

**THE GENUS EPIPREMNUM SCHOTT
(ARACEAE–MONSTEROIDEAE–MONSTEREAE)
IN WEST AND CENTRAL MALESIA**

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SUMMARY

An account of native and introduced *Epipremnum* species in West and Central Malesia is presented as a precursor to the forthcoming Flora Malesiana Araceae treatment. Seven species and one cultivar, none new, are recognized. *Epipremnum grandifolium* is returned to *Scindapsus*, the genus in which it was originally described and *Scindapsus dilaceratus* (synonyms *Monstera dilacerata*, *Tornelia dilacerata*), a long-overlooked synonym of *E. pinnatum*, is discussed. Related genera and identification pit-falls are highlighted. Dichotomous keys to the genera of tribes Anadendreae and Monstereae and to West and Central Malesian *Epipremnum* species, a multi-access key to *Epipremnum* species in West and Central Malesia and a geographical species-finder list are provided. All names in the review area are accounted for. Five species are illustrated.

INTRODUCTION

The genus *Epipremnum* Schott comprises approximately 15 species of slender to gigantic root-climbing lianes distributed from S Japan (Ryukyu Islands) to Australia (Queensland) and from India (Manipur) to the Cook Islands (Rarotonga). The widespread *E. pinnatum* (L.) Engl. accounts for most of these distributional extremes while all other species have a restricted natural range. Variegated clones of *E. pinnatum* cv. Aureum are frequently met with as horticultural escapes throughout the tropics. Seven species and one much cultivated and often naturalized cultivar occur in West and Central Malesia [Malaysia, Indonesia (excluding Irian Jaya), Philippines, Brunei and Singapore]. Species outside the review area will be dealt with in separate papers.

HISTORY OF THE GENUS EPIPREMNUM

Epipremnum Schott was established in 1857 (Schott, 1857). Based on the only species known to him, *E. mirabile* Schott [= *E. pinnatum* (L.) Engl.] Schott defined *Epipremnum* by unilocular ovaries with a single intrusive parietal placenta bearing two sub-basal ovules. A floral diagnosis was figured in *Genera Aroidearum* (Schott, 1858: t. 79). The current circumscription of *Epipremnum* has ovule number ranging from two [most species, but see *E. ceramense* (Engl. & K. Krause) Alderw. and *E. falcifolium* Engl.] to eight [*E. amplissimum* (Schott) Engl., Australia, New Guinea, W Pacific] and albuminous strongly curved seeds with a bony, smooth to ornamented testa. However, as noted by Hay (1990, 1993) the established reliance on gynoeceal characters to define Old World genera in tribe Monstereae [*Amydrium* Schott (including *Epi-*

premnopsis Engl.), *Epipremnum*, *Rhaphidophora* Hassk. and *Scindapsus* Schott] requires reassessment since it does not take into account a wealth of shared vegetative characters in the four genera presently recognized. An in-depth discussion of this is beyond the scope of this paper but individual species' notes highlight particular examples and an introduction to the problems associated with these characters and the present generic circumscription in Old World Monstereae can be gained from Blanc (1978, 1981), Hay (1986, 1990), Hay & Mabberley (1991), Madison (1977), Mayo, Bogner & Boyce (1997), and Ray (1987, 1988, 1990).

Schott (1863) established the genus *Anthelia* with a single species, *A. nobilis* Schott, for a climbing aroid from Maluku with incompletely bilocular ovaries and four ovules (two per partial locule). The generic boundaries of *Anthelia* fall within the current circumscription of *Epipremnum*.

SIMILAR GENERA

Epipremnum is one of four Asian genera in Monstereae (sensu Mayo, Bogner & Boyce, 1997), the others are *Scindapsus*, *Rhaphidophora* and *Amydrium*. In Malesia these genera are mostly root-climbing lianes (see Schimper, 1903: 193), exceptions include, e.g., *Scindapsus rupestris* Ridl. (Peninsular Malaysia, Borneo; creeping rheophyte), *Amydrium humile* Schott (Peninsular Malaysia, Thailand, Sumatra; creeping to rarely climbing forest floor herb), *Rhaphidophora beccarii* Engl. (Peninsular Malaysia, Thailand, Sumatra, Borneo; creeping rheophyte)] occurring in a wide range of habitats [lowland dipterocarp forest (e.g. *Rhaphidophora crassifolia* Hook. f., Pasoh Forest Reserve, Negeri Sembilan, Malaysia) to montane kerangas (e.g. *Scindapsus scortechinii* Hook. f., Genting Highlands, Selangor, Malaysia)]. All genera except *Amydrium* have abundant trichosclereids in all tissues (sparse in *Amydrium*). These are observable by tearing a mature leaf lamina and looking for 'hairs' protruding from the damaged edges. All genera have spadices bearing bisexual naked flowers. Often the lower and uppermost flowers in a spadix are sterile and different in appearance. Lower sterile flowers are usually larger and free while those at the spadix tip are often smaller and partially fused to adjacent sterile flowers. In neotropical *Monstera* Adans. the basal sterile flowers usually produce a nectar droplet and appear to act as pollinator attractants (Madison, 1977). They perhaps function similarly in Asian genera. In most species observed to date the spathe gapes on opening and is swiftly shed at male anthesis (exceptions with partially persistent spathes include *Scindapsus rupestris*). In all but *Amydrium medium* (Zoll. & Moritzi) Nicolson and *A. humile* Schott the mature infructescence surface is comprised of tough thickened stylar tissue. When the infructescence is ripe the styles adhere to one-another and fall as irregular plates to expose the ovary cavity with the seed embedded in copious, variously coloured pulp.

Confusion can occur between *Epipremnum* and the other Malesian monsteroid genera. If fruits are mature, seed characters are useful in separating *Epipremnum* and *Rhaphidophora*. *Epipremnum* has fruits with few large, strongly curved, seeds with a bony, smooth to ornamented testa. The fruits of *Rhaphidophora* each contain many small ellipsoid seeds with a brittle, smooth testa. Alternatively, immature fruits can be dissected and the number of ovules counted (few in *Epipremnum*, almost always many in *Rhaphidophora*).

Certain *Scindapsus* [notably *S. latifolius* M. Hotta (Borneo), *S. splendidus* Alderw. and *S. roseus* Alderw. (both Sumatra)] are very similar in appearance to the entire-leaved *Epipremnum* species. The only way to differentiate these *Scindapsus* and *Epipremnum* species, aside from field experience, is to observe inflorescences or, better, semi-mature infructescences. *Scindapsus* has fruits with a solitary curved seed. However, certain *Epipremnum* species (e.g. *E. ceramense* and *E. falcifolium*) seem to habitually abort all but one ovule and produce fruits with a solitary seed. Older texts (e.g. Engler & Krause, 1908) state that *Scindapsus* seed is exalbuminous but recent studies of Araceae seed by Seubert (1993) have demonstrated that *Scindapsus* seeds do contain small quantities of endosperm. Nevertheless the embryo is still relatively larger in *Scindapsus*.

The sparse trichosclereids of all *Amydrium* species facilitates field identification of even sterile material to genus (see note above). Where confusion between individual species can occur [e.g. between *Amydrium zippelianum* (Schott) Nicolson, *A. magnificentum* (Engl.) Nicolson and *E. pinnatum*] a note is included with the relevant species.

Species of *Anadendrum* Schott (tribe Anadendreae) are often collected as '*Rhaphidophora*', '*Scindapsus*' or '*Epipremnum*'. *Anadendrum*, together with most *Pothos* L. and *Pedicellarum* M. Hotta (both subfamily Pothoideae), are the only simple-leaved Asian aroid climbers with reticulate venation (*Amydrium humile*, also with reticulate venation, can occasionally be observed as a low climber, but then with a solitary inflorescence). Additionally, *Anadendrum* lacks trichosclereids and can be distinguished from all Monstereae using a leaf tear. Using floral characters *Anadendrum* (each flower with a membranous perigon of fused tepals) is a singular genus and should not be confused with any other Asian climbing Araceae. Confusion can occur between *Anadendrum* and genera of Pothoideae (i.e., *Pothos*, *Pothoidium* Schott and *Pedicellarum*) that also lack trichosclereids. However, *Pothos* (except subg. *Pothos*) and *Pedicellarum* are instantly recognizable by the intramarginal veins crossing the primary venation (for illustration see Hay, 1995). *Anadendrum* flowers on clinging climbing shoots whereas almost all *Pothos* flower on free lateral shoots. In fruit both have red, somewhat juicy berries. However, those of *Anadendrum* are apically truncate with a prominent linear stigma whereas *Pothos* has ellipsoid to globose berries with a tiny, puncti-form to slightly elongated stigma. The critical characters for differentiating between the genera of Anadendreae and Monstereae in West and Central Malesia are presented below as a dichotomous key.

Confusion is also possible at species level. *Epipremnum pinnatum* is vegetatively most similar to *Rhaphidophora korthalsii* Schott but easily-observed distinguishing characters are present. Mature leaves of *R. korthalsii* are invariably pinnatisect (variously pinnatifid, pinnatipartite or pinnatisect in *E. pinnatum*) with individual pinnae, even the narrowest, having more than one primary lateral vein (one per pinna in *E. pinnatum*). The internodes of *R. korthalsii* lack the prominent irregular longitudinal whitish crests and older stems lack the distinctive matt to sub-lustrous pale brown papery epidermis typical of *E. pinnatum*. The feeder roots of *R. korthalsii* are scaly whereas they are lenticellate-corky in *E. pinnatum*. The pre-adult stage of *R. korthalsii* is a 'shingle' climber with oblong-elliptic to ovate, slightly falcate, upwards pointing leaves overlapping in the manner of roof tiles. Juvenile plants of *E. pinnatum* are sprawling to climbing with long-petioled 'conventional' leaves. Fertile material of

R. korthalsii and *E. pinnatum* is readily separated by the shape of the style apex [round to oval (*R. korthalsii*) versus angled (*E. pinnatum*)] and the shape of the stigma and its orientation to the spadix [punctiform and circumferential (*R. korthalsii*) versus linear and longitudinal (*E. pinnatum*)].

Epipremnum pinnatum and *Rhaphidophora tetrasperma* Hook. f., another pinnatifid and perforate-laminaed species can be confused. Juvenile *R. tetrasperma* is a shingle-plant similar in appearance to *R. korthalsii*. Flowering-size plants have smooth stems and unequal ovate-elliptic coriaceous laminae (longitudinally crested stems and more-or-less equal, ovate to oblong-elliptic and sub-membranaceous laminae in *E. pinnatum*) and a more scandent habit, with leaves scattered along sinuous stems. *Rhaphidophora tetrasperma* is a rather rare species restricted to a few sites in Peninsular Malaysia (Kelantan, Perak) and southern Peninsular Thailand (Narathiwat).

Some terms employed in the descriptions to follow may need clarification:

Monopodial stems — Sterile stems, often of great length, that are monopodial. Such stems are usually only clinging and orthotropic (or nearly so).

Physiognomically monopodial stems — Fertile stems, of variable length, with the appearance of being monopodial but that are actually sympodia with growth terminating by a, sometimes aborted, inflorescence. Such stems may be clinging and orthotropic (or nearly so) or free and plagiotropic to pendent.

Clasping roots — Short specialized roots that anchor a climber, hemiepiphyte or epiphyte to its substrate, generally a tree or rock.

Feeding roots — Specialized roots arising from aerial stems which, extending down to the soil, transport nutrients to the plant.

Shingle climber — A type of juvenile morphology, found in climbers, in which the petiole is very short and the leaf blade relatively broad and more-or-less overlapping with its neighbours to resemble the tiles (or shingles) of a roof; such plants are found climbing up larger tree trunks; e.g. *Rhaphidophora korthalsii*

Compound primary lateral veins — Vein type found in dried specimens in which a primary lateral vein is comprised of few to several vascular bundles (vs one vascular bundle in simple lateral veins). In fresh material such features are often obscured by the turgidity of the vein.

Interprimary veins — A vein approximately parallel to and situated between the primary lateral veins.

Perigon — The floral envelope of a flower in which there is no differentiation of calyx from corolla; it may be a single structure (connate tepals) or composed of individual, similar tepals.

Perigoniate — Of a flower which possesses a perigone.

Circumferential orientation (of stigmas) — Linear stigmas set parallel to the circumference of the spadix axis.

Longitudinal orientation (of stigmas) — Linear stigmas set parallel to the long axis of the spadix.

Trichosclereids — Literally a hair-like sclereid; fibre cells (cells with thick, lignified walls) which are very slender and elongated so as to be visible to the naked eye as hair-like structures. On tearing the leaf blade they can be seen protruding from the torn edge.

KEY TO GENERA OF ANADENDREAE AND MONSTEREAE IN
WEST AND CENTRAL MALESIA

- 1a. Inflorescence small. Spathe mostly less than 9 cm long just prior to opening 2
 b. Inflorescence moderate to large. Spathe mostly more than 9 cm long just prior to opening 4
- 2a. Spathe in bud slender, long-slender-pedunculate, conspicuously long-beaked (beak to 1/3 length of entire spathe), opening with inside greenish white and conspicuously glossy-waxy. Flowers with a membranous perigon of fused tepals (i.e. flowers perigoniate). Trichosclereids absent **Anadendrum**
 b. Spathe in bud stout, short to long-pedunculate, not conspicuously long-beaked, or if beak present then less than 1/6 length of entire spathe, opening with inside yellow, greenish or glistening white, only moderately waxy. Individual flowers naked (i.e. flowers aperigoniate); trichosclereids present (but sparse in *Amydrium*) 3
- 3a. Trichosclereids abundant (many 'hairs' apparent when a mature leaf lamina is torn). Plant terrestrial, rheophytic. Leaf with petiole broadly canaliculate, sheath margins scarious, extending to near apical geniculum, leaf lamina stoutly coriaceous, oblong. Spathe exceptionally thick **Scindapsus**
 b. Trichosclereids sparse (very few 'hairs' apparent when a mature leaf lamina is torn). Plant climbing or terrestrial and not rheophytic. Leaf with petiole terete, sheath margins not scarious, barely exceeding basal geniculum, leaf lamina rather thin-textured, never oblong. Spathe not exceptionally thick. — If plant climbing then leaf lamina variously pinnatifid and perforated **Amydrium**
- 4a. Trichosclereids sparse (very few 'hairs' apparent when a mature leaf lamina is torn). Higher order venation completely reticulate. — Ovary 1-locular, placenta 1, intrusive-parietal, ovules 2 **Amydrium**
 b. Trichosclereids abundant (many 'hairs' apparent when a mature leaf lamina is torn). Higher order venation striate or reticulate 5
- 5a. Ovules solitary, placentation basal. Fruits with a solitary seed **Scindapsus**
 b. Ovules 2–6 or more, placentation parietal. Fruits with more than one seed . 6
- 6a. Ovules 8 or more, superposed on 2 (rarely 3) parietal placentas. Seeds many, ellipsoid, straight, 1.3–3.2 mm long, 0.6–1 mm wide; testa brittle, smooth . .
 **Rhaphidophora**
 b. Ovules 2–4(–6) at base of a single intrusive placenta. Seeds few, curved, 3–7 mm long, 1.5–4 mm wide; testa bony and ornamented **Epipremnum**

EPIPREMNUM

Epipremnum Schott, Bonplandia 5 (1857) 45; Gen. Aroid. (1858) t. 79; Engl. in DC., Monogr. Phanerogam. 2 (1879) 248; Engl. in Beccari, Malesia 1 (1883) 272; Engl. in Engl. & Prantl, Nat. Pflanzenfam. 2 (3) (1889) 120; Hook. f., Fl. Brit. India 6 (1893) 548; Engl. & K. Krause in Engl., Pflanzenz. 37 (IV.23B) (1908) 54; Merr., Enum. Philipp. Flow. Pl. (1923) 177; Ridl., Fl. Malay Penins. 5 (1925) 119; Henderson, Malay. Wild Flow. (Monocots) (1954) 235. — Type: *E. mirabile* Schott [= *E. pinnatum* (L.) Engl.].

Anthelia Schott, Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 127. — Type: *Anthelia nobilis* Schott.

Slender to gigantic homophyllous (but leaf laminae occasionally becoming increasingly pinnatifid and perforated towards maturity) root-climbing lianes to 20 m. Seedling stage mostly not observed. Pre-adult plants forming modest to extensive terrestrial colonies. Adult plants with physiognomically monopodial clinging stems rooting along their entire length, free stems usually not occurring (but see *E. giganteum*) other than as a result of external physical damage (e.g. weight of the inflorescences and infructescences) and then usually soon climbing again. Flagellate foraging stems occurring in some species (maybe all, but often not observed), these often exceedingly long, reaching the ground then rooting, foraging and climbing again. Growing stems with internodes separated by variously prominent leaf scars, stems smooth, asperous or furnished with prominent irregular whitish longitudinal crests, older stems sub-woody or somewhat to exceptionally corky or with distinctive matt to sub-lustrous pale brown papery epidermis, with or without variously textured prophyll, cataphyll and petiolar sheath fibre; aerial roots of two types, clasping roots sparsely to densely arising from the nodes and internodes, strongly adherent to substrate, feeding roots rather uncommon, often absent, usually strongly adherent to substrate, more rarely free, both root types pubescent, clasping roots later corky, feeding roots later becoming woody and prominently lenticellate. *Cataphylls* and *prophylls* sub-coriaceous to membranaceous, soon drying and falling or degrading to variously textured sheaths and fibres, where present these variously clothing upper stem before eventually decaying and falling. Foliage leaves evenly distributed or scattered on lower stem and evenly distributed to clustered distally. *Petiole* canaliculate to weakly carinate with apical and basal genicula; petiolar sheath prominent, at first membranaceous to coriaceous, soon completely or along the margins drying chartaceous, sometimes degrading to untidy variously netted or simple fibres and later variously falling to leave a scar or disintegrating marginally or completely. *Lamina* sub-membranaceous to stiffly chartaceous or coriaceous, entire to regularly or irregularly pinnatifid, divisions pinnatifid to pinnatisect (Stearn, 1992: 324), occasionally midrib \pm naked between segments, lamina rarely with minute to somewhat well developed pellucid dots adjacent to the midrib, these dots often perforating and enlarging, sometimes extending to lamina margin (fenestrations then often additional to fully developed pinnae); primary venation simple to compound and pinnately arranged, interprimaries mostly present, subparallel to primaries and sometimes indistinguishable from them (*E. giganteum*); secondary venation striate to reticulate, tertiary venation reticulate to tessellate, reticulate higher venation restricted to species with dissected or fenestrate leaves. *Inflorescences* solitary to several together, first inflorescence subtended by a (usually fully developed) foliage leaf and/or a very swiftly disintegrating cataphyll, subsequent inflorescences subtended by a prophyll and cataphyll, inflorescences at anthesis almost naked by disintegration of subtending cataphyll to partially to almost completely obscured by netted and sheet-like fibres. Peduncle terete to laterally compressed. Spathe canoe-shaped, stoutly to rather weakly beaked, gaping to opening almost flat at anthesis and then deciduous before anthesis is complete, stiff to rather soft-coriaceous, dirty-white, greenish or yellow. Spadix variously cylindrical, sessile, rarely stipitate, bluntly tapering towards the apex, base often slightly obliquely inserted. *Flowers* bisexual, naked. *Ovary*

variously cylindrical, often laterally compressed and variously irregularly angled, those upper- and lowermost on the spadix often sterile and bereft of stigma; placenta one; placentation intrusive parietal; ovules 2–8, anatropous; stylar region prominent to massive; stigma punctate to linear, sticky at female anthesis, orientation circumferential or longitudinal. *Stamens* 4; filaments strap-shaped; anthers prominently exerted from between ovaries at male anthesis, dehiscing by a longitudinal slit. *Fruit* with stylar region greatly enlarged, transversely dehiscent, the abscission developing at the base of the massive stylar region and this falling to expose the ovary cavity with the seeds embedded in variously coloured sticky pulp. *Seeds* curved, often strongly so, albuminous, testa bony and smooth to ornamented. *Pollen* fully zonate, hamburger-shaped, medium-sized (36–44 μm), exine foveolate-fossulate, psilate at periphery, apertural exine coarsely verrucate. $2n = 60$ (56, 84).

Distribution — Approximately 15 species from Japan (Ryukyu Islands) to Australia (Queensland) and India (Manipur) to Oceania (Cook Islands: Rarotonga).

Habitat — Bole climbers in low to mid-elevation evergreen forest, occasionally persisting in disturbed areas or growing lithophytically in exposed situations.

KEY TO EPIPREMNUM IN WEST AND CENTRAL MALESIA

- 1a. Leaf lamina pinnatifid 2
 b. Leaf lamina entire 3
 2a. Leaf lamina sub-membranaceous, regularly pinnatifid, often with numerous tiny to moderately large perforations. Lamina never variegated **6. *E. pinnatum***
 b. Leaf lamina somewhat coriaceous, irregularly pinnatifid and sometimes partially entire, rarely with tiny perforations. Lamina usually yellow, more rarely white-variegated **7. *E. pinnatum* cv. *Aureum***
 3a. Leaf lamina mostly coriaceous. Primary and interprimary venation prominent, indistinguishable from one another, or nearly so (Peninsular Malaysia & Singapore) **3. *E. giganteum***
 b. Leaf lamina variously textured. Primary venation markedly more prominent than interprimary venation (Indonesian islands, Borneo) 4
 4a. Leaf lamina elliptic. Spadix conspicuously stipitate (Maluku) **4. *E. moluccanum***
 b. Leaf lamina oblong to elongate-oblong to elongate-lanceolate, never elliptic. Spadix sessile or nearly so 5
 5a. Leaf lamina base acute, oblique (Borneo: Brunei, Sabah & Kalimantan) **2. *E. falcifolium***
 b. Leaf lamina base subacute to rounded, unequal 6
 6a. Leaf lamina equalling petiole, 18–20 primary lateral veins per side (Maluku) ... **1. *E. ceramense***
 b. Leaf lamina longer than petiole, fewer than 15 or more than 30 primary lateral veins per side 7
 7a. 35–40 primary lateral veins per side (Sulawesi) **5. *E. nobile***
 b. About 10 primary lateral veins per side (Sumatra) **8. *E. silvaticum***

MULTI-ACCESS KEY TO EPIPREMNUM IN WEST AND CENTRAL MALESIA
(adult plants only)

Shoot

- Prophyll and cataphylls degrading to conspicuous nets and fibre 5. *E. nobile*,
6. *E. pinnatum*, 7. *E. pinnatum* cv. *aureum*
(beware certain *Rhaphidophora* species)
- Prophylls and cataphylls falling 1. *E. ceramense*, 2. *E. falcifolium*, 3. *E. giganteum*,
4. *E. moluccanum*, 5. *E. nobile*, 8. *E. silvaticum*
- Internodes asperous 4. *E. moluccanum*
- Internodes smooth 1. *E. ceramense*, 2. *E. falcifolium*, 3. *E. giganteum*,
5. *E. nobile*, 8. *E. silvaticum*
- Internodes with prominent irregular whitish longitudinal crests 6. *E. pinnatum*,
7. *E. pinnatum* cv. *Aureum*

Leaf

- Leaf lamina pinnatifid 6. *E. pinnatum*, 7. *E. pinnatum* cv. *Aureum*
- Leaf lamina entire 1. *E. ceramense*, 2. *E. falcifolium*, 3. *E. giganteum*,
4. *E. moluccanum*, 5. *E. nobile*, 8. *E. silvaticum*
- Leaf lamina elliptic 4. *E. moluccanum*
- Leaf lamina with tiny to moderate perforations 6. *E. pinnatum*,
7. *E. pinnatum* cv. *Aureum*
(beware *Amydrium medium* and certain *Rhaphidophora* species)
- Leaf lamina variegated yellow (rarely white) 7. *E. pinnatum* cv. *Aureum*
(beware *Scindapsus pictus*, juvenile *S. hederaceus* and
green-leaved plants of *E. pinnatum* cv. *Aureum*)

Spadix

- Spadix sessile or nearly so 1. *E. ceramense*, 2. *E. falcifolium*, 3. *E. giganteum*,
5. *E. nobile*, 6. *E. pinnatum*, 7. *E. pinnatum* cv. *Aureum*, 8. *E. silvaticum*
- Spadix prominently stipitate 4. *E. moluccanum*

Pistil

- Stigma punctiform to globose, or slightly elongate 4. *E. moluccanum*, 5. *E. nobile*
- Stigma linear 1. *E. ceramense*, 2. *E. falcifolium*, 3. *E. giganteum*, 6. *E. pinnatum*,
7. *E. pinnatum* cv. *Aureum*, 8. *E. silvaticum*
- Stigma orientation longitudinal 1. *E. ceramense*, 2. *E. falcifolium*, 3. *E. giganteum*,
6. *E. pinnatum*, 7. *E. pinnatum* cv. *Aureum*, 8. *E. silvaticum*
- Stigma orientation circumferential 4. *E. moluccanum*, 5. *E. nobile*
- Stylar region in fruiting material massively enlarged 2. *E. falcifolium*, 3. *E. giganteum*

Epipremnum species arranged by main geographical divisions in West and Central Malesia:

Borneo:	Brunei:	2. <i>E. falcifolium</i>	Sabah:	2. <i>E. falcifolium</i> , 6. <i>E. pinnatum</i>
	Kalimantan:	2. <i>E. falcifolium</i>	Sarawak:	6. <i>E. pinnatum</i>
Java:		6. <i>E. pinnatum</i>		
Lesser Sunda Islands:		6. <i>E. pinnatum</i>		
Maluku:		1. <i>E. ceramense</i> , 4. <i>E. moluccanum</i> , 6. <i>E. pinnatum</i>		
Peninsular Malaysia:		3. <i>E. giganteum</i> , 6. <i>E. pinnatum</i>		
Philippines:		6. <i>E. pinnatum</i>		
Singapore:		3. <i>E. giganteum</i> , 6. <i>E. pinnatum</i>		
Sulawesi:		5. <i>E. nobile</i> , 6. <i>E. pinnatum</i>		
Sumatra:		6. <i>E. pinnatum</i> , 8. <i>E. silvaticum</i>		
Naturalized:		7. <i>E. pinnatum</i> cv. <i>Aureum</i>		
Widely cultivated:		7. <i>E. pinnatum</i> cv. <i>Aureum</i>		

1. *Epipremnum ceramense* (Engl. & K. Krause) Alderw. — Fig. 1

Epipremnum ceramense (Engl. & K. Krause) Alderw., Bull. Jard. Bot. Buitenzorg III, 1 (1920) 376. — *Scindapsus ceramensis* Engl. & K. Krause in Engl., Pflanzenr. 37 (IV.23B) (1908) 70. — Type: Engler 4004 (B holo), Indonesia, Maluku, Pulau Seram, Wahai, cultivated Bogor Botanic Garden, Canarienallee 5, Feb. 1906.

Epipremnum ceramense (Engl. & K. Krause) Alderw. var. *flavispathum* Alderw., Bull. Jard. Bot. Buitenzorg III, 1 (1920) 376. — Type: Alderwerelt 325 (BO holo), of unknown origin, cultivated Bogor Botanic Garden, July 1919.

Gigantic root-climber to 10 m. Adult plant with stem 20–30 mm diam., internodes 1.5–18 cm long, separated by prominent paler leaf scars. Foraging stems to 5 m or more, 6–8 mm diam., internodes 15–18 cm long. Clasping roots sparse, feeding roots very long, hanging free or adhering to climbing substrate and eventually reaching the ground. Cataphylls and prophylls soon drying and falling. Foliage leaves evenly distributed, lower leaves falling and thus leaves tending to become clustered distally. Petiole 35–70 cm × 15–20 mm, canaliculate, smooth, air-drying orange- to dark-brown; apical geniculum 3.5–5 × 2–5 mm, basal geniculum 3–5 × 1–2 cm, both genicula greater in diameter than the petiole, drying shrunken to less than petiole diameter and almost black; petiolar sheath extending to base of the apical geniculum, at first sub-membranaceous, soon drying scarious with a tough hyaline margin, later disintegrating in irregular blocks and then partially to completely falling to leave a smooth scar. Lamina 50–90 × 20–48 cm, entire, elliptic- to ovate-oblong, sub-coriaceous to coriaceous, apex sub-acute, abruptly apiculate, base unequal-rounded to sub-cordate, slightly decurrent, air-drying reddish brown; primary lateral veins simple, 18–20 per side, 2–5 cm distant, diverging from midrib at 60°, interprimary veins numerous, remaining sub-parallel to primary vein, all higher order venation weakly reticulate, tessellate in places, especially towards the lamina margins, barely visible in dried material; midrib impressed above, very prominently raised beneath, lower order venation slightly impressed to almost flush above, prominently raised beneath, interprimary venation flush above, very slightly raised beneath but conspicuous in dried specimens. Inflorescence solitary, subtended by a fully developed foliage leaf with an exceptionally broad petiolar sheath. Peduncle 6–12 cm × 10–30 mm, stout, terete, slightly laterally compressed, tapering basally, pale green. Spathe canoe-shaped, stoutly beaked, up to 36 × 12 cm when pressed flat, exterior green, interior ivory-white to pale yellow at anthesis, air-drying mid-brown to almost black. Spadix 12–34 × 2.5–4.5 cm, sessile, conic-cylindrical, bluntly tapering towards the apex, yellow at anthesis, air-drying mid-brown. Flowers 2–5 mm diam., the uppermost flowers on the spadix sterile and fused into irregular groups; ovary 10–17 × 2–5 mm, cylindrical-ellipsoid, basal part strongly compressed; ovules 2 or 3; stylar region 2.2–5 × 2–4 mm, trapezoid, robust, apex slightly conical; stigma linear, c. 2 × 0.1–0.5 mm, longitudinal; stamens 4; filaments 5 × 1 mm; anthers narrowly ellipsoid, 3–5 × 0.75–1 mm. Fruit green, ripening orange, stylar region slightly enlarged. Seeds c. 5 × 4.5 mm, often solitary, strongly curved, testa prominently ornamented, pale brown.

Distribution — Indonesia (Maluku).

Habitat — Margins of undisturbed forest on steep hillsides, clayey soil; altitude 45–60 m.

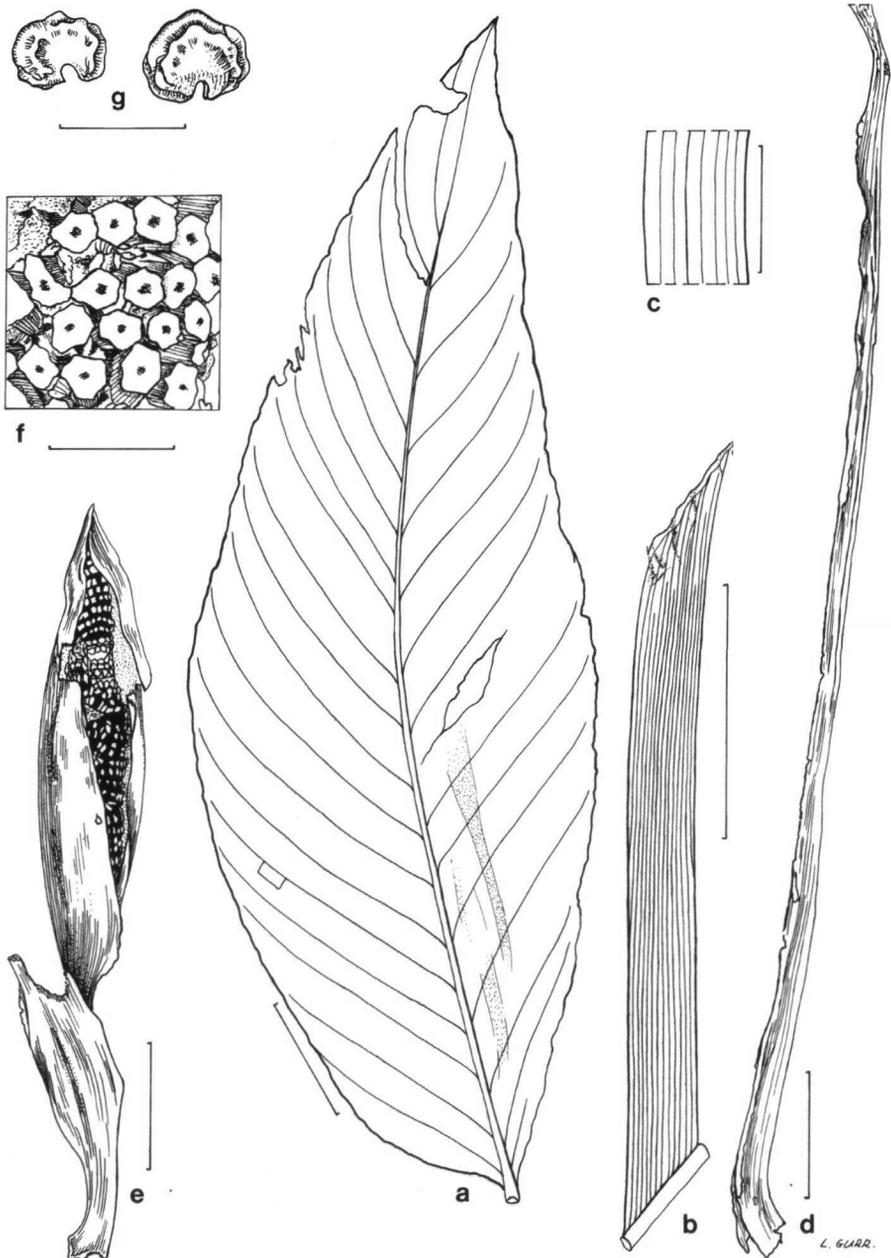


Fig. 1. *Epipremnum ceramense* (Engl. & K. Krause) Alderw. a. Lamina, lower surface; b. venation between two primary lateral veins; c. venation; d. petiole; e. inflorescence and petiole of subtending leaf; f. spadix detail; g. seed, opposing lateral views (a–g: *de Vogel 3190*). — Scale bar to a & d = 8 cm; to b & e = 6 cm; to c, f & g = 1 cm.

Notes — 1. Merrill (1917: 126) cites *Robinson P.R.A. 114*, under *Scindapsus marantifolius* Miq., as representative of 'Adpendix cuscuaria latifolia' [Rumphius' Herbarium Amboinense (1745: 5, 488, t. 183, f. 1)], a phrase-name later used as the basis of *Pothos cuscuaria* Gmel. non Aubl., nom. illeg. [= *Scindapsus marantifolius* Miq., synonyms, among others, *Aglaonema cuscuaria* (Miq.) J.F. Gmel.; *Scindapsus cuscuaria* (J.F. Gmel.) Engl. & K. Krause and *Cuscuaria marantifolia* (Miq.) Schott]. However, the Robinson (L, US) collection is clearly *Epipremnum ceramense*.

2. *Epipremnum ceramense* often aborts all but one ovule per ovary, producing fruits with a sub-basal, massive solitary seed. A specimen in BO (*Beguin 2254*: Maluku) is annotated as *Scindapsus maclurei* (Merr.) Merr. & Metcalf [Thailand, Vietnam, China (Hainan)], on the basis of "1 seeded ovary" and numerous other mis-determinations have occurred. Together with *E. falcifolium* (which behaves similarly), *E. ceramense* provides strong evidence to support merging *Scindapsus* and *Epipremnum*.

3. Alderwerelt recognized var. *flavispathum* on the basis of minor differences in leaf dimensions and lamina shape and different inflorescence colour and dimensions. These characters are variable in other *Epipremnum* species (q.v. especially *E. pinnatum*) and are insufficient to support even a species-subordinate taxon.

4. *De Vogel (3190, L)* notes that the long feeding roots are often used for tying outriggers on canoes on Pulau Halmahera.

2. *Epipremnum falcifolium* Engl. — Fig. 2

Epipremnum falcifolium Engl., Bot. Jahrb. Syst. 25 (1898) 11; Engl. & K. Krause in Engl., Pflanzenz. 37 (IV.23B) (1908) 58. — Type: *Engler s.n.* (BO holo; B & spirit B iso), cultivated Bogor Botanic Garden, Canarienallee Z65, 1906.

Very large root-climber to 15 m. Pre-adult plant forming extensive terrestrial colonies. Adult plant with stem 5–30 mm diam., internodes 0.5–13 cm long, separated by prominent pale leaf scars. Growing stems smooth, glossy dark green, older stems sub-woody, mid-brown. Slender flagellate foraging shoots occasionally occurring, these moderately to very long (7 m or more). Clasping roots sparse, minutely pubescent, later corky, mid- to dark brown, growing tip pale brown-yellow, strongly adherent to substrate. Cataphylls and prophylls soon drying and falling. Foliage leaves evenly distributed, lower leaves falling and thus leaves tending to become clustered distally. Petiole 25–80 cm × 5–20 mm, canaliculate, smooth, dark green, air-drying pale to dark brown; apical geniculum 15–35 × 2–5 mm, basal geniculum 7 × 1–1.5 cm, both genicula greater in diameter than petiole, drying shrunken to less than petiole diameter and darker; petiolar sheath extending 2/3–3/4 along petiole, at first sub-membranaceous, soon drying scarious, later disintegrating in regular blocks and then falling to leave a somewhat roughened, mid-brown scar. Lamina 5–58 × 3–20 cm, entire, oblique-elliptic, slightly falcate, sub-coriaceous to coriaceous, apex acute, base unequal-rounded, lustrous dark green, air-drying strongly discolorous with adaxial surface deep black-brown, abaxial surface pale to mid-red-brown; primary lateral veins simple, c. 30 per side, c. 1 cm distant, diverging from midrib at 40°–60°, interprimary veins remaining sub-parallel to primary vein, all higher order venation conspicuously tessellate in dried material; midrib impressed above, very prominently raised beneath, lower order venation slightly impressed to almost flush above, variously raised be-

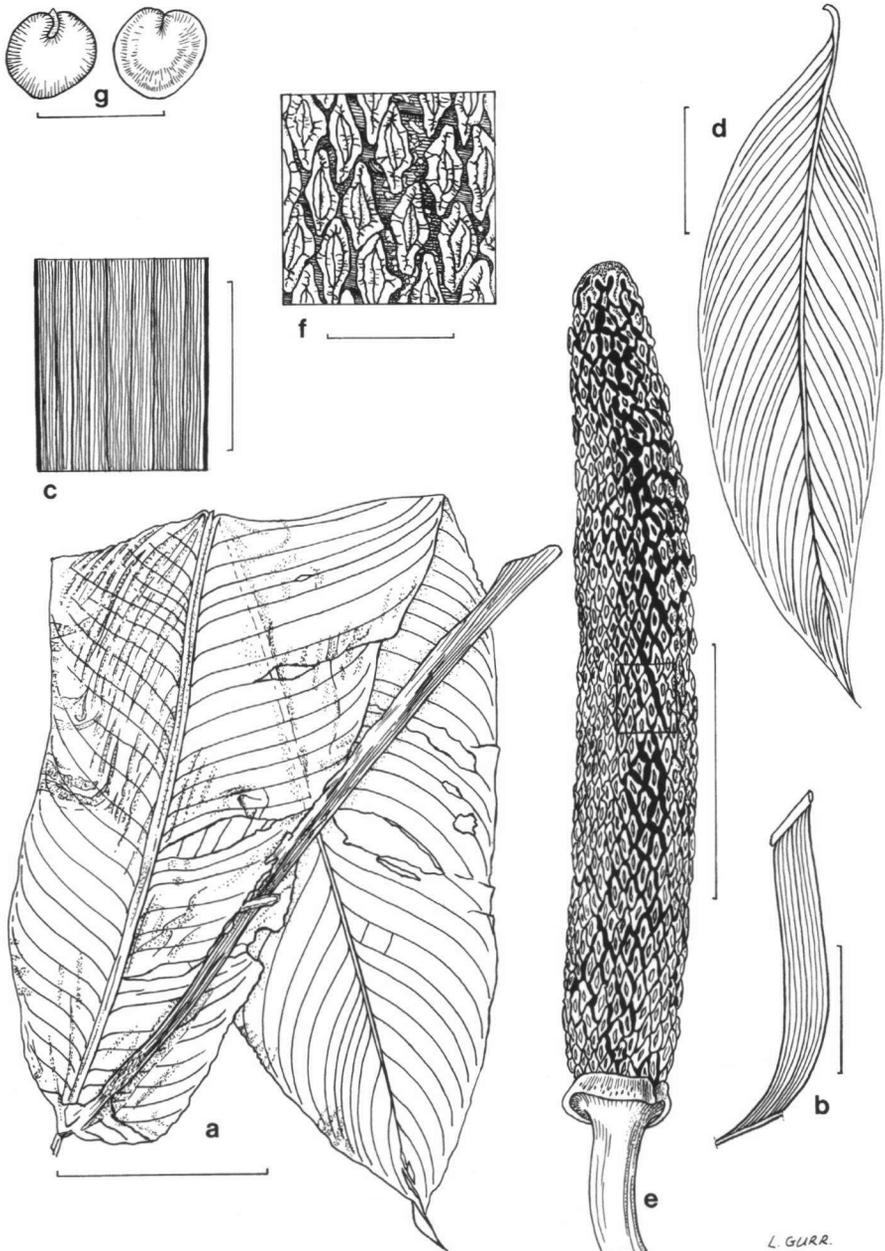


Fig. 2. *Epipremnum falcifolium* Engl. a. Lamina; b. venation between two primary lateral veins; c. venation; d. sub-adult lamina, lower surface; e. inflorescence, spathe fallen; f. spadix detail; g. seed, lateral views (a–c, f & g: Poulsen 363; d: Poulsen 233; e: Forman 986). — Scale bar to a = 10 cm; to b & d = 4 cm; to c, f & g = 1 cm; to e = 6 cm.

neath, higher order venation flush above, flush or nearly so beneath in fresh material but raised and rather conspicuous in dried specimens. Inflorescence solitary, subtended by a fully developed foliage leaf with an exceptionally broad petiolar sheath. Peduncle 5–10 cm × 4–12 mm, stout, terete, tapering basally, pale green. Spathe canoe-shaped, stoutly beaked, stiffly coriaceous, gaping at anthesis, up to 27 × 10 cm when pressed flat, exterior green, later dull yellow, interior dull yellow at anthesis, air-drying mid-brown to almost black. Spadix 17–24 × 3–5 cm, sessile, cylindrical, bluntly tapering towards the apex, dark yellow at anthesis, air-drying mid-brown. Flowers 4–12 mm diam., the uppermost flowers on the spadix partially fused and sterile; ovary 7–12 × 3–8 mm, cylindrical-ellipsoid, basal part strongly compressed; ovules 2; stylar region 4–12 × 1.5–4 mm, trapezoid, often misshapen by lateral compression of other styles, exceptionally robust, apex flattened, margins strongly reflexed in dry material; stigma linear with two prominent lateral cushions, 2–6 × 0.1–0.5 mm, longitudinal; stamens 4; filaments 5 × 1 mm; anthers narrowly ellipsoid, 3–5 × 0.75–1 mm. Fruit light-green, ripening red, stylar region greatly enlarged, the region surrounding the stigma swollen and the stigma thus raised; ovary cavity with the seeds embedded in sticky red pulp. Seeds curved, c. 5 × 4 mm, pale brown.

Distribution — Brunei, Malaysia (Sabah) and Indonesia (Kalimantan).

Habitat — Near rivers, mixed dipterocarp forest, swampy secondary forest, Setap shales, clay soil, yellow sandy loam; altitude 5–250 m.

Notes — 1. Described from plants of doubtful origin grown at Bogor Botanic Garden; the provenance of *E. falcifolium* was unknown until recent collections from Brunei. During the preparation of this revision searches in various herbaria revealed several hitherto undetermined collections by Kostermans [*10560* (Kalimantan; BO, L)], Hotta [*13324* (Brunei; KYO)], Hotta & Kokawa [*Kokawa & Hotta 263* (Sabah; KYO, L)] and Mariyoh & Lideh [*SAN 111746* (Sabah; E, K, SAN)].

2. *Epipremnum falcifolium* and *E. giganteum* have similar infructescences with massively enlarged stylar tissue but they can usually be readily separated on leaf characters (see Key to species above). However, *Alston 12632 & 15465* approach *E. giganteum* in appearance. Nevertheless, the living plants still at Bogor are unquestionably *E. falcifolium* (Boyce, pers. obs., 1996). Dried inflorescences and infructescences of *E. falcifolium* have the region around stigma expanded into two lateral cushions (see Fig. 2). These are absent from *E. giganteum* (see Fig. 3).

3. *Epipremnum falcifolium* often produces fruits with a solitary seed by abortion, q.v. *E. ceramense*.

3. *Epipremnum giganteum* (Roxb.) Schott — Fig. 3

Epipremnum giganteum (Roxb.) Schott, *Bonplandia* 5 (1857) 45; *Prod. Syst. Aroid.* (1860) 389; Engl. in DC., *Monogr. Phanerogam.* 2 (1879) 249; Engl. & K. Krause in Engl., *Pflanzenr.* 37 (IV.23B) (1908) 59; Hook. f., *Fl. Brit. India* 6 (1893) 548; Hemsley, *Bot. Mag.* 130 (1904) t. 7952; Ridl., *Fl. Malay Penins.* 5 (1925) 119. — *Pothos gigantea* Roxb., *Fl. Ind.* 1 (1820) 455. — *Monstera gigantea* (Roxb.) Schott, *Wien. Zeit. Kunst, Literatur, Theater, Mode*, 4th Quartal (127) (1830) 1028. — *Scindapsus giganteus* (Roxb.) Schott in Schott & Endlicher, *Melet. Bot.* (1832) 21. — Type: *Roxburgh Ic.* 2117 (K).

Very large to gigantic root-climber to 60 m. Pre-adult plant forming modest terrestrial colonies. Adult plant with stem 10–35 mm diam., internodes 1.5–20 cm long, sepa-

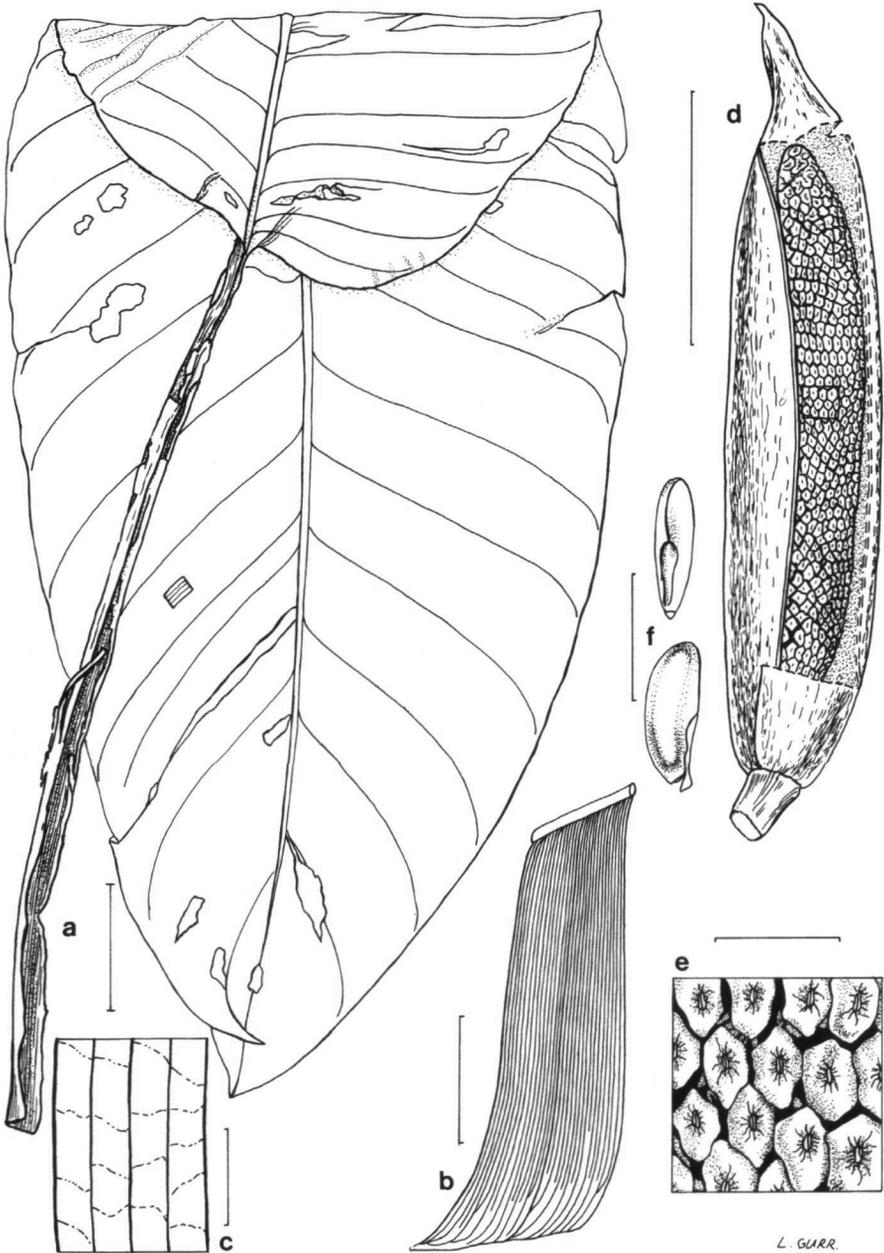


Fig. 3. *Epipremnum giganteum* (Roxb.) Schott. a. Lamina; b. venation between two primary lateral veins; c. venation; d. inflorescence, spathe partly removed; e. spadix; f. seed, lateral and ventral views (a–f: *Boyce 1190*). — Scale bar to a = 4 cm; to b = 3 cm; to c = 2.5 mm; to d = 6 cm; to e & f = 5 mm.

rated by prominent leaf scars. Growing stems smooth, glossy dark green, older stems sub-woody to exceptionally corky, mid-brown. Robust foraging stems occasionally occurring. Clasping roots sparse to rather prolific, feeding roots freely produced, often reaching great length, minutely pubescent, later corky, mid- to dark brown, growing tip pale yellow. Cataphylls and prophylls soon drying and falling. Foliage leaves evenly distributed but lower leaves often falling and then leaves tending to become clustered distally. Petiole 33–62.5 cm × 6–20 mm, canaliculate, dark green to slightly glaucous, smooth, air-drying pale brown; apical geniculum 20–25 × 5–12 mm, smooth, basal geniculum 2–4 cm × 7–15 mm, both genicula greater in diameter than petiole, drying shrunken and deeply sulcate, less than petiole diameter and almost black; petiolar sheath extending to half way along the apical geniculum, at first sub-membranaceous, soon drying scarious, later the margin breaking into regular sections which eventually fall to leave a somewhat roughened edge. Lamina 5.5–120 × 8.5–50 cm, entire, oblong-elliptic, slightly falcate, stiffly chartaceous to coriaceous, apex acute to slightly acuminate, base unequal-rounded, one side often produced into a rounded to truncate posterior lobe, glossy bright green, margins hyaline, prominently reddish to yellowish in exposed situations; overall venation densely striate, primary lateral veins simple, 10–15(–22) per side, 1–1.5 cm distant, diverging from midrib at 70°–75°, often barely or not differentiated from interprimary veins, interprimary veins very numerous, prominent, remaining parallel to primary vein, all higher order venation tessellate; midrib deeply impressed above, very prominently raised beneath, primary venation raised on both surfaces, noticeably so in dried material, higher order venation obscure in fresh and scarcely visible in dried material. Inflorescence solitary, rarely two or more together, first inflorescence subtended by a fully to partially developed foliage leaf with a well developed petiolar sheath. Peduncle 5–8 cm × 4–10 mm, stout, terete, bright green. Spathe canoe-shaped, shortly but stoutly tapering, stiffly coriaceous, gaping at anthesis, 16–33.5 × 5.5–16 cm when pressed flat, exterior green, interior waxy-glaucous to deep yellow at anthesis, air-drying mid-brown. Spadix 15.5–28.5 × 1.5–4.5 cm, sessile, cylindrical, bluntly tapering towards the apex, orange at anthesis, air-drying mid-brown. Flowers 2.5–4 mm diam.; ovary 3–10 × 2.5–4 mm, ellipsoid, basal part strongly compressed; ovules 2; stylar region 4–10 × 1.5–4 mm, trapezoid, robust, apex flattened, margins reflexed in dry material; stigma linear, 0.8–3 × 0.1–0.5 mm, longitudinal; stamens 4; filaments 1 × 0.5 mm; anthers narrowly ellipsoid 2 × 0.75–1 mm. Fruit light-green, ripening to dull orange, stylar region greatly enlarged. Seeds slightly curved, c. 5 × 2 mm, glossy pale brown.

Distribution — Myanmar (?), Cambodia (?), Vietnam, Thailand, Peninsular Malaysia, Singapore.

Habitat — Quartz ridge vegetation, limestone and marble hills and cliffs, hill forest, established oil palm plantation on iron-rich alluvium, damp lowland rain forest, swamp forest; altitude 90–170 m.

Notes — 1. *Epipremnum giganteum* is one of the most readily recognizable species by virtue of the bright green coriaceous leaf lamina with prominent dense striate venation. In exposed situations, for example the trunks of oil palm, the leaf colour intensifies and is further enhanced by the red or yellow tint taken on by the hyaline margin of the lamina. Forest specimens tend towards 'legginess' with widely sepa-

rated leaves and duller leaf laminae. *Epipremnum giganteum* often remains in logged-over areas, forming a distinctive high-climber on remaining once-emergent trees.

2. This is the only *Epipremnum* species that seems to flower regularly on both adherent and free stems (even on the same plant, Boyce & Hay independent pers. obs.). The newly opened inflorescences have a strong smell of peanut butter (Boyce pers. obs.). Most collections are of the glaucous-spathed plant but forms with a rich yellow spathe interior are not rare.

3. Specimens of *E. giganteum* are not common in herbaria even though it is one of the ubiquitous climbers in Peninsular Malaysia. I suspect that field workers often simply pass it by because it is so large.

4. *Epipremnum moluccanum* Schott

Epipremnum moluccanum Schott, Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 130. — [*Dracontium moluccanum* Zipp. ex Schott, Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 130, nom. superfl.]. — Type: *Zippelius 59d* (L. holo), Indonesia, Maluku, Pulau Ambon.

Large root-climber. Adult plant with stem c. 7 mm diam., epidermis minutely asperous, internodes c. 3.5 cm long, separated by prominent leaf scars furnished with a narrow collar of sheath tissue. Foraging shoots occurring (fide Zippelius ex Schott, 1863: 130). Cataphylls and prophylls soon drying and falling. Petiole 18–21 cm × 7–10 mm, canaliculate, smooth, air-drying pale brown; apical geniculum rather prominent, 7–10 × 3–4 mm, basal geniculum 3.5 × 1 cm, both genicula drying shrunken to less than petiole diameter; petiolar sheath very prominent, extending along the adaxial surface of the geniculum and ± merging with lamina margins, margins somewhat ragged, base of sheath ± enclosing the stem. Lamina 21.5–24 × 10.2–10.5, entire, elliptic to slightly oblique-elliptic, apex acute to slightly attenuate, base acute to sub-obtuse, briefly decurrent, air-drying mid-brown; primary lateral veins simple, 6–9 per side, c. 2 cm distant, diverging from midrib at c. 45°, barely differentiated from interprimary veins, the latter remaining parallel to primary veins, all higher order venation tessellate, but barely visible in dried material; midrib moderately impressed above, prominently raised beneath, lower order venation flush or nearly so above and beneath in fresh material but raised and rather conspicuous in dried specimens. Inflorescence solitary, subtended by a fully developed foliage leaf with a much expanded petiolar sheath. Peduncle 4.3 × 5 mm, sub-terete, epidermis slightly rough. Spathe canoe-shaped, exterior and interior dull yellow. Spadix stipitate, fertile portion cylindrical, apex rounded, obliquely inserted on stipe; stipe 10 × 6 mm, obliquely inserted on peduncle. Flowers 2–2.5 mm diam.; ovary 7–9 × 2.5–4 mm, cylindrical, basal part laterally compressed; ovules 2; stylar region c. 2.2 × 2 mm, trapezoid in air-dried post-anthesis material, somewhat feeble, apex flattened, margins slightly raised in dry material; stigma elongate-globose, c. 1.5 × 0.5 mm, circumferential, very slightly prominent; stamens 4; filaments 5 × 1 mm; anthers narrowly ovoid, 3–5 × 0.75–1 mm. Fruit green, stylar region somewhat feeble.

Distribution — Indonesia (Maluku).

Habitat — Unclear. "In montanis supra arbores" fide Schott.

Note — Known only from the type; *E. moluccanum* is a distinctive species with broad elliptic leaf laminae and a stipitate spadix. While the leaf shape is unique, the character of a stipitate spadix is shared with *E. papuanum* Alderw. (New Guinea).

5. *Epipremnum nobile* (Schott) Engl. — Fig. 4.

Epipremnum nobile (Schott) Engl. in DC., Monogr. Phanerogam. 2 (1879) 250; Engl. & K. Krause in Engl., Pflanzenr. 37 (IV.23B) (1908) 57. — *Anthelia nobilis* Schott, Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 127. — Type: *Forster s.n.* (L. holo), Indonesia, Sulawesi, near Tondano.

Large root-climber to 5 m. Adult plant with stem 5–30 mm diam., internodes 0.5–10 cm long, separated by prominent leaf scars, epidermis smooth, papery, detaching from the underlying tissue in air-dried specimens. Clasping roots sparse, minutely pubescent. Cataphylls and prophylls soon drying and degrading to papery masses then disintegrating to leave a few tough fibres, later falling. Foliage leaves evenly distributed, lower leaves falling and thus leaves tending to become clustered distally. Petiole 34–40 cm × 5–15 mm, canaliculate, smooth, air-drying pale brown; apical geniculum 25–3 × 4–6 mm, basal geniculum 3.5 × 1 cm, both genicula slightly greater in diameter than petiole, drying shrunken to less than petiole diameter and with the apical geniculum almost black; petiolar sheath extending to the base of the apical geniculum, at first sub-membranaceous, soon drying and degrading into long, adherent, scurfy papery strips and robust simple fibres, then falling to leave a prominent, somewhat corky mid-brown scar. Lamina 25–49 × 11–18.5 cm, entire, oblique-oblong to oblique-elliptic or -ovate, slightly falcate, sub-coriaceous, apex acute, apiculate, base unequal, wider side rounded to sub-truncate, narrower side sub-acute, decurrent, air-drying pale to mid-brown with the abaxial surface slightly glaucous; primary lateral veins simple but conspicuously longitudinally grooved basally, 35–40 per side, c. 1 cm distant, diverging from midrib at c. 75°, interprimary veins remaining sub-parallel to primary vein, all higher order venation reticulate, rather conspicuous in dried material; midrib moderately impressed above, triangular and prominently raised beneath, lower order venation flush or nearly so above and beneath in fresh material but intermittently raised and conspicuous in dried specimens. Inflorescences usually several together, first inflorescence subtended by a fully developed foliage leaf often with a much expanded petiolar sheath and a swiftly disintegrating long-attenuate cataphyll, subsequent inflorescences each subtended by a robust prophyll and enclosed by a large long-attenuate cataphyll during development, inflorescences at anthesis naked to partially obscured by sheet-like and solitary fibres. Peduncle 3–6 cm × 4–8 mm, slender, terete, laterally compressed. Spathe canoe-shaped, short to long-beaked, up to 14.5 × 10 cm when pressed flat, exterior dark cream, yellow or orange yellow, interior dull yellow, air-drying mid-brown black. Spadix 8–13.5 × 1.5–2 cm, sessile, cylindrical, bluntly tapering towards the apex, air-drying mid-brown. Flowers 2–14 mm diam.; ovary 7–9 × 2.5–4 mm, cylindrical, basal part laterally compressed; ovules 4; stylar region 2–2.5 × 2–5 mm, trapezoid in air-dried post-anthesis material, somewhat feeble, apex flattened, margins slightly raised in dry material; stigma slightly elongate, 0.75–1.5 diameter, circumferential; stamens 4; filaments 5 × 1 mm; anthers narrowly ellipsoid, 3–5 × 0.75–1 mm. Fruit green, stylar region weakly developed. Seeds c. 3 × 4 mm.

Distribution — Indonesia (Sulawesi).

Habitat — *Eucalyptus deglupta*-dominant rain forest on alluvial soil, stream sides, montane Fagaceae and *Eugenia* forest; altitude 1000–1700 m.

Note — *Alston 15758* (BO) notes “spathe apricot-yellow, sweet scented”.

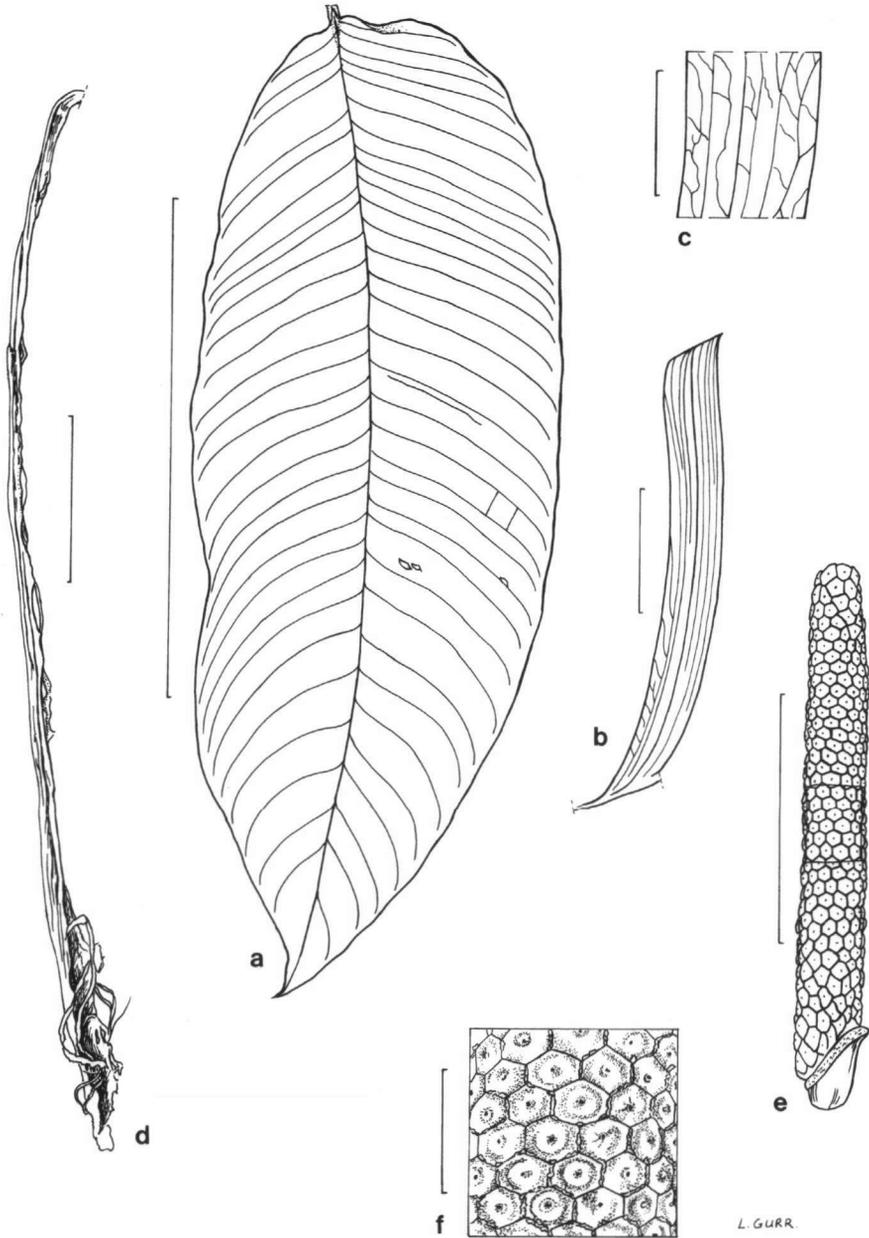


Fig. 4. *Epipremnum nobile* (Schott) Engl. a. Lamina, upper surface; b. venation between two primary lateral veins; c. venation; d. petiole; e. inflorescence, spathe fallen; f. spadix (a–f: *Forman* 289). — Scale bar to a = 9 cm; to b = 4 cm; to c & f = 1 cm; to d = 3 cm; to e = 6 cm.

6. *Epipremnum pinnatum* (L.) Engl. — Fig. 5

- Epipremnum pinnatum* (L.) Engl. in Engl., Pflanzenz. 37 (IV.23B) (1908) 60. — *Pothos pinnata* L., Sp. Pl., ed. 2 (1763) 1374. — *Monstera pinnata* (L.) Schott, Wien. Zeit. Kunst, Literatur, Theater, Mode, 4th Quartal (127) (1830) 1028. — *Scindapsus pinnatus* (L.) Schott in Schott & Endlicher, Melet. Bot. (1832) 21. — *Rhaphidophora pinnata* (L.) Schott, Prod. Syst. Aroid. (1860) 385. — Type: *Appendix laciniata* Rumph., Herb. Amb. 5 (1747) 489, t. 183, f. 2.
- Pothos caudatus* Roxb., Fl. Ind. (1832) 436. — *Scindapsus caudatus* (Roxb.) Schott in Schott & Endlicher, Melet. Bot. (1832) 21. — Type: Cultivated Calcutta Botanic Garden (not traced).
- Pothos pinnatifidus* ('*pinnatifida*') Roxb., Fl. Ind. 1 (1832) 437. — *Monstera pinnatifida* (Roxb.) Schott, Wien. Zeit. Kunst, Literatur, Theater, Mode, 4th Quartal (127) (1830) 1028. — *Scindapsus pinnatifidus* (Roxb.) Schott in Schott & Endlicher, Melet. Bot. (1832) 21. — Type: Cultivated Calcutta Botanic Garden (not traced).
- Scindapsus dilaceratus* C. Koch & Sello, Ind. Sem. Hort. Bot. Berol., App. (1853) 5. — *Monstera dilacerata* (C. Koch & Sello) C. Koch, Ind. Sem. Hort. Berol., App. (1855) 5. — *Tornelia dilacerata* (C. Koch & Sello) Schott, Prodr. Syst. Aroid. (1860) 356. — Type: Cultivated Berlin Botanic Garden (B† holo; K iso), syn. nov.
- Epipremnum mirabile* Schott, Bonplandia 5 (1857) 45. — Type: Schott, Gen. Aroid. (1858) t. 79.
- Epipremnum elegans* Engl., Bull. Soc. Tosc. di Ort. 4 (1879) 269. — Syntypes: *Beccari PP 472* (FI; erroneously cited as *PP 442* in protologue), Papua New Guinea, Soron, June 1872; *Beccari PS 46* (FI), Indonesia, Sulawesi Tenggara, SE from Lepo-Lepo towards Kendari, July 1874.
- Epipremnum crassifolium* Engl., Bot. Jahrb. Syst. 25 (1898) 12. — *Rhaphidophora crassifolia* (Engl.) Alderw., Bull. Jard. Bot. Buitenzorg III, 1 (1920) 382, comb. illeg., non *R. crassifolia* Hook. f., 1893. — *Rhaphidophora rosenburghii* Furtado, Gard. Bull. Straits Settle. 8 (1935) 8. — Type: *Engler 4006* (B holo; B, spirit, iso), cultivated Bogor Botanic Garden 1896, syn. nov.
- Epipremnum mirabile* Schott forma *multisectum* Engl., Bot. Jahrb. Syst. 25 (1898) 12. — *Epipremnum pinnatum* (L.) Engl. forma *multisectum* (Engl.) Engl. in Engl., Pflanzenz. 37 (IV.23B) (1908) 63. — Type: *Engler s.n.* (B† holo), cultivated Bogor Botanic Garden 1896.
- Rhaphidophora merrillii* Engl., Bot. Jahrb. Syst. 37 (1905) 115. — Syntypes: *Copeland PNH 335* (B; K, PNH† iso), Philippines, Mindanao, Davao, March 1904; *Elmer PNH 5539* (B; K, PNH† iso), Philippines, Luzon, La Union, Bauang, Feb. 1904. As explained elsewhere in this paper, the Philippine populations of *E. pinnatum* require a separate study to resolve their status. Given the varied nature of the syntypes cited by Engler, no attempt at lectotypification will be made here.
- Epipremnum merrillii* Engl. & K. Krause in Engl., Pflanzenz. 37 (IV.23B) (1908) 137. — Type: *Curran BS 5883* (B holo; PNH† iso), Philippines, Luzon, Zambales, Jan. 1907.
- Epipremnum angustilobum* K. Krause, Bot. Jahrb. Syst. 45 (1911) 659. — Type: *Fenix 12587* (B holo; PNH† iso), Philippines, Luzon, Benguet, Sablang, Nov.–Dec. 1910.
- Epipremnum elegans* Engl. forma *ternatensis* Alderw., Bull. Jard. Bot. Buitenzorg III, 4 (1922) 169. — Type: *Beguin 939* (BO holo), Indonesia, Maluku, Pulau Ternate, Kota Baru ('Baroe'), 13 Oct. 1920.
- [*Epipremnum glaucicephalum* Elmer, Leaf. Philipp. Bot. 10 (133) (1938) 3620. — Voucher: *Elmer 15135* (BM, K, MO, PNH†), Sorsogon, Irosin, Mt Bulusan, Nov. 1915; nom. inval., descr. angl.]

Large root-climber to 15 m. Pre-adult plant usually forming modest terrestrial colonies. Adult plant with stem 5–40 mm diam., internodes 2–25 cm long, separated by quite prominent leaf scars, though these often obscured by prophyll, cataphyll and petiolar sheath fibre, stems lustrous green with prominent irregular longitudinal whitish crests, older stems with distinctive matt to sub-lustrous pale brown papery epidermis, flowering stems often with the terminal portion torn away from climbing substrate and ± plagiotropic. Clasping roots dense, feeding roots rather uncommon, usually strongly adherent to substrate, more rarely free, both root types pubescent, mid- to dark brown, growing tip pale brown-yellow, feeding roots later becoming prominently

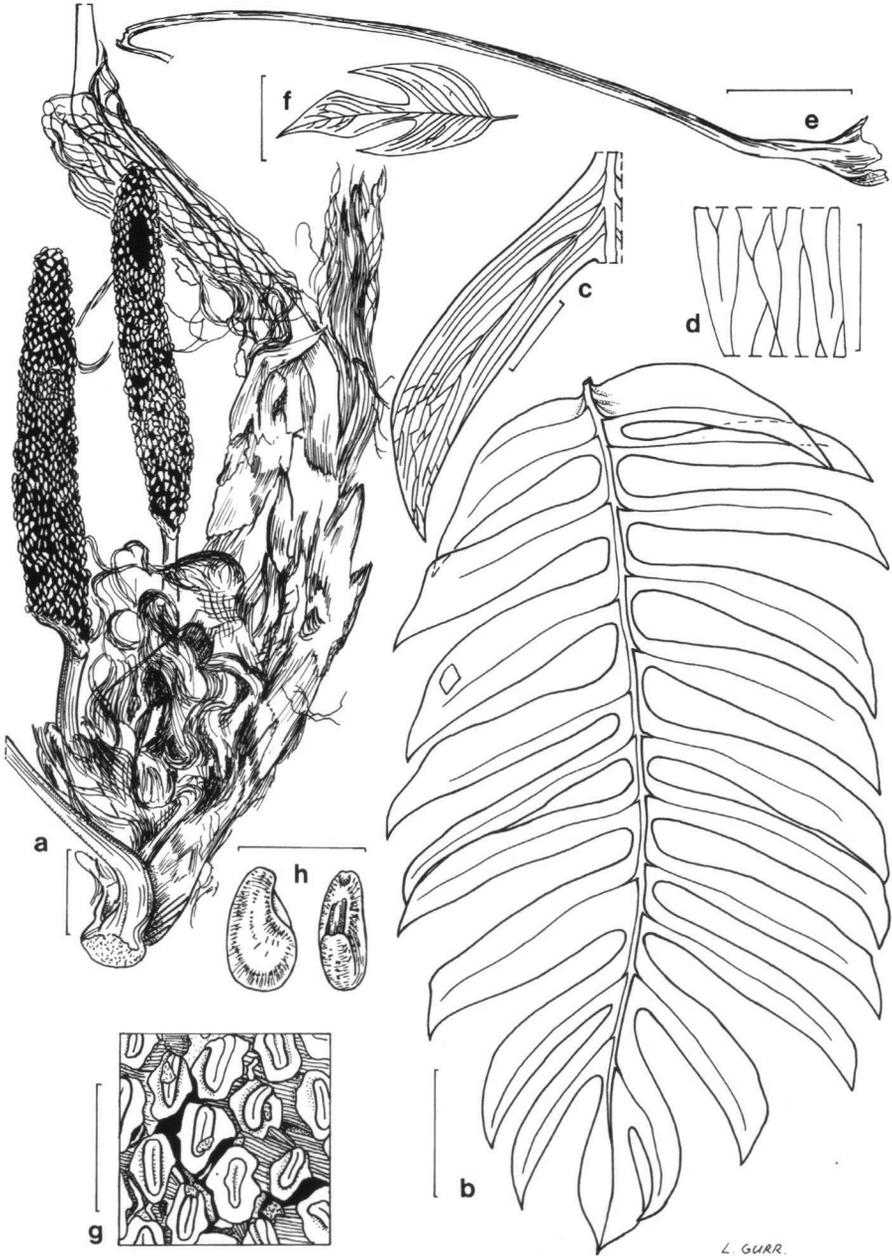


Fig. 5. *Epipremnum pinnatum* (L.) Engl. a. Shoot apex with two developing infructescences; b. lamina; c. venation between two primary lateral veins; d. venation; e. petiole; f. juvenile lamina; g. spadix; h. seed, lateral and ventral views (a, g & h: *Kostermans 18558*, b–e: *Rand 671*; f: *Lucas 15*). — Scale bar to a & c = 3 cm; to b & e = 6 cm; to d = 1 cm; to f = 4 cm; to g & h = 5 mm.

lenticellate. Cataphylls and prophylls soon drying and then degrading to prominent netted sheaths, these \pm long-persistent and \pm densely clothing upper stem before eventually decaying (but see Hay, 1990: pl. Xia). Foliage leaves somewhat scattered on lower stem, becoming somewhat clustered distally. Petiole 19.5–60 cm \times 3–13 mm, canaliculate, smooth, dark green, air-drying mid- to dark brown and longitudinally sulcate; apical geniculum 16–70 \times 3–5 mm, smooth, basal geniculum 3–7 \times 1–1.5 cm, both genicula greater in diameter than petiole, drying shrunken to less than petiole diameter, dark and often with many lamellae-like ridges; petiolar sheath extending to half way along the apical geniculum, at first membranaceous, soon drying chartaceous, then disintegrating into untidy partially netted fibres, later falling to leave a \pm smooth, mid-brown scar; lamina 10–93 \times 5–60 cm, regularly pinnatifid to (rarely) entire, ovate to oblong-elliptic in outline, sub-membranaceous, apex acute to acuminate, base rounded to slightly cordate, divisions pinnatifid to pinnatisect, rarely midrib \pm naked at sinus; pinnae 1.2–6.5 cm wide, apex truncate to acute, terminal pinna weakly sinuous, many individuals with minute to somewhat well developed pellucid dots especially adjacent to the midrib in leaves just beginning to display pinnae, pellucid dots often perforating and enlarging, sometimes extending to lamina margin (then fenestrations often additional to fully developed pinnae), lamina lustrous dark green, rarely slightly to intensely blue-green and glaucous above, paler beneath, pinnae each with 1 (rarely more except for the terminal pinna) compound primary lateral vein and several to rather many interprimary veins, these diverging from midrib at c. 75°, individual elements of the compound vein diverging at c. 10° from various points along the pinna, the compound vein becoming progressively finer towards the pinna tip, interprimary and secondary venation mostly remaining sub-parallel to compound primary vein, some weaker elements further dividing and becoming sub-reticulate, all higher order venation conspicuously reticulate, midrib impressed above, very prominently raised beneath, lower order venation slightly impressed to almost flush above, variously raised beneath, higher order venation flush above, flush or nearly so beneath in fresh material but raised and rather conspicuous in dried specimens. Inflorescence solitary, more rarely two or more together, first inflorescence subtended by an usually fully developed foliage leaf and a very swiftly disintegrating cataphyll, at anthesis \pm naked to partially or almost completely obscured by netted and sheet-like fibres. Peduncle 5.5–21.5 cm \times 4–10 mm, stout, terete, pale green. Spathe canoe-shaped, stoutly attenuate to 15 mm, opening almost flat at anthesis, 7–23.5 \times 3–15 cm when pressed flat, exterior green, later dull greenish yellow to mid-green, interior dull yellow or pale green (reported as white by some collectors) at anthesis, air-drying dark brown, no detectable odour when fresh. Spadix 8.5–25 \times 1.1–3.5 cm, sessile, cylindrical, bluntly tapering towards the apex, base slightly obliquely inserted, white when young, glaucous grey-green to greenish cream, dark yellow to green or greenish white at anthesis, air-drying almost black. Flowers 3–7 mm diam.; ovary 4–12 \times 2–7 mm, cylindrical, basal part slightly compressed; ovules 2 or 3; stilar region 3–7 \times 1.5–4 mm, trapezoid, rather robust, apex flattened, margins somewhat raised in dry material; stigma linear, 2–6 \times 0.1–0.5 mm, longitudinal; stamens 4; filaments 5 \times 1 mm; anthers narrowly ellipsoid, 1.5–2 \times 0.75–1 mm. Fruit mid-green (prominently glaucous in *Kostermans 21806*, L), stilar region greatly enlarged, ovary cavity with seeds embedded in sticky orange-red pulp. Seeds 4.5 \times 3.5 mm, pale to mid-brown.

Distribution — Bangladesh, India (Andaman Islands), Myanmar, Thailand, Vietnam, Laos (?), China (Hainan), Hong Kong, Taiwan, Japan (Ryukyu Islands, Ogasawara Gunto [Bonin Islands]), Malaysia (Peninsular, Sabah, Sarawak), Singapore, Indonesia (Java, Maluku, Nusa Tenggara, Sulawesi, Sumatra), Philippines, Solomon Islands, Vanuatu, New Caledonia, New Guinea, Australia (Queensland), Marshall Islands, Belau Islands, Fiji, Tonga, Cook Islands, Western Samoa.

Habitat — Primary and secondary dense to open lowland to upper hill rain and monsoonal forest, weeds of rubber plantation, growing occasionally on rocks and in coastal forest, on a variety of substrate including granite, andesite and limestone; altitude 1–1600 m.

Notes — 1. *Epipremnum pinnatum* is a widespread and variable species; hence its extensive Malesian synonymy. However, there are several elements which, given more intensive study, might warrant taxonomic recognition. In particular various of these elements from the Philippines seem to differ by, e.g., consistently larger stature and pinnatisect leaf division. Current herbarium material is inadequate to resolve these plants' status and more field observations are needed.

2. Sterile herbarium material lacking the pre-adult stage may prove difficult to distinguish from the complex of taxa centred on *Rhaphidophora korthalsii* Schott. Mature leaves of 'typical' *R. korthalsii* almost always have more than one primary lateral vein per pinna. The stems of *R. korthalsii* lack the prominent irregular whitish longitudinal crests and older stems the distinctive matt to sub-lustrous pale brown papery epidermis typical of *E. pinnatum*. The feeding roots of *R. korthalsii* are prominently scaly while those of *E. pinnatum* are lenticellate-corky. The pre-adult stage of *R. korthalsii* is a shingle climber with oblong-elliptic to ovate, slightly falcate upwards pointing leaves overlapping in the manner of roof tiles.

3. Fertile material of *R. korthalsii* and *E. pinnatum* is readily separated by the shape of the style apex (round to oval versus trapezoid) and the shape and orientation of the stigma (punctiform and circumferential versus linear and longitudinal) and, if fruits are mature, by seed characters. *Epipremnum pinnatum* has fruits with two large, strongly curved seeds with a bony and ornamented testa. The fruits of *R. korthalsii* each contain many small ellipsoid seeds with a brittle, smooth testa.

4. *Epipremnum pinnatum* also resembles *Rhaphidophora tetrasperma*, a species restricted to the northern Malay Peninsula (Perak, Kelantan) and the extreme south of Peninsular Thailand (Naratiwhat). *Rhaphidophora tetrasperma* has swiftly falling prophylls, cataphylls, and petiolar sheaths (i.e. 'clean' stems), a shingling juvenile stage and punctiform, circumferential stigmas.

5. Confusion may occur between *E. pinnatum* and sterile *Amydrium magnificum* and *A. zippelianum*. The often quoted 'difference' between *Epipremnum* and *Amydrium*, that of reticulate versus parallel-pinnate higher order venation, is really a question of degrees of difference since both *E. pinnatum* and *Amydrium* have essentially the same venation patterns (parallel primary and reticulate higher veins). However, both *A. magnificum* and *A. zippelianum* have one primary lateral vein and two prominent interprimary veins (one on each side) per pinna; *E. pinnatum* has one primary lateral vein per pinna and the interprimaries are not particularly conspicuous. The leaflet tips of the *Amydrium* species are acute to acuminate, those of *E. pinnatum* truncate with the distal margin extended into a fragile thread of tissue. A further distinguishing fea-

ture concerns the petiolar sheath. *Epipremnum pinnatum* has the sheath extending to half way along the apical geniculum while in both the *Amydrium* species the sheath only reaches to the top of the basal geniculum, the remainder of the petiole being terete with two sharply defined low keels running its length to merge with the base of the leaf lamina.

6. Croat & Grayum (1987) discussed *Monstera dilacerata* (C. Koch & Sello) C. Koch [syn. *Scindapsus dilaceratus* C. Koch & Sello, *Tornelia dilacerata* (C. Koch & Sello) Schott], a name applied by Madison (1977) to a number of different pinnatifid-leaved *Monstera* species (fide Croat & Grayum pers. comm.), and concluded that since the type specimen of the basionym (*Scindapsus dilaceratus*), deposited in Berlin, is missing and presumed lost, its true identity would probably remain unknown. However, N.E. Brown prepared a drawing of the type (K) that shows it to be an exact match for the pre-adult stage of *E. pinnatum*, even to the pellucid dots next to the mid-rib. Further, on a copy (K) of an article by Brown (1882) dealing with *E. mirabile* (= *E. pinnatum*) there is a note in the margin adjacent to the discussion of *Monstera dilacerata*, in Brown's hand and dated April 1885, stating "I now believe that *Monstera dilacerata* Koch is identified with *Epipremnum mirabile* Schott." Grayum (pers comm.) reports a similar note, also in Brown's hand, on a duplicate of *E. pinnatum* in MO. *Scindapsus dilaceratus* and its derived names are here added to the synonymy of the earlier *E. pinnatum*.

7. *Rhaphidophora lacera* Hassk., occasionally cited as synonymous with *E. pinnatum*, is referable to *Rhaphidophora pertusa* (Roxb.) Schott, a species endemic to southern India and Sri Lanka (see Nicolson, 1988 and Hay, 1993 for discussion).

8. Maliwanag (111, PNH) notes that *E. pinnatum* is used to blacken the teeth.

7. *Epipremnum pinnatum* cv. Aureum

Epipremnum pinnatum (L.) Engl. cv. Aureum [see Nicolson, Allertonia 1 (1978) 347]. — *Pothos aureus* Linden & André, Ill. Hort. 27 (1880) 69. — *Scindapsus aureus* (Linden & André) Engl. in Engl., Pflanzenr. 37 (IV.23B) (1908) 80. — *Rhaphidophora aurea* (Linden & André) Birdsey, Bailey 10 (1963, '1962') 159. — [*Rhaphidophora aurea* (Linden & André) Furtado, Gard. Bull. Singapore 20 (1964) 379, comb. superfl.] — *Epipemnum aureum* (Linden & André) G.S. Bunting, Ann. Missouri Bot. Gard. 50 (1964, '1963') 28. — Type: Ill. Hort. 27 (1880) pl. 381.

Very large root-climber to 16 m. Pre-adult plant usually forming modest terrestrial colonies. Adult plant with stem 5–40 mm diam., internodes 2–30 cm long, separated by prominent leaf scars, with prominent irregular whitish longitudinal crests, older stems with distinctive matt to sub-lustrous orange-brown papery epidermis, growing stems mid-green to pale yellow-green, occasionally with obscure large dull yellow to white variegations. Flagellate foraging shoots common, these arising high in the canopy and reaching the ground. Aerial roots of two types, clasping roots densely arising from nodes and internodes, feeding roots prolific, both strongly adherent to substrate and free, both root types pubescent, mid- to dark brown, growing tip pale brown-yellow, feeding roots later prominently lenticellate. Cataphylls and prophylls soon drying and then degrading to netted sheaths, these sparsely clothing upper stem and mostly soon falling. Foliage leaves scattered on lower stem, becoming clustered distally. Petiole 19.5–50 cm × 3–15 mm, canaliculate, smooth, mid-green to rather bright yellow-green,

air-drying mid- to dark brown; apical geniculum 16–50 × 3–8 mm, smooth, basal geniculum 3–7 × 1–1.5 cm, both genicula barely or not greater in diameter than petiole; petiolar sheath extending to up to mid-way along apical geniculum, at first sub-membranaceous, soon drying chartaceous and degrading to untidy, slightly netted weak fibres, then falling to leave a smooth, mid-brown scar. Lamina 10–93 × 5–60 cm, entire to irregularly pinnatifid, ovate to elliptic in outline, sub-coriaceous, apex acute to acuminate, base moderately cordate, divisions pinnatifid to pinnatipartite; pinnae up to half the length of the lamina wide, apex truncate; terminal pinna, if present, smooth-margined, some leaves with few minute pellucid dots adjacent to the midrib in leaves, pellucid dots rarely perforating and almost never enlarging, lamina dull to somewhat glossy mid-green; slightly paler beneath, usually irregularly yellow or white variegated, rarely entirely mid-green; pinnae each with 1 (very rarely more except for the terminal pinna) compound primary lateral vein and several to rather many interprimary veins, these diverging from midrib at c. 70°, individual elements of the compound vein diverging at c. 10° from various points along the pinna, the vein thus becoming finer towards the margin; interprimary and secondary venation mostly remaining sub-parallel to compound primary vein, some weaker elements further dividing and becoming sub-reticulate, all other higher order venation conspicuously reticulate, midrib impressed above, very prominently raised beneath, lower order venation slightly impressed to almost flush above, variously raised beneath, higher order venation flush above, flush or nearly so beneath in fresh material but raised and rather conspicuous in dried specimens. Inflorescences several together, first inflorescence subtended by an usually fully developed foliage leaf and a swiftly disintegrating cataphyll, at anthesis partially to almost completely exposed. Peduncle c. 6 cm × 10–15 mm, stout, terete, pale green to yellow-green. Spathe canoe-shaped, shortly acuminate, spreading wide at anthesis and margins reflexing, c. 15 × 6–7 cm when pressed flat, exterior green, later whitish, interior whitish, air-drying dark brown. Spadix 17–19 × 2–3 cm, sessile, cylindrical, bluntly tapering towards the apex, the base slightly obliquely inserted, whitish, air-drying almost black. Flowers 3–5 mm diam.; ovary 4–6 × 3–5 mm, cylindrical, basal part slightly compressed; ovules 2; stylar region 3–5 × 2.5–5.5 mm, trapezoid, rather robust, apex flattened, margins somewhat raised in dry material; stigma linear, 2–6 × 0.1–0.5 mm, longitudinal; stamens 4; filaments c. 6 × 0.5 mm; anthers narrowly ellipsoid, c. 1.5 × 0.75–1 mm.

Distribution — Unknown in the wild, alleged to have originated in the Solomon Islands.

Habitat — Unknown in the wild. Where it escapes in Malaysia it grows in damp evergreen forest and abandoned rubber plantations at low altitudes.

Notes — 1. Described from cultivated material alleged to have originated in the Solomon Islands, *E. pinnatum* cv. Aureum has a tortuous nomenclatural history. It was first published as *Pothos aureus* (Linden & André, 1880) based on sterile pre-adult material. The curious choice of generic placement, given the manifestly different appearance of the plant to any species of *Pothos* as then circumscribed, remained unchallenged until Engler (Engler & Krause, 1908) removed the species, still unflowered, to *Scindapsus*. His generic choice was influenced by the plants' overall appearance. There it remained until Birdsey (1962) reported the first recorded flowerings, in Puerto Rico and at the Fairchild Tropical Garden, Florida, and thus for the first time

the critical ovule characters that showed the plant to belong to *Epipremnum* sensu Engler & Krause (1908). However, Birdsey chose to follow Bakhuizen's (1958) generic ideas and transferred *Pothos aureus* to *Rhaphidophora* as *R. aurea*. Furtado (1964), unaware of Birdsey's publication, published the same combination when reporting the flowering of "*P. aurea*" in Singapore. Furtado based his generic placement upon D.H. Nicolson's hand-written annotations to Engler & Krause's (1908) key (Nicolson then also followed Bakhuizen's generic concepts). Bunting (1964), transferring *P. aureus* to *Epipremnum*, remarked that "flowering material is very similar to that of *E. pinnatum*, and must be included in that genus." He went on to reiterate the characters he regarded as distinct for *Epipremnum* compared with *Rhaphidophora*. Nicolson's (1978) paper discussing *E. aureum* and *E. pinnatum* stated that there were insufficient differences for them to remain distinct species and concluded by proposing that *E. aureum* be regarded as cultivar of *E. pinnatum*. In the same paper Nicolson also laid to rest the long-standing nomenclatural problems associated with the names *Epipremnum* and *Rhaphidophora* that formed the cornerstone of Bakhuizen's paper (Bakhuizen, 1958). Nicolson's 1978 generic circumscription and cultivar status of 'aureum' have since been incorporated into floras of Fiji and Sri Lanka (Nicolson, 1979, 1988) and various checklists (e.g. Hay et al., 1995).

2. The wild provenance of cv. Aureum is unresolved. The type description of *Pothos aureus* states that the original plant came to Linden's garden from the Solomon Islands, but this cannot be substantiated. Certainly cv. Aureum appears never to have been collected in the wild and the possibility exists that it is a horticultural selection of *E. pinnatum*. Such selections, looking radically different to the progenitor, are common in some plants (*Codiaeum*, *Polyscias*, etc.) and when seen in isolation appear highly distinct. Plant hunters of the nineteenth century were often on the lookout for horticultural novelties and it is possible that cv. Aureum was gathered from cultivation somewhere in the Solomon Islands.

3. There exists a suite of vegetative characters that consistently separate *E. pinnatum* and cv. Aureum. Based on observations made in Zone 1 of the Tropical Conservatory at Kew, at the Forest Research Institute Malaysia, Kepong and in Bogor Botanic Garden, Java the following can be stated. Beginning at the earliest observed stage, that of young pre-adult plants, the leaf laminae are different in shape and texture. Those of cv. Aureum are ovate to ovate-lanceolate and thicker in texture than the lanceolate to elliptic pre-adult leaves typical of *E. pinnatum*. As plants progress through the pre-adult stage and approach maturity more differences become apparent. The distinctive netted sheath-remains usually present in *E. pinnatum* are absent in cv. Aureum while the leaf lamina 'pin-holes' characteristic of *E. pinnatum* are far fewer in number, do not develop to any degree and hardly ever perforate. Leaf division by means of pinnation is sporadic and occurs only as solitary to few irregular rather shallow pinnations. Leaf texture remains consistently thicker than for *E. pinnatum* and leaf lamina shape remains more-or-less constant, the lamina simply increasing in size and not perceptibly altering shape. Massive flagellate foraging shoots develop, often in some quantity, and a profusion of prominently lenticellate robust feeding roots is produced, many of which remain hanging free and reach the ground. Overall the plants are considerably more robust and produce many climbing stems (*E. pinnatum* is generally noticeably less robust and few-stemmed). The observations made at the Forest

Research Institute Malaysia, Kepong and Bogor Botanic Garden, Java support those at Kew. All the characters observed at Kew were seen in large numbers of plants of both *E. pinnatum* and cv. Aureum growing in a variety of situations. Most notably, several plants of cv. Aureum with entirely green leaf laminae were observed that retained the distinctive overall appearance of the variegated plants. Furtado's comment that the variegated plant 'reverts' to the typical green plant in shady situations was not supported by my observations in Bogor where mature variegated plants were often seen in deep shade and adult green plants could be seen in full sun. This suggests that the green forms are somatic segregates from the variegated chimera. Most literature emphasises the shy-flowering nature of cv. Aureum. Enquiries at Bogor confirmed that both the variegated and the wholly green plants of cv. Aureum cultivated there are shy-flowering. This is in marked contrast to *E. pinnatum* which flowers profusely wherever it occurs in the wild and in cultivation.

8. *Epipremnum silvaticum* Alderw.

Epipremnum silvaticum Alderw., Bull. Jard. Bot. Buitenzorg III, 1 (1920) 377. — Type: *Lörzing* 3295 (BO holo), Indonesia, Sumatra, Lubuk Pakam (Loeboeq Pakam), 26 Oct. 1914.

Slender root-climber to 6 m. Adult plant with stem 5–10 mm diam., internodes 0.5–2 cm long, separated by somewhat prominent leaf scars. Cataphylls and prophylls soon drying and falling. Petiole 3–6 cm × 2–4 mm, canaliculate; apical geniculum c. 10 × 3 mm, basal geniculum c. 10 × 4 mm; petiolar sheath extending to the base of the leaf lamina, sub-membranaceous, soon drying and falling. Lamina 10–18 × 3.5–6 cm, entire, unequal-oblancoate, sub-coriaceous, apex shortly acuminate, base unequal-subacute, air-drying strongly discoloured, adaxial surface deep black-brown, abaxial surface pale brown; primary lateral veins simple, c. 10 per side, c. 2 cm distant, diverging from the midrib at 40°, interprimary veins remaining sub-parallel to primary vein; midrib impressed above, rather prominently raised beneath, lower order venation slightly impressed to almost flush above, variously raised beneath, higher order venation flush above, raised and rather conspicuous in dried specimens. Inflorescence solitary (always?). Peduncle c. 1 cm, slender, terete. Spathe unknown. Spadix 17.5 × 5–7.5 mm (broken), almost sessile, obtuse-clavate-cylindrical. Flowers 4–8 mm diameter; stamens not observed; ovary 7–12 × 3–8 mm, truncate-obovoid, basal part laterally compressed; ovules 3–7; stylar region 2–4 × 2–8 mm, trapezoid, apex flattened; stigma linear, 2–6 × 0.1–0.5 mm, longitudinal. *Seeds* c. 4 × 3 mm.

Distribution — Indonesia (Sumatra). Known only from the type.

Habitat — Swampy forest. 20 m.

EXCLUDED SPECIES

Epipremnum asperatum Engl., Bull. Soc. Tosc.ortic. 4 (1879) 270. — Syntypes: *d'Albertis s.n.* (FI), Papua New Guinea, Fly River; *Beccari PM s.n.* (FI), Indonesia, Maluku, Pulau Ternate.

Note — Synonym of *Amydrium zippelianum* (Schott) Nicolson (see Nicolson, 1968).

Epipremnum beccarii Engl., Bull. Soc. Tosc.ortic. 4 (1879) 269. — Type: *Beccari PB 832* (FI holo), Malaysia, Sarawak.

Note — Synonym of *Rhaphidophora beccarii* (Engl.) Engl. (see Hay et al., 1995).

Epipremnum elmerianum Engl in Engl., Pflanzenr. 37 (IV.23B) (1908) 66. — Type: *Elmer 7295* (B† holo; BO, G iso), Philippines, Leyte, Palo, Jan. 1906.

Note — Synonym of *Amydrium magnificum* (Engl.) Nicolson (see Nicolson, 1968).

Epipremnum foraminiferum Engl., Bot. Jahrb. Syst. 25 (1898) 11. — Type: Bogor Botanic Garden (B† holo).

Note — Synonym of *Rhaphidophora foraminifera* (Engl.) Engl. (see Hay et al., 1995).

Epipremnum grandifolium (Engl.) Engl. in Engl., Pflanzenr. 37 (IV.23B) (1908) 56.

— *Scindapsus grandifolius* Engl., Bot. Jahrb. Syst. 25 (1898) 13. — Type: cultivated Bogor Botanic Garden (B† holo).

Note — In publishing *Scindapsus grandifolius* Engler used the characters of a single ovule on a basal placenta and a more-or-less straight embryo to decide generic placement. Subsequently, during a visit to Bogor Botanic Garden, he collected inflorescences in spirit (now at B) and observed the seeds to be albuminous. At that time (1906) *Scindapsus* was considered to have exalbuminous seeds and *Epipremnum* albuminous seeds. In transferring *Scindapsus grandifolius* to *Epipremnum* Engler clearly placed greater emphasis on seed albumen content than on the more numerous pistil characters, even though by these latter characters *E. grandifolium* is incongruous in *Epipremnum* as defined by Engler. Recent studies of Araceae seed by Seubert (1993) have demonstrated that seeds of *Scindapsus* do in fact contain small quantities of endosperm. Thus the basis of Engler's transfer is diminished and *Scindapsus grandifolius* is here reinstated. However, as noted above (see particularly *E. ceramense* and *E. falcifolium*), the characters usually cited to support the continued maintenance of *Epipremnum* and *Scindapsus* as distinct genera are now much weakened.

Epipremnum humile (Schott) Hook. f., Fl. Brit. India 6 (1893) 659. — Type: *Korthals s.n.* (L). Locality not known with certainty (see Nicolson, 1968).

Note — Synonym of *Amydrium humile* Schott (see Nicolson, 1968).

Epipremnum luzonense K. Krause, Bot. Jahrb. Syst. 45 (1911) 659. — Type: *Ramos BS 10052* (PNH† holo), Philippines, Luzon, Laguna, Paete, July 1909.

Note — Synonym of *Amydrium magnificum* (Engl.) Nicolson (see Nicolson, 1968).

Epipremnum magnificum Engl., Bull. Soc. Tosc.ortic. 4 (1879) 270. — Syntypes: *Beccari PS s.n.* (FI), Indonesia, Sulawesi, Lepo-Lepo near Kandari; *Beccari PP 536* (FI), Papua New Guinea, Andai.

Note — Synonym of *Amydrium magnificum* (Engl.) Nicolson (see Nicolson, 1968).

Epipremnum mampuanum Alderw., Bull. Jard. Bot. Buitenzorg III, 1 (1920) 378. — Type: *van Vuuren sub Alderwerelt 251* (BO holo), cultivated Bogor Botanic garden from specimen collected in Sulawesi, Gn Mampoe.

Note — Synonym of *Amydrium magnificum* (Engl.) Nicolson (see Nicolson, 1968).

Epipremnum medium (Zoll. & Moritzi) Engl. in DC., Monogr. Phan. 2 (1879) 250. — Type: *Zollinger 982* (G holo; FI iso), Indonesia, Java.

Note — Synonym of *Amydrium medium* (Zoll. & Moritzi) Nicolson (see Nicolson, 1968).

Epipremnum minatum Elmer, Leafl. Philipp. Bot. 10 (1938) 3622, nom. nud., descr. Angl. — Based on: *Elmer 1422* (PNH†; US), *Elmer 15113* (US) and *Elmer 16422* (US).

Note — Referable to *Amydrium magnificum* (Engl.) Nicolson (see Nicolson, 1968).

Epipremnum multicephalum Elmer, Leafl. Philipp. Bot. 10 (1938) 3624, nom. nud., descr. Angl. — Based on: *Elmer 16061* (US).

Note — Referable to *Rhaphidophora korthalsii* Schott (see Hay et al., 1995).

Epipremnum philippinense Engl. & K. Krause in Engl., Pflanzenr. 37 (IV.23B) (1908) 137. — Type: *Elmer 7623* (B holo), Philippines, Luzon, Tayabas, May 1907.

Note — Synonym of *Amydrium magnificum* (Engl.) Nicolson (see Nicolson, 1968).

Epipremnum sorsogonense Elmer ex Merr., Enum. Philipp. Flow. Pl. 1 (1923) 177, nom. nud. — Based on: *Elmer 16422* (US).

Note — Referable to *Amydrium magnificum* (Engl.) Nicolson (see Nicolson, 1968).

Epipremnum truncatum Engl. & K. Krause in Engl., Pflanzenr. 37 (IV.23B) (1908) 63. — Type: *Elmer 7291* (B holo; L iso), Philippines, Leyte, Palo, Jan. 1906.

Note — Synonym of *Amydrium medium* (Zoll. & Moritzi) Nicolson (see Nicolson, 1968).

Epipremnum zippelianum (Schott) Engl., Bot. Jahrb. Syst. 1 (1881) 182. — Type: *Zippel s.n.* (L holo).

Note — Synonym of *Amydrium zippelianum* (Schott) Nicolson (see Nicolson, 1968).

SPECIES DUBIA

Epipremnum robinsonii K. Krause, Notizbl. Königl. Bot. Gart. Berlin 5 (1922) 266. — Type: *Robinson BS 9181* (PNH†, duplicates searched for and not found), Philippines, Polillo Island, Aug. 1909.

Distribution — Philippines.

Note—With no surviving type found and no traceable authentic material, the identity of Krause's *E. robinsonii* is unresolved. The leaves are described as regularly pinnatifid. This agrees with four Philippine aroids, viz. *Amydrium medium*, *A. magnificum*, *Epipremnum pinnatum* and *Rhaphidophora korthalsii*. Primary venation is said to be parallel with numerous interprimary veins parallel to the first order venation (“*multis nervis lateralibus II primariis parallelis*”). This effectively removes *Amydrium* from the argument; see above discussion under *E. pinnatum*. The inflorescence described is a substantial structure (“*Pedunculus ... circ. 8 cm longus ... Spadix ... circ. 11 cm longus, 1.8 cm crassus*”) and, coupled with the description of the stigma (“*stigmatē lineari-oblongo*”) and colour notes (“*Spatha extus viridis intus flavescens. Spadix viridis*”) fits *E. pinnatum* better than *R. korthalsii*.

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