

Studies on Schismatoglottideae (Araceae) of Borneo XXXXIII: *Fenestratarum culum* - A new genus and species from Kalimantan Barat, Indonesian Borneo

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ABSTRACT

Fenestratarum is described as a new genus of Tribe Schismatoglottideae, with a single novel species, *Fenestratarum culum*. Preliminary molecular analyses places *Fenestratarum* near the base of a clade comprised of *Bakoa*, *Hottarum*, two clades containing species currently assigned to *Aridarum*, and a clade of species presently included in *Piptospatha*.

KEY WORDS

Rheophytic, molecular phylogenetic analyses, *Fenestratarum*, Araceae

INTRODUCTION

The past decade has witnessed discovery of a significant number of novel Bornean aroid taxa belonging to Tribe Schismatoglottideae (see: <http://www.aroid.org/gallery/boyce/>)

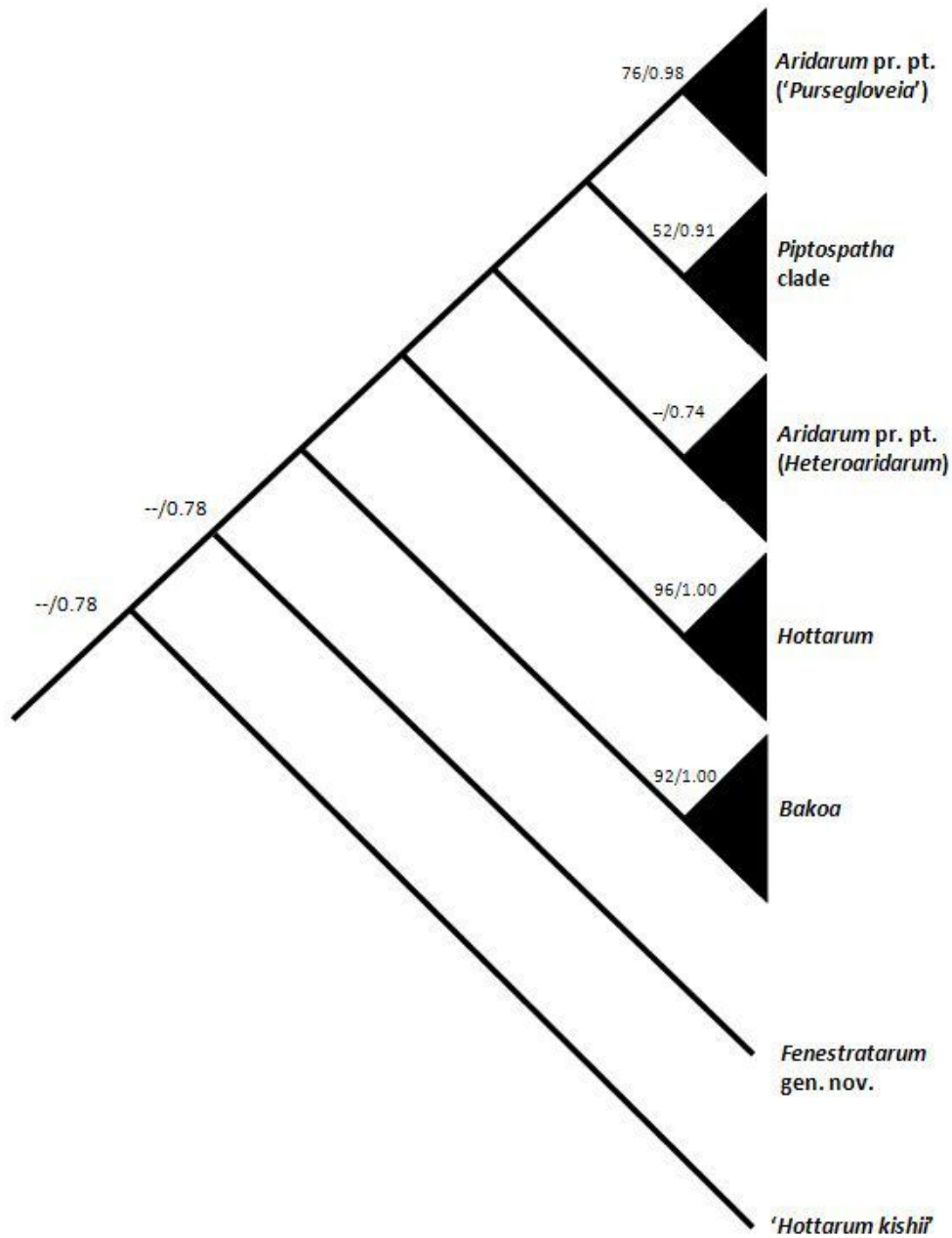


Figure 1.

Schematic diagram of phylogenetic relationships of *Fenestratarum* to their immediate relatives in a partial clade of Tribe Schismatoglottideae as recovered by Low et al. (in prep.) based on data from one nuclear and one plastid DNA region. Figures at nodes indicate support values (Maximum Likelihood/Bayesian Posterior Probabilities).

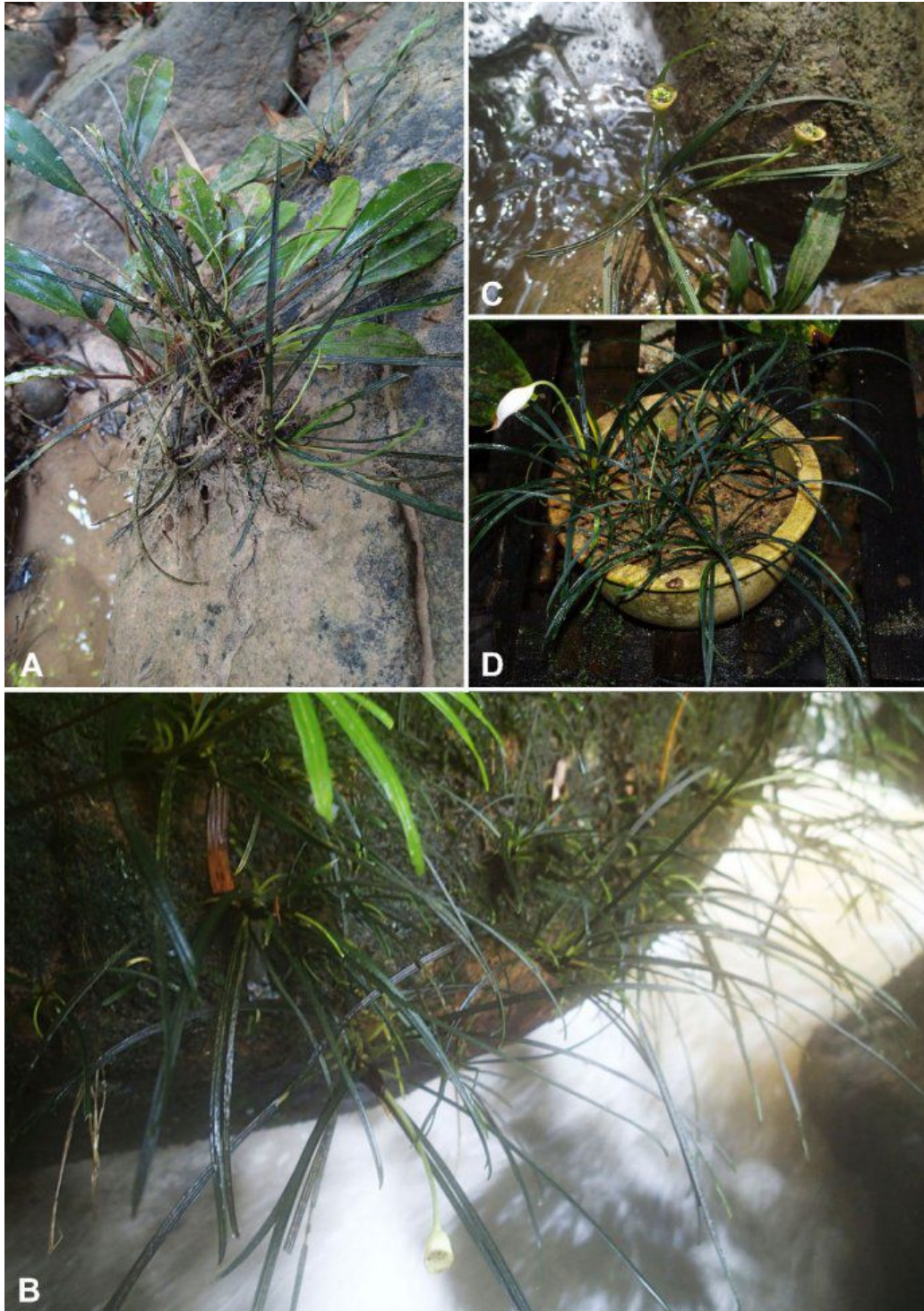


Figure 2. *Fenestratarum culum* P. C. Boyce & S. Y. Wong

A, B, & C. Plants in habitat, Type locality. Note the post-anthesis inflorescence (spathe limb and spent part of spadix fallen) in **B**, and the erect splash-cups with developing fruits in **C**.

D. Plants in cultivation. **A–D** from *AR-4300*. Images A, B & C © Hiroyuki Kishi; D © P.C.Boyce.



Figure 3. *Fenestratarum culum* P. C. Boyce & S. Y. Wong
A – C. Inflorescence at pistillate anthesis. Note that the lower spathe margins are fused. **D.** Inflorescence at pistillate anthesis, nearside spathe artificially removed. **E.** Inflorescence at late staminate anthesis, caducous part of spathe removed prematurely. **F.** leaf blade, abaxial view. **A–F** from *AR-4300*. Images © P.C.Boyce.

& <http://www.aroid.org/gallery/wong/>). Here we continue this by describing a singular new species of rheophytic aroid which on morphological bases cannot be accommodated into any of the currently described genera. Preliminary molecular phylogenetic analyses resolves *Fenestratarum* near the base of a clade comprising the genera *Bakoa*, *Hottarum*, and three clades composed of species currently included in *Aridarum* and *Piptospatha*. Basal to the entire clade is a further clade representing an additional undescribed genus – **Figure 1**.

Fenestratarum P. C. Boyce & S. Y. Wong, **gen. nov.** Type species: *Fenestratum culum* P. C. Boyce & S. Y. Wong, **sp. nov.** **Figures 2 & 3.**

Fenestratarum culum P. C. Boyce & S. Y. Wong, **sp. nov.** Type: Indonesian Borneo, Kalimantan Barat, Ngabang, Landak, Desa Sungai Durian, Riam Desa Sungai Durian, 00°31'41"N 109°47'39"E, 1 Nov. 2013, *H. Kishi AR-4300* (BO!).

Diagnosis

Fenestratarum and its sole species *Fenestratarum culum* are diagnosed by the combination of a nodding inflorescence on a very slender erect peduncle, an unstricted spathe limb, with the portion equating to the limb having large translucent areas separated by opaque veins, and the portion equating to the lower spathe uniformly opaque, by completely fused lower spathe margins reducing access to the

spadix to a narrow opening on the median ventral side of the spathe, thecae in deep pits and lacking thecae horns, sterile appendicle staminodes, basal placentation, orthotropous ovules with a beak-like micropylar appendage, funnel-form splash-cups held erect by straightening of the distal portion of the peduncle, and indehiscent berries.

Fenestratarum, *Hottarum* Bogner & Nicolson and *Bakoa lucens* (Bogner) P. C. Boyce & S. Y. Wong all have thecae set in deep pits. *Fenestratarum* differs by a fenestrate spathe limb, also by completely fused lower spathe margins forming a tube and linear leaf blades with a basally pulvinate petiole. *Fenestratarum* further differs from all *Bakoa* species by the caducous (vs persistent) spathe limb, and an erect splash-cup infructescence. *Fenestratarum* is additionally differentiated from *Bakoa lucens* by fleshy fruits (vs fruits drying to form a caryopsis), and from the remaining *Bakoa* species by indehiscent (vs dehiscent) berries. *Fenestratarum* is distinguished from *Piptospatha* by basal (vs parietal) placentation, and although sharing with *Piptospatha* a nodding inflorescence, the peduncle is much more slender, and no *Piptospatha* has a fenestrate spathe limb, or linear leaf blades. From *Aridarum*, *Fenestratarum* diagnostically lacks thecae horns.

Description

Small obligate rheophytes to ca. 15 cm tall. **Stem** initially compact, later elongating to ca 10 cm, sub-erect, ca. 3 cm in diam.,

basally with copious strong roots. **Leaves** many together, stiffly arching; **petiole** ca. 2 cm long, basal half broadly sheathing and swollen, ca. 5 mm wide, very pale green, remainder of petiole D-shaped in cross-section, ventrally pale matte green, dorsally very deep glossy green; **petiolar sheath** with wings extended into a narrowly triangular ligular caducous portion ca. 3 cm long; **blade** stiffly coriaceous, linear, 11–15 cm long \times ca. 5 mm wide, base decurrent, apex acute and apiculate for ca. 4 mm, adaxially very deep glossy green, abaxially matte pale olive green; **midrib** abaxially and adaxially sharply prominent; **primary lateral veins** restricted to one on each side, arising from the base of the blade and remaining at the margin of the blade, meeting at the tip and there coalescing to form the apiculate point; all other veins invisible. **Inflorescence** up to three produced in sequence, alternating with membranous, later papery cataphylls; **peduncle** slender, somewhat exceeding the leaves, ca. 15 cm long \times 1.5 – 2 mm in diam., pale green, uppermost part curving forward to hold the inflorescence at slightly less than 90° to the peduncle. **Spathe** ca. 3 cm long, ca. twice length of spadix; **spathe limb** broadly lanceolate with large transparent areas separated by opaque white veins, terminally specked reddish, and extended into a prominent reddish-stained rostrum ca. 4 mm long, limb opening at pistillate anthesis by a ventral elliptic fissure with incurving margins, limb caducous by deliquescence at junction with persistent lower part after staminate anthesis, falling in a single but deliquescing piece together with

the spent parts of the spadix; **lower spathe** with fully fused margins, forming a tube, white, persistent after anthesis and forming a funnel-form structure subtending the developing fruits. **Spadix** sub-cylindric, 13 – 20 mm long \times 5 – 7 mm wide; **pistillate flower zone** cylindric, comprised of ca 3 spirals of flowers, narrower than remainder of spadix, accounting for ca. $\frac{1}{4}$ of spadix, 3 – 6 mm long \times 3 – 5 mm in diam., with single row squat polygonal glossy white staminodes at base; **pistils** crowded, sub-globose, ca. 1 mm in diam., pale green; **stigma** sessile, discoid, almost as wide as pistil, rather coarsely papillate, very pale green; **sterile interstice** 1 – 2 mm long \times 5 – 7 mm in diam., composed of a single row of polygonal staminodes, these 1 – 2 mm long \times 0.5 – 1 mm wide, very pale creamy white; **staminate flower zone** slightly less than $\frac{1}{2}$ of entire spadix length, 5 – 6 mm long \times 5 – 7 mm in diam., very pale creamy white; **staminate flowers** large, spirally arranged, each comprised of two stamens, truncate, rhomboid from above, ca. 2 mm long \times 1.5 mm wide; **thecae** set in deep pits on the top and bottom (with respect to the spadix axis) of each stamen separated by a conspicuous broad, slightly domed connective; **appendix** 4 – 5 mm long, slightly tapering, obtuse; **appendix staminodes** resembling stamens without thecae, very pale creamy white. **Infructescences** erect. **Fruiting spathe** campanuliform, ca. 1 cm long \times ca. 1 cm wide, medium green with a scar along rim; **fruits** obpyriform, ca 3 mm long, stigmatic remain raised, darker green; **seeds** not seen.

Distribution — *Fenestratarum culum* is so far known only from the Type locality.

Ecology — *Fenestratarum culum* is rheophytic on riverside Cretaceous sandstones rocks and boulders under open perhumid lowland at ca. 45m asl.

Etymology — From Latin, *fenestratus*, windowed, + *Arum*, hence windowed arum, coined to describe the unique translucent areas of the spathe limb.

The species epithet is derived from Latin, *culus* [*culum* – neut.], the fundament, or sphincter, in allusion to the highly restricted opening in the spathe limb by which pollinators access the spadix

Notes — The splash-cup infructescence of *Fenestratarum culum* is unique in the Tribe Schismatoglottideae owing to the fused margins.

The molecular analyses upon which the above genus has been resolved forms part of a PhD study of *Aridarum* by Low Shook Ling.

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REFERENCES

None