

Florae Malesianae Precursores – LVIII, Part Two*

The Genus *Gordonia* (Theaceae) in Malesia

HSUAN KENG

Department of Botany, National University of Singapore, Singapore

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Abstract

This is a taxonomic treatment of 21 species of *Gordonia* (of the family Theaceae) found in the Malesian region. Among these, there are two new (*G. borneensis*, *G. sarawakensis*) and two newly combined (*G. integerrima*, *G. vulcanica*) species. Besides, two excluded (*G. brevifolia*, *G. lobbii*) and two doubtful (*G. lanceifolia*, *G. sarasini*) ones are briefly mentioned. A complete list of scientific names and their synonyms is presented in an index.

I. INTRODUCTION

The genus *Gordonia* was established by John Ellis in 1771 in honour of James Gordon (1728–1791), an English nurseryman. The type species *Gordonia lasianthus* (L.) Ellis (basinym: *Hypericum lasianthus* L.), is a tree originally from the coastal plain areas along Loblolly Bay in eastern North America.

Gordonia Ellis is a conserved generic name against the earlier name, *Lasianthus* Adanson (1763). In addition, a number of synonyms were proposed by different authors. Some of them perpetuate to this day. The most controversial one is *Laplacea* HBK (1822), which is based on a plant (*Laplacea speciosa* Kunth ex HBK) from Ecuador in South America. The original *Gordonia*, namely *G. lasianthus* Ellis, differs considerably from the type species of *Laplacea*, namely *L. speciosa* HBK. They differ in various aspects of pedicels, bracteoles, sepals, petals, androecia and gynoecia. These differences gradually break down when many more species were subsequently discovered and described. Even in recent literature, several authors (e.g. Melchior, Kobuski) maintain *Laplacea* as a separate genus mainly on the ground of the usually 5 short, free styles; while others (e.g. Burkill, Merrill, Sealy) advocate that these two genera, *Gordonia* and *Laplacea*, should be merged. A formal fusion was made by the present writer (Keng 1980).

For the Asiatic *Gordonia* species, the earliest synonym is *Polyspora* Sweet (1826). It was named after a plant originally described under the name *Camellia axillaris* Roxb. ex Ker. The flowers of this plant are almost sessile, the bracteoles and bracts pass gradually into sepals which protect the rest of the flower parts in bud, the style is stout and 5-fid at the apex. Other notable synonyms are *Antheischima* and *Closaschima* of Korthals (1842), who tended to think that plants from America and Asia could not be possibly accommodated in the same genus. Korthals' two new genera were based on two Malesian plants, *Gordonia excelsa* Bl. and *G. ovalis* Korth., respectively.

* Part One: The Genus *Pyrenaria* (Theaceae) in Malesia, *Gard. Bull. Sing.* 33 (1980) 264–289.

Like Korthals, Pitard, (1902) also emphasized the geographic separation between Asia and America, and established the genus *Nabiasodendron* for the Asiatic *Gordonia* species. Besides some external morphological characters, Pitard mentioned some dubious internal anatomical features to stress that the Asiatic species should be classified in a separate genus. For critical discussions of these and other synonyms of *Gordonia*, see Burkill (1917) and Sealy (1958).

On the other hand, the first botanist who referred the Asiatic plants to *Gordonia* is Blume (1825). The Javanese plant was at first described as *Schima excelsa* Bl. in 1823; two years later, it was transferred by himself to *Gordonia*, namely, *G. excelsa* (Bl.) Bl.

II. A GENERAL ACCOUNT OF THE TAXONOMIC CHARACTERS

The Malesian *Gordonia* species are mostly small or medium-sized trees. Some species, however, are lofty trees which can reach 60 m or more in height, while others are shrubs which are usually found in high altitudes (e.g. *G. imbricata* and *G. vulcanica*).

The leaves are alternate, well-spaced, mostly spirally arranged on branchlets. The leaf-bases are acute, attenuate or rounded, sometimes decurrent along the petiole and forming two narrow wings (e.g. *G. multinervis*, *G. singaporeana* and *G. oblongifolia*), which are especially prominent in young trees and saplings. The nerves are usually visible and often intermingled with smaller, parallel veins and complicately looped and merged near the margin into submarginal veins or reticulations. The secondary veins are invisible in a few species (e.g. *G. imbricata* and *G. ovalis*). The tertiary veins and reticulations, in general, cannot be clearly seen, except after treatment with dilute sodium hydroxide (as seen in some of the illustrations accompanying this paper). The venation is found to be useful in separating some related species and in identifying sterile material of *Gordonia*.

The flowers are borne in leaf-axils, often in the upper axils, usually solitary, rarely 2-3 in a cluster. Each flower is usually subtended by one bract and two bracteoles which are generally caducous. In *G. maingayi*, however, the bracteoles, bracts and sepals, not being clearly differentiated, together form perules subtending the corolla at anthesis. While in most of the other species, the bracteoles, bracts and sepals are \pm differentiated, the bract and bracteoles are caducous, only the sepals being present at anthesis. The peduncles vary in length, the flowers are sessile or subsessile in some species.

The differentiation between calyx and the corolla in most species is clear: sepals are 5-6 in number, thick and hairy; petals are also 5-6, generally thick (at least in their lower middle part) and briefly joined at the base into a short corolla-tube and shed together after anthesis. In *G. sarawakensis*, the petals are 8-10 in number, but they are relatively narrow, arranged in one series; whereas in *G. borneensis* and *G. polisana*, the petals are also 8-10 in number, but are very broad, arranged in two distinct series. In the two latter species, the petals of the outer series are smaller and somewhat intermediate between sepals and petals.

The androecium consists of numerous stamens which are in 3–4 whorls, usually briefly fused at the base, sometimes in 5 (or 4) groups. The filaments are glabrous or hairy, or more often the upper part glabrous and the lower, hairy. They are always adnate to the base of the corolla and shed together after anthesis.

The gynoecium consists of a usually hairy, ovoid or subglobose ovary, one (solitary or branched) or several (5, rarely 3 or 4 more) free styles, of which the tip is enlarged into a stigma. Exceptions are found in *G. ovalis* and *G. sarawakensis* in which species the styles are absent and the stigmas lie on top of the ovary. In each ovary-locule, 3–5 ovules are found.

The fruits are capsular, angulate, cylindric-oblong to ellipsoid, rarely broadly ovoid (e.g. *G. borneensis*) or subglobose (e.g. *G. sarawakensis*), dehiscent loculicidally from the top downwards. As they are mostly 5-locular, they thus often dehisce into 5 valves. In those species with ovary-locules other than 5, the number of valves is generally in accordance with that of their ovary-locules; thus 3 (-4) in *G. scortechini*, and 7–8 in *G. sarawakensis*. In the last named species, septicial lines can be clearly seen in the lower part of the fruit. In fully matured fruits of all *Gordonia* species, the valves break away for most of their length from the stout columella, but remain attached to it at the base for some time and eventually disintegrate.

The seeds are usually ovoid or ellipsoid, always flattened, 2–3 in each locule, with a large obliquely attached apical wing. Superficially they resemble the seeds of some conifers (e.g. *Pinus*, *Abies* or *Keteleeria*). The embryo is large, slightly bent, surrounded by a thin layer of endosperm.

III. TAXONOMIC TREATMENT

Gordonia Ellis

Gordonia Ellis, Phil. Trans. London 60 (1771) 518, *t.* 11 [Type species: *Gordonia lasianthus* (Linn.) Ellis]; Benth. in B. & H. Gen. Pl. 1 (1862) 186 (incl. *Laplacea*); Szyszyl. in E. & P. Pflanzenfam. 3, 6 (1893) 185 (incl. *Haemocharis*); Melchior in E. & P. Pflanzenfam. ed. 2, 21 (1925) 136, *f.* 63 (incl. *Laplacea*); Burkill, J. Str. Br. Roy. As. Soc. 76 (1917) 133 (incl. *Haemocharis*); Merrill, J. Str. Br. Roy. As. Soc. 86 (1922) 332; Sealy, Rev. Gen. *Camellia* (1958) 8; H. Keng, Gard. Bull. Sing. 33 (1980) 308. *Nom. cons.*

Lasianthus Adans., Fam. 2 (1763) 398 [*non* Jack (1823), *nec* Zucc. ex DC (1836)].

Laplacea HBK, Nov. Gen. Sp. 5 (1822) 207, *t.* 461.

Lindleya Nees, Flora 4 (1821) 299.

Haemocharis Salisb. ex Martius et Zucc., Nov. Gen. Sp. 1 (1824) 106.

Polyspora Sweet, Hort. Brit. ed. 1 (1826) 61.

Antheischima Korth., Kruidk. (1842) 137, *t.* 27.

Closaschima Korth. op. cit. 139.

Carria Gardn. Calc. J. Nat. Hist. 7 (1847) 6.

Dipterospermum Griff., Notul. 4 (1854) 564.

Nabiasodendron Pitard, Act. Soc. Linn. Bordeaux 57 (1902) Cpt. Rend. Sc. 54.

Small to medium-sized trees, rarely shrubs. Leaves simple, coriaceous, alternate, spirally or distichously arranged, entire or serrate. Flowers bisexual, axillary, solitary or 2–3 (rarely more) congested in a cluster, shortly pedunculate or subsessile; bracteoles and bracts 2–3 or more; sepals 5–6, unequal; petals 5–6, rarely 9–10, unequal or subequal, usually briefly fused at the base; stamens numerous, in 3 or 4 whorls, shortly connate at the base and often briefly adnate to the corolla, sometimes in 4–5 less distinct fascicles; anthers versatile, on a short or long filament; ovary mostly 5-locular, rarely 8–10 or 3–4 locular; ovules 2–8 (usually 3–5) in each locule, on axile placentation in two vertical rows; styles mostly 5, sometimes more or only 3, fused to varying extent proximally, or sometimes totally free. Fruit a woody capsule, ovoid-cylindric, bluntly angulate, dehiscing loculicidally from apex to base along a persistent central columella. Seeds usually 2–5 in each locule, compressed, with a thin membranous, oblique, unilaterally attached wing; testa soft woody; embryo oblong, straight or slightly oblique; endosperm of a thin layer, enveloping the embryo.

A genus with about seventy species; occurs in SE. Asia and America. Forty or so Asiatic species are found from India, Sri Lanka, Burma, Thailand, Indochina, S. China to Taiwan and southwards to Malesia (the Malay Peninsula, Sumatra, Borneo, Java, the Philippines, Celebes to New Guinea). Thirty or so American species are concentrated in Central America and the West Indies (most of them formerly arranged under the generic names *Haemocharis* or *Laplacea*), with a few species in the northern parts of South America, and only one species (which is the type species) in the southeast of the United States of America.

About 21 species occur in Malesia.

KEY TO THE MALESIAN *GORDONIA* SPECIES

1. Average leaves very large, generally over 15 cm long
 2. Peduncles of flowers generally less than 0.5 cm long
 3. Leaf-apex usually acuminate; nerves 10–11 pairs; flowers 5–6 cm across (the Malay Peninsula) 20. *G. taipingensis*
 3. Leaf-apex usually rounded and mucronate; nerves up to 18 pairs; flowers 3–4 cm across (the Malay Peninsula) 12. *G. multinervis*
 2. Peduncles of flowers usually over 1.5 cm long
 4. Petioles conspicuously winged; sepals persistent in fruit
 5. Capsules broadly ovoid, 2–3 cm long (Borneo: Sabah and Kalimantan) 2. *G. borneensis*
 5. Capsules cylindric, about 5 cm long (Sumatra) 13. *G. oblongifolia*

4. Petioles not winged; sepals caducous in fruit; capsules broadly ovoid, about 5 cm long (Borneo: Sabah)4. *G. grandiflora*
1. Average leaves smaller, generally less than 15 cm long
 6. Average leaves relatively small, usually less than 9.5 cm long
 7. Leaf-apex generally obtuse or rounded, often emarginate; plants often found in montane or lower montane forest
 8. Petals mostly 5, rarely 6, in one whorl; leaves thick coriaceous
 9. Leaves elliptic, 4.5–9.5 cm long (the Malay Peninsula & Borneo)7. *G. imbricata*
 9. Leaves ovate or broadly oblong 2–5 cm long; capsules 2.5–3 cm long (Sumatra)21. *G. vulcanica*
 8. Petals 8–10, in two whorls; leaves thin-coriaceous (the Philippines)16. *G. polisanra*
 7. Leaf-apex mostly acute or acuminate, pointed or blunt and rarely rounded; plants generally found in lowland or at medium altitudes
 10. Ovary 3- (rarely 4-) locular, the 3 (rarely 4) styles free; flowers very small (1.5–1.8 cm across) (the Malay Peninsula)18. *G. scortechinii*
 10. Ovary 5- (rarely 4-) locular; styles fused together into a column, sometimes branched above; flowers various
 11. Number of bracteoles, bracts and sepals rather large (around or over 10) and less clearly differentiated, together forming overlapping perules surrounding the flowers at anthesis (the Malay Peninsula)10. *G. maingayi*
 11. Number of bracteoles, bracts and sepals generally less than 8, and usually differentiated; normally bracteoles and bract caducous and only the sepals present at anthesis
 12. Leaf-apex generally acuminate and obliquely caudate; capsule cylindric, pointed, 3.5–5 cm long (the Malay Peninsula)15. *G. penangensis*
 12. Leaf-apex acute or sometimes acuminate, but rarely caudate; capsules usually less than 3 cm long
 13. Leaves 3–6 cm wide, often glaucescent beneath; flowers 3–3.5 cm across; styles solitary, with a club-shaped tip (Borneo: Sarawak & Sabah)5. *G. havilandii*
 13. Leaves generally less than 3 cm wide, not glaucescent below; flowers less than 2.5 cm across; styles either branched or absent
 14. Nerves visible; style 1.5–2.5 mm long, 5-branched above (Borneo)11. *G. marginata*
 14. Nerves nearly invisible; style absent, only 5 tiny protrusions (less than 1 mm long) on top of the ovary representing the stigmas (Sumatra)14. *G. ovalis*
 6. Average leaves generally between 10 to 14 cm long
 15. Petals 7–8, in one series; ovary 8–10 locular, style absent or very short; fruit broadly ovoid or subglobose (Borneo: Sarawak & Sabah)17. *G. sarawakensis*
 15. Petals 5–6; ovary 5- (rarely 4-) locular; style present; fruit generally ovoid or cylindric

16. Leaf-margin entire, subentire, very rarely serrulate (Java, Bali, Celebes) 8. *G. integerrima*
16. Leaf-margin serrate or serrulate
17. Peduncles of flowers usually less than 0.5 cm long
18. Leaves subsessile or sessile, the blade usually tapering towards the base and winged; capsules 3 or 5 cm long
19. Leaves thin-coriaceous; nerves 10–12 pairs; flowers 4–5 cm across (the Malay Peninsula) 19. *G. singaporeana*
19. Leaves membranous; nerves 12–18 pairs; flowers 2–3.5 cm across (the Malay Peninsula) 12. *G. multinervis*
18. Leaves petiolate, petiole 5–8 mm long; leaf-base not winged; capsules 2 or 2.5 cm long (the Malay Peninsula) 6. *G. hirtella*
17. Peduncles of flowers generally 0.5–1 cm long, sometimes longer
20. Style columnar, the tip enlarged, discoid, shallowly 5- (rarely 4-) lobed
21. Flowers 2.5–3 cm across; capsule 3.5–4.5 cm long (Sumatra and Java) 3. *G. excelsa*
21. Flowers 7–8 cm across; capsules 3–4 cm long (the Philippines) 9. *G. luzonica*
20. Style distinctly 5-branched above (Celebes, Lesser Sunda Isls., Moluccas and New Guinea) 1. *G. amboinensis*

1. *Gordonia amboinensis* (Miq.) Merr., J. Str. Br. Roy. As. Soc. 86 (1922) 332. Fig. 1

Laplacea amboinensis Miq., Ann. Mus. Bot. Lugd. Bat. 4 (1968) 114 (based on *Lignum mucosum* vel *Caju lapia* Rumph., Herb. Amb. III (1743) 203, tab.130).

Haemocharis amboinensis (Miq.) Burk., J. Str. Br. Roy. As. Soc. 76 (1917) 141, 158.

Gordonia rumphii Merr., Interpret. Herb. Amb. (1917) 368.

Gordonia brassii Kobuski, J. Arn. Arb. 21 (1940) 135. **Syn. nov.**

Gordonia papuana Kobuski, op. cit., 136 (incl. var. *acuminata* & var. *montana*); W. R. Barker, Brunonia 3 (1980) 8 f.1. **Syn. nov.**

Gordonia sp. Kobuski, op. cit., 139 (citing *Brass & Versteegh 13169* from W. Irian).

Tree, to 20 (–25) m tall. Bark grey to brown, smooth or shallowly fissured; inner bark beefy red. Young twigs and buds covered with short silky hairs or glabrous. Leaf-blades thin coriaceous or membranous, lanceolate, narrowly ovate to ovate-elliptic, 7–14 (–20) cm long, 3–5.5 (–8) cm wide, apex bluntly acuminate, sometimes obtuse or retuse, base acute or attenuate; margin shallowly crenate to undulate, or subentire; nerves 9–12 pairs, intermingled with less conspicuous veins and merged

and looped into submarginal reticulation; glabrous above, glabrescent and sometimes papillate beneath; petiole 0.5–1 (–1.5) cm long, thickened. Flowers in the upper axils, solitary; peduncle 0.5–1 (–2) cm long, slender. Bracteoles and bracts 2–3, caducous. Sepals 4–5, unequal, deltoid, lunate or broadly ovoid, 4–6 mm long, coriaceous, densely covered with silky hairs externally. Corolla 3–4 cm across, creamy yellow or white; petals 5–6, broadly ovate to subrounded, concave, 1.5–2 cm long, the outer surface sericeous in the central portion and below, glabrous around the margin. Androecium 7–8 mm long, the filaments glabrous, except the base which is covered with short hairs. Gynoecium 5–8 mm long, shortly silky; ovary globose or ovoid, 3–4 mm in diameter; style (4–) 5-branched above. Capsule

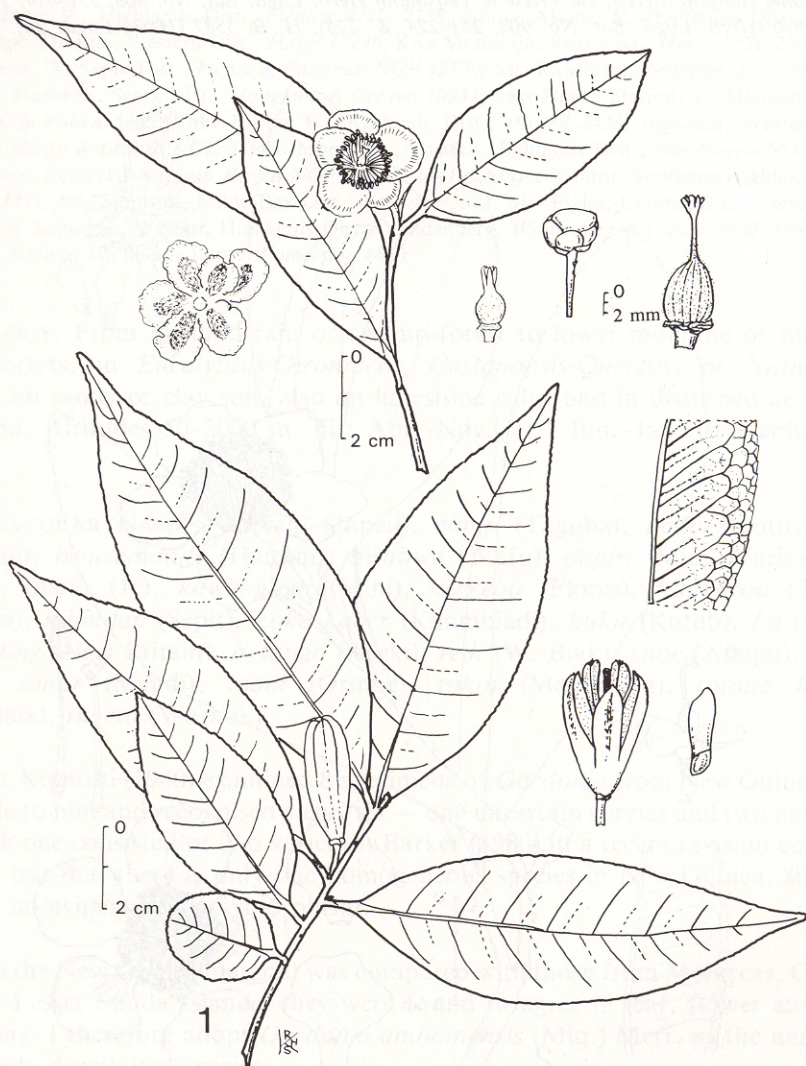


Fig. 1. *Gordonia amboinensis* (Miq.) Merr.

Ambon, Teysmann H. B. 5587 (Herb. Lugd. Bat. No. 908, 249-227) (lectotype); Halmahera, Neth. Ind. For. Serv. 31360 (fr.).

oblong cylindric, 2.5–3 (–3.5) cm long, puberulous, dehiscent into 4 or 5 valves. Seeds about 2 cm long including the wing.

DISTRIBUTION. Malesia (Celebes, Moluccas, Lesser Sunda Isls. and New Guinea) and Bismarck Archipelago (New Britain and New Ireland). (All specimens cited below from L.).

Celebes. Minahassa, Koorders 18910, 18912, 18913, 18914; Molili, *Neth. Ind. For. Serv.* 481.

Moluccas. G. Sembilan, Halmahera, *Pleyte* 341; Ternate, *Neth. Ind. For. Serv.* 24534. P. Buru, *Neth. Ind. For. Serv.* 31360, Ceram, *Eyma* 2214, *Kuswata & Soepadmo* 240. Ambon, *Robinson* 276 (isotype of *Gordonia rumphii* Merr.); *De Vriese & Teijsmann Herb. Lugd. Bat.* No. 908, 251–414; *Teysmann H. B.* 1970 (*Herb. Lugd. Bat.* No. 908, 251–224, & -225), *H. B.* 5587 (*Herb. Lugd. Bat.* No. 908,



Fig. 2. *Gordonia borneensis* H. Keng **sp. nov.**

Kalimantan, *Kostermans* 35063 (fl.); *Kostermans* 13627 (fr.).

249–227, lectotype of *Laplacea amboinensis* Miq.)

Lesser Sunda Isls. Bali, Mt. Batukau complex, *Kostermans et al. KK-SS 137, 174*. Flores, near Wae Mao, *Kostermans 838*; Monde Hill, *Schmutz 3552, 3711*.

Irian Jaya (representative specimens only). Sidoarsi Mts., Hollandia D. 3t, *Iwanggin BW 9037*; Sibil Valley, Star Mts., *Kalkman 4285*; near Andai, SW. of Manokwari, *Koster BW 11798*; near Soendei, Isle of Biak, *Moll BW 9721*; Cycloop Mts., Hollandia Dist., *van Royen 3635*; Mt. Tohkiri, Vogelkop Peninsula, *van Royen & Sleumer 7253*; Tobie, Kebar Valley, *Schram BW 7970*; Aisao, Japen Isl., *Schram BW 10584*.

Papua New Guinea (representative specimens only). Arau, Eastern Highlands Dist. *Brass 32063*; Mt. Dayman, Maneau Range, *Brass 23243*; Torricelli Mts., W. Sepik Dist., *Darbyshire 358*; near Lake Birip, Wabag, W. Highlands Dist., *Flenley ANU 2738*; Above Akuna, E. Highlands Dist., *Hartley 11986*; upper Oriomo, Western Dist., *Havel 17246*; Kwa Mountain, Rossel Isl., *Henty NGF 27071*; near Frieda River, W. Sepik Dist., *Henty & Foreman NGF 42579*; Mt. Rawlinson, Morobe Dist., *Hoogland 9262*; Mt. Hunstein, Sepik Dist., *Hoogland & Craven 10951*; near Hagen Station, W. Highlands Dist., *Hoogland & Pullen 5965*; Lake Erobo, S. Highlands Dist., *Powell 2423*; Ingembit, Western Dist., *Ridsdale, Henty & Galore NGF 31943*; Marapuna, Eastern Highlands Dist., *van Royen NGF 15053*; Mt. Kumme, Central Dist., *van Royen NGF 20346, 20416*; Above Kiburu, Southern Highlands Dist., *Schodde 1371*; Mt. Simpson, Milne Bay Dist., *Schodde 5522*; Mt. Pigini, Central Dist., *Stevens LAE 50449*; near Kapiaggo, Western Highlands Dist., *Vandenberg, Womersley & Galore NGF 39995*; near Nondugl, Eastern Highlands Dist., *Womersley 4860*.

ECOLOGY. From lowland rain or swamp-forest to lower montane or montane moss forests, in *Eucalyptus-Gironniera*, *Castanopsis-Quercus*, or *Nothofagus* forests; on sandy or clay soil, also on limestone ridge and in disturbed areas and grassland. Altitudes 50–2000 m. Fl.: Apr.–Nov., fr.: Jun.–Jan. (few collections only).

VERNACULAR NAMES: *adikelp* (Japen), *alimp* (Tagoba), *bado* (Motus), *baif* (Gab-gab), *benelemonde* (Hattam), *bwabwa* (Wafu), *dapiri* (Mid. Waria), *dimi* (Kiwai), *iniaili* (Je), *kawal-gugn* (Mini), *kerkebo* (Flores), *kimkaroo* (Tehid), *la* (Enga), *kilimdan* (Sepit), *koka kabere* (Knambiadi), *kuku* (Kutub), *La* (Enga), *naningning* (New Britain), *oytungo* (Aseki), *reik* (W. Biak), *sjioe* (Andjai), *tawan* (Wipi), *timor* (Mendi), *toani* (Ormoe), *tokoi* (Manikiong), *totona Rombo* (Garumaia), *tugera* (Waskuk).

NOTE. Kobuski (1940) examined 8 specimens of *Gordonia* from New Guinea then available to him and recognised 4 entities — one uncertain species and two new ones of which one consisted of two varieties. Barker (1980) in a recent revision correctly pointed out that there is only one homogeneous species in New Guinea, showing little or no evidence of polymorphism.

When the New Guinea material was compared with those from Moluccas, Celebes and the Lesser Sunda Islands, they were found to agree in leaf, flower and fruit characters. I therefore adopt *Gordonia amboinensis* (Miq.) Merr. as the name for this widely distributed species.

Regarding the field notes of numerous collectors, the following two are noteworthy: on *Brass 23243* was stated that the flowers are 6–6.5 cm in diameter; this appears much larger than the usual size (3–4 cm in diameter). *Schram BW 10584* indicated

the flowers are pink; all the others are recorded as white, creamy white or creamy. Some specimens from Flores (e.g. *Schmutz 3711*) have much smaller capsules (less than 2 cm long) which are probably immature or from trees growing on extremely poor soil. They also may represent a new entity.

Gordonia amboinensis is closely allied to *G. excelsa*. The two are quite similar in shape and venation of their leaves. However, they can be differentiated by their shape and size of the flowers and geographically they are more or less demarcated.

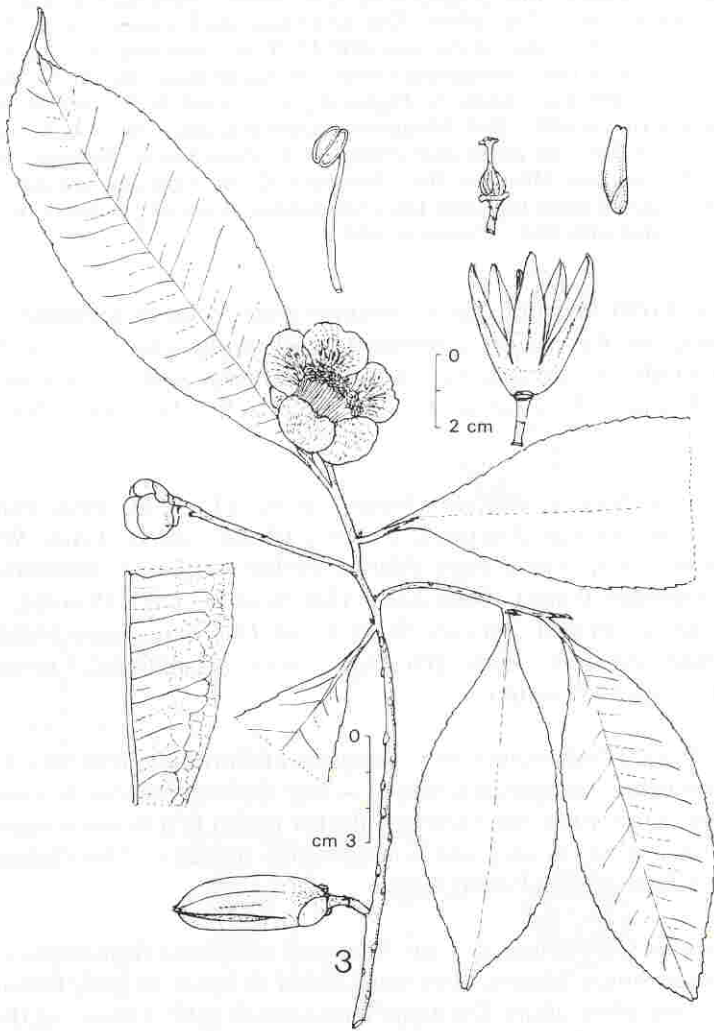


Fig. 3. *Gordonia excelsa* (Bl.) Bl.

Java, Cult. in Hort. Bog. No. 161 (Anno 1901); Koorders 14735 (fr.).

2. *Gordonia borneensis* H. Keng, sp. nov.

Fig. 2

Arbor 20–30 m alta. Folia angusto-elliptica, angusto-obovata vel oblanceolata, 18–25 (–30) cm longa, apice acuta vel cuspidata, basi attenuata vel cuneata, coriacea tenui, nervis lateralibus 20–22, petiolo 3–5 mm longo. Flores flavi, axillares, solitarii, 6–7.5 cm diametro; bracteae 2, caducuae; sepala 5, subrotundata, 1–1.2 cm longa; petala circa 10, 1.5–3.5 cm longa. Gynoecium 2.5–3.5 cm longum; styli ad apicem discoideum. Capsula obovoidea, 2–3 cm longa, valvis 5. – Typus: E. Kalimantan, *Kostermans 7084*, in L.

A tree, 20–30 m tall. Bark greyish brown, smooth, or minutely fissured; young branches stout, glabrescent. Leaf-blades thin coriaceous, narrowly elliptic, narrowly obovate or oblanceolate, apex acute or obliquely cuspidate, base attenuate or cuneate and narrowly winged, 18–25 (–30) cm long, 6.5–7.5 (–10) cm wide; margin finely crenulate-serrulate for the most part, subentire or entire near the base; side veins 20–22 pairs, further intermingled with less distinct and smaller ones in between and intricately interlooped near the margin; glabrous on both surfaces, thinly puberulous on the midrib beneath; petiole 2–5 mm long, thickened. Flowers solitary, in upper leaf-axils, sometimes several together on the branch tips; peduncle 1.5–2.5 cm long, often elongate and much thickened after anthesis. Bracts 2, a short distance below the calyx, caducous. Sepals 5, suborbicular, 1–1.2 cm long coriaceous, silky-hairy externally. Corolla 6–7.5 cm across, yellow to bright yellow (*vide* *Kostermans*); petals about 10, in 2 series, sericeous externally, petals of the outer series thicker (thin coriaceous) and smaller (1.5–2 cm long), broadly oblong or sub-rounded, somewhat intermediate between sepals and the inner petals; petals of the inner series thinner (membranous) and larger (2.5–3.5 cm long), broadly ovate or broadly oblong, apex often notched, base sometimes abruptly narrowed, 2.5–3.5 cm long. Androeium 1.2–1.5 cm long; stamens numerous, in 3–4 whorls, connate below, the filaments glabrous. Gynoecium 2.5–3.5 cm long; style 1, 1.5–2 cm long, the tip discoid, shallowly 5-lobed into stigmas; ovary ovoid, 1–1.5 cm long, densely covered with yellowish brown hair. Capsule obovoid, 5-angulate, 2–3 cm long; calyx persistent. Seeds about 2 cm long including the wing.

DISTRIBUTION. Malesia (Brunei, Sabah and Kalimantan).

Brunei. Kuala Sebatu, *Ashton BRUN 354* (BO, L, SING).

Sabah. Monsapol F. R., Sipitang, *Aban Gibot SAN 65950* (L); Kalabakan, Tawau, *Bakar SAN 24974* (BO, L, SING); Benawood, Tawau, *Felilis & Sumbing SAN 88140, 88418* (SAN); Sandakan, *J. Singh SAN 53427* (L, SING); Ulu Dusun, Sandakan, *Tarodop SAN 87724* (SAN); Beaufort, *Wood & Kapis SAN 16984* (BO, L, SAN, SING).

Kalimantan. Tg. Bangko, near mouth of Sg. Mahakam, *Kostermans 7084* (L, holotype; BO, isotype); Sangkulirang, Karangan River, *Kostermans 13627* (BO, L); Sg. Tiram Balikpapan, *Kostermans 35063*; Landak, W. Borneo, *Ngabang 6410* (L).

ECOLOGY. In primary forests, on low ridges in sandy soils or on seasonally inundated riverine alluvium. Alt. 20–100 m. Fl. May–Aug.; fr.: Aug–Oct.

VERNACULAR NAMES: *obah* (Sabah), *rawali batu* (Kalimantan).

NOTE. This species differs from *G. grandifolia* Merr. and *G. oblongifolia* Steenis in that the flowers have about 10 petals in two series (instead of 5 petals in one series) and in the much smaller fruits and seeds.



Fig. 4. *Gordonia grandiflora* Merr.

Sabah, Wood SAN 16185 (fr.); Meijer SAN 94245 (fl.).

3. *Gordonia excelsa* (Bl.) Bl., Bijdr. (1825) 130; Miq., Fl. Ind. Bat. 2 (1857) 489; Koord. & Val., Med., 's Lands Pl. Tuin (1896) 289 (incl. var. *macrocarpa* K. & V.); Koord., Exk. Pl. Jav. 2 (1912) 608; Koord. -Schum. Syst. Verz. fam. 180 (1913) 35; Burk., J. Str. Br. Roy. As. Soc. 76 (1917) 155; Merr. Contr. Arn. Arb. 8 (1934) 106; Back. & Bakh. f. Fl. Jav. 1 (1963) 320. Fig. 3

Schima excelsa Bl., Cat. (1823) 80.

Antheeschima excelsa (Bl.) Korth., Kruidk. (1842) 138, t. 27.

Gordonia acuminata Choisy in Zoll. Syst. Verz. 2 (1854) 144.

Small or large tree, to 40 m tall. Bark smooth, greyish brown. Young twigs slender, covered with soft yellow hairs or puberulous; old branches glabrescent.

Leaf-blades thin coriaceous or membranous, elliptic or narrowly elliptic or oblong-lanceolate, apex obtuse or acuminate, base attenuate, (7-) 10-14 (-20) cm long, (2.5-) 3.5-4.5 (-6) cm wide, equal or sometimes slightly bent and unequal-sided; margin remotely serrulate; midrib impressed above and elevated below; nerves 12-15 pairs, connected and merged into submarginal reticulation; glabrous above, appressed pubescent beneath; petiole 0.5-1 cm long, puberulous. Flowers in axils of the upper leaves or subterminal, usually solitary; peduncle 0.5-1 (to 2 cm in fruit) cm long, stout, velutinous. Bract and bracteoles about 3 caducous. Sepals 5-6, unequal, reniform to suborbicular, 7-8 mm long, sericeous. Corolla 2.5-3.5 cm across, white, fragrant; petals 5-6, deltoid-reniform, often concave and notched, 1-1.7 cm long, 1.2-2 cm wide, thin coriaceous, sericeous on both sides except the edge of the inner surface, which is glabrous. Androecium about 1 cm long; filaments nearly glabrous and briefly united below. Gynoecium about 1 cm long; style 1, stout, 5-6 mm long, glabrescent, the tip disk-shaped, shallowly undulate or shortly lobed into 5 stigmas; ovary globose, 4-5 mm across, densely sericeous. Capsule cylindric, 3.5-4.5 (-5) cm long, bluntly angulate, pubescent, dehiscing into 5 valves. Seeds 2-2.5 cm long including the wing.

DISTRIBUTION. Malesia (Sumatra & Java).

Sumatra. Without precise locality, *Forbes* 2053 (L). West Coast, *Neth, Ind. For. Serv.* 2860, 2878 (L).

Java. G. Loechoer, *Bakhuizen v/d Brink* 7146 (L); G. Salak, *Blume Herb. Lugd. Bat.* 908, 251-415, -421 (lectotype), -422, -431 (L); without locality, *Houtsoorten van Gedeh* 638 (L), *Junghuhn* 73, 83; Besuki, *Koorders* 14735 (holotype of *G. excelsa* Bl. var. *macrocarpa* K. & V.), 20381, 28675, 32342 (L), *Sukari FRI* 7525; Java, *Teysmann s.n. in* 1860 (L); Preanger, *Winckel* 486 (L) *Wind s.n. in* 1918 (L).

ECOLOGY. In primary forests, altitude 600-1700 m. Fl.: Apr.-Nov. fr.: Jun.-Feb.

NOTE. This is the first Asiatic species described under *Gordonia*, a genus previously known only from N. America.

4. *Gordonia grandiflora* Merr., J. Str. Br. Roy. As. Soc. 86 (1922) 331; Masamune, Enum. Phan. Born. (1942) 472. Fig. 4

Small or large tree, 10-28 m tall. Bark greyish brown fissured or scaly. Branchlets stout, glabrescent. Leaf-blades coriaceous, elliptic, narrowly elliptic or obovate, sometimes oblanceolate, 15-25 (-35) cm long, 6.5-8 (-10) cm wide, apex obtuse or abruptly acute, base attenuate, decurrent and narrowly winged or sometimes rounded; margin crenulate; nerves 13-16 pairs; glabrous above, scattered with short hairs beneath; Petiole 3-5 mm long, thickened. Flowers solitary, in upper leaf-axils; peduncles 2-3 cm long, stout. Bracts and sepals not seen. Corolla 8-9 cm across, white; petals 5, membranous, pubescent externally, broadly oblong or obovate, 4-4.5 cm long, narrowed beneath, sometimes notched or bilobed above. Androecium 1.5-2 cm long, the filaments pubescent, connate only at the base and adnate to the corolla. Gynoecium not seen. Fruit (nearly mature) broadly ovoid, about 5 cm long; dehiscing into 5 valves. Seeds about 4 cm long including the wing.

DISTRIBUTION. Malesia (Sabah).

Sabah. Rosab, near Kudat. *P. Castro* 972 (A, isotype [photo]); Ranau, Kinabalu National Park, *Aban Gibot* SAN 76577, 76605, 76608 (SAN), *Meijer* SAN 94245 (SAN); Kota Belud, Kandasau, *Wood & Kapis* SAN 16185 (B, SING).

ECOLOGY. In primary forest, on hill side or on dry slopes; alt. 50–1,300 m. Fl.: Sept. & Nov. (2 collections); fr.: Feb. (1 collection).

NOTE. This species, as mentioned in some of the field notes is common in the Kinabalu National Park. However, among the material available, only *Meijer* 94245

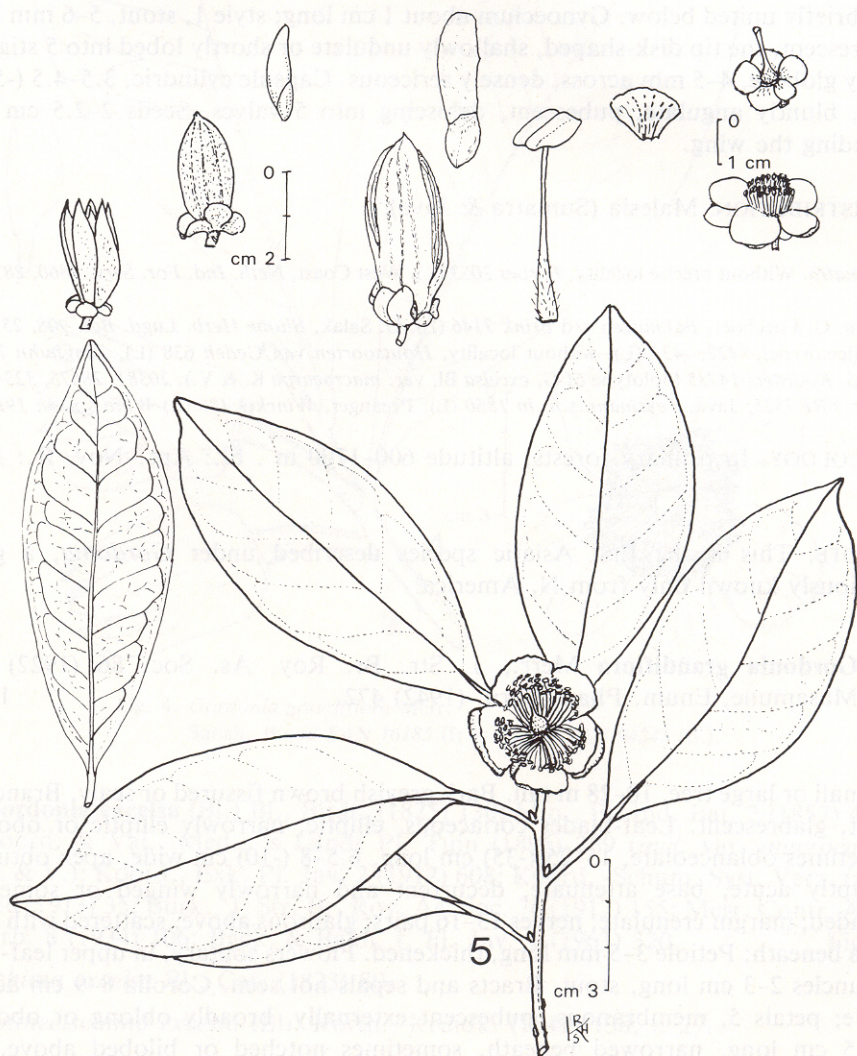


Fig. 5. *Gordonia havilandii* Burk.

Sarawak, *Haviland* 1995 (syntype, fl.); *Rosali* S 15184 (fr., immature). Sabah, *Amin G. et al.* SAN 93856 (fr., mature).

bears a detached corolla, and *Wood & Kapis 16185* (2 specimens) bears two nearly mature fruits, the others being sterile. A photo of the type (*Castro 972*) was made available through the courtesy of the Director of the Arnold Arboretum, Harvard University.

In Merrill's original description, the sepals are "coriaceous, broadly ovate to orbicular-ovate, rounded, glabrous or slightly pubescent, 1.5–2 cm long and somewhat accrescent in anthesis", the ovary is "pubescent" and the style is "slender, glabrous, up to 2.5 cm long". He also mentioned that the flower is "10–11 cm in diameter". This is larger than in *Meijer 94245*, which is 8–9 cm across.

This species is related to *G. oblongifolia* of Sumatra. Because of the scarcity and imperfection of fertile materials in both species, close comparisons cannot be made at the present.

5. *Gordonia havilandii* Burk., J. Str. Br. Roy. As. Soc. 76 (1917) 157; Merr., op. cit. spec. no. 20 (1921) 389. Fig. 5

Small to medium-sized tree about 25 m tall and 30 cm in diameter. Bark smooth, hoop-marked, mauve brown and grey. Young twigs slender, covered with yellow or black hispid hairs. Older branches greyish brown, glabrescent. Leaf-blades chartaceous or thin coriaceous, elliptic, rarely narrowly or broadly elliptic, obtuse or acuminate, occasionally cuspidate, base cuneate or attenuate, 7–10 (–12) cm long, 3–6 cm wide, symmetrical or sometimes slightly unequal; margin entire or nearly so; midrib impressed above, tomentose and glaucescent beneath; nerves 9–10 pairs, less conspicuous above; petiole slender, 1–1.5 cm long, puberulent. Flowers subterminal and in upper axils, solitary or 2–3 together; peduncles 2–3 mm long, hispid. Bracteoles and bracts 2–3 silvery puberulous, orbiculate-deltoid, 2–3 mm long. Sepals 5–6 suborbicular, 7–8 mm long leathery, sericeous externally. Corolla 3–3.5 cm across, yellow or pale yellow; petals 5–6, suborbicular to reniform, 0.8–1.2 cm long, thin leathery, concave, sericeous externally. Androecium 6–7 mm long, the filaments thinly sericeous in the lower part, and united at the base. Gynoecium about 1 cm long; style 1, 6–7 mm long, glabrescent; stigmas 5, very short; ovary globose, 3–4 mm across, densely sericeous. Capsule cylindric, 2.5–4.5 cm long, 1.2–2 cm across, pointed, bluntly 5 angled, thinly strigose; calyx persistent. Seeds about 2–4 cm long including the narrow wing.

DISTRIBUTION. Malesia (Borneo, known only from Sarawak and Sabah).

Sarawak. Mt. Serapi, alt. 900–1000 m, *Haviland 67* (SING, holotype), 1995 (L, SING, syntype); Burgh Range, near Summit, *Anderson et al. S 29323* (L); Ulu Kenyana, Mukoh, *Ashton S 195492* (SING); Mt. Meroyang, Ulu Lundu, *Ashton S 18861* (L); Semengoh F. R., *Banyeng & Benang S. 25490* (L, SING), *Banyeng & Jugah S 26882* (L), *Rosli S 15184* (L); Mt. Santubong, *Chew 1386* (L, SING); Bt. Lambir, Miri, *Dan bin Hj. Bakar 3090* (L); Sg. Belaban, Lawas, *Ilias S 26319* (L).

Sabah. Telupid, Sandakan, *Aban Gibot & Joseph SAN 94036*; Kiabau, Beluran, *Amin G. et al. SAN 39856*; Sg. Korang, Lamag, *Madani SAN 76315*; Tongod, *Sundaling SAN 90348* (all in SAN).

ECOLOGY. In heath or fagaceous forests, from lowland to the summit of sandstone hills; alt. 15–1850 m. Fl.: Aug.–Nov., fr.: Dec, Mar. & Aug.

VERNACULAR NAME: *linggai*.

NOTE. This species can be recognized by the elliptic leaves with a tomentose and glaucescent undersurface.

6. ***Gordonia hirtella*** Ridl., J. Str. Br. Roy. As. Soc. 73 (1916) 142; Burk., op. cit., 149, f. 7; Ridl., Fl. Mal. Pen. 1 (1922) 204; H. Keng in Ng, Tr. Fl. Mal. 3 (1978) 285. Fig. 6

Tree, 20 m high; bole coarsely and shortly fluted. Bark grey, smooth-rugulose. Young branches slender, silky-pubescent. Leaf-blades thin coriaceous, elliptic, elliptic-lanceolate or narrowly ovate; apex acute or acuminate, base cuneate or



Fig. 6. *Gordonia hirtella* Ridl.

Malaya, Ridley 7350 (isotype, fl.); Whitmore FRI 20049 (fr.).

attenuate, 6–13 (–15) cm long, 2.5–4 (–5) cm wide; margin crenulate-serrate or subentire; nerves and reticulations barely visible above, indistinct below; shining dark green and glabrescent on the upper surface, light green, strigose on and around the midrib especially near the base on the lower surface; petiole 3–6 mm long, densely hispid. Flowers subterminal or in leaf-axils, usually solitary, densely covered with greyish yellow hairs externally; peduncles subsessile or very short (2–3 mm long), appressed silky. Bracteoles and bracts about 3, 1–2 mm long. Sepals about 5, ovate to broadly orbicular, 3–5 mm long. Corolla 2–2.5 cm across, cream in colour; petals 5, oblong to broadly obovate, 1–1.2 cm long, briefly joined at the base. Androecium 4–5 mm long, the filaments connate below and adnate to the corolla tube. Gynoecium 5–6 mm long, the ovary densely covered with greyish yellow hairs, the style and its branches glabrescent. Capsule 2–2.5 cm long, 5-valved, puberulous; sepals persistent. Seeds 1.5–2 cm long including the wing.

DISTRIBUTION. Malesia (the Malay Peninsula)

The Malay Peninsula, Perak, Batu Puteh, Wray 1116 (syntype, SING). Selangor, Bt. Kutu, Ridley 7350 (isotype, SING); Bt. Etam, Kelsall 1848 (SING). Pahang, Sg. Telom Ridge, Whitmore FRI 20049 (L).

ECOLOGY. In forests and on ridges; alt. 400–1000 m. Fl.: June, fr.: May.

NOTE. Burkill (l.c.) stated that this species “occurs on the central chain of mountains of the Malay Peninsula from Gunong Batu Puteh in Perak to the west of Tapah . . . through Bukit Kutu in Selangor . . . to Bukit Etam . . . on the Selangor Negri Sembilan boundary”. Apart from the specimens cited by Ridley and Burkill, which were all collected near the end of the last century, the only single recent collection referable to this species was the collection made by Whitmore from Sg. Telom ridge in NW. Pahang.

7. ***Gordonia imbricata*** King, J. As. Soc. Bengal 59, 2 (1890) 204, Ann. Roy. Gard. Calc. 5 (1896) 148, *pl.* 179; Burk., *op. cit.*, 157, *f.* 15; Ridl. Fl. Mal. Pen. 1 (1922) 203; H. Keng in Ng, *op. cit.*, 285. Fig. 7

Low shrub or stout tree, to 15 m tall. Bark brown, finely cracked. Young twigs stout, glabrescent or thinly covered with scattered pilose hairs; older branches often finely fissured. Leaf-blades coriaceous or thick coriaceous, narrowly elliptic to oblanceolate or elliptic; apex obtuse or rounded, sometimes shallowly retuse, base cuneate, 4.5–9.5 (–12) cm long, 2–4 (–5) cm wide; margin remotely undulate or entire, sometimes revolute; midrib sulcate above; nerves about 10–12 pairs, barely visible above, and obscure beneath; drying green; glabrous above, brownish, verruculous and subglaucous beneath; petiole stout, 0.5–1.5 (–2) cm long, puberulous. Flowers axillary or subterminal, solitary or 2–4 and congested near the tip; peduncle absent or very short (1–2 mm long, stout). Bracteoles, bracts and sepals forming an involucre about 1–1.5 cm high, densely woolly externally, and increasing in size from the lower bracteoles (deltoid, 2–3 mm long) to the upper sepals (broadly ovoid to suborbicular, 8–10 mm long). Corolla 2.5–3.5 cm across, white to butter yellow (*vide* Whitmore); petals 5, suborbicular to reinform, 1.2–1.7 cm long, for the most chartaceous and glabrous except the lower portion which

is coriaceous and woolly and similar to the sepals. Androecium 8–10 mm long, the filaments velutinous and connate below, Gynoecium 8–9 mm long; style thick, columnar, 2–3 mm long, briefly 5-branched near the tip, glabrous except the lower portion; ovary globose, 5–6 mm long and wide, densely covered with golden velutinous hairs. Capsule cylindric, 4–5 cm long, strigose, dehiscent into 5 valves; sepals persistent until the dehiscence of the capsule. Seed 3–3.5 cm long including the wing.

DISTRIBUTION. Malesia (the Malay Peninsula and Borneo (Sabah)).

The Malay Peninsula. Perak, G. Kerbau, *Robinson s.n.* in June 1913, *Scortechini 402 b* (SING, duplicate of type). Kelantan, G. Stong, *Symington 37695* (SING); Gua Ninik, *Henderson SFN 19745* (SING); G. Rabong, *Soepadmo & Mahmud 1063* (L). Pahang, G. Tahan, *Kloss 12108, 12296* (SING),

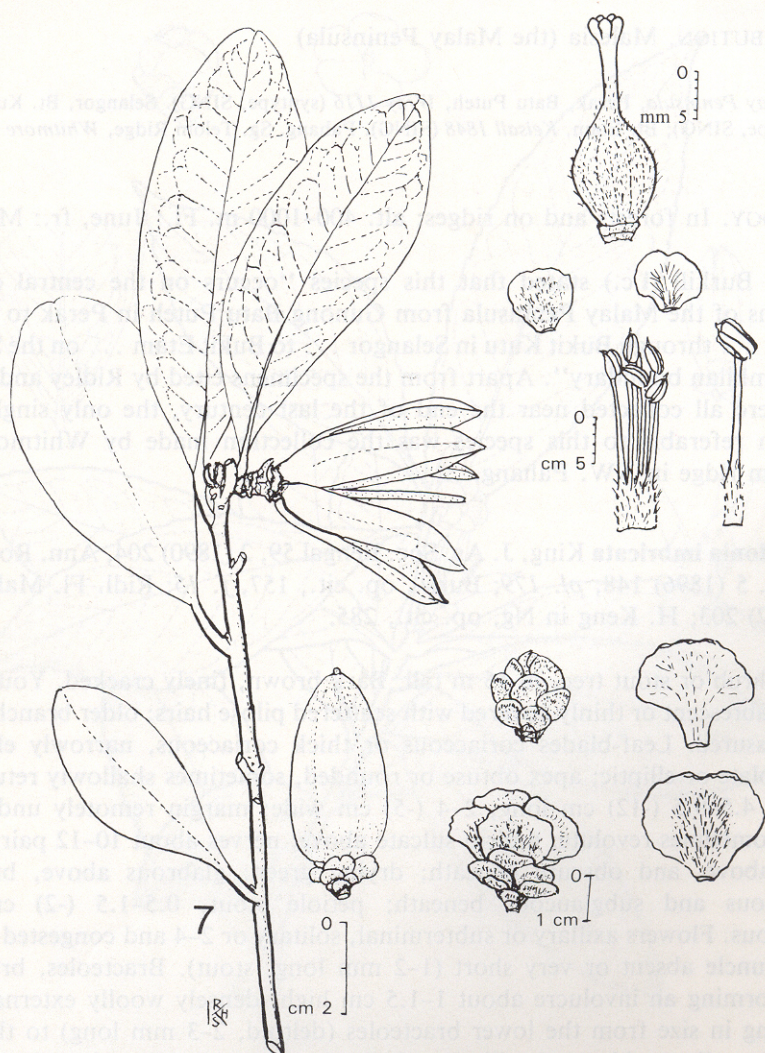


Fig. 7. *Gordonia imbricata* King
Malaya, Ng KFN 98043 (fr.); Whitmore KFN 8727 (fl.).

Ridley 16021, 16263 (SING), Md. Haniff & Md. Nur 7885 (SING), Seimund 566 (SING), Holtum 20707 (SING), Corner s.n. in Sept. 1937 (L); Cameron Highlands, Wyatt-Smith KFN 94594 (L); G. Rapis, Symington & Kiah 28909 (SING). Trengganu, G. Tabu, Md. Shah et al. 3284 (SING); G. Pandan, Whitmore FRI 12673 (L), Kiah SF 33358 (SING). Johore, G. Blumut, Holtum 10719 (SING), Md. Shah & Samsuri 2227 (SING), Ng KFN 98043 (SING, L), Whitmore KFN 8727 (SING, L), Suppiah FRI 17839 (SING, L).

Sabah. Mt. Kinabalu, J. & M. S. Clemens 50720 (L), Kokawa & Hotta 5628 (SAN), Hotta 3780 (SAN), Meijer SAN 29197 (SAN).

ECOLOGY. In lower and upper montane forests, on ridges or in *Leptospermum* scrub. Alt. 1000–2300 m; once recorded at 650 m (Henderson SFN 19745). Fl.: Mar.–Sept., fr.: Sept.–Jan.

NOTE. This species is allied to *G. vulcanica* of W. & Central Sumatra. Both species are characterized by the sessile flowers with woolly, imbricate bracteoles, bracts and sepals. Both occur at high elevations. They differ from each other in shape, size and venation of the leaves and in the detailed structures of the flowers and fruit.

Original materials of *G. imbricata* King were collected from the northern Malayan mountains (at about 1700–2200 m). Several recent collections from G. Blumut (at about 1000–1100 m) in S. Johore match well with the original except that the leaves are slightly thinner and the venations clearly visible, and the flowers slightly larger in dimension (3.5 cm vs. 2.5 cm across). It also occurs in Mt. Kinabalu at about 1400–2300 m.

8. *Gordonia integerrima* [T. & B., Cat. Hort. Bog. (1866) 204. *nom. nud.*] (Miq.)
H. Keng, **comb. nov.** Fig. 8

Laplacea integerrima Miq., Mus. Bot. Lugd. Bat. 4 (1869) 113; Back. & Bakh.f., Fl. Java 1 (1963) 321.

Haemocharis integerrima (Miq.) K. & V. Med. 'S Lands Pl. Tuin 16 (1896) 294; Burk. J. Str. Br. Roy. As. Soc. 76 (1917) 151.

Haemocharis serrata K. & V., op. cit., 296, **syn. nov.**

Laplacea serrata (K. & V.) Melch. in E. & P., Pflanzenfam. ed. 2, 21 (1925) 136; Back. & Bakh.f., l.c. **syn. nov.**

A tree, 18–30 m tall. Bark smooth, dark brown. Branches and branchlets terete, glabrous. Leaf-blades thin-coriaceous, narrowly elliptic, or oblong-ob lanceolate, apex acuminate, obtuse, rounded or subemarginate, base acute, 7–14 (–16) cm long, 2.5–3.5 (–4.5) cm wide; margin entire, subentire or the upper half (or two-thirds) finely serrulate, nerves (less clearly defined) about 9–11 pairs, anastomosing and twining into submarginal network, glabrous on both surfaces; midrib slightly sunken above, and elevated below; petioles 3–5 mm long, glabrous. Flowers in upper axils, solitary or two to several together; peduncles 2–4 mm long. Bracts 2–3 on the peduncle slightly below the calyx, early caducous. Sepals 5–6, unequal, broadly ovate to reniform, pubescent externally. Corolla 2–3 cm across, white;

Gynoecium 1.2–1.6 cm long, pubescent; ovary ovoid, 6–8 mm long with apical

petals 5-6, broadly oblong to rounded, concave, briefly joined below, varying from 0.6-1.4 cm long, thin-coriaceous. Silvery hairy on the outer surface except the upper margin which is thin and glabrous. Androecium 5-8 cm long, the filaments shortly united below. Gynoeceum 6-8 mm long; style 3-3.5 mm long, the upper half to two-thirds 5-branched, glabrous, the lower half of the style and the ovary densely covered with long yellowish brown hairs; ovary globose, 3-5 mm long and across. Capsule cylindric-ellipsoid, 5-grooved, sparsely pubescent 2.5-3 cm long, dehiscing into 5-valves; sepals persistent.

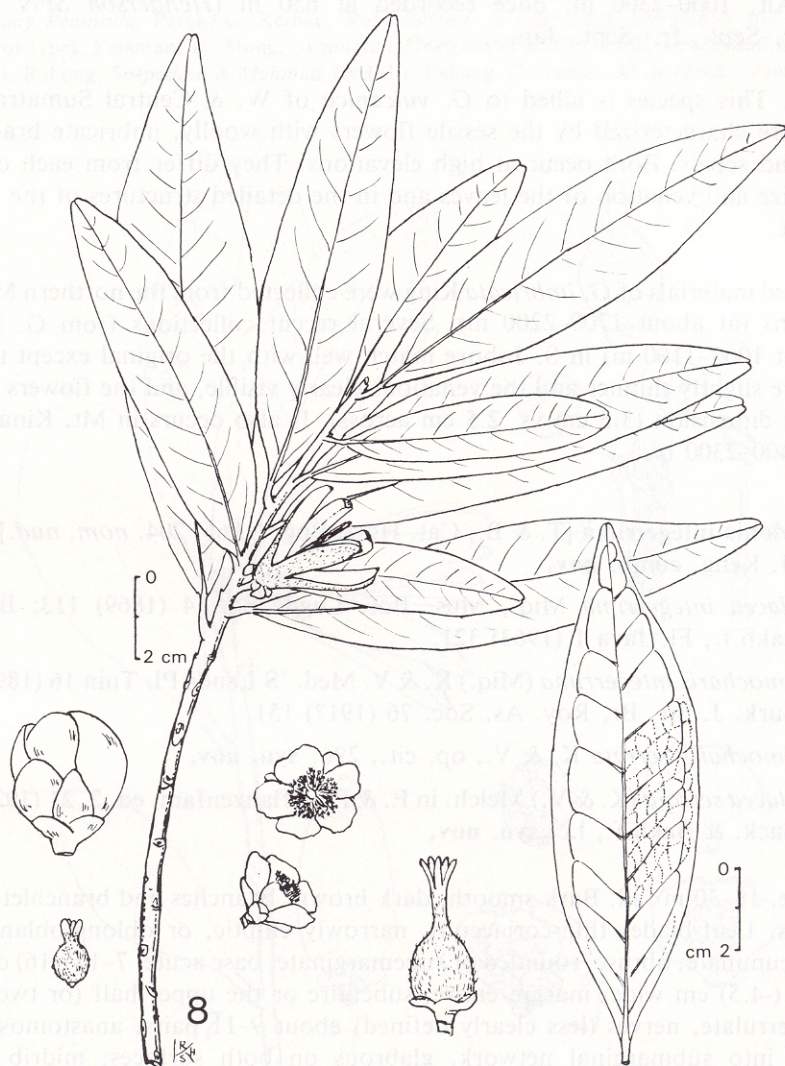


Fig. 8. *Gordonia integerrima* (Miq.) H. Keng **comb. nov.**

Java. *Teysmann s.n.* (Herb. Lugd. Bat. 908, 249-234 & 237).

DISTRIBUTION. Malesia (Java, Bali, Celebes).

Java. Locality unknown, *Teysmann s.n.* (*Herb. Lugd. Bat.* 908, 249-237) (lectotype of *Laplacea integerrima* Miq., L); G. Poelasari, Banten, *Koorders* 8202 (isotype of *Haemocharis serrata* K. & V., L); Tjibodas, Preanger, *Koorders* 10018, 15760, 15761, 24352, 37271 (L); Bandung, *Seekaria* 180 (FRI Ja 7458) (L).

Bali. Collector unknown, *Herb. Lugd. Bat.* 980, 249-283 (L).

Celebes. Minahassa, *Koorders* 18099 (L); Menado, *Neth. Ind. For. Serv.* 18095 (L), 18100 (SING).

ECOLOGY. In primary forests, alt. 1000-1850 m. Fl.: Jan., Jun. & Oct., fl.: Oct. (one collection).

NOTE. The name *Gordonia integerrima* T. & B. appeared first as a *nomen nudum* in the unpublished Catalogue of the Botanic Gardens, Buitenzorg. This name is thus invalid and without nomenclatural status. Miquel adopted the specific epithet in describing his new species.

An isotype of Koorders & Valetton's '*Haemocharis serrata*' has been studied and found indistinguishable from this species.

9. ***Gordonia luzonica*** Vidal, *Rev. Pl. Vasc. Filip.* (1886) 57; Merr. & Rolfe, *Philip. J. Sc. (Bot.)* 3 (1908) 114; Burk., *J. Str. Br. Roy. As. Soc.* 76 (1917) 149, f. 8; *Philip. J. Sc.* 15 (1919) 478; Merr., *Enum. Philip.* 3 (1923) 70. Fig. 9
Gordonia fragrans Merr. *Philip. J. Sc.* 1 (1906) Suppl. 95.

G. welbornei Elm. *Leafl. Philip. Bot.* 2 (1908) 500; Burk., *J. St. Br. Roy. As. Soc.* 76 (1917) 150.

G. benguetica Burk. *Philip. J. Sc.* 15 (1919) 478; Merr. *Enum. Philip.* 3 (1923) 70. **Syn. nov.**

?*G. subclavata* Burk. *Philip. J. Sc.* 15 (1919) 478; Merr., *op. cit.* 71.

?*G. sp.* Burk., l.c.; Merr., *op. cit.* 71.

Small to large tree, 10-50 m. tall. Bark thick, greyish, scaling in plates on old trees. Branches spreading; branchlets puberulous. Leaf-blades thin-coriaceous or membranous, elliptic, narrowly obovate or oblanceolate, 5-13 cm long, 2.5-5.5 cm wide, apex acute or obtuse and abruptly acuminate, sometimes rounded, base cuneate or attenuate; the upper half or two-thirds finely serrulate or crenulate, entire near the base; nerves 9-12 pairs, intermingled with less distinct ones; dark green, glabrous above, lighter, more or less puberulose beneath; petiole 2-5 mm long. Flowers subterminal or in upper axils, solitary; peduncles 0.5-1 cm long, stout. Bracts 2-3, caducuous. Sepals 5, broadly ovoid to deltoid, 0.5-1.2 cm long, sericeous externally. Corolla 7-8 cm across, light yellow or creamy white; petals 5, broadly oblong or suborbiculate, 3-3.8 cm long, united below, densely covered with short yellowish hairs throughout the external surface and in the middle basal portion on the internal surface. Androecium 1.2-1.5 cm long, the filaments puberulous. Gynoecium 1.2-1.6 cm long, pubescent; ovary ovoid, 6-8 mm long; style approx-

imately the same length of ovary, rather thick, enlarged at the top, 5-lobed. Capsule broadly cylindric, 3–4 cm long, tapering or nearly rounded above, dehiscent into 5 valves; calyx persistent. Seeds 2.5–3.2 cm long, including the wing.

DISTRIBUTION. Malesia (the Philippines).

Philippines. Luzon, Mt. Mariveles, Bataan, *Borden 809* (SING); Baguio, *Curran 5083* (isotype of *G. benguetica* Burk., SING); Mt. Bulusan, Sorsogon, *Edano & Gutierrez 38465* (L), *Elmer 16373* (L); Llavac, Real, *Lagrimas 521* (L); Apunan, *Meijer 2596* (SING); Panai, Benquet, *Santos 31755* (L, SING); Bontoc to Baguio, *Steenis 17973* (L), Mt. Bulusan, Sorsogon, *Sulit PNH 2754* (L, SING). Mt. Suiro, Biliran Isl., *Sulit PNH 21481* (L). Negros, Dumaguete, Negros oriental, *Elmer 9584* (isotype of



Fig. 9. *Gordonia luzonica* Vidal

Philippines, *Sulit PNH 21481* (fl.); *Lagrimas EPRI 521* (fr.).

G. welborni Elm., L). Mindanao, Mt. Apo, Davao, *Elmer 11217* (L); Kulasihan, Lanao, *Simajon FB 3063* (L).

ECOLOGY. In primary forests and on exposed ridges. Altitude 600–1300 m. Fl.: Feb.–Aug., fr.: Apr.–Dec.

NOTE. Burkill (1919) examined a loan of *Gordonia* specimens (under the name *G. luzonica* Vidal) from the herbarium of the Bureau of Science, Manila, and found five different forms which he called ‘species’ with a caution that “other authors may perhaps not concede more than varietal rank to one, or possibly even two of them”.

Most of the specimens he cited were probably destroyed during the War. At present only one sheet, namely the isotype of *G. benguetica* Burk., is available to me. Burkill emphasizes that in *G. benguetica* the leaves are rounded under the acumen, about one-half as broad as long, and are broadest at the middle. It is in contrast with “*G. luzonica*” of which the leaves are narrowed to the acumen, about $\frac{1}{3}$ as broad as long. This does not hold. For example, in *Elmer 11217* (L), the leaves are both acute and rounded at the tip and the length-width ratio varies.

At present, I can only recognise Burkill’s *G. polisana* as a good species. As to his *G. subclavata* (characterized by the subclavate capsule, about 4 cm long, with the top domed) and *Gordonia* sp. (characterized by the small entire leaves), I tend to think they are merely variants of *G. luzonica* Vidal.

10. *Gordonia maingayi* Dyer in Hook.f., Fl. Brit. Ind. 1 (1872) 291; King, J. As. Soc. Bengal 59, 2 (1890) 204, Ann. Bot. Gard. Calc. 5 (1896) 147, pl. 179A; Burk., J. Str. Roy. As. Soc. 76 (1917) 147; Ridl., Fl. Mal. Pen. 1 (1922) 204; H. Keng in Ng, Tr. Fl. Mal. 3 (1978) 285. Fig. 10

A small tree, to 13 m tall. Crown dense; bark brownish or light red brown, smooth, finely fissured. Young twigs very slender, densely covered with short yellow-brown hairs; older branches with rough bark glabrescent. Leaf-blades thin-coriaceous, oblanceolate, ovate or narrowly obovate, apex short and bluntly acute, base cuneate or attenuate, (4-) 6–8 cm long, 2–3.5 cm wide; drying yellow-brown; the upper half or two-thirds remotely serrulate, the lower part entire; nerves 5–7 pairs, slightly elevated above, very obscure below; glabrous above, sparsely pubescent beneath; petioles slender, 0.4–1 cm long, pubescent. Flowers subterminal or in upper axils, solitary or sometimes 2–3 together; peduncles very short (1–2 mm long) or almost sessile. Perules (bracteoles, bracts and sepals) persistent at anthesis and forming an involucre about 1–1.5 cm high, densely greyish pubescent externally, increasing in size from the lower bracts (deltoid, 2–3 mm wide) to the upper sepals (suborbiculate, 5–7 mm long and wide). Corolla 1.5–2.2 cm across, white (*vide* van Balgooy) or yellow (*vide* Cockburn); petals obovate to orbicular, concave, 0.6–1 cm long and wide, often emarginate at apex and clawed at base, densely greyish hairy on the external surface except the margin which is usually thinner and glabrous, sparsely pubescent on the internal surface. Androecium 6–7 mm long, the filaments glabrous, briefly connate below. Gynoecium 8–9 mm long; style slender; 4–5 mm long, glabrous; ovary ovoid, 3–4 mm long, ridged, glabrescent. Capsule cylindric,

2.5–3 cm long, 1.2–1.5 cm across, dehiscing into 4, sometimes 5 valves; sepals persistent. Seeds 2–2.5 cm long including the wing.

DISTRIBUTION. Malesia (the Malay Peninsula).

Malay Peninsula. Perak, *Scortechini* 1982 (L, SING), *Wray* 3766 (SING); Kuala Kangsar, *Kochummen* *FRI* 2461 (L); Bintang Hijau F. R., *Chan* *FRI* 13328 (L, SING); nr. Fort Tapong, *Whitmore* *FRI* 15749 (L); G. Babu, *Selvaraj* *FRI* 6555 (L). Trengganu, Bt. Jebak Puyoh, Ulu Besut, *Cockburn* *FRI* 8335 (L). Negri Sembilan, Nilai Jindaram Estate, *Md. Shah* 70 (SING). Pahang, Sg. Telom, Bt. Cheraya, *Sohadi* *FRI* 14731 (L, SING); Taman Negara, *van Balgooy* 2577 (L). Kelantan, G. Babong, *Soepadmo* & *Mahmud* 1172 (L). Malacca, *A. C. Maingay* 192 (L, isotype).

VERNACULAR NAMES: *titup*, *titup tiup*, *tiup*, *damak*.

ECOLOGY. In primary forest and dipterocarp forest, on ridge-top or on hill side; alt. 300–400 m. Fl.: Apr.–May, fr.: July–Jan.

11. *Gordonia marginata* (Korth.) Endl. ex Walp., Repert. 5 (1845) 134; Merr., J. Str. Br. Roy. As. Soc. spec. no. (1921) 390; Masamune, Enum. Phan. Born. (1942). 472. Fig. 11

Closaschima marginata Korth., Kruidk. (1842) 141 (*incl. var. dasyophthalma* Korth.); Walp., op. cit. 1 (1842) 375.

Laplacea marginata (Korth.) Choisy, Mém. Soc. Phys. Hist. Nat. Genève 14 (1855) 148; Miq., Fl. Ind. Bat. 2 (1857) 490.

Haemocharis marginata (Korth.) O. Ktze, Rev. Gen. Pl. (1891) 62; Burk., op. cit., 153.

Tree, 25–40 m tall, buttressed. Bark grey, smooth, scaling off in large pieces; living bark beefy red, sap wood reddish white. Young twigs reddish brown, glabrous. Leaf-blades thin coriaceous, obovate or narrowly obovate, sometimes rhomboid, obtuse or slightly emarginate, base cuneate, 4–7 (–9) cm long, 2–3 (–3.5) cm wide; margins for the most part undulate or remotely crenulate, entire near the base; nerves 5–7 pairs, slightly impressed above, inconspicuous below, glabrous on both surfaces, except the lower pilose midrib; petioles stout, 2–3 mm long. Flowers in upper axils or subterminal, solitary or 2–3 in clusters; peduncles very short, 1–3 mm long; bracteoles, bracts and sepals forming an involucre about 5–8 mm high, silvery puberulous on the back, increasing in size from the lower bracts (broadly ovate, 1–1.5 mm long) to the upper sepals (broadly ovate or subrounded, 4–5 mm long). Corolla 2–2.5 cm across, pale yellow; petals 5, obcordate to subrounded, 8–10 mm long, membranous, silky externally except the margins which are thinner and glabrous; petals briefly joined at the base and adnate to the filaments. Androecium 4–5 mm long, the filaments united below. Gynoecium 4–6 mm long; columnar, 1.5–2.5 mm long, ridged, the upper portion separating into 5 branches each bearing a terminal stigma; ovary ovoid, velutinous, tapering above into the style. Capsule ellipsoid-cylindric, 2–2.5 cm long, 5-grooved, velutinous along the grooves; sepals persistent. Seeds 1–1.4 cm long including the wing.

DISTRIBUTION. SE. Borneo (Kalimantan).

SE. Borneo. Without precise locality, *Korthals*, s.n. (several collections, *Herb. Lugd. Bat.* 908, 249–245 selected as lectotype of *Closaschima marginata* Korth.); G. Pamatton, Poelau Lampe, *Korthals* s.n.; Martapoera, *Korthals* s.n.; G. Tirin, *Korthals*, s.n. (all from L.); Tanjong Bangko, near the mouth of Mahakam River, alt. 20 m, *Kostermans* 7049 (BO, L); West of Samarinda, *Kostermans* 6702 (BO, L).

ECOLOGY. Sandy ridges, on loam soil; alt. 30–300 m. Fl. & fr.: Apr.–Aug.

VERNACULAR NAME: *penagit*.

NOTE. Over a dozen specimens collected by Korthals during his Borneo trip (Oct.–Dec. 1836) are deposited in the Leiden Rijksherbarium. They were variously



Fig. 10. *Gordonia maingayi* Dyer

Malaya, Wray 3766 (fr.); van Balgooy 2577 (fl.).



Fig. 11. *Gordonia marginata* (Korth.) Endl. ex Walp.

Kalimantan, Korthals s.n. (Herb. Lugd. Bat. No 925, 250-547); Kostermans 6702 (fl., fr.).

labelled as *Closaschima* (or as *Closaschyma*) *marginata*, *C. obovata*, *C. lanceolata*, and *C. marginata* var. *dasyopathalma*, all in Korthals' handwriting. Only the first name was published. These specimens bear small flower buds or are sterile. Among them there is only a single fruit (Herb. Lugd. Bat. 908, 249-238). The description presented here is largely based on two collections of Dr. Kostermans.

- 12. *Gordonia multinervis*** King, J. As. soc. Bengal 59, 2 (1890) 205; Burk., J. Str. Br. Roy. As. Soc. 76 (1917) 154, f. 11; Ridl., Fl. Mal. Pen. 1 (1922) 203; H. Keng in Ng, Tr. Fl. Mal. 3 (1978) 286. Fig. 12

Gordonia concentricatrix Burk., op cit., 153, f. 10 & 11, op. cit., 78 (1918)

49, pl. 3; Ridl., l.c.; H. Keng, op. cit., 285. **Syn. nov.**

Small to large tree, 10–30 m tall. Bark grey, smooth or reddish brown and with large loose scales in several layers, scallop-marked. Young twigs glabrous except near the tip which is puberulous. Leaf-blades membranous or thin coriaceous, obovate-spathulate, apex rounded, mucronate, or shortly acuminate, base gradually attenuate and often narrowly winged below, varying from 10–15 cm long, 2–5.5 cm wide ('*concentricatrix*') to 12–20 cm long, 6–8.5 (-10) cm wide ('*multinervis*'), the upper two-thirds crenate, subentire or entire below; glabrous on both surfaces; nerves 8–18 pairs (often with smaller, less conspicuous veins in between), very faint above, barely visible beneath, fused near margin and forming intramarginal reticulations; midrib sulcate above; petiole thickened, 2–5 mm long, glabrescent.

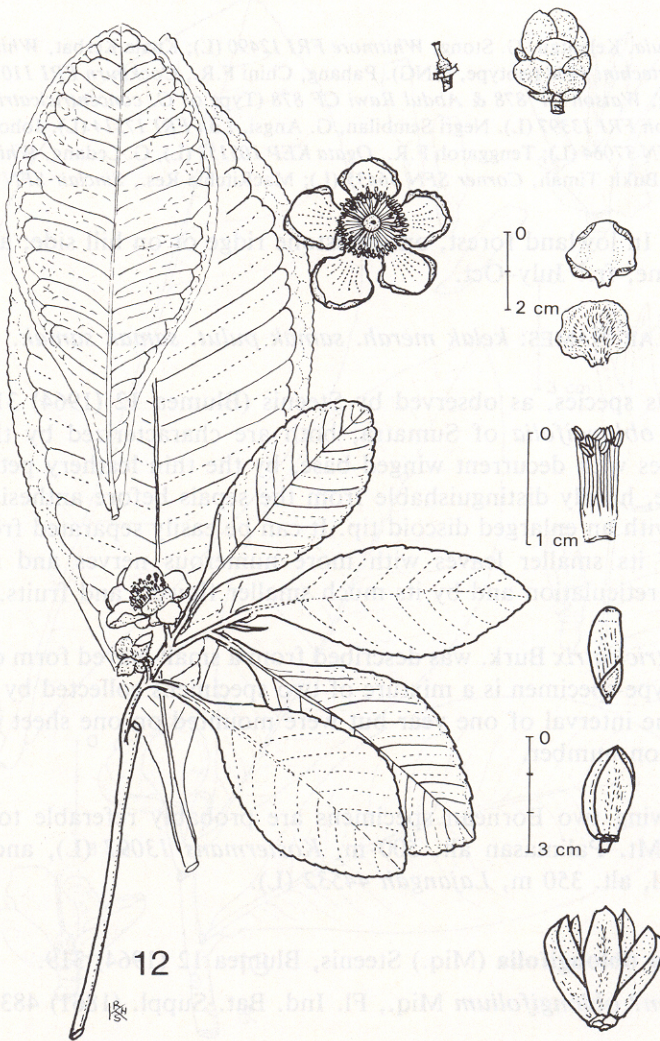


Fig. 12. *Gordonia multinervis* King

Malaya, Watson CF 878 & Abdul Rawi CF 878 (fl. & fr.); Scortechini 1968 (large leaf).

Flowers axillary, solitary; peduncles short, 2–5 (–10) mm long, stout. Bracts 2–3, broadly deltoid, 3–5 mm long. Sepals 5–6, broadly ovate to suborbicular, thin coriaceous, about 1 cm long and wide, greyish silky externally. Corolla 2–3.5 cm across, yellow; petals 5, broadly obovate or suborbicular, 1–1.7 cm long and wide, thin coriaceous, greyish silky externally (indistinguishable from sepals from without except by larger size and position) briefly clawed and joined at base, and adnate to the filaments. Androecium 1.2–1.5 cm long, the filaments united below. Gynoecium 1–1.2 cm long; style solitary, columnar, 4–5 mm long, hispid, the tip discoid, 5-lobed into 5 stigmas; ovary ovoid, 3–4 mm long, densely covered with sericeous hairs. Capsule bluntly 5 angulate, 3–4 cm long, 5-valved; sepals persistent. Seeds 2–2.5 cm long including the wing.

DISTRIBUTION. Malasia (the Malay Peninsula).

Malay Peninsula. Kelantan, G. Stong, *Whitmore FRI 12490* (L); Kuala Kerbat, *Whitmore FRI 20244* (L). Perak, *Scortechini 1968* (isotype, SING). Pahang, Chini F.R., *Cockburn FRI 11076* (L). Selangor, Rantau Panjang, *Watson CF 878 & Abdul Rawi CF 878* (Type of *G. concentricatrix* Burk., SING); Gading F.R., *Loh FRI 13397* (L). Negri Sembilan, G. Angsi, *Loh FRI 17314* (L). Johore, Bukit Tingan Laut, *Corner SFN 37064* (L); Tenggara F.R., *Ogata KEP 105152* (L), G. Ledang, *Whitmore FRI 12303* (L). Singapore, Bukit Timah, *Corner SFN 36435* (L); MacRitchie Res., *Sinclair SFN 40231* (L).

ECOLOGY. In lowland forest, on sandstone ridge or on hill side; alt. 10–800 m. Fl.: Apr.–June, fr.: July–Oct.

VERNACULAR NAMES: *kelak merah. samak pulut. samak samak.*

NOTE. This species, as observed by Steenis (*Blumea* 12 (1964) 319), is closely allied to *G. oblongifolia* of Sumatra; both are characterized by the oblong or obovate leaves with decurrent winged base, by the thin leathery petals with silky outer surface, hardly distinguishable from the sepals before anthesis, and by the single style with an enlarged discoid tip. It can be easily separated from the latter, however, by its smaller leaves with more numerous nerves and more distinct submarginal reticulation and by its much smaller flowers and fruits.

G. concentricatrix Burk. was described from a small-leaved form of the species. Of this the type specimen is a mixture of two specimens collected by two different persons at the interval of one year but were mounted on one sheet and given the same collection number.

The following two Bornean specimens are probably referable to this species: E. Borneo, Mt. Palimasan alt. 500 m, *Kostermans 13097* (L), and N. Borneo, Beaufort Hill, alt. 350 m, *Lajangah 44532* (L).

13. *Gordonia oblongifolia* (Miq.) Steenis, *Blumea* 12 (1964) 319.

Fig. 13

Ploiarium? oblongifolium Miq., Fl. Ind. Bat. Suppl. (1861) 483.

Tree, 13 m tall. Branches stout, glabrous. Leaf-blades thin coriaceous, elliptic-oblong, narrowly oblong or oblanceolate-spathulate, apex broadly acute or obtuse, base acute or attenuate, decurrent and narrowly winged, 14–20 (–28) cm long, 6.5–7

(-10) cm wide; margin finely crenulate-serrulate for the most part, nearly entire toward the base; nerves 11-14 pairs, intermingled with less distinct ones and intricately interlocked near the margin; glabrous on both surfaces; petiole 3-5 mm long, thickened. Flowers solitary, in upper leaf-axils, sometimes several together near the top of a top branchlet; peduncle 1.5-2 cm long, very stout. Bracts and bracteoles 2-3, caducous. Sepals 5, broadly ovate, 1.8-2.2 cm long, thick coriaceous, densely sericeous externally, yellowish brown. Corolla unknown. Gynoecium about 1.8 cm long; style about 1.4 cm long, thinly hispid, minutely 5-lobed at the end; ovary ovoid, about 4 mm long, sulcate, densely sericeous. Capsule cylindric, 5-angulate, about 5 cm long; calyx persistent. Seed 3.5 cm long including the wing.

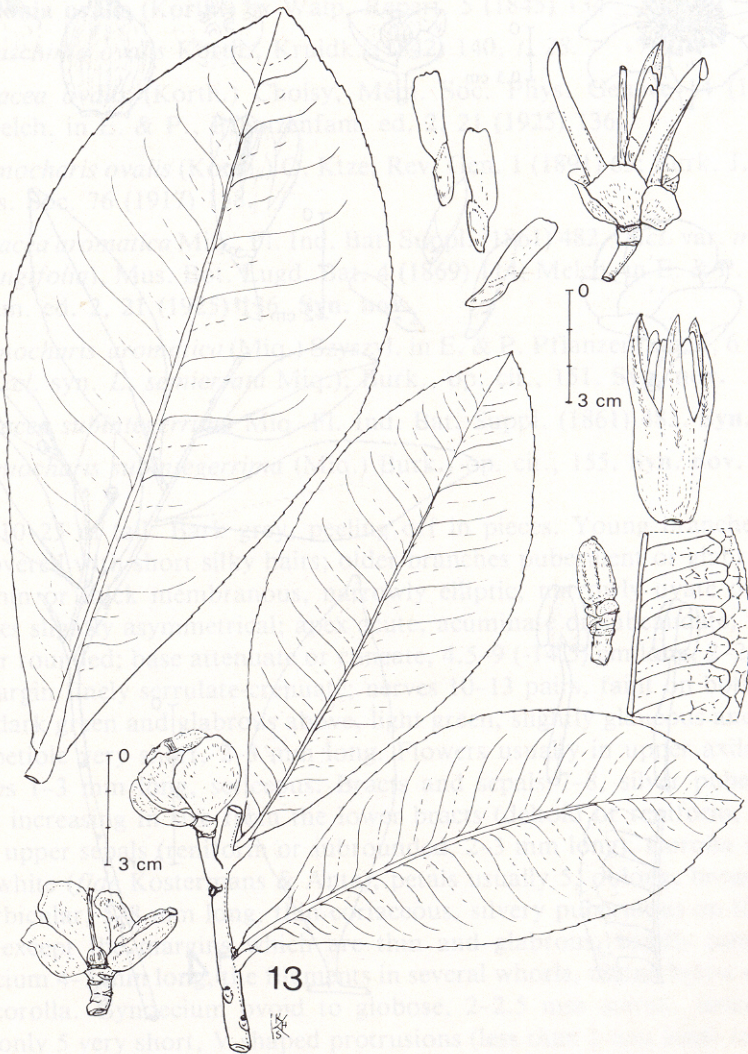


Fig. 13. *Gordonia oblongifolia* (Miq.) Steenis
Sumatra, Neth. Ind. For. Serv. 2794 (fl.), 9571 (fr.).

DISTRIBUTION. Malesia (Central & W. Sumatra).

Sumatra. Benkoelen, Lebong, Neth. Ind. For. Serv. 2794, 9571 (L); Res. Lum, Oud. Agam, Olivier 16 (B), Neth. Ind. For. Serv. 2946 (L). Res. Tapanoeli, Sibolga, Neth. Ind. For. Serv. 3780 (L). Fort de Kock, nr. Bukit Silit, Teysmann HB 668 (L, type of *Ploiarium oblongifolium* Miq.)

ECOLOGY. In primary forest; alt. 50–1300 m. Fl.: Jan. (one collection), fr.: Dec. (one collection).

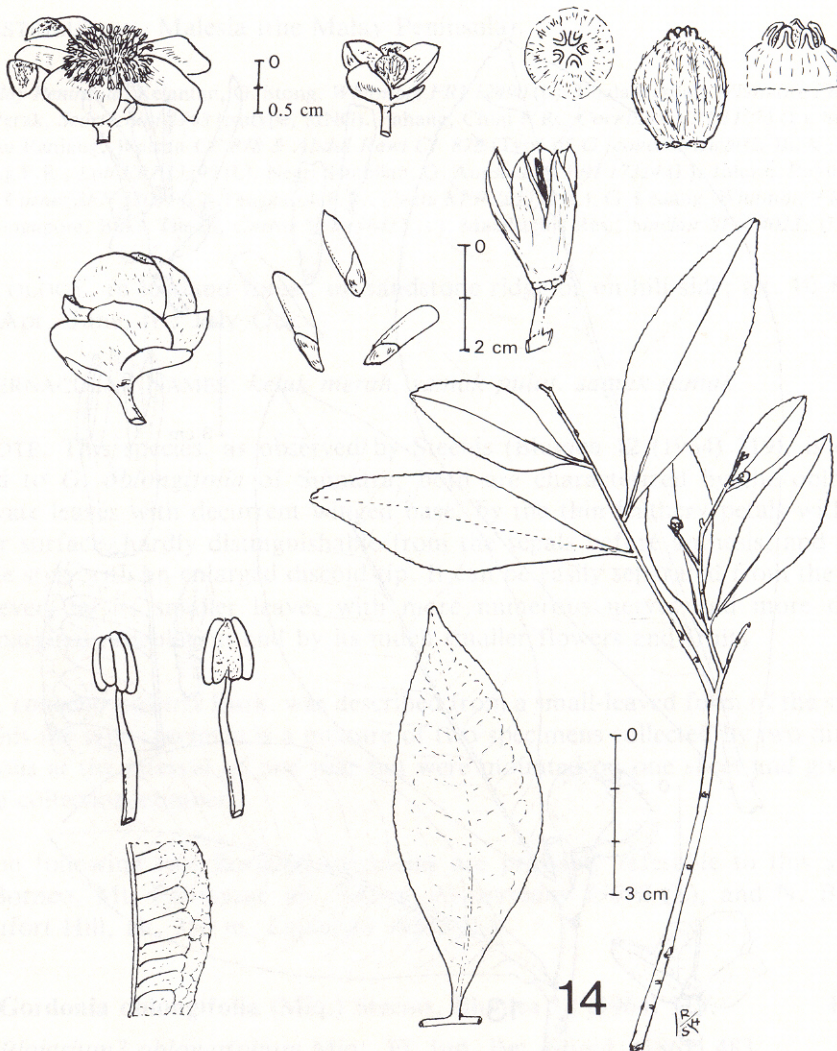


Fig. 14. *Gordonia ovalis* (Korth.) Korth. ex Walp.

Sumatra, Korthals, s.n. (Herb. Lugd. Bat. No. 908, 249-324, fr); Jacobs 8311 (fl.).

VERNACULAR NAMES: *kajoe patjat*, *ubar lilim*, *djirok bantjoh* (Sumatra).

NOTE. The original description of *Ploiarium oblongifolium* Miq. was based on a sterile specimen (*Teysmann HB 668*). Miquel therefore was uncertain about the generic status. In fertile material, van Steenis found the style bearing minute stigmas, and therefore transferred it to *Gordonia*. A well-preserved fruiting specimen (*Neth. Ind. For. Serv. bb. 9571*) further confirms this transfer.

This species, although with large elliptic-oblong leaves, showy flowers and big fruits, is poorly represented in herbaria. I failed to find any Sumatran specimens collected later than 1925 referable to this plant.

14. *Gordonia ovalis* (Korth.) ex Walp. Repert. 5 (1845) 134

Fig. 14

Closaschima ovalis Korth., Kruidk. (1842) 140, t. 28.

Laplacea ovalis (Korth.) Choisy, Mém. Soc. Phys. Genève 14 (1855) 148; Melch. in E. & P., Pflanzenfam. ed. 2, 21 (1925) 136.

Haemocharis ovalis (Korth.) O. Ktze, Rev. Gen. 1 (1891) 63; Burk. J. Str. Roy. As. Soc. 76 (1917) 158.

Laplacea aromatica Miq., Fl. Ind. Bat. Suppl. (1861) 482, (*incl. var. minor*, *var. longifolia*), Mus. Bot. Lugd. Bat. 4 (1869) 114; Melch. in E. & P. Pflanzenfam. ed. 2, 21 (1925) 136. **Syn. nov.**

Haemocharis aromatica (Miq.) Szyszyl. in E. & P. Pflanzenfam. 3, 6 (1893) 185 (*excl. syn. L. semierrata* Miq.); Burk., op. cit., 151. **Syn. nov.**

Laplacea subintegerrima Miq. Fl. Ind. Bat. Suppl. (1861) 483. **Syn. nov.**

Haemocharis subintegerrima (Miq.) Burk., op. cit., 155. **Syn. nov.**

Tree, 10–25 m tall. Bark grey, peeling off in pieces. Young branches slender, thinly covered with short silky hairs; older branches puberulent or glabrous. Leaf-blades thin or thick membranous, narrowly elliptic, narrowly ovate or obovate, sometimes slightly asymmetrical; apex acute, acuminate or subcaudate, sometimes obtuse or rounded; base attenuate or cuneate, 4.5–9 (–14.5) cm long, 2–2.5 (–4) cm wide; margin finely serrulate-crenulate; nerves 10–13 pairs, faint on both surfaces, shining dark green and glabrous above, light green, slightly glaucous and sericeous below; petiole very short, 2–3 mm long. Flowers usually in upper axils, solitary, peduncles 1–3 mm long, sericeous. Bracts and sepals 7–8, silver puberulous externally, increasing in size from the lower bracts (deltoid or reniform, 1–1.2 mm long) to upper sepals (reniform or subrounded, 2–3 mm long). Corolla 1.2–2.5 cm across, white (*fide* Kostermans & Anta); petals usually 5, oblong, broadly oblong to suborbicular, 5–8 mm long, thin coriaceous, silvery puberulous on the external surface except the margins which are thin and glabrous, briefly joined below. Androecium 4–5 mm long, the filaments in several whorls, united below and adnate to the corolla. Gynoecium ovoid to globose, 2–2.5 mm across, sericeous; style absent, only 5 very short, V-shaped protrusions (less than 1 mm long) representing the stigmas; ovary shallowly longitudinally ridged. Capsule 2–2.5 cm long, ovoid or narrowly ovoid, thinly puberulous, dehiscent into 5 valves; sepals caducous fully ripe fruit; seeds 1.5–2 cm long including the narrow wing.

DISTRIBUTION. Malesia (Sumatra).

Sumatra. W. Sumatra, *Korthals s.n. Herb. Lugd. Bat.* 908, 249-247, -248, -249, -284, -305, -311, -312, -313, -314, -315, -318, -319, -320, -321, -322 (holotype of *Closaschima ovalis* Korth., L.), -323, -324, -474 (L); Pariamen, W. Sumatra, *Diepenhorst H.B.* 3081 (isotype of *Laplacea aromatica* Miq., L), 2184 (lectotype of *L. aromatica* var. *minor* Miq.), 2492 (lectotype of *L. aromatica* var. *longifolia* Miq., (L). Lampung, NW. of Kota Agung, *Jacobs* 8311, 8439 (BO, L). Asahan, *Krukoff* 4224, 4235 (BO), *Rahmat Si Boeea* 9346 (L). Bangka Lubok Besar, *Kostermans & Anta* 540 (BO, L). Palembang, *Neth. Ind. For. Serv.* bb. 938, 32002, 31720 (L), *Teysmann H.B.* 3969 (holotype of *Laplacea subintegerrima* Miq., L).

ECOLOGY. In primary forest, on 'red' soil. Alt. 20-500 m. Fl.: Apr, May & Sept., fr.: Apr.-May, & July.

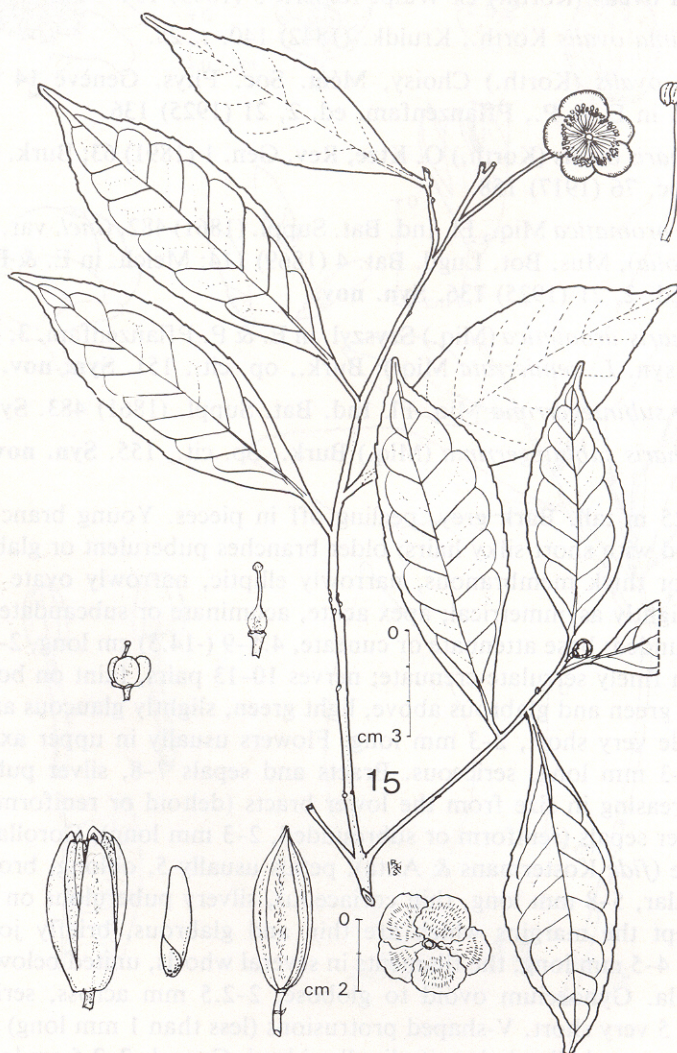


Fig. 15. *Gordonia penangensis* Ridl.
Malaya, Curtis 834 (isotype).

VERNACULAR NAME: *palembang putih*.

NOTE. This plant was first collected by P. W. Korthals from the forests of Melintang Mountains (near Padang) between April and May, 1834 during his trip to W. Sumatra. Over a dozen sheets of the same plant (including flowers buds, flowers and a single fruit) are preserved in the Leiden Herbarium to-day. Korthals was probably fascinated by the small flowers with an ovoid ovary totally devoid of styles. In some of these specimens a tiny sheet of paper with hand-written '*Gordonia*' was attached. This was possibly done in the field. Later he described this plant under a new generic name *Closaschima*.

Miquel's *Laplacea aromatica* was based on H. Diepenhorst's collection from Priaman, very near the area where the Korthals' collection was made. Miquel compared his 'new species' with *Laplacea vulcanica* (= *G. vulcanica*) but failed to do so with Korthals' *Closaschima ovalis*, with which it agrees in almost every aspect. Miquel also proposed two new varieties of this species: var. *longifolia* has longer (10–12.5 cm long) lanceolate-oblong leaves, and var. *minor* has smaller, elliptic-lanceolate leaves. The leaves of var. *minor* match closer the type specimens of Korthals.

Szyszyłowicz (1893) transferred *Laplacea aromatica* Miq. to *Haemocharis*; at the same time, he cited *L. semiserrata* Miq. as a synonym. This was obviously a mistake, as Miquel never described a species under such a name which is in fact a New World one, namely, *Laplacea semiserrata* Cambess. from Brazil.

There are two distinct forms (which probably warrant infraspecific status) in *Gordonia ovalis*. In one form the leaves are generally smaller (4.5–7 cm long), thin membranous and their leaf-apices usually gradually taper to a blunt point; this includes the type specimens of *Closaschima ovalis* Korthals and *Laplacea aromatica* Miquel, and most specimens were collected from Pariamen-Padang area in the south. In another form the leaves are usually larger (6–9 cm long), thin-coriaceous and their leaf-apices are obtuse or rounded; this includes the type specimens of *Laplacea subintegerrima* Miq. and others from the Palembang area and Bangka Island in the northeast. There are no obvious differences in their flower and fruit structures. In both forms, in the styles are almost totally absent, with five stigmas lying on top of the hairy ovary.

15. ***Gordonia penangensis*** Ridl. J. Str. Br. Roy. As. Soc. 73 (1916) 142, Fl. Ml. Pen. 1 (1922) 203; H. Keng in Ng, Tr. Fl. Mal. 3 (1978) 286, f. 4.
Fig. 15

Gordonia excelsa auct. non Blume: King J. As. Soc. Bengal 59, 2 (1890) 203.

A small, slender tree, 10–13 (–20) m tall. Bark smooth, pale grey brown; young twigs very slender, short-silky pubescent, greyish; older branches less hairy, brownish. Leaf-blades thin coriaceous, narrowly elliptic-lanceolate, apex acuminate or more frequently obliquely caudate, base attenuate or cuneate, 6–10 cm long, 2.5–4 cm wide, the upper half or two-thirds remotely serrulate or almost entire; midrib sulcate above and elevated below; nerves about 5–8 pairs, very faint above, barely visible beneath; drying light olive green; glabrous above, somewhat greyish

and tomentose below; petiole slender, 0.5–1 cm long, silky, brownish. Flowers solitary, terminal or subterminal on small branches; peduncle 2–3 mm long, silky tomentose. Bracteoles 2, triangular-cordate, 2–3 mm long, caducous. Sepals 5, ovate or suborbicular, thick coriaceous and with thinner and ciliate edge, silvery pubescent at the back, 5–7 mm long and wide. Corolla 2.5–3 cm across, yellowish to golden yellow; petals 5, suborbicular to spatulate, chartaceous, fused below. Androecium 5–6 mm long, the filaments joined into a short tube and briefly adnate to the corolla, more or less in 5 bundles. Gynoecium 9–11 mm long; style solitary, slender glabrescent, 6–7 mm long, the upper portion enlarged into club-shaped stigmas; ovary spherical, 3–4 mm across, woolly. Capsule cylindrical, 3.5–5 cm long, 1.5–2 cm across, glabrescent, 5-valved. Seeds 2.5–3 cm long including the wing.

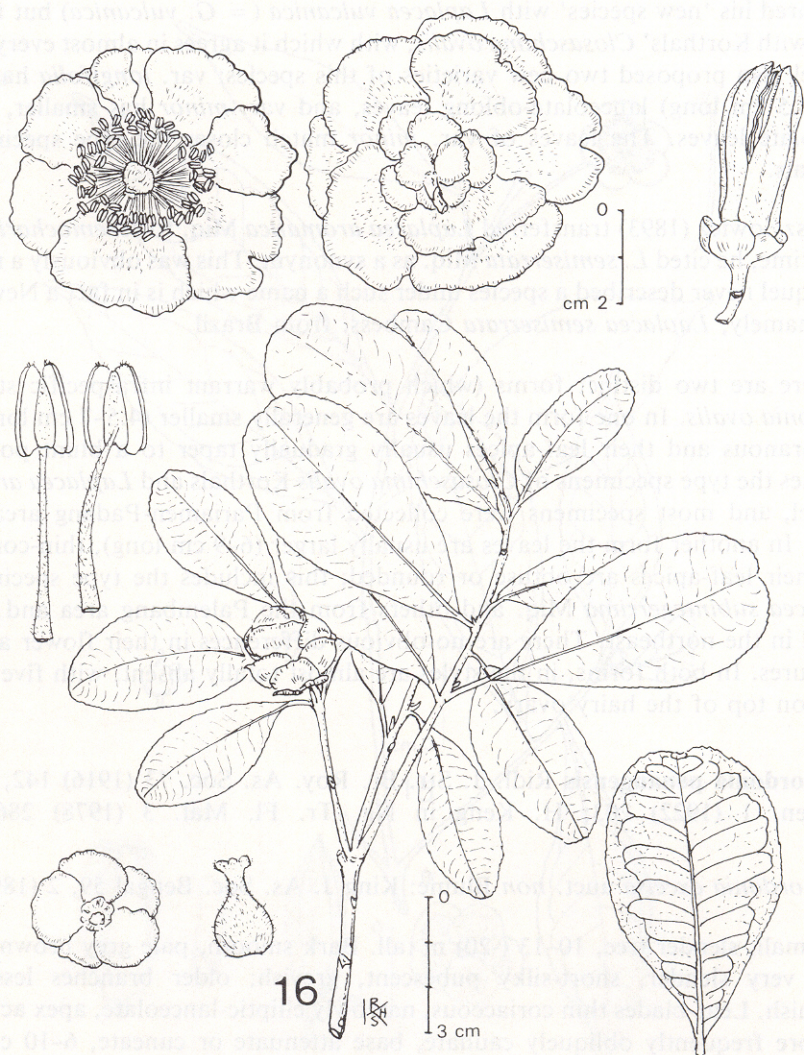


Fig. 16. *Gordonia polissana* Burk.

Philippines, Celestino 695 (fl.); Jacobs 7397 (fr.).

DISTRIBUTION. Malesia (the Malay Peninsula).

Malay Peninsula. Penang, Penang Hill, *Curtis 834* (isotype, SING), *Ng FRI 1054* (L). Perak, *Wray s.n.* (SING). Pahang, Cameron Highlands, *Md. Nur SFN 32948* (SING); *Whitmore FRI 15882* (L). Johore, Tg Penawar, *Cockburn FRI 7642* (L); Kota Tinggi, *Stone & Anderson 8714* (L). Singapore, Seletar, *Ridley 6214, 3913* (paratypes, SING); *Sinclair SFN 39585* (L), *Jumali 1048* (SING).

ECOLOGY. In open lowland forests, alt. 20–500 m. Fl.: Feb–May, fr.: May–June.

- 16. *Gordonia polisana* Burk., Philip. J. Sc. 15 (1919) 478; Merr., Enum. Philip. 3 (1923) 71.** Fig. 16

Shrub or small tree, 8–15 m tall. Branchlets slender, glabrous. Leaf-blades thin-coriaceous, obovate or narrowly obovate, apex obtuse or rounded, often shallowly retuse, base acute or attenuate, 4–7 cm long, 2.5–3.5 cm wide, the upper part remotely crenulate-serrulate, the lower entire, nerves 12–14 pairs, not distinct; glabrous on both surfaces except a few scattered hairs on the midrib beneath; petiole 2–5 mm long. Flowers in upper leaf-axils, solitary; peduncle about 0.5 cm long. Bracteoles about 2. Sepals 5–6, broadly orbiculate or reniform, 0.8–1 cm long, densely yellowish silky externally. Corolla 7–8 (–14?) cm across, white (*fide* Celestino); petals 8–10, in two series, united below, densely covered with short yellowish hairs over the external surface and in the middle-basal portion on the internal. Androecium 1.2–1.5 cm long, the filaments puberulous. Gynoecium about 2 cm long, pubescent; ovary ovoid, about 1.5 cm long; style about 0.5 cm long, very thick and stout, the top enlarged and shallowly lobed into stigmas. Capsule broadly cylindric, 3.5–4 cm long.

DISTRIBUTION. Malesia (endemic to the Philippines; Luzon).

Luzon. Mt. Polis, Ifugao, Mountain Province, *M. Celestino 695* (PNH 8021) (L). Mt. Pulog, *Jacobs 7397, 7421* (L).

ECOLOGY. In mossy forest, above stream; alt. 1700–2300 m. Fl. Feb.–Mar. (two collections), fr.: Feb. (one collection).

NOTE. Among the 4 new species described by Burkill from the Philippines, this is undoubtedly the most outstanding. The type specimens (*Alvarez FB 18384* and *Sandkuhl 316*), both collected on Mt. Polis in Bontoc Sub-province, were not available for this study. Among a limited number of Philippino specimens at my disposal, I was only able to identify the above-cited ones as belonging to this species.

Burkill pointed out that (1) the leaves of this plant are rounded under the acumen, broadest above the middle; (2) the flowers are very large, about 9 cm (or according to Sandkuhl, 11–14 cm) in diameter; and (3) the capsule is about 4 cm long, long-tapering above.

The leaves of *Celestino 695* fully agree with Burkill's description. This bears two fully expanded flowers, the larger one measures about 8 cm in diameter. One unusual feature of the flowers, which Burkill failed to mention is that the petals are

8–10 in number and are arranged in 2 series. Petals of the outer series are intermediate between the largest sepals of the calyx and the smaller petals of the inner series.

17. *Gordonia sarawakensis* H. Keng sp. nov.

Fig. 17

Arbor ca. 30 m alta. Folia angusto-lanceolata vel angusto elliptica, 12–15 cm long, acuminata vel breviter obtusa, basi cuneata, coriacea, nervis lateralibus 20–35 bene intra marginem anastomosantibus, pagina utrinque suborscuris, petiolo 3–5 mm longo. Flores flavi (*fide Banyeng & Benang*), axillares, solitarii, 5–6 cm diametro; bractae 2–3, deciucae. Sepala coriacea, ovato-rotundata, 1–1.3 cm longa, dorso adpresse pubescentia. Petala late obovata vel lineario-lanceolata, 1.5–2.4 cm longa. Gynoecium 4.5 cm longum; stylo 0; stigmatibus 8–10. Capsula late ovoidea, 3–3.5 cm longa, valvis 8–10. — Typus, Sarawak, *Banyeng & Benang* S25218, in L.

A large tree, 30 m tall. Bark flaky. Young twigs with scattered short hairs; older branches stout, greyish brown glabrous. Leaf-blades coriaceous, narrowly ovate or narrowly elliptic, acuminate or shortly obtuse, base attenuate, very narrowly winged, 12–15 cm long, 5–6 cm wide; margin crenulate or undulate; midrib elevated beneath; nerves 18–25 pairs (often with lesser ones between) fused near the margin and forming a submarginal vein, faint on both surfaces; drying blade dark green or brown, with scattered short hairs on both surfaces; petiole very thick, 2–3 mm long. Flowers axillary, solitary, peduncle very stout, 4–5 mm long; bracts 2–3, deltoid-caudate, 4–5 mm long, caducous. Sepals 5, broadly ovate or suborbicular, 1–1.3 cm long and wide, thin-coriaceous, greyish silvery externally. Corolla 5–6 cm across yellow (*fide Banyeng & Benang*) or yellowish white (*fide Bujang*); petals 7–8, arranged in one series, varying from broadly obovate or obovate (1.8–2.0 × 1.4–1.8 cm) to narrowly obovate or linear lanceolate (1.8–2.4 × 0.8–1.2 cm), the exposed part in bud thick and silvery hairy externally, other parts thinner and glabrous. Androecium 5 mm long, the filaments glabrous, connate below and adnate to corolla. Gynoecium 4–6 mm long; ovary subglobose, hirsute; style absent or very short; stigmas 8–10, lying on top of the ovary. Capsule broadly ovoid or subglobose, 3–3.5 cm long, 2.5–3 cm across, dehiscent into 8–10 valves; short septicidal lines also developed near the base of the fruit. Seeds 2–2.2 cm long including the wing.

DISTRIBUTION. Malesia (Borneo: Sarawak & Sabah).

Sarawak. Kuching, 12th mile, Penrissen Road, *Banyeng & Benang* S 25218 (holotype, L); Semengoh F.R., *Rosli* S 14983 (L, SING), *S* 15192 (L), *Hj. Bujang* S 32444 (L), *S* 32957 (L, SING), *Galau* S 15738 (L), *Zen* 10031 (SING).

Sabah. Bukit Hampuan alt. 1300 m., *Ranau Aban Gibot* 61804; G. Lotung Inarat alt. 1700 m. *Lamag, Aban Gibot* SAN 83233; Mt. Silam, Lahad Datu, *Meijer & Anak* SAN 37489, *Mujin* 37816; along Labuk Road, Sandakan, *Mikil* 46699 (all in SAN).

ECOLOGY. In lowland dipterocarp forest, alt. 10–100 m. or in hill forest, alt. 1300–1700 m. Fl.: July–Oct., fr.: Oct.–Nov.

VERNACULAR NAME: *entuyut*.

NOTE. Superficially this species resembles *G. multinervis* King of Malaya, but differs from the latter in detailed structures of the flower and fruit. This species

possesses 7–8 petals, more or less arranged in one whorl, (at least as seen in a fully expanded flower); the stamens are comparatively short and fewer in number; the gynoecium is devoid of styles, thus the 8–10 V-shaped stigmas are lying on top of the ovary which is 8–10 locular. The fully developed fruit is a nearly spherical capsule dehiscing loculicidally into 8–10 valves. Short septicidal lines (one each along the dorsal line of the capsule-valves) present near the base of the fruit. The combination of these features makes this species one of the most outstanding in the genus.

At first, all the available specimens referable to this species were collected from the lowland forest near Kuching, Sarawak. Later five specimens were found in a loan from Sabah Forest Department; they match well with the Sarawak material, except *Aban Gibot 61804* & *Mujin 37816*, both flowering; in these, a short style (2–3 mm long) is present.

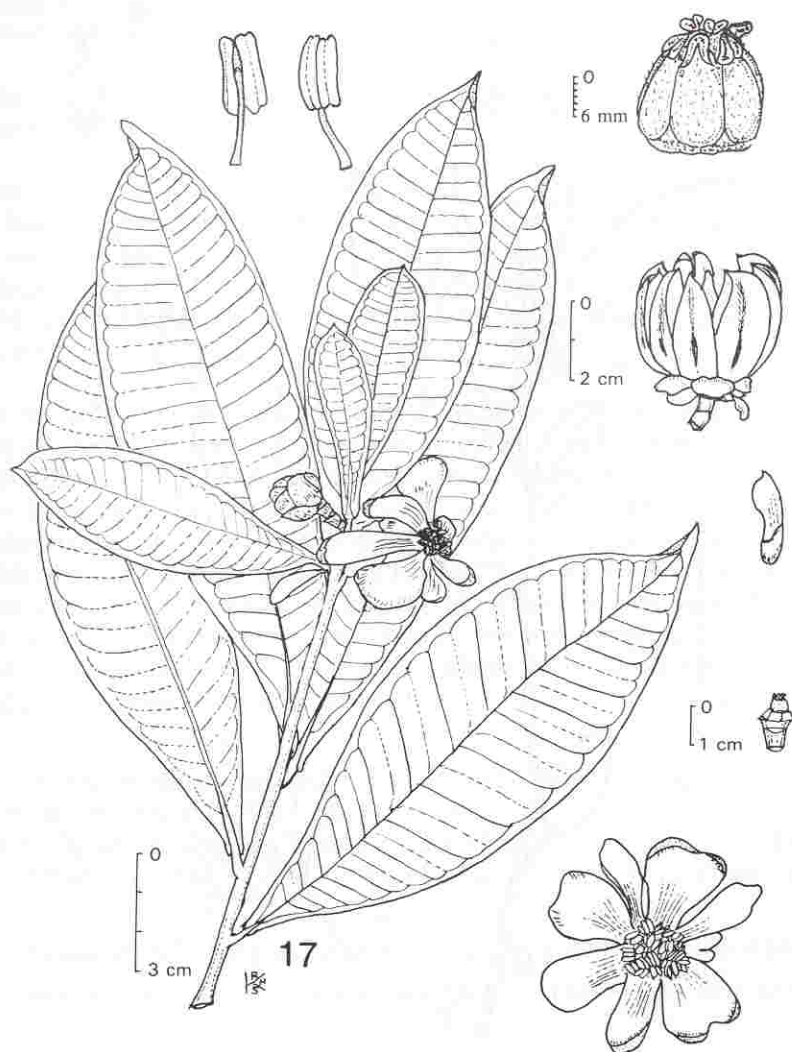


Fig. 17. *Gordonia sarawakensis* H. Keng sp. nov.

Sarawak, Banyeng & Benang S 25218 (holotype) (fl.); Galau S 15738 (fr.).

18. *Gordonia scortechinii* King, J. As. Soc. Bengal 59, 2 (1890) 204; Burk., J. Str. Br. Roy. As. Soc. 76 (1917) 158; Ridl., Fl. Mal. Pen. 1 (1922) 204; H. Keng in Ng, Tr. Fl. Mal. 3 (1978) 286. Fig. 18

A tree to 18 m tall; bark smooth, brown. Young twigs slender, dark brown or greyish, puberulent; older branches glabrous. Leaf-blades thin-coriaceous, elliptic or narrowly elliptic, or sometimes narrowly obovate, apex obtuse or bluntly acute, base cuneate or obtuse, 6–9 cm long, 2.5–3.5 cm drying olive green; margin of the upper half or two-thirds remotely undulate or subentire; nerves 6–8 pairs, faint above, almost invisible below; glabrous on both surfaces, shining green above, subglaucous beneath; petiole 3–5 mm long, puberulent. Flowers subterminal and

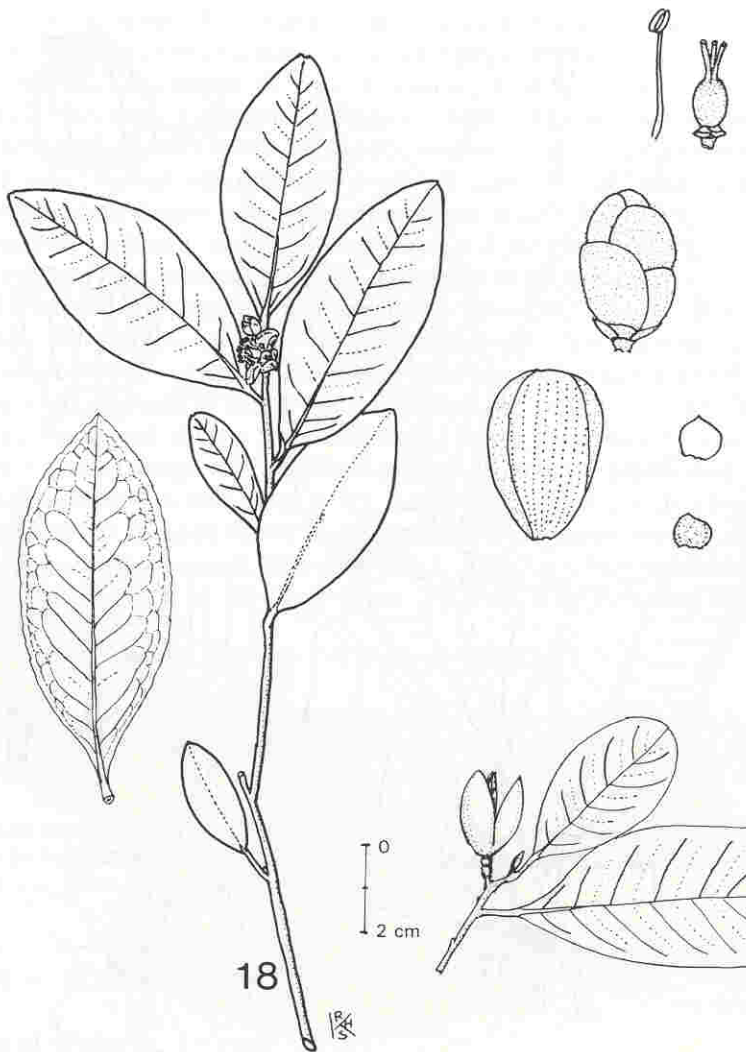


Fig. 18. *Gordonia scortechinii* King
Malaya, *Scortechinii* 362 b (isotype) (fl.); Chelliah FRI 6545 (fr.).

axillary, solitary; peduncles subsessile or very short (2–3 mm long). Bracteoles 2. Sepals about 5, cordate-deltoid, 2–3 mm long and wide. Corolla 1.5–1.8 cm across, butter yellow; petals 5, ovate or suborbicular, strongly concave, 8–9 mm long and wide, thin-chartaceous, sparsely silvery puberulous externally, briefly joined at base and adnate to the filaments. Androecium 6–8 mm long; the filaments glabrous, briefly united below. Gynoecium 5–6 mm long; styles 3 (or 4?), free to base, spreading; stigmatic surface inside the tip of styles; ovary ovoid densely strigose. Capsule 1.8–2 cm long, glabrous, dehiscent into 3 (or 4?) valves; sepals caducous. Seeds 1.2–1.4 cm long including the wing.

DISTRIBUTION. Endemic to the Malay Peninsula. (Perak, Kelantan Trengganu, Selangor?)

Malay Peninsula. Perak, without locality, *Scortechini 362 b* (isotype, SING) Kelantan, *Whitmore FRI 20647* (SAN). Trengganu, Bukit Rauk F.R. Dungun, *S. Chelliah FRI 6545* (L).

ECOLOGY. In hillside primary forest. Fl.: Mar. (one collection), fr.: Nov. (one collection with two specimens).

NOTE. King (l.c) points out that this species superficially resembles *G. maingayi*, but it has smaller flowers with fewer stamens (about 30) and a 3-locular ovary with 3 free styles. Burkill (l.c.) states that this species “might be described a *G. imbricata* with an admixture of *G. maingayi*. Its branches however are more slender than the first of these two and its flowers are recorded as remarkably small, the stamens being not more than 30.”

For years, only the original collection (*Scortechini 362 b*) was known. During the course of this study, the other specimen which can positively be identified as this species in *Chelliah FRI 6545* from Trengganu. It has a small 3-valved capsule and agrees closely with the type specimen in all aspects of vegetative characters except that the texture of leaves appears slightly thicker. Besides, two other collections possibly also represent this species: (1) Perak, Piah F.R. *Ja'mat FMS 3931* (SING), several small flower buds being present (dissection of one large bud revealed numerous perianth-lobes without any sign of reproductive organs in the centre and is likely to be a gall flower); (2) Selangor, Klang Gates quartz Ridge, *Stone 12094* (L), the small capsules being 4-valved.

19. *Gordonia singaporeana* Wall. [Cat. no. 1457 (lith. 1829) *nom. nud.*; Ridl. *J. Str. Br. R. As. Soc.* 73 (1916) 141, *nom.*, Burk., op. cit., 154, *f. 1, 2, 3, 12, & 13, nom.*] ex Ridl. *Fl. Mal. Pen.* 1 (1922) 202; Corner. *Ways. Tr.* 2nd ed. (1952) 629, *pl. 186, f. 236*; H. Keng in Ng, *Fl. Mal.* 3 (1978) op. cit., 286.

Fig. 19

Gordonia grandis King *J. As. Soc. Beng.* 59, (1890) 203, *non* André (1880).

Gordonia excelsa Bl. var. *sincapuriana* Dyer in Hook. f., *Fl. Brit. Ind.* 1 (1872) 291.

A tree up to 32 m tall. Bark black, scaly, Young twigs puberulous or glabrous. Leaf-blades thin coriaceous, elliptic or oblong-lanceolate 7–12 (–15) cm long, 2.5–5

(-8) cm wide, apex subrounded or abruptly acuminate, base acute or attenuate, slightly decurrent or not; margin crenulate-serrate or undulate, usually entire near the base; nerves 10-12 pairs, merged and looped near the margin into submarginal reticulations, barely visible above, even less conspicuous below; glabrous on the upper surface, short appressed pubescent beneath; petiole 2-5 mm long, puberulous. Flowers in upper leaf-axils, usually solitary; peduncles 0.3-5 (-0.75) cm long, stout, pubescent. Bracts and bracteoles about 3, caducous. Sepals 5-6, cordate, subrounded or reniform, often notched above, 6-8 mm long, densely covered with greyish hairs externally and also near the base on the inner surface. Corolla 4-5 cm across, cream white, scentless; petals 5-6, broadly oblong or obcordate, 2-2.4 cm long, sericeous on the external surface, scattered puberulous on the internal. Androecium about 1 cm long, the filaments glabrous, connate below.

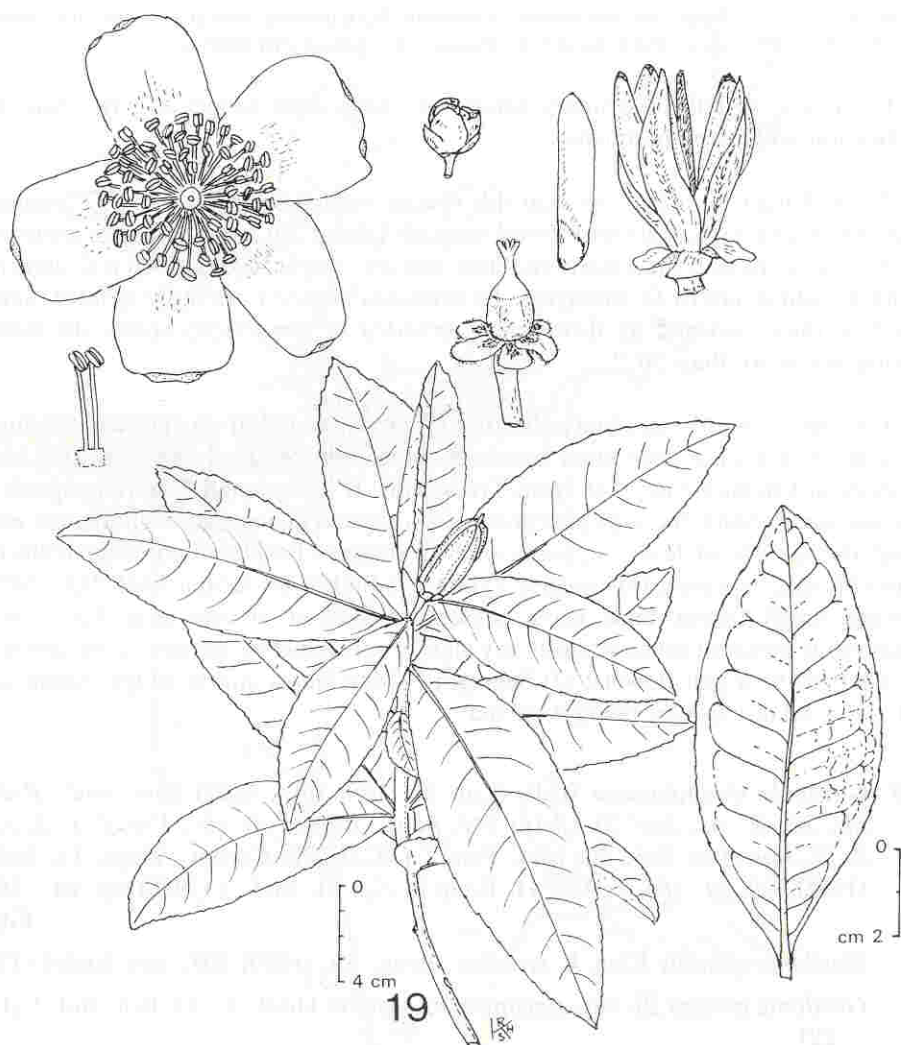


Fig. 19. *Gordonia singaporeana* Wall. ex Ridl.
Singapore, fresh material.

Gynoecium 6–8 mm long, the ovary ovoid, 4–5 mm long, densely covered with long, yellowish grey hairs, tapering above to form a stout style which branches into five for about half its length. Capsule ovoid cylindric, 3–3.5 cm long, dehiscent into 5 valves; seeds 2–2.5 cm long including the wing.

DISTRIBUTION. Malesia (the Malay Peninsula).

Malay Peninsula. Penang, Government Hill, *Burkill 2891, Curtis 2281, Philip CF 1002, Ridley 7963.* Selangor, Fraser's Hill, *Md. Nur 11174, 11454.* Malacca, *Alvins s.n.* in 1886, *Curtis 3488, Derry 976, Maingay 191, 1072, Ridley 976.* Johore, Mawai, *Corner 29253, Ngadiman SFN 34757.* Singapore, *Corner 33564, Ngadiman SFN 35000, 34923, Ridley 1946, 3812, 4564, 4801* (all in SING, except *Maingay 1072, Ridley 976, 481, L.*).

ECOLOGY. In primary and mature secondary forests; altitude 50–1300 m. Fl.: May, June & Oct.; fr.: Aug., Nov. & Dec.

VERNACULAR NAMES: *kayu kelat asam, kayu kelat putih, sawak pulot.*

NOTE. Corner (l.c.) observed that this tree is nocturnal, the flowers open at dusk and fall next morning. He also noted that the flowering is seasonal and occurs more than once in a year, perhaps after dry weather.

20. *Gordonia taipingensis* Burkill, J. Str. Br. Roy. As. Soc. 76 (1917) 148, f. 6; Ridl., Fl. Mal. Pen. 1 (1922) 204; H. Keng in Ng, 288. Fig. 20

Small to medium-sized tree, 12–16 (–20) m tall. Young twigs covered with short hairs. Leaf-blades membranous or thin coriaceous, elliptic to elliptic-oblong, apex acuminate, obtuse or briefly caudate, base cuneate or attenuate, (8–) 13–20 (–30) cm long, (3.5–) 4.5–7.5 cm wide; margin of the upper two-thirds remotely crenulate, entire below; nerves 10–11 pairs on each side, slightly elevated above, faint and inconspicuous below; dark green and glabrous above, with scattered strigose hairs on the midrib beneath, otherwise glabrous; petiole 1.5–2 cm long, with scattered short hairs. Flowers axillary, solitary; bracteoles and bracts about 3, caducous; peduncle 0.2–0.5 cm long. Sepals ovate, broadly ovate to suborbicular, 1.2–1.7 cm long and broad, coriaceous, sericeous on both surfaces, but more densely hairy externally. Corolla 5–6 cm across, yellowish; petals 5–6, broadly oblong, suborbicular to reniform, 2.5–3 cm long, the exposed portion of the three outer petals thick and densely sericeous, the covered portion and the two inner petals membranous and puberulous. Androecium 1–1.2 cm long; stamens numerous, in 3 whorls and more or less in 5 bundles, the filaments hairy below, connate briefly with the base of corolla tube. Gynoecium about 1 cm long; ovary globose, densely sericeous, about 6 mm across, the upper tapering into a short style (about 4 mm long) with 5 branches (about 2 mm long). Capsule (immature) ovoid, 2 cm long, subtended by the persistent calyx.

DISTRIBUTION. Malesia (the Malay Peninsula: Perak and Pahang).

Malay Peninsula. Perak, Taiping Hill, *Md. Haniff & Md. Nur SFN 2359* (isotype, SING); Caulfield's Hill, *Md. Haniff & Md. Nur SFN 12734* (SING); Birch's Hill, *Wray 617* (SING). Pahang. Cameron Highlands, *Henderson 11191* (SING).

ECOLOGY. In montane forests, altitude 1200–1700m. Fl.; Feb. & June.

21. *Gordonia vulcanica* (Korth.) H. Keng, comb. nov.

Laplacea vulcanica Korth., Kruidk. (1842) 138, t. 26; Miq., Fl. Ind. Bat. 2 (1857) 490.

Haemocharis vulcanica O. Ktze, Rev. Gen. (1891) 62 (as '*vulcania*'); Burk., op. cit., 157.

Gordonia densiflora Ridl. J. Fed. Mal. St. Mus. 8 pt. 4 (1917) 17 **Syn. nov.**

Fig. 21

var. ***vulcanica***

A stout shrub, 2–6 m tall, or sometimes a crooked tree to 20 m tall, densely crowned. Young twigs densely covered with yellow or black hispid hairs; older branches stout, less hairy. Leaf-blades coriaceous or thick-coriaceous, ovate or broadly oblong, apex rounded or obtuse, sometimes retuse or emarginate, base rounded or very shallowly cordate, 2.5–5 (–6) cm long, 2–2.5 cm wide; margin of the upper half or two-thirds remotely serrulate or subentire; nerves 5–7 pairs, often slightly impressed above, faint or inconspicuous beneath; drying green and glabrous but often verrucous above, light green and somewhat faintly glaucous below, strigose near and on the midrib especially at the base; petiole stout, 1–3 mm long, sometimes almost sessile, hispid. Flowers in upper axils or subterminal, solitary or 2–3 together; peduncles almost absent or very short, 1–2 mm long, stout. Bracteoles, bracts and sepals 8–10, forming an involucre about 1–1.2 cm high, silvery wooly on the back, and increasing in size from the lower bracteoles (deltoid, 2–3 mm long) to the upper sepals (broadly obovate or suborbicular, 1–1.2 cm long). Corolla 4–5 cm across, creamy white (*vide* de Wilde); petals 5–6, varying from reniform to obcordate, 1.5–2.5 cm long, membranous, tapering below, glabrous except the lower one or two which are silvery puberulous and thickened at the back in the central portion, all petals are briefly joined at the base and adnate to the filaments. Androeceum 6–7 mm long, the filaments briefly united below, often in 5 less distinct fascicles. Gynoeceum 8–9 mm long; style columnar, 2–3 mm long, ridged, the upper portion separating into 5 free branches; ovary ovoid, 4–5 mm long, strigose or velutinous. Capsule 2.5–3 cm long, puberulous, dehiscent into 5 valves; sepals caducous eventually. Seeds 1.2–1.5 cm long including the wing.

DISTRIBUTION. Malesia (W. & Central Sumatra.)

Sumatra. Without precise locality, *Korthals Herb. Lugd. Bat.* 908. 251–803, –804, –815, –824 (lectotype) (L); *Beccari* 207 (L). Atjeh, *Jeswiet* 6827 (L); G. Losir, Atjeh, *Steenis* 8473 (BO), 8493, 8636, 9653 (L), *de Wilde & de Wilde-Duyffjes* 15276, 15432, 16141, 16565 (L). Mt. Sinabung, *Lorzing* 8182, 13681 (L). G. Singgalang, *Bunnemeijer* 2839 (L); Mt Kerintji, *Jacobs* 4417 (L); Korinchi Peak, *Robinson & Kloss s.n.* 10 May 1914 (holotype of *Gordonia densiflora* Ridl., SING). Mt Tanggamus, Lampung, *Jacobs* 8246 (L).

ECOLOGY. In montane forest, mostly in mossy elfin forests or in dense *Gleichenia* scrubs, sometimes near streams; alt. 2000–3400 m. Fl.: Jan.–May; fr.: April–July.

NOTE. Korthals described this species as having 5 free styles. This was because his description was based on small flower-buds rather than fully developed flowers.

Ridley's *Gordonia densiflora* is clearly a synonym.

var. **buxifolia** (Miq.) H. Keng, *stat. nov.*

Laplacea buxifolia Miq., Fl. Ind. Bat. Suppl. (1861) 482.

Haemocharis buxifolia (Miq.) Szyszyl. in E. & P., Pflanzenfam. 3, 6 (1893) 185;
Burk., J. Str. Br. Roy. As. Soc. 76 (1917) 158.

It differs from the above in the smaller and narrower ($3-4 \times 1-1.5$ cm, rarely to 6×2 cm) leaves with less conspicuous nerves, and in the smaller fruit (1.2–1.4 cm long) (? immature).

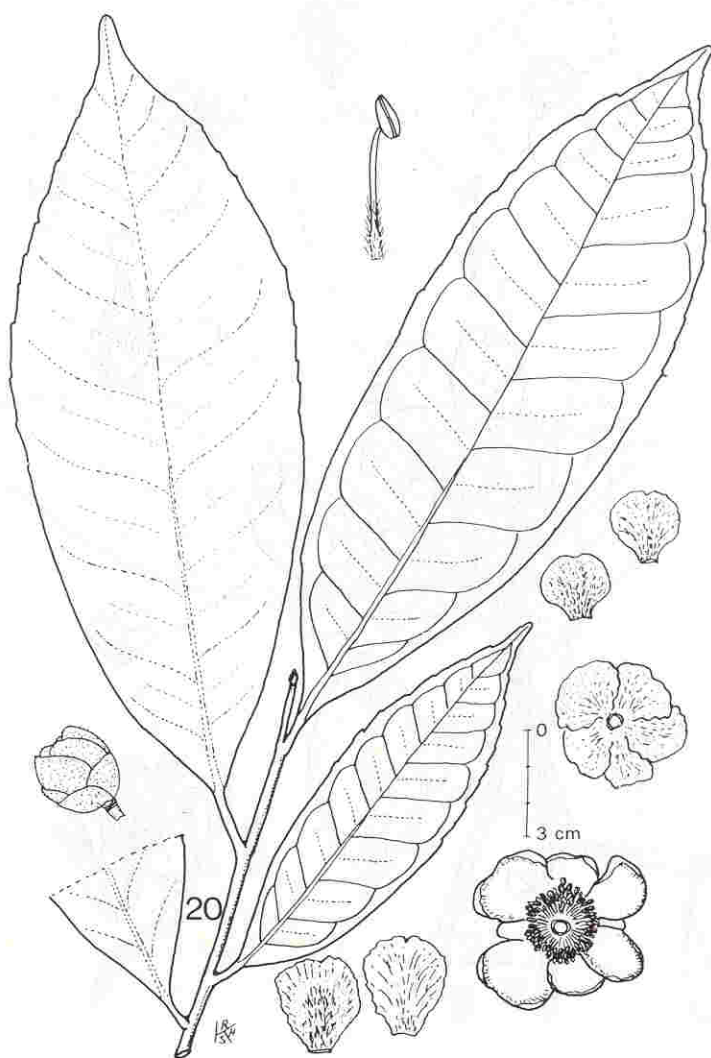


Fig. 20. *Gordonia taipingensis* Burk.

Malaya, Md. Haniff & Md. Nur SFN 12734 (fl.).

DISTRIBUTION. Malesia (W. Sumatra.)

Sumatra. Paya Kombo, *Herb. Teysmann H. B. 656* (isotype of *Laplacea buxifolia* Miq.); Mt. Sago, near Pajakumbuh, *Meijer 5525*; Taram, Bukit Paku, Pajakumbuh, *Meijer 7171*. Gajo Loeus G. Agosan, *Neth. Ind. For. Serv. bb. 22441* (L).

ECOLOGY. *Meijer 5525* was collected from 1800–2000 m, and *Meijer 7171*, from 600 m. Fr.: July.

NOTE. This variety probably represents merely a diminutive form of the above. The two taxa may have to be merged eventually.

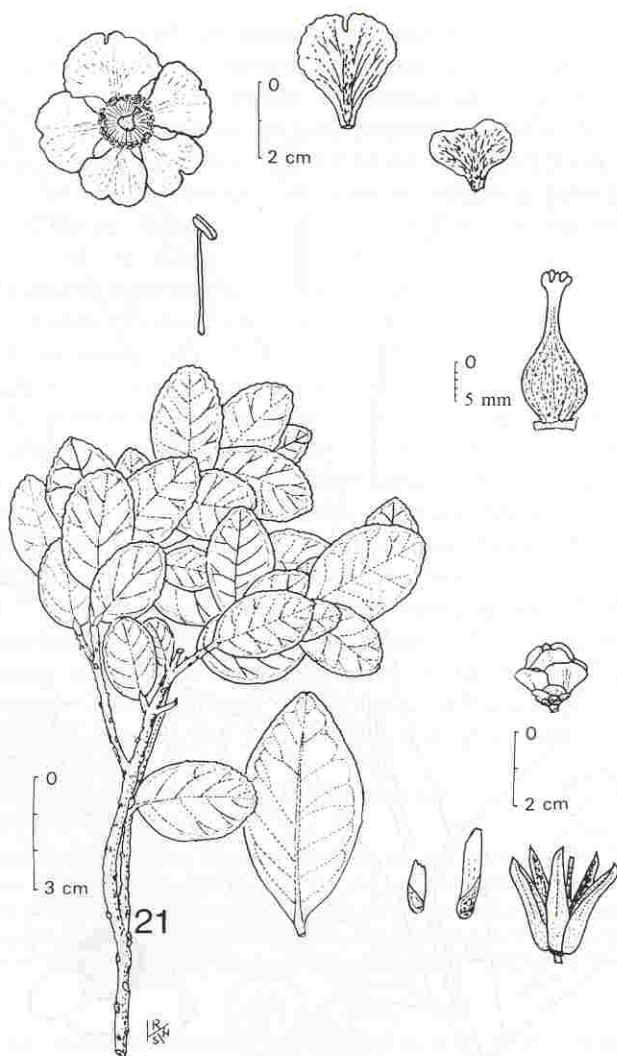


Fig. 21. *Gordonia vulcanica* (Korth.) H. Keng **comb. nov.**

Sumatra, *Steenis 8493* (habit); *de Wilde & de Wilde-Duyfjes 16565* fl & fr).

EXCLUDED AND DOUBTFUL SPECIES

1. *Gordonia brevifolia* Hook.f., Trans. Linn. Soc. 23 (1860) 162; Burk., J. Str. Br. Roy. As. Soc. 76 (1917) 158.
= *Schima brevifolia* (Hook.f.) Stapf. in Hook. Ic. IV, 3 (1893) t. 2264, Trans. Linn. Soc. Bot. 4 (1894) 135.
2. *Gordonia lanceifolia* Burk., op. cit., 150. Fig. 22
Burkill writes: "*G. lanceifolia*, a new species, comes near to *G. luzonica*. It has leaves of the same outline but more nearly entire, and differently veined. Its

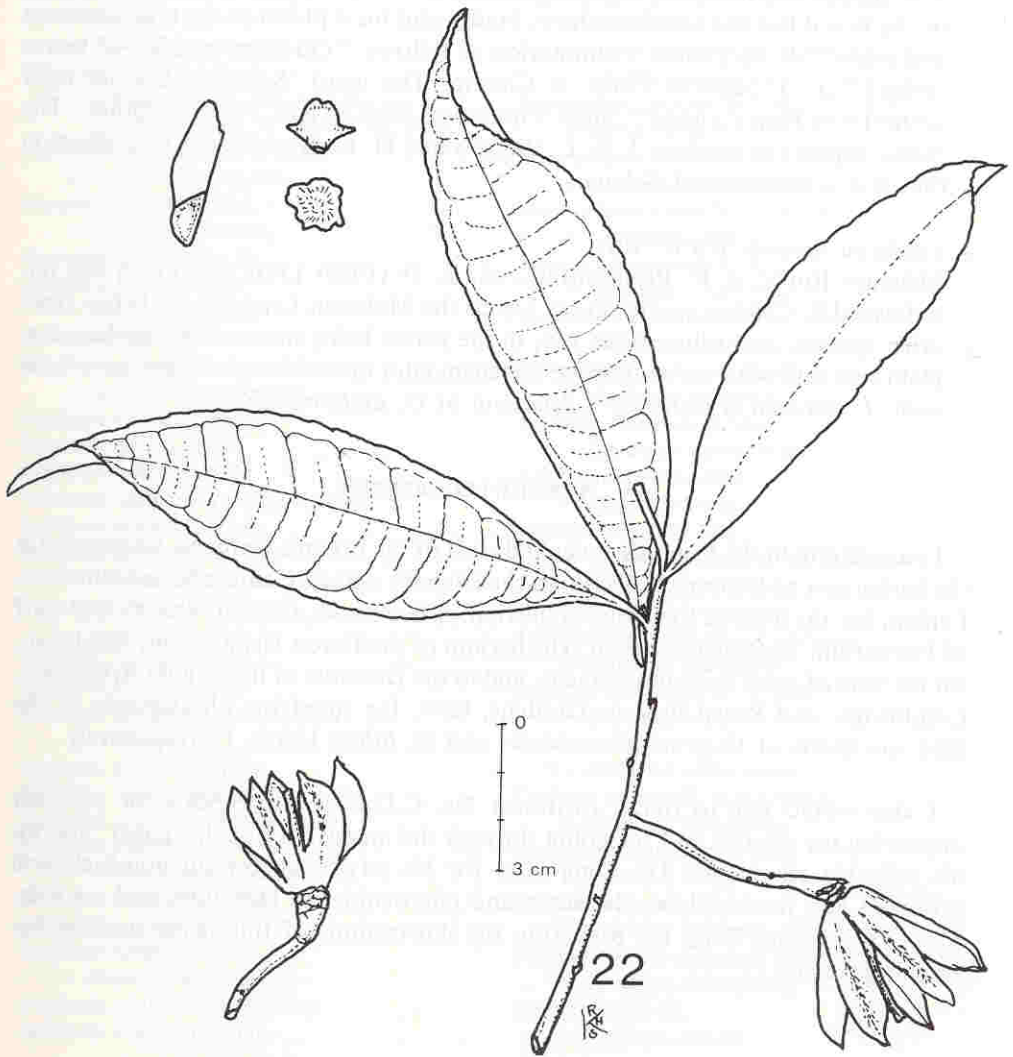


Fig. 22. *Gordonia lanceifolia* Burk.
Sarawak, Haviland 1010 (holotype).

capsule terminate leafless branchlets which may be 4 cm long. It occurs in Borneo near Kuching". Only a single specimen, the holotype, *Haviland 1010* (SING) was available for this study, which is a fruiting one. A recent (here depicted in figure 22) collection from Sarawak, which is close to or probably referable to this species is: *P. Chai S 32128* (L, SAN), collected from Segan For. Res., Bintulu on Sept. 19, 1972. It differs from the type specimen, however, in the smaller leaves (to 11 vs. to 13 cm long) and fruits (to 2.5 vs. to 3 cm long). There is only a single 5-valved fruit in the type, but over twenty dry capsules in *P. Chai's* collection, mostly 6-valved, few are 7- or 5-valved.

3. *Gordonia lobbii* Hook. f., Trans. Linn. Soc 23 (1860) 162; Burk., op. cit., 156. This species was based on T. Lobb's collection from Sarawak. Mr L. L. Forman of the Royal Botanic Gardens, Kew, kindly sent me a photo of the type specimen and copied Mr Airy-Shaw's annotation as follows: "On right, middle —' leaves crenate/ cf. *S. superba* Grdn. et Champ. The word '*Schima*' (Bottom right corner) is in Pierre's hand". Shaw's note says 'verisim a cl. Pierre scriptum'. The photo appears to confirm J. B. L. Pierre's and H. K. Airy-Shaw's identification that it is a specimen of *Schima*.
4. *Laplacea sarasini* Warb. MS. Melchior [(in E. & P. Pflanzenfam. ed. 2, 21 (1925) 136)] mentioned this unpublished S. Celebes species in his key to the Malesian *Laplacea*. It differs from other species, according to his key, in the leaves being more or less herbaceous, glabrous, and with an acuminate (or cuspidate) apex. No specimens have been seen. *L. sarasini* is probably a synonym of *G. amboinensis*.

IV. ACKNOWLEDGEMENTS

I am grateful to the Commissioner and staff of the Botanic Gardens, Singapore for the herbarium and library facilities, to the Director and staff of the Rijksherbarium, Leiden, for the loan of the entire collection of *Gordonia*, to the Directors and staff of Herbarium Bogoriense, Bogor, Herbarium of the Forest Department, Sandakan, for the loan of some critical specimens, and to the Directors of the Arnold Arboretum, Cambridge, and Royal Botanic Gardens, Kew, for supplying photographs of the type specimens of *G. grandiflora* Merr. and *G. lobbii* Hook. f., respectively.

I also would like to thank Professor Dr. C.G.G.J. van Steenis for patiently answering my queries and for going through the manuscript of this paper, and for his valuable comments; Dr. Dịng Hou for his advice on certain nomenclatural problems and for supplying the xerox and photocopies of literature; and my wife, Mrs. Ro-siu Ling Keng for preparing the illustrations of this paper and for her encouragement.

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 = *Gordonia ovalis*
Laplacea buxifolia Miq.
 = *Gordonia vulcanica* var. *buxifolia*
Laplacea integerrima Miq.
 = *Gordonia integerrima*
Laplacea marginata (Korth.) Choisy
 = *Gordonia marginata*
Laplacea ovalis (Korth.) Choisy
 = *Gordonia ovalis*
Laplacea sarasini Warb.
 ? = *Gordonia amboinensis*
Laplacea serrata (K. & V.) Melch.
 = *Gordonia integerrima*
Laplacea subintegerrima Miq.
 = *Gordonia ovalis*
Laplacea vulcanica Korth.
 = *Gordonia vulcanica*
Ploiarium ? *oblongifolium* Miq.
 = *Gordonia oblongifolia*
Schima excelsa Bl.
 = *Gordonia excelsa*