

EBENACEAE

171

Diospyros malabarica (Descr.) Kostel.

Synonyms : *Diospyros embryopteris* Pers., *Diospyros embryopteris* var. *siamensis* (Hochr.) Phengklai, *Diospyros glutinosa* Koenig. & Roxb., *Diospyros malabarica* var. *malabarica*, *Diospyros melanoxylon* Hassk., *Diospyros peregrina* Guerke., *Diospyros peregrina* f. *javanica* (Gaert.) Guerke., *Diospyros siamensis* Hochr., *Diospyros siamensis* Ridl., *Garcinia malabarica* Desr.

Vernacular name(s) : River ebony, Indian persimmon, Mountain ebony, Malabar ebony (E), Komoi, Kumun (Mal.), Culiket, Klega, Kleca, Toyokuku, Makusi (Ind.), Tako suan (Thai)

Description : Evergreen dioecious tree with male and female flowers occurring on different trees, medium to large sized, up to 37 m tall. The trunk may have a girth of up to 2 m and is often fluted at the base; bark is almost black. Leaves are simple, alternate, leathery, 3-6(-10) cm by 10-20(-24) cm, oblong, 6-8 side veins, sunken mid-vein, and often with a pointed tip. Leaf stalk 10-12 mm long. Young leaves are reddish. Flowers are whitish. Male flower clusters have 3-5 flowers, 4-merous, each up to 6 mm wide, with valve-like calyx lobes and 24-47 stamens. Female flowers are solitary in leaf axils, 18-25 mm wide, with a 1 cm long stalk; 4- or 5-merous. Fruit is round or egg-shaped, 4-5 cm long, 3.5 cm diameter, yellowish to rusty brown, 6-8 partitions, with 3-8 seeds. Fruit is at first densely hairy, later becoming smooth; 4 calyx lobes are hairy and remain attached to fruit. Fruit pulp is glutinous.

Ecology : Often cultivated in homestead gardens. On Java the species rarely occurs below an altitude of 400 m asl. Grows on all soil types, preferring moist, shady places along watercourses and can stand periodic flooding. Mangrove associate species.

Distribution : From India and Sri Lanka through Southeast Asia. In Southeast Asia recorded in Myanmar, Thailand, Cambodia, Malaysia (Peninsular) and Indonesia (Java, Sulawesi).

Abundance : Common in South Asia, uncommon in Southeast Asia apart from in gardens.

Use(s) : Wood occasionally used for timber. Young fruit used for extracting a glue-like gum, used for book binding. Ripe fruit eaten raw, and are reportedly tasty (Heyne) or astringent (Khan & Alam, 1996) – planted for this purpose in homestead gardens. Infusion of pulp used for dyeing fishing nets and making them more durable, and for caulking of boats. Bark and seeds used in medicine, for treating ulcers and wounds, and as a gargle for sore throats. Propagated from seeds.

Source of illustration : Corner (1988), Flora of China, Khan and Alam (1996)

Reference(s) : Heyne (1950), Ng (1978), Corner (1988), Khan & Alam (1996).

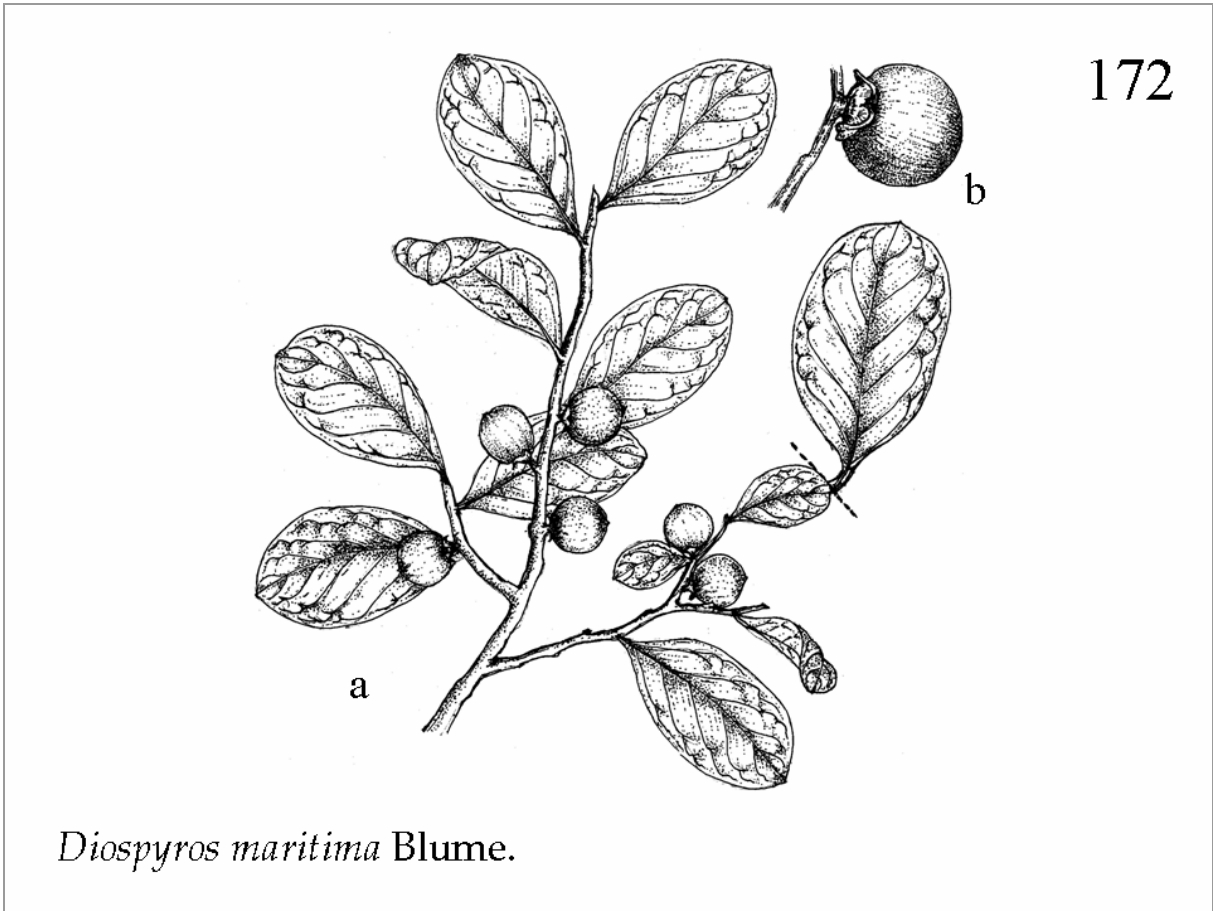


Fig. 172. *Diospyros maritima* Blume. (a) Fruiting branch, and (b) fruit.

EBENACEAE

172

Diospyros maritima Blume

Synonyms : *Diospyros kusanoi* Hayata, *Diospyros liukuensis* Makino, *Diospyros maritima* var. *transita* (Bakh.) Kosterm, *Maba cumingiana* A.DC. *Maba papuana* (R.Br.) Kosterm.

Vernacular name(s) : Broad leaved ebony (E)

Description : Evergreen, dioecious (with separate male or female) trees or shrubs, 4-8 m tall. Branchlets smooth. Leaves are simple, alternate, leathery, with a 4-10 mm long, smooth leaf stalk. Leaf blade elliptic to widely elliptic, 3-7 cm by 5-15 cm, leaf tip blunt or rounded, smooth on both surfaces, upper surface with a depressed midrib, lower surface with a prominent raised midrib and 5-8 pairs of raised lateral nerves. Female flowers are solitary in the leaf axils, with a very short stalk, 4 or 5 small scales at base, and with a fertile pistil and about 8 sterile stamens. Male flowers grouped in 2 or 3, clustered in leaf axils with a very short stalk; with 4 or 5 small scales at the base. The calyx is bell-shaped, silky white, about 3 mm long and deeply 4-lobed in male flower; about 4 mm long and shallowly 4-lobed in female flowers; female flower lobes are widely triangular, recurved at the tip. Corolla shaped like a salver, white, with a 10 mm long tube that measures 4 mm across and is dilated at base, densely white silky outside, smooth inside, 4-lobed; lobes recurved, oblong, rounded, and about 8 mm long and 4 mm wide. Stamens number about 16, with short filaments (about 1 mm long), smooth; anthers lanceolate and pointed, about 3 mm long in male flowers and much reduced in female flowers. Fruit a berry, round, but flattened from above, 2.5-3 cm in diameter, silky when young, later smooth, orange-yellow, 6 to 8-seeded. Seeds elliptic, laterally flattened, blunt at both ends, surrounded by a belt on edge, about 8 mm long, 5 mm wide, blackish and smooth.

Ecology : Occurs in coastal lowlands; recorded in evergreen “notophyll” vine forests on beach ridges of eastern Australia. Flowers from May to June. Mangrove associate species.

Distribution : From Southeast Asia to the Ryukyus and Taiwan, to Australia. In Southeast Asia recorded in the Philippines, Indonesia (Java, Papua) and Papua New Guinea.

Abundance : Locally common, but on the whole uncommon.

Use(s) : The bark and roots of this species have been reported to contain plumbagin and other monomeric and dimeric naphthoquinones.

Source of illustration : Flora of China vol. 15 fig. 161 (3-5).

Reference(s) : <http://bodd.cf.ac.uk/BotDermFolder/BotDermE/EBEN.html>,
<http://foj.c.u-tokyo.ac.jp>

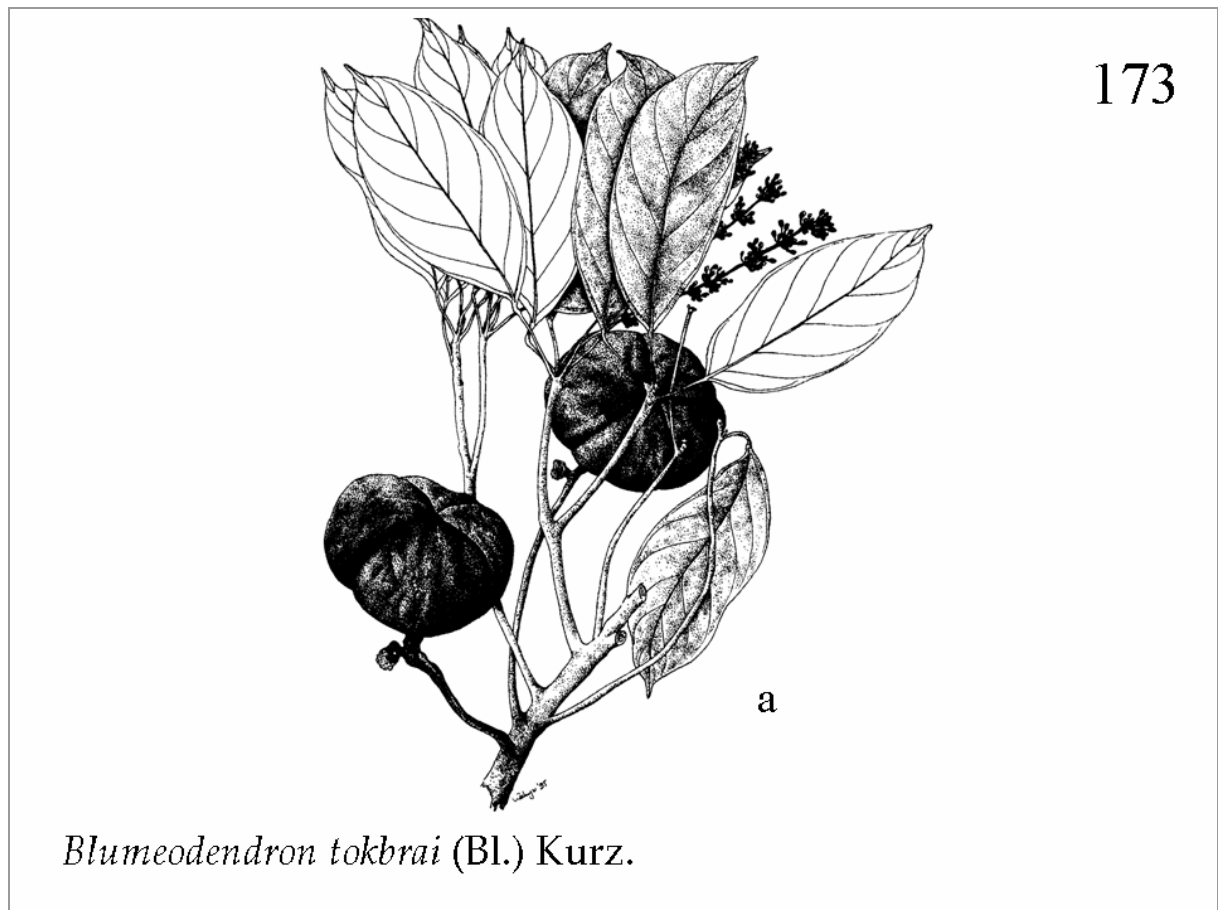


Fig. 173. *Blumeodendron tokbrai* (Bl.) Kurz. (a) Terminal branchlet with cluster of flowers and two fruits.

EUPHORBIACEAE

173

***Blumeodendron tokbrai* (Bl.) Kurz.**

Synonym(s) : *Blumeodendron elateriospermum* J.J. Smith, *Blumeodendron paucinervium* (Elm.) Merr., *Blumeodendron tokbrai* (Bl.) J.J. Smith, *Blumeodendron vernicosum* (Hk. f.) Gage, *Elateriospermum paucinervia*, *Elateriospermum tokbrai* Bl., *Mallotus tokbrai* (Bl.) Muell., *Mallotus vernicosus* (Hook. f.) Gage, *Rottlera tokbrai* (Bl.) Scheff.

Vernacular name(s) : Keretung (Mal.) Tokbrai, Batin-batin, Tekurung, Keterung, Siureuh, Kecipir (Ind.)

Description : Small to medium sized tree, up to 24 m (rarely 38 m) tall, 90 cm girth. The trunk is often fluted and may have small buttresses. In peat swamps it strongly develops 1 m-tall stilt roots. The crown is dense and small. Bark is orange-brown, smooth, sometimes marked with eye-like patterns. Wood is hard, yellow-brown (pink, according to Heyne, 1950), with fine radial lines. Young leaves are purplish, with a 2.5-5 cm stalk; blades are elliptic, 3.7-11.3 by 7.5-17 cm, with a narrow, long tip. The leaf margin is often whitish when the leaf is fresh and dry. There are six pairs of secondary nerves. Flowers occur on 5-7 cm-long clusters, each individual flower stalk being 2 mm long. Sepals 3-5, not overlapping; petals absent; stamens 14-35. Fruits are round, slightly flattened, about 3.2 cm across, (faintly) 3(-4)-shouldered, and orange when ripe. Seeds are black, enclosed in a cream jacket. Very variable species.

Ecology : Found in mangroves, primary peat swamp forest, *kerangas* (heath forest), lowland mixed Dipterocarp forest, hill forest and submontane moss forest, from sea level to 1,680 m (on Mt. Kinabalu, Sabah). Mangrove associate species.

Distribution : Southeast Asian species, recorded from Peninsular Malaysia, Brunei, Indonesia (Sumatra, Java, Borneo, the Moluccas and Papua) and Papua New Guinea.

Abundance : Uncommon.

Use(s) : The fruit is possibly edible (conflicting evidence regarding this). Timber splits easily, but is used for interior construction.

Source of illustration: Based on Whitmore (1972) and herbarium material of Rijksherbarium Leiden, the Netherlands.

Reference(s) : Heyne (1950), Whitmore (1973), Airy Shaw (1975).

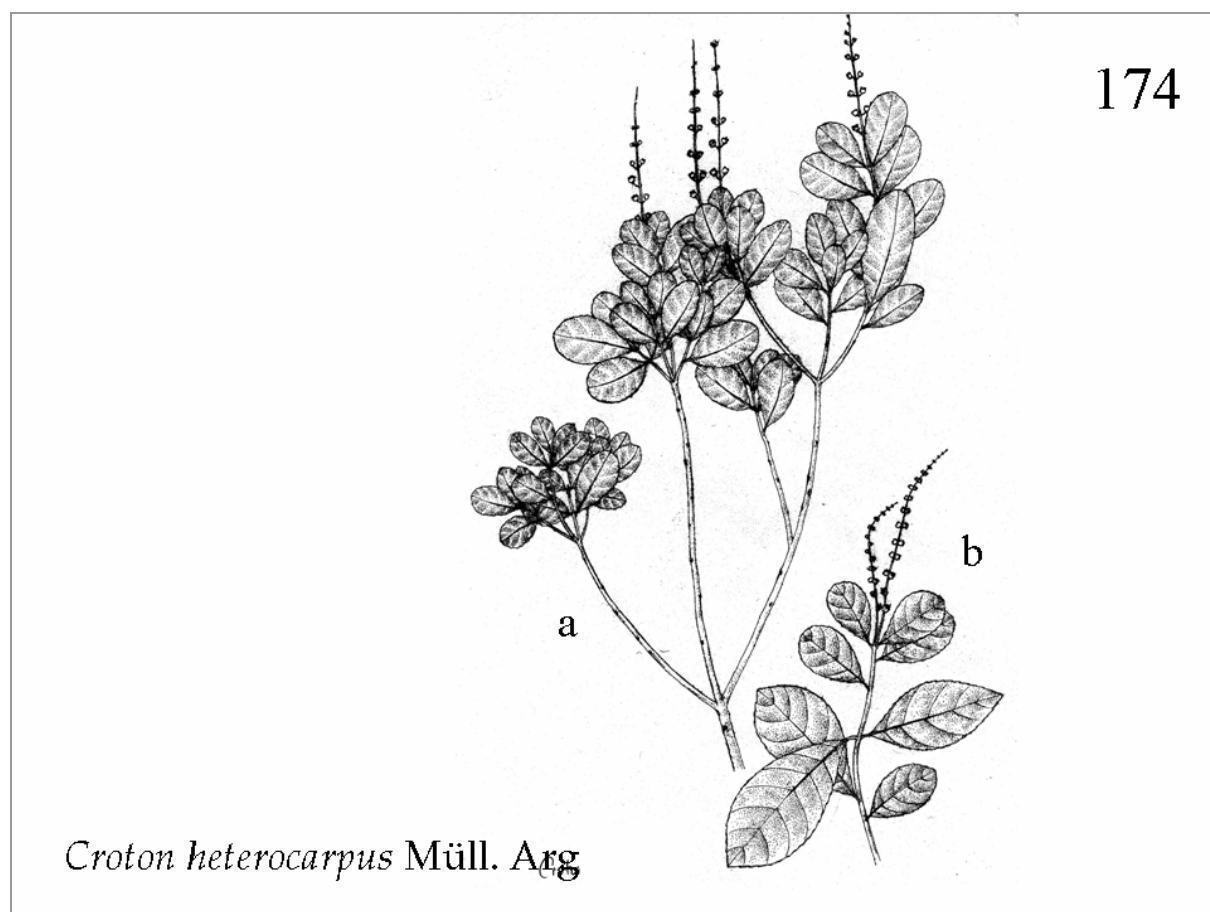


Fig. 174. *Croton heterocarpus* Müll. Arg. (a) Flowering terminal branches of small-leaved specimen, and (b), same, of large-leaved specimen.

EUPHORBIACEAE

174

***Croton heterocarpus* Müll. Arg.**

Synonyms : *Croton ardisioides* Hook. f., *Croton heteropetalum* (Sphalm.) Ridl.

Vernacular name(s) : Rat-tailed Croton (E), Melokan, Sari pelanduk, (Mal.), Lagarteiro, Sapokei, Tamu (Mal., Sabah), Margimaly (Mal., Sarawak), Darah-darah (Phil.), Patakoana, Wariemerie (Brun.)

Description : Small tree, 4-8(-12) m tall, with a clear bole up to half of this height, dbh up to 35 cm, usually much smaller. Bark smooth, grey to chocolate or reddish-brown, sometimes cracked and uneven; inner bark yellowish-green, sapwood pale orange, yellowish or whitish; occasionally with small buttress. Leaves are smooth, simple, spirally arranged, elliptic to obovate, 2-5 by 4-11 cm, simply pointed or blunt; leaf edge strongly wavy, with rounded teeth along upper part; wedge-shaped at base; leaf stalk 3-25 mm long. Leaves withering bright orange-red. Two conspicuous little glands at the base of the leaf blade, on the underside. Flowers are clustered in erect spikes at the ends of branches, 10-25 cm long, slender, either solitary or several spikes together. Flowers are pale green, whitish or slightly pink, 5(-6)-merous, 3.75 mm wide, with 5 overlapping sepals and 5 petals, shorter than the sepals, densely hairy within; anthers and stamens green. Fruit a round, green, bluish-green to yellowish capsule, 6 mm diameter, faintly three shouldered, set many along the (in fruit) drooping spikes like rats' tails.

Ecology : Primary forest near the coast, peat swamp, freshwater swamp forests, but especially along tidal creeks and rivers (e.g. in *Nypa* vegetation, or alongside *Gluta velutina*), and inland edges of mangroves. Occasionally in primary forest on hillsides. Mangrove associate species.

Distribution : Southeast Asian species, occurring in Singapore, Malaysia (Peninsular, Sarawak, Sabah), Brunei, the Philippines (Palawan) and Indonesia (Sumatra, Borneo).

Abundance : Uncommon.

Use(s) : Reported to be host plant for the lac insect; root is used in indigenous medicine in Sabah (collections by Goklin, 1962 and A. Mail in 1937).

Source of illustration : Holotype specimen (L0234540) collected by Zollinger in Lampung, Sumatra (undated), held at Leiden Herbarium.

Reference(s) : Whitmore (1972h), Airy Shaw (1975), Corner (1988)
http://www.sabah.gov.my/htan_caims/Vegetation/Fox%20Classification/Swamps/Mangroves.htm
http://www.rbgekew.org.uk/herbarium/brunei/lists/mangrove/151_01ls.htm

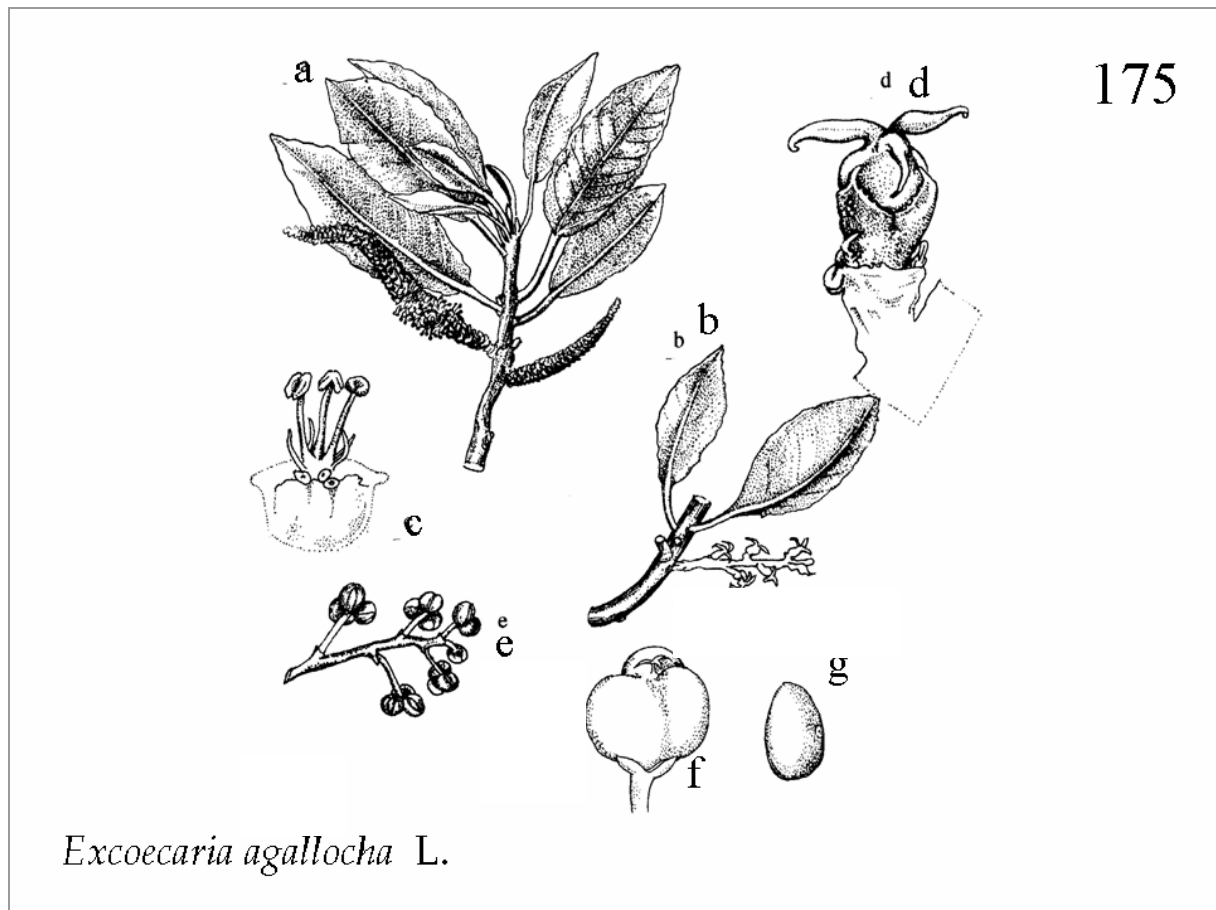


Fig. 175. *Excoecaria agallocha* L. (a) Branchlet with male flowers, (b) branchlet with female flowers, (c) male flower, (d) female flower, (e) cluster of fruit, (f) fruit, and (g) seed.

EUPHORBIACEAE

175

Excoecaria agallocha L.

Synonyms : *Commia cochinchinensis* Lour., *Stillingia agallocha* (L.) Baill.

Vernacular name(s) : Blind-your-eye, Milky mangrove (E), Buta-Buta, Kayu buta-butata (Mal.), Buta-butata, Menengan, Kayu Wuta, Sambuta, Kalapinrang, Mata Huli, Makasuta, Goro-goro Raci – *Kayu buta* (Ind.), Alipata, Batano, Bota-bota, Buta, Dipodata, Gumaingat, Himbabau, Iiñgi, Lipata, Lipatang-buhai, Siak – *Buta-butata* (Phil.), Thayaw (Myan.), Giá (Viet.), Taatum thale, Tatum (Thai.), Chheu chhor, Tatom (Camb.)

Description : Small deciduous tree up to 10 m tall, with a smooth, but somewhat warty, grey bark, trunk diameter at breast height about 15 cm in larger specimens. The crown is irregular. Its roots run along the surface of the soil, are often knotted and covered with lenticels. Copious amount of highly irritating white latex is present in trunk, stems and leaves. Leaves are ovate or elliptic, measuring 6.5-10.5 by 3.5-5 cm, and have a toothed margin. There are two glands at the base of the leaf. Leaves turn orange to a bright shade of red before they are shed, and this gives the entire tree a reddish appearance. Trees bear either male or female flowers, never both. The stemless, tiny flowers are spirally arranged on erect, catkin-like, elongated clusters located in the axils. The diffuse, very scented male flower cluster is green and up to 11 cm long. The three flower lobes of the male flower measure 1 by 0.5 mm. The female flower clusters are much smaller, measuring up to 3 cm. The 3-lobed fruit (a capsule) is up to 14 mm wide, and contains dark brown seeds that are streaked and 5 mm in diameter.

Ecology : Requires freshwater input for a large part of the year. It is commonly found on the landward margin of mangroves, on beach swales or occasionally above the high tide mark, occasionally up to an elevation of 400 m asl.. Also occurs along the banks of the saline (90% seawater) lake in the volcanic island of Satonda, off northern Sumbawa, Indonesia. It is particularly common as a regenerating species in some logged-over forests (e.g. Karang-Gading Langkat Timur Laut Reserve near Medan in North Sumatra) or forests with a long history of human influence (e.g. Sunderbans, Bangladesh). Flowering occurs intermittently all year round. Pollination by insects, especially bees, is suspected because of the sticky pollen and the presence of nectar producing glands at the end of the leaflets below the flowers. Mangrove species.

Distribution : Occurs in the Asian tropics, from India and Sri Lanka throughout Southeast Asia, to southern China, Taiwan, Southern Japan, Australia and the west Pacific.

Abundance : Locally abundant. Uncommon in Singapore.

Use(s) : Toothache and swellings are treated with the roots of this plant. The timber is useful for carving. Not used for firewood because of the unpleasant smoke. Sulphate-paper pulp with good properties can be produced from the wood. Wood used for making matchsticks (Philippines). The sap is used to kill fish. The wood is sometimes aromatic enough to be sold, but it loses its scent after a few years. The white sap is poisonous, causing blistering and (temporary) blindness. The common Indonesian name *buta-butata* refers to the latter characteristic.

Source of illustration : Based on Wightman (1989).

Reference(s) : Heyne (1950), Backer & Bakhuizen van den Brink (1963-8), Whitmore (1973), Airy Shaw (1975), Percival & Womersley (1975), Wightman (1989), Said (1990), Giesen & Sukotjo (1991), Aksornkoae (1993), Giesen & Rudyanto (1994), Aragonés *et al.* (1998), Ng & Sivasothi (1999), Marschke (2000), <http://www.uc.pt/timor/florafaua.html>.

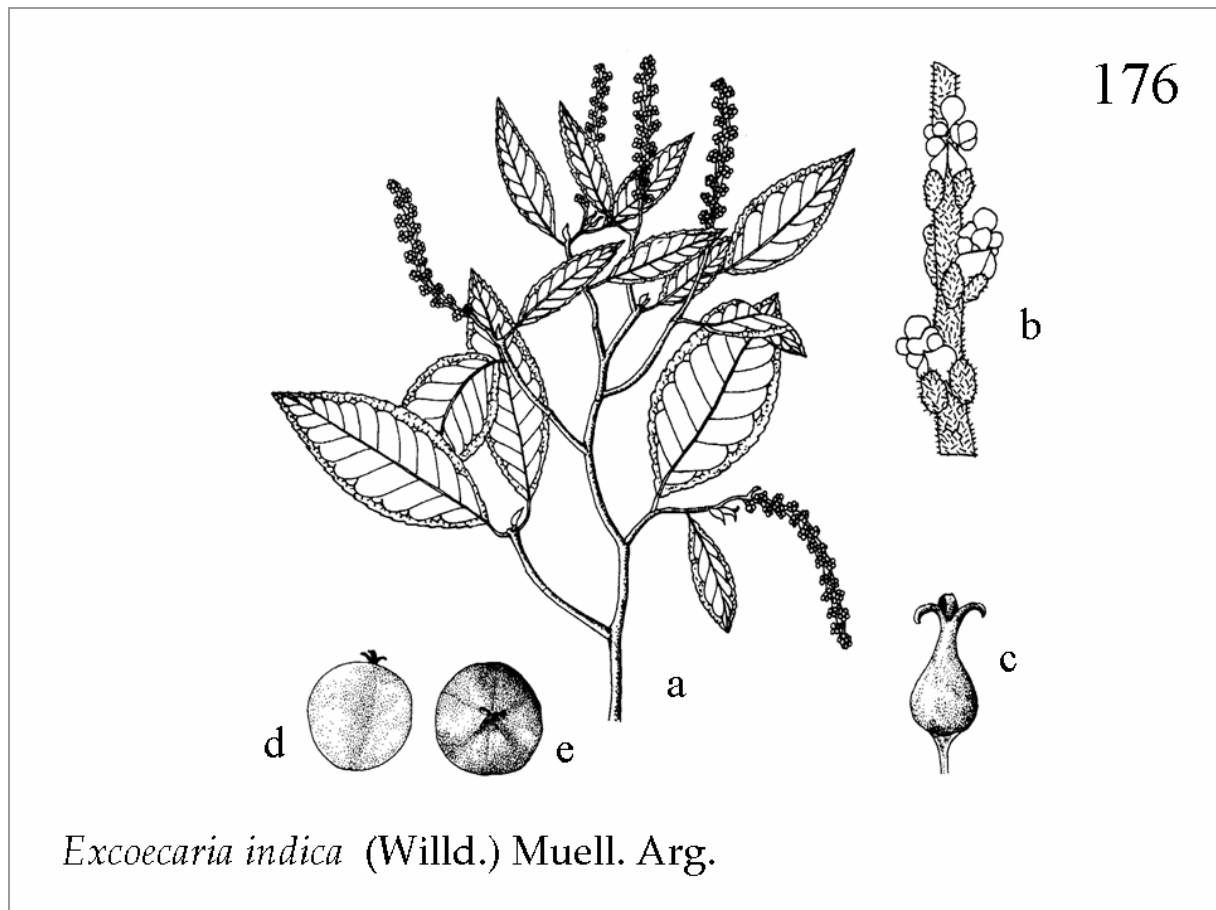


Fig. 176. *Excoecaria indica* (Willd.) Muell. Arg. (a) Terminal branchlet with clusters of flowers, (b) detail of flower cluster, (c) female flower, and (d, e) fruit, seen from side and above.

EUPHORBIACEAE

176

***Excoecaria indica* (Willd.) Muell. Arg.**

Synonyms : *Ichthyoctonos litorea* Rumph., *Sapium indicum* Willd., *Stillingia diversifolia*, *Stillingia indica* (Willd.) Baill.

Vernacular name(s) : Mock Willow (E), Gurah (Mal.), Ai Tui, Ai Tohi, Ai Pue (Ind.), Samo thale (Thai)

Description : A small tree, up to 18 m tall, usually less than 10 m, smooth and containing white latex. The trunk is short, not buttressed, with greyish, shallowly fissured bark. The crown is bushy, usually with upright branches and more or less drooping twigs. Leaves are elliptic or lanceolate, measuring 5-12 by 2-4 cm, finely toothed, with two small glands at the base of the blade. The leaf stalk is 7-20 mm long and reddish. Flowers occur in terminal, about 5 cm long, elongated clusters. Male flowers are numerous, each with three stamens. Female flowers are solitary, with three long styles. Fruit is a round, woody capsule, 2.5-3 cm in diameter, almost black, 3-seeded.

Ecology : Occupies primary *Nypa* forest in sea water, tidal river banks and sea shores. Also occurs in freshwater swamp forests, along rivers and in evergreen lowland forest up to an altitude of 250 m. Mangrove associate species.

Distribution : From south and east India throughout Southeast Asia to the Solomon Islands. In Southeast Asia so far not (yet) recorded in the Philippines.

Abundance : Locally common.

Use(s) : Leaves are used to prepare a black dye to colour yarn and rattan. Young fruits, containing aesculetin in the latex, are used as fish poison. The ripe seeds are used as a vegetable or condiment, after removal of the fruit-wall (the latex of the wall blisters the skin). The hard, round seeds are used by children as marbles (Indonesia). Wood used only for fuel. Leaves are applied to the abdomen to cure fevers; a decoction of the root bark has purgative properties.

Source of illustration : Based on Lemmens & Wulijarni-Soejipto (1991).

Reference(s) : Heyne (1950), Airy Shaw (1975), Tomlinson (1986), Aksornkoae (1993), Ng & Sivasothi (1999).

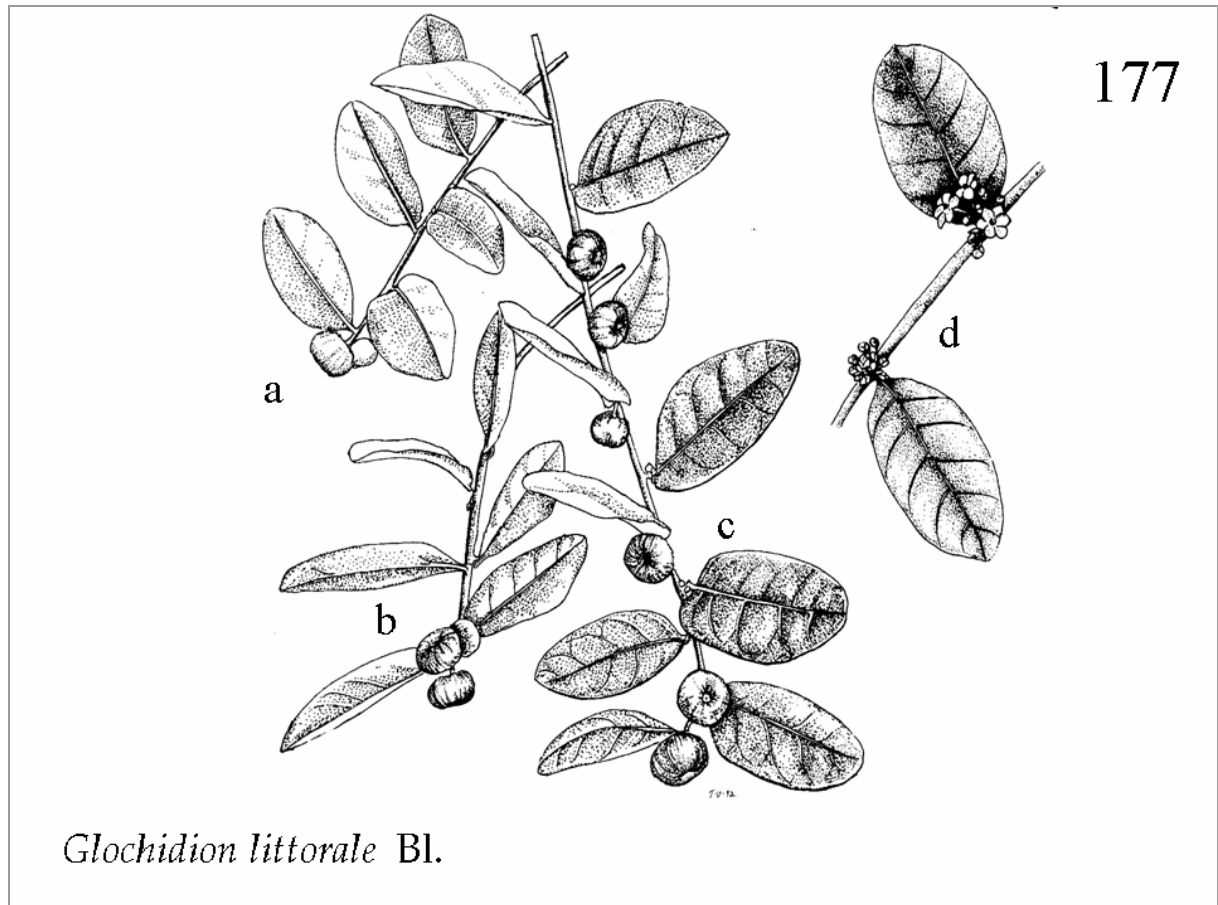


Fig. 177. *Glochidion littorale* Bl. (a, b, c) branchlets with fruit, and (d) branchlet with flowers.

EUPHORBIACEAE

177

Glochidion littorale Bl.

Synonyms : *Glochidion littoralis*, *Phyllanthus litoralis* [sic] (Bl.) Muell.

Vernacular name(s) : Monkey apple (E), Jambu kera, Selensur (Mal.) Kapo-kapo, Ketumbang, Dempul, Dempul Lelet Gajah, Jeraman – *Dempul* (Ind.), Bagnang-lalake, Kayongkong, Nigad, Padi-padi, Sagasa, Tabaño – *Kayong* (Phil.), Múi (Viet.)

Description : Erect shrub or small tree, 3-6(-8) m tall, with brown or grey, smooth twigs, and a stem diameter of 10-15 cm at breast height. The leaves are leathery, shiny and simple, oval-ovate or almost round, measuring 3.5-8.5 by 2.5-6.5 cm. The small, often green or yellowish-green flowers occur in clusters located in the axils. They do not have a corolla or disk. The fruit is red and smooth or partly covered with fine hairs; it is crowned by the (remains of the) style-column. Fruit measures 1 by 1.5 cm, slightly compressed at the top, up to 14-lobed, with longitudinal grooves; pinkish-white to reddish. The shrub is highly variable, and at least three varieties have been recognised (*littorale*, *culminicola* and *caudatum*).

Ecology : Occurs in coastal brushwoods and open forests, on tidal river banks, sea cliffs and peat swamp forest, up to altitudes of about 90 m. Flowering occurs all year round. Mangrove associate species. According to Airy Shaw (1975), there are three varieties: the coastal *Glochidion littorale* var. *littorale* (described here), *Glochidion littorale* var. *culminicola*, endemic to Sarawak, occurring in elfinwood or pygmy forest at altitudes of 240-1,800 m, and *Glochidion littorale* var. *caudatum*, also endemic to Sarawak, and occurring in peat swamp forests. Mangrove associate species.

Distribution : Occurs from India and Sri Lanka through Southeast Asia. In Southeast Asia it has been recorded in Cambodia, Peninsular Malaysia, the Philippines, Vietnam, Thailand, Singapore and Indonesia (Java, Sumatra and Borneo).

Abundance : Locally common.

Use(s) : Leaves used as medicine to treat blood in the stools, dysentery and tonsillitis. A concoction of leaves is used to treat stomachache. Fruit said to be edible. A preparation of the plant is used for bathing after childbirth. Wood is used for firewood, fencing and poles.

Source of illustration : Based on Polunin (1989).

Reference(s) : Heyne (1950), Backer & Bakhuizen van den Brink (1963-8), Whitmore (1973), Airy Shaw (1975), Tomlinson (1986), Aragones *et al.* (1998), Ng & Sivasothi (1999), Hong (2000).

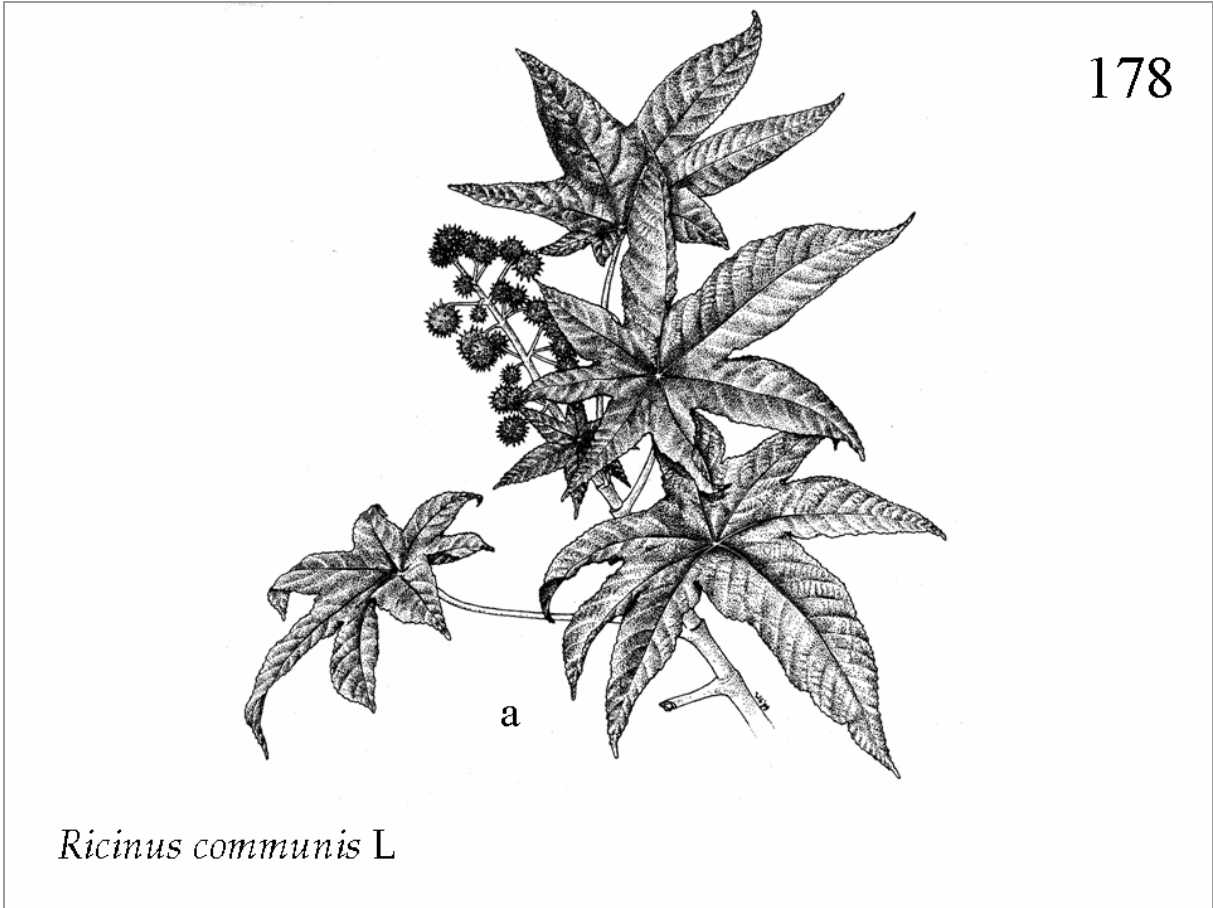


Fig. 178. *Ricinus communis* L. (a) Terminal branch with fruit.

EUPHORBIACEAE

178

Ricinus communis L.

Synonyms : *Ricinus inermis* Mill., *Ricinus spectabilis* Bl.

Vernacular name(s) : Castor oil plant (E), Wonderboom (NL), Jarak (Mal.), Gloah, Lulang, Jarak, Kalikih alang, Jarang, dulang jai, Lana-lana, Lutur bal, Luluk, Paku ton, Ketowang – *Jarak kosta* (Ind.)

Description : A large, smooth, woody herb or small tree, reaching a height of about 2m after 1 year, but may eventually attain 3-4(-8) m. Leaves are simple, alternate, hand-shaped, with 5-9 lobes, with pointed tips and serrated edges, 15-30(-40) cm in diameter, and with a 30 cm long stalk that has conspicuous glands at the base. Leaves and stems are often reddish green. Flower spikes are borne in the axils of the upper leaves and are 15-30 cm long, with female flowers in the lower part and male flowers above. Neither type of flower has petals; the male has numerous, cream-coloured stamens and the female 3 red stigmas. Fruits are spherical capsules, at first green, later turning brown, covered with soft spines, 12-18 mm across, splitting open when ripe to release 3 large seeds, pale-silvery coloured and marked with many black lines and stripes.

Ecology : Flowering and fruiting occurs all year round. Found on a wide variety of soils, but generally not in waterlogged areas, from sea level to about 2500 m asl. Occurs on landward margins of mangroves, and as a weed of waste ground. Seed coat is poisonous to birds and mammals. Mangrove associate species.

Distribution : Indigenous to tropical and subtropical Africa (or perhaps only Somalia and northeast Kenya), planted world-wide, including Southeast Asia where it now occurs throughout.

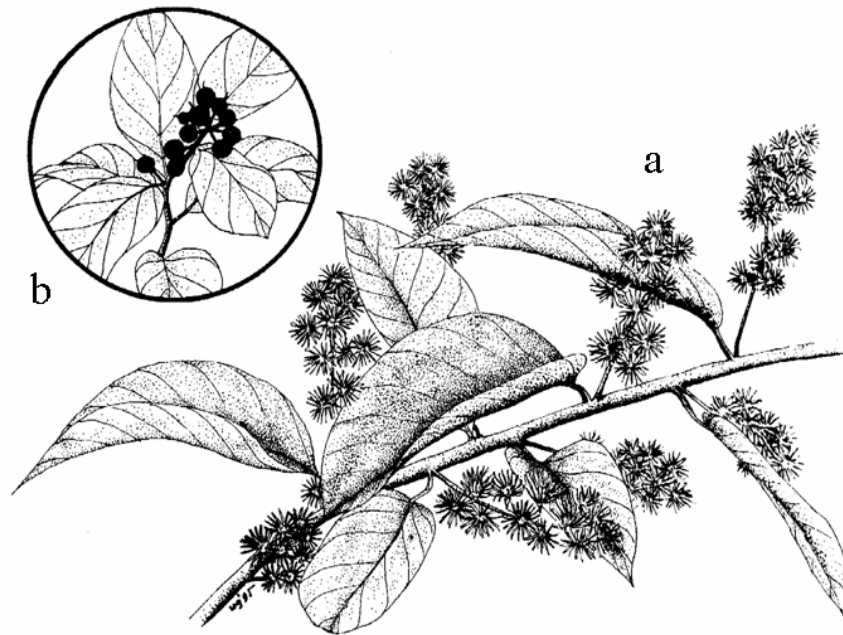
Abundance : Locally common.

Use(s) : Grown as a crop throughout the tropics for the production of castor oil, which is used as a lubricant and as a purgative. Oil cake is used as fertiliser (contains 4.8% nitrogen and 1.6% phosphorous). Leaves are used as fodder. The plant has many medicinal uses: leaves are used to treat headaches, as a poultice for boils, and as a cure for rheumatism. Leaves are also used as a feed for silkworms. Seeds contain a potent poisonous protein called ricinin.

Source of illustration : Drawn from live specimen.

Reference(s) : Heyne (1950), Ivens (1972), Airy-Shaw (1975), Afriastini (1988), Corner (1988), Khan & Alam (1996).

179



Scolopia macrophylla (W. & A.) Clos.

Fig. 179. *Scolopia macrophylla* (W. & A.) Clos. (a) Flowering branchlet, and (b) fruiting branchlet.

FLACOURTIACEAE

179

Scolopia macrophylla (W. & A.) Clos

Synonyms : *Phoberos macrophylla* W. & A., *Phoberos maritima* Miq., *Phoberos rhinantha* Benn. & Br., *Rhinantha blumei* Steud., *Rhamnicastrum rhinantha* O. Ktze, *Scolopia crenata* [non (Wall.) Clos.] King, *Scolopia maritima* Warb., *Scolopia rhinantha* Clos.

Vernacular names : Pokok rukam gajah, Rukem Laut, Damak-damak (Mal.), Marong, Rukam laka, Rukem Betina, Api, Belangan (Ind.), Bó'm Bà (Viet.)

Description : A small tree, up to 10 m tall, with a smooth, greyish-pink bark, often with a spiny trunk and branches. Spines may be up to 3 cm long. The ovate, leathery leaves, 5-16 by 3-8 cm, are red when young and spirally arranged; leaf edges are minutely and regularly toothed. Usually there are two orange glands at the insertion of the blade. Similarly, there are two such glands on the flower disk opposite each petal. The slender leaf stalk is reddish-pink, 5-10 by 1 mm. The bisexual, slightly scented flowers occur in elongated clusters located in the axils, or occasionally in loose clusters located at the ends of branches, 2.5-10.5 cm long. The greenish-white or yellowish-white flowers measure 4 mm across and are hairy along the margins. The 4 mm long style, the numerous stamens and the lobes of the calyx are persistent – i.e. they remain visible on the fruit. The orange, round berry is 6-7 mm long and 2-6 seeded.

Ecology : Occurs in moist or marshy soil on the landward margin of mangroves, or further inland on river banks, along swampy creeks, at the margins of pools and along marshes in teak-forest. Usually on temporarily inundated soils, up to altitudes of 15 m, rarely inland up to 90-150 m altitude. Near Lake Toba in Sumatra it has been recorded at 900 m, but this is exceptional. Flowering occurs from August to October. Mangrove associate species.

Distribution : Southeast Asian species, recorded from Cambodia, Thailand, Vietnam, Malaysia and Indonesia (Sumatra, Borneo, Java).

Abundance : Localities at which it has been recorded are widely scattered, but the species is sometimes locally relatively common. Generally it is uncommon.

Use(s) : Small construction timber.

Source of illustration : From herbarium specimen at Herbarium Bogoriense.

Reference(s) : Sleumer (1954), Backer & Bakhuizen van den Brink (1963-8), Whitmore (1972d), Tomlinson (1986), Corner (1988), Said (1990)
[http://www.mekonginfo.org/mrc_en/contact.nsf/0/8902A71A698A3DE1802566860066E546/\\$FILE/Bomba.htm](http://www.mekonginfo.org/mrc_en/contact.nsf/0/8902A71A698A3DE1802566860066E546/$FILE/Bomba.htm).

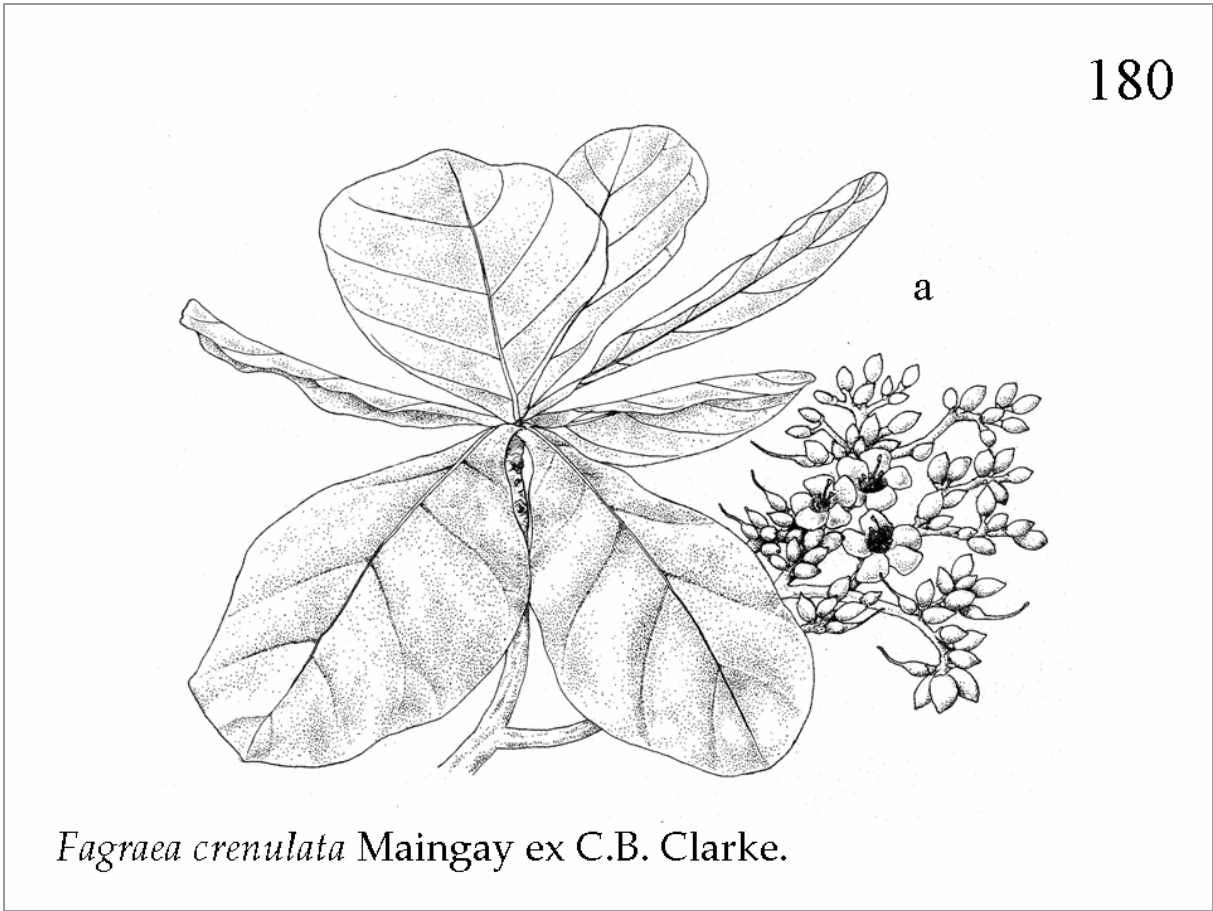


Fig. 180. *Fagraea crenulata* Maingay ex C.B. Clarke. (a) Flowering branch.

GENTIANACEAE

180

Fagraea crenulata Maingay ex C.B. Clarke

Synonyms : *Fagraea fastigiata* (non Bl.) Ridl.

Vernacular name(s) : Cabbage Tree (E), Melabira (Thai.), Bàng nu'óc (Viet.), Malabera (Mal.), Bebira, Bira bira, Bubira, Malabira, Melabira, Kayu Bulan (Ind.)

Description : A large tree reaching a height of 17-23(-25)m with tiers of radiating branches like that of *Terminalia catappa* (Sea Almond or Ketapang). The trunk and branches are covered with short thorns that often disappear as the tree matures. The bark is light grey in colour that darkens with age and is deeply ridged and fissured. Leaves are simple, opposite, broadly obovate, crowded in a terminal whorl; leaves large, 14-25 by 18-45 cm, with rounded apex and narrow base which clasp the twig; leaf edge has tiny, rounded teeth (= 'crenulations', hence the name). Veins, 5-7 pairs, are raised and prominent on the lower side of the leaf. Leaf stalks (virtually) absent. Flowers are in large terminal bunches, 25 cm long, cream coloured turning yellow with age and are fragrant; calyx 1 cm long, divided to near the base; corolla tube funnel-shaped, 1.75-2 cm long. Flowering occurs in March or April with the flowering branches losing their leaves. Fruits are green, oblong, 2.5 cm or longer. They are fleshy with many small seeds. The Cabbage Tree tends to be mistaken with the Ketapang due the tier-like branching and large leaves. The difference between the two is that the Ketapang has no thorns. Recent taxonomic revisions have resulted in the genus *Fagraea* being moved from the Loganiaceae to the closely related Gentianaceae (Struwe & Victor, 2000).

Ecology : Occurs in wet lowland habitats, tolerating full-strength sea water. Usually occurs in permanent or seasonal freshwater swamps, on banks of tidal rivers, and is occasionally recorded in mangroves. Up to an altitude of 10 m asl. Mangrove associate species.

Distribution : Southeast Asian species, recorded in Thailand, southern Vietnam, Malaysia (Peninsular and Sarawak), Singapore and Indonesia (Sumatra and Borneo).

Abundance : Common.

Use(s) : Planted as a roadside tree in Singapore and Malaysia. Used for afforestation of tin tailings in Malaysia, as it is tolerant of high levels of heavy metals and acidity. It is used for making walking sticks. Furnishes a good, though cross-grained timber. Wood very valuable for piling, as it resists *teredo* borers when used with the bark still present. Also used used firewood. Planted in Bengkalis (Riau Province, Sumatra).

Source of illustration : <http://biodiversity.uno.edu/delta/wood/en/www/logfafra.htm>

Reference(s) : Leenhouts (1962), Aronson (1989); Ang & Ho (2002),
<http://biodiversity.uno.edu/delta/wood/en/www/logfafra.htm>
<http://www.nparks.gov.sg/plants/tre/pla-tre-fag.shtml>
<http://www.ussl.ars.usda.gov/pls/caliche/Halophyte.query?k=Genus&q=Fagraea>.

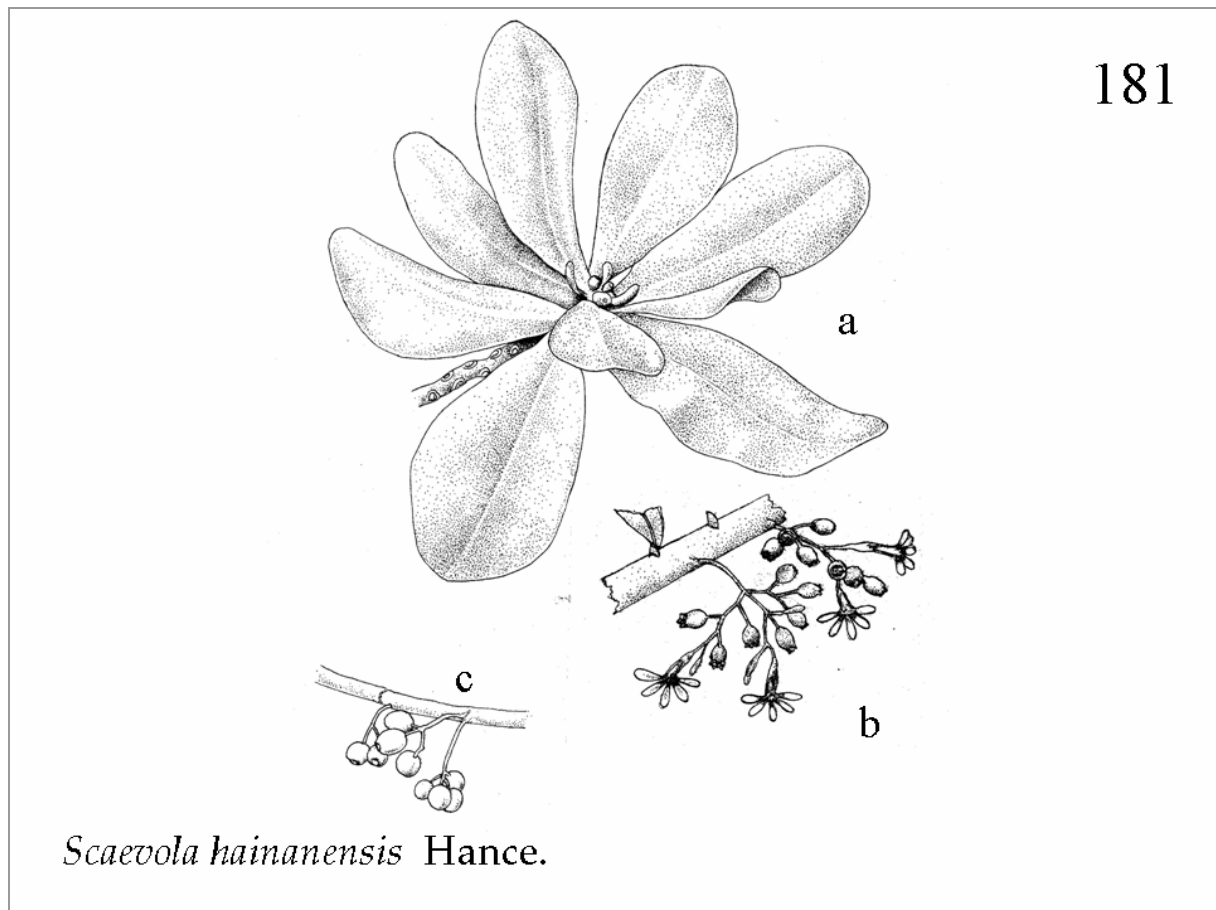


Fig. 181. *Scaevola hainanensis* Hance. (a) Terminal branch, (b) cluster of flowers and fruit, and (c) fruit clusters.

GOODENIACEAE

181

Scaevola hainanensis Hance

Synonyms : *Crossotoma hainanensis*

Vernacular name(s) : Fan flower (E)

Description : A stiff, rigid, low growing shrub, 1.5-2 m, branches covered with short stiff, greyish-white hairs. Leaves are fleshy, alternate and bright green, varying in shape from narrow to spatula-shaped (rounded and gradually narrowing to the base) 1-1.5 by 6-7 cm. They are arranged in clusters along the branches and have woolly leaf axils. Flowers are (almost) without a stalk. There are five calyx lobes, the lower parts of which are united into a tube and joined to the ovary. Five petals are winged and united at the base, arranged in a one-sided manner like an outstretched hand or fan; densely hairy on the inside, smooth on the outside, 4-5 cm long; white, with purplish marking inside. There are five free stamens. Fruit is a white fleshy berry, 5-8 mm diameter, to which the persistent calyx remains attached; contains two seeds.

Ecology : Not recorded in the original description by Hance, and not yet described in the Flora of China. Judging from photographs and from the records from Vietnam, it may be (predominantly) a coastal species. In Vietnam, the species is recorded along with *Suaeda australis* and *Acrostichum aureum* on landward margins of mangroves on a gravelly substrate at several localities. In southern China (Guangdong) it is common on sandy soils, especially on sandy beach ridges (Howes *et al.*, 2004). Mangrove associate species.

Distribution : Mainly an East Asian species, first recorded in southern China (Hainan Island), but also found elsewhere in southern China and Taiwan. In Southeast Asia it has been recorded in Vietnam only.

Abundance : Uncommon to rare.

Use(s) : Potential as ornamental.

Source of illustration : Taiwanese websites.

Reference(s) : Hance (1878), Chau *et al.* (2000),
<http://www.dec.ctu.edu.vn/sardi/htqt/english/succession.htm>.

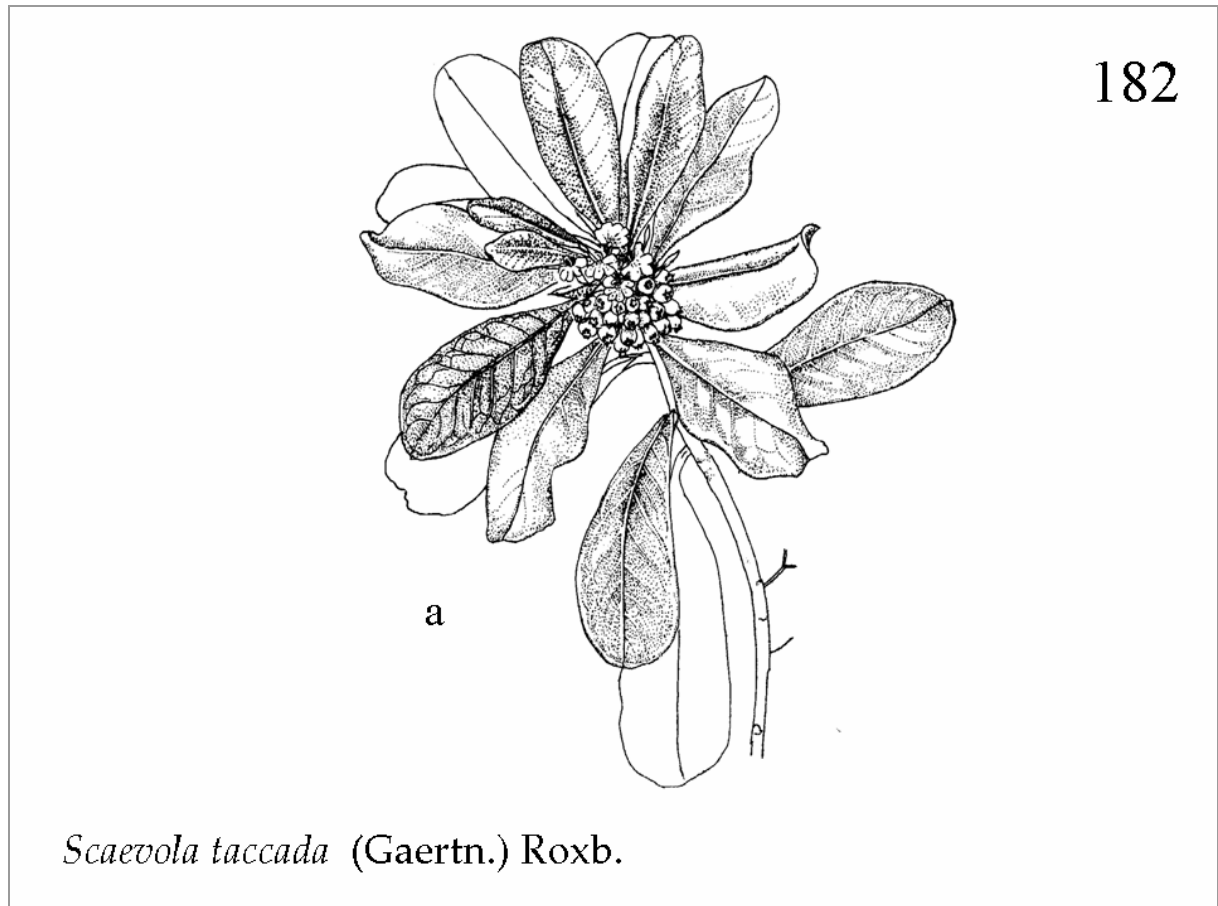


Fig. 182. *Scaevola taccada* (Gaertn.) Roxb. (a) Branchlet with flowers and fruit.

GOODENIACEAE

182

Scaevola taccada (Gaertn.) Roxb.

Synonyms : *Buglossum litoreum* Rumph., *Lobelia frutescens* Mill., *Lobelia plumieri* (non L.) Burm., *Lobelia taccada* Gaertn., *Scaevola frutescens*, *Scaevola koenigii* Vahl., *Scaevola leschenaultii* DC., *Scaevola lobelia* Murr., *Scaevola macrocalyx* de Vriese, *Scaevola piliplena* Miq., *Scaevola plumieri* (non Vahl.) Bl., *Scaevola sericea* Vahl., *Scaevola velutina* Presl.

Vernacular names : Sea-lettuce Tree (E), Strand ossetong (NL), Ambong-ambong, Merambong, Pelampong (Mal.) Ambung-ambung, Beruwas Laut, Gabusan, Kaju Ambong, Subang-subang, Cilekle, Babakoan, Baba koan Lelaki, Gagabusan, Niangka, Porang, Dudulan, Gabus, Gabus Cina, Pohodo'elang, Klindo, Pelenda Laut, Bojo, Batang Lampung, Bawuntulon, Bojolo, Bukolako, Kokole, Panimburang, Papaceda, Witungtasi, Anas, Boppa Ceda, Gilitopa, Hokal, Mokal, Panimburana, (Pa)Paceda – *Subeng-subeng* (Ind.), Dodogo kubar, Kaikikira, Paimeh (PNG), Balak-balak, Balok-Balok, Bokabok, Bosboron, Boto, Linu, Mosboron, Boto (Phil.), Rak thale (Thai.)

Description : Robust, erect or spreading shrub, up to 3 m tall. Occasionally develops into a small tree up to 7 m, with slender white branchlets that have a white pith. Leaf scars are conspicuous and have hairs along their edge. The succulent, spirally arranged or opposite, oblong-obovate leaves are often densely crowded at the ends of the branches. Leaves measure 15-25 by 6-12 cm, tapering into a short, broad leaf stalk. Tufts of stiff, white hairs occur in the leaf axils. The conspicuous white or pale yellow bisexual flowers are 2-2.5 cm long, and occur 4 cm long clusters located in the axils on a 1 cm long stalk. Flowers are covered with fine, white hairs. The calyx segments are about 0.5 cm long. The petals often have violet stripes on the inside and an undulating margin. The corolla tube, 10-15 mm long, is split completely down one side, exposing the curved style. The fleshy, white fruits are 1 cm long, with 1-2 corky seeds.

Ecology : Typical of beach communities, especially sand dunes, where it can form extensive colonies, apparently by subterranean branching of the roots. It also occurs on rocky beaches, and in mangrove communities, but only in sandy, well-drained areas. Flowering occurs throughout the year. Large bees pollinate the flowers, but self-pollination also seems to occur. Fruits are probably dispersed by birds. Mangrove associate species.

Distribution : From Madagascar to Southeast Asia, through tropical Australia and the South Pacific, up to Hawaii. Recorded throughout Southeast Asia.

Abundance : Common, and locally very abundant.

Use(s) : Several parts of this plant are used in native medicine. The wood is small, but resistant against sea water and used for making nails for canoes. The thick, soft pith of the young twigs is used in microscopy, replacing elder-pith. As this pith can easily be cut and painted, ornaments, such as small flowers, small birds, fruits etc... are carved from it (e.g. in the Moluccas).

Source of illustration : Based on Polunin (1988).

Reference(s) : Leenhouts (1957), Backer & Bakhuizen van den Brink (1963-8), Tomlinson (1986), Afriastini (1988), Corner (1988), Aksornkoae (1993).

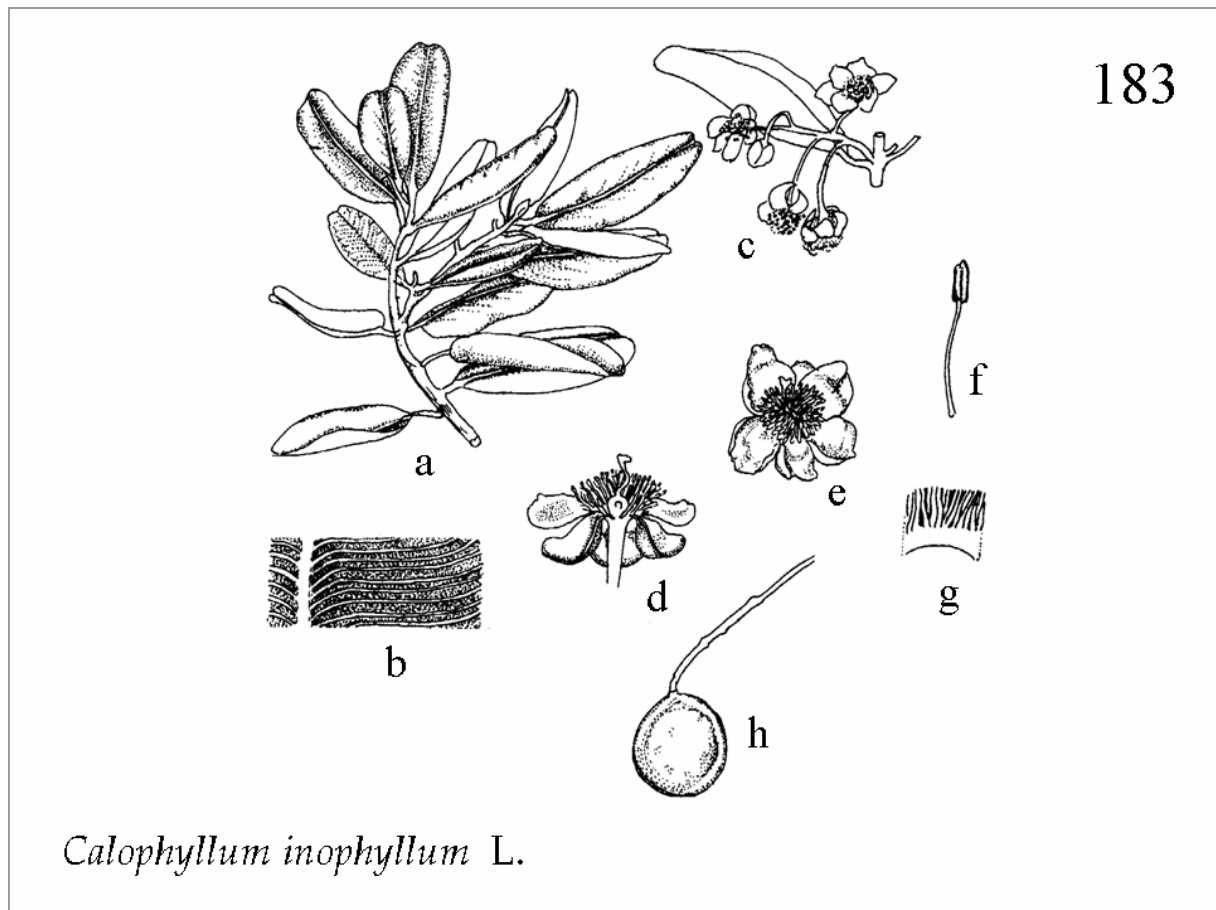


Fig. 183. *Calophyllum inophyllum* L. (a) Branchlet with leaves, (b) detail of leaf venation, (c) branchlet with several flowers, (d) longitudinal section of flower, (e) flowers seen from above, (f) stamen, (g) fused bases of stamens, and (h) fruit.

GUTTIFERAE

183

Calophyllum inophyllum L.

Synonyms : *Bintangur maritima* Rumph.

Vernacular name(s) : Alexandrian Laurel (E), Benaga, Bintangur Laut, Penaga laut, Paku achu, Menaga, Naga (Mal.), Nyamplung, Punaga, Calpong, Punaga, Dingkaran, Lingkaren – *Nyamplung* (Ind.), Mù u (Viet.), Krathing (Thai.)

Description : A dense, dark tree, 10-30 m tall, that is usually crooked, leaning or even growing along the ground. Has a sticky, yellow or white latex. Stems are angular. The elliptic to oblong, rounded or notched leaves have very numerous, fine, parallel lateral veins (hence the scientific name 'calophyllum', meaning 'beautiful leaf'). Leaves measure 10-21.5 by 6-11 cm, and are shiny, dark green above, with a pale midrib. Flower clusters occur in the axils and are up to 15 cm long, solitary and usually have 5-15 flowers. Three flowers at the end of the elongated cluster are pendulous. The white, bisexual, sweet-scented flowers measure 2-3 cm across, have four petals, four sepals and numerous stamens. Two of the four sepals are white. The fruit is a round, 1-seeded berry, 2.5-4 cm in diameter.

Ecology : Occurs on non-swampy, sandy beaches and bordering areas, up to an altitude of 200 m. Occasionally it occurs in mangroves, usually in transitional habitats. Also recorded inland, e.g. in Sumatra along Lake Singkarak at 386 m. Flowering seems to be continuous throughout the year, with one or more peaks. Pollination is almost certainly by insects. Fruit is dispersed by sea current as it floats for extended periods, or by bats that eat the fleshy outer layers. In Singapore the tree flowers twice a year, in April-June and again in October-December. Mangrove associate species.

Distribution : From East Africa through India, Sri Lanka and Southeast Asia to the Polynesia. Introduced in the Pacific area. Probably occurs throughout Southeast Asia; in Indonesia it has been recorded from Sumatra, Java, Kalimantan and Papua.

Abundance : Common.

Use(s) : Immature fruit is salted as a snack. It is a source of dye, oil, timber (boats) and medicine. In Australia, Indonesia and Malaysia it is often cultivated as a shade tree. All parts of this tree have traditional medicinal uses, of an astonishing range.

Source of illustration : Tomlinson (1986).

Reference(s) : Heyne (1950), Backer & Bakhuizen van den Brink (1963-8), Whitmore (1972), Tomlinson, (1986), Corner (1988).

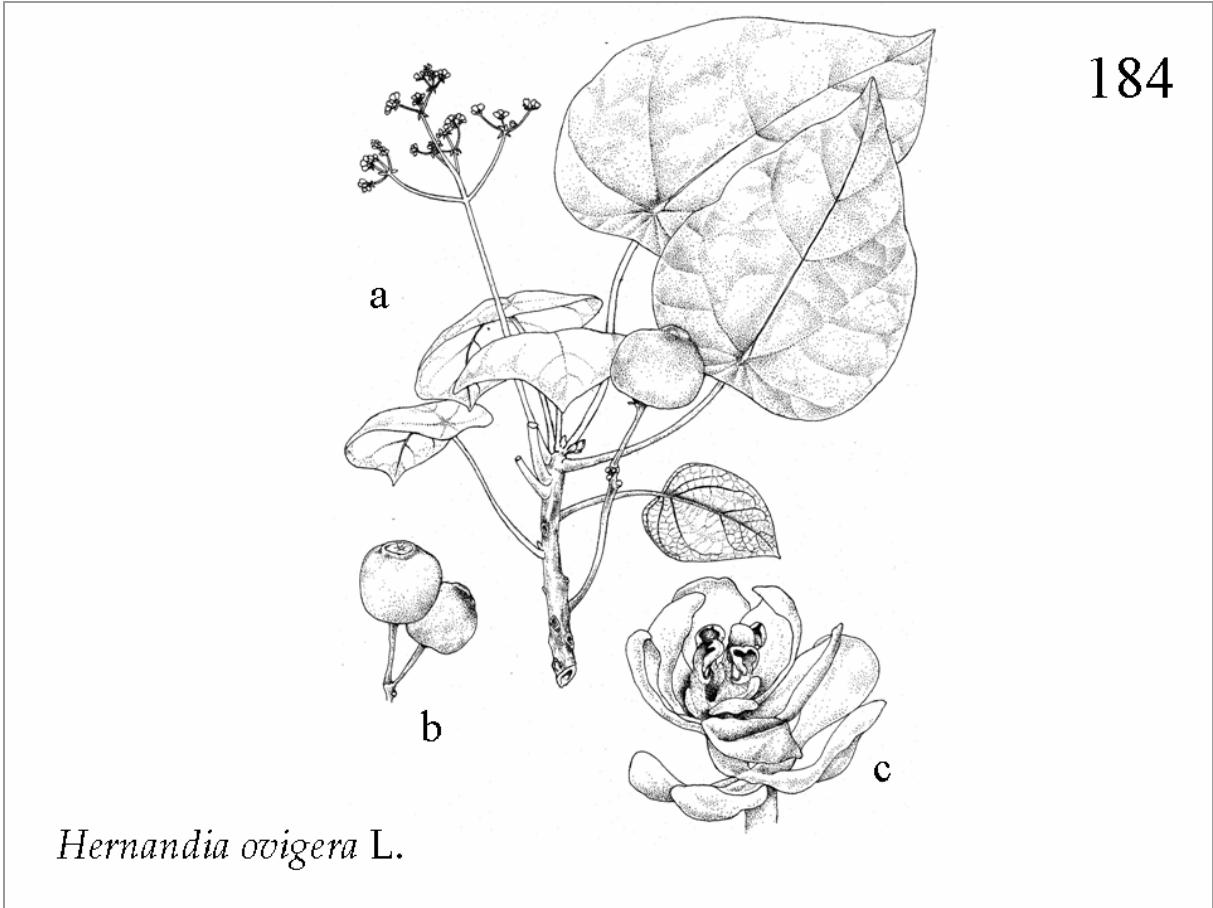


Fig. 184. *Hernandia ovigera* L. (a) Flowering and fruiting branch, (b) two fruits, and (c) detail of flower.

HERNANDIACEAE

184

Hernandia ovigera L.

Synonyms : *Arbor ovigera* Rumph., *Hernandia guianensis* Aubl., *Hernandia javanica* Tuyama, *Hernandia nymphaeifolia* (Presl.), *Hernandia papuana* C.T. White, *Hernandia peltata* Meisn., *Hernandia peltata* Sessé & Moc., *Hernandezia sonora* (L.) Hoffman, *Hernandia sonora* L.

Vernacular name(s) : Sea Hearse, Jack-in-the-box tree (E), Eierboom (NL), Bengkak, Mahandap, Mapopo, Mawiao, Machlana, Hapo-hapo, Mata ikan, Binong laut, Kampis, Nawoko ma lako, Nyalu, (Ind.), Buah keras laut (Mal.), Banung-kalauai, Habag, Kolon-kogon, Kolinkogun, Kolung-kolung, Koron-koron, Kung-kung, Malat-antañgan, Pantog-lubo, Tabataba (Phil.)

Description : Tree, attaining a height of 10-20(-40) m, diameter at breast height of 50-100 cm, bark silvery-grey buff and pimply, trunk becoming shortly buttressed as the base. The leaves are simple, alternate (or spirally arranged), smooth, somewhat leathery, shining, peltate (i.e. stalk borne on lower surface of leaf rather than on edge), ovate, (6-)8-10(-21) by (10-)15-18(-40) cm, pointed at the tip, and broad and rounded at the base, on leaf stalks 7-19(-25) cm in length. The leaf blade is 5-7(-9) nerved. The flower clusters are terminal or located at the axils of the leaves, 15 to 30 cm in length (including the 6-18 cm long stalk). The flowers are 3-merous (male) or 4-merous (female), hairy, creamy-white, fragrant, and about 8 mm wide. Male flowers have a 4-5 mm stalk, tepals 7 mm long, 3 stamens. Female flowers have a short 1.5 mm stalk, tepals 4-5 mm long, style 5 mm long. The fruit consists of a hard seed enveloped by a fleshy exterior, ellipsoid or round, somewhat flattened, and 2-2.5 by 1.7-2.2 cm, dark brown or black, longitudinally faintly 8 ribbed, with a 2-6 mm long stalk. *Hernandia nymphaeifolia* and *Hernandia ovigera* are treated as separate species by Duyfjes (1996).

Ecology : Tree from lowland rainforest on coastal plains and alluvial flats, often on river banks or ridges, old secondary forest, hill forest; recorded from peat, clay and sandy soils. Especially found along seashore, in the *Barringtonia* formation, sometimes immersed by seawater, and on landward margins of mangroves. Occasionally extending inland on slopes at low altitude, although recorded up to an altitude of 1000 m asl. Mangrove associate species.

Distribution : Tropical East Africa, Madagascar, Sri Lanka, Taiwan, through Southeast Asia to tropical Australia and Polynesia. In Southeast Asia recorded from Thailand, Cambodia, the Philippines, East Timor, Indonesia (Sumatra, Java, Borneo, Sulawesi, Moluccas, Papua) and PNG.

Abundance : Locally common.

Use(s) : Wood sometimes used for constructing canoes. Lamp oil is extracted from the fruit, and this is sometimes also used to make candles. Seeds (without the fleshy pericarp) contain 51% oil. The oil is red brown; it is feebly drying oil, which contains stearin. Seed contains an alkaloid. The wood can cause dermatitis in wood-workers, possibly from its content of podophyllotoxin acetate. According to some sources, the leaf juice has a hair removing effect, but according to Heyne (1950) this is based on a misidentification by Rumphius, who confused this species with a Euphorbiaceae. The fruit contains an alkaloid 0.7 per cent resembling berberine. Filipinos use the oil as a hair restorer and dandruff removers. Heartwood is used in the Moluccas for treating haemorrhages.

Source of illustration : Duyfjes (1996)

Reference(s) : Heyne (1950), Ng (1972), Corner (1988), Duyfjes (1996)
<http://bodd.cf.ac.uk/BotDermFolder/BotDermH/HERN.html>,
<http://bpi.da.gov.ph/websitemedicinal/all/k/koron-koron.htm> ,
<http://www.uc.pt/timor/florafauna.html>.

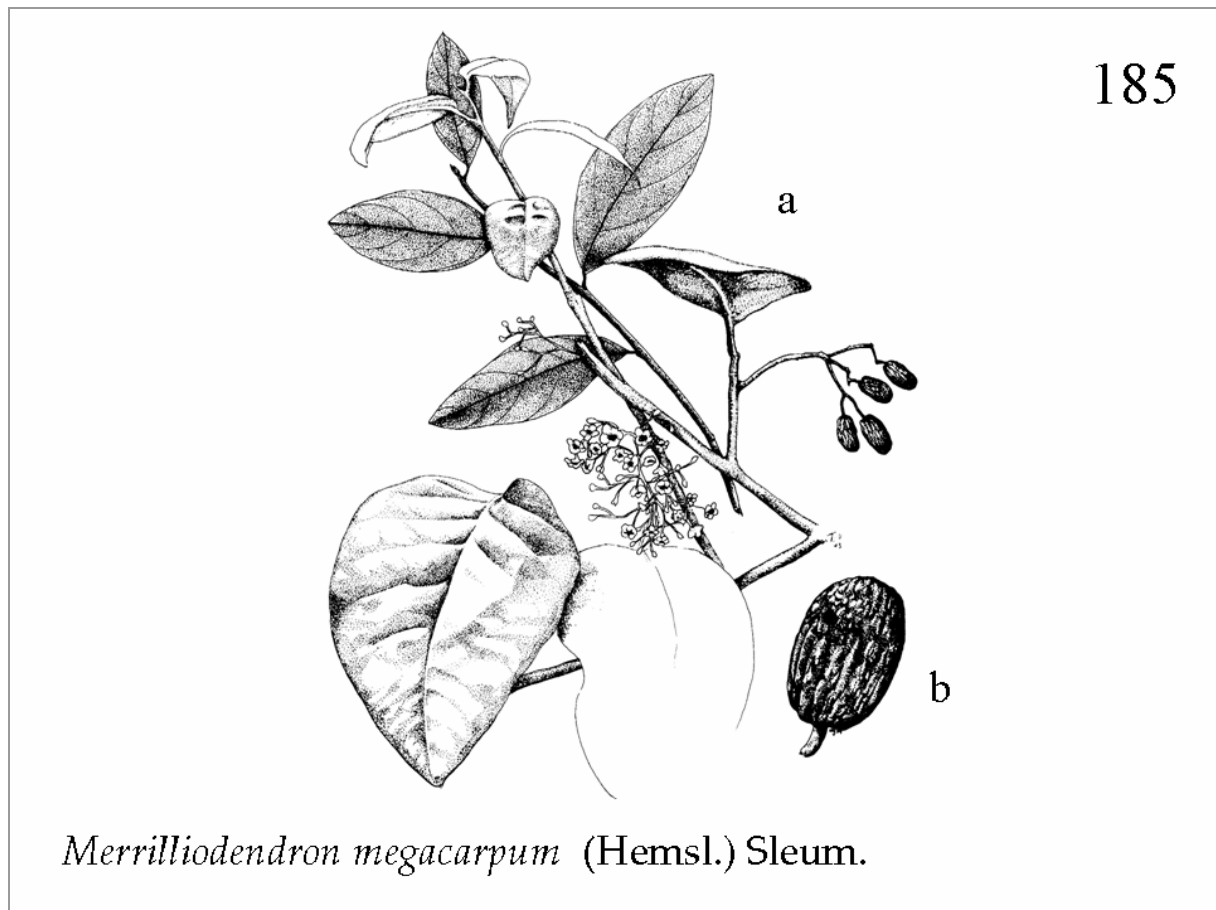


Fig. 185. *Merrilliodendron megacarpum* (Hemsl.) Sleum. (a) Branchlet with flowers and fruit, and (b) mature fruit.

ICACINACEAE

185

***Merrilliodendron megacarpum* (Hemsl.) Sleum.**

Synonyms : *Mangifera xylocarpa* Laut., *Merrilliodendron rotense* Kanehe, *Peckeliodendron missionariorum* Sleum.

Vernacular name(s) : Pake Saukatibu (Ind.), Vabilisi, Manggaresi (PNG)

Description : A shrub or more commonly a tree, up to 15 m tall, occasionally even up to 25 m, with a straight, sometimes fluted trunk, up to 55 cm in diameter. The green-grey to light brown bark is smooth, and shed in irregular, soft flakes. Leaves measure 15-30 by 7-16 cm, are oblong to oblong-ovate, thin-leathery and smooth. When held to the light, numerous minute, transparent points can be observed. The flower clusters are 7-20 cm long, and are composed of soft, flexible, many-flowered lateral groups of flowers. The clusters occur in groups of 1-3 in leaf axils or sprout directly from older branches or the trunk. The lobes of the calyx are 1-1.5 mm. The dull cream or yellow to purplish petals are a little fleshy, 3-4 by 1.5 mm, smooth and hairless outside and densely covered with yellow hairs on the inside. The leathery, drooping berry is round to somewhat elongated, slightly laterally or nearly quadrangularly compressed. It measures 4-10 by 2-6 cm and is white or yellow to purple when fresh and ripe, turning purple to black in older stages. The starchy seed measures 4-6 by 2-2.5 cm.

Ecology : Generally in coastal lowlands and partly swampy rainforest, up to altitudes of 30 m. On Japan Island it reportedly occurs at 700 m. In mangroves it usually occurs on the landward margins. It also occurs on sandy or coral beaches, and volcanic soil, in moist places, often near streams or in freshwater swamp forest. The corky or spongy fruit is buoyant and adapted for water dispersal. Mangrove associate species.

Distribution : Occurs in Melanesia, Solomon Islands, Micronesia and the eastern part of Southeast Asia, where it has been recorded in Indonesia (Southeast Sulawesi, northern Papua), Papua New Guinea and the Philippines (Palawan).

Abundance : In general it is uncommon, although locally it may be relatively common. It has a rather scattered distribution.

Use(s) : Fruit is reportedly edible.

Source of illustration : Drawn from herbarium specimen, Bogor Herbarium.

Reference(s) : Sleumer (1971).

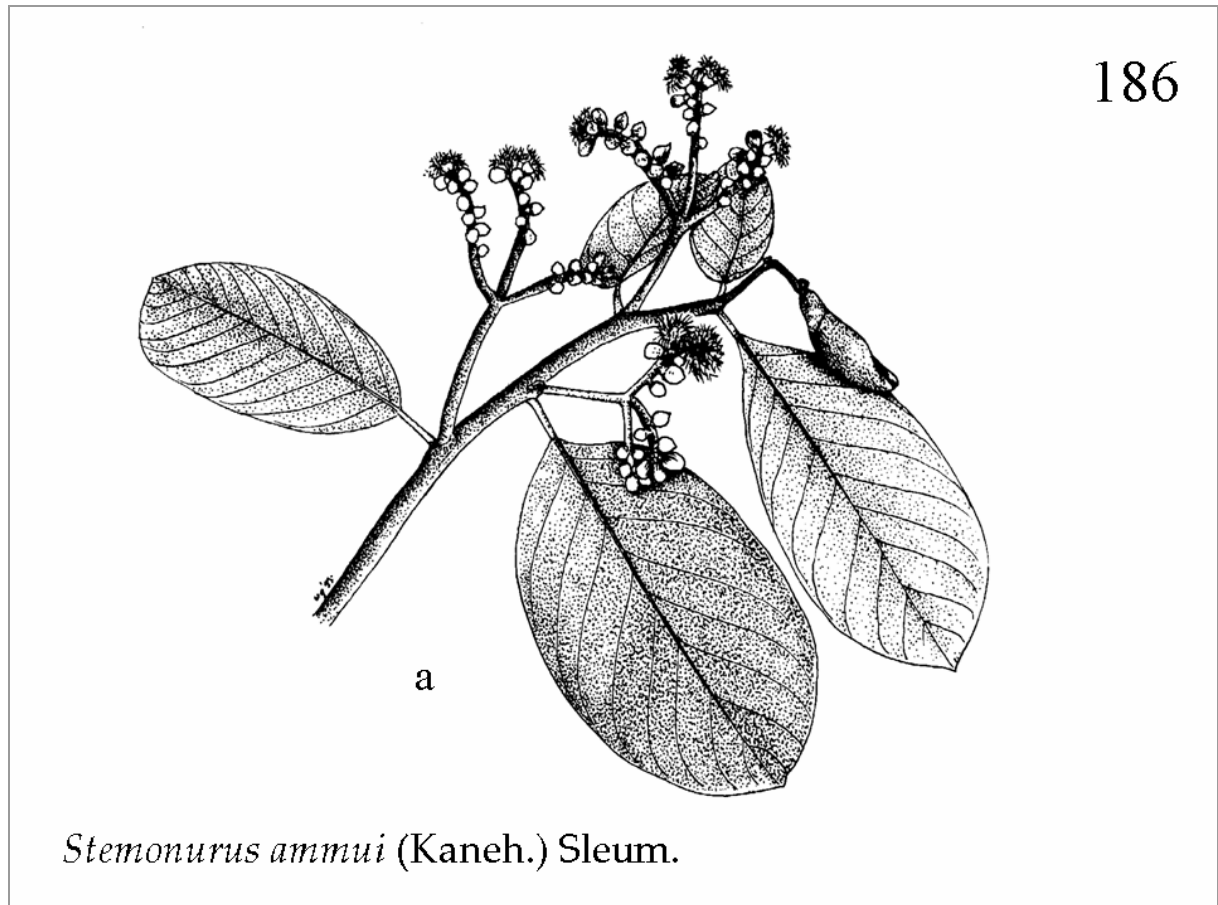


Fig. 186. *Stemonurus ammui* (Kaneh.) Sleum. (a) Branchlet with flowers and fruit.

ICACINACEAE

186

***Stemonurus ammui* (Kaneh.) Sleum.**

Synonym(s) : *Stemonurus ellipticus* (Schellenb.) Sleum., *Urandra ammui* Kaneh., *Urandra elliptica* Schellenb.

Vernacular(s) : Aikanu, Ailalo, Aimarako, Ainunura, Mala Sata, Ammui (PNG)

Description : Tree, 10-24 m tall, sometimes with buttresses or slender, cylindrical pneumatophores. Bark is smooth or with fine, longitudinal fissures or blister-like growths, pale grey to pale or dark brown. Leaves are leathery, oblong- to obovate-elliptic, measuring 9-16 by 4-8 cm, with a 1-2 cm pointed tip. Veins occur in 12-14 (occasionally up to 18) slightly curved pairs. Leaf stalks measure 1.5-2 cm. Flowers occur in clusters with a flattened top, with a main stalk of 3-5 cm bearing 5-7 (rarely up to 9) branches of flowers. The calyx is cup-shaped, 2 mm broad and shallowly lobed. Petals measure 5 by 2 mm, slightly keeled outside, yellowish-white, with a strong lemon scent. The flower disk is low and slightly lobed. Fruit is an elongated berry, measuring about 4-5 cm by 1.5-1.7 cm.

Ecology : Occurs in primary forest, generally on well-drained, hilly slopes up to an altitude of 200 m, occasionally in freshwater swamp forest or mangroves. Flowering occurs all year round. Mangrove associate species.

Distribution : Occurs in Micronesia, Melanesia, Solomon Islands and the eastern part of Papua New Guinea. May also occur in Indonesian Papua, but as yet it has not been recorded.

Abundance : Unknown.

Use(s) : Unknown.

Source of illustration : Drawn from herbarium specimen, Bogor Herbarium.

References : Sleumer (1971).

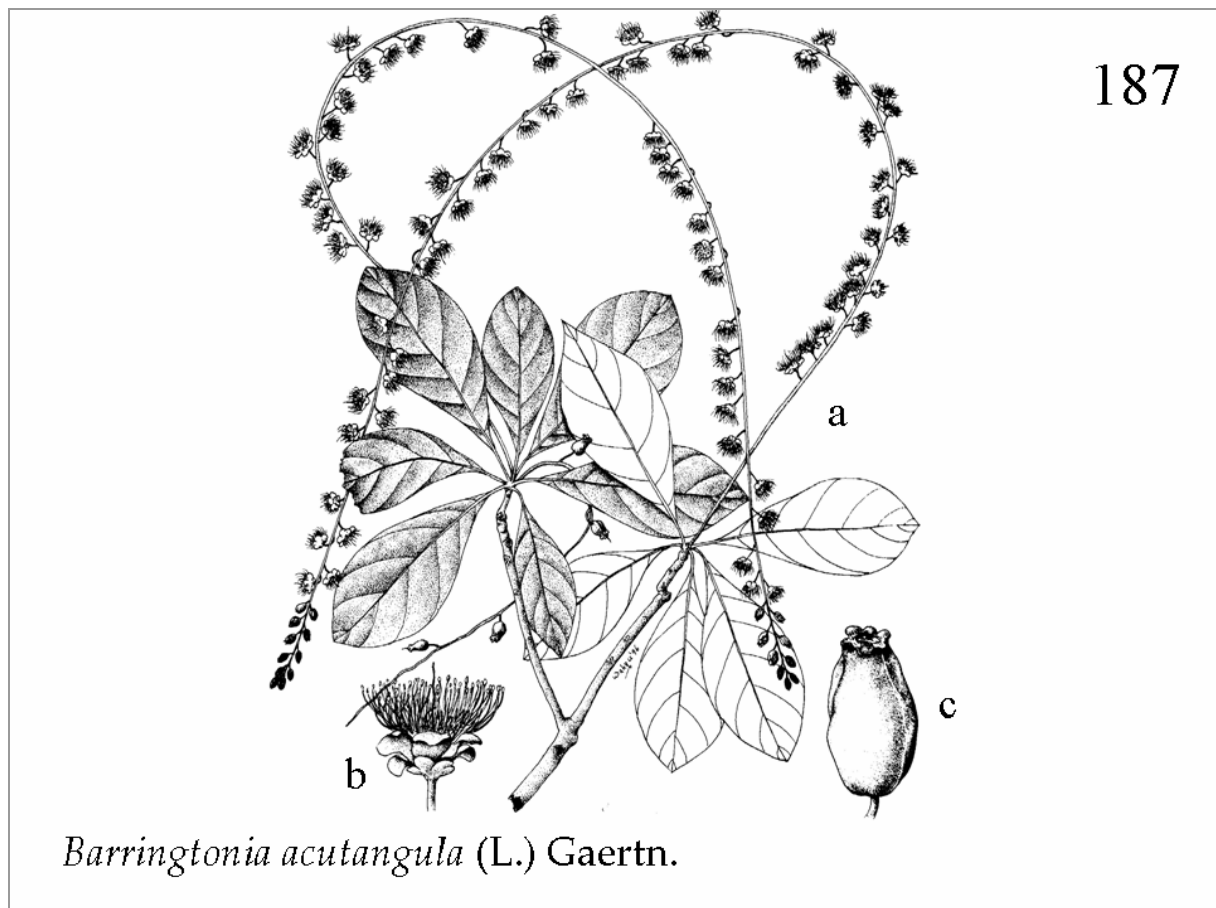


Fig. 187. *Barringtonia acutangula* (L.) Gaertn. (a) Two terminal branchlets with two racemes of flowers, (b) flower, and (c) fruit.

LECYTHIDACEAE

187

Barringtonia acutangula (L.) Gaertn.

Synonym(s) : *Barringtonia acutangula* subsp. *spicata* (Bl.) Payens, *Barringtonia edaphocarpa* Gagn., *Barringtonia spicata* Blume

Vernacular name(s) : Indian Putat (E), Putat, Langkong, Jempalang (Mal.), Putat, Salinsa, Alakang (Ind.), Chiê'c (Viet.)

Description : Small tree, 2-13(-25) m tall, stem 20-90 cm in diameter, bark light brown, smooth. Almost sessile leaves spirally arranged in terminal clusters, each leaf measuring 3-9 by 8-28 cm, finely toothed along edges and with a pointed tip. Flowers have 0.5-1 cm long individual stalks, arranged along a drooping string-like stalk, 30-65 cm long. Flowers measure 5 cm across the stamens, that are pinkish to red. Fruit is oblong and bluntly 4-angled, 2 by 7 cm, pale yellowish brown and hard. Although now commonly treated as synonyms, Corner (1988), is not convinced and recognises the following differences between *Barringtonia acutangula*, '*spicata*' and '*edaphocarpa*' :

	<i>B. acutangula</i>	<i>B. spicata</i>	<i>B. edaphocarpa</i>
Flower stalk	6-12 mm	(almost) sessile	sessile
Fruit	sharply 4-angled	bluntly 4-angled	round with 8 grooves, 4 deep, 4 shallow

Ecology : Lowland swamp forests, along streams and margins of mangroves. As with other *Barringtonia*'s this species flowers at night, often in great profusion, and is probably pollinated by moths. Flowers are usually dropped in the morning, and can be seen as pink flotsam under the trees. Fruit is buoyant and water dispersed. In deeply flooded swamp forests, hair-like tassels of roots spread from the trunk of larger trees; occasionally these may cover the entire base of the trunk, together with tangles of prop roots. In West Borneo, Giesen (1995) found that immature specimens of *Barringtonia acutangula* could withstand being totally submerged for 10-11 months per year. Mangrove associate species.

Distribution : From Afghanistan, India and Bangladesh through Southeast Asia to Australia. Recorded from Myanmar, Thailand, Vietnam, Cambodia, Malaysia, Brunei, Indonesia (Sumatra, Borneo, Sulawesi, Papua, but not in Java or the Moluccas) and Papua New Guinea.

Abundance : Common, locally very common.

Use(s) : Regarded as important to floodplain fisheries in Bangladesh. Wood sometimes used for parts of boats and rice pestles.

Source of illustration : Based on Corner (1988) and photographs.

Reference(s) : Heyne (1950), Whitmore (1972c), Corner (1988), Whitmore, Tantra & Sutisna (1989 & 1990), Hong & San (1993), Giesen (1995),
<http://www.rbgekew.org.uk/herbarium/brunei/bclhome.htm>.

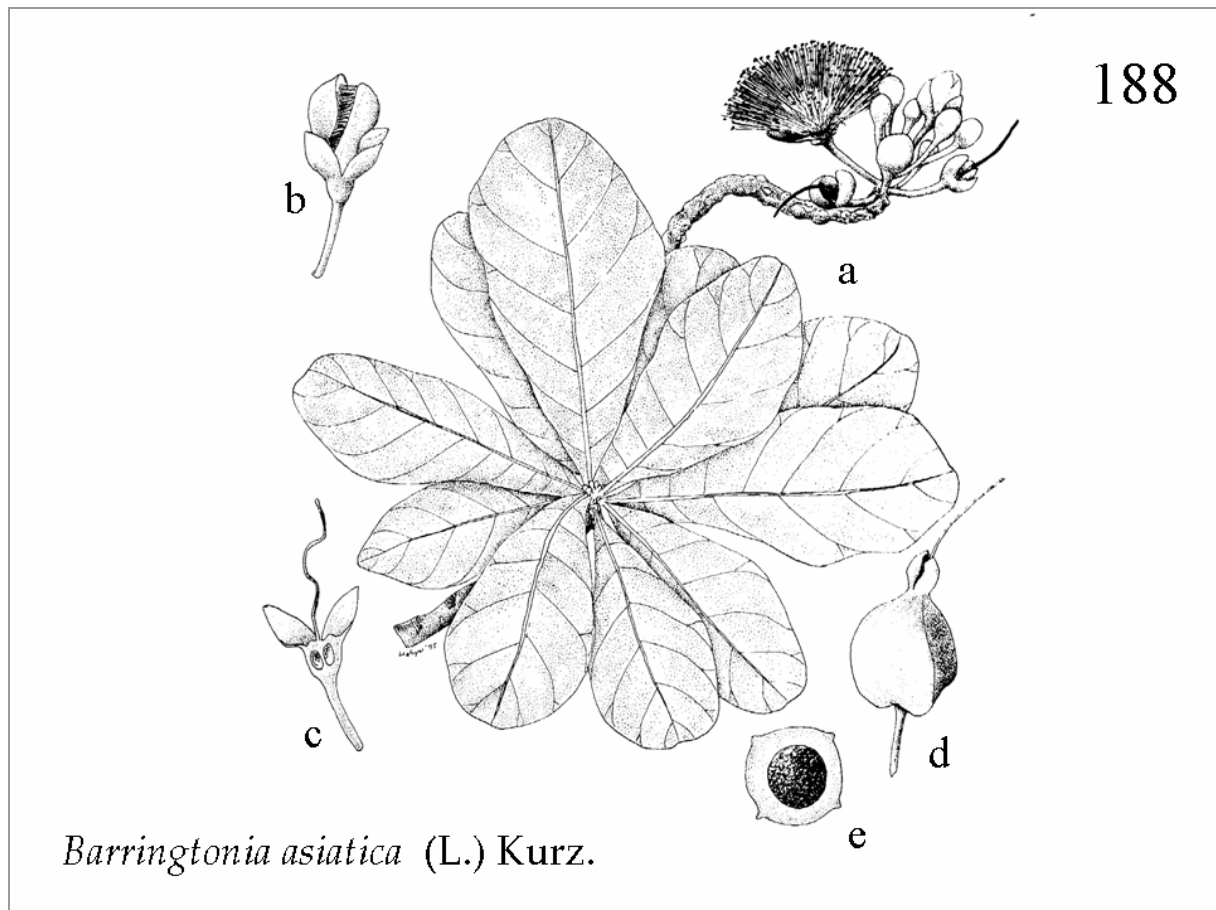


Fig. 188. *Barringtonia asiatica* (L.) Kurz. (a) Terminal branchlet with flowers, (b) flower bud, (c) longitudinal-section of flower, (d) fruit, and (e) cross-section of fruit.

LECYTHIDACEAE

188

***Barringtonia asiatica* (L.) Kurz**

Synonym(s) : *Agasta asiatica* Miers., *Barringtonia butonica* Forster, *Barringtonia speciosa* J. R. & G. Forster, *Butonica rumphina* Miers, *Mammea asiatica* Linne

Vernacular name(s) : Sea Putat (E), Butong, Butun, Pertun, Putat Laut (Mal.), Bitung, Talise, Butun, Hutu, Wutunu, Keben-keben, Keptun, Moju, Miju, Jaga – *Butun* (Ind.), Chik an, Chik le, Chik nam (Thai.), Bitoon (Phil.), Chiéc vàng (Viet.)

Description : A small to medium sized tree 7-20(-30) m tall, with a diameter of 25-100 cm. The crown is large-leaved and shiny, bark pinkish grey, smooth. Twigs are thick. Young leaves are pinkish olive with pink veins, while old leaves wither to yellow or pale orange. Leaves are spirally arranged in rosettes, each blade obovate, blunt, rather thick and leathery, 15-45 by 9-20 cm, with an entire edge. Flowers occur in short, erect raceme, very large, measuring 10(-15) cm across the stamens, which are white, tinged pink at the ends; petals are 7.5 cm long and greenish-white. Flowers are very sweet scented and more or less hang upright. Fruit is 10-15 cm wide, cubic, with a broad square base, tapering towards the tip like a truncated pyramid, first green, then going brown; has two persistent calyx lobes. They contain one large seed and a tough, corky-fibrous husk to which it owes its buoyancy. In general vegetative appearance, this species may be mistaken for *Terminalia catappa* or *Fagraea crenulata*. However, *Barringtonia asiatica* has fleshier, shinier and more pointed leaves than *Terminalia catappa*, which withers to a red, rather than yellow or orange. *Fagraea crenulata* has leaves arranged in pairs, and has short spines along the trunk.

Ecology : Coastal forest, sea shores, beaches, sandy coasts, rocky shores and occasionally in mangroves. It does equally well when planted inland. Fruit has a cork brown husk and can often be seen along beaches; they float and may germinate after floating a great distance. Flowers open after sunset and drop early in the morning, being open only one night. Pollination is probably by large moths. The tree and seeds contain saponins, used as fish poisons. The large fruits are commonly stranded on the beach, the brown husk having been worn away to a fibrous basket which surrounds the seed. Characteristic beach tree of the Indo-Malayan and Polynesian region. Mangrove associate species.

Distribution : Occurs from Madagascar and the Comoros in the Indian Ocean through South Asia and Southeast Asia to the West Pacific. It is common throughout Southeast Asia, having been recorded in Thailand, Cambodia, Malaysia, Vietnam, Brunei, Singapore, the Philippines, Indonesia (Sumatra, Borneo, Java, Sulawesi, the Lesser Sundas and the Moluccas, Papua) and Papua New Guinea. Likely to also occur in Myanmar and East Timor, but there are no reliable records so far. Collections of the NY Botanical Garden suggest that this species also occurs in Martinique and Puerto Rica.

Abundance : Generally common, but uncommon in PNG and Indonesian Papua.

Use(s) : Occasionally Reddish oil can be obtained by heating and crushing the seeds; this oil can be used for burning only. Juice from seeds is used to seal paper umbrellas (Java), and to kill ecto-parasites such as lice.

Source of illustration : Based on Keng (1987), Corner (1988) and Polunin (1988).

Reference(s) : Heyne (1950), Whitmore (1972c), Corner (1988), Polunin (1988), Whitmore, Tantra & Sutisna (1990), Hong & San (1993), Aksornkoe (1993), Nguyen *et al.* (2000).

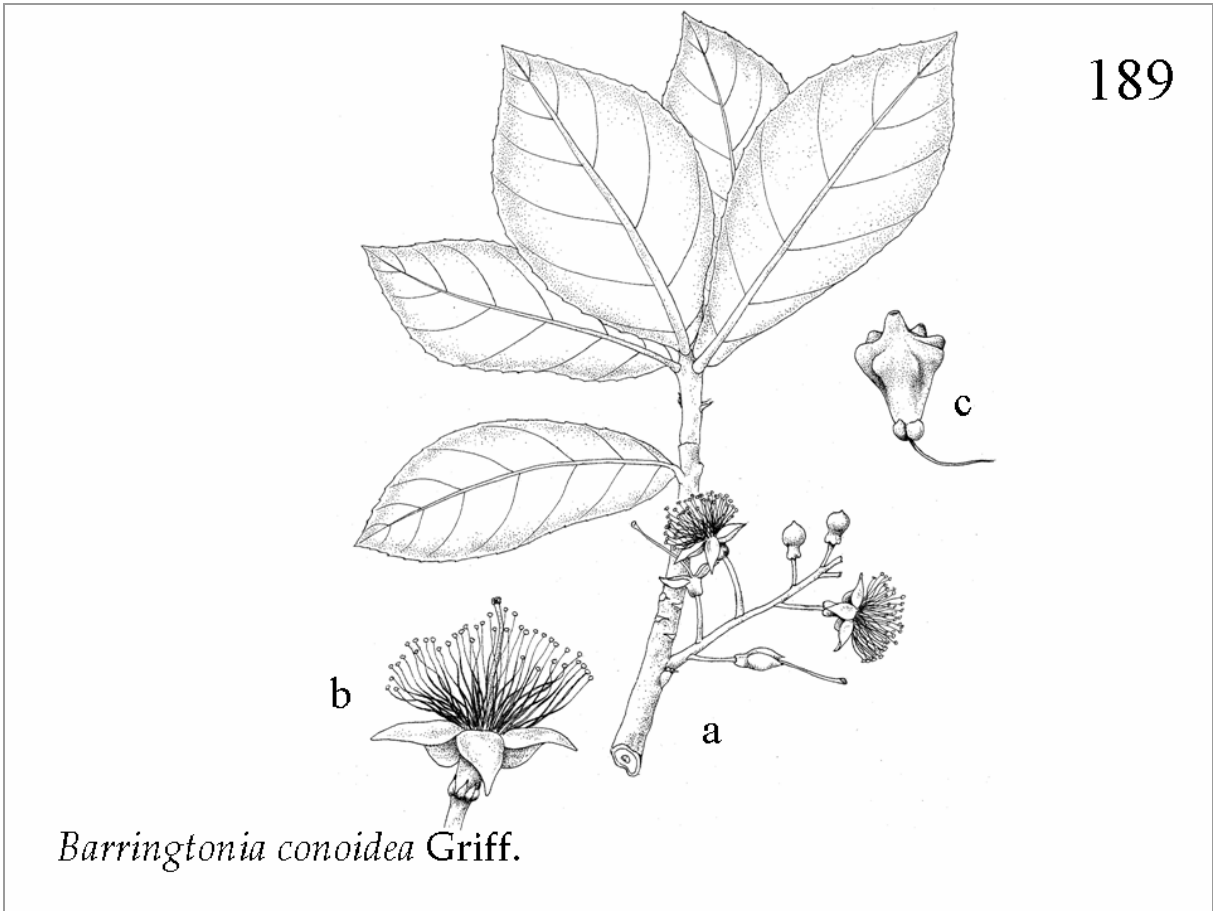


Fig. 189. *Barringtonia conoidea* Griff. (a) Flowering branch, (b) flower, and (c) fruit.

LECYTHIDACEAE

189

Barringtonia conoidea Griff.**Synonyms :** Unknown.**Vernacular name(s) :** River Putat (E), Putat Ayer (Mal.)**Description :** A dense bush or short, stout, scarcely branched treelet, up to 4m tall. Leaves spirally arranged in rosettes. Leaf blade 6-18 by 20-35 cm, large, elliptic, narrowly heart-shaped at the base, and without a leaf stalk. Flowers 7.5-8 cm wide across the stamens, white, only the style pink, distinctly stalked (1.2 cm), in short, scarcely hanging, few flowered spikes, 5-10 cm, from below the leaves. Fruit conical shaped, 5-7.5 cm long, 3.7-5.0 cm wide, with 8 projecting basal flanges, tapering to the 2(-3) blunt sepals. Leaves of *Barringtonia conoidea* wither yellow, whereas those of *Barringtonia racemosa* wither red.**Ecology :** Riparian species, but also found in brackish and tidal estuaries and estuarine mangroves. Generally on submerged mud banks, standing in water at high tide. Often occurring in the same association as *Gluta velutina*. Fruits are often found on the beach as fibrous skeletons enclosing the seed. Fruits specialised for floating in water. Most *Barringtonia* flowers are pollinated by moths and flower only during the night, falling to the ground in the morning. *Barringtonia conoidea* is an exception, however, as it flowers remain open until midday or later. Mangrove associate species.**Distribution :** Southeast Asian species, recorded in Myanmar, Peninsular Malaysia, Brunei and Indonesia (Banka, Sumatra). Formerly also in Singapore, but now extinct.**Abundance :** Locally common.**Use(s) :** Most *Barringtonia*'s, including *Barringtonia conoidea*, contain saponins and on that account are fish poisons, and the seeds, bark or roots are occasionally used for that purpose, often in combination with *Derris* (tuba).**Source of illustration :** Archive, Royal Botanic Garden, Kew.**Reference(s) :** Tomlinson (1986), Whitmore (1972c), Corner (1988)
http://www.rbgekew.org.uk/herbarium/brunei/fams/67_02.htm.

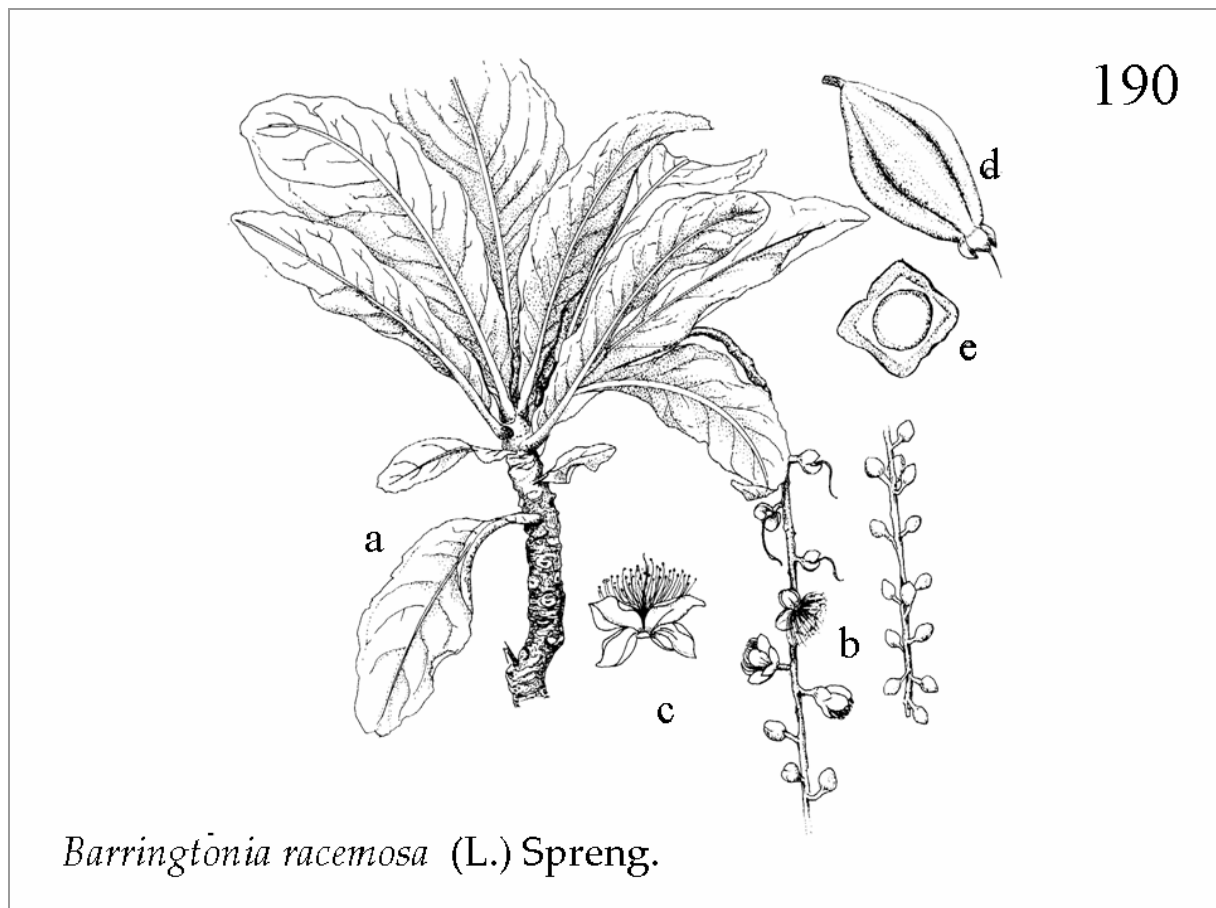


Fig. 190. *Barringtonia racemosa* (L.) Spreng. (a) Terminal branchlet with raceme of flowers, (b) raceme of buds, (c) flower, (d) fruit, and (e) cross-section of fruit.

LECYTHIDACEAE

190

***Barringtonia racemosa* (L.) Spreng.**

Synonyms : *Barringtonia racemosa* (L.) Bl. ex DC., *Barringtonia rubra* Blume, *Barringtonia stravadarium* Blanco, *Butonica rosata* Miers., *Butonica terrestris rubra* Rumph., *Eugenia racemosa* L.

Vernacular name(s) : Comon putat (E), Putat ayam (Mal.), Butun Darat, Putat, Putat Sungai, Alakang, Penggung, Malegai, Alakang, Sesiil, Kungkungan (Ind.), Kasouai, Kutkut-timbalon, Nuling, Paling, Potat, Putad, Tuba-tuba – *Putat* (Phil.), Tim lang (Viet.), Dawm trojiekbres, Pchek tekbray (Camb.), Chik suan (Thai)

Description : Shrub, or more usually a small tree, 5-15 m tall, with greyish-brown young stems. Leaves measure 17.5-43 by 5-16 cm, usually with a toothed margin, and are oblong-obovate. They taper into a short, somewhat fleshy leaf stalk that measures scarcely 1 cm. Leaves are clustered at the ends of the branches. The 20-80 cm long, pendulous, many-flowered clusters occur at the ends of branches or in axils of fallen leaves. Flowers are large, have a very strong, fragrant scent and measure 7-10 wide across the stamens. Individual flower stalks measure 5 cm at most. Calyx smooth; petals are green or pale, rose-coloured, their edges recurved and pale pink, 1.75-3 cm. Flowers have a large number of long, white stamens, that may be tipped with either red, white or yellow. The 4- to 6-angled fruit is usually 5-7(-9) by 3-4(-5) cm, oblong or pear-shaped, crowned by 2-3 blunt sepals. Occasionally 4-angled specimens may measure up to 10-12 cm along one rib. Fruits have a fleshy-fibrous outer part and a woody-fibrous inner part. They contain one seed only.

Ecology : Occurs in mangroves, along tidal rivers and in areas subject to tide and regular input of sea water. Also in beach vegetation, freshwater swamps, along rivers, on the edge of peat swamp forests and on hillsides to altitudes of 200(-1000) m. Flowering occurs all year round. The flowers open at night and are pollinated by small bats and moths. By morning, petals and stamens of flowers that opened during the previous evening have usually already dropped off. Fruits are very buoyant and may be transported by seawater for many months. Mangrove associate species.

Distribution : From East and South Africa eastwards though Southeast Asia to Polynesia (Samoa, Fiji). In Southeast Asia recorded in Myanmar, Cambodia, Thailand, Vietnam, Malaysia, Singapore, the Philippines, Brunei and Indonesia (throughout).

Abundance : Common, but scattered.

Use(s) : The bark and the fruits contain saponins and are used as fish poison. Young leaves are edible and eaten as salad or as a vegetable. Firewood.

Source of illustration : Based on Walker (1976).

Reference(s) : Heyne (1950), Backer & Bakhuizen van den Brink (1963-8), Whitmore (1972c), Tomlinson (1986), Said (1990), Hong & San (1993), Aksornkoae (1993), Aragones *et al.* (1998), Nguyen *et al.* (2000), Hong (2000), Marschke (2000), Maung (2003), www.unepscs.org/ProjectComponents/Mangroves/mangroves.htm, <http://www.rbgekew.org.uk/herbarium/brunei/bclhome.htm>.

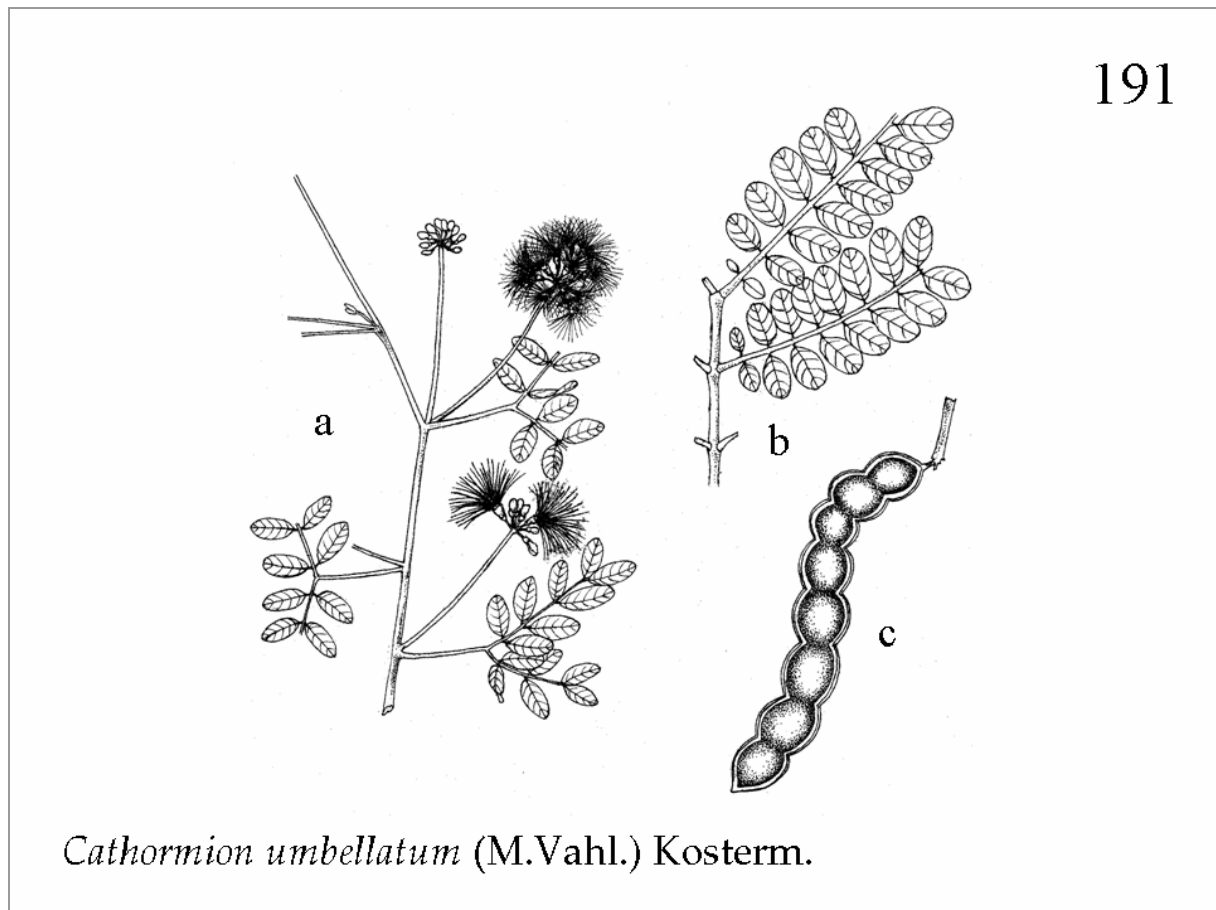


Fig. 191. *Cathormion umbellatum* (M.Vahl.) Kosterm. (a) Flowering branchlet, (b) detail of two leaves (each with 8 pairs of leaflets), and (c) pod.

LEGUMINOSAE

191

***Cathormion umbellatum* (M.Vahl.) Kosterm.**

Synonyms : *Feuillea umbellata* (Vahl.) Kuntze, *Inga corcondiana* DC., *Inga umbellata* (Vahl.) Willd., *Mimosa corcondiana* Roxb., *Mimosa umbellata* Vahl., *Pithecellobium malayanum* Pierre, *Pithecellobium moniliferum* Miq., *Pithecellobium umbellatum* (Vahl) Bth.

Vernacular name(s) : Lambaran, Lom, Aram Aron, Hirang Krama, Kiu Tasi (Ind.)

Description : Tree, up to 15 m tall, often with spines in the axils, especially on the young shoots, that are often branched and 2-15 cm long. There are 1-2 pairs of main leaflets per leaf, the upper ones being the largest. Main leaflets are subdivided into 3-8 pairs of shiny, dark green secondary leaflets that are oval-oblong or almost obovate with an unequal base, 0.75-5 by 0.5-2.5 cm. Again, the topmost leaflets are the largest. Leaves have one or more glands on the main vein and on the veins of the main leaflets. Usually 1-4 flower heads are located in the leaf axils, but sometimes they form elongated clusters. Flower head stalks measure 2-4.5 cm. Single flowers occur on short 3-4 mm long stalks. The calyx is 2-3 mm long, the corolla is funnel-shaped and 6-8 mm long. Numerous white stamens extend from the corolla. The 10-20 by 2-3 cm, thick pods are curved but not rolled on an axis. They are constricted along both sutures and break up into sections. Pods contain 5-13 seeds. In Southeast Asian literature, *Pithecellobium umbellatum* is the most commonly used (but incorrect) scientific name.

Ecology : Occurs almost exclusively in the beach vegetation and in mangroves. Flowering occurs throughout the year. Mangrove associate species.

Distribution : It's exact distribution remains uncertain. In Southeast Asia it has been recorded in Thailand, Indonesia (Java, Madura, the Moluccas) and East Timor.

Abundance : Locally relatively common.

Use(s) : Used for construction, but is not very durable.

Source of illustration : Drawn from live specimen.

Reference(s) : Heyne (1950), Backer & Bakhuizen van den Brink (1963-8).

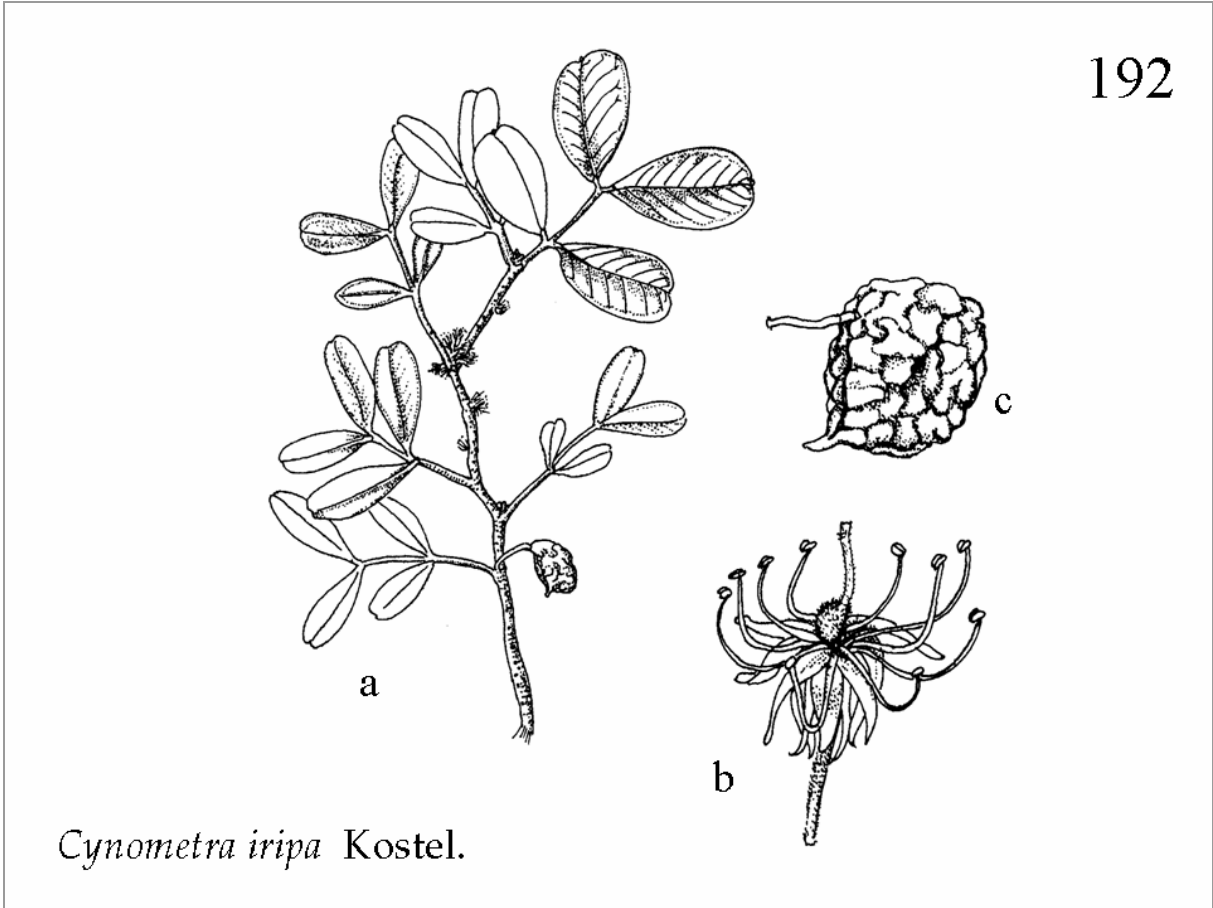


Fig. 192. *Cynometra iripa* Kostel. (a) Branchlet with flowers and fruit, (b) flower, and (c) fruit.

LEGUMINOSAE

192

***Cynometra iripa* Kostel.**

Synonyms : *Cynometra bijuga* var. *mimosoides* Merr., *Cynometra ramiflora* var. B Wight & Arn., *Cynometra ramiflora* var. *mimosoides* Baker

Vernacular name(s) : Kateng, Katong laut (Mal.), Namu-namu utan, Kateng, Kepel, Wunut, Kayu pel (Ind.)

Description : Small tree or shrub, 3-8 m tall, with smooth, brown bark that has numerous lenticels. Leaves measure 4.5-5.5 by 2-3 cm and occur in pairs. The glossy-green, lowest pair of leaflets is smaller (2-3 by 1-1.5 cm) than the upper pairs. Occasionally there is only one pair of opposite leaflets. Leaflets are asymmetrically elliptic, with a minute point in the notched leaf tip. Flower clusters are stemless and simple, and located in the axils. In the bud they are densely contracted and almost globular, clothed in covering leaflets. The white flowers are bisexual. Sepals are recurved, almost towards the end when in full flower. Ovaries are densely hairy, and the style is bent. This bent style later becomes the prominent, lateral beak of the fruit. The irregular 'pod' measures 2 by 6 cm and is woody, brown, almost globular with a distinct beak. Its surface is deeply wrinkled and covered with short hairs.

Ecology : Found in mangroves, littoral scrub, on or near the beach, but also up to an altitude of 500 m asl. Occurs at the landward margin of mangroves, in areas that receive perennial freshwater input. It may also occur in areas above the high tide mark. The fruit is capable of floating for up to two months due to the buoyant tissue in the fruit wall. However, this species rarely produces viable mature seed in spite of prolific flowering. Mangrove associate species.

Distribution : Occurs from Sri Lanka and India through Southeast Asia to northern Australia and the western Pacific. In Southeast Asia recorded in Myanmar, Thailand, the Philippines, Malaysia (Peninsular) and Indonesia (Java, Madura, Moluccas).

Abundance : Locally common, but listed as rare in Indonesia (Mogea *et al.*, 2001).

Use(s) : (Small) construction timber, but the wood is reportedly not very durable. Seeds and leaves used for medicinal purposes.

Source of illustration : Based on Tomlinson (1986), Wightman (1989).

Reference(s) : Heyne (1950), Tomlinson (1986), Corner (1988), Wightman (1989), Said (1990), Hou *et al.* (1996).

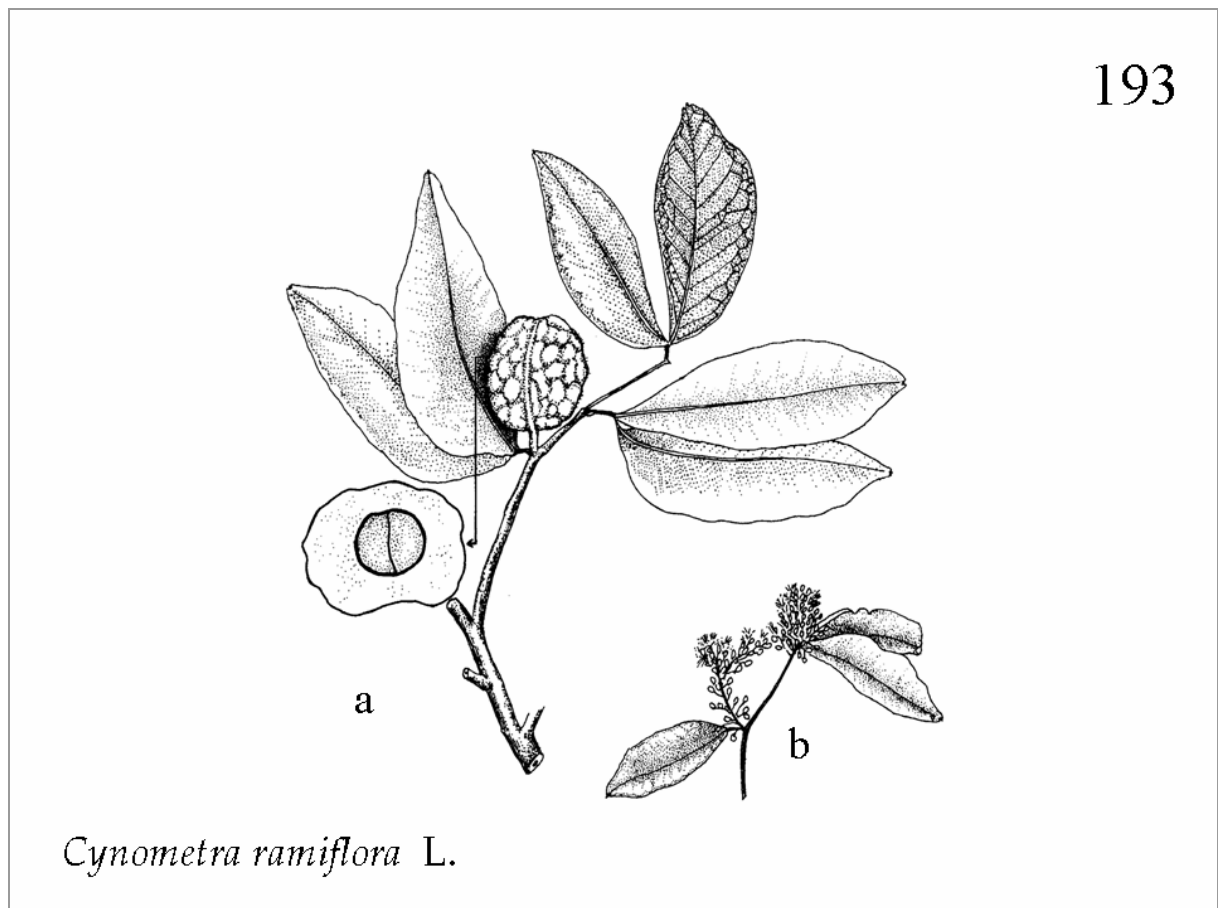


Fig. 193. *Cynometra ramiflora* L. (a) Branchlet with fruit, with cross-section of fruit (inset), and (b) branchlet with flowers.

LEGUMINOSAE

193

Cynometra ramiflora L.

Synonyms : *Cynometra bijuga* Span. ex Miq., *Cynometra polyandra* auct. non Roxb., *Cynometra schumanniana* Harms., *Cynometra whitfordii* Elmer, *Cynomorium silvestre*.

Vernacular name(s) : Kateng, Katong laut (Mal.), Kateng, Kepel, Wunut, Kayu Pel, Namu-namu Utan (Ind.), Myinga (Myan.), Komon, Odling, Ula, Ulud – *Balitbitan* (Phil.), Lá lua (Viet.)

Description : Tree or shrub, 4-12(-26) m tall, with a smooth, grey bark, numerous lenticels and a somewhat fluted trunk that may have a diameter at breast height of 30 cm. Leaf is 4.5-5.5 by 2-3 cm (occasionally 10-13 by 4-6 cm) and occurs in pairs. The glossy-green, lowest pair of leaflets is smaller (2-3 by 1-1.5 cm) than the upper pair. Often, however, there is only one pair of opposite leaflets. Young leaflets are white or red. Leaflets are asymmetrically elliptic, with a minute point in the notched leaf tip. The flower clusters are stemless, hairy, simple and located in the axils. In the bud they are densely contracted, almost globular and clothed in covering leaflets. The bisexual flowers are white, soon turning brown, and have sepals that do not curve towards the end when in full flower. The ovary is smooth, with a straight style. The 'pod' is woody, brown, elliptic to slightly circular, 1.3-4 by 2.2-5(-7) cm. Its surface is deeply wrinkled, often covered with short hairs, and it does not (immediately) drop off the tree when ripe. The species is somewhat variable, and a number of varieties are recognised.

Ecology : Occurs on landward margins of mangroves, but also inland up to an altitude of 400 m. Often on heavy, firm soil. Flowering occurs from August to October. Fruit is distributed by water. Young shoots develop from buds that are covered with rather small scales. In a short time they produce 1-7 internodes, after which the growth rate slows down considerably. Mangrove associate species.

Distribution : From India through Southeast Asia to the Pacific. In Southeast Asia it is recorded throughout, except in Cambodia and Vietnam. Not found in Australia.

Abundance : Locally common, but on the whole uncommon and listed as rare in Indonesia (Mogea *et al.*, 2001).

Use(s) : Sometimes used as construction timber. Cultivated as an ornamental. The wood is heavy, hard and strong, but not durable when exposed to the weather. It has a lasting property for interior works as it is not easily damaged by insects. Suitable for house building, tool handles, woodcraft and interior framing.

Source of illustration : Based on Tomlinson (1986).

Reference(s) : Heyne (1950), Backer & Bakhuizen van den Brink (1963-8), Percival & Womersley (1975), Tomlinson (1986), Hou *et al.* (1996), Aragonés *et al.* (1998).

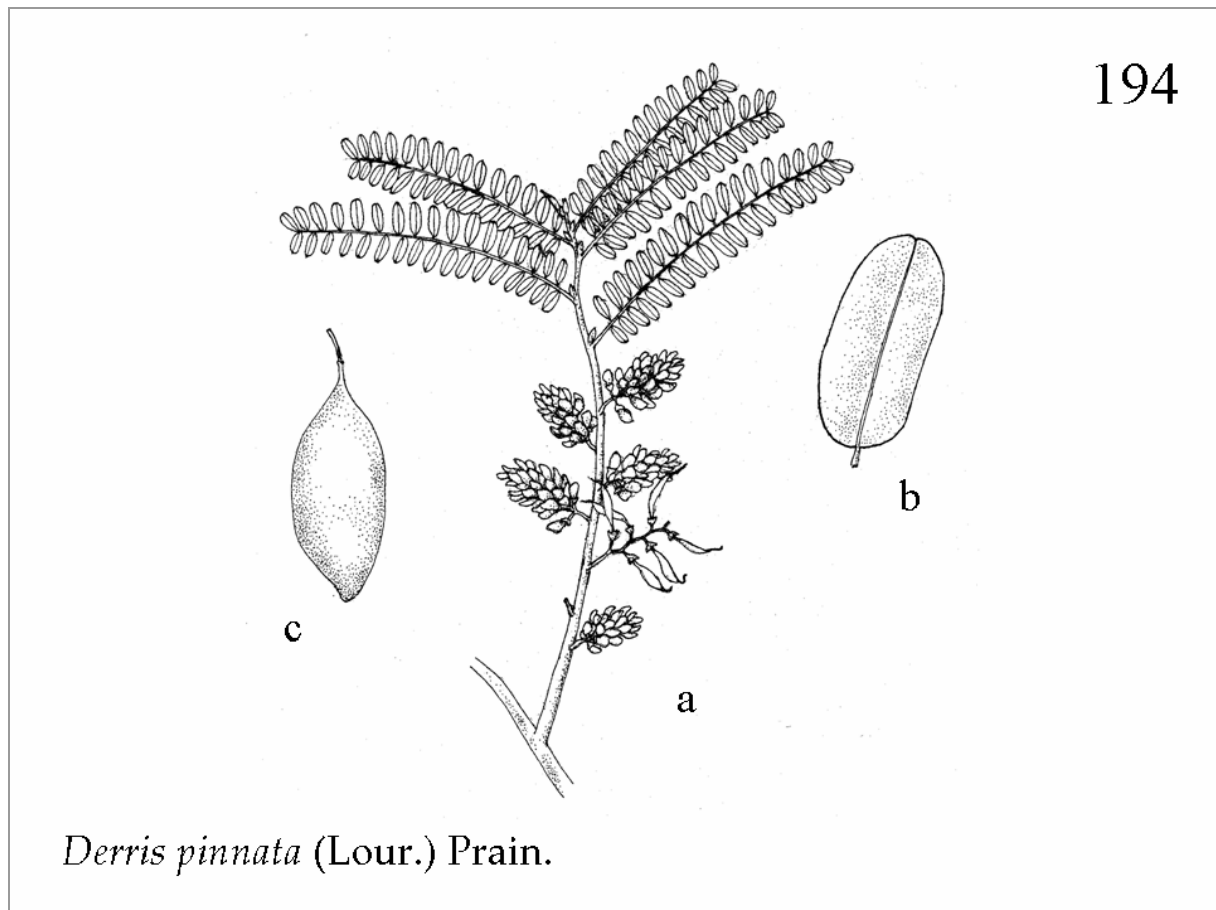


Fig. 194. *Derris pinnata* (Lour.) Prain. (a) Branchlet with 5 leaves, flower clusters and immature pods, (b) leaflet, and (c) mature pod.

LEGUMINOSAE

194

***Derris pinnata* (Lour.) Prain**

Synonyms : *Dalbergia pinnata* (Lour.) Prain., *Dalbergia tamarindifolia* Roxb., *Derris pinnata* Lour.

Vernacular name(s) : Java polisander (NL), Areuy ki loma, Areuy ki menter, Areuy munding serakit, Jampak luyak, Oyod sambang, Sana keling, Sana sungu – *Sono keling* (Ind.)

Description : Small trees or sometimes shrubby climbers, 1-10 m tall, with long, drooping branches, young branchlets covered with short hairs. Leaves 12-15 cm, imparipinnate (odd in number, with an end, unpaired leaflet), leaf stalks densely hairy; leaflets at the base of the stalk are lanceolate, hairy and about 5 mm long; leaflets are small, 5-7.5 by 12-18 mm and number 21-42, firmly papery and trapezoid-oblong in shape, asymmetrical at the base, (slightly) hairy on both surfaces. Flowers gathered in panicles in the axils on short, densely hairy stalks. Flowers are small, about 6 mm long; the calyx is bell-shaped, about 3 mm long, either hairy or smooth on the outside, with ovate teeth; corolla white; stamens 9-10. Pods are thin, oblong to tong-shaped, pointed, base tapering to the long, slender stalk, 1-1.4 by 2.5-6 cm, smooth, bright-brown when dry, uniformly covered with a fine net-like venation. Seeds are narrow, about 4 by 18 mm, numbering 1-4 per pod.

Ecology : Found in dense forests, below 1400 m; occasionally on landward edges of mangroves. Flowering reported in January-February (southern China). Mangrove associate species.

Distribution : Southeast Asia and southern China (Hainan, Guangxi, Yunnan, Xizang). In Southeast Asia recorded from Myanmar, the Philippines, Malaysia (Peninsular) and Indonesia (Java).

Abundance : Locally common.

Use(s) : Leaves are reportedly “ideal for treating varices and typhus”. In Indonesia it is used to cure skin disorders.

Source of illustration : Archive, Royal Botanic Garden, Kew.

Reference(s) : Heyne (1950), Afriastini (1988)
http://flora.huh.harvard.edu/china/mss/volume10/Fabaceae-MO-Dalbergia_edited.htm;
http://www.arcbc.org/arcbcweb/medicinal_plants/medicinal_plants_page3.htm.

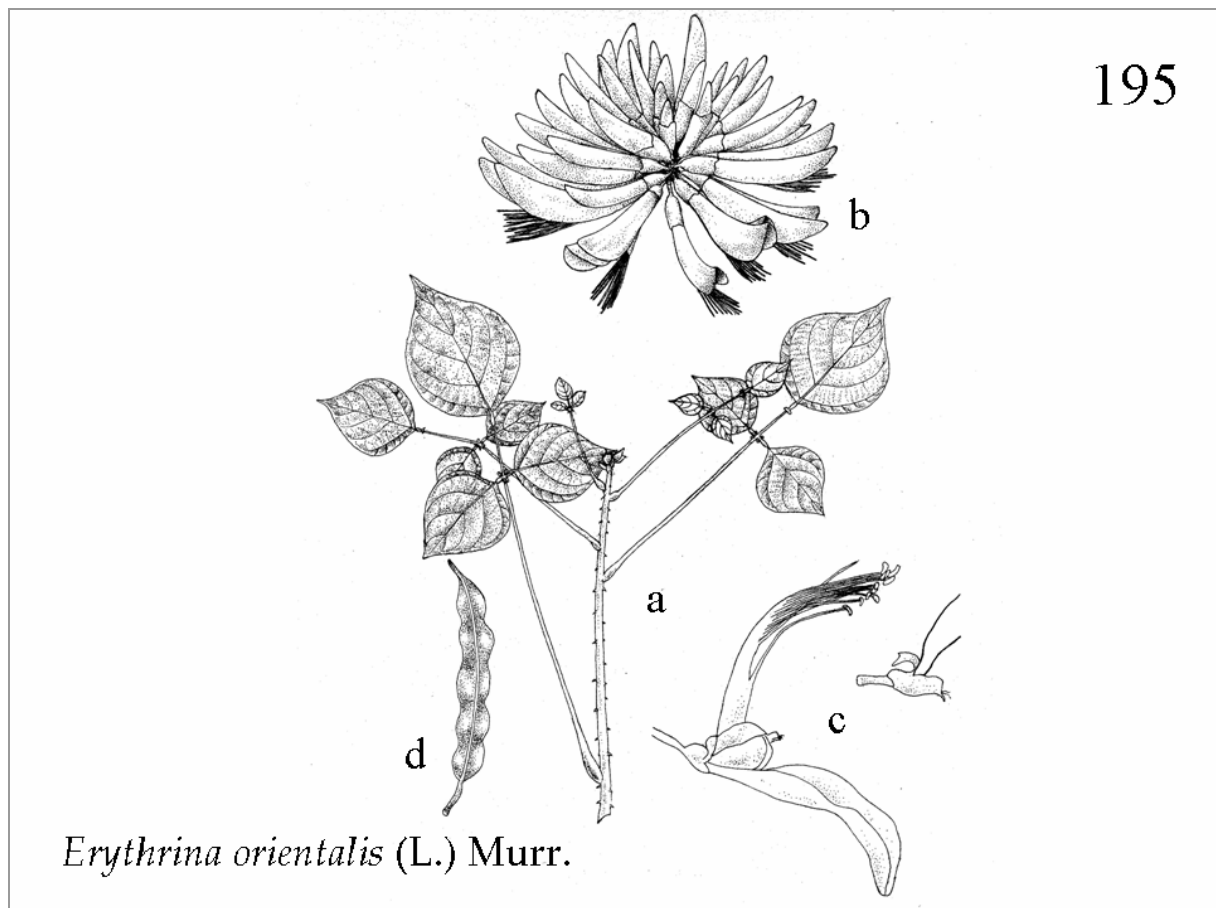


Fig. 195. *Erythrina orientalis* (L.) Murr. (a) Branch with trifoliate leaves, (b) cluster of flowers, (c) detail of single flower, and (d) pod.

LEGUMINOSAE

195

Erythrina orientalis (L.) Murr.

Synonyms : *Erythrina corallodendrum* L. var. *orientalis*, *Erythrina indica* Lamk., *Erythrina indica* Zoll., *Erythrina indica* var. *alba* W.S. Millard & E. Blatter, *Erythrina indica* var. *fastigiata* Guillaumin, *Erythrina indica* var. *marmorata* (Planchon) B.& M., *Erythrina indica* var. *picta* (L.) B.&M., *Erythrina variegata* L., *Erythrina variegata* var. *orientalis* (L.) Merr., *Gelala litorea* Rumphius (=type)

Vernacular name(s) : Indian Coral Tree, Tiger's claw (E), Dedap, Derdap, Dadap (Mal.), Dadap, Gelala, Galala, Ngoa (Ind.), Bông nem (Viet.)

Description : Fast growing, medium-sized tree, (6-)12-15(-25) m tall, with a round deciduous crown, greenish grey smooth bark, marked with pale longitudinal stripes. Trunk 40-60 cm diameter. Armed with short, blackish spines along the stout twigs. Leaves three-lobed, leaflets generally broader than long, rhomboid in shape, about 10-15 cm, with a very broad base; with leaf stalk up to 40 cm long. Flowers are bright scarlet, in dense terminal clusters up to 25-40 cm long, often flowering before the tree is in leaf; flowers 6-8 cm long; calyx 2.5-3 cm long, corolla 4.5 cm wide; stamens red. Flower stalks are 0.5-1.0 cm long. Fruit a pod, 15-30(-40) cm long, 2-3 cm wide, with 1-8(-13) pinkish or purplish-red, 2 cm long oblong or oblong-ellipsoid seeds; often jointed between the seeds; stalk of pod 1.5-3.0 cm long. In the variegated form, the leaflets have a broad yellow stripe along the midrib and secondary nerves; flowers are orange-red.

Ecology : Found on sandy, advancing beaches along the coast and in marshy places and landward margins of mangroves. Also in coastal bush on the landward edge of *Avicennia* mangroves and other associations just above the high water mark. Planted in homestead gardens and along roads up to an altitude of 1200 m asl in Indonesia. Tolerant of salt and periodic flooding. Sheds its leaves in the beginning of the drier months (e.g. Jan.-Feb. in Peninsular Malaysia). Older trees become umbrella-shaped. Fruiting time usually August-September in monsoon areas. Flowering and fruiting from May-October in Indonesia. Flowers attract sunbirds. Seeds are sea dispersed. Mangrove associate species.

Distribution : From East Africa (Tanzania), the Seychelles and India eastwards to southern China, Taiwan and the Pacific (Fiji, Samoa). In Southeast Asia it has been recorded in Myanmar, Vietnam, Malaysia, Indonesia (Java, Moluccas) and East Timor.

Abundance : Common in South Asia, uncommon in Southeast Asia.

Use(s) : Propagated by cuttings and from seeds; coppices well. Branches planted as live fences; leaves used as cattle fodder. The fibre of the bark is used as cordage; bark is also used to treat dysentery. Leaves used to treat pain in the joints. The wood is light and is used for frames of sieves. Leaves and seeds can be eaten when cooked, but the raw seeds are poisonous. Leaves used to induce sleep, and to increase lactation.

Source of illustration : Corner (1988), Khan and Alam (1996).

Reference(s) : Heyne, (1950), van Steenis *et al.* (1951), Gillett *et al.* (1971), Whitmore (1972a), Corner (1988), Khan and Alam (1996), Nguyen *et al.* (2000).

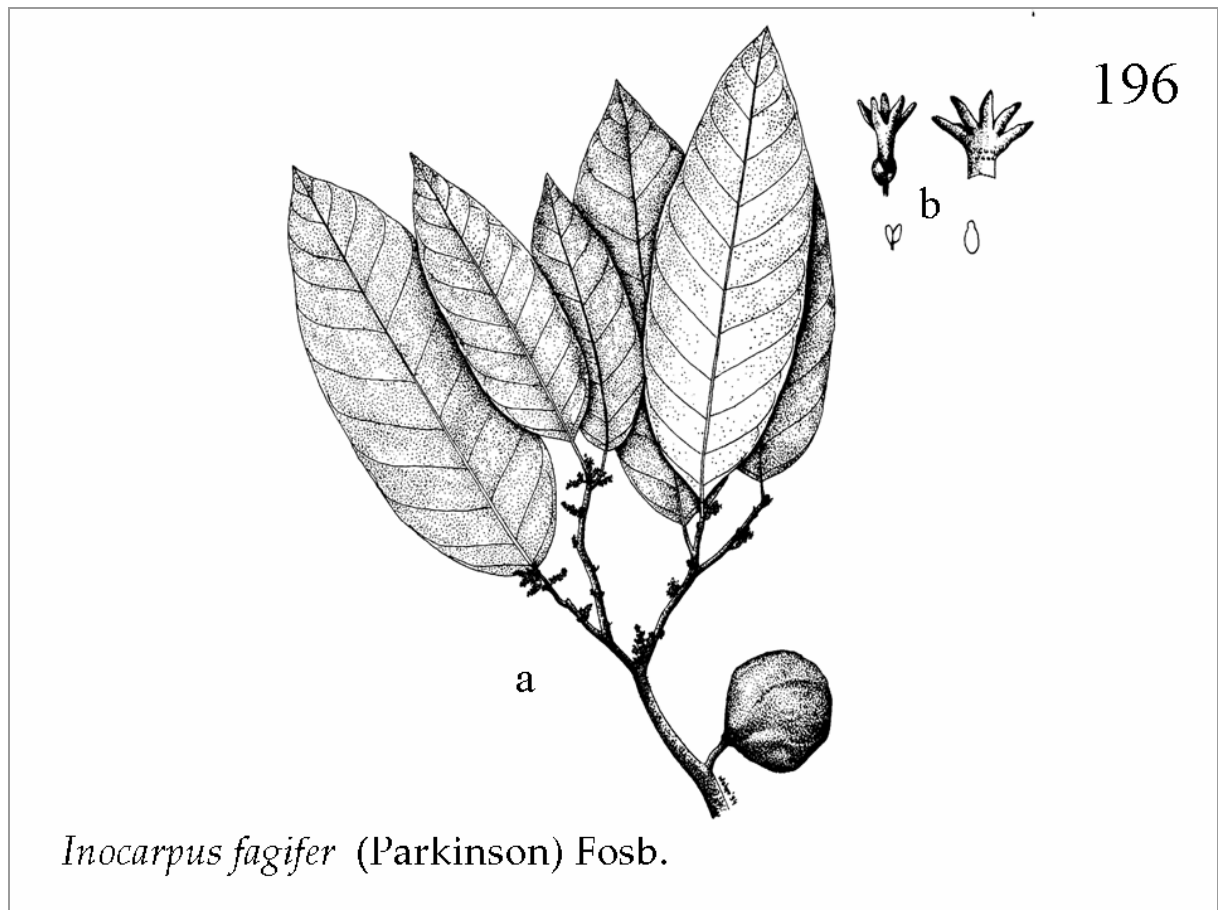


Fig. 196. *Inocarpus fagifer* (Parkinson) Fosb. (a) Branchlet with flowers and fruit, (b) details of flower.

LEGUMINOSAE

196

***Inocarpus fagifer* (Parkinson) Fosb.**

Synonyms : *Inocarpus edulis* J.R. & G. Forst., *Inocarpus fagiferus* (sic), *Inodaphnis lanceolata* Miq.

Vernacular name(s) : Tahitian Chestnut (E), Kerepit, Kapit, Benjek, Bosua (Mal.), Gajam, Gajang, Pandaram Boheng, Gasep, Tolok, Ain Hual, Angkaeng, Gayamu (Ind.)

Description : Tree, up to 30 m tall, with a fluted stem that exudes a red sap from cut surfaces. The terminal branchlets are thin and often drooping. The shiny, leathery leaves are oblong to oblong-lanceolate, 20 by 7 cm, sometimes 30 cm or longer. The scented flowers occur in elongated clusters located in the axils that are up to 12 cm long. Flower groups occur either singularly, or in clusters on a common stalk, especially on larger branches. The calyx is pinkish white; the recurved, almost equal petals are white or yellow and 1-1.5 cm long. Fruit is yellow, irregular, but more-or-less round or slightly flattened, 5-10 by 5-7 cm, 1-seeded, and may either be variously keeled or ribbed, or smooth altogether. The fruit is not readily shed after ripening and may be retained on the tree for some time.

Ecology : Occurs on river banks subjected to tidal influence, brackish swamps, landward margins of mangroves and sandy foreshores. However, it is essentially a lowland swamp forest species, occurring up to an altitude of 500 m. Flowering has been recorded from January to June and in September (Indonesia). Mangrove associate species.

Distribution : Occurs from Southeast Asia through the Pacific. In Southeast Asia it has been recorded in Malaysia, Indonesia (Borneo, Java, Sumatra, Nusa Tenggara, Sulawesi, the Moluccas and Papua), and Papua New Guinea. Its range may have been artificially extended through cultivation.

Abundance : Relatively common.

Use(s) : It is one of the few examples of a plant in the mangrove association that readily provides human food. The roasted or boiled seeds are eaten. Also the young leaves are said to be edible. Wood is used for light construction, especially of furniture. Foliage is used for fodder. The tree is often planted, mostly along roads.

Source of illustration : Drawn from herbarium specimen, Bogor Herbarium.

Reference(s) : Heyne (1950), Backer & Bakhuizen van den Brink (1963-8), Tomlinson (1986), Corner (1999).

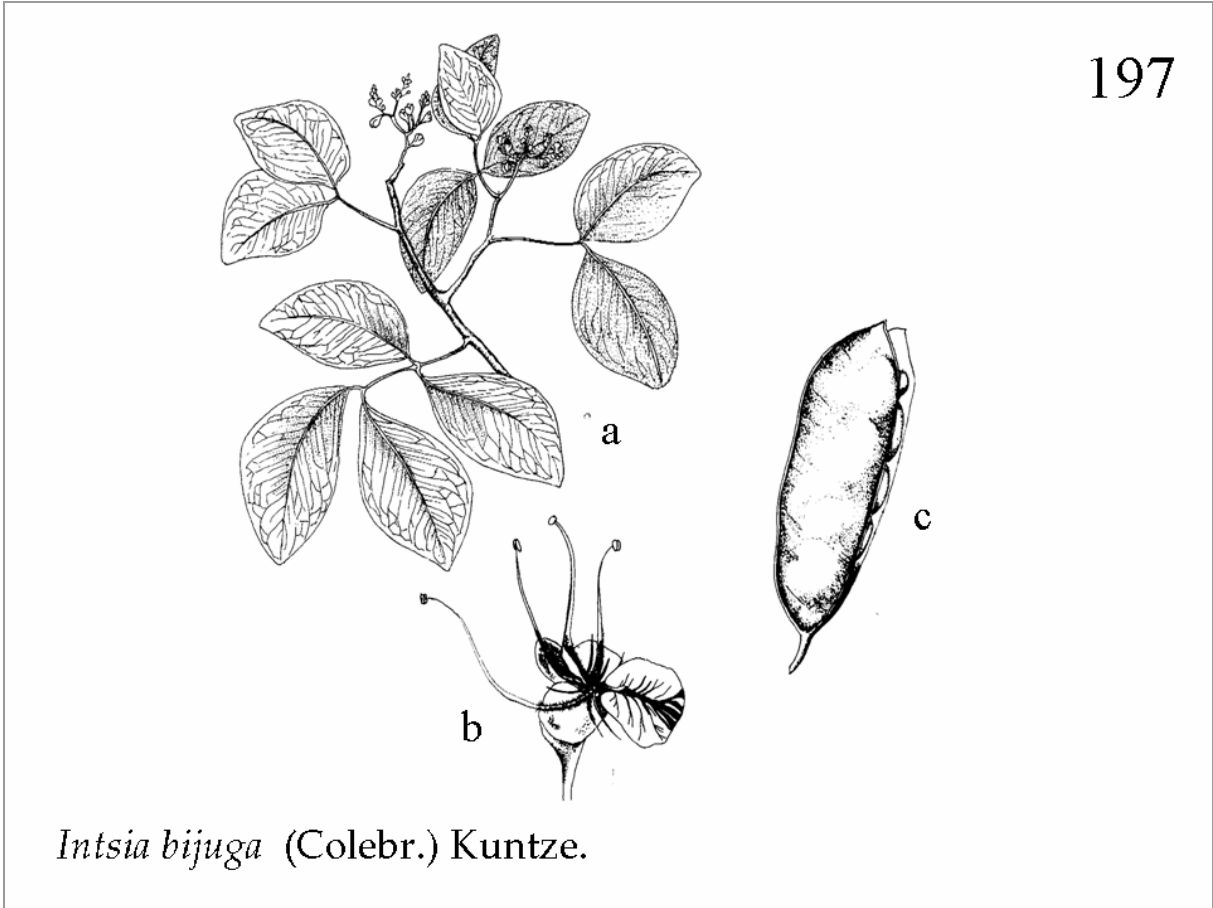


Fig. 197. *Intsia bijuga* (Colebr.) Kuntze. (a) Branchlet with buds, (b) flower, and (c) pod.

LEGUMINOSAE

197

Intsia bijuga (Colebr.) Kuntze

Synonyms : *Afzelia bijuga* A. Gray, *Afzelia retusa* Kurz., *Eperua decandra* Blanco, *Intsia amboinensis* Thouars., *Intsia madagascariensis* Thouars ex DC, *Intsia retusa* Colebr., *Macrolobium amboinensis* Teijsm. ex Hassk., *Macrolobium bijugum* Colebr., *Outea bijuga* DC.

Vernacular name(s) : Merbau ipil (Mal.) Kayu Besi Ambon, Merbau, Ipil, Sira, Ipilo, Bajang, Ipi, Baibui, Wesele – *Merbau cangkat* (Ind.), Ipil-lalao, Itil, Labnig, Mulato, Nala, Taal, Tigel – *Ipil* (Phil.), Gõ nu'ó'c (Viet.), Ngon gai, Lumpho thale (Thai.), Krognungteukbray, Krokosteukpray (Camb.)

Description : A deciduous tree up to 40 m tall, with a long, slightly buttressed trunk, up to 1 m diameter and spreading crown. The leathery leaves have 2-6 (usually 4) leaflets that are ovate, hairy on the lower midrib, and measure 5-20 by 4-12.5 cm. There is no terminal leaflet. Numerous flowers occur in dense, terminal, finely hairy, elongated clusters that are 5-18 cm long. The four unequal sepals are smooth, or densely covered with short hairs, and up to 10 mm long. The 2-3 cm long solitary petal is clawed, white at first but later turning red or orange. The leathery fruit is flat pod, oblong, measuring 4-5(-7.2) by 8.5-15(-28) cm, with a white, fleshy stalk that turns brown. Seeds measure 2-3.5 cm, and 8 mm thick. In earlier Philippine literature it was referred to as 'ipil laut' *Intsia retusa*, but this was found to be the same species as *Intsia bijuga*.

Ecology : Occurs in mangroves and on sandy beaches, often on coral. Marginal mangrove species, mostly occurring on drier portions of the swamp. Flowering in Indonesia has been recorded in January, February and October. Mangrove associate species.

Distribution : Occurs from Madagascar and the islands in the Indian Ocean, through tropical Asia to northern Australia, Melanesia and Micronesia. Recorded throughout Southeast Asia. In Indonesia recorded from Sumatra, Kalimantan, Java, Sulawesi, the Lesser Sundas and the Moluccas.

Abundance : Relatively common, and often cultivated.

Use(s) : Very hard, good quality timber, with little shrinkage or warping, used for houses and bridges. Very durable, resistant to insects and weather. Often used for making house posts. Important source of 'merbau' timber. Bark and leaves used as medicine to treat diarrhoea. Seeds are fried, soaked for 3-4 days, then boiled and eaten.

Source of illustration : Based on Walker (1976).

Reference(s) : Heyne (1950), Backer & Bakhuizen van den Brink (1963-8), Tomlinson (1986), Afriastini (1988), Hou *et al.* (1996), Aragonés *et al.* (1998), Marschke (2000).

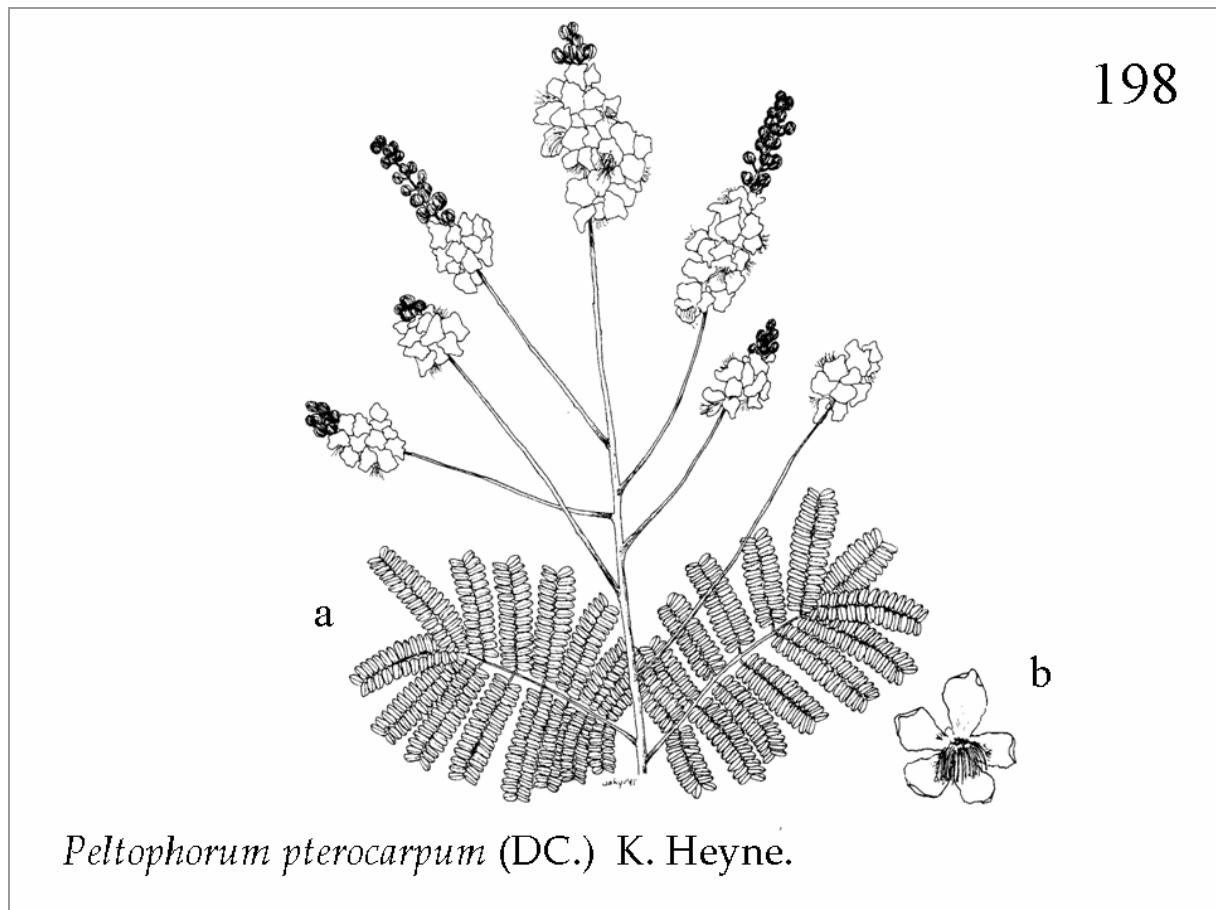


Fig. 198. *Peltophorum pterocarpum* (DC.) K. Heyne. (a) Terminal flower clusters (emerging from canopy), and (b) flower.

LEGUMINOSAE

198

***Peltophorum pterocarpum* (DC.) K. Heyne**

Synonym(s) : *Caesalpinia arborea* Zoll. ex Miq., *Inga pterocarpa* D.C., *Peltophorum ferruginea* Decne., *Peltophorum ferrugineum* (Decne.) Benth., *Peltophorum inerme* Nav., *Peltophorum inermis* Roxb., *Peltophorum pterocarpum* (DC.) Backer ex Heyne

Vernacular name(s) : Yellow Flame (E), Jemerlang Laut (Mal.), Pohon Soga, Batai, Batai Laut, Soga, Kayu Juwok, Hau Kolo (Ind.), Non see (Thai)

Description : Small to medium sized tree, up to 25(-35) m tall, with an umbrella-shaped crown and light grey bark. Trunk girth up to 60(-100) cm; young twigs are covered with short brown hairs. Leaves are 15-40 cm long, divided into 5-11 primary leaflet pairs; these are further subdivided into another 9-20 secondary leaflet pairs. Individual secondary leaflets measure 12-15 by 8 mm, with a notched or very minutely pointed tip, and an uneven base. Secondary leaflets are virtually without a stalk. Flowers occur in large terminal clusters, 30-45 cm long, on red-brown stalks that protrude from the foliage. Flowers measure almost 4 cm across, are sweet scented and bright golden yellow with deep orange pollen. Petals are crinkled and wavy, with brown hairs towards the base on both sides. Fruit is a purplish-brown pod, 6-14 by 2.5 cm, and winged (2-5 mm wide) all the way around. The pods do not open readily. Each pod bear 1-5(-6) yellowish to reddish-brown, flattened, very hard seeds that are shaped like sun-flower seeds, 5 by 10-12 mm.

Ecology : Found on rocky and sandy shores, occasionally along margins of mangroves or on limestone. Occurs from sea level up to about 100 m asl. A quick growing species, that does well along roadsides. Strictly seasonal, shedding its leaves after a dry spell; in many parts of its range this is twice annually. It may be bare for about two weeks, then develops new shoots for its terminal flower clusters. Flowering continues for several weeks. Seeds take several months to germinate, but this can be hastened by filing though one end of the hard coat, or by softening in dilute acid or immersion in boiling water for two minutes. Mangrove associate species.

Distribution : From Sri Lanka through Southeast Asia to Australia. In Southeast Asia it has been recorded in Thailand, Cambodia, Vietnam, the Philippines, Malaysia, East Timor and Indonesia (Java, Flores, Borneo and Sumatra).

Abundance : Common in natural habitats; very common as an ornamental and as a planted shade tree.

Use(s) : Often planted as an ornamental or shade tree, especially along roadsides and in gardens. The bark contains a yellow-brown dye used in Java for dying batik cloth – hence the common name for this species in Indonesia: *Pohon Soga*. Used to treat gastric disorders, and compresses are used to treat sprains. Leaves are fed to goats and cattle (Madura, Indonesia).

Source of illustration : Sastrapradja *et al.* (1980).

Reference(s) : Heyne (1950), Whitmore (1972), Sastrapradja *et al.* (1980), Corner (1988), Whitmore, Tantra & Sutisna (1990), Aksornkoae (1993), Hou *et al.* (1996).

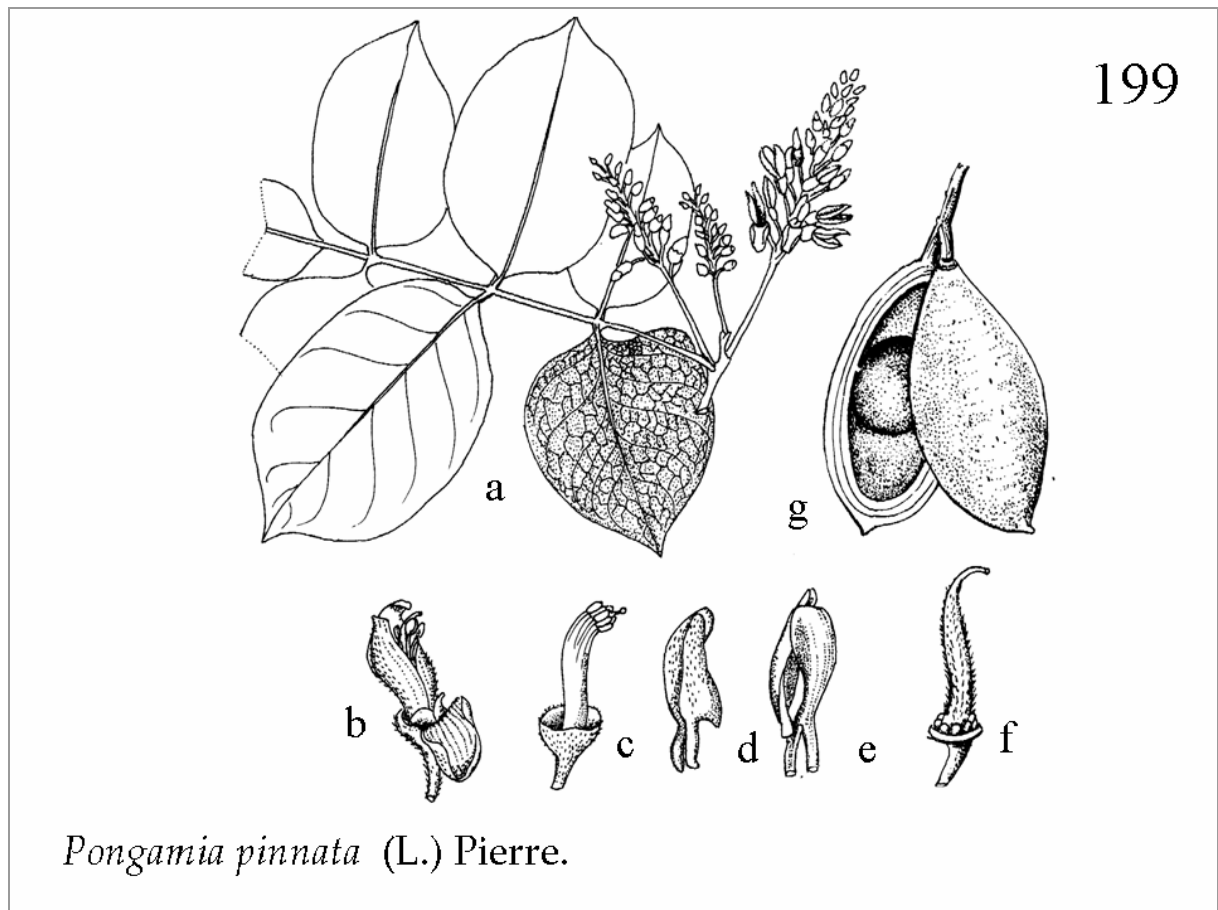


Fig. 199. *Pongamia pinnata* (L.) Pierre. (a) Leaf (with 7 leaflets) and flower clusters, (b) flower, (c-f) details of flower, and (g) pod.

LEGUMINOSAE

199

Pongamia pinnata (L.) Pierre

Synonyms : *Caju pinnatum* O. Kuntze., *Cytisus pinnatus* Linn., *Dalbergia arborea* Willd., *Derris indica* (Lam.) Bennet., *Galedupa indica* Lam., *Galedupa maculata* Blanco, *Galedupa pinnata* Taub., *Millettia pinnata*, *Pongamia glabra* Vent., *Pongamia mitis* Merr., *Pterocarpus flavus* Lour., *Robinia mitis* Linn.

Vernacular name(s) : Indian Beech (E), Kacang Kayu Laut (Mal.), Ki Pahang Laut, Bangkok, Kranji, Asawali, Awakal, Marauwen – *Kacang kayu laut* (Ind.), Bagnei, Balikbalik, Balu-balu, Balok, Balok-balok, Balu-balu, Baluk-baluk, Balut-balut, Banit, Baobao, Bayok-bayok, Butong, Kadel, Magit, Manlok-balok, Amarok-barok, Maruk-baruk, Marobahai – *Bani* (Phil.), Yee thale, Yi thale (Thai.)

Description : Tree, up to 6-15(-20) m tall, with branches that are generally without hairs or scales, and have wart-like scars left by leaflets at base of leaf stalks. Crown is irregular in shape, shaggy and dense. Bark is smooth in young trees, becoming shallowly fissured with maturity, greyish-brown or dull-brown to pinkish-brown; exuding strongly crushed bean pod odour. The compound leaves occur in two rows, and there are 3-7 opposite, shiny, dark green leaflets that are ovate, oval or oblong, 5-22,5 by 2.5-15 cm. Flowers are purplish to pinkish-white, and occur in pairs along the stalks of flower clusters that are 6-27 cm long, located in the axils. The 7-15 mm flower stalk is covered with fine, short hairs, and has 2 minute leaflets above the middle. The 4-5 mm long calyx is covered with fine, short hairs, is cup-shaped, and has very short, blunt teeth. The main lobe of the standard of the flower is broadly obovate, 11-18 mm long, white or pale violet. The lower half has a green central spot and it is covered with fine, brown hairs on the back. The wings adhere to the keel. The beaked, thickly leathery pod, 5-7 by 2-3(-5) cm, has a short stalk above the corolla-scar, is compressed and contains 1 seed, 3.5-5 cm long. Pods remain closed.

Ecology : Occurs on non-swampy beaches, and occasionally on landward margins of mangroves. Flowering occurs all year round. Flowers are very frequently transformed into round galls which might be mistaken for fruits. Mangrove associate species.

Distribution : Occurs in the Mascarene Islands, and in tropical Asia, through Southeast Asia to Australia, and in Polynesia. Recorded throughout Southeast Asia. In some localities it extends inland (e.g. Laguna de Bay in the Philippines) near the borders of lakes. In Myanmar it is recorded as *Derris indica*.

Abundance : Common.

Use(s) : Leaves are used for fodder. Seeds are poisonous. It is commonly planted elsewhere in the tropics in coastal areas, because it is resistant to salt and exposure. Sometimes it is planted as a shade tree along roads. The bark is used for making strings and ropes. The seeds yields a red-brown, thick oil known as pongam oil. *Pongamia* oil (called pongamol or hongay oil) is employed for illuminating and for medicinal purposes and should also be useful for the manufacture of soap and candles. The roots and seeds are used as a fish poison in Australia and Madura (Indonesia). In the Philippines a decoction of the leaves is given to a children with cough. The juice of the leaves is used against itches, herpes and gonorrhoea. Bark is used as an abortive by the natives of the Islands of Guimaras. In the Philippines, young shoots are used to treat rheumatism.

Source of illustration : Based on Tomlinson (1986)

References : Backer & Bakhuizen van den Brink (1963-8), Tomlinson (1986), Afriastini (1988), Aksornkoe (1993), Aragonés *et al.* (1998).

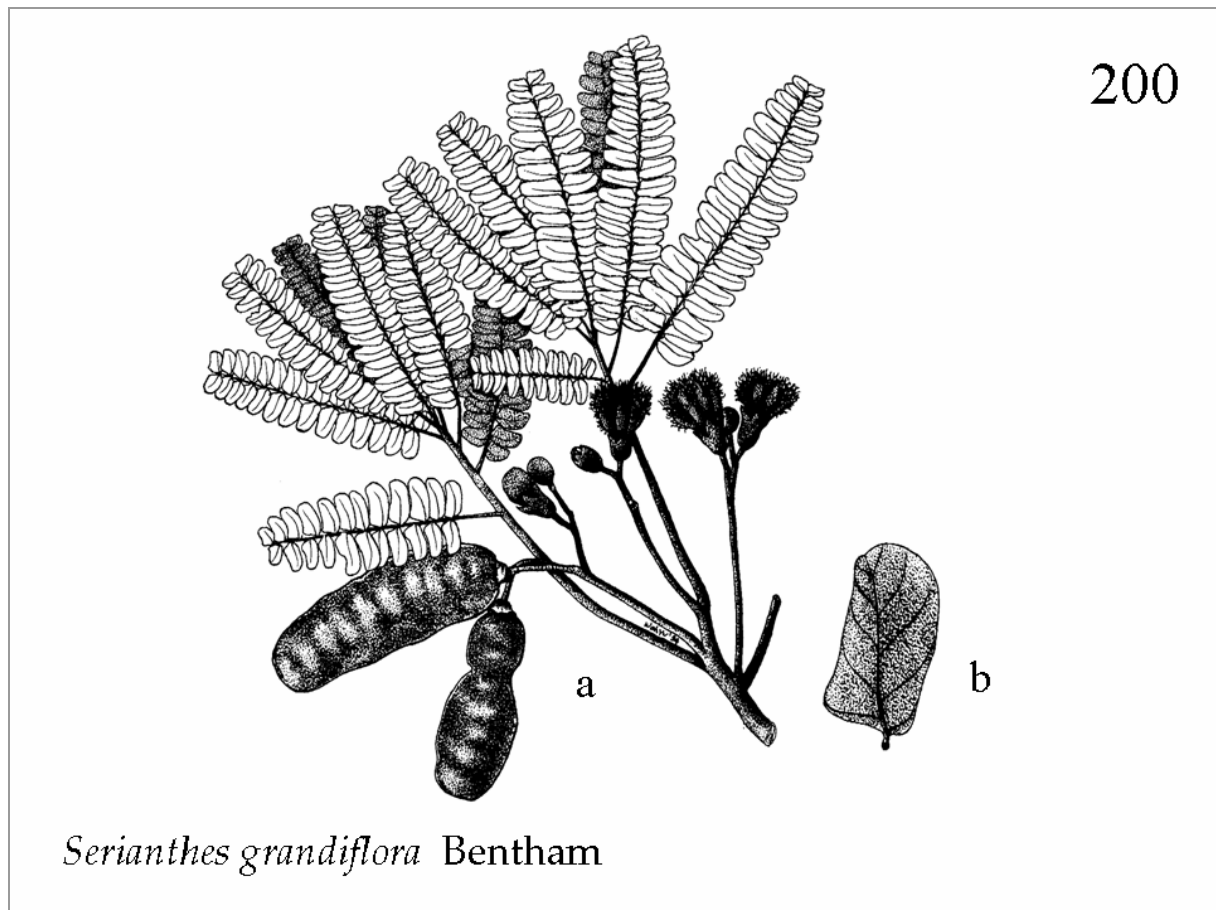


Fig. 200. *Serianthes grandiflora* Bentham. (a) Terminal branchlet with flower clusters and pods, (b) single leaflet, showing the typical asymmetry.

LEGUMINOSAE

200

***Serianthes grandiflora* Benth.**

Synonyms : *Albizia grandiflora* (Benth.) F. Muell., *Feuillea serianthes* Kuntze, *Serianthes dilmyi* Fosberg

Vernacular names : Unknown.

Description : Tree, up to 30 m tall, with young branchlets that are densely covered with short, brown hairs. Leaves have a main vein that has several glands, and are subdivided into 3-9 pairs of main leaflets, each with 12-36 nearly stemless, oblong, smooth, secondary leaflets. Secondary leaflets are alternate, for the greater part, and have a very unequal leaf base. They are broadly rounded or very blunt, measuring 1-3 by 0.5-2 cm. The flower heads are stalked and located in the axils, their end branchlets resembling elongated clusters, each bearing 2-5 flowers. The 5-merous flowers have a 5 mm-thick stalk and a bell-shaped, 5-lobed calyx that is very densely covered with hairs on the outside and 1-2 cm long. The 3.5-4.5 cm-long corolla is yellowish-white, funnel-shaped, divided for more than half its length, and densely covered with hairs on the outside. The very numerous, yellowish-white stamens extend beyond the corolla; they are connected at the base into a tube that includes the ovary. The 10-15 by 5-6 cm, woody pod is stemless above the corolla scar, flat but swollen. The pod does not open when ripe. The 4-8 oblong seeds measure 10-15 by 5-6 mm.

Ecology : Occurs in all coastal vegetation types, including mangroves. Mangrove associate species.

Distribution : Southeast Asian species, known from Malaysia, Singapore, the Philippines, Indonesia (Sumatra, Java, Sulawesi, Borneo, the Moluccas, Papua) and Papua New Guinea.

Abundance : Unknown.

Use(s) : Unknown.

Source of illustration : Drawn from herbarium specimen, Bogor Herbarium.

Reference(s) : Backer & Bakhuizen van den Brink (1963-8).

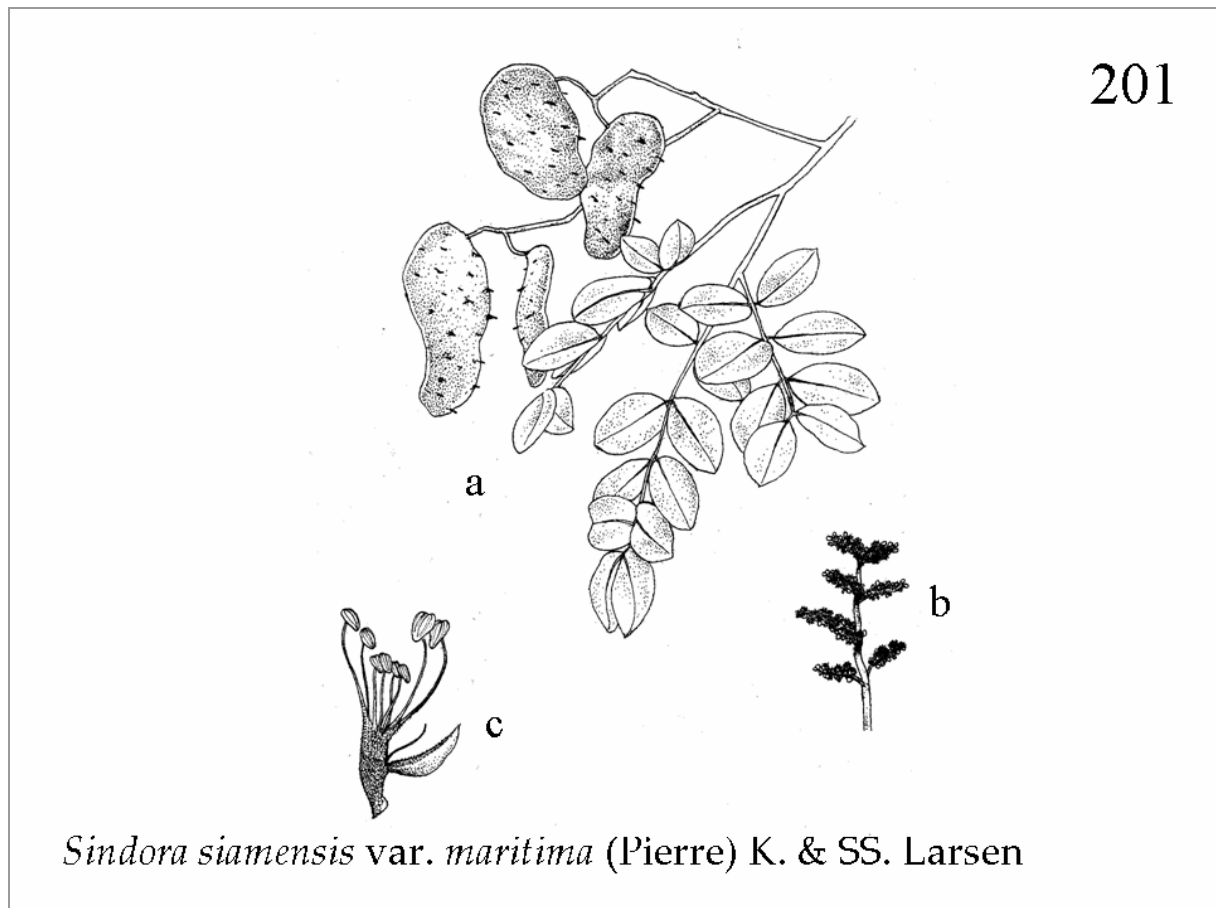


Fig. 201. *Sindora siamensis* var. *maritima* (Pierre) K. & SS. Larsen. (a) Fruiting branchlet, (b) flower cluster, and (c) detail of flower.