Studies on Schismatoglottideae (Araceae) of Borneo LIII – *Schismatoglottis larynx and S. rejangica*, new species allied to *S. petradoxa*

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ABSTRACT

Schismatoglottis larynx S. Y. Wong & P. C. Boyce and *S. rejangica* S. Y. Wong & P. C. Boyce are described, illustrated, and compared with *S. petradoxa* S. Y. Wong & P. C. Boyce, the species to which they are most closely similar. A key to all three species is provided.

KEY WORDS

Rheophyte, shale ecology, *Schismatoglottis* Tecturata Group

INTRODUCTION

Schismatoglottis petradoxa S. Y. Wong & P. C. Boyce (Wong & Boyce 2014) is a perplexing

plant that, whereas overall highly reminiscent of species of the *Schismatoglottis* Multiflora Group (Hay & Yuzammi 2000), is distinguished by the shoot modules comprising a single foliage leaf, a petiolar sheath reduced to a very short collar with its protective role homeotically taken by the subtending prophyll, and leaf blades with tessellate secondary venation, all characteristics that are absent from the Multiflora Group. At the time of publication no further species combining this combination of characteristics was known to exist, and *S. petradoxa* was considered to be an isolated species.

Recently two further species have flowered that share the defining characteristics of *S. petradoxa* but which are also obviously distinguished from it. We here describe these as taxonomic novelties: ***Schismatoglottis larynx* S. Y. Wong & P. C. Boyce sp. nov.** and ***S. rejangica* S. Y. Wong & P. C. Boyce sp. nov.** The result is that there is now a species cluster of three morphologically similar (and molecularly allied) species occupying an isolated position within *Schismatoglottis* sens. lat. (Low et al., in prep.).

Dimensions in the descriptions are derived from fertile (i.e., mature) plants. Seedlings have overall smaller measurements.

In verifying geological occurrences for this paper we have been much assisted by the excellent geological map of Tate (2001).

KEY TO THE SPECIES OF THE *SCHISMATOGLOTTIS PETRADOXA* CLADE

1a. Leaf blades pendulous; thick, brittle; spadix weakly clavate-cylindric, 5.5–7 cm long 2

1b. Leaf blades arching-erect, leathery; spadix stoutly clavate, 4–4.5 cm long . . . . ***Schismatoglottis larynx*** S. Y. Wong & P. C. Boyce

2a. Leaf blades up to 45 cm long × 14 cm wide; petioles up to 27 cm long; leaf blade abaxially conspicuously ribbed (ribs corresponding to the primary lateral veins); mid-rib pale creamy yellow contrasting with remainder of blade matte olive-green; inflorescences in groups of three; spadix 6–7 cm long; stigmas narrower then pistil . . . . . ***Schismatoglottis petradoxa*** S. Y. Wong & P. C. Boyce

2b. Leaf blades up to 26 cm long × 7 cm wide; petioles up to 11 cm long; leaf blade abaxially not conspicuously ribbed; mid-rib concolorous with remainder of blade; inflorescences solitary; spadix ca. 5.5 cm long; stigmas wider than pistil . . . . . ***Schismatoglottis rejangica*** S. Y. Wong & P. C. Boyce

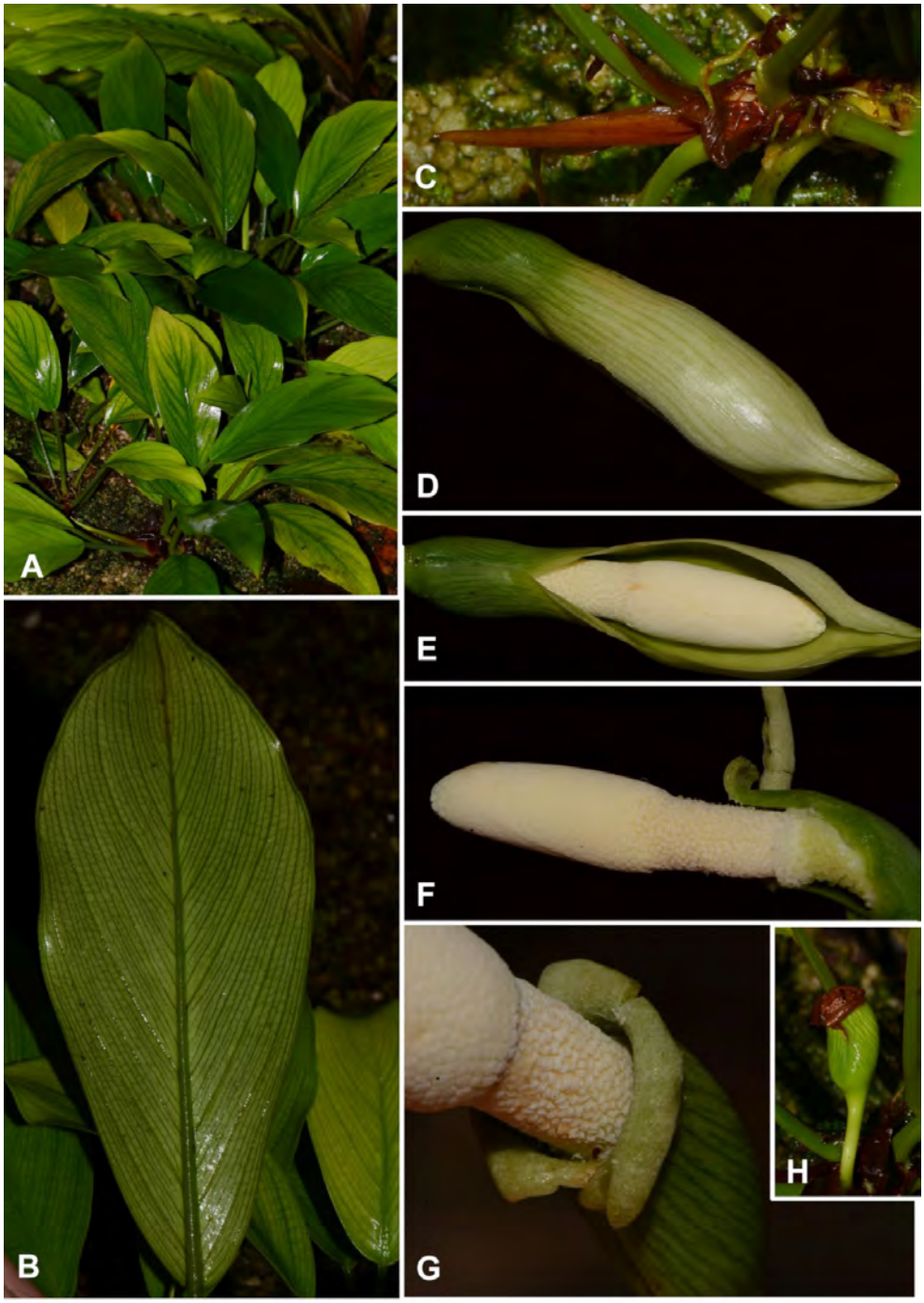

Figure 1. Schismatoglottis larynx S. Y. Wong & P. C. Boyce
A. Cultivated plant. **B.** Leaf blade, abaxial surface showing tessellate veins. **C.** Active shoot tip showing each leaf subtended by a protective cataphyll; note that petiolar sheath is reduced to a short collar with no protection function of emerging leaf. **D & E.** Inflorescence at pistillate anthesis; the posture in **D.** is as in nature. **F.** Spadix at onset of staminate anthesis, nearside portion of spathe artificially removed, note expanded interstice staminodes spathe limb shed, leaving recurved remnants around orifice of lower spathe. **G.** View of the recurved remnants of the spathe limb at orifice of lower spathe, inflorescence at onset of staminate anthesis. **H.** Developing infructescence; note that the peduncle has reflexed to bring the infructescence upright. **A–H** from *AR–4186*. Images © P.C. Boyce.

Schismatoglottis larynx S. Y. Wong & P. C. Boyce, **sp. nov**. Type: Malaysian Borneo, Sarawak, Betong, Saratok, Sungai Kabo, 01°46'37.1"N 111°28'26.1E", 15 Jul 2013, *M. Lo AR–4186* (holotype SAR!; isotypes M!, SAR!, SING! – all alcohol preserved). **Figure 1.**

Diagnosis

Schismatoglottis larynx is distinguished from *S. petradoxa* and *S. rejanica* by arching-erect (not pendulous) leathery (not thick, brittle) leaf blades, and by a stoutly clavate spadix 4–4.5 cm long (vs slender clavate-cylindric, 6–7 cm long). *Schismatoglottis larynx* is further differentiated from *S. petradoxa* by the much smaller leaf blades (up to 26 × 7 cm vs up to 45 × 14 cm), without a discolorous mid-rib, shorter petioles (up to 11cm long vs up to 27 cm long), and solitary inflorescences (vs inflorescences in threes).

Description

Creeping rheophytic herb to ca. 15 cm tall. **Stem** condensed, rhizome-like, densely rooting along its length, internodes to 1 cm long, ca. 4 mm diam. **Leaves** numerous, each alternating with soon-marcescent, tapering lanceolate weakly scabrid cataphyll to 3.5 cm long; **petiole** shorter than blade, erect, 5–8 cm long, dorsally flattened with blunt ridges running along the dorsal margins, dull green, minutely scabrid, sheathing only at very base, petiolar sheath reduced to an obscure collar; **blade** oblanceolate, 9–11.5 cm long × 3.5–4 cm wide, leathery, adaxially matte olive-green, much slightly paler, base cuneate to very narrowly rounded, apex acuminate and apiculate for ca. 1 mm; **midrib** adaxially more or less flush with blade, abaxially prominent; **primary lateral veins** ca. 8 on each side, diverging at 45–60°, adaxially hardly impressed, abaxially somewhat raised; interprimary veins more numerous than primaries, ca. half width; **secondary venation** abaxially forming a conspicuous dark green tessellate reticulum; **tertiary venation** invisible. **Inflorescence** nodding, solitary, subtended by lanceolate membranous cataphylls, smelling very faintly sweet-esteric at pistillate anthesis; **peduncle** cylindric, and subtended almost obscured by a conspicuous prophyll, up to 4 cm long × 3 mm wide, pale green. **Spathe** with a strong constriction between the lower part and the limb, limb inflating and gaping at pistillate anthesis, opening further at staminate anthesis, 5–6 cm long; **lower spathe** narrowly ovoid and markedly asymmetric, dorsally shallowly flattened-convex corresponding to the adnation of the pistillate flower zone, glossy medium green with fine darker longitudinal veins, dorsally ca. 1 cm long, ventrally 1.5 cm long, persistent; **spathe limb** exterior pale greenish while with fine darker green longitudinal lines at pistillate anthesis, interior dirty whitish, rather glossy, broadly lanceolate 4–4.5 cm long, bluntly rostrate for ca. 1 cm, upper half opening at pistillate anthesis and initially via a narrow terminal slit, then wide-gaping (ca. 2 cm wide), and weakly fornicate, limb margins reflexing during staminate anthesis, limb caducous to leave a rim of recurved degraded tissue at

the lower spathe insertion. **Spadix** 4–4.5 cm long, stoutly clavate; **pistillate zone ca.** 3.5 mm (dorsal side) to 8 mm long (ventral side), weakly conic, obliquely inserted, distally ca. 4 mm diam., light green; **pistils** somewhat crowded, and upwardly oriented with relation with the spadix axis, ca. 0.7 mm diam., slightly depressed-globose, light green; **stigma** briefly stipitate, capitate, narrower than top of pistil, ca. 0.2 mm tall × 0.4 mm wide, papillose; **interpistillar pistillodes** very few, occurring at junction of peduncle and pistillate flower zone with peduncle, ca. 2 mm long, compressed-clavate, white; **sterile interstice** with about 2 rows of staminodes; **interstice staminodes** weakly columnar-polygonal ca. 1 mm across, dull-white, initially equalling the height of pistils, later (late pistillate anthesis) staminodes lengthening to create a ring ca 1/3 wider than fertile zones; **staminate zone** cylindric-weakly conical, ca. 1.5 cm long × 0.4–0.5 cm diam., cream; **stamens** irregularly densely crowded, individual flowers impossible to distinguish, rectangular dumb-bell shaped from above, truncate with narrow connective slightly pointed-elevated above thecae, thecae opening by a single pore, creamy white; **appendix** stoutly clavate, blunt, proximally slightly wider than top of staminate zone, 2–2.4 cm long, widest part ca. 7 mm diam., distally tapering and narrowly obtuse, white; **appendix staminodes** very dense, weakly polygonal in plan-view with a weak central depression, pale cream. **Fruiting spathe** erect by flexing of the peduncle, oblique-urceolate with the rim bearing recurved spathe limb remnants, deep glossy green. **Fruits** and **seeds** not seen.

Ecology — Occurring on semi-shaded shale rocks beside a small forest waterfall. 60 m asl.

Distribution — *Schismatoglottis larynx* is known only from the type locality, where it is very locally plentiful.

Etymology — The trivial epithet is suggested from the form of the human larynx and its resemblance to the manner in which the lower spathe tightly grips the pistillate portion of the spadix as far as the expanded zone of interstice staminodes.

Notes — Although mono(folia)phyllous shoot modules, a condensed petiolar sheath, and protective subtending prophyll are all typical of the *Schismatoglottis* Tecturata Group (Boyce & Wong 2013), *S. larynx* differs from *S. tecturata* and its allies by leaf blades with tessellate secondary venation, and pendent inflorescences each on a long peduncle (**Figure 3)**.

Molecular analyses (Low et al, in prep.) fails to retrieve as monophyletic the *Schismatoglottis* Tecturata Group, with multiple accessions of the representative species [*S. tecturata* (Schott) Engl.] falling together outside of *Schismatoglottis* sens. strict. It is perhaps significant that Schott (1865) recognized a separate genus, *Colobogynium* Schott, for the plant now called *Schismatoglottis tecturata*.

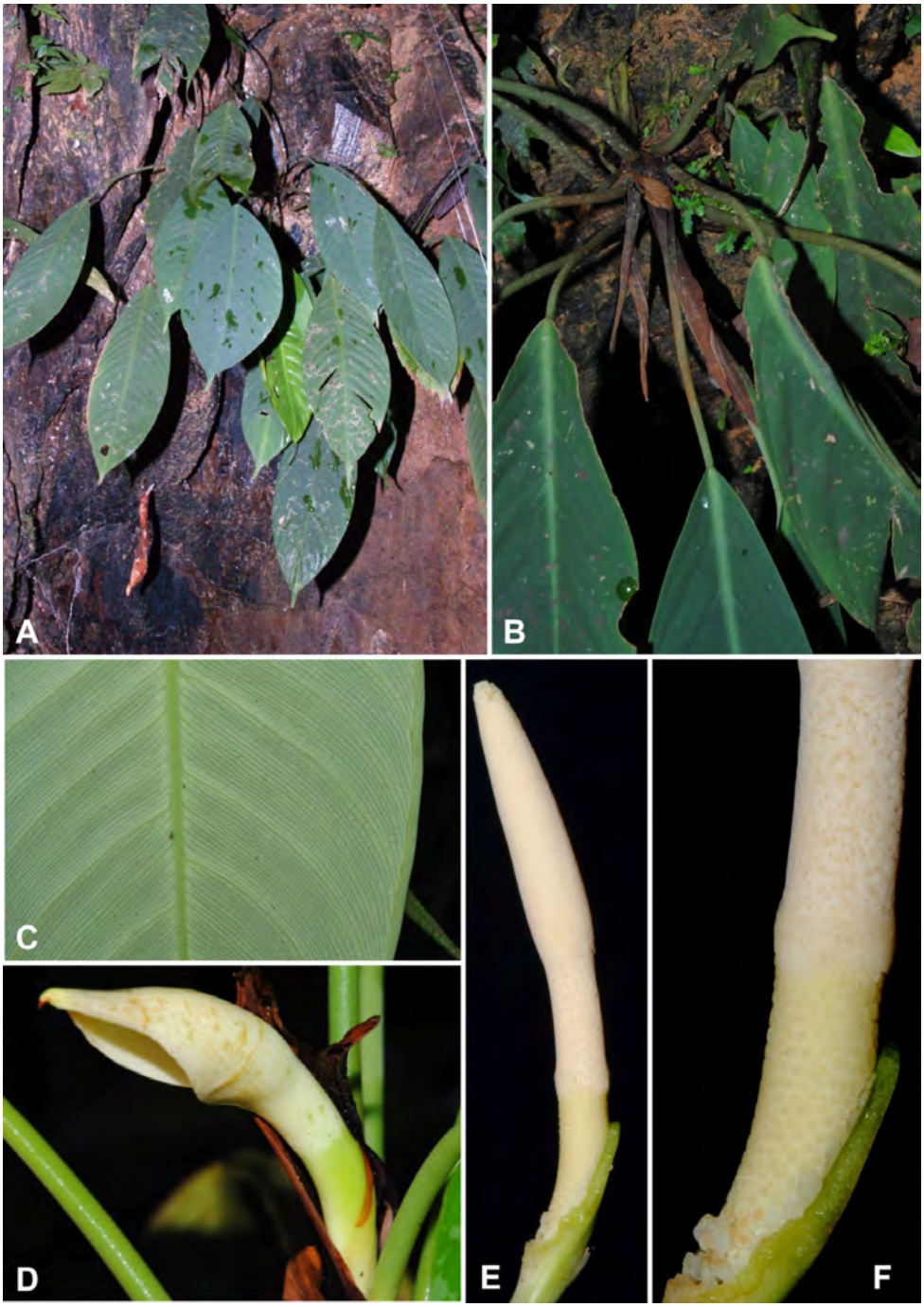

Figure 2. Schismatoglottis rejangica S. Y. Wong & P. C. Boyce
A. Plans in habitat. **B.** Detail of plant showing each leaf subtended by a protective cataphyll; note that petiolar sheath is reduced to a short collar with no protection function of emerging leaf. **C.** Leaf blade, abaxial surface showing tessellate veins. **D.** Inflorescence at pistillate anthesis. **E.** Spadix at onset of staminate anthesis, spathe artificially removed, note expanded interstice staminodes spathe limb shed, leaving recurved remnants around orifice of lower spathe. **F.** Detail of lower spadix, pistillate flower zone separated by expanded interstice staminodes, and lower portion of staminate flower zone; note the large pistillodes at the junction of the pistillate flower zone with the spathe adnation. **A–C** from *AR–1758*; **D–F** from *AR-353*. Images © P.C. Boyce.

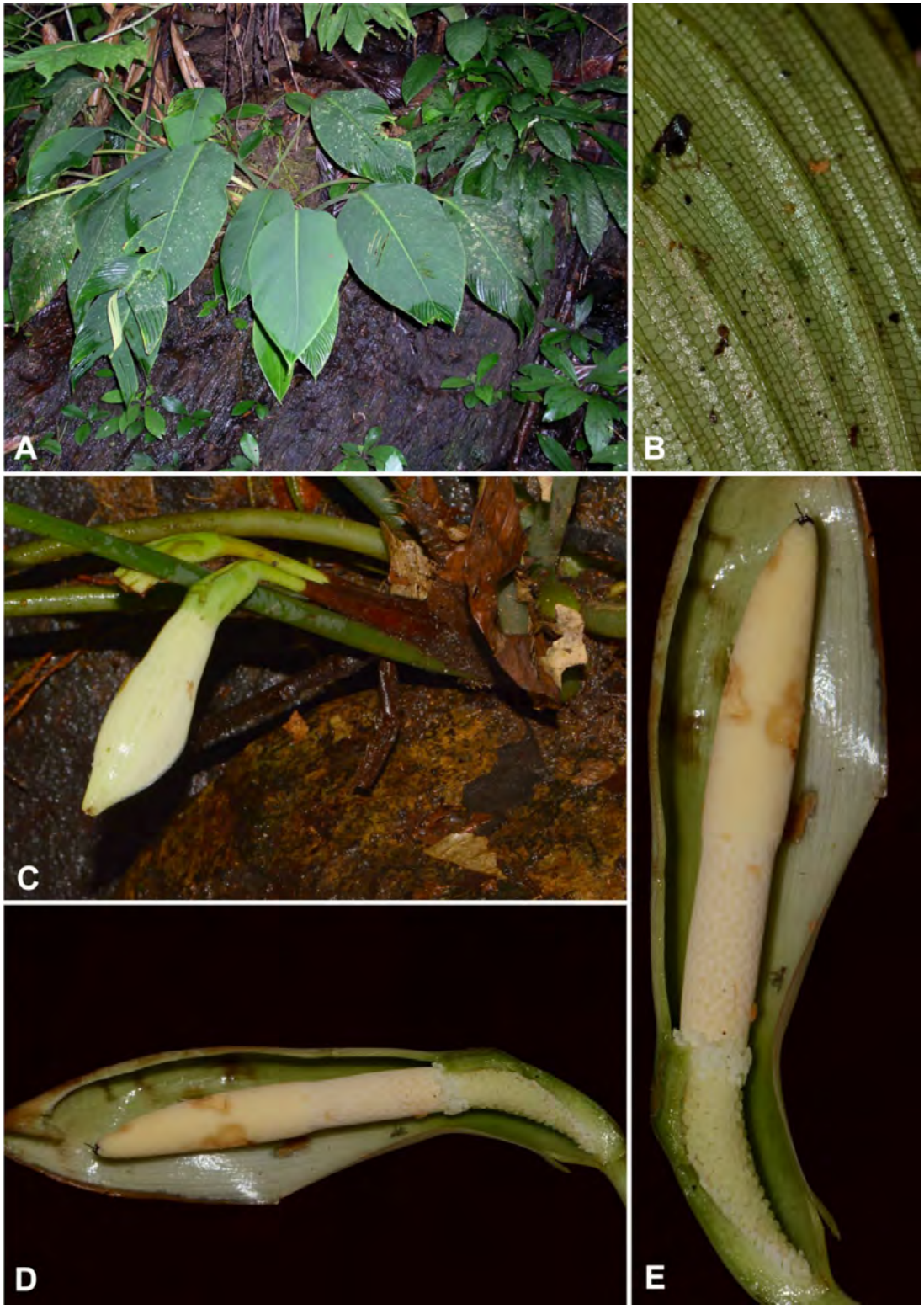

Figure 3. Schismatoglottis petradoxa S. Y. Wong & P. C. Boyce
A. Plants in habitat. **B.** Detail of tessellate secondary venation. **C.** Inflorescence at pistillate anthesis. **D & E.** Inflorescence at late pistillate anthesis, nearside spathe artificially removed. Note that the interstice staminodes have lengthened. **A** from *AR-464*; **B - E** from *AR-4894*. Images © P.C.Boyce.

Schismatoglottis rejangica S. Y. Wong & P. C. Boyce, **sp. nov**. Type: Malaysian Borneo, Sarawak, Kapit, Nanga Gaat, Rejang Wood Concession, km 65 road to Camp Gahada, 01° 42'01.1"N 113°31'14.8"E, 12 May 2004, *P. C. Boyce, Jeland ak Kisai & Jepom ak Tisai AR-353* (holotype SAR!; isotypes M!, SAR!, SING! – all alcohol preserved). **Figure 2.**

Diagnosis

Schismatoglottis rejangica is distinguished from *S. petradoxa* by the much smaller leaf blades (up to 26 cm × 7 cm vs up to 45 × 14 cm), without a discolorous mid-rib, lacking conspicuous abaxial ribbing, less conspicuous tessellate secondary venation, by shorter petioles (up to 11 cm long vs up to 27 cm long), and solitary inflorescences (vs inflorescences in threes) with a spadix ca. 5.5 cm long (vs 6–7 cm long).

Description

Pendent rheophytic herb to ca. 25 cm. **Stem** condensed, with internodes to 1 cm long, 1–2 cm diam. **Leaves** several together alternating soon-marcescent, somewhat brittle tapering lanceolate weakly scabrid cataphylls to 8 cm long; **petiole** shorter than blade, arching to almost pendent, 6–11 cm long, sub-terete, proximal third, dull medium green, minutely scabrid, sheathing only at very base, with the petiolar sheath reduced to an obscure collar; **blade** broadly lanceolate, 16–26 cm long × 4–7 cm wide, thick, adaxially matte medium green, paler and matte abaxially, base cuneate to very narrowly rounded, apex acuminate and apiculate for ca. 1 cm; **midrib** adaxially more or less flush with blade, abaxially prominent; **primary lateral** veins ca. 12 on each side, diverging at 45–60°, abaxially slightly raised, adaxially impressed; **secondary venation** adaxially invisible, abaxially forming a slightly conspicuous darker tessellate reticulum; **tertiary venation** invisible. **Inflorescence** pendulous, solitary, subtended by lanceolate chartaceous cataphylls, with a weak esteric odour at pistillate anthesis; **peduncle** compressed-cylindric, subtended by a conspicuous prophyll or cataphyll, up to 8 cm long × 3.5 mm wide, medium green, minutely scabrid. **Spathe** with a moderate constriction between the lower part and the limb, limb inflating and gaping at pistillate anthesis, opening further at staminate anthesis, 6–6.5 cm long; **lower spathe** compressed ovoid and strongly asymmetric, dorsally flattened-convex corresponding to the adnation of the pistillate flower zone, medium green with very fine darker longitudinal veins, dorsally ca. 1 cm long, ventrally ca. 2 cm long, persistent; **spathe limb** exterior white with very fine darker longitudinal lines at pistillate anthesis, interior dirty whitish green shading dorsally to glossy green broadly lanceolate 5–6 cm long, upper half opening at pistillate anthesis and initially via a narrow terminal slit, then wide-gaping (ca. 2 cm wide), and weakly fornicate, limb margins reflexing during staminate anthesis, then whole limb degrading-caducous with the rim remaining above the lower spathe insertion reflexing somewhat. **Spadix** ca. 5.5 cm long, stoutly

cylindrical-clavate; **pistillate zone dorsally entirely adnate to spathe,** 1cm long, compressed conic, ca. 6 mm diam., very pale green; **pistils** crowded, ca. 1 mm tall, 0.7 mm diam., narrowly barrel-shaped, pale green; **stigma** sessile, discoid, wider than top of pistil, ca. 0.5 mm tall × 1 mm wide, papillose; **interpistillar pistillodes** forming a row at junction with peduncle, ca. 1.2 mm long, resembling slender, compressed pistils,, whitish green; **sterile interstice** with about 3 rows of staminodes; **interstice staminodes** compressed-cylindrical ca. 1 mm across, dull-white, initially equalling the height of pistils, later (late pistillate anthesis) staminodes lengthening to form a ring ca 1/3 wider than fertile zones; **staminate zone** cylindric, ca. 1.5 cm long × 0.4–0.6 cm diam., cream; **stamens** irregularly densely crowded, individual flowers difficult to distinguish, rectangular-dumbbell shaped from above, truncate with thick connective slightly elevated above thecae, thecae opening by a single pore; **appendix** stoutly cylindrical, blunt, proximally as wide as staminate zone, 2.5–3 cm long, widest part 5–8 mm diam., distally slightly tapering and narrowly obtuse, cream; **appendix staminodes** very dense, irregularly rectangular shaped from above, ca. 0.5 mm diam., centrally with a narrow, deep depression, cream. **Fruiting spadix** not seen.

Ecology — Pendulous on vertical shaded forested shale river banks in moist lowland forest between 20–350 msl.

Distribution — *Schismatoglottis rejangica* occurs exclusively in the basin of the Rejang river, from the vicinity of Kapit town eastwards to the junctions ('nanga' in the local Iban language) of the Balleh and Gaat rivers, and north to Pelagus.

Etymology — Named for the Rejang river, in the basin of which *S. rejangica* is widespread and locally abundant.

Notes — *Schismatoglottis rejangica* is highly distinctive in the wild, with the rather thick, pendulous matte olive green lead blades often covering large areas of suitably shaded vertical shale to the exclusion of any other plants. Most populations favour sharp bends in the stream which afford them almost constant shade.

Other material examined: MALAYSIAN BORNEO: **Sarawak: Kapit**. Nanga Gaat, Rejang Wood Concession, Sungai Piat, 01°38'09.1"N 113°24'09.9'E, 14 Oct 2003. *P. C. Boyce & Jeland ak Kisai AR-114* (SAR) & *AR-125* (SAR); Nanga Gaat, Rejang Wood Concession, stream below Camp Gahada, 01°41'49.4'N 113°26'16.3"E, 15 Oct 2003, *P. C. Boyce & Jeland ak Kisai AR-134* (SAR); Nanga Gaat, Rejang Wood Concession, km 65 on road to Camp Gahada, 01°42'01.1"N 113°31'14.8"E, 12 May 2004, *P. C. Boyce, Jeland ak Kisai & Jepom ak Tisai AR-324* (SAR), *AR-327* (SAR) & *AR-352* (SAR) & 13 May 2004, *P. C. Boyce, Jeland ak Kisai & Jepom ak Tisai AR-392* (SAR); Nanga Gaat, Rejang Wood Concession, km 65 road to Camp Gahada,

Figure 4. Spadix of ***Schismatoglottis petradoxa*** Complex species compared.
A. *Schismatoglottis petradoxa* S. Y. Wong & P. C. Boyce. **B. *Schismatoglottis rejangica*** S. Y. Wong & P. C. Boyce. **C. *Schismatoglottis larynx*** S. Y. Wong & P. C. Boyce**. A.** from *AR-4894*; **B.** from *AR-353*; **C.** from *AR-4186*. Images A–B © P.C. Boyce.

01°41'59.7"N 113°31'13.7"E, 16 Dec 2004, *P. C. Boyce, Jeland ak Kisai & M.Gibernau AR-910* (SAR) & *AR-915* (SAR); Pelagus Rapids, Rapids Trail to waterfall, 02°11'35.7"N 113°03' 30.08"E, 15 Mar 2005, *P. C. Boyce, Jeland ak Kisai & Jepom ak Tisai AR-1047* (SAR); Kapit, Taman Rekreasi Sebabai, 01°56'45.6"N 112°54'16.8"E, 19 Apr 2006, *P. C. Boyce, Jeland ak Kisai & Wong Sin Yeng AR-1788* (SAR) & *AR-1789* (SAR) & 3 Apr 2009, *P. C. Boyce & Wong Sin Yeng AR-2426* (SAR); Kapit, Batang Baleh, 02°01'0.0"N 113°01'0.0"E, 29 May 2013, *K. Nakamoto AR-4159* (SAR).

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