Studies on the Schismatoglottideae (Araceae) of Borneo VI: A New *Schismatoglottis* Species from Sarawak, Malaysian Borneo

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Abstract

Fieldwork in Sarawak continues to reveal further novelties in the genus *Schismatoglottis* Zoll. & Moritzi, notably in the Asperata and Multiflora Groups (*sensu* Hay & Yuzammi, 2000). The second author collected a new *Schismatoglottis* species in Sarawak belonging to the Multiflora Group. This is here described and illustrated and included in additions to the key to Bornean *Schismatoglottis* published by Hay & Yuzammi (2000).

Introduction

In recent years *Schismatoglottis* Zoll. & Moritzi has been the subject of a major alpha-taxonomic revision (Hay & Yuzammi, 2000), which, together with subsidiary papers describing additional Bornean novelties (Hay, 2002; Hay and Herscovitch, 2003; Boyce and Wong, 2007; Wong, 2007; Wong and Boyce, 2007), and with the caveat that numerous tropical Asian novelties remain yet to be described, provides an alpha-taxonomy that is sufficiently stable to facilitate the description of further novelties, as well as higher level (molecular phylogenetic) and multidisciplinary (notably ecological and phenological) studies. Fieldwork in Sarawak continues to reveal further novelties in the genus *Schismatoglottis*, notably in the Asperata and Multiflora Groups (*sensu* Hay & Yuzammi, 2000).

Schismatoglottis hayana Bogner & P.C. Boyce, *sp. nov.*

Petiolus brevior quam lamina, vagina ligula librera; lamina foliorum lanceolate vel elliptica, apica longa acuminata vel caudata (1.5–2.5 cm longa); 12–19 nervi laterales primarii in utraque parte nervi mediani. Pedunculi breviores quam petioli; spadix subcylindrica, exappendiculata; ambo sacci pollinis thecae apertura poro separata; connectivum planum.

– **Typus:** Malaysia, Sarawak, Kuching, Sematan, Teluk Selabang, 01° 58' 40.09"; 109° 38' 56.00", 6 Oct. 2004, *P.C.Boyce, Jeland ak Kisai, Jipom ak Tisai & Mael ak Late AR 703* (holo, SAR; iso, SING). From the same collection: *Bogner 2906* (para, M). **Plates 1–3.**

Medium **herbs** to ca 25 cm tall. **Stem** pleionanthic, erect, condensed, short 2-3 cm long, up to 3 cm in diam., upper part densely covered with several glabrous leaves. **Leaves** to ca 8 together; petiole terete (slightly flattened on upper side at the base) (8)10-12 cm long and 0.3-0.5 cm in diam., green, tinged slightly reddish at base; sheathing only at the extreme base for 0.7-1.0 cm, the sheath extended into a free ligular portion, to (5) 7-9 cm long, this long-triangular, membranaceous when fresh, very soon becoming dry and dark brown; laminae lanceolate to elliptic, 18-23 cm long x (4)5 -7 cm wide, dark green adaxially, lighter green abaxially, base cuneate, apex long acuminate to caudate with a 1.5-2 (2.5) cm long tip; venation parallel-pinnate, midrib strong and very prominent abaxially, slightly raised adaxially, primary lateral veins 12-19 on each side of the midrib, these prominent abaxially, sunken adaxially; secondary and tertiary veins thinner, all veins merging into a prominent marginal vein ca 1mm in from the and a further, more obscure, marginal vein between the thicker one and the margin, abaxially this thicker vein often light brownish. Cataphylls 5-7 cm long, membranaceous, becoming dry and brown soon. **Inflorescences** 1-5 together in a synflorescence, the spathe bent and held sub-horizontal (apex of peduncle and base of spadix bent); the whole synflorescence subtended by a long-triangular longitudinally two-keeled prophyll 5-7 cm long and each subsequent inflorescence subtended by a long-triangular cataphyll 5-7 cm long, these membranaceous when fresh, soon becoming dry and brown; peduncle shorter than petiole, 6-8(9) cm long, ca 4 mm cm in diam., terete, green, reddish at base. **Spathe** 8-9 cm long, lower spathe obliquely inserted on the peduncle, glossy mid-green with irregular, slightly raised longitudinal areas, 3-3.5 cm long x 2.3-1.4 cm diam., differentiated from the limb by a moderately pronounced constriction level with the top of the spadix interstice; limb 4-4.5 cm long, at first green, turning greenish white at anthesis, oblong-lanceolate, inflating and then caducous, but occasionally persisting in a decaying state until after the onset of male anthesis; apex acuminate with a 0.8-1 cm long tubular mucro. **Spadix** sub-cylindric, fertile to apex, 6-7 cm long; female zone adnate basally on one side to the spathe for a length of ca 2 cm (2/3 to 4/5 of its length), female zone a little thinner than the male zone, slightly obconic, 2.5-2.8 cm long, at adnation 0.8-0.9 cm in diam., apically 0.6-0.7 cm long in diam., at the base of female flowers adjacent to the adnation sometimes a few pistillodes, these longer

Plate 1. *Schismatoglottis hayana* Bogner & P.C. Boyce. A. Mature plants at the type locality on shale rocks; B. Plant in cultivation with almost mature inflorescence.
(Photo: 1A, Malesiana Tropicals Sdn Bhd)

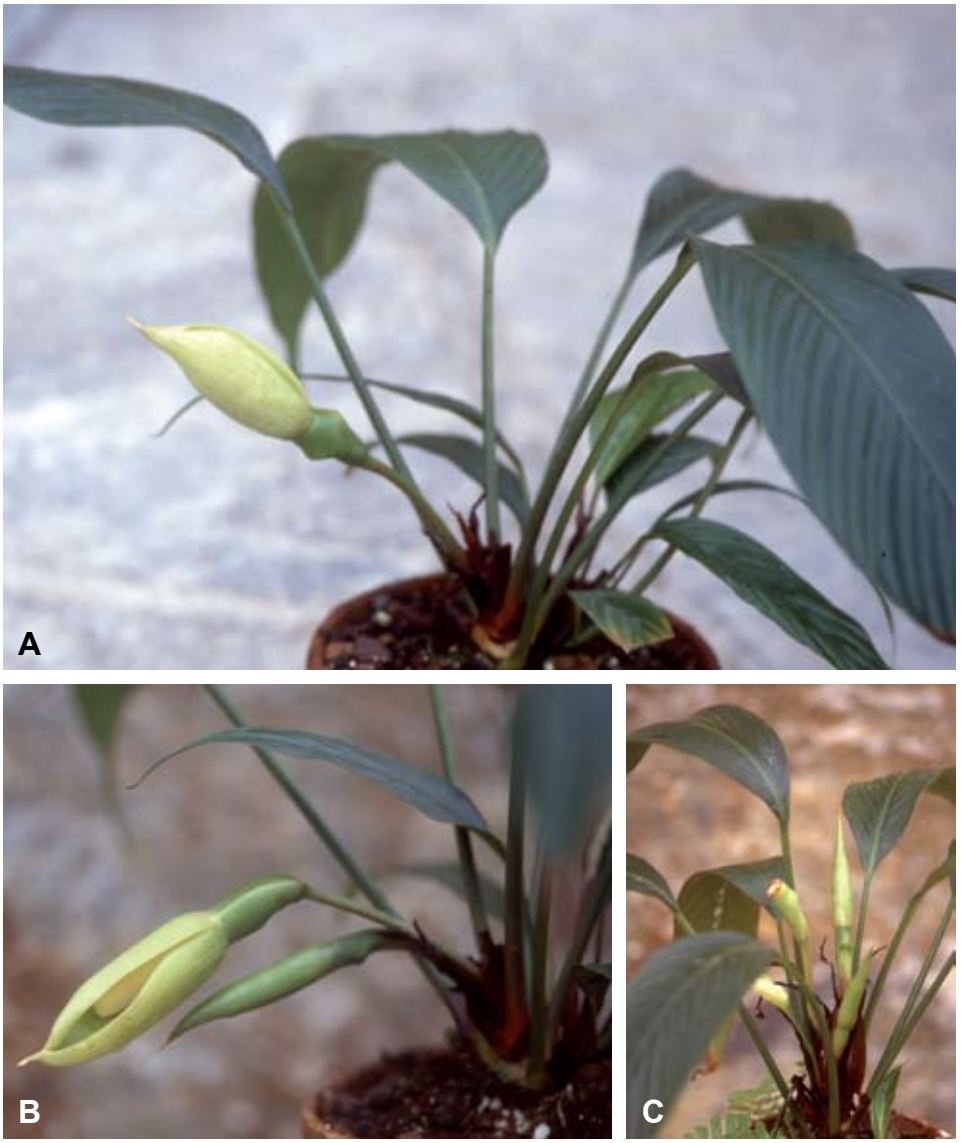

Plate 2. *Schismatoglottis hayana* Bogner & P.C. Boyce. A. Plant in cultivation with inflorescence at female anthesis (note the inflated spathe limb); B. Detail of the inflated and open spathe limb at female anthesis; C. Plant with inflorescences at various sequential stages. Note the near-most post-anthetic inflorescence has shed the spathe limb and spadix above the female portion. (Photos: J. Bogner)

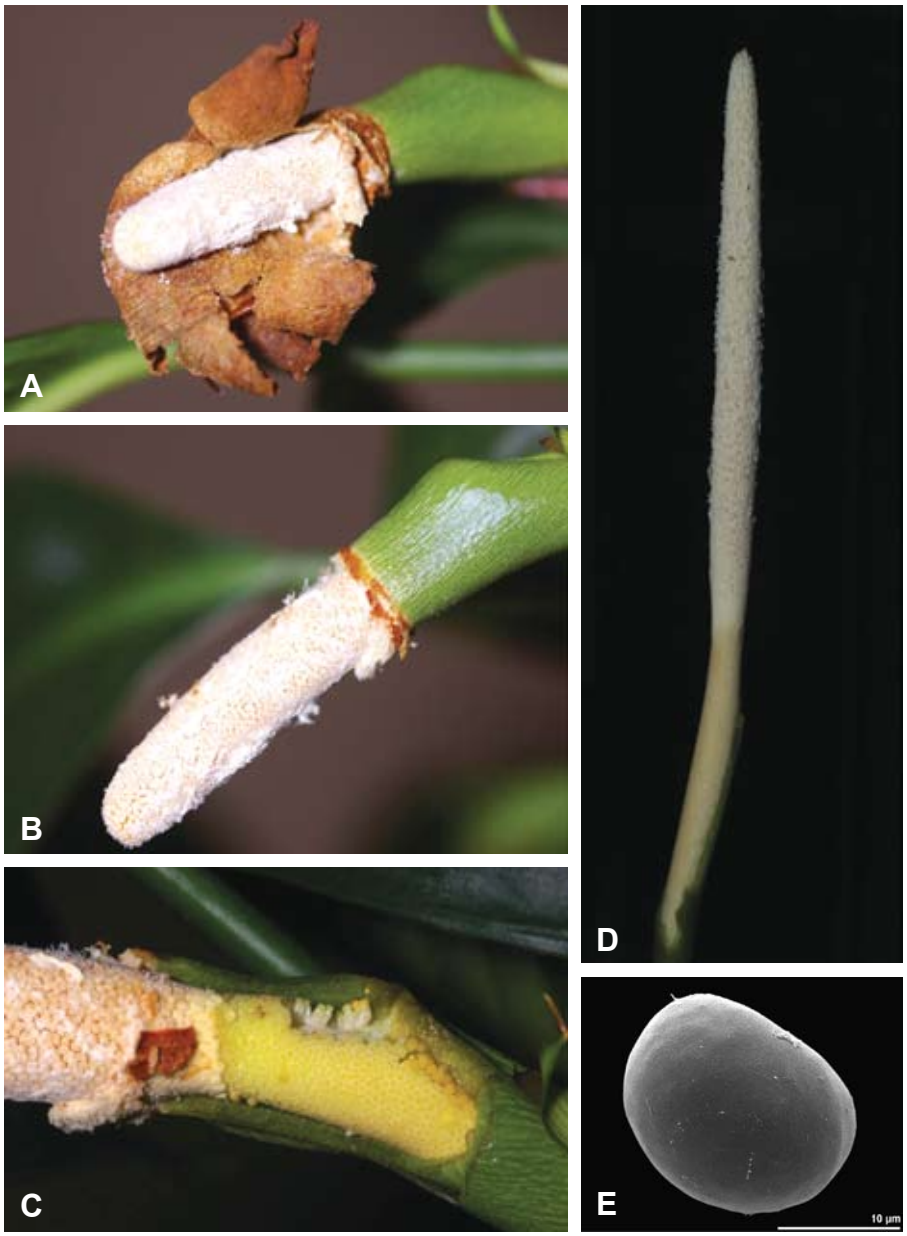

Plate 3. *Schismatoglottis hayana* Bogner & P.C. Boyce. A. Inflorescence at late male anthesis. Note the strings of pollen and the decaying spathe limb; B. Inflorescence just post anthesis. Spathe limb now fallen; C. Inflorescence with the persistent lower portion artificially opened to reveal the female flowers and associated basal pistillodes. *Schismatoglottis multiflora* Ridl.; D. Spadix artificially removed from spathe to show the differences between it and that of *S. hayana*. Note particularly the larger, fusiform spadix in *S. multiflora*. *Schismatoglottis hayana* Bogner & P.C. Boyce; E. pollen grain.
(Photos: 3A-C, G. Gerlach; 3D, Malesiana Tropicals Sdn Bhd; 3E, M. Hesse)

and slightly more robust than, but otherwise resembling, the gynoecia; between the female and male zone a ring of rings 0.6-0.7 cm long and 0.6-0.7 cm in diam., with 6-7 rows of staminodes; male part cylindric, fertile to the tip, 3.5-4 cm long x 0.9 cm in diam., blunt. **Female flowers** densely arranged; gynoecium sub-cylindric, 1.1-1.3 cm long; ovary 1-1.2 mm long and 0.5-0.7 mm in diam. (in the middle), whitish, placentation parietal, ovules many and anatropous; stigma sessile, disk-like, 0.4-0.5 in diam., yellow, later becoming brownish; staminodes ca 1.2 mm tall, truncate, yellowish, irregularly rectangular in view from above, ca 0.8 mm long and ca 0.4 mm wide; stamens free, truncate, cream, 1.2-1.3 mm tall and ca. 0.5 mm in diam. at lower part, apically somewhat broader, irregularly rectangular in view from above, ca 0.8 mm long and ca 0.4 mm wide, each pollen sac opens with an own pore (2 pores for each theca), therefore, 4 pores on each stamen, connective flat. Pollen grains inaperturate, ellipsoid to sub-reniform (one side more or less straight 17-19 μm long and ca 13 μm wide, exine psilate (smooth). **Fruits** unknown.

Ecology: Rheophytic on shale stream banks in lowland evermoist riverine forest, ca 40 m asl.

Etymology: *Schismatoglottis hayana* is named after Dr Alistair Hay, formerly of the Royal Botanic Gardens, Sydney, who among his prolific publications on Asian aroids co-authored with Yuzammi (BO) forming the current standard revision of the genus *Schismatoglottis* of Malesia.

Distribution: Sarawak, only known from the type locality.

Notes: *Schismatoglottis hayana* belongs to the Multiflora Group (sensu Hay & Yuzammi, 2000) by reason of the free-ligular leaf sheath, pleionanthic shoots and the inflorescence held sub-horizontal by the bent peduncle, and caducous spathe limb. The lack of a spadix appendix (i.e., the spadix fertile to the tip) is shared within the group with *S. bauensis* A.Hay, *S. erecta* M.Hotta, *S. multiflora* Ridl., *S. roseospatha* Bogner and *S. schottii* Bogner & Nicolson, while thecae each dehiscing via two pores occurs in *S. nicolsonii* A.Hay and *S. mayoana* Bogner & M.Hotta.

Vegetatively *S. hayana* most closely resembles *S. multiflora* (West Sarawak & NW Kalimantan: obligately rheophytic on a variety of geologies), *S. bauensis* (West Sarawak & NW Kalimantan: lithophytic/chasmophytic on limestones), and an as yet undescribed putative sister species to *S. bauensis* from SW Sarawak (Wong and Boyce, 2008). *Schismatoglottis hayana* shares with these species slightly glossy leaves with primary lateral

veins adaxially prominently impressed, a white spathe limb and a spadix interstice with conspicuous staminodes.

Schismatoglottis hayana is readily distinguished from both *S. bauensis* and *S. multiflora* by the thecae, each with two pores. *Schismatoglottis hayana* is further distinctive from *S. bauensis* by the preference of shale (vs. limestone) and rheophytic (vs. lithophytic/chasmophytic) ecology, while *S. hayana* differs additionally from *S. multiflora* by the inflated (vs. only loosened/unfurled) spathe limb, the proportionately shorter, thicker cylindrical spadix and the larger pistillodes situated at the base of the female flowers.

Thecae each with two pores also occur in *S. nicolsonii* and *S. mayoana* (both in West Sarawak) but these differ from *S. hayana* by the presence of a sterile appendix and in having leaves adaxially matte (vs. glossy in *S. hayana*). *Schismatoglottis nicolsonii* and *S. mayoana* are lithophytic on sandstones.

Schismatoglottis hayana is immediately distinguished from *S. erecta* and *S. schottii* by the condensed stems with larger plants producing few to several offshoots at the base (vs. internodes elongated and stems loosely erect and little or not offsetting basally: *S. erecta* and *S. schottii*), flat connective (vs. raised: *S. schottii*; grooved: *S. erecta*) and cylindrical (vs. clavate) spadix.

Schismatoglottis roseospatha is distinguishable by the slightly raised connective and much narrower and much glossier leaves in which the primary lateral veins are flush with the adaxial surface (conspicuously sunken in *S. hayana*). To date, *S. roseospatha* has been found only in the Rejang valley.

Almost all species in the Multiflora Group so far observed (including *S. hayana*) have the spathe inflating at male anthesis. However, *S. multiflora* is unusual in the Multiflora Group in having a spathe that only loosens at anthesis. Research on *S. multiflora* at the type locality by the second author, co-workers and students, has revealed while vegetatively similar in appearance to *S. hayana*, several unique floristic characteristics suggest that *S. multiflora* maybe somewhat isolated in the Multiflora Group (Li *et al*, in prep).

Schismatoglottis hayana can be fitted into the key to Bornean *Schismatoglottis* (Hay & Yuzammi 2000) as follows:

8a. Appendix absent or very reduced (a few terminal staminodes) 9
8b. Appendix well developed 14

9a. Plants rheophytic 10
9b. Plants not rheophytic 12

10a. Spathe inflated at anthesis; widespread in Borneo 11
10b. Spathe unrolling slightly at anthesis but not inflated; Sarawak & W Kalimantan ..... **41. *S. multiflora***

11a. Spadix ca. 4.5 cm long; leaves abaxially very glossy; Rejang Valley ..... **45. *S. roseospatha***
11b. Spadix ca. 6-7 cm long; leaves abaxially slightly glossy; Sematan ..... ***S. hayana***

12a. Male zone sub-cylindric; pollen sacs opening through a common pore in each theca; lithophytic on limestone; Bau, Sarawak ..... **34. *S. bauensis***
12b. Male zone clavate to ellipsoid; pollen sacs opening through paired pores in each theca; terrestrial 13
(13a in key = 14a, etc.)

Acknowledgements

The collaboration and support of the Sarawak Forestry Department, the Sarawak Biodiversity Centre, in particular former Acting Director Datin Eileen Yen Ee Lee and the Forest Research Centre (Kuching), notably L.C.J. Julaihi and Lucy Chong is gratefully acknowledged. Thanks are due to Datuk Amar (Dr) Leonard Linggi Tun Jugah, Graeme Brown & Dr Timothy Hatch of Malesiana Tropicals Sdn Bhd for their continued support and funding of fieldwork in Sarawak. We thank very much Professor Michael Hesse, Wien, Austria, for the SEM micrographs of the pollen grains & Dr H. Roessler, München for translation of the Latin diagnosis.

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