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THE GENUS RUBUS (ROSACEAE) IN MALESIA

1. Subgenera Chamaebatus and Idaeobatus

M. ZANDEE & C. KALKMAN

Lab. Exp. Plant Taxonomy, Leiden

Rijksherbarium, Leiden

SUMMARY

In subgenus *Chamaebatus* two Malesian species are recognized, in subgenus *Idaeobatus* 18. Synonymy, descriptions, and habitat notes are given, sometimes extending to, but not complete for, extra-Malesian parts of the species areas. No new names or combinations are published. Keys are given to the species.

INTRODUCTION

The infrageneric subdivision of *Rubus* has never been studied anew on a worldwide scale after Focke's large monograph in Bibl. Bot. 72 and 83 (1910–1914). It is probable that the subgenera he recognized will stand the test of a new investigation but that many of his sections and series will have to be redefined or abandoned.

In this first instalment of an intended revision of the Malesian species the small subgenus *Chamaebatus* and the larger subgenus *Idaeobatus* are treated. *Chamaebatus* comprises small creeping plants with simple, ± reniform leaves. *Idaeobatus* species have compound leaves: 3-foliolate, palmately (pedately) 5-foliolate, pinnate, or bipinnate.

The other subgenera represented in Malesia are *Malachobatus* (to which the well-known *R. moluccanus* and its relatives belong) and *Lampobatus*.

This paper is based on a treatment of subg. *Idaeobatus* by the first author several years ago. Afterwards the second author made a number of additions on the basis of new material, and he tried to solve some problems which had been left. The second author also is responsible for the treatment of *Chamaebatus*.

Types and other specimens were borrowed from several herbaria or seen during personal visits by the second author. Thanks are due to directors and curators of A, B, BM, BO, G, K, KLU, P, PNH, SING, and W.

Subgenus **Chamaebatus** (Focke) Focke

Sect. *Chamaebatus* Focke, Abh. Naturwiss. Ver. Bremen 4 (1874) 145, 156. — Subgen. *Chamaebatus* (Focke) Focke, Bibl. Bot. 72 (1910) 17.

Herbaceous to slightly woody, creeping plants. *Leaves* simple, reniform to cordate, not or slightly lobed, rarely more deeply incised. *Stipules* free, on the

junction of stem and petiole, persistent. *Flowers* bisexual, solitary, terminal, more rarely 2 or 3 on erect laterals. *Fruits* loosely cohering, becoming loose from the elevated torus when ripe.

Distribution: Disjunct area, the species occurring in America (Pacific N.W. America and Mexico) and Asia (China, Taiwan, Japan, Philippines, Java).

Notes: 1. The three subgenera which Focke placed at the beginning of his classification, viz. *Chamaemorus*, *Dalibarda*, and *Chamaebatus*, have much in common. They are small plants, more or less herbaceous, without elaborate inflorescences and often with simple leaves. *Chamaemorus* (only species: the northern circumpolar *R. chamaemorus*) is distinguished by its dioecy. *Dalibarda* differs from *Chamaebatus* mainly by its inermous habit.

2. Focke (1910) distinguished five species in his subgenus *Chamaebatus*, viz. the two treated here, *R. nivalis* in the north-western part of N. America (see Hitchcock c.s., Vasc. Pl. Pacific Northwest 3, 1961, 178), the closely allied *R. pumilus* in Mexico (see Standley, Contr. U.S. Nat. Herb. 23, 1922, 330), and *R. pectinaris* in C. China. As far as I know, no other species have been assigned to the subgenus. *R. pectinaris* could be conspecific with *R. pectinellus*, but I did not see the only specimen mentioned by Focke.

KEY TO THE MALESIAN SPECIES

1a. Stipules serrate to dentate . . . . . **1. R. calycinus**
b. Stipules deeply digitately divided . . . . . **2. R. pectinellus**

1. Rubus calycinus D. Don

R. calycinus [Wall. in litt.] *ex* D. Don, Prod. Fl. Nepal. (1825) 235; Hook. *f.*, Fl. Brit. Ind. 2 (1878) 327; Focke, Bibl. Bot. 72 (1910) 19; Backer & Bakh. *f.*, Fl. Java 1 (1963) 515; Hara & Ohashi in Hara, Fl. East Himal. 1 (1966) 128; van Steenis, Mountain Fl. Java (1972) pl. 46 – 1. — *Dalibarda calycina* (D. Don) Seringe in DC., Prod. 2 (1825) 568. — Type: a *Wallich* specimen from Gosaingsthan, not seen.
R. boschianus Zoll., Nat. Tijdschr. Ned. Ind. 14 (1857) 175, 176. — *R. calycinus* D. Don f. *javanicus* Kuntze, Meth. Speciesbeschr. (1879) 106, *nomen nudum*, '*javanica*'. — *R. calycinus* D. Don var. *suffruticosus* Focke, Bibl. Bot. 72 (1910) 21. — Type: *Zollinger 2964*, holo in P.

Main *stems* creeping, up to 3 m long, rooting on the nodes, leafy, with up to 22 cm long laterals; these erect, leafy, little or not branched; stems with a sparse indumentum of semi-appressed long hairs, glabrate, and with rather few recurved, up to 2 mm long prickles. *Leaves* simple. *Stipules* on the junction of stem and petiole, persistent, ± ovate, 9 – 15 by 6 – 12 mm, base ± cordate to rounded, apex acute to obtuse, margins (finely) serrate to dentate, glabrous except the sparsely fimbriate margin. *Petioles* $2\frac{1}{2}$ – 9 cm long, with long semi-appressed (near base) to patent (towards top) hairs and scattered, up to 3 mm long, curved (at base) to straight (at top) prickles. *Blade* reniform (l/w 0.85 – 1), usually shallowly 3 – 5-, sometimes up to 7-lobed, 3 – $6\frac{1}{2}$ by $3\frac{1}{2}$ – 7 cm, rather stiff and brittle when dry, base deeply (up to $2\frac{1}{2}$ cm) cordate, apex rounded, margins regularly serrate with 4 – 9 teeth per cm; nervation pedate with 2 or 3 (or 4) main side nerves on each side of the midrib, on each of the main nerves 2 – 3 basiscopic side nerves above the basal one, venation reticulate, nerves terminating in the margin, impressed above, smallest veins flat, main nerves prominent below, smaller veins progressively less so; indumentum

consisting of short patent hairs on the nerves above and long patent hairs on nerves and veins below; with small (up to $\frac{1}{2}$ mm long) prickles above, mostly between the veinlets, and with straight needle-like prickles up to $2\frac{1}{2}$ mm long on the nerves and larger veins below. *Flowers* solitary, terminal on the laterals, rarely also one flower axillary to the uppermost leaf which may be reduced to a stipular 'bracteole'. *Pedicels* (above upper leaf) 0.7 – 2 cm long, with semi-appressed to patent long hairs and slightly recurved prickles, grading into the needle-like ones on the hypanthium. *Hypanthium* saucer-shaped, $3\frac{1}{2}$ – 5 mm across, patently hairy outside and with many needle-like, up to $2\frac{1}{2}$ mm long prickles, glabrous inside or with a row of hairs at base of torus. *Sepals* elliptic to ovate, the outer ones wider than the inner ones, sometimes cordate, 11 – 16 by 5 – 13 mm, in fruit growing to *c.* 20 by 15 mm, the exposed margins pinnately lobed (up to 14 incisions on each side), the not-exposed margins entire or with few teeth, more or less hairy and glabrate outside and with straight needle-like prickles of up to $2\frac{1}{2}$ mm in the central part, fimbriate at the margin, inside shortly densely appressed-hairy. *Petals* elliptic to ovate, 10 – 11 by 5 – 7 mm, claw indistinct or up to $1\frac{1}{2}$ mm long, glabrous, white (once recorded as white to light pink). *Stamens* 30 – 40, glabrous; filaments up to 6 mm, erect in anthesis; anthers 0.8 – 1 mm long. *Pistils* 30 – 50 (– 70), glabrous; ovary 1 mm long; style up to 5 mm. *Torus* elevated, glabrous. *Fruits* with a fleshy exocarp, drying as a thin layer, orange to red in vivo; pyrene 3 – 4 by 2 mm; endocarp reticulately rugulose.

Distribution: Himalaya region from Nepal to Arunachal Pradesh, N.E. India (Assam, Meghalaya, Manipur), according to Hara & Ohashi also in N. Burma and S. China (Yunnan), E. Java.

Habitat: In Continental Asia in forests, between 1200 and 2600 m altitude. In Java recorded from different forest types (mixed, Casuarina, oak), at altitudes between 1900 and 2800 m, locally gregarious according to van Steenis (1972).

JAVA. East. Mt. Arjuno/Mt. Welirang, *Backer & Skottsberg 37372, van Houweninge s.n., van Steenis 7133*; Mt. Kawi, *Arens s.n., Arens & Wurth s.n., Docters van Leeuwen 12336, Posthumus 3997*; Iyang Mts., *van Dillewijn s.n., Hoogerwerf 445, Keers s.n., Opzichter Boschwezen s.n., van Steenis 10909, Zollinger 2964.*

Notes: 1. One of the very few examples of the Himalaya — Java disjunction which is not bridged by occurrences in Sumatra or Malaya.

2. The Continental specimens and the Javanese ones show very few differences and are best considered to be conspecific. Focke (1910) recognized a separate variety for the Javanese material, which according to him is more woody than the Himalaya plants. It is true that specimens from the continent are often less robust than plants from Java, having smaller leaves and shorter flowering laterals. Also the flowers are smaller and have fewer pistils, but there is a distinct overlap with the Javanese specimens. On the upper surface of the leaves the plants from Java have very small prickles between the veinlets and in these same places the plants from the Himalaya region have long appressed hairs. This seems to be a quite consistent difference between the two parts of the area, but altogether there is to my mind not sufficient reason for the distinction of varieties.

3. The description given above only refers to the Javanese material.

2. **Rubus pectinellus** Maximowicz

R. pectinellus Maxim., Mél. Biol. Acad. St. Pétersb. 8 (1872) 374 (= Bull. Acad. St. Pétersb. 17); Elmer, Leafl. Philipp. Bot. 2 (1908) 448; Focke, Bibl. Bot. 72 (1910) 22; Merr., Enum. Philipp. Flow. Pl. 2 (1923) 229; Ohwi, Fl. Japan (1965) 531; Iconogr. Cormoph. Sin. 2 (1972) 259, fig. 2247; Naruhashi & Satomi, Ann. Rep. Bot. Gard. Fac. Sci. Kanazawa 5 (1972) map 25. — T y p e: *Maximowicz s.n.*, from Japan, Higo-san, june 1863; holo in LE not seen, iso seen from L; syntype: *Tschonoski* specimen from Mt. Fudzi, Japan, probably in LE, not seen.

R. pectinellus Maxim. var. *trilobus* Koidzumi, J. Coll. Sc. Imp. Univ. Tokyo 34, 2 (1913) 108, '*triloba*'; Liu & Su in Li c.s., Fl. Taiwan 3 (1977) 120. — T y p e: *Kawakami, Nagasawa & Nakahara 1905*, not seen.

Main *stems* rather thin, creeping, up to 2 m long, rooting on the nodes, leafy, with erect little or not branched leafy laterals up to 20 cm (usually much shorter); all stems with long, patent, soft hairs and with usually rather few and spaced prickles, the latter recurved, thin, up to 3 mm long. *Leaves* simple, on the main stems probably larger than on the laterals. *Stipules* on the junction of stem and petiole, persistent, deeply digitately divided into up to 8 narrow, flat, 1-nerved lobes, up to 8 mm long and 10 mm wide, with long patent hairs on the outside and especially on the margins, inside glabrous. *Petiole* (1 –)2 – 6 cm, up to 8 cm on the leaves of the main stems, with long patent soft hairs and few to many, slightly recurved to straight, thin, up to $2\frac{1}{2}$ mm long prickles. *Blade* reniform (l/w 0.85 – 1), the larger ones slightly 3 (or 5)-lobed with very shallow incisions, 2 – $5\frac{1}{2}$ by 2 – 6 cm, thinly herbaceous, rather brittle when dry, base deeply ($\frac{1}{2}$ – 1, rarely up to 1 $\frac{1}{2}$ cm) cordate, apex rounded, margin regularly serrate with 6 – 15 teeth per cm; nervation pedate with mostly 2 (but sometimes only 1) main side nerves on each side of the midrib, the latter with *c.* 3 pairs of side nerves above the basal ones, the main side nerves with 3 – 5 basiscopic laterals; venation widely reticulate with reticulate areolation, nerves terminating in the margin, flat to slightly impressed above, usually distinctly visible but not very prominent below, smallest veins flat; indumentum of long hairs, on upper surface on the intervenium, below on the nerves and veins; prickles only on lower side, very rarely above, on nerves and larger veins, straight and needle-like, 2 – 4 mm long, rarely slightly curved. *Flowers* usually solitary, terminal on the short erect laterals, more rarely also 1 – 2 flowers in the axils of the bracteoles or the uppermost (reduced) leaves and inflorescence 2 – 3-flowered. *Pedicel* up to 3 cm long (above uppermost true leaf), with long, soft and patent hairs and needle-like, straight, 3 mm long prickles. *Bracteoles* stipule-like, 1 or 2 on the pedicel; apart from this sometimes a reduced leaf at base (very small blade with normal stipules). *Hypanthium* saucer-shaped, 3 – 4 mm across (– 6 mm when very old), outside with long, soft, patent hairs and with many, up to 4 mm long, needle-like prickles, inside long-hairy around the torus. *Sepals* ± elliptic, the outer ones wider than the inner ones, 8 – 10 by 3 – 10 mm in anthesis (including the lobes), up to 12 by 13 mm in the very old flowers, the exposed margin pinnately 5 – 10 lobed, lobes up to 3 by $\frac{1}{2}$ mm, the not exposed margins entire or with 1 – 2 small teeth; outside with hairs as the hypanthium and in lower part also with prickles, inside with long, ± appressed hairs, denser in the centre and at base; the sepals closing around developing fruits, later spreading again. *Petals* ± elliptic, 10 – 13 by 6 – 9 mm including the distinct $1\frac{1}{2}$ – 2 mm long claw, glabrous, white, apex rounded. *Stamens* 16 – 30, erect in anthesis, glabrous; filaments up to 5 mm; anthers 1 – $1\frac{1}{4}$ mm long. *Torus* elevated, hairy between the pistils. *Pistils* 24 – 40; ovary *c.* 1 mm long, with few long hairs; style 3 – 4 mm, glabrous. *Fruits* with a thin juicy exocarp, drying as a thin layer,

orange to red in vivo; pyrene $2\frac{1}{2}-3$ mm by 2 mm, endocarp smooth at first but rugulose with very shallow impressions when quite ripe.

Distribution: Southeastern part of China (prov. Kiangsi, Fukien, Szechuan, Kweichow, according to Iconogr. Cormoph. Sin.), Taiwan, Japan (islands Honshu, Shikoku, Kyushu, and Yaku-shima acc. to Naruhashi & Satomi 1972), Philippines.

Habitat: In the Philippines in primary and secondary forest, also in mossy forest; at altitudes from c. 750 m up to 2750 m. According to the literature in Japan, Taiwan, and China in woods, at comparable altitudes.

PHILIPPINES. Luzon. Ilocos Norte Prov.: Mt. Bubonbilit, *Iwatsuki c.s. P 488.* — Abra Prov.: *Ramos BS 7287.* — Mountain Prov.: Bontoc, *Vanoverbergh 563*; Mt. Polis, *Britton PNH 19731, Ramos & Edaño BS 37658*; Mt. St. Thomas, *van Steenis 18574*; Mt. Tabayoc, *Jacobs s.n.*; Mt. Pulog, *Jacobs 7102, Steiner 2062*; Pauai, *Mearns BS 4292, Sulit PNH 7536*; Baguio, *Elmer 8362*; Mt. Data, *Alcasid PNH 1875, Merrill 4540*; Mt. Banajao, *Foxworthy BS 2434.* — Mindoro. Mt. Halcon, *Edaño PNH 3603.* — Mindanao. Bukidnon Prov.: Mt. Lipa, *Ramos & Edaño BS 38547.* — Davao Prov.: Mt. Apo, *Edaño PNH 1414, Elmer 11559.*

Notes: 1. The description given above is made from the Philippines material only. The specimens from Japan and Taiwan agree very well and to my mind there is no reason to distinguish an endemic variety *trilobus* for the Taiwan specimens. Also elewhere the leaves may be obscurely 3-lobed.

2. I did not see any Chinese material, but the picture in Iconogr. Cormoph. Sin. is quite convincing.

Subgenus **Idaeobatus** (Focke) Focke

Sect. *Idaeobatus* Focke, Abh. Naturwiss. Ver. Bremen 4 (1874) 147. — Subgen. *Idaeobatus* (Focke) Focke, Bibl. Bot. 72 (1911) 128; Bibl. Bot. 83 (1914) 36.

Shrubs, erect or climbing. *Leaves* trifoliolate, palmately 5-foliolate or (bi)pinnate, rarely simple (not in Malesia). *Stipules* on the base of the petiole, persistent. *Flowers* bisexual, in ± elaborate thyrsoid inflorescences. *Fruits* cohering, becoming loose from the elevated torus when ripe.

Distribution: A large number of species, the great majority in Asia, extending to Australia and islands in the Pacific Ocean, and with one species to Europe (*R. idaeus*). Some species in Africa, including Madagascar and islands in the Indian Ocean. Few species in Central America.

Notes. 1: The species of the subgenus are in Malesia mostly mountainous, and rarely found below 1000 m. Only *R. brassii*, *R. fraxinifolius*, *R. rosifolius* and *R. sumatranus* are also growing in the lowland.

2. Focke (1911, 1914) recognized nine sections in the subgenus. For an evaluation of this subdivision the Himalayan species should be considered first, but this falls outside the scope of the present study. The 18 Malesian species do not belong to one section and might be grouped as follows.

a. A number of species with pinnate leaves: the widely distributed *R. rosifolius* and *R. fraxinifolius*, the New Guinean *R. chrysogaeus*, *R. sumatranus* on the

continent and in W. Malesia, and the closely related New Guinean species *R. ferdinandi-muelleri*, *R. papuanus* and *R. montis-wilhelmi*. The latter two were not known to Focke, and *R. ferdinandi-muelleri* only from the type specimen. He placed it in sect. *Pungentes*, stating that it differs from all earlier described species by its long spines. The other species of this group were placed by Focke in sect. *Rosaefolii*.

b. A number of species with trifoliolate leaves, with rather restricted areas: *R. acuminatissimus* in Sumatra and Java, *R. banghamii* only in Sumatra, *R. copelandii* only in Luzon, *R. lowii* only in Borneo, and the New Guinean species *R. archboldianus*, *R. lorentzianus* and *R. macgregorii* (the latter also in Celebes). Three of the species mentioned were not yet described in Focke's time, or were not placed by him; *R. copelandii* and *R. macgregorii* (with some doubt) were grouped in subgenus *Orobatus* which is an American subgenus, *R. lowii* he placed in section *Alpestres* of subg. *Idaeobatus*, and *R. acuminatissimus* in sect. *Rosaefolii*.

c. Related to the latter group, especially through *R. lowii*, are possibly two species with 5-foliolate palmate leaves: *R. alpestris* (widely distributed) and *R. brassii* (Solomon I.). The latter was not known by Focke, the former was one of the species of his sect. *Alpestres* (cf. *R. lowii* under b).

d. The two remaining Malesian species, *R. niveus* and *R. ellipticus*, have in common the dense woolly felt on the underside of the leaflets. *R. ellipticus* (Continental Asia, and Luzon) has trifoliolate leaves, *R. niveus* (widely distributed) pinnate ones. They may be grouped together but are probably not very closely related. Focke placed both species in section *Idaeanthi*, but in different series.

3. Nitrogen fixation by means of root nodules is suspected for some species, see under *R. ellipticus* and *R. ferdinandi-muelleri*.

KEY TO THE MALESIAN SPECIES*

1a. Leaves trifoliolate or palmately/pedately 5-foliolate 2
b. Leaves pinnate with more than 3 leaflets, or bipinnate 11
2a. No prickles or very few 3
b. Prickles present on stems and other parts 4
3a. Leaves trifoliolate, leaflets with 5–8 pairs of lateral nerves. . **11. R. lowii**
b. Leaves 5-foliolate, leaflets with 16–26 pairs of lateral nerves. **16. R. brassii**
4a. Leaves 5-foliolate . . . . . **15. R. alpestris**
b. Leaves trifoliolate 5
5a. Prickles on hypanthium less than 1 mm long, or absent 6
b. Hypanthium with up to 5 mm long prickles or bristles 8
6a. Ovary hairy. Leaves stiff-coriaceous . . . . . **14. R. macgregorii**
b. Ovary glabrous. Leaves herbaceous 7
7a. Stipules deeply divided . . . . . **9. R. banghamii**
b. Stipules entire . . . . . **8. R. acuminatissimus**
8a. Stems with long spine-like capitate hairs or long patent bristles. . . . 9
b. Stems without long capitate hairs 10

* Users of this key must be aware that not all Malesian species with compound leaves belong to *Idaeobatus*.

9a. Hypanthium and exposed parts of sepals outside glabrous, apart from prickles and spine-like hairs. Ovary glabrous. Fruits red. . . . **10. R. copelandii**
b. Hypanthium and sepals outside densely hairy and with bristles. Ovary hairy. Fruits yellow to orange . . . . . **18. R. ellipticus**
10a. Stems with straight prickles. Stipules entire or serrate. Flowers white. Ovary glabrous . . . . . **13. R. lorentzianus**
b. Stems with curved prickles. Stipules deeply divided. Flowers red. Ovary hairy **12. R. archboldianus**
11a. Prickles needle-shaped 12
b. Prickles not needle-shaped 14
12a. Leaves bipinnate . . . . . **7. R. montis-wilhelmi**
b. Leaves pinnate 13
13a. Leaflets 1 – 14 by $\frac{1}{2}$ – 2 cm, with 7 – 12(– 18) teeth on each side, upper surface glabrous or hairy between the nerves, lower surface glabrous or hairy on midrib and veins . . . . . **5. R. ferdinandi-muelleri**
b. Leaflets $\frac{1}{2}$ – $1\frac{1}{2}$ by $\frac{1}{2}$ – 1 cm, with 4 – 6(– 7) teeth on each side, both surfaces glabrous or almost so . . . . . **6. R. papuanus**
14a. Stems and leaves with long (– 5 mm) gland-tipped hairs.. **2. R. sumatranus**
b. No long gland-tipped hairs present 15
15a. Leaves ± glabrous 16
b. Leaves hairy, at least below 17
16a. Leaflets biserrate, with long-tapering apex. Pistils down to the base of the torus, with shortly stalked glands . . . . . **4. R. chrysogaeus**
b. Leaflets serrate, apex acute to long-pointed. Base of torus without pistils. Ovary without glands . . . . . **3. R. fraxinifolius**
17a. Underside of leaflets with a dense woolly felt all over and with straight hairs on the nerves. Flowers small: sepals 4 – 7 mm long, petals $3\frac{1}{2}$ – 5 mm long, pink. Pistils and fruits densely hairy. . . . . **17. R. niveus**
b. Underside of leaflets with long hairs but without woolly felt. Flowers larger: sepals 7 – 15(– 22) mm long, petals 8 – 17 mm long, white. Pistils with stalked glands and apically with some hars. . . . . **1. R. rosifolius**

1. Rubus rosifolius J. E. Smith

R. rosifolius J. E. Sm., Pl. Icon. Hact. Ined. 3 (1791) t. 60, '*rosaefolius*' as in many other references; Willd. Sp. Pl. 2 (1799) 1080; Poir. in Lam., Encycl. Meth. 6 (1806) 243; Willd., Enum. Pl. Hort. Berol. (1809) 548; Thunb., Diss. de Rubo (1813) 7; J. E. Sm. in Rees, Cyclop. 30 (1815) spec. nr. 1; Poir. in Lam. Encycl. Meth. Suppl. 4 (1816) 693; Tratt., Rosac. Monogr. 3 (1823) 3; Sprengel, Syst. Veg. 2 (1825) 527; Ser. in DC., Prodr. 2 (1825) 556; G. Don, Gen. Syst. 2 (1832) 529; Bl., Bijdr. (1827) 1107; Wall., Cat. (1828) 728; Roxb., Fl. Ind. ed. Carey 2 (1832) 518; Hook., Ic. Pl. 4 (1840) t. 349; Hasskarl, Flora 34 (1844) 585; Miq., Fl. Ind. Bat. 1, 1 (1855) 375; Harv. & Sond., Fl. Cap. 2 (1862) 286; Benth., Fl. Austral. 2 (1864) 431; Maximow., Mél. Biol. Acad. Sci. St. Pétersb. 8 (1872) 387, incl. α *tropicus* Maximow., *excl. ref.* Rumph. Herb. Amboin.; Focke, Abh. Naturw. Ver. Bremen 4 (1874) 169; Brandis, For. Fl. NW. C. India (1874) 198 *p.p.*; Kurz, Fl. Burm. 1 (1877) 439 *p.p.*; Hook. *f.*, Fl. Br. Ind. 2 (1878) 341 *p.p.*; F. v. M., Descr. Not. 7 (1886) 29; Kuntze, Rev. Gen. Pl. 1 (1891) 224, excl. α *fraxinifolia* (Poir.) Kuntze; Stapf, Trans. Linn. Soc. Bot. 4 (1894) 146; King, J. As. Soc. Beng. 66 ii (1897) 296 *p.p.*; Schumann, Notizbl. Berl.-Dahl. 2 (1898) 118; Brandis, Ind. Trees (1906) 287 *p.p.*; Elmer, Leafl. Philip. Bot. 2 (1908) 462; Focke, Bibl. Bot. 72 (1911) 153, *excl.* subsp. *sumatranus* (Miq.) Focke; Back., Schoolfl. Java (1911) 453; Koord., Exk. Fl. Java 2 (1912) 326, *excl. syn. R. sumatranus* Miq.; Focke, Bibl. Bot. 83 (1913) 38, 39, fig. 9; Koidzumi, J. Coll. Sc. Tokyo 34 (1913) 146; Cardot, Bull. Mus. Hist. Nat. Paris 23 (1917) 294; Merr., Sp. Blanc. (1918) 163; Cardot in Lecomte, Fl. Gén. Indochin. 2 (1920) 644; Ridley, Fl. Mal. Pen. 1 (1922) 680, *excl. specim.* Mal.; Merr., Enum. Philip.

Flow. Pl. 2 (1923) 230; Sealy, Kew Bull. 3 (1956) 378; Backer & Bakh. *f.*, Fl. Java 1 (1964) 515, *excl.* subsp. *sumatranus* Focke; Hara & Ohashi in Hara, Fl. East Himal. (1966) 131; Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 22, *excl. syn. R. merrillii* Focke; van Royen, Phan. Monogr. 2 (1969) 34; van Steenis, Mountain Fl. Java (1972) pl. 45–3; St. John, Pac. Trop. Bot. Gard. Mem. 1 (1973) 174. — T y p e: *Commerson s.n.*, from Mauritius; holo in LINN (herb. *Smith nr. 902.63*), seen on microfiche.

R. commersonii Poir. in Lam., Encycl. Meth. 6 (1806) 240; J. E. Sm. in Rees, Cyclop. 30 (1815) spec. nr. 11; Sprengel, Syst. Veg. 2 (1825) 527. — T y p e: *Commerson s.n.*, from Java; holo in P, not seen.

R. rosifolius J. E. Sm. var. *coronarius* Sims, Curt. Bot. Mag. (1816) t. 1783, as *β coronarius*; Tratt., Rosac. Monogr. 3 (1823) 4; Ser. in DC., Prodr. 2 (1825) 556; Maxim., Mél. Biol. Acad. Sci. St. Pétersb. 8 (1872) 388, as *β coronarius 2. flore pleno*; Koidzumi, J. Coll. Sc. Tokyo 34 (1913) 147; Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 24; Fl. Thail. 2 (1970) 49; Backer & Bakh. *f.*, Fl. Java 1 (1964) 515. — *R. coronarius* (Sims) Sweet, Hort. Brit. (1826) 144. — *R. rosifolius γ normalis* Kuntze *f. coronarius* (Sims) Kuntze, Rev. Gen. Pl. 1 (1891) 224. — T y p e: plate and description in Sims, l.c.

R. javanicus Bl., Bijdr. (1827) 1108; G. Don, Gen. Syst. 2 (1832) 530; Walp., Repert. 2 (1843) 19. — Type: *Blume 1571*, from Java; holo in L.

R. tagallus Cham. & Schlechtend., Linnaea 2 (1827) 9; G. Don, Gen. Syst. 2 (1832) 530; Walp., Repert. 2 (1843) 19; Presl, Epim. Bot. (1851) 196; Maxim., Mél. Biol. Acad. Sci. St. Pétersb. 8 (1872) 389; Elmer, Leafl. Philip. Bot. 2 (1908) 461; Focke, Bibl. Bot. 72 (1911) 157, fig. 66; Merr., Enum. Philip. Flow. Pl. 2 (1923) 230. — T y p e: *de Chamisso s.n.*, from Luzon; holo in LE, not seen, iso seen from B.

R. comintanus Blanco, Fl. Filip. ed. 2 (1845) 298. — *R. jamaicensis auct. non* L.: Blanco, Fl. Filip. (1837) 427. — T y p e: not known to exist, neotype: Merrill, *Species Blancoanae nr. 721*; iso seen from L.

R. rosifolius J. E. Sm. *β intermedius* Kuntze, *γ normalis* Kuntze, *δ plurifolius* Kuntze, Rev. Gen. Pl. 1 (1891) 223–224. — T y p e: *Kuntze* specimens, from Java; holo in NY, not seen.

R. taiwanianus Matsum., Bot. Mag. Tokyo 16 (1902) 3; Liu & Su, Fl. Taiwan 3 (1977) 128. — T y p e: several specimens mentioned, not seen.

R. rosifolius J. E. Sm. *f. paucijuga* Hallier, Med. Rijksherb. 14 (1912) 40. — T y p e: *Gründler 4165*, holo in L.

R. apoensis Elmer, Leafl. Philip. Bot. 5 (1913) 1618; Focke, Bibl. Bot. 83 (1914) 263. — T y p e: *Elmer 10464*, iso seen from L.

R. glandulosopunctatus Hayata, Icon. Pl. Form. 4 (1914) 5; Liu & Su, Fl. Taiwan 3 (1977) 113. — T y p e: *Kawakami s.n.*, not seen.

R. rosifolius J. E. Sm. *f. monophyllus* Backer in Backer & Bakh., *f.*, Fl. Java 1 (1964) 515, *nom. inval.* — T y p e: not indicated.

Erect or scrambling, rarely scandent shrubs up to 1 m (rarely up to 3 m) high. *Stems* more or less densely set with soft and patent hairs, glabrescent, rarely almost glabrous from the beginning, and with usually rather few curved to straight prickles of 1–5 mm length. *Glands* sessile, pale yellow, usually present on many parts of the plants. *Leaves* up to 18 cm long, imparipinnate, with (1–)2–3(–4) opposite pairs of leaflets, in and near the inflorescences often reduced to unifoliolate, papyraceous, rather light green on both sides and especially below. *Stipules* at or to some mm above the base of the petiole, persistent, linear, 4–9 by ½–1 mm, entire, sparsely hairy outside, glabrous inside. *Petioles* 1–5½ cm long, grooved above as are the rachis and the petiolules; lateral leaflets sessile or up to 2½ mm long petioluled; petiolule of terminal leaflet ½–2½ cm long; petiole, rachis and petiolules soft and patently hairy like the stems, some prickles often present on petiole and rachis. *Blades* of leaflets usually ovate to ovate-oblong, sometimes elliptic to oblong, 2–6 by 1–2½ cm, the terminal leaflet up to 8 by 4 cm; base varying from acute to cordate, margin biserrate, usually conspicuously so, with 6–9 teeth per cm, apex acute to long-tapering, in the lateral leaflets sometimes obtuse, terminal leaflets sometimes lobed on one or both sides. *Leaflets* pinninerved with (4–)7–9(–11) pairs of lateral nerves terminating in the margin, midrib and lateral nerves impressed above, prominent below, venation usually not conspicuous; upper surface patently soft-hairy on the main nerves and often more appressedly in between, lower surface usually with more and longer hairs and

sometimes with some small prickles on the midrib. *Inflorescences* terminal on the main stem and sometimes on some of the side-branches, consisting of a terminal flower and up to four 1 – 3-flowered cymes in the axils of the uppermost normal or reduced leaves, the entire inflorescence rarely more than 10 cm long, with 1 – 10 flowers; pedicels and other axes up to 4 cm long, hairy and with glands and some prickles like on the stems; bracteoles up to 4 by 1 mm, the apex dentate, hairy outside and more sparsely so inside. *Hypanthium* flat-saucershaped, 4 – $6\frac{1}{2}$ mm across, with scattered patent hairs and many sessile pale glands outside, glabrous inside except around the torus. *Sepals* ovate to narrowly triangular, 7 – 15(– 22) by 2 – 5 mm, long-pointed (acumen up to 5 mm), entire, indumentum on the outside as on the hypanthium, and shortly woolly on the margins covered in bud, inside shortly woolly all over or at least in the middle part. *Petals* falling early, broadly obovate to ovate, 8 – 17 by 6 – 12 mm, not clawed, apex obtuse, shortly hairy outside, white. *Stamens* c. 60 – 140, glabrous; filaments up to 8 mm long; anthers $\frac{1}{2}$ – $\frac{3}{4}$ mm long. *Pistils* up to c. 600; ovary c. 1 mm long, with some hairs especially apically and usually with a conspicuous number of shortly stalked pale glands; style up to 2 mm, glabrous. *Torus* elevated, hairy, with pistils down to the base. *Collective fruit* ovoid to globose, sometimes more ellipsoid, up to $2\frac{1}{2}$ cm across, the sepals ultimately recurved; *fruits* c. $1\frac{1}{2}$ by $\frac{3}{4}$ mm, exocarp red when ripe, only a thin layer when dry; endocarp rugose.

Distribution: Continental Asia (Assam, Cambodia, Vietnam), Japan?, Taiwan, Malesia (Java, Lesser Sunda I., Borneo, Philippines, Celebes, New Guinea), Bougainville I., New Britain, New Hebrides, New Caledonia, Australia (Queensland, New South Wales). Introduced and naturalized in the Hawaiian I., in many parts of Africa (Cameroun, Fernando Póo, S. Africa, Uganda, Tanzania, islands in the Indian Ocean: Mauritius, Rodrigues, Seychelles, possibly Madagascar) and in parts of America (several islands of Lesser Antilles, S. Brasil). See note 2.

Habitat: In open (secondary) places like clearings, forest-edges, roadsides, landslides, grassland, riverbanks, fallow gardens, also in shrubberies and rarely in the undergrowth of the lighter types of forest; at altitudes from sea-level up to 2000 m, rarely higher (– 2400 m, in Celebes also reported from 2800 – 2900 m). Because of its easy growth and propagation and its nice flowers often cultivated in sunny gardens, within and also outside its natural area.

Vernacular names: *hareu-eus* (Java, Sundanese); *beberetean* and variants (Java, Sundanese); *utjen* (Java); *gunggung* (Bali); *rikerara marukrau* (Sumba); *pidah* (Borneo, Kelabit); *sabit* (Borneo, Kutai); *nokon* (Philippines, Cebuano); *penet an iitang* (Philippines, Luzon); *gola-gola* (S.W. Celebes); *katti* (New Guinea, Wapi); *mamun, mamuni, mamunali* and variants (New Guinea, Enga, Huli a.o.); *kerikna* (New Guinea, Eipomek); *mamilk* (New Guinea, Medlpa); *umterra* (New Guinea, Kanambia, Tairosa); *kakari* (New Guinea, Finisterre); *molib* (New Guinea, Dani); *jililiken* (New Guinea, Dani); *donip* (New Guinea, Daga); *dignanbok* (New Guinea, Kubor); *uwelili* (New Guinea, Okapa).

JAVA. West. Mt. Megamedong, *Reinwardt s.n.*; Bogor and environs, several specimens; Purwakarta, *Bakhuizen van den Brink 4298*; Mt. Tangkubanperahu: *Backer 2468*; Mt. Patuha: *Scheffer 19957*; Cadasmalang, *Winckel 1264*; environs of Bandung, several specimens; Mt. Kancana, *Native coll. 166, 375, Soegandiredjo 9*; Mt. Papandayan, *Boerlage s.n., Holstvoogd 566*; Mt. Guntur, *Kostermans 104,*

Schiffner 2034; Mt. Mandalagiri: *Lam 236, van Rijckevorsel 48, van Vuuren s.n.*; Mt. Galunggung: *Backer 8631*; Telagabodas: *Burck 133*. — Central. Purwokerto, *Backer 130*; Dieng Mts., *Wiriosapoetro 50*; Mt. Sundoro, *Lörzing 222*; Magelang, *van Oosten 12*; Selo, *den Berger 53*; Mt. Merapi, *Junghuhn s.n.*; Mt. Lawu, *Backer 6776, Blokhuis s.n., Coert 311*. — East. West of Mt. Wilis, *Koorders 23140, 29361*; Tengger Mts., several collections; Mt. Mahameru, *Backer 36898*; Ijen Mts., *Kostermans s.n., Rant s.n.*

LESSER SUNDA ISLANDS. Bali, *Meijer 8063, Sarip (exp. Maier) 138, 414, Veldkamp 6943*. — Lombok, *Elbert 825, 857, 1176, 1250*. — Sumbawa, *Colfs 153, Gründler 4019, 4165*. — Sumba, *Grevenstuk 53, Iboet 508, Verheijen 4062*. — Flores, *Jaag 1498, Kostermans & Wirawan 425, Verheijen 289*. — Timor, *Bosarchitect Kupang 10, Forbes 3518, Schmutz 2251, 2261, van Steenis 18630*.

BORNEO. Sarawak. Bario, *Chai S 35420, Nooteboom & Chai 1782*; Bakelalan, *Brooke 10384*; Patau, *Alphonso A 51*. — Sabah. Ranau, *Sinclair c.s. 9246*; Kundasan, *Sidek bin Kiah S 8, Poore s.n.*; Tambunan, *Nooteboom 1292*; Mt. Kinabalu, *Clemens 9904*. — Indonesian Borneo. East Kalimantan: W. Kutai, *Endert 2386, 4084*.

PHILIPPINES. Luzon. Ilocos Norte Prov.: Mt. Semenublan, *Iwatsuki c.s. P 185, P 303*; Bangui, *McGregor BS 43543*. — Mountain Prov.: several places, several collections. — Sierra Madre Mts.: Dingalan, *Jacobs 7724*. — Pampanga Prov.: Mt. Pinatubo, *Elmer 22005*. — Bataan Prov.: Lamao River, *Barnes FB 203*; Mt. Mariveles, *Merrill 3953*; s. loc., *Merrill BS 791*. — Bulacan Prov.: *Ramos BS 2008*. — Rizal Prov.: Montalban, *Merrill Spec. Blanc. 721*; Mt. Irig, *Ramos BS 41911, BS 42197*; s. loc., *Ramos BS 2669*. — Quezon Prov.: Dolores, *Iwatsuki c.s. P 1314*. — Laguna Prov.: Mt. Makiling, *Elmer 18280, Sulit PNH 8221, Veloira 45*. — Albay Prov.: Mayon volc., *Mendoza PNH 18425*. — Sorsogon Prov.: Mt. Bulusan, *Edaño & Gutierrez PNH 37849*. — Mindoro. Mt. Yagaw, *Sulit & Conklin 16844*. — Negros. Cuernos Mts, *Elmer 9707*; Lake Balinsaayao, *Britton PNH 19584*. — Mindanao. Misamis Prov.: Mt. Malindang, *Mearns & Hutchinson FB 4562*. — Bukidnon Prov.: Mt. Katanglad, *Sulit PNH 9866*. — Davao Prov.: Mt. Apo, *Austr. Nat. Univ. 1522, Edaño PNH 1391, Elmer 10464, 11582, 11952, San Carlos Univ. 693*.

CELEBES. North. Minahasa, *Alston 16327, Koorders 18558, 18561*; Gurupahi, *Kaudern 256*; s. loc.: *Hose 824*. — Central. Mt. Nokilalaki, *Bloembergen 3960, 4079, 4108*. — South. Mt. Lompobatang (=Bonthain), *Bünnemeijer 11602, 11846, 12182, 12245*; Mt. Bawakra Eng, *van Zijll de Jong 30*; Bontarikun, *Noerkas 235*; Bontojai, *Rachmat 23*; Banta Eng, *Yoshida 959*; Bantimurung, *Buwalda 3786*; Bukit Poka Pinjang, *Kjellberg 3874*; Bukit Porema, *Kjellberg 2641*; Lembaya, *van Zijll de Jong 103*. — Salayar I., *Docters van Leeuwen 1737*.

NEW GUINEA. Irian Jaya. Vogelkop Peninsula: Kebar valley, van *Royen 3901, van Royen & Sleumer 8089, Schram BW 7944*; Tamrau Range, *van Royen & Sleumer 7622, 7750*. — Snow Mountains: Lake Habbema, *Brass 11389*; Nassau Mts., *Docters van Leeuwen 10516*; Baliem area, *Brass 11800, Hiepko & Schultze-Motel 644, 1054, Sinke 33, Versteegh BW 10491*; Star Mts., *de Wilde & Vervoort 448*; Orion Mts., *Kalkman 4068*. — Papua New Guinea. W. Sepik Dist.: Torricelli Mts., *Darbyshire 219*; Telefomin Subdist., *Henty c.s. NGF 41732, Kalkman 5324, Steinkraus 27, Vinas LAE 59581*. — Madang Dist.: Saidor Subdist., *Sayers NGF 19758, NGF 21267, NGF 21471*. — Morobe Dist.: Bulolo, *van Royen 4292, Streimann & Kairo NGF 21188, Wells NGF 7570*; Kaindi, *Brass 29621, van Royen NGF 16034*; Wau, *Millar NGF 14578, Womersley & van Royen NGF 5881*; Sambanga, *Clemens 6876*; Zenag, *Hartley 10926*. — Western Highl. Dist.: Wabag Subdist., *Hoogland & Schodde 6739, 6920, Womersley NGF 11322*; Mt. Kum, *Stevens LAE 50228, Womersley NGF 9512*; Kubor Range, *Vink 16327*; Upper Wahgi valley, *Powell UPNG 1520*; Lagaip valley, *Hoogland & Schodde 7336*; Nondugl, *Millar & Holttum NGF 18551, van Royen NGF 18268*; Birip, *Flenley ANU 2121, Henty NGF 20603, 20604*; Ogelbeng, *Stopf s.n.* — Eastern Highl. Dist.: Goroka, *Womersley & Floyd NGF 6152*; Kainantu, *Wheeler ANU 5746*, Marapuna, *van Royen NGF 15055*; Okapa, *Hartley 13097*; Arau, *Brass 32120*. — Southern Highl. Dist.: Ialibu, *Womersley & Woolliams NGF 12398*; Tari Subdist., *Powell UPNG 1600, UPNG 1625, Vink 16876*; Mendi valley, *Schodde 1431*. — Central Dist.: Lake Myola, *Croft & Lelean NGF 34692*; Boridi, *Carr 12990*; Uriko, *van Royen NGF 20288*. — Northern Dist.: Lake Myola, *Croft LAE 61909*. — Milne Bay Dist.: Mt. Suckling, *Stevens & Veldkamp LAE 54039, Veldkamp & Stevens 5949*; Bonenau, *Pullen 8054*; Gwariu River, *Brass 23755*; Mt. Dayman, *Brass 22514*.

BISMARCK ARCH. New Britain. Mt. Lululua, *Stevens & Lelean LAE 58205*; Gazelle Peninsula, *Rechinger 3802, 3833, 4335*.

SOLOMON I. Bougainville. Kieta, *Rechinger 4349*.

Notes: 1. There has been a lot of confusion around *R. rosifolius, asper*, and *sumatranus* (and a fair number of other names and synonyms). In our view *R. rosifolius* can be distinguished by having only sessile, pale glands and no stalked ones on the stems or other parts. *R. sumatranus*, on the other hand, has many long glandular setae (4–5 mm long) on the stems and on other parts. A third taxon, for

which the name *R. asper* Wall. *ex* D. Don seems to be correct (synonyms *R. croceacanthus* Lévl. and *R. indotibetanus* Koidz.), has shortly stalked dark glands ($\frac{1}{2}-1$ mm) and occurs on the Asian continent (China, Vietnam, Burma?, Sikkim, Assam), Taiwan, and the Ryu Kyu Islands.

As other authors have stated earlier, a thorough study of the '*rosifolius*-complex' over its entire area is highly desirable.

2. The distribution of *R. rosifolius* in Malesia is almost vicarious with that of *R. sumatranus* which in Malesia occurs in Sumatra and Malaya and in a restricted area in Java. *R. rosifolius* is absent from Malaya and Sumatra. It is quite remarkable that no specimens are known from the Moluccas; in view of the general distribution it must certainly grow there.

In New Guinea the species is of common occurrence, but from the Bismarck Archipelago and from the Solomon Islands only few collections are known. Still there seems to be no reason to suppose that the species is not indigenous there.

We have also accepted the species to be indigenous in Australia, the New Hebrides and New Caledonia, although the successful naturalization in many parts of the world might give rise to doubts. In the Hawaiian Archipelago the species was introduced, according to St. John, l.c.

We did not see specimens from China. A large distribution in S. China is given in Iconographia Coromophytorum Sinicorum 2 (1972) 274, but the plate shows distinctly stalked glands on the stems and it seems likely that only *R. asper* and *R. sumatranus* occur in China, not *R. rosifolius*.

3. A garden-form with double flowers, which probably has been developed in Japan and which is known as var. *coronarius* Sims, has obviously escaped from cultivation in some places, viz. in Assam and in Malaya (Perak, Maxwell's Hill). It cannot be inferred from the herbarium whether this form is still cultivated in Malesia; we only saw a few old specimens. According to Backer & Bakh.*f.*, l.c., it is in Java 'often cultivated in gardens from the plains up to the mountains, also occasionally naturalized'.

4. In some specimens the erinea described by Docters van Leeuwen, Zoocecidia (1926) 220, are present. They are dots of a very dense indumentum, probably caused by the gall-mite *Eriophyes rubierineus*, and they are also found in some other species.

5. The fruits are by many collectors reported to be edible, but often with the addition that they are not very juicy or fleshy and that they are not often eaten. Van Steenis, l.c., says that the taste is very much improved by adding sugar.

6. The description given only refers to the Malesian material.

2. **Rubus sumatranus** Miquel

R. sumatranus Miq., Sum. (1860) 307; Merr., Contr. Arn. Arb. 8 (1934) 70; Rehder, J. Arn. Arb. 18 (1937) 43; Hara & Ohashi in Hara, Fl. East Himal. (1966) 132; Lauener & Ferguson, Not. R. Bot. Gard. Edinb. 30 (1970) 280. — *R. rosaefolius* J. E. Sm. subsp. *sumatranus* (Miq.) Focke, Bibl. Bot. 72 (1911) 155; Backer & Bakh.*f.*, Fl. Java 1 (1964) 515. — T y p e: *Teysmann s.n.*, from W. Sumatra; holo in U (*sheet nr. 041165*).

R. sorbifolius Maxim., Mél. Biol. Acad. St. Pétersb. 8 (1872) 390; Craib, Fl. Siam. Enum. 1 (1931) 573; Thuan, Fl. Thail. 2 (1970) 49. — T y p e: *Maximowicz s.n.*, from Japan; holo in LE, not seen, iso seen from L.

R. asper auct. non Wall. *ex* D. Don: Focke, Bibl. Bot. 72 (1911) 157, f. 67; Backer, Schoolfl. Java (1911) 454; Cardot in Lecomte, Fl. Gén. Indoch. 2 (1920) 645; Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 24.

Erect or scrambling to semi-scandent shrubs, up to 2 m high. *Stems* with many up to 5 mm long gland-tipped setose reddish hairs, and usually also with scattered short soft and curly hairs; prickles usually not many, up to 5 mm long, usually curved. Sessile pale or red globular *glands* often present on many parts of the plants, especially the leaves. *Leaves* up to 21 cm long, imparipinnate, with 2 or 3 (−4) pairs of opposite leaflets, in and near the inflorescences often reduced to unifoliolate, herbaceous. *Stipules* at or to a few mm above the base on the petiole, persistent, linear, 3−6 by up to ½ mm, entire, (almost) glabrous. *Petioles* (1−)2−6 cm long, grooved above as are the rachis and the petiolules; lateral leaflets sessile or up to 4 mm long petioluled; petiolule of terminal leaflets ½−2 cm long; petiole, rachis and petiolules with soft hairs, gland-tipped setose hairs, and some curved prickles like on the stems. *Blades* of leaflets oblong to oblong-ovate, 2½−7 by ¾−2 cm; base acute to rounded, margin serrate to biserrate, with 5−8 teeth per cm, apex acute to long-tapering; terminal leaflet sometimes lobed on one or both sides. *Leaflets* pinninerved with 7−12 pairs of lateral nerves terminating in the margin, midrib and lateral nerves impressed above, prominent below, venation usually not conspicuous; upper surface with long patent soft hairs, especially on midrib and larger nerves but also on smaller veins, and with few gland-tipped long hairs, lower surface with long patent soft hairs and with some gland-tipped long hairs on midrib, nerves and veins; midrib sometimes with few prickles; gland-tipped hairs also present on the margin. *Inflorescences* terminal on the main stem and sometimes on some of the upper side-branches, being compound lax leafy thyrses, consisting of a terminal flower and up to 5(−8) cymes of 1−3(or 4) flowers in the axils of the upper compound or unifoliolate leaves; the entire thyrse up to 25 cm long and with up to 20 or more flowers but often (at least in herbarium specimens) less richly branched and with fewer flowers; pedicels up to 4 cm long; all axes and pedicels hairy and with gland-tipped setae and small curved prickles like the stems; bracts in the cymes often leaf-like (sessile to shortly petioled, unifoliolate, small), other bracts ovate-lanceolate, up to 3 mm long, entire or with some teeth, slightly hairy; bracteoles usually present on the pedicels, like the bracts but smaller. *Hypanthium* flat saucer-shaped, 4−5 mm across, with some patent soft hairs and gland-tipped setose hairs outside, glabrous inside except around the torus. *Sepals* narrowly triangular, 7−14 by 2−3½ mm, long-pointed (acumen up to 5 mm), entire, indumentum on the outside as on the hypanthium and shortly woolly on the margins covered in bud, inside shortly woolly. *Petals* falling early, oblong to obovate, 8−10 by 2−4 mm, base gradually narrowed, apex obtuse, outside with short hairs at base, slightly fimbriate at apex, white. *Stamens* up to *c.* 120, glabrous; filaments up to 4 mm long; anthers ½ mm long. *Pistils* up to *c.* 500, glabrous; ovary *c.* ¾ mm long; style up to 2 mm long. *Torus* elevated, glabrous between pistils, the pistils inserted down to the base. *Collective fruit* ellipsoid, up to 1½ by ¾ cm when dry, the sepals recurved after anthesis; *fruits* 1−1½ by ¾ mm, exocarp orange-red to red when ripe, only a very thin layer when dry; endocarp rugose.

Distribution: N.E. India (Arunachal, Meghalaya, Mizoram), Thailand, Laos, Vietnam, S. China (Fukien, Kwangtung, and Kwangsi, according to Iconogr. Corm. Sin. 2, 1972, 274; also specimens seen from Szechuan and Yunnan), Japan, Sumatra, Malaya, Java. According to Hara & Ohashi, l.c.; also recorded for Korea and Taiwan, but no specimens seen. *R. sumatranus* is not recorded in Fl. Taiwan 3, 1977, but *R. dolichocephalus* Hayata (p. 111) is probably synonymous.

H a b i t a t: Clearings, roadsides, thickets, tea-plantations, forest borders and similar open places, very rarely recorded from (lighter types of) forest. In Sumatra and Malaya collected between *c.* 500 and *c.* 2000 m altitude.

V e r n a c u l a r n a m e s: *Pantjaringit* and variants (W. Sumatra); *sanggirgir* and variants (N. Sumatra).

SUMATRA. A c e h. Blangkejeren, *van Steenis 9386*. — N o r t h. Several localities around Lake Toba, several collections. — W e s t. Mt. Talang, *Bünnemeijer 5167*; Mt. Gombak, *Bünnemeijer 5631, 5743*. — S o u t h. Rimbo Pengadang, *Ajoeb 120*; Koedjoeng, *Forbes 2026*.

MALAYA. P e r a k. Mt. Kerbau, *Haniff 3990*; Batang Padang valley, *Wray 1484*; The Cottage, *Ridley s.n.*; Caulfield's Hill, *Wray 4187*. — P a h a n g. Cameron Highlands, several specimens; Ginting Highlands Road, *Kochummen Kep FRI 16456, Stone 9543*; Lubok Tamang, *Henderson 11112*; Telda, *Ridley 13543*. — S e l a n g o r. Fraser's Hill, *Burkill 2065, Shimizu c.s. M 13921*; Ginting Simpak, *Hume 8525, 8580, 8587, 8647, 9543*; Pahang track, *Ridley 8602*; Ulu Batang Kali, *Whitmore FRI 4549*. — P e n a n g. Government Hill, *Burkill SF 6259*.

JAVA. W e s t. Mt. Patuha, *Lörzing 1320*; Pengalengan, *Backer 26227, Forbes 1024*.

N o t e s: 1. Regarding confusion with *R. asper* and *R. rosifolius*, see note 1 under the latter species.

2. The three specimens from W. Java (two of which in BO), are from a small area between the Mts. Patuha and Malabar. Except for these specimens the distribution of this species in Malesia is vicarious with that of *R. rosifolius*; on the continent the distributions overlap.

3. The fruits are sometimes recorded as edible and pleasant.

4. The description given is based on Malesian specimens only.

3. **Rubus fraxinifolius** Poiret

R. fraxinifolius Poir. in Lam., Encycl. Meth. 6 (1806) 242; J. E. Sm. in Rees, Cyclop. 30 (1815) spec. nr. 2; Tratt., Rosac. Monogr. 3 (1823) 5; Ser. in DC., Prodr. 2 (1825) 556; Sprengel, Syst. Veg. 2 (1825) 527; Bl., Bijdr. (1827) 1107; G. Don, Gen. Syst. 2 (1832) 529; Hasskarl, Flora 24 (1844) 585; Miq., Fl. Ind. Bat. 1, 1 (1855) 376, incl. var. *β minor* Miq.; Maximow., Mel. Biol. Acad. Sci. St. Pétersb. 8 (1872) 391; Stapf, Trans. Linn. Soc. Bot. 4 (1894) 146; Koord., Minah. (1898) 449; Elmer, Leafl. Philip. Bot. 2 (1908) 460; Focke, Bibl. Bot. 72 (1911) 150; Backer, Schoolfl. Java (1911) 452; Koord., Exk. Fl. Java 2 (1912) 327; Cardot, Bull. Mus. Hist. Nat. Paris 23 (1917) 293; Merr., Enum. Philip. Flow. Pl. 2 (1923) 227; Backer & Bakh. *f.*, Fl. Java 1 (1964) 514; van Royen. Phan. Monogr. 2 (1969) 45; van Steenis, Mountain Fl. Java (1972) pl. 45 – 3.; *non R. fraxinifolius sensu* Matsum. & Hay., J. Coll. Sc. Tokyo 22 (1906) 121, et Koidz., op. cit. 34 (1913) 143, *quod est R. alnifoliolatus* Lévl. — *R. rosifolius* J. E. Sm. α *fraxinifolia* (Poir.) Kuntze, Rev. Gen. Pl. 1 (1891) 223, p.p. — T y p e: a *Commerson* specimen from Java, in P-JU, not seen.

[*R. moluccus parvifolius* Rumph., Herb. Amboin. 5 (1747) 88, t. 47, 1.] — T y p e: the plate.

R. parvifolius L., Sp. Pl. (1753) 1197, *p.p., quoad syn. Rumph., typo excl.* — See note 6.

R. celebicus Bl., Bijdr. (1827) 1107: G. Don, Gen. Syst. 2 (1832) 530; Walp., Rep. 2 (1843) 19; Presl, Epim. Bot. (1851) 196. — *R. fraxinifolius* Poir. subsp. *celebicus* (Bl.) Focke, Bibl. Bot. 72 (1911) 151. — T y p e: In L no specimen was found with the name *R. celebicus* in Blume's handwriting. A *Reinwardt* specimen (L, sh. nr. *905.130 – 126*) might be considered to be the type.

R. rosaefolius auct. non J. E. Sm.: Vidal, Sinopsis (1883) 25.

R. fraxinifolius Poir. var. *haightii* Elmer, Leafl. Philip. Bot. 2 (1908) 461; Focke, Bibl. Bot. 72 (1911) 151. — T y p e: a *Mearns* specimen from Pauai ('*Mr. Haight's Place*'), Luzon. This may be *Mearns BS 4459*, cited by Merrill under *R. merrillii*, see below. Specimen not seen. See note 2.

R. merrillii Focke, Bibl. Bot. 72 (1911) 153; Merr., Enum. Philip. Flow. Pl. 2 (1923) 228. — T y p e: a *Merrill* specimen from Pauai. This may have been *Merrill BS 862* or *BS 6637*, both cited by Merrill under *R. merrillii*. See note 2.

Erect shrubs, rarely semi-scandent, up to 3 m high. *Stems* glabrous (some pubescence only when very young) unarmed or with few rather straight up to 6 mm long prickles. *Glands* absent or a few, sessile or subsessile, sometimes present on

leaves, stipules, pedicels and hypanthium. *Leaves* up to 27 cm long, imparipinnate, with up to 4 (−5) opposite pairs of leaflets, in the inflorescence reduced to 3−1-foliolate, papyraceous to pergamentaceous, green, on lower surface paler. *Stipules* at or up to 5 mm above the base on the petiole, persistent, linear, 5−13 by ½−1 (−2) mm, entire or rarely sparsely toothed, hairy when young, glabrate. *Petioles* 2−6 cm long, grooved above as is the rachis, with few straight to curved prickles at the back, (almost) glabrous; petiolules of lateral leaflets 0−5 mm long, grooved above, at base softly hairy as is the (otherwise glabrous) rachis; petiolule of terminal leaflet up to 2½ cm long, grooved above and softly hairy to (almost) glabrous. *Blades* of leaflets elliptic to oblong or sub-ovate, 2−9(−12) by 1−4(−6) cm, the terminal leaflet often longer and/or wider than the lateral ones; base usually rounded or (especially in the terminal leaflet) cordate, in lateral leaflets often more or less oblique and then in the upper half acute, rarely both halves acute, margin serrate, rarely slightly biserrate, with 4−8 teeth per cm, apex acute to long-pointed, sometimes acuminate. *Leaflets* pinninerved with (7−)10−15(−19) pairs of lateral nerves, terminating in the margin, midrib and lateral nerves impressed above, prominent below, venation reticulate, not very conspicuous; upper surface sparsely short hairy on the midrib, sometimes also on the lateral nerves and at base, rarely so between the nerves, lower surface sparsely short hairy only on the midrib and nerves, and rarely with some short prickles on the midrib. *Inflorescences* terminal (and axillary sometimes) thyrses with under the terminal flower up to 7 branches, the lower of these in the axils of pinnate to unifoliolate leaves, the upper ones in the axils of bracts, being cymes with 1 to 3 flowers, the lower ones consisting of bracteate to leafy thyrses; the entire inflorescence lax and wide, with ± divaricate branches, up to *c.* 20 cm long and wide, with up to 60 flowers; *pedicels* and lower axes up to 5 cm long, (almost) glabrous, sometimes with few small prickles; bracts lanceolate to (the lower ones) tripartite i.e. consisting of a reduced leaf-blade with relatively large and connate stipules, *c.* 3 by 1 mm when simple, up to *c.* 1 cm long when tripartite, margins entire or toothed, glabrous or sparsely hairy; bracteoles 2, on the pedicel, usually not opposite, up to 3 by 1 mm, usually entire, glabrous or sparsely hairy. *Hypanthium* saucer-shaped, 5−6 mm across, glabrous and unarmed outside, glabrous inside. *Sepals* triangular, 7−13 by 3−6 mm, including the 2−5 mm long acumen, not or hardly growing after anthesis, entire, glabrous outside except a woolly indumentum on the margins covered in bud, inside shortly and densely woolly except at base and on the acumen. *Petals* falling early, orbicular to elliptic or obovate, not clawed, about as long as the sepals, 7−12 by 5−9 mm, glabrous, white to greenish white. *Stamens* up to more than 100, glabrous; filaments up to 3 mm long; anthers *c.* 1 mm long. *Pistils* up to more than 300, glabrous; ovary *c.* ½ mm long; style up to 1½ mm long. *Torus* elevated, the basal part without pistils and long-hairy, glabrous between the pistils. *Collective fruit* ellipsoid to ovoid, up to 2½ by 1½ cm, the sepals ultimately recurved; *fruits c.* 1½ by ¾ mm when dry, exocarp red when ripe, a thin layer when dry; endocarp rugose.

Distribution: Java, Lesser Sunda Islands, Borneo, Philippines, Celebes, Moluccas, New Guinea, Bismarck Archipelago, Solomon Islands. According to Focke (1911) and Merrill (1923) also in Sumatra, but no specimens seen. According to Cardot (1917) also in Queensland, but no specimens seen from Australia. The species does not seem to occur in Taiwan, from where it has formerly been reported. According to Focke introduced in Brazil, no specimens seen.

Habitat: Forest borders and open places in forests, riverbanks, deserted gardens, roadsides, and other more or less open places; at altitudes from near sea-level up to *c.* 2500 m.

Vernacular names: *bengberitean* and orthographic variants (Java, Sundanese); *emperingan* (Borneo, Iban); *ragimot* (Sabah); *balinana* (Philippines, Mangalay); *pinit* (Philippines, Ifugao); *garuat'a* (Talaud); *djalangaro* (Ternate); *katé-katé* (Tidore); *wolohatti* (New Guinea, Wapi); *tahari* (New Guinea, Naho); *kaman* (New Guinea, Wain); *djembuna* (New Guinea, Iha); *pising* (Bougainville).

JAVA. West. Mt. Salak, several specimens; Mt. Gede-Pangrango, many specimens; Mt. Papandayan, several specimens; Mt. Telagabodas, *Boerlage s.n.*, *Burck 132*, *Kostermans 255*; Mt. Talun, *Pulle 3125*. — Central. Petungkriono, *Backer 15827*; Dieng Mts., several specimens; Mt. Sumbing, *Docters van Leeuwen 8868*, *Lörzing 140*; Mt. Andong, *Docters van Leeuwen 149*; Mt. Telomojo, *Coert 1605*, *Koorders 35984*; Mt. Merbabu, *Backer 30295*. — East. Mt. Lawu, *Elbert 238*, *Yoshida 1778*; Mt. Wilis, *Backer 11609*; Mt. Kelud, *Clason 3*, *108*, *van der Veen 28*; Mt. Anjasmoro, *Burger 6669*; Tengger Mts., several specimens; Mt. Widodaren, *Backer 3644*; Mt. Semeru, *Backer 3659*; Iyang Mts., *Backer 9873*; Ijen Mts., *Backer s.n.*, *Clason E 1*, *Dammerman 10*.

LESSER SUNDA ISLANDS. Flores, *Rensch 1100*, *Schmutz 453*, *1822*, *Veldkamp 7070*, *Verheijen 537*, *de Voogd 1786*. — Timor, *Forbes 3874*, *van Steenis 18666*, *Wiriadinata 408*.

BORNEO. Sabah. Mt. Kinabalu, many specimens; localities in district Ranau, *Badak SAN 32325*, *Kadir A 1661*, *Poore H 141*, *Sidek bin Kiah S 9*, *Sinclair c.s. 8962*.

PHILIPPINES. Batanes. Batan I., *Hatusima & Sato 28652*, *Quisumbing c.s. PNH 79489*, *del Rosario PNH 79965*; Sabtang I., *Quisumbing c.s. PNH 79370*. — Luzon. Ilocos Norte Prov.: Mt. Semenublan, *Iwatsuki c.s. P 304*; Mt. Bubonbilit, *Iwatsuki c.s. P 474*. — Cagayan Prov.: Peñablanca, *Ramos BS 76740*, *76759*. — Mountain Prov.: several places, several collections. — Sierra Madre Mts.: *Guttierez PNH 78085*, *Jacobs 7715*. — Zambales Prov.: Mt. Tapolao, *Ramos & Edaño BS 44716*. — Laguna Prov.: Mt. Makiling, *Elmer 18147*. — Camarines Sur Prov.: *Cuming 1457*, *Edaño BS 76434*. — Albay Prov.: Mt. Malinao, *Edaño PNH 34483*; Mayon volc., *Mendoza PNH 18268*, *18330*, *Ramos & Edaño BS 75737*. — Sorsogon Prov.: Mt. Bulusan, *Elmer 15413*; Lake Agangay, *Sinclair & Edaño 9641*. — Mindoro. Baco Riv., *Merrill 999*; Mt. Yagaw, *Sulit & Conklin PNH 17700*; Mt. Panulong, *Ebalo 316*; Mt. Naapug, *Conklin PNH 17505*; s. loc., *Merritt FB 12124*. — Negros. Mt. Katugasan, *Edaño PNH 21781*; Lake Balinsasayao, *Britton PNH 19583*, *Edaño PNH 6732*; Cuernos Mts., *Edaño PNH 7143*, *Elmer 10348*; Inalacan Riv., *Edaño PNH 6814*; Mt. Tolines, *Kondo & Edaño PNH 36725*. — Cebu. Cantipla, *San Carlos Univ. 7*. — Leyte. Lake Danao, *Edaño PNH 11925*. — Mindanao. Bukidnon Prov., *Cid 39*, *Escritor BS 21418*, *Ramos & Edaño BS 38504*, *38846*. — Agusan Prov., *Mendoza & Convocar PNH 10722*. — Davao Prov., *Ramos & Edaño BS 49404*.

CELEBES. Talaud I. P. Karakelong, *Lam 2522*, *2762*. — North. Tondano, *Wisse 11*; Mt. Klabat, *Koorders 18559*, *Steup 170*; Ratahan, *Koorders 19737*; Lolambulon Mts., *Koorders 18566*: Soputan Mts., *Koorders 18562*; s. loc., *Koorders 18564*, *18567*. — Central. Mt. Lumut, *Eyma 3613*; Mt. Sikuku, *Rachmat 449*. — South. Mt. Rantelemo, *Kjellberg 1439*, *1537*; Gowa, *Bouman 64*, *van Zijll de Jong NIFS 102*; Mt. Lompobatang (= Bonthain), *Bünnemeijer 11572*, *11601*, *12001*; Lombasang, *Bünnemeijer 10979*, *11092*.

MOLUCCAS. Ternate, *Atasrip 23*, *Beguin 602*, *Idjan & Mochtar 31*, *Reinwardt s.n.* — Tidore, *Lam 3764*. — Bacan, *Nedi 63*. — Sula I. Sanana, *Bloembergen 4288*. — Buru, *Binnendijk 19956*, *NIFS bb 22811*. — Seram, *Eyma 1793*, *1919*, *2067*, *2255*, *2909*, *3220*, *Kornassi 79*, *1008*, *Rutten 126*, *2183*, *Stresemann 38*. — Ambon, *Boerlage 534*, *Forsten s.n.*, *Rant 335*, *559*, *777*, *806*, *Reinwardt s.n.*, *Robinson 271*, *Teysmann 5135*, *Treub 566*, *de Vriese & Teysmann s.n.*

NEW GUINEA. Irian Jaya. Arfak Mts., *Mayr 105*, *208*; Fak-Fak, *Stefels BW 5134*; Gautier Mts., *Gjellerup 837*; Star Mts., Mt. Antares, *Kalkman 4327*. — Papua New Guinea. W. Sepik Dist.: Torricelli Mts., *Darbyshire 260*. — Madang Dist.: Finisterre Mts., *Pullen 6013*. — Morobe Dist.: Ramu valley, *Brass 32602*; Rawlison Range, *van Royen NGF 16094*; Bulolo, *Gillison NGF 25063*; Wau, *Womersley & Millar NGF 8333*, *Womersley & van Royen NGF 5882*. — Eastern Highl. Dist.: Kassam Pass, *Stauffer & Sayers 5571*; Arau, *Brass 31956*.

BISMARCK ARCH. New Britain. Torlu Riv., *Sayers NGF 24256*.

SOLOMON I. Bougainville. Kupei, *Kajewski 1629*; Iru, *Waterhouse 448B*.

Notes: 1. In Java and Borneo the flowers seem to be slightly larger on an average than in the rest of the area.

2. Some specimens have short, up to 1 mm long, spine-like capitate hairs on the stems (Celebes: *Bünnemeijer 11601*, *Koorders 18559*, *18564*, *Reinwardt s.n.*; Philippines: *Cid 39*, *Elmer 18147*, *Ramos & Edaño BS 38846*). The var. *haightii* Elmer and *R. merrillii* Focke have been described for specimens with many of these glandular spines. Merrill (1923) mentioned four such specimens under *R. merrillii*, all from Pauai. We only saw two of them, viz. *Merrill BS 6637* and *Santos BS 31773*. They look as if hybridization with *R. copelandii*, which has been collected at the same locality, might account for the presence of the glandular spines and we do not think that the var. *haightii* merits recognition as a separate taxon.

3. A specimen from Ambon, *Rant 777*, has virescent flowers.

4. The same phenomenon as described for *R. rosifolius* and *R. niveus* occurs in the present species: a very dense indument, probably caused by a gall-mite, on the leaves, stems and sepals. It was observed in specimens from Flores (*Schmutz 822*) and Celebes (*Bünnemeijer 12001*, *Kjellberg 1430*).

5. 'The fruits of this species are slightly less unpalatable than those of most other Rubus species in Java', says Backer (1911) with his characteristic sarcasm. Collectors often mention that the fruits are edible but tasteless, not juicy, or bitter.

6. *R. parvifolius* L. is based on two different elements, viz. an *Osbeck* specimen from 'India' and the reference to Rumphius' *R. moluccus parvifolius*. Linnaeus' description (*'foliis ternatis subtus tomentosis'*) obviously is based on the specimen only and this must be considered to be the type.

4. Rubus chrysogaeus van Royen

R. chrysogaeus van Royen, Phan. Monogr. 2 (1969) 42, fig. 8 — T y p e: *Womersley & van Royen NGF 5919* (= *van Royen 4334*), holo in L.

Sprawling to erect shrubs up to 2 m high. *Stems* glabrous, with slightly curved up to 4 mm long prickles. *Glands* sessile or subsessile, pale, usually present on many parts of the plants. *Leaves* up to 17 cm long, imparipinnate, with 2 or 3 opposite pairs of leaflets, in the inflorescences often reduced to unifoliolate, leaflets papyraceous. *Stipules* on the petiole some mm above the base, linear, 6–9 by *c.* $\frac{1}{2}$ mm, persistent, entire, glabrous or with few long hairs. *Petioles* $\frac{3}{4}$–5 cm long, petiole and rachis grooved above, with several curved prickles, long-hairy near the insertions of the leaflets, otherwise glabrous or nearly so; petiolules of lateral leaflets up to 1 mm only, of terminal leaflet $\frac{1}{2}$–$1\frac{1}{2}$ cm long. *Blades* of leaflets ovate-lanceolate to lanceolate, 2–8 by 1–3 cm, base rounded or the upper half more acute, margin biserrate with 5–8 teeth per cm, apex long-tapering; terminal leaflet sometimes lobed on one or both sides; *leaflets* pinnerved with 9–13 pairs of lateral nerves, terminating in the margin, midrib and lateral nerves slightly impressed above, rather prominent below, venation usually not conspicuous; both surfaces only sparsely hairy on midrib and larger nerves, often with some small prickles on the midrib below. *Inflorescence* a terminal leafy thyrse, consisting of a terminal flower and lower down up to 4 monochasial to sometimes dichasial branches with up to 4 flowers in the axils of pinnate to unifoliolate leaves; the entire inflorescence up to 12 cm long, lax and widely branched, with up to 12 flowers; *pedicels* and lower axes up to 4 cm long, glabrous and with some small prickles; bracts of flowers and cymes mostly leaf-like, unifoliolate, only the upper ones and the bracteoles linear or tripartite. *Hypanthium* saucer-shaped, up to *c.* 5 mm across, glabrous outside but

with rather many sessile yellow glands, inside glabrous except a ring of long hairs around the torus. *Sepals* narrowly triangular, 8 – 16 by 3 – 5 mm, including the acumen which is 1/3 to $\frac{1}{2}$ of the length, entire, on the outside glabrous to sparsely hairy and with glands as on the hypanthium, shortly woolly on the margins covered in bud, inside shortly woolly at least in the middle part. *Petals* falling early, elliptic to obovate or spathulate, 8 – 12 by $3\frac{1}{2}$ – 5 mm, not clawed, apex obtuse, shortly hairy outside and with few hairs inside, white. *Stamens c.* 70 to 80, glabrous; filaments up to 5 mm long; anthers *c.* $\frac{3}{4}$ mm long. *Pistils c.* 500; ovary *c.* $\frac{3}{4}$ mm long, (sub) glabrous and with a number of shortly stalked, pale glands; style up to $1\frac{1}{2}$ mm long, glabrous. *Torus* elevated, hairy, with pistils down to the base. *Collective fruit* globose to slightly ovoid, up to $1\frac{1}{2}$ cm across, the sepals ultimately spreading; *fruits* up to 1 by $\frac{3}{4}$ mm, exocarp red when ripe, only a thin layer when dry; endocarp rugose.

Distribution: New Guinea, as yet only known from the Eastern part of Papua New Guinea.

Habitat: Shrubberies, forest borders, roadsides and similar places, also recorded from forest and from grassland; at altitudes from *c.* 1200 to *c.* 2600 m.

NEW GUINEA. Papua New Guinea. Morobe Dist.: Edie Creek, *Womersley NGF 24680, Womersley & van Royen NGF 5900, 5919.* — Western Highl. Dist.: Mt. Minmugl, *Borgmann 361.* — Central Dist.: Boridi, *Foreman & Vinas LAE 60267*; Lake Myola, *Croft NGF 34527*; Woitape-Kosipi, *van Royen NGF 20286.* — Northern Dist.: Yodda (= Mambare) River, *Carr 13912.* — Milne Bay Dist.: Mt. Suckling, *Stevens & Veldkamp LAE 54038.*

Note: This seems to be a distinct species, most closely related to *R. rosifolius*. Being much more glabrous in all parts than the latter species, it also reminds of *R. fraxinifolius*. The long-tapering leaflets and sepals, and the large number of sessile glands are its most distinctive features.

5. **Rubus ferdinandi-muelleri** Focke

R. ferdinandi-muelleri Focke, Abh. Naturw. Ver. Bremen 13 (1895) 165; van Royen, Phan. Monogr. 2 (1969) 21, fig. 2, pl. 1 — *R. ferdinandi* Focke, Bibl. Bot. 72 (1911) 162; Bot. Jahrb. 54 (1916) 71, *nom. superfl.* — Type: *MacGregor s.n.*; holo in MEL, not seen.

R. laeteviridis van Royen, Phan. Monogr. 2 (1969) 29, fig. 5. — Type: *Womersley & van Royen NGF 5901* (= *van Royen 4332*), holo in L.

R. woitapensis van Royen, Phan. Monogr. 2 (1969) 39, fig. 7. — Type: *van Royen NGF 20287*, holo in BISH.

Usually erect shrublets, sometimes scandent or scrambling, up to $1\frac{1}{2}$ m long. *Stems* varying from rather densely soft-hairy to quite glabrous, with usually rather many straight, slender, up to $1\frac{1}{2}$ cm long, reddish to purple spines. Scattered sessile red or yellow *glands* sometimes present on many parts of the plants. *Leaves* up to 13 cm long, imparipinnate, with 3 – 8(– 9) usually opposite pairs of leaflets, papyraceous to pergamentaceous. *Stipules* inserted at or slightly above the base on the petiole, linear to lanceolate, 3 – 10 by $\frac{1}{4}$ – 3 mm, persistent, acute to acuminate, entire or with few small teeth, sometimes with 1 or 2 glandular hairs on the margins, glabrous. *Petioles* 1 – $3\frac{1}{2}$ cm long, grooved above as are rachis and petiolules; lateral leaflets sessile or petiolule up to $1\frac{1}{2}$ mm long, of terminal leaflet up to 1 cm long; petiole, rachis and petiolules varying from rather densely soft-hairy to glabrous, petiole and rachis with spines as on the stems. *Blades* of leaflets ovate to elliptic, 1 – 4 by $\frac{1}{2}$ – 2 cm, terminal leaflet usually distinctly larger than upper lateral ones, up

to 5 cm long, base rounded to cuneate, margin serrate to biserrate with (6–)7–12(–18) teeth on each side, apex acute. *Leaflets* pinninerved with 5–9 pairs of lateral nerves, terminating in the margin, midrib and lateral nerves flat to distinctly impressed above, (rather) prominent below, venation visible underneath; upper surface glabrous or with short, appressed hairs between and parallel to the lateral nerves, lower surface glabrous or soft-hairy on the midrib and nerves, spines sometimes present on the midrib below; upper surface drying often distinctly darker than lower side. *Inflorescence* a terminal leafy thyrse with below the terminal flower one or two 3- to 1-flowered cymes in the axils of normal or reduced leaves (sometimes reduced to tripartite bracts), the entire inflorescence loosely branched, up to *c.* 5. cm long, with up to 7 flowers; *pedicels* and other axes up to 3 cm long, thin, hairy to glabrous, with spines as on the stems; bracts stipule-like or tripartite, up to 5 mm long, bracteoles on the pedicels of lateral flowers, usually not opposite, stipule-like or tripartite, up to 3 mm long. *Flowers* usually erect. *Hypanthium* saucer-shaped, *c.* 4 mm across, sparsely hairy to glabrous outside and with 1 to 5 red to purple spines alternating with the sepals, glabrous inside or with some hairs around the torus. *Sepals* narrowly triangular, 5–9 by $1\frac{1}{2}$–3 mm, acuminate or gradually narrowing to an up to 2 mm long point, entire, indumentum on the outside as on the hypanthium, shortly woolly on the margins covered in bud, shortly woolly inside except at apex. *Petals* falling early, obovate or elliptic to suborbicular, up to 9(–10) by 7 mm, as long as or slightly longer than sepals, not clawed, entire, apex rounded, glabrous or with few hairs at base, white. *Stamens* rather few, *c.* 30–35, glabrous; filaments up to 3 mm long; anthers *c.* $\frac{1}{2}$ mm long. *Pistils c.* 120–180; ovary *c.* 1 mm long, glabrous or dorsally with some hairs; style up to 2 mm long. *Torus* elevated, glabrous, with pistils down to the base. *Collective fruit* ovoid to subglobose, up to 1 cm across, the sepals ultimately spreading; *fruits c.* $1\frac{1}{2}$ by 1 mm; exocarp bright to dark red, not very juicy and only a thin layer when dry, endocarp rugose.

Distribution: New Guinea, New Britain.

Habitat: Clearings in forest, forest edges, streambanks, along tracks and roads; at altitudes from (1550–) 1800 to 3000 (–3465) m.

Vernacular names: *putiri* (Ialibu), *akare* (Finisterre), *momin*, *momani* (Mendi), *leek* (Wabag).

New Guinea. Irian Jaya. Vogelkop Peninsula: Mt. Nettoti, *van Royen & Sleumer 8160*. — Snow Mountains: Lake Habbema, *Brass 9132, 10574*; Mt. Hellwig, *Pulle 775, 947*; Carstensz Mts. (G. Jaya), *Hope ANU 16148, Raynal 17416*. — Papua New Guinea. W. Sepik Dist.: Telefomin Subdist., *Barker LAE 67555, Kalkman 5271*. — Madang Dist.: Finisterre Mts., *Sayers NGF 21348*. — Morobe Dist.: Edie Creek, *Hartley 11655, Sayers NGF 19955, Womersley NGF 24679*; Wau, *Womersley & van Royen NGF 5901, 5961, 5962, Womersley & Millar NGF 8715*; Mt. Kaindi, *Brass 29600, 29602, Fallen 382, van Royen NGF 16035*; Lae Subdist., *Katik & Taho NGF 37904*; Cromwell Mts., *Hoogland 9559*. — Western Highl. Dist.: Tomba, *Veldkamp & Stevens 5461, 5499*; Birip, *Henty NGF 20606*; Kubor Range, *Vink 16158*; Wabag Subdist., *Womersley NGF 11321*; Mt. Giluwe, *Womersley NGF 14248*. — Eastern Highl. Dist.: Mt. Wilhelm, *van Balgooy 205* (mixed with *R. papuanus*), *Brass 30465, 30642, Smith ANU 15187*; Okapa, *Henty NGF 10636*; Pengagl Creek, *Sayers & Millar NGF 19895*; Mt. Kerigomma, *Stevens & Grubb LAE 54677*; Marafunga, *Millar NGF 40703, Vandenberg & Womersley NGF 35008*; Kanawyroka Creek, *Millar & van Royen NGF 15980*; Nondugl, *van Royen NGF 19192*; Daulo Pass, *Quisumbing PNH 65841*; Goroka, *Womersley & Floyd NGF 6153*. — Southern Highl. Dist.: Ialibu Subdist., *Andrew LAE 57015, 57094, Womersley & Woolliams NGF 12399*; Mendi, *Womersley & Woolliams NGF 37056*; Tari Subdist., *Gillison NGF 25176, 25227, Kalkman 4878*; Mt. Ambua, *Frodin NGF 28279, Kalkman 5036, 5155, 5164*; Mt. Giluwe, *Schodde 2080*; Anga Valley, *Schodde 1518*. — Central Dist.: Mt. Tafa, *Brass 4940*; Mt. Victoria, *Croft & Larivita LAE 61682*; Murray Pass, *Ridsdale NGF 36962, van Royen NGF 30123*; Woitape-Kosipi, *Buderus NGF 20731, van Royen NFG 20287, 20291*.

— Northern Dist.: Mt. Kenive (Nisbet), *Croft LAE 65147*; Evi River, *Carr 13600*. — Milne Bay Dist.: Vitanen, *Cruttwell 1235*; Mt. Dayman, *Brass 23265*; Goropu Mts. (Mt. Suckling), *Veldkamp & Stevens 5595, 5737*.

BISMARCK ARCH. New Britain. Mt. Lululua, *Stevens & Isles LAE 58362, 58369*.

Notes: 1. A biosystematic study of the species complex here presented as consisting of the three species *R. ferdinandi-muelleri*, *R. papuanus* and *R. montis-wilhelmi*, would be highly rewarding and would disclose more of the relationships between and within the taxa than is possible with herbarium methods. The three species are obviously closely related; see also the notes to the other species. There is no information whatever on chromosome numbers. On herbarium evidence it is supposed that hybridization is possible and occurs in nature.

2. *Rubus ferdinandi-muelleri*, as conceived here, is a species with a variable indumentum, ranging from absent to rather dense, on twigs, leaves, hypanthium and sepals. One of us observed glabrous and hairy specimens growing together (*Kalkman 5155*, glabrous; *5164*, hairy), without seeing transitional plants. However, there are all degrees of variation to be observed in the herbarium and it does not seems possible to separate two taxa.

3. Van Royen (1969) separated *R. laeteviridis* (with flat leaves) from *R. ferdinandi-muelleri* (with bullate leaves). In our experience it is impossible to maintain this difference as a character separating two species. Included in the present species is also *R. woitapensis* van Royen, distinguished on the indumentum of the leaves only. A third species, kept separate by van Royen, is *R. keysseri* with deeply incised leaflets. The type of this species (*Keysser s.n.*) is lost and actually we think that it and other specimens of its kind represent introgressions from *R. montis-wilhelmi*. The species is, therefore, listed under doubtful species at the end of this treatment.

4. *Kalkman 4878 and 5164* deviate by *c.* 1 mm long glandular hairs on stems, petioles, rachis and pedicels.

5. Two specimens, *Kalkman 5155* and *5164*, were found to be in the possession of root-nodules. It cannot be proved that there are nitrogen-fixing bacteria in the nodules. Recently *R. ellipticus* was listed as possibly nitrogen-fixing (see note 4 under that species).

6. **Rubus papuanus** Schlechter ex Diels

R. papuanus Schlechter *ex* Diels, Bot. Jahrb. 62 (1929) 481; Merr. & Perry, J. Arn. Arb. 21 (1940) 182; van Royen, Phan. Monogr. 2 (1969) 26, fig. 4 — Type: *Keysser 36*; lost in B, neotype designated by van Royen, l.c.: *Brass 4246*, holo in BRI according to van Royen (not seen), iso in A (not seen).

Erect shrublets, sometimes semiscandent or scrambling up to 80 cm high. *Stems* rather densely to moderately soft-hairy, glabrescent, with a fair number of straight, slender, up to 1 cm long red spines. *Glands* (sub)sessile, red or yellow, often scattered on many parts of the plants. *Leaves* up to 10 cm long, imparipinnate, with 6–9(–10) opposite to sub-opposite pairs of leaflets, pergamentaceous. *Stipules* on the petiole, at base or slightly above it, oblong to linear-lanceolate, 4–9 by 1–3 mm, persistent, acute to acuminate, entire or with few small teeth, sometimes with 1 or 2 glandular hairs on the margins, glabrous. *Petioles* $\frac{1}{2}$–1(–$1\frac{1}{2}$) cm long, grooved above as are rachis and petiolules; lateral leaflets sessile or petiolule up to 1 (–$1\frac{1}{2}$) mm long, of terminal leaflet up to 5 mm long; petiole, rachis and petiolules with soft

hairs, glabrescent, petiole and rachis with usually rather many spines as on the stems. *Blades* of leaflets (broadly) ovate, 6–15 by 4–9 mm; base rounded to cuneate, margin rather deeply serrate with (3–)4–6(–7) teeth on each side, apex pointed to acuminate. *Leaflets* pinninerved with 3–5 pairs of lateral nerves, terminating in the margin, midrib and lateral nerves impressed to flat above, (rather) prominent below, venation hardly or not visible; both surfaces glabrous or almost so, sometimes sparsely puberulous on the midrib below, a spine sometimes present on the midrib below. *Inflorescence* terminal, usually consisting of only one flower, sometimes with in addition one or two flowers in the axils of the uppermost leaves; *pedicels* up to $2\frac{1}{2}$ cm long, soft-hairy and often with one or few spines; bracteoles absent. *Flowers* more or less pendulous. *Hypanthium* saucer-shaped, up to *c.* 6 mm across, sparsely soft-hairy to glabrous outside and with some spines, the largest ones (up to *c.* 1 cm) alternating with the sepals, inside glabrous or with few hairs. *Sepals* narrowly triangular, 6–11 by 2–4 mm, including the up to 3 mm long acumen, entire, glabrous or sparsely soft-hairy outside and shortly woolly on the margins covered in bud, inside shortly woolly, more or less glabrescent. *Petals* falling early, broadly obovate to orbicular, up to 15 (18 according to one field observation) by 12 mm, longer than the sepals, hardly clawed, entire, apex rounded or retuse, glabrous except for some hairs at base outside, white. *Stamens* not many, *c.* 35–50, glabrous; filaments up to 3 mm long; anthers *c.* $\frac{3}{4}$ mm long. *Pistils c.* 70–100; ovary *c.* 1 mm long, glabrous or dorsally with some few hairs; style up to $1\frac{1}{2}$ mm long. *Torus* elevated, glabrous, with pistils down to the base. *Collective fruit* ovoid, up to 2 by $1\frac{1}{2}$ cm, the sepals ultimately spreading; *fruits* up to $2\frac{1}{2}$ by $1\frac{1}{2}$ mm; exocarp bright red, fleshy in vivo, only a thin layer when dry; endocarp rugose.

Distribution: New Guinea, only collected in the Eastern part. In 1965 introduced in England (Grasmere, Westmorland) and there hardy outdoors.

Habitat: Subalpine and alpine shrubberies, grasslands, open places in forest and forest edges; at altitudes from 3000 to 3650 m.

Vernacular names: Only one recorded on herbarium labels: *mail kembra* (Chimbu).

NEW GUINEA. Papua New Guinea. W. Sepik Dist.: Mt. Scorpion, *Croft LAE 68013*; Mt. Capella, *Barker LAE 66947*. — Morobe Dist.: Salawaket Range, *Hoogland 9934*. — Western Highl. Dist.: Mt. Kinkain, *Vink 16116*; Mt. Kegum, *Vinas & Veldkamp LAE 59786*. — Eastern Highl. Dist.: Mt. Wilhelm, *van Balgooy 153, 414, 481, Philipson 3444, Stone 9845*; Mt. Kerigomma, *Stevens LAE 54563, Stevens & Grubb LAE 54675*; Mt. Michael, *Brass & Collins 31215*; Mt. Otto, *Johns & Noble NGF 47098*. — Southern Highl. Dist.: Mt. Ialibu, *Stevens & Foreman LAE 55903*; Mt. Ambua, *Kalkman 5051, 5061*; Mt. Kerewa, *Kalkman 4748*. — Central Dist.: Mt. Scratchley, *Stevens & Coode LAE 51470*.

Note: *R. papuanus* is closely related to *R. ferdinandi-muelleri* (see note 1 under that species). It may be only a high altitude form of the latter species, but since it can be separated by its smaller leaflets with fewer marginal teeth, it seemed appropriate to keep it as a separate species. Other characters (indumentum on the leaves, elaborateness of the inflorescence, dimensions of flowers) show differences too, but in these characters there are more transitions between the two species.

7. **Rubus montis-wilhelmi** van Royen

R. montis-wilhelmi van Royen, Phan. Monogr. 2 (1969) 19, fig. 1. — Type: *Millar & van Royen NGF 14645*, holo in L.

Erect shrublets, semiscandent to straggling when larger, up to 1(−1½) m high. *Stems* sparsely shortly hairy, glabrate, with a fair number of straight, slender, up to 1(−1½) cm long spines. *Glands* (sub)sessile, red or yellow, usually scattered on many parts of the plants. *Leaves* up to 12 cm long, bipinnate to pinnate (to the apex) or sometimes tripinnate (at very base), with 4−10 opposite or sub-opposite pairs of 1−3 cm long pinnae, each with 3−5 sub-opposite to alternate leaflets, pergamentaceous. *Stipules* at or shortly above base on petiole, linear-lanceolate, 5−12 by ½−1½ mm, persistent, acute, entire or with 1 or 2 teeth, subglabrous or glabrous, sometimes with 1 or 2 glandular hairs on margin. *Petioles* 1−3 cm long; petiole, rachis and rachilla flat to grooved above, with spines as on the stems, sparsely short-hairy to glabrous; petiolules of lateral leaflets up to 1 mm long, those of terminal leaflets 1−5 mm long. *Blades* of leaflets ovate to ovate-elliptic or elliptic-oblong, 2−10 by 1½−6 mm; base acute, margin serrate to deeply incised (pinnatipartite), apex usually acuminate. *Leaflets* pinninerved with 3−5 pairs of lateral nerves, terminating in the margin, midrib and lateral nerves flat to impressed above, midrib rather prominent below, nerves flat, venation widely reticulate, usually only visible below; both surfaces glabrous or with some short hairs, especially on midrib and nerves, a spine sometimes present on midrib below. *Inflorescence* a terminal leafy thyrse with below the terminal flower one or two 1- to 3-flowered cymes in the axils of leaves, the entire inflorescence loosely branched, up to *c.* 5 cm long, with up to 5 flowers; *pedicels* up to 2 cm long, thin, sparsely hairy and with spines; bracts up to 3 by 1 mm, linear. *Flowers* usually (sub)pendulous. *Hypanthium* saucer-shaped, up to *c.* 4½ mm across, sparsely and shortly hairy outside and with some straight and slender spines, the largest ones up to almost as long as and alternating with the sepals, glabrous inside. *Sepals* narrowly triangular, 5−9 by 2−3½ mm, gradually narrowing to a long point, entire, indumentum on the outside as on the hypanthium, and very shortly woolly on the margins covered in bud, shortly woolly inside except at the tips. *Petals* falling early, obovate to elliptic, up to 12 by 10 mm, longer than the sepals, not clawed, entire, apex rounded, glabrous, white. *Stamens* rather few, 25−35, glabrous; filaments up to 3 mm long; anthers ½−¾ mm long. *Pistils c.* 100−150, glabrous; ovary c. 1 mm long; style up to 1½ mm long. *Torus* elevated, glabrous, with pistils down to the base. *Collective fruit* ovoid to ellipsoid, up to 1 cm across, compact, the sepals ultimately spreading; *fruits c.* 1½ by 1 mm; exocarp (dark) red, not very juicy; endocarp rugose.

Distribution: New Guinea, only collected in the Eastern part.

Habitat: In and in the edges of subalpine and alpine shrubberies and forests; at altitudes from 2660 to 3660 m.

Vernacular names: Only one recorded on herbarium labels, *kilkailn mail* (Chimbu).

NEW GUINEA. Papua New Guinea. Western Highl. Dist.: Kubor Range, *Vink 16118, 16159.* — Eastern Highl. Dist.: Mt. Piora, *Henty & Carlquist NGF 16637*; Mt. Kerigomma, *Stevens & Grubb LAE 54663*; Mt. Wilhelm, many collections. — Southern Highl. Dist.: Mt. Ambua, *Kalkman 4963, 5000, 5035*; Mt. Ialibu, *Stevens & Foreman LAE 55828, 55905*; Mt. Giluwe, *Vandenberg c.s. NGF 39749.* — Central Dist.: Mt. Service, *van Royen 10886.*

Note: Typical *R. montis-wilhelmi* is easily recognized by its bipinnate leaves. It is closely related to *R. papuanus* and *R. ferdinandi-muelleri* and probably hybridizes in nature with both of them. At least there are several specimens in the herbarium

showing pinnate, bipinnate and transitional leaves. *R. keysseri* (see also note 3 under *R. ferdinandi-muelleri*) probably was based on specimens of a population of hybrid origin.

8. Rubus acuminatissimus Hasskarl

R. acuminatissimus Hassk., Tijdschr. Nat. Gesch. Phys. 10 (1843) 146, excl. syn. *R. moluccus parvifolius* Rumph.; Cat. Hort. Bog. (1844) 266; Flora 27 (1844) 585; Walp., Rep. 5 (1846) 649; Miq., Fl. Ind. Bat. 1, 1 (1855) 377; Focke, Bibl. Bot. 72 (1911) 149; Backer, Schoolfl. Java (1911) 452; Koord., Exk. Fl. Java 2 (1912) 328; Cardot, Bull. Mus. Hist. Nat. Paris 23 (1917) 293; Koorders, Fl. Tjibodas 2 (1923) 102; Backer & Bakh.*f.*, Fl. Java 1 (1964) 514. — T y p e: not indicated, possibly described from a living specimen in the Bogor Botanical Garden. In L, where the herbarium Hasskarl is kept, there is no specimen which could be considered with any confidence to be the type.

R. podocarpus Kuntze, Rev. Gen. Pl. 1 (1891) 223. — T y p e: *Kuntze 5350*; see Backer in Brittonia 3 (1938) 80; holotype in NY, isotypes seen from K and L. See note 1.

Climbing shrubs, sometimes erect? *Stems* up to 3 m long, glabrous, with rather many stout curved prickles of up to 6 mm long. *Leaves* trifoliolate or usually unifoliolate near and in the inflorescence (see note 3), thinly herbaceous. *Stipules* inserted on the petiole up to 4 mm above its base, long persistent, linear, 3 – 7 by up to 1 mm, entire, with some long hairs outside and on the margins. *Petioles* $1\frac{1}{2}$ – 5 cm long, grooved above; petiolules of lateral leaflets 1 – 5 mm long, those of terminal leaflets 10 – 40 mm long; petiole with some long hairs near the insertion of the petiolules and with curved prickles, lateral petiolules hairy, terminal petiolule glabrous except at base and apex, with prickles. *Blades* of leaflets elliptic to oblong, or rather ovate-oblong, the terminal leaflet 4 – 11 by 2 – 6 cm, the lateral leaflets smaller, 2 – 9 by 1 – 4 cm; base rounded, in unifoliolate leaves often slightly emarginate, in the lateral leaflets usually oblique, upper half of leaflets acute, margin serrate with 4 – 7 teeth per cm, apex acuminate. *Leaflets* pinninerved with 6 – 13 pairs of lateral nerves, terminating in the margin, midrib slightly impressed above, prominent below, lateral nerves almost flat above, slightly prominent below, venation visible below but not prominent; upper surface with patent hairs on midrib and nerves and sometimes with appressed hairs between the nerves, lower surface with prickles on the midrib, glabrous except sometimes some hairs on the larger nerves. *Inflorescence* a lax thyrse with below the terminal flower up to 5 cymes in the axils of 3- or 1-foliolate leaves or bracts, the cymes 1- or 2-, rarely 3-flowered, the richer ones sometimes with the lateral flowers in the axils of small leaves; *pedicels* and lower axes up to 5 cm long, glabrous, provided with curved prickles; bracts often tripartite, bracteoles usually 2 on the pedicel, up to 3 by 1 mm. *Hypanthium* saucer-shaped, 5 – 6 mm across, thick and hard, glabrous outside and inside, unarmed outside or more rarely with some few short straight prickles. *Sepals* triangular to narrowly ovate, 6 – 12 by 3 – 6 mm, after anthesis accrescent and up to 17 mm long, pointed, entire, glabrous outside except a woolly indumentum on the margins covered in bud, inside woolly in the upper part, thick and hard. *Petals* falling early, obovate, 12 – 15 by *c.* 8 mm, gradually narrowed at base, emarginate at apex, glabrous, except the ciliate undulate margin, white. *Stamens* 150 – 180, glabrous; filaments up to 5 mm long; anthers *c.* 1 mm long. *Pistils* more than 150, glabrous; ovary *c.* 1 mm long; style up to $2\frac{1}{2}$ mm long. *Torus* elevated, the basal part without pistils and stalk-like, the upper part swollen, entirely glabrous. *Collective fruit* globose to depressed globose, up to $1\frac{1}{2}$ cm diameter, the sepals ultimately recurved; *fruits c.* 2 by 1 mm when dry, the exocarp orange-red to red when ripe, as a thin membranous layer around the pyrene when dry; endocarp rugose.

Distribution: Sumatra, Java. According to Backer & Bakhuizen van den Brink (1964) in West and Central Java, but only specimens from West Java seen.

Habitat: Forest edges and lighter places in forest, at altitudes from 1600 to 2200 m in Java, reported from *c.* 1450 to 1700 m in Sumatra, according to Backer & Bakhuizen van den Brink (1964) descending to 700 m along watercourses.

Vernacular names: *hareu-eus*, like other brambles, in Sundanese; *pintjorinek* (West Sumatra).

JAVA. West. Mts. Gede-Pangrango, *Koorders 31632, Kuhl & van Hasselt s.n., Lörzing 1973, Sapiin (129), van Steenis 5187*; Mt. Tangkubanperahu, *Backer 30901, Docters van Leeuwen 11469, Holstvoogd 439, Korthals s.n., Kuntze 5350*; Mt. Burangrang, *Backer 14190*; Mt. Patuha, *Backer 12587, Hildebrand E 359*; Mt. Masigit, *Lörzing 1230*; Mt. Kendang, *Scheffer 19918*; Mt. Tilu, *Scheffer (56)*; Bandung, *Docters van Leeuwen s.n.*: Mt. Papandayan, *Backer 5541*; Mt. Mandalagiri, *Lam 76.*

SUMATRA. Aceh. Mt. Ketambe, *de Wilde c.s. 13713*; Blang Kejeren, *van Steenis 9353*; Tretet, *Bangham 879.* — North. Berastagi, *Yates 1525.* — West. Mt. Gombak, *Bünnemeijer 5630.*

Notes: 1. Kuntze mis-interpreted Hasskarl's *R. acuminatissimus* and placed this name in the synonymy of *R. fraxinifolius* (under *R. rosifolius* var. α *fraxinifolia*'). At the same time he described *R. podocarpus*. Although a type-specimen is missing for *R. acuminatissimus*, there is no doubt that *R. podocarpus* is synonymous with it.

2. According to van Steenis (5187) the fruits remain hard for a long time and soften very late. They are reported by various collectors as edible, tasty, or 'not bad'.

3. Backer (1911) states that the lower leaves are exceptionally 5-foliolate. This was not seen in the herbarium specimens examined. One wonders whether it could be due to hybridization with *R. fraxinifolius*.

9. **Rubus banghamii** Merrill

R. banghamii Merr., Contr. Arn. Arb. 8 (1934) 68, pl. III. — Type: *Bangham 1163*; holo in A, isotype seen from SING.

Semi-scandent shrubs. *Stems* glabrous, with rather few curved prickles up to 5 mm long. *Leaves* 3-foliolate, those in the inflorescences unifoliolate (and lobed), herbaceous. *Stipules* inserted on the petiole, just above its base, long persistent, up to 12 mm long, deeply 3- to 8-laciniate, the lobes up to ½ mm wide, glabrous. *Petioles* 1½ – 4 cm long, grooved above; petiolules of lateral leaflets 2 – 10 mm, those of terminal leaflets little longer, up to 15 mm; petiole glabrous, petiolules shortly hairy above, some prickles on the back of the petiole and the terminal petiolule. *Blades* ± elliptic, the terminal leaflet 8 – 10 by 4 – 5 cm, the lateral leaflets slightly smaller, 6 – 8 by 2½ – 4 cm; base acute, in the lateral leaflets oblique, margin serrate with 2 – 4 teeth per cm, apex acuminate. *Leaflets* pinninerved with 8 – 12 pairs of lateral nerves, terminating in the margin, midrib slightly impressed above, prominent below, lateral nerves almost flat above, rather prominent below, venation visible below, but not conspicuous; upper surface glabrous except for short semi-patent hairs on the midrib, lower surface glabrous (at least in mature leaves). *Inflorescence* a lax leafy thyrse with below the terminal flower in axils of leaves (lower ones) or bracts (upper ones) up to 6 dichasia of up to 3(–6) flowers; *pedicels* and peduncles of the dichasia up to 6 cm long, glabrous, unarmed; bracts and bracteoles entire or resembling the stipules. *Hypanthium* saucer-shaped, *c.* 7 mm across (in fruit), outside glabrous and unarmed, glabrous inside except long hairs around the torus. *Sepals* triangular to triangular-ovate, 9 – 17 by 5 – 8 mm, pointed, entire, glabrous outside except a woolly indumentum on the margins covered in bud, woolly inside.

Petals not present in the fruiting stage, not seen. *Stamens* c. 50, glabrous; filaments up to 7 mm long; anthers c. 1 mm long. *Pistils* c. 35, glabrous; ovary not seen; style up to 5 mm long. *Torus* elevated, densely long-hairy. *Collective fruit* ± ovoid, c. $1\frac{1}{2}$ cm diameter, the sepals ultimately spreading; *fruits* glabrous, the exocarp red in vivo, present as a thin membranous layer when dry; pyrene 3–4 by $2-2\frac{1}{2}$ mm, endocarp rugose.

Distribution: Only known from the type, collected in Sumatra.
Habitat: Primary forest, between 1250 and 1400 m altitude.

SUMATRA. North. Tapanuli, *Bangham 1163*. And see note 2.

Notes: 1. The species is obviously insufficiently known. Most related are *R. lowii* and *R. acuminatissimus*, but it differs from both in the laciniate stipules. From *R. acuminatissimus* it differs in some more characters, e.g. in having far fewer pistils on a hairy not-stalked torus.

2. *Meijer 7271* from the Mt. Kerinci region (1500–2000 m alt.) in West Sumatra may belong to *R. banghamii* but its leaves are partly 5-foliolate, which is not the case in the type specimen. Since the stipules in *Meijer 7271* are entire to pinnatifid, not deeply laciniate, its identification remains uncertain for the moment.

10. **Rubus copelandii** Merrill

R. copelandii Merr., Philip. J. Sc. 1 (1906) Suppl. 3, 194 ('*copelandi*'); Elmer, Leafl. Philip. Bot. 2 (1908) 457; Focke, Bibl. Bot. 72 (1910) 33; Merr., Enum. Philip. Flow. Pl. 2 (1923) 227. — Type: *Merrill 4810*, from Luzon; holotype destroyed, isotype seen from B.

Climbing or sprawling shrubs. *Stems* up to 4 m long, with many straight to curved up to 5 mm long prickles and with spine-like capitate hairs, otherwise glabrous. *Leaves* trifoliolate, herbaceous, those in the inflorescence and those at the base of the lateral branches often unifoliolate and sometimes lobed. *Stipules* inserted on the petiole at its very base, long persistent, oblong, 7–15 by 2–7 mm, base narrowed, apex acute to acuminate, margin entire or with some teeth near the apex, with spine-like capitate hairs on the margin (and sometimes also on the outside), otherwise glabrous. *Petioles* $2\frac{1}{2}-6\frac{1}{2}$ cm long, grooved above; petiolules of lateral leaflets 1–3 mm, those of terminal leaflets (5–)15–25 mm long; petiole near apex with some short patent hairs, petiolules densely short-hairy above, petiole and petiolule of terminal leaflet with curved prickles and capitate spine-like hairs on the backside. *Blades* ovate, the terminal leaflet 4–10 by 3–7 cm, the lateral leaflets 3–9 by 2–5 cm; base rounded to broadly cuneate, sometimes slightly emarginate (especially in unifoliolate leaves), the lateral leaflets sometimes with distinctly oblique base, apex acute to acuminate, margin serrate to biserrate with 5–8 teeth per cm. *Leaflets* pinninerved with 9–12 pairs of lateral nerves, terminating in the margin, midrib and lateral nerves flat to slightly impressed above, rather prominent below, venation transverse, invisible above, distinct below but not prominent; upper surface shortly patent-hairy on midrib and nerves, and with long appressed hairs between the nerves, lower surface glabrous except sometimes some hairs near the petiolule, also with some curved prickles on the midrib (and sometimes the larger nerves) below. *Inflorescence* a lax leafy thyrse, consisting of a terminal flower and up to 3 axillary dichasia of up to 5 flowers below it; *pedicels* and other axes in the

inflorescence up to 6 cm long, with curved prickles and spine-like capitate hairs; bracts and bracteoles stipule-like but sometimes 3-partite. *Hypanthium* saucer-shaped, *c.* 5 mm across, glabrous outside but with straight prickles and capitate spine-like hairs, glabrous inside except some hairs around the torus. *Sepals* triangular to ovate, 7–11 by 3–5 mm, only slightly growing after anthesis, acuminate, entire, the parts covered in bud outside with a woolly indumentum, the exposed parts glabrous but with straight prickles and capitate spine-like hairs like on the hypanthium, inside woolly. *Petals* falling early, broadly elliptic to obovate, indistinctly clawed, longer than the sepals, 9–12 by 7–9 mm, apex rounded, sometimes with short hairs at the base inside and ciliolate, white. *Stamens c.* 80–100, glabrous; filaments up to 5 mm long; anthers *c.* 1 mm long. *Pistils* over 100, glabrous; ovary *c.* 1 mm long; style up to 2 mm long. *Torus* elevated, glabrous. *Collective fruits* ovoid, up to 2 by 1 cm, sepals spreading; *fruits* up to 2 by $1\frac{1}{2}$ mm, the exocarp dark red in vivo, a thin membranous layer in sicco; pyrene with distinctly rugose endocarp.

Distribution: Philippines, only known from some mountains in Luzon.

Habitat: More or less open places in forest, forest borders, thickets; at altitudes between 1700 and 2450 m.

PHILIPPINES. Luzon. Mt. Pulog, *Celestinó PNH 4302*, *Jacobs 7065*; Mt. Polis, *Britton 280* (in L mixed with *R. fraxinifolius*), *Ramos & Edaño BS 37615*; Mt. Sinapsapan, *Ramos & Edaño BS 40467*; Pauai, *Mearns BS 4309*, *Merrill 4810*; Benguet *s. loc.*, *Merrill BS 860*.

Note: According to *Jacobs* (*7065*) a vigorous grower, seen to colonize a newly bulldozed road by means of root suckers.

11. **Rubus lowii** Stapf.

R. lowii Stapf in Hook., Ic. Plant. 23 (1894) t. 2289; Trans. Linn. Soc. Bot. 4 (1894) 145; Focke, Bibl. Bot. 72 (1911) 144. — Type: *Low s.n.*, from Mt. Kinabalu; holo in K.

Scrambling or climbing shrubs. *Stems* up to 6 m long, rather densely hairy, glabrate; the hairs appressed to patent, partly straight, partly curly. Prickles absent, only by exception some curved up to 2 mm long prickles on stem and petiole. *Gland*-tipped hairs and (sub)sessile glands sometimes present on all parts of the plant up to the sepals. *Leaves* trifoliolate, the upper ones sometimes bi- or unifoliolate, coriaceous. *Stipules* at or up to 3 mm above the base on the petiole, long persistent, lanceolate, 6–13 by $1\frac{1}{2}$–5 mm, base narrowed, apex acute, margin entire or rarely with 1 or 2 small teeth, glabrous except base and margin. *Petioles* $\frac{3}{4}$–2 cm long, narrowly grooved above; petiolules of lateral leaflets 0–3 mm, those of terminal leaflets 1–3 mm; petiole and petiolules with semi-appressed to patent hairs, the hairs straight to curly. *Blades* elliptic to elliptic-ovate, sometimes ± rhomboid, the terminal leaflet 2–7 by 1–4 cm, the lateral leaflets $1\frac{1}{2}$–6 by 1–$3\frac{1}{2}$ cm; base of terminal leaflet acute, lateral leaflets usually oblique with the base rounded on the lower side, acute on the upper side, apex of leaflets acute to acuminate, margin serrate with 4–6 teeth per cm. *Leaflets* pinninerved with 5–8 pairs of lateral nerves, terminating in the margin, midrib impressed above, prominent below, nerves slightly impressed to flat above, (slightly) prominent below, the basal side nerve at the rounded side of the lateral leaflet with some basiscopic laterals, venation usually not conspicuous, ± transverse; both sides of the leaflets with long

straight hairs on midrib and larger nerves, the hairs semi-appressed below, patent to semi-appressed above, the upper surface rarely also with hairs between the nerves. *Inflorescence* a leafy thyrse with below the terminal flower up to 4 axillary cymes of 1 – 3(– 4) flowers; *pedicels* up to 3 cm long, hairy; bracts and bracteoles stipule-like, up to 11 by 7 mm. *Hypanthium* saucer-shaped, *c.* 6 mm across, appressedly short-hairy outside, densely hairy inside except the margin. *Sepals* triangular to ovate, 8 – 11 by 4 – 6 mm in anthesis, slightly growing afterwards to *c.* 13 mm, caudate with an acumen of up to 3 mm long, margin entire; outer sepals sometimes with one short tooth near the apex on either side; outside sparsely patently hairy except the margins covered in bud which bear a woolly indumentum, inside woolly. *Petals* obovate to suborbicular, not clawed, 6 – 7 by 4 – 5½ mm, always distinctly shorter than the sepals, persistent after anthesis, rounded, glabrous, white (sometimes pinkish?). *Stamens* 30 – 45, glabrous; filaments up to 5 mm long; anthers *c.* 1 mm long. *Pistils* 15 – 25; ovary *c.* 1½ mm long, glabrous; style up to 6 mm long, glabrous. *Torus* slightly elevated, hairy. *Collective fruit* ovoid, *c.* 1½ by 1 cm; *fruits* up to 4 by 3 mm, exocarp fleshy, red (few data only), a tough layer when dry; pyrene up to 4 by 2½ mm, endocarp rugose.

Distribution: Borneo, only known from Mt. Kinabalu in Sabah.

Habitat: In open forest, forest edges, shrubberies; at altitudes from 3000 to 3960 m.

BORNEO. Sabah. Mt. Kinabalu, *Anderson S 27087, Campbell NB 1, Carr SF 27609, Chew & Corner RSNB 5956, Clemens 10642, 28939, 29860, 51522, Collenette 808, Flenley 154, Haviland 1082, Low s.n., Meijer SAN 24143, Rao c.s. 63, Sinclair c.s. 9133, J. M. B. Smith 475, Smythies 10637.*

12. **Rubus archboldianus** Merrill & Perry

R. archboldianus Merr. & Perry, J. Arn. Arb. 21 (1940) 180; van Royen, Phan. Monogr. 2 (1969) 57. — Type: *Brass 4565*; holo in A not seen, iso seen from BO.

Scandent or scrambling shrubs, up to 5 m high. *Stems* with patent to semi-appressed long hairs, glabrate to various degree, and with curved up to 2 mm long often purplish prickles. Very shortly stalked or sessile red *glands* sometimes present on all parts of the plants including hypanthium and sepals. *Leaves* trifoliolate, the upper ones sometimes simple and then sometimes lobed on one or both sides, coriaceous, in vivo paler green benath. *Stipules* inserted on the junction of stem and petiole, long persistent, 4 – 15 mm long, deeply divided into up to 6 linear lobes, hairy outside, (sub)glabrous inside. *Petioles* 1 – 4 cm long, grooved above as are the petiolules of the terminal and lateral leaflets, respectively 3 – 10 and 1 – 5 mm long, petioles and petiolules densely covered with long patent to semi-appressed hairs and with prickles as on the stem. *Blade* of terminal leaflet elliptic, ovate-elliptic or obovate-elliptic, sometimes deltoid or rhomboid, 1½ – 12 by 2 – 6½ cm, lateral leaflets usually elliptic, often oblique, 1 – 5½ by 1 – 4 cm; base of leaflets usually acute, sometimes rounded, apex obtuse to acute or sometimes acuminate, margin serrate with 4 – 7 teeth per cm. *Leaflets* pinninerved with 5 – 10(– 12) pairs of lateral nerves terminating in the margin, midrib and lateral nerves impressed above, prominent below, venation ± transverse, not very conspicuous; upper surface more or less densely covered with long semi-appressed hairs on and between the nerves, lower side less densely hairy, the hairs mainly on the nerves, and also with some small prickles. *Inflorescence* a few-flowered thyrse composed of a terminal flower

and 1 or 2 cymes of 1 – 2 flowers in the axils of (reduced) leaves or bracts; *pedicels* up to 4 cm long, appressed-hairy and with some small curved to straight prickles; bracts and bracteoles stipule-like. *Hypanthium* saucer-shaped, up to 15 mm across in anthesis, the outside densely covered with appressed to semi-patent long hairs, and with many straight up to 5 mm long prickles, inside glabrous except a ring of hairs around the torus. *Sepals* ovate to triangular, 12 – 18 by 6 – 10 mm, erect in anthesis, accrescent after anthesis, caudate, the exposed margins with up to 15 slender teeth of up to 7 mm length, the covered margins entire or dentate near apex only, outside long-hairy and in the basal central part with prickles like the hypanthium, the covered parts short-woolly, inside densely woolly, the sepals often recorded as (partly) purplish or reddish in vivo. *Petals* falling early, obovate or spathulate with a distinct claw, about as long as the sepals or shorter, 11 – 18 by 7 – 10 mm, on the inside sometimes with few hairs, (orange or pinkish) red. *Stamens* 50 – 75, glabrous; filaments up to 10 mm long; anthers up to $1\frac{1}{2}$ mm long. *Pistils* 35 – 90; ovary *c.* 2 mm long, long-hairy in upper part; style up to 7 mm long, densely hairy at base. *Torus* elevated, glabrous. *Collective fruit* depressed ovoid, up to *c.* $2\frac{1}{2}$ cm across when ripe; *fruits* 4 – 5 by 2 – $2\frac{1}{2}$ mm, with a juicy exocarp, dark red when ripe and with a silky shine caused by the persistent long hairs, endocarp dorsally keeled and faintly ± longitudinally ridged.

Distribution: New Guinea, all over the Eastern half of the island, probably also in Irian Jaya but not collected thusfar.

Habitat: In and along edges of different kinds of mountain forest and in shrubberies; 1800 – 3600 m altitude, on Mt. Wilhelm collected at 4340 m.

Vernacular names: *diganbol, dilgan* (Minj), *iki-limbu* (Enga), *kasowanaja, kumbulendegap* (Hagen), *mail, mail nggogl, mekankigan, mugankigan* (Chimbu), *ongoburunanehra, gongobuna* (Mairi), *paowanawa* (Kefamo).

NEW GUINEA. Papua New Guinea. West Sepik Dist.: Mt. Amdutakin, *Kalkman 5276*. — Morobe Dist.: Salawaket Range, *Hartley 11206, van Royen NGF 16145*; Mt. Kaindi, *Fallen 377, Womersley NGF 24510*; Edie Creek, *Kairo & Streimann NGF 30884, Sayers NGF 19996*; Lae Subdist., *Katik & Taho NGF 37906*; Wau, *Fallen 542*. — Western Highl. Dist.: Kubor Range, *Vink 16157*; Wabag, *Flenley ANU 2789*; Mt. Hagen, *Stevens LAE 50271, Wheeler ANU 6118*. — Eastern Highl. Dist.: Minj, *van Royen NGF 18146*; Goroka, *Hoogland & Pullen 5460, 5537*; Marafunga, *Womersley NGF 24589*; Chimbu, *Millar & Sayers NGF 23694*; Mt. Wilhelm, many collections; Mt. Piora, *Croft & Akakavara LAE 68151*. — Southern Highl. Dist.: Tari, *Frodin NGF 28121, Gillison NGF 25213, Kalkman 4672, 5013, 5037, Vink 17515*; Mendi, *Vandenberg, Katik & Kairo NGF 39738*; Ialibu, *Rau 151, Stevens & Foreman LAE 55835, Womersley & Woolliams NGF 12395*; Mt. Giluwe, *Croft c.s. LAE 60745*. — Central Dist.: Wharton Range, *Brass 4565, van Royen NGF 30024*; Murray Pass, *Ridsdale & Woods NGF 36931*; Goilala, *Foreman & Lelean NGF 48374*. — Northern Dist.: Mt. Kenive, *Croft c.s. LAE 65066*. — Milne Bay Dist.: Mt. Ganaina, *Crutwell 1285*.

Note: The fruits are edible, with pleasant sourish taste and fragrancy, according to several collectors.

13. **Rubus lorentzianus** Pulle

R. lorentzianus Pulle, Nova Guinea 8 (1912) 647; Merrill & Perry, J. Arn. Arb. 21 (1940) 181; van Royen, Phan. Monogr. 2 (1969) 54. — Type: *von Römer 1276*; holo in BO, iso seen from L.

Scrambling or climbing shrubs, up to 4 m high, but often much smaller. *Stems* with long patent straight to curly hairs, glabrate to various degree, with many straight stout up to 9 mm long red prickles. *Glandular hairs* up to 1 mm long rarely

occurring on stems and petioles, very shortly stalked to sessile red glands sometimes on all parts up to the sepals. *Leaves* trifoliolate, the upper ones sometimes simple and then sometimes lobed on one or both sides, very stiff coriaceous. *Stipules* at or a few mm above the base on the petiole, long persistent, ovate to lanceolate, usually oblique, 10 – 18 by 3 – 15 mm, base narrowed, apex acute to caudate, margin entire or finely to coarsely and irregularly serrate, glabrous except at base, hard and distinctly veined, sometimes with a few prickles outside. *Petioles* 1 – 5 cm long, grooved above; petiolules 1 – 10 mm long, those of the terminal leaflets (slightly) longer than the lateral ones, also grooved; petiole and petiolules with long straight to curly hairs, prickles as on the stem. *Blade* of terminal leaflet obovate, 2 – 7 by $1\frac{1}{2}$ – $3\frac{1}{2}$ cm, lateral leaflets broadly obovate to elliptic-obovate or suborbicular, 2 – $4\frac{1}{2}$ by $1\frac{1}{2}$ – 3 cm; base of leaflets acute to rounded, apex rounded, very rarely acute or acuminate, margin (coarsely) serrate with 4 – 6 teeth per cm, the blade often folded along the midrib. *Leaflets* pinninerved with 4 – 8 pairs of lateral nerves, terminating in the margin, midrib and lateral nerves impressed above, prominent below, venation inconspicuous, ± transverse; both sides slightly hairy on midrib and nerves, the hairs short, semi-appressed, often quite disappearing with age, midrib and nerves below with rather many large prickles as on the stem. *Inflorescence* a thyrse consisting of a terminal flower and with up to 4 cymes of 1 – 3 flowers, partly in the axils of leaves or the upper ones in the axils of bracts, the whole inflorescence usually having less than 8 flowers; *pedicels* up to 3 cm long, hairy and with some prickles; bracts and bracteoles stipule-like. *Hypanthium* saucer-shaped, up to *c.* 7 mm across in anthesis, outside short-hairy and with many up to 5 mm long straight prickles, inside glabrous except a ring of hairs around the torus. *Sepals* ovate to triangular, 9 – 14 by 5 – 8 mm, erect in anthesis, caudate, entire, outside rather sparsely short-hairy and woolly on the parts covered in bud, with many long prickles, inside woolly. *Petals* obovate to suborbicular, shorter than or as long as the sepals, 8 – 11 by $6\frac{1}{2}$ – 9 mm, not clawed, rounded, glabrous, white. *Stamens* 30 – 45, glabrous; filaments up to 5 mm long; anthers *c.* 1 mm long. *Pistils* 15 – 45; ovary *c.* $1\frac{1}{2}$ mm long, glabrous; style up to 4 mm long, glabrous. *Torus* elevated, hairy. *Collective fruit* ovoid, up to $1\frac{1}{2}$ cm across when ripe; *fruits* up to $4\frac{1}{2}$ by 3 mm, with a fleshy exocarp, orange to red when ripe; pyrene up to *c.* $3\frac{1}{2}$ mm long, endocarp rugose.

Distribution: New Guinea.

Habitat: Forest edges, openings in forest, shrubberies, sometimes in grassland; at altitudes from 2200 to 3650 m, once collected at 3890 m (G. Jaya).

Vernacular names: *igabut* (Mendi), *igik* (Enga), *mail kama* (Chimbu).

NEW GUINEA. Irian Jaya. Snow Mts. Hellwig Mts, *Pulle 580, 921, von Römer 1276*; Lake Habbema, *Brass 9131, 10632, 10980, 11262*; G. Jaya (Carstensz Mts.), *Hope ANU 16011*. — Papua New Guinea. West Sepik Dist.: Mt. Capella, *Barker & Umba LAE 67369*; Mt. Scorpion, *Croft LAE 68012*. — Madang Dist.: Finisterre Mts., *Sayers NGF 21431*. Western Highl. Dist.: Mt. Sugarloaf, *Hoogland & Schodde 7064*; Mt. Kegum, *Veldkamp 7580*. — Eastern Highl. Dist.: Mt. Wilhelm, several collections; Mt. Otto, *Johns & Noble NGF 47127*; Mt. Kerigomma, *Stevens LAE 54562*. — Southern Highl. Dist.: Tari, *Kalkman 4749, 4926, 4948, 4957, 4964, 5015, 5039*; Mt. Giluwe, *Coode c.s. NGF 40266, Stevens & Foreman LAE 52264, Vandenberg c.s. NGF 39760*; Mt. Ialibu, *Stevens & Foreman LAE 55901*.

Note: Fruit only once recorded to be 'palatable', obviously not very juicy.

14. Rubus macgregorii F. von Mueller

R. macgregorii F. v. M., Trans. Roy. Soc. Vict. 1, 2 (1889) 4; Focke, Bot. Jahrb. 54 (1916) 72; van Steenis, Bull. Jard. Bot. Buitenz. III, 13 (1934) 245; Merr. & Perry, J. Arn. Arb. 21 (1940) 179; van Royen, Phan. Monogr. 2 (1969) 52. — T y p e: *McGregor s.n.*, from Mt. Victoria; holo in MEL (not seen).

Creeping or scrambling small shrubs. *Stems* with a usually sparse cover of soft, patent hairs, glabrate, and with rather few curved up to 2(−4) mm long prickles. *Glands* shortly stalked to subsessile, red, on all parts of the plants up to the sepals. *Leaves* trifoliolate, the upper ones simple and often 3-lobed (see note 1), stiff coriaceous. *Stipules* usually at the very base on the petiole, long persistent, elliptic to elliptic-lanceolate, 5 − 12 by 1 − 5 mm, base narrowed, apex acuminate to caudate, margin entire or with up to 4 teeth on either side, glabrous except at base and margin. *Petioles* 1 − 5 cm long, grooved above; petiolules also grooved, those of lateral leaflets up to 1½ mm long, those of terminal leaflets up to 4 mm; petiole and petiolules with patent to semi-appressed hairs, and with some prickles as on the stem. *Blades* obovate to elliptic, the terminal leaflets 1½ − 3½ by 1 − 2½ cm, the lateral leaflets smaller, often oblique, 1 − 2½ by 1 − 2 cm; base of leaflets usually narrowed, apex rounded, with or without a short acumen, margin serrate with 4 − 5 teeth per cm. *Leaflets* pinninerved with 4 − 7 pairs of lateral nerves terminating in the margin, midrib and lateral nerves impressed above, prominent below, venation ± transverse, not conspicuous in sicco; both sides very sparsely semi-appressedly hairy on midrib and larger nerves, the indumentum often entirely disappearing with age or almost so, some prickles on the midrib (and large nerves) below. *Inflorescence* few-flowered, often consisting of only one terminal flower, sometimes 1 or 2 flowers below the terminal one; *pedicels* up to 2 cm long, hairy and with some curved prickles; bracts and bracteoles, where present, stipule-like. *Hypanthium* saucer-shaped, 5 − 6 mm across in anthesis, with sparse appressed hairs outside and with some straight less than 1 mm long prickles, hairy inside. *Sepals* ovate to triangular, 8 − 12 by 5 − 7 mm in anthesis, accrescent afterwards and up to 15 mm long, acuminate to caudate, the acumen up to 4 mm long, margin entire, outside appressed long-hairy on the exposed parts, the margins covered in bud woolly as is the inside, sometimes with one or few very small straight prickles outside. *Petals* obovate to orbicular, not clawed, 8 − 9 by 7 − 8½ mm, shorter than to as long as the sepals, rounded, glabrous, white. *Stamens* 40 − 50, glabrous; filaments up to 4 mm long; anthers *c.* 1 mm long. *Pistils* 30 − 40; ovary *c.* 1 mm long, long patently hairy on the backside and at the top; style up to 3½ mm long, with hairs at base. *Torus* elevated, hairy. *Collective fruit* ovoid, up to 2 cm across when ripe; *fruits* up to 4 by 3 mm, with a fleshy exocarp drying as a thin layer, still with some hairs especially on top, possibly purple when ripe (but almost no data); pyrene up to 3 mm long, endocarp rugose.

D i s t r i b u t i o n: Celebes (one collection only), Papua New Guinea (only known from some mountains in its Eastern part).

H a b i t a t: Mainly collected in shrubberies in grassland, at altitudes from 2600 to 3600 m.

CELEBES. S o u t h. Mt. Rantemario, *Kjellberg 3871.*

NEW GUINEA. P a p u a N e w G u i n e a. Eastern Highl. Dist.: Mt. Piora, *Henty & Carlquist NGF 16640.* — Central Dist.: Mt. Victoria, *Craven 2861, Croft LAE 61609, van Royen 10798*; Mt. Scratchley, *Stevens & Coode LAE 51483*; Mt. Strong, *Coode & Stevens NGF 46249*; Mt. Albert Edward, *Brass 4312.*

N o t e s: 1. There is some indication that the leaves may sometimes be digitately 5-foliolate. In *Croft LAE 61609* there is (in the L duplicate) a thick main stem of *c.* 5 mm thick, on which the leaves have lateral leaflets which are basally lobed to various degree. The leaves on the flowering shoots of this collection are 3-foliolate.

2. The single specimen from Celebes differs from the Papua New Guinea material only in details: less prickly, more hairy leaflets.

15. Rubus alpestris Blume

R. alpestris Bl., Bijdr. (1827) 1108; G. Don, Gen. Syst. 2 (1832) 536; Walp., Repert. 2 (1843) 19; Miq., Fl. Ind. Bat. 1, 1 (1855) 378; Hook.*f.*, Fl. Brit. India 2 (1878) 332, *excl. syn. R. pentagonus* Wall. *ex* Focke; Kuntze, Rev. Gen. Pl. 1 (1891) 219; Stapf, Trans. Linn. Soc. Bot. 4 (1894) 145, excl. the Himalayan form; Focke, Bibl. Bot. 72 (1911) 144; Backer, Schoolfl. Java (1911) 451; Koord., Exk. Fl. Java 2 (1912) 326; Fl. Tjibodas 2 (1923) 103; Backer & Bakh.*f.*, Fl. Java 1 (1964) 514; Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 36; Fl. Thail. 2 (1970) 52; van Steenis, Mount. Fl. Java (1972) pl. 45 – 1. — T y p e: *Blume 407*, holo in L.

R. alpestris Bl. α *normalis* Kuntze, l.c., excl. Sikkim record. — T y p e: *Kuntze* specimen from Java, Mt Gede; holo in NY, not seen.

R. alpestris Bl. β *glutinosus* Kuntze, l.c. — T y p e: *Kuntze* specimen from Java, Dieng Mts.; holo in NY, not seen.

Erect or climbing shrubs, up to 4 m high. *Stems* sparsely hairy when young, soon glabrous (more densely hairy in Borneo, see note 2), with usually rather few up to 7 mm long curved to straight prickles, and with many to few short (less than 1 mm) capitate *glandular hairs*. *Leaves* palmately (sometimes more or less distinctly pedately) 5-foliolate, the upper ones often 3-foliolate, papyraceous to pergamentaceous. *Stipules* inserted at or some mm above the base on the petiole, long persistent, linear to linear-lanceolate, 4 – 12 by $\frac{1}{2}$ – 2 mm (larger and ovate in Celebes and the Moluccas, see note 3), entire or with some small teeth, sparsely hairy and with some capitate hairs. *Petioles* (1 –)2 – 5 cm long, grooved above; petiolule of terminal leaflet 2 – 5 mm, the lateral leaflets usually sessile or sometimes with up to 2 mm long petiolule; petiole usually glabrous except near apex, sometimes (Borneo) more densely hairy, with capitate hairs, petiolules patently hairy on upper surface. *Blades* oblong, rarely obovate-oblong, the terminal leaflets (4 –)6 – 14 by 2 – 4 cm, the lateral leaflets smaller; base acute, in the basal leaflets sometimes slightly oblique, margin serrate to biserrate with 4 – 7 teeth per cm, apex acuminate to caudate. *Leaflets* pinninerved with 9 – 17 pairs of lateral nerves, terminating in the margin, midrib and lateral nerves slightly impressed above, (rather) prominent below, venation transverse, not prominent but usually visible at least below; upper surface normally only with patent hairs on the midrib, sometimes (Borneo) also on the nerves and between them, lower surface (semi-)appressedly hairy on (sometimes also between) midrib and nerves, sometimes with small prickles and with capitate hairs on midrib. *Inflorescences* in the axils of the upper 1 – 3 leaves, the apex of the flowering twig usually(?) aborted, dichasial with up to 6 flowers but often with only one; peduncle up to 5 cm, *pedicels* up to 3 cm long, sparsely pubescent and with capitate hairs; bracts and bracteoles elliptic to lanceolate, up to *c.* 12 mm long, often toothed, glabrous to sparsely hairy, the margins often with capitate hairs. *Hypanthium* saucer-shaped, 6 – 8 mm across, outside (almost) glabrous to sparsely hairy and with some capitate hairs, inside glabrous except around the torus. *Sepals* ovate-triangular to narrowly triangular, 10 – 15(– 17) by $2\frac{1}{2}$ – 6 mm, acuminate to long-caudate (acumen up to 6 mm), entire or the outer ones with one or two up to 2

mm long marginal teeth, outside with some appressed hairs and some capitate hairs, the covered margins shortly woolly, inside densely shortly woolly at least in the lower part. *Petals* falling early, orbicular to elliptic, much smaller than the sepals, 6 – 7 by 5 – 6 mm, inside with some hairs, light green to white or pale red (see note 3). *Stamens* c. 50 – 60, glabrous; filaments up to 4 mm long; anthers 1 – 1½ mm long. *Pistils* 15 – 25; ovary c. 1½ mm long, glabrous except for some hairs around insertion; style up to 8 mm long, glabrous. *Torus* little elevated to flat, hairy. *Collective fruit* ovoid, c. 1 cm across, with sepals upright; *fruits* up to 4 by 2½ mm when dry; exocarp red in ripe fruits, only a moderately thin layer when dry; endocarp rugose.

Distribution: N. Thailand, N. Vietnam, Sumatra, Java, Borneo, Celebes, Moluccas. See notes 1 and 5.

Habitat: Lighter places in (primary) forest and scrub; at altitudes from 1750 to 2850 (– 3000) metres.

Vernacular names: *pingat* (Sumatra); *bengberetan* (Java, sundanese); *bidang* (Borneo, Murud).

SUMATRA. Aceh. Mt. Leuser and vicinity, *van Steenis 8532, 9123, 9706*. — North. Lake Toba, *Lörzing 16272*; Sidikalang, *Alston 15049*. — West. Mt. Talakmau, *Bünnemeijer 745*; Mt. Malintang, *Bünnemeijer 4079*; Mt. Kerinci, *Alston 14202, Bünnemeijer 9893, 10000, Meijer 6373*.

JAVA. West. Mts. Gede-Pangrango, many specimens; Mt. Masigit, *Lörzing 1233*; Mt. Patuha, *Hildebrand F 195, Kuhl & van Hasselt s.n., Lörzing 1355, 1400, Reinwardt s.n.*; Kendeng near Bandung, *Docters van Leeuwen s.n.*; Mt. Papandayan, *Backer 5507, Korthals s.n., van Rijckevorsel 12, van Steenis 4119*; Garut, *Burck s.n.* — Central. Mt. Perahu, *Backer 21800*.

BORNEO. Sarawak. Mt. Murud, *Ilias Paie S 26396, Nooteboom & Chai 1993*. — Sabah. Mt Kinabalu, *Clemens 29860, 35057, Haviland 1209*.

CELEBES. Central. Mt. Ngilalaki, *Bloembergen 3990*. — South. Mt. Lompobatang (= Bonthain), *Bünnemeijer 11899, 11926, 12215, 12255, van Zijll de Jong 11*; Bukit Poka Pinjang, *Kjellberg 1451*.

MOLUCCAS. Ceram, *Eyma 2300*.

Notes: 1. The Himalayan collections, sometimes referred to the present species, may usually be *R. pentagonus* Wall. *ex* Focke which seems to be distinct.

2. In some sterile Bornean specimens the twigs and leaves are distinctly more hairy than in sterile shoots from Java.

3. Most (but not all!) of the specimens from Celebes and also the only one seen from Ceram deviate in having ovate and much larger stipules of 11 – 17 by 6 – 11 mm. In this Eastern part of the area the plants are also more glabrous than normally elsewhere, and capitate hairs are scarce or absent. Petals are recorded as pale red, elsewhere as greenish to white, but data are scarce. Whether this merits recognition of a separate taxon (variety) will have to be decided later.

4. The fruits are edible. *Koorders* (on the label of his specimen *31658*) even recommends the species for planting.

5. The description given only refers to the Malesian specimens from Sumatra, Java and Borneo. There are only two specimens known from the Asian continent, one from Thailand, one from Vietnam.

16. **Rubus brassii** Merrill & Perry

R. brassii Merr. & Perry, J. Arn. Arb. 21 (1940) 182. — Type: *Brass 2891*; holo in A, iso seen from BO and L.

Straggling or climbing unarmed shrubs up to 4 m high. *Stems* shortly woolly to glabrous. *Leaves* pedately 5-foliolate, the upper ones often 3- (or 1–) foliolate, herbaceous. *Stipules* inserted, at or some mm above the base on the petiole, long persistent, lanceolate to linear-lanceolate, 5–10 by 1–3 mm, entire, glabrous or with hairs at base and margin, sometimes with short glandular hairs. *Petioles* 2–5 cm long, not or hardly grooved above; petiolule of terminal leaflet 2–8(–15) mm, petiolules of lateral leaflets 0–2 mm long; petiole shortly hairy to glabrous, petiolules hairy. *Blades* oblong-lanceolate to lanceolate, rarely ovate-lanceolate, the terminal leaflet 8–14 by 2–4½ cm, the lateral leaflets 4–13 by 1½–3½ cm; base acute but the lower lateral leaflets sometimes with oblique base of which the basiscopic half obtuse, margin mostly biserrate with 4–6 teeth per cm, apex acuminate. *Leaflets* pinninerved with (16–)18–21(–26) pairs of lateral nerves, terminating in the margin, midrib slightly grooved above, prominent below, lateral nerves flat to slightly impressed above, slightly prominent below, venation invisible above, visible but not prominent below, transverse; upper surface sparsely hairy, denser on the midrib and usually only there remaining, lower surface with sparse appressed hairs, mainly on the midrib. *Inflorescence* a lax terminal thyrse with below the terminal flower up to 5 lateral branches, the lowermost of which in the axil of a 3- to 1-foliolate or reduced leaf, the upper ones in the axils of usually tripartite bracts; the laterals dichasially branched with up to 8 flowers but usually fewer, the lowermost lateral sometimes thyrsoid (a raceme of dichasia); the entire inflorescence up to 12 cm long; *pedicels* up to 2 cm long, all axes shortly woolly to ± glabrous, sometimes with short glandular hairs; bracts up to 1 cm long, often toothed, glabrous except at base and margin, sometimes with glandular hairs, bracteoles usually 2 on the pedicel. *Hypanthium* saucer-shaped, 5–6 mm across, sparsely hairy and sometimes with few short glandular hairs outside, glabrous inside except around the torus. *Sepals* narrowly triangular. 8–13 by 3–5 mm, acuminate to caudate (acumen up to 4 mm), entire, outside with few hairs and woolly on the covered margins, inside shortly woolly. *Petals* falling early, obovate to elliptic, equal to or slightly exceeding the sepals, 9–12 by 6–9 mm, not clawed, with obtuse apex, glabrous, white. *Stamens* 45–100, glabrous; filaments up to 4 mm long; anthers *c.* 1 mm long. *Pistils* 80– more than 100; ovary *c.* 1 mm long, glabrous or with few hairs; style up to 2½ mm, glabrous. *Torus* elevated, sparsely hairy. *Collective fruit* ovoid, up to 1 cm across, with sepals upright; *fruits* up to 2 by 1 mm when dry; exocarp orange to red in ripe fruits, only a thin layer when dry; endocarp rugose.

Distribution: Solomon Islands.

Habitat: Forest, at altitudes from (180–)600–1525 m.

Vernacular names: *me-meo* (Kwara-ae); *chei-chei, faragau* and variants (Guadalcanal).

SOLOMON I SOLOMON ISLANDS. Bougainville, *Craven & Schodde 326.* — Guadalcanal, *Corner 173, Farodo & coll. BSIP 12018, Kajewski 2530, Whitmore 6039.* — San Christobal, *Brass 2891.*

Notes: 1. The species is obviously related to *R. alpestris*. In this light the absence of the latter or a related species in the New Guinean mainland is remarkable.

2. The fruits are edible, according to some collectors.

17. **Rubus niveus** Thunb.

R. niveus Thunb., Diss. Rubo (1813) 9, fig. 3; Focke, Bibl. Bot. 72 (1911) 1832; Koord., Exk. Fl. Java 2 (1912) 327; Merr., Enum. Phil. Flow. Pl. 2 (1923) 229; Alston, Handb. Fl. Ceylon, Suppl. (1931) 104; Graham, Fl. Trop. E. Afr. (1960) 40; Backer & Bakh.*f.*, Fl. Java 1 (1964) 515; Hara & Ohashi in Hara, Fl. East Himal. (1966) 130; Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 26; Fl. Thail. 2 (1970) 51; Lauener & Ferguson, Not. Roy. Bot. Gard. Edinb. 30 (1970) 276; van Steenis, Mount. Fl. Java (1972) pl. 45 – 5; Iconogr. Cormoph. Sinic. 2 (1972) 278. — T y p e: *Thunberg s.n.*, from Java; holo in UPS, not seen, microfiche *Cat. 12275*.

R. lasiocarpus J. E. Sm. in Rees, Cyclop. 30 (1815) nr. 6; Hook.*f.*, Fl. Brit. India 2 (1878) 339, *pro max. parte*. — T y p e: a *Rottler* specimen from Mysore, India, not seen. Reduced to *R. niveus* by Focke (1911).

R. pruinosus Zoll. & Mor., Nat. Geneesk. Arch. Ned. Indië 2 (1845) 587. — T y p e: *Zollinger 2174*, iso seen from B.

R. horsfieldii Miq., Fl. Ind. Bat. 1, 1 (1855) 375, t. 7; Koord., Nat. Tijdschr. Ned. Indië 60 (1901) 276. — *R. niveus* Thunb. subsp. *horsfieldii* (Miq.) Focke, Bibl. Bot. 72 (1911) 183, incl. var. *timorensis* Focke and var. *asperatus* Focke; Backer, Schoolfl. Java (1911) 453. — T y p e: *Horsfield s.n.*, from Mt. Perahu, Java; holo in LINN, not seen.

R. lasiocarpus J. E. Sm. var. ('α') *normalis* Kuntze, Rev. Gen. Pl. 1 (1891) 221. — T y p e (of var.): *Kuntze* specimens from Mts. Dieng and Sumbing, Java; holo in NY, not seen.

R. leucocarpus Arnott var. *tomentosus* Alston, Handb. Fl. Ceylon, Suppl. (1931) 105. — T y p e (of var.): not indicated.

R. incanus Sasaki ex Liu & Yang, Quart. J. Taiwan Mus. 20 (1967) 375, fig. 1; Liu & Su, Fl. Taiwan 3 (1977) 115. — T y p e: *Sasaki s.n.*, from Taiwan; holo in TAI, not seen.

Usually erect, sometimes scandent shrubs up to 2 m high, the often drooping branches up to $3\frac{1}{2}$ m long. *Stems* sparsely hairy when young, soon glabrous, with a whitish bloom which usually has disappeared in herbarium specimens, rather dark brown and shining, with usually rather few stout straight to slightly curved prickles of up to 7 mm long. *Leaves* up to 27 cm long, imparipinnate, with 2 – 4(– 5) opposite pairs of leaflets, near the inflorescences reduced to 3- or 1-foliolate, papyraceous to pergamentaceous. *Stipules* inserted a few mm above the base on the petiole, persistent, lanceolate to linear-lanceolate, 6 – 16 by 1 – 3(– 5) mm, acute to acuminate, entire, slightly hairy to glabrous. *Petioles* $1\frac{1}{2}$ – 5 cm long, flat to distinctly grooved above as is the rachis; lateral leaflets sessile or petiolule up to 3 mm, of terminal leaflet 3 – 20 mm long; petiole, rachis and petiolules soft and ± patently hairy, glabrescent, petiole and rachis armed with a fair number of stout, curved prickles. *Blades* of leaflets elliptic or rhombic to ± ovate, sometimes narrower and ± ovate-lanceolate, 2 – 8 by 1 – 4 cm; base usually acute, sometimes rounded, margin serrate to biserrate with 3 – 6 teeth per cm, the incisions sometimes rather deep, the basal part often entire, apex acute to acuminate; terminal leaflet sometimes lobed on one or both sides. *Leaflets* pinninerved with 6 – 9 pairs of lateral nerves, terminating in the margin, midrib and lateral nerves impressed above, prominent below, venation ± transverse, not conspicuous; upper surface semi-patently soft-hairy on midrib and nerves and often also in between, glabrate or almost glabrous from the beginning, lower surface with a woolly silvery-white felt of short curly hairs all over and with longer semi-appressed straight hairs on midrib and nerves, the midrib sometimes with some small curved prickles; dark green above and distinctly discolorous. *Inflorescences* terminal and axillary, usually rich-flowered and compactly branched, consisting of a number of racemes with under the terminal flower up to three dichasial to monochasial branches, the racemes in the axils of normal to unifoliolate leaves or in the terminal part of the inflorescence in the axils of bracts, altogether forming a compound leafy thyrse up to 20 cm long;

pedicels and other axes hairy, with few small prickles, the pedicels up to $1\frac{1}{2}$ cm long, usually unarmed; bracts and bracteoles stipule-like. *Hypanthium* flat saucer-shaped, 2–3 mm across, hairy outside, glabrous inside except around the torus. *Sepals* triangular, cuspidate to caudate, 4–7 by $1\frac{1}{2}-2\frac{1}{2}$ mm including the up to 2 mm long acumen, entire, outside densely woolly, sometimes more densely so on the margins, acumen usually glabrous, inside densely woolly. *Petals* falling rather early, plate suborbicular, $3\frac{1}{2}-5$ by $3-3\frac{1}{2}$ mm including the distinct up to 1 mm long claw, entire to slightly emarginate, glabrous or with few hairs at base, pink. *Stamens* 25–35, glabrous; filaments up to 4 mm long; anthers *c.* $\frac{1}{2}$ mm long. *Pistils* 50–75, or sometimes more; ovary *c.* 1 mm long, rather densely long-hairy; style up to 3 mm long, also hairy at base. *Torus* elevated, hairy, with pistils down to the base. *Collective fruit* globular to broadly ovoid, up to *c.* 1 cm across, compact, with sepals spreading; *fruits c.* $2\frac{1}{2}$ by 1 mm, densely hairy, exocarp red, but the colour masked by the dark (blue to blackish) hair-cover, only a thin layer when dry; endocarp rugose.

Distribution: Continental Asia (Himalayan region from Kashmir Eastwards including Nepal and Sikkim, Assam, Thailand, Burma, Laos, Vietnam, Southern India), Sri Lanka, Taiwan, Malesia (Sumatra, in Malaya introduced and naturalized, Java, Lesser Sunda Islands, Luzon, Celebes). Introduced and naturalized in Southern and Eastern Africa, see note 3.

Habitat: Open and half-shaded places like hedges, shrubberies, grassfields, abandoned gardens, roadsides, and Eucalyptus savannas, rarely collected in forest; at altitudes from 1000 to 2900 m, rarely as low as 600 m.

Vernacular names: *kala kucet*, *seliringan*, *boborètéan* (Java); *conco poco* (Flores); *sakanati nono* (Timor).

SUMATRA. Aceh. Takengon, *Fairchild 79*. See note 4.

MALAYA. Pahang. Fraser's Hill, naturalized, *Purseglove 4319*, *Shah & Noor MS 623*, *Stone 6906*, *6909*. Penang. Penang Hill, cultivated, *Ridley s.n.*

JAVA. West. Mt. Gede, *Kern 7476*, run wild from cultivation; Mt. Papandayan, *Ecoma Verstege s.n.*, *van Steenis 4232*; Mt. Talun, *Soegandiredjo 143*. — Central. Dieng Mts., *Backer 21605*, *Blokhuis s.n.*, *Docters van Leeuwen 163*, *Kartawinata 1241*, *Meijer 2770*, *Veldkamp 6015*; Mt. Perahu, *Brinkman 180*, *Hochreutiner 2409*; Mt. Sindoro, *Docters van Leeuwen 8963*; Mt. Sumbing, *Lörzing 40*; Mt. Ungaran, *Junghuhn s.n.*; Mt. Merbabu, *Backer 30279*, *Coert 150*, *Docters van Leeuwen 1152*, *1208*, *Junghuhn s.n.*, *Kooper 1036*; Mt. Merapi, *Beguin s.n.*, *den Berger 64*, *Coert 130*; Mt. Butak, *Arens & Wurth s.n.* — East. Mt. Lawu, several specimens; Mt. Wanasegara, *Backer 11553*; Mt. Kawi, *Docters van Leeuwen 12201*, *Rappard 29*; Mt. Arjuna, *Arens 72*, *van Steenis 7018*; Mt. Welirang, *Rademacher s.n.*, *Zollinger 2174*; Tengger Mts., many speciemens; Mt. Semeru, *Backer 36365*, *Jeswiet 103*; Iyang Mts., *Backer 9626*, *van Steenis 10944*; Ijen Mts., *Buwalda 7508*, *Posthumus 4011*.

LESSER SUNDA ISLANDS. Bali, *Dilmy 1126*, *de Voogd 2479*. — Lombok, *Tengwall 55*. — Flores, *Schmutz 1425*, *de Voogd 2815*. — Timor, *Bloembergen 3425*, *Bosarchitect Kupang 15*, *Forbes 3502*, *Schmutz 2250*, *van Steenis 18427*.

PHILIPPINES. Luzon. Benguet, *Elmer 5989*, *Merrill 883*; Bontoc, *Vanoverbergh 612*.

CELEBES. South. Rante Lemo, *Eyma 421*, *Kjellberg 1536*; Rimbon, *Rachmat 989*.

Notes: 1. The synonymy given above is incomplete as far as names are concerned originally applied to plants from continental Asia. The nomenclatural situation on the continent is confused and possibly the species is indeed more variable there than in Malesia. Infraspecific subdivision, which is not possible in Malesia, might be justified on the continent, as the treatments by e.g. Hooker (sub *R. lasiocarpus*) and Focke indicate. Possible synonyms of *R. niveus* are e.g. *R. mysorensis* Heyne *ex* Roth (1821), *R. micranthus* D. Don (1825), *R. foliolosus* D. Don (1825), *R.*

pedunculosus D. Don (1825), *R. leucocarpus* Arnott (1836), and *R. pyi* Lévl. (1908, see Lauener & Ferguson 1970). We did not examine the types of these names.

2. A related species in India, China, ? Japan, and Taiwan has 3(−5)-foliolate leaves. The indumentum on the lower surface of the leaflets is obviously varying from scattered-pubescent to densely tomentose. Wallich applied the epithet *niveus* to it (type: *Wallich 734*) and under this name the species was treated in Hooker's Flora of British India. Thunberg's (heterotypical) epithet *niveus* being older (1813), another name had to be found for the trifoliolate species. Focke (1901) coined a nomen novum: *R. euleucus* Focke, but later (1911) applied *R. gracilis* Roxb. *ex* DC. (1825) to it. The latter name, however, is a later homonym of the European *R. gracilis* Presl & Presl (1822). The correct name seems to be *R. hypargyrus* Edgew. (1845), as explained by Hara, J. Jap. Bot. 53 (1978) 137. *R. mesogaeus* Focke (see Lauener & Ferguson 1970, and Liu & Su, Flora of Taiwan 1978) is probably conspecific.

3. In Africa the species is also found, and it is spreading in several places recently. Up till now it has been found in Kenya, Tanzania, Zimbabwe, South Africa and Swaziland (Stirton, personal communication). There is some room for doubt about it being introduced, intentionally or accidentally. The distributional pattern does not quite rule out native occurrence in (part of) the African area. A similar case is *R. rosifolius*.

4. *Fairchild 79* is the only specimen seen from Sumatra. It has larger flowers with broader sepals (−$4\frac{1}{2}$ mm). It may represent a separate taxon on infraspecific level but a decision has to be postponed till more material becomes known from the island.

5. In two specimens from Timor (van *Steenis 18427* and *Forbes 3502*) the dense whitish woolly indumentum on the underside of the leaves is missing. In the last-mentioned specimen there are dots and patches of a very dense, rather long indumentum, possible caused by a gall-mite (see under *R. rosifolius*).

6. By exception short gland-tipped hairs may occur (seen in *Koorders 37748* and *Coert 130* from Java).

7. The description given is drawn from Malesian material only.

18. **Rubus ellipticus** J. E. Smith

R. ellipticus J. E. Sm. in Rees, Cyclop. 30 (1815) Rubus spec. 16; Seringe in DC., Prodr. 2 (1825) 563; G. Don, Gen. Syst. 2 (1832) 533; Hook. *f.*, Fl. Brit. Ind. 2 (1878) 336; Kuntze, Rev. Gen. Pl. 1 (1891) 220; Trimen, Fl. Ceylon 2 (1894) 137; Elmer, Leafl. Philipp. Bot. 2 (1908) 456; Focke, Bibl. Bot. 72 (1911) 198; Backer, Schoolfl. Java (1911) 454; Cardot, Bull. Mus. Hist. Nat. Paris 23 (1917) 305; in Lecomte, Fl. Gén. Indoch. 2 (1920) 648; Merr., Enum. Philipp. Flow. Pl. 2 (1923) 227; Backer & Bakh. *f.*, Fl. Java 1 (1964) 515; Hara & Ohashi in Hara, Fl. East. Himal. (1966) 129; Thuan, Fl. Camb., Laos & Vietn. 7 (1968) 33; Fl. Thail. 2 (1970) 51. — T y p e: *Hamilton s.n.*, from Nepal; in herb. J. E. Smith (K), seen on microfiche, cat. nr. 902.71.

R. flavus D. Don, Prodr. Fl. Nepal. (1825) 234; Thwaites, Enum. Pl. Zeyl. (1859) 101. — T y p e: a *Hamilton* specimen from Hethaura in Nepal; not seen. Reduced to *R. ellipticus* by G. Don, Gen. Syst. 2 (1832) 533.

R. gowreephul Roxb. [Hort. Beng. (1814) 39, '*gowry-phul*', *nom. nud.*]; Fl. Ind., 2nd ed., 2 (1832) 517; Wight, Ic. 1 (1839) pl. 230. — T y p e: a plant cultivated in Calcutta Botanical Garden, collected by Hardwick in the Sewalik Mts; not seen. Reduced to *R. ellipticus* by Hook. *f.*, Fl. Brit. Ind. 2 (1878) 336.

R. ellipticus J. E. Sm. var. *denudatus* Hook. *f.*, Fl. Brit. Ind. 2 (1878) 337, '*denudata*'. — *R. ellipticus* J. E. Sm. var. *depilis* Focke, Bibl. Bot. 72 (1911) 199, *nom. superfl.* — T y p e: part of *Wallich 730*, not seen.

R. ellipticus J. E. Sm. forma *obcordatus* Franch., Pl. Delav. (1890) 206, '*obcordata*'; Thuan, Fl. Thail. 2 (1970) 52. — *R. ellipticus* J. E. Sm. var. *obcordatus* (Franch.) Focke, Bibl. Bot. 72 (1911) 199; Iconogr.

Corm. Sin. 2 (1972) 282. — *R. obcordatus* (Franch.) Thuan, Fl. Camb. Laos & Vietn. 7 (1968) 34. — T y p e: *Delavay 1130*, from Yunnan; not seen.

R. ellipticus J. E. Sm. forma *acuminatus* Franch., Pl. Delav. (1890) 206, '*acuminata*'. — T y p e: *Delavay 3733*, from Yunnan; not seen.

R. erythrolasius Focke, Bibl. Bot. 72 (1911) 197. — T y p e: *Henry 10583 A*, not seen. Reduced to *R. ellipticus* by Lauener & Ferguson, Notes Roy. Bot. Gard. Edinb. 30 (1970) 271.

R. ellipticus J. E. Sm. var. *insulanus* Focke, Bibl. Bot. 72 (1911) 199. — T y p e: not indicated, from the Philippines. The only specimen from the Philippines, present in L and identified by Focke as *R. ellipticus* (but without the varietal name), is *Vidal 1360*. This could be elected as a type, if necessary.

Crawling or climbing shrubs. *Stems* up to 4 m long, densely woolly at least when young, provided with many patent red bristles, up to 8 mm long and with a glandular knob when young, and with rather few straight to slightly curved prickles, up to 5 mm long, on very thick stems up to 8 mm. *Leaves* trifoliolate, in the inflorescence sometimes unifoliolate and then sometimes lobed, coriaceous. *Stipules* inserted 1 – 2 mm above the base on the petiole, long persistent, linear, up to 10 by $\frac{1}{2}$ mm, entire, rather densely hairy and sometimes with some short bristles. *Petioles* 1 – $7\frac{1}{2}$ cm long, not grooved above; petiolule of terminal leaflet $\frac{1}{2}$ – $4\frac{1}{2}$ cm, those of lateral leaflets only 1 – 4 mm long; petioles and petiolules woolly and with bristles as on the stems, and with curved prickles. *Blades* elliptic to orbicular, sometimes slightly obovate or ovate, terminal leaflet 4 – 9 by $3\frac{1}{2}$ – 9 cm, lateral leaflets 2 – $6\frac{1}{2}$ by 2 – $6\frac{1}{2}$ cm; base rounded to slightly emarginate, apex acute to rounded, sometimes truncate, rarely retuse, margin serrate to unequally serrate with 3 – 7 teeth per cm. *Leaflets* pinninerved with 7 – 10 pairs of lateral nerves terminating in the margin, midrib and lateral nerves impressed above, prominent below, venation transverse, impressed above, rather prominent below; upper surface with erect hairs, remaining only on the midrib and larger nerves, lower surface with a dense woolly felt of short curly hairs all over and with longer semi-erect straight hairs on midrib, nerves and veins, where also some curved prickles and some bristles may be present. *Inflorescences* terminal leafy thyrses with below the terminal flower up to 12 (– 20) lateral branches, of which the 3 or 4 basal ones in the axils of either normal, or smaller, or unifoliolate leaves; the upper lateral branches being racemes with below the terminal flower up to 8 cymes of (1 –)3 flowers, farther downwards the lateral branches more compound (a compound raceme of cymes) and also sometimes leafy; the entire inflorescence rather lax, up to 30 cm long, with up to 150 or more flowers; *pedicels* up to 1 (– 2) cm long, all axes woolly, with bristles and with curved prickles as on the stems; bracts linear or (the lower ones) tripartite, up to *c.* 8 mm long, hairy; bracteoles 2, at the base of the pedicel, up to 3 mm, linear, hairy. *Hypanthium* saucer-shaped, 4 – 5 mm across, densely hairy (woolly and with longer semi-appressed hairs) and with bristles outside, long-hairy inside except near the margin. *Sepals* ovate-triangular, 5 – $7\frac{1}{2}$ by 3 – $4\frac{1}{2}$ mm, not or hardly growing after anthesis, shortly ($\frac{1}{2}$ – 1 mm) acuminate, entire, densely hairy (woolly and with longer semi-appressed hairs) over the entire surface on both sides, outside at base also with some bristles, closing around the developing fruits. *Petals* early falling, obovate to spathulate, about as long as to longer than the sepals, up to 10 by 5 mm, rounded or acute, entire, with straight hairs on both sides, white. *Stamens* 30 – 40, glabrous; filaments up to 2 mm long; anthers *c.* 0.5 mm long. *Pistils* 100 – 150; ovary 1 – $1\frac{1}{2}$ mm long, on the back with many long straight hairs, especially near the apex; style up to 2 mm long, hairy at base. *Torus* elevated, densely hairy. *Collective fruit* ovoid to globose, up to 8 by 10 mm, the sepals ultimately

slightly spreading; *fruits* up to $1\frac{1}{2}$ by $\frac{3}{4}$ mm when dry, exocarp yellow to orange, only a thin layer when dry, still hairy when ripe; endocarp rugose.

Distribution: Himalayas, India, Sri Lanka, Burma, Thailand, Laos, Vietnam, China (Yunnan, Szechuan, Kweichow), Philippines (Luzon). Introduced and naturalized in Java, Jamaica, Puerto Rico, Africa, and Australia, see note 3.

Habitat: In Luzon a species of forests (oak, pine) and secondary growth; at altitudes of 1000 to 2400 metres.

Vernacular name: *init gan kumadop* (Luzon, Banaue).

JAVA. West. Cibodas, Sindanglaya: *Backer 22303, Bakhuizen van den Brink 3511, Ochse s.n.*, cultivated and/or run wild, see note 3.

PHILLIPPINES. Luzon. Mountain Prov., several localities: *Banlugan PNH 72609, Elmer 5795, 8633, Jacobs 7391, Mendoza PNH 40922, 81860, Merrill BS 850, Ramos BS 5832, Ramos & Edaño BS 37714, 38106, Santos 5476, Sulit PNH 7545, Vanoverbergh 182, Vidal 1360.*

Notes: 1. *R. ellipticus*, as accepted with the synonymy given above, is a species with a rather wide distribution and a corresponding variation, mainly in (a) the shape of the leaflets, especially of their apex, (b) the relative dimensions of terminal and lateral leaflets, (c) the indumentum on the lower surface of the leaflets, (d) the elaborateness of the inflorescence.

A form **obcordatus** Franch. can be recognized. In this form the apex of the leaflets is truncate and distinctly retuse. We saw specimens with this kind of leaflets from several countries on the Asiatic continent. Since the demarcation is not too sharp and, moreover, not accompanied by differences in more important characters, we are inclined to follow other authors and to give the taxon the status of forma.

In typical specimens the indumentum on the lower leaf surface consists of two types of hairs: the whole surface is covered by a dense mat of woolly, interwoven hairs, and on midrib, nerves and veins there are straight, longer and semi-erect hairs. In this respect, however, specimens from India are variable in that the underlying woolly cover is sometimes less dense and not closed. The short curly hairs may even be almost absent. It does not seem possible to separate the densely hairy plants from the less densely so, and hence not to distinguish infraspecific taxa on this character.

In Vietnam, the Himalayas region, and Taiwan there are also specimens without any woolly cover at all. They have acuminate leaflets and although these plants have sometimes been brought in connection with *R. ellipticus*, in our opinion there is sufficient reason to distinguish them as a separate species.

A provisional synonymy of this latter species, to which the name **R. wallichianus** W. & A. will have to be applied, runs as follows:

R. wallichianus Wight & Arnott in Wight, Catal. (1833) 61; Prodr. (1834) 298, '*wallichiana*'; Wight, Ic. 1 (1839) pl. 231. – *R. hirtus* Roxb. [Hort. Beng. (1814) 38, *nom. nud.*]; Fl. Ind. 2nd ed., 2 (1832) 518, *nom. illeg. non* Waldst. & Kit., Pl. Rar. Hung. 2 (1805) 150, pl. 141. – *R. ellipticus* J. E. Sm. var. *hirtus* (Roxb.) Hook. *f.*, Fl. Brit. Ind. 2 (1878) 336, '*hirta*'. – *R. ellipticus* J. E. Sm. var. *wallichianus* (Wight & Arn.) Focke, Bibl. Bot. 72 (1911) 199. — Type: a plant growing in the Calcutta Botanical Garden, originally collected by Berry in Mysore, not seen.

R. fasciculatus Duthie, Ann. Bot. Gard. Calc. 9 (1901) 39, pl. 48, *nom. illeg. non* P. J. Mueller, Flora 41 (1858) 182. — *R. ellipticus* J. E. Sm. subsp. *fasciculatus* (Duthie) Focke, Bibl. Bot. 72 (1911) 1 199. — *R. ellipticus* J. E. Sm. var. *fasciculatus* (Duthie) Kudo & Masam., Ann. Rep. Taihoku Bot. Gard. 2 (1932) 129. — Type: a *Duthie* specimen from Tehri-Garhwâl in W. Himalaya; holo in CAL not seen, iso seen from B (as Duthie 23534). Reduced to *R. pinfaensis* by Rehder, J. Arn. Arb. 18 (1937) 50.

R. pinfaensis Lévl. & Van., Bull. Soc. Agric. Sc. & Arts Sarthe 39 (1904) 320, repr. in Fedde, Rep. 6 (1909) 374; Focke, Bibl. Bot. 72 (1911) 199; Rehder, J. Arn. Arb. 18 (1937) 50; Iconogr. Corm. Sin. 2 (1972) 283; Liu & Su, Fl. Taiwan 3 (1977) 121. — T y p e: *Cavalerie 920*, from Kweichow; not seen. Reduced to *R. ellipticus* by Thuan, Fl. Camb. Laos & Vietn. 7 (1968) 33, but kept as a separate species by others.

R. ellipticus J. E. Sm. subsp. *achenigerus* Duthie ex Focke, Bibl. Bot. 72 (1911) 199, '*achenigera*'. — T y p e: a Duthie specimen from Bámsu Valley in the W. Himalayas ('Bamon' according to Focke); iso seen from B (as *Duthie 21028*) and L (as *Duthie s.n.*). The subspecies was based by Focke on '*R. achenigera* Duthie, J. Bot. 21, 1883'. This specific name apparently was never published, certainly not in the place indicated.

2. The inflorescence, although variable, cannot be used for specific or infraspecific distinction. Large and rich inflorescences (compound thyrses) gradually pass into less rich, less elaborate, more compact, more leafy, more simple systems.

3. The species was long ago introduced in Australia and was reported as naturalized in 1912. It is now growing in several places in mainly coastal areas of Queensland and New South Wales extending from *c.* 100 km south to *c.* 200 km north of Brisbane (R. W. Johnson, in litt.; see also Everist, Queensl. Argric. J., March 1960).

In 1894 the species was introduced in Jamaica where it also became naturalized. See Fawcett & Rendle, Fl. Jamaica 3 (1914) 261 and Adams, Flow. Pl. Jamaica (1972) 315.

According to Graham, Fl. Trop. E. Afr. (1960) 25, the species has been introduced 'here and there in Africa'.

In Java the species was planted in the botanical garden of Cibodas and found more or less naturalized in the neighbourhood later. Since root nodules (see note 4) were reported for this species from the Bogor region at 1500 m altitude in 1976, it may be surmised that *R. ellipticus* in still growing near Cibodas. We did not seen any herbarium specimens collected after 1925.

4. Bond in Nutman (ed.), Results of IBP survey of root-nodule formation in non-leguminous angiosperms (1976, pp. 443–474) reported that Mrs. Soemartono observed root-nodules in *R. ellipticus* from Java (see note 3). According to Bond 'certain of the nodule cells appeared to contain a tangled mass of very fine hyphae', but nitrogen-fixation was not proved experimentally. Seedlings grown in soil from elsewhere showed symptons of nitrogen deficiency and nodules were absent. See also note 5 under *R. ferdinandi-muelleri*.

5. The description given above only refers to the Philippine specimens.

DOUBTFUL SPECIES

Rubus keysseri Schlechter *ex* Diels, Bot. Jahrb. 62 (1929) 481; van Royen, Phan. Monogr. 2 (1969) 24. — T y p e: a *Keysser* specimen originally in B, now lost.

REGISTER OF SPECIFIC AND INFRASPECIFIC NAMES

Accepted names in roman type, synonyms in italics