbicular anthers;

receptacle subconoid, hairy; fruitlets few, smooth; style subterminal, thickened at base, strongly elongated, with dilated stigma twice as long as fruitlets. May-July.

Alpine, usually stony meadows and pastures. — Caucasus: E. Transc. (Karabakh), S. Transc. (Alagez, Ararat). Endemic. Described from Alagez Mountain and Karabakh (Kapudschik, Karagil), paratype from Ararat. Type in Leningrad.

Note. A race related to *P. argaea* Boiss. et Bal. of Iran, namely *P. savelanica* Bienert (which Wolf referred to *P. argaea*), was described from Asia Minor (Cappadocia).

The Iranian *P. elvendensis* (*ellwindensis*) Boiss., which slightly resembles *P. raddeana* and is reported from Ciscaucasia by Wolf (Grossheim, Fl. Kavk. IV, 1934, p. 309), is in fact not encountered in the Soviet Union; the specimen recorded by Wolf is preserved at the Herbarium of the Academy of Sciences and is represented by a rosette of leaves of *Carum caucasicum* with the attached stem of *P. gelida* C. A. M. (sic!).

95. *P. flabellata* Rgl. et Schmalh. Pl. nov. Fedtsch. in A. Fedtschenko, Fedtschenko, Puteshestvie v Turkestan III (1882) 24; T. Wolf, Mon. Pot. (1908) 428. — *P. flabellata* var. *multisecta* T. Wolf, Mon. Pot. (1908) 429. — Ic.: T. Wolf, l. c., tab. XIV, f. 3.

Perennial; caudex multicipital, covered in upper part with relics of stipules; stems prostrate or ascending, arranged in a circle with a rosette of radical leaves in the center, like the petioles and pedicels slightly hairy, often with a mixture of sessile glands; radical and lower cauline leaves rather long-petioled, palmate-pinnate, with 3 pairs of lateral leaflets, upper cauline leaves short-petioled, ternate; stipules of cauline leaves large, broadly ovate, entire or usually with 2-5 obtuse teeth; terminal leaflet petiolulate, upper lateral leaflets decurrent, often confluent at base with terminal leaflet, leaflets of middle pair remote from the three upper, petiolate, the lowermost united to median leaflets, much smaller than others; all leaflets slightly fleshy, cuneately and broadly obovate in outline, irregularly and flabelliformly incised-dentate, 2-3-lobed, segments completely obtuse; leaves green on both sides, very slightly hairy or glabrescent. Inflorescence few-flowered, compressed; flowers short-pedicel, 6-8 mm in diameter; hypanthium and calyx hairy; outer sepals broadly elliptic, obtuse, inner sepals longer than the outer, ovate-lanceolate, acute; petals obovate, emarginate, nearly as long as sepals, yellow; filaments long, anthers small, ovate; fruitlets large, oblong-ovoid, slightly rugose; style much longer than fruitlets. July-August.

Alpine zone. — Centr. Asia: Pam.-Al. (Tadzhikistan, Uzbekistan). Described from Mura Pass. Type in Tashkent, cotype in Leningrad.

96. *P. pamirica* T. Wolf in A. H. P. XXXI (1915) 489.

Perennial; caudex thick, multicipital, developing congested shoots forming tufts, covered with brown relics of radical leaves; stems lateral, ascending, 3-8 cm long, slightly leafy, nearly simple, 1-5-flowered, appressed-hairy, silky-grayish, eglandulose; radical leaves slightly fleshy, small, long-petioled, 3-4-paripinnate; leaflets cuneately obovate, stipules scarious, brown, oblong, with obtuse auricles; cauline leaves with 1-2 pairs of leaflets, stipules oblong, acute; leaflets sessile, the three upper oblong-ovate, much

shorter than others, decurrent, pinnatipartite nearly to midrib, segments oblong-obovate, obtuse, two lower leaflets 5-sect, the following two 2-3-sect, the lowermost small, entire, all leaflets — like the whole plant — densely silky, especially beneath, greenish above. Flowers on long thin pedicels; sepals ovate, acute, outer sepals oblong, linear, obtuse; petals broadly ovate, emarginate, much longer than sepals; anthers oblong-ovate; receptacle conoid, long-hairy; fruitlets oblong-ovoid; style verrucose-thickened at base, much longer than fruitlets; stigma large. June—July.

Centr. Asia: Pam.-Al. Endemic. Described from Alichur valley near Ak-Balyk. Type in Leningrad.

97. *P. komaroviana* T. Wolf, Mon. Pot. (1908) 436. — Ic.: T. Wolf, l. c., tab. XIII, f. 1.

178 Perennial; caudex sturdy, covered with brown relics of stipules, developing several lateral prostrate stems and central rosette of radical leaves; stems 10–15 cm long, very leafy, spreading-branching, covered like petioles and pedicels with short hairs mixed with longer spreading hairs; lower leaves with rather long and thin petioles, usually quinate; upper cauline leaves short-petioled, ternate; stipules of cauline leaves ovate, acute, entire; leaflets sessile, oblong or oblong-lanceolate, cuneate, with 3–5 oblong ovate, acute to rather obtuse teeth at each side, appressed-silky-hairy on both sides (more dense beneath), pale green. Flowers in loose few-flowered inflorescence, on pedicels varying in length, 10–15 mm in diameter; calyx slightly villous, outer sepals oblong-linear, obtuse, inner sepals twice as long as outer, ovate-lanceolate, acute; petals obovate, emarginate, hardly longer than calyx, yellow; filaments long, anthers ovate; fruitlets ovoid; style more than twice as long as fruitlets. July.

Open mountain slopes. — Centr. Asia: Pam.-Al. (Zeravshan), Mtn. Turkm. (Kopet-Dagh). Endemic? Described from Shut (Kashka-Darya River). Type in Leningrad.

98. *P. ruprechtii* Boiss., Fl. Or. II (1872) 716; T. Wolf, Mon. Pot. (1908) 440.

Perennial; caudex sturdy, multicapital, developing short shoots, covered with brown relics of stipules; stems 5–20 cm long, ascending to suberect, usually just slightly exceeding radical leaves in length, sparingly spreading-hairy or glabrescent, with few sessile and short-stalked glands; radical leaves rather long-petioled, quinate, cauline leaves ternate; stipules large, scarious, broadly ovate, obtuse; leaflets nearly sessile, thick, cuneate and entire at base, crenulate-dentate, with 4–7 obtuse proximate teeth at each side, glabrous and remotely glandulose on both sides, sparsely ciliate at margin only. Inflorescence loosely corymbiform, 3–7-flowered; flowers on pedicels varying in length, ca. 18 mm in diameter; calyx somewhat accrescent after flowering; sepals subequal at flowering, outer sepals broadly elliptic, the inner ovate, obtuse, longer than the outer after flowering (sometimes the outer longer than the inner); petals twice as long as sepals, broadly obovate, emarginate, yellow; stamens 20, with long filaments and small subreniform anthers; receptacle conoid, hairy; fruitlets ovoid, smooth, converging, longitudinally slightly striate; style subterminal, much longer than fruitlets, slightly thickened at base, filiform, with strongly dilated stigma. June–August.

Alpine zone, 2,500–3,000 m (alpine meadows and pastures).— Caucasus: Cisc., Dag., E. and W. Transc. Endemic. Described from Mamison, Rachinsk District above the village of Kalaka. Type In Geneva.

99. *P. porphyrantha* Juz. in Not. Syst. ex Herb. Inst. Bot. Ac. Sc. USSR (1940) 48.

179 Perennial, small, silky-white plant; caudex thick, multicapital, covered above with relics of stipules; stems 6–15 cm high, ascending, rather delicate, few-leaved, more or less loosely branching in upper part, densely pubescent — like petioles — with short hairs and longer, thin, crisp ones; radical leaves long-petioled, quinate, leaflets distinctly petioluled, rather thick, broadly and cuneately obovate or subrhombic, entire at base, rounded at apex or rarely obtusely angled, deeply (up to three-fourths) pinnatisect-dentate, with 3–4 oblong obtuse teeth (segments) at each side, terminal tooth slightly longer than the neighboring, densely covered on both sides with fine white appressed hairs, slightly silky-glossy; cauline leaves ternate, leaflets rhombic, stipules small, ovate-lanceolate or lanceolate, obtuse or acute. Flowers a few to 15 in inflorescence, rather long-pedicelled, 10–15 mm in diameter; hypanthium with calyx 7–9 mm long, silky-villous; outer sepals linear-lanceolate, obtuse, shorter than the ovate-lanceolate, acute, inner sepals; petals cuneately obovate, notchless distinctly longer than sepals, purple with dark purple veins; stamens red, filaments long, anthers ovate; fruitlets few, obliquely ovoid, rugose; style red, one and a half times longer than fruitlets. July.

Rocks.— Caucasus: S. Transc. Endemic? Described from Kechal-Dagh Mountain. Type in Leningrad.

100. *P. cryptophila* Bornm. in Bull. Herb. Boiss. Ser.2, VI (1906) 614; T. Wolf, Mon. Pot. (1908) 442.— Ic.: Bornm., l. c., tab. 16; T. Wolf, l. c., Tab. XIV, f. 1.

Similar to the preceding species from which it is distinguished by the sessile or subsessile leaflets, being truncate at apex, the fan-shaped arrangement of teeth, the outer sepals half as long as the inner, the petals emarginate at apex, and generally being white with thin purple veins. June–July.

Rock crevices, stony slopes.— Caucasus: reported for Tal. **Gen. distr.:** Iran. Described from the western part of the Elburz, in the vicinity of Asadbar on Gerdene Bary Range. Type probably in Berlin.

Note. We have not seen specimens of this plant from the Caucasus; A. A. Grosheim contends that it was found in Talysh (Zuvant) (oral communication).

Section 8. **GRANDIFLORAE** T. Wolf in Asch. u. Graebn., Syn. VI (1904) 671; Mon. Pot. (1908) 444.— Stems firm, erect from ascending base, branching above, usually few-flowered; radical leaves ternate or quinate, leaflets usually more or less thick, distinctly veined. Inflorescence usually few-flowered; style more or less thick, thickened at base, gradually attenuate, one and a half times as long as mature fruitlets; stigma usually slightly thickened.

101. *P. umbrosa* Stev. in M. B., Fl. taur.-cauc. III Suppl. (1819) 357; Ldb., Fl. Ross. II, 53; T. Wolf, Mon. Pot. 453.— Ic.: Lehm., Rev. Pot. (1856) tab. 35.— Exs.: Callier, It. taur. tert. 1900, No. 594.

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Perennial; caudex thick, multicapital, covered with brown relics of stipules; stems 20–50 cm high, thick, arcuately ascending to suberect, like the whole plant copiously finely glandulose, (very fragrant in living state), covered with straightly spreading hairs, loosely branching in upper part; radical leaves large, long-petioled, quinate; three upper leaflets long-petioluled, lower lateral leaflets subsessile, oblong-obovate, cuneate and entire at base, rounded at apex, with (8)9–12 straightly spreading, subequal, small and shallow, straight obtuse teeth at both sides, green on both sides, sparingly hairy above, more densely hairy beneath along veins; cauline leaves ternate, with oblong-cuneate leaflets, acutely large-toothed upwards; stipules very large, oblong-ovate-lanceolate, acute or subobtuse, entire. Inflorescence very loose, narrow, with long, suberect branches; flowers large, ca. 3 cm in diameter; sepals ovate, obtuse, the outer slightly shorter and narrower than the inner; petals obovate, nearly twice as long as sepals, golden yellow; filaments long, anthers short-ovate; fruitlets oblong-ovoid, nearly smooth; style longer than fruitlets. June–July. (Plate XIV, Figure 1).

Mountain meadows, often at foot of slopes.— European part: Crim. Endemic. Described from Chatyr-Dag Mountain. Type in Helsingfors.

102. *P. nordmanniana* Ldb., Fl. Ross II (1844) 53; Grossh., Fl. Kavk. IV, 311.— *P. umbrosa* var. *minor* Lehm., Rev. Pot. (1856) 90; T. Wolf, Mon. Pot. (1908) 454.— *P. umbrosaeformis* Siegf. et Alb. ex Kell. in Bull. Herb. Boiss. II (1894) 641.

Perennial, 10–32 cm high; hairs simple, weaker and less appressed, glandular pubescence much less conspicuous than in *P. umbrosa*; leaflets of radical leaves shortly obovate, large, deeply incised-dentate, with obtuse or rounded teeth, often slightly spreading at tip, 4–8 at each side of leaflet; cauline leaves with obovate leaflets and fewer teeth, 3–5 at each side. Branches of inflorescence shorter than in *P. umbrosa*; flowers smaller, ca. 17 mm in diameter. Otherwise similar to *P. umbrosa*. June–July.

Alpine mountain zone.— Caucasus: W. and E. Transc. Endemic. Described from Transcaucasia. Type in Leningrad.

Note. *P. umbrosaeformis* Siegf. et Alb., described from Mingrelia, might be a special race; our material on this taxon is inadequate.

Section 9. **CHRYSANTHAE** T. Wolf in Asch. u. Graebn., Syn. VI (1904) 671; Mon. Pot. (1908) 455.— Stems weak, flexuous, ascending, dichasially branching from the upper two-thirds or half; radical leaves palmately 5–9-paired, leaflets usually thin, indistinctly veined. Inflorescence often many-flowered; pedicels thin, often reflexed after flowering; style thick, shorter than or as long as mature fruitlets, often covered with papillae; stigma broad.

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103. *P. chrysantha* Trev., Ind. Sem. Hort. Vratisl. (1818) 5; Ldb., Fl. Ross. II 49; T. Wolf, Mon. Pot. (1908) 458; Kryl., Fl. Zap. Sib. VII (1935) 1516.— *P. chrysantha* var. *normalis* T. Wolf, l.c., 460.— *P. chrysantha* var. *macrophylla* Lehm., Sem. Hort. Hamb. (1850) 7.

Perennial; caudex sturdy, multicapital, developing short shoots loosely covered with brown relics of stipules; stems thin, ascending, (10)15–30(40) cm long, few-leaved, loosely dichasially branching in upper half or at summit, covered like petioles and pedicels with short down and longer spreading hairs, more or less densely glandulose or eglandulose; radical and lower cauline leaves long-petioled, quinate, sometimes mixed with few 6–7-paired leaves; median cauline leaves quinate, the upper ternate, short-petioled or sessile; stipules of radical leaves scarious, with ovate-lanceolate acute auricles, stipules of cauline leaves broadly ovate at base, acuminate or ovate-lanceolate, entire; leaflets of lower leaves obovate, oblong-obovate, elliptic or oblong-lanceolate, serrate-dentate, with 5–10 obtuse teeth at each side, more or less spreading-hairy on both sides, green. Inflorescence often leafy; flowers many, large or rather small; pedicels long, thin, usually declinate after flowering; outer sepals narrow, oblong or linear, obtuse, inner sepals, lanceolate or ovate-lanceolate, acute; petals broadly obovate, emarginate, one and a half to twice as long as calyx, golden yellow; stamens 20, filaments rather long, anthers oblong; receptacle subglobose, slightly hairy; fruitlets ovoid, finely rugose, somewhat carinate; style sub-terminal, slightly thickened at base, with rather dilated stigma, shorter than fruitlets. May–July. (Plate XIV, Figure 2).

Meadows, meadow slopes, thinned-out forests, forest edges. — European part: V.-Kama (Urals); W. Siberia: Ob, Alt., Irt.; E. Siberia: Ang.-Say., Dau.; Centr. Asia: Dzu.-Tarb. **Gen. distr.:** Centr. Eur. (Hungary), Bal.-As. Min. (Yugoslavia). Described from cultivated specimen. Type unknown.

Note. A species-aggregate; for the time being we have separated only two of the more distinct forms (see below). Soviet forms of *P. chrysantha* are rather doubtfully identified with the European ones.

104. *P. holopetala* Turcz. in Bull. Soc. Nat. Mosc. XVI (1843) 612. — *P. chrysantha* var. *holopetala* Ldb., Fl. Ross. II (1844) 49; T. Wolf, Mon. Pot. (1908) 461.

82 Perennial, delicate plant, 30–40 cm high; stems few-leaved, like petioles densely spreading-hairy; leaflets with many acute teeth, very densely hairy beneath, somewhat silky. Inflorescence compressedly corymbiform-paniculate; sepals often 1-toothed at each side; petals barely longer than sepals, notchless at apex. Otherwise similar to *P. chrysantha* Trev. June–July.

Riverbanks? — E. Siberia: Dau. Endemic. Described from Buguldeikha. Type in Leningrad.

105. *P. asiatica* Juz. comb. nova. — *P. chrysantha* var. *asiatica* T. Wolf, Mon. Pot. (1908) 462. — Ic.: Ldb., Ic. Fl. Ross. IV (1833) 338.

Perennial; stems straight, 30–50 cm high, ascending or nearly erect, few-leaved, rather sparsely covered with appressed or straight-spreading, short and long, whitish hairs. Flowers often large; petals much longer than sepals. Otherwise like *P. chrysantha* Trev. June–July.

Mountains. — W. Siberia: Alt.? Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. **Gen. distr.:** Dzu.-Kash. Described from Tien Shan. Type in Leningrad.

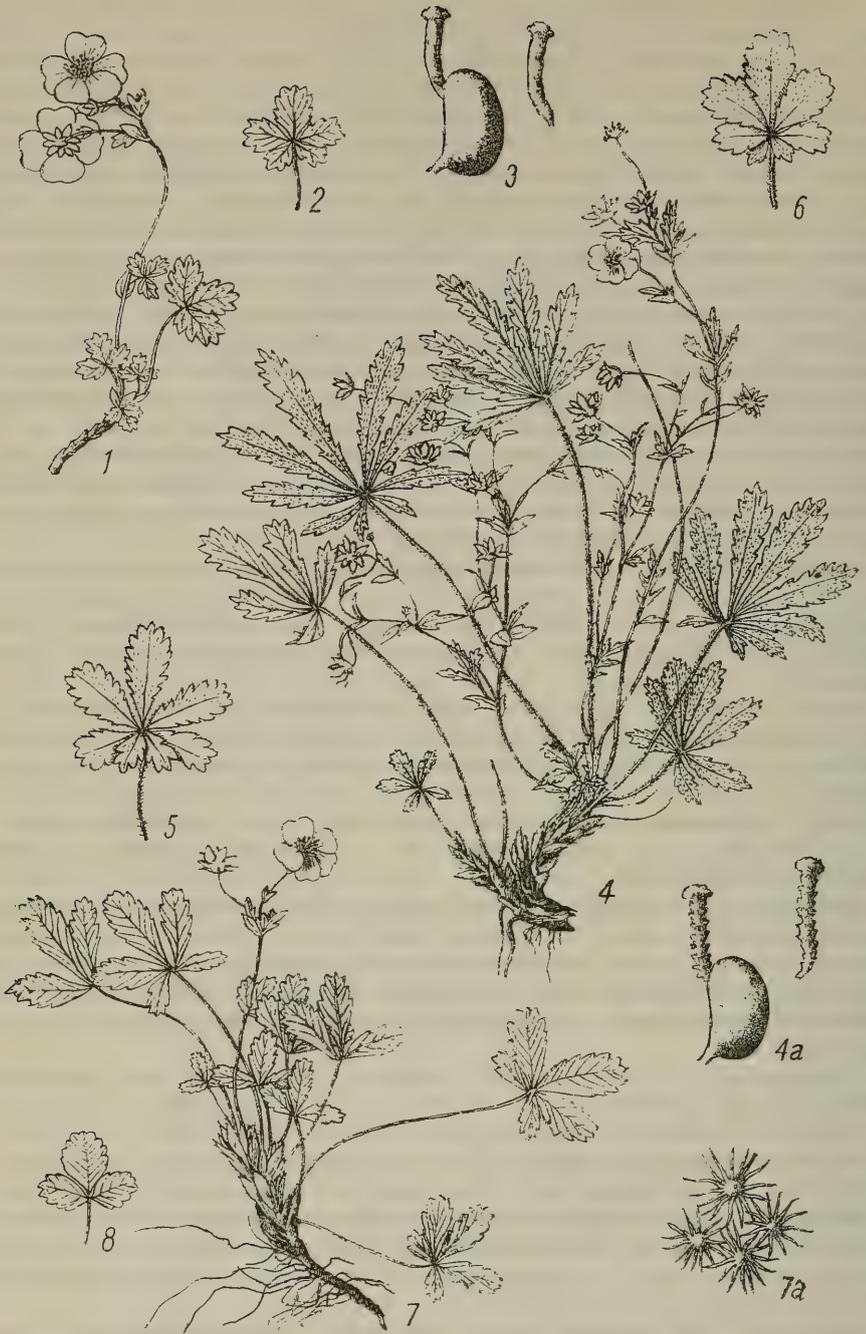


PLATE XV. 1 - *Potentilla gelida* C.A.M., general view; 2 - *P. crantzii* (Crantz) Beck, leaves; 3 - *P. heptaphylla* L., fruit and style; 4 - *P. humifusa* Willd., general view; a) fruit and style; 5 - *P. adenophylla* Boiss., leaves; 6 - *P. depressa* Willd., leaves; 7 - *P. glaucescens* Willd., general view, a) stellate hairs; 8 - *P. acaulis* L., leaves.

106. *P. goldbachii* Rupr., Fl. Ingr. I (1860) 319; Petunnikov in A. H. P. XIV (1895) 22.— *P. elongata* Goldb. in Flora III (1820) 20, nomen solum, non Bess.— *P. thuringiaca* auct. mult. fl. Ross., non Bernh.— *P. thuringiaca* var. *elongata* T. Wolf, Mon. Pot. (1908) 466.— ? *P. nestleriana* auct. Fl. Ross. p. p., vix autem Tratt.— Ic.: Petunnik., l. c., tab. IV.— Exs.: HFR No. 666, 2171, 2172.

Perennial; rootstock sturdy, multicipital; stems 15–50 cm high, firm, ascending, few-leaved, branching from middle, developing loose dichasial inflorescence; covered — like petioles, branches of inflorescence and pedicels — with short and long spreading hairs, usually reddening; radical and lower cauline leaves long-petioled, large, usually septenate mixed with quinate; stipules of radical leaves scarious, with large lanceolate acuminate auricles, stipules of cauline leaves broadly ovate, acute, entire or often dentate; upper cauline leaves quinate and ternate; leaflets of lower leaves usually sessile, oblong-obovate or ovate-lanceolate, widest in the middle, tapering at both ends, short-cuneate at base, deeply incised-dentate; teeth many, acute or obtuse in upper part of leaflets, rather densely hairy beneath, sparsely so above, green, paler beneath. Flowers very long-pedicel, rather large; sepals nearly equal in length, lanceolate, acute, the outer much narrower than the inner; petals broadly obovate, emarginate, longer than sepals, golden yellow; stamens 20, with rather long filaments and oblong-ovate anthers; achenes oblong-ovoid, rugose, indistinctly carinate; style subterminal, barely thickened at base, slightly shorter than mature achene. June–July. (Plate XIV, Figure 4).

Thinned-out forests and forest edges, felled areas, shrubby formations, meadows and other grassy places, rarely in fields.— European part: Kar.-Lap., Lad.-Ilm., U. V., V.-Kama, U. Dnp., M. Dnp., V.-Don, Transv.; W. Siberia: Ob. Gen. distr.: Scand., Centr. Eur. (eastern part). Described from the environs of Moscow. Type in Leningrad.

Note. The related species *P. nestleriana* Tratt. (usually under the name *P. thuringiaca* var. *nestleriana* Schinz et Keller) is erroneously reported from certain parts of the distribution area of *P. goldbachii* Rupr. and *P. caucasica*.

107. *P. caucasica* Juz. nov. spec. in Addenda IX, p. 453.— *P. thuringiaca* var. (vel. f.) *caucasica* T. Wolf, in sched.— *P. thuringiaca* f. *villosa* Kell. et Siegf. in Engl. Bot. Jahrb. XIV (1892) 508.

Perennial, very similar to *P. goldbachii* Rupr., from which it is slightly distinguished by its lower stems, rather broadly obovate leaflets, drooping pedicels in fruit, and obtuse sepals. June–July.

Mountains: Caucasus: Cisc., W. and E. Transc. Endemic. Described from Abkhazia. Type in Leningrad.

Note. This is apparently not the only form of *P. thuringiaca* s. l. in the Caucasus: however, the material of this complex that we have at hand is very inadequate. The entire group requires critical study.

108. *P. szovitsii* T. Wolf, Mon. Pot. (1908) 471.

Perennial; caudex sturdy, multicipital; stems suberect, 30–50 cm high, more or less thick, leafy, dichasially branching in upper part with nearly

erect branches, like petioles and pedicels rather densely soft-hairy and somewhat short-pubescent; radical and lower cauline leaves long-petioled, septenate, upper cauline leaves quinate, bracts ternate; stipules of lower leaves with long lanceolate auricles; cauline leaves broadly ovate, often 1-2-toothed; leaflets sessile, broadly obovate or oblong-obovate, 2.5 cm long, entire and cuneate at base and with 5-6 ovate or lanceolate, straight, obtuse or acute teeth at each side, terminal tooth smaller and shorter than the lateral; leaflets of cauline leaves oblong, tapering at apex; all leaflets green on both sides, appressed-hairy, with long white hairs along nerves and margin. Inflorescence loosely corymbiform-paniculate; pedicels short, erect in fruit; flowers ca. 15 mm in diameter; sepals equal, lanceolate, acute; petals barely longer than sepals, obovate, emarginate; filaments short, anthers rather large, oblong; receptacle large, very hairy; fruitlets oblong-ovoid, smooth; style thickened at base, gradually attenuate, about as long as fruitlets. Fl. June.

Hills, stony places. — Caucasus: S. Transc. Gen. distr.: Iran. Described from Nakhichevan District. Type in Leningrad.

109. *P. sphenophylla* T. Wolf, Mon. Pot. (1908) 472.

Perennial; caudex multicipital, covered with grayish brown relics of stipules; stems thin, slightly flexuous, erect or ascending, 8-15 cm high, few-leaved, few-flowered (1-7), covered like petioles, pedicels and calyx with short or longer white straightly spreading or appressed hairs; radical leaves long-petioled, 7-paired, mixed with 5-paired, cauline leaves 5-paired, with shorter petioles, floral leaves ternate and simple; stipules of radical leaves scarious, with small lanceolate auricles; stipules of cauline leaves broadly ovate, acute, entire; leaflets sessile or very short-petioluled, narrow, obovate-cuneate, gradually dilating upwards, obtuse or rounded at apex with few (ca. 3 at each side) short, acute or obtuse teeth, green on both sides, appressedly-hairy. Flowers long-pedicel, 15-18 mm in diameter; outer sepals linear-oblong, obtuse, much shorter than the ovate-lanceolate acute inner; petals broadly ovate, slightly emarginate, one and a half times as long as calyx, golden yellow; stamens 20, with oblong-ovate anthers; receptacle small, flattened-subglobose, hairy; fruitlets oblong-ovoid, finely rugose, keelless, whitish; style subterminal, slightly thickened at base, with slightly dilated stigma, nearly as long as mature fruitlets. May.

Caucasus: W. Transc. Endemic. Described from Novorossiisk. Type in Leningrad.

110. *P. orbiculata* T. Wolf, Mon. Pot. (1908) 473. — Ic.: T. Wolf, l. c., tab. XVI, f. 2.

Perennial; caudex rather thick, multicipital, densely covered above with grayish brown relics of stipules; stems thin, ascending, 15-20 cm long, loosely branching from middle, branches elongate, rather densely covered — like petioles, pedicels and calyx — with short and longer spreading or ascending hairs, glandless; radical and lower cauline leaves short-petioled, septenate, upper cauline leaves quinate and ternate; stipules of radical leaves with linear-lanceolate acuminate auricles, stipules of cauline leaves ovate-lanceolate, entire; leaflets of lower leaves broadly obovate, shortly cuneate at base, rounded or obtuse at apex, larger, 10-12 mm long, confluent or partly

overlapping at margin so that leaf appears orbicular or reniform in outline, serrate at upper half, with 4-5 very proximate acute straight teeth at each side, densely appressed-hairy on both sides but especially beneath, grayish-silky when young. Inflorescence dichasially branching, with elongate few-flowered branches; flowers long- and thin-pedicel, 10-12 mm in diameter; outer sepals ovate-lanceolate, obtuse, hardly as long as the ovate-lanceolate acute inner sepals; petals obovate, emarginate, just slightly longer than sepals, golden yellow; stamens 20, with short filaments and small oblong-ovate anthers; receptacle flattened-subglobose, hairy; fruitlets few, oblong-ovoid; style subterminal, strongly thickened at base and covered with papillae, stigma slightly dilated. June.

Mountain meadows, pine forests, taluses. — Caucasus: Cisc.? Dag.? W. Transc. Endemic? Described from the western slope of Sumari Range (Malitskaya village, now Molita). Type in Geneva, cotype in Leningrad.

111. *P. longipes* Ldb., Fl. Ross. II (1844) 50; Lehm., Rev. Pot. 88; T. Wolf, Mon. Pot. 474; Kryl, Fl. Zap. Sib. VII (1933) 1518. — Ic.: Lehm., l. c., tab. 36.

Perennial, 20-40 cm high; rootstock somewhat thickened, covered with few dried stipules; stems erect, tall, branching in upper part, usually many-flowered, pale yellow, covered with small but easily seen rigid spreading bristles; radical leaves with long thin petioles, septenate, stipules with small lanceolate auricles; lower cauline leaves with much shorter petioles, quinate, upper cauline leaves ternate and simple, sessile; stipules of cauline leaves ovate-lanceolate, acuminate, entire or 1-2-toothed; leaflets of lower leaves sessile or short-petioluled oblong, with 4-7 large acute remote teeth at each side, glabrous above, slightly hairy beneath, ciliate at margin. Flowers small, on long thin pedicels; calyx rather densely hairy, sepals nearly equal in length, the outer linear-lanceolate, obtuse, the inner ovate-lanceolate, acuminate; petals obovate, emarginate, longer than sepals; stamens 20, filaments short, anthers small, ovate; achenes oblong-ovoid, slightly rugose, weakly keeled dorsally; style subterminal, thickened at base, nearly as long as mature achenes. May-June. (Plate XIV, Figure 3).

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Steppes, meadows, grassy and shrubby slopes. — European part: V.-Kama, Transv., V.-Don; W. Siberia: U. Tob.; Centr. Asia: Dzu.-Tarb. Endemic. Described from the Lessing expedition (from "Russia"). Type in Berlin.

112. *P. schrenkiana* Rgl. in Annal. d. sc. nat. ser. 4, XII (1859) 379; T. Wolf, Mon. Pot. (1908) 476.

Perennial; stems erect or ascending, canescent with dense long spreading hairs, glandless; lower leaves usually quinate, upper cauline leaves ternate or almost simple, glabrescent above, hairy beneath along veins, ciliate at margin; leaflets narrow, cuneate, oblong-lanceolate, those of radical leaves slightly wider, incised-dentate, with 1-7 teeth at each side (leaflets of upper cauline leaves often entire). Calyx 15-18 mm in diameter, villous, sepals ovate-lanceolate, long-acuminate, outer sepals equal to inner, linear-lanceolate; petals obcordate, about as long as sepals; fruitlets finely rugose, distinctly keeled.

Centr. Asia: Dzu.-Tarb. Reported earlier from Pam.-Al. (Zeravshan), but this record probably refers to some other species. Endemic. Described from Tarbagatai (from cultivated specimens).

Note. A little known species, based upon cultivated specimens and requiring critical study.

113. *P. adscharica* Somm. et Lev. apud R. Keller in Engl. Bot. Jahrb. XIV (1891–1892) 509. — *P. adscharica* var. *trichosepala* T. Wolf; Mon. Pot. (1903) 481. — Exs.: Siegfr. No. 654 (cult.).

Perennial; caudex thick; stems sturdy, up to 50 cm high, ascending, covered with short crisp hairs and long spreading ones without glands, dichasially branching from upper half; lower radical leaves long-petioled, quinate, withering at flowering, upper cauline leaves ternate with narrower leaflets; stipules of cauline leaves ovate-lanceolate, acute, usually entire; leaflets obovate-cuneate, obtuse, large, ca. 4 cm long and 2 cm wide, incised-serrate in upper half, with 4–5 teeth at each side, the terminal smaller, sparsely ciliate at margin, covered with long appressed hairs, especially beneath along nerves. Inflorescence corymbiform-paniculate, many-flowered, with branches divaricate, rather long, straight. Flowers ca. 2 cm in diameter on rather long pedicels erect in fruit; sepals subequal, ovate-lanceolate, acute, sparsely and spreadingly ciliate-pubescent along margin; outer sepals tapering at base, more pubescent than inner sepals; calyx prominently netted-veined, especially at base, sepals strongly enlarged in fruit (ca. 12 mm long); petals longer than sepals, obcordate, golden yellow; filaments long; fruitlets oblong-ovoid grayish brown, slightly keeled, style shorter than or nearly as long as fruitlets. June–July.

189 Forests, mountain meadows. — Caucasus: Cisc., E., S. and W. Transc. Gen. distr.: Iran. Described from Adzharia, between Batumi and Akhaltsikhe, Khulo village. Type in Florence.

Note. *P. iberica* Lehm. ex T. Wolf, Mon. Pot. (1908) 480 (= *P. adsharica* var. *gymnosepala* T. Wolf, l. c., p. 479), very closely related to this species, is distinguished by an erect stem, few-flowered inflorescence, more copious, rigid, long, bristly, subappressed hairs along margins of leaflets and sepals, and very wide, usually glabrous inner sepals; it is distributed mainly in Ciscaucasia, Dagestan, E. and S. Transcaucasia, where *P. adsharica* is more rare, even completely absent in some places; these taxa, however, are very distinctive geographically and morphologically. Both are extremely polymorphic; T. Wolf distinguished from them an entire series of varieties, obviously of insignificant taxonomic importance (with the exception of the especially strongly pubescent and villous-bristly *P. adsharica* var. *gymnosepala* f. *hirsutissima* T. Wolf, l. c., 480, common to Dagestan and Karabakh).

114. *P. lipskyana* T. Wolf, Mon. Pot. (1908) 483. — *P. lipskyana* var. *gigantea* T. Wolf, l. c., 484. — Ic.: T. Wolf, l. c., tab. XVII; W. Lipsky in A. H. P. XXVI (1909) tab. V, 2.

Perennial; caudex sturdy, multicapital, covered with relics of grayish brown stipules; stems erect or ascending, 25–40(50) cm high, dichasially branching from middle, leafy from base, developing thin, often rather long, few-flowered branches arranged in axils of basal cauline leaves, villous — like petioles, branches and inflorescence — with short and long hairs; radical and lower cauline leaves rather long-petioled, quinate, upper cauline leaves ternate, the uppermost simple, sessile; stipules of radical leaves

scarious, red-brown to grayish, with lanceolate auricles, stipules of cauline leaves herbaceous, ovate-lanceolate, acute or obtuse; leaflets of lower leaves sometimes shortly petioluled (at least the median), oblong, 2-3 (8 - in var. *gigantea*) cm long, strongly and irregularly incised-serrate nearly to base, with 4-5 oblong-lanceolate, acute or obtuse segments at each side, leaflets of upper cauline leaves much narrower, less deeply dentate; all leaflets green above, sparsely appressed-hairy, pale beneath, covered along veins and margin with long rigid spreading hairs, young leaves silky-villous. Inflorescence loosely paniculate, many-flowered; flowers long-pediceled, 15-18 mm in diameter; calyx villous, outer sepals oblong- or linear-lanceolate, obtuse or acute, usually much shorter than the ovate and acute inner sepals; petals broadly obovate, emarginate, longer than sepals, yellow; stamens 20, filaments long, anthers oblong; receptacle subconoid, hairy; fruitlets oblong-ovoid, smooth; style subterminal, conoid, thickened at base, gradually strongly constricting, slightly dilated toward stigma, longer than fruitlets. July-August.

Mountain slopes. - Centr. Asia: Pam.-Al. Endemic. Described from the Kupa-Kanyaz along Kanyaz River (Gissar). Type in Leningrad.

115. *P. sericata* T. Wolf, Mon. Pot. (1908) 484. - Ic.: T. Wolf, l. c., tab. XVI, fig. 1.

Perennial; caudex sturdy, developing crowded shoots, covered with grayish brown relics of stipules, bearing sterile rosettes of leaves; stems ascending, 10-20 cm high, slightly leafy, branching in upper part, more or less densely covered like petioles, pedicels and calyx with long appressed hairs; radical and lower cauline leaves long-petioled, quinate, upper cauline leaves ternate, short-petioled, uppermost leaves simple, sessile; stipules of radical leaves with acute lanceolate auricles, stipules of cauline leaves ovate-lanceolate, entire; leaflets sessile, palmately arranged, or sometimes the outer one or two slightly remote from the inner, cuneately obovate, 2-3 cm long and 1-1.5 cm wide, entire at base, incised-serrate above, with 4-7 oblong-lanceolate, acute or obtuse teeth at each side, sparsely appressed-hairy above, slightly silky-shiny, white-silky beneath with dense appressed white hairs. Inflorescence loosely semiumbelliform, few-flowered; flowers long-pediceled, large, ca. 25 mm in diameter; outer sepals oblong-lanceolate, inner sepals slightly longer than the outer, ovate-lanceolate, acute; petals large, twice as long as sepals, broadly obcordate, golden yellow; stamens 20, with rather large oblong anthers; receptacle conoid, hairy; fruitlets numerous, oblong-ovoid; style subterminal, hardly as long as fruitlets, thickened at base and covered with papillae, gradually attenuate above, with strongly dilated stigma. July-August.

Mountain meadows and slopes. - Centr. Asia: Pam.-Al. Endemic. Described from the source of Yagnob River near the Sang-Dara glacier and from the source of Baldzhuan River between the Khovaling Mountains and Chorab-Dara (E. Bukhara). Type and paratype in Leningrad.

Note. This species is unjustifiably placed in Wolf's system far from *P. chrysantha* Trev., to which it (more precisely to *P. asiatica* Juz.) is unquestionably closely related. Wolf described a distinctive var. *condensata* T. W. of this species from the upper reaches of the Amu-Darya. Sagyr-Dasht village; however, this is probably only a dwarf form with stems 2-5 cm high.

116. *P. tollii* Trautv. in A. H. P. X (1888) 507; T. Wolf. Mon. Pot. (1908) 486. — Ic.: T. Wolf, l. c., tab. XI, f. 2.

Perennial; caudex thin, multicapital, developing crowded shoots, densely covered with relics of stipules; stems 15–30 cm high, ascending or erect, somewhat leafy, much longer than radical leaves, simple or few-branched, sparsely covered — like petioles and branches of inflorescence — with long straight-spreading hairs and very small sessile and short-stalked glands; radical leaves rather long-petioled, ternate and quinate, cauline leaves reduced, subsessile, ternate and simple; stipules of radical leaves more or less rust-colored, with linear-lanceolate, subulate-acuminate stipules; stipules of cauline leaves small, lanceolate, acuminate; leaflets oblong-obovate, unequal, the median largest, short-petioluled, the outer smallest, sessile (like [sic] median leaflets), pectinately pinnatisect, with 3–5(7) very narrowly linear, revolute at margin lobes, glabrous and green above, glaucous beneath, long-ciliate at margin and along midrib and with small glands. Inflorescence 3–7-flowered; flowers thin-pedicelated, large, 18–20 mm in diameter; calyx hairy and glandulose, outer sepals oblong-linear, obtuse, inner sepals hardly as long as the outer, lanceolate, acute; petals twice as long as sepals, orbicular-obovate, deeply emarginate, yellow; stamens 20, filaments short, anthers small, orbicular-ovate; receptacle conoid, hairy; fruitlets oblong-ovoid, smooth; style subterminal, slightly shorter than fruitlets, thickened at base, covered with short papillae, distinctly attenuate above but strongly dilated toward stigma. June–July.

Habitat unknown. — E. Siberia: Lena-Kol. Endemic. Described from the Yana, Khaiban-Kalakh and Iktyr-Khaya rivers. Type and paratype in Leningrad.

Note. This plant, discovered by A. Bunge (Jr.) in 1885, was not collected for many years until recently found again by M. I. Yarov.

117. *P. anadyrensis* Juz. nov. spec. in Addenda IX, p. 454.

192 Perennial; caudex thin, developing elongated shoots forming loose tufts, covered with grayish brown relics of stipules; stems 6–30 cm high, slender, ascending, few-leaved, much longer than radical leaves, few-branched at apex, few-flowered, densely covered — like petioles and branches of inflorescence — with very short and spreading hairs, mixed with very fine short-stalked glands, visible only under magnification; radical leaves long-petioled, ternate, lower cauline leaves with shorter petioles, uppermost leaves sessile; stipules of radical leaves scarious, with lanceolate, acute auricles; stipules of cauline leaves long, linear-lanceolate; leaflets oblong-obovate in outline, narrowly cuneate at base, nearly equal in size, short-petioluled, deeply (down to three-fourths) pinnatisect, with 3–4 lanceolate or linear-lanceolate, straightly spreading, revolute at margin lobes, green above, with very small sessile glands or glabrous (when mature), velutinous beneath of very dense, extremely short spreading hairs, with prominent lateral veins. Inflorescence 2–5-flowered; flowers on very thin rather long pedicels, 12–18 mm in diameter; calyx very short-hairy, finely glandulose; outer sepals oblong-linear, obtuse, inner sepals much longer, ovate-lanceolate, acute; petals nearly one and a half to twice as long as sepals, obcordate, deeply emarginate, yellow; stamens 20, with short filaments and small broadly-ovate anthers; receptacle conoid, hairy; fruitlets ovoid,

smooth; style subterminal, about as long as fruitlets, thickened at base, attenuate above, slightly dilated near stigma. June–July.

Rocks.—Arctic: An. Endemic. Described from the Anadyr River basin, Opalennye Mountains. Type in Leningrad.

Note. Readily distinguished from *P. tollii* Trautv. by the characteristic pubescence of the stems, petioles and lower part of leaves, the always ternate radical leaves, the less deeply dissected leaflets, and the shorter outer sepals.

118. *P. stipularis* L., Sp. pl. (1753) 498; Ldb., Fl. Ross. II, 50; T. Wolf, Mon. Pot. (1908) 487; Kryl., Fl. Zap. Sib. VII (1933) 1518.— Ic.: Gmel., Fl. Sib. III, tab. 37, f. 2; Lehm., Rev. Pot. tab. 46.

Perennial; rootstock fibrous; caudex thin, multicapital; stems 10–25(35) cm high, erect or ascending at base, thin, few-leaved (3–4-leaved), nearly simple or branching in the uppermost part, glabrous like pedicels and eglandulose; radical and lower cauline leaves long-thin-petiolate, 7–9-paired; median cauline leaves short-petioled, with 5–7 leaflets, upper cauline leaves sessile, ternate or simple; stipules of radical leaves narrow, with small lanceolate auricles; stipules of cauline leaves very large and wide, ovate or oblong, concrescent with petioles for nearly entire length, free only at the semiovate apex, lanceolate-acuminate, entire or sometimes 193 2-lobed; leaflets of lower leaves sessile, oblong-obovate, oblong or linear-oblong, cuneately tapering at base, often longitudinally bent and folded, 6–20(30) mm long, with 3–7 acute teeth at apex, otherwise entire, glabrous or sometimes covered at margins with long erect rigid hairs. Flowers 2–13, on long, thin pedicels often hairy above, 1–1.5(2) cm in diameter; calyx sparsely hairy or glabrescent, outer sepals narrowly linear, inner sepals slightly longer than the outer, oblong-ovate, acute; petals obcordate, 1.5 times as long as calyx, yellow; stamens 20, filaments short, anthers small, ovate; receptacle conoid, glabrescent; fruitlets oblong-ovoid, smooth; style subterminal or somewhat lateral, thickened at base, in the middle and near apex, about as long as fruitlets. July–August. (Plate XIV, Figure 5).

Arctic and alpine meadows, tundras, riverbanks.—Arctic: Arc. Sib., Chuk.; W. Siberia: Ob; E. Siberia: Yenis., Lena-Kol., Ang.-Say. (above Uda River). Endemic. Described from Siberia. Type in London.

Section 10. **RANUNCULOIDES** T. Wolf, Mon. Pot. (1908) 503.— Perennial plants; the Soviet specimens with palmate-ternate leaves; style shortly conoid at base, thin, filiform, twice to three times as long as mature fruitlets.

119. *P. fragiformis* Willd. Herb. ex Schlecht. in Magaz. naturf. Fr. zu Berl. VII (1816) 294; Lehm., Rev. Pot. (1856) 155; Ldb., Fl. Ross. II, 59; T. Wolf, Mon. Pot. (1908) 509.— ? *P. nana* Willd. Herb. ex Schlecht. in Magaz. naturf. Fr. zu Berl. VII (1816) 296; Ldb., Fl. Ross. II, 56.— ? *P. lucida* Willd., l. c., 296.— *P. grandiflora* var. *fragiformis* Ser. in DC., Prodr. II (1825) 572.— Ic.: Lehm., Monogr. Pot. tab. 15; Takeda in Bull. Miscell. Inform. Kew (1911) No. 6, 251.

Perennial; caudex thick, developing short shoots and few stems covered with brown relics of stipules; stems more or less ascending or erect,

10–25 cm high, villous with long spreading hairs, with few (1–2) leaves, long erect branches, and usually with few flowers; stipules ovate, the lower scarious, brown, acute, the upper herbaceous, acute or obtuse, usually dissected or dentate; leaves ternate, cordate in outline; leaflets sessile, the middle larger, broadly obovate, cuneate, sometimes petioluled, the lateral leaflets obliquely elliptic or obovate, all entire at base, with 3–5 rounded teeth at each side, more or less villous with spreading hairs on both sides, green. Flowers in loose corymbiform inflorescences, 20–30 mm in diameter; calyx villous, strongly accrescent (nearly twice) in fruit, outer sepals broadly elliptic, obtuse or subacute, as long as or usually shorter than the ovate, acute inner sepals; petals large, obcordate, deeply emarginate, golden yellow; staminal ring glabrous, stamens 20, filaments rather long, anthers orbicular-ovate; receptacle subglobose, villous; fruitlets numerous, oblong-ovoid, smooth, slightly carinate; style subterminal, slightly thickened at base, thin, one and a half to twice as long as fruitlets. June–August. (Plate XIV, Figure 6).

Rocks, gravels. — Arctic: An.; Far East: Kamch., Okh., Uda, Uss. Also reported from W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb. **Gen. distr.:** Jap.-Ch. (Manchuria), Ber. Described from Aleutian Islands. Type in Berlin.

120. *P. megalantha* Takeda in Bull. miscell. inform. Kew No. 6 (1911) 255. — *P. fragiformis* Fr. Schmidt, Reise Amurl. (1865) 127, non Willd. — *P. fragiformis* subsp. *megalantha* Hulten, Fl. of Kamtch. III (1929) 58. — Ic.: Takeda, l. c., 252; Hulten, l. c., (fructus).

Perennial, resembling *P. fragiformis* Willd., from which it is distinguished as follows: leaves thick, slightly fleshy, different in shape; lateral leaflets cordate-orbicular or broadly obovate, emarginate at apex; terminal leaflet obcordate, emarginate and thus the central tooth distinctly shorter than the others; stipules usually entire; flowers large, up to 4 cm in diameter, the calyx correspondingly larger at anthesis but very slightly accrescent postanthesis; outer sepals orbicular-ovate, obtuse at apex and usually 3-toothed; petals slightly emarginate; staminal ring hairy; stamens more numerous; fruitlets orbicular nearly auriculate in outline. July.

Stony places. — Far East: Kamch. (southern part), Sakh. **Gen. distr.:** Jap.-Ch. (Japan). Described from Kompumoi, Yezo and other places in Japan, and also from Sakhalin. Type in Kew.

Subgenus 6. **DYNAMIDIUM** Fourr. in An. Soc. Linn. Lyon II, 16 (1868) 371. — Flowers in corymbiform-paniculate inflorescence, rarely solitary and axillary; sepals, outer sepals and petals 5, rarely 4; petals yellow, emarginate or entire at apex; stamens, receptacle and fruit like in the preceding subgenus, but style claviform, not thickened at base, abruptly thickened at apex beneath stigma, as long as fruitlets or shorter. — Perennial herbs, often with palmately compound, rarely pinnate leaves, without real tomentum, sometimes with stellate hairs.

1. Flowers in corymbiform or corymbiform-paniculate inflorescences; rarely solitary at apex; cauline leaves smaller than radical leaves and not fully developed 2.

- 195 + Flowers solitary in axils of the well developed cauline leaves
(Section 3. *Tormentillae* Rydb.) 22.
2. Leaves palmate, with 5-7 leaflets or with 3 (then plant without long
creeping shoots), very rarely 2-3-paripinnate; anthers small,
suborbicular (Section 1. *Aureae* T. Wolf) 3.
- + Leaves pinnate, 3 upper leaflets larger than the rest, very rarely
leaves ternate (then plant with long creeping shoots); anthers large,
twice to three times as long as broad (Section 2. *Fragarioides*
T. Wolf) 16.
3. Leaves covered with simple hairs or glabrescent 4.
- + Leaves densely covered with stellate or fascicled hairs 14.
4. Nearly all radical leaves 2-3-paripinnate, with lateral leaflets adj
adjacent 126. *P. subpalmata* Ldb.
- + Radical leaves palmate 5.
5. Leaves ternate 6.
- + Leaves 5-7(9)-paired 10.
6. Outer sepals entire 7.
- + Outer sepals 3-fid 125. *P. seidlitziana* Bienert.
7. Plant small in all parts; stems 2-3 cm long, leaves 1-1.5 cm long;
flowers small; petals usually not longer than sepals
. 121. *P. elegans* Cham. et Schlecht.
- + Plant larger; petals longer than sepals 8.
8. Arctic plant, with all green parts long villous-hairy; stamens short;
anthers orbicular 122. *P. emarginata* Pursh.
- + Alpine plants, glabrescent or covered with shorter hairs; filaments
long; anthers ovate 9.
9. Plant glabrescent or rather slightly pubescent
. 123. *P. gelida* C. A. M.
- + Plant very densely appressed-silky-hairy
. 124. *P. tephroleuca* T. Wolf.
10. Leaves quinate, sparingly or more or less hairy
. 127. *P. crantzii* (Crantz) Beck.
- + Leaves 7(9)-paired, usually strongly pubescent 11.
11. Stems and petioles covered with spreading hairs sessile on small
tubercles; usually glandulose 12.
- + Stems and petioles covered with straightly spreading or appressed
hairs without tubercles at base; eglandulose
. 128. *P. schurii* Fuss. e Zimm.
- 196 12. Glands (if present) long-stalked with red heads; style typically
claviform, constricted at base, smooth 129. *P. heptaphylla* L.
- + Glands short-stalked with yellow heads; style equally thick through-
out entire length, strongly verrucose 13.
13. Plant usually only somewhat glandulose (sometimes glands absent);
leaflets of radical leaves oblong-cuneate, with many acute teeth . . .
. 130. *P. humifusa* Willd.
- + Leaves usually much glandulose; leaflets of radical leaves obovate,
with 3-6 teeth on each side 13bis.
- Leaflets usually rather broadly obovate, obtusely dentate (Crimean
plant) 131. *P. depressa* Willd.

- + Leaflets usually narrowly obovate, acutely dentate (Caucasian plant) 132. *P. adenophylla* Boiss.
14. Radical leaves ternate; plant nearly acaulescent or with short few-flowered (1-3) stems not exceeding radical leaves 135. *P. acaulis* L.
- + Radical leaves quinate [or 5-paired], often mixed with ternate; stems well developed, usually longer than radical leaves, many-flowered 15.
15. Radical leaves usually 5-paired; leaflets thin, obovate, usually obtusely toothed; stems often rather many-flowered, longer than radical leaves 133. *P. arenaria* Borkh.
- + Radical leaves usually quinate mixed with ternate; leaflets thicker, oblong-obovate, usually acutely toothed; stems often few-flowered, not longer than radical leaves 134. *P. glaucescens* Willd.
16. Plants with long creeping shoots 17.
- + Plants without creeping shoots 18.
17. Radical leaves 2-3-(4)-paripinnate 141. *P. stolonifera* Lehm.
- + Radical leaves ternate 142. *P. freyniana* Bornm.
18. Stems, petioles and leaves rigidulous-hairy on both sides 19.
- + Stems and petioles softly short-hairy; leaves with coarse incomplete tomentum of flexuous or curved hairs beneath 20.
19. Stem not longer or slightly longer than radical leaves; stipules of cauline leaves ovate; leaflets oblong-elliptic or rhombic, acute, serrate-dentate; flowers small, 8-12 mm in diameter; petals slightly longer than sepals, narrow 136. *P. fragarioides* L.
- 197 + Stems longer than radical leaves; stipules of cauline leaves broadly ovate; leaflets orbicular-obovate, obtuse, crenate-dentate; flowers large, 2 cm in diameter; petals much longer than sepals, wide 137. *P. sprengeliana* Lehm.
20. Tomentum at lower side of leaves incomplete but conspicuous and more or less dense; upper leaflets of radical leaves with 6-10 teeth at each side 21.
- + Tomentum at lower side of leaves weakly developed, incomplete and very loose, absent at upper side; upper leaflets of radical leaves with 5-6 teeth at each side 138. *P. tranzschelii* Juz.
21. Leaves with incomplete tomentum above; leaflets obtusely toothed 139. *P. ussuriensis* Juz.
- + Leaves without incomplete tomentum above, remotely appressed-hairy or glabrous, wrinkled; leaflets rather acutely toothed 140. *P. aemulans* Juz.
22. Stems branching, erect or ascending, not rooting at nodes; leaves ternate; flowers tetramerous 143. *P. erecta* (L.) Hampe.
- + Stems simple, strongly elongated, prostrate or creeping, very often rooting at nodes; leaves 5-7-paired; flowers pentamerous 23.
23. Leaflets obovate or oblong-ovate; flowers large, sepals wide, outer sepals usually obtuse, accrescent after flowering 144. *P. reptans* L.
- + Leaflets lanceolate or oblong; flowers small, sepals narrow, outer and inner sepals acute, not accrescent after flowering 145. *P. flagellaris* Willd.

Section 1. **AUREAE** T. Wolf in Asch. u. Graebn., Syn. VI (1904); Mon. Pot. (1908) 521. — Stems shorter or hardly longer than radical leaves; radical leaves usually palmate, 3–9-paired. Inflorescence many-flowered, corymbiform; bracts small, reduced; anthers small, orbicular or short-ovate.

Subsection 1. **FRIGIDAE** T. Wolf in Asch. u. Gr., Syn. VI (1904) 787. — Small Arctic and alpine plants with normally ternate leaves (except in the probable hybrid *P. subpalmata* Ldb.) with wide and usually obtuse stipules of radical leaves.

198 121. *P. elegans* Cham. et Schlecht. in Linnaea II (1827) 22; Ldb., Fl. Ross. II, 56; T. Wolf, Mon. Pot. (1908) 532; Kryl., Fl. Zap. Sib. VII (1933) 1519. — *Tormentilla pusilla* Willd. ex Cham. et Schlecht., l. c., 23. — Ic.: Lehm., Rev. Pot. tab. 53, f. 1.

Perennial; caudex rather sturdy, developing many crowded shoots forming pulvinate tufts, covered with brown relics of stipules; stems 1–3 cm high, erect or ascending, usually not exceeding radical leaves, filiform, 1–2-leaved, 1-flowered, sparingly covered like petioles with short and longer hairs mixed with sessile glands; radical leaves small, long-petioled, ternate, cauline leaves short-petioled, the upper usually simple; stipules of radical leaves large, scarious, with ovate obtuse auricles, stipules of cauline leaves herbaceous, oblong-ovate, acute; leaflets sessile, 3–5 mm long, broadly obovate, deeply incised-dentate or pinnatisect, with 2–3 oblong-linear obtuse segments at each side, segments rarely 2–3-lobuled, with lobules entire or 2–3-toothed, green on both sides, glabrous above, spreading-hairy beneath and along margin. Flowers small, 5–6 mm in diameter; calyx slightly hairy; sepals equal in length, the outer elliptical, inner oblong-ovate, obtuse; petals slightly longer than sepals, broadly obovate, somewhat emarginate, yellow; stamens 20, filaments long, anthers small, orbicular; receptacle conoid, hairy; fruitlets large, oblong-ovoid, glabrous; style subterminal, much shorter than fruitlets, slightly tubercled in lower part, with much dilated stigma. July–August.

Bald mountains, tundras. — Arctic: Arc. Sib. (mouth of Lena River and eastward), Chuk., An.; W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau.; Far East: Ze.-Bu. Gen. distr.: Ber., Mong. (N.). Described from Lavrentiya Bay. Type in Berlin.

122. *P. emarginata* Pursh, Fl. Am. sept. (1814) 353; T. Wolf, Mon. Pot. (1908) 533. — *P. nivea* var. *arctica* Cham. in sched. (cfr. T. Wolf, l. c.). — Ic.: Fl. dan. XIII, tab. 2291; Rydb., Monogr. N. Am. Pot. tab. 32, fig. 11.

199 Perennial; caudex sturdy, multicapital, with shoots forming thick tufts and densely covered with brown relics of stipules; stems ascending or prostrate, 5–15 cm long, with 1–2 cauline leaves, 1–3-flowered, sparsely covered — like petioles — with long, soft, almost spreading or straightly spreading hairs, densely short-hairy toward summit; radical leaves long-petioled, ternate, cauline leaves short-petioled, the uppermost leaves often simple; stipules of radical leaves scarious, with ovate or lanceolate auricles, stipules of cauline leaves usually ovate, acute; leaflets sessile or

the median leaflets petioluled, 10–15 mm long, cuneately obovate, rather deeply incised-dentate, with 2–3 spreading, subelliptic or oblong, obtuse or acute teeth at each side, median tooth usually longer than the neighboring; densely covered on both sides with generally long straight hairs, dirty green or grayish green beneath, long-ciliate at margin. Flowers short-pedicelated, large, 15–20 mm in diameter; calyx villous; sepals equal in length, the outer oblong-lanceolate, obtuse, the inner oblong-ovate, obtuse or acute; petals one and a half to twice as long as sepals, obcordate, emarginate, yellow; stamens 20, filaments very short, anthers suborbicular; receptacle small, subglobose, hairy; fruitlets oblong-ovoid, glabrous; style subterminal, distinctly shorter than fruitlets, claviform or sometimes with a slightly dilated base. July–August.

Tundras (stony and clayey), rocky and other slopes, gravels. — Arctic: Nov. Z., Arc. Eur. (Kanin Point), Arc. Sib., Chuk., An. **Gen. distr.:** Arc. Eur. (Spitsbergen), Greenland, Arc. N. Am. Described from N. Am.

Note. A supposed hybrid of this species with *P. crantzii* (Crantz) Beck is known from Novaya Zemlya.

123. *P. gelida* C. A. M., Ind. plant. in Cauc. et ad mare Casp. collect. (1831) 167; Ldb., Fl. Ross. II (1844) 59; T. Wolf, Mon. Pot. (1908) 535; Kryl., Fl. Zap. Sib. VII (1933) 1520. — *P. grandiflora* Bge. in Ldb., Fl. Alt. II (1830) 259, non L. — *P. turczaninowiana* Stschegleew in Bull. Soc. Nat. Mosc. I (1854) 163. — *P. gelida* var. *turczaninowiana* T. Wolf, l. c. (1908) 536. — *P. fragiformis* var. *gelida* Trautv. Enum. plant. Song. (1864–1868) No. 410. — *P. gelida* var. *pilosior* et var. *glabrior* C. A. M., l. c. — *P. gelida* var. *genuina* (cum ff. *pilosior* et *glabrior*) T. Wolf, l. c., 536.

200 Perennial; caudex sturdy, multicapital, developing crowded shoots forming tufts and covered with brown relics of stipules; stems thin, erect or ascending, rarely prostrate, 5–20(30) cm high, few-branched, with few flowers at summit, rarely branching from middle and many-flowered, weakly pubescent with short and longer hairs, often mixed with glands; radical and lower cauline leaves long-petioled, ternate, upper cauline leaves short-petioled and often simple; stipules of radical leaves scarious, pale or grayish brown, with broadly ovate obtuse auricles, stipules of cauline leaves broadly ovate, obtuse, entire; leaflets sessile or the median short-petioluled, about 2–3(4) cm long, cuneately obovate or suborbicular, incised-serrate or shortly serrate-crenate in the upper two-thirds, with 3–5 ovate, oblong or lanceolate, obtuse or acute teeth at each side, glabrescent on both sides with only margin slightly ciliate, or more or less pubescent on both sides (rather densely so beneath). Flowers 10–20 mm in diameter; outer sepals elliptic or oblong, obtuse, as long as or distinctly shorter than the oblong-ovate acute inner sepals; petals obcordate, emarginate, a little longer than to twice as long as sepals, yellow; stamens 20, filaments long, anthers ovate; receptacle subglobose, hairy; fruitlets ovoid, more or less rugose; style subterminal, claviform, with dilated stigma, about as long as fruitlets. June–July. (Plate XV, Figure 1).

Alpine meadows, mountain tundras, stony places, moraines. — European part: V.-Kama (C. Urals, Kosvinskii Kamen); Caucasus: Cisc., Dag., E., W. and S. Caucasus; W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau.; Centr.

Asia: Dzu.-Tarb., T. Sh., Pam.-Al. (Pamir). Gen. distr.: Scand. (Norway), Arm.-Kurd., Dzu.-Kash., Mong., C. Asia, Ind.-Him. (Kashmir), Tib. Described from the Caucasus. Type in Leningrad.

Note. A very polymorphic species; it should be critically reviewed.

124. *P. tephroleuca* T. Wolf, Mon. Pot. (1908) 537.— *P. gelida* var. *tephroleuca* T. Wolf in Sched. (ex ipso l. c.).

Perennial; caudex thick, multicapital, densely covered at apex with brown relics of stipules; stems 8–10 cm long, ascending from base or nearly erect, few-leaved, like petioles and branches of inflorescence densely silky-hairy; radical leaves with long and thick petioles, ternate, cauline leaves smaller, short-petioled; stipules of radical and lower cauline leaves glabrous, with broadly ovate obtuse auricles, stipules of median and upper cauline leaves large, herbaceous, broadly ovate, deeply incised-dentate, densely hairy; leaflets sessile, suborbicular, broadly cuneate at base, the largest 15 mm long, rather deeply incised-serrate, with 4–6 close ovate or oblong obtuse or acute teeth at each side, thick, very densely appressed-hairy on both sides, whitish-silky, shiny. Inflorescence congested, few-flowered; flowers short-pedicel, 15 mm in diameter; calyx silky-hairy, outer sepals broadly elliptic, obtuse, inner sepals oblong-ovate, obtuse, nearly as long as outer sepals; petals obcordate, broadly emarginate, one and a half times as long as sepals, yellow; stamens 20, filaments short, anthers oblong-ovate; receptacle subglobose, becoming conoid, hairy; fruitlets many, oblong-ovoid, smooth; style small, shorter than fruitlet, nearly as thick as long, with a slightly thickened stigma. August.

Mountains, 2,500–3,000 m.— Centr. Asia: Pam.- Al. Endemic. Described from Tadzhikistan, Darvaz, Kenisek Mountain between the Tevil-Dara and Sagyr-Dasht rivers (paratype from Sagyr-Dasht pass). Type and paratype in Leningrad.

125. *P. seidlitziana* Bienert in Seidlitz, Bot. Ergebn. einer Reise in d. östl. Transcauc. (1857) 96; Boiss., Fl. Or. II (1872) 725; T. Wolf, Mon. Pot. (1908) 539.

Perennial; caudex sturdy, multicapital, covered in upper part with grayish brown stipules; stems ascending, 5–7 cm long, rigidulous, distinctly longer than radical leaves, few-leaved, sparsely covered with straight, spreading hairs; radical and lower cauline leaves short-petioled, small, ternate, with scarious, adherent, ovate stipules, obtuse at apex; upper cauline leaves subsessile, sometimes simple, with herbaceous, ovate, usually entire stipules; leaflets sessile, small, the largest 6–7 mm long, cunately obovate, crenate-dentate, with 3–4 ovate obtuse teeth at each side, sparsely covered with nearly spreading hairs. Inflorescence 2–3-flowered; flowers short-pedicel, rather large, 15 mm in diameter; sepals slightly hairy, the outer broadly cuneately obovate, obtusely 3-lobed at apex, inner sepals oblong, obtuse, much longer than outer sepals; petals twice as long as sepals, obcordate, emarginate, yellow; stamens 20, filaments short, anthers ovate; receptacle subglobose, hairy; style (nearly) terminal, thin and rather long, with dilated stigma; fruitlets unknown. July.

Mountains.— Caucasus: S. Transc. Endemic. Described from Armenia, Alagöz Mountain, above Kaznafar. Type unknown, cotype in Geneva.

126. *P. subpalmata* Ldb., Fl. Ross. II (1844) 56; Boiss., Fl. Or. II (1872) 712; T. Wolf, Monogr. Pot. (1908) 540.— Ic.: Lehm., Rev. Pot. (1856) tab. 29.

202 Perennial; caudex thick, multicapital, developing crowded shoots forming tufts and covered with brown relics of stipules; stems ascending or nearly erect, 5–10 cm high, villous like petioles, pedicels and calyx, eglandulose; radical leaves rather long-petioled, pinnate, with 2–3 pairs of adjacent lateral leaflets thus leaves sometimes appearing nearly palmate; stipules large, red to grayish brown, with broadly ovate obtuse auricles; cauline leaves few, short-petioled, ternate; stipules large, broadly ovate, obtuse or acute, entire; leaflets of radical leaves sessile or the terminal, sometimes slightly petiolulate, three upper leaflets larger than others, 8–15 mm long, cuneately obovate to suborbicular, deeply incised-serrate or pinnatifid, with 3–5 spreading, proximate, oblong, obtuse lobes, lower 2–4 leaflets twice to three times smaller than upper leaflets, all green on both sides, densely hairy above, less so beneath. Flowers few, rather long-pedicelated, 15 mm in diameter; outer sepals oblong, obtuse, shorter than the ovate acute inner sepals; petals obcordate, a little to one and a half times longer than calyx, yellow; stamens 20, with short filaments and ovate anthers; receptacle conoid, hairy; fruitlets oblong-ovoid, smooth, obsoletely carinate; style subterminal, claviform, shorter than fruitlets, stigma dilated. June–August.

Mountains.—Caucasus: S. Transc. (Ararat). Gen. distr.: Mong.? Described from Ararat. Type in Leningrad.

Note. Though now a completely stable and valid species, it is suspected to be a hybrid derivative (*P. gelida* C. A. M. × *P. raddeana* Juz.?). Its occurrence in Mongolia is doubtful, and the corresponding report by T. Wolf possibly refers to some other form resembling *P. subpalmata*.

Subsection 2. ALPESTRES T. Wolf in Asch. u. Gr. Syn. VI (1904) 787.—Arctic and alpine, rarely subarctic and subalpine plants, usually medium in size, slightly hairy; leaves quinate.

127. *P. crantzii* (Crantz) Beck in sched. ex Fl. N. Öst. (1892) 760.—*Fragaria crantzii* Crantz, Inst. rei herb. II (1766) 178.—*F. villosa* Crantz, Stirp. Austr. ed. II (1769) 75.—*Potentilla villosa* Zimm., Eur. Art. Pot. (1884) 25, non Pall.—*P. verna* L. Sp. pl. (1753) 498, p. p.; Ldb., Fl. Ross. II, 55 p. p.—*P. crocea* Hall. f. in Schleich., Cat. pl. Helv. 1807 (nomen); Lehm., Monogr. Pot. (1820) 111.—*P. maculata* Pourret in Mém. Acad. Toulouse III (1788) 326.—*P. alpestris* Hall. fil. in Ser. Mus. Helv. I (1818) 53; T. Wolf, Mon. Pot. (1908) 541; Kryl., Fl. Zap. Sib. VII (1933) 1521.—*P. salisburgensis* auct. plur. vix Haenke; Ldb., Fl. Ross. II, 55.—*P. rubens* auct. mult., non Vill.—*P. levieri* Siegr. et Keller in Engl. Bot. Jahrb. XIV (1892) 511.—*P. alpestris* var. *gelidiformis* T. Wolf, Mon. Pot. (1908) 554.—*P. alpestris* var. *brotheriana* T. Wolf, l. c., 555.—*P. alpestris* var. *levieri* T. Wolf, l. c., 556.— Ic.: Jacq., Ic. Pl. rar. III, tab. 430; Sturm Deutschl. Fl. XVII, tab. 5.— Exs.: Meinsh., Fl. Ingr. No. 204; HFR No. 2654.

Perennial; rootstock developing short flowerless shoots, appearing flat due to the biseriate arrangement of squamose stipules; stems many, thin, the marginal ascending, the central cespitose, erect, usually flexuous, 8–20 cm long, longer than radical leaves, branching, covered with spreading

white hairs, sometimes mixed with glands; radical and lower cauline leaves usually short-petioled, quinate; median cauline leaves ternate, the upper usually simple, sessile; leaflets obovate, broadly cuneate at base, more or less deeply incised-dentate only in upper part, with 2–5 obtuse teeth at each side, appressed-hairy above or glabrescent, long-ciliate at margin beneath [sic], usually also long-spreading-hairy along veins, green on both sides or rarely silky-canescens. Inflorescence generally many-flowered, pedicels long, spreading-hairy, rarely glandulose, erect; flowers 1–2.5 cm in diameter; outer sepals oblong or elliptic, obtuse, shorter than or as long as the ovate acuminate inner sepals; petals broadly obovate, emarginate, golden yellow, about twice as long as sepals; stamens with ovate anthers; fruitlets oblong-ovoid, rugose; style shorter than or as long as fruitlets. June–August. (Plate XV, Figure 2).

Stony rock streams, ravines, meadows, forest edges. — Arctic: Nov. Z., Arc. Eur. and Sib. (W.); European part: Kar.-Lap., Dv.-Pech., V.-Kama (C. Urals), Lad.-Ilm.; Caucasus: all regions; W. Siberia: Alt.; Centr. Asia: T. Sh. **Gen. distr.:** Arc. Eur., Scand., Centr. Eur., Atl. (England), Med. (Pyrenees, Apennines), Bal.-As. Min., Arm., Iran., Arc. Am. Described from Austria. Type unknown.

Note. This species is regarded here in the broad sense and represents a whole complex of forms that have not yet been studied in the USSR.

Subsection 3. OPACAE T. Wolf in Asch. et Gr., Syn. VI (1904) 787. — Medium-sized plants of lowlands and low mountains; leaves 7(9)-paired, more or less densely hairy.

Series 1. *Patulae* Juz. — Outer sepals narrowly linear, much narrower than the inner.

128. *P. schurii* Fuss ex Zimm., Eur. Art. Pot. (1884) 17. — *P. pratensis* Schur, Verh. d. Siebenb. Ver. (1859) 38, non Herb. — *P. patula* var. *tenella* Tratt., Ros. Monogr. IV (1824) 93; T. Wolf, Mon. Pot. 580. — *P. patula* Ldb., Fl. Ross. II, 48 et auct. Fl. Ross., non W. et K. — Ic.: Rchb., Ic. Fl. Germ. XV, t. 43. — Exs.: HFR No. 212.

Perennial, 5–15 cm high; rootstock firm, multicipital, with crowded-cespitose ascending or erect stems and rosettes of radical leaves; stems thin, low, firm, few-leaved, usually branching only in upper part, like petioles and pedicels finely pubescent and covered with long straight bristly hairs, often reddening; radical leaves with long thin petioles, 5–7-paired; lower cauline leaves similar to radical but smaller, upper cauline ternate; stipules of radical leaves scarious, with small lanceolate acute auricles, stipules of cauline leaves herbaceous, ovate-lanceolate, acute, entire; leaflets of lower leaves oblong, cuneate, with 1–7 lanceolate, obtuse teeth at each side, densely long-hairy on both sides or often glabrescent above, usually rather densely appressed-hairy along midrib. Flowers few, long-pedicel, 10–20 mm in diameter; sepals nearly equal in length, the outer linear-lanceolate, flat [?], the inner acutely ovate, all sepals more or less hairy; petals broadly

obcordate, longer than sepals, yellow; stamens 20; achenes oblong-ovoid, rugose; style subterminal, shorter than mature fruitlets. May–July.

Steppes, dry slopes, forest clearings, edges of pine and oak forests, sands. — European part: U. V., M. Dnp., V.-Don, Bl., L. Don. **Gen. distr.:** Centr. Eur. (eastern part). Described from Siebenbürgen: Cluj, Sholtau.

Series 2. **Heptaphyllae** Juz. — Outer sepals about twice as narrow as the inner.

129. **P. heptaphylla** L., Cent. pl. I (1755) 13. — *P. opaca* L., Amoen. acad. IV (1759) 274 p. p.; Ldb., Fl. Ross. II, 50 p. p. — *P. dubia* Moench, Fl. Hass. (1777) 433. — *P. rubens* Zimm., Eur. Art. Pot. (1884) 16. — *Fragaria rubens* Crantz, Stirp. Austr. I fasc., II (1763) 14. — Ic.: Jacq., Ic. pl. rar. tab. 91; Schlecht., Fl. v. Deutschl. ed. 5, XXV, tab. 2607. — Exs.: HFR No. 2161.

Perennial; caudex sturdy, multicapital, developing crowded shoots; stems usually thin, 10–25 cm long, prostrate or ascending, branching in upper part, covered with long gray hairs spreading or declinate beneath mixed with glandular hairs; glands red, stalked; radical leaves long-petioled, 7–9-paired; leaflets linear-obovate or oblong-obovate, cuneate and entire at base, with 4–6 triangular obtuse serrate teeth above, covered on both sides with long soft spreading hairs; leaflets of cauline leaves few-toothed at apex; stipules ovate or oblong, acute or subacute. Inflorescence loose, divaricate, many-flowered, with branches often slightly flexuous, densely hairy; pedicels long, thin, reflexed; flowers small or medium in size, 8–12 mm in diameter; outer sepals oblong, narrowly lanceolate, as long as or shorter than the twice wider ovate-lanceolate or ovate acute inner sepals; petals nearly twice as long as sepals; filaments long; fruitlets oblong-ovoid, rugose; style claviform, smooth, shorter than fruitlets, with strongly dilated stigma. May–June. (Plate XV, Figure 3).

Exposed dry grassy slopes, clearings, ravines, edges of pine forests. — European part: U. V., U. Dnp., M. Dnp., V.-Don?, Bl.? **Gen. distr.:** Scand., Centr. Eur., Bal. Described from Switzerland. Type in London.

130. **P. humifusa** Willd. ex Schlecht. in Mag. naturf. Fr. Berlin (1816) 290. — *P. opaciformis* T. Wolf in Asch. et Gr., Syn. VI (1904) 802 (nomen); Monogr. Pot. (1908) 573; Kryl., Fl. Zap. Sib. VII (1933) 1522. — *P. opaca* Ldb., Fl. Ross. II, 49 et auct. plur. Fl. Ross. p. p. — *P. rubens* auct. mult. Fl. Ross. saltem p. p. — *P. sibirica* Patr. in ex T. Wolf, l. c. — Ic.: T. Wolf, Mon. Pot. tab. XIX, f. 3; Yuzepchuk in A. H. B. Acad. Sc. USSR XLIII, fasc. 2 (1931) tab. 125. — Exs.: HFR No. 213, 2162.

Perennial; rootstock thickened, developing many short crowded shoots, covered with relics of dead leaves; stems 5–10 cm high, weak, ascending, not or hardly exceeding radical leaves, branching from the lower third or the middle, covered — like petioles — with long spreading hairs often mixed with short-stalked or sessile yellow glands; radical leaves long-petioled, 5–7-paired, stipules with lanceolate acute auricles; cauline leaves few, short-petioled, 3–5-paired, the uppermost simple, stipules large, ovate, acute, entire or 1–2-toothed; leaflets of radical leaves sessile, thick, the

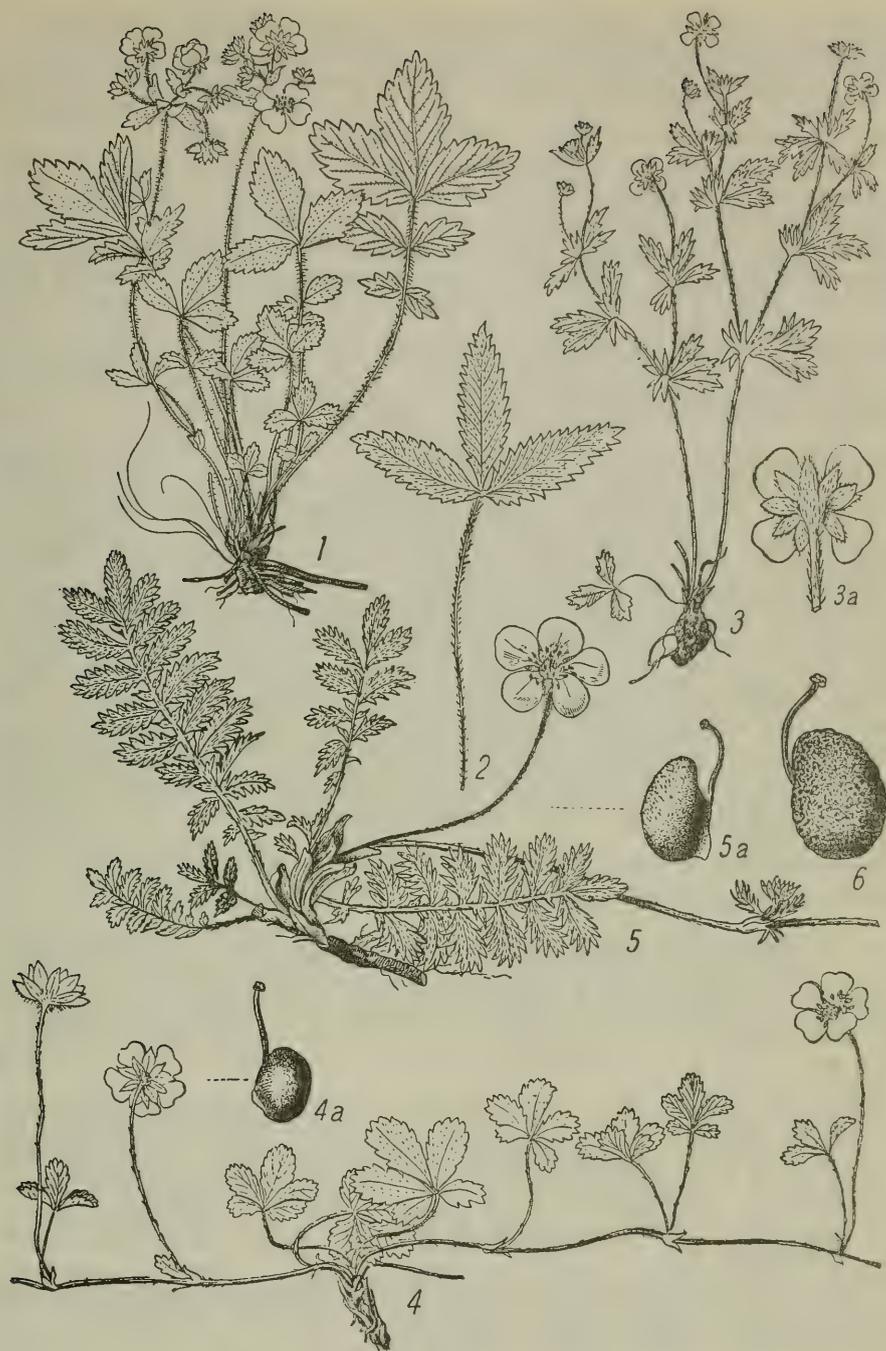


PLATE XVI. 1 - *Potentilla fragarioides* L., general view; 2 - *P. freyniana* Bornm., leaves; 3 - *P. erecta* (L.) Hampe, general view, a) flowers (from beneath); 4 - *P. reptans* L., general view, a) fruit; 5 - *P. anserina* L., general view, a) fruit; 6 - *P. pacifica* Howell, fruit.

two extreme distinctly smaller than others, few-toothed, the inner larger, oblong-cuneate, with many often short, acute teeth rarely rather deeply pinnatisect; green, spreading-hairy on both sides, sometimes mixed with yellow glands. Flowers in few- or rather many-flowered inflorescence, on short thin pedicels, usually 8–10 mm in diameter; calyx hairy, outer sepals oblong, obtuse, much narrower and somewhat shorter than the ovate acute inner sepals; petals obovate, emarginate, barely as long as sepals, golden yellow; stamens 20, anthers small, ovate; achenes oblong-ovoid, smooth; style almost equally thick throughout, verrucose and papillose, shorter than or as long as achenes. June–August. (Plate XV, Figure 4).

Steppes, steppical meadows and slopes, dry forest edges and sandy places. — European part: M. Dnp., U. V., V.-Kama, V.-Don, Transv., L. (Don), Bl.; Caucasus: Cisc.; W. Siberia: Ob, U. Tob., Irt., Alt.; E. Siberia: Ang.-Say. (Krasnoyarsk); Centr. Asia: Balkh., Dzu.-Tarb. (?). Endemic? Described from W. Siberia. Type in Leningrad.

208 131. *P. depressa* Willd. ex Schlecht. in Mag. naturf. Fr. Berlin (1816) 290 s. str. — *P. muscicapa* T. Wolf in Aschers. et Gr., Syn. VI (1904) 800 (nomen); id. Mon. Pot. (1908) 575 (in syn.). — *P. puberula* var. *muscaecapa* Borbas in sched. ad Exs. Callieri It. taur. tert. (1900) No. 600 (nomen). — Exs.: Callier, It. taur. tert. No. 600.

Perennial, 3–15 cm high; the whole plant almost always very densely glandulose, viscous to touch in living state; radical leaves usually with rather short and short-hairy petioles; stems often distinctly longer than petioles; leaflets wide and short, almost twice as long as broad, obovate or broadly obovate, cuneate and entire at base, with rather few (2)3–6(7), obtuse or even rounded teeth at each side, densely villous with long hairs. Inflorescence often very many-flowered; sepals broader and more obtuse than in *P. humifusa* to which it is similar in other parts. May–June. (Plate XV, Figure 6).

Mountain meadows and pastures. — European part: Crim. (Yaila). Endemic. Described from the Crimea. Type in Berlin.

132. *P. adenophylla* Boiss. et Hohenack., Diagn. Ser. 1, III (1843) 5; Fl. Or. II, 718. — *P. opaca* β *adenophylla* Boiss. in Suppl. Fl. Or. (1888) 234. — *P. anatolica* Bornm. in sched. exs. No. 3327 sec. T. Wolf, Mon. Pot. (1908) 575. — *P. bungei* var. *anatolica* Bornm. Mittheil. Thür. Bot. Ver. N. F. VI (1894) 65. — *P. opaciformis* f. *glandulosa* T. Wolf, l. c., p. p.

Perennial, very similar to *P. depressa* in general appearance and pubescence, but leaflets usually narrowly obovate, acutely toothed; number of teeth like in *P. depressa*, usually 3–6 on each side, i. e., less than in *P. humifusa*. Flowers often very large, up to 2 cm in diameter, calyx much larger than in *P. humifusa*, sepals wide and obtuse. April–June. (Plate XV, Figure 5).

Alpine and subalpine meadows, stony slopes, limestone rocks. — Caucasus: Cisc., E. and S. Transc. **Gen. distr.:** Arm., As.-Min. (Anatolia). Described from Armenia. Type in Geneva.

Subsection 1. CINEREAЕ Juz. — Small or medium sized plants of lowlands and low mountains, rarely subalpine; leaves ternate to quinate, more or less densely covered with stellate or fascicled hairs; stipules of radical leaves lanceolate, acute.

133. *P. arenaria* Borkh., Flora d. obern. Grafsch. Catzenelnbog. (1795—1796); id. ex Fl. Wett. I (1800) 248; T. Wolf, Mon. Pot. (1908) 619. — *P. incana* Borkh., Fl. Wett., l. c. — *P. cinerea* auct. mult., non Chaix.; Ldb., Fl. Ross. II, 54. — Ic.: Sturm, Deutschl. Fl. fasc. 92, tab. 3; Schlecht., end. Fl. Deutschl. ed. 5, XXV, tab. 2606. Exs.: HFR No. 615, 2154.

209 Perennial; rootstock firm, multicapital, with many prostrate, elongate and rooting branches; stems 5—15 cm long, decumbent, below appressed to ground, hardly exceeding radical leaves, branching in upper half, densely covered — like the whole plant — with stellate-tomentose hairs and soft long ones; radical leaves short-petioled, usually quinate, rarely ternate or more rarely septenate, stipules with long narrowly linear auricles; lower cauline leaves usually ternate, stipules ovate or oblong, entire; leaflets usually sessile, cuneately obovate, with 2—5 shallow acute or obtuse teeth on each side, usually thin and soft, inconspicuously veined, ash-gray of dense tomentum of stellate hairs on both sides, sometimes only slightly tomentose then greenish; flowers medium-sized or small, thin-pedicelled; outer sepals much shorter than the inner, oblong, inner sepals ovate, acute or obtuse; petals distinctly longer than sepals; stamens 20, filaments short, anthers orbicular-ovate; fruitlets ovoid, rugose, indistinctly carinate; style sub-terminal, slightly shorter than mature achenes. April—June.

Sandy soils (especially edges of pine forests), rocky and stony slopes and ravines, steppes and steppical slopes. — European part: U. Dnp., U. V., M. Dnp., V.-Don, Bl. **Gen. distr.:** Centr. Eur., Scand. (S. Sweden). Described from Germany. Type unknown.

× *P. okensis* Petunn. in A. H. P. XIV (1895) 27. (*P. arenaria* Borkh. × *P. goldbachii* Rupr.). — Ic.: Petunn., l. c., tab. V — Exs.: Siegfr., Pot. spont. cult. No. 985. — A curious plant, distinctly intermediate in character between both parental forms and mostly found with them. — European part: U. V. (former Serpukhov County, Zibrovo, Luzhki). Type in Leningrad.

134. *P. glaucescens* Willd. ex Schlecht., Mag. Ges. naturf. Fr. Berl. VII (1816) 289. — *P. kirghizorum* Juz. in A. H., Bot. Ac. Sc. URSS XLIII, 2 (1931) 526; N. Pavlov, Fl. Tsentr. Kazakhst. 2 (1935) 335. — *P. arenaria* auct. Fl. Ross. Eur. Orient. et Medio-asiat., non Borkh. — *P. tommasiniana* T. Wolf in sched. p. p., non F. Schultz; Juz., l. c.

Perennial, with stems shorter than in *P. arenaria* and with more ternate leaves (usually mixed with quinate); leaflets oblong, thicker, usually acutely toothed, nearly always densely stellate-tomentose. Inflorescence poorly developed, few-flowered; style often slightly thickened at base. Otherwise similar to the preceding species. April—May. (Plate XV, Figure 7).

210 Steppes, steppe slopes, rocky and stony places, sandy soils (edges of pine forests). — European part: V.-Kama, V.-Don, Transv., L. Don, L. V.; Caucasus: Cisc., Tal.; W. Siberia: U. Tob. Endemic. Described from the Transvolga area (?). Type in Berlin.

Note. Apparently a rather problematic form; much resembling *P. arenaria* Borkh. and only slightly distinct from it.

135. *P. acaulis* L. Sp. pl. (1753) 500; Kryl., Fl. Zap. Sib. VII (1933) 1523. — *P. subacaulis* L. Syst. Nat. ed. X (1758) 1065 et Sp. pl. ed. 2 (1762) 715; T. Wolf, Monogr. Pot. (1908) 632. — *P. cinerea* β *trifoliata* Ldb. Fl. Ross. II (1846) 54 p. p., non Koch. — Ic.: Lehm. Rev. Pot. (1856) tab. 56. — Exs.: HFR No. 2168.

Perennial; caudex sturdy, multicapital, developing long rooting stolons, forming tufts; stems 1–5 cm long, not longer than radical leaves, few, thin, simple, 1–2(3)-flowered, covered — like petioles — with stellate and long simple bristly straight-spreading hairs, without glands; radical leaves many, short-petioled, ternate, stipules with narrow and long linear-lanceolate auricles; cauline leaves reduced, sessile, simple, stipules ovate-lanceolate, often bifid; leaflets of radical leaves sessile or often conspicuously petioluled, broadly obovate-cuneate, rounded at apex, 10–20 mm long, in upper half or one-third shortly crenulate-dentate, with (2)3–5 obtuse teeth at each side, thick, prominently veined, rugose, very densely stellate-tomentose with a mixture of long simple hairs (especially along nerves) on both sides, canescent or whitish. Flowers thin-pedicel, 10–17 mm in diameter; calyx stellate-hairy, outer sepals linear or oblong, obtuse, usually much shorter than the oblong-ovate acute inner sepals; petals broadly ovate, emarginate, nearly twice as long as calyx, golden yellow; stamens 20, with rather long filaments and ovate anthers; receptacle subglobose, long-hairy; fruitlets rather large, oblong-ovoid, rugose; style usually more or less thickened and sometimes papillate at base, shorter than fruitlets, with a slightly dilated stigma. May–June (sometimes a second time in August–September). (Plate 15, Figure 8).

Steppes, steppical meadows, stony slopes, edges of pine forests. — W. Siberia: Alt., Irt., U. Tob.; E. Siberia: Ang.-Say., Dau., Lena-Kol. (southern part); Far East: Ze.-Bu. Gen. distr.: Jap.-Ch., Mong., Tib. Described from Siberia (from the Gmelin specimen). Type in London.

211 Section 2. **FRAGARIOIDES** T. Wolf, Mon., Pot. (1908) 635. — Stems shorter than or hardly as long as radical leaves; radical leaves 2–4-paripinnate, rarely ternate. Inflorescence many-flowered, corymbiform or corymbiform-paniculate, bracts small, reduced; anthers rather large, two to three times as long as broad.

Series 1. **Eu-Fragarioides** Juz. — Creeping shoots absent; stems and petioles with rigidulous hairs; leaves pinnate; inflorescence more or less many-flowered; pedicels declinate post anthesis.

136. *P. fragarioides* L., Sp. pl. (1753) 496 saltem p. p. (quoad pl. Gmel.); Ldb., Fl. Ross. II, 38; Kryl., Fl. Zap. Sib. VII (1933) 1525.— *P. poterioides* Willd. Herb. ex Schlecht., Mag. Ges. naturf. Fr. Berlin VII (1816) 286.— *P. fragarioides* var. *typica* Maxim., Mél. biol. IX (1873) 158; T. Wolf, Mon. Pot. (1908) 637.— Ic.: Gmel., Fl. Sib. III, tab. XXXIV, f. 2 (mala); Lehm., Mon. Pot. tab. IV.

Perennial; rootstock fibrous; caudex covered in upper part with brown relics of dead leaves, developing rosette of radical leaves, persistent post anthesis and strongly accrescent; stems many, 5–25 cm long, ascending or nearly erect, rather thin, few-leaved, not or slightly exceeding radical leaves, densely covered — like petioles — with long horizontally spreading hairs; radical and lower cauline leaves 2–4- (usually 3-) paripinnate, sometimes mixed with ternate leaves, long-petioled; upper cauline leaves ternate, with shorter petioles, bracts simple, sessile; stipules of radical leaves scarious, wide, with lanceolate acute auricles; stipules of cauline leaves large, ovate, entire or incised, leaflets usually sessile, oblong-elliptic or rhombic, acute or acuminate, cuneate, shallowly serrate-dentate, with numerous acute teeth, rigidulous-hairy on both sides, green above, pale beneath and often slightly silky with more dense hairs, densely ciliate at margin. Inflorescence somewhat compressed, corymbiform, many-flowered; flowers usually small, 8–12 mm in diameter, on thin pedicels spreading or reflexed post anthesis; calyx villous, sepals equal, linear or oblong, acute, inner sepals broader than the outer; petals obovate, slightly longer than sepals, entire or weakly emarginate (especially in plants in the eastern part of distribution), golden yellow; stamens 20; filaments subulate, anthers oblong-linear; receptacle conoid, hairy; fruitlets few, oblong-ovoid, slightly rugose, whitish; style subterminal, slightly shorter than fruitlets, claviform, with a weakly dilated stigma. June–July. (Plate XVI, Figure 1).

Meadows, shrubby formations, stony slopes, fallow fields.— W. Siberia: Ob (Tomsk Region), Alt. (foothills), Irt. (eastern part); E. Siberia: Ang.-Say., Lena-Kol., Dau.; Far East: Ze.-Bu., Uss., Sakh.? **Gen. distr.:** Mong., Jap. Ch. (Manchuria). Described from the environs of Tomsk (cf. Gmelin, Fl. Sib. III, 182–183). Type in London.

12 Note. Linnaeus ascribed creeping shoots (*stolones decumbentes*) to this species, apparently as a result of combining the Siberian plant of Gmelin with the Kamchatkan *P. stolonifera* Lehm. (cf. Ldb., l. c.). Gmelin focused his attention on the absence of creeping shoots (attributed by Linnaeus to *P. fragarioides*) in the Siberian plant and evidently tried to envisage (with a great deal of imagination) Linnaeus' "*stolones decumbentes*" as the stipules of the radical leaves of *P. fragarioides*. He wrote: "*Petioli accessorii in inferioribus foliis conspiciuntur qui vero quo propriores sunt basi, eo minores sunt, steriles, decumbentes*" (l. c., p. 182). These "*petioli accessorii*," depicted in his sketch, are strongly enlarged (hypertrophic). Perhaps it would be more accurate, in order to avoid confusion, to name our plant *P. poterioides* Willd., a type which was collected by Bukov (a companion of Pallas) in Western Siberia.

137. *P. sprengeliana* Lehm., Monogr. Potent (1820) 49 (?); Ldb., Fl. Ross. II, 37.— *P. fragarioides* var. *sprengeliana* Maxim. in Mél. biol. IX (1877) 160 saltem pro max. pt.; T. Wolf, Mon. Pot. (1908) 638.— Ic.: Lehm., Monogr. Pot., tab. III (?) (see note to *P. stolonifera*).

Perennial; rootstock like in *P. fragarioides*; plant taller than *P. fragarioides*, 10–30 cm high; stems thicker, usually exceeding radical leaves; pubescence like in *P. fragarioides*; radical leaves larger, 2–6; usually 3–4-paripinnate; stipules of cauline leaves broadly ovate, usually incised; leaflets orbicular-obovate, obtuse or rounded at apex, crenate-dentate; teeth numerous, dense, short, obtuse. Inflorescence not so many-flowered; flowers larger, 15–20 mm wide; petals nearly twice as long as sepals, obovate, as broad as long or broader than long, overlapping at margin, notched at apex. Otherwise similar to *P. fragarioides*.

Stony and dry grassy slopes, coastal rocks, sandy banks. — Far East: Sakh., Uda, Uss. (Pacific Ocean, particularly near Vladivostok). **Gen. distr.:** Jap.-Ch, (Japan) (see Note). Described from Siberia (?). Type in Berlin.

Note. Our plant from Ussuria is not typical but approaches *P. fragarioides*. The plant described in Herb. Fl. Ross. No. 1923 also has such a form. On the other hand, the Japanese plant, according to Wolf, is distinguished from the Far Eastern plant by its smaller flowers and the more densely pubescent leaflets beneath; it probably represents a special race. We retain the name given to the just described plant by a number of the more recent authors; however, it should be noted that as a result of further study of its validity a completely new name (for example, *P. sachalinensis* Juz., nom. nov.) might be used, since *P. sprengeliana* Lehm. does not actually refer to this plant but to *P. stolonifera* Lehm. (see 213 Note to this latter species).

Series 2. *Ussurienses* Juz. — Stems and petioles softly short-hairy; leaves with more or less conspicuous tomentum at lower side. Otherwise like the preceding species.

138. *P. tranzschelii* Juz. sp. nova in Addenda IX, p. 454. — *P. fragaricoides* var. *argentea* Tranzsch. in sched. — *P. ancistrifolia* Kom. in sched., non Bge.

Perennial; rootstock fibrous; caudex covered in upper part with relics of stipules; stems 7–25 cm high, ascending or erect, loosely branching in upper two-thirds or half, few-leaved, not or hardly exceeding radical leaves, covered — like petioles and branches of inflorescence — with shorter soft hairs (compared with *P. fragarioides*) mixed with simple hairs, and growing a loose coarse tomentum of short, somewhat crisp hairs; radical leaves more or less large, 4–5-paripinnate, very long-petioled; lower cauline leaves biparipinnate, with shorter petioled, upper leaves ternate, subsessile; stipules of cauline leaves ovate, usually acutely incised-dentate; leaflets sessile, the terminal up to 4 cm long, broadly ovate or obovate, the lower leaflets sometimes suborbicular, rather deeply incised-dentate, with 5–10 teeth (3–4 in lower leaflets) on each side of leaflet, large, triangular-ovate or oblong-ovate, obtuse, leaves densely covered with short curved or crisp hairs, on both sides mixed with sparse longer ones, tomentum especially dense and coarse at lower side of leaves, dark green above, grayish green beneath, slightly velutinous, with prominent midrib and lateral veins. Inflorescence usually many-flowered, loose; flowers rather small, 10–15 mm in diameter, just slightly larger than in *P. fragarioides*, on

pedicels curved or patulous post anthesis; calyx sparsely coarse-tomentose, with a mixture of longer straight hairs; sepals equal in length, the outer linear-lanceolate, the inner narrowly ovate, acute; petals longer than sepals, emarginate, yellow; stamens like in *P. fragarioides*; receptacle rounded conoid, densely hairy; fruitlets few, large, oblong-ovoid, strongly transversely rugose, whitish; style like in *P. fragarioides*. July.

Rocks, stony places. — Far East: Uss. (Olga Bay, Dzhigit Bay, etc.). Endemic. Described from the slopes of the Vaifudin River (Olga Bay). Type in Leningrad.

139. *P. ussuriensis* Juz. nov. spec. in Addenda IX, p. 455. — *P. fragarioides* var. ξ *incisa* Maxim. in M \acute{e} l. biol. IX (1873) 162; T. Wolf, Mon. Pot. (1908) 638.

14 Perennial; stems 15–25 cm high, nearly erect, loosely branching in upper fourth or third, somewhat exceeding radical leaves, few-leaved, sparsely covered — like petioles of radical leaves and branches of inflorescence — with short and soft hairs; radical leaves long-petioled, with 5–6 pairs of leaflets; cauline leaves biparinnate or ternate, with shorter petioles or subsessile; stipules incised-dentate; leaflets broadly obovate to suborbicular, orbicular, very deeply incised-dentate, teeth few, 5–6 at each side in the upper three leaflets and 2–3 in the lower, oblong, obtuse, often somewhat divaricate; leaves dark green above, remotely covered with appressed simple hairs, paler beneath, with very weak tomentum of short, coarse, curved or crisp hairs. Inflorescence rather many-flowered, loose; pedicels recurved post anthesis; calyx sparsely soft-hairy; sepals nearly equal, acute; petals emarginate; fruitlets large, transversely rugose, whitish. Otherwise similar to *P. tranzschelii*. May–June.

Rocks. — Far East: Uss. (Ussuri River basin). Endemic. Described from rocks at the estuary of Chao-Sun River, above Shrei-Latsza on Lifudin. Type in Leningrad.

Note. This species is easily distinguished from *P. tranzschelii*, to which it is closely related, by the very weak pubescence of the leaflets, covered only above with sparse, straight, appressed hairs and very sparse coarse tomentum beneath, more deeply incised into fewer (5–6 in upper leaflets, 2–3 in lower) very large, oblong, acute teeth. Except for the type, other specimens referred to here are, so far, doubtful.

140. *P. aemulans* Juz. sp. nova in Addenda IX, p. 456. — *P. ancistri-folia* Kom. et Klob.-Alis., Key for the plants of the far east. reg. USSR II (1932) 642, non Bge.

Perennial; stems 10–20 m high, ascending or erect, branching in upper fourth, not exceeding radical leaves, sparsely covered like petioles and branches of inflorescence with short, soft, flexuous hairs; radical leaves with long, rigid, usually reddish petioles, 4–5-paripinnate; cauline leaves with shorter petioles, biparipinnate or ternate, with ovate, entire or slightly dentate stipules; leaflets obovate or rhombic, deeply incised-dentate, with 6–10 elongate, triangular-ovate, acute teeth at each side of the three upper leaflets, lower leaflets 2–5-toothed, often revolute at margins; leaves dark green above, sparsely appressed-hairy or glabrous, wrinkled, grayish beneath and rather densely and coarsely tomentose with short, curved or

215 slightly crisp hairs, prominently nerved. Inflorescence few-flowered, loose; pedicels thin, patulate post anthesis; calyx ca. 1 cm in diameter; petals, stamens and style unknown; receptacle strongly hairy; fruitlets small, whitish, distinctly transversely rugose. Otherwise similar to *P. tranzschelii* and *P. ussuriensis*. Fr. in August.

Rocks. — Far East: Uss. (Suchan and Maikhe rivers). Endemic. Described from Maikhe village in the Maikhe River basin and from the Suchan River valley (Suchan mines). Type and paratype in Leningrad.

Note. *P. aemulans* is based upon a deficient specimen collected after flowering and for this reason its description is incomplete and provisional. As far as could be judged, it occupies an intermediary position between *P. ussuriensis* and *P. tranzschelii*; it has, however, certain features of *P. ancistrifolia* Bge., which V. L. Komarov regarded as *P. aemulans*. It shows only a superficial likeness to *P. ancistrifolia*, especially with regard to the authentic *P. ancistrifolia* Bge. from Eastern Mongolia. The latter is characterized by leaflets not wrinkled above and coarse-hairy beneath only along nerves (without any tomentum) and a glandular-pubescent stem and branches of inflorescence. The Manchurian plant, commonly known as *P. ancistrifolia* Bge., is distinguished from the Eastern Mongolian plant by its leaflets which are rugose, densely pubescent on both sides and gray-tomentose beneath, by its absence of glandular pubescence and, in addition, by its congested inflorescence and smaller flowers; it was recently described under the name of *P. rugulosa* Kitag. However, it seems that *P. ancistrifolia* and *P. rugulosa* Kitag. (Rep. Inst. sc. Res. Manch. I (1937) 260) exhibit an entirely different shape of fruitlet and belong to another group.

Series 3. *Stoloniferae* Juz. — Plants with long creeping shoots; stem and petioles softly pubescent; leaves pinnate; inflorescence poor; pedicels not patulous after anthesis.

141. *P. stolonifera* Lehm., Ind. sem. hort. Hamb. (1831) No. 5 (nomen); Ldb., Fl. Ross. II, 38; Lehm., Rev. Pot. (1856) 44. — *P. fragarioides* var. ϵ *stolonifera* Maxim. in M \acute{e} l. biol. IX (1873) 160, p. p.; T. Wolf, Mon. Pot. (1903) 639. — Ic.: Lehm., Rev. Pot. tab. 15.

216 Perennial; rootstock fibrous, with thinner rootlets than in *P. fragarioides*; caudex covered with relics of petioles and stipules; plant large, vigorous with long and firm, slightly rooting, creeping stolons, often reddish like stem; stems usually ascending or prostrate, 4–45 cm high, about twice as long as leaves of radical rosette, densely covered — like petioles and shoots — with soft spreading hairs, simple or loosely and dichasially branching in upper half to third; radical leaves 2–3(4)-paripinnate, long-petioled, cauline leaves usually ternate, short-petioled; stipules of cauline leaves rather large, ovate, acute, entire or with few acute teeth; leaflets very short-petioluled or subsessile, the three upper 2–6 cm long, 2–3 cm wide, wider than in *P. fragarioides*, more rounded, short-elliptic, rhombic or obovate, broadly cuneate or rounded-cuneate at base, largely and acutely dentate, with rather few teeth, 4–6 at each side, the two lower leaflets not too remote from upper, relatively large, sparingly or rather densely soft-hairy on both sides, densely covered beneath along veins with

dense straight-spreading hairs. Inflorescence few-flowered (1-4- rarely 5-flowered), with branches erect after anthesis (not spreading); flowers large, 18-25 mm in diameter; calyx villous; sepals equal, oblong, acute; petals twice as long as sepals, obcordate, distinctly emarginate, golden yellow; fruitlets oblong-ovoid, rugose, pale olive; style as in *P. fragarioides*. June-August (September).

Rocks, ravines, dry exposed slopes, forest clearings, meadows, and abandoned plowed fields. — Far East: Kamch. **Gen. distr.:** Ber. Described from Kamchatka? Type unknown.

Note. There is some doubt that the just described Kamchatkan plant should be named *P. stolonifera* and not some other more valid name. In the first place, without examining the type of *P. fragarioides* in the Linnaeus Herbarium, it is difficult to say if Linnaeus, who characterized the latter species as "flagellis reptantibus," did not actually have the Kamchatkan plant before him; if so, then *P. stolonifera* should be called *P. fragarioides* L. excl. syn. Gmel. The description of *P. sprengeliana* Lehm. made by Lehmann should be skeptically accepted and might not be maintained at all, since it is extremely doubtful whether the description in his *Mongr. Pot.* referred to the plant to which T. Wolf referred. Notice, for instance, the small number of flowers (1-3), leaves merely 3-paripinnate, stipules of cauline leaves entire, few (usually 5 at each side of upper leaflets) acute teeth; these characters were included in the description, which was apparently based on some specimen originally from Siberia and found in the Willdenow Herbarium (cf. Lehmann, l. c.). We have never seen such a plant in Siberia. On the other hand, it could hardly have come from Sakhalin where *P. sprengeliana* (of the more recent authors) is predominant. It is suspected that Willdenow's plant was really from Kamchatka and actually refers to *P. stolonifera* and that the specimen drawn by Lehmann was incomplete (without shoots); it may be that the shoots were lost during preservation at the herbarium. Willdenow accepted it as *P. fragarioides* and distinguished his *P. poterioides* from it. To support this premise, it should be noted that from Lehmann's description, *P. sprengeliana* is in no way distinguished from *P. stolonifera* except by the absence of shoots; this is attested to in his descriptions of both species and, in particular, by the fact that in Rev. Potent.,²¹⁷ he refers Eschscholtz's specimen from Siberia to *P. sprengeliana* when clearly it should be referred to *P. stolonifera*. In the herbarium of the Botanical Institute there are specimens of these species from the Fischer Herbarium that bear the label "Kamch(atka) Eschsch(oltz); some have stolons and others are without them. It should be pointed out that Sprengel distributed seeds, supposedly of *P. sprengeliana* (from Eschscholtz's plant?), from which the typical *P. stolonifera* (with shoots) was grown at the St. Petersburg Botanical Garden; it is also preserved at the herbarium of the Botanical Institute. That it would be easy to confuse *P. sprengeliana* (Sakhalin) with *P. stolonifera* (Kamchatka), when shoots are absent in the latter and the examination of material at hand is superficial, is apparent from the many misidentifications of this kind made by T. Wolf; for example, he referred Levitsky's plant from Tigil to *P. sprengeliana* and an entire series of specimens from Sakhalin to *P. stolonifera*. An examination of the authentic *P. fragarioides* and *P. sprengeliana* in

the Linnean and Willdenow herbaria will finally lead to a solution of all the problems posed above. — *P. stolonifera* is replaced in Japan by the related *P. japonica* Blume.

Series 4. **Freynianae** Juz. — Plant developing creeping shoots; radical leaves ternate.

142. *P. freyniana* Bornm. in Mitteil. d. Thür. Bot. Ver. N. F. XX (1904) 12; T. Wolf Monogr. Pot. (1908) 639. — *P. ternata* Freyn in Ö. B. Z. (1902) 62, non C. Koch; Kom. Fl. Mansh. II (1904) 496. — *P. fragarioides* var. γ *ternata* Maxim. in Mém. biol. IX (1877) 159 saltem p. p. (quoad pl. mandschuricam). — Exs.: F. Karo, Pl. Amuricae et Zeaëns. No. 128; HFR No. 1924.

Perennial; caudex thick, short, developing very slender simple axillary (?) shoots at summit; stems 8–20 cm high, thin, ascending or erect, remotely covered — like petioles, receptacle and shoots — with straight-spreading hairs; radical leaves with very long and thin petioles, always ternate; stipules with lanceolate auricles; cauline leaves 1–3, short-petioled, with broadly ovate, deeply and acutely dentate stipules; leaflets sessile or short-petioluled, up to 3–5 cm long, rhombic-elliptic or (oblong-) obovate, shortly cuneate at base, acute or obtuse, serrate around except for the base, with many usually very acute teeth; leaves dark green above, remotely rigid-hairy, whitish beneath, with more dense (especially along veins) appressed hairs. Inflorescence loosely corymbiform, few- or usually many-flowered; flowers small, 8–12 mm in diameter; sepals nearly equal in length, lanceolate or oblong, acute, outer sepals narrower than the inner; petals slightly longer than sepals, oblong, or obovate, pale yellow; stamens 20, with linear-oblong anthers; receptacle conoid, distinctly hairy; fruitlets oblong-ovoid, rugose, whitish; style shorter than fruitlets, claviform, with a slightly dilated stigma. End May–July. (Plate XVI, Figure 2).

Ripaerian (inundated) damp meadows; rarely forests. — Far East: Ze.-Bu., Uss. **Gen. distr.:** Jap.-Ch. (Manchuria). Described from the vicinity of Blagoveshchensk. Cotype in Leningrad.

Note. In Japan there is a close race *P. yokusaiana* Makino (*P. freyniana* var. *grandiflora* T. Wolf).

Section 3. **TORMENTILLAE** Rydb., Mon. N. Amer. Pot. (1898); T. Wolf Mon. Pot. (1908) 641. — Stems markedly longer than radical leaves, as ascending, erect, prostrate or creeping, often rooting at nodes, simple or dichasially branching, more or less leafy; radical leaves lanceolate, 3–7-paired. Flowers usually solitary in axils of cauline leaves.

143. *P. erecta* (L.) Hampe in Linnaea XI (1837) 50; Kryl., Fl. Zap. Sib. VII (1933) 1526. — *Tormentilla erecta* L., Sp. pl. (1753) 500. — *Fragaria tormentilla* Crantz, Stirp. Austr. ed. 1, II (1763) 23. — *Potentilla tormentilla* Neck., Hist. comm. Acad. Theod. Palat. II (1770) 491; Ldb., Fl. Ross. II, 51. — *P. silvestris* Necker, Del. Gall.-Balg. I (1768) 222. — *P. tetrapetala* Hall. fil. in Ser. Mus. Helv. I (1818) 1. —

Tormentilla officinalis Curt., Fl. Lond. II, fasc. V (1798) tab. 35.—*T. tuberosa* Ren., Fl. Dep. de l'Orne (1804) 149.—*T. adstringens* Lindem. in Bull. Soc. Nat. Mosc. XXIII, 2 (1850) 480.—*T. recta* Schur, En. Pl. Transsilv. (1866) 188.—*Potentilla strictissima* Zimm. Eur. Art. Pot. (1884) 5.—*Tormentilla alpina* Opiz, Boheims Gew. (1823) 64.—*T. divergens* Rchb., Fl. Germ. exc. (1832) No. 2248.—Ic.: Schlecht., Fl. Deutschl. ed. 5, XXV, tab. 2602.—Exs.: HFR 815.

Perennial; rootstock strongly and unequally thickened, tuberiform, woody; stems 10–20 cm high, erect or ascending, thin, delicate, leafy, repeatedly bi- or or tri-furcate in upper part, like petioles and pedicels usually somewhat short-hairy; radical leaves usually ternate, long-petioled, dying at anthesis; cauline leaves usually sessile, always ternate, with large leaf-shaped deeply incised stipules; leaflets sessile or very short-petioluled, oblong, obovate or lanceolate, cuneate, strongly but remotely incised-serrate from the middle upwards, appressed-hairy on both sides especially beneath along veins, rarely glabrous above and sometimes beneath. Flowers on long thin pedicels, solitary, ca. 1 cm in diameter, tetramerous; calyx hairy, the outer sepals narrower than the ovate-lanceolate inner, all sepals acute; petals slightly longer than sepals, obcordate, emarginate; stamens 15–20, with long filaments and small orbicular anthers; receptacle small, hairy; achenes ovoid, rugose, indistinctly carinate; style subterminal, more or less as long as mature achene, thin, equally thick throughout. June–August (Plate XVI, Figure 3).

Open forests, forest edges, clearings, forest meadows, bogs, fallow fields, pastures.—Arctic: Arc. Eur.; European part: all regions (except for the southernmost); Caucasus: Cisc., Dag., W. and E. Transc.; W. Siberia: Ob, Irt. **Gen. distr.:** nearly all Europe, Asia Minor (Turkish Lazistan). Described from Europe. Type in London.

Economic importance. The roots are rich with tannic substances in addition to a red dye. The plant also possesses styptic materials; in the past it was widely used in medicine (ancient authors even attributed miraculous healing properties to it); it is very popular among the people even now and is used in the treatment of stomach diseases (as tea, broth, or tincture).

144. *P. reptans* L., Sp. pl. (1753) 499; T. Wolf, Mon. Pot. (1908) 655; Kryl., Fl. Zap. Sib. VII (1933) 1527.—*Fragaria reptans* Crantz, Inst. II (1766) 179.—*P. anomala* Ldb., Fl. Ross. II (1844) 53.—*P. reptans* γ *brevipes* Bge. Alex., Lehm. reliq. bot. (1854) 286.—Ic.: Engl., Bot. XII, tab. 862; Schlecht., Fl. Deutschl. ed. 5, XXV, tab. 2599.—Exs.: HFR No. 765.

Perennial; rootstock thick, multicipital; stems very long, 30–100 cm long, creeping, rooting at nodes, hairy; radical leaves long-petioled, 5–7-paired, nearly palmate, stipules scarious, with lanceolate entire auricles; cauline leaves resembling radical leaves but petioles shorter, stipules herbaceous, ovate or oblong, acute, sometimes dentate; leaflets obovate or oblong-obovate, cuneate, incised-dentate or crenate in upper part, with numerous obtuse or acute teeth, glabrescent above, more or less densely appressed-hairy beneath. Flowers solitary, rarely 2, axillary, large, ca. 2 cm in diameter, usually pentamerous; pedicels long, as long as or longer than leaves; sepals varying in length and shape, outer sepals usually

obtuse, the inner acute, accrescent post anthesis; petals broadly obcordate, longer than sepals (sometimes twice), golden yellow; stamens 20, filaments short, anthers large, ovate; receptacle large, conoid; fruitlets oblong-ovoid, rugose; style subterminal, as long as or shorter than mature achenes, with a dilated stigma. June–August. (Plate XVI, Figure 4).

Inundated meadows, coastal slopes, glades and shrubby places, roadsides, ditches. — European part: Lad.-Ilm., U. V., V.-Kama, U. Dnp., V.-Don, M. Dnp., Bl., L.-Don, Transv., L. V., Crim.; Caucasus: all regions; W. Siberia: Ob? U. Tob., Irt.?.; Centr. Asia: nearly all regions. **Gen. distr.:** all W. Eur., As. Min., Iran., Syria, Afghanistan, Kashmir, N. Afr. Described from Europe. Type in London.

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145. **P. flagellaris** Willd. ex Schlecht. in Mag. Ges. naturf. Fr. Berl. VII (1816) 291; Lehm., Monogr. Pot. (1820) 141; id. Rev. Pot. (1856) 185; Ldb., Fl. Ross. II, 52; Kom., Fl. Mansh. II (1904) 507; T. Wolf, Monogr. Pot. (1903) 662; Kryl., Fl. Zap. Sib. VII (1933) 1528. — *P. nemoralis* Bge. in Ldb., Fl. alt. II (1830) 256 p. p. — Ic.: Lehm., Monogr. Pot. (1820) tab. 12.

Perennial; rootstock small, nearly simple; stems few, simple, delicate, filiform, creeping, 10–50 cm long, with few solitary flowers at axils of leaves, at first — like petioles and pedicels — densely hairy later becoming glabrous; radical leaves long-petioled, quinate, cauline leaves resembling the radical but shorter-petioled, gradually reduced in size; stipules ovate-lanceolate, small; leaflets sessile, lanceolate or oblong-cuneate, large and irregularly incised serrate-dentate, with spreading acute unequal teeth, appressed-hairy when young, later glabrescent on both sides or short-hairy beneath along veins. Flowers on long filiform pedicels, small, 8–12 mm in diameter, pentamerous; calyx faintly hairy, outer sepals linear-oblong acute or obtuse, inner sepals slightly longer, lanceolate acuminate; petals obovate, slightly emarginate, about as long as sepals, yellow; staminal disk glabrous; stamens 20, with rather large ovate anthers; receptacle small, subglobose, densely hairy; fruitlets few, oblong-ovoid, slightly rugose, indistinctly carinate; style subterminal, claviform, nearly as long as mature fruitlets, with a slightly dilated stigma. May–July.

Damp meadows, pastures, river and lake banks. — W. Siberia: Ob, Alt.; E. Siberia: Yenis., Ang.-Say., Lena-Kol., Dau.; Far East: Ze.-Bu., Uss. **Gen. distr.:** N. Mong., Jap.-Ch. (Manchuria, Korea, China), Ind.-Him.

Subgenus 7. **CHENOPOTENTILLA** Focke in Naturw. Ver. Bremen X (1889) 415. — Argentina Lam., Fl. Fr. III (1778) 118, p. p. (pro gen.). — Flowers solitary, axillary, borne on creeping stems; sepals, outer sepals and petals 5; petals yellow, clawless, notchless; stamens 20–25, triseriate, filaments short; style lateral, arising almost from middle of fruit, thin, short-filiform (rod-shaped), shorter than fruitlets. — Perennial herbs, with creeping shoots rooting at nodes and interruptedly-pinnate (with many leaflets) linear or linear-lanceolate leaves.

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1. Leaves slightly silky-tomentose beneath, shiny; outer sepals usually incised-dentate; fruitlets large, dorsally sulcate . . . 146. **P. anserina** L.

- + Leaves dull-tomentose or glabrous beneath; outer sepals usually entire; fruitlets smaller, not dorsally sulcate 2.
- 2. Leaves large, with 7–12 pairs of lateral leaflets (without the intercalary ones), always pubescent beneath 147. *P. pacifica* Havell.
- + Leaves not longer than 10 cm, with 2–7 pairs of lateral leaflets, often glabrous beneath 148. *P. egedii* Wormsk.

Series 1. *Anserinae* Lehm., Rev. Pot. (1856) 188 emend. — Leaves silky-tomentose beneath, shiny; outer sepals usually incised or dentate; fruitlets large, with suberous pericarp, dorsally sulcate.

145. *P. anserina* L., Sp. pl. (1753) 495; Ldb., Fl. Ross. II, 44; Kryl., Fl. Zap. Sib. VII (1933) 1529. — *P. argentina* Huds., Fl. Angl. (1762) 195. — *P. anserina* var. *vulgaris* et var. *sericea* Hayne, Arzneigew. IV (1816) 31. — *P. anserina* var. *viridis* Koch, Synops. (1832) 213. — *Fragaria anserina* Crantz, Stirp. Austr. fasc. 2 (1763) 9. — *Argentina vulgaris* Lam., Fl. Fr. III (1778) 119. — *Dactylophyllum anserina* Spenn., Fl. Frib. III (1829) 1994. — *Argentina anserina* Rydb. in Mem. Dep. Bot. Columb. Univ. (1898) 159. — *A. argentea* Rydb. in Bull. Torrey Bot. Club 33 (1906) 143. — Ic.: Engl., Bot. XII, tab. 861; Schlecht., Fl. v. Deutschl. ed. 5, XXV, tab. 2590. — Exs.: HFR No. 665.

Perennial; rootstock fusiformly thickened, fleshy; caudex short and thick, multicipital, covered with brown relics of stipules; floriferous stems thin, usually 15–80 cm long, creeping and rooting at nodes, covered with appressed or slightly spreading hairs; radical leaves numerous, usually 10–20 cm long, with more or less dilated, long white-hairy (like leaf axis) petioles and large stipules with ovate or lanceolate acute auricles, interruptedly pinnate, with (9)13–21(31) leaflets (without the intercalary), oblong-obovate; lower cauline leaves resembling the radical but with shorter petioles and smaller number of leaflets, stipules similar to stipules of radical leaves; uppermost cauline leaves reduced, with few leaflets, stipules connate and with leaf-shaped or partite auricles; leaflets sessile, elliptic or oblong-obovate, the largest 1–4 cm long, acutely and deeply serrate-dentate, glabrous or sparingly appressed-hairy above (v. *vulgaris* Hayne) or silky-hairy (v. *sericea* Hayne), more or less densely silky-tomentose beneath, glossy. Pedicels single (rarely 2) at nodes, 3–10 cm long, longer than leaves; flowers large, 1–2 cm in diameter; calyx silky-hairy, outer sepals as long as inner, usually 3–many-parted, inner sepals broadly ovate, acuminate, entire; petals 7–10 mm long, obovate, notchless at apex, twice as long as sepals, pale yellow; filaments short, anthers ovate; fruitlets large, ovoid, pitted, dorsally sulcate; style shorter than mature fruitlets. May–August. (Plate XVI, Figure 5).

Banks of rivers, lakes and streams, ditches, roadsides and fields, pastures, near dwelling places. — European part: all regions; Caucasus: all regions; E. and W. Siberia: all regions; Far East: Ze.-Bu., Uss., Kamch. (?); Centr. Asia: all regions. **Gen. distr.:** nearly all Europe (absent in large part of the Mediterranean area), Mong., Jap.-Ch., Centr. Asia, Him., Iran. (N.), Syria; N. Am., S. Austr., S. Am. (Chile). Described from Europe. Type in London.

Note. Wolf established a variety of this species — *P. anserina* var. *hirsuta* T. Wolf, Mon. Pot. (1908) 674, with stem, petioles, pedicels and sepals, with horizontally spreading and rigidulous hairs, which might have been a specific geographical Asiatic race with a more southern area of distribution; encountered in the USSR in the Far East (Ussuri) and in Central Asia.

Economic importance. The tuberous thickened roots are used by some people, the Yakuts and Tanguts, for example, as food. The young shoots are eaten as salad and when ground up used as fodder for domestic animals (geese, in particular). They contain tannic substances; in medicine they are used as astringents.

Series 2. **Egedianae** Juz. — Leaves dull-tomentose or glabrous; outer sepals usually entire, fruitlets without spongy pericarp, not dorsally sulcate.

147. *P. pacifica* Howell, Fl. N.-W. Am. I (1898) 444. — *P. anserina* var. *pacifica* Rydb. in North Amer. Fl. 22 (1908) 353. — *P. anserina* var. *grandis* Torr. et Gr., Fl. N. Am. I (1840) 144; Ldb., Fl. Ross. II, 45; T. Wolf, Mon. Pot. (1908) 675. — *P. anserina* var. *grandis* Rydb. in Mem. Dep. Bot. Columbia Univ. II (1898) 161.

Perennial, 10–80 cm; leaves large, 15–30(40) cm long, usually erect, but with petioles and axis glabrous or appressed-hairy, usually interruptedly-pinnate, largest leaflets 15–25, obovate, oval or usually oblong; upper leaves 3–7 cm long, serrate-dentate, teeth obtuse or rather acute, glabrous or slightly appressed-hairy above, densely tomentose beneath, not silky-pubescent or with short, sparse, silky, hairs only on veins. Pedicels 10–20 cm long, slightly silky; hypanthium ca. 1 cm in diameter, silky; outer sepals lanceolate, nearly always entire, inner sepals ovate; petals sub-orbicular, 10–12 mm long; fruitlets ca. 2 mm long, dark brown, rounded at apex, without suberous pericarp and not sulcate dorsally. Otherwise resembling *P. anserina* L. June–August. (Plate XVI, Figure 6).

Far East: Kamch., Sakh., Okh., Uda, Uss. Gen. distr.: N. Am. (Pacific Ocean coastline). Described from Oregon.

148. *P. egedii* Wormsk., Fl. Dan. IX, 27 (1818) 5. — *P. maritima* Steph. in sched. — *P. anserina* var. *groenlandica* Tratt., Ros. Monogr. IV (1824) 13; T. Wolf Mon. Pot. (1908) 676. — *P. anserina* var. *egedii* Torr. et Gr., Fl. N. Am. I (1840) 444; T. Wolf, l. c., 677. — *P. anserina* var. *egedii* Rydb. in Mem. Dep. Bot. Columbia Univ. II (1898) 158. — Ic.: Fl. Dan. IX (1818) tab. 1578.

Perennial, much smaller in all parts than the two preceding species but closer to *P. pacifica*; stems creeping, 10–60 cm long, glabrous; leaves 3–6 (rarely to 10) cm long, with 2–7 pairs of lateral leaflets; leaflets broadly obovate to suborbicular, 0.5–1 cm long, shortly rounded-crenate or crenate-dentate, with obtuse or acute teeth, glabrous or subglabrous above, glabrous or sometimes sparsely tomentose beneath (var. *groenlandica*) Tratt.) but dull, with short silky hairs only on veins. Pedicels 2–5 cm long, glabrous or appressed-hairy above (like petioles); outer sepals ca. 2 mm long, glabrous or appressed-hairy above (like petioles); outer sepals

ca. 2 mm long, linear-lanceolate, entire, inner sepals ca. 4 mm long, ovate, obtuse, often strongly tomentose; petals broadly obovate, 8–12 mm long; fruitlets large, 2.5 mm long, without suberous pericarp, not dorsally sulcate. July–August.

Sandy shores of rivers and seas, tundras.— Arctic: Arct. Eur., Chuk., An.; Far East: Okh., Uss.? **Gen. distr.:** Scand. (Norway), N. Am: (Arctic). Described from Greenland, Holsteinborg. Type in Copenhagen.

Note. Although *P. pacifica* and *P. egedii* sharply differ, it is very difficult to delimit them, and possibly they will subsequently be regarded as forms of one species.

Genus 740. **SIBBALDIA** * L.

L., Sp. pl. ed. I (1753) 284

Flowers in corymbiform inflorescences, small, 5–10 mm in diameter, always bisexual in the Soviet plants; hypanthium patelliform or short-campanulate; sepals and outer sepals 5; petals 5, short, yellow (Soviet species) or purple; stamens 5 (rarely 10), alternating with petals; pistils 5–15; styles lateral or subterminal, claviform (slightly dilating above), nearly as long as ovary; stigma capitate; fruitlets ovoid, smooth, with a constriction in upper part. — Perennials, with prostrate, woody, branching stolons, covered with relics of dead petioles and stipules, developing radical leaves and flower-bearing stems; leaves petiolate, ternate, with dissected 3(5)-dentate leaflets at apex and scarious stipules adnate to petioles.

- 1. Leaves completely glabrous above (Caucasus) 3. *S. semiglabra* C. A. M.
- + Leaves more or less hairy above 2.
- 2. Leaves sparingly hairy above, more densely so beneath. Petals nearly half as long as sepals 3.
- + Leaves more or less densely hairy on both sides. Petals slightly shorter, as long as or longer than sepals 4.
- 3. Leaflets of radical leaves with equally long teeth. . . 1. *S. procumbens* L.
- + Median tooth in leaflets of radical leaves distinctly smaller than the lateral 2. *S. macrophylla* Turcz.
- 4. Petals as long as or slightly shorter than sepals, narrow; leaflets obovate 4. *S. parviflora* Willd.
- + Petals distinctly longer than sepals, wide; leaflets suborbicular 5. *S. olgae* Juz. et Ovcz.

Series 1. **Procumbentes** Juz.— Leaves slightly hairy or glabrescent. Receptacle glabrous or somewhat hairy, with a distinct disk; petals shorter than sepals.

1. *S. procumbens* L., Sp. pl. (1753) 284; Ldb., Fl. Ross. II, 32; Kryl., Fl. Zap. Sib. VII (1933) 1530. — *S. octopetala* Mill., Gard. Dict. ed. 8, (1768) No. 2. — *Potentilla procumbens* Clairv., Man. Herb. (1811) 166

* Named after Robert Sibbald, Edinburgh, naturalist and physician (1643–1720).

(non Sibth.).— *P. sibbaldii* Hall. fil. in Ser. Mus. Helv. I (1818) 51.—
P. sibbaldiana Lehm. in Nov. Act. Nat. Cur. XXIII, Suppl. (1856) 203.—
Dactylophyllum sibbaldia Spenn., Fl. Frib. III (1829) 1034.— Ic.: Ic.
Fl. Dan., tab. 32; Sv. Bot., tab. 761; Muravjova in Acta Inst. Bot. Ac. Sc.
URSS, ser. I, fasc. 2 (1936) 224, f. I.

225 Perennial; rootstock horizontal or oblique, woody, strongly branching
with branches bearing dense tufts of leaf rosettes; radical leaves with
rather long thin petioles; leaflets 1–2 cm long, oblong or obovate, cuneate,
obtuse at apex, with 3 usually acute teeth of equal length (median narrower),
sparingly appressed-hairy above, more densely pubescent with glandulose
hairs beneath (usually only on veins) and at margin; stems shorter than
leaves, 2–4(20) cm high, prostrate or ascending, covered with many appressed
hairs and some stalked glands, few-leaved; cauline leaves resembling the
radical but with shorter petioles; stipules adnate to petioles, obliquely ovate
or lanceolate, glabrescent. Flowers small, in few-flowered rather dense
umbel-like inflorescences, bracteate; hypanthia 3–4 mm in diameter, hairy;
sepals 3–4 mm long, ovate, appressed-hairy at margins and beneath; outer
sepals lanceolate, shorter than the inner; petals 1–2 mm long, shorter than
sepals, lanceolate or oblong-spatulate, yellowish; stamens 5; receptacle with
a distinct disk, slightly hairy; style lateral, short-claviform; fruitlets
usually 5, ovoid, 1–1.2(3) mm long, glabrous, smooth, dark brown. June–July,
Fr. August. (Plate XVII, Figure 2).

Alpine meadows, tundras, stony slopes.— Arctic: Arct. Eur., Chuk.;
European part: Urals; W. Siberia: Ob (estuary of the Ob); Far East: Kamch.,
Commander Islands. **Gen. distr.:** Arc. and Alp. Eur., N. Am. Described
from Lapland. Type in London.

Economic importance. Readily eaten by deer.

2. *S. macrophylla* Turcz. in sched.; cfr. Addenda IX, p. 456.— *S. procumbens* auct. Fl. Sib. et As. Med. pro max. part.

Perennial, usually firmer than *S. procumbens* L.; stems usually as
long as petioles of radical leaves or slightly longer; radical leaves with
long thin petioles; leaflets distinctly petioluled, 1–3 cm long, 0.5–2 cm wide,
obovate, tapering at base, with 3, sometimes 5, short, broadly semiovate teeth
abruptly terminating in a small dark red mucro, the median usually smaller
and shorter than the lateral, sparsely appressed-hairy above, more densely
so beneath, hairs usually long, somewhat rigidulous; stems generally 3–10 cm
high, ascending or nearly erect, rather firm, covered with dense appressed
or usually loosely appressed, sometimes straightly spreading hairs, few-
leaved; cauline leaves 1–3, with leaflets narrower than those of radical
leaves or entire; stipules adnate to petiole, with broadly ovate, thin-
acuminate, appressed-hairy (especially along midrib) auricles. Flowers
small, in few-flowered rather compact corymbiform inflorescences; bracts
trifid (lateral lobes corresponding to stipules) or just lanceolate; pedicels
short; hypanthia rigid-hairy; sepals ovate, acuminate, one and a half times
as long as the lanceolate outer sepals; petals shorter than inner sepals,
yellowish, obovate, ca. 2 mm long and 1 mm wide; stamens 5; fruitlets
usually 5, smooth. June–July. Fr. August.

226 Stony slopes in the alpine zone, mountainous tundras.— W. Siberia: Alt.;
E. Siberia: Ang.-Say., Dau.; Far East: Uss. (Botchi River valley) (?);
Centr. Asia: Dzu.-Tarb., T. Sh. **Gen. distr.:** Mong. Described from Dauria.
Type in Leningrad.

Note. Turczaninow's species is described here for the first time. It is common to South Siberia and completely absent in the Arctic. *S. macrophylla* is only very slightly different from the Arcto-Alpine *S. procumbens* and is distinguished mainly by the dentation of leaflets; even this character is rather variable. However, we have attempted to separate them, believing that it will stimulate other authors to study them in greater detail.

Economic importance. In contrast to the previous species, this plant is probably not eaten by cattle (B. K. Shishkin, oral communication).

3. *S. semiglabra* C. A. M. in Beitr. z. Pflanzenk. d. Russ. Reich. VI (1849) 44; Grossg., Fl. Kavk. IV (1934) 318.— *S. parviflora* var. *minor* Boiss., Fl. Or. II (1872) 726.— *S. parviflora* var. *semiglabra* Trautv. in A. H. P. V (1877) 430.— *S. caucasica* C. A. M. in sched.— Ic.: Muravjova in Acta Inst. Bot. Sc. URSS, ser. I, fasc. 2 (1936) 226, f. 2.

Perennial; rootstock thin to rather thick; stems as long as or shorter than petioles of radical leaves, longer in fruit; radical leaves petioled, 0.5–5 cm long; leaflets short-petioluled or sessile, 1–2 cm long, 0.7–1.4 cm wide, broadly obovate, sometimes suborbicular, tapering toward base, with 3, rarely 5, large, broad, slightly acuminate teeth at apex, the median distinctly narrower than the lateral, as long as or shorter than them, usually completely glabrous above, remotely or sparsely appressed-hairy beneath (more dense only on midrib and partly on lateral ribs) or completely glabrous, appressed-ciliate along margins; stipules scarious, glabrous, often reddish; stems 1–7 cm high, slightly ascending at base, delicate, remotely or sparsely appressed-hairy. Inflorescence 3–6-flowered, loose; pedicels short to relatively long; hypanthium covered with remote or sparse appressed hairs; sepals oblong-ovate, slightly acuminate, often (nearly) glabrous, outer sepals nearly half as long as the inner, lanceolate, with a distinct annular ridge at the inner base of sepals; receptacle usually glabrous, rarely slightly hairy; petals visibly shorter than sepals, yellowish, narrowly obovate; stamens 5; pistils 5–8. Otherwise similar to *S. procumbens*. June–July. Fr. August.

Alpine, rarely subalpine, meadows and pastures, taluses. — Caucasus: Cisc., E., W. and S. Transc., Dag. **Gen. distr.:** As.-Min. Described from the alpine region of W. Caucasus and also from Kazbek and Alagez. Type in Leningrad.

Note. Together with typical *S. semiglabra* in the Caucasus, there are often forms distinguished by leaves remotely hairy above, rather densely hairy beneath, and by narrower leaflets; in these characters these forms approach *S. parviflora* Willd., but in other respects they are closer to *S. semiglabra*. We found such a form, which we call *S. ambigua* Juz., in large quantities atop Achishkho Mountain in W. Transcaucasia (Krasnodar Territory). It is very probable that these are hybrid derivatives (see also Note to *S. parviflora* Willd.).

Series 2. **Cuneatae** Juz. — Leaves usually more or less densely hairy on both sides. Receptacle hairy; disk not visible; petals as long as or longer than sepals.

4. *S. parviflora* Willd. in Neue Schrift. d. naturf. Ges. z. Berl. II (1799) 125; C. A. M., Beitr. z. Pflanzenk. d. Russ. Reich. VI (1849) 44; Grossg., Fl. Kavk. IV (1934) 318. — *S. procumbens* var. *pilosior* Trautv., in A. H. P. V (1877) 430. — *S. procumbens* var. *orientalis* Somm. et Lev. in A. H. P. XVI (1900) 159. — Ic.: Willd., l. c., tab. 5, f. 4; Muravjova in Acta Inst. Bot. Ac. Sc. URSS ser. I, fasc. 2 (1936) 228, f. 3.

Perennial; rootstock woody, prostrate, covered with relics of old petioles, branching with branches developing rosettes of leaves and low stems at summit; leaves 0.5–6(10) cm long, petiolate; leaflets 0.5–2(2.5) cm long and 0.4–1.2(1.5) cm wide, oblong-cuneate or obovate, tapering at base, with 3(5) acute or acuminate teeth at apex, the median smaller than the lateral, more or less densely pubescent on both sides with appressed long rigidulous hairs on small tubercles; stipules scarious, appressed-hairy on midrib; stems 1.3–6(8) cm high, usually longer than petioles of radical leaves, usually ascending at base, more or less thick, densely covered with appressed or straight-spreading long hairs. Inflorescence dense, capitate, later corymbiform, 3–6-flowered; flowers 2–6 mm long, on short thick pedicels; hypanthium and calyx long bristly-hairy; sepals lanceolate or oblong-ovate, acute or acuminate, outer sepals nearly half as long as the inner, lanceolate, acute; annular ridge (disk) not visible; receptacle hairy; petals 2–2.5 mm long, 1–1.5 mm wide, as long as or slightly shorter than sepals, obovate or oval, yellow; stamens 5; pistils 7–15; fruit smooth. June–July, Fr. August.

Rocks, stony places, pastures, roadsides, exposed areas in the alpine and subalpine zones. — Caucasus: Cisc., E., W. and S. Transc. **Gen. distr.:** As.-Min., Iran. Described from Cappadocia. Type in Berlin.

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Note. A rather polymorphic species. Forms of *S. semiglabra* C. A. M. have been observed in the Caucasus that approach *S. parviflora*, and likewise in *S. parviflora*, there are forms with floral structure typical for this species but differing from it by the slightly and softer hairy leaves and by the shape of their wide leaflets, uncharacteristic for *S. parviflora*. Such forms are known to us from Ciscaucasia and Eastern and Southern Transcaucasia. Field observations are necessary to determine whether they are hybrids or just modified derivatives (the first possibility appears more likely).

5. *S. olgae* Juz. et Ovcz. sp. nova in Addenda IX, p. 456. — *S. cuneata* Muravjova in Acta Inst. Bot. Ac. Sc. URSS, ser. I, fasc. 2 (1936) 231 p. p. (quad pl. ex As. Med.), non Hornem.

Perennial, small plant; rootstock woody, branching, covered with dark brown relics of stipules; flower-bearing stems short, 0.5–2 cm high; petioles 2–10 mm long; leaflets small, suborbicular, rounded or broadly cuneate at base, truncate at apex, with 3 large obtuse teeth, thin simple-hairy on both sides, usually rather sparsely so above; stipules ovate, slightly hairy at lower side (mainly at apex). Flowers 2–4, at summit of stem; calyx and pedicels with many appressed hairs; outer sepals linear or narrowly lanceolate, two-thirds as long as and two to three times narrower than inner sepals; petals 1.5–2 mm long and wide, orbicular or broadly obovate, slightly longer than calyx, whitish when dry; stamens 5; pistils few; fruitlets ovoid, smooth. July.

Exposed slopes in the alpine zone. — Centr. Asia; T. Sh. (Kirghiz Ala-Tau), Pam.-Al. (Karategin). Endemic. Described from Karategin, from the upper reaches of the Myn-Bulak River. Type in Leningrad.

Genus 741. **DRYADANTHE** * Endl.

Endl., Gen. (1840) 1242.

Flowers short-pedicelated, 1–2 at ends of short branches, 7–8 mm in diameter, unisexual in dioecious plants; sepals and outer sepals 4; petals 4, slightly longer than sepals, ovate; stamens 4, abortive in pistillate flowers; pistils 4, absent in staminate flowers; styles lateral, erect; stigma capitate; fruitlets smooth, glabrous. — Perennials, with woody roots and stems; stems prostrate and columnar, forming compact tufts or cushions; leaves petiolate, ternate; leaflets sessile, obovate, the lateral bidentate, the median tridentate. Monotypica genus.

229 1. **D. tetrandra** (Bge.) Juz. comb. nova. — *Sibbaldia tetrandra* Bge. in Mém. pres. Ac. Sc. St.-Pétersb. II (1835) 539; Lipsky in A. H. P. XXVI (1909) 286; Kryl., Fl. Zap. Sib. VII (1933) 1532. — *D. bungeana* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 342; Ldb., Fl. Ross. I (1844) 33. — *D. pusilla* Walp., Repert. II (1843) 37. — *D. altaica* Bge. in herb. ex Lipsky, l. c. — *Chionice dioica* Bge. in litt. ex Ldb., l. c. — *Potentilla tetrandra* Hook., Fl. Brit. Ind. II (1879) 347. — *Sibbaldia procumbens* var. *tibetica* Hook. et Thoms. herb. ex Hook., Fl. Brit. Ind. II (1879) 346 (in syn.).

Perennial; rootstock woody; rhizome procumbent, long, branching; stems woody, some very short, 1–2 cm long, columnar, closely crowded, others long, 10–15 cm long, prostrate, covered below with brown stipules and green-leafy only above, forming dense tufts or cushions difficult to pull up; leaves short-petioled, ternate; leaflets sessile, cuneately obovate, wide or narrow, often longitudinally folded, silky-whitish or canescent with long hairs on both sides, rarely green (mainly when mature) but always hairy; lateral leaflets bidentate at apex, the median tridentate, with a distinctly smaller median tooth; stipules scarious, wide, connate, sheathlike, long-hairy, with ovate acuminate auricles. Flowers almost overtopped by leaves 1–2 borne at ends of usually short branches, on short, rarely rather long, axillary pedicels, with simple entire bracts and 2 stipules at base, normally unisexual plants, dioecious, 7–8 mm in diameter; hypanthium and calyx hairy; sepals always 4, triangular-ovate, acute, 2–2.5 mm long, outer sepals three-fourths as long as and 3–4 times narrower than inner sepals, linear-oblong, obtuse; petals 4, somewhat longer than sepals, 2.5–3.5 mm long, obovate or sub-elliptic, slightly emarginate, straw-colored; stamens 4, abortive in pistillate flowers; pistils 4, completely absent in staminate flowers; styles lateral, erect; stigma capitate; fruitlets smooth, glabrous. July. (Plate XVII, Figure 3).

Rocks, stony slopes in alpine zone, gravelly tundras. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. **Gen. distr.:** Tib., Him. Described from mountain tops along Chuya River. Type in Leningrad.

Genus 742. **SIBBALDIANTHE** ** Juz. gen. nov.

Juz. in Addenda IX, 457.

Flowers usually solitary, on long thin pedicels, in axils of upper cauline leaves, small, bisexual; hypanthium patelliform; sepals and outer sepals 5,

* From *dryas* — *dryad* and *anthe* — flower.

** From *Sibbaldia* and *anthe* — flower.

230 short, pale yellow; stamens 10, opposite to petals; pistils 9–15, nearly basal, longer than ovary, fusiform (dilated at middle); achenes rather broadly ovoid, rugose. — Perennials, with a long root bearing short tufted shoots. Leaves petiolate, ternate; lateral leaflets sessile, lanceolate, entire, the median petiolate, tripartite, with tridentate median lobe. — Monotypic genus.

1. *S. adpressa* (Bge.) Juz. comb. nova. — *Sibbaldia adpressa* Bge. in Ldb., Fl. alt. I (1829) 428; Ldb., Fl. Ross. II, 33; Kryl., Fl. Zap. Sib. VII (1933) 1531; Muravjova in Act. Inst. Bot. Ac. Sc. URSS, ser. I, fasc. 2 (1936) 237. — *S. fragariastrum* (sphalm. *fraganiastrum*) Turcz. in sched. ex Ldb., l. c. — *Potentilla bifurca* var. *unijuga* T. Wolf, Monogr. Pot. (1908) 65. — Ic.: Ldb., Ic. pl. Fl. Ross. III, tab. 276; Muravjova, l. c., 237, f. 7.

Perennial; root vertical, woody, producing at summit numerous, prostrate or erect, elongated or short stems forming small tufts; radical leaves with long thin petioles, broadly ovate or oblong, ternate; lateral leaflets sessile, linear-lanceolate, entire, acute, median leaflet long petioluled, trisect with lateral lobes similar to lateral leaflets, and with a broader obtuse, apically tridentate median lobe, acutely toothed (whole leaf appearing biparipinnate-partite); leaves grayish green, covered — like petioles — with coarse appressed hairs on both sides, sparsely above, more dense beneath (especially along veins); stipules linear-lanceolate, ciliate at margin, with narrow acute auricles; stems 4–15 cm long, prostrate or ascending, delicate, indurate, usually slightly longer than radical leaves, appressed-hairy, few-leaved; cauline leaves 1–4, with shorter petioles, all or only the upper with entire terminal lobe, otherwise resembling radical leaves. Flowers few, solitary in axils of cauline leaves, rarely developed in axils of a lower leaf, 2(4)-flowered branch; pedicels rather long, later slightly bent; hypanthium 2–3 mm in diameter, flat, like calyx strongly accrescent in fruit, coarsely appressed-hairy; sepals ovate, acuminate, appressed in fruit, outer sepals much narrower and nearly as long as inner sepals, linear-lanceolate; 233 petals ca. 2 mm long, nearly as long as sepals, oblong-obovate or spatulate, pale yellow; stamens usually 10; receptacle hairy; pistils 9–15; style longer than ovary, lateral, arising below middle of ovary, fusiform, markedly thickened in the middle; achenes few, obliquely broadly ovoid, with network of thick veins (rugae). May–June. (Plate XVII, Figure 1).

Stony and gravelly mountainous and coastal slopes, steppes, sands, solonchaks. — W. Siberia: Alt.; E. Siberia: Lena-Kol. (Olekminsk District), Ang.-Say., Dau.; Centr. Asia: Dzu.-Tarb. **Gen. distr.:** N. Mong., Jap.-Ch. (China), Tib. Described from Altai between the Kan and Chuya rivers. Type in Leningrad.

Genus 743. **CHAMAERHODOS** * Bge.

Bge. in Ldb., Fl. Alt. I (1829) 429.

Flowers small, in paniculate or often corymbiform inflorescence, sometimes solitary; hypanthium obconical (pyriform), campanulate or

* From *chamai* — dwarf and *rhodon* — rose, because of the small dimensions of this rosaceous plant and in particular of its flowers.

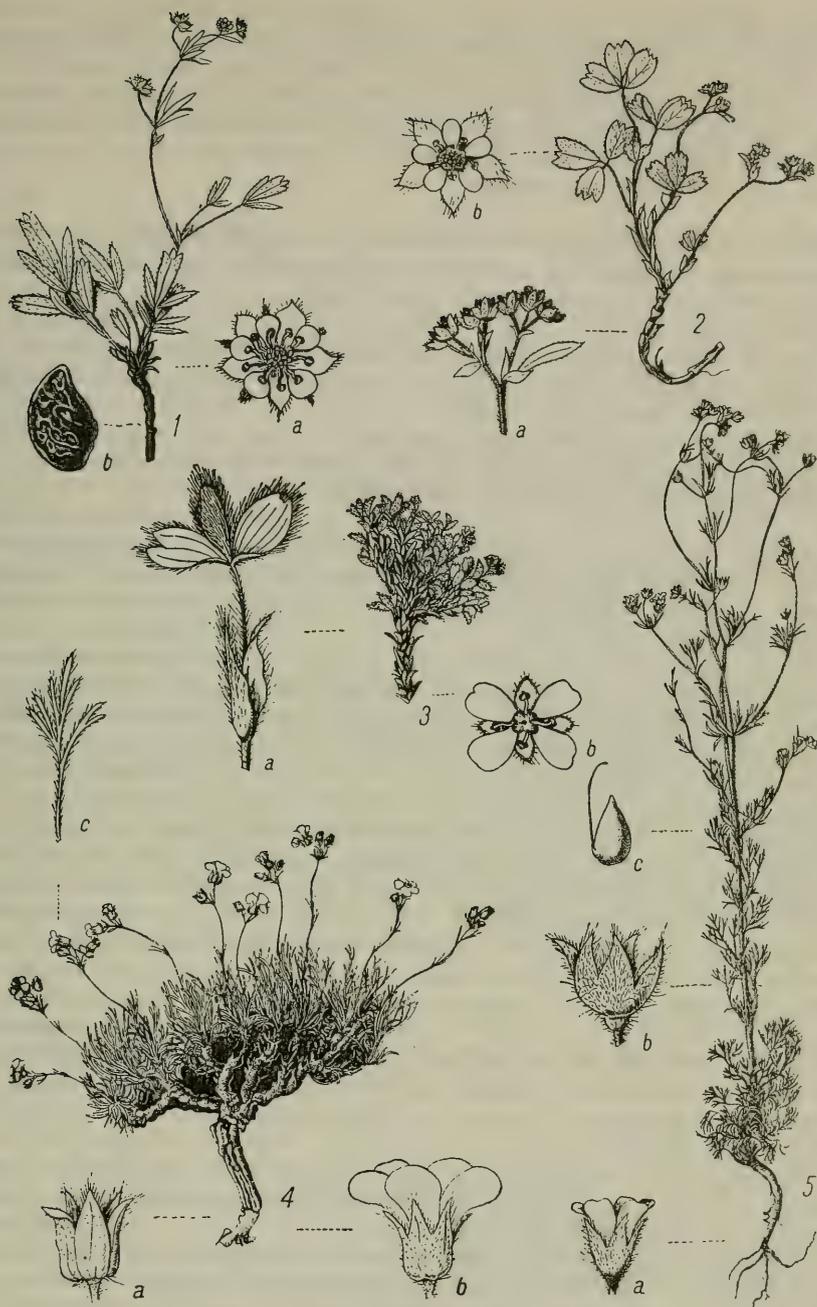


PLATE XVII. 1 - *Sibbaldianthe adpressa* (Bge.) Juz., general view, a) flowers, b) fruit; 2 - *Sibbaldia procumbens* L., general view, a) inflorescence, b) flowers; 3 - *Dryadanthe tetrandra* (Bge.) Juz., general view, a) leaves, b) flowers; 4 - *Chamaerhodos trifida* Ldb., general view, a) calyx, b) flowers, c) leaves; 5 - *C. erecta* (L.) Bge., general view, a) flowers, b) calyx in fruit, c) fruit.

subcylindrical; calyx persistent; outer sepals absent; petals 5, as long as or longer than sepals, white or pink. Stamens 5, arranged opposite petals, short; disk long coarse-hairy at margin. Pistils 5–10, rarely more, on narrow receptacle, sometimes hardly visible; styles basal, falling, with capitate stigma. Achenes surrounded by hypanthium, glabrous.— Herbs or undershrubs, with alternate leaves dissected into narrow lobes; stipules scarious at base, adnate to petioles.

- 1. Flowers rather large, up to 8 mm long, sometimes even longer; hypanthium campanulate with truncate, rounded or slightly tapering base, constricted or not in the middle; petals longer than calyx (sometimes twice) 2.
- + Flowers small, not more than 5 mm long; hypanthium pyriform or broadly obconical, constricted just above base; petals shorter, as long as or slightly longer than calyx 4.
- 2. Branches of inflorescence and pedicels covered with long-stalked glands and long simple hairs. Sepals acuminate. Plant forming small loose tufts; stems tall, many-flowered 1. *C. grandiflora* (Pall.) Ldb.
- + Branches of inflorescence and pedicels covered with short-stalked glands and short simple hairs, sometimes the latter absent. Sepals acute or obtuse. Plant forming large compact tufts; stems usually low, rather few-flowered 3.
- 234 3. Radical leaves tripartite, with lobes 3-sect. Stems and branches of inflorescence covered with short-stalked glands mixed with simple hairs. Hypanthium and calyx with many glandular and simple hairs covering their entire surface or, at least, at margins of sepals and base of hypanthium and along ribs 2. *C. altaica* (Laxm.) Bge.
- + Lobes of radical leaves entire or 2–3-fid. Stems and branches of inflorescence sparsely covered with very small glands or (nearly) glabrous. Hypanthium and calyx slightly pubescent with simple hairs, sometimes only along margin of sepals and at base of hypanthium, and with sparse, very small glands 3. *C. trifida* Ldb.
- 4. Perennials, many-stemmed. Radical leaves rosetted, persistent at fruiting, with wide, rounded at apex lobes, distinctly larger than the reduced cauline leaves. Sepals short, acute, erect; achenes shiny 4. *C. sabulosa* Bge.
- + Biennials with one or few stems. Radical leaves usually withering at fruiting, with narrowly linear obtuse lobes, hardly distinguished from lower cauline leaves. Sepals long- and thin-acuminate, recurved in fruit; achenes dull 5.
- 5. Siberian plant. Stems covered above usually with long-stalked glands and short soft simple hairs; hypanthium and calyx sparsely and shortly appressed-hairy, with many glands above 5. *C. erecta* (L.) Bge.
- + Dzungarian plant. Stems covered above with short glands and often with longer simple hairs; hypanthium and calyx densely covered with long coarse hairs, with glands usually only at base of hypanthium 6. *C. songarica* Juz.

Section 1. **CODONOCALYX** Juz.— Flowers rather large, usually 5–8 mm long; petals longer than calyx (sometimes two times); hypanthium campanulate, with or without a constriction at the middle.

There are 3 series in this section; the two described below occur in the USSR, and the third is series *Canescentes* Juz. with two species, *C. canescens* J. Krause and *C. corymbosa* Murav., common to China.

Series 1. **Grandiflorae** Juz.— Branches of inflorescence and pedicels with long-stalked glands. Sepals acute.

1. ***C. grandiflora*** (Pall.) Ldb., Fl. Alt. I (1829) 431, in nota; Ldb., Fl. Ross. II, 34.— *Sibbaldia grandiflora* Pall. sec. Willd. Mss. ex Schult., Syst. veg. VI (1820) 770.— *C. grandiflora* var. *arctica* N. H. Nilsson in sched.— Ic.: Ldb., Ic. plant. fl. Ross. illustr. (1831) tab. 271.

Perennial, with woody vertical root and short or rather long, flexuous, woody, epigeal shoots forming loose tufts; radical leaves 1.5–4.5 cm long, tripartite, with lateral lobes 2-sect into 3–5-fid lobules and median lobe tripartite with 3–5-fid confluent lobules, lanceolate or sublinear, acute or obtuse, densely glandulose-pubescent mixed with simple hairs; stems few, elongate, erect or ascending, densely covered with glandular hairs of different lengths, glands often very long with multicellular ("jointed") stalks; cauline leaves similar to the radical, with entire or 2–3-partite stipules. Inflorescence loosely dichasially branching, paniculate, many-flowered, branches glandulose-villous; flowers large; hypanthium (with calyx) 5–8 mm long, 3.5–5 mm wide, campanulate, truncate or rounded at base; sepals nearly as long as hypanthium, lanceolate, acuminate, densely covered with long simple rigidulous hairs and stalked glands; petals pink, 4.5–6 mm long, 4–5.5 mm wide, twice as long as calyx, broadly obovate or suborbicular, notched at apex, tapering to a claw; pistils 12–20 (usually 15). May–August.

Dry mountain slopes, pine forests, stony slopes, sands, dunes, rocks and gravels along riverbanks.— E. Siberia: all regions. **Gen. distr.:** Mong. Described from Dauria, Selenga River. Type in Berlin.

Series 2. **Altaicae** Juz.— Branches of inflorescence and pedicels pubescent with short-stalked glands and short simple hairs, sometimes hairs absent. Sepals acute or obtuse.

2. ***C. altaica*** (Laxm.) Bge. in Ldb., Fl. Alt. I (1829) 429; Ldb., Fl. Ross. II, 35; Kryl., Fl. Zap. Sib. VII (1933) 1534.— *Sibbaldia altaica* Laxm. in Nov. Comm. Ac. Petrop. XVIII (1774) 527.— *C. altaica* var. α *acaulis*, β *orientalis* (saltem pro parte) et γ *alpestris* Bge. in Ann. des Sc. natur., seconde sér., tab. XIX (1843) 177.— *C. alpestris*, *C. gracilis* et *C. turczaninowii* Bge. in sched. sec. Muravjova in Bull. Jard. Bot. Princip. URSS XXVII, 1 (1928) 43.— Ic.: Laxm., l. c., tab. VI, fig. 2.

Perennial undershrub with thick woody roots; shoots woody, firm, branching, prostrate, covered with peeling dark brown bark and with relics

of dead leaves above, forming dense compact tufts; radical leaves 2.5 cm long, petiolate, tripartite, with lateral lobes entire or 2-3-sect into oblong-linear segments, densely covered with small glandular hairs and with rigid bristly hairs usually covering the glandular pubescence; stems reduced, up to 6 cm high, sometimes almost absent, sometimes twice as long as radical leaves, densely covered with short simple and short-stalked glandular hairs, leafless or few-leaved; cauline leaves similar to the radical, petiolate, tripartite; stipules entire or absent. Flowers solitary or 3-5, proximate; hypanthium (with calyx) up to 7 mm long, tubular or campanulate, like petals covered with many simple and glandular hairs, tapering at base; sepals oblong, usually obtuse, as long as or slightly shorter than hypanthium; petals 5 mm long, 4.5 mm wide, broadly obovate, rounded or slightly emarginate at apex, tapering into a claw, hardly longer than sepals; pistils 6-10 (usually 10). June.

Rocks, stony taluses, sand dunes and dry mountain slopes in the subalpine mountain zone. — W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau.; Centr. Asia: Dzu.-Tarb. (reported by Krylov for Tarbagatai). **Gen. distr.:** Mong. (N.). Described from Altai. Type unknown.

3. *C. trifida* Ldb., Fl. Ross. II (1844) 34; Zinserling in Not. system. ex Herb. H. B. P. t. II, fasc. 19 (1921) 75. — *C. altaica* var. *mongolica* Trautv. in A. H. P. 1, fasc. II (1872) 177. — *C. mongolica* Muravjova in Bull. Jard. Bot. Princip. URSS XXVII, 1 (1928) 45, vix autem *C. mongolica* Bge. in Del. Sem. a. 1842 Hort. Dorp. (1842) VIII. — *C. klementzii* Muravjova, l. c., 47 saltem pro maxim. parte. — Ic.: Muravjova, l. c., p. 46, fig. 2 (*mediocris*).

Perennial undershrubs with woody root, forming loose glaucous green tufts; radical leaves 1.5-4 cm long, tripartite, with linear, entire or 2-3-sect lobes, covered with hairs and glands; stems erect or ascending, hairy or (in lower part) glabrous or slightly pubescent, 5-15 cm high, much longer than radical leaves, leafy, lower cauline leaves petiolate, tripartite, with entire stipules, upper cauline leaves sessile, 3-5-partite; bracts trifid or linear. Inflorescence dichasially branching, usually many-flowered, with 15-20 flowers; hypanthium (with calyx) 3.5-5.5(7) mm long, truncate at base, short-hairy only at base, otherwise hairless, slightly glandulose; sepals triangular, almost as long as hypanthium, long-ciliate at margins; petals 4.5-6 mm long, 5.5 mm wide, one and a half to twice as long as calyx, obovate, tapering into a claw, pink; pistils 6-10. June. (Plate XVII, Figure 4).

Steppes, stony and sandy slopes. — E. Siberia: Dau. (E.). **Gen. distr.:** Mong. Described from Dauria. Type in Leningrad.

Note. This species is unquestionably closely related to *C. altaica* (Laxm.) Bge. with which it is connected by intermediate forms; the many specimens from Dauria and Mongolia at the herbarium of the Botanical Institute apparently came from areas where *C. altaica* and *C. trifida* meet. The first who correctly observed the closeness of Lomonosov's Mongolian plant to *C. altaica* was Trautvetter; he referred it to *C. altaica* as a "variety," *C. altaica* var. *mongolica* Trautv., considering it — as is seen from the name of this variety — identical to *C. mongolica* Bge. The latter species, however, remains rather problematic without a definite determination, since it was incompletely

described (the character of the pubescence of the hypanthium is lacking), and because of the absence of authentic specimens (apparently preserved in Paris). In any case, there is no Mongolian plant in the herbaria accessible to me that could represent the typical *C. trifida* and that was collected earlier than 1842 when Bunge established his *C. mongolica*; there are a few specimens from Mongolia which were collected by that date that are intermediate forms between *C. altaica* and *C. trifida* (among them specimens collected by Bunge himself). The name *C. mongolica* most probably refers to one of such intermediate forms.

Section 2. **PYROCALYX** Juz.— Flowers small, 3–5 mm long; petals shorter or slightly longer than calyx; hypanthium pyriform or broadly campanulate, with a constriction slightly above base.

Series 1. **Sabulosae** Juz.— Perennials, with rosette of radical leaves persistent in fruiting. Calyx teeth short, erect. Fruitlets glossy.

4. *C. sabulosa* Bge. in Ldb., Fl. Alt. I (1829) 432; Ldb., Fl. Ross. II, 35; Kryl., Fl. Zap. Sib. VII (1933) 1535.— Ic.: Ldb., Ic. pl. Fl. Ross. illustr. (1831) tab. 257.

Perennial undershrubs with woody vertical root developing cespitose short epigeal shoots covered with relics of dead leaves and bearing dense rosettes of radical leaves at summit, forming loose or rather dense tufts; radical leaves 1–3 cm long, more or less long-petioled, tripartite, with lobes 3-sect into entire (especially the lateral) or 2–3-fid spatulate lobules, rounded at apex, densely covered with simple hairs mixed with short-stalked glands; stems 6–10(18) cm long, numerous, prostrate or ascending, indurate, short-glandulose; cauline leaves few, similar to radical leaves but smaller, with entire stipules, sometimes cauline leaves absent (except for bracts). Inflorescence compressed at anthesis, later becoming loose, paniculate-corymbiform, many-flowered; hypanthium pyriform or broadly campanulate, together with calyx 2–4.5 mm long; sepals ovate, acute (not acuminate), usually as long as hypanthium, erect; petals linear-spatulate or cuneate, rounded at apex, 2–3 mm long, ca. 1 mm wide, shorter than or as long as calyx; pistils (5)6–8(10). June–August.

Sands and gravels along riverbanks.— W. Siberia: Alt.; Centr. Asia: T. Sh., Pam.-Al. (Pamir). **Gen. distr.:** Mong., Dzu.-Tarb., Tib. Described from sandy islands in Chuya River next to estuary of Chegan-Uzun River. Type in Leningrad.

Series 2. **Erectae** Juz.— Biennials, often with rosette of radical leaves dying at fruiting. Sepals long-acuminate, recurved in fruit. Fruitlets dull in shade.

5. *C. erecta* (L.) Bge. in Ldb., Fl. Alt. I (1829) 430; Ldb., Fl. Ross. II (1844) 33; Kryl., Fl. Zap. Sib. VII (1933) 1533.— *Sibbaldia erecta* L., Sp. pl. I (1753) 284.— *S. polygyna* Willd. Mss. ex Schult., Syst. veg. VI (1820) 770.— *C. erecta* α *stricta* Ldb., Fl. Ross. II (1844) 34.—

C. erecta β *adscensens* Ldb., *ibid.*— *Ic.*: Amman., *Ruthen.* (1739) tab. 15; Lam., *Illustr.* I (1797) tab. 221, f. 2 (mala).— *Exs.*: HFR No. 1324.

Biennial, with thin woody flexuous root and dense rosette of radical leaves usually dying at fruiting; radical leaves (1)4.5 cm long, tripartite, lateral lobes 2-sect, the median often 3-sect into 3–5-fid or lobular segments with lobules long and obtuse, covered with simple hairs mixed with short-stalked glands; stems solitary, rarely few, elongate, 10–60 cm high, often delicate, erect or rarely arcuately ascending, straight or rarely flexuous, often branching only in upper half, densely covered with short soft simple hairs and more or less long stalked glands, green or often (usually only in fruit) reddish or dirty purple, very leafy; cauline leaves similar to the radical, with tripartite stipules. Inflorescence repeatedly dichasially branching, paniculate, later loose, many-flowered; pedicels long, thin; hypanthium 3.5–4 mm long, pyriform or turbinate or broadly campanulate; sepals ovate-lanceolate, acuminate, as long as or slightly longer than hypanthium, often divaricate, recurved at apex, sparsely covered — like hypanthium — with short coarse hairs, profusely glandulose above; petals 3 mm long, 2 mm wide, almost as long as or slightly longer than calyx, obovate, emarginate, tapering into a cuneate claw, pale pink or white; pistils 10–15. June–August. (Plate XVII, Figure 5).

Dry mountain, often stony slopes, pebbly-gravelly taluses, stony outcrops, steppe plains, pine forests, dry meadows, pastures, waste lands, sandy riverbanks, dunes, gravels.— *W. Siberia*: U. Tob., Irt., Alt.; *E. Siberia*: Lena-Kol., Ang.-Say., Dau.; *Far East*: Ze.-Bu., Uss. (Voroshilov).

239 **Gen. distr.:** Dzu.-Kash., Mong., Jap.-Ch. Described from Dauria (from Gmelin specimens). Type in London.

Note. Series *Erectae* Juz., one of the members of which is the previously mentioned species, consists of the somewhat indistinct and apparently still young geographical races of the species-aggregate *C. erecta* s. l., and partly of allied intermediate forms. Only the North American representatives of this series, *C. nuttallii* Pickering and *C. keweenawensis* (Fern.) Juz., have been satisfactorily studied. *C. micrantha* J. Krause in Fedde, *Rep. spec. nov. Beih. Bd. XII* (1922) 411, which was recently described from China pertains here. Besides the typical *C. erecta* s. str., only one form of this series occurs in the USSR, but it has never been noted; its characteristics are given below.

6. *C. songarica* Juz. sp. nov. in *Addenda IX*, p. 457.— *Exs.*: *Edit. H. Bot. Petri Magni* No. 71.

Biennial, plant often branching from base, less delicate than *C. erecta*, with denser inflorescence and shorter thicker pedicels; stems often reddening early, dark purple, covered — like branches — with shorter stalked glands less dense than in *C. erecta*, often hidden (especially in upper branches) by longer and coarser simple hairs. Hypanthium and calyx densely covered with long coarse hairs, glands observed usually only at hypanthium base. Otherwise similar to the preceding species. June–July.

Centr. Asia: Dzu.-Tarb. **Gen. distr.:** Dzu.-Kash. Described from Kopal (Lipsky). Type in Leningrad.

Genus 744. **WALDSTEINIA** * Willd.

Willd. in Neue Schrift., Ges. naturf. Fr. Berlin II (1799) 105, tab.4.—*Comaropsis* L.C.Rich. in Nestl. Monogr. Pot. (1816) 16.

Flowers in very loose inflorescence; hypanthium infundibular; outer and inner sepals 5; petals 5, small or medium-sized, yellow; stamens numerous; receptacle short, dry; pistils 2–6, style articulated at base and capitate stigma; fruitlets nut-shaped. Herbs, forming loose or dense tufts, with rosette of radical leaves, leaves lobed or compound.

1. Plant with underground [sic] creeping stolons; leaves ternate. Petals without auricles at base 1. *W. ternata* (Steph.) Fritsch.
- + Plant without creeping stolons; leaves simple, lobed. Petals with 2 auricles at base 2. *W. goeoides* Willd.

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1. *W. ternata* (Steph.) Fritsch in Oest. Bot. Zeitschr. XXXIX (1889) 277 quoad nomen. — *Dalibarda ternata* Steph. in Mém. Soc. Nat. Mosc. I (1806) 129. — *Waldsteinia sibirica* Tratt., Rosar. monogr. vol. III (1823–1824) 108; Ldb., Fl. Ross. II, 26. — *Comaropsis sibirica* Ser. in DC., Prodr. II (1825) 555. — Ic.: Steph., l. c., tab. 10. — Exs.: HFR No. No. 2356.

Perennial small plant, 7–17 cm high; root creeping, developing rather long (up to 20 cm) creeping and rooting, usually reddish epigeal stolons, covered with remote, broadly ovate, ciliate-margined scalelike stipules; stems erect, thin, flexuous, leafless, glabrescent; radical leaves long-petioled, ternate, sparsely or rather densely hairy on both sides (especially beneath along veins), leaflets short-petioluled, the terminal broadly obovate or suborbicular, crenate-dentate and somewhat crenate-lobate in upper part, lateral leaflets tapering, subrhombic, crenate along outer margin (sometimes to base). Inflorescence 3–7-flowered; upper leaves (bracts) oblong-lanceolate, entire or tridentate, with ovate-lanceolate stipules; flowers ca. 1.5 cm in diameter, on long, erect pedicels drooping post anthesis, densely covered with short hairs mixed with long ones; hypanthium narrowly obconical, with a constriction in upper part; sepals acute, horizontally spreading or slightly reflexed, outer sepals narrowly ovate, much smaller than the large, triangular-ovate inner sepals; petals longer than sepals, without auricles at base, yellow; filaments long, persistent; fruitlets silky-hairy. April–June (Far East), August (Baikal). (Plate XVIII, Figure 1).

Damp forests (conifer, mixed, broad-leaved), wooded slopes, shrubby formations mossy banks of forest streams. — E. Siberia: Ang.-Say., Lake Baikal (southwestern shore); Far East: Uss., Uda, Sakh. Gen. distr.: Jap.-Ch. Described from Baikal (from Sievers specimen). Type in Leningrad.

Note. According to D. I. Litvinov (Sched. ad HFR No. 2356), this plant, usually allied with the European plant growing in the mountains of Austria, should be called *W. trifolia* Rochel apud C. Koch in *Linnaea* XIII (1839) 337, tab. VI, as it is distinguished by much sparser pubescence of leaves and petioles and also by smaller bracts. It is difficult to detect how the Baikal plant differs from the Far Eastern (*W. maximowicziana* Juz.

* Named for F.A. Waldstein von Wartenberg, 1759–1823, who published in cooperation with the Hungarian botanist Kitaibel an outstanding work on Hungarian flora (in 1799–1812).

ined.). Maximowicz found differences in the shape of leaves (Prim. fl. Amur. 1859, p. 93); this was refuted by Litvinov. The Far Eastern plant has larger and fewer flowers (usually 1-2).

2. *W. geoides* Willd. Neue Verh. Ges. Naturf. Fr. Berlin II (1799) 106; Ldb., Fl. Ross. II, 26. — Ic.: Willd., l. c., tab. 4. — Exs.: Fl. exs. Austro. Hung. 445; Fl. exs. Reip. Bohem.-Slov. 512.

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Perennial medium-sized plant, 7-25 cm high; root short, creeping, without epigeal creeping stolons; stems ascending or nearly erect; radical leaves long-petioled, entire, broadly cordate-reniform, 5-lobed, coarsely bicrenate, usually rather densely spreading-hairy with somewhat declinate hairs; cauline leaves short-petioled, subrhombic, shortly lobed. Inflorescence very loose, few-flowered; flowers on long thin pedicels, ca. 2 cm in diameter; outer sepals narrow, sublinear, inner sepals twice as long as the outer, lanceolate, acute, straight-spreading at anthesis, declinate below post anthesis; petals distinctly longer than sepals, broadly obovate, with 2 auricles at base, yellow. April-May.

Forests, shrubby formations, mountain slopes and ravines. European part: U. Dnp., Crim. ?; Caucasus: reported occasionally from Transcaucasia (obviously a mistake). **Gen. distr.:** Centr. Eur. (Hungary), Bal.-As. Min. (Balkan Peninsula). Described from Hungary. Type in Berlin.

Note. This species is reported from the Crimea by Ledebour on the basis of a written communication from Bunge; it was never found later and therefore must be excluded from the Flora of the Crimea.

Genus 745. **COLURIA** * R. Br.

R. Br. in Suppl. Append. Parry's First Voy. (1824) 276; W. E. Evans in Notes Bot. Gard. Edinburgh XV (1925) 47-54.

Hypanthium usually long, campanulate, rarely short, 10-nerved; outer sepals usually small; petals 5 (rarely 6-7); disk distinctly marginate; stamens ca. 15, filaments indurate and persistent in fruit after falling of anthers; carpels rather few (less than stamens); styles long, glabrescent (short-hairy only in lower part), with a constriction at base, deciduous; fruitlets nut-shaped, covered with coarse papillae. — Perennial herbs; radical leaves often with nearly parallel margins, lyrate-pinnatisect or pinnate.

1. *C. geoides* (Pall.) Ldb., Fl. alt. II (1830) 263; Fl. Ross. II, 21; Evans in Notes Bot. Gard. Edinburgh XV (1925) 48; Kryl., Fl. Zap. Sib. (1933) 1536. — *Dryas geoides* Pall., Reise Russ. Reich. III Anh. (1776) 732. — *Coluria potentilloides* R. Br. in Suppl. App. Parry's I Voy. (1824) 276. — *Geum laxmanni* Gärtn., De fructib. et semin. I (1787) 352. — *G. potentilloides* Ait., Hort. Kew. I, II (1789) 219. — *Caryophyllata potentilloides* Lam., Encycl. meth. I (1784) 395. — *Laxmannia geoides* Fisch. Mss. ex Ldb., Fl. Alt. II (1830) 263. —

* From the Greek koluros, signifying a "stump" because of the deciduous style.

242 *Laxmannia potentilloides* Fisch., Cat. Gorenk. ed. 2 (1812) 67.—
Sieversia geoides Spreng., Syst. veg. II (1825) 543.—*Coluria*
laxmanni Aschers. et Gr., Syn. VI (1904) 874.— Ic.: Pall., I. c. (1776)
III, 2, tab. V; Ldb., Ic. pl. Fl. Ross. (1831) tab. 104; Gaertn., l. c., tab. 74,
f. 1.

Perennial, (5)10–25(35) cm high; root creeping, branching, woody, developing numerous long thin rootlets, covered in upper part with remains of old petioles; radical leaves oblong-obovate, short-petioled, interruptedly pinnate, with lobes subelliptic, obtusely dentate, elongated upwards, rather densely and finely pubescent below, less pubescent above with a mixture of remote long straight hairs; stems 1 to several, ascending from base; cauline leaves all alternate, sessile, abortive. Flowers solitary or in 2–4-flowered inflorescence; hypanthium campanulate, elongating and obconical in fruit, with 10 prominent veins, covered with yellowish green hairs; corolla ca. 2 cm in diameter, bright yellow; petals 5–7, orbicular, very short-clawed; stamens numerous, filaments persistent in fruit; receptacle elongate; style hairy in lower part, deciduous; achenes oblong-ovoid, ca. 2 mm long, 1 mm wide, covered with hyaline papillae. May. (Plate XVIII, Figure 2).

Mountain and high mountain steppes, steppes, often stony or rocky slopes (usually along river valleys).— W. Siberia: Alt.; E. Siberia: Ang.-Say. (Khakass Autonomous Oblast). **Gen. distr.:** Mong. Described from Altai and Sayan Mountains. Type in London.

Economic importance. A valuable essential oil bearing plant that may be used as a substitute for *Eugenia caryophyllata* Thunb.; the root yields volatile oil containing 96% eugenol. The content of volatile oil in the roots and rhizomes of *Coluria* varies from 0.4 to 1.8%; at the present time experiments to cultivate this plant are being carried out. In folk medicine probably unknown; the roots are also used in cooking, for example in dough as a substitute for cinammon, for the distillation of vodka, and sometimes as a substitute for tea; used by the Kazakhs to make tobacco more aromatic. See the many articles on *Coluria* in the collection "Istochniki evgenola v SSSR" (Tr. BIEM, v. 4, 1938).

Genus 746. **SIEVERIA** * Willd.

Willd. in Mag. Gesellsch. naturf. Fr. Berlin V (1811) 397.

243 Flowers solitary, on scapes; hypanthium short, nearly patelliform; outer sepals 5, nearly equal to the inner; petals 5; disk absent or nearly inconspicuous; stamens numerous, filaments glabrous; gynophore absent or nearly so; receptacle short-conical, glabrous; pistils numerous; style elongate, densely hairy, unarticulated. Low shrubs (or undershrubs). Leaves (interruptedly) pinnate, with rather few, cuneately obovate, incised-crenate-dentate or pinnatisect leaflets. Stem (scape) developing small bract under normal conditions.

1. *S. pentapetala* (L.) Greene, Pittonia 4 (1899) 49.—*Dryas pentapetala* L., Sp. Pl. ed. 1 (1753) 501.—*Geum pentapetalum* Makino

* Named for Johannes Sievers, known for his travels through South Siberia and Dzungaria (1790–1794).

in Bot. Mag. Tokyo XXIV (1910) 32 p.p.; Hultén, Fl. of Kamtch. III in K. Svenska Vet. Akad. Handl. 8, 1 (1929) 73.—*Dryas anemonoides* Pall., Reise durch versch. Prov. Russ. Reichs III (1776) 733.—*Geum anemonoides* Willd., Sp. pl. II (1797) 1117.—*Sieversia anemonoides* Willd. in Mag., Ges. natur. Fr. Berlin V (1811) 398.—*Caryophyllata kamtschatica* Lam., Encycl. I (1783) 40.—*Geum kamtschaticum* Poir., Encycl. Suppl. I (1810) 618.—*Siev. dryadoides* Sieb. et Zucc. in Abh. Ak. Muench. IV, 2 (1843) 125.—*Geum dryadoides* Franch. et Sav., Enum. Pl. Jap. I (1875) 527 et II (1879) 335, non DC.—*S. acaenifolia* Fisch. in herb.—Ic.: Pall., l. c., tab. Ee, f. 4, 5.

Perennial small undershrub, with thin, ascending or prostrate, curved woody stems; leaves apical on shoots, short-petioled, pinnate, glabrous; leaflets 5–7, 5–15 mm long (the lower markedly smaller than the upper), cuneate or obovate-lanceolate, acutely incised-serrate at apex; floral stems scapoid, 5–15 cm long, finely and short-tomentose, bearing 1–2 cauline leaves, the lower of which sometimes resembling the radical but smaller, the upper leaf or sometimes both narrowly linear or linear-lanceolate, with subulate stipule at base, entire or bipartite. Flowers 15–25 mm; hypanthium broadly obconical or nearly flat, thin-hairy; outer sepals lanceolate, obtuse, glabrous or ciliate at margin, about as long as sepals; sepals ovate-lanceolate, acuminate, 7–8 mm long, with finely appressed hairs, spreading or inflexed in fruit; petals spreading, orbicular or obovate, ca. 1 cm long, twice as long as sepals, white; stamens with thin filaments, unequal in length (inner stamens distinctly shorter than outer); fruitlets narrowly obovoid, gradually tapering into style; style very long, thin, flexuous in fruit, spreading-hairy, pinniform, part of style 2–4 cm long in fruit, the upper part glabrous, ca. 2 mm long. June–July. (Plate XVIII, Figure 6).

Bogs, damp meadows, mossy areas, woody slopes (balds).—Far East: Kamch. (SE), Sakh., Uda (upper reaches of Botcha River, N. Sikhote-Alin). Gen. distr.: Ber., Jap.-Ch. (Japan). Described from Kamchatka. Type in London.

244 2. *S. pusilla* (Gaertn.) Hultén, Fl. of Kamtch. III. in K. Svensk. Vet. Ac. Handl. 8, 1 (1929) 76.—*Anemone pusilla* Gaertn. in Novi Comm. Acad. Sc. Imp. Petrop. XIV (1770) 543.—*Sieversia selinifolia* Fisch. in herb. sec. Fr. Schmidt in Mém. Acad. Sc. St. Pétersb. XII, sér. VII Bot. (1868) 39.—*Sieversia selinifolia* Rgl. et Til., Fl. Ajan. in Nouv. Mem. Soc. Imp. Nat. Mosc. XI (1859) 82 pro synonym.—*Geum selinifolium* Hultén, Fl. of Kamtch. III (1929) 76.—*S. anemonoides* β . *tenuis* Rgl. et Til., Fl. Ajan., l. c.—Ic.: Gaertn., l. c., tab. XIX, f. 2, 3; Hultén, l. c., 73, f. 9, b (folium).

Perennial; rootstock usually thin, less woody than in preceding species; leaflets obovate or broadly obovate, cuneately tapering at base, deeply (up to middle and deeper) 3-lobate, with lobes oblong, 2–3-fid at apex or entire in lower leaflets. Flowers larger, 25–30 mm in diameter; sepals ovate or broadly ovate, nearly equal; fruitlet more or less abruptly passing into style. Otherwise similar to *S. pentapetala*. July–August. (Plate XVIII, Figure 7).

Tundras, mountain slopes, seashores.—Arctic: An.; Far East: Kamch. (also central part of Karyagin Island), Okh., Uda (source of Bureya River). Endemic. Described, in all probability, from Kamchatka, from Steller's specimen. Type unknown.

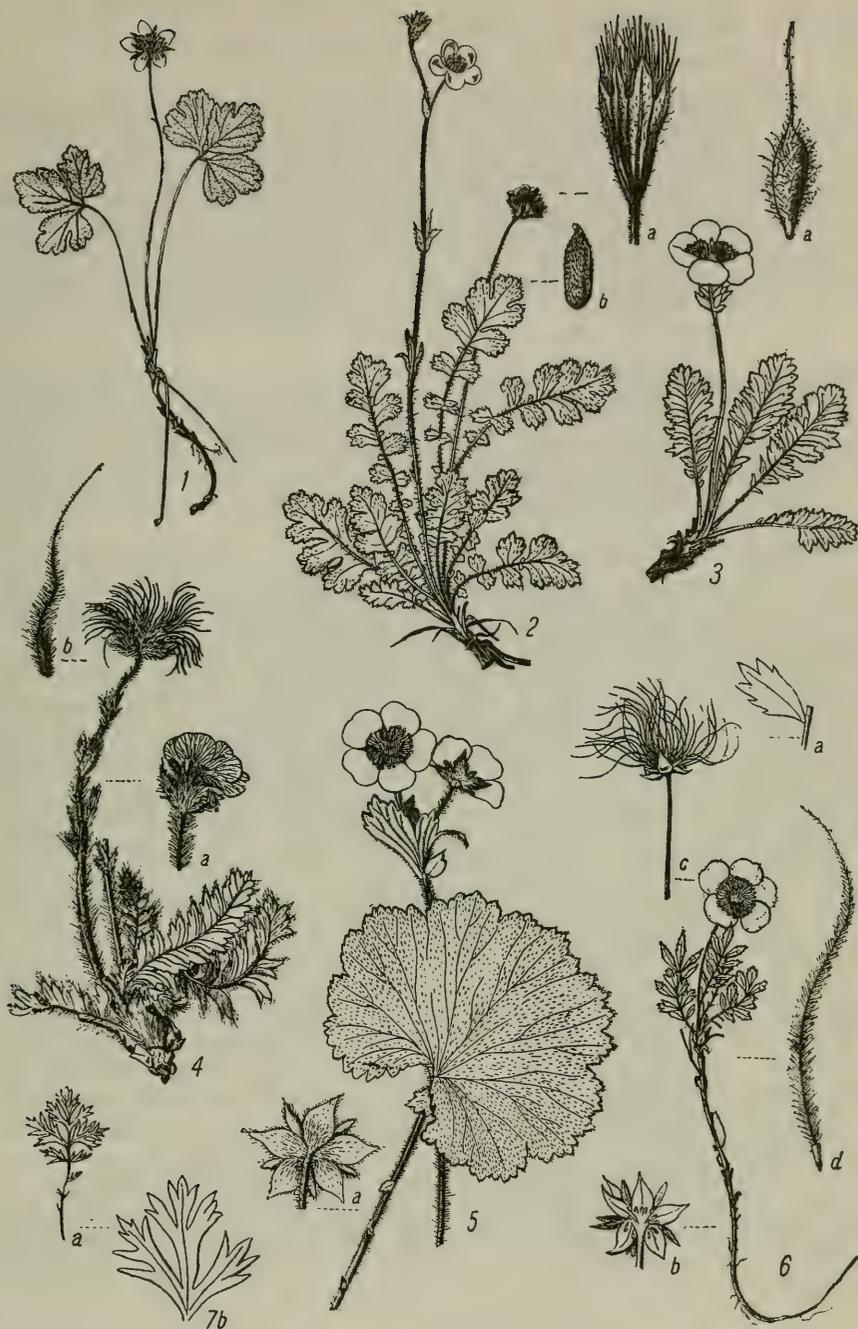


PLATE XVIII. 1 - *Waldsteinia ternata* (Steph.) Fritsch, general view; 2 - *Coluria geoides* R.Br., general view, a) calyx in fruit, b) fruit; 3 - *Acomastilis rossii* Greene, general view, a) fruit; 4 - *Novosieversia glacialis* Bolle, general view, a) flowers, b) fruit; 5 - *Parageum calthifolium* Nakai et Hara, leaves and inflorescence, a) calyx; 6 - *Sieversia pentapetala* (L.) Greene, general view, a) leaflet, b) calyx, c) flower head, d) fruitlet; 7 - *S. pusilla* (Gaertn.) Hultén; a) leaflet, b) leaflet detail.

Genus 747. **NOVOSIEVERSIA** F. Bolle

F. Bolle in Fedde, Report. Spec. nov. Beihefte Bd. LXXII (1933) 23.

Flowers solitary at apex of stems; hypanthium obconical, often appearing biserrate; outer series formed normally of 10 small leaves arranged in pairs at both sides of the 5 medium-sized leaves of inner series [outer sepals], inner sepals 5, large; disk absent; stamens and pistils numerous; receptacle usually long, especially strongly elongate in fruit, cylindrical-conical; style long, pinnately hairy, unarticulated. Perennials. Radical leaves nearly equally pinnatisect or pinnate, petioles with broad rufous scarious wings; leaflets usually entire or nearly entire; stems develop 3-5 leaves or stipules. Monotypic genus

247 1. **N. glacialis** (Adams) F. Bolle, l. c. — *Geum glaciale* Adams ap. Fisch. in Mém. Soc. Nat. Mosc. II (1809) 187; Kryl., Fl. Zap. Sib. VII (1933) 1540. — *Adamsia glacialis* Fisch. ex Steud., Nom. Bot. (1821) 366, pro synon. — *Sieversia glacialis* R. Br. in Parry's I Voy., Suppl. App. (1824) CCLXXVI; Ldb., Fl. Ross. II, 25. — Ic.: Fisch., l. c., tab. 11, f. 20.

Perennial; rootstock thick, blackish brown, covered in upper part with relics of dead petioles of radical leaves; radical leaves 4-8 cm long, short-petioled, oblong, pinnate; leaflets 11-17, 7-15 mm long, oblong-ovate or oblong, decurrent, with 2 rarely 3-4 obtuse teeth on outer side near apex, sometimes entire, remotely hairy above or glabrous, densely covered beneath with long, thin, yellowish hairs; stems 8-90 cm high, usually solitary, erect, strong, 1-flowered, covered with long and thin spreading or reflexed yellowish hairs; cauline leaves few, 3-5, small, sessile, the uppermost ternate, with entire lobes, the middle leaflet elongate. Flowers erect, large, ca. 3.5 cm in diameter, often with enlarged number of petals and sepals; hypanthium 3.5-5 mm long; calyx formed of 10 outer small leaves (rarely less), 5 medium, 4-7 mm long, lanceolate, often very narrow and 5 large inner sepals; inner sepals 5-8 mm long, triangular-lanceolate or ovate, acuminate, nearly erect, densely hairy; petals large, up to 12 mm long, 8.5 mm wide, pale yellow, broadly obovate or suborbicular, entire or notched at apex, cuneately tapering at base, longer than calyx; hypanthium inwardly short-pubescent; stamens 80-120, filaments glabrous, anthers minute, more or less oblong; gynophore rather weakly pubescent; receptacle turbinate in shape, densely short-hairy; achenes 40-90, ca. 4 mm long and 1 mm broad, long-hairy, stalked; style 18-25 mm long, densely beset in lower part with long thin spreading hairs, glabrous in upper part (at a length of ca. 3 mm). (May) June - beginning of July, Fr. August. (Plate XVIII, Figure 4).

Stony tundras, mountain slopes in alpine zone, seashores. — Arctic: Arc. Sib., Chuk., An.; W. Siberia: Ob; E. Siberia: Lena-Kol., Dau. (Vitim Plateau, former Barguzin County); Far East: Kamch. **Gen. distr.:** Ber., N. Am. Described from the estuary of the Lena River. Type in Leningrad.

Genus 748. **PARAGEUM** * Nakai et Hara

Nakai et Hara in Bot. Mag. Tokyo, XLIX (1935) 124.

248 Flowers solitary or in corymbiform inflorescence, erect; hypanthium infundibular; outer sepals 5, small; sepals 5, erect [sic] in fruit; petals 5, longer than sepals, spreading, yellow; stamens numerous; disk present; gynophore short; pistils numerous; achenes sessile, coarse-hairy; styles straight, not articulated, pinnately hairy at base, glabrous at apex, persistent, elongate in fruit. Perennials, with lyrate-pinnate, coarse-hairy radical leaves; terminal segment [leaflet] very large, usually orbicular, lateral leaflets small, often inconspicuous; stipules large, adnate to petioles; cauline leaves usually simple, sessile.

1. *P. calthifolium* (Menzies) Nakai et Hara, l. c. (1935) 125.— *Geum calthifolium* Menzies apud Smith in Rees, Cycl. 16 (1810) No. 13.— *G. rotundifolium* Langsd. ex Fisch. et Mey. in Mém. Soc. Nat. Mosc. 2 (1809) 187, non Moench.— *Sieversia rotundifolia* Cham. et Schlecht. in Linnaea II (1827) 4.— *Sieversia calthifolia* D. Don ex Torrey et Gray, Fl. N. Amer. I (1840) 425; D. Dietr., Syn. Pl. 3 (1843) 193.— *Acomastylis calthifolia* F. Bolle in Fedde, Repert. Spec. nov. Beihefte Bd. LXXII (1933) 81.

Perennial; rootstock sturdy, covered in upper part with relics of dead petioles and stipules; radical leaves long-petioled, lyrate-pinnate, with 2–6 very small inconspicuous lateral leaflets (at first glance leaves appearing simple) and a large orbicular-reniform terminal leaflet, 5–10 cm wide, with a narrow basal sinus and usually with 7 upper, orbicular-arcuate or obtuse lobes, crenate-dentate, sparsely or densely hairy on both sides (especially beneath along veins); stems 10–30 cm high, covered with more or less coarse yellowish hairs, bearing few remote leaves, slightly branching in upper part; cauline leaves sessile, orbicular-cordate, shallowly lobate and thinly toothed, teeth short, acute. Inflorescence few-flowered (1–4, usually 2 flowers); flowers medium in size; hypanthium broadly obconical, densely hairy; outer sepals oblong or narrowly elliptic, 3–4 mm long, obtuse; inner sepals nearly twice as long as outer sepals, triangular-ovate to ovate-lanceolate, acute, often more or less dentate, appressedly coarse-hairy, straight-spreading in fruit; petals yellow, 8–12 mm long, one and a half times longer than sepals, broadly obovate, rounded or slightly emarginate at apex; achenes small; styles short, erect, pinnately hairy to about three-fourths their length. June–September. (Plate XVIII, Figure 5).

Tundras, seashores.— Far East: Kamch. **Gen. distr.:** Ber., N. Am. Described from the western shores of North America. Type in London.

Note. The allied species in Japan is *Acomastylis nipponica* F. Bolle for which the combination *Parageum nipponicum*, *Sieversia nipponica* is possible. The other species of the genus are in North America and Western Europe.

* From para, Greek preposition meaning at, beside, near (for the sake of comparison) and geum — avens.

E.L. Greene, Leaflets I (1906) 174 s. str.

Flowers solitary or few in inflorescence; hypanthium often infundibular, rarely cup-shaped; lower [outer] calyx always present, usually large; petals longer than sepals; stamens numerous; disk absent or slightly developed; gynophore absent; receptacle usually small; pistils numerous, rarely few (several); style glabrous or glabrescent, slightly elongating in fruit, not articulated. Perennials. Radical leaves almost uniformly pinnatisect, [petioles?, axis?] winged; terminal leaflet similar to the lateral. Stem bearing cauline leaves or stipules.

1. **A. rossii** (R. Br.) Greene, Leaflets I (1906) 174. — *Sieversia rossii* R. Br., Chlor. Melv. (1823) 18 et in Suppl. App. Parry's I Voy. (1824) p. CCLXXVI. — Ic.: R. Br., l. c., tab. C.

Perennial; rootstock thick, densely covered with dark brown, squamiform relics of preceding year's leaves; radical leaves long, 3.5–15 cm long, rather narrowly obovate, elliptic or cuneate, interruptedly pinnate, remotely pubescent (mainly along veins) or glabrescent, ciliate at margin; leaflets 11–17, 8–15 mm long, the lower small, obovate or cuneate, often (especially in upper part of leaves) imbricate, narrow and distinctly ciliate at apex, 2–3-lobed or 3–5-toothed, with ovate acute teeth or lobes, the lowermost and intercalary usually entire; stems 5–30 cm high, often glabrous in lower part, densely short-hairy above (and seldom along entire length); cauline leaves 1–3, small, pinnately 3–7-sect. Inflorescence few-flowered; flowers 1–3, erect; hypanthium short-obconoid or nearly patelliform, 2–4 mm long and 6–8 mm broad, like petioles more or less densely short-hairy outside; outer sepals two-thirds as long as sepals, oblong-lanceolate or ovate, obtuse, 3–5 mm long; sepals broadly ovate, acuminate, 4.5–8 mm long; petals longer than sepals, broadly obovate to orbicular, very broadly cuneate at base, with short claw, slightly emarginate at apex, yellow, ca. 8–12 mm long; stamens 40–100, filaments glabrous or slightly pubescent below, anthers very small; gynophore absent; receptacle glabrous; achenes 20–40, lanceolate, ca. 2.5 mm long, coarse-hairy; styles glabrous, ca. 4 mm long. July–August. (Plate XVIII, Figure 3).

Dry stony tundras. — Arctic: Chuk., An.; Far East: Kamch. **Gen. distr.:** Ber., N. Am. (Arctic). Described from Melville Island. Type in London.

Genus 750. **WORONOWIA** ** Juz. gen. nov.

Juz. in Addenda IX, 457.

Flowers large, in 3-flowered cymes; hypanthium infundibular; outer and inner sepals and petals 5; sepals erect (not reflexed postanthesis); petals large, patent; stamens numerous, filaments persistent in fruit; pistils ca. 15; gynophore present; fruitlets disposed at base (4–5), summit

* From a - negation, coma - hair, and stylis - style, because of the glabrous style.

** Named after Yu.N. Voronov (1874–1931), the noted Soviet botanist and traveler, one of the best-known experts on Caucasian flora. He devoted a great deal of study to the flora of Western Transcaucasia, in particular to Abkhazia.

(like *Orthurus* Juz.) and even the middle; style glabrous, with an articulation below middle, lower joint of style shorter than fruit, not hamate, upper joint much longer than fruit. — Perennial herbs, with large, lyrate-pinnate lower leaves and small cauline leaves, the upper leaves nearly opposite; stem simple or usually branching stem.

1. *W. speciosa* (Alb.) Juz. comb. nova. — *Sieversia speciosa* Alb. in *Otcheti Tr. Odessk. Otd. Ross. Obsch. sadov.* 1890 (1891) 101. — *Geum speciosum* Alb. in *Bull. Herb. Boiss.* I (1893) 244. — *G. sredienskianum* Krasn., *Enum. pl. nov. Svanetiae* in *Bull. Soc. nat. Khark.* (1892, separat. 1891) 21. — *Ic.: Alboff in Bull. Herb. Boiss.* I (1893) tab. 10. — *Exs.: Fl. caucas. exs.* No. 13.

Perennial, 30–75 cm high; rootstock horizontal, sturdy, thick, bearing rosette of radical leaves and 1–2 erect stems; radical leaves 10–25 cm long, with strongly glandular-hairy petioles and rhachis, lyrate-pinnate-partite; lateral lobes small, much smaller than the terminal, unequal, ovate, dentate, few or sometimes nearly absent; terminal lobe large, 5–10 cm long, 8–13 cm wide, orbicular-reniform, slightly lacinate, with orbicular bicrenate-dentate lobes, sparingly appressed-hairy or glabrescent above, velutinous below; stems tall, 2–3 times longer than radical leaves, erect, dichasially branched, strongly glandular-hairy like branches; cauline leaves small, few, sessile, cuneate or rhombic, trifid or pinnatifid, upper cauline leaves nearly opposite. Inflorescences terminal, dichasial; flowers rather large, up to 2.5 cm in diameter; hypanthium infundibular or turbinate; sepals as long as hypanthium, erect, triangular-lanceolate, outer sepals small, linear; petals 1 cm long, twice as long as calyx, orbicular, short-clawed, golden or orange-yellow, emarginate; fruitlets numerous, ca. 15.6 mm long (together with lower joint), ovoid-oblong, appressed-hairy; style glabrous, many times longer than fruitlets. June–August. (Plate XIX, Figure 6).

251 Alpine and subalpine meadows and pastures, calcareous soil. — Caucasus: W. Transc. (Cherkessia, Abkhazia, Mingrelia). Endemic. Described from Abkhazia (Bzyb District). Type in Geneva.

Genus 751. **GEUM** * L.

L., *Sp. Pl.* I (1753) 500.

Flowers solitary, often in corymbiform inflorescence, usually medium in size or rather large; hypanthium patelliform, campanulate or turbinate; outer and inner sepals 5, the outer up to half as long as the inner, often recurved below; petals 5, in Soviet species yellow or reddish; stamens numerous; pistils numerous, on prominent usually cylindrical receptacle; styles terminal, filiform, bent, with an articulation in upper part, upper joint deciduous in ripe fruits; fruitlets nut-shaped, with the lower elongate joint of style persistent in fruit forming hamately curved beak at apex. Perennial herbs; leaves of radical rosette lyrate-pinnate, with a large terminal lobe; cauline leaves few, poorly developed, ternate or tripartite.

* Pliny's name for this plant probably refers to *G. urbanum* L.

1. Flowers drooping, campanulate, with erect sepals. Fruitlets-head on long gynophore 1. *G. rivale* L.
 + Flowers not drooping, not campanulate, with patent sepals; gynophore absent or very short 2.
 2. Petals orange or red; upper joint of style more than twice as long as the the fruit beak 2. *G. coccineum* Sibth. et Sm.
 + Petals yellow; upper joint of style less than twice as long as fruit-beak 3.
 3. Petals shorter or barely longer than sepals. Capitulum of fruitlets orbicular. Receptacle long-hairy (hairs longer than 1 mm) 4.
 + Petals often much longer than sepals. Capitulum of fruitlets usually obovate. Receptacle glabrous or short-hairy 5.
 4. Middle cauline leaves usually shallowly trilobate; median lobe not larger than the lateral, obtuse or rounded at apex
 6. *G. latilobum* Somm. et Lev.
 + Middle cauline leaves usually tri-sect, rarely deeply trifid; median lobe larger than lateral, usually acute at apex 7. *G. urbanum* L.
 252 5. Beak of fruitlet glandulose 6. *G. aleppicum* Jacq.
 + Beak of fruitlet glandulose 6.
 6. Receptacle inconspicuously pubescent 5. *G. macrophyllum* Willd.
 + Pubescence of receptacle short but distinct 4. *G. fauriei* Lévl.

Section 1. **CARYOPHYLLATA** Seringe in Mém. Soc. phys. Genève 2 (1824) 139. — Flowers campanulate, usually drooping; fruiting sepals erect or erect-recurved; petals long-clawed; capitulum of fruitlets on long gynophore.

1. *G. rivale* L., Sp. pl. (1753) 501; Ldb., Fl. Ross. II 23. — *Caryophyllata aquatica* Lam., Encycl. I (1783) 399. — *C. rivalis* Scop., Fl. Carn. ed. 2 (1772) 365. — *Geum nutans* Crantz, Stirp. Austr. ed. 2 (1763) 70, non Lam. — *G. pallidum* Fisch. et Mey. in Ind. Sem. Hort. Petrop. XI (1846) 49. — *G. rivale* var. *minus* Ser. in DC., Prodr. II (1825) 552. — *G. rivale* var. *pallidum* Blytt., Norges Fl. (1876) 1178. — *G. rivale* var. *lividum* Chitr. in Mater. k pozn. prir. Orl. gub. I (1904). — Ic.: Sturm., Fl. Deutschl. ed. 2 VIII (1904) tab. 45; Rchb., Ic. Fl. Germ. XXV (1912) tab. 67. — Exs.: HFR No. 2656, 2657.

Perennial, 25–75 cm high; rootstock thick, compact, brown, covered with relics of leaves; stems 1–3, erect, spreading-hairy and glandular, single or slightly branched at summit, usually dark red; radical leaves long-petioled, interruptedly lyrate-pinnatifid, with 2–3 pairs of small, obovate, bidentate lobules on each side and a large, reniform or reniform-orbicular terminal lobe; cauline leaves short-petioled, tripartite, with small ovate stipules; all leaves appressed-hairy on both sides. Flowers usually 2–3 (rarely more), drooping, campanulate, erect post anthesis; calyx together with hypanthium brownish red, glandular-hairy, with erect ovate-lanceolate sepals, adjacent to petals, outer sepals small, linear; petals nearly as long as sepals, convergent, reddish or yellowish white, with red-brown veins, limb wide, notched at apex, abruptly tapering to a rather long claw (claw usually longer than the obreniform limb); receptacle slightly protruding from the campanulate hypanthium, strongly hairy, on 10–15 mm long gynophore;

fruitlet heads nearly ovate, rigidulous-hairy, with straight-spreading hairs; lower joint of style hairy at base, upper joint when young glandulose and spreading-hairy nearly to apex, as long as lower joint, lower joint in fruit twice as long as upper. End of May—beginning of July. (Plate XIX, Figure 1).

Damp meadows, forests and shrubby formations, banks of rivers, lakes and streams, boggy places. — European part: entire northern region, south to M. Dnp., V.-Don. Transv.; Caucasus: all regions; W. Siberia: all regions; E. Siberia: Yenis., Ang.-Say.; Centr. Asia: Dzu.-Tarb., T. Sh. **Gen. distr.:** Europe, except for the southern part of the Med., As.-Min. Described from Europe. Type in London.

Note. Hybrids with *G. aleppicum* Jacq. and *G. urbanum* L. are described later on.

Economic importance. In earlier times the rootstock was used in medicine.

Section 2. **CARYOPHYLLASTRUM** Seringe in Mém. Soc. phys. Genève 2 (1824) 138. — Flowers with spreading sepals (not campanulate), erect, sepals recurved below in fruit. Fruitlet heads sessile or subsessile. Petals clawless or with very short claws.

Series. 1. **Grandiflora** Juz. — Stems densely glandulose above; petals twice as long as sepals, usually reddish or red; upper joint of style longer than half the fruitlet beak.

★2. **G. coccineum** Sibth. et Smith, Fl. Graec. Prodr. I (1806) 354. — *G. macedonicum* Griseb., Spicil. Fl. Rumel. II (1845) 165, nomen; Forman. in Verh. naturf. Ver. Brünn. (1891) 92. — *S. sadleri* Friv. in Flora XVIII, I (1835) 332. — *G. grandiflorum* C. Koch in Linnaea XIX (1847); 43. — *G. nitidostylum* Form., l. c. XXXIII (1894) 158. — Ic.: Sibth. et Sm., Fl. Gr. I, tab. 485. — Exs.: Bornm., It. Anat. tert. No. 4469.

Perennial; stems 12–30 cm high, very densely glandulose (especially above) and spreading-hairy; radical leaves with large, cordate-reniform, angular-lobate terminal leaflet and few lateral leaflets, often with reddish nerves beneath; cauline leaves few, small, sessile, tripartite, incised-dentate; all leaves with more or less dense, usually rigid spreading hairs; stipules rather large. Flowers in few-flowered inflorescence, large, ca. 3 cm in diameter; outer sepals linear-lanceolate, nearly half as long as the ovate-lanceolate inner sepals, recurved below after anthesis; petals large, twice as long as sepals, orbicular, slightly emarginate at apex, orange-yellow to red; gynophore very short or absent; receptacle hairy; fruitlets stalked, profusely hairy, rarely glandulose, beak bristly-hairy, glandulose or eglandulose; upper joint of style longer than half of beak, slightly hairy or glabrescent, sometimes with scattered glands. May–July.

Alpine and subalpine meadows, forest edges, banks of mountain streams and brooks. — Caucasus: grows in the Artvin District, possibly occurring in the USSR. **Gen. distr.:** Bal.-As. Min. Described from Greece. Type in London (?).

254 Series 2. *Stricta* Juz.— Stems usually rigid-hairy, rarely glabrescent. Petals slightly longer than sepals; fruitlets in obovoid head, with eglandulose beak; receptacle short-hairy.

3. *G. aleppicum* Jacq. Ic. pl. rar. I (1786) 88.— *G. strictum* Ait. Hort. Kew. 2 (1789) 217; Ldb., Fl. Ross. II, 22; Kryl., Fl. Zap. Sib. VII, 1538.— *G. besserianum* Fisch. Mss. ex Sweet, Hort. Britann. ed. II (1830) 190.— *G. ranunculoides* Ser. in DC. Prodr. II (1825) 551.— *G. rugosum* Desf. Cat. Hort. Paris ed. III (1829) 409.— *G. fischeri* Bess. ex Fisch. et May. Ind. Sem. H. Petrop. III (1838) 36; *Linnaea* XII (1838) 95.— *G. giganteum* Schur in Verh. natur. Ver. Brünn. XXXIII (1894).— Ic.: Jacq., l. c., tab. 93.— Exs.: HFR No. 2661.

Perennial, sturdy plant with thick short rootstock; stems 40–80 cm long, erect, like petioles usually spreadingly rigid-hairy and shortly tomentose, with elongate nearly erect branches, leafy nearly from base; radical leaves long-petioled, lyrate-pinnate or interruptedly pinnate; lateral segment 3–6(8) pairs, cuneately obovate, incised-lobate and dentate, unequal: the lower small, upper large, sometimes irregularly dissected; upper segment usually large, orbicular or broadly orbicular-triangular, cordate at base, shallowly lobate; cauline leaves pinnatisect or usually tripartite, rarely trifid, with elliptic or oblong segments; stipules ovate, deeply incised, ca. 2–2.5 cm long. Flowers erect, numerous, often rather large, on rather thick and firm pedicels; outer sepals linear-oblong, nearly half as long and four times narrower than the ovate-triangular acuminate inner sepals; petals broadly obovate or suborbicular, rounded at base, golden yellow, longer than sepals; gynophore nearly absent; receptacle densely covered with very short hairs; globose-ovoid; fruitlet appressed-hairy at base, with long rigid hairs above; lower joint of style elongate, usually rigid-hairy at base, nearly as long as fruitlet; upper joint half as long as the lower, hairy nearly up to top. June–July. (Plate IX, Figure 3).

Thinned out forests and forest edges, meadows, shrubby slopes, roadsides, residential areas.— European part: Lad.-Ilm., Dv.-Pech. (southern part), V.-Kama and most of southern region except for L. V. and the Crim.; Caucasus: Cisc., E. Transc.; W. Siberia: all regions; Far East: all regions; Centr. Asia: Dzu.-Tarb., T. Sh. **Gen. distr.:** Centr. Eur., Mong., Jap.-Ch., N. Am. Described from a specimen of unknown origin (cultivated?). Type unknown.

255 Note. This species, in the broad sense, is highly polymorphic; this is particularly true of the North American and East Asian populations (in the USSR, in the Far East and parts of East Siberia). Since, at this time, its racial composition cannot be analyzed, description is limited to four of the more important and clear-cut forms in the USSR (an attempt at separating the first two was first made in the work of E. Hultén, Fl. of Kamtch. III, 1929, p. 77).

1) *G. aleppicum* Jacq. s. str.— Generally resembling the typical form as described above; characterized in part by the large radical leaves and a large terminal lobe, orbicular, shallowly lobed and obtusely toothed. Hultén accepted this form as the European race of *G. aleppicum* s. l.; however, completely analogous forms grow also in the Far East.

2) *G. strictum* Ait.— Distinguished from the preceding forms by smaller radical leaves, with broadly rhombic, usually deeply trifid or

tripartite, acutely toothed terminal lobe. According to Hultén, this form is widely distributed in Asia and North America (apparently the typical *G. aleppicum* is not encountered in North America). Described from North America. Type in London.

3) *G. potaninii* Juz. nom. nov. — *G. strictum* var. *bipinnata* Batal. in A. H. P. XIII (1894) 93. — *G. ranunculoides* Lévl. in Bull. Geogr. Bot. XXV (1915) 46, non Ser. — Stems, like the whole plant, densely rigid-hairy; radical leaves lyrate-pinnatisect, cauline leaves pinnatisect or pinnatipartite; segments and lobes of both pinnatisect or parted, lobulate-serrate-dentate. July. — Meadows and other grassy places. — Far. East: Uss. (southern part). **Gen. distr.:** Jap.-Ch. (Ch., Manchuria). Described from N. China (E. Kansu Province, near Wuping and Chagon). Type in Leningrad.

4) *G. glabricaula* Juz. sp. n. in Addenda, p. 458. — Delicate plant, with simple or few-leaved and few-flowered erect stem, glabrous or usually very shortly and thinly pubescent only above; without the bristly pubescence of stem, characteristic for *G. aleppicum*, or only with scattered hairs in lower part of stem; leaves rather small, similar in shape to leaves of *G. strictum*, not densely appressed-hairy above, with straight-spreading bristly hairs only along nerves, otherwise glabrous. June–July.

Riparian meadows and among shrubs in river valleys. — E. Siberia: Dau.; Far East: Ze.-Bu. **Gen. distr.:** Mong. Described from the basin of the Zeya River. Type in Leningrad.

× *G. meinshausenii* Gams apud Hegi, Illustr. Fl. Mittel. Eur. IV, 2 (anno?) 921. — *G. willdenowii* Fisch. et Mey. in Ind. Sem. Hort. Petrop. XI (1846) 43, non Buek. — *G. aleppicum* Jacq. × *G. rivale* L. — Exs.: HFR No. 2662. — Similar in outward appearance to *G. intermedium* Ehrh., distinguished from it, according to V. N. Khitrovo (Izv. Obshch. dlya issl. 256 566 Orl. gub. II, 1910), by being thicker in all parts, with terminal lobes of cauline leaves more acute, gynophore longer and glandular pubescence absent (always?). Apparently, a rare hybrid, reliably known only from the European part: U. Dnp., Lad.-Ilm.

Series 3. **Macrophylla** Juz. — Stems rigid-hairy; petals longer than sepals; fruitlets in obovoid head; beak slightly glandulose; receptacle short-hairy.

4. **G. fauriei** Lévl. in Fedde Repert. Spec. novar. VIII (1910) 281. — *G. sachalinense* Lévl. l. c. — *G. sachalinense* Makino in Journ. Jap. Bot. II (1916) 28. — *G. japonicum* Scheutz in Nov. Act. R. Soc. Ups., ser. III (1870) 31 p. p., non Thunb. — *G. japonicum* var. *sachalinense* Koidz. ex Makino l. c. — *G. macrophyllum* auct. fl. Kamtsch., non Willd.

Perennial, rather delicate plant; stems 25–75 cm high, like petioles more or less densely long-rigid-hairy, more or less branching above with divaricate, rather long branches; leaves with appressed rigid hairs above, sparsely hairy beneath or often rigid-hairy only along midribs; radical leaves medium-sized, lyrate-interruptedly pinnate, with few, small, ovate lateral leaflets and medium-sized to large, orbicular, cordate terminal lobe trilobulate to middle and like lateral lobes bifid-dentate, with rather large,

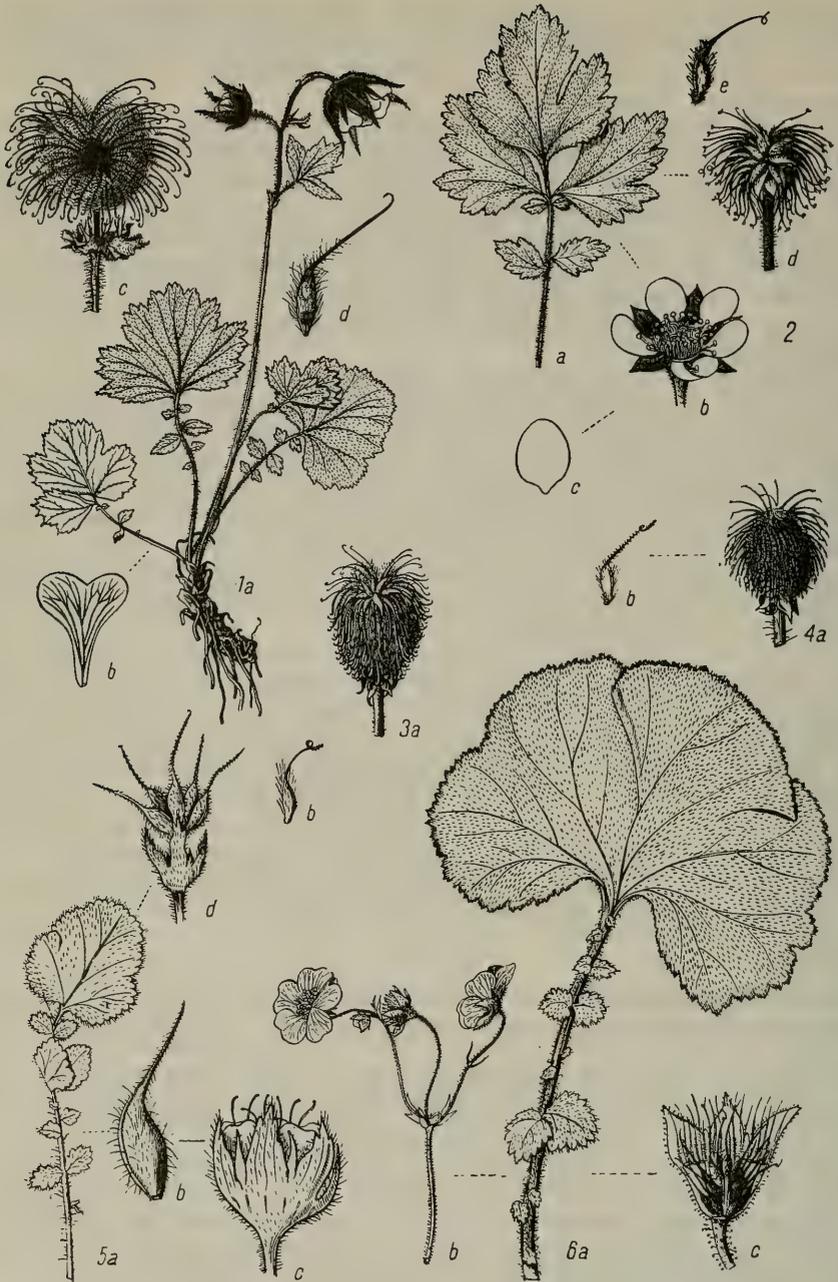


PLATE XIX. 1 — *Geum rivale* L., a) general view, b) petals, c) fruitlets head, d) individual fruitlet; 2 — *G. urbanum* L., a) leaves, b) flower, c) petals, d) fruitlets head, e) fruitlet; 3 — *G. aleppicum* Jacq., a) fruitlets head, b) fruitlet; 4 — *G. macrophyllum* Willd., a) fruitlets head, b) fruitlet; 5 — *Orthurus kokanicus* (Rgl. et Schmah.) Juz., a) leaves, b) fruitlet, c) flower, d) fruitlets head; 6 — *Woronowia speciosa* (Alb.) Juz., a) leaves, b) branch of inflorescence, c) fruitlets head.

unequal, acute teeth; cauline leaves (in upper half of stem) orbicular, broadly ovate or (the upper) ovate, cordate or cuneately tapering at base, simple, trilobate or trisect, with orbicular or ovate lobes or segments, unevenly acutely toothed; stipules rather small, ovate-lanceolate, acuminate, dentate. Inflorescence loose, flowers rather long pediceled, erect; sepals — like pedicels — densely covered with short hairs (glandular pubescence absent); sepals declinate below, rather long, outer sepals small, acute; petals elliptic or broadly obovate, tapering at base, yellow; stamens ca. 40; anthers small, rounded; gynophore absent; receptacle short-hairy, cylindrical or ovoid; fruitlets 80, appressed-hairy, long rigid-hairy at apex, beak sparsely glandular-hairy, one and a half times longer than fruitlet; upper joint of style short-hairy. June, Fr. July and later.

259 Forests, shrubby formations near streams. — Far East: Kamch., Sakh.
Gen. distr.: Jap.-Ch. (Japan). Described from Sakhalin, in the forests of Kimonai. Type in Paris, cotype in Leningrad.

5. *G. macrophyllum* Willd. Enum. Hort. Berol. I (1809) 557; Ldb. Fl. Ross. II, 22. — *G. japonicum* Scheutz in Nov. Act. R. Soc. Ups., ser. III (1870) 31 p. p., non Thunb. — Exs.: Meinsh. Fl. ingr. No. 188; HFR No. 1325.

Perennial; rootstock thick; stems up to 50 cm high, densely and coarsely spreading-hairy, leafless in lower half, branching above, with erect branches short at first, later elongating; leaves on both sides with more or less densely appressed coarse hairs; radical leaves very large, interruptedly lyrate-pinnate, with obovate, biserrate, lateral leaflets very different in size (usually small) and very large orbicular-reniform, weakly 3- or 5-lobed and a biserrate terminal lobe; cauline leaves short-petioled, broader than long, shallowly 3-lobed or ternate-incised with segments orbicular, irregularly serrate, the lowermost sometimes with a pair of lateral segments; stipules rather small, orbicular or elliptic, entire or 3-5-toothed. Flowers at first crowded at apex of stem, later erect, small, short-pediceled; outer sepals very small, not longer than one-third of the inner, inner sepals triangular, acute, recurved below in fruit; petals as long as sepals, cuneate-ovate, dark yellow; gynophore absent; receptacle indistinctly short-hairy, ovoid-globose; fruitlet usually covered at apex with long coarse brown hairs; lower joint of style sparsely glandular-hairy, upper joint with straight-spreading hairs. June–July. (Plate XIX, Figure 4).

Groves, shrubby formations, forest edges, gardens, parks, ditches, roadsides. — European part: Lad.-Ilm. (grows wild in the vicinity of Leningrad).
Gen. distr.: Ber., N. Am. Described from Kamchatka (?). Type in Berlin.

Series 4. *Urbana* Juz. — Stems finely pubescent. Petals usually not longer than sepals; fruitlets in orbicular heads, with eglandulose beaks; receptacle long-hairy.

6. *G. latilobum* Somm. et Lev. in A. H. P. XIII (1893) 44. — *G. waldsteinioides* Alb. Prodr. Fl. Colch. (1895) 79.

Perennial, finely pubescent and villous, with thick oblique rootstock; stems 20–40 cm high, slightly and shortly branching at apex; radical leaves

260 numerous, crowded in a dense rosette, long-petioled, lyrate, the terminal lobe very large, reniform or orbicular, broadly cordate at base, shortly and obtusely 5-10-lobed, bicrenate-dentate, the lateral lobes 1-4, small, ovate, shallowly lobed, crenate to subentire, sometimes leaves entire; cauline leaves short-petioled, with large, ovate, coarsely toothed stipules, the lowermost similar to radical leaves, orbicular, the middle and upper leaves broadly ovate, rhombic or triangular, obtuse or nearly cordate to cuneate at base, usually deeply 3-lobuled, rarely trifold or trilaciniate, with obtuse or rounded lobes, the terminal lobe not larger than the lateral, lateral lobes sometimes almost 2-lobuled, strongly and remotely crenate-dentate, the uppermost leaves subentire, lanceolate; stipules of cauline leaves rather large, ovate, coarsely toothed. Flowers small; sepals subsequently declinate below; petals obovate or suborbicular, cuneate at base, one and a half to twice as long as sepals, rarely as long as or even slightly shorter; receptacle densely hairy; fruitlets coarsely hairy; style jointed above middle, lower joint glabrous, the upper shorter than the lower, glabrous or hairy only at base. May-July.

Subalpine meadows and pastures. — Caucasus: W. Transc. Endemic. Described from Abkhazia, Klyuch River valley. Type in Florence.

7. *G. urbanum* L. Sp. pl. I (1753) 501; Ldb. Fl. Ross. II, 21; Kryl., Fl. Zap. Sib. VII (1933) 1537. — *Caryophyllata urbana* Scop. Fl. Carn. ed. 2, 1 (1772) 364. — *C. officinalis* Scop., l. c. — *G. caryophyllatum* Pers. Synops. II (1807) 57. — *G. ibericum* Bess. ex Boiss. Fl. orient. II (1872) 696. — ? *G. hyrcanum* C. A. M. ex Fisch. et Mey. in Suppl. Ind. Sem. Hort. Petrop. XI (1846) 32. — Ic.: Schlecht., Lang et Schenk Fl. Deutschl. ed. 5, XXV (1866). — Exs.: HFR No. 2568; Pl. Finl. exs. No. 710, 711.

261 Perennial; plant 30-70 cm high, with thick creeping rootstock and delicate stems covered with short hairs mixed with long ones, branching in upper part; leaves usually slightly hairy; radical leaves long-petioled, lyrate and interruptedly pinnatisect, with 1-3 pairs of obovate, acute, lateral segments, large and often bidentate, the terminal rhombic-ovate, usually 3-5-lobuled and, like the two neighboring lateral segments, larger than the rest; lobules or lobes elliptic or rhombic, acute; stipules large, ovate, strongly incised-dentate. Flowers ca. 1.5 cm in diameter, erect on long thin pedicels; sepals divaricate, later recurved below, green, outer sepals linear, obtuse, the inner triangular, acuminate, twice as long as outer sepals; petals pale yellow, obovate-elliptic, divaricate; gynophore absent; receptacle coarsely hairy; style jointed above middle, upper joint glabrous but with short appressed hairs in lower part, lower joint four times longer than the upper; fruitlet covered at base with thin spreading hairs, and with coarser hairs at apex, obovoid, half as long as lower joint of style. May-August. (Plate XIX, Figure 2).

Forest edges, shrubby formations, gardens, parks, roadsides. — European part: all regions; W. Siberia: Ob, U. Tob., Irt.; Caucasus: all regions; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al., Mtn. Turkm. **Gen. distr.:** Centr. Eur., N. and Atl. Eur., Med., Bal.-As. Min., Iran., Him., N. Afr. Described from Europe. Type in London.

Economic importance. The roots contain sugar, tannins and dyes and some (about 0.022%) essential oil, mainly eugenol from which are derived

aromatic and tonic substances; it is a substitute for cloves. In earlier times it was used in medicine and even cultivated.

Note. A variable species which might be separated into geographical races. The very problematic *G. hircanum* C. A. M., described from just one specimen (at flowering stage), is apparently included in *G. urbanum* within its range accepted here; however, it is possible that in the future this name will have to be retained for one of the races of the aggregate *G. urbanum*. The Crimean-Caucasian forms of *G. urbanum* differ slightly from the typical *G. urbanum* — among other by the stronger pubescence of the whole plant, the firmer leaves and in particular the more compact fruitlet heads — and apparently are allied to the Mediterranean *G. urbanum* var. *australe* Guss.

× *G. intermedium* Ehrh. Beitr. VI (1789) 143; Ldb. Fl. Ross. II, 22; Kryl., Fl. Zap. Sib. VII (1933) 1540. — *G. urbano-rivale* Schiede Fl. hybr. (1825) 72. — *G. rivale-urbanum* G. Mey. Chloris Han. (1836) 39. — *G. intermedium* α *brachypogon* et β *dolichopogon* C. A. M. Ind. Sem. Hort. Petrop. XI (1896) 42. — *G. intermedium* β *ehrharti* Scheutz. Prodr. Mon. Geor. (1870) 42. — *G. rivale* L. × *G. urbanum* L. — Exs.: Meinsh. Herb. Fl. Ingr. No. 188; HFR No. 1325, 2669 a, b, 2660.

Perennial; in all characters transitional between *G. rivale* and *G. urbanum*, extremely variable and might approximate one or the other of the parents. In the more typical cases the flowers are erect or slightly nutant; corolla half-open; petals yellow with reddish veins; sepals reddish brown, horizontally spreading in fruit; fruitlet heads sessile or short-pediceled; upper joint of style twice as long as the lower, pubescent to middle or slightly higher. June–July.

Gardens and parks, roadsides and ditches, waste places. — European part: Lad.-Ilm., V.-Kama, U. V., U. Dnp.; W. Siberia: Ob, Alt.; Centr. Asia: T. Sh.

262 A widely distributed, completely fertile hybrid, ranked in many of the "floras" as a species.

× *G. spurium* Fisch. et Mey. in Ind. Sem. Hort. Petrop. XI (1846) 28. — *G. teszlense* Simonk. Enum. Fl. Transsylv. (1886) 215. (*G. alepicum* Jacq. × *G. urbanum* L.). — Intermediate in characters between parental forms. — European part: V.-Don, M. Dnp. Apparently this hybrid is common in the USSR but usually overlooked.

Genus 752. **ORTHURUS*** Juz. gen. nov.

Juz. in Addenda IX, p. 458.

Flowers in few-flowered diachasial inflorescence, medium-sized; hypanthium infundibular or subcampanulate; outer and inner sepals and petals 5; sepals erect; petals shorter than or as long as sepals; pistils 4–10; gynophore long or short, one of the fruitlets sessile at the base of the gynophore in the hypanthium, the rest stellately arranged at gynophore

* From the Greek *orthos* — straight, and *ura* — tail, because of the straight (hook not bent above) lower joint of the style.

summit; style erect, articulate in the middle, upper joint deciduous, glabrous or pubescent, lower joint strongly accrescent, longer than fruitlet, not hamate at apex, covered in upper part or throughout with large deflexed bristles.— Perennial herbs, with rosette of lyrate divided radical leaves.

1. Sepals narrow; gynophore long; fruitlets 7–15; lower joint of style covered only at apex with deflexed bristles 1. *O. heterocarpus* (Boiss.) Juz.
- + Sepals wide; gynophore short; fruitlets 4–10; lower joint of style covered throughout with deflexed bristles 2. *O. kokanicus* (Rgl. et Schmalh.) Juz.

1. *O. heterocarpus* (Boiss.) Juz. comb. nov.— *Geum heterocarpum* Boiss. Elench. pl. nov. (1838) No. 69; Voy. Bot. dans Midi de l'Espagne II (1845) 201.— *G. umbrosum* Boiss., l. c. (1845) 728.— *G. karatavicum* Rgl. et Schmalh. in A. H. P. V (1877) 577.— Ic.: Boiss., l. c., I (1845) tab. 58.

263 Perennial, 30–50 cm high; rootstock thick, very fibrous; radical leaves interruptedly pinnate, lateral segments differing in size, the lower small, the upper nearly the same as the terminal, terminal segment large, cordate-reniform or orbicular, slightly sinuous or obtuse at base, with 5–7 short, obtuse, incised-crenate lobules; cauline leaves with ovate-lanceolate, acutely incised stipules, with only a terminal leaflet, orbicular or oblong, short petioled or sessile, the upper leaves nearly opposite; all leaves delicate, soon withering, spreading-hairy; stems 1–3, ascending, erect, dichasially branching at summit. Flowers 5–12, on glandular-hairy pedicels, drooping or half-drooping; hypanthium obturbinate or campanulate; sepals twice as long as hypanthium, erect, wide at base, narrow above, acuminate; outer sepals shorter than inner (equal to two-thirds their length), narrow; petals yellowish white, obovate or elliptic, cuneate at base, half as long as sepals; stamens ca. 20; gynophore narrow and long, as long as hypanthium, short-hairy; fruitlets 7–15; lower joint of style glabrous at base, with a tuft of rigid deflexed hairs at apex, upper joint rather long but shorter than the lower, rigid-hairy at base, pubescent above, soon deciduous. May–June.

Shady mountain slopes, ravines.— Centr. Asia: T. Sh. (Kara-Tau, Zailiiski Ala-Tau), Mtn. Turkm. (Kopet-Dagh). **Gen. distr.:** Med. (S. Spain, E. Algeria), Centr. Eur. (Daupinè), As.-Min., Iran. Described from S. Spain. Type in Geneva.

2. *O. kokanicus* (Rgl. et Schmalh.) Juz. comb. nova.— *Geum kokanicum* Rgl. et Schmalh. ex Rgl. Descript. plant. novar. rarior. a O. Fedtsch. in Turkest. lect. (1882) 24.— *G. heterocarpum* var. *oligocarpum* Boiss. in sched. ex F. Bolle in Fedde Rep. spec. nov. Beih. LXXII (1933) 45.— *G. persicum* Bornm. in sched. ex F. Bolle, l. c.

Perennial, 15–45 cm high; radical leaves in a dense rosette, interruptedly lyrate-pinnatisect, rigidulous-hairy, lateral segments [leaflets] numerous, short-petiololed or sessile, ovate-rhombic, simple or bidentate, terminal segment large, orbicular-cordate, slightly lobed, bidentate; stems ascending, covered with short hairs mixed with longer spreading ones, dichasially branching above; cauline leaves few, small, short-petiololed to sessile, ovate

or suborbicular, often 3-lobed, large-toothed. Inflorescence 2-7-flowered, rigid-hairy, crowded at first, later loose, with strongly elongated branches; hypanthium broadly campanulate; sepals shorter and broader than in *O. heterocarpus*, ovate-oblong or lanceolate, acute, entire or usually incised-dentate at apex, with few teeth; outer sepals linear-lanceolate, shorter than the inner; petals yellow, suborbicular, about as long as sepals; fruitlets few, 4-10, larger than in *O. heterocarpus*, on short gynophore, flattened-ovoid, spreadingly rigid-hairy; lower joint of style longer than fruitlets, nearly horizontally spreading, covered throughout with deflexed bristles, upper joint glabrous, filiform. May-July. (Plate XIX, Figure 5).

Mountain slopes. - Centr. Asia: T. Sh. (western part), Pam.-Al., Mtn. Turkm. (Kopet-Dagh). **Gen. distr.:** Iran. Described from Sangadzhuman Pass. Type in Tashkent, cotype in Leningrad.

264 Genus 753. **DRYAS*** L.

L. Gen. ed.1 (1737) 148; L. Spec. pl. ed.1 (1753) 501.

Flower scapes erect, 1-flowered in the Soviet species. Flowers more or less large. Hypanthium concave, usually densely covered with glands. Sepals (6)8-9(10); outer calyx absent. Petals longer than sepals, same in number, obovate, white or (in 2 North American species) yellow. Stamens numerous. Pistils many, arranged on convex receptacle. Style terminal, with simple stigma. Ovules oblong, narrowly ovate, appressed-hairy, terminating in an elongate, pinnately hairy style. - Evergreen shrubs, with prostrate or spreading, strongly branching stem (or rootstock), covered with relics of dead petioles and at the ends of branches bearing leaves and flower scapes.

Dryas octopetala - Quaternary period at end of glaciation, Lad.-Ilm. (Peschanka, Kushelevka, Toksovo, Leningrad, Tolpolovo, Kolpino, and others), Dv.-Pech. (Totma, Vologda); Quaternary period Ob (Demyanskoe), Arc. Sib. (Novo-Sibirskiye Ostrova).

Economic importance. An ornamental plant; *D. octopetala* L. (its alpine form in particular) is used in gardening, etc. The Soviet forms have not been used in this connection.

- 1. Leaves gradually tapering at base, never covered with punctiform glands at apex. Petals ascending or nearly erect at anthesis 1. *D. grandis* Juz.
- + Leaves usually rounded, dissected or slightly cordate, rarely abruptly tapering at base (only in *D. viscosa* Juz. individual leaves often gradually tapering at base, but then leaves covered above with punctate glands) 2.
- 2. Leaves covered above with punctiform glands 3.
- + Leaves without punctiform glands above 4.

* Named after the wood nymphs of Greek mythology and derived from the Greek for oak; the USSR plant was thus named by Linnaeus because of the remote resemblance of the leaves of *D. octopetala* to oak leaves.

3. Flower scapes and hypanthium covered with short-stalked, greenish glands. Individual leaves often tapering at base; petioles and midrib at lower side of leaves glabrous 2. *D. viscosa* Juz.
- + Flower scapes and hypanthium covered with long-stalked, black-purple glands. Leaves always truncate or slightly cordate at base; petioles and midrib at lower side of leaves usually with glandular and brownish branching hairs 3. *D. punctata* Juz.
- 265 4. Leaves more or less deeply incised-crenate or dentate along entire margin 5.
- + Leaves, at least in upper part, entire or if crenate-dentate along entire margin, then teeth shallow (not longer than broad) 9.
5. Flower scapes usually with a number of bracts (2-7). Caucasian plant 6. *D. caucasica* Juz.
- + Flower scapes with 1 bract 6.
6. European and Siberian plants with flower scapes rather markedly elongated after anthesis and sepals usually linear-lanceolate 7.
- + Far Eastern plants with scapes slightly elongated post anthesis and sepals ovate or ovate-lanceolate 8.
7. Leaves usually oblong or ovate, often revolute at margins, cordate, rounded or truncate at base, crenate-dentate, in the Soviet forms the lower teeth cut often nearly to midrib. Sepals more or less acute, often glandulose throughout 4. *D. octopetala* L.
- + Leaves usually elliptic, flat, usually rounded or slightly compressed at base, acutely toothed. Sepals obtuse, slightly glandulose in upper part, greenish 5. *D. oxyodonta* Juz.
8. Leaves elliptic, teeth usually simple; scapes and hypanthium (with calyx) more or less glandular 7. *D. ajanensis* Juz.
- + Leaves short-elliptic or suborbicular, teeth often bifurcate; scapes and hypanthium (with calyx) covered with branching hairs 8. *D. tschonoskii* Juz.
9. Leaves shallowly crenate-dentate along or nearly along entire length 9. *D. crenulata* Juz.
- + At least some leaves dentate only at base or in lower half, few leaves often completely entire 10. *D. chamissonis* Spreng.

Section 1. *NOTHODRYAS* Juz. in Bull. Jard. Bot. Princip. URSS XXVIII, fasc. 3-4 (1929) 311. — Leaves acuminate at base. Calyx and petals ascending or nearly erect at anthesis. Petals white or yellow.

Series 1. *Grandes* Juz. — Petals white. Filaments glabrous.

1. *D. grandis* Juz. in Journ. de la Soc. bot. de Russie, t.4 (1919) 18. — *D. longifolia* C. A. M. in sched. et Mss., p. p. — *D. drummondii* Ldb. Fl. Ross. II, p. I (1844) 20, non Richards. ex Hook. — *D. octopetala* β longifolia Rgl. et Tiling, Fl. Ajan. in Nouv. Mém. Soc. Nat. Mosc. XI 266 (1859) 82, p. p. — Ic.: Juz., l. c., 25, a-g.

Shrub; stem prostrate, simple or branching, woody; leaves oblong, 2-6 cm long, 0.5-2 cm wide, widest in upper part, gradually tapering below, acuminate at base, thick, dark green above, glossy, with deeply impressed

veins, rugose, glabrous or sparsely hairy, but more densely pubescent along midrib, densely snow-white-tomentose beneath, with tomentum completely covering prominent lateral ribs and upper part of midrib, glabrous and reddish in lower part of midrib, deeply incised-dentate (more deeply at base), with 6–13 teeth at each side, obliquely triangular or suborbicular, obtuse; the lowermost 1–2 teeth on both sides of leaves smaller, remote from the others, alternating; petioles shorter than blade, usually reddish, sparsely to rather densely covered with brownish branching hairs. Flower scapes 1–6 cm long at anthesis, not or barely exceeding leaves, strongly elongating in fruit, 14–20 cm long, often reddening, thick and firm, densely white-tomentose, beset with long black-red glandular hairs; bract 1, rather long, subulate, hairy; flowers 1.3–2 cm in diameter; hypanthium with calyx 0.6–1 cm long, up to 1.3 cm in fruit, densely covered with long black-red glandular hairs and sparse white tomentum; sepals narrowly ovate or ovate-lanceolate, 4–7 mm long and 1.5–5 mm wide, acute or rarely obtuse, often greenish, slightly silky along margin and inside; petals narrowly obovate, about twice as long as sepals, 0.7–1.5 cm long, 3–6 mm wide, glabrous; achenes ca. 4 mm long, with awns 3–5 cm long. Fl. June–July (August), Fr. July–September. (Plate XX, Figure 1).

Gravels and limestone outcrops along riverbanks. — E. Siberia: Lena-Kol., Ang.-Say. **Gen. distr.:** Mong. (N.). Described from Yakutia. Type in Leningrad.

Section 2. **EUDRYAS** Juz. in Bull. Jard. Bot. Princip. URSS, XVIII, fasc. 3–4 (1929) 312. — Leaves usually rounded, truncate or subcordate at base. Sepals and petals spreading at anthesis. Petals white.

Series 1. **Punctatae** Juz., l. c. — Leaves crenately incised dentate along entire length, with deeply impressed lateral veins, rugose, glandular-punctate.

2. **D. viscosa** Juz. in Bull. Jard. Bot. Princip. URSS, XXVIII, fasc. 3–4 (1929) 323. — **D. octopetala** Gmel. Fl. Sib. III (1768) 188 ex parte, non L. — **D. octopetala** β *longifolia* Rgl. et Til. in Nouv. Mém. Soc. Nat. Mosc. XI (1859) 82 ex minima parte.

Shrub; leaves obovate or oblong-obovate, two to three times longer than wide, 1–4.3 cm long, 0.5–1.5 cm wide, widest at middle or usually slightly above, tapering at base, cuneate-acuminate, obtuse or rounded, rarely slightly cordate at base, rounded at apex, rather dark green above, not glossy when dry, with impressed median and lateral ribs, rather rugose, with solitary or scattered hairs but more densely hairy along midrib, profusely punctate-glandular on entire surface, apparently viscous in live state, densely grayish-tomentose beneath between veins, with prominent, greenish, later brownish veins covered with short-stalked and sessile glands mixed with simple hairs, often with covering tomentum in upper part of mid and lateral ribs, strongly incised-dentate with 5–13 unequal, obliquely triangular teeth on each side, teeth slightly turned aside at outer margin in upper part of leaves or at apex, lowermost often completely separate and remote from the

rest, alternating or rarely opposite; petioles two-thirds to one-half times as long as blade, greenish or very rarely reddish (like lower part of midrib), covered with short-stalked or sessile glands and simple hairs. Flower scapes 4–9 cm long at anthesis, up to 17 cm long in fruit, thin, flexuous, not densely tomentose, greenish or green, covered along entire length with numerous short-stalked greenish glands; bract 1, linear-subulate, rather long, slightly tomentose; flowers 1.8–2.5 cm in diameter; hypanthium with calyx 5–8 mm long (in fruit to 1.1 cm), sparsely tomentose, densely covered with short-stalked greenish glands, green; sepals linear-lanceolate, 3.5–7 mm long, ca. 2 mm wide (in fruit up to 9 mm long and 3 mm wide), acute, often slightly silky along margin and at apex, glabrous inside or rarely pubescent at apex; petals elliptic or obovate, 9–13 mm long, 5–9 mm wide; achenes ca. 4 mm long, with awns 2.5–3 cm long. July. (Plate XX, Figure 7).

Limestone rocks and stony slopes along riverbanks. — E. Siberia: Lena-Kol. Endemic. Described from the left bank of the Maya River above the estuary of the Batom River. Type in Leningrad.

268 3. *D. punctata* Juz. in Bull. Jard. Bot. Princip. URSS, XXVIII, fasc. 3–4 (1929) 320. — *D. octopetala* Gmel. Fl. Sib. III (1768) 188 ex parte, non L. — *D. longifolia* C. A. M. in sched. ex parte sec. Juz., l. c., 321. — *D. octopetala* β *longifolia* Rgl. et Til. in Nouv. Mém. Soc. Nat. Mosc. XI (1859) 82 ex parte. — Ic.: Marret, Ic. Fl. Alp. Pl., II ser., fasc. 6 (1914) tab. 259^a, f. 4.

Shrub; leaves usually oblong, (2)2.5–4.5 times longer than wide, 0.4–4 cm long, 0.15–1.3 cm wide, widest at middle or often equally wide throughout, narrowly cordate or obtuse at base, rounded at apex, glossy above, with deeply impressed median and lateral ribs, strongly rugose, sparsely hairy or often glabrous but more densely hairy along midrib, beset with punctate glands along both sides of veins; densely grayish-tomentose beneath between veins, with mid and lateral ribs not covered with tomentum, more or less prominent, densely beset, like petioles, with yellowish short-stalked glands and brownish branching hairs, coarsely incised crenate-dentate, with 5–16 obtuse, distally rounded teeth on each side, deeply cut (the lowermost very often to the midrib) becoming smaller toward base and apex; petioles as long as or often two-thirds to one-half times shorter than blade, more or less densely covered with simple and white, or brownish and branching hairs and yellowish, short-stalked glands; stipules narrow, brownish, covered with yellowish glands, hairy at margin. Flower scapes 1–8 cm long at anthesis, 4–11 cm in fruit, sparsely tomentose, covered with rather many black-purple, long-stalked glands; bract 1, long, subulate, hairy; flowers 1.2–3 cm in diameter; hypanthium with calyx 6–10 mm long, densely covered with long, black-purple glandular and simple white hairs; sepals linear-lanceolate or linear, 4–7 mm long, 1–2 mm wide, acute or obtuse, covered with simple white and long glandular hairs, becoming sparse in upper part of sepals, greenish, usually hairy inside at apex; petals obovate, short-clawed, 6–12 mm long, 3–7 mm wide, one and a half to twice as long as calyx, glabrous or very rarely with few hairs outside along midrib; achenes narrowly obovoid, 3–4 mm long, with awns up to 3 cm long. June–August. (Plate XX, Figure 6).

Balds and tundras. — Arctic: Arc. Eur., Arc. Sib., Chuk., An.; European part: Kar.-Lap., Dv.-Pech.; W. Siberia: Ob; E. Siberia: Yenis.,

Lena-Kol., Ang.-Say., Dau.; Far East: Kamch. **Gen. distr.:** Mong., Dzu.-Kash. Described from Irkutsk. Type in Leningrad.

Note. A rather variable species; some of its forms may apparently be considered as separate races. The following two forms fall into this category:

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1) *D. henricae* Juz. Sp. n. in Addenda IX, p. 458. — Leaf blade like type in outline but more or less strongly tomentose-pubescent at upper surface (because of this its relationship to the Series *Punctatae* Juz. is scarcely noticed) and densely white-tomentose beneath. — E. Siberia: Lena-Kol. (southern part of Upper Angara River basin). Described from Kirensk Mountain. Type in Leningrad.

2) *D. kamtschatica* Juz. in Bull. Jard. Bot. Princip. URSS, XXVIII, fasc. 3-4 (1929) 323. — with elliptic leaves only one and a half to three times wider than long, widely cordate at base, less deeply dentate, somewhat more densely tomentose beneath (lateral veins often hidden by tomentum). — Far East: Kamch. Described from Karyatskaya Sopka (Avacha River basin). Type in Leningrad. A form of this race with tomentose pubescence at top of leaves is *f. albicans* Kom. in sched.

Some of the other various forms, i.e., those with exceptionally indurate and rugose leaves from Arctic Siberia, and others, are possibly modifications.

For hybrids of *D. punctata* Juz. with *D. octopetala* L. see the latter species.

Series 2. **Chamaedrifoliae** Juz. in Bull. Jard. Bot. Princip. URSS, XXVIII, fasc. 3-4 (1929) 312. — Leaves incised-crenate or dentate along entire length, with more or less deeply impressed lateral veins, rugose or nearly smooth, without punctiform glands.

4. *D. octopetala* L. Sp. pl. (1753) 501 pro max. parte (excl. pl. ex "Alpibus Sibiricis"); Ldb. Fl. Ross. II, 20, p.p. — *Geum chamaedrifolium* Crantz Stirp. Austr., ed. 1, fasc. II (1763) 7. — *Dryas chamaedrionides* Pall. Reise III (1776) 733. — *D. alpina* Salisb. Prodr. (1796) 363. — *D. chamaedifolia* S. F. Gray Nat. Arc. Brit. Pl. II (1821) 578. — *D. octopetala* var. *minor* Hook. Trans. Linn. Soc. XIV (1824) 387. — *D. octopetala* var. *argentea* Blytt, Norges Fl. (1876) 1176. — *D. octopetala* var. *hirsuta* Hartz. Medd. Grönl. XVIII (1895) 319. — *D. incisa* Juz. in Bull. Jard. Bot. Princip. URSS, XXVIII, fasc. 3-4 (1929) 315. — *Ptilotum octopetalum* Dulac, Fl. Hautes Pyr. (1867) 313. — *Dryas octopetala* Kuntze, Rev. Gen. (1891) 215. — Ic.: Gartenfl. IX (1860) pl. 286, f. 1; Medd. Grönl. XVIII (1896) 321, f. 1, 8-10; Marret Ic., Fl. Alp. Pl., II ser., fasc. 6 (1914) tab. 259, f. 2, tab. 259^a, f. 1, 2, tab. 259^b, f. 1-5. — Exs.: Sieb. Pl. Austr. No. 167; Rehb. Fl. Germ. exs. No. 1749; Fl. exs. reip. Boh. et Slov. No. 621.

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Shrub; leaves ovate or oblong, twice to three times as long as wide, 7-30 mm long, 2-10 mm wide, widest at the middle part or below, cordate or slightly sinuate at base, acute at apex, glossy above, with more or less impressed mid and lateral ribs more or less rugose, usually glabrous or hairy only along midrib, rarely more or less densely hairy on entire surface, densely gray- or white-tomentose beneath on the entire surface, with median and lateral or only lateral ribs usually covered with tomentum,

rarely midrib covered with brownish branching hairs, incised-dentate, often deeply incised with 4–10 obtuse or usually acute teeth at each side, becoming smaller toward apex; petioles as long as or two-thirds, but rarely one-half as long as blade, more or less densely white-tomentose, often with mixture of brownish branching hairs; stipules narrow, brownish, hairy along margin. Flower scapes 1.5–10 cm long at anthesis, up to 15 cm long in fruit, sparsely to rather densely tomentose and with remote or rather dense black-purple, long-stalked glands; bract 1, long, subulate, hairy; flowers 1.5–3.5 cm in diameter; hypanthium with calyx 7–12 mm long, densely covered with long, black-purple glandular hairs mixed with simple white ones; sepals linear-lanceolate or lanceolate, rarely ovate-lanceolate, 4–8 mm long, 1–3 mm wide acute or obtuse, with simple white hairs especially dense along margin and long glandular hairs becoming sparse in upper part of sepals, usually glabrous inside; petals obovate or narrowly obovate, 7–17 mm long, 3.5–7 mm wide, one and a half times longer than calyx, glabrous; achenes 2.5–4 mm long, with awns 1.6–4 mm long. July.

Balds and tundras. — Arctic: Arc. Eur., Nov. Z., Arc. Sib., Chuk., An.; European part: Kar.-Lap., Dv.-Pech., V.-Kama (Urals); W. Siberia: Ob; E. Siberia: Yenis., Lena-Kol. **Gen. distr.:** Scand., Centr. Eur., Atl. Eur., Med., Bal.-As. Min. Ber., N. Am. Described from Lapland. Type in London.

273 **Note.** This circumpolar species, encountered also in the Alps of Western Europe and the Urals, is heterogeneous throughout its distribution area. The characters of the typical *D. octopetala* L. are: ovate leaves, shallower serration, often densely glandular pedicels and calyx, silky upper part of sepals, large flowers; nearly all the West European (Alpine) material available has this complex of characters (other material is slightly heterogeneous). The North American and part of the West European Arctic material is hardly distinguished from it (except for the smaller dimensions of the entire plant). In the USSR the most typical *D. octopetala*, identical with the North American forms, is found in Chukchi and on Wrangel Island. The Ural form is markedly distinguished by its oblong leaves (reminiscent in shape of the leaves of *D. punctata* Juz.) and its unpronounced glandular pedicels. The specimens from Arctic Europe and Siberia, in particular, are usually similar in leaves and pubescence of pedicels to the Ural forms; besides, they are characterized by the exceptionally deep serration of the leaves, in their lower part the incisions (between the teeth) almost reach the midrib (*D. octopetala* var. *minor* Hook., *D. incisa* Juz.; see Plate XX, Figure 2). However, the borders between these forms are ambiguous and they require further study (cultivating them under equal conditions).

× *D. vagans* Juz. hybr. nov. in Addenda IX, p. 459 (*D. octopetala* L. × *D. punctata* Juz.). — Plant very similar to the Arctic forms of *D. octopetala* L., differing from them mainly by the more or less glandular upper side of the leaves, often also by the more or less distinct lateral veins on lower side of leaves.

Tundras. Fairly widely distributed hybrid in the Arctic (European part), often encountered in places where the typical *D. punctata* is absent. Described from the Kola Peninsula (Kirovsk). Type in Leningrad.

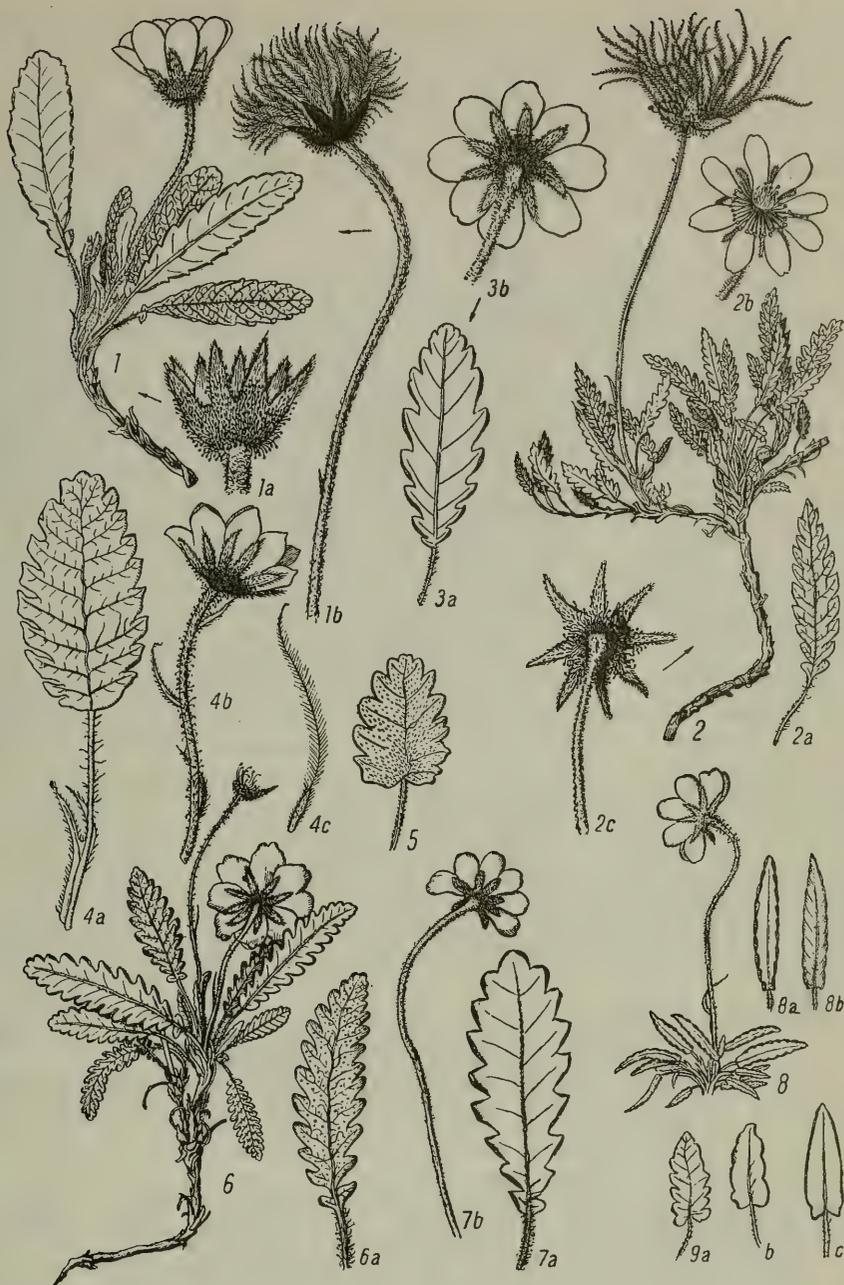


PLATE XX. 1 - *Dryas grandis* Juz., general view, a) calyx b) scape in fruit; 2 - *D. incisa* Juz., general view, a) leaf, b) flowers, c) calyx; 3 - *D. oxyodonta* Juz., a) leaf, b) flowers; 4 - *D. caucasica* Juz., a) leaf, b) flower scape, c) fruitlet; 5 - *D. tschonokii* Juz., leaf; 6 - *D. punctata* Juz., general view, a) leaf; 7 - *D. viscosa* Juz., a) leaf, b) flower scape; 8 - *D. crenulata* Juz., general view, a, b) leaves from above and beneath; 9 - *D. chamissonis* Spreng., a, b, c) different shapes of leaves.

5. *D. oxyodonta* Juz. in Bull. Jard. Bot. Princip. URSS, XXVIII, fasc. 3-4 (1929) 313; Kryl., Fl. Zap. Sib. VII (1933) 1541. — *D. octopetala* L. Sp. pl. (1753) 501 ex parte (quoad pl. ex alp. Sibir.); Ldb., Fl. Ross. II, 1 (1844) 20 ex parte et auct. plur. florae Sibir.; Ldb., Fl. Alt. II (1830) 267. — *D. octopetala* α genuina Rgl. et Til. In Nouv. Mém. Soc. Nat. Mosc. XI (1859) 82 ex parte. — Ic.: Pallas, Fl. Ross. I, pars II (1788) tab. 105; O. Drude in A. Schenk, Handb. d. Bot. III, 2 Hälfte (1887) 213, f. 1, 9 (folium); Marret, Ic. Fl. Alp. Pl., II ser., fasc. 6 (1914) tab. 259^a, f. 3.

274 Shrub; leaves elliptic or rarely oblong-elliptic, one and a half to three times longer than wide, 0.5-3 cm long, 0.3-1.4 cm wide, widest in middle part, truncate or slightly tapering at base, broadly cuneate (bluntly angular), rarely very slightly cordate, rather thin, dull above, with impressed median and lateral veins, rugulose, hairy usually only along midrib, otherwise glabrous or rarely sparsely hairy, grayish tomentose beneath with prominent midrib not hidden by tomentum and covered with biseriate brown branching hairs, lateral veins barely protruding, often not completely hidden by tomentum, without or infrequently with isolated branching hairs, crenately incised-dentate with 5-10 acute teeth often reflexed; petioles as long or twice as long as blade, sometimes slightly shorter, densely or sparsely covered with simple white hairs usually mixed with branched greenish or brownish hairs, rarely glabrescent; stipules long, often covered with minute yellowish glandular hairs, with white simple hairs along margin. Flower scapes 1.5-7 cm long at anthesis, twice as long as leaves, up to 10 cm long in fruit, densely or sparsely white-tomentose, nearly without glandular hairs or with remote, long, black-red glandular hairs in upper part, rarely throughout length; flowers 1.4-3.7 cm in diameter; hypanthium with calyx 0.6-1.3 cm long, rather densely covered with long, black-red, glandular hairs and white tomentum; sepals usually linear-lanceolate or linear, 0.5-1 cm long, 1.5-2.5 mm wide, obtuse or somewhat acuminate, sparse-tomentose and glandular in upper part or nearly eglandulose, green, with white spreading hairs along margin, glabrous within or hairy at apex; petals elliptic or obovate, usually one and a half times longer than calyx, 0.7-1.8 cm long, 4.5-9 mm wide, glabrous or sometimes slightly hairy below along midrib; achenes 3.5-4 mm long, with 1.6-3 cm long awns. June-August. (Plate XX, Figure 3).

Alpine zone. — W. Siberia: Alt.; E. Siberia: Ang.-Say., Dau. Gen. distr.: Mong. (N.). Described from Altai. Type in Leningrad.

Note. The Daurian and E. Sayans forms of this species differ from the typical Altai *D. oxyodonta* by smaller leaves and flowers; however, this difference is not constant.

6. *D. caucasica* Juz. apud G. Woron. in Tr. zakavk. nauchn. assoc., ser. I, v. 1 (1925) 56 (nomen solum); Bull. Jard. Princip. URSS, XXVIII, asc. 3-4 (1929) 316. — *D. octopetala* var. *caucasica* Bornm., Beibl. z. Bot. Jahrb. Bd. LX, Heft 3 (1926) 27. — *D. octopetala* M. B., Fl. taur.-cauc. I (1808) 412 et auct. plur. Fl. cauc., non L. — Ic.: O. Drude in A. Schenk, Handb. d. Bot. III, 2 Hälfte (1887) 213, f. 1, 6 (pl. fl.); Marret, Ic. Fl. Alp. Pl., II ser., fasc. 6 (1914) fol. 2, f. 5 (folium). — Exs.: HFR No. 513.

275 Shrub; leaves elliptic, twice to four times as long as wide, 0.9–4 cm long, 0.4–1.5 cm wide, narrowest at middle part, rounded or truncate, rarely slightly cordate or sometimes tapering, bluntly angular base, glossy above (in live state), with impressed median and lateral veins, usually rather rugose, few-hairy or glabrous, densely pubescent only along midrib, rather densely white- or grayish-tomentose beneath between nerves, with median and lateral ribs not hidden by tomentum and covered (the midrib rather profusely, the lateral sparsely with brownish hairs; lateral ribs approximate, often originating at a right angle, prominent crenately incised-dentate, with 6–12 teeth on each side; teeth small, unequal, irregularly digitate [?] or rounded, acute or obtuse, in dry state very often bent at apex and nearly quadrate; petioles as long as or slightly longer than blade, covered with few or usually rather many simple white and branching brownish hairs; stipules hairy at margins. Flower scape 2–11 cm long at anthesis, up to 18 cm long in fruit, rather densely covered with appressed tomentum and many long, black-purple, often branching (hairy) stalked glands; bracts (1)2–7, along entire length of scape, long, hairy; flowers 2–3.5 cm in diameter; hypanthium with calyx 0.7–1.2 cm long (1.5 cm long in fruit), densely covered with blackish, long-stalked glands and sparse tomentum; sepals linear-lanceolate, 0.5–1 cm long (in fruit 1.2 cm), 1.3–2.5 mm wide, acute, often nearly glandless at apex, appressed-hairy, often nearly silky, hairy inside; petals obovate, one and a half to two times longer than sepals, hairy beneath along entire surface; achenes ca. 4 mm long, with 1.5–4 cm long awns. June–August. (Plate XX, Figure 4).

Alpine zone.—Caucasus: Cisc., Dag., W. Transc. Endemic. Described from Stolovaya Gora (Mat-khokh) near Ordzhonikidze (formerly Vladikavkaz). Type in Leningrad.

7. *D. ajanensis* Juz. in Bull. Jard. Bot. Princip. URSS, XXVIII, fasc. 3–4 (1929) 318.—*D. octopetala* α *genuina* Rgl. et Til. in Nouv. Mém. Soc. Imp. Nat. Mosc. XI (1859) 82 ex parte.

276 Shrub; leaves elliptic, 1.25–2 times as long as wide, 0.5–1.5 cm long, 0.3–1 cm wide, widest at middle, slightly cordate or sometimes truncate at base, rounded and incised crenate-dentate toward apex, in dry state dull above, with deeply impressed median and lateral veins, rugulose, glabrous or sparingly hairy, more densely hairy along midrib, densely white-tomentose beneath with lateral veins completely hidden by tomentum or rarely glabrescent, midrib covered with brownish branching hairs and white tomentum, prominent like lateral ribs, teeth 5–10 on each side, becoming smaller toward base and apex of leaves, irregularly obliquely triangular or digitate [?], acute, slightly spreading, often revolute at margin, rarely incised at apex; petioles as long as blade or twice as long, covered with brownish branching hairs and dense white tomentum; stipules brownish, hairy at margin. Flower scapes 1–7 cm long at anthesis, only slightly elongating in fruit, 4–9 cm long, densely white- or grayish-tomentose, in addition usually sparsely beset with black-purple, long, glandular hairs in upper part or sometimes throughout, sometimes mixed with branching hairs; bracts long, subulate, densely hairy; flowers 1.5–2.5 cm in diameter; hypanthium with calyx 5–9 mm long (in fruit up to 1 cm long), densely covered with black-red glandular hairs, sometimes mixed with branching hairs and few simple white

ones, denser on sepals; sepals ovate or narrowly ovate, 3–7 mm long, 1–3 mm wide, obtuse, less densely glandular than hypanthium but with dense, white, simple hairs at margins, silky-hairy inside; petals obovate, one and a half to twice as long as calyx, 8–12 mm long, 5–9 mm wide, glabrous or sometimes somewhat hairy beneath along midrib; achenes ca. 4 mm long, with short 1.5–2.5 cm long awns. June–July.

Balds.— Far. East: Okh., Uda. Endemic. Described from vicinity of Ayan. Type in Leningrad.

Note. The so-called form *D. incanescens* Juz. in Bull. Jard. Bot. Princip. URSS, XXVIII, fasc. 3–4 (1929) 318, with leaves densely hairy, often villous in upper part, apparently has a somewhat different distribution area than the typical *D. ajanensis* Juz. and may prove to be an independent taxon.

8. *D. tschonoskii* Juz. in Bull. Jard. Bot. Princip. URSS, XXVIII, fasc. 3–4 (1929) 319. — *D. octopetala* Makino in Tok. Bot. Mag. vol. IX, No. 104 (1895) 388 et auct. plur. Fl. jap., non L. — *D. octopetala* f. *asiatica* Nakai, Praecurs. ad Fl. silv. Corean. VII, in Bot. Mag. Tokyo vol. XXX (1916) 233 ex parte. — Ic.: Miyoshi and Makino Pock., Atl. Alp. Pl. Jap. II (1907) pl. XLIX, f. 280; Nakai, Fl. silv. Kor. pars VII (1918) tab. 17.

277 Shrub; leaves short-elliptic or suborbicular, almost twice as long as broad, 0.6–1.7 cm long, 0.5–1.15 cm wide, widest at middle, obtuse at base, rarely slightly cordate or obtusely angled, thin, slightly glossy above, with shallowly impressed veins, deeply impressed median and lateral veins only on previous year's dead leaves, sparsely hairy along midrib or on entire surface, white tomentose beneath, with lateral veins hidden by tomentum, or more often distinct but not prominent (prominent only on dead leaves), midrib not hidden by tomentum, beset with sparse, white, crisp and numerous brownish branching hairs, fewer on lateral veins, crenately incised-dentate, with 4–7 orbicular teeth on each side, often incised or emarginate at apex; petioles as long as blade or slightly longer, densely white tomentose and with sparse brownish branching hairs; stipules hairy. Flower scapes short, 2–3 cm long at anthesis, up to 4.5 cm long in fruit, rather densely white-tomentose and with many long-stalked glands and branching hairs; hairs brownish in lower part of scape, black-purple above; bract 1, subulate, covered with simple hairs and small yellowish stalked glands; flowers 1.7–2 cm in diameter; hypanthium with calyx 7–9 mm long, sparsely pubescent, greenish, with sparse white crisp hairs and rather many black-purple branching hairs usually mixed with few black-purple and many small yellowish glandular ones; sepals narrowly ovate, 5–6 mm long, 1.5–2 mm wide, acute, covered with solitary branching black-purple and sparse simple white hairs, nearly without glands, slightly hairy inside at apex; petals obovate, 0.8–1 cm long, 4–5 mm wide, glabrous; achenes 3–4 mm long, with 1.5–2 cm long awns. July. (Plate XX, Figure 5).

Alpine zone.— Far. East: Sakh. Gen. distr.: Jap.-Ch. (Japan). Described from Itsiu Tateyama, Tateyama Kinbai. Type in Leningrad.

Series 3. *Tenellae* Juz. in Bull. Jard. Bot. Princip. URSS XXVIII, fasc. 3-4 (1929) 312. — Leaves entire or (in USSR species) dentate only in lower part or slightly and shallowly crenate along margin, with scarcely or slightly impressed lateral veins above, smooth or slightly rugose, without punctiform glands.

9. *D. crenulata* Juz. in Bull. Jard. Princip. URSS XXVIII, fasc. 3-4 (1929) 325. — *D. integrifolia* C. A. M. in sched. sec. Juz., l. c., nec aliorum.

Shrub; leaves ovate or usually oblong-ovate, about twice as long as wide, 0.6-1.4 cm long, 3-4.5 mm wide, widest usually below middle, truncate or often slightly cordate at base, acuminate or rarely rounded at apex, slightly crenate along entire length or rarely entire toward apex, very rarely entire to base, usually reflexed at margin, glossy above, with deeply impressed midrib and less deeply or slightly impressed lateral ribs, slightly rugose or smooth, weakly glabrous or with solitary hairs but sparsely, rather densely hairy along midrib, white-tomentose beneath, with more or less prominent midrib, sometimes completely hidden by tomentum or often, at least in upper part, glabrescent, with inconspicuous lateral veins, completely hidden by tomentum (only the lower veins sometimes conspicuous), teeth 6-10, small, short, arcuate or subrounded or rarely short-digitate teeth; petioles as long as blade or slightly longer, rarely shorter, covered with few simple hairs, sometimes mixed with solitary, brownish branching hairs; stipules usually pubescent only along margin. Flower scapes 4.5-6 cm long at anthesis, up to 8 cm long in fruit, thin, flexuous, slightly tomentose, usually with remote, long, black-red glandular hairs in upper part; bract 1, subulate, hairy; flowers 1.8-2.5 cm in diameter; hypanthium with calyx 5-7 mm long, rather densely covered with black-purple glandular hairs and sparsely tomentose; sepals linear-lanceolate or linear, 4-5.5 mm long, 0.75-1.5 mm wide, acute, covered with black-purple glandular hairs becoming shorter above, and with simple white hairs, hairy along margin, glabrous inside; petals obovate or elliptic, 8-11 mm long, 4-7.5 mm wide, twice as long as calyx, short-clawed, glabrous; fruitlets unknown. June. (Plate XX, Figure 8).

Balds. — E. Siberia: Lena-Kol., Ang.-Say. (Tunkinskie gol'tsy). Endemic. Described from Dzhegdal at the foot of Yablonoy Range. Type in Leningrad.

10. *D. chamissonis* Spreng. ined. ex Juz. in Bull. Jard. Bot. Princip. URSS, XXVIII, fasc. 3-4 (1929) 312 (nomen), 326. — *D. integrifolia* Ldb., Fl. Ross. II, 1 (1844) 20, non M. Vahl.

Shrub; leaves ovate or rarely oblong-ovate, two to three times (rarely four) as long as wide, 0.3-1.1 cm long, 1.5-6 mm wide, widest usually at base, gradually tapering upward or abruptly tapering only in upper part, cordate at base, usually acuminate at apex, flat or often usually bent at margin, glossy above, with deeply impressed median and slightly impressed lateral veins, scarcely rugose, glabrous or hairy only along midrib, white-tomentose beneath, with prominent midrib, usually glabrescent or glabrous in lower part and with inconspicuous lateral veins completely hidden by tomentum, sometimes (some leaves) shallowly dentate along entire length with 5-6 teeth on each side, or often entire in upper half and only with few teeth at base, rarely entire throughout, leaves dentate in various degrees in

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individual specimens; teeth rather large but short, very irregular, obtuse or acute; petioles as long as blade or usually shorter, sparsely simple-hairy (without branching ones); stipules usually hairy only at margin. Flower scapes 1.5–5 cm long at anthesis, 6–9 cm long in fruit, thick or thin, usually erect, slightly tomentose, with a mixture of few, long, black-red glandular hairs only near apex; flowers 1.5–2 cm in diameter; hypanthium with calyx 5–7 mm long (up to 9 mm long after flowering), densely covered with red-purple glandular hairs and sparsely tomentose, sepals linear-lanceolate or lanceolate, 4–6 mm long, 1–2 mm wide, acute, covered with red-black glandular and simple white hairs, eglandulose at margin and apex, whitish, glabrous inside; petals short-obovate, 5–9 mm long, 3–7 mm wide, nearly twice as long as calyx, short-clawed, rounded at apex, glabrous or slightly hairy below along midrib; achenes ca. 2.5 mm long, with awns ca. 1.5 cm long. July–August. (Plate XX, Figure 9).

Tundras. — Arctic: Chuk. **Gen. distr.:** Ber. Described from "e freto Kotzebuei." Type in Berlin.

Tribe 3. **ULMARIEAE** Focke in Engl. et Prantl, Nat. Pflanzenfam. III, 3 (1888) 40. — Hypanthium flat or slightly curved; outer calyx absent; petals 5; stamens 20–40; tapering at base, subcuneate, immediately deciduous post anthesis; carpels 5–15; fruit an indehiscent follicle. Large herbs, with pinnate leaves and many-flowered inflorescence.

Genus 754. **FILIPENDULA*** Adans.

[Tourn. ex L., Gen. ed. 1 (1737) 145] — Adans., Fam. II (1763) 295. — Maxim in A.H.P. VI (1879) 245.

Inflorescence many-flowered, corymbiform-paniculate, with reduced main axis and elongated lower lateral branches; flowers bisexual; hypanthium flat; sepals 5–6; petals equal in number to sepals, white, pink or red; stamens 20–40, dilated above; pistils 5–15, straight, free; stigma capitate; ovules 2, nutant, anatropous; fruit an indehiscent 1-seeded follicle, free or appearing united (but not connate). — Usually large perennial herbs, with short or rather long, thin or often thick rootstock; leaves pinnate or interruptedly pinnatifid, rarely entire, lanceolate, with more or less large stipules adnate to petioles.

Filipendula ulmaria in the Quaternary, Volga-Don (Belolipki).

- 1. Lateral leaflets numerous, terminal leaflet equal to them in size; roots tuberous-thickened 10. **F. hexapetala** Gilib.
- + Lateral leaflets few or absent, terminal leaflet markedly larger; roots not tuberous 2.
- 2. Fruitlets attached to receptacle at base, not contorted, free 3.
- + Fruitlets attached to receptacle above base, spirally contorted and appearing united 8.

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* Name formed from the Latin words *filum* — filament and *pendere* — to hang, after the tubers of *F. hexapetala* which are as if hanging on filaments.

3. Fruitlets distinctly stalked, equal in number (4)5(8); leaflet with more or less broad lobes 4.
 + Fruitlets sessile, numerous; leaflet with very narrow, linear lobes . . . 7.
 4. Radical and lower cauline leaves with few (usually 1 pair) small, entire, lateral leaflets or leaflets absent; leaves green beneath 5.
 + Radical and lower cauline leaves with numerous, well-developed, usually 3-lobed lateral leaflets; leaves white-tomentose beneath 4. *F. palmata* (Pall.) Maxim.
 5. Petals white; fruitlets long-ciliate at margin 6.
 + Petals red; fruitlets bristly-hairy or glabrous at margin 3. *F. purpurea* Maxim.
 6. Terminal leaflets broadly reniform; leaves and axis of inflorescence more or less densely hairy beneath 1. *F. kamtschatica* (Pall.) Maxim.
 + Terminal leaflets cordate; leaves and axis of inflorescence more or less glabrous or glabrescent beneath 2. *F. glabra* Nakai.
 7. Leaves white-tomentose beneath; fruitlets usually bristly-hairy at margin 6. *F. intermedia* (Glehn) Juz.
 + Leaves green beneath; fruitlets glabrous 5. *F. angustiloba* (Turcz.) Maxim.
 8. Leaves white-tomentose beneath 9.
 + Leaves green on both sides 8. *F. denudata* (Presl) Fritsch.
 9. Stems for the most part glabrous; leaflets flat at margin; terminal leaflet and large lateral leaflets with entire or slightly cut lobes. Flowers 6–8 mm in diameter 7. *F. ulmaria* (L.) Maxim.
 + Stems tomentose nearly to base or at least in upper half; leaflets usually undulate along margins; terminal leaflet and large lateral leaflets with deeply incised lobes. Flowers somewhat larger 9. *F. stepposa* Juz.

Subgenus 1. **ACERARIA** Juz. — East Asiatic species, with thin tuberous roots, small number of lateral leaflets and fruitlets attached to receptacle at base.

Section 1. **SCHALAMEYA** Juz. — Fruitlets usually 5, stalked, not jointed at base. Leaflets more or less wide, triangular or lanceolate.

1. *F. kamtschatica* (Pall.) Maxim. in A. H. P. VI (1879) 248; Kom., Fl. Mansh. II, 2 (1904) 524. — *Spiraea kamtschatica* Pall., Fl. Ross. I (1784) 41; Ldb., Fl. Ross. II, 19. — Ic.: Pall., l. c., tab. 28; Kom., Put. Kamch. 1908–1909 I (1912) tab. 19 (hab.).

Perennial, 3 m high, with sturdy rootstock developing below, 2–3 stems, ca. 2.5 cm thick; radical leaves very large, often more than 30 cm wide, 20 cm long, broadly reniform, 3–5-lobed, with acute bidentate lobes; lateral leaflets absent or very few, usually 2, rather small, ovate, acuminate, sometimes lanceolate; leaves usually brown-villous beneath; stems triquetrous-cylindrical, deeply sulcate, hairy; cauline leaves similar to radical, the upper 3-lobed, the uppermost (bracts) subhastate or lanceolate; stipules large,

subcordate or lanceolate, dentate. Inflorescence branching, loose; flowers large, white, flower buds red; hypanthium and calyx hairy, sepals recurved; petals oblong-elliptic; stamens 10-12, longer than the hairy style; stigma capitate; fruitlets 4-6, usually 5, erect, oblong-lanceolate, flattened, very long-ciliate at margin, on long stalks one-third to one-half as long as fruitlets; seeds oblong. July-August. (Plate XXI, Figure 1).

High-grass meadows along riverbanks.— Far East: Uda (Shishkova Mountain), Sakh., Kamch. Endemic. Described from Kamchatka. Type in London (?).

Economic importance. Ornamental. According to Pallas the young shoots are eaten raw by the people of Kamchatka; the leaves are eaten as vegetables, and the roots are also edible, raw or cooked.

2. **F. glabra** Nakai ex Kom. et Klob.-Alis., Key Pl. Far. East. reg., USSR II (1932) 653.— *F. kamtschatica* var. *glaberrima* Nakai, Tok. Bot. Mag. XXVI (1913) 131 nomen.— *Spiraea digitata* var. *glabra* Maxim., Prim. Fl. Amur. (1859) 92 salt. p. p., non Ldb.— *S. palmata* Thunb., Fl. Jap. 212 p. p. quoad pl. albifl. (non Pall.).— *Ulmaria kamtschatica* Nakai, Fl. Silv. Kor. II (1911) 481.— *U. palmata* Nakai, Fl. Silv. Kor. I (1909) 201, non Focke.— Ic.: Somoku Dzusetsu, ed. Makino (Iconogr. Pl. Nippon) IX (1910) tab. 23 (s. n. *F. purpurea albiflora* Makino).

282 Perennial; plant with short rootstock, taller than 1 m, glabrous or glabrescent; stems erect, rarely leafy, sulcate, glabrous; petioles long, thin, glabrous; leaves with one pair of ovate, irregularly dentate, acute lateral leaflets in their middle (or leaflets absent, especially in upper cauline leaves); terminal leaflet cordate, usually 5-lobed, upper cauline leaves 3-lobed, lobes ovate-acuminate, strongly and irregularly bidentate at margin, glabrous on both sides or sparingly short-hairy beneath, thin; stipules small, obliquely ovate-lanceolate. Inflorescence short, poor, loose; flowers small, on rather long filiform, often reddish pedicels; sepals very small, short, obtuse, recurved, often reddish; petals narrowly obovate, usually white, reddish only in buds; stamens longer than petals; anthers small, reddish; fruitlets 5, erect, tapering then short-stalked, arcuately lanceolate, short-ciliate at margin, with straightly-spreading cilia; style short, stigma capitate. June-July.

Light, broad-leaved and coniferous forests, near riparian forests.— Far East: Uss., Uda. **Gen. distr.:** Jap.-Ch. Described from Korea. Type in Tokyo.

3. **F. purpurea** Maxim. in A. H. P. VI (1879) 248; Kom. Fl. Mansh. II, 2 (1904) 523.— *Spiraea palmata* Thunb. Fl. Jap., 212 p. p. (non Pall.).— Ic.: Bot. Mag. tab. 5726.

Perennial, 30-60 cm high, completely glabrous; stems erect, leafy, sulcate; stems, stipules, petioles and pedicels often purple; leaves with petioles 8-18 cm long, rigid, glandular above, with few and small, ovate, finely glandular-serrate leaflets; terminal leaflet large, 10-25 cm in diameter, cordate, palmately 5-7-lobed, lobes ovate-lanceolate, acute, deeply and irregularly biserrate; uppermost leaves 3-lobed; stipules erect, obliquely lanceolate, those of uppermost leaves subulate, glandular-serrate. Inflorescence strongly branched, branches numerous, delicate, terminal;

flowers purple-red or pink in all parts, small, short-pediceled; sepals small, broadly oblong, obtuse, recurved; petals suborbicular, concave; stamens numerous, filaments flexuous; anthers very small; fruitlets 4-6, erect, stalked, concave-elliptic, glabrous or slightly hairy dorsally and ventrally; style short, curved, stigma capitate. June-July.

Forests, banks of forest and mountain streams. — Far East: reported for Uss. **Gen. distr.:** Jap. (cultivated?). Described from Japan (Nagasaki, Shimoda, Hakone, Yokohama, Hakodate). Type and paratype in Leningrad.

Economic importance. An ornamental plant.

283 4. **F. palmata** (Pall.) Maxim. in A. H. P. VI (1879) 250; Kom., Fl. Mansh. I, 2 (1904) 521. — *Spiraea palmata* Pall., Reise Prov. Russ. Reichs III App. (1776) 735; id. Fl. Ross. I (1784) 40. — *S. digitata* Willd., Sp. pl. II (1799) 1061; Ldb., Fl. Ross. II, 17. — *S. digitata* β *tomentosa* Ldb., Fl. Ross. II, 18. — *S. digitata* α *latiloba* Glehn, A. H. P. IV (1876) 38. — *Ulmaria palmata* Focke in Engl. u. Prantl, Nat. Pflanzenf. III, 3 (1894) 41. — Ic.: Pall., l. c. (1776) tab. Q., fig. 1 et Fl. Ross. (1784) tab. 26. — Exs.: F. Karo, Pl. Amuricae et Zeaënsae No. 363.

Perennial; plant 40-100 cm high; radical leaves long-petioled, white-tomentose beneath, lateral leaflets usually 2 pairs, in addition to several very small dentate intercalary leaflets, upper leaflets palmately 3-5-lobed, the lower trifid-dentate; terminal leaflet very large, cordate, 7-9-lobed to a depth of one-third to one-fourth, lobes elongated triangular-lanceolate, acute, largely bidentate, often broadest at middle part; stems cylindrical, sulcate, glabrous or very short- (glandular) pubescent (especially above); cauline leaves 6-8, with 2 pairs of trifid lateral leaflets and hastate, very small, dentate intercalary leaflets, sometimes the latter absent; stipules of cauline leaves subcordate, dentate. Inflorescence usually leafless, terminal compressed; flowers white (flower buds reddish), small; sepals wide, concave; petals elliptic; stamens ca. 20, longer than petals; anthers reddish; fruitlets 5-8, short-stalked (not more than one-third the length of fruitlets erect, lanceolate, flattened, long-ciliate at margin; style thick; stigma capitate; seeds linear. June-August. (Plate XXI, Figure 2).

Damp, usually mixed grass meadows, broad-leaved forests, riverbanks. — E. Siberia: Ang.-Say., Dau., Lena-Kol.; Far East: Ze.-Bur., Uss., Uda, Sakh., Okh., Kamch. **Gen. distr.:** Jap.-Ch., Mong. Described from Dauria. Type in London.

Note. *F. palmata* apparently does not have forms with leaves green on both sides like *F. angustiloba* (Turcz.) Maxim. and *F. denudata* (Presl) Fritsch. Most often *F. glabra* Nakai, rarely other problematic hybrid forms unclassified due to a lack of material, appear in herbaria under the name *F. palmata* var. *glabra* "Ldb."

Section 2. **ALBICOMA** Juz. — Fruitlets up to 10, sessile, articulated at base. Leaf segments narrow, linear.

5. **F. angustiloba** (Turcz.) Maxim. in A. H. P. VI (1879) 250; Kom., Fl. Mansh. II, 2 (1904) 522. — *Spiraea lobata* β *angustiloba* Turcz., Fl. baic.-dah. I (1843) 364. — *S. digitata* α *glabra* Ldb., Fl. Ross. II

(1844) 18.— *F. angustiloba* α *glabra* Maxim. in A. H. P. VI (1879) 251.— *S. digitata* γ *angustiloba* Glehn in A. H. P. IV (1876) 38.— *S. angustiloba* Turcz. in Fisch. et Mey., Ind. Sem. VIII H. B. P. (1841) 72; Id. Add., Fl. baic.-dah. (1856) XIX p. p.; Ldb., Fl. Ross. II, 17.— *S. angustiloba* var. *denudata* Turcz. in sched. olim.— *Spiraea argunensis* Ldb., Mss. ex Fisch. et Mey., l. c. (1841).

Perennial; stems glabrous, sulcate; leaves short-hairy only at margins and beneath along nerves, otherwise completely glabrous (without tomentum); lateral leaflets 4–5 pairs, palmately 3–5-partite, lobes narrow, oblong-linear, acute, strongly and irregularly serrate, reflexed at margins, in addition to small intercalary 2–3-fid leaflets; terminal leaflet large, deeply cut (nearly to base) into 5–9 lobes, resembling those of the lateral leaflets but larger. Inflorescence rather loosely branching, branches short-hairy; flowers ca. 7 mm in diameter; sepals wide, obtuse, concave; petals white, broadly obovate, clawed; stamens about as long as petals; style twice as long as ovary; fruitlets up to 10, sessile, jointed at base, erect, oblong-lanceolate, concave, with auriculate appendage at base, usually completely glabrous; seeds oblong. July. (Plate XXI, Figure 3).

Forest meadows and near dwellings.— E. Siberia: Dau.; Far East: Ze.-Bur., Uss. **Gen. distr.:** Jap.-Ch. (Manchuria). Described from Nerchinskii Zavod. Type in Leningrad.

6. **F. intermedia** (Glehn) Juz. comb. nov.— *Spiraea digitata* β *intermedia* Glehn in A. H. P. IV (1876) 38.— *S. lobata* β *angustiloba* Turcz., Fl. baic.-dah. I (1843) 364 saltem p. p.— *S. angustiloba* Turcz., Add. Fl. baic.-dah. (1856) XIX p. p.— *F. angustiloba* β *tomentosa* Maxim. in A. H. P. VI (1879) 251.

Perennial, resembling the preceding species but distinguished by the leaves, white-tomentose beneath, and the fruitlets usually bristly-silky along margins. July.

Mixed grass and dry wormwood-reedgrass meadows, shrubby formations.— E. Siberia: Dau.; Far East: Ze.-Bur., Uss. **Gen. distr.:** like the preceding? Described from Dauria. Type in Leningrad.

Note. *F. intermedia* f. *leiocarpa* Juz. in sched. is a form with glabrous fruitlets.

Subgenus 2. **ULMARIA** Moench, Meth. (1794) 663 pro gen.— Leaves with rather small number of lateral leaflets and larger terminal leaflet; fruitlets up to 10, attached to receptacle above base, subcordate, spirally contorted.

7. **F. ulmaria** (L.) Maxim. in A. H. P. VI (1879) 251.— *Spiraea ulmaria* L., Sp. pl. ed. 1 (1753) 490; Ldb., Fl. Ross. II, 18 pro max. parte (quoad var. β).— *S. glauca* Schultz, Fl. Starg. Suppl. (1819) 26.— *Ulmaria pentapetala* Gilib., Fl. lithuan. V (1782) 236.— *U. palustris* Moench, Meth. (1794) 663.— *Spiraea ulmaria* α *nivea* Wallr., Sched. crit. (1822) 235.— *Filipendula ulmaria* subsp. *nivea* Hayek, Fl. stir. exs. 8 Lief. (1906) No. 356.— *Spiraea ulmaria* var. *tomentosa* Camb., Ann. sc. nat. I (1824) 381.— *Filipendula ulmaria* α *tomentosa* Maxim., A. H. P. VI (1879) 252.— *Spiraea ulmaria* β *discolor*

Koch, Syn. ed. 1 (1837) 208.— *S. ulmaria* α *glauca* Schur, Enum. pl. Transs. (1866) 182.— *Filipendula ulmaria* var. *glauca* Asch. u. Gr., Syn. VI (1902) 438.— *Spiraea ulmaria* var. *vestita* Adamov. in herb.—
285 Ic.: Rchb., Ic. Fl. Germ. XXV (1912) 79.— Exs.: Hayek, Fl. stir. exs. No. 356; Pl. Finl. exs. No. 708.

Perennial; rootstock creeping; stems tall, 1–2 m high, simple or branching, indurate, ribbed, glabrous, densely leafy; leaves interruptedly pinnate, thick, glabrous, dark green above, thinly white-tomentose beneath; large lateral leaflets 2–5 pairs, broadly ovate to ovate-lanceolate, acute, entire or slightly lobate, incised-serrate like the palmately 3–5-sect terminal leaflet; intercalary leaflets several pairs below the lateral, acutely toothed; stipules large, broadly cordate, dentate. Flowers in dense paniculate inflorescence up to 20 cm long, branches slightly tomentose; flowers numerous, small, 6–8 mm in diameter, aromatic; petals 5 or 6, obovate, long-clawed, yellowish white; stamens twice as long as petals; carpels 6–10, sessile, contorted; style short; fruitlets ca. 3–4 mm long, spirally contorted, glabrous. June–July. (Plate XXI, Figure 4).

Grassy bogs, boggy and inundated meadows, banks of rivers, lakes, streams and ditches, damp meadows and shrubby formations, forest edges, felled areas.— Arctic: Arc. Eur.; European part: all regions (except L. V.); Caucasus: all regions; W. Siberia: all regions; E. Siberia: all regions (less common toward the east); Centr. Asia: Dzu.-Tarb. **Gen. distr.:** nearly all Eur., As.-Min., Mong.; in N. Am. growing wild. Described from Europe. Type in London.

Note. A rather polymorphic species; the two species described next are relatively new and little has been done to determine the races.

Economic importance. In earlier times used as an astringent to check bleeding and diarrhea; in folk medicine, tea brewed from the flowers is applied as a diaphoretic; the dried flowers are used as an inhalant in colds, etc.

8. *F. denudata* (Presl) Fritsch in Abhandl. zool.-bot. Ges. Wien XXXIX (1889) 591; Rydb. in North Amer. Fl., Vol. 22, 3 (1908) 267.— *Spiraea denudata* Presl., Fl. Čech. (1819) 101.— *S. ulmaria* β *denudata* Hayne, Arzneigew. VIII (1819) sub tab. 31.— *S. ulmaria* var. α Ldb., Fl. Ross. II, 19.— *Filipendula ulmaria* β *denudata* Maxim. in A. H. P. VI (1879) 252.— *S. ulmaria* β *concolor* Lange, Haandb. Danske Fl. ed. 2 (1859) 334; Neilr., Fl. Nied. Oest. (1859) 917.— Exs.: Fl. exs. Austro-Hung., No. 2417; Fl. exs. Reipubl. Bohem.-Slov. No. 224; Pl. Finl. exs. No. 709; HFR No. 871; Pabo i Cholovskii, Gub. Mogilew XII, 6.

Perennial, 1–2 m. Distinguished from the preceding species by its leaves which are green on both sides and glabrous beneath (f. *glaberrima* Beck in Ann. nat. Hofmus. II (1887) 118 sub *F. ulmaria*; Glaab in DBM XIV (1896) 60 id.) or usually only with hairy nerves. June–August.

Damp and boggy meadows, banks of streams, damp and boggy forests (coniferous and broad-leaved), forest edges, groves, shrubby formations.— Arctic: Arc. Eur.; European part: Kar.-Lap., Dv.-Pech., V.-Kama, Lad.-Ilm., U. Dnp., U. V., M. Dnp., V.-Don, Transv.; Caucasus: Cisc., Dag., E. Transc. **Gen. distr.:** Scand., Centr. Eur.; N. Am. growing wild. Described from Bohemia. Type in Prague.

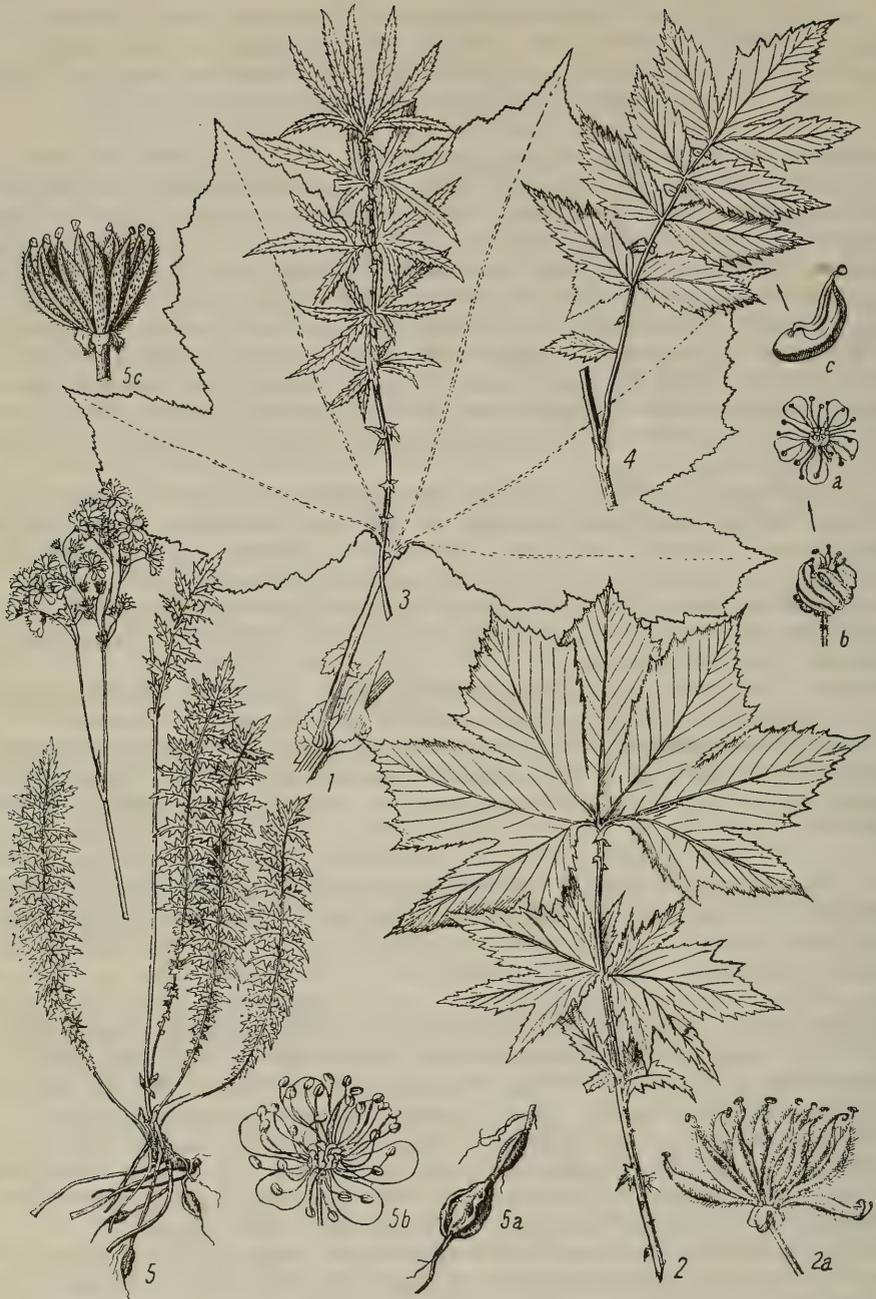


PLATE XXI. 1 - *Filipendula kamschatnica* (Pall.) Maxim., leaves; 2 - *F. palmata* (Pall.) Maxim., leaves, a) head of fruitlets; 3 - *F. angustiloba* (Turcz.) Maxim., leaves; 4 - *F. ulmaria* (L.) Maxim., leaves, a) flower, b) head of fruitlets, c) fruitlet; 5 - *F. hexapetala* Gilib., general view, a) thickened root, b) flower, c) head of fruitlets.

Note. This taxon is hardly separable from *F. ulmaria*, but has a somewhat different ecology and a more western area of distribution. Intermediate forms between *F. ulmaria* and *F. denudata*, named *F. subdenudata* Fritsch in Verh. zool.-bot. Gesellsch. Wien XXXIX, 1889, 591 (*F. ulmaria* f. *subdenudata* Glaab in DBM XIV, 1896, 60), are sometimes encountered; in all likelihood they are of hybrid origin.

9. *F. stepposa* Juz. sp. nova in Addenda IX, p. 459.

Perennial, very similar to *F. ulmaria* but distinguished by the lower habit, the strongly tomentose-pubescent stem (often down to its lowest part), the thick, coriaceous, leaves, usually undulate at margin, silky-hairy above, very densely finely tomentose beneath, the deeply incised lateral leaflets and the lobes of terminal leaflet, teeth bent at margins, the thick branches of inflorescence, the more conspicuous large flowers and their [fruitlet] heads. June—July.

Meadows and, particularly, meadow steppes, fallow fields, shrubby formations.— European part: Transv., Urals (S.); W. Siberia: U. Tob., Ir., Alt. Endemic. Described from Bashkiria. Type in Leningrad.

Note. This form (like the preceding), with its special ecology, is an example of "local vicaroids," as termed by Vierhapper. It has very typical characters and yet is connected with *F. ulmaria* by transitions. Further field studies are required, as well as experimental work on character constancy.

Subgenus 3. **EU-FILIPENDULA** Juz.— Leaves with very large number of lateral leaflets, terminal leaflet equal to lateral in size and shape. Fruitlets up to 12, attached to receptacle above base, subcordate, erect.

10. *F. hexapetala* Gilib., Fl. lithuan. II (1781) 237.— *Spiraea filipendula* L., Sp. pl. ed. 1 (1753) 490; Ldb., Fl. Ross. II, 16.— *F. vulgaris* Hill. Brit. Herb. (1756) 24.— *Ulmaria filipendula* Hill., Hort Kew. (1768) 214; Kostel., Ind. Prag. (1844) 138.— *Filipendula filipendula* Voss. in Vilmor. Blumengärt. 3 Aufl. I (1896) 240.— Ic.: Rchb., Ic. Fl. Germ. XXV (1912), tab. 78.

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Perennial, 30—80 cm high; rootstock oblique, thin, with tuberiform fusiform or globosely thickened (bulbous) root; radical leaves interruptedly pinnate, with numerous (up to 20 pairs and even more), large, oblong, deeply incised-dentate or pinnatisect leaflets, among them few pairs of small leaflets, leaflets green on both sides, glabrous above, slightly hairy below along veins; stems erect, usually simple, thin, cylindrical or shallowly sulcate; cauline leaves similar to radical but smaller and with smaller number of leaflets; stipules rather small, dentate. Flowers in terminal many-flowered panicle, large, usually 6-merous; petals oblong-obovate, short-clawed, white or pale pink; stamens as long as or slightly longer than petals; carpels 9—12, free, erect; style thickened; fruitlets hairy, sessile, erect. (End May) June—August. (Plate XXI, Figure 5).

Steppes and dry-meadows, forest clearings and edges, shrubby formations, open forests.— European part: Dv.-Pech. (Vologda), Lad.-Ilm., U. Dnp., U. V., V.-Kama and the entire southern region; W. Siberia: all regions; E. Siberia: Ang.-Say. (former Minusinsk District); Caucasus: all regions. **Gen. distr.:** nearly all Europe except for the Arctic and a large part of the Balkan Peninsula; As.-Min; growing wild in N. Am. Described from Europe. Type in London.

Tribe 4. **SANGUISORBEAE** Spreng., Anleit. ed. 2, II (1818) 861; Focke in Engl. u. Prantl, Nat. Pflanzenfam. III, 3 (1888) 41. — Hypanthium urceolate, saccate or tubular, becoming larger in fruit, compactly embracing fruit; sepals 4, rarely 5; outer calyx often present; petals often absent; stamens numerous or more often few, sometimes 1–2; carpels 1–2; fruitlets often with different modifications for dispersal, in which sepals or involucrate leaves often take part. Herbs, with pinnate, palmate or simple (lobed) leaves.

Genus 755. **ALCHIMILLA** * L.

L., Sp. pl. ed. 1 (1753)

290 Flowers short-pedicel, bisexual, grouped in loose or dense heads generally arranged in corymbiform-paniculate inflorescence; hypanthium subglobose, campanulate or obconoid, with glandular ring (disk) in throat, falling together with fruit; sepals and outer sepals 4, persistent; petals absent; stamens 4 in the Soviet species, arranged at throat of hypanthium outside of disk alternating sepals, with short filaments and undeveloped (in Soviet species) anthers; pistil 1 in Soviet species, within the hypanthium; style filiform, basal; stigma capitate; fruitlet nut-shaped, flattened-ovoid. — Perennial herbs, usually with creeping rhizome, densely covered with relics of stipules and petioles, in Soviet species with rosette of long-petioled radical leaves; cauline leaves in Soviet species much smaller than the radical, usually short-petioled; all leaves plicate at aestivation, palmatisect or palmatifid, with large stipules adnate to petioles.

Note. The genus *Alchimilla* L. (s. str.) comprises several hundred species distributed in Europe, Asia and Africa; *Lachemilla* Focke is a related genus found in South and Central America. The Soviet species refer to two different subgenera; the species are at first glance very similar to each other and up to the classical work of the Swedish botanist R. Buser had been regarded as relating to a small number of species (in Soviet flora: *A. sericea* Willd., *A. alpina* L., *A. vulgaris* L.). After a more careful study of the particular forms of these species, however, it became apparent that they differ from each other by many characters which concern all organs of the plant. At the present time most of the taxonomists agree that these forms are separate species; they often grow together in large quantities, but due to the abortive pollen (and anthers) and the obligate apogamy, they are incapable now of crossbreeding. It is assumed that many of them originated from interspecific hybridization in the remote past. The ecological characters of *Alchimilla* make precise classification important in the study of geobotany; the individual fixed distribution of nearly each species might indicate a very different history for some, therefore making it possible to satisfactorily resolve, from such material, a series of the more important problems in the history of Eurasian flora.

* Borrowed from the Arabic, the word *alchymia* (alchemy) denotes a secret science, named so because of the miraculous properties attributed to this plant in the Middle Ages. Introduced by Linnaeus, the transcription of *Alchemilla* is orthographically incorrect.

The reader should note that lack of material from many regions has made it impossible, at the present time, to describe all the forms encountered in the Soviet flora; thus, many species still remain undescribed and do not appear in this work. This particularly concerns the species common to the Caucasus where the genus *Alchimilla* is exceptionally widespread. To achieve effective classification of the genus, it is necessary to have abundant, well-dried, herbarium specimens collected in the summer months (June, July, and in the mountains also in August); fall plants (second flowering) cannot be determined from Keys or Plates. It should also be noted that sometimes it is difficult to determine faultless material from the Keys or the descriptions, owing to the features of the discriminating characters of certain species of *Alchimilla*. For purposes of comparison, it is very important to have at hand completely reliable material, which has been determined or examined by a specialist.

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1. Radical leaves parted nearly to base into 5-7 oblong or oblong-lanceolate lobes (only very rarely connate for one-third to half of their length). Outer sepals minute, often inconspicuous. (Subgenus *Argentaria* Juz.) 2.
 - + Radical leaves entire or shallowly to rather deeply lobed (but rarely lobes cut as deeply as two-thirds to three-fifths of the leaf length). Outer sepals more or less well-developed. (Subgenus *Pes-Leonis* Juz.) 7.
 2. Leaf lobes shallowly and finely dentate only at apex; leaves completely glabrous above, densely appressed-hairy, silky-silvery beneath. Arctic (in USSR) plant 1. *A. alpina* L. s. str.
 - + Leaf lobes deeply incised-dentate in upper half; leaves usually not pubescent as above. Alpine plants common to the mountains of the Caucasus 3.
 3. Leaves parted to base 4.
 - + Leaf lobes (even though few) one-third to one-half connate at base 6.
 4. Leaves, like all other parts of plant, densely covered on both sides with appressed, silky-shiny hairs 2. *A. sericea* Willd.
 - + Leaves glabrous, at least on one side 5.
 5. Leaves glabrous above, densely appressed-hairy beneath 3. *A. chlorosericea* Bus.
 - + Leaves glabrous beneath or glabrescent, more or less hairy above 4. *A. hypochlora* Juz.
 6. All leaf lobes connate to the same degree; leaves carinate-plicate 5. *A. raddeana* Bus.
 - + Only lateral lobes connate, median lobe separated from the neighboring nearly to base; leaves flat 6. *A. heteroschista* Juz.
 7. Hypanthium almost as long as petioles, or usually longer in fruit; outer sepals usually distinctly shorter and narrower than the inner; mature achenes not protruding above disk. Leaves often herbaceous, almost inconspicuously netted-veined 8.
 - + Hypanthium in fruit usually shorter than, rarely as long as calyx; outer sepals as long as, or rarely somewhat shorter than inner sepals; mature achenes often protruding above disk for one-half to two-thirds their length. Leaves often indurate, usually with strongly prominent (in dry plant) network of veins. (Section *Calicinae* Bus.) 128.
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8. Stems and petioles of radical leaves (sometimes only few) more or less spreading-hairy (or if, in rare cases, completely glabrous, then leaves usually slightly hairy above) 9.
- + Stems (sometimes only in lowermost part) and petioles of radical leaves (sometimes only few) covered with appressed or adhering hairs or rarely (nearly) glabrous (if so — then leaves completely glabrous above) 98.
9. Petioles of all radical leaves hairy (sometimes petioles of innermost leaves glabrous in upper part) 10.
- + At least petioles of outer leaves and sometimes all petioles completely glabrous 87.
10. All parts of plant including pedicels densely and evenly hairy along their entire or nearly entire length 11.
- + Pedicels of all flowers, or at least of the upper in heads, glabrous or hairy only in their upper one-fourth to three-fourths 19.
11. Leaves slightly silky-shiny beneath, nearly without incision between lobes. Sepals converging after anthesis 12.
- + Leaves dull beneath, with more or less distinct incision between lobes. Sepals usually spreading after anthesis 13.
12. Flower relatively large, up to 3 mm long, in loose heads. Leaves orbicular-reniform 12. *A. minor* Huds.
- + Flowers very small, in dense heads. Leaves reniform. Entire plant smaller and slenderer than the above 13. *A. supina* Juz.
13. Petioles of radical leaves reddening 14.
- + Petioles of radical leaves without anthocyan 16.
14. Leaves gray-green, not too densely hairy, not velutinous to touch, teeth small. Petioles, leaves and stems with ascending hairs 14. *A. taurica* Juz.
- + Leaves glaucous-green, densely velutinous-hairy, teeth large 15.
15. Stems low, usually covered, like petioles, with somewhat ascending or horizontally spreading hairs 15. *A. caucasica* Bus.
- + Stems tall, firm, covered below, like petioles, with distinctly declinate hairs 16. *A. erythropoda* Juz.
- 293 16. Petioles of radical leaves and stem covered with horizontally spreading hairs; stipules of cauline leaves deeply palmatipartite. Outer sepals usually hairy only along margins 20. *A. hirsuticaulis* Lindb. fil.
- + Petioles of radical leaves and stem covered below with declinate hairs; stipules of cauline leaves incised-dentate. Outer sepals evenly hairy on the whole surface 17.
17. Leaves not too densely hairy, not velutinous at touch; stems rather weak 19. *A. exsanguis* Juz.
- + Leaves densely velutinous-hairy; stems firm, erect 18.
18. Radical leaves undulate, gray-green; lobes arcuate or subrounded, with 4–6 obtuse teeth on each side 21. *A. jailae* Juz.
- + Radical leaves carinate-plicate, glaucescent-green; lobes triangular, with up to 9 with teeth usually acute, often twin 22. *A. lithophila* Juz.
19. Hypanthia of all, or nearly all flowers, usually more or less densely hairy. Leaves more or less densely hairy above on the whole surface 20.

- + Hypanthium of all flowers glabrous or sometimes of the lower flowers in heads, with few or solitary hairs (in *A. litwinowii* Juz., Hypanthia sometimes rather densely hairy, but then leaves hairy above only along wrinkles) 44.
20. Hairs on petioles of radical leaves and stems distinctly declinate beneath 21.
- + Hairs on petioles of radical leaves and stems ascending or horizontally spreading 33.
21. Pedicels of all flowers pubescent in lower part 22.
- + Pedicels glabrous or sometimes those of the lower flowers merely pubescent 29.
22. Radical leaves reniform, lobes with few teeth (3-6 at each side) . . 23.
- + Radical leaves orbicular, rarely reniform, lobes with more teeth (up to 7-9 at each side) 24.
23. Petioles of radical leaves pale, stems much longer than petioles. Flowers small, ca. 3 mm in diameter 23. *A. egens* Juz.
- + Petioles of radical leaves reddening, stems usually not longer or slightly longer than petioles. Flowers large, up to 5 mm in diameter 24. *A. rubens* Juz.
24. Leaves flat or only slightly undulate, teeth rather short 25.
- + Leaves distinctly undulate, teeth long 28.
- 194 25. Pedicels hairy only at base 25. *A. bungei* Juz.
- + Pedicels hairy to half their length 26.
26. Lobes of radical leaves (at least some) obtuse or truncate at apex 30. *A. hebescens* Juz.
- + Lobes of radical leaves rounded at apex 27.
27. Stems ascending at base. Flowers in rather loose heads. Caucasian plant 26. *A. grossheimii* Juz.
- + Stems generally erect. Flowers in dense heads. Crimean plant 27. *A. pycnantha* Juz.
28. Leaves gray-green, velutinous to touch; hairs with basal tubercules (especially conspicuous on hypanthia) 28. *A. gibberulosa* Lindb. fil.
- + Leaves green, not velutinous to touch; tubercules at base of hairs absent or obsolete 29. *A. aemula* Juz.
29. Crimean plant with very densely rigidulous-hairy leaves, petioles and stems. Outer sepals (at least in lower flowers in heads) as long as inner sepals 35. *A. hirsutissima* Juz.
- + Siberian and Caucasian plants with looser and less rigid hairs. Outer sepals shorter than the inner 30.
30. Inner radical leaves usually strongly undulate, orbicular, large-toothed, without incisions between lobes 31.
- + Radical leaves flat or slightly undulate, reniform, denticulate, with distinct incision between lobes 32.
31. Teeth narrow, long. Hypanthia (at least in upper flowers) not densely hairy 33. *A. argutiserrata* Lindb. fil.
- + Teeth rather broad. Hypanthia densely hairy 31. *A. valdehirsuta* Bus.
32. Pedicels of lower flower in head hairy 34. *A. barbulata* Juz.
- + Pedicels of all flowers glabrous 32. *A. pycnotricha* Juz.
33. Leaves gray-green, usually flat; hairs on petioles of radical leaves and stems usually horizontally spreading 34.

- + Leaves pure or dark green, usually undulate; hairs on petioles and stems usually ascending 37.
34. Pedicels glabrous 35.
- 295 + Pedicels of lower flowers in heads hairy 36.
35. Leaf teeth small, obtuse. Flowers in dense heads, small, ca. 3 mm long; hypanthia usually slightly hairy 36. *A. pastoralis* Bus.
- + Leaf teeth large, acute. Flowers in loose heads, relatively large, up to 4 mm long; hypanthia densely hairy 39. *A. omalophylla* Juz.
36. Leaves with very deep incision between lobes, teeth large, acute. Flowers in loose heads 37. *A. schistophylla* Juz.
- + Leaves with shallow incision between lobes, teeth small, obtuse. Flowers in very dense, heads 38. *A. neo-stevenii* Juz.
37. Lobes of radical leaves with few teeth (no more than 6 at each side); stems short, usually not longer than petioles of middle radical leaves 17. *A. plicata* Bus.
- + Lobes of radical leaves mostly with large number of teeth (more than 6 at each side); stems usually long 38.
38. Leaves dark green; stipules of radical leaves an intensive wine-red; stipules of cauline leaves deeply palmatisect 45. *A. stevenii* Bus.
- + Leaves light or yellowish green; stipules of radical leaves pale; stipules of cauline leaves dentate 39.
39. Radical leaves deeply incised between lobes 40.
- + Radical leaves hardly or shallowly incised between lobes 42.
40. Radical leaves with long narrow lobes 41.
- + Radical leaves with short wide lobes 42. *A. sibirica* Zam.
41. All radical leaves orbicular. Flowers in compact heads, relatively large, ca. 3 mm long, yellowish 43. *A. conglobata* Lindb. fil.
- + At least lower radical leaves reniform. Flowers in loose heads, smaller, 2–2.5 mm long, green 44. *A. juzepczukii* Alech.
42. Leaf teeth acute 18. *A. languida* Bus.
- + Leaf teeth obtuse 43.
43. Cauline leaves cuneately rhombic. Inflorescence very loose 41. *A. languescens* Juz.
- + Cauline leaves reniform. Flowers in more or less dense heads 40. *A. propinqua* Lindb. fil.
- 296 44. Main ribs of radical leaves more or less hairy throughout (sometimes except for the outermost) 45.
- + Main ribs of inner radical leaves or almost all radical leaves (except for the innermost) glabrous in lower part 73.
45. Petioles of radical leaves and stems covered with hairs noticeably declinate below 46.
- + Petioles of radical leaves and stems covered with horizontally spreading or ascending hairs 55.
46. All radical leaves densely hairy above. Flowers usually large, up to 3.5 mm long, often yellowish green 47.
- + Radical leaves usually sparingly hairy above, outer radical leaves often glabrescent. Flowers usually small, not more than 2.5 mm long, greenish or green 53.
47. All radical leaves orbicular, the inner with contiguous or overlapping lateral lobes 48.

- + Radical leaves orbicular-reniform or reniform, rarely the inner orbicular, with axil more or less distinct at base, rarely with contiguous lateral lobes 49.
- 48. Flowers in loose heads 47. *A. substrigosa* Juz.
- + Flowers in very dense heads 51. *A. compactilis* Juz.
- 49. Cauline leaves cuneate or (the lower) broadly cuneate at base 52. *A. pachyphylla* Juz.
- + Lower cauline leaves cordate 50.
- 50. Radical leaves broadly reniform, flat, lobes truncate at apex. Inflorescence very narrow 48. *A. breviloba* Lindb. fil.
- + Radical leaves orbicular-reniform, often slightly undulate, lobes not truncate at apex. Inflorescence broader 51.
- 51. Stipules of radical leaves wine-red; teeth of radical leaves asymmetrical 50. *A. cyrtopleura* Juz.
- + Stipules of radical leaves usually pale; teeth of radical leaves nearly symmetrical 52.
- 52. Teeth of radical leaves small, short 46. *A. sarmatica* Juz.
- + Teeth of radical leaves large, long 49. *A. retropilosa* Juz.
- 53. Radical leaves hairy above only in folds. Hypanthia often slightly hairy 53. *A. litwinowii* Juz.
- + Radical leaves usually hairy above on the whole surface. Hypanthia glabrous 54.
- 54. Radical leaves glaucous-green, dull, orbicular or orbicular-reniform, with more or less deep incision between lobes 54. *A. cymatophylla* Juz.
- + Radical leaves dark green, somewhat shiny, broadly reniform, without incision between lobes 55. *A. semilunaris* Alech.
- 55. All radical leaves more or less densely hairy above 56.
- + Radical leaves sparingly hairy above, the uppermost often glabrescent or all leaves glabrous above 66.
- 56. Crimean species with leaves very densely hairy on both sides . . . 57.
- + Boreal and Caucasian species with leaves less densely hairy, sometimes glabrous beneath between ribs 59.
- 57. Leaves flat, acutely toothed. Flowers ca. 1.5 mm long, 2.5 mm wide 56. *A. tythantha* Juz.
- + Radical leaves undulate, lobes obtusely toothed. Flowers 3 mm long and 4 mm wide 58.
- 58. Pure green plants; radical leaves densely pubescent with rather well-developed arcuate leaf lobes 57. *A. imberbis* Juz.
- + Dark green plants; radical leaves few, less densely hairy, with obsolete very short arcuate lobes 58. *A. arcuatiloba* Juz.
- 59. Stipules of radical leaves always wine-red 60.
- + Stipules of radical leaves pale 62.
- 60. Flowers large, 4–5 mm long. European plant. (Occurring, however, in the lowlands of W. Siberia) 59. *A. micans* Bus.
- + Flowers smaller. Siberian plants (Altai) 61.
- 61. Dark green plants with large-toothed leaves; stems and petioles often covered with few ascending hairs 60. *A. hians* Juz.
- + Dark green plants with very denticulate leaves; stems and petioles with horizontally spreading hairs 61. *A. denticulata* Juz.

62. Stems and petioles of radical leaves covered with ascending hairs 63.
+ Stems and petioles of radical leaves covered with horizontally spreading hairs 64.
63. European plants with gray-green leaves 62. *A. lindbergiana* Juz.
+ Caucasian plants with pure green leaves 63. *A. sedelmeyeriana* Juz.
64. Leaves orbicular. Flowers generally small [sic], green 64. *A. microdonta* Juz.
+ Leaves reniform. Flowers larger [sic] 65.
65. Leaves soft. Flowers relatively small [sic], 1.75–2.5 mm long, green 65. *A. nemoralis* Alech.
+ Leaves rigid, subcoriaceous. Flowers larger, yellowish. 66. *A. rigescens* Juz.
66. Radical leaves more or less hairy above 67.
+ Radical leaves completely glabrous above 71.
67. Radical leaves flat, lobes and teeth acute 68.
+ Radical leaves more or less hairy, lobes and teeth obtuse 69.
68. Pure green plants; radical leaves often remotely hairy beneath between veins 67. *M. acutangula* Bus.
+ Glaucous-green plants; radical leaves glabrous beneath between veins 68. *A. kozlowskii* Juz.
69. Pure green plants; lobes of radical leaves large-toothed 70.
+ Glaucous-green plants; lobes of radical leaves short-denticulate 70. *A. brevidens* Juz.
70. European (and W. Siberian) plants with orbicular thin leaves. Inflorescence narrow; flowers small, ca. 2.5 mm long; hypanthia campanulate in fruit 71. *A. subcrenata* Bus.
+ Caucasian plants with orbicular-reniform, subcoriaceous leaves. Inflorescence rather broad; flowers large, hypanthia globular in fruit 72. *A. subcrenatiformis* Juz.
71. Lobes of radical leaves with acute, nearly equal lateral teeth. Inflorescence broad, strongly branching 73. *A. vulgaris* L.
+ Lobes of radical leaves with obtuse teeth, lateral teeth at apex of lobe strongly enlarged. Inflorescence narrow, few-flowered 72.
72. Leaf teeth small. Flowers in dense heads 74. *A. tianschanica* Juz.
+ Leaf teeth large. Flowers in loose heads. 75. *A. laeticolor* Juz.
73. Leaves usually more or less hairy above, only in inner leaves the main ribs glabrous in the lower part 74.
+ Leaves glabrous above; main ribs of all leaves glabrous at lower part or hairy along entire length of innermost leaves 69. *A. leiophylla* Juz.
74. Leaves usually orbicular with lobes contiguous 75.
+ Leaves reniform or orbicular-reniform, with a distinct axil at base 77.
75. Lobes of radical leaves narrow, long, leaves substellate 78. *A. stellaris* Juz.
+ Lobes of radical leaves short, leaves different 76.
76. Radical leaves 11- (to almost 13-) lobed 89. *A. biquadrata* Juz.
+ Radical leaves usually 9-lobed 77. *A. heptagona* Juz.

77. Stems and petioles of radical leaves covered with horizontally spreading hairs 78.
 + Stems and petioles covered beneath with declinate hairs 80.
78. Stems hairy only in lower half 79.
 + Stems hairy nearly to apex 79. *A. decalvans* Juz.
79. Lobes of radical leaves large-toothed. Flowers large, to 4 mm long, 5 mm broad 80. *A. filicaulis* Bus.
 + Lobes of radical leaves rather denticulate. Flowers smaller, ca. 3 mm long, and broad 81. *A. hyrcana* Bus.
80. Stipules of radical leaves wine-red 81.
 + Stipules of radical leaves pale 82.
81. Radical leaves glabrous above, lobes triangular. Stems not longer than petioles of radical leaves 82. *A. humilicaulis* Juz.
 + Radical leaves hairy above, at least along folds, lobes arcuate or suborbicular. Stems often longer than petioles of radical leaves 83. *A. sanguinolenta* Juz.
82. Lobes of radical leaves arcuate or suborbicular 83.
 + Lobes of radical leaves subovate, subelliptic or triangular 85.
83. Stems hairy only in lowermost part (on first internode) 85. *A. schischkinii* Juz.
 + Pubescent higher 84.
84. Glaucous pale green plants; petioles of radical leaves pubescent throughout length; radical leaves usually hairy above only along folds, lobes arcuate 84. *A. orbicans* Juz.
 + Dark green plants; petioles of inner radical leaves glabrous in upper part; radical leaves usually hairy above on the whole surface, lobes suborbicular 76. *A. exuens* Juz.
85. Radical leaves with deep incision between lobes; each basal lobe separately and deeply incised outside the upper part, forming a ligulate segment above petioles 88. *A. diglossa* Juz.
 + Radical leaves with shallow incision between lobes; basal lobes without ligulate segment 86.
86. Leaves yellowish in the fall; lobes of radical leaves and stipules of cauline leaves with short obtuse teeth. Flowers in loose heads 86. *A. lipschitzii* Juz.
 + Leaves reddening in the fall; lobes of radical leaves and stipules of cauline leaves with elongate acute teeth. Flowers in rather dense heads 87. *A. purpurascens* Juz.
87. Petioles of all radical leaves and stems completely glabrous throughout 101. *A. glabricaulis* Lindb. fil.
 + Petioles of inner radical leaves more or less hairy 88.
88. Hypanthia hairy. Stems and petioles of inner radical leaves covered with ascending hairs 89.
 + Hypanthia glabrous or (in *A. alexandrii* Juz.) sometimes slightly hairy, but then stems and petioles of inner radical leaves covered with horizontally spreading hairs 90.
89. Gray-green plants; radical leaves small, with suborbicular incised lobes. Stems elongate; stems and petioles with nearly horizontally spreading hairs; stipules of cauline leaves deeply dentate 90. *A. transiliensis* Juz.

- + Yellowish green plants; radical leaves medium-sized, with lobes subovate or triangular, not incised. Stems short, stems and petioles of radical leaves with ascending hairs; stipules of cauline leaves shallowly dentate 91. *A. fontinalis* Juz.
90. A small number of petioles of radical leaves (usually less than half), glabrous, the others rather densely covered with horizontally spreading or declinate hairs 91.
- + Nearly all petioles of radical leaves glabrous, only those of the very innermost sparsely covered with ascending hairs 97.
91. Lobes of radical leaves triangular or subovate 92.
- + Lobes of radical leaves arcuate or suborbicular 95.
92. Lobes of radical leaves narrowly triangular, acutely toothed 92. *A. insignis* Juz.
- + Lobes of radical leaves triangular-subovate, obtusely toothed 93.
93. Teeth of radical leaves markedly asymmetrical. 93. *A. altaica* Juz.
- + Teeth of radical leaves nearly symmetrical 94.
94. Caucasian plants with short-toothed radical leaves and often hairy hypanthia 94. *A. alexandri* Juz.
- + Siberian plants with long-toothed radical leaves and glabrous hypanthia 96. *A. anisopoda* Juz.
95. Lobes of radical leaves few-toothed (up to 6 at each side) 98. *A. turuchanica* Juz.
- + Lobes of radical leaves with more teeth 96.
96. Glaucous-green plants; lobes of radical leaves with 5-7 medium-sized teeth at each side; main ribs at lower side of leaves glabrous in lower part; stems arcuately ascending. Inflorescence broad, with elongate branches 95. *A. diversipes* Juz.
- + Light green plants; lobes of radical leaves with 7-12 small teeth at each side; main ribs at lower side of leaves hairy for entire length stems erect. Inflorescence rather narrow, with short branches 97. *A. sauri* Juz.
97. Lobes of radical leaves acutely toothed, terminal tooth almost as long as the neighboring; stems and petioles of radical leaves reddening in the sun. Flowers yellowish green 100. *A. oligotricha* Juz.
- + Lobes of radical leaves obtusely toothed, terminal tooth distinctly smaller than the neighboring; stems and petioles of radical leaves not reddening. Flowers green 99. *A. krylovii* Juz.
98. Caucasian alpine plants with leaves densely hairy on both sides and usually silky beneath; lobes of radical leaves few-toothed (usually 4-6 at each side); hypanthia densely covered with appressed or subappressed hairs 99.
- + Not as above 103.
99. Pedicels of all flowers hairy throughout length 100.
- + Pedicels, at least of the upper flowers in a head, glabrous 11. *A. woronowii* Juz.
100. Leaves dark green above, noticeably silky beneath; stems usually much longer than petioles of radical leaves 101.
- + Leaves glaucous-green, slightly silky beneath; stems shorter or hardly longer than petioles of radical leaves 10. *A. elisabethae* Juz.

101. Radical leaves flat, with broad, obtuse, nearly quadrate lobes, covered beneath with loosely appressed hairs; teeth short and obtuse; stems and petioles covered with loosely appressed hairs 9. *A. rigida* Bus.
- 02 + Radical leaves slightly undulate, with suborbicular or subovate lobes, appressed-hairy beneath; teeth oblong, digitate [?]; stems and petioles covered with tightly appressed hairs 102.
102. Leaves dissected to almost half their radius, slightly dull, silky beneath. Pedicels short, generally about as long as hypanthium 7. *A. sericata* Rchb.
- + Leaves dissected to two-thirds their radius, the upper to three-fifths, silky-shiny beneath. Pedicels long, twice to three times as long as hypanthium 8. *A. tephroserica* Bus.
103. Leaves (at least the inner) hairy on both sides or only on one side on the whole surface 104.
- + Leaves glabrous above or hairy along folds and margins, hairy beneath only along main ribs and margins 117.
104. Leaves glabrous above or hairy only along folds, remotely appressed-hairy beneath on the whole surface 105.
- + Leaves hairy on both sides or sometimes glabrescent beneath 106.
105. Pure green plants, leaves acutely denticulate; terminal tooth of lobe as long as the neighboring. Flowers large, 3.5 mm long; hypanthia elongate-obconoid 115. *A. daghestanica* Juz.
- + Yellowish green plants, leaves with large obtuse teeth; tooth distinctly smaller than neighboring. Flowers small, 1.5–2 mm long; hypanthia short-obconical 110. *A. obtusiformis* Alech.
106. Petioles of radical leaves and stems covered with few ascending hairs 111. *A. suberectipila* Juz.
- + Petioles of radical leaves and stems covered with tightly appressed hairs 107.
107. Small plants, common to the Crimea; lobes of radical leaves with only 4–5 teeth on each side 106. *A. buschii* Juz.
- + Lobes of radical leaves with more teeth 108.
108. Radical leaves orbicular or orbicular-reniform 109.
- + Radical leaves usually broadly reniform, only the innermost sometimes orbicular 113.
109. Flowers large, 2.5–4 mm in diameter, with densely hairy hypanthia. 102. *A. pogonophora* Juz.
- + Flowers smaller, with glabrous hypanthia 110.
- 03 110. Leaves orbicular, at least the inner usually with lobes overlapping at margin 111.
- + Leaves orbicular-reniform, without overlapping lobes 112.
111. Radical leaves undulate, with suborbicular, strongly-toothed lobes, without incision between them 104. *A. obtegens* Juz.
- + Radical leaves nearly flat, often carinate-plicate, at least inner leaves with oblong, denticulate lobes, with incision between them 105. *A. crebridens* Juz.
112. Dark green plants; radical leaves densely hairy on both sides, with suborbicular or subovate lobes. Flowers green 107. *A. tamarae* Juz.

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- + Pale green plants; radical leaves usually glabrous beneath between nerves, with short-triangular lobes. Flowers yellowish green 108. **A. appressipila** Juz.
- 113. Hypanthia of all flowers hairy 103. **A. camptopoda** Juz.
- + Hypanthia glabrous or hairy in the lower flowers in a head 114.
- 114. Radical leaves without incision or with rather shallow incision between lobes, lobes obtusely or acutely toothed, terminal tooth smaller than the neighboring. Flowers medium-sized, up to 3.5 mm long 115.
- + Radical leaves often with very deep incision between lobes, lobes acutely toothed, terminal tooth as long as neighboring teeth. Flowers often large, up to 4.5 mm long 116.
- 115. All leaves reniform, with short rounded lobes, without incision, teeth broad, obtuse. Flowers in rather dense heads 109. **A. glomerulans** Bus.
- + Innermost leaves often orbicular-reniform or suborbicular, with subovate or subtriangular lobes and incision between them, teeth narrow, often acute. Flowers in rather loose heads 112. **A. depexa** Juz.
- 116. Stems arcuately ascending or nearly prostrate, cauline leaves small; radical leaves appressed-hairy beneath along nerves, lobes narrowly triangular, with very deep incision between them. Flowers in very loose heads 113. **A. urceolata** Juz.
- + Stems nearly erect, cauline leaves large; radical leaves often glabrous beneath along lower part of nerves, lobes shorter and broader with much shallower incision between them. Flowers in rather dense heads 114. **A. frondosa** Juz.
- 117. Radical leaves hairy above along wrinkles. Flowers relatively large, ca. 3.5 mm long 118.
- + Radical leaves glabrous above or only slightly hairy along wrinkles. Flowers smaller, up to 3 mm long 120.
- 118. Stems hairy only at first internode, otherwise glabrous 116. **A. psilocaula** Juz.
- + Stems hairy nearly throughout length 119.
- 119. Lobes of radical leaves with distinct incision, with 8-11 small teeth at each side 117. **A. pilosiplica** Juz.
- + Radical leaves without incision between lobes, with 6-7 large teeth at each side 118. **A. flavescens** Bus.
- 120. Petioles of all radical leaves hairy; lobes of radical leaves acutely toothed, terminal tooth nearly equal in length to the neighboring 121.
- + Petioles of outer radical leaves usually glabrous; lobes of radical leaves obtusely toothed, terminal tooth distinctly smaller than the neighboring 126.
- 121. Stems appressed-hairy above; hypanthia of the lower flowers in a head with solitary hairs 119. **A. georgica** Juz.
- + Stems hairy only in the lower half or two-thirds; hypanthia completely glabrous 122.
- 122. Inflorescence compressed; flowers in dense heads, short-pedicelcd, small (ca. 2 mm long, 3 mm in diameter). Leaf teeth short 120. **A. minusculiflora** Bus.

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- + Inflorescence more or less broad; flowers in loose heads, long-pediceled, larger. Leaf teeth long 123.
 - 123. Lobes of radical leaves triangular or subovate, without incision 121. *A. murbeckiana* Bus.
 - + Lobes of radical leaves arcuate or semi-orbicular, with incision between 124.
 - 124. Main ribs at lower side of leaves glabrous in lower part 124. *A. psiloneura* Juz.
 - + Main ribs at lower side of leaves appressed-hairy along entire length 125.
 - 125. Radical leaves orbicular; stems usually much longer than petioles of radical leaves 122. *A. nebulosa* G. Sam.
 - + Radical leaves reniform; stems usually not longer or hardly longer than petioles of radical leaves 123. *A. cartalinica* Juz.
 - 126. Lobes of radical leaves with nearly symmetrical papillary teeth; stems usually more or less densely hairy at the lower 2-3 internodes 127.
 - + Lobes of radical leaves with strongly asymmetrical teeth, teeth often curved in S-form at outer margin; stems usually more or less densely hairy only at the lower (reduced) internode, sometimes (nearly) glabrous 127. *A. alpestris* F. W. Schmidt.
 - 127. Inner radical leaves orbicular-reniform, lobes short, orbicular. Inflorescence narrow, long; flowers in rather dense heads 125. *A. obtusa* Bus.
 - + All radical leaves broadly reniform, lobes subovate. Inflorescence broad, divaricate; flowers in rather loose heads 126. *A. pseudo-cartalinica* Juz.
 - 128. Petioles of radical leaves and stems covered with more or less (often horizontally) spreading hairs 129.
 - + Petioles of radical leaves and stems covered with appressed or loosely adhering hairs 139.
 - 129. Radical leaves hairy on both sides (often less densely above) 130.
 - + Radical leaves more or less hairy beneath, glabrous above (sometimes with the exception of the lowermost leaves) 136.
 - 130. Pedicels hairy 131.
 - + Pedicels of all or only upper flowers in a head glabrous for entire length or in lower half 134.
 - 131. Radical leaves deeply incised between lobes; petioles of radical leaves and stems covered with ascending hairs 128. *A. speciosa* Bus.
 - + Radical leaves not deeply incised between lobes; petioles of radical leaves and stems covered with horizontally spreading hairs 132.
 - 132. Leaves pure green, very densely villous-hairy on both sides. Flowers more or less large, 4 mm in diameter, yellowish 133.
 - + Leaves glaucous-green, less densely hairy. Flowers small, green, unattractive 131. *A. hirtipedicellata* Juz.
 - 133. Lobes of radical leaves arcuate or suborbicular, obtusely toothed 129. *A. holotricha* Juz.
 - + Lobes of radical leaves acutely angled, acutely toothed 130. *A. smirnovii* Juz.

134. Leaves large, usually reniform, usually sparsely hairy above, short- and broad-toothed; branches of inflorescence glabrous 132. *A. oxysepala* Juz.
- 306 + Leaves smaller, orbicular or orbicular-reniform, usually densely hairy above; teeth narrow and long or if short and broad then branches of inflorescence hairy above 135.
135. Lobes of radical leaves subovate or subelliptic, long-toothed; branches of inflorescence glabrous 133. *A. porrectidens* Juz.
- + Lobes of radical leaves arcuate or usually suborbicular in upper leaves, short-toothed; branches of inflorescence hairy above 134. *A. pseudomollis* Juz.
136. Radical leaves with rather long acute triangular lobes 135. *A. laeta* Juz.
- + Radical leaves with short obtuse arcuate or suborbicular lobes 137.
137. Glaucous-green plant; lowermost radical leaves more or less hairy above (usually along folds); petioles and stems covered with ascending hairs 136. *A. circassica* Juz.
- + Bright green plant; all radical leaves glabrous above; petioles and stems covered with horizontally spreading hairs 138.
138. Radical leaves broadly reniform, 7-9-lobed; lobes arcuate, with 4-7 large obtuse teeth at each side; cauline leaves large, often with completely obtuse lobes. Hypanthia glabrous or sometimes with few hairs at base; sepals narrow, long 137. *A. epipsila* Juz.
- + Radical leaves orbicular-reniform, 9-11-lobed; lobes generally suborbicular or subovate, with 6-9 smaller and more acute teeth at each side; cauline leaves smaller, with arcuate lobes. Hypanthia always glabrous; sepals wider and shorter . . . 138. *A. stellulata* Juz.
139. Radical leaves appressed-hairy beneath between ribs 140.
- + Radical leaves glabrous beneath between ribs 147.
140. Stems and petioles of radical leaves covered with loosely adhering or often nearly ascending hairs 141.
- + Stems and petioles of radical leaves covered with tightly appressed hairs 142.
141. Leaves usually hairy above along folds, very densely hairy beneath. Hypanthia glabrous or with few hairs at base; sepals narrowly ovate 139. *A. sevangensis* Juz.
- + Leaves glabrous above, slightly pubescent beneath. Hypanthia rather densely hairy in lower part; sepals broadly ovate 140. *A. grandidens* Juz.
- 307 142. Pedicels of all or nearly all flowers hairy 143.
- + Pedicels glabrous (sometimes hairy in the lowermost flowers). 144.
143. Leaves orbicular, with arcuate lobes, acutely toothed, glabrous above, appressed-hairy beneath, not silky, prominently netted-veined. Flowers in very loose divaricate inflorescence, relatively large, 3.5 mm long and 5 mm in diameter; hypanthia and pedicels of all flowers hairy 141. *A. divaricans* Bus.
- + Leaves orbicular-reniform, with subelliptic lobes, obtusely toothed, hairy above along folds, silky-appressed-hairy beneath, not prominently netted-veined. Flowers in rather dense and compressed inflorescence, smaller in size; hypanthia and pedicels of the upper flowers in heads hairy 142. *A. subsplendens* Bus.

144. Hypanthia of all flowers glabrous or with solitary hairs in the lower flowers in heads 145.
 + Hypanthia more or less densely hairy, sometimes glabrous only in the upper flowers in a head 146.
145. Radical leaves usually appressed-hairy above, along folds and marginal lobes, nearly without incision between lobes. Flowers large, 4 mm long and 4.5 mm wide; hypanthia of the lower flowers in heads often with solitary hairs 143. **A. haraldi** Juz.
 + Radical leaves completely glabrous above, with distinct incision between lobes. Flowers smaller; hypanthia glabrous 144. **A. venosa** Juz.
146. Radical leaves broadly reniform, sparsely hairy beneath between veins; lobes often broadly triangular, acutely toothed; stems appressed-hairy throughout. Inflorescence many-flowered; hypanthia spreading-hairy 145. **A. abchasica** Bus.
 + Radical leaves suborbicular, uniformly and rather densely appressed-hairy beneath; lobes subovate, obtusely toothed; stems glabrescent toward inflorescence. Inflorescence few-flowered; hypanthia with tuft of spreading hairs at base 146. **A. barbatiflora** Juz.
147. Plants usually large; radical leaves with numerous (11–13) triangular lobes with 7–12 teeth at each side 148.
 + Plants smaller; radical leaves with 5–9 arcuate or suborbicular lobes, 4–6-toothed at each side 149.
148. Lobes of radical leaves narrowly and long-triangular, obtusely toothed, with outer margin convex 147. **A. tredecimloba** Bus.
 + Lobes of radical leaves short-triangular, very acutely toothed, with outer margin straight 148. **A. undecimloba** Juz.
149. Stems and petioles of radical leaves appressed hairy in lower part or glabrous 150.
 + Stems and petioles of radical leaves sparsely covered in lower part with nearly ascending hairs 150. **A. debilis** Juz.
150. Small alpine plants, with abortive cauline leaves 149. **A. retinervis** Bus.
 + Larger subalpine plants, with well-developed cauline leaves 151. **A. dura** Bus.

Subgenus 1. **ARGENTARIA** Juz.—Alchimilla sect. Alpinae Buser in Bull. Soc. dauph. (1892) 92; idem in Jaccard Cat. fl. Valais. (1895) 105.—Plants forming dense compact tufts; radical leaves parted nearly to base into 5–7 oblong or oblong-lanceolate lobes (only very rarely connate for one-third or one-half their length); stems in lower half often leafless. Outer sepals very small, often inconspicuous.

Series 1. **Saxatiles** Buser apud Schroeter, Pflanzenleb. Alp. (1908) 43.—Leaves glabrous above, densely appressed-hairy, silky-silvery beneath; lobes shallowly denticulate at apex. Flowers in dense heads; sepals narrow, rather acute.

1. *A. alpina* L., Sp. pl. (1753) 123, s. str.; Ldb., Fl. Ross. II, 1, 30.—*A. alpina* γ *glomerata* Tausch in Flora XXIV, 1 (1841) Beibl. 108 (excl. pl. corsica).—*A. glomerata* E. G. Camus, Fl. France VI (1900) 441.—Ic.: Fl. Dan. 1 (1761) Tab. 10, Svensk. Bot. XI (1843); 753; Buser in Ber. Schweiz Bot. Ges. IV (1894) 45, tab. II.—Exs.: Baenitz, Herb. Europ. No. 8223.

309 Shrub; radical leaves 0.8–2.5 cm long, 1.2–3.5 cm wide, broadly reniform or suborbicular, dark green above, slightly glossy, glabrous, shiny beneath, silky-silvery with dense tightly appressed hairs, dissected to base into 5–7 lobes, the inner of which usually lanceolate or elliptic-lanceolate, margins nearly radially opposite to each other, asymmetrical (inner half broadest above middle, outer half below middle), 3–5 times narrower than long, rather rigid, pinninerved, cuneately tapering at base, acuminate at apex, with 2–4 minute, acute, somewhat inflexed teeth at each side; petioles and stems densely covered with appressed-silky hairs along entire length; stems 5–18 cm high, thin, indurate, not exceeding petioles of radical leaves or usually twice as long; cauline leaves few, reduced, usually with 3 entire or subdentate segments. Inflorescence somewhat branching, compressed; flowers in dense globose heads often attached to each other (especially the upper), 2–3.5 mm in diameter, yellowish green; hypanthia turbinate, thickened and campanulate in fruit, with constriction below sepals, like sepals loosely appressed-silky-hairy; sepals ovate orbroadly ovate, as long as or slightly longer than hypanthia, erect or spreading in fruit (never recurved below); outer sepals abortive, much smaller than the inner; pedicels very short, as long as or shorter than hypanthia, densely subappressed-hairy. June–August. (Plate XXII, Figure 1).

Rocks, meadows, shrubby formations.—Arctic: Arc. Eur. (Kildin Island, Rybachi Peninsula, Iokanga). **Gen. distr.:** Arc. Eur., Greenland, mountains of Southern Europe. Described from European Alps. Type in London.

Series 2. **Sericeae** Buser apud Schroeter, l. c. 444 (nomen); id. in Monit. Jard. Bot. Tiflis 4 (1906) 6.—Leaves usually appressed-silky-hairy on both sides, very rarely glabrous above or beneath; lobes in upper half very deeply incised-dentate. Inflorescence corymbiform-paniculate; sepals unusually wide, obtuse.

2. *A. sericea* Willd., Enum. pl. Hort. Berol. I (1809) 171 in nota; Boiss., Fl. Or. II, 730 p. p.; Ldb., Fl. Ross. II, 30; Buser, l. c. (1906) —*A. alpina* M. B., Fl. taur.-cauc. I (1808) 114, non L.—*A. alpina* δ *sericea* Tausch in Flora XXIV, 1 (1841) Beibl. 108, 110.—Exs.: Baenitz, Herb. Eur. sine No.

Perennial, small, grayish green, silky-shiny plants, forming compact tufts; radical leaves broadly reniform, grayish dark green above, densely covered with tightly adhering but dullish hairs, very densely silky-silvery and shiny beneath, dissected to base into 7 oblanceolate or narrowly obovate lobes; lobes cuneate at base, acute, rarely obtuse at apex, entire for the lower $\frac{1}{3}$, deeper incised-dentate in upper part, with 2–7 long, narrow, linear-lanceolate or lanceolate teeth at each side, lower teeth larger, often strongly divaricate and even outwardly curved, the upper teeth more straight or slightly

10 declining toward terminal tooth; the lower lobes flat or very often plicate and retroflexed along main rib, soft (comparable to *A. alpina*); terminal (i. e., largest) segments 0.9–5.3 cm long, 3–15 mm wide; entire leaf: 10 × 12 mm [cm?]-7 × 9 cm, flat or usually plicate; petioles and stems densely covered with tightly appressed silky hairs along entire length, often (especially in lower part) reddening; stems numerous, slightly to twice as long as petioles of radical leaves, 3–25 cm high, erect, often leafless below, in upper part with few, small, cauline leaves trisect to base, with small and acutely toothed stipules; branches few, (often very elongate), inclining at a sharp angle. Inflorescence rather many-flowered; flowers in loose often confluent heads, 1.5–4 mm long, 2–4.5 mm wide, yellowish; hypanthia obconoid, and broadly ovoid, very densely appressed silky-hairy, acute; sepals as long as hypanthia or slightly longer; outer sepals small, one-fifth to one-third as long as and many times narrower than inner sepals; pedicels longer than hypanthia, silky-hairy. End June–August (September). (Plate XXII, Figure 2).

Moraines, rocks, stony taluses, meadows, mountain slopes in the alpine, rarely subalpine, mountain zone. — Caucasus: all regions. **Gen. distr.:** Iran., As.-Min. Described from the Caucasus (without exact locality). Type in Berlin.

Note. Distinctly variable in shape of leaves and teeth. Occasionally encountered forms with obovate leaf lobes, nearly rounded at apex, with shorter regular erect teeth, are particularly conspicuous. Buser mentioned a similar form, as well as the unusually slender and thin-stemmed form *A. sericea* whose leaves have 5 leaflets. (Vestn. Tifl. Bot. Sada, p. 7, Vol. 4. 1906.)

3. *A. chlorosericea* Buser in Monit. du Jard. Bot. de Tiflis, livr. 4 (1906) 7 (pro subsp. *A. sericeae* Willd.); Juz. apud Grossh., Fl. Kavk. IV (1934) 322. — *A. sericea* Willd. pro p. (cfr. R. Buser, l. c., 8).

Perennial, resembling *A. sericea*, but the whole plant more weakly pubescent, yellowish green; stipules of radical leaves broader and more obtuse than in *A. sericea*; leaves glabrous above, thinly silky-hairy beneath; hypanthia slightly silky-hairy at base and sepals only in upper part; lower radical leaves with oblong-ovate, short-acuminate, evenly pectinate-dentate lobes; upper radical leaves with oblong lobes and elongate teeth. July.

Rocks? — Caucasus: Cisc. (Paischar, Diklo Tuschetiae), Dag. (Dindidagh). Described from Diklo in Tushetiya. Type in Helsingfors, cotypes in Geneva and Leningrad.

4. *A. hypochlora* Juz. nov. spec. in Addenda IX, p. 459.

Perennial, similar to *A. chlorosericea* but leaves slightly silky-appressed-hairy on the whole upper surface, more or less glabrous or glabrescent beneath (especially the inner leaves, the outer silky-hairy along main rib, otherwise usually sparsely hairy); lobes oblong-obovate (broader than in *A. chlorosericea*); stems and branches glabrous above; pedicels and hypanthia glabrous; sepals often wine-red inside. August.

311 Alpine meadows. — Caucasus: E. Transc. (South Ossetian Autonomous Region). Endemic. Described from the Sredne-Erman Gorge. Type in Leningrad.

5. *A. raddeana* Buser in Monit. du Jard. Bot. de Tiflis, livr. 4 (1906) 8, (pro subsp. *A. sericeae* Willd.); Juz. in Grossh. Fl. Kavk. IV (1934) 321.

Perennial, small grayish green, silky-hairy plant; radical leaves ca. 1.5 cm long and 2 cm wide, carinate-plicate, reniform, densely appressed-hairy, dingy above, yellowish-shiny beneath, partite up to one-half to two-thirds into narrowly obovate lobes; lobes rounded at apex, deeply incised-dentate in upper half, with 2–5 lanceolate, acute, slightly introrse teeth at each side; petioles and stems densely silky-appressed-hairy along entire length; stems 1–2, two to three times as long as petioles of radical leaves, 6–13 cm high; cauline leaves few, deeply 3-lobed; stipules strongly dentate. Inflorescence very narrow and few-flowered; flowers in loose heads, 2.5–3 cm [mm?] long, 3–4 cm [mm?] wide, yellowish, with all parts densely appressed-hairy; hypanthia obconoidal; sepals broadly ovate, acute, outer sepals one-half to one-third as long as inner sepals and three to four times narrower; pedicels appressed-hairy, longer than hypanthia. July.

Rocks? — Caucasus: S. Transc. Endemic. Described from Koshkar-Dag. Type in Tbilisi, cotype in Leningrad.

6. *A. heteroschista* Juz. nov. sp. in Addenda IX, p. 459.

Perennial medium-sized plant, sturdy, all parts silky-hairy; radical leaves 4.5 cm long and 5 cm wide, flat, reniform or the inner usually orbicular-reniform to orbicular, densely appressed-hairy on both sides (very densely beneath), strongly silky-hairy beneath, weakly above, dissected to a depth of two-thirds to three-fourths into 7 oblong or obovate, rather broad lobes, the middle lobe separated from the adjacent ones nearly to base (at least in the rosetted upper leaves), all lobes rounded at apex, deeply incised-dentate in upper part; teeth 3–5 at each side of lobe, oblong-lanceolate, acute, nearly straight; stems 13–16 cm high, twice as long as petioles of radical leaves. Flowers 3.5 mm long, 2 mm wide; inner sepals reddening. Otherwise like *A. raddeana* Bus. August.

Damp mountain slopes (northern) in the alpine zone. — Caucasus: S. Transc. Endemic. Described from vicinity of Nor-Bayazet, Kyzyl-Dag River. Type in Leningrad, cotype in Moscow.

312 Subgenus II. **PES-LEONIS** Juz. — Plant loosely caespitose, rootstock usually long-creeping; radical leaves entire, shallowly or rather deeply lobed (lobes rarely reach two-thirds to three-fifths of leaf radius); stems usually leafy throughout. Outer sepals more or less well developed.

Economic importance. The species of this subgenus are excellent fodder plants but eaten reluctantly by cattle when green. They contain tannic acid and are widely used in folk medicine as a styptic.

Section 1. **PUBESCENTES** Buser in Bull. Soc. Dauph. (1892) 98; idem in Jaccard, Cat. Fl. Valais. (1895) 110; idem in Bull. Herb. Boiss. IV (1896) 756. Rather small xerophyllous plant, densely villous or silky-hairy in all parts (sometimes pedicels glabrous); leaves small, usually reniform, rarely suborbicular, 7–9-lobed, crenate-dentate or very rarely acutely toothed, with few (3–6 at each side of lobe) teeth, glaucescent or gray-green;

stems usually indurate, often reddening in the sun, diachasially branching. Flowers often small, usually crowded in heads, short-pedicel; outer sepals shorter and narrower than inner sepals, sepals usually obtuse, shorter than hypanthia, sepals and hypanthia always densely hairy, often adjoined in fruit; fruitlets not exerted above disk after ripening.

Note. It is very difficult to delimit this section from the following one; some series referred here are clearly intermediate in character (thus, series *Coloratae* Juz. is easily connected with *Aemulantes* Juz., referred by us to section *Vulgares* Buser, series *Plicatae* Juz. with *Propinquae* Juz., and series *Pseudo-sericatae* Juz. obviously with the group *Appressipilae* Juz.) and consist of very heterogeneous elements.

Series 1. *Saricatae* Juz. — Stems and petioles of radical leaves appressed-hairy; leaves dark green above, more or less silky-shiny beneath; stems tall, ascending, indurate. Pedicels and all floral parts very densely appressed-hairy.

7. *A. sericata* Rchb., *Iconogr.* 1 (1823) 6 (et 95). — *A. pubescens* M. B., *Schreib. Länd. am kasp. Meere* No. 9 (1800) 134; id. *apud Koenig et Sims, Annals of Bot.* II (1806) 408; *Fl. taur.-cauc.* I (1808) 114, excl. syn.; *Suppl.* (1819) 113 (excl. pl. *taurica*), non Lam. — *A. pubescens* Willd., *Enum. H. Berol.* (1809) 170; *Hort. Berol.* (1816) tab. 79. — *A. vulgaris* var. *caucasica* Beck, *Fl. N.-Oest.* (1892) 766. — *A. sericata* subsp. *leu-sericata* Buser in *Monit. du Jard. Bot. de Tiflis, livr. 5* (1906) 2. — *lc.*: Willd., *Hort. Berol.*, l. c.; Rchb., *Iconogr.* l. c., tab. IV, f. 9.

Perennial, small or usually medium-sized plants; radical leaves small in comparison to the dimensions of the whole plant (0.8–3 cm long, 1.2–3.5 cm wide), generally orbicular-reniform, with tapering or rectangular axil at base, slightly undulate, dark bluish green, evenly appressed-hairy above, gray or glaucescent-gray, densely appressed-hairy, dullish silky beneath and obscurely netted-veined, 7-lobed or rarely almost 8–9-lobed; lobes deep, as long as two-fifths or two-thirds of the radius, suborbicular or subovate, subelliptic in upper leaves, with deep narrowly cuneate incision between them, slightly overlapping each other, with 5–7 large, digitate [?] teeth at each side of upper part; petioles and stems densely appressed-silky-hairy along entire length; stems few (6) 12–45 cm long, longer than petioles of inner radical leaves, arcuately or straightly ascending or usually erect, firm, brownish purple in the sun, with elongate internodes; cauline leaves large (compared with the radical), upper cauline leaves very deeply lobed. Inflorescence narrow, with branches inclined at a sharp angle, elongate; flowers in rather dense heads, more or less small, 1.3–2 mm long and wide, yellowish, densely subappressed silky-pubescent outside in all parts; hypanthia obovoid or subglobose, binding calyx; sepals as long as hypanthia or shorter, broadly cordate-ovate, arcuately converging after anthesis; outer sepals large; pedicels as long as hypanthia or twice as long, densely appressed-silky-hairy. June–August.

Rocks, stony pastures and shrubby formations in the alpine and subalpine zones. — Caucasus: Cisc., Dag., E., W. and S. Transc. Endemic. Based upon a specimen collected by von Vietinghoff in the high mountain regions

of the Caucasus ("auf den höhern caucasischen Gebürge"), without exact locality and described in Rchb., l. c. Type in Vienna?

Note. A polymorphic taxon; Buser distinguished two forms in it (mainly according to the outline of the lobes) — *f. angustiloba* and *f. latiloba* Bus. in *Monit. Jard. Bot. Tifl.*, livr. 5, 1906, p. 2 et 3; however, these are only a few of the many forms of this variable species.

8. *A. tephroserica* Buser in *Monit. du Jard. Bot. de Tiflis*, livr. 5 (1906) 3 (pro subsp. II *A. sericatae* Rchb.); Juz. in *Grossh. Fl. Kavk.* IV (1934) 323 (sphalm. *A. tephrosericea*).

Perennial, resembling *A. sericata* Rchb., but the whole plant slenderer; radical leaves more deeply incised (the lower up to two-thirds, the upper up to three-fifths of the radius), upper leaves dark green above, silky-gray, shiny beneath, with prominent mid and lateral ribs (second order). Flowers slightly larger than in *A. sericata*; hypanthia globose-ovoid or compressed-globose; sepals broader and more obtuse; pedicels distinctly longer. June–August. (Plate XXII, Figure 3).

314 Caucasus: Cisc. (Lars, Kislovodsk), Dag. Endemic. Described from a specimen cultivated at the Botanical Garden in Paris (paratype from Kislovodsk in Tbilisi).

9. *A. rigida* Buser in *Bull. Herb. Boiss.* IV (1896) 756. — *A. sericata* subsp. III *rigida* Buser in *Monit. du Jard. Bot. de Tiflis*, livr. 5 (1906) 3. — ? *A. montana* Link, *Enum. h. Berol.* I (1821) 144; Mert. u. Koch, *Deutschl. Fl.* I (1823) 830; Wimm. et Grab., *Fl. Siles.* 1 (1827) 135, non Willd., non Lam.

Perennial small or medium-sized rather dark green plants, very similar to *A. sericata* Rchb.; radical leaves 2–3.5 cm long, 2.5–4 cm wide, orbicular-reniform, flat, 7- or often 9-lobed; lobes confluent or adjacent at margin, very broad, $\frac{2}{5}$ – $\frac{1}{2}$ the length of the leaf radius, arcuately orbicular or semi-ovate, often more or less obtuse to nearly quadrate, entire at base, not overlapping at margins, with 4–6 short-digitate [?], ovate, papillary or usually subcrenate short and obtuse teeth at each side, silky-villous, with pubescence beneath looser than in *A. sericata*, often prominently netted-veined; petioles and stems densely covered with subappressed or semi-spreading hairs; stems 20–30 cm, completely straight or rarely slightly flexuous, strong, firm, branching in upper fourth; cauline leaves remote, incised to one-third. Inflorescence rather broad; flowers usually in compact heads, 3–4 mm in diameter (larger than in *A. sericata*), yellowish green; hypanthia 1–2 mm long, 0.75–1.5 mm broad; sepals longer than hypanthium, 1.25–1.5 mm long, half-open; pedicels short. July–August.

Rocky and stony places, mostly in the alpine zone. — Caucasus: Cisc., Dag., E., W. and S. Transc., Tal. **Gen. distr.:** N. Iran. Described from the Elburz Mountain Range above the Kükürtli River, ca. 2,500 m. Type in Florence.

Series 2. **Pseudo-sericatae** Juz. — Stems and petioles of radical leaves appressed-hairy; leaves usually glaucous or glaucescent, slightly silky-shiny or dullish beneath; stems often low. Pedicels often glabrous along entire length or only in upper part.

10. *A. elisabethae* Juz. apud Grossh., Fl. Kavk. IV (1934) 322.

315 Perennial glaucous-green plants; radical leaves 1.4–2 cm long, 1.7–2.5 cm wide, reniform or orbicular-reniform, slightly undulate, with 7 short, wide, arcuate or nearly obrhombic obtuse lobes; lobes with cuneate incision between them and with 3–4 large, nearly semi-orbicular or usually semi-elliptic obtuse teeth at each side, densely subappressed-hairy on both sides, slightly silky-shiny beneath (especially along main ribs); petioles 1–5 cm long, densely subappressed-hairy, often dark red in color; stems 4–12 cm long, erect, simple or with 1–2 short branches in the upper part inclined at a sharp angle, as pubescent as petioles; cauline leaves few, abortive. Inflorescence very poor, few-flowered; flowers in few heads, dense at beginning, loose at fruiting, [relatively] large, 2–3 mm long and wide; hypanthia campanulate densely covered with appressed or ascending hairs; sepals as long as hypanthia or shorter, densely appressed-hairy like the much smaller outer sepals; pedicels as long as hypanthia or longer, densely appressed-hairy. June–July.

Alpine meadows. — Caucasus: Cisc. (Main Range, central part), Dag., E. Transc. (South Ossetian Autonomous Region). Endemic. Described from Balkan. Type in Leningrad.

11. *A. woronowii* Juz. nov. spec. in Addenda IX, p.460.

Perennial small grayish green, somewhat silky-shiny plants; radical leaves 1.3–3.5 cm long, 1.7–4 cm wide, reniform, usually flat, 5- or almost 7-lobed; lobes short, arcuate, obtuse, with distinct incision between and with 3–5 large, semi-ovate or semi-elliptic obtuse teeth at each side and a slightly shorter terminal tooth, all densely appressed-hairy on both sides, especially strongly pubescent and somewhat silky-shiny beneath, with very densely appressed-hairy ribs; petioles of radical leaves densely appressed-hairy; stems 10–25 cm long, more or less ascending at base, firm, sparsely (compared to petioles) appressed-hairy along entire length, reddening; cauline leaves almost semi-orbicular, with very short lobes and large few-toothed stipules. Inflorescence few-flowered, narrow, with short branches; flowers in rather dense heads, small, ca. 2 mm long, yellowish; hypanthia narrowly campanulate, appressed-hairy; sepals about as long as hypanthia, broadly ovate, acute, appressed-hairy at least in upper part, outer sepals nearly half as long and considerably narrower than inner, hairy at margin; lower pedicels in a head of flowers longer than hypanthia, the rest as long or shorter, glabrous. July, Fr. August.

Stony slopes and shrubby formations in the subalpine mountain zone. — Caucasus: E. Transc. (South Ossetian Autonomous Region). Endemic. Described from Edisi village. Type in Leningrad.

316 Series 3. *Glaucoscentes* Juz. — Stems and petioles of radical leaves covered with ascending hairs; petioles not reddening in the sun; leaves nearly without incision between lobes, silky-shiny beneath. Pedicels hairy along entire length.

12. *A. minor* Huds., Fl. Angl. ed. I (1762) 59; Bus. in Bull. soc. dauph., sér. 2 (1892) 98 nec alibi. — *A. pubescens* Lam., Tableau encyclop. et

méthod. livr. 1 (1791) 347, No. 1703 ex parte; Bus., Alch. Valais. (1894) 94; H. Lind. in Acta Soc. Scient. Fenn. tab. XXXVII, No. 10 (1909) 45 et auct. plur. recent. — ? *A. sylvestris* F. W. Schmidt, Fl. Boëm. inchoat. cent. III (1794) 88 (ex descr.), non aliorum. — *A. glaucescens* Wallr. in Linnaea, XIV (1840) 134, 549. — *A. hybrida* Fritsch, Exkursionsfl. Oesterr. (1909) 331 et auct. plur., non, L. Amoen., Ac. III (1764) 49; an Mill. Gard. Dict. ed. VIII (1768) No. 2?. — *A. anglica* Rothm. in Fedde, Repert. XLII (1937) 167, excl. syn. — Ic. (phot.): H. Lindb., l. c., tab. 2. — Exs.: Baenitz, Herb. Eur. No. 8260, 8273, 8274; Pl. Finl. exs. No. 270, 735; HFR No. 2655.

Perennial small gray-green plants; radical leaves suborbicular, ca. 3.5–5 cm long and wide, slightly undulate, lobes suborbicular, cut nearly to base, dentate with 4–5 broad obtuse teeth at each side, densely covered on both sides with soft, slightly appressed hairs, dark gray-green above, somewhat silky-shiny beneath (especially in young state); petioles of radical leaves and stems covered with long, soft, somewhat ascending hairs; stems 4–30 cm high, not firm, rather thin, arcuately ascending; cauline leaves small, with dentate stipules. Inflorescence more or less narrow; flowers in subglobose, rather dense, white-tomentose and shiny heads, ca. 3 mm long, yellow-green, densely covered, like petioles of radical leaves, with soft, somewhat ascending silky hairs; hypanthia nearly semi-globose in fruit; sepals converging postanthesis, short, obtuse; pedicels densely white-tomentose with ascending hairs for their entire length. June–July. (Plate XXII, Figure 4).

Open damp places with low and usually sparse grasslands, forest edges, often on sandy or limestone soils. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., U. Dnp., V.-Kama (western part). Gen. distr.: Scand., Centr. Eur., Atl. Described from Western Europe. Type in Paris.

13. *A. supina* Juz. in Not. Syst. ex Herb. Inst. Bot. Acad. Sc. URSS VIII, fasc. 1–2 (1938) 8, in adnot.

Perennial, slightly differing from the typical *A. minor* Huds. (the local form of which it undoubtedly represents) by the smaller size of the entire plant, being slenderer in appearance, the reniform leaves and their usually narrower lobes, denticulate, the pedicels glabrous at the very apex, the small flowers (not more than 2.5 mm long) in denser heads. June–July.

317 Mountain meadows, grasslands, open herbaceous slopes, forest edges (mostly of pine forests), pastures. — European part: Crim. (Yaila). Endemic? Described from Nikitskaya Yaila. Type in Leningrad.

Note. A problematic plant, easily identified in herbaria but in cultivations hardly distinguished from *A. minor* Huds.

Series 4. **Flabellatae** Juz. — Stems and petioles of radical leaves usually covered with ascending hairs, rarely hairs declinate; petioles usually reddening in the sun; leaves with distinct incision between lobes, dull beneath. Pedicels hairy for their entire length.

14. *A. taurica* Juz. in Acta Inst. Bot. Acad. Sc. USSR, ser. I, fasc. I (1933) 118 (nomen); id. in Delect. Sem. Hort. Bot. Acad. Sc. USSR 1934

(1933) 6 (nomen); Not. Syst. ex Herb. Inst. Bot. Acad. Sc. USSR VIII, 1-2 (1938) 8. — *A. flabellata* var. *taurica* Buser in Monit. Jard. Bot. Tiflis, livr. 4 (1906) 3, adnot.

Perennial small bluish gray-green plants; radical leaves 1-2.8 cm long, 1.5-3.5 cm wide, reniform, with more or less broad axil at base, flat, 5-7-lobed, lobes short, arcuate or rarely semi-orbicular, usually obtuse, entire at base, with 3-5(6) short, semi-ovate or semi-elliptic, subobtuse or obtuse teeth at each side and a smaller terminal tooth densely covered on both sides with spreading or usually slightly appressed hairs, somewhat silky-shiny beneath when young, ribs beneath densely covered with erect hairs, lateral veins netted and sometimes (when dry) distinctly protruding; petioles of radical leaves densely covered like stems with long, usually slightly ascending, rarely horizontally spreading hairs; stems 3-22 cm long, usually three to four times as long as petioles of radical leaves, somewhat arcuately ascending as base, straight, thin and weak, often reddening like petioles of radical leaves in the sun, very sparsely short-hairy at apex; cauline leaves reduced, with small- or large-toothed stipules. Inflorescence very poor, with branches inclining at a very sharp angle; flowers in rather dense heads, small, 1.5-2.5 mm long, 2-3 mm wide, yellowish green; hypanthia campanulate, nearly semi-globose in fruit, constricted below sepals, densely covered with ascending hairs; sepals about as long as hypanthium, densely hairy like outer sepals, outer sepals as long as inner but narrower; pedicels as long as or slightly longer than hypanthia, densely covered for the entire length with ascending hairs. June.

318 Pastures, grassy slopes. — European part: Crim. (Yaila); Caucasus: Cisc., W. Transc. Endemic. Described from Nikitskaya Yaila. Type in Leningrad. Type of Buser's variety from Chatyr-Dag ("Tugaturdagh") (sic) is in the Herbarium of the Botanical Museum of Helsingfors University, Steven Herbarium.

15. *A. caucasica* Buser in Bull. Herb. Boiss. IV (1896) 757; Juz. apud Grossh., Fl. Kavk. IV (1934) 323.

Perennial small gray-green plants; radical leaves small, 1.2-1.9 mm long, 1.5-2.7 cm wide, reniform, flat, 7-lobed, lobes wide, obovate, obtuse, (with cuneate incision between them) half the length of the radius, with 2-4 large, ovate teeth at each side, very densely pubescent on both sides (especially beneath), with slightly appressed hairs (when young), silky-shiny, hairs nearly spreading at maturation; petioles 2-3 cm long, densely covered with spreading hairs; stems 6-12 cm long, erect, thin, few-branched with 1-2 short branches; cauline leaves few, reduced. Inflorescence very poor; flowers in dense terminal heads, large, ca. 3 mm long and 3-3.5 mm in diameter, densely hairy in all parts; hypanthia ca. 1.5 mm long; sepals about as long as hypanthia; pedicels short, hairy. June-August.

Alpine meadows and pastures. — Caucasus: Cisc., Dag. **Gen. distr.:** Turkish Armenia (?). Described from the Teberda pass between the Teberda and Dout rivers (former Kuban Region). Type in Florence.

16. *A. erythropoda* Juz. apud Grossh., Fl. Kavk. IV (1934) 323.

Perennial small or medium-sized bluish gray-green plants; radical leaves 1.1-3.2 cm long, 1.7-5 cm wide, reniform or orbicular-reniform,

flat, 7-lobed, lobes wide and short, ca. one-third to two-fifths as long as radius, broadly obovate or nearly obovate, apically arcuate or obtuse, laterally entire [?], with 3–5 more or less large, oblong, obtuse teeth at each side, very densely spreading-hairy on both sides (especially along main rib at lower side of leaf), velutinous to the touch; petioles 1–11 cm long, intensively red-violet, densely covered with declinate hairs; stems 5–20 cm long, erect, usually firm, densely covered with distinctly declinate hairs, few-branched in upper part, branches inclining at a sharp angle; cauline leaves few, usually broadly rhombic, with 3 narrow, cuneate, apically 3-toothed lobes; stipules deeply incised-dentate. Flowers few, in loose heads, large, 2.5–4 mm long and wide, densely spreading-hairy, yellowish; hypanthia 1.25–2 mm long, at first obovate, later globose; sepals as long as hypanthium, patent; outer sepals noticeably shorter and two to three times narrower than the inner; pedicels as long as hypanthia or usually longer, densely spreading-hairy. June–August.

Alpine and subalpine meadows. — Caucasus: E. and S. Transc. Endemic. Described from Bakuriani. Type in Leningrad.

Series 5. **Plicatae** Juz. — Stems and petioles of radical leaves covered with ascending hairs; petioles not reddening in the sun; leaves with more or less deep incision between lobes, dull beneath. Pedicels glabrous or subglabrous, at least those of upper flowers in a head.

17. **A. plicata** Buser in Bull. Herb. Boiss. I, append. 2 (1893) 20; H. Lindb. in Acta Soc. Scient. Fenn. t. XXXVIII, No. 10 (1909) 54. — Ic.: H. Lindb., l. c., tab. 3 (phot.). — Exs.: Baenitz, Herb. Eur. No. 8271; Pl. Finl. exs. No. 271 a, b.

Perennial, small, rarely medium in size, gray-green plants; radical leaves 2.5–5(8) cm long, 3.5–6.5(10) cm wide, broadly ovate, slightly undulate, 7- or incompletely 9-lobed, lobes arcuate, semi-rounded or obtuse, with a deep and narrow incision between, with 4–6 large obtuse teeth at each side, densely appressed-hairy on both sides, with main ribs at lower side of leaves densely covered with spreading to subappressed hairs; petioles, like stems, densely spreading-hairy throughout length; stems 7–25(40) cm high, slightly ascending at base or nearly erect, usually about as long as petioles of inner radical leaves or only slightly longer; cauline leaves small, deeply incised between lobes. Inflorescence narrow, with few ascending branches, few-flowered; flowers in dense heads, 3.5–4 mm in diameter, yellow-green; hypanthia turbinate, densely covered with ascending hairs; sepals sparsely hairy, outer sepals hairy nearly only along margins; pedicels shorter than hypanthia, lower pedicels in a head more or less hairy, the rest glabrous. June–July.

Dry open grassy places. — European part: Kar.-Lap., Lad.-Ilm., U. V., U. Dnp. **Gen. distr.:** Scand., Centr. Eur. Described from France: Haute-Savoie, and Mon Salève near Geneva. Type in Leningrad.

18. **A. languida** Buser in Monit. du Jard. Bot. de Tiflis, livr. 5 (1906) 6; Juz. apud Grossh., Fl. Kavk. IV (1934) 323.

Perennial small yellowish green plants; radical leaves 1.7–5 cm long, 2.5–5 cm wide, reniform or orbicular-reniform, 7–9-lobed, lobes deep,

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about half as long as radius, orbicular or semi-ovate, usually obtuse at apex, with shallow [?] incision between them, with 4–7 short, ovate, acute teeth at each side, softly and densely spreading-hairy on both sides; stems 10–30 cm long, numerous, prostrate at base, arcuately ascending, flexuous, spreading-hairy; cauline leaves large, the upper with narrow lobes entire at base. Inflorescence with reduced branches; flowers in dense heads, large, 3–3.5 mm long, 3.5–4 mm in diameter, yellow; hypanthia ovoid or semi-globose, densely covered with appressed or spreading hairs glabrescent in upper part; sepals as long as hypanthium, acute, appressed-hairy; outer sepals of the same size or large; pedicels short, thick, the lower often sparsely spreading-hairy, the rest glabrescent. July.

Alpine zone.—Caucasus: Cisc., Dag. Endemic. Described from Koslovodsk (Narzana, Steven, 1811). Type in Helsingfors, paratypes in Munich and Vienna.

Series 6. **Hirsuticaules** Juz.—Stems and petioles of radical leaves covered with horizontally spreading or declinate hairs; petioles not reddening in the sun; leaves with more or less distinct incision between lobes, dull beneath, velutinous to the touch. Pedicels hairy for entire length.

19. **A. exsanguis** Juz. in Not. Syst. ex Herb. Inst. Bot. Acad. Sc. USSR, VIII, 1–2 (1938) 10.

323

Perennial small grayish green plants; radical leaves 1.2–3 cm long, 1.5–3.5 cm wide, reniform, flat, 7-lobed; lobes short, arcuate or semi-orbicular or usually semi-ovate in upper leaves, with more or less deep (but usually small in upper leaves) incision between lobes (3)4–5-toothed at each side, teeth large, short to rather long, cuneate-semi-ovate, straight, obtuse, nearly equal or the upper slightly larger, terminal tooth slightly narrower; densely hairy on both sides, main rib spreading-hairy in lower part; petioles usually pale, densely covered with spreading or usually declinate hairs; stipules of radical leaves pale; stems 3.5–14 cm long, usually twice as long as petioles of radical leaves, arcuately ascending or nearly erect, pubescent like petioles; cauline leaves usually reduced, semi-orbicular or rhombic, usually with obtuse lobes; stipules large, few, obtusely dentate. Inflorescence narrow, poor, usually with reduced branches; flowers in dense heads, 2.2–3.5 mm in diameter, greenish; hypanthia campanulate or subglobose, densely spreading-hairy; sepals slightly shorter than hypanthium, ovate, obtuse, rather densely hairy; outer sepals three-fourths as long as the inner, narrowly ovate, slightly hairy; pedicels short, densely hairy for the entire length. June–July.

Open places, meadows, grassy slopes, pastures, roadsides.—European part: Crim. (Yaila). Endemic. Described from Ai-Petri Yaila. Type in Leningrad.

20. **A. hirsuticaulis** Lind. fil. in Meddel. Soc. pro Fauna et Flora Fenn. H. 30 (1904) 143; Acta Soc. Scient. Fenn. t. XXXVII, No. 10 (1909) 43; Kryl., Fl. Zap. Sib. VII (1933) 1549.—*A. colorata* Buser apud A. Mela, Suomen Koulukasvio, ed. 4 (1899) 584, nec alibi.—*A. fennica* Buser in sched. sec. Lindb. fil., l. c. (1909) 43.—Ic.: H. Lindb. in Acta Soc. Scient. Fenn., l. c., tab. 1 (phot.).—Exs.: Pl. Finl. exs. No. 269, 1213, 1214, 1215; HFR No. 2015.



PLATE XXII. 1 - *Alchimilla alpina* L., leaf, a) flower, side view, b) the same, from above; 2 - *A. sericea* Willd., general view; 3 - *A. tephrosERICA* Bus., inflorescence, a) leaf, b) flower, side view; 4 - *A. minor* Huds., flower, side view, a) leaf; 5 - *A. hirsuticaulis* Lindb., inflorescence, a) flower, side view; 6 - *A. jailae* Juz., inflorescence, a) leaf.

Perennial small or medium-sized gray-green plant; radical leaves 3–5 cm long, 4.5–6 cm wide, reniform or suborbicular, flat or nearly flat, with 7–9 rather short, usually rounded lobes, with deep incision between them and 4–6 large obtuse teeth at each side, densely spreading-hairy on both sides, dull beneath or only somewhat silky-shiny at the beginning along main ribs, with horizontally spreading hairs, at least in lower part of veins; petioles and stems densely covered with rigid horizontally spreading hairs along their entire length; stems 6–30 cm high, often erect, often slightly reddening in the sun; cauline leaves small, with entire lobes in upper part and deeply palmately incised stipules. Inflorescence narrow, branches nearly erect, bearing a small number of dense heads; flowers relatively large, 3.5–4.5 mm in diameter, yellow-green, usually of a dark red color in the sun; hypanthia campanulate, densely spreading-hairy; sepals densely hairy, outer sepals shorter than the inner, usually ciliate along margin; pedicels as long as or shorter than hypanthia, densely spreading-hairy along the entire or nearly entire length. June–July (Plate XXII, Figure 5).

324 Dry meadows and other open grassy places with low and usually sparse herbs, shrubby formations and forest edges, roadsides, ditches, fallow fields, mostly on sandy and sandy loam soil. — European part: Dv.-Pech., Lad.-Ilm., Balt., U. V., V.-Kama, V.-Don. W. Siberia: Ob. **Gen. distr.:** Southern Finland (northernmost locality — Kuopio). Described from Finland, Kuopio. Type in Helsingfors, cotype and topotype in Leningrad.

21. *A. jailae* Juz. in Acta Inst. Bot. Acad. Sc. USSR, ser. I, fasc. 1 (1933) 118.

Perennial small or medium-sized gray-green plant; radical leaves 1–3 cm long, 1.6–5 cm wide, reniform or rarely the upper orbicular-reniform, often with broad axil at base, flat or hardly undulate, 7-lobed; lobes short, obtuse, arcuate, arcuate-orbicular or nearly triangular, entire at base, with 4–6 large, semi-ovate, usually obtuse teeth at each side, very densely covered with soft spreading hairs on both sides, with main ribs on lower side of upper leaves covered in lower part with distinctly declinate hairs, lateral ribs often prominent; petioles of radical leaves densely covered with usually declinate, rigid hairs; stems 8–26 cm, twice to three times as long as petioles of radical leaves, erect, densely covered throughout with horizontally spreading or declinate hairs, branches few, in upper fourth, declined at a sharp angle; cauline leaves small, with large obtusely toothed stipules. Inflorescence narrow, few-flowered; flowers usually in dense heads, relatively large, 2–3.5 mm long, 2–4 mm wide, yellowish green; hypanthia campanulate, densely spreading-hairy; sepals almost as long as hypanthium, densely hairy like the slightly shorter outer sepals; pedicels short, usually as long as hypanthia; densely spreading-hairy for the entire length. June. (Plate XXII, Figure 6).

Stony slopes and mountainous steppes. — European part: Crim. (Yaila). Endemic. Described from Ai-Petri. Type in Leningrad.

22. *A. lithophila* Juz. in Not. Syst. Herb. Inst. Bot. Acad. Sc. USSR VIII, fasc. 1–2 (1938) 12.

Perennial small or usually medium-sized gray-green plants; radical leaves 1.8–4.5 cm long, 2–5.3 cm wide, reniform or the uppermost sometimes orbicular-reniform, flat, carinate-plicate when live (especially in

lower part), 7–9-lobed; lobes semi-orbicular or semi-ovate, the uppermost usually rather narrowly triangular, medium-sized or rather long, obtuse or acute, with 5–9 small, acute, obliquely ovate or obliquely triangular, often double teeth at each side, very densely soft-spreading-hairy on both sides, nearly velutinous, thick; petioles densely covered with generally retrorse yellowish green hairs, stems 1–7, 6–32 cm long, two to three times as long as petioles of radical leaves, erect, pubescent like petioles throughout length; cauline leaves medium-sized, usually with semi-orbicular lobes, stipules shallowly incised-dentate. Inflorescence narrow to rather wide, often quite many-flowered; heads more or less dense, often loose in fruit; flowers medium-sized, 1.75–3.25 mm long, 2–3.5 mm wide, yellowish; hypanthia obconoid, campanulate in fruit, very densely spreading-hairy; sepals ovate, acute, as long as or slightly shorter than hypanthia, densely hairy like the slightly shorter and twice as narrow outer sepals; pedicels as long as or slightly longer than hypanthia, densely spreading-hairy for the entire length. June–July.

Stony mountain slopes. — European part: Crim. Endemic. Described from Nikitskaya Yaila. Type in Leningrad.

Series 7. *Coloratae* Juz. — Stems and petioles of radical leaves covered below with declinate hairs, petioles often reddening in the sun; leaves with distinct incision between lobes. Pedicels glabrous in upper part.

23. *A. egens* Juz. in *Animad. system. ex Herb. Univers. Tomsk.* No. 5–6 (1932) 3 (nomen); idem in *Acta Inst. Bot. Acad. Sc. USSR, ser. I, fasc. 1* (1933) 119. — *A. exilis* Juz. in *A. H. P. t. XLIII, fasc. 2* (1931) 537 (rossice), non Buser ap. Dörfler, *Herb. Norm.* 4644 (pro subsp. *A. chyrophyllae* Bus.).

Perennial small or medium-sized gray-green plants; radical leaves 1.2–3.2 cm long, 2–5.5 cm wide, broadly reniform, with triangular axil at base, flat, 5–7-lobed; lobes short, arcuate or semi-orbicular, often obtuse at apex, with a deep incision between with 3–5(6) large, oblong-semi-elliptic obtuse teeth at each side, densely spreading-hairy, covered with declinate hairs in lower part of main ribs (spreading hairs in upper part); petioles rather long, densely covered with declinate hairs, pale; stems 9–28 cm long, distinctly longer than petioles of inner radical leaves, slightly ascending at base, thin, densely covered, at least in lower part, with distinctly declinate hairs; cauline leaves weakly developed, semi-orbicular or rhombic, with coarsely and obtusely toothed stipules. Inflorescence narrow, few-flowered, with elongate branches declining at a sharp angle; flowers in rather loose heads, small, 1.5–2.5 mm long, 2–3 mm wide, greenish; hypanthia campanulate in fruit, densely spreading-hairy; sepals as long as or slightly shorter than hypanthia, hairy, inner sepals one-third as long as outer, ciliate along margin; pedicels longer than hypanthia, thin, spreading-hairy in lower half, glabrous in upper half. June.

Herbaceous places, forest edges. — European part: V.-Don. Endemic. Described from Staraya Zinov'evka, former Korsun County, Simbirsk Province. Type in Leningrad.

24. *A. rubens* Juz. nov. spec. in Addenda IX, p. 618.

Perennial small or medium-sized grayish green plants; radical leaves 1.7–6 cm long, 2–8 cm wide, broadly reniform or reniform, only the innermost sometimes orbicular-reniform, with more or less broad axil at base, flat, with 7 wide, short, arcuate or semi-orbicular lobes obtuse to nearly quadrate-shaped at apex; lobes of the innermost leaves sometimes triangular-semi-ovate, all with deep incision between, with 4–6, very rarely 7, ovate-oblong, obtuse, usually straight teeth at each side, densely hairy on both sides, with horizontally spreading or slightly declinate hairs in lower part of main ribs; sepals short to rather long, densely covered with horizontally spreading or usually distinctly declinate hairs beneath, often reddening in the sun; stems 6–28 cm long, only slightly to twice as long as petioles of radical leaves, usually erect or slightly flexuous, densely spreading-hairy along entire length, often more or less reddening in the sun; cauline leaves subdeveloped, the lower semi-orbicular, with 3–5 short deeply incised lobes; stipules large toothed. Inflorescence few-branched, with 1–4 branches inclining at a sharp angle; flowers in few loose heads, large, 2.5–5 mm in diameter, yellowish green; hypanthia 1–2 mm long, campanulate or nearly globose at maturity, densely spreading-hairy in lower part, glabrescent above; sepals usually as long as hypanthia, ovate, acute, not densely hairy, outer sepals shorter and narrower than inner, acute, ciliate along margin; pedicels usually longer than hypanthia, hairy in lower half and sometimes slightly higher. June–July.

Mountains, mainly subalpine meadows. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb. Endemic. Described from Saur Range, from the Temir-Su River valley and watershed of Bol'shaya and Malaya Dzhemeneya rivers. Type and paratype in Leningrad.

Section 2. VULGARES Buser, Notes quelq. Alch. crit. nouv. (1891) 16 et in Bull. soc. dauph. sér. 2 (1892) 105; idem in Jaccard, Cat. Fl. Valais. (1895) 116. — Medium-sized or large, more or less mesophyllous plants, much differing in habit and pubescence; leaves usually soft, in dry specimens often with inconspicuous lateral veins beneath, rosettes with inner leaves well-developed, all leaves 7–11-lobed, with more teeth than in the preceding section, often herbaceous-green; stipules of radical leaves scarious, pale or sometimes purple-colored; stipules of cauline leaves variously dissected or dentate. Flowers in loose or dense heads, usually medium-sized but sometimes small, green or yellowish green; pedicels varying in length; outer sepals usually much shorter and narrower than the inner, inner sepals shorter than or as long as hypanthia, often spreading in fruit, soft, often somewhat obtuse or obtuse (especially the outer), glabrous like hypanthia or more or less hairy; ripe fruitlets not exerted above disk.

Note. The species of this section in the USSR are the most numerous and are very difficult to classify. As yet a more satisfactory system cannot be proposed; nevertheless, these species have been placed in certain artificial groups, emphasizing the arbitrary and conditional characters of those groups (concerning in particular *Hirsutae exuentes*, *H. heteropodae*, and *Subglabrae appressipilae*).

Group 1. **Hirsutae** H. Lindb fil. in Acta Soc. Sc. Fennicae, t. XXXVII, No. 10 (1909) 40. — Stems and petioles of radical leaves (at least some) covered with more or less spreading hairs, very rarely completely glabrous (if so, leaves more or less hairy above).

Subgroup 1. **Barbulatae** Juz. — Stems and petioles of all radical leaves hairy along entire length; all leaves usually densely hairy on both sides. Hypanthia of all flowers always more or less densely hairy.

Series 1. **Aemulantes** Juz. — Stems and petioles of radical leaves covered beneath with declinate hairs; leaves usually orbicular, rarely reniform, lobes usually deeply incised. Pedicels of all flowers usually hairy in lower part.

25. **A. bungei** Juz. in Animadv. syst. ex Herb. Univers. Tomsk. No. 5—6 (1932) 2; Kryl., Fl. Zap. Sib. VII (1933) 1549. — **A. stricticaulis** Juz. in sched. olim.

328 Perennial small or medium-sized gray-green plants; radical leaves 1.5—3.5 cm long, 2.3—4.3 cm wide, lower leaves reniform, the upper orbicular-reniform and orbicular, flat or slightly undulate, 7- or incompletely 9-lobed; lobes short, arcuate or semi-orbicular, with deep incision between, with 4—6 large, somewhat elongate, obtuse teeth at each side, densely and rather soft-hairy on both sides, main ribs of lower leaves densely covered with ascending hairs at lower side, in upper leaves with horizontally spreading and slightly declinate hairs, usually green (not reddening); stems 10—35 cm high, twice to three times as long as petioles of radical leaves, suberect, sometimes slightly reddening in the sun; cauline leaves abortive, stipules shallowly dentate. Inflorescence narrow, few-branched, branches inclining at a very sharp angle; flowers large, in rather dense heads, 3—4 mm in diameter, yellowish green; hypanthia campanulate, densely hairy; sepals almost as long as hypanthia, hairy, outer sepals sparsely hairy; pedicels about as long as hypanthia, glabrous or with few hairs at base. June—July.

Grassy mountain slopes. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb. Endemic? Described from the Kureyka River valley in Altai. Type in Leningrad.

26. **A. grossheimii** Juz. apud Grossh., Fl. Kavk. IV (1934) 323.

Perennial medium-sized rather dark green plants; radical leaves 2.5—5 cm long, 4—6 cm wide, reniform or orbicular-reniform, with rectangular or narrow axil at base, slightly undulate or (the inner) nearly flat, 7-lobed; lobes arcuate or semi-orbicular, with medium or small incision between, and with 5—6 semi-ovate obtuse teeth at each side, densely spreading-hairy on both sides, main ribs covered with horizontally spreading hairs; petioles densely spreading-hairy especially below; stems 25 cm long, ascending at base, erect, pubescent like petioles, dirty purple in lower part; cauline leaves with very short lobes and deeply incised stipules. Inflorescence with long branches inclining at a very sharp angle; flowers in

loose heads, large, 3.5–4 mm in diameter, yellowish green; hypanthia ca. 1.5–2 mm long, campanulate, densely spreading-hairy; inner sepals nearly as long as hypanthia, glabrous, 3–4 times longer than the glabrous outer sepals; pedicels longer than hypanthia, densely hairy in lower half, glabrous above. June–August.

Alpine meadows and pastures. — Caucasus: E. Trans. Endemic. Described from Tskhra-Tskharo near Bakuriani. Type in Leningrad.

27. *A. pycnantha* Juz. in Not. Syst. ex Herb. Inst. Bot. Ac. Sc. URSS VIII, 1–2 (1938) 15.

329 Perennial small grayish green plant; radical leaves reniform or usually orbicular-reniform, flat, 7- or incompletely 9-lobed; lobes short, semi-orbicular or semi-elliptic, with deep incision between and with 4–6 small, short, obtuse teeth at each side, densely hairy on both sides (spreading beneath), veins at lower side of leaves covered with spreading hairs slightly declinate below; petioles densely covered with hairs declinate below; stems 6.5–12.5 cm high, twice to three times as long as petioles of radical leaves, somewhat arcuately ascending or suberect, pubescent like petioles of radical leaves; cauline leaves small, denticulate, stipules deeply incised-dentate. Inflorescence narrow, usually poor; flowers in dense heads, medium sized, 2–3.25 mm long, yellowish; hypanthia subglobose, densely spreading-hairy; sepals broadly ovate, rather densely hairy, outer sepals half as long, ovate, slightly hairy; pedicels short, densely hairy in lower part, glabrous in upper third.

Mountainous pastures. — European part: Crim. (Yaila). Endemic. Described from Babugan-Yaila. Type in Leningrad.

28. *A. gibberulosa* Lindb. fil. in Acta Soc. Scient. Fenn. XXXVII, No. 10 (1909) 4 (in adnot.). — Ic.: Syreishch., Ill. Fl. Mosk. gub. IV (1914) 92.

Perennial medium-sized gray-green plant; radical leaves 2.8–6.5 cm long and wide, orbicular, with adjacent or (in inner leaves) overlapping lobes, undulate, 9-lobed (outer leaves incompletely 9-lobed); lobes arcuate or semi-orbicular, with deep incision between and with 6–8(9) small and rather equidimensional, semi-ovate, obtuse teeth at each side and nearly equal terminal tooth, all densely covered on both sides with spreading hairs, nearly velutinous beneath, main ribs on lower side of leaves covered with distinctly declinate hairs; petioles of radical leaves and stems densely covered throughout with declinate hairs; stems 14–20 cm long, slightly arcuately ascending at base or suberect; cauline leaves subdeveloped, with shallowly large-toothed stipules. Inflorescence few-flowered, narrow, with branches inclining at a very sharp angle; flowers in rather dense heads, yellowish grayish-green, large, 2.5–3.5 mm long and wide; hypanthia narrowly campanulate at anthesis, subglobose in fruit, densely covered with spreading hairs on developed tubercules; sepals shorter than hypanthia, ovate, densely hairy, outer sepals one-third as long and two times narrower than inner sepals, hairy; pedicels as long as or slightly longer than hypanthia, spreading-hairy in lower half, glabrous in upper. June.

Open and dry grassy places. — European part: Lad.-Ilm. (?), Dv.-Pech. (Vologda), U. V. Endemic. Described from former Moscow County near the village Bol'shoe. Type in Moscow (Moscow University), cotype in Leningrad.

29. *A. aemula* Juz. in Acta Inst. Bot. Ac. Scient. URSS, ser. I, fasc. 1 (1933) 120.

330 Perennial, small, rarely medium-sized, purely green plant; radical leaves 1.2–2.5(3.5) cm long, 1.5–4(5.5) cm wide, reniform or nearly orbicular, with rather broad or very narrow axil at base, more or less hairy (sometimes strongly so), 7- or incompletely 9-lobed; lobes wide and short, of lower leaves arcuate, of upper semi-orbicular, obtuse at apex, with short or rather deep incision between them and (4)5–7 long, oblong-ovate, obtuse, usually straight teeth at each side, very densely hairy on both sides, main ribs beneath with spreading or distinctly declinate hairs in their lower part; petioles short, densely covered with declinate hairs along entire length, pale; stems 7–20 cm long, much longer than petioles, arcuately ascending, usually slightly flexuous, densely hairy throughout, with slightly declinate hairs in lower part with the rest of the hairs horizontally spreading, pale or slightly reddening in the sun; cauline leaves well-developed, semi-orbicular. Inflorescence branching, with branches inclining at a sharp angle, often elongate; flowers in rather dense or usually in loose heads, medium-sized, 3 mm in diameter, yellowish green; hypanthia 1–2 mm long, subglobose at maturity, densely spreading-hairy; sepals distinctly shorter than hypanthia, obtuse and densely hairy like the shorter outer sepals; pedicels usually longer than hypanthia, glabrous or hairy only at base. End May–June.

Pastures, forest edges. — European part: Crim. (Yaila). Endemic. Described from Chatyr-Dag Yaila. Type in Leningrad.

30. *A. hebescens* Juz. in A. H. B. Ac. Sc. URSS, t. XLIII, fasc. 2 (1931) 537 (rossice); idem in Animadv. syst. ex Herb. Univers. Tomsk. No. 5–6 (1932) 3; Kryl., Fl. Zap. Sib. VII, 1550.

331 Perennial medium-sized purely green plant; radical leaves (1.5)2–5.5 cm long, 3–9 cm wide, reniform, flat, 7–9-lobed, with broad axil at base; lobes of lower leaves arcuate or semi-orbicular, strongly obtuse at apex, often nearly quadrate, lobes of upper leaves semi-ovate, often triangular (but in innermost and upper leaves lobes usually obtuse at apex like lower leaves), with deep incision between lobes (in upper leaves incision very short or nearly absent) and 6–9 rather small, semi-ovate and obtuse or nearly symmetrical teeth at each side, densely hairy on both sides, densely declinate-hairy in lower half of main ribs; stems 8–32 cm long, as long as twice as long as petioles of upper radical leaves, suberect; cauline leaves medium-sized, broadly reniform or semi-orbicular, with rather long entire lobes. Inflorescence rather broad, many-flowered; flowers in more or less loose heads, medium-sized, 1.7–3 mm long, 2–3.5 mm wide, yellowish green; hypanthia campanulate, at least at base, densely spreading-hairy; sepals slightly shorter than hypanthia, sparsely hairy, outer sepals nearly half as long as inner sepals, slightly hairy at apex; pedicels usually slightly longer than hypanthia, spreading-hairy at base, glabrous above. June–July.

Open or semi-shady grassy places. — European part: U. V., V. -Don.; W. Siberia: Alt.; E. Siberia: Ang.-Say. Gen. distr.: Mong. Described from Gudkovskoe village, former Achinsk County. Type in Leningrad.

Series 2. *Valdehirsutae* Juz. — Like the preceding but pedicels of all flowers usually glabrous or only pedicels of lower flowers in a head; leaves usually purely green. Flowers comparatively larger.

31. *A. valdehirsuta* Buser in Monit. du Jard. Bot. de Tiflis livr. 5 (1906) 10; Juz. apud Grossh., Fl. Kavk. IV (1934) 324.

Perennial medium-sized pure green or somewhat bluish green plants; radical leaves 3.5–6 cm long and wide, lower radical leaves orbicular-reniform, the upper orbicular, strongly undulate, 9-lobed; lobes arcuate, semi-orbicular or (in upper leaves) semi-elliptic, with 6–8 usually large, obliquely ovate, acuminate, obtuse (in upper leaves) teeth; all leaves densely hairy on both sides, spreading-hairy along main ribs, distinctly netted-veined; petioles and stems densely covered along entire length with spreading or usually more or less declinate hairs; stems 14–17 cm high, ascending at base, erect, twice as long as petioles of inner radical leaves, dirty purple in the sun; cauline leaves small. Inflorescence narrow; flowers in rather dense heads, large, 2.5–3 mm long, 3–4 mm broad, dirty yellow; hypanthia campanulate; pedicels of lower flowers twice as long as hypanthia, of upper flowers as long as or shorter than hypanthia, slightly hairy or glabrous. June–July.

Caucasus: W. and E. Transc. **Gen. distr.:** Arm.-Kurd. Described from Kodzhora near Tbilisi. Type in Geneva, cotypes in several herbaria.

32. *A. pycnotricha* Juz. (sphalm. Bus.) in Grossh., Fl. Kavk. IV (1934) 324.

332 Perennial medium-sized grayish green plant; radical leaves 2–5.5 cm long, 2.5–6.5 cm wide, reniform or orbicular-reniform, usually with rectangular axil at base, slightly undulate or nearly flat, 7–9-lobed; lobes semi-orbicular or broadly semi-ovate, rounded at apex; incision small but distinct, with 6–8 long, straight, asymmetrical, obtuse or acute teeth at each side and terminal tooth smaller than its neighbors; all leaves rather densely hairy on both sides, main ribs with horizontally spreading or sometimes declinate hairs in lower part, in upper part of ribs hairs spreading; petioles 4–15 cm long, densely covered with declinate hairs, pale green; stipules pale or just slightly reddish, auricles weakly hairy; stems up to 20 cm long, weak, ascending, somewhat longer than petioles of inner radical leaves, declinate hairy throughout, sparsely to in inflorescence; cauline leaves small, semi-orbicular; stipules deeply and obtusely large-toothed. Inflorescence few-flowered, narrow, with branches inclining at a sharp angle; flowers in loose heads, medium-sized, 3–3.5 mm in diameter, green; hypanthia 1–2 mm long, campanulate, the lower densely spreading-hairy, the upper often slightly hairy or (nearly) glabrous; sepals 1–1.3 mm long, ovate or broadly ovate, slightly hairy, outer sepals half as long and half as narrow as inner sepals; pedicels as long as to twice as long as hypanthia, glabrous. July.

Forest and subalpine meadows. — Caucasus: E. Transc. Endemic. Described from Tskhra-Tskharo Mountain. Type in Leningrad.

33. *A. argutiserrata* Lindb. fil. ex Juz. in Animadv. syst. ex Herb. Univers. Tomsk. No. 5–6 (1932) 4 (in adnot.); Kryl., Fl. Zap. Sib. VII, 1550.

Perennial medium-sized grayish green plant; radical leaves 1.8–9 cm long, 2.5–10 cm wide, lower and middle leaves reniform or orbicular-reniform, the uppermost orbicular, 9-lobed; lobes semi-ovate or triangular, with deep incision between, incision obscure in innermost leaves, with 7–9 large, acute teeth at each side deep and elongate, broadening toward terminal tooth (especially below), densely hairy or sometimes remotely hairy above, main ribs beneath spreading-hairy in lower half, often with declinate hairs, usually prominently netted-veined when dry; petioles and stems densely covered throughout with distinctly declinate hairs; stems 7–35 cm long, usually erect, as long as twice as long as petioles of radical leaves; cauline leaves rather well-developed. Inflorescence narrow and few-flowered; flowers in loose heads, ca. 2.5 mm long, 3.5 mm wide, greenish; hypanthia campanulate, densely hairy in lower flowers, otherwise rather sparsely spreading-hairy; sepals slightly shorter than hypanthia, broadly ovate, remotely hairy (like outer sepals); pedicels as long as to longer than hypanthia, lower pedicels spreading-hairy in lower half, glabrous above. June–July.

Shrubby formations. — W. Siberia: Ob, Alt. Endemic. Described from the vicinity of Tobolsk. Type in Helsingfors, cotype in Leningrad.

333 34. *A. barbulata* Juz. in *Animadv. syst. ex Herb. Univers. Tomsk.* No. 5–6 (1932) 4; Kryl., *Fl. Zap. Sib.* VII, 1550.

Perennial medium sized purely green plant; radical leaves 2–5.5 cm long, 3–6.5 cm wide, reniform or the upper orbicular-reniform, slightly hairy; lobes 7–9, semi-orbicular, semi-elliptic in upper leaves, with rather deep and narrow incision between and 6–8 small, obliquely ovate, acute teeth at each side; all leaves densely hairy on both sides, main ribs at lower side of leaves spreading-hairy in lower part; petioles densely covered with distinctly declinate hairs; stems 20–30 cm long, rather weak, densely hairy throughout, lower part of stem with declinate hairs, upper part with horizontally spreading hairs; cauline leaves small, deeply incised between lobes. Inflorescence narrow, with branches inclining at a sharp angle; flowers in loose heads, small, 2.5–3.5 mm in diameter, light or yellowish green; hypanthia campanulate, densely covered with long spreading hairs; sepals and outer sepals hairy, the outer about half as long as the inner; pedicels as long as to twice as long as hypanthia, pedicels of lower flowers hairy, the rest hairy only in lower half or (uppermost) glabrous. June–July.

Meadows, forest clearings. — W. Siberia: Alt. Endemic. Described from the Lebed River valley above the village of Suranazh. Type in Leningrad.

35. *A. hirsutissima* Juz. in *Not. Syst. ex Herb. Inst. Bot. Acad. Scient. URSS*, t. VIII, fasc. 1–2 (1938) 16.

Perennial medium-sized pure or yellowish green plants; radical leaves 1.8–6 cm long, 2.4–6.5 cm wide, reniform or usually orbicular-reniform, with narrow axil at base, slightly undulate, 7- or incompletely 9-lobed; lobes arcuate, semi-orbicular orbroadly semi-ovate, with shallow incision between and 5–7 large, obliquely ovate or narrowly triangular acute teeth at each side, densely rigid-hairy on both sides, hair usually spreading or declinate along veins; petioles densely covered throughout with rigid

declinate hairs; stems rather thick, 6–26 cm long, usually erect or slightly bent, densely covered throughout with horizontally spreading or slightly declinate hairs; cauline leaves large, broadly reniform, with arcuate, denticulate lobes and shallowly large-toothed stipules. Inflorescence usually broad and many-flowered, divaricate above; flowers in loose heads, large, 2–3.75 mm long, 2.5–5 mm wide, yellowish green; hypanthia short, 1–1.75 mm long, obconoid, usually densely spreading-hairy; sepals as long or slightly longer than hypanthia, hairy above; outer sepals shorter (often just slightly shorter) than inner sepals, glabrous; pedicels as long as or longer than hypanthia, glabrous or subglabrous. June–July.

Stony and grassy mountain slopes, meadows. — European part: Crim. (Yaila). Endemic. Described from the slopes near the peak of Malaya Chuchel' Mountain. Type in Leningrad.

Series 3. **Pastorales** Juz. — Like the preceding but stems and petioles of radical leaves covered with horizontally spreading, sometimes even ascending hairs; leaves often reniform, usually gray-green. Flowers usually small.

36. **A. pastoralis** Buser, Notes quelq. Alchim. critiz. nouv. (1891) 18; et in Bull. Soc. Dauph. sér. 2 (1892) 107; idem in Jaccard, Cat. fl. Valais. (1895) 138; Alchimilles valaisannes (1894) 34; H. Lindb. in Acta Soc. Sc. Fenn. XXXVII, No. 10 (1909) 57; Kryl., Fl. Zap. Sib. VII, 1552. — *A. vulgaris* L., Sp. pl. (1753) 123, p. p.; Bus. in Dörf. Herb. norm. (1898) No. 3633. — *A. sylvestris* auct. plur. vix autem F. W. Schmidt., Fl. boëm. inch. Cent. III (1794) 88. — ? *A. monticola* Opiz in Bercht. et Opiz Oekon.-techn. Fl. Böhm. II, 1 (1838) 13 pro subsp. *A. montanae*. — Ic.: H. Lindb., l. c., tab. 4; Syreishch., Mosk. Fl. IV, 91. — Exs.: HFR No. 2017; Fl. exs. austro-hung. No. 816; Baenitz, Herb. Eur. No. 8266, 8267, 8268, 8269, 8270; Callier, Pl. Siles exs. No. 1054, 1055.

Perennial generally medium-sized gray-green plant; radical leaves 1.5–2 cm long, 9–11 cm wide, reniform or orbicular-reniform, flat, usually 9-lobed; lobes short or rather long, semi-orbicular or semi-ovate, rarely acutely angled, with 6–9 rather small and narrow, usually obtuse teeth at each side, densely hairy on both sides, spreading-hairy along lower main ribs; petioles of radical leaves and stems densely covered throughout with horizontally spreading hairs; stems 7–40 cm long, suberect, usually considerably longer than upper radical leaves. Inflorescence narrow, branches ascending; flowers in more or less dense heads, small, yellowish green; hypanthia narrowly campanulate in fruit, somewhat globular at base, rather densely or often sparingly hairy, sometimes glabrescent; pedicels short, glabrous. June–July.

Dry meadows, pastures and other grassy places, shrubby formations, forest edges, roadsides and ditches, fallow fields. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U.-Dnp., V.-Don, M. Dnp.; W. Siberia: Ob. **Gen. distr.:** Scand., Centr. and Atl. Eur. Described from Mont Salève near Geneva. Type in Geneva.

335 37. *A. schistophylla* Juz. in Acta Inst. bot. Acad. Sc. USSR, ser. I, 5 fasc. 1 (1933) 121.

Perennial medium-sized gray-green plant; radical leaves 3–5 cm long, 4.5–8.5 cm wide, lower leaves reniform, the upper orbicular-reniform, flat, 7–9-lobed; lobes of lower leaves orbicular, of upper semi-elliptic, entire below (for 3–10 mm), with (6)7–10 semi-ovate or digitate [?], acute elongate teeth at each side; all leaves densely hairy on both sides, with horizontally spreading hairs on lower part of main ribs; petioles of radical leaves and stems densely covered throughout with horizontally spreading hairs; stems 11–35 cm high, longer than petioles of radical leaves, arcuately ascending at base to suberect, weak; cauline leaves medium-sized, with long deeply incised lobes. Inflorescence narrow, rather many-flowered; flowers in loose heads, small, 1.5–2.5 mm long, 2–3 mm in diameter, green; hypanthia campanulate at maturity, densely hairy; sepals as long as or shorter than hypanthia, densely hairy; outer sepals about half as long as sepals, hairy; pedicels as long as or longer than hypanthia, the lowermost hairy, the rest hairy at base or glabrous. End May–July.

Open and semi-shady places. — European part: U. V. Endemic. Described from Moscow (Petrovsko-Razumovskoe). Type in Leningrad.

38. *A. neo-stevenii* Juz. in Not. Syst. ex Herb. Inst. Bot. Ac. Sc. URSS, VIII, fasc. 1–2 (1938) 12.

336 Perennial, small, slender, gray-green plant; radical leaves 1.3–2.7 cm long, 1.9–3.5 cm wide, reniform or orbicular-reniform, nearly flat or slightly undulate; lobes short, semi-orbicular or semi-ovate, rather long in inner leaves, with deep incision between, with 5–7 small, semi-ovate, acute or obtuse, nearly equal in length teeth at each side, densely hairy on both sides, with ascending hairs on lower part of main ribs beneath leaves; petioles densely covered with horizontally spreading hairs or (in lower leaves) ascending hairs; stipules pale; stems thin, arcuately ascending to suberect, pubescent like petioles; cauline leaves broadly ovate, denticulate, their stipules dentate. Inflorescence narrow, poor, short-branched; flowers in dense heads, small, 2–3 mm long; hypanthia narrowly campanulate, densely spreading-hairy; sepals broadly ovate, densely hairy, the outer ovate, two-thirds as long as the inner; pedicels very short, hairy or pedicels of upper flowers usually glabrous above. June.

Mountainous pastures. — European part: Crim. (Yaila). Endemic. Described from Chatyr-Dag Mountain. Type in Leningrad.

39. *A. omalophylla* Juz. sp. nova in Addenda IX, p. 461.

Perennial, medium-sized or rather large gray-green plant; radical leaves 3.5–6.5 cm long, 4.5–9 cm wide, reniform or broadly reniform, flat, carinate-plicate only at base, 9-lobed; lobes more or less short, arcuate, semi-ovate or short-triangular, usually with small but very distinct incision between them, lobes of innermost leaf usually with deep incision thus appearing like leaflets and with separate upper teeth; teeth 5–8 at each side of lobes, semi-ovate or narrowly triangular, obtuse or acute, asymmetrical, straight, slightly broader toward the smaller terminal tooth; leaves densely hairy on both sides, main ribs beneath leaves covered in lower part with spreading or ascending hairs; petioles thick, with

horizontally spreading hairs; stipules pale; stems 20–45 cm high, usually twice as long as petioles of radical leaves, erect, firm, with horizontally spreading hairs above; cauline leaves small, usually semi-orbicular, lobes arcuate or semi-orbicular, with deep incision between; stipules acutely toothed. Inflorescence short, narrow, with branches inclining at a sharp angle; flowers in loose heads, 3–4 mm in diameter, yellowish green; hypanthia obconoid or campanulate, densely spreading-hairy; sepals shorter than hypanthia, ovate, acute, the outer much shorter and narrower than sepals, both long-hairy above; pedicels about as long as hypanthia, glabrous or hairy at base. August.

Forest edges and grass clearings (in Siberian stonepine). — W. Siberia: Alt. Endemic. Described from the Seminskii Pass (Oiro). Type in Leningrad.

Series 4. **Propinque** Juz. — Stems and petioles or radical leaves covered with ascending hairs; leaves orbicular or often reniform, usually purely green. Pedicels usually glabrous; flowers relatively large.

40. **A. propinqua** Lindb. fil. ex Juz. in Not. Syst. ex Herb. H. B. P. t. IV, fasc. 23–24 (1923) 124 (in adnot.); Juz. in A. H. B. Ac. Sc. URSS, XLIII, fasc. 2 (1931) 538 (rossice). — *A. orbiculata* Alechin in Predv. otchet or rabot. Nizhegorodsk. geobot. eksped. v 1927 g. (1928) 80 (in adnot.), non Ruiz et Pav. nec Formanek. — *A. basillii* P. Smirn. in Journ. de la Soc. Bot. de Russie, t. 14 No. 1 (1929) 97. — *A. alechinii* Zamelis in Acta Hort. Bot. Univers. Latviens., IV, 1929 (1930) 89. — Ic. (phot.): Zamelis, l. c. (tab. post p. 94).

Perennial medium-sized yellowish green plant; radical leaves 2.5–3 cm long, 8–9.5 cm wide, reniform, slightly undulate, 7–9-lobed; lobes short, arcuate or semi-orbicular, obtuse, without incision between them, with (4)5–7 short obtuse teeth at each side; all leaves appressed-hairy on both sides, with ascending hairs in lower half of main ribs; petioles of radical leaves densely covered like stems along the entire length with somewhat ascending or often horizontally spreading hairs; stems 7–32 cm long, firm, arcuately ascending, distinctly longer than petioles of upper radical leaves; cauline leaves small or medium-sized. Inflorescence not wide, with ascending branches; flowers in rather dense heads, large, 2.5–3.5 mm long, 3–4 mm wide; hypanthia campanulate, densely hairy; sepals hairy, the outer glabrescent; pedicels short, glabrous. June–July. (Plate XXIII, Figure 1).

European part: Lad.-Ilm., Balt., U. V., U. Dnp. (Dorogobuzh), V.-Don, V.-Kama. **Gen. distr.:** Scand. Described from Moscow Region, Mytishchi village. Type in Helsingfors, cotype in Moscow.

41. **A. languescens** Juz. in Not. Syst. ex Herb. Inst. Bot. Ac. Sc. URSS, VIII, 1–2 (1938) 18.

Perennial usually medium-sized yellowish green plant; radical leaves reniform, 7(9)-lobed; lobes arcuate to short-triangular, with small incision between and 5–8 large, semi-ovate, straight, acutish or acute teeth at each side, densely covered on both sides with loosely appressed hairs; petioles densely spreading-hairy along entire length; stipules whitish; stems

distinctly (2–6 times) longer than petioles of inner leaves, prostrate or arcuately ascending, flexuous, densely covered throughout with horizontally spreading or somewhat ascending hairs; cauline leaves medium-sized, rhombic or (the upper) cuneate in shape, with large short, broadly dentate stipules. Inflorescence broad, with lower branches elongate; flowers in very loose heads, large, 2–4 mm long, greenish later yellow; hypanthia obconoid, more or less densely spreading-hairy, glabrescent above; sepals nearly as long as hypanthia, hairy above, outer sepals half as long as inner; pedicels as long as or slightly longer than hypanthia, lower pedicels hairy, the upper hairy at base or glabrous. June–July.

Grassy mountain slopes, mountainous meadows. — European part: Crim. (Yaila). Endemic. Described from Babugan-Yaila. Type in Leningrad.

338 42. *A. sibirica* Zemelis in Animad. syst. ex Herb. Univers. Tomsk. No. 3 (1931) 3; Kryl., Fl. Zap. Sib. VII, 1552.

Perennial, small or medium-sized grayish green plant; radical leaves 1.5–5 cm long, 2.5–6.5 cm wide, reniform or orbicular-reniform, with rather broad or narrow axil at base, nearly flat, 7–9-lobed; lobes short (one-fourth to one-third the length of the radius), semi-orbicular, semi-ovate in upper leaves, with rather deep incision (2–4 mm long) between and (4)6–8(9) small, short, digitate [?] or obliquely triangular, acute teeth at each side; all leaves densely hairy on both sides, with dense ascending hairs along main ribs beneath or loosely appressed hairs (above), indurate; petioles and stems densely covered throughout with ascending hairs; stems 7–30 cm long, usually arcuately ascending at base, rather weak; cauline leaves medium-sized. Inflorescence few-flowered; flowers in loose to rather dense heads, medium-sized or relatively large, 1.5–3.5 mm long, 2–3 mm wide, yellowish green; hypanthia campanulate, densely hairy or remotely hairy in upper flowers; sepals shorter than hypanthia, hairy; outer sepals slightly shorter than the inner, glabrescent; pedicels equal to or slightly longer than hypanthia, glabrous (lowermost sometimes hairy). June.

Grassy places, forest edges, forests. — W. Siberia: Ob, Alt.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. Endemic. Described from the vicinity of Tomsk. Type in Riga.

43. *A. conglobata* Lindb. fil. in Acta Soc. Sc. Fenn. XXXVII, No. 10 (1909) 36 (in adnot.).

Perennial medium-sized green or yellowish green plant, radical leaves 2.5–8.5 cm long, 3–9.3 cm wide, lower leaves orbicular-reniform with narrow axil at base, upper leaves orbicular with lobes overlapping at margins undulate, 9-lobed; lobes semi-orbicular or broadly semi-ovate, with deep incision between, with 5–9 small to rather large, obliquely semi-ovate, acute or papillary subequal teeth at each side and a small terminal tooth; leaves densely appressed-hairy on both sides, main ribs beneath leaves densely covered with ascending or (especially above) loosely appressed hairs, rather thick, slightly coriaceous, usually with prominent lateral veins when dry; petioles of radical leaves and stems densely covered throughout with ascending hairs; stems 9–28 cm high, usually ascending, firm, slightly to twice as long as petioles of inner radical leaves; cauline leaves medium-sized or small. Inflorescence few-flowered, narrow;

flowers in very dense heads, relatively large, 2.5–3 mm long, 3–4 mm in diameter, yellowish; hypanthia campanulate, densely spreading-hairy in lower part, glabrescent above; sepals shorter than hypanthia, remotely hairy in upper part; outer sepals few-hairy or glabrous; pedicels short, usually as long as or shorter than hypanthia, glabrous. June–July.

Meadows and other grassy places, forest edges. — European part: Dv.-Pech., V.-Kama, U. V. Endemic. Described from Mordino and Konsha villages in Ust-Sysol'sk County, former Vologda Province. Type in Leningrad.

44. **A. juzepczukii** Alechin in Predv. otchet o rabot. Nizhegor. geob. eksped. v. 1928 g., IV (1919) 92; Juz. in Acta H. Bot. Ac. Sc. URSS, t. XLIII, fasc. 2 (1931) 538.

Perennial small or medium-sized dark green plant with yellow tinge; radical leaves 2.5–7.5 cm long, 3–8.5 cm wide, the lower reniform, upper orbicular-reniform or orbicular, slightly undulate or flat, 9-lobed; lobes semi-ovate, narrowly semi-ovate or subtriangular, usually elongate, with deep incision (up to 0.5 cm), with 6–8 obtuse teeth at each side; leaves densely covered on both sides with loosely appressed hairs, main ribs beneath leaves densely covered with ascending hairs; petioles of radical leaves and stems densely covered throughout with somewhat ascending hairs; stems 7–25 cm high, usually ascending, weak, flexuous, almost twice as long as petioles of radical leaves; cauline leaves small. Inflorescence more or less compressed; flowers in more or less loose heads, rather small, 2–2.5 mm long, 2.5–3 mm wide, greenish; hypanthia like sepals densely hairy, campanulate in fruit; pedicels glabrous or with few hairs in lower part. June–July.

Forest edges. — European part: U. V., V.-Kama, V.-Don; W. Siberia: Alt.? Endemic. Described from the village of Krasnaya Sloboda at the boundary between Sergach and Lyskovo counties of former Nizhnii-Novgorod (now Gorki) Province. Type in Moscow, cotype in Leningrad.

45. **A. stevenii** Buser in Monit. du Jard. Bot. Tifl., 4 (1906) 3, in adnot.; Juz. in Not. Syst. ex Herb. Inst. Bot. Ac. Sc. URSS, VIII, 1–2 (1938) 7, 20. — *A. vinacea* Juz. in sched. olim ex Juz., l. c., 21.

Perennial small or usually medium-sized rather dark green plant, becoming dark purple in the fall; radical leaves 1.3–6 cm long, 2–7 cm wide, reniform or orbicular-reniform, flat or hardly undulate, 7–9-lobed; lobes semi-orbicular or usually semi-ovate, entire at base, with 5–7 large, digitate [?] or broadly semi-ovate obtuse teeth at each side, outer leaves sparingly hairy on both sides, other leaves usually rather densely hairy, innermost leaves often glabrous beneath between ribs and sometimes above between wrinkles, main ribs in lower side of leaves densely covered with spreading or sometimes subappressed hairs; petioles of radical leaves very densely pubescent with ascending hairs; stipules of radical leaves wine-red; stems 6–25 cm high, hardly as long as petioles of radical leaves or three to four times as long, straight or slightly bent or flexuous, covered throughout with ascending or nearly horizontally spreading hairs; cauline leaves rather small, stipules very deeply incised-dentate, with acute digitate [?] teeth. Inflorescence narrow, few-flowered, often compressed; flowers in dense

heads, small to relatively large, usually ca. 2.5 mm long, pale green, subsequently reddening; hypanthia obconoid or campanulate, sparsely spreading-hairy, rarely glabrous or densely hairy; sepals ovate, obtuse, more or less hairy at apex, outer sepals distinctly shorter than the inner; pedicels short, usually not longer than hypanthia, glabrous. June—July. (Plate XXIII, Figure 2).

Mountainous meadows, pastures, forest edges, roadsides. — European part: Crim. (Yaila). Endemic. Described from Chatyr-Dag. Type in Helsingfors.

Subgroup 2. **Imberbes** Juz. — Stems and petioles of all radical leaves hairy or stems glabrous in upper part; main ribs at lower side of leaves usually hairy along entire length. Hypanthia of all flowers always glabrous or subglabrous.

Series 1. **Retropilosae** Juz. — Stems and petioles of radical leaves more or less covered with declinate hairs, distinctly so below; leaves orbicular or rarely reniform, usually with incision between lobes, densely or remotely hairy on both sides or only above.

46. **A. sarmatica** Juz. in Acta Inst. Bot. Ac. Scient. URSS III (1936) 202. — **A. strigosula** H. Lindb. in Acta Soc. Sc. Fenn. XXXVII, No. 10 (1909) 70 pro max. parte et auct. f. Europ. orient., non Buser. — **A. strigosula** var. **karelica** Bus. in sched. ex H. Lindb., l. c., 72. — Ic.: H. Lindb., l. c., tab. 6 et 7a, b.; Syreishch., Ill. Fl. Mosk. IV (1914) p. 93 (nom. **A. strigosula**) — Exs.: Pl. Finl. exs. No. 738.

341 Perennial small or usually medium-sized green or yellowish green plant; radical leaves 1.5–6(8) cm long, 2–7(9) cm wide, reniform, orbicular-reniform or (the inner) orbicular; slightly undulate; lobes 7–9, short, usually semi-orbicular (in lower leaves often arcuate, in uppermost semi-ovate), with small to rather deep incision between them and 6–9 small, semi-ovate or semi-elliptic usually obtuse teeth at each side; all leaves densely hairy on both sides with horizontally spreading hairs, the lower and uppermost often glabrescent beneath between main ribs, upper leaves with ascending hairs on lower part of main ribs; petioles densely covered with long horizontally spreading hairs below, usually (at least in part of leaves) with distinctly declinate hairs beneath; stems 7–30(45) cm long, generally considerably longer than petioles of radical leaves, pubescent in lower part like petioles, in upper part usually sparsely or remotely hairy; cauline leaves small. Inflorescence narrow to rather broad, many-flowered; flowers in rather dense, separate glomerules, medium-sized to rather large, 2–3.5 mm long, 2–4 mm wide, yellow-green; hypanthia subcampanulate in flower, glabrous, rarely in part of flowers (the lower in a head) with solitary hairs; sepals ovate, obtuse to acute, glabrous, outer sepals two-thirds as long as the inner; pedicels as long as or shorter than hypanthia, glabrous. June—July.

Dry open places (dry meadows, pastures, grassy slopes), rarely among shrubs and forest edges. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm.,

Balt., U. V., V.-Kama, U.Dnp.?, V.-Don. Gen. distr.: Scand. Described from Novye El'tsy village, former Ostashkov County, the former Tver (now Kalinin Region) Province. Type in Leningrad.

47. *A. substrigosa* Juz. apud Majewski, Fl. Sredn. pol. Evr. tsch. SSSR ed. VII (1940) 446.

Perennial, easily distinguished from *A. sarmatica* Juz. by the more orbicular radical leaves hairy on both sides on the entire surface and with lobes overlapping at margins, the larger and less regular serration of leaves, the loose heads and the longer pediceled flowers. June–July.

Grassy places, thinned-out forests and shrubby formations. — European part: U. V. (Melenki), V.-Kama. Endemic? Described from the vicinity of Gorki (Marina Roshcha). Type in Leningrad, cotype in Gorki.

Note. This plant greatly resembles *A. subglobosa* C. Westerl., described from Sweden, and should be carefully compared with it; however, we have decided not to identify these two taxa since certain differences are found in the shape of the lobes and the structure of the flowers (in particular, shape of hypanthia).

48. *A. breviloba* Lindb. fil. in Acta Soc. Sc. Fenn. XXXVII No. 10 (1909) 4 (in adnot.).

Perennial usually small somewhat grayish green plant; radical leaves 2–4.5 cm long, 3–5.5 cm wide, reniform, nearly flat, 7–9-lobed; lobes arcuate, short, usually obtuse at apex, with incision deep but often not visible because of their overlapping, with 5–7 rather small, obtuse teeth at each side; leaves densely soft-hairy on both sides, main ribs beneath leaves with horizontally spreading hairs; petioles and stems densely covered for most of their length with slightly declinate hairs; stems 8–25 cm high, as long as to twice as long as petioles of radical leaves; cauline leaves small, usually reduced, with very short obtuse lobes. Inflorescence narrow, few-flowered; flowers in rather dense heads, small, ca. 3 mm long and wide, yellowish green; hypanthia campanulate, glabrous or in lower flowers (in a head) with solitary hairs; pedicels short, glabrous. June–July.

Open dry places. — European part: U. V., V.-Kama, V.-Don. Endemic. Described from the vicinity of Tambov. Type in Leningrad.

49. *A. retropilosa* Juz. in Acta Inst. Bot. Acad. Scient. URSS III (1936) 204.

Perennial medium-sized rather dark green plant; radical leaves 1.5–8 cm long, 2–10 cm wide, reniform or orbicular-reniform, slightly undulate; lobes 7–9, short, semi-orbicular or semi-ovate, with short incision between and 6–9 medium-sized or large, oblong-semi-ovate or semi-elliptic, obtuse teeth at each side; all leaves, or at least the lower and the middle, densely hairy on both sides, upper leaves often glabrescent beneath between main ribs, main ribs densely covered with spreading or slightly declinate hairs; petioles densely covered with declinate hairs; stems 3–45 cm long, as long as to one and a half times longer than petioles of upper radical leaves, pubescent in lower part like petioles, usually remotely hairy in upper part; cauline leaves medium-sized or rather large. Inflorescence slightly branching, compressed, not too many-flowered, with

rather dense often contiguous heads of flowers; flowers large, 2.5–3.5 mm long, 3–4 mm wide, greenish or yellowish green; hypanthia campanulate, glabrous or hairy along margin, outer sepals nearly half as long as inner sepals; pedicels as long as or slightly shorter than hypanthia, glabrous. July.

Mountainous meadows in the subalpine, rarely alpine forest zone. — Centr. Asia: T. Sh., Pam.-Al. (Alai Range). Endemic. Described from the Koi Dzhula Pass (Alai Range). — Type in Leningrad.

50. **A. cyrtopleura** Juz. sp. nova in Addenda IX, p. 462.

343 Perennial medium-sized usually pure green plant; radical leaves 3–7 cm long, 3.5–9 cm wide, reniform or the inner orbicular-reniform, rarely orbicular, slightly undulate; lobes (7)9, arcuate or semi-orbicular in outer leaves, semi-ovate in inner leaves, with shallow obscure incision between and 6–8 distinct, short, semi-ovate or semi-elliptic, usually strongly asymmetrical obtuse teeth at each side, terminal tooth distinctly shorter than the neighboring; leaves densely hairy on both sides, the innermost and lowermost often sparingly hairy, main ribs beneath spreading-hairy in lower part; petioles densely covered with declinate hairs (conspicuously so below); stipules intensively wine-red; stems 10–35 cm long, one and a half to twice as long as petioles of radical leaves, slightly ascending at base or erect, bent or straight, pubescent like petioles, glabrescent in inflorescence, often reddening in the sun. Inflorescence narrow, branches inclining at a sharp angle; cauline leaves usually medium-sized, usually semi-orbicular, stipules shallowly and obtusely dentate; flowers in loose or dense heads, large, 2–3.5 mm long, 2.5–4 mm in diameter, yellowish green, sometimes reddening within; hypanthia campanulate, glabrous or in the lower flowers often remotely hairy; sepals slightly shorter than hypanthia, ovate, remotely hairy above, outer sepals three-fourths as long and markedly narrower (nearly twice) than inner sepals; pedicels as long as or (usually in upper flowers) slightly shorter than hypanthia, glabrous. Fr. August.

Alpine glades, forest clearings and edges and shrubby formations in the upper timberline. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb., T. Sh. Endemic? Described from Oirot, Kuraika River gorge. Type in Leningrad.

Note. Easily distinguished from *A. retropilosa* by the shorter, more asymmetrical teeth of radical leaves, the more intensive anthocyanin color of stipules of radical leaves and the looser flower heads.

51. **A. compactilis** Juz. apud Grossh., Fl. Kavk. IV (1934) 325.

Perennial medium-sized, grayish green plant; radical leaves 3.5–7 cm long, 4–7.5 cm wide, orbicular, undulate; lobes 9, converging or overlapping at margin, semi-orbicular or semi-ovate, with distinct deep incision, and 5–7 large, oblong, straight, obtuse teeth at each side of lobes, obviously broader toward apex, terminal tooth as long as the neighboring; all leaves rather thick and compact, more or less densely spreading-hairy on both sides, main ribs beneath leaves densely covered with declinate hairs, prominently netted-veined beneath (when dry); petioles of radical leaves densely declinate-hairy beneath; stems 12–25 cm long, arcuately ascending at base, thick, slightly flexuous, pale, densely covered below with declinate hairs becoming sparse in inflorescence; cauline leaves well-developed, with

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deeply cut semi-ovate lobes and large subdentate stipules. Inflorescence few-flowered, branches elongated, the lower inclining at a sharp angle, the upper at a right angle; flowers in few, very dense, separate, globose heads, large, 2.5–3.5 mm long, green; hypanthia obconoid or narrowly campanulate, glabrous or with solitary hairs; sepals shorter than hypanthia, very broadly ovate, remotely hairy (often hairy only at apex); outer sepals small, glabrous or few-hairy at apex; pedicels usually as long as hypanthia, glabrous. July, Fr. August.

Mountains, 2,000–3,500 m. — Caucasus: S. Transc. (Armenia, Nor-Bayazet and Delizhan districts). — Endemic. Described from Satanakhach. Type in Leningrad.

52. *A. pachyphylla* Juz. sp. nova in Addenda IX, p. 620.

Perennial medium-sized or rather large dark green plant; radical leaves 3.5–10 cm long, 4–11.5 cm wide, orbicular-reniform, undulate; lobes 9, short, arcuate or semi-orbicular, with shallow incision between and 8–9 large, tapering-semi-ovate or semi-elliptic, obtuse teeth at each side; leaves thick, densely hairy on both sides, only the uppermost often glabrescent between wrinkles and below between main ribs, main ribs hairy throughout entire length with hairs in lower part of ribs slightly declinate, dry leaves prominently netted-veined; stipules pale; petioles of radical leaves densely covered with declinate hairs more or less conspicuously so below; stems 10–55 cm long, hardly longer than petioles of radical leaves, pubescent like petioles in the lower half or two-thirds, glabrous in inflorescence; lower and, in particular, middle cauline leaves well-developed, broadly reniform, with deep incision between lobes, upper cauline leaves rhombic, cuneate at base, stipules of cauline leaves rather deeply and obtusely incised-dentate. Inflorescence narrow, slightly spreading, few-flowered; flowers large, 2–3.5 mm long, 2.5–4 mm wide, in loose heads, yellowish green; hypanthia obcampahulate or subobconoid, glabrous or with solitary hairs; sepals glabrous, nearly as long as hypanthia; outer sepals two-thirds as long and twice as narrow as inner sepals; pedicels as long as hypanthia or shorter, glabrous. Fr. August.

Clearings between shrubs, meadows and other herbaceous places. — W. Siberia: Alt. Endemic? Described from the vicinity of Shebaline, Sema River valley. Type in Leningrad.

53. *A. litwinowii* Juz. in Acta Inst. Bot. Acad. Sc. URSS, ser. I, fasc. 1 (1933) 122.

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Perennial small or medium-sized, somewhat gray-green plant; radical leaves 1.6–7.5 cm long, 2–8 cm wide, orbicular-reniform or orbicular, with or without narrow axil at base, more or less undulate 7- or incompletely 11-lobed; lobes short, arcuate, semi-orbicular or sometimes subtriangular, with rather deep incision between (sometimes incision absent in innermost leaves) and 5–7(8) semi-elliptic or semi-ovate, sometimes subtriangular, acute or obtuse teeth at each side; leaves hairy above only along wrinkles and margins, beneath only on main ribs and margins, otherwise glabrous, main ribs in lower half covered above with horizontally spreading and appressed hairs; petioles covered for entire length with long, soft, horizontally spreading or usually distinctly declinate hairs below; stems 5–30 cm high, usually much longer than petioles, arcuately ascending to suberect,

pubescent like petioles but glabrescent upward in the branching inflorescence; cauline leaves small or medium-sized. Inflorescence narrow; flowers large, 1.75–3.5 mm long, 2–4 mm wide, greenish or yellowish green, in loose heads; hypanthia campanulate in fruit, more or less hairy, rarely glabrescent; sepals slightly shorter than hypanthium, glabrous or with solitary hairs at apex; outer sepals of normal dimensions, glabrous; pedicels usually as long as hypanthia, glabrous. June.

Open grassy places, meadows, pastures, roadsides and forest edges. — European part: U. V. Endemic. Described from Novinka village, the former Kineshma County, Ivanovo-Voznesensk Province. Type in Leningrad.

54. *A. cymatophylla* Juz. in Not. syst. ex Herb. H. B. P., t. III (1922) 41. — *A. subcrenata* Lindb. fil. in Acta Soc. Sc. Fenn. XXXVII, No. 10 (1909) 75 ex minima parte (quoad specim. Paboanum ex "Gouv. Mohilew" in pag. 81 allatum), non Buser. — *A. breviloba* Lindb. fil. ex K. Starcs in Fenn. XXXVII, No. 10 (1909) 4 adnot. — Ic. (phot.): K. Starcs, l. c., 22, f. 2 sub nom. *A. breviloba* Lindb. f.

346 Perennial medium-sized or large glaucescent plant; radical leaves 2–13 cm long, 2.5–15 cm wide, lower leaves reniform, the upper suborbicular, more or less undulate, often (especially in large shaded specimens) very undulate; lobes usually short, arcuate, orbicular in upper leaves, sometimes semi-ovate, usually obtuse at apex, with 4–9 (rarely up to 11) long, semi-elliptic or semi-ovate, straight, nearly symmetrical, obtuse teeth at each side, with deep and narrow incision between lobes; leaves sparingly hairy above, spreading-hairy beneath only along main ribs or remotely hairy on the entire surface; petioles of radical leaves and stems rather densely spreading-hairy in lower part or with declinate hairs below; stems (8)12–70 cm long, firm, arcuately ascending at base; cauline leaves rather large, lobes entire at base. Inflorescence narrow, few-flowered, branches inclining at a sharper angle; flowers small, 2–2.5 mm long, 2.5–3.5 mm wide, green, in rather loose heads; hypanthia glabrous, campanulate in fruit; sepals with solitary hairs at apex or glabrous, outer sepals half as long as the inner; pedicels almost twice as long as hypanthia, glabrous. June–July.

Shady places, rarely meadows; often on cultivated land. — European part: Lad.-Ilm., Dv.-Pech., Balt., U. V., V.-Kama, U. Dnp. **Gen. distr.:** Scand. Described from Eltsy village, the Ostashkov District, Kalinin Region. Type in Leningrad.

55. *A. semilunaris* Alech. in Not. Syst. ex Herb. H. B. P. III, fasc. 32–33 (1922) 132.

Perennial medium-sized dark green plant; radical leaves 2–6 cm long, 3–7.5 cm wide, broadly reniform, with broad obtusely angular or (in inner leaves) rectangular axil at base, slightly hairy, 7–9-lobed; lobes very short, arcuate, sometimes nearly semi-orbicular or broadly semi-ovate only in innermost leaves, dentate nearly to base with 5–8 small, obliquely semi-ovate, acute teeth at each side, remotely hairy above on the entire surface, hairy beneath only near margin and on the main ribs, otherwise glabrous, main ribs with horizontally spreading or ascending hairs in lower part, appressed-hairy in upper part; petioles densely covered throughout with horizontally spreading or usually slightly declinate hairs; stems 10–30 cm

long, as long as to almost twice as long as petioles of inner radical leaves, ascending at base to suberect, rather straight, in lower part pubescent like petioles, glabrescent in inflorescence; cauline leaves well-developed, nearly semi-orbicular. Inflorescence narrow, few-flowered; flowers small, ca. 2.5 mm long, 3 mm wide, green, in rather loose heads; hypanthia obconoid or campanulate, glabrous; sepals as long as or shorter than hypanthia, broadly ovate; outer sepals about half as long as the inner; pedicels as long as or twice as long as hypanthia, glabrous. May–July.

Forest clearings, shrubby formations, groves (especially alder stands), parks. — European part: Lad.-Ilm., Balt., U. V., V.-Kama. Endemic. Described from Golitsyn in the former Zvenigorod County, Moscow Province along the road to Kobyakovo. Type in Moscow, cotype in Leningrad.

Series 1. **Nemorales** Juz. — Stems and petioles of radical leaves covered with horizontal or ascending hairs; leaves orbicular or very often reniform, usually almost without incision between lobes, densely or sparingly hairy on both sides or often glabrous below between ribs, rarely glabrous either above or on each side.

347 56. **A. tyttantha** Juz. in Acta Inst. Bot. Acad. Sc. URSS, ser. 1, fasc. 1 (1933) 123. — **A. leptantha** Juz. in sched. olim.

Perennial small medium-sized or sometimes very large green or yellowish green plant; radical leaves 1.5–5.3 cm long, 2.2–9 cm wide, broadly reniform, with wide axil at base, flat or nearly so; lobes short, obtuse; arcuate, semi-orbicular or broadly triangular (in uppermost leaves), in lower leaves with small incision in upper cut to base, with (5)6–8 small, short, obliquely triangular or semi-ovate, acute teeth at each side; all leaves densely velutinous-hairy on both sides, main ribs covered in lower part with ascending hairs; petioles of radical leaves densely pubescent with horizontally spreading or somewhat declinate hairs (ascending in lower leaves); stems 6–55 cm long, slightly to twice as long as petioles, arcuately ascending at base, densely hairy, along entire length with horizontally spreading or somewhat declinate hairs; cauline leaves rather large. Inflorescence usually compressed, poor; flowers in loose or rather dense heads, small, 1.5–2 mm long, green or usually yellowish green; hypanthia obconoid, glabrous; sepals shorter than hypanthium, thin, glabrous; outer sepals about half as long as the inner; pedicels as long as or longer than hypanthia, glabrous. June–July. (Plate XXII, Figure 3).

Mountainous meadows. — Crim. (Yaila). Endemic. Described from Nikitskaya Yaila near Avinda. Type in Leningrad.

57. **A. imberbis** Juz. in Not. Syst. ex Herb. Inst. Bot. Acad. Sc. URSS, VIII, 1–2 (1938) 21.

Perennial medium-sized purely green plant; radical leaves 1.5–5 cm long, 2.1–6 cm wide, reniform or (the upper) orbicular-reniform, undulate; lobes very short, arcuate, with a short incision between, with 5–8 large acute teeth at each side; leaves densely hairy on both sides, main ribs beneath covered with ascending hairs; petioles spreading-hairy; stems 8–20 cm long, arcuately ascending, spreading-hairy along entire length; cauline leaves reniform, lobes with rather deep incision between; stipules \

with large acute teeth. Flowers in loose heads, medium-sized, 2–3.75 mm long, green; hypanthia campanulate, glabrous or subglabrous; pedicels long, glabrous. June.

Grassy (meadows) mountain slopes. — European part: Crim. (Yaila). Endemic. Described from Ai-Petri Yaila. Type in Leningrad.

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58. *A. arcuatiloba* Juz. spec. nov. in Addenda IX, p. 463.

Perennial, very similar to *A. imberis* Juz., bud distinguished from it by the dark green (in living state), somewhat shiny at apex, less undulate and less densely hairy radical leaves, the very short, arcuate, denticulate lobes and the slightly smaller flowers. June–July.

Grassy slopes. — European part: Crim. Endemic. Described from Malaya Chuchel'. Type in Leningrad.

59. *A. micans* Buser in Bull. Herb. Boiss. I, append. 2 (1893) 28; idem in Jaccard, Cat. fl. Valais. (1895) 137; H. Lindb. in Acta Soc. Scient. Fenn. t. XXXVII, No. 10 (1909) 65; Kryl., Fl. Zap. Sib. VII (1933) 1554. — ? *A. montana* F. W. Schmidt, Fl. boëm. inch. cent. III (1794) 88 (ex descr.), non aliorum. — ? *A. gracilis* Opiz apud Bercht. et Opiz, Oekon.-techn. Fl. Böhm. II, 1 (1838) 14 pro subsp. *A. vulgaris*, non Bus. — Ic.: H. Lindb., l. c., tab. 5. — Exs.: HFR No. 2016 a, b, 2153; Pl. Finl. exs. No. No. 1220; Baenitz, Herb. Eur. No. 8257, 2858, 8259; Callier, Fl. Siles, exs. No. 1052.

Perennial, usually medium-sized dark green plant; radical leaves 1.3–10 cm long, 1.5–12 cm wide, usually reniform, rarely suborbicular, slightly undulate to nearly flat, 9- or rarely 11-lobed; lobes short or rather long, usually semi-ovate or often triangular, almost without incision and with 7–9 (rarely 11) rather narrow, acute or obtuse teeth at each side; leaves rather densely hairy above, densely appressed-hairy beneath along main ribs, rarely with ascending hairs in lower part, more or less hairy or sometimes glabrous between veins; petioles of radical leaves and stems densely pubescent with soft, somewhat ascending to nearly horizontally spreading hairs; stipules usually reddish; stems 5–50 cm high, thin, arcuately ascending or nearly prostrate. Inflorescence very loose, with ascending branches; flowers in very loose heads, 2.5–4 mm long, greenish; hypanthia elongate, poculiform, constricted at base; sepals broadly ovate, acute, glabrous; pedicels long, glabrous or sometimes in lower flowers hairy. End May–July.

Meadows and other herbaceous places, shrubby formations, groves. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. Dnp., V.-Don, M. Dnp.; W. Siberia: Ob. **Gen. distr.:** Scand., Centr. Eur. Described from Haute-Savoie, alpe Sommier-Dessous dans la vallée du Reposoir, Mont Salève, near Geneva, and others. Type in Geneva.

60. *A. hians* Juz. sp. nova in Addenda IX, p. 463.

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Perennial medium-sized or rather large herbaceous green plant; root-stock thick; radical leaves 4–9 cm long, 6–13 cm wide, broadly reniform with curved or obtusely angular axil at base (rectangular usually in inner leaves), flat or nearly so, 7–9-lobed; lobes arcuate, semi-orbicular, usually short-triangular in inner leaves, with a shallow but distinct broad (open) incision and 5–8 semi-ovate and obtuse (in outer leaves) or obliquely triangular and acute (in inner leaves) asymmetrical, straight teeth at each

side, terminal tooth small, but as long as the neighboring lateral ones; lowermost leaves hairy along main ribs, otherwise glabrous or glabrescent, the rest of the leaves sparingly or rather densely hairy on both sides, with ascending hairs along main ribs beneath; petioles of radical leaves covered with horizontally spreading or usually somewhat ascending hairs; stems 20–38 cm long, straight or slightly flexuous, as long as or one and a half times as long as petioles of inner radical leaves, covered with horizontally spreading or ascending hairs becoming sparse in inflorescence; cauline leaves large, semi-orbicular, with semi-orbicular or semi-ovate lobes, stipules irregularly and acutely large-toothed. Inflorescence few-flowered, narrow, with branches inclining at an acute angle; flowers medium-sized or relatively large, 3–4 mm in diameter, green or yellowish green, in loose heads; hypanthia 1–2 mm long, obconoid or campanulate, glabrous; sepals 1–1.5 mm long, broadly ovate, acute, with solitary hairs at apex; outer sepals much shorter and narrower than the inner; pedicels as long as or longer than hypanthia, glabrous. Fr. August.

Forest edges, clearings, riparian meadows and shrubby formations. — W. Siberia: Alt. Endemic. Described from the vicinity of Shebalino (Sema River valley). Type in Leningrad.

61. *A. denticulata* Juz. sp. nova in Addenda IX, p. 464.

Perennial medium-sized dark green plant; radical leaves 2.5–9.5 cm long, 3–11 cm wide, reniform or orbicular-reniform, slightly undulate or nearly flat, 9- or incompletely 11-lobed; lobes semi-ovate, nearly without incision between them, with 6–9 small, obliquely ovate, obtuse teeth at each side; leaves sparsely or rather densely hairy on both sides, the uppermost often glabrescent above between wrinkles and beneath between main ribs, ribs at lower side densely covered along their length with ascending hairs; petioles of radical leaves densely covered throughout with horizontally spreading or somewhat declinate hairs; stipules more or less wine-red; stems 12–40 cm long, about twice as long as petioles of radical leaves, suberect, thin, slightly bent or flexuous, pubescent in lower half like petioles of radical leaves, glabrous above; cauline leaves small, broadly reniform or semi-orbicular, lobes short, obtusely denticulate to base; stipules of cauline leaves strongly obtusely toothed. Inflorescence narrow, spreading in upper part, rather few-flowered; flowers small, 2–2.5 mm long, 2–3 mm in diameter, light green, in rather loose heads; hypanthia campanulate, glabrous; sepals broadly ovate, obtuse, glabrous, outer sepals three-fourths as long as the inner and nearly half as narrow; pedicels as long as or slightly longer than hypanthia, glabrous. Fr. August.

Open grassy places, meadows, shrubby formations. — W. Siberia: Alt. Endemic. Described from the vicinity of Shebalino (Sema River valley). Type in Leningrad.

62. *A. lindbergiana* Juz. in Not. Syst. ex Herb. H. B. P. IV, fasc. 23–24 (1923) 181.

Perennial medium-sized or rather large gray-green plant; radical leaves (2.5)4–12 cm long, (2.6)4.5–13 cm wide, the lower reniform, the upper orbicular-reniform or usually obliquely orbicular or suborbicular, slightly undulate, 9- or 11-lobed; lobes short, obtuse, arcuate, orbicular, often semi-ovate or nearly short-triangular in upper leaves, dentate to base with

5-9(11) small, semi-ovate or nearly triangular, usually acute teeth at each side; lower leaves remotely hairy above, usually glabrous between main ribs beneath, middle and upper leaves rather densely hairy above, remotely hairy beneath, with main ribs covered in lower part with ascending hairs; petioles with densely spreading or (especially above) ascending hairs; stems (6)16-40(55) cm high, as long as or slightly longer than petioles of radical leaves, pubescent in lower part like petioles, glabrous above; cauline leaves medium-sized, short-lobed. Inflorescence usually broad, many-flowered; flowers small, 2-3 mm long, (2)2.5-4 mm wide, green, in loose heads; hypanthia obconoid, campanulate in fruit, always glabrous; sepals glabrous or in lower flowers with solitary hairs at apex; pedicels as long as or twice as long as hypanthia, glabrous. June-July.

Shady places, groves, shrubby formations, gardens, parks, rarely meadows and other grassy places. - European part: Balt., U. V., V.-Kama (?); W. Siberia: Ob? Endemic. Described from Podsolnechnaya Railway Station, Klin District, Moscow Region. Type in Moscow (Moscow University Herbarium), cotype in Leningrad.

351 Note. The Urals plant (from the V.-Kama and Ob areas), recorded here with a question mark, is apparently not identical with the authentic *A. lindbergiana*. The differences between the two plants are especially striking in living specimens cultivated under parallel conditions - the Urals plant is distinguished by its dark green leaves. It is called *A. atrifolia* Zamelis in litt.

63. *A. sedelmeyeriana* Juz. apud Grossh., Fl. Kavk. IV (1934) 324.

Perennial medium-sized purely green plant; radical leaves 4-5.5 cm long, 5.5-6.5 cm wide, orbicular-reniform or orbicular, slightly undulate, 9- or incompletely 11-lobed; lobes short, triangular, obtuse, with or without short incision, and with 6-8 small, semi-ovate, acute teeth at each side; all leaves rather densely appressed-hairy on both sides, loosely appressed-hairy along main ribs beneath; petioles and lower half of stems densely covered with somewhat ascending hairs; stems ca. 25 cm high, slightly longer than petioles of upper radical leaves, sparingly hairy in lower part of inflorescence, glabrous above; cauline leaves small, with semi-ovate denticulate lobes. Inflorescence narrow, rather few-flowered; flowers in loose heads, small, 2-3 mm long and wide, greenish; hypanthia obconoid, subcampanulate in fruit, glabrous; sepals shorter than hypanthia, glabrous; outer sepals hardly shorter and narrower than the inner; pedicels as long as or longer than hypanthia, glabrous. July.

Lake shores. - Caucasus: S. Transc. Endemic. Described from the former Akhalkalak County (Dzhavakhetiya) near Lake Khanchaly-Gel (19 July 1924, collected by O. Sedelmeyer). Type in Leningrad.

64. *A. microdonta* Juz. in Delect. semin. Hort. Bot. Ac. Scient. URSS (1934) 5.

Perennial small or medium-sized green or rather dark green plant; radical leaves 1.8-7.5 cm long, 1.8-8.5 cm wide, reniform, orbicular-reniform or usually orbicular, usually flat or slightly undulate, 7-9-lobed; lobes overlapping at margins, semi-orbicular or semi-ovate, with very short incision between, sometimes nearly without incision, with (4)5-9 equidimensional, small, semi-ovate, obtuse teeth at each side and terminal tooth

nearly as long as neighboring; lower leaves densely hairy, glabrous beneath between ribs, middle and upper leaves densely hairy on both sides, with dense ascending or horizontally spreading hairs in lower part of main ribs; petioles of radical leaves 2.5–16 cm long, densely covered along entire length with horizontally spreading hairs; stipules pale, with green denticulate auricles, later becoming brown; stems ascending at base, 16–26 cm long, longer than petioles of radical leaves, densely covered for about the lower two-thirds with horizontally spreading hairs, glabrescent upward; cauline leaves rather well-developed, broadly reniform, with semi-ovate lobes and short incision between them; stipules obtusely and irregularly dentate. Inflorescence rather many-flowered, branches inclining at a sharp angle; flowers in loose heads, small, 2–3.5 mm in diameter, green; hypanthia 1–1.5 mm long, obconoid, later campanulate, glabrous; sepals ca. 1 mm long, slightly shorter than hypanthia, ovate, glabrous, inner sepals one-third to one-half as long as the outer, outer sepals two to three times narrower than the inner, glabrous or in lower flowers with solitary hairs; pedicels longer than hypanthia, glabrous. June–July.

Grassy slopes, grassy clearings, among shrubs.—Caucasus: Cisc. Endemic. Described from the vicinity of Ordzhonikidze. Type in Leningrad.

65. **A. nemoralis** Alechin in Predv. otchet o rabot. Nizhegor. geob. eksped. v 1927 g. (1928) 80 (in adnot.); Juz. in A. H. B. Acad. Sc. URSS, XLIII, fasc. 2 (1931) 541 (rossice).—Ic.: Juz. l. c., f. 428.

Perennial medium-sized or rather large pale green plant; radical leaves 2.5–8.5 cm long, 3–12 cm wide, reniform, slightly undulate, usually 9-lobed; lobes short, semi-ovate, rounded at apex; with obsolete incision or without one, with 7–9 small acute teeth at each side; leaves densely appressed-hairy on both sides, the uppermost sometimes sparingly hairy, covered beneath in lower part of main ribs with ascending or nearly horizontally spreading hairs, hairs in upper part loosely appressed; petioles long, rather densely covered with horizontally spreading hairs; stems 12–55 cm long, rather firm, usually erect, slightly longer than petioles of upper radical leaves, pubescent with horizontally spreading hairs, dense below, sparse above; cauline leaves rather well-developed, shortly lobes. Inflorescence rather narrow, branches inclining at a sharp angle; flowers in loose heads, small, 1.75–2.5 mm long, 2–3 mm wide, yellowish-greenish; hypanthia shortly obconoid, campanulate in fruit, glabrous; pedicels of medium length, glabrous. June–July.

In broadleaf forests (oak forests, etc.).—European part: V.-Kama, V.-Don. Endemic. Described from Lukoyanov, Arzamas and Sergach counties in the former Nizhni Novgorod Province. Type in Moscow, cotype in Leningrad.

66. **A. rigescens** Juz. in Animadvers. syst. ex Herb. Univers. Tomsk., No. 5–6 (1932) 5; Kryl., Fl. Zap. Sib. VII, 1555.

Perennial medium-sized or large bright green or yellowish green plant; radical leaves 2.5–10 cm long, 3.5–12 cm wide, reniform or the upper sometimes orbicular-reniform, with broad or sometimes narrow axil at base, thick, slightly coriaceous, slightly undulate or nearly flat, 9- or incompletely 11-lobed; short, lobes, arcuate, semi-orbicular or broadly triangular,

353 usually without incision, and with 7–10 small, obliquely triangular, obtuse or rather acute small teeth at each side; leaves hairy on both sides or the uppermost usually glabrous beneath, between main ribs hairs dense and ascending, usually prominently netted-veined below when dry; petioles of radical leaves along entire length and lower part of stem densely covered with horizontally spreading hairs; stems 15–50 cm long, slightly to twice longer than petioles of radical leaves, suberect; cauline leaves medium-sized, broadly reniform, with lobes dentate to base. Inflorescence rather narrow or in upper part usually somewhat spreading, few-flowered; flowers in loose or rather dense heads, large, 2–3.5 mm long, 3–4 mm in diameter, yellow; hypanthia obconic or narrowly campanulate, glabrous; sepals ovate, glabrous, outer sepals two-thirds as long as the inner; pedicels as long as hypanthia or slightly longer, glabrous. June–August.

Forest and mountain-steppe meadows. — European part: V.-Kama (formerly Verkhne-Uralsk County); W. Siberia: Ob. Endemic. Described from Krykty Range, between the villages of Dautovoya and Boirangulovaya (in the former Verkhne-Uralsk County). Type in Leningrad.

67. *A. acutangula* Buser in Ber. Schweiz. Bot. Gesellsch. H. IV (1894) 69; H. Lindb. in Acta Soc. Scient. Fenn. XXXVII, No. 10 (1909) 82; Kryl., Fl. Zap. Sib. VII (1933) 1555. — ? *A. pratensis* F. W. Schmidt, Fl. boëm. inch. cent. III (1794) 88 (ex descr.), non aliorum. — ? *A. acutiloba* Opiz apud Bercht et Opiz, Oekon.-techn. Fl. Böhm. II, 1 (1838) 15 p. p., non Stev. — Ic.: H. Lindb., l. c., tab. 10 (phot.). — Exs.: HFR No. 2012, 2152; Pl. Finl. No. 1219; Callier, Fl. Siles. exs. No. 1057; Baenitz, Herb. Eur. sine No; Hofmann, Pl. crit. Saxon. No. 309.

Perennial medium-sized or large usually pale green plant; radical leaves 3–16 cm long, 4–19 cm wide, reniform or orbicular-reniform, flat, 9–11-lobed; lobes long, narrow, acutely angular with 8–12 narrow and acute teeth at each side; lowermost leaves glabrescent, the rest sparingly hairy on both sides, rarely inner leaves glabrescent or sometimes rather densely hairy above between wrinkles and beneath between main ribs; petioles of radical leaves and stems densely horizontally spreading-hairy for nearly the entire length; stipules pale; stems 7–65 cm high, slightly ascending at base to erect; cauline leaves broadly reniform or often semi-orbicular and nearly straight-truncate at base. Inflorescence rather narrow and few-flowered, branches ascending; flowers in rather loose heads, 2–3 mm long, ca. 3.5 mm in diameter, yellow or yellowish green; hypanthia campanulate in fruit, glabrous or sometimes with solitary hairs; sepals ovate or broadly ovate, glabrous or subglabrous, acute; pedicels 1–4 mm long, usually all glabrous. June.

354 Meadows and other grassy places, shrubby formations, groves. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. Dnp., V.-Don; W. Siberia: Ob. **Gen. distr.:** Centr. Eur., Scand. Described from Switzerland. Type in Geneva.

68. *A. kozłowskii* Juz. apud Grossh. Fl. Kavk. IV (1934) 325.

Perennial medium-sized glaucescent-green plant; radical leaves 2.5–6.5 cm long, 4–8.5 cm wide, broadly reniform, with very broad obtusely angular axil at base, nearly flat, 9-lobed; lobes semi-ovate (in lower leaves),

narrowly semi-ovate or subacutely angular, with inconspicuous incision and 6-7 asymmetrical, obliquely semi-ovate or obliquely triangular, acute teeth at each side; lowermost leaves glabrescent above, upper leaves sparsely or rather densely hairy on the whole upper surface, glabrous beneath between main ribs, main ribs in lower and middle leaves glabrous in lower part, above with appressed hairs, in upper leaves sparsely spreading hairy in lower part; petioles of lower radical leaves sparsely covered with horizontally spreading or slightly declinate hairs, of other leaves densely so; stems ca. 30 cm high, ascending at base, densely covered in lower part with somewhat declinate hairs, sparsely hairy above. Inflorescence rather branching, narrow; flowers in loose heads, 2-3 mm long, 3-4 mm in diameter; yellowish green; hypanthia narrowly campanulate, glabrous; sepals shorter than hypanthia, glabrous; inner sepals one-third to one-half as long as the outer; pedicels as long as or longer than hypanthia, glabrous.

Meadows. - Caucasus: E. Transc. Endemic. Described from Bakuriani village near Borzhomi. Type in Leningrad.

69. *A. leiophylla* Juz. in Acta Inst. Bot. Acad. Scient. URSS, ser. I, fasc. 1 (1933) 127.

Perennial medium-sized or rather large green or yellowish green plant; radical leaves 2.5-5.5 cm long, 3.5-6.5 cm wide, reniform or (the upper) orbicular-reniform, with rather narrow axil at base or without, slightly undulate or nearly flat, 9-lobed; lobes medium-sized, semi-ovate or sub-triangular, with inconspicuous incision and 6-7 semi-ovate, usually acute teeth at each side, slightly inclined toward the smaller terminal tooth; leaves glabrous above or hairy only at margin, middle and lower leaves hairy only on upper part of main ribs, uppermost leaves with main ribs spreading-hairy along entire length, otherwise glabrous; petioles of lower leaves sparsely hairy, the upper with rather dense horizontally spreading hairs; stems tall and strong, 11-30 cm long, twice as long as petioles of radical leaves, suberect, rather densely spreading-hairy in lower part, glabrous or subglabrous in upper part, often reddening in the sun; cauline leaves medium-sized. Inflorescence broad, many-flowered; flowers large, 1-4 mm long, 2.5-5 mm wide, yellowish; hypanthia campanulate in fruit, glabrous; sepals almost as long as or slightly shorter than hypanthia, glabrescent; outer sepals somewhat or half as long as the inner, glabrous; pedicels as long as or longer than hypanthia, glabrous. June.

Meadows and other open or semi-shady grassy places. - European part: U. V., V.-Kama. Endemic. Described from Kirov. Type in Leningrad.

70. *A. brevidens* Juz. in Not. Syst. ex Herb. Inst. Bot. Acad. Scient. URSS VIII, 1-2 (1938) 22. - *A. acutiloba* ssp. *pontica* f. *glabriuscula* E. Wulff in Tr. Krymsk. n.-issl. inst. I (1926), pro max. p.

Perennial medium-sized or rather large glaucescent-green plant; radical leaves 3.5-7.5 cm long, 4.3-8 cm wide, reniform, orbicular-reniform or (inner) suborbicular, nearly flat, 9-lobed; lobes short, arcuate or (of inner leaves) semi-orbicular or broadly semi-ovate, nearly without incision, with 6-8 short, broadly semi-ovate, more or less obtuse teeth at each side and small terminal tooth; leaves sparingly hairy on both sides, the lowermost hairy above only at margin and beneath along ribs, the

innermost hairy above only on wrinkles, beneath only along ribs, ribs with ascending hairs along entire length; petioles densely spreading-hairy along the entire length; stems ascending, suberect, densely spreading-hairy in lower part, glabrescent in inflorescence; cauline leaves well-developed, broadly reniform, denticulate, stipules strongly acutely toothed. Inflorescence few-flowered, loose; flowers in loose heads, small, 1.75–3 mm long, green; hypanthia campanulate, slightly hairy or glabrous; sepals ovate, glabrous, the outer three-fourths as long as the inner; pedicels usually twice as long as hypanthia, glabrous. June.

Herbaceous (meadows) mountain slopes, edges of beech forest at their upper boundaries.— Europe part: Crim. (Yaila). Endemic. Described from Ai-Petri Yaila. Type in Leningrad.

71. *A. suberentata* Buser, apud Magnier, *Scrinia fl. select.* (1893) 285; idem apud Jaccard, *Cat. fl. Valais.* (1895) 137; H. Lindb. in *Acta Soc. Sc. Fenn.* t. XXXVII, No. 10 (1909) 75; Kryl., *Fl. Zap. Sib.* VII, 1555.— ? *A. pratensis* Opiz apud Bercht. et Opiz, *Oekon.-techn. Fl. Böhm.* II, 1 (1838) 15, non F. W. Schmidt.— Ic.: H. Lindb., l. c., tab. 9.— Exs.: Baenitz, *Herb. Eur.* No. 8282, 8289, 8290; Callier, *Fl. Siles.* exs. No. 1018; *Fl. Ital. exs.* No. 852; HFR No. 2018, 2019.

356 Perennial medium-sized or rather large light green plant; lower radical leaves reniform, the upper orbicular-reniform or usually suborbicular, more or less hairy; 9- (rarely incompletely 11-) lobed; lobes rather long and wide (in upper leaves usually semi-ovate) with 5–8 large, broad, asymmetrical obtuse teeth at each side; lower leaves glabrescent, all others sparsely hairy on both sides; petioles of radical leaves and lower part of stems with horizontally spreading hairs; stems 8–65 cm high, rather thin, arcuately ascending or usually erect. Inflorescence rather narrow, few-flowered, branches ascending; flowers in rather loose heads, small, ca. 2.5 mm long, green; hypanthia campanulate in fruit; glabrous; pedicels glabrous. End May–July.

Meadows and other herbaceous places, shrubby formations, etc.— Arctic: Arc. Eur.; European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. Dnp., V.-Don., M. Dnp.; W. Siberia: Ob. Gen. distr.: Centr. Eur., Scand. Described from Switzerland. Type in Geneva.

72. *A. subcrenatiformis* Juz. in Grossh., *Fl. Kavk.* IV (1934) 325.

Perennial, almost indistinguishable in color, pubescence, shape and serration of leaves, and shape of inflorescence from *A. subcrenata* with which, however, it cannot be identified because of its subcoriaceous leaves and, in particular, the different structure of its flowers; the flowers are generally slightly larger, hypanthia wide, rounded at base (subglobose), petals exceptionally short. July.

Mountainous meadows, forest clearings.— Caucasus: E. Transc. Endemic. Described from Bakuriani. Type in Leningrad.

73. *A. vulgaris* L., *Sp. pl. ed. I* (1753) 123 sensu proprio; Opiz apud Bercht. et Opiz, *Oekon.-techn. Fl. Böhm.* II, 1 (1838) 13; Bus., *Notes quelq. Alch. crit. nouv.* (1891) 16 et in *Bull. Soc. Dauph.* 2 sér. (1892) 105; idem in Jaccard, *Cat. fl. Valais.* (1895) 135.— *A. pratensis* Bus. in *Sched. Herb. exs. Soc. pour l'Etude fl. France*; H. Lindb. in *Acta Soc.*

Sc. Fenn. XXXVII 10 (1909) 88 et auct. plur., non F. W. Schmidt. —
A. xanthochlora Rothm. in Fedde, Repert. Spec. nov. XLII (1937) 167. —
Ic.: H. Lindb., I. c., tab. 11. — Exs.: Baenitz, Herb. Eur. No. 8296; Soc.
pour l'étude fl. Franco-Helv. No. 1504; Fiori et Beguinot, No. 1063.

357 Perennial medium-sized or usually large yellow-green plant; radical
leaves 5–12 cm long, 6–13 cm wide, reniform or orbicular-reniform, flat or
nearly so, 9- or incompletely 11-lobed; lobes usually short, wide, broadly
semi-ovate or suborbicular, with 8–12 short, rather broad, nearly obliquely
triangular, acute, rather equal teeth; leaves glabrous above, rather densely
spreading-hairy beneath, with ascending or subappressed hairs along main
ribs; petioles and stems densely covered for almost entire length with
horizontally spreading hairs; stems 15–50 cm high, slightly arcuately
ascending or erect, strong; cauline leaves large. Inflorescence broad,
strongly branching, many-flowered; flowers in loose heads, small, ca.
1.5–3 mm long and 2–3.5 mm wide, yellow; hypanthia short, nearly semi-
globose in fruit, glabrous or some flowers with solitary spreading hairs;
sepals and outer sepals glabrous; pedicels glabrous. June.

Grassy meadows, forest edges. — European part: Lad.-Ilm. (grows
wild in the park of the Botanical Institute of the Academy of Sciences in
Leningrad). **Gen. distr.:** Atl., Centr. Eur., Scand. Described from
Western Europe. Type unknown.

74. *A. tianschanica* Juz. nov. spec. in Addenda IX, p. 464.

Perennial medium-sized or rather large yellowish green plant; radical
leaves 2–8 cm long, 2.5–10 cm wide, orbicular-reniform, with rectangular or
tapering axil at base, probably flat (?); outer leaves 7-lobed, inner 9-lobed;
lobes semi-orbicular, semi-ovate or (in innermost) sometimes triangular,
with small incision, lobes of inner leaves nearly without incision, with
6–9 obliquely semi-ovate, strongly asymmetrical, convex above, acuminate
teeth at each side, wider toward the very small terminal tooth; all leaves
glabrous above, sparingly or usually densely hairy beneath, main ribs densely
covered with ascending hairs, slightly coriaceous, prominently netted-veined
when dry; petioles of all leaves densely covered with short, horizontally
spreading hairs; stems 20–50 cm long, straight or slightly flexuous,
pubescent like petioles, glabrescent in inflorescence; cauline leaves
numerous, well-developed, stipules acutely toothed. Inflorescence narrow,
many-flowered, branches thin, inclining at a sharp angle; flowers in rather
dense heads, small, 1.5–2 mm long, 2–3 mm wide, green; hypanthia
0.75–1.5 mm long, obconoid, spreading-hairy at base in outer flowers,
glabrous in the rest; sepals shorter than hypanthia, broadly ovate, glabrous
or with solitary hairs; outer sepals small, half as long and twice as narrow
as the inner; pedicels as long as or usually shorter than hypanthia, glabrous.
July-August.

Banks of streams, rocks. — Centr. Asia: T. Sh. Endemic. Type in
Tashkent, cotype in Leningrad.

358 75. *A. laeticolor* Juz. sp. nova in Addenda IX, p. 465.

Perennial medium-sized green or yellow-green plant; radical leaves
2.5–10 cm long, 2.5–11.5 cm wide, reniform or orbicular-reniform, undulate,
7- or usually 9-lobed; lobes semi-orbicular or semi-ovate, with small

incision, obtuse, with 6–10 large, asymmetrical, outwardly concave, acuminate, teeth at each side, wider toward the distinctly smaller terminal tooth; leaves glabrous above or remotely hairy only at margins, densely hairy beneath on the entire surface, main ribs densely covered with spreading or ascending hairs; petioles and stems densely covered with spreading or usually somewhat ascending short hairs in their lower part; stems short, 10–40 cm long, suberect, usually slightly bent, few-branched; cauline leaves well-developed, shortly lobes, stipules shallowly broad-toothed. Inflorescence narrow; flowers in loose heads, small, 2–2.5 mm long, 2–3 mm wide, yellowish; hypanthia short-obconoid, glabrous or with solitary hairs; sepals ovate or narrowly ovate, slightly shorter than hypanthia; outer sepals often nearly as long as sepals (especially in lower flowers) but narrower; pedicels usually longer than hypanthia, glabrous. July.

Grassy mountain slopes, forest edges and grassy clearings in the sub-alpine mountain zone. — Caucasus: W. Transc. (the vicinity of Krasnaya Polyana). Endemic. Described from Achishkho. Type in Leningrad.

Subgroup 3. **Exuentes** Juz. (*Strigosulae* Bus. in Bull. Herb. Boiss. ser. 2, I (1901) 473, p. p.). Petioles of radical leaves hairy throughout or those of inner leaves in the rosette sometimes glabrous in upper part; main ribs at lower side of the inner radical leaves in the rosette glabrous below. Hypanthia of all flowers always glabrous.

76. **A. exuens** Juz. in Not. Syst. ex Herb. Inst. Bot. Acad. Sc. URSS VIII, 1–2 (1938) 24.

359 Perennial medium-sized dark green plant; radical leaves 1.5–7 cm long, 2–8 cm wide, reniform or the inner orbicular-reniform, slightly undulate, 7–9-lobed; lobes short, arcuate or rarely semi-orbicular, with short incision and 5–7 short, broad, semi-ovate, obtuse teeth at each side, the terminal tooth distinctly smaller than the neighboring; leaves sparsely hairy above, sometimes (in the lower and inner) only along wrinkles, lowermost and uppermost leaves glabrous beneath between ribs, middle leaves sparsely hairy, veins beneath spreading-hairy, inner leaves glabrous; petioles with short, horizontally spreading or declinate hairs, inner petioles often (nearly) glabrous above; stems thin, ascending, pubescent in lower half like petioles, glabrous above; cauline leaves semi-orbicular, stipules obtusely toothed. Inflorescence usually narrow, often with spreading branches; flowers in loose heads, small, 1.75–2.5 mm long, pale green; hypanthia campanulate, glabrous; sepals as long as hypanthia, broadly ovate (nearly) glabrous; outer sepals three-fourths as long and twice as narrow as inner sepals; pedicels as long as or twice as long as hypanthia, glabrous. June–July.

Mountainous meadows, edges of beech forests. — European part: Crim. (Yaila). Endemic. Described from Bol'shaya Chuchel' Mountain (clearing at foot). Type in Leningrad.

77. **A. heptagona** Juz. in Not. syst. ex Herb. H. B. P. t. III (1922) 45. — Ic.: Zamelis in Acta Horti Bot. Univers. Latviens. IV, 1929 (1930) 140, f. 1.

Perennial small or rather large dark green plant; radical leaves 1.8–10.5 cm long, 2.2–11.3 cm wide, orbicular, slightly undulate, usually

9-lobed; lobes converging or overlapping at margins, short, arcuate, semi-orbicular or in upper leaves usually obtusely angular (then leaves heptagonal in outline), rarely rectangular, dentate with 5-8(10) short, usually obtuse teeth at each side; leaves sparsely pubescent above, lower (and middle) leaves slightly or sparsely hairy between main ribs, main ribs spreading-hairy, upper leaves glabrous between ribs and along their lower part; petioles of radical leaves densely covered with somewhat declinate hairs; stems (4)12-15 cm high, longer than petioles of radical leaves, arcuately ascending at base or suberect, pubescent in lower half like petioles, glabrous above; cauline leaves large, with dentate lobes. Inflorescence somewhat spreading, few-flowered; flowers in loose heads, small, 2-3.5 mm long, 2.5-4.5 mm wide, green or yellowish green; hypanthia campanulate in fruit, glabrous; sepals as long as or shorter than hypanthia, with solitary hairs at apex or glabrous, one-third to one-fourth as long as outer sepals; pedicels usually twice as long as hypanthia, glabrous. June-July. (Plate XXIII, Figure 4).

Shady and semi-shady places, rarely in meadows. — European part: Dv.-Pech. (the vicinity of Vologda), Lad.-Ilm., Balt., U. V. **Gen. distr.:** Scand. (Sweden). Described from Eltsy, Ostashkov, Kalinin Region. Type in Leningrad.

78. *A. stellaris* Juz. in Acta Inst. Bot. Acad. Sc. URSS, ser. I, fasc. 1 (1933) 126.

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Perennial small or medium-sized dark green plant; radical leaves 1.8-6 cm long, 2.2-6.7 cm wide, the lower reniform or orbicular-reniform, the upper orbicular, flat, 7-9-lobed; lobes rather long, semi-orbicular (in lower leaves) or semi-elliptic; semi-ovate or acutely angular (in upper leaves), with short incision or without incision in upper leaves, with 5-8 obliquely triangular, acute teeth at each side; lower leaves usually glabrous or glabrescent above, spreading-hairy only along main ribs beneath, middle leaves sparsely hairy on both sides, upper leaves hairy only along wrinkles and margins, glabrous beneath between main ribs; main ribs appressed-hairy only in upper part; petioles densely covered along entire length with horizontally spreading hairs, in upper leaves often glabrescent near blade; stems 4-25 cm high, as long as or twice as long as petioles of radical leaves, usually arcuately ascending at base, covered in lower half with horizontally spreading hairs, glabrous above; cauline leaves medium-sized, with narrow lobes. Inflorescence usually narrow, few-flowered; flowers in loose heads, small, 2-3 mm long, 2.5-3.5 mm wide, green; hypanthia campanulate in fruit, glabrous; inner sepals as long as or shorter than hypanthium, glabrous like the about half as long outer sepals; pedicels as long as or twice as long as hypanthia, glabrous. June.

Open grassy places, shrubby formations, groves. — European part: Dv.-Pech., U. V., V.-Kama. Endemic. Described from Khokhlovaya Mountain (between the villages of Baranovo and Vishen'e) in Novotorzhskii District, Kalinin Region, Type in Leningrad.

79. *A. decalvans* Juz. in A. H. B. Acad. Sc. URSS, t. XLIII, fasc. 2 (1931) 535, in clavi (rossice); idem in Acta Inst. Bot. Acad. Sc. URSS, ser. I, fasc. 1 (1933) 125.

Perennial small or medium-sized pure green plant; radical leaves 1.5–4 cm long, 2.5–4.7 cm wide, the upper reniform, the lower orbicular-reniform or orbicular, flat, 7–9-lobed; lobes short, arcuate (in lower leaves), semi-orbicular or broadly triangular (in upper leaves), with very short or cut to base incision, with 6–8 small, semi-ovate, acute teeth at each side; lower leaves densely hairy on both sides, [the rest] hairy above only along wrinkles and beneath only along main ribs, uppermost leaves often hairy only at margin, main ribs beneath glabrescent in lower part; petioles for the entire length and stems in the lower part densely covered with horizontally spreading or usually declinate hairs; stems 10–17 cm long, approximately twice as long as petioles, arcuately ascending at base, glabrescent in inflorescence; cauline leaves small, very finely and acutely toothed. Inflorescence rather narrow, poor; flowers in loose heads, medium-sized, 2–3 mm long, 2–3.5 mm wide, yellowish green; inner sepals about as long as hypanthia, glabrous like the half as long outer sepals; pedicels as long as or slightly longer than hypanthia; glabrous. June.

Open places. — European part: V.-Kama, V.-Don. Endemic. Described from Bazarnaya Ken'sha, formerly Gorodishchenskii County, Penza Province. Type in Leningrad.

80. *A. filicaulis* Buser in Bull. Herb. Boissier, I (1893) append. II 22. — *A. minor* **filicaulis* Lindb. fil. in Acta Soc. Sc. Fenn. XXXVII, No. 10 (1909) 96. — Ic.: H. Lindb., l. c., tab. 14. — Exs.: HFR No. 2014; Baenitz, Herb. Eur. No. 8261.

Perennial small or medium-sized glaucescent-green plant; radical leaves 3.5–8.5 cm long, 4–10 cm wide, reniform or orbicular-reniform, flat, 7–9-lobed; lobes rather wide, short, obtuse and 6–8(9) broad, obtuse teeth at both sides; leaves usually sparsely hairy above, rarely rather densely hairy or hairy only along wrinkles, slightly hairy beneath or glabrous between ribs, main ribs often glabrous in lower part; petioles slightly spreading-hairy or those of lower radical leaves often glabrous; stems 8–10 cm high, erect or arcuately ascending at base, approximately twice as long as petioles of radical leaves, spreading-hairy in lower part, otherwise glabrous; cauline leaves small. Inflorescence narrow, few-flowered, with erect branches; flowers in rather loose heads, large, 2.5–3.5 mm long, 3–4.5 mm in diameter; hypanthia pyriform, sparsely hairy or glabrous in upper flowers; sepals ovate, slightly hairy or glabrous; pedicels rather long, glabrous. June–July.

Damp meadows, forest edges. — European part: Kar.-Lap., Lad.-Ilm., V.-Don, (Tambov). Gen. distr.: Scand., Centr. Eur., Scotland, Ferro Island, Iceland, Greenland. Described from France: Haute-Savoie, Monts Vuache et Salève near Geneva. Type in Geneva.

81. *A. hyrcana* Buser in Monit. du Jard. Bot. de Tiflis, fasc. 5 (1906) 10 (pro subsp. *A. filicaulis* Bus.); Juz. apud Grossh., Fl. Kavk. IV, 324.

Perennial medium-sized gray-green plant; radical leaves long-petioled, with reniform, relatively small blade, 1–3.4 cm long, 1.5–5 cm wide, flat, 7–9-lobed; lobes arcuate or semi-orbicular with 4–7 small, semi-ovate, obtuse teeth at each side; leaves densely hairy on both sides, main ribs spreading-hairy below, the uppermost (inner) leaves glabrescent almost

362 throughout upper surface and also beneath between main ribs and on lower part of ribs; petioles of radical leaves rather densely spreading-hairy; stems 12–35 cm high, slightly arcuately ascending at base, one and a half to twice as long as petioles of radical leaves, indurate, flexuous, spreading-hairy in lower part, otherwise glabrous; cauline leaves usually small. Inflorescence narrow, few-flowered, with branches inclined at a sharp angle; flowers in loose heads, 1.5–3 mm long and wide; hypanthia subglobose, glabrous; sepals shorter than hypanthia, the outer distinctly smaller than the inner; pedicels longer than hypanthia, glabrous. June–July.

Habitat unknown. — Caucasus: Tal. Endemic? Described from Talysh, from the vicinity of Amurat village, 1,300 m. Cotype in Leningrad.

82. *A. humilicaulis* Juz. nov. spec. in Addenda IX, p. 466.

Perennial medium-sized herbaceous green plant; radical leaves flat, 3–8 cm long, 3.5–10 cm wide, reniform or broadly reniform, with broad rectangular or obtusely angular axil at base, 7–9-lobed; lobes arcuate (in outer leaves) to semi-ovate or nearly triangular (in inner leaves), one-third as long as the radius or shorter, with small incision and 6–8 semi-ovate, distinctly irregular, acute teeth at each side larger toward apex, terminal tooth about as long as the neighboring teeth; outer leaves appressed-hairy beneath along main ribs, hairy above along wrinkles and margins and only the innermost with few hairs between wrinkles, main ribs beneath glabrous in lower part (one-half to three-fourths); petioles of radical leaves 3–18.5 cm long, densely covered along entire length with horizontally spreading or somewhat delcidate hairs; stipules of radical leaves intensively wine-red; stems 15–23 cm long, ascending, flexuous, shorter than petioles of inner radical leaves or slightly longer, densely covered with declinate hairs in lower 1–2 internodes, glabrous upward; cauline leaves usually abortive, semi-orbicular or rhombic, deeply incised between lobes; stipules strongly toothed. Inflorescence rather broad and many-flowered; flowers in loose heads, large, ca. 4 mm in diameter, green; hypanthia ca. 2 mm long, obconoid or campanulate, glabrous; sepals shorter than hypanthia, ovate, usually glabrous; outer sepals two-thirds as long as the inner and twice as narrow; pedicels equal to or two times longer than hypanthia, glabrous. June–July.

Mountainous meadows, forest edges. — Centr. Asia: T. Sh. Endemic. Described from the Dzhergilchak Gorge (southern bank of Issyk-Kul). Type in Leningrad.

83. *A. sanguinolenta* Juz. sp. nova in Addenda IX, p. 466.

363 Perennial medium-sized or large green plant; radical leaves 1.8–13 cm wide, orbicular or broadly ovate, undulate, usually 9-lobed; lobes short, one-fifth to one-fourth, very rarely one-third of the radius of blade, arcuate or semi-orbicular, only in upper leaves sometimes semi-ovate or short triangular, with short incision or usually without incision in upper leaves, with 5–7 large, semi-ovate or oblong, acute teeth at each side; leaves sparsely hairy above on the entire surface or usually hairy only along wrinkles and margins, otherwise glabrous, usually with spreading hairs beneath along main ribs, sometimes inner leaves sparsely hairy between veins, veins of inner leaves glabrous in lower part, all leaves with prominent

lateral nerves beneath when dry; stipules of radical leaves and often even adjacent lower part of petioles dirty purple; petioles of radical leaves and stems below rather densely declinate-hairy; stems 3–46 cm long, as long as or shorter than the markedly elongate petioles of inner radical leaves, rarely slightly longer, usually erect, pubescent only in lower 1–2 internodes, branches (especially upper) often rather spreading; cauline leaves relatively well-developed, the lower reniform; stipules deeply incised-dentate. Inflorescence usually few-flowered; flowers in loose heads, 2–3.5 mm long and wide, yellow; hypanthia elongate, obconoid, glabrous; sepals shorter than hypanthia, glabrous, the outer two-thirds as long and as narrow as the inner; pedicels approximately as long as hypanthia, glabrous. Fr. August.

Riverbanks, meadows, shrubby formations. — W. Siberia: Alt. Endemic. Described from the vicinity of Shebalino village, Sema River valley. Type in Leningrad.

Note. Related to *A. orbicans* and distinguished from it by the purely green, less hairy leaves, with longer and more acute teeth, the denser pubescence of petioles and stems, the red stipules, those of cauline leaves deeply incised, the different character and shape of inflorescence, and the larger hypanthia.

84. *A. orbicans* Juz. in *Animad. syst. ex Herb. Univ. Tomsk* No. 5–6 (1932) 6; Kryl., *Fl. Zap. Sib.* VII, 1557.

364 Perennial small or medium-sized glaucescent-green plant; radical leaves 1.7–7.5 cm long, 1.9–8.5 cm wide, orbicular-reniform, obliquely orbicular or orbicular, 7–9-lobed; lobes very short, equal to one-fifth to one-third of the radius, arcuate or nearly obtuse or semi-orbicular in upper leaves, without incision or only lower leaves incised between lobes, with 5–8 short, semi-elliptic or semi-ovate, obtuse teeth at each side; leaves sparsely hairy only above along wrinkles and margins, otherwise glabrous, hairy beneath only along main ribs, lower leaves spreading-hairy on the entire face, the upper leaves hairy at margins and with main ribs glabrous in lower part, ascending-hairy in upper part; petioles and stems below covered with spreading or declinate hairs; stems 5–29 cm long, up to twice as long as the petioles of radical leaves, arcuately ascending, weak, glabrous in upper part, with branches inclining at a sharp angle; cauline leaves small or medium-sized. Inflorescence rather broad and few-flowered; flowers in loose heads, 1.5–3 mm long, 2–3.5 mm wide, green; hypanthia campanulate, glabrous; sepals shorter than hypanthia, glabrous, outer sepals two-thirds as long as inner sepals; pedicels equal to or longer than hypanthia, glabrous. June.

Grassy places, banks of rivers and streams, inundated meadows, forest edges. — W. Siberia: Ob; E. Siberia: Ang.-Say. Endemic. Described from the vicinity of Kuznetsk city. Type and cotype in Leningrad.

85. *A. schischkinii* Juz. in *Animad. syst. ex Herb. Univers. Tomsk* No. 5–6 (1932) 7; Kryl., *Fl. Zap. Sib.* VII, 1556.

Perennial medium-sized glaucescent-green plant; radical leaves 1.8–4 cm long, 2.8–5 cm wide, orbicular-reniform or orbicular, undulate, 7–9-lobed; lobes adjacent at margins, arcuate, semi-orbicular or slightly

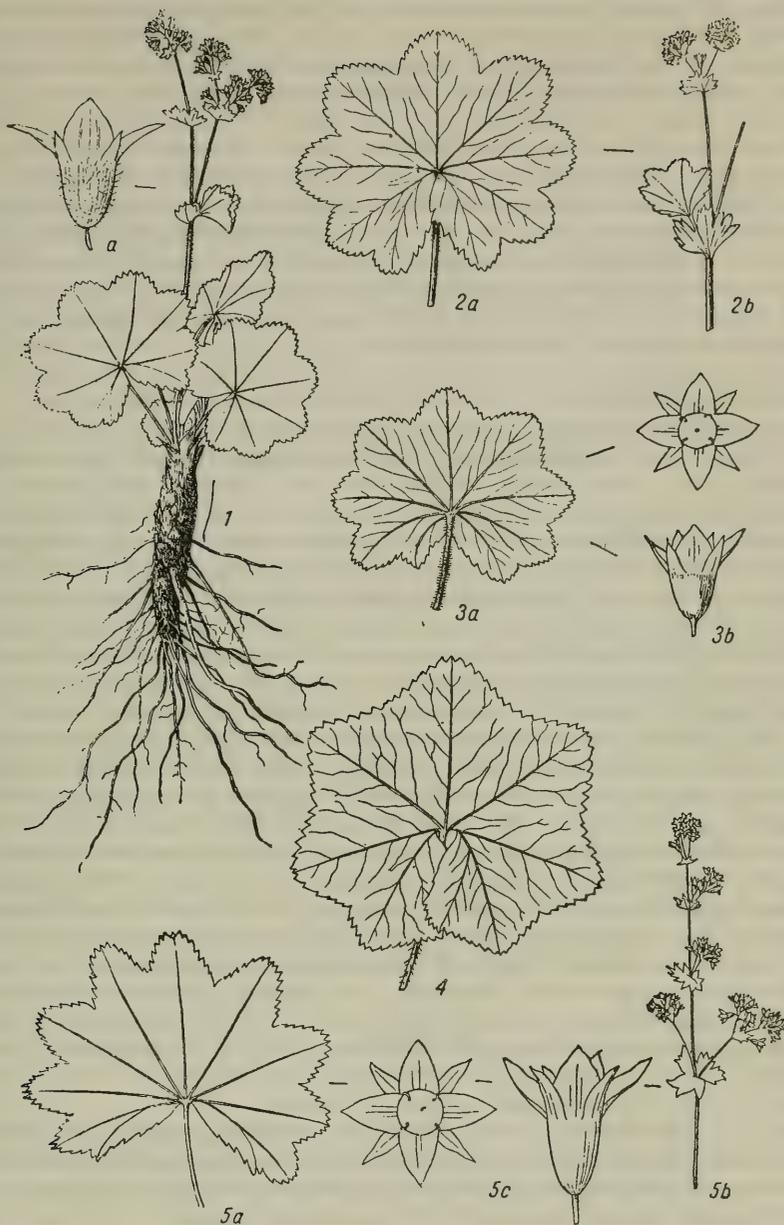


PLATE XXIII. 1 - *Alchimilla propinqua* Lindb. fil., general view, a) flowers; 2 - *A. stevenii* Bus., a) leaf, b) part of inflorescence; 3 - *A. tyttantha* Juz., a) leaf, b) flowers; 4 - *A. heptagona* Juz., leaf; 5 - *A. urceolata* Juz., a) leaf, b) part of inflorescence, c) single flowers.

angular, with shallow incision between and 6-7 obliquely semi-ovate, acute teeth at each side; leaves sparsely hairy on the entire upper surface, hairy beneath only along margins and main ribs, in upper leaves veins glabrous for the lower one-fourth or half; petioles of all leaves densely covered for the entire length with slightly declinate hairs; stems up to 20 cm long, almost two times longer than petioles of inner radical leaves, spreading-hairy only on lower internode, otherwise glabrous; cauline leaves broadly reniform, with arcuate lobes. Inflorescence broad, few-flowered; flowers in loose or rather dense heads, large, 4 mm in diameter, green; hypanthia campanulate, glabrous; sepals as long as or shorter than hypanthia, with solitary hairs at apex or glabrous; outer sepals equal in dimensions, glabrous; pedicels as long as or slightly longer than hypanthia, glabrous. June-July.

W. Siberia: Alt. Endemic. Described from Chermal village, in the bank of the Chermal River. Type in Tomsk.

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86. *A. lipschitzii* Juz. nov. spec. in Addenda IX. p. 467.

Perennial medium-sized green plant; radical leaves 1.5-4 cm long, 2.8-4.5 cm wide, reniform, usually with rectangular axil at base, slightly undulate, prominently netted-veined when dry, sparsely hairy above, glabrous beneath (at least the outermost) innermost and between ribs; main ribs of outer and middle leaves covered with ascending hairs or in their lower parts with horizontally spreading hairs, of inner leaves glabrous below; lobes semi-orbicular or in inner leaves semi-elliptic, with rather deep and narrow incision between, with 6-7 large, tapering-semi-elliptic or digitate [?], obtuse, equal teeth, the terminal tooth nearly as long as the neighboring; petioles of outer and middle leaves sparsely covered with spreading or declinate hairs, petioles of inner leaves glabrous in upper part or sometimes along the entire length; stems suberect, slightly flexuous, 9-17 cm long, slightly or two times longer than petioles of inner radical leaves, soft, straw yellow when dry, the 1-2 lower internodes sparsely declinate-hairy, otherwise glabrous; cauline leaves few, semi-orbicular, with deep incision between narrow lobes. Inflorescence narrow, few-flowered, branches usually reduced, inclined at a sharp angle; flowers in loose or rather dense, often contiguous heads, rather large, 2-3 mm long, 2.5-4 mm wide, yellowish; hypanthia 1-1.75 mm long, short-obconoid, glabrous; sepals slightly shorter than hypanthia, broadly ovate, acute, glabrous; outer sepals distinctly shorter and narrower than the inner; pedicels as long as or shorter than hypanthia, glabrous. August.

Alpine grassy clearings. - W. Siberia: Alt. (?); Centr. Asia; Dzu.-Tarb. Endemic. Described from Kongr-Oba, Chulak District (formerly Lepsinsk County). Type in Leningrad, cotype in Moscow.

Note. This Altai plant, recorded here with a question mark, differs from the typical form by its larger dimensions, its more abundant pubescence of leaves and stems, and its looser flower heads. It is possible that the plant is a separate species (*A. cembreforum* Juz. ined.).

87. *A. purpurascens* Juz. sp. nova in Addenda IX, p. 468.

Perennial, very similar to *A. lipschitzii*, distinguished from it by the intensively dark purple leaves in the fall, the elongate and acute teeth of leaves and stipules of cauline leaves especially characteristic is the

serration of the inner radical leaves with acutely angular, asymmetrical teeth, nearly straight at margins, distinctly larger toward apex, and the dense flower heads. Fr. August.

Edges of Siberian stone pine and broad-leaved forests, forest clearings. — W. Siberia: Alt. Endemic. Described from Seminskii Pass (Oiroi). Type in Leningrad.

88. *A. diglossa* Juz. nov. spec. in Addenda IX, p. 468.

Perennial, similar to *A. lipschitzii* Juz. (in particular, to its Altai form, see Note to that species), but distinguished from it by the deeper incision between lobes; the more acute serration; lateral lobes of inner radical leaves developing at base a pair of ligulae (in other words, 2–3 teeth completely separated from the others by a deep incision); the deeply incised-dentate stipules of cauline leaves, with narrow and acute teeth; the poor inflorescence with loose flower heads; the longer hypanthia, tapering at base. July–August.

Forest clearings near upper timberline. — W. Siberia: Alt. Endemic. Described from Altai (Chernyi Anui River). Type in Leningrad.

89. *A. biquadrata* Juz. sp. nova in Addenda IX, p. 469.

Perennial large glaucescent pale green plant; radical leaves orbicular, with narrow axil at base, 11- (incompletely 13-) lobed; lobes short, (in inner leaves) arcuate or semi-orbicular, nearly triangular (in upper leaves) 8–11-dentate, teeth small, nearly equal or the upper larger, asymmetrical, convex outside below, terminal tooth minute (much shorter than the neighboring); leaves sparsely hairy, above only on wrinkles and at margins, beneath along margins, the rest glabrous, main ribs at lower side of leaves appressed-hairy only near apex, otherwise glabrous; petioles of radical leaves sparsely covered with horizontally spreading or somewhat declinate hairs, frequently glabrous above; stems erect, slightly longer than petioles of radical leaves, sparsely hairy on the lower 2–3 internodes, glabrous above; cauline leaves reniform or (upper) rhombic with semi-orbicular or semi-ovate lobes; stipules acutely incised-dentate. Inflorescence narrow, few-flowered; flowers in loose or rather dense heads, small, pale green; hypanthia obconoid, glabrous, longer than sepals; sepals broadly ovate, glabrous, the outer distinctly shorter and narrower than the inner; pedicels shorter than hypanthia, glabrous. Fr. August.

Grassy clearings in Siberian stone pine forests. — W. Siberia: Alt. Endemic. Described from Seminskii Pass (Oiroi). Type in Leningrad.

Subgroup 4. **Heteropodae** Buser in Bull. Herb. Boiss., sér. 2, I (1901) 471. — Petioles of outer radical leaves glabrous; main ribs at lower side of radical leaves glabrous in lower part or hairy along entire length in the inner leaves of the rosette. Hypanthia of all flowers mostly glabrous or sometimes more or less hairy.

90. *A. transiliensis* Juz. sp. nova in Addenda IX, p. 469.

Perennial medium-sized gray-green plant; rootstock rather thick; radical leaves small, 1–3 cm long, 1.4–3.7 cm wide, reniform, flat or slightly

undulate, 7- or incompletely 9-lobed; lobes short, usually semi-orbicular, with very distinct incision between them, with 4-6 small, rather equal, semi-ovate, acute, lateral teeth slightly inclined toward the much larger terminal tooth; lowermost leaves usually hairy above only at margins, beneath on main ribs (except for their lower part), middle and upper leaves rather densely appressed-hairy on both sides, main ribs beneath densely pubescent with ascending hairs, all leaves often prominently netted-veined beneath when dry; petioles of lowermost leaves glabrous or sparsely hairy in upper part, glabrescent toward apex, petioles of middle and upper leaves densely covered with soft, somewhat ascending or horizontally spreading hairs; stems elongate, 17-30 cm long, much longer than petioles of upper radical leaves, erect, pubescent like petioles of upper radical leaves, generally sparsely hairy in inflorescence; cauline leaves numerous, well-developed, the lower similar to radical leaves but smaller; stipules of cauline leaves deeply incised-dentate. Inflorescence very narrow, few-flowered, with long branches inclined at a very acute angle; flowers in rather dense or loose heads, 2-3.5 mm long and wide; hypanthia obconoid or narrowly campanulate, 1-2 mm long, spreading-hairy; sepals broadly ovate, hairy at apex, the outer two-thirds as long and twice as narrow as the inner; pedicels generally as long as hypanthia, glabrous. June.

Shrubby formations in the coniferous forest zone. - Centr. Asia: T. Sh. Endemic. Described from Trans-Ili Ala-Tau, Issyk River, above lake. Type in Leningrad, cotype in Tashkent.

91. *A. fontinalis* Juz. sp. nova in Addenda IX, p. 470.

370 Perennial medium-sized yellowish green plant; radical leaves 1.7-3.5 cm long, 2.1-8 cm wide, reniform or orbicular-reniform, flat, 7- or incompletely 9-lobed; lobes short, arcuate (in outer leaves) to broadly semi-ovate or nearly short-triangular (in inner leaves), obtuse, without incision, with 5-7 short, obtuse or acute, obliquely semi-ovate or obliquely triangular unequal teeth slightly increasing at apex of lobes, the terminal tooth obtuse and much smaller than the neighboring; lower leaves (outermost) glabrous on both sides, appressed-hairy beneath only in upper part of main ribs, middle and upper leaves sparsely or rather densely hairy above, densely appressed-hairy beneath, with main ribs appressed-hairy along entire length; petioles of lower leaves completely glabrous, of middle and upper leaves densely covered with appressed or nearly ascending hairs; stems 10-28 cm long, slightly or twice as long as petioles of upper radical leaves, nearly straight or generally slightly bent, frequently glabrous on lower internode, otherwise with same pubescence as petioles of inner leaves but less densely; cauline leaves medium-sized; stipules shallowly dentate. Inflorescence narrow and few-flowered, with short branches inclined at an acute angle; flowers in loose heads, small, 2-3 mm long and wide, yellowish; hypanthia obconoid, glabrous; sepals shorter than hypanthia, broadly ovate, acute, often reddening in fruit, outer sepals two-thirds as long as the inner and twice as narrow; pedicels almost as long as hypanthia, glabrous. August.

Riverbanks, springs, alpine moist meadows (sazy). - Centr. Asia: Pam.-Al. Endemic. Described from western Darvaza Range, Vozgin Pass and from eastern Tadzhikistan, Khingou River basin, Kulyum Pass. Type and paratype in Leningrad.

92. *A. insignis* Juz. apud Grossh, Fl. Kavk. IV (1934) 325.

371 Perennial large glaucescent-green plant; radical leaves 5.5–12 cm long, 6.5–14 cm wide, orbicular-reniform, undulate, 9–11-lobed; lobes generally long, semi-ovate or oblong-semi-ovate, with shallow incision between, with 9–11 large, obliquely triangular, strongly asymmetrical acute teeth at each side, gradually larger toward terminal tooth; lower and middle leaves glabrous above or glabrescent, main ribs beneath hairy only in upper part; upper leaves sparsely hairy above, main ribs beneath sparsely spreading-hairy for the entire length; petioles of lower and middle leaves glabrous, of the inner sparsely spreading-hairy; stems 25–40 cm high, about as long as petioles of inner radical leaves, suberect, slightly flexuous, spreading-hairy in lower part, glabrous above; cauline leaves rather large, well-developed, with rather long acute lobes and large-toothed stipules. Inflorescence poor, few-branched, lower branches inclined at an acute angle, the upper spreading; flowers in few loose heads, small, 1.5–3 mm long, 2–3 mm wide, green; hypanthia obconoid, glabrous; sepals shorter than hypanthia, broadly ovate, acute, outer sepals half as long and nearly one-fourth as narrow as the inner; pedicels usually as long as hypanthia, glabrous. July.

Mountains (1,750 m). — Caucasus: E. Transc. Endemic. Described from Akhalkalak District (Dzhavakhetiya) between the villages of Efremovka and Gorelovka. Type in Leningrad.

93. *A. altaica* Juz. in Animad. syst. ex Herb. Univ. Tomsk. No. 5–6 (1932) 5, emend.

Perennial medium-sized or large slightly glaucescent-green plant; radical leaves 3–9.5 cm long, 5–12 cm wide, the lower reniform, the upper orbicular-reniform or orbicular, with rather narrow axil at base, slightly undulate, 9- or incompletely 11-lobed; lobes elongate or rarely short and rather wide, semi-orbicular, semi-ovate or nearly triangular, with obsolete incision, with (6)7–9 large, tapering-semi-ovate, strongly asymmetrical, acute teeth at each side, strongly convex at outer margin and nearly straight at inner, with small papilliform terminal tooth; lower leaves hairy above along wrinkles and beneath along main ribs, middle and upper leaves sparsely hairy on both sides, main ribs on lower side of leaves covered in lower half with horizontally spreading hairs; petioles of lowermost leaves often glabrous or subglabrous, the rest rather densely spreading-hairy along the entire length; stems short, 20–40 cm long, usually almost as long or slightly longer than petioles of middle radical leaves, ascending at base or generally erect, slightly flexuous, strong, with horizontally spreading hairs in lower part, glabrous above; cauline leaves well-developed, broadly reniform, stipules large, irregularly acutely dentate. Inflorescence narrow, few-flowered, with short branches inclined at an acute angle; flowers in loose or rather dense heads, 2–3 mm long, 3.5 mm wide, green; hypanthia obconoid or narrowly campanulate, 1–2 mm long, glabrous; sepals distinctly shorter than hypanthia, broadly ovate, acute, with few hairs at apex or glabrous, outer sepals half as long and half as narrow as the inner, glabrous; pedicels as long as or slightly shorter than hypanthia; pedicels of lower flowers slightly longer than hypanthia, all glabrous. July.

Stony banks of mountain streams, grassy forest clearings. — W. Siberia: Alt. Endemic. Described from the former Biisk County, Chernyi Anui

District, Talitskie belki (in Siberia from flattened mountain summits covered with snow). Type in Leningrad.

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94. *A. alexandri* Juz. apud Grossh., Fl. Kavk. (1934) 325.

Perennial small usually green or slightly glaucescent-green plant; radical leaves 1.5–2.5 cm long, 2–3.5 cm wide, reniform, frequently with rectangular axil at base, 7- or incompletely 9-lobed; lobes semi-orbicular or semi-ovate one-third to two-fifths as long as radius, with short incision or without, with 5–6 elongate, obliquely ovate, acute teeth at each side; lower leaves subglabrous on both sides (above usually hairy along wrinkles, beneath only in upper part of main ribs), upper leaves densely appressed-hairy on both sides, main ribs covered in lower half with spreading or ascending hairs; petioles of lower radical leaves completely glabrous, the upper densely spreading-hairy along entire length; stems 7–10 cm long, arcuately ascending or prostrate, usually glabrous at lower internode, at next 1–2 internodes rather densely or sparsely spreading-hairy, but again glabrous above. Inflorescence narrow, compressed or sometimes rather broad, spreading; flowers in dense heads, ca. 2.5 mm long and 3 mm wide, pale green; hypanthia obconoid or narrowly campanulate, sparsely spreading-hairy or glabrescent in upper flowers; sepals shorter than hypanthia, broadly ovate, obtuse, with solitary hairs at apex or glabrous, outer sepals two-thirds as long and twice as narrow as the inner; pedicels short, or (in lower flowers) two times longer than hypanthia. July–August.

Alpine zone. — Caucasus: E. Transc. Endemic. Described from Mokrye Gory, Leily-Dag (Dzhavakhetiya), 2,300–2,900 m. Type in Leningrad.

95. *A. diversipes* Juz. apud Grossh., Fl. Kavk. (1934) 325.

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Perennial medium-sized glaucescent-green plant; radical leaves 3.5–6 cm long, 4–7 cm wide, outer radical leaves reniform, the inner orbicular, undulate, 7–9-lobed; lobes short, arcuate or semi-orbicular, with obsolete incision and generally dentate to base, with 5–7 small, short, tapering, semi-ovate asymmetrical, acute teeth at each side; outer leaves glabrous on both sides, appressed-hairy only beneath along upper part of main ribs, middle leaves sparsely hairy above, sparsely hairy beneath only along margins, main ribs with ascending or appressed hairs only in upper part, inner leaves sparsely or rather densely hairy on both sides, main ribs glabrous at base, above spreading-hairy; petioles of lower leaves, glabrous, of middle leaves with solitary or remote hairs, of inner leaves with dense spreading hairs; stems 15–35 cm high, nearly two times longer than petioles of inner radical leaves, usually arcuately ascending at base, flexuous, frequently glabrous at lower internode, sparsely covered in middle part with short, horizontally spreading hairs, glabrous again in inflorescence; cauline leaves medium-sized, reniform, with short arcuate lobes and short-dentate stipules. Inflorescence with elongate branches inclined at an acute angle, rather broad; flowers in loose or rather dense heads, large, 2–3 mm long, green; hypanthia narrowly campanulate in fruit, glabrous; sepals shorter than hypanthia, ovate, glabrous or with solitary hairs, outer sepals half as long and narrow as the inner, glabrous; pedicels as long as or shorter than hypanthia, glabrous. July.

Mountains. — Caucasus: S. Transc. Endemic. Described from Armenia, the former Novo-Bayazet County, Satanakhach village, and also Keity-Yanykh, Gezeldar Mountains. Type and paratype in Leningrad.

96. *A. anisopoda* Juz. in *Animad. syst. ex Herb. Univ. Tomsk. No. 5-6* (1932) 7; *Kryl., Fl. Zap. Sib. VII* (1933) 1557.

Perennial small or medium-sized green plant; radical leaves 1.5-6 cm long, 2-8.3 cm wide, the lower orbicular with lobes adjacent at margin, the upper orbicular-reniform, with broad axil at base, undulate, 9-lobed; lobes semi-orbicular (in lower leaves) or semi-ovate to nearly triangular (in upper leaves), with short incision (except in uppermost leaves) and with 5-7 semi-ovate or nearly triangular, narrow, long, acute teeth at each side; lower and middle leaves hairy only at upper margins, beneath only on upper part of nerves, upper leaves sparsely hairy on both sides, main ribs at lower side of leaves spreading hairy in lower half; petioles of lower radical leaves glabrous, of middle and upper with sparse or rather dense spreading or slightly declinate hairs; stems nearly twice as long as petioles, 4-30 cm long, weak, ascending, flexuous, sparsely spreading-hairy, glabrous or subglabrous in inflorescence, strongly (already from first or second nodes) branching; cauline leaves poorly developed, with few acute lobes. Inflorescence rather broad, with branches long, inclined at an acute angle; flowers in loose heads, small (1.5)2-3 mm long, 2-3.5 mm wide, green; hypanthia obconoid or campanulate, glabrous; sepals shorter than hypanthia, flabrous; outer sepals half as long as the inner; pedicels as long as or longer than hypanthia, glabrous. June-July.

374 Meadows, stream banks, shrubby formations, open forest (pine, birch-larch groves) in the forest and subalpine zone. - W. Siberia: Ob? E. Siberia: Ang.-Say., Dau. Endemic? Described from Irkutsk Region, Kultuk village in the Medyanka River valley. Type in Leningrad.

97. *A. sauri* Juz. sp. nova in *Addenda IX*, p. 471.

Perennial medium-sized pale green plant; radical leaves 2-7.5 cm long, 2.5-9 cm wide, reniform or orbicular-reniform, undulate, 7- or usually 9-lobed; lobes short or medium in length, arcuate or semi-orbicular in outer leaves, broadly semi-ovate or sometimes triangular-semi-ovate in inner leaves, frequently without or rarely with inconspicuous incision between them, with (5)7-12 small, short, obliquely triangular, asymmetrical, acute teeth, often strongly convex in lower outer part, terminal tooth slightly smaller than the neighboring lateral ones; outer leaves glabrous on both sides, loosely appressed-hairy beneath only along upper part of main ribs, middle leaves sparsely hairy above, otherwise like lower leaves, inner leaves pubescent above like middle leaves, sparsely hairy beneath at margins, with main ribs covered with long hairs throughout length, hairs in lower part of main ribs horizontally spreading, glabrous between main ribs, all with translucent network of veins; petioles of outer leaves completely glabrous, of middle leaves sparsely pubescent, of inner more or less densely pubescent with horizontally spreading or slightly declinate hairs; stems 6-30 cm high, one and a half to two times longer than petioles of inner radical leaves, suberect, thick, slightly flexuous, more or less densely spreading-hairy only at lower internodes, glabrous or subglabrous above, branching only in upper part; cauline leaves rather well-developed, broadly reniform with orbicular or semi-ovate lobes and large acutely toothed stipules. Inflorescence narrow, with short branches inclined at an acute angle; flowers in loose heads, small, 2-3 mm long and wide; hypanthia

obconoid, broadly campanulate in fruit, glabrous; sepals shorter than hypanthia, ovate, acute, glabrous, the outer half as long and narrow as the inner; pedicels nearly as long as hypanthia, glabrous. June—July.

Subalpine and alpine meadows. — Centr. Asia: Dzu.-Tarb. Endemic. Described from Saur Range, watershed of Bolshaya and Malaya Dzhemeneya. Type and paratype in Leningrad.

98. *A. turuchanica* Juz. in *Animad. syst. ex Herb. Univers. Tomsk.* No. 5—6 (1932) 8.

375 Perennial small rather dark green plant; radical leaves 1—3.5 cm long, 1.7—5.5 cm wide, broadly reniform or rarely orbicular-reniform, with arcuate or semi-orbicular obtuse shortly cut lobes and 4—7 semi-ovate or triangular, obtuse or acute teeth at each side, lower leaves glabrous above, hairy beneath only in upper part of main ribs, middle and upper leaves sparsely hairy on both sides, main ribs beneath hairy with hairs horizontally spreading (in lower part of veins); petioles of lower radical leaves glabrous, of middle and upper leaves sparsely or rather densely covered with horizontally spreading or slightly declinate hairs; stems 5—25 cm high, just slightly longer than petioles of radical leaves, ascending, weak, pubescent in lower part like petioles of upper radical leaves, with few hairs above; cauline leaves semi-orbicular or rhombic, short-lobed. Inflorescence narrow, few-flowered, with branches inclined at a very acute angle; flowers in loose heads, small, 1.5—2 mm long and wide, green; hypanthia obconoid, campanulate in fruit, glabrous or with solitary hairs; outer sepals shorter and narrower than the inner; pedicels as long as or longer than hypanthia, glabrous. June—July.

Damp sandy riverbanks, clearings, etc. — E. Siberia: Yenisei. Endemic. Described from the villages of Baklanikha and Monastyrskoe along the Yenisei River. Type in Leningrad.

99. *A. krylovii* Juz. in *Animad. syst. ex Herb. Univ. Tomsk.* No. 5—6 (1932) 9; Kryl., *Fl. Zap. Sib.* III (1933) 1558.

Perennial medium-sized or rather large green plant; radical leaves 2—5 cm long, 3—8.5 cm wide, reniform, with a rather broad axil between the lower lobes, slightly undulate, 7- or incompletely 9-lobed; lobes short (in lower leaves), arcuate (in upper), semi-orbicular or nearly triangular, obtuse, very short, nearly without incision and with 6—8 semi-ovate or nearly triangular, obtuse teeth, straight or usually slightly inclined toward the larger terminal tooth; lower and middle leaves sparsely hairy above only along margins and wrinkles or subglabrous, appressed-hairy beneath only in upper part of main ribs, otherwise glabrous, upper leaves sparsely hairy on the entire upper surface, sparsely hairy beneath on lateral lobes, loosely appressed-hairy in upper part of main ribs; petioles of lower and middle leaves completely glabrous, of upper sparsely spreading-hairy; stems 20—30 cm high, slightly to two times longer than petioles of radical leaves, suberect, glabrous or with sparse ascending hairs only at first internode; cauline leaves rather well-developed, broadly reniform or semi-orbicular, with arcuate lobes. Inflorescence narrow, poor; flowers small, 2—2.5 mm long, 2—3 mm in diameter, green; hypanthia campanulate, glabrous like sepals; inner sepals slightly shorter than hypanthia, outer sepals

two-thirds as long and half as narrow as the inner; pedicels as long as or longer than hypanthia, glabrous. June–August.

Stream banks. — W. Siberia: Alt.; Centr. Asia: Dzu.-Tarb., T. Sh. Endemic. Described from Lake Balakty-Kol. Type in Leningrad, cotype in Tomsk.

100. *A. oligotricha* Juz. sp. nova in Addenda IX, p.471.

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Perennial medium-sized pale green plant; radical leaves broad-reniform, (nearly) flat; lobes arcuate, semi-orbicular or short-triangular, shortly cut, with 6–7 rather large, almost straight, acute teeth at each side, the terminal tooth nearly as long as the neighboring; leaves appressed- or spreading-hairy beneath only on upper part of main ribs, glabrous above or sparsely hairy along wrinkles and margins; petioles of most leaves glabrous, only of innermost leaves sparsely spreading-hairy, like stems often reddening in sun; stems delicate, ascending or suberect, glabrous; cauline leaves semi-orbicular or rhombic, with short few-dentate lobes entire at base, and with very deeply, strongly and irregularly incised-dentate stipules. Inflorescence narrow, few-flowered; flowers in loose heads, small, yellowish green; hypanthia obconoid, glabrous; sepals broadly ovate, shorter than hypanthia, glabrous, outer sepals nearly as long as the inner, narrowly ovate; pedicels longer than hypanthia, glabrous. July.

Grassy and stony slopes, streambanks in the subalpine zone. — Caucasus: W. Transc. Endemic. Described from Achishkho Mountain. Type in Leningrad.

Subgroup 5. *Glabrificaules* Juz. — Stems and petioles of all radical leaves completely glabrous; radical leaves pubescent above, at least on wrinkles. Hypanthia glabrous.

101. *A. glabricaulis* Lindb. fil. in Acta Soc. Sc. Fenn. XXXVII, No. 10 (1909) 3 (in adnot.); Juz., Beitr. Kenntn. Alch. Weissrusl. (1925) 9 et in Act. H. Bot. Acad. Sc. (Petrop.) XLIII, 2 (1931) 542 (rossice).

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Perennial generally medium-sized dark green plant; radical leaves 1.5–6 cm long, 2.3–7 cm wide, broadly reniform or the uppermost sometimes orbicular-reniform, slightly undulate or nearly flat, 7–9-lobed; lobes short, arcuate or broadly triangular, dentate to base, with 5–8 short, obliquely semi-ovate, obtuse teeth at each side; leaves sparsely hairy above, sparsely appressed-hairy below only at upper part of main ribs; otherwise glabrous; petioles of radical leaves completely glabrous, of upper leaves frequently very elongate; stems 6–35 cm long, generally only slightly longer than upper radical leaves, slightly ascending at base, often delicate, completely glabrous. Inflorescence narrow or slightly spreading, few-flowered; flowers in rather loose heads, very small, 1.5–3 mm long and wide; hypanthia campanulate in fruit, glabrous; sepals and pedicels glabrous. End May, June–July.

Mainly in shady places, groves, gardens, shrubby formations, rarely in open grassy places. — European part: Lad.-Ilm., Balt., U. V., V.-Kama, U. Dnp., V.-Don; Caucasus? Endemic. Described from the vicinity of Tambov. Type and paratype (from the village of Melekhovka, formerly Tula County) in Leningrad.

Group 2. **Subglabrae** Lindb. fil. in Acta Soc. Sc. Fenn. XXXVII, No. 10 (1909) 41.— Stems and petioles of radical leaves (at least some) appressed-hairy, very rarely completely glabrous (if so, then leaves completely glabrous above).

Subgroup 1. **Appressipilae** Juz.— Leaves always sparsely or rather densely appressed-hairy on one or on both sides. Hypanthia more or less hairy or glabrous.

102. **A. pogonophora** Juz. sp. nova in Addenda IX, p. 472.

Perennial medium-sized or rather large glaucescent-green plant; radical leaves 3.5–12 cm long, 4–14 cm wide, orbicular-reniform or the upper usually orbicular, undulate or rarely nearly flat, with narrow axil covered by lobes; lobes (7)9–11, almost one-third of the radius, arcuate, semi-orbicular, in inner leaves usually broadly semi-ovate or subtriangular, obtuse, dentate to base, with 7–10 short, broad, obliquely triangular teeth; teeth usually with protuberance on outer side, obtuse, the upper gradually larger, terminal tooth distinctly smaller than the neighboring lateral ones; leaves sparsely hairy on both sides or subglabrous above; petioles of radical leaves (like main ribs beneath leaves) densely appressed-hairy; stems 20–35 cm long, thick, as long as petioles of radical leaves or one and a half to two times longer, suberect, straight or slightly curved or flexuous. Inflorescence narrow or rather broad, not too many-flowered, branches elongate, inclined at an acute angle; flowers in rather dense heads, large, 2.5–4 mm in diameter, dark green; hypanthia obconoid or campanulate, densely covered with ascending hairs; sepals hardly as long as hypanthia, more or less hairy, outer sepals shorter and narrower than the inner, subglabrous; pedicels generally shorter than hypanthia, glabrous or those of lower flowers with solitary hairs. July.

Grassy clearings and slopes, streambanks in the subalpine zone.— Caucasus; W. Transc. Endemic. Described from the vicinity of Krasnaya Polyana, Achishkho. Type in Leningrad.

378 103. **A. camptopoda** Juz. in Not. Syst. ex Herb. Inst. Bot. Acad. Sc. URSS VIII, 1–2 (1938) 25.

Perennial medium-sized or rather large pale green plant; radical leaves 2–7.5 cm long, 2.7–9.7 cm wide, reniform, more or less undulate, 9-lobed; lobes short, semi-ovate or semi-elliptic with rather deep incision and with 6–9 acute teeth at each side; leaves, except the subglabrous lower ones, sparsely or densely appressed-hairy on both sides, almost silky-hairy beneath along main ribs; petioles generally flexuous or curved, densely appressed-hairy; stems 7–28 cm long, arcuately ascending, slightly flexuous; cauline leaves large, broadly reniform, stipules not deeply or acutely dentate. Inflorescence few-flowered, with elongate branches; flowers in loose heads, 2–3 mm long, green; hypanthia obconoid, densely covered with ascending hairs; sepals hairy, ovate, obtuse, the outer half as long as the inner; lower pedicels hairy, the rest subglabrous. June.

Edges of beech forests at their upper border.— European part: Crim. (Yaila). Endemic. Described from Ai-Petri-Yaila. Type in Leningrad.

104. *A. obtegens* Juz. apud Grossh., Fl. Kavk. IV (1934) 328.

Perennial medium-sized pale green plant; radical leaves 3.5–9 cm long, 4–10 cm wide, orbicular, slightly undulate or flat, 9-lobed; lobes converging or diverging at margins, broadly semi-ovate, rounded at apex, one-third as long as radius, 6–8-dentate; teeth large, papilliform or obliquely ovate, sometimes triangular, obtuse or acute, the upper hardly larger, the terminal much smaller than the neighboring; leaves evenly sparsely hairy on both sides, with appressed hairs beneath along main ribs; petioles 4–24 cm long, appressed-hairy; stems up to 25 cm long, erect, weak, almost as long as petioles of upper radical leaves or longer, appressed-hairy along entire length; cauline leaves well-developed, broadly reniform, with large, shallowly cut between lobes; stipules irregularly short-dentate. Inflorescence narrow, poor, branches inclined at an acute angle; flowers in loose heads, ca. 3 mm in diameter; hypanthia 1–1.5 mm long, narrowly campanulate, the lower with solitary hairs, otherwise glabrous; sepals slightly shorter than hypanthia, broadly ovate, with solitary hairs or glabrous, outer sepals half as long and three times as narrow as the inner; pedicels as long as (in lower flowers) or slightly longer than hypanthia, the lower covered with ascending hairs, the rest glabrous.

379 Mountains. — Caucasus: W. Transc. Endemic. Described from Bakhmaro (Grossheim). Type in Leningrad.

105. *A. crebridens* Juz. in Not. Syst. ex Herb. Inst. Bot. Acad. Sc. URSS, VIII, 1–2 (1938) 27.

Perennial medium-sized dark green plant; radical leaves 1.5–7.2 cm long, 1.8–8.3 cm wide, orbicular-reniform or orbicular, flat or slightly undulate, the upper carinate-plicate, 9–11-lobed; lobes semi-orbicular or semi-ovate, sometimes in inner leaves subtriangular, with distinct incision and 5–8 acute or obtuse, usually straight, small teeth at each side, the upper teeth larger, the terminal smaller; leaves sparsely appressed-hairy on both sides or often above only along margins and wrinkles, appressed-hairy beneath along lateral lobes and main ribs; petioles 1–10 cm long, straight or slightly curved, appressed-hairy; stems delicate, 6–24 cm long, two to three times longer than petioles, arcuately ascending, appressed-hairy along entire length; cauline leaves large, short-petioled, with oblong, denticulate, lobes, separated from each other by incisions and incised-dentate stipules. Inflorescence mostly narrow, with elongate lower branches; flowers in loose heads, rather small, 2–2.75 mm long, 2.5–3.5 mm wide, green; hypanthia 1–1.5 mm long, obconoid, glabrous or the lower with solitary hairs; sepals shorter than hypanthia, outer sepals distinctly shorter and narrower than the inner; pedicels as long as hypanthia or longer, glabrous. June–July.

Meadows, pastures, edges of beech forests. — European part: Crim. (Yaila). Endemic. Described from Babugan-Yaila (Crimea State Reserve). Type in Leningrad.

106. *A. buschii* Juz. in Acta Inst. Bot. Acad. Sc. URSS, ser. I, fasc. 1 (1933) 128.

Perennial small gray-green plant; radical leaves 1–1.5 cm long, 1.3–2.5 cm wide, reniform, with broad axil at base, flat, 5–7-lobed (up to the middle); lobes semi-orbicular, entire at base, with 4–6 large, semi-ovate obtuse teeth at both sides; leaves sparsely or densely hairy on both sides,

380 the upper rather densely hairy above, dull in shade, densely appressed-hairy beneath, slightly silky-shiny, very densely silky-hairy along main ribs; petioles densely covered with loosely appressed hairs; stems 7–9 cm high, delicate, three to four times longer than petioles of radical leaves, arcuately ascending, flexuous, densely covered along entire length — like branches of inflorescence — with loosely appressed hairs; cauline leaves small, semi-orbicular, with short obtuse lobes. Inflorescence narrow, few-flowered, branches inclined at an acute angle; flowers in loose heads, relatively large, 3 mm long and 4 mm wide, yellowish green; hypanthia obconoid, in lower flowers hairy at base, in rest with solitary hairs or glabrous; sepals shorter than hypanthia, acute, outwardly slightly hairy, outer sepals half as long as the inner, glabrescent; pedicels as long as or longer than sepals, the innermost appressed-hairy at base, the rest glabrous or subglabrous. May–June.

Open mountain slopes. — European part: Crim. Endemic. Described from the Crimea, Karabi-Yaila, slopes of Kara-Tau and Tai-Koba. Type in Leningrad.

107. *A. tamarae* Juz. in Delect. semin. Hort. Bot. Acad. Sc. URSS 1934 (1933) 6.

Perennial medium-sized green plant; radical leaves 2–5 cm long, 3–6 cm wide, reniform or orbicular-reniform, slightly undulate, 7–9-lobed; lobes semi-orbicular or semi-ovate, with small incision and (5)6–8 short, obliquely semi-ovate teeth at each side; leaves rather densely hairy on both sides (only the innermost glabrous beneath between main ribs), with appressed or loosely appressed hairs on main ribs; petioles of radical leaves loosely appressed-hairy; stems 20–27 cm high, as long as petioles of inner radical leaves or slightly longer, densely appressed-hairy in lower part, slightly hairy in inflorescence; cauline leaves small, poorly developed. Inflorescence with elongate branches inclined at an acute angle; flowers in rather loose heads, 2–2.5 mm long, 3–4 mm wide, greenish; hypanthia short-obconoid, glabrous; sepals nearly as long as hypanthia, glabrous, the outer two-thirds as long as the inner; pedicels longer than hypanthia (sometimes 2 times), glabrous. June–July.

Grassy clearings, pastures. — Caucasus: Cisc. Endemic. Described from the vicinity of Ordzhonikidze (formerly Vladikavkaz). Type in Leningrad.

108. *A. appressipila* Juz. in Animad. syst. ex Herb. Univ. Tomsk. No. 5–6 (1932) 10.

Perennial medium-sized yellowish green plant; radical leaves 2–5.5 cm long, 3–7 cm wide, reniform or orbicular-reniform, with medium-sized evident axil at base, slightly undulate, 9- or incompletely 11-lobed; lobes short, arcuate or short-triangular, incision hardly obvious and with 7–9 small, short and acute teeth at each side; leaves rather densely appressed-hairy on the entire upper surface, densely appressed-hairy beneath along main ribs, glabrous between main ribs; petioles of radical leaves densely appressed-hairy; stems ca. 18 cm long, slightly longer than petioles of inner radical leaves, suberect, appressed-hairy, glabrescent in inflorescence; cauline leaves well-developed, reniform, short-lobed. Inflorescence narrow, few-flowered; flowers in loose heads, small, 2.5 mm long and wide, yellowish

81 green; hypanthia obconoid, glabrous; sepals shorter than hypanthia, obtuse, glabrous, outer sepals three-fourths as long as the inner; pedicels nearly as long as hypanthia, glabrous. June.

Meadows, broad-leaved forests (birch).— E. Siberia: Ang.-Say. **Gen. distr.:** N. Mong. (?). Described from the village of Novoe Mar'yasovo in the former Minusinsk County. Type in Leningrad.

109. **A. glomerulans** Buser in Bull. Herb. Boiss. I (1893), append. 2, 30; H. Lindb. in Acta Soc. Sc. Fenn. XXXVII, No. (1909) 105.— *A. pseudomicans* Böcher in Meddel. Gronland CIV, No. 3 (1933) 16.— ? *A. irregularis* Alechin apud Govoruch., Fl. Ural. (1937) 531 cum f. 117 (f. *subtruncata*).— Ic.: H. Lindb., I. c., tab. 15.— Exs.: Baenitz, Herb. Eur. No. 8243; Pl. Finl. exs., No. 1216.

Perennial usually medium-sized or rather large pale green or yellow-green plant; radical leaves 2.5–12 cm long, 3–14 cm wide, reniform, undulate, usually 9-lobed; lobes short, orbicular, with (6)7–9 short, semi-elliptic or semi-ovate, frequently obtuse teeth on each side, with terminal tooth smaller than the neighboring ones; leaves sparsely or densely appressed-hairy on the entire upper surface, rarely only along wrinkles, beneath appressed-hairy along main ribs, sparsely hairy or glabrous between them; petioles of radical leaves and stems appressed-hairy along entire length; stems 5–50 cm high, arcuately ascending at base, rather firm; cauline leaves usually large, well-developed. Inflorescence rather narrow; flowers in dense heads, 3–3.5 mm long, 3.5–4 mm wide, yellowish green or yellowish; hypanthia rounded at base, glabrous or in lowermost flowers slightly hairy; sepals wide, glabrous or with solitary hairs at apex, as long as hypanthia; pedicels short, glabrous or appressed-hairy in lowermost flowers. July–August.

Damp and moist meadows, grassy clearings, shrubby formations, springs, banks of rivers and streams.— Arctic: Arct. Eur.; European part: Kar.-Lap., Dv.-Pech., Balt., Lad.-Ilm. (Slutsk), N. Urals. **Gen. distr.:** Scand., mountains of Centr. Eur., Iceland, Greenland, Labrador. Described from Switzerland and Savoy.

110. **A. obtusiformis** Alech. in Govorukhin, Fl. Urala (1837) 531.

82 Perennial medium-sized yellowish green plant; radical leaves 2–5.6 cm long, 2.5–6.5 cm wide, orbicular-reniform, with narrow axil between basal lobes, 7–9-lobed; lobes arcuate (in lower leaves), semi-orbicular and semi-ovate (in inner leaves), with short incision or in inner leaves without incision, with 5–7 large, obliquely semi-ovate, asymmetrical, obtuse or acuminate teeth at each side, the terminal tooth smaller than the neighboring; leaves glabrous above or appressed-hairy at margins, sparsely hairy on the entire lower surface but with denser pubescence at margins and the lateral lobes, main ribs densely appressed-hairy; stems ca. 20 cm long, slightly ascending at base, weak, flexuous; cauline leaves nearly semi-orbicular, with arcuate lobes, stipules strongly and acutely toothed. Inflorescence few-flowered, narrow, broader above, with branches inclined at an acute angle; flowers in very loose heads, small, 1.5–2 mm long, 2–3 mm wide, green; hypanthia obconoid, in lower flowers, with solitary hairs, the rest glabrous; sepals broadly ovate, acute, slightly shorter than hypanthia; outer sepals slightly shorter and much narrower than the inner; pedicels distinctly longer than hypanthia, glabrous. July–August.

Calcareous rocks along riverbanks.— European part: Dv.-Pech. (N. Urals). Endemic. Described from the banks of the Synya River (foothills of N. Urals on calcareous rocks along banks of Synya River, 1 August 1926, flowers, fruit, S. N. Naumov). Type in Moscow, cotype in Leningrad.

Note. A rather doubtful species; it may prove to be merely a form of the preceding species.

111. *A. suberectipila* Juz. in Delect. seminum Hort. Bot. Acad. Scient. URSS (1934) 6; idem in Grossh., Fl. Kavk. IV (1934) 326.

383 Perennial medium-sized or rather large pale green plant; radical leaves 4.5–13 cm long, 5.5–14 cm wide, reniform or the inner orbicular-reniform with broad or rectangular axil at base, flat, 7–9-lobed; lobes semi-orbicular, broadly semi-ovate or triangular, nearly without incision, with 7–10 oblong, symmetrically or obliquely triangular, obtuse or rather acute teeth at each side, terminal tooth smaller than the neighboring; lower leaves glabrous on both sides, upper leaves sparsely hairy above, often subglabrous beneath between ribs, main ribs covered in lower part with ascending hairs, upper part appressed-hairy; petioles of radical leaves 8–30 cm long, pale green, like stems densely covered along entire length with ascending hairs; stipules pale, with somewhat appressed-hairy auricles; stems suberect, flexuous, 50 cm long, nearly two times longer than petioles of radical leaves, glabrescent in upper third; cauline leaves rather large, semi-orbicular, with broadly semi-ovate or semi-elliptic lobes, stipules short, irregularly dentate. Inflorescence rather broad and many-flowered, branches inclined at an acute angle; flowers in loose heads, 3–4 mm in diameter, green; hypanthia 1–2 mm long, campanulate, glabrous; sepals 1–1.5 mm long, broadly ovate, glabrous; outer sepals two-thirds as long and nearly twice as narrow as inner sepals; pedicels usually longer than hypanthia (sometimes more than twice), glabrous. July.

Mountainous meadows.— Caucasus: E. Transc. Endemic. Described from the vicinity of Bakuriani (Kokhta Mountain). Type in Leningrad.

112. *A. depexa* Juz. apud Grossh. Fl. Kavk. (1934) 326.

Perennial medium-sized or rather large purely or pale green plant; radical leaves 3–9 cm long, 4.5–9.5 cm wide, the lower reniform, the upper suborbicular, slightly undulate or nearly flat, 9-lobed or incompletely 11-lobed; lobes semi-ovate or nearly triangular, ca. one-third as long as radius of leaves, with incision and with 7–8 obliquely semi-ovate or obliquely triangular, obtuse or rather acute teeth at each side, the terminal tooth distinctly smaller; leaves rather densely subappressed-hairy on both sides, ribs beneath appressed-hairy along entire length; petioles of all radical leaves appressed-hairy along entire length; stems 20–25 cm high, slightly longer than petioles of inner leaves, somewhat ascending at base, appressed-hairy for the entire length; cauline leaves rather large. Inflorescence medium-sized, with branches inclined at an acute angle; flowers in loose heads, 3 mm in diameter, greenish; hypanthia broadly conoid, later campanulate, glabrous or with solitary hairs; sepals shorter than hypanthia, broadly ovate, glabrous or with solitary hairs at apex, outer sepals three-fourths as long as the inner; pedicels as long as or shorter than hypanthia, glabrous or with solitary hairs, the lowermost often hairy along entire length. June–July.

Mountainous meadows. — Caucasus: Cisc., E. Transc. Endemic. Described from Bakuriani near Borzhomi, spur of Tskhra-Tskharo Mountain. Type in Leningrad.

113. *A. urceolata* Juz. sp. nova in Addenda IX, p. 472.

384 Perennial medium-sized or rather large somewhat glaucescent-green plant; radical leaves 3–8.5 cm long, 3.5–11 cm wide, broadly reniform, slightly undulate, 9–11-lobed; lobes medium in size or rather long, mostly semi-ovate or narrowly triangular, with distinct incision, with 5–7 large, straight, elongate, obliquely triangular, acute teeth at each side, the terminal tooth nearly as long as the neighboring ones; leaves sparsely appressed-hairy on both sides, beneath sometimes densely so, often hairy above only along wrinkles, rarely sparsely hairy above along margins [and wrinkles] and appressed-hairy beneath only along main ribs and lateral lobes; petioles densely appressed-hairy; stems 9–50 cm long, two to four times longer than petioles of radical leaves, generally arcuately ascending at base or nearly prostrate, appressed-hairy nearly to top, many-leaved; cauline leaves large, semi-orbicular, with deeply cut lobes, stipules deeply, strongly and acutely toothed. Inflorescence often long and rather broad, many-flowered, with long branches; flowers in very loose heads, large, 2–4.5 mm long, 2.5–4 mm wide, pale green; hypanthia elongate, obconoid, glabrous, in lower flowers sparsely hairy; sepals broadly ovate, acute, shorter than hypanthia, glabrous or with solitary hairs at apex, outer sepals distinctly narrower and slightly shorter than inner, ovate-lanceolate; pedicels as long as hypanthia, in lower flowers usually longer, glabrous or the lower sparsely hairy. July. (Plate XXIII, Figure 5).

Grassy slopes, forest edges, pastures and meadows in the subalpine zone. — Caucasus: Cisc. (Karachai Autonomous Region), W. Transc. (Krasnodar District, Krasnaya Polyana; Abkhazia). Endemic. Described from Achishkho Mountain. Type in Leningrad.

114. *A. frondosa* Juz. sp. nova in Addenda IX, p. 473.

Perennial; closely related to *A. urceolata* Juz., but distinguished by its larger stature (in particular, the suberect thick stems), the looser pubescence of the entire plant (stems glabrous in upper part), the subglabrous leaves often glabrous beneath in upper part of main ribs, the shorter and wider leaf lobes with obscure incisions between them (particularly in the cauline leaves), the shorter teeth strongly curved at outer side, the larger cauline leaves with their broad-toothed stipules, and the slightly smaller flowers gathered in dense heads. August.

Grassy places in the subalpine zone, in particular along banks of rivers and streams. — Caucasus: Cisc. (Karachai Autonomous Region). Endemic. Described from the Severnyi Klukhor River gorge (ascent to the Klukhor Pass). Type in Leningrad.

115. *A. daghestanica* Juz. in Delect. semin. Hort. Bot. Acad. Sc. URSS 1934 (1933) 5.

Perennial medium-sized herbaceous green plant; radical leaves 2–5.5 cm long, 2.7–6.3 cm wide, reniform or orbicular-reniform, slightly undulate, 7- or usually 9-lobed; lobes semi-orbicular (in lower leaves) or

semi-ovate (in the rest), with very short incisions between them and 6–8 small, tapering, semi-ovate, obtuse or acute, subequal teeth at each side; lowermost leaves glabrous, silky-appressed-hairy beneath along main ribs and lateral lobes, middle and upper leaves appressed-hairy above at wrinkles and margins, sparsely appressed-hairy beneath also between main ribs [in contrast to lower leaves]; petioles 3–18 cm long, appressed-hairy; stems 20–40 cm high, ascending, longer than petioles of radical leaves, appressed-hairy along the entire length but pubescence looser in inflorescence; cauline leaves rather well-developed. Inflorescence narrow, rather many-flowered, with branches inclined at a very acute angle; flowers 3–3.5 mm in diameter, green; hypanthia elongate, obconoid, 2 mm long, glabrous; sepals shorter than hypanthia (up to 1.5 mm long), glabrous, outer sepals half as long as the inner; pedicels of lowermost flowers sometimes sparsely covered with ascending hairs, the rest glabrous. July,

Mountainous meadows and grassy clearings. — Caucasus: Dag. Endemic. Described from Kamelyuk in S. Dagestan. Type in Leningrad.

116. **A. psilocaula** Juz. sp. nova in Addenda IX, p. 473.

Perennial medium-sized plant, 12–35 cm high; radical leaves reniform or broadly reniform, with subrectangular axil at base, slightly undulate, rather densely hairy above along wrinkles, otherwise glabrous or sparsely hairy, appressed-hairy along main ribs beneath or usually, at least in the middle leaves, glabrous [sic] in lower part of veins, the rest glabrous, dark green; lobes semi-orbicular or shortly and broadly semi-ovate, with 5–7 tapering semi-ovate, long and acute teeth at each side and a shorter terminal tooth; petioles of radical leaves densely appressed-hairy, stipules wine-red; stems distinctly longer than petioles of radical leaves, ascending, somewhat flexuous, intensively wine-red in the sun, appressed-hairy at 1(2) lowermost internodes, otherwise glabrous; cauline leaves small, generally abortive, stipules irregularly strongly toothed. Inflorescence rather broad, many-flowered; flowers in loose heads, up to 3.5 mm long and wide; hypanthia obconoid, glabrous; sepals ovate, acute, nearly as long as hypanthia, glabrous, outer sepals much narrower and slightly shorter than the inner; pedicels as long as hypanthia or two times longer. July–August.

Damp alpine meadows, along banks of mountain streams and brooks. — Caucasus: Cisc. Endemic. Described from the vicinity of Teberda. Type in Leningrad.

Subgroup 2. **Glabratae** Juz. — Leaves glabrous above or hairy only along wrinkles, glabrous beneath between main ribs. Hypanthia glabrous.

Series 1. **Acutidentes** Juz. — Teeth of radical leaves usually acute, the terminal tooth of each lobe as long as the neighboring; stipules of cauline leaves frequently deeply incised-dentate.

117. **A. pilosiplica** Juz. sp. nova in Addenda IX, p. 473.

Perennial medium-sized or rather large gray-green plant; radical leaves 2.4–9.3 cm long, 2.7–10.5 cm wide, orbicular, slightly undulate or

nearly flat, 11-lobed; lobes converging or diverging at margins, arcuate (in lower leaves), semi-orbicular or semi-ovate, with conspicuous incision and 8–11 small, obliquely triangular or obliquely semi-ovate, acute or obtuse teeth at each side, terminal tooth distinctly smaller than the neighboring; leaves hairy above only on wrinkles and lateral lobes, otherwise glabrous, sparsely appressed-hairy beneath along main ribs, glabrous between main ribs, often prominently netted-veined when dry; petioles appressed-hairy; stems 7–30 cm long, shorter than, as long as, or slightly longer than petioles of upper radical leaves, suberect, flexuous, appressed-hairy, glabrescent in inflorescence; cauline leaves reniform, lobes elongate and entire at base, stipules strongly and acutely dentate. Inflorescence few-flowered, spreading in upper part; flowers in rather dense heads, large, ca. 2–3.5 mm long, yellowish green; hypanthia elongate, obconoid, glabrous; sepals shorter than hypanthia, broadly ovate, obtuse, glabrous; outer sepals two-thirds as long and twice as narrow as the inner; pedicels shorter than hypanthia, glabrous. Fr. August.

Damp meadows, shrubby formations. — W. Siberia: Alt. Endemic. Described from the vicinity of Shebalino. Type in Leningrad.

118. *A. flavescens* Buser in Bull. Herb. Boiss. II (1894) 107.

Perennial medium-sized plant, dark yellow when dry; radical leaves 3.5–6 cm long, 4.5–7.3 cm wide, reniform, with broad or rather narrow axil at base, strongly undulate, 9- or incompletely 11-lobed; lobes semi-orbicular or in inner leaves semi-ovate with incision or hardly so (sometimes hidden by overlapping lobes at margins), with 6–7 large teeth at each side; teeth acute in lower leaves, nearly papiliform and obtuse in inner leaves; leaves rather densely appressed-hairy only above along wrinkles and margins, glabrous or with solitary, rarely sparse hairs between wrinkles, thinly appressed-hairy beneath along main ribs (often sparsely so in lower half of ribs), glabrous between ribs, prominently netted-veined when dry; petioles sturdy, appressed-hairy; stems ca. 20 cm high, two times longer than petioles of radical leaves, suberect, sparsely hairy only at the lower 1–2 internodes, otherwise glabrous; sometimes hairy up to top of inflorescence; cauline leaves well-developed, broadly reniform, with semi-ovate lobes. Inflorescence few-flowered; flowers in rather dense heads, large, ca. 3 mm long, yellowish green; hypanthia elongate, obconoid, glabrous; sepals shorter than hypanthia, obtuse, glabrous, outer sepals about three-fourths as long as the inner; pedicels nearly as long as hypanthia, glabrous. June–July.

E. Siberia: Ang.-Say. **Gen. distr.:** reported for Mong. Described from the area between Novyi Udinsk and Irkutsk (Avgustinovich). Type in Geneva (?), cotype in Leningrad.

119. *A. georgica* Juz. apud Grossh., Fl. Kavk. IV (1934) 327.

Perennial medium-sized green plant; radical leaves 1.8–4.5 cm long, 2.5–5.5 cm wide, reniform, 9-lobed; lobes semi-ovate or broadly triangular, with short incision between and 5–7 obliquely semi-ovate, acute teeth at each side, terminal tooth as long as the neighboring; leaves usually sparsely appressed-hairy above only along wrinkles and at margins, very rarely sparsely hairy on the entire surface, densely or loosely appressed-hairy

beneath along main ribs and margins and on lateral lobes; petioles of all leaves densely appressed-hairy; stems 6–20 cm high, erect or slightly arcuately ascending, slightly flexuous, densely subappressed-hairy along the entire length; cauline leaves medium-sized, semi-orbicular, with narrow oblong lobes, stipules well-developed, acutely dentate. Inflorescence narrow, usually few-flowered; flowers in loose but rather adjacent heads, 2–3 mm long, 3.5 mm wide, green; hypanthia obconoid, glabrous or with solitary hairs; sepals shorter than hypanthia, ovate, slightly hairy, outer sepals distinctly shorter and narrower than the inner, glabrous, with solitary hairs at apex; pedicels as long as or shorter than hypanthia, glabrous. July.

Mountains at an altitude of 2,300–2,900 m. — Caucasus: E. Transc. Endemic. Described from Dzhavakhetiya, Mokrye Gory, Leily-Dag Mountain. Type in Leningrad.

120. *A. minusculiflora* Buser in Monit. du Jard. Bot. de Tiflis, livr. 5 (1906) 15.

388 Perennial small plant; radical leaves ca. 2.5 cm long and 3 cm wide, reniform, 9-lobed, flat; lobes wide, semi-orbicular, dentate to base into 6–7 short, acute, subequal teeth at each side; leaves glabrous above, pubescent beneath with loosely appressed slightly silky hairs along main ribs and margins, pale, netted-veined; petioles and stems below (up to second branch) loosely appressed-hairy; stems up to 12 cm high, ascending at base, almost two times longer than petioles of inner radical leaves, somewhat flexuous; cauline leaves small. Inflorescence compressed; flowers in rather dense heads, small, ca. 3 mm in diameter; hypanthia pyriform, glabrous; sepals as long as hypanthia or shorter, obtuse, with solitary hairs only at apex, otherwise glabrous, erect after flowering, outer sepals shorter than the inner; pedicels as long as or shorter than hypanthia, glabrous. July.

Caucasus: W. Transc. (Abkhazia). Endemic. Described from Bzyb Range. Type in Tbilisi.

121. *A. murbeckiana* Buser in Botaniska Notis. (1906) 140–142. — *A. acutidens* H. Lindb. fil. in Acta Soc. Sc. Fenn. XXXVII, No. 10 (1909) 111, p. p. — Ic.: H. Lindb., l. c., tab. 16 (et 17 in statu autumn.?).

Perennial usually medium-sized green or often yellowish green plant; radical leaves 1.5–2 cm long, 7.5–10 cm wide, reniform, flat, 7- or rarely 9-lobed; lobes elongate, semi-orbicular in lower leaves, in the rest semi-ovate or subtriangular or rarely semi-elliptic, without incision or with small usually inconspicuous one (due to lobes overlapping at margins), with 6–9 large, irregular, obliquely semi-ovate or subtriangular, acute or obtuse teeth at each side; leaves glabrous or subglabrous above, appressed-hairy beneath along main ribs, sometimes glabrescent, in lower part of leaves, otherwise generally sparsely hairy only along margins, with translucent network of veins; petioles of radical leaves and lower part of stems (for three-fourths) appressed-hairy; stems arcuately ascending at base or erect, often reddening in the sun. Inflorescence narrow or rather wide, frequently poor, few-flowered; flowers in loose, sometimes confluent heads, greenish or yellowish green; hypanthia obconoid, glabrous; sepals broadly ovate, as long as hypanthia or slightly shorter, glabrous, outer sepals

subequal or half as long and almost three times as narrow as the inner; pedicels varying in length, glabrous. June–September.

Meadows, forest edges. — Arctic: Arc. Eur., Arc. Sib.; European part: Kar.-Lap. (Kirovsk and others), Dv.-Pech. (Mezen and others), V.-Kama (Urals); W. Siberia: Ob (Tyumen), Alt.; Centr. Asia: Dzu.-Tarb. **Gen. distr.:** Scand. Described from Sweden. Type probably in Stockholm.

122. *A. nebulosa* G. Sam. in Svensk Bot. Tidskr. Bd. 34 (1940) 144. — *A. baltica* G. Sam. ex Juz. apud Majewski, Fl. Sredn. pol. Evr. tsch. SSSR, ed. VII (1940) 449. — *A. zamelisia* Snarskis in Mém. fac. sc. Univers. Kaunas XIII (1939) 241 sine diagn. lat. — *A. acatidens* Lindb. fil. in Acta Soc. Sc. Fenn. t. XXXVII, No. 10 (1909) 11 p. p., non Buser. — *A. wichuræ* auct. Fl. URSS, non Bus. — Exs.: HFR No. 2013.

389 Perennial medium-sized or rather large green or yellow-green plant; radical leaves 1.5–11 cm long, 2–12 cm wide, orbicular-reniform or orbicular, flat or the inner concave when alive, usually 9-lobed; lobes usually rather short, orbicular, rarely longer and narrower, with rather deep incision between them and 6–9 irregular, acute teeth at each side, strongly increasing in size toward apex; leaves glabrous above or slightly hairy along wrinkles, densely appressed-hairy beneath along lateral lobes and main ribs, glabrous between them; petioles of radical leaves and lower part of stems densely appressed-hairy; stems arcuately ascending or nearly prostrate, flexuous, pale; cauline leaves with semi-orbicular or semi-ovate lobes entire at base, stipules deeply incised and strongly acute-toothed. Inflorescence broad, many-branched, spreading above, many-flowered; flowers in numerous loose heads, greenish; hypanthia obconoid, glabrous; outer sepals slightly shorter than the inner; pedicels as long as or longer than hypanthia, glabrous. June–July.

Meadows, shrubby formations, forest edges. — European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., Balt., U. Dnp., U. V., V.-Kama, V.-Don; W. Siberia: Ob. **Gen. distr.:** Scand. Described from Sweden. Type in Stockholm.

123. *A. cartalinica* Juz. apud Grossh., Fl. Kavk. IV (1934) 327.

390 Perennial medium-sized green plant; radical leaves 2.5–5 cm long, 3–6 mm wide, reniform, 9-lobed; lobes arcuate or broadly semi-ovate, with shallow but conspicuous incision and 6–8 obliquely semi-ovate or obliquely triangular acute teeth at each side, terminal tooth somewhat narrower than the neighboring ones but just as long; leaves glabrous above or slightly hairy along margins, densely appressed-hairy beneath along main ribs, margins and lower lobes, glabrous between ribs; petioles of all leaves appressed-hairy; stems 7–22 cm long, arcuately ascending, often flexuous, weak, loosely appressed-hairy at the 3–4 lower internodes, otherwise glabrous or nearly so; cauline leaves small, semi-orbicular, stipules rather deeply acute-toothed. Inflorescence rather broad, spreading, many-flowered; flowers in loose heads, ca. 2–3 mm long and wide, greenish; hypanthia narrowly obconoid, glabrous or with solitary hairs; sepals shorter than hypanthia, ovate, acute or with solitary hairs at apex; outer sepals hardly as long and distinctly narrower than the inner, glabrous; pedicels as long as or slightly longer than hypanthia, glabrous. June–July.

Forests and subalpine meadows. — Caucasus: E. Transc. Endemic. Described from Bakuriani. Type in Leningrad.

124. *A. psiloneura* Juz. in Acta Inst. Bot. Acad. Sc. URSS, ser. I, fasc. 1 (1933) 129.

Perennial medium-sized or rather large glaucous-green plant; radical leaves 3.5–10 cm long, 4–11.5 cm wide, reniform or orbicular-reniform, with rather broad or narrow axil at base, slightly undulate, 7- or 9-lobed; lobes short, arcuate in inner leaves, semi-orbicular in middle leaves, generally obtuse at apex, narrowly subtrapeziform in uppermost leaves, with short but distinct incision and 7–10 small, short, rather acute teeth at each side, terminal tooth nearly as long as the neighboring; leaves usually slightly hairy above on wrinkles and at margins, otherwise glabrous, sparsely hairy beneath on lateral lobes, with main ribs glabrous or with solitary hairs in lower part and appressed-hairy in upper part; petioles sparsely appressed-hairy; stems 14–40 cm long, as long as or slightly longer than petioles of inner radical leaves, suberect, slightly flexuous, loosely appressed-hairy to middle (up to the first branch), glabrous above; cauline leaves medium-sized, shortly-lobed. Inflorescence more or less broad or many-flowered; flowers in loose heads, small, 1.5–3 mm long and wide, green, glabrous; hypanthia obconoid, narrowly campanulate in fruit; sepals glabrous, of normal (for the section) size; pedicels as long as hypanthia or longer, glabrous. June.

Shady places. — European part: U. V. Endemic. Described from Zaluch'e, Vyshnii Volochok District, Kalinin Region. Type and cotype in Leningrad.

Series 2. *Obtusae* Juz. — Teeth of radical leaves obtuse, terminal tooth distinctly smaller than the neighboring; stipules of cauline leaves strikingly deeply dentate.

125. *A. obtusa* Buser, Alchim. Valaisannes (1894) 22; H. Lindb. in Acta Soc. Sc. Fenn. XXXVII, No. 10 (1919) 125. — Ic.: H. Lindb., l. c., tab. 19. — Exs.: Baenitz, Herb. Eur. No. 8264; Pl. Finl. exs. No. 1217; Hayek, Fl. Stir. exs. No. 998, 999.

391 Perennial medium-sized or rather large glaucous-green plant; radical leaves 3–11 cm long, 4–13 cm wide, reniform or orbicular-reniform, 9- or 11-lobed; lobes short, orbicular, with (6)7–8(9) short, broad, rounded teeth at each side and very small (much smaller than the neighboring) nearly semi-orbicular terminal tooth; leaves glabrous above, appressed-hairy beneath and often only along main ribs, sometimes appressed-hairy also on the lateral lobes; petioles of radical leaves more or less densely appressed-hairy, in uppermost leaves sometimes subglabrous; stems 8–60 cm high, almost two times longer than petioles of radical leaves, arcuately ascending at base, suberect, delicate, appressed-hairy up to second or third branch, otherwise glabrous; cauline leaves well-developed. Inflorescence narrow and long; flowers in rather dense heads, ca. 3 mm long, 3–4 mm wide, yellowish; hypanthia campanulate, glabrous; sepals distinctly shorter than hypanthia, wide, obtuse, glabrous or in lower flowers with solitary hairs at apex, outer sepals short, glabrous; pedicels short, completely glabrous. June–July.

Meadows, shrubby formations, springs. — European part: Lad.-Ilm., V.-Kama (Urals). Centr. Asia: Dzu.-Tarb., Tien Shan. **Gen. distr.:** Scand., Centr. Eur. Described from Switzerland. Type in Geneva.

126. **A. pseudo-cartalinica** Juz. apud Grossh. Fl. Kavk. IV (1934) 327.

Perennial medium-sized glaucous-green plant; radical leaves 3–7.5 cm long, 3.5–9.5 cm wide, broadly reniform, 7- or usually 9-lobed; lobes semi-orbicular, semi-ovate or semi-elliptic without incision, with 5–8 semi-ovate, obtuse teeth at each side, terminal tooth small (distinctly shorter than the neighboring); leaves usually glabrous above or slightly appressed-hairy only at upper lobe, usually densely appressed-hairy beneath along main ribs; petioles of lower radical leaves usually completely glabrous, the rest appressed-hairy; stems 12–35 cm long, arcuately ascending, slightly flexuous, weak, appressed-hairy at the 2–3 lower internodes, otherwise glabrous; cauline leaves small, semi-orbicular, stipules large, acutely toothed. Inflorescence rather broad and spreading but few-flowered; flowers in rather loose heads, ca. 2–2.5 mm long, 2.5–4 mm wide, yellowish-greenish at anthesis; hypanthia obconical, campanulate in fruit, glabrous; sepals as long as or slightly shorter than hypanthia, broadly ovate, acute, glabrous, outer sepals shorter and distinctly narrower than the inner, glabrous; pedicels as long as or slightly longer than hypanthia, glabrous. July.

Forest meadows, beech forests, subalpine meadows. — Caucasus: E. and W. Transc. Endemic. Described from Bakuriani. Type in Leningrad.

127. **A. alpestris** F. W. Schmidt, Fl. Boëmica inchoata, cent. III (1794) 88; Buser apud Magnier, Scrin. fl. select. (1893) 282 et alibi; H. Lindb. in Acta Soc. Sc. Fenn. XXXVII, No. 10 (1909) 127. — *A. glabra* Neygenfind, Enchirid. bot. Siles. (1821) 67, non Poir. — *A. glabrata* Tausch ex Steud., Nomencl. ed. 2, 1 (1840) 48. — *A. psilophylla* Borbas in Oest. bot. Zeitschr. XLI (1891) 424. — ? *A. perglabra* Alech. in Gavoruch., Fl. Ural. (1937) 531. — *A. vulgaris* var. *glabra* Wimm. et Grab., Fl. Siles. I (1830) 135. — *A. vulgaris* α *glabrata* Wimmer, Fl. Sohles. I (1844) 143. — Ic.: H. Lindb., l. c. tab. 20 (phot.). — Exs.: Fl. exs. austro-hung. No. 817; Callier, Fl. siles, exs. No. 1056; Baenitz, Herb. Europ. No. 8219, 8220, 8221, 8222; Hofmann, Pl. crit. Saxon. f. XIII, 310; Pl. Finl. exs. No. 1218.

Perennial medium-sized or rather large pale green plant; radical leaves 3–12 cm long, 3.5–15 cm wide, reniform or sometimes orbicular-reniform, undulate, usually 9-lobed; lobes rather long, semi-ovate or semi-elliptic, with (6)7–9(10) obliquely ovate, strongly asymmetrical, markedly convex outside (usually in the lower part), acute (in lower leaves) or obtuse (in upper leaves) teeth at each side, the terminal very small, suborbicular, constricted at base; leaves glabrous above or hairy only along margins, sometimes with solitary hairs along wrinkles, appressed-hairy beneath only in lower part of main ribs; petioles of lower radical leaves glabrous, the upper (inner) sparsely or loosely appressed-hairy; stems 4–60 cm high, delicate, arcuately ascending to suberect, densely appressed-hairy only at the first (reduced) internode, sparsely hairy at second internode, glabrous or with solitary hairs above; cauline leaves well-developed. Inflorescence long and rather

narrow, with ascending to suberect branches; flowers 2.5–3.5 mm long, 4–4.5 mm wide, yellowish green, glabrous in all parts; hypanthia campanulate; pedicels 1–3 mm long, glabrous. June–July.

Damp meadows and other grassy places, shrubby formations, forest edges, gardens. — European part: Lad.-Ilm. (Karelian Isthmus, vicinity of Leningrad), Urals (C.). **Gen. distr.:** Scand. (S. Finland, S. and C. Sweden, Norway), Centr. Eur., Atl. Eur., Med. (Spain, Italy), particularly in the mountainous countries (subalpine and alpine zone). Described from Bohemia.

393 Section 3. **CALICINAE** Buser in Bull. Soc. dauph. Sér. 2 (1892) 104; idem in Jaccard, Cat. fl. Valais. (1895) 113; idem in Bull. Herb. Boiss., IV (1896) 758.*— Mountainous plants varying in dimensions and habit, usually with erect stems; leaves often slightly pubescent, rarely villous, rather thin but rigid, with translucent lateral veins often prominent beneath when dry; stipules of dried radical leaves brown, scarious; stipules of cauline leaves irregularly incised-dentate. Inflorescence loose, branches often elongate; flowers relatively large, usually yellowish or yellow, long-pedicelled; outer and inner sepals acutely, usually equal in length and width, usually shorter than hypanthia, often horizontally spreading in fruit, rigid; ripe fruit very often protruding one-third to two-thirds above the broad disk.

Note. Notwithstanding the characteristic structure of the flowers, inherent in the typical species of this section, the border between it and the preceding section is not easily defined in view of the occurrence of a number of taxa rather intermediate in character. Such are, for example, *A. hirtipedicellata* Juz. and *A. capillacea* Juz. ined. (see Note to *A. oxysepala*) of the series *Oxysepalae* Juz. and many species of the series *Subsplendentes* Juz.

Series 1. **Oxysepalae** Juz.— Large or medium-sized plant; stem and petioles of radical leaves with horizontally spreading or, rarely, ascending hairs; leaves densely hairy on both sides or only beneath.

Economic importance. Most species of this series are ornamental; however, very few have been cultivated. Of the Soviet species only *A. speciosa* Bus. and of the species outside the Soviet Union only *A. mollis* Bus. (*A. pilosissima* Simonk.) have been cultivated.

128. *A. speciosa* Buser apud Magnier, *Scrinia fl. selectae* (1893) 281.— Exs.: Dörfler, Herb. norm. 4658.

Perennial large or extremely large grayish-green plant; radical leaves 5–12 cm long, 6.5–14 cm wide, orbicular-reniform, with rectangular or narrow axil at base; lobes semi-ovate or semi-elliptic, often elongate, one-third to two-fifths as long as radius of leaves, with deep incision, with 6–10 large, unequal, obliquely triangular, acute teeth at each side; leaves densely appressed hairy on both sides, loosely appressed-hairy beneath

* The work by W. Rothmaler, Systematik u. Geographie der Subsection *Calycanthum* der Gattung *Alchemilla* L., Repert. sp. nov. regni veget., Beihefte Bd. C, 1938, pp. 59–93, in which several new Caucasian species of section *Calicinae* Bus. (= subsection *Calycanthum* Rothm.) were published, was received in Leningrad only in August 1940 (sic), when this volume of the "Flora" was already at the printer's, and thus could not be taken into consideration.

along main ribs, with prominent lateral veins when dry; petioles and stems densely covered throughout with ascending hairs; stems 25–50 cm long, thick, erect, sometimes flexuous. Inflorescence broad, spreading, many-branched, very many-flowered; flowers in loose heads, 2–3 mm long, 2–4 mm wide; hypanthia short, ca. 1 mm long, obconoid, subglobose in fruit, densely hairy; sepals distinctly longer than hypanthia, ovate, acute, the outer sepals as long as the inner but narrower, sparsely hairy like inner sepals; pedicels longer than hypanthia (lower pedicels many times longer), densely covered throughout with ascending hairs. July.

Mountains. — Caucasus: Cisc., E. Transc. Endemic? Described from a cultivated specimen, apparently from the Caucasus. Type in Geneva.

194 129. *A. holotricha* Juz. spec. nov. in Addenda IX, p. 474. — ? *A. acutiloba* var. *hirsutiflora* Buser in Monit. Jard. Bot. Tifl. 5 (1906) 7 (non *A. hirsutiflora* Rothm.).

Perennial medium-sized or rather large grayish-green plant with thick rhizome; radical leaves 2–12 cm long, 2.8–13 cm wide, orbicular-reniform, flat or slightly undulate, with lobes overlapping at margins; lobes short, one-fourth to one-third as long as leaf radius, arcuate or broadly semi-ovate, nearly without incision, with 5–8 small, short, irregular, broadly semi-ovate, asymmetrical, obtuse or acute teeth, the upper — the larger; leaves densely hairy above, very densely beneath, densely covered along main ribs with ascending hairs, with distinctly protruding lateral nerves when dry; petioles of radical leaves with very densely spreading or often ascending hairs; stems 8–60 cm long, usually firm, suberect, flexuous, pubescent throughout like petioles; cauline leaves rather well-developed but often small, reniform, with short arcuate lobes. Inflorescence narrow; flowers rather small, usually not more than 3 mm long and wide (up to 4 mm wide in fruit), yellowish; hypanthia 1 mm long, spreading-hairy; sepals ovate, acute, two times longer than hypanthia, sparsely hairy, stellately patent in fruit; outer sepals as long and as wide as the inner; pedicels more than three times longer than hypanthia, spreading-hairy throughout. July–August. (Plate XXIV, Figure 2).

Banks of mountain streams and brooks, grassy slopes. Caucasus: Cisc., E. and W. Transc. Endemic. Described from the vicinity of Teberda (ascent to Klukhor Pass). Type in Leningrad.

130. *A. smirnovii* Juz. spec. nov. in Addenda IX, p. 475.

Perennial; pubescent nearly like the preceding but readily distinguished from it by the more delicate appearance, the elongate, acutely angular, acutely toothed lobes of radical leaves, and by the smaller flowers. July–August.

Grassy mountain slopes. — Caucasus: S. Transc. Endemic. Described from Lake Sevan District. Type in Leningrad.

131. *A. hirtipedicellata* Juz. apud Grossh., Fl. Kavk. IV (1934) 327.

195 Perennial medium-sized or rather large dark grayish green plant; radical leaves 2.5–9 cm long, 3.2–10 cm wide, reniform or orbicular reniform, slightly undulate, usually 9-lobed; lobes semi-orbicular or shortly semi-ovate with very short incision and 6–8 short, broad, semi-ovate or papilliform, obtuse or acute teeth at each side; lowermost leaves

hairy only beneath along main ribs, the rest rather densely hairy on both sides; petioles 2–30 cm long, like stems densely spreading-hairy throughout; stems ascending at base to suberect, longer than petioles of inner radical leaves (sometimes two times longer); cauline leaves rather large, with arcuate or semi-orbicular lobes. Inflorescence narrow or rather large, with arcuate or semi-orbicular lobes. Inflorescence narrow or rather broad, patent; flowers in loose heads, small, ca. 2.5 mm long, 3.5 mm wide, yellowish or greenish; hypanthia obconoid, ca. 1 mm long, covered in lower part with horizontally spreading hairs, glabrescent above; sepals slightly longer than hypanthia (Ca. 1.3 mm long), glabrous, outer sepals nearly as long as the inner; pedicels longer than hypanthia (sometimes two times longer), spreading-hairy throughout length. July–August.

Meadows, forest edges. — Caucasus: E. and W. Transc. Endemic. Described from Bakuriani, near Borzhomi. Type in Leningrad.

132. *A. oxysepala* Juz. in Not. Syst. Herb. Inst. Bot. Acad. Sc. URSS, t. VIII, fasc. 1–2 (1938) 4, in adnot. — *A. acutiloba* Stev. in Bull. Soc. Nat. Mosc. XXIX (1856) 173 p. p., non Opiz; Buser in Magnier, *Scrinia fl. sel.* (1893) 280; idem in Bull. Herb. Boiss. IV (1896) 758 p. p. — *A. acutiloba* α *pontica* Buser in Bull. Herb. Boiss., l. c., 759 saltem p. p. — *A. vulgaris* β *major* Boiss. et Buhse in Nouv. Mém. Soc. Nat. Mosc. XII (1860) 81; Boiss., *Fl. Or.* II (1872) 730 p. p.

Perennial large or very large, green, somewhat glaucescent plant; radical leaves 6.5–15.5 cm long, 7–17 cm wide, reniform or orbicular-reniform, 9–11-lobed, with more or less broad axil at base; lobes short, one-fifth as long as leaf radius, arcuate or semi-orbicular, often semi-elliptic, in inner leaves, dentate to base, with 6–9 large, broad, tapering, triangular-semi-ovate, acuminate, subcordate [?] teeth; all leaves sparse-hairy above, rather densely hairy beneath, prominently netted-veined; petioles of radical leaves and lower part of stems densely spreading-hairy; stems 35–80 cm long, thick, straight or slightly flexuous, sometimes glabrous in inflorescence; cauline leaves well-developed, strong, numerous. Inflorescence broad, loose, many-branched; flowers in very loose heads, large, 2.5–3.5 mm long, 4.5–6.5 mm wide, yellow; hypanthia short, ca. 1 mm long, obconoid, glabrous or usually spreading-hairy at base; sepals one and a half times longer than hypanthia, broadly ovate, acute, outer sepals frequently two times longer than hypanthium, ovate or elliptic, like inner sepals with 3 distinct nerves; pedicels distinctly longer than hypanthia, glabrous. July–September. (Plate XXIV, Figure 1).

396 Meadows and shrubby formations in the alpine and forest zones of mountains, forest edges, banks of streams. — Caucasus: Cisc., Dag., W., E., and S. Transc. **Gen. distr.:** Iran. Described from the Caucasus. Type in Leningrad.

Note 1. A polymorphic species, in need of further study. It is particularly variable in size of the flower. We tried once to distinguish the larger-flowered Iranian form, which we called *A. iranica* Juz. in sched., from the typical Caucasian *A. oxysepala*, established by us, which corresponds to *A. acutiloba* var. *pontica* Bus., and is characterized by its relatively small flowers; in the Iranian form the radical leaves are pale green, thinner, broadly reniform in shape, with very broad open axil

at base, short triangular lobes, strongly prominent network of veins on both sides in dry plants, and with very asymmetrical acuminate teeth with strongly curved outer margin.

Our specimens from Talysh may be referred to *A. iranica* and also, apparently, the paratype *A. acutiloba* Stev., collected by Szovits in the province of Khoi, Azerbaidzhan.

The characters of both forms so overlap that it is very difficult to distinguish them; many of the specimens could thus hardly be referred to one or the other of these forms. In particular, the type *A. vulgaris* var. major Boiss., collected by Buhse in northern Iran (Iri), much resembles *A. oxysepala* in all its features, but is distinguished by its exceptionally large flowers. There are specimens from the Caucasus which we are inclined to refer to *A. oxysepala* that are hardly distinguishable from Buhse's plant.

Note 2. P. Panyutin collected a unique form in the Bzyb Range (forest at the ascent on Nosikho) named *A. capillacea* Juz. in Addenda IX, p. 475. In general appearance and pubescence it could be a miniature *A. oxysepala*, with delicate stem and nearly filiform branches; its flowers, however, are exceptionally small, 1.5–2 mm long, 2–2.5 mm wide, greenish; the hypanthia (compared with sepals) are rather large for section *Calicinae*.

133. *A. porrectidens* Juz. sp. nov. in Addenda IX, p. 475.

Perennial, resembling *A. oxysepala* Juz., from which it is largely distinguished by the more orbicular and flatter radical leaves, often densely hairy above, the triangular-semi-ovate lobes, the always strongly elongate, straight and acute teeth, the narrow rather few-flowered inflorescence with branches inclined at a very sharp angle, the larger flowers with hypanthia densely hairy in lower part (pedicels of lower flowers in a head often sparsely hairy). August.

Banks of mountainous streams and brooks. — Caucasus: Cisc., E. Transc.? Endemic. Described from the vicinity of Teberda, at the ascent to Klukhor Pass. Type in Leningrad.

134. *A. pseudomollis* Juz. sp. n. in Addenda IX, p. 475.

Perennial, resembling *A. oxysepala* Juz. in appearance, shape of leaves, lobes and serration, but easily distinguished from it by the smaller dimensions of the entire plant, the glaucescent-green color of the leaves, the sometimes stronger pubescence of the entire plant, particularly stems which are densely hairy to the uppermost branches, and also by the pubescence of pedicels, the lower of which are often hairy (the upper glabrous or slightly hairy) and of hypanthia which vary from rather densely hairy in lower flowers to glabrous, or with solitary hairs in upper flowers; inflorescence narrow and few-flowered as compared with *A. oxysepala*, its branches inclined at an acute angle; sepals obtuse, the outer often sparsely hairy. July.

Subalpine meadows, pastures, shrubby formations, banks of mountainous streams. — Caucasus: W. Trans. Endemic. Described from Aibgi. Type in Leningrad.

135. *A. laeta* Juz. sp. n. in Addenda IX, p. 476.

Perennial medium-sized or rather large green plant; radical leaves 4–9 cm long, 5–10.5 cm wide, orbicular-reniform or suborbicular, mostly

398 with narrow axil at base, flat, 9–11-lobed; lobes semi-ovate in lower leaves and triangular in upper leaves, one-third to two-fifths as long as radius of leaves, with 6–11 large, obliquely triangular, acute teeth, often convex at outer side, the upper the larger, terminal tooth much shorter than the neighboring; leaves glabrous above (only the lower usually hairy along wrinkles), rather densely appressed-hairy beneath, main ribs with ascending hairs, indurate, prominently netted-veined; petioles eccentric [?], densely covered with ascending hairs, stipules turning brown at anthesis; stems 1–2, 23–30 cm long, almost two times longer than petioles of upper radical leaves, strong, erect, pubescent – like petioles – just above middle; cauline leaves well-developed, large, broadly reniform, with strongly and acutely dentate stipules, usually with triangular lobes, upper leaves with prominent long and acute terminal tooth. Inflorescence narrow, branches inclined at an acute angle, not too many-flowered; flowers in loose heads large, 3.5–5 mm in diameter, yellow; hypanthia short-obconoid, glabrous; sepals distinctly (nearly twice) longer than hypanthium, narrowly ovate-triangular, very acute, glabrous, stellately patent in fruit, outer sepals as long as the inner but much narrower; pedicels many times longer than hypanthia, thin, glabrous. July–August.

Banks of streams and brooks in the alpine and subalpine zones. – Caucasus: Cisc. (Karachai), E. Trans. (S. Osetia). Endemic. Described from the vicinity of Teberda, Azgek River Gorge. Type in Leningrad.

136. *A. circassica* Juz. sp. nov. in Addenda IX, p. 476.

Perennial; generally similar to *A. pseudomollis* Juz., from which it is particularly distinguished by the subglabrous upper surface of leaves; outer (lower) leaves in the rosettes more or less pubescent on upper surface (often only on wrinkles); stems (in upper part), pedicels and hypanthia glabrous; petioles of radical leaves and lower part of stem covered with somewhat ascending hairs. Of the species characterized by glabrous upper leaves in the group *Oxysepalae* Juz., *A. circassica* is most reminiscent of *A. stellulata* Juz., from which it is distinguished by the outer radical leaves being somewhat pubescent at apex, the inclination of hairs on petioles and stems, the smaller dimensions of the entire plant, and especially by the unusually distinct glaucous tinge of the leaves and their slightly rounded lobes. July.

Subalpine meadows, pastures, grassy slopes. – Caucasus: W. Transc. Endemic. Described from Aibgi. Type in Leningrad.

137. *A. epipsila* Juz. in Grossh., Fl. Kavk. IV (1934) 328.

Perennial medium-sized or large green plant; rhizome robust; radical leaves 1.8–7 cm long, 2.5–11 cm wide, broadly reniform, flat, 7- or usually 9-lobed, with very broad axil at base; lobes short, one-fifth to one-sixth as long as radius, arcuate or rarely (in inner leaves) semi-orbicular, with short incision between or dentate to base, with 4–7 large, short, irregular, broadly ovate, slightly concave above, often obtuse, rarely acute teeth; leaves completely glabrous above, sparsely or rather densely hairy beneath, main ribs densely covered with ascending hairs, coarse, with prominent lateral ribs in dry plant; petioles of radical leaves spreading-hairy; stems 24–50 cm long, rather delicate, erect or arcuately ascending at base, flexuous, firm,

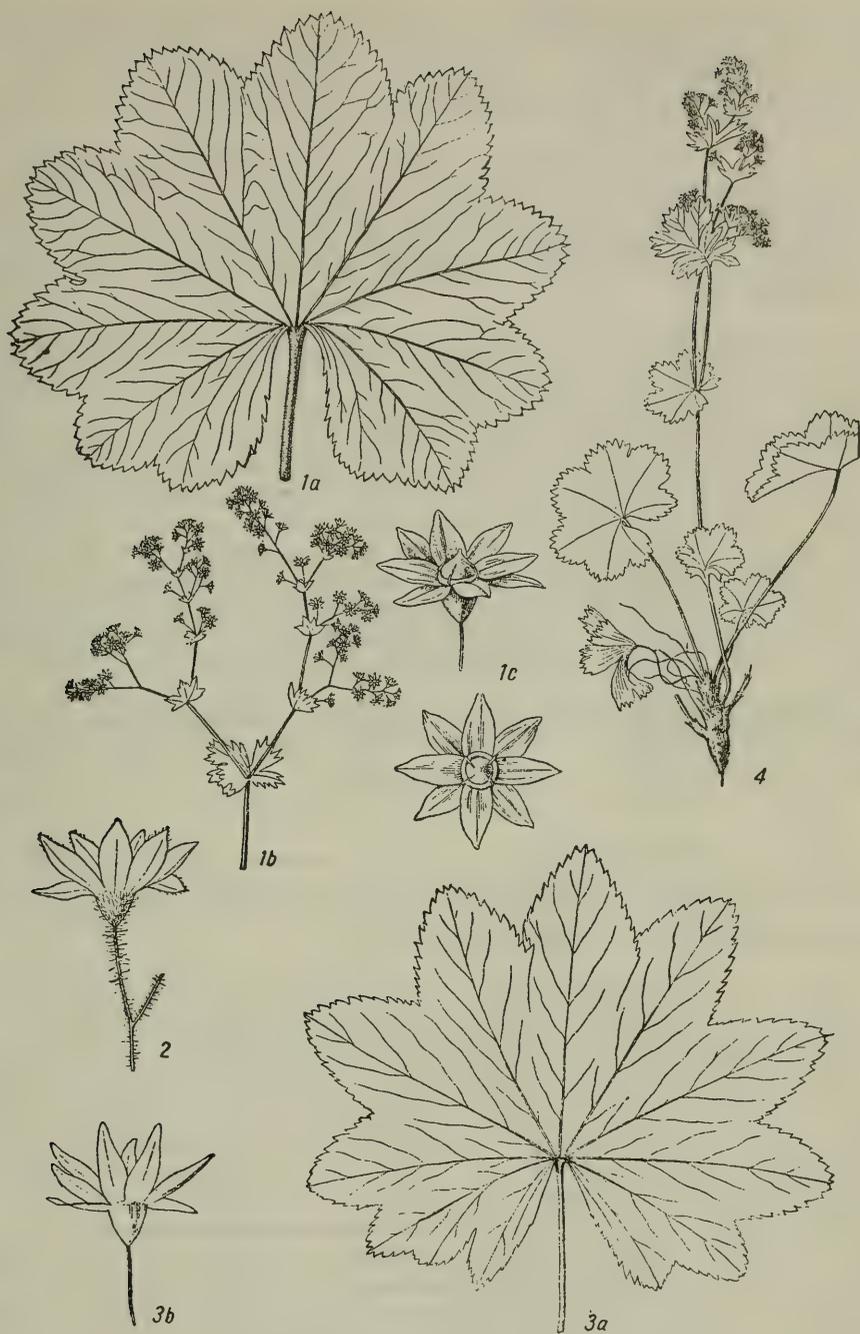


PLATE XXIV. 1 - *Alchimilla oxysepala* Juz., a) leaf, b) part of inflorescence, c) flower; 2 - *A. holotricha* Juz., flower; 3 - *A. tredecimloba* Bus., a) leaf, b) flower; 4 - *A. retinervis* Bus., general view.

401 spreading-hairy in lower part, glabrous above; cauline leaves well-developed, large, nearly semi-orbicular, with very short or nearly truncate lobes, the lower leaves long-petioled. Inflorescence broad, very loose; flowers large, 1.5–3 mm long, 2–4 mm wide, yellowish; hypanthia short, 0.5–1 mm long, obconoid, glabrous, sometimes with few hairs at base; sepals almost two times longer than hypanthia, ovate-lanceolate, acute, glabrous, stellately patent in fruit; outer sepals as long as the inner but narrower; pedicels several times longer than hypanthia. July–August.

Stony mountain slopes, banks of mountain streams and brooks. — Caucasus: E. and S. Transc. Endemic. Described from Armenia. Type in Leningrad.

138. *A. stellulata* Juz. in Not. Syst. ex Herb. Inst. Bot. Acad. Sc. URSS VIII, fasc. 1–2 (1938) 4, in adnot. — ? *A. acutiloba* Stev. in Bull. Soc. Nat. Mosc. XXIX (1856) 173 p. p., non Opiz.

Perennial; very similar to the preceding species (i. e., *A. epipsila*), distinguished from it by the orbicular-reniform (and not broadly reniform), 9–11 (and not 7–9) radical leaf lobes, that are somewhat longer, rarely semi-orbicular or semi-ovate (and not nearly always arcuate) and with 6–9 (and not 4–7) slightly smaller acute teeth at each side, the somewhat smaller cauline leaves with more distinct lobes, the often short-triangular, always glabrous hypanthia [?] in upper leaves [sic], slightly broader and shorter sepals in middle leaves [sic] (this character is not always distinct); fruiting sepals horizontally spreading, forming a delicate star. July–August.

Subalpine zone, banks of rivers and streams, damp rocky places, forest edges and meadow slopes. — Caucasus: Cisc. Endemic. Described from the vicinity of Teberda. Type in Leningrad.

Series 2. *Subsplendentes* Juz. — Medium-sized or small plant with appressed, very rarely ascending hairs on cauline leaves and petioles of radical leaves; leaves glabrous above or hairy only along wrinkles, appressed hairy (often slightly silky) beneath.

139. *A. sevagensis* Juz. apud Grossh., Fl. Kavk. IV (1934) 328.

402 Perennial medium-sized green plant; radical leaves 2–4 cm long, 2.5–4.5 cm wide, reniform or orbicular-reniform, usually with rectangular or in some leaves very narrow axil at base, flat, 7-lobed; lobes short and wide, arcuate or semi-orbicular, with slight incision and 5–7 rather large, semi-elliptic or semi-ovate, elongate, obtuse or rather acute teeth at each side; leaves densely covered beneath (especially in lower leaves) with appressed, slightly silky hairs, glabrous above or sparsely hairy along wrinkles; petioles densely covered with rather ascending to nearly horizontally spreading hairs, often reddening; stems 8–16 cm long, firm, erect, sparsely covered with ascending hairs; cauline leaves slightly developed, stipules acutely large-toothed. Inflorescence compressed, poor; flowers in loose, often confluent heads, large, 2.5–4 mm long, 3–5 mm wide, yellowish; hypanthia long, obconoid or pyriform, glabrous, or with few hairs at base; sepals as long as hypanthia or slightly longer, narrowly ovate,

hairy at apex, outer sepals nearly as long as the inner but twice as narrow, glabrous; pedicels 2–4 mm long, longer than hypanthia, covered with ascending hairs (only pedicels of uppermost flowers glabrescent). July.

Mountains. — Caucasus: S. Transc. (Nor-Bayazet District). Endemic. Described from Keity-Yanykh, Gezeldar Mountain. Type in Leningrad.

140. *A. grandidens* Juz. sp. nova in Addenda IX, p. 476.

Perennial small rarely medium-sized pale or yellowish green plant; rhizome thin; radical leaves 1.5–5.5 cm long, 2–7 cm wide, orbicular-reniform or sometimes orbicular, flat, 7- or incompletely 9-lobed; lobes arcuate or semi-orbicular, with conspicuous incision and 4–6 very large, papilliform or elongate triangular-semi-ovate, obtuse or acute teeth; leaves glabrous above, hairy beneath on lateral lobes and along margins and main ribs, only middle leaves sometimes sparsely hairy between main ribs on the entire surface, coriaceous, prominently netted-veined beneath when dry; petioles densely covered with ascending hairs, often reddening in the sun; stems few, 10–25 cm long, two to three times longer than petioles of radical leaves, usually erect, flexuous, firm, pubescent like petioles, glabrescent in inflorescence; cauline leaves slightly developed, semi-orbicular, with short lobes and very large- and acute-toothed stipules. Inflorescence narrow or rather broad, with branches inclined at an acute angle; flowers in loose heads, large, 2–3 mm long, 2.5–4 mm wide, yellowish; hypanthia obconoid or campanulate, rather densely covered in lower part with ascending hairs, becoming glabrous above; sepals slightly longer than hypanthium, broadly ovate, obtuse, with few hairs at apex, outer sepals as long as the inner but narrower, acute, glabrous; pedicels distinctly (2–4 times) longer than hypanthia, with sparse or few subappressed hairs in lower flowers, glabrous in upper flowers. June–August.

403 Rocky and stony places in alpine zone. — Caucasus: E. Transc. Endemic. Described from Tskhra-Tskharo Mountains near Bakuriani. Type and cotype in Leningrad.

141. *A. divaricans* Buser in Monit. du Jard. Bot. de Tiflis, livr. 5 (1906) 8.

Perennial medium-sized plant; radical leaves 6–7 cm long, 7–8 cm wide, suborbicular, 9-lobed or incompletely 11-lobed; lobes wide and short, arcuate or semi-orbicular, broadly triangular in innermost leaves, obtuse at apex, dentate nearly to base, with 7–8 medium-sized, unequal, subtriangular, acute teeth; leaves firm, glabrous above, uniformly hairy beneath on the entire surface but not silky, prominently netted-veined; petioles of radical leaves 12–20 cm long, covered along entire length with appressed or subappressed hairs; stems ca. 40 cm long, delicate, slightly curved, pubescent like petioles of radical leaves; cauline leaves large, with orbicular, incised lobes. Inflorescence loose, spreading, with elongate, suberect branches; flowers 2.5–3.5 mm long, 4.5–5 mm wide, appressed-hairy; hypanthia longer than sepals; sepals large, acute, yellowish, outer sepals as long as the inner or slightly longer; pedicels longer than hypanthia (usually twice), appressed-hairy. Time of flowering unknown.

Caucasus: Cisc. Endemic. Described from the vicinity of Kislovodsk. Type in Tbilisi.

142. *A. subsplendens* Buser in Monit. du Jard. Bot. de Tiflis, livr. 5 (1903) 13.

Perennial robust medium-sized plant; radical leaves 6–7 cm long and nearly as wide, orbicular-reniform or orbicular, with or without narrow axil at base, flat, 9- or incompletely 10-lobed; lobes semi-orbicular or semi-elliptic, dentate to base with 7 small, equal, papilliform teeth at each side; leaves indurate, glabrous above, densely appressed-silky-hairy beneath along main ribs, glabrous (lower leaves) between main ribs or appressed-hairy on the entire surface, slightly silky-shiny (upper leaves); petioles thick, silky-hairy; stems firm, up to 22 cm long, erect, silky-appressed-hairy above; cauline leaves medium-sized, with incision between lobes. Inflorescence rather narrow and compact; flowers ca. 3 mm long, 4 mm wide, yellowish; hypanthia obconoid, as long as sepals, in lower flowers silky-hairy especially at base, in upper flowers glabrous; sepals few-hairy or glabrous, outer sepals rather large; pedicels 2–4 mm long, longer than hypanthia, silky-hairy in lower flowers, glabrous in the upper. July.

404 Rocks at 300 m. — Caucasus: W. Transc. Endemic. Described from Adjan (where? collected by Szovitz). Type in Helsingfors.

143. *A. haraldi* Juz. in Acta Inst. Bot. Acad. Sc. URSS, ser. I, fasc. 1 (1933) 130.

Perennial medium-sized glaucescent-green plant; radical leaves 2–4 cm long, 3.5–7.5 cm wide, the lower and middle reniform or orbicular-reniform, the upper orbicular-reniform or orbicular, with distinct axil at base or lower lobes adjacent in uppermost leaves, slightly undulate or nearly flat, 7- or frequently 9-lobed; lobes generally short, arcuate, semi-orbicular or in upper leaves semi-ovate, with or without inconspicuous incision, with 7–10 obliquely triangular or semi-ovate acute or obtuse teeth at each side; lower leaves appressed-hairy above only along margins, beneath along margins and main ribs, otherwise glabrous, upper leaves hairy above along margins and wrinkles and rather densely subappressed-hairy beneath on the entire surface; petioles of all leaves, like stem, densely appressed-hairy nearly along the entire length; stems 16–25 cm long, firm, one and a half to two times longer than petioles, sparsely appressed-hairy in inflorescence; cauline leaves rather large, broadly reniform or semi-orbicular, with arcuate lobes. Inflorescence rather narrow; flowers in loose heads, large, 2.5–4 mm long, 3–4.5 mm wide, yellowish green; hypanthia obconoid, glabrous or in lower flowers with solitary hairs at base; sepals about as long as hypanthium, broadly ovate, acute, sparsely appressed-hairy, outer sepals slightly shorter and twice as narrow as the inner, with solitary hairs at apex or glabrous; pedicels usually longer than hypanthia, appressed-hairy in lowermost flowers, the rest glabrous. July.

Alpine meadows. — European part: Urals (S.). Endemic. Described from Malaya Iremel Mountain, along the road to Insalovo. Type in Leningrad.

144. *A. venosa* Juz. apud Grossh., Fl. Kavk. IV (1934) 328.

Perennial medium-sized yellowish green plant; radical leaves 2–4 cm long, 2.2–4.5 cm wide, orbicular-reniform or orbicular, flat, 9-lobed; lobes arcuate or semi-orbicular with small but distinct incision, with

6-7 small obliquely triangular, acute teeth at each side curved inwardly, the terminal tooth larger; leaves completely glabrous above, densely appressed-hairy beneath on the entire surface, prominently netted-veined on both sides when dry; petioles densely covered with more or less spreading hairs; stems many, 19-28 cm long, two times longer than petioles of radical leaves, erect, indurate, covered with more or less spreading hairs, pubescence sparser in inflorescence, reddening in the sun; cauline leaves rather well-developed, reniform or semi-orbicular, short lobed, with strongly and acutely toothed stipules. Inflorescence narrow but rather many-flowered, with branches inclined at an acute angle; flowers in rather loose heads, large, ca. 3 mm long, 3-3.5 mm in diameter, yellowish; hypanthia obconoid, glabrous or sometimes with solitary hairs; sepals as long as hypanthia or slightly longer, ovate, acute, hairy above; outer sepals nearly as long as the inner but distinctly narrower; pedicels longer than hypanthia, glabrous, only the lower sparingly hairy. July.

Mountains, 1,900-2,400 m. - Caucasus: S. Transc. Endemic? Described from Nor-Bayazet District, Archanots Range near Tsymakapert village. Type in Leningrad.

145. *A. abchasica* Buser in Monit. du Jard. Bot. de Tiflis, livr. 5 (1906) 14.

Perennial large delicate pale green plant; radical leaves 8.5 cm long, 10 cm wide, broadly reniform, with broad arcuate axil at base, 9- or incompletely 11-lobed, flat; lobes short, arcuate or short-triangular, dentate to base, with 7-9 medium-sized, triangular, acute teeth at each side; leaves glabrous above, appressed-hairy beneath along main ribs and at margin, sparsely hairy between ribs (on inner leaves) or glabrous; petioles of radical leaves, like stem, appressed-hairy throughout; stem two times longer than petioles of radical leaves, flexuous and curved; cauline leaves medium-sized, with large stipules. Inflorescence narrow, loose, with elongate branches inclined at an acute angle; flowers ca. 3 mm long, 4 mm in diameter; hypanthia obconoid, with tufted hairs; sepals as long as hypanthia, broadly ovate, cute, thin, glabrous; outer sepals hardly as long as the inner; pedicels long (3 mm), filiform, completely glabrous. July?

Caucasus: W. Transc. (Abkhazia). Endemic. Described from Abkhazia - without precise locality. Type in Helsingfors.

146. *A. barbatiflora* Juz. apud Grossh., Fl. Kavk. IV (1934) 329.

Perennial medium-sized green plant; radical leaves 1.3-6.5 cm long, 1.7-7.5 cm wide, orbicular-reniform or suborbicular, nearly flat, 9-lobed; lobes semi-elliptic, semi-ovate or triangular, with inconspicuous incision between them and with (6)7-10 small, obliquely semi-ovate, obtuse teeth at each side; leaves glabrous above, lower leaves appressed-hairy beneath only in upper part of main ribs, glabrous between ribs, the rest long-appressed-hairy along entire length of main ribs; petioles sparsely appressed-hairy; stems solitary, ca. 35 cm long, one-third as long as petioles of radical leaves, suberect, firm, not densely appressed-hairy, glabrescent in inflorescence; cauline leaves well-developed. Inflorescence narrow, branching at an acute angle; flowers in loose heads, ca. 3 mm in diameter, yellowish green; hypanthia obconoid, with rather dense tufts of

ascending hairs in lower part, hypanthia of upper flowers with solitary hairs; sepals as long as hypanthia, glabrous, outer sepals slightly shorter than the inner; pedicels slightly to two times longer than sepals, glabrous. Time of flowering unknown.

Mountains.—Caucasus: W. Transc. Endemic. Described from Bakhmaro. Type in Leningrad.

Series 3. **Duræ** Juz.—Large, medium-sized or small plants, with appressed (very rarely ascending) hairs on stems and petioles of radical leaves, rarely hairless; leaves glabrous above or appressed-hairy only along wrinkles, hairy, beneath only along main ribs (often only in upper part).

147. **A. tredecimloba** Buser in Bull. Herb. Boiss. IV (1896) 759.

Perennial very large glaucescent-green plant; radical leaves 2.5–14.5 cm long, 3–16 cm wide, orbicular-reniform or obliquely orbicular, flat, (9)11- or 13-lobed, with rectangular axil at base; lobes rather long, one-third as long as the radius, arcuate in lower leaves, in upper triangular, dentate to base, with 7–12 obliquely ovate or papilliform acuminate teeth at each side; leaves glabrous above, covered beneath only along main ribs with loosely appressed hairs, otherwise glabrous; stems tall (10)35–65 cm high, appressed-hairy in lower part (up to lower branches), glabrous above; cauline leaves numerous, large, obtuse at base. Inflorescence and flowers, as in *A. oxysepala* Juz.; flowers glabrous, 5.5–6 mm in diameter; hypanthia 1 mm long; sepals 2–2.5 mm long. July–August. (Plate XXIV, Figure 3).

Banks of streams and brooks, mostly in the subalpine zone.—Caucasus: Cisc., W. Transc. (Svanetia, Cherkessia), E. Trans. (S. Osetia). Endemic. Described from Tetenar Mountains above Tsiolur village along the Tskhenis-Tskhali River (Svanetia), ca. 2,000 m. Type in Florence.

Economic importance. Useful as an ornamental plant, but not cultivated.

148. **A. undecimloba** Juz. sp. nova in Addenda IX, p. 477.

407 Perennial; reminiscent of *A. tredecimloba* in appearance and pubescence but readily distinguished from it by the short, nearly rectangular lobes of radical leaves, approximately one-fourth as long as leaf radius; teeth very short and broad, obliquely and broadly triangular or rectangular, scalariformly arranged, with almost straight margins, acuminate or acute at apex. Flowers smaller than in *A. tredecimloba*, ca. 4 mm in diameter. July–August.

Subalpine grassy meadows, forest edges (at timberline).—Caucasus: W. Transc. Endemic. Described from Achishkho. Type in Leningrad.

149. **A. retinervis** Buser in Bull. Herb. Boiss. IV (1896) 760.—Exs.: Kotschy, Iter Cilic. No. 151, 194, 249, 249a.

Perennial small plant, delicate, dark green, partly lilac in the sun; radical leaves small, 1.8–3.2 cm long, 2–4 cm wide, reniform or suborbicular, flat, 5–7-lobed, with distinct axil at base or lateral lobes contiguous; lobes one-third to two-fifths, sometimes one-half as long as leaf radius, with cuneate

incision, not overlapping at margins, obtuse at apex, with 4-6 rather narrow, acute teeth at each side, curved toward the small terminal tooth; leaves glabrous above, appressed-hairy beneath along main ribs and on lateral lobes or sometimes completely glabrous, coarse, prominently netted-veined on both sides (especially below) when dry; petioles with numerous short appressed hairs or glabrous; stems 7-23 cm long, thin but firm, ascending, curved or flexuous, appressed-hairy on lower internode, otherwise completely glabrous or subglabrous; cauline leaves few, usually not developed. Inflorescence very loose; flowers 3-4 mm in diameter, dark lemon-yellow, completely glabrous in all parts; hypanthia obconoid, 0.75-1 mm long; sepals longer than hypanthia, 1.3-1.5 mm long, triangular-ovate, acute, rigid in fruit, with prominent veins, outer sepals almost twice as narrow as the inner but usually longer, very acute; pedicels 2-5 mm long. July-August. (Plate XXIV, Figure 4).

Rocks in the alpine zone.—Caucasus: Cisc., W. and E. Transc., Dag.
Gen. distr.: As.-Min. Described from Latpari Range between the Tskhenis-Tskhali and Ingur rivers, 2,500 m. Type in Florence.

150. **A. debilis** Juz. in Delect. semin. Hort. Bot. Acad. Sc. URSS 1934 (1933) 5.

Perennial; radical leaves (in cultivated) 1.9-3.5 cm long, 2.2-4.2 cm wide, reniform, with narrow axil at base, slightly undulate, 7-lobed; lobes short, wide, arcuate, with conspicuous incision, with 5-6 broadly obliquely ovate, obtuse or rather acute teeth at each side and smaller terminal tooth; leaves glabrous above, the lowermost appressed-hairy beneath only along upper part of main ribs, the rest sparsely appressed-hairy along margins and the entire length of main ribs, otherwise glabrous; petioles of radical leaves (in cultivated plants) 2.5-9 cm long, sparsely covered with loosely appressed or ascending hairs; stems weak, ascending to base, flexuous, sparsely ascending-hairy in lower third, otherwise glabrous; cauline leaves broadly reniform, with short arcuate petals [sic! should be "lobes"]. Inflorescence poor, narrow; flowers in very loose heads, 3-3.75 mm in diameter, yellowish green; hypanthia small, obconoid, glabrous; sepals slightly longer than hypanthium, outer sepals nearly as long as the inner; pedicels usually longer than hypanthia, glabrous. June-July.

Alpine zone, sandy soils.—Caucasus: Dag. Endemic. Described from Dagestan. Type in Leningrad.

151. **A. dura** Bus. in Monit. Jard. Bot. Tifl. 5 (1906) 7.—*A. firma* Bus. in Bull. Herb. Boiss. IV (1896) 760, nec alibi.

Perennial; resembling *A. retinervis* Bus., distinguished from it by its larger dimensions, the suberect stems, the well-developed cauline leaves with large, elongate, straight teeth and the narrow inflorescence. July.

Riverbanks, mountain slopes ca. 2,000 m. Caucasus: E. and W. Transc. Endemic. Described from Elbrus Mountain above the Kükürtli River and from Svanetia (Tetenar Mountain along Tskhenis-Tskhali River and between the Nemkra and Seken rivers). Type in Florence.

Note. This species is little known; its type has never been seen by us (in the herbarium of the Botanical Institute there is the duplicate of one of the paratypes of this species, but it is a poor specimen, which offers very

little). Buser accepted it at first as *A. firma* Bus., noting its few distinctions as being firmer, rigid habit, leaves more distinctly netted when dry, and sepals markedly exceeding the hypanthium. It is possible in this regard that *A. dura* is very close to *A. retinervis* with which Buser, however, did not compare it; no descriptions of *A. dura* were given by Buser. In general, the series of *A. retinervis* in the Caucasus is unusually polymorphic and requires further study. Both *A. dura* Bus. and *A. debilis* Juz. apparently represent only two forms in this series.

DOUBTFUL SPECIES

1. *A. lydiae* ("Lidijae") Zamelis in *Animadvers. Syst. ex Herb. Univ. Tomsk. No. 3* (1931) 1; *Kryl., Fl. Zap. Sib. VII* (1933) 1551.

409 Perennial medium-sized plant; radical leaves 3–10 cm long, 3.5–11 cm wide, orbicular with lateral lobes converging, undulate, usually 9-lobed; lobes broadly semi-ovate, one-third to one-half as long as radius, with narrow and deep incision between them and (6)7–8(9) wide and long teeth at each side, the terminal tooth shorter than the neighboring; leaves densely hairy on both sides, only the inner (upper) hairy above along wrinkles and margins, covered beneath along ribs with ascending hairs; petioles of radical leaves densely spreading-hairy along the entire length; stipules reddish; stems 15–31 cm long, rather weak, just slightly longer than petioles of radical leaves, densely hairy along the entire length, in lower part of stem hairs horizontally spreading, in upper part hairs ascending; cauline leaves medium-sized, semi-orbicular or broadly reniform. Inflorescence more or less broad, few-flowered; flowers in loose heads, small, 2–3.5 mm long, green; hypanthia campanulate in fruit, densely covered with ascending hairs; sepals hairy, the outer shorter and two to three times narrower than the inner; pedicels as long as or longer than hypanthia, with ascending hairs. June–August.

Meadows. — W. Siberia: Ob. Endemic. Described from the vicinity of Tomsk. Type in Riga.

Note. An obscure species, the type of which was inaccessible to us. After describing this plant, A. Zamelis sent us a living rootstock (for cultivation) and a herbarium specimen of his species, but they proved to be two different forms, not one of which completely fitted in with the description of *A. lydiae* (in neither of them were the inner radical leaves glabrous above).

2. *A. elata* Buser in *Monit. du Jard. bot. de Tiflis, livr. 5* (1906) 12.

Perennial large plant; radical leaves unknown, probably very large, orbicular-reniform, 11-lobed; lobes with shallow incision dentate to base; stems ca. 50 cm high, covered up to branches with coarse spreading hairs; cauline leaves large (the lowermost 3.2 cm long, 5.2 cm wide), reniform, flat, short-lobed (lowermost 9-lobed); lobes arcuate, with 6–7 (in lower leaves) triangular, acute teeth at each side; leaves thin, sparsely hairy above, more densely so beneath. Inflorescence long, narrow, with numerous elongate thin branches; flowers in dense heads, large, 4.5–5 mm in diameter, pale green, glabrous; hypanthia 1.5–2 mm long, campanulate, tapering at base; sepals as

long as hypanthia, acute, slightly shiny, outer petals large, as long as the inner; pedicels filiform, the lowermost as long as hypanthia, becoming very short in upper flowers.

Subalpine meadows.—Caucasus: W. Transc. (Cherkessia). Endemic? Described from the Achkha Mountains. Type in Tbilisi.

110 Note. A little-known, problematic plant; its description is based on an incomplete specimen. It may prove to be one of the forms of the series *Oxysepalae* Juz.

Genus 756. **APHANES** * L.

L., Gen. ed. 1 (1737) 33; Sp. pl. (1753) 123.

Flowers in axillary heads, covered by stipules; hypanthia cup-shaped; inner and outer sepals 5; petals absent; stamens 1, rarely 2 or 3, opposite sepals, inside the disk; pistils 1, with a lateral style; seeds small, ovate. Annuals or biennials; all leaves cauline, fan-shaped or broadly rhombic, palmately 3–5-sect, short-petioled or sessile; stipules connate.

There is only one species in the USSR.

1. **A. arvensis** L., Sp. pl. (1753) 123.—*Alchemilla arvensis* Scop., Fl. carn. ed. 2, I (1772) 115; Ldb., Fl. Ross. II, 30.—*Alchemilla aphanes* Leers, Fl. Herborn. (1775) 54.—*Percepier arvensis* Moench, Meth. (1794) 690.—Ic.: Dietr., Fl. Bor. VII, tab. 489; Schlecht., Fl. Deutschl. ed. 5 tab. 2547.—Exs.: Baenitz, Herb. Eur. No. 8297; Fl. exs. Rhen. 25; HFR No. 2151.

Annual or biennial, 2–20 cm high; stem simple or generally branching at base, erect, ascending or prostrate, like leaves shortly coarse-pubescent with hairs; stipules broad, palmatifid; leaves short-petioled, the upper sessile, broadly cuneate or rhombic, deeply 3–5-partite, lobes deeply 2–5-toothed with long obtuse teeth, sparsely or rather densely appressed-hairy on both sides. Heads of flowers axillary, often developing already from base but usually from middle of stem upward; uppermost heads (and leaves) usually adjacent; hypanthia subglobose, whitish with dense, almost straight, coarse hairs; sepals erect, green, outer sepals very small. From May to the fall.

Fields, dry slopes.—European part: Crim.; Caucasus: Cisc., Dag., W. and E. Transc., Tal. **Gen. distr.:** nearly all of W. Eur. (except for the Arctic), W. Asia (Iran.); N. Am. (introduced). Described from Europe. Type in London.

Genus 757. **AGRIMONIA** ** L.

L. Spec. pl. ed. 1 (1753) 418.

Flowers in spicate racemes, short-pedicel, with two tripartite bracts, bisexual. Hypanthia turbinate, indurate, with multiseriate crown or prickles,

* From the Greek *aphanee* — inconspicuous, plain.

** Probably a distortion of *argemonia* (the name of a completely different plant, apparently poppy, by Pliny).

411 soft at the beginning, later hardening, hamate at apex. Sepals 5, converging postanthesis, persisting in fruit. Petals 5, small, usually yellow. Ovules 2 (1 usually abortive), enclosed in the 10-sulcate hypanthium hardening in fruit. Styles 2; stigma reniform. — Perennial herbs. Leaves interruptedly imparipinnate; hairs simple and glandular.

1. Stems more or less hairy, sometimes with admixture of short glands 2.
- + Stems densely glandular, without simple hairs 4. *A. granulosa* Juz.
2. Stems covered with long and short hairs; leaves usually grayish or . . whitish beneath, rarely green on both sides 3.
- + Stems covered only with long straight hairs; leaves green on both sides 6.
3. Leaves very thinly pubescent beneath, green on both sides. Fruit with prickles connivent to form a core 6. *A. japonica* (Miq.) Koidz.
- + Leaves grayish or whitish, velutinous-hairy beneath; prickles in fruit not connivent (not forming a core) 4.
4. Leaves eglandulose beneath. Fruit erect 7. *A. velutina* Juz.
- + Leaves glandular beneath (glands often hidden by eglandulose hairs). Fruits drooping 5.
5. Leaves whitish beneath. Fruits flat above, outer prickles ascending or spreading 3. *A. eupatoria* L.
- + Leaves grayish beneath. Fruit convex above, outer prickles spreading below 2. *A. asiatica* Juz.
6. Leaflets with numerous teeth, thin-tomentose beneath. Fruits large, with recurved outer prickles 1. *A. odorata* Mill.
- + Leaflets with few teeth, hairy beneath only along ribs. Fruits small, all prickles antrorse, connivent to form a cone 5. *A. pilosa* Ldb.

Series 1. *Eupatoriae* Juz. — Flowers rather large, 8–12 mm in diameter. Fruit drooping early. Outer prickles of fruit ascending, spreading or recurved, the inner longer than sepals. Leaves with glands beneath, glands often nearly completely hidden by simple hairs.

412 1. *A. odorata* Mill., Gard. Dict. ed. VIII (1768) No. 3, excl. syn. Camer.; Ldb., Fl. Ross. II, 31 p. p. — *A. procera* Wallr., Fl. Hercyn. (1840) 203; id. in Linnaea XIV (1840) 573; Beitr. zur Bot. Bd. I (1842) 50. — *A. robusta* Andrz., Enum. pl. Podol. I (1860) 36. — Ic.: Wallr., Beitr. z. Bot. (1842) tab. I, f. 2. — Exs.: Fries, Herb. Norm. fasc. XIV; Schultz, Herb. Norm. Cent. 5, No. 472.

Perennial; rhizome robust, rarely branching; stems 50–180 cm high, robust, erect, sulcate, branching above with elongate, later virgate branches, densely covered like petioles with spreading or reclinate rigid hairs, hairs on small tubercles, mixed with dense very small short-stalked glands; leaves large, 12–13 cm long, 8–15 cm wide, remote (lower leaves not crowded in rosettes), upper leaves often longer than internodes, nearly equally green on both sides, weakly pubescent, sparsely long-hairy and with shorter flexuous hairs beneath forming a loose tomentum, mixed with many small glands; leaflets 7–11, 4–8 cm long, 2–4 cm wide, oblong-ovate, tapering

below, acuminate, dentate nearly to base into 6–14 teeth, teeth large, deep, orbicular-semi-ovate and obtuse to lanceolate and acute, with 5–8 pairs of lateral veins; intercalary lobes dentate; stipules large, semi-cordate, deeply and acutely dentate. Inflorescence more or less branching, long, up to 45 cm in fruit, strongly narrower at summit, virgate, often rather dense (especially in upper part); bracts deeply 3-sect, with acute linear lobes, the middle lobe two times longer than the lateral; flowers short-pedicel, 1–3 mm long, large, 10–12 mm in diameter; sepals ovate, mucronulate; petals two times longer than sepals, obovate, sulphur-yellow; hypanthium 3–5 mm long, broadly campanulate, sparsely (often only at base) soft-hairy, with 10 short shallow furrows up to the middle forming an infundibular-ovoid shape, sometimes nearly smooth; fruit half-drooping, 7–9 mm long, 7.5–10 mm wide, upper part (bearing bristles) strongly convex, nearly semi-globose; prickles multiseriate, the outer strongly recurved, the innermost erect, nearly as long as hypanthium and longer than sepals. July. (Plate XXV, Figure 1).

Broad-leaved forests and other shady places. — European part: U. Dnp., M. Dnp., Bes. **Gen. distr.:** Scand., Centr. and Atl. Eur., Med. Described from Europe (England?). Type unknown.

2. *A. asiatica* Juz. in The Weeds of URSS III (1934) 138. — *A. odorata* auct. nonnull.; Ldb., Fl. Ross. II, 31 p. p.? non Mill. — *A. eupatoria* Kryl., Fl. Zap. Sib. VII (1933) 1559 et auct. fl. As. Med., non L. — ? *A. major* Uspensky in Bull. Soc. Nat. Mosc. VII (1834) 373 (nomen solum). — ? *A. eupatoria* β *major* Boiss., Fl. Or. II (1872) 728.

13 Perennial; rhizome generally robust; stems 30–140 cm high, firm, erect, usually branching above with elongate branches, very densely covered — like petioles — with long, coarse, spreading or slightly reclinate hairs, mixed with shorter and softer ones; leaves 6–30 cm long, 3.5–12 cm wide, sparsely or rather densely appressed-hairy above, green, densely and softly velutinous-hairy beneath with a mixture of small yellow glands, grayish green; leaflets (the larger) 7–11, 2–8 cm long, 1.5–4 cm wide, elliptic or oblong-ovate, lateral leaflets sessile, the terminal petioluled, obtuse at base, strongly dentate nearly to base, with 6–10 teeth at each side, in lower leaves teeth obtuse, often rounded, in upper more acute; intercalary lobes small, with few teeth or subentire; stipules large, semi-cordate, strongly and acutely toothed. Inflorescence long, 9–25 cm long, up to 40 cm long in fruit, flowers (or fruits), few and remote in lower part, crowded above; bracts 3-partite, with acute lobes; flowers short-pedicel, 2–3(4) mm long, 10–12 mm in diameter; sepals ovate, acuminate; petals nearly two times longer than sepals, elliptic, dark yellow; hypanthium campanulate, with dense, ascending hairs almost as long as its breadth and rather deep furrows extending almost to two-thirds to three-fourths of its length; fruit drooping, 6–9 mm long and wide, upper part conspicuously convex, with prickles in few rows, the outer short, recurved, those following long, spreading or ascending, the innermost erect, ca. 4 mm long, longer than sepals. June–July. (Plate XXV, Figure 2).

Shrubby formations, edges of broad-leaved forests, irrigation ditches, gardens, along roads, banks of rivers and streams, riparian forests, walnut forests. — European part: L. V., Transv., V.-Don (southeastern part), L. Don, V.-Kama (southern part); Caucasus: Cisc.; W. Siberia: U. Tob.,

Irt., Alt.; Centr. Asia: Pam.-Al., T. Sh., Dzu.-Tarb., Mtn. Turkm. (Kopet-Dagh), Syr D. Gen. distr.: Bal.-As. Min. (Asia Minor), Arm.-Kurd. Iran. Described from Central Asia. Type in Leningrad.

Note. Bornmüller has determined this plant as *A. grandis* Andrz. ex C. A. M. in Bull. Acad. Sc. Pétersb. X (1842) 343. Since we have never seen the authentic *A. grandis* and the presence of *A. asiatica* in the flora of Podolia, from where *A. grandis* was described, is unproven, we cannot accept Bornmüller's classification.

3. *A. eupatoria* L., Sp. pl. (1753) 448; Ldb., Fl. Ross. II, 31.—
A. officinalis Lam., Encycl. I (1783) 62.—*A. sororia* Fisch. et Mey. in Bull. Ac. Sc. St.-Pétersb. X (1842) 334; Ldb., l. c. (sphalm. *A. sororia*)—
414 *A. adscendens* Andrz., Enum. pl. Podol. I (1860) 36.—*l. c.*: Wallr., Beitr. z. Bot. I Bd. (1842) tab. I, f. 1; Syreishch., Fl. Mosk. Gub. II (1907) 239.—*Exs.*: Fl. exs. Austro-Hung. No. 2419; Hayek, Fl. stir. exsicc. No. 756; Pl. Finl. exs. No. 272; HFR No. 918; Grossh. et Schischk., Pl. or exs. No. 307 (nom. *A. sororia*).

Perennial; rhizome more or less short, rather thick, simple or branching; stems 30–100 cm high, generally solitary, erect, simple, or somewhat branching above, densely covered with long, coarse, spreading hairs and shorter and thinner, slightly crispy ones; all leaves cauline, the lowermost scalelike, the middle adjacent as in a rosette, the upper abruptly diminishing remote, all leaves petioled and with rachises, covered like stem with two kinds of hairs, the lower and middle 9–30 cm long, twice as long as wide, with 5–9(13) larger leaflets and 6–10 smaller intercalary lobes; leaflets 2–6 cm long, 1–3 cm wide, sessile, elliptic, ovate or rhombic, strongly and acutely toothed, with 5–10 teeth at each side and as many simple lateral nerves, dark green above, sparingly appressed-hairy, whitish beneath with very dense silky-velutinous pubescence, often mixed with very small subsessile glands, completely hidden by the simple hairs; intercalary lobes small, often 2–3 pairs in each gap between leaflets, entire or dentate; stipules resembling intercalary lobes, obliquely ovate, acute, with few large teeth outside. Inflorescence spicate, racemose, simple, very loose in lower part, more dense above, 10–30 cm long; flowers in axils of small 3-partite bracts, in fruit on very short recurved pedicels; hypanthia densely hairy, 2–3 mm long in flower; in fruit 4–5 mm long, obconoid or campanulate, longer than broad, deeply furrowed nearly to base; sepals ca. 2 mm long, ovate-lanceolate, acute connivent postanthesis; petals 4–6 mm long, 2–3 mm wide, ovate-lanceolate, yellow; stamens 10–20, shorter than petals; fruit drooping early, 5–8 mm long, 3–6.5 mm wide; upper surface of fruit flat, with 4 rows of bristles, the outer ascending or sometimes spreading, the inner, longer, erect, 2–2.5 mm long. June–August. (Plate XXV, Figure 3).

Thinned-out forests, forest edges, meadows, pastures, roadsides, edges of fields, alongside fences.—European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. Dnp., M. Dnp., V.-Don, Transv. (western part), Bl., Crim., L.-Don (northern part); Caucasus: entire region. Gen. distr.: Scand., Centr. and Atl. Eur., Med. Described from Europe. Type in London.

415 **Economic importance.** Once a very popular officinal plant, used in the treatment of a variety of illnesses; it is still a traditional remedy in folk medicine. It contains tannins and yields a yellow dye.

Note. *A. eupatoria* L. is in fact a polymorphic species group. Its Caucasian form requires a detailed study. We have decided not to separate the problematic *A. sororia* Fisch. et Mey. from it, as Caucasian florists are doing, because the distinguishing characters as described are rather intergradating.

Series 2. **Pilosae** Juz. — Flowers 4–8 mm in diameter. Fruit long, remaining erect; all prickles erect, later connivent conoidally toward sepals; sepals generally longer than inner row of prickles. Leaves more or less glandular beneath.

4. ***A. granulosa*** Juz. sp. nova in Addenda IX, p. 477.

Perennial; rhizome thick, branching; stem ca. 95 cm high, solitary, strongly branching in upper part with very delicate and flexuous branches, densely covered for entire length with stalked glands (simple hairs completely absent in stem); leaves remote, 9–17 cm long, 7–10 cm wide, rachis covered with a mixture of glandular and few rather long simple hairs, all leaves green above, covered with remote short simple hairs and small sessile glands, paler beneath, with few short simple and many short-stalked glands along nerves and numerous sessile glands on the rest of surface; (larger) leaflets 5, 4–8.5 cm long, 2–3.5 cm wide, short-petiololed, thin, rather rather broadly rhombic, dentate along margins, lower leaflets entire at base of outer margin, with 7–11 large, obtuse or (in upper leaflets) acute teeth and as many thin veins at each side; intercalary lobes numerous, elliptic or obovate, entire or (the larger) with 1 tooth at each side; stipules small, obliquely ovate, acuminate, acutely dentate. Inflorescence thin, loose; flowers small, ca. 4 mm in diameter, short-pedicelcd; hypanthia covered with small sessile glands; sepals glandular; petals pale yellow or whitish (?), two times longer than sepals; fruit ca. 5 mm long and 3 mm broad, with semi-ovoid hypanthium broadly and shallowly furrowed nearly to base, with antrorse bristles; bristles about as long as sepals, connivent above them in ripe fruit. August.

416 Mixed forests, shrubby formations. — Far East: Uss. (Suchan River basin). **Gen. distr.:** Jap.-Ch.? Described from the vicinity of the village of Sergeevka (Muladzy River valley).

5. ***A. pilosa*** Ldb. in Ind. sem. hort. Dorpat. (1823) 1; Fl. Ross. II, 32; Kryl., Fl. Zap. Sib. VII (1933) 1560. — *A. dahurica* Willd. ex Stev. in litt. ex Seringe in DC., Prodr. II (1825) 587. — *A. davurica* Schlecht. pat. ex Ldb., Fl. Ross. II, 32. — *A. glabrata* Spr. in Catal. hort. hal. (1838) et ex C. A. M. in Bull. Ac. Sc. Pétersb. X (1842) 346. — *A. godetiana* Andrzej., Enum. pl. Podol. I (1860) 36 ["*A. goctectiana*" (sic!) auct. plur. in synonymia *A. pilosae*]. — *A. conopsea* Czern. in sched. — *A. convergens* Czern. in sched. — *A. eupatoria* var. *davurica* Link, Pl. Hort. Berol. II (1822) 34. — *A. pilosa* forma *davurica* Nakai in the Bot. Magaz. XLVII (1933) 245. — Ic.: Rchb., Ic. Pl. crit. III (1825) tab. 252; Syreishch., III. Fl. Mosk. gub. II (1907) 239.

Perennial; rhizome horizontal, rather weak; stem 25–100 cm high, more or less delicate, not too densely covered with long spreading hairs unmixed

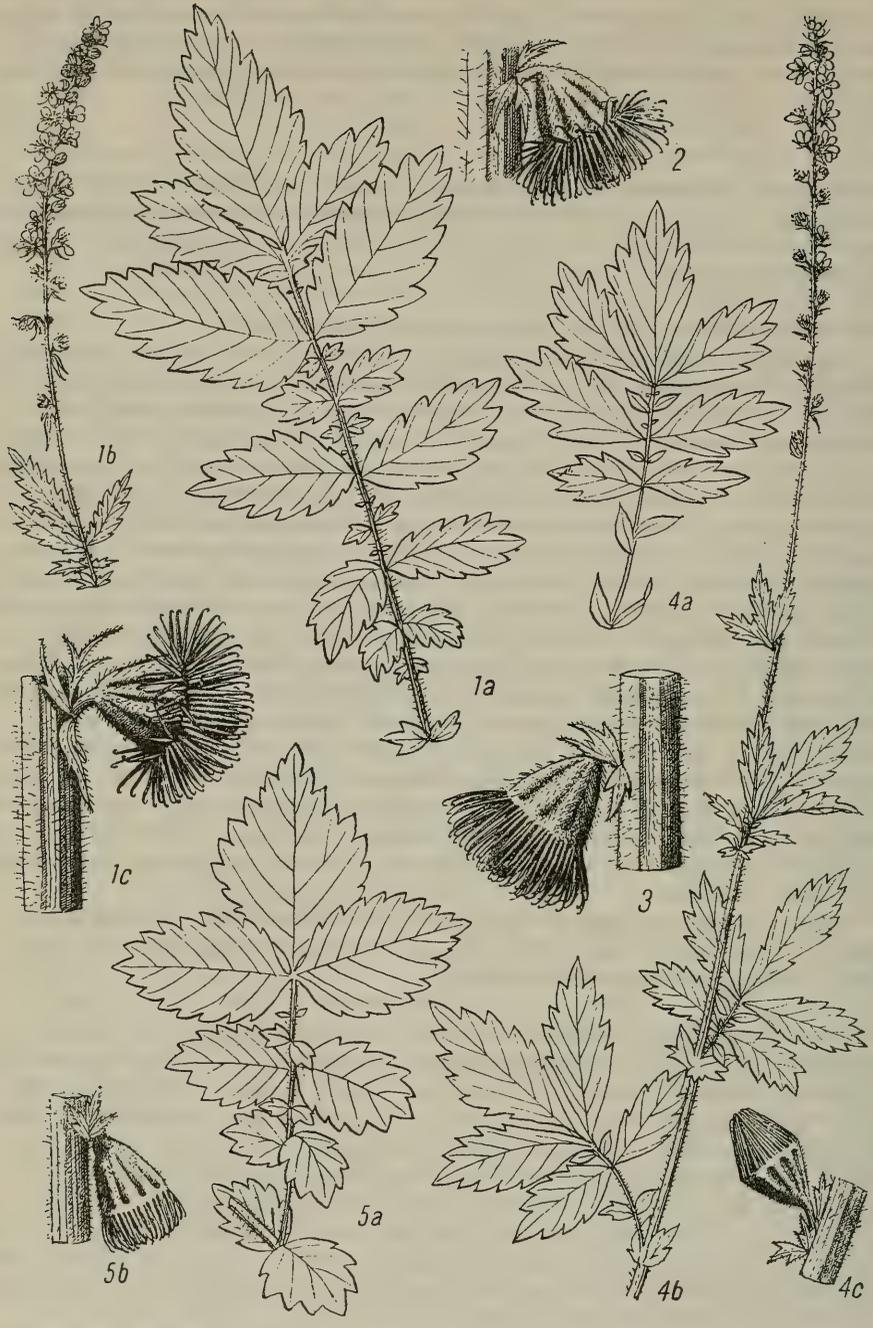


PLATE XXV. 1 - *Agrimonia adorata* Mill., a) leaf, b) inflorescence, c) fruit; 2 - *A. asiatica* Juz., fruit; 3 - *A. eupatoria* L., fruit; 4 - *A. pilosa* Ldb., a) leaf, b) upper part of stem, c) fruit; 5 - *A. velutina* Juz., a) leaf, b) fruit.

with short ones; leaves remote (the lower withering at anthesis), 6–16 cm long, 5–9 cm wide, green on both sides, petioles and rachis pubescent like stem, darker above, glabrous or sparingly hairy, sparsely hairy beneath along nerves and with few or rarely rather many very small glands on the entire surface of leaves, often blood red in fall; leaflets 5–7(9), 2–6(7) cm long, 1–3 cm wide, rhombic or sometimes obovate, cuneately tapering at base, acuminate or sometimes obtuse at tip, large-toothed, with (3)4–5(7) large, acute or obtuse teeth and as many thin veins at each side; intercalary lobes few pairs, small, oblong-ovate, generally entire; stipules small, sub-entire, often semi-cordate. Inflorescence loose; flowers small, 6–8 mm in diameter; sepals ovate-lanceolate, mucronulate; petals oblong, two times longer than sepals, pale yellow; hypanthia obconoid, deeply furrowed nearly to base, slightly hairy, eglandulose or with solitary spreading glandular hairs; outer bristles obliquely curved above in fruit, the rest erect, partly connivent at tips; fruit small, 5 × 2.75 mm, erect for a long time, drooping only when fully ripe. June–July. (Plate XXV, Figure 4).

Forests (broad-leaved and coniferous), groves, forest edges, shrubby formations, banks of rivers and lakes, meadows, ravines, clearings, burnt areas, roadsides. — European part: Dv.-Pech., V.-Kama, U. Dnp., Lad.-Ilm., U. V., M. Dnp., Transv., V.-Don (northern part); W. Siberia: Ob, U. Tob., Irt., Alt.; E. Siberia: Yenis., Ang.-Say., Dau.; Far. East: Ze.-Bu., Uda, Uss. (northern part). **Gen. distr.:** Centr. Eur., Mong. Described from Tartu (formerly Derpt). Type in Leningrad.

The name *A. dahurica* Willd. (and also *A. davurica* Schlecht., *A. eupatoria* var. *davurica* Link and *A. pilosa* f. *davurica* Nakai), listed as a synonym of this species, refers to a special form now becoming dominant in East Siberia and the Far East; this form is intermediate between *A. dahurica* and the following species (*A. japonica*). *A. dahurica* is characterized by having a broader habit than the type, more obtuse leaflets with a few more teeth (6–10 at each side), shorter (entire) base, shorter and less spreading hairs on main ribs beneath, and being more glandiferous. Apparently, these two are extremely young and as yet incomplete races, the western *A. pilosa* Ldb. s. str. and the eastern *A. dahurica* Willd.; it is very difficult to distinguish between them in view of the similarity of all characters. It seems that Nakai was the first who tried to distinguish these two forms.

6. *A. japonica* (Miquel) Koidzumi in Tokyo Bot. Mag. XLIV (1930) 104. — *A. blumei* Don., Gen. Syst. Gard. Bot. II (1832) 563 p. p. (quoad pl. Japon.); C. A. M. in Bull. Ac. St.-Petersb. X (1842) 563. — *A. viscidula* Sieb. et Zucc., Fl. Jap. Fam. Nat. I (1845) 125, non Bge. (quae est pl. chinensis). — *A. viscidula* var. *japonica* Miquel in Ann. Mus. Bot. Lugd. Bat. III (1867) 38. — *A. pilosa* var. β *viscidula* Kom. in A. H. P. XXII, 2 (1904) 520 saltem p. p. — *A. pilosa* var. *japonica* Nakai, Veget. Mt. Apoi (1930) 54; the Bot. Magaz. XLVII (1933) 245. — Ic.: Somoku Dzusetsu, ed. 2, IX (1874) tab. 8 (nom. *A. viscidula* Bge.).

Perennial; stem 20–70 cm high, usually branching in upper part, rarely simple, glandular-hairy, pubescent with a mixture of long and short hairs; leaves densely or sparingly covered above with appressed bristly hairs, usually rather densely soft-hairy beneath, especially along nerves (hairs

shorter and more appressed than in *A. pilosa*), sometimes subglabrous between ribs, golden of numerous small glands; leaflets 7-5 (in upper leaves 3), oblong, elliptic or lanceolate, sometimes obovate, broader than in *A. pilosa*, tapering at both ends or the terminal leaflet obtuse, the three apical equal in length, usually acute-serrate at outer margin down to base, with 7-13 (usually 9-11) teeth at each side; teeth sometimes obtuse, orbicular, all leaflets thick, dense, frequently with strongly prominent main ribs beneath; stipules medium-sized or small, semi-cordate, acutely toothed. Inflorescence delicate, loose, erect, rachis covered with short glandular crisp whitish hairs; bracts tripartite, lobes ovate, few-toothed or entire; flowers 4-8(10) mm in diameter; hypanthia appressed-hairy at anthesis, later glabrous, glandular-granular, acutely obconoid in fruit, deeply furrowed with furrows not reaching base; sepals linear-lanceolate, narrower than in *A. pilosa*; petals small; fruit 6 mm long, 3-4 mm wide, with connivent prickles, 2-3 mm long, shorter than or nearly as long as sepals. June-September.

Broad-leaved forests, meadows and other grassy places, mountain slopes. — Far East: Ze.-Bu. (?), Uss. Sakh. **Gen. distr.:** Jap.-Ch. (Japan, Manchuria). Described from Japan.

Series 3. **Nipponicae** Juz. — Flowers small; fruit remaining erect for a long time; outer prickles ascending, the inner erect, longer than sepals. Leaves eglandulose.

7. *A. velutina* Juz. sp. nova in Addenda IX, p. 478. — *A. viscidula* Maxim. saltem in sched. p. p., non Bge. — *A. pilosa* var. β *viscidula* Kom. in A. H. P. XXII p. 2 (1904) 52 p. p.

Perennial; rhizome simple, horizontal, ligneous; stem 30-50 cm high, covered for half their length with simple hairs spreading below and with shorter, soft, curly hairs, simple or few-branched; leaves 5-15 cm long, 4-11 cm wide, the lower and middle with 5 leaflets, the upper with 3; leaflets obovate or short-subrhombic, obtuse, crenate-dentate, with 7-11 teeth at each side; lateral leaflets sessile, sparingly and shortly appressed-hairy above, green, densely velutinous-canescens beneath, usually short-spreading-hairy along main ribs, eglandulose or nearly so; intercalary lobes few, small, usually entire; stipules often very large, semi-cordate, strongly acutely toothed. Inflorescence loose, few-flowered; bracts small, 3-partite; flowers very short-pedicelated, ca. 3 mm in diameter; hypanthia obconoid, densely hairy, in fruit obovoid, furrowed nearly to base, appressed hairy mostly alongside furrows, eglandulose; sepals ovate-lanceolate, with distinctly prominent midrib; petals oblong, rounded at apex, yellow; fruit not drooping for a long time, ascending-erect or spreading, 5 mm long; bristles erect, not connivent or the outer ascending ca. 2 mm long, shorter than hypanthium and slightly longer than sepals. July. (Plate XXV, Figure 5).

Oak forests, shrubby formations, meadows. — Far East: Uss. (southern part). Endemic. Described from Posyeta Bay and the vicinity of Vladivostok. Type in Leningrad.

Note. This species is apparently closely related to the Japanese *A. nipponica* Koidz. in Bot. Magaz. Tokyo Bot. Soc. XLIV (1930) 104,

but is distinguished from it by its pubescence (the leaves in *A. nipponica* are covered beneath only along veins with long coarse hairs).

Genus 758. **SANGUISORBA** * L.

L., Sp. pl. (1753) 116.

Inflorescence dense, capitate or spicate, long-peduncled; flowers bisexual or partly pistillate, with 1 bract and 2 epicalyx scales. Hypanthia cubiform, with 4 petaloid convex sepals, deciduous in ripe fruit; corolla and outer calyx absent; stamens 4, long; pistils solitary; styles apical, stigma capitate and fimbriate with papillae (villi); fruitlets dry, in the indurate tetragonal hypanthium. Shrubs or undershrubs, glabrous or slightly pubescent, with pinnate leaves.

- 1. Flowers greenish (sometimes slightly reddening) 2.
- + Flowers of another color (sometimes only partly greenish) 3.
- 2. Leaflets of radical leaves truncate or rounded, sometimes almost cordate at base. Inflorescence not more than 3 times as long as broad, drooping 9. *S. alpina* Bge.
- + Leaflets of radical leaves deeply cordate. Inflorescence much longer than broad, erect 8. *S. sitchensis* C. A. M.
- 3. Leaflets almost linear. Inflorescence very narrow and long; flowers white 6. *S. parviflora* (Maxim.) Takeda.
- + Leaflets wider. Inflorescence neither narrow nor long; flowers black-purple, dark red or pink, sometimes partly greenish 4.
- 4. Plant more or less conspicuously rufous-hairy, partly glandular 4. *S. glandulosa* Kom.
- + Plant glabrous or slightly pubescent but not as above 5.
- 422 5. Leaflets orbicular or broadly elliptic 5. *S. magnifica* Schischk. et Kom.
- + Leaflets more or less oblong 6.
- 6. Inflorescence globular or elliptic; flowers black-purple or dark red 7.
- + Inflorescence more or less oblong, often pale 8.
- 7. Plant more than 1 m high; leaves glaucescent-green. Inflorescence elliptic, flowers dark brown-purple or nearly black-purple 1. *S. officinalis* L.
- + Plant not as high; leaves bright green. Inflorescence globular, flowers blood-red 2. *S. polygama* Nyl.
- 8. Robust plant with few-leaved and few-branched stem; leaflets very wide; flowers generally dark purple, rarely pale purple, often partly greenish 3. *S. riparia* Juz.
- + Rather delicate plant with many-leaved stem strongly branching above. Leaflets comparatively narrow. Flowers of different shades of red, never partly green 7. *S. tenuifolia* Fisch.

* From the Latin *sanguis* - blood and *sorbere* - absorb, for the styptic qualities of the plant.

1. *S. officinalis* L., Sp. pl. (1753) 116; Ldb., Fl. Ross. II, I (1844) 27; Kryl., Fl. Zap. Sib. VII (1933) 1562. — *Poterium officinale* A. Gray in Proc. Am. Acad. 7 (1868) 340. — *Sanguisorba cernua* Bess. in Flora XVII (1834) I Beibl. 11. — *S. major* Gilib., Fl. Lituani. I (1781) 18. — *S. praecox* Bess. ex Rchb., Fl. Germ. Excurs. (1832) 611. — *S. bracteosa* Bess. ex Eichw., Skizze (1830) 163. — Ic.: Svensk. Bot. V (1807) 305; Schlechtend., Fl. Deutschl. ed. 5, XXV (1886) 2548; Syreishch., III. Fl. Mosk. gub. II (1907) 240.

Perennial, 20–100 cm high; root robust, developing radical rosette of leaves and mostly solitary stem which branches above; radical leaves long-petioled, with numerous, usually 7–25 petioluled leaflets and usually with stipules arranged at their base; leaflets oblong-ovate or elliptic, cordate or truncate at base, rounded at apex, serrate-dentate, with 10–12 large generally acuminate teeth at each side, thick, dark green above, shiny, glaucescent beneath, dullish, glabrous like entire plant; stems erect, ribbed, hollow, with several adjacent cauline leaves at base, leaflets rapidly diminishing in number [upward], upper cauline leaves small, sessile. Flowers in oval or short-cylindrical heads, 15–30 mm long, on long erect peduncles, dark brown-red or nearly black-purple, bisexual; bracts oblong-ovate, brownish, membranous, pubescent, longer than hypanthium; sepals elliptic or ovate, one and a half to two times longer than hypanthium; filaments red, usually not longer than sepals; anthers small, dark red; stigma with short villi; fruiting hypanthia with thick, obtuse, slightly winged ribs. June–August. (Plate XXVI, Figure 2).

Meadows, steppe meadows and shrubby formations, open grassy slopes, ravines and outcrops, forest edges, edges of bogs, banks of streams. — European part: nearly all regions, absent in Lad.-Ilm.; Krim.; Bl., L.-Don and L. V. — only in northern parts; in Kar.-Lap. (also in Dv.-Pech.?) partially replaced by the species next given in the text; W. Siberia: all regions; E. Siberia: all regions; Far East: Dzu.-Tarb., T. Sh. **Gen. distr.:** nearly all of W. Eur., Mong., Jap.-Ch., N. Am. Described from Europe. Type in London.

Economic importance. The root contains tannins and was formerly used in medicine as a styptic agent (hemorrhages, diarrhea); it was also used in veterinary medicine (intestinal disorders and as an anthelmintic).

2. *S. polygama* Nyl., Spicil. Fl. Fenn. Cent. I (1843) 10. — ? *S. carnea* Fisch. ex Link, Enum. pl. Berol. I (1821) 144 (forma cultura exorata).

Perennial; Arctic and subarctic race of the preceding species, distinguished by its rather low habit, usually ca. 45 cm high, bright green leaves, globular (at anthesis) inflorescence, blood-red flowers and narrower linear-lanceolate bracts. June–July.

Meadows along banks of rivers and lakes and seacoasts. — Arctic: Arc. Eur. (and Siberia?); European part: Kar.-Lap. Endemic. Described from Kola Peninsula (Lake Imandra, Niva River, Kandalaksha village). Type in Helsingfors.

Note. A problematic species, the distribution of which has not been thoroughly investigated. It should be cultivated in order to determine which of its characters are constant and inheritable.

3. *S. riparia* Juz. sp. nova in Addenda IX, p. 479.

Perennial; easily distinguished from *S. officinalis* L. by its robust habit, oblong inflorescence, and slightly paler flowers (sometimes partly greenish). Resembles *S. alpina* Bge. in appearance but is readily distinguished from it by the cordate leaflets of lower leaves, the erect, dense inflorescence, and the dark-colored flowers. July–August.

Riverbanks, vegetation, cliffs near water. — Centr. Asia: T. Sh. (Talass Ala-Tau). Endemic. Described from the valleys of the Ulkun-Kaindy (type), Topchak-su and Dzhebogly-su rivers. Type in Leningrad.

Note. This is apparently a hybrid-derivative which has been collected many times; it grows in an area where the typical *S. officinalis*, as far as we know, is no longer found. Requires further study.

4. *S. glandulosa* Kom. in Not. Syst. Herb. Hort. Bot. URSS VI (1926) 10.

Perennial robust plant, 1 m high, densely covered when young (at maturity sparsely) with rufous and small multicellular glands; radical leaves up to 40 cm long, imparipinnate, with 11–12 short petioluled leaflets; leaflets 6–10 cm long, 3–3.5 cm wide, cordate, oblong or ovate, hairy beneath along nerves, otherwise short-pubescent; cauline leaves smaller, short-petioled or sessile. Peduncles densely hairy and glandular, reddish brown; bracts acuminate, acute, covered with coarse white hairs and rufous glands; inflorescence (spikes) many (10–20), globular or elliptic, 1–2 cm long, rachis densely pubescent; hypanthia tetragonal, with narrowly winged ribs; sepals acute, dark purple, hairy at base, along veins and at apex; filaments shorter than calyx. July–September.

Broad-leaved (oak) forests, tall herbaceous meadows. — Far East: Uss. Endemic. Described from the Daubikhe River valley near Lazarevka village and from the Suchan River valley, Lozovoi Klyuch stream. Type and paratype in Leningrad.

S. glandulosa Kom. × *S. officinalis* L. — According to Komarov, such hybrids are found west of the distribution area of *P. glandulosa* up to Irkutsk *S. officinalis* var. *pubescens* Ganesch. in Trav. Mus. Bot. Ac. Sc. Petrop. XIII (1915) 128, described by S. S. Ganeshin, is referred to this hybrid.

5. *S. magnifica* Schischk. et Kom. in Not. Syst. Herb. Hort. Bot. URSS VI (1926) 10.

Perennial; rhizome rather robust, multicapital, covered with relics of dead leaves; stems 30–60 cm high, simple or few-branched, glabrous like whole plant; radical leaves 50 cm long, imparipinnate; leaflets 7–11, orbicular or orbicular-oblong, cordate, emarginate at apex, 2.5–6 cm long, 3–6 cm wide, coarsely dentate at margin, rather thick, glaucous, with petiolules 0.5–2.5 cm long; cauline leaves 1–2, small, sessile, with 3–5 cuneate leaflets. Peduncles axillary, 1–5, elongate, with small foliaceous dentate or entire bracts; inflorescence elongate, dense, 3–3.5 cm long, with villous rachis; flowers sessile; epicalyx-scales lanceolate, pubescent, as long as hypanthia; hypanthia tetragonal, wingless, glabrous or slightly hairy at summit; sepals oblong, obtuse, bright pink, slightly pubescent; stamens long, 3–4 times longer than sepals, dilated and flattened above, pink. July.

Limestone rock crevices and outcrops. — Far East; Uss. Endemic. Described from the Suchan River valley, Chandalez cliff. Type in Leningrad.

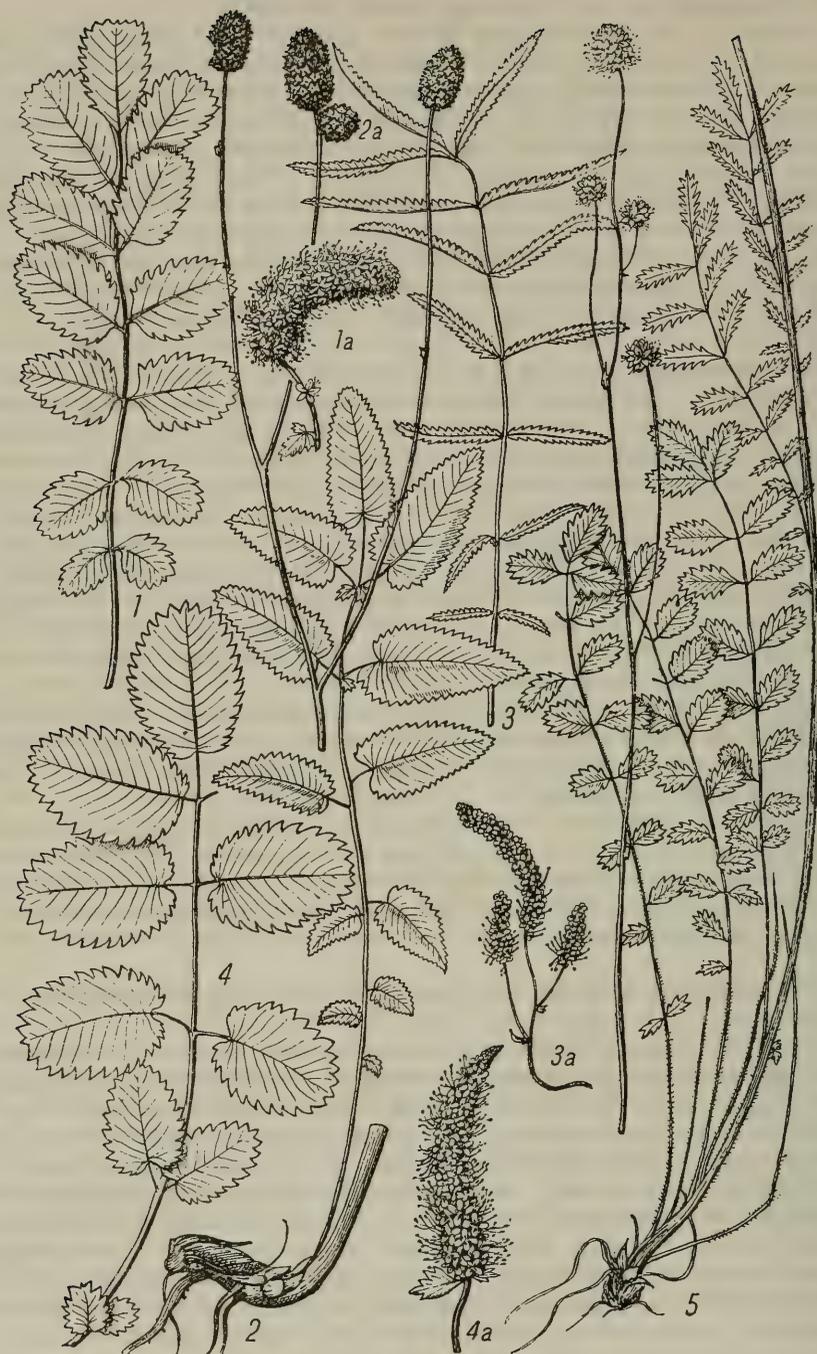


PLATE XXVI. 1 - *Sanguisorba alpina* Bge.: leaf, a) inflorescence; 2 - *S. officinalis* L.: radical leaf, a) inflorescence; 3 - *S. parviflora* (Maxim.) Tak.: leaf, a) inflorescence; 4 - *S. sitchensis* C.A.M.: leaf, a) inflorescence; 5 - *Poterium sanguisorba* L.: general view.

6. *S. parviflora* (Maxim.) Takeda in Journ. Soc. Bot. XLII (1914) 462, in observ.; Kom, et Klob.-Al., Key pl. far-east. II (1937) 653. — *S. alba* Pall., It. III (1776) 320 (nomen). — *S. tenuifolia* Fischer, Herb. saltem p.p.; Ldb., Fl. Ross. II, I (1844) 28, p.p.; Korsh. in A. H. P. XII (1893) 328 et auct. — *S. tenuifolia* γ *parviflora* α Maxim. in Mél. biol. IX (1873) 153.

Perennial completely glabrous robust plant; rhizome thick; stems 60–100 cm high, few- to many-branched above, with thin branches inclined at a very sharp angle or suberect; radical leaves 25–50 cm long, imparipinnate, with 7–15 sessile or very short-petioluled leaflets at each side; leaflets long, narrowly lanceolate or linear, tapering or obtuse and asymmetrical at base, acutely serrate, sometimes biserrate, 4–15 cm long, 5–15 mm wide, stipulate (at least the radical leaves) at base. Peduncles elongate, with lanceolate dentate or entire bracts; inflorescence spicate, cylindrical, long and narrow, 2–7 cm long, 5–10 mm broad, bent; flowers sessile; epicalyx-scales ovate-lanceolate, pubescent; hypanthia wingless, glabrous; sepals orbicular, white, glabrous; stamens exerting, very long, usually longer than width of spike, filaments dilated toward apex. July. (Plate XXVI, Figure 3).

Meadows in river valleys. — Far East: Kamch., Okh., Uda, Ze.-Bur., USS. **Gen. distr.:** Jap.-Ch. Described from Manchúria. Type in Leningrad.

7. *S. tenuifolia* Fisch. ex Link, Enum. pl. Hort. Berol. I (1821) 144, non Fisch. herb.; Ldb., Fl. Ross. II, I (1844) 28 p.p. — *S. media* Rgl., Tent. Fl. Ussuriens. (1861) No. 159, vix autem L. — *S. tenuifolia* β *purpurea* Trautv. et Mey., Fl. Ochot. No. 117, p. 55; Maxim. in Mél. Biol. IX (1873) 153. — *S. officinalis* \times *S. tenuifolia* Korsh. in A. H. P. XII (1892) 328. — *Poterium tenuifolium* Franchet et Sav., En. pl. Japon. I (1875) 133, salt m quoad nomen. — *S. baicalensis* Poplawska in Bull. Acad. Pétersb. sér. VI–VIII (1914) 137.

Perennial; a complex of hybrid forms, with many variable characters; different combinations of characters are represented in both parental species (i. e., *S. officinalis* and *S. parviflora*). July.

Meadows. Distribution nearly like that of *S. parviflora*; in some places encountered more often and in a greater number than the parental forms (for example, in Kamchatka — cf. Hultén, Fl. of Kamtchatka III (1929) p. 84 on). **Gen. distr.:** Jap.-Ch. Description based on a cultivated specimen. Type in Berlin.

8. *S. sitchensis* C. A. M. in Middend., Fl. Ochot. (1856) 34. — *S. canadensis* Cham. et Schlecht. in Linndea II (1827) 32, non L.; Ldb., Fl. Ross. II, I, 28; Kom. et Klob.-Al., Key pl. far-east. II (1937) 653. — *Poterium sitchense* S. Wats., Bibl. Ind. I (1878) 303.

Perennial, 20–120 cm high; rhizome robust; stems simple or branching above, glabrous (like the whole plant); radical leaves with 11–21 short-petioluled leaflets; leaflets cordate at base, the terminal rounded, short-serrate, with ovate teeth; cauline leaves reduced, with sessile, oblong-lanceolate, broadly cuneate leaflets, upper 3 leaflets decurrent-confluent at base. Inflorescence spicate, 2–10 cm long, up to 2 cm broad, fusiform

at anthesis, later cylindrical; epicalyx-scales lanceolate, glabrous or ciliate; sepals ovate, white or reddish; stamens 2-3 times longer than sepals; filaments dilated at apex. July-August. (Plate XXVI, Figure 4).

Marshy banks of mountainous streams, meadows. — Far East: Sakh., Uda, USS. (Sikhota-Alin). **Gen. distr.:** N. Am. Described from Sitkha. Type in Leningrad.

Note. The identification of the Far Eastern plants with the North American requires confirmation.

9. **S. alpina** Bge. in Ldb., Fl. Alt. I (1829) 142; Ldb., Fl. Ross. II (1844) 27; Kryl., Fl. Zap. Sib. VII (1933) 1563. — Ic.: Ldb., Ic. Pl. Fl. Ross. I (1829) tab. 90.

Perennial, 15-80 cm high; radical leaves long-petioled, with 11-17 leaflets, glabrous except for base of petiolules; leaflets short-petioluled, oblong-ovate or elliptic, truncate or slightly cordate, with acute-subulate teeth; stems simple or branching above, slightly tomentose at base and near inflorescence. Inflorescence erect or drooping, 1.5-8 cm long, short-elliptic at first, elongating later, cylindrical; flowers yellowish green, sometimes reddish; bracts ovate-lanceolate, brownish, membranous, pubescent, longer than hypanthia, sepals ovate, not more than one and a half times longer than hypanthia; stamens two to two and a half times longer than calyx; fruiting hypanthia broadly winged along ribs (wings up to 1.5 mm wide). End June-July. (Plate XXVI, Figure 1).

Subalpine and alpine meadows, banks of mountain lakes and streams. — W. Siberia: Alt.; E. Siberia: Ang.-Say.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. **Gen. distr.:** Mong. (Tuva Autonomous Region, Mong. Altai). Described from Eilagush and Aigulak). Type in Leningrad.

Genus 759. **POTERIUM** * L.

L. Gen. pl. ed. 5 (1754) 430.

Flowers small, greenish (reddening in the sun), in dense capitate inflorescence, unisexual in monoecious plants, the upper pistillate, the lower staminate, the median bisexual, with 2 epicalyx-scales at base; hypanthia turbinate or ovoid, tapering at summit; sepals 4; petals absent; stamens numerous, 10-30; pistils 2; ovary at base of hypanthium, styles exerted from its mouth; stigmas penicillate, with long bright red cilia (papillae); fruit consisting of 2 achenes contained in an accrescent and hardening tetrahedral hypanthium furnished with 4 longitudinal ribs. — Perennial herbs or undershrubs with pinnate leaves.

- 1. Fruit (false) glabrous 2.
- + Fruit covered with short rufous hairs (especially in pits), visible only under magnification 3. **P. lasiocarpum** Boiss. et Hausskn.
- 2. Fruit very narrowly winged along ribs or wingless, finely netted-pitted or nearly smooth 1. **P. sanguisorba** L.
- + Fruit conspicuously winged along ribs, wings ca. 0.5 mm wide, hairy along margin, strongly and deeply pitted at faces 2. **P. polygamum** W. et K.

* From the Greek *poterion* — drinking cup; name of a plant by Dioscorides and Pliny.

1. *P. sanguisorba* L. Sp. pl. (1753) 594; Ldb. Fl. Ross. II, 26 saltem p. max. p. — *P. collinum* Salisb. Prodr. (1796) 361. — *Sanguisorba minor* Scop. Fl. Carn. ed. 2 (1772) 110; Kryl., Fl. Zap. Sib. VII (1933) 1564. — *S. poterium* Web. in Wigg. Prim. Fl. Hols. (1780) 14. — *P. dictyocarpum* Spach in Ann. Sc. nat. 3 ser. V (1846) 34. — *S. dictyocarpa* Franchet Fl. Cher-et-Loire (anno?) 180. — Ic.: Cusin et Ansb. Herb. Fl. Fr. VIII (1870) tab. 129. — Exs.: Pl. exs. Austro-Hung. No. 3611.

430 Perennial, 30–60 cm high; rhizome robust, becoming woody; stem prostrate, ascending or erect, usually more or less spreading-hairy in lower part, otherwise glabrous, cylindrical, furcately branching; radical and lower cauline leaves often with pubescent rachis, with 5–25(35) leaflets; leaflets 1–1.5 cm long, short-petioluled, ovate or suborbicular, rarely oblong, cordate or obtuse at base, crenate or serrate, with 3–9 rather large teeth at each side, glabrous, usually pale green; cauline leaves small and with smaller number of leaflets (5–9 in upper leaves). Flower head long-peduncled, globose, or (especially in fruit) ellipsoid, up to 2 cm long; lower flowers staminate, the median bisexual, the upper often pistillate; pedicels short, with one lanceolate enveloping leaf and ovate bracts; calyx pale yellow, later turning brown, deciduous in fruit; stamens of staminate flowers (10)20–30, in bisexual flowers less, filaments long, thin; fruit 1–3 mm long, tetragonal-ovoid, wingless or very narrowly winged along ribs, with obtuse wings only 0.25 mm wide, finely netted-veined or nearly smooth (between wings), yellowish gray. May–July. (Plate XXVI, Figure 5).

Open dry places, meadows, stony taluses, banks, roadsides and field borders, crops, fallow fields and waste places. — European part: M. Dnp., Bl., V.-Don; W. Siberia: reported for Alt. (?); Caucasus: all regions (?). **Gen. distr.:** Scand., Centr. Eur. Described from Western Europe. Type in London.

Economic importance. In west European countries used as a vegetable (in salads, soups, etc.); once cultivated.

2. *P. polygamum* Waldst. et Kit., Descr. pl. Hung. II (1805) 217; Ldb., Fl. Ross. II, 27. — *P. muricatum* Spach, Ann. Sc. nat. 3 sér. V (1846) 36. — *Sanguisorba muricata* Franch., Fl. Cher-et-Loire (anno?) 181; Focke in Engl. u. Prantl, Nat. Pflanzenfam. III, 3 (1888) 45. — *S. polygama* Beck, Fl. N. Oest. (1892) 768, non Nyl. — *Pimpinella sanguisorba* Gärtn., De fruct. I (1788) 162. — Ic.: Waldst. et Kit., l. c. tab. 198; Gaertn., l. c. tab. 32; Cusin et Ansb., Herb. Fl. Fr. VIII (1870) 130. — Exs.: Billot, Fl. Gall. et Germ. No. 3079; Kern. Fl. exs. Austr.-Hung. No. 3610.

Perennial, very similar to the preceding species, distinguished mainly by the following characters: stems slightly taller, 40–80 cm high, erect, completely glabrous; leaflets rather long-petioluled (in radical leaves petiolules often as long as leaflets), indurate, yellowish or glaucescent-green. Inflorescence more or less elliptic at anthesis; fruit 4–5 mm long, 2.5 mm wide, tetragonal-ovoid, winged along ribs, wings up to 0.5 mm wide, with undulate, slightly crenate-dentate at margins, strongly and deeply alveolate or tuberculate on faces (between wings), yellowish-brownish or brown. May–July.

Habitats like the preceding. — European part: Bl., V.-Don, Crim.; Caucasus: all regions; Centra. Asia: T. Sh., Pam.-Al., Syr D., Mtn. Turkm. **Gen. distr.:** Centr. Eur., Med., As.-Min. and Near Asia. Described from Hungary.

431 Note. A polymorphic species. Often not quite typical forms with pubescence of stem like *P. sanguisorba* and with very narrowly winged ribs of fruit but otherwise resembling *P. polygamum* that occur in the Caucasus. Similar intermediate forms have been recorded under the name *P. polygamum* var. *stenolophum* Spach in Ann. Sc. Nat., 3 ser. V (1846) 37 (sub *P. muricato*). We have never seen the typical *P. sanguisorba* in the Caucasus.

3. *P. lasiocarpum* Boiss. et Hausskn. ex Boiss., Fl. or. II (1872) 733; Grossh., Fl. Kavk. IV (1934) 332. — *P. villosum* auct. Fl. As. Med., non Sibth. et Sm. — Exs.: Sintenis It. transcasp.-pers. No. 662.

Perennial glabrous or subglabrous plant with long and acutely dentate leaflets, very much like *P. polygamum* in general appearance (to which it is, undoubtedly, closely related). Scapes long, erect; fruit large, ovoid-tetragonal, with rather narrowly winged ribs and deeply alveolate faces, velutinous with short, golden-rufous hairs, especially dense in pits. Fr. July–August.

Dry slopes and hills, meadows, fields (cotton crops). — Caucasus: S. Transc. (Nakhichevan District); Centr. Asia: Mtn. Turkm., Pam.-Al. (Tadjhikistan). Gen. distr.: Iran, Mesopotamia. Described from Derbent in Basian and Pir Omar Gudrun in Mesopotamia. Type in Geneva, cotype in Leningrad.

Tribe 5. **ROSEAE** Cambess. in Ann. Sc. nat. I (1824) 225; DC., Prodr. II (1825) 596. — Hypanthium urceolate or turbinate, containing numerous carpels, fruit becoming soft at maturity, generally fleshy; outer calyx absent; petals 5, rarely 6; stamens numerous attached to mouth of hypanthium; carpels arranged at base of hypanthium; ovaries with 1–2 pendant ovules. Fruitlet a hard, monospermous nutlet. Shrubs, with prickles or spinelets.

Genus 760. **ROSA** * L.

L., Spec. pl. ed. I (1753) 491; Gen. pl. ed. 5 (1754) 217.

432 Flowers solitary or in terminal umbelliform-paniculate inflorescence, bisexual; hypanthia globose, ovoid, urceolate, or lageniform, tapering toward apex, with well-developed glandular ring (disk); sepals 5, foliaceous, entire or the 2–3 outer pinnatisect; petals 5, white, yellow, pink or red, obcordate; stamens many; pistils numerous, arranged freely at bottom of hypanthium, sessile or short-stalked; ovary pubescent; style nearly terminal; stigma capitate, glabrous or densely hairy; fruitlet nut-shaped, monospermous, in the fleshy hypanthium, together with hypanthium forming false fruit, sometimes hairy inside. Short or rather tall shrubs with shoots frequently armed with prickles; leaves spirally arranged, imparipinnate; stipules herbaceous, generally adnate to petiole.

* Name of this plant in ancient Rome.

Note. Many specialists in Western Europe have painstakingly studied the systematics of *Rosa*; this genus has drawn the attention of botanists for a good number of years, and voluminous literature has been devoted to it; indeed, there is scarcely another genus so much dealt with. Unfortunately, Russian *Rosa* specialists, contrary to their West European counterparts, are still in the incipient stages of such systematical study and many of the species distinguished by them are actually complex-groups of forms whose components have not been sufficiently analyzed. It is noteworthy, however, that a good start of this kind was made by Marshall von Bieberstein and Besser in the first half of the last century; however, no one continued their work, and it was soon forgotten. Subsequently, E. Regel devoted a good deal of attention to the USSR *Rosa* and published a monograph of the genus in 1877 (E. Regel, *Tentamen Rosarum Monographiae*, Tr. SPb. Bot. sada, Vol. 5, No. 2, 1877). Yet, in spite of his broad understanding of the species, his unfamiliarity with the wild-growing species of the genus in their natural habitats led to an incorrect interpretation of many forms known only to him from the scanty herbarium material; as a result his monograph plays more of a negative than a positive role in the study of Soviet forms. After Regel there were only two other Russian specialists: I. F. Shmal'gauzen and A. A. Lonachevskii. The first contributed excellent work, valuable for its time, on the genus in the environs of Kiev (Kiev, 1891). The second studied the genus in the Ukraine, Crimea and Caucasus; unfortunately, he died before completing his work, and, in comparison to what he had done, he had published very little: Keys to the *Rosa* in the European Part of the USSR (Russk. Bot. Zhurn. No. 3, 1910), Crimea and Caucasus (Tr. Bot. Sada Yur'ev. Univ., Vol. 13, 1912); an article on the *Rosa* of Adzharistan (Vestn. Tifl. Bot. Sada, Vol. 30, 1913); and a series of captions of different species or forms for the publication by the Academy of Sciences "Herbarium Florae Rossicae." Lonachevskii planned to describe many of the forms (varieties) of section *Caninae* whose names appear in the different herbaria with which he was associated, but these descriptions were not preserved.

It is therefore not surprising that most of the information on *Rosa* in the USSR comes from works or monographs of West European specialists. Outstanding among these specialists is the Belgian botanist Crépin, who devoted his whole life to the study of this genus. He studied (and treated) the extensive material of the Leningrad herbaria, and the results of this work are recorded in his numerous publications (appearing for the most part in the *Bulletin de la Société Botanique de Belgique*). Some of these publications and remarks on the labels of some herbarial specimens show Crépin's dissatisfaction with fragmentary material (Crépin never wrote a monograph on the genus). The fact that many duplicates of the Russian collections treated by Crépin remained in his herbarium in Brussels enabled Boulenger, one of the more prominent botanists in modern times, to examine them and to publish a monographic survey of *Rosa* of Asia (*Revision des Roses d'Asie*, Bull. du Jardin Bot. de l'Etat Bruxelles, Vol. IX, 1933; XIII, 1935; XIV, 1936-1937). This work, in which many specimens of *Rosa* collected by Russian botanists are cited and the errors made by Crépin corrected, bears far greater significance to Russian botany.

Both Crépin and Boulenger were representatives of the "synthetic" trend in the study of genera, and for this reason a detailed systematic analysis of

Soviet *Rosa* should not be expected of their work. Neither is this accomplished in the present treatment, which was carried out in a comparatively short time; our aim has been not so much the presenting of new data on USSR *Rosa* as the summing up of a century and a half of its study. Least of all this treatment should be regarded as a monograph or even as a thorough study. This, for example, applies to synonymy; thus, we have knowingly omitted many names of species described or noted at an early date in the USSR, the types of which are unknown to us (probably lost in many cases) or cannot be easily identified. Most of these names have long since been forgotten and are not represented in any flora or monograph. We have also omitted a number of varieties, established for some species by different botanists, because of their questionable taxonomical value.

434 The study of the systematic relationships within the genus *Rosa* is extremely difficult; moreover, difficulties encountered here are different for the different groups. Typical of the majority of the sections is their wide intraspecific variability and hybridizing capability; they can be compared in this respect with other genera of the subfamily *Rosoideae*, such as *Potentilla* and *Sanguisorba*. The geographical-morphological method of investigation is fundamental here. A unique picture is presented by the section *Caninae*, in which the species proved to be apomictic; in this context, constant elementary units of the same order [status] as in *Alchimilla* have been observed. In contrast to the latter genus, there has not yet been any attempt to study these units, and the taxa described in this section are necessarily species-aggregates.

For the study and classification of *Rosa* there must be a great deal of material containing both annotinous sterile shoots (turions) and flower-bearing branches in flower and especially in fruit; branches with fruit should be collected for herbaria before the ripening of the fruit.

Economic importance. The varieties of the genus *Rosa* have been popular favorites since ancient times. The most significant of these, of course, are the cultivated types of roses, which here are treated quite superficially. Even the wild-growing species (with their simple 2-whorled flowers) are widely favored in horticulture as ornamental plants as well as for growing hedges, and they are used as a stock for cultivated forms. In addition, one must note the introduction of some species into industry, mainly for the production of attar of roses from the petals; the wild-growing species may be utilized as tanning agents and dyes, which are extracted from the roots (in the Caucasus the roots of many species of roses are used to dye cloth brown) and also from the petals. Of particular economic importance is the fruit of *Rosa*, which is edible and also used in medicine; in recent years it has proved to be a new and excellent source of Vitamin C or ascorbic acid. See the following notes to the individual sections and species.

- 435
1. Styles attached or appearing connate forming a thin column, rarely free, as long or half as long as inner stamens. Shrubs, usually creeping or climbing 2.
 - + Styles free, usually included in hypanthium 5.
 2. Shrubs, often creeping or climbing; leaves with (5)7-9 leaflets. Flowers often small, in many-flowered corymbiform-paniculate inflorescence, rarely solitary; styles connate forming a column, as long as inner stamens 3.

- + Erect shrubs; leaves with 3-5 leaflets. Flowers always solitary, large. Cultivated plants with double flowers; styles free, half as long as inner stamens ***R. chinensis** Jacq.
3. Stipules not incised, glandular. Flowers in few-flowered inflorescence or solitary ***R. arvensis** Huds.
- + Stipules incised. Flowers in many-flowered inflorescence 4.
4. Stipules shortly incised-fimbriate, with laciniae shorter than width of stipules; leaflets glabrous or hairy only beneath along main ribs. Pedicels glabrous; flowers 3-5 cm in diameter 1. **R. maximowicziana** Rgl.
- + Stipules deeply cleft or long-fimbriate, laciniae longer than width of stipules; leaflets hairy, at least along ribs. Pedicels pubescent; flowers 1.5-2.5 cm in diameter ***R. multiflora** Thunb.
5. Climbing shrubs; stipules free, deciduous, with filiform laciniae at margin ***R. banksiae** R. Br.
- + Erect shrubs. Stipules adnate to petioles, without filiform laciniae at margin 6.
6. Sepals entire or very rarely the outer with solitary narrow lateral appendages 7.
- + Outer sepals with lateral appendages (feathers) 39.
7. Fruits red, soft (fleshy). Flowers white or pink (never yellow), frequently few (rarely solitary) 8.
- + Fruit violet, later blackening, indurate (dry). Flowers white or yellow, solitary 33.
8. Upper part of hypanthium falling off the ripe fruit together with sepals, disk, stamens and styles 9.
- + Upper part of hypanthium not falling off the ripe fruit 11.
9. Prickles straight; flowers solitary, rarely 2-3; fruit ovoid or ellipsoid 7. **R. alberti** Rgl.
- + Prickles bent; flowers in many-flowered corymbiform or paniculate inflorescences; fruit globose 10.
10. Leaflets simply-dentate, rarely almost bidentate, eglandulose beneath 19. **R. beggeriana** Schrenk.
- + Leaflets compoundly glandular-dentate, distinctly glandular, beneath 20. **R. lacerans** Boiss. et Buhse.
11. Shoots and prickles densely pubescent; leaves distinctly rugose above 2. **R. rugosa** Thunb.
- + Shoots glabrous or strigose, prickles glabrous; leaves not rugose above 12.
12. Prickles more or less bent 13.
- + Prickles straight or suberect, rarely (weakly) curved (in Caucasian mountainous plant with wide strongly toothed leaflets) 20.
13. Prickles small, weak. Flowers solitary or in few-flowered inflorescences 14.
- + Prickles rather large, rigid. Flowers usually in many-flowered (up to 15) corymbiform inflorescences 17. **R. laxa** Retz.
14. European and West Siberian plants, with reddish brown cortex; leaf with well-developed teeth 15.
- + East Siberian and Far Eastern plants with blackish cortex; leaf generally with weakly developed teeth 17.

15. Leaflets bidentate-glandular, beneath finely glandular, like pedicels
 11. *R. gorinkensis* Bess.
 + Leaflets simply dentate, eglandulose 16.
16. Leaflets with proximate teeth, densely appressed-hairy beneath.
 Flowers often solitary 10. *R. cinnamomea* L.
 + Leaflets with obliquely antrorse teeth, glabrous or slightly pubescent
 beneath. Flowers often 2-4 12. *R. glabrifolia* C. A. M.
17. Leaves (under magnification) finely granular-glandular beneath,
 fragrant when alive 13. *R. davorica* Pall.
 + Leaves generally eglandulose beneath 18.
18. Leaves more or less pubescent (especially beneath) 19.
 + Leaves glabrous or subglabrous 14. *R. jacutica* Juz.
19. Fruit 1-1.5 cm in diameter 15. *R. amblyotis* C. A. M.
 + Fruit larger 16. *R. marretii* Lévl.
20. Leaves eglandulose above 21.
 + Leaves glandular on both sides 29. *R. korshinskiana* Bouleng.
21. Shoots densely covered with thin prickles and bristles 22.
 + Shoots remotely covered with usually broad and firm prickles ... 24.
22. Leaflets large, 1.5-6 cm long, simply dentate. . . 3. *R. acicularis* Lindl.
 + Leaflets small, partly doubly or compoundly dentate 23.
- 437 23. Leaflets oblong, once or doubly dentate. Fruit large, often more
 than 1 cm in diameter 4. *R. oxyacantha* M. B.
 + Leaflets wider, bidentate. Fruit smaller 5. *R. ussuriensis* Juz.
24. Leaflets 12-40 mm long; prickles shorter than the larger leaflets .
 25.
 + Leaflets 3-15 mm long; prickles as long as or longer than the
 larger leaflets 28.
25. Prickles narrow 26.
 + Largest prickles usually very broad and rigid 27.
26. Pedicels very long. Prickles completely straight
 6. *R. schrenkiana* Crép.
 + Pedicels short. Prickles generally somewhat curved
 8. *R. oxyodon* Boiss.
27. Fruit usually glandular-bristly, generally oblong. Leaflets glabrous
 beneath 22. *R. fedtschenkoana* Rgl.
 + Fruit smooth, rarely glandular, generally globose. Leaflets
 appressed-hairy beneath 21. *R. webbiana* Wall.
28. Leaves usually glabrous, more or less glandular beneath 29.
 + Leaves pubescent on both sides or only beneath, eglandulose beneath
 31.
29. Leaves compoundly dentate, many-glandular beneath
 28. *R. alaica* Juz.
 + Leaves generally simply dentate, sparsely glandular beneath 30.
30. Fruit generally oblong; shoots without glaucous bloom
 23. *R. maracandica* Bge.
 + Fruit globose; shoots with glaucous bloom . . . 24. *R. kuhitangi* Nevski.
31. Leaflets simply dentate, glabrous or sparsely pubescent
 26. *R. nanothamnus* Bouleng.
 + Leaflets bidentate, densely hairy on both sides 32.
32. Shrub up to 1.25 m high, with nearly white flowers 4 cm in diameter
 and many firm prickles 25. *R. bellicosa* Nevski.

- + Dwarf shrub, 15–30 cm high, with dark pink flowers ca. 2 cm in diameter and remote, usually small thin prickles 27. *R. hissarica* Slob.
33. Flowers white or yellowish white, leaflets usually numerous, 9–13 34.
- + Flowers yellow, leaflets less numerous, often 7 36.
- 438 34. Large prickles markedly broadened and considerably flattened at base, mixed with acicular bristles 31. *R. elasmacantha* Trautv.
- + All prickles more or less thin, slightly flattened at base 35.
35. Leaflets simply dentate, not glandular beneath 30. *R. spinosissima* L.
- + Leaflets compoundly dentate-glandulose, more or less glandular beneath 32. *R. myriacantha* DC.
36. Leaflets (like rachis of leaf) not glandular, with simple teeth 33. *R. platyacantha* Schrenk.
- + Leaflets beneath or only rachis of leaf more or less glandular 37.
37. Leaflets small, 5–7 mm long, with 4–5 simple or 2-fid teeth 34. *R. ecae* Aitch.
- + Leaflets larger, with many (up to 14) glandular and compound teeth 38.
38. Prickles equal; leaflets frequently glandular on both sides 35. *R. kokanica* Rgl.
- + Large prickles mixed with acicular bristles; leaflets usually eglandulose or glandular only beneath 36. *R. turkestanica* Rgl.
39. Flowers white or pink, usually several together. Fruits soft, fleshy 40.
- + Flowers yellow, usually solitary 71.
40. Leaves with 3–5 large (ca. 4 cm long), generally coriaceous leaflets, rarely leaflets softer in garden forms with large double flowers). Pedicels firm, long, more than 3 cm, densely glandulose 41.
- + Median leaves of flower-bearing shoots generally with 7 leaflets; leaflets smaller, not coriaceous. Pedicels usually shorter (generally wild forms without pleiopetalous flowers) 46.
41. Low-growing (50 cm low) indigenous shrub with creeping underground stolons, without pleiopetalous flowers 40. *R. gallica* L.
- + Taller shrubs with double flowers, cultivated in gardens 42.
42. Leaflets more or less pubescent beneath (at least along veins) 43.
- + Leaves glabrous beneath (often glandular) 45.
43. Sepals usually not parted, ascending above before ripening of fruit **R. turbinata* Ait.
- + Sepals distinctly plumose, recurved 44.
- 439 44. Leaves pubescent on both sides; hypanthia ovoid, glandular-strigose; branches usually covered with small prickles at base; flowers pink **R. damascena* Mill.
- + Leaves glabrous above; hypanthia ellipsoid, usually smooth; branches nearly always prickleless; flowers white **R. alba* L.
45. Leaflets glandular-biserrate, with solitary glands beneath along veins; rachis tomentose. Plant flowering once in the summer; flowers mostly pink **R. centifolia* L.

- + Leaflets simple or eglandular-biserrate, usually eglandulose beneath; rachis of leaf glabrous. Plant flowering two to three times in the summer; flowers usually bright red **R. bifera* Poir.
46. Bristles large, directed upward; flowers in many-flowered inflorescences; sepals with few narrow feathers 9. *R. roopae* Lonacz.
- + Characters other than above 47.
47. Prickles completely straight or hardly curved 48.
- + Prickles rather strongly curved 54.
48. Low shrub (80 cm low), with thick, large, often glabrous leaflets, prominently netted-veined beneath; flowers rather large, bright pink; pedicels rather long, glandular-strigose like lower part of fruit; sepals recurved postanthesis 41. *R. jundzilli* Bess.
- + Characters other than above 49.
49. Leaves glabrous, red like shoots and covered with blue or glaucous bloom; sepals narrow and long, longer than petals . . . **R. glauca* Pourr.
- + Leaves usually densely pubescent, often nearly tomentose, rarely glabrous, not red, frequently without bloom; sepals as long as or shorter than petals 50.
50. Prickles slightly bent; leaflets usually simply serrate, generally eglandulose beneath; sepals patent or turned upward before ripening of fruit 51.
- + Prickles completely straight; leaflets always glandular-biserrate, glandular beneath; sepals ascending or completely closed before ripening of fruit 52.
51. Prickles large; sepals distinctly plumose; fruit strongly strigose 42. *R. tomentosa* Sm.
- + Prickles small; sepals slightly pinnate; fruit smooth or strigulose 46. *R. boissieri* Crép.
- 440 52. Branches pubescent, covered with thin large prickles and small bristles 45. *R. hirtissima* Lonacz.
- + Branches glabrous, only with some large prickles 53.
53. Plant large in all parts; leaves distinctly glandular; leaflets 2–5 cm long; pedicels and fruit bristly; fruit 15–27 mm 44. *R. pomifera* Herrm.
- + Plant with all parts smaller; leaves sparingly glandular; leaflets 1.4 cm long; pedicels and fruit slightly glandular; fruit 12–16 mm 43. *R. mollis* Sm.
54. Low shrubs with very short pedicels (1–4(7) mm) and small leaflets (ca. 1 cm long); prickles large . . . 48. *R. elymaitica* Boiss. et Hausskn.
- + Characters not as above 55.
55. Leaves more or less many-glandular above and often beneath . . . 56.
- + Leaves not glandular pubescent or with weak glandular pubescence (usually only on petioles and beneath along main ribs) 63.
56. Sepals often turned upward or at ripening of fruit spreading, frequently persistent 57.
- + Sepals recurved at ripening of fruit, generally deciduous 60.
57. Disk with aperture (hypanthium mouth) equal in width to one-half to three-fifths of the whole diameter. (European species) 58.

- + Disk aperture (usually reduced to a simple ridge), one-fourth to two-fifths of the diameter (Asiatic species) 59.
58. Leaflets ovate or orbicular, rounded at base. Pedicels glandular-bristly 49. *R. eglanteria* L.
- + Leaflets oblong-obovate or oblong, cuneate. Pedicels almost always without stalked glands 50. *R. caryophyllacea* Bess.
59. Prickles usually somewhat curved, branches with acicular pricklets in addition to prickles; larger leaflets with 12-20 teeth at each side 55. *R. glutinosa* Sm.
- + Prickles straight, branches without acicular pricklets; larger leaflets with 3-13 teeth at each side 56. *R. alticola* Bouleng.
60. Branches and shoots with acicular pricklets besides prickles; largest leaflets less than 2 cm; pedicels shorter than hypanthia 54. *R. horrida* F. Fisch.
- + Acicular pricklets absent; leaflets often larger; pedicels frequently longer than hypanthia 61.
61. Hypanthium mouth rather broad, one-half to two-fifths of the diameter of disk. (Asiatic species) 51. *R. iberica* Stev.
- 441 + Hypanthium mouth very narrow, one-seventh to one-fifth of the disk diameter. (Eurasian species) 62.
62. Leaflets usually 7, cuneate or tapering at base. Pedicels and hypanthia generally smooth; flowers often white 53. *R. agrestis* Savi.
- + Leaflets often 5, usually rounded at base. Pedicels and sepals frequently bristly or glandular below; flowers often pink 52. *R. micrantha* Sm.
63. Leaflets very densely hairy, nearly tomentose on both sides (like the species in subsection *Vestitae*); rachis and petioles tomentose-hairy and short-glandular. Pedicels and hypanthia very densely glandular-bristly 61. *R. alexeenkoi* Crép.
- + Characters not as above 64.
64. Head of styles sessile, large, thick, tomentose; sepals spreading or antrorse in ripe fruit 65.
- + Head of styles usually stalked, smaller, looser, glabrous or slightly pubescent; sepals always recurved, generally deciduous before ripening of fruit 68.
65. Prickles thick, more or less curved or falcate, strongly and gradually broadening at base; feathers of sepals numerous, rather wide . . . 66.
- + Prickles thin, slightly curved, weakly flattened at base, slightly but abruptly broadening and nearly becoming pricklets; feathers of sepals few, narrow 64. *R. woronowii* Lonacz.
66. Prickles distinctly curved; flowers dark pink; pedicels smooth . . 67.
- + Prickles less curved; flowers white; pedicels usually bristly 47. *R. svanetica* Crep.
67. Leaflets densely hairy on both sides 58. *R. coriifolia* Fries.
- + Leaflets glabrous or sometimes slightly hairy 57. *R. afzeliana* Fries.
68. Leaflets glabrous on both sides 59. *R. canina* L.
- + Leaflets more or less pubescent on both sides (sometimes only beneath along main ribs) 69.

69. Leaflets not glandular 60. *R. corymbifera* Borkh.
 + Leaflets slightly glandular beneath (at least along midrib) 70.
 70. Leaflets usually orbicular, simple or bidentate. Pedicels generally
 smooth; sepals frequently with wide appendages . . . 62. *R. klukii* Bess.
 442 + Leaflets obovate, deeply bidentate. Pedicels, hypanthia and sepals
 sparingly glandular below; sepals with narrow appendages
 63. *R. leucantha* M. B.
 71. Prickles partly curved; leaflets generally tapering at base 72.
 + All prickles erect; leaflets orbicular at base, usually glandular . . .
 37. *R. foetida* Herrm.
 72. Leaflets broadly obovate 38. *R. hemisphaerica* Herrm.
 + Leaflets oblong-obovate 39. *R. bungeana* Boiss. et Buhse.

Section 1. SYNSTYLAE DC., Cat. Hort. Monsp. (1813) 137 p. p. — Erect or often creeping or climbing shrubs with curved prickles; in USSR species stipules adnate to petioles, deeply incised or dentate. Sepals entire or the outer pinnatisect, recurved after anthesis, deciduous in fruit; styles connate in slender column, longer than attached stamen and approximately as long as inner stamens.

1. *R. maximowicziana* Rgl. in A. H. P. V, fasc. II (1878) 378; Crép. in Bul. Bull. Soc. Bot. Belg. XVIII (1879) 282; Boulenger in Bull. Jard. Bot. de Bruxelles IX (1933) 258. — *R. luciae* var. *aculeatissima* Crép in sched. ex Rgl. l. c.; cfr. Crép., l. c. — *R. coreana* R. Keller in Bot. Jahrb. XLIV (1909) 46, non Kom. — *R. kelleri* Baker in Willmott, Gen. Rosa (1910) 75. — *R. multiflora* auct. plur., non Thunb.

Shrub, erect, dense, strongly branching; prickles few, small, curved, some in pairs, sometimes with admixture of erect or curved pricklets; leaves 5–10 cm long, 7–9 leaflets to 2–4.5 cm long, ovate or elliptic, orbicular or tapering at base, orbicular or acuminate at apex; teeth simple, shallow, 15–28 at each side, upper leaflets glabrous, pubescent only on lower side of midrib; petioles pubescent, sometimes slightly glandular, armed with small curved prickles; stipules narrow, glabrous, their margin shallowly ciliate-dentate (cilia shorter than breadth of stipules). Inflorescence corymbiform or oblong-paniculate; flowers 3.5–5 cm in diameter, white; pedicels long, 2–3 cm, glabrous and smooth or slightly glandular; hypanthium globose or ovate, smooth; sepals smooth, with long apical appendage and 1–2 linear lateral feathery, dorsally glandulose, proximally recurved readily flowering; caducous; disk semi-globose or conical; hypanthium mouth narrow; style column glabrous, head orbicular or conical; petals globular, smooth, without sepals. June–July. (Plate XXVII, Figure 1).

443 Forest edges, meadows, shrubs, banks of rivers and lakes. — Far East: Uss. Gen. distr.: Jap.-Ch. (Manchuria and Korea). Described from Posyet Bay and Victoria Bay. Type in Leningrad.

**R. multiflora* Thunb., Fl. Japon. (1787) 217. — *R. thunbergii* Tratt., Mon. I (1823) 86. — *R. polyantha* Sieb. et Zucc., Abh. Ak. Münch. IV, II (1846) 128. — *R. wichurae* K. Koch, Wochenschr. f. Gärtn. XII (1869) 201. — Ic.: Curtis, Bot. Mag. XLVI (1890) 7119; Willmott, Gen. Rosa (1910) p. 20.

Shrub, climbing, 7 m high; prickles usually curved, sparse, or arranged in pairs; leaves 4.5–10 cm long; leaflets of different shapes, 5–9, 2–5 cm long, sometimes suborbicular, tapering at base, orbicular or acuminate at apex, teeth simple, rather deep, in larger leaflets 13–22 on each side; uppermost leaflets glabrous or slightly hairy above, more or less pubescent beneath, at least along midrib and lateral veins; petioles pubescent, usually elgandulose; stipules narrow, deeply incised or bearing along margin long, sometimes branching cilia, longer than breadth of stipules. Inflorescence often pyramidal-paniculate, many-flowered; flowers small, 1.5–2 cm in diameter; pedicels 0.5–1.5 cm long, pubescent, sometimes tomentose, smooth or glandular-bristly; sepals short, tapering abruptly to a short mucro, with 1–3 very narrow lateral feathers, glabrous or pubescent, smooth or slightly glandular dorsally, later declinate, readily deciduous; petals white or pink, narrow, distinctly longer than sepals; fruit globose or ovate, red, without sepals. June–July.

Cultivated in the Crimea, Caucasus, and other places. **Gen. distr.:** Jap. Described from Nagasaki, Kyushu Island. Type in Uppsala.

**R. arvensis* Huds., Fl. Angl. ed. 1 (1762) 192. — *R. silvestris* Herrm., Diss. inaug. Ros. (1762) 10. — *R. repens* Scop., Fl. carn. ed. 2, I (1772) 355. — *R. serpens* Wib., Prim. fl. Werth. (1799) 265.

Shrub; stem low, with climbing or creeping shoots; prickles strongly curved; leaves 5–7 pairs; leaflets oblong to orbicular, thin, dull green, glabrous or slightly pubescent, with few broad teeth. Flowers solitary or in inflorescences; pedicels usually covered with dense short-stalked glands; hypanthium smooth; sepals entire or the two outer ones with few short feathers; petals white; fruit globose or oblong, small, dry. June–July.

Cultivated. Wild in Centr. and Atl. Eur., Med., Bal.-As. Min. Described from England. Type in London.

Economic importance. The cultivated strains of this rose are used to cover trellises, walls, summer houses, etc. In the USSR they are for the most part used as coverings.

Section 2. **INDICAE** Thory, Prodr. Mon. gen. Rosae (1820) 128. — Generally erect shrubs with large, persistent leaves with 3–5 leaflets. Styles free, approximately half as long as inner stamens. Otherwise similar to preceding section.

**R. chinensis* Jacq., Obs. bot. III (1765) 7. — *R. indica* Lindl., Monogr. Ros. (1820) 106; Focke in Engl. u. Prantl, Nat. Pflanzenfam. III, 3 (1888) 47 et auct. plur., an L.? Ic.: Jacquin l. c. tab. 55; Redouté, Roses, tab. ad pag. 51 et tab. 3 ad pag. 79.

Shrub; leaves persistent; leaflets compact, oblong, the basal pair conspicuously smaller, the terminal much larger, slightly acuminate, twice finely serrate, dark green, luminous, pale green beneath. Flowers usually solitary, rarely 2–3, on long, delicate, often stalked glandular pedicels, frequently double; petals pale pink or dark purple, rarely pale yellow or whitish; sepals recurved after flowering; fruit long remaining green, finally turning dirty brown. June to fall.

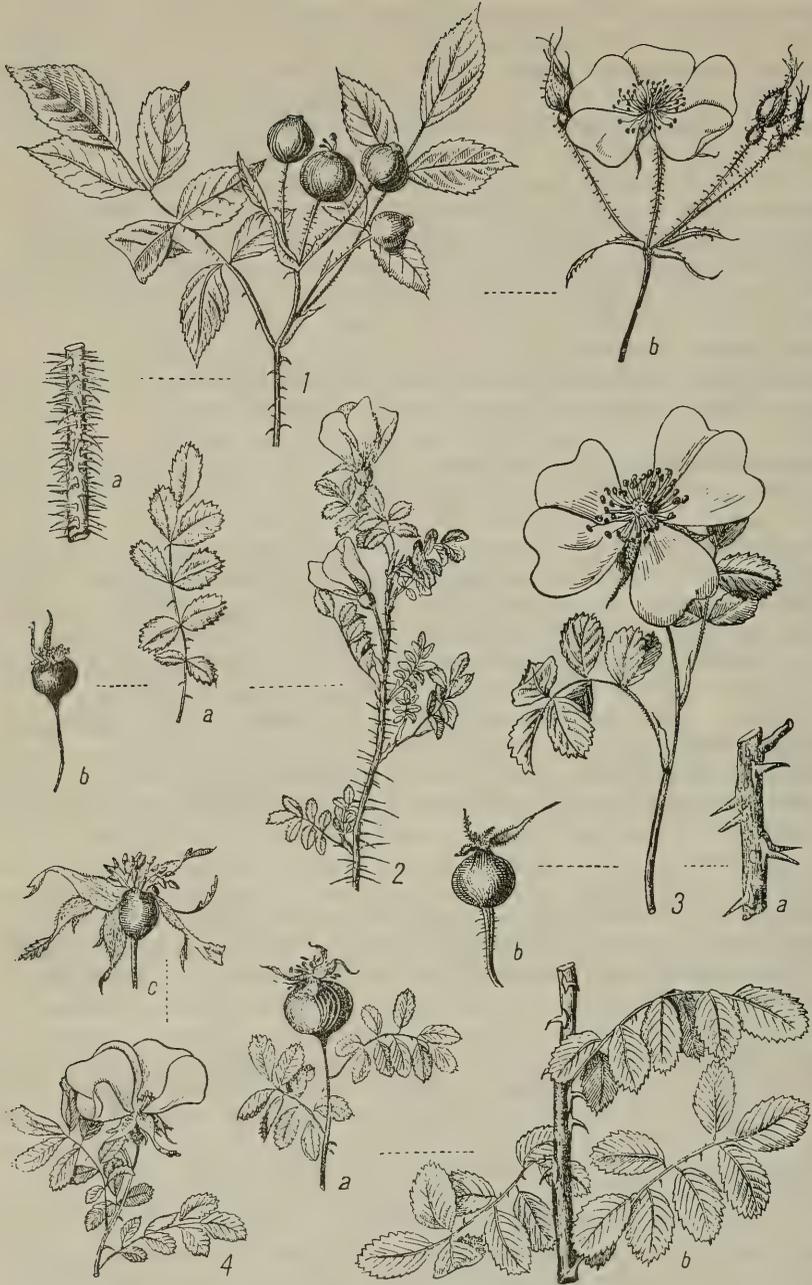


PLATE XXVII. 1 - *Rosa maximowicziana* Rgl., fruiting branch, a) part of stem, b) inflorescence branch; 2 - *R. spinosissima* L., flower-bearing branch, a, leaves, b, fruit; 3 - *R. platycantha* Schrenk., flower-bearing branch, a) part of stem, b) fruit; 4 - *R. bungeana* Boiss et Buhse, flowering branch, a) fruiting branch, b) part of stem with leaf, c) fruit.

Cultivated. Believed to be a native of China, but wild-growing species unknown. Described from a garden specimen. Type unknown.

Economic importance. The perennial strains and hybrids of this species are among the most beautiful flowering plants. Of interest are the so-called trailing tea roses, grown in summer houses, on balconies, and in the southern regions (e. g., Crimea) etc. In the more northern regions, *R. chinensis* can winter only if well-protected.

Section 3. **BANKSIAE** Crép. in Journ. Hort. Soc. London XI (1889) 217. — Climbing shrubs, almost without prickly branches; stipules free, deeply incised, deciduous. Sepals entire; petals usually yellow.

***R. banksiae** R. Br. in Ait. Hort. Kew. ed. 2, III (1811) 256. — Ic.: Bot. Mag. tab. 1954.

Shrub, climbing, 4 m high; branches slender, usually without prickles; leaves overwintering; leaflets 3–5(7), oblong to broadly lanceolate, glossy on both sides, paler beneath. Inflorescence irregularly corymbiform-paniculate; flowers yellowish or white; hypanthium in rare non-double flowers only 1.5–2 mm in diameter, larger in double flowers, semi-globose. June–August.

Cultivated in the Soviet Union, in particular on the southern shores of the Crimea and W. Caucasus, where it often grows wild. Derivation: China (Yunnan). Described from China. Type in London.

447 **Economic importance.** This valuable plant of southern regions has the same significance as *R. multiflora* and *R. arvensis*.

Section 4. **CINNAMOMEAE** DC., ap. Ser. Mus. Helv. I (1818) 2. — Flower-bearing scapes often without prickles or more or less densely glandular-bristly; prickles erect or curved, often paired at base of leaves; upper stipules usually broadening, passing gradually into broad and elongate auricles. Flowers solitary or in many-flowered (3) inflorescence; sepals entire, directed upward after flowering, persistent in fruit, rarely deciduous.

Economic importance. The high-quality raw material from which vitamin C is extracted and which is obtainable from many species gives this section special economic importance. It is worthy of note that whereas all the investigated species of this section proved to be excellent vitamin sources, none of the investigated species from other sections of the genus proved to contain any. This appears to corroborate the natural character of section *Cinnamomeae*. In turn, it leads us to prefer the earlier subgeneric system of Crépin to the more recent ones of Almquist and Boulenger, in which this section is not recognized.

Cycle 1. **Rugosae** Juz. — Shoots densely pubescent, with numerous prickles, also pubescent; prickles usually with a mixture of spicules and bristles. Flowers bright red; calyx persistent in fruit.

2. *R. rugosa* Thunb., Fl. Jap. (1784) 213; C. A. M. in Mém. Ac. Sc. St. Pétersb. sér. VI, t. VI Bot. (1849) 32 quoad var. α Thunbergiana m et β ferocem; Crép. in Bull. Soc. Bot. Belg. XIV (1875) 41. — *R. ferox* Ait. Hort. Kew. ed. 2, III (1811) 262; Lindl., Ros. Mon. (1820) 5 excl. pl. Caucas., non Lawr. — *R. regeliana* Linden et André, III. Hortic. XVIII (1871) 11. — *R. rugosa* var. *amurensis* Debaux, B. S. Linn. Bord. XXXI (1876) 152. — Ic.: Redout., Roses, tab. 12 (sub *R. kamtschatica*); Linden et Andre, l. c., t. XLVII. — Exs.: HFR No. 2109.

448 Shrub, robust; shoots 1–2 m high, to 4 cm in diameter; prickles abundant, erect, rarely slightly curved, thin, short, pubescent, mixed with more or less numerous acicular prickles or bristles; leaves 5–22 cm long; leaflets 5–9, generally medium-sized, the largest 2.5–6 cm long, orbicular or elliptic, robust, strongly rugose, glabrous above, glossy, grayish green beneath, pubescent, eglandulose or slightly glandular, with 13–24 simple, short, obtuse teeth at each side; stipules broad, with triangular, acute or acuminate slightly divergent auricles; petioles tomentose-hairy, unarmed or with few pricklets. Flowers solitary or in 3–6-flowered inflorescence, large, 6–12 cm in diameter, aromatic; pedicels short, 1–2.5 cm long, covered with broad terminal leaves, glabrous or tomentose-hairy, smooth or covered with stalked glands and glandular bristles; hypanthium globose or broader than long, glabrous, smooth or bearing few prickles; sepals 2–4 cm long, frequently with distal broadened foliate appendages, smooth or glandular-bristly dorsally; petals rather large, carmine red or dark pink, sometimes white; capitulum of styles globose or flattened, woolly; fruit large, globose, usually flattened-globose, fleshy, soft, bright red, crowned by erect sepals, often drooping. July, early August. (Plate XXVIII, Figure 1).

Meadows along the seacoast, sandy soil. Widely distributed in gardens, sometimes wild. — Far East: Kamch. (S.), Sakh., Okh., Uss. **Gen. distr.:** Jap.-Ch. (Korea, N. Ch., Hokkaido Island). Described from Japan. Type in Uppsala.

Economic importance. A favorite ornamental plant, distinguished by great resistance to frost. In the Far East (S. Sikhote-Alin), the flowers are used to make jelly and preserves. The people of Sikhote-Alin store the edible fruit for the winter. A fine vitamin-producing plant (about 2.75% ascorbic acid per dry weight of pulp).

× *R. kamtschatica* Vent., Descr. plant. nov. Jard. Cels. (1800) 67; Crépin in Bull. Soc. Bot. Belg. XI (1872) 51. — *R. cinnamomea* Ldb., Fl. Ross. II, 76 quoad pl. kamtsch. p. p. — *R. rugosa* var. γ Lindleyana C. A. M. in Mém. Ac. Sc. St. Pétersb. sér. VI t. VI (1849) p. 34, δ Chamissoniana p. 34, ϵ Ventenatiana p. 35, σ subinermis p. 36 quoad pl. kamtsch.; cfr. Crép., l. c. XIV (1875) 44. — *R. kamtschatica* β nitens Lindl. in Bot. Regist. tab. 824. — *R. davurica* × *rugosa* Hultén, Flora of Kamtchatka III (1929) 91. — Ic.: Ventenat, l. c. — Lindl., l. c.

Shrub; plant similar to *R. rugosa* in pubescence of stem and prickles, bristly stem and more orbicular leaflets; to *R. amblyotis* in large, broad opposite stipulate prickles, dark-colored, often glabrous stem and smaller flowers (cf. Hultén l. c.). Presumably a hybrid between *R. rugosa* Thunb. and *R. amblyotis* C. A. M.

Habitat the same as preceding species.— Far East: Kamch. Endemic. Described from cultivated specimens from Kamchatka. Type unknown.

Economic importance. Ornamental, often cultivated alongside *R. rugosa*, for which it is often mistaken.

Note. In the Ussuri territory, there occurs an analogous hybrid between *R. rugosa* and *R. davurica* Pall. (oral communication by V. L. Komarov); it has not yet been studied.

149 Cycle 2. **Aciculares** Juz.— Shoots glabrous with dense, erect, thinnish prickles and bristles. Flowers red or pink; calyx persistent in fruit.

3. *R. acicularis* Lindl., Ros. Monogr. (1820) 44; Crép. in Bull. Soc. Bot. Belg. vol. XIV (1875) 5.— *R. alpina* Pall., Fl. Ross. vol. I, 2 (1788) 61, non L.— *R. gmelini* Bge. in Ldb., Fl. Alt. III (1829) 228; Ldb., Fl. Ross. II (1844) 75; Déségl. in Bull. Soc. Bot. Belg. XV (1876) 281.— *R. baicalensis* Turcz. ap. Bess., in Flora XVII (1834) I, Beibl. 12.— *R. acicularis* α *hypoleuca* et β *gmelini* C. A. M. in Mém. Acad. Sc. St. Pétersb. 6 sér. VI (1846) 15, 17.— *R. carelica* Fr. Summa Veg. Scand. I (1846) 171; Déségl., l. c., vol. XV (1876) 274;— *R. korsakovien-sis* Lévl. in Fedde, Rep. sp. nov. X (1912) 378.— Ic.: Lindl., l. c., tab. 8; Lange, Fl. Dan., Suppl. 2 (1865) tab. 75.— Exs.: HFR No. 2108.

Shrub, low or medium-sized (to 2 m high), with arcuate stem and weak, glabrous branches covered with dense prickles and bristles; prickles very thin, erect or slightly curved, often paired at base of leaves; leaves 3–15 cm long, leaflets 5–7(9), to 1.5–6 cm long, on glabrous or finely pubescent and glandular rachis, ovate or elliptic, acute, thin, glaucescent, usually with 9–25 simple deep teeth at each side, glabrous above, glabrous or thin-pubescent beneath, often only along veins; stipules glandular-ciliate-margined, with divergent ovate-lanceolate auricles. Flowers often solitary, rarely 2–3, 3–6 cm in diameter, on long, smooth, sometimes glandular-bristly, 0.7–3.5 cm long pedicels; hypanthia elliptic, ovoid or pyriform, rarely globose; sepals lanceolate, narrow, more or less broadened distally, often foliate, dorsally smooth or glandular, directed upward after anthesis, persistent; petals obcordate, pink or reddish; styles villous, free, head orbicular, woolly; fruits usually drooping, sometimes erect, 1.5–2.5 cm in diameter, red, sometimes ovoid with apical constriction, sometimes ellipsoid, tapering at both ends, sometimes oblong, often obovate-pyriform, strongly tapering at base, crowned with convergent sepals. June–July. (Plate XXVIII, Figure 4).

Forests (predominantly spruce), forest slopes and edges.— European part: Karl.-Lap., Dv.-Pech., V.-Kama; W. and E. Siberia; Far East: from Kamch. to Uss.; Centr. Asia: Dzu.-Tarb., T. Sh. **Gen. distr.:** Scand., N. Mong., N. Ch., Jap., N. Am. Described from Siberia. Type in London.

450 **Economic importance.** Ornamental, often grown in the gardens of Siberia; also forms part of hedges. Roots and leaves contain tannins. The yield of essential oils from the flowers is 0.04% of dry weight (Hammerman). The fruit contains sugar, tannic and dye substances, pectin, pentosan, vitamin C (ca. 2.30% ascorbic acid per dry weight of pulp) and yields an orange dye upon boiling.

Note. A highly variable species which may require further division; such forms as *R. gmelini* Bge. and *R. carelica* Fr., at one time considered as separate species, scarcely deserve special attention. Of much greater interest are some of the Far Eastern forms studied by Crépin. Crépin wrote (l. c. 1875, 6) that at one time in the Berlin herbarium he had given the name *R. discolor* Crép. to a form collected by Maksimovich in Manchuria along the Amur River; this form, also collected by Glehn, had been seen by Crépin in the herbarium of the Academy of Sciences, St. Petersburg. He gave the name of *R. amurensis* Crép to another form in the Berlin herbarium also collected by Maksimovich. Both these forms, however, still await study.

In Japan, *R. nipponensis* Crép., l. c., p. 7, is a related species.

4. *R. oxyacantha* M. B., Fl. taur.-cauc. III (1819) 338; Crépin in Bull. Soc. Bot. Belg. XIV (1875) 9 saltem p. p. — *R. pimpinellifolia* var. *subalpina* Bge. ex M. B., l. c. — *R. acicularis* var. *subalpina* Bouleng., Bull. Jard. Bot. Etat, Bruxelles XIV (1936) 136.

Shrub, low, divaricately branched, with gray (on old shoots) or red-brown (young branches and turions) bark; prickles numerous, thin, acicular, erect, whitish, with abruptly short-broadened base; leaves 3–6 cm long, usually with 9 leaflets; rachis and petioles glabrous, bearing stalked glands sometimes mixed with small prickles; stipules on flower-bearing branches strongly broadening distally, dorsally purple, with dense purple stalked glands along margin; leaflets small, oblong or elliptic, rounded at base or slightly tapering, usually short-acuminate at apex, glabrous on both sides, pale green beneath, often with stalked glands along midrib; teeth 8–15 at each side, shallow, small, turning upward, acute, simple or often, at least some, duplicate, with small dark purple sessile distal gland. Flowers solitary, small, 2.5–3 cm in diameter, not longer than bract; pedicels 1–1.5 cm long, usually covered with dense stalked glands, rarely smooth, glabrous; hypanthia ovate or oblong, rarely globose, smooth or sometimes remotely glandular-bristly; sepals lanceolate or narrowly lanceolate, with long, linear or slightly broadened appendages, thinly white-tomentose inside and along margins, dorsally smooth and glabrous, sometimes glandular-bristly, more than 1 cm long; petals as long or nearly as long as sepals, probably pale pink; head of style orbicular, densely lanate; fruit 451 oblong or orbicular, more than 1 cm in diameter, dark red, fleshy, crowned by sepals directed upward. July.

Mountain slopes and rock streams, shrubby formations along upper forest border. — W. Siberia: Alt.; E. Siberia: Ang.-Say. Gen. distr.: Mong. Described from Siberia (from the Zalesov specimen). Type in Leningrad.

Note. Crépin, l. c. (p. 10) regarded this plant as a hybrid of *R. pimpinellifolia* (*R. spinosissima* L. in our nomenclature) and *R. acicularis* Lindl., a view which appears to us entirely without foundation. Later, Boulenger (l. c.) rejected this opinion preferring the view that *R. oxyacantha* M. B. was only a microphyllous form of *R. acicularis* Lindl. It is indeed very close to the latter, but in view of the existence of a number of indubitably constant differences, especially in the shape of the leaflets and their uncharacteristic serration, this interpretation is not accepted.

5. *R. ussuriensis* Juz. nov. sp. in Addenda IX, p.479.—*R. koreana* Kom. et Klob.-Alis., Key for the pl. far East region USSR II (1932) 654, non Kom.—*R. oxyacantha* Crép., l. c. (1875) p. p., non M. B.

Shrub, readily distinguished from preceding species by larger growth, dark green leaflets broadly elliptic, at least in upper part, duplicate-dentate, pedicels usually shorter and smoother, fruit small. July.

Rock streams in forests.—Far. East: Uss. Gen. distr.: Jap.-Ch. (Manchuria). Described from Ussuri region. Type in Leningrad.

Note. The Ussuri plant is readily distinguished from the "type" *R. coreana* Kom. It varies in shape and dimensions of fruit and requires further study.

×*R. schischkinii* Juz. hybr. n. in Addenda, IX, p.479.—? *R. davurica* Pall. × *R. ussuriensis* Juz.).

Recalls *R. ussuriensis*, but is distinguished from it by the fewer prickles on the flower-bearing branchlets and the different serration of the leaflets (teeth, simple, contiguous); from *R. davurica* and *R. amblyotis* C. A. M. by thin, acicular, basally slightly broadened, prickles, smaller glabrous leaflets and solitary flowers. June–July.

Distribution as in *R. ussuriensis*.—Far East: Uda. Endemic. Described from Botcha valley (Sikhote-Alin). Type in Leningrad.

6. *R. schrenkiana* Crép. in Bull. Soc. Bot. Belg. XIV (1875) 31.—*R. acicularis* var. *schrenkiana* Bouleng. in Bull. Jard. Bot. Etat Bruxelles XIV (1936) 135.

Shrub, low, with rather coarse, slightly flexuous branches, glaucous-green bark and paired prickles; prickles whitish green, rather thin, horizontally spreading or ascending, erect or very slightly curved distally, very slightly compressed, with oval or elliptic base; besides stipulate prickles, branches also with small remote prickles; stipules short, moderately wide, thinly glandular-ciliate-margined, with divergent lanceolate auricles; sepals glabrous; leaflets 3–5, small, quite glabrous, dark green above, whitish glaucescent beneath, distinctly petioluled, ovate or orbicular ovate, obtuse, with simple teeth. Flowers solitary or 2–4; bracts 1–2 on pedicels, broadly ovate, short-acuminate, thinly glandular-ciliate; pedicels long, flexuous or curved, drooping distally, profusely stalked-glandular; hypanthia ovoid, more or less orbicular at base, distally thickened, densely glandular-hispid, rather long, moderately broadened, after anthesis ascending at summit; sepals probably persistent; corolla apparently small; styles lanate-villous, with stigma forming a rather large sessile capitulum; fruit ovoid. July.

Mountains.—Centr. Asia: Dzu.-Tarb. Endemic? Described from the foothills of Dzungarian Ala-Tau. Type in Leningrad.

Note. As pointed out by Boulenger, this species is close to *R. acicularis* rather than to *R. laxa* Retz. with which it was allied by Crép. the differences in the character of the prickles and fruit appear sufficiently significant to indicate that the species should be treated separately.

Cycle 3. *Albertianae* Juz.—Shoots glabrous, with numerous erect, thin prickles. Flowers white; at ripening of fruit calyx and upper part of hypanthium deciduous.

7. *R. alberti* Rgl. in A. H. P. VIII (1883) 278; Crép. in Bull. Herb. Boiss. IV (1896) 716; Bouleng. in Bull. Jard. Bot. Etat Bruxelles XIV, 2 (1936) 176. — ? *R. beggeriana* var. *macrocarpa* R. Kell. in Verh. Bot. Ver. Brandenb. XLVI (1904) 113 p. p.

453 Shrub, strongly branching, more than 1 m high; branches long, arcuately curved; prickles small, thin, erect, subulate or abruptly tapering, usually together with acicular prickles at base; leaves with (5)7–9(11) leaflets, oblanceolate or elliptic base, tapering or orbicular, apex rounded or acute, 4.5 cm long, 1.5 cm wide, glabrous above, generally hairy (at least along veins) beneath, often eglandulose; teeth as a rule duplicate-glandular-serrate; petioles pubescent, sometimes glandular; stipules with acute declinate auricles, bearing glands along margins. Flowers frequently solitary, exceeding bracts; pedicels 1.2–3.5 cm long, smooth, often glandular, longer than the long ovoid, ellipsoid or lageniform, and smooth hypanthium; sepals narrow, gradually tapering at base, slightly broadened distally, 1–2.5 cm long; corolla 3–4 cm in diameter; petals as long as or longer than sepals, slightly notched, white; style head flat or orbicular, lanate; fruit ovoid or ellipsoid, 1.5 cm long, attenuate, falling off together with disk and sepals. June–July. (Plate XXIX, Figure 1).

Mountain forests, forest edges, shrubby formations. — W. Siberia: Alt.: Centr. Asia: Dzu.-Tarb., T. Sh. Endemic. Described from Tien Shan. Type in Leningrad.

Cycle 4. *Pendulinae* Juz. — Mountain plants with few erect or slightly curved prickles; flowers pink; calyx persistent in fruit.

8. *R. oxyodon* Boiss., Fl. Or. II (1872) 674; Crép. in Bull. Soc. Bot. Belg. XIV (1875) 12. — *R. oplisthes* Boiss., l. c.; Christ. in Boiss., l. c.; Suppl. (1888) 211; Crép. in Bull. Soc. Bot. Belg. XXVII, II (1888) 103. — *R. haematodes* Boiss., l. c. (1872) 684. — *R. cinnamomea* var. *oxyodon* Rgl. in A. H. P. V, 2 (1878) 326. — *R. canina* var. *szovitsi* Rgl., l. c. 339. — *R. alpina* var. *oxyodon* Bouleng. in Bull. Jard. Bot. Bruss. XIV (1936) 244.

Shrub, ca. 1 m high (sometimes dwarf), with reddish brown or dark red bark; prickles usually equal, large or medium-sized, erect or slightly curved, with broadened, elliptic, sometimes strongly decurrent base, often sparse, rarely in sessile pairs, sometimes together with numerous acicular prickles; leaves 4.5–15 cm long; leaflets 5–7 (often 7), 2–6 cm long, elliptic, obovate or suborbicular, with orbicular or tapering base, orbicular or acute apex, glabrous above, paler beneath, glabrous or slightly pubescent (mainly along veins), sometimes glandular along midrib, serrate-dentate in upper two-thirds or sometimes from base, teeth 15–30 at each side, acute, of rather compact consistency, simple-duplicate or glandular-compound (to 5 glands); petioles glabrous or pubescent, with more or less numerous glands, armed with erect prickles or without prickles; stipules often red, rather narrow or broadened with glandular margins; auricles divergent. Flowers solitary or 2–7, 2.5–3.5 cm in diameter; pedicels as long as or two to four times as long as hypanthium, 1–4 cm long, frequently densely

454 glandular-hispid; hypanthia smooth or more or less glandular-hispid for a good part, elongate and tapering into a neck above; sepals entire or with long broad apical appendages, dorsally usually more or less glandular-hispid; petals pink, slightly notched, shorter than sepals; style head convex, more or less pubescent; fruit drooping, ovoid, pyriform or urceolate, 1–1.5 cm in diameter, crowned by erect or divergent persistent sepals. July.

Forest edges, mountain slopes 1,000–2,000 m. — Caucasus: Cisc., E. Transc. (Main Range, particularly its eastern part), Dag. Endemic. Described from Tushetia, from "Tpheschko," not far from Dano, 1,800 m. Type in Geneva, cotype in Leningrad.

9. *R. roopae* Lonacz. in Acta Horti Bot. Univers. Juriev. XII (1912) 107.

Shrub; shoots glaucescent; prickles thin, somewhat broadened at base, erect, often distally inclined 40–80°; leaflets 7–9, 3 cm long, oblong-ovate, glaucescent, glabrous, slightly glandular beneath along nerves, glandular-biserrate; stipules all broadened. Flowers in corymbiform inflorescences of 3–12 flowers; all inflorescences densely aculeate or hispid; pedicels 10–15 mm long; ovary elongate-cylindrical or ellipsoidal; sepals with long appendage, nearly undivided (with few linear or filiform lobes); petals large, 3 cm long, pale pink (?); style head subsessile, slightly tomentose; fruit unknown. July.

Habitat unknown. — Caucasus: S. Transc. Endemic? Described from Enikei. Type probably in Tbilisi.

Note. No specimens of this little-known species have been seen.

Cycle 5. *Majales* Juz. — Prickles few, curved. Flowers pink; calyx persistent in fruit.

10. *R. cinnamomea* L., Syst. nat. ed. 10, II (1759) 1062; L., Sp. pl. ed. 2 (1762) 703, non L., Sp. pl. ed. 1, (1753) quae est *R. pendulina* L. — *R. spinosissima* L., Sp. pl. (1753) 491 p. p. ?; Fl. suec. ed. 2 (1755) 171. — *R. majalis* Hermm., Diss. Ros. (1762) 8. — *R. collincola* Ehrh., Beitr. z. Naturk. II (1788) 179. — *R. fischeriana* Besser, Enum. Volh. Podol. (1822) 60. — *R. cinnamomea* var. *vulgaris* cum f. f. *subglobosa* et *elliptica* C. A. M. in Mém. Ac. Sc. St. Pétersb., sér. VI, t. VI (1847–1849) 21–23. — Ic.: Syreishch., Ill. Fl. Mosk. g. II (1907) 234; Willmott, Gen. Rosa I (1911) 141, 143. — Exs.: HFR No. 2105, 2106.

455 Shrub, low (10)20–200 cm high, with thin virgate branches covered with shiny brown-red bark; prickles small, slightly curved, usually sessile in pairs at base of leaves, often lacking on flower-bearing branches; in addition to larger prickles there are also numerous erect or slightly curved pricklets and bristles (especially in lower part of branch and on turions); leaves with 5 or often 7 leaflets; petioles short-pubescent, unarmed, or with sparse short prickles, often with obscure short-stalked glands; stipules in leaves of turions narrow, with turbinate-converging margins; leaves of flower-bearing branches with broad, flat stipules, with divergent acute, eglandulose or slightly glandular marginal auricles; leaflets thin, approached, small or large, 1.4–5.5 cm long, 8–23 mm wide, oblong-elliptic, oblong-ovate, ovate or obovate, tapering at base, apex

orbicular or short-acuminate, with short simple, broad, or rather long, acuminate, contiguous, eglandulose teeth, bright or glaucescent-green above, glabrous or usually rather densely appressed-hairy beneath, gray-green, densely appressed-hairy, eglandulose, with markedly prominent network of veins. Flowers solitary, rarely 2-3, 3-5 cm in diameter, on short, smooth, 5-17 mm long pedicels, covered with lanceolate bracts; hypanthia globose or slightly elongate (ovoid), glabrous; sepals nearly always entire, very rarely the outer with single, short, filiform lobes, with lanceolate appendage longer than petals, glandular at margins and along back, usually sepals entirely covered by dense hairs, erect after flowering, persistent to ripening of fruit; petals pale or dark red; style forming a large, lanate head of stigma; rictus of hypanthium broad, disk narrow; fruit small, globose or flattened-globose in typical form, rarely ovoid or ellipsoid, smooth, orange or red, fleshy, crowned by persistent sepals. May-July. (Plate XXVIII, Figure 2).

Forests, shrubs, meadows, in particular along river floodplains. — European part: all regions, except for Crim., Bl., L. Don (?); W. Siberia: all regions; E. Siberia: Ang.-Say.; Caucasus: Cisc.? (probably most records from the Caucasus are erroneous and refer to *R. oxyodon*).

Gen. distr.: Scand., Centr. Eur.

Economic importance. An officinal and ornamental plant, widely used in folk medicine; the roots, decocted or infused in vodka, are used in the treatment of diarrhea. The petals are made into jams, rose water, juice, and rose vinegar; decoction of the fruit yields an orange dye. An excellent vitamin source, of great importance because of the wide distribution of the natural thickets of this plant. The fruit of *R. cinnamomea*, from Arkhangelsk Region, contains in percent of dry weight: sugar, 18.25%; invert sugars 15.71%, saccharose 2.4%; pectins 3.75%; pentosans 3.99%; tannins and dyestuffs 4.44%; carotene 17.07%; citric acid 1.78%; ascorbic acid 5.50%, etc. (Vadova).

456 **Note.** As evident from the synonymy, the correct name is *R. majalis* Herrm.; however, not wishing to discard the accepted Linnaean name, we have preferred the latter.

11. *R. gorinkensis* Bess., Enum. pl. Volh. (1822) 60, non Fisch. — *R. cinnamomea* var. *glandulifolia* C.A.M. in Mém. Ac. Sc. St. Pétersb. VI série, VI (1847-1849) 23. — *R. turbinata* Schmalh., Fl. Sr. i Yuzhn. Rossii (1895) 341, non Ait. — Exs.: HFR No. 2107.

Shrub, very similar to *R. cinnamomea* from which it is distinguished only by the duplicate-glandular-dentate leaflets, which are half hidden by the pubescence, covered beneath with small glands, and by the often glandular-hispid pedicels. May-June.

European part: M. Dnp. (escaped in gardens of Kiev), L. Don (mouth of the Don), L. V. (Sarpeta, Astrakhan). Endemic. Described from cultivated specimens. Type in Kiev.

12. *R. glabrifolia* C.A.M. ex Rupr., Diatr. Petrop. (1845) 65; Fl. Ingr. I (1860) 345. — ? *R. microcarpa* Retz. in Hoffm., Phytogr. I (1803) 40 (nomen prius). — *R. incana* Falk ex Wikstr. in K. V. Acad. Handl. 2 H. (1821) 13 pro syn. — ? *R. dissimilis* Desegl., Journ. of Bot. (1874) 168. — *R. pratorum* Sukatsch. in Bull. Jard. Bot. Princip. de l'URSS XXVI, livr. 2 (1927) 105; N. Pavl., Fl. Tsentr. Kazakhst., part 2 (1935) 341. —

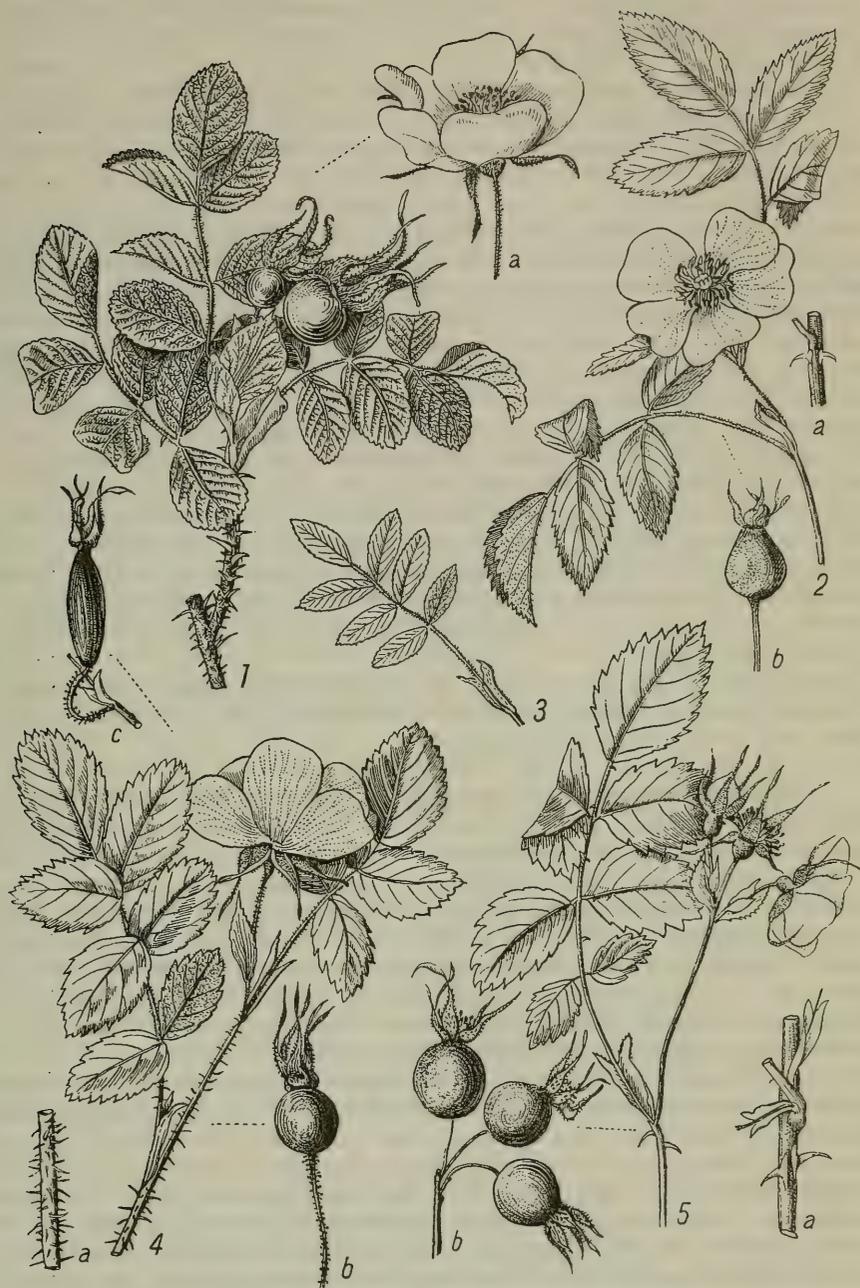


PLATE XXVIII. 1 - *Rosa rugosa* Thunb., fruiting branch, a) flower; 2 - *R. cinnamomea* L., flowering branch, a) part of stem, b) fruit; 3 - *R. dahurica* Pall., leaf; 4 - *R. acicularis* Lindl., flowering branch, a) part of stem, b) fruit; 5 - *R. laxa* Retz., flowering branch, a) part of stem, b) part of inflorescence in fruit.

R. cinnamomea auct. p. p. — *R. cinnamomea* δ *glabrifolia* C. A. M. in Mém. Ac. St. Pétersb. VI (1847). — *R. laxa* Krylov, Fl. Zap. Sib. VII (1933) 1571 p. p., non Retz. — *R. laxa* β *incana* Wikstr., l. c. — Ic.: Sukatschew, l. c. p. 107, Fig. B (fol.).

459 Shrub, 120–160(200) cm high, with straight spreading branches and dark red or greenish bark, with glaucous bloom at first, later usually shiny; shoots with paired larger prickles confined to nodes, broadened at base, slightly bent, otherwise (at least in lower part) covered with sparse, thin, subulate or acicular, erect or slightly downward recurved prickles or bristles; leaves 7–20 cm long, with 5–7(9) elliptic or ovate-oblong, generally distant leaflets, the latter 3–7 cm long, 1.5–3.5 cm wide, short-petioluled or sessile, with broadly cuneate base, acuminate, glaucescent-green beneath, green above, glabrous or slightly short-pubescent (sometimes rather densely pubescent only along midrib), largely and irregularly, often deeply biserrate-dentate, with remote, broad, acute teeth obliquely directed upward; stipules narrow, finely glandular-dentate at margin, glabrous or short-ciliate at margin, with acute auricles directed upward; flowering branches with short paired slightly curved prickles below nodes or prickleless. Flowers solitary or often 2–4, short-pedicelled, 0.7–1.2 cm long, 5–6.5 cm in diameter; bracts broad, approached to flowers; hypanthia smooth; sepals 2.5–4.5 cm long, narrow, distally broadened, entire, rarely with 1(2) lateral lobes, slightly longer than petals, with densely pubescent margins; petals reddish pink; stigma head large, hairy; fruit large, 1.3–2.5 mm long, elliptic, pyriform or ovate, rarely globose, red, with persistent convergent sepals. May–June.

Steppe and floodplain meadows and shrubby formations, forest edges. — European part: V.-Kama, V. Don; W. Siberia: U. Tob. Endemic. Described from Ural area. Type in Leningrad.

13. *R. davurica* Pall., Fl. Ross. I, II (1788) 61; Crép. in Bull. Soc. Bot. Belg. XIV (1875) 33. — *R. gmelinii* Ldb., Fl. Ross. II, 75 saltem p. p., non Bge. — *R. cinnamomea* Ldb., Fl. Ross. II, 76 saltem p. p., non L.

Shrub, erect, strongly branching, often 1.5 m high; branches thin, rigid, smooth, with brown or black-purple bark; prickles usually stipulate, i. e., arranged in pairs at base of branches and on annotinous branchlets at base of leaves, markedly spreading, slightly curved, yellowish or gray; leaves 4–8 cm long, with pubescent petioles densely covered with delicate gland, narrow, finely serrate, with glandular margins, often slightly pubescent; stipules reddish (broadened only on bracts of inflorescence); leaflets, 7, nearly equal, oblong or narrowly elliptic, tapering at both ends, glabrous or barely pubescent above, more or less pubescent beneath, in addition covered with very small yellowish sessile glands, entire at base (sometimes nearly to middle) with increasing serration toward summit, teeth 10–22 on each side small, directed upward, acute, simple. Flowers solitary or 2–3, ca. 4 cm in diameter; pedicels glabrous, smooth or with sparse stalked glands; sepals narrowly lanceolate, with few broadened appendages at summit, 1.5–2.5 cm long, equal to or slightly longer than petals, pubescent inside and along margin, often glandular, glabrous dorsally; petals dark pink, entire, large; stigma head orbicular, densely lanate; fruit globose, ovoid or oblong, smooth, red, 1–1.5 cm in diameter. June–July. (Plate XXVIII, Figure 3).

Open places, birch forests, sparse larch forests.— E. Siberia: Lena-Kol. (southern part), Dau.; Far East: Ze.-Bu., Uss. **Gen. distr.:** Mong., Jap.-Ch. (Manchuria). Described from Dauria and Mongolia. Cotype in Leningrad.

Economic importance. The edible fruit is picked and stored by the people of East Siberia and the Far East (S. Sikhote-Alin). It contains ca. 2.80% ascorbic acid (per dry weight of pulp). The plant, readily visited by bees, is an excellent source of beebread.

14. *R. jacutica* Juz., nov. spec. in Addenda IX, 637.

Shrub, very similar to *R. davurica* Pall. as well as *R. amblyotis* C. A. M., but distinguished from the former by larger growth and eglandulose pubescence or glabrosity of leaflets, and from the latter by glabrous leaflets. July.

E. Siberia: Lena-Kol. Endemic. Described from Yakutia. Type in Leningrad.

15. *R. amblyotis* C. A. M. in Mém. Acad. Sc. St. Pétersb. sér. VI, t. VI (1849) 30; Crep. in Bull. Soc. Bot. Belg. XIV (1875) 38; Kom., Fl. Kamtsch. II, 268.— *R. camtschatica* Cham. in Linnaea VI (1831) 590, non Vent.— *R. davurica* Hultén, Fl. of Kamtch. III (1929) 89, non Pall.

Shrub; stipulate prickles on flower-bearing branches subulate, usually erect, with ascending mucro (prickles sometimes absent); stipules very thin, scarious, very obtuse; leaflets broader than in *R. davurica*, pubescent beneath and very often glandular (like *R. davurica*); bracts of the same character as stipules, broader than in *R. davurica*. In all other parts similar to *R. davurica* Pall. Presumably the eastern race of *R. davurica*. June—July.

Meadows, shrubby formations and birch forests.— Far East: Kamch., Sakh. Endemic? (In the Aleutians, the most closely related form is *R. aleutensis* Crép.). Described from Kamchatka (near Petropavlovsk, Tagil River, and between Kharchinsk and Shivelyuch). Type and paratype in Leningrad.

Economic importance. According to Schrenk, in Sakhalin the fruit is stored up for the winter to be used in the preparation of a special kind of food (reminiscent of cereal processed; the thawed-out fruit is ground up and mixed with fish oil).

Note. Hultén (l. c., p. 90—91) conjectures that the material from which C. A. Meyer established this species may have comprised the hybrid *R. davurica* × *R. rugosa*, common in Petropavlovsk. If so, Meyer's view that his species was "inter *R. cinnamomea** et *R. rugosa media*" may indeed be correct.

16. *R. marretii* Lévl. in Fedde, Repert. Nov. Spec. VIII (1910) 281.

Shrub; leaflets 3—4 pairs, elongate, ca. 3 cm long, 1 cm wide, narrowly lanceolate, sparingly pubescent beneath. Fruit globose, very large. In all other parts similar to preceding species. Fruit ripens in October.

461 Forest edges.— Far East: Sakh. Endemic. Described from vicinity of Korsakov. Type in Paris.

* C. A. Meyer united *R. davurica* with *R. cinnamomea*.

Note. A problematic form requiring study; distinguished from the typical *R. amblyotis* C. A. M. chiefly by its large fruit. N. E. Kabanov, who observed *R. marretii* in Sakhalin and obtained a fruiting specimen for our herbarium, considered it distinct from the typical *R. amblyotis*, also growing in Sakhalin.

Cycle 6. *Laxae* Juz. — Prickles few, large, strong, markedly curved; flowers usually white; calyx persistent in fruit.

17. *R. laxa* Retz. in Hoffm., Phytogr. Bl. (1803) 39; Wikstr. in Kongl. Vetensk. Akad. Handling. (1820) 267; C. A. M., Ueber die Zimmtrosen (1849) 120; Crep. in Bull. Soc. Bot. Belg. XIV (1875) 26; Kryl., Fl. Zap. Sib. VII (1933) 1571. — *R. soongarica* Bge. ex Ldb., Fl. Alt. vol. II (1830) 226. — *R. alpina* Ldb., Fl. Ross. II, 75 p. p., non L. — *R. gebleriana* Schrenk in Bull. Phys.-Math. Acad. Sc. St.-Pétersb. I (1843) 80; Ldb., Fl. Ross. vol. II (1844) 76. — *R. cinnamomea* var. *soongarica* Ldb., l. c. 76. — *R. laxa* β *incana* Wikstr., l. c. — *R. laxa* α *pubescens* et β *glabra* C. A. M., l. c. — *R. cinnamomea* var. *microcarpa*: α *puberula* et β *glabra* C. A. M., l. c. 29. — Ic.: Willmott, The Gen. Rosa VIII (1911) tab. 53. — Exs.: Kar. et Kir., No. 325 (s. n. *R. oxyacantha*) et No. 560 (s. n. *R. cinnamomea*).

Shrub, to 2 m high, stem arcuate, with strong branches; bark nearly always green, glaucescent (at least when young); prickles sparse, rather large, strongly arcuately downcurved, flattened, with distinctly broadened base, normally in pairs at base of leaves, mainly at base of stem with mixture of medium-sized heterogeneous prickles, prickles on very thin shoots (nearly) erect, often very thin; stipules rather broad, sometimes with glandular margin, with small, ovate divergent auricles, not increased in upper leaves; petioles short, slightly downy, sometimes glandular, with weak prickles; leaves 3–10 cm long, leaflets 5–9, ovate, obovate, elliptic or oblong, the largest 1.5–4.5 cm long, 8–25 mm wide, obtuse, serrate-dentate, with simple teeth, grayish green, glabrous on both sides or slightly downy beneath, rather compact. Flowers few or rather numerous (at least on well-developed branches), in corymbs of 3–6, sometimes solitary; pedicels rather short, 0.5–1.6 cm long, smooth, often glandular-hispid, prickly; hypanthia ovoid, ellipsoid or oblong, usually smooth; sepals ovate or sublanceolate, with long, narrow appendage often broadened distally, entire, with slightly pubescent margins, laterally usually smooth, rarely slightly glandular-hispid; corolla (3/4–5 cm in diameter, pale pink or nearly 462 white; disk two to three times as broad as hypanthium mouth; style head lanate; fruit globose or elliptic, 12–18 mm in diameter, usually smooth, crowned by convergent, persistent sepals, on erect or drooping pedicels. June. (Plate XXVIII, Figure 5).

Steppe meadows, forest edges, banks of rivers and lakes. — W. Siberia: Irt.; Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. Gen. distr.: Mong., Dzu.-Kash. Described after cultivated specimen, probably from W. Siberia. Type unknown.

Economic importance. A good vitamin source; its fruit contains 4.15% ascorbic acid per dry weight of pulp.

Note. A polymorphic and probably composite species. The problematic 18. *R. kaschgarica* Rupr. in Ost.-Sack. et Rupr. Sert. Tianshan (1869) 46, with its exceptionally large and robust prickles and coriaceous leaflets, described from the Suukta valley in Kashgar, is undoubtedly very close to this species; however, relevant material is so meager than we prefer not to treat it separately, the more so as it appears that it has never been collected in the USSR. It should also be compared with *R. algoiensis* Crép., described from Chinese Turkestan.

Cycle 7. **Beggerianae** Juz. — Like preceding species, but calyx and upper part of hypanthium caducous at maturation of fruit.

19. *R. beggeriana* Schrenk, Enum. pl. nov. (1841) 73; Ldb., Fl. Ross. II, 82; Crép. in Bull. Soc. Bot. Belg. XIV (1875) 15; *ibid.* XV (1876) 56 et XXVII (1888) 2; Christ. in Boiss., Fl. Or. Suppl. (1888) 208. — *R. silverhjelmii* Schrenk, Bull. Ac. St.-Pétersb. II (1847) 195. — *R. lehmanniana* Bge. Pl. Lehm. (1851) 287. — *R. beggeriana* var. *genuina*, var. *silverhjelmii* var. *lehmanniana* Crép. in Bull. Soc. Bot. Belg. XIV (1875) 20. — *R. cinnamomea* var. *sewerzowi* Rgl. in A. H. P. V, fasc. 2 (1878) 326. — *R. laxa* var. *alata*, var. *karatavica* var. *sewerzowi* Rgl., I. c. 331. — *R. beggeriana* R. Keller in Verh. Bot. Ver. Brandenb. XLVI (1904) 94 p. p. cum varr. plur.

Shrub, 1–2.5 m high, with suberect, delicate, glaucescent branches armed with equal, often large, slightly or usually strongly falcately curved prickles broadened at base, yellowish, thin or often strong, sessile in pairs at base, sometimes, especially in lower part of shoots, with a mixture of prickles; leaves 2–12 cm long; leaflets (5)7–9(11), small, usually 1–3 cm long, ovate, ovate-oblong or elliptic, orbicular or tapering at base, orbicular or acuminate at apex, glabrous or like petioles very short-pubescent beneath, sometimes very finely glandular, simple or nearly duplicate-dentate, with 10–20 short, ovate teeth on each side; stipules of lower leaves narrow, broadening toward inflorescence, pubescent, with triangular auricles; petioles often with small prickles, sometimes glandular. Flowers often in many-flowered compound corymbs or panicles, 2–4 cm in diameter, pedicels rather long, to 2.5 cm long, like outer side of sepals glabrous or pubescent, sometimes remotely glandular, with ovate-lanceolate, minute bracts; hypanthia globose or ovoid, glabrous or sparingly pubescent; sepals entire, acuminate, spreading or suberect after anthesis; petals pale; styles short, with an orbicular tomentose head; fruit 0.5–1.4 cm long, small, frequently globose like a pea, often ovoid, smooth, red or sometimes blackish, with caducous disk and sepals caducous at ripening, leaving an opening in upper part of fruit which permits a view of the exposed achenes and the tiny hairs encircling them. June–July. (Plate XXIX, Figure 3).

Mountain slopes, banks of streams and brooks, roadsides, fences, forest edges. — Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. **Gen. distr.:** Iran, Afghanistan, Beludzhistan, Dzu.-Kash. Described from Dzhungaria, from the Kok-su River. Type in Leningrad.

Economic importance. In Central Asia, this plant is often cultivated as an ornamental and on enclosures. Its tiny petals contain almost a record amount of ascorbic acids, ca. 8.75% per dry weight of pulp.

Note. This is an extremely polymorphic species which surely will one day require further division. Though R. Keller (l. c.) gave it special attention, it is difficult to make use of his work because, firstly, he certainly confused it with other species (among them such totally different species as *R. alberti* and *R. laxa*, not to mention hybrids), and, secondly, his superficial separation of numerous varieties, based on an arbitrary choice of characters, often led to spurious unions between dissimilar forms.

× *R. piptocalyx* Juz. Hybr. nov. in Addenda IX, p. 479. (? *R. beggeriana* Schrenk × *R. webbiana* Wall.).

In the character of prickles and shape of leaflets most similar to *R. webbiana*; at maturation the large fruit loses the upper part of the hypanthium together with sepals. June.

Mountain slopes. — Centr. Asia: Pam.-Al. Described from Pam.-Al. Type in Leningrad.

20. *R. lacerans* Boiss. et Buhse in Nouv. Mém. Soc. de Nat. de Mosc. XII (1860) 85.

464 Shrub; branches flexuous, thin, glabrous, bluish glaucescent, prickles sparse, strong, markedly curved, with decurrent base; leaflets 7–9, ovate or ovate-oblong, short-velutinous above, glandular-pubescent beneath, with biserrate-dentate margin, glandular, the lowermost leaflets often much smaller than the others; petioles glandular-hairy; stipules very narrow with erect linear auricles, very strongly glandular. Flowers small, in corymbs at tips of branches; bracts oblong; dentate, shorter than pedicels; sepals lanceolate, acuminate, entire, tomentulose, twice as long as globose, caducous hypanthium; fruit small, globose, on long, spreading pedicels. July.

Mountain slopes. — Centr. Asia: Turkm. (Kopet-Dagh). Gen. distr.: Iran. Described from Elburz Range near Radkann in Niki Valley. Type in Geneva.

Cycle 8. *Webbiana* Juz. — Prickles few or numerous, strong, broad, erect; leaves eglandulose or slightly glandular. Flowers white or pink; calyx persistent in fruit.

21. *R. webbiana* Wall. ex Royle, III. Bot. Himal. (1839) 208; Rgl., Tent. Ros. Mon. (1877) 30; Christ in Boiss., Fl. Or. Suppl. (1888) 207. — *R. hookeriana* Bertol., Misc. Bot. XXIV (1863) 14. — *R. hoffmeisteri* Klotzsch, Bot. Ergebn. Reise Prinz Waldemar (1862) 153; Rgl. l. c. 38. — *R. guilelmi waldemarii* Klotzsch, l. c. — *R. macrophylla* auct. plur., non Lindl. — Ic.: Royle, l. c. pl. XLII, f. 2; Klotzsch, l. c. pl. VII, VLI.

Shrub, 1 m high; prickles often erect, sometimes slightly directed upward, remote or in pairs, in part very robust, gradually broadened at base, others rather thin, abruptly and strongly broadened at base, usually shorter than (very rarely as long as) the larger leaflets, whitish or straw yellow; (with the exception of turions) acicular prickles absent; leaves 2–10 cm long; leaflets generally 7–9, orbicular, obovate or elliptic, orbicular or slightly tapering at base, obtuse, orbicular or acute at apex, 1–3 cm long, glabrous

above or barely pubescent, frequently lightly appressed-hairy, eglandulose or with glands only along midrib; beneath; teeth often simple, 8–20 at each side; stipules mostly broad with triangular, more or less glandular divergent auricles. Flowers as a rule solitary, rarely 2–3, 4–6 cm in diameter; pedicels 0.5–3 cm, glabrous or pubescent; hypanthia globose or ovoid, smooth or with few glands and acicular prickles; sepals as long as, longer, or (rarely) shorter than petals, entire, generally with a broadened appendage, outer sepals glabrous or pubescent, frequently glandular-hispid; petals white or pink; hypanthium mouth twice as wide as the adjacent disk; style lanate, stigma head globose or conical; fruit globose or ovate, often pendulous, fleshy, red, crowned by persistent prostrate or ascending sepals. June–July.

Mountain slopes, forest edges, shrubby formations. — Centr. Asia: T. Sh., Pam.-Al. **Gen. distr.:** Dzu.-Kash., Tib., Him., Afghan., Ch., Mong. Described from the Himalayas. Type in London.

Note. In spite of numerous separations of related forms in recent years, this polymorphic species is still rather broadly interpreted. Further studies and, in particular, a comparison of the Soviet forms with those of the Himalayan *R. webbiana* are required.

22. *R. fedtschenkoana* Rgl. in A. H. P., t. V, fasc. 2 (1878) 314. — *R. fedtschenkoana*, var. α lageniformis et β ovata Rgl., l. c. 315.

Branching shrub, 6 m high, with glabrous branches; prickles on branches and branchlets more or less equal, large, indurate, erect, usually markedly broadened at base, slightly compressed; leaflets mostly 7, rarely 5 or 9, often slightly larger than in *R. webbiana*, 4 cm long, rather coriaceous, glaucescent, glabrous, suborbicular or ovate, orbicular-obtuse, simple-dentate. Pedicels glandular-hispid; flowers solitary or up to 4, rather large, to 8 cm in diameter, mostly white, rarely pink; sepals long-acuminate with thin or apically slightly broadened mucro, shorter than petals, outer sepals densely glandular-hispid; fruit large, 5 cm long, oblong-ovate, with elongated neck, distally somewhat broadening or ovoid, rarely globose, covered with glandular bristles. Otherwise, similar to *R. webbiana* Wall. June–July. (Plate XXIX, Figure 2).

In the same localities as preceding species. — Centr. Asia: T. Sh. (W.), Pam.-Al. Endemic. Described from vicinity of Gulchi. Type in Tashkent.

Economic importance. An excellent vitamin source containing ca. 6.60% ascorbic acid per dry weight of pulp.

Note. This species is not sharply demarcated from the preceding one (as here understood) and in fact appears to be one of the many races of the composite species *R. webbiana*.

23. *R. maracandica* Bge. in Mém. sav. étrang. VII (1851) 286. — *R. platyacantha* var. *carnea* Franch. in Ann. Sc. Nat. Bot. XVI (1883) 286. — *R. glutinosa* Franch., l. c. 287, non Sm. — *R. kulikalani* — ca B. Fedtsch. in Tr. Tadzh. Bazy Akad. Nauk SSSR, t. II (1936) 142.

Shrub, divaricate, with flexuous or erect, glaucous, glabrous branches; prickles numerous, remote, equal, in pairs on flower-bearing branches, strong, erect, slightly directed upward, flattened at base, markedly longer than leaflets, straw yellow; petioles unarmed, glabrous or pubescent, often

466 glandular; stipules linear, short, acute, with slightly divergent auricles and glandular margins; leaflets 5-7, small, orbicular, coriaceous, glaucescent, tapering at base, truncate or rounded at apex, nearly glandular-biserrate-bidentate, often more or less finely glandular beneath. Flowers solitary or 2 on short pedicels, 5-6 mm long, generally glabrous, rarely puberulent, sometimes glandular; bracts reduced; hypanthia ovoid, glabrous or glandular-prickly; sepals narrowly lanceolate, with appendage, entire, glabrescent or pubescent, glandular-margined, directed upward in fruit, closing; corolla white (or pale pink?); style densely villous, free, forming a rather compact head; fruit 1-1.5 cm long, subsessile (pedicels 2 mm long), ovate-urceolate or ovate-oblong, bright red, rather fleshy. June.

Mountains. - Centr. Asia: T. Sh. (W.), Pam.-Al. Probably endemic. Described from right affluents of Upper Zaravshan River near Uramitan. Type in Paris.

Economic importance. A rather good vitamin source.

Note. The description of this species by Boissier, Fl. Or. II, 671 does not agree with that of Bunge and apparently refers to another plant (probably *R. kokanica* Rgl. or *R. ecae* Aitch.).

24. *R. kuhitangi* Nevski in Acta Inst. Bot. Ac. Sc. URSS ser. I, fasc. 4 (1937) 248 ampl. - *R. nanothamnus* Bouleng. var. *litvinovii* Bouleng. in Bull. du Jard. Bot. de Bruxelles vol. XIII (1935) 209. - *R. fedtschenkooana* var. β *glandulosa* Rgl. in A. H. P. V f. II (1878) 315. - *R. platyacantha* var. *maricandica* Franchet, Ann. Sc. Nat. Bot. XVI (1883) 286.

467 Shrub, ca. 75 cm high, with glabrous glaucescent branches; prickles equal, suberect, thin, 4-9 mm long, abruptly broadened at base, partly in pairs, light straw-colored, the largest as long as or slightly longer than the largest leaflets; stipules short-lanceolate, finely glandular at margin; petioles short-glandular; leaflets (generally) 5 or 7, the largest 10-12 mm long, orbicular or ovate, glabrous above, short-pubescent beneath, glaucescent, some with few glands beneath or rather strongly glandular along entire lower surface, teeth (in largest leaflets) 10 or 11, often compound-glandular (2-7 glands) or with apical gland only. Flowers solitary or 2-3, ca. 3 cm in diameter; pedicels 0.4-1(2) cm long, puberulent, smooth (rarely glandular), like globose hypanthium; sepals 7-15 mm long, linear:lanceolate, long-acuminate, slightly broadened at summit, short-pubescent, smooth (dorsal surface rarely glandular), later curved; petals pink; fruit globose, smooth. June.

Stony mountain slopes. - Centr. Asia: T. Sh. (W.), Pam.-Al. Endemic. Described from the Kugitang River near the village of Kugitang. Type in Leningrad.

25. *R. bellicosa* Nevski in Acta Inst. Bot. Acad. Sc. URSS, ser. I, fasc. 4 (1937) 248.

Shrub, erect, 1.25 m high, with abundant prickles; prickles on flower-bearing branches equal, strong, 1.3-1.9 cm long, broad at base, 0.5-1 cm wide, whitish-yellowish, on sterile shoots unequal, large and small, the latter only 4-5 mm long, 1-2 mm wide at base; petioles densely glandular-hairy; stipules narrow, with lanceolate acute auricles, glandular-pubescent;

leaves with 5–7 leaflets, both sides grayish, with very dense soft hairs, almost velutinous, 7–15 mm long, 4–8 mm wide, obovate, finely serrate-dentate with entire margin or 2–3 denticulate, with apical gland. Flowers very pale pink (nearly white), solitary, 2 or 3 on short pedicels, 3.5–4 cm in diameter; hypanthia ovoid, prickly; sepals linear-lanceolate, with long mucro, ca. 1.2 cm long and 4 mm wide, outer sepals glandular-prickly, the inner with gossamer hairs; fruit apparently ovoid, prickly. June–July.

In mountains at lower border of *Juniperus sabina*. — Centr. Asia: Pam.-Al. Endemic. Described from Kugitang. Type in Leningrad.

26. *R. nanothamnus* Bouleng. in Bull. Jard. Bot. de l'Etat Bruxelles XIII, fasc. 3 (1935) 206. — *R. webbiana* Crép. in Bull. Soc. Bot. Belg. XIII (1874) 273, p. p., non Wall. ex Royle. — *R. webbiana* var. *microphylla* Crép., l. c., 276. — Ic.: Bouleng., l. c.; 208, f. 2 (ram. florif.).

Shrub, dwarf, usually 15–30 cm high, with very short flower-bearing branches; prickles erect, rarely curved, sometimes directed upward, remote or in pairs, often thin and abruptly broadened at base, the longest as long as or longer than the largest leaflets, often yellow; small pricklets absent, with the exception of turions which may bear strong prickles, in exceptional cases some branches with few prickles; leaves very small, 10–55 mm long; leaflets 5–9, remote, often approximate, sessile or petioluled, orbicular, ovate or obovate, sometimes truncate, 3–15 mm long, glabrous or pubescent either on both sides or only beneath; teeth simple, sometimes some with 2–3 mucros; petioles glabrous or pubescent, somewhat glandular at times, with small erect prickles or without prickles; stipules connate, narrow, with triangular or acute divergent auricles, margin frequently glandular. Flowers often solitary, pedicels 1–17 mm long, glabrous, smooth or glandular; sepals nearly always shorter than petals, in bud not exceeding or slightly exceeding petals, entire or narrowing at base, mucronate, more or less broadened, with spatulate or foliate tip, dorsally glandular or glandular-hispid, rarely smooth, persistent; corolla 20–35 mm in diameter; petals pink or white, barely incised; opening of disk one-third to two-fifths its diameter; style lanate-villous, stigma head flattened, capitate, conical or clavate; fruit globose or ovoid, sparsely glandular-hispid or smooth, 10–12 mm long, crowned by spreading or ascending sepals. June–July.

Centr. Asia: T. Sh., Pam.-Al. **Gen. distr.:** see (s. str.), probably endemic. Described from Fergana, Arslanbob. Type in Brussels, cotype in Leningrad.

Note. Boulenger's delimitation of this species is much too wide. In his view species Nos. 23, 24, 25, 27, and 28 should all be included in *R. nanothamnus*.

27. *R. hissarica* Slobodov in Tr. Tadzhikist. Bazy Akad. Nauk SSSR, Vol. II (1936) 197.

Shrub, low, strongly branching, to 25–35 cm high, bark of one-year shoots dark purple, with weak waxy bloom; prickles numerous, slightly curved, pale yellowish, with base elongated along stem, on flower-bearing shoots often erect, sometimes directed upward, at petiole base often paired or whorled; petioles armed with short prickles, pubescent; stipules narrow,

glandular margin adnate to petioles over four-fifths of their length, pubescent beneath, terminating in narrow auricles; leaves with 7-9 obovate or suborbicular biserrate leaflets, pubescent on both sides, eglandulose, spreading-hairy above; teeth of leaflets curved upward, the distal tooth equal to neighboring teeth or shorter; bracts slightly broadened, the outer reddish and pubescent, the inner with isolated spreading sericeous hairs, glandular at margin; pedicels 18 mm long, glandular-downy. Flowers small, 22 mm in diameter, solitary, dark red or pink; sepals as long as petals or slightly shorter, the outer pubescent, glandular at base; fruit 15 mm long, orbicular-oblong, apically constricted, red, usually glandular, with glands mostly clustered at apex of fruit. July. (Plate XXIX, Figure 4).

Stony slopes in the subalpine mountain zone. — Centr. Asia: Pam.-Al. Endemic. Described from Stalinabad Region, Tadzhik SSR, from the southern slopes of Gissar Range, 4 km to the north of Takhob Pass. Type in Leningrad.

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28. *R. alaiica* Juz., spec. nova in Addenda IX, p. 480.

Shrub, low, with long slender flexuous branches and slightly glaucescent-dark brown bark; prickles erect, remote, sometimes paired, rather strong, flattened-conical, abruptly or gradually broadened at base, as long as the largest leaflets or slightly longer, straw yellow, without small prickles; small prickles wanting; leaves 1.8-2.5 cm long; leaflets 5-9, approximate, sessile or very short-petiololed, orbicular or broadly obovate, usually orbicular at apex and base, 4-10 mm long, 3-8 mm wide, bright green above, paler and glabrous or remotely hairy, sparsely thin-pubescent beneath, covered with profuse minute glands, compound-glandular-dentate, with 7-10 teeth on each side; petioles slightly downy and profusely glandular; stipules connate, small, with rather narrow erect acuricles, profusely glandular along back and margins. Flowers mostly solitary, rarely 2, exceeding distal leaves; pedicels thin, 1-2 cm long, covered with more or less dense stalked glands; hypanthia subglobose or short-ovoid, smooth or slightly stalked-glandular; sepals shorter than petals, tapering from base, with narrowly linear mucro, dorsally smooth; petals white or pink; style lanate-villous, stigma head subglobose; bracts generally present; ripe fruit unknown. July.

Juniperus sabina forests. — Centr. Asia: Pam.-Al. (Alai Range). Endemic. Described from Uch-Tyube (right bank of Gulchi River, between Sufi-Kurgan and Ak-Bosaga). Type in Leningrad.

Cycle 9. *Korshinskianae* Juz. — Like preceding, but leaves very strongly glandular on both sides.

29. *R. korshinskiana* Bouleng. in Bull. du Jard. Bot. de l'État Bruxelles XIII, fasc. 3 (1935) 213. — *R. schugnanica* Meffert in Tr. Tadzhikist. Bazy Akad. Nauk SSSR II (1936) 191. — ? *R. odudiana* Meffert, l. c. 193. — Ic.: Bouleng., l. c., 214, f. 3.

Shrub; prickles erect or slightly curved, sometimes directed upward, mostly in twos or threes (?), distinctly and gradually broadening at base, as long as or slightly longer than largest leaflets, interspersed with more

or less abundant little prickles; leaves 1.5–7.8 cm long; leaflets 5 or 7, sessile or petioluled, suborbicular, ovate or obovate, rounded or obtuse, 5–13 mm long, both sides with very abundant small to very large glands, teeth usually slightly compound-glandular (with 2–5 glands), 5–11 on each side of leaflet; petioles pubescent and glandular, with few small prickles or without prickles; stipules connate, rather broad, with triangular or acuminate auricles, glandular beneath and along margin. Flowers solitary or 3, not exceeding the terminal leaves; bracts well-developed, with glandular margins; pedicels 2–8 mm long, glandular-hispid like the globose hypanthium; sepals 8–11 mm long, without lateral appendages, shorter than petals (which they do not exceed in bud), not tapering to base, acuminate or slightly broadened distally, dorsally hispid-glandular; corolla 3–4 cm in diameter; stamens 60–70; disk reduced; style lanate-villous, forming a flattened or orbicular head. July.

Stony slopes and cliffs. — Centr. Asia: Pam.-Al., T. Sh. (?). Endemic. Described from Daraut-Kurgan (Alai Range).

Note. *R. odudiana* Meffert is described from the only specimen available. It is an enigmatic form, distinguished from the type only by thin leaflets and longer pedicels; it was collected by Alekseenko "in a birch grove"! It is perhaps a shade form and is therefore included in the synonymy of the present species with a question mark.

Section 5. **PIMPINELLIFOLIAE** DC., apud Ser. Mus. Helv. I (1818) 3. — Median leaves of flower-bearing shoots with 9–11 leaflets; stipules of upper leaves narrow, with abruptly broadened, strongly divergent auricles. Flowers generally solitary, ebracteate; sepals entire, spreading at base; ripe fruit blackish.

Cycle 1. **Spinosissimae** [Thory, Prodr. Mon. gen. Rosae (1820) 40 pp.] Juz. — Flowers white or yellow-white.

30. *R. spinosissima* L., Spec. pl. (1753) 491; M. B., Fl. taur.-cauc. I (1808) 394, 395. — *R. pimpinellifolia* L., Syst. nat. ed. 10, II (1759) 1062; Spec. pl. ed. 2 (1762) 703; Pallas, Fl. Ross. II (1789) 62; M. B., Fl. taur.-cauc. I (1803) 394 et III (1819) 335; Ldb., Fl. Ross. II (1844) 73; Boulenger in Bull. Jard. Bot. de l'État Bruxelles XIII (1935) 172. — *R. altaica* Willd., Enum. Pl. Hort. Berol. (1809) 543. — *R. sibirica* Tratt., Mon. II (1823) 230. — *R. pimpinellifolia* var. *altaica* Ser. in DC., Prodr. II (1825) 608. — *R. pimpinellifolia* var. *grandiflora* Ldb., l. c. — ? *R. elasmacantha* β *leptacantha* Trautv., Ind. sem. H. Petrop. (1869) 25. — Ic.: Pall., l. c. pl., LXXV. — Exs.: F. Schulz, Herb. norm. nov. ser. cent. 8, No. 787.

Shrub, low, (30)75–200 cm high; branches erect or divergent at a right angle, densely covered with thin, erect, slightly divergent prickles usually abruptly broadened at base, and with small prickles and pricklets of different dimensions; the largest of these as long as or longer than the largest leaflets, often mixed with more or less numerous spicules, usually tightly crowded; leaves with 5–11 leaflets, rachis glabrous or barely pubescent,

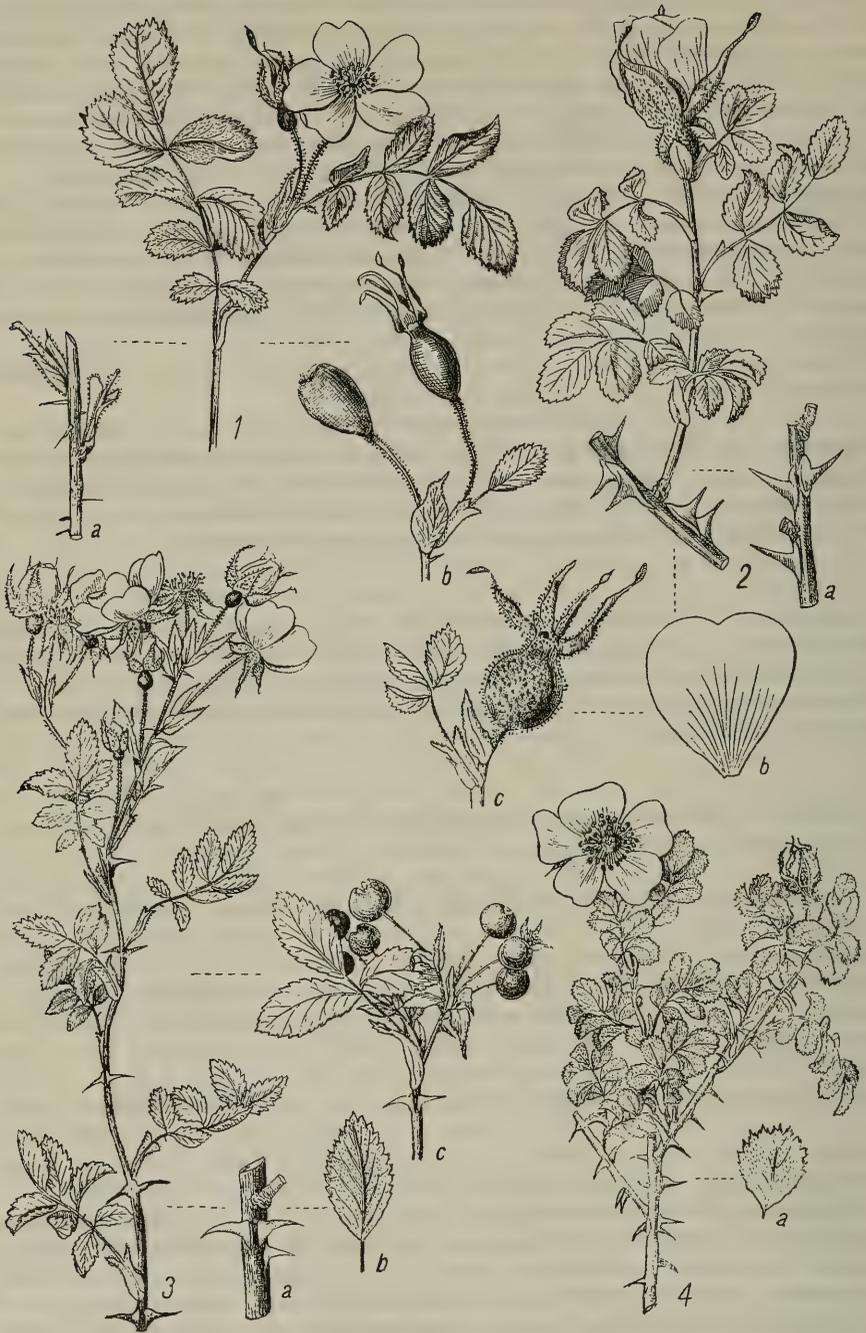


PLATE XXIX. 1 — *Rosa alberti* Rgl., flowering branch, a) part of stem, b) branch with fruit; 2 — *R. fedtschenkoana* Rgl., flowering branch, a) part of stem, b) petal, c) fruit; 3 — *R. beggeriana* Schrenk, flowering branch, a) part of stem, b) leaflet, c) inflorescence in fruit; 4 — *R. hissarica* Slob., flowering branch, a) leaflet.

with sparse glands and more or less abundant small prickles; stipules glabrous, rarely with glandular margins, narrow, with erect or divergent auricles; leaflets small, 5–18 mm long, orbicular or elliptic, rounded or blunt at apex, glabrous, with 5–15 simple, acute or rectangular, more or less deep teeth at each side, dark green above, light green beneath. Flowers solitary; pedicels 10–30(45) mm, smooth or bearing stalked glands and acicular prickles; hypanthia globose or barely longer than broad; sepals simple, narrowly lanceolate, tapering from base, 7–17 mm long, shorter than petals, dorsally smooth or slightly pubescent, persistent in fruit, spreading or declinate; corolla 2–5 cm in diameter; petals large, notched, white or yellowish white; stigma a large tomentose head; fruit 6–14 mm long, globose or flattened-globose, slightly broader than long, blackish when ripe, crowned by sepals; pedicels at maturation of fruit often fleshy, blackish. May–June. (Plate XXVII, Figure 2).

Stony mountain slopes. — European part: M. Dnp., Bl., L. Don, Transv., Crim.; Caucasus: Cisc., E. and S. Transc.; W. Siberia: Alt., U. Tob., Irt.; Centr. Asia: Dzu.-Tarb., T. Sh. **Gen. distr.:** Scand., Centr. Eur., Med., Bal.-As. Min. Described from Europe. Type in London.

Economic importance. In the Caucasus the dried leaves and fruit are used as a substitute for tea.

31. *R. elasmacantha* Trautv., Ind. Sem. H. Petr. (1869) 25; Rgl. in A. H. P. V, fasc. 2 (1878) 311; Crép. in Bull. Soc. Bot. Belg. XVIII (1879) 376. — *R. elasmacantha* α *platyacantha* Trautv., l. c. — *R. pimpinellifolia* var. *elasmacantha* Crép., l. c., 377.

Shrub, low, entirely glabrous, with stems, branches and branchlets armed with two kinds of prickles, the smaller aciculiform, densely crowded or remote, the larger rather remote, flattened into a very thin, flexible blade, very broad, triangular, 5–25 mm wide at base; leaflets 5–13, elliptic or narrowly elliptic, 10–25 mm long, tapering at base, very often orbicular at apex, rarely acute, simple or bidentate; stipules narrow, auricles linear-lanceolate; petioles and rachis unarmed or furnished with sparse prickles, glabrous or rarely glandular-hispid. Flowers solitary at ends of branches, on long smooth pedicels, small; petals white; sepals narrowly lanceolate, entire, acute, shorter than petals, glabrous, rarely glandular-hispid; fruit globose, crowned by divaricate sepals. June.

Caucasus: Cisc., Dag. Endemic? (Reported for China, but the Chinese plant probably differs from the Caucasian.) Described from the Caucasus from Lagovskii's specimen, claimed to come from Abkhazia and Armenia, where it has never been collected again and, presumably, does not grow. Type in Leningrad.

32. *R. myriacantha* DC., ex Lam. et DC., Fl. Fr., ed. 3, IV (1805) 439; M. B., Fl. taur.-cauc. III (1819) 337; Crép. in Bull. Soc. Bot. Belg. XIX (1880) 225. — *R. pimpinellifolia* var. *myriacantha* Ser. in DC., Prodr. II (1825) 608; Ldb., Fl. Ross. II (1844) 74; Rgl. in A. H. P. V, f. II (1878) 307; Crép., l. c. XXI (1882) 9, 10; Christ in Boiss., Fl. Or. Suppl. (1888) 206; Bouleng. in Bull. Jard. Bot. de Bruxelles XIII (1935) 174.

Shrub; prickles and pricklets as a rule very abundant, approximate, often very few (some specimens unarmed); leaflets 5–11, often 7, 10–24 mm

long, orbicular, twice as long as broad, glandular, at least along midrib beneath, teeth (rarely only partly) compound-glandular, 8–16 at each side; pedicels 10–30 mm long, smooth or more or less prickly and glandular, resembling the often hispid hypanthium; sepals 8–13 mm long, dorsally more or less glandular or acicular-glandular; corolla white, 30–50 mm in diameter; fruit globose or slightly broader than long, 8–13 mm long. June–July.

European part: Crim. (mainly in the Yaila Mountains, but also found near Bakhchisarai); Caucasus: W., E. and S. Transc. **Gen. distr.:** Med. Described from S. France (vicinity of Montpellier). Type in Geneva.

Note. In the districts of Ai-Petri and Kokkoz, there are often encountered less typical forms, with glands confined to midrib and teeth only, partially bidentate (entire teeth prevail!). Similar intermediate forms also grow in other localities; one of these, *R. rupicola* Fisch. ex Sweet, Hort. Brit. ed. II (1830) 180, is widely distributed in W. Siberia, where *R. myriacantha* does not grow. Generally speaking, like the whole series *Spinosissimae*, forms of the type *R. myriacantha* also require special study. For the present, it should be pointed out that forms identical with the authentic *R. myriacantha* DC. from Montpellier are apparently not encountered in the USSR; Bieberstein named the ordinary Crimean form in schedis *R. polyacantha* M. B., but by the rules of nomenclature this name is disqualified.

Cycle 2. **Xanthinae** Juz. — Flowers yellow.

475 33. *R. platyacantha* Schrenk in Bull. Acad. Sc. St. Pétersb. X (1842) 252; Ldb., Fl. Ross. II, 75; Crép. in Bull. Soc. Bot. Belg. XIII (1875) 270, XIV (1875) 165, XVIII (1879) 376. — ? *R. heteracantha* Kar. et Kir. in Bull. Soc. Nat. Mosc. XV (1842) 350. — *R. platyacantha* var. α *typica*, et γ *cuneifolia* Rgl. in A. H. P. V f. II (1878) 312. — *R. xanthina* auct. fl. Turkest., non Lindl.

Shrub, low or medium-sized, with reddish bark, branches diverging at an acute angle, branches and turions usually covered with uniformly long, firm, erect, flattened or abruptly markedly broadened whitish prickles, sometimes turning slightly upward; leaves with 5–9 leaflets; rachis unarmed, glabrous or with gossamer hairs; stipules narrow, generally glabrous, with divergent auricles; margins glandular; leaflets small, 6–20 mm long, orbicular or broadly elliptic, with orbicular base; apex rounded or slightly acuminate, glabrous or sparingly pubescent along midrib, with 4–9 simple, large, obtuse or acuminate, distinctly asymmetrical teeth on each side, dark green above, pale green beneath. Flowers solitary; pedicels 1.5–4 cm long, usually smooth; hypanthia globose or slightly longer than broad, smooth; sepals simple, lanceolate, 1–2 cm long, shorter than petals, with slightly broadened mucro, margin and upper surface tomentose-lanate; lower surface smooth; corolla 3–5 cm in diameter; petals large, yellow; stigma head large, white-tomentose; fruit globose, 1–2 cm in diameter, like apically thickened pedicels, black-violet when ripe, crowned in fruit by divergent or upwardly-directed, not convergent sepals. June. (Plate XXVII, Figure 3).

Mountain slopes, shrubby formations. — Centr. Asia: T. Sh., Pam. Al. (rarely). **Gen. distr.:** Dzu.-Kash. Described from Dzhungaria. Type in Leningrad.

Economic importance. Sometimes, as in the city of Alma-Ata, cultivated as an ornamental plant.

Note. *R. heteracantha* Kar. et Kir., here considered as a synonym of this species, is distinguished by a mixture of numerous thin acicular prickles passing into normal, firm, markedly flattened prickles. It appears to be a problematic form, perhaps a hybrid of *R. platyacantha* Schrenk. × *R. spinosissima* L.

34. *R. ecae* Aitch. in Journ. Linn. Soc. XVIII (1880) 54 et XIX (1882) 161; Crép. in Bull. Soc. Bot. Belg. XXVII, II (1888) 102. — *R. platyacantha* var. *kokanica* Rgl. in A. H. P. V., fasc. II (1878) 313 p. p. — Ic.: Aitch., l. c. XIX, tab. 8; Oliver in Hook., Ic. Plant. XIV (1881) tab. 1329; Hook. f. in Curtis Bot. Mag. LV (1899) tab. 7666 (sub *R. xanthina*).

Shrub, 1 m high, with flexuous shoots and gray bark; prickles of uniform length (pricklets and bristles absent), purple or whitish, erect, often inclined upward, long, thin, flattened, with considerably broadened, decurrent base, often densely crowded and contiguous; petioles and rachis often finely glandular; stipules narrow, with divergent auricles, margin finely glandular; leaflets 5–9(11), very small, (2)5–7 mm long, glaucescent green, oblong or orbicular, dentate or fairly bidentate, with 4–9 predominantly obtuse teeth on each side, glabrous above, glabrous or pubescent beneath, bearing minute yellowish glands. Flowers solitary, small, usually ca. 1.5, rarely to 2.5 cm in diameter; pedicels about as long as the very small hypanthium or rather longer, thin, smooth; sepals 4–5 mm long, simple, lanceolate, with dense hairs above, often lightly pubescent below, persistent, spreading or recurved; petals lemon-yellow, longer than sepals; fruit subglobose, very tiny, 6–8 mm long, black-violet, on slender pedicels. May–June.

Mountains. — Centr. Asia: Pam.-Al. Gen. distr.: Afghanistan. Described from the Kuram Valley between Habibkalla and Alikhel. Type in London (Kew).

35. *R. kokanica* Rgl. in sched. — *R. platyacantha* ♂ *kokanica* Rgl. p. p. et ♀ *variabilis* Rgl. in A. H. P. V, f. II, (1878) 313. — *R. xanthina* var. *kokanica* Bouleng. in Bull. Jard. Bot. État, Bruxelles XIII (1935) 182. — *R. lutea* auct. fl. turkest. saltem pro max. part., non Mill.

Shrub, small or medium-sized, with red-brown or brown-violet bark and long, erect branches; prickles on turions abundant, dense, of uniform length, firm, erect or lightly curved upward, markedly flattened, strongly and abruptly broadened at base, brown-violet, on branches smaller and weaker, less flattened, nearly conical, sometimes mixed with isolated acicular prickles; leaves 2.5–6 cm long, with 7–9 leaflets; leaflets generally small, 8–15 mm long, elliptic or obovate, with orbicular or cuneate base, often orbicular at apex, with remotely appressed hairs above or glabrous towards tip, eglandulose or with few glands, frequently entire surface more or less pubescent beneath with more or less abundant short-stalked greenish and blackish brown glands, acute, glandular biserrate-bidentate, with 7–12 teeth on each side; petioles more or less (sometimes very densely) pubescent, covered with short-stalked glands, and few short pricklets; stipules narrow, pubescent, with divergent auricles, margin glandular. Flowers solitary, sometimes 2; pedicels long, 1–3 cm, glabrous or densely pubescent, smooth or remotely glandular-hispid;

477 hypanthia globose or flattened, globose, often glandular-hispid, becoming short-prickly (often with only few bristles or pricklets); sepals nearly as long as petals, 8–15 mm long, pubescent on both sides, outer sepals also with more or less abundant stalked glands, entire or with several short distal linear pinnules, with long-stalked glands at margins; corolla small, 2–4 cm in diameter; petals pale yellow; styles free, densely lanate like their heads; fruit globose, dark brown or nearly black; sepals long persistent, spreading or directed upward (but not converging). June–August.

Mountain slopes. — Centr. Asia: T. Sh., Pam.-Al. Gen. distr.: unclear, because confused with the preceding species; probably Iran and Afghanistan, Jap.-Ch.? (Rehder et Wilson, cf. Bouleng., l. c.). Described from Central Asia. Type in Leningrad.

36. *R. turkestanica* Rgl. in A. H. P. V fasc. 2 (1878) 349. — *R. platyacantha* var. *kokanica* Rgl. in A. H. P. V, f. II (1878) 313 p. p.

Shrub, low, similar in appearance to *R. pimpinellifolia*; branches and branchlets covered with erect unequal remote prickles, the largest of which are firm, flattened-broadened at base, the smallest setaceous, short glandular-hispid; petioles and rachis unarmed or with sparse short prickles, pubescent with a mixture of short-stalked glands; stipules narrow, broadened distally, with glandular-margined auricles; leaflets small, very often 5, suborbicular, obtuse, eglandulose beneath, simple or nearly bidentate, often teeth terminating in a small apical gland. Flowers 1–3; pedicels as well as the subglobose hypanthium covered with short glandular bristles; sepals entire, passing into a mucro, often broadened distally, shorter than sepals, dorsally glandular-hispid; petals apparently yellow; styles connate, forming a protruding lanate conoid column. June.

Centr. Asia: T. Sh. (Kara-Tau). Endemic. Described from Bugun. Type in Leningrad.

Note. A little-known problematic form, perhaps a hybrid: *R. kokanica* Rgl. × *R. platyacantha* Schrenk?

Section 6. LUTEAE Crép. Nouv. Class. (1891) 25. — Median leaves of flower-bearing shoots with 5–7 leaflets; upper stipules narrow. Flowers 1–3; outer sepals with few pinnules; fruit brick red.

478 37. *R. foetida* Herrm., Dissert. (1762) 18; *R. Keller*, Syn. Ros. Eur. Med. (1931) 753; Bouleng. in Bull. Jard. Bot. État Bruxelles XIII (1935) 189. — *R. eglantheria* L. Amoen. acad. V (1760) 220 et S. Nat. ed. 10, II (1759) 1062 et auct. mult. non L. Spec., Pl. ed. 1. — *R. lutea* Mill. Gard., Dict. ed. 8 (1768); Ldb., Fl. Ross. II (1844) 73; Boiss., Fl. Or. II (1872) 671; Christ in Boiss., Fl. Or. Suppl. (1888) 205; Crep., l. c. XXVII, 2 (1888) 101 et XXIX, 2 (1890) 9. — *R. punicea* Mill. l. c. — *R. bicolor* Jacq., Hort. bot. Vindob. I, tab. I (1770). — *R. chlorophylla* Ehrh., Beitr. z. Naturkunde II (1788). — *R. eglantheria* α *lutea* Seringe in DC., Prodr. II (1825) 607. — Ic.: Curtis, Bot. Mag. (1797) tab. 363; Jacq., l. c.; Curtis, Bot. Mag. (1808) tab. 1877; Willmott, Gen. Rosa II (1911) 267, et 269.

Shrub, small or medium-sized, 30–200 cm high, with long arcuately curved branches; prickles on turions numerous, erect or lightly curved,

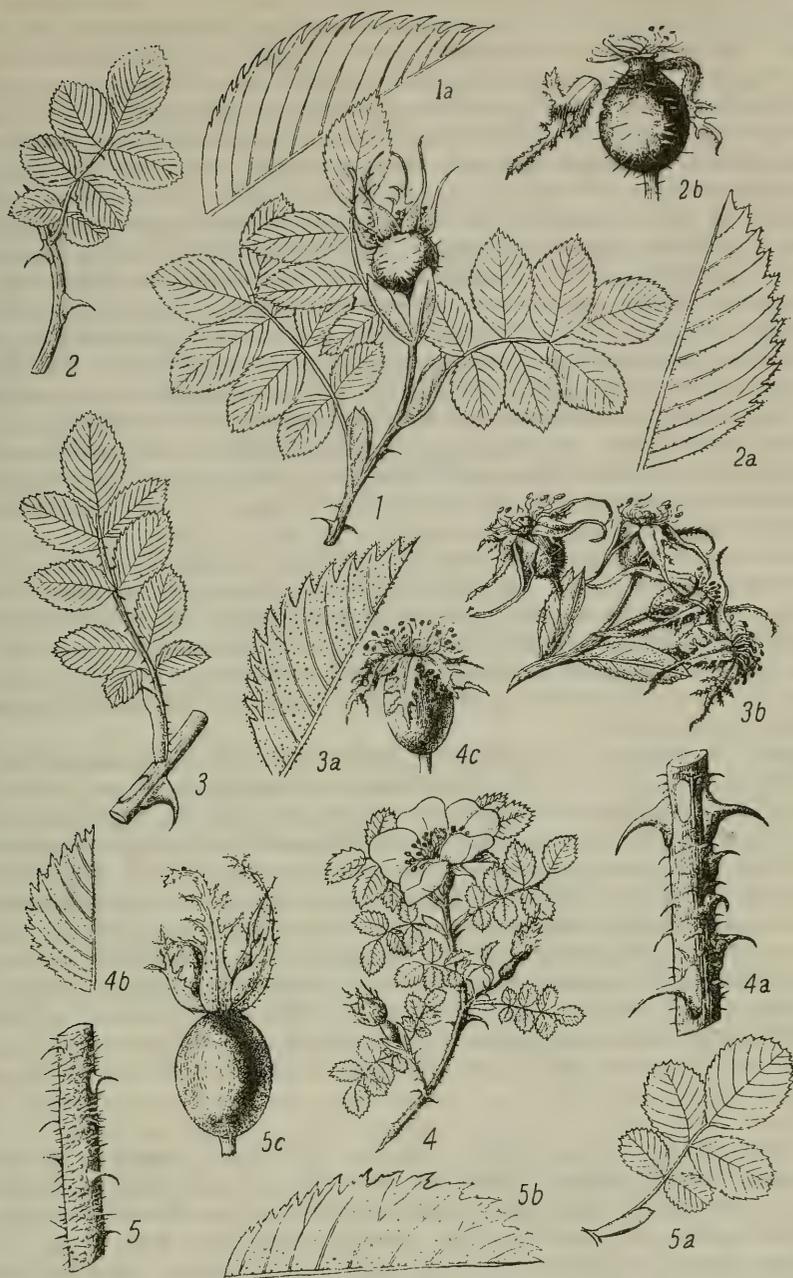


PLATE XXX. 1 - *Rosa boissieri* Crép., branchlet with fruit, a) leaflet; 2 - *R. eglanteria* L., part of stem with leaves, a) leaflet, b) fruit; 3 - *R. iberica* Crép., part of stem with leaves, a) leaflet, b) inflorescence with fruit; 4 - *R. horrida* Fisch., flowering branchlet, a) part of stem, b) leaflet, c) fruit; 5 - *R. glutinosa* Sibth., part of stem, a) leaves, b) part of leaf, c) fruit.

less abundant on branches, often mixed with thin pricklets and bristles (sometimes glandular); flower-bearing branches often unarmed; leaves with 5-7 (on turions, 7-9) leaflets; leaflets small or medium-sized, rarely rather large, 8-25 mm long, narrowly elliptic to suborbicular, frequently with orbicular base, sometimes obovate with broadly cuneate base, weakly appressed-hairy above, hairy beneath along veins, usually bearing glands (in exceptional cases eglandulose), dark green, deeply and openly serrate-dentate, often with 4-7 teeth on each side and these in turn with 1-4 glandular denticles; petioles pubescent, with numerous sessile glands and sparse pricklets; stipules narrow, the upper somewhat broadened, with divergent auricles. Flowers solitary, rarely 2 or few ebracteate; pedicels long (7 mm) [?] 1.2-3 cm, glabrous or velutinous-pubescent, smooth, rarely with few stalked glands; hypanthia semi-globose, often sparingly bristly; sepals shorter than petals, 1.3-2.2 cm long, glandular-hispid dorsally, with more or less long, lanceolate, entire or finely-toothed appendage, outer sepals often with small, linear, solitary lateral appendages, spreading after flowering, later erect; corolla large, 3-6.5 cm in diameter; petals yellow or the inner rufous-reddish; style free, short; stigma head densely hairy; fruit flattened-globose, red, with broad mouth, long-hairy at margin, crowned by long persistent sepals. June-July.

Caucasus: E. Transc. (obviously wild); Centr. Asia: Pam.-Al., T. Sh. **Gen. distr.:** Centr. Eur., As. Min., Armenia, Iran., Afghanistan, Him. to India (apparently frequent in Centr. Eur., but only the escaped form). Described from a cultivated specimen. Type unknown.

Economic importance. Although this is a very ornamental plant, its cultivation is on the decline, presumably because of its unpleasant smell, reminiscent of bedbugs.

481 **Note.** Boulenger, l. c. 190-191, thinks that this plant was introduced into cultivation in the remote past, possibly in the Middle Ages, as the result of crossing *R. hemisphaerica* Herrm. with *R. myriacantha* DC. If so, then all reports on the feral nature of *R. foetida* would refer to the plant in its escaped form. This would agree with the Soviet flora, at least insofar as the authentic *R. foetida* is concerned, which completely answers to the above description. Yet, we are not certain that there are no *R. foetida* in the Soviet Union. Judging by the information on the labels, we find it difficult to regard some of the Central Asian specimens as escapees. It appears that in Soviet Central Asia other truly wild forms, as yet insufficiently studied, belonging to the cycle *R. xanthina* Lindl. (mainly *R. kokanica* Rgl. - see above) are listed as *R. foetida* (= *R. lutea*).

38. ***R. haemisphaerica*** Herrm., Dissert. (1762) 18; Bouleng. in Bull. Jard. Bot. Etat Bruxelles XIII (1935) 186. - *R. glaucophylla* Ehrh., Beitr. z. Naturk. II (1788) 69. - *R. sulphurea* Ait., Hort. Kew. II (1789) 201; Boiss., Fl. Or. II (1872) 672; Crép. in Bull. Soc. Bot. Belg. XI (1872) 98; Christ. in Boiss., Fl. Or. Suppl. (1888) 206; Crép. in Bull. Soc. Bot. Belg. XXIX, 2 (1890) 8. - ? *R. rapini* Boiss., Diagn. Pl. Nov. Ser. 2, No. 6 (1859) 72 et l. c. (1872) 672. - *R. lutea* var. *sulphurea* Rgl. in A. H. P. V, f. 1 (1877) 32. - Ic.: Willmott, Gen. Rosa (1911), p. 273, pl.

482 Shrub, erect, 1–2 m high, with more or less curved branches; prickles slender, heterogeneous, rather large, curved (sometimes nearly hamate), with more or less strongly decurrent base, often mixed with few very slender pricklets; large prickles shorter than half the length of the largest leaflets; leaflets 5–7, small, 0.5–2.5 cm long, rather approximate, sessile or with well-developed petiolules, more or less broadly obovate, cuneate, generally orbicular or obtuse at apex, simple or slightly compound glandular-serrate, with 4–17 shallow teeth at each side, glaucous-green, pale beneath, glabrous on both sides or often only above, short-hairy beneath along veins or entire surface appressed-hairy and if so, usually also pubescent above; petioles nearly unarmed, glabrous or pubescent, glandulose or eglandulose; stipules narrow, with erect or divergent auricles. Flowers solitary, rarely 2 or 3, ebracteate, medium-sized, 4.5–7 cm in diameter, on long (0.7–2.2 cm) glabrous or velutinous-pubescent, rarely slightly glandular pedicels; hypanthia semi-globose, smooth or hispid-hairy; sepals 1.3–1.8 cm long, tapering from base, acuminate, often with spatulate or foliate appendage, entire or with 1–2 lateral filiform appendages, spreading, long persistent, smooth or slightly glandular dorsally; petals slightly notched, sulphur-yellow; disk narrow; style short, white-tomentose; style head globose, sessile; fruit globose or short-ovoid, 1.5–1.8 cm long, yellow or orange, crowned by erect sepals. June.

Caucasus; S. Transc. (Erevan and others). **Geñ. distr.:** As. Min., Iran. Described from cultivated specimens. Type unknown.

Economic importance. In Azerbaidzhan the dried and roasted fruit and leaves are used to make tea. The garden form, with double flowers, is frequently cultivated.

39. *R. bungeana* Boiss. et Buhse in Mém. Soc. Nat. Mosc. XII (1860) 84.— Ic.: Boiss. et Buhse, l. c. pl. VI.

Shrub, probably erect, densely branching, with slightly curved branches; on young branches and shoots bark dark red to brown; young branches glandular-scabrous; prickles thin, heterogeneous, the larger prickles more or less strongly curved, subconical, with distinctly broadened decurrent base, sometimes mixed with very thin straight or slightly curved pricklets, the largest prickles markedly shorter than half the length of the largest leaflets; leaflets (5)7–9, small, 0.7–2 cm long, approximate, subsessile or with well-developed petiolules, obovate (usually oblong-obovate), cuneate, orbicular or slightly acuminate at apex, simple or doubly serrate-dentate, with 7–20 small, shallow teeth on each side, glaucous-green, paler beneath, remotely or rather densely covered with short and thin appressed hairs, usually glabrous (or pubescent) above; petioles and rachis unarmed or with few pricklets, generally pubescent, sometimes with small glands; stipules narrow, with few divergent auricles; margin slightly glandular-dentate. Flowers solitary, ebracteate, rather small, 3–5 cm in diameter, on more or less long, sparingly pubescent pedicels; hypanthia globose or ovoid, smooth; sepals 1–2 cm long, tapering from base, mostly with spatulate or foliate appendages, entire or with 1 or 2 lateral, frequently short, filiform usually oblanceolate, obtuse appendages, long persistent, dorsally smooth; style short, white-tomentose, stigma head flattened-globose, sessile; fruit globose, 1–1.5 cm long and as broad, crowned by few recurved sepals. May–June.

Mountain slopes.— Centr. Asia: Turkm. (Kopet-Dagh). **Gen. distr.:** Iran. Described from Iran: Type in Leningrad.

483 **Note.** Very similar to preceding species, with which it is linked by transitional forms.

Section 7. **GALLICAE** Crép. in Bull. Soc. Bot. Belg. XXXI (1892) 70, 72.— Shrubs with erect, not climbing stem; curved prickles on stem mixed with erect, acicular or setaceous pricklets and stalked glands; stipules adnate to petioles, not fimbriate, the upper broader than the median; median leaves of flower-bearing shoots with 5, rarely 3 leaflets. Flowers generally solitary, large; sepals recurved after flowering, caducous before maturation of fruit; outer sepals pinnatisect; stigma head semi-globose, its outer margin usually not exceeding the line of attachment of the stamens.

40. **R. gallica** L., Sp. pl. ed. 1 (1753) 492; Rgl. in A. H. P. V, f. 2 (1878) 350.— **R. austriaca** Crantz, Stirp. austr. I (1768) 86.— **R. pumila** Jacq., Fl. austr. II (1773) 59.— **R. rubra** Lam., Fl. fr. III (1778) 130.— **R. pygmaea** M. B., Fl. taur.-cauc. I (1808) 397; id. Cent. Pl. Rar. Ross. Mer. (1810).— pl. II.— **R. gallica** β **pygmaea** Boiss., Fl. Or. II (1872) 676.— **R. gallica** α **pumila** Rgl. in A. H. P. V, 2 (1878) 351.— **l.c.:** Jacq., l. c., tab. 148.— **Exs.:** HFR No. 2101.

Dwarf shrub, usually less than 50 cm but sometimes to 1 m high; underground stem with erect or spreading flower-bearing branches; prickles small, the largest falcate, flattened, mixed with many erect often glandular pricklets; leaves 4.5–12.5 cm long, with 3–5 very large, up to 3–5.5 cm long, orbicular or elliptic, rarely ovate, basally and apically rounded or acute, slightly coriaceous leaflets, glabrous above, paler beneath, pubescent and glandular along nerves, with prominent network of veins beneath; leaflet margins simple or generally doubly glandular-serrate, with broad open teeth; stipules usually narrow, glandular-margined, with short divergent auricles. Flowers frequently solitary, pedicels long (1.8–5 cm), robust, like hypanthium covered with stalked glands; sepals 1.5–2.5 cm long, mucronate or more or less broadened, distinctly pinnate, with 2–5 lateral pinules, dorsally glandular, recurved, falling off before ripening of fruit; corolla very large, 4–6 cm in diameter; petals longer than sepals, notched, dark red; style pubescent sometimes exerted from disk; fruit globose or ovate, ca. 1.5 cm long. June–July.

Open broad-leaved forests, shrubby formations, roadsides and forest edges, open slopes.— European part: Crim.; Caucasus: W. and S. Transc. **Gen. distr.:** Centr. Eur., Med., Atl. (escaped?), Bal.-As. Min. Described from France. Type in London.

484 **Economic importance.** A tanning agent. The flowers are used to make jams and candied peel; in Germany the seeds boiled in sugar produce a special beverage (a tea).

***R. centifolia** L., Sp. pl. ed. 1 (1753) 491.— **R. gallica** β **centifolia** Koehne, Deutsch. Dendr. (1813) 282.— **Exs.:** HFR No. 2102.

Shrub, ca. 1 m high; rhizome not as long-creeping but prickles of sterile shoots larger than in *R. gallica*, bristles more profuse on branches, leaflets less coriaceous, glabrous, glandular beneath. Flowers drooping,

pink, nearly always double; hypanthia ovoid; sepals longer and narrower than in *R. gallica*; fruit not seen. June—July.

Many strains in cultivation, sometimes wild. Origin Bal.-As. Min. (or Med.). Described from cultivated specimens. Type in London.

Note. Usually considered as a cultivated form of *R. gallica* L.

Economic importance. In earlier times a very popular ornamental, now supplanted by the higher-growing *R. damascena*. An officinal plant (*flores Rosae centifoliae*).

**R. damascena* Mill., Gard. Dict. ed. 8 (1768) No. 15. — Ic.: Redout., Ros., t. 73 et 109. — Exs.: HFR No. 2103.

Shrub; stem higher and more robust than in *R. gallica*, to 1.5 m; prickles equal, large, hamate, flattened, often red; stipules distinctly glandular-ciliate, upper stipules barely broader than the lower; leaflets ovate:lanceolate, once crenate-serrate, shiny above, pubescent beneath (sometimes also above). Inflorescence usually rather many-flowered, corymbiform or corymbiform-paniculate; flowers double, pale red or pink; fruit oblong, broadest in upper part, red (ripening only very rarely). June—July.

A much cultivated ornamental, apparently of Near Asian origin. Described from a cultivated specimen. Type in London.

Note. Probably a hybrid of *R. centifolia* (perhaps with *R. alba*).

Economic importance. More resistant to frost than *R. centifolia*. Grown for commercial purposes. For petals yielding attar of roses, the "Kazanlyk rose" (*R. damascena* f. *trigintipetala*) is the most valuable strain. The petals are also used to make jam. An officinal plant (sepals).

**R. bifera* Poir., Enc. VI (1804) 270 (pro var. *R. centifoliae*) et hort.

485

Shrub; underground shoots usually absent; prickles strong, falcate, flattened; pricklets and bristles of branches smaller than in *R. centifolia* and *R. damascena*; leaflets large, oblong-ovate, generally once serrate, glabrous and smooth. Flowers in inflorescences, often large, usually densely double, generally bright or dark red, rarely pink; pedicels glandular. June to fall (or with second flowering in the fall).

Grown in gardens (though more rarely than preceding species). Origin unknown. Described from cultivated specimen. Type not known (perhaps in Paris).

Note. Believed to be a hybrid: *R. centifolia* L. × *R. chinensis* Jacq.

Economic importance. This strain is highly valued because of its 2 or 3 periods of flowering in one summer as well as because of its strong growth which yields long-stalked flowers for the flower market. Without covering, it winters well only in areas with a mild climate (e.g., the southern part of the Crimea, Black Sea coast of the Caucasus).

**R. turbinata* Ait., Hort. Kew. ed. 1, II (1789) 206. — *R. francfurtana* Borkh., Vers. Forstbot. Besch. (1790) 312.

Shrub; stem to 2 m high; prickles few, unequal, partly erect, often curved, often absent; flower-bearing branches generally prickleless; leaves with 5—7 leaflets; stipules of upper leaves markedly broadened; leaflets ovate

or elliptic, orbicular at base, once serrate, slightly coriaceous, glabrous above, shining, gray-green, glabrous or pubescent along veins. Flowers solitary, 2 or 3, bright pink, double; pedicels and lower part of hypanthium with stalked glands; hypanthia broadly turbinate; sepals often entire (outer sepals sometimes with few narrow pinnules), ascending after flowering. June—July.

Rarely cultivated, sometimes wild. Origin believed to be Europe. Described from a cultivated specimen of unknown origin. Type in London.

Note. Obviously a hybrid (according to Crépin — *R. cinnamomea* L. × *R. gallica* L.).

**R. alba* L., Sp. pl. ed. 1 (1753).— Exs.: HFR No. 2104.

Shrub, strong, to 2.5 m high; prickles firm, falcate, flattened at base, prickles nearly absent; leaflets oblong, less coriaceous than in preceding species (i. e., *R. centifolia*, *R. damascena*, *R. bifera*), almost regularly serrate, glabrous above, pubescent beneath. Flowers medium-sized, often in clusters, semi-double, whitish; hypanthia oblong-ovoid, smooth. June.

Cultivated in gardens. Origin believed to be Central Europe or the Mediterranean area. Described from cultivated specimens. Type in London.

486 Note. Considered a hybrid: *R. corymbifera* Borkh. × *R. gallica* L.
Economic importance. As a result of its resistance to frost (winters uncovered), it is a very useful plant for northern regions.

Section 8. **CANINAE** Crép. in Bull. Soc. Bot. Belg. XXXI, 2 (1892) 70, 71.— Shrubs with erect trunk; prickles often equal, erect, curved or hamately curved; median leaves of flower-bearing shoots mostly with 7 leaflets. Flowers frequently in many-flowered inflorescence; sepals downcurved after flowering, falling before maturation of fruit or ascending and persistent during fruiting and even to maturation of fruit, outer sepals pinnatisect; stigma with semi-globose head, usually not exceeding line of attachment of stamens by its outer margin.

Note. The species of this section display a sharp deviation from the norm with respect to the number of chromosomes and the very poor development of pollen. As we have noted, typical for the whole group is the phenomenon of apomixis, i. e., formation of embryo not dependant upon fertilization (probably from the nucelli). All this confirms that the species of the section *Caninae* originated (in the remote past) as the result of hybridization processes — the so-called "cryptohybrids." In connection with apomixis, it is possible to distinguish within the section a very large quantity of completely constant small systematic units, which are accurately considered as separate species. In the Soviet Union, investigation of these species has started but only in the Ukraine; in the present work, they could not be described since their units in other parts of the distribution area of the section (within the USSR) have never been studied and the acceptance of elementary species appearing only in part of this area would give the treatment a one-sided character (naturally, a more detailed treatment of the Ukrainian *Rosa* can and should be made in the local flora of the Ukrainian SSR). In order to give an indication of the amount of work yet to be done on this section, suffice it to say that even for

a flora as thoroughly studied as that of Sweden, Matsson recognizes in only two provinces (Norrlund and Dalarna) no less than one hundred different species (with several hundred subspecies) of the section *Caninae*, not to mention numerous hybrids (cf. L. P. R. Matsson, *Examen Rosarum Sueciae I*, Kungl. Sv. Vetens. Ak. Handl., 3 ser., XIV, No. 3, 1934).

Subsection 1. *JUNDZILLIAE* Crép. in Bull. Soc. Bot. Belg. XXXI, 2 (1892) 80. — Prickles delicate, erect or suberect, sometimes mixed with acicular pricklets; leaflets large, rigid, compound-dentate, with prominent network of veins. Pedicels generally bear stalked glands mixed with acicular pricklets; sepals recurved after flowering.

487 41. *R. jundzillii* Besser, Cat. Hort. Crem. (1816) 117; M. B., Fl. taur.-cauc. III (1819) 347; Crép., Bull. Soc. Bot. Belg. XVIII, 1 (1878) 231, 364, XXIX, II (1890) 15 et XXXI, 2 (1892) 80. — ? *R. marginata* Wallr., Annus Bot. (1815) 68 (nom. pr.). — *R. glandulosa* Bess., Cat. Hort. Crem. Suppl. V (1814) 20, non Bell. — *R. trachyphylla* Rau, Enum. Ros. Wirceb. (1816) 124. — *R. jundzilliana* Bess. Enum., Pl. Volh. Pod. (1822) 67. — *R. britzensis* Koehne in Fedde, Rep. Sp. nov. VIII (1910) 21 et XI (1913) 530. — Ic.: Hegi, Ill. Fl. IV, 2, f. 1219. — Exs.: Kern., fl. exs. austr.-hung. No. 463; HFR No. 2110 a, b.

Shrub, usually low-growing (1 m, sometimes to 3 m high), loose; prickles erect or curved, few, at times suberect, thin, very rarely mixed with small erect acicular pricklets; shoots very often prickleless; leaflets 5–9, 25–48 mm long, obovate or elliptic, obtuse or acute, glabrous, rarely pubescent beneath along veins, often remotely glandular beneath, with prominent nerves, doubly glandular-serrate; stipules large, with glandular margins, and parallel or divergent veins. Flowers solitary or 2–6, pedicels 10–20 mm, like lower part of hypanthium glandular-hispid; sepals 18–25 mm long, shorter than petals, somewhat broadened distally, thin-pinnate, with 2–4 pinnules on each side, recurved, rarely slightly spreading, persistent until ripening; corolla to 8 cm in diameter; petals large, 20–30 mm long, bright pink; style pubescent, with sessile, flattened, head, lanate; fruit 2.5–3 cm in diameter, globose or ovoid, tapering to a short crown. June.

Amid shrubs, steppes, stony places. — European part: M. Dnp., Crim.; Caucasus: Cisc. Gen. distr.: Centr. and Atl. Eur. (S. and E. France, C. Germany, Alps and Carpathians).

Subsection 2. *RUBRIFOLIAE* Crép. in Bull. Soc. Bot. Belg. XXXI, 2 (1892) 79. — Prickles equal, erect or slightly curved; leaflets glabrous, simple-dentate. Pedicels usually eglandulose; sepals narrow, the outer with small filiform pinnules or often without, after flowering directed upward, persistent.

**R. glauca* Pourret in Mém. Acad. Toul. III (1788) 326. — *R. rubrifolia* Vill., Hist. pl. Dauph. III (1789) 549. — *R. rubicunda* Hall. fil. in Römer, Arch. II (1799) 6.

488 Shrub, 1–3 m high; shoots, leaves, and stipules with dark or light blue bloom, often with reddish purple tinge; flower-bearing branches with erect or slightly curved, small prickles, or without prickles; leaves generally with 7 leaflets, glabrous; leaflets oblong-ovate, dentate, with appressed teeth, lower one-fourth to one-third entire. Inflorescence 2 to many-flowered; pedicels smooth or glandular, bearing reddish, often foliate bracts; hypanthia globose, smooth; sepals narrow, the outer with narrow filiform pinnules; petals pink, small, shorter than sepals; fruit smallish, globose, light red, coriaceous. June–July.

Cultivated in gardens and parks. Wild in Centr. and Atl. Eur., Bal.-As. Min. (Serbia). Described from France. Type not known.

Economic importance. A very effective park shrub, distinguished by its remarkable resistance and, therefore, especially important for the more northern regions; also used as stock for double flowers.

Subsection 3. VESTITAE R. Kell. in Asch. et Gr., Syn. VI (1900) 64. – Prickles delicate, erect or slightly curved. Leaflets usually soft-tomentose or velutinous on both sides, frequently compound-dentate; sepals ascending after flowering, long persistent.

42. *R. tomentosa* Smith, Fl. Brit. II (1800) 539. – *R. mollissima* Willd., Fl. Berol. Prodr. (1783) 174; Boiss., Fl. Or. Suppl. (1888) 226. – *R. cuspidata* M. B., Fl. taur.-cauc. I (1808) 396 et III (1819) 339. – *R. dimorpha* Bess., Cat. hort. Crem. (1811) Suppl. IV, 19; et (1816) 117; Enum. pl. Pod. Volh. (1822) 19. – ? *R. the rebinthacea* Bess., Enum. pl. Pod. Volh. (1822) 21, 61, 66. – *R. mollis* Christ in Boiss., Fl. Or. Suppl. (1888) 224 p. p. – *R. ruprechtii* var. β *daghestanica* Boiss., Fl. Or. II (1872) 682. – Ic.: Willmott, Gen. Rosa II, p. 421, pl. – Exs.: HFR No. 2148, 2149, 2150.

489 Shrub, medium-sized (1–3 m high), with elongated, zigzag or flexuous branches; prickles usually equal, downcurved, often suberect, sometimes markedly curved, with moderately broadened base, rarely mixed with small pricklets; leaves 5–15 cm long; leaflets often 5–7, 2–6.5 cm long, orbicular to oblong-elliptic, rounded or acuminate at both ends, glaucous-grayish-green; teeth compound, 10–30 on each side of leaflet, with 2–10 glands at each side, sometimes some teeth simple; leaflets more or less densely hairy on both sides, often tomentose (especially beneath), eglandulose or with very tiny, barely distinguishable glands beneath; petioles pubescent, frequently glandular mixed with small pricklets; stipules broadened, pubescent, with glandular-ciliate margin. Flowers solitary or in corymbiform, 3–15-flowered inflorescences, on long, more or less densely glandular-hispid pedicels, medium-sized, 3.5–6 cm in diameter, pink; hypanthia globose or oblong, smooth or glandular-hispid; sepals pubescent along margins and above, dorsally densely glandular-hispid, with 1–4 lateral pinnules and foliate appendage, in fruit spreading or ascending not converging; disk flat or convex, 4–6 times as broad as the mouth of the hypanthium; style heads subsessile, tomentose, rarely glabrous, distinctly pediceled; fruit globose or ovoid, smooth or more or less glandular-hispid, shorter, as long as, or longer than pedicels, orange or bright red; petals finally deciduous. June. (Plate XXXI, Figure 4).

Forest edges, shrubby formations. — European part: U. Dnp., M. Dnp.; Caucasus: Dag., Cisc., E. and W. Transc. **Gen. distr.:** Centr. Eur., Scand., Atl., Med., Bal.-As. Min. (eastern part). Described from England. Type in London.

43. *R. mollis* Smith in Sowerby, Engl. Bot. XXXV (1812) t. 2459. — *R. villosa* L., Sp. Pl. 1753) 704 saltem p. p. (nomen confusum). — *R. andrzeiowskii* Stev. in Bess., Cat. hort. Crem. (1811) Suppl. IV, 19 et (1816) 117; Enum. pl. Pod. Volh. (1822) 19. — *R. ciliopetala* Bess., Fl. Pod. et Volh. (1822) 66. — *R. mollissima* Fr. Novit., ed. 2 (1828) 61; id. Nov., Fl. suec., ed. 2 (1828) 151, non Willd. — *R. ruprechtii* Boiss., Fl. Or. II (1872) 682. — Exs.: HFR No. 2146, 2147.

Shrub, low-growing, few-branched, 0.5–1.5 m high; branches short, erect, with glaucous tinge (like leaves); prickles thin, usually quite erect, sometimes directed slightly upward, often irregular; leaves 3–20 cm long; leaflets 3–9, medium-sized, approximate, orbicular-ovate or obovate, rarely slightly elongated, frequently rounded at both ends, pubescent on both sides, dark gray-green, sericeous-luminous, often densely tomentose beneath, sometimes more or less glandular above, doubly glandular-serrate, with 15–30 large, obtuse, usually acuminate teeth at each side; petioles more or less pubescent, with stalked glands mixed with small pricklets; stipules frequently large with auricles pointed in different directions, margins with large glands. Flowers solitary or 3–13 in corymbiform inflorescences, 2.5–6.5 cm in diameter; pedicels very short, with few stalked glands; hypanthia globose, smooth or glandular-hispid; sepals short-mucronate, with 3 narrow lateral pinnules, approached after flowering, persistent; petals dark pink, longer than sepals, sometimes with glandular margins; style heads sessile, tomentose; disk flat or concave, often considerably reduced; fruit small (1.5 cm long), ovoid or globose, smooth or often more or less glandular-hispid, often slightly longer than pedicels, orange or dark red. June–July.

Riverbanks, shrubby formations, forest edges. — European part: Lad.-Ilm., U. Dnp., M. Dnp., V.-Don (Galich'ya Gora, Donets); Caucasus: Cisc., Dag., E. Transc. **Gen. distr.:** Scand., Centr. Eur., Atl. Eur.; Bal.-As. Min., Arm.-Kurd., Iran?

44. *R. pomifera* Herrm., Dissert. inaug. de Rosa (1712) 16. — *R. villosa* L. var. *pomifera* Desvaux, Journ. bot. II (1813) 117. — *R. villosa* L. var. *vulgaris* Rau, Enum. ros. Wirceb. (1816) 151. — *R. pomifera* Herrm. ssp. *eupomifera* Schwertschlagel, Ros. Bayerns in Ber. d. bay. Bot. Ges. XVIII (1926) 2. — Ic.: Hegi, Ill. Fl. IV, 2 tab. 155.

490 Shrub, to 2.5 m, with erect shoots, short internodes and branches; prickles regular, with constricted oval base, erect, often directed slightly upward, subulate, sometimes mixed with smaller, thin acicular or strigose pricklets; leaflets 5–7, very large (5 cm long, 3 cm wide), remote, oblong, with nearly parallel sides, finely tomentose, dense glaucous-green beneath, with compound glandular-serrate glands between tomentum; stipules broadened. Flowers in corymbs or solitary, short-pedicel, like hypanthium and sepals strigose, densely finely glandular beneath; sepals medium-sized, pinnate, with long appendage, erect, converging after

flowering; petals dark pink, shorter than sepals; style heads sessile, white-tomentose; fruit drooping, large, 3 cm long, globose, rarely ovoid, with persistent sepals. June–July. (Plate XXXI, Figure 3).

Amid shrubs, stony bluffs, sands. — European part: Lad.-Ilm., M. Dnp.; Caucasus: Cisc., E. and W. Transc. **Gen. distr.:** Centr. Eur. (Germany, Switzerland), Atl. Eur. (Great Britain), Scand., Med., Bal.-As. Min. Described from Germany.

Economic importance. The large fruits of this species are in great demand for making jams, compots, etc. Of all the representatives of section *Caninae* examined, *R. pomifera* showed the highest content of vitamin C (ca. 1.20% ascorbic acid per dry weight of pulp).

45. *R. hirtissima* Lonacz. in Acta Horti Bot. Univers. Juriev. XIII (1912) 107.

Shrub, apparently high; branches densely pubescent; prickles erect, mixed with acicular pricklets and bristles, slightly pubescent; stipules broadened; leaflets large, to 3.5 cm long, ovate, doubly glandular-serrate, gray-tomentose on both sides, densely glandular beneath. Flowers few; pedicels 2 cm, densely glandular; hypanthia ovoid, strigose at base; sepals pinnate, the outer glandular; style heads sessile, tomentose; fruit unknown. July.

Subalpine mountain zone. — Caucasus: W. Transc. Endemic. Described from Ertsov Mountain in Abkhazia. Type in Leningrad.

46. *R. boissieri* Crépin in Bull. Soc. Bot. Belg. VIII (1869) 340.

491 Shrub, rather high, with strict erect glabrous shoots and branches, covered with brown bark and profuse prickles; prickles small, rather thin, horizontally spreading, erect or slightly curved, flattened at base; leaves medium-sized or rather large, usually with 5–7 leaflets; leaflets thick, slightly velutinous-pubescent above, tomentose-pubescent, whitish beneath, eglandulose or with few glands on midrib, broadly ovate-elliptic, short-acuminate, with simple, rarely nearly double teeth slightly curved upward, eglandulose at their tips; petioles tomentose-pubescent, often unarmed; stipules distinctly broadened, with broad not divergent glandular-ciliate auricles. Flowers usually solitary; pedicels short, 6–13 mm, glabrous, smooth, rarely glandular-hispid, hidden by stipules of bracts; hypanthia glabrous and smooth, ovoid-globose; sepals eglandulose, two sepals with two pinnules, one with one pinnule, the rest entire or with very long linear mucro; corolla 5–6 cm in diameter, white or pale pink; style villous; stigma forming a large head. July. (Plate XXX, Figure 1).

Forest edges and glades, to subalpine zone. — Caucasus: Cisc., Dag., E. and W. Transc., Tal. **Gen. distr.:** Artvin District, Turkish Armenia and Lazistan. Described from Djumil Valley (Lazistan). Type in Geneva (Boissier Herbarium).

47. *R. svanetica* Crépin apud Somm. et Lev. in A. H. P. XVI (1900) 139.

Shrub; prickles erect or slightly curved; cauline leaves often with 9 leaflets, leaflets glabrous, often bidentate, glandular or smooth; upper stipules broadened, with falcately curved auricles. Flowers large, white or pale pink; pedicels elongate, glandular-hispid, rarely smooth; sepals erect after flowering, probably deciduous; style tomentose; fruit glandular-hispid. May–July.

Banks of mountain streams, forest edges and shrubby formations (1,500–2,000 m).—Caucasus: W. Transc. (Svanetia, Abkhazia). Endemic. Described 1) from Kala village, 2) between Kala and Ipar along the Ingur River, and 3) between Mulach and Mestia. Type in Florence.

Note. A little known problematic species close to *R. boissieri*; Crépin writes that it is related to *Rosa glauca* (i. e., *R. afzeliana*) as *R. boissieri* is to *R. coriifolia* (i. e., that *R. boissieri* is the pubescent form of *R. svanetica* just as *R. coriifolia* is the pubescent form of *R. afzeliana*).

Subsection 4. ELYMAITICAE Boiss., Fl. Or. II (1872) 675.—Prickles remote, of two kinds: strong, erect or curved, and setaceous; leaflets small, (nearly) eglandulose beneath, simple-dentate. Flowers subsessile; bracts large; sepals long persistent in fruit, recurved below.

48. *R. elymaitica* Boiss. et Hausskn. ex Boiss., Fl. Or. II (1872) 675; Crép. in Bull. Soc. Bot. Belg. XIII (1874) 278; Christ in Boiss., Fl. Or. Suppl. (1888) 227; Bouleng. in Bull. Jard. Bot. de Bruxelles XIV (1936) 170.—*R. elymaitica* var. *tomentella* Boiss., l. c.—*R. albicans* Godet ex Boiss., l. c., Christ., l. c.—*R. albicans* var. *flexicaulis* Godet et Boiss., l. c.

492 Small or medium-sized shrub with erect, rarely flexuous, purple branches, with glaucous bloom; prickles homogeneous, very dense, erect, slightly curved or hamate, large, with broad often decurrent base, often arranged in twos (or threes); leaves 1.5–4 cm long, glaucescent; leaflets 3–5(7), small (the largest 1–1.5 cm long), sessile or petioled, more or less approximate in upper half of rachis, orbicular-obovate, large- and small-toothed, with 8–14 broad, simple, eglandulose, very large teeth at each side, glabrous or pubescent on both sides, eglandulose or with few glands along midrib beneath, indurate, often with strongly protruding veins beneath; petioles glabrous or pubescent, armed with prickles and few glands or often without them; stipules short, lanceolate, narrow or rather broad with triangular or acuminate auricles, usually with glandular margin. Flowers small, 25–30 mm in diameter, solitary, rarely 2 or 3, subsessile or on 7 mm pedicels, bracteate; hypanthia ovoid, like the sepals very densely glandular-hispid; sepals 10–15 mm long, slightly broadened distally, with (0)1–3 filiform or linear-lanceolate pinnules; corolla white or pink; petals almost as long as sepals; styles white-tomentose, villous, not united into column; stigma a more or less protruding, glabrous, orbicular or conical head; fruit globose (pisiform), 7–13 mm long, red, more or less densely glandular-hispid, with somewhat persistent sepals. June.

Alpine and subalpine mountain zone, rocks, 1,500–3,000 m.—Caucasus: S. Transc. Gen. distr.: Iran, Kurdistan (Persian). Described from Avroman in Kurdistan. Type in Geneva.

Subsection 5. RUBIGINOSAE Crép. in Soc. Bot. Belg. XXXI, 2 (1892) 91.—Prickles more or less strongly recurved, usually hamate, gradually broadening toward base; leaflets small or medium-sized, compound-dentate, with a pleasant odor due to numerous glands over entire lower surface.

49. *R. eglanteria* L., Spec. pl. (1753) 491, non ed. 2, nec Amoën. Acad. V (1760) 220. — *R. rubiginosa* L., Mant. II App. (1771) 564. — *R. umbellata* Leers, Fl. Herb. (1775) 117. — *R. suavifolia* Lightfoot, Fl. scot. I (1777) 262. — *R. tenuiglandulosa* Merat, Fl. Env. Paris (1812) 189. — Ic.: Hegi, Ill. Fl. M. Eur. IV (1923) 1018, figs. e-1; Willmott, G. Rosa II, 449, pl. — Exs.: Crép., Herb. Ros. No. 416; HFR No. 2140-2142, 2144.

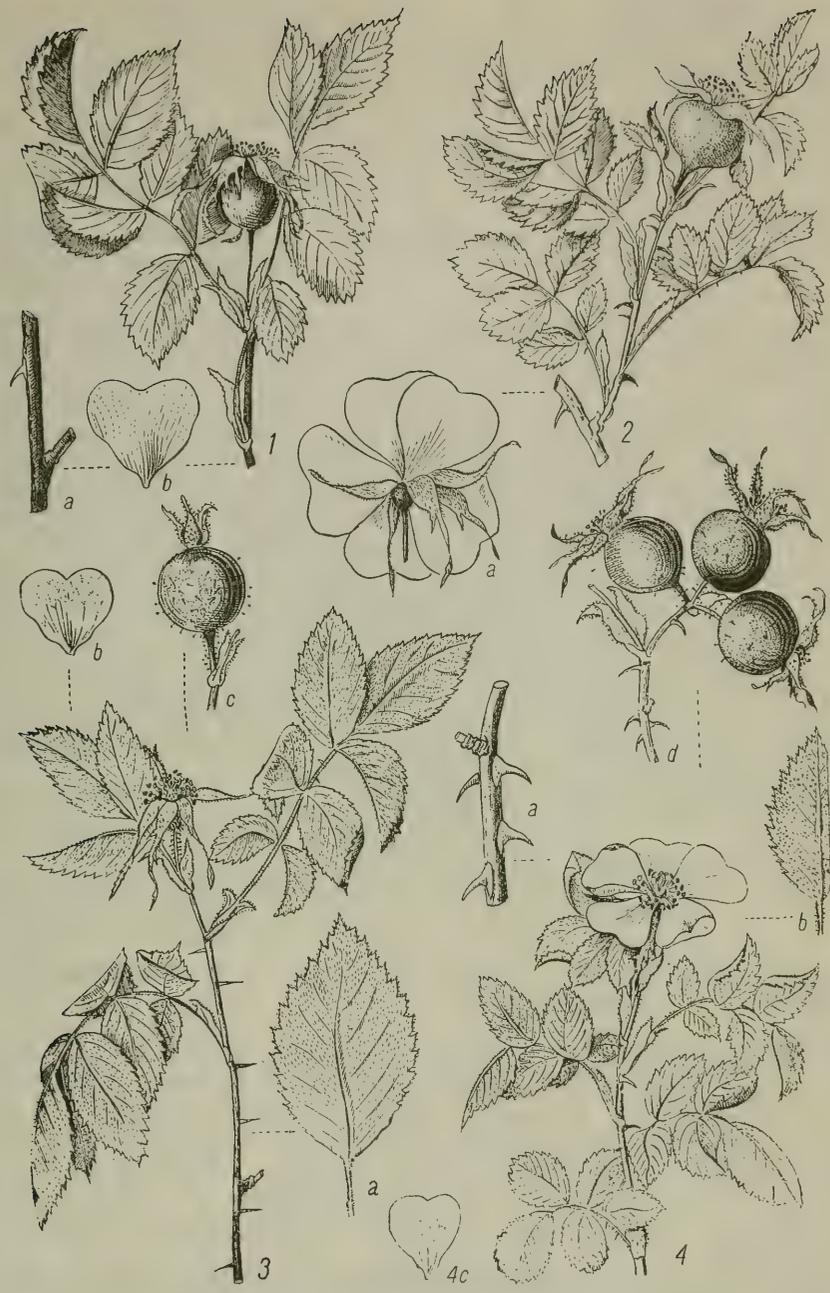
493 Medium-sized shrub, (50) cm 1-1.5(3) m high, densely branching, with short branches; prickles typically equal, large, strong, hamate, flattened, with strongly and rather abruptly broadened base, on some branches mixed with abundant small erect pricklets; leaves 2-10 cm long; leaflets (3)5-7(9), small, ca. 1.5-3 cm long, orbicular or elliptic, with orbicular base, usually obtuse, glabrous or slightly puberulent above, more or less pubescent beneath with transparent or dark-colored glands, sometimes remotely glandular above, aromatic, doubly glandular-serrate, with 5-20 teeth at each side; petioles generally pubescent, markedly glandular, armed with pricklets; stipules often large, broadening from base upward, generally pubescent and glandular. Flowers solitary or in dense 3-25-flowered corymbiform inflorescences, small, 2.5-5 cm (usually 3 cm) in diameter; pedicels short or medium-long, with glandular bristles like hypanthium and lower side of sepals; hypanthia globose or oblong; sepals directed upward or spreading, pinnate, tomentose along margin and sometimes also dorsally, with linear-lanceolate appendages, often persistent; petals pink or red; disk flat or slightly convex or concave, with wide aperture, style head small, sessile, flattened, pubescent; fruit globose or ovoid-globose, blood red, smooth or glandular-aculeate. June. (Plate XXX, Figure 2).

Shrubby formations, pastures, rocky bluffs. — European part: Crim., M. Dnp.; Caucasus (?). **Gen. distr.:** Centr. Eur., Scand., Atl. Eur., Med., Bal.-As. Min. Described from Switzerland (and England). Type in London.

50. *R. caryophyllacea* Bess., Cat. hort. Cremen., Suppl. IV (1811) 18 et (1816) 117. — *R. rubiginosa* var. *caryophyllacea* Besser ex Seringe in DC., Prodr. II (1825) 617. — Exs.: HFR No. 2139.

Shrub, dense, medium-sized (1-2.5 m high); prickles usually equal, curved, sometimes mixed with erect prickles and also more or less numerous acicular pricklets; leaves 3-11 cm long, leaflets generally 7, medium-sized, obovate or elliptic, often nearly cuneate, glabrous above, more or less pubescent beneath, on both sides or only beneath with very dense glands, with distinctly prominent network of veins beneath, doubly glandular-dentate, with 6-25 spreading acute teeth at each side, smells strongly. Flowers solitary or in few-flowered corymbiform inflorescence, 2.5-4.5 cm in diameter; pedicels of different length, hidden by upper leaves, eglandulose, rarely with isolated glands; hypanthia ovoid; sepals recurved after flowering, rather persistent, dorsally glandular, outer sepals pinnatisect; petals small, pale pink, often with glandular margin; style short; stigma heads white-tomentose; fruit ovoid or globose, usually smooth, often crowned by erect or spreading sepals. June.

494 In same localities as *R. eglanteria*. — European part: M. Dnp.; Caucasus: reported for Cisc. and E. Transc. (probably erroneous). **Gen. distr.:** Centr. Eur. (Hungary). Described from the Ukraine. Type in Kiev.



PLANT XXXI. 1 - *Rosa canina* L., branchlet with fruit, a) part of shoot with prickles, b) petal; 2 - *R. coriifolia* Fr., branchlet with fruit, a) flower; 3 - *R. pomifera* Herrm., branchlet with flower (after flowering), a) leaflet, b) petal, c) fruit; 4 - *R. tomentosa* Sm., branchlet with flower, a) part of shoot with prickles, b) leaflet, c) petal, d) branchlet with fruit.

51. *R. iberica* Stev. in M. B., Fl. taur.-cauc. III (1819) 345; Crép. in Bull. Soc. Bot. Belg. XVIII (1879) 264, 407 et XXI (1882) 23; Bouleng. in Bull. Jard. Bot. Bruxelles XIII (1935) 224.—*R. rubiginosa* Ldb., Fl. Ross. 1 (1844) 80 p. p.—*R. aucheri* Crép., l. c. VIII (1869) 344; Boiss., Fl. Or. II (1872) 687.—*R. arabica* Crép., l. c. et in Bull. Soc. Bot. Belg. XVIII (1879) 412; Christ in Boiss., l. c. Suppl. (1888) 218.—*R. anatolica* Crép., Bull. Herb. Boiss. I (1893) 165.—Exs.: HFR No. 2145.

High (1.5 m), sometimes dwarf shrub, loose or often rather compact; prickles unequal, bent or hamate, gradually broadening toward base, often decurrent (very rarely longer than half the length of the largest leaflets), without, rarely with few small pricklets; leaves 3.5–15 cm, usually glandular, frequently viscid; leaflets 5, 7, rarely 9, rather remote, orbicular or often ovate, obovate or elliptic, generally tapered, rarely orbicular at base, rounded or rarely acuminate, the largest 3 cm long, acutely dentate-serrate, with 11–24 teeth at each side, glabrous or slightly pubescent along veins beneath, mostly glandular on both sides (often very densely so beneath); petioles glabrous or slightly pubescent, glandular; stipules often broad, glandular beneath and along margin. Flowers solitary, rarely 2 or 3, very rarely in corymbs of 4–6; bracts often large, pedicels 5–20 mm, like hypanthium glabrous or slightly pubescent, smooth or short glandular-hispid; sepals 9–25 mm long, often somewhat spatulately broadened distally, linear, with 1–4 subulate appendages at each side, often sparingly hairy dorsally and along margin, always more or less glandular-hispid dorsally, after flowering reflexed, caducous shortly before ripening; corolla 30–50 mm in diameter; petals white or pink; style heads tomentose with stigma a flat or concave head; fruit ovoid or globose, smooth or slightly setaceous, nearly always without sepals. June. (Plate XXX, Figure 3).

Mountains, 900–2,000 m.—Caucasus: Dag., Cisc., E., S. and W. Transc.; Centr. Asia: Kopet-Dagh. Gen. distr.: Iran., Bal.-As. Min., Arm.-Kurd. Described from Georgia. Type in Helsingfors.

497 Note. We consider Boulenger's record for Tadzhikistan (junction of the Pyandzh and Murgab rivers) (l. c. 228) to be erroneous. The sepals of that plant had already fallen off before the author examined the specimen; it represents a form close to *R. korshinskyana* but is distinguished from it by its curved prickles.

52. *R. micrantha* Smith in Sowerby, Engl. Bot. XXXV (1812) tab. 2490; Boiss., Fl. Or. II (1872) 687; Christ in Boiss., l. c. Suppl. (1888) 219; Crép., Bull. Soc. bot. Belg. XVIII (1879) 415, XXIX, 2 (1890) 15 et in A. H. P. XVI (1900) 141; Bouleng. in Bull. Jard. Bot. de l'État Bruxelles XIII (1935) 231.—*R. floribunda* Stev. ex Bess., Cat. hort. Crem. (1811) Suppl. IV, 19; M. B., Fl. taur.-cauc. III (1819) 343.—*R. rubiginosa* β *micrantha* Shmal'g., Fl. Sr. Yuzh. R. (1895) 344.—Ic.: Hegi, II. Fl. IV, 2, f. 1224.

High (2 m) shrub with long arcuate branches; prickles usually equal, large, hamately curved, gradually and strongly broadened toward base, rarely mixed with small erect pricklets or bristles; leaflets 5–7, medium-sized, 2–3 (to 4.5) cm long, ovate or elliptic, slightly tapering toward base, generally acuminate, sparingly pubescent on both sides, especially beneath,

more or less densely glandular beneath, smooth or sometimes with few glands above, doubly glandular-serrate, with 14–24 teeth at each side; petioles pubescent and glandular, with small curved pricklets; stipules rather narrow, glandular below and along margin. Flowers 1–8; pedicels long, 0.7–2.8 cm, frequently glandular-hispid, pubescent; hypanthia often like the sepals glandular-hispid; sepals 14–23 mm long, recurved, caducous before ripening; corolla 25–30 mm in diameter; petals small, pink, rarely white; style head pediceled, glabrescent; fruit globose or ovoid. June.

Hills.— European part: Crim.; Caucasus: Cisc., Dag., W., E. and S. Transc., Tal. **Gen. distr.:** Centr. and Atl. Eur., Scand., Arm.-Kurd. Described from England.

53. *R. agrestis* Savi, Fl. Pisan. I (1798) 475; Christ in Boiss., Fl. Or. Suppl. (1888) 218; Crépin in Bull. Soc. Bot. Belg. XXI, 1 (1882) 186.— *R. sepium* Thuill., Fl. Par. ed. II (1799) 252.

498 More or less high shrub, 1–3 m, with long virgate branches; prickles equal, strong, hamately curved, with strongly broadened decurrent base; leaflets 5 or 7, medium-sized, 1.5–5 cm long, oblong, elliptic or obovate, uniformly tapering at both ends (nearly cuneately toward base), glabrous above, slightly glossy, glabrous or sparingly pubescent beneath, with abundant, light brown, often distinctly stalked glands, glandular-crenate along margin; petioles often sparsely pubescent or glabrous, with numerous stalked glands; stipules often rather narrow, with stalked glands inside of and along margin. Flowers solitary or 2–10; bracts short-lanceolate; pedicels more or less long, 1–2 cm, smooth; flowers small (ca. 3 cm in diameter); hypanthia shorter than pedicels, globose, ellipsoid or ovoid, generally smooth; sepals eglandulose dorsally, after flowering recurved, caducous, outer sepals with long linear distally broadened appendages, often slightly dentate, like inner sepals with long-stalked glands along margins; petals ca. 1.5 cm long, shorter than sepals, pale pink or white; style heads glabrescent; fruit ovoid or globose, 1–1.5 cm, coriaceous. June–July.

Forest edges, shrubby formations, roadsides, alongside fences, open mountain slopes.— European part: Crim. **Gen. distr.:** Centr. Eur., Atl. Eur., Med. Described from Italy.

54. *R. horrida* Fischer, Cat. Hort. Gorenk. (1812) 66; Crép. in Bull. Soc. Bot. Belg. XI (1872) 86.— *R. ferox* M. B., Cent. pl. Ross. I (1810) tab. XXXVIII; Fl. taur.-cauc. III (1819) 339; Boiss., Fl. or II (1872) 687; Crép. in Bull. Soc. Bot. Belg. XVIII (1879) 257; Christ in Boiss., Fl. Or. Suppl. (1888) 220; Crép., l. c. XXX, II (1892) 87, non Lawrence.— *R. rubiginosa* v. *minor* Ldb., Fl. Ross. II (1844) 80.— *R. rigida* Willd. ex Crép., ib. XI (1872) 84.— ? *R. ferox* var. *boissieriana* Rgl. in A. H. P. V, f. 2 (1878) 348.— *R. micrantha* var. *ferox* Crép., l. c. XVIII (1879) 259.— Ic.: M. B., l. c. (1810); Willmott, Gen. Rosa (1912) 477, tab.

Low shrub, 60 cm, densely branching with short branches; prickles very unequal; the larger firm, hamate, sometimes suberect, gradually broadening toward base, the smaller very short pricklets, mixed with glandular bristles; leaves small, leaflets 5–7, approximate, very small, 1–2 cm long, broadly ovate or suborbicular, with orbicular or slightly tapering base, sometimes acute, doubly glandular-serrate, with 8–15 teeth at each side, glandular on

499 both sides (remotely above, densely beneath), somewhat pubescent beneath along midrib; petioles generally glabrous, markedly glandular, often with small curved prickles; stipules with erect or divergent auricles, glandular beneath and along margin. Flowers solitary, rarely 2 or 3, on short (3–9 mm long) glandular-hispid pedicels; hypanthia ovoid, elongate or lageniform, smooth or like sepals glandular-hispid on the outside; sepals 10–14 mm long, shorter than or as long as petals, pinnate, often broadened distally, recurved, caducous; crown small, 1.5–3.5 mm in diameter; petals white, notched; style heads small, glabrescent, usually conical; fruit globose or ovoid, 10–16 mm long, smooth or with few acicular pricklets. June. (Plate XXX, Figure 4).

Hills. — European part: Crim.; Caucasus: Cisc. **Gen. distr.:** Rumania (Transylvania), As.-Min. Described from the Crimea. Type in Leningrad.

55. *R. glutinosa* Smith in Sibth., Fl. Graec. Prodr. I (1806) 318; Boiss., Fl. Or. II (1872) 679; Crép. in Bull. Soc. Bot. Belg. XXIX, 2 (1890) 14. — *R. pulverulenta* M. B., Fl. taur.-cauc. I (1808) 399 et III (1819) 344; Crép., I. c. XVIII (1879) 265, 384. — *R. ferox* Rgl. in A. H. P. V, f. II (1878) 348 p. p., non M. B. — Ic.: Sibth., Fl. Graec. (1806) tab. 482; M. B., Cent. Pl. rar. Ross. merid., II (1832) tab. LXII. — Ex.: HFR No. 2144.

Low shrub, 10–100 cm high, with rigid branches; prickles dense, unequal, rather thin, basally abruptly broadened, rather erect, rarely somewhat curved, larger prickles mixed with abundant very dense bristles and glands, these obsolete on old shoots; leaves 2.5–10 cm long, often viscid; leaflets small, 5–7, orbicular-ovate, obovate or orbicular, obtuse, acute but short-glandular-bidentate, glabrous or more or less pubescent, both sides densely covered with glands, larger above than beneath; petioles generally pubescent, distinctly aculeate and glandular; stipules large, glandular-ciliate, with divergent auricles. Flowers solitary, rarely 2 or 3, small; pedicels very short, (2)5–7(13) mm, remotely pubescent and — like hypanthium and lower side of sepals — sparsely covered with thin, long spicules and stalked glands subtended by ovate bracts; sepals often pinnate, with 1–4 narrow pinnules on each side; corolla 3–4 cm in diameter, pink; style heads tomentose; fruit ovoid or subglobose, red, 1–2.5 cm in diameter, crowned by erect persistent sepals. June–July. (Plate XXX, Figure 5).

Herbaceous and on mountain slopes overgrown by shrubs, subalpine meadows and pastures. — Caucasus: Cisc., Dag., W., E. and S. Transc. **Gen. distr.:** Med., Bal.-As. Min., Iran. Described from Crete. Type in London.

Note. The leaflets of the USSR plant differ in shape from those of the authentic type of *R. glutinosa*, which appear to be consistently rounded. Eventually it will have to be called *R. pulverulenta* M. B.

× *R. tuschetica* Boiss., Fl. Or. II (1872) 673.

500 Low erect shrub; prickles erect, thin but firm, subulate, broadened at base, mixed with numerous pricklets; stipules equal, linear; leaflets small, ovate, coarse, doubly glandular-serrate, remotely glandular above, densely so beneath. Flowers solitary; hypanthia globose, like pedicels glabrous or setaceous at base; fruit erect, crowned by dorsally glandular sepals produced into long appendages; outer sepals sometimes slightly pinnate proximally; petals pink.

Subalpine and alpine mountain zone.— Caucasus: Cisc., Dag. Endemic. Described from vicinity of Beshita, Diklo, 1,800–2,400 m. Type in Geneva, cotype in Leningrad.

Note. Assumed hybrid; *R. glutinosa* Smith × *R. spinosissima* L.; cf. Boulenger, l. c. (1935) 219.

56. *R. alticola* Bouleng. in Bull. Jard. Bot. de Bruxelles, XIII, fasc. 3 (1935) 220.— Ic.: Boulenger, l. c. 221 f. 4.

Shrub; prickles erect, thin abruptly broadened at base, shorter than largest leaflets, often adnate; pricklets absent; leaves 3–5 cm long, leaflets 5 or 7, serrate, sessile or petioluled, overlapping at margins, orbicular or slightly longer than wide, rounded or tapering at base, rounded or obtuse at apex, the largest to 1.7 cm long, glabrous or sparingly pubescent along midrib beneath, glandular on both sides; teeth 8–13 at each side, compound-glandular (with 2–7 glands); petioles glabrous or lightly pubescent, glandular; stipules broad, glandular, with divergent auricles. Flowers 2 or 3, shorter than subtending leaves, subsessile or on pedicels not longer than 3 mm; hypanthia ovoid, with firm very dense glandular bristles; sepals 10–15 mm long, with 1–2 narrow lateral appendages on each side, slightly broadened distally, dorsally glandular-setaceous, shorter than petals (which they exceed in bud); corolla 50 mm in diameter; petals notched; disk reduced to a simple ring; style lanate-villous, stigma forming flattened head; fruit unknown. Fl. July.

Dry mountain slopes, ca. 3,000 m.— Centr. Asia: Pam.-Al. Endemic? Described from Bok-Bash mountain pass (Alai). Type in Brussels, cotype in Leningrad.

Subsection 6. EUCANINAE Crép. in Soc. Bot. Belg. XXXI, 2 (1892) 81.— Prickles more or less curved, generally hamate, gradually broadened toward base. Leaflets medium-sized or large, glabrous or pubescent, margins eglandulose or glandular only along veins, rarely entire surface remotely glandular, without the typical aroma of the plants of the preceding subsection.

Note. Some species included in this subsection (in conformance with long-accepted usage) are distinguished only by the type of pubescence. Their inclusion is only provisory; in fact, they comprise a complex of artificially united splinter groups and with only one common character.

57. *R. afzeliana* Fries in Liljeblad, Utrast til on Svensk Fl. Suppl. (1816); Fl. Halland. (1818) 87.— *R. glauca* Villars apud Loisel. in Desv., Journ. bot. II (1809) 336 et auct. Fl. URSS, non Pourret.— *R. vosagiaca* Desportes, Roset. gall. (1828) 88.— *R. reuteri* Godet in Reut., Cat. Pl. Genève, ed. 2 (1861) 68.— *R. canina* var. *glauca* Desv., Journ. bot. ser. 2, II (1813) 116.— *R. afzeliana* ssp. *vosagiaca* Rob., Keller et Gams in Hegi, Illustr. Fl. Mitt.-Eur. IV, 2 (1923) 1035.— Ic.: Hegi, l. c. f. 1230 a–e.— Exs.: Crép., Herb. ros. No. 29, 420; HFR No. 2116–2120.

More or less high open shrub with rather flexuous or arcuate and pendulous branches; bark variously colored, often reddish, with glaucous bloom; prickles abundant with strongly broadened base, slightly compressed

laterally, falcate, often small; petioles glabrous, sometimes pubescent; leaves 17 cm long, (nearly) glabrous when mature, sometimes pubescent along midrib beneath, sometimes with isolated small glands along veins; stipules narrow, imperceptibly glandular-serrate; leaflets 5-7, very rarely 9, orbicular, ovate or (usually) elliptic, tapering or rounded at base, acuminate, acutely serrate, with simple eglandulose teeth or 1 or 2 secondary teeth with up to 3 glands, green above, usually glaucescent beneath. Flowers solitary or in 2-5-flowered corymbs 3-6.5 cm in diameter (rarely flowers larger), surrounded by large terminal leaves with 1-5 leaflets; pedicels usually short, as long as or shorter than hypanthium, hidden by very large bracts, usually smooth, rarely glandular-hispid; hypanthia usually like sepals smooth on the outside; sepals medium-sized, 1-4 cm long, with narrow terminal appendage and 1-4 generally glandular-serrate, filiform or lanceolate pinnules, turned upward or divergent after flowering, later caducous; petals bright pink; disk flat, rarely more or less concave; mouth of hypanthium one-half to one-fourth (mostly one-third) the diameter of the disk; stigma heads sessile, large, dense, white-tomentose; fruit of different sizes and shapes, sessile, orange-red or bright red (rarely yellow). June-July.

Forest edges, shrubby formations, open places. — European part: southern regions; Caucasus: Cisc., W. and E. Transc. **Gen. distr.:** Scand., Centr. and Atl. Eur., Bal.-As. Min., Arm.-Kurd. Described from Scandinavia. Type in Sweden.

Note. This species includes *R. djimilensis* Boiss., Fl. Or. (1872) 673 and *R. macrocarpa* Boiss., l. c. 684; glandular-setaceous pedicels and hypanthium are representative of its forms. Similar forms have been found in the Caucasus.

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58. *R. coriifolia* Fries, Novit. Fl. suec. ed. I (1814) 33. — *R. frutetorum* Bess., Cat. pl. hort. crem. (1816) suppl. III, 20; Enum. pl. Volh. (1820) 18, (1821) 61. — *R. monticola* var. *frutetorum* Rapin, Guide du bot. dans le ct. de Vaud, 2-me. éd. (1862) 195, p. p. — *R. glauca* var. *coriifolia* Dumort. in Bull. Soc. Bot. Belg. VI (1867) 59. — *R. canina* var. *coriifolia* Bak., Journ. Linn. Soc. XI (1869) 235. — *R. afzeliana* subsp. *coriifolia* Rob. Keller et Gams in Hegi, Illustr. Fl. IV, 2 (1923) 1038. — Ic.: Willmott., Gen. Rosa II, p. 391, pl. — Exs.: Crép. Herb. ros. No. 412; HFR No. 2126 a, b.

Shrub; branches often covered with a glaucous bloom; prickles generally large, with broadened base, curved; leaves mostly medium-sized, often approximate, indurate, often with 9 leaflets, green, without glaucous tinge, glabrous or appressed-hairy above, more or less densely pubescent to nearly tomentose beneath, eglandulose, very rarely with remote glands; stipules with densely glandular margins, auricles densely appressed-hairy below, upper stipules markedly broadened; petioles tomentose-pubescent. Flowers as in *R. afzeliana*; pedicels short, less than 6 mm long; sepals gray-pubescent, divergent or turned upward, persistent to ripening; style heads tomentose, sessile; fruit as in *R. afzeliana*, which is generally very similar except for the pubescence of the leaves. Flowering slightly later than in *R. afzeliana*. June-July. (Plate XXXI, Figure 2).

Localities as in preceding species. — European part: Lad.-Ilm., U. Dnp., M. Dnp., V.-Don, Bl.; Caucasus: Cisc. **Gen. distr.:** Scand., Centr. and Atl. Eur. Described from Sweden. Type in Sweden.

59. *R. canina* L., Spec. pl. ed. I (1753) 491 s. str. — *R. canina* ssp. *R. vulgaris* Gams. in Hegi, Illustr. Fl. IV, 2 (1923) 1032. — *R. caucasica* Pall., Fl. Ross. I, p. II (1788) 62. — *R. andegavensis* Bastard, Essai Fl. d. M. et Loire (1809) 189; Suppl. 29. — *R. lutetiana* Lem. in Bull. Philom. (1818) 93. — *R. calycina* M. B., Fl. taur.-cauc. III (1819) 349. — *R. armata* Stev. in Bess., Enum. Pl. Pod. Volh. (1822) 62. — *R. arguta* Stev. in M. B., Fl. taur.-cauc. III (1819) 348. — *R. kosinsciana* Bess., Enum. Pl. Pod. Volh. (1822) 64. — *R. glauca* Schott ex Bess., Enum. Pl. Pod. Volh. (1822) 64. — *R. caucasea* Lindl., Mon. (1820) 97. — *R. biebersteinii* Tratt., Ros. Mon. I (1823) 5. — *R. frondosa* Stev. in Spreng., Syst. II (1825) 554. — *R. caucasica* var. *lindleyana* Ser. in DC., Prodr. II (1825) 615. — ? *R. didoensis* Boiss., Fl. Or. II (1872) 685. — Ic.: Hegi, l. c., tab. 154, f. 3. — Exs.: HFR, No. 2113, 2114, 2115.

503 High, sparse, branching shrub with arcuate branches; bark green or red-brown, usually without glaucous bloom; prickles often sparse or remote, on main shoots, in pairs or whorled, with very broad base, compressed, falcately curved (very rarely suberect), smaller on fertile shoots and usually rather abundant; leaves glabrous or with few hairs on rachis above, green or glaucescent; stipules narrow, only in terminal leaves slightly broadened, with distally divergent auricles, glandular-ciliate; leaflets of different shapes, often elliptic, 1.5–6 cm long, acuminate, acutely serrate, with thin-acuminate teeth curving upward, simple or with 1–2 secondary teeth terminating in a gland, smooth or at times sparsely glandular along veins beneath. Flowers solitary, 3, 4 or 5(20) in corymbiform inflorescence, on more or less long, glabrous or sparingly pubescent pedicels, as long to twice as long as hypanthium, often as long as fruit, 0.5–2.5 cm long, smooth (rarely with sparse stalked glands?); sepals medium-sized, with lateral pinnules and terminal appendage, recurved after flowering and usually caducous long before ripening of fruit, well separated from disk; corolla 2–8 cm in diameter; petals usually pale pink or white, sometimes rather bright pink; disk flat or concave, sometimes distinctly conical; hypanthium mouth not exceeding one-fourth the diameter of the disk; style long, sparsely hairy or glabrous, folded in a raceme; style heads often conical; fruit globose, or elongate-ovoid, smooth, bright or pale red. May–July. (Plate XXXI, Figure 1).

Forest edges and thinned-out forests, shrubs, open slopes, banks of mountain streams and brooks, felled areas, pastures, roadsides, fences. — European part: central and southern regions; Caucasus: Cisc., Dag. W., E. and S. Transc., Tal.? Centr. Asia: Pam.-Al. **Gen. distr.:** nearly all Europe (in the north to S. Scandinavia), No. Afr., W. Asia (As. Min., Syria, Iran). Described from Europe. Type in London.

Economic importance. This species is a widely used stock for cultivated roses. Various parts of the plant contain tannins. An officinal plant with astringent properties. The ripe fruit is used in the treatment of diarrhea. In N. Caucasus the fruit pulp of *R. canina* has been found to contain in percent of dry weight: sugars 8.09, pectin 2.74, pentosans 2.18, nitrogenous substances 3.58, tannins and dye stuffs 3.58, acids 1.31, etc. (Saburov and Grzhivo). Its vitamin content is low, 0.24–0.85% ascorbic acid per dry weight of pulp.

504 60. *R. corymbifera* Borkh., Vers. Forstbot. Beschr. (1790) 319.—*R. dumetorum* Thuill., Fl. Paris ed. 2 (1798–1799) 250.—*R. collina* Lam. et DC., Fl. Fr. éd. 3, IV (1805) 441.—*R. taurica* M. B., Fl. taur.-cauc. I (1808) 394; III (1819) 355.—*R. solstitialis* Bess. Primit. fl. Galic. V (1809) 324; Enum. pl. Pod. Volh. (1822) 19.—*R. uncinella* Bess., Enum. pl. Pod. Volh. (1822) 20; M. B., Fl. taur.-cauc. III (1819) 349.—*R. collina* M. B., Fl. taur.-cauc. I (1808) 399; III (1819) 30.—*R. saxatilis* Stev. n. M. B., Fl. taur.-cauc. III (1819) 348.—*R. montana* Stev. ex Bess., En. pl. Pod. Volh. (1822) 65.—*R. friedlaenderiana* Bess., Enum. pl. Pod. Volh. (1822) 46, 63.—*R. caucasica* M. B., Fl. taur.-cauc. I (1808) 40; (1819) 351, non Pall.—*R. canina* var. *dumetorum* Desv., Journ. bot. II (1813) 115; Rgl. in A. H. P., V, f. 2 (1878) 335.—*R. arguta* Muss.-Puschk. in Willd. herb. ex Crép. in Bull. Soc. Bot. Belg. XI (1872) 194, 335.—*R. canina* var. *corymbifera* Rouy, Fl. Fr. VI (1900) 314.—Ic.: Willmott, Gen. Rosa, p. 397, pl.—Exs.: Fiori et Beguinot, Fl. ital. exs. No. 2075; HFR No. 2121–2125.

Shrub; plant similar to preceding species from which it is distinguished only by the pubescence of the leaves; prickles equal, hamate; leaflets 5–7, large, ovate, more or less pubescent on both sides, at least beneath where hairs are sometimes confined to veins, simple-dentate, teeth less prominent than in *R. canina*, rarely nearly bidentate, with 1–2 glands; petioles smooth or faintly glandular; stipules broadened. Flowers long-pedicelated, medium-sized, white or pale pink, with lanceolate bracts; hypanthia, pedicels and lower side of sepals smooth, rarely with remote stalked glands; sepals recurved below, pinnate, often with foliate appendages; style heads pedicelated, pubescent or glabrous; fruit ovoid, sepals persistent. June–July.

In same places as *R. canina*.—European part: central and southern regions; Caucasus: all regions; Centr. Asia: T. Sh., Pam.-Al., Mtn. Turkm. **Gen. distr.:** all Europe, N. Afr., Near Asia (As. Min. and up to Afghanistan). Described from Germany. Type not known (perhaps in Munster).

61. *R. alexeenkoi* Crép. ined. (cfr. Addenda IX, p. 480).

Shrub; turions glabrous, without glaucous bloom, with large, falcately curved, flat prickles; sepals tomentose-villous, remote-glandular; leaflets ovate-elliptic, densely pubescent on both sides, eglandulose; stipules broadened distally, tomentose-pubescent proximally. Flower-bearing branches with erect acicular pricklets as well as larger curved prickles; flowers on rather long glandular-hispid pedicels, in few-flowered corymbiform inflorescences; hypanthia elongate, densely glandular-hispid; sepals densely glandular on the outside, tomentose within, recurved after flowering; petals and fruit unknown. June.

Slopes of ravines.—Caucasus: Dag. Endemic. Described from Kuba District, Sudur village. Type in Leningrad.

Note. Probably a hybrid form.

505 62. *R. klukii* Bess., Cat. hort. Crem. (1816) 118; Enum. pl. Pod. Volh. (1822) 46, 67.—*R. balsamica* Bess., Cat. hort. Crem. (1811) Suppl. IV, 18 et Enum. pl. Pod. Volh. (1822) 19, non Willd.—*R. nitidula* Bess., Cat. hort. Crem. (1811) Suppl. IV, 30 et (1816) 118; Enum. pl. Pod. Volh. (1822)

20 et 67.— ?*R. tomentella* Leman, Bull. Philom. (1818) 86, 354.—
? *R. obtusifolia* Desv., Journ. bot. II (1809) 317 (nomen prius).— Exs.:
Crép., Herb. Ros. No. 417; HFR No. 2132–2138.

Medium-sized shrub (ca. 1 m), resembling *R. canina* L. and even more so *R. corymbifera* Borkh., with its abundant, usually large, equal, flattened falcate or hamate prickles and small, orbicular, typically more or less pubescent, glandular-serrate leaflets; petioles always pubescent and glandular. Flowers on long, generally smooth pedicels; sepals pinnate, with numerous short and typically broad glandular-dentate pinnules, recurved, caducous; petals large (2–3 cm long), varying in color from whitish to bright pink; style heads columnar, slightly pubescent. May–June.

Shrubby formations, rocky places.— European part: M. Dnp., V.-Don, Bl., L. Don, Crim.; Caucasus: Dag., W., E. and S. Transc., Tal. Gen. distr.: Centr., S. and Atl. Eur., in the north to S. Scandinavia; Turkey, Artvin District (Grossh.). Described from the Ukraine. Type in Kiev.

Note. *R. klukii* (as understood by D. I. Litvinov) is similar to *R. corymbifera* and others, and certainly represents an entire group of basic forms, artificially united because of similar pubescence of leaves. The following species appears to represent one of these.

63. *R. leucantha* M. B., Fl. taur.-cauc. III (1819) 352.

Shrub; leaflets large, obovate, deeply bidentate, glabrous above, pubescent beneath, covered with small glands thinning out toward the leaf margin; pedicels, corolla and sepals remotely glandular beneath, rarely pubescent; sepals with narrow appendage. Otherwise similar to *R. klukii* Bess. June–July.

Herbaceous hills, thinned-out forests, forest edges.— Caucasus: Cisc., E. Transc. Endemic. Described from Georgia. Type in Leningrad.

Species of unclear systematic position

64. *R. woronowii* Lonacz. in Acta Horti Bot. Univers. Juriev., XIII (1912) 107.

Shrub; prickles equal or transitional to acicular pricklets, thin, slightly compressed, abruptly broadened at base, erect or slightly declinate; leaflets 5–7, ovate, serrate or nearly biserrate, glabrous above, glabrous or slightly pubescent along nerves beneath, eglandulose, with ciliate margin; stipules all broadened. Flowers 1–4; pedicels short, eglandulose or sparingly glandular-hispid, glabrous or slightly pubescent, nearly hidden by broadened bracts; sepals subentire, with long foliate appendage, erect, rarely spreading; petals white, rarely pinkish at first; style heads large, sessile, tomentose. June or July?

Habitat unknown.— Caucasus: W. Transc. (Adzharistan). Gen. distr.: vicinity of Artvin. Described from the vicinity of Artvin, Sakurtul and Goma Mountain in Adzharia. Type in Tbilisi.

Note. A little-known species, not seen by us.

Genus 761. **HULTHEMIA** * Dumort.

Not. nouv. gen. Hulthemia (1824) 13.—Lowea Lindl. in Bot. Reg. (1829) tab. 1261.—Rosa sect. IRhodopsis Bge., in Ldb., Fl. Alt. II (1828) 224.

Flowers solitary; hypanthia globose or flattened-globose; sepals entire; petals yellow, with dark purple spot at base, broadly obovate, slightly notched at apex; stamens black-violet.—Low shrubs with simple leaves, exstipulate. Otherwise like *Rosa* L.

1. Plant glabrous in all parts; leaf base typically cordate 1. *H. berberifolia* (Pall.) Dumort.
+ Leaves, young branches and prickles velutinous-pubescent; leaves typically cuneate 2. *H. persica* (Michx.) Bornm.

1. *H. berberifolia* (Pall.) Dumort., Note nouv. genre Hulth. (1824) 13; Ldb., Fl. Ross. II, 78.—*Rosa berberifolia* Pall. in Nova Acta Acad. Sc. Petrop. X (1797) 379.—Ic.: Pall., l. c. tab. X, f. 5; Ldb., Ic. pl. Fl. Ross. IV, 370,

Low, flexuously branching shrub, 15–35(50) cm high, glabrous in all parts; young shoots virgate nearly simple or branching; prickles solitary or in groups of 2 or 3, at base of leaves always paired, nearly opposite, firm, spreading, slightly hamately curved, whitish; leaves simple, coriaceous, glabrous, ovate or elliptic, often with cordate base, rarely obovate or cuneate, with very short petioles or subsessile, obtuse, entire below, then usually deeply incised-dentate, with few, remote teeth; stipules absent. Flowers solitary, the terminal 2.5–3.5 cm in diameter; hypanthia globose, distally constricted, setaceous; sepals entire, oblong-lanceolate, acute, convex, finely pubescent on both sides, dorsally often with sparse bristles, persistent in fruit, straight-spreading; petals divaricate, golden yellow, with dark purple spot at base, broadly obovate, faintly notched at apex; stamens black-violet; fruit ca. 10 mm long, 12 mm in diameter, with more or less dense erect acicular prickles, violet-colored, when ripe dryish, brown; seeds oblong, ca. 5 mm long, dark brown, shiny. April–June.

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Solonetzic steppes.—W. Siberia: U. Tob., Irt.; Centr. Asia: Balkh., Dzu.-Tarb., Syr. D., Pam.-Al. Described from Dzungaria, from the Uldzhar River flowing into Lake Ala-Kul (south of Tarbagatai Range).

Gen. distr.: Dzu.-Kosh. Type in London?

2. *H. persica* (Michx.) Bornm. in Bull. Herb. Boiss., ser. II (1906) 6.—*Rosa persica* Michx. in Juss. Gen. pl. app. (1786) 452.—? *R. simplicifolia* Salisb., Prodr. (1786) 359.—Exs.: Sintenis, It. transcasp.-pers. 486, 658.

Shrub; young branches bearing prickles (at least in their lower part), leaves slightly velutinous on both sides (or at least beneath) with more or less dense short spreading hairs; leaves narrowly elliptic, narrowly obovate or cuneate, with short usually distinct petioles, base tapering, very rarely rounded; teeth generally short, directed upward. Otherwise similar to the preceding species. June.

* Named after C. J. E. van Hultem (1764–1832), the author of a study on the agriculture of Holland (published 1817).

Among crops. — Centr. Asia: Pam.-Al., Mtn. Turkm. Gen. distr.: Iran. Described from Iran. Type in Paris.

Economic importance. A fodder plant; leaves eaten in the winter by sheep and camels.

× *Hulthemosa* Juz. nov. gen. hybr.

In Addenda IX, 480.

Plant similar in all parts to *Rosa* but stipules resembling leaflets, sometimes adnate to leaflets of lower pair.

Note. The following two forms appear to be hybrids between *Hulthemia persica* and species of *Rosa*; this hybrid nature of the "genus" is reflected in its name.

× *H. guzarica* Juz. hybr. nov. in Addenda IX, p. 481 (*Rosa guzarica* Juz. in sched. olim.).

Apparently a low shrub, with slightly flexuous or suberect, grayish or (when young) brown branches; annotinous shoots and branches densely velutinous-pubescent; prickles thin, divergent, quick straight, narrowly conical, somewhat flattened, with abruptly broadened base, on annotinous branches and shoots rather densely velutinous-pubescent; leaves with 2 or 3 pairs of leaflets, leaflets small, 4–8 mm long, 2–5 mm wide, obovate, cuneate, rounded or obtuse, densely finely pubescent on both sides, with 3–5 simple, obtuse teeth at each side; rachis velutinous-pubescent; stipules identical with leaflets in arrangement, dimensions, color, pubescence and serration, long-decurrent along outer margin into winged petioles, rarely small, entire, often half adnate to leaflets of lower pair. Flowers solitary, ebracteate, very small; on very short velutinous pedicels; hypanthia almost as long as pedicels, ca. 3 mm when immature, globose, velutinous-pubescent; sepals divergent, ovate-lanceolate, gradually acuminate, entire, short-hairy and, sparingly tomentose along margin; petals unknown; style heads densely lanate; fruit unknown. May.

Mountain slopes among juniper brushwood. — Centr. Asia: Pam.-Al. (Ak-Tag Mountains, south of Guzar Mountain). Endemic. Described from cited localities. Type in Leningrad, cotype in Tashkent.

Note. Apparently a hybrid between *Hulthemia persica* (Michx.) Bornm. and *Rosa* sp. (section *Cinnamomeae*).

× *H. kopetdaghensis* (Meffert) Juz., comb. nova. — *Rosa kopetdaghensis* (sic) Meffert in Journ. Sx. Bot. USSR 20 (1939) 191.

Shrub with upward directed leaves appressed to branches (as in *Hulthemia*), often sterile shoots with denser prickles; prickles curved below, often short-pubescent; stipules narrow below, becoming broadened and terminating in foliate auricles, giving the appearance of a third pair of leaflets; leaves pinnate, with 2, rarely 1 pair of leaflets, sometimes with only terminal leaflet, adnate to auricle of stipule along one side; leaflets 1–2 cm long, 5–7 mm wide, lanceolate or oblong-elliptic, tapering at both ends, with simple acute teeth, and prominent network of lateral veins beneath, short-pubescent,

shiny above. Flowers yellow; hypanthia globose, without prickles; sepals lanceolate, without appendages, covered with sparse acicular prickles; sepals lanceolate, without appendages, covered with sparse acicular prickles; style heads distinctly exerted from aperture of hypanthium.

Mountain slopes.— Centr. Asia: Kopet-Dagh. Endemic. Described from E. Kopet-Dagh, Vetelka Gorge above Robergovskii settlement. Type in Leningrad.

Note. Presumably a hybrid of *Hulthemia persica* (Michx.) Bornm. × *Rosa bungeana* Boiss. et Buhse, which we interpret as a new "species" of *Rosa* on the strength of material provided by V. Meffert.

509 Subfamily 4. **PRUNOIDEAE** Focke in Engl. un Prantl, Nat. Pflanzenfam. III, 3 (1888) 50.— Hypanthia flat, turbinate, tubular; sepals usually 5, petals as many as sepals, white or pink, rarely absent; stamens 10–20 or more, borne near edge of hypanthium; carpel 1, rarely 2 or 5, free, basal, unilocular, usually with 2 pendulous ovules; style terminal; fruit a 1- (very rarely 2-) seeded juicy drupe with stony (in USSR genera) endocarp, rarely pulp coriaceous; drupe with annular suture, dehiscing by two valves during germination. Evergreen or deciduous tree or shrub; leaves simple, entire; stipules often small, deciduous.

Prunus avium L.— Pliocene of Armenia (Nakhichevan).— *P. calophylla* Heer — Tertiary Paleogene of Sakh. (Mgach).— *P. luculii* Kryst.— Sarmatian deposits of Bl. (Krynka).— *P. mahaleb* L.— Pliocene Akchagyl series of E. Trans. (Kakhetia); Pliocene of V.-Don.— *P. padus* L.— Quaternary of V.-Don (Belolipki).— *P. serrulata* Heer — Tertiary of Sakh. (Mgach), Balkh. (Chingistai).— *P. spinosa* L.— Pliocene of Akchagyl series of E. Transc. (Azerbaidzhan, Shirak steppe); Quaternary Cisc. (Zheleznovodsk).— *P. sp.*— Tertiary Pliocene of Armenia (Naftalan); Uss. (Rechnoi), V.-Don (Voronezh Region, Uryv); Quarternary Mindel-Riss of V. Don (Voronezh Region Likhvin).— *P. laurocerasus* L.— Pliocene (Akchagyl) E. Transc. (Shirak Region).— *Amygdalus iberica* Palib.— Pliocene (Apsheron) of E. Transc. (Malaya Shirakskaya steppe).

Key to Genera*

- 1. Drupe velutinous or tomentose 2.
- + Drupe smooth (not velutinous and not tomentose) 4.
- 2. Drupe smooth, leaves tubularly folded in aestivation 768. *Armeniaca* Mill.
- + Drupe deeply pitted or dotted-pitted or reticular-sulcate, rarely nearly smooth; aestivation conduplicate 3.
- 3. Drupe velutinous, globose; pulp juicy, edible 769. *Persica* Mill.
- + Drupe oblong, pulp dry, inedible 763. *Amygdalus* L.
- 4. Flowers in long racemes, drupe black or dark purple 5.
- + Flowers in fascicles or in reduced corymbiform racemes, drupe variously colored, rarely blackish 6.

* Treatment by B.K. Shishkin.

- 5. Leaves evergreen, coriaceous, entire or with sparse teeth 766. *Laurocerasus* Roem.
- + Leaves deciduous, not coriaceous, densely unevenly serrate 765. *Padus* Mill.
- 6. Petals yellow, drupe grumose, flattened (Far East) 767. *Prinsepia* Royle.
- + Petals white, drupe oblong, ovate or globose 7.
- 7. Drupe with glaucous bloom, more or less flattened laterally; aestivation tubularly folded' 762. *Prunus* Mill.
- + Drupe without bloom, globose or ovoid; aestivation conduplicate 764. *Cerasus* Juss.

Genus 762. **PRUNUS** * Mill.**

Mill, Gard. Dict, ed. VIII (1768).

Flowers solitary or in fascicles, opening together with leaves or earlier. Sepals 5. Petals 5. Stamens numerous: Ovary glabrous or glabrescent, unilocular, with 2 ovules. Fruit a 1-seeded drupe with fleshy, juicy, indehiscent pericarp. Stone ovoid or ovoid-oblong, flattened laterally, smooth, rarely sulcate or rugose. Deciduous trees or shrubs with few, rarely spiny branches. Leaves alternate, margin, base of blade or petioles usually glandular.

Note. *Prunus* Mill., as here accepted, is a good natural genus, which includes all species usually referred to prunes. It is extremely important horticulturally and is grown on a total area estimated at 700,000–800,000 ha for the whole world. In several fruit-growing areas it is a major crop. Thousands of cultivated varieties are known, some of very high quality. Hence, the interest in their wild ancestors, which provide material for new and perhaps better varieties. The beginnings of its cultivateion are lost in the remote past. Stones of prunes were discovered among the remains of lake-dwellings in Central Europe. In many cases the wild ancestors of the contemporary prune have been impossible to determine. Nor has the racial composition of wild (and partly cultivated) prunes been adequately studied. This applies in particular to the USSR, which has many wild prunes from which some of the present-day strains of cultivated prunes have probably been derived.

- 1. Flowers 1, rarely 2 2.
- + Flowers 2–4 4.
- 2. Fruit black, with blue bloom, on short indurate pedicels, rarely drooping; very spiny shrub 1. *P. spinosa* L.
- + Fruit yellow, red, dark purple, drooping; shrub not spiny or only slightly so 3.
- 3. Flowers white; ovary glabrous; fruit yellow, red, dark red; cling-stone 3. *P. divaricata* Ldb.
- + Flowers pink; ovary wholly or partly pubescent; fruit dark red; free-stone 4. *P. ferganica* Lincz.

* From the Greek *prumnon*, Latin *prunus*, used for this tree by Theophrastus and Pliny.

** Treatment by N.V. Kovalev; manuscript prepared for press by editors.

4. Flowers often 2; young shoots short-pubescent or glabrous; free-stone, rarely cling-stone **P. domestica* L.
 + Flowers 3-4; young shoots glabrous; cling-stone 5.
 5. Leaves glabrous on both sides 6.
 + Leaves slightly pubescent or moderately pubescent beneath; stone small, smooth; small tree or spiny, rarely without spines
 7. *P. ussuriensis* Kov. et Kost.
 6. Leaves oval-lanceolate, with arcuate basal veins; stone with transverse furrows; tree with pyramidal crown, without spines
 5. *P. simonii* Carr.
 + Leaves oval-obovate; drupe rugose; tree with or without spines
 6. *P. salicina* Lindl.

1. *P. spinosa* L., sp. pl. (1753) 475; Ldb., Fl. Ross. II, 4; Boiss., Fl. or. II, 650; Shmal'g., Fl. I, 312; C. K. Schn., Laubholz. I, 628; Hegi, III. Fl. IV, 2, 1101; Rehd., Man. cult. trees N.A. (1927) 454; Fl. Yugo-Vost. V, 552; Grossg., Fl. Kavk. IV, 338. — Ic.: C. K. Schn., l. c. f. 347; Hegi, l. c., f. 1270-74; Rchb., Ic. Fl. Germ. XXV, tab. 80.

Distinctly branching very spiny shrub, rarely small tree, to 4-8 m high; young shoots short-pubescent, rarely glabrous, small; leaves elliptic, obovate, rarely oblong-obovate, (1)2-4(5) cm long, obtuse, cuneate at base, acute or crenate-serrate, when young, short, coarse-hairy, later partly glabrescent. Flowers blossoming before leaves, solitary, very rarely 2, small (1)1.4-1.8 cm in diameter, white or with greenish tinge; sepals not curved, with ciliate-margin; pedicels (3)5-6(15) mm long, strict, glabrous or sparingly pubescent, sometimes densely pubescent, gray; fruit black; with glaucous bloom, globose, ovoid, globose-conoid, fruit pulp green, sweet-sour, very bitter; drupe cylindrical-rugose, ovoid or oval-ovoid. March-May to July-August. (Plate XXXII, Figure 1).

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Mostly in the forest-steppe zone, glades, forest edges, ravines, river valleys; rarely inside forest; 800-1,200 m (Transcaucasia); in meadows in northern part of distribution area. — European part: Lad.-Ilm. (western part), U. V., V.-Kama, U. Dnp., M. Dnp., V.-Don, Transv., Bes., U. Dns., Bl., Crim., L.-Don, L. V.; Caucasus: all regions; W. Siberia: U. Tob. (Mugodzhary). Gen. distr.: Scand. (S.), Centr. Eur., Atl. Eur., Med., Bal.-As. Min., Arm.-Kurd., Iran (N. W.), N. Am. (escaped). Described from Europe. Type in London.

Note. A markedly variable species in both general habit — from smallest shrub to a small tree (in the forest) — and other characters, such as shape of fruit and leaves, size of leaves, flowers, fruit and pedicels, pubescence of shoots; color of fruit constant. In the Caucasus pubescence of the shoots served to separate var. *typica* Medw., with glabrous shoots, and var. *pubescens* Medw., with pubescent shoots. Cultivated varieties are var. *purpurea* Andre (flowers pink, leaves purple) and var. *plena* West. (with double white flowers). Where the two species grow side by side *Prunus spinosa* L. very readily crosses with *Prunus cerasifera*. Their hybrids are sterile or fully fertile, $2n = 24$ and 32 (see *P. media* Kov.)

Prunus spinosa is occasionally applied to a round-fruited, low-quality, bitter-tasting form *P. domestica* L. *P. curdica* Fenzl et Fritsch. is extremely close to *P. spinosa* and may represent one of its forms.

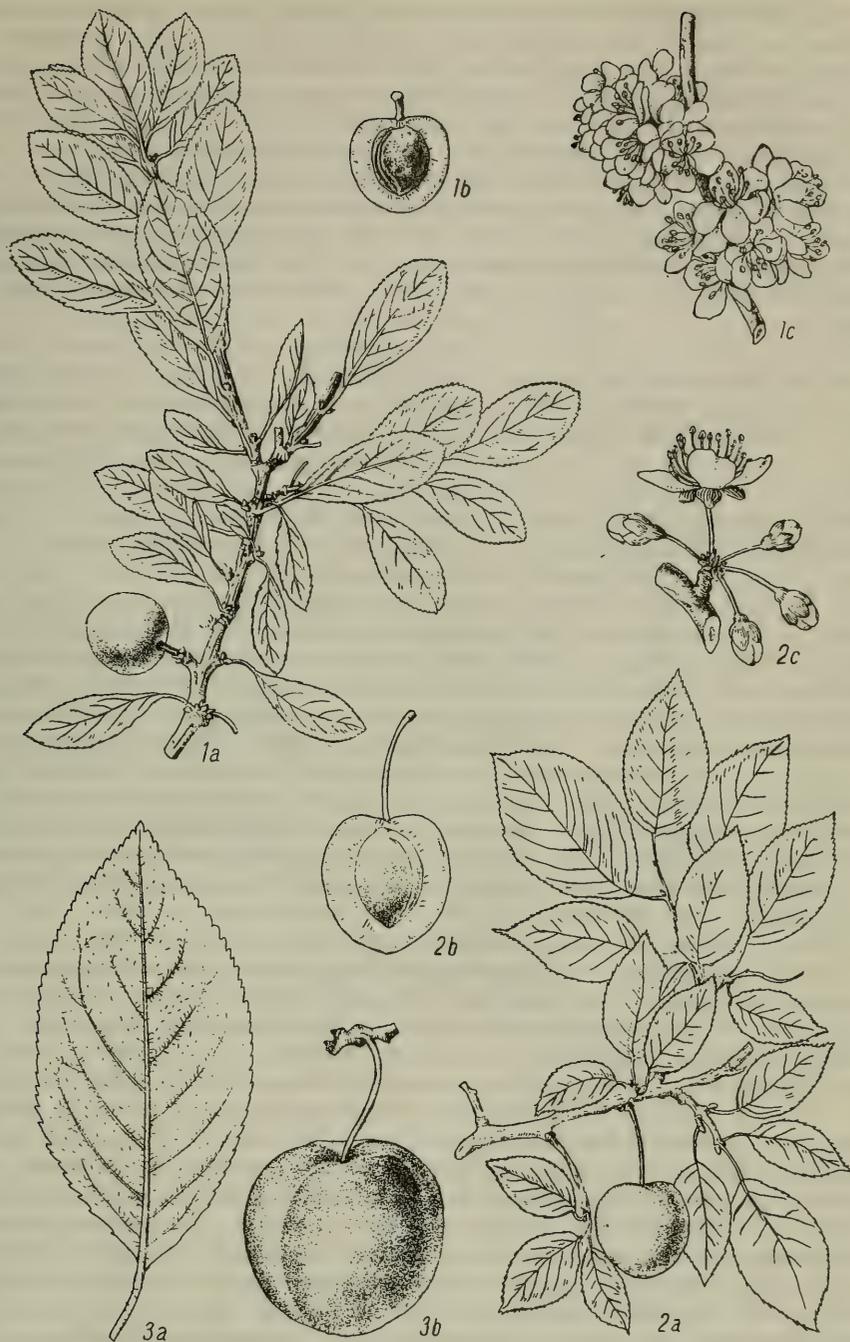


PLATE XXXII. 1 - *Prunus spinosa* L., a) branch with fruit, b) fruit in section, c) branch with flowers; 2 - *P. divaricata* Ldb., a) branch with fruit, b) fruit in section, c) branch with flowers; 3 - *P. caspica* Kov. et Ekim., a) leaf, b) fruit.

Economic importance. The fruit of *Prunus spinosa* is picked for drying, the dried product being quite satisfactory for compots; it is also used in the making of jams, vodka ("sloe"), fruit wine and vinegar; in France the unripe fruit is pickled. The leaves are sometimes added to tea. Fruits and roots are sometimes used as dyes. The northern forms of sloe are distinguished by greater resistance to the cold (in Norway they are encountered at 68°N) and extend farther north and east than any other European species. However, in Siberia, it dies when not covered in winter. Improved varieties, obtained by the selection of larger and tastier fruits, from among hybrids with *P. domestica* L. (I. V. Michurin), may provide material suitable for the more northern regions of the European part of the USSR.

515 2. **P. domestica* L., Sp. pl. (1753) 475; Ldb., Fl. Ross. II, 5; Boiss., Fl. or. II, 652; Shmal'g., Fl. I, 312; C. K. Schn., Laubholz. I, 630; Hegi, III. Fl. IV, 2, 1106; Rehd., Man. cult. trees N. A. (1927) 455; Fl. Yugo-Vost. V, 554; Grossg., Fl. Kavk. IV, 338.—*P. insititia* L. Amoen. IV (1755) 273.—*P. italica* Borkh., Handb.-Forstb. II (1803) 1409.—*P. oeconomica* Borkh., l. c., 1401.—*P. syriaca* Borkh., l. c., 1406.—*P. claudiana* Poir. in Lam., Encycl. V (1804) 677.—Ic.: C. K. Schn., l. c., f. 347; Hegi, l. c. f. 1275-78; Rchb., Ic. Fl. Germ. XXV, tab. 83,

Tree, 6-12 m high, unarmed or with slightly spiny branches; young shoots glabrous or densely hairy or tomentose-pubescent; leaves elliptic or obovate, 4-10 cm long, 2.5-6 cm wide, obtuse or acutely crenate, delicately hairy beneath. Flowers white or with greenish tinge, 15-25 mm in diameter; sepals pubescent inside; pedicels glabrous or sparsely hairy; fruit unusually heterogeneous in shape (from elongate, oval, ovoid to flattened-globose, usually with conspicuous lateral furrow) as well as in color (from pale green to green, yellow, red, violet with glaucous bloom; stone free or not, ovoid, rather broad, slightly pitted, always glabrous. April, May to July-September.

Widely distributed in the USSR, S. W. Eurasia, N. and S. Africa, locally distributed in E. Asia, N. W. India, N. America. Described from cultivated specimens. Type in London.

Note. There are numerous reports of wild specimens (Boissier, Ledebourg, Medvedev, Grossheim and others) but in all cases, these concern escaped specimens. The most likely theory on the origin of this species is due to M. B. Crane and W. J. K. Lawrence, who, on the basis of careful cytological analysis, claim it to be a hybrid of *P. domestica* L., the cultivated *P. cerasifera* Ehrh. and *P. spinosa* L. In *P. domestica* L. $2n = 48$, equal to $2n = 16$ of *P. cerasifera* Ehrh., plus $2n = 32$ of *P. spinosa* L. A study of the fruits of *P. domestica* L. also revealed several characters of *P. spinosa* as well as of *P. cerasifera*, such as the presence of citric acid, not found in fruits of *P. spinosa*, and the presence of tannins, which does not occur in *P. cerasifera*. The same applies to the morphology and the color characteristics of the fruits. Hybrids of *spinosa* and *cerasifera* with $2n = 48$ can be obtained experimentally (V. A. Rybin). *P. institia* L., earlier separated from *P. domestica* L. also has $2n = 48$. This was never found in its wild form so far. No specimens of *Prunus* with $2n = 48$ have been found in wild state. The low-quality forms of *P. domestica*, with smaller, sour fruit, as well as the variety with pubescent

516 shoots and spiny branches (i. e., forms which frequently occur among seedlings of different strains of *Prunus*) are usually referred to *P. insititia*.

Economic importance. In the USSR as elsewhere in Europe the domestic plum (*P. domestica* L.) accounts for 99% of total plum plantings. In America, it ranges from 25–60% in different regions. The domestic plum has been cultivated since antiquity. From Iran and Asia Minor, its presumed area of origin, it was brought to Europe some 2,000 years ago. Of about 2,000–3,000 cultivated varieties no less than 150 are widely distributed. Many varieties flourish as far as 60°N (USSR, W. Europe). The diversity of varieties is such that in the south fresh fruit is available from the beginning of July to the middle of October. It is eaten raw or frozen, and also used in the making of compots, jams, preserves, and jellies. Varieties with high sugar content strains and corresponding amounts of acids yield dry prunes. Chemical analysis of their fruit indicate: sugars from 6 to 15–17%, acids — from 0.2 to 1.5%, vitamin A — to 10 mg%. Areas for possible future extension in the USSR include the northern Caucasus and the southwestern and western parts of the Ukraine and Bessarabia.

3. *P. divaricata* Ldb., Ind. Sem. hort. Dorpat. (1824) 6; Ldb., Fl. Ross. II, 5; Boiss., Fl. or. II, 651; J.D. Hook. in Bot. Mag. XXXVI (1880) ad tab. 6519; Shmal'g., Fl. I, 312; Vinogradov-Nikitin in Tr. Pr. Bot., Gen. i Sel. XXII, 3 (1929) 45; Grossg., Fl. Kavk. V, 338.— *P. cerasifera* ssp. *divaricata* C. K. Schn., Laubholzk. I (1906) 632; Hegi, Ill. Fl. IV, 2, 1100.— *P. cerasifera* var. *divaricata* Bailey in Stand. Cycl. Hortic. III (1927) 2825; Rehd., Man. cult. trees N. A. (1927) 455.— *P. cerasifera* Popov in Tr. Pr. Bot., Gen. i Sel. XXII, 3 (1929) 392.— *P. cerasifera* auct. URSS p. p.— Ic.: Ldb., Ic. Fl. Ross. tab. 13; Bot. Mag., l. c., tab. 6519; Hegi, l. c. f. 1269; C. K. Schn., l. c. f. 348.

517 Shrub; tree (often many-stemmed) or shrub (1.5)4–10(15) m high, with more or less spiny, broadly flexuous, thin, erect or drooping branches; young shoots reddish brown, perennial branches dark gray; winter buds glabrous, rarely slightly pubescent, oblong-ovoid, small; leaves of annual shoots alternate, on spurs, approximate, in subsessile fascicles; petioles (0.5) 1–1.5(2.3) cm long, glabrous, rarely sparingly pubescent, eglandulose; lamina oval or oval-ovate to oval-lanceolate (1)4.5–6(10) cm long, (0.5)2–4(6) cm wide, gradually acuminate, narrowly or broadly cuneate at base, with finely, obtusely, rarely acutely, sometimes doubly serrate-dentate, eciliate margin, glabrous above, densely, rarely slightly tomentose or pubescent along veins beneath. Flowers opening somewhat before the leaves, sessile on spurs or annual shoots of preceding year, on rather long (0.4)1–1.6(2.2) cm, usually glabrous, rarely sparsely haired pedicels; calyx tube glabrous, rarely barely pubescent, short-cylindrical or cylindrical-campanulate, 1.5–3 mm long, with recurved ovate teeth; petals white, very rarely pinkish, ovate, or oval-ovate, sometimes spatulate, obtuse or acute, sometimes notched at apex, 5–15 mm long, 3–10 mm broad; ovary and style glabrous, very rarely inconspicuously pubescent in lower part; fruit globose, ovoid, oblong-ovoid, obovoid, (0.8)1.8–2.8(3.5) cm in diameter, yellow, pale red or rose to dark wine-red, with the exception of hybrid forms, always glabrous, with faint lateral furrow; stones not free, ovoid or ovate-ovoid,

acuminate, sometimes truncate at base, light brown, whitish, with smooth or scarious surface, sometimes pitted and sulcate in the sutures, dorsal suture a narrow, interrupted or uninterrupted furrow, ventral suture obtuse or acute, sometimes broadened, with 2 lateral furrows. March, April—August, September. (Plate XXXII, Figure 2).

Mountain slopes in woody or shrubby forest thickets, stony slopes and bottoms of ravines, near water, montane river valleys. — In Central Asia usually in undergrowth of walnut (*Juglans fallax* Dode) forests. In the Caucasus sometimes forming massive thickets. In the Caucasus, 300 m (littoral)—2,000 m, in Centr. Asia 800—2,000 m. Caucasus: all regions; Centr. Asia: Mtn. Turkm., Pam.-Al., T. Sh. Gen. distr.: Bal.-As. Min., Arm.-Kurd., Iran. Described from cultivated specimens, grown from stones collected by Parrot in the Caucasus. Type in Leningrad.

Note. Most authors consider *P. divaricata* Ldb. a synonym of *P. cerasifera* Ehrh. We prefer to accept *P. divaricata* Ldb. as an independent name for the wild cherry plum, to distinguish it from the very variable varieties obtained through cultivation and, presumably also by hybridization. It seems that one of these was described by Erhardt as *P. cerasifera* Ehrh. Erhardt's statement: "Ihr Vaterland ist Virginien" is probably erroneous, the plant concerned probably being a cultivated plum reared from seeds obtained in the wild. Hence, *P. cerasifera* Ehrh. should include the horticultural varieties of this group, now broadly distributed in Europe, America, as well as in parts of the USSR. In particular, *P. cerasifera* Ehrh. serves as a general stock for plums of the group *P. domestica* L. Horticulturally, *P. cerasifera* Ehrh. is widely known as "Myrobalan" or "Mirabelle" although the latter name is often applied to the group of varieties of the domestic plum — *P. domestica* L. Studies of the wild plum, *P. divaricata* Ldb. at the All-Union Institute of Crop Husbandry indicate the variety of its forms. M. G. Popov, l. c. observed the differences between the Central Asia plum from the Caucasus and from Central Asia. In the latter region he recognized two 2 varieties (var. *orientalis* M. Pop., from Tien Shan and Pamir Alai and var. *turcomanica* M. Pop. from Kopet-Dagh). N. V. Kovalev, in previous report on the "Ecological Differentiation of the Plum" and on "New Species of Plums" (Doklady Akademii Nauk SSSR, XXIII, 3 (1939) 285 and 289, resp.), examined several new forms, such as: 1) *P. caspica* Kov. et V. Ekim. (Plate XXXII, Figure 3), distributed on the Caspian coast of the Caucasus from Dagestan to Talysh, and distinguished by a continuous velutinous or tomentose pubescence on the lower side and short pubescence on the upper side of the leaves and by pitted or perforated stones (including some cultivated subspecies) — *P. caspica* ssp. *foveata* Kov. et Strebk., cultivated in Azerbaidzhan, having a "flat, broad stone with needle-point perforations over the entire surface," leaves densely pubescent beneath. This ssp. has valuable horticultural characters; *P. media* Kov. — a natural hybrid between prune and plum; 3) *P. rybini* Kov. — an analogous hybrid but with a different number of chromosomes. He also recognized several subspecies: ssp. *nairica* Kov., ssp. *pontica* Kov. et V. Ekim., ssp. *boreali-caucasica* Kov. et V. Ekim. The cultivated plums from the Caucasus account for a new species from Azerbaidzhan, *P. iranica* Kov., distinguished by its velutinous-pubescent stone, and for the subspecies, ssp. *nachichevanica* Kov. of *P. cerasifera* Ehrh., with very sweet

and juicy fruit, cultivated in southern Transcaucasia. It is to this subspecies that N. V. Kovalev refers kok-sultan, the widely known plum from Central Asia.

Economic importance. In the Caucasus and Central Asia the wild-growing Myrobalan plums annually yield several tons of fruit used for canning or drying (for compot), or for the production of jams, jellies, etc. In the Caucasus a very popular product known as Myrobalan plum "lavash" is obtained by sun-drying of fruit pulp into thin flakes which retain all its gustatory and dietetic properties; plum "lavash" is used in the preparation of various foods; it is also a tonic, and officinal plant, in particular against scurvy. The fruit contains 5–7% sugars, 4–7% citric acid, to 15% pectins, and 6–17 mg% vitamin A. The high content of citric acid is of special significance.

The Myrobalan plum is an excellent stock for plums, peaches, apricots and others and as such is widely cultivated in Europe and America.

519 4. *P. ferganica* Lincz. nom. nov. — *P. silvestris* M. Pop. in Bull. of appl. Bot. XXII, 3 (1929) 393; Kostina i Linchevskii, Tr. prikl. bot., gen. i sel., ser. VIII, 1 (1932) 223, non *P. sylvestris* Habl. (1789), Pers. (1807), Mill. ex Steud. (1821). — Ic.: Popov, l. c. f. 75, 76; Kostina i Linchevskii, l. c. f. 2–3, 9–16, 19–20, 23, 25.

Shrub, or small tree to 3 m high, with more or less erect unarmed branches; mature turions brown, annual branches gray or reddish gray, short and rather densely pubescent or glabrescent; perennial branches gray; winter buds brown, small; leaves on long shoots alternate, larger, on perennial spurs small, sessile in fascicles; petioles 5–10 mm; lamina broadly elliptic to obovate, rarely broadly lanceolate, usually acuminate, broadly cuneate at base, with acutely serrate margin, ciliate, remotely hairy above and beneath, 3–6(7) cm long, 2–4(4.7) cm wide. Flowers opening together with leaves, sessile on spurs or on annual shoots of preceding year, pedicels more or less pubescent, 4–10 mm; calyx tube short-cylindrical, slightly broadened proximally, 2.5–4 mm long, with reflexed teeth; petals pale to bright pink, elliptic, ovate or obovate, 7.5–16 mm long, 5.5–11 mm broad, with rounded apex; ovary and style from slightly pubescent in upper part to densely pubescent over entire ovary and upper half of style; fruit subglobose, 15–17 mm in diameter, pink-red, the unripe fruit short-pubescent, later glabrescent, drooping; stones free, rather large, robust, ovate at side, ca. 12 mm long, 10 mm wide, 8–9 mm thick, yellow-brown with netted-pitted surface, almost without furrows, spinal suture with narrow furrow, ventral suture broad, double, ascending, with distinct lateral furrows, apex and base obtuse, apex with small mucro. April–August.

Mountain slopes, forest zone and woody-shrubby formations at 1,500–2,000(2,500) m, predominantly in undergrowth of walnut forests, rarely in stony ravines and near roads. — Centr. Asia: Pam.-Al. (Baldzhuan; unreliable?), T. Sh. (Fergana Range, Chatkal Range). Endemic. Described from Fergana Range. Type in Leningrad.

Note. According to M. G. Popov, l. c., this species is probably a hybrid between *Amygdalus ulmifolia* (Franch.) M. Pop. and *Prunus divaricata* Ldb. Kostina and Linchevskii, l. c. have attempted to clear up this question by a morphological analysis of all three species and their hybrids.

They recognize the following varieties of *P. ferganica* (var. *pseudocerasifera* Kost. et Lincz., var. *typica* Kost. et Lincz, and var. *nudipedunculata* Kost. et Lincz.).

520 5. *P. simonii* Carr. in Rev. Hort. (1872) 111; C.K.Schn., Laubholzk. I (1906) 634; Hedrick, Plums of N. J. (1911) 55; Rehder, Man. cult. trees (1927) 456. — Ic.: Rev. Hort., l. c. 110; C.K.Schn., l. c. f. 350.

Shrub; tree with pyramidal crown and unarmed branches growing upward; shoots glabrous; leaves oval-lanceolate, 7–10 cm long, strongly acuminate, slightly obtusely crenate, glabrous, dark green, with arcuate basic veins; petioles short, with 2–4 glands. Flowers in clusters of three, white, 20–25 mm in diameter; pedicels short, 2–4 mm; fruit 3–5(6) cm in diameter, globose, strongly flattened, red; fruit pulp bright yellow, with a distinct, unique, slightly tart aroma; stone small, flattened-globose, dehiscing at furrows. April.

Not known in wild state; cultivated in N. China, Japan and, to a lesser extent, in W. China (Sinkiang). In the middle of the last century it was introduced into W. Europe (France) from where it was brought to N. America. In the USSR occasionally cultivated in Centr. Asia (Fergana valley). Described from a cultivated specimen. Type in Paris?

Economic importance. In the USSR this species is of minor horticultural importance as a crop plant. It is suitable for cultivation in the southern regions, particularly in damp areas. One of its shortcomings is the high susceptibility of the fruit to rot. In America, it is widely crossed with *P. salicina* Lindl., to produce valuable commercial varieties. In the USSR, these varieties (Kara and others) endure the climate of Leningrad. The hybrid strains are more resistant to rot than *P. simonii* Carr.

6. *P. salicina* Lindl., Trans. Hort. Soc. Lond. VII (1830) 239; Rehd., Man. cult. trees N. A. (1927) 456. — *P. triflora* Roxb., Hort. Bengal. (1814) 38; nomen; C.K.Schn., Laubholzk. I (1906) 627; Kom. in A. H. P. XXXIX, 1 (1923) 78. — *P. communis* Kom., Fl. Manchzh. II (1904) 542. — Ic.: C.K.Schn., l. c., f. 346c, 347d; Skvortsov, Sliva v Severnoi Manchzh. (1925) f. 2, 3, 6.

521 Perennial; small tree, 10 m high, with glabrous red-brown on sunny side shiny shoots; leaves usually oval-obovate to broadly oval (4)6–8(12) cm long, broadly or narrowly cuneate at base, abruptly acuminate, finely obtusely doubly crenate, bright green, shiny above, dingy beneath, glabrous, rarely hairy beneath; petioles 1–2 cm, with few glands. Flowers in clusters of 2–3(4), white, small, 1.5–2 cm in diameter, opening together with leaves or later; pedicels (4)10–15 mm, coarse, glabrous; sepals oval-ovate, glabrous, barely crenate; fruit globose, ovoid, oval, with deeply impressed base and conspicuous lateral furrow, 2–3.5(4) cm in diameter (cultivated, up to 7 cm in diameter), yellow or red to dark wine, sometimes green or violet, some forms with apical excrescence. April, May–August, September.

Wild in the forests of S. E. and N. China. Cultivated in the USSR (Far Eastern Maritime Territory), in India, Japan and recently also in Europe and America; escaped in Maritime Territory and S. Manchuria.

Note. This is the most widely distributed species of plums in E. and parts of S. Asia. Two allied species, i. e., *P. gymnodonta* Koehne and

P. bokhariensis C. K. Schn., presumably represent forms of the basic species *P. salicina* Lindl. V. L. Komarov's variety, *P. salicina* Lindl. var. *coreana* Kom., also appears to be a cultivated form.

Economic importance. The cultivated *P. salicina* Lindl. has several useful characters: an exceptional immunity to fruit rot, early ripening and a unique taste. Yet its poor resistance to cold and early flowering limit its distribution in the USSR to the extreme southern regions, the Black Sea coast of the Caucasus, Transcaucasia, Lenkoran, and S. Central Asia.

7. *P. ussuriensis* Kov. et Kost. in Bull. of appl. Bot. ser. 8, No. 4 (1935) 75.—*P. triflora* Roxb. var. *manchurica* Skvorzov, Sliva v sev. Manchzh. (1925) 16.

Perennial, distinguished from preceding species by shrubby habit, strong (usually) armed branches, partial pubescence of leaves along veins beneath, sometimes more pubescent, smaller leaves; pedicels coarse, short, fruit small, 1.5–2.5 cm long, peel tart-bitter, pulp without the specific melon smell of *P. salicina* Lindl. April, May–August, September.

Cultivated as well as wild in Manchuria and the Soviet Far East (Maritime Territory); cultivated in Minusinsk and Krasnoyarsk areas.

Economic importance. An extraordinarily frost-resistant species, enduring -50°C in E. Siberia and Manchuria and average temperatures for January of -23° to -27°C . In E. Siberia it accounts for about 70% of the total fruit-growing area. It is of interest for crossing *P. salicina* Lindl. and the American species of plums and Myrobalan prunes. Burbank, Hansen and others have produced several such varieties in America.

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Genus 763. **AMYGDALUS** * L.**

L., Syst. ed. 1 (1735); Sp. pl. ed. 1 (1753) 472.

Shrub; small tree or shrub with unarmed or spiny branches. Leaves in buds conduplicate, often with glands on petioles and on margin of blade, opening together with flowers or later. Flowers sessile or on more or less long pedicels; calyx tube campanulate-semiglobose or cup-shaped, obconical or cylindrical, sometimes more or less inflated proximally. Fruit a drupe with dry (not juicy) pericarp, dehiscent at ripening by two valves, rarely indehiscent; stone free at maturity, smooth or flexuously or reticularly furrowed, often perforate.

Note. Because of the existence of intermediate forms C. K. Schneider, Koehne, Focke, et al. have not separated *Amygdalus* from *Prunus*, *Persica* and *Armeniaca*. In fact, *A. tangutica* Korsh. (*Persica tangutica* Kost. et Rjab.) of C. China, and also *A. kuramica* Korsh., and *A. aitchisoni* Korsh of Afghanistan closely link *Amygdalus* and *Persica*. S. I. Korzhinskii considers the latter two species to be the ancestral forms of cultivated *Persica* because of their peculiar furrowed-rimous perforated drupes. One fundamental character separating *Amygdalus* Tourn. from associated genera is the dry dehiscent pericarp.

* From amygdale and amygdalea — names of the almond tree used by Theophrastus, Dioscorides, and Pliny.

** Treatment by I. A. Linchevskii and A. A. Fedorov (Caucasian species).

However, even this character is unsatisfactory because the more or less dry pericarp of one of the species of *Armeniaca sibirica* Pers. also occasionally dehisces. The habitus of the species of *Amygdalus* is so peculiar that in most cases a single glance suffices to determine their generic affiliation.

At present, there are about 40 known species of *Amygdalus* distributed from the Mediterranean area to Central Asia (Algeria, the Balkans, Asia Minor, Syria, Palestine, Mesopotamia, the Caucasus, Iran, Beludzhistan, Afghanistan, Central Asia, Mongolia, central mountainous China). At the northern border of the distribution area it is represented by the cycle *A. nana* L. and by allied species in the steppe region of Eurasia. The allied genus *Empletocladus* Torr. (accepted by some authors as a subgenus placed close to section *Chamaeamygdalus* Spach) comprises 6 species distributed in N. America.

523 The species of *Amygdalus* are cross-pollinated. Their frequent interhybridization and segregation explains the abundance of transitional forms. Because of the variability of the leaves, flowers and stones, the material for critical study should represent different stages of one and the same specimen; leaves should be collected from annual ground shoots as well as from spurs.

- | | | |
|----|---|---|
| 1. | Calyx tube campanulate or cylindrical. Small trees or shrubs, with spiny or unarmed branches | 2. |
| + | Calyx tube campanulate-semiglobose or cup-shaped. Low shrubs with unarmed branches | 14. |
| 2. | Calyx tube cylindrical or subcylindrical, prolonged at base, obconical or more or less inflated | 3. |
| + | Calyx tube campanulate or cylindrical, more or less globose at base, not inflated (Section <i>Euamygdalus</i> Spach) | 10. |
| 3. | Calyx tube subcylindrical, prolonged at base, obconical. Low, unarmed shrubs (Section <i>Chamaeamygdalus</i> Spach) | 7. |
| + | Calyx tube narrowly cylindrical, more or less inflated proximally. | 4. |
| 4. | Low strongly armed shrubs, with entire leaves (Section <i>Lycioides</i> (Spach) Boiss.) | 5. |
| + | Shrub or small tree with serrate-dentate leaves, globose or ovoid fruit and indehiscent pericarp (Section <i>Amygdalopsis</i> (Carr.) Lincz.) | 15. <i>A. ulmifolia</i> (Franch.) M. Pop. |
| 5. | Drupes smooth or inconspicuously furrowed at base, rarely with inconspicuous reticular furrows, strongly compressed laterally, oblong, without or nearly without ventral keel | 10. <i>A. spinosissima</i> Bge. |
| + | Stones smooth or slightly furrowed in lower part, only slightly compressed laterally, inflated, globose, with narrow acute keel along ventral suture | 11. <i>A. turcomanica</i> Lincz. |
| ++ | Stones with deep reticular furrows | 6. |
| 6. | Stones ovoid or oblong-ovoid, obtuse or mucronate, with faint obtuse keel (Transc.) | 12. <i>A. nairica</i> Fed. et Takht. |
| + | Stones asymmetrically ovoid, acute, with very prominent acute keel, accompanied by deep furrows (Centr. Asia-Kopet-Dagh) | 13. <i>A. vavilovii</i> M. Pop. |

7. Leaves 0.2–1 cm wide. Stones obliquely prolonged at base (T. Sh.) 9. *A. petunnikowii* Litw.
 + Leaves wide, to 3.5 cm 8.
 8. Rather large shrubs, to 2 m high. Calyx tube 7–9 mm long 9.
 + Smaller shrubs, to 1–1.5 m high. Calyx tube 5–8 mm long
 6. *A. nana* L.
 9. Stones nearly always obtuse, obliquely prolonged at base (Altai, Tarbagatai) 7. *A. ledebouriana* Schlecht.
 + Stones erect or with slight obtuse basal prolongation (Transc.-Georgia) 8. *A. georgica* Desf.
 10. Calyx tube cylindrical. Branches unarmed 11.
 + Calyx tube campanulate or cylindrical. Branches armed 12.
 11. Stones perforated 1. *A. communis* L.
 + Stones smooth, not perforated, sometimes slightly furrowed
 2. *A. bucharica* Korsh.
 12. Calyx tube cylindrical. Stones small, rounded, distinctly furrowed, perforated or unperforated 5. *A. pseudopersica* S. Tamamsch.
 + Calyx tube campanulate 13.
 13. Stones oval, laterally compressed, perforated and with few indistinctly contoured furrows along keel 3. *A. fenzliana* (Fritsch.) Lipsky.
 + Stones nearly globose, perforated and with well-defined furrows alongside keel and at base 4. *A. zangezura* Fed. et Takht.
 14. Low shrub with unarmed virgate green branches, without reduced branchlets. Leaves entire; pedicels ca. 2 mm (Section *Spartioides* Spach. Centr. Asia – Kopet-Dagh) 14. *A. scoparia* Spach.
 + Low unarmed shrub, with strongly developed reduced branchlets. Leaves dentate-serrate; pedicels 4–8 mm (Section *Cerasioides* Lincz. – E. Siberia) 16. *A. pedunculata* Pall.

Section 1. *EUAMYGDALUS* Spach. in Ann. Sc. Nat. ser. 2, XIX (1843)
 114. – Calyx tube cylindrical or campanulate. Small trees or shrubs, with armed or unarmed branches and reduced branchlets. Leaves opening slightly after the flowers. Pericarp dehiscent.

1. *A. communis* L., Sp. pl. (1753) 473; Spach in Ann. Sc. Nat. ser. 2, XIX (1843) 115; Boiss., Fl. Or. II (1872) 641; Popov, Tr. prikl. bot., gen. i sel. XXII, 3, 362; Bogushevskii, ibid., ser. 8, I, 57. – *A. communis* var. *spontanea* Korsh. in Bull. Acad. Pétersb. XIV (1901) 90. – *Prunus amygdalus* Stokes in Bot. Mat. Med. III (1812) 101. – *P. communis* Fritsch in Sitzb. Acad. Wien (1892) 632; C. K. Schn., Handb. Laubholz. 1 (1905) 592. – Ic.: Popov, l. c., f. 54–65; Bogushevskii, l. c., f. 30–45; Hegi, III. Fl. IV, 2, f. 1259; C. K. Schn., l. c., f. 333–334.

Shrub; small tree or shrub, (2)4–6(8) m high, with strict-erect or declinate unarmed branches, and rather abundant reduced branchlets; annual shoots reddish brown or brown, perennial branches gray-brown, older stems gray-black; all branches glabrous; winter buds 5–7 mm long, 2–2.5 mm in diameter; stipules subulate or very narrowly lanceolate, 3–5 mm long, with large sparse marginal glands; leaves alternate on annual shoots, on spurs approximate, often sessile in clusters, all long-petioluled;

petioles (1)1.5–2(3) cm, with 2–4 glands at base of leaf blade; blades lanceolate or narrowly elliptic, (3)4–6(9) cm long, (1)1.5–2(2.5) cm wide, tapering, acuminate, rarely obtuse, orbicular, or broadly cuneate at base, glabrous (young blades sparsely hairy), with shallowly, obtusely, remotely serrate-dentate, glandular margin. Flowers opening before leaves, sessile on spurs on annual shoots of preceding year, pedicels rather short, 3–5 mm; bud scales brown, large, at flowering concealing only lower part of pedicels, usually deciduous immediately after beginning of flowering, calyx tube glabrous, cylindrical, 5–6 mm long, 3–4 mm broad, with broadly lanceolate, obtuse, long spreading-hairy marginal teeth, 4–5 mm long, 2.5–3 mm broad; petals white or pale pink, broadly cuneate, 1.5–2 cm long, 1.2–1.5 cm wide, short-clawed, rounded-truncate, more or less deeply notched; pedicels 4–10 mm; fruit short velutinous-pubescent, obliquely ovoid or oblong-ovoid, compressed, more or less plano-truncate at base, apex elongate-acuminate obtuse, asymmetrical, more curved at one side than on the other, 3–3.5 (4.3) cm long, (1.7)2.3–2.6(2.9) cm wide; stones nearly white to brown, more or less smooth, perforated-pitted, sometimes more or less furrowed, compressed, oval, ovoid, ovoid-lanceolate, lanceolate, obliquely or more or less erectly orbicular-truncate at base, usually apex prolonged-acuminate, asymmetrical, spinal suture generally straight (sometimes convex-acinaciform) with or without more or less shallow furrow, more curved along ventral suture, with more or less acute keel, with or without inconspicuous adjacent furrows, 2.7–3.3(4) cm long, (1.4)2–2.2(2.6) cm wide, (0.8)1–1.6 cm thick. March, April–June, July. (Plate XXXIII, Figure 1).

526 Mountainous stony and fine earth rubble, frequently on the southern slopes; in Centr. Asia, in ephemeral and woody shrubby formations at 800–1,600 m; in W. Kopet-Dagh forming rather large underbrush. – Caucasus: S. Transc.; Centr. Asia: Mtn. Turkm., T. Sh. (Chirchik River basin, Fergana Range). **Gen. distr.:** Iran., Arm.-Kurd., Bal.-As. Min. (E.); W. Med. (Algeria). Described from cultivated specimens. Type in London.

Note. The distribution area of wild *A. communis* L. is so extensive that one would confidently expect considerable morphological differentiation. Yet a study of herbarium specimens emphasizes the almost complete absence of such differentiation. On the other hand, wild *A. communis* L. is morphologically so close to the cultivated almond that there is practically no basis for its separation in a distinct species of lesser systematic unit, as was done, for example, by Korzhinskii (l. c.).

As *A. communis* L. has for so long been cultivated in the southern and central parts of W. Europe that many of its forms have been described, some of them as distinct species. These cultivated varieties are merely distinguished by few and inconspicuous characters (sweet or bitter core, different shape and different degree of brittleness of stone, simple or double flowers, etc.) and are not treated here. Some of them represent the accumulated results of artificial selection but most of them derive from corresponding wild-growing forms. Bogushevskii, working in W. Kopet-Dagh has shown that the number of these forms is very large.

Economic importance. Cultivated since earliest antiquity, *A. communis* L. is now widely distributed in the dry subtropical regions of the Ancient and – since the end of the 19th century – the New World, yielding tasty and nutritious fruit, as well as several products used in the production of medicines and perfumes. The overwhelming majority of cultivated

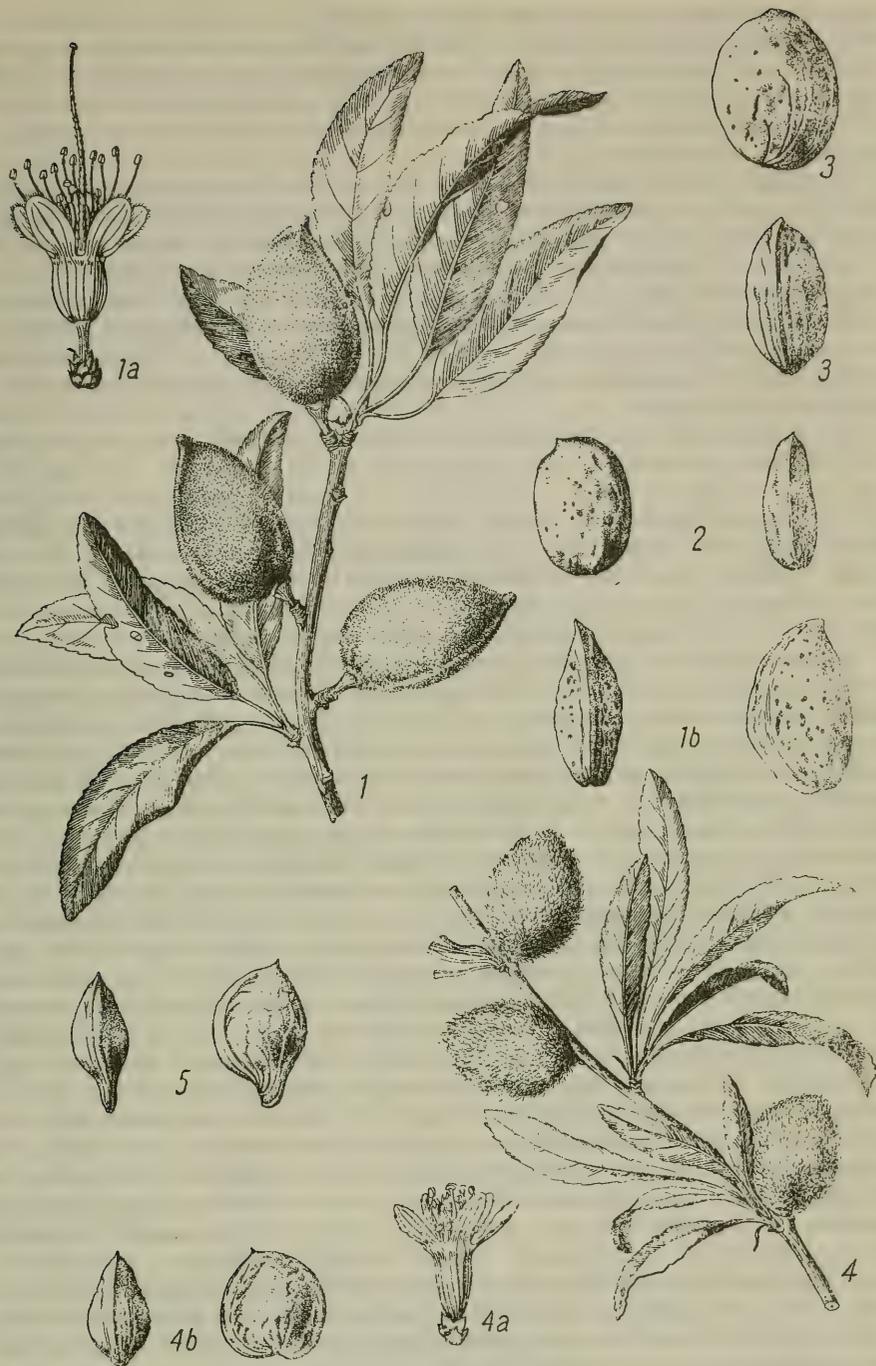


PLATE XXXIII. 1 - *Amygdalus communis* L., branchlet with fruit, a) calyx, b) drupe; 2 - *A. fenzliana* (Fritsch) Lipsky, drupe; 3 - *A. zangezura* Fed. et Takht., drupe; 4 - *A. nana* L., branch with fruit, a) calyx, b) drupe; 5 - *A. petunnikowi* Litw., drupe.

varieties has sweet stones; the bitter sort is more rarely cultivated. The wild-growing *A. communis* L. mostly has bitter seeds and is used for the extraction of bitter oil of almonds which attains about 50% of the dry weight; this is used in perfumes, and in medicine. In addition to the fatty oil in the core of bitter almond, it also contains the ferment of the emulsion and glucosides of amygdalin.

529 Amygdalin under the influence of water and in the presence of emulsion may be hydrolyzed to benzaldehyde ($C_6H_5 \cdot CHO$) and prussic acid. The typical smell of bitter almonds is due to benzaldehyde. Its toxicity is due to prussic acid. To make the fatty oils of bitter almond suitable for consumption as food, the prussic acid is removed by lime and iron sulfate. Oil cakes of bitter almond are poisonous and cannot be fed to cattle. When burned, the shell of the stones yields a valuable coal-absorbing gas. The pericarp yields ash with a high content of potassium, suitable for the production of soap.

In addition, wild *A. communis* L. can be used as a stock for peaches and cultivated almond.

2. *A. bucharica* Korsh. in Bull. Acad. Pétersb. sér. 5, XIV (1901) 92; Popov, Tr. prikl. bot., gen. i sel. XXII, 3, 368; Bogushevskii in Tr. Tadzh. kompl. eksp. XIII (1935) 239. — *Prunus amygdalus* β *ovalifolia* Franch. in Ann. Sc. Nat. sér. 6, XVI (1883) p. p. — *Prunus bucharica* B. Fedtsch., in sched. — Ic.: Bogushevskii, l. c., f. 144.

Shrub; small tree or shrub, from 1.5–2 to 4–6(8) m high, with erect or spreading unarmed branches with numerous reduced branchlets; annual shoots glabrous, brown or gray with dense velutinous pubescence, perennial branches pale ash-gray or dark gray; winter buds long, narrow, 5–10 mm long, 2–2.5 mm in diameter, reminiscent of spruce cones; stipules subulate, glandular-fimbriate, 2–4 mm long; leaves on annual branches alternate, on spurs approximate, sessile in fascicles, all long-petioluled; petioles 2–2.5 cm, with or without 2 glands at base of blade; leaf blades broadly lanceolate, oblong-ovate or oval, 3–4(6) cm long, 1.5–2(3.5) cm wide, obtuse at apex or prolonged-acuminate, orbicular or broadly cuneate at base, glabrous above, glabrous or more or less short velutinous-pubescent beneath, margin shallowly, obtusely, remotely serrate-dentate, glandular. Flowers opening before leaves, sessile on reduced branchlets or on annual shoots of the previous year on short, 1.5–2 mm pedicels; bud scales brown, large, concealing the pedicels and the entire calyx tube, generally deciduous at beginning of anthesis; calyx tube glabrous, rather narrow, cylindrical, 6–8 mm long, 3–5 mm wide, with oblong-ovate, obtuse, long teeth with spreading marginal hairs, 4–8 mm long, 2.5–5 mm broad; petals pale pink, broadly, sometimes irregularly oval, 1.4–1.9 cm long, 0.8–1.2 cm wide, broadly cuneate at base, short-clawed, orbicular at apex, rather deeply notched; fruit stalks 2–3 mm; fruit short, velutinous-pubescent, irregularly
530 ovate, compressed, flat-truncate at base, elongate-acuminate or obtuse at apex, asymmetrical by one side being more bulging than the other, 2.0–3.8 cm long, 1.5–2.5 cm wide; drupes light brown, shining, with smooth surface, without furrows or with inconspicuous, irregularly reticular furrows rarely with rather deep furrows at base or over entire surface, compressed, ovate or ovate-lanceolate, truncate-orbicular at base, gradually tapering above,

prolonged-acuminate at end, asymmetrical, more flattened along dorsal suture, with more or less shallow furrow, more curved along ventral suture, with obtuse keel and adjacent furrows, 1.5–3.3 cm long, 0.9–1.7 cm wide, 0.7–1.4 cm thick. March, April, May–June, July.

Among stones and fine-earth rubble on mountain slopes at 850–2,500 m, in zones of ephemerals and woody-shrubby formations, in Central Tadzhikistan in patches of independent almond and ephemeral formations. Also common in many other formations in the above-mentioned zones, such as pistachio at much higher elevations. — Centr. Asia: Mtn. Turkm. (Kugitang), Pam.-Al. (northern slopes of the Turkestan, Zeravshan, Gissar, Petr I, Darvaz ranges and foothills of S. Tadzhikistan). **Gen. distr.:** Afghanistan. Described from Pamir-Alai (Zeravshan Valley near Dashti-Kazu). Type in Leningrad.

Note. One of the rather restricted endemic species of the section, easily distinguished from *A. communis* L. by its long and narrow flower buds, shorter and narrower leaves and, in particular, by the smooth surface of the stones. In view of its polymorphism (growth habit from small bush to more or less large tree; surface of stones — from smooth to more or less furrowed; shape of leaves; taste of kernel from bitter to sweet, etc.) this species deserves a more detailed study. The following forms were separated by the character of the pubescence: young branches and leaves glabrous or glabrescent — var. *glabrata* M. Pop.; young branches densely pubescent, leaves glabrous or glabrescent — var. *media* M. Pop.; young branches densely pubescent, petioles and lower side of leaves pubescent — var. *incana* M. Pop.

Economic importance. *A. bucharica* Korsh. occupies from 300,000 to 500,000 ha of thickets in Pamir-Alai, a fact which demonstrates its economic importance in mountainous arboreal shrubby thickets. Because of its exceptional drought resistance, *A. bucharica* is a very valuable plant for reforestation as well as for the stabilization of stony mountain slopes. According to Bogushevskii's data for the Zeravshan Valley (l. c.), the kernels are 98.5% bitter and 1.5% sweet and contain fatty oils ca. 50% of dry weight. According to some sources, these can be used in the manufacture of hard soap. They can probably also be used in pharmaceutical preparations, etc. No complete technological evaluation of these oils is as yet available. The discovery of sweet-kerneled forms creates the possibility of selection and improvement by grafting. Several experiments recently made at the Tadzhik station of the USSR Academy of Sciences reveal that *A. bucharica* is a suitable stock for cultivated strains of *A. communis* L. and for apricots, plums and peaches. Thus the very high drought resistance of *A. bucharica* may one day play a major role in the development of non-irrigated fruit growing in the mountains of Central Asia. The local inhabitants use the bark of the root of *A. bucharica* as a yellow dye for fabrics and for tanning.

3. *A. fenzliana* (Fritsch) Lipsky in A. H. P. XIV (1897) 263. — *Prunus fenzliana* Fritsch in Sitzungsber. d. Acad. d. Wissensch. B. C I, H. VII, Abth. 1 (1892) 632. — *A. divaricata* Fenzl (nomen. Vide Fritsch. op. cit.). — *A. urartu* S. Tamamsch. in Fedde, Rep. sp. nov. XXXVIII (1935) 155 et in Trudy Ssel'sko-choz. Inst. Armenii No. 12 (1935) 165, ex parte. — *A. gjarnyensis* S. Tamamsch. et *A. grossheimii* S. Tamamsch. in

Fedde, Rep. sp. nov. XXXVIII (1935) 391 et in Trudy Sseliskochoz. Inst. Armenii No. 12 (1935) 166. — Ic.: Fritsch., l. c. p. 633.

Tree or shrub, 1.5 m high, with divaricate, very long purple branches produced into spines; leaves elliptic-lanceolate, semi-coriaceous, smooth, crenate-serrate, adjacent teeth unequal; base orbicular, often cuneate; petioles ca. 1.5 cm; blades 6–8 cm long, 1.5 (to 2.0) cm wide, intensely green above, pale, dull, slightly shiny beneath with very prominent midrib; winter buds to 7 mm long. Flowers in remote clusters (1–5), subtended by hairy scales; calyx tube campanulate, reddish, with rather short, obtuse or acuminate teeth; petals broadly oval or nearly rounded, notched, pink; fruits solitary, on biennial leafless branches, sessile, rounded, velutinous; stone ovoid, laterally flattened, slightly acuminate or obtuse at apex, keeled, with lateral furrows and small perforations, dorsally smooth, (2.5)2.3–2 (1.5) cm long, (1.5)1.3–1.2(1) cm wide. April–September. (Plate XXXIII, Figure 2).

Rocky mountain slopes and rubble covered rock debris of foothills, juniper forests, to 1,500 m. — Caucasus: S. and E. Transc. (Arm. SSR, Nakhichevan ASSR). **Gen. distr.:** Arm.-Kurd. (?). Described from Karabakh, from a garden specimen growing in Vienna originally. Type in Vienna.

532 4. *A. zangezura* Fed. et Takht. in Trans. of the Armenian Branch of the Ac. Sc. USSR, biol. ser. II (1937) 198.

Shrub; small tree to 2 m high, with divaricate branches produced into spines; bark purple when young; leaves rather large, (8)6–7(5) cm long, (2.5)2–1.5(1) cm wide, lanceolate-elliptic or nearly oblong-ovate, with distinctly orbicular base, crenate-serrate with unequal teeth, semi-coriaceous, glabrous and smooth on both sides; petioles ca. 1.5 cm, winter buds 2–3 mm long. Flowers in clusters or solitary; petals pink; calyx tube campanulate, reddish purple; drupe large, 3 cm in diameter, globose, velutinous, barely dehiscent when dry; stone large, quite rounded, somewhat flattened laterally and dorsally smooth, ventrally keeled, with few furrows with few tiny perforations, (2.5)2–1.5(1) cm long, (2.0)2–1.5(1) cm wide. April–September. (Plate XXXIII, Figure 3).

Stony mountain slopes covered with thinned juniper or oak forests, to 1,500 m. — Caucasus: S. Transc. (Armenia). Endemic. Described from the Megra River valley. Type in Erevan.

Note. Very close to *A. fenzliana* (Fritsch) Lipsky, from which it is however sharply distinguished by large globular drupelets, with a different surface.

5. *A. pseudopersica* S. Tamamsch. in Fedde Rep. sp. nov. XXXVIII (1935) 166 (sub *A. urartu* ssp. *pseudopersica* S. Tam.) et in Trudy Sseliskochoz. Inst. Armenii No. 12 (1935) 167.

Shrub or small tree, 2 m high, with numerous reduced curved branches produced into short spines; bark and spines grayish white; leaves coriaceous, lanceolate, with strongly prominent midrib and distinct network of veins, glabrous on both sides; winter buds to 1.0 mm long. Flowers few; calyx tube elongate, tapering below, with teeth half as long as tube; drupe rounded, velutinous, mucronulate, yellow-purple (with blush); stones as big as peas, rounded, strongly keeled, prickly mucronate, markedly

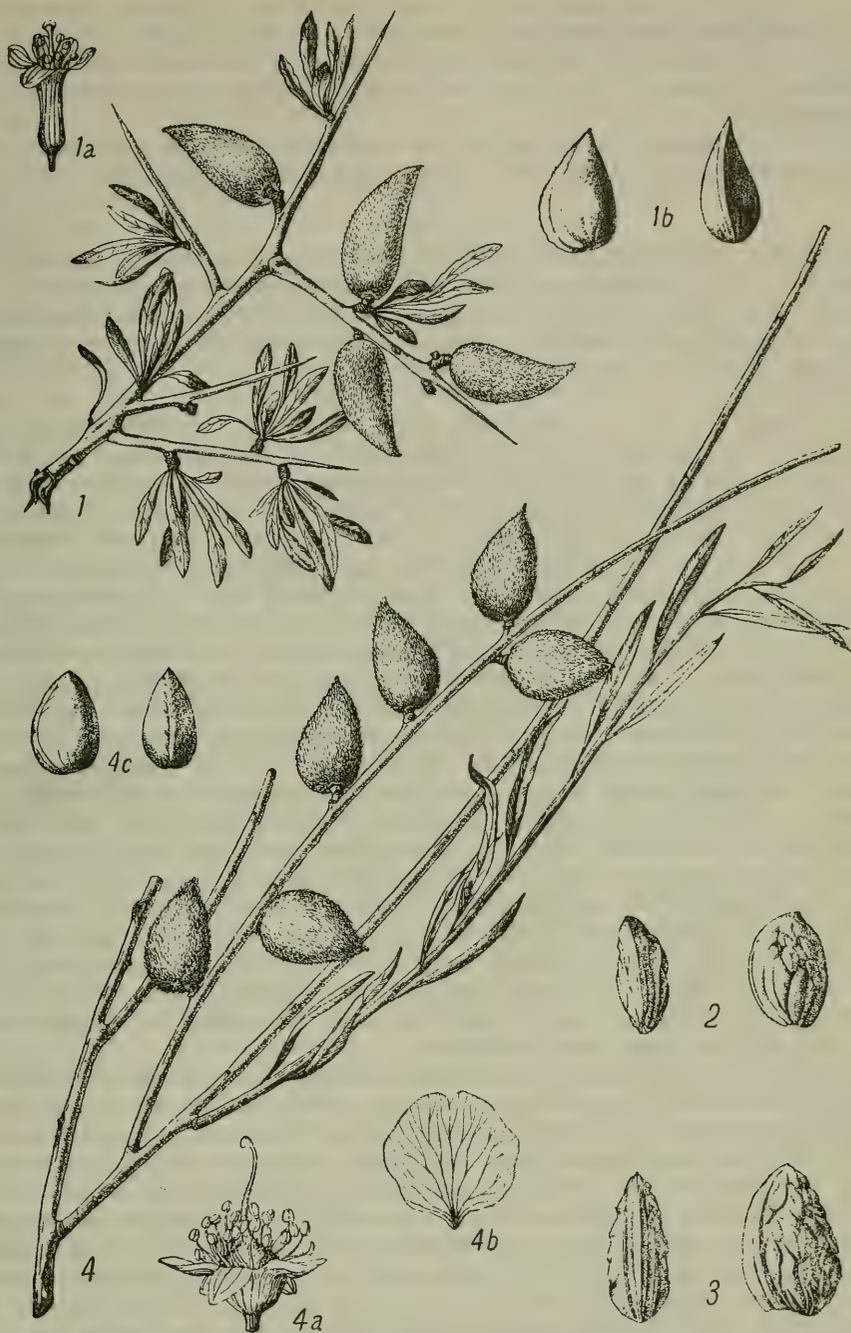


PLATE XXXIV. 1 — *Amygdalus spinosissima* Bge., branchlet with fruit, a) calyx, b) stone; 2 — *A. nairica* Fed. et Takht., stone; 3 — *A. vavilovii* M. Pop., stone; 4 — *A. scoparia* Spach., branchlet with fruit, a) calyx, b) petal, c) stone.

furrowed, with few tiny perforations, usually purple. (F. mira Tamamsch. has stones only 0.9 cm in diameter and even smaller.) April, September.

535 On stony slopes together with *A. fenziiana*. — Caucasus: S. Transc. (Armenia). Endemic. Described from Eranos Mountain near Erevan. Type in Erevan.

Note. Apparently very rare in the USSR; the Soviet locality may represent the northernmost limit of the Iranian distribution area.

Section 2. **CHAMAEAMYGDALUS** Spach in Ann. Sc. Nat. ser. 2 XIX (1843) 110. — Calyx tube subcylindrical, prolonged at base, obconical or oblong. Unarmed low shrubs, with more or less strict branches bearing reduced branchlets. Leaves bursting simultaneously with flowers. Fruit with dehiscent pericarp.

6. *A. nana* L., Sp. pl. (1753) 473; Pall., Fl. Ross. I (1789) 27 p. p.; Boiss., Fl. Or. II, 643, p. p.; Fl. Yugo-vost. V, 551; Grossg., Fl. Kavk. IV, 340. — *A. nana* β *biserrata* Spach in Ann. Sc. Nat. ser. 2, XIX (1843) 110. — *A. nana* β *campestris* auct. plur. — *A. nana* β *vulgaris* Ldb., Fl. Ross. II (1844) 1. — *A. nana* γ *angustifolia* Spach, l. c. 111. — *A. besseriana* Schott, Cat. pl. Vindob. (1818) nomen. — *A. campestris* Bess., Enum. pl. Volhyn. (1822) 46. — *A. gaertneriana* Schlecht. in Ab. Naturf. Ges. Halle II (1854) 19. — *A. pallasiana* Schlecht., l. c. 14. — *A. chinensis* Leroy ex C. Koch, l. c. 79. — *A. serratifolia* hort. ex C. Koch, l. c. 79. — *A. gessleriana* hort. ex Dippel, Handb. Laubholz. III (1893) 606. — *A. sweginzowii* Ricker in Proc. Biol. Soc. Wash. XXX (1917) 18. — *Prunus nana* Stokes in Bot. Mat. Med. III (1812) 103; Focke, Nat. Pflanzenf. III, 3 (1888) 54; C. K. Schn., Laubholz. I, 599. — *R. nana* Benth. et Hook. ex Shmal'g., Fl. Sr. i Yuzhn. Ross. I (1895) 311. — *P. sweginzowii* Koehne in Fedde, Repert. sp. nov. VIII (1910) 62. — *P. tenella* Rehder in Journ. Arn. Arb. XIX, 3 (1938) 275 p. p. — *P. inermis*, foliis ex linearilanceolatis calicum laciniis oblongis Gmel., Fl. Sib. III (1768) 171. — Ic.: Pall., Fl. Ross. tab. 6; C. K. Schn., l. c. 594, 600, f. 333, 336, Syreishch., Fl. Mosk. gub. II (1907) 281; Rchb., Ic. Fl. Germ. XXV (1913) tab. 88, Fl. Yugo-vost V (1931) 551, fig. 432. — Exs.: Fl. Hung. exs. No. 355; Dörfler, Herb. norm. No. 5032; Schultz, Herb. norm. nov. ser. No. 251; Kern. Fl. austro-hung. exs. No. 440; Fl. cauc. exs. No. 309.

536 Shrub, 1–1.5 m high, with erect divaricate branches and rather numerous reduced branchlets; bark, branches whitish or reddish brown on annual, reddish gray or gray on perennial branches, all branches glabrous; stipules linear or linear-lanceolate, entire or slightly dentate, 5–10 mm long, 1–2 mm wide; leaves on reduced branchlets sessile, in clusters, on grown shoots generally solitary, all glabrous, linear-lanceolate or lanceolate, sometimes oblong-oval, acuminate, gradually tapering to 4–7 mm long petioles, margin serriform-dentate, (2.5)3.5–6(7.5) cm long, (0.5)0.8–2(3.5) cm wide. Flowers appearing simultaneously with leaves, sessile, often on reduced branchlets on ca. 2 mm long pedicels, surrounded by brown bud scales; calyx tube glabrous, subcylindrical, obconical at base, 5–8 mm long, 2–3 mm broad, with ovate or lanceolate-obtuse teeth, 3–4 mm long, margin slightly serrate,

with more or less sparse remote papilliform glands; petals bright pink or pink, irregularly obovate or oblong-oval, 10–17 mm long, 4–8 mm wide, cuneate, obtuse, sometimes shallowly notched; fruit densely and coarsely tomentose-villous, whitish, straw yellow, ovate or orbicular-ovate, 1–2(2.5) cm long, 1.2–1.8(2) cm wide, stipes compressed, with shallow, irregularly reticular furrows, broadly orbicular-ovoid or oblong-ovoid, nearly symmetrical, with heavy ventral and more or less keeled dorsal suture, obtuse or short-acuminate, 0.8–1.8(2.2) cm long, 1–1.5(1.7) cm wide, 0.5–1 cm thick. April, May–June, July. (Plate XXXIII, Figure 4).

Fescue-feather grass and forb-meadow steppe, sinkholes, hollows, slopes of ravines, in rich humus and elutriated soils. — European part: V.-Kama, U. Dnp., M. Dnp., V.-Don, Transv. Bes., Bl., Crim., L.-Don, L. V.; Caucasus: Cisc.; W. Siberia: U. Tob., Irt.; Centr. Asia: Ar.-Casp. (northern part — Mugodzhaz). Gen. distr.: Centr. Eur. (S. Germany), Bal.-As. Min. (Hungary, Serbia). Described from cultivated specimens. Type in London.

Note. Throughout its wide area of distribution this species produces a series of small races; those most isolated morphologically and geographically are here separated as distinct species (*A. ledebouriana* Schlecht. and *A. georgica* Desf.) described below. Other members of these races are included in the collective species *A. nana* L. Some of the names cited in the synonymy are certainly synonymous. After a monographic study of the entire cycle, others will have to be recognized as distinct. This is the case especially with *A. campestris* Bess. (*A. besseriana* Schott., *A. nana* β *campestris* auct. p. p.), which grows in the western reaches of the European part of the USSR (U. Dnp., M. Dnp., Bes. and Bl. regions). Its diagnosis shows it to be distinguished by higher growth, broader leaves, shorter calyx tube, white petals, and a style which is glabrous for more than one-third of its length. The type locality is unknown. Besser thought it was Podolia. Asherson and Grebner (l. c.) reported it only for Transylvania. *A. nana* was described by Linnaeus from a cultivated specimen grown in Clifford's garden from seed of unknown origin ("Crescendi locus nos latet" — Linn. Hort. Clifford (1737) 186). In Sp. pl. (l. c.) Linnaeus quotes Amman with a question mark (Stirp. Ruth., 273, tab. 30) and adds: "Habitat in Asia septentrionali?" Even though the habitat of *A. nana* was unknown to him, Linnaeus doubted whether it could be identified with the plant described by Amman from Altai (Bukhtarma River basin). Probably the type was grown from seed collected in S. Europe. The other synonyms, *A. chinensis* Leroy, *A. gessleriana* Hort., and *A. serratifolia* Hort., are mere names (nomina); *A. gaertneriana* Schlecht., *A. pallasiana* Schlecht., and *A. sweginzowii* (Koehne) Richer are described from cultivated specimens (the latter only from leaves and flowers) and without having seen the types, the differences between them seem negligible. *A. sweginzowii*, distinguished by Koehne, mainly by the biserrate margin of the leaves, apparently represents one of the forms earlier recognized by Spach (l. c.) as *A. nana* β *biserrata*.

All considered, in the absence of a comparative study of the types of *A. nana* L. and related species and without extensive observations in nature, it is impossible to delimit these species satisfactorily, either morphologically or geographically, nor is it possible to confirm their specific status.

Economic importance. An attractive, early blossoming, ornamental, shrub. According to Hegi (Ill. Fl. IV, 2 (1923) 1086), the kernel contains bitter almond oil and is used for the production of inferior almond oil as well as for bitter almond water ("Bittermandelwasser," "aqua amygdalarum amarum"), applied officinally instead of laurel cherry water ("aqua lauro-cerasi").

7. *A. ledebouriana* Schlecht. in Abh. Naturf. Ges. Halle II (1854) 21. — *A. nana* β *latifolia* Ldb., Fl. alt. II (1830) 210; Fl. Ross. II, 2. — *A. heuckeana* Schlecht., l. c. 22. — *A. nana* Kryl., Fl. Zap. Sib. VII (1933) 1573, non L. — *A. sweginzowii* Popov in Tr. prikl. bot. gen. i sel. XXII 3 (1929) 371, non Ricker. — *P. tenella* Rehder in Journ. Arn. Arb. XIX, 3 (1938) 275 p. p. — *Prunus nana* auct. plur. ex parte. — *P. inermis floribus sessilibus, foliis lanceolatis, calicum laciniis subrotundis* Gmel., Fl. sib. III (1768) 172.

538 Shrub, 1.5–2 m high, with divaricate, more or less erect branches and rather numerous reduced branchlets; bark reddish brown, on annual, reddish gray or gray on perennial branches; all branches glabrous; stipules narrowly lanceolate or lanceolate, entire or sparingly dentate, 5–10 mm long, 1–2 mm wide; leaves on reduced branchlets sessile in clusters, on normal shoots usually solitary, all glabrous, lanceolate or oblong-oval, acuminate, rarely obtuse, gradually tapering to 4–8 mm long petioles, shallowly and obtusely serriform-dentate, (2.5)3.5–6(7.5) cm long, (0.5)0.8–1.5(2) cm wide. Flowers appearing simultaneously with leaves, often sessile on reduced branchlets, on short (2–4 mm) pedicels, surrounded by small brown bud scales; calyx tube glabrous, subcylindrical, obconical, 7–9 mm long, 2.5–3 mm wide, with obtuse ovate-lanceolate teeth, 3–5 mm long, with more or less sparse, remote, papilliform, marginal glands; petals bright pink, irregularly oblong-oval, 12–17 mm long, 4–8 mm wide, cuneate, obtuse, sometimes shallowly notched; fruiting pedicel 3–5 mm long, ca. 1.5 mm thick; fruit compact, long, coarsely tomentose-villous, of a whitish straw yellow, irregularly or nearly regularly globose-ovoid, 1.5–2.5 cm long, 1.2–2 cm wide, 0.8–1.2 cm thick; stones compressed, with shallow, irregularly reticular furrows, inconspicuously alveolate, conspicuously scabrous, broadly globose-ovoid or oblong-ovoid, asymmetrical or nearly so, with thick ventral, more or less keeled, dorsal suture nearly always obliquely attenuate at base, obtuse or very short attenuate-acuminate at apex, 1.2–2.2 cm long, 1.0–1.7 cm wide, 0.6–1.0 cm thick. May, June–August.

Meadow hollows, mountain steppe plateaus and slopes, mixed forb steppes at foot of mountain ranges, in river valleys. — W. Siberia: Alt. (foothills of S. W. Altai); Centr. Asia: Dzu.-Tarb. (Tarbagatai Range). Endemic. Described from stones sent to Shlekhtendal by Bunge. Type in Halle (?).

Note. Very close to *A. nana* L. (analogous to *A. georgica* Desf.) from which it is mainly distinguished by the more sturdy growth, the larger leaves and fruits, the slightly more scarious stones with obliquely prolonged base. Also the distribution area of *A. ledebouriana* is more or less isolated, limited as it is to Altai and Tarbagatai. In shape, the stones (with obliquely prolonged base) most closely resemble *A. petunnikowii* Litw.; in other forms of the cycle of *A. nana*, this character does not appear or is but very weakly developed.

Economic importance. An attractive, ornamental, early blossoming shrub.

8. *A. georgica* Desf. in Hist. des Arbr. et Arbriss. II (1809) 221; Spach in Ann. des Sc. Nat. ser. 2 (1843) 8, emend. Woronow in Monit. Jard. Tifl. XXXVI, 11 (1915) 35.—*Prunus tenella* Rehder in Journ. Arn. Arb. XIX, 3 (1938) 275 p. p.—Ic.: Woronow, l. c., tab. 1; Schmidt, Oesterr. Allgem. Baumzucht (1822) tab. 204.—Exs.: Herb. Fl. Cauc. fasc. XII (1931).

Shrub, 1 m high; leaves rather large, 8 cm long, 3 cm wide, oblong-lanceolate, short-prolonged at base, adjacent, marginal teeth irregular; stipules acuminate or linear-lanceolate, ciliate, longer than petioles, deciduous. Calyx 5–7 mm long, ca. 3 mm in diameter, membranous, glabrous, reddish, short-cylindrical, tapering below, with oblong, obtuse or faintly acuminate green teeth; petals oval or obovate, obtuse, short-clawed, rounded or erose-notched, bright pink, 8–9.5 mm long, 5–5.5 mm wide; drupes ovate, bristely-villous, 2.5 cm long, 2 cm wide; stones laterally compressed, mucronate, with lateral furrows and keel. April–September.

Treeless slopes of mountains.—Caucasus: Transc. (Georgia). Endemic. Described from Georgia. Type in Paris (?).

9. *A. petunnikowii* Litw. in Trav. Mus. Bot. Acad. Pétersb. I (1902) 16; Popov in Tr. prikl. bot., gen. i sel. XXII, 3 (1929) 371.—*Prunus petunnikowii* Rehder in Journ. Arn. Arb. VII (1926) 29.

Shrub, 1 m high, with divaricate or erect branches and numerous reduced branchlets; bark straw colored on annual, brown-gray on perennial branches; all branches glabrous; stipules linear-lanceolate, 3–5 mm long; leaves sessile in clusters on reduced branches, on grown shoots frequently solitary, all glabrous, with short petioles, linear and linear-lanceolate, (1.5)2–3(3.5) cm long, (2)3–5(10) mm wide, acutely cuneate at base, acuminate, with obtuse or acutely serrate-dentate margin. Flowers appearing simultaneously with leaves, sessile on ends of reduced branchlets or on annual shoots of previous year; bud scales small, brown; calyx tube glabrous, subcylindrical, obconical, 5–8 mm long, 2–3 mm wide, with oval-lanceolate obtuse teeth, ca. 3 mm long, with sparsely remote, papilliform, marginal glands; petals pink, oblong-oval, 5–8 mm long, 3–4 mm wide, cuneate, orbicular or orbicular-truncate, with shallow apical notch; fruiting pedicels very short, 1–2 mm; fruit densely tomentose-villous, rufous, irregularly oval-ovoid, asymmetrical, obliquely attenuate at base, more or less attenuate-acuminate at apex, 1.5–2.5 cm long, 1.2–1.6 cm wide; stones compressed, irregularly obovoid, asymmetrical, with shallow reticular furrows, base obliquely attenuate, apex more or less attenuate-acuminate, dorsal suture less curved than the ventral, 1.4–2.4 cm long, 1.0–1.4 cm wide, 5–8 mm thick. April–June. (Plate XXXIII, Figure 5).

Fine-earth rubble on mountain slopes in the belt of arboreal-shrubby formations, at ca. 1,400–1,800 m.—Centr. Asia: T. Sh. (Chirchik River basin, southern part of Kara-Tau Range, western part of Talass Ala-Tau Range). Endemic. Described from the Chatkal River valley (Nazar-Magomet). Type in Leningrad.

Note. This species is readily distinguished from all the other species of the section; its isolated area of distribution in W. Tien Shan surely indicates its relict character. *A. stoksiانا* Boiss., the southernmost species of the section *Chamaemygdalus*, described from Beludzhistan, presumably represents a similar relict.

Economic importance. An attractive ornamental shrub.

Section 3. LYCIOIDES Spach in Ann. Sc. Nat. ser. 2, XIX (1843) 120 (sensu Boiss., Fl. Or. II (1872) 644, incl. sect. Scorpius Spach, ibid., p. 122). — Calyx tube narrowly cylindrical, more or less inflated proximally; low, divaricately branching, thorny shrubs; leaves more or less coriaceous, small, appearing immediately after beginning of anthesis, pericarp dehiscent.

10. *A. spinosissima* Bge. in Reliq. Lehm. I (1851) 106; Boiss., Fl. Or. II 645; Popov in Tr. prikl. bot., gen. i sel. XXII, 3 (1929) 370; Bogushevskii in Tr. Tadzh. kompl. eksp. XIII (1935) 241. — *Prunus spinosissima* Franch in Ann. Sc. Nat. ser. 6, XVI (1883) 281; C. K. Schn., Laubholz I, 601. — Ic.: C. K. Schn., l. c. f. 336.

Small tree, often low shrub, to 2 m high, with strongly divaricating branches bearing long horizontal spines and more or less abundant reduced branchlets; bark smooth, shining, red-brown on annual, scabrous on perennial branches, whitish gray or pale yellowish gray, glabrous; stipules plano-subulate or narrowly spatulate, almost foliate, 2–5 mm long, margin glandular; leaves narrow, lanceolate or cuneately spatulate, sessile or short-petiolated, alternate, on reduced branchlets approximate, sessile in clusters, (1)1.5–2 cm long, (2)4–5(7) mm wide, cuneate at base, obtuse or short attenuate-acuminate at apex, entire or more or less remotely shallowly serrate-glandular. Flowers mostly on reduced branchlets, appearing just before leaves, sessile or, rarely, on very short, ca. 0.5 mm pedicels, hidden by small brown bud scales; calyx tube glabrous, cylindrical, somewhat inflated proximally, (4)5–7(9) mm long, 1.5–2.5 mm wide, with lanceolate or oval-lanceolate, slightly acuminate, obtuse teeth, 2–4 mm long, glabrous or very sparsely hairy along margin; petals pale or bright pink, obovate, oval or oval-lanceolate, (5)7–8(10) mm long, (2.5)3.5–4(4.5) mm wide, cuneate at base, short-clawed, rounded at apex, sometimes faintly notched; fruiting pedicel short, 1–2 mm; fruit rather densely short velutinous-tomentose, rarely glabrescent, ovoid, oval-ovoid, ovoid-lanceolate, lanceolate, often asymmetrical, one side more curved than the other, often acinaciform, attenuate-acuminate, (1.3)1.7–2(2.4) cm long, (0.9)1.2–1.4(1.5) cm wide; stones pale or dark brown to rust-brown, compressed, smooth or more or less scabrous, sometimes furrowed at base, rarely entire surface with inconspicuous reticular furrows, ovoid, oval-ovoid, ovoid-lanceolate, lanceolate, often asymmetrical, dorsal suture less curved than ventral (sometimes curved-acinaciform), with more or less shallow furrow or without, ventral suture with acute or obtuse narrow keel or keelless, with or without furrows alongside keel or suture, more or less truncate at base, obtuse or short-acuminate at apex, (1)1.4–1.8(2.1) cm long, (0.7)1–1.2(1.4) cm wide, (0.6)0.8–0.9(1) cm thick. March, April–May, June. (Plate XXXIV, Figure 1).

Rocks, exposed bedrock, stony and fine-earth rubble slopes in lower mountain zone, 300–1,500 m. — Centr. Asia: Kyz. K., Mtn. Turkm. (Kugitang), Amu D., Syr D., Pam.-Al., T. Sh. (east of Kara-Tau and Fergana Range). Gen. distr.: Iran. (Afghanistan, Iran). Described from W. Pam.-Al. Type in Leningrad.

Note. This species is readily distinguished from the rest of the section (mostly described from Iran). It is characterized by a rather marked polymorphism, linked with some geographical localization of such

characters as the shape and dimensions of the leaves, flowers, fruit and stones. Thus, in Badkhyz and Kopet-Dagh there grow forms separated as *A. turcomanica* Lincz., which are apparently absent in Pamir-Alai and T. Sh., and vice-versa. However, it is impossible to provide exhaustive descriptions of all forms without special observations in nature since all the herbarium material was collected either with only the flowers, i. e., almost without leaves, or with only leaves and fruit. Given this immense morphological diversity (especially in the shape of the stones), such material is quite insufficient;

Most of the Iranian species of the section *Lycioides* have been described from incomplete herbarium specimens — some only from flowers, others only from leaves and fruit, and still others only from stones. For this reason the systematics of this group is very complicated and no exhaustive division of *A. spinosissima* Bge. into geographical races is attempted here. Collections are required which will comprise all organs of the individual plants.

Economic importance. An early blossoming ornamental shrub; its strong thorniness indicates its suitability for living hedges. Since it grows very well together with the peach and common almond, it deserves consideration as drought-resistant grafting stock.

11. *A. turcomanica* Lincz. in Addenda IX, p. 481. — *A. brahuica* auct. turk., non Boiss. — *Prunus brahuica* Aitch. et Hemsl. var. *calyce omnino glabro* in Trans. Linn. Soc., ser. 2, III (1888) 62. — ? *P. eburnea* Aitch. et Hemsl., var. *fructu flavo*, l. c. 62.

Low shrub, 1.5–2 m high, with divaricate branches and numerous long horizontal spines; annual branches smooth, reddish brown, perennial branches scabrous, whitish gray; leaves oval-lanceolate, cuneate-spatulate or oblong-ovate, rarely nearly elliptic, 2.5–3 cm long, 1 cm wide. Flowers almost indistinguishable from preceding species; fruit rather densely short velutinous-pubescent, sometimes glabrescent, irregularly orbicular-ovoid; stones pale or dark brown, often rust-brown, slightly compressed, convex, scabrous, usually distinctly furrowed in lower part, with shallow dorsal furrow, narrowly and acutely keeled on ventral suture, with two broad obtuse subsidiary keels, parallel to middle keel, truncate at base, more or less acuminate at summit, (1)1.3–1.5(1.7) cm long, (1)1.2–1.3 cm wide, (0.7)0.8–1 cm thick. March, April–May, June.

Rocks, exposed stony slopes in lower mountain zones. — Centr. Asia: Mtn. Turkm. (Kopet-Dagh and Badkhyz). **Gen. distr.:** Iran. (Afghanistan, Iran). Described from Badkhyz (Pul-i-Khatun). Type in Leningrad.

Note. The main differences which distinguish it from the preceding species are: a slightly different character of branching, broader leaves (oval leaves rare), stones scabrous, dark brown, more often rust-brown, orbicular, convex at sides, almost uncompressed, with acute narrow central keel and two broad obtuse lateral keels, in general reminiscent of apricot stones. This species may be close to the authentic *A. brahuica* Boiss., described from Beludzhistan; the stones of the latter are unfortunately unknown.

Economic importance. The same as the preceding species.

12. *A. nairica* Fed. et Takht. in Fedde, Rep. sp. nov. XL (1936) 288.

543 Shrub, glabrous, strongly branching, 1 m high; branches divaricate, interlocked, very thorny; lateral branchlets produced at right angles, giving the appearance of a lattice; young branchlets bright purple, perennial nearly white, with a dull tinge; leaves (3)2.5–2.0(1.5) cm long, (0.9)0.8–0.7(0.6) cm wide, oblong-lanceolate, attenuate to distinct petiole, cuneate, crenate-serrate, sometimes subentire (with small contiguous teeth), glaucescent, semi-coriaceous, glabrous and smooth on both sides; petioles 0.8 cm long. Flowers solitary, subsessile, with pale pink petals, more intensively colored at base and on veins, slightly notched; calyx teeth oblong, acuminate, with small apical cilia, calyx tube cylindrical, proximally inflated in the shape of an onion; drupe ovoid or subglobose or oblong, flattened, velutinous; stones ovoid or oblong, sometimes sublanceolate (var. *dolychocarpa* Fed. et Takht.), reticularly furrowed, obtuse or mucronulate, rather deeply and conspicuously furrowed dorsally, (2)1.5–1(0.9) cm long, (1.5)1.2–1(0.8) cm wide. April–September. (Plate XXXIV, Figure 2).

Dry stony slopes, mountains to 1,500 m. – Caucasus: S. Transc. (Armenia). Endemic. Described from southern spurs of the Zangezur Range sloping toward Araks. Type in Erevan.

Note. It is very likely found in N. Iran.

13. *A. vavilovii* M. Pop. in Bull. Appl. Bot. XXII, 3 (1929) 372. – Ic.: Popov, l. c. f. 69.

Shrub (?); "stone ca. 20–22 mm long, 13 mm wide, 8–9 mm thick, asymmetrically ovoid, acute, with prominent tuberculate-rugose sculpture. Keel thin, exserted, accompanied by 2 parallel deep furrows. Furrow along dorsal suture. Only stones collected. Kopet-Dagh, Mount Morkou (L. A. Berezin)." (Plate XXXIV, Figure 3).

Note. This species, described from stones only, was collected but once. Because the type was not found in the herbaria of the Botanical Institute of the Academy of Sciences of the USSR or in the All-Union Institute of Crop Husbandry VASKhNIL, G. M. Popov's original diagnosis is here quoted. According to N. V. Kovalev and K. F. Kostina (Tr. prikl. bot., gen. i sel., ser. VIII, No. 4 (1935) 42), the stones of *A. vavilovii* were sown and proved by the leaves to belong to a hybrid of *A. spinosissima* Bge. and *A. communis* L. To further elucidate this species, studies of it in its natural habitat or in cultivation are eminently desirable.

Economic importance. An interesting ornamental.

544 Section 4. **SPARTIOIDES** Spach in Ann. Sc. Nat. ser. 2, XIX (1843) 107. – Calyx tube campanulate-semiglobose. Low shrubs with unarmed, erect, virgate, green branches without reduced branchlets. Leaves mainly on annual shoots sparse, appearing after beginning of flowering, deciduous in the summer. Pericarp dehiscent.

14. *A. scoparia* Spach in Ann. Sc. Nat. ser. 2, XIX (1843) 109; Boiss., Fl. Or. II, 641; Popov in Tr. po prikl. bot., gen. i sel. XXII, 3 (1929) 370. – *Prunus scoparia* C. K. Schn., Laubholzk. I (1905) 590. – Ic.: Jaub. et Sp., III. pl. or. III (1847–1850) tab. 227; C. K. Schn., l. c. f. 332; Popov, l. c. f. 66. – Exs.: Editio HBP No. 72.

Shrub, 3 m high, with many, approximate, erect, strict branches; branches pale green, becoming brown, glabrous, reduced branches absent; stipules linear-lanceolate, 1.5–2.5 mm long, soon deciduous; leaves with thin, 4–7 mm long petioles, oblong, linear-lanceolate, 2–4 cm long, 3–4 mm wide, with slightly serrate-glandular margin, mainly on annual branches, deciduous in summer. Flowers opening slightly before leaves, sessile on very short, ca. 2 mm long pedicels, hidden by light brown bud scales; calyx tube glabrous, campanulate-semi-globose, 3–3.5 mm long, almost entirely covered by bud scales, with orbicular-triangular, crisp-hairy teeth at inner side of margin, 2.5–3.5 mm long; petals pink, orbicular or rhombic-orbicular, obtuse, very short-clawed, 7–8.5 mm long and as wide; ovary densely hairy; pistil hairy in lower part, glabrous above; pedicels 2–3 mm long, 1.5 mm thick; fruit sparsely hairy-lanate, obliquely oblong-ovate, asymmetrical, more curved on one side than the other, 1.6–2 cm long, 1–1.2 cm wide, with attenuate mucro; stones nearly smooth, with inconspicuous furrows in lower part, more or less truncate at base, obliquely oblong-ovate, 1.4–1.7 cm long, 0.8–1 cm wide, 6–7 mm thick, asymmetrical, nearly erect, ventral suture with shallow furrow, dorsal suture arcuately curved, with low keel accompanied by shallow, slightly branching furrows which sometimes extend to upper part. April–July. (Plate XXXIV, Figure 4).

Stony mountain slopes and exposed bedrocks in lower mountain zones at 600–900 m, sometimes forming small thickets. — Centr. Asia: Mtn. Turkm. (W. Kopet-Dagh; vicinity of Nukhur and Kara-Kala). **Gen. distr.:** Iran. Described from S. Iran (Laristan Province). Type in Paris, cotype in Leningrad.

545 **Note.** Section *Spartioides* Spach is an extremely xerophyllous, morphologically unique group of species, distributed from N. Arabia, Palestine and Asia Minor to S. and E. Iran, which reaches the northern limit of distribution in Kopet-Dagh. To date, five very closely allied species of this group have been described. These are mainly distinguished by the shape and surface sculpture of the stones as well as by the angularity and roundness of the branches. The extreme shortage of herbarium material precludes an adequate critical evaluation of the characters. In any case, the USSR Kopet-Dagh almond is most closely related to *A. scoparia* described by Spach.

Economic importance. An original ornamental shrub. Attempts to graft *A. communis* L. on *A. scoparia* proved successful (P. N. Bogushevskii in Tr. Tadzhik. kompl. eksp. XIII (1935) 243); the latter, owing to its high resistance to drought, is of definite economic interest.

Section 5. AMYGDALOPSIS (Carr.) Lincz. — *Amygdalopsis* Carr. in Rev. Hort. (1862) 91; l. c. (1872), 31 (pro genere) p. p. — Calyx tube cylindrical, slightly inflated in lower part. Low shrubs or trees, with unarmed branches. The serrate-dentate leaves appear after beginning of flowering. Pericarp indehiscent; stones subglobular, very robust.

15. *A. ulmifolia* (Franch.) M. Pop. in Tr. po prikl. bot., gen. i sel. XXII, 3 (1929) 362; Kostina i Linchevskii, Tr. po prikl. bot., gen. i sel. VIII, 1 (1932) 241. — *Prunus ulmifolia* Franch in Ann. Sc. Nat. ser. VII,

XVI (1883) 281; Lipskii in A. H. P. XXIII (1904) 106; C. K. Schn., Laubholz. I (1905) 596. — *P. baldshuanica* Rgl. in A. H. P. XI (1890) 314. — Ic.: Kostana i Linchevskii, l. c. tab. 17, 18, 21.

546 Shrub, or small tree, 3 m high, the more or less divaricate branches bearing abundant reduced branchlets; annual shoots gray-brown, perennial gray; young shoots short-pubescent; winter buds tiny, 2–3 mm long; stipules narrowly linear, subfiliform, dentate or branching, 10–15 mm long; leaves on annual shoots alternate, on reduced branchlets approximate, sessile in clusters; petioles 3–5(8) mm, laminae obovate or obacuminate-ovate, rarely oval, sometimes obscurely 3-lobed at tip, (2)3–4(6) cm long, (1)1.5–3(4) cm wide, usually slightly acuminate (sometimes asymmetrical), broadly cuneate at base, rarely suborbicular, acutely, sometimes doubly serrate-dentate. Flowers appearing before leaves, sessile on reduced branchlets or on annual shoots of preceding year; pedicels rather long (3)4–5(8) mm; bud scales dark brown, soon deciduous; calyx tube glabrous, cylindrical, slightly broadened proximally, 3.5–5.5 mm long, with recurved, linear-lanceolate teeth nearly as long as calyx tube; petals light or bright pink, obovate or broadly cuneate, 6–9(10) mm long, 8–9 mm wide, orbicular sometimes shallowly notched; fruit-bearing scapes 5–6(10) mm long; ovary and lower part of style densely pubescent; fruit short, rather sparsely pubescent, rounded or oval, mucronulate at apex; stones light brown, rounded or oval, barely compressed at sides, finely pitted with irregularly branching furrows, (10)12–14(16) mm long, (8)12–13 mm wide, 9–11 mm thick. April (September);* fr. June, July.

Mountain slopes, forest and arboreal-shrub vegetation, 1,500–2,500 m. — In W. Pam.-Al. (W. Darvaz) widely distributed in pearlbush-maple formation; in T. Sh. (Fergana and Chatkal ranges) encountered in pearlbush-maple formation, in undergrowth of walnut (*Juglandeta*) forests, sometimes in groves of Tien Shan spruce; rarely reaching the subalpine zone. — Centr. Asia: Pam.-Al. (Darvaz, Karategin, Baldzhuan District), T. Sh. (Kirghiz Ala-Tau, Talass Ala-Tau, Fergana, Chatkal ranges). — **Gen. distr.:** Afghanistan (?). Described from W. T. Sh. (Chatkal Range, Aflatan). Type in Paris, cotype in Leningrad.

Note. Natural hybrids between *A. ulmifolia* (Franch.) M. Pop. and *Prunus divaricata* Ldb., which have recently been described in great detail, are occasionally encountered (see *P. ferganica* Lincz.).

Economic importance. An attractive, early blossoming, ornamental shrub. Experiments in Leningrad indicate the need for good winter protection in northern latitudes.

Section 6. **CERASIOIDES** Lincz. — Calyx tube campanulate-calyciform, short. Low shrubs with unarmed branches and serrate-dentate leaves; leaves appearing after beginning of flowering. Pedicels long, thin. Pericarp dehiscent.

16. *A. pedunculata* Pall. in Nov. Act. Petrop. VII (1789) 353; Turcz., Fl. baic.-dah. I, 354; Spach in Ann. Sc. Nat. ser. II, XIX (1843) 8; Ldb., Fl. Ross. II, 2; K. Koch, Dendrol. I (1869) 80. — *A. pilosa* Turcz. in

* In fall, a second flowering has often been observed.

Bull. Soc. Nat. Mosc. V (1832) 189.— *Prunus pedunculata* Maxim. in Bull. Acad. Sc. Pétersb. XXIX (1883) 78; C.K. Schn., Handb. Laubholzk. I (1905) 597; Koehne in Sargent, Pl. Wilsonianae I (1913) 274.— *Prunus pilosa* Maxim., l. c. XXIX (1883) 79 C.K. Schn., l. c. I (1905) 974; Koehne, l. c. I (1913) 274.— Ic.: Pall., l. c. tab. 8, 9; Maund, Bot. Gard. X (1839–1851) tab. 227; C.K. Schn., l. c. tab. 335.

547 Shrub, 0.5–2 m high, with more or less divaricate branches bearing many rather strongly developed reduced branchlets; annual shoots light brown, perennial dark gray; young shoots glabrous; winter buds tiny, 2–3 mm long; stipules narrow, subfiliform, 2–4 mm long; leaves on annual shoots alternate, on reduced branchlets in dense clusters; petioles 2–3(5) mm; laminae oblong-obovate or oblong-oval, often narrow, sublanceolate or cuneate, (1)2–3(5) cm long, (0.5)0.8–1.0(1.3) cm wide, cuneate at base, acuminate, acutely serrate-dentate, ciliate-pubescent, remotely short-hairy above and beneath. Flowers opening slightly before the leaves, sessile on reduced branchlets; pedicels (4)6–8 mm, ciliate-pubescent; bud scales dark brown, not immediately deciduous; calyx tube glabrous, campanulate-calyxiform, slightly broadening proximally, 4–5 mm long, 3–4 mm in diameter, with broadly triangular teeth recurved at margin, about as long as the calyx tube; petals bright pink, broadly orbicular, 7–10 mm in diameter, very short-clawed, rarely shallowly notched; style glabrous; ovary densely pubescent; fruit densely short-pubescent, ovate or oblong-ovate, mucronate; pedicels 4–8 mm long; stones very pale brown, scabrous but not pitted, with few furrows and pits near ventral and dorsal sutures, ovate, orbicular-ovate or oblong-ovate, faintly compressed laterally, 8–12(14) mm long, 8–10 mm wide, 6–8 mm thick. May–July.

Stony mountain slopes and watersheds with steppe vegetation. — E. Siberia: Ang.-Say., Dau. (Selenginsk, Nerchinsk, Troitskosavsk, now Kyakhta). Gen. distr.: Mong. (northeastern part). Described from E. Siberia. Type unknown.

Note. A unique species of almond, which cannot be accommodated in any of the sections established to date, particularly distinguished by the shape of the calyx tube, which most nearly resembles that of the cherry (for example, *Prunus (Cerasus) fruticosa* Pall.). Its isolated area of distribution as well as its morphological peculiarity indicate the need for a separate section. *Amygdalus pilosa* Turcz. is another species of *Amygdalus*, which should presumably also be included in this section and is apparently indistinguishable from *A. pedunculata* Pall. However, Koehne (l. c.) has made the following comment on *A. pilosa* Turcz.: "Very similar to and probably not different from, or a variety of *Prunus pedunculata*."

Economic importance. An attractive, very cold-resistant ornamental shrub.

Genus 764. **CERASUS*** Juss.**

Juss. Gen. pl. (1789) 340.

Flowers 1 or 2 or in umbelliform or racemiform inflorescences; hypanthium campanulate or tubular; ovary one, free; stamens 15–50;

* Named after Kerasus, a port on the Black Sea coast of Asia Minor, from where, according to some sources, Lucullus first introduced the wild cherry into Rome.

** Treatment by A.I. Poyarkova.

548 fruit a juicy and fleshy drupe, stone globular or ovate, smooth or more or less rugose or torulose. Leaves with stipules, folded in aestivation, deciduous, entire, dentate; trees or shrubs.

1. Leaves with punctate glands beneath 4. *C. glandulifolia* (Rupr. et Maxim.) Kom.
- + Leaves without punctate glands 2.
2. Flowers in racemes or few-flowered umbels 3.
- + Flowers 1-2, buds sessile in groups of 2, 3 or several 10.
3. Flowers in racemes (sometimes nearly umbelliform), each pedicel bracteate at base 4.
- + Flowers in few-flowered umbels, surrounded at base by bud scales and sometimes by few green leaves; bracts absent (Section *Eucerasus*) 6.
4. Rachis very short (3-10 mm), raceme often nearly umbelliform, bracts flabelliform, strongly glandular; flowers 2.5 cm in diameter, with tubular hypanthium 3. *C. sachalinensis* (Fr. Schm.) Kom.
- + Rachis developed, bracts large, ovate or orbicular; flowers not more than 1.5 cm in diameter; hypanthium campanulate 5.
5. Inflorescence glabrous, bracts ovate, with glandular-dentate margin, leaves finely and equally dentate 2. *C. mahaleb* (L.) Mill.
- + Inflorescence hairy, bracts orbicular, with simple teeth, leaf teeth large, unequal 1. *C. maximowiczii* (Rupr.) Kom.
6. Inflorescence leafless at base, inner bud scales recurvate beneath; petioles with 2 large glands in upper part; leaves biserrate 5. *C. avium* L.
- + Inflorescence with few basal green leaves and with erect inner scales; petioles often eglandulose; leaves crenate-dentate 7.
7. Petioles 15 mm, leaves small, oblong-elliptic or lanceolate, on shoots 3 cm long; flowers ca. 1.5 cm in diameter 6. *C. fruticosa* Pall.
- + Petioles (to 4-5) rarely shorter than 2 cm; leaves larger, usually broadly elliptic; flowers 2-3 cm in diameter 8.
8. Fruit light red, with colorless juice; stone not separating from pulp; pedicels rather short, two to three times as long as the hypanthium 7. *C. vulgaris* Mill.
- + Fruit black-red, with dark red juice; stone easily separating from pulp; pedicels longer 9.
9. Shrub, producing profuse root suckers; leaves 6-7 cm long 9. *C. collina* Lej. et Court.
- + Tree, 10 m high, not producing root suckers; leaves larger, 10-12 cm long 8. *C. austera* (Ehrh.) Roem.
- 10(2). Flowers white or pinkish, 18-20 mm in diameter, with campanulate hypanthium, on 10-20 mm pedicels; leaves 7 cm long, 3 cm wide, produced to long mucro 10. *C. glandulosa* (Thunb.) Lois.
- + Flowers with tubular-cylindrical hypanthium, ca. 1 cm in diameter; pedicels 0.5-5(8) mm; leaves small, without mucro, on shoots not longer than 3(3.5) cm (Section *Amygdalocerasus*) 11.
11. Petals white, fruit black, leaves two-fifths to three times the length of the petioles; pedicels 3-8 mm 11. *C. microcarpa* (C. A. M.) Boiss.

- + Petals pink, fruit red, petioles and pedicels very short, 0.5–2(3) mm long (Cycle Prostratae) 12.
12. Leaves narrower (5–8 times as long as wide), linear-lanceolate, usually with revolute margins 12. *C. araxina* Pojark.
- + Leaves broader, length not more than 2.5–4 times the width, margins not revolute 13.
13. Leaves white-tomentose beneath (very rarely glabrous) 14.
- + Leaves glabrous, rarely appressed-hairy on both sides 16.
14. Leaves of short shoots wide, 3.5–10(14) mm long, 2.5–7 mm wide; sepals narrowly triangular; hypanthium 2–2.5 times as long as sepals 14. *C. pseudoprostrata* Pojark.
- + All leaves narrower, lanceolate or lanceolate-obovate; sepals broader, one-third to one-fourth the length of the hypanthium . . . 15.
15. Stone furrowed-torulose, leaves of short shoots 22 mm long, 14 mm wide 15. *C. erythrocarpa* Nevski.
- + Stone with sparse network of furrows; leaves larger and narrower, on short shoots to 30–35 mm long, 10 mm wide 13. *C. incana* (Pall.) Spach.
16. Low shrub, 5–20 cm high, pulvinate; leaves small, 3–5(7) mm long, sometimes appressed-hairy beneath . . . 16. *C. amygdaliflora* Nevski.
- + Shrub with erect or more or less prostrate branches but not pulvinate; leaves larger, glabrous beneath 17.
17. Leaves linear-obovate or oboval, 2.5–4 times as long as wide; stone smooth on sides, sparse network of furrows confined to apex and vicinity of suture; sepals broadly triangular; hypanthium 3.5–4.5 times as long as sepals 20. *C. tianschanica* Pojark.
- + Leaves broader 18.
- 50 18. Leaves of short shoots 15–25 mm long, 6–10 mm wide; hypanthium 6–8 mm long, not inflated proximally, 3–3.5 times as long as sepals; stone 8–10 mm long, sides smooth or slightly furrowed 18. *C. jacquemontii* (Hook. f.) Buser.
- + Leaves, flowers, fruit and drupelet smaller, hypanthium inflated proximally 19.
19. Sepals triangular-lanceolate, half as long as hypanthium; ovary densely villous-tomentose; stone with sparse network of furrows. Low rough shrub 21. *C. turcomanica* Pojark.
- + Sepals broadly oval-triangular, hypanthium 4–5 times as long as sepals 20.
20. Stone distinctly torulose 17. *C. verrucosa* (Franch.) Nevski.
- + Stone smooth on sides, sometimes apex and sutures torulose 19. *C. alaica* Pojark.

Subgenus 1. **TYPOCERASUS** Koehne ex Kurt Meyer in Fedde, Repert. sp. nov. XXII (1923) 39, 57 (pro grege).— Flowers in racemes or in few-flowered umbels, rarely solitary; buds not less than 3 mm long, solitary or crowded in small clusters but then without general envelope of scales; stipules deciduous.

Section 1. **MAHALEB** Koehne, Deutsch. Dendrologie (1893) 306; C. K. Schn., III Handl. d. Laubh. I (1906) 617. — Flowers in stalked, more or less corymbiform racemes, hypanthium broadly campanulate, sepals recurved; petals as long as stamens or slightly longer, outer sepals pubescent.

Series 1. **Maximowiczianae** Pojark. — Inflorescence hairy, bracts large, foliate, with simple teeth; fruit black, stone reticular-costate. East Asian species.

1. **C. maximowiczii** (Rupr.) Kom. in Kom. et Klob.-Alis., Key Pl. Far East. Reg. USSR II (1932) 657. — *Prunus maximowiczii* Rupr. in Bull. Ac. St.-Petersb. XV (1857) 131; Maxim., Prim. Fl. amur. (1859) 89; Kom., Fl. mansh. II (1904) 547. — Ic.: Nakai, Fl. sylv. Korean. V (1916) tab. V; Kom. i Klob.-Al., l. c., Plate 193, Figure 4.

551 Tree 7 m high, rarely shrub, branches dark gray, scabrous, prostrate or drooping or bark pale golden gray; young shoots densely appressed-hairy; buds ovoid, scales brown, lighter at margin, the outer more or less rufous-hairy, the others glabrous; leaves elliptic or obovate, abruptly tapering into a mucro, with cuneate or orbicular base, 3.5–9 cm long, 1.8–5 cm wide, particularly when young with remote, short hairs above, older leaves glabrescent, usually hairy only along veins beneath; petioles one-half to one-fourth the length of the lamina, with dense appressed yellowish hairs; stipules lanceolate-linear, with few glandular teeth, deciduous. Racemes corymbiform (3)5–9-flowered, bracts 5–13(15) mm long, ovate or orbicular, generally obtuse, rarely acute, dentate; rachis, pedicels, hypanthium and sepals with densely pubescent with yellowish antrorse hairs, sepals oval-triangular, acute, entire or with few teeth; petals white, 6–8 mm long, 3–5 mm wide; fruit ovoid-globose, small, 7–8 mm long, 5–6 mm wide, black, bitter; stone globose, with sparse network of ribs over entire surface. Fl. at beginning of June, fr. September. (Plate XXXV, Figure 1).

Shady mountain forests, stony places with humus soil; sometimes escape on open mountain slopes with shrubby and herbaceous vegetation, where its habitus is different (f. *aperta* Kom.). — Far East: Uss., Uda (below the course of the Amur), Sakh. **Gen. distr.:** Jap.-Ch., Manchuria, Korea, Jap. Described from the lower reaches of the Amur. Type in Leningrad.

Economic importance. Ornamental; wood suitable for miscellaneous purposes.

Series 2. **Mahaleb** Pojark. — Inflorescence glabrous, bracts large, glandular-dentate; fruit black, stone smooth; teeth of leaves large, double, with callous-thickened tips. One species.

2. **C. mahaleb** (L.) Mill., Gard. Dict. (1759) No. 4; Boiss., Fl. Or. II (1872) 649; Grossg., Fl. Kavk. IV (1934) 340. — *Prunus mahaleb* L., Sp. pl. (1753) 474; M. B., Fl. taur.-cauc. I, 384; Ldb., Fl. Ross. II, 1, p. 8; Shmal'g., Fl. I, 314. — *Padus mahaleb* Borkh., Handb. Forstb. II (1803) 1434. — Ic.: Hegi, Illustr. Fl. Mitteleur. IV, 2 (1925) f. 1247–1248. — Exs.: HFR No. 1662.

Shrub, rarely a tree, sometimes attaining 10–13 m; buds ovate, light brown, short-pubescent; crown dense, sometimes slightly drooping; bark dark gray, thinly dehiscent, shoots thin, at first green, becoming light blue, glabrous or short velutinous-pubescent, becoming brown-gray; leaves with deciduous stipules, with petioles 3–20 mm, in upper part with or without 1 or 2 glands, pale green, with faint shine above, smooth, glabrous or with yellowish pubescence on midribs beneath or only with beards in axils, broadly ovate to suborbicular, rarely elongate-ovate, generally abruptly tapering into short, obtuse mucro, rarely more or less tapering-acuminate, with orbicular, slightly notched or broadly cuneate base, 2–8 cm long, 1.5–6.5 cm wide, glandular-crenate. Flowers in corymbiform racemes, with 2 small basal leaves; bracts foliate, ovate-elliptic, 5–12 mm long, glandular-dentate; rachis and pedicels glabrous, pedicels 6–15 mm; hypanthium campanulate, glabrous; sepals oval-triangular, frequently obtuse, rarely acute; corolla white, fragrant; petals broadly obovate, 5–8 mm long; stamens 20–25, almost as long as petals; ovary glabrous; drupe yellow at first, reddening, ripening black, bitter, ovoid, 8–10 mm long, 7–9 mm wide; stones smooth, ovoid, July–August.

Shrub thickets, open stony mountain slopes, light broad-leaved forests. — European part: M. Dnp., westernmost part (Podolia, Bes., Crim.); Caucasus: E. and S. Transc.; Centr. Asia: Pam.-Al., T. Sh. (only western part, including mountains in Andizhan and Namangan districts). **Gen. distr.:** Centr. Eur. (southern part), Med., Bal.-As. Min. Described from Switzerland. Type in London.

Economic importance. Ornamental and used as stock for cultivated varieties of cherry and mazzard cherry. Several garden forms with unique shape of crown, variegated leaves, and yellow fruit are known. The wood is hard, heavy, and takes a good polish; its pleasant odor is due to the presence of coumarin which occurs in bound form in the wood and bark. It is used in woodwork and lathework for the manufacture of canes, cigarette holders, pipe stems, etc.; the latter, usually incorrectly referred to as cherry pipes, are highly valued. Ash of the bark contains 80.9% lime. The fruit contains salicylic, malic and tartaric acids, as well as amylase, invertase, emulsin. The seeds are used in the production of "almond" soap; their peculiar odor is due to amygdalin, which contains prussic acid. None of the other parts of the plant contains amygdalin. Distillation of the leaves and fruit yields a fragrant liquid, used in perfumery. The fruits also yield a purple dye.

Section 2. **PSEUDOCERASUS** Koehne, Deutsch. Dendrol. (1893) 305; C. K. Schn., Handb. d. Laubh. I (1906) 606. — Flowers in few-flowered, more or less corymbiform racemes, pedicels bracteate, hypanthium tubular, sepals erect or straight-spreading, petals longer than stamens and glabrous below. Eastern Asiatic species.

3. **C. sachalinensis** (Fr. Schm.) Kom. et Klob.-Alis., Key Pl. Far East. Reg. USSR (1932) 657. — *Prunus pseudocerasus* var. *sachalinensis* Fr. Schmidt, Fl. sachal. (1868) 124. — *P. pseudocerasus* α *spontanea* Maxim. in Mél. biol. XI (1885) 657 (ex parte). — *P. pseudocerasus* Kom., Fl. Mandsh. II (1904) 545 (non Lindl.). — *P. sachalinensis* Koidz. in Bot. Mag. Tokyo XXVI (1912) 52 (nom nud.). —



PLATE XXXV. 1 — *Cerasus maximowiczii* (Rupr.), flowering shoot, a) stone; 2 — *C. glandulifolia* (Rupr. et Maxim.) Kom., flowering shoot, a) flowers in section; 3 — *C. glandulosa* (Thunb.) Lois., flowering shoot, a) leaf, b) flower in section, c) stone.

55 *P. donarium* ssp. *sachalinensis* Koidz., Consp. Rosac. japon. in Journ. coll. sc. Tokyo XXXIV, 2 (1913) 276.— *P. sachalinensis* Miyo hi in Journ. coll. sc. Tokyo XXXIV, 1 (1916) 75; Nakai, Fl. sylv. korean. V (1916) 24.— Ic.: Nakai, l. c. tab. VII; Koidz. in Journ. Coll. sc. Tokyo, XXXIV, 2, f. 8, 9.

High, spreading tree with brown-gray bark; branches pale yellowish gray; shoots glabrous brown annotinous; buds ovoid, acute, ca. 5 mm long, with light brown scales with glabrous margin; leaves ovate, obovate or elliptic, abruptly tapering to a long mucro, with orbicular or orbicular-cuneate, often asymmetrical base, 13 cm long, 7 cm wide, glabrous on both sides or sparsely hairy above, with unequal dense acute teeth produced to a thin mucro; petioles 2–3 cm long, with 2 large glands in upper part; stipules narrowly linear, ca. 1 cm long, with glandular-dentate margins. Flowers in short-stalked, subcorymbiform, glabrous racemes, opening together with leaves or slightly earlier; pedicels 1.2–3 cm, with spatulate glandular-dentate bracts; hypanthia tubular, lightly broadened distally; sepals lanceolate or ovate-lanceolate, entire; corolla 2.8–3.5 cm in diameter; petals white, orbicular-obovate, notched, white, rarely pink; fruit black, 8–10 mm long; stone faintly laterally compressed, ovoid, smooth. Fl. May, fr. August.

Mountain slopes, among trees, amidst herbaceous and shrubby vegetation.— Far East: Uss. (southern part), Sakh. (central and southern parts). **Gen. distr.:** Jap.-Ch., Manchuria and Korea (Japan?). Described from Sakhalin Island. Type in Tokyo.

Economic importance. An ornamental nectar plant; the wood is used for miscellaneous purposes.

Note. Owing to the scarcity of material, it is impossible to determine the relation of accepted *C. sachalinensis* to the very closely related Japanese species described under the more widely accepted names of *P. floribunda* Koehne (in Fedde, Repert. XI, 1913, p. 269) from Honshu Island and *C. sargentii* Rehder (in Mitteil. d. deutsch. dendr. Gesellsch. 1908, p. 159) from Hokkaido Island.

Section 3. HYPADENIUM Koehne ex Kurt Meyer in Fedde, Repert. sp. nov. XXII (1923) 41 (pro subsect.).— Flowers 1 or 2 from pure leafless flower buds, hypanthia campanulate-tubular, sepals prostrate, petals glabrous below and shorter than stamens; leaves with punctate glands beneath. One species.

4. *C. glandulifolia* (Rupr. et Maxim.) Kom. in Kom. et Klob.-Alis., Key Plants Far East Reg. USSR II (1932) 657.— *Prunus glandulifolia* Rupr. et Maxim. in Bull. Acad. Sc. St.-Pétersb. XV (1857) 130 (excl. pl. fruct.); Maxim., Prim. fl. amur. (1859) 87.

556 Tree with dark shining bark; young branches short-pubescent, annual branches dark brown; buds ovoid, with brown scales; leaves 3–8.5 cm long, 1.5–4 cm wide, elongate-elliptic or oval, base usually asymmetrical, broadly cuneate or orbicular, apex mucronate, when young veins hairy on both sides (more densely so above) and, in addition, the entire lower surface covered with punctate glands, irregularly thin-serrate; teeth with attenuate mucros,

slightly curved outward, petioles ca. 1 cm, hairy; stipules setaceous, glandular-dentate, 8–10 mm long. Flowers opening together with leaves, solitary or in pairs of leafless bundles, 1 or 2 inner scales usually foliate; pedicels 5–7 mm, sparingly pubescent, as long as or slightly shorter than hypanthium; sepals oval-triangular, acute, glandular-dentate, half the length of the calyx tube; corolla 7–8 mm in diameter; petals obovate, shorter than stamens and style; style pubescent at base; fruit unknown. Fl. at end of May. (Plate XXXV, Figure 2).

Broad-leaved forests. — Far East: Uda: along the Amur, north of the 50th parallel near the villages of Adi, Tot'kho, Poddale and Onmoi; no other localities known with certainty in the USSR. **Gen. distr.:** ? Manchuria (Girin Province): sterile specimens collected there have been referred by V. L. Komarov to *C. glandulifolia*, which is however distinguished by broader leaves. Described from the lower Amur. Type in Leningrad.

Section 4. **EUCERASUS** Koehne, Deutsch. Dendr. (1893) 306. — Flowers in few-flowered umbels, surrounded at base by large scales of which the inner sometimes foliate; sepals recurved, hypanthia campanulate; petals glabrous below.

5. **C. avium** (L.) Moench, Meth. pl. (1794) 672; Boiss., Fl. Or. II (1872) 649; Grossg., Fl. Kavk. IV (1934) 340. — *Prunus cerasus* i *avium* L., Sp. pl. (1753) 474 (incl. δ , ϵ , κ , λ). — *P. avium* L., Fl. suec. ed. 2 (1755) 165; M. B., Fl. taur.-cauc. I, 384; Ldb., Fl. Ross. II, 1, 6; Shmal'g., Fl. I, 313. — *Cerasus nigra* Mill., Gard. Dict. (1759) No. 2. — *C. dulcis* Gaertn., Fl. Wetterau II (1880) 181. — Ic.: Hegi, III, Fl. v. Mitteleur. IV, 2 (1925) f. 1252, tab. 157, f. 1.

557 Tree, to 23(35) m high, producing no root suckers, with glabrous shoots and strict branches forming an ovoid crown; bark blackish, splitting transversely; leaves elongate-ovate or elliptic, with cuneate or orbicular base, abruptly tapering to a mucro, 16 cm long, 8 cm wide, at first usually densely hairy beneath, when adult glabrous above, over entire surface or only slightly pubescent along veins, to completely glabrous beneath, rarely glabrous even when young (Tal.); teeth biserrate, with terminal cartilaginous mucro; petioles 2–5 cm long, generally 2.5 cm, with two glands in upper part; stipules linearly glandular-dentate. Flowers in few-flowered umbels of leafless buds, inner scales of the latter recurved at flowering; pedicels glabrous, (2)2.5–6 cm; hypanthia cyathiform; sepals obtuse, recurved, usually entire, often carmine red like scales of flower buds; corolla 2.5–3 mm in diameter, white; fruit globose, in wild cherry ca. 1 cm long, dark red to nearly black, generally bitter (var. *amara* D. Sosn.) with soft juicy pulp; stone globose or ovoid, smooth. Fl. April–May, fr. June.

In broad-leaved forests and along their edges (Ukraine), in mountain forests of the lower and middle zones in the Caucasus. — European part: U. Dns., U. Dnp. (southern part), M. Dnp., Bes., Bl. (western part), Crim.; Caucasus: all regions. **Gen. distr.:** Centr. Eur., W. Med. (apparently escaped), Bal.-As. Min. (Greece, Asia Minor), Iran. (Elburz Range). Described from Europe. Type in London.

Economic importance. The fruit is eaten raw and when dried used in the preparation of different types of preserves, compots, and fruit wines.

According to Wehmer, the fruit contains: water 77.84%, invert sugars 8.7–13.9%, saccharoses 0.45–0.75%, free acids 0.4–0.8% (of these malic acid 83.25% and the rest including citric and some salicylic acid; the raw fruit also contains succinic and lactic acids), nitrogenous substances 0.7–0.98%, cellulose 0.24–0.37%, pigments 0.05–0.15%, ash 0.43–0.60%, potassium 57.67%, phosphoric acid 15%, and sodium 6.8%. The kernel contains 28% proteins per dry weight, 1% essential oils, 30% fatty oils, laurocerasin, amygdalin, and emulsin. The bark, especially of the root, contains the dye phlorizin, the wood xylan. The gum (cherry-tree gum) produced in the trunk is marked by a high content of araban (to 52%); upon hydrolysis it yields to 59% arabinose. The wood is brown; the red sapwood is valued in woodwork and lathework. A nectar plant yielding both nectar and pollen. A variety of forms with double and pink flowers, dissected or with variegated leaves or with drooping crown are cultivated as ornamentals.

Note. Among the numerous varieties of cherry two basic types are distinguished which differ markedly in the character of the fruit pulp: var. *juliana* L. (*C. juliana* Lam.) with soft, juicy, usually dark-colored pulp (guines (French), Herzkirschen (German)) is distinguished from the wild cherry (var. *silvestris* Kirschl.) only by the size and taste of the fruits; the second, var. *duracina* L. (*C. duracina* Lam.) with compact, light-colored pulp, in most of the strains (bigarreaux (French), Knorpelkirschen (German)), is distinguished by the lower growth and broader crown. Some authors are inclined to regard bigarreaux as a hybrid of cherry and mazzard cherry. (The latter is widely represented among the cultivated strains.)

58 6. *C. fruticosa* (Pall.) G. Woron. in Bull. Appl. Bot., Gen. a. Plant. breed. XIV, 3 (1925) 52; Voronov, Fl. Yugo-vost. V. (1931) 554; Grossg., Fl. Kavk. IV (1934) 341.—*Prunus cerasus* β *pumila* L., Sp. pl. (1753) 474.—*C. pumila* Pall., Iter I (1771) 153, non *Prunus pumila* L.—*P. fruticosa* Pall., Fl. Ross. I (1784) 19; Fedtsch., Consp. fl. turk. III (1909) 4; Medv., Der. i kust. Kavk. (1919) 106; Kryl., Fl. Zap. Sib. VII, 1575.—*P. chamaecerasus* Jacq., Collect. I (1786) 133; Ldb., Fl. Ross. II, 1, 6; Shmal'g., Fl. I, 313.—*P. chamaecerasus* β *fruticosa* Willd., Sp. pl. II (1799) 990.—*Prunus pumila* Georgi, Besch. d. Russ. Reich. III, 4 (1800) 1004 (non L.).—*C. chamaecerasus* Lois. in Nouv. Duham. V (1812) 29.—Ic.: Pall., Fl. Ross. I, tab. 8; Voron, Fl. Yugo-vost. V. (1931) f. 434; Rchb., Ic. fl. germ. XV, tab. 90.—Exs.: HFR No. 917.

Usually low shrub, 0.2–1 m high, rarely to 2 m, with dense crown; branches erect, or more or less drooping, producing root suckers; buds small, 2–4 mm long, spreading, ovoid, covered by brown scales with reddish margins; shoots thin, virgate, sparingly pubescent at first, becoming glabrous; petioles 10–15 mm; leaves eglandulose, glabrous, shiny dark or dark green above, much lighter beneath, oblong-elliptic, obovate or lanceolate, rarely wider, on short shoots to 3 cm long, on longer shoots to 4–5 cm long, acute or obtuse, base cuneate, obtusely dentate or acutely dentate; teeth with indurate cartilaginous margins; stipules narrow, linear, dentate. Flowers (1), 3 or 4 in sessile or short-stalked umbelliform inflorescences terminating very short axillary shoots, with few small basal leaves; pedicels

15–25 mm long, glabrous, recurved, two to three times as long as the campanulate hypanthium; petals white, obovate, usually notched, 6–7 mm long; fruit usually 8–10 mm long but can be larger, 12–15(19) mm long (var. *pallasii* O'Clerc), ovate, ovate-elongate, subglobular, flattened-globular, urceolate, usually mucronate, epidermis red or dark red; pulp with pale or colored juice and sour-sweet, sometimes tart taste; stone generally ellipsoidal at both ends, acuminate or ovoid, rarely globose, smooth at sides. Fl. April–May, fr. July. (Plate XXXVI, Figure 1).

Forest-steppe and steppe zone, shrubby thickets, steppes, groves, broad-leaved forest edges, open dry slopes. — European part: U. V., V.-Kama, U. Dns., U. Dnp., M. Dnp., V.-Don, Bl., Bes., L.-Don, Transv., L. V.; Caucasus: Cisc.; W. Siberia: U. Tob., Irt., Ob (southern part); Centr. Asia: Balkh., Dzu.-Tarb. **Gen. distr.:** Centr. Eur., Bal.-As. Min. (northern part of the Balkans). Described from southern regions of the USSR. Type in London.

559 **Economic importance.** Deserves the constant attention of fruit growers, especially as a possible source of frost- and drought-resistant strains of cherry. There is a delicious dessert strain (Rannyaya Maiskaya early May – W. European strain) directly derived from *C. fruticosa* by Michurin by crossing it with (Knyazhna Severa) Princess of the North (a hybrid of cherry and mazzard cherry). In addition to the succulence of the fruit, it is also marked by a dwarf growth, which makes it possible to cultivate it in northern regions with heavy snow cover. Michurin also obtained a hybrid of *C. fruticosa* × *Padus virginiana* (American chokecherry) with racemiform inflorescence and rather large fruit. *C. fruticosa* is one of the ancestors of the varieties of cultivated cherry presumably produced by hybridization of *C. fruticosa* with *C. avium*. It is occasionally cultivated in fruit gardens in eastern regions, or as an ornamental. Because of its ability to produce abundant root suckers it is suitable for cultivation on dry slopes and in ravines.

7. *C. vulgaris* Mill., Gard. Dict. ed. VIII (1768) No. 1; Grossg., Fl. Kavk. IV (1934) 340. — *Prunus cerasus* α *caproniana* L., Sp. pl. (1753) 474. — *P. acida* Ehrh., Beitr. VII (1792) 130, non Dum., non C. Koch. — *C. caproniana* Lam. et DC., Fl. d. France IV (1805) 482, ex parte. — *C. recta* Liegel, Ann. d. Obstk. II (1841) 199. — *P. cerasus* Ldb., Fl. Ross. II, 1, 6 p.p.; Shmal'g., Fl. 313. — *P. cerasus* α *acida* Koch, Syn. ed. 2 (1843) 229. — *P. cerasus* a) *recta* Focke in Hallier, Koch's Synops. I, ed. 3 (1890) 729. — *P. cerasus* ssp. *eu-cerasus* var. *caproniana* Asch. et Graebn., Syn. VI, 2 (1906) 149. — *P. cerasus* var. *typica* C. K. Schn., Handb. d. Laubh. I (1906) 615 (ex parte?). — Ic.: Hegi, III. Fl. IV, 2, f. 1250, tab. 157, f. 2–2a.

Small tree, sometimes producing root suckers; crown broad, subglobular, branches rather short, rigid, strict, short shoots crowded at ends of numerous long terminal shoots, the latter glabrous, at first pale green, later red-brown; leaves broadly elliptic, rarely elongate-elliptic, acuminate or tapering to a short mucro, base cuneate, dark or bright green above, shiny, lighter beneath, glabrous from the very beginning or sparingly pubescent when young, to 7(12) cm long, 4–5.5 cm wide, crenate-dentate; teeth with very short cartilaginous cusp, with 2–4 glands near base of lamina;

petioles 1-2(3) cm, usually eglandulose, rarely with 1 or 2 glands; stipules linear, with sparse glandular marginal teeth, deciduous. Flowers in few, usually 2-4-flowered umbelliform inflorescences subtended by several small green leaves, bud scales erect at flowering; pedicels two to three times as long as campanulate hypanthium; sepals slightly shorter than hypanthium, obtuse or acute, usually with glandular marginal teeth, curved upward; petals 10-13 mm long, white; fruit globose or flattened above, pale red with yellowish pulp and colorless juice, sour; stone not separating from pulp, globose, smooth. April-May; Fr. June-July.

Cultivated in the European part, to the latitude of Vologda and Molotov, but sometimes also encountered in its escape state; reported for U. Dnp., southern part, M. Dnp., U. Dns., V.-Don, southern part, Crim., Caucasus, escape encountered in Cisc., Dag., W. Trans. - Abkhazia, E. Transc. - vicinity of Tbilisi and Kirovabad, S. Transc. - vicinity of Erevan. Described from Europe.

Note. As is the case of other species of garden cherry (with the possible exception of *C. collina* Lej. et Court. and *C. marasca* Host), there is no reliable information on wild *C. vulgaris*. The escape form is locally naturalized in Centr. Eur. and Bal.-As. Min. Cultivation extends to 65°20' in Sweden and to 67°56' in Norway. It is believed that species of the garden cherry are the result of the hybridization of *C. avium* L. with *C. fruticosa* Pall. Morphological characters as well as cytological analysis tend to confirm this belief.

Economic importance. Numerous strains of garden cherry with light red fruit and colorless juice, known in French as amarelle or griotte and in German as Glaskirschen, belong to this species. The fruit is eaten raw, dried, or canned to produce compots, jellies, syrups, liqueurs, and wine. According to Wehmer, the chemical composition of the fruit is: 80-86% water, 6-9% sugars (mainly invert, dextrose and levulose, with some saccharose), 1.46-2.16% free acids (predominantly malic and citric with some formic and succinic acids), 0.05-0.2% tannic acid, 0.76-1.3% nitrogenous substances, 0.23-0.33% raw cellulose, 6-24% nitrogen-free extractable substances (pectins, gum, inositol, and dyestuffs), 0.41-0.59% ash. Prior and up to ripening the fruit contains cyano-containing glucosides - amygdalin. The ash contains 51% potassium and 16% phosphoric acid. Seeds contain an almond-flavored fatty oil (24-35%) which rapidly becomes more bitter; this is used in the manufacture of soap and is suitable for burning. The oil contains a large quantity of amygdalin. The stones are used as well: according to American data, 1,000 tons of stones yields 448 tons of kernels which can yield to 96,235.5 kg (95,563 liters) of syrup, 22,736 liters of spirits, 338,130 liters of gum, 200 tons of powder, 3 tons of essential oil, and 4.134 tons of fatty oil (Kichunov). The bark and leaves contain citric acid and coloring substances: the bark contains phlorhizin, fuscophlobaphene and rubrophlobaphene, as well as lecithin; some quercetin is found in the 5-7% tannins in the bark. The leaves are used to prepare tea and in the pickling of cucumbers. The wood is yellowish red, compact, rather heavy and suitable in woodwork and lathework (pipes, cigarette holders, hoops for barrels). It yields gum (cherry-tree gum) and is used in the manufacture of cloth. An excellent nectar plant, yielding both nectar and pollen. Suitable as stock for cherries. Also cultivated as an ornamental, available with double flowers or variegated leaves.

8. *C. austera* (L.) Roem., Syn. monogr. III (1847) 75. — *Prunus cerasus* η *austera* L., Sp. pl. (1753) 474; Hegi, III. Fl. v. Mitteleur. IV, 2 (1925) 1076. — *P. austera* Ehrh., Beitr. VII (1792) 129. — *P. cerasus* Ldb., Fl. Ross. II, 1, 6 (p. p.); Shmal'g., Fl. I, 313 p. p. — *P. cerasus* ssp. *A. eu-cerasus* var. *II austera* Asch. et Graebn., Syn. VI, 2 (1906) 147. — Ic.: Rchb., Ic. Fl. Germ. XXV, tab. 91 (sub *P. ceraso*).

Tree, higher than *C. vulgaris*, to 10 m, with slightly drooping branches. Flowers longer, 4(6) cm long; fruit dark, black-red, with dark red-colored juice; stones easily separating from pulp. Otherwise, like preceding species. April–May, fr. June–July.

Cultivated in the European part of the USSR, in the Crimea, Caucasus and Asia Minor; locally wild. Its distribution in the escape state seems to be as in the preceding species: European part: U. Dnp. (southern part), M. Dnp., V.-Don (southern part), Crim.; Caucasus. Described from Centr. Eur.

Economic importance. As preceding species. One of its strains is woody garden cherry with dark, nearly black fruit, known as morelles (French — morelle, cerise, German — Weichsel).

*9. *C. collina* Lej. et Court., Comp. fl. Belg. II (1831) 130. — *C. acida* Dum., Fl. Belg. prodr. (1827) 91, non Ehrh. (nom. nud.). — *Prunus acida* C. Koch, Dendrol. I (1869) 112; Kichunov, Vishnya i chershnya (1929) 15. — *C. pendula* Liegl., Ann. d. Obstk. II (1841) 199. — *P. cerasus* var. *frutescens* C. K. Schn., Handb. d. Laubh. I (1906) 615. — *P. cerasus* ssp. *acida* Asch. u. Graebn., Syn. Mitteleur. Fl. VI, 2 (1906) 149.

562 Shrub, producing copious root suckers, with flexuous crown; branches and shoots weak, drooping to pendulant; leaves wide or elongate-elliptic or obovate, 6–7.5 cm long, 3.5–4.5 cm wide, usually with acute apex, glabrous or when young with shiny sericeous hairs beneath, base of lamina with 1–3 glands; petioles usually eglandulose, rarely with 1(2) glands. Flowers in 2 or 3-flowered umbels, opening together with leaves, with few small, erect bud scales; petals ca. 1 cm long, entire, nearly flat in blossom; fruit ca. 1 cm long, globose, black-red; juice dark, sour. May, fr. July.

Cultivated strains grown in gardens. No information is available from the USSR on the distribution of its escape form. **Gen. distr.:** Centr. Eur. — in escape state widely distributed in Belgium, in Germany (in the Rhine area), in Bal.-As. Min., and, in particular, in the Adriatic coast countries where it sometimes gives the impression of being a wild plant. Described from Belgium.

Economic importance. Several cultivated varieties are referred to *C. collina*, of these the so-called Vladimir cherry is especially well known in the Soviet Union. Crossing this variety with a variety of the mazzard cherry, Michurin obtained a very valuable large-fruited hybrid (*Knyazhna Severa*) "Princess of the North," distinguished by its high resistance to cold. The double-flowered and variegated-leaf varieties of this species (*f. albo-variegata* and *f. aureo-marginata*) are cultivated as ornamentals. In all other aspects, its economic importance is the same as in the two preceding species.

Subgenus 2. **MICROCERASUS** Webb., Phytogr. Canar. II (1836-1850) 19 (pro subsect.); Roem., Syn. monog. I (1846) 93 (pro gen.); Koehne ex Kurt Meyr in Fedde, Repert. sp. nov. XXII (1923) 44, 57 (pro grege).— Flowers 1 or 2 in leafless clusters, buds small, 1-2 mm long, usually in group of three: two lateral flower buds and one leaf bud, three are initially covered by a common scale; stipules not deciduous.

Section 1. **SPIRAEOPSIS** Koehne, Deutsch. Dendr. (1893) 306; idem ex Kurt Meyer in Fedde, Repert. sp. nov. XXII (1923) 44, 57.— Hypanthia campanulate; stamens borne on edge of hypanthium, more or less at one level; pedicels two to three times as long as hypanthium; leaf teeth simple; buds ca. 2 mm long. A species of southeastern Asia and N. America.

10. **C. glandulosa** (Thunb.) Lois. in Nouv. Duham. V (1812) 33.— *Prunus glandulosa* Thunb., Fl. jap. (1784) 202; Nakai, Fl. sylv. korean. V (1916) 35.— *P. japonica* β *glandulosa* Maxim. in Mél. biol. XI (1883) 685; Kom., Fl. Mansh. II (1904) 544.— *Cerasus japonica* var. *glandulosa* Kom. et Klob.-Alis., Key Plant. Far East. Reg. USSR, II (1932) 657.— Ic.: Naikai, l. c. tab. 20; Kom. i Klob.-Allis., l. c., Plate 192, f. 2.

Shrub, usually 50-90 cm high, rarely 1.5-2 m, with strict, virgate, thin, smooth terminal shoots, sometimes with light glaucous bloom; buds 1.5 mm long and as wide, with broad obtuse brown scales, the inner scales glandular at margin, more or less foliate; leaves oblong-oval or lanceolate, gradually or abruptly tapering to a long thin mucro, to 7 cm long, 3 cm wide, usually glabrous or sparse-hairy above, hairy only along midrib beneath, irregularly finely toothed; petioles 2.5-7 mm; bracts 8-10 mm long, subulate, with glandular-margins. Flowers generally 2, rarely solitary or 3, opening together with leaves or slightly earlier, flower buds sessile in transverse rows of 1 or 3; pedicels glabrous or sparsely glandular, 1-2 cm; hypanthia broadly campanulate; sepals recurved, as long as hypanthia, frequently glandular-dentate; corolla 18-20 mm in diameter; petals generally reddish, becoming pinkish, or white (var. *albiflora* Nakai), ca. 10 mm long, oboval or ovate-elliptic, tapering to a claw; drupe globose, ca. 1 cm long, dark red; stone obovoid, mucronate, with faint network of furrows. Fl. at end of May, fr. from July. (Plate XXXV, Figure 3).

Open, stony, dry slopes and rocks, open sunny places, solitary or in small groups.— Far East: Uss., only in southern part of region. **Gen. distr.:** Jap.-Ch. (Korea, Manchuria and N. Ch.). Described after a cultivated specimen from Japan.

Economic importance. An ornamental low-growing shrub with edible fruit. A variety with double pink flowers is known as var. *sinensis* Nakai. Widely cultivated in Japan, but also grown in W. Europe; rare in the USSR.

Note. *C. japonica* (Thunb.) Lois., apparently distinguished only by its wide leaves, has been known in Japan for a long time. It seems to be a cultivated form of *C. glandulosa*.

Section 2. **AMYGDALOCERASUS** Koehne ex Kurt Meyer in Fedde, Repert. sp. nov. XXII (1923) 44, 57. — Hypanthia tubular, stamens borne at different levels, leaf teeth simple; buds not longer than 1 mm.

Series 1. **Microcarpae** Pojark. — Fruit black, petioles developed, pedicels as long, or not shorter than half the length of the hypanthium. In addition to the USSR species, two species grow in Near Asia.

11. **C. microcarpa** (C. A. M.) Boiss., Fl. Or. II (1872) 646; Grossg., Fl. Kavk. IV (1934) 341. — *Prunus microcarpa* C. A. M., Enum. pl. cauc.-caspic. (1831) 167; Ldb., Fl. Ross. II, 1, p. 6; Medved., Der. i kust. Kavk. (1919) 104; M. Popov in Tr. prikl. bot., gen. i sel. XXII (1929) 347. — *Cerasus orientalis* Spach in Ann. sc. nat., 2 sér., XIX (1843) 128 (ex parte). — Exs.: Fl. cauc. exs., No. 209.

564 Shrub, 1–2 m high; shoots thin, glabrous or short-pubescent, brown, slightly faceted, sometimes short aciculiform, sometimes long flexuous; branches gray; leaves elliptic, oblong-elliptic, ovate or obovate, on short shoots 0.8–3 cm long, 0.5–1.8 cm wide, on long shoots 5.5 cm long and 4.5 cm wide, with acute or obtuse or orbicular apex, cuneate or truncate at base, bright green above, pale beneath, glabrous on both sides or sparsely hairy above, with obtuse or acute dentate margins; lamina two-fifths to one-third as long as the petiole; stipules linear-subulate, pinnatisect. Flowers opening together with leaves, flower buds sessile in twos, rarely solitary generally, 2, rarely 1-flowered; pedicels 3–8 mm, pubescent or glabrous (in Caucasian plant apparently always pubescent; predominantly glabrous in plants from Kopet-Dagh); hypanthia narrowly conical, 4–5 mm long; sepals erect, obtuse, reddish, hairy only along margin, half as long as hypanthia; petals 5–6 mm long, white or pale pink (?), elongate-oboval, clawed; fruit black, sour, usually ovate, 6.5–8 mm long, 5–6 mm wide; stone ovoid, frequently acute, compressed at sides, smooth. April, fr. June. (Plate XXXVI, Figure 2).

Dry stony and pebbly mountain slopes, amidst shrubs. — Caucasus: E. and S. Transc., only in the area of Araks; Centra. Asia: Mtn. Turkm. (Kopet-Dagh). **Gen. distr.:** Arm.-Kurd., Iran. (Elburz Range). Described from E. Transcaucasia (Beshbarmak Mountain). Type in Leningrad.

Economic importance. Suitable as an ornamental; fruit edible.

Note. *Prunus calycosa* Ait. et Hemsl. (in Trans. Linn. Soc., Ser. 2, III (1888) 61, tab. 8) is described from Badkhyz in N. Afghanistan. This cherry is distinguished from *C. microcarpa* by its very large sepals, which are as long as the hypanthia. However, the larger dimensions of the sepals, judging by the only type specimen, seem to be of a tetralogical character, as in most flowers the sepals are not just larger but for the sepaloid color and consistency in the lower part and the hairy margins are quite petaloid. Hence, it appears that *Prunus calycosa* is not a valid species.

Cycle Prostratae Pojark. — Fruit black, petals pink, petioles and pedicels very short, the pedicels not exceeding half the length of the hypanthium. Species of the Mediterranean and C. Asia (only 1 Central Asian species reaches Japan).

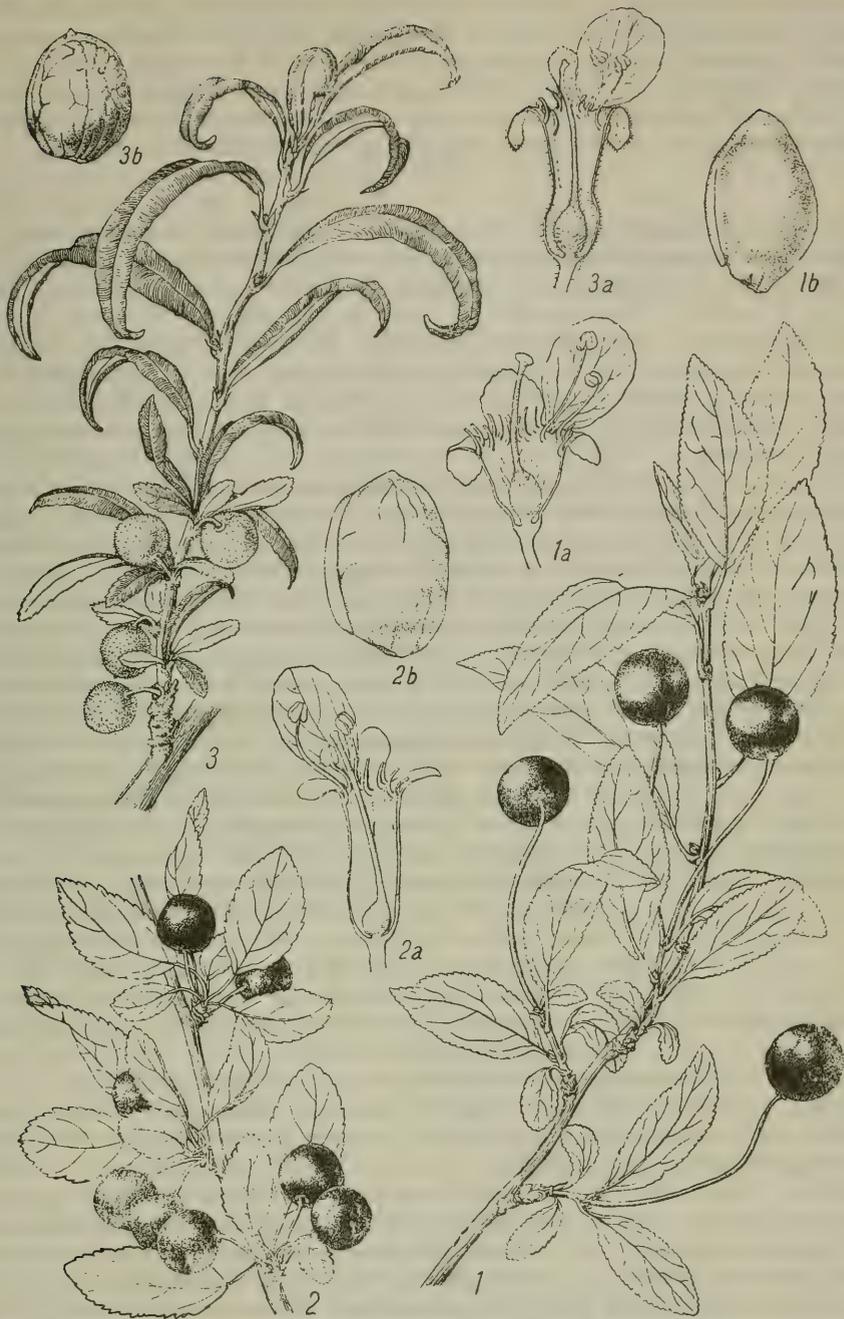


PLATE XXXVI. 1 — *Cerasus fruticosa* (Pall.) G. Woron., fruiting shoot, a) flower, b) stone; 2 — *C. microcarpa* (C.A.M.) Boiss., fruiting shoot, a) flower, b) stone; 3 — *C. araxina* Pojark., fruiting shoot, a) flower, b) stone.

Economic importance. The fruit of most of the species is distinguished by its fleshiness and juiciness, as well as by its pleasant taste. As they are rather resistant to drought, these species may be of interest as drought-resistant stock and as sources of drought-resistant strains by crossing with cultivated strains of cherry. They may also be useful in nonirrigated fruit-growing areas as stock for regrafting with cultivated strains.

Series 1. *Incanae* Pojark. — Leaves white-tomentose beneath (some species have forms with glabrous leaves), sepals narrowly triangular hypanthium 1.5–2(2.5) times as long as sepals.

12. *C. araxina* Pojark. in Journ. d. Bot. XXIV, 3 (1939) 233. — *C. incana* var. *angustifolia* Spach in Bull. Sc. nat. sér. 2, XIX (1843) 126. — *Prunus incana* var. *sintenisii* C. K. Schn., III. Handb. d. Laubh. I (1906) 603. — *P. incana* auct. fl. cauc. (p. p., non Steven). — Ic.: Pojark., l. c. f. 1.

Erect shrub, ca. 1.5 m high, with thin, virgate, pale yellowish gray shoots; stipules subulate, to 7 mm long, usually with sparse glandular teeth; sepals 1.5–3 mm long; leaves narrowly linear-lanceolate or narrowly lanceolate, widest at middle or below, 5–8 times as long as wide, very often curved, nearly falcate, with margins turned inward or even folded up, gradually acuminate at apex, base decurrent, glabrous on both sides or short-pubescent above, white-tomentose beneath (and then shoots and petioles usually short velutinous-pubescent), acutely dentate usually nearly from base, on short shoots (6) 10–25 mm long and 1.75–3 mm wide, on long shoots 25–35 mm long and 4.5–6 mm wide. Flowers sometimes 1 or 2, more often 3–6(8), (on reduced shoots pairs of flower buds are quite crowded); pedicels 0.5–2 mm; hypanthia 5.5–6 mm long, tubular-cylindrical at base, apparently not inflated, outwardly glabrous or pubescent, inwardly pubescent above base; sepals 2.5(3.5) times shorter than hypanthia, narrowly oval-triangular, obtuse, white-tomentose inside, 1.5–2(2.5) mm long, 0.75–1 mm wide; petals oboval-spatulate, short-clawed, obtuse, ca. 5 mm long, 3 mm wide; stamens 18–22; lower part of style and ovary densely tomentose-villous; drupe 8 mm long, more or less pubescent when ripe; stone 5.5–6 mm long, 4.5–5 mm wide, ovoid, acute, rarely obtuse, netted-rugose, sometimes nearly torulose along sutures and at apex. May, fr. end of June to beginning of July. (Plate XXXVI, Figure 3).

Dry stony mountain slopes of middle zone, thickets of shrubs. — Caucasus: S. Transc. (Araks valley, Daralagez). **Gen. distr.:** Arm.-Kurd. (Turkish Armenia, former Kars Region). Described from Kara-Kurt in Kars Region. Type in Leningrad.

Note. *C. araxina* is readily distinguished from *C. incana* by its differently shaped narrow leaves, the densely tomentose-villous ovary, and the pubescence of the fruit. It is most closely related to *C. hippophaeoides* Bornm. (from Cappadocia), from which it is distinguished by longer sepals (only half as long as the hypanthia), and by leaves which are tomentose on both sides.

13. *C. incana* (Pall.) Spach in Ann. d. sc. nat., 2 sér., XIX (1843) 126 (excl. var. *angustifolia*); Boiss., Fl. Or. II (1872) 647 (ex parte); Grossg., Fl. Kavk. IV (1934) 341 (ex parte); Poyark. in Botan. Zhurn. XXIV, 3 (1939) 235.—*Amygdalus incana* Pall., Fl. Ross. I (1784) 13.—*Prunus incana* Stev. in Mém. soc. nat. Mosc. III (1812) 263.—*Prunus prostrata* Ldb., Fl. Ross. II, 1 (1844–1846) 7 (non Labill.); Shmal'g., Fl., I, 313; auct. fl. cauc. (p. p).—*Microcerasus incana* Roem., Fam. nat. syn. mon. II (1847) 94.— Ic.: Pall., l. c. tab. 7.

Erect shrub, to 1.5 m high, with thin, erect shoots, usually short-pubescent when young; stipules longer than petioles, to 5–7 mm long, subulate, more or less pinnatifid; sepals 2–4(6) mm long, short-pubescent; leaves on short shoots 10–25(35) mm long, 3–10 mm wide, oblanceolate, broadest in upper part of lamina, 2.5–3(4) times as long as wide, rounded or acuminate, base narrowly cuneate, decurrent, glabrous above or short-hairy, white-tomentose beneath, rarely glabrous on both sides, margins not reflexed, acutely dentate from base or from middle, sometimes only in upper part, on long shoots often elongate-elliptic, usually mucronate, 2.5–3.5(4.7) cm long, 10–12(16) mm wide. Flowers 1 or 2 per bud, on reduced shoots often in clusters of 4 or 5(8), owing to the close proximity of the buds; pedicels 0.5–2 mm, glabrous or pubescent; hypanthia cylindrical-tubular, 5–8 mm long, apparently slightly inflated at base, glabrous or sparingly pubescent outside, hairy above base inside; sepals elongate-oval-triangular or narrowly triangular, from obtuse to acuminate, 2–3 mm long, 1–1.5 mm wide, glabrous or lanate-hairy outside, brown-tomentose inside; petals oboval, short-clawed; stamens 17–24; lower part of style lanate-villous; ovary glabrous or lanate-villous at apex, rarely lanate-villous throughout; drupe 6 mm long, (rarely longer), globular, mature drupe glabrous; stone broadly ovoid, obtusely or acutely pointed, with sparse network of furrows, sometimes laterally with few transverse furrows advancing from base. Fl. May, fr. June–July.

Dry stony mountain slopes, in middle zone, among shrubs.—Caucasus: Dag., E. Transc. (vicinity of Tbilisi, Kuba District, Kirovabad, Shusha), S. Transc. (Zangezur, Megri). Gen. distr.: Bal.-As. Min.: N. Anatolia (Tokat). Described from Tbilisi. Type in London.

14. *C. pseudoprostrata* Pojark. in Journ. Bot. XXIV (1933) 235.—*Prunus prostrata* Lipsky in A. H. P. XXIII (1904) 103 (ex parte) (non Labill.).—*P. prostrata* var. *discolor* et var. *incana* auct. fl. As. med. (p. p.).— Ic.: Pojarkova, l. c. f. 2.

569 Low, strongly branching shrub, with nodose, sometimes prostrate branches and slender, short, densely short-hairy shoots; annual shoots yellowish gray, branches ash-gray; stipules longer than petioles, lanceolate-subulate, more or less glandular-dentate; petioles 0.5–1.5 mm; leaves short-hairy above, white-tomentose beneath, broadly obovate or ovate-elliptic, obtuse or acute apex, generally irregularly dentate, on short shoots, 3.5–10(14) mm long, 2.5–7 mm wide, on longer sterile shoots to 25 mm long and as wide, frequently narrower and more regularly dentate. Flowers often 1 or 2; pedicels 2–2.5 mm long, pubescent; hypanthia conspicuously inflated at base, 5–6.5 mm long, pubescent outside, hairy above base inside, pink; sepals 2.5–3 mm long, 0.8–1.25 mm wide, elongate-triangular-lanceolate, acuminate, entire, tomentose inside, $\frac{1}{2}$ – $1\frac{1}{2}$ times as long as hypanthia;

stamens 18–22; entire ovary and lower half of style densely tomentose-villous; petals broadly obovate, abruptly tapering to short claw; drupe ca. 8–9 mm, ovoid globose, glabrous or hairy at apex; stone ovoid-globose, rather gradually attenuate, with furrows advancing laterally from suture and forming a very sparse net. May, fr. June–July.

Stony and pebbly-stony mountain slopes, in shrub thickets. — Centr. Asia: Mtn. Turkm. (Greater Balkhan Range and Kopet-Dagh). **Gen. distr.:** Iran.; N. Iran (Astrabad Province and Elburz Range). Described from the vicinity of the Greater Balkhan Range. Type in Leningrad.

Note. The authentic *C. prostrata* (Labill.) Ser., described from Syria, is distinguished from this species by the shape of the hypanthium, which is not inflated at base, the glabrous or very lightly pubescent ovary and style, the shape of leaves, and the nearly pulvinate shape of the frutex.

15. *C. erythrocarpa* Nevski in Acta Inst. Bot. Acad. Sc. URSS ser. I, fasc. 4 (1937) 246; Pojark. in Journ. Bot. XXIV, 3 (1939) 237. — *Prunus prostrata* Lipsky in A. H. P. XXIII (1904) 103 (non Labill.) p. p. — *P. prostrata* var. *discolor* et var. *incana* auct. fl. As. med. (p. p.).

Shrub, erect, (40)75–200 cm high; young shoots thin, long, erect, short-pubescent, light-colored; older branches gray; stipules longer than petioles, lanceolate-subulate; petioles 2–3 mm, pubescent; leaves bright green above, with sparse short pubescence, sometimes glabrescent, white-tomentose beneath, lanceolate-obovate, rarely broader, elongate-obovate, short-acuminate, rarely obtuse, with narrowly cuneate base, generally acutely toothed nearly from base, on short shoots (8)12–22 mm long, (3)5–14 mm wide, on long shoots 3.5 cm long, 17.5–2 cm wide, usually broader, often elliptic
570 or ovate-elliptic. Flowers 1 or 2, rarely 3–6 (flower buds in close proximity on spurs); pedicels 1.5–2.5 mm; hypanthia 5–6 mm long, inflated at base, outwardly glabrous or more or less pubescent, inwardly hairy above base; sepals one-third the length of the hypanthia, oblong-triangular (1.5 times as long as wide), acuminate, rarely obtuse, inwardly densely hairy; petals obovate, tapering to a claw; stamens 17–20; lower part of style and tip of ovary villous-hairy; drupe globose or ovoid globose, 9–10 mm long, 8 mm wide, glabrous when mature; stone ovoid, 8 mm long, 5–6 mm wide, netted-rugose to nearly torulose. April–May, fr. June–July.

Stony mountain slopes, shrubby thickets, in middle and subalpine zones. — Centr. Asia: W. T. Sh. (Kara-Tau, Chatkal-Tau, Tashkent Ala-Tau ranges) and Pam.-Al. (Zeravshan, Turkestan, Mogol-Tau, Kugitang, Gissar, Darvaz ranges). Described from Kugitang Range in Turkmenistan. Type in Leningrad. **Gen. distr.:** Iran. (N. Afghanistan).

Note. *C. bifrons* (Fritsch) Pojark., a related species, distributed in the NW Himalayas, E. Afghanistan (Kafiristan), and Kashgaria (Yarkend). This is distinguished by shorter and broader sepals, broader petals, and more dense but looser tomentum on lower and dense pubescence on upper surface of leaves. In W. Tien Shan there occur hybrids of *C. erythrocarpa* × *C. tianschanica* and, apparently, also of *C. erythrocarpa* × *C. verrucosa*. These are usually marked by the appressed or loosely tomentose pubescence of the lower surface of the leaves and — like *C. erythrocarpa* — by the oblong sepals; the stone from nearly smooth to strongly torulose.

Series 2. *Amygdaliflorae* Pojark. — Leaves glabrous on both sides, rarely appressed-pubescent beneath (not tomentose!), leaves usually broadly triangular, short, one-third to one-fifth as long as hypanthium, rarely narrower and longer.

16. *C. amygdaliflora* Nevski in Acta Inst. Bot. Acad. Sc. URSS ser. I, fasc. 4 (1937) 246. — Ic.: Pojark. in Journ. de Bot. XXIV, 3 (1939) 240, f. 3.

Low shrub, 5–20 cm high, prostrate on stones, pulvinate, with nodose, short, crowded grayish brown branches; young shoots thin, short, with very short pubescence, annual shoots glabrous, grayish brown branches; young shoots thin, short, with very short pubescence, annual shoots glabrous, grayish yellow; stipules subulate, glandular-dentate, 2–2.5 mm long; petioles very short, 0.5–1.5 mm long; young leaves often appressed-hairy on both sides or only beneath, on sterile shoots mature leaves usually glabrous or glabrescent, obovate or ovate-elliptic; on short shoots leaves 3–5(7) mm long, 2–3(3.5) mm wide, on long shoots to 8 mm long, 6 mm wide, usually acutely and irregularly dentate along entire margin or only above middle. Flowers usually 1 (flower buds often solitary), opening simultaneously with leaves; pedicels 0.75–2 mm; hypanthia 3.5–4(5) mm long, 0.25–1.5 mm wide, inflated below, hairy inside above base, glabrous outside, more or less reddish; sepals $\frac{1}{3}$ to $\frac{1}{4}$ the length of the hypanthia, elongate-oval-triangular, abruptly broadened, acuminate or obtuse at base, 1–1.5 mm long, densely hairy inside; petals oboval, with rather long claw; drupe 9–10 mm long, glabrous; stone ovoid, obtusely acuminate, 8 mm long, 5 mm wide, with slightly torulose surface. April–May.

Dry stony slopes, rock crevices in subalpine zone. — Centr. Asia: Pam.-Al. (Kugitang Range, mountains in the Baisun, Yakkabag, Guzar areas, Zeravshan Range). Endemic. Described from Kugitang. Type in Leningrad.

17. *C. verrucosa* (Franch.) Nevski in Acta Inst. Bot. Acad. Sc. URSS, ser. I, fasc. 4 (1937) 246; Pojark. in Journ. de Bot. XXIV, 3 (1939) 241. — *Prunus verrucosa* Franch. in Ann. d. sc. nat., sér. 6 XVI (1883) 280. — *P. prostrata* var. *concolor* Lipsky in A. H. P. XXIII (1904) 105 (p. p.) et auct. fl. turk. — Ic.: Pojark., l. c. f. 4.

Low shrub, with dense crown of nodose branches and erect, generally short shoots, villous when young; anctinous shoots pale, grayish yellow, older branches variegated, brownish gray; stipules linear-subulate, twice as long as petioles, 6 mm long, pinnatifid in lower part; petioles short-pubescent, 0.5–1.5 mm, on 2(3) mm long shoots; leaves generally glabrous on both sides, rarely (mainly on sterile shoots) appressed-pubescent beneath when young, obovate or obovate-lanceolate, with rounded or acute apex, on the long shoots often elliptic, mucronate; margin often acutely toothed from base, 5–15(17) mm long, (2.5)–3.5–6.5 mm wide, on long shoots to 15–20 mm long, 6–8 mm wide. Clusters of flower buds often crowded on reduced shoots, resulting in groups of 3–8(10) sessile flowers, rarely buds paired; pedicels 1.5–4 mm, short-pubescent; hypanthia somewhat inflated proximally, glabrous outside, hairy above base inside, 5–8 mm long; sepals triangular or oval-triangular, broad, 1.5–2.5 mm long, acute, rarely obtuse, entire, rarely with few glandular teeth, villous-tomentose on the outside, hypanthia 3.5–4.5(5) times as long as sepals; petals oboval or oblong-oval,

572 tapering to a claw, 6 mm long; stamens 15–18; style densely hairy in lower part; ovary frequently hairy only at apex, rarely all parts shallowly pubescent; drupe 7–8(9) mm in diameter, orbicular or broadly ovate, glabrous; stone often ovoid with acute apex, rarely subglobular, obtuse, 5–7(7.5) mm long, (3.5)4–6 mm wide, with strongly torulose surface. Fl. April–May, fr. June–July.

Stony and pebbly-stony mountain slopes, amidst rocks and large rock streams, rarely on fine-earth slopes, in middle mountain zone amidst xerophytic, arboreal-shrub thickets. — Centr. Asia: Pam.-Al. (from Baba-Taga to Darvaz and Zeravshan Range, Turkestan), T. Sh. (only W.). Endemic. Described from Varsout village in Zeravshan Range. Type in Paris.

18. *C. jacquemontii* (Hook. f.) Buser in Boiss., Fl. Or., Suppl. (1888) 198; Pojark. in Journ. d. Bot. XXIV (1939) 241. — *Amygdalus humilis* Edgw. in Trans. Linn. Soc. XX (1846) 44. — *Prunus jacquemontii* Hook f., Fl. Brit. Ind. II (1879) 314; C. K. Schn., III. Handb. d. Laubh. I (1906) 601. — Ic.: C. K. Schn., l. c. f. 337 i-k, 338 b; Pojark., l. c. f. 5.

573 Erect shrub, 2(3) m high; shoots thin, long, short-pubescent when young, annotinous shoots pale, yellowish gray, with residual pubescence or glabrous, older shoots brownish; stipules longer than petioles, to 7–9 mm long, subulate, proximally pinnatisect; petioles 1.5–5 mm, short-pubescent or glabrous; leaves glabrous on both sides or shallowly appressed-hairy mainly on veins when young, compact, with prominent veins, larger than in all other closely related species; leaves on short shoots from 6 mm (lowermost) to 15–25 mm long, 6–9(10) mm wide, often elongate-obovate-cuneate or elongate-elliptic, rounded or acute apex, margin from base or slightly above with acute teeth directed upward or declinate outward close to apex, terminating in a short callous mucro, leaves on sterile shoots to 26(30) mm long 18(22) mm wide, broadly elliptic, mucronate, with larger teeth from base. Flowers solitary or paired, opening together with or slightly later than leaves; pedicels glabrous, 2–2.5(3) mm long; hypanthia cylindrical, not inflated proximally, 6–8 mm long, slightly broadened distally, glabrous on the outside, usually hairy (generally, not colored?) slightly above base on the inside; calyx lobes oblong-oval-triangular, 2–2.5 mm long, 1–1.5 mm wide, acute, entire or with few glandular teeth, near tip, glabrous on the outside, densely appressed-hairy on the inside, one-third to one-fourth the length of the hypanthia; petals oblong-obovate, ca. 3 mm long, 3 mm wide; stamens 15–20; ovary hairy at tip, sometimes down to the middle and along sutures even to base; style densely villous-pubescent in lower part; drupe fleshy, glabrous, ovoid, acuminate, rarely subglobose and even slightly flattened-globose, (8)10–12 mm long; stone 8–10 mm long, 7–9 mm wide, with radially divergent furrows, partially overlapping laterally, with network of shallow furrows along sutures and on apex. Fl. May, fr. end of June.

Stony, rarely fine-earth mountain slopes, shrubby thickets. — Centr. Asia: Pam.-Al. (Karategin, Kulyab, Shuroabad regions, in Darvaz and the southern slope of Peter I Range). Gen. distr.: Iran. (Afghanistan) and Ind.-Him. (NW Himalaya). Described from NW Himalayas. Type in London.

19. *C. alaiica* Pojark. in Journ. de Bot. XXIV, 3 (1939) 241.— Ic.: Pojark. l. c. f. 6.

Low, rough, branching shrub, with spreading, often prostrate, nodose, gray or brownish gray branches, young shoots short, thin, short-pubescent, anntinous shoots pale gray, glabrous or pubescent; stipules subulate, longer than petioles, 3–4 mm long, pinnatisect proximally; leaves glabrous on both sides or appressed-hairy beneath when young, in rare cases pubescence persisting, mature leaves compact, with prominent veins, on the short shoots usually broadly obovate, orbicular, frequently with rather broad cuneate base, rarely ovate, with acute apex, 5–10(14) mm long, 3.5–5(5.5) mm wide, on the long sterile shoots, lower leaves usually oblong-obovate, the rest elliptic, 15 mm long, 10 mm wide, acutely toothed. Flowers 1 or 2 or (when groups of flower buds clustered together 3–6; pedicels 1–2.5 mm, pubescent or glabrous; hypanthia-tubular-cylindrical, conspicuously inflated proximally, on the outside glabrous, on the inside, hairy above base, 6–7(8) mm long; sepals triangular, 2–2.5 mm long, 1–1.5 mm broad, acute, entire or with few teeth; petals elongate-oboval, clawed; lower part of style and tip of ovary hairy; drupe globose, rarely ovoid, glabrous, ca. 9 mm long; stone ovoid or ovoid-globose, with acute or obtuse, 6–8 mm long, 6–6.5 mm wide, more or less torulose around sutures and at apex, sides smooth or with sparse network of light furrows. Fl. May, fr. June.

Stony mountain slopes, shrubby thickets.— Centr. Asia: Pam.-Al. (north near Alai Range in the area of Margelan and Osh). Endemic. Described from the northern slope of Alai Range, from Peshkaut ravine. Type in Leningrad.

20. *C. tianschanica* Pojark. in Journ. de Bot. XXIV, 3 (1939) 242.— *Prunus prostrata* var. *concolor* Lipsky in A. H. P. XXIII (1904) 105 (p. p.); Kryl., Fl. Zap. Sib. VII, 1565; auct. fl. turk.— Ic.: Pojark., l. c. f. 7.

Erect shrub, 1.5(2) cm high, with thin, long, shoots pubescent in first year; anntinous shoots pale, yellowish gray; branches brownish gray; stipules linear-subulate, more or less pinnatisect proximally, longer than petioles, the latter short-pubescent, 1.5–2 mm long; leaves glabrous on both sides, narrowly lanceolate or obovate-lanceolate, with narrowly cuneate base decurrent on petiole, acute or acuminate (rarely obtuse), acutely finely toothed, leaves on short shoots 4.5–25 mm long, 2.5–7 mm wide, on the long to 30 mm long, 9 mm wide, upper leaves usually elliptic. Flowers on reduced shoots usually 4–6 (because flower buds usually densely paired), rarely 1–3; pedicels 1–2.5 mm, frequently glabrous; hypanthia tubular-cylindrical inflated proximally, on the outside glabrous, hairy above base on the inside, 5–8 mm long; sepals triangular, acute, entire, $\frac{2}{7}-\frac{2}{9}$ the length of the hypanthium, outer sepals densely hairy; petals elongate-oboval; stamens 15–18(25); lower part of style and apex of ovary villous-hairy; drupe globose or ovoid, glabrous, 7–9 mm long; stone 5.5–8 mm long, 5–6 mm wide, ovoid, acute, smooth on both sides, with network of shallow furrows at apex and near sutures. May–June, fr. June–July.

Stony mountain slopes and canyons, shrubby formations.— Centr. Asia: Dzu.-Tarb., T. Sh., Pam.-Al. (only in the area of Gulchi at the northern slope of Alai Range). Gen. distr.: Dzu.-Kash. (northern part). Described from the vicinity of Alma-Ata. Type in Leningrad.

21. *C. turcomanica* Pojark. in Bull. d. Bot. XXIV, 3 (1939) 224.—
C. calycosa Freyn in Bull. Herb. Boiss. 2 sér., VI (1906) 206, non
Prunus calycosa Aitch. et Hemsl.— Ic.: Pojark., l. c. f. 8.

575 Low shrub, with numerous flexuous or prostrate branches and thin, very short shoots, short-pubescent when young; branches dark gray; stipules linear-subulate, deeply pinnatisect in lower part, more or less glandular-dentate, longer than petioles; petioles 1.5–3 mm, pubescent; leaves glabrous on both sides, compact, with distinct prominent veins, irregularly acutely toothed, leaves on short shoots obovate, usually obtuse, 6–15 mm long, 3–8 mm wide, on long shoots, generally elliptic, 20 mm long, 12 mm wide. Flowers often 1 or 2, rarely 3–5 when 2 or 3 flower buds clustered together; pedicels 0.5–2 mm long, glabrous; hypanthia tubular-cylindrical, slightly inflated proximally, somewhat broadened above, on the outside glabrous or shallowly pubescent mainly along veins, 5–6 mm long; sepals 2.5–2.75 mm long, 1–1.5 mm wide, $\frac{2}{5}$ the length of the hypanthia, triangular-lanceolate, acuminate or truncate, with few glandular teeth; petals oblong-oboval, short-clawed; 5–6 mm long; lower part of style and ovary densely villous-hairy; drupe subglobose, glabrous, 8–9 mm and as broad; stone ovoid-globose, acute 6.5 mm long and as broad, its sides with a rather dense network of shallow furrows. June.

Open stony mountain slopes.— Centr. Asia: Mtn. Turkm. (Kopet-Dagh and Greater Balkhan Range). Gen. distr.: N. Iran. (Astrabad Province). Described from Greater Balkhan Range. Type in Leningrad.

Genus 765. **PADUS** * Mill.**

Mill., Gard. Dict., Ed. VIII (1768).

Trees and shrubs, with alternate deciduous leaves and small white flowers in narrow racemes terminating in leafy annual shoots; stipules and bracts caducous, calyx with campanulate hypanthium and 5 short sepals; petals prostrate; stamens 15–20; style terminal, simple; stigma flat; stone small, globose, smooth or pitted-rugose; exocarp fleshy, juicy, dark purple or black. Number of chromosomes 16 and 32.

- 1. Bark yellowish, leaves with numerous flattened glands beneath 3. *P. maackii* Rupr.
- + Bark dark brown or gray, leaves eglandulose 2.
- 2. Stone smooth or slightly furrowed, hypanthia glabrous on the outside, petals with scarcely visible teeth 3.
- + Stone pitted-furrowed, hypanthia pubescent on the outside, petals with very small teeth; racemes not compact, often drooping 4.
- 3. Flower stalks 15 cm, leafless **P. ssiiori* (Fr. Schmidt) C. K. Schn.
- + Flower stalks 5–13 cm, leafy **P. virginiana* (L.) Mill.
- 4. Young year-old branches densely pubescent 1. *P. racemosa* (Lam.) Gilib.
- + Young year-old branches pubescent 2. *P. asiatica* Kom.

* Name of a shrub, due to Theophrastus.

** Treatment by V.L. Komarov.

**P. virginiana* (L.) Mill., Gard. Dict., Ed. 8 (1768) No. 3.— *Prunus virginiana* L., Sp. pl. (1753) 473.— *P. serotina* Ehrh., Beitr. (1788) 30, 20.— *P. rubra* Mill., Dict., ed. 8 (1768) No. 2.

Small or even large tree, to 15 m high, to 1.3 m in diameter; bark with an unpleasant odor, irregularly black, squamulose; young branches 576 glabrous, rarely more or less pubescent, anntinous branches cherry-brown with abundant lenticels; leaves oval or oval-lanceolate, mucronate or acute, cuneate or orbicular at base, smooth or pubescent along veins beneath, finely serrate, with appressed cartilaginous teeth; petioles 2 cm long, with 2–4 lateral glands. Flowering racemes elongate, erect or drooping, terminating in short axillary branches with few leaves; flowers white, 8–13 mm in diameter; petals oboval or orbicular, entire; drupe globose, red, becoming black, fully edible when ripe; stone smooth, with broad ridge. May–June, fr. August–September.

Cultivated in gardens. Cited for Leningrad, Moscow, and others. Native to N. America from Nova Scotia to Texas, in forests.

Note. The ripe fruit is edible; the reddish brown hard wood is used in cabinet work; in America the bark is regarded officinal; it contains hydrocyanic acid.

**P. ssiori* (Fr. Schm.) C. K. Schn., Laubholz. I (1904) 641.— *Prunus ssiori* Fr. Schm., Sakhalinskaya flora (1874) 135.

Tree 7 m high, with dark gray bark and well-developed white lenticels; young branches smooth; leaves of terminal branches obovate-oblong, on the largest lateral branches elliptic, to 14 cm long, long-mucronate, with truncate or cordate base; petioles 3.5 cm, with two well-defined glands, densely and irregularly serrate, with linear, terminally setaceous teeth, armed with a small gland, barbate at tips of veins beneath; stipules small, linear, smooth, glandular-serrate. Racemes long, 15 cm, sometimes flexuous, terminating in axillary branches; bracts pectinate-serrate, falling off at flowering; pedicels as long as petioles, or two to three times as long in lower part of raceme; hypanthia inflated, smooth; sepals broadly triangular, glandular at margins; petals orbicular, nearly as long as calyx lobes, with well-defined network of veins; drupe globose, black, fleshy. May–June, fr. August–September.

Cultivated. Native in forests of the southern half of Sakhalin Island and N. Japan. Type in Leningrad.

Note. Fruit twice as large as in the common bird cherry; the wood is used for miscellaneous purposes.

1. *P. racemosa* (Lam.) Gilib., Fl. Lithuan. V (1785) 231; C. K. Schn., Laubholz. I (1904) 699; Kryl., Fl. Zap. Sib. 1574.— *Prunus racemosa* Lam., Fl. Fr. III (1778) 107.— *P. padus* L., Sp. pl. (1753) 473; Ldb., Fl. Ross. II, 8 p.p.; Shmal'g., Fl. I, 314.— *Padus vulgaris* Borkh., Forstbot. (1803) 1426.— *Carasus padus* DC., Fl. Fr. IV (1806) 580.

577 Small tree, tree or shrub, 0.6–10 m high, crown dense, elongate; bark dull, black-gray, with distinct lenticels; young branches olive-colored, often cherry red; inner bark yellow with typical odor; leaves thin, ovate-lanceolate or oblong-elliptic, acute, 3–10 (rarely 15) cm long, thinly and acutely serrate (on flowering branches sometimes entire), teeth terminating

in readily deciduous red-brown glands; petioles 1–1.5 cm, with 1–13 glands; stipules subulate, caducous. Flowering racemes 8–12 cm long, dense, drooping; flowers aromatic; hypanthia semi-globose, glabrous on the outside, villous on the inside; calyx lobes triquetrous, with glandular margins; petals obovate, with very short claws, white (rarely pink – var. *roseiflora* Sinz.); stamens ca. 20; anthers yellow; style green, glabrous; drupe globose, 7–8 mm long, black (very rarely white – var. *leucocarpa* C. Koch), shining, strongly astringent, sweet; stone globose-ovoid, notched. Fl. May–June, fr. August–September.

In riparian forests (bottomland) and shrubby thickets, along riverbanks, forest edges, sands near underground waters, forest clearings. In the north to the northern boundary of the forest tundra; its southern limit reaches from Kamenets to Saratov and Chkalov, rounding the southern Urals; growing in the birch outliers of the Baraba Steppe, NW Altai, along the Irtysh to Zaisan; the eastern limit approaches the Yenisei. The forests of the Caucasus are outliers in relation to the major distribution area. – European part: Kar.-Lap., Dv.-Pech., Lad.-Ilm., U. V., V.-Kama, U. and M. Dnp., V.-Don, Transv., L.-Don (northern part); Caucasus: (western part); W. Siberia: Ob, U. Tob., Irt., Alt.; Centr. Asia: Ar.-Casp., Dzu.-Tarb. **Gen. distr.:** Eur., up to 70°35' N., Scotland, Portugal (isolated), Madeira Island. Northern part of the Balkan Peninsula, Turkish Armenia, Afghanistan, Himalayas. In the mountains and in the north in transition to low-growing – var. *petraea* Tausch. or *P. borealis* Schüb., reported for Kar.-Lap. (Barzuch plant).

Note. In the fall, the leaves become partly bright red and partly yellow. Specimens with sparse hairs on leaves are available from nearly all regions. The winter buds are narrow, their scales ciliate-margined. A characteristic biochemical feature of the bird cherry is the presence of amygdonitrileglucoside and bitter almond oil; the lightly scarred bark of young branches gives off a typical odor; the aroma of the flowers is due to emanation of ammonia, trimethylamine and amygdalin; the fruit contains sugar, malic and citric acids and tannoids.

Economic importance. The fruit dried and ground together with the stones yields a powder used in the Urals and Siberia as a filling for tarts and in the preparation of a fruit liqueur. The fine-grained, brown yellowish, firm, resilient wood is used for miscellaneous purposes; the bark yields green and brown-green dyes, the fruit – a dark red dye used for coloring alcoholic beverages. As a nectar plant, it produces abundant supplies of nectar and pollen. Often cultivated in gardens and parks, where the following varieties can be found: *f. aucubaefolia* Kirchner and *aurea* Zabel with variegated leaves, *f. pendula* Dippel with pendant branches, *f. pyramidalis* hort. with appressed branches above producing a pyramidal silhouette. When young, moist semi-shaded sites are indicated.

2. *P. asiatica* Kom., sp. nova. – *Prunus padus* var. *pubescens* Rgl. et Tilling, Fl. Ajan. 79 (1858) No. 85; Rgl., Fl. Ussur. 54, No. 149. – *P. padus* Ldb., Fl. Ross. II, 8 (pro parte); Maxim., Prim. Fl. amur. 89 et in Mél. Biol. XI, 705; Rupr. in Mél. Biol. II, 536; Fr. Schmidt, Reisen Sachal. 107; Kom., Fl. Mansh. II, 550; Koidzumi in Journ. Coll. Sc. Univers. Tokyo XXXIV (1913) 287.

Tree with elongate crown, often with a few parallel ascending branches, densely leafy with abundant flowers, branches dark brown, year-old branches more or less velutinous, grayish, cherry red beneath or olive brown, with few visible lenticels; leaves elliptic or short oboval, short mucronate, with obtuse base, acutely serrate; stipules membranous, linear-lanceolate, deciduous, young leaves with glaucous bloom (var. *glauc a* Nakai) or pubescent (var. *pubescens* Regl.) or with rufous-colored barbulae at angles of veins beneath (var. *rufo-ferruginea* Nakai), becoming glabrous, to completely smooth. Racemes longer than in the European bird cherry, flower stalks 10–15 cm long; pedicels two to three times as long as the hypanthium, drooping; corolla slightly larger than in *P. racemosa*; bracts caducous; hypanthia smooth, obconical, with oval, variegated, glandular-dentate lobes; petals orbicular, much longer than stamens; style smooth, shorter than stamens; stigma capitate; drupe black, with persistent relic of calyx; stone with flexuous ribs and furrows. Fl. May–June, fr. September.

Riverbanks and riverine island beds, rarely along forest edges; isolated or in small groups. — E. Siberia: Yenisei?, Lena-Kol., Ang.-Say., Dau.; Far East: Kamch., Okh., Ze.-Bu., Uda, Uss., Sakh. **Gen. distr.:** Mong., Jap.-Ch. Type in Leningrad.

Note. The distinguishing characters of this species — pubescence and more luxuriously developed inflorescence and others — are insufficient to separate the E. Asian bird cherry as a separate species, nor is available herbarium material adequate to determine the boundary of *P. racemosa* and *P. asiatica*. I believe it to lie along the Yenisei, but an even more easterly distribution cannot be excluded. C. K. Schneider accepted the specimen Karo, No. 370 from the River Zey as belonging to one of the varieties of *P. racemosa* rather than as a separate species. A constant character of the Asiatic bird cherry is the pubescence of the young branches; the pubescence of leaves and inflorescence is not constant, but in typical specimens it is very sharply defined. The divergence of the bird cherry into two species is rather recent and not completely finished.

Economic importance. An excellent nectar plant. The bark, flowers and fruit have medicinal properties; the wood serves practical purposes.

3. *P. maackii* (Rupr.) Kom. in Kom. and Alisova, Key for the Plants of the Far East. Reg. II (1932) 657. — *Prunus maackii* Rupr. in Bull. Acad. Petrop. XV (1857) 361; Kom., Fl. Mansh. II, 549. — *Laurocerasus maackii* C. K. Schn., Laubholzk. I (1904) 645.

Tree with spreading crown, trunk 40 cm in diameter, 6–16 m high, with dark gray bark, covered with thin, pellucid paper-bark, resembling the bark of birch; leaves elliptic or oblong, with orbicular base, 10 cm long, 5 cm wide; petioles ca. 7 cm; young branches pubescent; stipules linear, to 7 mm long, dark purple, oblong glands bearing over entire length; leaves covered with flat yellowish glands beneath, elliptic or oblong, orbicular at base, with 2 glands, mucronate, serrate, teeth terminating in bristles. Racemes with one large or several small leaves at base, rarely leafless, many-flowered (10–30), flowers developing after leaves with slightly drooping pedicels much longer than flowers; hypanthia ovoid, distally contracted, lobes acute, oval, with glandular teeth; stamens longer than white oblong petals but shorter

than thin hairy style; fruit black, dry, small, ca. 5 mm long, 4 mm broad, ovoid-globose; stone rugose. Fl. May, fr. August–September. (Plate XXXVII, Figure 2).

Taiga, mixed forests, rare in conifer forests and even more rare in purely broad-leaved forests, often on mountain slopes, in illuminated sites, along streams, forest edges and a clearings, and coarse rock taluses. — Far East: Ze.-Bur. (eastern part), Uss. Gen. distr.: Jap.-Ch. (Korea, E. Manchuria). Described from lower course of the Ussuri. Type in Leningrad.

Genus. 766. **LAUROCERASUS** * Roem.**

Roem. Syn. monogr. III (1847) 89.

Distinguished from the genus *Padus* by evergreen, coriaceous leaves; pedicels in axils of preceding year's leaves originate in old wood and are destitute of leaves in lower part; leaves entire or with sparse teeth. Otherwise like bird cherry.

580 1. *L. officinalis* Roem., Fam. nat. Syn. (1847) 91; C.K.Schn., Laubholz. I, 646; Grossg., Fl. Kavk. IV, 342. — *Prunus laurocerasus* L., Sp. pl. (1753) 474; Ldb., Fl. Ross. II, 9; Medvedev, Der. i kust. Kavkaza, 88. — *Padus laurocerasus* Mill., Gard. Dict. (1759) No. 4. — *Cerasus laurocerasus* Lois. in Nouv. Duh. (1812) 6.

Tree or shrub, 1–3, rarely to 6 m high, often strongly branching, branches glabrous; leaves shiny above, paler beneath, dull, glabrous or glabrescent, oblong-elliptic, acuminate, short-petiolate, shiny, coriaceous, with 2–4 glands at base of midrib beneath. Flowering racemes shorter than leaves, dense, rarely more than 10 cm long, considerably shorter in upper mountain zone (var. *brachystachys* Medw.); flowers small, white; petals ca. 3 mm long, obovate; stamens ca. 20; style not divided, with capitate stigma; drupes black, globose-ovoid; stone smooth, ovoid, with lateral keel. Fl. April–May, fr. August. (Plate XXXVII, Figure 3).

Extensive thickets in forests of W. Transc. to 2,400 m, partly as sometimes impenetrable undergrowth. — Caucasus: Cisc. (Kuban), E. Transc. (Tbilisi), S. Transc.? Tal.? Gen. distr.: Bal.-As. Min., Iran. Type in Linnaeus Herbarium, London.

Economic importance. Bark and buds contain prussic acid. The leaves contain a derivative of this. They are extracted with water to produce cherry-laurel water containing 1 part of hydrocyanide per 1,000 parts by weight. Cherry laurel oil also contains benzaldehyde and prussic acid. The pinkish gray wood is used in carpentry and lathework. Except for the edible fruit, the entire plant is poisonous. In garden forms the fruit is large and sweet. Suitable for landscaping in temperate climates also with variegated leaves. In Germany it winters without covering north to Silesia; in the Soviet Union experience with cultivation is as yet insufficient.

* Literally cherry laurel; a name used in antiquity.

** Treatment by V.L. Komarov.

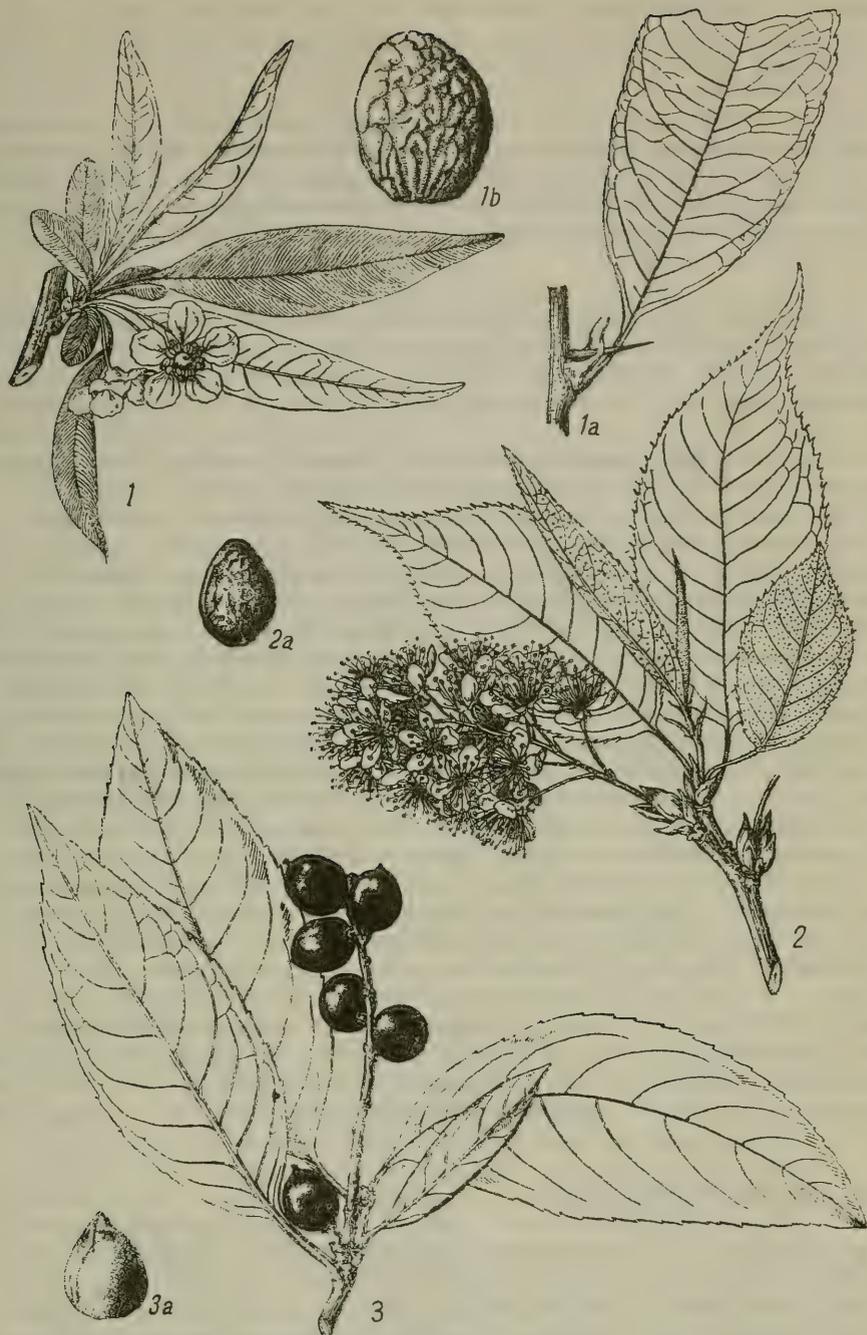


PLATE XXXVII. 1 — *Prinsepia sinensis* (Oliv.) Kom., flowering shoot, a) part of sterile shoot with leaves and spine, b) stone; 2 — *Padus maackii* Rupr., flowering shoot, a) stone; 3 — *Laurocerasus officinalis* Roem, fruiting shoot, a) stone.

Genus 767. **PRINSEPIA** * Royle**

Royle, Illustr. Bot. Himal. Mount. (1839) 206, tab. 38.—*Plagiospermum* Oliv. in Hooker, Icones pl. (1886) tab. 1526.

583 Flowers bisexual; hypanthia deeply concave, cup-shaped; petals 5, with short claws; stamens many, in several rows, with rather short filaments; carpel 1, sessile; lateral style with capitate stigma; drupe oblique, sessile on flat firm scale, orbicular, with abundant juicy pulp; stone flattened, oblong. Deciduous shrub, with axillary spines; inflorescence axillary, reduced, few-flowered.

1. *P. sinensis* (Oliv.) Kom. in Kom. et Al., Key. for the Pl. of the Far East Reg. II (1932) 658.—*Plagiospermum sinense* Oliv., l.c.; Kom., Fl. Mansh. II, 554.—*Prinsepia chinensis* Kom., l.c. (1932).—*l.c.*: A. Purpus in Mitt. der Deutsch. dendrol. Ges. (1903) No. 12 cum tab. colorata.

Shrub, 2–3 m high, branching, with thin arcuately drooping or erect pale or dark gray branches; spines straight or hamate; stipules paired, subulate; leaves alternate, rarely clustered, short-petioled, oblong-oval or oblong-lanceolate, mucronate, entire, with flat or recurved margins, sometimes hairy or even slightly crenate. Flowers 1–4 in axillary bundles yellow, with pleasant aroma; hypanthia with oval-deltoid teeth; petals 5, orbicular or oval-orbicular; stamens 18; anthers as long as stamens, rounded; ovary sessile, unilocular, 1-ovuled, with style originating laterally at ovary base; drupe bright red, globose, 1.5–2 cm long, as long as fruit stalks, with remnant of pentagonal hypogynous disk; mesocarp fleshy, juicy, red, with pleasant sourish taste; stone very hard, 12 mm long, 10 mm wide, flattened laterally, strongly furrowed with oblong protuberances; seeds flattened, white, smooth, with robust cotyledons containing much fatty oil. Fl. April–May, fr. August–September. (Plate XXXVII, Figure 1).

In shade of mixed forests or in riparian shrubby thickets, sometimes in willow woods, on pebbles or on generally alluvial soil, in single or in small thickets.—Far. East.: Uss. (Maikhe and Suputinka rivers). **Gen. distr.:** Jap.-Ch. (Manchuria). Described from valleys of the right tributaries of Yalu River, Mukden Province. Type in London.

Note. *Prinsepia* is also known from the Himalayas, from the mountains of S. and C. China and the Island of Formosa (2,000–3,000 m), *P. utilis* Royle, with white flowers is certainly a Tertiary relic.

Economic importance. An easily cultivated ornamental, with edible fruit resembling cherries, of possible promise in cultivation.

584

Genus 768 **ARMENIACA** † Mill.††

Miller, Gard. Dict. ed. VIII (1768).—*Prunus* L., Gen. pl. (1737) p.p.—*Prunus* subgen. *armeniaca* Nakai, Fl. silv. Kor. V (1915) 38.—*Prunus* subgen. *euprunus* sect. *armeniaca* W.D.J. Koch, Syn. Fl. Germ. et Helv. (1837) 205.—*Prunus* subgen. *prunophora* Necker, El. Bot. II (1790) 718.

Tree, rarely shrub, with unarmed, rarely armed branches; 2 or 3 leaf and flower buds grouped together in axils of leaves, with 1, very rarely

* Named for James Prinsep, English naturalist from Bengal.

** Treatment by V.L. Komarov.

† From *Malum* or *Prunum armeniacum*, the name used for the apricot by Pliny, Columella and Dioscorides.

†† Treatment by K.F. Kostina.

2 flowers per flower bud; leaves, folded at first, develop after the flowers, elliptic to orbicular, with more or less abruptly prolonged teeth at apex, with cordate, orbicular base, slightly separated from petioles or base cuneate, often petioles with glands at base of lamina; margin simple or double, from crenate to serrate. Flowers abundant, opening before leaves, subsessile or on 6 cm long pedicels; fruit a more or less fleshy and juicy drupe, not splitting before ripening, rarely dry, globose or elongate, laterally compressed, with distinct longitudinal furrow, pubescent, rarely glabrous; stone free or clinging, laterally flattened, smooth, scabrous or reticular, rarely pitted; seeds large, almondlike, with bitter taste, rarely seedless; cultivated forms often without bitter taste.

Note. *Armeniaca* comprises 8 species: *A. vulgaris* Lam., *A. manshurica* (Koehne) Skwartz., *A. sibirica* Lam. (close to the latter), *A. davidiana* Garr., *A. ansu* (Kom.) Kost., *A. mume* Sieb., *A. dasycarpa* Pers., *A. holosericea* (Batal.) Kost. Owing to the lack of material, it is difficult to decide whether Person (1797), Schneider (1906), Rehder (1927), and others, who have referred *Prunus brigantia* Vill. to this genus, should be followed, or whether Koehne (1903) was right in including in it even *Prunus anomala* Koehne.

This distribution area of the genus stretches in an east to west direction from S. Ussuri Territory and N. Korea to Manchuria and N. China. Following the mountain systems, it runs north and south through the central deserts of Asia from where it reaches with several gaps to Tibet, and then again continuously to the mountains of Tien Shan, spreading out over nearly all its ranges. The northern branch of the area, to the Far East, extends westward over the spurs of the Khingan Mountains, NW Mongolia, Nerchinsk and Chita Dauria to Selega Dauria. It is separated from the Tien Shan distribution area by the vast area of the Altai and Tarbagatai mountains. The northern boundaries of the area reach the Nerchinsk and Chita regions, south of the provinces of Szechwan and Hupeh in China.

585 Wild-growing apricot also occurs in some localities in the mountainous part of Dagestan, but it remains an open question whether or not it is spontaneous. The variety of species is largest in E. Asia (N. China, Manchuria, Korea); there is only 1 species in Centr. Asia. Four species of wild-growing apricot are found in the USSR: *A. vulgaris* Lam., *A. manshurica* Skwartz., *A. sibirica* Lam., and its ally *A. davidiana* Garr.

The great majority of cultivated apricots, grown for their fruit, belong to the common *A. vulgaris*. The remaining species are much less important, and their role in the formation of cultivated strains is limited to areas adjacent to their native distribution areas. Thus, *A. manshurica* is cultivated in S. Ussuri territory and N. Manchuria where are also found some varieties which probably are hybrids with the common apricot (*A. vulgaris*). Many cold-resistant varieties from I. V. Michurin's selections also issue from this species.

Even though they are morphologically close to the common *A. vulgaris*, in most apricots cultivated for their fruit in Japan, Korea, and E. China belong to *A. ansu*, and are indeed better adapted to maritime climates. In those regions the so-called Japanese apricot is widely cultivated, though more for its ornamental value than for its fruit. Because of its immunity to fungal

and bacterial root diseases, *A. mume* Sieb. has been attracting the attention of European and American fruit growers as seedling stock for apricots and other stone fruits.

A small group of varieties with black, purple, or violet fruits are cultivated in some countries of Near and C. Asia (Soviet Centr. Asia, Afghanistan, Beludzhistan, Kashmir, Kashgaria, Transcaucasia and Iran) as well as in European collections. They are referred to *A. dasycarpa*, which is obviously of hybrid origin (*A. vulgaris* × *P. cerasifera*).

The Siberian apricot *A. sibirica* and its allied *A. davidiana* are distinguished by the dry, inedible pericarp; they are ornamentals of little value as food (their seeds are used). However, they deserve attention in the breeding of cold-resistant cultivated apricots.

586 The last species of E. Tibet apricot, *A. holosericea* (Batal.), as well as the previously mentioned Briançon apricot *Prunus brigantia* Vill. and the anomalous *P. anomala* Koehne, are not used in the breeding of new cultivated varieties.

- 1. Fruit of different shades, yellow, with or without bloom, rarely red, sessile or on short, rarely rather long pedicel, with or without free stone 2.
- + Fruit dark purple, pedicels rather long and slender 4. *A. dasycarpa* Pers.
- 2. Leaves coarsely and acutely doubly serrate-dentate; pedicels rather long (5–10 mm), longer than calyx tube 3. *A. manshurica* (Maxim.) Skvotrz.
- + Dentation of leaves simple, smaller, teeth orbicular; pedicels short, shorter than calyx tube 3.
- 3. Shrub or small tree, to 2.5–3 m; leaves with long apical tooth; pericarp inedible, dry, splitting on ripening; stone with rib along abdominal suture 2. *S. sibirica* Lam.*
- + Larger tree; leaves with shorter apical tooth; pericarp edible, juicy, not splitting; median ventral rib of stone less acute 1. *A. vulgaris* Lam.

1. *A. vulgaris* Lam., *Encycl. Meth.* (1789) I, 2, III. III (1797) 431; DC., *Prodr.* II (1825) 532. — *Prunus armeniaca* L., *Sp. pl. ed. I* (1753) 474; Koehne, *Deutsche Dendr.* (1893) 318; C. K. Schn., *Handb. Laubholz.* (1908) 630. — *Prunus armeniaca* var. *typica* Maxim. in *Bull. Acad. Sc. St. Pétersb.* XXIX, 86; *Mél. Biol.* XI (1883) 654. — *Prunus tiliaefolia* Salisb., *Prodr.* (1796) 350.

Tree, (3)5–8(17) m high, with spherical-flat or slightly elongate, spreading crown; trunk 20–30 cm, in some cases to 60 cm in diameter, with branches at 0.5–2 m, trunk of older trees dark, grayish brown, transversely lenticels; annual shoots shiny, reddish brown, grayish-olive, beneath with numerous small pale lenticels in lower part; all branches glabrous; winter buds globose-conical, sessile in groups; bud scales glabrous, brown, concealing the pedicels and the base of the calyx tube, usually deciduous at flowering; calyx tube cylindrical, thinly pubescent proximally, greenish dark red, with dark red, oval teeth recurved at flowering until adhering to tube; leaves large (4.5)6–9(12) cm long, (3–5)5–8(11) cm wide, glabrous or with beards at

* Also including *A. davidiana* Carr.

angles of veins beneath, rarely very slightly pubescent (more so when young), cordate, orbicular or ovate, with more or less short, rarely rather long, distinct apical tooth, base orbicular or short, prolonged; margin finely, obtusely and irregularly serrate to nearly crenate; petioles canaliculate, more or less pendant, thin, dark red, (18)25–30(55) mm long, with (1)2–3(6) glands at base of lamina. Flowers white or pinkish, rarely pink, large, (18)25–30(40) mm in diameter, sessile or on very short thinly pubescent pedicels, opening before leaves; petals orbicular, oval or obovate, white or pink, with pink veins, more or less cochleariform-convex, with more or less abruptly prolonged short claw and rounded apex; stamens (25)27–32(45), filaments white; anthers yellow, splitting transversely; fruit globose, ovoid, rarely obovoid, amygdaloid and flat-globose, often asymmetrical, more or less compressed laterally, from nearly white to reddish orange, often of different shades of yellow or orange, with or without bloom, pubescent, rarely glabrous; pericarp juicy, in wild forms often coarsely fibrose, with distinct bitter taste, with free or clinging stone; fruit (2)2.5–4(5.5) cm long, (1.5)2–3.5(5) cm wide, the weight of fruit of wild-growing forms varying from 3–18 g, of cultivated forms 5.5–80 g; stones globose to ovoid, obovoid, often asymmetrical, rather more straight at dorsal and more rounded at ventral suture, the more or less prominent median rib of the ventral suture keel-like, with a pair of distinct lateral ribs, sometimes more or less smooth and even passing over to weak furrows. March, April–May, July. (Plate XXXVIII, Figure 1).

Mostly on southern, well-illuminated mountain, slopes with light, well-drained, usually gravelly soil, often along edges of stony taluses and slopes of rocky gorges, solitary or in groups, rarely forming sparse groves. — Centr. Asia: from W. to E. T. Sh., at 500–1,200 m. **Gen. distr.:** N. Ch.: cultivated in temperate zone between 50°N and 35°S. Type in Linnaeus Herbarium.

Note 1. The once prevalent view assuming the presence of the wild apricot in Transcaucasia and Armenia as the place of origin of the cultivated apricot is no longer acceptable, since none of the reports of wild apricot in Armenia and along the Terek have been confirmed. Even the spontaneous occurrence on the slopes of the mountainous parts of Dagestan (upper part of Avar-Koisu, Kazi-Kumukh, Koisu and Kara Koisu) ca. 1,500 is in doubt, for the sporadic trees which do occur are confined to localities close to the main and very old areas of apricot cultivation and should surely be considered naturalized.

The distribution area of *A. vulgaris* stretches from west to east, with gaps from the southern slopes of Chatkal Range to Uzun-Akhmat, Susamyr and the NW slopes of Fergana Range, right up to Trans-Ili Ala-Tau and the southern slopes of Dzungarian-Ala-Tau. To the east, they extend to the sources of the Ili River, the lower sources of the Tekesa, Kok-Su and Great Yulduz. Further east, there is but inadequate information on wild apricot in the Himalayas. According to available material, it is only in E. Tibet that the apricot appears, e. g., in many places on slopes of the Tsinling Mountains, from where its distribution area extends to the Peking Mountains. Thus, the distribution area of *A. vulgaris* is discontinuous with two parts: the western — Tien Shan, and the eastern — China.

Note 2. Several varieties of common apricot are usually recognized: 1) var. *pendula* Jaeg. — with drooping branches, 2) var. *variegata* C.K. Schn. — with variegated leaves, 3) var. *ovalifolia* Ser. — with oval leaves, 4) var. *cordifolia* Ser. — with broad cordate leaves, 5) var. *communis* Schubler et Mertens — an escape apricot. These, as well as others, may all be regarded as forms since they are distinguished by a single, often immaterial character, without reference to their geographical distribution.

Apricots: *A. vulgaris* var. *stricta* Van Houtte (Rev. Hort. (1849) 161), *A. verrucosa* May. (Rev. Hort. (1875) 299), and *A. schirassica* Carr. (Rev. Hort. (1871) 508) should rather be regarded as varieties or groups of varieties within *A. vulgaris*. The extensive distribution area and prolonged natural and artificial selection are related to the antiquity of apricot cultivation, resulting in the considerable differentiation of varieties in both economic characters and geographical distribution.

Economic importance. The main value of the apricot derives from its fruit, which has a juicy, edible pericarp. The hard stone contains a sweet or bitter kernel, rich in oil and protein. The pericarp is characterized by a high sugar content (from 4.7% to 20%), depending upon the variety and the growth conditions. The predominant sugar is saccharose (2.85–10.37%), followed by glucose (0.13–3.88%), fructose (0.065–3%), and a very small quantity of maltose (0.05–2.4%). In addition, there is dextrin (0.23–1.72%), inulin, and in most varieties also starch. The sugar content of the group of dry fruit Central Asian and Caucasian varieties is exceptionally high, to 27% of fresh weight of fruit (to 87% of absolute dry weight). It should be noted that all the "saccharifying" varieties become hard upon drying (Kandak, Mirsandzhali, etc.); in them saccharose is predominant and usually accounts for over 49% of absolute dry weight of fruit. The entire group of nonsaccharifying varieties, which comprises all the European varieties, contains less than 40% saccharose; the wild apricot contains 45% saccharose per absolute dry weight. The quantity of acids in the fresh fruit varies from 0.32 to 2.60%, with malic and citric acids predominant and traces of salicylic and tartaric acids. Pectin, so important in the making of jams, marmelade, jellies, pastilles and fillings for candies, varies from 0.058 to 1.06%. The ash contains potash, calcium, magnesium, phosphoric anhydride, etc. The water content of the fresh fruit varies from 70 to 92.14%. Vitamin A is predominant, and in fact, in this respect apricots compare favorably with spinach, egg yokes, and butter; vitamin C is less abundant. The seeds 3.33–7.08% water, are nutritious with 30–40% oil, and ca. 25% protein. (45–58% of absolute dry weight). The bitter taste of the seeds of wild apricot and of most European varieties (as well as their seedlings) is due to amygdalin.

In addition to their good taste, raw apricots are excellent for canning and confectionery purposes.

Oil is extracted from the seeds of the apricot for use in food and as fuel. The shells of stones are used as fuel; the wood, which is of high-quality, is used by carpenters.

At the end of the second and the beginning of the third Five-Year Plan, there were more than 42,000 ha of apricots under cultivation in the USSR; over half of this was in the Central Asian republics, and the remainder was

divided among the S. Ukraine, Transcaucasian republics, Dagestan, and the N. Caucasus and Crimea. In Central Asia, most of the crop is dried for shipping to other parts of the USSR. In the European part of the USSR, the fruit is mostly eaten raw and preserved.

590 Although much inferior to the cultivated varieties, the fruit of the wild apricot serves its purpose: wild apricot from Semirechye, dried in the sun, yielded 45% sugar (absolute dry weight).

Its drought resistance and general hardiness, together with its rapid growth rate and high-quality wood, suitable for wood-working as well as for fuel, make the apricot of great interest for the afforestation of bare slopes in the mountainous regions of Central Asia and the Caucasus.

In tensile strength apricot is only slightly inferior to oak; the compressive strength of its wood is twice that of oak and $4\frac{1}{2}$ times that of pine. Its hygroscopicity is the lowest of all, indicating low dimensional instability under variable environmental conditions.

2. *A. sibirica* (L.) Lam., Encycl. Meth. I (1789) 3; DC., Prodr. (1825); 532.—*Prunus sibirica* L., Sp. pl. (1753) 474; Pall., Fl. Ross. I 15.—*P. armeniaca* var. *sibirica* K. Koch, Dendr. I (1869) 88; Maxim. in Bull. Acad. Sc. St. Pétersb. XXIX (1883) 86; Mém. biol. XI (1883) 673.

593 Shrub or small tree, 3 m high, with spreading branches; young branches gray-brown or reddish brown, glabrous, rarely very weakly and thinly pubescent; winter buds long, narrowly conical, in groups of 1 leaf and to 3 or 4 flower buds on spurs and growth shoots of the preceding year; leaves ovate, broadly oval, orbicular, rarely (3)5–8(10) cm long, (2.4)4–5(7) cm wide, with cordate, orbicular or slightly prolonged base and long, abruptly prolonged apical teeth; teeth (0.7)1–1.8(2.5) cm long; lamina small, more or less obtuse, rarely acute, often irregularly serrate-crenate, usually glabrous or pubescent beneath along veins, rarely more or less pubescent beneath, even more rarely above; petioles thin, canaliculate, 2–3 cm, with small glands or eglandulose. Flowers 1 per bud, very abundant, pink, rarely white, sessile or on very short pedicels (1–2 mm), opening before leaves; petals white with pink veins or pale pink; calyx tube cylindrical-conical, red, thinly velutinous-pubescent proximally, lobes elongate-oval, acuminate, recurved at flowering; fruit 1.2–2.5 cm long, 1.2–2.5 cm broad, globose, strongly compressed laterally, pubescent, yellow, orange, with or without bloom, on very short pedicels connected close to its dorsal side; pericarp 2.5–3 mm thick, dry, compact, bitter-sweet, inedible, drying up at maturity and splitting along ventral suture, releasing the stone as in almond; stone 10–21 mm long, 10–20 mm wide, from globose with sharply truncate base to more or less elongate, flattened laterally, pale, yellowish brown, smooth or slightly scabrous, readily separating from pericarp; central rib of ventral suture acute, winged, strongly protruding toward base, dorsal rib more obtuse, proximally produced into a more or less abrupt beak; seed more or less bitter. March, April, May–July, August. (Plate XXXVIII, Figure 4).

Brightly illuminated, predominantly southern stony mountain slopes, among shrubby thickets.—E. Siberia: Dau. (river basins: Shilka, Argun, Ingoda, Selenga, Onon); Far East: Uss. (Suifun River valley and SE of Lake Khanka). Gen. distr.: E. Asia. Described from Siberia. Type in London.

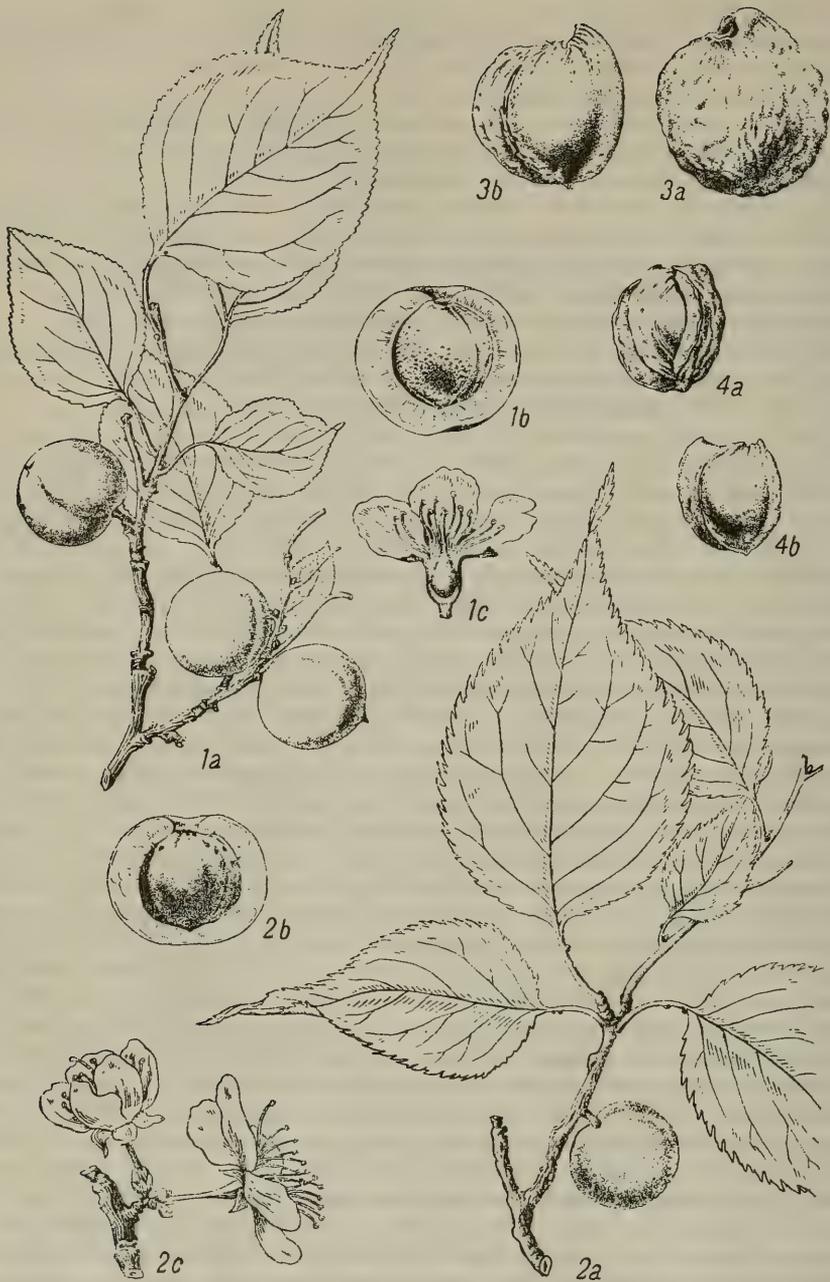


PLATE XXXVIII. 1 — *Armeniaca vulgaris* Lam., a) branchlet with fruit and leaves, b) leaf in section, c) flower in section; 2 — *A. manshurica* (Koehne) Skv., a) branchlet with leaves and fruit, b) fruit in section, c) flowers; 3 — *A. davidiana* Carr., a) fruit, b) stone; 4 — *A. sibirica* Lam., a) fruit, b) stone.

Note. The general distribution area extends, with large or small gaps, from the Transbaikal region (Selenga and Nerchinsk Dauria) through N., E., and SE Mongolia to Manchuria (Sungari River basin) and S. Ussuri territory, bypassing the Central Asian deserts (Gobi, Ordos) to reach its southern and western limit at the northern spurs of the Tsinling Mountains (Muni-Ula, Shara-Khada, Ala-Shan).

Throughout its wide range, *A. sibirica* shows a certain regularity in its pattern of variability. Thus, in Dauria there occurs a more or less distinct type of plant — a low shrub, with more or less small, almost always glabrous, very finely crenate leaves, with dry, subsessile fruit splitting at maturity, with a pale, rather flat stone, with an acute keel, borne on the central rib of the ventral suture.

Toward the east and southeast there is observed a deviation from the type, reflected in the increasing variety of forms, owing to the appearance of large-leaved forms that sometimes have fleshier fruit and more elongate pedicels and sometimes have the fruit more rounded and the stone more coarsely scabrous with a poorly developed, less acute rib.

In the S. Ussuri territory, where the distribution area of *A. sibirica* (L.) Lam. overlaps the area of *A. manshurica* (Skv.) Koehne, the Siberian apricot is distinguished by considerable variability, both botanically and economically. In general, the Far Eastern *A. sibirica* (L.) Lam. differs from the Dauria species by larger leaves with more strongly attenuate mucros, sometimes more or less pubescent and more coarsely crenate, by fleshier and more juicy fruit, slightly rounded laterally and by a darker colored stone with a less acute, less protruding rib.

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Seeds collected in the S. Ussuri territory (near Sinel'nikovo village along the Suifun River) and planted in the Central Asian Station of the All-Union Scientific Research Institute of Crop Husbandry near Tashkent, yielded a complete series of forms, transitional between *A. sibirica* (L.) Lam. and *A. manshurica* (Koehne) Skvortz in both leaves and stones. The variability of these plants was such, that even by the vegetative characters alone, it was possible to recognize series of sharply distinguished forms, or even varieties. Thus, besides plants with the usual growth habit, there were forms with weak pendulant branches, forms with glabrous leaves, and others with more or less distinctly, sometimes strongly velutinous pubescence on lower side or on both sides of the lamina, which could be referred to var. *dasyphylla*.

An extremely interesting group of plants, var. *pubescens* Kost., with more or less pubescent young shoots, was separated; it has as yet not been observed in the genus *Armeniaca*.

The extensive variability among these plants of the Suifun apricot was also reflected in the shape of the leaves, from flattened, orbicular, and broadly oval to strongly elongate, with different lengths and shape of mucro and different shape of base, from cordate to cuneately elongate. A similar variability was observed in the creation of the lamina. Very shallow, attenuate, and deliquescent dentation occurred, as well as sharply contoured crenation, from simple to double, with teeth from very small and dense to deep and sparse.

A whole series of transitional forms, in both leaves and stones, link this group on the one hand with the typical Siberian apricot, *A. sibirica* (L.) Pers. and on the other with the typical Manchurian apricot, *A. manshurica* (Koehne) Skv.

595 Forms approaching the Suifun apricot also occur in E. Manchuria, Korea, and C. China. Some botanists have described these as *Armeniaca sibirica* and others as *A. manshurica*; according to the descriptions and sketches of the Chinese apricot (Revue Horticole, 1879), most of the Suifun apricots should be referred to *A. davidiana* Carr. (Plate XXXVIII, Figure 3).

Koehne (Sargent, *Plantae Wilsonianae* (1913) 281) considers this species to be very close to *A. sibirica* L. in both the splitting pericarp and the smooth stone. The drooping branches which, according to Carrier's description, distinguish *A. davidiana* from *A. sibirica*, led Koehne to consider *A. davidiana* the pendulous form of *A. sibirica*.

Judging by Carrier's report (1879) as well as by Bretschneider's and other herbarium specimens from the Peking Mountains, N. China, N. Korea, E. Manchuria and the Far Eastern territory, the distribution of this species is really very similar to that of *A. sibirica*, extending from N. China to the Far Eastern territory of the USSR. Its basic differences from the dwarf Daurian-Mongolian *A. sibirica*, in addition to the often pendulous forms, are the slightly larger tree sizes, the larger and more coarsely crenate leaves, and the often slightly more juicier and fleshier fruits.

This species crosses very readily with other members of *Armeniaca*, a fact which largely explains the exceptional polymorphism and the wealth of transitional forms with typical *A. sibirica* and *A. manshurica* as well as with *A. vulgaris*, as evident from herbarium specimens collected in the natural habitats of this species and from the above-mentioned plants grown from seeds collected in the Suifun River valley.

Whether *A. davidiana*, like *A. sibirica*, should be regarded as a distinct species or merely as the more southern geographical race of *A. sibirica* cannot be decided until more material becomes available.

Economic importance. In both frost and drought resistance, the Siberian apricot is far superior to other species (in the Chita and Nerchinsk area, it endures temperatures as low as -50°C). It is therefore of considerable interest as stock which may help to extend the cultivation of apricots. It is no less promising as hardy dwarf stock for apricots and other *Amygdalaceae*.

The Siberian apricot, because of its early and luxuriant blossoming and its high frost-resistance, is attracting attention as an ornamental in the center and north of the USSR.

596 As for the immediate uses of the existing wild apricot, it could serve as a source of seed for stocks and of kernel, which could successfully replace the bitter almond, and for the production of high-quality oil.

3. ***A. manshurica*** (Koehne) Skvortz. in Bull. of appl. Bot., genet. XXII, 3 (1929) 213.— *Prunus manshurica* Koehne, *Deutsch. Dendr.* (1893) 318; Sarg., *Pl. Wils.* (1913) 282; Kom., *Fl. Mansh.* II (1904) 540; C. K. Schn., *Handb. Laubholzk.* I (1906) 635.— *P. armeniaca* var. *manshurica* Maxim. in *Mél. Biol.* XI (1883) 675.

Tree, more or less large, occasionally to 15 m high and 45 cm in diameter at base of trunk; bark soft, dark gray, deeply splitting; wood very hard and beautiful; young shoots glabrous, green or light brown, reddish or brown to grayish-brown on the illuminated side; leaves of growth shoots 6–8 cm long, 3–4 cm wide, from lanceolate-oval and ovate to broadly oval with wide rounded or slightly tapering, rarely cordate base and strongly elongate and

prolonged, mucronate apex, glabrous or especially when young, with more or less weak pubescence on both sides of lamina and petiole; leaves of growth shoots with petioles distinctly shorter than in the Siberian and common apricot; leaves of fruiting shoots larger and broader, with longer petioles, (4)6–12(15) cm long, (2.5)3–6(8) cm wide, usually glabrous or at angles of veins with barbate hairs beneath, lamina usually coarsely biserrate, teeth varying from very deep and acute (nearly awned, often recurved toward apex) to considerably smaller or more or less obtuse. Flowers pale pink or white, 2.5 cm in diameter, on rather long (0.7–1 cm) glabrous pedicels, opening before leaves; fruit 2.3 cm long, 2.6 cm wide, 2.2 cm thick, pubescent, yellow, sometimes with red tinge or red spots on illuminated side, more or less slightly fleshy; pulp of pericarp usually juicy or dry, sour or slightly bitter, in large-fruited forms edible, aromatic and rather tasty; stones 13.5–18 mm long, 11–18 mm wide, 7.5–11 mm thick, globose or slightly elongate, with weakly tapering, slightly rugose base and apex, sometimes drawn out below, especially from dorsal side, varying from acuminate to orbicular and obtuse, dark-colored, brownish, lateral surface with scattered small pits; ventral suture very smooth, with obtuse median rib, lateral ribs not developed, dorsal suture closed, orbicular; forms with stones transitional to the Siberian apricot are frequent; they are distinguished by the more acute ventral rib and the basally more or less cuneately protruding dorsal rib; seeds bitter, rarely sweet. April, May–July, August. (Plate XXXVIII, Figure 2).

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Open, well illuminated stony or rocky slopes of bald mountains, widely isolated trees or in groups together with other broad-leaved species, often shrubs. — Far East: Uss. (Khanka Lake region, Vladivostok). **Gen. distr.:** The Manchurian apricot is confined to the S. Ussuri, Grinsk, and N. Korean sections of the Manchurian floristic region, and stretches in a relatively narrow strip from the north to the south, from Lake Khanka and S. Ussuri territory over E. Manchuria to the forests of N. Korea. Described from the lower reaches of Sungari. Type in Leningrad.

Note. *A. sibirica* is distinguished by a much more developed tree, with deeply splitting suberized bark and more elongate leaves with double, large, and coarsely serrate crenation; the stone is more nearly globose, without acute ribs. From *A. vulgaris* it is distinguished by the more elongate and coarsely serrate leaves, the longer pedicels and the less fleshy fruit.

Skvortsov separates two varieties:

a) var. *subcordata* Skvortz. — distinguished by broad oval or cordate leaves with truncate-rounded apex and rather long teeth. The fruit is quite small (1.4 cm wide), from globose to lightly elongate, often ovoid or slightly pyriform, yellow; stones darker than in typical forms, globose, with inflated sides, prolonged base, orbicular apex and rather smooth surface; ventral suture only slightly protruding.

2) var. *domestica* Skvortz. — distinguished by medium-sized leaves with tapering base and attenuate tip, finely and doubly dentate margins and more or less short (0.5–0.7 cm) fruit stalks. Fruit 2 cm in diameter, globose, yellow; stones nearly smooth, with acuminate apex and obtuse base, ventral suture produced into an acuminate rib. This form is grown in gardens in Kharbin, and may be of hybrid origin.

Economic importance. The Manchurian apricot, with its high frost resistance and strong, rapid growth, is important from a silvicultural point of view because of its durable and attractive wood.

Analysis of two specimens made by the laboratory of the Far Eastern branch of the Academy of Sciences of the USSR yielded the following average composition: water 86.24%, dense residue 13.71%, ash 1.43%, cellulose 0.35%, total content sugar 0.26%, raw proteins 0.45%, general acidity 3.07%, caustic acids 0.05%. The stone constitutes ca. 63% of the fresh weight of the fruit; (the kernels account for ca. 20%).

598 Owing to its bitterness, low sugar content, and high content of acids, the palatability of the fresh fruit is not very high; however, the use of wild fruit in the making of candied peel, pastilles, candy fillings, and jams is of great interest. The kernel, with its bitter-almond taste, is of particular value as a possible substitute for the almond in the confectionery industry; according to the same laboratory, in percentages of air-dry substances: water accounted for 52.5%, oil 52.41%, sugars (after inversion) 9.32%, raw proteins 20.44%, amygdalin 0.17%, and prussic acid 0.011%. In N. Manchuria, the apricot kernels are used in food; in the confectionery industry they are ground up for baking, and mixed with sugar they are used to prepare a cold beverage.

The stones of the Manchurian apricot, together with the Siberian apricot, are very useful for the procurement of durable, frost-resistant stocks for cultivated apricots, which is broadly practiced in local fruit growing.

In addition, the Manchurian apricot is broadly represented in cultivation in Manchuria and S. Ussuri territory as an ornamental and, partly, fruit tree since it blossoms early and luxuriantly and its larger fruited forms are edible and also used by the local population in food, especially in jams and jellies.

The Manchurian apricot is also of immense interest in selection work for the purposes of introducing economically important strains of apricot into the Far Eastern territory as well as a number of other places with a sharply continental climate.

The Manchurian apricot is one of the ancestors of the Michurin apricots, enduring the winters of the central zone of the USSR.

The wide use of this species in selection work will provide the opportunity to obtain new and more frost-resistant strains in other regions of the USSR and will allow for the movement of industrial cultivation to the north for comparison with its present boundaries.

4. *A. dasycarpa* (Ehrh.) Pers., Syn. (1807) 1; DC., Prodr. (1825) 2. — *Prunus dasycarpa* Ehrh., Beitr. V (1790) 91; Koehne, Deutsch. Dendr. (1893) 601. — *P. armeniaca nigra* Desf., Cat. ed. 3 (1829) 297. — *Armeniaca fusca* Tourp. et Poit., Nouv. Duham. 1 (1804) 123, tab. 60. — *A. atropurpurea* Loisel., Duham. nov. ed. V (1812) 172, tab. 551. — *A. persicifolia* Lois., *ibid.*

Small tree, 6 m high; young shoots abundant, rather thin, glabrous, olive red; leaves small (4–6 cm), from oval to orbicular-ovate, with short acuminate apex, finely and narrowly irregularly crenate, more or less pubescent beneath along veins or at angles of veins, surface slightly rugose, petioles short, slightly glandular or eglandulose. Flowers white or with

pink tinge, on more or less long (4–7 mm) thin, thinly pubescent pedicels; calyx tube shorter than in other species of apricot, calyx teeth more orbicular and smaller; fruit subglobose, from purple-red to violet-black, velutinous-pubescent, pulp juicy, sour, especially in drupelet and epidermis; stone not separating, with coarsely scabrous or slightly pitted surface; seeds bitter, rarely sweet; some forms have a marked percentage of abortive seeds and abortive pollen. March, April–June, July.

Cultivated in the countries of SW Asia: Soviet Central Asia, Kashmir, Beludzhistan and much more rarely in the Caucasus and Ukraine. Not found in the wild-growing state. Described provisionally from Europe. Type in Moscow.

Note. In morphological character this species is an intermediate between *A. vulgaris* and *Prunus divaricata*. It is distinguished from the other species of apricot by slightly smaller leaves and by dark colored fruit on longer pedicels and with nonseparating stone – characters allying this species to *Prunus cerasifera*. In biological character it is distinguished from all other species of apricot by later flowering; from *A. vulgaris* – by greater frost resistance and greater resistance to fungal diseases.

Flowering usually starts 7–10 days later than that of most strains of the common apricot. In some forms the fruit simultaneously ripens with that of most of the strains of *A. vulgaris*, in other forms 10–20 days later. All forms of *A. dasycarpa* are well pollinated by apricot and myrobalan plum.

The intermediate nature of the morphological and biological characters of the given species between *A. vulgaris* and *P. divaricata*, the absence of the given species in a wild-growing state, the self-sterility of its forms having a high percentage of defective pollen and abortive seeds with low germination – all this provides a serious basis for assuming the hybrid origin of *A. dasycarpa*. Many of the earlier taxonomists and pomologists attributed its habitat to Europe, others to Manchuria, and still others regarded this species as emanating from the East, but most indicate that its habitat is unknown.

The most plausible habitat of the majority of forms of this species is Central Asia, Kashmir, Beludzhistan, Iran, where many of its strains have been in cultivation for centuries (in Central Asia: Olkhrod, Kizil-Olkhrod, Kara-Olkhrod, Irany-Olyu; in Armenia and Iran: Shlor-Tsiran, Persian black). In all these countries the apricot and myrobalan plum are the basic fruits growing together in dense mixed plantings where the mutual pollination of these species is very easy.

Broadly applied seed multiplication of Amygdalaceae in local fruit growing ensures the growth of hybrid plants from seeds obtained as a result of natural mutual pollination of apricot and Myrobalan plum. The possibility of crossing these two species has also been confirmed by experiment.

Alongside the marked variety of forms of *A. dasycarpa* in the gardens of the local populations of C. Tadzhikistan and Uzbekistan, there is also encountered a group of strains close to this species in every way with the exception of an absence of pubescence on the fruit epidermis. This group obviously is of the same hybrid origin, and we refer it to the species

A. leiocarpa, which unlike *A. dasycarpa* comprises only the glabrous fruited forms. As yet, only two varieties have been found ("zarolyu," apricot), which are both striking as ornamental and yield fruit of satisfactory quality.

Genus 769. **PERSICA** * Mill.**

Mill., Gard. Dict. ed. VIII (1768).—*Amygdalus* subgen. *persica* L., Sp. pl. (1753) 472.—*Prunus* subgen. *Amygdalus* Borkh. in Roem., Arch. I, 2 (1796) 37.—*Trichocarpus* Necker, El. Bot. II (1790) 718.

Flower 1, rarely 2 per flower bud, pink, rarely white, sessile or on short pedicels; fruit a drupe with juicy, rarely dry (*P. davidiana*) pericarp, not splitting at ripening, with distinct ventral furrow and large hollow pedicels; epidermis lanate-pubescent, rarely glabrous; stone deeply furrowed, rarely nearly smooth (*P. mira*), with thick shell and bitter, rarely sweet seed. Small tree, (2)3–5(8) m high; leaves opening after flowers, rarely together with them, in buds folded lengthwise, often with glandular petioles.

Six species: *P. vulgaris* Mill., *P. ferganensis* Kost. et Rjab., *P. kansuensis* (Rehder) Kov. et Kost., *P. mira* (Koehne) Kov. et Kost., *P. davidiana* Carr., and *P. potanini* (Batal.) Kov. et Kost. Some transitory species (*P. mira* with nearly smooth stone, *P. davidiana* with meagerly juicy pericarp like in the almond) unite this genus with the genus *Amygdalus*, which possesses a dry splitting pericarp and, in many species, a nearly smooth stone.

The first two species have been under cultivation for many years as fruit trees, the first broadly so throughout the moderate and moderately warm zone and the second less broadly, mainly in Central Asia and W. China. All the other species are very sparsely distributed under cultivation, mostly in China as ornamentals or as a stock for fruit growing and ornamentals.

Only two species are cultivated in the USSR — *P. vulgaris* and *P. ferganensis*; the latter species is distinguished from the common peach by the character of the leaf veins.

1. *P. vulgaris* Mill., Gard. Dict. ed. VIII (1768).—*Amygdalus persica* L., Sp. pl. (1753) 472.—*Prunus persica* Stokes, Bot. Mat. Med. 3 (1812) 100; Dipp., Handb. Laubh. 3 (1893) 606; Koehne, Dendr. (1893) 314; Rehd., Man. Tr. a. Schr. N.A. (1927) 462.—*Prunus persica* var. *vulgaris* Maxim. in Bull. Acad. Sc. Pétersb. XXIX, 82, Mél. biol. XI (1883) 668.—*P. persica* var. *densa* Makino, Tokyo Bot. Mag. XVI (1908) 78.

Small tree (2)3–5(8) m high and with trunk (15)18–25(28) cm in diameter, with broad more or less prostrate crown; bark dark, reddish brown, in old trees scabrous and squamose; branches prostrate, sometimes pendulous, young branches more or less thin, glabrous, shiny, green, becoming red on illuminated side, with large number of small lenticels; buds obtusely conical, pubescent, sitting in groups of 2 or 3 of which the middle is the leaf bud, the

* From *malum persicum* (Persian apple), the Greek and Roman name of the peach which refers to its introduction into Europe from Iran.

** Treatment by K.F. Kostina.

rest flower buds; leaves elliptic-lanceolate or elongate-lanceolate, 8–15 cm long, 2–3.5 cm wide, with long-acuminate apex and broadly cuneate base, dark green above, glabrous, smooth, dull or more or less shiny, beneath paler, with slight pubescence at angles of veins or without pubescence, margins thin and more or less coarsely serrate or obtusely serrate, with glands at ends of teeth or without them; petioles large, 1–2 cm long, with 1–8 glands or without them. Flower 1, appearing from bud before leaves, very short pediceled, subsessile; flowers of two distinctly different dimensions and types and rarely intermediate between them: 1) smaller, 2.5 cm in diameter, with narrow petals (campanulate type), and 2) larger, 2.5–3.5 in diameter, with larger and broader petals (rosaceous type); flowers range in color from pink to red, rarely white; calyx tube cup-shaped, usually pubescent, sometimes outwardly glabrous, green, with red tinge, inwardly greenish-yellow or dark orange; stamens 20–30, ca. 1.5–2 cm long, thin, white, slightly pinkish, intensifying in color toward end of flowering; anthers purple-red, very rarely yellow; fruit varying markedly in shape (from flat napiform to more or less strongly elongate-oval and ovate), in size (3)5–7(12) cm long, and also in diameter dimensions; ventral suture and hollow pericarp usually sharply outlined, color of fruit varies from greenish-white to orange-yellow, usually with bloom on illuminated side; fruit epidermis deeply and coarsely pubescent with the exception of the group of so-called "nectarines" having a glabrous epidermis; pulp greenish, white, yellow or orange, often more or less reddish around stone, rarely all red, juicy, sweet or sour-sweet, aromatic; stone large, deeply and coarsely furrowed, costate and pitted, very large, elliptic, oval or orbicular, compressed at sides, with acuminate apex, rarely flat, freely separating from pulp or compactly adnate to it; seeds bitter, rarely sweet. April, May–September.

Cultivated throughout the south of the USSR (Centr. Asia, Caucasus, Crimea, and southern part of the Ukrainian SSR); as a fruit-bearing and ornamental plant cultivated throughout the temperate and temperate-warm to subtropical zone. Type in London.

Note. There are exceptional variegated forms among cultivated peach.

Among the ornamental forms the following varieties are separated:

1) var. *atropurpurea* Schneid. (Fl. de Serr. (1886) 19) with purple leaves; 2) var. *alba* Schneid. (Bot. Reg., p. 1586) with white flowers; 3) var. *duplex* Rehd. (Rev. Hort. (1852) 221) with double pink flowers; 4) var. *camelliaeflora* Dipp. (Fl. de Serr. 13, tab. 1299) with semi-double dark red flowers; 5) var. *dianthiflora* Dipp. (Fl. de Serr. 13, tab. 1300) with semi-double pink flowers; 6) var. *albo-plena* Schneid. (Fr. d. Serr. 10, tab. 969) with white double flowers; 7) var. *magnifica* Schneid. (Garden., Vol. 1, 1871, 56, p. 516) with light red double flowers; 8) var. *versicolor* Voss. (Fl. d. Serr. 13 p., tab. 1319) with semi-double white, red and striped flowers on one plant; 9) var. *pyramidalis* Dipp. with narrowly pyramidal crown, and 10) var. *pendula* Dipp. with pendulous branches.

The gymnocarpous strains of the peach, separated by the authors as species: *P. nucipersica* Borkh., Forstb. Beschreib. (1790) 205; *P. laevis* DC., Fl. Fr. (1805) 487; *Amygdalus nectarina* Aiton, Hort. Kew. ed. 2 (1811) 194; *A. nucipersica* Rchb., Fl. Germ. exs.

(1831) 647; *A. laevis* Dietr., Syn. pl. 3 (1852) 42, are viewed by most investigators as varieties. The peach with the flat napiform shape of fruit is usually regarded as the species *P. platycapra* Decaisne (Jard. fruit. (1872) 142) or more often as the variety of *P. persica* var. *platycapra* Bailey, Cycl. (Am. Hort. (1902) 1456) or *Persica vulgaris* var. *compressa* Loud. (Arb. Frutic. Brit. II (1838) 683).

According to the classification of the cultivated strains of the peach by I. N. Ryabov (Zapiski Nikitskogo Bot. Sada, No. 1, 1939), all strains with large rosaceous flowers refer to var. *rosiflora* Rjab and the strains with small campanulate flowers to var. *campanuliflora* Rjab.

603 **Economic importance.** The peach is an exceptionally valuable fruit because of its large and regular harvest, high-quality fruit and its variability in quality and ripening time. The fruit, besides being eaten raw, is excellent material for processing, yielding high-quality jams, jellies, and dried fruits for compots. The stones are used in the chemical industry; they are also sown in garden nurseries to obtain stocks for cultivated varieties of peach. Its ornamental forms are sparsely distributed in the USSR, but they deserve much more attention because in early spring they are densely covered with clusters of double, white, pink, red flowers which hold their own among the most attractive blossoming ornamental shrubs.

2. *P. ferganensis* (Kost. et Rjab.) Kov. et Kost. in Bull. appl. Bot. Genet., ser. VIII, 4 (1935). — *Prunus persica* ssp. *ferganensis* Kost. et Rjab., ibid. ser. VIII, Vol. 1 (1932) 318.

Tree, 8 m high; annual shoots of medium thickness, with numerous slightly ascending lenticels, crown smooth, shiny, reddish on illuminated side, greenish on shady side; older branches reddish brown, squamose, with protruding, large crowded lenticels; buds pubescent, 2 or 3 in axils of leaves, 1 flower in each flowering bud; leaves lanceolate, with more or less strongly acuminate apex, dark green above, paler beneath, glabrous, with slight pubescence at angles of veins, margin crenate below, teeth with glands; lamina with unique venation (differing from *P. vulgaris*), with veins of the first order ascending arcuately from their origin, gradually approaching margin and separately running along this margin nearly to teeth; vein branches anastomosing and forming a barely distinguishable net; petioles thick, short (0.5–2.1) cm, always with 2–8 glands. Flowers large, pale pink, subsessile, opening before leaves; calyx tube cup-shaped, green with reddish tinge on the outside, glabrous inside, with greenish yellow or orange ring, lobes ovate or oval, glabrous inside, pubescent outside; petals ca. 15 cm long, 17 mm wide, flattish, orbicular, pale pink; pistils nearly as long as stamens; ovary pubescent; fruit 37–58 mm long, 44–67 mm wide, strongly flattened, flattened-globose, very rarely more globose, pubescent, rarely glabrous, white with greenish tinge, rarely golden yellow, sometimes with slight bloom; pulp juicy, sour-sweet, with a peculiar spicy taste, separating readily from stone; stone 17–32 mm long, 13–29 mm wide, flattened-globose, rarely globose or slightly elongate, with broad flat base; surface longitudinally ribbed; seeds bitter, sometimes sweet. April–July–August.

604 Cultivated in Central Asia (Fergana and Zeravshan valleys, Pam.-Al.), Khorezm and Tashkent oases. **Gen. distr.:** Kashgaria. Described from Fergana. Type in Leningrad (All-Union Scientific-Research Institute of Crop Husbandry).

Economic importance. In many regions of Central Asia extensively cultivated for local consumption, because the fruit is not hardy enough for transport or canning.

DIAGNOSES PLANTARUM NOVARUM
IN TOMO X FLORAE URSS COMMEMORATARUM

(DIAGNOSES OF NEW SPECIES MENTIONED IN VOLUME X)

1941

RUBUS

1. **R. ponticus** (Focke) Juz. sp. nova (Subg. *Eubatus*, Sect. *Glandulosi*).—*R. hirtus* f. *ponticus* Focke, Species Ruborum III (1914) 249.

Turio prostratus, teres, epruinosis, glabrescens, glandulis crebris violaceo-fuscis longis, aculeis basi parum dilatatis aciculisque longis tenuibus rectis reclinatisve sparsis intermixtis praeditus; folia 3-nata haud magna tenuia viridia supra disperse pilosa subtus ob tomentum tenuissimum appressum cinerascens vel albida ad nervos principales tantum parce pilosa, mucronato serrata dentibus inaequalibus parum profundis; foliolum terminale ovatum basi emarginatum sensim acuminatum; stipulae lineares glanduliferae. Rami floriferi sparse appresseque piloso-tomentosi glandulis crebris obscure purpureis, aciculis et aculeis sparsis tenuibus rectis vel interdum paululum reclinatis obsiti, foliis superioribus subtus cinerascens vel albidis tenuissime tomentosus, infimis (sub) concoloribus utrinque disperse pilosis; inflorescentia mediocris, laxa, gracilis, aphylla vel fundo solum foliosa, erecta; rachis sat dense appresseque piloso-tomentosa, glandulis obscure purpureis longis, aciculis sparsis praedita; pedunculi elongati patentes, 1—3-flori; pedicelli mediocres — sat longi; sepala lanceolata longe acuminata tomentoso-virescentia, dense glandulosa aciculata post anthesin patentia; petala mediocria calycem paullo superantia obovata alba; stamina stylos longe superantia; fructus ignoti.

Habitat: in silvis montanis Caucasi.

Typus speciei: Caucasus, ad margines silvarum prope Alagir 2 Julii 1899 fl. defl. W. Markowicz, HFR n^o 875 sub nomine *R. caucasicus* Focke (in Herb. Inst. Bot. Ac. Sc. URSS asservatur); cotypi atque topotypi in diversis herbariis vidi a typo plerumque foliis omnibus subtus tomentosus distinctissime discoloribus recedentes, vix tamen ab eo specificè separandi).

Affinitas: a *R. moscho* Juz. turione epruinosis, foliolis minoribus angustioribusque supra plus minus pilosis, inflorescentia erecta, petalis majoribus in flore magis patentibus, staminibus longioribus, a *R. platyphyllus* C. Koch praeterea glandulis longioribus numerosioribusque dignoscitur.

DASIPHORA

2. **D. phyllocalyx** Juz. sp. nova.

Fruticulus humilis plerumque prostratus 5—20 cm alt.; rami floriferi erecti sicut stipulae et calyces saepius rubescentes; stipulae ovato-lanceo-

* [This appendix has been reproduced photographically from the Russian original.]

latae acutae; folia parva unacum petiolis 0.5—1.5 cm lg. ceterum iis *D. fruticosae* simillima, 5-foliolata (i. e. bijuga); foliola elliptica vel lineari-lanceolata margine plerumque (saepe tamen parum) revoluta, utrinque (subtus praesertim ad nervos) pilis haud densis vel sat densis laxe accumbentibus vestita. Flores ad apicem ramorum solitarii, breviuscule vel sat longe pedicellati, relative magni v. etiam maximi, 2—3 cm in diam.; hypanthium pilis albis patentibus dense vestitum villosum, calyx pilosus episepalis foliaceis, 2-fidis vel incisus vel saepissime quasi e foliis (2) 3 acutis compositis sepalis breve acuminatis subaequantibus vel paulo brevioribus. Ceaterum *D. fruticosae* simillima.

Habitat: in Asia Media in regione alpina montium Tian-Schan.

Typus speciei: e mont. Alata Transiliensis, in vicin. opp. Alma-ata, fl. Bolshaja Almaatinka; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: a proxima *D. fruticosa* (L.) Rydb. imprimis statura humili, habitu, floribus solitariis, calyce rubescenti, episepalorum indole distinguenda.

3. *D. dryadanthoides* Juz. sp. nova.

Fruticulus humilis prostratus ramis ascendentibus 3—12 cm alt., in statu juvenili molliter pubescentibus et rubellis; stipulae oblique ovatae apice rotundatae; folia parva petiolis tenuissimis gracilibus, 7-foliolata jugis 2 infimis approximatis verticillum formantibus admixtis foliis 5 et 3-foliolatis; foliola elliptica obtusa apice haud raro rotundata, plana vel margine paulo revoluta, supra sericeo-villosa subscabrida, subtus plerumque solum ad nervos pilis patentibus longis vestita, reticulatione saepe prominula. Folia solitaria, brevissime petiolata, haud magna, 1—1.5 cm in diam.; hypanthium cum calyce pilis patentibus dense vestitum, atropurpureum; episepala lanceolata vel ovata acutiuscula, sepalis late ovatis acutis vel acuminatis paulo breviora et multo angustiora; petala sepalis subduplo longiora, late elliptica.

Habitat: in rupibus, in declivibus lapidosis et herbosis montium reg. Pamir et Shugnan Asiae Mediae.

Typus speciei e fontibus fl. Ak-su (Murgab) in Herb. Inst. Bot. Ac. Sc. USSR asservatur.

Affinitas: arcte affinis „*Potentillae ochreateae*“ auct. an Lehm. (*P. fruticosa* var. *pumila* Hook. s. str., *Dasiphora Hookeri* Juz. in sched.), imprimis tamen foliorum pubescentia satis distincta. Etiam cum *D. parvifolia* (Fisch.) Juz. comparari potest a qua longius distat habitu, pubescentia, foliis latioribus obtusis, floribus solitariis. Ceterum *D. parvifolia* est planta valde variabilis; in ditione florum USSR praeter prolem typicam aliae 3 distingui possunt, scilicet:

1) *D. stepposa* Juz. — proles orientali-dahurica, foliis saepius latioribus utrinque sericeo-pilosis, floribus submajoribus pedunculis crassioribus.

2) *D. mollicrinis* Juz. — proles occidentali-dahurica a praecedente ramis floriferis et imprimis petiolis et pedunculis pilis longis et mollibus patentibus dense vestitis distincta.

3) *D. imitatrix* Juz. — proles tjanschanica alticola *D. phyllocalyci* quasi analoga (vel forma e hybridatione ejus cum *D. parvifolia* orta?) foliolis gaudens latioribus, floribus submajoribus solitariis.

POTENTILLA

4. *P. jailae* Juz. sp. nova (Subg. *Closterostyles*).

Rhizoma tenuiusculum vel sat crassum, obliquum; caules solitarii, sulcati, parum foliati, solum apice ramosi, rubescentes, glandulis longe stipitatis longissimis et pilis accumbentibus vel erecto patentibus strigosis in parte caulis inferiore sparsis vel omnino deficientibus in parte superiore inflorescentiae densissimis; folia radicalia et caulina inferiora longe petiolata petiolis glandulis longe stipitatis admixtis interdum pilis strigosis accumbentibus vestitis; folia pinnata jugis 2—3 valde remotis; stipulae foliorum radicalium auriculis oblongo-ovatis acutiusculis, foliorum caulinarum ovatae, acutatae; folia caulina superiora ternata breve petiolata; foliola foliorum radicalium conspicue petiolulata petiolulis plerumque longis, foliorum caulinarum breve petiolulata vel superiorum sessilia, late obovata vel fere rotundata, foliola jugorum basi valde inaequilateralia apice obtusa, duplicato-dentata dentibus latis apice breviter mucronatis, foliola jugi infimi caeteris minora, foliolum apicale majus basi cuneatum petiolulo longiore, omnia utrinque viridia supra disperse pilosa subtus imprimis ad nervos pilis longiusculis accumbentibus admixtis pilis glanduliferis haud numerosis tecta. Inflorescentia pauci (3—5)-flora; hypanthium cum calyce pilis densis accumbentibus vel erecto patentibus longiusculis substrigosis dense tectum admixtis glandulis longe stipitatis; episepala ovato-lanceolata apice bidentata sepalis oblongo-ovatis breve acuminatis sesqui breviores, calyce fructifero accrescenti; petala calyce multo longiora, rotundato-obcordata alba; carpella laevia.

Habitat: in herbosis, in fruticetis, ad margines silvarum Tauriae (jugum Jaila).

Typus e m. Ai-Petri in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: Proles ex affinitate *P. rupestris* L. et *P. foliosae* Somm. et Lev., bene distincta pubescentia appressa setosa caulium, hypanthiorum et sepalorum, necnon foliolis distincte petiolulatis.

5. *P. pamiroalaica* Juz. sp. nova (Subg. *Hypargyrium*, sect. *Multifidae*)

Caudex crassus multiceps, caudiculis caespitosim aggregatis reliquiis fuscis stipularum dense tectis; caules 5—20 cm alt. sat robusti arcuato ascendentes vel subprostrati, rarius erecti cum ramis inflorescentiae elongatis erectis et petiolis pubescentia densa e tomento albo et praeterea e pilis longis tenuibus plerumque accumbentibus constante dense vestiti; folia caulina inferiora pinnata vel subinterrupte pinnata, ambitu obovata, jugis foliolorum 3—5 plerumque approximatis; stipulae foliorum radicalium

auriculis longis lanceolatis, foliorum caulinarum ovato-lanceolatae integrae; foliola profundissime pinnatisecta segmentis valde approximatis oblongis vel oblongo-linearibus apice rotundatis, saepe curvatis, utrinque sed subtus densissime tomentosa et praeterea pilis longis accumbentibus sericeis dense tecta. Folia plerumque magna haud numerosa breviuscule petiolata; calyx sericeo-pilosus, episepala ovato-lanceolata sepalis ovatis breviora, sicut sepala obtusiuscula vel obtusa, rarius sepala acutiuscula; petala late-obovata vel obcordata emarginata; filamenta brevina, antherae oblongo-ovatae; receptaculum parvum, URSS conicum, pilosum.

Habitat: in alpinis Asiae Mediae (imprimis in montibus pamiroalaicis et Tian-Schan occidentalis, ubi vera *P. sericea* omnino deesse videtur).

Typus speciei: in valle Alaj prope Sarytash leg. S. Juzepczuk; in Herb. Inst. Bot. As. Sc. URSS asservatur.

Affinitas: valde affinis *P. sericeae* L. (quacum confunditur) satis tamen distincta pubescentia axium appressa, foliolis minus numerosis necnon distributione geographica peculiari.

6. *P. malacotricha* Juz. sp. nova. (Subg. *Hypargyrium*, sect. *Multifidae*).

Planta habitu *P. pamiroalaicae* simillima, differt tamen pubescentia caulium petiolorum necnon foliolorum e pilis densis mollibus longis patentibus constante atque calycibus flavescenti-virescentibus glandulosissimis.

Habitat in arenosis et in declivibus lapidosis et argillosis Pamiri.

Typus speciei ex altiplanitie Pamir in Herb. Inst. Bot. Ac. Sc. USSR asservatur.

7. *P. nervosa* Juz. sp. nova (Subg. *Hypargyrium* sect. *Niveae*).

Caudex validus, multiceps, sicut caudiculi reliquiis fuscis stipularum vestitus; caules 8—40 cm alt. robusti erecti vel basi arcuati paucifoliati pauciflori, sicut petioli tomento floccoso parce vel dense vestiti pilis rectis nullis; folia radicalia plus minus longe petiolata ternata, caulina petiolis multo brevioribus suprema sessilia; stipulae foliorum radicalium scariosae auriculis lanceolatis acutis, stipulae foliorum caulinarum herbaceae oblique ovatae lanceolatae longe acutatae integerrimae; foliola lateralia ovata vel elliptica basi inaequilateralis sessilia, medium iis aequilongum vel conspicue longius obovatum vel oblongum distincte petiolulatum basi plerumque late cuneatum, 1—4.5 cm lg. inciso serrato-dentatum dentibus utrinque 6—12 angustiusculis et plerumque acutiusculis; supra plerumque obscure viridia pilis breviusculis tenuissimis rectis perappressis sparsiusculis vel sat densis vestita haud raro etiam tomento floccoso admixto vel interdum tota facie sat dense tomentosa canescentia pubescentia e pilis rectis tomento omnino occulta; subtus dense vel plerumque paullo grisescenti-tomentosa nervis prominentibus tomento non obtectis pilis rectis appressis vestites bene conspicuis. Inflorescentia 3—12-flora, floribus breviter pedunculatis magnis 1.5—2.5 cm in diam.; calyx pilis rectis longis accumbentibus tectus subse-

riceus; sepala et episepala subaequilonga acuta, episepala linearia vel lineari-lanceolata, sepala ovata; petala sepalis multo ($1\frac{1}{2}$ —2-plo) longiora, late obcordata emarginata, lutea; stamina 20 filamentis brevibus antheris ellipticis oblongisve; receptaculum hemisphaericum pilosum, carpella ovoidea laevia, stylis subapicalibus quam carpella brevioribus basi paullo incrassatis stigmate dilatato. VI.

Habitat: in pratis montanis et declivibus herbosis Asiae Mediae.

Typus speciei: in valle Alai prope pag. Sarytash leg. S. Juzepczuk (in Herb. Inst. Bot. Ac. Sc. URSS asservatur).

Affinitas: foliolis oblongis multidentatis, dentibus utrinque 6—12 sat angustis acutiusculis, subtus nervis prominentibus, tomento saepius non obtectis a vera *P. nivea* bene distincta.

8. *P. jacutica* Juz. sp. nova (Subg. *Hypargyrium*, sect. *Niveae*).

Caudex subtenuis vel sat validus, reliquiis fuscis stipularum vestitus. Caules 5—25 cm alt. numerosi robusti vel sat tenues, basi arcuato ascendentes, parum foliati, superne ramosi, pilis mollibus patentibus haud densis et etiam glandulis minimis (saltem in parte superiore) vestiti; folia radicalia breviter petiolata petiolis dense patulo-pilosis, ternata; folia caulina haud numerosa sessilia, suprema simplicia; stipulae foliorum radicalium auriculis lanceolatis acutis, foliorum caulinarum magnae ovatae acutae, integrae vel haud raro (plerumque superiores) profunde dentatae; foliola foliorum radicalium et caulinarum inferiorum obovata vel interdum fere rotundata marginibus sese tegentia, basi integerrima, plerumque sessilia, relative haud profunde inciso-dentata dentibus utrinque 2—6 magnis sed proportione angustis plerumque acutis, supra griseo-viridia densissime appresse pilosa et praeterea minute glandulosa subtus griseo-tomentosa et villosa nervis lateralibus conspicuis; foliola foliorum caulinarum supremorum cuneata paucidentata. Inflorescentia 3—12-flora floribus breve vel sat longe pedunculatis parvis 8—12 mm in diam.; calyx pilis accumbentibus dense tectus admixtis glandulis parvis numerosis, sepala aequilonga lanceolata vel interiora ovato lanceolata acuta; petala sepalis paullo longiora, late obovata, lutea; stamina filamentis brevibus, antheris ellipticis; fructus maturi ignoti. VI.

Habitat: in pratis Sibiriae Orientalis (Jacutia).

Typus speciei: e vicin. opp. Jakutsk (in Herb. Inst. Bot. Ac. Sc. URSS asservatur).

Affinitas: differt a *P. evestita* Th. Wolf foliis radicalibus breve petiolatis foliolis parvis haud profunde dentatis dentibus utrinque 2—6, inflorescentia multiflora.

9. *P. caucasica* Juz. sp. nova (Subg. *Hypargyrium*, sect. *Chrysanthae*).—*P. thuringiaca* var. (vel f.) *caucasica* Th. Wolf in sched.

Planta ex affinitate *P. Goldbachii* Rupr. caulibus humilioribus, foliolis sat late obovatis, pedicellis fructiferis nutantibus et sepalis obtusiusculis dignoscenda.

Habitat: in montibus caucasicis.

Typus speciei: ex Abchasia (in Herb. Inst. Bot. Ac. Sc. URSS asservatur).

10. **P. anadyrensis** Juz. sp. nova (Subg. *Hypargyrium*, sect. *Chrysanthae*).

Caudex tenuiusculus caudiculos elongatos emittens, reliquiis fuscis stipularum tectos et caespitem laxam formantes; caules 6—30 cm alti, graciles ascendentes parum foliati foliis radicalibus multo longiores, apice parum ramosi, haud multiflori sicut petioli foliorum et ramuli inflorescentiae pilis sat densis brevissimis patentibus tecti, admixtis glandulis breviter stipitatis minimis; folia radicalia longe petiolata ternata, caulina infima brevius petiolata, suprema sessilia; stipulae foliorum radicalium scariosae auriculis lanceolatis acutis, foliorum caulinarum longae lineari-lanceolatae; foliola ambitu oblongo-obovata basi anguste cuneata subaequalia breviter petiolulata, profunde (usque ad $\frac{3}{4}$) pinnatisecta segmentis 3—4 lanceolatis vel lineari-lanceolatis erecto patentibus marginé revolutis, supra viridia glandulis sessilibus minimis adpersa vel adulta glabra, subtus pilis brevissimis patentibus densissime vestita velutina, nervis lateralibus prominentibus. Inflorescentia 2—5-flora, floribus tenuissime et sat longe pedunculatis, 12—18 mm in diametro; calyx brevissime pilosus minute glandulosus; episepala oblongo-lineariter obtusa, sepala iis multo longiora ovato-lanceolata acutiuscula; petala calyce fere $1\frac{1}{2}$ —2-plo longiora, obcordata profunde emarginata lutea; stamina 20 in numero filamentis brevibus, antheris parvis late ovoideis; receptaculum conicum pilosum; carpella ovoidea, laevia; stylus fere apicalis carpello subaequilongus basi satis incrassatus, versus apicem attenuatus apice parum dilatatus.

Habitat: in reg. subarctica Orientis Extremi, reg. Anadyr.

Typus speciei: in ditone fl. Anadyr leg. V. Vassiljev (in Herb. Inst. Bot. Ac. Sc. URSS asservatur).

Affinitas. Planta cum *P. Tollii* Trautv. comparanda, a qua bene differt pubescentia caulium e pilis densis brevissimis sub lente solum conspicuis constante, foliis semper ternis subtus velutinis minus profunde divisis, episepalis brevioribus.

11. **P. Tranzschelii** Juz. sp. nova (Subg. *Dynamidium*, sect. *Fragarioides*).

Radix fasciculata; caudex superne reliquiis stipularum tectus; caules 7—25 cm alti ascendentes vel erecti in $\frac{1}{2}$ — $\frac{2}{3}$ superioribus laxè ramosi, parum foliati folia radicalia non vel parum superantes cum ramulis inflorescentiae brevius et mollius pilosi quam in *P. fragarioides*, praeter pilos simplices tomentum haud densum et imperfectum e pilis brevibus paullo crispatis constante gerentes; folia radicalia plus minusve magna pinnata, 4—5-juga longissime petiolata; caulina inferiora bijuga petiolis brevioribus, superiora ternata subsessilia; stipulae foliorum caulinarum ovatae, plerum-

que acute inciso-dentatae; foliola sessilia, terminalia ad 4 cm longa late-ovata vel obovata, lateralialia infima interdum fere rotundata, sat profunde inciso dentata; dentes utrinque 5—10 (in foliis infimis 3—4) magni, triangulari-ovati vel oblongo-ovati obtusiusculi; foliola utrinque pilis longioribus dispersis et praeterea pilis curvatis vel crispatis brevibus imprimis in pagina foliorum inferiori densis tecta; folia supra obscure viridia subtus griseo-viridia paullo velutina, nervis principali et lateralibus prominentibus. Inflorescentia sat multiflora laxa; flores haud magni 10—15 mm in diametro iis *P. fragarioides* parum majores, pedicellis post anthesin curvatis vel reclinatis; calyx haud dense imperfecte tomentosus, admixtis pilis longioribus rectis; sepala aequilonga, exteriora lineari-lanceolata, interiora anguste-ovata, acuta; petala sepalis longiora emarginata lutea; receptaculum rotundato-conicum dense pilosum; stamina et styli ut in *P. fragarioides*; carpella haud numerosa majuscula oblongo-ovoidea valde rugosa albescentia.

Habitat: in rupibus et in lapidosis reg. Ussuriensis.

Typus speciei e sinu Olgae a cl. W. Tranzschel lectus in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: species distinctissima cum *P. fragarioides* confusa, a qua bene differt caulibus molliter et breve pubescentibus, foliolis subtus tomentosiusculis.

12. *P. ussuriensis* Juz. sp. nova (Subg. *Dynamidium*, sect. *Fragarioides*).

Caulis 15—25 cm alti suberectus in $\frac{1}{4}$ — $\frac{1}{3}$ superioribus laxè ramosus, folia radicalia paullo superantes, parum foliati sicut petioli foliorum radicalium et ramuli inflorescentiae haud dense breviter et molliter pilosi; folia radicalia longe petiolata, 5—6 juga; folia caulina bijuga vel ternata brevius petiolata vel sessilia stipulis inciso-dentatis; foliola late obovata vel fere rotundata, profundissime inciso-dentata dentibus haud numerosis foliolorum superiorum utrinque 5—6 infimorum 2—3 in numero, oblongis obtusis saepe paullo divaricatis; folia supra obscure-viridia pilis sparsis appressis simplicibus vestita, subtus pallidiora tomento parco imperfecto vestita e pilis brevibus curvatis vel crispatis constante. Inflorescentia sat multiflora laxa; pedicelli post anthesin curvati; calyx haud dense molliter pilosus; sepala subaequilonga acutiuscula: petala emarginata; carpella majuscula, transversim rugosa albescentia. Caetera ut in *P. Tranzschelii*.

Habitat: in rupibus ad ripas fluviorum Orientis Extremi reg. Ussuriensis.

Typus: ad ost. fl. Tshac-sun supra Shrej lauza leg. Bulavkina (in Herb. Inst. Bot. Ac. Sc. URSS asservatur).

Affinitas: Affinis *P. Tranzschelii*, sed differt ab ea foliolis minus dense pilosis paucidentatis, dentibus utrinque 2—6 magnis oblongis obtusis profunde incis.

13. **P. aemulans** Juz. sp. nova. (Subg. *Dynamidium*, sect. *Fragarioides*).

Caules 10—20 cm alti, ascendentes vel erecti, in $\frac{1}{4}$ superiore ramosi folia radicalia non superantes sicut petioli foliorum et ramuli inflorescentiae pilis haud densis brevibus mollibus flexuosis vestiti; folia radicalia petiolis longis firmis plerumque rubescentibus, pinnata, 4—5-juga; caulina brevius petiolata bijuga vel ternata stipulis ovatis integerrimis vel paullo dentatis; foliola obovata vel rhomboidea profunde inciso dentata, tria superiora dentibus utrinque 6—10 elongatis triangulari-ovatis acutiusculis, inferiora dentibus utrinque 2—5, margine saepe revoluta; supra obscure viridia disperse appresse pilosa vel glabra rugosa, subtus canescentia tomento denso imperfecto e pilis brevibus curvatis vel paullo crispatis constante tecta, nervis valde prominentibus. Inflorescentia pauciflora laxa; pedicelli tenues, post anthesin reclinati; calyx circa 1 cm in diametro; petala, stamina et styli ignoti; receptaculum dense pilosum; carpella haud magna albescentia transversim rugosissima. Caeterum *P. Tranzschelii* et *P. ussuriensi* similis.

Habitat: in rupibus Orientis Extremi (reg. Ussuriensis).

Typus speciei: e pag. Majchinskoe in valle fl. Majche in Herb. Inst. Bot. Ac. Sc. asservatur.

Affinitas: quasi medium tenet inter *P. Tranzschelii* et *P. ussuriensem* ab utraque specie tamen satis distincta.

SIBBALDIA

14. **S. macrophylla** Turcz. ined.

Tota planta quam *S. procumbens* L. robustior caulibus ad 10 cm lg., foliolis ad 3 cm lg. et 2 cm lt. obovatis apice 3-vel interdum 5-dentatis dentibus breviusculis, late semiovatis apice in mucronem parvum atrorubrum subito attenuatis, dente medio vicinis plerumque conspicue minore et brevior, (foliolis) pilis sat longis rigidiusculis utrinque vestitis. Flores parvi hypanthiis pilis rigidis tectis, episepalis lanceolatis, sepalis ovatis sesqui longioribus, petalis ca. 2 mm lg. quam sepala brevioribus. Reliqua *S. procumbentis* L.

Habitat: in regione alpina Sibiriae australis.

Typus: e Dahuria in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

15. **S. Olgae** Juz. et Ovcz. sp. nova.

Planta perennis humilis, rhizomate lignoso ramoso reliquiis atrofuscis stipularum tecto; caules floriferi breves, 0.5—2 cm alt.; folia 2—10 mm longe petiolata; foliola parva subrotundata basi rotundata vel late cuneata, apice truncata dentibus 3 magnis obtusis praedita, tenuiuscula, pilis simplicibus, subtus plerumque sparsiusculis utrinque pilosa; stipulae ovatae subtus parce pilosae (imprimis ad apicem). Flores 2—4 ad caulis apicem dispositi; calyces sicut pedicelli pilis accumbentibus dense pilosi; episepala linearia vel anguste lanceolata, sepalis interioribus $1\frac{1}{2}$ breviora et 2—3-plo angus-

tiora; petala 1.5—2 mm lg. et lat. rotundata vel late obovata, calyce paullo longiora, sicca albescentia; stamina 5; pistilli parum numerosi; carpella ovoidea, laevia.

Habitat: in declivibus apricis reg. alpinae montium Alatau-kirghizici et Pamiro-Alai.

Typus speciei: e Tadzhi-kistania (Karategin, ad fontes fl. Mynbulak) in Herb. Inst. Bot. Ac. Sc. USSR conservatur.

Species in honorem cl. Olgaе Muravjovae, generis Sibbaldiae monographi, nominatur.

SIBBALDIANTHE JUZ. gen. nov.

Flores plerumque solitarii pedicellis plus minusve longis tenuibus, in axillis foliorum caulinarum superiorum dispositis insidentes, parvi, hermaphroditi; hypanthium patelliforme; sepala sicut episepala 5 in numero; petala 5, hrevia, pallide lutea; stamina 10 petalis opposita; pistilli 9—15; styli subbasales ovario multo longiores fusiformes; carpella sat lata oblique ovata, rugosa. Herba perennis radice longa caudiculos breves lignescentes emitente; folia petiolata ternata foliolis lateralibus sessilibus lanceolatis integerrimis, medio petiolulato tripartito partitione media 3-dentata.

Genus a *Sibbaldia* L. longe diversum habitu, staminum numero et dispositione, stylorum forma et insertione.

Species unica: *S. adpressa* Juz. comb. nova. — *Sibbaldia adpressa* Bge. in Ldb. Fl. alt. I (1829) 428.

CHAMAERHODOS

16. **Ch. songarica** Juz. sp. nova (*Pyrocalyx*).

Planta biennis plerumque a basi ramosa, minus gracilis quam *Ch. erecta*, inflorescentia minus laxa pedicellis brevioribus et crassioribus; caulis plerumque cito rubescens obscure purpureus, cum ramis glandulis pedicellatis minus densis et brevioribus quam in *Ch. erecta*, saepe imprimis in ramulis supremis pilis longioribus et rigidioribus simplicibus occultis. Hypanthium et calyx pilis longis rigidis densis vestiti, glandulae solum ad basin hypanthii observantur; caetera ut in *Ch. erecta*.

Habitat: in Songoria.

Typus: Kopal, leg. V. Lipsky; in Herb. Inst. Bot. Ac. Sc. USSR asservatur.

WORONOWIA JUZ. gen. nov.

Flores in dichasiis 3-plurifloris dispositi ampli; hypanthium infundibuliforme; sepala sicut episepala 5 in numero; sepala erecta (post anthesin non reflexa); petala magna, patentia; stamina numerosa filamentis persistentibus; pistilli ca. 15 in numero; gynophorum adest, carpella non solum ad ejus basin (4—5 in numero) et ad apicem disposita (ut in *Orthurus* Juz., cfr. infra) sed etiam in parte ejus media; stylus glaber infra medium articulatus parte inferiore fructo breviori apice non uncinata, parte superiore

fructo multo longiore.—Herbae perennes foliis basalibus magnis lyratis, caulinis parvis superioribus suboppositis, caule simplici vel plerumpue ramoso.

Genus a *Geo* L. dispositione carpellorum atque styli parte inferiore in fructu haud accrescenti apice non uncinata necnon filamentis persistentibus distinctum.

Species unica: *W. speciosa* Juz. comb. nova. — *Sieversia speciosa* Alb. in Ottsch. i Tr. Odess. Otd. Ross. Obschtsch. sadov. 1890 (1891) 101.

Nomen datur in memoriam clarissimi et amicissimi G. N. Woronow, florum Caucasicum scrutatoris celeberrimi.

GEUM

18. **G. glabricaule** Juz. (Sect. *Caryophyllastrum*).

Proles ex affinitate *G. aleppici* Jacq. habitu et foliorum forma *G. stricto* Ait. simillima a quo tamen caulium ut etiam foliorum paginae inferioris glabritie distinguitur.

Habitat: in Dahuria, Mongolia boreali.

Typus speciei: e ditone fl. Zejæ et Burejæ in Herb. Inst. Bot. Ac. Sc. USSR asservatur.

ORTHURUS JUZ. gen. nov.

Flores in dichasiis paucifloris dispositi, mediocres; hypanthium infundibuliforme vel subcampanulatum; sepala et episepala 5; sepala erecta, petala calyce breviora vel aequilonga; carpella 4—10 in numero, gynophorum breve vel breviusculum, fructu 1 ad ejus basin disposito et in hypanthio occulto ceteris ad ejus apicem stellatum dispositis; styli recti in medio articulati parte superiore caduca glabra vel pilosa, inferiore in fructu valde accrescenti fructum superante apice non uncinata, superne vel tota longitudine setis magnis retroflexis tecta.—Herbae perennes basi rosulatae foliis radicalibus lyratis.

Genus *Woronowiae* Juz. proximum sed imprimis fructuum indole abhorrens.

Species duae: 1) *O. heterocarpus* Juz. comb. nova (= *Geum heterocarpum* Boiss. Elench. pl. nov. (1838) n° 69); 2) *O. kokanicus* Juz. comb. nova (= *Geum kokanicum* Rgl. et Schmalh. ex Rgl. Descr. plant. nov. rarior. a O. Fedtsch. in Turkest. lect. (1882) 24).

DRYAS

20. **D. Henricae** Juz. sp. nova (*Punctatae*).

Proles et affinitatae *D. punctatae* Juz., a qua differt foliis supra sat dense tomentoso-pilosis (glandulis sessilibus tomento omnino occultis), subtus tota facie densissime albo tomentosis.

Habitat: in stepposis Sibiriae Orientalis.

Typus speciei: e m. Kiren a cl. H. Poplawska (cui species dedicatur) lectus in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

21. $\times D. vagans$ Juz. hybr. nova (*D. octopetala* L. \times *D. punctata* Juz.).
Formis arcticis *D. octopetalae* simillima, attamen ab ea foliis supra plus minusve glanduloso-punctatis, saepe etiam subtus distinctius nervosis abhorret.

Habitat: in tundris partis Europae URSS.

Typus e peninsula Kola in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

FILIPENDULA

22. **F. stepposa** Juz. sp. nova (Subg. *Ulmaria*).

F. Ulmariae (L.) Maxim. valde affinis, differt ab ea statura humiliore, caule haud raro usque ad basin tomentosus, foliis crassis subcoriaceis margine saepius crispatis, supra plerumque strigoso-pilosis, subtus dense et molliter tomentosus, foliolis lateralibus et lobis folioli terminalis profunde incisus, dentibus foliorum margine revolutis, ramis inflorescentiae crassis, floribus et alabastris conspicue majoribus.

Habitat: in pratis, in steppis, in fruticetis Rossiae orientalis et Sibiriae Occidentalis.

Typus e Baschkiria in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

ALCHIMILLA

23. **A. hypochlora** Juz. sp. nova (*Sericeae*).

Revocat *A. chlorosericeam* Bus., differt tamen foliis supra tota facie subsericeo appresse pilosis, subtus (imprimis interioribus) plerumque glabris vel subglabris (exterioribus nervo principali sericeo piloso, caeterum disperse pilosis), foliolis oblongo-obovatis iis *A. chlorosericeae* latioribus; caulibus superne et ejus ramis glabris; pedicellis et hypanthio glabris; calyce intus saepe vinicoloris.

Habitat: in pratis alpinis Caucasi Magni (Austro-Ossia).

Typus e faucibus Ermani in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

24. **A. heteroschista** Juz. sp. nova (*Sericeae*).

Planta mediocris valida, in omnibus partibus appresse sericeo-pilosa; folia radicalia ad 4.5 cm longa et 5 cm lata, plana, reniformia vel interiora plerumque rotundato-reniformia vel rotundata, utrinque (subtus densissime) appresse pilosa supra parum subtus valde sericeo-micantia, usque ad $\frac{2}{3}$ — $\frac{3}{4}$ 7-secta, segmentis oblongis vel obovatis latiusculis, medio usque ad basin a vicinis separato (saltem in foliis superioribus scil. interioribus), omnibus apice rotundatis in dimidio superiore profunde inciso dentatis dentibus oblongo-lanceolatis acutis fere rectis utrinque 3—5; caules petioli foliorum radicalium duplo longiores 13—16 cm alt. Flores ad 3.5 mm longi et 2 mm lati, sepalis intus rubescentibus. Reliqua *A. Raddeanae* Bus.

Habitat: in regione alpina Transcaucasiae australis, in declivibus humidis (septentrionalibus).

Typus: e viciniis Nor-Bajazet, m. Kysyl-dagh a P. Smirnovio lectus in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: a proxima *A. Raddeana* Bus. differt foliis planis segmento medio usque ad basin cum lateralibus vicinis haud connato.

25. A. Woronowii Juz. sp. nova (*Pubescentes Pseudo-Sericatae*).

Planta parva griseo-viridis, paullo sericeo-micans; folia radicalia 1.3—3.5 cm longa, 1.7—4 cm lata, reniformia, plerumque plana, 5-incomplete 7-loba lobis brevibus arcuatis truncatis, incisura inter lobos conspicua, dentibus utrinque 3—5 magnis semiovatis vel semiellipticis obtusiusculis, dente terminali brevioribus; omnia utrinque dense appresse pilosa subtus densissime pilosa et paullo sericeo-micantia, nervis principalibus densissime appresse pilosis; petioli foliorum radicalium dense appresse pilosi; caules 10—25 cm longi basi plus minus ascendentes, duri, tota longitudine quam petioli minus dense appresse pilosi rubescentes; folia radicalia fere semirounda, lobis brevissimis, stipulis grosse dentatis dentibus parum numerosis. Inflorescentia haud multiflora angusta, ramis breviusculis; flores sat dense glomerulati parvi, circa 2 mm longi et lati flavescens; urceoli anguste campanulati appresse pilosi; sepala urceolos subaequantia, late ovata, acuta saltem superne appresse pilosa; episepala sepalis subduplo breviora et multo angustiora margine pilosa; pedicelli solum florum infimorum urceolis longiores caeteri eos subaequantibus vel breviores, glabri. VII, fr. VIII.

Habitat: in regione subalpina Caucasi Magni (Austro-Ossia), in declivibus lapidosis et in fruticetis.

Typus speciei: Austro-Ossia, prope pagum Edis (Edisi). 1924, legit S. Juzepczuk; in Herb. Inst. Bot. Ac. Sc. USSR conservatur.

Affinitas: species habitu et pubescentia *A. sericatam* Rchb. satis admonens, sed jam pedicellis glabris distinctissima.

Species nomine cl. G. N. Woronow, nuper beati, ornata.

26. A. rubens Juz. sp. nova (*Pubescentes Coloratae*).

Planta parva vel mediocris griseo-viridis; folia radicalia 1.7—6 cm longa, 2—8 cm lata, late-reniformia vel reniformia, solum suprema interdum rotundato-reniformia, basi plus minus late sinuata, plana, 7-loba, lobis latis et brevibus arcuatis vel semiroundatis haud raro apice truncatis subquadratis, solum in foliis intimis interdum triangulari-semiovatis, incisura inter lobos valde profunda, dentibus loborum utrinque 4—6 vel rarissime 7 oblongo-ovatis obtusis vel obtusiusculis plerumque porrectis; utrinque dense pilosa subtus ad nervos principales inferne pilis horizontaliter patentibus vel paullo reflexis tecta, petioli breves vel longiusculi pilis horizontaliter patentibus densis tecti in sole saepe rubescentes; caules 6—28 cm longi petiolis plerumque parum vel subduplo longiores plerumque suberecti, stricti vel paullo flexuosi, tota longitudine dense patule pilosi in sole plerumque plus

minus rubescentes; folia caulina parum evoluta, infima semirotonda, 3—5-loba, lobis brevibus lateribus integerrimis, stipulis grosse dentatis. Inflorescentia parum ramosa ramis 1—4 sub angulo acuto orientibus; flores in glomerulis haud numerosis laxiusculis aggregati majusculi 2.5—5 mm in diametro, flavescenti-virides; urceoli 1—2 mm longi campanulati vel maturi subsphaerici in parte inferiore dense patulo pilosi superne glabrescentes; sepala plerumque urceolos subaequantia ovata acutiuscula haud dense pilosa, episepala sepalis breviora et angustiora acuta solum margine ciliata; pedicelli plerumque urceolis longiores inferne vel interdum usque ad paulo supra medium patule pilosi. VI—VII.

Habitat: in pratis montanis (plerumque subalpinis) Sibiriae Occidentalis et Asiae Mediae.

Typus speciei: Jugum Saur in valle fluminis Temir-su, leg. Gontscharov et Borissova.

Affinitas: similis *A. Grossheimii* Juz. sed ab ea foliis magis reniformibus omnino planis, incisura inter lobos profundiore, caule humiliore, inflorescentia depauperata, floribus subminoribus, urceolis superne glabrescentibus atque sepalis minus dense pilosis discernenda. Ab *A. egentii* Juz., cui magis affinis, differt petiolis foliorum radicalium rubescentibus, caulibus plerumque eos non superantibus vel parum superantibus, floribus majoribus.

27. *A. omalophylla* Juz. sp. nova (*Eu vulgares Hirsutae Barbulatae*).

Planta mediocris vel rarius sat magna, griseo-viridis; folia radicalia 3.5—6.5 cm longa et 4.5—9 cm lata reniformia vel late reniformia plana 9-loba, lobis brevibus vel breviusculis arcuatis, semiovatis vel breve triangularibus, incisura inter eos brevi sed bene conspicua, lobis exterioribus foliorum intimorum plerumque dentibus basalibus lateris exterioris incisura profunda a caeteris separatis quasi foliolum formantibus; dentibus loborum utrinque 5—8 semiovatis vel anguste triangularibus obtusiusculis vel acutis inaequilateralibus porrectis apicem versus paulo increscentibus dente terminali vicinis minore; utrinque dense pilosa nervis principalibus paginae inferioris pilis patentibus vel erecto-patentibus tectis; petioli crassi pilis horizontaliter patentibus vestiti, stipulis pallidis; caules 20—45 cm alti petiolis foliorum supremorum plerumque subduplo longiores, erecti, stricti, robusti, usque ad apicem pilis horizontaliter patentibus vestiti; folia caulina haud magna plerumque semirotonda lobis arcuatis semirotondatisve, incisura inter eos profunda, stipulis acutiuscule dentatis. Inflorescentia brevis et sat angusta ramulis sub angulo acuto orientibus; flores laxiuscule glomerulati 3—4 mm in diametro, flavescenti-virides; urceoli obconici vel campanulati dense patulo-pilosi; sepala urceolis breviora ovata acutiuscula, episepala sepalis conspicue breviora et angustiora sicut sepala extus longe pilosa; pedicelli urceolis aequantes vel paulo breviores basi pilosi vel in floribus superioribus glabri.

Habitat: in pratulis silvaticis, in margine silvarum (imprimis cembretorum) et in fruticetis montium Altaicorum.

Typus speciei: Oirotia, trajectus Sjominski, leg. S. Juzepczuk; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: prope *A. pastorem* Bus. ponenda sed dentibus foliorum magnis acutis, floribus laxe glomeratis majusculis, urceolis dense pilosis distinctissima.

28. **A. cyrtopleura** Juz. sp. nova (*Eu-vulgares Hirsutae Retropilosae*).

Planta mediocris, gramineo-viridis; folia radicalia 3—7 cm longa 3.5—9 cm lata reniformia vel interiora rotundato-reniformia raro rotundata, paullo undulata, (7) 9-loba lobis arcuatis vel semirobundatis, foliorum interiorum semiovatis incisura inter eos haud profunda plerumque inconspicua, dentibus utrinque 6—8 majusculis breviusculis semiovatis vel semiellipticis plerumque valde inaequalateralibus obtusiusculis vel obtusis, dente terminali vicinis multo minore; utrinque plerumque densiuscule, infima et suprema haud raro disperse pilosa nervis principalibus in pagina inferiore inferne plerumque patulo-pilosis; petioli pilis densis conspicue reversis vestiti, stipulae intense rubro-coloratae; caules (6) 10—35 cm longi petiolos foliorum radicalium sesqui—duplo longiores basi paullo ascendentes vel suberecti-curvati vel stricti, sicut petioli pubescentes, in inflorescentia glabrescentes, in sole saepe rubescentes, Inflorescentia sat angusta, flores in glomerulis, haud densis vel densiusculis aggregatis majusculi, circa 3 mm longi, flavescenti-virides intus interdum rubescentes; urceoli campanulati glabri vel florum inferiorum saepe disperse pilosi; sepala urceolis paullo breviora ovata superne parce pilosa, episepala sepalis sesqui breviora et subtriplo angustiora; pedicelli urceolis paullo longiores vel iis aequilongi in floribus superioribus urceolis breviores glabri.

Habitat: in pratulis alpinis et silvaticis, ad margines silvarum et fruticetorum montium altaicorum et tjanschanicorum.

Typus speciei: Oirotia, prope pagum Kuraj, ad ripam dextram fl. Kuraj, in lariceto ad tramitem. 24 VIII 1936 leg. S. Juzepczuk sub n° 298; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: ab *A. retropilosa* Juz. bene differt dentibus foliorum radicalium brevioribus valde inaequalateralibus, stipulis foliorum radicalium intensius coloratis, florum glomerulis paullo laxioribus.

29. **A. pachyphylla** Juz. sp. nova (*Eu-vulgares Hirsutae Retropilosae*).

Planta mediocris vel sat magna, obscure viridis; folia radicalia 3.5—10 cm longa, 4—11.5 cm lata, rotundato-reniformia, undulata, lobis 9 brevibus arcuatis semirobundatisve inter lobos parum incisa, dentibus loborum utrinque 8—9 magnis oblique semiovatis vel semiellipticis, obtusiusculis vel obtusis; utrinque densiuscule pilosa solum suprema supra inter plicas et subtus inter nervos haud raro glabrescentia, subtus ad nervos principales tota longitudine pilosa, pilis in parte inferiore nervorum paullo reclinatis;

crassiuscula, sicca reticulatione subtus prominula; stipulae pallidae; petioli oliorum radicalium sat dense pilosi pilis plus minus conspicue reversis, caules 10—55 cm longi, quam petioli parum longiores, in $\frac{1}{2}$ — $\frac{1}{3}$ inferioribus sicut petioli pilosi, in inflorescentia glabrescentes; folia caulina inferiora et imprimis media bene evoluta late reniformia, inter lobos profunde incisa, superiora rhomboidea basi cuneata; stipulae foliorum caulinarum sat profunde grosse et obtuse inciso-dentatae. Inflorescentia parum ramosa, angusta vel sat divaricata, haud multiflora; flores laxè glomerulati, magni circa 3 mm longi, 4 mm lati, flavescenti-virides; urceolis campanulati vel fere obconici, glabri vel pilis solitariis praediti; sepala urceolis subaequilonga, glabra; episepala sepalis sesqui breviora et subduplo angustiora; pedicelli urceolis aequilongi vel breviores, glabri.

Habitat: in pratulis inter frutices in pratis, locis graminosis Sibiriae altaicae.

Typus speciei: Oirotia, in insula fl. Sjoma paullo supra pagum Schebalino, in herba alta. 5 VIII 1936, leg. S. Juzepczuk sub n° 105; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: a speciebus affinibus et imprimis ab *A. cyrtopleura* Juz. foliis caulinis basi cuneatis necnon stipulis foliorum radicalium pallidis dignoscenda.

30. **A. arcuatiloba** Juz. sp. nova (*Euulgares Hirsutae Nemorales*).

Valde affinis *A. imberbi* Juz., a qua differt foliis obscure viridibus, in planta viva supra paullo nitentibus, minus undulatis, lobis brevissimis arcuatis minute dentatis, floribus subminoribus.

Habitat: in declivibus herbosis Tauriae (jugum Jaila).

Typus speciei: e m. M. Tschutschel a S. Juzepczuk lectus in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

31. **A. hians** Juz. sp. nova (*Euulgares Hirsutae Nemorales*).

Planta mediocris vel sat magna, gramineo-viridis; rhizoma robustum; folia radicalia 4—9 cm longa, 6—13 cm lata, late reniformia sinu basali arcuato vel obtuso, in foliis supremis plerumque rectangulo, plana vel fere plana, 7—9-loba, lobis arcuatis vel in foliis supremis plerumque breve triangularibus, incisura inter eos conspicua lata (aperta), dentibus loborum utrinque 5—8 semiovatis obtusiusculis (in foliis exterioribus) vel oblique triangularibus acutis (in foliis interioribus) valde inaequaliter porrectis dente terminali parvo longitudine tamen vicinos aequante; infima subtus nervis principalibus pilosis ceterum glabra vel glabrescentia reliqua utrinque disperse vel sat dense pilosa subtus ad nervos principales pilis suberecto patentibus vestita; petioli foliorum radicalium pilis horizontaliter vel plerumque paullo suberecto patentibus tecti; caules 20—38 cm longi suberecti stricti vel paullo flexuosi petiolis aequilongi vel sesqui longiores sicut petioli pilosi, in inflorescentia subglabrescentes; folia caulina ampla semirota lobis semirota vel semiovatis, stipulis irregulariter grosse

acute dentatis. Inflorescentia haud multiflora angusta ramulis sub angulo acuto orientibus; flores laxae vel laxiuscule glomerulati, mediocres vel magni, 3—4 cm in diametro virides vel flavescenti virides, urceolis 1—2 mm longis obconicis vel campanulatis, glabris; sepala 1—1.5 mm longa, late ovata acuta apice pilis solitariis praedita; episepala sepalis multo breviora et angustiora; pedicelli urceolos aequantes vel longiores glabri.

Habitat: in pratis silvaticis, in marginibus silvarum, in pratis ad ripas fluviorum et in fruticetis Sibiriae altaicae.

Typus speciei: Oirotia, trajectus Sjominski, in prato silvatico in cembreto. 29 VIII 1936, leg. S. Juzepczuk n° 394; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: differt ab *A. micanti* Bus. foliis sat laete viridibus dentibus foliorum magnis, caulibus suberectis, floribus subminoribus.

32. *A. denticulata* Juz. sp. nova (*Euvulgares Hirsutae Nemorales*).

Planta mediocris obscure viridis; folia radicalia 2.5—9.5 cm longa, 3—11 cm lata, reniformia vel rotundato reniformia, paullo undulata vel; fere plana, 9-vel incomplete 11-loba, lobis semiovatis fere sine incisura inter eos, dentibus loborum utrinque 6—9 parvis oblique semiovatis obtusiusculis in utraque pagina pilis dispersis vel sat densis tecta supra inter plicas subtus inter nervos haud raro glabrescentia nervis paginae inferioris tota longitudine pilis erecto patentibus dense vestitis; petioli foliorum radicalium tota longitudine pilis horizontaliter patentibus vel leniter reclinatis tecti, stipulis plus minus vini coloris; caules 12—40 cm longi petiolis subduplo longiores suberecti graciles paullo curvati vel flexuosi, in dimidio inferiore sicut petioli pilosi, superne glabri; folia caulina parva late reniformia vel semirotonda lobis brevibus usque ad basin minute obtuse dentatis stipulis grosse obtuse dentatis. Inflorescentia sat angusta, superne divaricata, relative pauciflora; flores sat dense glomerulati parvi non ultra 3 mm longi, virides, urceolis campanulatis glabris; sepala late ovata obtusa glabra; episepala sepalis sesqui breviora subtriplo angustiora; pedicelli urceolos aequantes vel paullo longiores glabri.

Habitat: in locis graminosis apricis, in pratis et in fruticetis Sibiriae altaicae.

Typus speciei: Oirotia, in valle fl. Sjoma paullo supra pagum Schebalino. VIII 1936; leg. S. Juzepczuk; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: a praecedente foliis magis rotundatis obscure viridibus minute denticulatis, caulibus petiolisque pilis horizontaliter patentibus vestitis optime distincta.

33. *A. tianschanica* Juz. sp. nova (*Euvulgares Hirsutae Nemorales*).

Planta mediocris vel sat magna flavescenti-viridis; folia radicalia 2—8 cm longa, 2.5—10 cm lata, rotundato-reniformia basi anguste sinuata ut videtur plana, exteriora 7-interiora 9-loba; lobis semirotondatis vel semi-

ovatis, in foliis supremis interdum triangularibus, incisura inter eos brevi vel in foliis inter oribus subnulla, dentibus loborum utrinque 6—9 oblique semiovatis valde inaequalateralibus dorso convexis acuminatis versus dentem apicalem minutum increscentibus; supra glabra subtus disperse vel plerumque densiuscule pilosa nervis principalibus pilis densis erecto patentibus vestita, subcoriacea, sicca subtus reticulatione prominula; petioli foliorum radicalium omnium pilis densiusculis haud longis horizontaliter patentibus vestiti; caules 20—50 cm longi erecti, stricti vel subflexuosi, sicut petioli vestiti, in inflorescentia glabrescentes; folia caulina numerosa bene evoluta stipulis acute dentatis. Inflorescentia angusta multiflora ramis tenuibus sub angulo acuto orientibus; flores sat dense glomerulati parvuli 1.5—2 mm longi, 2—3 mm lati, virides; urceoli 0.75—1.5 mm longi, obconici, florum inferiorum basi patulo pilosi, cetaerum glabri, sepala urceolis breviora late ovata glabra vel pilis solitariis praedita, episepala parva urceolis subduplo breviora subtriploque angustiora; pedicelli urceolis subaequilongi vel plerumque breviores glabri.

Habitat: ad ripas rivorum, in rupibus Asiae Mediae (montes Tian-Schan).

Typus speciei: Ala-tau kirghisicus, jugum Kan-dzhajlau in parte ejus occidentali, in rupibus secus rivum, 2 VII 1922, leg. E. P. Korovin sub n^o 1598; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: differt ab *A. vulgari* L. s. str. (*A. pratensi* auct.) dentibus foliorum radicalium obtusis apicem versus valde increscentibus inflorescentia angusta parum ramosa.

34. *A. laeticolor* Juz. sp. nova (*Euvulgares Hirsutae Nemorales*).

Planta mediocris vel sat magna gramíneo vel flavescenti-viridis; folia radicalia 2.5—10 cm longa, 2.5—11.5 cm lata, reniformia vel rotundato-reniformia, undulata, 7— vel plerumque 9-loba, lobis semiotundis vel semiovatis obtusiusculis, incisura inter eos parva, dentibus loborum utrinque 6—10 magnis inaequalateralibus extus convexis apice acuminatis versus apicem loborum valde increscentibus, dente terminali vicinis multo minore; supra glabra vel solum ad margines disperse pilosa, subtus plerumque tota facie disperse vel densiuscule pilosa ad nervos principales pilis densis patentibus vel erecto patentibus vestita, petioli sicut caules in dimidio eorum inferiore pilis densis patentibus vel plerumque paullo erecto patentibus breviusculis vestiti; caules breviusculi 10—40 cm longi suberecti plerumque paullo curvati parum ramosi; folia caulina bene evoluta breviloba stipulis haud profunde grosse dentatis. Inflorescentia sat angusta, floribus laxe glomerulatis, 2—2.5 mm longis, flavescens; urceoli breviuscule obconici glabri vel florum infimorum pilis solitariis praediti; sepala ovata vel anguste ovata urceolis vix breviora; episepala haud raro (imprimis florum infimorum) iis subaequilonga sed angustiora; pedicelli urceolis plerumque longiores glabri.

Habitat: in declivibus graminosis montium, ad margines silvarum et in pratulis regionis subalpinæ Caucasi occidentalis.

Typus speciei: Circassia, prope pagum Krasnaja Poljana, mons Atschischkho, in declivibus umbrosis in fageto-altiherbeto, ad tramitem. 24 VII 1937, leg. S. Juzepczuk sub n° 374; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: ab *A. vulgari* L. s. str. bene distinguitur incisura inter lobos bene evoluta quamquam haud profunda, dentibus eorum acuminatis, floribus paullo majoribus sepalis longioribus et angustioribus, ab *A. tianschanica* Juz. superdescripta dentibus foliorum majoribus, floribus majoribus laxè glomerulatis.

35. **A. humilicaulis** Juz. sp. nova (*Euvulgares Hirsutae Exuentes*).

Planta mediocris gramineo-viridis; folia radicalia 3—8 cm longa, 3.5—10 cm lata, reniformia vel late-reniformia, sinu basali rectangulo vel obtusangulo, plana, 7—9 loba, lobis arcuatis usque ad semiovatos vel fere triangulares (in foliis supremis), circa $\frac{1}{3}$ radiilon gitudinis aequantibus, incisura inter lobos parva, dentibus loborum utrinque 6—8 semiovatis valde inaequaliter acutiusculis apicem versus increscentibus, dente terminali vicinos subaequante; intima solum subtus ad nervos principales accumbenti pilosa, cetera supra ad plicas et ad margines loborum pilosa et solum suprema supra inter plicas pilis haud numerosis obsita subtus nervis principalibus in parte inferiore ($\frac{1}{2}$ — $\frac{3}{4}$) glabris; petioli foliorum radicalium 3—18.5 cm longi tota longitudine pilis sat densis horizontaliter patentibus vel paullo reclina is vestiti; stipulae intense vinaceae; caules 15—23 cm longi ascendentes flexuosi quam petioli foliorum radicalium interiorum brevioris vixve longiores, ad internodia infima 1—2 sat dense pilosi pilis conspicue reversis, ceterum glabri; folia caulina plerumque parum evoluta semirotonda vel rhomboidea inter lobos profunde incisa, stipulis grosse dentatis. Inflorescentia sat ampla et multiflora; flores laxè glomerulati, majusculi, circa 4 mm in diametro, virides; urceoli circa 2 mm longi obconici vel campanulati, glabri; sepala urceolis breviora, ovata, plerumque glabra; episepala sepalis $\frac{1}{3}$ breviores et duplo angustiores; pedicelli urceolos aequantes vel iis subduplo longiores glabri.

Habitat: in pratis silvaticis et subalpinis montium Thian-Schan.

Typus speciei: ad litora australia lacus Issyk-kul, in faucibus Dzhergiltshak, in graminosis juxta marginem piceeti e rhizomate, IX 1930 a. S. Juzepczuk lecto educatus, in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: foliis supra glabris, caulibus humilibus necnon stipulis rubescentibus a speciebus affinis diversa.

36. **A. sanguinolenta** Juz. sp. nova (*Euvulgares Hirsutae Exuentes*).

Planta mediocris vel magna gramineo-viridis vel interdum subglaucescens; folia radicalia 1.8—13 cm longa, 2.5—14 cm lata, rotundata vel

late reniformia, undulata, plerumque 9-loba, lobis brevissimis $\frac{1}{5}$ — $\frac{1}{4}$ radii longitudinis aequantibus, arcuatis vel semirotondis, solum in foliis supremis interdum semiovatis vel breve triangularibus, incisura inter lobos brevi vel in foliis supremis plerumque nulla, dentibus loborum utrinque 5—7 magnis semiovatis vel oblongis acutiusculis, supra tota facie disperse pilosa vel plerumque solum ad plicas et margines loborum pilosa, ceterum glabra, subtus plerumque solum ad nervos principales pilis patentibus pilosa, exceptis inferioribus interdum inter nervos disperse pilosis, nervis foliorum superiorum inferne glabris; stipulae (haud raro etiam et partes adjacentes petiolorum) intense vinaceae; petioli foliorum radicalium sicut caules in parte inferiore pilis sat densis reflexis tecti; caules 3—46 cm longi petiolos foliorum supremorum valde elongatos aequantes vel iis breviores, rarius paullo longiores, plerumque erecti, solum ad internodia infima 1—2 pilosi, ramis (imprimis superioribus) saepe sat divaricatis; folia caulina sat bene evoluta, late reniformia, stipulis profunde incise dentatis. Inflorescentia plerumque haud multiflora; flores laxiuscule glomerulati, circa 3 mm longi, ad 4 mm in diametro, flavescens; urceoli elongati obconici; sepala urceolis breviora, glabra; episepala urceolis sesqui breviora et angustiora; pedicelli urceolis subaequilongi, glabri.

Habitat: ad ripas fluviorum, in pratis et in fruticetis Sibiriae altaicae.

Typus speciei: Oirotia, ad ripam fl. Sjoma paullo supra pagum Schebalino. VIII 1936, leg. S. Juzepczuk; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: proxima *A. orbicanti*, differt tamen foliis minus rotundatis dentibus longioribus et acutioribus, pubescentia caulium et petiolorum densiore, stipulis rubentibus, stipulis foliorum caulinarum profunde incisus necnon inflorescentiae indole atque urceolorum majorum forma.

37. **A. Lipschitzii** Juz. sp. nova (*Euvulgares Hirsutae Exuentes*).

Planta mediocris laete viridis, rhizomate robusto; folia radicalia 1.5—4 cm longa, 2.8—4.5 cm lata, reniformia, sinu basali plerumque rectangula, paullo undulata, supra disperse pilosa, subtus saltem infima et suprema inter nervos principales glabra, nervis principalibus foliorum exteriorum et mediorum pilis erecto-patentibus vel inferne horizontaliter patentibus, superiorum in parte inferiore glabris; lobis semirotondis vel foliorum superiorum semiellipticis, incisura inter eos sat profunda et angusta, dentibus loborum utrinque 6—7 magnis anguste semiellipticis vel semiovatis obtusiusculis fere aequalibus, dente terminali vicinos subaequante; subtus in planta sicca prominule reticulata; petioli foliorum inferiorum et mediorum pilis haud densis patentibus vel reversis tecti, foliorum superiorum versus apicem vel tota fere longitudine glabri; caules suberecti paullo flexuosi 9—17 cm longi, paullo vel subduplo petiolis foliorum superiorum longiores, sicci straminei, internodiis 1(2) infimis pilis haud densis reflexis vestiti,

ceterum glabri; folia caulina pauca ambitu semirobundata, incisura inter lobos angustos profunda. Inflorescentia angusta pauciflora ramis plerumque abbreviatis sub angulo acuto orientibus; flores laxiuscule vel sat dense glomerulati, glomerulis haud raro confluentibus, sat magni, 2—3 mm longi, 2.5—4 mm in diametro, flavescentes; urceoli 1—1.75 mm longi, breviter obconici glabri; sepala urceolis paullo breviora late ovata acutiuscula glabra, episepala sepalis multo breviora et angustiora; pedicelli urceolis aequilongi vel breviores, glabri.

Habitat: in pratis alpinis Asiae Mediae.

Typus speciei: Districtus Lepsa, in ditone Tschulak in pratis alpinis juxta apicem montis Kongr-oba 18 VIII 1928, leg. S. Lipschitz sub n^o 1130; in Herb. Inst. Bot. Ac. Sc. URSS, cotypus in Universitate Mosquensi conservantur.

Affinitas: planta *A. Lipschitzii* superdescriptae valde affinis sed adhuc non satis nota crescit in montibus altaicis, ab *A. Lipschitzii* dimensionibus majoribus, foliis magis pilosis (haud raro utrinque densiuscule pilosis) nervis patule pilosis, caulibus internodiis semper 2 infimis pilosis, florum glomerulis laxioribus distincta; haec a nobis nomine *A. cembretorum* in schedis salutata. (Typus e trajecto Sjominski).

38. ***A. purpurascens*** Juz. sp. nova (*Euvulgares Hirsutae Exuentes*).

Planta *A. cembretorum* supra commemoratae valde similis sed ab ea stipulis foliorum radicalium pallidis, coloratione autumnali foliorum obscure purpurea, dentibus foliorum et stipularum elongatis et acutis distincta; lobi foliorum superiorum triangulares dentibus acutangulis inaequilateralibus margine fere rectis apicem versus conspicue increscentibus; florum glomeruli densi.

Habitat: ad margines cembretorum et laricetorum, in pratulis silvaticis montium altaicorum.

Typus speciei: Oirotia, trajectus Sjominski in pratulo silvatico in cembreto, 29 VIII 1936, leg. S. Juzepczuk; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

39. ***A. diglossa*** Juz. sp. nova (*Euvulgares Hirsutae Exuentes*).

Simillima *A. cembretorum* et *A. purpurascenti* Juz. quibuscum saepe promiscue crescit, bene autem differt incisura inter lobos foliorum radicalium et caulinarum valde evoluta lobis foliorum radicalium extimis imperfectis a vicinis omnino separatis quasi foliola duo supra petiolum formantibus, dentibus imprimis foliorum caulinarum inferiorum distincte curvatis, stipulis foliorum caulinarum profunde incisus, urceolis elongatis obconicis neque campanulatis; ab *A. cembretorum* praeterea dentibus foliorum et stipularum acutis, ab *A. purpurascenti* foliis autumnis non purpurascensibus, florum glomerulis laxis.

Habitat: ad margines silvarum acerosarum et in pratis silvaticis juxta finem silvarum Sibiriae altaicae.

Typus speciae: districtum Bijsk, reg. Tschjornyj Anuj, Talitzkie bjelki, in silva acerosa, in declivibus montis 15 VII 1928, leg. E. Pobedimova; in Herb. Inst. Bot. Ac. Sc. USSR asservatur.

40. **A. biquadrata** Juz. sp. nova (*Euvulgares Hirsutae Exuentes*).

Planta magna glaucescenti pallide viridis, folia radicalia rotundata sinu basali angusto, 11 vel incomplete 13-loba, lobis brevibus foliorum inferiorum arcuatis vel semirobundatis, foliorum superiorum subtriangularibus circumcirca dentatis, dentibus utrinque 8—11 subaequalibus vel apicem versus incrementibus minusculis inaequalateralibus, margine exteriori inferne convexis dente terminali minimo vicinis multo minore; praesertim solum ad plicas et ad margines, subtus ad lobos extremos disperse pilosa, ceterum glabra, nervis principalibus faciei foliorum inferioris solum ad apicem adpresse pilosis ceterum glabris; petioli foliorum radicalium pilis haud densis dispersis horizontaliter patentibus vel paullo reclinatis vestiti, juxta apicem plerumque glabrescentes; caules suberecti quam petioli foliorum paullo longiores ad internodia infima 2—3 disperse pilosi ceterum glabri; folia caulina reniformia vel superiora rhomboidea, lobis semirobundatis vel semiovatis, stipulis acutiuscule incisodentatis. Inflorescentia angustiuscula haud multiflora, floribus laxiuscule vel sat dense glomerulatis haud magnis, pallide viridibus; urceoli obconici glabri sepalis longiores; sepala late ovata glabra episepalis distincte longiora et latiora; pedicelli urceolis breviores glabri.

Habitat: in pratulis silvaticis Sibiriae Altaicae.

Typus speciei: Oirotia in ascensu ad trajectum Sjominski a pago Toputschaja, in pratulo silvatico (in cembreto) 29 VIII 1936; leg. S. Juzepczuk sub n° 364; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: ab *A. Lipschitzii* speciebusque affinibus jam foliis rotundatis, ab *A. heptagona* Juz. lobis foliorum numerosis distinctissima.

41. **A. transiliensis** Juz. sp. nova. (*Euvulgares Hirsutae Heteropodae*).

Planta mediocris griseo-viridis, rhizomate sat robusto; folia radicalia relative parva, 1—3 cm longa, 1.4—3.7 cm lata, reniformia, plana vel paullo undulata, 7 vel incomplete 9-loba, lobis brevibus plerumque semirobundis, incisura inter eos bene evoluta, dentibus loborum utrinque 4—6 minusculis sat aequalibus acutiusculis vel acutis polliciformibus, versus dentem terminalem conspicue minorem paullo inclinatis; infima superne plerumque solum ad margines, subtus ad nervos principales (parte eorum inferiore excepta) pilosa, media et superiora pilis sat densis accumbentibus utrinque vestita, subtus pubescentia nervorum principalium e pilis densis erecto-patentibus constante, sicca reticulatione saepe prominula; petioli foliorum infimorum glabri vel solum inferne parce pilosi, superne glabrescentes, foliorum mediorum et superiorum pilis sat densis mollibus paullo erecto-patentibus vel horizontaliter patentibus tecti; caules elongati, 17—30 cm longi, quam petioli foliorum superiorum multo longiores, erecti, stricti, sicut petioli

foliorum superiorum pilosi, in inflorescentia plerumque disperse pilosi; folia caulina numerosa, bene evoluta, inferiora radicalibus similia sed minora, stipulis profunde inciso dentatis. Inflorescentia angustissima pauciflora ramulis longis sub angulo peracuto orientibus; flores sat dense vel laxiuscule glomerulati, 2—3.5 mm longi; urceoli obconici vel anguste campanulati, 1—2 mm longi, patulo pilosi; sepala late-ovata apice pilosa; episepala sepalis sesqui breviora duploque angustiora; pedicelli urceolis plerumque aequilongi, glabri.

Habitat: in fruticetis regionis silvarum acerosarum Asiae Mediae (montes Tian-Schan).

Typus speciei: Jugum Alatau transiliense, fl. Issyk, supra lacum. Leg. R. Abolin sub n° 165; in Herb. Inst. Bot. Ac. Sc. URSS, cotypus in Herb. Universitatis Asiae Mediae conservantur.

Affinitas: species singularis foliis parvis griseo-viridibus, caulibus petiolisque pilis erecto patentibus, caulibus valde elongatis, urceolis pilosis a confinibus distinguenda.

42. *A. fontinalis* Juz. sp. nova (*Euulgares Hirsutae Heteropodae*).

Planta mediocris flavescenti viridis; folia radicalia 1.7—3.5 cm lg., 2.1—8 cm lt., reniformia vel rotundato reniformia, plana, 7 vel plerumque 9-loba; lobis brevibus in foliis exterioribus arcuatis, in intimis late semiovatis vel fere breviter triangularibus, obtusis vel obtusiusculis, sine incisura inter eos, dentibus utrinque 5—7 breviusculis obtusiusculis vel acutis oblique semiovatis vel oblique triangularibus inaequilateralibus versus apicem loborum paullo increscentibus, dente apicali vicinis conspicue minore; infima utrinque glabra solum subtus ad nervos principales in parte eorum superiore appresse pilosa, media et suprema disperse vel sat dense, subtus dense appresse pilosa; petioli foliorum inferiorum glaberrimi, ceteri pilis sat densis laxè accumulatis vel fere erecto-patentibus vestiti; caules 10—28 cm lg., suberecti, stricti vel paullo curvati, ad internodium primum plerumque glabri, ceterum sicut petioli sed minus dense pubescentes; folia caulina mediocria stipulis haud profunde dentatis. Inflorescentia angusta et haud multiflora, ramis brevibus sub angulo acuto orientibus; flores laxiuscule glomerulati, infimi 2—3 cm lg. et lat., flavescentes; urceoli obconici, glabri; sepala urceolis breviora, late ovata, acutiuscula, fructificatione haud raro rubescentia; episepala sepalis $1\frac{1}{2}$ breviora et triplo angustiora; pedicelli urceolis subaequilongi, glabri.

Habitat: ad ripas rivorum et ad fontes in regione alpina montium Pamiroalaj.

Typus speciei: Darwaz occident., traject. Vozgina (paratypus e Tadzhikestania australi, bass. fl. Chingou, traject. Kulium); in herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: pubescentia caulium et petiolorum erecto patenti et urceolis pilosis a caeteris *Heteropodis* statim dignoscitur.

43. **A. Sauri** Juz. sp. nova (*Euvulgares Hirsutae Heteropodae*).

Planta mediocris laete viridis; folia radicalia reniformia vel rotundata, undulata, 7 vel plerumque 9-loba, lobis breviusculis vel mediocribus arcuatis, semirobundatis et late semiovatis vel interdum fere triangulari-semiovatis, incisura inter eos nulla vel vix conspicua, dentibus loborum utrinque (5) 7—12 parvis breviusculis oblique triangularibus inaequilateralibus acutis, extus inferne saepe valde convexis, dente terminali vicinis plerumque paullo minore, infima utrinque glabrescentia, media supra disperse pilosa, superiora praeterea subtus ad margines disperse pilosa, nervis principalibus tota longitudine pilosis, in mesophyllo glabra; petioli foliorum inferiorum glaberrimi, mediorum disperse superiorum sat dense pilosi, pilis patentibus vel paullo reflexis; caules suberecti, crassi, subflexuosi, solum ad internodia infima dense patule pilosi ceterum glabrescentes; folia caulina sat bene evoluta late reniformia lobis rotundatis vel semiovatis, stipulis acute dentatis. Inflorescentia sat angusta ramis breviusculis sub angulo acute orientibus; flores laxiuscule glomerulati parvi; urceoli obconici, maturi late campanulati, glabri; sepala urceolis breviora ovata, acuta, glabra, episepala sepalis subduplo breviora et angustiora, pedicelli urceolis subaequilongi, glabri.

Habitat: in pratis alpinis et subalpinis Asiae Mediae, jug. Saur.

Typus speciei: inter fl. B. et M. Dzhemenej, leg. Borissova et Gontscharov; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: ab *A. anisopoda* Juz. (specie dahurica) jam lobis foliorum brevioribus arcuatis semirobundatisve distincta.

44. **A. oligotricha** Juz. sp. nova (*Euvulgares Hirsutae Heteropodae*).

Planta mediocris laete viridis; folia radicalia late reniformia (fere) plana lobis arcuatis semirobundatis vel breve triangularibus, incisura inter lobos brevi dentibus loborum utrinque 6—7 sat magnis fere rectis acutiusculis vel acutis, dente terminali vicinos subaequante, subtus solum ad nervos principales in parte superiore appresse vel patule pilosa, supra glabra vel solum ad plicas et margines loborum disperse pilosa; petioli solum foliorum intimorum parce patule pilosi, ceterum glabri, in sole sicut caules haud raro rubescentes; caules graciles ascendentes vel suberecti, glabri; folia caulina semirobundata vel rhomboidea, lobis integerrimis, dentibus haud numerosis, stipulis profunde grosse et irregulariter inciso-dentatis. Inflorescentia sat angusta pauciflora; flores laxe glomerulati, parvi, flavescenti virides; urceoli obconici, glabri; sepala late ovata, quam urceoli breviores, glabri, episepala sepalis subaequilonga anguste ovata; pedicelli urceolis longiores, glabri.

Habitat: in declivibus herbosis lapidosis, ad ripas rivorum in regione subalpina Caucasi occidentalis.

Typus speciei: in monte Atshishkho leg. S. Juzepczuk; in herb. H. Bot. Ac. Sc. URSS asservatur.

Affinitas: quoad pubescentiam *A. Krylovii* Juz. admonet, sed lobis

foliorum acute dentatis, dente terminali vicinos subaequanti floribus flavescenscentibus differt.

45. **A. pogonophora** Juz. spec. nova (*Euulgares Subglabrae Appressipilae*).

Planta mediocris vel magna, glaucescenti-viridis, foliis rotundatis undulatis vel fere planis, (7) 9—11-lobis, lobis extremis saepe sese obtentibus; lobis arcuatis, semirotundatis vel in foliis supremis plerumque late semiovatis vel fere triangularibus, obtusis, circumcirca dentatis, dentibus utrinque 7—10 brevibus et latis, oblique triangularibus, extus plerumque curvatis, dente terminali vicinis plerumque multo minore; utrinque disperse pilosa vel supra fere glabra; petioli dense appresse pilosi; caules 20—35 cm lg. robusti, suberecti, stricti vel flexuosi, tota longitudine laxiuscule appresse pilosi. Inflorescentia haud multiflora ramis elongatis; flores sat dense glomerulati magni, 2.5—4 mm in diam., obscure virides; urceoli obconici vel campanulati, pilis sat densis erecto-patentibus vestiti, sepala urceolis vix breviora, plerumque pilosa; episepala sepalis breviora et angustiora subglabra; pedicelli urceolis breviores, glabri vel in floribus infimis pilis solitariis praediti.

Habitat: in pratis et in declivibus herbosis ad ripas rivorum in reg. subalpina Transcaucasiae occidentalis.

Typus speciei: Circassia, m. Atshishkho, leg. S. Juzepczuk in herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: ab *A. camptopoda* Juz. (specie taurica) foliorum et dentium forma bene differt.

46. **A. urceolata** Juz. sp. nova (*Euulgares Subglabrae Appressipilae*).

Planta mediocris vel sat magna paullo glaucescenti-viridis; folia radicalia 3—8.5 cm lg., 3.5—11 cm lata, late reniformia, paullo undulata 9—11-loba, lobis mediocribus vel sat longis plerumque semiovatis vel anguste triangularibus, incisura inter eos conspicua, dentibus loborum utrinque 5—7 magnis porrectis elongatis oblique triangularibus acutis, dente apicali vicinis subaequilongo; in utraque pagina disperse vel subtus densiuscule appresse pilosa, supra haud raro solum ad plicas pilosa vel rarius supra solum ad plicas parce pilosa, subtus ad nervos principales et ad lobos externos appresse pilosa; petioli dense appresse pilosi; caules 9—50 cm alt., plerumque arcuato ascendentes vel fere prostrati fere usque ad apicem appresse pilosi, bene foliati; folia caulina ampla, semirotundata, inter lobos profunde incisa, stipulis grosse et profunde acutidentatis. Inflorescentia plerumque ampla, multiflora, ramis elongatis, glomerulis laxissimis, floribus amplis 2—4.5 mm lg., 2.5—4 mm lt. pallide viridibus; urceoli elongato-obconici, glabri vel in floribus infimis disperse pilosi; sepala late ovata acutiuscula, urceolis breviora, glabra vel apice pilis solitariis praedita; episepala sepalis multo angustiora sed parum breviora ovato lanceolata; pedicelli urceolis aequilonga vel florum inferiorum plerumque longiora, glabri vel florum infimorum parce pilosi.

Habitat: in declivibus herbosis, ad margines silvarum, in pascuis et pratis subalpinis Caucasi.

Typus: in m. Atshischkho (Circassicae) in vicin. opp. Krasnaja Poljana, leg. S. Juzepczuk, in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: foliis late reniformibus inter lobos profunde incisis, dentibus acutis urceolis magnis a speciebus affinibus optime distincta.

47. **A. frondosa** Juz. sp. nova (*Euvulgares Subglabrae Appressipilae*).

Affinis *A. urceolatae* Juz., a qua differt habitu robustiore (et imprimis caulibus suberectis crassis), pubescentia totae plantaeminus evoluta (caules in dimidio superiore glabri, folia subglabra, subtus ad nervos in eorum parte inferiore haud raro glabrescentia), lobis brevioribus et latioribus, incisura inter lobos minus evoluta, dentibus loborum brevioribus incurvatis, foliis caulinis majoribus, eorum stipulis latius dentatis, floribus paullo minoribus densiuscule glomerulatis.

Habitat: in herbosis regionis subalpinae, imprimis ad ripos fluviorum; et rivulorum Caucasi septentrionali.

Typus speciei: in fauc. fl. Klukhor septentr. leg. S. Juzepczuk in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

48. **A. psilocaula** Juz. sp. nova (*Euvulgares Subglabrae Appressipilae*).

Planta mediocris 12—35 cm alta, folia radicalia reniformia vel late reniformia, sinu basali fere rectangulo, paullo undulata, supra ad plicas sat dense pilosa, ceterum glabra vel disperse pilosa, subtus ad nervos principales appresse pilosa vel plerumque saltem in foliis mediis in parte inferiore nervorum glabra, ceterum glabra, obscure viridia, lobis semirobundatis vel breve et late semiovatis, dentibus loborum utrinque 5—7 oblique semiovatis longis et acutiusculis, dente terminalis vicinis brevior; petioli foliorum radicalium densiuscule appresse pilosi; caules quam petioli multo longiores, ascendentes, paullo flexuosi, in solo intense vinacei, saepius solum ad internodium primum appresse-pilosi, ceterum glabri; folia caulina parva plerumque non satis evoluta, stipulis irregulariter grandidentatis. Inflorescentia sat lata, multiflora; flores laxe glomerulati, ad 3.5 mm lg. et lat., urceolis obconicis glabris; sepala ovata acutiuscula, urceolis subaequilonga, glabra; episepala sepalis multo angustiora et paullo breviora, pedicelli urceolis aequilongi vel duplo longiores.

Habitat: in pratis humidis, ad margines rivulorum in regione alpina Caucasi septentrionalis.

Typus speciei: in vicin. pag. Teberda m. M. Chatipara, leg. S. Juzepczuk; in herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: a confinibus caulibus basi tantum pilosis diversissima.

49. **A. pilosiplica** Juz. sp. nova (*Euvulgares Subglabrae Acutidentes*).

Planta mediocris vel sat magna, grisescenti-viridis, foliis radicalibus rotundatis, lobis extremis sese obtegentibus vel supertegentibus, paullo

undulata vel fere plana 11-loba, lobis (foliorum infimorum) arcuatis vel (caeteris) semirondatis semiovatisve, incisura inter lobos \pm bene conspicua, dentibus loborum utrinque 8—11 minusculis oblique triangularibus vel oblique semiovatis acutis vel obtusiusculis, dente terminali vicinis paullo minore, supra solum ad plicas et margines loborum pilosa, ceterum glabra, subtus ad nervos principales haud dense appresse pilosa, inter nervos glabra, sicca reticulatione haud raro prominula; petioli appresse pilosi; caules petiolis foliorum radicalium breviores vel subaequilongi vel paullo longiores, suberecti, flexuosi, appresse pilosi, solum in inflorescentia glabrescentes; folia caulina reniformia, lobis elongatis basi integerrimis, stipulis amplis acute dentatis. Inflorescentia haud multiflora, superne divaricata; flores sat dense glomerulati magni flavescenti-virides; urceoli elongato obconici, glabri; sepala urceolis breviora, late ovata, obtusiuscula, glabra; episepala sepalis $1\frac{1}{2}$ breviora et subduplo angustiora; pedicelli urceolis breviores, glabri.

Habitat: in pratis humidis et in fruticetis Sibiriae occidentalis.

Typus speciei: Oirotia, in vicin. pag. Shebalino, in valle fl. Sjoma, leg. S. Juzepczuk; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: ab *A. flavescenti* Buser bene differt foliis inter lobos incisus, dentibus loborum minoribus et numerosioribus.

50. *A. holotricha* Juz. sp. nova (*Calicinae Oxysepalae*).

Planta mediocris vel sat magna grisescenti-viridis, rhizomate robusto; folia radicalia 2—12 cm lg., 2.8—13 cm lt., rotundato-reniformia, plana vel paullo undulata, lobis extremis sese obtegentibus; lobi breviusculi vel breves, $\frac{1}{4}$ — $\frac{1}{3}$ radii longitudinis aequantes arcuati vel late semiovati, fere sine incisura inter eos, dentibus utrinque 5—8 haud magnis breviusculis inaequalibus accrescentibus, late semiovatis inaequilateralibus, obtusis vel acutiusculis; supra dense, subtus densissime pilosa, nervis principalibus pilis densissimis erecto patentibus vestitis, sicca nervis lateralibus prominentibus; petioli pilis patentibus vel saepius erecto-patientibus densissime vestiti; caules 8—60 cm lg., plerumque robusti, fere erecti, flexuosi, tota longitudine sicut petioli pilosi; folia caulina sat bene evoluta vel saepe mediocria, reniformia, lobis brevibus arcuatis. Inflorescentia sat angusta; flores mediocres, plerumque non ultra 3 mm lg. et lat. (fructiferi ad 4 mm lat.), flavescentes, urceoli ad 1 mm lg. patule pilosi; sepala ovata acuta urceolis duplo longiora, disperse pilosa, fructificatione stellatim patentia; episepala sepalis subaequilonga ac lata; pedicelli urceolis triplo et ultra longiora tota longitudine patule pilosi.

Habitat: ad ripas rivorum, in declivibus graminosis montium Caucasicorum (reg. subalpina).

Typus speciei: reg. Karatshaj, in vicin. pag. Teberda, in ascensu ad traject. Klukhor, leg. S. Juzepczuk; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: ab *A. speciosa* Buser jam foliis inter lobos non incisus brevibus omnino diversa.

51. **A. Smirnovii** Juz. sp. nova (*Calicinae Oxysepalae*).

Planta ex affinitate *A. oxysepalae* Juz. fere ut *A. holotricha* Juz. vestita sed ab ea habitu graciliore et lobis foliorum radicalium acutangulis acute dentatis satis distincta.

Habitat: in declivibus graminosis montium Transcaucasiae.

Typus speciei: Armenia, in regione lac. Sevan leg. E. N. Kara-Murza; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Nomen speciei in honorem cl. P. A. Smirnov propositum, florum Armeniae scrutatoris diligentissimi.

52. **A. capillacea** Juz. sp. nova (*Calicinae Oxysepalae*).

Quoad pubescentiam caulium foliorumque atque foliorum, loborum et dentium formam *A. oxysepalam* Juz. valde admonet, sed est planta minor, gracilis, caulibus eorumque ramis tenuibus subcapillaceis, floribus parvis virescentibus, urceolis satis evolutis; folia sat tenuia nervis parum prominentibus, caulina semirobundata brevissime lobata stipulis breve et late dentatis. Flores laxè glomerulati.

Habitat: in silvaticis Caucasi occidentalis (Abchasia).

Typus speciei: jug. Bzybicum, in silva in ascensu ad Nosikho, 1200 m. 25 VII 1936, leg. P. Panjutin; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

53. **A. porrectidens** Juz. sp. nova (*Calicinae Oxysepalae*).

Similis *A. oxysepalae* Juz., differt autem foliis radicalibus magis rotundatis fere planis supra plerumque densius pilosis, lobis triangulari semiovatis dentibus angustioribus magis elongatis porrectis acutis, inflorescentia angusta parum multiflora ramulis sub angulo acutiore abeuntibus, floribus submajoribus urceolis in dimidio inferiore plerumque dense pilosis, pedicellis florum inferiorum haud raro disperse pilosis.

Habitat: ad ripas fluviorum et rivulorum Ciscaucasiae (reg. subalpina).

Typus speciei: in ascensu ad trajectum Klukhor, leg. S. Juzepczuk; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

54. **A. pseudomollis** Juz. sp. nova (*Calicinae Oxysepalae*).

Habitu, foliorum et loborum forma necnon denticulatione *A. oxysepalam* Juz. valde revocans sed ab ea dimensionibus totae plantae nonnihil minoribus, foliis glauco-viridibus, pubescentia omnium partium et imprimis caulium usque ad ramulos ultimos pilosorum uberiore (pedicelli florum inferiorum plerumque pilosi, caeteri parce pilosi vel glabri, urceoli plus minusve pilosi sunt); inflorescentia angusta et haud multiflora, ramulis sub angulo acuto orientibus; sepala obtusiuscula, extus haud raro disperse pilosa. VII.

Habitat: in pratis subalpinis, in pascuis, in fruticetis ad ripas rivulorum in montibus Transcaucasiae occidentalis.

Typus speciei: in monte Aibga Circassiae leg. S. Juzepczuk; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

55. **A. laeta** Juz. sp. nova (*Calicinae Oxysepalae*).

Planta mediocris vel sat magna laete viridis; folia radicalia 4—9 cm lg., 5—10.5 cm lt., rotundato reniformia, vel fere rotundata sinu basali plerumque angusto, plana, 9—11-loba, lobis 9—11 semiovatis vel triangularibus, dentibus loborum utrinque 6—11 magnis versus apicem accrescentibus oblique triangularibus acutis extus saepius convexis dente terminali vicinis multo minore; supra glabra, solum infima plerumque ad plicas pilosa, subtus sat dense appresse pilosa, nervis principalibus pilis erecto-patentibus vestitis, dura, reticulatione subtus prominula; petioli valde excentrici, dense patule pilosi; caules 23—30 cm lg., firmi, erecti, paullo supra medium patule pilosi, folia caulina bene evoluta stipulis grosse et acute dentatis, late reniformia lobis triangularibus, in foliis supremis dente terminali longo valde exserto. Inflorescentia sat angusta non valde multiflora, ramificatione acutangula; flores late glomerulati ampli 3.5—5 mm in diam. flavescens; urceoli breviter obconici glabri; sepala urceolis subduplo longiora, anguste ovato-triangularia, peracuta, fructificatione stellatim patentia; episepala sepalis aequilonga sed multo angustiora; pedicelli urceolis multoties longiores, tenues, glabri.

Habitat: ad ripas rivulorum et fluviorum in regione subalpina Caucasi.

Typus speciei: reg. Karatshaj, in vicin. opp. Teberda, in valle Azgek leg. S. Juzepczuk; in herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: ab *A. circassica* Juz. bene differt coloratione foliorum atque loborum forma.

56. **A. circassica** Juz. sp. nova (*Calicinae Oxysepalae*).

Planta *A. pseudomolli* Juz. simillima, a qua fere solum foliis superne subglabris distincta, solum folia radicalia exteriora superne pilosa sunt (plerumque autem solum ad plicas); praeterea et caulis in parte superiore sicut pedicelli et hypanthia glabrescunt; petioli foliorum radicalium et caulis pars inferior pilis paullo erecto patentibus vestiti. E speciebus foliis superne glabris gaudentibus *A. stellulatam* Juz. imprimis admonet sed ab ea praeter pubescentiam paginae superioris foliorum radicalium exteriorum dimensionibus totae plantae minoribus, foliorum glaucescunt, eorum lobis minus rotundatis diversa.

In pratis subalpinis, in pascuis, in declivibus graminosis Transcaucasiae occidentalis.

Typus speciei: in monte Aibga leg. S. Juzepczuk; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

57. **A. grandidens** Juz. spec. nova (*Calicinae Subsplendentes*).

Planta parva vel mediocris laete vel flavescenti-viridis; folia radicalia 1.5—5.5 cm lg., 2—7 cm lata rotundato reniformia vel raro rotundata, plana, 7 vel incomplete 9-loba, lobis arcuatis semirobundatisve, inter lobos incisa, dentibus loborum utrinque 4—6 magnis mammiformibus vel elongato

triangularem-semiovatis, obtusis vel obtusiusculis; supra glabra, subtus ad lobos extremos margine et ad nervos principales pilosa in mesophyllo glabra vel in foliis mediis interdum disperse pilosa, coriacea, sicca reticulatione subtus prominula; petioli pilis sat densis erecto-patentibus pilosi, caules 10—25 cm alt., plerumque erecti, flexuosi, firmi, sicut petioli pilosi; folia caulina parum evoluta semirobundata lobis brevibus, stipulis grosse obtuse dentatis. Inflorescentia angusta vel sat lata; flores late glomerulati majusculi, 2—3 mm lg., 2.5—4 mm lati, flavescens, urceoli obconici vel campanulati inferne pilis erecto patentibus tecti; sepala urceolis paullo longiora late ovata obtusa, episepala sepalis aequilonga sed angustiora; pedicelli urceolis multo longiores in floribus inferioribus pilis laxe appressis vestiti, ceterum glabri.

Habitat: in rupibus humidis alpinis Transcaesiae.

Typus speciei: Mons Tzkhra-tzkhara prope pag. Bakuriani, leg. S. Juzepczuk; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: cum *A. sevangensi* Juz. comparanda, differt tamen pilis caulium et petiolorum minus patentibus, foliis supra glabris, subtus minus dense pilosis, urceolis inferne dense pilosis, sepalis late ovatis.

58. **A. undecimloba** Juz. sp. nova (*Calicinae Retinerves*).

Habitu et pubescentia valde revocat *A. tredecimlobam* Bus., sed ab ea bene differt lobis foliorum radicalium brevibus fere rectangularibus $\frac{1}{4}$ — $\frac{1}{3}$ radii longitudinis aequantibus, dentibus eorum brevibus et latis oblique late triangularibus vel rectangularibus fere scaliformibus marginibus rectiusculis apice acuminatis vel acutis; flores iis *A. tredecimlobae* minores, ca. 3 mm in diametro.

Habitat: in pratis alti-herbosis subalpinis juxta fines silvarum Transcaesiae occidentalis.

Typus speciei: in monte Atshishkho (Circassiae) leg. S. Juzepczuk; in Herb. Inst. bot. Ac. Sc. URSS asservatur.

AGRIMONIA

59. **A. granulosa** Juz. sp. nova (*Pilosae*).

Perennis, rhizomate crasso, ramoso; caulis circa 95 cm alt. solitarius in parte superiore divaricato ramosissimus ramis tenuissimis, tota longitudine glandulis stipitatis densissimis tectus (pilis simplicibus in pubescentia caulis omnino deficientibus); folia omnia remota, 9—17 cm lg., 7—10 cm lt., rhachide praeter glandulas etiam pilis simplicibus sat longis haud numerosis vestita; supra viridia, pilis simplicibus brevibus sparsis et glandulis minutis sessilibus tecta, subtus pallidiora ad nervos pilis simplicibus brevibus parcis et glandulis breve stipitatis numerosissimis, ceterum glandulis sessilibus numerosis tecta; foliola majora 5 in numero, 4—8.5 cm lg., 2—3.5 cm lt. breve petiolulata tenuia, sat late rhomboidea, tota longitu-

dine dentata, solum infima margine exteriore basi integerrima, dentibus utrinque 7—11 magnis obtusis vel in foliis superioribus acutiusculis, nervis tenuibus; foliola interjecta numerosa elliptica vel obovata, integerrima vel (majora) dente utrinque 1 praedita; stipulae haud magnae, oblique ovatae, curvatae, acute dentatae. Inflorescentia tenuis, haud densa; flores parvi ca. 4 mm in diam., breve pedicellati; hypanthium glandulis sessilibus minimis tectum, sepala glandulosa; petala pallide lutea vel albida (?), sepalis duplo longiora; fructus parvi ca. 5 mm lg., 3 mm lt., hypanthio semiovato usque fere ad basin late et haud profunde sulcato setis erectis in fructibus maturis supra sepala longitudinem setarum interiorum fere non superantia conniventibus. VIII.

Habitat: in silvis mixtis et in fruticetis Asiae orientalis (reg. Ussuriensis).

Typus speciei: e vicin. pag. Sergeevka, in valle fl. Muladzy (bass. fl. Sutschan) in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Affinitas: a proxima *A. pilosa* Ldb. jam pubescentia peculiari totae plantae et imprimis caulis discernenda.

60. *A. velutina* Juz. sp. nova (*Nipponicae*).

Perennis rhizomate simplici horizontali lignescenti; caulis 30—50 cm alt., pilis mediocribus simplicibus reflexis ex pilis brevioribus molliusculis crispatis vestitus, simplex vel parum ramosus; folia 5—15 cm lg., 4—11 cm lt., infima et media 5-, superiora 3-foliolata; foliola obovata vel fere breviter rhomboidea, apice obtusiuscula, fere usque ad basin crenato-dentata, dentibus utrinque 7—11; foliola lateralia sessilia supra pilis brevibus accumdentibus disperse pilosa viridia, subtus dense velutino-canescens, ad nervos principales plerumque prominentes haud longe patulo-pilosa; glandulis deficientibus vel subnullis; foliola interjecta haud numerosa parva plerumque integerrima, stipulae maximae semicordatae, grosse acutiuscule dentatae. Inflorescentia laxa haud multiflora; bracteae parvae 3 partitae; flores brevissime pedicellati, ca. 3 mm in diam.; hypanthium obconicum, dense pilosum; sepala ovato-lanceolata, nervo valde prominulo; petala oblonga, apice rotundata, flava; fructus diu haud nutantes, erecto patentes vel patuli, 5 mm lg., hypanthio semi-obovato usque fere ad basin sulcato pilis accumdentibus imprimis juxta sulcos dispositis piloso; setae omnes erecti non conniventes vel exteriores erecto-patentes ca. 2 mm lg., hypanthio breviores et sepalis paullo longiores. VII.

Habitat: in quercetis, in fruticetis, in pratis Orientis extremi (reg. Ussuriensis).

Typus speciei: ripa sinus Possiet, paratypus e vicin. opp. Vladivostok in Herb. Inst. Bot. Ac. Sc. URSS asservantur.

Affinitas: *A. nipponicae* Koidz. ut videtur proxime affinis, attamen jam pubescentia peculiari distincta (in *A. nipponica* folia subtus imprimis ad nervos pilis longis rigides vestita sunt).

SANGUISORBA

61. *S. riparia* Juz. sp. nova.

A *S. officinali* bene differt habitu robusto, inflorescentia elongata, floribus pallidioribus (interdum partim virescentibus); habitu *S. alpinam* Bge. satis revocat, set foliolis foliorum inferiorum basi cordatis, inflorescentia erecta densa atque floribus intense coloratis statim dignoscitur.

Habitat: ad ripas fluviorum Asiae Mediae (Jug. Alatau Talasicum).

Typus speciei: in valle fl. Ulkun-kaindy leg. M. Popow.

ROSA

62. *R. ussuriensis* Juz. (*Cinnamomeae*). Affinis *R. oxyacanthae* M. B., a qua differt statura altiore, foliolis majoribus obscure viridibus late ellipticis saltem versus apicem duplicato dentatis necnon fructibus minoribus.

Habitat: in lapidosis in silvis Orientis Extremi.

Typus speciei: e reg. Ussuriensi in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

63. \times *R. Schischkinii* Juz. hybr. nov. (? *Rosa davurica* Pall. \times *R. ussuriensis* Juz.).

Revocat *R. ussuriensem*, differt ab ea aculeis ramorum floriferorum parum numerosis, dentibus foliolorum simplicibus accumbentibus; a *R. davurica* (ut quoque a *R. amblyotis* C. A. M.) differt aculeis tenuibus aciculiformibus basi parum dilatatis, foliolis minoribus glabris, floribus solitariis.

Habitat: in silvis Orientis Extremi, in schistosis.

Typus speciei: e valle fl. Botscha (jugum Sichota-Alinj, leg. I. Schischkin); in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

64. *R. jacutica* Juz. sp. nova (*Cinnamomeae*).

Proles ex affinitate *R. davuricae* Pall., a qua differt statura altiore foliolis glabris eglandulosis; a *R. amblyotis* C. A. M. imprimis foliolis glabris distincta.

Habitat: in Sibiria orientali.

Typus speciei: e Jacutia; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

65. *R. piptocalyx* Juz. hybr. nova. — Forma verisim. hybridogena quasi medium tenens inter *R. Beggerianam* Schrenk et *P. Webbianam* Wall. (s. l.); a priore differt spinis rectis horizontaliter patentibus, fructibus magnis, a posteriore calyce cum parte superiore hypanthii in fructu caducis.

Habitat: in montibus pamiroalaicis.

Typus: e Tadzhikistania in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

66. *R. alaica* Juz. sp. nova (*Cinnamomeae*).

Frutex haud altus ramis elongatis tenuibus flexuosis, cortice glaucescenti obscure brunneo; aculei recti dispersi vel jugati, sat robusti, compresso-conici, basi subito vel sensim dilatati, foliolis maximis aequilongi vel paullo longiores, straminei; aciculi desunt; folia parva 1.8—2.5 cm longa, foliola 5—9 in numero, approximata sessilia vel brevissime petiolulata rotundata vel late obovata, apice et basi plerumque rotundata, 4—10 mm longa, 3—8 mm lata, supra viridia, glabra vel disperse pilosa, subtus pallidiora, haud dense tenuiter pilosa et praeterea glandulis numerosis parvis tecta, composito glanduloso-dentata, dentibus utrinque 7—10; petioli paullo pubescentes glandulosissimi; stipulae adnatae parvae auriculis angustis erectis, dorso et margine valde glandulosae. Flores plerumque solitarii, raro bini, folia floralia superantes, pedicellis 1—2 cm longis tenuibus gracilibusque glandulis sessilibus tectis; hypanthium subglobosum vel breviter ovoideum, laeve vel paullo glanduloso-setosum; sepala petalis breviora a basi attenuata, apice in acumen anguste lineare exeuntia, dorso laevia; petala alba vel rosea; styli villosi capitulo subgloboso; fructus ignoti.

Habitat: in juniperetis (sabinetis) Asiae Mediae, jugum Alaicum.

Typus: e loco dicto Utsch-tjube (ripa dextra fl. Gultscha inter Sufi-kurgan et Ak-bosaga) a S. Juzepczuk lectus; in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

Affinitas: species ex affinitate *R. nanothamnus* Bouleng. et *R. hissaricae* Slob., foliolis subtus glandulis minimis numerosissimis tectis ab eis diversa.

67. *R. Alexeenkoi* Crépin ined. (*Caninae*).

Turiones glabri epruinosi aculeis magnis falcatis planis; petioli tomentoso-villosi disperse glandulosi; foliola ovato-elliptica utrinque dense pilosa eglandulosa; stipulae versus apicem dilatatae subtus tomentoso pilosi. Ramuli floriferi praeter aculeos majores aculeolis rectis aciculiformibus armati, superne glandulosissimi, flores in corymbis multifloris dispositi, pedicellis sat longis glanduloso-aculeolatis; hypanthia elongata dense glanduloso-aculeolata; sepala extus dense glandulosa, intus tomentosa post anthesin reclinata; petala et fructus ignoti.

Habitat: in declivibus angustiorum Daghestaniae.

Typus: e reg. Kuba, pag. Sudur, leg. Alexeenko; in herb. Inst. Bot. Ac. Sc. URSS conservatur.

Affinitas: forma verisimiliter hybridogena *Eu-caninis* melius adnumeranda, quoad pubescentiam tamen *Vestitas* valde revocans.

× *Hulthemosa* Juz. gen. nov. hybr.

Plantae ut videtur origine hybrida inter species generum *Rosae* et *Hulthemiae* mediante, habitu omnino *Rosae*, attamen foliis quasi exstipulatis i. e. stipulis haud adnatis foliolis simillimis recedentes.

68. × *H. gazarica* Juz. hybr. nova (*Rosa gazarica* Juz. in sched. olim).

Frutex ut videtur haud altus ramis paullo flexuosis vel fere rectis cortice griseo vel novellis fusco tectis; turiones et rami novelli dense velutino-pilosi, aculei tenuiusculi horizontaliter patentes strictissimi anguste conici paullo compressi, basi subito dilatati, ramorum annotinorum et turionum sat dense pilosi velutini (apice spinescenti excepto); foliola 5—7 in numero, parva, 4—8 mm lg., 2—5 mm lt., obovata, molliter pilosa, dentibus utrinque 3—5 simplicibus obtusiusculis; rachis velutina; stipulae quoad positionem, dimensiones, colorationem, pubescentiam et denticulationem omnino foliis simillimae, extus decurrentes petiolo ideo quasi alato, rarius parvae integerrimae, haud raro cum petiolis jugi inferioris usque ad dimidium connatae. Flores solitarii ebracteati parvi breve pedicellati pedicello velutino; hypanthium pedicello subaequilongum, immaturum ca. 3 mm lg., globosum, velutinum; sepala patentia ovato-lanceolata sensim acutata integra breviter pilosa et imprimis margine paullo tomentosa; petala ignota; capitulum stylosum dense lanatum; fructus ignoti.

Habitat: in declivibus montium, in juniperetis Asiae Mediae.

Typus: e mont. Ak-tag prope opp-Guzar in Herb. Inst. Bot. Ac. Sc. URSS asservatur.

AMYGDALUS

69. **A. turcomanica** Lincz. sp. nova (Sect. *Lycioides* Spach)—*A. brahuica* auct. fl. turk., non Boiss.—*Prunus brahuica* Aitch. et Hemsl. var. calyce omnino glabro in Trans Linn. Soc. Ser. 2, III (1888—1894) 62.—? *P. eburnea* Aitch. et Hemsl. var. fructu flavo, l. c., 62.

Frutex 1.5—2 m altus, ramis divaricatis, spinis longis, horizontalibus, numerosis instructis; ramulis annotinis cortice laevi, glabro, cinnamomeo-rubrescenti, ramulis hornotinis cortice vix scabro, griseo-albido. Folia ovato-lanceolata, cuneato-spathulata vel oblongo-obovata, raro subelliptica, ad 2.5—3 cm lg., 1 cm lt. Flores ab iis *A. spinosissimae* Bge. non diversii; drupae breviter velutinae, interdum subglabrae, inaequaliter rotundato-ovatae; putaminibus pallide vel atro-fuscis, saepius ferrugineis, vix compressis, latere visis convexis, superficie vix asperis in parte inferiore vulgo conspicue sulcatis, sutura dorsali non profunde sulcata, sutura ventrali anguste acuto-carinata, juxta carinam mediam duabus carinis lateralibus, latis, obtusiusculis instructis, basi truncatis, apice acutiusculis, (1) 1.3—1.5 (1.7) cm long., (1) 1.2—1.3 cm lat., (0.7) 0.8—1 cm crassis.

Habitat: in rupibus et decliviis saxosis montium Kopet-dagh et Badghys Turcomaniae australis.

Typus: Turcomania australis, Badghys, Pul-i-khatun, in decliviis montium, 2 V 1895, n° 841, fr., leg. S. I. Korshinsky; in Herb. Inst. Bot. Ac. Sc. URSS conservatur.

Affinitas: *Amygdalo brahuico* Boiss. videtur affinis.

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VEGETATION REGIONS OF THE USSR

Abbreviated name	Full name
------------------	-----------

I. Arctic

- | | |
|----------------------|------------------------|
| 1. Arc. Eur. | Arctic (European part) |
| 2. Nov. Z. | Novaya Zemlya |
| 3. Arc. Sib. | Arctic (Siberia) |
| 4. Chuk. | Chukchi |
| 5. An. | Anadyr |

II. European part

- | | |
|-----------------------|-----------------|
| 6. Kar.-Lap. | Karelia-Lapland |
| 7. Dv.-Pech. | Dvina-Pechora |
| 8. Balt. | Baltic States |
| 9. Lad.-Ilm. | Ladoga-Il'men |
| 10. U. V. | Upper Volga |
| 11. V.-Kama | Volga-Kama |
| 12. U. Dnp. | Upper Dnieper |
| 13. M. Dnp. | Middle Dnieper |
| 14. V.-Don. | Volga-Don |
| 15. Transv. | Transvolga area |
| 16. U. Dns. | Upper Dniester |
| 17. Bes. | Bessarabia |
| 18. Bl. | Black Sea area |
| 19. Crim. | Crimea |
| 20. L. Don | Lower Don |
| 21. L. V. | Lower Volga |

III. Caucasus

- | | |
|------------------------|------------------------|
| 22. Cisc. | Ciscaucasia |
| 23. Dag. | Dagestan |
| 24. W. Transc. | Western Transcaucasia |
| 25. E. Transc. | Eastern Transcaucasia |
| 26. S. Transc. | Southern Transcaucasia |
| 27. Tal. | Talysh |

IV. West Siberia

- | | |
|--------|---|
| 28. Ob | Ob region (from the eastern slopes of the Urals to the Yenisei River) |
|--------|---|

- 29. U. Tob. Upper Tobol
- 30. Irt. Irtysk
- 31. Alt. Altai

V. East Siberia

- 32. Yenisei Yenisei
- 33. Lena-Kol. Lena-Kolyma
- 34. Ang.-Say. Angara River-Sayans
- 35. Dau. Dauria

VI. Far East

- 36. Kamch. Kamchatka
- 37. Okh. Okhotsk
- 38. Ze.-Bu. Zeya-Bureya
- 39. Uda Uda River area
- 40. Uss. Ussuri
- 41. Sakh. Sakhalin

VII. Soviet Central Asia

- 42. Ar.-Casp. Aral-Caspian
- 43. Balkh. Lake Balkhash area
- 44. Dzu.-Tarb. Dzungaria-Tarbatagay
- 45. Kyz. K. Kyzyl-Kum
- 46. Kara K. Kara-Kum
- 47. Mtn. Turkm. Mountainous part of Turkmenistan
- 48. Amu D. Amu Darya
- 49. Syr D. Syr Darya
- 50. Pam.-Al. Pamir-Alai
- 51. T. Sh. Tien Shan

Accepted Regions for Indication of General Distribution of
Species Appearing in "Flora of the U. S. S. R."

- I. Arc. Arctic (Spitsbergen, Greenland and farther)
- II. Scand. Scandinavia (Norway, Denmark, Sweden, Finland)
- III. Centr. Eur. Central Europe (Germany, Poland, Czechoslovakia, Hungary, Austria, Switzerland)
- IV. Atl. Eur. Atlantic Europe (Netherlands, Belgium, England, France, Portugal)
- V. Med. Mediterranean (including North Africa)
- VI. Bal.-As. Min. Balkan Peninsula and Asia Minor
- VII. Arm.-Kurd. Lesser Armenia and Kurdistan
- VIII. Iran Iran and Afghanistan

IX. Ind.-Him.	India and Himalayas
X. Dzu.-Kash.	[Dzungaria-Kashgar area] Eastern or Chinese Turkestan (Sinkiang)
XI. Mong.	Mongolia
XII. Jap.-Ch.	Japan and China
XIII. Ber.	North American coast of the Bering Sea
XIV. N. Am.	North America (U. S. A. and Canada)
XV. Tib.	Tibet

Other Geographical Abbreviations

Afr.	Africa
Aust.	Australia
Centr.	Central
E.	East(ern)
Gr.	Great, Greater
I.	Island
Is.	Islands
Mt.	Mount
Mts.	Mountains
N.	North(ern)
R.	River
S.	South(ern)
W.	West(ern)

TRANSLATOR'S NOTE

1. The Russian term "Srednyaya Aziya" is, in English, Central Asia (or Soviet Central Asia). Therefore the term Middle Asia has been used for Russian "Tsentral'naya Aziya," which is non-Soviet inner Asia, comprising western China (Sinkiang and Tibet) and Mongolia.

2. According to Russian usage, the European part of the USSR is "eastern Europe." Therefore "western Europe" includes the whole of Europe outside the USSR.

EXPLANATORY LIST OF ABBREVIATIONS OF RUSSIAN
INSTITUTIONS AND PERIODICALS APPEARING
IN THIS TEXT

Abbreviation	Full name (transliterated)	Translation
Bot.-geogr. issled. v Turkest.	Botaniko-geograficheskie issledovaniya v Turkestane	Botanical and Geographical Investigations in Turkestan
Bot. Mat. Gerb Bot. inst. AN SSSR	Botanicheskie Materialy Gerbariya Botaniches- kogo instituta AN SSSR	Botanical Materials of the Herbarium of the Botanical Institute of the Academy of Sciences of the USSR
Bot. Mat. Gerb. Gl. Bot. Sada	Botanicheskie Materialy Gerbariya Glavnogo Botanicheskogo Sada	Botanical Materials of the Herbarium of the Main Botanical Gardens
Bot. zap. SPb. univ.	Botanicheskie zapiski Sankt-Peterburgskogo universiteta	Botanical Notes of St. Petersburg University
Bot. zhurn. SSSR	Botanicheskii zhurnal SSSR	Botanical Journal of the USSR
Byull. Glavn. Bot. Sada	Byulleten' Glavnogo Botanicheskogo Sada	Bulletin of the Main Botanical Gardens
Byull. Obshch. lyubit. estest- vozn., antrop. i etnogr.	Byulleten' Obshchestva lyubitelei estestvo- znaniya, antropologii i etnografii	Bulletin of the Naturalists', Anthropologists' and Ethnographers' Society
Byull. Voronezh. obshch. estestv.	Byulleten' Voronezhskogo obshchestva estestvois- pytatelei	Bulletin of the Voronezh Society of Naturalists
Dendr.	Dendrarii	Arboretum
Der. i kust.	Derev'ya i kustarniki	Trees and Shrubs
Der. i kust. Kavk.	Derev'ya i kustarniki Kavkaza	Trees and Shrubs of the Caucasus
Dikie polezn. i tekhnich. raste- niya SSSR	Dikie poleznye i tekhnichesk- skie rasteniya SSSR	Useful Wild Plants and Industrial Crops of the USSR
Dikorastushchie r. Kavkaza, ikh ras- prostranenie, svoistva i pri- menenie	Dikorastushchie raste- niya Kavkaza, ikh ras- prostranenie, svoistva i primeneniye	Wild Plants of the Caucasus, Their Distribution, Properties and Uses
Dokl. AN Azerb. SSR	Doklady Akademii Nauk Azerbaidzhanskoi SSR	Reports of the Academy of Sciences of the Azerbaijan SSR

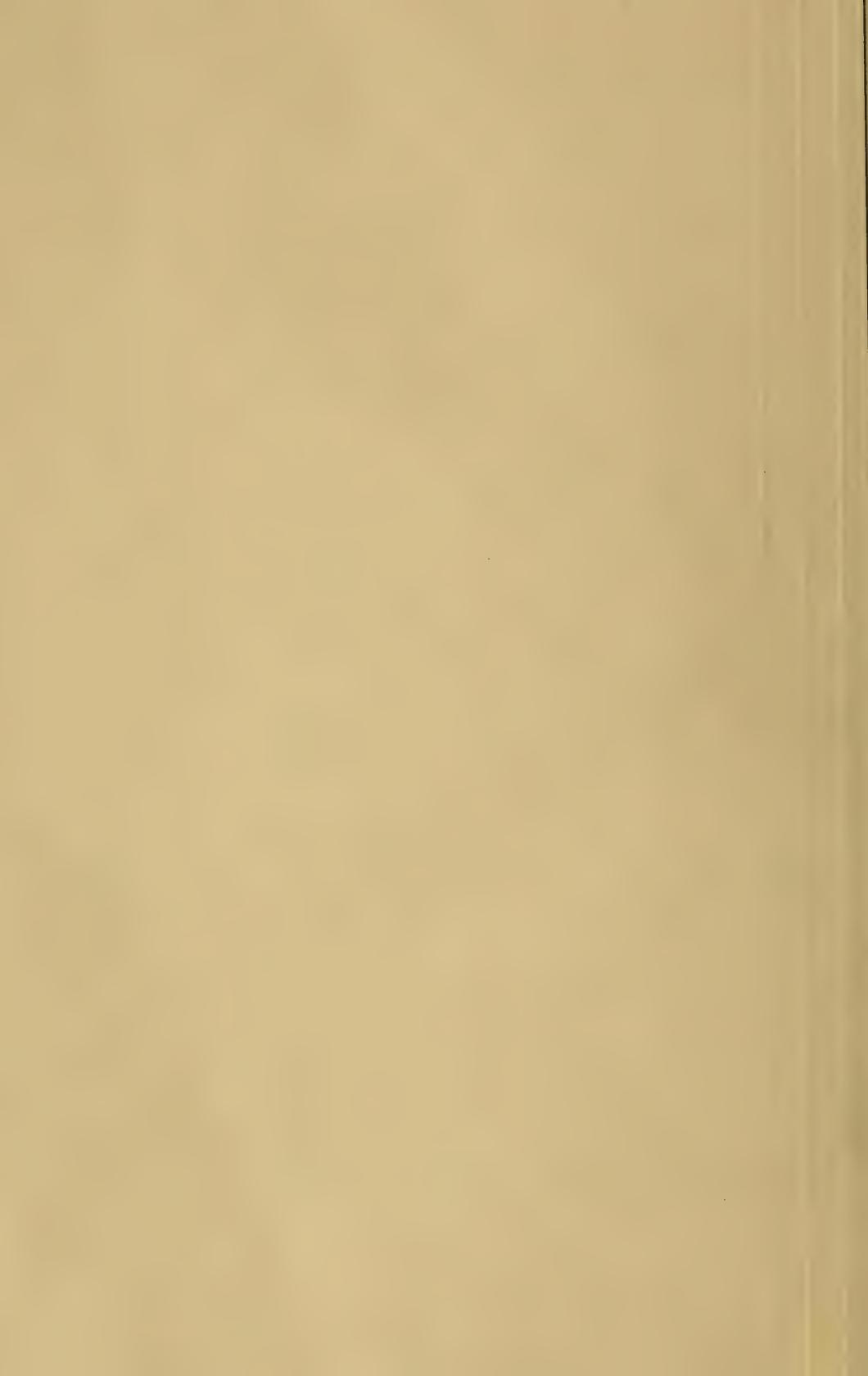
Fl.	Flora	Flora
Fl. Abkh.	Flora Abkhazii	Abkhasian Flora
Fl. Almat. Zapovedn.	Flora Alma-Atinskogo zapovednika	Flora of the Alma-Ata Reserve
Fl. Alt.	Flora Altaya	Altai Flora
Fl. Alt. i Tomsk. gub.	Flora Altaiskoi i Tomskoi gubernii	Flora of Altai and Tomsk Provinces
Fl. Az. Ross.	Flora Aziatskoi Rossii	Flora of Asiatic Russia
Fl. Evrop. Rossii	Flora Evropeiskoi Rossii	Flora of European Russia
Fl. Gruzii	Flora Gruzii	Georgian Flora
Fl. Kamch.	Flora Kamchatki	Kamchatkan Flora
Fl. Kavk.	Flora Kavkaza	Caucasian Flora
Fl. Man'chzh.	Flora Man'chzhurii	Manchurian Flora
Fl. Mosk. gub.	Flora Moskovskoi gubernii	Flora of Moscow Province
Fl. Poles'ya	Flora Poles'ya	Flora of Polesie
Fl. Sev. Kraya	Flora Severnogo Kraya	Flora of the Northern Territory
Fl. Sakh.	Flora Sakhalina	Flora of Sakhalin
Fl. Sib.	Flora Sibiri	Siberian Flora
Fl. Sib. i Dal'n. Vost.	Flora Sibiri i Dal'nego Vostoka	Flora of Siberia and the Far East
Fl. Sr. i Yuzhn. Ross.	Flora Srednei i Yuzhnoi Rossii	Flora of Central and Southern Russia
Fl. Sr. Ross.	Flora Srednei Rossii	Flora of Central Russia
Fl. Tadzhik.	Flora Tadzhikistana	Flora of Tadzhikistan
Fl. Talysh.	Flora Talysha	Talysh Flora
Fl. Tsent. Kazakhst.	Flora Tsentral'nogo Kazakhstana	Flora of Central Kazakhstan
Fl. Vost. Evr. Ross.	Flora Vostochnoi Evropeiskoi Rossii	Flora of East European Russia
Fl. Yugo-Vost.	Flora Yugo-Vostoka	Flora of the Southeast
Fl. Yugo-zap. Ross.	Flora Yugo-zapadnoi Rossii	Flora of Southwest Russia
Fl. Yur. Bot.-sada	Flora Yur'evskogo botanicheskogo sada	Flora of Yur'ev Botanical Garden
Fl. Zap. Sib.	Flora Zapadnoi Sibiri	Flora of West Siberia
Gerb. donsk. fl.	Gerbarii donskoi flory	Herbarium of Don Flora
Gerb. Orlovsk. gub.	Gerbarii Orlovskoi gubernii	Herbarium of Orel Province
Gerb. Ukr. fl.	Gerbarii Ukrainskoi flory	Herbarium of Ukrainian Flora
GRF	Gerbarii Russkoi Flory	Herbarium of Russian Flora
Ill. Fl. Mosk. gub.	Illyustrirovannaya Flora Moskovskoi gubernii	Illustrated Flora of Moscow Province
Izv. AN SSSR	Izvestiya AN SSSR	Bulletin of the Academy of Sciences of the USSR
Izv. Bot. Sada	Izvestiya Botanicheskogo Sada	Bulletin of the Botanical Gardens
Izv. Bot. Sada Petra Vel.	Izvestiya Botanicheskogo Sada Petra Velikogo	Bulletin of Peter the Great Botanical Gardens

Izv. Gl. Bot. Sada	Izvestiya Glavnogo Botanicheskogo Sada	Bulletin of the Main Botanical Gardens
Izv. Kavk. Muzeya	Izvestiya Kavkazskogo Muzeya	Bulletin of the Caucasian Museum
Izv. Kazakhst. fil. AN SSSR	Izvestiya Kazakhstanskogo Filiala Akademii Nauk SSSR	Bulletin of the Kazakhstan Branch of the Academy of Sciences of the USSR
Izv. Kievsk. Bot. Sada	Izvestiya Kievskogo Botanicheskogo Sada	Bulletin of the Kiev Botanical Gardens
Izv. Obshch. lyubit. estestvozn., antrop. i etnogr.	Izvestiya Obshchestva lyubitelei estestvoznaniya, antropologii i etnografii	Bulletin of the Naturalists', Anthropologists' and Ethnographers' Society
Izv. Obshch. Sadov.	Izvestiya Obshchestva Sadovodov	Bulletin of the Horticulturists' Society
Izv. Tadzhiik. Bazy AN SSSR	Izvestiya Tadzhiikskoi Bazy Akademii Nauk SSSR	Bulletin of the Tadzhiikistan Base of the Academy of Sciences of the USSR
Konsp. rast. okr. Khar'kova	Konspekt rastenii okruga Khar'kova	Compendium of Plants of Kharkov District
Korm. rast. Estestv. senokosov i pastb. SSSR	Kormovye rasteniya estestvennykh senokosov i pastbishch SSSR	Fodder Plants of Natural Hay Meadows and Pastures of the USSR
Mat. (dlya) Fl. Kavk.	Materialy dlya Flory Kavkaza	Material on Caucasian Flora
Mat. (dlya) fl. Sredn. Azii	Materialy dlya flory Srednei Azii	Materials on Soviet Central Asia Flora
Mat. (dlya) Fl. stepei Kher'sonsk. Gub.	Materialy dlya Flory stepei Khersonskoi Gubernii	Materials on the Flora of Kherson Province Steppes
Nov. obozr.	Novoe obozrenie	New Review
Ob. rast. Kievsk. uch. okr.	Obzor rastitel'nosti Kievskogo uchebnogo okruga	Survey of Vegetation in the Kiev Educational District
Obz. Krym.-Kavk. Medicago	Obzor Krymsko-Kavkazskogo Medicago	Survey of Crimean-Caucasian Medicago
Och. obozr. i fl. Karpat	Ocherki rastitel'nosti i flory Karpat	Survey of Carpathian Vegetation and Flora
Ocherk. Tifl. fl.	Ocherki Tiflisskoi flory	Survey of Tiflis [Tbilisi] Flora
Opis. Amur. obl.	Opisanie Amurskoi oblasti	Description of the Amur Region
Opis. ist. razv. fl. vost. Tyan'-Shanya	Opisanie istorii razvitiya flory vostochnogo Tyan'-Shanya	Description of the History of the Development of Flora of Eastern Tien Shan
Opis. nov. rast. Turk.	Opisanie novykh rastenii Turkestana	Description of New Plants of Turkestan
Opis. nov. vidov	Opisanie novykh vidov	Description of New Species
Opred. der. i kust.	Opredelitel' derev'ev i kustarnikov	Key to Trees and Shrubs

Opred. rast. Dal'nevost. kr.	Opredelitel' rastenii Dal'nevostochnogo kraya	Key to Plants of the Far Eastern Territory
Opred. rast. Kavk.	Opredelite' rastenii Kavkaza	Key to Caucasian Plants
Opred. vyssh.	Opredelitel' vysshikh rastenii	Key to Higher Plants
Opred. (vyssh.) rasten. Evrop. chasti SSSR	Opredelitel' (vysshikh) rastenii Evropeiskoi chasti SSSR	Key to Higher Plants of the European USSR
Opyt Russko- Kavk. Fl.	Opyt Russko-Kavkazskoi Flory	Attempted Russian-Caucasian Flora
Perech. rast. Turk.	Perechen' rastenii Turkmenii	List of Turkmenian Plants
Pochv. eksped. v bass. r. Syr- Dar'i i Amu- Dar'i	Pochvennaya ekspeditsiya v basseiny rek Syr- Dar'i i Amu-Dar'i	Soil Science Expedition to the Syr-Darya and Amu-Darya River Basins
Priroda	Priroda	Nature
Protok. Zased. Kievsk. Obshch. Estestv.	Protokol Zasedaniya Kievskogo Obshchest- va Estestvoispytatelei	Protocol of a Conference of Kiev Naturalists' Society
Putesh.	Puteshestviya	Travels
Rast. i fl. Karp.	Rasteniya i flora Karpat	Plants and Flora of the Carpathians
Rast. letn. pastb. Gandzh.	Rasteniya letnikh pastbishch Gandzhi	Vegetation of Gandzha [now Kirovabad] Summer Pastures
Rast. res. Turkm.	Rastitel'nye resursy Turkmenii	Plant Resources of Turkmenia
Rast. resursy Kavkaza	Rastitel'nye resursy Kavkaza	Plant Resources of the Caucasus
Rast. Sib.	Rastitel'nost' Sibiri	Vegetation of Siberia
Rast. Sr. Az.	Rastitel'nost' Srednei Azii	Vegetation of Soviet Central Asia
Rast. Turkest.	Rastitel'nost' Turkestana	Vegetation of Turkestan
Rast. Zakasp. obl.	Rastitel'nost' Zakas- piiskoi oblasti	Vegetation of the Transcaspi- an Region
Rastit. Kavk.	Rastitel'nost' Kavkaza	Vegetation of the Caucasus
Rastit. pokrov. vost. Pamira	Rastitel'nyi pokrov vostochnogo Pamira	Plant Cover of the Eastern Pamirs
Rastit. syr'e Kazakhst.	Rastitel'noe syr'e Kazakhstana	Plant Resources of Kazakhstan
Rastit. zapovedn. Guralash i Zaaminsk. lesn. ugodii	Rastitel'nost' zapo- vednika Guralash i Zaaminskikh lesnykh ugodii	Vegetation of Guralash Reserve and Zaamin Forest Lands
Rezult' dvukh puteshestv. na Kavk.	Rezultaty dvukh puteshestvii na Kavkaz	Results of Two Travels to the Caucasus

Russk. Fl.	Russkaya Flora	Russian Flora
Russk. lek. rast.	Russkie lekarstvennyye rasteniya	Russian Medicinal Plants
Sbor, sushka i raz. lek. rast.	Sbor, sushka i razvitie lekarstvennykh rastenii	Gathering, Drying and Development of Medicinal Plants
Sorn. rast. SSSR	Sornye rasteniya SSSR	Weed Plants of the USSR
Sots. Rasteniyevodstvo	Sotsialisticheskoe Rasteniyevodstvo	Socialist Plant Growing
Sov. Bot.	Sovetskaya Botanika	Soviet Botany
Sov. Farmats.	Sovetskaya Farmatsevtika	Soviet Pharmaceutics
Spis. rast.	Spisok rastenii	List of Plants
Spis. Rast. Krymsk. Zapovedn.	Spisok Rastenii Krymskogo Zapovednika	List of Plants of the Crimean Reserve
Tr. Bot. inst. AN SSSR	Trudy Botanicheskogo Instituta AN SSSR	Transactions of the Botanical Institute of the Academy of Sciences of the USSR
Tr. Bot. Inst. Azerb. Filiala Akad. Nauk	Trudy Botanicheskogo Instituta Azerbaidzhanskogo Filiala Akademii Nauk	Transactions of the Botanical Institute of Azerbaijan Branch of the Academy of Sciences
Tr. Bot. Sada	Trudy Botanicheskogo Sada	Transactions of the Botanical Gardens
Tr. Bot. Sada Yur'evsk. Univ.	Trudy Botanicheskogo Sada Yur'evskogo Universiteta	Transactions of the Botanical Gardens of Yur'ev [now Tartu] University
Tr. Byuro prikl. Bot.	Trudy Byuro po prikladnoi botanike	Transactions of the Bureau of Applied Botany
Tr. Dal'nevost. bazy AN SSSR	Trudy Dal'nevostochnoi bazy AN SSSR	Transactions of the Far Eastern Base of the Academy of Sciences of the USSR
Tr. Inst. nov. lub. syr'ya	Trudy Instituta novogo lubyanogo syr'ya	Transactions of the Institute of New Fiber Raw Materials
Tr. Nauk. -Doslid. Inst. Bot. Khar. Derzh. Univ.	Trudy naukovo-doslidnoho instytutu botaniky Kharkivs'koho Derzhavnoho Universytetu	Transactions of the Botanical Research Institute of the Kharkov State University
Tr. Obshch. isp. prir. Khark'k. univ.	Trudy Obshchestva ispytatelei prirody Khar'kovskogo universiteta	Transactions of the Naturalists' Society of Kharkov University
Tr. Obshch. sadov. v Odesse	Trudy obshchestva sadovodov v Odesse	Transactions of the Odessa Horticulturists' Society
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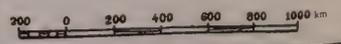


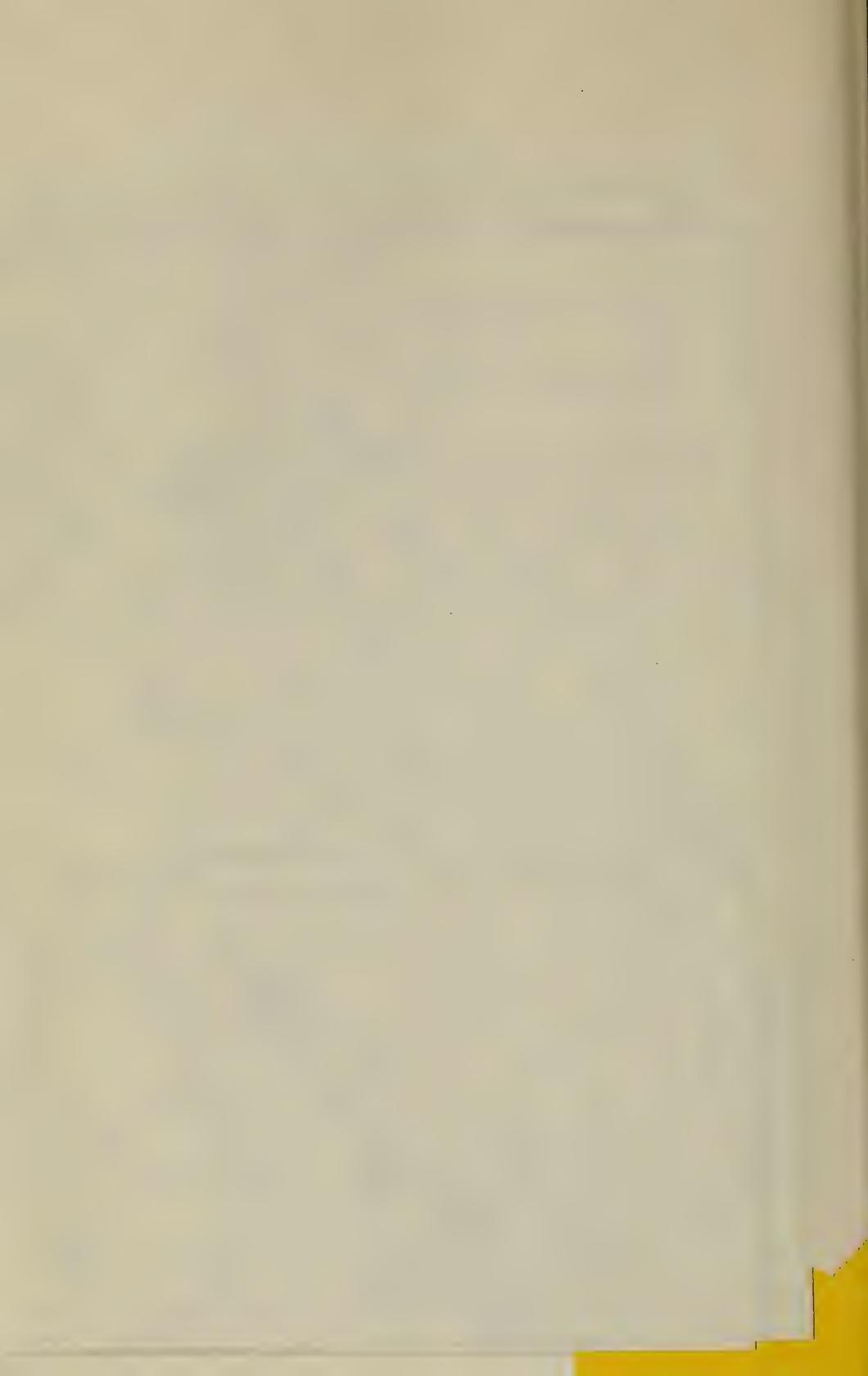


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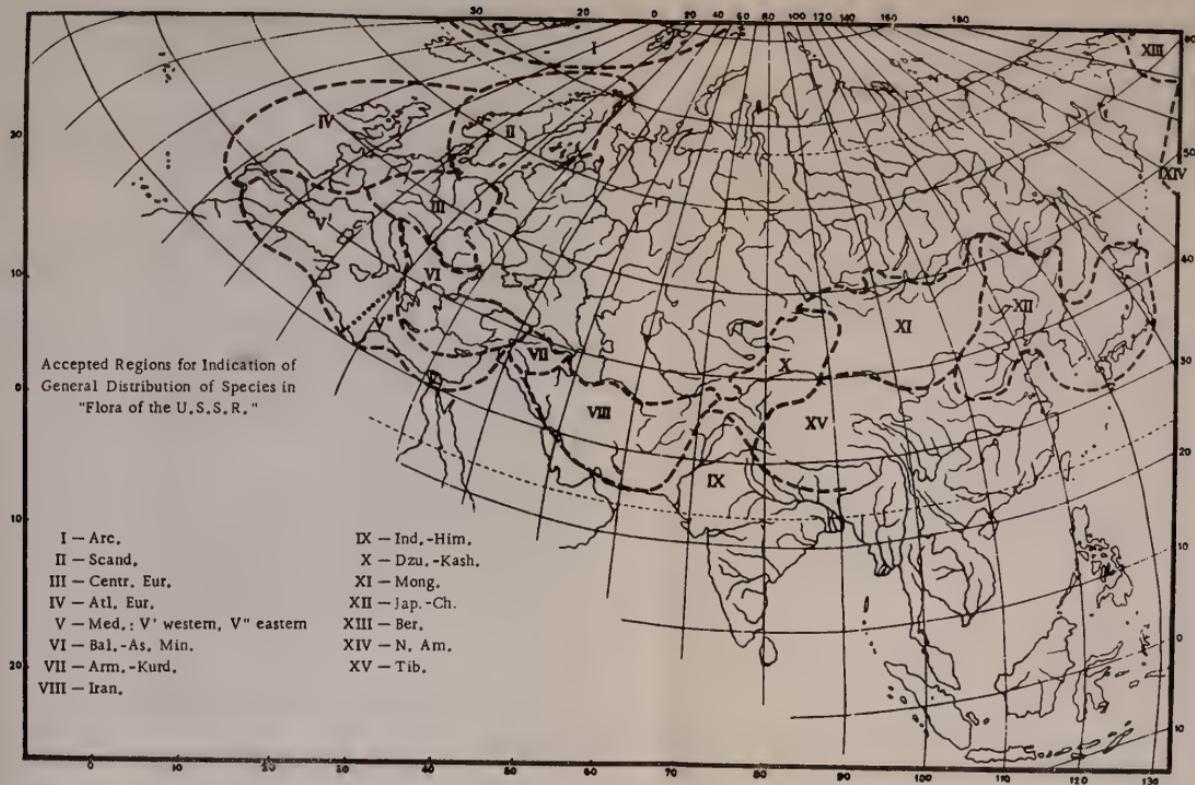
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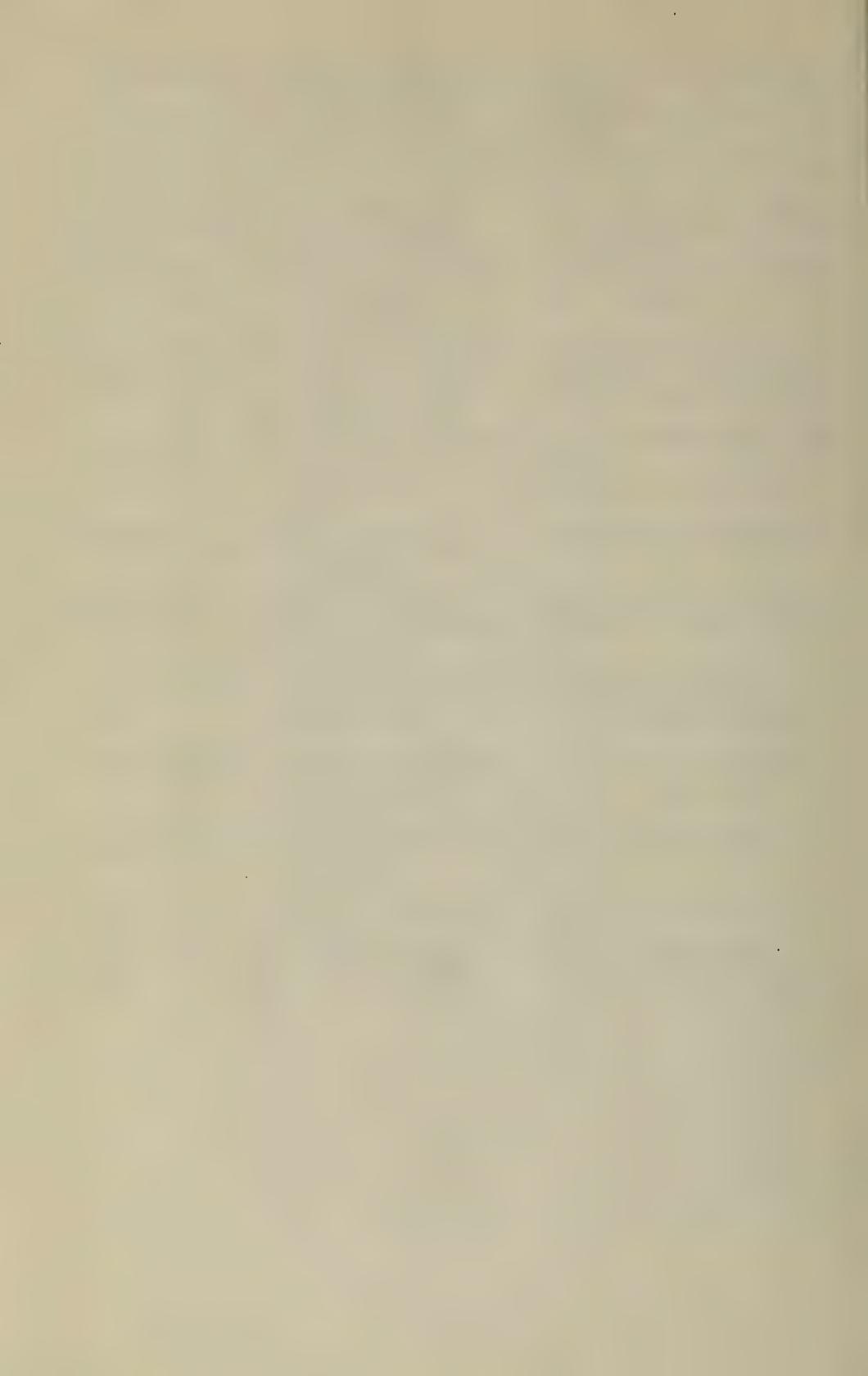


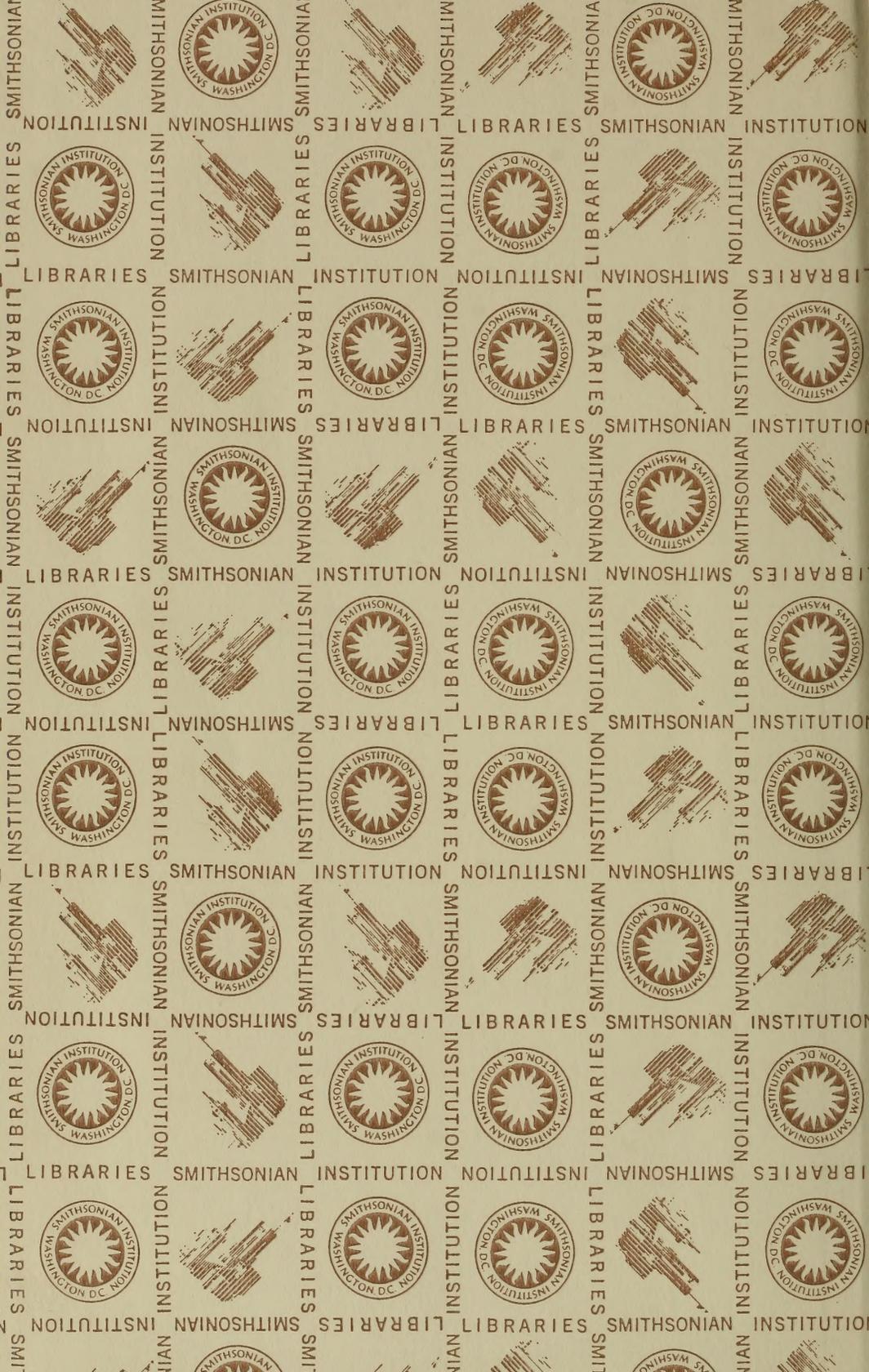




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Tr. po geobot. obsled. pastb. Azerb.	Trudy po geobotanicheskim obsledovaniyam pastbishch Azerbaidzhana	Transactions of Geobotanical Investigations of Azerbaijan SSR Pastures
Tr. Odessk. otd. R. obshch. sadov.	Trudy Odesskogo otdeleniya Rossiiskogo obshchestva sadovodov	Transactions of Odessa Branch of the Russian Horticulturists' Society
Tr. prikl. bot. Tr. (gen. i sel.)	Trudy po prikladnoi botanike, genetike i selektsii	Transactions of Applied Botany, Genetics and Selection
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Tr. Tadzh. bazy AN SSSR	Trudy Tadzhikskoi bazy AN SSSR	Transactions of the Tadzhikistan Base of the Academy of Sciences of the USSR
Tr. Tbil. bot. inst.	Trudy Tbilisskogo botanicheskogo instituta	Transactions of Tbilisi Botanical Institute
Tr. Tbil. (or Tifl.) bot. sada	Trudy Tbilisskogo (Tifliskogo) botanicheskogo sada	Transactions of the Tbilisi (Tiflis) Botanical Garden
Tr. Turkmensk. bot. sada	Trudy Turkmenskogo botanicheskogo sada	Transactions of the Turkmenian Botanical Garden
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Uchen. Zapiski Kazansk. Gos. Univ.	Uchenye Zapiski Kazanskogo Gosudarstvennogo Universiteta	Scientific Reports of the Kazan State University
Vest. Akad. Nauk. (or AN) Kazakhsk. SSR	Vestnik Akademii Nauk Kazakhskoi SSR	Bulletin of the Academy of Sciences of the Kazakh SSR
Vestn. estestv. nauk	Vestnik estestvennykh nauk	Bulletin of Natural Sciences
Vestn. Ross. Obshch. sadov	Vestnik Rossiiskogo Obshchestva sadovodov	Bulletin of the Russian Horticulturists' Society

Vest. Tifl. bot. sada	Vestnik Tiflisskogo botanicheskogo sada	Bulletin of Tiflis Botanical Garden
Visn. Kyyivsk. bot. sadu	Visnyk Kyyivs'koho Botanichnoho Sadu	Bulletin of the Kiev Botanical Garden
Vizn. (or Vznachn.) rosl. URSS	Viznachnyk roslyn URSS	Key to Plants of the Ukrainian SSR
V. obl. polupustyni	V oblasti polupustyni	(In the) Semidesert Region
Yadov. rast. lugov i pastb.	Yadovitye rasteniya lugov i pastbishch	Poisonous Plants of Meadows and Pastures
Yubil. sbornik V. L. Komarovu	Yubileinyi Sbornik Posvyashchennyi V. L. Komarovu	Jubilee Collection Dedicated to V. L. Komarov
Zam. po sist. i geogr. rast. Tbil. bot. inst.	Zametki po sistematiike i geografii rastenii Tbilisskogo botanicheskogo instituta	Notes on Taxonomy and Geography of Plants of the Tbilisi Botanical Institute
Zam. o Rast. Russk. Flory	Zametki o Rastenyakh Russkoi Flory	Notes on Plants of the Russian Flora
Zam. po fl. EL'T	Zametki po flore El'tona	Notes on the Flora of Elton
Zap. Kievsk. Obshch. Estestv.	Zapiski Kievskogo Obshchestva Estestvoispytatelei	Reports of the Kiev Society of Naturalists
Zap. Kyyivsk. Inst. Nar. Osv.	Zapysky Kyyivs'koho Instytututu Narodnoho Osvichennya	Reports of the Kiev Institute of Public Education
Zap. Nauchno-Prikl. Otd. Tifl. Sada	Zapiski Nauchno-Prikladnogo Otdeleniya Tifliskogo Sada	Reports of the Applied Sciences Section of the Tiflis [Tbilisi] Botanical Garden
Zap. NOVOROSS. obshch. Estestv.	Zapiski Novorossiiskogo obshchestva Estestvoispytatelei	Reports of the Novorossiisk Society of Naturalists
Zap. Russk. geogr. obshch.	Zapiski Russkogo geograficheskogo obshchestva	Reports of the Russian Geographical Society
Zhurn. Bot. obshch.	Zhurnal Botanicheskogo obshchestva	Journal of the Botanical Society
Zhurn. opytn. agron. Yugo-Vost.	Zhurnal opytnoi agromonii Yugo-Vostoka	Journal of Experimental Agronomy of the Southeast







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