Studies on Schismatoglottideae (Araceae) of Borneo LII – *Piptospatha helix*, another species with green pistils

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ABSTRACT

Piptospatha helix S. Y. Wong & P. C. Boyce is described from Kalimantan Barat, Indonesian Borneo, and compared with the four pre-existing species with which it shares green pistils. A key to all *Piptospatha* species with green pistils is provided, *Piptospatha helix* is figured from living plants, and from the nomenclatural Isotype, and a comparative plate of the spadix of all *Piptospatha* species with green pistils is given.

KEY WORDS

Rheophyte, granite, Muller Range, Schwaner Range, Kalimantan Barat, Araceae

INTRODUCTION

Piptospatha N. E. Br., currently comprises 16 described species (Boyce & Wong 2015). Significantly, one fifth of the 100 plus accessions in our research living collection are as yet without name, and a rather considerable number of herbarium

specimens we have examined haved proved to be taxonomically unresolvable. In conclusion it is decidedly plausible that *Piptospatha* comprises as many as 50 species.

Here we describe a new species of *Piptospatha* first encountered as herbarium material [*K. Sidiyasa et al, 1929*] more than five years ago in Bogor (BO) and Leiden (L) herbaria. At the time, despite the unusual comprehensiveness of the material, and satisfactory state of preservation of the specimens, and consequently conviction that it represented a taxonomic novelty, in line with our rule of describing taxonomic novelties only when we have access to living material, we delayed describing a new species. Recently three accessions have flowered in our research collection that are excellent matches for *K. Sidiyasa et al. 1929*, in particular in the distinct helical arrangement of the staminate flowers, enabling us to publish them as a new species.

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

Interpretation of the geology of Borneo relies on Tate (2001).

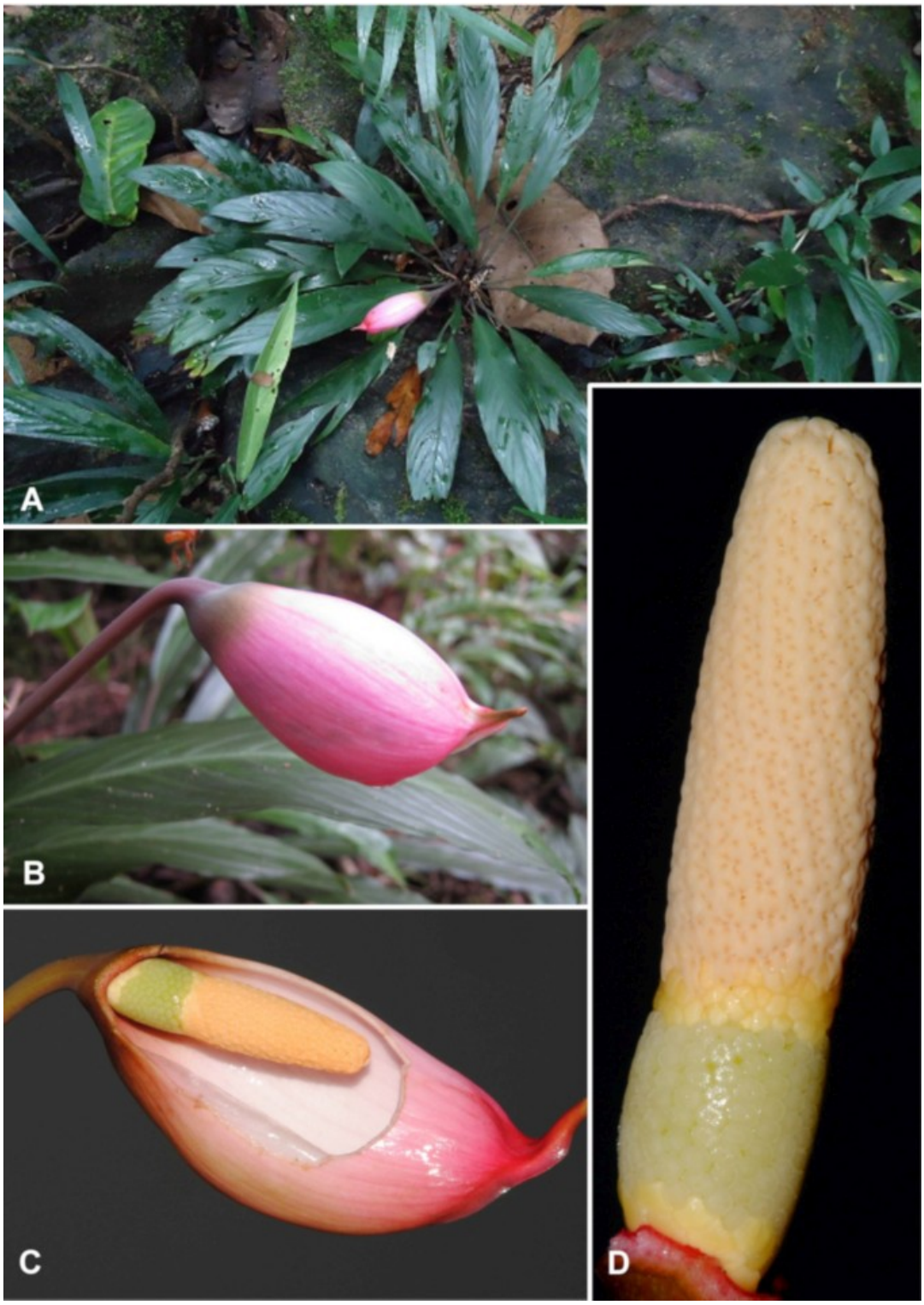

Figure 1. ***Piptospatha helix*** S. Y. Wong & P. C. Boyce. **A.** Plant in habitat. **B.** Inflorescence at pistillate anthesis. **C.** Inflorescence at pistillate anthesis, nearside portion of spathe artificially removed. **D.** Spadix at pistillate anthesis, spathe artificially removed. **A–D** from *AR-5196*. Images **A & B** © K. Nakamoto, used with permission; images **C & D** © P.C. Boyce.

KEY TO THE SPECIES OF *PIPTOSPATHA* WITH GREEN PISTILS

1a. Spadix overall conical, widest at the base; interstice zone very reduced, comprising only a few scattered staminodes **2**

1b. Spadix cylindrical to somewhat fusiform, not widest at the base; interstice conspicuous with numerous to many staminodes **3**

2a. Spathe white; thecae set in very shallow pits. Sandstones. Kalimantan Tengah . . . . . ***Piptospatha nivea*** P. C. Boyce, S. Y. Wong & Sahal

2b. Spathe bright pink; thecae set in deep pits; Alkaline geologies (limestone, basalts). NW Borneo . . . . . ***Piptospatha viridistigma*** P. C. Boyce, S. Y. Wong & Bogner

3a. Leaf blades adaxially with venation almost invisible; roots producing numerous plantlets; interstice widest part of spadix. NE Sarawak, Brunei, SW Sabah . . . . . ***Piptospatha burbidgei*** (N. E. Br.) M. Hotta

3b. Leaf blades adaxially with venation conspicuously incised; roots without plantlets; interstice not the widest part of spadix **4**

4a. Staminate flowers not arranged in a discernible pattern; pistillate flower zone weakly conical; interstice and infra pistillar staminodes large, angular. Vicinity of Nanga Taman and Kayu Lipis, NW of Schwaner Range . . ***Piptospatha colata*** P. C. Boyce & S. Y. Wong

4b. Staminate flowers arranged in distinct spirals; pistillate flower zone fusiform; interstice and infrapistillar staminodes small, rounded. North Schwaner range and west Muller range . . . . . ***Piptospatha helix*** S. Y. Wong & P. C. Boyce

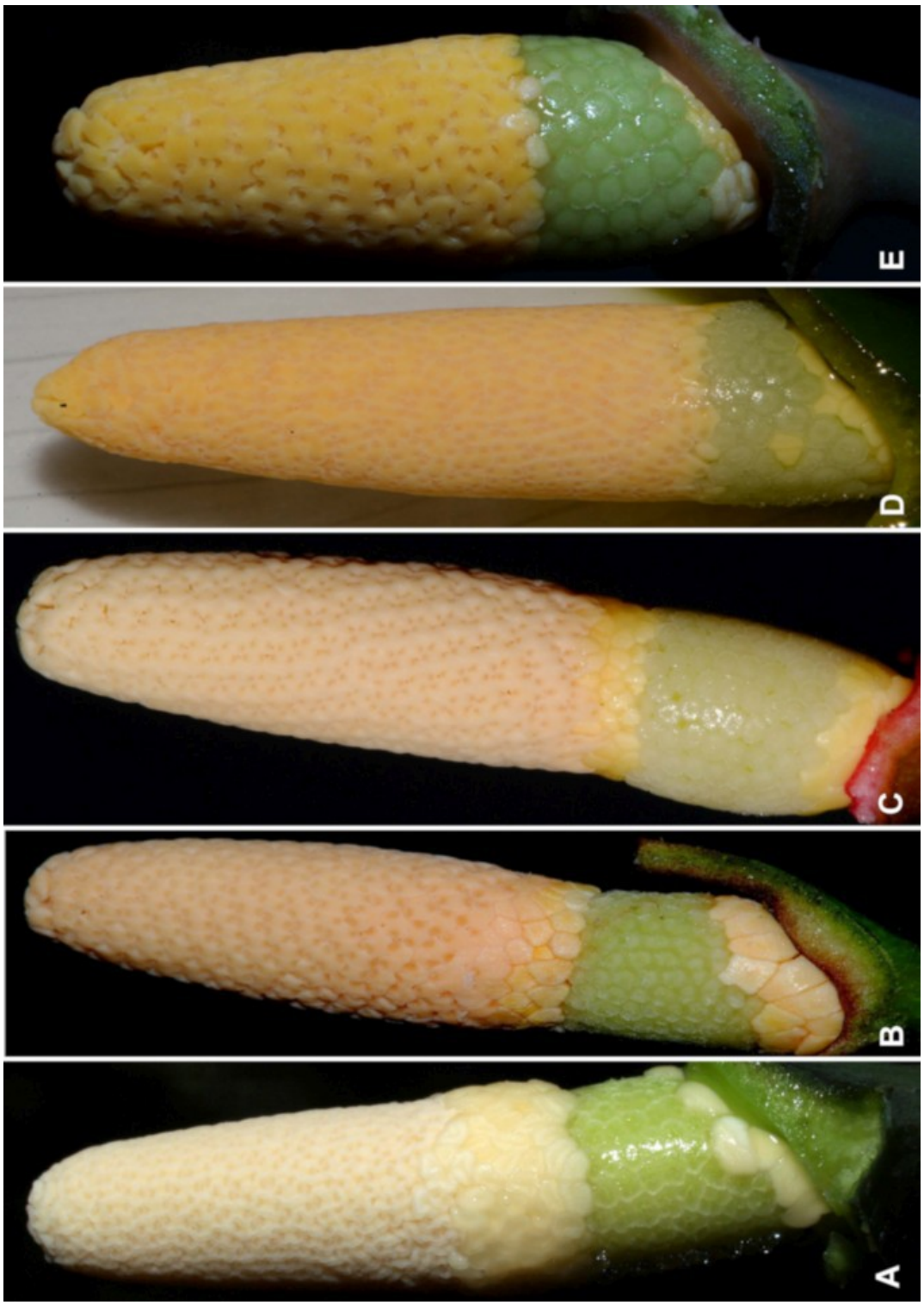

Figure 2. Spadix of *Piptospatha* with green pistils compared. A. *Piptospatha burbidgei* (N. E. Br.) M. Hotta. **B. *Piptospatha colata*** P. C. Boyce & S. Y. Wong. **C. *Piptospatha helix*** S. Y. Wong & P. C. Boyce. **D. *Piptospatha nivea*** P. C. Boyce, S. Y. Wong & Sahal. **E. *Piptospatha viridistigma*** P. C. Boyce, S. Y. Wong & Bogner **A.** from *AR-1973*; **B.** from *AR-3665*; **C.** from *AR*-4041; **D.** from *AR-4711*; E. from *AR-250*. Images A – E © P.C. Boyce.

Piptospatha helix S. Y. Wong & P. C. Boyce, **sp. nov**. Type: Indonesian Borneo, Kalimantan Barat: Kapuas Hulu, Putissibau, Harongan Betung Kerihun National Park, River, upper Mendalam river, 01°06'N 113°19'E, 200 m asl, Feb 2015, *K. Sidiyasa, Ambriansyah, Albertus & Syahirsyah 1929* (holo BO!; iso L!). **Figure 1, 2, 3C.**

Diagnosis

Staminate flowers arranged in clear spirals differentiates *Piptospatha helix* from all other *Piptospatha* species with green pistils (*Piptospatha burbidgei* (N. E. Br.) M. Hotta, *P. colata* P. C. Boyce & S. Y. Wong, *P. nivea* P. C. Boyce, S. Y. Wong & Sahal, and *P. viridistigma* P. C. Boyce, S. Y. Wong & Bogner). *Piptospatha helix* is overall most similar to *P. colata* but may be distinguished by the fusiform (vs weakly conical) pistillate flower zone, smaller interstice and infrapistillar staminodes, and by the spadix not obliquely adnate to the peduncle.

Clumping rheophytic herb to 30 cm tall. **Roots** strong, adhering to rocky substrate. c. 2 mm in diameter. **Stem** short, condensed, to 20 mm in diameter, all except the oldest portions obscured by leaf bases. **Leaves** many together, spreading or arching, forming a rosette; petiole bases clasping stem; **petiole** 5–8 cm long, up to 2.5 mm in diameter, D-shaped in cross-section, minutely scabrous, dull reddish; **petiolar sheath** with free ligular portion c. 4 cm long, these long-marcescent, ultimately deciduous, pale brownish-pink when fresh, drying deep reddish brown; **leaf blades** narrowly elliptic, 5–20 cm long × 2–4.5 cm wide, base cuneate, somewhat obtuse, apex acute with stout tubule, c. 5 mm long, in life semi-glossy medium green adaxially, paler abaxially with the mid-rib and primary lateral veins medium reddish, drying medium brown with abaxial venation slightly darker; **mid-rib** bluntly raised adaxially, rounded-raised and minutely scabrous adaxially; primary lateral veins c. 10 per side, parallel pinnate, impressed adaxially, very slightly raised abaxially; interprimary lateral veins weaker than primary laterals although still conspicuous, interprimary veins joining a weakly defined sub-marginal collecting vein; primary lateral and interprimary veins very slightly raised abaxially and adaxially; interprimary veins irregularly visible as semi-translucent broken lines running parallel to the primary laterals. **Inflorescence** solitary, erect; peduncle c. 15 cm long (at anthesis), c. 3.5 mm in diameter, minutely but distinctly scabrous, reddish brown. **Spathe** initially erect, later held at c. 90° to peduncle, later still (post anthesis) again erect, not constricted, deep pink in late bud, spathe limb opening mainly in shades of glossy deep pink, with the median keel and terminal rostrum deep purple-pink, the rostrum ultimately deep reddish brown; **spathe limb**, c. 6 cm long, the base c. 1 cm wide, mid-way inflated to c. 2.5 cm, ventrally constricted and terminating in a rostrum c. 6 mm long, internally with weakly defined rostral keels. **Spadix** 2.3–2.8 cm long × 6.5–7.5 mm in diameter; **pistillate flower zone** jade-green, slightly fusiform, 5.5–8.5 mm long × 6–7.5 mm in diameter; **infrapistillar staminodes** with c.

Figure 3. ***Piptospatha helix*** S. Y. Wong & P. C. Boyce. Isotype specimen – *K. Sidiyasa, et al. 1929* (L).

2 rows of rounded truncate pale yellow rounded staminodes inserted basally, **pistils** cylindrical, truncate, congested, c. 0.6 mm diameter; **stigma** weakly umbonate, papillate, as wide as ovary; pistillate and staminate zones separated by a zone c. 2 mm long comprised of c. 2 whorls of staminodes, round, truncate, pale yellow staminodes; **staminate flower zone** cream, equalling the pistillate zone in width, 1.5–21 cm long × 6.5–7.5 mm in diameter, weakly fusiform to slightly tapering, apex blunt; **staminate flowers congested**, arranged in distinct spirals, comprised of paired stamens, irregularly oblong and very weakly butterfly shaped, c. 0.5 mm wide × c. 1 mm long, connective truncate, glabrous; thecae lateral, c. 0.3 mm, ellipsoid with a wide rim, sunken into a shallow pit. **Infructescence** with cyathiform persistent spathe, c. 1.5 cm wide, 1 cm tall; **fruits** not observed.

Other specimens seen: INDONESIAN BORNEO. **Kalimantan Barat.** Sekadau, Nanga Taman, south east of Nanga Taman, Kampung Seri Punti, Gunung Raya, south slope, 3 Feb 2012*, K. Nakamoto AR-3776* (BO, SAR); Melawi, Nanga Pinoh, 33km south of Nanga Pinoh and 11km before Kotabaru junction of logging road to Kalimantan Tengah, 16 Oct 2012, *K. Nakamoto AR- 4041* (BO, SAR) & *K. Nakamoto AR- 4043* (BO, SAR).

Ecology — Obligate rheophyte on granite under moist lowland forest; 100–300 m. asl.

Distribution — Indonesian Borneo, Kalimantan Barat, north of the Schwaner range and west of the Muller range.

Etymology — From Latin noun, *helix*, a spiral or turn, here used to describe the diagnostic arrangement of the staminate flowers.

Notes — *Piptospatha helix* (**Figure 3C**) is the fifth species to be described with green pistils, and is most similar to *P. colata* P. C. Boyce & S. Y. Wong (Boyce & Wong 2013 – **Figure 3B**) which has a distribution further to the west in Kalimantan Barat. Other *Piptospatha* species with green pistils are *P. burbidgei* (N. E. Br.) M. Hotta (Brown 1882; Hotta 1965 – **Figure 3A**), *P. nivea* P. C. Boyce, S. Y. Wong & Sahal (Boyce et al., 2014 – **Figure 3D**), and *P. viridistigma* P. C. Boyce, S. Y. Wong & Bogner (Wong et al. 2009 – **Figure 3E**). Phylogentic analyses (Low et al, in prep.) does not recover these species as a single clade.

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REFERENCES

Boyce, P. C. & Wong S. Y. 2013. Studies on Schismatoglottideae (Araceae) of Borneo XXIII: *Piptospatha colata* and *P. deceptrix*, taxonomic novelties from Borneo. *Gard. Bull. Singapore* 65(1): 7–17.

Boyce P. C. & Wong S. Y. 2015. Compendium Genera Aracearum Malesianum. *Aroideana* 38: 40–177.

Boyce, P. C. [et al 2014], Wong S. Y. & A. Sahal. 2014. Studies on Schismatoglottideae (Araceae) of Borneo XXXXIV: *Piptospatha nivea,* a new species from Kalimantan Tengah, Indonesian Borneo. *Aroideana* 37E(2): 50–55.

Brown, N. E. 1882. Four new genera of Aroideae. *J. Bot.* 20: 193–197.

Low S. L., Wong S. Y. & Boyce, P.C. in prep. Relationships of Schismatoglottideae genera with thecae horns, with new generic delimitations, and ten new genera.

Hotta, M. 1965. Notes on the Schismatoglottidinae of Borneo. I. *Mem. Coll. Sci. Univ. Kyoto, Ser. B*, 32: 19–30.

Tate R. B. 2001: *The geology of Borneo island* [CDROM]. – Kuala Lumpur: Geological Society of Malaysia / Persatuan Geologi Malaysia.

Wong S. Y. [et al. 2009], P. C. Boyce & J. Bogner. 2009. Studies on Schismatoglottideae (Araceae) of Borneo VIII: A review of the *Piptospatha elongata* Group in West Sarawak. *Gard. Bull. Singapore* 61(1): 221–238.