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A Revision of Beaumontia Wallich, Kibatalia G. Don and Vallariopsis Woodson
(Apoecynaceae)

(series of revisions of Apocynaceae XIX)

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INTRODUCTION

The present publication is a monographic revision of the Asian genera Beau­montia, Kibatalia and Vallariopsis. It is based on the study of living plants, her­barium material and spirit collections.

The author had the opportunity to study living plants in the field of B. multi­flora, K. arborea, K. maingayi, K. villosa and K. wigmanii. The first and last were seen only in cultivation, the others in the wild. The cultivated plants of the men­tioned species he studied in the Botanic Gardens of Yogyakarta and Bogor.

The genera Beaumontia and Kibatalia consist of 9 and 15 species respectively. Vallariopsis is considered to be monotypic. The three genera belong to the tribe Nerieae, of the subfamily Apocynoideae.

The distribution maps are the first ever made for these genera.
Almost all specimens studied are cited in the present paper.

HISTORY OF THE GENERA

BEAUMONTIA

Beaumontia was described by WALLICH in 1824 with a single species Beaumon­tia grandiflora. He named it in honour of the late lady Diana Beaumont, a bene­volvent supporter of botanical science. Ten years earlier, ROXBURGH proposed the nomen nudum Echites grandiflora for the same taxon which he validated only in 1832, although it did not belong to the genus Echites as delimited today.

In 1850 WIGHT published a second species: B. jerdoniana. Several more fol­lowed, the last of which, B. yunnanensis Tsiang & W. C. Chen (1973), turned out to be conspecific with B. khasiana.

KIBATALIA

In 1826 BLUME proposed the Apocynaceous genus Hasseltia based on a single species H. arborea. He didn’t know that 3 years earlier HUMBOLDT, BONPLAND and KUNTH published the Tiliaceous genus Hasseltia. When he discovered the latter, BLUME rebaptized his Hasseltia Kickxia. However, his Kickxia turned out to be a homonym of the Scrophulariaceous genus Kickxia Dumortier (1827). The latter fact was the reason why G. DON (1837) gave it its third name Kibatalia being used up to the present day.

The name of Kibatalia is derived from the Sundanese, Ki Benteli. Ki = wood; Benteli = spear. Presumably its wood was used by local people for shafts of spears (personal communication of M. RIVAI and HARINI, 1985).

MAP A. • Beaumontia; ■ Kibatalia; ★ Vallariopsis.
VALLARIOPSIS

In 1882 Hooker f. described the species Vallaris lancifolia based on material collected by Maingayi under Kew distribution number 1048. Woodson (1936) proposed the genus Vallariopsis based on this species. The present author maintains this genus.

GEOGRAPHICAL DISTRIBUTION

The distribution of the genera is shown on map A. Beaumontia occurs in tropical Asia from India to Bali in Indonesia. B. grandiflora is the only species reaching temperate regions in Nepal, Bhutan and Sikkim. The latter is widely cultivated in America, Europa and Africa.

Kibatalia is restricted to Southeast Asia, known from Thailand south to Indonesia and east to The Philippines. Its area nearly reaches 127° East. Several species occur in very limited areas: K. elmeri at Irosin (Luzon), K. longifolia at Southeast Mindanao, K. macgregori inhabit Sibuyan island and K. wigmanii Northeast Sulawesi. The most widely distributed species is K. maingayi covering a large part of the area of the genus.

Vallariopsis is only known from continental Malaysia and from the Islands of Siberut and Pagai, Province of West Sumatra. It is curious that the genus is not yet known from Sumatra.

TAXONOMIC PART


Type species: Beaumontia grandiflora Wallich

Woody climbers, producing white latex. Trunk terete; bark pale grey, rough and mostly corky. Branches terete, hollow when dry, pale grey or pale grey-brown, with longitudinally fissured bark, lenticellate, sometimes corky; branchlets terete, lenticellate, at the apex somewhat quadrangular or laterally compressed. Leaves opposite, those of a pair equal or subequal, less often unequal, petiolate; petioles connate at the base into a very short ocrea, with colleters in the axils. Blade coriaceous or papyraceous, entire, with costa impressed above and prominent beneath; secondary veins anastomizing; tertiary venation conspicuous, reticulate. Inflorescences axillary or terminal and then often seemingly axillary as in the axil of subtending leaf pair a branchlet is developing for the continuation of the branch, alternating when axillary, cymose, lax or less often congested. Peduncle and pedicels puberulent, sparsely to densely pubescent or less often tomentose; bracts sepal-like, mostly with colleters at the base of each bract (only in B. macrantha, colleters absent). Flowers 5-merous, mostly very large, actinomorphic, mostly fragrant. Sepals 5 (which may be 6 for B. khasiana), free, entire, with a single row of colleters at the base. Corolla consisting of a lower and an upper part; lower part cylindrical. Stamens connivent into a close cone around the pistil head (only in B. khasiana the anther cone less close), without dorsal swelling; filaments filiform; anthers narrowly triangular, acuminate at the apex, sagittate at the base, introrse, tails curved towards each other; cells 2, dehiscent throughout by a longitudinal slit. Pistil: disk ring- or cup-shaped, shallowly 5-lobed, or only in B. longituba 5-parted, surrounding the ovary; ovary bicarpellate; carpels broadly ovoid; style filiform; pistil head ellipsoid or ovoid, topped by a conical sterile apex. In each cell one semiglobose or ellipsoid placenta with many ovules. Infructescences as far as is known bearing 1-2(3) fruits, pendulous. Mericarps dark brown or dark grey, cylindrical or ellipsoid, rounded at the apex, somewhat cordate at the base, glabrous, lenticellate, dehiscent throughout by a longitudinal slit, many-seeded. Seeds (only known for B. multiflora, B. murtonii and B. grandiflora): with apex of the seeds directed towards the apex of the follicle, bearing an apical coma; grains fusiform, brown, glabrous, granulate; coma white, silky; hairs simple, recurved when the seed left the fruit; endosperm white, surrounding the embryo; embryo large, straight, white; cotyledons flat, elliptic; rootlet cylindrical, directed towards the apex of the seed, obtuse at the apex.

**KEY TO THE SPECIES**

1. Corolla tube 10–22.5(30) mm long, upper part 6–17.5(20) mm long; anthers inserted 4–6(10) mm from the corolla base, 8–9.5 × 1.5–2 mm; disk densely pubescent or tomentose ........................... 2
   - Corolla tube (20)30–130 mm long, upper part (25)27.5–110 mm long; anthers inserted 10–40 mm from the corolla base, 10–17 × 2–4 mm; disk glabrous or puberulent ........................... 3

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2. Corolla lobes (20)25-40 × 17.5-40 mm; mouth diameter 20-30 mm; filaments 20-25(30) mm long; stamens exserted for 10-20 mm; leaves sparsely puberulent or glabrescent above .......................... 5. B. khasiana
   - Corolla lobes 9-12 × 6-10 mm; mouth diameter 10-12.5 mm; filaments 10-10.5 mm long; stamens included for 0-1 mm; leaves (sparsely) tomentose above .......................... 7. B. macranthana
3. Stamens exserted, less often included; filaments (10)15-25 mm long; pistil 25-50 mm long; disk glabrous, or sometimes with hirto-puberulence at the apex .......................... 4
   - Stamens included; filaments 30-60 mm long; pistil 65-100 mm long; disk tomentulose, pubescent or densely hirto-puberulent .......................... 6
4. Peduncle 10 mm long; sepals very narrowly ovate, about 0.2 × as long as the corolla tube, 8-10 × 2 mm; mouth 12.5 mm in diameter; disk parted .......................... 6. B. longituba
   - Peduncle (25)30-100 mm long; sepals elliptic, obovate or narrowly ovate, 0.2-0.9 × as long as the corolla tube, 9-40(45) × 2-27 mm; mouth (25)32.5-70 mm in diameter; disk lobed .......................... 5
5. Sepals 27.5-40(45) × 18-27 mm; colleters of the sepals 50-70 in the whole flower; lower part of the tube (10)15-17.5 mm long; filaments inserted 20-25 mm from the corolla base .......................... 9. B. murtonii
   - Sepals 9-20(30) × 2-6(10) mm; colleters of the sepals 10-40 in the whole flower; lower part of the tube 5-10 mm long; filaments inserted 10-15(20) mm from the corolla base .......................... 8. B. multiflora
6. Sepals (22.5)30-55(60) × (5)10-25(40) mm, 1.3-6 × as long as wide, costa and secondary veins conspicuous; colleters at each bract 7-15; pistil head 10-12 × 2-3 mm, at the base hairy, furthermore glabrous; carpels tomentulose .......................... 7
   - Sepals 13-27 × 3-6 mm, 4-5.6 × as long as wide, costa and secondary veins inconspicuous; colleters at each bract 1-3; pistil head 5-10 × 3 mm, glabrous, carpels pubescent or hirto-puberulent .......................... 8
7. Corolla tube 60-70(85) mm long, inside hairy; anthers hairy outside; pedicels puberulent or less often pubescent; bracts 1.1-1.8 × as long as wide, 17-25 × 9-20 mm .......................... 1. B. brevituba
   - Corolla tube (65)75-130 mm long, inside glabrous; anthers glabrous outside; pedicels puberulent or densely pubescent; bracts about twice as long as wide, 10-21 × 5-11(15) mm .......................... 3. B. grandiflora
8. Upper part of the corolla tube 6-9 × as long as the lower part, 60-90 mm long; anthers 15 × 4 mm; colleters at the sepals 60-70 in the whole flower; base of the corolla tube hairy inside; style hairy at the base 2. B. campanulata
   - Upper part of the corolla tube 2.25-3 × as long as the lower part, 45-55 mm long; anthers 10-12 × 2 mm; colleters at the sepals 6-10 in the whole flower; base of the corolla tube glabrous inside; style glabrous at the base .......................... 4. B. jerdoniana


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**Fig. 1; Map 1**

*Type:* China: Kwangtung (Guangdong): Hainan, Henry 16 (K, holotype).

Woody climber, 3–5 m high. *Trunk* up to 2.5 cm in diameter. *Branchets* pale yellow or grey, pubescent. *Leaves:* petiole 10–30 mm long, puberulent or sparsely pubescent, rarely glabrous, sometimes lenticellate, with 10–20 collets in 1–3 rows in the axils; blade obovate or elliptic, 2–2.5 × as long as wide, (7)11.5–22.5 × (3)5–11 cm, acute or apiculate at the apex, at the base cuneate, sometimes almost rounded, above glabrous and sometimes pubescent only on the costa, beneath glabrous or sparsely to densely pubescent; with 9–15 secondary veins on each side. *Inflorescences* lax, 1–6-flowered, 0.6–1.3(1.8) × as long as the leaves, 13.5–21.5 cm long, once-branched. *Peduncle* 10–35(45) mm long, puberulent, less often pubescent; pedicles 35–60 mm long, puberulent, less often pubescent; *bract* elliptic or ovate, 1.1–1.8 × as long as wide, 17–25 × 9–20 mm, 0.3–0.4 × as long as the sepals, apiculate at the apex, sparsely pubescent on both sides, deciduous or persistent, with 7–10 collets in a single row. *Flowers* fragrant or odourless. *Sepals* foliaceous, pale yellow, elliptic or obovate, 1.3–1.8(2.5) × as long as wide, 35–53 × 20–32 mm, outside puberulent, inside puberulent or often glabrous, acuminate at the apex, with 50–60 collets in the whole flower, with conspicuous costa and veins; collets slender, 1 mm long, acuminate at the apex. *Corolla* white or less often creamy; tube 1.3–2.3 × as long as the calyx, 1.5–1.6 × as long as the mouth diameter, 60–70(85) mm long, puberulent on both sides; lower part 12.5–20 mm long; upper part widely obconical or nearly rotate, 2.5–3.5 × as long as the lower part, 45–50(70) mm long, at the mouth 35–60 mm in diameter; lobes lingulate, 1–1.25 × as long as wide, 40–55 × 35–50 mm, acute at the apex, puberulent on both sides, with conspicuous parallel veins. *Stamens* included for 0–5 mm, rarely exserted; filament inserted at about 30–35 mm from the corolla base, 55–60 mm long, glabrous; anthers 13–17 × 3 mm, at the apex for about 2 mm sterile, outside with some pubescence, inside glabrous. *Pistil* about 85–90 mm long; disk cup-shaped, 1–3 × 4–5 mm, sparsely puberulent at the apex; ovary superior; carpels connate, 2.5–4 × 3–4 mm, tomentulose; style 55–70 mm long, glabrous; pistil head 10 × 3 mm, with some hirto-pubescent near the base, furthermore glabrous. *Infructescences:* Mericarps obovoid, black when dry, 6 × 3 cm, glabrous, subtended by the persistent calyx; pedicels 4 cm long, glabrous, lenticellate; seed unknown.

**Distribution:** China: Hainan.

**Ecology:** Thickets or forests in the mountains, often or river banks. Altitude up to 1700 m.
FIG. 1. *Beaumontia brevituba*. 1, habit (× 4); part of flower opened (× 3); 3, anther, ventral view (× 2); 4, anther, dorsal view (× 2); 5, part of pistil (× 3); 6, flower base, partly dissected (× 3). 1–6 from Lau 1492.

Specimens examined:


FIG. 2. *Beaumontia campanulata*. 1, habit (× 2); flower opened (× 2); 3–4, anther both sides (× 2); 5, pistil head with anthers (× 2); 6, basal part of flower (× 4). 1–6 from Bon 3828.


Type: Vietnam (Tonkin): Kien Khe, Dong Ham, Bon 3828 (P, lectotype; isotype: P).

Woody climber. Branches smooth, with longitudinally fissured bark; branchlets dark brown, sparsely to densely pubescent. Leaves: petiole 10–20 mm long, puberulent or pubescent, sometimes glabrous, with 6–20 colleters in 1–2 rows in the axils; blade elliptic or obovate, 1.9–2.6 × as long as wide, 10.5–20 × 5.5–10 cm, often some basal smaller, apex apiculate, at the base cuneate or almost rounded, above glabrous or sometimes only on the costa and veins more densely so; with 11–14 secondary veins on each side. Inflorescences lax, about 1 × as long as the leaves, 14–17 cm long, 6–9-flowered, once branched. Peduncle 10–25 mm long, tomentulose; pedicels 22.5–30 mm long, tomentulose; bracts ovate, 2–5 × as long as wide, 10–15 × 3–5 mm, acute at the apex, tomentulose on both sides, mostly persistent, with 1–3 colleters. Flowers white, probably fragrant. Sepals narrowly elliptic, 4–5.6 × as long as wide, 15–25 × 3–6 mm, acute at the apex, tomentulose on both sides, with 60–70 colleters in the whole flower; costa and veins inconspicuous. Corolla: tube 2.8–6.6 × as long as the calyx, 70–100 mm long, 2–4 × as long as the mouth diameter, outside with some puberulence, inside glabrous but sparsely puberulent at the extreme base; lower part 10 mm long; upper part narrowly campanulate, 6–9 × as long as the lower part, 60–90 mm long, at the mouth 25–35 mm in diameter; lobes broadly ovate, 0.8–1 × as long as wide, 17.5–20 × 15–25 mm, acute or acuminate at the apex, outside sparsely puberulent, inside glabrate; veins parallel, conspicuous. Stamens included for 5–10 mm; filaments inserted 20–22.5 mm from the corolla base, 45–50 mm long, glabrous; anthers 15 × 4 mm, at the apex for 3–4 mm sterile, outside glabrous or often with some hirto-puberulence, inside glabrous. Pistil 70–75 mm long; disk cup-shaped, 1–1.5 × 2–3 mm, shallowly 5-lobed, glabrous on both sides, puberulent at the apex, enveloping the ovary; ovary superior; carpels 1.5 × 2 mm, pubescent; style 60–70 mm long, near the base sparsely hirto-puberulent, furthermore glabrous; pistil head 5–7.5 mm long, glabrous. Fruit unknown.

Distribution: Vietnam (Tonkin).
Ecology: In mountain area on rocky soil. Altitude unknown.
Vernacular names: Vietnam: Giai Hoang or Hung (Kien Khe) teste Bon 3828.

Specimens examined:
VIETNAM (TONKIN): Dong Dang (fl. Feb.) Balansa s.n. (P); Kien Khe: Dong Ham (fl. March) Bon 3828 (P, type); Dong Bau, Bon 2871 (P, paratype); sin. loc. (fl. Apr.) Bon 2056 (P, paratype).
MAP 2. Beaumontia campanulata


Type: Nepal: Noakote, Nawakot, Wallich 1629.1 (K – WALL, holotype).

Homotypic synonym: Echites grandiflora Roxburgh, Fl. Ind. 2: 14. 1832.
FIG. 3. Beaumontia grandiflora. 1, habit ($\times \frac{3}{10}$); 2, part of flower opened ($\times \frac{3}{5}$); 3, part of disk dissected ($\times \frac{10}{11}$); 4, anther, dorsal view ($\times \frac{1}{2}$); 5, anther, ventral view ($\frac{3}{1}$); 6, pistil head and anther dorsal view ($\times \frac{3}{2}$); 7, seed ($\times \frac{1}{2}$). 1–6 from Grierson & Long 3546; 7 from Wallich 1826.
Large woody climber or shrub 1–20 m high. Trunk up to 2 cm in diameter; bark corky, longitudinally fissured; branchlets sulcate when dry, dark brown, pubescent or tomentulose, less often glabrous. Leaves: petiole (5)10–30 mm long, channeled above, glabrous, less often sparsely to densely pubescent, sometimes lenticellate, with 10–20 colleters in 1–3 rows in the axils (occasionally colleters present on the ocrea); blade narrowly to broadly elliptic or obovate, 1.3–3.5 × as long as wide, (8.5)10.5–28 × (3.5) 5–15 cm, often some basal smaller, equal- or subequal-sided, acuminate, acute or apiculate at the apex, at the base cuneate or decurrent into the petiole, rarely rounded, less often slightly sinuate at the margin, above glabrous or sparsely puberulent, especially on the costa more densely so, beneath glabrous or sparsely to densely pubescent, usually with black dots; with 8–18(20) secondary veins on each side. Inflorescences lax, 3–19-flowered, 1–3 branched, (12)15–25 cm long, 1–1.4 × as long as the leaves. Peduncle (5–10)25–65(90) mm long, sparsely to densely pubescent or tomentulose, lenticellate; pedicels 25–45 mm long, tomentulose or densely pubescent; bracts elliptic, about twice as long as wide, 10–21 × 5–11(15) mm, 0.4–0.5 × as long as the sepals, obtuse or acuminate at the apex, densely pubescent on both sides, persistent or deciduous, with 10–15 colleters in a single row. Sepals foliaceous, pale green, less often purplish, obovate or elliptic, 1.75–5(6) × as long as wide, (22.5)30–55(60) × (5)10–25(40) mm, acuminate at the apex, sometimes acute, entire, sparsely to densely pubescent on both sides, with conspicuous costa and veins, with 40–60 colleters in the whole flower; colleters slender, about 1 mm long, acuminate at the apex. Corolla white, creamy or pale yellow, at the base pale green (testibus: Forrest 16248, Gierson & Lang 4309); tube 1.8–3.3 × as long as the calyx, (65)75–130 mm long, sparsely to densely pubescent outside, rarely puberulent, inside glabrous; lower part (10)15–25 mm long, upper part narrowly obconical or less often campanulate, (2.5)3.2–6(7) × as long as the lower part, (50)65–110 mm long, at the mouth 25–65 mm in diameter; lobes suborbicular or broadly ovate, sometimes lingulate, equal- or unequal-sided, 0.8–2 × as long as wide, 17.5–40 × 15–40 mm, acuminate at the apex, sparsely puberulent or less often glabrous on both sides, with conspicuous parallel veins. Stamens white, included for (0)5–25(30) mm, rarely exserted; filaments inserted at 25–40 mm from the corolla base, 32.5–60 mm long, sparsely hirto-puberulent or glabrous; anthers 15–17 × 2 mm, at the apex for 1.5 mm sterile, glabrous on both sides. Pistil 70–100 mm long; disk ring-shaped, 1.5–2 × 3–4 mm, sparsely puberulent at the apex, superior; carpels connate, 3 × 9 mm, tomentulose; style 70–90 mm long, sparsely hirto-puberulent or glabrous; pistil head 12 × 5 mm, glabrous. Infructescences: pedicels 5 × 1 cm, glabrous, lenticellate; peduncle 3 × 1 cm, glabrous, lenticellate. Fruits: mericarps dark grey, 22–31 × 5–6 cm, ellipsoid, obtuse at the apex, 200–300-seeded; wall 2–3 mm thick, pale brown inside. Seeds: grains 15–25 × 4–7 mm, obtuse at the both ends; coma (20)40–70 mm long; embryo: cotyledons 13–17 × 3–4 mm; rootlet 3 × 1 mm.
MAP 3. *Beaumontia grandiflora*

**Distribution:** Nepal, Bhutan, India, Bangladesh, Burma, China (Yunnan), Thailand, Vietnam.

Ecology: Humid montane forests, in valleys or on river banks. Altitude 25–1400 m.

**Vernacular names:** Tao Tum Yarn Chang (Thai), teste Put 3584.

**Uses:** Ornamental. The young branches are used for making coarse ropes (Bor & Raizada, 1954).

**Most of the specimens examined:**

**NEPAL: EAST**
- Dingia, Udaipur (fl. Apr.) Banerji 1568 (A);
- Iripura (fl. Jan.) N.B. s.n. (E);
- Kali Gandaki, Totupani (fl. Apr.) Rice 1578 (US);
- Mayangdi Khola (fl. Apr.) Stainton et al. 2529 (E, UPS);
- Mayangdi Khola near Beni (fl. Apr.) Stainton et al. 106 (E, UPS);
- Kali Gandaki near Beni (fl. Apr.) Stainton et al. 86 (E);
- sin. loc., Carrey s.n. (K);
- Noakote, Nawakot, Wallich 1629.1 (K-WALL, type).

**BHUTAN**
- Tongsa Distr., Wang de Khola below Shamgong, Grierson & Long 4309 (E);
- Samchi Distr., Phunsholing (fl. Feb.) Grierson & Long 2993 (E);
- Gaylephung Distr., Lodrai Khola (fl. March) Grierson & Long 3890 (E);
- Sarbong Distr., 12 km E. of Sarbong, near Lao Pani, Grierson
& Long 3546 (E); Byiti Sam, Mangde Chu (fl. March) Ludlow et al. 18553 (E); Mangde Chu (fl. May) Ludlow & Sherriff 3066 (E, UPS).

**INDIA:** Bettiah, Rastler 396 (K); Bombay: sin. loc., Herb. Dalzell s.n. (K). North West: Royle, Anonym. s.n. (K). Ichgaon (? (fl. March) Biswas 3258 (CAL); Calcutta, CBO s.n. (E); sin. loc. (fl. Dec.) Herb. Graham s.n. (CAL); Mt. Tura (fr. March) Koelz 24798 a (MICH), Koelz 24688 (L, MICH); Ercha, near Kalimpong (fl., fr. March) Gamble 3225 (K); Thora, near Sivoke (fl. Apr.) Gamble 3224 A (K). ASSAM: Lusai Hills (fl. Apr.) Koelz 27578 (L, MICH); Abor Hills, Dihang (fl. Feb.) Kingdom-Ward 7856 (K), Chutia Nagpur, Pandalu, Cooke 94 (K); Cochan, Keenan s.n. (K); Kanara, Yellapur (fl. Nov.) Bell 7522 (K); sin. loc (fl. Oct.) Herb. Weber s.n. (HBG).

**BURMA:** Chittagong, Sylhet, Anonym., s.n. (E); Sylhet, Wallich 1629.2 (K-WALL, M). Buxa Duars (fl. March) Biswar 1942 (NY).


**THAILAND:** sin. loc., Herb. Desvaux 398 (P); Lamphong, Me Laung (fl. March) Winit 1639 (BM, K, P); Korat Prov., Kao Lam Put 3384 (BM).

**VIETNAM:** Mt. Tay Ninh (fl., fr. Feb.) Muller 914 (K, P); between Dong Mo and Van Linh (fl. March) Pételot 2441 (A, MO).

**CULTIVATED:**

**USA:** Lake of Central Florida (fl. Nov.) Farlin 5229 (MICH); Los Angeles (fl. Apr.) Griffiths 4340 (K).

**GUATEMALA:** near Coban (fl. March, Apr.) Standley 90916 (F).

**HONDURAS:** Lancetilla valley near Tela (fl. March, Dec.) Standley 55187 (F, US).

**EL SALVADOR:** Pomincio, Calderon 484 (NY, US).

**COSTA RICA:** San Jose (fl. Dec.) Brenez & Valerio 138 (F); National Park (fl. Jan.) Khan et al. 319 (BM).

**CUBA:** Santa Clara, Soledad, Cienfuegos (fl. Jan.) Brues s.n. (GH).

**JAMAICA:** Arntully, Orcutt 5639 (US).

**MARTINIQUE:** sin. loc., Belanger s.n. (P).

**GUATEMELE:** sin. loc. (fl. March) Questel 2314 (US).

**TRINIDAD:** Port of Spain (fl. Nov.) B.E.D. s.n. (F).

**BERMUDA Islands:** Agricultural Station, Brown et al. 2010 (NY).

**HAIITI:** Port au Prince (fl. Nov.) Ekman s.n. (K).

**BRAZIL:** Saô Paulo (fl. Aug.) Kuhlmann 4322 (K, US).

**GREAT BRITAIN:** Kew Bot. Gard. (fl. Apr.) Anonym. s.n. (K).

**AFRICA:** GHANA: Legon (fl. Feb.) Leeuwenberg 11070 (WAG).

**NIGERIA:** Bot. Gard. of Ibadan University (fl. Oct.) Emwiosebon 57962 (FHO, WAG).

**ZAIRE:** Kisantu (fl. Sept.) Callens 2869 (NY).

**ZAMBIA:** Livingstone (fl. July) Gilges 650 (K, M, SRGH).

**KENYA:** Nairobi Arboretum (fl. June) Williams 460 (FHO, K).

**MALAWI:** Zomba Bot. Gard. (fl. Aug.) Salubeni 816 (SRGH).

**MOZAMBIQUE:** Vasco da Gama Gard. (fl. Dec.) Balsinhas 1917 (K, LISC).

**MADAGASCAR:** sin loc., Anonym. s.n. (MEL).

**REUNION:** sin. loc., Cadet s.n. (P).

**MAURITIUS:** Bot. Gard. (fl. Sept.) Guicho 10819 (MAU); Rose Hills (fl. Sept.) Rivaland 422 (MAU).


**CHINA:** Hongkong Bot. Gard., Chun 6169 (UC); Chung Chi campus (fl. Feb.) Hu 6582 (K, MICH, US); Fukien, Foochow (fl. Apr.) Chung 2695 (K, UC).

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THAILAND: Kasetsart University (fl. Dec.) Watdamnahsamp 31 (L).
SINGAPORE: Palace of Sultan (fl. July) Anonym, s.n. (L).

Note: In 1814 ROXBURGH published a nomen nudum *Echites grandiflora* in Hort. Beng. 20. 1814, which he validated only in 1832. As meanwhile WALlich had published *Beaumontia grandiflora* as a valid name for the same species in Tent. Nap. 15. 1824, he is the author.


Type: India: sin. loc., Herb. Wight s.n. (K, holotype).

Woody climber. Branches glabrous, with longitudinally fissured bark; branchlets smooth and with dark brown sparse pubescence. Leaves: petiole 5–25 mm long, glabrous or rarely puberulent, with 2–8 colleters in a single row in the axils; blade ovate or often elliptic, 2–3.3 × as long as wide, (7)9.5–28 × 3–13.5 cm, equal-sided, long acuminate at the apex, at the base cuneate, glabrous above or sometimes sparsely pubescent on the costa, beneath glabrous or sparsely pubescent; with 12–18 secondary veins on each side. Inflorescences lax, 6–9-flowered, 0.4–1.6 × as long as the leaves, 12–16 cm long, cymose, once branched. Peduncle (15) 25–50 mm long, sparsely pubescent; pedicels 15–25 mm long, pubescent; bracts elliptic, 2.5–3.6 × as long as wide, 10–11 × 3–4 mm, acuminate at the apex, sparsely pubescent on both sides, with 1–3 colleters, deciduous. Flowers: Sepals pale green with light pink on the veins (teste Saldanha 16005), elliptic 4–5.6 × as long as wide, 13–27.5 × 3–6 mm, acuminate at the apex, pubescent on both sides, mostly with invisible veins, with 6–10 colleters in the whole flower; colleters slender, 1 mm long, acuminate at the apex. Corolla white (teste Saldanha 16005); tube 2.1–4.3 × as long as the calyx, 60–70 mm long, 1.5–2.8 × as long as the mouth diameter, outside sparsely puberulent, inside glabrous; lower part 15–20 mm long; upper part widely obconical, 2.25–3.3 × as long as the lower part, 45–50 mm long, at the mouth 30–40 mm in diameter; lobes ovate or semi-orbicular, 0.5 × as long as the calyx, about 1 × as long as wide, 17.5–35 × 15–35 mm, acute or rounded at the apex, sparsely puberulent on both sides, with conspicuous parallel veins. Stamens included for 5–10 mm, inserted 20–30 mm from the corolla base, 30–45 mm long, glabrous; anthers 10–12 × 2 mm, acuminate, at the apex for 1 mm sterile, glabrous on both sides. Pistil about 65–70 mm long; disk 1.5–2 × 4 mm, sparsely hirtio-puberulent at the apex; ovary superior; carpels connate, 1–2 × 3 mm, densely hirtio-puberulent; style green, 55–75 mm long, glabrous; pistil head green, 8–10 × 3 mm, glabrous. Fruit unknown.
FIG. 4. Beaumontia jerdoniana. 1, flowering branch (× $\frac{3}{3}$); 2, bud (× $\frac{3}{3}$); 3, opened flower (× $\frac{3}{3}$); 4, ovary with disk and colleters (× 3); 5–6, stamen both sites (× 3); 7, fruit (× $\frac{3}{3}$); 8, seed (× $\frac{3}{3}$). 1, 3–6 from Saldanha 16005; 2 from Thomson 3411; 7–8 from Wight s.n.

Distribution: India, Burma.

Specimens examined:


Burma: Wa Dist.: Nan Pan Chaung (fl. Apr.) Khant 15332 (K).

Cultivated:

USA: S. California (fl. May) Griffith 5061 (K).


Thailand: Bangkok, Collins s.n. (RM).

Indonesia: Bogor Bot. Gard. (fl. Nov.) Merrill s.n. (NY, US); ibid., Spire s.n. (P); ibid., Leeuwenberg 13160, 13161, 13183, 13185 (WAG).

**Fig. 5; Map 5**

Type: India, Meghalaya: Mt. Khasia, Nungklow, Lobb s.n. (K: holotype; isotype: W).

Heterotypic synonyms: *B. shanica* McGregor et Smith, Rec. Bot. Surv. Ind. 4: 278. 1911. Corrigenda to vol. 4, fasc. 6, p. 278 line 10 for *B. brevituba* and *B. shanica* nom. nov. The specific name of *brevituba* is preoccupied. Vol. 4, p. 278 is in fasc. 5, 1911. Type: Burma: S. Shan state, McGregor 1286 (K, holotype; isotype: E).


Woody climber. Trunk stout. Branchlets smooth, densely dark brown-pubescent. Leaves: petiole 10–30(40) mm long, (sparsely) puberulent or less often pubescent, with 8–25 colleters in 1–2 rows in the axils; ocrea with 5–12 colleters; blade elliptic or obovate, 1.7–2.3 × as long as wide, 12–25 × 6–13.5 cm, long-acuminate or apiculate at the apex, at the base cuneate or almost rounded, above sparsely puberulent or glabrescent, only on the costa and secondary veins more densely hairy, beneath tomentose or velutinous; with (12)13–18 secondary veins on each side. Inflorescences lax, 16–20 cm long, 1–1.4 × as long as the leaves, 9–13-flowered, 1–2 × branched. Peduncle 65–120 mm long, densely pubescent; bracts 0.7–1 × as long as the sepals, 2.1–3.5 × as long as wide, 15–17 × 6–7 mm or sometimes smaller, narrowly elliptic, acuminate at the apex, densely pubescent on both sides, with 3–5 colleters in a single row, persistent. Flowers probably fragrant. Sepals narrowly elliptic or narrowly ovate, 2.6–4 × as long as wide (7)10–16 × 2–5(10) mm, acuminate at the apex, densely pubescent on both sides, with 5–30 colleters in the whole flower; costa and veins inconspicuous. Corolla white; tube 1–1.8 × as long as the calyx, 0.5–1 × as long as the mouth diameter, 10–20 mm long, outside pubescent, often near the base more densely so, inside glabrous or with several tufts of hairs, only near the base densely hirto-pubescent; lower part 4–5(7.5) mm long; upper part broadly campanulate, 1.1–3.75 × as long as the lower, 6–15(20) mm long, at the mouth 20–30 mm wide; lobes broadly ovate or broadly elliptic, 0.8–1.4 × as long as wide, 1.25–4 × as long as the corolla tube, 25–40 × 17.5–40 mm, rounded at the apex, (sparsely) puberulent or pubescent on both sides, equal-sided; parallel veins especially in the lobes conspicuous. Stamens exserted for about 10–20 mm; filaments inserted where the corolla tube widens, being 4–5(10) mm from the corolla base, 20–25(30) mm long, at the base twisted and with some hirto-puberulence, furthermore glabrous or with some puberulence; anthers 8–9.5 × 1.5–2 mm, at the apex for about 1–1.5 mm sterile, glabrous or with some puberulence outside, inside glabrous. Pistil 32.5–35(40) mm long; disk ring-shaped, shallowly 5-lobed, 1–2 × 3–5 mm, outside sparsely to densely pubescent, at the apex often more densely so; ovary superior; carpels connate, 2 ×
FIG. 5. *Beaumontia khasiana*. 1, flowering branch (× ½); 2, detail of leaf beneath (× 1); 3, flower (× ½); 4, opened flower (× 3); 5–6, anther both sides (× 3); 7, anthers with pistil head (× 3); 8, ovary with disk and colliers (× 4). 1–8 from Kingdon-Ward 20735.
3 mm, densely pubescent; style 20–30 mm long, hirsute; pistil head 4–5 × 1.5–2 mm, glabrous or often only at the extreme apex with some hirto-puberulence. 

*Fruit* unknown.

**Distribution:** India, Burma, China (Yunnan).

**Ecology:** Forests in the high mountains. Altitude 1500–1750 m.

**Uses:** Ornamental.
Specimens examined:
India: Mt. Khasia, Nungklow, Lobb s.n. (K, W, Type).
China: Yunnan, Lung Ling Hsien (fl. March) Tsai 55535 (A, BO, type of *B. yunnanensis*).

6. Beaumontia longituba Craib in Fedde, Repert. 393. 1913. Fig. 6; Map 6


Climbing shrub. Branches glabrous, smooth, sulcate when dry, with many black dots; branchlets pale grey, with many black dots. Leaves: petiole 10–12 mm long, glabrous, with many black dots, with 5–10 colleters in 1 row in the axils; blade narrowly elliptic, 2.8–3.3 × as long as wide, 13–17 × 4.5–6 cm, often some basal smaller, acuminate at the apex, at the base cuneate, glabrous and with many black dots on both sides; with 11–14 secondary veins on each side. Inflorescences lax, once branched, 6–7-flowered, 10 cm long, 0.6–0.7 × as long as the leaves. Peduncle 10 mm long, with dark brown dense short pubescence; pedicels 3–4 mm long, with dark brown dense short pubescence; bracts narrowly ovate, 2–3.3 × as long as wide, 5–8 × 1.5–4 mm, acuminate at the apex, outside pubescent, incised sparsely pubescent, persistent, with 1–2 colleters at the edges. Flowers: Sepals very narrowly ovate, 4–5 × as long as wide, about 0.2 × as long as the corolla tube, 8–10 × 2 mm, acuminate or acute at the apex, with dense short pubescence on both sides, with inconspicuous costa and veins, with about 35 colleters in the whole flower; colleters slender, 1 mm long, acuminate at the apex. Corolla white(?); tube 4.5–5.6 × as long as the calyx, 3.5–3.6 × as long as the mouth diameter, about 45 mm long, outside at the lower part densely pubescent and at the upper part more densely so, inside glabrous; lower part 20 mm long; upper part obconical, 1.25 × as long as the lower part, 25 mm long, at the mouth 12.5 mm in diameter; lobes ovate, equal-sided, 1.5–1.8 × as long as wide, 15–18 × 10 mm, acute at the apex, sparsely pubescent on both sides, with inconspicuous parallel veins. Stamens included for 3–5 mm; filaments inserted at about 24–25 mm from the corolla base, 10–11 mm long; anthers 11 × 1.75 mm, at the apex for about 2 mm sterile, glabrous on both sides. Pistil 43 mm long; disk consisting of 5 parts, 2 × 1 mm; parts rounded and puberulous at the apex, glabrous elsewhere; ovary superior; carpels connate, 2 × 1 mm, densely pubescent; style 35 mm long, sparsely to densely pubescent; pistil head 8 × 2 mm, glabrous. Fruits unknown.

Distribution: India: Naga Hills, Saithu near Manipur.
Only known from the type.

FIG. 6. Beaumontia longituba. 1, flowering branch (× ½); 2, opened flower (× ½); 3–4, anther both sides (× 2); 5, anthers with pistil head (× 2); 6, ovary (× 4). 1–6 from Meebold 6615.


Fig. 7; Map 7


Type: Thailand: Tapli, Kloss 6946 (K, holotype).

Heterotypic synonym: *B. rosea* Fischer, Kew Bull. 316. 1929.

Type: Burma: Bausanpan, Parkinson 7751 (K, holotype).
FIG. 7. *Beaumontia macrantha*. 1, branchlet ($\times \frac{3}{4}$); 2, node with colleters ($\times 2$); 3, flowering branch ($\times \frac{3}{4}$); 4, flower ($\times 1\frac{1}{2}$); 5, opened flower ($\times 1\frac{1}{2}$); 6, pistil ($\times 4$); 7, sepal with colleters ($\times 4$); 8–9, stamen both sides ($\times 4$). 1–9 from Kerr 18653.

Climbing shrub up to 5 m high. Stem up to 1.25 cm in diameter (according to Ridley, 1922); bark fibrous. Branches smooth; branchlets pale grey, whitish-pubescent. Leaves probably only at the apex decussate; petiole 2.5–3.5 cm long (copied from Fischer (1929) and Ridley (1920)), tomentose, with 10–20 collets in 1–3 rows in the axils; blade elliptic, 1.1–1.6 × as long as wide, 14–25 × 12–15 cm (copied from Fischer and Ridley), apiculate at the apex, cuneate or almost rounded at the base, above (sparsely) tomentose, beneath tomentose; with 6–8 secondary veins on each side. Inflorescences congested, 2–3 × as long as the leaves, 7–7.5 cm long, 17–34-flowered, 1–3 branched. Peduncle 35–40 mm long, tomentose; pedicels 15–17.5 mm long, tomentose; bracts elliptic, 2.1–3 × as long as wide, 6–8 × 2–3.5 mm, acuminate at the apex, tomentose on both sides, deciduous; collets absent. Flowers probably fragrant. Sepals elliptic, 2.6–3.5 × as long as wide, 8–9 × 2–3 mm, acuminate at the apex, tomentose on both sides, with 8–10 collets in the whole flower; costa and veins inconspicuous. Corolla pale yellow or light pink; tube 2.2–2.8 × as long as the calyx, 1.8–2.5 × as long as the mouth diameter, 20–22.5(25) mm long, tomentose outside, inside tomentose near the base and sparsely so at the apex, with a glabrous belt in the middle; lower part 5–6 mm long; upper part campanulate, 2.5–3.5 × as long as the lower, 15–17.5 mm long, with 10(5 × 2) appendages at the extreme apex alternating with the lobes, at the mouth 10–12.5 mm wide; lobes broadly ovate, 1.2–1.5 × as long as wide, 9–12 × 6–10 mm, acute at the apex, tomentose on both sides, with inconspicuous parallel veins. Stamens included for 0–1 mm; filaments inserted where the corolla tube widens, being 5–6 mm from the corolla base; about 10–10.5 mm long, tomentose at the base, and with hirto-pubescent at the apex, furthermore glabrous; anthers 8–10 × 1.5 mm, at the apex for about 1 mm sterile, outside hirto-pubescent, inside glabrous. Pistil about 20 mm long; disk cup-shaped, 1–1.25 × 3 mm, shallowly 5-lobed, glabrous outside, at the apex tomentose; ovary superior; carpels connate, 1 × 2.5 mm, tomentose; style 17–18 mm long, (sparsely) tomentose; pistil head 2 × 1 mm, glabrous. Fruit unknown.

Distribution: Burma, Thailand.
Ecology: Coastal area, lowland forests. Altitude 0–200 m.
Vernacular name: Muantum (Thai).
Uses: probably useful as an ornamental.

Specimens examined:
Burma: Bausanpan (fl. Apr.) Parkinson 7751 (K, type of B. rosea).
Thailand: Tapli, Kloss 6946 (K, type); Tamben Kao, Panom Krabi (fl. March) Kerr 18653 (BM, E, K, L, P).

Type: Indonesia: West Java: Banten, Teijsmann 14050 (BM, lectotype).

Woody evergreen climber, 4–20 m high. Trunk 3–15 cm in diameter; bark 2–3 mm thick, scabrous; sapwood straw-coloured, conspicuously porous.
FIG. 8. Beaumontia multiflora. 1, habit ($\times \frac{3}{2}$); 2, outline of fully developed leaf ($\times \frac{3}{2}$); 3, section of flower ($\times \frac{3}{2}$); 4, anther, ventral view ($\times \frac{3}{2}$); 5, pistil head ($\times \frac{3}{2}$); 6, flower base, partly dissected ($\times \frac{3}{4}$).

1–6 from Leeuwenberg 11893.
Branches corky, with longitudinally fissured bark; branchlets pale grey-brown, smooth, sulcate when dry and with dark brown-pubescent. Leaves: petiole 10–20 mm long, glabrous or less often sparsely puberulent, with 10–20 collets in a single row in the axils; blade dark green and shiny above, elliptic, less often obovate, 1.5–2.6 \( \times \) as long as wide, 6–24.5 \( \times \) 3–13 cm, apiculate or caudate at the apex, at the base cuneate or less often rounded, glabrous or sparsely pubescent above, beneath sparsely to densely pubescent, rarely glabrous; with costa sometimes white-spotted, with 12–17 secondary veins on each side. Inflorescences lax, 9–38-flowered, 10–17 cm long, 0.5–2 \( \times \) as long as the leaves. Peduncle 30–100 mm long, sparsely puberulent, somewhat quadrangular or laterally compressed, often lenticellate; pedicels 15–40 mm long, sparsely dark brown-pubescent; bracts pale green, pink at the extreme apex, elliptic, 2.25–2.5 \( \times \) as long as wide, 5–9 \( \times \) 2–4 mm, acuminate at the apex, outside pubescent, inside pubescent except for the glabrous base, with 5–20 collets in a single row. Sepals pale green or maroon, sometimes pinkish at both margins, elliptic or narrowly ovate, 2–4.5 \( \times \) as long as wide, 0.2–0.48 \( \times \) as long as the tube, 9–20(30) \( \times \) 2–6(10) mm, acuminate at the apex, sparsely to densely pubescent on both sides, or glabrous inside, with conspicuous costa and veins, with 10–40 collets in the whole flower; collets about 1 mm long, acuminate or truncate at the apex. Corolla white, near the base pale yellow or light green; tube (1.75) 3–4.5(5) \( \times \) as long as the calyx, (20)30–45(50) mm long, outside sparsely to densely pubescent, inside glabrous; lower part 5–10 mm long; upper part widely obconical, 3–4(5) \( \times \) as long as the lower part, (25)27.5–35(40) mm long, at the mouth (25)32.5–50(70) mm in diameter; lobes broadly ovate, 0.8–1.7 \( \times \) as long as wide, 17–30 \( \times \) 12–30 mm, rounded or acute at the apex, rarely obtuse, unequal-sided, spreading, somewhat twisted at the right margin, outside sparsely pubescent, inside sparsely pubescent or less often glabrate, with conspicuous parallel veins. Stamens creamy or brown, exserted for 0–5 mm, less often included; filaments white, inserted 10–15(20) mm from the corolla base, 15–25 mm long, bending outward near the apex, widened at the apex, glabrous; anthers 10–12 \( \times \) 2–3 mm, at the apex for 1–2 mm sterile, glabrous on both sides. Pistil light green, 25–40 mm long; disk cup-shaped, 1–2 \( \times \) 3–5 mm, obscurely 5-lobed, glabrous or less often with some puberulence, enveloping the ovary; ovary semi-inferior; carpels connate, 0.5–2 \( \times \) 2–4 mm, tomentulose or densely pubescent; style light green, 25–30(35) mm long, sparsely hirt-puberulent near the base, furthermore glabrous; pistil head light green, 7.5 \( \times \) 2 mm. Inflorescences: pedicels 3–5 \( \times \) 0.75 cm, pale grey, glabrous, with some lenticels; peduncle short, glabrous, lenticellate. Mericarps dark or dark brown, cylindrical, 10–25 \( \times \) 4–7 cm, rounded at the apex, somewhat cordate at the base, glabrous, lenticellate, 100–250-seeded; wall 2–3 mm thick, pale yellow inside. Seeds: grains (10)14–18 \( \times \) (2)4–7 mm, obtuse at the apex, acute or obtuse at the base; coma (15)20–50 mm long; embryo: cotyledons 12–13 \( \times \) 4–4.5 mm; rootlet 3–4 \( \times \) 1 mm.

Distribution: Indonesia: From Sumatra to Java and Bali. Malaysia: Continent: Selangor.
Ecology: Lowland or mountain forests. Altitude 0–700 m.

Vernacular names: Susu Munding (Sundanese, according to Teijsmann & Binnendijk, 1853); Susu Kebo (Javanese, according to Koorders, 1912). Both mean milk of buffaloes.

Uses: Ornamental.

Specimens examined:

MALAYSIA: Selangor State, Batu caves (fl. Nov.) Sinclair 40057 (SING); ibid. (fl. Dec.) Ridley s.n. (K).

INDONESIA: SUMATRA: NORTH: near Medan (fl. Dec.) Lörzing 16458 (BO); South: N.W. of Ranau Lake, near Kampung Sukanegri (fl. Oct.) Van Steenis 3438 (BO). JAVA: sin. loc., Hasskarl s.n. (P);
Fig. 9; Map 9

Type: Thailand: Kow Hoo Wen, Murton 113 (K, lectotype).


Large woody climbing evergreen shrub, up to 20 m high. Trunk 1.5–2.5 cm in diameter; branchlets pale grey or dark brown, sparsely to densely pubescent or glabrous. Leaves: petiole 10–25(30) mm long, sparsely puberulent or glabrate, less often pubescent, with 6–30 collers in 1–3 rows in the axils; blade broadly elliptic or obovate, 1.4–2.3 × as long as wide, 10–25(30) × 3.5–13(15) cm, apiculate or acute, rarely obtuse at the apex, at the base rounded or cuneate, above glabrous or sometimes sparsely pubescent on the costa, beneath glabrous or sparsely to densely pubescent but often more densely so on the costa and veins; with 11–18 secondary veins on each side. Inflorescences lax, 1–3 branched, 6–12-flowered, 12–19.5 cm long, 0.6–1.4 × as long as the leaves. Peduncle (25)30–60(90) mm long, puberulent or sparsely to densely pubescent; pedicels 30–50 mm long, sparsely pubescent; bracts 2 × as long as wide, 10–15 × 5–7.5 mm, deciduous or less often persistent, with (10)15–20 collers. Flowers fragrant. Sepals pale green, broadly elliptic, rarely elliptic or obovate, 1–2.6(3) × as long as wide, 0.4–0.9 × as long as the corolla tube, 27.5–40(45) ×
FIG. 9. Beaumontia murtonii. 1, flowering branch (x \( \frac{3}{4} \)); 2, opened flower (x \( \frac{3}{4} \)); 3–4, anther both sides (x 2); 5, ovary (x 4); 6, seed (x \( \frac{3}{4} \)); 7, embryo (x \( \frac{3}{4} \)). 1–5 from Kerr 19837; 6–7 from Collins 1030.
(10)18–27 mm, apiculate or rounded, rarely acuminate at the apex, entire, sparsely pubescent on both sides, with conspicuous costa and veins, with 50–70 collers in the whole flower; collers slender, 1 mm long, acuminate at the apex. *Corolla* white or creamy; tube 0.8–2.75 × as long as the calyx, 0.7–1.4 × as long as the mouth diameter, outside sparsely to densely pubescent, inside glabrate or glabrous; lower part (10)15–17.5 mm long; upper part widely obconical, 1.8–3.1 × as long as the lower part, (30)32.5–47.5 mm long, at the mouth 32.5–65 mm in diameter; lobes ovate or lingulate, subequal- or equal-sided, 1.3–1.4 × as long as wide, 19–30 × 14–30 mm, acute at the apex, less often rounded, glabrate or less often sparsely pubescent on both sides, with conspicuous parallel veins. *Stamens* yellow or orange, exserted for about 0–5 mm, rarely included; filaments white, inserted at about 20–25 mm from the corolla base, 15–25 mm long, glabrous; anthers (10)13–15 × 2–3 mm, at the apex for about 2 mm sterile, glabrous or less often with some pubescence on both sides. *Pistil* about 45–50 mm long; disk cup- or rarely ring-shaped, (0.5)1.5 × 3–4 mm, glabrous, or sometimes only at the apex with hirto-puberulence; ovary superior; carpels connate, 1–1.25 × 3 mm, densely pubescent, often puberulent; style 40 mm long, glabrous or sparsely hirto-puberulent; pistil head 8–13 × 2 mm, glabrous. *Infrauctescences*: pedicels 4 × 0.75 cm, rigid, glabrous, lenticellate; peduncle 2.5 × 0.5 cm, glabrous, lenticellate. *Fruits*: mericarps dark brown, 18 × 5 cm, ellipsoid, obtuse at the apex, cordate at the base, glabrous, 200–300-seeded; wall 2–3 mm, pale brown inside. *Seeds*: grains 11–14(20) × 4–5 mm, sparsely pubescent or glabrous, obtuse at the both ends; coma 30–80 mm long; embryo pale brown; cotyledons 11 × 4 mm, obtuse at the base; rootlet 3 × 1 mm.

**Distribution**: Thailand, Laos, Cambodia, Vietnam, Continental Malaysia.

**Ecology**: Evergreen forests or thickets in the mountains, or on river banks, often along the coasts. Altitude 0–1500 m.

**Vernacular names**: Thailand: Kumlung Changsarn (near Bangtapan) teste Put 1426; Sai tan yai (near Krabi) teste Kerr 19837; Knua nguan hern or Sala naung, teste Phon Anuwat Wanasah 60. Cambodia: Chor Chhak (near Watphnom) teste Vidal 5100.

**Uses**: The latex is used as arrow poison (teste Vidal 5100); ornamental (teste Sulit 3555).

**Specimens examined**:


**THAILAND**: Chonburi Prov., Sriracha Distr.: Chundaten R. Falls (fl. Nov.) Maxwell 74–987 (AAU, L); Hoap Bon, Collins 535 (K, US); Ban Chark (fl. Nov.) Collins 1718 (BM, K, US); Pan Sadhet (fl., fr. Nov.) Collins 1365 (K, US); between Nong Kaw and Nong Khe Ploy (fl. Feb.) Collins 356 (K); Naung Yai Bu (fl. Sept.) Kerr 2676 (K, paratype); sin. loc., Collins 1030 (K); sin. loc. (fl. Nov.) Collins 1985 (K, US). Ban Keng near Krabin (fl. Nov.) Kerr 19837 (E, K); Kan Kradai, Prachap (fl. Jan.) Put 2309 (BM, K, P); Bangtapan (fl., fr. Dec.) Put 1426 (BM, K, L); sin. loc. (fl. Jan.) Phon Anuwat Wanasah 60 (K); Kow Hoo Wen (fl. Feb.) Murton 113 (K, type).

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LAOS: Savannakhet Prov., between Lao Bo and Muong Nou (fl. Apr.) Poilane 13295 (P, WAG); near Luang Prabang, on Mt. Xuong (fl. March) Poilane 20519 (L, P).


CULTIVATED:

GHANA: Achimota (fl. Dec.) Irvine 2576 (E).
NIGERIA: Ibadan (fl. Feb.) Assi 13782 (K).
THAILAND: Bangkok (fl. Dec.) Vesterdal 241 (C).
CAMBODIA: Wat Phnom and Camp Le Rolland (fl. Feb.) Vidal 5100 (P).
nym. s.n. (P); ibid. (fl. Apr.) Fleury in Chevalier 37757 (P, WAG).
INDONESIA: Bogor Bot. Gard., Rudijman s.n. (Herb. Kehutanan UGM, Yogyakarta); ibid.,
Leeuwenberg 13184 (WAG).
PHILIPPINES: Laguna Prov., on Mt. Makiling, at Forestry Camp (fl. Dec.) Sulit 3555 (PNH); Rizal,
at Mandaluyong (fl. Nov.) Vergara 15 (L); Cebu (fl. Oct.) Lawrence s.n. (K).

NOMINA NUDA

*B. speciosa* Hort., Siebert & Doß, *Dilm. Blumeng.* 1:660. 1893 = *B. grandiflora*
Wallich

EXCLUDED SPECIES

1977.


Type species: *Hasseltia arborea* Blume (= *K. arborea* (Blume) G. Don).


Evergreen less often deciduous tree or shrub. Bark exuding white latex. Branches terete, brown or dark grey, lenticellate, glabrous; branchlets terete, sometimes laterally compressed and canaliculate at the apex, glabrous (only in *K. anceps* sometimes sparsely puberulent), lenticellate, brown or dark grey, with transversely fissured bark or not. Leaves opposite, those of a pair equal or subequal, petiolate; petiole of a pair connate into a very short ocrea, with colleters in the axils (not in *K. longifolia*); petiole glabrous, only in *K. anceps* sparsely puberulent; blade papyraceous to coriaceous, mostly narrowly to widely elliptic, unequal to equal-sided, entire, glabrous on both sides or more or less pubescent beneath; costa impressed above, rarely not, prominent beneath; secondary veins anastomizing or slightly curved towards the margins; tertiary venation more or less reticulate; domatia mostly present. Inflorescences terminal or axillary and then in alternating axils, once-branched. Peduncle short, glabrous; pedicels mostly glabrous; bracts sepal-like, shorter than the sepals, persistent, rarely deciduous. Flowers 5-merous, actinomorphic. Sepals ovate, less often hemic-orebic or elliptic, the inner narrower than the outer, imbricate quincuncial in bud, entire, mostly with colleters inside at the base. Corolla white, creamy or pale green, subdivid in a lower and an upper part (not known for *K. longifolia*), or not in *K. maingayi* and some specimens of *K. anceps*, lower part cylindrical or nearly so, often with a subglobose lower one- or two-thirds; slightly widened into an upper part; lobes elliptic, narrowly elliptic or sometimes obovate or ovate, entire, overlapping to the right in bud. Stamens exserted or included, connivent into
a close cone around the pistil head, rarely free, with or without dorsal swellings (not known for K. longifolia), inserted at the level where corolla tube (lower part) is widening, or only in K. maingayi at the apex of the corolla tube; anthers narrowly triangular, adhering to the pistil head, acuminate at the partially sterile apex, sagittate at the base, introrse; cells 2, dehiscent throughout by a longitudinal slit. 

**Pistil:** disk ring- to cup-shaped, sometimes enveloping the ovary, 5-lobed or nearly so; ovary bicarpellate, superior; carpels 2, free, ovoid; style mostly cylindrical, consisting of two connate strands; pistil head conical. In each cell one semi-globose or rarely ovoid placenta with many ovules. **Inferticesences** bearing 1–4(8) fruits, with glabrous pedicels and peduncle. **Mericarps** very narrowly ellipsoid or cylindrical, less often clavate, subtended by the persistent calyx. **Seeds:** grains brown, fusiform, tapering into a coma bearing beak, with apex directed towards the base of the follicle; coma whitish or brown; hairs simple, straight; rootlet cylindrical, obtuse at the apex, rarely very short; cotyledons folded.

**KEY TO THE SPECIES**

1. Stamens exserted for 0.5–4 mm ........................................... 2
   – Stamens included for (1)3–30 mm ....................................... 8
2. Corolla tube 5–14 mm long; upper part absent or up to 2 mm long .... 3
   – Corolla tube 23–37 mm long; upper part 5–9(10) mm long .......... 7
3. Leaves 15–34.5 cm long; costa hairy beneath, manifestly prominent; petiole 6–15 mm long, sparsely puberulent, less often glabrous .... 1. K. anceps
   – Leaves 3.5–19 cm long; costa glabrous beneath, moderately prominent; petiole 2–10 mm long, glabrous .................. 4
4. Leaves 8–19 × 2–7.5 cm; secondary veins (6)7–14 on each side; corolla tube (9)11–14 mm long; domatia (if present) consisting of pits .... 5
   – Leaves 3.5–13.5(14) × 0.8–5.5(6) cm; secondary veins 4–8 on each side; corolla tube 5–8(10) mm long; domatia (if present) without pit .......... 6
5. Corolla mouth glabrous or glabrate; inflorescences 1–6-flowered; axis with many bracts; petiole 2–6 mm long .................. 7. K. laurifolia
   – Corolla mouth densely hairy; inflorescences 8–25-flowered; axis without bract; petiole 5–15 mm long .......... 14. K. villosa
6. Corolla lobes glabrous at the apex; colleters in the calyx 2–4; leaves 3–8.1 × as long as wide, 4–10 × 0.8–4 cm; corolla tube 2.8–7 × as long as the calyx ................................................ 6. K. gitingensis
   – Corolla lobes hairy at the apex; colleters in the calyx 4–15; leaves 2.1–4.75 × as long as wide, 3.5–13.5(14) × (1)2–5.5(6) cm; corolla tube 2–3(4.5) × as long as the calyx ................................................ 10. K. maingayi
7. Corolla tube 23–26 mm long; lobes 15–20 mm long; leaves obtuse or acute at the apex; ovary glabrous .................. 5. K. elmeri
   – Corolla tube 34–37 mm long; lobes 25–33 mm long; leaves acuminate with obtuse point at the apex; ovary hairy .... 11. K. merrilliana

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8. Corolla lobes 25–33 × 3–4 mm, 7.5–10 × as long as wide; mouth 2–2.5 mm in diameter; lower part of the tube 4–5 mm long; calyx without colleters

- Corolla lobes (19)27–60 × (5)7–22 mm, 0.9–5 × as long as wide ++); mouth 4–10 mm in diameter; lower part of the tube 5–16(18) mm long; calyx with colleters

13. K. stenopetala

9. Anthers inserted 6–8 mm from the corolla base; lower part of the tube 5–6.5 mm long; sepals ciliolate, rarely not; inflorescences one-flowered...

- Anthers inserted 15–19 mm from the corolla base +); lower part of the tube 7–17(18) mm long +); sepals not ciliolate; inflorescences 1–12-flowered

10. Leaves 1.5–2.2 × as long as wide; domatia several; corolla tube 18–23 mm long; colleters in the calyx 5–15

- Leaves 2.7–4.2 × as long as wide; domatia many, almost all over; corolla tube (25)28–33 mm long; colleters in the calyx 50–60

15. K. wigmanii

11. Stamens included for 1–1.5 mm; anthers inserted 15 mm from the corolla base; leaves narrowly ovate; upper part of the tube pubescent or velutinous inside

- Stamens included for 3–30 mm; anthers inserted 17–19 mm from the corolla base; leaves elliptic to narrowly elliptic or obovate; upper part of the tube glabrous or sparsely (hirto-) pubescent inside

9. K. macgregori

12. Leaves 1.7–2.5 × as long as wide, 16–26(35) × 8–13 cm; colleters in the leaf axils 15–60; corolla tube glabrous inside; colleters in the calyx 70–100

- Leaves 2.6–5.7 × as long as wide, (5)6–20 × 1–6.5 cm; colleters in the leaf axils 0–3; corolla tube hairy inside; colleters in the calyx 4–15

13. Leaves (5)6–11 × 1–4 cm; corolla tube 11–25(27) mm long; lobes (1.1)1.3–4 × as long as the tube; stamens included for 4–6 mm

3. K. blancoi

- Leaves 13–17.5 × 3–6.5 cm; corolla tube (20)33–37 mm long + +); lobes (0.5)0.8–0.9 × as long as the tube; stamens included for (3)9–11 mm + +)

14. Leaves 3–4.8 × as long as wide, acuminate or caudate at the apex; leaf axils with colleters; sepals 2–3.75 × as long as wide; pedicels 5 mm long.

- Leaves 2.6–2.8 × as long as wide, acute at the apex; leaf axils without colleters; sepals 0.8–1.7 × as long as wide; pedicels 30 mm long

8. K. longifolia

++) not yet known for K. longifolia.


Fig. 10; Map 10

FIG. 10. Kibatalia anceps. 1, habit ($\times \frac{1}{3}$); 2, part of corolla lobes dissected ($\times 3$); 3, part of calyx with pistil ($\times 3$); 4, anther, dorsal view ($\times 11$); 5, fruit ($\times \frac{1}{3}$); 6, seed ($\times \frac{1}{3}$); 7, embryo ($\times 2$). 1 from Pételot Oct. 1935; 2–4 from Pételot 1866; 5 from Pételot 6001; 6 from Fleury in Chevalier 32197; 7 from Poilane 13629.

Type: Burma: Letpanthaung, Mergui: Meebold 14654 (K, lectotype); Tenasserim, Bosvachaung and Kyauktalan: Meebold 15408 (K, paratype); Meebold no. 14966 not traced.


Deciduous shrub or tree 3–15 m high. Trunk 10–23 cm in diameter. Branches hollow when dry, slightly compressed, with longitudinally fissured bark; branchlets hollow when dry, terete, laterally compressed and canaliculate at the extreme apex, sparsely puberulent or glabrous, longitudinally fissured. Leaves: petiole 5–15 mm long, sparsely puberulent or less often glabrous; colleters many, long, in a single row, persistent when the leaves are shed; blade coriaceous, glossy above, narrowly elliptic, 2.2–4 × as long as wide, 15–38 × 5–13 cm, equal- or subequal-sided, acuminate, obtuse or sometimes subcaudate at the apex, at the base cuneate or rounded, sinuate at the margins, glabrous above, beneath glabrous or often sparsely pubescent and sometimes minutely granulate, especially on the costa and secondary veins more densely so, less often hirsute; with 13–19(21) secondary veins on each side; tertiary venation obscure; domatia mostly absent, rarely present. Inflorescences lax, 0.1–0.4 × as long as the leaves, 2.5–6 cm long, (2)4–12-flowered. Peduncle 3–7.5 mm long, less often obsolete; inflorescence axis with deciduous bracts close together, 5–25 mm long; pedicels 15–30 mm long, sparsely to densely pubescent; bracts mostly erect. Flowers fragrant. Sepals pale green, free or connate for about 2 mm, ovate, 1.3–2.5 × as long as wide, 4–5 × 2–3 mm, acute or acuminate at the apex, sparsely puberulent outside, inside sparsely puberulent or glabrous; with 3–7 colleters in the whole flower in a single row at the base of the inner sepals near the edges, slender, about 1 mm long, obtuse rarely retuse at the apex. Corolla white or pale green; tube 2.2–2.75 × as long as the calyx, 11–12.5 mm long, glabrous outside, inside sparsely puberulent or pubescent in upper-half, furthermore glabrous; at the mouth 3.5–4 mm wide, sparsely pubescent; lobes narrowly elliptic, 1.2–1.8 × as long as the tube, 2.1–4 × as long as wide, 13.5–20 × 4–7 mm, acute or obtuse at the apex, sparsely puberulent outside, inside at the extreme base sparsely pubescent, furthermore sparsely to densely puberulent. Stamens exserted for 3–4 mm; anthers sessile, 3–3.5 × 0.75–1 mm, with apex for about 0.25–0.5

mm sterile, outside glabrous or sparsely hirto-pubescent, with a narrowly longitudinal dorsal groove, inside near the base pubescent and furthermore glabrous; tails curved inwards. **Pistil** 12.5-14 mm long; disk cup- or ring-shaped, 1-1.5 \( \times \) 2-3 mm, obscurely 5-lobed; carpels ovoid, 1.25-2.5 \( \times \) 1.75-2 mm, puberulent or with several stiff hairs outside; style 9-12 mm long, pubescent at the extreme apex, furthermore glabrous; pistil head 1-1.5 mm, with a bifid or obscurely lobed apex. **Infructescences**: pedicels 1.5-3 cm long, rigid, often sparsely puberulent, sparsely or not lenticellate; peduncle 2-10 mm long, often sparsely puberulent; bracts persistent. **Mericarps** narrowly ellipsoid, green (?) when mature, slightly pubescent at the extreme base, 7-24 \( \times \) 0.5-0.8 cm, with a raised line at each side, acute or obtuse at the apex, many-seeded, divergent at an angle of about 60-180°, with exocarp rather thick and hard, not lenticellate; wall 0.5-1 mm thick, pale brown inside. **Seeds**: grains 15-20 \( \times \) 2-3 mm, glabrous, granulate, acute at the base, beak glabrous for about 15 mm, bearing an apical coma about 10-22 mm; coma white or pale brown; hairs 15-45 mm long, shorter than the grain (and beak); embryo whitish; cotyledons 17 \( \times \) 4 mm; rootlet 3 \( \times \) 1 mm.

**Distribution**: Burma, China (Yünnan), Thailand, Laos, Cambodia and Vietnam.

**Ecology**: Forests, Savannas, often on stream banks, valleys or road sides. Altitude: 50-700 m.

**Vernacular name**: Burma: Nan Kai Tong (Shan); Thailand: Mook Yai (Loei); Laos: Khao Khouay (B. Sapham Meuk); Vietnam: Suoi-nai, Cay duoi, Cay toi voi (Phu Tho).

**Most of the specimens examined**:


**China**: Yünnan: Hsi-Shuang Pan-Na (fr. Apr.) Feng 20361 (PE, type of *Paravallaris yunnanensis*).

**Thailand**: Loei, Num Khan (fr. Nov.) Dee 1029 (K); N Phrae (fr. Jan.) Smitinand 10779 (L); N Phrae, between Muang Khan and Nam Krai (fl., fr. Apr.) Smitinand & Cheke 10794 (C, K, L, P); Doi Duan, Muang Pan (fr. March) Kerr 5108 (BM, K, L, P); Pra Ruang Waterfalls, Suhotai (bud, June) Maxwell 72-272 (AAU); Lampang: Muang Trang (fl. June) Winit 1420 (K); Me Salop (fl., fr.) Winit 1246 (K); Me Jom, Me Chawk (fl. May) Winit 1825 (K).

**Cambodia**: De Ninh Prov., Bang Tre Lat, Poilane 16449 (P); De Vinh Prov., Song Ca valley, km 102, road 7 (fr. Jan.) Poilane 19962 (P, WAG).

**Laos**: Lai Chau (fr. Jan.) Poilane 27147 (P, WAG); Lai Chau, near Pong Saly (fr. Apr.) Poilane 25844 (P, WAG); B. Sapham Meuk (fr. March) Vidal 1182 B (P); Central, near Mekong R., Harmand s.n. (P).

**Vietnam**: Tu-Phap (fr. Sept.) Balansa 2103 (G, K, P, paratype of *Paravallaris macrophylla*); ibid. (fl. June) Anonym. s.n. (L); Cay Sen, Thien Thon (fr. Jan.) Bon 5057 (P, WAG); Tuyen Quang Prov.: Phu Ho (fl., fr. June) Péételot 1866 (A, UC); ibid., Parquier 3052 (P, UC); sin. loc. (fl. June) Péételot 1934 (NY, P); Cho Ganh, Phu Ho (fl. Sept.) Péételot 698 (P); Muong St, near Lac Tho (fl. March) Bon s.n. (P); Sontay Prov.: between Sontay and Da Chang (fl., fr. Oct.) Péételot s.n. (A, P, US); Mt. Basi (fr. Feb.) Péételot 6001 (A); Vinh Yen Prov.: Vinh Yen, Herb. Eberhardt 3801 (NY, P); Lang Lue, Herb. Eberhardt 4904 (A, P); Phu Tho Prov.: La Pho, Herb. Eberhardt 4349

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(P); Dao Gia, near Phu Tho (fr. Apr.) Chevalier 37478 (P); Chan Mong F.R. (fr. Apr.) Fleury in Chevalier 32197 (P, WAG); Trung Giap For. (fl. May) Fleury 37531 (P, WAG); Hoa Binh Prov.: near Muang Than, road from Hanoi to Hoa Binh (fr. Jan.) Pételot 4921 (AAU, NY, P); Sui Yut, Herb. Eberhardt 422 (P, WAG); Mai Chau, Herb. Eberhardt 4245 (P); Thanh Hoa Prov.: Thien Hou (fl. June) Bon 5404 (A, P); between La Han and Lung Van (fr. Jan.) Poilane 18876 (P, WAG); Hoi Xuan (fl., fr. Aug.) Poilane 1752 (A, NY, P); Quang Tri Prov.: Ailao Pass (fl. May) Poilane 24872 (WAG); ibid. (fl. May) Poilane 24837 (P, WAG); sin. loc. (fr. March) Poilane 13629 (P, WAG); Hue, Harmand s.n. (P); Hue, (fl. Sept.) Harmand in Herb. Pierre 1869 (K, P, lectotype of *Paravallaris macrophylla*).

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Evergreen big **tree** 7.5-45(65) m high; crown small, light, rounded or cylindrical, up to 5 m in diameter. **Trunk** straight, 15-100 cm in diameter, often with short buttresses about 1.5 m high, clear bole 5-40 m high; outer bark smooth, finely fissured, about 2-4 mm thick, grey, grey-brown or black, lenticellate; inner bark white, light orange or greenish, often spotted, 0.8-2 cm thick; sapwood white or pale yellow, with faint rings. **Branches** hollow (when dry), often fissured, smooth; branchlets hollow (when dry), laterally compressed and slightly canaliculate at the extreme apex, sulcate when dry, bark sometimes transversely fissured, less often slightly peeling off. **Leaves:** petiole 5-14(30) mm long; colleters 15-60, long, slender, in 1-3 rows (colleters persistent when the leaves are shed); blade coriaceous or papyraceous, elliptic, less often obovate, 1.7-2.5 × as long as wide, 16-26(35) × 8-13 cm, equal- or subequal-sided, acute, acuminate or rarely obtuse at the apex, rounded or cuneate at the base, dark green above, beneath pale green, often granulate, sparsely pubescent, on the midrib and secondary veins more densely so, rarely with black dots all over; with 11-18 secondary veins on each side; tertiary venation conspicuous; domatia absent. **Inflorescence** lax, 0.5-0.6 × as long as the leaves, 8-10 cm long, 1-2-flowered. **Peduncle** 2-5 mm long; pedicels 30-50 mm long. **Flowers** fragrant, and with about the same odour as Kenanga (*Cananga sp.*). **Sepals** pale green or white, connate for 0.5-1 mm, ovate or narrowly ovate, 1.3-3.5 × as long as wide, 4-7 × 2-3 mm, obtuse, acute or acuminate at the apex, glabrous.
Fig. 11. Kibatalia arborea. 1, habit (× ½); 2, flower (× ½); 3, part of flower opened out (× 1); 4, anther, dorsal view (× 3); 5, anther, ventral view (× 3); 6, fruit (× ½); 7, seed (× ½); 8, embryo (× 1).
1 from Sargent 20-10-1903; 2–5 from Blume s.n., L 898.110-294; 6–7 from Koorders 202B; 8 from Whitmore FRI 13406.
outside, inside glabrous or less often sparsely to densely pubescent; with about 70–100 colleters in the whole flower in a single row at the base of the sepals, simple, rarely lobed, about 1 mm long, obtuse at the apex. Corolla white or creamy, often tinged with green outside; tube 1.8–11.2 × as long as the calyx, 24–45 mm long, glabrous on both sides; lower part 10–15 mm long; upper part obconical or narrowly campanulate, 1–2.2 (3.7) × as long as the lower (part), (9)12–25(40) mm long, at the mouth 5–10 mm wide; lobes elliptic or narrowly obovate, 2.3–3.2 × as long as wide, 30–40 × 10–18 mm, (0.2)0.8–2.2 × as long the tube, acute, acuminate or rounded at the apex, glabrous or sparsely to densely pubescent on both sides, unequal-sided. Stamens included for 3–30 mm, inserted 7–19 mm from the corolla base; filaments 0–1 mm long, rarely obosolate; anthers 6–7 × 1–2 mm, with apex about 1–1.5 mm sterile, outside glabrous or sparsely hirto-pubescent, inside hirto-pubescent or tomentose below the connectives, and furthermore glabrous; tails straight. Pistil 12–22 mm long; disk cup-shaped, 2–3 × 2–3 mm, obscurely 5-lobed; carpels ovoid, 2.5–4 × 1.5–2.5 mm, glabrous; style 10–19 mm long, widening towards the apex, glabrous; pistil head 1–3 × 1–2 mm, with a lateral receptive zone and topped by an obscurely lobed apex. Infructescences pendulous; pedicels 4–6 cm long, rigid, stout, with large lenticels, less often with faint transversely fissured bark; peduncle 2–6 mm long. Mericarps very narrowly ellipsoid or very narrowly clavate, 25–85 × 1–2.5 cm, tapering into an acuminate or acute apex, with or without large lenticels, hard, many-seeded, parallel or divergent; wall 3–5 mm thick, yellow inside; calyx mostly persistent under the ripe fruits. Seeds: grains 28–35 × 2–3.5 mm, glabrous, acuminate or acute at the base; beak glabrous for about 50 mm, bearing an apical coma for about 30–40 (80) mm; coma white; hairs 20–100 mm long, shorter than the grain (and beak); embryo whitish or creamy; cotyledons 22–25 × 3 mm; rootlet 4–7 × 1 mm.

Distribution: Thailand, Malaysia, Indonesia (Sumatra, Java, Sulawesi), Philippines (Island of Palawan).

Ecology: Lowland tropical forest, often on stream banks and steep slopes. Altitude: 0–500 m.

Uses: According to Heyne (1950), the latex is used as medicine against stomach disorder or worm diseases. In Southeast Sulawesi the wood is used as sabre sheath.

Vernacular names: Malaysia: Jelutung (Sandakan); Jelutung pipit, Jelutung Beruang or Tamadak (Kepong). Indonesia: Sumatra: Balam batik, Balam dadi or Kayu gede (Tapanuli). Java: West: Kitumbali (Bogor); Kibunteli (Bogor, Bandung); Kibenteli (Banten); Hambulu (Cirebon). Central and East: Kayu Santen (Pekalongan, Subah, Cilacap, Yogyakarta, Kediri, Malang, Banyuwangi); Balung (Subah). Sulawesi: Lingorumbolia (Malibi); Atesahah (Mamuju); Soliti, Kasimbolili (Muna).
Most of the specimens examined:

THAILAND: Ban Tu Gor, Tan Young Mas (fl. Apr.) Laksnakara 840 (BM, E, K, L, P); Naung Chick, Krabi (fl. March) Kerr 18623 (BM, K, MO).


CULTIVATED:


MALAYSIA: Kepong, Selangor (fl. Sept.) Sahak bin Said 45825 (KEP); ibid. (fl. Sept.) Hamid 18245 (KEP).


Fig. 12; Map 12


Fig. 12; Map 12


FIG. 12. *Kibatalia blancoi*. 1, habit (× ¼); 2, section of flower (× ¼); 3, apex of gynoecium and anthers lateral view (× 3); 4, anther ventral view (× 3); 5, anther dorsal view (× 3); 6, sepal inside with collers (× 3); 7, part of calyx with disk and ovary (× 3). 1, 6–7 from Sulit PNH 6876; 2–5 from Mabesa FB 25726.

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**Tree** 10–20 m high; trunk terete, 13–40 cm in diameter; branchlets sulcate when dry, finely longitudinally fissured, bark sometimes transversely fissured. **Leaves:** petiole channeled above, (2)4–10 mm long; colleters several, short; blade coriaceous, sometimes subcoriaceous when dry, narrowly elliptic, 2.6–5.7 × as long as wide, (5)6–11 × 1–4 cm, acute or acuminate with an obtuse point at the apex, rarely shortly caudate, cuneate at the base, glabrous on both sides; with 5–10(12) secondary veins on each side; tertiary venation conspicuously or obscurely reticulate; domatia with or without tufts of hairs. **Inflorescences** lax, 0.5–2 × as long as the leaves, 4.5–8.5(10) cm long, 1–4-flowered. Peduncle (0)2–5 mm long; pedicels 8–17(25) mm long, glabrous; bracts erect or spreading. **Flowers** fragrant, less often odourless. **Sepals** pale-green (?), free, ovate, (0.5)1–1.6 × as long as wide, 2–5 × 2–4 mm, acute or obtuse at the apex, glabrous on both sides, with 4–15 colleters in the whole flower in a single row at the base of the sepals, slender, flat, obtuse at the apex. **Corolla** white; tube 3.5–8 × as long as the calyx, 11–25(27) mm long, glabrous outside, inside glabrous or sometimes sparsely hirto-pubescent; lower part 6–16(18) mm long; upper part campanulate, 0.3–0.8 × as long as the lower, 5–10(15) mm long, at the mouth about 6–8(15) mm wide; lobes narrowly elliptic, (1.1)1.3–4 × as long as the tube, 1.5–4 × as long as wide, 30–45 × (6)10–22 mm, acute at the apex, sparsely pubescent or glabrous outside, glabrous or often sparsely puberulent at the base inside. **Stamens** included for about 4–6 mm; anthers sessile, about 6 × 2 mm, at the apex sterile for about 0.5 mm, outside sparsely to densely hirto-pubescent except for the glabrous tails, inside sparsely hirto-pubescent below the connectives; tails straight. **Pistil** about 19–22 mm long; disk cup-shaped, 1.5–3 × 2–4 mm, shorter than the ovary, retuse at the apex; carpels 2–4 × 1.5–3 mm, glabrous; style 12–22 mm long, glabrous, widened at the apex; pistil head 3 × 1 mm. **Fruit** unknown.

**Distribution:** Philippines: Islands of Luzon, Guimaras, Catanduanes, Zambales, Mindoro, and Panay.

**Ecology:** Mountains or volcanic area.

**Vernacular names:** Laniti Itim, Pandakaki Itim (Rizal); Lanete (Luzon); Baguiboanlas (Panay).

**Uses:** For making wooden shoes.

**Specimens examined:**


Type: Sarawak: *Lobb s.n.* (K, holotype; MO, holotype photograph).

FIG. 13. *Kibatalia borneensis*. 1, habit (× \(\frac{1}{3}\)); 2, section of flower (× 2); 3, anther, dorsal view (× 4); 4, anther, ventral view (× 4); 5, anther, lateral view (× 4); 6, sepal inside with colleters (× 4); 7, part of calyx with disk and ovary (× 4); 8, seed (× \(\frac{2}{3}\)); 9, enlarged part of seed (× 2). 1 from Bujang S 20865; 2–7 from Native collector 46; 8–9 from Tahir 12251.

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Treelet or shrub 1.5–4 m high. Trunk 2.5–5 cm in diameter; bark dark brown. Branches hollow (when dry), smooth; brachlets sulcate when dry. Leaves: petiole 5–20 mm long, often shorter, with 1–3 short collers; blade coriaceous when dry, narrowly elliptic, 3–4.8 x as long as wide, 9.5–20 x 3–6 cm, equal- or subequal-sided, acuminate (acumen 7–15 mm long) or caudate at the apex, glabrous on both sides; with 8–11(15) secondary veins on each side; tertiary venation mostly invisible or obscure; domatia present, rarely absent. Inflorescences 0.2–0.6 x as long as the leaves, 5–8 cm long, lax, 1–2-flowered. Peduncle about 2 mm long; pedicels about 5 mm long, glabrous. Flowers probably fragrant. Sepals pale green, connate for about 1 mm, narrowly ovate, 2–3.75 x as long as wide, 4–7.5 x 2–2.5 mm (the inner narrower than the outer), acuminate at the apex, glabrous outside, sparsely puberulent inside; with 5–15 collers in the whole flower in a single row mostly situated at the base near the edges of the sepals; collers simple, slender, 0.5–1 mm long, obtuse at the apex. Corolla white; tube 4.9–8 x as long as the calyx, (20)30–37 mm long, glabrous outside, inside sparsely pubescent or tomentose; lower part (11)15–17 mm long; upper part campanulate, 1–1.1 x as long as the lower, about (8)15–20 mm long, at the mouth about 5–6 mm wide; lobes narrowly elliptic, 3.75–4.2 x as long as wide, (15–19)30–36 x (5)8–9 mm, (0.5)0.8–0.9 x as long as the tube, acute at the apex, glabrous on both sides or with some stiff hairs at the extreme base inside. Stamens included for (3)9–11 mm, inserted 19–22 mm from the corolla base; anthers sessile, 5–5.5 x 1–1.5 mm, with apex for about 0.5 mm sterile, outside with some stiff hairs, especially near the apex more densely so, tomentose or with some stiff hairs below the connectives inside; tails slightly curved inwards or not. Pistil about 22–25 mm long; disk ring-shaped, 0.5 x 1–2 mm, shorter than the ovary, obscurely 5-lobed; carpels narrowly ovoid, 2–4 x 2 mm, glabrous, abruptly narrowing into the style; style 18 mm long, glabrous; pistil head about 1–2 mm long, with a lateral receptive zone, topped by an obscurely lobed apex, adhering to the anthers. Infructescences: pedicels 7–10 mm long, with small lenticels; inflorescence axis with many deciduous bracts closely together, about 12–23 mm long. Mericarps black, very narrowly cylindrical, 10–30 x 0.4–0.6 cm, tapering into an acuminate apex, lenticellate or not, many-seeded; wall 1–2 mm thick, whitish or pale yellow. Seeds bearing a coma all over; grains 18–20 x 2–3 mm, minutely granulate; acuminate at the base; beak 3–11 mm long; coma white, hairs 15–30 mm long, longer than the grains (and beak); embryo whitish; cotyledons 6–10 x 1.5 mm; rootlet very short.


Specimens examined:


**Fig. 14; Map 14**


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FIG. 14. *Kibatalia elmeri*. 1, flowering branch \((x \frac{3}{4})\); 2, leaves beneath \((x \frac{3}{4})\); 3, flower from above \((x 1)\); 4, opened flower \((x 2)\); 5, part of disk \((x 6)\); 6, sepal with colleters \((x 2)\); 7–8, stamen both sides \((x 6)\); 9, fruit \((x \frac{3}{4})\); 10, seed \((x \frac{3}{4})\). 1–8 from Elmer 15934; 9–10 from Elmer 15270.

*Tree* 5–15 m high (according to Woodson, 1936); branches finely fissured; branchlets sulcate when dry, bark sometimes transversely fissured. *Leaves*: petiole channelled above, 4–6 mm long; colleters several, long, in a single row, persistent or less often deciduous when the leaves are shed; blade elliptic, 2.7–3.8 x as long as wide, 6–10.5 x 2–3.5 cm, equal- or subequal-sided, obtuse or sometimes acute at the apex, glabrous on both sides; with 5–7 secondary veins on each side; tertiary venation obscure; domatia present, without tufts of hairs. *Inflorescences* lax, 0.6–1.2 x as long as the leaves, 6.5–7.5 cm long, 1–6-flowered. Peduncle 4–5 mm long; pedicels 20–25 mm long, glabrous: bracts about 0.5 mm long, erect. *Flowers*: *Sepals* probably pale green, connate for about 1 mm, ovate to broadly ovate, 1–1.5 x as long as wide, 2–4.5 x 2–3.5 mm, acute or obtuse at the apex, outside glabrous or glabrate, sometimes sparsely hirtio-puberulent near the apex outside, inside glabrous, with 4–8 colleters in the whole flower in a single row, flat, about 1 mm long, obtuse at the apex. *Corolla*: tube 5.7–8.3 x as long as the calyx, 23–26 mm long, glabrous outside, inside glabrous or sometimes near the apex sparsely pubescent; lower part 17–20 mm long; upper part obconical, 0.2–0.3 x as long as the lower, 5–6 mm long, at the mouth 7.5–9.5 mm wide; lobes 1.2–1.7 x as long as wide, 15–20 x 10–14 mm, 0.5–0.8 x as long as the tube, obtuse at the apex, glabrate or often glabrous outside, inside sparsely to densely hirtio-pubescent near the base, furthermore glabrous. *Stamens* exserted for 0.5–3 mm, inserted 19–22 mm from the corolla base; anthers sessile, 5–6.5 x 1.5–2 mm, apex sterile for about 0.5 mm, outside glabrous or sparsely puberulent, inside glabrous or sometimes velutinous or less often sparsely pubescent near the base; tails straight. *Pistil* 21–26 mm long; disk cup-shaped, as long as or longer than the ovary, 4–5 x 2–3 mm, glabrate or sparsely puberulent outside, inside glabrous; carpels ovoid, 3–4 x 3–4 mm, glabrous; style 14–19 mm long, glabrous, persistent when the corolla is shed; pistil head 2 x 1 mm. *Infrauctescences*: pedicels 2.5–3.5 x 0.5–0.75 cm, dark brown, with many lenticels; peduncle 1.5–2.5 x 0.5 cm, dark brown; bracts deciduous. *Mericarps* dark grey or grey-brown, very narrowly ellipsoid or very narrowly ovoid, 10–15.5 x 1–1.5 cm, tapering into an obtuse apex; wall light brown, 2 mm thick. *Seeds*: grains minutely granulate, 20–27 x 2 mm; beak 35–45 mm long, bearing coma all over; coma pale brown; hairs 10–50 m long, longer than the grain and beak; embryo unknown.

*Distribution*: Philippines: Island of Luzon, Irosin, Mt. Bulusan.  
*Ecology*: Forest in the mountains. Altitude unknown.  
*Vernacular names*: Lanetenggubat (Tag.) or Cagpaayan (Il.), according to Woodson (1936).
Specimens examined:


**Type:** Philippines: Island of Sibuyan, Mt. Giting-giting, Elmer 12203 (K, holotype; isotypes: BM, BO, BP, E, F, G, K, L, MO, NY, W, Z; WAG photograph of US isotype).

**Homotypic synonym:** *Vallaris gitingensis* (Elmer) Merrill, Philipp. Journ. Sei. 10(1): 70. 1915.


Evergreen big tree, 4–30 m high. **Trunk** 5–55 cm in diameter, with short spreading buttresses; outer bark brittle, fissured, blackish, inconspicuously lenticellate; inner bark white; sapwood pale yellow, white or creamy. **Branches** finely longitudinally fissured, often lenticellate; branchlets slightly sulcate when dry, bark dark brown or blackish, with small lenticels. **Leaves:** petiole 3–7(10) mm long; colleters slender, 2–8, in 1–3 rows; blade papyraceous, often subcoriaceous when dry, narrowly elliptic, less often narrowly ovate, 3–8.1 × as long as wide, 4–10 × 0.8–4 cm, unequal-, less often equal-sided, acuminate or subcaudate with an obtuse point at the apex, cuneate at the base or decurrent into the petiole, entire or less often slightly sinuate, glabrous on both sides; costa not channeled above; with 5–8 obscure secondary veins on each side; tertiary venation invisible or obscure; with or without domatia, if present, domatia obscure. **Inflorescences** 0.2–0.6 × as long as the leaves, 2.5–3 cm long, congested, 4–24-flowered. Peduncle about 1–2 mm long; pedicels 8–12 mm long. **Flowers** fragrant. **Sepals** green, connate for 0.2–1 mm, ovate, 0.8–2.5 × as long as wide, 1–2.5 × 1–1.5 mm, acute at the apex, entire, glabrous outside, inside glabrous or often sparsely puberulent, ciliate at the margins, with 2–4 colleters in the whole flower at the base of the sepals, simple, slender, obtuse at the apex, rarely absent. **Corolla** white; tube 2.8–7 × as long as the calyx, 6–8 mm long, glabrous on both sides, except for the sparsely hirto-pubescent apex outside; lower part 4–6.5 mm long; upper part 0.1–0.25 × as long as the lower part, 1–1.5 mm long, at the mouth about 3–4 mm wide; lobes narrowly elliptic, 1–2 × as long as the tube, 1.3–3 × as long as wide, 8–12 × 3–7 cm, acute at the apex, less often obtuse, outside sparsely puberulent or glabrous, less often pubescent, inside sparsely to densely pubescent, only near the base more densely so, less often glabrous. **Stamens** exserted for 2–2.25 mm, inserted 5–7 mm from the corolla base; filaments about 0.3–0.5 mm long, glabrous outside, inside velutinous; anthers 2–2.25 × 0.5–0.75 mm, with apex for about 0.25 mm sterile, outside sparsely puberulent, especially along the grooves and at the apex more densely so, less often glabrous (sometimes without grooves), inside glabrous or sparsely to densely velutinous below the connectives; tails curved inwards. **Pistil** 7–9 mm long; disk often cup-shaped, 0.5–1 × 1 mm, 5-lobed, glabrous on both
FIG. 15. *Kibatalia gitingensis*. 1, habit (× ½); 2, part of flower opened out (× 2); 3, part of pistil and anther lateral view (× 10); 4, anther, ventral view (× 10); 5, fruit (× ½); 6, seed (× ½); 7, embryo (× 1). 1 from Wenzel 652; 2–4 from Duldulao 25565; 5–6 from Ramos BS 19537; 7 from Elmer 15391.
MAP 15. *Kibatalia gitingensis*

sides; carpels ovoid, 1−1.5 × 0.75−1 mm, puberulent outside; style 5.5−7 mm long, glabrous; pistil head about 0.75−1 mm long. **Infructescences:** pedicels 10−15(20) mm long, with or without lenticels, bark sometimes transversely fissured; peduncle about 2 mm long; bracts persistent. **Mericarps** very narrowly ellipsoid, one fruit normally developed and the others galled, 8−25 × 0.3−0.4
cm, tapering into an acuminate apex, several-seeded, divergent; wall 1 mm thick, pale yellow inside. Seeds: grains 22–25 × 2–3 mm, glabrous, minutely granulate, acute at the base; beak glabrous for 5–10 mm, bearing an apical coma for 20–30 mm; coma brownish or whitish; hairs 10–60 mm long, longer than the grain and beak; embryo creamy; cotyledons 17–18 × 3 mm; rootlet 4–5 × 1 mm.

Distribution: Philippines: Islands of Catanduanes, Luzon (Tayabas, Sibuyan, Quèzon, Biliran), Leyte and Surigao.


Uses: Timber production, wooden crafts, wooden shoes (bakia), tooth picks.

Vernacular names: Laniti (dialect Bis, Biliran); Laniting gubat (Laguna Prov., Luzon).

Specimens examined:


7. *Kibatalia laurifolia* (Ridley) Woodson, Philipp. Journ. Sci. 60: 212. 1936. Fig. 16; Map 16


FIG. 16. *Kibatalia laurifolia*. 1, flowering branch (× 1/4); 2, flower (× 2); 3, opened flower (× 2); 4–5, anther both sides (× 6); 6, opened fruit (× 1/4); 7, seed (× 1/4); 8, detail of seed (× 1/4); 9, embryo (× 1/4). 1, 6–7 from Clemens 4344; 2–5 from Leeuwenberg 12166; 8–9 from Kerr 18229.
Evergreen shrub or tree 1–20 m high. Trunk 4–19 cm in diameter; bark rather smooth. Branches hollow when dry, appear from low down; branchlets slightly compressed and canaliculate at the extreme apex or not; bark sometimes transversely fissured. Leaves: petiole 2–6 mm long, colleters 2–15, in 1–3 rows; blade coriaceous or papyraceous when dry, narrowly elliptic or narrowly ovate, sometimes elliptic, (1.8)2.5–5.7 x as long as wide, 8–19 x 2–6 cm, unequal- or equal-sided, tapering into an acuminate or subcaudate apex with obtuse point, less often acute at the apex, glabrous on both sides, much paler beneath or not; with (6)7–14 secondary veins on each side; tertiary venation obscure; with or less often without domatia, if present, domatia consisting of pits. Inflorescences lax, 0.2–0.4 x as long as the leaves, 2.5–3 cm long, 1–6-flowered. Peduncle 0–5 mm long, lenticelate or not, inflorescence axis with deciduous bracts closely together and 2–5 mm long; pedicels 5–20 mm long, glabrous, less often with puberulent base; bracts erect, sometimes with ciliolate margin. Flowers fragrant. Sepals pale green, connate for 0.5–2 mm, ovate, elliptic or hemi-orbicular, 1–2.5 x as long as wide, 1.5–3 x 1–3 mm, obtuse, acute or rounded at the apex, ciliolate at the margin, outside glabrous or glabrate, inside glabrous, sometimes with gladular dots; with 4–8 colleters in the whole flower in a single row at the base of the sepals near the edges, simple, slender or flat, 0.75–1 x 0.5 mm, acute or obtuse at the apex. Corolla white or pale yellow; tube 11–12 mm long, 3.3–7 x as long as the calyx, mostly glabrous on both sides, sometimes only near the apex sparsely hirt-pubescent outside and tomentose inside; lower part 8.5–11 mm long, slightly widening into a very short obconical upper part; upper part 0.09–0.2 x as long as the lower part, 1–2 mm long, at the mouth 2.5–4.5 mm wide; lobes narrowly elliptic, 0.8–1.3 x as long as the tube, 1.6–3 x as long as wide, 9–16 x 3–8 mm, acute at the apex, at the base auriculate, at the margin often sparsely ciliolate, sparsely to densely pubescent on both sides, less often puberulent outside. Stamens exerted for 2–2.5 mm, adnate to the mouth or not, inserted 10–12 mm from the corolla base; anthers sessile, 2.75–3.5 x 0.5–1 mm, acuminate at the for about 0.25–0.5 mm sterile apex, outside hirt-pubescent, inside glabrous or sometimes near the base sparsely hirt-pubescent; tails curved inwards or straight. Pistil 12–14 mm long, persistent when the corolla is shed; disk ring-shaped, 0.75–1 x 1–2 mm, obscurely 5-lobed; carpels ovoid, 2 x 1–2 mm, sparsely hirt-puberulent outside, less often retuse at the apex, abruptly narrowing into the style; style filiform, 9–11 mm long, glabrous; pistil head 1–2 x 0.75 mm, glabrous or with some hirtot-pubescent. Infructescences: pedicels 1.5–2.5 x 0.3 cm, lenticellate, bark sometimes transversely fissured; peduncle short or obsolete, 0–0.2 cm long; bracts persistent. Mericarps dark grey or dark brown, cylindrical or ellipsoid, woody, 6.5–17 x 0.5–1 cm, tapering into an obtuse apex, with a raised line at each side or not, not lenticellate, many-seeded; wall 0.75–1 mm thick, pale brown or pale yellow inside. Seeds: grains 15–23 x 1.5–3 mm, glabrous, minutely granulate and shallowly canaliculate, acute at the base; beak glabrous for 5–10 mm, bearing an apical coma for 10–20 mm; coma whitish; hairs 30–50 mm
long, longer than the grain and beak; embryo whitish; cotyledons $16 \times 2$ mm; rootlet cylindrical, $4.5 \times 1$ mm.

**Distribution**: Thailand, Vietnam, and Malaysia (Continent).

**Ecology**: Forests, thickets, or limestone hill. Altitude: 25–500 m.

**Vernacular names**: Thailand: Nga Chang (Surat). Vietnam: Cay danh (Hoa Tan), Cay Banh Loi (Ile Tre), Cay Moc (Dong Che), Bhao (Nhatrang).

**Map 16.** *Kibatalia laurifolia*

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Specimens examined:


CULTIVATED: IVORY COAST: near Abobo (fl. Dec.) Leeuwenberg 10712 (WAG); Adiopodoumé, 17 km W. of Abidjan (fl. May) Leeuwenberg 12166 (WAG).

8. Kibatalia longifolia Merrill, Philipp. Journ. Sci. 17: 307. 1920; Merrill, Enum. Philipp. 3: 335. 1923 (as K. oblongifolia). Fig. 17; Map 17

Type: Philippines: Mindanao: Davao Prov., Balutakay, Santa Cruz (fl., fr. Apr.) A. de Mesa 118 in FB 27534 (A, lectotype, was isotype).

Tree up to 16 m high; trunk up to 34 cm in diameter, with white latex (?). Branches: branchlets dark brown, sulcate when dry. Leaves: petiole 6–7 mm long, channeled above; without colleters in the axils; blade elliptic or subobovate, 2.6–2.8 x as long as wide, 16–17.5 x 6–6.5 cm, acute at the apex; with 8–9 secondary veins on each side; tertiary venation obscure; domatia obsolete. Inflorescences about 10 cm (?) long, probably 0.5–0.6 x as long as the leaves, 1–3-flowered, lax. Peduncle short, 3–5 mm long; pedicels 30 mm long; bracts persistent. Flowers white, bell-shaped (teste: A de Mesa 27534). Sepals 0.8–1.7 x as long as wide, 4–7 x 4–5 mm, glabrous on both sides, acute or rounded at the apex, entire; colleters more or less than 7 in the whole flower, flat, retuse or obtuse at the apex. Corolla unknown: tube (according to Merrill, 1920): lower part 16 mm long; upper part 10 mm long, inflated, outside glabrous or sparsely puberulent, inside pubescent; lobes 40 x 4–5 mm, outside sparsely puberulent, inside peberulent. Stamens probably included; anthers sessile, outside glabrous, at the apex hirto-pubescent, inside hirto-pubescent below the connectives, furthermore glabrous. Pistil: disk 5 x 4 mm, hirto-puberulent at the apex, furthermore glabrous; ovary 6 x 4 mm, glabrous; style and pistil head unknown. Infructescences: pedicels 3 x 0.5 cm, rigid, glabrous. Mericarps dark brown, narrowly ellipsoid, 17–21.5 x 1.5–1.75 cm, tapering into an acute apex, with a raised line at each side, divergent at an angle of about 225–250°, many-seeded. Seeds with several tufts of hairs on suture side; grains 20–30 x 2–3 mm, glabrare, minutely granulate, acuminate at the base; beak glabrous for about 10–15 mm, bearing an apical coma for 40–50 mm; coma white; hairs 20–50 mm long, shorter than the grain (and beak); embryo pale yellow; cotyledons 20 x 3 mm; rootlet 3 x 1 mm.
Fig. 17. Kibatalia longifolia. 1, flowering branch (× 3); 2, part of bud (× 3); 3, sepal with colleters (× 3); 4, immature stamen both sides (× 4); 6, branchlet with fruit (× 4); 7, seed (× 4); 8, embryo (× 14). 1–8 from de Mesa 118.
Distribution: Philippines, Mindanao Isl., Province of Davao.
Ecology: Forests (?), on deep rich soil. Altitude: 40 m.
Vernacular name: Klangnita (dialect Tagakaolo).
Only known from the type.

Fig. 18; Map 18


A rather small or middle sized tree; stem 20 cm thick, 8 m high or higher, branched above the middle; wood yellowish-white, very soft, bitter, odourless; bark roughened, brown when old, greyish-mottled towards the top; branches with numerous lax secondary branches, the shining portion slender and more or less drooping (copied from Elmer, 1912); branchlets sulcate when dry. Leaves: petiole 5–7 mm long; colleters several, in a single row, persistent when the leaves are shed; blade papyraceous or subcoriaceous when dry, narrowly ovate, 3.5–4 × as long as wide, 8–12.5 × 2–3.5 cm, equal- or less often subequal-sided, acuminate or acute, sometimes shortly caudate at the apex, cuneate at the base, glabrous on both sides; with 10–13 secondary veins on each side; tertiary venation obscure; domatia with or without several tufts of hairs. Inflorescences lax, 0.4–0.8 × as long as the leaves, 5.5–6.5 cm long, 1–3-flowered. Peduncle 2–3 mm long; pedicels 10–15(20) mm long; bracts 0.5–1 mm long, erect. Flowers odourless (Elmer, 1912). Sepals green, free, ovate, 1–1.5 × as long as wide, 2–3 × 2 mm, acute or acuminate at the apex, glabrous on both sides; with 3–5 colleters in the whole flower in a single row at the base of the sepals, mostly situated on the inner sepals, flat, about 1 mm long, acute at the apex. Corolla white (Elmer, 1912); tube 6.5–11 × as long as the calyx, (17)19–22 mm long, glabrous outside, inside densely pubescent or velutinous except for the glabrous base, lower part 13–15 mm long; upper part obconical, 0.3–0.53 × as long as the lower, 5–7 mm long, at the mouth about 4.5(8.5) mm wide; lobes narrowly elliptic, 1.2–2.1 × as long as the tube, 2–3.8 × as long as wide, 27–40 × 7–15 mm, acute at the apex, folded near the base, glabrous outside, inside glabrate or sparsely puberulent, often near the base more densely so. Stamens included for 1–1.5 mm, inserted 18–20 mm from the corolla base; anthers sessile, 4–4.5 × 1 mm, at apex sterile for about 0.5 mm, outside sparsely puberulent, only near the apex more densely so, inside sparsely pubescent, especially below the connectives hirto-pubescent or velutinous; tails straight. Pistil 17–20 mm long; disk cup-shaped, 2–2.5 × 2–3 mm; carpels ovoid, 2–3 × 1.5–3 mm, glabrous; style 12–15 mm long, glabrous, persistent when the corolla is shed; pistil head about 2 × 0.5 mm. Fruits unknown.

Distribution: Philippines: Island of Sibuyan.
Only known from the type.
FIG. 18. *Kibatalia macgregori*. 1, flowering branch ($\times 1/2$); 2, leaf beneath ($\times 1/2$); 3, opening bud ($\times 1/2$); 4, longitudinal section of flower ($\times 3$); 5, sepal with colleters ($\times 3$); 6–7, stamen both sides ($\times 6$). 1–7 from Elmer 12373.

*Fig. 19; Map 19*


Type: Malaysia: Malacca, Maingayi 2948, under Kew distribution number 1084 (K, holotype; isotypes: K, L); ibid., Maingayi 2628 under Kew distribution number 1084 (A, GH, K, paratype).

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FIG. 19. *Kibatalia maingayi*. 1, habit ($\times \frac{1}{2}$); 2, flower ($\times 5$); 3, gynoecium and stamens inside and dorsal view ($\times 5$); 4, stamen, ventral view ($\times 10$); 5, stamen, dorsal view ($\times 10$); 6, fruit, small size ($\times 1$); 7, mature fruit ($\times \frac{1}{2}$); 8, seed ($\times \frac{1}{2}$). 1 from Kostermans & Anta 1096; 2–5 from Kostermans 7167; 6–7 from Dachlan 2 in bb 9898; 8 from Kostermans 6698.


Evergreen big tree 5–40 m high; crown small, about 2 m across, light, rarely dense. Trunk straight, slender, 7–120 cm in diameter, sometimes with buttresses; when big buttress about 1 m high; clear bole 10–30 m high, 30–50 cm in diameter at the first branch; outer bark rough or smooth, 1–4 mm thick, often fissured or cracked, pale brown, grey or whitish mottled; fissures in bark 10 mm long, 5–10 mm wide; inner bark pale yellow, less often brown outside, mottled, granulate, often with sweet taste, 3–10 mm thick, inside white; sapwood moderately soft, white, straw-coloured or pale yellow, odourless, with a distinct sweetish taste (tested: Elmer 11912). Branches smooth, with often longitudinally and transversely fissured bark; branchlets smooth, sulcate when dry, with or without lenticels. Leaves: petiole 2–10 mm long, with or without colleters; if present, colleters slender, persistent or deciduous when the leaves are shed; blade coriaceous, narrowly to widely elliptic, 2.1–4.75 x as long as wide, 3.5–14 x (1)2–6 cm, acuminate with an obtuse point, less often acute or shortly caudate at the apex, with sometimes slightly sinuate margins, cuneate at the base or decurrent into the petiole, above dark green, shiny, with or without domatia; domatia with tufts of hairs or not; with 4–7 secondary veins on each side; tertiary venation obscure. Inflorescences congested, 0.2–0.3 x as long as the leaves, 1.5–2.5 cm long, 4–25-flowered. Peduncle 1–3 mm long, not lenticellate; pedicels 7–12(15) mm long, lenticellate; bracts very small. Flowers fragrant and with about the same odour as peanut (*Arachis hypogaea*) tested Dorst in bb. 1T.2P.191), less often odourless. Sepals green, spreading or recurved, free or connate for 0.5–1 mm, ovate, (1)1.2–3 x as long as wide, 1.5–3 x 1–2 mm, acute or acuminate at the apex, less often obtuse, ciliate at the margin, outside glabrous or less often pubescent, only near the apex puberulent, inside glabrous; colleters 4–15 in the whole flower in a single row at the base of the sepals, short, about 0.5 mm long, flat, retuse or rarely obtuse at the apex. Corolla white, pale yellow or light green; tube 2–3(4.5) x as long as the calyx, 5–8(10) mm long, glabrous outside, inside sparsely to densely hirtio-puberulent except for the glabrous part near the apex; mouth about 3–4 mm wide, sparsely to densely hirtio-puberulent; lobes obovate or ovate, rarely elliptic, (0.6)0.75–2.4 x as long as the tube, 1.4–2.3 x as long as wide, 6–12 x 3–7 mm, obtuse or acute at the apex, less often rounded, equal- or unequal-sided, slightly ciliolate at the apex, sparsely to densely pubescent on both sides, less often glabrous inside. Stamens exserted for 2–2.5(3) mm, inserted 5–8(10) mm from the corolla base; anthers sessile, 2–2.5(3) x 0.75–1 mm, with apex for about 0.25–0.5 mm sterile, outside glabrous, only along the
grooves and at the apex hirto-puberulent, inside glabrous, only below the con­nective hirto-puberulent; tails curved inward. *Pistil* 6–9(12) mm long; disk ring­to cup-shaped, 0.5–1.5 × 1–1.5(2) mm, 5-lobed; carpels ovoid, 1–2 × 0.75–1.5 mm, sparsely hirto-puberulent (especially near the apex outside); style 4.5–6.5(9) mm long, sparsely puberulent or glabrous, only at the extreme apex more densely hirto-puberulent; pistil head about 1 mm long, partly hirto-pubes­cent at the extreme base. Infructescences: pedicels 10–25 mm long, with or without lenticels and sometimes with transversely fissured bark; peduncle about 10–20 mm long, with lenticels or not. *Mericarps* dark brown or pale grey, bitter (teste Dorst 1T.2P 191), very narrowly cylindrical, 8–50 × 0.4–0.6 cm, tapering into an acuminate apex, glabrous, many-seeded; wall 1 mm thick, light brown inside. *Seeds*: grains glabrous, granulate, 20–35 × 1.5–3 mm, acute at the base; bead glabrous for about 5–10 mm, bearing an apical coma for 0–65 mm; coma light brown or whitish; hairs 10–80 mm long, longer than the grain (and bead); embryo creamy; cotyledons 15–20 × 1.5–3 mm; rootlet 5 × 0.5–1 mm.


**Ecology**: Evergreen lowland or montane forests, often on dry, sandy soil.

**Uses**: The latex is for sale (teste: Kostermans 211), the wood is used for axes shaft or knife sheath (teste - Rudjiman 242, 263, 265), the leaves are applied for spleenomegaly in the Philippines (teste: Frake 707).

**Vernacular names**: Malaysia: Jelutong (Perak), Jelutung Pipit (Selangor), Jelutung Beruang (Selangor), Polai (Malacca). Indonesia: Sumatra: Bentaos su­suh (Palembang), Mayang Parbue (Simalungun), Mengkelai (Bangka), Pulai (Bangka), Rubi Bunga (Simalur), Rubi Item Silai (Simalur), Rubi Item (Simalur), Kayu Tambus Purun (Asahan), Kayu Nasi (Palembang), Pulai (Riau), Mentaos (Riau). Kalimantan: West: Pe­lai Liling (Sambas). South: Mentaos (Kintap, Barito Kuala), Bintuas (Pleiharai). The Philippines: Mindanao: Mele­gates (Zamboanga).

**Specimens examined**:

**THAILAND**: Kao Soi Dao, Patalung (fl. Apr.) Kerr 19237 (BM, E, L, P, SING); Bam Kaluti, Toh Moh (fl. Apr.) Herb. Kerr 787 (BM, K).


**MAP 19. Kibatalia maingayi**


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**Fig. 20; Map 20**


*Tree* 6–7 m high. *Trunk* 10–12 cm in diameter. *Leaves:* petiole 2–5 mm long; colleters several, long; blade coriaceous, elliptic, 2.5–3.4 × as long as wide, 7.5–13.5 × 2.5–4.5 cm, acuminate with obtuse point at the apex, glabrous on both sides; with 6–8 conspicuous secondary veins on each side; tertiary venation obscure; domatia present. **Inflorescences** lax, 0.6–1.2 × as long as the leaves, 9–9.5 cm long, 1–2-flowered. Peduncle about 4–5 mm long; pedicels about 20–25 mm long, glabrous; bracts about 1 × 1 mm, ovate, acute at the apex, glabrous on both sides. *Flowers* fragrant. *Sepals* probably pale green, free, ovate, 0.7–1.5 × as long as wide, 3–5 × 2–5 mm, acute, obtuse or rounded at the apex, glabrous on both sides; with 4–10 colleters in the whole flower, at the base of the sepals, being flat, simple, about 1 mm long and acute at the apex. *Corolla* white; tube 7–9 × as long as the calyx, 34–37 mm long, glabrous outside, inside glabrous, except for the pubescence near the apex; lower part 27–28 mm long; upper part campanulate, 0.25–0.3 × as long as the lower part, 7–9 mm long, at the mouth about 10–12 mm wide; lobes obovate, 0.6–0.9 × as long as the tube, 1.3–1.7 × as long as wide, 25–33 × (12)17–23 mm, obtuse at the apex, folded at the base or not, outside glabrous, inside sparsely hirtupubescent near the base, furthermore glabrous. *Stamens* exerted for 1–3 mm, inserted about 29–30 mm from the corolla base; filaments 0.5–1 mm long, glabrous; anthers 6–7 × 1.5–2 mm, with apex for about 0.5 mm sterile, outside glabrous, only along the grooves with some puberulence, inside sparsely hirtupubescent; tails straight. *Pistil* 30 mm long; disk urceolate, 8 × 5 mm, longer than the ovary, 5-lobed, minutely puberulent outside; carpels ovoid, about 7 × 4.5 mm, glabrous; style filiform, 20 mm long, glabrous; pistil head about 3 mm long. *Fruits* immature; peduncle 7.5 mm; pedicels 35–45 × 4 mm, glabrous.
FIG. 20. *Kibatalia merrilliana*. 1, branch with flower and young fruit (× ½); 2, flower bud (× ½); 3, flower (× 3); 4, opened flower (× 2); 5, part of disk (× 6); 6, sepal with colleters (× 2); 7, part of calyx with ovary (disk removed) (× 2); 8–10, stamen three sides (× 4). 1–3 from Sulit & Conese PNH 6241; 4–10 from Wenzel 330.

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MAP 20. *Kibatalia merilliana*
Specimens examined:


Fig. 21; Map 21
Type: The Philippines: Samar Isl., McGregor BS 43767 (UC, lectotype, was isotype; isotype: NY).

Evergreen tree 6–10 m high. Trunk 15–20 cm in diameter. Branches: branchlets sulcate when dry, pale grey or pale brown. Leaves: petiole 3–5 mm long; colleters about 5–6, short; blade papyraceous or coriaceous when dry, elliptic, less often ovate or obovate, 1.5–2.2 × as long as wide, 11–17.5 × 5.5–9.5 cm, mostly equal-sided, obtuse, acuminate or acute at the apex, at the base rounded or cuneate, glabrous above, beneath sparsely puberulent, especially on the midrib and secondary veins more densely so, glabrescent; costa with several lenticels beneath, with 8–12 secondary veins on each side; tertiary venation obscure, seemingly parallel; several domatia. Inflorescences mostly solitary, 0.5–0.9 × as long as the leaves, 9.5–10 cm long. Peduncle about 2–5 mm long; pedicels about 20–30 mm long, glabrous or sparsely puberulent. Flowers fragrant. Sepals probably pale green, free, ovate, 0.6–2 × as long as wide, 2–4 × 2–4 mm, acute or acuminate at the apex, ciliate at the margin, outside sparsely puberulent or pubescent, near the base more densely so, inside glabrous; with 5–15 colleters in the whole flower in a single row at the base of the sepals, slender or flat, simple, obtuse or retuse at the apex. Corolla white; tube 5.6–11.5 × as long as the calyx, 18–23 mm long, outside glabrous, inside sparsely hirito-pubescent or puberulent; lower part about 6–6.5 mm long; upper part (2)2.4–2.8 × as long as the lower, (12)16–17 mm long; at the mouth about 4–5 mm wide; lobes narrowly elliptic, 1.7–2.6 × as long as the tube, 3.5–5 × as long as wide, (33)40–48.5 × 9–13 mm, acute or acuminate at the apex, outside glabrous or sparsely puberulent, except for the sparsely to densely hirito-pubescent base, inside glabrous, only near the base sparsely hirito-pubescent or puberulent. Stamens included for (5)8–9.5 mm, inserted (6)7.5–8 mm from the corolla base; anthers sessile, 6.5 × 1.5–2 mm, apex for about 0.5 mm sterile, outside glabrous, only sparsely to densely hirito-pubescent along the grooves, inside glabrous; tails straight. Pistil 10–15 mm long; disk ring- or cup-shaped, 2 × 2–3 mm, shorter than the ovary, glabrous on both sides, except for the hirito-pubescent apex; carpels ovoid, 3–3.5 × 2–2.5 mm, glabrous or with several stiff hairs at the apex; style 5.5–9.5 mm long; pistil head 1.5–2 mm long. Fruits unknown.

Distribution: Philippines: Island of Samar.
Ecology: Dipterocarp forests or river banks, sometimes on rocky hills. Altitude: 100–250 m.
Vernacular name: Lanete (dialect Bis).

FIG. 21. *Kibatalia puberula*. 1, flowering branch (× 1/3); 2, leaf beneath (detail with domatium) (× 4); 3, longitudinal section of corolla (× 2); 4–5, stamen both sides (× 4); 6, calyx with pistil and one stamen (× 4); 7, sepal with colleters (× 4). 1–7 from Sulit PNH 6293.
MAP 21. *Kibatalia puberula*

Specimens examined:


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Type: Philippines: Mindanao Isl., Ramos & Pascasio 34691 (A, lectotype, was isotype; isotypes: BM, BO, K, L, P; WAG, photograph of US isotype).


Tree, about 5–10 m high; branches nearly black when dry, glabrous, obscurely lenticellate (copied from Merrill (1920) and Woodson (1936)); branchlets sulcate when dry, bark sometimes transversely fissured. Leaves: petiole 2–5 mm long; colleters several, persistent when the leaves are shed; blade coriaceous or less often papyraceous when dry, elliptic to narrowly elliptic, often subobovate, 2–4.7 × as long as wide, 5–10 × 1.75–4.25 cm, obtuse or acuminate with an obtuse point at the apex, less often acute, at the base cuneate or decurrent into the petiole, glabrous on both sides; with 5–8 secondary veins on each side; tertiary venation obscure; domatia present or not. Inflorescences 4.5–7 cm long, 0.5–1 × as long as the leaves, 1–4-flowered. Peduncle 0–3 mm long; pedicels 9–22(25) mm long. Flowers: Sepals broadly ovate, free, 1–1.3 × as long as wide, 1.5–2 × 1.5 mm, acute at the apex, entire, glabrous on both sides; colleters absent. Corolla white (according to Merrill in Woodson (1936)); tube cylindrical, 10–16 mm long, 5–10.6 × as long as the calyx, glabrous outside, inside glabrous, except for the sparsely hirtio-pubescent upper part; lower part 4–5 mm long; upper part 5–12 mm long, 1–3 × as long as the lower part, mouth about 2–2.5 mm wide; lobes narrowly elliptic 1.5–3.3 × as long as the tube, 7.5–10 × as long as wide, 25–33 × 3–4 mm, acuminate at the apex, glabrous outside, inside glabrous, only sparsely puberulent near the base. Stamens included for 7–8 mm, not connivent into a close cone, inserted 4–5 mm from the corolla base; anthers sessile, 5–6 × 1 mm, with apex about 1 mm sterile, glabrous on both sides, except for the few stiff hairs along the grooves outside and below the connectives inside; tails curved towards each other. Pistil 7 mm long; disk ring-shaped, about 1 × 2 mm, shallowly 5-lobed; carpels ovoid, about 2 × 2 mm, glabrous; style 3 mm long, glabrous; pistil head about 2 × 1 mm. Mature fruits unknown.

Distribution: Philippines: Islands of Mindanao and Luzon.


Specimens examined:


FIG. 22. *Kibatalia stenosepala*. 1, flowering branch (× ½); 2, part of corolla without stamens (× 2); 3, flower base dissected (× 4); 4, sepal with colleters (× 4); 5–6, stamen both sides (× 6). 1–6 from Ramos & Pascasio BS 34691.

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14. **Kibatalia villosa** Rudjiman, sp. nov.

Arbor sempervirens. Folia petiolata laminis coriaceis ellipticis vel anguste ellipticis, apice acutis, acuminatis vel rare obtusis vel caudatis, basi cuneatis, utraque latere glabris. Inflorescentia congesta, pedunculo brevissimo vel obscurro. Flores pedicellati odorantes. Sepala pallide viridia, ovata, apice acuta, glabra vel sublabra. Corolla alba vel viridi-flava tubo calyce multo longiore, lobis
Fig. 23. *Kibatalia villosa*. 1, branchlet ($\times \frac{1}{2}$); 2, flowering branchlet ($\times \frac{3}{2}$); 3, flower ($\times 2$); 4, flower bud ($\times 2$); 5, section of flower ($\times 2$); 6, apex of gynoecium and anther lateral view ($\times 6$); 7, anther, ventral view ($\times 6$); 8, anther, dorsal view ($\times 6$). 1, 3–8 from Rudijiman 266; 2 from Haviland 3050.

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Evergreen tree 15–30 m high. Trunk 20–70 cm in diameter, clear bole 10–22 m high; crown small; bark rather smooth, finely fissured, often slightly cracked in small quadrangular pieces; inner bark brown; sapwood yellow, creamy or white. Branches and branchlets with transversely fissured bark, less often not. Leaves: petiole 5–15 mm long; colleters several, short, persistent when the leaves are shed; blade coriaceous, elliptic or narrowly elliptic, 1.2–3.8(7.2) × as long as wide, 9.5–18 × (2.5)5–7.5 cm, acute, acuminate, less often obtuse or slightly caudate at the apex, cuneate at the base, glabrous on both sides, dark green and shiny above, light green beneath; with (8)9–12 secondary veins on each side; tertiary venation obscure; domatia consisting of pits. Inflorescences 0.13–0.26 × as long as the leaves, 2.5–2.75 cm long, congested, 8–25-flowered. Peduncle (0)1–5 mm long; pedicels about 10–12 mm long, glabrous, sometimes near the base sparsely puberulent; bracts 0.5 mm long. Flowers rather fragrant. Sepals pale green, connate for about 1 mm, sometimes free, ovate 0.8–3 × as long as wide, 1.75–4.5 × 1.5–2 mm, acute at the apex, glabrous or sparsely puberulent on both sides; with 2–6 colleters in the whole flower at the base of the sepals near the edges, being about 0.5–1 mm long and obtuse at the apex. Corolla white or greenish-yellow; tube 2–8 × as long as the calyx, (9)11–14 mm long, cylindrical with or without a subglobose lower half, glabrous outside, inside glabrous, often sparsely puberulent, and sparsely tomentose near the apex; lower part 8–12 mm long; upper part 0.1–0.16 × as long as the lower part, 0–2 mm long; at the mouth sparsely hirto-pubescent, villose or often tomentose, about 6–8 mm wide; lobes elliptic or narrowly elliptic, 0.6–1.8 × as long as the tube, 0.9–3.7 × as long as wide, 9–7 × 4.5–7.5(10) mm, obtuse, acute or truncate at the apex, subequal-sided, sometimes ciliolate, near the base with recurved margins, outside glabrous or glabrate, inside pubescent, less often glabrate near the apex, and at the base sparsely hirto-pubescent or villous. Stamens exserted for 3–3.5 mm, inserted 10–12 mm from the corolla base; anthers sessile, 3 × 1.5–1.5 mm, apex for about 0.25–0.5 mm sterile, glabrous outside, only sparsely to densely hirto-pubescent near the apex, inside with several stiff hairs below the connectives, furthermore glabrous; tails straight or curved inward. Pistil 12–14.5 mm long, persistent when the corolla is shed; disk ring-to cup-shaped, 1–2 × 1–2 mm, shallowly 5-lobed, glabrous on both sides; carpels ovoid or narrowly ovoid, 2–3 × 1–2 mm, sparsely puberulent or glabrous; style 8–11 mm long, glabrous; pistil head 1.5–2 × 0.75 mm. Infructescences: Immature fruits narrowly follicular, mature fruits unknown.
**MAP 23. Kibatalia villosa**

**Distribution:** Malaysia: Continent: Johore, Sarawak: Kalong, Marudi. Indonesia: Kalimantan: West, East, South.

**Ecology:** Swamp or montane forest, often on limestone, sandy or loam soil. Altitude: 0–1200 m.

**Uses:** In Indonesia the wood is used for dagger sheaths.

**Vernacular names:** Malaysia: Uchong (Marudi); Jelutun pipit (Johore). Indonesia: Empaga (Simpang, W. Kalimantan); Nyatu (Berauw, E. Kalimantan); Mantaos (Kintap, Barito Kuala, S. Kalimantan).

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Specimens examined:

Oya, Kalong (fl. Apr.) Haviland 3050 (BM, BO, CAL, K, L, P, SING, paratype); Bukit Mentagui,
Bok Tisam, Marudi (fl. Apr.) Asah ak. Bubong S 23014 (A, L, SING, paratype).

INDONESIA: KALIMANTAN: WEST: Simpang, near Pene Contong village, Fryd 7 in bb 13524 (BO,
paratype). EAST: N. part of Nunukan Isl., Kostermans 18 f (BO, L, paratype); Berauw, near Long
Lanuh village (fl. Apr.) Zwaan 74 in bb 18491 (A, BO, BZF, L, paratype); East Kutai, Susuk R.
Region (fr. June) Kostermans 5585 (A, BO, L, SING, paratype); Peak of Balikpapan, Be-oul
(fl. June) Kostermans 7559 (K, L, NY, paratype). SOUTH: Bambangin village, Subdistr. Belawang,
Distr. Barito Kuala (fl. Apr.) Rudjiman 266 (BO, L, Herb. Fak. Kehutanan UGM Yogyakarta,
WAG, type); about 5 km W. of Sidomulyo transmigration area, Subdistr. Belawang, Distr. Barito
Kuala, Rudjiman 267 (BO, Herb. Fak. Kehutanan UGM, WAG, paratype), near Bambangin,
UGM, Yogyakarta, paratype).

Journ. Sci. 60: 226. 1936. Fig. 24; Map 24


Type: Indonesia: North Sulawesi, Koorders 16045 β (L, lectotype; isotypes: BO, K, P).

Homotypic synonym: Kickxia valetonii Koorders, loc. cit., p. 67 & 169 (nomen nudum), p. 647 (citing Kickxia wigmanii, as the correct name).

Evergreen tree, 7–25 m high; crown small. Trunk straight, 20–45 cm in diameter, often slightly fluted at the base, with horizontal branches; outer bark smooth, dark brown, blackish or grey, 5–8 mm thick; inner bark whitish or light brown; sapwood straw-coloured or white. Branches: branchlets dark grey, with a laterally compressed apex, elliptic on section. Leaves: petiole 5–10 mm long; colleters 2–13, short, in a single row, persistent when the leaves are shed; blade coriaceous, narrowly obovate or narrowly elliptic, 2.7–4.2 × as long as wide, 12.5–33.5 × 4.5–8 cm, subequal- or rarely equal-sided, acute, acuminate or less often shortly ciliate with sharp point at the apex, at the base cuneate, less often slightly sinuate at the margin; with 10–16 secondary veins on each side; tertiary venation conspicuous; domatia many, rarely few. Inflorescences pendulous, 0.2–0.7 × as long as the leaves, 7.5–9 cm long, 1–2-flowered. Peduncle 5–10 mm long, dark grey; pedicels 15–20 mm long, light green. Flowers fleshy, fragrant. Sepals pale green, connate for about 1 mm, ovate, 1.3–2 × as long as wide, 5.5–8 × 4–5 mm, acute at the apex, sometimes ciliate at the margin, glabrous on both sides; colleters about 50–60 in the whole flower in a single row at the base of the sepals, simple, slender, shallowly lobed, about 1 mm long, obtuse at the apex. Corolla yellow or creamy; tube thick, 4.6–5.4 × as long as the calyx, (25)28–33 mm long, glabrous except for the sparsely puberulent apex outside, inside sparsely pubescent, near the apex more densely so; lower part 5–5.5 mm long; upper part cylindrical (but wider), 4.6–5 × as long as the lower part, (20)23–25 mm long, at the mouth about 5–7.5 mm wide; lobes narrowly elliptic, (1.2)1.6–2.1 × as long as the tube, 3.2–3.6 × as long as wide, (30)55–60 × (7)15–20 mm, unequal-sided, with a thick midrib,
FIG. 24. *Kibatalia wigmanii*. 1, habit ($\times \frac{2}{3}$); 2, section of flower ($\times \frac{2}{3}$); 3, part of calyx opened out and pistil ($\times \frac{2}{3}$); 4, a single sepal inside ($\times \frac{2}{3}$); 5, anther, ventral view ($\times \frac{3}{4}$); 6, fruit ($\times \frac{3}{4}$); 7, seed ($\times \frac{3}{4}$); 8, embryo ($\times \frac{3}{4}$). 1–5 from Leeuwenberg 11864; 6–8 from Koorders 16045B.

rounded or obtuse at the apex, glabrous outside, inside sparsely puberulent or pubescent near the base, furthermore glabrous. *Stamens* included for 15–17 mm, inserted 6–7 mm from the corolla base; anthers sessile, 5–6 \( \times \) 1.5–2 mm, apex about 0.5 mm sterile, glabrous on both sides, only sparsely hirt-pubescent inside at the base; tails straight. *Pistil* 11–11.75 mm long; disk cup-shaped, 3–3.25 \( \times \) 3 mm, about as long as the ovary, shallowly 5-lobed, glabrous on both sides; carpels 3–3.25 \( \times \) 2.25 mm, glabrous on both sides; style 8–8.5 mm
long, glabrous; pistil head 2–3.5 mm long. Infructescences: pedicels 3–4 cm long, rigid, with large lenticels; peduncle 0.4–0.5 cm long; bracts deciduous. Mericarps narrowly ellipsoid or narrowly cylindrical, (11)23–31.5 × 1–2 cm, tapering into an acute or obtuse apex, with large lenticels, many-seeded, divergent, light brown or dark brown inside; wall 3 mm thick. Seeds: grains 17–30 × 3–4 mm, glabrous, minutely granulate, acute at the base; beak glabrous for 5–20 mm, bearing an apical coma for 25–70 mm; coma yellowish or creamy; hairs 25–70 mm long, shorter than the grains (and beak); embryo whitish or creamy; cotyledons 15–19 × 3–4 mm; rootlet 4–5.5 × 1 mm.

Distribution: Indonesia: North Sulawesi.
Ecology: Forest in the mountains, on volcanic soil. Altitude: 50–500 m.
Vernacular names: Kayu Santi (Pinamorongan), Mawarotan (Mt. Klabat), Lila (Lolumbulan), Lenas Lalaina (Papo Pompaso).

Specimens examined:

**INDONESIA: SULAWESI: NORTH:** Lolumbulan near Paku ure (fl., fr. Apr.) Koorders 16045 β (BO, K, L, P, type); Karowa or Papo Pompaso near Menado (fr. Apr.) Koorders 16046 β (BO, L, paratype); Kayawatu, Koorders 16067 β (BO, L, UC, paratype); Pinamorongan, Kakas Distr. (fr. Feb.) Koorders 16049 β (BO, L, paratype); Ratahan, Koorders 16047 β (BO, L, paratype); Mt. Klabat, Koorders 16048 β (BO, K, L, paratype); Bonedoa, Kampung Gunung Bone (fr. Feb.) Steur 118 in bb 18417 (BO, L); Bolaan Mongondo, between Pinagaluman and Pindol (fl. Oct.) De Vogel 2560 (L); Minahasa (fl. Apr.) Alston 15385 (BM).


**Vallariopsis lancifolia** (Hooker f.) Woodson, Philipp. Journ. Sci. 60: 228. 1936. **Fig. 25; Map 25**

Type: Malaysia: Malacca, Maingayi 1846, under Kew distribution number 1102 (K, holotype; isotypes: A, K, L; MO, photograph of K isotype).

Climber or creeper 1–12 m high. Branches terete, dark brown or grey, lenticellate, glabrous; branchlets terete, sometimes slightly angled, dark brown or grey, with warty lenticels. Leaves opposite, those of a pair mostly equal, less often unequal, petiolate; petiole 2–10 mm long, channeled above, glabrous or less often sparsely pubescent, those of a pair connate at the base into a very short ocrea, sometimes with 1–2 short collettes in the axils; blade papyraceous, narrowly elliptic or ovate, 2.6–4.5 × as long as wide, 1.75–8 × 0.4–3 cm, tapering into an acuminate or obtuse apex, at the base attenuate or less often acute, entire, glabrous on both sides; with costa slightly impressed above and prominent beneath; with 8–19 inconspicuous, fine, anastomizing secondary

FIG. 25. Vallariopsis lancifolia. 1, flowering branch (× 1/2); 2, leaves (× 1/2); 3, leaf (× 2); 4, flower bud (× 4); 5, flower (× 4); 6, flower from above (× 4); 7, part of corolla with stamens (× 8); 8, part of corolla without stamens (× 8); 9-10, stamen both sides (× 12); 11, calyx with pistil (× 8); 12, two sepals with colleters (× 8). 1-12 from Fox 33.

veins; tertiary venation obscurely reticulate. Inflorescences terminal or axillary, opposite, cymose, almost dichasial, 0.3–0.4 × as long as the leaves, 1–2 cm long, 3–11-flowered once branched. Peduncle short, 1–8 mm long, or obsolete, dark brown, glabrous, rarely sparsely pubescent; pedicels 4–9 mm long, dark brown, glabrous, less often sparsely pubescent; bracts sepal-like, erect or recurved, sparsely ciliate at the margin, persistent. Flowers 5-merous, actino-

morphic. Sepals probably pale green, connate for about 0.5 mm, ovate, about 2 × as long as wide, 1–1.5 × 0.5–0.75 mm, acute, often ciliate at the apex, entire, glabrous outside, inside glabrous or less often sparsely pubescent, with about 20 colleters in a single row in the whole flower at the base of the sepals. Corolla white; tube 2.6–4 × as long as the calyx, 4–4.5 mm long, glabrous on both sides, except for the tomentose apex inside, consisting of a lower and an upper part; lower part cylindrical, 2.5–3 mm long; upper part campanulate, 0.3–0.6 × as long as the lower, about 1.5 mm long, at the mouth about 2 mm wide; lobes oblique, 1.4–3.3 × as long as wide, 3.5–5 × 1.5–2.5 mm, obtuse or acute at the apex, entire, glabrous outside, inside glabrous, except for the pubescent base. Stamens exserted for 1.5–2 mm, with small ellipsoid ventral swellings at the base, adhering to the style apex; filaments inserted where the corolla tube widens, 4–4.5 mm from the corolla base; anthers sessile, narrowly triangular, 2.5 × 0.3 mm, acuminated at the for about 0.2 mm sterile apex, sagitate at the base, glabrous on both sides, introrse; cells 2, dehiscent throughout by a longitudinal slit. Pistil 3–3.5 mm long; disk cup-shaped, 0.5 × 0.75 mm, shorter than the ovary, 5-lobed, glabrous on both sides; ovary bicarpellate, superior; carpels connate at the base, ovoid, abruptly narrowing into the style, 1 × 0.75 mm, glabrous; style cylindrical, somewhat widened at the apex, 2–3 mm long, glabrous; pistil head subellipsoid, about 0.75 mm long, with a short tip at the apex, adhering to the anthers. In each cell one semiglobose placenta with about 200 ovules. Infructescences unknown.

Distribution: Malaysia, Indonesia: Sumatera: Islands of Siberut and Pagai. Ecology: Open area or swamp forest. Altitude: 0–700 m.

Specimens examined:
INDONESIA: SUMATRA: WEST: Pagai Isl. (fl. Feb.) Hagerup s.n. (C); Siberut Isl. (fl. Sept.) Booden-Kloss 14612 (K, SING).

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The author received a 9-months fellowship from the NUFFIC-FONC cooperation project in 1984 to study Apocynaceae genera that included field work in Kalimantan and Java. The Directorate-General International Cooperation of the Dutch Government granted in 1985/1986 another 9-months fellowship, that included visits to Kew, London, Oxford, and Paris; he is very much indebted to Prof. Ir. A. Van Maaren, the project leader, and to the Dutch Government for its financial support.

The Manuscript has been corrected by Dr. A. J. M. LEEUWENBERG and Prof. Dr. Ir. L. J. G. VAN DER MAESEN. Mrs. Drs. F. VAN DILST has helped him in compiling the index of exsiccatae. The illustrations have been made by Mr. PIET KOSTENSE, Mr. PHILIP DIRKSWAGER, and Miss YUEN FANG TAN. To them his thanks are also due. Assistance from the administration and technical staff of the Department of Plant Taxonomy of the Agricultural University of Wageningen is greatly appreciated.

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Finally his thanks go to his wife and children for their patience awaiting his return when he stayed far from home in Wageningen preparing this publication.
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The letters in parentheses are the first letters of the species epithet. Only numbered collections with a named collector have been listed. If a collector gathered (a part of) his collection together with others, only his name is cited in this list: e.g. Kasin, M. & A.R. is cited as Kasin, M. The index is divided in three parts: part I: Beaumontia; part II: Kibatalia; part III: Vallariopsis lancifolia.

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