Notes on *Pothos insignis* (*Araceae: Pothoideae*)

P. C. BOYCE* & A. D. POULSEN**

Summary. Pothos insignis has recently been collected for the first time in Brunei. A new description based on all available collections of this hitherto obscure species is given. Observations on stem architecture in *Pothos* sect. *Allopothos* are presented.

INTRODUCTION

Ten species of *Pothos* have so far been collected in Brunei. These all belong to sect. *Allopothos* sensu Engler (1905), series *Longevaginati* (seven species) and series *Goniuri* (two species). The juvenile stage, probably of a further species, has also been gathered but cannot be named yet. So far no members of sect. *Pothos* ('*Eupothos*' sensu Engler 1905) have been collected in Brunei. From herbarium material seen in Leiden (L), Florence (FI) and Kew (K) it appears that sect. *Pothos* is restricted to the more mountainous regions of Borneo and is thus likely to be very local if it occurs in Brunei at all.

Gatherings of *Pothos* material in Brunei have mostly extended the known distributions of species common elsewhere in Malaysia, Indonesia and the Philippines, but some of the material represents only the third or fourth collection of species endemic to Borneo. Two collections made by one of us (ADP) belong to *Pothos insignis* Engler, a species first gathered by Beccari and previously known from only three localities in Sarawak.

The isotype of *P. insignis* at Kew is sterile, but vegetatively matches the Brunei gatherings. Comparison between the Brunei collections, the fertile holotype in Florence and an illustration of the species in Beccari (1882) does not reveal any significant differences. There are two further collections at Kew (*Ludong* S.31842 & *Mamit* S.32655) which are referable to this species. Both differ from the type and from the Brunei gathering in the shape of the petioles on the sterile mature stems. The petioles also have pronounced petiolar sheaths and the laminae have a slightly different, less pronounced, abaxial venation pattern. In other respects, especially in their inflorescences, they match the type well and clearly represent the same taxon.

Pothos insignis *Engler*, Bull. Soc. Tosc. Ortic. 4: 276 (1879) & Bot. Jahrb. Syst. 1: 180 (1881) & in Beccari, Malesia 1: 263, t. 17 (1882) & in Engler, Das Pflanzenr. 21 (IV.23B): 39 (1905). Type: Sarawak, Matang, *Beccari* PB953 (holotype FI!, isotype K!).

Accepted for publication September 1993.

*The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AE, U.K.
**Botanisk Institut, University of Aarhus, 68 Nordlandsvej, DK-8240, Risskov, Denmark.

Moderately slender, slightly branched, adpressed to 'hammock'-forming trunk climber to 3 m, main stem monopodial, apparently of indeterminate length, sterile, never branching terminally unless damaged; side branches sympodial, of determinate length, fertile, branching terminally after flowering (plant displaying Model of Stone, Hallé *et al.* 1978). Stem: Juvenile stem lengths unknown; mature sterile stem lengths straight to slightly flexuous, 3–5 mm diam., apparently of indeterminate length, naked, nodes distant, slightly prominent, c. 6–8 cm apart, stem rooting copiously from nodes, roots 0·75–1 mm diam.; mature post-fertile (see below) stem lengths straight, 5–7 mm diam., naked, nodes ± compacted, c. 1·5 cm apart, producing few, slender, tough roots, roots 0·5–2·5 mm diam.; mature fertile stem lengths quite strongly flexuous, 6–25 cm long, 4–6 mm diam., apparently of determinate length, completely and densely clothed by inflated, overlapping cataphylls, nodes compacted, c. 1·5 cm apart, producing few slender roots, roots c. 0·5 mm diam. *Leaf*: Juvenile leaves unknown; leaves on mature sterile stem: prophyll unknown, cataphyll unknown, petiole slender, strongly channelled, geniculate apically, 11–24 cm × 3–6·6 mm, geniculum prominent, 7–9 × 2 mm, extending beneath lamina, sheath initially conspicuous, c. 2–4 mm wide, later much reduced and present as a minutely erose margin along the entire petiole length and forming a smooth, flattened oblique ochrea above the geniculum; lamina (7–)0·5–34 × (2·5)5–14 cm lanceolate-elliptic, strongly oblique, base minutely cordate, apex attenuate with a 2–2·5 mm apiculum; leaves on mature fertile stems: prophyll unknown, all other leaves reduced to cataphylls, cataphylls 7–10 × 1·5–2 cm, oblong elliptic, robust, margins hyaline, apex drawn into a lamina 3–9 × c. 1 mm, margins erose. *Inflorescence*: peduncle 5 cm × 2–3 mm, greenish purple; subtending cataphyll c. 2 cm × 6 mm; spathe 4·5–5·5 × 1·5–3·25 cm, ovate-elliptic, base decurrent, apex acuminate, mid-green with a broad purple mark centrally and some purple staining apically, spathe reflexing at anthesis; spadix 3·5–5 cm × 4–6 mm overall; stipe 4–6 × 1·5–2 mm, decurrent into spathe limb, purple; fertile portion 4·2 cm, cream. *Flowers*: tepals 2 × 1 mm, oblong-cymbiform, apex cucullate, triangular, outer whorl slightly hirsute, inner whorl glabrous, cream with purple staining apically. Stamens: filament 1 × 0·5 mm, strap-shaped, thecae linear, 1 × 0·33 mm, dehiscing via longitudinal slits, cream, gynoecium 2 × 1 mm, 3-loculate, ovoid-ellipsoid, stylar region pointed, purple, stigma punctate, very slightly two-lobed, purple. *Infructescence*: peduncle 6–8 cm × 2–3 mm diam., greenish purple; spathe persistent into fruiting, becoming chartaceous; tepals much increased in size, up to 7 × 2·5 mm, and apparently functioning as protection for developing berries; filament remains abundant, chartaceous; berries flattened basally, turbinate apically, 5–10 × 2–3·5 mm, stylar region strongly pointed, young berries dark purple, tinged white, mature berries white with purplish stylar region; seed c. 2 mm diam., ovoid, usually only one developing per berry, greyish brown. (Fig. 1).

DISTRIBUTION. Brunei, Sarawak.

BRUNEI. Temburong: Sungai Belalong at Kuala Belalong, Batu Apoi Forest Reserve, ridge west of Kuala Belalong Field Studies Centre slope, 115°09'E, 4°33'N, 22 June 1991, *Poulsen* 180 (AAU! BRUN! K!); Sungai Belalong at Kuala

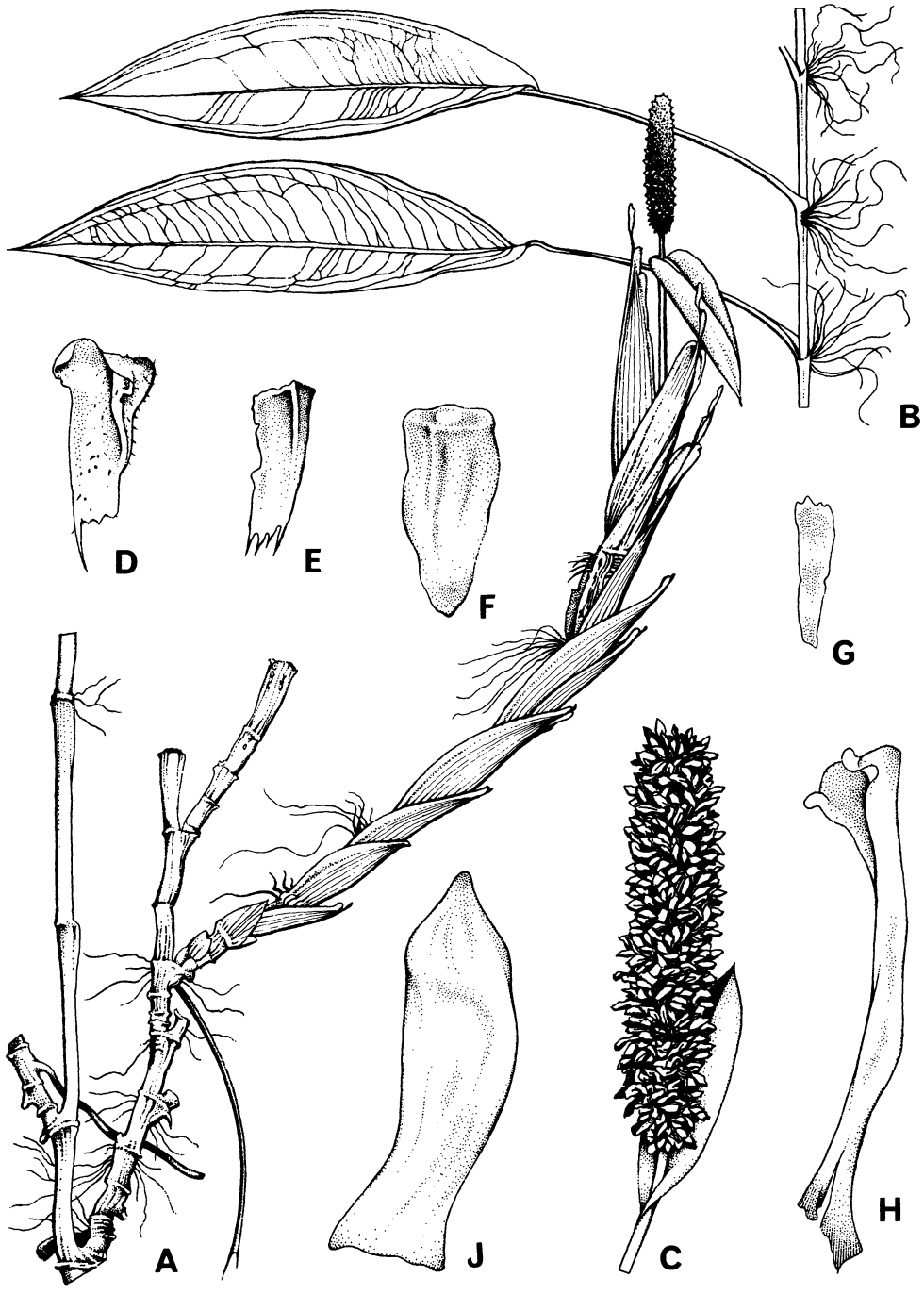

FIG. 1. *Pothos insignis*. **A** flowering stem × ⅓; **B** 'sterile mature' stem × ⅓; **C** semi-mature infructescence × ⅔; **D** outer whorl tepal × 10; **E** inner whorl tepal × 10; **F** ovary × 10; **G** filament remains from semi-mature infructescence × 10; **H** tepal from semi-mature infructescence × 10; **J** semi-mature fruit. Drawn by Emmanuel Papadopoulos.

Belalong, Batu Apoi Forest Reserve, Kuala Belalong Field Studies Centre, Webber Booth's Plot, 115°09'E, 4°33'N, 23 June 1991, *Poulsen* 183 (AAU! BRUN! K!).

SARAWAK. 1st Division: Matang, *Beccari* 953 (holotype FI! isotype K!); Tiang Bukop, 32 mile Padawan road, 13 Jan. 1973, *Mamit* S32655 (L! K! SAR!). 4th Division, Bukit Kala, Long Melinau, Paku, Tutoh, *Ludong* S31842 (SAR! K! L! SYD).

HABITAT. Hemiepiphytic trunk or treelet climber at base of ridges or near rivers in primary mixed dipterocarp forest on Setap shales or limestone. 70–100 m.

Pothos insignis is apparently allied to *P. rumphii* (Presl) Schott (1832) and *P. borneensis* Furt. (1935) in having long petioles with a petiolar sheath extending to the base of the geniculum, a relatively large, leathery spathe and robust tepals. *Pothos insignis* is distinguished from *P. rumphii* and *P. borneensis* by the manner in which the inflorescences are presented. In *P. insignis* new fertile stems arise from leafless, post fertile stems (see below). The new fertile stems are clothed along their entire length by inflated cataphylls each consisting of a greatly enlarged petiolar sheath terminated by a much reduced leaf lamina. From the apex of each fertile stem emerge the inflorescences, one at a time, each new inflorescence emerging as the previous one begins to fruit. It is unclear how many inflorescences a fertile stem produces before it dies, but a study of the scarring of post fertile stems suggests that it may be as many as twelve.

STEM ARCHITECTURE

Our observations of *Pothos* in the field and in herbaria show that there are four types of stem architecture displayed by the plants in sect. *Allopothos*. All members of the section investigated in Brunei pass through a juvenile phase. The seedling is a shade-orientated (skototrophic; (Strong & Ray 1975; Madison 1977)), climber which grows along the forest floor until a suitable climbing surface is encountered. The juvenile phases of all the species investigated have ovate to lanceolate, almost sessile, distichously arranged leaves. Once a climbing surface is reached the plants often form a distinctive 'shingle' climber with the leaves overlapping in the manner of roof tiles. Such 'shingle' climbers are abundant on the lower parts of tree trunks. The 'shingle' stage continues for approximately 2 metres when, abruptly, adult leaves are produced with long petioles and lanceolate to elliptic laminae. This transition marks the beginning of the second type of stem architecture known as 'sterile mature'. It appears that many *Pothos* species remain at this growth stage for a considerable time, the sterile mature stems continuing growth and often branching repeatedly from the lower parts, especially in series *Goniuri*. It should be noted that while the 'shingle' stage is always closely attached to the substrate by roots from the nodes, the sterile mature stems are often scandent, forming 'hammocks' in the canopy and only rooting at distant nodes. Eventually sterile mature stems branch from the older, often leafless, lower parts, giving rise to fertile mature stems. These fertile stems, although initially produced from the mature sterile stem, later give rise, themselves, to new fertile stems which are produced from post fertile portions, usually the older mid-portions, the whole structures eventually forming a much-branched system. Each plant may

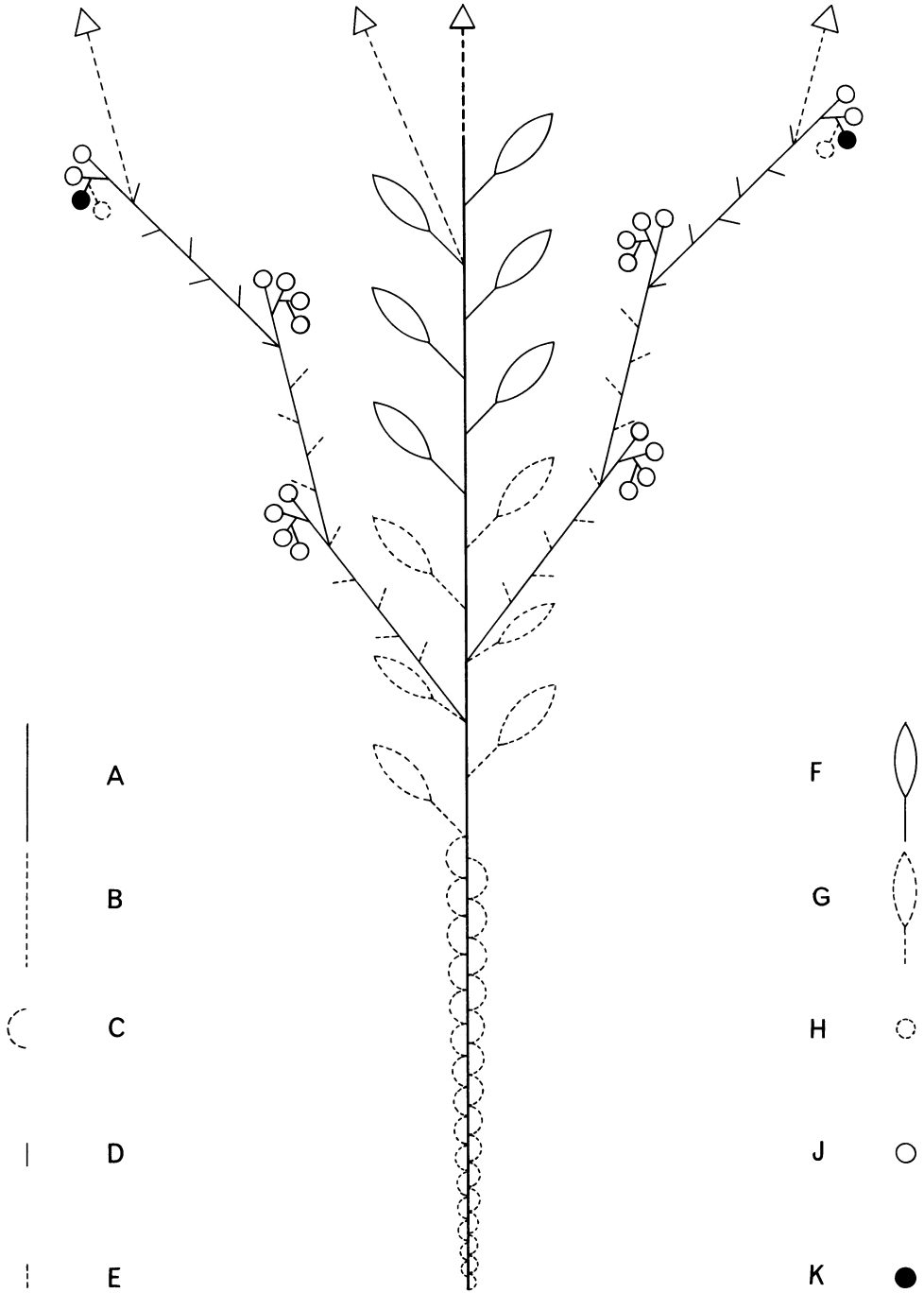

FIG. 2. Diagrammatic representation of growth habit of *Pothos* sect. *Allopothos*. **A** *in situ* stems; **B** stems yet to develop; **C** fallen juvenile 'shingle' leaves; **D** *in situ* cataphylls; **E** fallen cataphylls; **F** *in situ* leaf; **G** fallen leaf; **H** inflorescence yet to develop; **J** post-anthesis inflorescence; **K** inflorescence at anthesis. Drawn by Emmanuel Papadopoulos.

bear many such systems (see Fig. 2).

The most important observation about this differentiation of stem function is that while the juvenile sterile and mature sterile stems are apparently monopodial, the fertile mature stems are sympodial. Although this growth habit does occur in other species of sect. *Allopathos*, it is difficult to observe because these species have densely aggregated flowering stems. *Pothos insignis* has fertile mature stems of sufficient size to make the stem architecture readily observable.

References

Beccari, O. (ed.), Malesia 1: 261–304, t. 16–28. Genova.

Engler, A. (1879). *Araceae* specialmente Bornensi e Papuane raccolte da O. Beccari. Bull. Soc. Tosc. Ortic. 4: 265–271, 295–302 (1879).

—— (1881). Beiträge zur Kenntniss der *Araceae*. I. 1. Neue Araceen vom indischen Archipel. Bot. Jahrb. Syst. 1: 179–190.

—— (1882). *Araceae*. In Beccari, O. (ed.), Malesia 1: 261–304, t. 16–28. Genova.

—— (1905). *Pothos*. In Engler, A. (ed.), Das Pflanzenreich 21(IV.23B): 21–44 (1905). Leipzig.

Furtado, C. X. (1935). *Araceae* Malesicae. Gard. Bull. Straits Settlem. 8: 145–158.

Hallé, F., Oldemann, R. A. A. & Tomlinson, P. B. (1978). Tropical Trees and Forests; An Architectural Analysis. Springer-Verlag. Berlin.

Madison, M. (1977). A revision of *Monstera* (*Araceae*). Contrib. Gray. Herb. 207: 3–100.

Schott, H. W. (1832). *Pothos*. In Schott, H. W. & Endlicher, S. F. L., Meletemata Botanica 17. Vienna.

Strong, D. R. & Ray, T. S. (1975). Host tree location behavior of a tropical vine (*Monstera gigantea*) by skototropism. Science 190: 804–806.