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## Studies on Schismatoglottideae (Araceae) of Borneo LXIX: *Schismatoglottis imbakensis*, a new species of the Patentineria Complex from ultramafic rocks, Sabah

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**Abstract.** *Schismatoglottis imbakensis* is described as a new species of the *Schismatoglottis* Patentineria Clade from forested ultramafic rocks, and compared with *S. retinervia* Furtado, the only the species for the clade yet described from Sabah.

**Keywords:** *Schismatoglottis*, Patentineria clade, Sabah, Borneo.

### INTRODUCTION

The *Schismatoglottis* Patentineria Clade is entirely Bornean (Wong et al., 2017, 2019), comprising small mesophytic herbs with highly distinctive lanceolate to oblong-elliptic to narrowly obovate leaf blades lacking posterior lobes, and with ladder-like rather closely spaced numerous primary lateral veins diverging from the mid-rib at about 90°. At present the clade comprises 11 described species, 8 of which have been described in the past three years (Boyce 2017; Wong et al. 2017, 2018, 2019). Until now, only one species of the Patentineria Clade has been recorded from Sabah, *Schismatoglottis retinervia* Furtado (1935), restricted to the vicinity of Kinabalu between 1000 and 1600 m asl on granite.

During a Borneo Geographic Scientific Expedition organised by Universiti Malaysia Sabah (UMS) and the Sabah Foundation to the Sungai Kangkawat, Imbak Canyon Conservation Area (ICCA), the first author encountered a small colony of a highly distinctive *Schismatoglottis* with venation suggesting a species of the Patentineria Clade. At the time of discovery the plants were sterile although their distinctive morphology and occurrence on

ultrabasic rocks let us to suspect they represented an undescribed species. Subsequently the plant flowered in the living collection of UMS revealing the plant to be a taxonomic novelty of the *Patentinervia* Clade, and furthermore the first species of the clade recorded from ultramafic rocks. It is described here as *Schismatoglottis imbakensis*.

The Imbak Canyon Conservation Area is located immediately to the north of Maliau Basin Conservation Area in central Sabah. The canyon of Cretaceous to Paleogene deep water sediments with ultramafic outcrops encompasses a range of lowland to hill forest habitats within a 10 km long valley (at about 250 m asl.), hemmed in on three sides by sandstone ridges up to 1000 m asl. (Oldfield 2014). The Kangkawat Research Station is located at the eastern part of the canyon near to the Sungai Kangkawat river. And close by Cretaceous outcroppings of ultramafic Harzburgite and Serpentinite.

Dimensions in the descriptions are from fertile (i.e., mature) plants. Seedlings have overall smaller measurements. Geological occurrences in this paper are verified with Tate (2001).

***Schismatoglottis imbakensis*** Kartini, S. Y. Wong & P. C. Boyce, **sp. nov.**

Type: Malaysian Borneo. Sabah. East Coast Division, Telupid, Imbak Canyon Conservation Area, Sungai Kangkawat, 1 Oct 2018, 5°5'4.62"N 117°3'20.10"E, ca 260 m asl, (holotype BORH 2705 + spirit). (Figures 1 and 3A).

#### Diagnosis

*Schismatoglottis imbakensis* is distinguished from *S. retinervia*, the only other species of the *Patentinervia* clade occurring in Sabah, by the plant glabrous (vs petioles and abaxial midribs puberulous), by the naked sterile interstice of the spadix equalling the pistillate floret zone (vs naked sterile interstice hardly developed), by the deep green pistils with the stigma about half the width of the ovary (vs pistils dirty pale green with the stigma almost equalling the ovary width), by the staminate florets somewhat laxly arranged and the stamens readily discernible (vs staminate florets very densely packed and individual stamens scarcely distinguishable). *Schismatoglottis imbakensis* is distinguished from *S. pichinensis* and *S. puncakborneensis*, the other two *Patentinervia* clade species with a long naked sterile interstice, by large rhomboidal cream interpistillar staminodes (vs interpistillar staminodes lorate or if rhomboidal then small and white), the large, laxly arranged

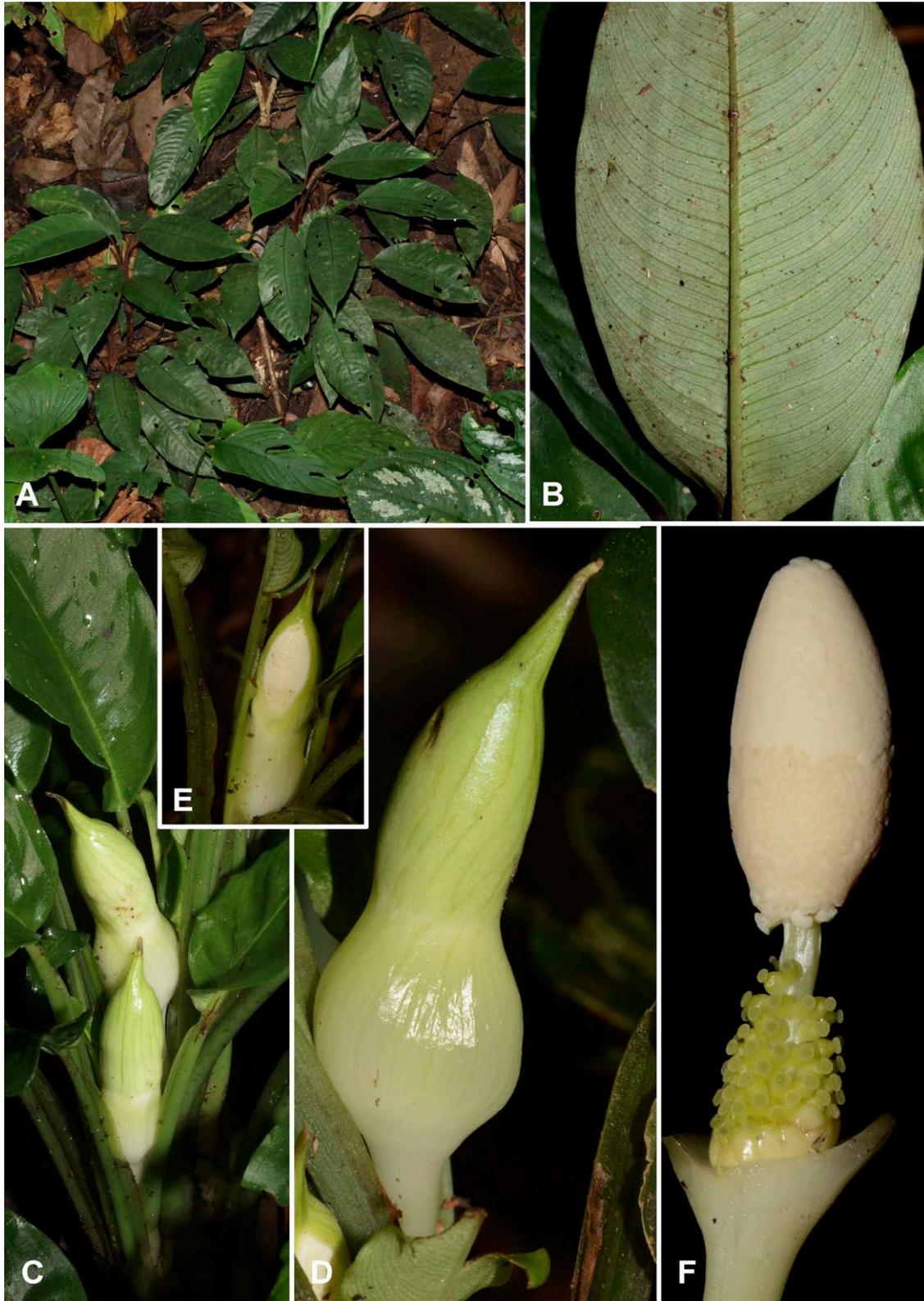
stamens (vs small and congensted), and sharply pointed (vs blunt) spadix appendix.

#### Description

Small, colony-forming mesophytic herb to ca 10 cm tall. Stem epigeal, erect to sprawling, rather elongate, to c. 50 cm long, c. 0.5 cm diam., decumbent portions tending to root along their length, modules pleioanthic, internodes 0.2–1 cm long, green. Leaves many together along distal parts of stem and tending to become clustered at apex; petiole 3–4 cm long, D-shaped in cross-section, sheathing in lower 1/2–2/3, pale green, glabrous; petiolar sheath wings fully attached to petiole, rather wide and tending to be flat, membranous, long-persistent; leaf blades glossy metallic dark green adaxially, much paler abaxially, oblong-elliptic, 4–6 cm long × 1.5–2 cm wide, base cuneate, apex blunt with a brief tubular mucro ca 0.5 mm long; midrib abaxially prominent, adaxially slightly impressed into blade; primary lateral veins about 9 on each side, mostly alternating with barely lesser interprimaries, diverging at 80–90° from midrib, then gradually and evenly curving up to meet margin, abaxially rather prominent; interprimaries almost indistinguishable from primaries, occurring more or less equally between them; secondary venation mostly arising from midrib, occasionally from base of primary veins; tertiary venation abaxially forming a faint tessellate reticulum. Inflorescence solitary; peduncle to c. 1 cm long, more often peduncle and part of lower spathe obscured by leaf bases, pale green. Spathe 3–3.5 cm long; lower spathe c. 1.5 cm long, ovoid, differentiated from limb by a marked constriction, semi glossy pale green; spathe limb ovate, c. 1.5–2 cm long, mucronate for 0.5–1 mm, opening slightly at pistillate anthesis, white at anthesis, later darkening and rotting-deciduous. Spadix sub-equalling spathe, sessile; pistillate floret zone c. 7 mm long, conoid; pistils crowded, subglobose, 1 mm diam., dark green; stigma sessile, button-like, subequalling diameter of ovary, pale green, conspicuously papillate at anthesis; interpistillar staminodes confined to a ring at base of pistillate zone, rhomboid, glossy cream, ca 1 mm across; sterile interstice attenuate, naked ca 3 mm long, pale green; staminate zone rather stoutly obconoid, ca 8 mm long, 2.5 mm diam. at base, 6 mm diam. distally; stamens rather lax, dumbbell-shaped, truncate with connective flat between thecae; pores joined across the anther by a narrow deep slit, each with a heavily thickened rim, dull white; appendix wider than the widest part of the with staminate flower zone, stoutly conic, blunt, ca 1.5 cm long; appendix staminodes composed of irregularly rhomboidal to polygonal-shaped, truncate staminodes c. 1 mm diam., creamy white. Fruiting spathe urceolate, ca 1 cm long, mid-green.



**Figure 1.** *Schismatoglottis imbakensis* (A) Plants in habitat. (B) Inflorescence at pistillate anthesis. The spathe limb slightly open. (C) Spadix at pistillate anthesis with the spathe artificially removed (D) Inflorescence at staminate anthesis. The spathe limb darkening and rotting.



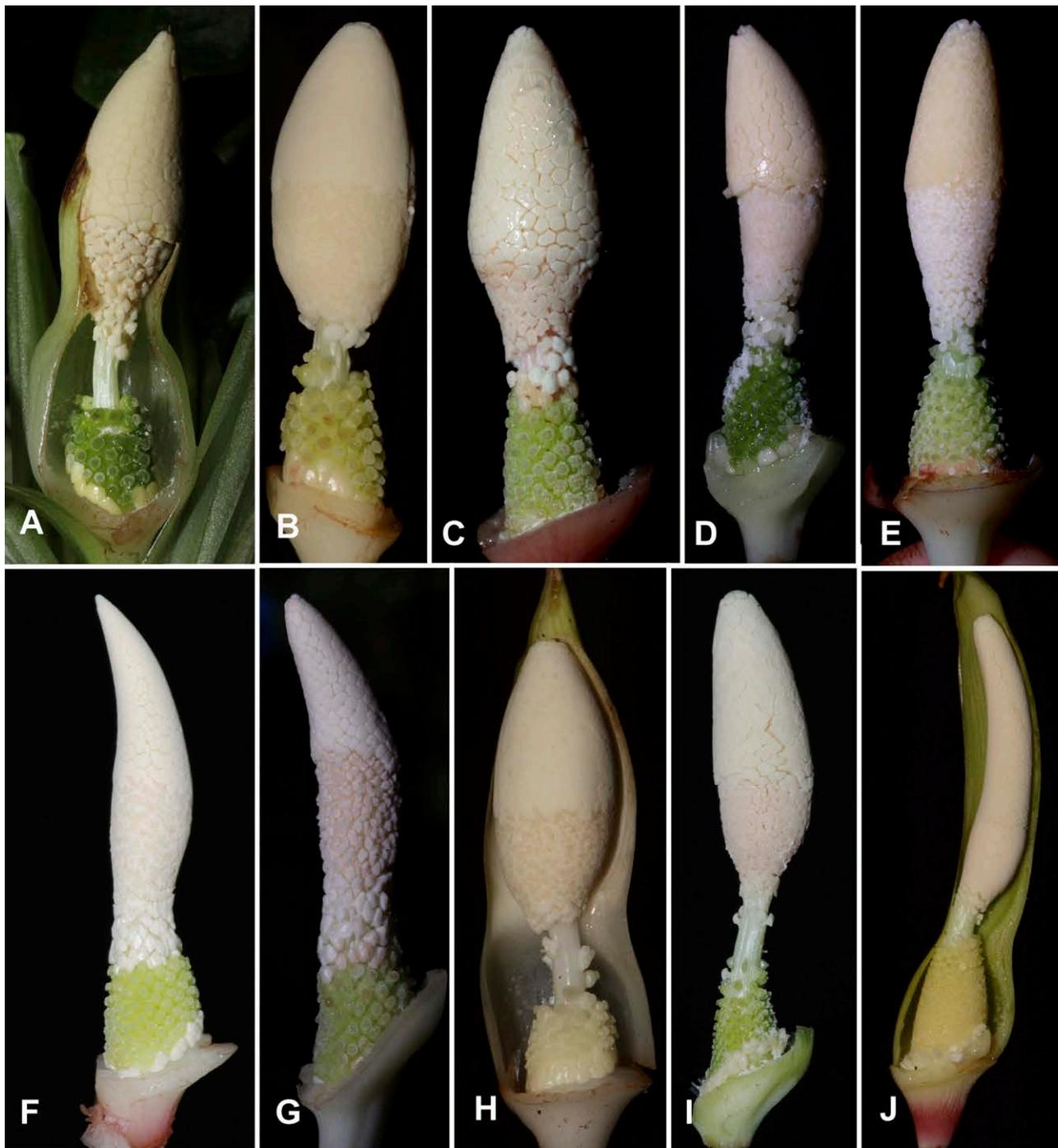
**Figure 2.** *Schismatoglottis retinervia* (A) Plants in habitat. (B) Leaf blade, abaxial view, showing the typical venation of species of the *Schismatoglottis Patentinervia* Clade. (C) Flowering shoots. (D & E) Inflorescence at pistillate anthesis; note that the spathe limb hardly opens. (F) Spadix at pistillate anthesis, spathe artificially removed. A & B from AR-4691; C - F from AR-4714.

*Etymology*

The trivial epithet is from the Type locality plus the suffix *-ensis*, indicating 'from'.

*Distribution*

Known only from the type locality on the Sungai Kangkawat, Imbak Canyon Conservation Area.



**Figure 3.** Spadices of 10 species of *Schimatoglottis* Patentinervia Clade compared. (A) *Schimatoglottis imbakensis*. (B) *Schimatoglottis retinervia*. (C) *Schimatoglottis gangsai*. (D) *Schimatoglottis smaragdina*. (E) *Schimatoglottis fossae*. (F) *Schimatoglottis belonis*. (G) *Schimatoglottis gephyra* (H) *Schimatoglottis puncakborneensis*. (I) *Schimatoglottis pichinensis*. (J) *Schimatoglottis gaesa*.

### Ecology

Primary lowland mixed dipterocarp forest on Cretaceous Harzburgite and Serpentinite outcrops, occurring on steep muddy river banks above the flood zone, about 270 m asl.

### Notes

In Sabah *Schismatoglottis imbakensis* can be mistaken for *S. retinervia*, a species endemic to much higher altitude forest on granite in the Kinabalu area. The two species are readily separated as per the above diagnosis (Fig 1, 2, and 3A, 3B). The stoutly club-like spadix of *Schismatoglottis imbakensis* is most similar to that of *S. gangsai* S. Y. Wong, Aisahtul & P. C. Boyce (Fig. 3C) and *S. smaragdina* S. Y. Wong, Aisahtul & P. C. Boyce (Fig. 3D), both from Pelagus, Kapit, Sarawak, to *S. fossae* S. Y. Wong, Aisahtul & P. C. Boyce (Sarawak: Mulu N.P. - Fig. 3E), *S. puncakborneensis* P. C. Boyce (Sarawak: Kuching, Penrissen Range - Fig. 3H), and to *S. pichinensis* P. C. Boyce (Sarawak: Serian, Padawan karst - Fig. 3I). Recognition of *Schismatoglottis imbakensis* takes the aroid flora of ultramafic substrates in Sabah to six species in four genera – *Alocasia melo* A. Hay, P. C. Boyce & K. M. Wong, *Bucephalandra ultramafica* S. Y. Wong & P. C. Boyce, *Schismatoglottis* (*S. decipiens* A. Hay, *S. imbakensis*, and *S. silamensis* A. Hay), and *Tawaia sabahensis* (S.Y. Wong, S.L. Low & P.C. Boyce) S.Y. Wong & P.C. Boyce. All are restricted to the substrate and furthermore locally endemic.

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