

# *Pothos grandis* (Araceae: Pothoideae) described and validated and architectural notes on *Pothos* subgenus *Pothos*

PETER C. BOYCE\* & NGUYEN VAN DZU\*\*

*Summary.* *Pothos grandis*, a name proposed but not validly published by Buchet (1942), is validated and an emended species description given. Discussion of the growth architecture of western Indomalaysian *Pothos* subgenus *Pothos* is presented.

## INTRODUCTION

*Pothos* L. is genus of approximately 70 species of subtropical and tropical forest climbers centred in Malesia (Hay *et al.* in press) belonging to Araceae subfamily Pothoideae (sensu Bogner & Nicolson 1991). Shared leaf, flower and fruit characters suggest that *Pothos* is most closely related to *Pedicellarum* M. Hotta (1976) and *Pothoidium* Schott (1857a, b). Indeed, *Pothos* and *Pedicellarum* may be congeneric. Until a full revision of *Pothos* is completed we are, in this and other papers, adopting a modified, informal version of Engler's infrageneric classification of *Pothos* (Engler 1905). While we follow Engler's sections (as subgenera) we reject his serial concepts, instead recognizing informal species groups. *Pothos grandis* belongs to the *P. seemanii* Schott group of subgenus *Pothos*.

## HISTORY OF *Pothos grandis*

Buchet (1942) writing in Gagnepain's Floré Général de l'Indo-Chine proposed the name *Pothos grandis* for specimens collected at three sites in Tonkin (modern northern Vietnam) and a single specimen from Annam (central Vietnam). Unfortunately, Buchet omitted the Latin diagnoses for his new species and thus according to the Art. 36.1 of the International Code of Botanical Nomenclature (Greuter *et al.* 1994) the name *Pothos grandis* is not validly published. Since Buchet's time the species has been seldom re-collected. All collections seen are rather poor and none display the full range of shoot form to be expected for a species of *Pothos* subgenus *Pothos*. Recent field work in northern Vietnam undertaken jointly by staff of the Herbarium, Royal Botanic Gardens, Kew, (K), the Department of Botany of the Institute of Ecology and Biological Resources, Hanoi (HN) and the Department of Botany, University of Hanoi, (HNU) resulted in the re-collection

---

Accepted for publication April 1995.

\*Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AE, U.K.

\*\*Herbarium, Department of Botany, Institute of Ecology & Biological Resources, NCNST, Nghia Do, Tu Liem, Hanoi, Vietnam.

of *P. grandis* at one of the type localities. A plant was found in flower and sufficient material collected to enable a complete description to be prepared.

***Pothos grandis*** S. Buchet ex P.C. Boyce & D. V. Nguyen sp. nov., *P. grandis* in aspectu *P. seemannii* valde proxima, et ab ea foliis majoribus, pedunculo petiolum aequanti sed numquam eum superanti (pedunculus in *P. seemannii* petiolo duplo longior), spatha aliquantum grandi atque spadice dissimiliter formato grandiore in stipite longiore suffulto distinguibilis. Typus: *Colani* s.n. (holotypus P!; isotypi K (photo!) SGN!).

*Pothos grandis* S. Buchet apud Gagnepain in Lecomte, Fl. Gén. l'Indo-Chine 6: 1088 (1942), nom. invalid. sine descr. Latin.

Moderately robust somewhat woody root-climber and hammock-forming hemi-epiphyte to 3 m. **Shoot system** differentiated into several phases (seedling phase not known). *Seedling/mature sterile transition shoots* monopodial, apparently of indeterminate length, climbing, appressed to substrate and rooting moderately from most nodes, probably not branching unless damaged apically (reiteration not observed), stem to 4 mm diam., sharply four-angled, minutely winged along the angles, leaves rather scattered. *Mature sterile shoots* monopodial, orthotropic, of indeterminate length, climbing, appressed to substrate and rooting prolifically from each node, not branching unless damaged apically, reiteration occurring from a node some distance back from the damaged apex, stems occasionally transforming terminally into a foraging flagellum (see below), stem to 8 mm diam., weakly four-angled or slightly compressed-terete, at first somewhat sparsely clothed with leaves, later naked, naked portions with prominent, slightly stepped nodes to 5 cm distant, stem deep green, becoming black-brown with age, drying dark green to almost black. *Mature fertile shoot* sympodial, with growth modules of varying determinate lengths, free, arising from the mature sterile stem as side branches, often branching to three orders, plagiotropic, not rooting from nodes, stem to 4 mm diam., mostly moderately clothed with leaves, occasionally older portions naked at the base to approximately half their length, naked portions with prominent, stepped nodes to 3 cm distant. *Flowering shoots* much abbreviated, arising from the leaf axils of mature fertile shoots, subtended by a minute prophyll and up to seven 4–30 mm, sequentially longer, cataphylls, terminated by 1–3 sequentially-produced inflorescences. *Foraging shoot* a flagellum to 2 mm diam. with a few leaf-like cataphylls and reduced foliage-leaves at first but soon becoming naked with slightly prominent nodes up to 10 cm distant, arising mostly by terminal extension of the mature sterile shoot, (more rarely from a similar extension of a fertile shoot), monopodial, of indeterminate length, foraging for several metres until a suitable climbing surface is encountered, not branching unless damaged apically and then branching from the nearest healthy node, occasionally rooting sparsely from the nodes while foraging, always rooting prolifically on resumption of climbing habit. **Leaves:** *Petiolo* obovate-oblong, broadly winged, base decurrent, apex truncate to rounded or slightly auriculate, 2–5 × 1–2 cm, petiolo with 2–3 secondary veins and numerous veinlets per side, all veins prominent, especially in dried material; *lamina* ovate, base rounded,

apex acuminate-mucronate, 14–23 × 5.5–10 cm, lamina with 2 secondary veins per side, these arising from the base and either reaching the leaf tip or merging into a prominent submarginal collecting vein, all additional veins arising obliquely from the mid-vein, remaining parallel with numerous branches arising from them, leaves deep green adaxially, paler and slightly yellowish abaxially when fresh, drying dull olive green. **Inflorescence** pedunculate, *peduncle* robust, 4–7 cm × 2–3 mm, tapering, slightly thinner towards the apex, deep purple; *spathe* ovate to ovate-lanceolate, base slightly cordate to decurrent, apex acute with a somewhat stout mucro, 2.5–5.2 × 2–3 cm, margins prominently in-rolled, deep purple, sometimes slightly greenish abaxially when fresh, drying almost black; *spadix* stipitate, deep purple, stipe terete, 1.2–1.5 cm × c. 2 mm; fertile portion of spadix ovoid to clavate, 1.2–3 cm × 9–13 mm, yellow-green to off-white. **Flowers:** *tepals* 6, 4 × 1.3 mm, oblong-cymbiform, yellow-green to dirty white, apex cucullate, triangular, truncate, *stamens* 6, 1–4 × c. 0.5 mm, filaments strap-shaped, thecae elongate-globose, 1 × 0.25 mm, dehiscing via longitudinal slits, cream, *gynoecium* 5 × 1.75 mm, 3-locular, compressed angular-ellipsoid, yellow-green to dirty white, stylar region truncate, stigma prominent, punctate, purple. **Infructescence** a head of 4–10 berries, these obclavate, 1–1.75 × 1–1.4 cm, green ripening through yellow to deep orange-red. **Seeds** 1–3, ellipsoid to compressed-globose, c. 5–8 mm diam. (Fig. 1).

**DISTRIBUTION.** Vietnam.

VIETNAM. Hanoi: near Kien Khe, *Bon* s.n. (P!). Ha Tay: My Duc, Chua Huong, 28 May 1977, *Nguyen Thi Nhan* HN 111 (HN!); My Duc, Chua Huong, 1 July 1993, *Ha Thi Dung* HN 217 (HN!); Hoa Binh: Cho Bo, *Balansa* s.n. (P!); Kim Boi, 30 Aug. 1994, *Boyce & Nguyen Van Dzu* 857 (HN!, K!); Kim Boi, June 1926, *Colani* 3002 (holotype P!; isotypes K (photo!), SGN!); Kon Tum, Dak Glay, 29 March 1977, *Tran Ding Ly* HN 389 (HN!); Lang Son: Pac Mo, 23 March 1961, *Soviet-Vietnam Expedition* 1137 (LE!); Nghe An: from Phu Qui to Kebon, *Poilane* s.n. (P!, SGN!); Quy Chau, *Trinh Xuan Mai* HN 737 (HN!). Ninh Binh: Cuc Phuong Nat. Park, 6 Jan. 1963, *Nguyen Quo Chung* HN 2130 (HN!); Cuc Phuong Nat. Park, 17 Feb. 1971, *Hach* 26 CP (HN!); Cuc Phuong Nat. Park, 9 July 1971, *Tran Hop* HN 643 (HN!). The collection from Pac Mo, Lang Son prov., (*Soviet-Vietnam Expedition* 1137) was made close to the border with China. *Pothos grandis* is to be expected in that country.

**ECOLOGY.** Climber or hemiepiphyte on trees and cliffs of Karst limestone formations in fragments of very degraded lowland to lower hill evergreen forest. 75–250 m.

**VERNACULAR NAME:** Cóm lênh lábuói (Viet.).

*Pothos grandis* is most similar in appearance to *P. seemannii* Schott (SW China, Laos, Thailand, Vietnam) from which it may be separated by the larger leaves, the peduncle equalling the petiole (peduncle twice as long as the petiole in *P. seemannii*), larger, differently shaped spathe (ovate to ovate-lanceolate in *P. grandis*, ovoid in *P. seemannii*), the differently shaped, larger fertile portion of spadix (ovoid to clavate in *P. grandis*, ovoid in *P. seemannii*) and longer stipe.



FIG. 1. *Pothos insignis*. A flowering shoot  $\times \frac{1}{3}$ ; B sterile mature shoot  $\times \frac{1}{3}$ ; C flagellum  $\times \frac{1}{3}$ ; D inflorescence at pistillate anthesis  $\times 2$ ; E tepal, three-quarter adaxial view  $\times 10$ ; F stamen, adaxial view  $\times 10$ ; G gynoceium, side view  $\times 10$ . Drawn by Emmanuel Papadopoulos.

## SHOOT ARCHITECTURE

*Pothos grandis* displays the typical growth architecture and inflorescence presentation of most species of subgenus *Pothos* and can be used as a point of reference for a discussion of the majority of species of this subgenus in western Indomalesia. Species of the *Pothos scandens* L. group (subgenus *Pothos*), while conforming to the pattern of growth architecture described above, behave somewhat differently in the manner of inflorescence presentation. Discussion of this will be the subject of a future paper. Data concerning stem architecture in *P. insignis* Engl. (Borneo; subgenus *Allopothos*) were discussed by Boyce and Poulsen (1994, as sect. *Allopothos*).

Most species of subgenus *Pothos* in western Indomalesia appear to have the five-phase growth architecture described above for *P. grandis* (Fig. 2). A possible sixth phase, a modified version of the sterile mature growth, has been observed in three species of *Pothos* and is discussed below. The seedling stage is not known for all species in the subgenus but for those known, *P. scandens* L., *P. repens* (Lour.) Druce (syn. *P. loureirii* Hook. & Arn.), *P. longipes* Schott (see Hay, in press), *P. cathcartii* Schott and *P. yunnanensis* Engl., this phase consists of a skototropic (see Strong & Ray 1975) flagellar growth which, on reaching a suitable climbing surface, alters into a shingle climber with closely arranged or overlapping leaves of much the same shape as those found in the adult growth stages. The shingle stage appears to be monopodial but also produces simple branching systems by reiteration (sensu Hallé, Oldemann and Tomlinson 1978). The seedling phase continues until one or more as yet unknown factors (e.g. light and moisture levels, available nutrients) trigger the production of the sterile mature growth stage. This stage is a densely leafy, later naked, appressed monopodial climber rooting copiously from the nodes. The sterile mature growth phase does not branch terminally unless damaged when it then reiterates from a node usually some distance back from the damaged apex. However, this phase does occasionally transform terminally into a foraging flagellum as discussed above for *P. grandis*. At some point the sterile mature stage begins to produce fertile mature shoots from lateral buds. These fertile shoots are sympodial, of varying determinate lengths and often branch to several orders from lateral buds. They are generally moderately leafy, later becoming naked below. Fertile mature shoots eventually produce much-abbreviated lateral shoots consisting of a minute prophyll and one to several cataphylls and terminating in one to several sequentially-produced inflorescences. Occasionally fertile mature shoots transform terminally into a foraging flagellum.

In *P. scandens* (observed in cultivation at Kew), *P. macrocephalus* Scort. ex Hook. f. (observed in cultivation at Leiden), *P. repens* and *P. cathcartii* (both observed in habitat), the sterile mature growth phase occasionally produces exceptionally robust lateral branches in which the leaves, while of conventional shape and size, are tightly imbricated and not spreading. The factors triggering this modified growth phase are not known. It might represent another form of foraging shoot or, possibly, a means for the plant to reiterate from lower buds when the top growth carried begins to exceed the capability of the functional root mass. It is noteworthy that this type of sterile mature shoot reiteration has only been observed on plants of great size, most notably an immense specimen of *P. repens* covering

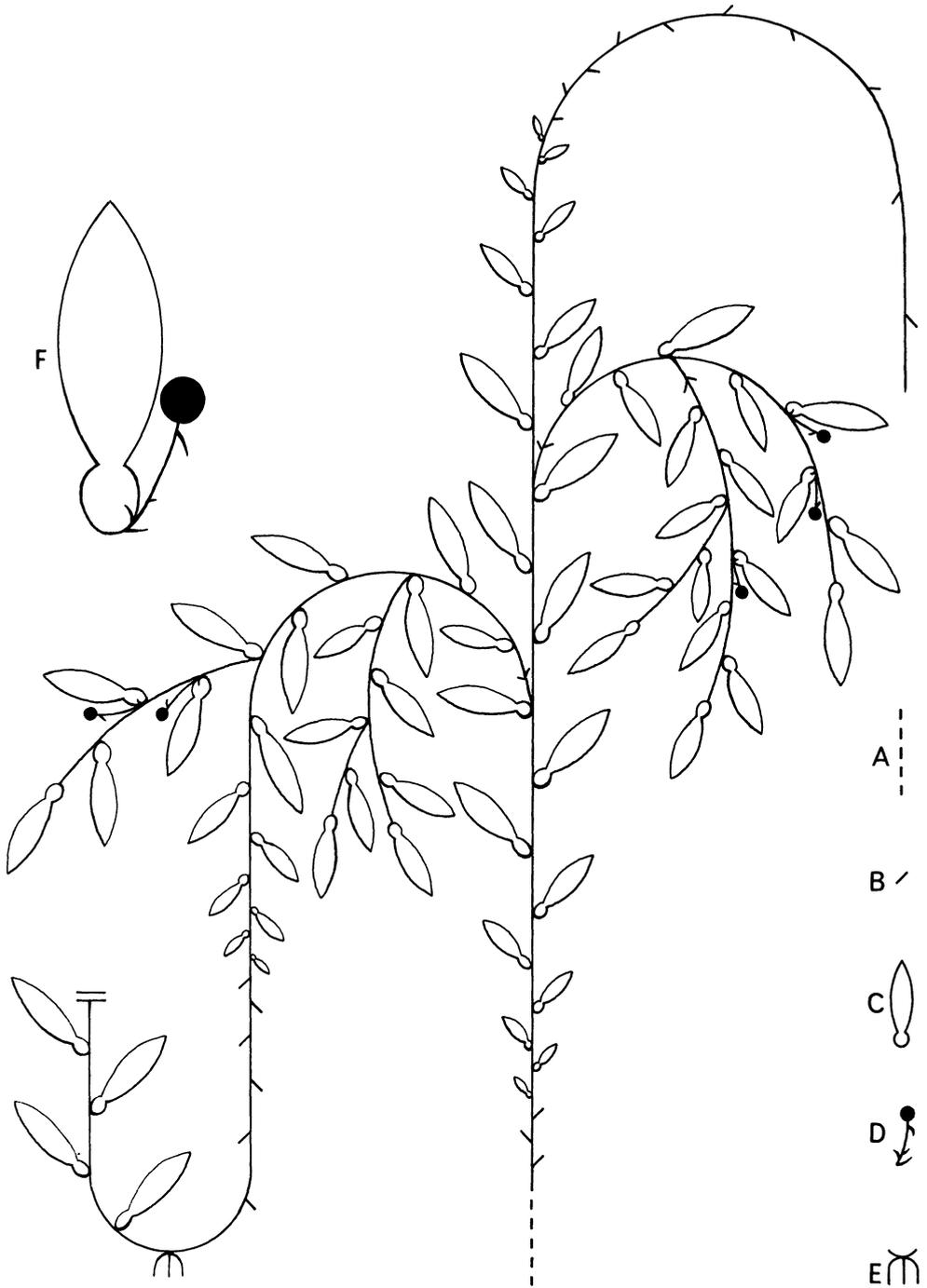


FIG. 2. Diagrammatic representation of growth habit of *Pothos* subgenus *Pothos* and inflorescence/leaf arrangement. **A** unknown seedling stage stems; **B** cataphylls; **C** foliage leaf; **D** short shoot terminating in an inflorescence; **E** rooted foraging stem; **F** leaf/inflorescence arrangement. Drawn by Emmanuel Papadopoulos.

almost an entire karst limestone formation at Man Duc, Hoa Binn province, Vietnam.

## ACKNOWLEDGEMENTS

We would like to thank Dr David Simpson and Dr Alistair Hay for their comments and suggestions and Mr Alan R. Radcliffe-Smith for the Latin translation of the diagnoses.

## REFERENCES

- Bogner, J. & Nicolson, D. H. (1991). A revised classification of *Araceae* with dichotomous keys. *Willdenowia* 21: 35–50.
- Boyce, P. C. & Poulsen, A. D. (1994). Notes on *Pothos insignis* (*Araceae: Pothoideae*). *Kew Bull.* 49(3): 523–528.
- Buchet, S. (1942). *Pothos grandis* apud Gagnepain in Lecomte, *Flore Général de l'Indo-Chine* 6, 1088. Paris.
- Engler, A. (1905). *Pothos*. In: A. Engler (ed.), *Das Pflanzenreich* 21(IV.23B): 21–44 (1905). Leipzig.
- Greuter, W. *et al.* (eds) (1994). *International Code of Botanical Nomenclature (Tokyo Code)*. Koeltz. Königstein.
- Hallé, F., Oldemann, R. A. A. & Tomlinson, P. B. (1978). *Tropical Trees and Forests; An Architectural Analysis*. Springer-Verlag. Berlin.
- Hay, A. (in press). The genus *Pothos* L. (*Araceae: Pothoeae*) in New Guinea, Solomon Islands and Australia. Submitted to *Blumea*.
- , Boyce, P. C., Hettterscheid, W. L. A., Jacobsen, N., Murata, J. & Bogner, J. (1995). A checklist of the *Araceae* of Malesia, Australia and the tropical western Pacific region. *Blumea Suppl.* 8.
- Hotta, M. (1976). Notes on Bornean Plants III. *Pedicellarum* and *Heteroaridarum*, two new genera of the aroids. *Acta Phytotax. Geobot.* 27: 61–65.
- Schott, H. W. (1857a). *Aroideae* Fasc. 6. Gerold et Fil. Vienna.
- (1857b). *Aroideae* Skizzirt. *Oesterr. Bot. Wochenbl.* 7: 69–70.
- Strong, D. R. & Ray, T. S. (1975). Host tree location behavior of a tropical vine (*Monstera gigantea*) by skototropism. *Science* 190: 804–806.