

MONIMIACEAE

J.S. Strijk

Juss., Ann. Mus. Hist. Nat. 14 (1809) 133 as ‘Monimieae’ nom. cons; Endlicher, Gen. Pl., fasc. 4 (1837) 313; Hooker & Thomson, Fl. Ind. 1 (1855) 164; Tulasne, Arch. Mus. Hist. Nat. 8 (1855–1856) 273; Miquel, Fl. Ned. Ind. 1(2), fasc. 1 (1858) 73; de Candolle, Prodr. 16(2), fasc. 2 (1868) 640; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 114; Perkins, Bot. Jahrb. Syst. 25 (1898) 547; Perkins & Gilg in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 4) (1901) 1; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 1; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 250; Ridley, Fl. Malay Penins. 3 (1924) 73; Perkins, Übers. Gatt. Monim. (1925) 1; Backer & Bakhuizen van den Brink, Fl. Java (Spermatoph.) 1 (1964) 116; Keng, Ord. Fam. Malayan Seed Pl., ed. 3 (1983) 35; Philipson, Fl. Males., ser. 1, 10(2) (1986) 255; Ng, Tree Fl. Malaya 4 (1989) 261; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Philipson in Kubitzki et al. (ed.), Fam. Gen. Vasc. Pl. 2 (1993) 426; Yii & Lesmy, Tree Fl. Sabah & Sarawak 1 (1995) 245; Heywood in Heywood et al., Fl. Pl. Fam. World (2007) 216; Renner et al., J. Biogeogr. 37 (2010) 1227; Renner, Fl. Thailand 11(1) (2011) 46; Syahida-Emiza, Fl. Penins. Malaysia, ser. 2, 6 (2017) 27. **Type:** *Monimia* Thouars

Monoecious shrubs or scandent trees. Spherical oil cells present throughout the plant. **Bark** generally smooth to small-fissured, aromatic. **Twigs** smooth and slender, in some cases with distinct lenticels or corky longitudinal ridges. **Leaves** opposite, simple, decussate (rarely in whorls of 3–4 leaves), margin entire to serrate or dentate; glabrous or with simple or stellate hairs when young; resting buds sometimes with cataphylls; main secondary venation irregular but arching and meeting within the margin of the leaf. Stipules absent. **Inflorescences** axillary, lateral or (sub-)terminal, cymose, racemose or paniculate, sometimes ramiflorous on older branches; generally shorter than the leaves; pedicels often thickening with age. **Flowers** small, actinomorphic, more rarely slightly oblique, generally unisexual; receptacle well developed, perigynous (rarely hypogynous), forming a deepened thick-rimmed cup-shaped, (sub-)globose structure; with distinct sepals and petals or with tepals grading from sepals to petals, or vestigial or absent. **Male flowers** with stamens ranging from 4 to (6–)8(–150), scattered in a hollow receptacle; filaments free and short, anthers opening through 1–2 longitudinal slits; receptacle with a small ostiole surrounded by 1 or more pairs of tepals. **Female flowers** occasionally with staminodes; carpels many, rarely 1, sessile or stalked, free, outer carpels sometimes sterile; stigma and styles free; ovary solitary or apocarpous, superior to partly inferior, sessile; receptacle with a small ostiole surrounded by tepals; sometimes upper half of the receptacle abscising as a calyptra at anthesis. **Fruit** an aggregate of sessile or stalked drupelets, exposed by splitting of the receptacle at maturity. **Seeds** pendulous; testa membranous; albumen fleshy; cotyledons flattened; radicle superior.

Distribution. A pantropical and warm temperate family of 33 genera and c. 320 species with centres of generic and species diversity in Malesia, the Indian Ocean islands and the Neotropics. Only one species in Africa. In Singapore, 2 genera, each with 1 species.

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Doi: 10.26492/fo4.2026-13; 4 September 2026 (online & print).

Ecology. Monimiaceae occur in forests from sea level to the upper tree limit but, overall, are found mostly in lower montane to submontane evergreen rain forests. Some genera are restricted to and very common in the warm temperate forests of New Guinea, Australia, New Zealand and South America. A small number of species are found in coastal scrub on sandy or coral soils and in the scrub zone above the tree-line. In Singapore, the two species described are confined to primary lowland and semi-open secondary forest vegetation.

Uses. Leaves of some species are used in cooking and in traditional medicine.

Taxonomy. The family, as first founded by de Jussieu (Ann. Mus. Hist. Nat. 14 (1809) 133), included the genera which represent most of the current subfamilies. It also included several genera that have since been transferred to other families, most notably Amborellaceae, Atherospermataceae, Siparunaceae and Trimeniaceae (Money et al., J. Arnold Arbor. 31 (1950) 372–404; Schodde, Taxon 19 (1970) 324–328). The internal division of subfamilies and tribes continues to be a subject of debate. Currently, Malesian genera fall into subfamily Mollinedioideae (tribe Mollinedieae with 7 genera, namely *Kairoa* Philipson, *Kibara* Endl., *Lauterbachia* Perkins, *Matthaea* Blume, *Parakibara* Philipson, *Steganthera* Perkins, *Wilkiea* F.Muell., and tribe Hedycaryeae with 1 genus, *Levieria* Becc.) or subfamily Monimioideae (represented only by the genus *Palmeria* F. Muell.).

Key to genera

1. Leaves ovate to broadly elliptic; secondary veins arched and diminishing towards the margin; female receptacle with thickened glands inside the ostiole; anthers 8 (exterior 4 larger than the interior 4), 1-celled, dehiscing vertically in 2 unequal pores **1. Kibara**
Leaves narrowly lanceolate to lanceolate-oblong; secondary veins arched, ascending, and looping extensively along the margin; female receptacle without glands inside the ostiole; anthers 4 (of equal size), 2-celled, dehiscing longitudinally **2. Matthaea**

1. KIBARA Endl.

(from a vernacular name)

Gen. Pl., fasc. 4 (1837) 314; Hooker & Thomson, Fl. Ind. 1 (1855) 165; Tulasne, Arch. Mus. Hist. Nat. 8 (1855–1856) 403; Blume, Mus. Bot. 2(6) (1856) 88; Miquel, Fl. Ned. Ind. 1(2), fasc. 1 (1858) 73; de Candolle, Prodr. 16(2), fasc. 2 (1868) 670; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 114; Perkins, Bot. Jahrb. Syst. 25 (1898) 570; Perkins & Gilg in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 4) (1901) 58; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 28; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 253; Ridley, Fl. Malay Penins. 3 (1924) 74; Perkins, Übers. Gatt. Monim. (1925) 39; Masamune, Enum. Phanerog. Born. (1942) 305; Backer & Bakhuizen van den Brink, Fl. Java (Spermatoph.) 1 (1964) 117; Philipson, Blumea 30(2) (1985) 389, fig. 1; Philipson, Fl. Males., ser. 1, 10(2) (1986) 287, fig. 14; Ng, Tree Fl. Malaya 4 (1989) 261; Philipson in Kubitzki et al. (ed.), Fam. Gen. Vasc. Pl. 2 (1993) 435; Yii & Lesmy, Tree Fl. Sabah & Sarawak 1 (1995) 246; Renner, Fl. Thailand 11(1) (2011) 46; Syahida-Emiza, Fl. Penins. Malaysia, ser. 2, 6 (2017) 28. **Synonyms:** *Brongniartia* Blume,

Bijdr. Fl. Ned. Ind., pt 9 (1825) 435, nom. illeg. non Kunth. (1824). – *Sciadicarpus* Hassk., Flora 25(2, Beibl.) (1842) 20, nom. illeg. superfl. **Type:** *Kibara coriacea* (Blume) Hook.f. & Thomson

Sarcodiscus Griff., Not. Pl. Asiat. 4 (1854) 380. **Type:** *Sarcodiscus chloranthiformis* Griff. (= *Kibara coriacea* (Blume) Hook.f. & Thomson).

Small to medium-sized trees or understorey shrubs, rarely woody climbers; monoecious; aromatic. **Bark** variable, ranging from smooth to roughly fissured or corky. **Twigs** slender. **Leaves** opposite, pubescent or becoming glabrescent; lamina coriaceous or chartaceous, upper surface glabrous to pubescent on midrib and secondary veins, lower surface generally pubescent, margin entire or sparsely dentate, principal secondary veins arched and diminishing within the margin (occasionally reconnecting); petioles pubescent or glabrescent; resting buds with cataphylls. **Inflorescences** terminal or axillary cymes, mostly paniculate or fasciculate; bracts very small. **Flowers** unisexual, yellow-orange or green; perianth ovoid, globular or hemispherical; tepals 2–4, decussate; pedicels thickened distally towards the receptacle. **Male flowers** usually smaller than female flowers, apex with a minute opening (ostiole) surrounded by 2–4 decussate pairs of tepals; androecium usually with 4 (or 5) symmetrically large outer (decussate) stamens and up to 4 (or 2) inner smaller stamens or staminodes, occasionally rudimentary and more or less connate; anthers opening by a single slit; filaments present or stamens sessile. **Female flowers** with the ostiole surrounded by about 5 decussate pairs of tepals, the inner pairs thickened and glandular; the upper half of the receptacle abscising as a calyptra after anthesis; carpels numerous, free, placed on the interior of the urceolate perianth, with only a few developing as sessile berrylets; ovule 1; style very short; stigma obtuse and discoid, sessile on a turbinate ovary. **Fruit** an aggregate of fleshy sessile or stalked 1-seeded drupelets. **Seeds** coniform, testa membranous; albumen fleshy; cotyledons mostly flat, leafy, and ovate; radicle thick, superior.

Distribution. A genus of 43 species from the Nicobar Islands and Peninsular Thailand through Malesia to New Guinea and northeastern Australia (Queensland). Most speciose in New Guinea. In Singapore, 1 cryptogenic species.

Ecology. Across its range, in rain forest from sea level to 2800 m. Occasionally, on sandy or coral substrates.

Taxonomy. *Kibara* is the largest genus of Monimiaceae in Malesia although most species have small or local distributions. The Malesian species were last revised in the 1980s (Philipson, Blumea 30(2) (1985) 389–415; Philipson, Fl. Males., ser. 1, 10(2) (1986) 287–305) and have been little studied since. Morphological data suggests that *Kibara* is closely related to *Wilkiea* (a genus more or less restricted to New Guinea and eastern Australia) but molecular phylogenetic data is generally lacking and more research on species delimitation and relationships is needed.

Morphologically, *Kibara* can easily be distinguished from *Matthaea* and *Steganthera* by the presence of swollen glandular tissue surrounding the inner rim of the ostiole.

Kibara coriacea (Blume) Hook.f. & Thomson

(Latin, *coriaceus* = leathery; referring to the leaf texture)

Fl. Ind. 1 (1855) 166; Tulasne, Arch. Mus. Hist. Nat. 8 (1855–1856) 404; Miquel, Fl. Ned. Ind. 1(2), fasc. 1 (1858) 73; de Candolle, Prodr. 16(2), fasc. 2 (1868) 670; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 114; Perkins, Bot. Jahrb. Syst. 25 (1898) 576; Perkins & Gilg in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 4) (1901) 62; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 35, fig. 11; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 255; Ridley, Fl. Malay Penins. 3 (1924) 75, fig. 142; Perkins, Übers. Gatt. Monim. (1925) fig 30: B; Masamune, Enum. Phanerog. Born. (1942) 305; Backer & Bakhuizen van den Brink, Fl. Java (Spermatoph.) 1 (1964) 117; Philipson, Blumea 30(2) (1985) 406; Philipson, Fl. Males., ser. 1, 10(2) (1986) 298; Ng, Tree Fl. Malaya 4 (1989) 261, fig. 1; Turner, Gard. Bull. Singapore 45 (1993) 139; Wong et al., Gard. Bull. Singapore 46(2) (1995 [‘1994’]) 72, as ‘*coriace*’; Yui & Lesmy, Tree Fl. Sabah & Sarawak 1 (1995) 246; Turner, Gard. Bull. Singapore 47 (1997 [‘1995’]) 346; Kochummen, Tree Fl. Pasoh Forest (1997) 305; Turner et al., Gard. Bull. Singapore 48 (1998 [‘1996’]) 149; Chew et al., Gard. Bull. Singapore 49(2) (1999 [‘1997’]) 196; LaFrankie et al., Forest Trees Bukit Timah (2005) 163; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 52, 151, 207; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 47; Renner, Fl. Thailand 11(1) (2011) 47; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 152, 400; Syahida-Emiza, Fl. Penins. Malaysia, ser. 2, 6 (2017) 29, fig. 1, pl. 4; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 94; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 461. **Basionym:** *Brongniartia coriacea* Blume, Bijdr. Fl. Ned. Ind., pt 9 (1825) 436. **Synonyms:** *Kibara blumei* Steud., Nomencl. Bot., ed. 2, 1 (1840) 846, nom. illeg. superfl.; Blume, Mus. Bot. 2(6) (1856) 88. – *Sciadocarpus brongniartii* Hassk., Flora 25(2, Beibl.) (1842) 20, nom. illeg. superfl. – *Mollinedia coriacea* (Blume) Baill., Hist. Pl. 1(5) (1869) 304. **Type:** *Blume s.n.*, [Indonesia], Java (lectotype L [L0901251], designated here; isoelectotype L [L0841261]). **Fig. 1, 2.**

Sarcodiscus chloranthiformis Griff., Not. Pl. Asiat. 4 (1854) 380; Griffith, Icon. Pl. Asiat. 4 (1854) pl. 545. **Type:** [Published illustration] *Sarcodiscus chloranthiformis* in Griffith, Icon. Pl. Asiat. 4 (1854) pl. 545, lectotype designated here.

Kibara blumei Steud. var. *serrulata* Blume, Mus. Bot. 2(6) (1856) 88. **Synonyms:** *Kibara serrulata* (Blume) Perkins, Bot. Jahrb. Syst. 25 (1898) 575; Perkins & Gilg in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 4) (1901) 62, fig. 16: A; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 256; Ridley, Fl. Malay Penins. 3 (1924) 75. – *Kibara coriacea* (Blume) Hook.f. & Thomson var. *serrulata* (Blume) Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 36. **Type:** *Teijsmann s.n.*, [Indonesia], Java (lectotype GH [GH00041089], designated here).

Kibara chartacea Blume, Mus. Bot. 2(6) (1856) 89; Perkins & Gilg in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 4) (1901) 61; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 255; Ridley, Fl. Malay Penins. 3 (1924) 74. **Type:** *Korthals s.n.*, [Indonesia], Sumatra (lectotype L [L0841313], designated here, isoelectotype L (carp.) [L.1773991]).

Kibara chartacea Blume var. *apiculata* Blume, Mus. Bot. 2(6) (1856) 89; Perkins & Gilg in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 4) (1901) 61. **Type:** *Korthals s.n.*, [Indonesia], Sumatra (lectotype L [L0841315], designated here).

Kibara cuspidata Blume, Mus. Bot. 2(6) (1856) 89; Perkins & Gilg in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 4) (1901) 61; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 33; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 254; Merrill, J. Straits Branch Roy. Asiat. Soc., Special

No. [Bibliogr. Enum. Born. Pl.] (1921) 271; Merrill, Enum. Philipp. Fl. Pl. 2 (1923) 185; Masamune, Enum. Phanerog. Born. (1942) 305. **Type:** *Korthals s.n.*, [Indonesia], Sumatra (lectotype L [L.1773972], designated here; isoelectotypes L [L.1773960, L.1773966, L.1773967, L.1773970, L.1773971]).

Kibara coriacea (Blume) Hook.f. & Thomson var. *angustifolia* Becc., Malesia 1, fasc. 2 (1877) 186. **Synonym:** *Kibara angustifolia* (Becc.) Perkins, Bot. Jahrb. Syst. 25 (1898) 577. **Type:** *Beccari s.n.*, [Indonesia], Aru islands, Vokan, March 1873 (lectotype FI [FI013281 – a single specimen over several sheets], designated here; isoelectotypes A [A00041091], FI [FI013280, FI013282]).

Kibara tomentosa Perkins, Bot. Jahrb. Syst. 25 (1898) 571. **Type:** *Zollinger 1107* p.p., [Indonesia], Java (lectotype GH (fragment) [GH00039937], designated here).

Kibara trichantha Perkins, Bot. Jahrb. Syst. 25 (1898) 572. **Type:** *Warburg 1406*, [Indonesia], Java, Botanical Garden Buitenzorg (lectotype GH (fragment) [GH00039934], designated here).

Kibara macrophylla Perkins, Bot. Jahrb. Syst. 25 (1898) 573, nom. illeg. non (Tul.) Benth. (1870) nec (A.Cunn.) Benth. (1870). **Type:** *Zollinger 1107* p.p., [Indonesia], Java (lectotype A [A00056234], designated here; isoelectotype GH (fragment) [GH00039936]).

Kibara grandifolia Merr., Publ. Bur. Sci. Gov. Lab. 29 (1905) 15; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 30; Merrill, Enum. Philipp. Fl. Pl. 2 (1923) 185. **Type:** *Ahern's Collector 1158*, Philippines, Luzon, Rizal, Bosoboso, June 1904 (holotype PNH (lost); lectotype K [K000802127], designated here; isoelectotypes NSW [NSW927053], US [US00099007]).

Kibara schlechteri Perkins in Schumann & Lauterbach, Nachtr. Fl. Schutzgeb. Südsee (1905) 268; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 31. **Type:** *Schlechter 13825*, Kaiser Wilhelmsland [Papua New Guinea], am Schumannflusse, December 1901 (not traced).

Kibara ellipsoidea Merr., Philipp. J. Sci. 1(Suppl. 1) (1906) 56. **Type:** *Meyer 2843*, Philippines, Lamao, March 1905 (holotype PNH (lost); lectotype US [US00099004], designated here; isoelectotypes K [K000802097], NY [NY00320755]).

Kibara mollis Merr., Philipp. J. Sci., C 3(4) (1908) 225. **Type:** *Ramos 1070*, Philippines, Luzon, Rizal, Bosoboso, July 1906 (lectotype NY [NY00320759], designated here; isoelectotypes K [K000802125]), US [US00099009]).

Kibara clemensiae Perkins, Bot. Jahrb. Syst. 45(4) (1911) 423; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 29; Merrill, Enum. Philipp. Fl. Pl. 2 (1923) 184. **Type:** *Clemens 541*, Philippines, Mindanao, Lake Lanao, Camp Keithley, May 1906 (lectotype K [K000802124], designated here; isoelectotype M [M0217768]).

Kibara vidalii Perkins, Bot. Jahrb. Syst. 45(4) (1911) 423, as ‘*vidalli*’; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 30; Merrill, Enum. Philipp. Fl. Pl. 2 (1923) 185. **Type:** *Vidal 950*, Philippines, Luzon, Bataan, Bagac, November 1894 (holotype K [K000802126]).

Kibara motleyi Perkins, Bot. Jahrb. Syst. 45(4) (1911) 424, as ‘*motleyii*’; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 32; Merrill, J. Straits Branch Roy. Asiat. Soc., Special No. [Bibliogr. Enum. Born. Pl.] (1921) 272; Masamune, Enum. Phanerog. Born. (1942) 305. **Type:** *Motley 119*, [Malaysia], Borneo, Labuan, Loobookduan (lectotype K [K000802116], designated here).

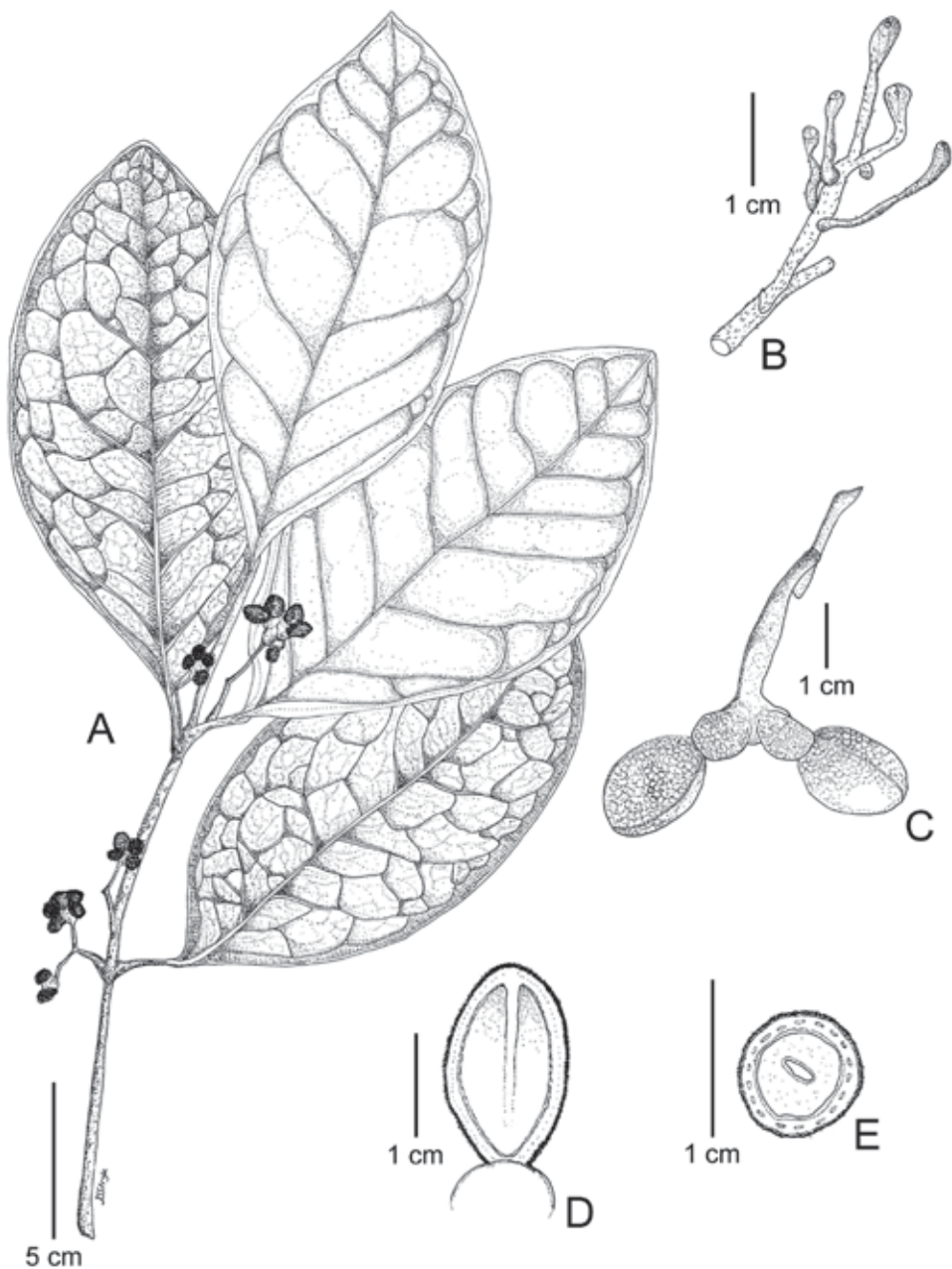


Figure 1. *Kibara coriacea* (Blume) Hook.f. & Thomson. **A.** Habit. **B.** Male inflorescence. **C.** Infructescence. **D.** Longitudinal section of fruit. **E.** Cross-section of fruit. (A from Peninsular Malaysia, *Kochummen FRI29002*; B–E from the Philippines, drawn from photos by B. Pasion (B & C), and P.B. Pelser & J.F. Barcelona (D & E). Drawn by J.S. Strijk).



Figure 2. *Kibara coriacea* (Blume) Hook.f. & Thomson. **A.** Habit with leaves and flowering branch. **B.** Leaves and mature fruit. **C.** Inflorescence with immature fruit. **D.** Longitudinal section of fruit. (A–D from the Philippines. Photos: A–C, B. Pasion; D, P.B. Pelser & J.F. Barcelona. All images reproduced with kind permission from Pelser et al. (ed.), Co's Digital Flora of the Philippines (2011 onwards).

Kibara merrilliana Perkins, Bot. Jahrb. Syst. 45(4) (1911) 424; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 32; Merrill, Enum. Philipp. Fl. Pl. 2 (1923) 185. **Type:** *Elmer 6151*, Philippines, Luzon, Benguet, Sablan, April 1904 (lectotype K [K000802129], designated here; isoelectotypes NY [NY00320758], US [US00099008]).

Kibara stapfiana Perkins, Bot. Jahrb. Syst. 45(4) (1911) 424; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 33; Merrill, Enum. Philipp. Fl. Pl. 2 (1923) 185. **Type:** *Vidal 3618*, Philippines, Luzon, Albay, Matnog, Pampanga, March 1895 (holotype K [K000802128]).

Kibara warburgii Perkins, Bot. Jahrb. Syst. 45(4) (1911) 424; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 34. **Type:** *Warburg 15470*, [Indonesia], northern Celebes [Sulawesi], Bojong (holotype B (lost); lectotype GH [GH00039938 – fragment], designated here).

Kibara macrocarpa Perkins, Bot. Jahrb. Syst. 45(4) (1911) 425; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 36. **Type:** *Riedel s.n.*, [Indonesia], North Celebes [Sulawesi], Gorontalo, June 1875 (lectotype K [K000802121], designated here; isoelectotype K [K000802120]).

Kibara longipes Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 31, nom. illeg. non Benth. (1870). **Type:** *Schlechter 16769*, Kaiser Wilhelmsland [Papua New Guinea], Kauro, 4 November 1907 (lectotype P [P02010797], designated here; isoelectotypes P [P02010799, P06794870, P06794871]; possible isoelectotype P [P02010798]).

Kibara inamoena Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 34. **Type:** *Schlechter 17146*, Kaiser Wilhelmsland [Papua New Guinea], Kauai mountains, January 1908 (lectotype NY [NY00320757], designated here; isoelectotypes K [K000802132], B [B 10 0294385], S [S03-2240], A [A00039947]).

Kibara dichasialis Suess. & Heine, Mitt. Bot. Staatssamml. München 1(Heft 2) (1950) 60. **Type:** *Clemens & Clemens 27382*, [Malaysia], Borneo [Sabah], Ranau, Dallas, Kinabalu, 2 December 1931 (holotype M [M0217769]; isotypes BM [BM000565575], K [K000802118, K000802119], L [L0037154, L0037154]).

Trees to 15–20 m tall, or rarely scandent shrubs. **Bark** smooth, grey. **Twigs** glabrous or pubescent when young. **Leaves** opposite, lamina coriaceous or chartaceous, broadly ovate to elliptic-oblong, 9–35 × 5–24 cm, apex shortly to long acuminate, base cuneate rounded or subcordate, margin entire or minutely to coarsely dentate, glabrous above, glabrous or sparingly to densely pubescent beneath, midrib and principal secondary veins prominent beneath, veins arched ascending and occasionally meeting within the margin, tertiary reticulation irregular; petiole 5–25 mm long, channelled above, glabrous or pubescent. **Inflorescences** (supra-) axillary, terminal or cauliflorous, sometimes pubescent; cymes solitary or several arising at the same node, simple 3-flowered cymes to complex pleiochasia with lateral branches branching to the third or fourth degree; male flowers on lower branches, female flowers above; rachis and lateral branches of female parts of the inflorescence stout, thickened and lignifying after anthesis, male parts finer and caducous, to 20 cm long but often much shorter; pedicels 15–30 mm long, gradually widening below the flowers, male parts more delicate. **Male flowers** globose, 1.5–2 mm diam., only slightly wider than the pedicel, pubescent, green-yellow; tepals 6–8, apex rounded; usually with 4 outer stamens and up to 4 smaller inner stamens, filaments strap-shaped. **Female flowers** globose, 3–5 mm diam., yellow to green; tepals c. 6; swollen pendulous glands within the ostiole; carpels usually c. 20, stigma short, obtuse, pubescent. **Infructescences** enlarged and woody; receptacle c. 20 mm diam., yellow to orange. **Fruit** with

shortly stalked or sessile drupelets, drupelets ovoid, apex acute, to 16 mm long, black. **Seeds:** testa membranous, orange when dried.

Distribution. Nicobar Islands, Peninsular Thailand and Peninsular Malaysia to New Guinea. In Singapore, currently considered cryptogenic and known with certainty from only one collection from Pulau Ubin (*Ali Ibrahim et al. SING2007-420*, Dec 2007, SING [SING114756]). There are also two historical collections labelled as being from Singapore but lacking more precise locality data (*Cantley s.n.*, SING [SING0013755, SING0013756]) and, being Cantley collections, they might not actually be from Singapore (see Middleton & Turner, Fl. Singapore 1 (2019) 32). Furthermore, no specimens have been traced to verify the published reports of *Kibara coriacea* from Bukit Timah (LaFrankie et al., Forest Trees Bukit Timah (2005) 163) and Nee Soon (Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 152, 400).

Ecology. In Singapore, the single localised specimen was collected in open secondary forest. Elsewhere, in swamp forest, along water margins and on slopes and ridges in undisturbed mixed dipterocarp and submontane forests to 1700 m. Recorded substrates include sandy soils, clay and limestone.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, previously considered native and assessed as Critically Endangered (CR/D) (Davison et al. (ed.), Singapore Red Data Book, ed. 2 (2008); Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 52, 151, 207), but recently reassessed as cryptogenic (Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 461) and, therefore, not included in the third edition of the Singapore Red Data Book (Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024)).

Uses. The fruit is edible and, in Borneo, the leaves are used to tenderise meat and flavour meat dishes.

Notes. *Kibara coriacea* is variable in the size and shape of its foliage, inflorescences, the number of tepals and the extent of pubescence, yet remains distinct enough across its range to be readily identified. The extent of morphological variation seems to be most pronounced in the Philippines and the largest inflorescences have been recorded in Sumatra. Further studies may uncover cryptic species that are currently being treated as synonyms of *Kibara coriacea*.

2. MATTHAEA Blume

(Matteo di San Giuseppe, 1617–1691,
Italian missionary and botanist in India)

Mus. Bot. 2(6) (1856) 89; Miquel, Fl. Ned. Ind. 1(2), fasc. 1 (1858) 74; de Candolle, Prodr. 16(2), fasc. 2 (1868) 669; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 115; Perkins, Bot. Jahrb. Syst. 25 (1898) 562; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 15; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 250; Ridley, Fl. Malay Penins. 3 (1924) 73; Perkins, Übers. Gatt. Monim. (1925) 33; Masamune, Enum. Phanerog. Born. (1942) 305; Anderson, Checkl. Trees Sarawak (1980) 254; Philipson, Blumea 28(1) (1982) 77; Philipson, Fl. Males., ser. 1, 10(2) (1986) 319; Ng, Tree Fl. Malaya 4 (1989) 263; Philipson in Kubitzki et al. (ed.), Fam. Gen. Vasc. Pl. 2 (1993) 435; Yii & Lesmy,

Tree Fl. Sabah & Sarawak 1 (1995) 248; Syahida-Emiza, Fl. Penins. Malaysia, ser. 2, 6 (2017) 30. **Type:** *Matthaea sancta* Blume

Trees or shrubs, occasionally scandent. **Bark** pale to dark brown-grey, smooth. **Twigs** generally smooth and slender. **Leaves** simple, opposite, petiolate; lamina chartaceous, smooth above, sparsely hairy to almost smooth below, margin entire or with varying degrees of serration, the midrib flattened above, raised below, secondary veins arched, ascending, looping near the margin, sunken above, prominent below. **Inflorescences** in the axils of leaves or on the nodes of branches, rarely terminal as cymes; much shorter than leaves. **Male flowers:** receptacle pedicellate, subglobose; tepals 4; stamens 4, free, filaments very short, anthers ovoid, 2-celled, opening by 2 longitudinal slits; pistillode minute. **Female flowers:** receptacle pedicellate, perianth depressed globose or turbinate, green to pale yellow or yellow; tepals 4, without apical pore or gap but upper half abscising as a calyptra at anthesis to reveal numerous free carpels; style short, conical; ovule solitary, pendulous, anatropous. **Fruit** an aggregate of 1-seeded long-stalked drupelets, fleshy; one or more on the enlarged and persistent flat receptacle. **Seeds** pendulous; albumen fleshy; cotyledons small, flat, radicle clavate, superior.

Distribution. A genus of 6 species in Peninsular Malaysia, Singapore, Sumatra, Anambas Islands, Borneo, Sulawesi, Philippines and the Moluccas (Talaud Island). In Singapore, 1 native species.

Ecology. In Singapore, in the understorey of lowland primary and secondary forest. Elsewhere, in the understorey of lowland and submontane forests to about 1700 m.

Taxonomy. Apart from the monotypic *Parakibara*, *Matthaea* is the only genus in Malesia that lies exclusively to the west of New Guinea. The genus is quite poorly known but can be readily distinguished from most genera, the only exception being *Steganthera*, from which it is nearly impossible to distinguish in the absence of flowers and/or fruit. *Matthaea* and *Steganthera* have non-overlapping distributions but may both be present on Sulawesi. Little is known about the evolutionary relationships with other genera as no representative molecular phylogenetic studies have been conducted. Further research is needed to resolve the placement of the group, to clarify internal relationships and better understand species delimitation.

Matthaea sancta Blume

(Latin, *sanctus* = holy, sacred; either referring to religious uses of the plant or because the genus was concurrently named after the missionary Matteo di San Giuseppe)

Mus. Bot. 2(6) (1856) 90, t. 10; Miquel, Fl. Ned. Ind. 1(2), fasc. 1 (1858) 74; de Candolle, Prodr. 16(2), fasc. 2 (1868) 670; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 115; Perkins, Bot. Jahrb. Syst. 25 (1898) 563, t. 5: D (fig. 1–4); Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 130, as ‘*Matthea*’; Perkins & Gilg in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 4) (1901) 52, fig. 10; Perkins in Engler (ed.), Pflanzenr., IV, fam. 101 (Heft 49) (1911) 18; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 251; Merrill, J. Straits Branch Roy. Asiat. Soc., Special No. [Bibliogr. Enum. Born. Pl.] (1921) 272; Merrill, Enum. Philipp. Fl. Pl. 2 (1923) 186; Ridley, Fl. Malay Penins. 3 (1924) 73; Perkins, Übers. Gatt. Monim. (1925) fig. 20: 1–4; Burkill, Dict. Econ. Prod. Malay Penins. 2 (1935) 1428; Keng, Gard. Bull. Singapore 27

(1974) 77; Philipson, *Blumea* 28(1) (1982) 82, fig. 2: d, fig. 3; Philipson, *Fl. Males.*, ser. 1, 10(2) (1986) 323, fig. 24, fig. 26: d; Ng, *Tree Fl. Malaya* 4 (1989) 263; Keng, *Concise Fl. Singapore*, vol. 1, *Gymn. Dicot.* (1990) 17, fig. 12.1 (as '*Mathaea*') ; Turner, *Gard. Bull. Singapore* 45 (1993) 139; Turner et al., *Gard. Bull. Singapore* 46(2) (1995 ['1994']) 23; Yii & Lesmy, *Tree Fl. Sabah & Sarawak* 1 (1995) 248, fig. 2; Turner, *Gard. Bull. Singapore* 47 (1997 ['1995']) 346; Turner et al., *Gard. Bull. Singapore* 48 (1998 ['1996']) 149; Chew et al., *Gard. Bull. Singapore* 49(2) (1999 ['1997']) 196; LaFrankie et al., *Forest Trees Bukit Timah* (2005) 164; Chong et al., *Checkl. Vasc. Pl. Fl. Singapore* (2009) 59, 151, 217; Turner & Chua, *Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res.* (2011) 47; Wong et al., *Checkl. Pl. Sp. Nee Soon Swamp Forest* (2013) 177, 400; Syahida-Emiza, *Fl. Penins. Malaysia*, ser. 2, 6 (2017) 32, fig. 2; Ho et al., *Gard. Bull. Singapore* 71(Suppl. 1) (2019) 94; Lindsay et al., *Gard. Bull. Singapore* 74(Suppl. 1) (2022) 461. **Synonym:** *Mollinedia sancta* (Blume) Baill., *Hist. Pl.* 1(5) (1869) 306. **Type:** *Collector unknown s.n.*, [Indonesia], Sumatra (lectotype L [L1786040], designated here). **Fig. 3, 4.**

Matthaea latifolia Perkins, *Bot. Jahrb. Syst.* 25 (1898) 563, t. 5: D (fig. 5–7); Perkins & Gilg in Engler (ed.), *Pflanzenr.*, IV, fam. 101 (Heft 4) (1901) 52, fig. 10: 5–7; Perkins in Engler (ed.), *Pflanzenr.*, IV, fam. 101 (Heft 49) (1911) 17, fig. 7: B, C. **Type:** *Maingay s.n.* [Kew Distribution 1308], Malaya [Malaysia], 'Malacca' [Melaka] (lectotype GH [GH00039968], designated here; possible isoelectotypes K [K000802091, K000802092], L [L0037186]).

Matthaea calophylla Perkins, *Bot. Jahrb. Syst.* 25 (1898) 563; Perkins & Gilg in Engler (ed.), *Pflanzenr.*, IV, fam. 101 (Heft 4) (1901) 52; Perkins in Engler (ed.), *Pflanzenr.*, IV, fam. 101 (Heft 49) (1911) 16, fig. 7: A; Merrill, *J. Straits Branch Roy. Asiat. Soc., Special No. [Bibliogr. Enum. Born. Pl.]* (1921) 272. **Type:** *Beccari 3236*, [Malaysia], Borneo, Sarawak (lectotype K [K000802093], designated here).

Matthaea sancta Blume var. *mindanaoensis* Perkins in Engler (ed.), *Pflanzenr.*, IV, fam. 101 (Heft 49) (1911) 18. **Type:** *Clemens 233*, Philippines, Mindanao, near outlet Lake Lanao, Camp Keithley, 1906 (lectotype US [US00345346], designated here).

Matthaea sancta Blume var. *venulosa* Perkins in Engler (ed.), *Pflanzenr.*, IV, fam. 101 (Heft 49) (1911) 19; Merrill, *J. Straits Branch Roy. Asiat. Soc., Special No. [Bibliogr. Enum. Born. Pl.]* (1921) 272. **Type:** *Curran & Merritt 7916*, Philippines, Luzon, Laguna, Mt Banajao (lectotype NY [NY00320765], designated here; isoelectotype US [US00098988]).

Shrubs or small trees to 15 m tall, rarely scandent. **Bark** brown, smooth. **Twigs** initially with soft hairs, but young branches becoming glabrous with age, terete, green-grey, uppermost somewhat flattened. **Leaves:** lamina chartaceous, lanceolate-oblong to oblong-acuminate, 15–30 × 3.5–9.5 cm, apex acuminate, base broadly cuneate, truncate or rounded, margin entire to subserrate, surface glabrous, often somewhat bullate, secondary veins impressed above and prominently raised on the lower surface, arched and meeting far from the margins, tertiary venation irregularly netted; petiole 2–3 cm long, glabrous. **Inflorescences** axillary or terminal, solitary or fascicled. **Male flowers** usually terminal, usually with 1–2 pairs of lateral flowers on short branches (occasionally with additional branching), green, rachis c. 2–3 cm long, pubescent, short-lived; receptacle (sub-)globose, c. 3–5 mm diam., slightly strigose; apex with small ostiole, tepals 4, minute; stamens 4, free, filaments broad and short, anthers triangular. **Female flowers** like male flowers but much larger, yellow, with lateral as well as terminal flowers developing into fruit, rachis becoming stout and dilated distally; receptacle turbinate, c. 10–12 mm diam., in clusters of 3–5 on short puberulous peduncles, without apical opening but upper half dehiscent as a calyptra at anthesis; inner surface pilose between the very numerous carpels; ovary densely pilose, stigma prominent. **Fruit** with drupelet stalks to 25

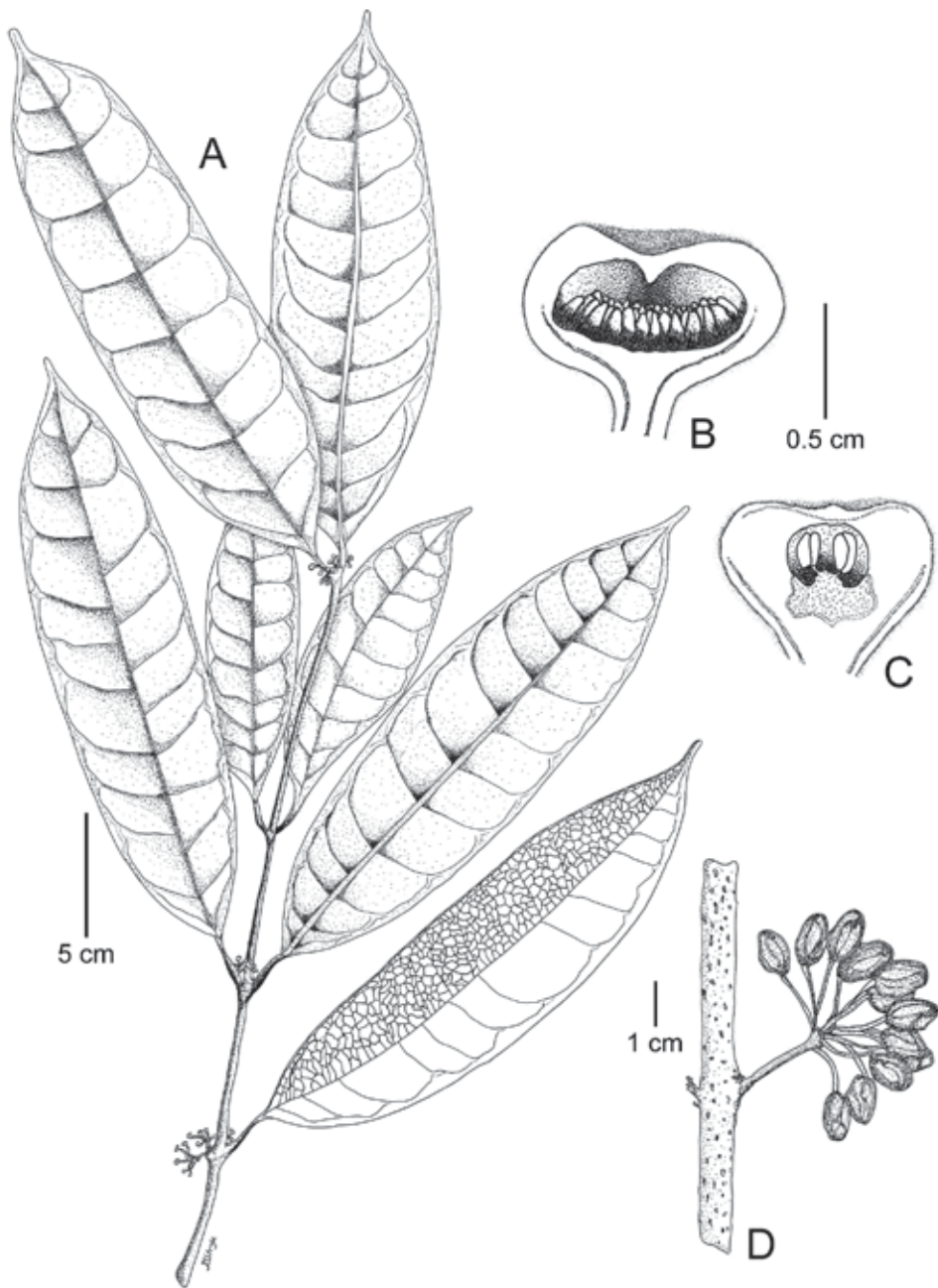


Figure 3. *Matthaea sancta* Blume. **A.** Habit. **B.** Male flower cross-section. **C.** Female flower cross-section. **D.** Infructescence. (A & D from Singapore, Singapore Botanic Gardens, *Tang & Sidek 1131*; B & C from the Philippines, drawn from photos by B. Pasion (B) and P.B. Pelser & J.F. Barcelona (C). Drawn by J.S. Strijk).

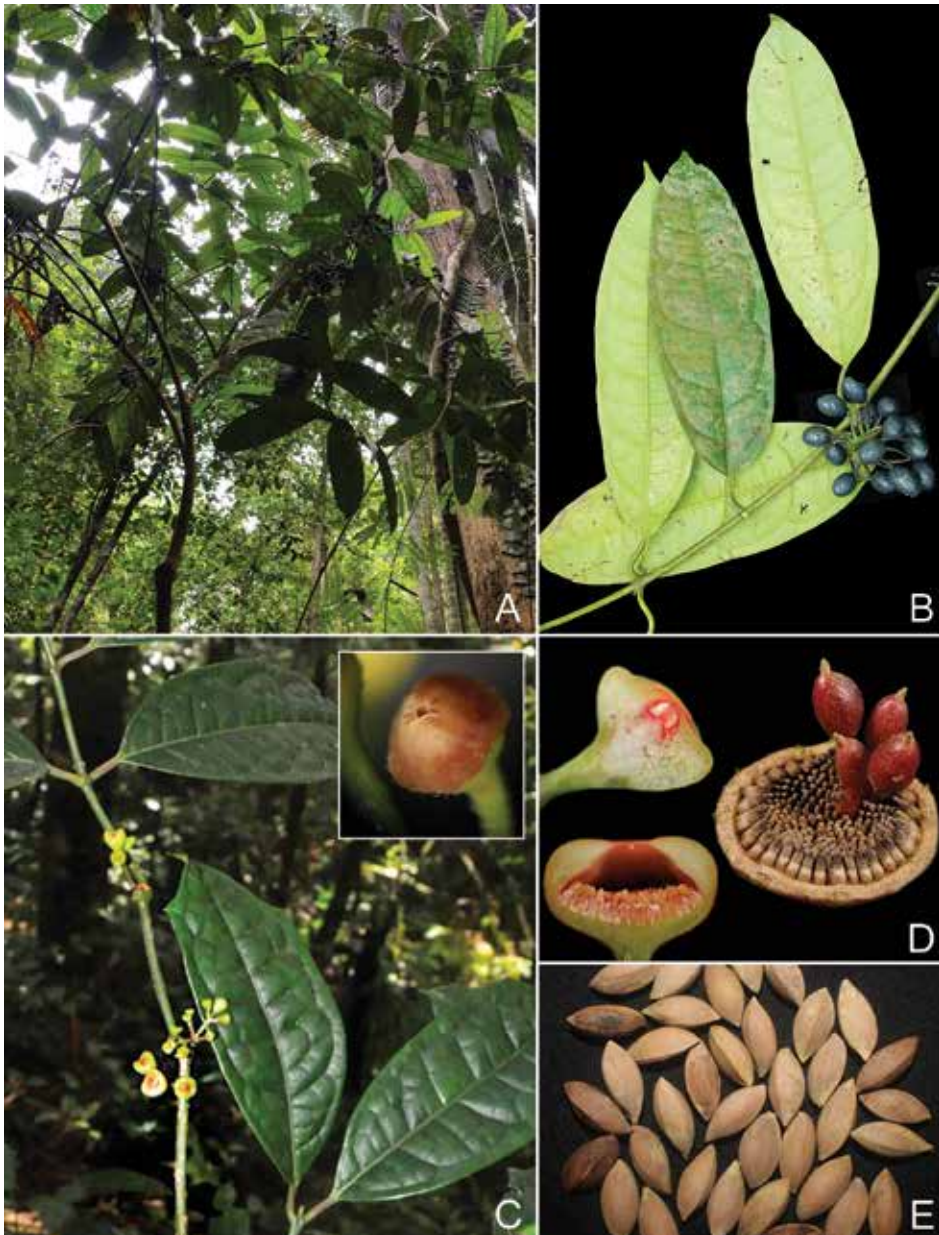


Figure 4. *Matthaëa sancta* Blume. **A.** Habit with leaves and fruiting branches. **B.** Leaves with mature fruit. **C.** Flowering branch with female flowers. Inset: Magnified male flower. **D.** Longitudinal section of male flower (top left); longitudinal section of female flower (bottom left); young developing fruit (right). **E.** Dried seeds. (A, B & E from Singapore, Bukit Timah, *Lim et al. SING 2019-721*; C inset from Singapore Botanic Gardens, *Ali Ibrahim et al. SING2019-180*; C & D from the Philippines. Photos: A, B & C inset, P.K.F. Leong; C & D (top left), B. Pasion; D (bottom left and right), P.B. Pelser & J.F. Barcelona; E, X.Y. Ng. C & D reproduced with kind permission from Pelser et al. (ed.), *Co's Digital Flora of the Philippines* (2011 onwards).

mm long, pericarp crustaceous, black to metallic blue, drupelets ovoid, to 18 mm long and 11 mm wide. **Seeds** oblong, c. 15 mm long with prominent funicle and broad hilum, albumen thick; cotyledons ovate-oblong, flattened, 4–6 mm long; radicle as long as cotyledons, thick. **Seeds:** testa light brown when dried.

Distribution. Peninsular Malaysia, Sumatra, Anambas Islands, Borneo, Sulawesi, Philippines and the Moluccas (Talaud Island). In Singapore, known from Singapore Botanic Gardens' Rain Forest (*Ridley s.n.*, 1 Mar [year illegible], SING [SING0013766]), MacRitchie (*Corner 34648*, 2 Jan 1938, SING [SING0013760]; *Corner s.n.*, 12 Mar 1941, SING [SING0013761]), Nee Soon (*Lua SING2014-357*, 10 Oct 2014, SING [SING0232241]) and Bukit Timah (*Bazilah Ibrahim et al. SING2016-008*, 19 Jan 2016, SING [SING0222228]).

Ecology. In Singapore, in primary lowland forest and secondary forest. Elsewhere, in lowland and submontane forests to 1200 m.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, assessed as Endangered (EN/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 491).

Uses. The leaves are reported to have medicinal properties, particularly for relieving headaches. The wood is moderately hard and durable making it suitable for construction.

Vernacular name. *Pokok cherum* (NParks' Flora & Fauna Web, 2026).

Notes. This is the only species in the genus with an extensive geographical distribution. The leaf size, width and patterns of teeth on the margins are variable across its distribution, with broader and more coarsely-toothed leaves appearing to occur more frequently in the east of its range.