The Genus Alocasia (Araceae-Colocasieae) in the Philippines

A. HAY

Royal Botanic Gardens Sydney, Mrs Macquaries Road, Sydney 2000, Australia.

Abstract

The genus *Alocasia* (Schott) G. Don (Araceae) is revised for the Philippine Islands. Fourteen species are recognised, of which four are new to science. A key to the species is provided. All except *Alocasia macrorrhizos* (L.) G. Don are endemic. *Alocasia wenzelii* Merr. is placed in the synonymy of *A. zebrina* Schott ex van Houtte. *Alocasia manilensis* Engl. and *A. warburgii* Engl. are synonyms of *A. heterophylla* (Presl) Merr. *Alocasia reversa* N.E. Brown is Bornean, not Philippine as originally attributed. The new species (*A. boyceana* A. Hay, *A. elypeolata* A. Hay, *A. scalprim* A. Hay and *A. ramosii* A Hay), the frequently misinterpreted *Alocasia heterophylla* and the very rare *A. atropurpurea* Engl. are illustrated. Brief notes are made on horticultural value, conservation status, local endemicity and relationships of Philippines *Alocasia*. Where possible, cultivars recognised by the international horticultural community are ascribed to species.

Contents

Introduction .......................................................................................................................... 1
Conservation status and local endemicity ........................................................................ 2
Horticulture ....................................................................................................................... 3
*Alocasia* .......................................................................................................................... 3
Relationships of the Philippine species .......................................................................... 5
Key to the species in the Philippines ................................................................................ 6
The Philippine species ..................................................................................................... 7
Excluded, dubious or doubtfully Philippine species ...................................................... 36
Misapplied names ............................................................................................................ 38
Acknowledgements ......................................................................................................... 39
References ....................................................................................................................... 39
Index to species ............................................................................................................... 41

Introduction

The genus *Alocasia* includes about 65 species of small herbaceous to massive arborescent pachycaul aroids occurring from Sri Lanka and India, through Indochina to China and southern Japan, the Malesian Archipelago, Australia and Oceania. Malesian, Australian and Oceanian species have
been listed in Hay et al. (1995). The Sri Lankan species were revised by Nicolson (1987). The 14 species in New Guinea and Australia were revised by Hay & Wise (1991). The genus has its principal centre of diversity in Borneo where there are an estimated 23 species including two intractable complexes of extreme variability (Hay, 1998). The Philippines is the second most species-rich subregion in Malesia for this genus, followed by New Guinea. However, New Guinea has three endemic infrageneric groups (Hay & Wise, 1991; Hay, 1994) and represents a somewhat distinct transwallacean enclave, while the Philippine species appear to be of West Malesian and continental Asian affinity. More detailed biogeographical evaluation must await molecular and cladistic analysis of the genus.

As with the genus in other parts of its range, the Philippines species have come to be known scientifically not only through the work of Schott (e.g. 1860), Engler (e.g. 1879) and Engler & Krause (1920), the main botanical specialists in the family, but also through European horticultural channels during the late 19th Century mania for exotic foliage plants and to a lesser extent through general floristic work. A number of species, including the spectacular A. sanderiana W. Bull and A. zebrina Schott ex van Houtte - both once endangered by over-collecting, were described from plants in British and Continental nurserymen’s collections, as was A. sinuata N.E. Brown. More recently, further new species, such as A. chypeolata and A. scalpnum described here, have first come to light through horticultural rather than botanical initiatives. The prodigious Philippine floristic work of Merrill (1912, 1922) and the later and more eclectic Elmer (1938, 1939) brought additional species to light, whereas the earlier Philippine floristic accounts of Blanco (1837 and later editions), had obfuscated matters by the use of superfluous or misapplied names.

Further discussion of general aspects of the genus can be found in Hay (1998) and Hay & Wise (1991).

Conservation Status and Local Endemicity

Six Philippine Alocasia species are known from very few botanical collections and appear to have extremely restricted distributions. Alocasia atropurpurea Engl. is known from just three collections and two localities from northern Luzon, and does not appear to have entered horticultural collections extensively, if at all; A. portei Schott appears to be known only from one wild collection from Laguna Province on Luzon, though this may well be due to undercollecting of this massive plant; A. scalpnum A. Hay, from Samar, is not represented in preserved botanical collections at all, except for its type, cultivated at the Munich Botanic Garden, though it is
well-known to horticultural collectors; *A. sanderiana*, restricted to northern Mindanao, has at least in the past been over-collected for horticultural purposes, and is known from only four preserved collections from the wild; *A. sinuata* is known from a single botanical collection from Mindanao, though material of horticultural origin is attributed also to Leyte and Palawan; *A. clypeolata* A. Hay, also from northern Mindanao, is known botanically only from its type, though this species again is well-known horticulturally. The actual status of these species, with regard to endangerment in the wild, requires verification by local botanists with field access. Most of these species, however, except *A. atropurpurea*, are known to be in horticulture, though more systematic measures for protection may well be desirable.

**Horticulture**

Several Philippine *Alocasia* species are of considerable ornamental interest, and are figured in the horticultural account by Burnett (1984). Some of those cultivated entities he recognised appear to have no counterpart among preserved botanical material and remain undescribed. Burnett illustrated many species, though not always under the correct names, and recognised a number of cultivars. Where correctly named useful illustrations of Philippine species appear in that account, I have cited them.

*Alocasia portei*, of enormous stature and magnificent foliage, is widely cultivated in the tropics and in tropical conservatories of public gardens outside the tropics. *A. sanderiana* has long been in demand for its striking leaves, and has been extensively used in hybridisation programmes. *A. zebrina* is also a fine plant for use in tropical landscaping. The variable *A. micholitziana* Sander has had a number of cultivars selected. *Alocasia scalprum* is, according to Burnett (1984), extensively cultivated in the Philippines as an ornamental pot plant. *A. clypeolata* has also been taken up by specialist horticultural collectors, as have forms of *A. sinuata*, *A. heterophylla* (Presl) Merr., *A. boyceana* A. Hay and *A. ramosii* A. Hay. Some of these have now been tissue cultured (mainly in the U.S.A.) and are commercially available.

**ALOCASIA**


Massive arborescent pachycauls to small decumbent herbs; stems sympodial, more or less cataphylliferous, fleshy, often starch-filled, smooth to tessellated to clothed in marcescent leaf bases, usually bearing short, sometimes branched, mostly subterranean stolons terminating in small cornels; foliage leaves solitary or more usually clustered, glabrous to thickly pubescent, sometimes enormous; petioles sheathing in the lower part, sometimes glandular; leaf blades deeply pinnatifid to hastosagittate, to suborbicular, to narrowly lanceolate, sometimes peltate (almost always in seedlings), often strikingly coloured or of metallic appearance or bullate, membranous to thickly coriaceous; major venation pinnate, running to a sometimes conspicuous submarginal vein, usually with glands in the axils abaxially; secondary venation reticulate, often joining between the primary veins to form interprimary collective veins, but these quite commonly absent and then secondary venation tending towards striate; inflorescences (solitary to) paired and subtended by a prophyll and cataphyll, the pairs either interspersed with foliage leaves (and then appearing lateral) or produced in succession and then forming a cluster in the centre of the leaf crown; peduncles mostly short at anthesis, rarely subequalling the petioles; spathe divided into a persistent lower portion enclosing the ovaries, sterile interstice and sometimes part of the male zone, the upper portion a deciduous, variously coloured, membranous limb (this persistent in some New Guinea species); spadix monoeccious, protogynous, sometimes stipitate, shorter than to equalling, rarely exceeding the spathe, sometimes partly adnate with the spathe in the lower portion; basal female zone of naked pistils; ovaries unilocular to apically incompletely 4-septate; stigma sessile or on a usually short style, button-like to stellate; placentation basal; ovules several,
anatropous to suborthotropous; distal to the female zone a sometimes attenuate, sometimes very short sterile interstice composed of (sometimes massive) synandrodia; male zone composed of close-packed rhombohexagonal synandria; thecae opening by apical pores, or concealed from above by the expanded over-topping synconnective; spadix terminating in a conspicuous appendix usually composed of elongate sinuous low structures considered homologous with staminodes; fruiting peduncle usually elongating; fruits usually red berries contained within the persistent and enlarged spathe base which eventually dehisces to expose them; seeds ca. 3–5 mm in diam., albuminous, with thin testa.

**Distribution:** About 65 species from IndoMalesia with extratropical extensions into the Himalayas, southern China, southern Japan and eastern Australia. *Alocasia macrorrhizos* and its several varieties are virtually pantropical, naturalised through introduction as ornamental plants and as an inferior starch crop. However, even through much of its Asian range it occurs in close association with human habitation and it may be a cultigen. In Malesia there are 57 species currently recognised, 14 of them in the Philippines.

**Relationships of the Philippine species**

In the present herbarium-based alpha-taxonomic study, most of the Philippine species of *Alocasia* do not fall readily into groups either with each other or with species outside the Philippines. No attempt has been made to treat them under informal group headings, as has been done in previous papers (Hay, 1998; Hay & Wise, 1991). Some affinities are to a certain extent recognisable, however, though nevertheless tenuously at present: *Alocasia sanderiana* and probably *A. boyceana* belong in the mainly West Malesian Longiloba Group (see Hay, 1998); *A. maquilingensis* falls rather clearly into the Puber Group, also West Malesian. *Alocasia atropurpurea*, and other species with membranous peltate leaves – *A. micholitiziana* and *A. clypeolata*, may be allied with continental Asian *A. odora* (Lodd.) Spach. The thick-textured sometimes peltate leaves of *A. sinuata* suggest it may be related to the Bornean endemic Scabriuscula Group. *Alocasia portei* is clearly related to *A. macrorrhizos*. The remaining species do not suggest any particular affinity. Molecular studies are needed throughout the genus to assist in proposing a firm infrageneric classification.
Key to the Species in the Philippines

1a. Leaves all distinctly peltate, with the confluence of leaf blade across the sinus exceeding 5 mm in width ........................................... 2

1b. Leaves not peltate or only some on the plant peltate or confluence of leaf blade across sinus not exceeding 4 mm in width .................. 5

2a. Leaf margin deeply to shallowly sinuate ......................................... 3

2b. Leaf margin not sinuate ................................................................. 4

3a. Leaf blades glossy, petioles subtended by cataphylls ................................................................. 11. A. sanderiana

3b. Leaf blades velvety, petioles not subtended by cataphylls ........................................... 8. A. micholitziana

4a. Blade cordato-sagittate, peltate, with the posterior lobes united only at the base ....................................................... 1. A. atropurpurea

4b. Blade ovato-sagittate, peltate, with the posterior lobes united for most of their length ....................................................... 3. A. clypeolata

5a. Blade deeply pinnatifid; massive plants ........................................ 9. A. portei

5b. Blade with entire to shallowly undulate margin, massive to diminutive plants .................. 6

6a. Blade very broadly cordato-sagittate, ca. 80 cm or more long ............ 7

6b. Blade (sometimes very narrowly) sagittate to hastate, if broadly cordato-sagittate, then small, less than 30 cm long ..................... 8

7a. Leaves glabrous; secondary venation not very prominent abaxially, not forming interprimary collective veins ................... 6. A. macrorrhizos

7b. Leaves densely to sparsely pubescent abaxially; secondary venation prominent abaxially and forming well-defined interprimary collective veins ....................................................... 7. A. maquililingensis

8a. All leaves with posterior costae with lamina to the sinus............... 9

8b. Non-peltate leaves with posterior costae (very reduced in A. scalprum) naked in the sinus .................................................. 10

9a. Robust plants 1-1.8 m tall; leaf blade not bullate; secondary veins not forming subsidiary veins ............................................. 14. A. zebrina
9b. Small plants 40 cm tall or less; leaf blade more or less bullate; secondary venation forming subsidiary veins ........................................ 13. A. sinuata

10a. Posterior lobes about a third or less the length of the anterior lobe; leaves narrowly lanceolate ........................................ 12. A. scalprum

10b. Posterior lobes more than a third the length of the anterior lobe; leaves not narrowly lanceolate ........................................ 11

11a. Sterile interstice composed of very large synandroda occupying upper part of lower spathe cavity; spathe constriction shallow ..................... 12

11b. Sterile interstice not so; spathe constriction abrupt ..................... 13

12a. Posterior lobes diverging at an obtuse to very obtuse angle .................................................................................. 4. A. culionensis

12b. Posterior lobes diverging at an acute angle ......................... 5. A. heterophylla

13a. Posterior lobes ca. two thirds the length of the anterior; stigmas button-like ................................................................. 10. A. ramosii

13b. Posterior lobes ca. half the length of the anterior; stigmas acutely lobed ........................................................................ 2. A. boyceana

The Philippine Species

1. Alocasia atropurpurea Engl.


Moderately robust herb; petiole to ca. 50 cm long, sheathing in the lower third; blade membranous, ovato-sagittate, ca. 40 cm long, very shallowly peltate; anterior lobe ca. 30 cm long x 30 cm wide at base, with about 4 primary lateral veins on each side of the anterior costa diverging at ca. 45–70°; secondary veins flush on both sides of the blade, arising from the primary veins at ca. 70° and then deflected to the margin, not or hardly forming interprimary collective veins; posterior costae diverging at an obtuse angle; posterior lobes ca. half the length of the anterior, rounded, with little laminar tissue on the posterior side of the posterior costae, but this confluent across the sinus; glands in the axils of the primary veins
Figure 1. *Alocasia atropurpurea* Engl.

*MacGregor BS19663* - A: leaf blade; B: inflorescence (part of spathe removed); C: pistils; D: synandria. - Scale: bar to A, B = 5 cm, to C, D = 4 mm.
inconspicuous or absent; inflorescence arrangement [not known]; spathe to ca. 14 cm long; lower spathe ca. 4 cm long, ovoid, asymmetric (due to partial connation with spadix); limb broadly oblong-lanceolate, cucullate, the basal ca. 1 cm deflected and somewhat inflated, then the rest erect, dark purple brown; spadix somewhat shorter than the spathe; female zone ca. 3 cm long, partly connate with spathe in lower third, tapering distally; ovaries globose, rather large, ca. 2.5–3 mm diam. (dry); stigma strongly 3–4-lobed on a very short style; sterile interstice slender, ca. 1 cm long, corresponding with spathe constriction; male zone ca. 3 cm long x 1.3 cm thick (dry); synandria rhombo-hexagonal, ca. 2 mm diam., more or less capped by expanded synconnective; appendix slightly longer than to about twice the length of the male zone, slightly constricted at junction with male zone, thence cylindric and distally abruptly tapering; infructescence unknown.

Distribution: Endemic to northern Luzon, known only from Mt Polis, and an unspecified locality in Bontoc Subprovince.

Habitat: Not recorded.

Notes: This apparently highly distinctive species is poorly known. The inflorescence seems large for the size of the leaves, though the latter may have been collected from conveniently small examples. The female zone partly adnate to the spathe, the large ovaries and purple, rather inflated spathe limb appear diagnostic. Vanoverbergh 3684 has the appendix relatively much longer than other specimens. Alocasia atropurpurea bears some resemblance to continental Asian A. odora (Lodd.) Spach.

Other specimens seen: Luzon, Mountain Province, Mt Polis, Celestino PNH 8014 (GH); Luzon, Bontoc subprov., Vanoverbergh 3684 (P).

2. Alocasia boyceana A. Hay, sp. nov.


Moderately robust herb to ca. 60 cm tall; stem ca. 2 cm diam.; leaves few,
?1–3 together, often subtended by cataphylls; cataphylls papery, lanceolate, to ca. 11 cm long; petiole to ca. 45 cm long, sheathing in the lower third, sometimes maculate; blade rather narrowly sagittate to narrowly hastasagittate, to ca. 35 cm long; anterior lobe to 24 cm long, ca. 11 cm wide at base, with 4–5 primary lateral veins on each side of the anterior costa diverging at 45–80°; margin slightly undulate to entire; primary lateral veins somewhat prominent adaxially and abaxially, with inconspicuous glands in the axis on abaxial side; secondary venation arising from the primary at ca. 70–90° then deflected marginally, not or hardly forming interprimary collective veins; posterior lobes slender, about half the length of the anterior; posterior costae diverging at an obtuse (hastate) to acute (sagittate) angle, naked in the sinus for 1–2 cm; inflorescences paired or solitary; peduncle to ca. 20 cm long; spathe ca. 7.5 cm long; lower spathe ca. 2 cm long, ovoid, separated from the limb by a strong constriction; limb lanceolate, reflexed; spadix somewhat shorter than the spathe, stipitate for ca. 4 mm with the stipe partly adnate to merely obliquely inserted on the spathe; female zone 6–8 mm long; pistils subglobose, ca. 1.5 mm diam.; stigma subsessile, rather sharply 3–4-lobed; sterile interstice about equalling the female zone, tapering distally, its top corresponding with spathe constriction; male zone ca. 12 mm long, cylindric, ca. 5 mm diam.; synandria rhombo-hexagonal, ca. 1 mm diam., opening by apical pores not overtopped by the synconnective; appendix 1.5–1.7 cm long, tapering, composed of irregularly sinuate staminodes, slightly narrower than to equalling the male zone in thickness; infructescence broadly ovoid, ca. 2.4 cm diam.

*Distribution:* Philippines, on Luzon, Cebu, Negros.

*Habitat:* Rain forest at low to medium elevation, sometimes on limestone.

*Notes:* The stipitate spadix, sharply lobed stigmas and cataphylliferous stem with few leaves suggest that *A. boyceana* is a segregate entity of the mainly West Malesian *A. longiloba* Miq. complex.

This species is named for Peter Boyce (K), in recognition of his continuing contribution to knowledge of tropical Asian Araceae.

*Other specimens seen:* Negros, Negros Oriental Province, Dumaguete (Cuernos mts), Elmer 9702 (BO, E, G, K, L, NSW, NY, US); Luzon, Hacienda de Julajala, Loher 2437 (K); Jolo, Mt Dajo, Merrill 5328 (US); Mindanao, Colabato prov., Nutol, Ramos & Edaño BS 84942 (H); Cebu, Seidenschwarz s.n. (M); Cebu, Tagbao, University of San Carlos 145 (L); Luzon, Bataan Province, Lamon R., Whitford 1362 (K, US); Central Luzon, Bataan Province, Mt Mariveles, Lamon River, Williams 794 (NY).
Figure 2. Alocasia boyceana A. Hay

Bogner s.n. - A: leaf and venation; B: inflorescence with part of spathe removed; C: pistils; D: neuter organs of sterile interstice; E: synandria. - Scale: bar to A = 8 cm, to B = 2.4 cm, to C, D, E = 6 mm.
3. Alocasia clupeolata A. Hay, sp. nov.

Ab alis speciebus Alocasis Philippinarum lamina folii parva ovata vel subrotunda valde peltata differt. - TYPUS: Philippines, Mindanao, Surigao Province, Mt Kabatuan, 18 Mar 1949, Mendoza & Convocar PNH 10433 (GH holo, 2 sheets).

[?Alocasia cv. Green Shield; see Burnett, Aroideana 7 (1984) 87, fig. 20].

Small herb to ca. 30 cm tall; stem short, ca. 5 cm long x 2 cm diam. (dry); leaves ca. 6 together; petiole ca. 17 cm long, sheathing in the lower quarter; blade weakly coriaceous, darker near the main veins, ovate to very broadly ovate, 16 x 6.5 cm to 12 x 8 cm; anterior lobe 7–11 cm long, widest ca. quarter of the way from the base, the tip acute to obtuse and then apiculate; anterior costa with 3 primary lateral veins on each side diverging at 45–60°; secondary venation forming irregular interprimary collective veins in the proximal part of the blade, these not formed in the distal portions; all venation flush with the lamina on both sides (dry); posterior lobes ca. 4 cm long, peltate for more than 80% of their length, with the posterior costae subparallel; inflorescences paired amongst the leaves, subtended by oblong lanceolate cataphylls to ca. 5 cm long; peduncle much shorter than the petioles, ca. 5 cm long; spathe white, ca. 6 cm long; lower spathe ca. 1.8 cm long, ovoid; spathe limb broadly lanceolate ca. 4.2 cm long x 1.8 cm wide at the base, at male anthesis with the lower ca. 1 cm sharply reflexed and the rest erect; spadix more or less equalling the spathe, stipitate for ca. 2 mm; female zone subcylindric, ca. 1 cm long x ca. 6 mm diam.; ovaries globose, ca. 1.2 mm diam.; style shorter than ovary, ca. 0.5 mm long; stigma rounded and weakly lobed; sterile interstice ca. 6 mm long x 3 mm diam., composed of rhomboid synandrodia ca. 1.3 mm diam.; male zone 1 cm long x 4 mm diam., subcylindric, narrowed at the base and apex, the base corresponding with the spathe constriction; synandria rhombo-hexagonal, ca. 1 mm diam., of 3–4 connate stamens; thecae opening by apical pores not overtopped by the synconnective; appendix ca. 3 cm long, tapering to a point, covered in low, elongate sinuous irregular sterile organs; infructescence with short peduncle; fruiting spathe subglobose, ca. 2.5 x 1.5 cm.

Distribution: Known botanically from only the type collection made on Mindanao.

Habitat: In rocky soil on a steep slope on forest edge, 80 m altitude.

Notes: This species bears strong resemblance to the plant known in cultivation as Alocasia ‘Green Shield’, illustrated in Burnett, loc. cit., and
Figure 3. Alocasia clypeolata A. Hay

Mendoza & Convocar 10433 - A: habit; B: venation; C: spadix with part of spathe removed; D: synandria. - Scale: bar to A = 4 cm, to B = 2.5 cm, to C = 1 cm, to D = 2 mm.
also commonly grown as ‘Green Cuprea’. *A. clypeolata* appears to differ from this cultivar only in its somewhat smaller leaf dimensions (about half the size of the upper limit reported for the cultivated plant by Burnett). The cultivated plant is said to have the leaf blades lime green with ‘dramatically contrasting black [sic] zones around the primary veins’ (Burnett, 1984: 87). Further colour notes made from the cultivated plant include that the lower part of the spadix is cream to white and the appendix is yellow (Burnett, loc.cit.)

The specific epithet alludes to the leaves shaped like small shields.


Moderately robust herb to ca. 70 cm tall; stem erect, ca. 2 cm thick; leaves several together, not interspersed with cataphylls; petiole to ca. 45 cm long, sheathing in the lower third; blade sagittate to hastate, ca. 35–45 cm long; anterior lobe narrowly triangular to triangular, sometimes with a faintly undulate margin, 10–18 cm wide at base, with 3–5 primary lateral veins on each side of the anterior costa diverging at 60–80°; axillary glands inconspicuous; secondary venation fine, rather distant (ca. 3–4 mm apart), arising from the primary at a wide angle, then rather abruptly deflected to the margin and forming rather disorganised interprimary collective veins only towards the margin, flush with the lamina on both sides; posterior lobes diverging at an obtuse to very obtuse angle, spreading, tapering to sub-rhomboid to narrowly round-ended, 11–20 cm long; posterior costae naked in the sinus for 2–5 cm; inflorescences clustered, ca. 6–8 together, subtended by lanceolate cataphylls ca. 12 cm long; peduncle to ca. 20 cm long; spathe ca. 8–9 cm long; lower spathe 2–3 cm long, separated from the limb by a long gradual constriction; limb narrowly lanceolate, white, eventually reflexed, the tip mucronate for ca. 1 cm, the micro straight; spadix somewhat shorter than the spathe, stipitate for 2.5 mm, the stipe free but obliquely inserted; female zone 5 mm long; ovaries more or less flask-shaped, upturned, ca. 1 mm diam.; style ca. 0.5 mm long; stigma weakly 2–3-lobed; sterile interstice short, ca. 4 mm long, composed of two whorls of massive synandria filling the upper part of the lower spathe cavity; male zone ca. 1.4 cm long, cylindric, ca. 5 mm diam. (dry); synandria rhombo-hexagonal, ca. 1.5 mm diam., thecae opening by apical pores not capped by synconnective; appendix 1.7 cm long, tapering; fruiting spathe ovoid, ca. 3 cm diam.
Distribution: Endemic to the Philippines; Luzon, Palawan, Basilan, Culion, Balabac, Mindoro, Mindanao, Leyte, Busuanga, Panay.

Habitat: Lowland rain forest.

Vernacular name: Urinkokuk (Yakan).

Notes: The isotype sheet at K has, in addition to Merrill 555, a specimen of A. heterophylla with associated label notes of Loher 2442.

This species is very similar to A. heterophylla in inflorescence form, sharing the weakly constricted spathe, flask shaped up-turned pistils beneath massive synandroda occupying the upper part of the lower spathe chamber. It differs in the relatively shorter appendix, relatively longer male zone, the overall larger size of the inflorescences arranged into larger synflorescences, the larger leaves with finer secondary venation and widely diverging posterior lobes that are never peltate. In the herbarium, the two are easily separated in aspect and do not exhibit intergrading. However, the listed differences are somewhat trivial, at least individually. While the distributions of these two species, as recognised here, overlap, A. culionensis has a more southerly emphasis. The matter of distinction of these species may be more satisfactorily resolved by further field work.

Other specimens seen: Basilan, Isabela de Basilan, Ebalo 938 (H); Palawan, Ebalo & Conklin 1275 (H); Sulu Archipelago, Jolo, Siasi, Kondo & Edaño PNH 38757 (H); Busuanga Isl., Malbato, Marche B229 (P); Palawan, Lake Manguao, Merrill 9568 (K, US); Balabac, Dalawan Bay, Olsen 535 (L); Leyte, Dagami, Ramos BS 15353 (US); Mindoro, Paluan. Ramos BS 39602 (K, P, US); Busuanga Isl., Ramos BS 41235 (US); Mindanao, Davao Prov., Mati, Ramos & Edaño s.n. (UC); Panay, Capiz Prov., Jamindan, Ramos & Edaño BS 31264 (BO, L); Balabac Isl, Ramos & Edaño BS 49709 (UC); Luzon, Sorsogon Prov., Mt Bulusan, Sulit PNH 2649 (US).

5. Alocasia heterophylla (Presl) Merr.


Alocasia manilensis Engl., Bot. Jahrb. Syst. 25 (1898) 23; K. Krause & Engl., Pflanzenr. 71 (IV.23E) (1920) 95, fig. 19E & F; Burnett, Aroideana
Small herb to ca. 40 cm tall; stem to ca. 20 cm long, decumbent to creeping, ca. 1.7 cm thick; leaves 3–5 together; petiole to ca. 35 cm long, sheathing in the lower ca. quarter to third; blade to ca. 27 cm long, narrowly (hasto-) sagittate, sometimes shallowly to deeply peltate in adult plants and then some non-peltate leaves also present; anterior lobe to 20 cm long, to ca. 10 cm wide at base, narrowly triangular, with the margin sometimes shallowly sinuate; anterior costa not very prominent abaxially, with 3–4 sometimes opposite primary lateral veins diverging at ca. 45–60° and usually distally deflected towards the leaf tip, then joining a conspicuous submarginal vein situated ca. 3 mm from the margin; secondary venation rather widely spaced (ca. 3 mm) arising from the primary at a high angle, thence mostly abruptly (ca. right angle) deflected towards the margin and forming rather disorganised interprimary collective veins; glands in the axils of primary veins inconspicuous; posterior lobes diverging at an acute angle, narrow, tapering, sometimes distally out-turned; posterior costae naked in sinus for ca. 1.2 cm to peltate for ca. 20% of their length; inflorescences paired, to 4 together; peduncle to ca. 4 cm diam., ca. half the length of the petioles; spathe 5–6.5 cm long; lower spathe narrowly ovoid, 2.5–3 cm long, differentiated from the limb by a rather long gradual constriction; limb narrowly lanceolate, eventually reflexed; spadix ca. three quarters of the length of the spathe, shortly stipitate, with the stipe adnate to the spathe; female zone 0.5–1 cm long, containing few to several flask-shaped pistils; style ca. 0.5 mm, stigma globose; sterile interstice ca. 5 mm long, comprised of massive synandria filling the upper part of the cavity of the lower spathe; male zone ca. 5–8 mm long, subcylindric, ca. 3 mm thick; synandria more or less hexagonal, ca. 1.2 mm diam., opening by apical pores not capped by synconnective; appendix ca. 2 cm long, tapering; infructescence ovoid, ca. 3 cm diam.

**Distribution:** Endemic to the Philippines; Luzon, Mindanao, Polillo. Although Engler cited a specimen (now destroyed) from Sulawesi in the protologue of *A. warburgii*, no other material from Sulawesi is conspecific with the Philippines element.
Figure 4. *Alocasia heterophylla* (Presl) Merr.

*Ramos & Edaño BS 28495* - A: habit; B: venation; C: inflorescence (part of spathe removed).

- Scale: bar to A = 7.5 cm, to B = 6 cm, to C = 2 cm.
Habitat: Lowland rain forest (dipterocarp forest) to ca. 300 m altitude.

Notes: This species is distinguished from A. ramosii by the leaves sometimes peltate in mature plants, the gradually constricted spathe, the massive synandria of the sterile interstice, the more widely separated secondary venation, distally curved primary venation and the conspicuous submarginal vein situated well in from the margin.

The type of A. manilensis consists of seedling leaves only, but it matches A. heterophylla in shape and in the characteristic submarginal vein. The syntypes of A. warburgii no longer survive at Berlin presumably because Engler and Krause had reduced this to the synonymy of A. heterophylla and Krause consequently did not take out a representative specimen for protection from possible war damage which did, of course, subsequently occur. My acceptance of the placement of A. warburgii in the synonymy of A. heterophylla is based on the joint opinion of Engler and Merrill, who examined the pertinent material of both species together at Berlin, concluding that the two were indeed identical (Merrill’s annotation on Haenke s.n. at PR - the holotype of A. heterophylla). Elmer’s interpretation, however, also evidenced by specimen annotations, was different, applying the name A. warburgii to material of what is here recognised as a new species, A. boyceana. Elmer’s identifications of Araceae were not always reliable and it is not apparent that he had examined the relevant types; I therefore defer to Engler and Merrill’s view. The selected neotype of A. warburgii is a widely distributed fertile collection that falls well within the concept of A. heterophylla.

The illustration of this species in Krause & Engler (loc. cit.) is of poor quality, and it is perhaps as a consequence of this that the name Alocasia heterophylla has been applied by various workers to material of distinctly different species in Java and Borneo, where this species does not occur. Almost all the material that Krause & Engler cited under A. heterophylla was destroyed, but one extant specimen, Merrill 5328, is not of this species. Together with the fact that the illustration of the spadix does not show the characteristic enlarged synandria, this suggests that the illustration is based on material of more than one species.

The cultivars Alocasia ‘Blue Prince’ and ‘Blue Lady’ (Burnett, 1984: figs 17 & 18) appear to be derived from this species.

Other specimens seen: Luzon, Zambales Prov. Mt Pinatubo, Clemens 17362 (UC); Luzon, Pangasinan Prov., Labrador, Mt San Isidro, Fenix BS 29883 (US); Luzon, Quezon Prov., Quezon National Park, ca. 10 km W of Atimonan, Nicolson 800 (K, US); Luzon, Rizal Prov., Mt Susong Balaga, Ramos & Edaño BS 29238 (US); Luzon, Rizal Prov., Mt Irig, Ramos &
6. Alocasia macrorrhizos (L.) G. Don


[Calla badian* Blanco, Fl. Filip. (1837) 658, nom. nud.].

Massive pachycaul with the stem decumbent or erect, to 4 m tall; petioles to 1.3 m long, sheathing in lower third to half; blades ovato-sagittate, bluntly triangular in general outline, held more or less erect, with the margin entire to very slightly sinuate (distinctly sinuate in 'var. heterophylla' - see 'Notes' below); anterior lobe ca. 70 cm to over 1 m long, ca. 60–90 cm wide at base, with ca. 9 rather distant primary lateral veins on each side of the anterior costa diverging at ca. 60°; glands in axils of primary veins on abaxial side distinct; secondary venation flush with the lamina or but slightly raised abaxially, not forming interprimary collective veins or these poorly defined; posterior lobes ca. third to half the length of the anterior, somewhat rotund, often overlapping; inflorescences paired among the leaf bases, subtended by membranous cataphylls; peduncles barely exceeding the cataphylls at anthesis; spathe rather variable in length, ca. 13–35 cm long, constricted about sixth of the way from the base; lower part green, ovoid; limb broadly oblong-lanceolate, cowl-like at anthesis, later reflexed, then deliquescent, membranous, pale yellow; spadix slightly shorter than the spathe; female zone 1–2 cm long, c. 1.5 cm diam.; ovaries pale green, ca. 3 mm diam.; stigma sessile, 3–5-lobed, the lobes conic, yellow; sterile interstice slightly shorter than to equalling the female zone, whitish, slightly narrowed corresponding to the spathe constriction; male zone cylindric, c. 3–7 cm long, c. 2 cm diam., whitish; synandria rhombo-hexagonal, convex-topped due to cap-forming synconnective; appendix yellowish, slightly thicker than the male zone at the base, thence tapering, equalling to considerably exceeding half the length of the spadix, staminodial; fruiting spathe ca. 8 cm long, green.

**Distribution**: Indo-Malesia to Oceania. It is not clear where, if anywhere, this species occurs wild. It has evidently been widely distributed as a subsistence crop and is now pantropical by introduction as an ornamental. In the Philippines, widespread.

**Habitat**: Roadsides and clearings often near human habitation, at low to medium elevation.

**Vernacular names**: Badian(g), Biga, Bilan mumpaha, Bungiang, Bira.

**Notes**: In designating a neotype for *Calla maxima* Blanco, of which no original material was preserved, I have followed the uncontroversial interpretation of Merrill (1918: 91) and used the exemplifying collection he distributed. The drawings designated as the neotype of *Alocasia indica* var. *heterophylla* Schott ex Engl. are annotated with this name, together with the same collector’s name and provenance as the presumably destroyed
holotype specimen, indicating a high probability that the drawings were prepared from that material.

In the Philippines, the most closely related species appears to be A. porteii, which differs in the divided leaf, more elongated spadix, tessellated trunk, longer, brownish spathe and, perhaps most importantly, the arrangement of inflorescences, which are clustered in large numbers in the centre of the leaf crown in A. porteii, whereas they are paired among the leaves in A. macrorrhizos. A. maquilingensis (q.v.) is also similar, differing in the smaller inflorescences, hairy leaves and abaxially rather prominent secondary venation forming interprimary collective veins.

Several varieties have been described (see Furtado, 1941), mostly of little botanical interest though some may be usefully recognised at the level of cultivar. However, in the Philippines, a form that has rather deeply sinuate leaf margins has been given varietal status (these specimens are listed as 'var. heterophylla' below). Although slightly wavy leaf margins are commonly found in A. macrorrhizos s.s. throughout its range, variation to this extent seems confined to the Philippines. Merrill (1922: 185) regarded this taxon as a synonym of A. porteii. This status requires re-evaluation following field work. It is possibly a hybrid between A. macrorrhizos and A. porteii, since horticultural crosses between A. porteii and entire-leaved species yield sinuate-marginated hybrids. No data are yet available on the arrangement of the inflorescences. In the meantime, I provisionally place it in the synonymy of A. macrorrhizos, as it seems to intergrade with somewhat wavy-marginated forms that are typical of A. macrorrhizos elsewhere. It does not intergrade with A. porteii in leaf margin features. This form is illustrated in the horticultural account of Burnett (1984, fig. 83), where it is regarded as a hybrid.

Other specimens seen: 'Typical form' - Luzon, Pampanga, Mt Arayat, Bolster 92 (UC); Luzon, Benguet, Clemens 18710 (UC); Luzon, Mountain Prov. Baywinan, Banaue, Ifugao, Conklin & Buwaya 1-951 (GH, L); Luzon, Benguet, Baguio, Elmer 8818 (E, G, K, L, NY, US); Luzon, Irosin, Mt Bulusam, Elmer 15455 (CAL, G, GH, K, L, NSW, NY, P, US); Luzon, Laguna Prov., Los Baños (Mt Maquiling) Elmer 18243 (CAL, GH, K, US); Central Luzon, Loher 2438 (CAL, K, US); Luzon, Manila Province, Lueba da Montalban, Loher 2436 & 7038 (both K); Luzon, Benguet, Loher 5029 (K); Luzon, Tayabas Prov., Loher 14020 (UC); Puerto Prince, Ile Paragua, Marche 116 (P); Leyte, W of Tanuan, Malaquikay Barrio, Nicolson 815 (US); Luzon, Laguna Prov. College of Agriculture, behind Baker Hall, Molawin Ck, Nicolson 838 (US); Luzon, Rizal Prov., Mt Irig, Ramos BS 41989 (US); Batan, Ramos BS 80647 (NY); Luzon, Sorsogon Prov., Pilar, Regalado & Ugalde PNH 37494 (L, mixed with Cyrtoesperma merkusi);
Polillo, Robinson BS 6997 (US); Luzon, Mt Polis pass, Walker 7513 (US); Central Luzon, Bataan Prov., Mt Mariveles, Lamao R., Williams 320 (NY, US);
‘Var. heterophylla’ - NE Polillo Island, Karlagan, Fox 280 (GH, L); Luzon, Benguet, Yonglon, Loher 5029 (K); Luzon, Bataan Prov., Lamao R., Mt Mariveles, Whitford 1278 (K, NY, US).

7. Alocasia maquilingensis Merr.


[Alocasia vulcanica Elmer, mss.]

Robust caulescent herb; leaves several together, without interspersed cataphylls; petiole to ca. 1 m long, thickly pubescent to glabrescent, sheathing in the lower third to half; blade broadly ovato-sagittate ca. 55–90 cm long; anterior lobe 50–60 cm long, about as wide at base as long, with ca. 8 primary lateral veins on each side of the anterior costa diverging at ca. 60°, especially the proximal ones sometimes bearing subsidiary veins intermediate in thickness between primary and secondary venation; primary and subsidiary veins with conspicuous glands in their axils; secondary venation rather prominent abaxially, numerous and close-spaced, arising from the primary venation at ca. 70° then deflected marginally and organised into distinct interprimary collective veins; primary and secondary veins strongly pubescent to almost glabrous, but at least with some hairs on the finest secondary veins especially near the blade margin; posterior lobes mostly broadly rounded, sometimes squared off, ca. 20–30 cm long; posterior costae naked in the sinus for ca. 2 cm; inflorescences ca. 10–30 clustered together in the centre of the crown; peduncle ca. 15 cm long, pubescent; spathe white, ca. 10 cm long; lower spathe ca. 2 cm long, separated from the blade by a rather weak constriction slightly above the level of the sterile interstice of the spadix; limb narrowly oblong lanceolate, the tip obtuse to subtruncate and abruptly mucronate for ca. 5 mm; spadix equalling to slightly exceeding the spathe in length, stipitate for ca. 6 mm; female zone ca. 1 cm long; ovaries ovoid, ca. 1.5 mm tall; style slender, ca. 0.8 mm long; stigma broad, weakly lobed; sterile interstice very short, not or hardly attenuated, ca. 3 mm long (more or less one whorl of synandrodiad; male
zone 1.7–2 cm long, cylindric, ca. 6 mm diam.; synandria mostly rhombohexagonal, ca. 1.5–2 mm across, those in the middle of the male zone longitudinally (with respect to spadix) compressed (?always); appendix ca. 6–7 cm long, cylindric, distally tapering to a point, composed of low sinuous compressed staminodia; fruiting spathe ?red, ovoid to pyriform, 4.5 x 2 cm, longitudinally dehiscent; fruits red.

**Distribution:** Endemic to the Philippines; Luzon, Mindanao, Leyte, Panay.

**Habitat:** On slopes in primary rain forests at low to medium elevations.

**Notes:** In the protologue of *A. maquilingensis*, Merrill (loc. cit.) cited Baker 868 as the ‘type’, as well as citing a number of other collections. Of all the specimens cited, it appears that only Merrill 7153, designated here as neotype, is still extant. I infer that Merrill’s designation of one of the cited specimens as the ‘type’ has the consequence that neotypification, rather than lectotypification, is required under the circumstances.

The pubescent petioles and main veins are unique in Philippine *Alocasia*, but also found (constantly or variably) in New Guinea *A. nicolsonii* A. Hay, Sulawesi *A. suhirmaniana* Yuzami & A. Hay and *A. celebica* Engl., West Malesian *A. puber* (Hassk.) Schott and *A. inornata* Hallier f., Sumateran *A. arifolia* Hallier f. and Bornean *A. sarawakensis* M. Hotta (the latter only in juvenile plants), *A. reginae* N.E. Br. and *A. scabriuscula* N.E. Br.. Plants from the type locality are much hairier than those from elsewhere. This species can be mistaken for *A. macrorrhizados* (q.v.), which differs in being totally glabrous, having hardly prominent secondary venation that does not form interprimary collective veins, and much larger inflorescences that do not form central clusters.

8. *Alocasia micholitziana* Sander


Moderately robust herb; stem erect to decumbent, to ca. 50 cm long, ca. 4 cm diam.; leaves ca. 4–7 together, not interspersed with cataphylls; petiole to 45 cm long, sheathing in the lower ca. quarter to third, mottled brownish, reddish and/or purplish; blade rich velvety matt deep green adaxially, paler abaxially, sagittate, ca. 40 cm long x 13 cm wide, very shallowly to shallowly peltate; costae and primary veins white adaxially; anterior lobe ca. 20 cm long, rather broadly triangular, the margin very strongly to shallowly but distinctly undulate; anterior costa with 4–5 primary lateral veins on each side diverging at ca. 60–80° then curving distally to the margin; secondary venation flush on both sides, arising from the primary venation at a wide angle (ca. 90–100°) then curving to the margin; interprimary collective veins not or hardly differentiated; posterior lobes diverging at ca. 60–90°, narrowly triangular, the outer margins undulate, to ca. 11 cm long; inflorescences to ca. 4 together; peduncle to ca. 20 cm long; spathe ca. 14 cm long; lower spathe ovoid, ca. 3 cm long, green, separated from the limb by a rather abrupt constriction; limb ca. 11 cm long, basally somewhat reflexed and distally cucullate at anthesis, opening wide; spadix ca. 3.5 cm long (dry) x ca. 7 mm; ovaries globose, ca. 2.5 mm diam.; style ca. 1 mm, rather abruptly differentiated from ovary; stigma subglobose, weakly lobed; sterile interstice slender, ca. 7 mm long x 2 mm diam. at narrowest, the lower ring of synandrodia paler and larger than upper ones; male zone more or less cylindric, ca. 1.2 cm long x 5 mm wide; synandria rhombo-hexagonal, ca. 1.2 mm diam. (dry), opening by apical pores not capped by synconnective; appendix ca. 6 cm long, tapering to a narrow blunt tip, not or faintly constricted at junction with male zone, composed of irregular low elongate staminodia; fruiting spathe ca. 4 cm x 2 cm; fruit ca. 5 m diam.

**Distribution:** Endemic to Luzon.

**Habitat:** In primary and secondary forest and roadsides at ca. 1200–1500 m altitude. This species is said to be common and widespread, and presumably occurs over a somewhat wider altitudinal range than the limited available data indicate.
Notes: The plant illustrated in the figure accompanying the protologue is sterile and an epitype is needed to establish the application of this name more firmly. Selection of the designated specimen is based on the facts that it is fertile and preserved from a plant cultivated at Kew, annotated by Brown as *Alocasia micholitziana* and as obtained from Sander's nursery and originally collected by Micholitz after whom the species was named. Those facts would appear to form an adequate indirect link between the specimen and the plant on which Sander based his description; indeed they are quite probably clonally identical.

Madulid (*pers. comm.* ) notes that this species occurs in several varieties. These are not clearly evident from herbarium material, though there is sufficient variation for a number of horticultural varieties to have been recognised (Burnett, 1984). *A. micholitziana* is distinguishable from *A. sanderaiana*, with which it shares white major venation and undulate leaf margins, by its paler, brighter, matt green leaf surface - not purple abaxially, and by the leaf bases not subtended by cataphylls except at the beginning of a sympodial module. Moreover, the leaf of *A. micholitziana* is less deeply peltate than that of *A. sanderaiana*.

*Other specimens seen:* Luzon, Ifugao Prov., Banaue, Bogner 1631 (M); Ifugao prov., Banaue, Bayninan, Conklin & Buwaya PNH 80620 (GH, L); Laguna Prov., Los Baños (Mt Maquiling), Elmer 17769 (BO, CAL, GH, NY); Benguet Prov., Loher 2441 (K); Rizal Prov., Loher 15005 (UC); Ifugao Prov., Banaue, Poitan, Liwang, Mendoza PNH 37182 (L); Laguna Prov., Mt Makiling, along path from College of Agriculture, Nicolson 843 (L, US).

9. *Alocasia portei* Schott


*Schizocasia regnieri* L. Linden & Rodigas, Ill. Hort. 34 (1887) descr. ad t. 6 & Gartenfl. 36 (1887) 333. - Type: Ill. Hort. 34 (1887) t. 6.
Massive arborescent pachyaual to 6 m tall; stem erect, to ca. 40 cm diam. at base (thickening with age), distally to ca. 15 cm diam., older parts developing tessellated ‘bark’; leaves several together, more or less erect; petiole to ca. 1.5 m long, yellowish to dark green mottled chocolate, sheathing in the lower third; blade sagittate and deeply pinnatifid, dark green, coriaceous; anterior lobe to ca. 1.5 m long, with up to 10 linear-lanceolate round-tipped segments each with a primary lateral vein diverging from the anterior costa at ca. 80–90°; margins strongly crispatate; primary veins prominent below, tinged purple-brown or yellowish, with conspicuous axillary glands on abaxial side; secondary venation flush, arising from primary at ca. 80–90° and interspersed at ca. 2–3 cm intervals with abaxially slightly prominent stronger veins (but nearer in size to secondary than primary) with glands in their axils; inflorescences in numerous pairs clustered in the centre of the leaf crown, subtended by conspicuous brown-mottled lanceolate cataphylls; peduncle to ca. 30 cm long; spathe to 40 cm long; lower part subcylindric, dark brownish green, ca. 5 cm long; limb linear oblong-lanceolate, at first erect and canoe-shaped and cuneate, thence reflexed at the constriction, pale brownish, mottled and streaked chocolate brown, membranous; spadix somewhat shorter than the spathe, to 32 cm long; female zone sessile, ca. 4 cm long x 1.5 cm thick; ovaries subglobose, ca. 2.5 mm diam.; style very short; stigma weakly lobed; sterile interstice ca. 2 cm long, narrowed, corresponding with spathé constriction, white; male zone whitish, ca. 8 cm long, cylindric, ca. 1.5 cm diam.; synandria rhombo-hexagonal, ca. 1.2 mm diam. (dry); thecae capped by synconnective; appendix basally slightly thicker than male zone, then subcylindric and distally tapering; fruiting spathé ovoid, ca. 10 cm long x 5 cm thick.

**Distribution:** Endemic to the Philippines; Luzon. However, *A. porteii* is anecdotally reported to be common and widespread in the Philippines, although botanical collections have been made on only very few occasions, probably on account of its enormous size.

**Habitat:** Secondary forest at low to medium elevations.

**Notes:** The protologue of *Alocasia porteii* (Schott, loc. cit.) describes a leaf only. No collector or collection was cited, and if type material was preserved at W, it is presumably now destroyed. The designated neotype is a drawing Schott had caused to be prepared, which, like the protologue, includes only a leaf. However, it conforms unequivocally to the traditional and current concept of this species, and it seems not unreasonable to suppose that it was based on the original material.

*S. regnierii* appears to differ only in having a yellowish ground colour.
to the petioles and costae. It was originally described from living material imported to Europe from Thailand where it was presumably cultivated.


10. *Alocasia ramosii* A. Hay, sp. nov.


Small herb to ca. 40 cm tall; leaves 2–several together, not each subtended by cataphylls; petioles to ca. 25 cm long, sheathing in the lower third; blade membranous, hastate to sagittate, to ca. 28 cm long; anterior lobe narrowly to rather broadly triangular, the margin entire to very shallowly undulate; anterior costa impressed adaxially, with 4–5 primary lateral veins on each side diverging at ca. 60° and running more or less straight to the margin (cf. *A. heterophylla*), with glands in the axils usually conspicuous; secondary venation arising at a wide angle from primary veins, close-spaced (ca. 1.5–2 mm apart; cf. *A. heterophylla*, *A. culionensis*), then abruptly deflected into a somewhat disorganised zig-zag interprimary collective vein and/or running to the margin; posterior lobes diverging at an obtuse (hastate) or acute (sagittate) angle, narrow to rather broad, tapering to blunt points, 9–13 cm long; posterior costae naked in the sinus for 1–3 cm, never peltate except in seedlings; inflorescences 1–2 together; peduncle ca. 10–15 cm long, slender; spathe ca. 5 cm long; lower spathe ovoid, ca. 1.3 cm long, somewhat asymmetric due to adnation with spadix stipe, differentiated from the limb by a strong constriction; limb lanceolate, somewhat canoe-shaped, slightly deflected at base, thence up-curved; spadix stipitate for ca. 5 mm, with the stipe almost completely adnate to the spathe; female zone ca. 8 mm long; ovaries subglobose, ca. 1 mm diam., stigma subsessile, button-like; sterile interstice short, ca. 3–5 mm long, corresponding with
Figure 5. Alocasia ramosii A. Hay

Nicolson 752 - A: habit; B: venation; C: inflorescence (part of spathe removed). - Scale: bar to A = 10 cm, to B = 6 cm, to C = 2 cm.
spathe constrictive; male zone ca. 8 mm long, subcylindric, ca. 4 m diam.;
synandria rhombo-hexagonal, ca. 1 mm diam., not capped by synconnective;
appendix tapering to a point, ca. 1.2 cm long, slightly curved to ventral side
of spathe; infructescence subglobose, ca. 1.7 cm diam.

**Distribution:** Endemic to the Philippines: Luzon, Negros, Panay.

**Habitat:** Lowland rain forest, often near streams, to 400 m altitude.

**Notes:** The specific epithet commemorates Maximo Ramos (died May 11
1932), prodigious collector of Philippine and Bornean plants, in the employ
of the Bureau of Science at Manila (van Steenis-Kruseman, 1950).
Little complete fertile material has been seen.

**Other specimens seen:** Luzon, Sorsogon Prov., Irosin (Mt Bulusan), Elmer
16344 (G, L, NY); Luzon, Laguna Prov., Los Baños, (Mt Maquiling) Elmer
17769 (K, US - mixed; see also A. micholitziana); Luzon, Rizal Prov.,
Loher s.n. (UC); Luzon, Tayabas Prov., Umiray, Loher s.n. (UC); Panay,
Antique Prov. McGregor BS 32415 (K); Luzon, Laguna prov., resthouse
nr mud springs 400 m along path from College to summit of Mt Makiling,
Nicolson 684 (US); Luzon, Sorsogon Prov., along pathside around Lake
Bulusan, Nicolson 722 (US); Luzon, Laguna Prov., Molawin Ck, path
between Colleges of Agriculture and Forestry, Nicolson 753 (US); Negros
Oriental, Mt Canlaon, above Canlaon, Nicolson 832 (US); Luzon, Laguna
Prov., path from College to summit of Mt Makiling, Nicolson 845 (US);
Luzon, Camarines Prov., Mt Isarog, Ramos BS 22059 (US); Luzon, Rizal
Prov., Montalban, Robinson BS 6148 (US).

### 11. *Alocasia sanderiana* W. Bull

Krause & Engl., Pflanzenr. 71 (IV.23E) (1920) 104; Burnett, Aroideana 7
Syst. 25 (1898) 26. - Type: W. Bull, Retail List (1884) un-numbered fig. p. 3
(sterile). Epitype: Cult. Kew from material ex Philippines supplied by W.

Moderately robust herb to 60 cm tall; stem decumbent to creeping, ca. 15
cm long, ca. 2 cm thick; leaves solitary to few together, interspersed with
cataphylls (precise arrangement unclear from herbarium material);
cataphylls papery, narrowly lanceolate; petiole to 60 cm long, sheathing in
lower fifth to quarter; blade sagittate, deep glossy green adaxially, purple abaxially (?always), peltate for 25–30% of the length of the posterior lobes, to ca. 40 cm long x 20 cm wide; margin deeply undulate to sub-pinnatifid; anterior lobe to 24 cm long; anterior costa with 3-4 often but not always opposite primary lateral veins on each side diverging at ca. 80–100°, these somewhat acropetally deflected towards the tip of each segment; primary veins and costae white to yellowish; secondary veins emerging from the primary at a wide angle, thence deflected marginally, not or hardly forming interprimary collective veins; inflorescence mostly paired; peduncle slender, ca. 14–18 cm long; spathe 6–10 cm long, lower part 1.5–2 cm long, ovoid; limb 4–8 cm long, more or less canoe-shaped; spadix somewhat shorter than to half the length of the spathe, stipitate for ca. 5 mm; female zone ca. 1 cm long; ovaries ca. 2 cm diam., subglobose; stigma sessile, rather sharply 3–4-lobed; sterile interstice corresponding to spathe constriction, ca. 5 mm long, tapering distally; male zone 1.2 cm long, ca. 4–5 mm thick (dry); synandria rhombo-hexagonal with the thecae ventrally but hardly laterally joined; synconnective centrally impressed, marginally slightly exceeding but not capping the thecae; appendix short, equaling the male zone, cylindric then abruptly tapering in distal 3–4 mm, slightly narrower than male zone (dry).

**Distribution:** Endemic to Mindanao.

**Habitat:** Old forest in damp ravines at low elevation.

**Notes:** The peltate dark green, white veined leaves interspersed with cataphylls and the stipitate spadix and pointed-lobed stigmas indicate that this species is a segregate of the *Alocasia longiloba* complex, of which *A. boyceana* (q.v.) appears to be another facies.

Like *A. zebrina*, this species was CITES listed, but has now been removed from CITES schedules. *A. sandersoniana* was at one time much in demand horticulturally. It has been used extensively in hybridisation (see Burnett, 1984).

**Other specimens seen:** Cult. Kew, 4 Aug 1886, N.E. Brown s.n. (K); Suriago, Loher 2439 (K); cult. Manila, Loher 2440 (K, US); Lanao Prov., Pantar, Mearns 129 (US); Butuan sub prov., Agusan R., Merrill 7276 (US); Lanao Prov., Cawit, Zwickey 413 (GH).


Ab aliis speciebus Alocasisi Philippinarum lamina folii parva tenuiter

[Alocasia cv. Samar Lance; see Burnett, Aroidaeana 7 (1984) 99, fig. 38].

Diminutive to small herb; leaves several together; petiole shorter than the blade, to ca. 10 cm long, sheathing in the lower third, green mottled darker green; blade narrowly lanceolate, slightly falcate, 15–25 cm long x 2–5 cm wide; anterior lobe ca. 14–22 cm long, with the margin entire and slightly revolute (dry); anterior costa with 2–3 primary lateral veins on each side diverging at ca. 45°, like the costae and secondary venation deeply impressed adaxially, prominent abaxially; secondary venation arising from the primary at a low angle and running to margin, not or hardly forming interprimary collective veins; posterior lobes much reduced, forming narrowly triangular auricles 1.5–3 cm long; posterior costae poorly developed, naked in the sinus for ca. 1 cm to almost throughout their length; inflorescence solitary; peduncle subequalling the petioles at anthesis; spathe ca. 6 cm long; lower spathe ca. 1.5 cm long, subcylindric, differentiated from the limb by a weak, gradual constriction; limb lanceolate, green, mucronate for ca. 5 mm; spadix somewhat shorter than the spathe, stipitate for 5 mm, the stipe partly adnate to the spathe; female zone ca. 6 mm long, obliquely inserted on the stipe, narrow, ca. 3 mm thick (dry); ovaries subglobose, ca. 1.2 mm diam.; stigma sessile, discoid, almost as wide as the ovary, weakly 2–3-lobed; sterile interstice ca. 9 mm long, the lowermost synandrodia reduced, thence the interstice ca. 3 mm thick, slightly tapering distally; male zone somewhat thicker than the upper part of the interstice, 4.5 mm diam, 8 mm long; synandria rhombo-hexagonal, strongly wavy-edged, ca. 1.5 mm diam.; appendix 1.6 cm long, tapering; infructescence unknown.

Distribution: Philippines, said to be known only from Samar.

Habitat: Unknown.

Notes: This species is apparently quite well-known in cultivation in the Philippines, but is not represented by any wild-collected herbarium material. Burnett (1984) notes that what is considered in the horticultural community to be one species is highly variable and he lists four selected varieties all said to have originated from the island of Samar. The only material I have seen in flower, which forms the holotype, seems exactly to match the cultivar known as ‘Samar Lance’. Although it seems probable that the other forms mentioned and illustrated in Burnett (loc. cit.) are conspecific
Figure 6. Alocasia scalprum A. Hay

Bogner 1659 - A: leaf; B: leaf blade; C: inflorescence; D: spadix with part of spathe removed; E: pistils; F: neuter organs of sterile interstice; G: synandria, from above. - Scale: bar to A, B, C = 2 cm, to D = 1 cm, to E, F, G = 2 mm.
with *A. scalprum*, this remains to be verified.

The specific epithet alludes to the knife-shaped leaf blade.

### 13. *Alocasia sinuata* N. E. Brown


[Alocasia Quilted Dreams - Burnett, Aroideana 7 (1984) 97, fig. 33].

[Alocasia bullata* Hort., nom. inval.]*

Herb to ca. 35 cm tall; stem [dimensions not known]; leaves several together; petiole ca. 19 cm long, sheathing in the lower ca. fifth to quarter; blade sagittate to ovato-sagittate, peltate or not, somewhat to markedly bullate, somewhat to thickly coriaceous, dark green (sometimes darker about main veins) adaxially, paler abaxially, with the margin sometimes very shallowly sinuate, 22–27 cm long; anterior lobe widest at to ca. 4 cm from the base, the apex broadly acute to obtuse and apiculate for 0.5–1 cm; anterior costa with 2–3 primary lateral veins on each side, diverging at 60–80° and adaxially impressed; axillary glands inconspicuous; subsidiary veins numerous (i.e. ca. quarter to half the secondary venation thicker than the rest); secondary and subsidiary venation forming rather ill-defined interprimary collective veins running, like the primary venation, into a somewhat conspicuous intramarginal vein 1–3 mm from the margin; posterior lobes acute, ca. third to half the length of the anterior, connate for 0–half of their length, the inner sides more or less linear-lanceolate; posterior costae diverging at 45–90°, with lamina to the sinus when leaf not peltate; inflorescences ?solitary to paired to clustered, subtended by lanceolate cataphylls to ca. 7 cm long (in the type these with reduced petiole and leaf blade); peduncle about three quarters to equalling the length of the petiole at anthesis; spathe 7–7.5 cm long, green; lower spathe 1.5–2 cm long, ovoid; limb broadly oblong-lanceolate, green, apiculate for ca. 0.5 cm; spadix somewhat shorter than the spathe, 4–6.5 cm long, very shortly stipitate with somewhat oblique insertion, white except for green ovaries; female zone ca. 6 mm long, 3–8 whorls of somewhat lax pistils; ovary globose, ca. 2 mm diam.; stigma pronounced - almost as large as the ovary, sub sessile, thickly discoid to weakly 3-lobed; interstice ca. 7 mm long, the lower half of incompletely connate neuter organs, the upper half of sterile synandria, somewhat attenuate above and corresponding with spathe constriction, 2.5 mm diam.
(dry); male zone 1–1.5 cm long, somewhat obconic, distally ca. 5 mm diam.; synandria rhombohexagonal, 4–5-merous, 2–3 mm diam., thecae not overtopped by synconnective; appendix 1.5–4.5 cm long, basally isodiametric with top of male zone then tapering distally; infructescence unknown.

**Distribution:** Endemic to the Philippines - Leyte, Mindanao, Palawan.

**Habitat:** Unknown.

**Notes:** *Alocasia sinuata* is botanically poorly known, though it has been in cultivation for over a century. Two forms exist in cultivation today under the names *Alocasia Quilted Dreams* and *Alocasia Bullata* (the latter used as a pseudobinomial but it is botanically invalid). I have seen only one collection from the wild, unfortunately without habitat notes.

The type was at first said to have originated in the ‘Malay Archipelago’ (N.E. Brown, *loc. cit.*). However, the label has subsequently been altered in Brown’s hand to indicate that the plant originated in the Philippines. Observations on the species’ alleged large size made by W. Bull which Brown (*loc. cit.*) quoted (‘a full grown plant would be about 4 or 5 feet in diameter’), notwithstanding the much smaller dimensions of the type plant and matching material, are evidently incorrect (other material examined is somewhat smaller than the type).

The collection cited below originating in Palawan is included with some doubt as the sterile interstice is much attenuated and the secondary venation seems not to form subsidiary veins. In other respects, however, the specimen matches *A. sinuata*.


### 14. *Alocasia zebrina* Schott ex van Houtte


Moderately robust to robust herb to 1.8 m tall; leaves several together, not interspersed with cataphylls save at the beginning of a sympodial module; petiole to 1.1 m long, sheathing in the lower third, pale green, obliquely streaked brownish and/or darker green; blade rather narrowly sagittate, ca. 45–100 cm long, rather coriaceous, rich glossy green; anterior lobe triangular to somewhat ovate, to 80 cm long, with (4–)6–10 primary lateral veins diverging from each side of the anterior costa at ca. 80–90° and running almost straight to the margin, bearing small axillary glands on the abaxial side; secondary venation flush with the lamina and inconspicuous on both surfaces of the blade, arising from the primary veins at a wide angle then deflected to the margin without forming interprimary collective veins; posterior costae diverging at an acute or right angle, bearing lamina to the sinus and often minutely peltate; posterior lobes elongate, three fifths to two thirds the length of the anterior lobe; inflorescences paired, not in large clusters; peduncle ca. 25 cm long; spathe 13–16 cm long; lower part 2.2–3 cm long, narrowly ovoid, separated from the limb by an abrupt constriction corresponding with the sterile interstice of the spadix; limb narrowly lanceolate, erect; spadix somewhat shorter than the spathe, stipitate for ca. 7 mm; stipe conic; female zone 1.4–2 cm long x ca. 8 mm wide; ovaries globose; stigma weakly lobed, subsessile; sterile interstice ca. 1 cm long, distally attenuate; male zone cylindrical, ca. 3–4.5 cm long x 5 mm thick (dry); syncalix rhombo-hexagonal, 1.5–2 mm diam., capped by synnate connective; appendix distinctly narrower (at least in dry state) than male zone, 4.5–5 cm long, tapering; fruiting spadix globose, ca. 4.5 cm diam.

Distribution: Endemic to the Philippines - Luzon, Mindanao, Leyte, Samar, Biliran, Alabat.

Habitat: Rain forest at low to medium elevation.

Vernacular names: Badiang, Handuroi.

Notes: Easily distinguished from all other Philippine Alocasia species by the rather narrowly sagittate leaves with striped petioles and rather long acute posterior lobes bearing lamina to the sinus but with the blade not or only very narrowly peltate.
Merrill (1922: 186) suggested that *A. wenzelii* was no more than a robust form of *A. zebrina*, a view with which I concur. This species is rather variable and a number of different forms are in cultivation.


**Excluded, Dubious or Doubtfully Philippine Species**

*Alocasia liervalli* Hérincq

*Alocasia liervalli* Hérincq, Hortic. Franç. (1869) 243. Type: none found.

The description is vague, of sterile material and not accompanied by an illustration. Hérincq was a botanist and gardener associated with the Musée d’Histoire Naturelle at Paris, but no pertinent preserved material has been found there. Indeed, the whereabouts of his herbarium and types, if any exist, is unknown (Stafleu & Cowan, 1979). This plant was said by Hérincq to have been collected by Porte in the Philippines and introduced into commercial horticulture by Lierval. The only clue to the identity of *A. liervalli* is Hérincq’s allusion to the large size of the leaf blades and the mottled petioles, which may suggest that this is a synonym of the earlier *A. zebrina*.

*Alocasia maximiliani* Maedicke

*Alocasia maximiliani* (=*maximiliana*) Maedicke, Möllers Deutsche Gärt.-Zeit. 26 (1911) 134; Burnett, Aroideana 7 (1984) 93, excl. descr. et fig. 27
i.e. *Alocasia zebrina*. - Type: Möllers Deutsche Gärt.-Zeit. 26 (1911) 133, fig. I. ?= *Xanthosoma* sp.

This binomial is not in Index Kewensis, and I have not been able to find any earlier use of it. Burnett (1984) attributed this species to the Philippines. The basis for this is not clear to me, since Maedicke did not cite a provenance. Maedicke’s description is of a sterile plant cultivated in the Palmengarten at Frankfurt. The description and accompanying photograph indicate it is a *Xanthosoma*. Although a new name was apparently erected, there is no indication that the author was intentionally describing a new species. It seems likely that this epithet would have been derived from rather earlier usage by Schott, who worked under the patronage of Archduke Ferdinand Maximilian of Austria, and did indeed name an East Brazilian aroid *Xanthosoma maximilianum* Schott [Bonplandia 10 (1862) 322]. It would thus perhaps appear that Maedicke’s name was intended to be a new combination. However, since no reference was made to any earlier usage of the epithet, the name *Alocasia maximilianum* Maedicke must in that case be regarded as entirely new and typified by Maedeecke’s illustration, not by the type of *X. maximilianum* Schott; it would need epitypifying in the context of a revision of *Xanthosoma*. It seems more plausible however, that use of the generic name *Alocasia* in this case was simply a mistake rather than an actual taxonomic judgement.

*Alocasia merrillii* Engl. & K. Krause


*Alocasia reversa* N.E. Brown


Since its first description, subsequent authors have not ascribed any additional Philippine material to this species. Material collected from the wild and matching *A. reversa* is restricted to limestone substrate in Sarawak,
Borneo (Hay, 1998). Its initial ascription to the Philippines appears to have been in error.

**Alocasia talihan Elmer**


**Alocasia urdanetensis Elmer**

*Alocasia urdanetensis* Elmer, Leafl. Philipp. Bot. 10 (1939) 3699, nom. inval., descr. angl.; based on a collection from Mindanao, Agusan Prov. Cabadbaran (Mt Urdaneta), Sep 1912, Elmer 13857 (not located, presumed lost at PNH).

The description suggests some resemblance to *A. sanderiana*.

**Misapplied Names**

The occurrence of several species of *Alocasia* was recorded for the Philippines in Naves' Appendix to the third edition of Blanco's *Flora de Filipinas*. Seven of these are not Philippine species. Since there is no pertinent preserved material, it is not possible to interpret with any confidence what Naves meant in applying these names.

*Alocasia alba* sensu auct. non Schott: Naves, Novis. App. (1882) 293.

*Alocasia cucullata* sensu auct. non (Lour.) G. Don: Naves, loc. cit. (but possibly cultivated).

*Alocasia longiloba* sensu auct. non Miq.: Naves, op. cit., 294.

*Alocasia lowii* sensu auct. non Hook.f.: Naves, loc. cit.

*Alocasia montana* sensu auct. non (Roxb.) Schott: Naves, op. cit, 293.

*Alocasia odora* sensu auct. non (Lodd.) Spach: Naves, op. cit., 294.

*Alocasia pubera* sensu auct. non (Hassk.) Schott: Naves, op. cit., 293.
Acknowledgements

I am grateful to the Smithsonian Institution for awarding me a Visiting Fellowship in 1996 and for providing me facilities to work in the Department of Botany, US National Museum of Natural History and to Dr D.H. Nicolson (US) for making that possible and for his encouragement, expert advice and comment on the manuscript. I am also grateful to Peter Boyce (K) for finding articles including protologues of *Alocasia* from European horticultural journals and to Josef Bogner (Munich Botanic Garden) for sending me preserved material and photographs of material he has cultivated, to Dr Tom Croat (MO) for drawing my attention to informative vouchers from the Missouri Botanical Garden living collection and to Clare Herscovitch (NSW) for technical assistance. Special thanks are due to Lesley Elkan (NSW) for the botanical drawings, which, due to circumstances beyond our control, have had to be reproduced from photocopies. I thank the curators and directors of the following herbaria for allowing me to see collections at B, BM, BO, CAL, E, G, GH, K, L, M, MO, NSW, NY, P, PNH, PR, UC, US.

*Note: In Hay (1998) this paper was cited as ‘in press’ with Nordic Journal of Botany. It has since transpired that the corrected and final version of the paper and the original illustrations had become lost. In order to expedite publication, the paper was withdrawn from that journal. No suggestion of fault is directed at the editors of Nordic Journal of Botany. I thank Dr I. Nielsen for his helpful comments on an earlier version of the manuscript, and the editor-in-chief, Prof. Kai Larsen, for his forbearance.*

References


# Index to Species

<table>
<thead>
<tr>
<th>Species</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alocasia</td>
<td>3</td>
</tr>
<tr>
<td>atropurpurea</td>
<td>7</td>
</tr>
<tr>
<td>boyceana</td>
<td>9</td>
</tr>
<tr>
<td>clypeolata</td>
<td>12</td>
</tr>
<tr>
<td>culionensis</td>
<td>14</td>
</tr>
<tr>
<td>heterophylla</td>
<td>15</td>
</tr>
<tr>
<td>macrorrhizos</td>
<td>19</td>
</tr>
<tr>
<td>maquilingensis</td>
<td>22</td>
</tr>
<tr>
<td>micholiziana</td>
<td>24</td>
</tr>
<tr>
<td>portei</td>
<td>25</td>
</tr>
<tr>
<td>ramosii</td>
<td>27</td>
</tr>
<tr>
<td>sanderiana</td>
<td>29</td>
</tr>
<tr>
<td>scalprum</td>
<td>30</td>
</tr>
<tr>
<td>sinuata</td>
<td>33</td>
</tr>
<tr>
<td>zebrina</td>
<td>34</td>
</tr>
</tbody>
</table>