

## A REVISION OF OMALANTHUS (EUPHORBIACEAE) IN MALESIA

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### SUMMARY

*Omalanthus* is revised for Malesia and the Solomon Islands. For this region, 13 species without subspecific taxa are accepted, namely *O. arfakiensis*, *O. caloneurus*, *O. fastuosus*, *O. giganteus*, *O. grandifolius*, *O. longistylus*, *O. macradenius*, *O. nervosus*, *O. novoguineensis*, *O. populifolius*, *O. populneus*, and *O. trivalvis*, and, as a new species, *O. remotus*. In addition to established synonyms, 17 species from Malesia are not accepted any more. The diagnostic importance of a peltate or non-peltate leaf base is especially doubted. Although detailed phylogenetic and biogeographical analyses were not made, the value of the established sections of *Omalanthus* is questioned. An alternative subdivision unites all Malesian taxa into four subgroups, each with a distinct distribution of probably historic causes. The subgroups are distributed in W and C Malesia, the Lesser Sunda Islands, the Philippines and the Bismarck Archipelago, and New Guinea and Australia, respectively. The radiation in montane and subalpine habitats may also have contributed to the actual diversity. In addition, *O. gracilis* from French Polynesia is proposed to be a synonym of *O. stokesii*.

### INTRODUCTION

*Omalanthus* was first mentioned as *Duania* by Noronha (1790), then as *Carumbium* by Reinwardt (1823) and finally as *Omalanthus* by De Jussieu (1824). Neither *Duania* nor *Carumbium* were accompanied by diagnostic information and, therefore, not validly published. *Carumbium* was validated later by Reinwardt (1825) through a detailed description, but this had been preceded by De Jussieu (1824). Some 19th century authors used the name *Carumbium* for the genus, e.g., Miquel (1859) and Müller (1866), but Bentham (1878) argued against its use in some detail. Van Steenis (1959) considered *Carumbium* as a nomen semi-nudum, which should not be used for priority (see note 2 under *Omalanthus populneus*).

The name *Omalanthus* is based on the greek words *homalos* (= equal, level) and *anthos* (= flower). It was corrected into *Homalanthus* by Reichenbach (1828), but he was not followed consistently. Since then both spellings have been in use. Therefore, an official decision is necessary, and a proposal for conservation of the spelling of *Homalanthus* has recently been published (Esser, 1996). For historical reasons, *Omalanthus* has priority, and is used throughout this revision.

The first species had been described by Geiseler (1807) as *Stillingia populnea*. It was transferred to *Omalanthus* only by Pax (1890), having been overlooked by De Jussieu (1824). De Jussieu mentioned only two unpublished nameless species when

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describing the genus. In the legend of his figure, however, *O. leschenaultianus* is cited, which, therefore, is the only published name and considered now as the type of the genus (e.g., Webster, 1994).

When the first species with peltate leaves, *O. fastuosus* (Linden) Fern.-Vill., became known, it was described separately as a new genus, *Dibrachion* Regel (1866), but a few months later it was united with *Omalanthus* by Müller (1866, as '*Carumbium*').

In the 19th century, several Australian and Polynesian species of *Omalanthus* were described, but the number of known Malesian taxa increased only slowly. Müller (1866), in the first revision of the genus, included only three Malesian species. This changed drastically at the turn of the century. Pax & Hoffmann (1912) in the second and latest revision of the genus recognized 11 Malesian species. Several additional ones were described, e.g., by Gage (1917), and later on particularly by Airy Shaw (1968, 1980a). The cited publications of Airy Shaw also are the most important recent contributions to the systematics of Malesian *Omalanthus*.

Because the species of the Solomon Islands are partly identical to those of Malesia but completely different from those further east, it was decided to include also the Solomon Islands in this revision, which, therefore, covers not only Malesia but the region formerly known as Papuaasia. Up to the present, 40 species and several infraspecific taxa of *Omalanthus* have been described or cited for this region. The Philippine taxa, not treated by Airy Shaw, were especially in need of revision. In the present publication the number of Philippine species is reduced from 9 to 3; *O. alpinus* Elmer, *O. bicolor* Merr., *O. concolor* Merr., *O. megaphyllus* Merr., *O. milvus* Airy Shaw and *O. rotundifolius* Merr. are not accepted. Also outside of the Philippines new synonyms are proposed: *O. beguinii* J.J. Sm., *O. pachystylus* Airy Shaw, *O. tetrandrus* J.J. Sm. [all synonym with *O. novoguineensis* (Warb.) K. Schum.], *O. deltoideus* Airy Shaw and *O. vernicosus* Gage (united with *O. nervosus* J.J. Sm.), *O. goodenoviensis* Airy Shaw (only a form of *O. populifolius* Graham), *O. minutiflorus* Airy Shaw (very similar to *O. arfakiensis* Hutch.), *O. niveus* Pax & K. Hoffm. (synonym with *O. giganteus* Zoll. & Moritzi), *O. papuanus* Pax & K. Hoffm. (identical with *O. longistylus* Lauterb. & K. Schum.), *O. sulawesianus* Airy Shaw [not distinct from *O. populneus* (Geiseler) Pax], and *O. xerocarpus* Airy Shaw (identical with *O. trivalvis* Airy Shaw). One species, *O. polyadenius* Pax & K. Hoffm., could not be interpreted sufficiently. Finally, 12 species and no infraspecific taxa are retained, and one species (*O. remotus*) is described as new.

The sections proposed by Pax & Hoffmann (1912) are not accepted. Although some supposedly natural species groups are recognized, no formal supraspecific categories are established, as only part of the genus is revised here.

The relationships of *Omalanthus* are not elaborated here. However, in another, forthcoming paper (Esser et al., in press) the obviously isolated position of the genus in the tribe *Hippomaneae* A. Juss. ex Bartl. will be corroborated.

#### CHARACTERS

*Growth and architecture* — All species of *Omalanthus* are trees. They have in common a sympodial elongation of side branches, resulting in a pseudovercillate branch-

ing pattern and a rhythmic growth. The leaves may be somewhat crowded apically, but are alternate on ultimate twigs.

*Indumentum* — Most species are glabrous except on the stamens which are minutely papillate in all taxa. Some species, however, may develop an indumentum on leaves and younger parts. The hairs are multicellular, uniseriate, and coloured. Contrary to most other *Hippomaneae*, their occurrence is not typical for any species, and ecological correlations are not known.

*Stipules* — The stipules are very characteristic for *Omalanthus*, but do not distinguish species. They are remarkably large, cover young vegetative and generative buds, and may be terminal or subterminal. They are quite uniform in shape and morphology, elliptic, with distinct parallel venation and without glands, though their absolute size is very variable within species.

*Leaves* — The leaves also are typical for the genus, at least within the *Hippomaneae*. They resemble those of poplars, a form which is uncommon in tropical forests. With few exceptions most Malesian species have very similar foliage, even in quantitative characters, including the comparatively long petiole, lamina size and proportion, texture, the entire margin without marginal glands, the number and details of veins, the whitish undersurface, and, partly, the glands. Many species, however, differ in the details of leaf glands. Most species have submarginal-laminar nectaries on the lower surface of the leaves. In addition, some taxa may show a pair of abaxially-petiole, one or two adaxial basilaminar-petiole, or basally enlarged laminar glands. These features are usually very constant and characterize species groups. In one species, *O. caloneurus*, the laminar glands are found very close to the midrib.

One character used very often in the past is the peltate versus non-peltate leaf base. In *O. giganteus* this has usually been considered as variable, but other taxa were delimited by peltate (e.g., *O. fastuosus*) or non-peltate (e.g., *O. populneus*) leaves. During the study of a large amount of specimens it was concluded that this often is a variable character. Only one species, *O. macradenius*, has constantly peltate leaves. In many others, however, variation was found within specimens (*O. fastuosus*, *O. giganteus*, *O. novoguineensis*), or peltate and non-peltate leaves were the only difference between otherwise identical plants (*O. grandifolius*, *O. longistylus*). Repeatedly it has been mentioned that young leaves may be larger and more distinctly peltate than older ones (e.g., *O. giganteus*: Van Steenis, 1972). Nevertheless, some species never have a peltate leaf base (e.g., *O. populneus*), and genetical differences may exist.

From *Triadica sebifera* (L.) Small with superficially very similar foliage, *Omalanthus* species are distinguishable in particular by the percurrent tertiary leaf venation.

*Inflorescences* — The inflorescences are elongate thyrses, never branched but in most species very variable in length. Although sometimes only one sex is found on single specimens, quite often so in *O. novoguineensis*, all species of *Omalanthus* are monoecious. Like in other genera of *Hippomaneae* (Esser, 1994), there may be a temporal change of sex. In each thyrses there are few to several pistillate flowers at the base, and apically numerous staminate flowers. The sexes are rarely mixed.

Inflorescence buds of *O. giganteus* differ from those of other species. They are stiff, with densely packed bracts, and are found quite often on herbarium specimens (otherwise weak and quite rare).

The bracts of pistillate flowers are caducous, those of staminate cymules persistent. They are always glandular, the morphology and relative size of the glands being very constant and providing systematically useful characters: *O. novoguineensis* develops cup-shaped and multiple glands, *O. nervosus* conspicuously shiny ones; the glands may be very long (e.g., *O. fastuosus*) or very short (e.g., *O. populifolius*) compared to the accompanying bract. Bracteoles are usually absent.

*Flowers* — All flowers are distinctly pedicellate. The calyx of both sexes is very remarkable, bilaterally symmetric, and consists of usually two free lobes in Malesian taxa. The homology of these lobes with sepals still has to be proven. It may also be true that the lobes originate from a totally fused calyx split secondarily. The lobes are usually glandless, but may be glandulous in the pistillate flowers of several species.

The staminate cymules are basically 3-flowered in all Malesian species. Deviations from this number on single plants are found but rare. Staminate flowers usually show a distinct pedicel of quite constant length, articulate near its base, a bilobate calyx and 6–8(–10) stamens in the central flower of the cymule. A slight variation in stamen number is not uncommon. Two Malesian species, *O. giganteus* and *O. macradenius* (and several extra-Malesian taxa) differ in the possession of only one, inclinate calyx lobe and a considerably higher, very variable stamen number.

The pistillate flowers are bilocular in all Malesian species. *Omalanthus trivalvis* (from the Solomon Islands) and several taxa from the Pacific Islands differ in their trilocular ovaries. With very few exceptions, a dense, papillate indumentum covers ovaries and fruits and may be a generic character for *Omalanthus*.

A short style is present. Contrary to other related genera, it does not elongate significantly after fertilization. The two stigmata are very characteristic for the genus, and also distinguish species. They are glandular, which is a unique character in the *Hippomaneae*. The length of the glands varies rarely within, but often between species. *Omalanthus populneus* is easily recognizable by large glands along the whole stigma length. In few Malesian species (*O. novoguineensis*, *O. populifolius*), these glands are very small to irregularly absent, but only in *O. arfakiensis* often completely lacking. In few species, the stigmata may be often (*O. giganteus*) to irregularly (*O. populneus*) emarginate to divided. It is not a constant feature of *Omalanthus*, but is unique in the *Hippomaneae*.

*Fruits and seeds* — In most species, the fruits develop a woody albeit thin and weak pericarp. They open loculicidally, usually not along the septa. This is different from most related genera. Sometimes they are shed unopened (e.g., *O. giganteus*). The remaining, slightly alate columella does not exhibit peculiarities. However, few species are easily recognizable by characters of their fruits: early caducous styles in *O. macradenius*, a thick and massive pericarp in *O. longistylus* and *O. trivalvis*, or a peculiar shape in *O. giganteus* (clavate) and *O. fastuosus* (dorsal hooks).

The seeds are very similar in all species. They are reddish-brownish and irregularly foveolate. They are covered partly to totally by a membranaceous, pale to whitish

arillode which was analyzed in detail by Baillon (1867). Arillode size may distinguish species, but is difficult to study in herbarium specimens.

#### SUBDIVISION AND PHYLOGENY

*Omalanthus* is a well-defined genus. Probable autapomorphies (valid for Malesia, but not verified for all of its species) are, in particular, the peculiar stipules, the papillate ovaries, stigmatic glands, bilateral calyces, loculicidal fruit dehiscence, seed cover and shape. The bilateral flower symmetry, however, is also known from *Pimelodendron* Hassk. and could either be a parallel development, or a synapomorphy for both genera.

The position of *Omalanthus* in the subfamily *Euphorbioideae* is corroborated by, e.g., its white and usually harmful latex. Its placement in the tribe *Hippomaneae* is supported by the biglandular floral bracts, initially covering the inclinate flowers (Esser, 1994), and the pollen (Punt, 1962). Within this tribe, *Omalanthus* is isolated especially by its bilateral flowers. Therefore, it was in the past included into its own subtribe, the *Carumbiinae* (Webster, 1994). In a forthcoming publication (Esser et al., in prep.), this will be checked.

A thorough phylogenetic analysis of *Omalanthus* is hindered by the fact that only the Malesian species are treated here. Some patterns, nevertheless, are recognizable.

Four sections within *Omalanthus* have been established in the past. Two of them [*Ebracteati* (Guillaumin) Airy Shaw and *Wartmannia* (Müll. Arg.) Pax] each include only one extra-Malesian species, aberrant in single characters. They are not under discussion here; but as they only exclude single species and obviously leave the remaining taxa paraphyletic, they may not survive a phylogenetic classification of *Omalanthus*.

The other sections include Malesian taxa. The *Disepali* Pax, including the type, have to be named sect. *Omalanthus* (Airy Shaw, 1980b). They are predominantly Malesian. The *Monosepali* Pax comprise two Malesian species (*O. giganteus*, *O. macradenius*) and most of the Pacific ones. The sections are distinguished by staminate flowers with two calyx lobes and 6–10 stamens in two rows versus staminate flowers with one calyx lobe and at least 15 stamens not in distinct rows. The polarity of both characters, therefore the monophyly of the sections, is still uncertain, because all alternative character states are absent in all other Malesian *Hippomaneae*.

Different subdivisions are possible, e.g. by carpel number. All Malesian and Australian taxa of *Omalanthus* have bilocular ovaries. *Omalanthus trivalvis* (from the Solomon Islands) and all Pacific taxa form regularly trilocular or bi- to trilocular [*O. nutans* (G. Forst.) Guillemain] ovaries. Both character states are found in other Malesian genera of the *Hippomaneae*. Trilocular ovaries are probably plesiomorphic within the subfamily as well as within the tribe, as is true for the whole family, and deviating numbers of locules are usually correlated with specific dispersal mechanisms (Esser, unpublished). Malesian *Omalanthus*, therefore, may be monophyletic. But this has still to be proven.

Without an analysis of the whole genus it is not possible to decide which of the two conflicting subdivisions represents a common descent. Preliminarily, the established sections cited above are not accepted here.

There also are different ways of arranging the Malesian species into groups. The staminate flowers separate *O. giganteus* and *O. macradenius* (*Monosepali*) from the remaining taxa. Based on characters of the leaf glands, however, four different species groups are found. The leaves may bear a large, undivided or divided, disc-shaped gland adaxially on the junction of lamina base and petiole and no abaxial-petiolar glands (*O. arfakiensis*, *O. nervosus*, *O. novoguineensis*, *O. populifolius*, *O. remotus*). They may show a pair of disc-shaped or enlarged, abaxial-lateral petiolar glands and no adaxial glands (*O. fastuosus*, *O. longistylus*, *O. macradenius*, *O. trivalvis*). In one species, *O. giganteus*, the abaxial- to lateral-petiolar glands are very often multiple, forming a glomerule of glands; this species is additionally separated by peculiarities of floral bud, stigma and fruit, described above. Finally, 3 species of *Omalanthus* (*O. caloneurus*, *O. grandifolius*, *O. populneus*) exhibit adaxially glandless leaves with petioles glandless or, in *O. caloneurus*, with a pair of petiolar glands very variable in position but mostly adaxially. These groups agree with biogeographical patterns (see below).

#### BIOGEOGRAPHY AND ECOLOGY

Malesian *Omalanthus* species are characteristically found in secondary forests where they occasionally dominate the vegetation. Some are restricted to montane or subalpine forests (e.g., *O. nervosus*), others occur also at low altitudes but are less common there (e.g., *O. novoguineensis*). *Omalanthus*, therefore, fills in some respect the ecological niche taken by *Macaranga* in lowland environments. Although special adaptations like hollow stems are absent, *Omalanthus* species are ant-plants similar to *Macaranga*. Detailed studies of, e.g., Mackay & Whalen (1991) showed a remarkably low grazing density and leaf damage on *O. novoguineensis* and *O. populifolius*, correlated with ant attraction by the foliar nectaries.

Only *O. giganteus* is cited as being deciduous (Smith, 1910). The other species are probably evergreen.

The flowers seem to be pollinated by various insects, as is common in the Euphorbiaceae. They differ from all other Malesian genera of the tribe by the large number of stamens per flower, which may point to a slightly different pollinator spectrum.

The fruits (reddish seeds with arillode) show adaptations to zoochory. Zoochory is common in trees of secondary forests and may be responsible for the often high abundance of *Omalanthus* species.

*Omalanthus* occurs in all parts of Malesia. The W and N borders of its distribution coincide with the biogeographical borders of Malesia. To the south, the Malesian species are widespread beyond the border of Malesia. *Omalanthus* extends E of Malesia with a separate group of species.

Within Malesia, several distribution patterns may be distinguished. In W Malesia, there is one widespread species (*O. populneus*) and there are two local endemics (*O. caloneurus*, *O. grandifolius*). In C and E Malesia, most species are quite widespread, only *O. remotus* is a restricted endemic. Most species are restricted to higher altitudes. Compared with the other Malesian genera of *Hippomaneae* (species-poor and restricted to lowland forests) it may be postulated that the relative species richness of *Omalanthus* is correlated to montane environments and, therefore, ecology.

The separation of species by unilobed against bilobed calyces does not result in biogeographically separated groups. If species, however, are separated by the carpel number and leaf gland characters, as discussed above, we achieve species groups inhabiting different biogeographical areas.

All bicarpellate taxa are Malesian (excl. Solomon Islands), all tricarpellate ones are non-Malesian. Within Malesia, all species with glands on the adaxial lamina base are endemic to New Guinea, parts of the Moluccas, the eastern part of the Lesser Sunda Islands, and Australia. All Malesian taxa with abaxial-lateral petiolar glands are restricted to the Philippines, the Bismarck Archipelago, the Sattelberg region of New Guinea, and the Solomon Islands. The peculiar and somewhat isolated *O. giganteus* is endemic to E Java and the western Lesser Sunda Islands. Finally, the taxa lacking petiolar and prominent adaxial-laminar glands are found only in W and C Malesia.

## OMALANTHUS

- Omalanthus* A. Juss., Euphorb. Gen. (1824) 50, t. 16 f. 53; Blume, Bijdr. 12 (1826) 627; Endl., Gen. Pl. (1840) 1110; Baillon, Étude Euphorb. (1858) 537, Atlas pl. 8, f. 22–31; Kuntze, Revis. Gen. Pl. 2 (1891) 609; G.L. Webster, Taxon 24 (1975) 600; St. John, Nord. J. Bot. 4 (1984) 53; G.L. Webster, Ann. Missouri Bot. Gard. 81 (1994) 120. — *Homalanthus* Rchb., Consp. Regn. Veg. (1828) 194; Hassk., Cat. Hort. Bot. Bogor. (1844) 233; Benth., J. Linn. Soc., Bot. 17 (1878) 194, 240; in Benth. & Hook. f., Gen. Pl. 3, 1 (1880) 331; Pax in Engl. & Prantl, Nat. Pflanzenfam. 3, 5 (1890) 95; J.J. Sm. in Koord. & Valetton, Bijdr. Boomsoort. Java 12 (1910) 619; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, v (1912) 42; in Engl. & Harms, Nat. Pflanzenfam. ed. 2, 19c (1931) 188; Chittenden, Dict. Gard. 2 (1951) 1006; Airy Shaw, Kew Bull. Add. Ser. 8 (1980) 115; Huxley, New R.H.S. Dict. Gard. 2 (1992) 578. — *Homalanthus* sect. *Euhomalanthus* Kuntze in T. Post & Kuntze, Lex. Gen. Phan. (1903) 285, nom. inval. — Type: *Omalanthus leschenaultianus* A. Juss. [= *Omalanthus populneus* (Geiseler) Pax].
- Duania* Noronha, Verh. Batav. Genootsch. Kunst Wet. ed. 1, 5 (1790) 2, nomen; ed. 2 (1827) 65, nomen.
- Carumbium* Reinw., Elench. Sem. Hort. Leiden ex Isis 1 (1823) 319, nomen; in Blume, Cat. Pl. Bogor. (1823) 105, nomen; Syll. Pl. Nov. 2 (1825) 6; Baillon, Adansonia 6 (1867) 348; Benth., Fl. Austr. 6 (1873) 149. — *Carumbium* sect. *Eucarumbium* Müll. Arg. in DC., Prodr. 15, 2 (1866) 1143, nom. inval. — Type: *Carumbium populifolium* Reinw. [= *Omalanthus populneus* (Geiseler) Pax].
- Dibrachion* Regel, Index Sem. Hortus Bot. Petropol. 1865 (1866) 51, nomen illeg., see note 1; Gartenflora 15 (1866) 100, pl. 504. — Type: *Dibrachion peltatum* Regel [= *Omalanthus fastuosus* (Linden) Fern.-Vill.].

Trees, with pseudoverticillate branching. Monoecious. *Bark* without spines, nearly smooth. *Latex* in all parts, white, sticky. *Wood* white to straw, soft. *Indumentum* consisting of uniseriate, multicellular, pale to brownish hairs, but absent in most species. *Stipules* remarkably large (0.5–12 cm long), cuneate at base, margin entire, truncate to acute at apex, with distinct parallel venation, enclosing buds of leaves and inflorescences, usually present on youngest shoots but absent on older ones. *Leaves* alternate, simple; petiole present and shorter to or nearly as long as lamina, adaxially canaliculate, glandless or apically with 1 or 2 adaxial glands, 2 abaxial glands or a cluster of glands surrounding the apex; lamina symmetric, base cuneate to emarginate, not to distinctly peltate, very base often attenuate, margin entire (outside of Malesia rarely remotely crenate), flat, glandless, apex rounded to cuspidate, lower surface

usually whitish, sometimes only between veins, sometimes on nearly the whole surface, side veins in 8–15 pairs below the apex, looped, basal one not different, tertiary veins always distinct, numerous, percurrent to (rarely) reticulate, quarternary veins distinct to indistinct, reticulate to percurrent, adaxially glandless or with glandular margin at base or with 1 or 2 cup- to disc-shaped, prominent glands near the junction with the petiole, abaxial glands present in all species, absent only on single specimens, in 1 or 2 submarginal to laminar rows close to the margin (then near side veins in axils of divisions) or close to midrib, basal pair often distinctly enlarged and remote from touching petiole or even on abaxial apex of petiole. *Inflorescences* thyrzal, with an unbranched axis (not compound), bisexual, on single specimens sometimes only with one sex, with spirally arranged bracts, basal ones with a pistillate or, rarely, with a pistillate and few staminate flowers, distal ones with cymules of staminate flowers. *Bracts of staminate cymules* persistent, triangular to ovate, margin  $\pm$  entire, apex acute to truncate, at marginal base with one to several pairs of glands, this pair sometime situated even dorsally or on the thyrzal axis. *Staminate flowers* 1–3(–8) per cymule, inclinate in bud, free, yellowish, pedicel present, articulate; calyx large, persistent, bilateral to inclinate, consisting of 1 or 2 kidney-shaped, entire, free lobes; corolla, disc, and nectaries absent; stamens 4–c. 30 per flower, free, usually covered with dense papillae, filaments present, nearly as long as anthers, hardly elongating at anthesis, anthers dorsifix, opening latro-extorsely with longitudinal slits, connective present; pistillode absent. *Pistillate flowers* inclinate in bud; bract caducous, similar to but larger than that of staminate cymules; pedicel present, not articulate, elongating in fruit; calyx persistent to caducous, consisting of 1–3 kidney-shaped, entire, free lobes, apex obtuse to truncate, glandless or with basimarginal glands; corolla, disc, and staminodes absent; ovary 2- or 3-locular, without excrescences, mostly papillate to puberulous, each locule with 1 anatropous ovule, style very short to distinct, persistent (early caducous only in *O. macradenius*), stigma longer than wide, usually recurved, undivided or divided apically to over its whole length, in all species with an apical to subapical gland beneath (in few species often absent). *Fruit* a woody schizocarp, 2- or 3-seeded, sometimes with only 1 seed developed and then with lateral style, opening primarily loculicidally, pericarp thick and then opening regularly, or pericarp thin and then opening tardily to irregularly; remaining columella slightly alate. *Seeds* basically elliptic but usually irregularly foveolate and often flattened, testa reddish to brownish, smooth, not shining, only apically or over its whole length covered by pale to whitish, membranaceous arillode.

*Distribution* — About 22 species, from the Pacific Islands to New Caledonia, Australia, and throughout Malesia, also including the southern border of Thailand and Orchid Island of Taiwan. Most Malesian species are endemic; only two (*O. novoguineensis*, *O. populifolius*) are also distributed in Australia (both) and New Zealand (*O. populifolius*). Additionally, *O. populifolius* is often planted in botanical gardens; the occurrence in Sri Lanka probably also originates from naturalized bed plants.

*Notes* — 1. The name *Dibrachion* is a later homonym of *Dibrachion* Tulasne, a legume genus described in 1843.

2. In the following, the different spellings of *Omalanthus* vs. *Homalanthus* are not mentioned any more. The usage by different authors may be inferred from the heading of the genus.

KEY TO THE MALESIAN SPECIES  
(using leaves and staminate inflorescences)

- 1a. Leafblade whitish beneath with abaxially very distinct, completely visible venation; abaxial laminar glands close to midvein. Petiolar glands present, lateral to adaxial. — Borneo ..... **2. *O. caloneurus***
- b. Leafblade whitish beneath or not, with either abaxially completely visible venation or only larger veins distinct; abaxial laminar glands, if present, between midvein and margin or closer to margin. Petiolar glands absent or lateral to abaxial (rarely partially adaxial in *O. giganteus*) ..... 2
- 2a. Leaves with abaxial to lateral petiolar glands ..... 3
- b. Leaves without abaxial to lateral petiolar glands ..... 7
- 3a. Staminate flowers 1 per bract, with one calyx lobe and (6–)12–30 stamens. Petiolar glands sometimes irregularly enlarged or multiple ..... 4
- b. Staminate flowers 1–8 per bract, with two calyx lobes and 6–10(–12) stamens. Petiolar glands always in one pair and regularly disc-shaped ..... 5
- 4a. Bract glands 0.25–0.75 mm long, distinctly shorter than the bract. Leaves apically mucronate to acuminate, often yellowish villose at base. Petiolar glands not enlarged but often in several pairs ..... **4. *O. giganteus***
- b. Bract glands 1–1.5 mm long, completely covering the bract. Leaves apically rounded to acute to mucronate, always glabrous. Petiolar glands often enlarged and irregularly foliaceous ..... **7. *O. macradenius***
- 5a. Bract glands 1–2 mm long, nearly as long as bract. — Philippines ..... **3. *O. fastuosus***
- b. Bract glands 0.5–1.25 mm long, distinctly shorter than bract. — New Guinea, Solomon Islands ..... 6
- 6a. Staminate flowers (1–)3 per bract, with 6–8(–10) stamens. — New Guinea .. **6. *O. longistylus***
- b. Staminate flowers 1 per bract, with (6–)9–12 stamens. — Solomon Islands .. **13. *O. trivalvis***
- 7a. Leaves on upper side with one (or two) prominent, cup- to disc-shaped glands at junction lamina base/petiole apex (glandless when peltate) ..... 8
- b. Leaves on upper side at junction lamina base/petiole apex without a prominent gland, sometimes with inconspicuous glandular tissue or 2 small glands .. 14
- 8a. Bract glands elevated by peduncle, not touching rachis ..... **12. *O. remotus***
- b. Bract glands not elevated, touching rachis ..... 9
- 9a. Bract glands multiple, divided into several pairs ..... 10
- b. Bract glands simple, only in one pair ..... 11
- 10a. Bract glands in 1–3 pairs, each gland pillow-shaped and uniformly glaucous-papillate. Plant glabrous ..... **10. *O. populifolius***
- b. Bract glands in many, at least (3 or) 4 pairs, each gland cup-shaped with shiny centre and paler, glaucous-papillate, often elevated margin. Plant glabrous or puberulous ..... **9. *O. novoguineensis***
- 11a. Leafblade narrowly elliptic, index 1.8–2.5(–4.6) ..... 12
- b. Leafblade orbiculate to elliptic, index 1.1–1.8 ..... 13

- 12a. Leafblade distinctly whitish beneath, usually with reticulate tertiary veins and without conspicuous basilaminar glands . . . . . **1. O. arfakiensis**  
 b. Leafblade usually not whitish but shiny beneath, with percurrent tertiary veins and with conspicuous, 0.75–3 mm long, basilaminar glands . . . . . **8. O. nervosus**
- 13a. Leafblade distinctly whitish beneath, with small or without basilaminar glands. Bract glands only 0.25(–0.6) mm long, glaucous-papillate, often absent on some bracts . . . . . **10. O. populifolius**  
 b. Leafblade usually not whitish but shiny beneath, with conspicuous, 0.75–3 mm long, basilaminar glands. Bract glands 0.6–1 mm long, shiny, present on all bracts . . . . . **8. O. nervosus**
- 14a. Leafblade narrowly elliptic (index 1.8–4.6), not peltate, with usually reticulate tertiary venation, without conspicuous abaxial, basilaminar glands. Staminate cymules 1(–3)-flowered. Bract glands 0.2–0.25(–0.5) mm long, distinctly (at least 0.5 mm) overtopped by their bracts . . . . . **1. O. arfakiensis**  
 b. Leafblade orbiculate to narrowly elliptic (index 0.8–4.6), peltate or not, with percurrent tertiary venation, with or without conspicuous abaxial, basilaminar glands. Staminate cymules (1–)3-flowered. Bract glands 0.5–1.5 mm long, hardly (up to 0.3 mm) overtopped by their bracts . . . . . **15**
- 15a. Leafblade not peltate, with 1–3 pairs of abaxial, laminar glands. Usually in lowland, rarely above 1400 m altitude . . . . . **11. O. populneus**  
 b. Leafblade peltate or not, with 5–28 pairs of abaxial, laminar glands. Known only from above 1400 m altitude . . . . . **5. O. grandifolius**

## KEY TO THE MALESIAN SPECIES

(using leaves and fruits)

- 1a. Fruits regularly trilocular. — Solomon Islands . . . . . **13. O. trivalvis**  
 b. Fruits uni- to bilocular, rarely single ones trilocular . . . . . **2**
- 2a. Style and stigma very soon caducous, aborted at base and never found on ripe fruits. Fruits very small (3.5–4.5 mm long) and deeply sulcate. Leaves apically mucronate to acute to rounded; petiolar glands often enlarged to up to 6 mm long, irregular appendages, rarely regularly disc-shaped . . . . . **7. O. macradenius**  
 b. Style and stigma not very soon caducous, often found on ripe fruits. Fruits (3.5–)5–14 mm long, sulcate or not. Leaves apically mucronate to cuspidate; petiolar glands absent or regularly rounded, disc- or cup-shaped . . . . . **3**
- 3a. Stigma glandular over nearly its whole length, only up to 0.5 mm glandless. Leaves without conspicuous and prominent, adaxial or petiolar glands . . . . . **11. O. populneus**  
 b. Stigma not glandular over its whole length, more than 0.5 mm glandless. Leaves with or without conspicuous and prominent, adaxial or petiolar glands . . . . . **4**
- 4a. Stigma usually distinctly divided, often over its whole length (then apparently 4 per fruit), only rarely undivided. Fruit usually club-shaped with a 1–3 mm long, narrow base. Leaves with simple or multiple petiolar glands, often with distinct yellowish brown, villose indumentum . . . . . **4. O. giganteus**

- b. Stigma not or, rarely, only apically divided. Fruit elliptical to slightly obovoid in shape, without a conspicuous, narrow base. Leaves without or with simple petiolar glands, glabrous or hairy . . . . . 5
- 5a. Leaf blades with very distinct, abaxially completely visible venation, and abaxial laminar glands close to the midvein. — Borneo . . . . . **2. O. caloneurus**
  - b. Leaf blades with abaxially completely or, more often, only partially visible venation, and with laminar glands absent, between midvein and margin, or closer to the margin . . . . . 6
- 6a. Leaves adaxially with one or two elevated glands at junction blade/petiole . . . . . 7
  - b. Leaves adaxially glandless or with two inconspicuous, often diffuse glands . . . . . 11
- 7a. Stigmatic glands covering approximately half of the length of the stigma . . . . . 8
  - b. Stigmatic glands very short, covering less than a quarter of the length of the stigma, or absent . . . . . 9
- 8a. Leafblades abaxially usually not whitish, rarely whitish. Fruits 2–7 per infructescence . . . . . **8. O. nervosus**
  - b. Leafblades whitish beneath. One fruit per infructescence . . . . . **12. O. remotus**
- 9a. Leafblade narrowly elliptic, index 1.8–4.6. Stigma often widest at the base and continuously narrowing . . . . . **1. O. arfakiensis**
  - b. Leafblade narrowly or broadly elliptic, index 0.8–1.8. Stigma usually not conspicuously wider at base . . . . . 10
- 10a. Bract glands in 1–3 pairs, each gland pillow-shaped, uniformly glaucous-papillate without conspicuous margin. Fruits 1–4 per infructescence. Plant glabrous . . . . . **10. O. populifolius**
  - b. Bract glands in at least 4 pairs, each gland cup-shaped with shiny centre and thickened, glaucous-papillate margin. Fruits 2–30 per infructescence. Plant glabrous or puberulous . . . . . **9. O. novoguineensis**
- 11a. Leaves with large (1–2 mm long) glands on the abaxial lamina base close to the petiole, but without true petiolar glands. — W Malasia . . . . . **5. O. grandifolius**
  - b. Leaves with smaller (0.25–0.75 mm long) glands on the abaxial lamina base, with or without true petiolar glands . . . . . 12
- 12a. Leaves without abaxial-lateral petiolar glands . . . . . **1. O. arfakiensis**
  - b. Leaves with abaxial-lateral petiolar glands visible from beneath. — E and C Malasia . . . . . 13
- 13a. Fruits often with lateral hooks giving an obovoid shape; bracts totally covered by bract glands. — Philippines . . . . . **3. O. fastuosus**
  - b. Fruits orbicular in shape, without lateral hooks; the bracts distinctly longer than their glands. — New Guinea . . . . . **6. O. longistylus**

### 1. *Omalanthus arfakiensis* Hutch. — Map 1

*Omalanthus arfakiensis* Hutch. in Gibbs, Fl. Arfak Mts. (1917) 145; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, xvii, add. VII (1924) 198; Airy Shaw, Kew Bull. 21 (1968) 415; Kew Bull. Add. Ser. 8 (1980) 117; P. van Royen, Alpine Fl. New Guinea 3 (1982) 2179, f. 662. — Type: *Gibbs 5966* (BM holo; iso K), New Guinea, Irian Jaya, Arfak Mts, Anggi Lakes.

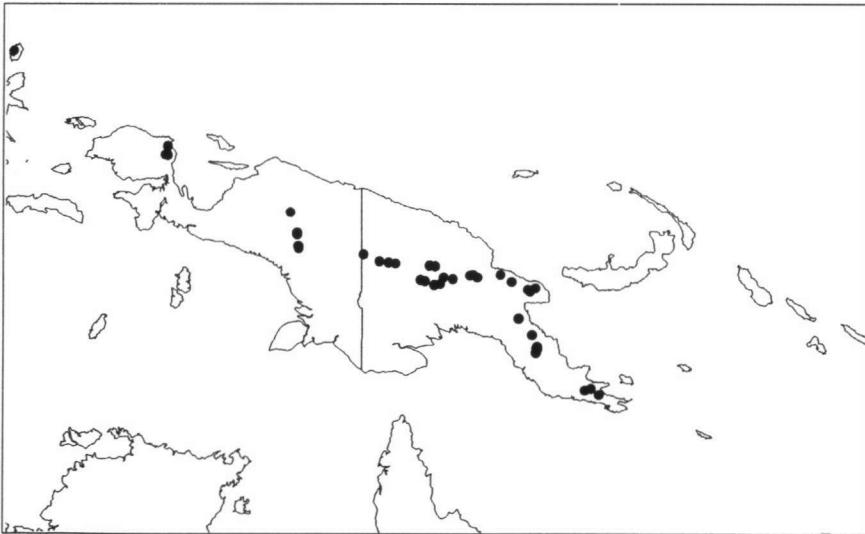
*Omalanthus collinus* Gage in Herderschee, Nova Guinea 12 (1917) 484; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, xvii, add. VII (1924) 199; Airy Shaw, Kew Bull. 21 (1968) 415; Kew Bull. Add. Ser. 8 (1980) 117. — Type: *Pulle 1013* (BO holo, n.v.; iso K, L, U), New Guinea, Irian Jaya, summit of Mt Wichmann.

*Omalanthus megalanthus* Gage in Herderschee, Nova Guinea 12 (1917) 482, t. 184; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, xvii, add. VII (1924) 199; Airy Shaw, Kew Bull. 21 (1968) 415; Kew Bull. Add. Ser. 8 (1980) 117. — Type: *Pulle 2409*, leg. Versteeg (BO holo, n.v.; iso K, L, U), New Guinea, Irian Jaya, Mt Hubrecht.

*Omalanthus agallochoides* J.J. Sm. in Herderschee, Nova Guinea 12 (1917) 547, pl. 228B, 229; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, xvii, add. VII (1924) 199; Airy Shaw, Kew Bull. 21 (1968) 415. — Type: *Gjellerup 1206* (BO holo, n.v.; iso L), New Guinea, Irian Jaya, Arfak Mts, 'zwischen den Anggi-Seen'.

?*Omalanthus minutiflorus* Airy Shaw, Kew Bull. 21 (1968) 414; 35 (1980) 399; 37 (1982) 25. — Type: *Kostermans 884* (K holo; iso L), Moluccas, Morotai, Sambiki River; syn. nov.

Tree up to 40 m tall, dbh up to 25 cm, widely spreading and densely foliated. Glabrous. *Bark* c. 3 mm thick; outer one medium brown, with frequent horizontal, large, white lenticels; inner one pale green to yellowish straw. *Wood* with purple discoloration. *Stipules* 1.5–3 cm long. *Leaves*: petiole 0.8–5 cm long, glandless; lamina elliptic to ovate, 3–11 by 2–5 cm, index 1.8–2.5(–4.6), base attenuate to obtuse to rounded, not peltate, margin often reddish, apex acute to acuminate, lower surface whitish but most of venation of different colour, side veins in 8–14 pairs below the apex, angle of divergence 50–55°, hardly joined towards the margin, tertiary veins indistinctly percurrent to reticulate, quarternary veins reticulate, adaxially usually glandless or, rarely, with a pair of disc-shaped and prominent glands on junction lamina base/petiole, each gland 0.75–1.25 mm in diam., abaxially with a pair of glands near base, 0.25–0.75 mm in diam. and touching the petiole or remote from petiole by up to 3 mm, additionally with 0–8 submarginal glands on each half of the blade,



Map 1. Distribution of *Omalanthus arfakiensis* Hutch.

0.25–0.5 mm in diam. and 1–3 mm distant from margin. *Inflorescences* 1–8 cm long, sometimes bisexual but often only staminate flowers present, staminate part 8–10 mm in diam., very often reddish. *Bracts of staminate cymules* 0.4–0.75 mm long, with a pair of undivided glands 0.2–0.25(–0.5) mm long and distinctly overtopped by the bract. *Staminate flowers* 1 (rarely 3: *NGF 28274*) per cymule, pedicel (0.75–)1.5–2.5 mm long; sepals 2, c. 1 mm long; stamens (6–)8(–10) per flower, with filaments and anthers each c. 0.6 mm long. *Pistillate flowers* 1 per thyrse; pedicel 7–10 mm long; sepals 2, c. 0.75 mm long; ovary 2 mm long, bicarpellate, papillate, style often absent, 0–0.25(–1) mm long, stigma 3–6 by 0.3–0.6 mm, often widest at the base and continuously narrowing, undivided, glandless or with small (c. 0.5 mm long) apical gland. *Fruits* 1 per infructescence; pedicel 1.5–3 cm long; calyx persistent; fruit excl. style 6–7 by 6–7 mm, papillate, sulcate, not carinate, style persistent; opened fruits not found, pericarp c. 0.25 mm thick (i.e. 1:25 of fruit length). *Seeds* often only one per fruit, c. 5.5 by 4.5 mm.

Distribution — *Malesia*: Moluccas (Morotai), New Guinea.

Habitat & Ecology — Found in mixed montane to subalpine forest, *Nothofagus* forest, moss forest, often along tracks, in regrowth and on forest margins, in scrub, grassland, or fire vegetation. Locally rare to common. Soil: grey clay, sand, peat, brownish soil, limestone. Altitude 1800–3500 m (but compare *O. minutiflorus*). Flowers collected in Jan., Feb., May–Oct.; fruits all the year round.

Vernacular names — New Guinea: amp, ombrarip (Mendi); ambubori, ambuwaji (Enga); embo (Tari); kurup, kurupu (Hagen, Tomba); gugau (Chimbu, Masul).

Notes — 1. The exact date of publication of *Nova Guinea* 12 is not known and therefore it remains uncertain whether *O. arfakiensis*, published in October 1917, is indeed the oldest name. I follow Airy Shaw (1980a) in maintaining this name.

2. *Omalanthus minutiflorus* is united here with *O. arfakiensis*. Airy Shaw (1968) admitted the close resemblance of both taxa, although he later (1980b) changed his opinion. *Omalanthus minutiflorus* is characterized by few quantitative characters, in particular smaller staminate flowers (e.g., only 4 stamens per flowers with anthers c. 0.25 mm long and filaments c. 0.2 mm long) and pistillate flowers with large stigmatic glands covering  $\pm$  half of the stigma length. Comparable plants are also known from New Guinea, e.g. *BW 14194*, with floral bracts 0.4 mm long, pedicels of staminate flowers 0.75 mm long, a flower diameter of 1 mm, and only 6 stamens per flower. Additionally, type (*Kostermans 884*) and paratype (*Kostermans 914*) of *O. minutiflorus* were found at elevations of 100–250 m, very different from all specimens from New Guinea.

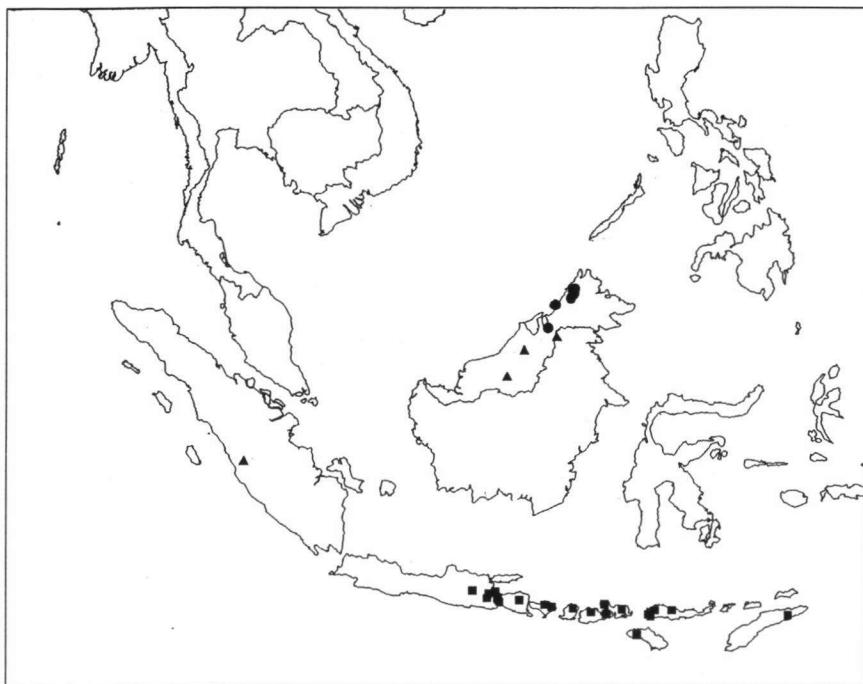
## 2. *Omalanthus caloneurus* Airy Shaw — Map 2

*Omalanthus caloneurus* Airy Shaw, *Kew Bull.* 21 (1968) 413; *Kew Bull. Add. Ser.* 4 (1975) 135.

— Type: *BRUN (Ashton) 2520* (K holo; iso L), Borneo, Brunei, Gunong Pagon Priok.

*Omalanthus populneus* (Geiseler) Pax var. *cordifolius* Heine, *Feddes Repert. Spec. Nov. Regni Veg.* 54 (1951) 235. — Type: *J. & M. S. Clemens 32620* (M holo; iso B, BM, HBG, K-2 sheets, L, NY), Borneo, Sabah, Mt Kinabalu, Marai Parai.

Tree up to 20 m tall. Glabrous. *Bark* grey. *Stipules* 2–6 cm long. *Leaves*: petiole 3–10 cm long, apically with a pair of disc-shaped glands 0.5–1.25 mm in diam. situated



Map 2. Distribution of *Omalanthus caloneurus* Airy Shaw (●), *O. giganteus* Zoll. & Moritzi (■), and *O. grandifolius* Ridl. (▲).

laterally or more often adaxially; lamina ovate, 5–10 by 4.5–12 cm, index 0.8–1.1, base emarginate to truncate, not peltate, apex acuminate to cuspidate, lower surface whitish with very distinct, completely visible venation, side veins in 12–14 pairs below the apex, angle of divergence 45–55°, joined towards the margin, tertiary veins percurrent, quaternary veins reticulate, truly adaxial glands absent (but compare the petiolar glands), abaxially with (0–)2–11 glands on each side of midvein, 0.25–0.5 mm in diam. and close to (often only 5–10 mm distant from) the midvein. *Inflorescences* 7–10 cm long, bisexual but often without female flowers, staminate part 5–6 mm in diam. *Bracts of staminate cymules* c. 1 by 0.75 mm, with a pair of undivided glands c. 1 mm long and only slightly to not overtopped by the bract. *Staminate flowers* 3 (rarely 1: *Clemens* 34463) per bract; pedicel up to 1.5–2 mm long; sepals 2, c. 1.25 mm long; stamens 8 per flower, with filaments shorter than anthers and anthers c. 0.25 mm long. *Pistillate flowers* 4–20, at base of staminate thyse or, rarely, intermixed with staminate flowers; pedicel 3–4 mm long; sepals 2, c. 0.5 mm long; ovary 3 mm long, bicarpellate, papillate, style 0.5–1 mm long, stigma 6–7 mm long, undivided, with an apical to subapical gland of 0.75–2 mm, apically up to 0.5 mm of stigma glandless. *Fruits* up to 20 per infructescence; pedicel 5–7 mm long; calyx persistent; fruit excl. style 7–8 by 6–7 mm, hardly sulcate, carinate at back, papillate or not, outer layer shrinking, style persistent; opened fruit not seen. *Seeds* not studied, according to Airy Shaw (1968) 5–6 by c. 4 mm, with small arillode.

Distribution — *Malesia*: Borneo (Sabah, Brunei).

Habitat & Ecology — Found in disturbed montane forests, on ridge sides. Soil lateritic. Altitude 1200–2500 m. Flowers collected in Mar., May, July–Sept; fruits in Mar.–May.

Vernacular names — Borneo: belantas, tapang lalat, ludai.

Note — *Omalanthus caloneurus* is unique in the genus as regards the venation, which is completely visible and conspicuous below, and the laminar glands which are quite close to the midrib. The position of the petiolar leaf glands is variable, in contrast with species like *O. fastuosus* with which Airy Shaw compared this.

### 3. *Omalanthus fastuosus* (Linden) Fern.-Vill. — Map 3

*Omalanthus fastuosus* (Linden) Fern.-Vill. in Blanco, Fl. Filip. ed. 3, Nov. App. (1880) 196; Vidal, Sin. Gen. Pl. Leños. Filip. Atlas (1883) 39, t. 84H; Revis. Pl. Vasc. Filip. (1886) 247; Merr. & Merritt, Philipp. J. Sc. 5, Bot. (1910) 357; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, v (1912) 45; Merr., Enum. Philipp. Flow. Pl. 2 (1923) 459; Burkill, Dict. Econ. Prod. Malay Pen. 1 (1935) 1182; Salvosa, Lex. Philipp. Trees (1963) 105; Hsieh, Fl. Taiwan 3 (1977) 487, pl. 697; Airy Shaw, Alph. Enum. Euph. Philipp. Is. (1983) 32. — *Mappa fastuosa* Linden, Belg. Hort. 15 (1865) 100; Cat. Pl. Exot. 19 (1865) 4. — *Carumbium fastuosum* (Linden) Müll. Arg. in DC., Prodr. 15, 2 (1866) 1144; Baillon, Adansonia 6 (1867) 348, pl. 8. — Neotype (here proposed): *Elmer 17878* (L holo; iso BM, C, F, HBG, NY, P, U), Philippines, Luzon, Prov. Laguna, Los Baños (Mt Maquilang).

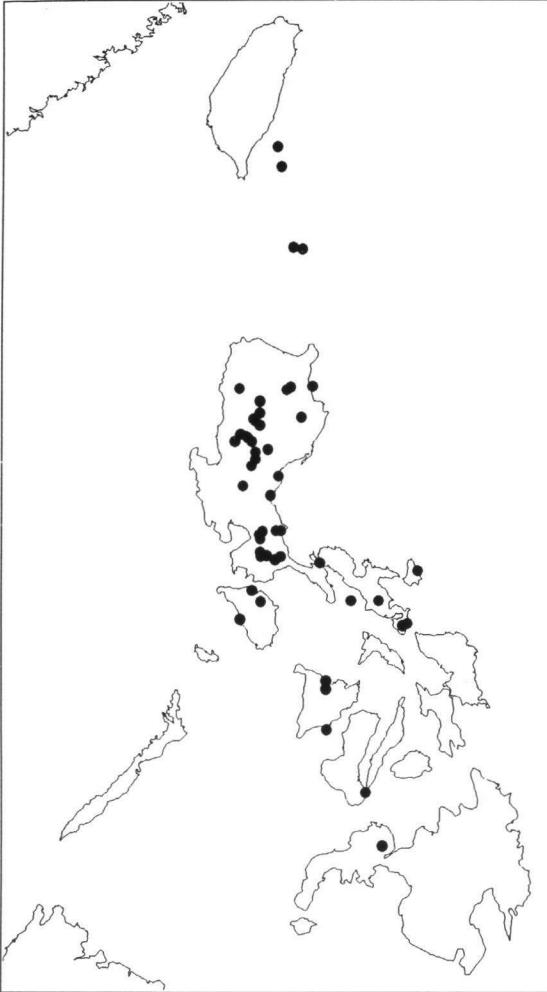
*Dibrachion peltatum* Regel, Index Sem. Hortus Bot. Petrop. 1865 (1866) 51; Gartenflora 15 (1866) 100, t. 504. — Lectotype (here proposed): Gartenflora 15 (1866) t. 504.

*Omalanthus alpinus* Elmer, Leaflet Philipp. Bot. 1 (1908) 307; Merr. & Merritt, Philipp. J. Sc. 5, Bot. (1910) 357; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, v (1912) 48; Merr., Philipp. J. Sc., 9, Bot. (1915) 486; Enum. Philipp. Flow. Pl. 2 (1923) 459; Salvosa, Lex. Philipp. Trees (1963) 105; Airy Shaw, Kew Bull. 21 (1968) 414; Alph. Enum. Euph. Philipp. Is. (1983) 32. — Type: *Elmer 7523* (PNH† holo; iso E, K, L, NY, WRS), Philippines, Luzon, Tayabas Prov., Lucban; syn. nov.

*Omalanthus bicolor* Merr., Philipp. J. Sc. 4, Bot. (1909) 282; Enum. Philipp. Flow. Pl. 2 (1923) 459; Salvosa, Lex. Philipp. Trees (1963) 105; Airy Shaw, Alph. Enum. Euph. Philipp. Is. (1983) 32. — Type: *FB (Mearns & Hutchinson) 4722* (PNH† holo, fragm. A, photo A; iso K-2 sheets, NY), Philippines, Mindanao, Misamis Prov., Mt Malindang; syn. nov.

*Omalanthus milvus* Airy Shaw, Kew Bull. 36 (1981) 611. — Type: *BS (Ramos & Edaño) 26406* (K holo; iso A, P), Philippines, Luzon, Prov. Nueva Ecija, Mt Umangan; syn. nov.

Tree up to 8(–18) m tall, dbh up to 30 cm, widely spreading and crookedly branched, with nearly flat-topped crown. Glabrous. *Bark* brown to grey-brown, marked with scattered corky pustules and long low horizontal ridges; outer bark soft, very thin, not detaching; inner bark soft, pale greenish-straw darkening to pale brownish on exposure. *Stipules* 1.5–8.5 cm long. *Leaves*: densely crowded towards end of twigs; petiole 3–30 cm long, apically with a pair of abaxial-lateral, disc-shaped glands 0.6–2 mm in diam., rarely glandless or with another subapical pair of glands; lamina orbiculate to ovate, 4–23 by 3.5–24 cm, index 0.8–1.3, base cuneate to rounded to emarginate, peltate by up to 40 mm or not peltate, apex mucronate to acuminate, the lower surface whitish between the veins, with most of the venation of different colour, side veins in 8–15 pairs below the apex, angle of divergence 45–60°, joined towards the margin, tertiary veins percurrent, quarternary veins reticulate to indistinctly percurrent, adaxially glandless, abaxially with 0–17 laminar glands on each



Map 3. Distribution of *Omalanthus fastuosus* (Linden) Fern.-Vill.

half of blade, 0.25–0.75 mm in diam. and 5–30 mm distant from margin. *Inflorescences* 6–30 cm long, usually bisexual, staminate part 7–11 mm in diam. *Bracts of staminate cymules* c. 0.6–1 mm long, totally hidden by large pair of undivided glands 1–2 mm long. *Staminate flowers* 3–8 per cymule, often less than half of cymules 3-flowered; pedicel 1.5–3 mm long; sepals 2, c. 1 mm long; stamens 6–8 per flower, with filaments and anthers each c. 0.4–0.5 mm long. *Pistillate flowers* 6–45 per inflorescence; pedicel 3–5 mm long; sepals 2, c. 1 mm long; ovary 2 mm long, papillate, style 0.5–2 mm long, stigma 3–6 by 0.6–1 mm, undivided (rarely apically slightly divided: *BS 13272*), with quite small (0.75–2.5 mm long) apical gland. *Fruits* 6–30 per infructescence; bract often persistent; pedicel 4–13 mm long; calyx persistent, c. 1 mm long; fruit excl. style 6–9 by 5.5–8 mm, distinctly papillate, not sulcate, carinate and often with characteristic lateral, shallowly-conical projections

and obovoid in shape, style persistent; regularly opened fruits not seen, pericarp 0.3–0.4 mm thick (c. 1 : 20 of fruit length). *Seeds* 3–5 by 3–4 mm, for a large part (at least the upper half) covered by arillode.

*Distribution* — Taiwan (Orchid Island, Botel Tobago) and *Malesia*: Philippines (Luzon to Mindoro and Panay, Negros, Cebu, NW Mindanao).

*Habitat & Ecology* — Found on slopes and ridges, in hill forest, along trails or at exposed edges of dipterocarp forest, mossy forest, mountain forest, in disturbed areas of old garden sites, in rocky ravines, creek banks, on crater rims. Soil: sandy-loamy, limestone. Locally common, mostly above 750 m. Altitude 50–2600 m. Flowers collected in Jan.–Mar., July–Nov.; fruits all the year round.

*Uses* — Used as fuel and firewood. The green smoke is said to make the eyes run unusually. The species is also known as fish poison (Burkill, 1935).

*Vernacular names* — Philippines: balanti (P. Vis., Tag.), botinag (Salvosa, 1963), buta (Tag.; Salvosa, 1963); butabuta, butabutan abibilog (Ifugao); minunga; topi (Sub.; Salvosa, 1963).

*Notes* — 1. *Omalanthus fastuosus* was described from cultivated plants introduced into Botanical Gardens in Central Europe in the middle of the 19th century. A type collection has never been cited; even the exact locality of origin is not known. No possible type or surviving cultivation is present at BR or LG, where collections of Linden could be expected. Therefore, a neotype had to be chosen. I decided for the flowering collection with the largest number of available duplicates, which is *Elmer 17878*.

2. *Omalanthus alpinus* differs from *O. fastuosus* only by non-peltate leaves. This character is of limited value, as in other species of the genus. This may be shown by *FB (Mearns & Hutchinson) 4722*. The leaves of this collection are not or slightly (up to 5 mm) peltate on the same twig. *Omalanthus bicolor* is based on this collection, separated from *O. fastuosus* primarily through the only slightly peltate leaves. Pax & Hoffmann (1912) cited this specimen under *O. fastuosus*, a species they keyed out and characterized by peltate leaves. Other collections on which peltate and non-peltate leaves were found together are *SF (Sinclair & Edaño) 9664* and *Jacobs 7180*. Collections with peltate and non-peltate leaves usually were gathered in the same localities, except the few cases mentioned in Note 4.

3. *Omalanthus milvus* was based on the unusual rhomboid leaf-shape with cuneate base. But this is only an extreme within the natural variation, and comparable leaf-shapes, although very rare, may be found in, e.g., *O. populneus* [*BS (Ramos) 14460*] or *Triadica sebifera* (L.) Small [= *Sapium sebiferum* (L.) Roxb.], a species of another genus in the same tribe and very similar in habit to several *Omalanthus* species.

4. Within the range of *O. fastuosus* some variation may be found, especially in leaf characters. In Taiwan, all collections studied may be recognized by very shortly acuminate, distinctly peltate leaves of remarkable similar size (6–8 by 6–8 cm). In the southernmost part of the range, e.g. Mindanao, only slightly to not peltate leaves were found.

5. Without flowers, *O. fastuosus* cannot be distinguished from *O. longistylus*. Therefore, the only (sterile) collection from the Caroline Islands, *Ledermann 13797 (B)*, remains undetermined.

#### 4. *Omalanthus giganteus* Zoll. & Moritzi — Map 2

*Omalanthus giganteus* Zoll. & Moritzi, *Natuur-Geneesk. Arch. Ned.-Indië* 2 (1845) 584; Hassk., *Flora* 30 (1847) 662; Baillon, *Étude Euphorb.* (1858) 538, Atlas pl. 8, f. 29–31; J.J. Sm. in Koord. & Valetton, *Bijdr. Boomsoort. Java* 12 (1910) 625; Pax & K. Hoffm. in Engl., *Pflanzenr.* IV, 147, v (1912) 51; Koord., *Exkurs.-Fl. Java* 2 (1912) 507; Backer & Bakh. f., *Fl. Java* 1 (1963) 498; Steenis, *Mountain Fl. Java* (1972) f. 23, pl. 19-5; Airy Shaw, *Kew Bull.* 37 (1982) 24. — *Carumbium giganteum* (Zoll. & Moritzi) Miq., *Fl. Ind. Bat.* 1. 2 (1859) 687; Müll. Arg. in DC., *Prodr.* 15, 2 (1866) 1145. — Type: *Zollinger 2524* (A, BM, P), Java, Malang, prope Gebok Klakka.

*Omalanthus niveus* Pax & K. Hoffm. in Engl., *Pflanzenr.* IV, 147, v (1912) 51; Airy Shaw, *Kew Bull.* 37 (1982) 25. — Type: *Zollinger 1467* (B† holo?; iso n.v.), Lesser Sunda Islands, Bali, Tjator; syn. nov.

Tree up to 30 m tall, rapidly growing, dbh up to 45 cm. Twigs villose to glabrous. *Bark* grey to pale brown, finely cracked, can be rubbed off, living part 0.1–0.5 cm thick, inside yellow. *Stipules* 1–8 cm long. *Leaves*: petiole 3–34 cm long, glabrous at base, yellowish brown villose to glabrous at apex, at the apex with 1–6 pairs of glands, 0.5–1.5 mm in diam., situated abaxially, laterally, or adaxially on petiole, or surrounding the petiole apex; lamina orbiculate to ovate, 3.5–34 by 4–28 cm, large in seedlings, smaller in older trees, index 0.75–1.2, base truncate to emarginate and often attenuate at the very base, peltate by 0.1–5 cm or not at all, apex mucronate to acuminate, upper surface glabrous, lower surface usually whitish, sometimes including the smallest veins, sometimes complete venation or only larger veins of different colour, rarely not whitish at all, yellowish brown villose to glabrous at base, especially above veins, otherwise glabrous, side veins in 10–14 pairs between petiole and the apex, angle of divergence 45–55°, joined towards the margin, tertiary veins percurrent, quarternary veins reticulate and often quite indistinct, adaxially glandless, abaxially with 0–5 laminar glands, c. 0.25 mm in diam. and close to margin (e.g., 6 mm distant from margin). *Inflorescences* 8–15 cm long, bisexual, glabrous, staminate part 2–4 mm in diam. *Bracts of staminate cymules* 1–1.5 mm long, basally with a comparatively small pair of undivided glands 0.25–0.75 mm long and distinctly overtopped by the bract. *Staminate flowers* 1 per cymule; pedicel 1.25–1.5 mm long; calyx consisting of 1, conspicuously inclinate sepal c. 1 mm long; stamens (6–)10–15 per flower, with filaments and anthers each c. 0.5 mm long. *Pistillate flowers* 2–14 per thyrs; pedicel 8–22 mm long, shortest in distal flowers; sepals 2, c. 1.5 mm long; ovary 3 mm long, bicarpellate, papillate, style 1 mm long, stigma 3–4 by c. 0.5 mm, apically divided over at least half of its length, sometimes even over its whole length (and then apparently four per fruit), very rarely undivided, with apical gland c. 2 mm long. *Fruits* 2–14 per infructescence; bract persistent; pedicel 15–35 mm long; calyx persistent; fruit excl. style 7–11 by 8–9 mm, clavate in shape with 1–3 mm long, narrow base, papillate, hardly sulcate, each carpel distinctly carinate; style 2–4 mm long, stigma 3–5 mm long; shed unopened, but opening later loculicidally, pericarp c. 0.3 mm thick (i.e. less than 1 : 20 of fruit length), remaining columella c. 2 mm long, alate. *Seeds* c. 4.5 by 4 mm, upper half surrounded by arillode.

Distribution — *Malesia*: E Java, Lesser Sunda Islands.

Habitat & Ecology — Found as pioneer species in *Casuarina* forest, *Podocarpus*–*Eugenia* forest, montane forests, thickets, grassy areas, along ravines, on riverbanks.

Locally very common. Soil: sand, loam, marl. Altitude 350–2400 m. Flowering plants collected throughout the year; fruits in May, Aug.–Oct. Leaves deciduous (Smith, 1910).

Vernacular names — Lesser Sunda Islands, Bali: glantih. Flores: haju lente. Java (fide Smith, 1910): djarak prati gede, karembi, tundjung, tutup; usually the same names as known for *O. populneus*.

Uses — Dye for cloth.

Notes — 1. No type of *Omalanthus niveus* could be traced in any of the herbaria consulted for this study. Pax & Hoffmann (1912), however, cited no reliable diagnostic characters for their *O. niveus*. Pubescence and whitish colour of the lower leaf surface are indeed variable in *O. giganteus*, and the bifurcate stigmata are diagnostic for *O. giganteus*, whereas simple ones (as cited by Pax & Hoffmann) are exceptional but not unexpected (compare *O. populneus*). In most other characters, the descriptions of both species are identical. The synonymy of both taxa had already been suspected (with doubt) by Airy Shaw (1982), and he certainly was right.

2. In several characters, for instance in indumentum, leaf base, measurements, and glands, *O. giganteus* is the most variable species of the genus. Leaves of seedlings may be peltate (*van Steenis 7305*) or non-peltate (*Schmutz 4080*), and differences between young and old leaves have been noted by several authors, e.g., Van Steenis (1972). Additionally, there are some differences between plants of Java and Bali to those of the remaining Sunda Islands. In the former, the petiolar leaf glands are undivided (i.e., only one pair), and the fruits are somewhat larger (9–11 against 7–8 mm length).

3. Inflorescence buds are found quite often in *O. giganteus*, contrary to all other Malesian taxa. They are stiff, with densely packed bracts. This may be ecologically correlated with the deciduous leaves, also not known from any other Malesian species.

## 5. *Omalanthus grandifolius* Ridl. — Fig. 1; Map 2

*Omalanthus grandifolius* Ridl., J. Fed. Malay States Mus. 8 (1917) 84. — Type: *Robinson & Kloss s.n.* (BM holotype; iso BM, K), Sumatra, Gunung Koerintji.

Small shrub to medium tree. Glabrous. *Stipules* 2.5–7.5 cm long. *Leaves*: petiole 4.5–15 cm long, glandless; lamina orbiculate to ovate, 9.5–17 by 9.5–15.5 cm, index 1–1.3, base truncate to emarginate, distinctly peltate by 5–15 mm (not peltate: *Burt 12902*), apex mucronate to acuminate, lower surface whitish with larger veins of different colour, side veins in 11 or 12 pairs below the apex, angle of divergence 50–55°, joined towards the margin, tertiary veins percurrent, quarternary veins percurrent to reticulate and quite indistinct, adaxially glandless, abaxially with a pair of large laminar glands 1–2 mm in diam. very close to and nearly touching petiole, additional laminar glands 4–26 on each half of blade, 0.3–1.5 mm in diam., in one or two rows or irregularly dispersed, nearly equally distant from margin and midrib or somewhat closer to margin. *Inflorescences* 9–14 cm long, bisexual, staminate part c. 7 mm in diam. *Bracts of staminate cymules* 1–1.25 mm long, nearly completely covered by a pair of undivided glands 1–1.5 mm long. *Staminate flowers* 1–3 per

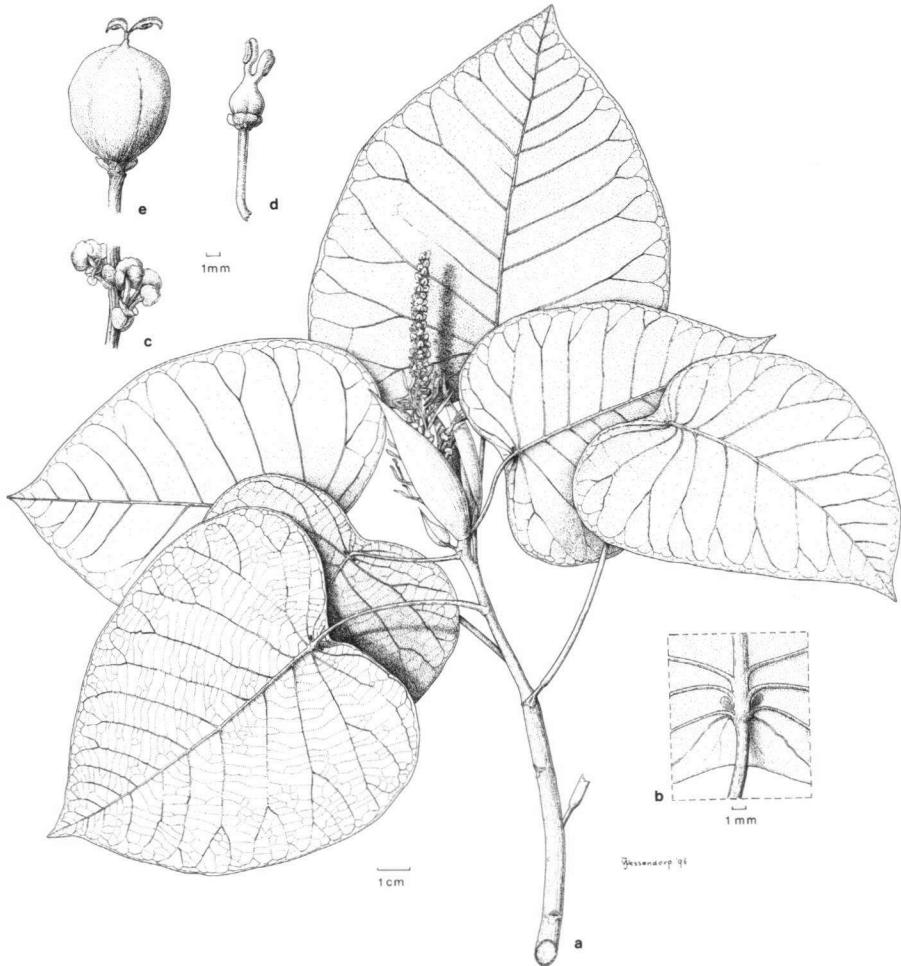


Fig. 1. *Omalanthus grandifolius* Ridl. a. Habit, showing in particular peltate leaves and large stipules; b. detail of abaxial leaf base showing basilaminar glands; c. staminate cymule; d. pistillate flower; e. fruit (a–c: Bünnemeijer 9570; d–e: Bünnemeijer 9408).

cymule; pedicel c. 2 mm long; sepals 2, c. 1 mm long; stamens 8–10 per flower, with filaments c. 0.3 mm long and anthers c. 0.5 mm long. *Pistillate flowers* 15–24 per thyrses; pedicel 4–8 mm long; sepals 2, 1–2 mm long; ovary 2 mm long, papillate, style 0.1–0.2 mm long, stigma 2.5–6 mm long, undivided, with apical to subapical gland 1–2 mm long. *Fruits* 11–15 per infructescence; pedicel 15–20 mm long; calyx caducous; fruit excl. style 7–8 mm long, papillate, style persistent, c. 0.75 mm long. *Seeds* not studied.

*Distribution* — *Malesia*: Sumatra, Borneo (Sabah, Sarawak, NE Kalimantan).

*Habitat & Ecology* — In evergreen hill forest and riverside vegetation, in gaps of fallen trees. Altitude 1400–2400 m. Flowers and fruits collected in Apr., May, July.

Notes — 1. The holotype bears the number 212 written on the label, which may be the collection number.

2. The several Bunnemeijer collections from Sumatra are labelled “*Omalanthus sumatranus* J.J. Sm.”, a name which obviously has never been published.

3. This species has been omitted in Airy Shaw’s treatments of the Euphorbiaceae of Borneo and Sumatra (1975, 1981).

4. The collections from Borneo differ from the Sumatran plants in the more elliptic leaves (index 1.2–1.3 instead of 1.0–1.1), the shorter floral bracts totally hidden by their glands, and the truly apical (instead of subapical) stigmatic glands. These differences do not justify taxonomic separation. The single collection with non-peltate leaves (*Burtt 12902*) agrees in all other characters with the remaining collections and is, therefore, attributed to this species.

## 6. *Omalanthus longistylus* Lauterb. & K. Schum. — Map 4

*Omalanthus longistylus* Lauterb. & K. Schum. in K. Schum. & Lauterb., Fl. Schutzgeb. Südsee (1900) 407 [as ‘*longistilus*’]; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, v (1912) 48; Airy Shaw, Kew Bull. Add. Ser. 8 (1980) 118. — Neotype (here proposed): *Clemens 6603* (B holo; iso A), Papua New Guinea, Morobe Prov., Sattelberg, Yoangen, Mongi River.

*Omalanthus papuanus* Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, v (1912) 45; Airy Shaw, Kew Bull. 21 (1968) 409; Kew Bull. Add. Ser. 8 (1980) 117. — Type: *Dr. Stephan s.n.* (B† holo, fragm. and drawing WRSL), Papua New Guinea, Bismarck Archipelago, New Ireland, Muliama; syn. nov.

*Carumbium populifolium* auct. non Reinw.: Warb., Bot. Jahrb. Syst. 13 (1891) 352.

*Carumbium populneum* auct. non (Geiseler) Müll. Arg.: K. Schum., Notizbl. Kön. Bot. Gart. Berlin 2 (1898) 129.

*Omalanthus populneus* auct. non (Geiseler) Pax: K. Schum. & Lauterb., Fl. Schutzgeb. Südsee (1900) 407, p.p. quoad *Lauterbach 1423*; Airy Shaw, Kew Bull. 21 (1968) 409; Peekel, Fl. Bismarck Archip. for natural. (1984) 316, f. 511.

*Omalanthus novoguineensis* auct. non (Warb.) K. Schum.: Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, v (1912) 49, p.p. quoad *Peekel 163*, *Schlechter 13761*.

*Omalanthus fastuosus* auct. non (Linden) Fern.-Vill.: Airy Shaw, Kew Bull. 21 (1968) 409.

*Omalanthus trivalvis* auct. non Airy Shaw: Airy Shaw, Kew Bull. Add. Ser. 8 (1980) 120.

Tree up to 12 m tall, dbh 20 cm. Glabrous (rarely youngest parts with yellowish pale, c. 0.5 mm long hairs: *NGF 12576*). Bark reddish. *Stipules* 1.5–3 cm long. *Leaves*: petiole 8–12 cm long, apically with a pair of abaxial-lateral, disc-shaped glands 0.75–1.5 mm in diam.; lamina orbiculate to ovate, 5–17 by 4–16 cm, index 0.9–1.2, base rounded to slightly emarginate, not distinctly (up to 10 mm) peltate, apex mucronate to acuminate, lower surface whitish with smaller veins of different colour, side veins in 10–13 pairs below the apex, angle of divergence 45–55°, joined towards the margin, tertiary veins percurrent, quarternary veins percurrent to slightly reticulate, adaxially glandless or with a pair of glands or one gland on lamina base c. 0.75 mm in diam., abaxially with 0–1(–14) glands on each side of midvein, 0.3–0.6 mm in diam. and 2–15 mm distant from margin with basal ones at least 10–15 mm distant from the midvein. *Inflorescences* 7–12 cm long, often without pistillate flowers, but sometimes bisexual, staminate part 7 mm in diam. *Bracts of staminate cymules* 1–1.5 mm long, with a pair of undivided glands c. 0.5–1.25 mm long, always distinctly overtopped by the bract. *Staminate flowers* (1–)3 per cymule; pedicel

1.5–2 mm long; sepals 2, c. 0.75–1.25 mm long; stamens 6–8(–10) per flower, with filaments and anthers each c. 0.4 mm long. *Pistillate flowers* (4–)6–14 per inflorescence; pedicel 2 mm long; sepals 2, 0.5–0.75 mm long; ovary papillate, style nearly absent, stigma c. 2 by 0.4 mm, undivided, with apical gland c. 0.75 mm long. *Fruits* 4–7 per infructescence; bract persistent; pedicel 9–15 mm long; calyx persistent; fruit excl. style 6–8 by 8–9 mm or 12–14 by 12–15 mm (see Note 3), papillate, sulcate, hardly to distinctly carinate, style persistent, 0.5–3 mm long, stigma 4–9 mm long; opened fruits not seen, pericarp c. 1 mm thick (slightly less than 1:10 of fruit length). *Seeds* c. 7 by 4 mm, upper half covered by arillode.

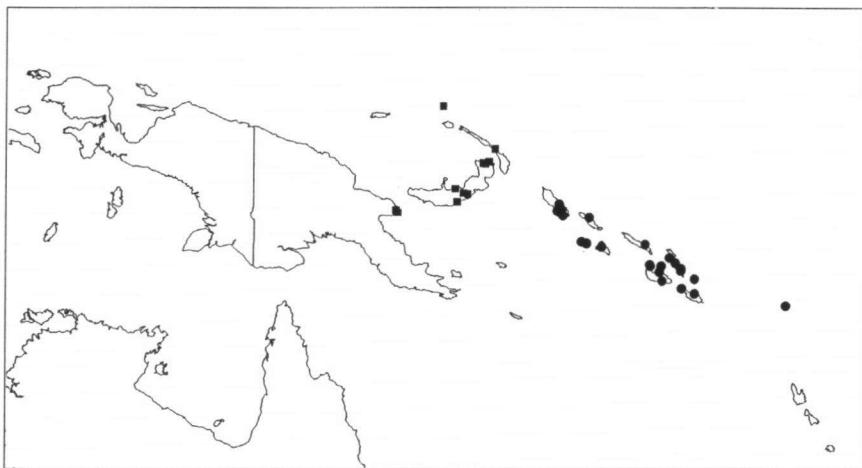
**Distribution** — *Malesia*: Papua New Guinea (in particular Sattelberg region and the Bismarck Archipelago).

**Habitat & Ecology** — Found in secondary forests, open bush, banana and taro gardens, often as a major weed, and *Nothofagus*-dominated moss forest. Soil: limestone. Locally common to uncommon. Altitude 50–1800 m. Flowers collected in Jan., Mar., July; fruits in Jan., Mar., Aug.–Sep.

**Uses** — The wood is used for building houses. The leaves are used for wrapping taro for cooking. The latex is irritant to the eyes. The terminal buds are eaten by women to induce abortion (Peekel, 1984).

**Vernacular names** — Papua New Guinea: a posoba (Namatanai, New Ireland); demeri (Sattelberg); kurip, pasok-mataves (Lamekot; Peekel, 1984); la pokakasi (W Nakani, New Britain); paba (Gazelle Peninsula); pasoba (Pala), pesem (Ugana); posom (Muliama); puba (Kuanua).

**Notes** — 1. The type of *O. longistylus*, *Bamler II 1b*, could not be traced in any of the herbaria consulted, including the Lauterbach herbarium (now WRS�). Therefore, a neotype is proposed here. *Clemens 6603* was chosen because it agrees with the description of *O. longistylus* and is the only collection from the Sattelberg region (the type locality) that was found in more than one herbarium.



Map 4. Distribution of *Omalanthus longistylus* Lauterb. & K. Schum. (■) and *O. trivalvis* Airy Shaw (●).

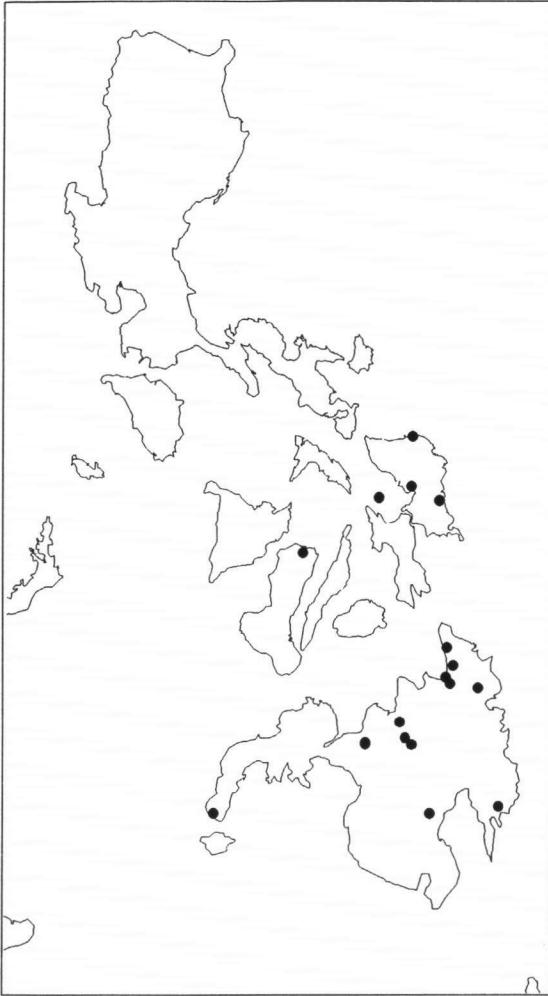
2. The type of *O. papuanus* is remarkable only by peltate leaves and 1-flowered staminate cymules. Both characters are found to be variable in such a way in *O. longistylus* that *O. papuanus* could easily be put into its synonymy.

3. The species is circumscribed here especially by the abaxial-petiolar, disc-shaped leaf glands, bicarpellate ovaries, and bract glands small compared to the bract itself. Pax & Hoffmann (1912) and Airy Shaw (1980a) cited the large, carinate fruits as characteristic for *O. longistylus*. This is not corroborated by the original literature. Schumann & Lauterbach (1900), when establishing the species from a single specimen, described no fruits, and obviously no later author studied the type, *Bamler II 1b*, not even Pax & Hoffmann. The large fruits described by them, repeated by Airy Shaw (1980a), probably were found in *Lauterbach 1423* (WRSL), the only fruiting specimen they cited; this specimen had also been cited by Schumann & Lauterbach (1900) on the same page, but, instead, named *O. populneus*. The collections united now under *O. longistylus* obviously include two fruit types, but are indistinguishable otherwise. In most plants the fruits are small (6–8 by 8–9 mm) and hardly carinate. Only 4 collections bear large (12–14 by 12–15 mm), sharply carinate fruits, i.e., *Lauterbach 1423* (Sattelberg), *Warburg 20669* (Finschhafen), *Clemens 41610* (Morobe Prov., Boana) and *NGF 41486* (New Britain). Because also *O. papuanus* is based only on a flowering plant, the taxonomic identity of the plants with large fruits remains uncertain; they are included here, with some doubt, under *O. longistylus*.

4. *Omalanthus trivalvis* is very similar to *O. longistylus* and distinguishable, besides by characters of the staminate flowers, in particular by constantly tricarpellate ovaries and fruits. In *O. longistylus*, rarely single fruits may be tricarpellate, but never all on a twig, as noted by Peekel (1984). The citation of *O. trivalvis* for New Guinea by Airy Shaw (1980a) is erroneously based on such a specimen of *O. longistylus* [NGF (Coode) 40469].

## 7. *Omalanthus macradenius* Pax & K. Hoffm. — Map 5

- Omalanthus macradenius* Pax & K. Hoffm. in Engl., Pflanzentr. IV, 147, v (1912) 51; Merr., Philipp. J. Sc., 9, Bot. (1915) 487; Enum. Philipp. Flow. Pl. 2 (1923) 459; Salvosa, Lex. Philipp. Trees (1963) 105; Airy Shaw, Alph. Enum. Euph. Philipp. Is. (1983) 33. — Type: *Elmer 10653* (B† holo; iso BM, E, F, HBG, K, L, NY, WRSL), Philippines, Mindanao, Davao, Todaya, Mt Apo.
- Omalanthus megaphyllus* Merr., Philipp. J. Sc., 9, Bot. (1915) 485 (as '*Homalanthus*'); Pax & K. Hoffm. in Engl., Pflanzentr. IV, 147, xiv, add. VI (1919) 56; Merr., Enum. Philipp. Flow. Pl. 2 (1923) 460; Salvosa, Lex. Philipp. Trees (1963) 105; Airy Shaw, Alph. Enum. Euph. Philipp. Is. (1983) 33. — Type: *BS (Fénix) 15765* (PNH† holo, fragm. A, photo A), Philippines, Mindanao, Bukidnon Subprovince, Sumilao; syn. nov.
- Omalanthus rotundifolius* Merr., Philipp. J. Sc., 9, Bot. (1915) 486; Pax & K. Hoffm. in Engl., Pflanzentr. IV, 147, xiv, add. VI (1919) 57; Merr., Enum. Philipp. Flow. Pl. 2 (1923) 460; Salvosa, Lex. Philipp. Trees (1963) 106; Airy Shaw, Alph. Enum. Euph. Philipp. Is. (1983) 33. — Type: *Ramos 1663* (PNH† holo; iso BM, L, NY, P), Philippines, Samar, Paranas; syn. nov.
- Omalanthus surigaonensis* Elmer, Leaflet. Philipp. Bot. 7 (1915) 2645; Pax & K. Hoffm. in Engl., Pflanzentr. IV, 147, xiv, add. VI (1919) 57. — Type: *Elmer 14045* (PNH† holo; iso BM, C, E, F, HBG, K, L, NY, P, U), Philippines, Mindanao, Agusan Prov., Cabadbaran (Mt. Urdaneta).
- Omalanthus concolor* Merr., Philipp. J. Sc. 20 (1922) 398; Enum. Philipp. Flow. Pl. 2 (1923) 459; Salvosa, Lex. Philipp. Trees (1963) 105; Airy Shaw, Alph. Enum. Euph. Philipp. Is. (1983) 32. — Type: *BS (Ramos & Edaña) 39166* (PNH† holo; iso A, K), Philippines, Mindanao, Bukidnon Subprov., near Tankulan; syn. nov.



Map 5. Distribution of *Omalanthus macradenius* Pax & K. Hoffm.

Crooked, often shrub-like tree up to 15 m tall, dbh up to 15 cm, crown open and spreading. Glabrous. *Bark* pale grey-brown. *Wood* nearly odour- and tasteless. *Stipules* 1.5–12 cm long. *Leaves*: petiole 3–20 cm long, always with a pair of abaxial-lateral glands either cup-shaped, 0.5 mm in diam., or, more often, enlarged to peculiar foliaceous appendages, up to 6 mm long, with glandular margin and often irregularly divided; lamina ovate to orbiculate, 4–36 by 3.5–30 cm, index 1.0–1.2, base rounded and distinctly peltate by 5–120 mm, only rarely single leaves indistinctly peltate, apex rounded to acute to mucronate, lower surface often whitish with larger veins of different colour, but especially large leaves sometimes not whitish at all, side veins in 9–13 pairs between petiole and apex, angle of divergence 45–55°, only indistinctly joined towards margin, tertiary veins percurrent, quarternary veins percurrent and often quite indistinct, adaxially glandless, abaxially without laminar glands.

*Inflorescences* 10–21 cm long, bisexual, sometimes without female flowers, staminate part 5–14 mm in diam. *Bracts of staminate cymules* 0.3–1 mm long, completely covered by a pair of undivided glands 1–1.5 mm long. *Staminate flowers* 1 per cymule; pedicel 2–5 mm long; sepal 1, inclinate, 1.5–2 mm long; stamens 20–30 per flower, with filaments c. 0.5 mm long and anthers c. 0.3 mm long. *Pistillate flowers* 5–11 per thyrses; pedicel 2–5 mm long; sepal 1, inclinate, early caducous; ovary 2 mm long, bicarpellate, papillate, style 0.5–2.5 mm long, soon caducous and aborted near base, stigma 3–4 mm long, undivided, with apical gland 2–3 mm long. *Fruits* 5–11 per infructescence; bracts caducous; pedicel 4–9 mm long; calyx caducous; fruit 3.5–4.5 by 3.5–6 mm, papillate, deeply sulcate, each carpel slightly carinate, always without style; opened fruits rarely seen, pericarp c. 0.15 mm thick (c. 1:25 of fruit length), remaining columella alate, c. 1 mm wide. *Seeds* c. 4 by 3.5 mm, with apical arilode.

*Distribution* — *Malesia*: Philippines (E and SE part only: Negros and Samar to Mindanao).

*Habitat & Ecology* — Found in secondary forests from early to advanced stages, in forest edges, open places, and along streams. Soil dry, red, stony. Locally common. Altitude 45–1800 m. Flowers and fruits collected in Mar.–Oct. with maxima in Mar.–May and Sep.–Oct.

*Uses* — The leaves are used for wrapping and covering food.

*Vernacular names* — Philippines: balalanti (Tagalog); balanti; balanting-bilog, Mindanao balanti (Fil.: Salvosa, 1963); biante (Cebuano); gibulag, glabulag; labagti, labugti, labulti, liuti, maquing, salingbaga (Bukidnon).

*Notes* — 1. Contrary to most other species, the whitish colour of the lower leaf surfaces may be absent; this is especially true for the largest leaves studied (e.g., the type of *O. megaphyllus*), but, less often, also for smaller leaves (e.g., the type of *O. concolor*).

2. *Omalanthus megaphyllus* is only a gigantic form of *O. macradenius*. The remarkable variability of its leaf size has been noted by Elmer (1915, under *O. surigaoensis*), but is not greater than in some other species, e.g., *O. giganteus*.

## 8. *Omalanthus nervosus* J.J. Sm. — Map 6

*Omalanthus nervosus* J.J. Sm. in Lorentz, Nova Guinea 8 (1912) 792, t. 141; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, vii, add. V (1914) 420; Airy Shaw, Kew Bull. 21 (1968) 412; Kew Bull. Add. Ser. 8 (1980) 118; P. van Royen, Alpine Fl. New Guinea 3 (1982) 2182, f. 663. — Type: *von Römer 1241* (BO holo, n.v.; iso L-2 sheets), New Guinea, Irian Jaya, 'Gipfel des Hellwig-Gebirges'.

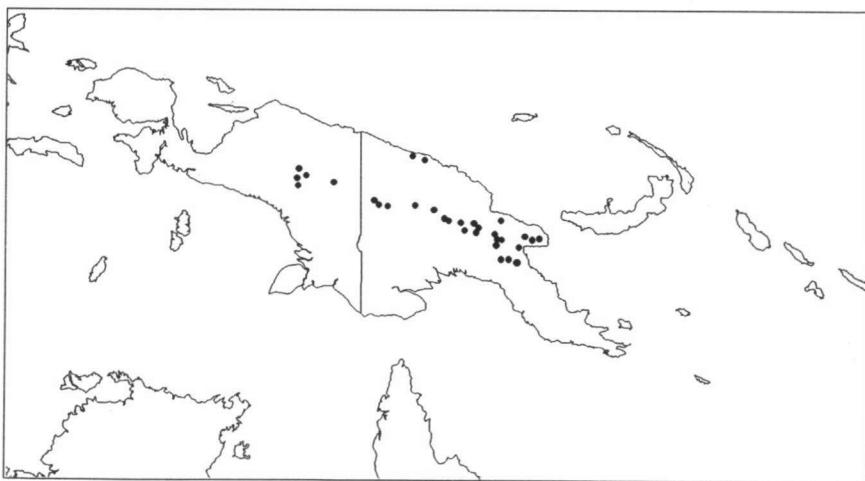
*Omalanthus vernicosus* Gage in Herderschee, Nova Guinea 12 (1917) 483, t. 185; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, xvii, add. VII (1924) 199; Airy Shaw, Kew Bull. Add. Ser. 8 (1980) 120. — Lectotype (here proposed): *Pulle 711* (BO holo, n.v.; iso K, L, U), New Guinea, Irian Jaya, Mt Hellwig; syn. nov.

*Omalanthus deltoideus* Airy Shaw, Kew Bull. 34 (1980) 594; Kew Bull. Add. Ser. 8 (1980) 117. — Type: *Brass 30586* (K holo; iso L), Papua New Guinea, Eastern Highlands Prov., Mt Wilhelm, E slopes; syn. nov.

Tree up to 10(–16) m tall, dbh 15 cm, heavily branched, spreading, with umbrella-shaped crown. Glabrous. Outer bark brown to grey, with numerous small, light-

coloured lenticels and discontinuous fissures; middle bark light green; inner bark straw to creamy. *Stipules* 1.2–5 cm long. *Leaves*: petiole 1.5–13 cm long, glandless; lamina ovate, 4–17 by 3–14 cm, index 1.1–2.4, base rounded to slightly emarginate, very base often attenuate, not or indistinctly (by 1 mm) peltate, apex acuminate to cuspidate, lower surface usually shiny and not whitish (rarely whitish beneath: '*O. deltoideus*'), 9–13 pairs of side veins below the apex, angle of divergence 45–65°, indistinctly to distinctly joined towards the margin, tertiary veins percurrent, quaternary veins percurrent to reticulate, adaxially with an undivided, disc-shaped, prominent gland on junction lamina base/petiole, 1–2 mm in diam., abaxially with a pair of conspicuous glands on lamina base, 0.75–3 mm in diam. and (0–)2–11 mm distant from midvein and petiole apex, sometimes absent on single leaves, without additional laminar glands (4 additional glands, 0.4 mm in diam.: *Webster & Hildreth 15117*). *Inflorescences* 2–18 cm long, often only with staminate flowers, if bisexual often with pistillate part longer than staminate part, staminate part 4–6 mm in diam. *Bracts of staminate cymules* 0.75–1.5 mm long, with a pair of undivided and often conspicuously shiny glands 0.6–1 mm long, distinctly overtopped by the bract. *Staminate flowers* 3 (rarely up to 6: *Jacobs 8609*) per cymule; pedicel 0.75–2 mm long; sepals 2, c. 0.75 mm long; stamens (6–)8 per flower, with filaments 0.25–0.5 mm long and anthers c. 0.5 mm long. *Pistillate flowers* 3–22 per thyse; pedicel 2–16 mm long, shorter in distal flowers; sepals 2, c. 0.5–1 mm long; ovary 1–1.5 mm long, bicarpellate, papillate or non-papillate, style 0.25–2.5 mm long, stigma 2–4 by c. 0.5 mm, undivided, with a small apical gland 1–2 mm long. *Fruits* 2–7 per infructescence; bract persistent; pedicel 8–25 mm long; calyx persistent; fruit excl. style 3.5–6 by 4–5.5 mm, indistinctly papillate, slightly sulcate, not carinate, style persistent, often only 1-seeded with lateral style; opened fruits not seen, usually shed unopened, pericarp c. 0.1 mm thick (i. e. 1 : 40 of fruit length); remaining columella c. 4 by 0.5 mm, hardly alate. *Seeds* c. 3 by 2.25 mm, with apical arillode.

Distribution — *Malesia*: throughout New Guinea.



Map 6. Distribution of *Omalanthus nervosus* J. J. Sm.

**Habitat & Ecology** — Found especially on ridges and slopes, in mossy, montane forest, *Nothofagus* and *Castanopsis*-oak forest, especially on margins, along tracks, in young (3–5 years old) or advanced (50 years old) regrowth, in open low scrub, on rocky streambanks. Soil: black peat over yellow clay, stony clay, loam, limestone, brown soil (pH 6–6.5), sand, of good to medium drainage or quite wet. Locally very common, sometimes even one of the principal species. Altitude 1400–2600 m. Flowers and fruits collected the year round, flowers with a maximum in July–Aug.

**Uses** — The fruits are favourite food for pigeons. The sap is known as fish poison and to be irritant to the eyes.

**Vernacular names** — New Guinea: amb (Mendi); ambobai, ambupi, ambupokai (Enga); bobo, gioriba (Middle Waria); bufan tikik (Telefomin); kareim (Aiyura); korosomore (Naho); kurup (Hagen, Wankl); mauk (Jal, Madang); nenifi (Wapi); tukko (Anona).

**Notes** — 1. *Omalanthus nervosus* and *O. vernicosus* are perfectly identical. Airy Shaw (1980a) distinguished both species only by the leaf venation being conspicuously prominent above in the latter and not prominent in the former. It is correct that the type of *O. vernicosus* is untypical in this respect for the majority of the known specimens, but this is also true for the type of *O. nervosus*, a specimen not examined by Airy Shaw.

2. *Omalanthus deltoideus* differs from typical *O. nervosus* only in the abaxially slightly whitish leaves and in the quite small inflorescences and flowers, e.g., only 6 stamens per flower. Also, the fruits are somewhat larger than in *O. nervosus* (8 by 7 mm). Airy Shaw himself (1968) had discussed *Brass* 30586, which he later made the type of *O. deltoideus*, concluding that it should not be separated from *O. nervosus*, not even by varietal name. This seems agreeable. Nevertheless, the most obvious character of *O. nervosus*, the leaves being shiny and not whitish beneath, shows exceptions.

3. *LAE (Stevens & Isles) 58351* from E New Britain, Mt Lululua, differs from typical *O. nervosus* by having leaves which are distinctly whitish beneath and have unusually small glands, but only studied in quite poor material. If belonging to *O. nervosus*, it would be the first record of this species for the Bismarck Archipelago.

## 9. *Omalanthus novoguineensis* (Warb.) K. Schum. — Map 7

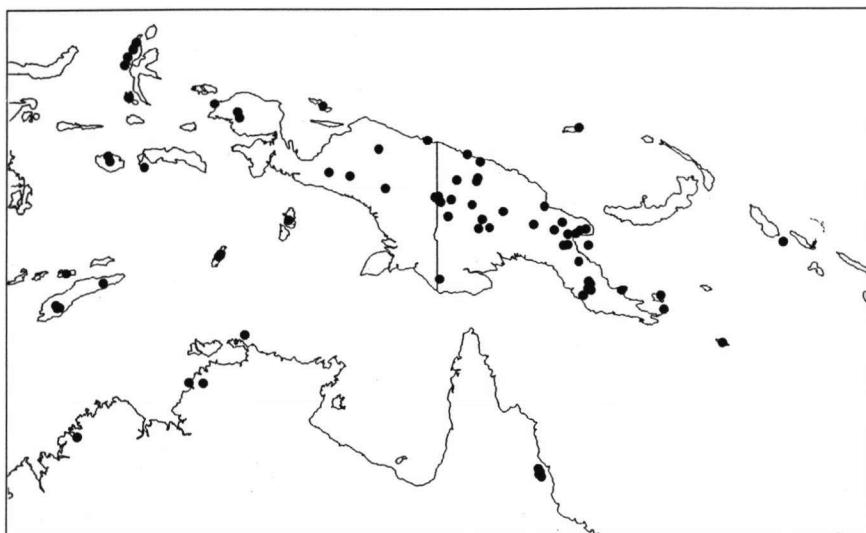
*Omalanthus novoguineensis* (Warb.) K. Schum. in K. Schum. & Lauterb., Fl. Schutzgeb. Südsee (1900) 407 [as '*novo-guineensis*']; J.J. Sm. in Lorentz, Nova Guinea 8 (1912) 792; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, v (1912) 48; Ridl., Trans. Linn. Soc., Bot. 9 (1916) 147; Airy Shaw, Kew Bull. 21 (1968) 410; Kew Bull. Add. Ser. 8 (1980) 118; Muellera 4 (1980) 238, 244; Kew Bull. 35 (1981) 642, f. 3B; Kew Bull. 37 (1982) 25; P.I. Forster, Teloepa 6 (1994) 170. — *Carumbium novoguineense* Warb., Bot. Jahrb. 18 (1893) 199. — Type: *Hellwig 555* (B† holo; iso K), Papua New Guinea, 'Finschhafen, am Sattelberg'.

*Omalanthus brachystachys* Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, v (1912) 47; Airy Shaw, Kew Bull. 21 (1968) 410. — Lectotype (here proposed): *Schlechter 16392* (A holo; iso P-3 sh.), Papua New Guinea, Kaiser Wilhelmsland, 'am Minjem'.

*Omalanthus tetrandrus* J.J. Sm. in Lorentz, Nova Guinea 8 (1912) 791, t. 140; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, vii, add. V (1914) 420; Airy Shaw, Kew Bull. Add. Ser. 8 (1980) 120; Kew Bull. 37 (1982) 25. — Type: *von Römer 912* (BO holo, n.v.; iso L), New Guinea, Irian Jaya, 'Vorgebirge des Hellwig-Gebirges'; syn. nov.

- Omalthus elegans* Gage in Herderschee, Nova Guinea 12 (1917) 483, t. 186; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, xvii, add. VII (1924) 198; Airy Shaw, Kew Bull. 21 (1968) 410. — Type: *Pulle 249* (BO holo, n.v.; iso K, L, U), New Guinea, Irian Jaya, North R. nr Kloofbivak.
- Omalthus crinitus* Gage in Herderschee, Nova Guinea 12 (1917) 484; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, xvii, ad. VII (1924) 198; Airy Shaw, Kew Bull. Add. Ser. 8 (1980) 120. — Type: *Pulle 168* (BO holo, n.v.; iso K, L), New Guinea, Irian Jaya, North River near Kloofbivak; syn. nov.
- Omalthus beguinii* J.J. Sm., Bull. Jard. Bot. Buitenzorg III, 6 (1924) 98; Heyne, Nutt. Pl. Ned. Ind., ed. 3, 1 (1950) 959; Airy Shaw, Kew Bull. 37 (1982) 24. — Lectotype (here proposed): *Beguin 1160* (BO n.v.; iso L), Moluccas, Ternate, Toramadiahi; syn. nov.
- Omalthus pachystylus* Airy Shaw, Kew Bull. 34 (1980) 595; Kew Bull. Add. Ser. 8 (1980) 119. — Type: *Hyndman 4* (K holo; iso L), Papua New Guinea, Western Prov., Kiunga Subprov., 43 km NE Ningerum; syn. nov.

Tree up to 25 m tall, dbh up to 50 cm, straight, much-branched and with umbrella-shaped crown; without buttresses. Glabrous to yellowish-brownish puberulous. *Bark* glabrous to puberulous, c. 5 mm thick, medium tan to creamy-white to grey, finely vertically fissured, with round pustular lenticels; under bark light green; inner bark straw to brown to purple-brown. *Stipules* 0.7–2 cm long. *Leaves*: petiole 2–13 cm long, glabrous to puberulous, glandless; lamina orbiculate to ovate to elliptic, 4.5–22 by 3.5–20 cm, index 0.8–1.7, base cuneate to rounded to slightly emarginate, peltate (up to 25 mm) or not, apex acute to acuminate, lower surface whitish but most of venation of different colour, glabrous to puberulous, side veins in 9–13 pairs below the apex, angle of divergence 45–55°, hardly joined towards the margin, tertiary veins percurrent, quarternary veins reticulate, adaxially on junction lamina base/petiole with an undivided, disc-shaped, prominent gland 1–2 mm in diam., glandless only when base peltate, abaxially usually with a pair of glands near base, 0.25–1.25 mm in diam. and 1–15 mm distant from petiole apex, additionally with 0–3 glands on each half of blade, 0.3–0.4 mm in diam. and 3–5 mm distant from leaf margin, rarely completely glandless abaxially. *Inflorescences* 5–13 cm long, sometimes bisexual and then pistillate part as long as or longer than staminate part, but quite often only with staminate or only with pistillate flowers, staminate part 5–7 mm in diam., glabrous to puberulous. *Bracts of staminate cymules* 0.9–1.25 mm long, at base with a cluster [at least (3 or) 4 pairs] of foveolate to cup-shaped glands with shiny centre and glaucous-papillate, often elevated margin, 0.75–1.5 mm long and consisting of at least 6 single glands 0.2–0.4 mm in diam., distinctly (by 0.4–0.8 mm) overtopped by the bract. *Staminate flowers* (1–)3(–6) per cymule; pedicel 1–2.5 mm long; sepals 2, c. 0.5–0.7 mm long; stamens 6–8 per flower, with filaments c. 0.3 mm long and anthers 0.3–0.4 mm long. *Pistillate flowers* 8–30 per thyrse if not absent at all; pedicel 2–10 mm long; sepals 2, c. 1 mm long; ovary 1–2 mm long, bicarpellate, papillate, style 0.2–1 mm long, stigma 1–2 by 0.3–0.5 mm, undivided, with a minute apical gland (up to 0.5 mm long) or rarely glandless. *Fruits* 2–30 per infructescence; bract persistent; pedicel 0.8–3.5 cm long; calyx caducous; fruit excl. style 5–13 by 6–9 mm, papillate, distinctly to indistinctly sulcate, not to slightly carinate, style persistent, fruits often one-seeded and then with a lateral, oblique style; regularly opened fruits not uncommon, pericarp 0.2–0.25 mm thick (i.e. 1:30 of fruit length), the remaining columella 5 by 1 mm, slightly alate. *Seeds* c. 4.5 by 4–4.5 mm.



Map 7. Distribution of *Omalanthus novoguineensis* (Warb.) K. Schum.

Distribution — N and NW Australia (West Australia, Northern Territory, Queensland) and in *Malesia*: Lesser Sunda Islands (eastern part), Moluccas, New Guinea, Solomon Islands.

Habitat & Ecology — Found in secondary growth of e.g. *Castanopsis*-oak forest, on plains and slopes, as landslide coloniser, in mossy forest with Myrtaceae, *Papua-cedrus*, and Podocarpaceae, old garden sites, *Eucalyptus* savanna, ladang along shallow river, on riverbanks and by streams, forest edge along sago swamps, in low lying and mostly water-logged fallows. Soil: old coral limestone, well-drained volcanic soil, dark marshy soil, rocky or poorly drained consolidated alluvium, clayey soil on limestone, alluvial sandy clay. Locally common, often even as characteristic and chief dominant species. Altitude 10–2300 m. Flowers and fruits collected all the year round, most often May–June. The fruit is said to be attractive to birds.

Uses — The latex is known as poison and harmful to the eyes. The sap of young leaves is administered to young children as mild laxative (Heyne, 1950). Leaves and bark are used as black dye (Heyne, 1950). The leaves are used for wrapping food, the wood as firewood, and for construction.

Vernacular names — Lesser Sunda Islands: ba'an (Dawan, Timor); bussii, fkeno (Timor); lalaa, tawa (Alor). Moluccas: palake, palate (Halmahera). Irian Jaya: kauw (Maibrat, Vogelkop); kopa (Kapaukoe, Wissel Lakes). Papua New Guinea: ambuboi (Enga); as defen, defen (Miyannin); bangium, bangiumba (Waskuk); bobo (Garaina, Bulolo); demeng sesakele (Finschhafen); hubawo (Kutubu); iduan (Wagu); imbo (Huli); kerrilla (Orne); nenum (Wapi, Marok); simsam (Weng); ugafo (Orokaiva).

Notes — 1. For the distinction from *O. populifolius* see Note 3 under that species.

2. *Omalanthus pachystylus* was distinguished from *O. novoguineensis* by somewhat larger (7–13 mm long), non-carinate fruits with thicker styles. Airy Shaw admitted that there was no clear morphological gap between both taxa. Indeed, leaves

and flowers of both taxa are identical, and the cited difference in the style could not be verified. Both taxa are united here. In this broad circumscription the fruits of *O. novoguineensis* are more variable than those of the other Malesian species.

3. *Omalanthus tetrandrus* (including *O. crinitus*) differs from typical *O. novoguineensis* only in the presence of a distinct indumentum, but is identical in all other characters studied. Usually, *O. novoguineensis* is glabrous. Pubescence may be found, however, in most parts of its distributional area, including Australia. Density, length, and localization of the hairs is very variable. *Hoogland 10417* and *Schlechter 16392* show minute, 0.1 mm long and nearly papillate hairs only on the petiole apex; *Brass 2006* and *Lauterbach 2487* have somewhat longer hairs on petioles and mid-vein of leaves; the leaves of *von Römer 912*, the type of *O. tetrandrus*, are densely covered with c. 0.6 mm long hairs over the whole lower surface, in particular on the veins; most extreme is *Hoover 494*, where not only leaves but also stipules and floral bracts are densely hairy. It is suggested here to treat the hairiness as variable; consequently, the respective taxa have to be united. Glabrous and hairy plants often grow together and may sometimes be distinguished by few additional characters, e.g. of the leaf base (Novotny, pers. comm.), but intergrade.

### 10. *Omalanthus populifolius* Graham — Map 8

*Omalanthus populifolius* Graham, Edinb. New Philos. J. 3 (1827) 175; Bot. Mag. 54 (1827) t. 2780; Baillon, Étude Euphorb. (1858) Atlas pl. 8, f. 22–26; Pax in Engl. & Prantl, Nat. Pflanzenfam. 3, 5 (1890) f. 60 (as '*populneus*'); Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, v (1912) 46, f. 7; Airy Shaw, Kew Bull. 21 (1968) 410; Sykes, New Zeal. J. Bot. 7 (1969) 302; Airy Shaw, Kew Bull. Add. Ser. 8 (1980) 119; Muellera 4 (1980) 238, 244; Kew Bull. 35 (1981) 642; P.I. Forster, Telopea 6 (1994) 169. — *Carumbium populifolium* (Graham) Benth., Fl. Austral. 6 (1873) 150. — Type: *Graham s.n.* (E holo, photo in K; iso K, n.v.), native of Australia, from seed collected by Fraser in 1824, cultivated in Hort. Bot. Edinburgh and flowering in 1827.

*Omalanthus goodenoviensis* Airy Shaw, Kew Bull. 21 (1968) 417; Kew Bull. Add. Ser. 8 (1980) 118. — Type: *Brass 24932* (K holo; iso L), Papua New Guinea, Milne Bay Prov., Goodenough Island (D'Entrecasteaux Group); syn. nov.

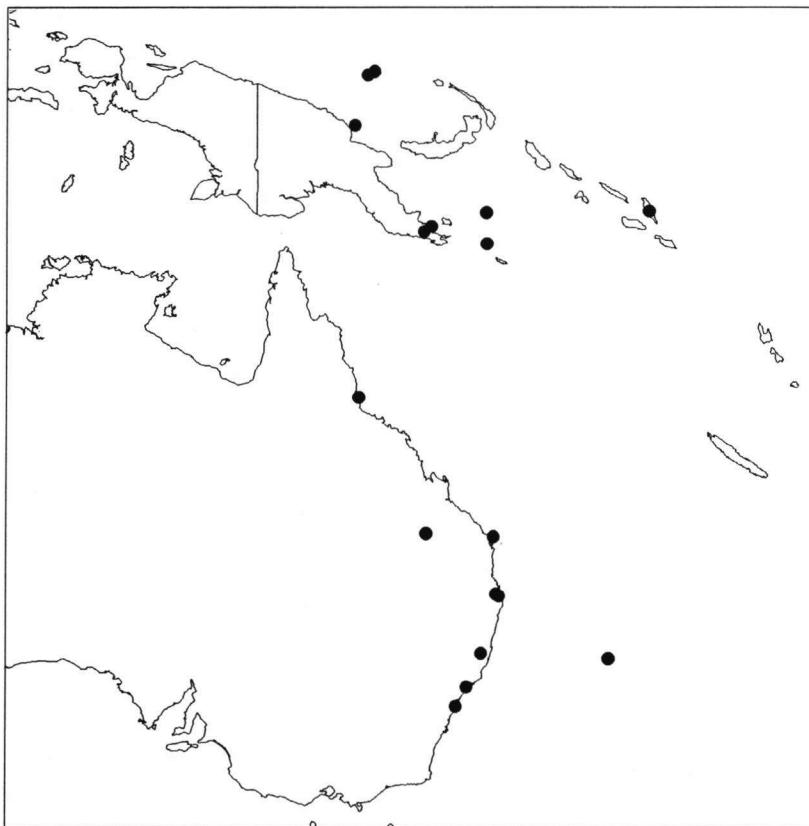
*Omalanthus populneus* auct. non (Geiseler) Pax: Müll. Arg. in DC., Prodr. 15, 2 (1866) 1144, p.p. (under *Carumbium*); De Wild., Icon. Horti Then. 5 (1904) 37, pl. 169.

Shrub or tree, up to 12 m tall, dbh 5 cm, with a straight bole and an open, spreading crown. Glabrous. *Stipules* c. 1.5 cm long. *Leaves*: petiole 1.5–7 cm long, glandless; lamina orbiculate to ovate, 3–11.5 by 2.5–9 cm, index 1.1–1.8, base obtuse, very base often attenuate, not peltate, apex acuminate, lower surface whitish with most of venation of different colour, side veins in 9–13 pairs below the apex, angle of divergence 45–60°, hardly joined towards the margin, tertiary veins percurrent, quaternary veins reticulate, adaxially with an undivided, disc-shaped, prominent gland on junction lamina base/petiole, 0.75–1 mm in diameter, abaxially with 0–2 laminar glands c. 0.25 mm in diam. and c. 2–4 mm distant from leaf margin, basal ones not enlarged. *Inflorescences* 4–9 cm long, bisexual, the staminate part c. 6 mm in diam. *Bracts of staminate cymules* 0.75–1 mm long, with a comparatively small pair of roundish to pillow-shaped glands c. 0.25(–0.6) mm long, distinctly overtopped by the bract, sometimes with 2 or 3 pairs of glands, rarely glandless (most bracts of *Brass 28722*). *Staminate flowers* 1(–3) per cymule; pedicel 0.75–2 mm long; sepals

2, 0.6–1 mm long; stamens 6–8 per flower, with filaments c. 0.3 mm long and anthers c. 0.4 mm long. *Pistillate flowers* 1–4 per thyrses; pedicel c. 5–15 mm long; sepals 2, 0.75–1.25 mm long; ovary 1.5–2 mm long, bicarpellate, papillate or glabrous, style c. 0.25–1 mm long, stigma 1–4 by 0.4–0.5 mm, undivided, with a minute apical gland c. 0.4 mm long or rarely glandless. *Fruits* 1–4 per infructescence; bract sometimes persistent; pedicel 1.2–3.8 cm long; calyx hardly persistent; fruit excl. style 5–8 by 6–8 mm, sulcate, not carinate, papillate or not, style persistent; regularly opened fruits not seen. *Seeds* not studied in Malesian specimens.

**Distribution** — NE and E Australia (Queensland, New South Wales), Solomon Islands, and *Malesia*: New Guinea (Papua New Guinea, including Admiralty Islands). Cultivated in many Botanical Gardens, and in Sri Lanka probably naturalized from cultivation.

**Habitat & Ecology** — Found in lowland and lower montane forest regrowth, secondary forest, well drained or swamp forest, on ridges, riversides. Soil: coral rubble, sandy soil, brown loam. Locally occasional to common. Altitude: from sea level up to 1000 m. Flowers collected July–Jan., fruits Mar., July, Oct.–Dec. Flowers reported to have a faint smell.



Map 8. Distribution of *Omalanthus populifolius* Graham.

Uses — In Australia used as a pioneer tree in landscape rehabilitation projects. In botanical gardens planted as an ornamental tree.

Vernacular names — Papua New Guinea: kinapuk. Australia: native bleeding heart, native poplar, Queensland poplar.

Notes — 1. Forster (1994) had united *O. populifolius* with *O. nutans* (G. Forst.) Guillemin from several Pacific Islands, the latter the older name and thus taking priority. This is not followed here. *Omalanthus nutans*, instead, differs from the former in several significant characters: leaves with a pair of adaxial base glands, bract glands large and hardly overtopped by bract, staminate flowers with only 1 sepal and 10–20 stamens each, ovaries and fruits 2- or 3-carpellate. This is certainly enough to keep the two species separate. Pax & Hoffmann (1912) even put them in different sections of *Omalanthus*. The ovaries, however, may be papillate or not in both taxa and are, therefore, of minor significance (this character had been stressed by Forster). The superficial similarity in habit may also be found in several other species of the genus.

2. *Omalanthus goodenoviensis*, i. e., the collections from the Goodenough Island, differs from the remaining Malesian collections in the non-papillate ovaries and fruits and in the short pedicels of the staminate flowers. These pedicels are so short that the flowers remain covered partly by the bract; but, indeed, the flowers are not sessile as Airy Shaw (1980a) had stated. Airy Shaw (1968), when establishing this species, did not compare it with *O. populifolius*, and it is indeed not different from the latter.

3. *Omalanthus populifolius* is very close to *O. novoguineensis*. Both are the only species of the genus where multiple bract glands may occur, and leaves, flowers, and fruits are hardly distinguishable. The stigma length, used repeatedly by Airy Shaw, does not separate both taxa. Interestingly, he first (1968) did not see a difference in this character, whereas he later (1981) distinguished *O. populifolius* by elongate stigmata. This character is as variable in *O. populifolius* as in most other species. Only two herbarium characters remain for separation from *O. novoguineensis*: the number of bract glands [1–3 pairs against at least (3 or) 4 pairs], and their morphology (roundish pillow-shaped with uniform surface against cup-shaped to foveolate with papillate margin and shiny centre). Additionally, *O. novoguineensis* sometimes is puberulous, contrary to *O. populifolius*, the number of pistillate flowers per thyrse is usually much higher in *O. novoguineensis*, and inflorescences are more often unisexual in the latter; but these last characters are not always visible. The limits of both species remain somewhat vague, and field studies may be necessary to evaluate the reliability of these features. Airy Shaw (1968) suspected introgression. The hairy-papillate ovary surface, used by Forster (1994), does not distinguish both. Contrary to the repeated confusion with *O. populneus* (compare the literature citations under both taxa!) and remarks like those of Airy Shaw (1968), this species does not seem to resemble *O. populifolius* closely.

4. Malesian specimens differ from the 'typical' *O. populifolius*, like the forms found in Australia and in botanical gardens, in pistillate flowers with somewhat shorter stigmata (often only 1–2 mm long) and mostly only 1-flowered staminate cymules. Otherwise, they match the type well. The bract glands may be missing on individual bracts, but never on all. Somewhat exceptional is the collection *NGF 36728*; it is the only Malesian one with 3-flowered staminate cymules, and the bract glands are 0.6 mm in diameter (the largest found in Malesia).

11. *Omalanthus populneus* (Geiseler) Pax — Map 9

*Omalanthus populneus* (Geiseler) Pax in Engl. & Prantl, Nat. Pflanzenfam. 3, 5 (1890) 96, excl. f. 60; Kuntze, Revis. Gen. Pl. 2 (1891) 609; Merr., Philipp. J. Sc. 1, Suppl. (1906) 83; J. J. Sm. in Koord. & Valetton, Bijdr. Boomsoort. Java 12 (1910) 621; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, v (1912) 46; Merr., J. Str. Br. Roy. As. Soc. (1921) 347; Enum. Philipp. Flow. Pl. 2 (1923) 460; Philipp. J. Sc. 29 (1926) 387; Pl. Elmer. Born. (1929) 166; Corner, Ways. Trees Malaya 1 (1940) 257; Holthuis & H. J. Lam, Blumea 5 (1942) 202; Heyne, Nutt. Pl. Ned. Ind., ed. 3, 1 (1950) 959; Heine, Feddes Repert. Spec. Nov. Regni Veg. 54 (1951) 235; Salvosa, Lex. Philipp. Trees (1963) 105; Backer & Bakh. f., Fl. Java 1 (1963) 498; Airy Shaw, Kew Bull. 26 (1972) 281; Whitmore, Tree Fl. Malaya 2 (1973) 102; Airy Shaw, Kew Bull. Add. Ser. 4 (1975) 136; Kew Bull. 36 (1981) 310; Kew Bull. 37 (1982) 25; Alph. Enum. Euph. Philipp. Is. (1983) 33; Keßler & Sidiyasa, Tropenbos Ser. 7 (1994) 129, f. 96. — *Stillingia populnea* Geiseler, Croton. Monogr. (1807) 80. — *Carumbium populneum* (Geiseler) Müll. Arg. in DC., Prodr. 15, 2 (1866) 1144. — *Omalanthus populneus* (Geiseler) Pax var. *genuinus* Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, v (1912) 46, nom. inval. — Type: *Herb. Thunberg* in *herb. Dahl s.n.* (C holo, microfiche 2201-73-16 & -17; ?iso UPS, n.v.), sine loc. (see Note 1).

*Carumbium populifolium* Reinw., Elench. Sem. Hort. Leiden ex Isis 1 (1823) 319 (nom. seminud., see Note 2); in Blume, Cat. Pl. Bogor. (1823) 105, nomen; T. Nees, Flora 8 (1825) 103, nomen (as '*Garumbium*'); Reinw., Syll. Pl. Nov. 2 (1825) 6; Miq., Fl. Ind. Bat. 1, 2 (1859) 414; Scheff., Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 127. — Lectotype (here proposed): *Reinwardt s.n.* (L sheet no. 904.75-183), Java.

*Omalanthus leschenaultianus* A. Juss., Euphorb. Gen. (1824) t. 16 f. 53; Blume, Bijdr. 12 (1826) 627; Hassk., Cat. Hort. Bot. Bogor. (1844) 234. — Type: *Leschenault de la Tour s.n.* (P-JU Cat. 16568 holo, microfiche 1199/5), Java.

*Excoecaria laevis* Blanco, Fl. Filip. (1837) 788; Fl. Filip. ed. 2 (1845) 543; Fl. Filip. ed. 3 (1879) 194. — *Omalanthus populneus* (Geiseler) Pax var. *laevis* (Blanco) Merr., Sp. Blancoan. (1918) 230; Enum. Philipp. Flow. Pl. 2 (1923) 460 ('*levis*'); Salvosa, Lex. Philipp. Trees (1963) 106 ('*levis*'); Airy Shaw, Alph. Enum. Euph. Philipp. Is. (1983) 33. — Neotype (here proposed): *Merrill Species Blancoanae* 75 (L holo; iso BM, F, K, NY, P), Philippines, Luzon, Batangas Prov.

*Carumbium populneum* (Geiseler) Müll. Arg. var. *minus* Müll. Arg. in DC., Prodr. 15, 2 (1866) 1145. — *Omalanthus populneus* (Geiseler) Pax var. *minor* (Müll. Arg.) Merr., Philipp. J. Sc. 7, Bot. (1912) 390; Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, vii, add. V (1914) 420; Merr., Sp. Blancoan. (1918) 230; Airy Shaw, Alph. Enum. Euph. Philipp. Is. (1983) 33. — Type: *Meyen s.n.* (B† holo), Philippines, Luzon, prope Manila.

*Omalanthus populneus* (Geiseler) Pax var. *siccus* Pax in Engl., Pflanzenr. IV, 147, v (1912) 46, p. p. quoad synonyma *Excoecaria laevis*, *Carumbium populifolium* var. *minus*; Merr., Philipp. J. Sc. 7, Bot. (1912) 390.

*Omalanthus sulawesianus* Airy Shaw, Kew Bull. 35 (1980) 398; Kew Bull. 37 (1982) 25. — Type: *Musser 917* (K holo; iso K), Central Celebes, Sungai Sadaunta; syn. nov.

*Omalanthus populifolius* auct. non Graham: Fern.-Vill. in Blanco, Fl. Filip. ed. 3, Nov. App. (1880) 196; Vidal, Revis. Pl. Vasc. Filip. (1886) 247; Hook. f., Fl. Brit. India 5 (1888) 469; Boerl., Fl. Ned. Ind. 3 (1900) 295; Ridl., J. Fed. Malay States Mus. 8 (1917) 84; Fl. Malay Penins. 3 (1924) 313; Burkill, Dict. Econ. Prod. Malay Pen. 1 (1935) 1182.

?*Omalanthus giganteus* auct. non Zoll. & Moritz: Boerl., Fl. Ned. Ind. 3 (1900) 295; Merr., J. Str. Br. Roy. As. Soc. (1921) 347.

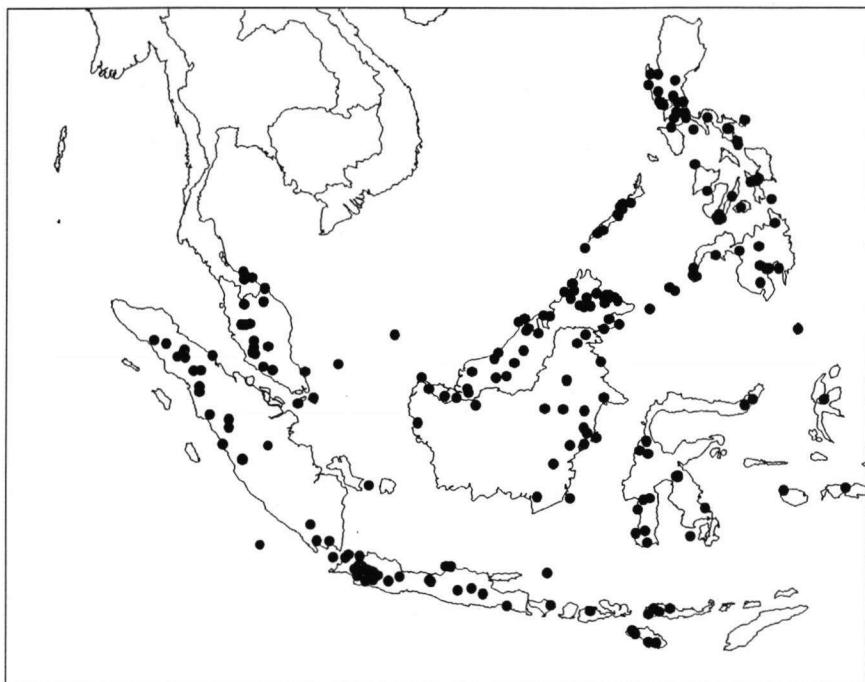
*Sapium sebiferum* auct. non (L.) Roxb.: Hutch., J. Linn. Soc., Bot. 42 (1878) 136.

Tree up to 10 m tall, dbh up to 18 cm, with slender, terete, crooked to straight trunk, numerous spreading, flexible branches, and a flattish but spreading crown; branching "with Koriba's model"; without buttresses. Glabrous. *Bark* pale brown to grey, non-fissured but lenticelled and mottled with pale patches, with greyish lenticels,

yellow on the inside, very thin, soft; cambium yellow; inner bark pale whitish to purple. *Wood* tasteless and odourless or with a slight disagreeable odour. *Stipules* 0.8–2 cm long. *Leaves*: petiole 1–15 cm long, glandless; lamina orbiculate to ovate to lanceolate, 3–22 by 1.5–20 cm, index 0.8–4.6, base rounded to slightly emarginate to, rarely, cuneate, not or indistinctly (up to 1 mm) peltate, very base often attenuate, apex acuminate, lower surface usually whitish with larger veins of different colour, rarely not whitish at all, side veins in 9–15 pairs below the apex, angle of divergence 50–60(–80)°, partially to completely joined towards the margin, tertiary veins percurrent, quarternary veins reticulate and usually indistinct, adaxially without any prominent gland, but often with 2 glandular auricles up to 0.6 mm long, abaxially with 1–3 glands on each half of blade, 0.2–0.5 mm in diam. and close to the margin (5–15 mm distant from margin), basal ones sometimes enlarged (0.75–1.5 mm in diam.) and close to or touching the midvein if not absent. *Inflorescences* 3–30 cm long, usually bisexual, occasionally wholly staminate, staminate part 6–9 mm in diam. *Bracts of staminate cymules* 0.75–1.5 mm long, with a pair of large undivided glands 0.5–1.5 mm long and only slightly (0.2–0.3 mm) overtopped by the bract. *Staminate flowers* (1–)3 per cymule; pedicel 0.6–3 mm long; sepals 2, c. 0.6 mm long; stamens (6–)8–10 per flower with filaments c. 0.4 mm long and anthers c. 0.3 mm long. *Pistillate flowers* 0–4(–21) per thyrses; pedicel 3–12 mm long; sepals 2, soon caducous; ovary c. 2 mm long, bicarpellate, papillate, style c. 0.6–1.5 mm long, stigma 1.5–3(–6) by 0.6–0.7 mm, apically undivided to slightly emarginate to shortly divided (see Note 3), glandular over its whole length or only the apical or basal 0.5 mm glandless. *Fruits* 2–4(–8) per infructescence; bract persistent; pedicel 1–2.5 cm long; calyx caducous; fruit excl. style 4–9 by 5–8 mm, papillate, slightly sulcate, not carinate, style 0.3–1 mm long, the stigma 1.5–3 by 0.6 mm; regularly opened fruits not uncommon, opening primarily loculicidally, pericarp c. 0.2–0.3 mm thick (i.e. 1:15–1:20 of fruit length), remaining columella c. 4 by 1 mm, slightly alate. *Seeds* c. 3.5–6 by 3–4 mm, upper half enveloped by arillode.

*Distribution* — Endemic to *Malesia*: Malay Peninsula (from the S border of Thailand/Isthmus of Kra southwards, incl. Singapore), Sumatra, Java, Borneo, Philippines (excl. N Luzon), Lesser Sunda Islands (western part), Sulawesi, Moluccas.

*Habitat & Ecology* — Found in secondary vegetation with *Dendrocalamus*, very open to old and shady secondary forest, light thicket, in *Casuarina equisetifolia* forest, disturbed *Lithocarpus* forest, at edges of lowland rain forest and *Agathis* forest, on roadsides, clearings, steep slopes (even extremely steep ones), forested ridges, exposed edge of hill forest, forest and secondary vegetation along river and in open rocky stream bed, on exposed cliff top, among heath-like vegetation, in waste land among high weeds, in cattle pasture, in 5-year-old *Gmelina* plantation. *Soil*: over granitic or sandstone rock, limestone rubble, shallow soil on rock with sulphur, ultramafic soil, silt clay, yellowish brown sandy loam, white sand, deep humus layer over clay, peaty soil, rusty red soil with concretions of iron, fertile compact soil. Locally scattered to frequent and gregarious, often one of the characteristic plants in recently cleared areas. Altitude from sea level up to 3000 m (see Note 4). Flowers and fruits collected all year round. Evergreen (Smith, 1910). Ants' nests are commonly observed in the upper branches.



Map 9. Distribution of *Omalanthus populneus* (Geiseler) Pax.

Uses — The fruits are used medicinally for wounds, e. g., in Sabah. The leaves are dried on the fire and are used after birth by putting them on the stomach, or the heated leaves are applied by the Malays to the abdomen for fever (Burkill, 1935). The bark and the leaves are, in connection with a certain kind of mud, used for dyeing clothes blackish. The dried and powdered leaves act as a vermifuge when fed to cattle (Heyne, 1950). The pounded leaves mixed with ashes and pepper sprayed in rivers act as fish poison. The plant adds flavour to tobacco (Bernstein 524). The wood is of low value and perishes quickly, but it is good firewood. Sometimes planted, but suitable for afforestation only on better soils (Lörzing 223).

Vernacular names — Malay Peninsula: ludai paya, moyia (Ridley, 1924); mahang di-makan pelandok, mumah lapan (Burkill, 1935); maya maya, memaya, mouse deer's poplar (Corner, 1940). Sumatra: apasapas (N Sumatra); balanti; bodi (Minangkabau); baleh-baleh angin (Padang); delenge (Enggano); doelpok, sindoelpok, kajoe sindoelpok (E coast); karembi (Djasilin); kilimijah (Djambi); meloe (Gunung Koerintji). Java: balik lar (Gunung Muria); djarak prati, karembi, karembi badak, mroewoe, toetoe, toetoe lakek (Smith, 1910); kareumbi (Sunda); karumbi burrum (Gedeh); toetop(a)-bang (Kediri area). Borneo: bangki (Bajau); belok malok (Dusun Keningau); belontos, butah butah paya, sedaman (Brunei); bubalong, bungalau (Sungei); buta buta (Malay); buta lalat (Martapura); delamato (Dusun Kandangan); gela (E Kalimantan),

near long lees); kalang matoh (Dusun Tambunan); kepelak (Kenyah); ketapang lalat (Ulu Anap, Tatau, Sarawak); ketukpok (E Kalimantan); laru (E Kalimantan, near Longbagun); ludai api (Melaya); majin (Boengoeran Is.); merendang (Bidayuh); tapang lalat (Iban). Philippines: balalanti (Cebuano); balanti, malabalanti (Salvosa, 1963; widespread); banti (Tawi-Tawi); batangig (Sibuyan); binuang-susong, malabinunga (Bataan; Merrill, 1912); bota-bota (Tayabas), botang gubat; buntatoli (Palawan); luglugun malagti; moguing (Bukidnon); santi (Yakan). Sulawesi: balante, tangu. Lesser Sunda Islands: lente, lente boé (Flores); woelloeroe (Sumba).

Notes — 1. The original type citation had been somewhat misleading. Geiseler (1807) wrote "Habitat in Zeylona. *Dahl*." Indeed, the original specimen in C does not give any locality and bears the note "Dahl a Dr. Thunberg." A probable isotype is found in the Thunberg herbarium in Uppsala under no. 22680, as judged from microfiche 1036-951-24. It is filed under *Croton* sp., which explains the treatment in Geiseler's *Croton* monograph. *Omalanthus populneus* obviously has never been found in Sri Lanka, and Geiseler must have been wrong in this respect. Thunberg indeed collected in Malesia, but included also other collections from several contemporaries into his herbarium. So, the identity of the real collector of the type remains uncertain.

2. *Carumbium populifolium* Reinw. was published first (1823) with a Latin footnote: "*Carumbium*: arbor tricocca, Crotonibus affinis." Van Steenis (1959) considered this not a scientific description and *Carumbium populifolium* Reinw. as a nomen semi-nudum "which should not serve for purpose of priority."

3. The concepts of the several Philippine varieties are somewhat overlapping and confusing. The Philippine plants of *O. populneus* are indeed remarkable by their often apically emarginate to divided stigmata. Pax & Hoffmann (1912) founded their var. *siccus* primarily on this character, but based its name on *Excoecaria sicca* Blanco, which is an *Alchornea* (Merrill, 1912). The stigmata, however, are not always divided in the Philippines and, very rarely, may be divided also in West Malesia. Smith (1910) cited this feature for Java, and three collections with distinctly emarginate stigmata were found in Borneo (e.g., *Murata et al. B-560*). Therefore, no taxonomic weight is given to this character.

4. Plants from Sulawesi often differ in the leaves which are narrowly elliptic to lanceolate (index 1.1–4.6 in Sulawesi, outside Sulawesi 0.8–1.3) with short petioles, not whitish beneath, and sometimes with very small flowers and fruits. *Omalanthus sulawesianus* is based on these differences. Usually, the differing plants were collected at elevations of 1700–3000 m, whereas outside of Sulawesi the species is only known from lower than 1700 m. But no morphological gap to typical plants exists in Sulawesi, and even on high altitudes typical, broad-leaved specimens were collected (e.g., *Eyma 603*, index 1.4). Therefore, *O. sulawesianus* is not kept separate from *O. populneus*. Although a comparable variability in leaf characters is not known from any other species of *Omalanthus*, it is not infrequent in other genera of the same tribe (Esser, 1994).

5. *Omalanthus populneus* is not known from Ambon (Moluccas). *Frutex excoecans* Rumphius, which was attributed to it by Merrill, Interpr. Herb. Amboin. (1917) 327, is probably identical with *O. novoguineensis*.

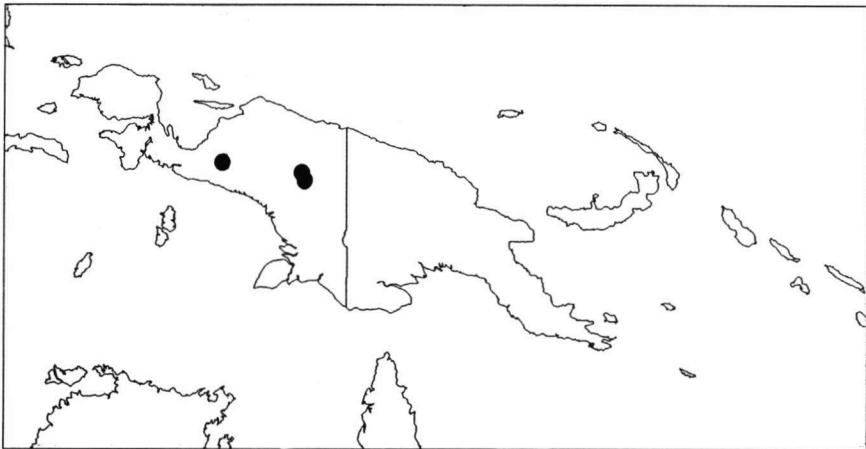
**12. *Omalanthus remotus* Esser, *spec. nov.* — Map 10**

*Omalanthus* laminae foliorum anguste ovatis supra glandulosis subtus distincte glaucis et basaliter glandulibus magnis ornatis, bracteis cymulorum masculinorum pedunculatis, glandulibus stigmarum dimidio longitudinis earundem tegentibus. — Typus: *Milliken 1178* (L holo; iso K), New Guinea, Irian Jaya, near Ilamik (1 hr walk E of Pronggoli), 2 Oct. 1992.

*Omalanthus leschenaultianus* auct. non A. Juss.: Ridl., *Trans. Linn. Soc. Lond.* 9 (1916) 147.

Tree up to 5 m tall. Glabrous. *Stipules* 0.5–1.5 cm long. *Leaves*: petiole 1–4 cm long, glandless; lamina narrowly ovate, 4.5–11.5 by 3–7 cm, index 1.6–2.7, base obtuse to rounded, very base often attenuate, not peltate, apex subacuminate to acuminate, lower surface whitish with darker larger veins, side veins in 10–14 pairs below the apex, angle of divergence 55–65°, distinctly to indistinctly joined towards the margin, tertiary veins reticulate to percurrent, quarternary veins reticulate, adaxially with a basal pair of pillow-shaped glands 1.2–1.5 mm in diam., abaxially with a basal pair of conspicuous, 0.8–3 mm long glands 0–4 mm distant from the midvein, on each side of midvein with additional 3–5 smaller, 0.3–0.4 mm long, submarginal glands 2–3 mm distant from the margin. *Inflorescences* 1.5–5 cm long, bisexual, staminate part 3–5 mm in diam. *Bracts of staminate cymules* with a peduncle 0.5–0.8 mm long, with a pair of undivided glands 0.3–0.5 mm long and only slightly to not overtopped by the bract. *Staminate flowers* 3 per cymule; pedicel up to 0.5 mm long; sepals 2, 0.3–0.6 mm long; stamens (4–)6 per flower, with very short filaments and anthers 0.3–0.4 mm long. *Pistillate flowers* 1 per thyrse; pedicel 8–11 mm long; sepals 2, c. 0.5 mm long; ovary 1–1.5 mm long, bicarpellate, papillate, style 0.5–1.5 mm long, stigma 1.5–3 mm long, undivided, with an apical to subapical gland 0.7–1.5 mm long. *Fruits* 1 per infructescence; pedicel 17–20 mm long; calyx persistent; fruit excl. style 4–5 by 4–5 mm, slightly sulcate, slightly carinate at back, papillate, style persistent; opened fruit not seen. *Seeds* not studied.

Distribution — *Malesia*: New Guinea (Irian Jaya).



Map 10. Distribution of *Omalanthus remotus* Esser.

**Habitat & Ecology** — Found in *Nothofagus*-dominated forest, and on limestone ridges. Altitude 1500–1900 m. Flowers and fruits collected in Feb., Mar, May, June, Aug., Oct.

**Uses** — The wood is used for making fire by friction.

**Vernacular names** — New Guinea: song, songkal (Jali).

**Note** — This new species is unique in the genus by the pedunculate floral bracts. The name refers to this character. It is obviously closely related to *O. arfakiensis* and differs from the latter also in the adaxially always glandular leaves without an acute base, percurrent tertiary veins and larger abaxial glands, and by larger stigma glands.

**Paratypes studied:** *Kloss s. n.*, (BM, K), New Guinea, Irian Jaya, Nassau Range, Camp VIb; *Mangen 2196* (A, L), Irian Jaya, Valentijn Mts, N of Angguruk; *Sauveur & Sinke 2560* (L), Irian Jaya, Angguruk; *Sinke 81* (L), Irian Jaya, Jayawijaya Distr., Anggaruk area; *Sosrodihardjo 135* (L), Irian Jaya, Ugamo hill, Enarotali.

### 13. *Omalanthus trivalvis* Airy Shaw — Map 4

*Omalanthus trivalvis* Airy Shaw, Kew Bull. 21 (1968) 415. — Type: *BSIP (Whitmore) 2236* (K holo; iso L), Solomon Islands, Santa Ysabel, Maringe Lagoon, Buala.

*Omalanthus xerocarpus* Airy Shaw, Kew Bull. 33 (1979) 536. — Type: *Kajewski 1691* (BRI holo; iso A), Bougainville, Kupei Gold Field; syn. nov.

Tree up to 17 m tall, girth up to 60 cm, crown large, diffuse; without buttresses. Glabrous. *Bark* light brown to grey, pustular; inside chestnut brown. *Slashwood* with a smell 'like medicine'. *Stipules* 1.2–4 cm long. *Leaves*: petiole 3–13 cm long, apically with an abaxial-lateral pair of disc-shaped glands 0.3–0.75 mm in diam.; lamina orbiculate to ovate, (3–)4.5–13.5 by (3–)4–14 cm, index 0.9–1.5, base rounded to emarginate, very base often slightly attenuate, usually not peltate, but rarely peltate by up to 6 mm, apex acuminate, lower surface whitish with complete venation of different colour, side veins 8–12 pairs below the apex, angle of divergence 45–50°, at least partially joined towards the margin, tertiary veins percurrent, quaternary veins reticulate to indistinctly percurrent, adaxially glandless, abaxially with 0 or 1 laminar gland c. 0.25 mm in diam. and c. 5 mm distant from leaf margin, very rarely also with the otherwise petiolar glands partially or totally on the lamina. *Inflorescences* 4–10 cm long, bisexual but pistillate flowers often absent, staminate part c. 6 mm in diam. *Bracts of staminate cymules* c. 1 mm long, with a pair of undivided glands 0.5–0.75 mm long and distinctly overtopped by the bract. *Staminate flowers* 1 per cymule; pedicel 1–1.5 mm long; sepals 2, c. 0.5 mm long; stamens (6–)9–12 per flower, with filaments and anthers each c. 0.25 mm long. *Pistillate flowers* 1 or 2 per thyse if not absent; pedicel 2–6 mm long; sepals 3, c. 0.5 mm long; ovary 1.5 mm long, tricarpellate, papillate, style 1–2 mm long, stigma 2.5–4 by 0.25 mm, undivided, with an apical gland 1–2 mm long. *Fruits* 1 or 2 per infructescence; bract often persistent; pedicel 2–4 cm long; calyx persistent; fruit excl. style 8–15 by 8–13 mm, tricarpellate, papillate, distinctly to indistinctly sulcate, each carpel carinate, style persistent; opening regularly and loculicidally, hardly along the septa, pericarp 1–1.2 mm thick (i.e. c. 1 : 10 of fruit length), each septum with 3 vascular strands, remaining columella c. 1 mm wide, not alate. *Seeds* 4.5–5 by 3.5–4 mm, totally covered by an arillode.

Distribution — Bougainville and the Solomon Islands.

Habitat & Ecology — Found in well-drained secondary forest, cloud forest, on steep slopes, ridge tops, cliffs, or flat plains. Soil: coral ground, lime. Altitude from sea level up to 1700 m. Locally common. Flowers and fruits were collected all year round with a maximum in Oct.

Uses — Pounded leaves are used for stupifying fish. Wood charcoal is used as paint on canoes. A drink made from the plant shall rid people from evil spirits.

Vernacular names — Bougainville: coondou, navi, tim-bar-ci. Solomon Islands: hi'isikima, nonilu, nonumba, sikima, sikona (Kwara'ae).

Notes — 1. The citation of this species for New Guinea by Airy Shaw (1980a) is erroneous and was based on a specimen of *O. longistylus* with some tricarpetate flowers (see Note 4 under *O. longistylus*).

2. *Omalanthus xerocarpus* is united here with *O. trivalvis*. Its type is a small-leaved form with quite indistinct leaf glands and only 6 stamens per flower, collected in a cloud forest at higher elevations, but reveals no substantial difference with *O. trivalvis*. Airy Shaw himself, when describing *O. xerocarpus*, did not cite any significant difference with *O. trivalvis*, but compared the species only with the Polynesian *O. acuminatus* which is quite different indeed.

#### DOUBTFUL SPECIES

#### 14. *Omalanthus polyadenius* Pax & K. Hoffm.

*Omalanthus polyadenius* Pax & K. Hoffm. in Engl., Pflanzenr. IV, 147, xiv, add. VI (1919) 57; Airy Shaw, Kew Bull. Add. Ser. 8 (1980) 119. — Type: *Ledermann 11948* (B† holo?), Papua New Guinea, Schraderberg, 'Gebirgswald'.

No extant type of this species could be traced. The description of Pax & Hoffmann (1919) gives only few distinguishing characters. Noteworthy are an undivided ad-axial-petiolar leaf gland, a pair of large abaxial laminar leaf glands near the leaf base, a row of additional submarginal leaf glands, and a pair of oblong glands at the floral bracts; staminate cymules with 3–5 flowers, and 5 or 6 stamens per flower. These characters are not sufficient to allow a determination of the specimen. It is improbable that *O. polyadenius* is a distinct species. It may be synonymous either with *O. nervosus* or with *O. populifolius*. The comments of Airy Shaw (1980a), who stated that *O. polyadenius* may be a juvenile form of *O. vermicosus* (= *O. nervosus*), may be right but are hypothetical. In my opinion, no definite synonymy should be proposed, and *O. polyadenius* should not be interpreted.

#### SOME REMARKS ON PACIFIC TAXA

Some remarks on *Omalanthus* species from outside Malesia are made here, although the species are not studied in detail.

#### *Omalanthus gracilis* St. John

When describing this species, St. John included detailed drawings and descriptions, as well as those of the related *O. stokesii* F.Br. (Nordic J. Bot. 4, 1984, 53–

56). Both differ mutually in some quantitative characters of thyrses, staminate, and pistillate flowers, and the leaf blades are apically subacute versus subacuminate. Compared with the species concepts now applied for Malesian *Omalanthus*, both certainly fall within the range of variation of a single species. Therefore, a new synonymy is proposed here:

***Omalanthus stokesii* F. Br.**

*Omalanthus stokesii* F. Br., Bishop Mus. Bull. 130 (1935) 151, f. 21, 101; St. John, Nordic J. Bot. 4 (1984) 56, f. 2. — Type: *Stokes 135* (BISH holo, n.v.), French Polynesia, Rapa Island, Maitua.

*Omalanthus gracilis* St. John, Nordic J. Bot. 4 (1984) 53, f. 1. — Type: *St. John 16162* (BISH holo, n.v.), French Polynesia, Austral Islands, Raivavae Island; syn. nov.

***Omalanthus schlechteri* Pax & K. Hoffm.**

A lectotype (*Schlechter 14884*, P) has been proposed by McPherson & Tirel, Fl. Nouv.-Caléd. 14, Euphorbiaceae 1 (1987) 29. It should be noted, however, that the original syntypes used by Pax & Hoffmann (*Franc 80*, *Schlechter 14884*) were not destroyed in Berlin, but are still extant in WRSL.

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## IDENTIFICATION LIST

Material of *Omalanthus* studied (only specimens with collector and number mentioned)

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|--|--|
| 1 = <i>O. arfakiensis</i> Hutch.               | 8 = <i>O. nervosus</i> J. J. Sm.               |
| 2 = <i>O. caloneurus</i> Airy Shaw             | 9 = <i>O. novoguineensis</i> (Warb.) K. Schum. |
| 3 = <i>O. fastuosus</i> (Linden) Fern.-Vill.   | 10 = <i>O. populifolius</i> Graham             |
| 4 = <i>O. giganteus</i> Zoll. & Moritzi        | 11 = <i>O. populneus</i> (Geiseler) Pax        |
| 5 = <i>O. grandifolius</i> Ridl.               | 12 = <i>O. remotus</i> Esser                   |
| 6 = <i>O. longistylus</i> Lauterb. & K. Schum. | 13 = <i>O. trivalvis</i> Airy Shaw             |
| 7 = <i>O. macradenius</i> Pax & K. Hoffm.      |  |
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