
Nephtytis Schott (Araceae) in Borneo: A New Species and New Generic Record for Malesia

A. Hay

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

J. Bogner

Botanischer Garten, Menzinger Str. 63, D-80638 München, Germany

P. C. Boyce

Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, U.K.

ABSTRACT. *Nephtytis bintuluensis* A. Hay, Bogner & P. C. Boyce is here first described from plants collected near Bintulu, Sarawak, East Malaysia. The genus was hitherto known only from western tropical Africa.

During fieldwork in January/February (A. H.) and February/March (J. B. & P. C. B.) 1994 pertaining to the preparation of accounts of Araceae for *Flora Malesiana* (Hay, 1994) and related projects, several small populations of an aroid, including a single flowering individual and two in fruit, not matching any Malesian genus, were found in remnant lowland rainforest near Bintulu in Sarawak, East Malaysia. Attention had originally been drawn to the existence of this plant by Arden Dearden, a private horticultural collector in Queensland, Australia, who had found it, sterile, in 1990.

Nephtytis bintuluensis A. Hay, Bogner & P. C. Boyce, sp. nov. TYPE: East Malaysia. Sarawak: Bintulu, 2.3 km from bridge over Batang Kemena along road to Sibu, approximately 3°08'N, 113°05'E, 6 Feb. 1994, Hay, Yahud, Saupel & Chan 9376 (holotype, SAR). Figure 1.

Ab aliis speciebus *Nephtytidis* rhizomate hypogaeo, folio unico, venis primariis lateralibus inferioribus lobi antici valde patentibus, spadice sessile, stylo breve differt.

Solitary deciduous geophytic herb. Rhizome to ca. 40 cm long, often very straight and physiologically unbranched (but cf. Fig. 1), sympodial, usually horizontal, completely hypogaeal, ca. 1.2–2.0 cm thick, whitish, bearing the scars of numerous cataphylls and occasional leaves and inflorescences, internodes ca. 5 mm long, roots rather short, brittle, often somewhat sparse, few-branched. Leaf always solitary (except in one observed juvenile with two),

probably long-lived (epiphyllous cryptogams sometimes abundant), with the rhizome elongating several centimeters beyond its insertion, unarmed. Petiole erect, smooth, straight, slender, to ca. 90 cm long, mottled green and ivory, with a hardly thickened apical genicular zone ca. 4–10 cm long. Blade to ca. 60 cm long, hastosagittate, held obliquely with the posterior lobes down, mid-green, becoming dark green in old leaves, sometimes irregularly spattered ivory-white; anterior lobe subequaling the posterior lobes in length, \pm narrowly oblong-ovate, flaring rather abruptly at the marginal junction with the posterior lobes at a level 4–8 cm distal to the junction of the anterior and posterior costae, the tip acute, somewhat acuminate; posterior lobes \pm narrowly ovate, acuminate-tipped; venation reticulate throughout, primary lateral veins of costae impressed adaxially, prominent abaxially, mostly diverging at ca. 40–45°, except in the anterior lobe between the levels of the junction of anterior and posterior costae and the marginal junctions of the anterior and posterior lobes, wherein the primary lateral veins diverge at a much higher angle (up to ca. 85°), the posterior costae naked in the sinus for ca. 1.5 cm. Inflorescence solitary, terminal, separated from the foliage leaf by up to several centimeters of rhizome bearing the scars of previous inflorescences, subtended by a series of ivory-colored cataphylls of increasing length, the last reaching almost to the base of the spathe. Peduncle erect, ca. 17 cm long, slightly thicker than the petiole, smooth, pale greenish ivory. Spathe ca. 6.4 cm long, rather narrowly ovate when flattened, canoe-shaped (observed prior to anthesis), erect, ivory-white, somewhat coriaceous, unconstricted, with an ascending acumen 1.8 cm long and reflexed distally, the margins convolute basally. Spadix ca. 5 cm long, ca. 1.1 cm thick, sessile with oblique insertion, fertile male and female zones contiguous, appendix absent;

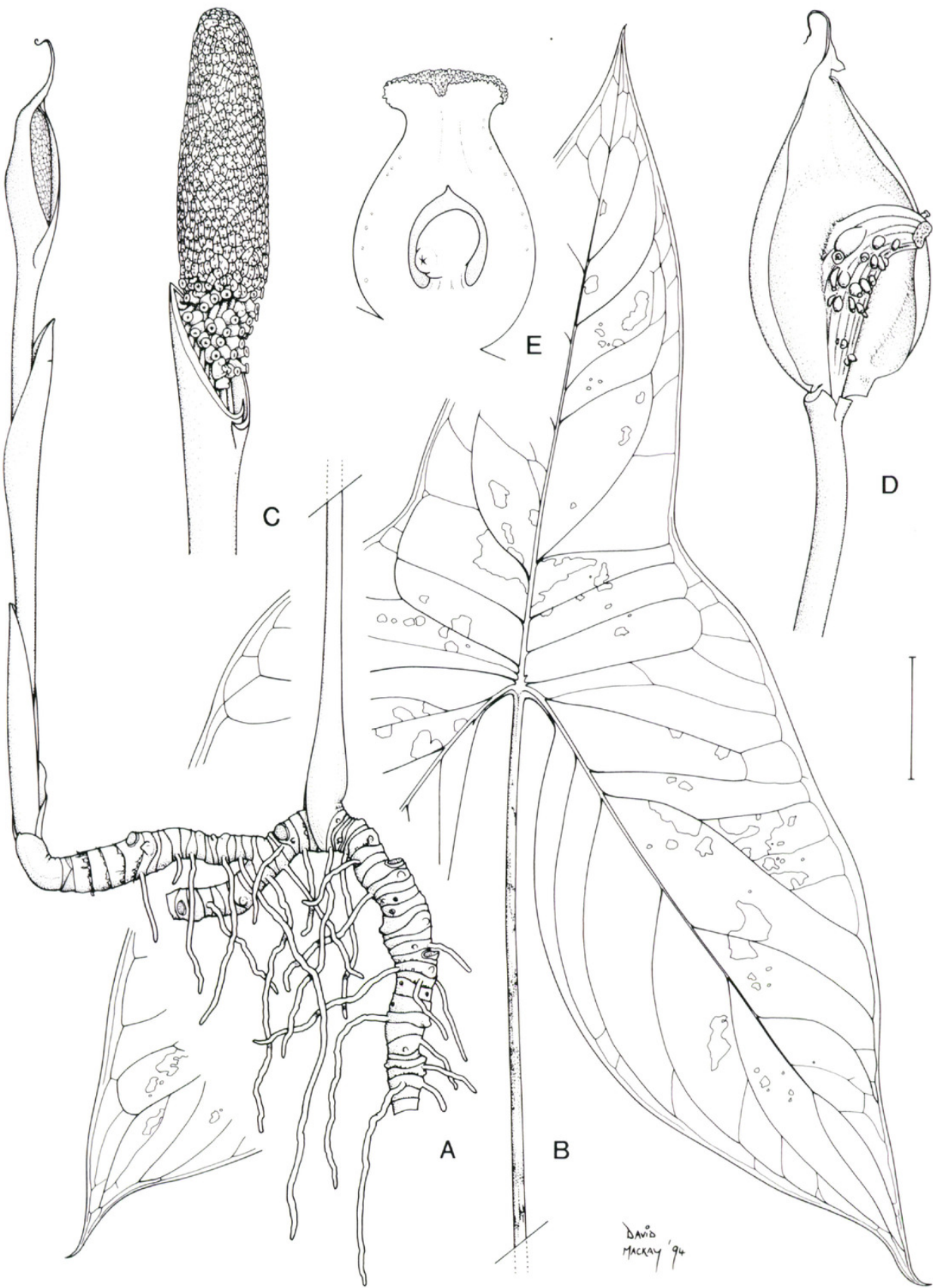


Figure 1. *Nephthytis bintuluensis* A. Hay, Bogner & P. C. Boyce, sp. nov. (based on Hay et al. 9376). —A. Rhizome with petiole base and inflorescence. —B. Leaf blade with outlines of variegation patterns. —C. Spadix. —D. Infructescence. —E. Pistil in longitudinal section. Scale bar for A, B = 3.5 cm; C, D = 1.5 cm; E = 1 mm.

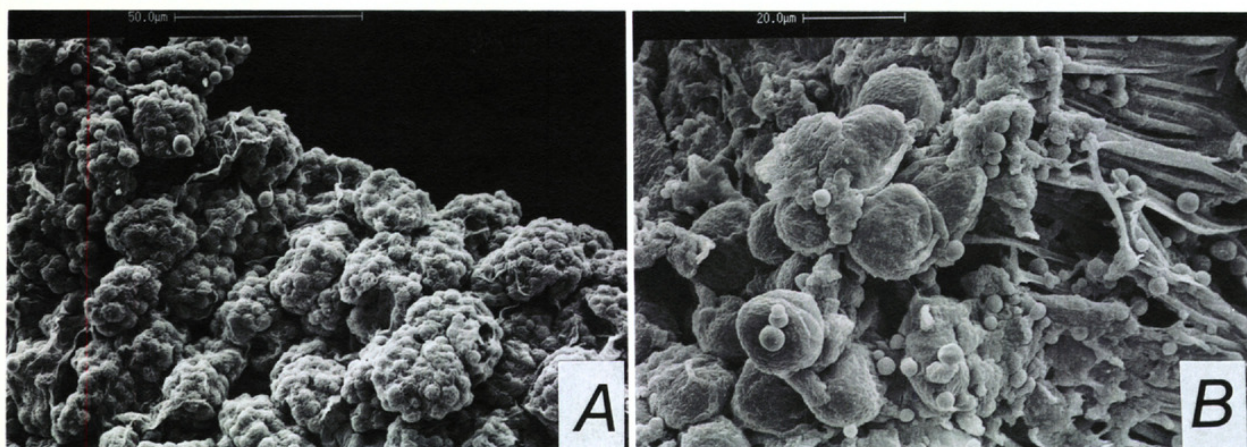


Figure 2. Scanning electron micrographs of pollen of *Nephtytis bintuluensis* (Hay et al. 9376). —A. Pollen grains completely covered by caducous subspherical verrucae. —B. Pollen grains (slightly collapsed) after most of the verrucae have fallen.

female zone ca. 1.2 cm long; pistils naked, not very close-packed, ca. 2.5 mm long \times ca. 1.2 mm diam., flask-shaped; stigma buttonlike, impressed centrally, minutely papillate, yellowish, raised on a short style; ovary unilocular; ovule solitary, anatropous, basal; male zone ca. 3.4 cm long, slightly tapering and blunt-tipped, ivory-white; individual male flowers hardly recognizable as such, ?3–4-merous, the male zone ostensibly a mass of stamens; stamens with very short, thick filaments; anthers truncate, with two thecae and four pollen sacs, ca. 1 \times 1.5 mm across, dehiscence not observed; pollen grains \pm globular, ca. 20–28 μ m diam., inaperturate, the rough exine covered with very easily dislodged \pm spherical verrucae of variable size ca. 2–4 μ m diam. (Fig. 2). Infructescence terminal (i.e., not displaced by further growth of rhizome until it has died), the peduncle not significantly enlarging after anthesis; spathe persistent, \pm wide open except for the somewhat inrolled margins, green marginally and distally, otherwise orange like the spadix and fruits; male portion of spadix deciduous, the female portion of the spadix axis somewhat enlarged; fruit subglobose, ca. 1.5 cm diam., bright orange; pericarp juicy, ca. 2–4 mm thick, orange; seed exalbuminous, without seed coat, hilum large, triangular, and somewhat sunken, embryo large, green, ellipsoid, ca. 1.2 \times 1.0 cm, plumule well developed and darker than rest of embryo. Chromosome number $2n = 36$.

Distribution. Known only from the type locality in lowland dipterocarp forest floor, or relictually in regrowth, usually on steep to moderate slopes, at ca. 150 m altitude.

We found the plants in very small remnant patches of lowland dipterocarp forest, growing both in the disturbed margin and in the understory. Since they

seem to be slow-growing, it would appear that those in the disturbed forest margin had persisted since prior to disturbance rather than become established afterwards. The single leaf in all observed adult individuals suggests that this plant is deciduous (other species of *Nephtytis* are evergreen—although the modules of the sympodium bear only one foliage leaf, the rhizome is multifoliar, or in unifoliar instances, e.g., *N. afzelii* Schott var. *graboensis* Bogner & Knecht (ined.), the break in leaf succession is not long enough to constitute a “resting” period). Most individuals had a fully expanded but young-looking leaf, while a few had evidently much older leaves (dark green and many epiphylls), which were nevertheless solitary. Dearden (pers. comm.) reported that in his cultivated plants of this species there is a distinct leafless resting period of several weeks. *Nephtytis bintuluensis* is geophytic, with the rhizome always completely buried up to ca. 15 cm deep in soil well below the litter layer, unlike the remainder of the genus where the rhizome creeps at the soil surface. The chromosome count of 36 for *N. bintuluensis* differs from the African species, in which $2n = 40$ or 60 (Petersen, 1989).

The new species is placed in *Nephtytis* because of the combination of laticifers, sympodial rhizomatous habit with each leaf subtended by cataphylls, entire hastosagittate [(sub-)triangular in *N. mayombensis* de Namur & Bogner (de Namur & Bogner, 1994) and *N. hallaei* (Bogner) Bogner (Bogner, 1969, 1980)] leaf blade with reticulate venation, monoecious spadix with naked unisexual flowers, the female zone not connate with the spathe, no appendix, truncate stamens, inaperturate pollen with caducous (cf. Thanikaimoni, 1969) verrucae, spathe persistent in infructescence, the large exalbuminous seed without seed coat (Seubert, 1993), conspicuous

hilum and green embryo, and in overall appearance (the latter factor further reducing the viability of argument that the individual generic characters of *Nephtytis* had arisen independently in this highly disjunct species). *Nephtytis* is separated from *Callopsiopsis*, the only other genus in which placement of this species could be considered, on the basis of the female zone of the spadix being entirely adnate to the spathe in *Callopsiopsis*, but free in *Nephtytis* [Bogner (1980) transferred his *C. hallaei* (Bogner, 1969) in which the female zone is free, into *Nephtytis*], and in the seed being albuminous in *Callopsiopsis* and exalbuminous in *Nephtytis* (Bogner, 1980; Seubert, 1993). Bogner (1980) and Grayum (1984, 1992) also noted that the exine surface is spinulose in *Callopsiopsis* and verruculose (or verrucate) in *Nephtytis*, the latter also observed by Knecht (1983). Moreover, the spathe is conspicuously petaloid in *Callopsiopsis*, while it is bractlike in *Nephtytis*.

Immediate allies of *Nephtytis* are scandent *Cercestis* (including *Rhektophyllum*) and deciduous geophytic *Anchomanes* and *Pseudohydrosme* (Bogner & Nicolson, 1991; Knecht, 1983). Though Grayum (1990) placed *Anchomanes* and *Pseudohydrosme* in a separate tribe, he included it in his "*Nephtytis* alliance." Also allied are *Callopsiopsis* (already mentioned) and *Culcasia*. All of these genera are tropical African, *Nephtytis* itself hitherto restricted to rainforest areas of western tropical Africa. The last genus consensually allied with these is the soboliferous, arborescent neotropical *Montrichardia*. Until now, no species of any genus of the *Nephtytis* alliance has been recorded naturally anywhere in the Indomalaysian region. This find brings the number of aroid genera recognized for Malesia to 34 in a checklist of Australian, Malesian, and tropical western Pacific Araceae recently compiled by Hay et al. (in prep.).

While many angiosperm genera extend through tropical Africa and Indomalaysia [including *Rhapidophora*, *Arisaema*, *Amorphophallus*, *Remusatia*, *Sauromatum*, and *Pothos* (Madagascar) in the Araceae], Malesian-African tropical disjunctions were not known in aroids (Croat, 1979; Hay & Mabberley, 1991) and do not seem to be common generally. Examples from other families are *Ganophyllum* (Sapindaceae), *Allantospermum* (Ixonanthaceae, Madagascar and Malesia), *Nesphostylis* (Leguminosae-Papilionoideae, tropical Africa and Burma), and *Petersianthus* (Lecythidaceae) (Mabberley, pers. comm. and 1987).

Paratypes. EAST MALAYSIA. **Sarawak:** same locality as holotype, *Bogner 2164* (M, MO, US), *Boyce 727* (K), *Hay et al. 9307* (sterile, SAR; also cult. Hort. Reg. Bot. Sydney, accession no. 940461); Cultivated,

Cairns, Queensland, Australia, ex Bintulu, Sarawak, *Dear-den s.n.* (sterile, NSW).

Acknowledgments. A. H. is grateful to Conrad B. Fleming, who funded his fieldwork in Malaysia. The authors thank the Sarawak Forestry Department, in particular Yahud Bin Hj. Wat, Saupel B. Atot, and Chang Ban Sem, for generous assistance in the field, David Mackay (NSW) for the botanical drawing, Tony Martin (NSW) for the SEM photographs of pollen, David Mabberley (OXF) for drawing attention to other genera with somewhat similar distributions, Gitte Petersen (Københavns Universitet) for counting the chromosomes, and Wilbert Hetterscheid (L), Dan Nicolson (US), and the anonymous reviewers for helpfully commenting on the manuscript.

Literature Cited

- Bogner, J. 1969. Une nouvelle espèce du genre *Callopsiopsis* Engl. (Aracées) et considérations taxonomiques sur ce genre. *Adansonia* sér. 2, 9: 285–291.
- . 1980. On two *Nephtytis* species from Gabon and Ghana. *Aroideana* 3: 75–85.
- & D. H. Nicolson. 1991. A revised classification of the Araceae with dichotomous keys. *Willdenowia* 21: 35–50.
- Croat, T. B. 1979. The distribution of Araceae. Pp. 291–308 in K. Larsen & L. Holm-Nielsen (editors), *Tropical Botany*. Academic Press, London.
- Grayum, M. H. 1984. Palynology and Phylogeny of the Araceae. Univ. Microfilms International, Ann Arbor, Michigan.
- . 1990. Evolution and phylogeny of the Araceae. *Ann. Missouri Bot. Gard.* 77: 628–697.
- . 1992. Comparative External Pollen Ultrastructure of the Araceae and Putatively Related Taxa. *Monogr. Syst. Bot. Missouri Bot. Gard.* 43: 1–167.
- Hay, A. 1994. Araceae: An internationally co-ordinated major family for the accelerated Flora Malesiana Project. *Flora Malesiana Bull.* 11: 202–205.
- & D. J. Mabberley. 1991. 'Transference of Function' and the origin of aroids: Their significance in early angiosperm evolution. *Bot. Jahrb. Syst.* 113: 339–428.
- Knecht, M. 1983. Contribution à l'étude biosystématique des représentants d'Aracées de la Côte d'Ivoire. *Phanerogamarum Monographiae* Vol. 17. J. Cramer, Vaduz.
- Mabberley, D. J. 1987. *The Plant-book*. Cambridge Univ. Press, Cambridge.
- Namur, Ch. de & J. Bogner. 1994. Une nouvelle espèce de *Nephtytis* Schott (Araceae) en République du Congo. *Adansonia* sér. 4, 16: 71–74.
- Petersen, G. 1989. Cytology and systematics of Araceae. *Nordic J. Bot.* 9: 119–166.
- Seubert, E. 1993. Die Samen der Araceen. Koeltz, Koenigstein.
- Thanikaimoni, G. 1969. Esquisse palynologique des Aracées. *Inst. Franç. Pondichéry, Trav. Sect. Sci. Tech.* 5(5): 1–31.



Bogner, J., Boyce, Peter C., and Hay, A. 1994. "Nephthytis Schott (Araceae) in Borneo: a new species and new generic record for Malesia." *Novon a journal of botanical nomenclature from the Missouri Botanical Garden* 4, 365–368.
<https://doi.org/10.2307/3391445>.

View This Item Online: <https://www.biodiversitylibrary.org/item/14664>

DOI: <https://doi.org/10.2307/3391445>

Permalink: <https://www.biodiversitylibrary.org/partpdf/20966>

Holding Institution

Missouri Botanical Garden, Peter H. Raven Library

Sponsored by

Missouri Botanical Garden

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.