

Europe. Al Au Be Br Bu Cz Ga Ge Gr Hb He Hs Hu Ju Po Rm Rs (W, K) Tu.

Many variants have been described varying in hairiness of stem, shape and indumentum of leaves, armature of inflorescence and length of stamens.

Related species include:

- R. amoenus** Koehler ex Weihe in Wimmer & Grab., *Fl. Siles.* 2(1): 54 (1829) (*R. purpuratus* Sudre). Au Be Br Cz Ga Ge Rm.  
**R. anisacanthoides** Sudre, *Bull. Soc. Bot. Fr.* 52: 328 (1905). Au Ga Ge Hu.  
**R. anoplocladus** Sudre, *op. cit.* 337 (1905). Au Cz Ga Ge He Hu.  
**R. brumalis** Sudre, *Bull. Assoc. Fr. Bot.* 4: 5 (1901). Au Cz Ga Ge He.  
**R. cappariopsis** Hormuzaki, *Mem. Secf. Sti. (Acad. Română)* ser. 3, 2: 299 (1925). Au.  
**R. carneus** Sabr., *Mitt. Naturw. Ver. Steierm.* 52: 270 (1916). Au Ge.  
**R. celtidifolius** Focke ex Gremli, *Beitr. Fl. Schweiz* 33 (1870). Au He.  
**R. coriifrons** (Sabr.) Hayek, *Fl. Steierm.* 1: 822 (1909). Au.  
**R. crassus** Holuby, *Österr. Bot. Zeitschr.* 23: 381 (1873). Au Cz Hu Po.  
**R. declivis** Sudre, *Compt. Rend. Congr. Soc. Sav. (Sci.)* 1908: 233 (1909). Au Cz Ga Ge Hu.  
**R. elegantissimus** Hayek, *Verh. Zool.-Bot. Ges. Wien* 66: 459 (1916). Au.  
**R. erythrostachys** (Sabr.) Sabr. ex Halácsy, *Verh. Zool.-Bot. Ges. Wien* 41: 278 (1891). Au Bu Ju.  
**R. garrulimontis** Hormuzaki, *Österr. Bot. Zeitschr.* 68: 227 (1919). Au.  
**R. guentheri** Weihe & Nees in Biuff & Fingerh., *Comp. Fl. Germ.* 1: 679 (1825). Au Br Bu Cz Ga Ge He Hu Ju Po.  
**R. hercynicus** G. Braun ex Focke, *Syn. Rub. Germ.* 370 (1877). Au Cz Ga Ge He Hu ?Ju ?Po.  
**R. hirtimimus** Juz., *Not. Syst. (Leningrad)* 13: 108 (1950). Rs (K).  
**R. interruptus** Sudre, *Bull. Assoc. Fr. Bot.* 2: 7 (1899). Au Cz Ga Ge He Hs Hu Po.  
**R. kaltenbachii** Metsch, *Linnaea* 28: 170 (1856). Au Be Cz Ga He Ho Hu ?Po ?Rs (W).  
**R. latifrons** (Progel) Hayek, *Fl. Steierm.* 1: 812 (1909). Ju.  
**R. minutidentatus** Sudre, *Bull. Soc. Bot. Fr.* 52: 323 (1905). Au Cz Ga Ge He Hs Hu Po.  
**R. minutiflorus** P. J. Mueller, *Pollichia* 16-17: 235 (1859). Au Cz Ho Hs Hu Ju ?Po.  
**R. nigricatus** P. J. Mueller & Lefèvre, *op. cit.* 204 (1859). Au Be Cz Ga Ge Hb He Hu ?Rs (W).  
**R. offensus** P. J. Mueller, *Bonplandia* 9: 286 (1861). Au Be Cz Ga Ge He Hu.  
**R. pierratii** Boulay, *Ronces Vosg.* 108 (1868). Au Ga Ge He Hu.  
**R. plusiacanthus** Borbás ex Sudre, *Rubi Eur.* 200 (1912). Au Cz Hu Ju.  
**R. posoniensis** Sabr., *Verh. Zool.-Bot. Ges. Wien* 36: 90 (1886). Cz Hu.  
**R. praealpinus** Hayek, *Fl. Steierm.* 1: 822 (1909). Au.  
**R. praedatus** Schmidely, *Bull. Herb. Boiss.* ser. 2, 3: 79 (1903). Au Cz Ga Ge.  
**R. romanicus** E. I. Nyárady in Sävul., *Fl. Rep. Pop. Române* 4: 929 (1956). Rm.  
**R. rubiginosus** P. J. Mueller, *Pollichia* 16-17: 207 (1859). Au ?Cz Hu ?Po.  
**R. rubrisetoides** Hormuzaki, *Mem. Secf. Sti. (Acad. Română)* ser. 3, 2: 305 (1925). Au.

<sup>1</sup> By I. Klášterský.

- R. ruderalis** Kupcsok, *Magyar Bot. Lapok* 9: 236 (1910). Au Cz.  
**R. scenereinus** Juz., *Not. Syst. (Leningrad)* 13: 106 (1950). Rs (K).  
**R. tenuidentatus** Sudre, *Bull. Soc. Bot. Fr.* 52: 344 (1905). Au Be Cz Ga Ge He Hs Hu Po.  
**R. topitzii** Halácsy ex Topitz, *Österr. Bot. Zeitschr.* 42: 203 (1892). Au.  
**R. trachyadenes** Sudre, *Compt. Rend. Congr. Soc. Sav. (Sci.)* 1908: 233 (1909). Au Cz Ga Ge Hu.  
**R. wittingii** Halácsy, *Verh. Zool.-Bot. Ges. Wien* 41: 271 (1891). Au.

Subsect. *Caesii* Focke. Stems usually terete. Leaves ternate or with 5 leaflets, the basal leaflets subsessile; stipules lanceolate. Inflorescence short and broad, or narrow with few-flowered branches; flowers often long-stalked. Petals often large, orbicular. Drupelets often large, partly abortive, usually pruinose.

75. **R. caesius** L., *Sp. Pl.* 493 (1753). Stems flagelliform, branched, terete, glabrous, pruinose, rarely with a few short glands; prickles few or many, weak, short, straight or falcate. Leaves ternate, slightly hairy above, more or less pubescent beneath; terminal leaflet ovate, sometimes more or less 3-lobed, shortly acuminate, subcordate, rather coarsely biserrate; lateral leaflets often bilobed; petiole sulcate; stipules ovate-lanceolate. Inflorescence short, consisting of a terminal and a few axillary 2- to 5-flowered corymbs; pedicels long, with short hairs, fine glands and sparse prickles; flowers 2-2.5 cm in diameter. Sepals appressed to the developing fruit, ovate-lanceolate, shortly acuminate, grey-green tomentose, with white margin and short glands; petals large, ovate, elliptical or suborbicular, white; stamens green, equalling the greenish styles. Drupelets 2-20, large, black, pruinose, loosely coherent.  $2n=28$ . *Somewhat calcicole. Most of Europe.* All except Az Co Cr Fa Is Sa Sb Tu.

Several varieties have been described, some with pink flowers.

Hybrids between *R. caesius* and plants belonging to other subsections of *Rubus* are termed **Rubi Corylifolii**. Many well-defined taxa have been described but they tend to have very restricted distributions and are not listed here; in Belgium for example, 38 *Corylifolii* have been described, in Britain 20, in Switzerland 50 and in Romania 28. *Corylifolii* are recognised by having at least some of the following characters; stems terete; stipules more or less lanceolate; leaves large; leaflets imbricate, the basal subsessile; inflorescence short and broad, or narrow and with few-flowered branches; flowers long-stalked; petals large, orbicular; drupelets large, partly abortive, rather pruinose. Some set good fruit consisting of large but few drupelets, whilst others tend to be somewhat infertile. In Great Britain and Scandinavia the chromosome numbers of many of the *Rubi Corylifolii* are higher than in the plants of other subsections (counts of 35 or 42 are relatively common), and this may well be true of the *Corylifolii* in other countries. Many are characteristic of ground which has been disturbed; they are particularly common at the edge of cultivated fields, in hedges, along ditch-banks, forest roads etc. The names *R. corylifolius* Sm. and *R. dumetorum* Weihe are no longer in use except as referring to rather broad aggregates.

## 10. *Rosa* L.<sup>1</sup>

Shrubs, usually deciduous. Stems usually with prickles. Leaves pinnate; stipules usually adnate to petiole. Flowers terminal, solitary or in corymbs, (4-)5-merous. Hypanthium urceolate, becoming coloured and fleshy in fruit; epicalyx absent; stamens

## ROSACEAE

and carpels numerous; styles protruding through the orifice of a disc, sometimes forming a short column; ovules 1. Fruit a pseudocarp of numerous achenes enclosed in the hypanthium.

Most species occur in scrub, woodland and hedges.

The description of leaves always refers to the best-developed leaves on the flowering stems.

The armature may include *prickles*, *acicles* (slender, needle-like structures), *setae*, stipitate *glands* and *eglandular hairs*.

The innumerable cultivars of *Rosa* to be found in European gardens (the great majority *flore pleno*) are mostly complex hybrids, of which the most important ancestors are **4**, **6** and **14**, described below, and also *R. chinensis* Jacq., *R. odorata* var. *gigantea* (Collett ex Crépin) Rehder & E. H. Wilson, *R. multiflora* Thunb., *R. wichuraiana* Crépin, all from E. Asia (though *R. chinensis* is not known in the wild state). Some modern garden roses, such as the 'hybrid polyanthas', include all seven of these species in their ancestry. For the origin of garden roses see C. C. Hurst, *Jour. Roy. Hort. Soc.* **66**: 73-82, 242-50, 282-9 (1941), and A. P. Wylie, *Jour. Roy. Hort. Soc.* **79**: 555-71 (1954); **80**: 8-24, 77-87 (1955).

In addition to these hybrids, and to the species described below, many species, mostly from E. Asia, are cultivated in gardens, and some are perhaps becoming naturalized locally. Two hybrids are cultivated on a field scale in Bulgaria and S. France for essential oil from their petals: these are **R. × bifera** (Poiret) Pers., *Syn. Pl.* **2**: 48 (1806) (*R. damascena* auct., non Miller), which is probably a hybrid between **4** and **14** and **R. × alba** L., *Sp. Pl.* 492 (1753), whose parentage is uncertain; it is perhaps a complex hybrid between **2**, **14** and a white-flowered member of Sect. *Caninae*.

Literature: F. Crépin, *Bull. Soc. Bot. Belg.* **8-21** (1869-82). H. Christ, *Rosen der Schweiz*. Basel. 1873. A. Déséglise, *Bull. Soc. Bot. Belg.* **15**: 176-405, 491-602 (1876). V. Borbás, *Primitiae Monographiae Rosarum Imperii Hungarici*. Budapest. 1880. J. Schwertschläger, *Die Rosen des südlichen and mittleren Frankenjura*. München. 1910. E. Willmott, *The genus Rosa*. London. 1910-14. G. Täckholm, *Acta Horti Berg.* **7**: 97-381 (1922). G. A. Boulenger, *Bull. Jard. Bot. Bruxelles* **10** (1924); **12** (1932). A. H. Wolley-Dod, *Jour. Bot. (London)* **68-69** (Suppl.): 1-111 (1930-1). R. Keller, *Synopsis Rosarum spontaneorum Europae mediae*. Zürich. 1931. C. Vicioso, *Estudios sobre el Género 'Rosa' en España*. Ed. 2. Madrid. 1964.

- 1 Styles connate in a column
- 2 Stylar column shorter than the inner stamens; styles sometimes becoming free in fruit **15. stylosa**
- 2 Stylar column at least as long as the inner stamens; styles not becoming free in fruit
- 3 Inflorescence with 10-20 flowers
- 4 Stylar column glabrous **3. phoenicia**
- 4 Stylar column hairy **4. moschata**
- 3 Flowers solitary or inflorescence with 2-7 flowers
- 5 Leaves coriaceous, evergreen; stylar column usually hairy **1. sempervirens**
- 5 Leaves herbaceous, deciduous; stylar column glabrous
- 6 Erect shrub; stems arching; prickles very stout with very broad bases **15. stylosa**
- 6 Trailing shrub; stems weak; prickles ± slender **2. arvensis**
- 1 Styles free
- 7 Sepals ± entire
- 8 Leaflets glabrous
- 9 Leaflets simply serrate

- 10 Stems with long prickles mixed with many short prickles and acicles **5. pimpinellifolia**
- 10 Stems without acicles
- 11 Pedicels glandular-hispid **13. virginiana**
- 11 Pedicels glabrous **9. glauca**
- 9 Leaflets biserrate or compound-serrate
- 12 Petals yellow; fruit c. 10 mm, globose **6. foetida**
- 12 Petals deep purplish-pink; fruit 15-25 mm, ovoid to elongate-pyriform, rarely globose **12. pendulina**
- 8 Leaflets pubescent, at least beneath
- 13 Petals yellow **6. foetida**
- 13 Petals white, pink or purplish-pink
- 14 Young stems, prickles and lower surface of the leaflets densely tomentose; leaves thick, rugose **10. rugosa**
- 14 Young stems and prickles glabrous, the lower surface of the leaflets ± sparsely hairy; leaves not rugose
- 15 Pedicels glandular-hispid
- 16 Leaflets biserrate or compound-serrate **12. pendulina**
- 16 Leaflets simply serrate
- 17 Flowering stems usually densely covered with slender prickles or acicles; sepals erect and persistent after anthesis **7. acicularis**
- 17 Flowering stems usually without acicles; sepals patent and deciduous after anthesis **13. virginiana**
- 15 Pedicels glabrous
- 18 Flowering stems usually densely covered with slender prickles or acicles; fruit ovoid, with a distinct neck below the disc **7. acicularis**
- 18 Flowering stems without acicles; fruit usually globose
- 19 Stems usually with a pair of curved prickles at the nodes **8. majalis**
- 19 Stems without paired prickles at the nodes **11. blanda**
- 7 Outer 3 sepals distinctly pinnatifid or lobed
- 20 Leaflets coriaceous; petals (25-)30-45 mm **14. gallica**
- 20 Leaflets not coriaceous; petals 8-25(-30) mm
- 21 Leaflets glabrous or subglabrous, eglandular or very sparsely glandular
- 22 Leaflets bluish-green or purplish; young stems pruinose
- 23 Hypanthium and pedicels densely stipitate-glandular **17. montana**
- 23 Hypanthium glabrous; pedicels rarely sparsely stipitate-glandular
- 24 Sepals 2-3 mm wide; prickles sparse, rather slender, curved or straight, without stout bases **9. glauca**
- 24 Sepals 3-5 mm wide; prickles stout, curved or hooked, usually with stout bases **(18-31). canina group**
- 22 Leaflets green; young stems not pruinose
- 25 Pedicels glabrous **(18-31). canina group**
- 25 Pedicels stipitate-glandular
- 26 Sepals erect and persistent after anthesis **17. montana**
- 26 Sepals deflexed and deciduous after anthesis
- 27 Leaflets not coriaceous; prickles usually hooked or curved **(18-31). canina group**
- 27 Leaflets subcoriaceous; prickles usually straight or slightly curved **16. jundzillii**
- 21 Leaflets distinctly hairy or glandular or both
- 28 Leaflets coriaceous; petals (25-)30-45 mm **14. gallica**
- 28 Leaflets not coriaceous; petals 8-25(-30) mm
- 29 Leaflets ± densely viscid-glandular beneath
- 30 Leaflets glabrous or somewhat pubescent beneath, smelling of apples **(39-47). rubiginosa group**
- 30 Leaflets tomentose beneath, with a resinous smell **(32-38). tomentosa group**
- 29 Leaflets eglandular beneath or with glands confined to main veins
- 31 Prickles straight or slightly curved; leaflets always hairy and usually very tomentose, with a resinous smell **(32-38). tomentosa group**
- 31 Prickles usually curved or hooked; leaflets glabrous or pubescent, very rarely tomentose and if tomentose then prickles distinctly curved or hooked and hypanthium glabrous; leaflets usually not scented **(18-31). canina group**

Sect. SYNSTYLAE DC. Trailing, climbing or creeping shrubs. Rhizome short. Prickles curved, all similar. Outer sepals usually pinnatifid, deflexed and deciduous after anthesis. Disc wide, with a narrow orifice. Carpels sessile. Styles connate in a column, at least as long as the inner stamens, not becoming free in fruit.

1. *R. sempervirens* L., *Sp. Pl.* 492 (1753). Evergreen, with long, creeping stems. Prickles sparse, curved, markedly decurrent at base. Leaflets (3-)5-7, 30-60 × 10-20 mm, coriaceous, ovate-lanceolate, acuminate, serrate, glabrous, shining; stipules narrow. Inflorescence (1-)3- to 7-flowered, corymbose. Pedicels glandular-hispid, 2-4 times as long as the fruit. Sepals ovate, long-acuminate, usually entire, glandular with stalked glands on the margins and back, deflexed and deciduous after anthesis. Petals 10-20(-30) mm, white. Styler column hairy or glabrous. Fruit c. 10 mm, globose or broadly ovoid, red. *Mediterranean region and S.W. Europe, northwards to 47° 30' in W. France.* Al Bl Co Cr Ga Gr Hs It Ju Lu Sa Si Tu [Br].

2. *R. arvensis* Hudson, *Fl. Angl.* 192 (1762). Deciduous, with long, weak, trailing stems. Prickles sparse, hooked, the upper sometimes slender and almost straight. Leaflets 5-7, 15-40 × 10-20 mm, herbaceous, ovate to broadly elliptical, dull above, sparsely appressed-pubescent to subglabrous. Inflorescence 1- to 3(-5)-flowered. Pedicels stipitate-glandular, 2-3 times as long as fruit. Sepals eglandular on the back, deflexed after anthesis, the outer with long, narrow lobes. Petals 15-25 mm, white. Styler column glabrous. Fruit 10-16 mm, globose to ovoid, red. *S., W. & C. Europe.* Al Au Be Bl Br Bu ?Co Cz Ga Ge Gr Hb He Ho Hs Hu It Ju ?Po Rm Rs (W) Si Tu.

3. *R. phoenicia* Boiss., *Diagn. Pl. Or. Nov.* 2(10): 4 (1849). Like 2 but stems climbing; prickles stout, hooked; leaflets 15-50 × 10-30 mm, usually densely hairy on both surfaces; inflorescence 10- to 20-flowered, corymbose; outer sepals with short and wide lobes; fruit c. 10 mm. *N.E. Greece (Thraci).* Gr. (S.W. Asia.)

4. *R. moschata* J. Herrmann, *Diss. Rosa* 15 (1762). Vigorous evergreen climber up to 12 m. Prickles sparse, stout, curved. Leaflets 5-7, 25-55 × 20-30 mm, ovate to elliptical, usually acute, serrate, usually pubescent, greyish-green beneath. Inflorescence many-flowered. Pedicels slightly pubescent and glandular. Sepals lanceolate, with a setiform apical appendage, more or less grey-pubescent, the outer with 2-4 lobes. Petals 10-15 mm, creamy-white. Styler column hairy. Fruit 8-10 mm, ovoid. *Cultivated for ornament, mainly in S. & W. Europe; naturalized in the Mediterranean region.* [Cr Ga Gr Hs Si.] (*Himalaya, Iran.*)

SECT. PIMPINELLIFOLIAE DC. Deciduous shrubs. Rhizome long. Stems usually with straight prickles and acicles. Flowers solitary, bracteate. Sepals entire, erect and persistent after anthesis. Disc narrow, with a wide orifice. Carpels shortly stipitate. Styles free.

5. *R. pimpinellifolia* L., *Syst. Nat.* ed. 10, 2: 1062 (1759) (*R. spinosissima* L. pro parte, *R. myriacantha* DC.). Stems up to 1 m, erect, forming dense patches. Prickles abundant and long on the main stems, sparser and shorter on the flowering stems and mixed with acicles. Leaflets 5-11, 5-15(-20) × 4-9 mm, glabrous, sub-orbicular to broadly elliptical, usually simply serrate and eglandular. Flowers solitary. Pedicels longer than the fruit, eglandular or with stalked glands. Sepals narrowly lanceolate, acuminate, eglandular. Petals 10-20(-25) mm, white, rarely pink. Styles short, usually in a compact head, lanate. Fruit c. 6 mm, globose or depressed-globose, black.  $2n=28$ . *Europe except the north-east,*

*most of Fennoscandia, the extreme south-west and many of the islands.* Al Au Be Br Bu Cz Da Ga Ge Gr Hb He Ho Hu Is It Ju No Po Rm Rs (C, W, K, E) †Su.

Many hybrids between 5 and members of Sect. *Caninae* have been described. The influence of 5 is usually recognizable in the presence of acicles and in the habit and leaflet-shape.

6. *R. foetida* J. Herrmann, *Diss. Rosa* 18 (1762). Stems up to 4 m. Prickles curved, more or less compressed and strongly decurrent at the base. Leaflets 5-7, 15-40 × 12-25 mm, ovate-elliptical, usually sparsely hairy and dark green above, sparsely glandular and slightly paler beneath, biserrate; teeth glandular. Flowers 1-3. Pedicels usually glabrous, sometimes hispid. Sepals attenuate at apex, glandular-hispid. Petals 20-30 mm, yellow. Styles long, lanate. Fruit c. 10 mm, globose, red. *Cultivated for ornament; locally naturalized in S. & C. Europe.* [Au Cz Ga Ge Gr Hs It Rm Tu.] (S.W. Asia.)

Sect. CASSIORHODON Dumort. (Sect. *Cinnamomeae* Crépin). Erect, deciduous shrubs. Rhizome long. Prickles at the nodes slender, straight, the others stout, hooked, or absent; acicles often present. Flowers in bracteate corymbs. Sepals usually entire, erect and persistent after anthesis. Disc narrow, with a wide orifice. Carpels lining the sides as well as the base of the hypanthium. Styles free.

7. *R. acicularis* Lindley, *Ros. Monogr.* 44 (1820). Stems up to 1 m, with numerous slender acicles and long straight prickles. Leaflets (3-)5-7, 15-55 × 15-28 mm, broadly elliptical to oblong, acute, usually rather coarsely serrate, usually glabrous above, pubescent beneath. Flowers solitary, scented. Bracts about equaling the pedicels, usually narrow. Pedicels usually glabrous, rarely glandular-hispid. Petals 18-24 mm, purplish-pink. Styles lanate. Fruit ovoid, with a distinct neck below the disc. *N.E. Europe, extending locally southwards to c. 52° N. in C. & E. Russia.* Fe Rs (N, C) Su [Au].

8. *R. majalis* J. Herrmann, *Diss. Rosa* 8 (1762) (*R. cinnamomea* sensu L. (1759), non L. (1753), *R. spinosissima* L., nom. ambig.). Stems up to 2 m, forming large patches; bark reddish-brown. Prickles slender, straight or slightly curved, in pairs at the nodes; flowering stems sometimes unarmed. Leaflets 5-7, 15-45 × 15-27 mm, elliptical to obovate, cuneate at base, serrate, pubescent, bluish-green above, pale bluish beneath. Flowers solitary. Bracts about equalling or a little longer than the pedicels, large. Pedicels glabrous. Petals 18-25(-30) mm, purplish-pink. Styles lanate. Fruit depressed-globose, rarely ovoid, glabrous, red.  $2n=14$ . *N. & C. Europe; U.S.S.R. except the south-west.* Au Cz Fe Ga Ge He It Ju No Po Rs (N, B, C, W, E) Su [Be Bu Da Ho].

9. *R. glauca* Pourret, *Mém. Acad. Toulouse* 3: 326 (1788) (*R. ferruginea* auct., non Vill., *R. rubrifolia* Vill.). Stems up to 3 m, erect bluish-green, pruinose when young, becoming brown. Prickles scattered, curved or straight, rather slender, without stout bases. Leaflets 5-9, 20-45 × 15-25 mm, elliptical to ovate, serrate, glabrous, bluish-green or purplish. Flowers 1-5. Pedicels glabrous, very rarely with stalked glands. Sepals 2-3 mm wide, sometimes almost entire but usually with a few linear lobes, glabrous. Petals 18-22 mm, narrow, deep pink. Disc flat. Styles white-lanate. Fruit c. 15 mm, globose, usually glabrous, brownish-red. *Mountains of C. Europe, extending southwards to the Pyrenees, C. Italy and N. Albania.* Al Au Bu Co Cz Ga Ge He Hs Hu It Ju Po Rm [Fe Su].

10. *R. rugosa* Thunb., *Fl. Jap.* 213 (1784). Stems up to 2.5 m, densely tomentose when young. Prickles hairy, at least at the base, straight, mixed with dense acicles. Leaflets 5–9, 20–50 × 18–25(–40) mm, ovate to elliptical, usually green and shiny above, thick, rugose. Flowers 1–3. Bracts large, enclosing the pedicels. Pedicels usually densely tomentose. Petals (25–)30–45(–50) mm, purplish-red, rarely white. Fruit depressed-globose, with a well-developed neck below the disc, glabrous, scarlet.  $2n=14$ . *Cultivated for ornament and for hedges; naturalized in parts of N., W. & C. Europe.* [Au Br Da Fe Ga Ge Hb Ho Hu No Po Rm Su.] (*E. Asia.*)

11. *R. blanda* Aiton, *Hort. Kew.* 2: 202 (1789). Erect shrub up to 2 m. Stems unarmed, or with scattered acicles when young; bark brown. Leaflets 5–7(–9), 20–60 × 15–40 mm, elliptical to obovate-oblong, usually acute, coarsely serrate, dull and glabrous above, paler and usually pubescent beneath. Flowers 1–5. Bracts large, enclosing the pedicels. Pedicels glabrous. Petals 15–25 mm, pink. Fruit subglobose or ellipsoid, glabrous, red. *Cultivated for ornament; naturalized in C. Europe.* [Au Ge.] (*E. & C. North America.*)

12. *R. pendulina* L., *Sp. Pl.* 492 (1753) (*R. alpina* L.). Stems up to 2 m; bark green, yellowish-green or occasionally purplish. Prickles usually absent. Leaflets 7–11, 20–60 × 10–30 mm, oblong-ovate to -obovate, biserrate, glabrous or pubescent above, usually sparsely pubescent and sometimes glandular at least on the veins beneath, with glandular teeth. Flowers solitary. Bracts about as long as and enclosing the pedicels, soon deciduous. Pedicels glandular-hispid, recurved in fruit. Petals 15–25 mm, deep purplish-pink. Styles densely hairy. Fruit 15–25 mm, pendent, ovoid to elongate-pyriform, rarely globose, often glandular-hispid, red. *Mountains of C. & S. Europe.* Al Au Be Bu Cz Ga Ge Gr He Hs Hu It Ju Po Rm Rs (W).

Sect. CAROLINAE Crépín. Erect, deciduous shrubs. Stems slender, with straight, paired prickles and often acicles. Flowers few, in corymbs. Sepals patent and soon deciduous after anthesis. Pedicels and hypanthium glandular-hispid, rarely smooth. Carpels confined to the bottom of the hypanthium.

13. *R. virginiana* J. Herrmann, *Diss. Rosa* 19 (1762). Stems up to 2 m, with few or no suckers; bark bluish-green, becoming reddish-brown. Prickles hooked, curved or absent. Leaflets 5–9, 20–60 × 12–25 mm, elliptical to elliptic-obovate, often cuneate at base, acute, serrate, dull green above, glabrous or sparsely hairy beneath; teeth eglandular. Flowers 2–8. Bracts much shorter than the pedicels. Pedicels glandular-hispid. Sepals patent and deciduous after anthesis, glandular-hispid on the back. Petals 15–25(–30) mm, pink or white. Styles lanate. Fruit 10–15 mm, ovoid-globose to globose, glandular-hispid. *Cultivated for ornament and locally naturalized.* [Au Br Ga.] (*E. North America.*)

Sect. ROSA (Sect. *Gallicanae* DC.). Erect, usually low shrubs. Rhizome long. Stems usually with hooked prickles mixed with acicles. Outer sepals usually pinnatifid, deflexed and deciduous after anthesis. Disc wide, with a narrow orifice. Carpels sessile. Styles free.

14. *R. gallica* L., *Sp. Pl.* 492 (1753). Deciduous shrub 0.4–0.8 m, forming large patches. Stems with prickles and glandular setae. Leaflets 3–7, 20–60 × 18–30 mm, coriaceous, suborbicular or ovate to narrowly elliptical, rounded at the apex, usually compound-serrate, dull bluish-green and glabrous above, paler, pubescent and glandular beneath. Flowers solitary, rarely 2–4,

6–9 cm in diameter, strongly scented. Pedicels glandular-setose. Sepals glandular on the back. Petals (25–)30–45 mm, deep pink. Styles densely hairy, rarely glabrous. Fruit globose to fusiform, densely glandular-setose, bright red. *S. & C. Europe, extending to Belgium and C. France.* Al Au Be Bu Cz Ga Ge Gr He Hu It Ju Po Rm Rs (C, W, K) Tu [Co Hs Lu Sa Si].

Sect. CANINAE DC. Deciduous shrubs, with erect or arching stems. Rhizome short. Prickles usually numerous, hooked or straight; acicles usually absent. Flowers in bracteate corymbs. Outer sepals usually pinnatifid, deflexed, erect or patent, persistent or caducous after anthesis. Disc flat or conical, variable in size, narrow. Carpels long-stipitate. Styles free.

This section has long been recognized as critical, and very large numbers of taxa have been described. So far as is known, they are all polyploid, with  $2n=28, 35$  or  $42$ , and their reproduction is unusual. In the pentaploids, for example, 7 bivalents and 21 univalents are formed at meiosis. In the pollen the univalents are lost, so that most functional pollen-grains carry only 7 chromosomes; in the ovules, on the other hand, all the univalents go to one pole at the first meiotic division and the egg has 28 chromosomes. Thus, in sexual reproduction, most of the chromosomes of the offspring come from the seed-parent and have not paired at meiosis. Inheritance thus tends to be predominantly maternal, and this in turn means there is a tendency for the biotypes in Sect. *Caninae* to be relatively constant, though hybridization can produce new biotypes, some of which may survive and become stabilized. The situation is analogous to facultative apomixis, though *Rosa* is not apomictic.

In the account of Sect. *Caninae* which follows, an attempt has been made to cover the whole range of variation but to describe only a limited number of fairly well-defined species. It is recognized that many intermediates may occur. Because of the taxonomic difficulties, the geographical distribution of many of the species is imperfectly known, and can only be given in general terms.

15. *R. stylosa* Desv., *Jour. Bot. Rédigé* 2: 317 (1809). Stems up to 3 m. Prickles hooked, some with very stout bases. Leaflets 5–7, 25–50 × 15–25 mm, elliptical to elliptic-oblong, usually acuminate, serrate, usually pubescent beneath at least on the veins, rarely pubescent above, eglandular. Flowers solitary to many. Pedicels long, usually glandular-hispid. Sepals deflexed and deciduous after anthesis. Petals 15–30 mm, usually white, sometimes pink. Disc conical. Styles connate in a column which is shorter than the inner stamens, sometimes becoming free in fruit. Fruit 10–15 mm, ovoid, rarely globose, glabrous, red. *From Ireland and W. Germany to S. Spain and Bulgaria; local.* Au Br Bu Ga Ge Hb He Hs Hu It Rm.

16. *R. jundzillii* Besser, *Cat. Horto Cremen.* 117 (1816) (*R. marginata* auct., non Wallr.). Stems up to 2 m, erect. Prickles slender, straight or slightly curved. Leaflets 5–7, 25–40 × 15–25 mm, subcoriaceous, elliptical to ovate, acute, biserrate, glabrous or rarely very sparsely pubescent, sparsely glandular on the margins and veins beneath; teeth glandular; rhachis sparsely glandular. Flowers solitary, slightly scented. Pedicels c. 25 mm, usually twice as long as the fruit, stipitate-glandular. Sepals glandular on the back, deflexed and deciduous after anthesis. Petals 15–25(–30) mm, pale to deep pink. Disc flat, wide. Styles ± densely pubescent. Fruit c. 12 mm, globose to ovoid, sparsely stipitate-glandular or glabrous, red. *C. & E. Europe, extending westwards to C. France and N.W. Italy.* Al Au Bu Cz Ga Ge ?Gr He Hu It Ju Po Rm Rs (C, W, K) ?Tu.

**17. *R. montana*** Chaix in Vill., *Hist. Pl. Dauph.* 1: 346 (1786). Stems up to 3 m, erect. Prickles curved or nearly straight, abruptly dilated at base. Leaflets 7–9, 20–35 × 12–25 mm, broadly obovate, biserrate, glabrous, bluish-green, glandular beneath on the midrib and rarely also on the lateral veins; petiole and rhachis glandular. Flowers solitary or 2–3. Pedicels very densely stipitate-glandular. Sepals glandular on the back, erect and persistent after anthesis. Petals 14–22 mm, pale pink, becoming whitish. Disc as wide as or very little wider than the orifice. Styles lanate. Fruit 15–25 mm, ovoid to elongate-pyriform, stipitate-glandular, rarely glabrous. *S. Europe and parts of S.C. Europe.* Au Ga Gr He Hs It ?Ju Si.

**(18–31). *R. canina* group.** Stems up to 5 m, erect. Prickles usually curved or hooked, stout, usually all similar. Leaflets ovate, obovate, elliptical or suborbicular, glabrous or pubescent, eglandular or with a few glands on the main veins beneath, more rarely with numerous glands, the glands not strongly scented. Pedicels glabrous or stipitate-glandular. Flowers solitary or 2–5. Sepals 3–5 mm wide, usually deflexed after anthesis but sometimes erect or patent. Petals white or pink. Disc flat. Styles short or long, glabrous, villous or lanate. Fruit globose, ovoid or ellipsoid, glabrous or stipitate-glandular.

- 1 Sepals usually deflexed and deciduous in fruit; styles usually glabrous or villous, rarely lanate
- 2 Leaflets glabrous
- 3 Pedicels glabrous
- 4 Leaves eglandular
- 5 Disc narrow, the orifice more than 1 mm in diameter **24. subcanina**
- 5 Disc wide, the orifice not more than 1 mm in diameter **18. canina**
- 4 Leaves glandular, at least on the rhachis, petioles and veins
- 6 Leaflets with glandular teeth **21. nitidula**
- 6 Leaflets with eglandular teeth **19. squarrosa**
- 3 Pedicels stipitate-glandular
- 7 Disc narrow, the orifice more than 1 mm in diameter **24. subcanina**
- 7 Disc wide, the orifice not more than 1 mm in diameter
- 8 Leaflets serrate, with short and rather wide teeth **20. andegavensis**
- 8 Leaflets biserrate or compound-serrate, with long, acuminate teeth
- 9 Styles glabrous; leaves usually eglandular or rarely sparsely glandular on petiole and rhachis **22. pouzinii**
- 9 Styles villous; leaves glandular on veins, petiole and rhachis **21. nitidula**
- 2 Leaflets hairy
- 10 Pedicels glabrous
- 11 Disc narrow, the orifice more than 1 mm in diameter **26. subcollina**
- 11 Disc wide, the orifice not more than 1 mm in diameter
- 12 Leaves usually glandular beneath **28. obtusifolia**
- 12 Leaves usually eglandular beneath **29. corymbifera**
- 10 Pedicels ± stipitate-glandular
- 13 Leaves usually densely glandular beneath; styles usually long **31. abietina**
- 13 Leaves with glands confined to rhachis and petiole; styles usually short **30. deseglisei**
- 1 Sepals usually erect or patent in fruit, persistent; styles lanate
- 14 Acicles present **27. rhaetica**
- 14 Acicles absent
- 15 Stems usually reddish; leaflets glabrous or rarely with a few scattered glands beneath **23. vosagiaca**
- 15 Stems usually green; leaflets hairy and usually glandular
- 16 Sepals erect or patent in fruit; leaflets densely appressed-hairy beneath **25. caesia**

16 Sepals deflexed or patent in fruit; leaflets usually sparsely hairy beneath **26. subcollina**

**18. *R. canina*** L., *Sp. Pl.* 491 (1753). Stems green; internodes long. Prickles stout, curved or hooked; flowering stems rarely unarmed. Leaflets 5–7, 15–40 × 12–20 mm, ovate, obovate or elliptical, serrate or compound-serrate, glabrous and eglandular, dark to glaucous green, shining or dull above; petiole and rhachis often with acicles. Pedicels 10–20 mm, as long as or longer than the fruit, glabrous. Sepals deflexed and caducous after anthesis. Petals 15–25(–30) mm, pink to white. Disc wide, with the orifice less than 1 mm in diameter. Styles usually not long-exserted, densely villous to glabrous. Fruit 10–20 mm, globose, ovoid or ellipsoid, glabrous, red.  $2n=35$ . *Europe northwards to c. 62° N.* All except Az Fa Is Sb Tu.

**19. *R. squarrosa*** (Rau) Boreau, *Fl. Centre Fr.* ed. 3, 2: 222 (1857). Like **18** but leaflets compound-serrate, glandular on the mid-veins and sometimes over the entire lower surface; stipules, petiole and rhachis densely glandular; styles long-exserted, villous. *Mainly in C. Europe; distribution not fully known.* Au Be Br Bu Cz Ga Ge Gr He Hu Po Rm.

**20. *R. andegavensis*** Bast., *Essai Fl. Maine Loire* 189 (1809). Like **18** but leaflets serrate; petiole and rhachis glandular and with acicles; pedicels stipitate-glandular; style usually long-exserted; fruit often stipitate-glandular. *W., S. & C. Europe.* Al Au Be Br Bu Cz Ga Ge Gr He Hs Hu It Ju Po Rm Rs (W) ?Sa Si.

**21. *R. nitidula*** Besser, *Cat. Pl. Jard. Krzemien. Suppl.* 4: 20 (1815) (*R. blondaeanana* Ripartex Déséglise). Like **18** but leaflets with glandular teeth, glandular on the mid-veins and sometimes on the lateral veins; petioles and rhachis always glandular; pedicels sometimes stipitate-glandular; styles usually long-exserted, pubescent or lanate; fruit sometimes glandular-hispid. *From Britain and N. Portugal eastwards to S. Sweden, the Carpathians and Greece.* Au Be Br Bu Cz Ga Ge Gr He Hs Hu It Ju Lu Po Rm Rs (W).

**22. *R. pouzinii*** Tratt., *Rosac. Monogr.* 2: 112 (1823). Like **18** but leaflets 15–25 × 10–18 mm, suborbicular to elliptical, with glandular teeth, sparsely glandular on rhachis and petiole; pedicels densely stipitate-glandular; styles long-exserted, glabrous; fruit occasionally glandular-hispid. *Mediterranean region, Portugal.* Bl Co Cr Ga Gr Hs It Lu Sa Si.

**23. *R. vosagiaca*** Desportes, *Ros. Gall.* 88 (1828) (*R. afzeliana* subsp. *vosagiaca* (Desportes) R. Keller & Gams, *R. glauca* subsp. *reuteri* (Godet) Hayek). Stems up to 2 m, pruinose when young; internodes long. Prickles crowded, rather short, curved or hooked. Leaflets 5–7, 20–40 × 15–25 mm, elliptical or ovate to obovate, serrate to compound-serrate, margins overlapping, glabrous, usually bluish-green and pruinose, or rarely green and not pruinose, rarely with scattered glands beneath. Pedicels 2–20 mm, rarely longer than fruit, glabrous. Sepals erect and persistent after anthesis. Petals 15–25 mm, bright pink. Disc narrow, with the orifice more than 1 mm in diameter. Styles lanate. Fruit 10–20 mm, globose, rarely ovoid, glabrous, deep red. *Most of Europe, northwards to Iceland and Fennoscandia, but rare in the south-west.* Al Au Bu Cz Da Fe Ga Ge Gr He Ho Hs Hu It Ju Lu No Po Rm Rs (N, B, C, W) Si Su.

**24. *R. subcanina*** (Christ) Dalla Torre & Sarnth., *Fl. Tirol* 6(2): 515 (1909) (*R. glauca* subsp. *subcanina* (Christ) Hayek). Like **23** but pedicels (10–)20–30 mm, often longer than the fruit,

rarely stipitate-glandular; sepals patent or deflexed. *Probably widespread in Europe, but rarer in the west.* Au Br Bu Cz Da Ga Ge He Hu It Ju No Po Rm Rs (B, C, W).

**25. *R. caesia*** Sm. in Sowerby, *Engl. Bot.* 33: t. 2367 (1812) (*R. coriifolia* Fries, *R. afzeliana* subsp. *coriifolia* (Fries) R. Keller & Gams). Like **23** but internodes short; leaflets pubescent to glabrous above, usually densely appressed-pubescent to almost tomentose beneath, rarely sparsely glandular; pedicels occasionally stipitate-glandular, sometimes pubescent when young; sepals patent or erect; fruits up to 25 mm, the central one often pyriform.  $2n=35$ . *Most of Europe eastwards to Estonia and C. Ukraine.* Au Be Br Bu Cz Da Fe Ga Ge Gr He Ho Hs Hu It Ju No Po Rm Rs (B, C, W) Si Su.

**26. *R. subcollina*** (Christ) Dalla Torre & Sarnth., *Fl. Tirol* 6(2): 516 (1909) (*R. coriifolia* subsp. *subcollina* (Christ) Hayek). Like **23** but leaves not bluish-green or pruinose, sometimes sparsely hairy above, hairy beneath at least on the veins and sometimes glandular on veins and rhachis; sepals patent or deflexed after anthesis and usually deciduous. *Probably widespread in Europe except the extreme north.* Au Be ?Br Bu Cz Da Ga Ge He Hs Hu ?It Ju No Po Rm Rs (W, E) Su.

**27. *R. rhaetica*** Greml., *Excurs.-Fl. Schweiz* ed. 4, 164 (1881) (*R. afzeliana* subsp. *rhaetica* (Greml.) R. Keller & Gams). Like **23** but stout, hooked prickles and slender, straight acicles both present; leaflets not bluish-green or pruinose, somewhat glandular and more or less hairy on both surfaces; pedicels 5–10 mm, glabrous or stipitate-glandular. ● *Alps.* Au He It.

**28. *R. obtusifolia*** Desv., *Jour. Bot. Rédigé* 2: 317 (1809) (*R. tomentella* Léman, *R. klukii* Besser). Stems up to 2 m, green; prickles scattered, short, stout, compressed, strongly hooked. Leaflets 5–7, 15–35 × 14–25 mm, broadly ovate, simply to compound-serrate, softly appressed-pubescent on both surfaces, sometimes pubescent only on the veins beneath, usually glandular on the veins beneath; teeth glandular, short and wide; petiole and rhachis densely pubescent, more or less glandular, covered with minute acicles. Pedicels 5–15 mm, glabrous. Sepals eglandular, deflexed and caducous after anthesis. Petals 12–18(–24) mm, white or pale pink. Disc wide, with the orifice less than 1 mm wide. Styles long-exserted, villous or rarely glabrous. Fruit 10–20 mm, ovoid or globose, glabrous, red. *C., S. & N.W. Europe.* Al Au Be Br Bu Co Cz Da Ge Gr Hb He Hu It Ju Po Rm Rs (W, C) Sa Si Su.

**29. *R. corymbifera*** Borkh., *Vers. Forstbot. Beschr. Holzart.* 319 (1790) (*R. dumetorum* Thuill.). Like **28** but leaflets broadly elliptical to suborbicular, rarely narrower, simply serrate, sometimes glabrous above, usually eglandular.  $2n=35$ . *Probably widespread throughout Europe but rarer in the north & north-west.* Al Au Be Bl Br Bu Co Cr Cz Fe Ga Ge Gr He Ho Hs Hu It Ju Lu No Po Rm Rs (?B, C, W, K, E) Sa Si Su Tu.

**30. *R. deseglisei*** Boreau, *Fl. Centre Fr.* ed. 3, 2: 224 (1857). Like **28** but petiole and rhachis usually glandular; pedicels and sometimes the base of the hypanthium rather sparsely stipitate-glandular; styles usually short. *Mainly C. Europe; distribution not fully known.* Au Br Bu Cz Fe Ga Ge He Hu It Ju ?No Po Rs (?B, ?C, ?W) ?Su.

**31. *R. abietina*** Gren. ex Christ, *Ros. Schweiz* 132 (1873) (*R. obtusifolia* subsp. *abietina* (Gren. ex Christ) F. Hermann). Like **28** but prickles more abundant, curved; leaflets compound-serrate, densely glandular; pedicels stipitate-glandular; sepals

glandular on the back; fruit 10–25 mm, glabrous or densely stipitate-glandular. ● *Alps.* Au Ga Ge He It Ju.

(32–38). ***R. tomentosa*** group. Stems up to 3 m, erect. Prickles usually straight or slightly curved. Leaflets orbicular, ovate, oblong-ovate or elliptical, compound-serrate, very rarely simply serrate, usually densely tomentose, frequently glandular beneath, with a resinous smell. Pedicels usually glandular-hispid. Flowers solitary or 2–5. Sepals usually pinnatifid, usually erect after anthesis but sometimes patent or deflexed. Petals usually pink. Styles lanate or villous, very rarely glabrous. Fruit globose, ovoid or pyriform, glandular-hispid.

- 1 Sepals ± patent or deflexed after flowering
- 2 Leaflets soft, densely tomentose or pubescent; sepals deciduous; styles usually villous or glabrous **32. tomentosa**
- 2 Leaflets rough, usually sparsely tomentose or pubescent; sepals persistent; styles densely villous to lanate **33. scabriuscula**
- 1 Sepals erect and persistent after flowering
- 3 Pedicels grey-puberulent and sometimes stipitate-glandular
- 4 Young stems pruinose, glabrous, or ± pubescent; leaflets and pedicels eglandular **37. heckeliana**
- 4 Young stems not pruinose, densely pubescent; leaflets glandular, at least on the veins beneath **38. orientalis**
- 3 Pedicels stipitate-glandular but not grey-puberulent
- 5 Prickles somewhat curved; base of sepals not swollen; sepals soon deciduous in fruit **34. sherardii**
- 5 Prickles straight; base of sepals swollen; sepals persistent in fruit
- 6 Leaflets 30–50(–60) × 16–30 mm; young stems not pruinose **35. villosa**
- 6 Leaflets 12–35 × 8–18 mm; young stems usually pruinose **36. mollis**

**32. *R. tomentosa*** Sm., *Fl. Brit.* 2: 539 (1800). Compact shrub. Stems up to 2 m. Internodes long; young stems and leaves pale green; prickles curved, or nearly straight on the flowering stems, somewhat slender. Leaflets 5–7, 20–40 × 12–20 mm, ovate, ovate-lanceolate or elliptical, rarely obovate, serrate or biserrate, usually densely pubescent or tomentose on both surfaces, glandular beneath and more or less sparsely glandular above, with a resinous smell. Pedicels c. 20 mm, longer than the fruit, glandular-hispid. Sepals densely glandular on the back, deflexed to patent, deciduous after anthesis. Petals 15–25 mm, pink or white. Disc 4–6 times the diameter of the orifice. Styles glabrous or villous. Fruit ovoid, globose or pyriform, stipitate-glandular, rarely glabrous, red. *Most of Europe except the extreme north.* Al Au Be Br Bu Co Cz Da Ga Ge Hb He Ho Hs Hu It Ju Lu No Po Rm Rs (B, C, W, K, ?E) Su.

**33. *R. scabriuscula*** Sm. in Sowerby, *Engl. Bot.* 27: t. 1896 (1808). Like **32** but more diffuse, with stems up to 3 m; leaflets sparsely tomentose or pubescent and often densely hairy only on the veins, rather rough to the touch, compound-serrate, teeth glandular; sepals persistent after anthesis; styles densely villous or lanate. *Probably widespread in most of Europe, except the northern and eastern margins.* Au Be ?Bl Br Bu Cz Da Ga Ge He Hs Hu It Ju No Po Rm Rs (W, C, ?E) Su.

**34. *R. sherardii*** Davies, *Welsh Botanol.* 1: 49 (1813) (*R. omissa* Déséglise). Like **32** but more compact; stems pruinose; internodes long; leaflets biserrate, with glandular teeth; pedicels 10–15(–20) mm, as long as the fruit; sepals erect and persistent after anthesis; petals pink; styles lanate, rarely villous.  $2n=28$ . *N., W. & C. Europe, eastwards to S.W. Finland and extending southwards to Bulgaria.* ?Be Br Bu Cz Da Fe Ga Ge Hb He Hs Ju Po Su.

**35. *R. villosa* L., *Sp. Pl.* 491 (1753) (*R. pomifera* J. Herrmann).** Compact shrub up to 1.5 m. Stems with short internodes, not pruinose. Prickles slender, long, straight, somewhat inflated at the base, scarcely decurrent. Leaflets 5–7, 30–50(–60) × 16–30 mm, oblong-ovate to broadly elliptical, biserrate, pubescent to tomentose on both surfaces, often densely glandular beneath, conspicuously bluish-green, with a resinous smell; teeth glandular. Pedicels 5–10(–15) mm, about as long as the fruit, stipitate- or setose-glandular. Sepals erect and persistent after anthesis. Petals 20–25 mm, pink. Disc narrow. Styles lanate. Fruit 10–20 mm, globose to pyriform, densely stipitate-glandular, dull red. *C. & S. Europe, extending northwards to the Netherlands.* Al Au Bu Ga Ge Gr He Ho Hu It Ju Po Rm Rs (C, W) [Cz Da No Rs (B) Su].

**36. *R. mollis* Sm. in Sowerby, *Engl. Bot.* 35: t. 2459 (1812) (*R. villosa* auct., non L.).** Like 35 but young stems usually pruinose; leaflets 12–35 × 8–18 mm, greyish-green; pedicels, sepals and sometimes fruit with sparse, slender, stipitate glands; fruit 10–15 mm, globose or broadly ovoid.  $2n=28$ . *Mainly in N. & W. Europe, but extending locally to S.C. Russia.* Al Be Br Da Fa Fe Ga Ge Hb He Hs Ju Lu No Po Rs (B, C, W) Su.

**37. *R. heckeliana* Tratt., *Rosac. Monogr.* 2: 85 (1823) (*R. orphanides* Boiss. & Reuter).** Stems up to 1 m, somewhat pruinose when young, more or less pubescent. Prickles sparse, curved or straight. Leaflets 5–7, 15–30 × 8–22 mm, orbicular to ovate, simply serrate or biserrate, densely pubescent above, grey-tomentose beneath, usually eglandular. Flowers solitary. Pedicels c. 5 mm, usually grey-puberulent, eglandular. Sepals more or less glandular-hispid on the back, erect and usually persistent after anthesis. Petals 12–15 mm, pink. Disc narrow. Styles lanate. Fruit 10–12 mm, globose to ovoid, glabrous or stipitate-glandular, red. *Mountains of E. Mediterranean region and Sicily.* Al Cr Gr It Si.

**38. *R. orientalis* Dupont ex Ser. in DC., *Prodr.* 2: 607 (1825).** Like 37 but usually not more than 0.5 m; young stems densely pubescent; prickles straight; leaflets usually somewhat glandular on the veins beneath; pedicels c. 10 mm, stipitate-glandular and tomentose; sepals more densely glandular-hispid on the back; fruit densely stipitate-glandular. *S. Yugoslavia, N. Albania, Greece.* Al Gr Ju.

(39–47). ***R. rubiginosa* group.** Erect shrubs up to 3.5 m. Prickles usually hooked or curved, sometimes mixed with acicles and glandular setae. Leaflets suborbicular, ovate, obovate or elliptical, rounded or cuneate at base, biserrate to compound-serrate, glabrous or somewhat pubescent, never tomentose, more or less densely glandular-viscid beneath, smelling of apples; teeth glandular. Pedicels glabrous or glandular-hispid. Flowers solitary or 2–3. Sepals pinnatifid, erect or deflexed after anthesis. Petals small, white or pink. Styles short or long, glabrous, villous or lanate. Fruit globose, ovoid or ellipsoid, glabrous or glandular-hispid.

- 1 Pedicels and hypanthium glabrous
- 2 Styles lanate or densely villous
- 3 Sepals deflexed and usually deciduous after anthesis; prickles usually mixed with acicles and glandular setae
- 4 Leaflets 10–30 × 10–20 mm, cuneate at base; prickles curved or straight, mixed with setae **43. caryophyllacea**
- 4 Leaflets 8–12 × 6–10 mm, rounded at base; prickles curved or falcate, rarely mixed with setae **47. serafinii**
- 3 Sepals erect and persistent after anthesis; stems without acicles and glandular setae
- 5 Prickles stout, curved or falcate; pedicels as long as or longer than fruit; stems up to 3.5 m **40. elliptica**

- 5 Prickles slender, nearly straight; pedicels c.  $\frac{1}{2}$  as long as fruit; stems not more than 0.5 m **44. sicula**
- 2 Styles glabrous or very sparsely villous
- 6 Leaflets 8–12 × 6–10 mm, rounded at base **47. serafinii**
- 6 Leaflets 10–30 × 12–25 mm, cuneate at base **41. agrestis**
- 1 Pedicels and hypanthium stipitate-glandular or glandular-pubescent
- 7 Styles glabrous or subglabrous
- 8 Leaflets cuneate at base **41. agrestis**
- 8 Leaflets rounded at base
- 9 Prickles mixed with numerous setae and stipitate glands; stems not more than 0.5 m **46. turcica**
- 9 Prickles not mixed with setae and stipitate glands; stems up to 3.5 m **42. micrantha**
- 7 Styles villous or lanate
- 10 Prickles slender, usually not mixed with glandular setae and acicles **44. sicula**
- 10 Prickles usually stout, mixed with glandular setae and acicles
- 11 Leaflets usually pubescent and glandular on the upper surface; styles lanate
- 12 Leaflets 7–15 × 5–15 mm, stems not more than 0.5 m **45. glutinosa**
- 12 Leaflets 10–25 × 8–15 mm; stems up to 3 m **39. rubiginosa**
- 11 Leaflets usually glabrous or subglabrous on the upper surface; styles villous
- 13 Pedicels usually less than 5 mm; sepals deflexed and deciduous after anthesis **46. turcica**
- 13 Pedicels 10–15 mm; sepals erect and persistent after anthesis **39. rubiginosa**

**39. *R. rubiginosa* L., *Mantissa Alt.* 564 (1771) (*R. eglanteria* L., nom. ambig.).** Up to 3 m. Prickles stout, curved or falcate, usually mixed with acicles and glandular setae especially on the flowering stems. Leaflets 5–7, 10–25 × 8–15 mm, suborbicular to broadly ovate to obovate, rounded at base, compound-serrate, glabrous or pubescent above, usually pubescent and more or less densely glandular beneath. Pedicels 10–15 mm, densely stipitate- or setose-glandular. Sepals glandular on the back, erect and persistent after anthesis. Petals 8–15 mm, deep pink. Disc narrow, with a wide orifice. Styles short, villous or lanate. Fruit 1–1.5 cm, subglobose, ovoid or ellipsoid, glabrous or glandular-hispid, bright red.  $2n=35$ . *Most of Europe northwards to 61° N.* Al Au Be Bl Br Bu Cz Da Ga Ge Gr Hb He Ho Hu It Ju No Po Rm Rs (B, C, W, K) Su Tu.

**40. *R. elliptica* Tausch, *Flora (Regensb.)* 2: 465 (1819) (*R. graveolens* Gren. & Godron).** Like 39 but stems without acicles or glandular setae; leaflets elliptical, cuneate at base, pubescent on both surfaces; pedicels glabrous; sepals eglandular on the back; fruit glabrous. *W. & C. Europe, extending south-eastwards to Albania and W. Ukraine.* Al Au Be Br Bu Cz Ga Ge Gr ?Hb He Hs Hu It Ju Po Rm Rs (W).

**41. *R. agrestis* Savi, *Fl. Pis.* 1: 475 (1798) (*R. sepium* Thuill., non Lam.).** Up to 2 m. Internodes long; prickles curved, sometimes few or absent on the flowering shoots. Leaflets 5–7, 10–30(–50) × 12–25 mm, elliptical to oblong-obovate, acute, cuneate at base, biserrate to compound-serrate, glabrous or pubescent, always glandular, dull green; teeth glandular. Pedicels 10–20 mm, glabrous or sometimes sparsely stipitate-glandular. Sepals eglandular, glabrous, deflexed and deciduous after anthesis. Petals 10–20 mm, white. Disc wide, with a narrow orifice. Styles rather long, glabrous or slightly villous. Fruit 10–15 mm, subglobose, ovoid or ellipsoid, glabrous, red. *Most of Europe, rare in the north and east.* All except Az Cr Fa Fe Is No Rs (N, B, C, E) Sb.

42. *R. micrantha* Borrer ex Sm. in Sowerby, *Engl. Bot.* 35: t. 2490 (1812). Like 41 but up to 3.5 m; leaflets usually rounded at base; pedicels stipitate-glandular; sepals glandular; fruit glabrous or glandular-hispid. *W., S. & C. Europe, extending to N. Ukraine.* Al Au Be Bl Br Bu Co Cz Ga Ge Gr Hb He Ho Hs Hu It Ju Lu Po Rm Rs (C, W, K) Si Tu.

43. *R. caryophyllacea* Besser, *Cat. Pl. Jard. Krzemien. Suppl.* 4: 18 (1815). Up to 1 m. Prickles stout, broad, curved, often paired, nearly straight, mixed with setae on the flowering shoots. Leaflets 5-7, 10-30 × 10-20 mm, ovate to elliptical, compound-serrate, usually densely glandular on both surfaces, glabrous to pubescent. Pedicels glabrous. Sepals glandular or eglandular, deflexed after anthesis and tardily deciduous. Petals 12-20 mm, pale pink. Styles lanate. Fruit c. 10 mm, subglobose to ellipsoid, glabrous, bright red. *E.C. Europe, Balkan peninsula, Ukraine.* Au Bu Cz Gr Hu It Ju Po Rm Rs (C, W).

44. *R. sicula* Tratt., *Rosac. Monogr.* 2: 86 (1823) (*R. thuretii* (Burnat & Greml) Burnat & Greml). Up to 0.5 m. Prickles usually sparse, slender, more or less curved, sometimes mixed with acicles and glandular setae. Leaflets 5-7, 7-15 × 5-15 mm, broadly ovate to suborbicular, compound-serrate, usually glabrous and sparsely glandular above, densely glandular and glabrous or sparsely pubescent beneath. Pedicels 3-5 mm, often stipitate-glandular, sometimes sparsely pubescent. Sepals glandular on the back, patent or erect after anthesis. Petals 10-15 mm, pink. Styles villous to lanate. Fruit c. 10 mm, globose, usually sparsely stipitate-glandular, red. *Mediterranean region.* Al Ga Gr Hs It ?Ju Si.

45. *R. glutinosa* Sibth. & Sm., *Fl. Graec. Prodr.* 1: 348 (1809). Like 44 but prickles mixed with numerous stalked glands and setae; leaflets more densely glandular and usually densely pubescent to tomentose on the upper surface. *E. & C. Mediterranean region, Balkan peninsula.* Al Bu Cr Gr It Ju Si.

46. *R. turcica* Rouy, *Ill. Pl. Eur. Rar.* 6: 45 (1896) (*R. ferox* Bieb., non Lawrance, *R. horrida* Fischer ex Crépin, non Sprengel). Like 44 but prickles abundant, stout, curved, mixed with numerous setae and stalked glands; sepals deflexed and deciduous after anthesis; styles glabrous or somewhat villous. *S.E. Europe.* Bu Gr Rm Rs (W, K) Tu.

47. *R. serafinii* Viv., *Fl. Lib.* 67 (1824). Like 44 but prickles hooked or falcate, rarely mixed with setae; leaflets 8-12 × 6-10 mm, shining and glabrous above; pedicels glabrous; sepals glandular or eglandular, deflexed and deciduous after anthesis; fruit glabrous. *C. Mediterranean region; Bulgaria and S. Jugoslavia.* Bu Co It ?Rm Sa Si.

### 11. *Agrimonia* L.<sup>1</sup>

Perennial, rhizomatous herbs. Stem erect, with glandular hairs. Leaves irregularly pinnate. Flowers 5-merous, in terminal, spike-like racemes; pedicels short, with 2 bracteoles. Hypanthium deeply concave, becoming hard in fruit; epicalyx absent; stamens 5-20; carpels 2; style terminal; ovules 1. Fruit of 1 to 2 achenes enclosed in the hypanthium, which is obconical, turbinate or cylindrical, and has hooked bristles at the upper end.

Literature: V. Skalický, *Acta Horti Bot. Prag.* 1962: 87-108 (1962).

1 Petals pale yellow; mature hypanthium (including bristles) 4-5 mm

1. *pilosa*

<sup>1</sup> By V. Skalický.

- 1 Petals golden yellow; mature hypanthium (including bristles) 6-12 mm
- 2 Pedicels 4-10 mm; bracts often ovate and entire
- 2 Pedicels 1-4 mm; lower bracts trilobed
- 3 Stem with both short and long eglandular hairs; mature hypanthium grooved for at least  $\frac{2}{3}$  of its length
- 3 Stem with long eglandular hairs only; mature hypanthium grooved for half its length

4. *repens*

2. *eupatoria*

3. *procera*

1. *A. pilosa* Ledeb., *Ind. Sem. Horti Dorpat., Suppl.* 1 (1823) (*A. dahurica* Willd. ex Ser.). Stem 50-150 cm, with long eglandular hairs. Leaves green on both surfaces, with glandular but very few eglandular hairs beneath; leaflets with 3-8 pairs of teeth, cuneate and entire at base. Raceme lax. Petals 2.5-4 mm, pale yellow, entire. Mature hypanthium (including bristles) 4-5 × 3-3.5 mm, deeply grooved throughout its length, more or less glabrous except for the bristles; inner bristles connivent and interwoven. *U.S.S.R. from c. 49° to c. 62° N., extending westwards to S. Finland, N.E. Poland and C. Romania.* Fe Po Rm Rs (N, B, C, W) [Cz].

2. *A. eupatoria* L., *Sp. Pl.* 448 (1753). Stem 15-150 cm, with both long patent, and short flexuous, eglandular hairs. Basal leaves often in a rosette and basal internodes short. Leaves with 3-6 pairs of main leaflets and 2-3 smaller pairs in between; leaflets serrate or crenulate almost to the base, dark green above, whitish- or greyish-tomentose beneath, with glandular hairs; stomata (21-)23-25(-27)  $\mu$ . Pedicels at maturity 1-3 mm; lower bracts trilobed. Petals (3-)4-5(-6) mm, golden yellow, obovate, usually not emarginate. Mature hypanthium obconical to turbinate, deeply and narrowly grooved for at least  $\frac{2}{3}$  of its length, and with many eglandular, appressed hairs; the inner bristles erect, the outer ascending, patent or deflexed. *Almost throughout Europe except the extreme north.* All except Cr Fa Is Sb.

(a) Subsp. *eupatoria*: Plants with rosette 15-40 cm, those without rosette up to 150 cm; not villous, except occasionally the tallest plants. Leaflets broadly obovate and coarsely crenulate to elliptical and serrate; glandular hairs concealed by the tomentum. Hypanthium (including bristles) 7-10 × 5-7 mm, grooved throughout its length; disc scarcely projecting; lowest bristles ascending or patent.  $2n=28$ . *Throughout the range of the species, except Açores.*

(b) Subsp. *grandis* (Andrz. ex Ascherson & Graebner) Bornm., *Feddes Repert. (Beih.)* 89: 244 (1940): Plants up to 150 cm, robust, villous, usually without rosette. Leaflets elliptical, coarsely serrate; glandular hairs concealed by the tomentum. Hypanthium (including bristles) 11 × 9 mm, grooved throughout its length; disc projecting by c. 0.4 mm; lowest bristles patent or slightly deflexed. *S., E. & E.C. Europe.*

(c) Subsp. *asiatica* (Juz.) Skalický, *Feddes Repert.* 79: 35 (1968) (*A. asiatica* Juz.). Without rosette. Leaflets elliptical, coarsely and acutely dentate; glandular hairs not concealed by the tomentum. Hypanthium (including bristles) 7-8 × 7-8 mm, grooved for  $\frac{2}{3}$  of its length; disc projecting by c. 0.5 mm; lowest bristles always distinctly deflexed. *S.E. Russia. (C. & S.W. Asia.)*

3. *A. procera* Wallr., *Erst. Beitr. Fl. Hercyn.* 203 (1840) (*A. odorata* auct., non Miller). Stem 50-120 cm, with long eglandular hairs; without basal rosette. Leaves green on both surfaces; stomata (27-)30(-33)  $\mu$ ; leaflets elliptical, coarsely and acutely serrate almost to the base. Pedicels at maturity (1.5-)2.5(-4) mm; lower bracts trilobed. Petals golden yellow, oblong to obovate, often emarginate. Mature hypanthium (including bristles) c. 11 × 11 mm, turbinate, with broad, shallow grooves for c.  $\frac{1}{2}$  its length, and with well-developed disc; lowest bristles distinctly deflexed.