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Source: Willdenowia, 42(2) : 255-260

Published By: Botanic Garden and Botanical Museum Berlin (BGBM)

URL: https://doi.org/10.3372/wi.42.42210

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Studies on *Schismatoglottideae (Araceae)* of Borneo XXI – Two new species of the *Schismatoglottis* Calyptrata Group: *Schismatoglottis heterodoxa* and *S. ranchanensis*

Abstract

Wong S. Y.: Studies on *Schismatoglottideae (Araceae)* of Borneo XXI – Two new species of the *Schismatoglottis* Calyptrata Group: *Schismatoglottis heterodoxa* and *S. ranchanensis*. – Willdenowia 42: 255–260. December 2012. – Online ISSN 1868-6397; © 2012 BGBM Berlin-Dahlem.
Stable URL: http://dx.doi.org/10.3372/wi.42.42210

Two new species of the *Schismatoglottis* Calyptrata Group are described from Malaysian Borneo. One, *S. heterodoxa,* is the second rheophytic species ever recorded for the Calyptrata Group. The other, *S. ranchanensis,* is lithophytic, a rather rare life form for that group. A key to the Bornean rheophytic and lithophytic species of the Calyptrata Group is given and both novelties are illustrated.

Additional key words: aroids, lithophyte, rheophyte, taxonomy, Malaysia, Indonesia

Introduction

Recent field work has revealed that the *Schismatoglottis* Calyptrata Group (species sharing hapaxanthic shoot modules, a fully attached and persistent petiolar sheath, and a caducous spathe limb, Hay & Yuzammi 2000) contains numerous taxonomic novelties. Among these, two species, one rheophyte and one lithophyte, are particularly interesting as, to date, the described species of the Calyptrata Group are almost exclusively mesophytes. The rheophytic novelty is here described as *Schismatoglottis heterodoxa* S. Y. Wong and the lithophyte as *S. ranchanensis* S. Y. Wong. *S. ranchanensis* is most similar in overall appearance to *S. viridissima* A. Hay, an obligate lithophyte from W Sarawak (Hay & Yuzammi 2000), but differs in several crucial morphological spadix characteristics. By comparison, although by its hapaxanthic shoots it clearly fits most conveniently into the Calyptrata Group, putative relationships of *S. heterodoxa* are not at all obvious. It differs very substantially from the only other known rheophytic species of the Calyptrata Group, *S. ahmadii* A. Hay (Hay & Yuzammi 2000), and does not closely resemble any other described species from Borneo.

Results and Discussion

Schismatoglottis heterodoxa S. Y. Wong, **sp. nov.**
Holotype: Malaysian Borneo, Sarawak, Bintulu Division, Bukit Satiam, 2°59'13.3"N, 112°55'57.5"E, c. 120 m asl, 14.7.2006, *P. C. Boyce & al. AR-1899* (SAR!)

Schismatoglottis heterodoxa is distinguished from *S. ahmadii,* the only other described rheophytic species of the *Schismatoglottis* Calyptrata Group, by the cylindric

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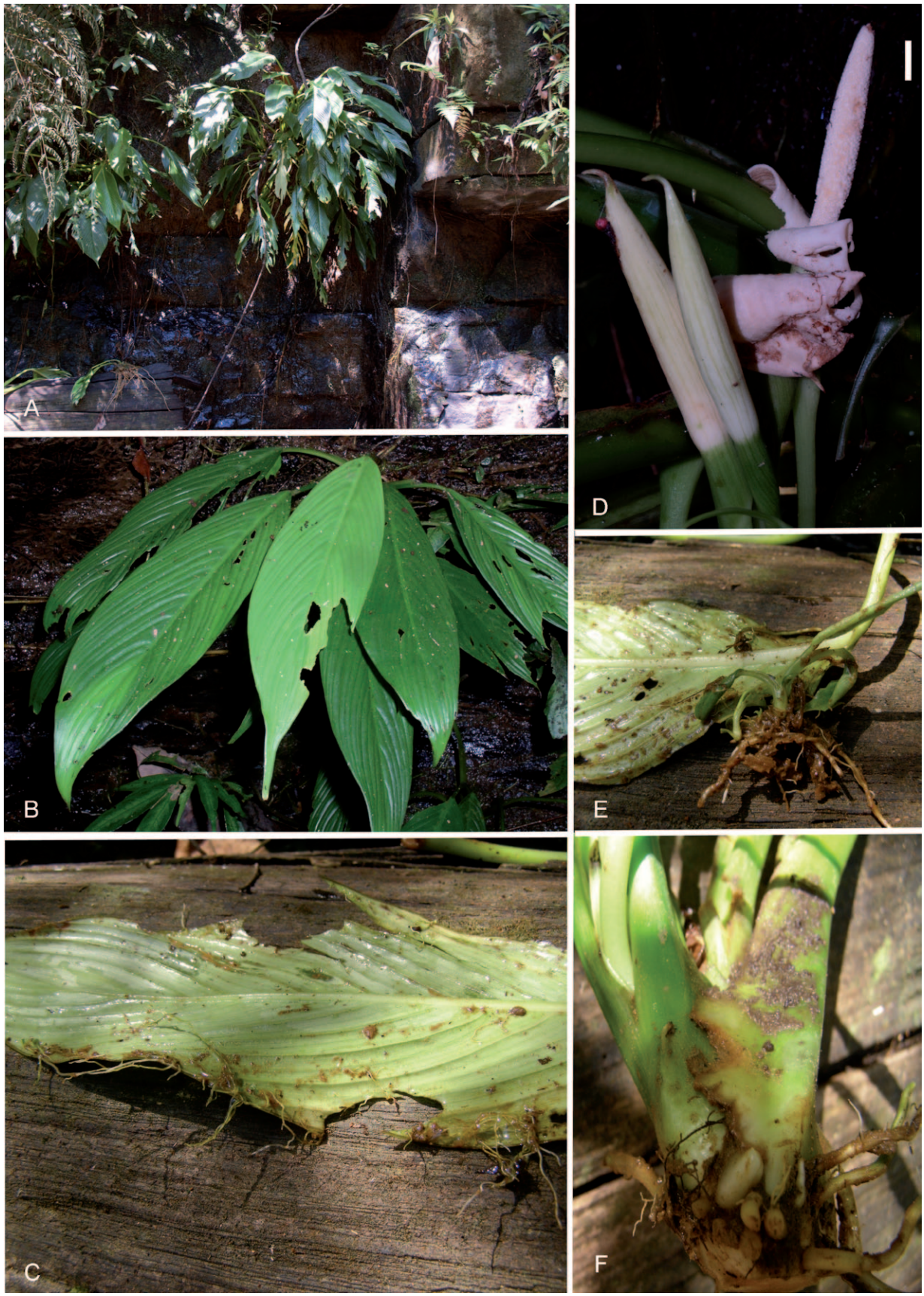


Fig. 1. *Schismatoglottis heterodoxa* – A: plant in habitat; note the rheophytic growth on wet shale; B: leaf blades; C, E: plantlets along the margins of the water-damaged leaf blade; D: flowering module; note the 2–3 inflorescences per module; F: new growth at the base of an already flowered shoot (i.e. modules hapaxanthic). – Photographs from *P. C. Boyce & al. AR-1899;* scale bar: D = 1 cm.

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spadix appendix (not conic to hemispheric), by each pollen sac opening through its own pore (not with the two pollen sacs opening through a common pore) and by the wider, as compared to ovary, elevated stigma (not flat). *S. heterodoxa* is further distinguished by the leaf blades habitually shredding, owing to water-related torsion, and then developing plantlets along the torn margins.

Medium to large obligate rheophytic herb to c. 90 cm tall. *Stem* hypogeal, hapaxanthic, erect to declinate, rhizome 3–5 cm in diameter. *Leaves* few together, c. 5 per module; *petioles* terete, smooth, glabrous, 40–50 cm long × 2–5 cm in diameter, sheathing in the lower 1/5; *sheath* fully attached, closed, tapering, persistent; *blade* pendent, oblong-ovate to oblong-lanceolate, leathery, 20–40 cm long × 6–16 cm wide, base cuneate to slightly truncate, apex acuminate to c. 5 cm long, greatly attenuate terminally to c. 3 cm long, tubular mucro to c. 5 mm long, adaxial surface glossy mid-green, abaxial surface paler, glabrous, blade often shredded by water torsion and with plantlets developing along the torn margins; *midrib* adaxially flush with blade, abaxially prominent, raised canaliculate in cross section, whitish green when fresh, dark brown (straw colour) when dry; *primary venation* strongly impressed adaxially, strongly raised abaxially, with 13–20 primary lateral veins on each side, alternating with lesser interprimaries from the midrib, occasionally arising from the base of primary veins, both diverging at 45°–60° and gradually curving towards the apex before reaching the intermarginal collecting vein; *secondary venation* obscure adaxially, weakly raised abaxially, prominent when dry, arising from the midrib, occasionally from near the bases of the primary veins; *tertiary venation* forming obscure tessellate venation abaxially. *Inflorescences* 2–3 per module, modules produced in a succession of up to 5, and together forming a synflorescence, cataphyll to c. 5 cm long; *peduncle* to c. 7 cm long, exserted from leaf bases. *Spathe* glossy, coriaceous, lower spathe ovoid, green when fresh, c. 3 cm long, differentiated from the limb by faint constriction coinciding with the lower part of staminate zone; limb whitish green, c. 6 cm long, mucronate for c. 2 mm. *Spadix* sessile, adnate isodiametrically to the spathe in the lower 1/2 of pistillate zone, subcylindric, 6–7.5 cm long, subequalling the spathe; *pistillate flower zone* conic-cylindric, 2–2.6 cm long × 5.5–6 mm in diameter, 1/3 of spadix length, attenuate distally; pistils numerous and close-packed, subglobose from above, c. 1.4 mm long × 0.8 mm in diameter, white in alcohol; stigma sessile, wider than ovary, c. 0.8–1 mm in diameter, raised, papillate, brown in alcohol; interpistillar staminodes present among pistils, taller than pistils, c. 3 mm long; *sterile interstice* present, staminodes or abortive stamens confined to ± a single ring interspersed with few stamens, staminodes irregularly polygonal, flat- to slightly round-topped, c. 0.8 mm in diameter, shiny black in alcohol; *staminate flower zone* cylindric with base slightly smaller in diameter than the rest of staminate zone, 1–1.3 cm long × 4.7–6.3 mm in diameter, 1/4 of spadix length; stamens close-packed, dumbbell-shaped from above, c. 1 mm in diameter, white when fresh, turning dark brown in alcohol and drying brick red, connective wide, alate, pores deeply impressed, each pollen sac with one pore, c. 0.02–0.04 mm in diameter, rim alate; *appendix* cylindric, white when fresh, shiny black in alcohol and dry material, c. 2.5–3 cm long × 5–6 mm in diameter, less than 1/2 of spadix length, tapering to a blunt point; staminodes of appendix irregularly polygonal or almost circular, flat- to round-topped, c. 0.7–1 mm in diameter. *Infructescences* with peduncle elongate in fruit, ultimately declinate; *fruits* not observed. – Fig. 1.

Ecology – The species is an obligate rheophyte in shale waterfalls in the dense shade of moist evergreen lowland forest at elevations of 20–120 m.

Distribution – *Schismatoglottis heterodoxa* is apparently endemic to Bukit Satiam, Bintulu Division, N Sarawak.

Etymology – The name is derived from Greek heteros (different) and doxa (to live in, or make a home in), in allusion to this species' very different appearance compared with other Calyptrata Group species.

Additional specimen seen – Malaysia: Sarawak: Bintulu Division, Bukit Satiam, 2°59'33.0"N, 112°56'01.4"E, 12.8.2004, *P. C. Boyce & Jeland ak Kisai AR-638* (SAR).

Discussion – *Schismatoglottis heterodoxa* and only three other species of *Schismatoglottis* (*S. mayoana* Bogner & M. Hotta, *S. pudenda* A. Hay and *S. schottii* Bogner & Nicolson) have the stamen with each pollen sac opening through its own pore (Hay & Yuzammi 2000). Two of these other species belong to the *Schismatoglottis* Multiflora Group *(S. mayoana* and *S. schottii)*, and the third *(S. pudenda)* to the Tecturata Group. These groups are defined by polphyllous modules with the greater portion of the petiolar sheath free-ligular (Multiflora Group), and monophyllous modules with the petiolar sheath very short and its protective role taken by the long cataphyll that precedes each foliage leaf (Tecturata Group).

Schismatoglottis ranchanensis S. Y. Wong, **sp. nov.**
Holotype: Malaysian Borneo, Sarawak, Samarahan Division, Serian, Taman Rekreasi Rachan, 1°08'34.9"N, 110°35'02.4"E, 57 m asl, 19.11.2005, *P. C. Boyce & al. AR-1532* (SAR).

Schismatoglottis ranchanensis is rather closely similar in overall appearance to *S. viridissima,* although readily distinguished from the latter by petioles longitudinally ridged and D-shaped in cross section with the dorsal edges sharp (not terete and slightly scabrid), the spadix slender cylin-

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Fig. 2. *Schismatoglottis ranchanensis* – A: plants in habitat; B: leaf blade; note the conspicuously raised primary venation; C: inflorescence at pistillate anthesis, the inflated spathe limb coincides with the upper part of pistillate flower zone; D: petiole showing the longitudinal ridges and D-shaped cross section; E: inflorescence with spathe artificially removed to reveal the long interstice, c. 1/4 of the spadix length, and the button-like interpistillar staminodes. – Photographs from the type collection; scale bars: C + E = 1 cm.

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drical (not ± hourglass-shaped), the sterile interstice up to 1/4 of the spadix length (not ill-defined) and the spathe constriction coinciding with the upper part of the pistillate zone (not with the basal third of the staminate zone held within the lower spathe chamber).

Small to medium sized lithophytic herb to c. 80 cm tall. *Leaves* few together, c. 5 per module; *petioles* D-shaped in cross section, weakly longitudinally ridged, with dorsal edges sharp, 40 cm long, glabrous, sheathing in the lower 1/10; *sheath* fully attached, tapering; *blade* rather soft, coriaceous, elliptic, sometimes ovate, sometimes oblong-shaped, 25–38 cm long × 8–15 cm wide, adaxial glossy, deep green, abaxial paler, not glaucous, the base ± truncate, the apex acute to broadly acute and acuminate for 2.5 cm, with a tubular mucro to c. 5 mm long; margin undulate; *midrib* abaxially prominent, adaxially bluntly obscurely raised; *primary lateral veins* adaxially somewhat raised, abaxially prominent usually even when dry (and then usually straw-coloured), c. 10 on each side of the midrib, alternating with interprimaries and diverging at c. 45°, interprimaries arising from midrib, obscure adaxially and abaxially; *secondary venation* adaxially and abaxially obscure; *tertiary venation* adaxially and abaxially a tessellate reticulum. *Inflorescence* solitary; *peduncle* to c. 9 cm long, exserted from leaf bases. *Spathe* glossy, coriaceous, lower spathe ovoid, green when fresh, c. 3 cm long, differentiated from the limb by faint constriction coinciding with the upper part of pistillate zone; limb white, c. 8 cm long, mucronate for c. 2 mm. *Spadix* sessile, adnate isodiametrically to the spathe in the lower 2/5 of pistillate zone, subcylindric, up to 7 cm long, subequalling the spathe; *pistillate flower zone* conic-cylindric, c. 3 cm long × 5 mm in diameter, 1/2 of spadix length, slender; pistils numerous and close-packed, subglobose from above, c. 1.4 mm long × 0.8 mm in diameter, light green when fresh, becoming brown in alcohol; stigma sessile, wider than ovary, c. 0.8 mm in diameter, flat, papillate, pale greyish white, turning brown in alcohol; interpistillar staminodes present among pistils, marginally taller and wider than pistils, button-like, c. 1.5 mm long × 1 mm in diameter, shiny white; *sterile interstice* present, 1/4 of spadix length, staminodes irregularly polygonal, flat and stretched proximally, slightly round-topped distally, c. 0.5–0.8 mm in diameter, light yellow when fresh, dark brown in alcohol; *staminate zone* cylindric, c. 1 cm long × 5 mm in diameter, 1/7 of spadix length; stamens close-packed, dumbbell-shaped from above, c. 0.8 mm in diameter, white when fresh, becoming brown in alcohol, connective wide, pores deeply impressed, 0.02–0.04 mm in diameter, rim alate; *appendix* cylindric, light yellow when fresh, c. 0.6 cm long × 5 mm in diameter, 1/10 of spadix length, tapering to a slightly blunt point; staminodes of appendix irregular polygonal or almost circular, flat- to round-topped, c. 0.7–1 mm in diameter. *Infructescence* with peduncle elongate in fruit, declinate. – Fig. 2.

Ecology – *Schismatoglottis ranchanensis* grows lithophytically on basalt under open perhumid lowland forest at an elavation of about 60 m, occasionally along watercourses but never rheophytic.

Distribution – The species is only known from the type locality at Ranchan Recreational Park, Samarahan Division, SE Sarawak.

Etymology – The specific epithet is derived from the name of the type locality.

Key to the rheophytic and lithophytic species of the *Schismatoglottis* Calyptrata Group on Borneo

1. Appendix narrowly cylindric to tapering-cylindric . 2
– Appendix hemispheric to bullet-shaped or conoid . 3
2. Leaf blade leathery, adaxially light green, with the primary veins impressed; blade frequently shredded owing to water torsion, with plantlets developing along the torn margins; blade base cuneate to weakly truncate; petioles terete in cross section, smooth; interpistillar staminodes overtopping pistils; interstice ill-defined; stamens with each pollen sac opening through its own pore; rheophytes on shale. Bukit Satiam, Sarawak . . . . . ***S. heterodoxa*** S. Y. Wong
– Leaf blade coriaceous, adaxially deep glossy green, with the primary veins conspicuously raised; blade never developing plantlets; blade base cordate; petioles D-shaped in cross section, with dorsal edges sharp, weakly longitudinally ridged; interpistillar staminodes equalling pistils; interstice conspicuous; stamens with two pollen sacs opening through a common pore; lithophytes on basalt. Ranchan, Serian, Sarawak . . . . . ***S. ranchanensis*** S. Y. Wong
3. Sterile interstice between pistillate and staminate flower zones a well-defined zone of crowded more or less columnar, polygonal staminodes 4
– Sterile interstice absent or ill-defined and/or composed of ± abortive, usually lax pistils and anthers and/or interpistillar staminodes 5
4. Leaf blade narrowly cordate-sagittate, thin textured, plain light green or heavily spattered with white and very pale grey; spadix c. 3 cm long. Nangapinoh, N Kalimantan Barat . . . . ***S. pumila*** Hallier f. ex Engl.
– Leaf blade ovate-sagittate, coriaceous, dull grey-green either variegated with four longitudinal grey bands or with small cloudy grey patches; spadix c. 8 cm long. Gunung Amai Ambit (c. 0°30'N, 113°15'E), N Kalimantan Barat . . . . . ***S. zonata*** Hallier f.
5. Lower part of staminate zone shortly cylindric and held within the lower spathe chamber, the rest obconic and exserted; leaf blades bright green, somewhat rubbery; lithophytic on granite. Gunung Gading, S Sarawak . . . . . ***S. viridissima*** A. Hay
– Staminate zone obconic, exserted from the lower

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spathe chamber (or sometimes included in the extreme base only); various substrates 6
6. Interpistillar staminodes very numerous, filling the spaces between lax pistils in lower half of pistillate zone, barely stipitate, clavate-prismatic, shorter than pistils; lithophytes on ultramafic rocks. Gunung Silam, Sabah . . . . . ***S. silamensis*** A. Hay
– Interpistillar staminodes few to rather many, stipitate, ± clavate, and equalling to exceeding the pistils . 7
7. Appendix shortly cylindric-bullet-shaped, basally isodiametric with top of staminate zone; anthers with the connective almost as broad as the thecae; lithophytic on ultramafic rocks. Scattered in Sabah . . . . . ***S. decipiens*** A. Hay
– Appendix bullet-shaped to conic to hemispheric, usually basally slightly and abruptly wider than the top of the staminate zone (if not, then hemispheric) . . . 8
8. Stem erect, epigeal and pleionanthic; lithophytic on limestone. Niah Caves, N Sarawak . . . . . ***S. niahensis*** A. Hay
– Stem hypogeal and hapaxanthic 9
9. Rheophytes on sandstone; leaves with rather closely spaced, tough, abaxially prominent primary lateral veins, margins undulate and often crispulate, leaf tip sometime cirrhate; fruiting peduncle erect. Widespread in N Borneo . . . . . ***S. ahmadii*** A. Hay
– Lithophytes on limestone 10
10. Leaf blades matte and very dark green adaxially; interpistillar staminodes shorter than to about equalling the pistils. E Sabah and NE Kalimantan . . . . . ***S. venusta*** A. Hay
– Leaf blades usually rich glossy green, membranous; interpistillar staminodes exceeding the pistils. Mulu N. P., NE Sarawak . . . . . ***S. muluensis*** M. Hotta

Acknowledgements

This paper is a result of an ongoing research programme, funded from various sources, currently by the Ministry of Higher Education, Malaysia by ERGS/01(02)/808/2011(03). Research and fieldwork in Borneo is most recently under Sarawak Forestry Department Research Permit No. NCCD.907.4.4(Jld.7) and Park Permit No: 104/2012. The continuing collaboration and support of the Forest Department Sarawak and Sarawak Forestry Corporation are gratefully acknowledged. Many thanks to Peter C. Boyce for his comments on an earlier draft of this manuscript.

References

Hay A. & Yuzammi 2000: *Schismatoglottideae* in Malesia I – *Schismatoglottis*. – Telopea **9:** 1–178.

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