

## DATISCACEAE (C. G. G. J. van Steenis, Leyden)

Dioecious trees (or tall herbs), often lepidote or hairy. *Leaves* large, simple, entire or dentate, spirally arranged, palminerved (or compound), often asymmetric. Stipules 0. *Flowers* actinomorphic, valvate, unisexual, rarely polygamous, in elongate, bracteate, caducous spikes or panicles.—♂ *Flowers*: sepals 4–9, free and very unequal or connate in a lobed tube, isomerous, in ♂ *Tetrameles* with a few occasionally additional lobules. Petals free, isomerous or 0. Stamens isomerous and episepalous, filaments often long; anthers basifix, intrors or latrors, incurved in bud. Rudimentary ovary present or 0.—♀ *Flowers*: sepals connate above the ovary or free. Petals and rudimentary stamens 0. Styles isomerous, opposite the calyx lobes, mostly inserted on the margin of the calyx, (2-fid, filiform), club-shaped, or with a capitate stigma. Ovary inferior, 1-celled, with 3–8 parietal, alternisepalous placentas. Ovules ∞. *Capsule* opening at the apex with slits or splitting laterally; pericarp membranous. Seeds ∞, very small, ovate or spindle-shaped; testa punctate or scrobiculate, outer sheet loosely covering the embryo. Albumen 0. Embryo straight, cylindrical.

Distr. Three genera with 4 spp., *Datisca* (herbaceous) with one sp. in Asia and one in W. Central America, *Tetrameles* and *Octomeles* both with one Indomalaysian sp..

Ecol. Rain forest (*Octomeles*) and monsoon forest (*Tetrameles*) below ± 1000 m.

Uses. Mainly for timber; see under the spp..

Wood anat. DEN BERGER, Med. Proefstat. Boschwezen 13 (1926) 133; DEN BERGER, Determinatietabel Houtsoorten van Malesië, Wageningen (1949) (hand lens). *Tetrameles*: MOLL & JANSSONIUS, Mikr. Holzes 3 (1914) 631; PEARSON & BROWN, Comm. Timb. 2 (1932) 606; DESCH, Mal. For. Rec. 15<sup>1</sup> (1941) 94. *Octomeles*: REYES, Philip. Dept Agric. Techn. Bull. 7 (1938) 340.

Notes. There is no unanimous opinion on the systematic position of the family which has been compared with several others cf. GILG, Pfl. Fam. ed. 2, 21 (1925) 545 and ERDTMAN, Pollen Morph. & Plant Tax. (1952) 144.

### KEY TO THE GENERA

1. Evergreen. Leaves lepidote. Petiole 5-angled. Spikes solitary, axillary. ♂ Flowers 6–8-merous. Petals present. Capsules dehiscing laterally . . . . . 1. *Octomeles*
1. Deciduous. Leaves hairy. Petiole terete. Inflorescences clustered at the apex of defoliate twigs. ♂ Flowers 4–5-merous. Petals absent. Capsule dehiscing apically. . . . . 2. *Tetrameles*

### 1. OCTOMELES

MIQUEL, Fl. Ind. Bat. Suppl. (1861) 133, 336; GILG, Pfl. Fam. ed. 2, 21 (1925) 546.—Fig. 1–4.

Colossal, fast-growing, buttressed tree with thick twigs sharply 3-angular at the apex. Flush and inflorescences lepidote, glabrescent. *Leaves* roundish-cordate, 5–7(–9)-nerved, lower surface with groups of large pitted domatial glands in the axils of the nerves, and very numerous smaller ones on the veins. Petiole long, 5-angled. *Flowers* sessile, coarse, green, 5–8-merous, thick, spreading, in axillary, sessile or peduncled spikes.—♂ *Flowers* campanulate; sepals triangular; petals triangular, with a subulate acumen; stamens in bud strongly incurved, with a thick filament and a large kidney-shaped curved intrors anther.—♀ *Flowers*: apex of the ovary deeply cup-shaped by the thick calyx tube; styles 5–8, inserted in the throat opposite the acute-triangular calyx-lobes, short, thick, appanate, crowned by a thick, capitate stigma. Petals 0. *Capsule* barrel-shaped, throwing off the irregular-longitudinally torn exocarp + calyx; endocarp pale, horny, obovate, splitting from the top downwards; persistent. Seeds spindle-shaped, produced in immense quantities.

Distr. Monotypic, Melanesia and *Malaysia*: absent from Java and the Lesser Sunda Islands. Fig. 2. Ecol. Rain forest, often alluvial and riverine, up to  $\pm 800$  m.

Notes. The generic name has sometimes been wrongly spelt *Octomelis*.

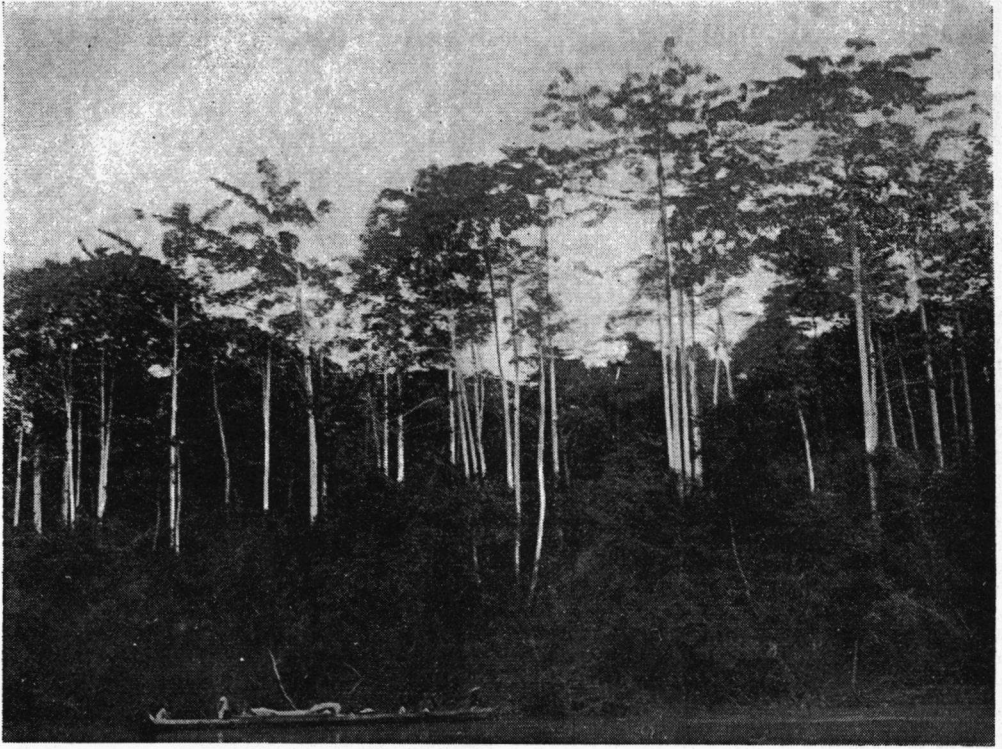


Fig. 1. Young riverine forest on the low banks of the Lower Telen (E. Borneo), of *Octomeles sumatrana* MIQ. and *Nauclea*, over a shrub layer of *Leea* (ENDERT, 1925).

1. *Octomeles sumatranum* MIQUEL, *l.c.*; BECC. Wand. (1904) 84; MERR. Int. Rumph. (1917) 378; HALL. *f. Med. Rijksherb. no 37* (1918) 5; LANE-POOLE, For. Res. Papua (1925) 7-8, 121, f. 3, 5, 6; GILG, *l.c.*; WITKAMP, Tijds. K.N.A.G. 46 (1929) 210; STEUP, Tect. 23 (1930) 871; *ibid.* 26 (1933) 29; KOOPMAN & VERHOEF, *ibid.* 31 (1938) 777-785, f. 1-3; SALVERDA, Rapp. Orient. Expl. (1937) 83; VAN DIJK, Boschbedrijf, etc. (1939) 20, 33, 46; WHITE, J. Arn. Arb. 31 (1950) 99.—*Palacca*, Rumph. Herb. Amb. 3 (1743) 195, t. 125.—*O. moluccana* T. & B. ex HASSK. in Abh. Naturf. Ges. Halle 9 (1866) 208; WARB. Bot. Jahrb. 13 (1891) 385; KOORD. Minah. (1898) 486; HALL. *f. l.c.* (1918) 6.—Fig. 1-3.

Up to 62(-80?) by  $1\frac{1}{2}$ - $2\frac{1}{4}$  (-4?) m; clear bole up to 30 m, crown semi-globular, branching made about in pagoda habit; bark grey, thin,  $\frac{1}{2}$ -5 mm diam.; heartwood absent; wood soft, light (SG 0.34). Buttresses up to 5-10(-15?) by 6 m. Leaf blade 12-30 by 6-23 cm, those of young trees and suckers much larger, margin in juvenile specimens sometimes with a few coarse teeth;

nerves rufous, tertiary nerves crossbar-like; petiole 6-30 cm. ♂ Spikes 20-60 cm. Bracts lanceolate, acute, 2 mm long.—♂ Flowers 4-5 by 5 mm, lobes ovate-triangular, acute, 2 mm long. Petals trian-

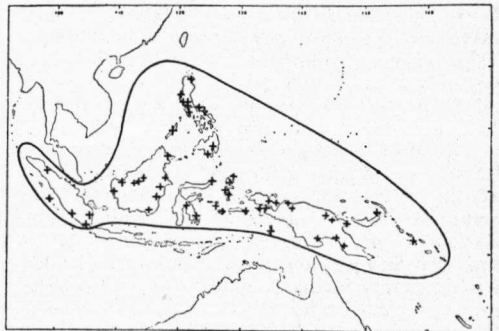


Fig. 2. Distribution of *Octomeles sumatrana* MIQ.

gular, 3 mm long, apex thickened, with an incurved subulate appendage forming a descending column in bud. Stamens *ca* 4 mm, filament thick, anther 2 mm.—♀ *Flowers* in 8–12 cm long spikes, *ca* 5 mm long; ovary 1–2 mm high, free calyx tube 2–4 mm high, lobes broadly triangular, *ca* 1 by 2 mm. Styles 1–2 mm, fleshy, thick, flattened; stigma  $\frac{1}{2}$  mm high, over 1 mm diam. Fruiting spikes 15–40 cm long, on 10–20 cm long peduncles. *Capsule* 12 mm long, endocarp splitting from the apex nearly to the base, *ca* 1 cm long. Seeds *ca* 1 by  $\frac{1}{4}$  mm, weighing *ca* 0.00005 Gr.

*Distr. Malaysia:* not yet found in the Malay Peninsula, Java, and the Lesser Sunda Islands. Fig. 2.

*Ecol.* Rain-forest tree, specially common along rivers, up to  $\pm$  800 m. Acc. to many explorers (BECCARI, *l.c.*) it is not a genuine constituent of the stable primary rain forest, but more a typical representative of natural secondary and seral riverine alluvial forest, often occurring in gregarious even-aged stands. KOOPMAN & VERHOEF (1938, *l.c.*) summarized ecological and silvicultural data. They state a 4 years old specimen cultivated at Bogor to have attained a height of 25 m and a diameter at breast height of 47 cm, which shows its very fast growth. They state further that *Octomeles* is not sensitive to fire. Germination power of collected seeds soon decreases. The size of mature trees is colossal: STEUP (KOOPMAN & VERHOEF, *l.c.* 780) found in Celebes the cubic content of one large tree to be 95.2 m<sup>3</sup>. Acc. to ENDERT (1927, *l.c.*) *benuwai* is a dominant tree of low moist soils in Kutei (E. Borneo), where acc. to WITKAMP (1929, *l.c.*) there are large complexes where it is absolutely dominant in the upper canopy, specially on the reed-grown capes of the big lowland rivers *e.g.* the Djambajan River. Fig. 1.

LANE-POOLE (1925, *l.c.*) found *ilimo* near Vanapa, Veimauro, Aroa, Kumusi and all the rivers of the Buna District and the foothills of the Hydrographers Range, but nowhere socially in the Mandated Territory. He says: 'it occurs scattered in rain forest in damp places, and in pure stands along banks of the big waterways. Wherever a large river like the Vanapa or the Brown has deposited a mass of alluvium, and made new ground, it comes up in a dense mass. These patches of young trees are very conspicuous, not only because they grow to the exclusion of all other trees but because they are even-aged. The tree is very attractive with its symmetrical development of branches and large, drooping leaves. Few of these *ilimo* groups reach maturity, as the rivers are continually changing their course and floods may sweep the seedling *ilimos* down to the sea. If *ilimo* has succeeded in establishing itself and growing for a generation it stands a good chance for reaching maturity. It binds the ground together with a network of roots and it takes a very great flood indeed to tear the soil away. Only an entire alteration in the course of the river can destroy the young trees now. When *ilimo* was quite young the ground was covered

by rushes<sup>1</sup> but is now covered much the same as in rain-forests; some third storey trees have found their way in, but are not numerous. Creepers, lianas and epiphytes are scarce. One 2nd storey

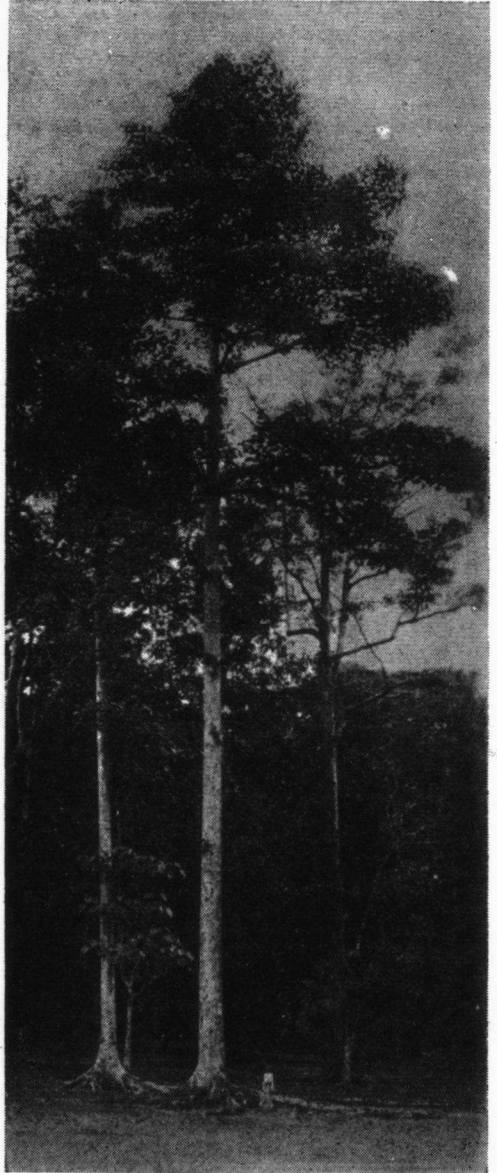


Fig. 3. Tree habit of *Octomeles sumatrana* MIQ. in the Botanic Gardens, Bogor; note the size to be estimated by person at base and large superficial root system (J. C. KONINGSBERGER).

(1) I assume it seeds in the *Saccharum spontaneum* fringe.

tree, *Vitex cofassus*, is found here and there. The top storey remains pure *ilimo*. In a 3.2 ha patch of over-mature *ilimo* forest were only 10 *sp.* and in all 62 individual trees, 39 (= 64%) of which were *ilimo*, furnishing 83% of the cubic content. Next in number was *Dracontomelum*, 12 trees (= 19%) with 6% of cub. content. The others were *Pometia pinnata*, *Planchonia timoriensis*, *Pterocarpus ilimo*, furnishing 83% of the cubic content. Next in number was *Dracontomelum*, 12 trees (= 19%) with 6% of cub. content. The others were *Pometia pinnata*, *Planchonia timoriensis*, *Pterocarpus indica*, *Pterocymbium*, *Garuga*, and *Terminalia catappoides*.

'The natural succession to these even-aged stands is mixed lowland rain-forest, which will have scattered *ilimo* in it, but *ilimo* cannot again regenerate as a pure stand until the forest is destroyed. It depends for that on fresh alluvial soil which must be drained up to allow *ilimo* to spring up.' A typical seral tree, following low vegetation and preceding mixed lowland rain forest.

Uses. The wood is soft, coarse-textured and

brittle, but the timber can only be used under cover where a weak, perishable timber will suffice. The colossal stems are, however, suitable for making large canoes. The timber industry is still interested in it (cf. Mal. For. 14, 1951, 229). In Borneo *Octomeles* represents one of the lofty 'bee-trees'.

Vern. *Bénuang*, M, *bunung*, SE. Borneo, *dut, maréndai*, Kutei, *binuang*, N. Borneo, *bénua motutu*, Malili, *bénui, bonui, wénoang, mapopo, winuang, binoang, winong, koror*, Minahassa, *salawaku, dadatoko*, Morotai, *kapu, lipé, lipé weda, dadatoko*, Halmahera, *afu, kafu*, Ternate, *ngafi, palaka*, Ambon, *bada*, Buru, *aitina*, W. New Guinea; Philippines: *banuang*, Sul., *barang, sarrai*, Ibn., *barouan, bilua, binowang, barauisan, kabal, libas*, Tag., *biluang*, Bik., Tag., Tagb., Mbo., Bagi; *erima*, trade name in New Guinea, *ilimo*, Papua, *starka*, Manokwari.

## 2. TETRAMELES

R. BROWN, in Observ. Pl. DENHAM & CLAPPERTON (1826) 230, app. 25, *nomen seminudum*; & BENN. Pl. Jav. Rar. (1838) 79, t. 17; GILG, Pfl. Fam. ed. 2, 21 (1925) 545.—Fig. 4-6.

Deciduous, buttressed tree. Leaf scars prominent, conspicuous. *Leaves* roundish, acuminate, entire or dentate, undersurface densely hairy by bulbous-based simple hairs, upper surface subglabrous or sparsely set with simple hairs. *Flowers* of both sexes subsessile or shortly pedicelled, in fasciculate apical, peduncled, pendent, simple or little branched spikes (♀) or panicles (♂) with tomentose rhachis on the apex of thick defoliate twigs, solitary or in twos or threes, 4-(♂) or 4-5-merous (♀).—♂ *Flowers*: calyx tube short, lobes oblong to ovate, equal, or unequal, sometimes alternating with a few occasional smaller, narrower appendages in structure similar to the calyx lobes. Petals 0. Stamens 4, opposite the sepals, inserted on the margin of the cup-shaped receptacle. Filaments short or rather long, anthers incurved in bud, 2-celled, extrors ± basifix, at last seemingly peltate. Rudimentary ovary disk-shaped, cross-like, or 0.—♀ *Flowers*: lower part of the calyx connate with the ovary, slightly 4-angular, glandular, and mostly hairy, upper part cupular, with 4 triangular lobes. Petals and androecium 0. Styles 4-5, erect, opposite the calyx lobes, inserted on the margin of the calyx throat, thickish, persistent, with an obliquely inserted, unilaterally stigmatic, thickened apex. Ovary with 4-5 parietal placentas alternating with the styles. Ovules in several rows. Flat top of the *capsule* splitting before the styles, the thus formed 4 triangular valves marcescent and curving inwards, leaving a roundish apical pore. Seeds narrow-oblong, slightly flattened.

Distr. Monotypic, SE. Asia through *Malaysia* to New Guinea. Fig. 6.

Ecol. Regions with a more or less well pronounced dry season at low altitude.

Uses. See under the *sp.*

1. *Tetrameles nudiflora* R. BROWN, in BENN. Pl. Jav. Rar. (1838) 79, t. 17; BEDD. Fl. Sylv. 2 (1869) t. 212; CLARKE, in HOOK. f. Fl. Br. Ind. 2 (1879) 657; KOORD. & VAL. Bijdr. Booms. Java 9 (1903) 37; Atlas 1 (1913) t. 71; RIDL. Fl. Mal. Pen. 1 (1922) 864, f. 71; GILG. l.c.; KOOPMAN & VERHOEF. Tect. 31 (1938) 785-789, f. 4-5; MERR.

& PERRY, J. Arn. Arb. 23 (1942) 407.—*T. horsfieldii* STEUD. Nomencl. ed. 2, 2 (1841) 671, *nomen*; TEYSM. Nat. Tijd. N.I. 11 (1856) 195.—*T. grahamiana* WIGHT, l.c. (1853) t. 1956.—Fig. 4-6.

Large tree, 25-45 m, stem diam. up to 2 m; clear bole long, columnar, 20-35 m, often deeply



Fig. 4. *Tetrameles nudiflora* R.Br. a. Twig with young foliage,  $\times \frac{2}{3}$ —♂: b. inflorescence,  $\times \frac{2}{3}$ , c. flower,  $\times 4$ ,—♀: d. inflorescence,  $\times \frac{2}{3}$ , e. flower,  $\times 4$ , f. style,  $\times 14$ , g. fruit, calyx tube with many small, globular and 2 large, flat glands,  $\times 4$ . (Partly after R. BROWN, ♂ after BRASS 8240, ♀ after KOORDERS 1578, fruit after bb 6043).

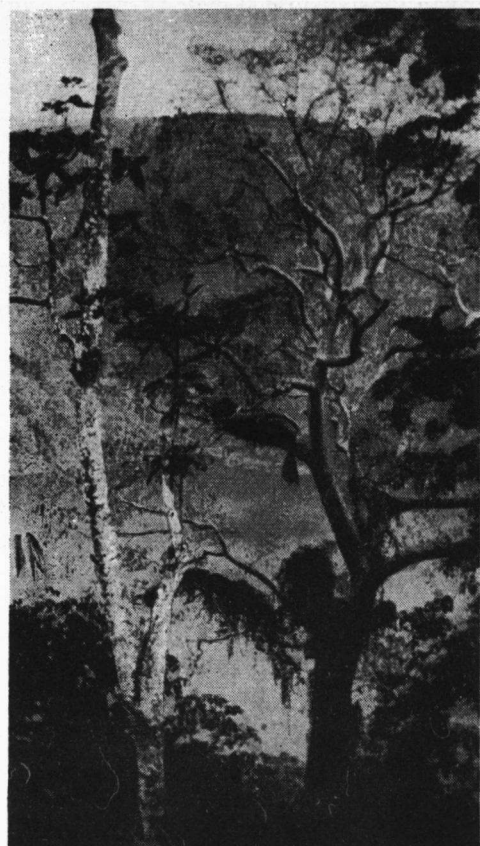


Fig. 5. Flowering leafless specimen of *Tetrameles nudiflora* R.Br. on slope along the Lake of Bedali (E. Java) with characteristic gnarled main branches (RUTTNER).

fluted, main branches thick, gnarled, rather irregularly placed, little branched, crown thin; buttresses to 5 by 4 m, thin; bark 5–25 mm diam., grey, smooth, dirty-orange yellow in section, white striped; large spreading surface roots (BRASS). Leaf scars  $\frac{1}{2}$ – $\frac{3}{4}$  cm diam.. *Leaves* broadly cordate-ovate or rounded, acute to acuminate, coarsely dentate to nearly entire, 3–7-nerved, upper surface  $\pm$  glabrous, lower surface hairy in various degree specially on nerves and veins; tertiary venation crossbar-like; blade 10–26 by 9–20 cm. Petiole terete, 3–7(–20) cm. —♂ *Flowers* slightly fragrant in 10–20 cm long panicles. Bracts spatulate, hairy, ca 1 mm long. Pedicels glabrous, subsessile, to 1 mm. Calyx  $1\frac{1}{2}$ –2 mm high, deeply 4-lobed, basal part cup-shaped,  $\frac{1}{2}$  mm high; lobes oblong, blunt, with 3 separate lengthwise nerves, entire or 1–2-toothed. Filaments  $\frac{1}{2}$ – $\frac{3}{2}$  mm, terete, thinner towards the apex, anthers rounded ca  $\frac{1}{2}$  mm.—

♀ *Flowers* sessile,  $3\frac{1}{2}$ –5 mm long, in spikes or panicles 8–20 cm long. Calyx sparsely hairy to subglabrous, tube  $2\frac{1}{2}$ – $3\frac{1}{2}$  mm, fusiform, sometimes provided with a few  $\frac{1}{4}$ – $\frac{1}{2}$  mm diam. disk-shaped, sessile, peltate, glands (bb. 6043 from Muna Isl.). Calyx lobes triangular, acutish, 3-nerved,  $\frac{1}{2}$ –1 mm long. Styles 4 or nor rarely 5, 1– $2\frac{1}{2}$  mm, with a central groove on the inner surface, erect or spreading, stigmatic inner side often occupying half their length. *Capsule* globular-urceolate, 4–5 mm high, prominently 8–10-nerved. Seeds ca 1 mm long.

Distr. Ceylon, Andamans, and SE. Asia, in *Malaysia*: not yet found in Banka, Billiton, Borneo, the Philippines, and the Moluccas. Fig. 6.

Ecol. Restricted to regions with a more or less well pronounced dry season (which accounts for its absence in the everwet areas of West Malaysia), predominantly in deciduous forests, common in teak forest, not social, on dry soils, not fire-resistant, up to ca 500–(1000) m. *Fl.* fr. Sept.–Dec. (in the Mal. Pen. fl. Febr.). Flush and flowers appear at the beginning of the wet season.

Vern. Sumatra: *pèrlak*, Gajo, *kalimèhmèh*, Karo, *kaju tabu*, *kundur*, S. Sum., *binong*, S, *bèdèrèk*, *winong*, *kapasan ganggangan*, *munung*, J, *bindung*, Md, *bindung*, Kangean, *linong*, W. Lombok, *kotera*, W. Sumba, *manuang*, Alor, *bonak*, Timor, *palumba*, *maramindi*, Malili, *wonolita*, Muna, *bolaang*, *itam*, *kola kola*, Minah., *bulangita*, Gorontalo, *andan boëmari*, Papua.

Uses. Timber, though to be had in large dimensions, is of an inferior quality; it is suitable for temporary buildings, wooden boxes (and matches?) and specially for canoes. Wood light brown-grey; heartwood is not present.

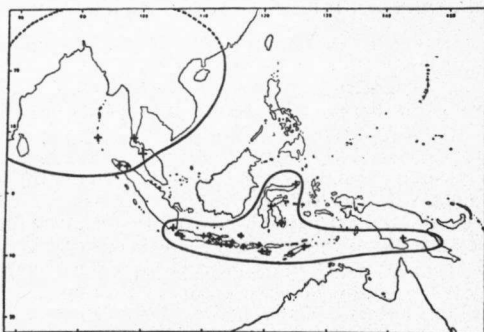


Fig. 6. Distribution of *Tetrameles nudiflora* R.Br. with localized Malaysian localities.

#### Excluded

*Tetrameles rufinervis* Miq. Fl. Ind. Bat. 1, 1 (1856) 726; Pl. Jungh. part 4 (1857) 401, is a *nomen confusum*; the type consists of leaves of *Alangium rotundifolium* (HASSK.) BLOEMB. and flowers of an entirely different plant. Cf. HALLIER f. Med. Rijks-herb. no 1 (1910) 12; 37 (1918) 5; BLOEMBERGEN, Bull. Jard. Bot. Botz. III, 16 (1939) 180, 181, 183.