

Studies on Schismatoglottideae (Araceae) of Borneo XVII: The *Schismatoglottis* Hottae Complex, a new informal taxon, and three new species from Sarawak, Malaysian Borneo

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ABSTRACT. On the basis of a suite of shared morphological characters, the *Schismatoglottis* Hottae Complex is defined as a Borneo-endemic informal taxon in the *Schismatoglottis* Asperata Group. Four species, three novel, are assigned to the Hottae Complex: *S. hottae* Bogner & Nicolson, *S. dilecta* S.Y.Wong, P.C.Boyce & S.L.Low, sp. nov., *S. mira* S.Y.Wong, P.C.Boyce & S.L.Low, sp. nov., and *S. thelephora* S.Y.Wong, P.C.Boyce & S.L.Low, sp. nov. A key to species of the Hottae Complex is proffered. *Schismatoglottis hottae* is illustrated from the Holotype herbarium material, the three novelties from living plants.

Keywords. Araceae, Borneo, Sarawak, *Schismatoglottis*, *Schismatoglottis* Hottae Complex

Introduction

Earlier papers of this series (Boyce & Wong 2006; Wong 2010), and Hay & Yuzammi (2000), highlight that the Asperata Group (*sensu* Hay & Yuzammi 2000) is certainly heterogeneous. Notwithstanding the phylogenetic veracity or otherwise of the Asperata Group, during extensive fieldwork over the past 6 years in Sarawak we have come to recognise that within the Asperata Group there exists a number of ‘species complexes’—subsets of morphotaxa—the application of an informal nomenclature to which provides a convenient tool for discussing potential phylogenetically significant units (PSUs). One such is the Hottae Complex, defined here by long-persistent somewhat bicarinate ligular sheaths, petioles and sometimes leaf blades with deciduous indumentum, leaf blades abaxially with conspicuous pellucid secretory canals, solitary inflorescences with a very short peduncle completely concealed within the subtending cataphylls, staminate flowers with a blunt, narrowly pyramidal connective extended well beyond the thecae, and a spathe limb darkening rapidly after opening and thence deliquescing without crumbling. All species show an ecological preference for vertical or very steep slopes with surface running water in lowland moist or perhumid gallery forest, with one (*S. thelephora* sp. nov.) at least a facultative rheophyte.

So far four species are known that display the above set of morphological characters: *S. hottae* Bogner & Nicolson, and three novelties, here described.

Key to the *Schismatoglottis* Hottae Complex

- 1a. Leaf blade lanceolate, abaxially with conspicuous pellucid secretory canals. Staminate flower zone much narrower than the pistillate zone. Interstice staminodes nipple-like, greatly exceeding the pistils and staminate flowers, upper-most staminodes furnished with a terminal yellow-brown rostrum (vestigial anther?). Anthers deep red 4. *S. thelephora*
- b. Leaf blade ovate to broadly ovate or ovato-cordate, abaxially with or without conspicuous pellucid secretory canals. Staminate flower zone width equalling or much exceeding the pistillate zone. Interstice staminodes not nipple-like, equalling pistils. Anthers pale salmon-orange, or bright pink 2
- 2a. Leaf blade adaxially minutely and softly densely tuberculate, abaxially often with adventitious plantlets. Emerging leaves green. Pistillate zone much narrower than the staminate zone, pale green. Staminate flowers pale brownish pink. Spathe limb opening green. Sarawak (Bintulu, Bukit Satiam), shales 3. *S. mira*
- b. Leaf blade adaxially minutely pubescent or smooth, abaxially without adventitious plantlets. Emerging leaves pink. Pistillate zone spadix sub-equalling or slightly exceeding the staminate zone. Spathe limb opening medium to bright pink. Sarawak and Brunei 3
- 3a. Plant to 35 cm tall. Leaf blade up to 30 cm × 20 cm, adaxially smooth, semi-glossy when wet, abaxially pale green with conspicuous pellucid secretory canals. Petioles, and midrib and primary lateral veins of abaxial surface sub-microscopically pale greyish pubescent. Spadix c. 9 cm long. Sarawak (Mulu), shales 2. *S. dilecta*
- b. Plant to 20 cm tall, often less. Leaf blade up to 12 cm × 9 cm, adaxially densely minutely hairy, matte even when wet, abaxially pale green without conspicuous pellucid secretory canals. Petioles, and mid-rib and primary lateral veins of abaxial surface densely pale brown pubescent. Spadix c. 2.5 cm long. Brunei (Teraja and Batu Patam), sandstones 1. *S. hottae*

1. *Schismatoglottis hottae* Bogner & Nicolson, Aroideana 2: 120 (1979); Mayo, Bogner & Boyce, The Genera of Araceae, 184, pl. 49(ii), D (1997); Hay & Yuzammi, Telopea 9(1): 70–71 (2000) — *Schismatoglottis cordifolia* M. Hotta, Mem. Coll. Sci. Univ. Kyoto, ser. B, 32: 229 (1966) (*non S. cordifolia* Ridl. (1911)). TYPE: Brunei, ‘Seria Distr.’ [Belait], Bukit Teraja, Teraja Forest Reserve, 21 Dec 1963, *M. Hotta* 12886 (holo KYO, K! photo). (Fig. 1)

Small lithophytic herb to 20 cm tall. **Stem** very condensed and shortly erect, c. 3 cm long \times 1 cm diam., older portions clothed in old leaf remains, with oldest portions naked and somewhat decumbent; modules pleionanthic. **Leaves** several together (4–7) with roots emerging from among their bases; petiole 5–9 cm long, slender, about equalling the blade, very densely clothed in minute straight pale brown hairs, sheathing only at the extreme base with the sheath extended into a narrowly triangular, abaxially pubescent, bicarinate ligular portion 2–4 cm long; blade ovate to broadly ovate, matte dark green, slightly metallic and densely minutely hairy throughout adaxially, matte pale green, densely minutely hairy on all the venation and minutely tuberculate between the veins abaxially, drying dark brown, 9–12 cm long \times 7–9 cm wide, the base retuse to cordate with rounded posterior lobes to 2 cm long, the apex broadly acute to obtuse and shortly apiculate; midrib not or hardly prominent abaxially and adaxially; primary lateral veins crowded, c. 13 on each side of the midrib, diverging at 45–60°, alternating with lesser interprimaries and very occasionally branching near the midrib, impressed adaxially, prominent abaxially; secondary veins abaxially prominent (due to hairs), arising from the midrib and the bases of the primary veins; tertiary venation obscure. **Inflorescence** solitary; peduncle very short, completely concealed within subtending leaf bases. **Spathe** c. 3.5 cm long, green to salmon pink and then veined with deeper pink; lower spathe ovoid, c. 1.1 cm long, differentiated from the limb by a slight constriction; limb 2.2–2.8 cm long, broadly lanceolate, apiculate for 2–3 mm, ?deciduous. **Spadix** 2.5 cm long, sessile; pistillate zone obliquely inserted, c. 3 mm long; pistils densely packed; ovary sub-globose, c. 1 mm diam.; stigma sessile, thickly discoid, almost as wide as the ovary; sterile interstice slightly wider than male and female zones, 2 mm long, c. 3 whorls of flat-topped irregularly polygonal staminodes c. 0.6 mm diam.; staminate flower zone cylindrical, slightly attenuate corresponding to spathe constriction, c. 3 mm long; stamens somewhat laxly arranged, mostly in adnate pairs with the blunt and narrowly pyramidal connective extended beyond the thecae; appendix cylindrical-ellipsoid, more than half the length of the spadix, about twice the width of the male zone, c. 2 cm long \times 6 mm thick, composed of flat-topped irregularly polygonal staminodes c. 1 mm diam. **Infructescence** unknown.

Other specimens examined: BRUNEI: Belait District: Melilas Subdistr., Ulu Ingei, Bukit Batu Patam, 04°05'N 114°42'E, 9 June 1989, *P.C.Boyce et al.* 279 (BRUN, K, L); Labi Subdistr., Bukit Teraja, south of summit, 04°20'N 114°27'E, 20 March 1991, *R.J.Johns* 6872 (BRUN, K).

Distribution. Brunei, to date recorded only from Bukit Teraja and Bukit Batu Patam.

Ecology. Lithophytic on sandstone boulders and low damp cliffs in lowland kerangas and humid hill dipterocarp forest, 180–400 m alt.

Notes. Hay & Yuzammi (2000) remarked that *S. hottae* appeared allied to *S. puberulipes* Alderw. by sharing velvety hairs on the leaf, a solitary short-pedunculate inflorescence, and an 'inflated' appendix. However, there is confusion with regard application of



Fig. 1. *Schismatoglottis hottae* Bogner & Nicolson. Holotype: *M. Hotta* 12886 (KYO). Image courtesy of Dr. Hidetoshi Nagamasu (KYO). Used with permission.

the name *S. puberulipes*. The plant illustrated in Hay & Yuzammi (2000:79, Fig. 9), and the substantial part of the description given is *Schismatoglottis hayi* S.Y.Wong & P.C.Boyce endemic to Gua Niah (NE Sarawak) and allied to Mulu-endemic *S. multinervia*, sharing with that species aromatic (terpenoids) vegetative tissues, fully adnate petiolar sheaths, and a spathe limb rapidly darkening on opening but then breaking into strips. Together with several other novelties, these are regarded by us as belonging to the Multinervia Complex, and are most probably not closely allied to the Hottae Complex. The lectotype of *S. puberulipes* (BOKR! + BO spirit!) matches exactly *S. gamoandra* M.Hotta, a very distinctive species of doubtful affinity (Wong & Boyce 2011).

2. *Schismatoglottis dilecta* S.Y.Wong, P.C.Boyce & S.L.Low, **sp. nov.**, *Schismatoglottis mirae accedens, innovationibus clare roseis, laminis adaxialiter seminitidis, abaxialiter canalis secretoriis pellucidis conspicuis venis similibus, sine proliferis adventiis, zona pistillata spadiceis aliis zonis in latitudine aequali spatha rosea differt.* TYPE: Malaysia, Sarawak, Limbang, Nanga Medamit, Mulu N.P., Melinau Gorge, 3 Oct. 2007, P.C.Boyce et al. AR- 2312 (holo SAR!). (Fig. 2)

Moderately robust usually lithophytic herb to 35 cm tall. **Stem** stout, condensed, up c. 15 cm long × 2 cm diam., active portion erect, completely obscured by leaf bases, oldest parts tending to become decumbent, naked and ringed with conspicuous cataphyll/prophyll and petiole scars; shoot modules pleioanthic. **Leaves** several to rather few together (4–8) with roots emerging from among their bases, innovations pink; petiole 10–25 cm long, stout, about equalling the blade, sub-microscopically pale greyish pubescent, appearing matte greyish-green when dry and minutely asperate when wet, sheathing only at the extreme base, the majority of the sheath forming a narrowly triangular, bicarinate, somewhat fleshy ligular portion 3–5 cm long; blade ovate to ovate-elliptic, semi-glossy slightly metallic dark green adaxially, much paler dull lime green abaxially, blades drying medium brown, 10–20 cm long × 6–15 cm wide, the base cordate with rounded posterior lobes to 3 cm long, the apex broadly acute shortly apiculate; midrib prominent abaxially, deeply impressed adaxially, silvery when living; primary lateral veins crowded, c. 15 on each side of the midrib, diverging at 45–60°, irregularly alternating with only slightly lesser interprimaries and very occasionally branching near the midrib, deeply impressed adaxially, prominent abaxially, sub-microscopically pale greyish pubescent; primary lateral veins sub-microscopically pale greyish pubescent and raised abaxially; interprimary veins interspersed with vein-like pellucid glands abaxially; secondary and tertiary almost invisible. **Inflorescence** solitary; peduncle very short, together with the lowermost part of spathe completely concealed within subtending cataphyll bases. **Spathe** c. 8.5 cm long, peduncle and lower part of bright pink, spathe limb much paler pink, veined with deeper pink; lower spathe cylindrical, c. 3 cm long, differentiated from the spathe limb by colour but with no obvious constriction separating them; limb 2.2–2.8 cm long, very broadly lanceolate, apiculate for c. 4 mm, opening clear pale pink but



Fig. 2. *Schismatoglottis dilecta* S.Y.Wong, P.C.Boyce & S.L.Low. **A.** Plants in habitat; note the semi-glossy leaf blades. **B.** Leaf blade, abaxial view. **C.** Plant with emerging inflorescence. Note the long, persistent, fleshy ligules. **D.** Spadix at pistillate anthesis, spathe artificially removed. **E.** Detail of interstice staminodes (below) and staminate flowers (above). **F.** Detail of appendix staminodes. **G.** Post anthesis inflorescence. Note that the spathe limb has deliquesced and that the lower spathe persists. All from P.C. Boyce *et al.* AR- 2312. Photo credits: Peter C. Boyce.

swiftly darkening during staminate anthesis and then soon deliquescent. **Spadix** stout, 8 cm long, sessile; pistillate zone very slightly conic-cylindrical, weakly obliquely inserted, c. 1.5 cm long; pistils densely packed, medium pink; ovary sub-globose, c. 1.5 mm diam.; stigma sessile, thickly discoid, as wide as the ovary; sterile interstice very slightly wider than pistillate and staminate zones, 0.5 cm long, c. 7 whorls of flat-topped irregularly polygonal glossy pale pink staminodes c. 1 mm diam.; staminate flower zone cylindrical, c. 1.5 cm long, often with a few scattered groups staminodes of similar form to those in the interstice; stamens very densely arranged, mostly in adnate pairs with the blunt and narrowly oblong connective extended beyond the thecae, anthers medium pink; appendix stoutly clavate-cylindric, c. 2/3 the length of the spadix, exceeding the width of the staminate zone, dull pale pink, c. 4.5 cm long × 10 mm thick, composed of very densely arranged flat-topped irregularly polygonal staminodes c. 1 mm diam. **Infructescence** unknown.

Other specimens examined: Malaysia, Sarawak, Miri, Marudi, Long Lama, Mulu N.P., trail to Long Lansat, Sungai Licat, 04°00'03.5"N 114°48'49.8"E, 9 Aug. 2006, P.C.Boyce et al., AR- 1974 (SAR).

Distribution. Mulu N.P., found so far in the extreme SW and NE parts of the park.

Ecology. Lowland moist gallery forest, restricted to vertical walls of low shale cliffs above forest streams, mostly on red clays with leaf litter accumulated around the bases, more rarely on almost bare shale with surface seepage moisture; c. 30 m asl.

Notes. *Schismatoglottis dilecta* is superficially very similar to *S. mira* (see below); from a distance plants of both are virtually indistinguishable. Aside from the floral characteristics noted above *S. dilecta* differs from *S. mira* by several vegetative features, including the leaf blade adaxial surface texture (smooth vs papillose), the presence abaxially of vein-like pellucid secretory veins, and an absence of adventitious plantlets (*S. dilecta*). The form and texture of the petiolar sheath ligules also differs (compare Fig. 2C & 3C).

Etymology. From *dilectos* (Latin) “lovely, esteemed”, in allusion to the highly attractive foliage, and striking colour of the inflorescences.

3. *Schismatoglottis mira* S.Y.Wong, P.C.Boyce & S.L.Low, **sp. nov.**, *Schismatoglottis dilectae similis, innovationibus viridibus (non roseis) lamina adaxialiter minute et molliter dense tuberculata, abaxialiter proliferis adventitiis multis, zona pistillata spadiceis aliis zonis multo angustiore, et spatha viridis facile distinguenda.* TYPE: Malaysia, Sarawak, Bintulu, Bukit Satiam, 02°59'07.4"N 112°55'47.0"E, 15 July 2006, P.C.Boyce et al. AR-1906 (holo SAR!). (Fig. 3)

Moderately robust lithophytic herb to 45 cm tall. **Stem** stout, condensed, up c. 10 cm long \times 2.5 cm diam., active portion erect, completely obscured by leaf bases, oldest portions usually naked and tending to be decumbent; shoot modules pleionanthic. **Leaves** several to rather few together (3–7) with roots emerging from among their bases, innovations very pale green; petiole 10–25 cm long, stout, very weakly D-shaped in cross-section, sub-equalling the blade, minutely asperate, matte pale-green, sheathing only at the extreme base, the greater part of the sheath forming a narrowly triangular very weakly bicarinate, membranous ligular portion 2–7 cm long; blade broadly ovate, carried sub-perpendicular to petiole, adaxially minutely and softly densely tuberculate, abaxially often with adventitious plantlets, adaxially deep green with the midrib marked by a somewhat irregular broad pale yellow band, abaxially pale grey-green with the epidermal cells somewhat refractive, blades drying pale brown, 15–25 cm long \times 10–21 cm wide, the base cordate with rounded posterior lobes to 4 cm long, the apex blunt, shortly apiculate; midrib prominent abaxially, somewhat impressed adaxially, pale yellow when living; primary lateral veins crowded, c. 15 on each side of the midrib, diverging at 45–60°, irregularly alternating with only slightly lesser interprimaries and very occasionally branching near the midrib, slightly impressed adaxially, prominent abaxially; interprimary veins interspersed; secondary and tertiary almost invisible. **Inflorescence** solitary; peduncle very short, completely concealed within subtending cataphyll bases. **Spathe** c. 9 cm long, spathe exterior medium somewhat glaucous green, longitudinally veined deeper green; lower spathe cylindrical, c. 3.5 cm long, not clearly differentiated from the spathe limb; limb 6–6.5 cm long, broadly funnel-form lanceolate at pistillate anthesis, the terminal portion tending to remain weakly furled, and apiculate for c. 2 mm, opening pale green internally but swiftly darkening to glossy tan during staminate anthesis, and then rapidly deliquescent starting from the spathe limb margins. **Spadix** stout, sub-equalling the spathe, c. 8.5 cm long, sessile; pistillate zone cylindrical, much narrower than rest of spadix, somewhat obliquely inserted, c. 1.5 cm long; pistils rather densely packed, pale green; ovary sub-globose, c. 1.5 mm diam., interspersed with a few prominent, stoutly clavate white staminodes; stigma sessile, thickly discoid, almost as wide as the ovary; sterile interstice very slightly wider than pistillate and staminate zones, c. 5 mm long, with c. 6 whorls of somewhat rounded-topped irregularly polygonal staminodes c. 1 mm diam., lowermost whorls glossy very pale yellow, upper whorls pale salmon-orange; staminate flower zone cylindrical, c. 1 cm long; stamens moderately densely arranged, mostly in adnate pairs with the bluntly and narrowly oblong connective barely extended beyond the thecae, anthers pale salmon-orange; appendix stoutly cylindrical, c. 2/3 the length of the spadix, equalling the width of the staminate zone, dull pale salmon-orange, c. 6 cm long \times 10 mm thick, composed of very densely arranged flat-topped irregularly polygonal staminodes c. 1 mm diam. **Infructescence** unknown.

Other specimens examined: Malaysia, Sarawak, Bintulu, Bukit Satiam, 02°59'26.1"N 112°55'54.4", 11 Aug. 2004, P.C.Boyce & Jeland ak Kisai AR- 597 (SAR), AR-603 (SAR), AR-618 (SAR); Bukit Satiam, 02°59'13.3"N 112°55'57.5"E, 14 July 2006, P.C.Boyce et al. AR-1888 (SAR); 02°59'07.4"N 112°55'47.0"E; 15 July 2006 P.C.Boyce et al. AR-1906 (SAR).

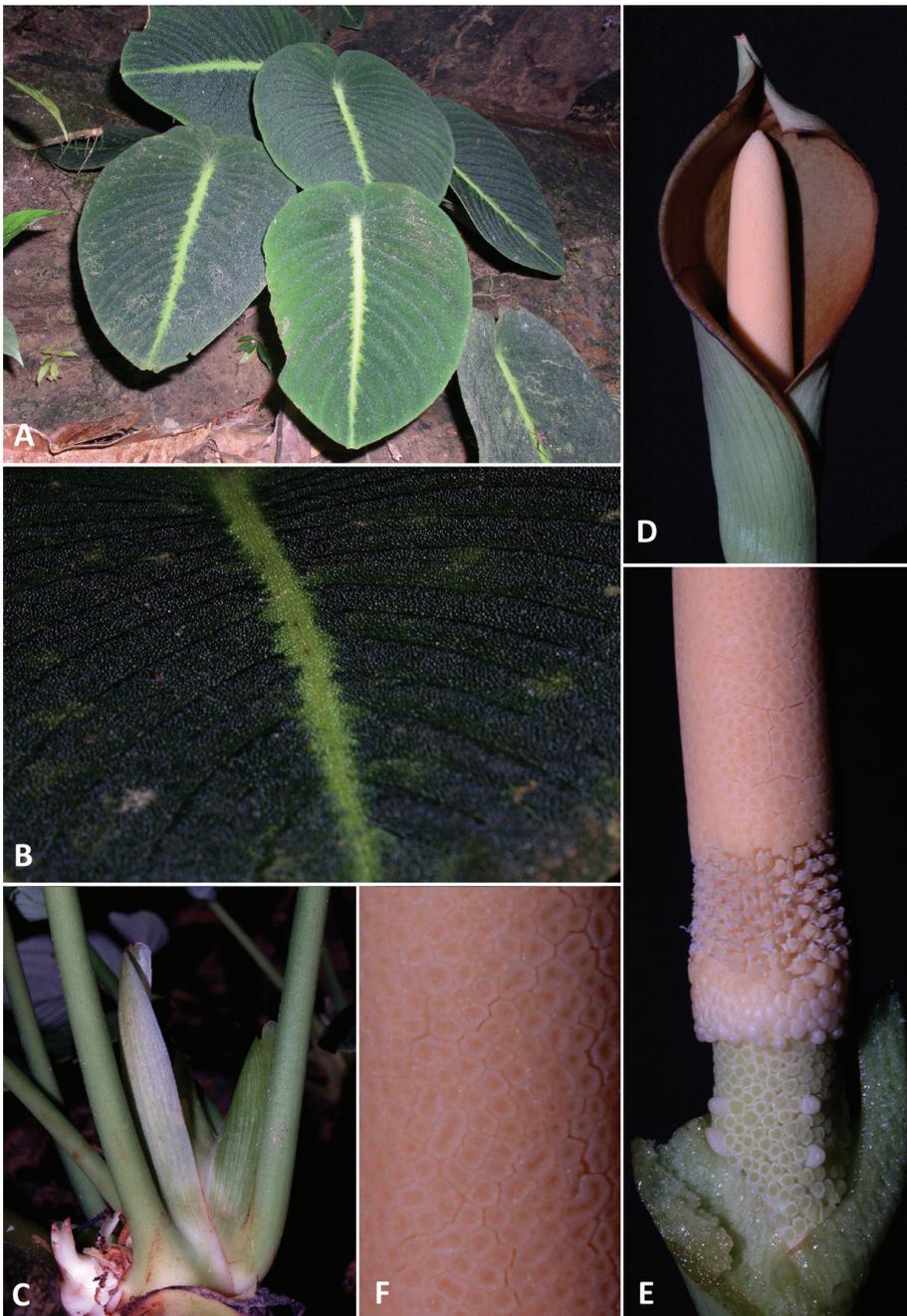


Fig. 3. *Schismatoglottis mira* S.Y.Wong, P.C.Boyce & S.L.Low. **A.** Plants in habitat; note the matte, tuberculate leaf blades. **B.** Leaf blade, adaxial view to show the tuberculate surface. **C.** Details of long, persistent, membranous ligules. **D.** Inflorescence at pistillate anthesis. Note that the spathe limb has already darkened and is starting to deliquesce along the margins. **E.** Detail of fertile portions of spadix and lower half of appendix; spathe artificially removed. **F.** Detail of appendix staminodes. All from *P.C. Boyce et al. AR-1906*. Photo credits: Peter C. Boyce.

Distribution. Known only from Bukit Satiam, Bintulu.

Ecology. Vertical shale cliffs and margins of waterfalls in lowland moist evergreen forest; 100–120 m asl.

Notes. A strikingly beautiful species with an extraordinary leaf blade texture that is so far unique in the genus, although somewhat approached by *S. hottae*. The superficially similar appearance to *S. dilecta* is remarkable, although the species differ in numerous critical morphologies.

Etymology. Latin, *mirus* (wonderful) in reference to the appearance of the plant, and the unique texture of the adaxial surface of the leaf blade.

4. *Schismatoglottis thelephora* S.Y.Wong, P.C.Boyce & S.L.Low, **sp. nov.**, *Ab omnibus speciebus complexi Hottae foliorum laminis lanceolatis, zona staminata pistillata multo angustiore, staminodiis papilliformibus pistillis multo excedentibus, floribus staminatis rubrissimis differt.* TYPE: Malaysia, Sarawak, Bintulu, Tatau, GT Plantations, Sungai Pandan Kecil, trail behind Camp C to intake point for water supply-pipe, 02°42'40.1"N 113° 20' 37.9"E, 5 Sept. 2010, P.C.Boyce, S.Y.Wong & S.L.Low AR-3082 (holo SAR!). (Fig. 4)

Small facultative rheophytic herb to 25 cm tall, but usually somewhat less. **Stem** rather stout, condensed, creeping and rooting strongly, up c. 25 cm long × 2.5 cm diam., active portion completely obscured by leaf bases; shoot modules pleionanthic. **Leaves** several together (5–11), with roots emerging from among their bases, innovations very pale green; petiole 7–17 cm long, relatively stout, very weakly D-shaped in cross-section, sub-equalling to rarely exceeding the blade, minutely asperate, matte medium-green, sheathing only at the extreme base, the majority of the sheath forming a narrowly triangular, bicarinate, fleshy ligular portion 1.5–3 cm long; blade oblanceolate to lanceolate or very narrowly ovate, thick to sub-succulent, 7–20 cm long × 2–8 cm wide, the base acute to cuneate or weakly obtuse, tip acuminate for 1–3 cm and then conspicuously tubular-mucronate; adaxially semi-glossy medium green, abaxially paler with the epidermal cells somewhat refractive and scattered vein-line pellucid secretory canals, blades drying straw yellow; midrib and primary veins tough and abaxially prominent, adaxially very weakly impressed; primary lateral veins 3–9 on each side of the midrib, irregularly alternating with interprimaries ill-differentiated from the secondary venation, diverging at c. 30°; secondary venation mostly arising from the midrib, some from near the bases of the primary veins in the lower part of the leaf; tertiary venation obscure. **Inflorescence** solitary; peduncle very short, completely concealed within subtending cataphyll bases. **Spathe** c. 3.5 cm long, spathe exterior medium green, longitudinally veined deeper green; lower spathe ovoid, c. 1.5 cm long, very pale greenish-white, with a shallow, broad constriction differentiating it from the spathe limb; limb c. 2 cm long, broadly lanceolate, apiculate for c. 2 mm, opening pale

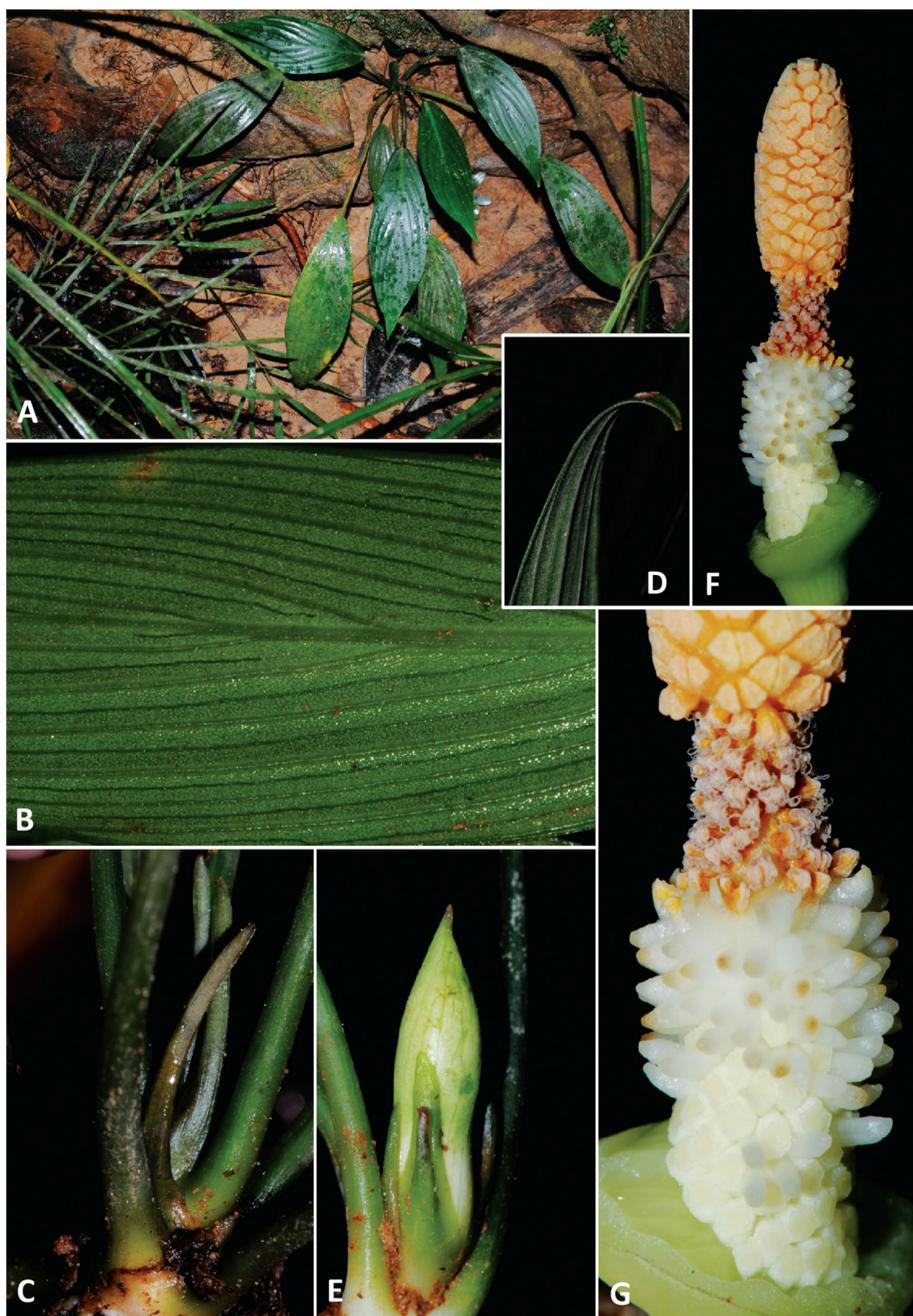


Fig. 4. *Schismatoglottis thelephora* S.Y.Wong, P.C.Boyce & S.L.Low. **A.** Plants in habitat. **B.** Leaf blade, adaxial view to show vein-like pellucid secretory canals. **C.** Details of long, persistent, membranous ligules. **D.** Leaf-tip tubule. **E.** Emerging inflorescence. **F.** Spadix at staminate anthesis, spathe artificially removed. **G.** Detail of fertile portions of spadix and lower half of appendix; spathe artificially removed. The nipple-like staminodes are prominent. Note, too, the slender strings of pollen. All from *P.C. Boyce, S.Y. Wong & S.L. Low AR-3082*. Photo credits: Peter C. Boyce.

green but swiftly darkening to dark glossy brown during staminate anthesis, and then rapidly deliquescent starting from the spathe limb margins. *Spadix* somewhat stout, sub-equalling spathe, c. 3 cm long, sessile; pistillate zone weakly conic-cylindrical, somewhat obliquely inserted, c. 5 mm long; pistils rather densely packed, white; ovary rhombic-subglobose, c. 0.5 mm diam.; stigma sessile, discoid, smaller than the ovary diam.; sterile interstice very slightly narrower than pistillate zone, c. 5 mm long, c. 6 whorls of elongated nipple-like staminodes, these up to twice as long as pistils, and with at least a few of these interspersed with the upper pistillate flowers, waxy white with a yellow-brown tip perhaps associated with a vestigial connective, each c. 2 mm long and 0.3 mm diam.; staminate flower zone cylindrical, c. 4 mm long; stamens rather loosely arranged, mostly in adnate pairs with the blunt and narrowly triangular connective extended beyond the thecae, deep yellow with the anthers (thecae) deep red, lowermost staminate flowers transitioning to staminodes, these dull yellow barely tinged red, these then transitioning to the elongated white staminodes present on the interstice; appendix bullet-shaped, c. ½ the length of the spadix, much wider than the staminate zone, dark yellow, c. 2 cm long × 6 mm thick, composed of rather loosely arranged flat-topped irregularly polygonal staminodes c. 0.7 mm diam. *Infructescence* subtended by the fleshy persistent lower spathe, rather loosely urceolate.

Other specimens examined: Malaysia, Sarawak, Bintulu, Tatau, GT Plantations, Sungai Likau, 02°44'37.6"N 113°26'10.5"E, 6 Sept. 2010, *P.C.Boyce, S.Y.Wong & S.L.Low AR- 3092 (SAR)*.

Distribution. Known only from the neighbourhood of the type locality.

Ecology. Rheophytic along the lower fringes of lowland perhumid gallery forest on sandstones and sandstone-derived clays; 50–70 m asl.

Notes. *Schismatoglottis thelephora* is remarkable, indeed unique, in the genus by the greatly elongated nipple-like staminodes that clothe the interstice between the pistillate and staminate flower zones, and also occur scattered among the uppermost pistillate flowers. The deep red anthers are distinct from all other species in the Hottae Complex, and furthermore this colour has not been previously recorded for the genus. Pollen is released in very slender white strings.

Etymology. From Greek *thele-*, a nipple, and Latin *-phora*, to bear, in allusion to the staminodes separating the pistillate and staminate flower zones.

ACKNOWLEDGEMENTS. Research and fieldwork in Borneo was conducted, most recently, under Sarawak Forestry Department Research Permit Nos. NPW.907.4.4(V)-77 & NCCD.907.4.4(Jld.VI)-56 & Park Permit Nos. 34/20010 & 27/2011. The continuing collaboration and support of the Forest Department Sarawak, and Sarawak Forestry Corporation, are gratefully acknowledged. We would like to thank Mr. Wong Kee Heng, Mr. Wilfred Rogers and Mr. Serum Ungau of GT Plantation Sdn. Bhd. for facilitating our field trip at Sg. Kakus, Bintulu.

References

- Boyce, P.C. & Wong, S.Y. (2006) Studies on Schismatoglottideae (Araceae) of Borneo I: A trio of new *Schismatoglottis* from Sarawak. *Gard. Bull. Singapore* 58: 7–18.
- Hay, A. & Yuzammi (2000) Schismatoglottideae (Araceae) in Malesia I – *Schismatoglottis*. *Telopea* 9(1): 1–177.
- Wong, S.Y. (2010) Studies on Schismatoglottideae (Araceae) of Borneo XIII: A Revision of the *Schismatoglottis nervosa* species complex. *Gard. Bull. Singapore* 62(1): 177–209.
- Wong, S.Y. & Boyce, P.C. (2011) Studies on Schismatoglottideae (Araceae) of Borneo XVI: A New Species and a New Informal Taxon (the Multinervia Complex) of *Schismatoglottis* from Sarawak. *Acta Phytotax. Geobot.* 60(3): 131–137.

