AROIDEANA

International Aroid Society, Inc.

Volume 38E
No 2
August 21,2015
ISSN 2310-0745

Studies on Schismatoglottideae (Araceae) of Borneo XXXXVIII – *Galantharum*, a new genus for the *Hottarum* Clade

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ABSTRACT

Galantharum is described as a new genus of Tribe Schismatoglottideae, with a single novel species, *Galantharum kishii*. Preliminary molecular analyses place *Galantharum* basal of a clade composed of *Fenestratarum*, *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

INTRODUCTION

Field-based research of Schismatoglottideae on Borneo continues to reveal still more remarkable undescribed species, quite some number of which prove difficult to place into presently recognised genera based solely on their morphological

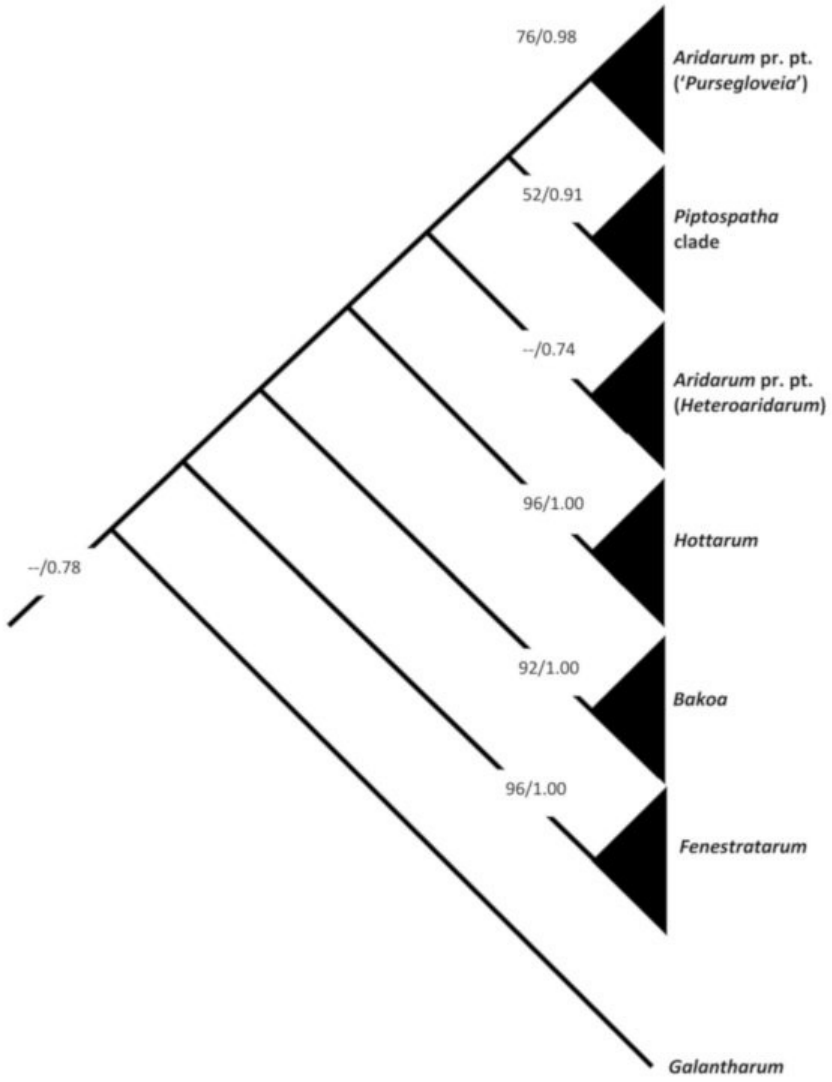

Figure 1. Schematic diagram of phylogenetic relationships of *Galantharum* to its immediate relatives in a partial clade of Tribe Schismatoglottideae as recovered by Low et al. (in prep.) based on data from one nuclear and one plastid DNA region. Figures at nodes indicate support values (Maximum Likelihood/ Bayesian Posterior Probabilities).

characteristics. In these instances additional data provided by molecular analyses is invaluable not only in assisting with generic placement and understanding relationships, but also modifying delimitation of genera themselves in a tribe where homoplastic events are rife (Wong, 2013; Low et al., 2015).

Here we describe a singular new species that can only be accommodated by the creation of a new genus, phylogenetically sitting at the base of a clade comprising *Fenestratarum* P. C. Boyce & S. Y. Wong, *Bakoa* P. C. Boyce & S. Y. Wong, *Hottarum* Bogner & Nicolson, two clades containing species currently assigned to *Aridarum* N. E. Br., and a clade of species presently included in *Piptospatha* N. E. Br. **Figure 1.**

Galantharum P. C. Boyce & S. Y. Wong, **gen. nov.** Type species**:** *Galantharum kishii* P. C. Boyce & S. Y. Wong, **sp. nov. Figure 2.**

Galantharum kishii P. C. Boyce & S. Y. Wong, **sp. nov.** Type: Indonesian Borneo, Kalimantan Utara, Bulungan Regency, Sekatak, 03°18' 35.3" N 116° 52' 50.6" E, 29 May 2013, *Mulyadi AR–4160* (holotype BO!; isotype SAR!).

Diagnosis

Galantharum and its only species *Galantharum kishii* are diagnosed by the combination of a very strongly nodding (peduncle deflexed almost 180°) powerfully fragrant (vanilla) inflorescence with an unconstricted spathe limb, spadix fertile to the tip, thecae in deep pits and lacking thecae horns, pollen released in oblong packages, basal-annular placentation, orthotropous ovules with a slender micropylar appendage, funnel-form splash-cups held erect by straightening of the distal portion of the peduncle, and indehiscent berries.

Galantharum is unique in the Schimatoglottideae by the extreme nature of the nodding of its inflorescences and by inflorescences producing a powerful vanilla-like smell at anthesis. *Galantharum* shares with *Fenestratarum*, *Hottarum* Bogner & Nicolson and *Bakoa lucens* (Bogner) P. C. Boyce & S. Y. Wong thecae set in deep pits. *Galantharum* differs from *Fenestratarum* by lacking a fenestrate spathe limb and by the much broader leaf blades without a basally pulvinate petiole. *Galantharum* differs from all *Bakoa* species by the caducous (vs persistent) spathe limb, and an erect splash-cup infructescence. *Galantharum* 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. *Galantharum* is distinguished from *Piptospatha* by basal (vs parietal) placentation, and although sharing with *Piptospatha* a nodding inflorescence, the degree of the nodding is much heightened and furthermore the inflorescences of *Galantharum* are powerfully vanilla–fragrant. The only fragrant *Piptospatha* species are *Piptospatha perakensis* (Engl.) Ridl., *P. ridleyi* N. E. Br. ex Hook. f. occurring in Peninsular

Figure 2. ***Galantharum kishii*** P. C. Boyce & S. Y. Wong
A. Plants in habitat, Type locality. Note the post–anthesis inflorescence (spathe limb and spent part of spadix fallen). **B–E.** Inflorescence at pistillate anthesis. Note that the terminating rostrum is more-or-less straight. A–E from *AR–4160*. Image A © Mulyadi. Used with permission. Images B–E © P. C. Boyce.

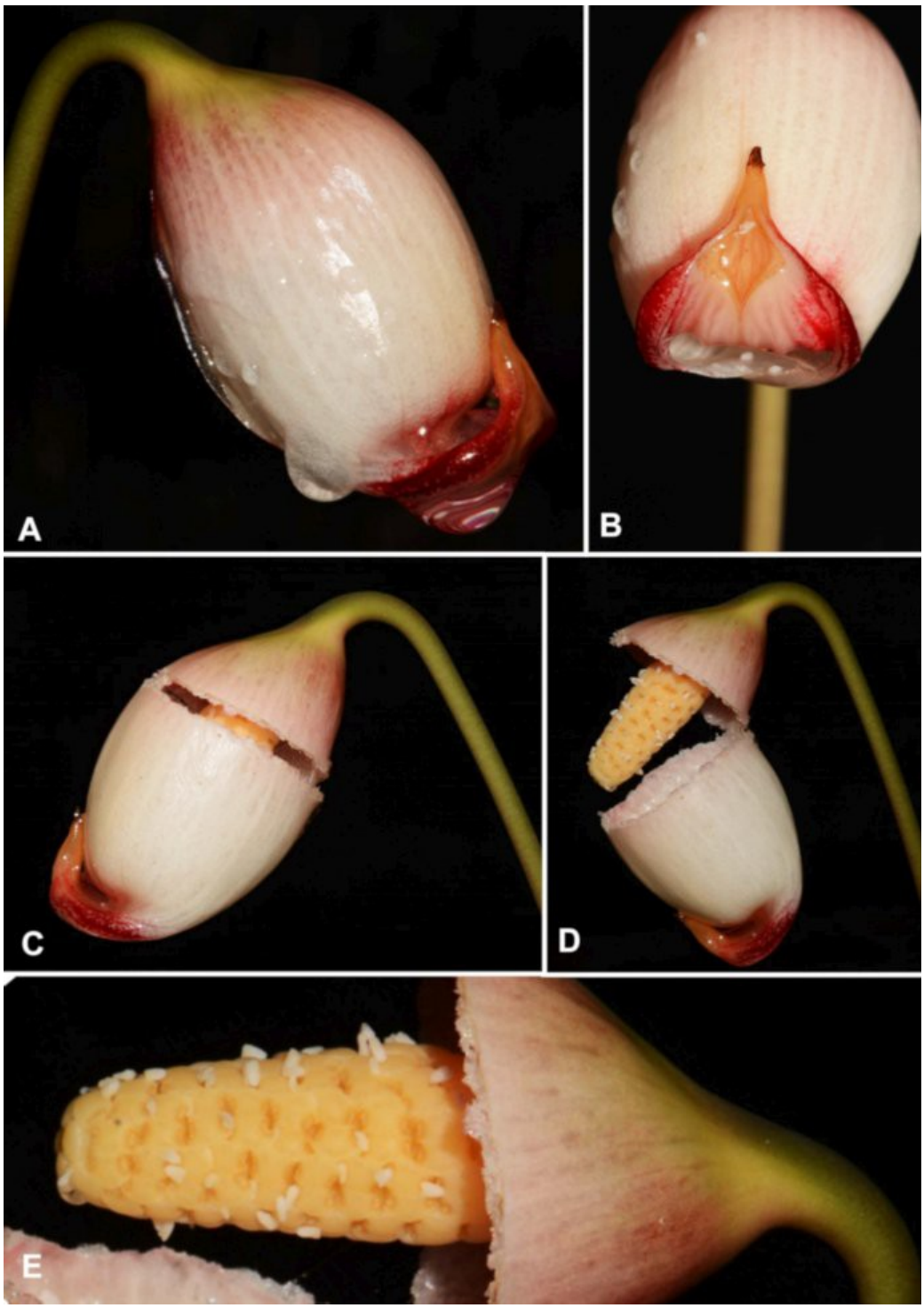

Figure 3. ***Galantharum kishii*** P. C. Boyce & S. Y. Wong
A–B. Inflorescence at staminate anthesis. Note the terminating rostrum is strongly reflexed. **C.** Inflorescence at staminate anthesis, spathe limb beginning to shed. **D.** Inflorescence at late staminate anthesis, spathe limb almost fallen. Note the pollen packages. **E.** Detail of the spadix, staminate anthesis. The oblong pollen packages are clearly visible. A–E from *AR–4160*. Images © P. C. Boyce.

Malaysia, with *P. perakensis* rather widespread and extending into southern Peninsular Thailand, and *P. ridleyi* occurring primarily in Johor, and *P. teijsmannii* P. C. Boyce & S. Y. Wong, which is restricted to two islands of the Riau Archipelago. All three of these West Sunda species smell of isoamyl acetate, not vanilla. From *Aridarum*, *Galantharum* diagnostically lacks thecae horns.

Description

Small clumping rheophytic herb to 20 cm tall. **Roots** strong and adhering to bare, wet rocks, ca 1.5 mm in diam. **Stem** short, to 10 mm in diameter, obscured by leaf bases. **Leaves** many together, arching, forming a dense rosette; **petiole** 4–5 cm long, ca 2.5 mm in diam., bases clasping stem D-shaped in cross-section with the dorsal margins alate crispulate-hyaline and reddish, petiole minutely but distinctly scabrous, pale to rather deep olive green, usually reddish brown tinged; **petiolar sheath** with free ligular portion ca 4 cm long, marcescent and eventually deciduous, very deep brown; **leaf blades** narrowly oblanceolate, 6–14 cm long × 1–2.5 cm wide, margins undulate, base cuneate, apex acute with stout tubule ca 5 mm long, blades emerging rather bright medium green, maturing to medium semi glossy bluish green adaxially, paler abaxially; mid-rib slightly bluntly raised adaxially, rounded-raised and minutely scabrous abaxially, somewhat reddish-tinged; **primary lateral veins** ca 3 per side, parallel pinnate, impressed adaxially, slightly raised abaxially and tending to be red-flushed, at least on newer leaves; **interprimary lateral veins** much weaker than primary laterals, visible as very slightly darker lines running parallel to the primary laterals and joining a moderately well-defined sub-marginal collecting vein. **Inflorescence** solitary, powerfully fragrant of vanilla at anthesis, spathe and spadix erect during early development, by anthesis deflexing to ca 170° to peduncle; **peduncle** 8–10 cm long, ca 2 mm in diam., minutely scabrous, pale reddish green. **Spathe** not constricted, glossy white with base tinged yellow-green, limb becoming slightly suffused pale pink, rostrum cherry-red shading to greenish, interior white with basal portion stained cherry-red, margins hyaline; **spathe limb** initially ellipsoid, inflating at anthesis to almost globose, limb falling at junction with persistent lower part during staminate anthesis, ca 3.5 cm long, base ca 1 cm wide, limb mid-way inflated to ca 2.5 cm, terminating in a ca 5 mm long rostrum with ca 6 ventral longitudinal ridges, rostrum initially straight, then (staminate anthesis) reflexing to become appressed against spathe limb. **Spadix** ca 20 mm long × ca 5 mm in diam., base very slightly obliquely inserted onto spathe; **pistillate flower zone** cylindric, ca 5 mm long × ca 4.5 mm in diam. comprising ca 1/3 of spadix length, fertile to the base with two or three (ca 1 × 1.2 mm) rhomboidal, flat-topped cream staminodes inserted basally; **pistils** cylindrical, truncate, congested, ca 0.7 mm diameter, lime green; **stigma** with a slight central depression, papillate, as wide as ovary, lime green, slightly darker centrally; **staminate flower zone** contiguous with and somewhat wider than pistillate zone,

fertile to tip, ca 15 mm long × ca 5 mm in diam., slightly tapering, apex blunt, pale creamy yellow; **staminate flowers** congested, composed of rather slightly irregularly paired stamens, stamen more or less oblong, with a conspicuous pit on each end, ca 0.5 mm wide × ca 0.8 mm long, connective convex; **thecae** lateral, set in pits, ca 0.3 mm; **pollen** shed in oblong packages ca 1.5 mm long. **Fruiting spathe** shallowly salverform, erect, ca 1 cm in diam., 1 cm deep in middle; **fruits** globose-ellipsoid, ca 2.5 mm long when ripe, medium green with brown stigma remnants, decomposing in the splash-cup into a slimy mass with seeds; **seeds** seed ca 2 mm long, 0.6–0.7 mm diam., narrowly ellipsoid, dark brown, slightly longitudinally ribbed, with a long curved translucent micropylar appendage 1.2–1.5 mm long, the appendages intertwined in the upper part of the berry.

Ecology — Growing in large clumps on mud-coated basalt stream rocks under open perhumid lowland forest between 95 and 300 m asl.

Distribution — Known from two localities ca 60 km apart.

Etymology — *Galantharum* is devised from Greek *gála* 'milk' + *ánthos* 'flower' + *Arum*, hence white–flowered aroid. This is intended as both a descriptive name and by way of allusion to the strongly nodding inflorescences that resemble, albeit quaintly, the flowers of the genus *Galanthus* (Amaryllidaceae) –the Eurasian 'snowdrops'.

The species epithet eponymy is for Hiroyuki Kishi, a collector and highly talented grower of tropical aquarium plants.

Other material examined — INDONESIA: BORNEO: Kalimantan Timur, Kabupaten, Malinau, Kecamatan Malinau Selatan (Loreh), Mt Sidi, 25 Nov. 2005, *Ni Putu Sri Asih s.n.*, cultivated in the Bali Botanic Garden (Kebun Raya Eka Karya Bali), Indonesian Institute of Sciences (LIPI).

Notes — *Galantharum kishii* is one of several novelties so far described from the species–rich basalts of Mt Sidi and nearby peaks (Kurniawan et al., 2011; Asih et al., 2012).

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

ACKNOWLEDGEMENTS

This is part of an on–going research which is funded by the Ministry of Higher Education, Malaysia by the Exploratory Research Grant Scheme Vote No. NRGS/1089/2013–(03) and Fundamental Research Grant Scheme Vote No. FRGS/STWN10(01)985/2013(26).

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