

MYRISTICACEAE

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R.Br., Prodr. Fl. Nov. Holland. (1810) 399, as ‘Myristicaeae’, nom. cons.; Warburg, Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 1; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 205; Ridley, Fl. Malay Penins. 3 (1924) 53; Sinclair, Gard. Bull. Singapore 16 (1958) 248; Whitmore, Tree Fl. Malaya 1 (1972) 315; Keng, Ord. Fam. Malayan Seed Pl., ed. 3 (1983) 32; de Wilde, Blumea 30(1) (1984) 173; Corner, Wayside Trees Malaya, ed. 3, 2 (1988) 560; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 15; de Wilde, Beitr. Biol. Pflanzen 66(1) (1992 [‘1991’]) 95; Kühn & Kubitzki in Kubitzki et al. (ed.), Fam. Gen. Vasc. Pl. 2 (1993) 457; de Wilde, Blumea 39 (1994) 341; Kochummen, Tree Fl. Pasoh Forest (1997) 334; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 335; de Wilde, Fl. Males., ser. 1, 14 (2000) 1; de Wilde, Fl. Thailand 7(4) (2002) 720; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 153; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 127. **Type:** *Myristica* Gronov.

Dioecious or monoecious (*Endocomia*) monopodial shrubs or trees, (2–)5–15(–40) m tall (in Asia); stilt-roots sometimes present; branching whorled and plagiotropic (Massart’s model), the crown often pyramidal. **Bark** and wood exuding a watery pink or red sap when cut. **Wood** white or soon brownish when cut, soft; rays narrow, tanniferous tubes present; growth rings usually distinct and visible to the naked eye. **Twigs** tomentose, glabrescent. **Hairs** uniseriate, often with armed cells, appearing stellate or dendroid. **Leaves** simple, entire, alternate, usually distichous on plagiotropic shoots, exstipulate, often with an indumentum on both surfaces when young, glabrescent, or remaining on the lower surface, often with oil cells, dark dots (corky hair bases) on lower surface present or absent, glands absent; lateral veins distinct, interarching veins at the margins; intercostal venation sometimes faint; venation conduplicate (in Asia). **Inflorescences** axillary or cauliflorous, either pedunculate, compound or not, with or without bracts at base, the flowers variously arranged at the ends of the branches, or a short, woody (sub)sessile simple or 2–4-branched scar-covered wart- or worm-like short-shoot (brachyblast) with the flowers in (sub)umbels at the end; bracts caducous. Female inflorescences similar to male, usually less branched. **Flowers** small, unisexual, (2–)3(–5)-merous, mostly pedicellate; bracteole absent or present; perianth uniseriate, gamophyllous, globose to rotate, bud 2- (*Horsfieldia*, p.p.) to 5-lobed (*Endocomia*, p.p.), cleft to various depths, lobes erect or little or much recurved; the female usually urceolate, larger, more swollen than the male; nectary (disc) rarely present; androecium with synandrium sessile or stalked (androphore), in *Myristica* mostly with a short sterile apex; anthers dorsally adnate to the column and laterally to each other, or free, in *Knema* stellately arranged around a staminal disc, 2–45 in number, ellipsoid to linear, extrorse, opening by longitudinal slits, 2-loculed; ovary monocarpellate, sessile, superior, ovoid; style absent or short, stigma 2-lobed or rarely peltate with few to many lacinations; ovule 1, more or less basal. **Fruit** (sub)globose to oblong, rarely transversely elongated (not in Asia), dehiscing by a single longitudinal circumferential suture into 2 valves, rarely indehiscent; pericarp leathery, fleshy or somewhat woody, glabrous or tomentose.

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Doi: 10.26492/fo4.2026-09; 4 September 2026 (online & print).

Seeds 1 per fruit, large; testa of three layers; endosperm hard, mostly ruminant, containing oil, sometimes starch; embryo small, near the base of the seed or a little above it; cotyledons connate at base (peltate or cup-shaped) or free; aril (orange-)red (or yellow?), completely covering the seed, or lacinate to various depths, or (sub)entire, attached to the base of the seed between the hilum and the micropyle.

Distribution. An entirely tropical family with a worldwide distribution of 20 genera and approximately 500 species. In Singapore, 5 genera and 33 species, of which 32 are native and 1 was formerly casual.

Ecology. The Myristicaceae are a family of low or medium-sized, rarely canopy, trees of various types of primary lowland rain forest, including freshwater swamp forest (and peat swamp forest and kerangas, not in Singapore). Few species are montane, and few are found in secondary forest. Sometimes, Myristicaceae constitute a considerable component of the forest, especially of the middle storey of lowland mixed dipterocarp forest, but they are not gregarious. Flowering and fruiting are generally throughout the year. The usually more or less fleshy, yellow or brown, inside creamy, pink or red flowers of species of several genera have repeatedly been reported as being fragrant, e.g., *Horsfieldia irya* (Gaertn.) Warb. Corner (Wayside Trees Malaya, ed. 3, 2 (1988) 564) comments on its citron scent. Anthesis is presumably mainly nocturnal and, in some species, small beetles effect pollination (Corlett, Biol. Rev. 79 (2004) 497–532). No nectar is reported for any species. Besides the coloured inside of the perianth, in *Knema* Lour. the staminal disc may also be brightly (purple-red) coloured, the contrast with the creamy-white pollen may possibly be connected with attraction of pollinators. The blackish seed contrasting with the red aril and the red, pink, or white inner surface of the opened pericarp attracts birds like fruit pigeons and doves, hornbills and, elsewhere, birds of paradise, which disperse the seeds (Sinclair, Gard. Bull. Singapore 16 (1958) 213). Wild nutmegs are an important food source for hornbills (Kitamura et al., Raffles Bull. Zool. 24 (2011) 137–147). Dissemination by water may occur in *Horsfieldia wallichii* (Hook.f. & Thomson) Warb. where the seed floats because of air trapped between aril and testa, and in *Horsfieldia irya*, a riverine species, that has cavities in the endosperm. The seeds of *Myristica elliptica* Wall. ex Hook.f. & Thomson are reported to float, even without the aril (Sinclair, Gard. Bull. Singapore 16 (1958) 214). The recalcitrant seeds remain viable for only 30–75(–315) days (Ng, Trop. Forest Fruits Seeds Seedlings & Trees (2014) 177–179) and germinate only in damp, shady environments. Therefore, natural reestablishment of Myristicaceae in secondary forest is severely compromised.

Uses. In most species of Myristicaceae the heartwood is poorly differentiated from the sapwood and the wood is of minor commercial importance. The timber is suitable for temporary light constructions. The wood, mainly from the blackish-stemmed group in *Myristica* Gronov. (*M. cinnamomea* King, *M. elliptica*, *M. gigantea* King, *M. iners* Blume, *M. lowiana* King, *M. maingayi* Hook.f. and *M. maxima* Warb.), is mostly soft or moderately hard or heavy, perishable, but easily treated with preservatives. It is easy to work but is sometimes prone to early splitting. The sapwood is pale, and sometimes not well defined, but often the heartwood is dark reddish brown. The seed (with endosperm) of *Myristica fragrans* Houtt. is the nutmeg of commerce and the spicy aril around the seed is mace. The pericarp can be candied. The seeds of some species may be used for their fat content, their fragrance, or as medicine. A

few species are ornamental, e.g., *Horsfieldia iryaghedhi* (Gaertn.) Warb., originally from Sri Lanka.

Vernacular name. In English, known as the nutmeg family.

Taxonomy. Myristicaceae are a homogeneous family in the Magnoliales. The family is morphologically most similar to Annonaceae, mainly due to the ruminant endosperm and the foliage. The 3-lobed perianth is reminiscent of Lauraceae and Annonaceae. However, molecular phylogenetic analyses place Myristicaceae as sister to all remaining families of the Magnoliales (e.g., Sauquet et al., Bot. J. Linn. Soc. 142 (2003) 125–186; Baker, Syst. Biol. 71 (2021) 301–319). Myristicaceae are distinguished by their unisexual flowers with a uniseriate perianth and monocarpellate 1-ovuled female flowers. Phylogenetic analysis of the genera indicates that the family is monophyletic and is originally of South American or African origin (Sauquet et al., Bot. J. Linn. Soc. 142 (2003) 125–186).

Notes. All members of Myristicaceae can be recognised in the field by their general habit: a slender bole with a monopodial crown, the branches more or less verticillate and tiered, and the rather long exstipulate distichous leaves like those of Annonaceae. The Annonaceae differ in their flower structure and fruit, they lack the red exudate of the cut bark, have radiating parenchyma in the bark of the cut twig, and also the pollen is different. In general, inflorescence, flower and fruit characters are necessary for a definite identification of the genera of Myristicaceae, vegetative characters being useful only with experience. Useful but not necessarily diagnostic generic characters are the non-striate, usually finely lenticellate and granulate bark of the twigs in *Gymnacranthera* (A.DC.) Warb., or the dry leaves not readily breaking into pieces in most species of *Knema* and *Gymnacranthera*.

The male organ in the unisexual flowers is formed by the fusion of a variable number of stamens. Together they form the androecium, situated in the centre of the flower. Each anther consists of a pair of lobes or locules (which are usually transversely septate when immature). When fully fused the number of anthers may be difficult to count but it is half that of the often closely appressed locules. In the case of connate anthers, these form the synandrium and the fused filaments below it form a stalk called the androphore. When the androphore is absent or inconspicuous, the synandrium coincides with the androecium. In *Knema* the anthers are mostly free and the androecium is described in a different way. In the species descriptions, the number of anthers is given in *Endocomia* W.J.de Wilde, *Gymnacranthera*, and *Knema*, but in *Horsfieldia* Willd. and *Myristica* only the number of locules.

Key to genera

(specimens with male flowers)

1. Inflorescence a short, tubercle-like or worm-like protuberance, with scars of fallen pedicels and bracts; bracteole present on pedicel 2
- Inflorescence branched, panicle-like, short- or long-peduncled, the distal parts of the branches with scars or not; bracteole present or absent on pedicel 3

2. Androecium a stalked disc with the anthers sessile, stellately attached by their bases; bracteole small, at the base of the perianth or lower on the pedicel **4. Knema**
Androecium a stalked elongated column with the anthers completely fused dorsally, apex of the column often a sterile protuberance; bracteole embracing the perianth, at the apex of the pedicel **5. Myristica** (in part)
3. Bracteole present, at apex of the pedicel; peduncle of inflorescence without scars at base **5. Myristica** (in part)
Bracteole absent; peduncle of inflorescence with bract scars at base 4
4. Synandrium various, with the central column hollowed to various depths at apex, broader than the androphore; perianth inside glabrous **3. Horsfieldia**
Synandrium elongated or more or less globose, central column at apex not hollowed, about as wide as, or narrower than, the androphore; perianth inside hairy or glabrous ... 5
5. Synandrium short, (depressed-)globose, anthers completely sessile, without apically free part; perianth lobes spreading or reflexed at anthesis **1. Endocomia**
Synandrium elongate, anthers free in the apical part; perianth lobes erect at anthesis **2. Gymnacranthera**

Key to genera

(specimens with female flowers and fruit)

1. Aril divided into segments to base or almost so 2
Aril entire or lacinate to halfway or less 3
2. Inflorescences or infructescences paniculate, with scars of basal cataphylls; bark of twigs smooth or very finely striate; fruit 1.5–3.5 cm long; leaves not conspicuously brittle when dry **2. Gymnacranthera**
Inflorescences either simple or branched, either a short short-shoot, or panicle-like with peduncle without basal cataphyll scars; bark of twigs striate, longitudinally cracked, or flaking; fruit (2.5–)4–9 cm long; leaves brittle when dry **5. Myristica**
3. Aril coarsely incised for the upper fifth to a third (to half); seeds usually variegated, often bluntly pointed at one end; inflorescence paniculate; monoecious; leaves brittle when dry **1. Endocomia**
Aril entire, at apex convoluted or folded, or shallowly lacinate; seeds not variegated, not pointed at apex; inflorescence paniculate or not; dioecious; leaves brittle or not brittle when dry 4
4. Bracteole absent; inflorescence paniculate; leaves brittle when dry; lower surface usually not pale **3. Horsfieldia**
Bracteole present; inflorescence a short, wart- or worm-like, simple or branched, scar-covered short-shoot; leaves not brittle when dry; lower surface usually more or less pale **4. Knema**

1. ENDOCOMIA W.J.de Wilde

(Greek, *endo-* = inside, *kome* = hair; referring to the presence of hairs inside the perianth)

Blumea 30(1) (1984) 179, fig. 1–3; de Wilde, Beitr. Biol. Pflanzen 66(1) (1992 ['1991']) 109; Kühn & Kubitzki in Kubitzki et al. (ed.), Fam. Gen. Vasc. Pl. 2 (1993) 466; Kochummen, Tree Fl. Pasoh Forest (1997) 335; de Wilde in Sosef et al. (ed.), Pl. Resources S.E. Asia 5(3) (1998) 214; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 338; de Wilde, Fl. Males., ser. 1, 14 (2000) 29; de Wilde, Fl. Thailand 7(4) (2002) 725; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 131. **Type:** *Endocomia macrocoma* (Miq.) W.J.de Wilde

Trees, monoecious (always?). **Twigs** never angular or ridged, without lenticels, sometimes flaky, often pale. **Leaves** membranous or chartaceous, brittle when dry, lower surface not pale, not papillose, dots absent; reticulation lax, distinct or not. **Inflorescences** with male and female flowers mixed (always?), sometimes pseudo-terminal (terminal bud of twig aborting), paniculate, not branched from near the base; basal cataphylls caducous; bracts caducous; flowers in small clusters, buds either in the same or in different stages of development. **Flowers** short or long pedicellate, at base not articulated; bracteole absent. **Male flowers:** perianth rotate, thinly leathery, inside pubescent, yellowish (or bright red – not in Singapore); bud small, ellipsoid, ovoid, or subglobose, cleft to c. 3/4 or more nearly to the base, lobes 3–5, spreading or recurved at anthesis; androecium with androphore narrow, glabrous, synandrium small, (depressed) globose or short-ellipsoid, with 2–6 completely fused, short (0.5 mm or less) elliptic sessile anthers, central column not obvious. **Female flowers:** similar to male; ovary ovoid, glabrous, stigma sessile, minute, 2-lobed, lobes narrow, or broad and 2–5-lobulate. **Infructescences** small or large panicles, to 30 cm long. **Fruit** ellipsoid or (ob)ovoid, yellowish or glabrous, purplish; pericarp thin or thick, fleshy-leathery. **Seeds** usually bluntly pointed at apex, variegated; endosperm ruminant, probably without starch; embryo incompletely known; aril yellowish or red, subentire or to halfway lacinate.

Distribution. A genus of 4 species from southern China through continental Southeast Asia and Malesia to New Guinea. In Singapore, 1 native species.

Ecology. Primary lowland rain forest.

Notes. The condition of flower buds in one cluster in different stages of development (not in Singapore) is sometimes also found in some species of the related genus *Horsfieldia*. Female flowers are to be found scattered in the large, paniculate, predominantly male-flowered inflorescences, or in purely female inflorescences, but they have not been seen in all species.

Endocomia canarioides (King) W.J.de Wilde

(the genus *Canarium*, Burseraceae, Greek, *-oides* = resembling;
the fruit resembles those of *Canarium* L.)

Blumea 30(1) (1984) 190, fig. 3: e–h; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 145; Kochummen, Tree Fl. Pasoh Forest (1997) 335; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 357; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996'])

149; Chew et al., Gard. Bull. Singapore 49(2) (1999 [‘1997’]) 198; de Wilde, Fl. Males., ser. 1, 14 (2000) 30, fig. 4: e–h; de Wilde, Fl. Thailand 7(4) (2002) 726, fig. 2; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 38, 153, 191; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 50; Leong et al., Gardenwise 47 (2016) 9; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 132, fig. 2: A–C; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 96; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 481. **Basionym:** *Myristica canarioides* King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 283, 304, pl. 134. **Synonyms:** *Horsfieldia canarioides* (King) Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 294, t. 21; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 208; Ridley, Fl. Malay Penins. 3 (1924) 55. – *Horsfieldia macrocoma* (Miq.) Warb. var. *canarioides* (King) J.Sinclair, Gard. Bull. Singapore 16 (1958) 389, fig. 55; Whitmore, Tree Fl. Malaya 1 (1972) 327; Keng, Gard. Bull. Singapore 27 (1974) 75; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16. **Type:** *King’s Collector 10064*, [Malaysia], ‘Perak’ [actually Selangor], Ulu Bubong, June 1886 (lectotype K [K000880130], designated by de Wilde, Blumea 30(1) (1984) 191; islectotype L [L0037209]). **Fig. 1, 2.**

Myristica racemosa King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 286, 328, pl. 173. **Synonym:** *Horsfieldia racemosa* (King) Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 347; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 222; Ridley, Fl. Malay Penins. 3 (1924) 60; Burkill, Dict. Econ. Prod. Malay Penins. 1 (1935) 1199. **Type:** *Curtis 934*, [Malaysia], Penang, July 1890 (lectotype CAL [CAL0000021280], designated by Sinclair, Gard. Bull. Singapore 16 (1958) 391).

Embelia ridleyi King & Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74(1) (1906 [‘1905’]) 112; Ridley, Fl. Malay Penins. 2 (1923) 234; Sinclair, Gard. Bull. Singapore 15 (1956) 31; Keng, Gard. Bull. Singapore 36(1) (1983) 110; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 139. **Type:** *Ridley 6324*, Singapore, Bukit Mandai, 1894 (lectotype SING, designated by Sinclair, Gard. Bull. Singapore 16 (1958) 391, not traced; islectotype K [K000880127]).

Trees 10–35 m tall. **Bark** grey-brown or dark brown, smooth, flaking in small thin pieces, or finely fissured or cracked. **Twigs** palish, brown or grey-brown, 1.5–4(–10) mm diam., with minute grey-brown hairs c. 0.1 mm long, early glabrescent, bark striate, on older twigs sometimes longitudinally cracking, lenticels inconspicuous. **Leaves:** petiole 8–30 mm long, 1.5–4 mm wide; lamina membranous or chartaceous, elliptic to oblong, 8–30 × 4–13.5 cm, base subcordate or rounded to short-cuneate, apex acute-acuminate; upper surface dark brown, glabrous, lower surface early glabrescent; midrib on both surfaces early glabrescent, flat or slightly raised above; lateral veins 11–19 pairs, interarching veins distinct or not; intercostal venation lax, distinct or not on both surfaces; leaf bud 6–25 mm long, 1–3 mm wide, with dense (grey-)brown hairs 0.1–0.2 mm long or less. **Inflorescences** predominantly with male flowers, generally behind the leaves, (sub)glabrescent or with sparse greyish hairs c. 0.1 mm long or less, various in shape, loose or condensed, many-flowered, 6–25 cm long, 3–15 cm wide, peduncle 0.5–6 cm long, bracts caducous, not seen. **Flowers** in loose or dense clusters of 3–8, all in about the same stage of development; perianth outside with sparse greyish hairs 0.1(–0.2) mm long, or glabrous, lobes inside with pale hairs 0.2–0.3 mm long, often in longitudinal rows. **Male flowers:** pedicel 1.5–2.5 mm long, bud broadly ellipsoid-obovoid, 1.5–1.6 mm long, 1.3–1.4 mm wide, apex broadly rounded or somewhat depressed, base more or less tapering, subcircular in cross-section, cleft 3/4 to 4/5, lobes 3 or 4 (or 5), 0.2(–0.3) mm thick; synandrium depressed-globose, 0.3–0.5 mm long, 0.5–0.6 mm wide, anthers 4–6, androphore 0.3–0.4 mm long, 0.3 mm wide. **Female flowers:** not seen; ovary in very immature fruit glabrous. **Fruit** (solitary or) 2–6 together in panicles of 15–25 cm long, ellipsoid-oblong,

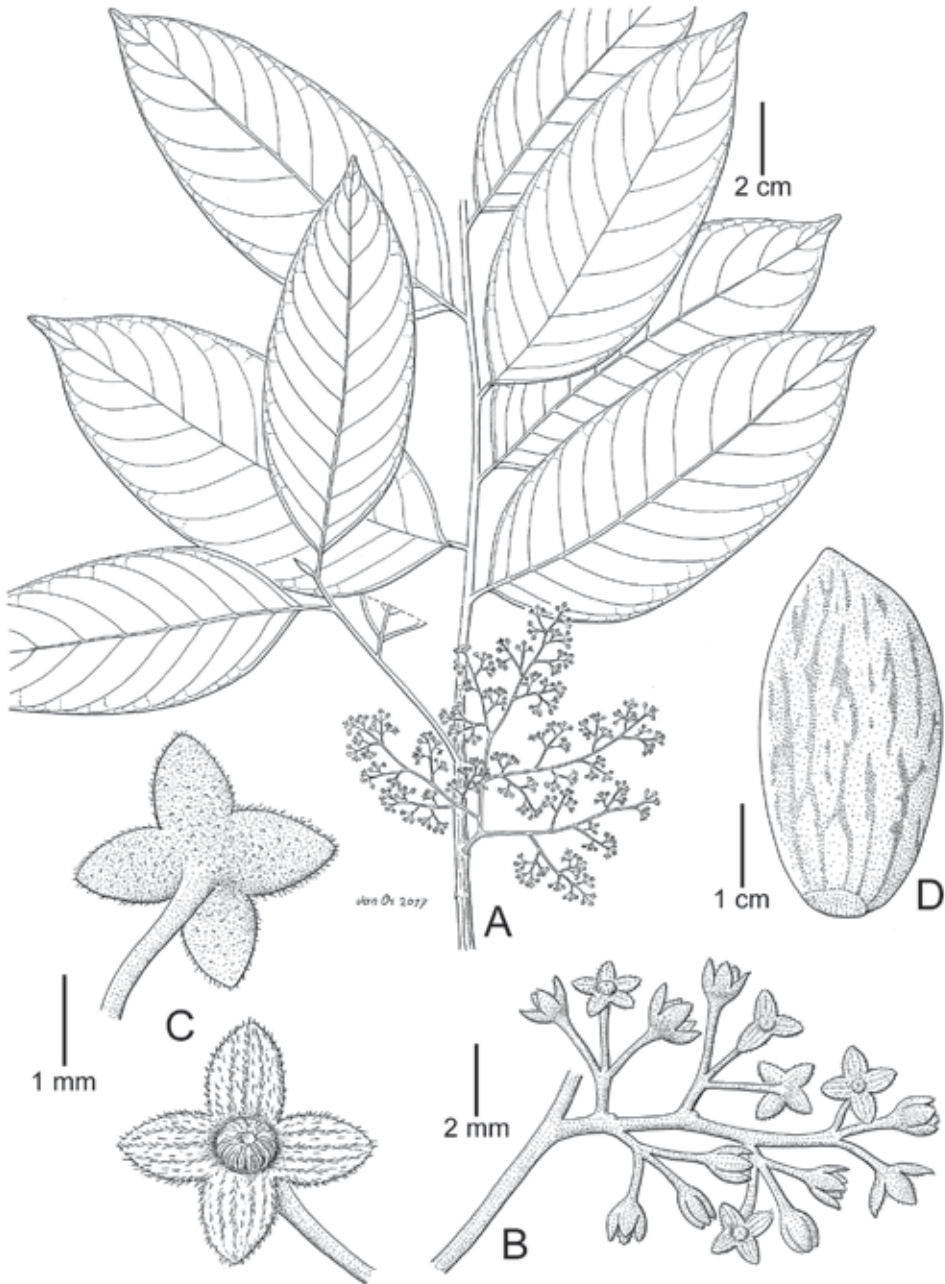


Figure 1. *Endocomia canarioides* (King) W.J.de Wilde. **A.** Flowering twig. **B.** Detail of male inflorescence. **C.** Male flower, seen from above and below. **D.** Variegated seed (A–C from Peninsular Malaysia, *Ngadiman SFN 36924*; D from Peninsular Malaysia, *Maingay 1298*. Drawn by J. van Os).

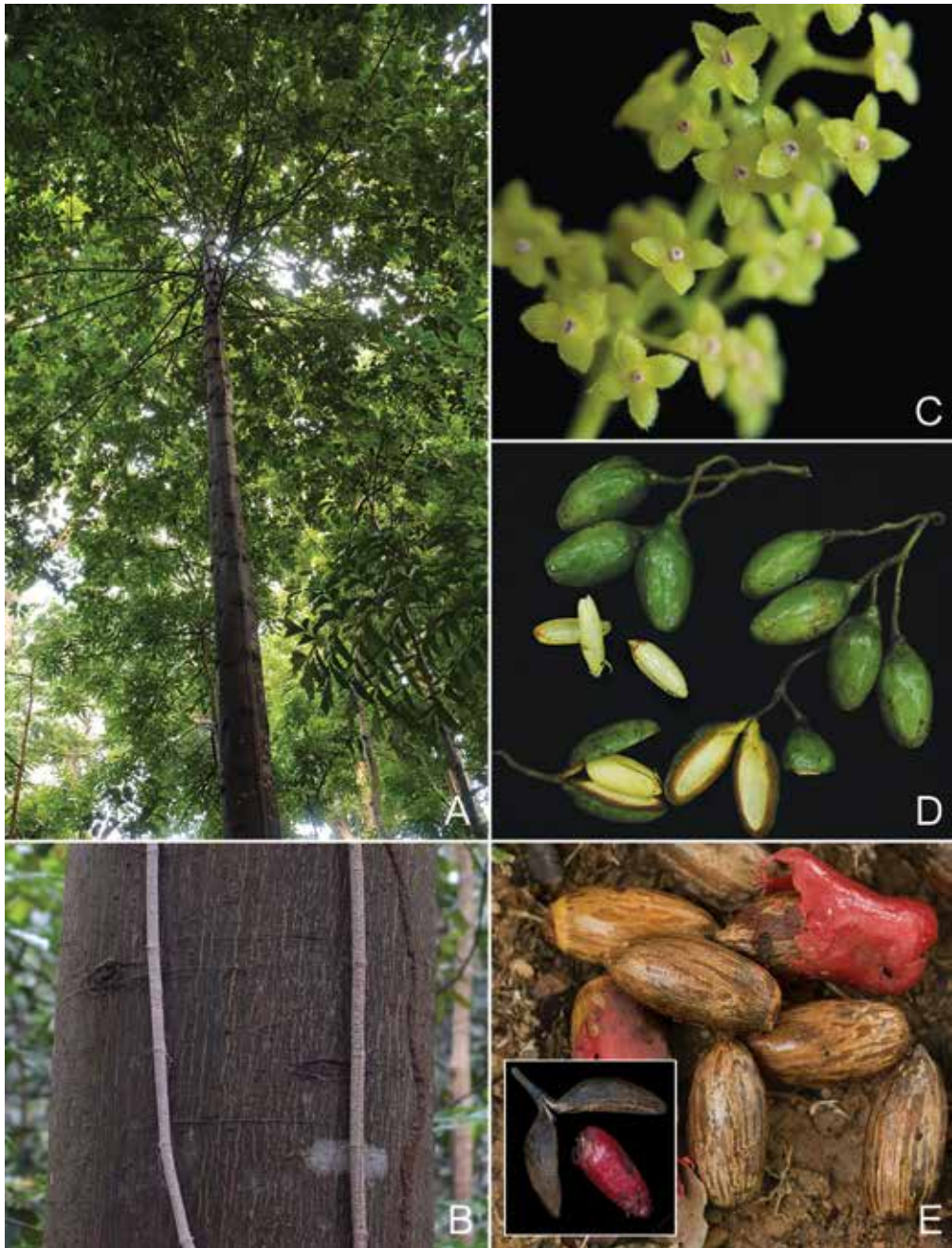


Figure 2. *Endocomia canarioides* (King) W.J.de Wilde. **A.** Habit **B.** Trunk. **C.** Male flowers. **D.** Unripe fruit. **E.** Seeds, one with aril. Inset: dropped fruit. (A–E from Singapore, Singapore Botanic Gardens’ Rain Forest, Leong *et al.* SING2016-031. Photos: A, B & D, P.K.F. Leong; C, E & E inset, Zaki Jamil).

(4.5–)5–7 cm long, 2.5–3.5 cm wide, apex (narrowly) rounded, base rounded or narrowed for 3–5 mm, glabrous, yellow-orange drying dark brown or blackish, finely granulate; pericarp 2–10 mm thick; fruit stalk 15–20 mm long. **Seeds** ellipsoid-oblong, 4–5 cm long, apex subacute or bluntly 2–3 mm beaked, testa purplish-brownish variegated; aril red, laciniate for about a third to nearly halfway.

Distribution. Southern Thailand, Peninsular Malaysia and Sumatra. In Singapore, known from Sungai Jurong (*Ridley 6095*, Mar 1894, SING [SING0011743]), Bukit Timah (*Ridley 6355*, 1894, SING [SING0011740]; *Khoo KMS 102*, 10 Jun 2009, SING [SING0145343]), Bukit Mandai (*Ridley 8426*, 1897, SING [SING0011742]) and Singapore Botanic Gardens' Rain Forest (*Leong et al. SING2016-031*, 5 Feb 2016, SING [SING0243738]).

Ecology. Across its range, in lowland rain forest, on flat land, hillsides or near rivers, to 300 m. Flowering and fruiting all through the year.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 51, 492).

Notes. The label of the type collection of *Endocomia canarioides*, *King's Collector 10064*, claims the material was collected in Perak but Kiew (Gard. Bull. Singapore 65 (2013) 149–156) has clarified that the collection locality of Ulu Bubong is actually in Selangor.

Sinclair (Gard. Bull. Singapore 16 (1958) 391) effectively designated *Curtis 934* (CAL) as the lectotype of *Myristica racemosa* King. This specimen is labelled as having been collected in July 1890. The specimens of *Curtis 934* in K [K000880132] and SING [SING0052726]) are, however, both labelled as having been collected in August 1886 so are not duplicates and are, therefore, syntypes and not isolectotypes.

2. GYMNACRANTHERA (A.DC.) Warb.

(Greek, *gymnos* = naked, free, *acros* = at the tip, *antheros* = flowering; referring to the inflorescence)

Ber. Deutsch. Bot. Ges. 13(Gen.Versamm.) (1896 ['1895']) 94; Warburg, Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 131; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 222; Ridley, Fl. Malay Penins. 3 (1924) 61; Sinclair, Gard. Bull. Singapore 16 (1958) 434; Sinclair, Gard. Bull. Singapore 17(1) (1958) 96; Whitmore, Tree Fl. Malaya 1 (1972) 318; Schouten, Blumea 31(2) (1986) 451; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 15; Kühn & Kubitzki in Kubitzki et al. (ed.), Fam. Gen. Vasc. Pl. 2 (1993) 466; de Wilde et al. in Lemmens et al., Pl. Resources S.E. Asia 5(2) (1995) 255; Kochummen, Tree Fl. Pasoh Forest (1997) 336; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 343; de Wilde, Fl. Males., ser. 1, 14 (2000) 40; de Wilde, Fl. Thailand 7(4) (2002) 730; Lim et al., Nat. Singapore 9 (2016) 71; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 136. **Basionym:** *Myristica* Gronov. sect. *Gymnacranthera* A.DC., Ann. Sci. Nat., Bot., sér. 4, 4 (1855) 31. **Type:** *Myristica paniculata* A.DC. (= *Gymnacranthera paniculata* (A.DC.) Warb.).

Shrubs or trees, dioecious. **Twigs** often somewhat compressed, lenticellate, smooth or very finely striate, not flaky. **Leaves** rarely brittle when dry, lower surface pale, not papillose, dots absent; reticulation lax, faint. **Inflorescences** paniculate, often branched from near the base (female more condensed); flowers in loose clusters, all in the same stage of development; basal cataphylls caducous; bracts caducous. **Flowers** short-pedicellate; bracteole absent. **Male flowers:** perianth urceolate, membranous or leathery, inside pubescent, yellow; bud ellipsoid, cleft to c. 1/2 or less, lobes (2 or) 3 or 4, erect or slightly curving outwards (in female more or less reflexed); androecium sessile or with short and narrow androphore, synandrium (long-) ellipsoid, with 5–12 linear anthers, dorsally connate into the central column, laterally and at apices free, the connective sometimes slenderly protruding. **Female flowers** shorter and wider than male, more or less ovoid; ovary broadly ovoid, pubescent, stigma small, sessile, 2-lobed, each lobe entire or 3–6-lobulate, mostly reflexed. **Infructescences** paniculate, several-fruited. **Fruit** ellipsoid (elsewhere globose), 1.5–3.5 cm long, hairy or glabrescent; pericarp thick-leathery. **Seeds:** testa not variegated; endosperm ruminant, containing a fatty oil; aril red, orange or yellow, lacinate to near the base (as in *Myristica*).

Distribution. A genus of 7 species, from southern India, southern Thailand and throughout Malesia to eastern New Guinea. In Singapore, 3 native species, one of which has 2 native varieties.

Ecology. Lowland and submontane forest, also in (peat) swamp forests.

Key to *Gymnacranthera* species

1. Twigs and inflorescences with woolly hairs 1(–2) mm long; lower leaf surface with persistent woolly hairs c. 0.5 mm long; fruit densely hairy **1. *G. bancana***
Twigs and inflorescences glabrescent; lower leaf surface glabrescent or with appressed hairs; fruit glabrescent 2
2. Twigs at apex 1–2 mm diameter and, at about 10 cm lower down, 2–3.5 mm diameter; leaves 5–17 × 1.5–5.5(–6) cm; midrib flat or sunken above **2. *G. farquhariana***
Twigs at apex (2–)2.5–4 mm diameter and, at about 10 cm lower down, (3–)3.5–5.5 mm diameter; leaves larger, 14–28 × (5.5–)6–13 cm; midrib usually sunken above
..... **3. *G. forbesii***

1. *Gymnacranthera bancana* (Miq.) J.Sinclair (of Banca)

Gard. Bull. Singapore 16 (1958) 436, fig. 53, pl. 13: A; Sinclair, Gard. Bull. Singapore 17(1) (1958) 99; Whitmore, Tree Fl. Malaya 1 (1972) 319; Keng, Gard. Bull. Singapore 27 (1974) 75; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78; Schouten, Blumea 31(2) (1986) 463, fig. 3: a–f; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 15, fig. 11.1; Turner, Gard. Bull. Singapore 45 (1993) 145; Wong et al., Gard. Bull. Singapore 46(2) (1995 [‘1994’]) 71; Turner, Gard. Bull. Singapore 47 (1997 [‘1995’])

357, as '*Gymnancranthera*'; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 198; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 345, fig. 2: A–F; de Wilde, Fl. Males., ser. 1, 14 (2000) 41, fig. 5: a–f, photo 1; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 46, 153, 206; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 136, 414; Lim et al., Nat. Singapore 9 (2016) 72; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 137, fig. 3; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 481. **Basionym:** *Myristica bancana* Miq., Fl. Ned. Ind., Eerste Bijv., fasc. 3 (1861) 383. **Type:** *Teijsmann HB 3279*, [Indonesia], Sumatra, Bangka (lectotype U [U0004812], designated by Sinclair, Gard. Bull. Singapore 16 (1958) 439).

Myristica murtonii Hook.f., Fl. Brit. India 5, fasc. 13 (1886) 105, as '*murtoni*'. **Synonym:** *Gymnancranthera murtonii* (Hook.f.) Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 357, t. 20 as '*murtoni*'; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 223, as '*murtoni*'; Ridley, Fl. Malay Penins. 3 (1924) 61, as '*murtoni*'. **Type:** *Murton 13*, Singapore, 15 August 1881 (lectotype K [K000880124], designated by Sinclair, Gard. Bull. Singapore 16 (1958) 438).

Myristica ferruginea Wall. [Numer. List no. 6803 (1832), nom. nud.] ex King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 283, 298, pl. 125; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129. **Type:** *Wallich s.n.* [EIC 6803], Singapore, 1822 (lectotype BM, designated by Schouten, Blumea 31(2) (1986) 465; isolecotypes G n.v., K [K000880123], K-W [K001124849]).

Trees 15–40 m tall, without buttresses. **Bark** brown, smooth, slightly fissured, flaky, or rugose with tiny, thick, rather loose scales. **Twigs** 3–6(–8) mm diam., rusty woolly-tomentose with hairs 0.5–1 mm long, glabrescent, greyish, bark smooth or finely cracked, densely set with lenticels. **Leaves:** petiole 10–20 mm long, 3–5 mm wide, late glabrescent; lamina coriaceous, elliptic to lanceolate, 18–42 × 7.5–19 cm, base short-attenuate to rounded or subcordate, margin often revolute, apex acute(-acuminate), upper surface olivaceous, often glossy, lower surface grey-brown, hairs dense, woolly, rusty, 0.5–1 mm long, sometimes late glabrescent; midrib above flat, 1–2 mm wide; lateral veins (13–)15–23 pairs, at 60–70° to the midrib, prominent below, intercostal venation indistinct on both surfaces; leaf bud 10–20 mm long, 4–6 mm wide, with dense brown hairs 0.5–1 mm long. **Inflorescences** paniculate, with hairs 1–2 mm long, male inflorescences 6–10 cm long, to 6 cm wide, many-flowered, female inflorescences 2–5 cm long, fewer-flowered; bracts triangular, 2–4 mm long, pubescent, caducous. **Flowers** rusty pubescent inside and outside, hairs 0.2–0.3 mm long. **Male flowers:** pedicel 1–3 mm long; bud ellipsoid-oblong, 4–6 mm long, 2–3 mm wide, cleft 1/4 to nearly 1/2, lobes (long) triangular, slightly spreading, tube 2.5–3.5 mm long; androecium truncately ellipsoid, (sub)sessile, 1.5–2 mm long, 0.8–1.2 mm wide; anthers (7–)9 or 10, subsessile, free apices more or less erect, 0.2–0.3 mm long. **Female flowers** (immature): pedicel c. 1 mm long; bud coriaceous, ovoid, 4–6 mm long, lobes 3; ovary subglobose, densely pubescent, stigma sessile. **Fruit** 2–8 per infructescence, ellipsoid(-oblong), 2.2–3.5 cm long, 1.5–2.2 cm wide, with rusty brown or reddish yellow dense hairs 0.3–0.5 mm long; pericarp c. 3 mm thick; fruit stalk 3–5 mm long. **Seeds** not seen.

Distribution. Peninsular Malaysia, Sumatra and Borneo. In Singapore, known from North Seletar (*Ridley 1835*, 1890, SING [SING0018780]), Bajau (*Ridley 3364*, Aug 1892, SING [SING0018777]), Sungei Morai (*Goodenough 3890*, 1892, SING [SING0018774]), Mandai Road (*Sinclair SFN 39502*, 4 Mar 1953, SING [SING0018775]) and Nee Soon (*Chong et al. NSSF 2-Q302T10*, 11 Jun 2013, SINU).

Ecology. In Singapore, now only known from freshwater swamp forest. Across its range, also known from primary lowland forest on hillsides to 250 m, swamp forest on white sandy clay, degraded dryland forest and seasonal swamp forest.

Conservation assessment. Globally, Least Concern (LC), assessed here. In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 482).

2. *Gymnacranthera farquhariana* (Wall. ex Hook.f. & Thomson) Warb. (William Farquhar, 1774–1839, Scottish colonial administrator in Malacca and Singapore)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 365, t. 20, as '*farquhariana*' in t. 20; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 225; Ridley, Fl. Malay Penins. 3 (1924) 62, p.p.; Burkill, Dict. Econ. Prod. Malay Penins. 1 (1935) 1117; Schouten, Blumea 31(2) (1986) 476, fig. 7; Turner, Gard. Bull. Singapore 45 (1993) 145; Turner et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 24; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 71; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 358; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 198; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 348; de Wilde, Fl. Males., ser. 1, 14 (2000) 44, photo 3; de Wilde, Fl. Thailand 7(4) (2002) 730, 732, fig. 4, pl. 26: 3; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 46, 153, 206; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 136, 414; Neo et al., Nat. Singapore 6 (2013) 121; Lim et al., Nat. Singapore 9 (2016) 75; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 140; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 482. **Basionym:** *Myristica farquhariana* Wall. [Numer. List no. 6795 (1832), nom. nud.] ex Hook.f. & Thomson, Fl. Ind. 1 (1855) 161; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 108; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129, p.p. **Type:** *Wallich s.n.* [EIC 6795], Singapore, 1822 (lectotype K [K000880110], designated by Schouten, Blumea 31(2) (1986) 467; isoelectotype BM [BM000884226], K-W [K001124835]). **Fig. 3, 4.**

Myristica zippeliana Miq., Ann. Mus. Bot. Lugduno-Batavi 2, fasc. 2 (1865) 50. **Synonyms:** *Myristica paniculata* A.DC. var. *zippeliana* (Miq.) J.Sinclair, Gard. Bull. Singapore 17(1) (1958) 108. – *Gymnacranthera farquhariana* (Wall. ex Hook.f. & Thomson) Warb. var. *zippeliana* (Miq.) R.T.A.Schouten, Blumea 31(2) (1986) 482, p.p.; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 15; Turner, Gard. Bull. Singapore 45 (1993) 145; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 358; de Wilde, Fl. Males., ser. 1, 14 (2000) 47; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 349; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 46, 153, 206; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 142. **Type:** *Zippelius s.n.*, [Indonesia, West Papua], Vogelkop (lectotype L [L0037236], first step designated by Schouten, Blumea 31(2) (1986) 482, second step designated here; isoelectotypes L [L0037237], U [U0226422]).

Myristica griffithii Hook.f., Fl. Brit. India 5, fasc. 13 (1886) 109, p.p.; King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 304, pl. 135, p.p. **Synonyms:** *Gymnacranthera farquhariana* (Wall. ex Hook.f. & Thomson) Warb. var. *griffithii* (Hook.f.) Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 368; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 226, p.p.; Ridley, Fl. Malay Penins. 3 (1924) 62. – *Gymnacranthera eugeniifolia* (A.DC.) J.Sinclair var. *griffithii* (Hook.f.) J.Sinclair, Gard. Bull. Singapore 16 (1958) 447, fig. 57; Sinclair, Gard. Bull. Singapore 17(1)

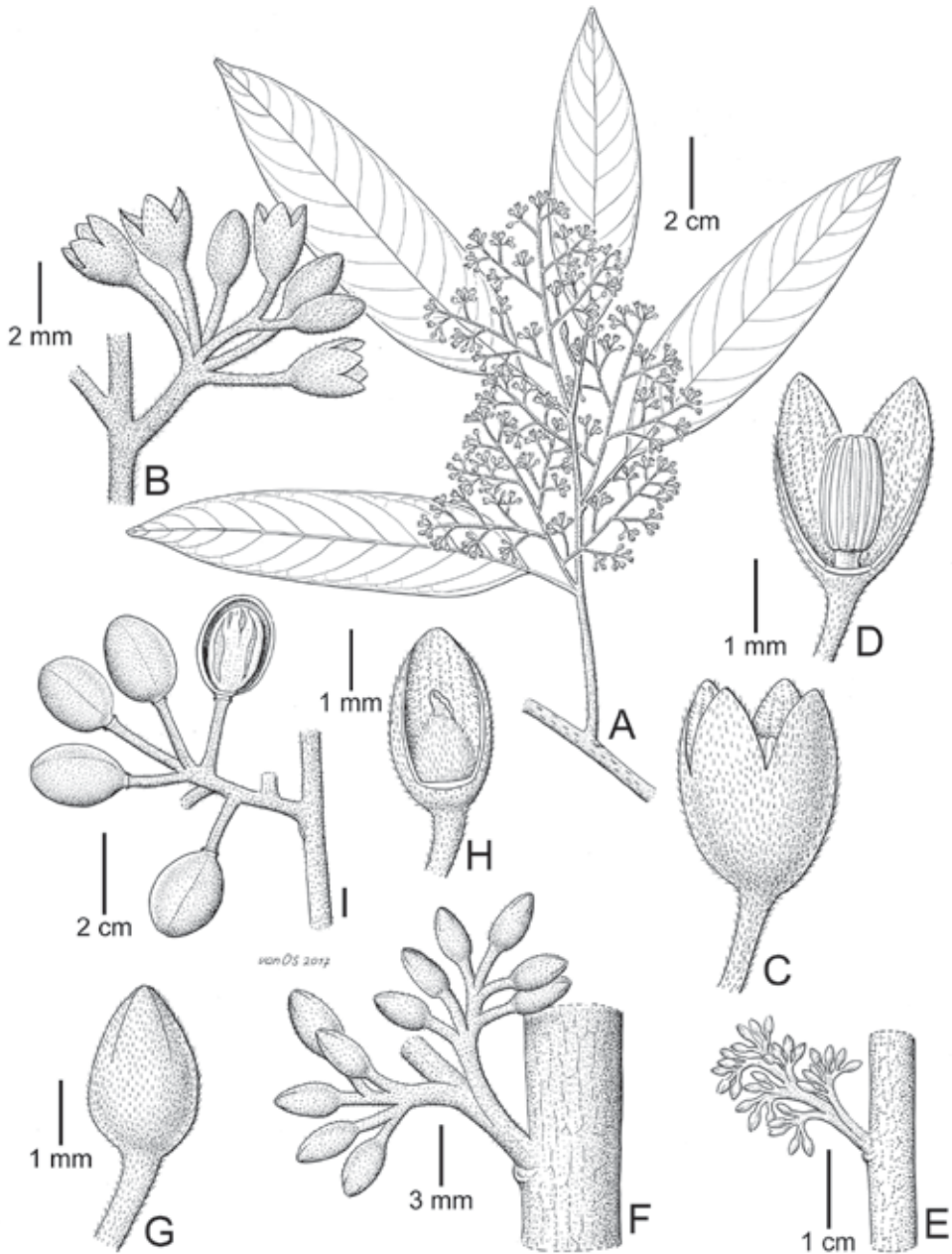


Figure 3. *Gymnacranthera farquhariana* (Wall. ex Hook.f. & Thomson) Warb. var. *farquhariana*. **A.** Portion of twig with male inflorescence. **B.** Detail of male inflorescence. **C.** Male flower. **D.** Male flower opened, showing androphore and synandrium (fused anthers). **E. & F.** Female inflorescence. **G.** Female flower bud. **H.** Female flower, opened, showing ovary and stigma. **I.** Infructescence, one fruit opened, showing lacinate aril (A–H from Malaysia, Sabah, A–D, *Soepadmo et al. FRI 41362*; E–H, *Meijer et al. SAN 122601*; I from Peninsular Malaysia, *Kochummen FRI 2192*. Drawn by J. van Os).



Figure 4. *Gymnacranthera farquhariana* (Wall. ex Hook.f. & Thomson) Warb. var. *farquhariana*. A. Fruiting branch. B. Leaves. C. Male flowers. D. Fruit. (A–D from Singapore, MacRitchie, Ng *et al.* SING2018-702. Photos: A–C, X.Y. Ng; D, P.K.F. Leong).

(1958) 113; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78. **Type:** *Griffith 4356*, [Malaysia], Malacca [Melaka] (lectotype K [K000880112], designated by Schouten, Blumea 31(2) (1986) 477).

Myristica farquhariana Wall. ex Hook.f. & Thomson var. *major* King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 306, pl. 136: fig. 4. **Synonym:** *Gymnacranthera farquhariana* (Wall. ex Hook.f. & Thomson) Warb. var. *major* (King) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 226; Ridley, Fl. Malay Penins. 3 (1924) 62. **Type:** *Griffith 4355*, [Malaysia], Malacca [Melaka] (lectotype K [K000880116], designated by Schouten, Blumea 31(2) (1986) 478).

Trees 3–30 m tall. **Twigs** faintly angular when young, 1–2(–3.5) mm diam., with hairs c. 0.1 mm long, early glabrescent, bark brown or grey, smooth, lenticellate. **Leaves:** petiole 6–15(–18) mm long, 1–2.5 mm wide; lamina membranous, chartaceous to coriaceous, elliptic to lanceolate, 5–17 × 1.5–6 cm, base cuneate, margin conspicuously revolute or not, apex acute(-acuminate), olivaceous or brown, sometimes glossy above, lower surface with sparse appressed hairs c. 0.1 mm long, glabrescent, pale brown to grey-purplish; midrib flat or sunken (grooved) above, to c. 1 mm wide; lateral veins 7–11(–15) pairs, flat or raised below, discolorous or not; intercostal venation indistinct; leaf bud slender, 5–10 mm long, 1–2 mm wide, with dense appressed greyish hairs c. 0.1 mm long. **Inflorescences** paniculate, with rusty hairs c. 0.2 mm long, male inflorescences 2.5–12 cm long, to 8 cm wide, many-flowered; female inflorescences to 4 cm long, 2 cm wide, fewer-flowered; bracts broadly triangular, c. 1 mm long, 2 mm wide, pubescent, caducous. **Flowers** rusty brown pubescent inside and outside, hairs c. 0.1 mm long. **Male flowers:** pedicel 1.5–4 mm long, bud ellipsoid(-oblong), 2.5–4 mm long, 2–3 mm wide, cleft 1/3 to 2/3, lobes 3 or 4, (long-)triangular, slightly spreading, tube 1–2.3 mm long; androecium truncately ellipsoid-oblong, 1–2.5 mm long, 0.8–1 mm wide, androphore to 0.3 mm long; anthers (6 or) 7–11(–13), subsessile, free apices to 0.5 mm long, erect or somewhat incurved. **Female flowers:** pedicel 1.5–3 mm long, bud ovoid or obpyriform, 2–3 mm long, 1.5–2 mm wide, cleft 1/2 to 3/4, lobes 3 or 4, long-triangular, strongly spreading or recurved, tube short-urceolate, 0.7–1.5 mm long; ovary subglobose, c. 1 mm diam., densely minutely pubescent, stigma minute, subsessile. **Fruit** to 13 per infructescence, subglobose to ellipsoid-oblong, 1.8–2.8 cm long, 1.1–1.9 cm wide, glabrescent (glabrous) or inconspicuously pubescent, hairs c. 0.1 mm long; pericarp c. 1 mm thick; fruit stalk 4–15 mm long. **Seeds** ellipsoid, testa green to brown; aril red to orange-yellow.

Distribution. A widespread species from Peninsular Malaysia east to the Bismarck Archipelago.

Taxonomy. Schouten (Blumea 31(2) (1986) 477) recognised four varieties in *Gymnacranthera farquhariana* to accommodate its particularly complex variation. The varieties closely resemble each other and some specimens cannot easily be placed within a variety. Two varieties are recognised in Singapore. In the present treatment *Gymnacranthera farquhariana* var. *zippeliana* (Miq.) R.T.A.Schouten is sunk into synonymy of *G. farquhariana* var. *farquhariana*.

Key to *Gymnacranthera farquhariana* varieties

1. Leaves elliptic(-oblong), small or large, 6–15(–17) × 3–5.5(–6) cm; veins below usually clearly visible and contrasting, usually distinctly raised (i.e., they can be felt with a finger) **a. var. farquhariana**
 Leaves oblong-lanceolate, small, 5–13.5 × 1.5–4.5 cm; veins below not or hardly raised (i.e., they cannot usually be felt with a finger) **b. var. eugeniifolia**

a. var. farquhariana

Trees 3–25 m tall, occasionally with short buttresses and stilt-roots. **Bark** grey- or red-brown, smooth or slightly rough. **Leaves:** petiole 8–18 mm long, 1.5–2 mm wide; lamina coriaceous, elliptic(-oblong), widest at or above the middle, 6–15(–17) × 3–5.5(–6) cm, usually with a conspicuously revolute margin; lateral veins 7–11 pairs, on the lower surface distinct and discoloured or not, but always clearly raised (and can be felt with a finger). **Fruit** 1–6 per infructescence, orange, globose to short-ellipsoid, 2–2.8 cm long; fruit stalk 6–15 mm long. **Seeds:** aril white to yellow pink, finally orange to red.

Distribution. Southern Thailand, Peninsular Malaysia, Sumatra and Borneo. In Singapore, known from Chan Chu Kang (*Ridley 3961*, 1892, SING [SING0018793]), Nee Soon (*Sinclair SFN 40716*, 20 Aug 1955, SING [SING0018791]), MacRitchie (*Hardial Singh & Samsuri 331*, 9 Jun 1965, SING [SING0018808]) and Upper Peirce (*Gwee SING2010-117*, 22 Jan 2010, SING [SING0144642]).

Ecology. Primary and secondary forest including swamp forest. In other parts of its range, also on hillsides and ridges to 900 m.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026, under *Gymnacranthera farquhariana*). In Singapore, assessed as Endangered (EN/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 482).

b. var. eugeniifolia (A.DC.) R.T.A.Schouten

(the genus *Eugenia*, Myrtaceae, Latin, *folium* = leaf;
with leaves resembling those of *Eugenia* L.)

Blumea 31(2) (1986) 480; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 15; Turner, Gard. Bull. Singapore 45 (1993) 145; Turner, Gard. Bull. Singapore 47 (1997 [‘1995’]) 357; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 349; de Wilde, Fl. Males., ser. 1, 14 (2000) 46; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 46, 153, 206; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 50; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 137, 414; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 141; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 96; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 482. **Basionym:** *Myristica eugeniifolia*

A.DC., Ann. Sci. Nat., Bot., sér. 4, 4 (1855) 29; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 113. **Synonym:** *Gymnacranthera eugeniifolia* (A.DC.) J.Sinclair, Gard. Bull. Singapore 16 (1958) 444, p.p.; Sinclair, Gard. Bull. Singapore 17(1) (1958) 112, p.p.; Whitmore, Tree Fl. Malaya 1 (1972) 320; Keng, Gard. Bull. Singapore 27 (1974) 75, as '*eugeniifolia*'; Kochummen, Tree Fl. Pasoh Forest (1997) 336; LaFrankie et al., Forest Trees Bukit Timah (2005) 163. **Type:** *Gaudichaud 116*, [Malaysia], Penang (lectotype G-DC [G00691588], designated by Sinclair, Gard. Bull. Singapore 16 (1958) 446; isolectotypes FI n.v., G n.v., P [P01965329]). **Fig. 5.**

Gymnacranthera forbesii auct. non (King) Warb.: Sinclair, Gard. Bull. Singapore 16 (1958) 441, p.p.; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 15, p.p.; Turner, Gard. Bull. Singapore 45 (1993) 146, p.p.; LaFrankie et al., Forest Trees Bukit Timah (2005) 115, 163, p.p.; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 46, 153, 206, p.p.; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 50; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 96.

Trees 3–30 m tall, without buttresses. **Bark** brown, smooth, or slightly fissured, or scaly with tiny adherent scales. **Leaves:** petiole 7–14 mm long, 1–1.5 mm wide; lamina chartaceous or coriaceous, oblong-lanceolate, widest at or below the middle, 5–13.5 × 1.5–4.5 cm, margin scarcely or conspicuously revolute or not; lateral veins 6–10 pairs, on lower surface not or hardly raised (and cannot be felt with a finger), usually concolorous. **Fruit** 1–3(–5) per infructescence, orange-brown, short ellipsoid to subglobose, 1.8–2.2 cm long, 1.3–1.8 cm wide; fruit stalk 4–13 mm long. **Seeds:** aril red.

Distribution. Peninsular Malaysia, Sumatra and Borneo. In Singapore, known from Sungei Bajau (*Ridley 3366*, 1892, SING [SING0018789]) and Bukit Timah (*Noor MN 298*, 27 Jun 1968, SING [SING0018807]; *Gwee SING2010-027*, 5 Jan 2010, SING [SING0138187]).

Ecology. In Singapore, in primary forest. Across its range, common in primary and degraded lowland forest, on hillsides, sometimes in bamboo forest, peat swamp forest or montane forest, from sea level to 500–750 m.

Conservation assessment. Globally, Least Concern (LC), assessed here. In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 483).

3. *Gymnacranthera forbesii* (King) Warb.

(Henry Ogg Forbes, 1851–1932, Scottish explorer, ornithologist and botanist)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 363, t. 20; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 224; Ridley, Fl. Malay Penins. 3 (1924) 61; Sinclair, Gard. Bull. Singapore 16 (1958) 441, fig. 55, pl. 13; B, p.p.; Sinclair, Gard. Bull. Singapore 17(1) (1958) 101; Whitmore, Tree Fl. Malaya 1 (1972) 320, fig. 3; Keng, Gard. Bull. Singapore 27 (1974) 75; Schouten, Blumea 31(2) (1986) 472; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 15, p.p.; Turner, Gard. Bull. Singapore 45 (1993) 146, p.p.; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 71; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 358; Kochummen, Tree Fl. Pasoh Forest (1997) 336; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 198; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 350; de



Figure 5. *Gymnacranthera farquhariana* (Wall. ex Hook.f. & Thomson) Warb. var. *eugeniifolia* (A.DC.) R.T.A.Schouten. **A.** Habit. **B.** Leaves (lower surface). **C.** Fruiting branch. **D.** Fruit & seeds. (A–D from Singapore, Bukit Timah, *Ho & Lua SING2017-034*. Photos: A & B, P.K.F. Leong; C & D, X.Y. Ng).

Wilde, Fl. Males., ser. 1, 14 (2000) 48, photo 2; de Wilde, Fl. Thailand 7(4) (2002) 732, fig. 5; LaFrankie et al., Forest Trees Bukit Timah (2005) 115, 163, p.p.; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 46, 153, 206; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 137, 414; Neo et al., Nat. Singapore 6 (2013) 70; Neo et al., Nat. Singapore 7 (2014) 105; Lim et al., Nat. Singapore 9 (2016) 77; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 143; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 483. **Basionym:** *Myristica forbesii* King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 283, 306, pl. 137; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129. **Type:** *Forbes* 2976, Sumatra, Soekaradja, 1881 (lectotype K [K000880104], designated by Schouten, Blumea 31(2) (1986) 472; isolectotypes BM [BM000884224], L [L0037238, L0037239]).

Distribution. Southern Thailand, Peninsular Malaysia, Singapore, Sumatra and Borneo.

Taxonomy. In Sinclair (Gard. Bull. Singapore 17(1) (1958) 101) and in de Wilde, Fl. Males., ser. 1, 14 (2000) 48, *Gymnacranthera forbesii* is segregated into two varieties, of which only *G. forbesii* var. *forbesii* occurs in Singapore (the other, *G. forbesii* var. *crassinervis* (Warb.) J.Sinclair, occurs in Borneo).

Notes. Keng (Gard. Bull. Singapore 27 (1974) 75) designated the collection *Ridley* 6270 as type but this was collected in 1894 and cannot, therefore, be original material. The type was later correctly designated by Schouten (Blumea 31(2) (1986) 472).

var. *forbesii*

Trees 5–25 m tall, without buttresses. **Bark** red or brown, smooth, finely fissured or thinly cracked. **Twigs** subterete to angular or ridged, (2–)2.4–4 mm diam. at apex, 3–5.5 mm diam. at 10 cm below apex, hairs 0.1 mm long or less, early glabrescent, bark chocolate-coloured, later brown or grey, finely cracked, with many lenticels. **Leaves:** petiole 8–20 mm long, 1.5–3 mm wide; lamina often coarsely undulate on drying, chartaceous or subcoriaceous, elliptic to oblong, widest at or below the middle, 14–28 × (5.5–)6–13 cm, base (short-)attenuate to broadly rounded, margin not revolute, apex (acute-)acuminate; upper surface olivaceous to brown, sometimes glossy, lower surface grey(-purple) to brownish, with scattered appressed minute hairs, glabrescent; midrib somewhat sunken (grooved) above, c. 1.5 mm wide; lateral veins 10–18 pairs, at (35–)40–50(–55)° to the midrib, yellowish, distinct and moderately prominent below, intercostal venation sometimes distinct at the lower surface; leaf bud 5–10 mm long, 1.5–4 mm wide, with dense greyish hairs c. 0.1 mm long. **Inflorescences** panicle, with (grey-)rusty brown, more or less woolly hairs 0.2–0.4 mm long; male inflorescences 4–12 cm long, to 8 cm wide, many-flowered, female inflorescences 1–4 cm long, 1–3 cm wide, generally fewer-flowered; bracts triangular, c. 3 mm long, 3.5 mm wide, pubescent, caducous. **Flowers** grey-rusty brown pubescent inside and outside, hairs 0.1–0.2 mm long. **Male flowers:** pedicel 2–3 mm long; bud ellipsoid-oblong, 2.5–4 mm long, 1.5–2 mm wide, cleft 1/3 to nearly 1/2, lobes 3 (or 4), (long-)triangular, only slightly spreading, tube 1.5–2.3 mm long; androecium more or less truncately ellipsoid-oblong, 1.5–2.3 mm long, 1 mm wide, androphore to 0.2 mm long; anthers 6–10, subsessile, often somewhat twisted, free apices 0.3–0.5 mm long, suberect. **Female flowers:** pedicel c. 2 mm long; bud ovoid or pyriform, 2–2.5 mm long, 1.7–2 mm wide, cleft to c. 3/4, lobes (2 or) 3, strongly spreading or recurved,

tube short-urceolate, 0.5–0.7 mm long; ovary subglobose, 1–1.3 mm diam., densely minutely pubescent; stigma sessile, minutely 2-lobed. **Fruit** 4–10, orange to bright pinkish red, ellipsoid-oblong, 1.8–2.4 cm long, 1–1.4 cm wide, (early) glabrescent or short-pubescent, hairs c. 0.1 mm long; pericarp c. 1 mm thick; fruit stalk 4–10 mm long. **Seeds:** aril yellow, finally red.

Distribution. Southern Thailand, Peninsular Malaysia, Sumatra and Borneo. In Singapore, known only from historical collections from Seletar (*Ridley* 6270, Apr 1894, SING [SING0018809]), Dalvey Road (*Ridley* s.n., SING [SING0018815]) and an unknown locality (*Cantley* s.n., SING [SING0018812]),

Ecology. Unknown in Singapore. Across its range, in primary lowland and hill dipterocarp forest, often by rivers, to 360 m; often on limestone-derived soils.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026, under *Gymnacranthera forbesii*). In Singapore, assessed as Nationally Extinct (NEx) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 483).

3. HORSFIELDIA Willd.

(Thomas Horsfield, 1773–1859, American physician
and naturalist in the Dutch East Indies)

Sp. Pl., ed. 4, 4(2) (1806) 872; Warburg, Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 262; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 206; Ridley, Fl. Malay Penins. 3 (1924) 56; Sinclair, Gard. Bull. Singapore 16 (1958) 368; Whitmore, Tree Fl. Malaya 1 (1972) 322; Sinclair, Gard. Bull. Singapore 27 (1974) 133; Sinclair, Gard. Bull. Singapore 28(1) (1975) 1; de Wilde, Gard. Bull. Singapore 37(2) (1985 [‘1984’]) 115; de Wilde, Gard. Bull. Singapore 38(1) (1985) 55; de Wilde, Gard. Bull. Singapore 38(2) (1986 [‘1985’]) 185; de Wilde, Gard. Bull. Singapore 39(1) (1986) 1; de Wilde, Blumea 32 (1987) 459; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 15; Kühn & Kubitzki in Kubitzki et al. (ed.), Fam. Gen. Vasc. Pl. 2 (1993) 466; Turner, Gard. Bull. Singapore 45 (1993) 146; de Wilde, Blumea 41 (1996) 375; Kochummen, Tree Fl. Pasoh Forest (1997) 336; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 352; de Wilde, Fl. Males., ser. 1, 14 (2000) 54; de Wilde, Fl. Thailand 7(4) (2002) 733; Lim et al., Nat. Singapore 9 (2016) 79; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 145. **Type:** *Horsfieldia odorata* Willd.

Dioecious shrubs or trees, occasionally buttressed. **Twigs** sometimes angular or with two raised lines, lenticellate, not flaky. **Leaves** distichous or sometimes dispersed, brittle when dry, lower surface not pale, dots present or absent; reticulation lax (never forming a close raised network as in *Knema*). **Inflorescences** paniculate (elsewhere on older wood), usually branched several times; flowers numerous, all in about the same stage of development, solitary, the male with flowers sessile in dense flower-heads; basal cataphylls caducous and leaving scars; bracts small or large, caducous. **Flowers** small, mostly short-pedicellate, at base articulated or not; bracteole absent. **Male flowers:** perianth more or less globose or cup-shaped, leathery, inside glabrous, yellowish (never red); bud (depressed-)globose, (transversely) ellipsoid, reniform, or clavate, laterally compressed or not, cleft to various depths, lobes 2 or 3 (or 4), not spreading at anthesis; androecium sessile or with a short narrow androphore, glabrous,

syndrium variously shaped (cup-shaped, globose, ellipsoid, cylindrical, or trigonous), laterally compressed or not; anthers 2 to about 25, largely or entirely connate into a central column hollowed to various depths at apex and broader than the androphore; anthers straight, curved, or inflexed into the apical cavity to various depths. **Female flowers:** slightly larger than male, globose to ovoid-ellipsoid; ovary glabrous or pubescent, style absent, stigma small, usually 2-lobed. **Infructescences** branched, few- to many-fruited. **Fruit** globose or ellipsoid, 1–8 cm long; pericarp leathery or somewhat fleshy, with or without lenticel-like tubercles, glabrous or pubescent, perianth sometimes persistent. **Seeds** ellipsoid, rarely globose, apex not pointed, not variegated; endosperm ruminant, with fatty oil but no starch; aril red, entire or only shallowly lobed.

Distribution. A genus of more than 100 species ranging from northeastern India, Sri Lanka and southern China to Malesia, northern Australia and the Solomon Islands. In Singapore, 10 species of which 9 are native and 1 was formerly casual.

Ecology. Trees of primary rain forest, persisting in degraded forest or sometimes in old secondary growth, sometimes in marshy forests, stilt-roots sometimes present. Elsewhere in its distribution, some species occur in or reach montane areas.

Key to *Horsfieldia* species
(specimens with male flowers)

1. Perianth 2-lobed, or sometimes a few flowers in one inflorescence 3- or 4-lobed 2
 Perianth 3- or 4-lobed, sometimes the odd flower in an inflorescence with a 2-lobed perianth 4
2. Leaves coriaceous, lower surface with inconspicuous, subpersistent, dense indumentum **1. *H. crassifolia***
 Leaves more or less membranous, lower surface glabrous or early glabrescent 3
3. Perianth globose; twigs often 2-lined **3. *H. irya***
 Perianth laterally compressed; twigs not lined **4. *H. parviflora***
4. Leaves in 3–5 rows along the twigs 5
 Leaves distichous (in rare cases a few on the same plant in 3 rows) 6
5. Bark of twigs pale, greyish or straw-coloured, contrasting with the blackish brown petioles; leaves early glabrescent beneath **7. *H. sparsa***
 Bark of twigs brown, not contrasting with the colour of the petioles; leaves pubescent beneath **8. *H. superba*** (in part)
6. Buds ellipsoid or obovoid, 7–8 mm long, cleft 1/5–1/4(–1/3); leaves matt above with finely wrinkled surface **8. *H. superba*** (in part)
 Buds either ellipsoid or short pear-shaped, or (depressed) globose, 3.5 mm long or less, cleft (1/4–)1/3–2/3; leaves typically not matt above 7

7. Leaves with (sub)persistent indumentum beneath, sometimes hairs vestigial on and near midrib and veins 8
 Leaves glabrous or early glabrescent beneath, sometimes with vestigial hairs on the lower midrib 10
8. Leaves scabrous above **2. *H. grandis***
 Leaves not scabrous above 9
9. Leaves without dots or dashes beneath **9. *H. tomentosa***
 Leaves with dots and/or dashes beneath, obscured by hairs or not
 **10. *H. wallichii*** (in part)
10. Leaves pubescent or glabrescent, with dots and dashes beneath; lateral veins flat or sunken above; twigs hollow **10. *H. wallichii*** (in part)
 Leaves glabrous, dots present or absent beneath; lateral veins raised or sunken above; twigs solid or slightly hollow 11
11. Leaves without minute dots beneath **5. *H. polyspherula***
 Leaves with minute dots beneath **6. *H. punctatifolia***

Key to *Horsfieldia* species
 (specimens with female flowers and fruit)

1. Perianth 2-lobed; ovary glabrous 2
 Perianth 3- (or 4–5)-lobed; ovary glabrous or pubescent 4
2. Twigs thinly ridged or lined; leaves often with irregular whitish blotches; fruit and seeds globose **3. *H. irya***
 Twigs not lined; leaves without pale blotches; fruit and seeds ellipsoid 3
3. Leaves minutely hairy beneath **1. *H. crassifolia***
 Leaves glabrous beneath **4. *H. parviflora***
4. Leaves without dots beneath 5
 Leaves with dots beneath (dots not to be confused with smaller dark punctation) 9
5. Leaves with persistent indumentum beneath 6
 Leaves glabrous or glabrescent beneath 8
6. Ovary pubescent; fruit glabrescent or with vestigial pubescence remaining near the base; perianth not persistent **9. *H. tomentosa***
 Ovary glabrous or with some incidental minute hairs; fruit glabrous; perianth (at least at first) persistent 7

7. Hairs on lower (and upper) leaf surface harsh, with hardened hair-bases, in older leaves rendering the surface scabrous; fruit 1–1.4 cm long **2. *H. grandis***
Leaves not scabrous; fruit 3.8–5.5 cm long **8. *H. superba***
8. Twigs brown, not contrasting with the petiole; leaves distichous **5. *H. polyspherula***
Twigs pale brown or straw-coloured, contrasting with the blackish petiole; leaves in 3–5 rows along the twigs **7. *H. sparsa***
9. Leaves glabrous or glabrescent, without dashes beneath; fruit 4.5–8 cm long; perianth not persistent **6. *H. punctatifolia***
Leaves more or less pubescent, sometimes late glabrescent, with dots and dashes beneath; fruit 4–6 cm long, glabrous; perianth usually persistent **10. *H. wallichii***

1. *Horsfieldia crassifolia* (Hook.f. & Thomson) Warb.

(Latin, *crassus* = thick, *folium* = leaf; with thick leaves)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 323, p.p.; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 217; Ridley, Fl. Malay Penins. 3 (1924) 59; Sinclair, Gard. Bull. Singapore 16 (1958) 386, fig. 34, pl. 10: A; Anderson, Gard. Bull. Singapore 20(2) (1963) 195; Sinclair, Gard. Bull. Singapore 28(1) (1975) 23; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78; de Wilde, Gard. Bull. Singapore 38(2) (1986 ['1985']) 219, fig. 25; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 15; Turner, Gard. Bull. Singapore 45 (1993) 146; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 72; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 358; Kochummen, Tree Fl. Pasoh Forest (1997) 338; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 198; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 366; de Wilde, Fl. Males., ser. 1, 14 (2000) 107, fig. 13; de Wilde, Fl. Thailand 7(4) (2002) 740, fig. 7; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 49, 153, 206; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 51; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 142, 414; Neo et al., Nat. Singapore 6 (2013) 281; Lim et al., Nat. Singapore 9 (2016) 79; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 152, fig. 4; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 96; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 483. **Basionym:** *Myristica crassifolia* Hook.f. & Thomson, Fl. Ind. 1 (1855) 160; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 108; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129. **Type:** *Griffith 4350*, [Malaysia], Malacca [Melaka] (lectotype K [K000846918], designated by de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 366).

Myristica paludicola King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 286, 328, pl. 169. **Synonym:** *Horsfieldia fulva* (King) Warb. var. *paludicola* (King) Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 299; Ridley, Fl. Malay Penins. 3 (1924) 56. **Type:** *King's Collector 4267*, [Malaysia], Perak, Larut, June 1883 (lectotype CAL n.v., designated by de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 152; isolectotypes BM [BM000950740], K [K000846921], L [L0132317], SING [SING0044694, SING0044695]).

Horsfieldia bracteosa auct. non M.R.Hend.: Sinclair, Gard. Bull. Singapore 16 (1958) 419, p.p.

Trees 10–25 m tall; few stilt-roots or low buttresses occasionally recorded. **Bark** fissured, flaking in small rectangular scales. **Twigs** 2–6(–8) mm diam., glabrescent, hairs yellow-brown or rusty, woolly, 0.2–0.5 mm long; bark coarsely striate, not flaking; lenticels sparse or dense, distinct or not. **Leaves:** petiole 9–20(–30) mm long, 1.5–4.5 mm wide; lamina coriaceous, elliptic to oblong, 10–20(–28) × 3.5–7(–10) cm, base rounded to attenuate, apex rounded to subacute or rarely emarginate; upper surface drying dull greenish brown to dark brown, without whitish marks, lower surface more or less covered with subpersistent, inconspicuous densely interwoven or more distantly spaced stellate scale-like hairs c. 0.1 mm high (when very young with dendroid emergents), or glabrescent and then showing distinct hair scars, and scattered dots and dashes; midrib above flattish; lateral veins 11–16 pairs, thin and flat or sunken above, intercostal venation faint on both surfaces; leaf bud 7–12 mm long, 2–3 mm wide with hairs 0.2–0.5 mm long. **Inflorescences** among or behind the leaves, late glabrescent or with persistent, dense, woolly dendroid hairs 0.2–0.5 mm long; male inflorescences 3–5 times branched, broadly paniculate, many-flowered, 6–20 cm long, 4–15 cm wide, peduncle 0.5–2 cm long; female inflorescences 3–14 cm long; bracts elliptic-lanceolate, 2–5(–7) mm long, pubescent, caducous; flowers (male) in loose clusters of 2–7, glabrous; perianth 2-lobed, pedicel slender, not articulated. **Male flowers:** pedicel (0.3–)1 mm long; bud globose or slightly transversely ellipsoid, (0.8–)1–1.3 mm long, 1–1.5 mm wide, cleft 1/3 to 1/2 (to 2/3), lobes 0.2–0.3 mm thick; androecium globose or more or less transversely ellipsoid, barely laterally compressed, 0.4–0.5 mm long, 0.5–0.8 mm wide; anther locules (6–)8–12, widely spaced, connectives broad (and androecium angular), anthers free for almost the upper half or more, androphore 0.2(–0.3) mm long, slender. **Female flowers:** pedicel 1.5–2.5 mm long; bud broadly obovoid, 2–3 mm long, 2–2.5 mm wide, cleft 1/5 to 1/3, lobes 0.6–1 mm thick; ovary obovoid, glabrous, c. 1.5 mm long, 1.2–1.5 mm wide, stigma of 2 sessile small lobes 0.1–0.2 mm high, running out into a faint ridge at one side of the ovary. **Fruit** (1–)2–10 per infructescence, ovoid to obovoid, 1.5–2.2 cm long, 1.2–1.8 cm wide, glabrous, drying dark brown, sometimes with few lenticel-like tubercles; pericarp 1.5–2 mm thick; fruit stalk 2–5(–7) mm long; perianth persistent. **Seeds** ellipsoid; aril orange.

Distribution. Southern Thailand, Peninsular Malaysia, Sumatra and Borneo. In Singapore, known from Bukit Mandai (*Goodenough* 3831, 1892, SING [SING0018835]), Seletar (*Ridley* 6126, Mar 1894, SING [SING0018822]), Chan Chu Kang (*Ridley* 10695, 1899, SING [SING0018818]), Nee Soon (*Shah & Ali Ibrahim* MS 4110, 2 Apr 1981, SING [SING0018832]) and Bukit Timah (*Niissalo et al.* SING2019-1236, 13 Nov 2019, SING [SING0295464]).

Ecology. Lowland forest, often in swampy areas. Elsewhere, also in peat swamp forest, to 300 m.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 484).

2. *Horsfieldia grandis* (Hook.f.) Warb.

(Latin, *grandis* = large; referring to the leaves)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 301; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 211; Ridley, Fl. Malay Penins. 3 (1924) 56; Sinclair, Gard. Bull. Singapore 16 (1958) 400, fig. 39; Whitmore, Tree Fl. Malaya 1 (1972) 323; Sinclair, Gard. Bull. Singapore 28(1) (1975) 48; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78; de Wilde, Gard. Bull. Singapore 38(2) (1986 ['1985']) 203; Turner, Gard. Bull. Singapore 45 (1993) 146; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 358; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 198; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 372; de Wilde, Fl. Males., ser. 1, 14 (2000) 123; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 49, 153, 206; Lim et al., Nat. Singapore 9 (2016) 82; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 159; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 96, 131; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 484. **Basionym:** *Myristica grandis* Hook.f., Trans. Linn. Soc. London 23 (1860) 157. **Type:** *Low s.n.*, [Malaysia], Borneo, [Sabah] (lectotype K [K000846956], designated by Sinclair, Gard. Bull. Singapore 16 (1958) 402). **Fig. 6, 7.**

Myristica rubiginosa King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 283, 302, pl. 130; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129. **Type:** *King's Collector 1233*, Singapore, June 1881 (lectotype CAL n.v., designated by Sinclair, Gard. Bull. Singapore 28(1) (1975) 49; isoelectotypes K [K000846910], L [L0037294]).

Trees 6–25 m tall, without buttresses. **Bark** usually longitudinally fissured, scaly or cracked, strips c. 1 mm thick, c. 1 cm wide, hard and thin, flaky or non-flaking; sapwood soft, whitish to yellowish pink. **Twigs** (3–)4–10 mm diam., late glabrescent, hairs dense, harsh, 1–1.5 mm long; bark coarsely striate, sometimes slightly cracking, or flaking; lenticels often present, somewhat elongate, inconspicuous. **Leaves:** petiole 6–15 mm long, 2.5–6 mm wide, pubescent; lamina membranous or chartaceous, more or less bullate, elliptic-oblong to oblong-ob lanceolate, 12–40 × 5–20 cm, base more or less attenuate to subcordate, apex acute(-acuminate); upper surface drying olivaceous, without whitish marks, minutely paler pustulate, with harsh, persistent sparse hairs, sometimes glabrescent but always scabrous from the harsh hair bases, lower surface with persistent dense to sparse harsh-woolly hairs 1–2 mm long; dots absent; midrib somewhat raised above, harsh-pubescent; lateral veins (8–)10–16(–19) pairs, flattish or usually sunken above, interarching veins distinct, intercostal venation lax, distinct on both surfaces (especially below); leaf bud short-conical, 7–15 mm long, densely pubescent. **Inflorescences** with dense yellow-rusty hairs, 1.5–3 mm long; male inflorescences many-flowered, 3 or 4 times branched, rather lax, 6–25 cm long, 2.5–10(–15) cm wide, peduncle to 1.2 cm long; female inflorescences 1.5–5 cm long, the buds often of different age; bracts oblong to lanceolate-linear, (1–)3–12 mm long, caducous; flowers solitary or usually (in male) in loose clusters, often aggregated into compound clusters corresponding to the main ramifications of the inflorescences, glabrous; perianth 3- or 4-lobed, pedicel slender, not articulated. **Male flowers:** pedicel (0.5–)1–2 mm long; bud (depressed-)globose, 1.2–1.8(–2) mm diam., base rounded, apex (broadly) rounded, cleft c. 1/3 to nearly 1/2, lobes c. 0.2 mm thick; androecium depressed globose, not laterally compressed, 0.5–1 mm long, 0.8–1.5 mm wide, anther locules 16–20, almost completely sessile, incurved towards the apex, column broad, hollow c. 0.2 mm deep, androphore narrow, 0.2–0.4 mm long. **Female flowers:** pedicel 0.3–0.5 mm long; bud subglobose to broadly ellipsoid, 2–3.2 mm long, 2–2.8 mm wide, cleft 1/4 to 1/3; ovary globose to broadly ellipsoid, 1.5–2 mm long, 1.5–1.8 mm wide,

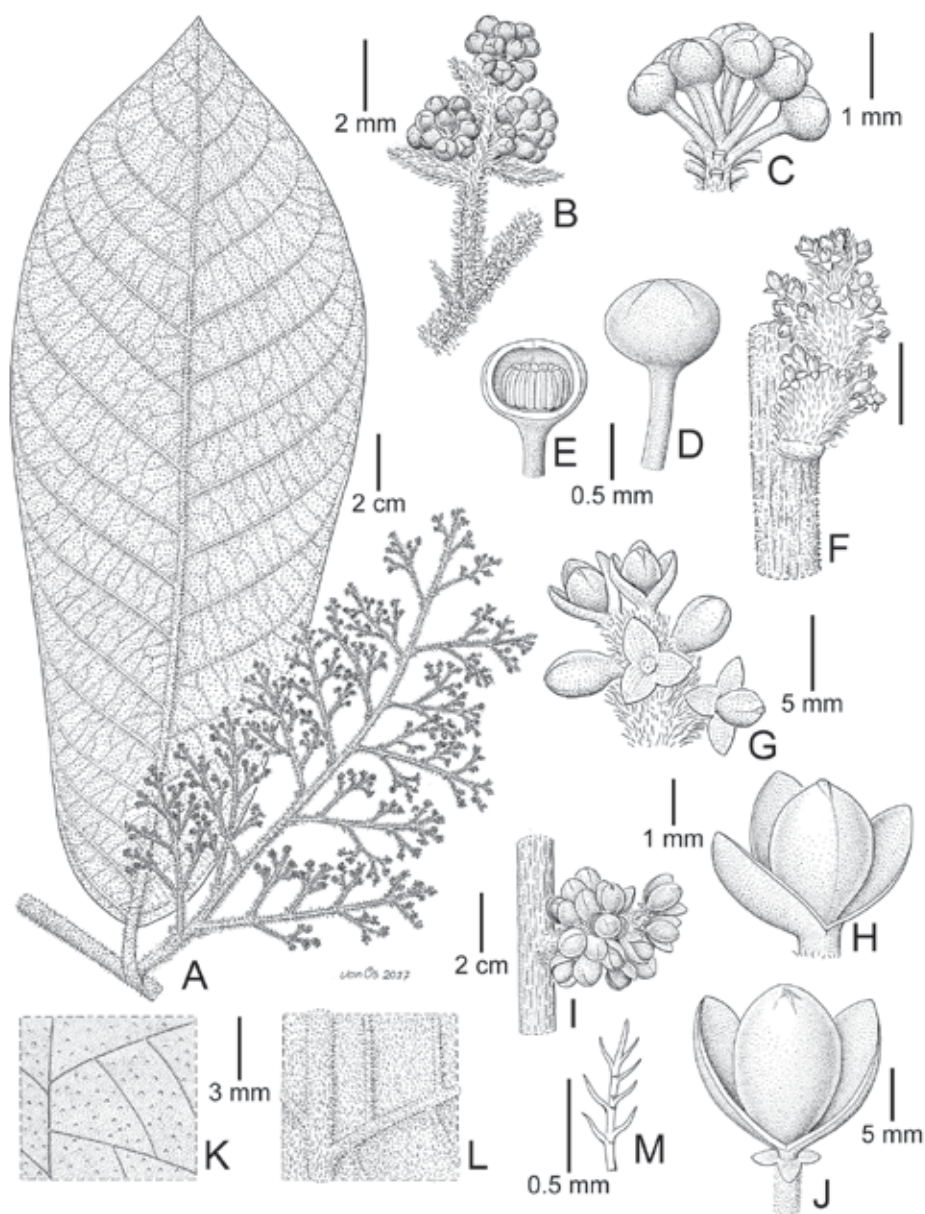


Figure 6. *Horsfieldia grandis* (Hook.f.) Warb. **A.** Portion of leafy twig with male inflorescence. **B.** Detail of male inflorescence. **C.** Cluster of male flowers. **D.** Mature male flower bud. **E.** Mature male flower bud opened to show androecium. **F.** Female inflorescence. **G.** Detail of female inflorescence. **H.** Female flower, forced open to base to show pistil (ovary with sessile stigma). **I.** Infructescence. **J.** Open fruit, showing seed enclosed in entire aril. **K.** Detail of upper leaf surface. **L.** Detail of lower leaf surface. **M.** Dendroid hairs. (A–E from Peninsular Malaysia, A, *Loh FRI 17135*; B–E, *Chew & Noor 261*; F–H from Indonesia, East Kalimantan, *Kostermans 7035*; I & J from Indonesia, East Kalimantan, *Ambriansyah & Arifin W671*; K–M from Singapore, *Sinclair 9363*. Drawn by J. van Os).



Figure 7. *Horsfieldia grandis* (Hook.f.) Warb. **A.** Fruiting branch. **B.** Slash mark on trunk. **C.** Leaves. **D.** Eaten fruit on leaf. **E.** Fruit, seeds & aril. (A–E from Singapore, Nee Soon, *Lim & Ng SING2018-783*. Photos: X.Y. Ng).

glabrous, stigma sessile, faintly 2-lobed, c. 0.2 mm high. **Fruit** 2–10 per infructescence, more or less clustered, obovoid-ellipsoid, 1–1.4 cm long, 0.8–1.1 cm wide, apex rounded, glabrous; pericarp c. 1.5 mm thick, drying dark brown or reddish brown, without lenticels or warts; fruit stalk c. 1 mm long, perianth persistent. **Seeds** almost globose, 8–10 mm diam., testa pale brown; aril red.

Distribution. Peninsular Malaysia, Sumatra and Borneo. In Singapore, known from Mount Faber (*Ridley* 4827, Oct 1892, SING [SING0011756]), Seletar (*Ridley s.n.*, 1894, SING [SING0011757]; *Gwee et al.* SING2005-26, 21 Feb 2005, SING [SING0059382]) and MacRitchie (*Sinclair* 9363, 29 Oct 1957, SING [SING0011758]).

Ecology. Across its range, in primary or degraded lowland forest, near streams and on hillsides, on clayey and sandy soil, to 100 m.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 484).

Notes. The perianths of *Horsfieldia grandis* are usually 4-, less frequently 3-lobed. There are 16–20 anther locules, the locules are tightly appressed and difficult to count.

Although there are two specimens in Kew labelled as *Myristica grandis* by Hooker, only one of them has Low's name on and, therefore, Sinclair's designation of a 'Low' specimen as type can be taken as effectively designating only that one specimen as lectotype.

3. *Horsfieldia irya* (Gaertn.) Warb.

(from a vernacular name)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 317, t. 22; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 215; Ridley, Fl. Malay Penins. 3 (1924) 58; Sinclair, Gard. Bull. Singapore 16 (1958) 382, fig. 33, pl. 9: A; Whitmore, Tree Fl. Malaya 1 (1972) 326; Keng, Gard. Bull. Singapore 27 (1974) 75; Sinclair, Gard. Bull. Singapore 28(1) (1975) 61; de Wilde, Gard. Bull. Singapore 38(1) (1985) 55, fig. 6; Corner, Wayside Trees Malaya, ed. 3, 2 (1988) 564, fig. 171; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 15, fig. 11.2; Turner, Gard. Bull. Singapore 45 (1993) 146; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 358; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 198; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 373; de Wilde, Fl. Males., ser. 1, 14 (2000) 132, fig. 20; de Wilde, Fl. Thailand 7(4) (2002) 740, fig. 8; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 49, 153, 206; Neo et al., Nat. Singapore 6 (2013) 281; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 160, fig. 6; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 484. **Basionym:** *Myristica irya* Gaertn., Fruct. Sem. Pl. 1 (1788) 195, t. 41: fig. [3]; Hooker & Thomson, Fl. Ind. 1 (1855) 159; King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 308, pl. 141, pl. 141 bis; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129. **Type:** [Published illustration] *Myristica irya* in Gaertner, Fruct. Sem. Pl. 1 (1788) t. 41: fig. [3]. **Fig. 8.**

Myristica lemanniana A.DC., Ann. Sci. Nat., Bot., sér. 4, 4 (1855) 31. **Synonym:** *Horsfieldia lemanniana* (A.DC.) Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 326; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 219; Ridley, Fl. Malay Penins. 3 (1924)

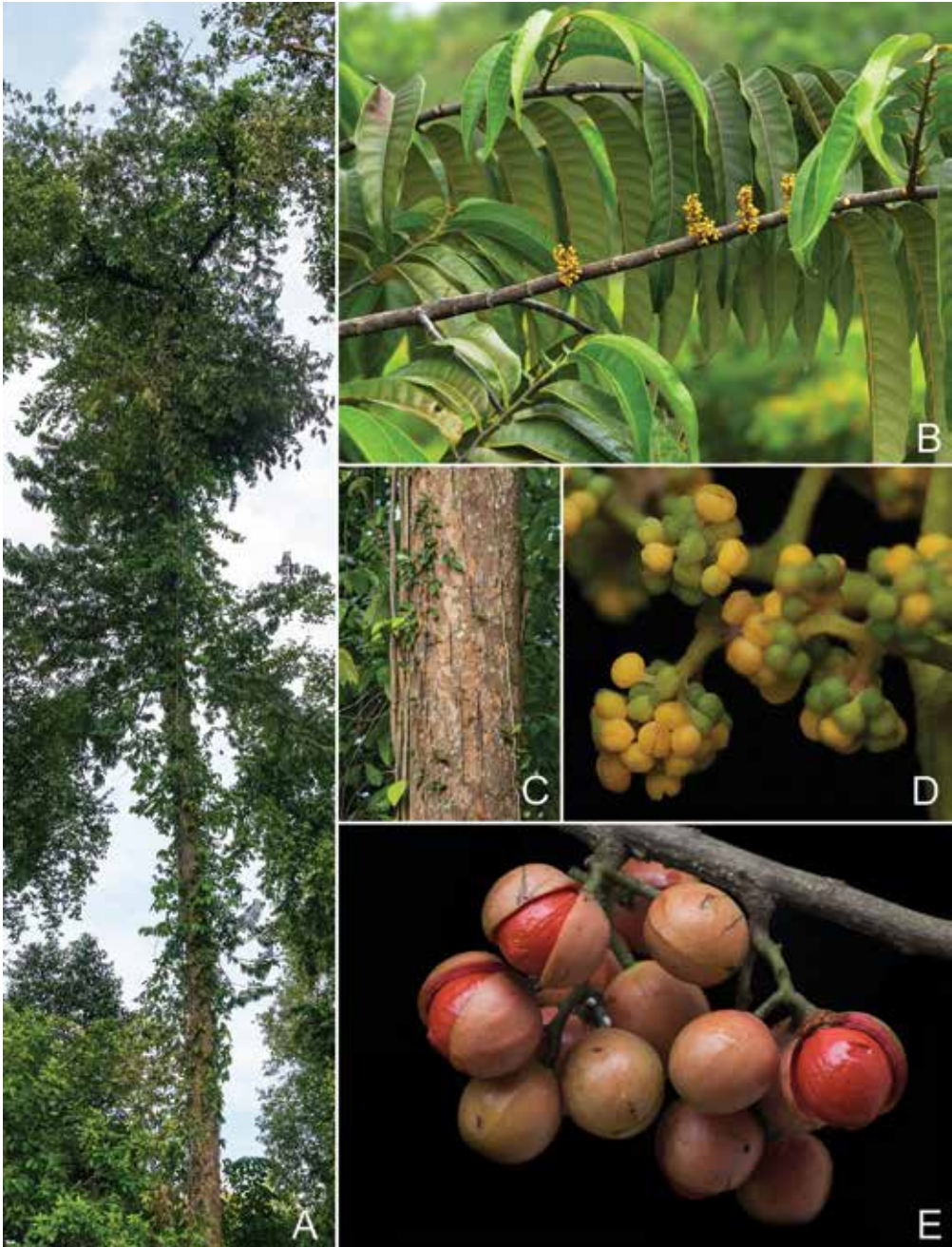


Figure 8. *Horsfieldia irya* (Gaertn.) Warb. **A.** Habit. **B.** Leaves & branch with female inflorescences. **C.** Trunk. **D.** Male flowers. **E.** Fruit. (A–E from Singapore, A, C & D, Singapore Botanic Gardens; B, Bukit Batok. Photos: A, C–E, Zaki Jamil; B, X.Y. Ng).

59, as '*lehmanniana*'; Burkill, Dict. Econ. Prod. Malay Penins. 1 (1935) 1198, as '*lehmanniana*'. **Type:** *Lemnan s.n.*, [Malaysia], Malacca [Melaka] (holotype G [G00340983]).

Myristica subglobosa Miq., Fl. Ned. Ind., Eerste Bijv., fasc. 3 (1861) 383. **Synonym:** *Myristica globularia* Blume var. *subglobosa* (Miq.) Miq., Ann. Mus. Bot. Lugduno-Batavi 1, fasc. 7 (1864) 206. **Type:** *Diepenhorst HB 2148*, [Indonesia], Sumatra, Priaman (lectotype U [U.1427083], designated by de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 161).

Trees (6–)10–25(–30) m tall; boles straight, sometimes fluted; without buttresses. **Bark** fissured or smooth; sapwood cream or pinkish. **Twigs** towards apex often drying flattened, usually thinly ridged, (2–)3–10 mm diam., glabrescent, indumentum minute to conspicuous (elsewhere), grey to rusty, dendroid hairs of mixed size, 0.1–0.5(–1) mm long; bark (coarsely) striate, more or less blackish, not flaking; lenticels conspicuous. **Leaves** distichous; petiole 7–16 mm long, 1.5–3(–4) mm wide; lamina often more or less curved towards one side at apex, membranous, elliptic-oblong to lanceolate, 10–30(–35) × 3–7(–9) cm, base rounded to attenuate, apex acute-acuminate; upper surface drying dull, greenish to blackish, almost always with irregular whitish marks of unknown origin, lower surface early glabrescent; dots absent; midrib flattish above; lateral veins 10–20 pairs, thin and flattish above, interarching veins usually indistinct, intercostal venation lax, faint above, thin though distinct beneath; leaf bud 10(–15) mm long, 2–3 mm wide, with hairs 0.1–0.5(–1) mm long. **Inflorescences** with dense hairs 0.1–0.5(–1) mm long, persistent or glabrescent; male inflorescences 3–4 times branched, many-flowered, 4–18 cm long, 3–7(–10) cm wide; female inflorescences 2–6(–8) cm long, 2(–3) times branched; peduncle 0.5–4.5 cm long; bracts more or less acute, 1.5–4 mm long (sometimes larger, leaf-like), caducous; flowers in male in clusters of 3–10, in female fewer; perianth 2-lobed, glabrous, glabrescent; pedicel pubescent or glabrescent, not articulated. **Male flowers:** pedicel slender, 0.1–1.5 mm long; bud subglobose or more or less transversely ellipsoid, somewhat laterally compressed or not, 1–1.5 mm long, 1–1.5 mm wide, apical part broadly rounded, base rounded or short-tapering, cleft 1/2 to 2/3, lobes c. 0.2 mm thick; androecium more or less broadly obovoid, 0.8–1.2 mm long, 1–1.5(–2) mm wide, anther locules 12–20, not closely touching, 0.5–0.8(–1) mm long, free apical part 0.2–0.3 mm long, incurved, column and androphore broadly concave, more or less saucer- or cup-shaped, 0.4–0.5 mm long, (0.5–)0.6–1 mm wide, tapered towards the base. **Female flowers:** pedicel 1–4 mm long; bud obovoid or ellipsoid, 1.5–2.3 mm long, 1.3–2 mm wide, cleft 1/4 to 1/3; ovary broadly obovoid, 1.2–1.5 mm long, 1–1.3 mm wide, glabrous, stigma minute, c. 0.1 mm long. **Fruit** 2–8 per infructescence, globose, orange-red, 1.5–2.2 cm diam., glabrous, finely granular, without tubercles or lenticels, drying dark brown to blackish; pericarp 1–2 mm thick; fruit stalk 5–10 mm long; perianth not persistent. **Seeds** globose; aril bright red.

Distribution. India, Sri Lanka, continental Southeast Asia, throughout Malesia to Australia and the Solomon Islands. In Singapore, known from Changi Road (*Ahmat s.n.*, SING [SING0011750]), Tyersall Avenue (*Kiah SFN 39448*, 19 May 1952, SING [SING0011749]), Singapore Botanic Gardens (*Samsuri SA 1215*, 26 Feb 1976 SING [SING0011751]) and Chua Chu Kang (*Lua et al. SING2018-818*, 10 Sep 2018, SING [SING0273987]).

Ecology. Across its range, most frequent in freshwater swamp forest and in coastal forest and beach forest, to 100 m. The seeds contain an air chamber and float, thereby facilitating their dispersal by water.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 484).

Vernacular names. *Chendarah, darah-darah, kalak pucung, kalapa tiyung, kumpang, lempoyang paya, penggu, peredanh burung, pianggu, piasau mamau, salinguat* (NParks' Flora & Fauna Web, 2026).

Notes. The irregular whitish marks of unknown origin, almost always present on the older leaves in dried specimens, are characteristic of this species.

4. *Horsfieldia parviflora* (Roxb.) J.Sinclair

(Latin, *parvus* = small, *flos* = flower; referring to the small flowers)

Gard. Bull. Singapore 28(1) (1975) 82; de Wilde, Gard. Bull. Singapore 38(1) (1985) 69; Turner, Gard. Bull. Singapore 45 (1993) 146; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 358; de Wilde, Fl. Males., ser. 1, 14 (2000) 161; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 49, 153, 266; Lok et al., Cosmos 6 (2010) 71; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 484. **Basionym:** *Myristica parviflora* Roxb., Fl. Ind. 3 (1832) 847. **Type:** [Unpublished illustration] Icones Roxburghianae no. 2574 [as '2564' on drawing] (lectotype K, designated here).

Myristica globularia Blume, Rumphia 1, fasc. 10–12 & 13–15 (1837) 191, t. 64: fig. 2, nom. illeg. non Lam. (1791). **Synonym:** *Horsfieldia globularia* Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 288; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 207; Ridley, Fl. Malay Penins. 3 (1924) 54; Burkill, Dict. Econ. Prod. Malay Penins. 1 (1935) 1198. **Type:** *Zippelius s.n.*, [Indonesia], Ambon (lectotype L [L0037334], designated by Sinclair, Gard. Bull. Singapore 28(1) (1975) 88).

Myristica bivalvis Hook.f., Fl. Brit. India 5, fasc. 13 (1886) 107; King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 307, pl. 139; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129. **Synonym:** *Horsfieldia bivalvis* (Hook.f.) Merr., Philipp. J. Sci., C 11(5) (1917 ['1916']) 271; Sinclair, Gard. Bull. Singapore 16 (1958) 379, fig. 32, pl. 8: B. **Type:** *Murton 149*, Singapore, 'Jungle nr B.G.' [Singapore Botanic Gardens' Rain Forest], 1878 (lectotype K [K000846990], designated by Sinclair, Gard. Bull. Singapore 16 (1958) 381).

Trees 10–20 m tall, without buttresses. **Bark** smooth or fissured. **Twigs** somewhat flattened but not angular, 2–5 mm diam., glabrescent, hairs c. 0.1 mm long; bark finely striate, not flaking; lenticels abundant, small, not conspicuous. **Leaves:** petiole 6–16 mm long, 1.5–2.5 mm wide; lamina membranous, (oblong-)lanceolate, 8–23 × 2.5–7.5 cm, base attenuate, apex acute-acuminate; upper surface drying olivaceous or brown, dull (sometimes with fine pale pustules or larger irregularly shaped marks), lower surface early glabrescent; dots absent; midrib flat above; veins 10–15 pairs, flat, inconspicuous above, lines of interarching indistinct, venation fine, indistinct; leaf bud 6–13 mm long, 1–2 mm wide, with hairs c. 0.1 mm long. **Inflorescences** with sparse or dense hairs 0.1–0.3 mm long; in both male and female inflorescences, 3–4 times branched, many-flowered, 4–10 cm long, 4–8 cm wide, peduncle 1–2 cm long; bracts pubescent, elliptic to oblong, 2–5 mm long, caducous; flowers in loose

clusters of 2–4, perianth 2-lobed, glabrous or in female sometimes minutely pubescent at base, pedicel with sparse hairs c. 0.1 mm long or less, not articulated. **Male flowers:** pedicel slender, 1–2 mm long; bud somewhat laterally compressed, obtriangular to transversely ellipsoid, 2.2–3 mm long, 2.5–4 mm wide, base short-attenuate, apex broadly rounded, firm, not collapsing on drying, bright brown or with a grey-blue tinge, cleft c. 1/2, lobes (0.1–)0.2–0.3 mm thick; androecium transversely ellipsoid or ± obtriangular, laterally compressed, largely hollow, (1–)1.6–2.2 mm long, 1.6–3 mm wide, locules 36–50, completely connate, forming a thin-walled cup, the anthers (sometimes only on one side of the androecium) completely inflexed from the middle and reaching nearly the bottom of the cup, free apices c. 0.1 mm long, androphore narrow, 0.1–0.3 mm long. **Female flowers:** pedicel 1–2 mm long, with sparse hairs c. 0.1 mm long; bud ellipsoid, (2.5–)3–3.5 mm long, 2.5 mm wide, cleft c. 1/3; ovary ovoid-ellipsoid, 2–2.3 mm long, c. 1.5 mm wide, glabrous, style and stigma 2- (or 3-)lobed, 0.1–0.2 mm long. **Fruit** 2–10 per infructescence, ellipsoid to nearly globose, 1.1–1.6 cm long, 1–1.3 cm wide, glabrous, finely granulate, not or hardly tuberculate; pericarp 1–1.5 mm thick; fruiting pedicel 2–4 mm long; perianth not persistent. **Seeds** not seen.

Distribution. Sulawesi and the Moluccas. In Singapore, formerly casual and known only from a few unlocalised historical collections (*Cantley s.n.*, 25 Jan 1882, SING [SING0042123]; *Ridley 6736*, 1894, SING [SING0042126]; *Alvins s.n.*, SING [SING0042125]). All collections are from male trees.

Ecology. Across its range, in forest to 600 m.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). Not native in Singapore.

5. *Horsfieldia polyspherula* (Hook.f.) J.Sinclair

(Greek, *poly-* = many, much; *sphaera* = sphere, globe, ball;
referring to the inflorescences with many small globose flowers)

Gard. Bull. Singapore 16 (1958) 422, fig. 47, pl. 12: B; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78; de Wilde, Gard. Bull. Singapore 39(1) (1986) 17; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 146; Wong et al., Gard. Bull. Singapore 46(2) (1995) ['1994'] 72; de Wilde, Blumea 41 (1996) 381; Kochummen, Tree Fl. Pasoh Forest (1997) 339; Turner, Gard. Bull. Singapore 47 (1997) ['1995'] 359; Turner et al., Gard. Bull. Singapore 48 (1998) ['1996'] 150; Chew et al., Gard. Bull. Singapore 49(2) (1999) ['1997'] 199; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 383; de Wilde, Fl. Males., ser. 1, 14 (2000) 167; LaFrankie et al., Forest Trees Bukit Timah (2005) 163; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 49, 153, 221; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 51; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 142, 414; Neo et al., Nat. Singapore 7 (2014) 105; Lim et al., Nat. Singapore 9 (2016) 84; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 167; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 484. **Basionym:** *Myristica polyspherula* Hook.f., Fl. Brit. India 5, fasc. 13 (1886) 108, p.p.; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129, as '*polysphaerula*'. **Type:** *Griffith 4354*, [Malaysia], Malacca [Melaka] (lectotype K [K000846896], designated by Sinclair, Gard. Bull. Singapore 16 (1958) 424; isolectotypes BM n.v., P [P01718053], U [U.1428736]). **Fig. 9.**



Figure 9. *Horsfieldia polyspherula* (Hook.f.) J.Sinclair. **A.** Habit. **B.** Leaves. **C.** Trunk. **D.** Male flowers **E.** Fruit. **F.** Fallen fruit. (A–F from Singapore, A & C, Pasir Panjang Nursery; B & E, Singapore Botanic Gardens; D, Nee Soon; F, Bukit Kalang. Photos: A, C & E, Zaki Jamil; B, D & F, X.Y. Ng).

Myristica glabra auct. non Blume: Hooker & Thomson, Fl. Ind. 1 (1855) 161, p.p.; Miquel, Fl. Ned. Ind. 1(2), fasc. 1 (1858) 65, p.p.; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 107 p.p.

Myristica majuscula auct. non King: Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129.

Horsfieldia majuscula auct. non (King) Warb.: Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 215, p.p.; Ridley, Fl. Malay Pen. 3 (1924) 57, p.p.

Horsfieldia subglobosa auct. non Warb.: Sinclair, Gard. Bull. Singapore 16 (1958) 425, p.p.; Keng, Gard. Bull. Singapore 27 (1974) 76.

Horsfieldia polyspherula (Hook.f.) J.Sinclair var. *sumatrana* auct. non (Miq.) W.J.de Wilde: De Wilde, Gard. Bull. Singapore 39(1) (1986) 20, p.p.; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 146; Turner et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 24; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 359; de Wilde, Fl. Males., ser. 1, 14 (2000) 170, p.p.; Tan et al. in Davison et al. (ed.), Singapore Red Data Book, ed. 2 (2008) 230; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 143, 415; Neo et al., Nat. Singapore 6 (2013) 121; Lim et al., Nat. Singapore 9 (2016) 86; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 169.

Distribution. Peninsular Malaysia, Singapore, Sumatra, Borneo and the Philippines.

Taxonomy. De Wilde (Gard. Bull. Singapore 39(1) (1986) 17) segregated *Horsfieldia polyspherula* into three varieties, *H. polyspherula* var. *polyspherula*, *H. polyspherula* var. *maxima* W.J.de Wilde (only in Borneo) and *H. polyspherula* var. *sumatrana* (Miq.) W.J.de Wilde, mainly on the basis of fruit size. Of these, only *Horsfieldia polyspherula* var. *polyspherula* occurs in Singapore.

var. **polyspherula**

Slender trees with narrow crowns 4–25 m tall, the branches often almost in whorls. **Bark** fissured, rarely flaky. **Twigs** brown, solid, terete or subterete, 2–3 mm diam., never lined or ridged, early or late glabrescent, hairs rusty brown, mealy, 0.1–0.6 mm long; bark finely or coarsely striate, neither cracking nor flaking, lenticels distinct or not. **Leaves** distichous; petiole 6–15 mm long, 1.5–3 mm wide, sometimes late glabrescent; lamina thickly membranous to chartaceous, brittle, (elliptic-)ovate-oblong to oblong-lanceolate, 7–19 × 2.5–6 cm, base more or less rounded or usually attenuate, apex acute-acuminate; upper surface drying olivaceous or (greenish) brown, without whitish marks, lower surface light brown or chocolate-brown, usually much contrasting with the upper surface, early glabrescent but midrib often late glabrescent; dots absent; midrib slender; lateral veins 6–15 pairs, distinctly raised above, interarching veins usually not distinct, intercostal venation lax, faint; leaf bud 6–17 mm long, 1.5–3 mm wide, with rusty brown dendroid hairs (0.2–)0.3–0.6 mm long. **Inflorescences** with sparse to dense woolly hairs to 0.6 mm long, sometimes glabrescent; male inflorescences 3–5 times branched, many-flowered, 4–15(–20) cm long, 3–12 cm wide, peduncle 0.3–1.5 cm long, the flowers in clusters of up to 8; female inflorescences few- to many-flowered, to 8 cm long; bracts oblong to lanceolate, 1.5–7 mm long, densely pubescent, caducous; perianth

3-lobed, glabrous or glabrescent, pedicel glabrous or minutely pubescent towards the base, articulated. **Male flowers:** pedicel slender, sometimes tapering, 0.8–1.5(–2) mm long; bud globose or broadly obovoid, 1–1.5 mm diam., base rounded or more or less tapering into the pedicel, apex (broadly) rounded, cleft 1/2 to 2/3, not collapsing on drying, lobes 0.2–0.4 mm thick, at base to 0.6 mm thick; androecium (including androphore) more or less broadly ovate in outline, 0.5–0.8 mm long, 0.6–1 mm wide, triangular in cross-section, anther locules (6 or) 8–14, free for at least for half of length, curved or suberect, 0.3–0.5 mm long, apex acute, at base column short bowl-shaped, narrowed into more or less tapering androphore (0.2–)0.3–0.4 mm long. **Female flowers:** pedicel 1–1.8 mm long, minutely pubescent; bud broadly ellipsoid-obovoid, 2–2.5 mm long, 1.8–2.8 mm wide, glabrous or with sparse hairs c. 0.1 mm long, cleft 1/3 to 2/3; ovary ovoid-ellipsoid, 1.2–1.5 mm long, 1–1.5 mm wide, glabrous, stigma shallowly 2-lobed, 0.2–0.3 mm long, 0.5 mm wide. **Fruit** 1–6 per infructescence, subglobose or ellipsoid, (1.7–)1.9–2.5(–2.8) cm long, 1.4–2 cm wide; base rounded or slightly attenuate, apex rounded, glabrous, not lenticel-like tuberculate; pericarp 2–4 mm thick; fruit stalk 1–4 mm long; perianth not persistent. **Seeds** ovoid, testa greyish green; aril yellow-red.

Distribution. Peninsular Malaysia, Sumatra, Borneo and the Philippines. In Singapore, known from Chan Chu Kang (*Ridley 2108*, 1891, SING [SING0018857]), Bukit Timah (*Ngadiman SFN 36122*, 17 Jul 1939, SING [SING0018858]), Mandai Road (*Sinclair SFN 40043*, 10 Oct 1953, SING [SING0018844]), Nee Soon (*Gwee et al. SING2005-87*, 5 Apr 2005, SING [SING0060957]) and Bukit Kalang (*Loo SING2011-433*, 25 Oct 2011, SING [SING0171388]).

Ecology. Across its range, in undulating lowland (disturbed) dipterocarp forest by streams, on hillsides or ridges, occasionally in freshwater swamp forest; lowland to 900 m.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026, under *Horsfieldia polyspherula*). In Singapore, assessed as Vulnerable (VU/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 485).

Notes. The anthers have two rather widely spaced, almost mutually free locules, giving the impression that there are twice as many anthers as there actually are.

6. *Horsfieldia punctatifolia* J.Sinclair

(Latin, *punctatus* = dotted, *folium* = leaf; referring to the dots on the lower leaf surface)

Gard. Bull. Singapore 16 (1958) 413, fig. 44, pl. 11: B; Whitmore, Tree Fl. Malaya 1 (1972) 327; Sinclair, Gard. Bull. Singapore 28(1) (1975) 105; de Wilde, Gard. Bull. Singapore 39(1) (1986) 54; Turner, Gard. Bull. Singapore 45 (1993) 146; Turner et al., Gard. Bull. Singapore 46(2) (1995 [‘1994’]) 24; Turner, Gard. Bull. Singapore 47 (1997 [‘1995’]) 359; Kochummen, Tree Fl. Pasoh Forest (1997) 338; Chew et al., Gard. Bull. Singapore 49(2) (1999 [‘1997’]) 199; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 384; de Wilde, Fl. Males., ser. 1, 14 (2000) 175; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 49, 153, 206; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 51; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 143, 415; Lim et al., Nat. Singapore 9 (2016) 88; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 172; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 485. **Type:** *Sinclair SFN 40211*, Singapore, Liane Road

[Singapore Botanic Gardens' Rain Forest], 24 February 1954 (holotype SING [SING0044355]; isotypes KEP n.v., L [L0037350], P [P01718049], SING [SING0045574]). **Fig. 10.**

Horsfieldia amygdalina auct. non (Wall.) Warb.: Ridley, Fl. Malay Penins. 3 (1924) 57.

Trees 4–30 m tall, with or without low-rounded or steep thick buttresses. **Bark** fissured. **Twigs** solid, 2.5–4 mm diam., not ridged, early glabrescent, hairs grey-brown, c. 0.1 mm long; bark finely to coarsely striate, not flaking; lenticels conspicuous or inconspicuous. **Leaves** distichous; petiole 10–17 mm long, 1.5–3 mm wide, glabrous; lamina membranous or subcoriaceous, (elliptic-)oblong, 9–21 × 3–9 cm, base attenuate, apex acute-acuminate; upper surface drying dull olivaceous or dark brown, without white marks, lower surface glabrous; scattered dots (c. 0.1 mm diam.) present; midrib more or less flat above; lateral veins 11–16 pairs, thin, flat above, interarching veins not distinct, intercostal venation lax, hardly visible on both surfaces; leaf bud 8–12 mm long, 1.5–2 mm wide, with dense grey-brown hairs c. 0.1 mm long. **Inflorescences** with sparse hairs c. 0.1 mm long, or glabrescent; male inflorescences c. 3 times branched, many-flowered, 4–10 cm long, 2–8 cm wide, peduncle 0.5–2 cm long; female inflorescences c. twice branched, 3–6 cm long, 1.5–4 cm wide, fewer-flowered than in male; bracts more or less oblong, 2–4 mm long, short-pubescent, caducous; flowers in male in loose clusters of 2–5, glabrous, perianth 3- or 4-lobed, pedicel not articulated. **Male flowers:** pedicel slender, 1–2.5 mm long; bud depressed-globose, 1.4–2 mm long, 1.6–2.2 mm wide, cleft 3/4 to 4/5, lobes 0.2–0.3 mm thick; androecium depressed-globose to depressed broadly ovoid, 0.6–0.7 mm long, 1–1.5 mm wide, nearly circular in cross-section; anther locules 14–18, completely sessile (free apices c. 0.1 mm long), the apices of anthers concealing the apical hollow, column broad with narrow hollow to 0.2 mm deep, androphore narrow, 0.1–0.2 mm long. **Female flowers:** pedicel 1–2 mm long; bud ellipsoid, 2.8–3.5 mm long, 2.5–3 mm wide, cleft c. 1/2; ovary broadly ovoid, 1.5–2 mm long, 1.3–2 mm wide, glabrous, stigma irregularly 2-lobed, 0.2–0.3 mm high. **Fruit** 1–3 per infructescence, (broadly) ellipsoid, ripening reddish orange, 4.5–8 cm long, 3–4.5 cm wide, glabrous, drying blackish brown, without or with few small warts; pericarp 10–20 mm thick; fruit stalk 4–6 mm long; perianth not persistent. **Seeds** ellipsoid, testa greyish green; aril orange to pinkish red.

Distribution. Peninsular Malaysia, Sumatra and Borneo. In Singapore, known from Mandai (Dahlan *et al.* SING2005-68, 28 Mar 2005, SING [SING0060015]; Gwee *et al.* SING2008-468, 2 Dec 2008, SING [SING0116911]), Mandai Road (Liew *et al.* SING2009-416, 16 Aug 2009, SING [SING0131724]; Teo *et al.* SING2010-153, 7 Jan 2010, SING [SING0145737]) and Chestnut (Gwee SING2010-582, 9 Mar 2010, SING [SING0144568]).

Ecology. Lowland forest, on hill slopes or ridges.

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) 485).

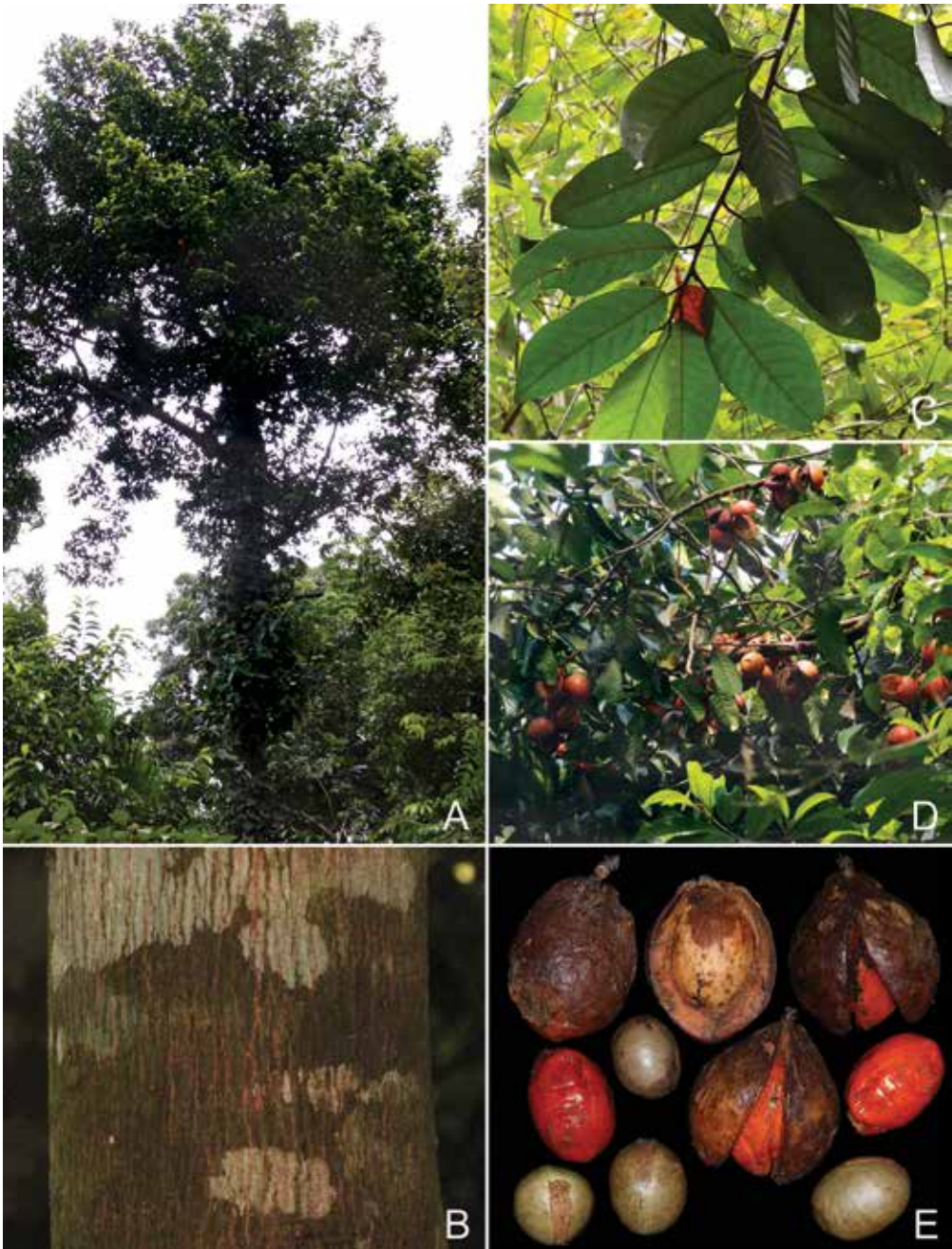


Figure 10. *Horsfieldia punctatifolia* J.Sinclair. **A.** Habit. **B.** Trunk. **C.** Leaves. **D.** Fruiting branch. **E.** Fallen fruit & seeds. (A–E from Singapore, A & C, Singapore Botanic Gardens, *Ali Ibrahim & Koh SING2017-104*; B, D & E, MacRitchie. Photos: A & C, P.K.F. Leong; B, D & E, X.Y. Ng).

7. *Horsfieldia sparsa* W.J.de Wilde

(Latin, *sparsus* = sparse, scattered; referring to the non-distichous leaves)

Gard. Bull. Singapore 38(2) (1986 ['1985']) 194; Turner, Gard. Bull. Singapore 45 (1993) 146; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 359; de Wilde, Fl. Males., ser. 1, 14 (2000) 189; de Wilde, Fl. Thailand 7(4) (2002) 745; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 49, 153, 193; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 175; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 485. **Type:** *Ogata* KEP 110406, Peninsular Malaysia, Johor, Labis Forest Reserve, 27 March 1968 (holotype L [L0037356]; isotypes KEP [KEP110406], SING [SING0222438]). **Fig. 11.**

Myristica sucosa auct. non King: Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129.

Horsfieldia sucosa auct. non (King) Warb.: Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 217; Ridley, Fl. Malay Penins. 3 (1924) 58, p.p.; Burkill, Dict. Econ. Prod. Malay Penins. 1 (1935) 1199; Sinclair, Gard. Bull. Singapore 16 (1958) 416, p.p.; Keng, Gard. Bull. Singapore 27 (1974) 76; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 147; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 72; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 359, p.p.; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 49, 153, 216; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 143, 415; Lim et al., Nat. Singapore 9 (2016) 90.

Trees 15–36 m tall, with clear boles, rarely with buttresses to 30 cm. **Bark** (blackish) brown, fissured and flaking in rectangular flakes. **Twigs** 4–11 mm diam., pale whitish brown or grey-brown, contrasting with the brown-black colour of the dried petioles, early glabrescent, at first with grey-brown hairs 0.1–0.2 mm long; bark rather smooth or coarsely striate, sometimes with a tendency to flake; lenticels conspicuous only towards the apex. **Leaves** crowded towards the apex or not, in 3–5 rows; petiole 12–34 mm long, 1.5–3 mm wide; lamina thickly membranous to chartaceous, oblong(-lanceolate), (10–)18–24 × 3.5–7 cm, base long-attenuate, apex acute-acuminate; upper surface drying (dark) brown, without whitish marks, lower surface bright brown, glabrous (early glabrescent); dots absent; midrib flat or slightly raised above, glabrous; lateral veins 12–16 pairs, more or less flat above, interarching veins not distinct, intercostal venation lax, hardly visible above; leaf bud relatively short and broad, 8–12 mm long, 3–5 mm wide, with dense hairs 0.1–0.2 mm long. **Inflorescences** behind the leaves, subglabrous or glabrescent, at first with weak hairs 0.1–0.2 mm long; male inflorescences 2 or 3 times branched, many-flowered, 6–12 cm long, 4–6 cm wide, peduncle (0.2–)0.5–1.5 cm long, the flowers in clusters of 4–10; female inflorescences (from infructescences) few-flowered, 1.5–3 cm long; bracts minute, very early caducous; flowers glabrous, perianth 3- or 4- (or exceptionally 5-)lobed, pedicel not or incidentally articulated. **Male flowers:** pedicel slender, 2–4 mm long; bud (slightly depressed-)globose, 1.5–2 mm long, 2–2.5 mm wide, cleft 1/3 to 1/2, not or only slightly collapsing on drying; lobes 0.1–0.2 mm thick; androecium (depressed-)globose, 0.8–1 mm long, 1–1.2 mm wide, anther locules 14–18, almost completely sessile, incurved at the apex, column broad and solid without or with a minute apical cavity, androphore slender, 0.3–0.4 mm long. **Female flowers** (from young fruit) c. 3 mm long, 3- or 4-lobed; ovary glabrous. **Fruit** 2–4 per infructescence, ovoid-ellipsoid, orange to red, 3–5.5 cm long, 2.5–4.5 cm wide, glabrous, drying blackish, finely granulate, sometimes more or less tuberculate; pericarp 4–20 mm thick; fruit stalk 5–7 mm long; perianth not persistent. **Seeds** subglobose; aril yellow to red.



Figure 11. *Horsfieldia sparsa* W.J.de Wilde. **A.** Habit (flowering). Inset: Twigs with opened fruit. **B.** Trunk. **C.** Leaves. **D.** Male flowers. **E.** Fruit. (A–E including inset from Singapore, Singapore Botanic Gardens. Photos: X.Y. Ng).

Distribution. Southern Thailand, Peninsular Malaysia and Sumatra. In Singapore, known from Cluny Road (*Ridley 11354*, SING [SING0018867]), Singapore Botanic Gardens' Rain Forest (*Ridley 6559*, 3 Jan 1928, SING [SING0018869]; *Nur s.n.*, 18 Jun 1929, SING [SING0018875]), Nee Soon (*Samsuri NES 45*, 24 Jun 2003, SING [SING0045754]) and Upper Peirce (*Gwee SING2009-549*, 9 Dec 2009, SING [SING0138062]).

Ecology. Primary lowland forest, across its range to 100(–500) m.

Conservation assessment. Globally, Near Threatened (NT) (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) 486).

Vernacular names. *Penarahan gajah*, *samak pulut* (NParks' Flora & Fauna Web, 2026).

8. *Horsfieldia superba* (Hook.f. & Thomson) Warb.

(Latin, *superbus* = beautiful; referring to the tree)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 295; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 209; Ridley, Fl. Malay Penins. 3 (1924) 55; Sinclair, Gard. Bull. Singapore 16 (1958) 393, fig. 36, pl. 10: B; Whitmore, Tree Fl. Malaya 1 (1972) 328, fig. 5; Keng, Gard. Bull. Singapore 27 (1974) 76; Sinclair, Gard. Bull. Singapore 28(1) (1975) 141; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78; de Wilde, Gard. Bull. Singapore 38(2) (1986 [‘1985’]) 200; Corner, Wayside Trees Malaya, ed. 3, 2 (1988) 564; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 147; Wong et al., Gard. Bull. Singapore 46(2) (1995 [‘1994’]) 72; Kochummen, Tree Fl. Pasoh Forest (1997) 339; Turner et al., Gard. Bull. Singapore 48 (1998 [‘1996’]) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 [‘1997’]) 199; de Wilde, Fl. Males., ser. 1, 14 (2000) 203; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 49, 153, 207; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 51; Lim et al., Nat. Singapore 9 (2016) 94; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 179; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 486. **Basionym:** *Myristica superba* Hook.f. & Thomson, Fl. Ind. 1 (1855) 162; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 105; King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 298, pl. 124 bis, pl. 125 bis; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129. **Type:** *Phillips s.n.*, [Malaysia], Penang, 1824 (lectotype K [K000846914], first step designated by Sinclair, Gard. Bull. Singapore 16 (1958) 395, second step designated by de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 179; isolectotype K [K000846913]). **Fig. 12.**

Trees 10–30 m tall; boles straight. **Bark** brown, shallowly fissured, or distantly dimpled or cracked. **Twigs** sometimes faintly angular, 5–7(–10) mm diam., late glabrescent, at first with dense, rusty brown, rather stiff dendroid hairs 0.5–1 mm long, bark brown, striate, sometimes slightly cracking and flaking; lenticels usually many and conspicuous. **Leaves** usually distichous, rarely in 3 rows; petiole 6–15 mm long, 5–7 mm wide, late glabrescent, not contrasting in colour with the twigs; lamina coriaceous, (elliptic-)oblong, (17–)25–40(–70) × (7.5–)10–18(–22) cm, base narrowly subcordate to short-attenuate, apex bluntish to acute-acuminate; upper surface drying dull olivaceous-brown with finely wrinkled structures, without whitish marks, glabrescent (except sometimes midrib), lower surface with (bright) rusty brown rather sparse to dense mealy indumentum of dendroid hairs of mixed size, (0.3–)0.5–1 mm



Figure 12. *Horsfieldia superba* (Hook.f. & Thomson) Warb. **A.** Habit. **B.** Leaves. **C.** Trunk. **D.** Fruiting branch. **E.** Fruit, half-fruit & sectioned seed. (A–E from Singapore, Streetscape trees. Photos: A, B & D, Zaki Jamil; C & E, X.Y. Ng).

long, usually with many or few longer hairs to c. 1.5 mm long; dots absent; midrib broad, flat above, pubescent or glabrescent; lateral veins 15–25(–30) pairs, flat or sunken above, interarching veins fairly regular, not very distinct, intercostal venation faint on both surfaces; leaf bud 20–30 mm long, 5–10 mm wide, with dense hairs 0.5–1.5 mm long. **Inflorescences** behind the leaves, with more or less dense, woolly, long-branched yellowish brown dendroid hairs 0.5–1 mm long; male inflorescences many-flowered, 2 or 3 times branched, 7–15 cm long, 2.5–10 cm wide, peduncle 1–1.5 cm; female inflorescences rather few-flowered, little branched, 2–5 cm long; bracts broadly ellipsoid, subacute-acuminate, to 12 mm long, 10 mm wide, densely pale brownish pubescent, caducous; flowers in male c. 5 in a cluster, glabrous, perianth 3- or 4-lobed, drying often with a grey bluish tinge, pedicel not articulated. **Male flowers:** pedicel slender, 1.5–3.5(–5) mm long; bud (obovoid-)ellipsoid, 6–7(–8) mm long, 4–5 mm wide, base rounded to short-attenuate, cleft 1/5 to 1/4, lobes c. 0.4 mm thick; androecium elongate-ellipsoid, subcylindrical to triangular in cross-section, (4–)4.5–5 mm long, 2.2–2.5 mm wide, base subtruncate, apex subtruncate, with a shallow 3-radiate crack, anther locules 32–40, completely sessile, androphore rather narrow, 0.1–0.4 mm long. **Female flowers:** pedicel stout, 2–3.5 mm long; bud ellipsoid, 7–8 mm long, 4.5 mm wide, cleft c. 1/5, lobes subcoriaceous; ovary ovoid, slightly compressed, 4–4.5 mm long, c. 3 mm wide, glabrous, stigma shallowly 2-lobed, broad, c. 0.5 mm long, 1.5 mm wide. **Fruit** 1–3 per infructescence, broadly ovoid-ellipsoid, yellowish green, ripening yellowish red, 3.8–5.5 cm long, 2.8–4.5 cm wide, glabrous, more or less coarsely warty and wrinkled; pericarp 8–12 mm thick; fruit stalk stout, 3–6 mm long; perianth persistent. **Seeds** ellipsoid; aril orange.

Distribution. Peninsular Malaysia and Sumatra. In Singapore, known from Bukit Timah (*Ngadiman SFN 36141*, 16 Apr 1940, SING [SING0018878]; *Samsuri et al. EP 15*, 4 Feb 2004, SING [SING0051170]), MacRitchie (*Corner SFN 36134*, 4 Apr 1940, SING [SING0018879]; *Lai et al. SING2017-45*, 18 Feb 2017, SING [SING0231958]) and Tanjong Pasir Laba (*Sinclair SFN 40174*, 12 Dec 1953, SING [SING0018881]).

Ecology. Across its range, in lowland primary forest, usually on flat land, on hillsides or in swamp forest, from sea level to 400 m.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 486).

Vernacular names. *Cabbage-leaved nutmeg*, *pendarah* (NParks' Flora & Fauna Web, 2026).

Notes. Sterile trees of *Horsfieldia superba* may be confused with *Gymnacranthera bancana*, the latter also with a stout habit and persistent indumentum on the twig apex and the lower leaf surface. However, in *Gymnacranthera bancana*, the hairs are much more interwoven forming a thin felty mat whereas in *Horsfieldia superba* the lower leaf surface is covered with more harsh, stellate-dendroid hairs.

9. *Horsfieldia tomentosa* (Kuntze) Warb.

(Latin, *tomentum* = stuffing for cushions, wool, *-osus* = abundance; referring to the indumentum on the twigs and the lower leaf surfaces)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 302; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 212; Ridley, Fl. Malay Penins. 3 (1924) 56; Burkill, Dict. Econ. Prod. Malay Penins. 1 (1935) 1199; Sinclair, Gard. Bull. Singapore 16 (1958) 403, fig. 40; Keng, Gard. Bull. Singapore 27 (1974) 76; Sinclair, Gard. Bull. Singapore 28(1) (1975) 149; de Wilde, Gard. Bull. Singapore 38(2) (1986 ['1985']) 210; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 147; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 359; Kochummen, Tree Fl. Pasoh Forest (1997) 337; de Wilde, Fl. Males., ser. 1, 14 (2000) 210; de Wilde, Fl. Thailand 7(4) (2002) 747, pl. 26: 4; LaFrankie et al., Forest Trees Bukit Timah (2005) 163; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 49, 153, 207; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 143, 415; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 181; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 486. **Basionym:** *Palala tomentosa* Kuntze, Revis. Gen. Pl. 2 (1891) 568. **Synonym:** *Myristica tomentosa* Hook.f. & Thomson, Fl. Ind. 1 (1855) 161, nom. illeg. non Thunb. (1782); Hooker, Fl. Brit. India 5, fasc. 13 (1886) 105; King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 301, pl. 129. **Type:** *Porter s.n.* [EIC 9025], [Malaysia], Penang hills (lectotype K [K000846909], first step designated by Sinclair, Gard. Bull. Singapore 16 (1958) 403, second step designated here; isolectotypes BM n.v., CAL [CAL0000021289], K-W [K001132117]).

Trees 5–20(–40) m tall. **Bark** smooth or slightly fissured. **Twigs** 2–5 mm diam., late glabrescent, hairs dense, rusty brown, woolly, 1–1.5 mm long; bark striate, not flaking; lenticels abundant, conspicuous. **Leaves** distichous; petiole 10–18 mm long, 1.5–3 mm wide, pubescent; lamina membranous, elliptic or obovate to oblong-lanceolate, 9–27 × 4–10(–12) cm, base nearly rounded to attenuate, apex acute-acuminate; upper surface drying brown, without whitish marks, faintly minutely pustulate or not, glabrous (glabrescent), lower surface with persistent dense dendroid hairs all of about the same size, 0.5–0.8 mm long; dots absent; midrib flattish, glabrescent above; lateral veins 7–15 pairs, flattish or sunken above, interarching veins more or less regular, distinct, intercostal venation lax, faint; leaf bud ovoid-ellipsoid, 10–15 mm long, 2–3 mm wide, with dense hairs c. 1.5 mm long. **Inflorescences** with woolly hairs 1.5–2 mm long; male inflorescences many-flowered, 3 or 4 times branched, 3–12 cm long, 1.5–7 cm wide, peduncle 0.3–2.5 cm long; female inflorescences few-flowered, 2–6 cm long; bracts elliptic, densely woolly pubescent, 2–4 mm long, caducous; flowers in small fascicles, perianth 3- (or 4- or 5-)lobed, glabrous; pedicel slender, in male glabrous, in female late glabrescent, not articulated, hairs c. 0.2 mm long. **Male flowers:** pedicel 1–3 mm long; bud globose, 1.4–2.5 mm diam., cleft nearly 1/2, lobes c. 0.1 mm thick; androecium much depressed-globose, above flattish or impressed, circular to blunt-triangular in cross-section, 0.6–0.9 mm long, 1.2–1.7 mm wide, anther locules 18–24(–30?), almost completely sessile, incurved towards the apex, column broad, with apical hollow c. 0.2 mm deep, androphore narrow, 0.4–0.5 mm long. **Female flowers:** pedicel 1–2 mm long; bud broadly ellipsoid, c. 2.5 mm long, 2.3 mm wide, cleft c. 1/3; ovary subglobose, c. 1.5 mm diam., with appressed hairs 0.1–0.2 mm long, style and stigma minute, faintly 2-lobed, c. 0.1 mm long. **Fruit** 1–5 per infructescence, ellipsoid, ripening orange, 1.5–2 cm long, 1.3–1.6 cm wide, glabrescent, usually with minute indumentum remaining towards the base, usually minutely pustulate; pericarp c. 1.5 mm thick; fruit stalk 2–6 mm long; perianth not (or for a short period) persistent. **Seeds:** aril orange to red.

Distribution. Peninsular Thailand, Peninsular Malaysia and Sumatra. In Singapore, known only from a historical collection from Bukit Timah (*Cantley 30*, K [K000842814]). Although care must be exercised when a species is known from Singapore only from Cantley collections (see Middleton & Turner, *Fl. Singapore 1* (2019) 32), the known distribution and habitat preferences of this species makes its presence in Singapore unsurprising so we are on the side of inclusion.

Ecology. Across its range, in primary lowland forest or old secondary forests, on (steep) hillsides or by streams, to 300 m.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, assessed as Nationally Extinct (NEx) by Middleton et al. (in Davison et al. (ed.), *Singapore Red Data Book*, ed. 3 (2024) 486).

Notes. The lobes of the male perianth in fully open flowers are often somewhat recurved.

10. *Horsfieldia wallichii* (Hook.f. & Thomson) Warb.

(Nathaniel Wallich, 1786–1854, Superintendent of the Calcutta Botanic Garden)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 305; Gamble, *J. Asiat. Soc. Bengal*, Pt. 2, *Nat. Hist.* 75(2) (1912) 213; Ridley, *Fl. Malay Penins.* 3 (1924) 57; Sinclair, *Gard. Bull. Singapore* 16 (1958) 405, fig. 41, pl. 11: A; Whitmore, *Tree Fl. Malaya 1* (1972) 330; Keng, *Gard. Bull. Singapore* 27 (1974) 76; Sinclair, *Gard. Bull. Singapore* 28(1) (1975) 156, p.p.; de Wilde, *Gard. Bull. Singapore* 38(2) (1986 [‘1985’]) 204; Keng, *Concise Fl. Singapore*, vol. 1, *Gymn. Dicot.* (1990) 16; Turner, *Gard. Bull. Singapore* 45 (1993) 147; Wong et al., *Gard. Bull. Singapore* 46(2) (1995 [‘1994’]) 72; Turner, *Gard. Bull. Singapore* 47 (1997 [‘1995’]) 359; Kochummen, *Tree Fl. Pasoh Forest* (1997) 337; Turner et al., *Gard. Bull. Singapore* 48 (1998 [‘1996’]) 150; Chew et al., *Gard. Bull. Singapore* 49(2) (1999 [‘1997’]) 199; de Wilde, *Tree Fl. Sabah & Sarawak 3* (2000) 396; de Wilde, *Fl. Males.*, ser. 1, 14 (2000) 219, photo 8; LaFrankie et al., *Forest Trees Bukit Timah* (2005) 163; Chong et al., *Checkl. Vasc. Pl. Fl. Singapore* (2009) 49, 153, 207; Turner & Chua, *Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res.* (2011) 51; Wong et al., *Checkl. Pl. Sp. Nee Soon Swamp Forest* (2013) 143, 415; Lim et al., *Nat. Singapore 9* (2016) 96; de Wilde & Duyfjes, *Fl. Penins. Malaysia*, ser. 2, 7 (2018) 182; Ho et al., *Gard. Bull. Singapore* 71(Suppl. 1) (2019) 97; Lindsay et al., *Gard. Bull. Singapore* 74(Suppl. 1) (2022) 486. **Basionym:** *Myristica wallichii* Hook.f. & Thomson, *Fl. Ind.* 1 (1855) 161; Miquel, *Fl. Ned. Ind.* 1(2), fasc. 1 (1858) 67; Hooker, *Fl. Brit. India* 5, fasc. 13 (1886) 105; King, *Ann. Roy. Bot. Gard. Calcutta* 3 (1891) 303, pl. 132, pl. 133, p.p.; Ridley, *J. Straits Branch Roy. Asiat. Soc.* 33 (1900) 129. **Type:** *Wallich s.n.* [EIC 6806], Singapore, 1822 (lectotype K-W [K001124858], lower left part only, designated here – see note below). **Fig. 13, 14.**

Trees 10–30 m tall, without buttresses. **Bark** shallowly or deeply fissured. **Twigs** not ridged, sometimes drying somewhat flattened, usually conspicuously hollow, 3–6 mm diam., early or late glabrescent, hairs 0.3–0.6 mm long; bark dark brown or blackish, coarsely striate, later on fissured, sometimes flaking, lenticels inconspicuous. **Leaves** distichous; petiole 15–35 mm long, 2.5–4.5 mm wide; lamina membranous to coriaceous, ovate-oblong to oblong-lanceolate, (14–)19–40 × (4–)4.5–12 cm, base rounded to short-attenuate, apex subobtuse to acute-acuminate; upper surface drying olivaceous to blackish brown, without whitish marks,

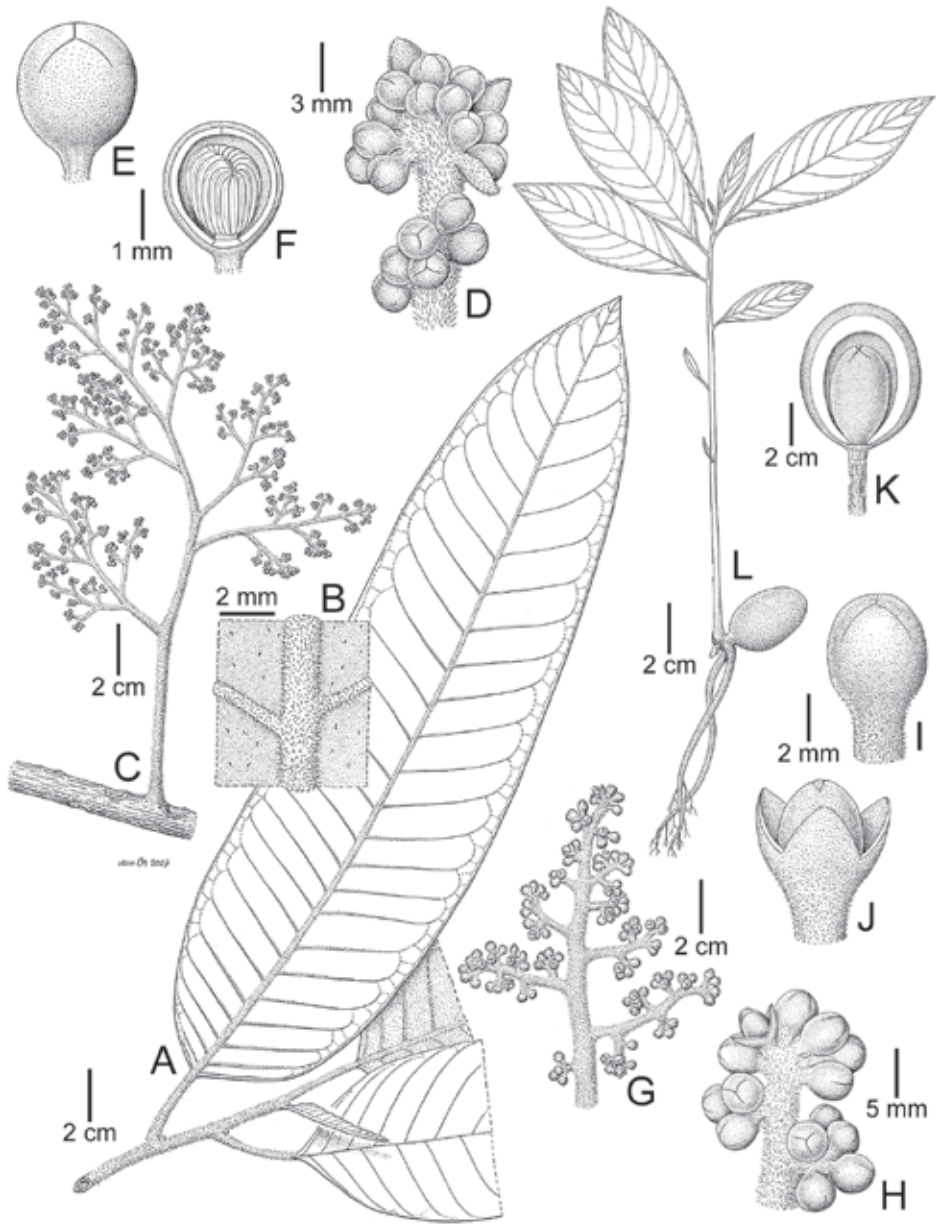


Figure 13. *Horsfieldia wallichii* (Hook.f. & Thomson) Warb. **A.** Twig apex with mature leaf and leaf bud, also showing hollow twig. **B.** Detail of lower surface of lamina showing dark dashes. **C.** Male inflorescence on older part of twig. **D.** Detail of male inflorescence. **E.** Mature male flower bud. **F.** Mature male flower bud opened, showing androecium. **G.** Female inflorescence. **H.** Detail of female inflorescence. **I** & **J.** Female flowers. **K.** Fruit, opened to show seed with entire aril. **L.** Seedling. (A–C from Indonesia, East Kalimantan Kessler & Ambriansyah PK 2398; D–F from Singapore, Sinclair SFN 39487; G–J & L from Indonesia, South Sumatra, de Vogel 1214; K from Indonesia, East Kalimantan, Arifin & Arbainsyah AA 1748. Drawn by J. van Os).



Figure 14. *Horsfieldia wallichii* (Hook.f. & Thomson) Warb. **A.** Habit. **B.** Leaves. **C.** Unripe fruit. **D.** Seed. **E.** Fallen fruit. (A–E from Singapore, Singapore Botanic Gardens. Photos: W.F. Ang).

glabrous (with minute indumentum sometimes remaining on midrib); lower surface pubescent, late glabrescent or indumentum locally persistent, hairs sparse or dense, dendroid, (0.3–)0.5–0.8 mm long; dark dots and dashes present; midrib slightly raised above, late glabrescent; lateral veins (12–)15–28 pairs, slender, flat or sunken above, interarching veins and intercostal venation indistinct; leaf bud 20–30 mm long, 4–6 mm wide, with dense hairs 0.3–0.6 mm long. **Inflorescences** usually behind the leaves, with sparse or dense stellate-dendroid hairs 0.5–1 mm long; male inflorescences large, many-flowered, 3 or 4 times branched, 10–33 cm long, 6–22 cm wide, peduncle 3–7 cm long; female inflorescences rather stout, fewer-flowered, 3–7 cm long; bracts broadly ovate, 3–10 mm long, densely woolly pubescent, caducous; flowers in male in clusters of 5–12, perianth 3- (or 4-)lobed, glabrous (in female glabrescent), pedicel with hairs 0.2–0.3 mm long, not articulated. **Male flowers:** pedicel 0.3–0.6(–1) mm long; bud broadly obovoid (short pear-shaped), 2–2.5(–3) mm long, 2.4–2.5(–3) mm wide, base more or less attenuate, apex broadly rounded, cleft 1/3 to 2/3, lobes 0.2–0.3 mm thick; androecium broadly obovoid to subglobose, base rounded to attenuate, apex more or less depressed with a 3-radiate crack, faintly triangular in cross-section, 1.3–2 mm long, 1.5–2 mm wide, anther locules (24?–)30–46, completely connate, sessile, closely appressed, at apex incurved into apical hollow, column broad with broad hollow to nearly halfway, androphore narrow, to 0.3 mm long. **Female flowers:** pedicel stout, 0.5–1.5 mm long; bud ovoid-ellipsoid, 2.5–4 mm long, 2–3.5 mm wide, glabrescent, hairs 0.1 mm long, cleft c. 1/3; ovary ovoid to subglobose, c. 2 mm long, 2–2.5 mm wide, glabrous, stigma broad, faintly 2-lobed, c. 0.3 mm long, 0.8 mm wide. **Fruit** 2–9 per infructescence, ovoid-ellipsoid, 4–7 cm long, 3–4.5 cm wide, glabrous, smooth or wrinkled, not or only faintly warty; pericarp 10–15 mm thick; fruit stalk stout, 4–6 mm long; perianth generally persistent. **Seeds** ellipsoid, testa brown; aril orange.

Distribution. Southern Thailand, Peninsular Malaysia, Sumatra and Borneo. In Singapore, known from Chan Chu Kang (*Ridley 5061*, 1893, SING [SING0018894]), MacRitchie (*Corner SFN 33556*, 18 Jun 1937, SING [SING0018887]), Nee Soon (*Gwee et al. SING2009-75*, 3 Feb 2009, SING [SING0120417]) and Upper Peirce (*Gwee SING2009-476*, 17 Nov 2009, SING [SING0138032]).

Ecology. Across its range, in lowland and ridge-top forest, to 470 m.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 487).

Notes. *Horsfieldia wallichii* can be recognised by the blackish dots and stripes (dashes) on the lower leaf surface with the indumentum partly remaining, and by its hollow twigs.

De Wilde (Tree Fl. Sabah & Sarawak 3 (2000) 396) designated a Griffith specimen at Kew as the lectotype of *Myristica wallichii* Hook.f. & Thomson but no such specimen could be found. Instead, one of the other syntypes, *Wallich s.n.* [EIC 6806], is designated here as the lectotype. This is a mixed collection (see Sinclair, Gard. Bull. Singapore 28(1) (1975) 158) and the lectotype is only the lower left branch on the sheet in K-W.

4. KNEMA Lour.

(Greek, *knema* = the spoke of a wheel; referring to the arrangement of the stamens)

Fl. Cochinch. 2 (1790) 604; Warburg, Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 132, 543; Sinclair, Gard. Bull. Singapore 16 (1958) 254; Sinclair, Gard. Bull. Singapore 18(3) (1961) 102; Whitmore, Tree Fl. Malaya 1 (1972) 330; de Wilde, Blumea 25 (1979) 321; de Wilde, Blumea 27 (1981) 223; de Wilde, Blumea 32 (1987) 115; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 15; Kühn & Kubitzki in Kubitzki et al. (ed.), Fam. Gen. Vasc. Pl. 2 (1993) 465; Kochummen, Tree Fl. Pasoh Forest (1997) 339; Sambas & Sosef in Sosef et al. (ed.), Pl. Resources S.E. Asia 5(3) (1998) 317; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 399; de Wilde, Fl. Males., ser. 1, 14 (2000) 222; de Wilde, Fl. Thailand 7(4) (2002) 747; Lim et al., Nat. Singapore 9 (2016) 98; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 183. **Synonym:** *Myristica* Gronov. sect. *Knema* (Lour.) Blume, Rumphia 1, fasc. 13–15 (1837) 187; King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 284. **Type:** *Knema corticosa* Lour.

Trees, dioecious; stilt-roots sometimes present. **Twigs** without lenticels, flaky or not. **Leaves** not breaking easily when dry (veins with sclerenchyma sheaths), lower surface pale, papillose or not, dots present or absent; reticulation dense, distinct. **Inflorescences** rarely supra-axillary; a sessile or 5(–10) mm long pedunculate, simple or 2- (or 4-) branched wart-like or worm-like densely scar-covered short-shoot 1–17 mm long, of slow unlimited growth; basal cataphylls absent; bracts minute, caducous; flowers in terminal subumbels (few-flowered in female); flowers pedicellate, not fragrant; bracteole minute, on the pedicel below the perianth, mostly persistent. **Male flowers:** perianth ± rotate, (thinly) carnose, inside glabrous, greenish creamy, pink or red; bud (sub)globose or (ob)ovoid, cleft to c. 1/2 to nearly to the base, lobes 3(–5), spreading at anthesis; androecium stalked, androphore (or staminal column) cylindrical or tapering, rarely with few hairs, androecium (or staminal disc) flat or convex (or mammillate) with 3–25 stellately attached ellipsoid anthers at the margin, (half-)sessile or shortly stalked. **Female flowers:** bud (ob)ovoid or ellipsoid; ovary pubescent, style short or absent, stigma ± 2-lobed and each lobe 2–many-lobulate. **Infructescences** sessile, with one or few fruit. **Fruit** ellipsoid, 2–5 cm long, tomentose or early glabrescent (never glabrous as in species of *Horsfieldia* and *Myristica*); pericarp leathery. **Seeds** ellipsoid to subglobose, not variegated; endosperm ruminant with a fixed oil and starch; cotyledons divaricate or suberect, slightly connate at the base; aril entire or lacinate at the apex only.

Distribution. A genus of about 90 species in India, South China, continental Southeast Asia and throughout Malesia. In Singapore, 12 native species.

Ecology. Lowland and (sub)montane rain forest.

Taxonomy. For a discussion of the segregation of *Knema* into series see de Wilde (Blumea 25 (1979) 330).

Key to *Knema* species
(specimens with male flowers)

1. Leaves hairy beneath, hairs stellate-dendroid c. 1 mm long; buds longer than broad (resembling female buds), cleft 1/2–2/3; androphore about as long as or usually longer than the diameter of the staminal disc including anthers; anthers mostly suberect **9. *K. laurina***
 Leaves variously hairy, glabrescent or glabrous beneath; buds ± as broad as long, or broader than long, cleft c. 2/3 to much deeper; androphore shorter than diameter of staminal disc including anthers; anthers suberect to horizontal 2
2. Bark of twigs soon longitudinally cracking, lower down flaking 3
 Bark of twigs ± smooth, at most coarsely striate, only occasionally cracking 5
3. Twigs 1.5–4(–6) mm diameter, hairs at apex c. 1 mm long; leaves 8–30 cm long, membranous to chartaceous **8. *K. latericia***
 Twigs 4–10 mm diameter, hairs at apex 1–8 mm long; leaves 25–60 cm long, coriaceous 4
4. Twigs with hairs 1–1.5 mm long, glabrescent; bark of twigs blackish; male pedicel 3–15 mm long; bud with hairs 0.5–1 mm long, glabrescent **5. *K. furfuracea***
 Twigs with hairs 3–8 mm long, late glabrescent; bark of twigs pale brown; male pedicel 15–20 mm long; bud with hairs 1–3 mm long, persistent **6. *K. hookeriana***
5. Buds obovoid or pear-shaped, in the lower half ± narrowed; buds cleft 1/2–3/4; anthers (half) erect; androphore tapering **3. *K. corticosa*** (in part)
 Buds (sub)globose or broadly (ob)ovoid, base rounded, truncate, saccate, or short attenuate; buds cleft to over 2/3; anthers horizontal, sometimes suberect; androphore tapering or cylindrical 6
6. Anthers completely sessile, tightly set, touching, the locules appearing as if representing twice as many, i.e. 18–50 sessile anthers; anthers completely hidden under the rim of the staminal disc **4. *K. curtisii***
 Anthers mutually free, i.e. not or at least not completely and not tightly touching each other; anthers either half sessile or just sessile, or stalked 7
7. Lower leaf surface with scattered brown dots, especially on the finer veins **2. *K. conferta***
 Lower leaf surface without dots (sometimes a few stray dots when leaves glabrescent) ...
 8
8. Buds rather robust, 4–5.5 mm diameter; staminal disc convex or with a mammilla (in dry specimens the latter sometimes shrivelled and indistinct); leaves coriaceous
 **7. *K. intermedia***

- Buds of various consistency and size; staminal disc concave, ($\pm$) flat, or only slightly convex (sometimes low-mammillate in *K. rubens*); leaves membranous or chartaceous ... 9
9. Indumentum of flowers and twig apices more conspicuous, with farinose or woolly hairs more than (0.1–)0.2 mm long; inflorescences all or partly to 5 mm pedunculate; leaves drying with a blackish metallic lustre above; often coastal **3. *K. corticosa*** (in part)
Indumentum of flowers and twig apices inconspicuous, scurfy or felty, with scale-like (in *K. rubens* with stellate-dendroid) hairs 0.1–0.2 mm long or less; inflorescences not pedunculate; leaves not drying with a blackish metallic lustre above; not coastal 10
10. Leaf lower surface early glabrescent except for the basal part of the midrib with minute hairs; twigs usually flattened or blunt-triangular, at first with farinose orange-red or orange-yellowish hairs 0.2 mm long **11. *K. rubens***
Leaf lower surface completely glabrescent or with a various (sub)persistent indumentum; twigs (sub)terete, at first with rusty or greyish or minute scalelike hairs 0.1 mm long or less 11
11. Lower leaf surface with $\pm$ dense hairs of 0.1–0.2 mm long, of $\pm$ mixed sizes; old leaves often glabrescent; venation on upper surface distinct, fine, areoles 0.5 mm diameter or less **1. *K. communis***
Lower leaf surface with hairs sparse, uniform, scale-like 0.1 mm long or less, early glabrescent; venation on upper surface distinct or indistinct 12
12. Lateral veins raised above; anthers 9–13, shortly stalked **10. *K. malayana***
Lateral veins more or less flat above; anthers 12–18, distinctly stalked ... **12. *K. sumatrana***

Key to *Knema* species
(specimens with female flowers and fruit)

1. Bark of twigs longitudinally cracking, when older flaking 2
Bark of twigs neither cracking nor flaking 4
2. Twigs 2–4(–6) mm diameter; fruit 1.5–2.5(–3) cm long, with hairs 1–2 mm long **8. *K. latericia***
Twigs 4–10 mm diameter; fruit 2.5–8 cm long, with hairs 1–13 mm long 3
3. Fruit 2.5–3.5 cm long, with hairs 1–2 mm long; twigs with hairs c. 1 mm long, soon rubbed off **5. *K. furfuracea***
Fruit 4.5–8 cm long, with hairs 5–13 mm long; twigs with hairs (3–)5–8 mm long, shed in compact rags **6. *K. hookeriana***
4. Lower leaf surface with dark dots, mostly on the smaller veins **2. *K. conferta***
Lower leaf surface without dots 5

5. Twigs (0.5–)1–2 mm diameter, early glabrescent, often yellowish; fruit often glabrescent, 4–5 cm long **4. *K. curtisii***
Twigs slender or stout, drying brown or blackish; fruit various 6
6. Hairs on twigs and flowers (0.1–)0.2 mm long or more; twigs not flattened 7
Hairs on twigs and (usually) flowers 0.1–0.2 mm long or less; twigs flattened or not 9
7. Twigs 1–2(–2.5) mm diameter; leaves 6–18(–24) cm long, drying with a blackish metallic lustre above; lower surface late glabrescent, at first with hairs c. 0.1 mm long **3. *K. corticosa***
Twigs 1.5–6 mm diameter; leaves 9–40(–55) cm long, without blackish metallic lustre; lower surface glabrescent or with persistent hairs c. 0.2 mm long or more 8
8. Leaves early glabrescent beneath **7. *K. intermedia***
Leaves with persistent indumentum beneath **9. *K. laurina***
9. Twigs flattened, with hairs 0.1–0.2 mm long; leaves early glabrescent beneath, except the basal part of the midrib **11. *K. rubens***
Twigs terete, with hairs 0.1–0.2 mm long or less; leaves glabrescent or with persistent indumentum beneath 10
10. Leaves beneath with ± conspicuous rather dense stellate-dendroid hairs c. 0.2 mm long (old leaves glabrescent); venation distinct above, with areoles c. 0.5 mm diameter or less **1. *K. communis***
Leaves beneath either with sparse hairs c. 0.2 mm long or less, or with sparse or dense scale-like hairs c. 0.1 mm long or less, or glabrous (early glabrescent); venation distinct or indistinct above, areoles c. 0.5 mm diameter or more 11
11. Fruit with persistent indumentum (hairs short); lateral veins raised above **10. *K. malayana***
Fruit glabrous (early glabrescent); lateral veins more or less flat above **12. *K. sumatrana***

1. *Knema communis* J.Sinclair

(Latin, *communis* = common)

Gard. Bull. Singapore 16 (1958) 297, fig. 10, pl. 9: B; Sinclair, Gard. Bull. Singapore 18(3) (1961) 193, p.p.; de Wilde, Blumea 25 (1979) 461; Turner, Gard. Bull. Singapore 45 (1993) 147; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 72; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 359; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; de Wilde, Fl. Males., ser. 1, 14 (2000) 250; Chong et al., Checkl. Vasc. Pl. Singapore (2009) 52, 153, 216; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 51; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 152, 415; Lim et al., Nat. Singapore 9 (2016) 98; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 192; Ho et al., Gard. Bull.

Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 487. **Type:** *Sinclair SFN 40522*, Singapore, Gardens' Jungle [Singapore Botanic Gardens' Rain Forest], January 1955 (holotype SING [SING0046033]; isotypes BKF, BM [BM000950811], E [E00393075], K [K001283814], KEP [KEP146745], L [L0037403], M [M0240326], P [P00710085], SAN, SING [SING0046034, SING0046035]). **Fig. 15.**

Trees 4–20 m tall; boles to 30 cm diam., fluted at base. **Bark** smooth or nearly so, or sparingly flaky. **Twigs** often blackish, (sub)terete, 1.5–2 mm diam., at first with scurfy rusty or greyish hairs c. 0.1 mm long, glabrescent; bark finely striate, sometimes finely cracking, not flaking. **Leaves:** petiole 7–20 mm long, 1–3 mm wide; lamina chartaceous or thinly coriaceous, (oblong-)lanceolate, broadest at the middle, (6–)10–25 × (2–)2.5–5 cm, base cuneate, apex acute-acuminate, upper surface (greenish) brown above, not drying with a blackish metallic lustre, lower surface grey-glaucous, with persistent dense rusty to greyish hairs 0.1–0.2 mm long, or late glabrescent, with distinct hair scars; dots absent; midrib raised above; lateral veins 15–22 pairs, slightly raised above, intercostal venation very fine, areoles c. 0.5 mm diam. or less. **Inflorescences** sessile; short shoot slender, simple or 2- to 3-branched, to 10 mm long; male inflorescences 3–10-flowered, female inflorescences 1–3-flowered; flowers with persistent rusty hairs c. 0.1 mm long, perianth 3-lobed, pink or reddish inside. **Male flowers:** pedicel 2–5 mm long; bracteole caducous, at the middle or somewhat above; bud globose, 2.5–3 mm diam., cleft to over 3/4, lobes 0.5–1 mm thick; staminal disc flat, circular, c. 1.5 mm diam., whitish, anthers 7–9, just stalked, almost horizontal, c. 0.3 mm long, spaced apart, androphore c. 1 mm long, red. **Female flowers:** pedicel c. 3 mm long; bracteole above the middle, more or less caducous; bud obovoid, c. 4 mm long, 3 mm wide, cleft to about 1/2, lobes 0.5–1 mm thick; ovary ovoid, nearly 2 mm long; stigma sessile, 2-lobed and each lobe irregularly serrate or subentire. **Fruit** 1 or 2 per infructescence, ellipsoid to obovoid, 1.5–1.8 cm long, 1–1.3 cm wide, brown scurfy with rusty hairs c. 0.1 mm long; pericarp c. 1 mm thick; fruit stalk 5–10(–15) mm long. **Seeds** ellipsoid, testa brown; aril white, ripening bright red.

Distribution. Peninsular Malaysia. In Singapore, known from Chan Chu Kang (*Ridley 1833*, SING [SING0018918]), Nee Soon (*Sinclair SFN 40368*, 19 Sep 1954, SING [SING0018901]; *Ng et al. SING2013-212*, 17 Sep 2013, SING [SING0203056]), MacRitchie (*Leong et al. MR2014-001*, 20 May 2014, SING [SING0205862]) and Bukit Timah (*Lua SING2014-321*, 20 Jun 2014, SING [SING0212426]).

Ecology. Primary lowland forest, in low undulating country, on ridge tops and hillsides, to 300 m, sometimes in secondary forest.

Conservation assessment. Globally, Vulnerable (VU A1c) (IUCN Red List, 2026). In Singapore, assessed as Vulnerable (VU/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 487).

Notes. The closely related species *Knema communis*, *K. malayana*, *K. glaucescens* (not in Singapore) and *K. patentinervia* (not in Singapore) are difficult to distinguish on sterile material and one has to rely on the indumentum of the lower surface of the lamina, a character which may be arbitrary. The names *Knema glaucescens* and *K. patentinervia* are both recorded for Singapore but based on material now identified as *K. sumatrana*. The taxonomic status of

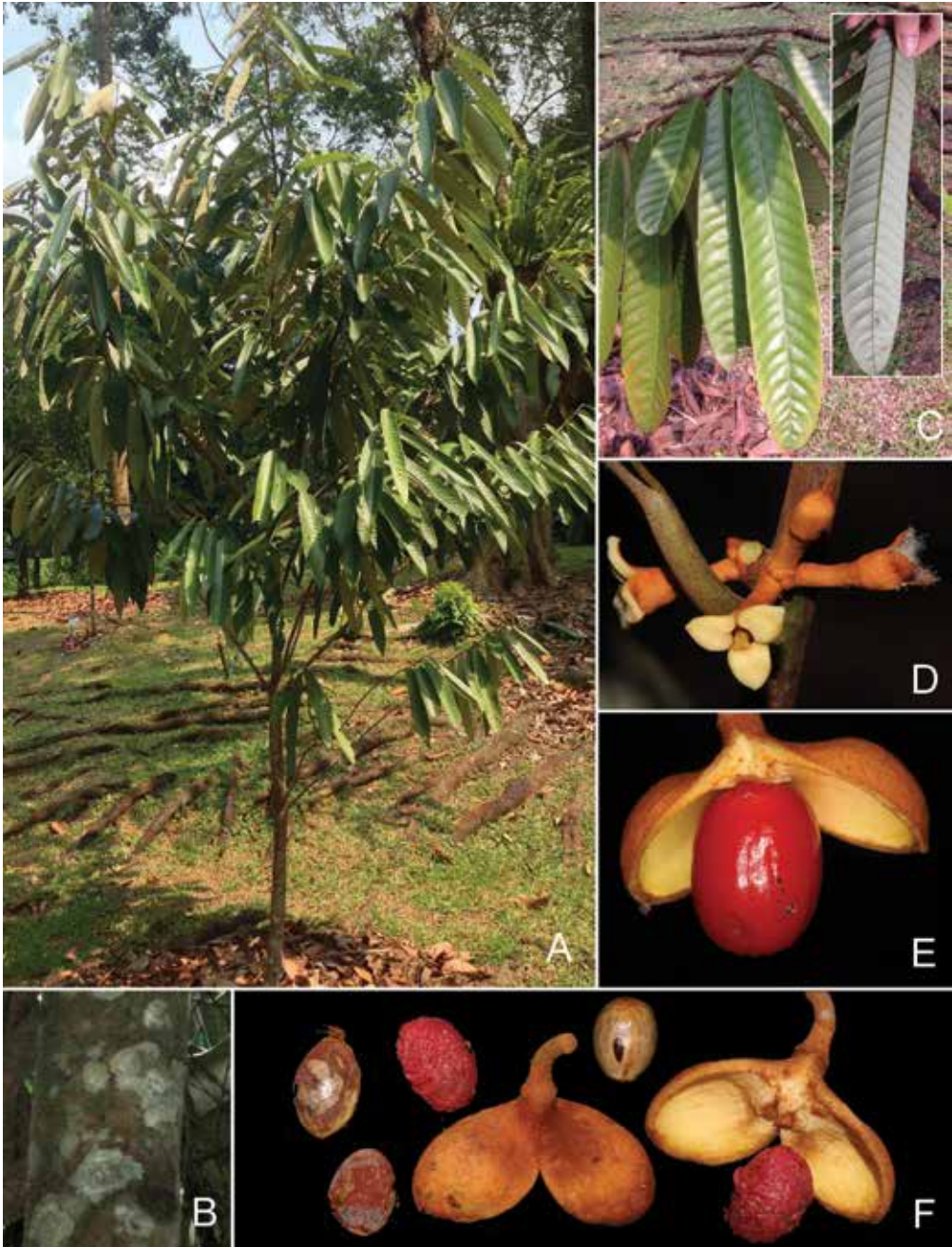


Figure 15. *Knema communis* J.Sinclair. **A.** Habit. **B.** Trunk. **C.** Leaves. **D.** Female flowers. **E.** Fresh fruit. **F.** Fallen fruit. (A–F from Singapore, A & C, Singapore Botanic Gardens; B & D–F, Chestnut. Photos: A & C, W.F. Ang; B & D–F, X.Y. Ng).

Knema communis as distinct from the similar *K. glaucescens* (the older name), however, is as yet unclear. *Knema glaucescens* may differ from *K. communis* in male pedicel longer (6–11 mm long) and perianth creamy or yellow within (pink or red in *K. communis*).

2. *Knema conferta* (King) Warb.

(Latin, *confertus* = pressed together, crowded, densely;
referring to the densely crowded male flowers)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 578, t. 24; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 243; Ridley, Fl. Malay Penins. 3 (1924) 70; Burkill, Dict. Econ. Prod. Malay Penins. 2 (1935) 1282; Sinclair, Gard. Bull. Singapore 16 (1958) 286, fig. 6; Sinclair, Gard. Bull. Singapore 18(3) (1961) 194; Whitmore, Tree Fl. Malaya 1 (1972) 335; Keng, Gard. Bull. Singapore 27 (1974) 76; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78; de Wilde, Blumea 25 (1979) 472; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 147; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 72; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 360; Kochummen, Tree Fl. Pasoh Forest (1997) 341; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 406; de Wilde, Fl. Males., ser. 1, 14 (2000) 251; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 52, 153, 216; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 51; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 152, 415; Lim et al., Nat. Singapore 9 (2016) 101; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 193; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 487. **Basionym:** *Myristica conferta* King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 285, 315, pl. 150; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129. **Type:** *Collector unknown* 442, Singapore, Bukit Mandai, 1889 (lectotype SING [SING0018919], first step designated by Keng, Gard. Bull. Singapore 27 (1974) 76, second step designated here; isolectotype CAL [CAL0000021099]). **Fig. 16.**

Trees 10–25 m tall; boles straight, to 40 cm diam., shallowly fluted, with small buttresses to 30 cm high, sometimes with a few stilt roots. **Bark** rough, scaly, flaking in large pieces. **Twigs** 2–5 mm diam., at first with dense rusty hairs 0.2–1 mm long, glabrescent; bark coarsely striate, not tending to crack or flake. **Leaves:** petiole 5–15 mm long, 1.5–5 mm wide, late glabrescent; lamina chartaceous to coriaceous, oblong to lanceolate, 10–35 × 3–12 cm, base subcordate to cuneate, apex subobtuse or acute-acuminate; upper surface glossy (greenish) brown, with distinct hair scars above or not, lower surface greyish or glaucous, finely papillose, with scattered minute brownish black dots especially on the veinlets, and with persistent indumentum of mixed sessile-stellate and stalked stellate-dendroid hairs of various size, (0.2–)0.3–1 mm long; midrib raised above; lateral veins 12–28 pairs, more or less raised, intercostal venation fine, distinct. **Inflorescences:** peduncle c. 1 mm long; short shoot simple or 2- (or 3-) branched, to 15 mm long; male inflorescences (5–)10–40-flowered, female inflorescences to 10-flowered; flowers with dull rusty hairs (0.1–)0.2–0.3 mm long, perianth 3-lobed, greenish or yellowish inside. **Male flowers:** pedicel 7–15 mm long; bracteole persistent or caducous, about the middle or above; bud subglobose, often more or less triangular, 4–4.5 mm diam., cleft nearly to the base, lobes 1–1.5 mm thick; staminal disc flat to slightly convex, circular or more or less triangular, 2–3 mm diam., anthers (10–)12–17, (just) stalked, horizontal, 0.3–0.7 mm long, spaced, androphore 0.8–1.5 mm long. **Female flowers:** pedicel 5–10 mm long;

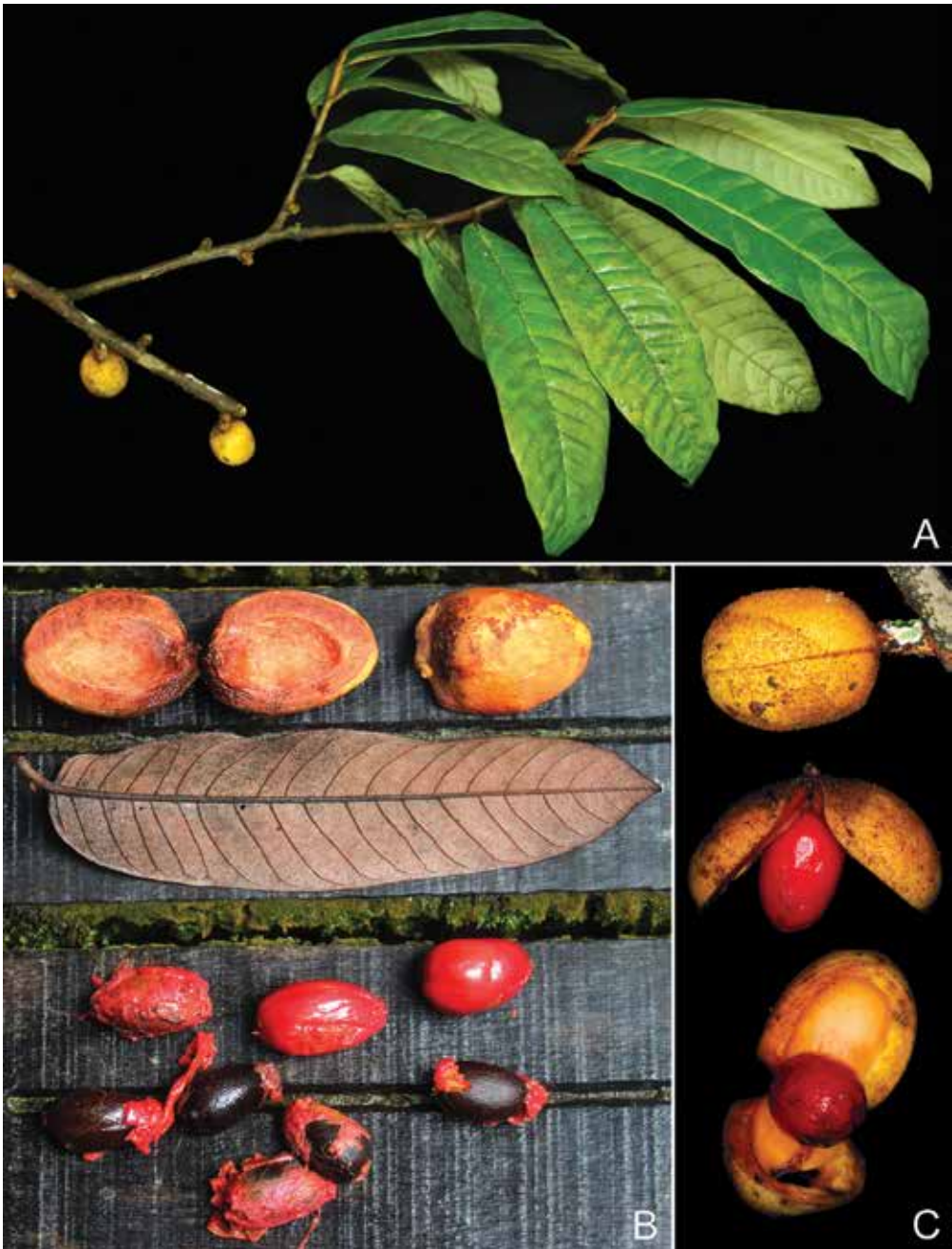


Figure 16. *Knema conferta* (King) Warb. **A.** Leafy branch with young fruit. **B.** Fallen fruit. **C.** Fresh fruit. (A–C from Singapore, MacRitchie. Photos: A & C, W.F. Ang; B, X.Y. Ng).

bracteole about the middle or above; bud obovoid, c. 5 mm long, cleft about 1/2, lobes 1–1.5 mm thick; ovary subglobose to ovoid, 1.5–2 mm diam.; style 0–1 mm long; stigma 3- or 2-lobed and each lobe 2–5-lobulate. **Fruit** 1–5 per infructescence, subglobose, ellipsoid or obovoid, (1.5–)2–4 cm long, (1–)2–3 cm wide, red or brownish tomentose, hairs c. 0.5 mm long, later on largely shed; pericarp 2–5 mm thick; fruit stalk 5–10 mm long. **Seeds** ellipsoid, testa black; aril red.

Distribution. Peninsular Malaysia, Sumatra and Borneo. In Singapore, known from Chan Chu Kang (*Ridley s.n.*, Feb 1894, SING [SING0018931]), Bukit Timah (*Liew SFN 37256*, 19 Feb 1941, SING [SING0018928]) and Nee Soon (*O'Dempsey SING2011-189*, 11 Jan 2011, SING [SING0159976]; *Yeo SING2012-359*, 11 Aug 2012, SING [SING0182398]).

Ecology. Across its range, in lowland primary forest or peat swamp forest on flat or low undulating land, often in inundated, swampy or riparian forest or in coastal forest, sometimes in lower hill forest or in secondary forest; from sea level to 200 m. In peat swamp forest, it develops stilt roots c. 1 m long.

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) 487).

Notes. The earlier but overlooked lectotypification of *Myristica conferta* by Keng (Gard. Bull. Singapore 27 (1974) 76) has priority over the later typification on a different collection by de Wilde (Blumea 25 (1979) 472). However, as Keng did not state a herbarium in his typification, the SING specimen is designated here in a second step.

3. *Knema corticosa* Lour.

(Latin, *cortex* = bark; alluding to the thick bark)

Fl. Cochinch. 2 (1790) 605; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 487. **Synonym:** *Myristica corticosa* (Lour.) Hook.f. & Thomson, Fl. Ind. 1 (1855) 158. **Type:** *de Loureiro s.n.*, Cochinchina [Vietnam] (lectotype BM [BM000950773], designated by Merrill, Trans. Amer. Phil. Soc. 24 (1935) 163). **Fig. 17, 18.**

Myristica globularia Lam., Hist. Acad. Roy. Sci. Mém. Math. Phys. (Paris, 4to) 1788 (1791) 162. **Synonym:** *Knema globularia* (Lam.) Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 601; Sinclair, Gard. Bull. Singapore 16 (1958) 325, fig. 18; Sinclair, Gard. Bull. Singapore 18(3) (1961) 214; Whitmore, Tree Fl. Malaya 1 (1972) 336; Keng, Gard. Bull. Singapore 27 (1974) 76; de Wilde, Blumea 25 (1979) 411; de Wilde, Blumea 32 (1987) 120, fig. 2; Corner, Wayside Trees Malaya, ed. 3, 2 (1988) 564, fig. 171, fig. 173; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 148; Turner, Gard. Bull. Singapore 47 (1997 [‘1995’]) 360; de Wilde, Fl. Males., ser. 1, 14 (2000) 265; de Wilde, Fl. Thailand 7(4) (2002) 757; Lee et al., Gard. Bull. Singapore 55 (2003) 301; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 53, 153, 207; Hung et al., Nat. Singapore 10 (2017) 46; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 202. **Type:** *Sonnerat s.n.*, locality unknown (lectotype P-LA, designated by Sinclair, Gard. Bull. Singapore 16 (1958) 328; isoelectotypes C [C10015454], G n.v.).



Figure 17. *Knema corticosa* Lour. **A.** Male flowering branch. **B.** Male inflorescence. **C.** Male flower bud showing bracteole at apex of pedicel. **D.** Open male flower. **E.** Androecium seen from below. **F.** Female inflorescence. **G.** Female flower bud from outside and opened. **H.** Portion of fruiting twig. **I.** Opened fruit showing seed with aril (A–E from Peninsular Malaysia, *Teo & Pachiappan* KL 3246; F & G from Singapore, Lazarus Island, *Sinclair SFN* 39240; H & I from Peninsular Malaysia, *Whitmore FRI* 3715. Drawn by J. van Os).

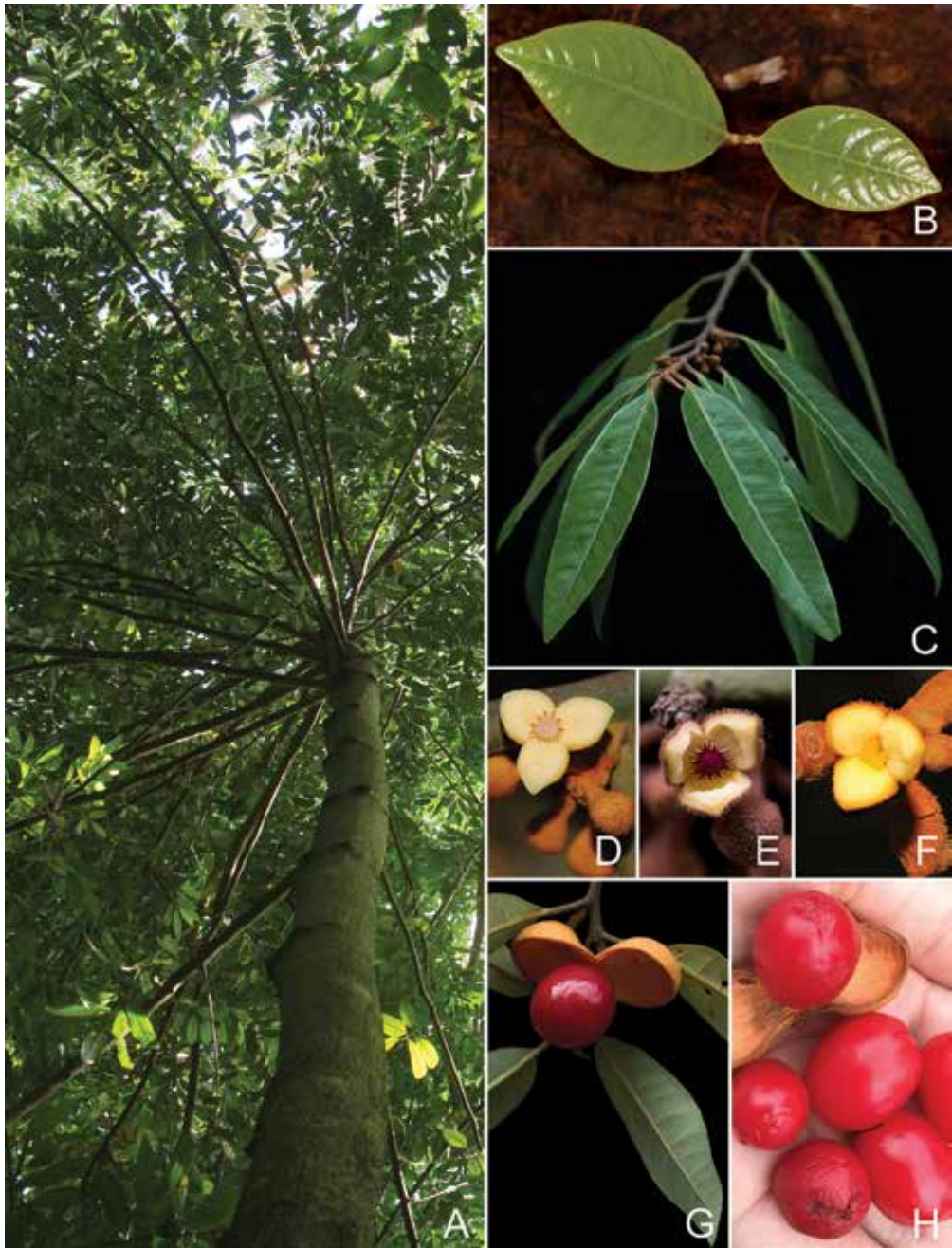


Figure 18. *Knema corticosa* Lour. **A.** Habit. **B.** Sapling. **C.** Leaves. **D.** Male flower. **E.** Male flower (mature). **F.** Female flower. **G.** Fruit on branch. **H.** Fallen fruit (A–H from Singapore, Pulau Ubin. Photos: A, W.F. Ang; B, F & H, X.Y. Ng; C, E & G, Zaki Jamil; D, B.E.E. Duyfjes).

Myristica sphaerula Hook.f., Fl. Brit. India 5, fasc. 16 (1890) 859. **Synonym:** *Knema sphaerula* (Hook.f.) Airy Shaw, Bull. Misc. Inform. Kew 1939(10) (1940) 545. **Type:** *Cantley 131*, [Malaysia], Malacca [Melaka] (holotype K [K000854628]).

Myristica missionis Wall. [Numer. List no. 6788 (1832), nom. nud.] ex King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 285, 321, pl. 158, nom. illeg. superfl. **Synonym:** *Knema missionis* Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 602, t. 25, nom. illeg. superfl.; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 247; Ridley, Fl. Malay Penins. 3 (1924) 71; Burkill, Dict. Econ. Prod. Malay Penins. 2 (1935) 1283. **Type:** *Wallich s.n.* [EIC 6788], [Malaysia], Penang (lectotype K-W [K001124827], first step designated by Sinclair, Gard. Bull. Singapore 16 (1958) 325, second step designated here; isoelectotype K [K000854591]).

Trees 3–20(–25) m tall; boles straight or fluted, to 40(–95) cm diam., also recorded with thick low buttresses. **Bark** fissured, or flaking in small, thin scales. **Twigs** 1–2(–2.5) mm diam., at first with yellowish brown hairs 0.1–0.3 mm long, glabrescent; bark striate, not or only rarely tending to crack, never flaking. **Leaves:** petiole 7–13 mm long, 1–1.5(–3) mm wide; lamina membranous or thinly coriaceous, at first with indumentum mainly of stellate golden brown or grey hairs c. 0.1 mm long, early or late glabrescent, oblong to lanceolate, parallel-sided or broadest at or below the middle, 6–18(–24) × 1.5–4(–7) cm, base cuneate, rarely rounded, apex acute or acuminate; olivaceous to dark brown (on drying), usually with a blackish metallic lustre above, lower surface greyish, at first with hairs c. 0.1 mm long, finely papillose; dots absent; midrib sunken above; lateral veins 10–18(–22) pairs, faint, flat or sunken above; intercostal venation inconspicuous. **Inflorescences** sessile or peduncle 1–5 mm long; short shoot simple or 2-branched, to 10 mm long; male inflorescences 5–20-flowered, female inflorescences 1–10-flowered; flowers greenish yellow with persistent rusty, woolly, hairs (0.1–)0.3(–0.7) mm long, perianth 3-(or 4-)lobed, creamy or reddish(?) inside. **Male flowers:** pedicel 3–5 mm long; bracteole usually apical, caducous or persistent; bud subglobose to broadly obovoid, often triangular in the basal part, 3–5 mm diam., cleft c. 2/3, lobes 0.3–0.6 mm thick; staminal disc circular or angled, flat, 1.5–2.5 mm diam., anthers 8–13(–16), subsessile or very shortly stalked, horizontal, occasionally half erect, 0.3–0.7 mm long, not touching, androphore tapering, 0.5–1 mm long. **Female flowers:** pedicel 1.5–4 mm long; bracteole (nearly) apical; bud ellipsoid or ovoid, 4–5 mm long, 2.5–3.5 mm wide, cleft about 1/2; ovary subglobose or conical, 1.5–2 mm long, style 0.5–1 mm long, stigma flattish, 2-lobed and each lobe (2–)3–7-lobulate; inside without disc at base. **Fruit** 1–5 per infructescence, ellipsoid, subglobose, or sometimes more or less pear-shaped, 1.2–2 cm long, 1–1.5 cm wide, at first pinkish orange with grey-brown to rusty hairs 0.1–0.2 mm long, partly glabrescent, pericarp c. 2 mm thick; fruit stalk 3–10 mm long; perianth not persistent. **Seeds** ellipsoid; aril rose-red, finally red.

Distribution. Northeastern India (doubtful), China (Yunnan), Myanmar, Thailand, Cambodia, Laos, Vietnam, Peninsular Malaysia, Sumatra and Java. In Singapore, known from Pulau Ubin (*Ridley 4817*, 1892, SING [SING0011774]; *Gwee GAT 3*, 28 Jan 2002, SING [SING0038948]), Lazarus Island (*Sinclair SFN 39240*, 14 May 1951, SING [SING0011771]; *Samsuri et al. LZ 14*, 14 May 2003, SING [SING0045141]) and Pulau Pawai (*Lee et al. SING2006-43*, 5 Dec 2006, SING [SING0090242]).

Ecology. Across its range, in lowland primary forest, on low undulating land, swampy ground, hillsides in coastal forest, close to sandy beaches, to 250 m.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026, under *Knema globularia*). In Singapore, assessed as Vulnerable (VU/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 488).

Vernacular names. *Cendarah padi*, *gerahan*, *merbatu kechil*, *penarahan padi*, *small-leaved nutmeg*, 小叶红光树 (NParks' Flora & Fauna Web, 2026).

4. *Knema curtisii* (King) Warb.

(Charles Curtis, 1853–1928, English botanist and first Superintendent of Penang Botanic Gardens)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 567, t. 25; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 240; Ridley, Fl. Malay Penins. 3 (1924) 69; Burkill, Dict. Econ. Prod. Malay Penins. 2 (1935) 1282; Sinclair, Gard. Bull. Singapore 16 (1958) 281, fig. 4; Sinclair, Gard. Bull. Singapore 18(3) (1961) 196, fig. 6, fig. 7, p.p.; Keng, Gard. Bull. Singapore 27 (1974) 76; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 68; de Wilde, Blumea 25 (1979) 416, fig. 9; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Kochummen, Tree Fl. Pasoh Forest (1997) 340; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 406; de Wilde, Fl. Males., ser. 1, 14 (2000) 252; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 152, 415; Lim et al., Nat. Singapore 9 (2016) 104; Hung et al., Nat. Singapore 10 (2017) 46; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 194, fig. 7; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 488. **Basionym:** *Myristica curtisii* King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 285, 326, pl. 167. **Type:** *Scortechini* 292, [Malaysia], Perak, 25 August 1891 (lectotype CAL n.v., designated by de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 407; isolectotypes K [K001283599], L [L0062683, L0062684]).

Distribution. Peninsular Thailand, Peninsular Malaysia, Singapore, Sumatra and Borneo.

Taxonomy. Sinclair (Gard. Bull. Singapore 18(3) (1961) 196–202) recognised five varieties of *Knema curtisii*, including the type variety, of which two are in Peninsular Malaysia but only one of which (*Knema curtisii* var. *paludosa* J.Sinclair) is confirmed for Singapore.

Notes. Several authors have reported *Knema curtisii* var. *curtisii* for Singapore (Lim et al., Nat. Singapore 9 (2016) 104; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 194; Chong et al., Gard. Bull. Singapore 70(Suppl. 1) (2018) 60) but these records are based on a single sterile collection that cannot be verified. It is possible that the variety is in Singapore as it has been collected from neighbouring Johor, but this has not yet been firmly established.

var. *paludosa* J.Sinclair(Latin, *paludosus* = swampy place; referring to the habitat)

Gard. Bull. Singapore 18(3) (1961) 201, fig. 6: A, E; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78; de Wilde, Blumea 25 (1979) 420; Turner, Gard. Bull. Singapore 45 (1993) 147; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 72; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 360; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 408; de Wilde, Fl. Males., ser. 1, 14 (2000) 256, fig. 37: b–d; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 52, 153, 216; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 153, 415; Lim et al., Nat. Singapore 9 (2016) 107; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 196, fig. 7: B–D; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 488. **Type:** *Corner SFN 26155*, Singapore, Jurong, 18 December 1932 (holotype K [K000854608]; isotype SING [SING0046041]). **Fig. 19.**

Trees 10–20 m tall; boles to 45 cm diam., with few stilt-roots. **Twigs** slender, sometimes faintly 2–3-angled, (0.5–)1–2 mm diam., yellow or yellow-brownish, at first with indumentum composed of greyish hairs c. 0.1 mm long or less, early glabrescent; bark finely striate, not cracking nor flaking. **Leaves:** petiole 5–20 mm long, 0.7–1.5 mm wide; lamina membranous or chartaceous, elliptic or (obovate-)oblong, broadest at or above the middle, 3.5–10 cm long, base cuneate or attenuate, apex either subacute or sometimes faintly acuminate with blunt tip, or obtuse or rounded; drying brown above; lower surface greyish, very finely papillose, at first with dense hairs c. 0.1 mm long, early glabrescent; dots absent; midrib raised above, lateral veins 6–16 pairs, veins and intercostal venation faint on both surfaces, intercostal venation (very) fine, distinct above or not. **Inflorescences:** peduncle c. 1 mm long; short shoot simple or branched, to 5 mm long, male inflorescences (2–)5–15-flowered, female inflorescences 1–3(–5)-flowered; flowers with persistent or partially caducous grey-brown or rusty hairs 0.1–0.3 mm long, perianth 3- (or 4-)lobed, cream to pink inside. **Male flowers:** pedicel 5–11 mm long; bracteole subpersistent, at the middle or considerably below or above; bud with mixed sessile-stellate and dendroid hairs 0.1–0.2 mm long, partially tending to become glabrescent, subglobose or broadly obovoid, apex often depressed, circular or obtusely or sharply angled in cross-section, 3–5 mm diam., cleft 2/3 to 4/5, lobes 0.5(–0.8) mm thick; staminal disc flat, slightly concave, or with a small mammilla, subtriangular, 1.7–3 mm diam., anthers 20–30 (i.e. with 40–60 locules), completely sessile, 0.2–0.4 mm long, closely appressed, nearly horizontally under the rim of the triangular staminal disc, androphore slender or broad and tapering, 1–2 mm long. **Female flowers:** pedicel 5–10 mm long; bracteole about the middle; bud ellipsoid to obovoid or subglobose, 4–5 mm long, 2.5–4 mm wide, cleft 1/2 to 2/3, lobes 0.7–1 mm thick; ovary ovoid, 1.5–3 mm long; style c. 0.5 mm long; stigma 8-lobulate. **Fruit** ridged on the line of suture, 4–5 cm long; fruit stalk c. 10 mm long. **Seeds** subglobose; aril red.

Distribution. Peninsular Malaysia, Sumatra (according to Sinclair, Gard. Bull. Singapore 18(3) (1961) 202) and Borneo. In Singapore, known from Mandai (*Goodenough 3376*, 1891, SING [SING0018940]; *Kiah SFN 37123*, 24 Jul 1940, SING [SING0042136]; *Kiah SFN 37148*, 26 Jul 1940, SING [SING0018939]; *Gwee SING2010-227*, 2 Feb 2010, SING [SING0145743]) and Changi (*Ridley 5968*, Feb 1894, SING [SING0058901]).

Ecology. Primary lowland forest to 200 m, usually in swamp forest, and then with stilt-roots.



Figure 19. *Knema curtisii* (King) Warb. var. *paludosa* J.Sinclair. **A.** Habit. **B.** Leaves. **C.** Lower surface of leaves. **D.** Fruiting branch. **E.** Close-up of fruit on twigs. **F.** Fallen fruit. (A–F from Singapore, Singapore Botanic Gardens. Photos: W.F. Ang).

Conservation assessment. Globally, Vulnerable (VU A1c) (IUCN Red List, 2026). In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 488).

Notes. As we have not seen the fruit of this species, the fruit characters in the description are taken from Sinclair (Gard. Bull. Singapore 18(3) (1961) 201).

5. *Knema furfuracea* (Hook.f. & Thomson) Warb.

(Latin, *furfuraceus* = scurfy, covered in bran-like scales or powder;
referring to the hairs on the twigs)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 581, t. 24; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 245; Ridley, Fl. Malay Penins. 3 (1924) 70; Sinclair, Gard. Bull. Singapore 16 (1958) 275, fig. 2, pl. 1: B; Sinclair, Gard. Bull. Singapore 18(3) (1961) 209; Whitmore, Tree Fl. Malaya 1 (1972) 335; Keng, Gard. Bull. Singapore 27 (1974) 76; de Wilde, Blumea 25 (1979) 387; Corner, Wayside Trees Malaya, ed. 3, 2 (1988) 564; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 147; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 72; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 360; Kochummen, Tree Fl. Pasoh Forest (1997) 342; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; de Wilde, Fl. Males., ser. 1, 14 (2000) 258; de Wilde, Fl. Thailand 7(4) (2002) 755; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 52, 153, 207; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 153, 415; Lim et al., Nat. Singapore 9 (2016) 109; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 198; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 488. **Basionym:** *Myristica furfuracea* Hook.f. & Thomson, Fl. Ind. 1 (1855) 159; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 112; King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 318, pl. 155, p.p. **Type:** *Collector unknown s.n.*, [Malaysia], Prince of Wales Island [Penang] (lectotype K [K000854598], designated by Sinclair, Gard. Bull. Singapore 18(3) (1961) 210).

Myristica longifolia auct. non Wall. ex Blume: Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 130.

Trees 8–25 m tall; boles to 25 cm diam., rarely with buttresses. **Bark** smooth with longitudinal flakes, or fissured. **Twigs** sometimes faintly angular, 4–8(–10) mm diam., at first with dense furfuraceous hairs c. 1 mm long, soon rubbed off, glabrescent; bark striate or not, lower down brown to blackish, conspicuously longitudinally cracking and flaking. **Leaves:** petiole 5–25 mm long, 4–8 mm wide, late glabrescent; lamina coriaceous, oblong to (ob)lanceolate, (10–)25–50 × (3–)5–21 cm, base narrowly to broadly cordate, apex acute(-acuminate), sometimes rather blunt; drying (greenish) brown, glossy or dull above, lower surface early glabrescent, finely papillose; dots absent; midrib stout, raised above; lateral veins 20–40(–50) pairs, raised above, intercostal venation raised or sunken above. **Inflorescences** sessile; short shoot simple or coarsely warted or branched, to 15 mm diam.; male inflorescences 3–30-flowered, female inflorescences to 20-flowered; flowers velvety with dense furfuraceous hairs 0.5–1 mm long, subpersistent or glabrescent, perianth 3- or 4-lobed, inside at base without a disc, red inside. **Male flowers:** pedicel 3–15 mm long; bracteole subpersistent or caducous, about the middle, sometimes towards the apex; bud depressed obovoid or depressed globose, somewhat triangular, 4–5 mm long, (4–)4.5–5 mm wide, cleft 3/4 to 4/5, lobes 1–1.5 mm thick; staminal disc circular or faintly triangular, flat or slightly concave, 2–2.5 mm diam., anthers 10–14,

just sessile, oblique or nearly horizontal, 0.5–0.7 mm long, not touching, androphore 1–2 mm long, striate. **Female flowers:** pedicel 1.5–2 mm long; bracteole at the middle to apical; bud ellipsoid or obovoid, 6–8 mm long, 5–7 mm wide, cleft c. 2/3, lobes c. 1.5 mm thick; ovary ovoid or subglobose, 2.5–4 mm long, stigma sessile, more or less flat, 2-lobed and each lobe with 5–9 lobes or serrations. **Fruit** 1–4 per infructescence, ovoid, subglobose, or obovoid, 2.5–3.5 cm long, 2–2.8 cm wide, velvety with rusty hairs 1–2 mm long; pericarp 3–5 mm thick; fruit stalk 2–5 mm long. **Seeds:** aril red.

Distribution. Southern Thailand, Peninsular Malaysia and Sumatra. In Singapore, only known with certainty from Singapore Botanic Gardens (*Samsuri SA 1218*, 20 Mar 1976, SING [SING0018945]; *Kiah s.n.*, 6 Jul 1979, SING [SING0018946]) but likely also in Singapore Botanic Gardens’ Rain Forest and Nee Soon (see notes below) and is here considered native.

Ecology. Across its range, in primary lowland or sometimes hill dipterocarp forest, on hillsides and ridges, sometimes near the sea, occasionally in forest on quartzite or in lower montane forest, to 200(–800) m.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 488).

Vernacular names. *Pala hutan*, *penarahan*, *wild nutmeg* (NParks’ Flora & Fauna Web, 2026).

Taxonomy. The present circumscription of *Knema furfuracea* is much narrower than that accepted by Sinclair (Gard. Bull. Singapore 16 (1958) 275) (see de Wilde, Fl. Males., ser. 1, 14 (2000) 258).

Notes. The last fertile collection made of this species in Singapore was in 1979 from a fallen tree in Singapore Botanic Gardens but living trees believed to be this species, which have not yet been collected fertile, are known in the Singapore Botanic Gardens’ Rain Forest (*Ganesan et al. SKG 39*, 26 Dec 2003, SING [SING0050026]) and Nee Soon (*Samsuri et al. NES 70*, 15 Jul 2003, SING [SING0045779]).

6. *Knema hookeriana* (Wall. ex Hook.f. & Thomson) Warb.

(Joseph Dalton Hooker, 1817–1911, English botanist, explorer
and Director of the Royal Botanic Gardens Kew)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 551, t. 24; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 237; Ridley, Fl. Malay Penins. 3 (1924) 67; Sinclair, Gard. Bull. Singapore 16 (1958) 272, fig. 1, pl. 1: A; Sinclair, Gard. Bull. Singapore 18(3) (1961) 226; Whitmore, Tree Fl. Malaya 1 (1972) 336, fig. 7; Keng, Gard. Bull. Singapore 27 (1974) 76; de Wilde, Blumea 25 (1979) 387; Corner, Wayside Trees Malaya, ed. 3, 1 & 2 (1988) 565, pl. 26; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16, fig. 11.3; Turner, Gard. Bull. Singapore 45 (1993) 148; Wong et al., Gard. Bull. Singapore 46(2) (1995 [‘1994’]) 72; Turner, Gard. Bull. Singapore 47 (1997 [‘1995’]) 360; Kochummen, Tree Fl. Pasoh Forest (1997) 342; Turner et al., Gard. Bull. Singapore 48 (1998

['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; de Wilde, Fl. Males., ser. 1, 14 (2000) 270; de Wilde, Fl. Thailand 7(4) (2002) 759; LaFrankie et al., Forest Trees Bukit Timah (2005) 163; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 53, 153, 207; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 51; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 153, 416; Neo et al., Nat. Singapore 7 (2014) 105; Lim et al., Nat. Singapore 9 (2016) 113; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 204; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 488. **Basionym:** *Myristica hookeriana* Wall. [Numer. List no. 6802 (1832), nom. nud.] ex Hook.f. & Thomson, Fl. Ind. 1 (1855) 156; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 109; King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 325, pl. 163; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 130. **Type:** *Wallich s.n.* [EIC 6802A], [Malaysia], Penang (lectotype K [K000854594], first step designated by Sinclair, Gard. Bull. Singapore 18(3) (1961) 226, second step designated here; isolectotypes BM [BM000950787], E [E00393074], GH [GH00039842], K-W [K001124847], M [M0240340, M0240341]). **Fig. 20.**

Trees 3–30 m tall; boles straight, to 30 cm diam., not buttressed; crown conical with large leaves, hanging when immature. **Bark** smooth but scaly due to several layers of thin brittle blackish adherent flakes; twigs, petioles, flowers and fruit densely shaggy with fawn woolly hairs. **Twigs** 5–10 mm diam., hairs (3–)5–8 mm long, late glabrescent, the lanose indumentum shed in compact rags; older bark longitudinally cracking, and flaking. **Leaves:** petiole 10–30 mm long, 8–12 mm wide, late glabrescent, hairs (1–)2–3 mm long; lamina coriaceous, when immature with dense hairs (2–)5–8 mm long, (oblong-)lanceolate, more or less narrowed towards the base, 25–65 × 5–22(–30) cm, base subcuneate, rounded or subcordate, apex subobtusate, acute or acuminate; olivaceous to dark brown above, lower surface glabrescent, greyish, faintly papillose or not; dots absent; midrib raised above; lateral veins 25–33 pairs, more or less raised above, reddish to yellowish brown, intercostal venation distinct. **Inflorescences** sessile; short shoot simple or 2–4-branched, to 20 mm diam., male inflorescences 5–20-flowered, female inflorescences 4–10-flowered; flowers with dense woolly hairs 1–3 mm long, perianth 3- (or 4-)lobed, striate and red inside. **Male flowers:** pedicel 15–20 mm long; bracteole caducous, at or somewhat above the middle; bud depressed globose-obovoid, 7–9 mm long, 8–10 mm wide, cleft c. 2/3, lobes 1–2 mm thick; staminal disc blunt-triangular, more or less concave, 3–4 mm diam., anthers 15–25, just sessile, half-erect or horizontal, 0.6–1 mm long, not touching, androphore more or less tapering, 2(–3) mm long. **Female flowers:** pedicel (5–)10–20 mm long; bracteole about the middle to subapical; bud subglobose, or ovoid, or depressed-obovoid, 8–10 mm long, 8–10 mm wide, cleft about 1/2, lobes 1–2.5 mm thick; ovary subglobose, 2–4 mm diam., hairs c. 2 mm long, style 1.5–2 mm long, stigma 2-lobed and each lobe 3–4-lobulate, each also 2–4-lobulate, hence stigma c. 20-lobulate-serrate. **Fruit** 1–3 per infructescence, ellipsoid, 4.5–7(–8) cm long, 3–4.5 cm wide, with thick, buff woolly hairs 5–13 mm long, not easily rubbed off; pericarp 3–8 mm thick; fruit stalk 5–10(–20?) mm long. **Seeds** ellipsoid; aril fresh colour not seen.

Distribution. Southern Thailand, Peninsular Malaysia and Sumatra. In Singapore, known from Seletar (*Ridley 4803*, 1892, SING [SING0018960]), MacRitchie (*Sinclair 8907*, 14 Feb 1957, SING [SING0018956]), Bukit Timah (*Noor MN 765*, 27 Nov 1969, SING [SING0018949]), Mandai (*Gwee et al. SING2008-503*, 2 Dec 2008, SING [SING0116863]) and Chestnut (*Gwee SING2010-520*, 9 Mar 2010, SING [SING0144631]).



Figure 20. *Knema hookeriana* (Wall. ex Hook.f. & Thomson) Warb. **A.** Habit. **B.** Trunk. **C.** Young leaves. **D.** Leaves. **E.** Fruiting branch **F.** Fallen fruit. (A–F from Singapore, A–E, Pasir Panjang Nursery; F, Singapore Botanic Gardens Rain Forest, *Leong et al. SING2018-690*. Photos: A, C & E, W.F. Ang; B & D, X.Y. Ng; F, P.K.F. Leong).

Ecology. Across its range, in primary lowland dipterocarp forest on low undulating land, on ridges and hillsides, or on river or stream banks, sometimes in coastal forest, to 600 m.

Conservation assessment. Globally, Vulnerable (VU A1c) (IUCN Red List, 2026). In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 489).

Vernacular names. *Acu, daun besar, great woolly nutmeg, mendarah penarahan, mendarah rengas* (NParks' Flora & Fauna Web, 2026).

7. *Knema intermedia* (Blume) Warb.

(Latin, *intermedius* = intermediate; possibly referring to the general morphology in comparison to other species)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 564, t. 25; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 239; Ridley, Fl. Malay Penins. 3 (1924) 68; Burkill, Dict. Econ. Prod. Malay Penins. 2 (1935) 1283; Sinclair, Gard. Bull. Singapore 16 (1958) 315, fig. 15, pl. 2: B; Sinclair, Gard. Bull. Singapore 18(3) (1961) 227; Keng, Gard. Bull. Singapore 27 (1974) 76; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78, 201; de Wilde, Blumea 25 (1979) 427; Corner, Wayside Trees Malaya, ed. 3, 2 (1988) 565, fig. 171; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 148; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 72; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 360; Kochummen, Tree Fl. Pasoh Forest (1997) 341; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 414; de Wilde, Fl. Males., ser. 1, 14 (2000) 271; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 53, 153, 216; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 51; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 153, 416; Lim et al., Nat. Singapore 9 (2016) 116; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 205; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 489. **Basionym:** *Myristica intermedia* Blume, Rumphia 1, fasc. 13–15 (1837) 187; Hooker & Thomson, Fl. Ind. 1 (1855) 158; Miquel, Fl. Ned. Ind. 1(2), fasc. 1 (1858) 70; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 112; King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 317, pl. 154; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129. **Type:** *Blume s.n.*, [Indonesia], [West] Java (lectotype L [L0037437], designated here). **Fig. 21.**

Trees 3–15(–30) m tall; boles to 35 cm diam., without buttresses, occasionally with stilt-roots. **Bark** smooth, scaly or flaky. **Twigs** slender or stout, subterete, more or less angled, or flattened, 1.5–4(–5) mm diam., at first with rusty hairs 0.3–0.5 mm long, glabrescent; bark smooth or finely striate, not tending to crack or flake. **Leaves:** petiole (late) glabrescent, 10–25 mm long, 2–3 mm wide; lamina chartaceous or coriaceous, oblong to lanceolate, 9–35 × 1.5–8(–9.5) cm, base rounded or cuneate, apex acute(–acuminate); greenish brown above, not pitted, lower surface grey-brown, glaucous, at first with dense indumentum, early glabrescent; dots absent; midrib raised above; lateral veins 12–25 pairs, much raised above, intercostal venation distinct. **Inflorescences:** peduncle to 2 mm long; short shoot simple or 2- or 3-branched, to 15 mm long, male inflorescences 5–25-flowered, female inflorescences 1–10-flowered; flowers with woolly or mealy rusty hairs 0.3–0.5 mm long, perianth 3-lobed, creamy or pinkish(?) inside (yellow with red centre). **Male flowers:** pedicel 5–13 mm long; bracteole subpersistent,

middle to apical; bud subglobose, circular to subtriangular in cross-section, (3–)4–5 mm long, (3–)4–5.5 mm wide, cleft (2/3 to) 3/4, lobes 0.3–0.4 mm thick; staminal disc circular to subtriangular, 2–2.5 mm diam., with a conspicuous mammilla 1–1.5 mm long, anthers 11–15, horizontal, 0.3–0.5 mm long, subsessile or shortly stalked, not touching, androphore c. 0.5 mm long. **Female flowers:** pedicel 2–8 mm long; bracteole about the middle; bud obovoid, 5(–6) mm long 3.5–4 mm wide, cleft about 1/2, lobes 0.5–0.7 mm thick; ovary subglobose to ovoid, c. 2.5 mm long, 2.5–3 mm wide, stigma sessile, 2-lobed and each lobe (2–)3–5-lobulate; inside without disc at base. **Fruit** 1–4 per infructescence, ellipsoid, not beaked, 2.5–4 cm long, 1.5–2.3 cm wide, often 1-ridged, velvety red or brown with hairs 0.3–0.5 mm long, easily rubbed off; pericarp 2–3 mm thick; fruit stalk (3–)5–14 mm long; perianth not persistent. **Seeds** ellipsoid-oblong, testa dark brown; aril red.

Distribution. Peninsular Malaysia, Sumatra, Java and Borneo. In Singapore, known from Loyang Changi (*Ridley* 2039, 11 Oct 1890, SING [SING0018965]), Bukit Timah (*Ridley* 2107, 1 Mar 1891, SING [SING0018962]; *Lai LJ* 148, 1997, SING [SING0008160]) and Mandai (*Sinclair* 10620, 5 Jul 1961, SING [SING0018971]; *Gwee et al.* SING2008-489, 2 Dec 2008, SING [SING0116899]).

Ecology. Across its range, in lowland dipterocarp forest near streams or on hillsides or ridges to 1000 m. Also in peat swamp forest and coastal forest. Corner (Gard. Bull. Singapore, Suppl. 1 (1978) 201) noted that some trees had stilt roots to 2.3 m high and abundant loop-roots 60 cm high around the tree, while in other trees in the vicinity they were scarce or absent.

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) 489).

Vernacular name. *Pala paya* (NParks' Flora & Fauna Web, 2026).

Notes. *Knema intermedia* is characterised by the conspicuous long-mammillate staminal disc. Young leaves have been noted to be pale chocolate in colour.

Sinclair (Gard. Bull. Singapore 16 (1958) 318) mentioned that the flower buds, observed on the tree in the Singapore arboretum, remained closed for six weeks before opening, and that they had probably been in the unopened stage for quite a considerable time prior to having been noticed.

8. *Knema latericia* Elmer

(Latin, *latericius* = dark brick red; referring to the inside of the perianth)

Leafl. Philipp. Bot. 5 (1913) 1815; Sinclair, Gard. Bull. Singapore 16 (1958) 278, fig. 3, pl. 2: A; Sinclair, Gard. Bull. Singapore 18(3) (1961) 238, fig. 15: B, F, G, p.p.; Whitmore, Tree Fl. Malaya 1 (1972) 332; Keng, Gard. Bull. Singapore 27 (1974) 76; de Wilde, Blumea 25 (1979) 395; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 24; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 72; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996'])

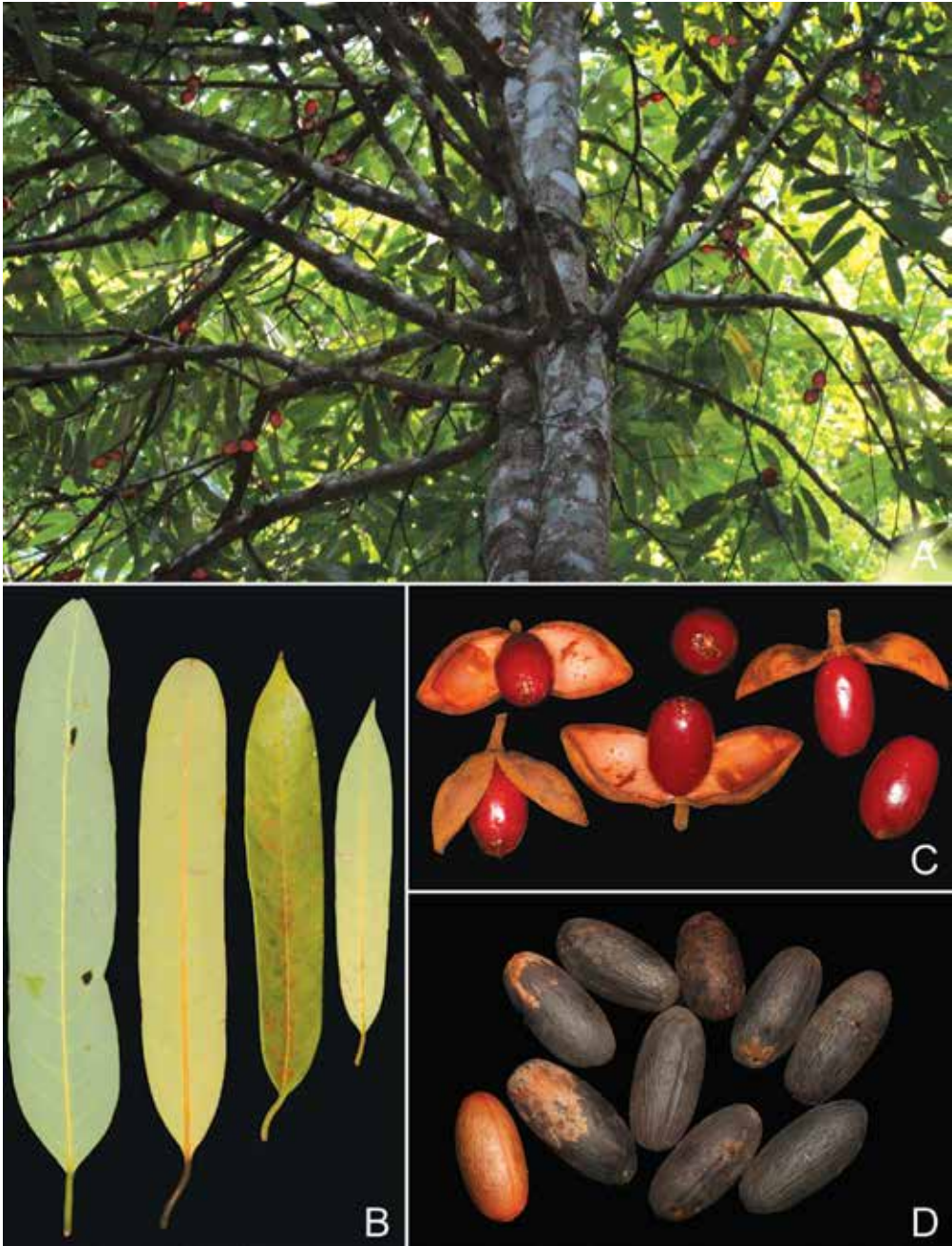


Figure 21. *Knema intermedia* (Blume) Warb. **A.** Habit. **B.** Leaves. **C.** Fruit. **D.** Seeds (corner left, new seed). (A–D from Singapore, MacRitchie. Photos: X.Y. Ng).

150; Chew et al., Gard. Bull. Singapore 49(2) (1999 [‘1997’]) 199; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 419; de Wilde, Fl. Males., ser. 1, 14 (2000) 284; LaFrankie et al., Forest Trees Bukit Timah (2005) 163; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 153, 416; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 209; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 489. **Type:** *Elmer 12757*, Philippines, Palawan, March 1911 (lectotype GH [GH00039815], designated here; isoelectotypes BISH [BISH1003473], BM, E [E00393059], F [F0064663F], K [K000854542], L [L0037465], MO [MO1889426], P [P02026851], U [U0004831], US [US00098957]).

Distribution. Southern Thailand, Peninsular Malaysia, Singapore, Sumatra, Borneo and Palawan.

Taxonomy. De Wilde (Blumea 25 (1979) 395–397) recognised three subspecies, *Knema latericia* subsp. *latericia* in the Philippines (Palawan), *K. latericia* subsp. *albifolia* (J.Sinclair) W.J. de Wilde in Borneo, and *K. latericia* subsp. *ridleyi* (Gand.) W.J.de Wilde from southern Thailand to Borneo. Only *Knema latericia* subsp. *ridleyi* occurs in Singapore.

subsp. **ridleyi** (Gand.) W.J.de Wilde

(Henry Nicholas Ridley, 1855–1956, English botanist
and first Director of Singapore Botanic Gardens)

Blumea 25 (1979) 396; Turner, Gard. Bull. Singapore 45 (1993) 148; Turner, Gard. Bull. Singapore 47 (1997 [‘1995’]) 360; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 420; de Wilde, Fl. Males., ser. 1, 14 (2000) 289; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 53, 153, 216; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 51; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 153, 416; Neo et al., Nat. Singapore 7 (2014) 105; Lim et al., Nat. Singapore 9 (2016) 118; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 209; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 489. **Basionym:** *Myristica ridleyi* Gand., Bull. Soc. Bot. France 66 (1919) 226. **Type:** *Ridley s.n.*, Singapore, 1898 (holotype LY n.v.). **Fig. 22.**

Knema meridionalis J.Sinclair, Gard. Bull. Singapore 13(2) (1951) 297, fig. 1. **Type:** *Sinclair SFN 38561*, Singapore, MacRitchie Reservoir, 14 May 1949 (lectotype SING [SING0044611], designated by Sinclair, Gard. Bull. Singapore 18(3) (1961) 242; isoelectotype K [K000854599]).

Myristica oblongifolia auct. non King: Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129.

Knema oblongifolia auct. non (King) Warb.: Ridley, Fl. Malay Penins. 3 (1924) 71.

Treelets flowering at 2 m to trees to 20 m tall with boles to 30 cm diam. **Bark** black-brown, flaky. **Twigs** 1.5–4(–6) mm diam., not angled, at first with rough rusty or grey- or yellowish brown hairs 0.5–2 mm long, glabrescent; bark striate, with a tendency to flaking longitudinally. **Leaves:** petiole (5–)10–18 mm long, 1.5–3.5 mm wide; lamina membranous or thinly chartaceous, oblong to (ob)lanceolate, 8–30 × (1–)1.5–10 cm, base cuneate to rounded, apex acute(–acuminate), drying green-brown or dark brown with brownish midrib above; lower surface glabrous, grey(–brown), not obviously papillose; dots absent; midrib raised above; lateral veins 9–25(–30) pairs, raised; intercostal venation distinct or not. **Inflorescences** sessile;

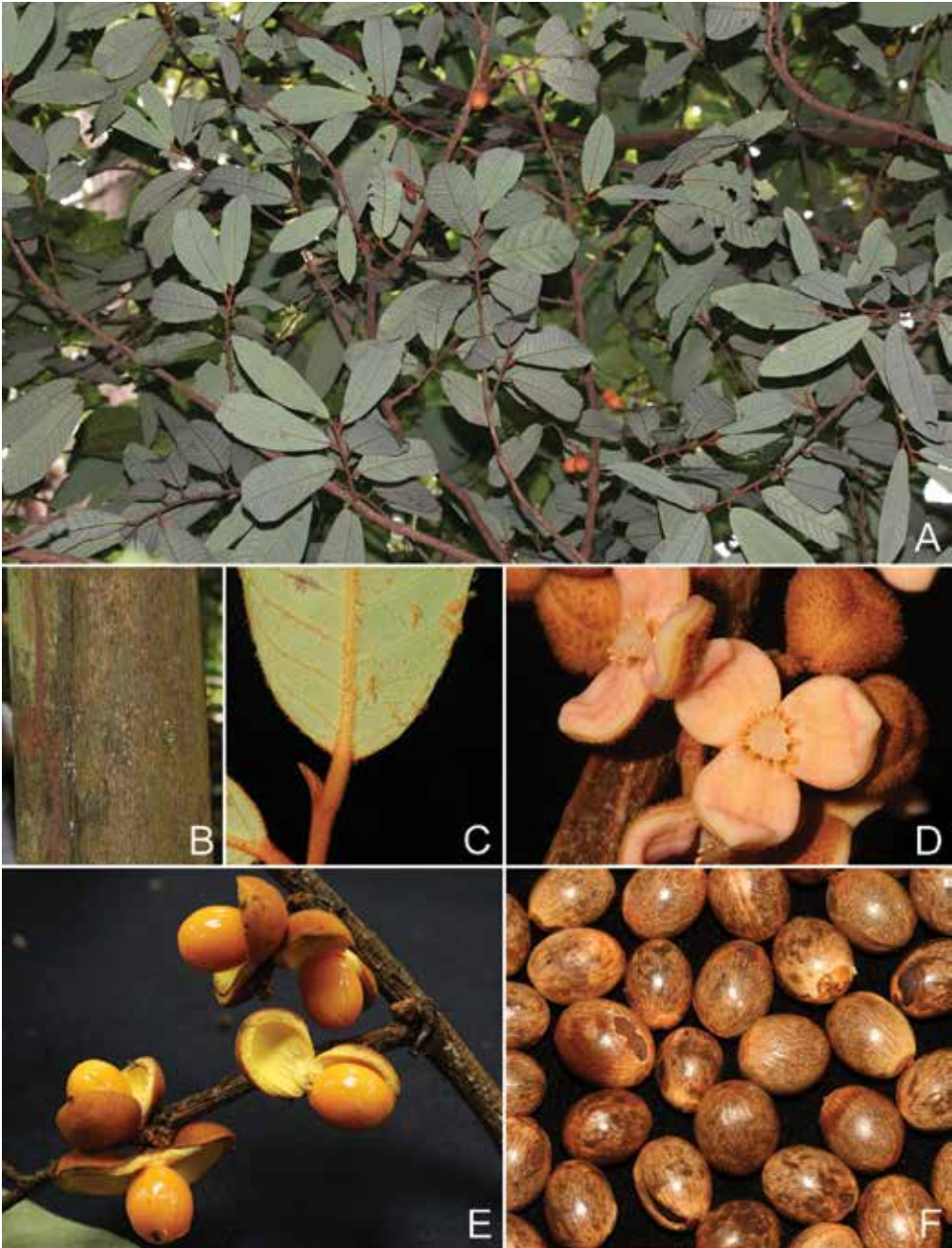


Figure 22. *Knema latericia* Elmer subsp. *ridleyi* (Gand.) W.J.de Wilde. **A.** Habit. **B.** Trunk. **C.** Leaf showing scurf. **D.** Male flowers. **E.** Fruit. **F.** Seeds. (A–F from Singapore, Nee Soon, Ng SING2017-587. Photos: X.Y. Ng).

short shoot simple, warted or branched, to 10 mm long, male inflorescences 3–20-flowered, female inflorescences 2–10-flowered; flowers with pale brown to rusty hairs 0.2–0.7 mm long; perianth 3- (or 4-)lobed, red inside. **Male flowers:** pedicel c. 5 mm long; bracteole caducous, at the middle to subapical; bud obconical or globose, 3–3.5 mm long, (3–)4–4.5 mm wide, cleft 2/3 to 4/5, lobes 0.5(–1) mm thick; staminal disc circular, flat or low-mammillate, c. 2 mm diam., anthers 9–12, shortly stalked, c. 0.5 mm long, horizontal, not touching, androphore c. 1 mm long. **Female flowers:** pedicel to 1.5 mm long; bracteole subapical; bud much larger than in male, obovoid, 5–8 mm long, cleft 1/3 to 2/3, lobes 0.5–1 mm thick; ovary subglobose to ovoid, 2.5–3 mm long, stigma subsessile, more or less 2-lobed and each lobe deeply (3–)4–6-serrate. **Fruit** 1–4 per infructescence, ripening orange or orange brown, broadly ellipsoid to obovoid, sometimes subglobose, (1–)1.5–3 cm long, 1–2.5 cm wide, apex rounded, with rough hairs (0.5–)1–2 mm long; pericarp (1–)2–3 mm thick, fruit stalk 2–5 mm long. **Seeds** subglobose to elliptic, testa pale brown, veined; aril orange to red.

Distribution. Thailand, Peninsular Malaysia, Sumatra and Borneo. In Singapore, known from Kranji (*Ridley 2043*, 1890, SING [SING0018987]), Bukit Timah (*Ngadiman SFN 34957*, 9 Apr 1938, SING [SING0018988]), MacRitchie (*Lee et al. SING2005-185*, 18 May 2005, SING [SING0061589]), Singapore Botanic Gardens' Rain Forest (*Loo SING2007-302*, 18 May 2007, SING [SING0093600]) and Nee Soon (*Ang & Yeo SING2012-065*, 6 Mar 2012, SING [SING0171444]).

Ecology. Across its range, in lowland dipterocarp forest on flat land, river banks and hillsides to 150 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) 490).

Uses. In other parts of Southeast Asia, the wood is reported to be good for building temporary structures.

Taxonomy. The type subspecies occurs in Palawan (Philippines) and is distinct in the non-cracking bark of the twigs. De Wilde (*Blumea* 43 (1998) 241–254) recognised a complex hierarchy of infraspecific taxa within *Knema latericia* that also included recognising the taxon in Singapore as *Knema latericia* forma *ridleyi*. This is the classification followed by Lim et al. (*Nat. Singapore* 9 (2016) 117) but here we include the taxon only at the rank of subspecies.

9. *Knema laurina* (Blume) Warb.

(Latin, *laurinus* = resembling *Laurus* L., Lauraceae; referring to the leaves)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 606, t. 24; Gamble, *J. Asiat. Soc. Bengal*, Pt. 2, *Nat. Hist.* 75(2) (1912) 248; Ridley, *Fl. Malay Penins.* 3 (1924) 72; Burkill, *Dict. Econ. Prod. Malay Penins.* 2 (1935) 1283; Sinclair, *Gard. Bull. Singapore* 16 (1958) 329, fig. 19, p.p.; Sinclair, *Gard. Bull. Singapore* 18(3) (1961) 248, p.p.; Whitmore, *Tree Fl. Malaya* 1 (1972)

338; Keng, Gard. Bull. Singapore 27 (1974) 76; de Wilde, Blumea 25 (1979) 379; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 148; Turner et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 24; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 72; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 360; Kochummen, Tree Fl. Pasoh Forest (1997) 340; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 421; de Wilde, Fl. Males., ser. 1, 14 (2000) 293; de Wilde, Fl. Thailand 7(4) (2002) 761; LaFrankie et al., Forest Trees Bukit Timah (2005) 117, 163; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 53, 153, 216; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 51; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 153, 416; Neo et al., Nat. Singapore 7 (2014) 105; Lim et al., Nat. Singapore 9 (2016) 121; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 210; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 490. **Basionym:** *Myristica laurina* Blume, Rumphia 1, fasc. 10–12 & 13–15 (1837) 189, t. 61; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 112; King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 319, pl. 156; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129. **Type:** *Blume s.n.*, [Indonesia], Java (lectotype L [L0037472], designated by de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 211; isolectotype L [L0037473]). **Fig. 23, 24.**

Myristica cantleyi Hook.f., Fl. Brit. India 5, fasc. 13 (1886) 110; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 130. **Synonym:** *Knema cantleyi* (Hook.f.) Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 554, p.p.; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 238, p.p.; Ridley, Fl. Malay Penins. 3 (1924) 68, p.p. **Type:** *Cantley 195*, Singapore (holotype K [K000854629]).

Distribution. Southern Thailand, Peninsular Malaysia, Singapore, Sumatra, Java and Borneo.

Taxonomy. *Knema laurina* has two varieties (de Wilde, Fl. Males., ser. 1 (2000) 294), *K. laurina* var. *laurina* and *K. laurina* var. *heteropilis* W.J. de Wilde, the latter in Peninsular Malaysia, Sumatra and Java. Only the type variety, *Knema laurina* var. *laurina*, is in Singapore.

var. *laurina*

Treelets or trees 3–20(–30) m tall; boles to 30 cm diam. **Bark** grey or (reddish) brown, essentially smooth but fine scaly or dimpled or slightly cracked, sometimes furrowed. **Twigs** (sub)terete, 2–5 mm diam., at first with dense, rough, rusty hairs 0.5–2 mm long, late glabrescent; bark smooth, not tending to crack or flake. **Leaves:** petiole late glabrescent, 10–20 mm long, 1.5–3.5 mm wide; lamina membranous, obovate-elliptic to oblong-lanceolate, 9–30 × 2.5–10.5 cm, base cuneate, rounded, obtuse or rarely subcordate, apex subobtuse to acute-acuminate; drying greenish to brown above, not pitted, lower surface finely papillose, with persistent more or less equally long-stalked dendroid hairs c. 1 mm long; dots absent; midrib more or less raised above, late glabrescent; lateral veins 12–28 pairs, flat or sunken above, intercostal venation raised, clearly visible above. **Inflorescences** sessile or peduncled to 0.5 mm long; short shoot simple or 2-branched, to 7 mm long, male inflorescences 5–20-flowered, female inflorescences 3–8-flowered; flowers with dense rusty hairs 0.5–1.5(–2) mm long; perianth 3-lobed, pink or red inside. **Male flowers:** pedicel (0.5–)2–5 mm long; bracteole subpersistent or caducous, (nearly) apical; bud longer than broad, obovoid(-oblong), 3–5(–6) mm long, 2–4 mm wide, cleft about 1/2, lobes 0.5–1 mm thick; staminal disc circular, flat or slightly concave, 1–1.5

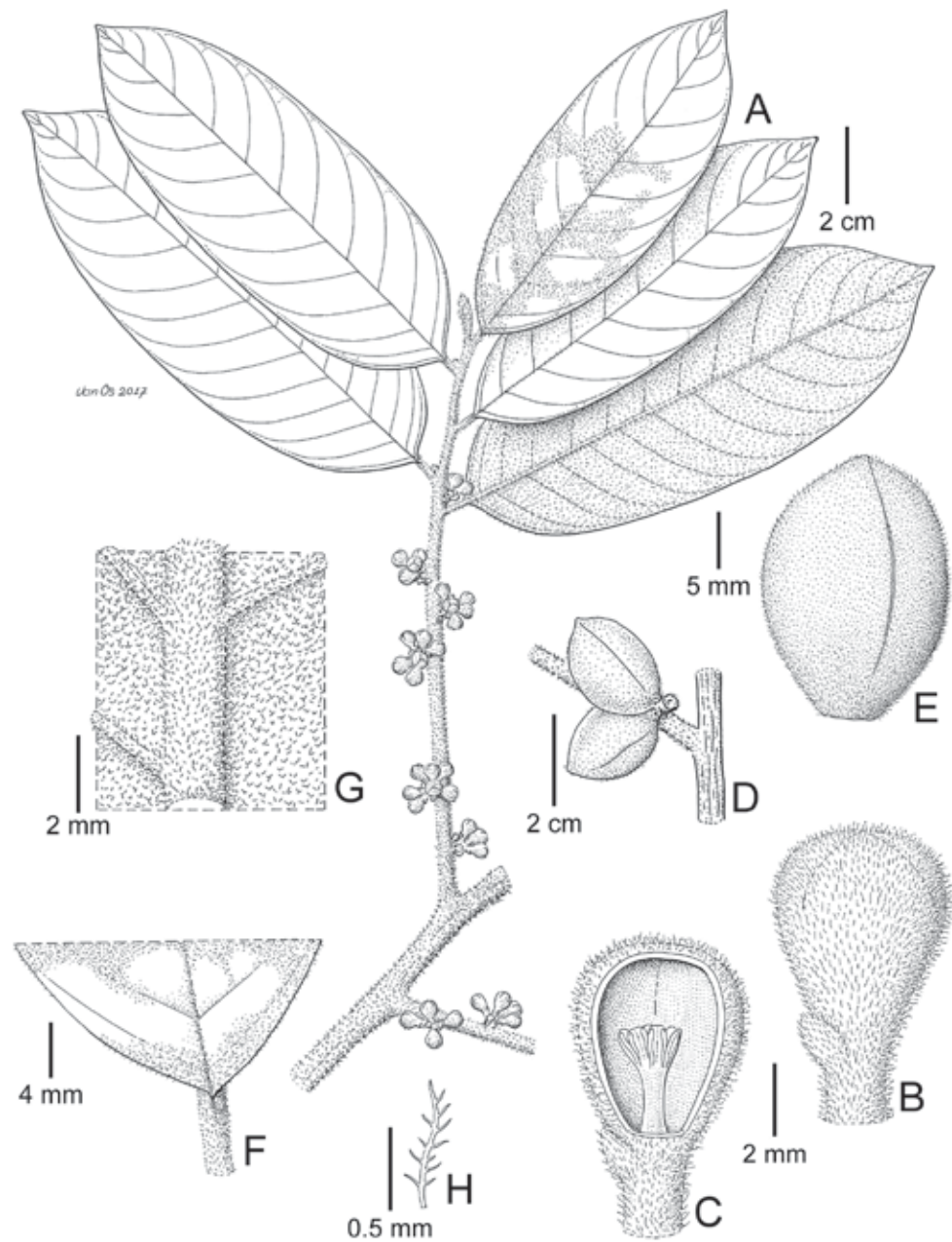


Figure 23. *Knema laurina* (Blume) Warb. **A.** Portion of twig with male inflorescences. **B.** Male flower bud showing bracteole at apex of pedicel. **C.** Male flower bud, opened, showing androphore and synandrium (fused anthers). **D.** Infructescence. **E.** Fruit. **F.** Lamina base, upper surface. **G.** Lamina base, detail of lower surface. **H.** Sample of hair from male bud. (A–C & F–H from Indonesia, Sumatra, *de Wilde & Duyffjes 15521*; D & E from Peninsular Malaysia, *King's Collector*. Drawn by J. van Os).



Figure 24. *Knema laurina* (Blume) Warb. **A.** Habit. **B.** Trunk. **C.** Leaves. **D.** Male flowers. **E.** Fallen fruit. (A–E from Singapore, Chestnut. Photos: X.Y. Ng).

mm diam., anthers 6–9, sessile, (sub)erect, 0.3–1 mm long, not or little touching, androphore somewhat tapering, 1.5–2.5 mm long, rarely minutely pubescent at the base. **Female flowers:** pedicel to 1 mm long; bracteole apical; bud ovoid(-oblong), with hairs 0.5–1(–2) mm long, 4–6 mm long, 2.5–3.5 mm wide, cleft about 1/2, lobes 0.5(–1) mm thick; ovary subglobose, (1.5–)2–2.5 mm diam., style slender, including 2-lobed stigma (1–)1.5–2 mm long, each lobe more or less erect, 4-lobulate; without disc at base. **Fruit** 1–5 per infructescence, reddish brown, ovoid, ellipsoid(-oblong), not beaked, 1.5–2.5 cm long, 1–2 cm wide, apex obtuse to subacute, with rusty hairs 1–3 mm long; pericarp 1.5–2 mm thick; fruit stalk 1(–5) mm long; perianth not persistent. **Seeds** ellipsoid, testa whitish, veined; aril red.

Distribution. Southern Thailand, Peninsular Malaysia, Sumatra, Java and Borneo. In Singapore, known from Bukit Timah (*Ridley*, 1892, SING [SING0019005]; *Sinclair SFN* 39475, 30 Jan 1953, SING [SING0019012]), MacRitchie (*Corner SFN* 36951, 22 Jun 1939, SING [SING0019011]), Mandai (*Gwee et al. SING2009-36*, 6 Jan 2009, SING [SING0116948]) and Pulau Ubin (*Lai & Ali Ibrahim SING2012-317*, 12 Jun 2012, SING [SING0179375]).

Ecology. Across its range, in primary lowland dipterocarp forest on undulating land, sometimes on hillsides or ridges, occasional in swamp forest, from sea level to 1000 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) 490).

10. *Knema malayana* Warb.

(of Malaya)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 570, t. 25; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 242; Ridley, Fl. Malay Penins. 3 (1924) 69; Burkill, Dict. Econ. Prod. Malay Penins. 2 (1935) 1283; Sinclair, Gard. Bull. Singapore 16 (1958) 293, fig. 9; Sinclair, Gard. Bull. Singapore 18(3) (1961) 260; Whitmore, Tree Fl. Malaya 1 (1972) 338; Keng, Gard. Bull. Singapore 27 (1974) 76; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78; de Wilde, Blumea 25 (1979) 456; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 148; Turner et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 24; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 72; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 361; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; de Wilde, Fl. Males., ser. 1, 14 (2000) 302; de Wilde, Fl. Thailand 7(4) (2002) 762; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 53, 153, 216; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 153, 416; Neo et al., Nat. Singapore 7 (2014) 65; Lim et al., Nat. Singapore 9 (2016) 123; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 213; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97, 131; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 490. **Type:** *King's Collector 10594*, [Malaysia], 'Perak' [actually Selangor], Ulu Bubong, July 1886 (lectotype L [L1772730], MEL [MEL611401]). **Fig. 25.**

Myristica glaucescens auct. non (Jack) Hook.f. & Thomson: Hooker, Fl. Brit. India 5, fasc. 13 (1886) 111, p.p.; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129.



Figure 25. *Knema malayana* Warb. **A.** Habit. **B.** Leaves. **C.** Male flowers. **D.** Fruit on branch. **E.** Fallen fruit. (A–E from Singapore, A & C–E, Nee Soon; B, Nee Soon, *Ali Ibrahim et al. SING2017-041*. Photos: A–C & E, W.F. Ang; D, B.E.E. Duyfjes).

Trees 3–20 m tall; boles to 50 cm girth. **Bark** not furrowed, not or only slightly flaky, nearly smooth. **Twigs** (sub)terete, 1–2 mm diam., at first with rusty stellate scale-like hairs 0.1 mm long or less, glabrescent; bark finely striate, not tending to crack or flake. **Leaves:** petiole 7–15 mm long, 1.5–2.5 mm wide; lamina membranous, elliptic to oblong-lanceolate, 7–21 × 2–7 cm, base cuneate to rounded, apex to 2.5 cm acute-acuminate; greenish brown above, not with a blackish metallic lustre, grey-glaucous beneath, at first with sparse, greyish, scale-like hairs c. 0.1 mm long or less, glabrescent; dots absent; midrib raised above; lateral veins 14–20 pairs, raised above, intercostal venation very fine, prominent and distinct above; areoles c. 0.5 mm diam. **Inflorescences** sessile; short shoot simple or 2-branched, to 5 mm long; male inflorescences 3–15-flowered, female inflorescences 1–6-flowered; flowers with persistent grey-rusty hairs 0.1 mm long or less; perianth 3- (or 4-)lobed, cream-coloured inside (always?). **Male flowers:** pedicel 7–15 mm long; bracteole caducous, at the middle or above; bud (depressed) globose, 3–4.5 mm diam., cleft c. 4/5, lobes 0.6–1.2 mm thick; staminal disc flat, circular or subtriangular, 2–2.3 mm diam., anthers 9–13, shortly stalked, horizontal, 0.3–0.5 mm long, spaced, androphore 0.5–1 mm long. **Female flowers:** pedicel 6–10 mm long; bracteole (somewhat above) the middle; bud 4–5 mm long, 2.5–3.5 mm wide, cleft 1/2 to 2/3, lobes 1–1.5 mm thick; ovary ovoid, 1.5–2 mm long, style to 0.5 mm long, stigma erect, irregularly peltate, 5-lobed. **Fruit** 1–3 per infructescence, ellipsoid to obovoid, 1.2–1.6 cm long, 0.8–1 cm wide, base often narrowed, apex subobtusate, rusty pubescent with mealy hairs 0.2–0.4 mm long; pericarp 1–1.5 mm thick; fruit stalk 6–15 mm long. **Seeds** ellipsoid, testa whitish; aril orange to red.

Distribution. Southern Thailand and Peninsular Malaysia. In Singapore, known from Singapore Botanic Gardens' Rain Forest (*Ridley 4136*, Nov 1892, SING [SING0019205]), MacRitchie (*Sinclair SFN 40714*, 19 Aug 1955, SING [SING0019196]; *Leong et al. MR 2014-037*, 1 Jul 2014, SING [SING0205867]) and Nee Soon (*Lai LJ 239*, 1997, SING [SING0008157]); *Lim et al. SING2013-335*, 30 Nov 2013, SING [SING0202328]).

Ecology. Across its range, in primary lowland dipterocarp forest, usually on flat or undulating land, sometimes on hillsides or ridges, by rivers or in swamp forest or secondary forest; from sea level to 650 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).

Vernacular name. *Malayan Knema* (NParks' Flora & Fauna Web, 2026).

11. *Knema rubens* (J.Sinclair) W.J.de Wilde (Latin, *rubens* = reddish; referring to the twigs)

Blumea 25 (1979) 450; Turner, Gard. Bull. Singapore 45 (1993) 148; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 361; de Wilde, Fl. Males., ser. 1, 14 (2000) 337; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 53, 154, 193; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 228; Ho et al.,

Gard. Bull. Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 491. **Basionym:** *Knema glaucescens* Jack f. *rubens* J.Sinclair, Gard. Bull. Singapore 16 (1958) 307, fig. 13: B. **Synonym:** *Knema cinerea* (Poir.) Warb. var. *rubens* (J.Sinclair) J.Sinclair, Gard. Bull. Singapore 18(3) (1961) 185, p.p.; Whitmore, Tree Fl. Malaya 1 (1972) 334. **Type:** *Ridley 4819*, Singapore, Reservoir Woods [MacRitchie], February 1893 (holotype SING [SING0011767]; isotype K [K000854630]).

Trees 5–25 m tall; boles straight, slender, to 15 cm diam. **Bark** smooth or slightly flaky. **Twigs** more or less flattened or blunt-triangular, 1.5–2 mm diam., at first with short farinose yellow-brown, reddish, or pale rusty stellate-dendroid hairs 0.1–0.2 mm long, glabrescent; bark smooth, then striate, not tending to crack or flake. **Leaves:** petiole 6–11 mm long, 1.5–2.5 mm diam., late glabrescent; lamina membranous or thinly coriaceous, elliptic-oblong to lanceolate, (5–)8–25 × 2–5(–8.5) cm, base cuneate, rarely rounded, apex acute-acuminate, drying greenish or brown, not with a blackish metallic lustre, often with a very fine pitted structure above, lower surface greyish, with a reddish tinge, glabrescent except for the basal part of the midrib with farinose stellate scale-like hairs; dots absent; midrib raised above; lateral veins (10–)15–25 pairs, more or less raised above, intercostal venation faint or distinct. **Inflorescences:** peduncle to 1 mm long; short shoot simple or 2- or 3-branched, to 5 mm long; male inflorescences 5–10-flowered, female inflorescences 2–5-flowered, flowers with rusty hairs 0.1–0.2 mm long; perianth 3-lobed, reddish inside. **Male flowers:** pedicel 3.5–4.5 mm long; bracteole subpersistent, about the middle; bud (depressed) globose, 2–3 mm long, 2–4 mm wide, cleft c. 4/5, lobes c. 0.8 mm thick; staminal disc slightly convex or low-mammillate, circular, 2–2.2 mm diam., anthers 10–12, shortly stalked, horizontal, c. 0.4 mm long, spaced, androphore 0.6–1 mm long. **Female flowers:** pedicel 1.5–3 mm long; bracteole subapical; bud ellipsoid to oblong, 3–3.5 mm long, 2–2.5 mm wide, cleft about 1/2, lobes c. 0.5 mm thick; ovary ovoid-globose, c. 1.5 mm diam., stigma subsessile, faintly 2-lobed and each lobe shallowly 1–3-lobulate. **Fruit** 1–4 per infructescence, ellipsoid, 1.7–2.7 cm long, 1.2–2 cm wide, base and apex obtuse or subacute, with mealy yellowish brown or rusty hairs c. 0.2 mm long; pericarp 1.5–2 mm thick; fruit stalk 2–7 mm long. **Seeds** not seen.

Distribution. Peninsular Malaysia and northern Sumatra. In Singapore, known from Bukit Timah (*Ngadiman SFN 35901*, 20 Sep 1938, SING [SING0011765]; *Noor MN 657*, 9 Oct 1969, SING [SING0018979]) and MacRitchie (*Sinclair SFN 40713*, 19 Aug 1955, SING [SING0011766]).

Ecology. Across its range, in primary lowland forest, often along streams, from sea level to 700 m.

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

Notes. *Knema rubens* is characterised by the more or less flattened twig apices. In general appearance it resembles *Knema latericia* subsp. *ridleyi* but that species differs in the flaky or cracking bark of the (subterete) twigs, more pronounced convex staminal disc, and thicker indumentum on twigs and flowers.

12. *Knema sumatrana* (Blume) W.J.de Wilde (of Sumatra)

Blumea 25 (1979) 454; Kochummen, Tree Fl. Pasoh Forest (1997) 341; de Wilde, Fl. Males., ser. 1, 14 (2000) 350, photo 7; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 232; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 491. **Basionym:** *Myristica sumatrana* Blume, Rumphia 1, fasc. 13–15 (1837) 187. **Synonym:** *Knema cinerea* (Poir.) Warb. var. *sumatrana* (Blume) J.Sinclair, Gard. Bull. Singapore 18(3) (1961) 185, p.p.; Whitmore, Tree Fl. Malaya 1 (1972) 334. **Type:** *Korthals s.n.*, [Indonesia], Sumatra, Padang (lectotype L [L0037582], first step designated by de Wilde, Fl. Males., ser. 1, 14 (2000) 350, second step designated here).

Myristica wrayi King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 285, 315, pl. 151; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129. **Synonym:** *Knema wrayi* (King) Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 572, t. 24; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 243; Ridley, Fl. Malay Penins. 3 (1924) 70. **Type:** *King's Collector 10444*, [Malaysia], 'Perak' [actually Selangor], Ulu Bubong, July 1886 (lectotype BM [BM000950807], first step designated by de Wilde, Fl. Males., ser. 1, 14 (2000) 350, second step designated here; isolectotypes K [K001283917], L [L0037577]).

Myristica glauca auct. non Blume: Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129.

Knema glaucescens auct. non Jack: Sinclair, Gard. Bull. Singapore 16 (1958) 302, p.p.; Keng, Gard. Bull. Singapore 27 (1974) 76; De Wilde, Blumea 25 (1979) 411, p.p.; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 147; Turner, Gard. Bull. Singapore 47 (1997 ['1995']) 360, p.p.; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; De Wilde, Fl. Males., ser. 1, 14 (2000) 264, p.p.; De Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 411, p.p.; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 52, 153, 193; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 51; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 153, 415; Lim et al., Nat. Singapore 9 (2016) 111; Chong et al., Gard. Bull. Singapore 70(Suppl. 1) (2018) 54.

Knema patentinervia auct. non (J.Sinclair) W.J.de Wilde: Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; de Wilde, Fl. Males., ser. 1, 14 (2000) 319, p.p.; LaFrankie et al., Forest Trees Bukit Timah (2005) 163; Tan et al. in Davison et al. (ed.), Singapore Red Data Book, ed. 2 (2008) 231; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 53, 153, 207; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 218, p.p.

Knema cinerea auct. non (Poir.) Warb.: LaFrankie et al., Forest Trees Bukit Timah (2005) 116, 163; Tan et al. in Davison et al. (ed.), Singapore Red Data Book, ed. 2 (2008) 230; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 52, 153, 207.

Trees 10–20 m tall; boles c. 20 cm diam. **Bark** fissured. **Twigs** (sub)terete, 2–3 mm diam., at first with minute scale-like hairs c. 0.1 mm long or less, very early glabrescent; bark finely striate, not tending to crack or flake. **Leaves:** petiole 12–16 mm long, 1.5–3 mm wide; lamina membranous or chartaceous, elliptic to oblong-lanceolate, 12–30 × 4.5–12 cm, base rounded, subtruncate, or short-cuneate, apex obtuse to acute-acuminate; drying greenish to brown above, not drying with a blackish metallic lustre, lower surface greyish, at first with inconspicuous scale-like hairs c. 0.1 mm long, early glabrescent, sometimes with minute lanose hairs at lamina edge near the base, soon glabrescent; dots absent; midrib more or less flat to raised above; lateral veins 17–22 pairs, more or less flat above, intercostal venation (areoles c. 1 mm diam.

or more) distinct. **Inflorescences** sessile; short shoot simple or branched, to 8 mm long; male inflorescences 10–20-flowered, female inflorescences 1–5(?)-flowered; flowers with greyish brown hairs less than 0.1 mm long; perianth 3- (or 4-)lobed, red inside. **Male flowers:** pedicel 10–11 mm long; bracteole c. 1 mm long, at or above the middle of the pedicel, persistent or late caducous; bud subglobose, 3–4 mm diam., cleft c. 4/5, lobes 0.5–0.8 mm thick; staminal disc slightly convex, finely papillose, circular, 2–2.5 mm diam., anthers 12–18, distinctly stalked, spaced, horizontal, 0.3–0.4 mm long (connective narrow above, locules opening more or less laterally), androphore 1–1.2 mm long. **Female flowers:** pedicel 2–4 mm long; bracteole in the middle to subapical, subpersistent; bud obovoid-ellipsoid, c. 4 mm long, 2.5 mm wide, cleft slightly over 1/2; ovary ovoid, c. 1.5 mm long, 1 mm wide, stigma sessile, 2-lobed and each lobe 3- or 4-lobulate. **Fruit** 1–3 per infructescence, ovoid-ellipsoid or ellipsoid-oblong, 3–4 cm long, 1.4–2 cm wide, base and apex subacute, at first with minute indumentum, early glabrescent, leaving a finely granulate dark surface; pericarp c. 3 mm thick; fruit stalk 3–6 mm long. **Seeds** not seen.

Distribution. Peninsular Malaysia and Sumatra. In Singapore, known from Sungai Jurong (Ridley 3873, 1892, SING [SING0011768]), Mandai Road (*Corner s.n.*, 24 Jul 1940, SING [SING0011764]), Nee Soon (*Gwee et al. SING2009-115*, 3 Feb 2009, SING [SING0120456]) and Chestnut (*Gwee SING2010-713*, 31 Mar 2010, SING [SING0145720]).

Ecology. Across is range, in primary lowland forest, along rivers or *Saraca* streams, at low elevations.

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

Notes. Characters of diagnostic value for *Knema sumatrana* are the early glabrescent twig apex and lower leaf surface, persistent bracteole, many (12–18) distinctly stalked anthers, somewhat convex, finely papillose staminal disc, narrow connective almost laterally opening locules, and dark-coloured glabrous fruit.

Two sterile collections, *Corner s.n.*, 24 Jul 1940 [SING0011764] and *Corner s.n.*, 7 Aug 1940 [SING0011763], both from Singapore, Mandai Road, that were formerly assigned to *Knema patentinervia* belong to *K. sumatrana*. *Knema patentinervia* is consequently now not known in Singapore.

5. MYRISTICA Gronov.

(Greek, *muron* = a fragrant plant ointment; the nutmeg tree)

Fl. Orient. (1755) 141, nom. cons.; Warburg, Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 374; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 226; Ridley, Fl. Malay Penins. 3 (1924) 62; Sinclair, Gard. Bull. Singapore 16 (1958) 333; Sinclair, Gard. Bull. Singapore 23 (1968) 1; Whitmore, Tree Fl. Malaya 1 (1972) 340; Corner, Wayside Trees Malaya, ed. 3, 2 (1988) 570; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 15; de Wilde, Blumea 35(1)

(1990) 233; de Wilde, Beitr. Biol. Pflanzen 66(1) (1992 [‘1991’]) 113; Kühn & Kubitzki in Kubitzki et al. (ed.), Fam. Gen. Vasc. Pl. 2 (1993) 466; de Wilde, Blumea 38(2) (1994) 349; de Wilde, Blumea 40 (1995) 237; de Wilde, Blumea 42 (1997) 111; Kochummen, Tree Fl. Pasoh Forest (1997) 342; de Wilde, Fl. Males., ser. 1, 14 (2000) 359; de Wilde, Fl. Thailand 7(4) (2002) 767; Lim et al., Nat. Singapore 9 (2016) 125; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 233. **Type:** *Myristica fragrans* Houtt.

Trees, dioecious (*Myristica fragrans* occasionally monoecious). **Stilt-roots** sometimes present. **Bark** sometimes coal-black. **Twigs** sometimes flaky (in some New Guinea species with ridges and in places swollen, hollow, inhabited by ants), lenticels present or absent. **Leaves** brittle when dry, lower surface often pale, papillose or not, dots present or absent; intercostal venation scalariform or a lax network (never as dense as in *Knema*, more abundant than in *Horsfieldia*). **Inflorescences** sometimes supra-axillary, either a branched panicle with the flowers in subumbels, or a (sub)sessile woody simple or 2–4-armed wart-like or worm-like densely scar-covered short-shoot producing flowers at the apex (as in *Knema*), or less often a combination of the two types when the basal part is smooth and bears 1–3 sparsely or densely scarred short-shoots at its extremity; basal cataphylls absent; bracts caducous. **Flowers** pedicellate; bracteole mostly persistent, often apical and embracing the perianth. **Male flowers:** perianth urceolate or tubular, leathery or fleshy, inside glabrous, creamy; bud various, cleft to various depths, lobes 3 (also 2 or 4), reflexed at anthesis; androecium an elongated stalked column with 8–30 completely fused linear anthers, androphore cylindrical, glabrous or pubescent, synandrium elongate, the apex often a sterile protuberance, rarely shallowly hollowed (not in Singapore). **Female flowers** larger and more swollen than the male; ovary glabrous or hairy; style absent, stigma minutely 2-lobed. **Infructescences** sessile or stalked. **Fruit** globose to oblong, or pyriform, 2.5–9 cm long (as small as 1 cm outside Singapore), glabrous, tomentose or woolly; pericarp mostly thick, fleshy but firm. **Seeds** not variegated; endosperm ruminate with fixed oil and starch; cotyledons connate at the base and edges, divaricate; aril red (or orange or yellow when immature), lacinate (nearly) to the base.

Distribution. A genus of about 175 species from South India and continental Southeast Asia (rare) through Malesia to northeastern Australia and east to Fiji. In Singapore, 7 native species.

Ecology. All species are confined to primary and disturbed lowland forests (or lower montane rain forests elsewhere). Outside of Singapore, many have restricted distributions and are confined to a restricted elevational range, and sometimes to soils derived from specific bedrock, e.g., limestone or ultramafic soils.

Taxonomy. The species now in *Myristica* are those formerly included in *Myristica* sect. *Myristica* (or as sect. *Eumyristica*) when the genus had a much wider circumscription in works such as those by Blume (Rumphia 1, fasc. 13–15 (1837) 180) and Hooker & Thomson (Fl. Ind. 1 (1855) 162).

Sinclair (Gard. Bull. Singapore 23 (1968) 54) distinguished two sections: *Myristica* sect. *Myristica* with more or less panicle-like branched inflorescences, and smooth, non-scar covered (often more or less flattened) common peduncle, generally lasting but one flowering season, and *Myristica* sect. *Fatua* J.Sinclair, with (sub)sessile, simple or branched scar-covered, wart-like or worm-like inflorescences (as in the genus *Knema*), lasting several flowering seasons. As discussed by de Wilde (Beitr. Biol. Pflanzen 66(1) (1992 [‘1991’]) 113;

Blumea 38(2) (1994) 349), the shape and architecture of the inflorescences are useful in keys, but a (monophyletic) division of the genus into two sections is unwarranted, there being many intermediate forms of inflorescence. In the present treatment the sections are not recognised.

Notes. The nutmeg, *Myristica fragrans* Hoult., was introduced from the Moluccas but is only known in cultivation in Singapore. *Myristica guatteriiifolia* A.DC. is also only known in cultivation in Singapore.

The basis for the previously assumed presence of the species *Myristica gigantea* in Singapore is a sterile collection of a sapling (*Sinclair 10664*, SING [SING0019184]) at the time named *M. iners* but later redetermined as *M. gigantea*. This identification has been questioned again and the conclusion reached that *Myristica gigantea* is not in Singapore. The specimen may be *Myristica iners*, in which case *Myristica gigantea* is a misapplication for this species, but as the specimen cannot be firmly identified, *Myristica gigantea* is placed in the Excluded taxa section.

Key to *Myristica* species

1. Inflorescence a densely scar-covered wart-like short-shoot; peduncle absent or to 6 mm long **2. M. crassa**
 Inflorescence not a densely scar-covered wart-like short-shoot; pedunculate, branched ...
 2
2. Leaf bud with short hairs 0.1–0.5 mm long or less 3
 Leaf bud with hairs 0.5 mm long or more 6
3. Twigs (4–)5–8 mm diameter; leaf lamina 16–40 cm long **7. M. maxima**
 Twigs 1.5–4 mm diameter; leaf lamina 7–22 cm long 4
4. Leaves with minute dense tomentum beneath **1. M. cinnamomea**
 Leaves glabrous or with sparse hairs beneath 5
5. Twigs and leaves drying yellowish; male flower bud angled; fruit drying blackish
 **3. M. elliptica**
 Twigs drying brown, leaves drying (green-)brown; male flower bud not angled; fruit
 drying brown **4. M. iners**
6. Twigs 3–6 mm diameter; leaves coriaceous; fruit (5–)6–7 cm long, hairs shaggy,
 conspicuous, persistent, 1–2 mm long; male buds 4–4.5(–5) mm long **5. M. lowiana**
 Twigs (2–)2.5–4 mm diameter; leaves chartaceous or thinly coriaceous; fruit (4.5–)7–9
 cm long, glabrescent, hairs rust-coloured, mealy, c. 0.5 mm long; male buds 6–7 mm long
 **6. M. maingayi**

1. *Myristica cinnamomea* King

(Latin, *cinnamomeus* = light brown, the colour of cinnamon;
referring to the indumentum on the lower leaf surface)

Ann. Roy. Bot. Gard. Calcutta 3 (1891) 282, 292, pl. 116, as '*cinnamomea*' in the text; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 128; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 232; Ridley, Fl. Malay Penins. 3 (1924) 65; Burkill, Dict. Econ. Prod. Malay Penins. 2 (1935) 1523; Sinclair, Gard. Bull. Singapore 16 (1958) 358, fig. 28, pl. 7: A; Sinclair, Gard. Bull. Singapore 23 (1968) 210; Whitmore, Tree Fl. Malaya 1 (1972) 342; Keng, Gard. Bull. Singapore 27 (1974) 77; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78; Corner, Wayside Trees Malaya, ed. 3, 2 (1988) 565; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 148; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 74; Kochummen, Tree Fl. Pasoh Forest (1997) 343; de Wilde, Blumea 42 (1997) 156; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 456; de Wilde, Fl. Males., ser. 1, 14 (2000) 431; de Wilde, Fl. Thailand 7(4) (2002) 769, pl. 27: 3; LaFrankie et al., Forest Trees Bukit Timah (2005) 164; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 62, 154, 209; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 51; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 185, 416; Lim et al., Nat. Singapore 9 (2016) 125; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 236; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 491. **Type:** *King's Collector 7474*, [Malaysia], Perak, April 1885 (lectotype CAL n.v., designated by de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 456; isolectotypes BM [BM000950836, BM000950837], K [K000880065], L [L0037601], P [P01955458], US [US00169875]). **Fig. 26.**

Trees (7–)10–30 m tall, trunks at base often with low buttresses, or with a few small stilt-roots. **Bark** blackish brown (chocolate, dark grey), brittle, with fine close vertical fissures, sometimes also with fine horizontal cracks, sometimes thinly flaking with appressed flakes. **Twigs** 1.5–2.5(–4) mm diam., glabrescent, hairs c. 0.1 mm long; older twigs dark grey-brown to blackish, coarsely striate, not or only rarely flaking; lenticels absent. **Leaves:** petiole 12–22 mm long, 1.5–3 mm wide; lamina chartaceous or thinly coriaceous, elliptic-oblong to oblong-lanceolate, (8–)10–22 × 2–8 cm, base broadly acute or attenuate, apex acute(-acuminate); upper surface olivaceous, more or less glossy, lower surface grey- or silvery-brown, sometimes late glabrescent, hairs dense, inconspicuous, c. 0.1 mm long, and with scattered brown hairs c. 0.2 mm long; not obviously papillose; dots absent; midrib flat above or somewhat raised, in a groove, lateral veins 10–17 per side, at 45–60 to the midrib, more or less sunken, indistinct above, interarching veins and intercostal venation indistinct; leaf bud 10–15 mm long, 2–3 mm wide, hairs c. 0.1 mm long. **Inflorescences** among the leaves, pedunculate, with mealy hairs 0.1–0.2 mm long; bracts ovate, 2–3 mm long, caducous; male inflorescences 1–2.5 cm long, peduncle 5–15 mm long; lateral branches to 5 mm long, central branch to 10 mm long or absent (or reduced to one flower), with subumbels of 5–8(–10) flowers, buds of various sizes; female inflorescence a pedunculate wart (rarely more or less branched) to 3 mm long, with 2–4-flowered subumbels; flowers with hairs 0.1(–0.3) mm long. **Male flowers:** pedicel 3–6 mm long; bracteole 1(–2) mm long, (sub)apical, (late) caducous; bud ellipsoid-oblong, angular in the upper part, cylindrical or more or less contracted in the middle, 5–7 mm long, 2–3 mm wide, cleft 1/3 to 1/2, lobes 2–3 mm long, 0.5(–1) mm thick, more or less curved outwards, bright red inside; androecium 3.5–4.5 mm long, androphore 1.5–2(–2.5) mm long, (0.6–)0.8–1 mm wide, with pale hairs 0.1 mm long or less; synandrium ellipsoid-oblong, 1.8–2 mm long, 0.6–0.8 mm wide, locules 12–16, sterile apex blunt, 0.2–0.3 mm, minutely pubescent. **Female**

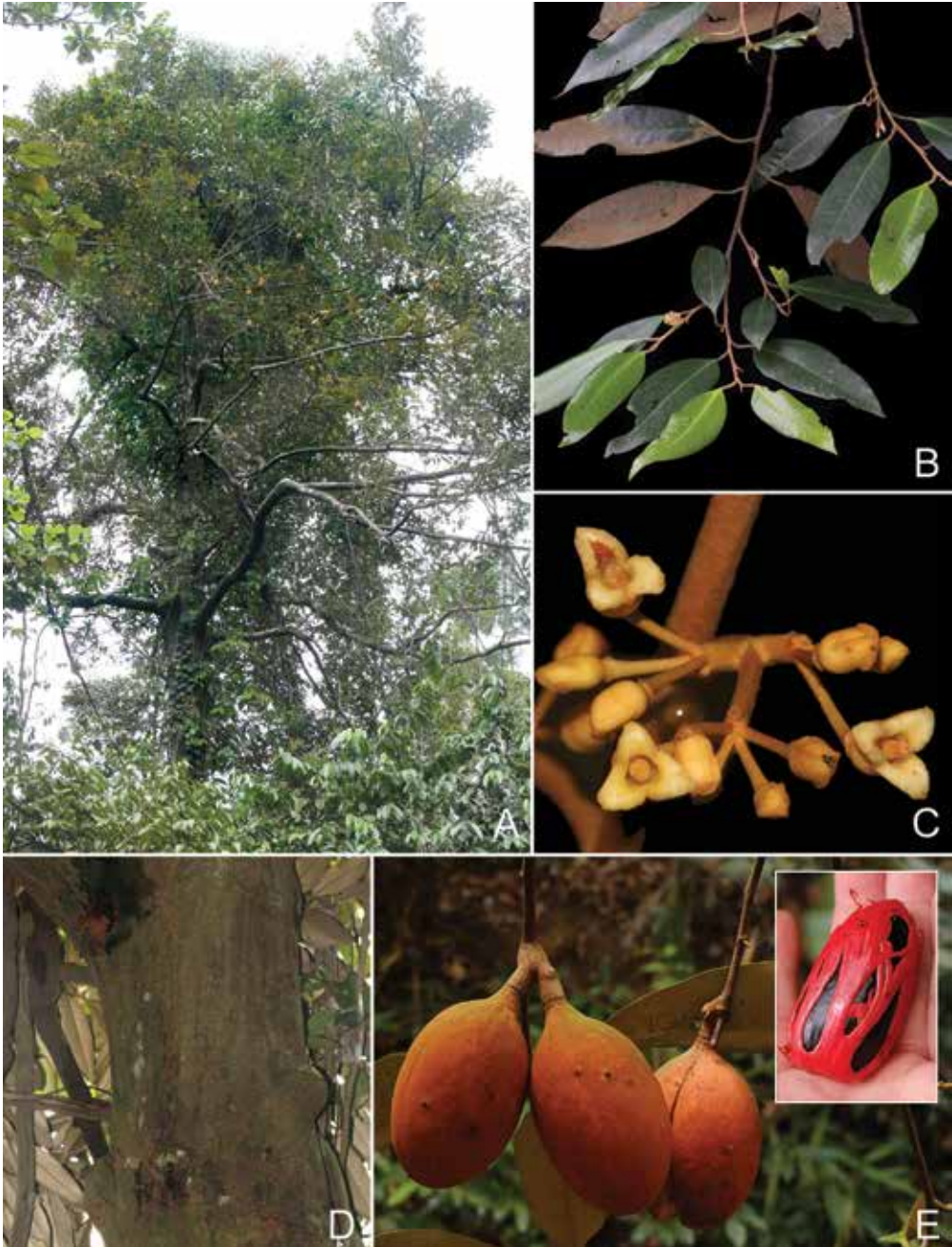


Figure 26. *Myristica cinnamomea* King. **A.** Habit. **B.** Leaves. **C.** Male flowers. **D.** Trunk. **E.** Fruit. Inset: Seed enclosed in lacinate aril. (A–E including inset from Singapore, A, Nee Soon; B–D, MacRitchie, *Lim et al. SING2018-414*; E & E inset Bukit Timah, *Lim et al. SING2018-451*. Photos: A, W.F. Ang; B, Zaki Jamil; C & D, X.Y. Ng; E & E inset, P.K.F. Leong).

flowers: pedicel 2.5–4 mm long; bud ovoid-ellipsoid, angled at apex, 5–6 mm long, 2.5–3 mm wide, cleft 1/3 to 1/2; ovary ovoid-conical, c. 2.5 mm long, 1.5–2 mm wide, with dense hairs 0.1 mm long or less. **Infructescence** 0.5–2 cm long. **Fruit** solitary or 2 (or 3), broadly ellipsoid or oblong, or somewhat pear-shaped, orange, 5–9 cm long, 2.5–5 cm wide, base rounded or subattenuate, hairs dense, mealy, rusty brown, 0.1(–0.2) mm long; pericarp (5–)8–15 mm thick; fruit stalk rather stout, to 10 mm long. **Seeds** ellipsoid, 3.5–5.5 cm long; aril orange or white, finally red.

Distribution. Southern Thailand, Peninsular Malaysia, Sumatra, Borneo and possibly the Philippines. In Singapore, known from Changi (*Ridley* 3377, 17 Dec 1891, SING [SING0019016]), Nee Soon (*Sinclair SFN* 40374, 25 Sep 1954, SING [SING0019017]), Bukit Timah (*Noor MN* 1682, 19 Mar 1973, SING [SING0019021]; *Maxwell* 82-288, 11 Nov 1982, SING [SING0019014]) and MacRitchie (*Lai et al. SING*2017-047, 18 Feb 2017, SING [SING0231960]).

Ecology. Across its range, in primary lowland to upper hill dipterocarp forest, also in swamp forest, from sea level to 900 m. The tepals have been recorded as red inside.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 492).

Vernacular names. *Mayong pahomh, mendarah, pala bukit, pala semang, pendarah* (NParks' Flora & Fauna Web, 2026).

2. *Myristica crassa* King

(Latin, *crassus* = thick; referring to the thick pericarp)

Ann. Roy. Bot. Gard. Calcutta 3 (1891) 282, 293, pl. 117; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 128; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 234; Ridley, Fl. Malay Penins. 3 (1924) 66; Burkill, Dict. Econ. Prod. Malay Penins. 2 (1935) 1523; Sinclair, Gard. Bull. Singapore 16 (1958) 366, fig. 31, pl. 8: A; Sinclair, Gard. Bull. Singapore 23 (1968) 435; Whitmore, Tree Fl. Malaya 1 (1972) 341; Keng, Gard. Bull. Singapore 27 (1974) 77; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 148; Turner, Gard. Bull. Singapore 47 (1997 [‘1995’]) 362; Chew et al., Gard. Bull. Singapore 49(2) (1999 [‘1997’]) 199; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 458; de Wilde, Fl. Males., ser. 1, 14 (2000) 440, fig. 70; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 62, 154, 209; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 238, fig. 9; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97, 131; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 492. **Type:** *King's Collector* 5065, [Malaysia], Perak, Larut, October 1883 (lectotype CAL n.v., designated by de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 458; isoelectotypes K [K000880061], L [L0037617]).

Myristica suavis King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 282, 295, pl. 121; Warburg, Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 441; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 232; Ridley, Fl. Malay Penins. 3 (1924) 65. **Type:** [Published

illustration] *Myristica suavis* in King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) pl. 121, lectotype designated here.

Trees 10–21 m tall with a few weak stilt-roots. **Bark** grey or brown, slightly and shallowly fissured longitudinally or smooth. **Twigs** 3–7 mm diam., dark brown or blackish, very early glabrescent, indumentum minute; older twigs not flaking; lenticels sometimes present, indistinct. **Leaves:** petiole 20–30 mm long, 2–4 mm wide; lamina chartaceous or thinly coriaceous, elliptic-oblong to oblong-lanceolate, (13–)17–40 × 4.5–13 cm, base rounded to cuneate, margin often somewhat revolute on drying, apex acute-acuminate; upper surface dark olivaceous, lower surface greyish (purplish) brown, glabrous or hairs scattered, scale-like, c. 0.1 mm long or less; papillose; dots absent; midrib flat or slightly raised above, lateral veins 13–18(–22) per side, at 45–80° to the midrib, sunken above, interarching veins and intercostal venation indistinct; leaf bud 8–14 mm long, 3–4 mm wide, hairs appressed, 0.1 mm long or less. **Inflorescences** 1–2 cm long, among the leaves or below, hairs 0.1 mm long or less, sessile or pedunculate to 6 mm, stout, with 1–3 woody, densely scar-covered wart-like short-shoots, rarely with a lateral branch to 5 mm long; male inflorescences with 10–30 flowers, buds of various sizes; bracts 1–1.5 mm long, finely pubescent, late caducous; female inflorescences short, 2–5-flowered; flowers more or less coriaceous, hairs less than 0.1 mm long, sometimes late glabrescent. **Male flowers:** pedicel 5–12(–15) mm long; bracteole (sub) persistent, sometimes more or less lobed at apex, (2–)3–4 mm long; bud ovoid or urceolate-oblong, 4.5–6 mm long, 2.5–5 mm wide, apex narrowly rounded, base broadly rounded to sub-truncate, not or only slightly angled at apex, cleft c. 1/3, lobes c. 0.3 mm thick; androecium slender, 3–3.5 mm long, androphore 0.7–2 mm long, 0.3–0.5 mm wide, minutely pubescent in the lower two thirds or towards the base only, synandrium ellipsoid-oblong c. 2 mm long, 0.5 mm wide, locules 6–10, sterile apex narrow, rather blunt or faintly lobed, c. 0.3 mm long. **Female flowers:** pedicel stout, c. 2 mm long; bracteole caducous; bud ovoid, 4–5 mm long, 3–4 mm wide, cleft c. 1/3, lobes curved outward, ovary 3(–4) mm long, 2–2.5 mm wide, minutely pubescent. **Infructescences** short. **Fruit** 1 or 2, broadly ellipsoid, orange or yellow-brown, 3.5–7 cm long, 3–4.5 cm wide, hairs rusty brown, powdery, 0.1–0.3 mm long (easily rubbed off); pericarp (7–)10 mm thick; fruit stalk stout, 5(–10) mm long. **Seeds** ellipsoid, 3–3.5 cm long; aril yellow.

Distribution. Peninsular Malaysia, Sumatra and Borneo. In Singapore, only known with certainty from MacRitchie (*Sinclair SFN 39490*, 23 Feb 1953, SING [SING0019023]). A sterile collection from Bukit Timah (*Tang & Sidek 1041*, 9 Nov 1995, SING [SING0042155]) has been tentatively identified as this species.

Ecology. Primary lowland forest, on hillsides and ridges to 130 m.

Conservation assessment. Globally, Near Threatened (NT) (IUCN Red List, 2026). In Singapore, assessed as Data Deficient (DD) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 492) as the only relatively recent collection is sterile and so cannot be confidently identified.

Notes. In the protologue of *Myristica suavis*, King noted that the single specimen he had seen to describe this species was a ‘Singapore Botanic Garden Collectors’ specimen from Selandor

on loan from SING. Sinclair (Gard. Bull. Singapore 16 (1958) 368), however, incorrectly wrote ‘Selandor, Cantley (CAL) holotype of *M. suavis*’. The SING specimen has not been traced but is illustrated in the protologue. The illustration is, therefore, designated here as the lectotype.

3. *Myristica elliptica* Wall. ex Hook.f. & Thomson

(Latin, *ellipticus* = elliptic; referring to the shape of the fruit)

Fl. Ind. 1 (1855) 162; Miquel, Fl. Ned. Ind. 1(2), fasc. 1 (1858) 58; King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 295, pl. 113; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 128; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 231; Ridley, Fl. Malay Penins. 3 (1924) 65; Burkill, Dict. Econ. Prod. Malay Penins. 2 (1935) 1534; Sinclair, Gard. Bull. Singapore 16 (1958) 353, fig. 26, pl. 6; Sinclair, Gard. Bull. Singapore 23 (1968) 188, fig. 12: G, H; Whitmore, Tree Fl. Malaya 1 (1972) 342; Keng, Gard. Bull. Singapore 27 (1974) 77; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78; Corner, Wayside Trees Malaya, ed. 3, 2 (1988) 565, fig. 171, fig. 173; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 149; Turner et al., Gard. Bull. Singapore 46(2) (1995 [‘1994’]) 24; Wong et al., Gard. Bull. Singapore 46(2) (1995 [‘1994’]) 74; de Wilde, Blumea 42 (1997) 164; Turner et al., Gard. Bull. Singapore 48 (1998 [‘1996’]) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 [‘1997’]) 199; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 460; de Wilde, Fl. Males., ser. 1, 14 (2000) 454, fig. 72; de Wilde, Fl. Thailand 7(4) (2002) 770, fig. 14; LaFrankie et al., Forest Trees Bukit Timah (2005) 164; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 62, 154, 217; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 52; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 185, 416; Lim et al., Nat. Singapore 9 (2016) 128; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 241, fig. 10; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 492. **Synonym:** *Myristica elliptica* Wall., Numer. List no. 6798 (1832), nom. nud. **Type:** *Porter s.n.* [EIC 6798a], [Malaysia], Penang (lectotype K [K000880066], first step designated by Sinclair, Gard. Bull. Singapore 16 (1958) 355, second step designated here; isolectotypes BM [BM000793087, as ‘6798’], BR [BR0000005230969], E [E00393054, as ‘6798’], GZU [GZU000273230], K [K000880067, as ‘6798’], M [M0240301, as ‘6798’], NY [NY00066874]). **Fig. 27.**

Trees 9–36 m tall; boles sometimes fluted or buttressed to 1 m high, often with stilt-roots. **Bark** smooth or finely fissured or scaly; sapwood white to pale yellow. **Twigs** 2–4 mm diam., pale, grey or yellowish, early glabrescent, hairs greyish, 0.1–0.3 mm long; older twigs straw-coloured or (brown-)yellow to greenish yellow, not longitudinally cracking; sometimes with a few pale brown lenticels. **Leaves:** petiole 10–20(–30) mm long, 1.5–2.5 mm wide, drying the same colour as the twigs; lamina chartaceous, elliptic or oblong, 9–21(–32) × 3–9(–12) cm, base narrowly rounded or acute, apex acute-acuminate; upper surface yellowish or olivaceous, lower surface greyish or pale olivaceous, early glabrescent, hairs scattered, appressed, greyish or pale brown, c. 0.1 mm long or less, surface minutely pustulate, papillae not obvious; dots sometimes present, scattered, faint; midrib flat or slightly raised above, lateral veins 8–13(–15) per side, at 45–60(–70)° to the midrib, faint, flat or slightly raised above, distinct on lower surface, interarching veins sometimes distinct, intercostal venation faint on both surfaces; leaf bud (10–)15–20 mm long, 1–1.5 mm wide, hairs glossy, light brown, 0.1–0.3 mm long. **Inflorescences** among the leaves, branched pedunculate, glabrescent, hairs (sparse), pale, appressed, c. 0.1 mm long or less; bracts minute, subpersistent; male inflorescences 1–2.5

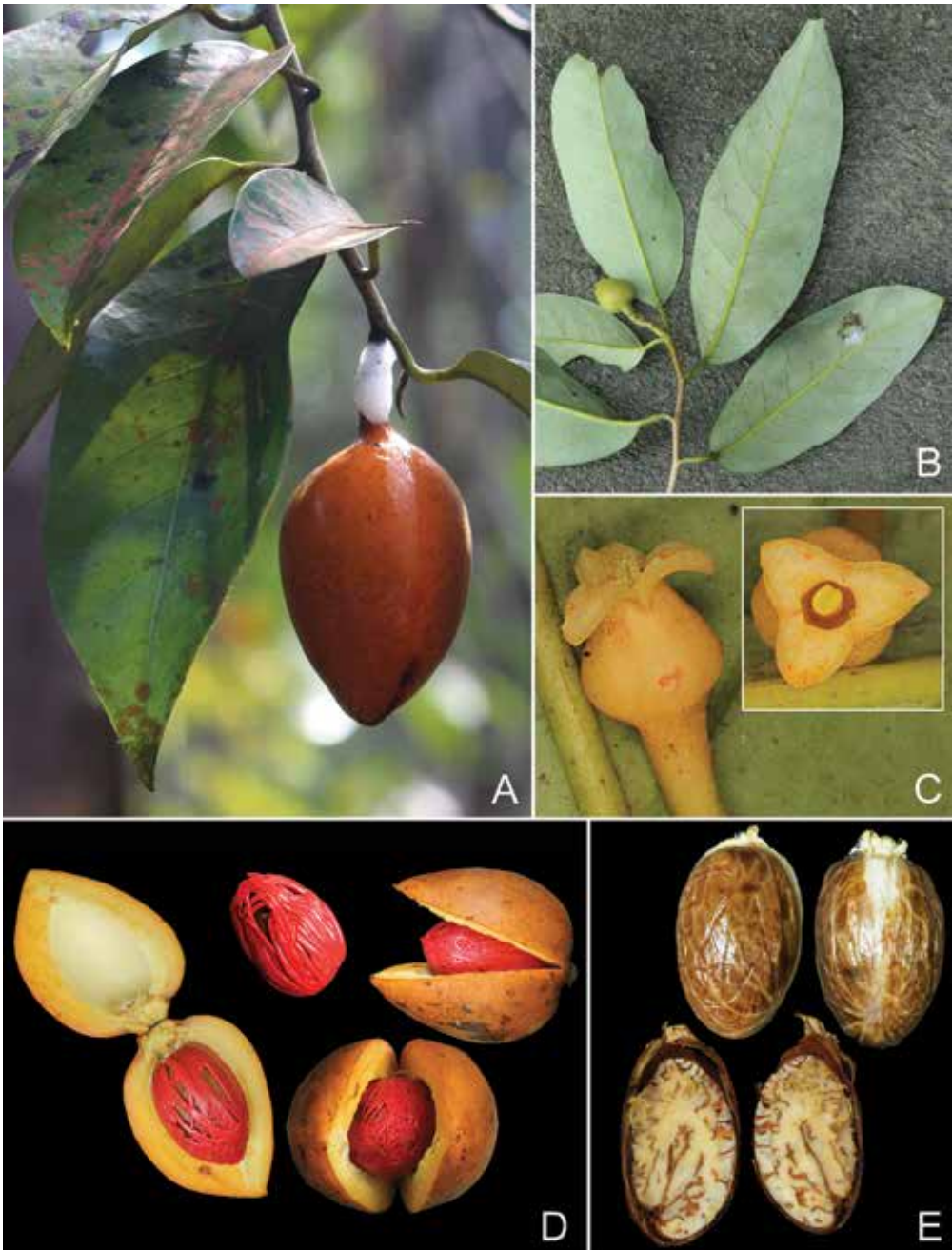


Figure 27. *Myristica elliptica* Wall. ex Hook.f. & Thomson. **A.** Fruiting branch. **B.** Leaves (lower surface). **C.** Female flower (side view). Inset: Female flower (front view). **D.** Fruit. **E.** Seeds and seeds longitudinally sectioned showing ruminant albumen. (A–E including inset from Singapore, A & E, Nee Soon, *Ng et al. SING2013-211*; B–D including C inset, Nee Soon, *Ang et al. SING2014-379*. Photos: A & E, X.Y. Ng; B–D including C inset, W.F. Ang).

cm long, 1–1.5 cm wide, flowers in loose subumbels of 3–5, peduncle slightly flattened, 5–12 mm long, branches simple, to 5 mm long, central branch similar, sometimes absent or with but a single flower, buds of various sizes, angular in the apical part; female inflorescences like the male, flowers only 1–3; flowers angled, hairs sparse, appressed, pale, c. 0.1 mm long. **Male flowers:** pedicel 3–5 mm long; bracteole more or less reniform, often truncate or faintly 3-topped, 0.5–1(–2) mm long, persistent, apical or rarely to c. 1 mm below; bud elliptic-oblong, sometimes slightly contracted below the lobes, 7–8(–9) mm long, 2.5–3.5 mm wide, apex subacute, cleft c. 1/3, lobes 0.5–0.8 mm thick; androecium 5–7 mm long, androphore slightly tapering, 2(–2.5) mm long, glabrous or at base thinly minutely pubescent, synandrium 4–4.5 mm long, (1–)1.5 mm wide, locules 10–12, more or less appressed, sterile apex rather blunt, c. 0.5 mm long. **Female flowers:** pedicel c. 3 mm long; bud ovoid-oblong, later urceolate, inflated, 6–8 mm long, 3–4 mm wide, apex acute, angled, cleft about 1/2, lobes at anthesis reflexed; ovary long-conical (including style) c. 5 mm long, 1 mm wide, hairs dense, appressed, c. 0.1 mm long. **Infructescences** often conspicuously lenticellate. **Fruit** 1 or 2, ovoid or ellipsoid(-oblong), orange or yellow, 4.5–7.5 cm long, (2–)2.5–4 cm wide, when dry base often narrowed into a 4–12 mm long pseudostalk, apex rounded or bluntly narrowed or somewhat beaked, early glabrescent, at first with minute hairs c. 0.1 mm long; pericarp dull dark brown or blackish, often with a green-yellowish exudate, 5(–10) mm thick; fruit stalk slender, 5–10 mm long. **Seeds** ellipsoid, 4–5 cm long; aril golden yellow, then red.

Distribution. Southern Thailand, Peninsular Malaysia, Sumatra and Borneo. In Singapore, known from Chan Chu Kang (*Ridley 331*, Nov 1889, SING [SING0019029]), Bukit Timah (*Ngadiman SFN 34952*, 25 Mar 1938, SING [SING0019030]), Mandai Road (*Corner s.n.*, 24 Jul 1940, SING [SING0042157]) and Nee Soon (*Samsuri et al. NES 31*, 24 Jun 2003, SING [SING0046281]).

Ecology. Across its range, in swamp forest or in low undulating forest, on river banks and occasionally in hill forest, to 200 m. Sinclair (*Sinclair, Gard. Bull. Singapore 16* (1958) 211) recorded that the seeds float, raising the possibility that its seeds are dispersed by water.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), *Singapore Red Data Book*, ed. 3 (2024) 492).

Vernacular names. *Mempatoh, pala hutan, pianggu, samban, sengkit* (NParks' Flora & Fauna Web, 2026).

4. *Myristica iners* Blume

(Latin, *iners* = inert; referring to the faint aroma of the seeds)

Bijdr. Fl. Ned. Ind., pt 11 (1826 [‘1825’]) 575; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 230; Ridley, Fl. Malay Penins. 3 (1924) 64; Sinclair, Gard. Bull. Singapore 16 (1958) 363, fig. 30, pl. 5: B; Sinclair, Gard. Bull. Singapore 23 (1968) 177, fig. 11; Whitmore, Tree Fl. Malaya 1 (1972) 342, fig. 9; Corner, Gard. Bull. Singapore, Suppl. 1

(1978) 78; Turner, Gard. Bull. Singapore 45 (1993) 149; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 74; de Wilde, Blumea 42 (1997) 168; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 464; de Wilde, Fl. Males., ser. 1, 14 (2000) 493, fig. 60: d, photo 9; de Wilde, Fl. Thailand 7(4) (2002) 772; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 62, 154, 209; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 185, 416; Lim et al., Nat. Singapore 9 (2016) 131; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 247; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97, 131; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 492. **Type:** *Blume s.n.*, [Indonesia], [West] Java (lectotype L [L0037704], designated by de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 247; isolectotypes L [L0037702, L0037703, L0037705, L0037706, L0037707]).

Trees 10–30 m tall, occasionally with buttresses and stilt-roots to 1 m. **Bark** dark brown, grey or blackish, smooth, thinly fissured, flaky or rugose. **Twigs** 1.5–3 mm diam., early glabrescent, hairs greyish, less than 0.1 mm long; older twigs (blackish) brown, more or less flaking, sporadically with a few lenticels. **Leaves:** petiole 11–25 mm long, (0.5–)1–2 mm wide; lamina membranous or chartaceous, elliptic-oblong to oblong-lanceolate, 7–24 × 1.5–8(–10) cm, base rounded or attenuate, apex acute-acuminate; upper surface olivaceous(-brown), lower surface early glabrescent, hairs scale-like, less than 0.1 mm long; not papillose; dots absent; midrib slightly raised above, lateral veins 11–16 per side, at (30–)45(–80)° to the midrib, flat to sunken above, rather flat or prominent below, interarching veins and intercostal venation indistinct; leaf bud 7–12 mm long, 1–2 mm wide, hairs 0.2(–0.5) mm long. **Inflorescences** between the leaves or below, branched, paniculate, pedunculate, glabrescent; male inflorescences 2–8 cm long, peduncle slender or stout, 2–30(–40) mm long, branches to 20 mm long, central branch absent or to 40 mm long, with 1 or 2 subumbels of 5–15 flowers, buds of various sizes; bracts 3–4 mm long, caducous; female inflorescences reduced, sometimes almost sessile, 1–6-flowered; flowers glabrescent, hairs woolly, 0.1–0.3 mm long. **Male flowers:** pedicel slender, 4–12 mm long; bracteole 1.5–3 mm long, subpersistent or caducous; bud ovoid(-ellipsoid), 4–6(–7) mm long, 2–4(–6) mm wide, cleft (1/4 to) 1/3 to 1/2, lobes membranous or thinly leathery, 0.2–0.3 mm thick; androecium 3(–6) mm long, androphore cylindrical or somewhat swollen, about as broad as the synandrium, 1.2–2(–3) mm long, with hairs 0.1–0.2 mm long in the lower half, synandrium ellipsoid-lanceolate, 2–3 mm long, 0.6–1 mm wide, locules 10–16, more or less contiguous, sterile apex 0.1–0.3 mm long, entire or shallowly lobed at apex, glabrous. **Female flowers:** pedicel 1–7 mm long; bud ovoid, 4–4.5 mm long, 3.5–4 mm wide; ovary long-ovoid, c. 3 mm long, (1–)1.5 mm wide, hairs dense 0.1 mm long or less. **Fruit** usually single, (ovoid-) ellipsoid, 4–8 cm long, 3.5–4.5 cm wide, glabrescent, hairs dense, mealy, grey-brown, c. 0.2 mm long; pericarp (4–)5–10 mm thick; fruit stalk c. 5 mm long. **Seeds** ellipsoid, 4–5 cm long; aril orange-red.

Distribution. Thailand, Cambodia, Peninsular Malaysia, Sumatra, Java, Borneo and possibly the Philippines. In Singapore, known from Mandai Road (*Corner SFN 28097*, 25 Apr 1934, SING [SING0019181]; *Corner SFN 36382*, 17 May 1939, SING [SING0019179]; *Corner SFN 37134*, 25 Jul 1940, SING [SING0019180]) and MacRitchie (*Lai et al. SING2017-042*, 28 Jan 2017, SING [SING0231955]).

Ecology. Across its range, in primary and disturbed lowland or hill dipterocarp forest to 500(–1000) m.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 493).

Notes. See comment on *Sinclair 10664* (SING [SING0019184]) in the notes section of the genus description.

5. *Myristica lowiana* King

(Hugh Low, 1824–1905, English colonial administrator and naturalist)

Ann. Roy. Bot. Gard. Calcutta 3 (1891) 282, 293, pl. 120: fig. 2–4 (excl. fig. 1, 5–7 = *M. crassa*), p.p.; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 128; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 235; Ridley, Fl. Malay Penins. 3 (1924) 66; Sinclair, Gard. Bull. Singapore 16 (1958) 345, fig. 23, pl. 4: B; Sinclair, Gard. Bull. Singapore 23 (1968) 164; Whitmore, Tree Fl. Malaya 1 (1972) 344; Corner, Gard. Bull. Singapore, Suppl. 1 (1978) 78; Turner, Gard. Bull. Singapore 45 (1993) 149; Wong et al., Gard. Bull. Singapore 46(2) (1995 [‘1994’]) 74; de Wilde, Blumea 42 (1997) 174; Turner et al., Gard. Bull. Singapore 48 (1998 [‘1996’]) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 [‘1997’]) 199; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 465; de Wilde, Fl. Males., ser. 1, 14 (2000) 517; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 62, 154, 209; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 52; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 186, 416; Lim et al., Nat. Singapore 9 (2016) 133; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 248; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 493. **Type:** *Scortechini 1855*, [Malaysia], Perak, Port Weld [Manjung], 1884 (lectotype K [K000880070], designated with correctable errors (see note below) by Sinclair, Gard. Bull. Singapore 23 (1968) 166; isoelectotype CAL n.v.; possible isoelectotype L [L0037741, as s.n.]).

Trees 15–30 m tall, occasionally with stilt-roots. **Bark** greenish or black, deeply fissured. **Twigs** 3–6 mm diam., late glabrescent, hairs rough-woolly, rufous, 1–1.5 mm long; older twigs blackish, cracking and flaking; lenticels indistinct or absent. **Leaves:** petiole 25–50 long, 2.5–5 mm wide, late glabrescent; lamina coriaceous, oblong(-lanceolate), 14–35 × (3.5–)9–11.5 cm, base rounded or short-cuneate, apex acute-acuminate; upper surface glossy, olivaceous or brown, lower surface grey-brown, early glabrescent, hairs mealy, rusty brown, 0.1–0.2 mm long; distinctly papillose; dots absent; midrib raised above, glabrescent, lateral veins 15–22 per side, at (45–)60–70 to the midrib, usually sunken above, interarching veins indistinct, intercostal venation sunken above, rendering the lamina somewhat bullate; leaf bud 10–15 mm long, 4–5 mm wide, hairs 1–1.5 mm long. **Inflorescences** between the lower leaves or below, pedunculate, branched, with rough-woolly hairs 1–1.5 mm long; bracts 3–5 mm long, late caducous; male inflorescences 2.5–5.5 cm long, 2–3 cm wide, peduncle (10–)15–30 mm long, basal branches 5–10 mm long, central branch 5–25 mm long, with 1–2 (or 3) (sub)sessile short-shoots, each with a subumbel of 5–10 flowers, buds of various sizes; female inflorescences 1–1.5 cm long, hardly branched, rather thick, with 3–5 flowers; flowers with hairs 0.5–1 mm long. **Male flowers:** pedicel 2–3(–5) mm long; bracteole c. 3 mm diam. (apex sometimes subtruncate), late caducous; bud ellipsoid(-oblong), 4–4.5(–5) mm long, 3 mm wide, apex narrowly rounded, cleft 1/4 (to 1/3), lobes 0.3(–0.4) mm thick; androecium (3–)3.5–4 mm long, androphore 1.5–2 mm long, 0.8–1 mm wide, with dense hairs c. 0.5 mm in the lower 4/5,

syndrium oblong, 2–2.2 mm long, 0.8 mm wide, locules 10–14, sometimes at apex loosely coalescent and proceeding into a (0.1–)0.2–0.3 mm long, more or less lobed sterile apex.

Female flowers: pedicel short; bud ovoid, c. 5 mm long, 4 mm wide, cleft c. 1/4; ovary rusty brown tomentose. **Infructescence** 1–1.5 cm long. **Fruit** generally solitary, ellipsoid, orange or reddish brown, (5–)6–7 cm long, 3.5–4 cm wide, hairs persistent, conspicuously velvety, 1–2.5 mm long; pericarp (5–)10(–15) mm thick; fruit stalk thick, 2–5 mm long. **Seeds** ellipsoid, 4–5 cm long; aril yellow, finally red.

Distribution. Peninsular Malaysia, Sumatra and Borneo. In Singapore, known from Kranji (*Ridley 6451*, 1894, SING [SING0019187]), Jurong Road (*Corner s.n.*, 19 Oct 1932, SING [SING0019185]) and Bukit Timah (*Lye L 84/72*, 22 Apr 1972 (sterile), SING [SING0019189]).

Ecology. Usually in peat swamp forest, also in coastal or seasonal swamp forest, sometimes in primary lowland forest, to 300 m.

Conservation assessment. Globally, Near Threatened (NT) (IUCN Red List, 2026). In Singapore, assessed as Nationally Extinct (NEx) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 493).

Notes. King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 294 gave three syntypes for *Myristica lowiana*: *Scortechini 1551*, *King's Collector 5537* and *King's Collector 7258*, all from Perak, but the latter two are *Myristica crassa* and should therefore be excluded from consideration. Sinclair, Gard. Bull. Singapore 23 (1968) 166, designated *Scortechini 7851* at K as the lectotype of *Myristica lowiana* (isolectotype CAL) and noted 'King quotes this as *1551*' but, confusingly, he also wrote 'I take the writing in Kew to be *1851*'. Neither *Scortechini 1551*, *1851* nor *7851* have been traced in K or CAL but Kew does house *Scortechini 1855* which would also appear to be original material (labelled with the name in the same hand, presumably King's, as on the collections now assigned to *Myristica crassa*) and is assumed to be the specimen intended by Sinclair despite the great confusion over collection numbers.

6. *Myristica maingayi* Hook.f.

(Alexander Carroll Maingay, 1836–1869, English physician,
colonial administrator and botanist)

Fl. Brit. India 5, fasc. 13 (1886) 104; King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 294, pl. 114; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 228; Ridley, Fl. Malay Penins. 3 (1924) 64; Sinclair, Gard. Bull. Singapore 16 (1958) 348, fig. 24, pl. 5: A; Sinclair, Gard. Bull. Singapore 23 (1968) 166; Whitmore, Tree Fl. Malaya 1 (1972) 344; Keng, Gard. Bull. Singapore 27 (1974) 77; Corner, Wayside Trees Malaya, ed. 3, 2 (1988) 566; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16, fig. 11.5; Turner, Gard. Bull. Singapore 45 (1993) 149; Turner et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 24; Wong et al., Gard. Bull. Singapore 46(2) (1995 ['1994']) 74; Kochummen, Tree Fl. Pasoh Forest (1997) 343; de Wilde, Blumea 42 (1997) 175; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; de Wilde, Fl. Males., ser. 1, 14 (2000) 518; de Wilde, Fl. Thailand 7(4) (2002) 774; LaFrankie et al., Forest Trees Bukit Timah (2005) 118, 164; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 62, 154, 209; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 52; de Wilde & Duyfjes, Fl.

Penins. Malaysia, ser. 2, 7 (2018) 249; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 493. **Type:** *Maingay 3302* [Kew Distribution 1289], [Malaysia], Malacca [Melaka] (lectotype K [K000880069], designated by Sinclair, Gard. Bull. Singapore 16 (1958) 350; isotype L [L0037742]).

Trees 10–36 m tall. **Bark** greyish or blackish, shallowly longitudinally fissured or cracking, or with brittle adherent scales. **Twigs** (2–)2.5–4 mm diam. (late) glabrescent, hairs rusty, woolly, 0.2–0.5 mm long; older twigs blackish, longitudinally and transversely cracking, or coarsely flaking; lenticels inconspicuous. **Leaves:** petiole 15–30 mm long, 1.5–3 mm wide, glabrescent; lamina chartaceous or (thinly) coriaceous, elliptic-oblong or oblong-lanceolate (rarely linear-oblong), 12–28 × 4–8.5 cm, base rounded or short-attenuate, apex acute-acuminate; upper surface olivaceous-brown, glossy, lower surface grey-brown, early glabrescent, hairs 0.1–0.3 mm long, often with hair scars; distinctly papillose; dots absent; midrib more or less raised above; lateral veins 13–20 per side, at 45–80° to the midrib, sunken, interarching veins indistinct, intercostal venation sometimes visible; leaf bud 8–15 mm long, 2.5–4 mm wide, hairs shaggy or appressed 0.5–1(–1.5) mm long. **Inflorescences** between the leaves or below, branched, pedunculate, with hairs 1(–1.5) mm long; male inflorescences 1.5–2 cm long, 1.5–2 cm wide, peduncle 5–12 mm long, branches to 4 mm long, central branch absent or to 6 mm long, simple (or 2-branched), apical subumbel(s) of 5–15(–20) flowers, buds of various sizes; bracts c. 4 mm long, caducous; female inflorescences like the male, but shorter and stouter, with 1–4 flowers; flowers with shaggy hairs 0.5–1 mm long. **Male flowers:** pedicel 5–6(–9) mm long; bracteole 4–5 mm long, rounded, or truncate or faintly angular (3-topped), subpersistent; bud ovoid-ellipsoid, 6–7 mm long, 4.5–5 mm wide, cleft 1/5 to 1/4, lobes 0.3–0.4 mm thick; androecium 5–5.5 mm long, androphore 1.2–2 mm long, 1–1.2 mm wide, hairs c. 0.5 mm long in the lower three quarters, synandrium 2.8–3.5 mm long, 1 mm wide, locules 12–16, sterile apex subacute, 0.5(–1) mm long. **Female flowers:** pedicel c. 3 mm long; bracteole c. 5 mm long, caducous; bud ovoid(-ellipsoid), c. 6 mm long, 4.5 mm wide, cleft c. 1/4; ovary 3.5(–4) mm long, 3 mm wide, hairs c. 0.5 mm long, stigma 0.5(–1) mm long. **Fruit** 1 or 2 per infructescence, broadly ovoid-ellipsoid, orange-brown, (4.5–)7–9(–10) cm long, (3.5–)5–6 cm wide, glabrescent, hairs rusty brown, mealy, c. 0.5 mm long; pericarp 15–20 mm thick; fruit stalk stout, 6–11 mm long. **Seeds** ellipsoid, 4–5 cm long; aril (yellow or) red.

Distribution. Southern Thailand, Peninsular Malaysia and possibly Sumatra. In Singapore, only known with certainty from MacRitchie (*Corner s.n.*, 20 Jul 1932, SING [SING0019190]; *Corner SFN 33555*, 18 Jun 1937, SING [SING0019191]).

Ecology. Across its range, in primary lowland and hill dipterocarp forest, on flat land, hillsides and ridges to 350(–800) m.

Conservation assessment. Globally, Near Threatened (NT) (IUCN Red List, 2026). In Singapore, assessed as Data Deficient (DD) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 492) as the relatively recent specimens from Chestnut and Bukit Timah (e.g., *Niissalo et al. CTFS H3-5031*, 22 Oct 2020, SING [SING0361783]) are not identified with complete certainty.

7. *Myristica maxima* Warb.

(Latin, *maximus* = greatest, largest; referring to the stout appearance of the leaves and fruit)

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68 [Monogr. Myristic.] (1897) 385; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 228; Ridley, Fl. Malay Penins. 3 (1924) 63; Sinclair, Gard. Bull. Singapore 16 (1958) 339, fig. 20, fig. 21, pl. 3, pl. 4: A; Sinclair, Gard. Bull. Singapore 23 (1968) 131; Whitmore, Tree Fl. Malaya 1 (1972) 345; Keng, Gard. Bull. Singapore 27 (1974) 77; Keng, Concise Fl. Singapore, vol. 1, Gymn. Dicot. (1990) 16; Turner, Gard. Bull. Singapore 45 (1993) 149; Kochummen, Tree Fl. Pasoh Forest (1997) 344; de Wilde, Blumea 42 (1997) 178; Turner et al., Gard. Bull. Singapore 48 (1998 ['1996']) 150; Chew et al., Gard. Bull. Singapore 49(2) (1999 ['1997']) 199; de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 467; de Wilde, Fl. Males., ser. 1, 14 (2000) 523, fig. 60: a, b, fig. 62: c; de Wilde, Fl. Thailand 7(4) (2002) 775; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 62, 154, 209; Turner & Chua, Checkl. Vasc. Pl. Sp. Bukit Timah Nat. Res. (2011) 52; Wong et al., Checkl. Pl. Sp. Nee Soon Swamp Forest (2013) 186, 416; Lim et al., Nat. Singapore 9 (2016) 136; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 252, fig. 11; Ho et al., Gard. Bull. Singapore 71(Suppl. 1) (2019) 97; Lindsay et al., Gard. Bull. Singapore 74(Suppl. 1) (2022) 493. **Type:** *King's Collector 5513*, [Malaysia], Perak, Larut, February 1884 (lectotype K [K000880074], designated by de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 467; isolectotypes CAL n.v., E [E00393053], MEL [MEL611426], SING [SING0222440, SING0222441]). **Fig. 28.**

Myristica bracteata auct. non A.DC.: King, Ann. Roy. Bot. Gard. Calcutta 3 (1891) 286, pl. 107, p.p.; Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 128.

Trees 15–33 m tall; with or without buttresses, sometimes with stilt-roots. **Bark** grey-brown, smooth with few scattered adherent scales or cracking, dimpled or scaly, slightly peeling. **Twigs** (4–)5–8 mm diam., early glabrescent, indumentum minute; older twigs becoming rough and scaly, not longitudinally cracking; lenticels often present but indistinct. **Leaves:** petiole 25–35 mm long, 2.5–4 mm wide, drying dark brown; lamina membranous, chartaceous or (thinly) coriaceous, elliptic or oblong-lanceolate, 16–40 × (6–)10–20 cm, base rounded or shallowly cordate, sometimes attenuate, apex acute-acuminate; upper surface (blackish) brown, sometimes bullate, lower surface (brownish) grey, seemingly glabrous, but actually minutely pubescent, or glabrescent, hairs interwoven or sparse, grey-brown, scale-like, 0.1–(0.2) mm long or less; usually papillose; dots absent; midrib flat or raised above, lateral veins (20–)23–33 per side, at 60–70° to the midrib, flat or impressed above, interarching veins and intercostal venation distinct (or indistinct) on both surfaces; leaf bud 15–20 mm long, (3–)4–5 mm wide, hairs c. 0.1 mm long or less. **Inflorescences** usually between the leaves, subglabrescent, indumentum minute, grey-villous, essentially paniculate, stout, the peduncle distinctly flattened, sometimes lenticellate; male inflorescences 6–12(–18) cm long, 3–8 cm wide, peduncle 20–45 mm long, 4–6 mm wide; lower branches to 3 cm long, central branch 4–8 cm long, with up to 6 side-branches, subumbels shortly stalked or sessile, each with 5–10 flowers, buds of various sizes, not angular; bracts caducous; female inflorescences smaller, 5–9 cm long, subumbels 1–5-flowered; flowers coriaceous, thinly hairy, hairs brown-grey, less than 0.1 mm long. **Male flowers:** pedicel 3–10 mm long; bracteole broadly reniform, or angular or 2- or 3-lobed at apex, with ciliate margin, persistent; bud ovoid(-ellipsoid), 5–7 mm long, 4–5 mm wide, cleft about 1/2 or slightly over, lobes c. 0.7 mm thick; androecium 3–4.5(–5) mm, androphore 0.5–0.8(–1) mm long, 0.8–1 mm wide, finely pubescent in the lower half, synandrium more or less cylindrical, 2–2.5 mm long, 1–1.2 mm wide, locules 16–24, sterile apex blunt, 0.3–0.5 mm long. **Female flowers:** pedicel stout, 1–3(–4) mm long;

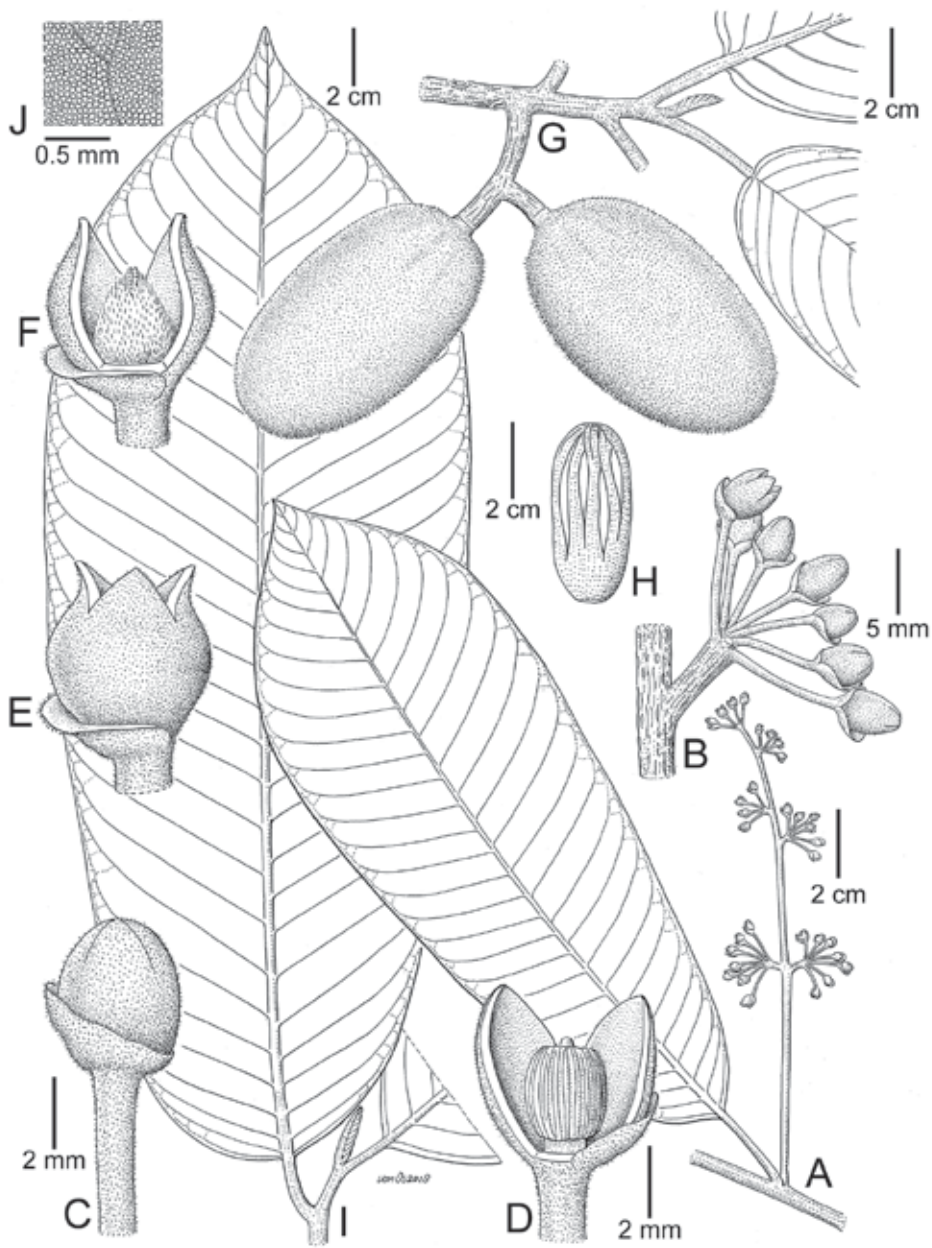


Figure 28. *Myristica maxima* Warb. **A.** Portion of twig with male inflorescence showing flowers in umbels. **B.** Portion of male inflorescence. **C.** Male flower. **D.** Male flower, opened, showing androecium. **E.** Female flower. **F.** Female flower opened. **G.** Twig with infructescence. **H.** Seed. **I.** Twig apex. **J.** Detail of lower leaf surface, with scattered minute stellate hairs (A–D from Malaysia, Sabah, *de Wilde et al. SAN 143907*; E & F from Indonesia, South Kalimantan, *Kostermans 8053*; G & H from Peninsular Malaysia, *Whitmore FRI 2205*; I & J from Singapore, Nee Soon, *Sinclair SFN 40304*. Drawn by J. van Os).

bracteole broadly rounded, 2(–3) mm long, persistent; bud ovoid, 5–7 mm long, 4–6 mm wide, cleft 1/3 to 1/2; ovary ovoid, 3–4 mm long, hairs appressed, 0.2–0.4 mm long, stigma lobes (0.5–)1 mm long. **Fruit** 1–4 per infructescence, ellipsoid-oblong, (yellow-) brown or reddish brown (4.5–)6–9 cm long, 3.5–5 cm wide, base sometimes narrowed, hairs mealy, dark brown, 0.1 mm long or less, sometimes late glabrescent; pericarp 10–15 mm thick; fruit stalk stout, 3–10 mm long. **Seeds** ellipsoid-oblong, (4–)4.5–6 cm long; aril yellow-orange, then red, in lower quarter sometimes undivided.

Distribution. Southern Thailand, Peninsular Malaysia, Sumatra and Borneo. In Singapore, known from Bukit Timah (*Ridley 3363*, 1892, SING [SING0019206]; *Khoo & Asri KMS 12*, 11 Apr 2006, SING [SING0123448]; *Khoo KMS 79*, 21 Apr 2009, SING [SING0123448]) and Nee Soon (*Sinclair SFN 40304*, 22 May 1954, SING [SING0019207]).

Ecology. Across its range, in primary lowland forest on hillsides or by streams, or in seasonal swamp forest; to 700 m.

Conservation assessment. Globally, Least Concern (LC) (IUCN Red List, 2026). In Singapore, assessed as Critically Endangered (CR/D) by Middleton et al. (in Davison et al. (ed.), Singapore Red Data Book, ed. 3 (2024) 493).

Notes. Herbarium specimens generally dry a markedly dark brown colour. The leaves seem glabrous below but actually have a very minute indumentum of scattered very small scale-like grey or pale brown hairs.

Excluded taxa

The following taxa have been recorded for Singapore in the literature cited but no verified specimen evidence has been found for their occurrence in the wild in Singapore nor to what species they may have been misapplied.

Horsfieldia brachiata (King) Warb.: Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75(2) (1912) 218; Ridley, Fl. Malay Penins. 3 (1924) 59; Chew et al., Gard. Bull. Singapore 49(2) (1999 [‘1997’]) 198; LaFrankie et al., Forest Trees Bukit Timah (2005) 163; Tan et al. in Davison et al. (ed.), Singapore Red Data Book, ed. 2 (2008) 230; Chong et al., Checkl. Vasc. Pl. Fl. Singapore (2009) 49, 153, 206.

Horsfieldia fulva (King) Warb.: Burkill, Dict. Econ. Prod. Malay Penins. 1 (1935) 1198.

Knema curtisii (King) Warb. var. **curtisii**: Lim et al., Nat. Singapore 9 (2016) 104; de Wilde & Duyfjes, Fl. Penins. Malaysia, ser. 2, 7 (2018) 194; Chong et al., Gard. Bull. Singapore 70(Suppl. 1) (2018) 60. – Only recorded from sterile material which cannot be verified.

Myristica brachiata King: Ridley, J. Straits Branch Roy. Asiat. Soc. 33 (1900) 129.

Myristica gigantea King: de Wilde, Fl. Males., ser. 1, 14: 479 (2000); de Wilde, Tree Fl. Sabah & Sarawak 3 (2000) 462.

Myristica obtusifolia Wall. [Numer. List no. 6808 (1832), nom. nud.] ex Hook.f. & Thomson, Fl. Ind. 1 (1855) 163; Miquel, Fl. Ned. Ind. 1(2), fasc. 1 (1858) 62; Hooker, Fl. Brit. India 5, fasc. 13 (1886) 113. – The identity of the material on which this species is based (*Wallich s.n.* [EIC 6808], Singapore, 1822 (K [K001124860])) is unknown but is likely not Myristicaceae.

Myristica pendulina Hook.f.: Hooker, Fl. Brit. India 5, fasc. 16 (1890) 859. – Although the type was collected in Singapore Botanic Gardens, it was from a cultivated plant. It is now treated as a synonym of *Horsfieldia sylvestris* (Houtt.) Warb., a species from eastern Malesia.