

Studies on Schismatoglottidae (Araceae) of Borneo I: A trio of new *Schismatoglottis* from Sarawak

P.C. BOYCE¹ AND WONG SIN YENG²

¹ Malesiana Tropicals, Suite 9-04, Tun Jugah Tower, No. 18, Jalan Tunku Abdul Rahman, 93100 Kuching, Sarawak, Malaysia

² Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Samarahan, Sarawak, Malaysia

Abstract

Three new species of *Schismatoglottis* - *Schismatoglottis jelandii* P.C.Boyce & S.Y. Wong, *Schismatoglottis jepomii* P.C.Boyce & S.Y. Wong and *Schismatoglottis maelii* P.C.Boyce S.Y. Wong - from Sarawak are described and included in the amendments to the key to Bornean *Schismatoglottis* published by Hay & Yuzammi (2000). All are illustrated.

Introduction

Recent revisions and publications on tropical Asian *Schismatoglottis* (Hay & Yuzammi, 2000; Hay, 2002; Hay & Herscovitch, 2003) have greatly facilitated accurate naming of Bornean *Schismatoglottis* and provided an excellent platform from which to describe further novelties without the concern that obfuscated species names are being overlooked. Despite a 100% increase in the number of Bornean *Schismatoglottis* in the past five years resulting from these publications, on-going fieldwork in Sarawak has revealed that there is still a considerable number of *Schismatoglottis* species awaiting formal description. Three are described here.

1. *Schismatoglottis jelandii* P.C.Boyce & S.Y. Wong, *sp. nov.*

Schismatoglottidem asperatam Engl. *simulans sed folii lamina stenophylla at inflorescentia gemini differt.* –**Typus:** Malaysia. Sarawak, Bintulu Division, Bintulu, Bukit Satiam, 02° 59' 33.0"N; 112° 56' 01.4"E, 12 Aug 2004, P.C.Boyce & Jeland ak Kisai AR-636 (holo, SAR). **Plate 1.**

Facultative rheophytic **herb** to c. 30 cm tall, solitary or forming small clumps.

Stem condensed, erect, to *c.* 1 cm diam., pleionanthic; internodes obscured by overlapping leaf bases, not conspicuous. **Leaves** several together (*c.* 10 per plant); petiole D-shaped in cross-section, 2–4(–7) cm long, *c.* 1/3 the length of the lamina, sheathing in the lower 1/3–2/3, asperulate, narrowly crispulate-alate on each side on the adaxial face; petiolar sheath adnate to petiole for the greater part, then free-auriculate at the top for *c.* 1 cm, broad and subparallel, the margins inrolled; blade narrowly obovate, thinly subsucculent, 15–21(–26) x 2–4(–5) cm, lustrous deep green adaxially variegated with two longitudinal zones of diffuse greenish white blotches, matt pale brownish yellow-green abaxially, the base slightly obliquely truncate, the tip attenuate and apiculate for *c.* 2 mm; midrib not prominent adaxially, prominently raised abaxially; primary lateral veins *c.* 9 on each side, alternating with slightly to considerably lesser interprimaries, diverging at *c.* 30°; secondary conspicuously tessellate (abaxially); tertiary venation not visible. **Inflorescences** two together, subtended by one narrow prophyll and one broad cataphyll; peduncle short, not exerted from leaf bases. **Spathe** 5.5–7.5 cm long, subcylindric, tapering distally, weakly rounded-truncate basally; lower spathe 1.5–2.5 cm long, ovoid, flushed pale pink, hardly differentiated from the limb by a barely perceptible constriction corresponding with the upper part of the fertile male zone; limb 3.5–6 cm long, narrowly ovate-lanceolate, dirty white flushed and slightly veined pale pink, spreading at onset of female anthesis then crumbling-deliquestent at late male anthesis. **Spadix** sessile, somewhat shorter than the spathe, to 5.5 cm long; female zone 0.6–1 cm long, with oblique to very shortly adnate (to spathe) insertion, 0.4 cm diam. at base, weakly conoid; pistils crowded, oblong-barrel-shaped, *c.* 1 mm tall, 0.75 mm diam.; stigma sessile, discoid, weakly umbonate, papillate, fractionally wider than ovary and \pm contiguous with neighbouring stigmas; interpistillar staminodes few, claviform, scattered among the pistils, slightly taller than the pistils, *c.* 0.5 mm diam.; sterile interstice 3–8 mm long, slightly wider with top of female and base of male zones, 4–5 whorls of irregularly polygonal staminodes *c.* 0.5 mm diam., separated from the female zone by a row of more slender staminodes; male zone *c.* 0.8 mm long, cylindric, fractionally wider at the junction of the appendix; stamens orange (even before anthesis) crowded, truncate with the thick connective slightly elevated above the thecae, more or less rectangular from above; pollen extruded in short strands; appendix pale pink, about one and a half the length of the rest of the spadix, widest *c.* half way up, then gradually tapering to a rather narrow blunt tip, 2.5–3.5 cm long, 4–6 mm diam.; staminodes of appendix more or less flat-topped, irregularly polygonal, 0.75–1 mm diam., densely crowded (fresh). **Fruiting spathe** not observed.



Plate 1. *Schismatoglottis jelandii*

a. Holotype plants in habitat; **b.** Inflorescence at female anthesis. Note orange stamens; **c.** Inflorescence at male anthesis, spathe beginning to deliquesce prior to being shed.

Distribution: Sarawak, Bintulu Division. Known only from the type locality.
Habitat: Facultative rheophyte on stream banks on sandstone-derived clays in slightly seasonally dry lowland secondary forest at 18 m altitude.

Notes: *Schismatoglottis jelandii* falls within the *Schismatoglottis asperata* group (see Hay & Yuzammi 2000:54) by the pleionanthic shoot, fully attached persistent leaf sheath and the spathe limb opening more or less wide and then crumbling-deliquestent. It is most similar to *S. asperata* Engl. from which it differs most notably in the stenophyllous habit, the conspicuously tessellate secondary venation (visible on the abaxial surface of the lamina) and in always producing pairs of inflorescences. Additionally the stamens are orange prior to and after anthesis vs. white prior and orange at and after anthesis in *S. asperata*.

The type locality is subjected to periodic inundation and while the plants of *S. jelandii* are probably not regularly buffeted by flood waters it does seem likely that during particularly heavy rainfall they are at least temporarily in the flood water flow. It seems reasonable to speculate that the stenophyllous habit is adaptive for this.

Hay & Yuzammi (2000) adopted a broad circumscription for *S. asperata* with the caveat that, 'Possibly it will transpire on further field study that more than one taxon has been included here, but at present there is insufficient evidence on which to base a split'. Extensive and focused fieldwork since has revealed that *S. asperata* is widespread and indeed variable but that there exists a considerable number of localized morphologically distinct taxa, frequently adapted to a specific substrate (shale in particular) and/or ecological niche and that these do, indeed, warrant taxonomic recognition.

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

- 31a. Appendix subcylindric 32
- b. Appendix conic-ellipsoid to broadly conic-ovoid 34
- 32a. Petiole conspicuously and thickly longitudinally ridged; stigmas minute, punctate, sterile interstice absent (or reduced to a whorl of incompletely abortive stamens); Southern Sarawak **27. *S. nervosa***
- b. Petiole finely longitudinally ridged and/or asperous; stigmas button-like to discoid; sterile interstice well-defined 33

33a. Petiole not ridged; appendix about two thirds of the length of the spadix;
 34

b. Petiole finely longitudinally ridged; appendix about or less than one third
 of the length of the spadix; Sarawak, ?W. Kalimantan **25. *S. latevaginata***

34a. Plant with broad leaves and not associated exclusively with riverine
 habitats; secondary venation obscure; inflorescences solitary; stamens white
 prior to anthesis, then turning orange. Widespread in NW Borneo
 **14. *S. asperata***

b. Plant stenophyllous, only associated with riverine habitats (facultative
 rheophytic); secondary venation conspicuously tessellate; inflorescences
 paired; stamens orange prior to and after anthesis. Bornean endemic.
 ***S. jelandii***

34a in key = 35a, etc.

Etymology: *Schismatoglottis jelandii* is named for Jeland ak Kisai in recog-
 nition of his considerable field skills and excellent company.

2. *Schismatoglottis jepomii* P.C.Boyce & S.Y. Wong, *sp. nov.*

Ab aliis speciebus sect. tecturae lamina spathae caducosenti differt. – **Typus:**
 Malaysia. Sarawak, Kuching Division, Lundu, Kampung Rayu, Sungai Rayu,
 01° 36' 42.6"N; 110° 08' 59.8"E, 30 m asl, 30 August 2005, *P.C. Boyce, Jeland
 ak Kisai, Jepom ak Tisai & Mael ak Late AR-1341* (holo, SAR; iso, SING).

Plate 2.

Facultative rheophytic **herb** to c. 45 cm tall, forming large clumps. **Stem**
 condensed, epigeal, pleionanthic, c. 8–10 mm diam., to c. 6 cm long (usually
 less); foliage **leaves** many together, each subtended by submembranous, later
 papery linear dark brown (when dry) cataphylls to 5 cm long; petiole 10–14
 cm long, slender, terete, sheathing only at very base; sheath very shortly and
 truncately ligular; leaf blades spreading to erect, lanceolate, somewhat brittle-
 coriaceous, glossy mid- to dark green adaxially, concolorous or frequently
 with irregular jagged or cloudy paler green or creamy grey blotched along
 the midrib, abaxially paler, the base cuneate, the tip long-acuminate and
 terminating in a 2–5 mm long tubular mucro, 8–25 x 1–5 cm; venation more
 or less obscure adaxially; midrib flattened-raised adaxially, usually drying

with a more or less conspicuous narrow central channel adaxially, abaxially prominent; primary lateral veins, *c.* 14 on each side of midrib, alternating with scarcely lesser interprimaries and diverging at *c.* 35°; secondary venation more-or-less obscure forming a weak reticulum, tertiary venation not visible. **Inflorescences** (solitary to) clustered in groups of up to four, smelling pungently of acetic acid; peduncle moderately robust, much shorter than the petiole *c.* 2 cm long and hardly emerging from the subtending cataphyll. *Spathe* white, *c.* 9 cm long; lower spathe ovoid basally becoming slender cylindrical above, *c.* 5 cm long; limb elongate-ovate, gaping at female anthesis then crumbling and falling, distinctly incurved ventrally, *c.* 4 cm long, apically stiffly mucronate for *c.* 3 mm, soon crumbling-caducous. *Spadix* sessile, stout, lower part cylindrical, distally weakly elongate-clavate, *c.* 4 (lower part) to 6 mm (upper part) diam., ventrally curved, slightly shorter than the spathe, *c.* 7 cm long; female zone *c.* 5 mm long, slightly conical, obliquely inserted but otherwise entirely free from the spathe; pistils crowded; ovary squat-oblong, *c.* 0.75 mm diam.; style distinct, *c.* 0.5 mm long; stigma minutely papillate, as wide as the style; interpistillar staminodes scattered throughout the zone, clavate, *c.* 0.5 mm diam.; male and female zones contiguous; male zone *c.* 2.5 cm long, cylindrical; stamens truncate, partly confluent apical pores; appendix sub-cylindric, *c.* 3.7 cm long, weakly elongate-clavate, blunt-tipped, composed of columnar trapezoid to triangular staminodes. *Fruiting spathe* with the lower part broadly ovoid.

Distribution: Sarawak, Kuching and Sri Aman Divisions.

Habitat: Facultative rheophyte in deep sandy-loam along stream banks in lowland secondary forest. 100 m altitude.

Notes: *Schismatoglottis jepomii* belongs to the *Schismatoglottis tectorata* group (see Hay & Yuzammi 2000: 162) based on shoot arrangement (pleioanthic with the leaf sheath very short and fully attached; foliage leaves alternating with cataphylls) but differs from the two species hitherto comprising this group (*S. tectorata* (Schott) Engl. and *S. petri* A.Hay) by the spathe limb crumbling and shedding before male anthesis. *Schismatoglottis jepomii* differs from *S. tectorata* in the considerably larger size of the inflorescence and the scattered interpistillar staminodes (arranged in a single ring at the base of the female zone in *S. tectorata*). From *S. petri* the truncate connective is immediately diagnostic.

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



Plate 2. *Schismatoglottis jepomii*.

a. Holotype plants in habitat; **b.** Inflorescence at female anthesis. Note spathe already partially shed; **c.** Inflorescence emerging from prophyll.

22a. Connective not or hardly elevated; appendix cylindrical or only weakly elongate-clavate, more or less isodimetric with top of male zone 23

b. Connective much elevated above the thecae; appendix clavate-cylindric, distinctly thicker than male zone; Brunei **87. S. petri**

23a. Spathe persistent into anthesis, later marcescent; appendix cylindric, more or less isodiametric with top of male zone; Borneo and Riau Archipelago **88. S. tecturat**

b. Spathe caducous prior to male anthesis; appendix weakly elongate-clavate; Western Sarawak **S. jepomii**

23a in key = 25a, etc.

Etymology: *Schismatoglottis jepomii* is named for Jepom ak Tisai, the most recent member of the Malesiana Tropicals field staff, who has an excellent pair of forest eyes and is a splendid company.

Other specimens examined: SARAWAK: Kuching Division: Bau, Segong, 12 Feb 2004, *Jepom ak Tisai AR-222* (SAR); Bau, Rieng Opui, 26 May 2004, *Jeland ak Kisai AR-402* (SAR); Bau, Singai, Batu Taring, 19 Jun 2004, *Jeland ak Kisai & Jepom ak Tisai AR-465* (SAR); Bau, Rieng Opui, 1 May 2005, *Jeland ak Kisai AR-1184* (SAR). Sri Aman Division: Lubok Antu, Batang Ai, Nanga Sumpa, Sungai Delok, 01° 11' 40.8"N; 112° 04' 04.2"E, 28 Jul 2004, *P.Boyce, Jeland ak Kisai & Kachong AR-558* (SAR).

3. Schismatoglottis maelii P.C.Boyce & S.Y. Wong, *sp. nov.*

Ab aliis speciebus sect. multiflorae foliis profunde corrugatis differt. – **Typus:** Malaysia. Sarawak, Kuching Division, Bau, Segong, Ulu Sungai Adis, Sungai Bronand, 50 m asl, 4 May 2004, *Jeland ak Kisai & Jepom ak Tisai AR-47* (holo, SAR). **Plate 3.**

Lithophytic *herb* to *c.* 50 cm tall. **Stem** condensed, erect to creeping, *c.* 2–2.5 cm thick, with internodes to *c.* 0.5 cm long, pleionanthic. **Leaves** to *c.* 15 together; petiole 15–25 cm long, terete, mid-green, sheathing only at the extreme base, the wings of the sheath extended into a bicarinate narrowly lanceolate free ligular portion to 13–18 cm long, drying dark brown; lamina oblong, deflexed at insertion on petiole and held subpendent, 14–25 x 5–15 cm, deep lustrous green adaxially, abaxially almost the same, the base obtuse and slightly decurrent, the tip acute and with a tubular mucro up to 8 mm long; midrib very prominent-rounded abaxially, adaxially impressed



Plate 3. *Schismatoglottis maelii*

a. Holotype plants in habitat; **b.** Inflorescence at female anthesis; **c.** Leaf lamina, adaxial surface to show diagnostic venation.

to semi-flush with the lamina, with 5–28 primary lateral veins on each side, irregularly alternating with the prominent interprimary veins and diverging at 60–70°; secondary venation very prominently deep green-transparent abaxially, impressed adaxially, arising from the midrib and from the bases of the primary veins; tertiary venation obscure, all primary and secondary veins impressed adaxially and giving the lamina a prominently finely corrugated texture. **Inflorescences** 1–4 together, nodding, subtended by lanceolate cataphylls resembling the ligular leaf sheaths, strongly fragrant of crushed raspberries at anthesis; peduncle to 7 cm long, terete, pale green, not exceeding the cataphylls, deflexed at the junction of the lower spathe and long-decurrent on the spathe (corresponding to the female zone). **Spathe** 7.5–8 cm long; lower spathe c. 2 cm long, green, differentiated from the limb by a pronounced constriction level with the top of the interstice; limb 5.5–6 cm long, pale green with darker green veining, apex mucronate for c. 3 mm, interior sticky at female anthesis when conspicuously inflated, then crumbling-caducous at male anthesis. Spadix to 4.5 cm long, subcylindric; female zone c. 1.8 cm long, adnate to the spathe in the lower 2/3, the free part slightly conoid, apically 6.5 mm diam.; pistils numerous and crowded, subcylindric, c. 0.4 mm diam.; stigma sessile, about the diameter of the ovary, button-like, papillate; interpistillar staminodes very few among the pistils, otherwise confined to a single row along the spathe/spadix adnation and a further incomplete row at the junction of the female zone and the interstice, overtopping the pistils, elongate mushroom-shaped, round-topped; sterile interstice 6 mm long, white, somewhat obconoid, distally 6 mm diam.; staminodes of interstice crowded, irregularly polygonal, the lower most resembling the interpistillar staminodes, the upper more flattened, 0.5–1 mm diam., flat-topped; male zone 2 cm long, cylindrical, basally isodiametric with top of interstice, tapering to a blunt point in the upper half; stamens rather dense, somewhat irregularly rectangular with the connective wide and raised and the pores small on the narrower edges of the connective, 0.7–10 mm across; appendix, c. 1 cm long, blunt-conic, composed of densely packed trapezoid to triangular irregular staminodes, the apex slightly depressed. Fruiting spathe mid-green, narrowly urceolate, up to 3 cm long.

Distribution: Sarawak, known only from the vicinity of Bau, Kuching Division.

Habitat: Lithophytic on thin layers of humus and in shallow litter pockets on sandstone boulders and cliffs, 60 – 100 m altitude.

Notes: *Schismatoglottis maelii* belongs to the *Schismatoglottis multiflora* group (see Hay & Yuzammi 2000: 84) by reason of the pleionanthic shoots,

free-ligular leaf sheath, and the inflorescence held subhorizontal by the bent peduncle and caducous spathe limb. It may immediately be distinguished from all other species in the group by the prominently raised striate veins, and from most species by the curiously brilliant green leaves.

Schismatoglottis maelii is most similar to *S. mayoana* Bogner & M.Hotta in possessing a sterile appendix with large staminodes and a sterile interstice but is readily differentiated by the markedly corrugated adaxial venation, smaller spadix (up to 4.5 cm in *S. maelii* vs. 8 cm in *S. mayoana*) and different inflorescence odour. The freshly opened inflorescences smell strongly of crushed raspberries in notable contrast to all other *Schismatoglottis* so far sampled, including species probably most closely related to *S. maelii*, e.g., *S. nicolsonii* A.Hay, *S. mayoana*, etc., in which the newly opened inflorescence emits a pungent smell reminiscent of acetic acid.

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

- 15a. Secondary venation very fine and dense – 2 veins per mm; thecae of stamens each with two pores 16
- b. Secondary venation density various but 1.5 veins or fewer per mm; thecae of stamens each with one pore 1*
- 16a. Spadix with a short sterile interstice of sterile stamens between the fertile zones; appendical staminodes large, ca. 1 mm across 17
- b. Spadix with fertile zone contiguous; staminodes small, ca. 0.3 mm across; Bako, Sarawak **42. *S. nicolsonii***
- 17a. Spadix usually ca. 8 cm long; leaves smooth adaxially; Matang, Sarawak **39. *S. mayoana***
- b. Spadix ca. 4.5 cm long, leaves corrugate adaxially; Bau, Sarawak ***S. maelii***

17a in key = 18a, etc.

Etymology: *Schismatoglottis maelii* is named for Mael ak Late, who is responsible for the construction and maintenance of the Malesiana Tropicals nurseries, and lately an occasional but valued member of our field team.

Other specimens seen: SARAWAK: Kuching Division: Bau, Kampung Jugan, Sungai Merah, 27 Apr 2004, *Jeland ak Kisai AR-32* (SAR) & 6 May 2004, P.Boyce & *Jeland ak Kisai AR-55* (SAR); Bau, Segong, Ulu Sungai Adis, 2 Jun 2004, *Jepom ak Tisai AR-427* (SAR) & 5 Jun 2004, *Jeland ak Kisai* & *Jepom ak Tisai AR-437* (SAR); Bau, Segong, Gunung Moi, 28 Feb 2005, *Jeland ak Kisai AR-1008* (SAR).

Acknowledgements

The collaboration and support of the Sarawak Forestry Department, the Sarawak Biodiversity Centre, in particular Datin Eileen Yen Ee Lee, the Forest Research Centre (Kuching), notably L.C.J. Julaihi, are gratefully acknowledged. Thanks are due to Datuk Amar (Dr) Leonard Linggi Tun Jugah, Graeme Brown and Dr Timothy Hatch of Malesiana Tropicals Sdn Bhd, for their considerable support and funding of fieldwork in Sarawak.

References

- Hay, A. 2002. A New Bornean Species of *Schismatoglottis* (Araceae). *Aroideana* **25**: 67–69.
- Hay, A. and C. Herscovitch. 2003. A New Species of *Schismatoglottis* (Araceae) from Sabah. *Gardens' Bulletin Singapore* **55**: 27–30.
- Hay, A. and Yuzammi. 2000. Schismatoglottideae (Araceae) in Malesia I - *Schismatoglottis*. *Telopea* **9**: 1–177.