

# New species of *Araceae* from Brunei

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*Summary.* *Schismatoglottis gilliana*, *S. cyria* and *Homalomena vagans* are described as new from Brunei.

## INTRODUCTION

During work on a botanical inventory of Brunei Darussalam, a collaborative programme between Forestry Department Brunei Darussalam and the Royal Botanic Gardens, Kew, it became apparent that two new species of *Schismatoglottis* and a new species of *Homalomena* were represented among the collections at Kew (K), Edinburgh (E), Aarhus (AAU), Leiden (L) and the Forestry Department, Brunei (BRUN). These are here described outside of the context of the proposed Botanical Inventory in accordance with the Inventory's requirements.

## TWO NEW SPECIES OF *Schismatoglottis* FROM BRUNEI

The genus *Schismatoglottis* Zoll. & Moritzi is especially diverse in Brunei but poorly understood. Many existing collections have proved to be difficult to identify and it is possible that a full revision of the genus in Brunei will reveal many new taxa. Six collections, representing two taxa, which could not be matched with any of the known species of the region are described here as new species.

***Schismatoglottis gilliana*** P. C. Boyce sp. nov., a *S. monoplacenti* foliis angustis oblanceolatis, ovariis crassis, stigmatibus quam ovarium latiore, inflorescentiis gracilibus, staminodiis trapezoidis non clavatis diagnoscenda, a *S. parviflora* et *S. homalomenoidea* spatha caduca non persistente distinguenda. Typus: Brunei, Coode *et al.* 6313 (holotypus K!; isotypi BRUN!, L!).

Relatively small, pendent to suberect rheophytic herb 15–50 cm long. *Stem*: a condensed rhizome, 1.5–3 × 0.5–1 cm, obscured by sheathing, overlapping leaf bases; rooting basally and from between leaf bases, anchor roots tough, 1–3 mm diam., deep rooted or extending over wet rocks, feeding roots 0.2–0.5 mm diam., spreading variously in the substrate. *Stem sympodia*: polyphyllous, stems reiterating by basal branching. *Leaf*: prophyll 3–6 cm × 3–6 mm, lanceolate; petiole slender, slightly 'D' shaped in cross-section, 2.5–12.5 cm × 1–3 mm, base expanded into c. 3 mm wide petiolar sheath, pale to olive green, unmarked or tinged reddish, red basally, sheath 3–5 cm long, the upper ½–⅔ a ligular extension c. 2 mm wide; lamina 9–35 × 3–3.5 cm, narrowly oblanceolate,

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Accepted for publication January 1994.

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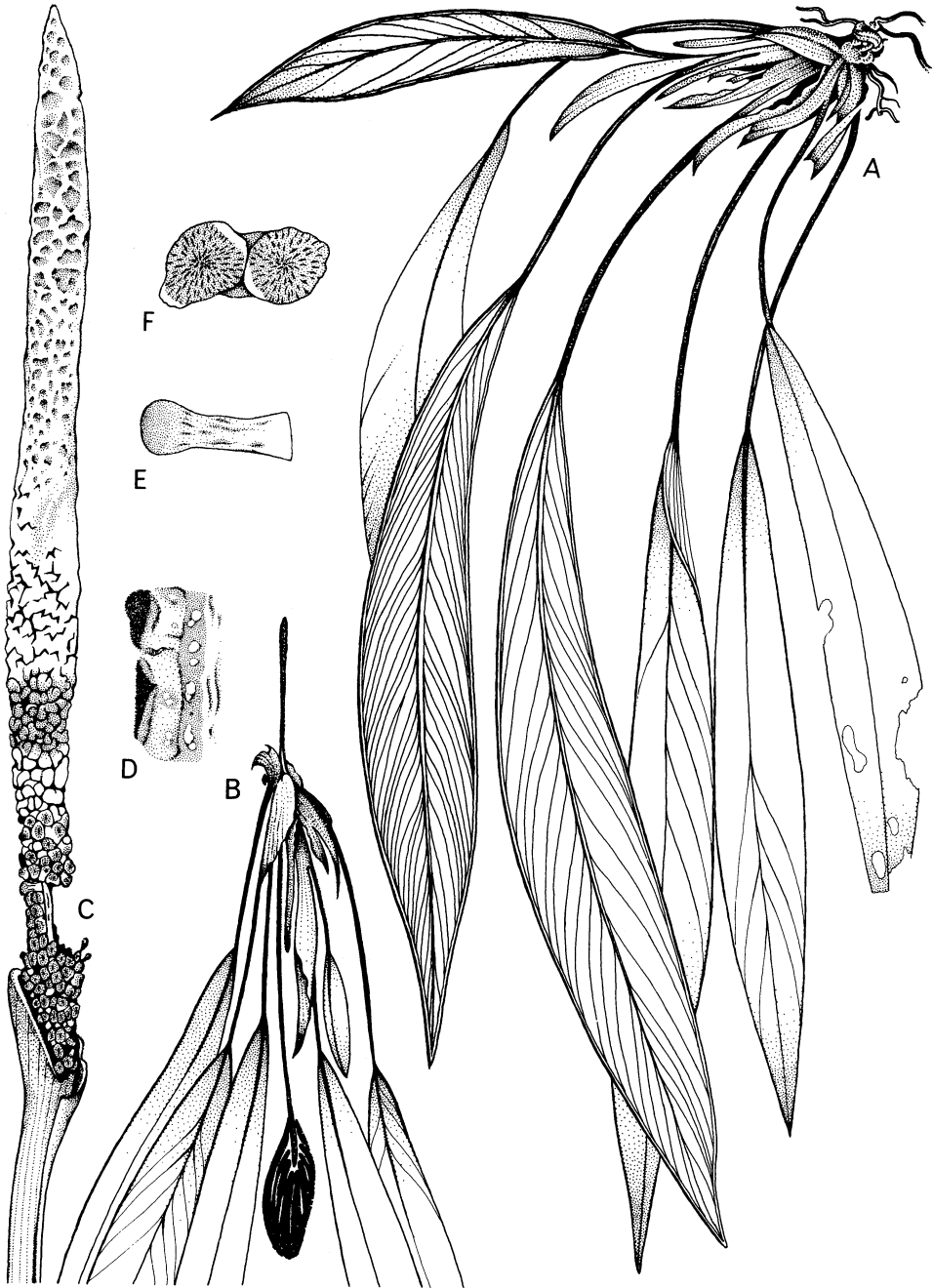


FIG. 1. *Schismatoglottis gilliana*. **A** habit  $\times \frac{1}{2}$ ; **B** fruiting plant with infructescence in centre of leaves  $\times \frac{1}{2}$ ; **C** spadix  $\times 2$ ; **D** two stamens, side view  $\times 14$ ; **E** lower staminode, side view  $\times 14$ ; **F** two gynocia, plan view  $\times 14$ . Drawn from Coode 6313 by Emmanuel Papadopoulos.

lamina (living) deep green adaxially, paler abaxially, (dry) pale to deep olive green adaxially, brownish green with prominent brown veins abaxially. *Inflor-escence*: peduncle 2–3.5 cm × 2–4 mm; subtending cataphyll 2–3.5 cm × c. 5 mm, ± tubular, acute; spathe 4–6 cm overall; lower part 1.5–2.5 × c. 5 mm, convolute, cream, tinged pink basally; upper part lanceolate, 2.5–4.5 × 1–1.5 cm, spadix 6 × 0.5 cm overall; sterile appendix 3 cm × 4 mm, tapering, flattened, especially distally; fertile male zone 13 × 4–5 mm, slightly fusiform; sterile zone 4 × 3–4 mm, obconoid; female zone 20 × 5 mm, cylindrical, slightly fusiform. *Flowers*: appendix staminodes c. 1 × 1 mm, trapezoid to polygonal, densely arranged; stamens 1–1.5 × 1–1.5 mm, polygonal, densely arranged; lower staminodes 0.75–1 mm oblong to slightly polygonal, rather laxly arranged; gynoeceum 1 × 1 mm, the lower part flattened in section, upper part ± circular, gynoeceum oblong to square in plan view, stigma circular, slightly exceeding the ovary, c. 1.1 mm diam., stigma surface papillate; locules 1 per ovary, placenta 1, parietal, ovules 3–5 per locule. *Infructescence*: peduncle 8 cm × c. 2 mm; fruiting spathe 4 × 1.5 cm, ellipsoid, truncate apically, green, firm, ripening to become watery and squashy; seed 0.75 × 0.5 mm, ellipsoid. (Fig. 1).

DISTRIBUTION. Brunei.

BRUNEI. Belait: Labi, Kampung Teraja, path along Sungai Teraja, 4°17' N, 114°25' E, 6 June 1989, *Boyce et al.* 254 (BRUN!, K!, L!). Tutong: Sungai Tutong between Benutan and Balabau, 27 March 1990, *Coode et al.* 6313 (holotype K!; isotypes BRUN! L!). Temburong: Sungai Temburong at Kuala Belalong, banks of Sungai Belalong, 4°32' N, 115°09' E, 24 June 1989, *Boyce et al.* 424 (BRUN!, K!, L!); Temburong river at Wong Nguan rapids, 9 April 1990, *Coode et al.* 6665 (BRUN!, K!); Selapon, banks of Sungai Selapon, upriver from village, 4°40' N, 115°12' E, 18 Nov. 1990, *Dransfield et al.* JD 6920 (BRUN!, K!, L!); Sungai Belalong at Kuala Belalong, 4°32' N, 115°09' E, 13 Feb. 1992, *Dransfield et al.* JD 7041 (BRUN!, K!).

HABITAT. Lowland primary dipterocarp forest on rocks above river or on riverbanks on Setap shales; 15–120 m.

Hotta (1966) described three species of *Schismatoglottis* with a single placenta, as opposed to the 2–4 placentas typical for the genus. Two of these species, *S. homalomenoidea* and *S. parviflora*, are closely related, having a persistent spathe-limb and a short, adnate petiolar sheath. The third species, *S. monoplacenta*, has a typical *Schismatoglottis* inflorescence with a caducous spathe-limb, but possesses a ligular extension to the petiolar sheath.

*Schismatoglottis gilliana* is related to *S. monoplacenta* in having a ligular extension to the petiolar sheath and a single placenta. It may be separated from *S. monoplacenta* by the narrow, oblanceolate leaves with decurrent bases, broader ovaries with stigmas slightly broader than the ovary, more slender inflorescence and narrower, longer staminodes.

Hotta & Bogner (1983) described *S. mayoana*, which also has a ligular extension to the petiolar sheath, but differs from *S. monoplacenta* in having, among other characters, two placentas. *Schismatoglottis gilliana* resembles *S. mayoana* in having a ligular extension to the petiole sheath, but can be differentiated by the presence of a single placenta, the narrower leaves, shorter petioles and longer, more

slender inflorescences.

*Schismatoglottis gillianae* differs from both *S. homalomenoidea* and *S. parviflora* in possessing a caducous, not persistent, spathe-limb.

The species is named after my wife Gillian.

**Schismatoglottis cyria** P. C. Boyce sp. nov., *S. latifoliae* similis, staminodis appendicis valde aggregatis, foliis oblongis non cordatis, statura magna differt; *S. megaphylla* spec. ined. Furtadae tangentis, staminodes non dense cerebriformis, foliis oblongis non cordatis distinguenda; ab aliis *Schismatoglottidibus* Borneensibus statura magna, foliis oblongis, inflorescentia valde rosea differt. Typus: Brunei, *Argent & Mitchell* 91/203 (holotypus E!; isotypi AAU, BRUN, K!, L).

Large erect herb to 1.2 m tall. *Stem*: a robust, condensed rhizome, 2.5 × 3 cm, partially obscured by sheathing, slightly distant leaf bases; outer epidermis mid-brown, cut flesh of stem pink, rhizome rooting from between leaf bases, roots 1.5–2 mm diam. *Stem sympodia*: oligo-monophyllous, modules in flowering-size plants separated by a conspicuous prophyll and a synflorescence. *Leaf*: petiole robust, slightly channelled adaxially, 91–102 cm × 4–13 mm, base considerably expanded at rhizome junction; sheath 4 cm × 4–6 mm, considerably thickened, entirely adnate to petiole; lamina 44 × 24 cm, oblong, base slightly cordate, truncate, shortly decurrent, apex slightly and abruptly-attenuate, lamina (living) dark green adaxially, paler abaxially, with impressed primary lateral veins, (dry) olive green adaxially, pale brownish green with prominent pale brown primary lateral veins abaxially. *Inflorescence* a sequential synflorescence of 5–7 inflorescences: subtending prophyll 12 cm × 5–8 mm, triangular-acuminate, tubular below, ligular above; peduncle 29 cm × 6 mm; spathe 10.5 cm overall, lower part c. 4.5 cm × 5–9 mm, convolute, very pale greenish pink; upper part c. 6 × 2.5 cm, lanceolate, pink; spadix 9.5 cm × 4–8 mm overall; sterile appendix 10 × 4 mm, tapering; fertile male zone 4 cm × 8 mm; sterile zone 2.5 cm × 3.5–8 mm; female zone 2.4 cm × 6 mm, conic, basally oblique. *Flowers*: appendix staminodes c. 1.5 × 0.5–0.7 mm, polygonal to trapezoidal or irregular-angular, moderately densely arranged, mid brown; stamens 0.75–1.5 × 1–1.5 mm, polygonal to cylindrical, densely arranged, apex triangular with large apical pores, stamens dark brown, heavily encrusted with white, cubic, crystalline granules; lower staminodes 0.5–0.75 × 1 mm, somewhat laxly arranged, dark brown; pistillodes 0.5 × 1 mm, clavate, loosely to somewhat densely arranged, dark brown, stylar region bright, salmon-pink, gynoeceum 1–1.25 × 0.5–0.75 mm, oblong to slightly flask-shaped, stigma capitate, disc-like, equalling to slightly broader than ovary, stigma surface slightly scabrate, shiny; locules 1 per ovary, placenta (2–)3, ovules 12–20 per locule. *Infructescence*: (immature) c. 4.5 cm × 10 mm, enclosed by the persistent lower spathe, pale green, tip with withered upper spathe remains. (Fig. 2).

DISTRIBUTION. Brunei.

BRUNEI. Temburong: Kuala Belalong, Sungai Engkiang, above Kuala Belalong, 4°30' N, 115°10' E, 6 May 1991, *Argent & Mitchell* 91/203 (holotype E!; isotypes AAU, BRUN, K!, L).

HABITAT. Wet, shaded cliff by river. c. 70 m.

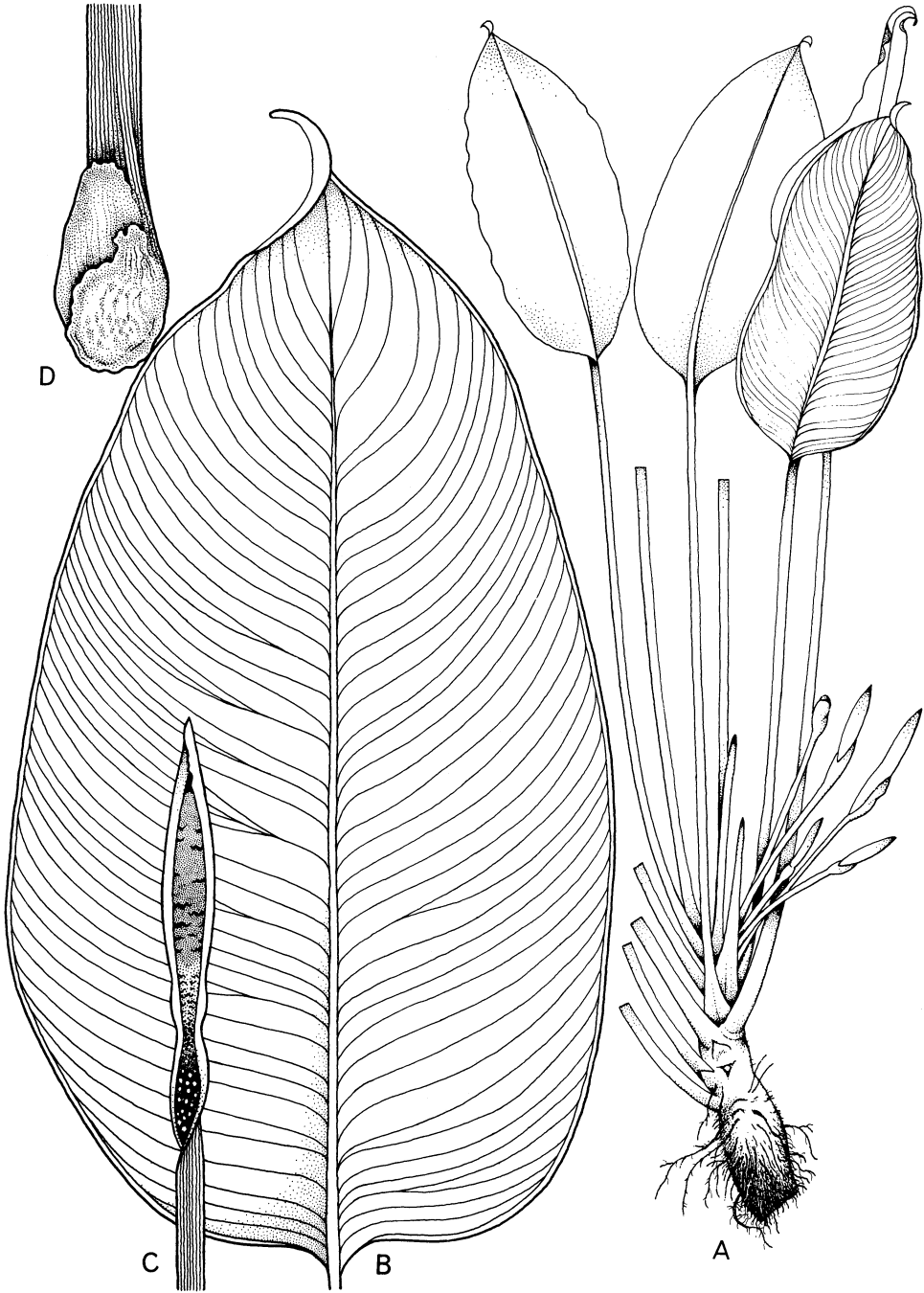


FIG. 2. *Schismatoglottis cyria*. A habit  $\times 1/9$ ; B leaf blade  $\times 1/3$ ; C inflorescence with front of spathe removed  $\times 1/2$ ; D petiole base  $\times 1/2$ . Drawn from *Argent & Mitchell* 91203 by Emmanuel Papadopoulos.

This remarkable new species is apparently related to *S. latifolia* Miq. (Miquel 1856: 214), a robust, cordate-leaved species described from Java but also occurring in east Kalimantan, Borneo. Both display stamens with a triangular apex, large thecae dehiscing via gaping apical pores and a fertile female zone with scattered clavate staminodes. *Schismatoglottis cyria* is distinguished from *S. latifolia* mainly on characters of the staminodes comprising the spadix appendix. In *S. latifolia* the spadix appendix has a homogeneous mosaic-like surface formed by the tops of tightly-adpressed clavate, truncate staminodes. In *S. cyria* the spadix appendix is comprised of somewhat loosely arranged narrowly cylindrical staminodes with a truncate, irregular top surface and does not have a homogeneous surface.

The stamens in *S. latifolia* are somewhat broader and do not display the striking crystalline substance noted in dried material of *S. cyria*. The origin of this substance is not clear. It is probable that a substance in the inflorescence is leached out by the alcohol used to preserve plant specimens in the field and then recrystallizes on the inflorescence when the specimens are dried.

The clavate staminodes associated with the male/female flower zone transition in *S. cyria* are absent in *S. latifolia*, but both species have staminodes scattered throughout the female flower zone. However, in *S. cyria* these inter-gynoecial staminodes are simple whereas in *S. latifolia* they are two-to-four branched. The ovary in *S. cyria* is cylindrical with a slightly stalked style whereas in *S. latifolia* the ovary is ellipsoid with an almost sessile stigma less than the diameter of the ovary.

Vegetatively *S. cyria* and *S. latifolia* are similar, especially in the thickened petiole base and thick, persistent petiolar sheath. The different leaf shape and considerably greater stature of *S. cyria* separates it from *S. latifolia*.

Material in Kew Herbarium (K) of a species from Sabah annotated *S. megaphylla* Furtado, apparently an unpublished name, also displays similarities to *S. cyria*, especially in stamen characters, the petiole base, petiolar sheaths and plant stature. It is also similar to *S. latifolia* in these characters and additionally in the smooth spadix surface. *Schismatoglottis megaphylla* is separable from both species by the considerably larger staminodes that have an extraordinary brain-like top surface. Vegetatively, *S. megaphylla* differs from *S. cyria* in the strongly cordate leaf bases. *Schismatoglottis megaphylla* is clearly distinct from *S. latifolia* and *S. cyria* but publication of it is beyond the scope of this paper.

The specimens of *S. latifolia* and *S. megaphylla* seen to date are insufficient to determine their architecture.

The specific epithet is from the Greek *kyria*, dominant, in allusion to the stature of the new species compared with the rest of the genus.

#### A NEW SPECIES OF *Homalomena* FROM BRUNEI

*Homalomena* Schott is probably the largest genus of *Araceae* in Indomalaysia, with c. 120 species. In Brunei c. 20 species have been collected to date, representing the three sections recognized by Furtado (1939) for Indomalaysia.

The taxonomy of *Homalomena* is presently in disarray, the problem compounded by the poor condition of many of the types and inadequate

understanding of the interspecific variability. Consequently, many of the Brunei collections have proved difficult to name. However, one collection made by A. D. Poulsen and Ingrid de la Motte of Aarhus University (AAU) is so distinctive that it is here described as new.

**Homalomena vagans** P. C. Boyce sp. nov., quoad formam inflorescentiae ad sectionem *Cyrtocladonem* pertinet et ibi arctissime ad instar *H. lunduensi* sed ab eis et omnibus aliis sectionis speciebus caule repenti, foliis textu tenuibus sine venis lateralibus primariis valde prominentibus, appendice spadicis clavata vel fusiformi, infructescentia erecta neque cernua differt. Typus: Brunei, *Poulsen & de la Motte* 273 (holotypus AAU!; isotypi BRUN!, K!, L!).

Relatively small, creeping rheophytic herb 20–45 cm tall. *Stem* creeping, 10–20 cm × 6–8 mm, lower part bare, upper part obscured by overlapping leaf bases, rooting along length; roots tough, 1–2 mm diam., attaching strongly to substrate, roots emerging through split leaf sheath below petiole insertion. *Stem sympodia*: oligo-monophyllous (leaf number variable per sympodial module). *Leaf*: prophyll 4–7 cm × 2–6 mm, linear-lanceolate, margins crispulate; petiole slender, subterete, canaliculate basally, 11–19 cm × 1–6 mm, base moderately expanded, sheath 4.5–7 cm; leaf lamina 11–23.5 × 1.5–6 cm, lanceolate-elliptic, base decurrent, apex long-acuminate, lamina (living) dark green adaxially, yellow-green abaxially, lamina (dry) dull grey-green adaxially, pale brownish green abaxially, primary lateral venation prominent abaxially, ± obscure adaxially. *Inflorescence*: peduncle 7–8 cm × c. 1.5 mm; subtending cataphyll 2–4 cm × 2–5 mm, linear-lanceolate, tubular to somewhat open; spathe c. 6 cm × 9 mm, basal third inflated, then constricted and distally tapering, yellow-green in living material; spadix 3–5 cm × 1–5 mm overall, stipitate; stipe 3 × 1 mm, terete; male zone 2–3 cm, narrowly cylindrical; female zone 1–2 × 3–5 mm, cylindrical, usually with a few stamens interspersed with the first few gynoecia and with numerous staminodes interspersed among the gynoecia. *Flowers*: stamens c. 0.75 × 0.75 mm, polygonal, densely arranged; staminodes 0.75–1 × c. 0.5 mm, clavate, truncate; gynoecium 1 × c. 0.75 mm, obpyriform, stigma extremely short-styled, circular, exceeding style in diam., c. 0.5 mm diam., stigma surface slightly papillate; locules 2–3, ovules c. 10 per locule, hemianatropous, funicle attached at middle. *Infructescence*: peduncle erect at infructescence maturity, 8–11 cm × c. 2 mm; fruiting spathe 3–7 × 1–2 cm., spathe limb persisting into fruiting stage, eventually breaking (rotting?) away and spathe tube bursting to reveal ripe fruit; fruit ± globose, 1.5–3 × c. 1.5 mm, slightly truncate apically, pale to mid-green, stigma remaining darker; seed ellipsoid, c. 0.75 × 0.5 mm. (Fig. 3).

DISTRIBUTION. Brunei.

BRUNEI. Temburong: along the Sungai Temburong and Sungai Belalong, near their junction, 4°30' N, 115°10' E, 2 Oct. 1958, *Jacobs* 5615 (BRUN, G, L!, K!, US); Batu Apoi Forest Reserve, Sungai Belalong, steep bank near river, 4°33' N, 115°9' E, 14 March 1992, *Poulsen & de la Motte* 47 (AAU!, BRUN!, K spirit!); Batu Apoi Forest Reserve, Sungai Belalong, steep bank near river,



FIG. 3. *Homalomena vagans*. **A** habit  $\times \frac{1}{2}$ ; **B** inflorescence  $\times \frac{2}{3}$ ; **C** inflorescence with spathe partially removed to reveal spadix  $\times 2$ ; **D** ovary, longitudinal section  $\times 9$ ; **E** infructescence with spathe partially removed to reveal berries  $\times \frac{2}{3}$ ; **F** fruiting habit  $\times \frac{1}{2}$ . Drawn from (**A**, **B**, **F**) Poulsen & de la Motte 47, (**C**, **D**, **E**) Poulsen & de la Motte 273 by Emmanuel Papadopoulos.



4°33' N, 115°9' E, 14 March 1992, *Poulsen & de la Motte* 273 (holotype AAU!, isotypes BRUN!, K!).

**HABITAT.** Steep banks near river in primary lowland mixed dipterocarp forest on Setap shale formation; 65 m.

The relationships of this species are not clear. The constricted spathe limb places *H. vagans* in sect. *Cyrtocladon* (Furtado 1939) but the creeping stem and narrow leaves bear little resemblance to any species in the section. *Homalomena lunduensis* Furtado (1935) (syn. *H. multinervia* Ridl. nom. illeg. (Ridley 1907: 49)) has superficially similar leaves but with dense, raised primary lateral venation, a rosette habit, clavate to fusion spadix and leaves notably coriaceous when dry.

The infructescence peduncle in *H. vagans* is unusual in the genus in its erect, not drooping habit. Infructescence posture in *H. lunduensis* is drooping.

While preparing this paper an examination of unnamed *Homalomena* in the Kew and Leiden herbaria revealed another collection of *H. vagans* from almost the same area as the type collection.

The species name reflects the creeping habit.

#### ACKNOWLEDGEMENTS

I would like to thank Dr David Simpson and Dr John Dransfield for their helpful comments on earlier drafts of this manuscript.

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