Studies on Monstereae (Araceae) of Peninsular Malaysia IV: The enigmatic *Rhaphidophora corneri* refound after 75 years

Peter C. Boyce[1,2], Zulhazman Hamzah[3] and Sofiman Othman[1]

[1]School of Biological Sciences, Universiti Sains Malaysia,
11800 USM, Pulau Pinang, Malaysia
[2]phymatarum@googlemail.com
[3]Faculty of Earth Science, Universiti Malaysia Kelantan,
Jeli Campus, Locked Bag 100,
17600 Jeli, Kelantan, Malaysia

ABSTRACT. *Rhaphidophora corneri* P.C.Boyce, a highly distinctive but hitherto poorly known species described from fragmentary material collected by E.J.H. Corner late in 1935 from Kemaman (Terengganu state in Peninsular Malaysia) has recently been refound in neighbouring Kelantan. A much-expanded species description is provided, along with new information pertaining to its ecology. A reinterpretation of possible relationships with other *Rhaphidophora* species is offered in light of these novel data. Photographs depicting newly observed vegetative morphology are provided.

Keywords. Monstereae, Peninsular Malaysia, *Raphidophora*

Introduction

The taxonomic revision of *Rhaphidophora* for Peninsular Malaysia and Singapore by Boyce (1999) included the description of a highly distinctive new species from Kemaman (Terengganu state) based on somewhat fragmentary material collected by E.J.H. Corner in November 1935. Despite the paucity of material (Fig. 1) Boyce noted at the time that "*Rhaphidophora corneri* is a remarkable species, unique in the genus by the manner of inflorescence production, small leaves with dense reticulate veins, and large perforations…", although the nature of the single specimen left many questions open.

During a preliminary survey of the aroids of Taman Negara Kuala Koh, Kelantan, in June 2010, a small population of *R. corneri* was located. A second more detailed survey by the second author in the following July revealed the population to be larger. These plants represent only the second ever collection, and enable expansion of the species description presented by Boyce, resolving several aspects of the plant's morphology. Furthermore, these additional data permit insight into possible relationships of *R. corneri* with other *Rhaphidophora* species.

Rhaphidophora corneri P.C.Boyce, Gard. Bull. Singapore 51 (1999) 183–256. TYPE: Malaysia, Kemaman, Terengganu, Ulu Kajang, 13 Nov 1935, *E.J.H. Corner SFN 30441* (holo SING!). (Fig. 1–3)

Small, rather slender, homeophyllous, leptocaul, liane up to 2.7 m height, with shoots extending along the ground for up to 2.4 m; seedling stage and pre-adult plants unknown; ***adult shoot*** architecture comprised of a much elongated, free or weakly clinging, physiognomically monopodial, leafy stem; ***stems*** smooth, without prophyll, cataphyll and petiolar sheath fibre, the internodes 1–14 × 0.5–0.7 cm long, with up to 31 internodes per module; branches arising almost perpendicular to main axis, up to 44 cm long, junction with main axis with a prominent corky leaf scar; roots one per node, adherent, stout, corky; ***leaves*** glossy medium green, erect or spreading on adult shoots, cataphylls and prophylls membranaceous, soon drying and falling; ***petiole*** narrowly canaliculate, pulvinate, 5–14 × 0.5–1.6 cm, smooth, apical and basal pulvini prominent; *petiolar sheath* obscure except for basal-most portion, extending to the apical pulvinus, sheath of newest leaf degrading into a very few feeble fibres, sheath soon falling to leave a proportionally wide, corky scar basally on the petiole; ***blade*** oblong-lanceolate, slightly oblique, 15–27 × 8–14 cm, sub-coriaceous, entire or with 1–4 perforations on the wider side, these large, ovate to rhomboid or trapezoid, often extending almost to the margin, base obtuse to weakly cordate, apex acute to acuminate with a slightly prominent apiculate tubule; mid-rib prominently raised abaxially, slightly raised adaxially; primary venation pinnate but distal-most veins becoming weakly reticulate and not reaching leaf margin, raised abaxially, raised (but weakly so) adaxially, 3–4 per side, alternate; interprimaries weakly reticulate to sometimes sub-parallel to primaries, slightly raised abaxially, weakly raised adaxially, often forming a weak reticulum; secondary venation reticulate, slightly raised abaxially, weakly raised adaxially; tertiary venation prominently reticulate. ***Inflorescence*** solitary, terminating a much-abbreviated specialised axis arising from the axil of a foliage leaf, with several inflorescences arising from sequential or semi-sequential leaf axils; ***peduncle*** terete, 1–1.3 × 0.2–0.25 cm; ***spathe*** canoe-shaped, thick, stout-beaked, c. 2.7–2.9 × 0.7–0.8 cm, soon caducous; ***spadix*** cylindrical, sessile, inserted slightly obliquely on peduncle, c. 2 × 0.4 cm; *stylar region* well developed, rounded-rhombohexagonal, c. 3 × 2 mm, convex to truncate, smoothly rounded; stigma impressed, irregularly elliptic, longitudinally oriented, c. 1 × 0.5 mm; *stamens* elongating at anthesis; *filaments* lorate, c. 2.5 × 1 mm; *anthers* ellipsoid, bluntly rostrate terminally, c. 1.5 × 0.6 mm; mature *infructescence* not observed.

Distribution. Peninsular Malaysia: Terengganu (Kemaman) and Kelantan (Kuala Koh).

Habitat. Perhumid lowland mixed dipterocarp forest on ridgetops and flat open areas, 80–100 m asl.

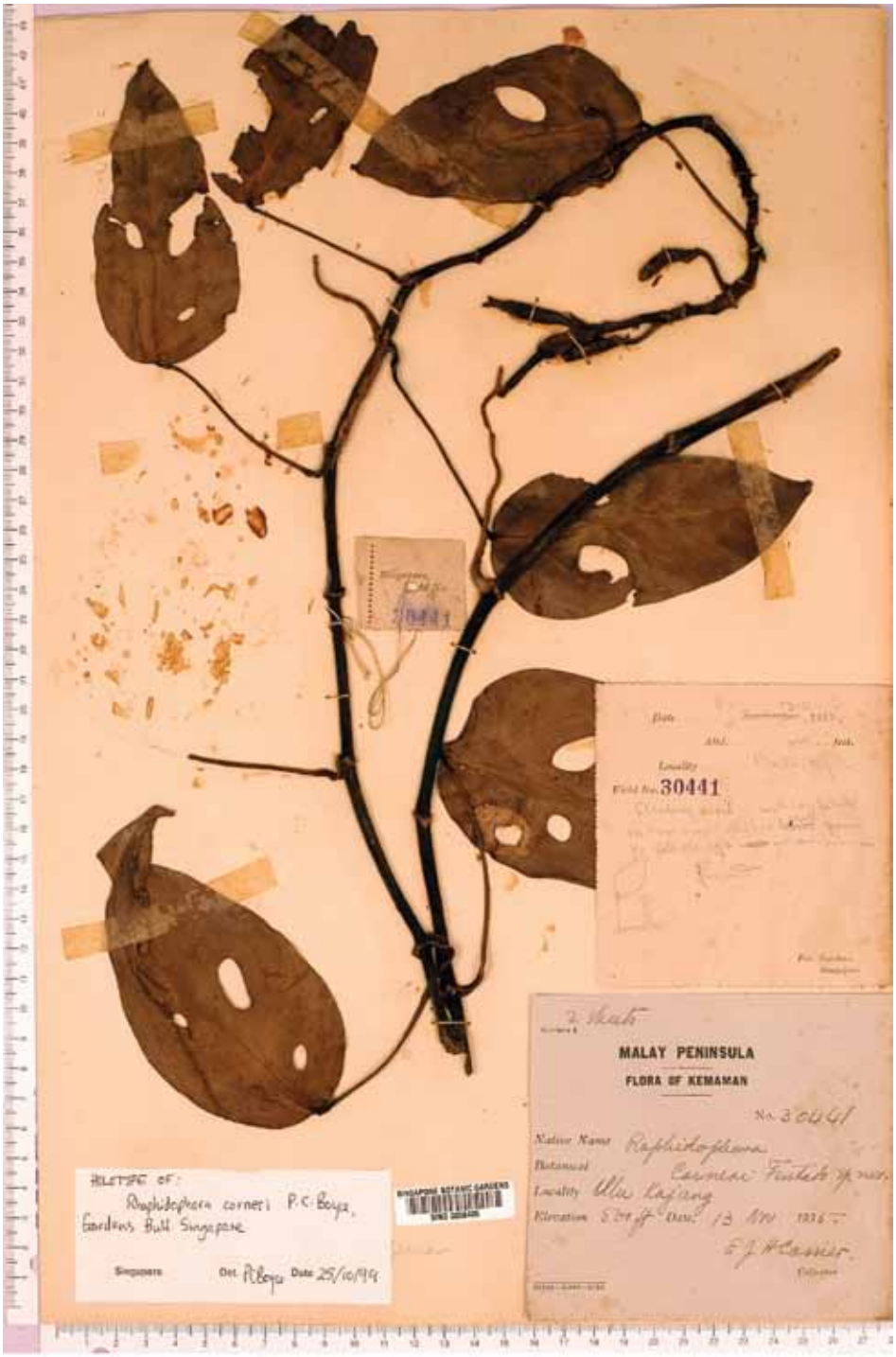

Fig. 1. *Rhaphidophora corneri* P.C.Boyce. Holotype: *E.J.H.Corner SFN 30441* (SING).

Fig. 2. *Rhaphidophora corneri* P.C.Boyce. **A.** Terrestrial population. **B.** Climbing axis. **C.** Adult leaf blade, adaxial view. (Photos: Zulhazman H.)

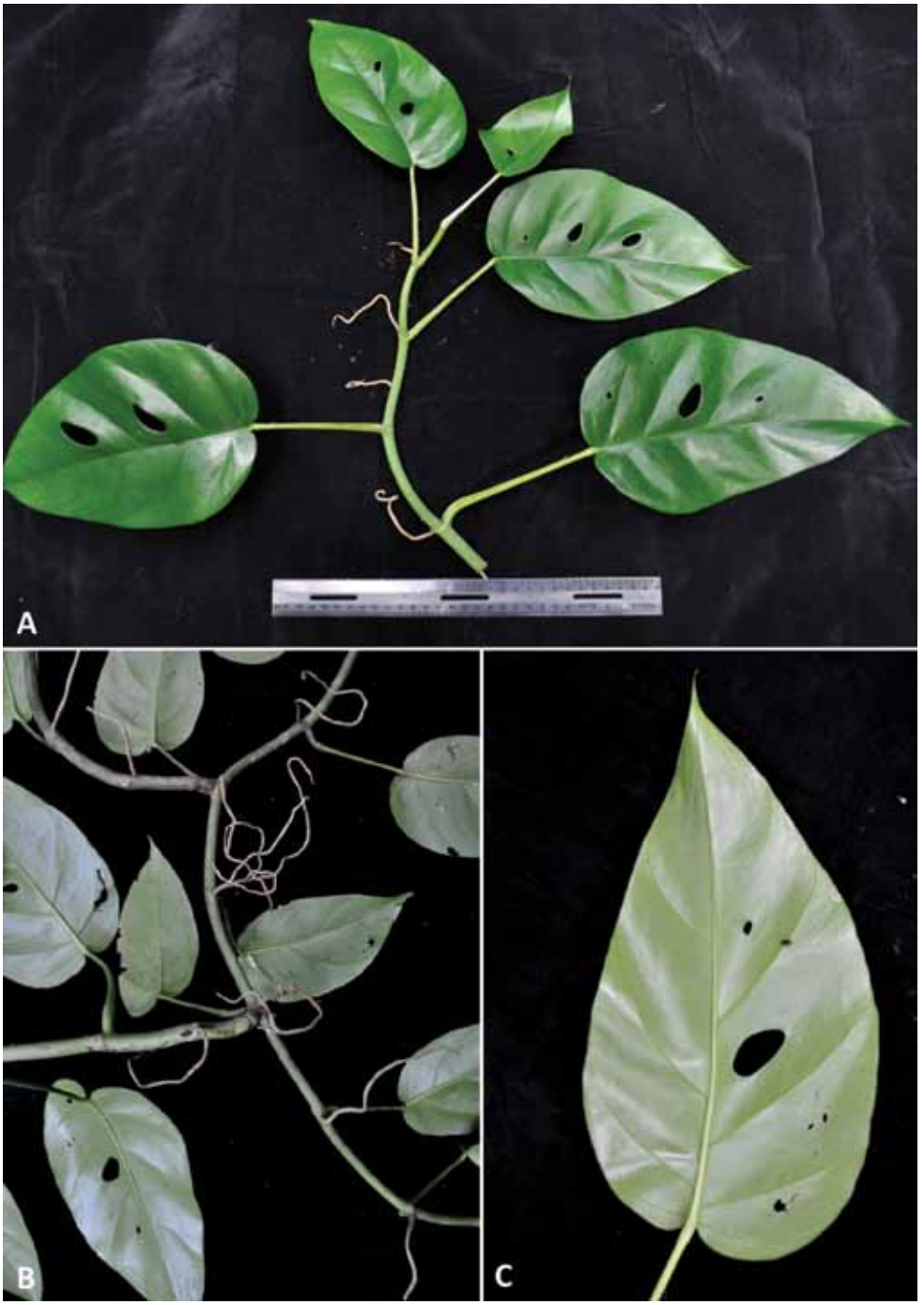

Fig. 3. *Rhaphidophora corneri* P.C.Boyce. **A.** Adult shoot, leaves in adaxial view; note the single root arising from each node. **B.** Adult shoot, abaxial view. The lateral branches arise almost perpendicularly to the main axis. **C.** Adult leaf blade, abaxial view. (Photos: Zulhazman H.)

Other specimen examined: Malaysia, Kelantan, Kuala Koh National Park, 4º52'5.37''N 102º26'31.2"E, 1 June 2010, *Zulhazman H.UMK00031* (Herbarium Universiti Malaysia Kelantan, Faculty of Earth Science, UMK).

Notes. Boyce (1999) speculated that the manner of inflorescence production in *R. corneri*, as then understood—several inflorescences together, each subtended by a cataphyll—indicated a close relationship with the New Guinean *R. ledermannii* Engl. & K.Krause and *R. versteegii* Engl. & K.Krause (Spathacea Group: see Boyce 2000, 2001a, b). However, re-examination of the single flowering shoot on the holotype of *R. corneri* (SING), coupled with insights provided by the hitherto unknown vegetative morphologies presented here, suggest that *R. corneri* is markedly more similar to Peninsular Malaysian *R. tetrasperma* Hook.f., and through this probably related to morphologically congruent taxa such as *R. pertusa* (Ridl.) Schott and *R. nicolsonii* P.C.Boyce. The taxa together form a distinctive and hitherto unrecognised morphotaxon—the Pertusa Group.

The holotype collection of *R. corneri* is, as remarked, somewhat fragmentary. The single flowering shoot bears four inflorescences; three post-anthesis and one in bud, and the entire inflorescence-bearing portion is leafless, with the last foliage leaf on the shoot situated some distance behind the first inflorescence, and that with a somewhat reduced blade. Along the inflorescence-bearing portion there are numerous conspicuous scars, with one scar associated with each of the post-anthesis inflorescences. Initial interpretation of the inflorescence-bearing shoot was that each inflorescence had been subtended by a prophyll/cataphyll, the scars being the result of this being shed, and that the inflorescence in bud marked the tip of a still-extending flowering axis. Such shoot morphology, albeit with the axis between each inflorescence considerably reduced, is found in the *Rhaphidophora* Spathacea Group (Boyce 2001b), while remarkably similar inflorescence architecture (but there certainly independently derived) occurs in *Pothos* L. (Araceae: Potheae), notably in *P. insignis* Engl. (Boyce & Poulsen 1994; Boyce & Hay 1997, 2001).

At the time of the first examination (late 1997), the age and fragility of the holotype material, its unique nature, and nomenclatural importance, precluded further (destructive) examination. More detailed examination has now been enabled, aided by digital enhancement, and we are now of the belief that the probable origin of the scars subtending each of the inflorescences is result of the loss of *foliage* leaves rather than prophylls or cataphylls and that the flowering shoot is better interpreted as having originally comprised solitary inflorescences, each terminating a much-abbreviated specialised axis arising from the axil of a foliage leaf. This is exactly the manner in which *R. tetrasperma* produces inflorescences (see Fig. 4).

Vegetative characteristics revealed by this rediscovery support the new interpretation presented here. *Rhaphidophora corneri*, together with all species in the Pertusa Group, has green, smooth stems, and bears foliage leaves at all except the first few congested nodes of a new module. Virtually every node produces one or occasionally two roots that may either remain short and function as climbing

Fig. 4. *Rhaphidophora tetrasperma* Hook.f. Holotype: *Fr B. Scortechini 169b* (K).

roots, or extend to the ground as feeder roots. Leaf blades in the group are always irregularly perforated and/or irregularly pinnate. All species have one or more primary axes which remain sterile and produce lateral shoots, along which are fertile nodes (Stone's Model—see Hallé & Oldeman 1970*;* Hallé, Oldeman & Tomlinson 1978). Inflorescences are born on very short lateral shoots arising from the axils of foliage leaves towards the ends of moderately elongated, lateral shoots.

ACKNOWLEDGEMENTS. The authors would like to acknowledge the Department of Wildlife and National Parks, Peninsular Malaysia (PERHILITAN) for allowing them to conduct the study in the Kuala Koh National Park. Special thanks to Mr. Nik Yuszrin Yusof, Ms. Naziah Zaid and Ms. Norzielawati Salleh for their kind assistance in our work. The first author's fieldwork was supported by USM Grant No: 1001/ JNC/ AUPRM001. The second author's project is funded by Universiti Malaysia Kelantan through short-term research grant R/SGJP/ A03.00/00279A/001/2009/000021 via the Faculty of Agro Industry & Natural Resources.

References

Boyce, P.C. (1999) The genus *Rhaphidophora* Hassk. (Araceae-Monsteroideae-Monstereae) in Peninsular Malaysia and Singapore. *Gard. Bull. Singapore* 51: 183–256.

Boyce, P.C. (2000) The genus *Rhaphidophora* Hassk. (Araceae-Monsteroideae-Monstereae) in the southern and western Indonesian archipelago. *Gard. Bull. Singapore* 52: 101–183.

Boyce, P.C. (2001a) The genus *Rhaphidophora* Hassk. (Araceae-Monsteroideae-Monstereae) in Borneo. *Gard. Bull. Singapore* 53: 19–74.

Boyce, P.C. (2001b) The genus *Rhaphidophora* Hassk. (Araceae-Monsteroideae-Monstereae) in New Guinea, Australia and the tropical western Pacific. *Gard. Bull. Singapore* 53: 75–183.

Boyce, P.C. & Hay, A. (1997) Diversity in shoot architecture in *Pothos* (Araceae: Pothoideae): Observations towards a new infrageneric classification. In: J. Dransfield et al. (eds) *Plant Diversity in Malesia III,* pp. 51–58.

Boyce, P.C. & Hay, A. (2001) A taxonomic revision of Araceae tribe Potheae *(Pothos*, *Pothoidium* and *Pedicellarum*) for Malesia, Australia and the tropical Western Pacific. *Telopea* 9(3): 449–571.

Boyce, P.C & Poulsen, A.D. (1994) Notes on *Pothos insignis* (Araceae: Pothoideae). *Kew Bull.* 49(3): 523–538.

Hallé, F. & Oldeman, R.A.A. (1970) *Essai sur l'Architecture et la Croissance des Arbres Tropicaux.* 178 pp. Paris: Masson et Cie.

Hallé, F., Oldeman, R.A.A. & Tomlinson, P.B. (1978) *Tropical Trees and Forests; An Architectural Analysis.* 441 pp. Heidelberg: Springer-Verlag.