

A TAXONOMIC REVISION OF THE GENUS *AMARACARPUS* (RUBIACEAE, PSYCHOTRIEAE)

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SUMMARY

A taxonomic revision of *Amaracarpus* Blume (Rubiaceae, Psychotrieae) is presented. The salient characteristics of *Amaracarpus* are given, with particular attention to the differences between *Amaracarpus*, *Dolianthus* and *Psychotria*. The taxonomic account includes a key to species, an informal (artificial) subgeneric classification, full descriptions, and a list of specimens examined. *Amaracarpus* comprises 22 species: six new combinations are proposed, one new species is described, eight species are moved to other genera, the transfer of 12 species to *Psychotria* is confirmed, and numerous taxa are placed into synonymy. A checklist of all *Amaracarpus* names is provided.

Key words: *Amaracarpus*, *Dolianthus*, *Psychotria*, Psychotrieae, Rubiaceae, New Guinea, South East Asia.

INTRODUCTION

Amaracarpus Blume has been the subject of recent systematic debate (Nepokroeff et al., 1999; Andersson, 2002) and taxonomic confusion (e.g. Puff & Wong, 1993). Generally, the salient features of the genus are poorly known or misunderstood and the genus has become a heterogeneous assemblage of species, which is known to include taxa from other genera (e.g. Smith, 1988; Fosberg & Sachet, 1991). Recently, Davis & Bridson (2001) reinstated the genus *Dolianthus*, and transferred 11 species of *Amaracarpus* to it. In this contribution we propose a revised taxonomy for *Amaracarpus*, representing the first taxonomic revision for *Amaracarpus*, and attempt to provide a more satisfactory delimitation of the genus. Of the 77 names in *Amaracarpus* we recognize 22 species. The remaining names are placed in the synonymy of *Amaracarpus*, designated to other genera (e.g. *Lasianthus* (Lasiantheae), *Psychotria* (Psychotrieae), and *Saprosma* (Paederieae)), or are of unknown placement (species unknown to us). A checklist of all taxa described in *Amaracarpus* is provided.

The salient features of *Amaracarpus* are: 1) branches with a distinctly horizontal orientation; 2) leaves arranged in the same plane as the branches; 3) shoots with a generally monopodial growth pattern (flowering does not significantly effect the architecture of the shoot); 4) stipules usually with two or (less often) one distinct setae, or stipules sometimes entire (rarely deeply bifid: only one species); 5) inflorescences ‘near axil-

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lary' (flowers/inflorescences on very short side shoots or axillary brachyblasts (very condensed side shoots), or axillary; 6) flowers small, 4-merous; 7) corollas all white (or greenish); 8) filaments attached within the ring of internal corolla hairs (if hairs present); 9) fruits red (and containing two pyrenes); 10) pyrenes possessing marginal pre-formed germination slits (PGSs), which run along the inside margins of each pyrene for (1/2–)2/3 to the entire length; 11) endosperm entire; and 12) seed coat (testa) not staining red in the presence of 70% alcohol (SCP negative).

Dolianthus shares the same fruit morphology as *Amaracarpus* but differs in the following features: 1) branches mostly not distinctly horizontal; 2) leaves not arranged in the same plane as the branches; 3) shoots with a growth pattern generally sympodial (flowering influences shoot architecture); 4) stipules entire or minutely fimbriate (without obvious appendages); 5) inflorescences terminal to subterminal (overtopped); 6) flowers large and 5-merous; 7) corollas brightly coloured (usually bicoloured with blue and yellow); and 8) filaments attached above the ring of internal corolla throat hairs (if hairs present). Further information on *Dolianthus* is provided in Davis & Bridson (2001).

Amaracarpus has often been associated (e.g. Sohmer, 1988; Nepokroeff et al., 1999) with *Psychotria*, a large (c. 2000 spp.) heterogeneous and taxonomically problematic genus (Andersson, 2002). Some authors have regarded *Amaracarpus* as a synonym of *Psychotria* (e.g. Fosberg & Sachet, 1991; Nepokroeff et al., 1999). Indeed, some species of *Psychotria* share one or more salient characters found in *Amaracarpus*, as listed above, and the two genera may superficially resemble each other. However, the combination of characters listed above for *Amaracarpus* is not found in *Psychotria* or any other genus. Detailed information on the delimitation of *Amaracarpus* and *Dolianthus*, and closely related members of Psychotrieae, is given in Davis & Bridson (in press).

Andersson (2002) has shown that *Amaracarpus* is most closely related to the Pacific/Australasian members of the Psychotrieae (including: the ant plants (e.g. *Hydnophytum*), *Calycosia*, *Dolianthus*, *Straussia*, and New Guinea *Psychotria* species, and not *Psychotria* s.s. (fide Andersson, 2002; and see Davis et al., 2001).

Species delimitation in *Amaracarpus* is difficult and often problematic, particularly as the only data currently available is from morphological study. We have no data concerning the genetic basis of morphological traits, and their value for the classification of *Amaracarpus*. In this taxonomic treatment we place importance on stipule and inflorescence characters (see below: Subgeneric Division of *Amaracarpus*), simply because they seem to be the least influenced by the environment and appear to have the most taxonomic value. Leaf size and shape are highly variable; pubescence appears to have some taxonomic value, although it is still somewhat variable within species. Polymorphism in leaf morphology, and to a certain extent inflorescence morphology (e.g. see Valetton, 1927) seems to have led to the recognition of too many species. Increased field collection since previous studies of *Amaracarpus* (e.g. Valetton, 1927; Merrill & Perry, 1946) has illuminated the significant variation in these characters. Many species based on quite subtle, or often apparently quite distinct differences in leaf morphology (particularly size and shape) have been synonymized in the taxonomic treatment presented here. In a similar manner Fosberg & Sachet (1991) reduced 11 Pacific *Amaracarpus* to two species of *Psychotria*.

In this taxonomic treatment we recognize 22 species, which we believe is based upon a species concept that is neither narrow nor broad but somewhere in between. A narrow species concept would lead to recognition of perhaps more than 60 species, but this would make the taxa very difficult to delimit and identify. A broad species delimitation would probably result in about 10 species or less, but again we feel this would make species highly polymorphic and very difficult to identify. We also believe that a formal classification based on a broad species concept would not satisfactorily record the natural (and potentially discrete) variation within the genus. When there are more collections for South East Asia and particularly New Guinea we believe that further taxonomic changes will be inevitable. Our instinct at the moment is that the number of species is more likely to increase, and where possible we have highlighted species (see Notes) where further taxonomic division may be necessary.

Amaracarpus distribution is centred in New Guinea (Papua Barat (formerly Irian Jaya) and Papua New Guinea) and all but two of the 22 species occur there. One species, *A. pubescens*, is very widespread, extending from the Indian Ocean (Seychelles and Christmas Islands), through SE Asia, to Papua Barat, with a subspecies (*A. pubescens* subsp. *microphyllus*) in the Philippines and Moluccas. Two species (*A. attenuatus*, *A. grandifolius*) extend to the Solomon Islands, and one species (*A. heteropus*) reaches Australia (NE Queensland). Two species are endemic to the Moluccas. Five species, *A. anomalus*, *A. brassii*, *A. doormaniensis*, *A. grandifolius*, and *A. xanthocarpus*, have limited distributions.

Amaracarpus grows at altitudes ranging from 0–2800 m, but (unlike *Dolianthus*) only a few species (*A. brassii*, and perhaps *A. compactus* and *A. novo-guineensis*) can be considered true alpine (> 2500 m).

MATERIALS AND METHODS

Herbarium material was consulted from the following herbaria: A, B, BM, BO, CANB, JCT, K, L, NSW, NY, QRS, SING, SYD, US, WRS. The measurements, colours and other details given in the descriptions are based on herbarium specimens, or data derived from field notes. Habitat and ecology, uses, and vernacular names are derived from herbarium labels; where such data are not recorded, the relevant category titles have been omitted from the revision text. Figures 2, 3, 4, and 5 have been reproduced from Nova Guinea 8, 3 (1909–1914) with modification (e.g. removal of inaccurately drawn structures).

A database of *Amaracarpus* specimens is available on request from the authors.

CONSERVATION ASSESSMENTS

Amaracarpus are generally widespread, and most are recorded from two or more countries or islands. As such, most *Amaracarpus* are assumed not to be in danger of extinction and should be placed in the Least Concern (LC) category of the IUCN Red List Category criteria (IUCN, 2001). Some species of *Amaracarpus*, however, occur in two countries but have a limited distribution, and other species have very limited distributions (within a single region of from one location only). Species falling into this category include: *A. anomalus*, *A. brassii*, *A. doormaniensis*, *A. grandifolius*, and

A. xanthocarpus. At the moment we consider the above species to be Data Deficient (DD), although we would like to highlight them as needing further study to ascertain whether they are in danger of extinction.

TAXONOMIC TREATMENT

DESCRIPTION OF THE GENUS

AMARACARPUS

Amaracarpus Blume (1826) 954. — Type: *Amaracarpus pubescens* Blume.
Neoschimpera Hemsl. (1906) t. 2810. — Type: *Neoschimpera heterophylla* Hemsl.

Shrubs, treelets, or trees, distinctly horizontally branched with leaves distinctly arranged in one plane, each branch sometimes resembling a bipinnate or tripinnate fern frond; short side shoots present and often conspicuous, usually bearing smaller leaves than the main shoots, the first leaf pair often smaller than those immediately above; secondary axillary side shoots (axillary brachyblasts) usually present, often greatly reduced and consisting of 1–2(–4) leaf pair(s), with leaves 1/2 to 1/3 smaller than the normal shoot leaves, sometimes making the branch appear superficially anisophyllous. *Branches* terete, glabrous to hirsutellous. *Branchlets* ± terete. *Stipules* caducous to semi-persistent, leaving a simple naked scar, distinctly sheathing, connate for c. 1/2 their length or more (and forming a tube), or free (when mature), membranous to chartaceous, glabrous to pubescent, apex truncate to acute but with (1 or) 2 prominent setae on the upper margin, or apex acute and entire, rarely very deeply bifid, setae usually continuing along the length of the stipule to the base as a raised line or ridge. *Leaves*: petiolate or sometimes ± sessile; leaf blades chartaceous to subcoriaceous; *abaxial surface*: secondary veins ± straight or slightly curved, linked by an undulating intramarginal vein (brochidodromous) and sometimes with a second (but much fainter) intramarginal vein closer to the margin, venation openly reticulate to branched. *Inflorescences* terminal on axillary brachyblasts ('near-axillary'), axillary (axillary brachyblasts greatly reduced or absent), or sometimes terminal on side shoots, subtended by reduced leaves (see habit) or sometimes only by small bract-like leaves of the axillary brachyblast and stipules; near-axillary and axillary inflorescences in 1 or 2 axil(s) per node, when 2 per node opposite in leaf axils; usually 1 inflorescence per leaf axil, rarely 2 or more, usually 1-flowered or 3–several-flowered (simple cymes or small compound racemes), sessile or pedunculate, usually erect, rarely pendent; bracts present or absent, if present at the apex of peduncle(s) or inflorescence axis/axes, subtending pedicels or sometimes the flower(s); bracteoles present or absent, if present at the apex of pedicel(s), directly subtending the flower(s). *Flowers* heterostylous, 4-merous, sessile to shortly pedicellate, ± glabrous. *Calyx* (incl. hypanthium) campanulate to cupuliform; calyx limb (tube) shorter than the lobes, calyx lobes usually deltate to triangular; apices acute or sometimes rounded. *Corolla* tube mostly shortly cylindrical, but also cylindrical, funnel-shaped, or campanulate, subequal to lobes or distinctly exceeding them, white or whitish, rarely (or in bud) green tinged; external surface glabrous or hairy, internal surface with a ring of white or whitish hairs in the upper (short-styled flowers) or middle upwards (long-

styled flowers) part of the throat, or internal surface glabrous, corolla lobes deltate to triangular, $\pm$ equal to much shorter than the tube, reflexed at maturity, apices thickened, acute to obtuse. *Stamens* 4, inserted at the top (short-styled flowers) or lower down, as far as the middle area (long-styled flowers) of the corolla tube, included (mostly long-styled flowers) or exserted to well-exserted (mostly short-styled flowers), fixed within the ring of hairs (if present); anthers dorsifixed, introrse, $\pm$ sessile, narrowly ellipsoid to $\pm$ linear, yellow, whitish or brown; filaments usually < 1 mm long, white or whitish. *Ovary* 2-locular, each locule with a single erect ovule. *Disc* hemi-globose, slightly 4-lobed or entire, glabrous. *Style* filiform; stigma composed of 2 flattened-linear lobes, or 2 linear to ellipsoid lobes, usually divaricate, exserted (long-styled) or included (short-styled), white or whitish. *Infructescence* erect to subpendent on the underside of the branchlets (pedunculate species only). *Fruit* a small drupe, containing 2 pyrenes, rather fleshy, ellipsoid to ellipsoid-obovoid, or rarely globose, usually no more than c. 7 mm long, with 6–8 longitudinal ridges running along its length (i.e. conspicuously ribbed) or $\pm$ smooth, glabrous or very rarely pubescent (only *A. grandifolius* var. *trichocarpus*), green to yellowish when immature, orange to red when mature, drying brown; calyx limb and lobes usually persistent; disc persistent. *Pyrenes* elliptic to elliptic-obovate or rarely circular in outline (only *A. acuminatus*), apex rounded, base cuneate; abaxial surface convex, each pyrene with 3 or 4 ridges or sometimes $\pm$ smooth; adaxial surface flat, smooth, with preformed germination slits (PGSs) running along the inside margins of each pyrene for $(1/2 - 2/3)$ to the entire length. *Seeds* the same shape as the pyrenes, but slightly smaller, 3 by 2 mm; seed coat smooth, not staining red or reddish in alcohol; endosperm homogenous, pale coloured.

Distribution — Indian Ocean (Seychelles, Christmas Islands); SE Asia, New Guinea (Papua Barat and Papua New Guinea, incl. New Britain and New Ireland), Australia (NE Queensland) and western Pacific (Solomon Islands).

Habitat & Ecology — An understorey plant of evergreen humid forest (incl. primary, disturbed and secondary forest), rarely in coastal scrub (*A. nymanii*).

KEY TO THE SPECIES

Notes on using key. Before using this key it is worthwhile to establish the presence/absence or certain salient characters. It is useful to determine whether: 1) the inflorescence is sessile or pedunculate; 2) the stipules have one or two setae (bristle-like point(s)), or none (stipule apex obtuse to acute, without appendages). It is necessary to examine several stipules, and preferably as many as a dozen or more, before a confident assessment of stipule morphology can be made.

It is important to use mature leaves when taking measurements for the key, and to ensure that only those of the main shoot (and not leaves of the short side shoots and axillary brachyblasts) are used (see generic description for details).

- 1a. Inflorescences pedunculate, (1–)3–7(–8)-flowered 2
- b. Inflorescences sessile, 1-flowered 10
- 2a. Leaves > 2 cm long 3
- b. Leaves < 2 cm long 5
- 3a. Leaves usually > 4.5 cm long, secondary veins > 8 pairs 4
- b. Leaves < 4.5 cm long, secondary veins < 8 pairs **20. A. major**
- 4a. Stipules with 2 setae. Leaves usually with 8–10 pairs of secondary veins
- **16. A. heteropus**

- b. Stipules deeply bifid, divided into two narrowly triangular points. Leaves usually with 10–14 pairs of secondary veins **22. *A. attenuatus***
- 5a. Stipules with 2 setae at the apex 6
- b. Stipules entire, or with 1 seta at the apex 8
- 6a. Inflorescences sessile **19. *A. xanthocarpus***
- b. Inflorescences pedunculate 7
- 7a. Inflorescences (2- or) 3-flowered **17. *A. acuminatus***
- b. Inflorescences 1-flowered **18. *A. doormaniensis***
- 8a. Leaves > 1.5 cm long **20. *A. major***
- b. Leaves < 1 cm long 9
- 9a. Inflorescences pedunculate, peduncle 0.4–1.3 cm long . . . **17. *A. acuminatus***
- b. Inflorescences sessile, or peduncle < 0.1–0.3 cm long . . . **21. *A. idenburgensis***
- 10a. Leaves usually > 2.5 cm long, secondary veins usually > 5 pairs 11
- b. Leaves usually < 2.5 cm long, secondary veins usually < 5 pairs 13
- 11a. Stipule apex entire, without appendages **11. *A. grandifolius***
- b. Stipule apex with 2 setae 12
- 12a. Leaves usually drying grey or greyish, midrib hirsutellous to pubescent, rarely glabrous, secondary veins hirsutellous to pubescent or sometimes glabrous **1a. *A. pubescens* subsp. *pubescens***
- b. Leaves drying green, midrib glabrous to puberulous, secondary veins glabrous to puberulous **2. *A. kochii***
- 13a. Corolla usually > (10–)13 mm long **7. *A. grandiflorus***
- b. Corolla < 5(–10) mm long 14
- 14a. Leaves usually > 1.2 cm long 15
- b. Leaves usually < 1 cm long 21
- 15a. Stipule apex entire or with 1 seta 16
- b. Stipule apex with 2 setae 18
- 16a. Leaf blades $\pm$ elliptic to narrowly elliptic or narrowly ovate, rarely narrowly obovate **11. *A. grandifolius***
- b. Leaf blades obovate to narrowly obovate or obovate-elliptic, rarely narrowly elliptic 17
- 17a. Branchlets glabrous to pubescent, rarely hirsutellous. Brachyblasts usually few. Leaves not conspicuously congested **12. *A. wichmannii***
- b. Branchlets hirsutellous to pubescent. Brachyblasts usually numerous. Leaves usually conspicuously congested **13. *A. nymanii***
- 18a. Leaves rather irregularly arranged along branchlets, forming $\pm$ flat but $\pm$ irregular tiers **5. *A. calcicola***
- b. Leaves regularly arranged in the same plane as the branchlets, forming flat but $\pm$ regular or regular tiers 19
- 19a. Leaves well spaced, forming irregular shaped tiers (in outline). Petioles usually > 1 mm long **1b. *A. pubescens* subsp. *microphyllus***
- b. Leaves close together, forming regular shaped tiers (in outline). Petioles usually < 1 mm long 20
- 20a. Axillary brachyblasts few to numerous. Stipule setae c. 1 mm long, glabrous to pubescent **3. *A. papuanus***

- b. Axillary brachyblasts few to absent. Stipule setae 2–3 mm long, puberulous . . . **4. *A. schlechteri***
- 21a. Leaves ≤ 2 mm long, cordate to deltate, or almost reniform. Stipules with 2 setae . . . **10. *A. brassii***
- b. Leaves > 4 mm long, variously shaped but not cordate, deltate or reniform. Stipules with 1 or 2 setae, or apex $\pm$ entire . . . 22
- 22a. Stipule apex entire or with 1 seta. . . 23
- b. Stipule apex with 2 setae . . . 24
- 23a. Stipule apex entire . . . **14. *A. novo-guineensis***
- b. Stipule apex entire or with 1 or 2 short tuft of hairs or sometimes with 1 seta . . . **15. *A. compactus***
- 24a. Axillary brachyblasts few to numerous . . . **3. *A. papuanus***
- b. Axillary brachyblasts absent or few. . . 25
- 25a. Branching pattern rather irregular. Leaves congested on side shoots, not distinctly arranged in the same plane. Corollas puberulous or glabrous on the external surface . . . **9. *A. anomalus***
- b. Branching pattern regular. Leaves $\pm$ evenly spaced on side shoots, distinctly arranged in the same plane. Corollas glabrous on the external surface. . . . 26
- 26a. Leaves 0.4–1.3(–2.2) cm long, but generally > 7 mm long, venation manifest to obscure, glabrous to puberulous. . . . **6. *A. cuneifolius***
- b. Leaves (0.3–)0.4–0.9(–1.2) cm long, but generally < 7 mm long, venation obscure to invisible, glabrous . . . **8. *A. belensis***

SUBGENERIC DIVISION OF AMARACARPUS

We have not attempted to devise a formal subgeneric classification for *Amaracarpus* and consider that to do so without further supporting systematic data would be meaningless, or at best preliminary. Instead we propose two informal species groups, the first with two subgroups and the second with three subgroups. It is suggested that these groups are used in conjunction with the key to assist species identifications.

SPECIES GROUP 1

Species with sessile, 1-flowered inflorescences (rarely 2- or 3-flowered)

- | | |
|--------------------------|--|
| Species subgroup 1a | Stipule apex with 2 setae |
| 1. <i>A. pubescens</i> | Leaves usually > 1.5 cm long and usually > 2 cm long |
| 2. <i>A. kochii</i> | |
| 3. <i>A. papuanus</i> | Leaves usually > 1.2 cm long but usually < 2 cm long |
| 4. <i>A. schlechteri</i> | |
| 5. <i>A. calcicola</i> | |
| 6. <i>A. cuneifolius</i> | Leaves usually < 1 cm long but > 0.7 cm long |
| 8. <i>A. belensis</i> | Leaves usually < 0.9 cm long and often < 0.7 cm long |
| 9. <i>A. anomalus</i> | |
| 10. <i>A. brassii</i> | Leaves < 0.3 cm long |

Species subgroup 1b	Stipule apex either entire or with 1 seta (both character states occur in some species)
11. <i>A. grandifolius</i>	Leaves usually > 1 cm long and often > 3 cm long
12. <i>A. wichmannii</i>	Leaves usually > 1 cm long but often < 2 cm long
13. <i>A. nymanii</i>	
7. <i>A. grandiflorus</i>	Leaves usually < 1 cm long but often < 0.8 cm long
14. <i>A. novo-guineensis</i>	
15. <i>A. compactus</i>	

SPECIES GROUP 2

Species with pedunculate inflorescences, and/or inflorescences consisting of simple or compound dichasial cymes, (1–)3–7(–8)-flowered

Species subgroup 2a	Stipule apex with 2 setae
16. <i>A. heteropus</i>	Leaves > 3 cm long and often > 5 cm long
17. <i>A. acuminatus</i>	Leaves usually 0.5–1 cm long, always < 2 cm long
18. <i>A. doormaniensis</i>	
19. <i>A. xanthocarpus</i>	
Species subgroup 2b	Stipule apex either entire or with 1 seta (both character states occur in some species)
20. <i>A. major</i>	Leaves > 1.5 cm long but never > 4 cm long
21. <i>A. idenburgensis</i>	Leaves 0.5–0.9 cm long
Species subgroup 2c	Stipule apex deeply bifid (divided into two long narrowly triangular points)
22. <i>A. attenuatus</i>	Leaves usually 4.5–11.5 cm long

DESCRIPTION OF SPECIES AND NOMENCLATURE

1. *Amaracarpus pubescens* Blume — Fig. 1

Amaracarpus pubescens Blume (1826) 954; Backer & Bakh.f. (1965) 345; Du Puy (1993) 399.
— Type: *Blume s.n.* (holo L), Java, ‘ad montem Menaram et prope Tugu Provinciae Buitenzorg ut etiam in Nusa Kambangan insula’ [without date].

Psychotria ferruginea Baker (1877) 156. — Type: *Horne* 253 (holo K), Seychelles, Mahé, Sept. 1871.

Saprosma nativitatis Baker f. in Andrews (1900) 180. — Type: *Andrews* 79 (holo BM; iso K), Christmas Island, 1897–1898.

Neoschimpera heterophylla Hemsl. (1906) t. 2810. — Type: *Thomasset* 181 (holo K), Seychelles, Mahé, Mont Serbert Estate, 1300 ft [396 m], March 1905.

[*Psychotria uniflora* Reinw. in schedae (see Miq. (1857) 304).]

Treelet or shrub, (0.45–)0.6–1.5(–3) m high, hirsutellous to pubescent, sometimes puberulous to glabrous, hairs ± erect to antrorse, (0.1–)0.2–0.6 mm long, brown to dark brown; axillary brachyblasts present; leaves regularly arranged in the same plane, but not close together, forming flat but irregular shaped tiers (in outline). *Branchlets* 1.5–3

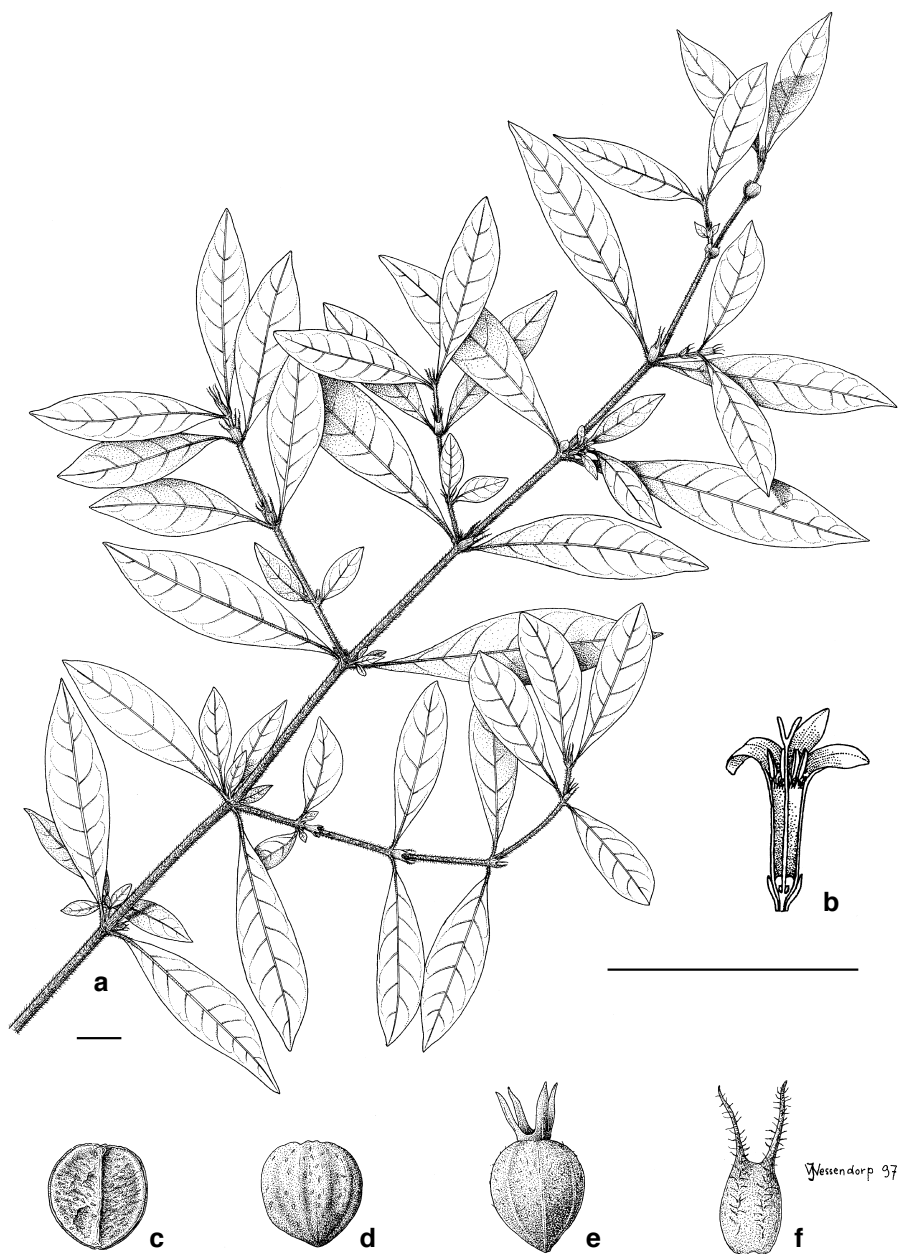


Fig. 1. *Amaracarpus pubescens* Blume. a. Habit; b. flower dissection; c. pyrene, ventral (adaxial) view, showing marginal preformed germination slits (PGSs); d. pyrene, dorsal (abaxial) view; e. fruit, with persistent calyx limb and lobes; f. stipule (all: Van Balgooy & Van Setten 5665 (L)). Drawn by J. Wessendorp. — Scale bars: a = 1 cm; b–f = 1 cm.

mm diam., smooth, brown, hirsutellous to pubescent. *Stipules* connate at the base or up to 1/3 their length, oblong to depressed-ovate, 4.5–7(–9) by 2–3 mm, chartaceous, hirsutellous to pubescent or glabrous, apex truncate to obtuse, with 2 prominent setae, setae (0.5–)2–4 mm long, hirsutellous to pubescent. *Leaves*: petioles (0.5–)1–3(–8) mm long, hirsutellous to pubescent; leaf blades elliptic to oblong-elliptic, broadly elliptic, or $\pm$ narrowly ovate to narrowly ovate, infrequently narrowly elliptic to narrowly obovate or subobovate, (0.4–)1.8–8.5(–10) by (0.4–)1–1.9(–2.7) cm, chartaceous, usually drying grey but sometimes green, base acute to shortly attenuate, apex acute or infrequently broadly acuminate; abaxial surface: midrib hirsutellous to pubescent, rarely glabrous, secondary veins (3–)5–10 pairs, prominent or rarely indistinct, ascending at an angle of 30–45°, hirsutellous to pubescent, rarely glabrous, venation manifest, rarely obscure; abaxial surface glabrous or rarely scabrid; adaxial surface glabrous, although midrib sometimes hirsutellous to pubescent especially near the base. *Inflorescences* terminal on axillary brachyblasts (near-axillary) or axillary, rarely terminal on short side shoots or 1(–3)-flowered, sessile; bracts and bracteoles absent. *Flowers* sessile. *Calyx* (incl. hypanthium) 2–4 by 1–2 mm, glabrous or hirsutellous to puberulous, calyx lobes triangular to narrowly triangular, or linear, (1.2–)2–2.5 by 0.5 mm, glabrous to puberulous. *Corolla* (3–)4–6(–8) by (2–)2.5–3 mm, external surface glabrous, internal surface with a ring of hairs, corolla lobes 3–4 by 1–1.5 mm. *Stamens*: anthers c. 0.7 mm long; filaments (0.5–)0.8–1 mm long. *Style* (3.5–)5–7 mm long. *Fruit* (3–)5.5–8 by (2–)4–5 mm, sessile; calyx 1.5–3 mm long. *Pyrenes* (3–)4.5–6 by (2.5–)3.5–4.5 mm.

Note — *Amaracarpus pubescens* has a wide distribution, extending from the Seychelles in the western part of the Indian Ocean, throughout SE Asia, to New Guinea (Papua Barat). Throughout its range it can be quite variable, particularly with respect to leaf size, leaf shape, and pubescence. The type specimen of *A. pubescens* comes from Java, and most collections are very much like the type. Material found to the east of Java, however, is much more variable. In Sulawesi, for example, there are plants with relatively small, usually obovate leaves, and these have been recognized here as *A. pubescens* subsp. *microphyllus*. Some collections from Sulawesi (e.g. *Coode 5942*, *5971*) exhibit distinct leaf heteromorphy (aside from the much smaller leaves of the axillary brachyblasts, which are present in most *Amaracarpus* species): the leaves of some branches are up to three times the size of others. This size variation may be due to age, with the smaller leaves representing immature foliage. *Amaracarpus pubescens* subsp. *sechellarum* F. Friedmann (1994), from the Seychelles, falls well within the range of variation for *Amaracarpus pubescens* subsp. *pubescens* and is accordingly not recognized as a distinct entity by us.

KEY TO THE SUBSPECIES

- 1a. Leaf blades > 2.5 cm long, secondary veins 5–10 pairs **a. subsp. pubescens**
 b. Leaf blades < 2.2 cm, secondary veins 3–5 pairs **b. subsp. microphyllus**

a. subsp. pubescens

Amaracarpus pubescens Blume subsp. *sechellarum* F. Friedmann (1994) 581, pl. 181. — Type: *Friedmann 5259* (holo P), Seychelles, Silhouette, June 1985.

Leaves: petioles 1–3(–8) mm long; leaf blades elliptic to oblong-elliptic, or $\pm$ narrowly ovate to narrowly ovate, infrequently narrowly elliptic to narrowly obovate or subobovate, (2.2–)2.5–8.5(–10) by 1–1.9(–2.7) cm, secondary veins 5–10 pairs.

Distribution — The Seychelles (Silhouette, Mahé), Myanmar, Andaman Islands (Andaman Island, Little Andaman Island), Nicobar Islands (Katchal Island); Thailand, Sumatra, Java, Borneo (Kalimantan), Bali, Sumbawa, Sumba, Flores, Timor, Sulawesi, Moluccas (Kepulauan Talaud, ?Halmahera, Kepulauan Tanimbar, Kepulauan Kai), Papua Barat (Vogelkop Peninsula), Christmas Island. *Amaracarpus pubescens* is believed to be extinct on Mahé (The Seychelles).

Habitat & Ecology — On ridges, river flats and riverbanks; substrate: limestone, coralline limestone, sand, granite, and clay with gravel; locally common to scattered; altitude 0–1600(–2400) m.

b. subsp. *microphyllus* (Miq.) A.P. Davis, *stat. nov.*

Amaracarpus microphyllus Miq. (1869) 211; Elmer (1911) 1036 [as '*microphylla*']. — Type: *De Vriese & Teijsmann s.n.* (holo L; iso L, U), Celebes, in prov. Menado [sic.], 1859–1860.

Amaracarpus apoensis Elmer (1915) 2804. — Type: *Elmer 10737* (holo PNH; iso A, L, NY, P), Philippines, Todaya (Mt Apo), District of Davao, Mindanao, May 1909.

Leaves: petioles (0.5–)1–2(–4) mm long; leaf blades elliptic to broadly elliptic, narrowly obovate or $\pm$ obovate, (0.4–)0.6–2.2 by (0.4–)0.8–1.2 cm, secondary veins 3–5 pairs.

Distribution — Philippines, Sulawesi, Moluccas (Halmahera, Seram).

Habitat & Ecology — Near rivers; substrate: clay, gravel; altitude 70–500 m.

2. *Amaracarpus kochii* Valeton

Amaracarpus kochii Valeton (1927) 116. — Type: *Koch 16* (holo L; iso BO), [Papua Barat], Etnabai, 1904–1905.

Treelet or shrub, 0.3–1.5 m high, glabrous, or puberulous to pubescent, rarely hirsutellous (stipules only), hairs antrorse to $\pm$ erect, 0.1–0.2(–0.6) mm long, brown to dark brown; axillary brachyblasts present; leaves regularly arranged in the same plane, but not close together, forming flat but irregular shaped tiers (in outline). *Branchlets* 1–2 mm diam., smooth, whitish to brown, $\pm$ glabrous, or puberulous to pubescent. *Stipules* free or connate at the base, oblong, 3–4.5 by 1.5–2 mm, membranous, glabrous to hirsutellous, apex truncate, with 2 prominent setae, setae 1–2.5 mm long, glabrous to hirsutellous. *Leaves*: petioles (0.5–)2–6 mm long, glabrous to puberulous; leaf blades elliptic to narrowly elliptic, rarely subovate, rarely subobovate, (1.2–)2–9.5(–11) by (0.7–)1.1–2.7 cm, chartaceous, usually drying green, base acute to obtuse, apex acute to acuminate; abaxial surface: midrib glabrous to puberulous, secondary veins (4–)5–8(–11) pairs, prominent to obscure, ascending at an angle of 30–45°, glabrous to puberulous, venation manifest or obscure; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal on axillary brachyblasts (near-axillary) to axillary, 1(–3)-flowered, sessile; bracts and bracteoles absent. *Flowers* sessile. *Calyx* (incl. hypanthium) 2–3 by 1–2 mm, glabrous, calyx lobes deltate to narrowly triangular, or $\pm$ elliptic, 1–2.1 by 0.6–1.2 mm, glabrous. *Corolla* 4–6 by 2.5–3 mm, external surface

glabrous, internal surface with a ring of hairs, corolla lobes 2–3 by 1–1.5 mm. *Stamens*: anthers c. 0.7 mm long; filaments 0.8–1 mm long. *Style* 3–5 mm long. *Fruit* 6.5–9 by 4.5–6 mm, sessile; calyx 1–1.5 mm long. *Pyrenes* 5–6 by 4–4.5 mm.

Distribution — Papua Barat (incl. Vogelkop Peninsula), and Papua New Guinea.

Habitat & Ecology — On slopes and in valleys; substrate: granites and volcaniclastic sediments; scattered; altitude 50–560 m.

Uses — Plants used to ‘chase’ ants and cockroaches from palm leaf roofing.

Notes — *Amaracarpus kochii* is morphologically very similar to *A. pubescens*, but can be separated by its puberulous to glabrous venation (instead of hirsutellous to pubescent, rarely glabrous, venation) and broader leaves that dry green (never grey or greyish).

Material of *A. kochii* from Papua New Guinea differs from the type and other material from Papua Barat by its smaller leaves and less strongly manifest venation. In the future, when more collections are available (and particularly from other parts of Papua Barat), it may be necessary to provide formal taxonomic rank for the collections from Papua New Guinea.

3. *Amaracarpus papuanus* Valetton — Fig. 2

Amaracarpus papuanus Valetton (1911) 501; (1909–1914) pl. 126. — Type: *Versteeg 1591* (holo BO; iso L), Südwest Neu-Guinea [Papua Barat], Noordriver, bivak Alkmaar, ± 30 m [without date].

Shrub, c. 1 m high, pubescent to puberulous, hairs antrorse to ± erect, (0.2–)0.3–0.4 mm long, light brown; axillary brachyblasts numerous; leaves close together and regularly arranged in the same plane, forming flat, regular tiers of regular shape (in outline). *Branchlets* 1.5–2.5 mm diam., longitudinally striated, whitish to brown, pubescent. *Stipules* free at base, oblong to ± square, 2–3.5 by 1–2 mm, thinly chartaceous to membranous, glabrous to pubescent, apex truncate to obtuse, with 2 setae, setae 0.3–1 mm long, glabrous to pubescent. *Leaves*: petioles (0.1–)0.5–1 mm long, pubescent; leaf blades ± elliptic to broadly elliptic, or subobovate to obovate, (0.7–)0.9–2.6(–3.1) by (0.3–)0.4–1.1 cm, chartaceous, drying green or greyish, base acute to shortly attenuate or obtuse, apex acute to abruptly acuminate; abaxial surface: midrib glabrous to puberulous, secondary veins 3–5(–6) pairs, manifest to prominent, ascending at an angle of c. 45°, glabrous or puberulous, venation manifest to ± invisible; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal on axillary brachyblasts (near-axillary) to axillary, 1-flowered, sessile; bracts and bracteoles absent. *Flowers* sessile. *Calyx* (incl. hypanthium) (1–)2.5–3 by (1–)2–2.5 mm, glabrous, calyx lobes deltate to triangular, (0.7–)1.5–2 by (0.5–)1 mm, glabrous. *Corolla* (0.7–)3 by 2–3.5(–4.4) mm, external surface glabrous, internal surface with a ring of hairs, corolla lobes c. 2.5 by 1–1.5 mm. *Stamens*: anthers c. 0.5 mm long; filaments 0.5–0.7 mm long. *Style* 2–3 mm long. *Fruit* 3.5–4.5 by 3.5–4 mm, sessile; calyx c. 1 mm long. *Pyrenes* c. 4 by 3 mm.

Distribution — Papua Barat, Papua New Guinea, Arau Island.

Habitat & Ecology — Recorded with *Castanopsis* spp. and *Quercus* spp.; altitude (50–)300–1400 m.

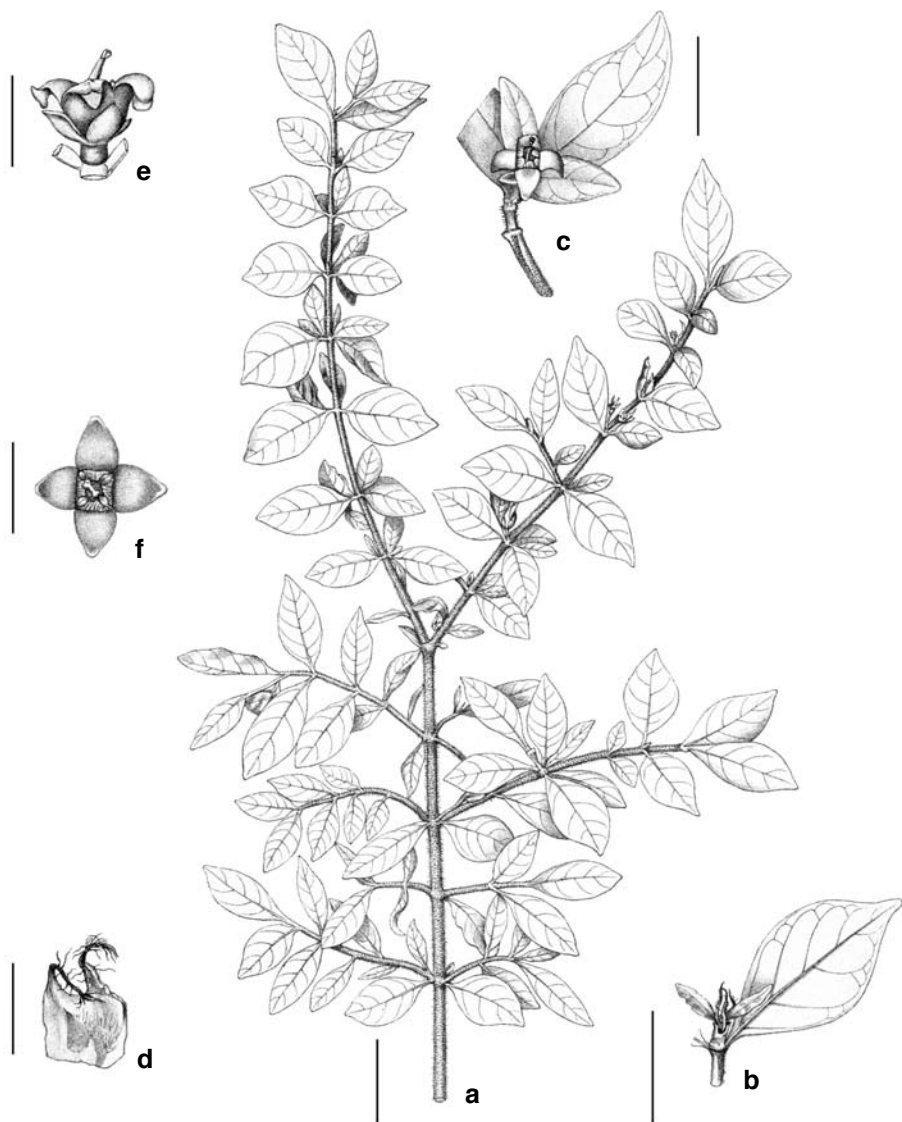


Fig. 2. *Amarcarpus papuanus* Valetton. a. Habit (flowering specimen); b. detail of shoot apex, including young leaves and stipule (one leaf blade removed); c. detail of axillary side shoots (axillary brachyblasts), showing reduced leaves and a single flower; d. stipule, with two setae; e. flower (side view), with petioles of reduced leaves at base (leaf blades removed); f. flower, view from above, showing 4-merous flower parts and ring of corolla throat hairs. Drawn by R. Natadipoera; reproduced from *Nova Guinea* 8, 3 (1909–1914) pl. 126 (modified for publication here). — Scale bars: a = 2 cm; b = 1 cm; c = 5 mm; d = 2 mm; e, f = 3 mm.

4. *Amaracarpus schlechteri* Valetton

Amaracarpus schlechteri Valetton (1927) 116. — Type: *Schlechter 16550* (holo B†; iso A, K, L), [Papua New Guinea], Bolobo, 1000 m, 9 Nov. 1907.

Amaracarpus atrocarpus Merr. & L.M. Perry (1946) 225. — Type: *Brass 6741* (holo A; iso BM, K, L), Papua New Guinea, Fly River, 528 mile Camp, 80 m, May 1936.

Treelet or shrub, 2–3 m high, glabrous, or puberulous to pubescent, hairs antrorse 0.1–0.2 mm long, light brown to brown; axillary brachyblasts few to absent; leaves close together and regularly arranged in the same plane, forming flat, regular tiers of regular shape (in outline). *Branchlets* 1–2 mm diam., ± smooth, dark brown, puberulous to pubescent. *Stipules* free or connate at the base, ± oblong, (2–)3–4.5 by 1.5 mm, 2-veined, membranous, glabrous to puberulous, apex truncate to obtuse or infrequently acute, with 2 setae, setae 2–3 mm long, puberulous. *Leaves*: petioles (0–)0.1–0.5 mm long, glabrous to puberulous; leaf blades broadly elliptic to elliptic-rhombic, ovate or obovate, 1.3–2.3 by 0.5–1.1 cm, sometimes slightly asymmetrical, chartaceous, usually drying green, base cuneate to rounded, apex acute, or abruptly acuminate; abaxial surface: midrib glabrous to puberulous, secondary veins (4–)5–6(–8) pairs, manifest, ascending at an angle of 30–45°, glabrous, venation obscure; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal at the apex of axillary brachyblasts (near-axillary) to axillary, 1-flowered, ± sessile; bracts and bracteoles absent. *Flowers* sessile. *Calyx* (incl. hypanthium) 2–4 by 1–2.5 mm, glabrous, calyx lobes deltate to triangular, 1–1.5 by 0.7–1 mm, glabrous. *Corolla* 4–4.5 by 2.5–3.5 mm, external surface glabrous, internal surface with a ring of hairs, corolla lobes 1.5–3 by 0.5–1.5 mm. *Stamens*: anthers c. 1 mm long; filaments c. 0.3 mm long. *Style* c. 6 mm long. *Fruit* 4.5–6 by 3–3.5 mm, sessile; calyx (1–)3–3.5 mm long. *Pyrenes* c. 4 by 3 mm.

Distribution — Papua Barat and Papua New Guinea.

Habitat & Ecology — Near streams; locally very common; altitude 80–1000 m.

5. *Amaracarpus calcicola* Merr. & L.M. Perry

Amaracarpus calcicola Merr. & L.M. Perry (1946) 224. — Type: *Brass 8849* (holo A; iso BM, L), Irian Jaya [Papua Barat], Tabati, Jautefa Bay, 17 June 1938.

Shrub, 1–2(–3) m high, glabrous to pubescent, hairs antrorse to ± erect, (0.1–)0.2–0.3 mm long, light brown; axillary brachyblasts present; leaves rather irregularly arranged, forming ± flat, ± irregular tiers of irregular shape (in outline). *Branchlets* 1.5–2.5 mm diam., often longitudinally striated, often soft and slightly spongy, whitish to dark brown, glabrous to pubescent. *Stipules* free at the base, ± oblong, 3.5–6 by 1–1.5 mm, chartaceous to membranous, glabrous or pubescent, apex truncate to obtuse, with 2 setae, setae (0.7–)1.5–2 mm long, glabrous to pubescent. *Leaves*: petioles 0.5–1.5(–3) mm long, glabrous; leaf blades elliptic-obovate, obovate to narrowly obovate, or almost spatulate, (0.8–)1.2–2(–2.7) by 0.4–0.7(–0.9) cm, chartaceous to subcoriaceous, usually drying grey, base attenuate, apex obtuse to broadly acute; abaxial surface: midrib glabrous, secondary veins 3–4(–6) pairs, obscure to invisible, ascending at an angle of c. 60°, basal vein elongated, glabrous, venation invisible; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal on axillary brachyblasts (near-axillary), 1-flowered, sessile; bracts and bracteoles absent. *Flowers* sessile. *Calyx*

(incl. hypanthium) 2.5–3 by 1–2 mm, glabrous, calyx lobes triangular, 1–1.5 by 0.3–0.5 mm, glabrous to puberulous. *Corolla* 4–5 by 2–3 mm, external surface glabrous, internal surface with a ring of hairs, corolla lobes 2–3 by 1–1.5 mm. *Stamens*: anthers 0.5–0.7 mm long; filaments 0.5–1 mm long. *Style* c. 2.5 mm long. *Fruit* 2.5–5.5 by 2.5–4 mm, sessile; calyx 0.5–1 mm long. *Pyrenes* 2.5–4.5 by 2–3 mm.

Distribution — N Papua Barat and Papua New Guinea.

Habitat & Ecology — Sometimes on riverbanks amongst rocks; recorded with *Casuarina* spp., *Quercus* spp., *Podocarpus* spp., *Intsia* spp., and *Pometia* spp.; substrate: limestone; altitude 100–200 m.

Note — *Amaracarpus calcicola* is most likely to be confused with *A. nymanii*. These species are easily separated from each other on the basis of stipule morphology: *A. calcicola* has two setae at the apex of the stipule, whereas the stipule apex of *A. nymanii* is acute or has one seta.

6. *Amaracarpus cuneifolius* Valetton — Fig. 3

Amaracarpus cuneifolius Valetton (1911) 502; (1909–1914) pl. 127. — Type: *Versteeg 1680* (lectotype BO, selected here; isoelectotypes K, L, U), Nova Guinea neerlandica meridionalis/Südwest-Neu Guinea [Papua Barat], in mont Resi, 350 m [without date].

Shrub, 1–2 m high, puberulous to sparsely pubescent, hairs antrorse to erecto-patent, 0.1–0.2 mm long, brown to dark brown; axillary brachyblasts few or absent; leaves close together and regularly arranged in the same plane, forming flat, regular tiers of irregular to $\pm$ regular shape (in outline). *Branchlets* 1–2 mm diam., $\pm$ smooth, brown to dark brown, sparsely pubescent but hairs rather obvious. *Stipules* slightly sheathing to $\pm$ free at the base, $\pm$ oblong to triangular, 1.7–3 by 1–1.5 mm, 2-veined, membranous, glabrous or puberulous, apex truncate to obtuse, with 2 setae, setae 0.7–1 mm long, puberulous. *Leaves*: petioles (0–)0.1–0.5(–1) mm long, glabrous to puberulous; leaf blades narrowly obovate-rhombic to rhombic, elliptic, or rarely ovate to deltate, 0.7–1.1 by 0.4–0.5 cm, chartaceous, usually drying green, base acute, apex abruptly acuminate, rarely acute; abaxial surface: midrib glabrous to puberulous, secondary veins 3 or 4 pairs, manifest, ascending at an angle of c. 45°, glabrous to puberulous, venation manifest to obscure; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal on axillary brachyblasts (near-axillary), or on short side shoots, or axillary, 1- (or 2-)flowered, $\pm$ sessile; bracts and bracteoles absent. *Flowers* sessile to very shortly pedicellate, pedicel (if present) 0.1–0.4 mm long. *Calyx* (incl. hypanthium) 2–3 by 2 mm, glabrous, calyx lobes $\pm$ deltate, 0.5–1 by 0.5–1.5 mm, glabrous. *Corolla* 2.2–5(–6) by 3–4.5 mm, external and internal surfaces glabrous, corolla lobes 1–2 by 1 mm. *Stamens*: anthers c. 0.3 mm long; filaments c. 0.3 mm long. *Style* 2.5–3 mm long. *Fruit* 5–6 by 3.5 mm, pedicel 0.1–0.5 mm long; calyx 0.2–0.5 mm long. *Pyrenes* c. 4.2 by 3.1 mm.

Distribution — Papua Barat and Papua New Guinea.

Habitat & Ecology — Riversides, ridges; substrate: granites and volcanoclastic sediments; altitude 400–1700 m.

Note — We have selected the specimen *Versteeg 1680* as the lectotype for this species. The specimen *Wichmann 6*, the second specimen cited by Valetton (1911: 502) in the protologue of *A. cuneifolius*, represents *A. wichmannii* (see Gibbs, 1917: 221).

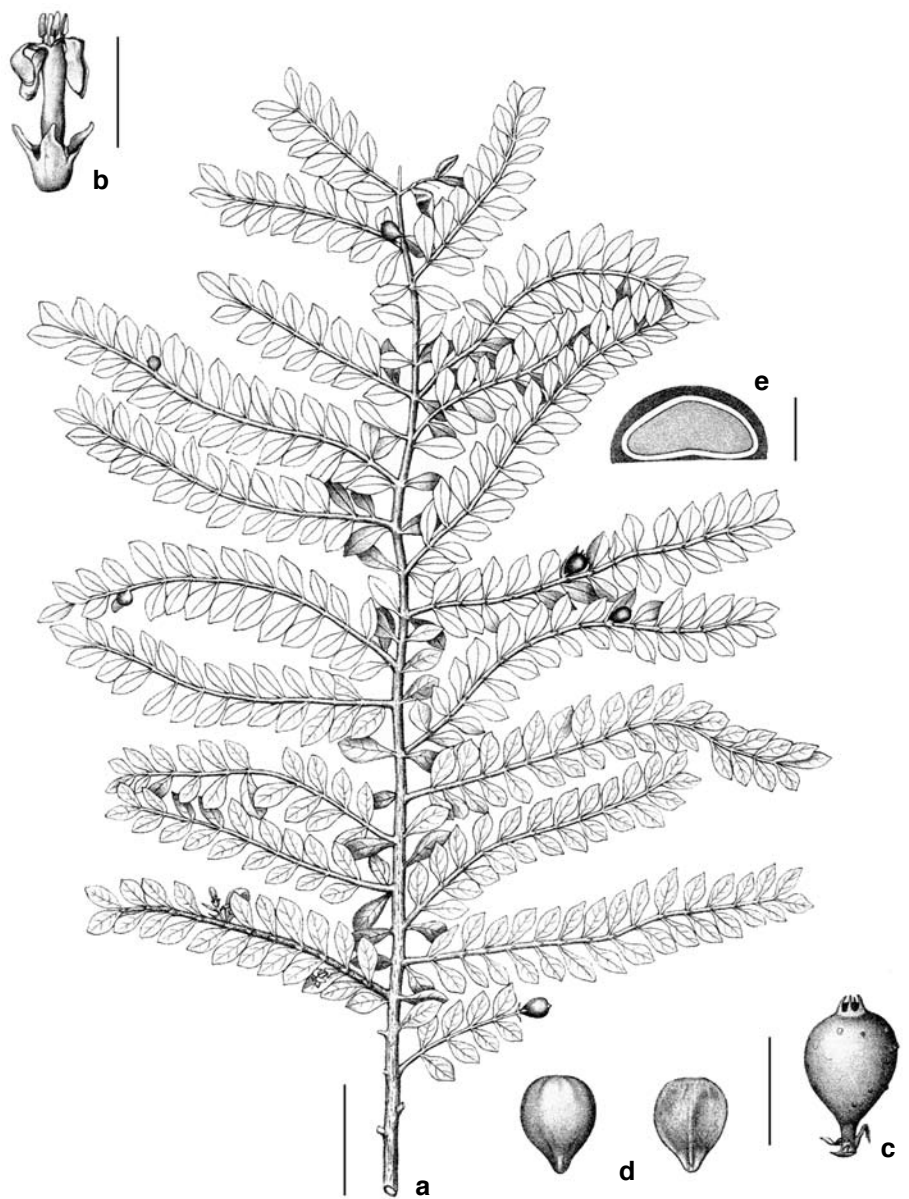


Fig. 3. *Amarcarpus cuneifolius* Valetón. a. Habit (fruiting specimen); b. flower; c. fruit; d. pyrene, dorsal (abaxial) and ventral (adaxial) views (left to right); e. transverse section through (part of) fruit, showing smooth dorsal surface of pyrene. Drawn by R. Natadipoera; reproduced from *Nova Guinea* 8, 3 (1909–1914) pl. 127 (modified for publication here). — Scale bars: a = 2 cm; b, c, d = 5 mm; e = 1.7 mm.

7. *Amaracarpus grandiflorus* A.P. Davis, *spec. nov.*

A. belensi Merr. & L.M. Perry affinis sed stipulis ad apicem acutis (nec apiculo 2-setulosis) et corolla 8.5–17 mm longa (nec 3 by 2–2.5 mm longa), differt. — Typus: *Eyma* 2368 (holo L; iso B, K), Seram, tanah goeoe-Hoalepas, 40 m, 1 Dec. 1937.

Tree or shrub, 2–4(–6) m high, puberulous to pubescent, hairs antrorse to erect, 0.1–0.2 mm long, brown to dark brown; axillary brachyblasts few or absent; leaves rather irregularly to $\pm$ regularly arranged, forming $\pm$ flat, $\pm$ regular tiers of irregular shape (in outline). *Branchlets* 1–2.5 mm diam., $\pm$ smooth, brown, puberulous to pubescent. *Stipules* connate at the base and sometimes for more than 1/2 their length, or mostly free, triangular to narrowly triangular, or $\pm$ narrowly ovate, 1.3–2.7 by 0.8–1.5 mm, subcoriaceous to chartaceous, glabrous, apex acute to narrowly acute. *Leaves*: petioles 0.5–1.2(–3.5) mm long, glabrous; leaf blades elliptic-rhombic, or rhombic-narrowly obovate to rhombic-obovate, or obovate to narrowly obovate, 0.4–1.3(–2.2) by (0.2–)0.3–0.6(–1) cm, chartaceous, usually drying green, base attenuate to decurrent, apex broadly acute to obtuse; abaxial surface: midrib glabrous, secondary veins 3 or 4 (or 5) pairs, obscure to manifest, ascending at an angle of 30–45°, glabrous, venation invisible; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal at the apex of side shoots and/or the axillary brachyblasts (near-axillary), 1-flowered, sessile; bracts and bracteoles absent. *Flowers* sessile or pedicellate; pedicel (if present) 0.2–0.5 mm long. *Calyx* (incl. hypanthium) 1.6–2.7 by 1.8–3 mm, glabrous, calyx lobes $\pm$ deltate to narrowly triangular, 0.7–1.4 by 0.5–0.7 mm, glabrous. *Corolla* (8.5–)9–17 by (3.8–)6–8.7 mm, external surface and internal surfaces glabrous, corolla lobes 2.5–5 by (1.2–)1.7–2.3 mm. *Stamens*: anthers c. 3 mm long; filaments c. 0.2 mm long. *Style* (9–)10–14 mm long. *Fruit* 6.5–8 by 3.2–5 mm, pedicel 0.2–0.5 mm long, or sessile; calyx 0.7–1.5 mm long. *Pyrenes* 5.5–6.1 by 3.6–4.4 mm.

Distribution — Moluccas (Seram). At the present time this species has only been recorded from Seram, and it is possibly restricted to altitudes above c. 1200 m in the Manusela National Park.

Habitat & Ecology — On slopes; recorded with trees 15–20 m high; substrate: limestone; altitude (?40–)1200–2200 m.

Note — This species was first collected in 1937 (*Eyma* 2368) but was overlooked until more recent multiple collections were made by staff of the University of Tokyo and Herbarium Bogoriense in 1984–1985. As the name suggests *A. grandiflorus* has large flowers, which are in fact the largest of any *Amaracarpus* species. It is similar to *A. belensis*, also from Seram, but differs owing to its acute stipule and much larger flowers (see diagnosis). *Amaracarpus pubescens* subsp. *microphyllus* also occurs in Seram, but this has larger leaves and stipules with 2 setae. *Amaracarpus grandiflorus* is endemic to Seram and is mainly restricted to altitudes above 1200 m.

8. *Amaracarpus belensis* Merr. & L.M. Perry

Amaracarpus belensis Merr. & L.M. Perry (1946) 228. — Type: *Brass* 11055 (holo A; iso BM, L), Irian Jaya [Papua Barat], Bele River, 18 km NE of Lake Habbema, 2300 m, Nov. 1938. [*Amaracarpus minutifolius* Valetton in schedae.]

Treelet or shrub, 3–4 m high, puberulous to pubescent, hairs antrorse to $\pm$ erect, 0.1–0.2 mm long, brown to dark brown; axillary brachyblasts few to quite prominent; leaves

close together and regularly arranged in the same plane, forming flat, $\pm$ regular tiers of irregular to regular shape (in outline). *Branchlets* 0.5–1 mm diam., $\pm$ smooth, dark brown, puberulous to pubescent. *Stipules* free or connate at the base, broadly obovate to $\pm$ square or oblong, (0.5–)1–2 by 1(–2) mm, membranous to almost subcoriaceous, puberulous to glabrous, apex truncate to broadly cuneate, with 2 setae, setae 0.2–0.5 mm long, glabrous to puberulous. *Leaves*: petioles 0.7–3.5 mm long, $\pm$ glabrous to puberulous; leaf blades elliptic to elliptic-rhombic, or rhombic-narrowly obovate, rarely obovate, (0.3–)0.4–0.9(–1.2) by (0.2–)0.3–0.4(–0.6) cm, chartaceous to subcoriaceous, base acute, apex acute to abruptly acuminate; abaxial surface: midrib glabrous to puberulous, secondary veins 3 or 4 pairs, obscure to invisible, ascending at an angle of c. 45°, glabrous, venation obscure to invisible; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal at the apex of side shoots and/or terminal on axillary brachyblasts (near-axillary), 1-flowered, sessile; bracts and bracteoles absent. *Flowers* sessile. *Calyx* (incl. hypanthium) 2–2.5 by 1.5–2.5 mm, glabrous, calyx lobes $\pm$ deltate, 0.4–0.6 by 0.2 mm, margins puberulous to glabrous. *Corolla* c. 3 by 2–2.5 mm, external and internal surfaces glabrous, corolla lobes c. 0.5 mm long. *Stamens*: anthers 0.2–0.3 mm long; filaments 0.3–0.5 mm long. *Style* 1–2 mm long. *Fruit* 4–5 by 2.5–3 mm, sessile; calyx c. 1.5 mm long. *Pyrenes* 4 by 2.5–3 mm.

Distribution — Moluccas (Seram), Papua Barat and Papua New Guinea.

Habitat & Ecology — Substrate: limestone; locally common; altitude (480–)1210–2300 m.

Uses — Leaves said to promote hair growth if rubbed into scalp.

Note — Specimens of *A. belensis* from Seram have been provisionally placed with this species, although they differ slightly from the type. Differences include slightly longer calyx teeth, a slightly longer corolla and leaves more or less consistently chartaceous. Further collecting may reveal that collections from Seram need to be given taxonomic status.

9. *Amaracarpus anomalus* Wernham

Amaracarpus anomalus Wernham (1916) 78. — Type: *Boden Kloss s.n.* (holo BM), [Papua Barat], Utakwa River to Mt Carstenz, Camp ix–x, 5500–6700 ft [1676–2042 m], 26 Jan. 1913.

Shrub, height unknown, puberulous to pubescent, hairs erect to erecto-patent, (0.1–)0.2–0.3 mm long, brown to dark brown; axillary brachyblasts present, few; leaves rather irregularly arranged, forming flat, $\pm$ irregular tiers of irregular shape (in outline). *Branchlets* 1–1.5 mm diam., smooth, light to dark brown, puberulous to pubescent. *Stipules* connate at the base or free, deltate to square, 1–2.5 by 0.7–2.5 mm, 2-veined, membranous, glabrous to puberulous, apex truncate or obtuse, with 2 setae, setae 0.3–0.5 mm long, puberulous. *Leaves*: petioles (0–)0.5–1 mm long, glabrous to pubescent; leaf blades obovate to elliptic-rhombic, 0.6–1.1 by 0.3–0.7 cm, chartaceous, usually drying dark green, base narrowly cuneate, apex rounded to abruptly acuminate; abaxial surface: midrib glabrous to minutely puberulous, secondary veins 3 or 4 pairs, manifest to obscure, ascending at an angle of c. 45°, glabrous, venation obscure to $\pm$ invisible; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal at the apex of side shoots, 1-flowered, sessile; bracts and bracteoles absent. *Flowers* sessile. *Calyx* (incl. hypanthium) 1.5–2 by 1.5 mm, glabrous, calyx lobes $\pm$ deltate, 0.5–1 by 0.2–0.3

mm, margins puberulous. *Corolla* 2–4.5 by 1.5–3 mm, external surfaces puberulous or glabrous, internal surface with a ring of hairs, corolla lobes 2–3 by 1 mm. *Stamens*: anthers c. 0.7 mm long; filaments c. 0.3 mm long. *Style* 4–5 mm long. *Fruit* c. 3 by 1.5 mm (immature), sessile; calyx c. 1 mm long. *Pyrenes* not seen.

Distribution — Papua Barat. Only known from two locations in SW Papua Barat: Mt Carstensz [Mt Jaya] and Wissel Lake [Lake Paniai] region.

Habitat & Ecology — Poorly known. Riversides.

10. *Amaracarpus brassii* Merr. & L.M. Perry

Amaracarpus brassii Merr. & L.M. Perry (1946) 229. — Type: *Brass* 10823 (holo A; iso L), Papua Barat, 9 km NE of Lake Habbema, 2700 m, Oct. 1938.

Treelet or shrub, 3–4 m high, puberulous to pubescent, or $\pm$ glabrous, hairs antrorse to $\pm$ erect, 0.1–0.2 mm long, brown to dark brown; axillary brachyblasts absent; leaves rather irregularly arranged, forming flat, $\pm$ irregular tiers of irregular shape (in outline). *Branchlets* 0.5–1.5 mm diam., $\pm$ smooth, dark brown, puberulous to pubescent, or glabrous. *Stipules* connate at the base, $\pm$ obovate, 0.8–1 by 1 mm, membranous, glabrous, apex truncate, with 2 setae, setae 0.2 mm long, glabrous to puberulous. *Leaves*: petioles c. 0.5 mm long, glabrous to puberulous; leaf blades cordate to deltate, or almost reniform, 0.1–0.2 by 0.1–0.2(–0.3) cm, subcoriaceous to coriaceous; drying dark green to blackish, base cordate, or rounded to truncate, apex obtuse to broadly cuneate; abaxial surface: midrib glabrous, secondary veins invisible, glabrous, venation invisible; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal at the apex of side shoots, 1-flowered, sessile; bracts and bracteoles absent. *Flowers* 4- (or 5-)merous, sessile. *Calyx* (incl. hypanthium) 1–1.5 by 1–1.5 mm, glabrous, calyx lobes tooth-like to deltate, 0.5–0.8 by 0.5–0.7 mm, margins puberulous. *Corolla* 2–2.5 by 1.5 mm, external and internal surface glabrous, corolla lobes c. 0.5 by 1 mm. *Stamens*: anthers c. 0.4 mm long; filaments c. 0.2 mm long. *Style* c. 0.5 mm long. *Fruit* 4.5–5 by 2.5–3 mm, sessile; calyx c. 0.5 mm long. *Pyrenes* 2.5–3.5 by 2–3 mm.

Distribution — Papua Barat. Restricted to central Papua Barat, and only known from two localities: north of Lake Habbema, and Mt Trikora.

Habitat & Ecology — Valley bottoms; occasional; altitude c. 2700 m.

Note — *Amaracarpus brassii* is easily recognized by its very small (1–2 mm long), cordate to deltate or almost reniform leaves. The species is currently only known from two specimens, the type and *Mangen* 299 (L, LUX).

11. *Amaracarpus grandifolius* Valetton

Amaracarpus grandifolius Valetton (1927) 120. — Type: *Schlechter* 16702 (lectotype L, selected here; isolectotypes A, K), Nordöstl. Neu-Guinea [Papua New Guinea], Kaiser-Wilhelmsland, 'in den Wäldern am Kaulo', c. 180 m, 20 Oct. 1907.

Amaracarpus grandicalyx Valetton (1927) 122. — Type: *Lauterbach* 1207 (lectotype WRS�, selected here), Nordöstl. Neu-Guinea [Papua New Guinea], Constantin-Hafen, Dec. 1890.

Amaracarpus brachypus Merr. & L.M. Perry (1946) 223. — Type: *Brass* 3876 (holo A; iso NY), Papua New Guinea, Dieni, Ononge Road, 500 m, April–May 1933.

Amaracarpus solomonensis Merr. & L.M. Perry (1946) 223. — Type: *Brass* 2955 (holo A; iso L), Solomon Islands, Ulawa [Island], 200–300 m, Oct. 1932.

[*Coffea uniflora* sensu K. Schum. & Lauterb., pro parte (*Lauterbach* 2188, 2893), non K. Schum.]

Tree or shrub, (0.3–)1–3.6(–7) m high, glabrous to subhirsute, rarely hirsute, hairs $\pm$ erect to antrorse, (0.1–)0.2–1.2(–2.2) mm long, brown; axillary brachyblasts present to numerous; leaves regularly arranged in the same plane, widely spaced or close together, forming flat, $\pm$ regular or irregular tiers, regular or irregular shape (in outline). *Branchlets* 1.5–3.5 mm diam., roughish, whitish to brown, glabrous to subhirsute, rarely hirsute. *Stipules* connate at the base to c. 1/2 their length, oblong to $\pm$ square, narrowly ovate to narrowly elliptic, or $\pm$ triangular, (2–)2.6–13(–15) by 0.8–4 mm, often 2-veined, chartaceous, glabrous to subhirsute, apex acute to narrowly acute. *Leaves*: petioles 0.5–6(–8) mm long, glabrous to hirsutellous; leaf blades $\pm$ elliptic to narrowly elliptic, $\pm$ narrowly ovate to narrowly ovate, rarely narrowly obovate, sometimes slightly rhombic, (0.8–)2.9–13(–15) by (0.2–)0.9–3.1(–3.8) cm, chartaceous, drying green, dark green or greyish, base acute, sometimes slightly decurrent, apex acute to subcaudate, cauda up to 0.9 cm long; abaxial surface: midrib glabrous to pubescent, rarely hirsutellous, secondary veins (4–)6–16(–18) pairs, prominent to obscure, ascending at an angle of c. 45°, glabrous to pubescent, venation usually prominent; abaxial surface glabrous to sparsely pubescent; adaxial surface glabrous. *Inflorescences* terminal at the apex of side shoots, or terminal on axillary brachyblasts (near-axillary) or axillary, 1–2(–5)-flowered, $\pm$ sessile; bracts and bracteoles absent. *Flowers* sessile to very shortly pedicellate; pedicel (if present) 0.5–1.5 mm long. *Calyx* (incl. hypanthium) 2–4 by 2–2.5 mm, glabrous to pubescent, calyx lobes deltate to triangular, 0.2–0.5 by 1 mm, glabrous to pubescent. *Corolla* 3.5–5 by 2–2.5 mm, external surface glabrous, internal surface with a ring or hairs, corolla lobes 1.5–2 by 1–2.5 mm. *Stamens*: anthers 0.7–1 mm long; filaments c. 0.5 mm long. *Style* 2–3 mm long. *Fruit* 4.5–6.5 by 3.5–5 mm, pedicel 0.5–1.7 mm long; calyx 1.5–3.5(–4.5) mm long. *Pyrenes* 4–6 by 4–5 mm.

Notes — In this account *A. brachypus*, *A. grandicalyx*, *A. humilis*, *A. lauterbachii*, *A. leucocarpus*, *A. solomonensis*, and *A. trichocarpus*, are considered to represent synonyms of *A. grandifolius*. Quantitative differences (e.g. leaf size and shape) and slight differences in leaf venation patterns seem to be the only tenable criteria for recognizing distinct entities. The extensive range of variation in these characters argues against the recognition of several species. In this revision *A. grandifolius* is treated as a highly polymorphic species, with four rather poorly differentiated varieties (var. *grandifolius*, var. *humilis*, var. *leucocarpus*, and var. *trichocarpus*). There is both morphological and geographical overlap between varieties and each may have originated independently a number of times throughout the distribution range of the species. The remarkable variation within *A. grandifolius* is exemplified by the collection Sands 798 (K): sheet I is typical *A. grandifolius* var. *grandifolius*, whereas sheet II is intermediate between var. *grandifolius* and var. *humilis*.

Valeton (1927: 120, 157) deduced that Schumann & Lauterbach (1901: 569) had cited a number of specimens of *A. grandifolius* under the name *Coffea uniflora* K. Schum. On the basis of the description and on inspection of two of these specimens (Lauterbach 2188 and 2893), Valeton (1927: 157) transferred *C. uniflora* to *Ixora*, making the combination *I. uniflora* (K. Schum.) Valeton, although he had clearly not seen the holotype ('*Hollrung* 607 non vidi'). It is almost certain that the holotype was destroyed in Berlin. On the basis of the description we concur with Valeton that *C. uniflora* is indeed an *Ixora*.

Of the specimens cited by Valetton (1927) for *A. grandifolius* (Lauterbach 268, 1148, 2064, 2215, 2432; Schlechter 14153, 16186, 16617, 16702, 17704), only the specimens Lauterbach 1148 and Schlechter 14153, 16186, 16702 are known to be extant. We have selected Schlechter 16702 as the lectotype for this species.

KEY TO THE VARIETIES

- 1a. Leaf blades usually > 4 cm long **a. var. grandiflorus**
- b. Leaf blades usually < 4 cm long 2
- 2a. Branchlets pubescent to subhirsute, rarely hirsute, hairs usually > 0.4 mm long ..
..... **d. var. trichocarpus**
- b. Branchlets glabrous, or puberulous to pubescent, hairs (if present) usually < 0.3
mm long 3
- 3a. Leaf blades elliptic to narrowly elliptic, narrowly ovate to narrowly obovate, drying
green to dark green, or sometimes grey. **b. var. humilis**
- b. Leaf blades elliptic to narrowly obovate, leaves usually drying grey
..... **c. var. leucocarpus**

a. var. grandifolius

Tree or shrub, (0.5–)1.2–3.6(–7) m high, glabrous to subhirsute, hairs $\pm$ erect to antrorse, (0.1–)0.2–1.2 mm long, brown. *Stipule*: apex acute to narrowly acute. *Leaves*: petioles (1–)2–4(–6) mm long, glabrous to hirsutellous; leaf blades $\pm$ elliptic to narrowly elliptic, or $\pm$ narrowly ovate to narrowly ovate, (2.7–)4–13(–15) by (1–)2–3.1(–3.8) cm, drying green to dark green, or sometimes grey; abaxial surface glabrous to sparsely pubescent.

Distribution — Moluccas (Halmahera: Morotai), Papua New Guinea (incl. New Ireland, Kawa Island, Kiriwina Island, Goodenough Island, Fergusson Island, Bougainville Island), Solomon Islands (incl. Mbava (Baga) Island, Kolombangara Island, Malaita Island, Ulawa Island).

Habitat & Ecology — Often on stream banks and river flats, ridge tops, and steep ridges; recorded with *Albizia* spp., *Anisoptera* spp., *Castanopsis* spp., *Dysoxylum* spp., *Litsea* spp., *Podocarpus* spp., *Quercus* spp., and *Syzygium* spp.; substrate: limestone, clay, and probably on other substrates; often locally common; 5–1100(–1320) m altitude.

Uses — Used for yam magic: leaves and bark boiled and eaten after pancelling [sic: definition not found] (*Saki & Wawikiak* 4663; Papua New Guinea). Bark macerated and given as a drink to infants suffering from constipation (*Kajewski* 2394; Solomon Islands).

Note — See above under *A. grandifolius*.

b. var. humilis (Valetton) A.P. Davis, *stat. nov.*

Amarcarpus humilis Valetton (1927) 125. — Type: Schlechter 17368 (holo B $\dagger$; iso A, BM, K, L), Nordöstl. Neu-Guinea [Papua New Guinea], Kaiser-Wilhelmsland, ‘in den Wäldern auf dem Rani’, 1000 m, 26 Feb. 1908.

Treelet or shrub, (0.3–)0.5–2.5(–3) m high, puberulous to pubescent, sometimes glabrous, hairs antrorse, (0.1–)0.2–0.3(–0.4) mm long, light brown to brown. *Stipule*: apex acute. *Leaves*: petioles (0.5–)1–2(–8) mm long, puberulous to pubescent; leaf blades elliptic to narrowly elliptic, $\pm$ narrowly ovate to narrowly obovate, (0.8–)1.5–3(–4.7) by (0.2–)0.4–1.4 cm, drying green to dark green, or sometimes grey; abaxial surface glabrous.

Distribution — Papua New Guinea (incl. Fergusson Island and Normanby Island).

Habitat & Ecology — On ridges, streamsides; on substrates with good drainage; recorded with *Bombax* spp., *Celtis* spp., *Chisocheton* spp., and *Ficus* spp.; altitude (50–)150–1000(–1300) m.

c. var. *leucocarpus* (Lauterb. & K. Schum.) A.P. Davis, *stat. nov.*

Amaracarpus leucocarpus (Lauterb. & K. Schum.) Valetton (1911) 501; (1927) 117. — *Litosanthes leucocarpa* Lauterb. & K. Schum. in K. Schum. & Lauterb. (1901) 586. — Type: *Lauterbach 21113* (holo B $\ddagger$; iso K, WRS�), [Papua New Guinea], Kaiser Wilhelmsland, Oertzen-gebirge, 'Charakterpflanze des Unterholzes', 200 m, 15 May 1896.

Amaracarpus lauterbachii Valetton (1927) 120. — Type: *Lauterbach 996* (holo B $\ddagger$; iso WRS�), Nordöstl. Neu-Guinea [Papua New Guinea], Gogol, Mittellauf, 19 Nov. 1890.

Treelet or shrub, 1–2 m high, puberulous to pubescent, hairs antrorse to $\pm$ erect, 0.1–0.2(–0.3) mm long, light brown. *Stipule*: apex acute. *Leaves*: petioles 0.5–2 mm long, glabrous to puberulous; leaf blades elliptic to $\pm$ narrowly obovate, 1.5–2(–2.6) by 0.7–0.9(–1.2) cm, leaves usually drying grey, surface glabrous.

Distribution — Papua New Guinea (incl. New Britain and New Ireland (Mussau Island)).

Habitat & Ecology — Poorly known. Riversides; altitude 0–60 m.

Notes — Schumann & Lauterbach (1901) cite the specimen *Lauterbach 2113* as the holotype specimen for *Litosanthes leucocarpa*, but no *Amaracarpus* material with this number has been found. There is, however, a specimen *Lauterbach 113*, matching the description and bearing the name *L. leucocarpa*, collected in Kaiser Wilhelmsland. We regard this specimen as the type (representing *Lauterbach 2113*) and believe that there has been a clerical error. Moreover, it is well documented that the very early collections of Lauterbach were not made in New Guinea (Van Steenis-Kruseman, 1950).

Schumann & Lauterbach (1901) recorded the fruit colour of *Litosanthes leucocarpa* as white, hence the epithet for this species. It is more likely, however, that this observation represents either immature material or an erroneous observation, as *Amaracarpus* fruits are orange or red.

d. var. *trichocarpus* (Merr. & L.M. Perry) A.P. Davis, *stat. nov.*

Amaracarpus trichocarpus Merr. & L.M. Perry (1946) 225. — Type: *Brass 1039* (holo A; iso BM), Papua New Guinea, Hohoro, Vailala River, 300 ft [91 m], 22 Jan. 1926.

Treelet or shrub, 0.6–1.5(–1.8) m high, pubescent to subhirsute, rarely hirsute, hairs antrorse to $\pm$ erect, (0.2–)0.4–2.2 mm long, light brown to brown, or golden brown. *Stipule*: apex acute. *Leaves*: petioles 0–1(–3) mm long, puberulous to hirsutellous; leaf blades elliptic, rarely obovate often slightly rhombic, (0.7–)0.9–3.8(–5.2) by

(0.2–)0.4–1.1(–1.4) cm, usually drying green to dark green; abaxial surface glabrous to sparsely pubescent.

Distribution — Papua New Guinea (incl. New Ireland), Solomon Islands (incl. Mbava (Baga) Island, Guadalcanal Island, Malaita Island).

Habitat & Ecology — Streamsides, river valleys, ridges valley bottoms, gorges and creeks, often on steep slopes; recorded with *Castanopsis* spp. and *Quercus* spp.; substrate: limestone, and raised coral; altitude 40–800(–1400) m.

Note — Two fruiting specimens from the Solomons (Guadalcanal: *Nakisi & Mauriasi BSIP 8065*; Malaita: *Hunt 3055*) are peculiar for this variety, as the fruits have enlarged, leaf-like calyx lobes. Taxonomic recognition may be necessary if this character proves to be consistent.

12. *Amaracarpus wichmannii* Valetton

Amaracarpus wichmannii Valetton in Gibbs (1917) 221. — Type: *Gibbs s.n.* [6185] (holo BM), [Papua Barat, Vogelkop Peninsula], Manokoeari [sic], 500 ft [152 m], Dec. 1913.

Shrub, (0.5–)0.75–1(–2) m high, glabrous to pubescent, rarely hirsutellous, hairs antrorse, (0.1–)0.2–0.3(–0.4) mm long, light brown; axillary brachyblasts usually numerous; leaves close together and regularly arranged in the same plane, forming flat, regular tiers of regular shape (in outline). *Branchlets* 1.5–2.5 mm diam., frequently with very fine longitudinal striations, brown, glabrous to pubescent, rarely hirsutellous. *Stipules* apparently free at the base, triangular, 2.5–5 by 1–2 mm, thinly chartaceous to membranous, glabrous or pubescent, sometimes with a tuft of hairs at the base, apex acute, with 1 seta, seta 0.5–1 mm long, glabrous or pubescent. *Leaves*: petioles 0.5–1.5(–3) mm long, glabrous to pubescent; leaf blades obovate to narrowly obovate or obovate-elliptic, (0.7–)1.1–2(–2.2) by (0.4–)0.6–0.8(–1) cm, chartaceous, drying green to grey, base shortly attenuate to attenuate, or cuneate, frequently slightly decurrent, apex acute to broadly acute; abaxial surface: midrib glabrous to pubescent, secondary veins 4 or 5 pairs, rather indistinct or prominent, ascending at an angle of 45–60°, glabrous to puberulous, venation obscure to invisible; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal on side shoots, or terminal on axillary brachyblasts (near-axillary), 1(–3)-flowered, sessile; bracts and bracteoles absent. *Flowers* sessile. *Calyx* (incl. hypanthium) c. 2.5 by 2 mm, glabrous to puberulous, calyx lobes triangular to linear, 1.2–1.5(–2.1) by 0.5–1 mm, margins puberulous. *Corolla* 3–5(–7) by 2–3 mm, external surface glabrous, internal surface with a ring of hairs, corolla lobes 1.5–2 by 1 mm. *Stamens*: anthers c. 0.6 mm long; filaments c. 0.5 mm long. *Style* c. 3.5 mm long. *Fruit* 3–4.5 by 2–3.5 mm, sessile; calyx 1–1.5 mm long. *Pyrenes* 3–5 by 2–4.5 mm.

Distribution — Papua Barat (incl. Vogelkop Peninsula), Papua New Guinea (incl. Normanby Island).

Habitat & Ecology — On rocks, steep ridges and along creeks; recorded with *Castanopsis* spp.; substrate: limestone (incl. open karst areas), granite and clay; scattered to locally common; altitude 10–750 m.

Note — *Amaracarpus wichmannii* is very similar to *A. nymanii*, as both species have leaves of similar size and shape and stipules with an acute apex (sometimes possessing a single, very small seta). The latter species differs by its hirsutellous to pubescent branchlets, often numerous brachyblasts and conspicuously congested leaves.

13. *Amaracarpus nymanii* Valeton

Amaracarpus nymanii Valeton (1927) 119 (as '*nymannii*'). — Type: *Nyman 104* (holo B⁺), Nordöstl. Neu-Guinea [Papua New Guinea], Stephansort, Jan. 1899. — Neotype: *Brass 24011* (neotype A, selected here; isoneotypes K, L, US), Papua New Guinea, Milne Bay District, Peria Creek, Kwagira River, 50 m, 17 Aug. 1953.

Shrub, (0.6–)1–1.75(–2) m high, hirsutellous to pubescent, hairs $\pm$ erect, 0.6–1 mm long, brown to dark brown; axillary brachyblasts numerous; leaves very close together and regularly arranged in the same plane, forming flat, dense regular tiers, of regular shape (in outline). *Branchlets* 1.5–2.4 mm diam., smooth, brown to dark brown, hirsutellous to pubescent. *Stipules* $\pm$ free at the base, $\pm$ triangular, 1.7–3.5 by 1–1.5 mm, 2-veined, membranous, glabrous but veins pubescent to puberulous, apex acute or with 1 seta, seta, if present, 0.5 mm long, pubescent to puberulous. *Leaves*: petioles (0.5–)1–2(–4) mm long, pubescent to hirsutellous; leaf blades obovate, rarely narrowly elliptic to narrowly obovate, (0.7–)1–1.8(–2.4) by (0.3–)0.4–1 cm, $\pm$ chartaceous, drying grey, greyish or green, base cuneate to narrowly cuneate, apex rounded to obtuse, rarely acute; abaxial surface: midrib glabrous to puberulous, secondary veins 3–5(–6) pairs, manifest to obscure, ascending at an angle of c. 45°, glabrous, venation manifest or obscure; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal on side shoots, or terminal on axillary brachyblasts (near-axillary), 1-flowered, sessile; bracts and bracteoles absent. *Flowers* sessile. *Calyx* (incl. hypanthium) c. 4 by 3 mm, glabrous, calyx lobes triangular, 0.8–2 by 0.5–1 mm, glabrous. *Corolla* 8–10 by 3–4 mm, external surface glabrous, internal surface with a ring of hairs, corolla lobes 3–3.5 by 1–1.5 mm. *Stamens*: anthers c. 0.5 mm long; filaments c. 0.4 mm long. *Style* c. 3.2 mm long. *Fruit* 5–7 by 3.5–6 mm, sessile; calyx c. 0.5 mm long. *Pyrenes* c. 3.5 by 2.2 mm.

Distribution — Papua New Guinea (incl. Goodenough Island).

Habitat & Ecology — Understorey of evergreen humid forest and also found in coastal scrub; recorded with *Casuarina* spp. and *Quercus* spp.; near rivers, stream-sides; substrate: limestone, sometimes rocky; sometimes locally common; altitude 50–220(–22515) m.

Note — Even though we have not seen the holotype of this species it is clear from the original description (Valeton, 1927) that the name *A. nymanii* should be used to represent this entity. Valeton (1927) spells the epithet for this species as '*nymannii*', but we have changed this to *nymanii* to accord with the collector's name (E. O. A. Nyman). After an exhaustive search for isotypes of *A. nymanii* (*Nyman 104*) we have come to the conclusion that the collection was a unicate (the holotype), and was destroyed in Berlin. It also appears that all the other material on which the taxon was based (if any ever existed) is missing, again presumably destroyed in Berlin. Valeton (1927: 120) cites a second specimen (*Schlechter 16090*, K, L) as perhaps the same ('Vielleicht ebenfalls') as *A. nymanii*, and annotated the collection as '*Amaracarpus* (aff. *Nymanii* Val) [sic.]'. Merrill & Perry (1946: 225) suggest that the Schlechter specimen is very close to their *A. calcicola*, and we confirm that it belongs to *A. calcicola*, not *A. nymanii*. In conclusion, it appears that no original material of this species exists, and so we have selected a neotype for *A. nymanii* (see above).

14. *Amaracarpus novo-guineensis* (Warb.) Valetton

Amaracarpus novo-guineensis (Warb.) Valetton (1927) 118. — *Litosanthes novo-guineensis* Warb. (1891) 442; K. Schum. & Lauterb. (1901) 585. — Type: *Hellwig 231* (lectotype BO, selected here; isoelectotype K), Neu-Guinea [Papua New Guinea], Kaiser Wilhelmsland, 13 Jan. 1889.

Shrub, height unknown, puberulous to minutely puberulous, or $\pm$ glabrous, hairs antrorse to $\pm$ erect < 0.1 – 0.1 mm long, light brown to brown; axillary brachyblasts present; leaves close together and regularly arranged in the same plane, forming flat, regular tiers of irregular shape (in outline). *Branchlets* $(0.5\text{--})1$ – 1.5 mm diam., $\pm$ smooth, brown, puberulous to minutely puberulous. *Stipules* connate at the base or free, broadly ovate to narrowly triangular, 1.5 – 4 by 0.7 – 1 mm, membranous to subcoriaceous, puberulous, apex acute. *Leaves*: petioles 0.5 – 1 mm long, glabrous to puberulous; leaf blades usually elliptic to broadly elliptic, $(0.4\text{--})0.6$ – 1.1 by $(0.2\text{--})0.3$ – 0.6 cm, chartaceous, usually drying light green to green, base cuneate to narrowly cuneate, apex acute to cuneate; abaxial surface: midrib puberulous to glabrous, secondary veins 3 or 4 pairs, obscure to obvious, ascending at an angle of 30 – 45° , glabrous, venation invisible; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal at the apex of side shoots or terminal on axillary brachyblasts (near-axillary), 1-flowered, sessile; bracts and bracteoles absent. *Flowers* sessile. *Calyx* (incl. hypanthium) 1 – 1.2 by 0.9 – 1 mm, glabrous, calyx lobes deltate to triangular, c. 0.7 by 0.5 mm long, margins puberulous. *Corolla* 2 – 3.5 by 1.3 – 1.5 mm, external surfaces puberulous or glabrous, internal surface with a ring of hairs, corolla lobes c. 0.5 mm long. *Stamens*: anthers c. 0.6 mm long; filaments c. 0.3 mm long. *Style* not seen. *Fruit* c. 3 by 2.5 mm (immature), sessile; calyx c. 0.7 mm long. *Pyrenes* not seen.

Distribution — Papua Barat and Papua New Guinea.

Habitat & Ecology — Poorly known. Altitude 1000 – 2400 (– 2600) m.

Note — Warburg (1891) based *Litosanthes novo-guineensis* on two specimens collected in northern Papua New Guinea (Kaiser-Wilhelmsland) by F. Hellwig (*Hellwig 231* and *523*). We have chosen the specimen *Hellwig 231* as the lectotype.

15. *Amaracarpus compactus* Merr. & L.M. Perry

Amaracarpus compactus Merr. & L.M. Perry (1946) 227. — Type *Brass 4133* (holo A; iso L, NY), Papua New Guinea, Mt Tafa, Central Division, 2100 m, May–Sept. 1933.

Amaracarpus simulans Merr. & L.M. Perry (1946) 228. — Type: *Brass 10522* (holo A; iso BM, L), Irian Jaya [Papua Barat], 9 km NE of Lake Habbema, 2800 m, Oct. 1938.

Treelet or shrub, 0.5 – 4 (– 6) m high, puberulous to pubescent, sometimes glabrous, hairs antrorse to $\pm$ erect, < 0.1 – 0.2 mm long, brown to dark brown; axillary brachyblasts usually absent, sometimes few; leaves rather irregularly arranged, forming flat $\pm$ regular tiers of irregular shape (in outline). *Branchlets* 0.5 – 1.5 (– 2.5) mm diam., $\pm$ smooth, brown, puberulous to pubescent. *Stipules* connate at the base and sometimes for more than $1/2$ their length, or free, broadly obovate, $\pm$ square to oblong, or triangular, 1 – 2.7 (– 3.5) by 0.7 – 1.5 mm, membranous, puberulous or glabrous, apex acute to broadly acute with 1 or 2 short tuft of hairs or with 1 seta, seta, if present, $(0.2\text{--})0.5$ – 0.7 mm long, puberulous to glabrous. *Leaves*: petioles $(0\text{--})0.5$ – 2 (– 2.5) mm long, puberulous to pubescent, or glabrous; leaf blades elliptic-rhombic, or rhombic-narrowly obovate to rhombic-obovate, $(0.3\text{--})0.4$ – 1.3 by $(0.1\text{--})0.2$ – 0.6 (– 1) cm, chartaceous, usually

drying dark green to brown, or blackish, base cuneate to narrowly cuneate, sometimes decurrent, apex abruptly acuminate, or acute to obtuse; abaxial surface: midrib puberulous or glabrous, secondary veins 3 or 4 (or 5) pairs, obscure to manifest, ascending at an angle of 30–45°, glabrous, venation obscure to invisible; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal at the apex of side shoots and/or the axillary brachyblasts (near-axillary), 1-flowered, sessile; bracts and bracteoles absent. *Flowers* sessile. *Calyx* (incl. hypanthium) 2–5 by 1.5–2.5 mm, glabrous, calyx lobes deltate to triangular, or broadly elliptic, 0.5–1.5 by 0.6–1(–1.5) mm long, glabrous. *Corolla* (2.5–)3–5(–7) by 2.5–5.5 mm, external surface glabrous to sparsely puberulous, internal surface with a ring of hairs or glabrous, corolla lobes (0.5–)1–2.5 by 0.7–1.5 mm. *Stamens*: anthers 0.5–1 mm long; filaments 0.2–0.3 mm long. *Style* (2–)3–6 mm long. *Fruit* 3–7 by 2.5–4 mm, sessile; calyx 0.7–1 mm long. *Pyrenes* 4–4.5 by 3.5–4 mm.

Distribution — Papua Barat and Papua New Guinea (incl. Fergusson Island).

Habitat & Ecology — Valley bottoms; substrate: limestone; locally frequent to common; altitude 1200–2800 m.

16. *Amaracarpus heteropus* Valeton — Fig. 4, 5

Amaracarpus heteropus Valeton (1912) 769; (1909–1914) pl. 128. — Type: *Gjellerup* 264 (lectotype L, selected here; isoelectotypes BO, L), N.N. Guinea [Papua Barat], Tami-river, $\pm$ 50 m, 8 July 1910.

Amaracarpus longifolius Valeton (1912) 770; (1909–1914) pl. 129, nom. illegit., non *Amaracarpus longifolius* Elmer. — Type: *Gjellerup* 327 (lectotype BO, selected here; isoelectotypes BO, L), Nord-n. Guinea, [Papua Barat], Augusta River, $\pm$ 60 m, 5 Oct. 1910.

Amaracarpus lanceolatus Valeton (1927) 115. — Type: *Lam* 1084 (lectotype L, selected here; isoelectotypes L, U), Nova Guinea neerlandica [Papua Barat] in reg. flum. Mamberamo, Prauwenbivak, 180 m, 6 Sept. 1920.

Amaracarpus corymbosus Valeton (1927) 115. — Type: *Feuilletau de Bruyn* 47 (lectotype BO, selected here; isoelectotypes K, L), Nova Guinea neerlandica meridionalis [Papua Barat], 20 June 1914.

Amaracarpus urophyllus Merr. & L.M. Perry (1946) 221. — Type: *Brass* 4998 (holo A; iso NY), Papua New Guinea, Mount Tafa, Central Division, 2400 m, Sept. 1933.

Shrub or treelet, 1–2 m high, glabrous to pubescent, hairs $\pm$ erect to antrorse, < 0.1–0.5(–1) mm long, brown; axillary brachyblasts usually present; leaves regularly arranged in the same plane, but not close together, forming flat but irregular shaped tiers (in outline). *Branchlets* 1.5–3 mm diam., $\pm$ smooth, brown, glabrous to pubescent. *Stipules* connate at the base to 1/3 to 1/2 of their length, rectangular or triangular to narrowly ovate, (2.5–)3.5–9.5(–11) by (1.8–)2.5–2.7 mm, 2-veined, membranaceous to chartaceous, glabrous to pubescent, apex truncate to acute, with 2 prominent setae, setae (1.5–)3–7.5 mm long, glabrous to pubescent. *Leaves*: petioles 3–5 mm long, glabrous to puberulous; leaf blades $\pm$ elliptic to $\pm$ narrowly ovate, elliptic-obovate, or narrowly elliptic, (3.2–)5.5–14.2 by (0.9–)1.5–4.2(–5.7) cm, chartaceous, drying green to dark green, or greyish to grey, base cuneate to obtuse, apex subcaudate, rarely acute, cauda 0.4–1 cm long; abaxial surface: midrib glabrous or puberulous, secondary veins (6–)8–10(–12) pairs, prominent, ascending at an angle of 30–45°, glabrous to puberulous, venation obscure to manifest; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal on axillary brachyblasts (near-axillary), or axillary

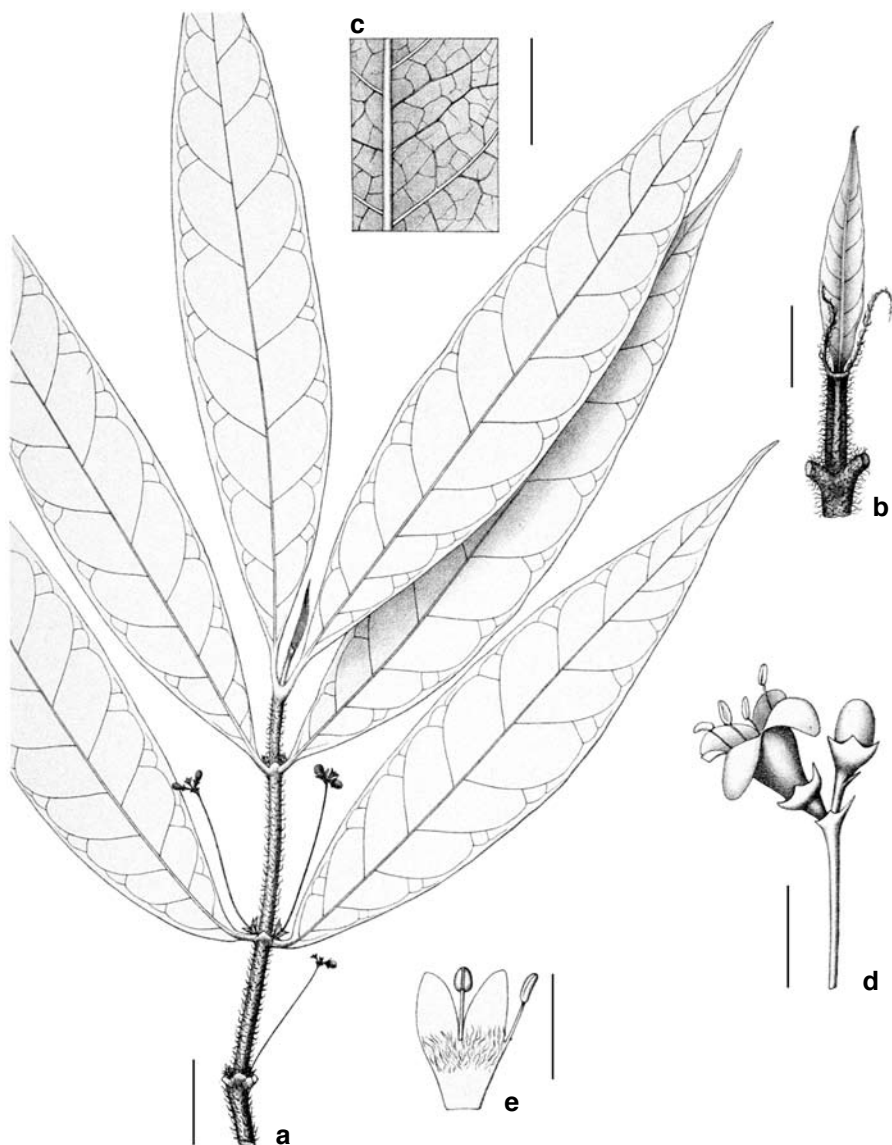


Fig. 4. *Amaracarpus heteropus* Valetton. a. Habit, showing terminal inflorescences on much reduced axillary brachyblasts (near axillary), the lowest inflorescence pair more or less axillary; b. detail of shoot apex, showing stipule with two distinct setae (2nd leaf pair removed); c. detail leaf venation; d. part of inflorescence, showing peduncle and flowers; e. section of corolla (internal view), showing two stamens inserted within the ring of corolla throat hairs. Drawn by R. Natadipoera; reproduced from *Nova Guinea* 8, 3 (1909–1914) pl. 129 (modified for publication here). — Scale bars: a = 2 cm; b, c = 2 mm; d = 4 mm; e = 3 mm.

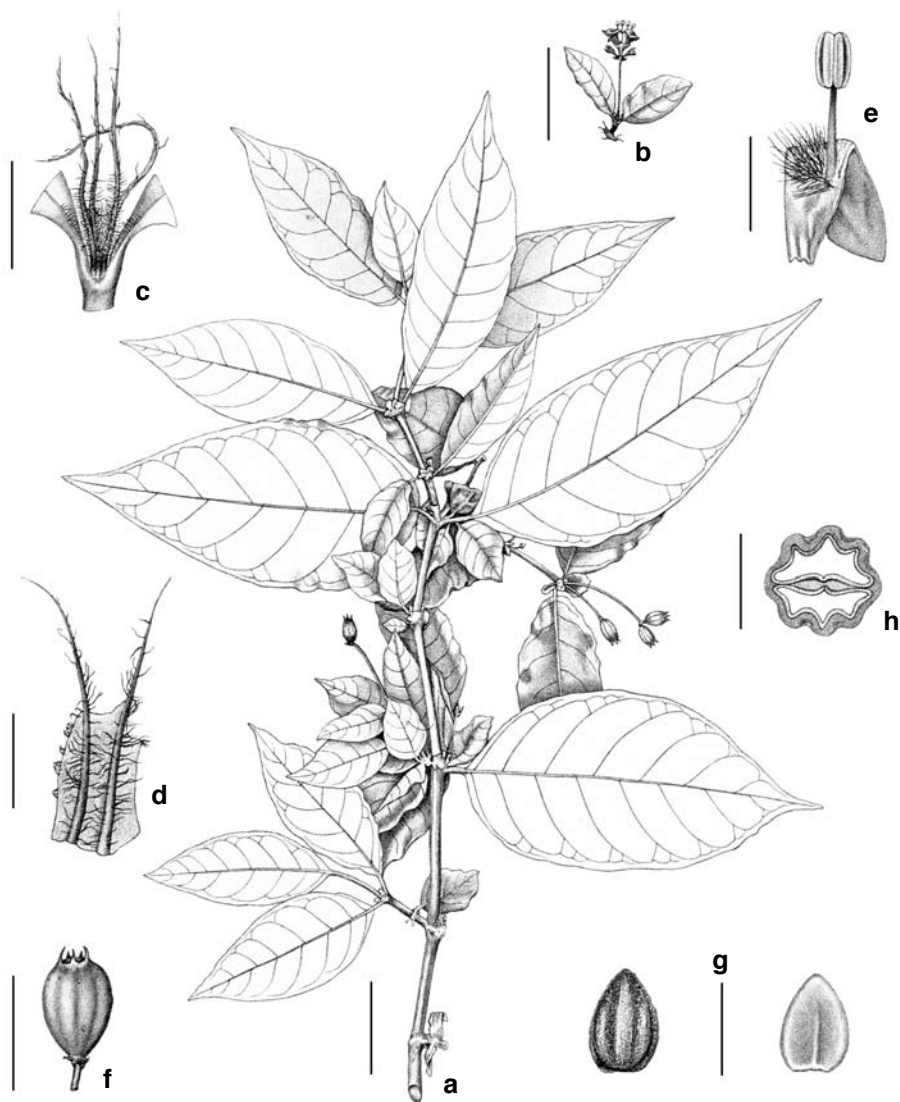


Fig. 5. *Amaracarpus heteropus* Valet. a. Habit, showing terminal inflorescences on axillary brachyblasts (near axillary); b. detail of (secondary) axillary side shoots (axillary brachyblasts), showing reduced leaves and pedunculate inflorescence; c. stipules; d. mature stipule with two setae; e. section of corolla (internal view), showing one stamen inserted within the ring of corolla throat hairs; f. fruit; g. pyrene, dorsal (abaxial) and ventral (adaxial) views (left to right); h. transverse section through fruit, showing ridged dorsal surface of pyrene. Drawn by R. Natadipoera; reproduced from *Nova Guinea* 8, 3 (1909–1914) pl. 128 (modified for publication here). — Scale bars: a = 2 cm; b = 1.3 cm; c, h = 3 mm; d = 2 mm; e = 1.8 mm; f, g = 5 mm.

in the first or second leaf pair, (1–)2–5(–7)-flowered simple cymes or few-branched simple (compound) cymes, pedunculate; peduncle (0.2–)0.7–4.6 cm long, glabrous to puberulous; second order inflorescence branches present or absent, if present 0.2–0.5 cm long; bracts 2 per peduncle, opposite, narrowly triangular to linear, (0.5–)1–3.5 mm long, sometimes fallen; bracteoles 2 per flower, opposite, linear, 0.2–0.6 mm long, or absent. *Flowers* sessile or pedicellate; pedicel, if present 0.5–1 mm long. *Calyx* (incl. hypanthium) 1–2.7 by 1.5–2(–3) mm, glabrous, calyx lobes deltate to triangular, (0.4–)0.6–1 by 0.4–0.7 mm, glabrous. *Corolla* 1.5–2.6(–5) by 1.5–3.5 mm; external surface glabrous, internal surface with a ring of hairs or rarely glabrous, corolla lobes 1–2.7 by 0.5–0.7 mm. *Stamens*: anthers (0.3–)0.5–0.7(–1) mm long; filaments 0.4–0.9(–1.7) mm long. *Style* 1.4–2.5 mm long. *Fruit* (3.2–)4.5–8 by 3–3.8 mm, pedicel, if present 0.5–1.1 mm long; calyx 1.5–2.5 mm long, or falling. *Pyrenes* 5–6.5 by 2.5–4.5 mm.

Distribution — Papua Barat, Papua New Guinea, Australia (North Queensland).

Habitat & Ecology — Coastal plains, edges of swamps; Recorded with *Celtis* spp., *Ficus* spp., *Oncosperma* sp., *Pometia* spp., Rubiaceae spp., *Sterculia* spp.; substrate: limestone, limestone with thin cover of clay; locally frequent; altitude 10–780 m.

Notes — *Amaracarpus heteropus* could be confused with *A. attenuatus*, as both species have relatively large leaves and long pedunculate inflorescences. These two species can be easily distinguished on the basis that *A. heteropus* has stipules with two very prominent setae, whereas the stipules of *A. attenuatus* are divided (bifid) into two narrowly (often seta-like) triangular points.

The two figures of *A. heteropus* reproduced here (see Fig. 4, 5) give some indication of the variability within one species, particularly in the degree to which the inflorescences can vary within a single species (i.e. terminal on axillary brachyblasts (Fig. 5) to near axillary and axillary (Fig. 4)). It should be noted, however, that Fig. 5 is somewhat inaccurate as the axillary brachyblasts *A. heteropus* do not possess quite so many leaves.

Amaracarpus longifolius Veleton is a later homonym of *A. longifolius* Elmer (= *Psychotria linearis* Bartl. ex DC.).

17. *Amaracarpus acuminatus* S. Moore

Amaracarpus acuminatus S. Moore (1923) 27. — Type: *Forbes* 657 (holo BM; iso L), Papua New Guinea, Sogeri, 1885–1886.

[*Amaracarpus forbesii* Veleton ined., in schedae.]

Shrub, 1–3.5 m high, puberulous to pubescent, hairs antrorse to erecto-patent, 0.1–0.2 mm long, brown to dark brown; axillary brachyblasts few; leaves close together and regularly arranged in the same plane, forming flat, regular tiers of irregular shape (in outline). *Branchlets* 0.4–1 mm diam., ± smooth, dark brown, puberulous to pubescent. *Stipules* connate for most of their length, ± oblong to square, 1.2–2.5 by 0.7–1 mm, membranous to chartaceous, glabrous to puberulous, apex truncate to obtuse, with 2 setae, or rarely acute and ± lacking setae, setae, if present, 0.5–0.7 mm long, glabrous to puberulous. *Leaves*: petioles 0–0.6(–3) mm long, glabrous to puberulous; leaf blades rhombic to elliptic-rhombic, or slightly obovate, 0.5–1.9 by (0.3–)0.5–1.1(–1.3) cm, often slightly asymmetric, chartaceous to subcoriaceous, drying green to blackish,

or grey, base cuneate to narrowly cuneate, apex abruptly acuminate to acute; abaxial surface: midrib glabrous to sparsely puberulous, secondary veins (3–)4–5(–8) pairs, manifest to obscure, ascending at an angle of 30–45°, glabrous to sparsely puberulous, venation obscure to $\pm$ invisible; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal at the apex of the side shoots, or terminal on axillary brachyblasts (near-axillary) or axillary, (2- or) 3-flowered umbels, pedunculate; peduncle 0.4–1.3 cm long, elongating during development, glabrous to puberulous; bracts 2 per peduncle, opposite, narrowly triangular to linear or cuspidate, c. 1 by 0.3 mm; bracteoles 2–5 per flower, sometimes forming a calyx-like structure, 1–1.5 by 1 mm, lobes triangular, c. 0.5 mm long, glabrous to puberulous. *Flowers* sessile. *Calyx* (incl. hypanthium) 1–2.5 by 1 mm, glabrous, calyx lobes deltate to triangular, 0.2–0.7 mm long, glabrous. *Corolla* 1.5–2 by 2 mm, external and internal surfaces glabrous, corolla lobes c. 0.7 by 0.7 mm. *Stamens*: anthers 0.2–0.5 mm long; filaments 0.2–0.3 mm long. *Style* 0.2–0.7 mm long. *Fruit* 4–5 by 3–4 mm; calyx 0.2–0.5 mm long. *Pyrenes* c. 4 by 3 mm.

Note — We consider that *A. acuminatus*, *A. mesophyllus*, and *A. pullei* represent a single species. There are, however, some morphological and ecological (e.g. altitude) differences between *A. acuminatus* and *A. pullei*, and we have recognized two subspecies: subsp. *acuminatus* and subsp. *pullei*.

KEY TO THE SUBSPECIES

- 1a. Secondary veins 3 or 4 pairs, obscure; inflorescence peduncle glabrous **a. subsp. *acuminatus***
- b. Secondary veins 4–5(–8) pairs, prominent to weak; inflorescence peduncle pubescent **b. subsp. *pullei***

a. subsp. *acuminatus*

Shrub, 1–3 m high. *Branchlets* 0.4–1 mm diam., often crooked in a zigzag pattern. *Leaves*: secondary veins 3 or 4 pairs, obscure. *Inflorescences*: peduncle 0.5–0.8 cm long, glabrous; bracts narrowly triangular to linear.

Distribution — Papua Barat, Papua New Guinea.

Habitat & Ecology — Poorly known. Recorded with *Fagus* spp.; altitude 450–1900 (–2680) m.

b. subsp. *pullei* (Valeton) A.P. Davis, *stat. nov.*

Amaracarpus pullei Valeton (1927) 114. — Type: *Pulle 1219* (lectotype L, selected here; isoelectotypes K, L, U), [Papua Barat], Noordriver, Kloof bivouac, 40 m, 24 March 1913.

Amaracarpus mesophyllus Valeton (1927) 113. — Type: *Lam 544* (lectotype L, selected here; isoelectotypes K, L, U), Noord N. Guinea [Irian Jaya], Pionierbivak [Pionier bivouac], 70 m, 4 July 1920.

Shrub, 1.5–3.5 m high. *Branchlets* 0.7–1 mm diam., usually straight. *Leaves*: secondary veins 4–5(–7–8) pairs, prominent to weak. *Inflorescences*: peduncle 0.4–1.3 cm long, pubescent; bracts triangular to cuspidate.

Distribution — Papua Barat, Papua New Guinea.

Habitat & Ecology — Recorded with *Agathis* spp.; substrate: clay; altitude 70–580 (–1050) m.

18. *Amaracarpus doormaniensis* Valeton

Amaracarpus doormaniensis Valeton (1927) 114 (as '*doormanniensis*'). — Type: *Lam 1990* (lectotype BO, selected here; isoelectotypes K, L, U), Nova Guinea neerlandica [Papua Barat], Mamberamo, alt. 2480 m, pr. in mont. Doorman, 13 Feb. 1920.

Shrub, c. 2.5 m high, puberulous to pubescent, hairs antrorse to erecto-patent, 0.1–0.2 mm long, brown to dark brown; axillary brachyblasts few or absent; leaves close together and regularly arranged in the same plane, forming flat, regular tiers of irregular shape (in outline). *Branchlets* 0.7–1.5 mm diam., $\pm$ smooth, dark brown, pubescent. *Stipules* connate for most of their length, $\pm$ oblong, 2–3 by 0.7–1 mm, subcoriaceous, glabrous, apex truncate, truncate to acute, with (1 or) 2 setae, setae 0.5–0.7 mm long, pubescent to puberulous. *Leaves*: petioles 0–0.5 mm long, glabrous; leaf blades rhombic to elliptic-rhombic, or rhombic-narrowly obovate, (0.7–)0.9–1.4 by 0.3–0.5(–0.7) cm, often slightly asymmetric, chartaceous, usually drying dark green, base narrowly cuneate and sometimes decurrent, apex abruptly acuminate; abaxial surface: midrib glabrous, secondary veins 3–5 pairs, manifest to obscure, ascending at an angle of 45–60°, glabrous, venation obscure to $\pm$ invisible; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal at the apex of reduced side shoots or terminal on axillary brachyblasts (near-axillary) or axillary, 1-flowered, pedunculate; peduncle (0.1–)0.3–0.8 cm long, elongating during development, glabrous; bracts 2 per peduncle, opposite, narrowly triangular to triangular, linear, or elliptic (subfoliaceous), 0.7–1.2 (–2) by 0.3–0.7(–1) mm; bracteoles absent. *Flowers* subsessile to pedicellate; pedicel 0.5–3.5(–5) mm long. *Calyx* (incl. hypanthium) c. 1.5 by 1 mm, glabrous, calyx lobes deltate to triangular, 1–1.5 by 0.3 mm long, glabrous. *Corolla* imperfectly known, 2–3 by 1–1.5 mm, external and internal surface glabrous, corolla lobes 2–3 by 1 mm. *Stamens*: anthers c. 0.6 mm long; filaments c. 1 mm long. *Style* c. 0.7 cm long. *Fruit* 5.5–7 by 4–4.5 mm, pedicel 3.5–5 mm long; calyx c. 1 mm long. *Pyrenes* 5.5–6 by 4–4.5 mm.

Distribution — Papua Barat and Papua New Guinea. Only recorded from two localities: Mt Doormantop [Angemuk] and the Hunstein Range (Mt Samsai).

Habitat & Ecology — Poorly known. Ridges; altitude 900–2480 m.

Notes — Valeton (1927) did not cite any specimens in his description of *A. doormaniensis* but we assume that the original material comprises two specimens collected by H.J. Lam (*Lam 1482* and *1990*) from Mt Doorman, both of which were annotated by Valeton ('*Amaracarpus doormanniensis* [sic] Val. N. sp.'). We have selected the specimen *Lam 1990* to serve as the lectotype.

Amaracarpus doormaniensis is close to *A. acuminatus*, but can be separated by its one-flowered inflorescences; *A. acuminatus* has three- or rarely two-flowered inflorescences.

19. *Amaracarpus xanthocarpus* Merr. & L.M. Perry

Amaracarpus xanthocarpus Merr. & L.M. Perry (1946) 226. — Type: *Brass 12861* (holo A!; iso BM, L), Irian Jaya [Papua Barat], 6 km SW of Bernhard Camp, Idenburg River, 1200 m, Feb. 1939.

Treelet or shrub, 2–4 m high, puberulous to pubescent, hairs $\pm$ erect to antrorse, 0.2–0.3 mm long, brown; axillary brachyblasts usually numerous; leaves close together and

regularly arranged in the same plane, forming flat, regular tiers of $\pm$ regular shape (in outline). *Branchlets* 0.5–0.7 mm diam., $\pm$ smooth, light brown, puberulous to pubescent. *Stipules* connate for c. 1/2 their length, square or oblong, 1–2 by 1 mm, membranous, glabrous to puberulous, apex truncate to rounded, with 2 setae, setae c. 1 mm long, puberulous. *Leaves*: petioles 1–1.5 mm long, puberulous; leaf blades elliptic to broadly elliptic, elliptic-rhombic, or $\pm$ obovate, 0.7–1.1 by 0.4–0.8 cm, chartaceous, drying green to dark green, base cuneate to slightly rounded, apex acute to abruptly acuminate; abaxial surface: midrib puberulous, secondary veins 3–5 pairs, manifest, ascending at an angle of c. 45°, glabrous, venation obscure to invisible; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal at the apex of the side shoots and terminal on axillary brachyblasts (near-axillary), 3–5(–7)-flowered simple cymes, sessile; bracts 2 per cyme, opposite, linear, 1–1.5 mm long, with two elongated lobe-like processes at the base; bracteoles absent. *Flowers* sessile. *Calyx* (incl. hypanthium) 2–3 by 2–3 mm, glabrous, calyx lobes $\pm$ deltate, 0.5–1 by 0.5–1 mm, glabrous. *Corolla* imperfectly known (only buds seen), 1–1.5 by 2 mm, internal and external surfaces glabrous, corolla lobes c. 0.5 mm long. *Stamens*: anthers 0.3–0.5 mm long; filaments 0.2–0.3 mm long. *Style* c. 1.5 mm long. *Fruit* 5–6 by 4–5 mm, sessile; calyx 0.7–0.9 mm long. *Pyrenes* c. 4 by 2.5 mm.

Distribution — Papua Barat. Known only from two collections along the Idenburg River (*Brass* 12393, 12861).

Habitat & Ecology — Poorly known. Occasional; altitude 1200–1500 m.

Note — *Amaracarpus xanthocarpus* is very similar to *A. idenburgensis*, but can be separated by having stipules with two setae at the apex, slightly larger (0.7–1.5 cm long) chartaceous leaves, and pedicellate flowers. *Amaracarpus idenburgensis* has stipules with an acute to obtuse apex (i.e. lacking setae), subcoriaceous leaves (0.5–0.9 cm long) and sessile flowers.

20. *Amaracarpus major* (Valeton) A.P. Davis, *stat. nov.*

Amaracarpus braunianus (Warb.) Valeton var. *major* Valeton (1927) 124. — *Litosanthes brauniana* Warb. (1891) 441. — Type: *Schlechter* 17221 (holo B $\dagger$; iso L), Nordöstl. Neu-Guinea [Papua New Guinea], Kaiser-Wilhelmsland, Kani, c. 1100 m, 20 Jan. 1908.

Shrub, terrestrial or subepiphytic, 0.9–1.5 m high, glabrous to puberulous, hairs $\pm$ erect to antrorse, < 0.1–0.2 mm long, brown; axillary brachyblasts few to $\pm$ absent; leaves regularly arranged in the same plane, but not close together, forming flat but irregular shaped tiers (in outline). *Branchlets* 1–2.5 mm diam., $\pm$ smooth, brown, glabrous to puberulous. *Stipules* connate in the lower part, oblong to triangular or narrowly triangular, 2–5 by 0.5–1.2 mm, membranous to chartaceous, glabrous, apex acute or with 1 seta, seta, if present, 0.2–0.4 mm long, glabrous or puberulous. *Leaves*: petioles (1–)3–5 mm long, glabrous; leaf blades obovate to narrowly obovate, $\pm$ elliptic, or nearly rhombic, (1.5–)1.7–3.8 by 0.7–1.2(–1.6) cm, chartaceous, drying green to greyish, base narrowly cuneate, slightly decurrent, apex acute to abruptly caudate; abaxial surface: midrib glabrous to puberulous, secondary veins (5 or) 6 or 7 pairs, indistinct to prominent, ascending at an angle of 30–45°, glabrous, venation obscure to manifest; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal at the apex of side shoots, 1–3(–5)-flowered simple cymes, pedunculate; peduncle

1.2–1.9 cm long, glabrous; bracts 2 per peduncle, opposite, narrowly triangular, c. 0.5 mm long; bracteoles absent. *Flowers* sessile. *Calyx* (incl. hypanthium) 1.5–2.5 by 1.5–2 mm, glabrous, calyx lobes deltate, 0.3–0.7 by 0.6 mm, glabrous. *Corolla* 1.5–2.2 by 1.2–2 mm, external and internal surface glabrous, corolla lobes c. 0.6 by 0.8 mm. *Stamens*: anthers 0.3–0.7 mm long; filaments 0.9–1.1 mm long. *Style* c. 1.5 mm long. *Fruit* unknown.

Distribution — Papua Barat and Papua New Guinea.

Habitat & Ecology — Poorly known. Altitude 1000–1300 m.

Note — The species *A. braunianus* is unknown to us: we could not find any specimen of this species and it seems likely that all the material cited by Warburg (1891) and Valetton (1927) was destroyed in Berlin. We propose that *A. braunianus* var. *major* be elevated to species rank as we believe it is illogical to assign it to a species (i.e. *A. braunianus*) that is likely to remain unknown.

21. *Amaracarpus idenburgensis* Merr. & L.M. Perry

Amaracarpus idenburgensis Merr. & L.M. Perry (1946) 227. — Type: *Brass* 12674 (holo A; iso BM, L), Irian Jaya [Papua Barat], 18 km SW of Bernhard Camp, Idenburg River, 2150 m, Feb. 1939.

Treelet or shrub, (1–)2–3 m high, puberulous to pubescent, hairs $\pm$ erect, 0.2–0.3 mm long, brown; axillary brachyblasts present; leaves close together and regularly arranged in the same plane, forming flat, regular tiers of $\pm$ regular shape (in outline). *Branchlets* 0.6–1 mm diam., $\pm$ smooth, dark brown, puberulous to pubescent. *Stipules* connate for c. 1/2 their length, oblong to triangular, 1–2.5(–3) by 0.6–1 mm, membranous to subcoriaceous, puberulous to pubescent, apex obtuse to acute. *Leaves*: petioles (0.5–) 1–1.5 mm long, puberulous to pubescent; leaf blades ovate, ovate-rhombic, or $\pm$ elliptic, 0.5–0.9 by 0.3–0.6(–1) cm, subcoriaceous, drying green to dark green, base cuneate to slightly rounded, apex acute to abruptly acuminate; abaxial surface: midrib puberulous, secondary veins 3–5 pairs, obscure to invisible, ascending at an angle of c. 45°, glabrous to puberulous, venation obscure to invisible; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* terminal on the apex of short side shoots, (1–)3–7-flowered, usually simple cymes, sessile to shortly pedunculate; peduncle, if present, < 0.1–0.3 cm long, glabrous to puberulous; bracts and bracteoles absent. *Flowers* imperfectly known (only buds seen), pedicellate; pedicel 0.5–2 mm long. *Calyx* (incl. hypanthium) 2–4 by 1.5–3.5 mm, glabrous, calyx lobes deltate to triangular, (0.5–)2–4 by 0.5–1 mm, glabrous. *Corolla* imperfectly known (only buds seen), c. 3 by 2–2.5 mm, external and internal surfaces glabrous, corolla lobes c. 1 mm long. *Stamens*: anthers 0.2–0.5 mm long; filaments 0.3–0.5(–0.8) mm long. *Style* 0.7–1.2 mm long. *Fruit* 5.5–7 by 4–5 mm, pedicel c. 2 mm long; calyx 1–2.5 mm long. *Pyrenes* 4–5.5 by 3–4 mm.

Distribution — Papua Barat and Papua New Guinea (incl. Sudest Island).

Habitat & Ecology — Poorly known. Ridges; recorded with scrambling bamboo; altitude 600–2150 m.

22. *Amaracarpus attenuatus* Merr. & L.M. Perry

Amaracarpus attenuatus Merr. & L.M. Perry (1946) 222. — Type: *Brass* 7419 (holo A; iso BM, K, L), Papua New Guinea, Oroville Camp, Fly River, Aug. 1936.

Tree or shrub, (1.5–)2–4.5(–8) m high, glabrous to puberulous, hairs $\pm$ erect to antrorse, < 0.1 –0.2 mm long, brown; axillary brachyblasts present; leaves regularly arranged in the same plane, but not close together, forming flat but irregular shaped tiers (in outline). *Branchlets* 1.5–3.1(–4) mm diam., $\pm$ smooth, brown, glabrous to puberulous. *Stipules* connate at the base to 1/3 of their length, narrowly ovate to triangular, (5–)8–18(–24) by (1–)1.5–4.2 mm, chartaceous to subcoriaceous, often 2-veined, $\pm$ glabrous to puberulous (mostly margins and veins), apex deeply bifid, divided into two narrowly (often seta-like) triangular points (but appearing acute and undivided during early stages of development), seta-like points (0.3–)2–10(–12) mm long, glabrous or puberulous. *Leaves*: petioles (3–)4–9 mm long, glabrous or puberulous; leaf blades $\pm$ elliptic to $\pm$ narrowly ovate, or oblong-elliptic, (2.9–)4.5–11.5(–13.2) by (1–)2.2–4.5 cm, chartaceous to almost subcoriaceous, usually drying green to dark green, but also greyish to grey, base cuneate to rounded, apex subcaudate to caudate, cauda (0.4–)0.6–2.2 cm long; abaxial surface: midrib glabrous to puberulous, secondary veins (8–)10–14 pairs, prominent, ascending at an angle of 30–40°, glabrous or sometimes puberulous, venation obscure to manifest; abaxial surface glabrous; adaxial surface glabrous. *Inflorescences* axillary in the first or second leaf pair or terminal on axillary brachyblasts (near-axillary), (1–)3–6(–8)-flowered simple cymes or few-branched simple (compound) cymes, pedunculate; peduncle (0.1–)1.2–2.7 cm long, glabrous to puberulous; second order inflorescence branches present or absent, if present 0.3–1.5 (–5) cm long; bracts 2 per peduncle or inflorescence branch opposite, narrowly triangular to linear, 1.5–2.4 mm long, sometimes fallen; bracteoles 2 per flower, linear, (0.3–)0.7–1 mm long, or absent. *Flowers* sessile or pedicellate; pedicel, if present 0.5–2 mm long. *Calyx* (incl. hypanthium) 1.5–3.5 by 1.5–3.5 mm, glabrous, calyx lobes deltate to triangular, (0.5–)0.7–1.1 by 0.4–0.5 mm, glabrous. *Corolla* 1.4–1.7(–2.1) by 1.5–4.5 mm, external surface glabrous, internal surface with a ring of hairs, corolla lobes 0.5–0.7 by 1–2.8 mm. *Stamens*: anthers c. 0.6 mm long; filaments c. 0.5 mm long. *Style* 1.5–2.8 mm long. *Fruit* 5–8 by 3–3.4 mm, pedicel, if present 0.5–2 mm long; calyx 1–1.5 mm long, or falling. *Pyrenes* 5.2–6.4 by 2.5–4.1 mm.

Distribution — Papua Barat, Papua New Guinea (incl. Goodenough Island, Fergusson Island (Milne Bay), and Solomon Islands (incl. Rennell and Santa Cruz Islands)).

Habitat & Ecology — Riverbanks, swampy ground and edges of swamps, but also on well-drained substrates, ravines, ridges, and coastal escarpments; recorded with *Bombax* spp., *Celtis* spp., *Chisocheton* spp., *Intsia* spp., *Pometia* spp. and *Quercus* spp.; substrate: clays and marls; locally common; altitude (30–)250–1900(–2450) m.

Note — The stipule of *A. attenuatus* is divided into two narrowly triangular points, which seem to divide deeper (often into two setae-like long points) as the stipule matures. Quite often the immature (partially developed) stipules of this species appear to be undivided. The stipule of *A. attenuatus* can sometimes resemble *A. heteropus*, although closer inspection reveals that the latter has two distinct needle-like setae.

INSUFFICIENTLY KNOWN SPECIES

Amaracarpus floribundus and *A. nouhuizii* are only known from their types. In each case the type specimen consist of material either in bud or at the early stages of flower-

ing. There is no floral material available for dissection, and fruits of both species are unknown. The stipules of these species strongly suggest *Amaracarpus*, as they possess two prominent setae, but the inflorescences are terminal on well-developed side shoots, more akin to *Psychotria*. On the basis of the material presently available it seems that *A. floribundus* and *A. nouhuizii* (see below) might belong in *Amaracarpus* but mature flowers and fruits are needed before a full assessment can be made. It seems likely that these two species may be very closely related and possibly conspecific.

23. *Amaracarpus floribundus* Valeton

Amaracarpus floribundus Valeton (1927) 116. — Type: *Pulle* 282 (lectotype BO, selected here; isolectotypes K, L, U), [Papua Barat], Beaufort River, 80 m, Nov. 1912.

24. *Amaracarpus nouhuizii* Valeton

Amaracarpus nouhuizii Valeton (1927) 115. — Type: *Römer* 620 (lectotype L, selected here; isolectotype BO), Nova Guinea neerlandica meridionalis [Papua Barat], Kuskushügel, c. 100 m, 1909–1910.

UNKNOWN SPECIES — SPECIES INCOGNITAE

This section contains *Amaracarpus* names for which no type (or other original material) has been seen, and which cannot be placed using the author's descriptions. Most of these taxa are described by Valeton, based on Ledermann collections. All of these types were presumably held at Berlin (B), but later destroyed. It seems that there were no duplicates of these specimens and therefore, at least at the present time, we have no option but to place these names in *Species Incognitae*. Other researchers (e.g. Sohmer, 1988) have also reached the conclusion that the only set of Ledermann collections were held at Berlin and later destroyed.

25. *Amaracarpus braunianus* (Warb.) Valeton

Amaracarpus braunianus (Warb.) Valeton (1911) 501; (1927) 124. — *Litosanthes brauniana* Warb. (1891) 441; K. Schum. & Lauterb. (1901) 585. — Syntypes: *Warburg* 21445 (B⁺), NNG, Sattelberg, Gipfelwald; *ibid.* *Hellwig* 520 (B⁺).

26. *Amaracarpus ledermannii* Valeton

Amaracarpus ledermannii Valeton (1927) 125. — Syntypes: *Ledermann* 11861 (holo B⁺), NNG, Schraderberg (Kais. Augusta-Station), 2070 m, 31 May 1913; *Ledermann* 12216 (holo B⁺), *ibid.*, 12 June 1913.

27. *Amaracarpus montanus* Valeton

Amaracarpus montanus Valeton (1927) 119. — Type: *Ledermann* 11954 (holo B⁺), Südöstl. Neu-Guinea [Papua New Guinea], Schraderberg, 2070 m, 5 June 1913.

28. *Amaracarpus rhombifolius* Valeton

Amaracarpus rhombifolius Valeton (1927) 117. — Type: *Ledermann* 7407 (holo B⁺), Nordöstl. Neu-Guinea [Papua New Guinea], Pfingstberg (Kais. Augustafluss), 1–300 m, 25 May 1912.

29. *Amaracarpus syzygifolius* Valeyton

Amaracarpus syzygifolius Valeyton (1927) 115. — Type: not designated by Valeyton (1927; type unknown, ?B⁺).

30. *Amaracarpus trichocalyx* Valeyton

Amaracarpus trichocalyx Valeyton (1927) 122. — Type: *Ledermann 12793* (holo B⁺), Nordöstl. Neu-Guinea [Papua New Guinea], Felsspitze, 10 Aug. 1913.

EXCLUDED SPECIES

31. *Amaracarpus caudatus* Ridl. (1920) 143. — Type: *Wray 670* (holo K), Malaysia, Perak, Birch's Hill, Taiping Hills, Aug. 1885. = ***Lasianthus***, possibly *L. lowianus* King & Gamble.

32. *Amaracarpus giluwensis* P. Royen (1983) 2686. — Type: *Schodde 1869* (holo K; iso L), Papua New Guinea, western summit grasslands of Mt Giluwe, Southern Highlands District, c. 10,000 ft [3050 m], 16 Aug. 1961. = ***Psychotria*** (no combination yet proposed).

33. *Amaracarpus longifolius* Elmer (1906) 1. — Type: *Merrill 4000* (holo ?PNH; iso K, P, US), Philippines, Atimonan, Province of Tayabas, Luzon, March 1905. = ***Psychotria linearis*** Bartl. ex DC.

34. *Amaracarpus montisstellaris* P. Royen (1983) 2701. — Type: *Veldkamp 6319* (holo L), Papua New Guinea, Star Mts, W Sepik, Camp 2, Tel Basin, 3000 m, 5 March 1975. = ***Psychotria*** (no combination yet proposed).

35. *Amaracarpus muscifer* A.C. Sm. (1946) 321. — Type: *Smith 1646* (holo GH; iso K, NY, P), Fiji, Vanau Levu, Mbua, Navotuvotu, summit of Mt Seatura, 830 m, 27 April 1934. = ***Psychotria*** s.l. (no combination yet proposed).

Note — *Amaracarpus muscifer* has terminal inflorescences, 5-merous flowers, and lacks the horizontal branching pattern and distinct dorsiventrality of *Amaracarpus* (e.g. see Smith, 1988: 262, f. 99c). The morphology is generally more in the direction of *Dolianthus*, although it is clearly not a member of this genus. Lack of available flowers and fruits for dissection means that a full appraisal of this species cannot be made at the present time. *Amaracarpus muscifer* is clearly not a species of *Amaracarpus*, however, and we provisionally place this species in *Psychotria* s.l.

36. *Amaracarpus saxicola* (Ridl.) Ridl. (1920) 143.

Saprosma saxicola Ridl. (1912) 22. — Type: *Ridley 11884* (holo K), Malaysia, Perak, Bukit Kamuning, Feb. 1904.

Note — *Amaracarpus saxicola* has terminal inflorescences, stipules with three to five distinct teeth, and blue fruits, characters which support its original position in the genus *Saprosma*.

37. *Amaracarpus subcaudatus* Merr. & L.M. Perry (1946) 224. — Type: *Brass* 12761 (holo A; iso L), Irian Jaya [Papua Barat], 6 km SW of Bernhard Camp, Idenburg River, 1200 m, Feb. 1939. = non **Amaracarpus**, probably *Psychotria* s.l.

Note — *Amaracarpus subcaudatus* appears to be a member of *Psychotria* s.l., but until more material of this species is available it cannot be confidently assigned to a genus. We have rejected it from *Amaracarpus* on the basis that it lacks the horizontal branching pattern and distinct dorsiventrality of other *Amaracarpus* species; the stipule is distinctly bifid; the inflorescences are terminal (on side shoots and main branches); and the flowers are 4- or 5-merous. In addition, most species of *Amaracarpus* possess abbreviated side shoots with much reduced leaves, a character not present in *A. subcaudatus*. The pyrenes of *A. subcaudatus* are of the type found in many members of the Psychotrieae Pacific Clade (sensu Andersson, 2002), including *Amaracarpus* and *Dolianthus*. The pyrenes have marginal preformed germination slits (PGSs) and non-ruminate (entire) endosperm. We have not been able to check for the presence of an ethanol soluble seed coat pigment (SCP), a feature present in many *Psychotria* species, including those previously associated and often confused with *Amaracarpus* (e.g. *P. mariana* Bartl. ex DC., *P. hombroniana* (Baill.) Fosberg s.l.). All *Amaracarpus* species lack an ethanol soluble pigment in the seed coat (SCP negative).

38. *Amaracarpus torricellensis* Valetton (1927) 123. — Type: *Schlechter* 20303 (holo B†; iso K), Nordöstl. Neu-Guinea [Papua New Guinea], Torricelli-Gebirge, 700 m, Sept. 1909. = non **Amaracarpus**, ?gen. nov.

Note — *Amaracarpus torricellensis* possesses several characteristics that set it apart from *Amaracarpus*, and there is the possibility that it represents a new genus. *Amaracarpus torricellensis* has a horizontally branched habit (like *Amaracarpus*); leaves which smell foetid when crushed (not reported in *Amaracarpus*); terminal and/or near-axillary inflorescences (the latter like *Amaracarpus*); relatively large, white, 5-merous flowers; anthers inserted above ring of corolla throat hairs (like *Dolianthus*); a style that has two opposite longitudinal furrows running down its length (the two halves of the style being easily pulled apart); a stigmatic surface comprising two large flattened membranous lobes, and pyrenes like *Amaracarpus* but with PGSs more or less on the adaxial surface rather than margins. The stipules of *A. torricellensis* are generally like those of *Amaracarpus* (caducous; leaving a simple naked scar, sheathing and connate for c. 1/2 their length or slightly more); the stipule apex is acute to obtuse, without setae or other appendages.

PREVIOUSLY EXCLUDED SPECIES

The above list of excluded species contains only those excluded by us. Previously, Fosberg & Sachet (1991) transferred 13 Pacific *Amaracarpus* to *Psychotria*, and Davis & Bridson (2001) transferred 13 species of *Amaracarpus* to *Dolianthus*. The Appendix includes the details of previously excluded species, within a checklist of all published *Amaracarpus* names.

MISCELLANEOUS NOTES

Note 1 — Since the revision of *Dolianthus* C.H. Wright (Davis & Bridson, 2001) we have become aware of the genus *Melachone*, published by Gilli (1980). The only species, *M. microphylla* Gilli, is clearly a synonym of *D. subalpinus* (P. Royen) A.P. Davis. *Melachone* has been previously treated as a synonym of *Amaracarpus* (e.g. Robbrecht, 1988).

Dolianthus C.H. Wright (1899) 106.

Melachone Gilli (1980) 459. — Type: *Melachone microphylla* Gilli.

Dolianthus subalpinus (P. Royen) A.P. Davis in A.P. Davis & Bridson (2001) 425.

Melachone microphylla Gilli (1980) 460. — Type: Gilli 338 (holo W), [Papua New Guinea], Südhang des Mt Wilhelm, 3300 m, 1 Feb. 1974.

Note 2 — It has been brought to our attention (C. Barker, pers. comm.) that we made an error in the citation of *Amaracarpus montiswilhelmii* P. Royen in our revision of *Dolianthus* (Davis & Bridson, 2001: 431), by adding a hyphen between *montis* and *wilhelmii* (as ‘*D. montis-wilhelmii*’). The ICBN does not mention adding hyphens only deleting them, as errors to be corrected, even though having a hyphen between *montis* and the genitive name of the mountain is the usual practice. The correct name for this species is *D. montiswilhelmii* (P. Royen) A.P. Davis; Van Royen’s original spelling (as ‘*montiswilhelmi*’) is an orthographical error.

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IDENTIFICATION LIST

<i>Amaracarpus</i>	11c = <i>A. grandifolius</i> var. <i>leucocarpus</i>
1a = <i>A. pubescens</i> subsp. <i>pubescens</i>	11d = <i>A. grandifolius</i> var. <i>trichocarpus</i>
1b = <i>A. pubescens</i> subsp. <i>microphyllus</i>	12 = <i>A. wichmannii</i>
2 = <i>A. kochii</i>	13 = <i>A. nymanii</i>
3 = <i>A. papuanus</i>	14 = <i>A. novo-guineensis</i>
4 = <i>A. schlechteri</i>	15 = <i>A. compactus</i>
5 = <i>A. calcicola</i>	16 = <i>A. heteropus</i>
6 = <i>A. cuneifolius</i>	17a = <i>A. acuminatus</i> subsp. <i>acuminatus</i>
7 = <i>A. grandiflorus</i>	17b = <i>A. acuminatus</i> subsp. <i>pullei</i>
8 = <i>A. belensis</i>	18 = <i>A. doormaniensis</i>
9 = <i>A. anomalus</i>	19 = <i>A. xanthocarpus</i>
10 = <i>A. brassii</i>	20 = <i>A. major</i>
11a = <i>A. grandifolius</i> var. <i>grandifolius</i>	21 = <i>A. idenburgensis</i>
11b = <i>A. grandifolius</i> var. <i>humilis</i>	22 = <i>A. attenuatus</i>

Adelbert 457: 1a — Argent 87184: 7.

Backer 37250: 1a — Baker 905: 14 — Barker 144: 2; 66841: 11b — Benjamin 67928: 22 — Bhargava 2405: 1a; 4153: 1a — Bloembergen 4740: 1a — Brass 1039: 11d; 2955: 11a; 3876: 11a; 4133: 15; 6741: 4; 7419: 22; 8849: 5; 10522: 15; 10823: 10; 11055: 8; 12393: 19; 12674: 21; 12861: 19; 13863: 4; 13864: 16; 23785: 13; 24011: 13; 24447: 11a; 24595: 22; 24629: 22; 24985: 13; 25404: 11a; 27150: 11a; 27837: 21; 28012: 5; 29231: 11a; 29281: 11a; 30876: 17a; 32095: 3; 32677: 11a — Brinkman 623: 1a — Burwalda 4283: 1a.

Carr 12544: 22; 13591: 15; 13722: 15; 13902: 22; 14064: 22; 15015: 22; 15215: 15; 15397: 22; 15703: 22 — Charkraborty 1205: 1a; 2022: 1a — Clemens 1040: 14; 3057: 14; — Clemens & Clemens 768: 20; 1064: 11a — Clunie et al. 63513: 11b; 63516: 22 — Conn, Pattison, Sands & Wood 66273: 22 — Coode 5842: 1a; 5942: 1b; 5971: 1a; 7998: 20; 32698: 11a — Craven & Schodde 1038: 14; 1259: 11b — Croft & Gideon 71587: 6 — Croft & Lelean 34947: 15 — Croft et al. 65023: 15; 68624: 16; 68777: 11a; 68889: 11b; 68916: 11b — Cruttwell 507: 13; 605: 11d; 710: 13.

Danser 3299: 1a — Darbyshire 1001: 11d — Davis 680: 2; 778: 6; 838: 12 — De Bruyn 47: 16; 169: 16 — De Voogd 1837: 1a — Donunaba 49111: 11a — Drozd 150: 5.

Edwards 4127: 2 — Elbert 3217: 1b; 3752: 1a; 3791: 1a; 3813: 1a — Elmer 10737: 1b — Eyma 2368: 7; 4283: 1a; 4674: 9; 5047: 9.

Forbes 657: 17a; 1569: 1a — Foreman 48150: 20 — Frodin 26799: 11b.

Gafui et al. 14808: 22; 14852: 22; 16452: 11a — Gardiner 25: 1a — Gideon 77132: 11b — Gillison 25325: 11a — Gjellerup 264(721): 16; 327: 16 — Gray 8103: 11b.

Hartley 9804: 11c; 9849: 11a; 10553: 11a; 11091: 11a; 11410: 11a; 11918: 11d; 12225: 11c — Hellwig 231: 14; 523: 14 — Henty 10618: 8; 10640: 11a; 11955: 11a; 13670: 11d; 14708: 11a; 14851: 22; 16864: 11d; 49917: 11b — Henty & Coode 29182: 11b; 29187: 11a — Henty & Frodin 27337: 11a — Henty, Isgar & Galore 41685: 17a — Henty & Lelean 49945: 11a — Henty, Ridsdale & Galore 33018: 4 — Hiepko & Schultze-Motel 1306: 15 — Hoogerwerf 185: 1a — Hoogland 4475: 11a — Hoogland & Craven 10667: 2 — Horne 252: 1a — Horsfield 43: 1a — Hunt 2982: 11d; 3050: 11d; 3055: 11d.

Iboet 493: 1a — Isles & Vinas 34468: 11a.

Jacobs 8876: 2 — Jeffrey, Moulinie & Zeila 798: 1a — Jeffrey & Zeila 823: 1a — Jensen 115: 1a — Johansson, Nybom & Riebe 204: 1a — Johns 8821: 20; 9807: 3; 10428: 2.

Kairo 114: 11a; 231: 11a — Kajewski 1541: 11a; 2394: 11a — Kalkman 122: 16; 3765: 16 — Kanehira & Hatusima 11862: 3; 12092: 17b; 13098: 12; 13258: 12 — Katik 37980: 11a; 46861: 11c; 78100: 11b — Katik & Taho 56361: 11a — Katik et al. 70873: 21 — Kato, Sunarno & Akiyama 3664: 1b — Kato, Ueda & Fanani 11885: 7; 13441: 8 — Kerenga 56431: 16; 56512: 17a — Kerr 18255: 1a — Koch 16: 2; 552: 2 — Koie & Olsen 1241: 11c; 1580: 11c — Koorders 18607b: 1a; 18609b: 1b; 18719b: 1b; 27535b: 1a; 38976b: 1a; 39165b: 1a — Koster 4335: 12; 10762: 14; 13570: 6; 13572: 16 — Kostermans 2695: 12; 7861: 11a; 18259: 1a; 18774: 1a; 19180: 1a — Kostermans,

- Kuswata, Soegeng & Soepadmo 135: 1a; 296: 1a — Kostermans & Soegeng 261: 16; 338: 16 — Kostermans & Wirawan 655: 1a; 836: 1a — Kurz 26: 1a.
- Lam 544: 17b; 1084: 16; 1482: 18; 1990: 18; 2813: 1a — Lauterbach 113: 11c; 685: 11a; 925: 11c; 996: 11c; 1148: 11a; 1207: 11a; 2113: 11c — Lütjeharms 4837: 1a.
- Mangen 299: 10; 2027: 15 — Mauriasi 8638: 11a — Mauriasi et al. 15869: 11a; 16624: 22; 17123: 22; 17159: 22 — McDonald & Ismail 3814: 16 — McKee 1781: 5; 1828: 5 — Meijer & Muchtar 10632: 1a — Moll 13000: 16.
- Nakisi & Mauriasi BSIP 8065: 11d — Native collector 5615: 11d — Nedi 282: 1b — Nyman 479: 14.
- Pajmans 1438: 11a — Pleyte 206: 1b; 663: 22; 1056: 12 — Powell 332: 1a; 332a: 1a — Proctor 4371: 1a — Pulle 284: 6; 1219: 17b — Pullen 1457: 11a; 1458: 17b; 1821: 22; 8355: 11d.
- Ridley 33: 1a — Ridsdale 33909: 11b — Ridsdale & Lavarack 30639: 11a — Rutten 249: 1b; 1973: 8.
- Saki & Wawikiak 4663: 11a — Sands 797: 11a; 798: 11a; 1020: 11a; 6131: 12 — Sands, Pattison & Wood 2623: 12 — Sands, Pattison, Wood & Kene 2066: 11a — Sarip 213: 1a — Saunders 174: 13 — Sayers 13208: 16; 13292: 11a — Schlechter 14153: 11a; 14237: 11a; 16090: 5; 16186: 11a; 16550: 4; 16614: 11a; 16702: 11a; 17221: 20; 17368: 11b — Schmutz 374: 1a; 1001: 1a; 2876: 1a — Schodde 3306: 16 — Schwabe 53: 1a — Smitinand & Sleumer et al. 1235: 1a — Soegeng Reksodihardjo 504: 4 — Sohmer 75047: 22 — Stevens 50412: 22; 51118: 17a — Stone 2363: 11a — Streiman 28740: 13; 53832: 5 — Streiman & Kairo 39204: 16; 39234: 2; 44439: 11a — Streseman 157: 8.
- Takeuchi 6285: 18; 8926: 11a — Takeuchi & Damas 4399: 11b — Takeuchi & Kulang 11318: 22 — Teijsmann 12774: 1a — Teona 4858: 11a — Thomasset 181: 1a — Toxopeus 307: 1a.
- Ueda, Okamoto & Mahjar 3910: 7 — UPNG 1324: 13 — Utteridge 126: 2; 453: 2.
- Van Balgooy & Van Setten 5665: 1a — Van Leeuwen 9136: 16; 9501: 16; 9718: 16; 10764: 6; 11168: 16; 11321: 16 — Van Royen 3041: 12; 4120: 5; 10948: 11d — Van Royen & Sleumer 6010: 8; 6204: 16; 6345: 17a; 7036: 12 — Van Steenis 7684: 1a; 18157: 1a — Veldkamp 6688: 15 — Verheijen 2954: 1a; 4084: 1a — Versteeg 1591: 3; 1680: 6 — Vinas & Wiakabu 59524: 15 — Vink 8412: 2; 8469: 17b; 15340: 16 — Von Römer 446: 6.
- Webster & Hildreth 15096: 11b — Whitmore 1306: 11d; 1335: 11a — Wichmann (leg. Atasrip) 6: 12 — Womersley 5324: 15; 48659: 11a — Womersley & Katik 43994: 13 — Woods 2240: 14.
- Zollinger 790: 1a; 796: 1a; 2334: 1a.

INDEX

Accepted names are in roman type; new combinations and new species in **bold**; synonyms, insufficiently known and excluded species in *italics*.

Amaracarpus Blume [p. 28]
acuminatus S. Moore 17
 subsp. *acuminatus* 17a
 subsp. **pullei** (Valeton) A.P. Davis 17b
anomalus Wernham 9
apoensis Elmer 1b
atrocarpus Merr. & L.M. Perry 4
attenuatus Merr. & L.M. Perry 22
belensis Merr. & L.M. Perry 8
brachypus Merr. & L.M. Perry 11
brassii Merr. & L.M. Perry 10
braunianus (Warb.) Valeton 25
 var. *major* Valeton 20
calicola Merr. & L.M. Perry 5
caudatus Ridl. 31
compactus Merr. & L.M. Perry 15

(*Amaracarpus*)
corymbosus Valeton 16
cuneifolius Valeton 6
doormaniensis Valeton 18
floribundus Valeton 23
forbesii Valeton 17
giluwensis P. Royen 32
grandicalyx Valeton 11
grandiflorus A.P. Davis 7
grandifolius Valeton 11
 var. *grandifolius* 11a
 var. ***humilis*** (Valeton) A.P. Davis 11b
 var. ***leucocarpus*** (Lauterb. & K. Schum.)
 A.P. Davis 11c
 var. ***trichocarpus*** (Merr. & L.M. Perry)
 A.P. Davis 11d

(Amaracarpus)

- heteropus* Valeton 16
humilis Valeton 11b
idenburgensis Merr. & L.M. Perry 21
kochii Valeton 2
lanceolatus Valeton 16
lauterbachii Valeton 11c
ledermannii Valeton 26
leucocarpus (Lauterb. & K. Schum.) Valeton 11c
longifolius Elmer 33
longifolius Valeton 16
major (Valeton) A.P. Davis 20
mesophyllus Valeton 17b
microphyllus Miq. 1b
minutifolius Valeton 8
montanus Valeton 27
montisstellaris P. Royen 34
muscifer A.C. Sm. 35
nouhuizii Valeton 24
novo-guineensis (Warb.) Valeton 14
nymanii Valeton 13
papuanus Valeton 3
pubescens Blume 1
 subsp. **microphyllus** (Miq.) A.P. Davis 1b
 subsp. *pubescens* 1a
 subsp. *sechellarum* F. Friedmann 1a
pullei Valeton 17b

(Amaracarpus)

- rhombifolius* Valeton 28
saxicola (Ridl.) Ridl. 36
schlechteri Valeton 4
simulans Merr. & L.M. Perry 15
solomonensis Merr. & L.M. Perry 11
subcaudatus Merr. & L.M. Perry 37
syzygifolius Valeton 29
torricellensis Valeton 38
trichocalyx Valeton 30
trichocarpus Merr. & L.M. Perry 11d
urophyllus Merr. & L.M. Perry 16
wichmannii Valeton 12
xanthocarpus Merr. & L.M. Perry 19
Coffea uniflora K. Schum. & Lauterb. 11
Litosanthes
 brauniana Warb. 20, 25
 leucocarpa Lauterb. & K. Schum. 11c
 novo-guineensis Warb. 14
Neoschimpera Hemsl. [p. 28]
 heterophylla Hemsl. 1
Psychotria
 ferruginea Baker 1
 linearis Bartl. ex DC. 33
 uniflora Reinw. 1
Saprosma
 nativitatis Baker f. 1
 saxicola Ridl. 36

Appendix. Alphabetical checklist of all published *Amaracarpus* names. Accepted names in **bold**.

All names	Accepted name
Amaracarpus acuminatus S. Moore	
Amaracarpus acuminatus S. Moore subsp. acuminatus	
Amaracarpus acuminatus S. Moore subsp. pullei (Valeton) A.P. Davis	
Amaracarpus anomalus Wernham	
<i>Amaracarpus apoensis</i> Elmer	Amaracarpus pubescens subsp. microphyllus (Miq.) A.P. Davis
<i>Amaracarpus archboldianus</i> Merr. & L.M. Perry ²	Dolianthus archboldianus (Merr. & L.M. Perry) A.P. Davis
<i>Amaracarpus atrocarpus</i> Merr. & L.M. Perry	Amaracarpus schlechteri Valeton
Amaracarpus attenuatus Merr. & L.M. Perry	
Amaracarpus belensis Merr. & L.M. Perry	
<i>Amaracarpus bicolor</i> Merr. & L.M. Perry ²	Dolianthus bicolor (Merr. & L.M. Perry) A.P. Davis
<i>Amaracarpus brachypus</i> Merr. & L.M. Perry	Amaracarpus grandifolius Valeton var. grandifolius
Amaracarpus brassii Merr. & L.M. Perry	
Amaracarpus braunianus Valeton	Amaracarpus (unknown species)
<i>Amaracarpus buxifolius</i> (C.H. Wright) Merr. & L.M. Perry ²	Dolianthus buxifolius (C.H. Wright) A.P. Davis
<i>Amaracarpus caeruleus</i> Merr. & L.M. Perry ²	
Amaracarpus calcicola Merr. & L.M. Perry	Dolianthus buxifolius (C.H. Wright) A.P. Davis
<i>Amaracarpus carolinensis</i> Valeton ¹	
<i>Amaracarpus carolinensis</i> Valeton var. <i>squarrosa</i> Valeton ¹	Psychotria hombroniana (Baill.) Fosberg var. <i>squarrosa</i> (Valeton) Fosberg
<i>Amaracarpus caudatus</i> Ridl.	Psychotria hombroniana (Baill.) Fosberg var. <i>squarrosa</i> (Valeton) Fosberg
<i>Amaracarpus clemensae</i> Merr. & L.M. Perry ²	Lasianthus , possibly L. lowianus King & Gamble
	Dolianthus clemensae (Merr. & L.M. Perry) A.P. Davis
Amaracarpus compactus Merr. & L.M. Perry	
<i>Amaracarpus confertifolius</i> Merr. & L.M. Perry ²	Dolianthus buxifolius (C.H. Wright) A.P. Davis
<i>Amaracarpus corymbosus</i> Valeton	Amaracarpus heteropus Valeton in error for Amaracarpus cuneifolius Valeton
<i>Amaracarpus cuneatus</i> Valeton	
Amaracarpus cuneifolius Valeton	
Amaracarpus doormaniensis Valeton	
<i>Amaracarpus epiphyticus</i> Valeton ²	Dolianthus epiphyticus (Valeton) A.P. Davis
<i>Amaracarpus fimbristipularis</i> P. Royen ²	Dolianthus fimbristipularis (P. Royen) A.P. Davis
Amaracarpus floribundus Valeton	Amaracarpus (insufficiently known species)
<i>Amaracarpus giluwensis</i> P. Royen	Psychotria spec. (comb. ined.)
<i>Amaracarpus grandicalyx</i> Valeton	Amaracarpus grandifolius Valeton
Amaracarpus grandiflorus A.P. Davis	
Amaracarpus grandifolius Valeton	
Amaracarpus grandifolius Valeton var. grandifolius	
Amaracarpus grandifolius Valeton var. humilis (Valeton) A.P. Davis	
Amaracarpus grandifolius Valeton var. leucocarpus (Lauterb. & K. Schum.) A.P. Davis	
Amaracarpus grandifolius Valeton var. trichocarpus (Merr. & L.M. Perry) A.P. Davis	
<i>Amaracarpus heteropoides</i> Valeton ¹	Psychotria hombroniana (Baill.) Fosberg var. <i>squarrosa</i> (Valeton) Fosberg
Amaracarpus heteropus Valeton	
<i>Amaracarpus hirtellus</i> Valeton ¹	Psychotria hombroniana (Baill.) Fosberg var. <i>hirtella</i> (Valeton) Fosberg
<i>Amaracarpus humilis</i> Valeton	Amaracarpus grandifolius Valeton var. humilis (Valeton) A.P. Davis
Amaracarpus idenburgensis Merr. & L.M. Perry	
<i>Amaracarpus kanehirae</i> Hosok. ¹	Psychotria hombroniana (Baill.) Fosberg var. <i>kusaiensis</i> (Kaneh.) Fosberg
<i>Amaracarpus kraemeri</i> Valeton ¹	Psychotria hombroniana (Baill.) Fosberg var. <i>squarrosa</i> (Valeton) Fosberg

Appendix (continued)

All names	Accepted name
<i>Amaracarpus kusaiensis</i> Kaneh. ¹	Psychotria hombroniana (Baill.) Fosberg var. <i>kusaiensis</i> (Kaneh.) Fosberg
<i>Amaracarpus ladronicus</i> (Hosok.) Hosok. ¹	Psychotria hombroniana (Baill.) Fosberg var. <i>ladronica</i> (Hosok.) Fosberg
<i>Amaracarpus lanceolatus</i> Veleton	Amaracarpus heteropus Veleton
<i>Amaracarpus lauterbachii</i> Veleton	Amaracarpus grandifolius Veleton var. <i>leucocarpus</i> (Lauterb. & K. Schum.) A.P. Davis
Amaracarpus ledermannii Veleton	Amaracarpus (unknown species)
<i>Amaracarpus leucocarpus</i> (Lauterb. & K. Schum.) Veleton	Amaracarpus grandifolius Veleton var. <i>leucocarpus</i> (Lauterb. & K. Schum.) A.P. Davis
<i>Amaracarpus longifolius</i> Elmer	Psychotria linearis Bartl. ex DC.
<i>Amaracarpus longifolius</i> Veleton	Amaracarpus heteropus Veleton
<i>Amaracarpus macrophyllus</i> Veleton ¹	Psychotria hombroniana (Baill.) Fosberg var. <i>hirtella</i> (Veleton) Fosberg
Amaracarpus major (Veleton) A.P. Davis	Psychotria malaspinae Merr.
<i>Amaracarpus malaspinae</i> (Merr.) Kaneh. & Hatus. ¹	Psychotria hombroniana (Baill.) Fosberg var. <i>mariannensis</i> (Kaneh.) Fosberg
<i>Amaracarpus mariannensis</i> Kaneh. ¹	Amaracarpus acuminatus S. Moore subsp. pullei (Veleton) A.P. Davis
<i>Amaracarpus mesophyllus</i> Veleton	Amaracarpus pubescens Blume subsp. microphyllus (Miq.) A.P. Davis
<i>Amaracarpus microphyllus</i> Miq.	Amaracarpus (unknown species)
Amaracarpus montanus Veleton	Psychotria spec. (comb. ined.)
<i>Amaracarpus montistellaris</i> P. Royen	Dolianthus montiswilhelmii (P. Royen) A.P. Davis
<i>Amaracarpus montiswilhelmii</i> P. Royen ²	= Psychotria s.l.
<i>Amaracarpus muscifer</i> A.C. Sm.	Amaracarpus (insufficiently known species)
Amaracarpus nouhuizii Veleton	
Amaracarpus novo-guineensis Veleton	Dolianthus nummatus (P. Royen) A.P. Davis
<i>Amaracarpus nummatus</i> P. Royen ²	
Amaracarpus nymanii Veleton	
Amaracarpus papuanus Veleton	
Amaracarpus pubescens Blume	Amaracarpus pubescens Blume subsp. pubescens
Amaracarpus pubescens Blume subsp. microphyllus (Miq.) A.P. Davis	
Amaracarpus pubescens Blume subsp. pubescens	
<i>Amaracarpus pubescens</i> subsp. <i>sechellarum</i> F. Friedmann	Amaracarpus pubescens Blume subsp. pubescens
<i>Amaracarpus pullei</i> Veleton	
Amaracarpus rhombifolius Veleton	Amaracarpus acuminatus S. Moore subsp. pullei (Veleton) A.P. Davis
<i>Amaracarpus rotensis</i> Hosok. ¹	Amaracarpus (unknown species)
<i>Amaracarpus saxicola</i> Ridl.	Psychotria hombroniana (Baill.) Fosberg var. <i>hombroniana</i>
Amaracarpus schlechteri Veleton	Saprosma spec.
<i>Amaracarpus simulans</i> Merr. & L.M. Perry	
<i>Amaracarpus solomonensis</i> Merr. & L.M. Perry	Amaracarpus compactus Merr. & L.M. Perry
<i>Amaracarpus subalpinus</i> P. Royen ²	Amaracarpus grandifolius Veleton var. <i>grandifolius</i>
<i>Amaracarpus subcaudatus</i> Merr. & L.M. Perry	Dolianthus subalpinus (P. Royen) A.P. Davis non Amaracarpus , probably Psychotria s.l.
Amaracarpus syzygifolius Veleton	Amaracarpus (unknown species)
<i>Amaracarpus torricellensis</i> Veleton	non Amaracarpus , ?gen. nov.
<i>Amaracarpus trichanthus</i> Merr. & L.M. Perry ²	Dolianthus trichanthus (Merr. & L.M. Perry) A.P. Davis
Amaracarpus trichocalyx Veleton	Amaracarpus (unknown species)
<i>Amaracarpus trichocarpus</i> Merr. & L.M. Perry	Amaracarpus grandifolius Veleton var. <i>trichocarpus</i> (Merr. & L.M. Perry) A.P. Davis
<i>Amaracarpus urophyllus</i> Merr. & L.M. Perry	Amaracarpus heteropus Veleton
<i>Amaracarpus vaccinioides</i> (C.H. Wright) P. Royen	Dolianthus vaccinioides C.H. Wright
Amaracarpus wichmannii Veleton	
Amaracarpus xanthocarpus Merr. & L.M. Perry	

1) Transferred to *Psychotria* by Fosberg & Sachet (1991).2) Transferred to *Dolianthus* by Davis & Bridson (2001).