

## *Piptospatha teijsmannii* (Araceae: Schismatoglottideae), a new species from Kepulauan Riau, Indonesia

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(Received 19 August 2013; final version received 28 September 2013)

A collection made in 1872 by Johannes Elias Teijsmann (*J.E. Teijsmann 16705*) on Pulau Lingga (Kepulauan Riau Province, Lingga Regency, Indonesia) has long been *Piptospatha*. Recent living collections have now shown that this collection is a taxonomic novelty, endemic to the Lingga Archipelago, and here described as *Piptospatha teijsmannii*. *Piptospatha teijsmannii* is morphologically most similar to *Piptospatha ridleyi* N.E.Br. ex Hook.f., a species restricted to the Peninsular Malaysian states of Johor and Pahang, differing by the morphology of its flowers. Both *P. teijsmannii* and *P. ridleyi* are illustrated in colour, and differentiated with an identification key to the species of *Piptospatha* in Peninsular Malaysia and Lingga Regency. Speculation as to the possible evolutionary origin of *P. teijsmannii* is proffered.

**Keywords:** Araceae; Schismatoglottideae; *Piptospatha teijsmannii*; *Piptospatha ridleyi*; endemic; Kepulauan Lingga; Indonesia

### Introduction

In resurrecting *Piptospatha marginata* (Engl.) N.E.Br., Wong et al. (2011) drew attention to a Teijsmann collection from Pulau Lingga [Kepulauan Riau Province, Lingga Regency, Indonesia—*J.E. Teijsmann 16,705* (BO!)], which has been placed in *Piptospatha marginata* (Engler 1912) but, as noted by Alderwerelt (1922), did not convincingly match that species, despite the similarly pubescent staminate flowers. This same collection was assigned to *Piptospatha ridleyi* N.E.Br. ex Hook.f. by Bogner and Hay (2000) to which Wong et al. (2011) expressed doubts. Shortly after publication of the *P. marginata* paper, we acquired living plants from Pulau Singkep that seemed a convincing match for the Teijsmann collection, and then somewhat later plants of apparently the same species were acquired from Pulau Lingga. At length these collections flowered with us, and revealed that although indeed resembling *P. ridleyi* in their pubescent staminate flowers, and in producing a powerful fruity floral fragrance at anthesis, they were also highly distinct in the morphology of the flowers, and the proportions of the spadix zones. In light of these morphological distinctions, coupled with the geographical isolation of these Lingga populations from all known populations of *P. ridleyi*, we are describing the Lingga plants as a taxonomically novel species, *Piptospatha teijsmannii* P.C. Boyce & S.Y. Wong, which we consider endemic to the Lingga Islands.

*Piptospatha teijsmannii* P.C. Boyce & S.Y. Wong, sp. nov.

### Diagnosis

*Piptospatha teijsmannii* is morphologically most similar to *P. ridleyi*, and together these two species are unique in the genus in producing a powerful fruity floral odour during anthesis. *Piptospatha teijsmannii* differs from *P. ridleyi* by the uniformly pale green spathe exterior (versus lower part green and spathe limb pale pink), the sessile (or only very briefly stipitate) spadix with the staminate flower zone three times longer than (versus equaling) the pistillate flower zone, a truncate (versus triangular-elevated) anther connective, anthers with terminal (not laterally displaced) pores, weakly isodiametric pale orange, papillate stigmas (versus isodiametric, green, glossy stigmas), and by the white, elongate-fusiform (versus yellow, somewhat squat obpyramidal) subpistillar staminodes.

Type: Indonesia, Kepulauan Riau Province, Lingga Regency, Pulau Lingga, Sungai Banda, 1872, *J.E. Teijsmann 16,705* (holo BO!). Figures 1, 3A, 4.

### Description

Rheophytic herb 15–35 cm tall. **Roots** strong, extensive, 1–2 mm diameter. **Stem** condensed, 1–5 cm long, 5–12 mm diameter. **Leaves** several together; petiole (3–)5–15(–20) cm long, 0.9–2.5 mm diameter, reddish, adaxially canaliculate, sheathing only at the extreme base, the

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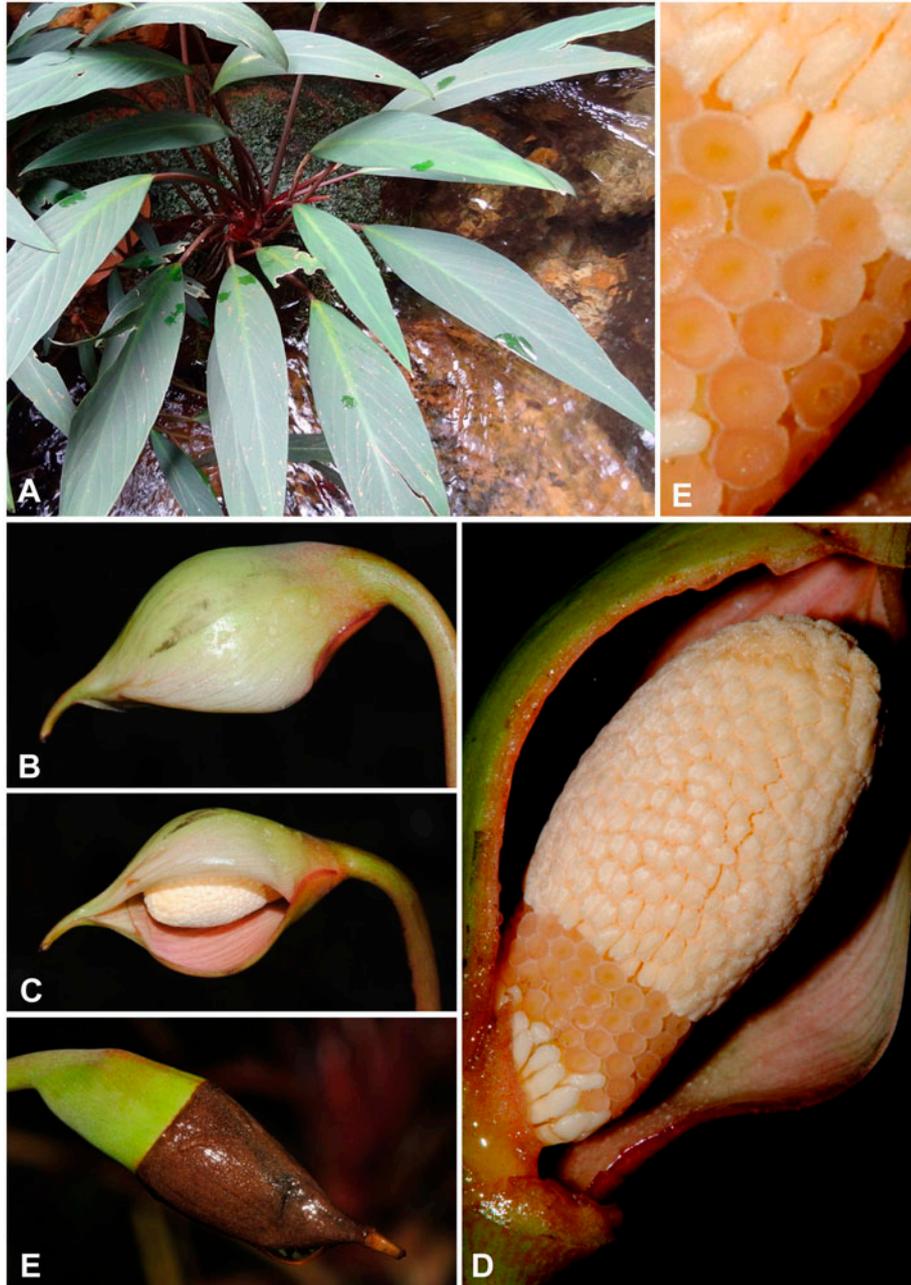


Figure 1. (A–E) *Piptospatha teijsmannii* P.C. Boyce & S.Y. Wong. (A) Plants in habitat on Pulau Lingga. (B, C) Inflorescence at pistillate anthesis in lateral and three-quarter view. Note uniform exterior colour, and the pale pink interior. (D) Spadix (nearside spathe artificially removed) at pistillate anthesis. Note the colour and shape of the subpistillar staminode and stigmas. Note, too, the truncate stamens connective. (E) Post anthesis inflorescence with the spathe limb marcescent. All from *K. Nakamoto AR-4021*. Photo credits: © Peter C. Boyce.

wings extended into a narrow ligular portion 2–7 cm long at first reddish then drying brown; blade narrowly elliptic (4–)6–18(–25) cm long by (1–)2.5–6 cm wide, thinly coriaceous, base cuneate, apex acute and apiculate for 1–3 mm, adaxially dark green, abaxially paler with all primary and interprimary veins distinctly reddish; midrib abaxially prominent, adaxially slightly impressed, with 5–7(–12) primary lateral veins on each side, these diverging at c.30–60°, running to a distinct submarginal vein; interprimary lateral veins less prominent than the primaries. **Inflorescence** several produced sequentially,

each separated by a conspicuous prophyll or somewhat reduced foliage leaf, powerfully fruity fragrant at anthesis; **peduncle** exceeding the petioles at anthesis, terete, 10–25 cm long, reddish brown. **Spathe** initially narrowly ovoid, expanding during anthesis to broadly ovoid, c.3.5–4.7 cm long, exterior pale green with weak pinkish suffusion, veining, and speckling in the caducous upper part, interior deep pinkish red with several deeper pink ridges running from the mid-point to the terminal opening, spathe apically abruptly beaked for c.9 mm, at anthesis spathe limb inflating and gaping ventrally.

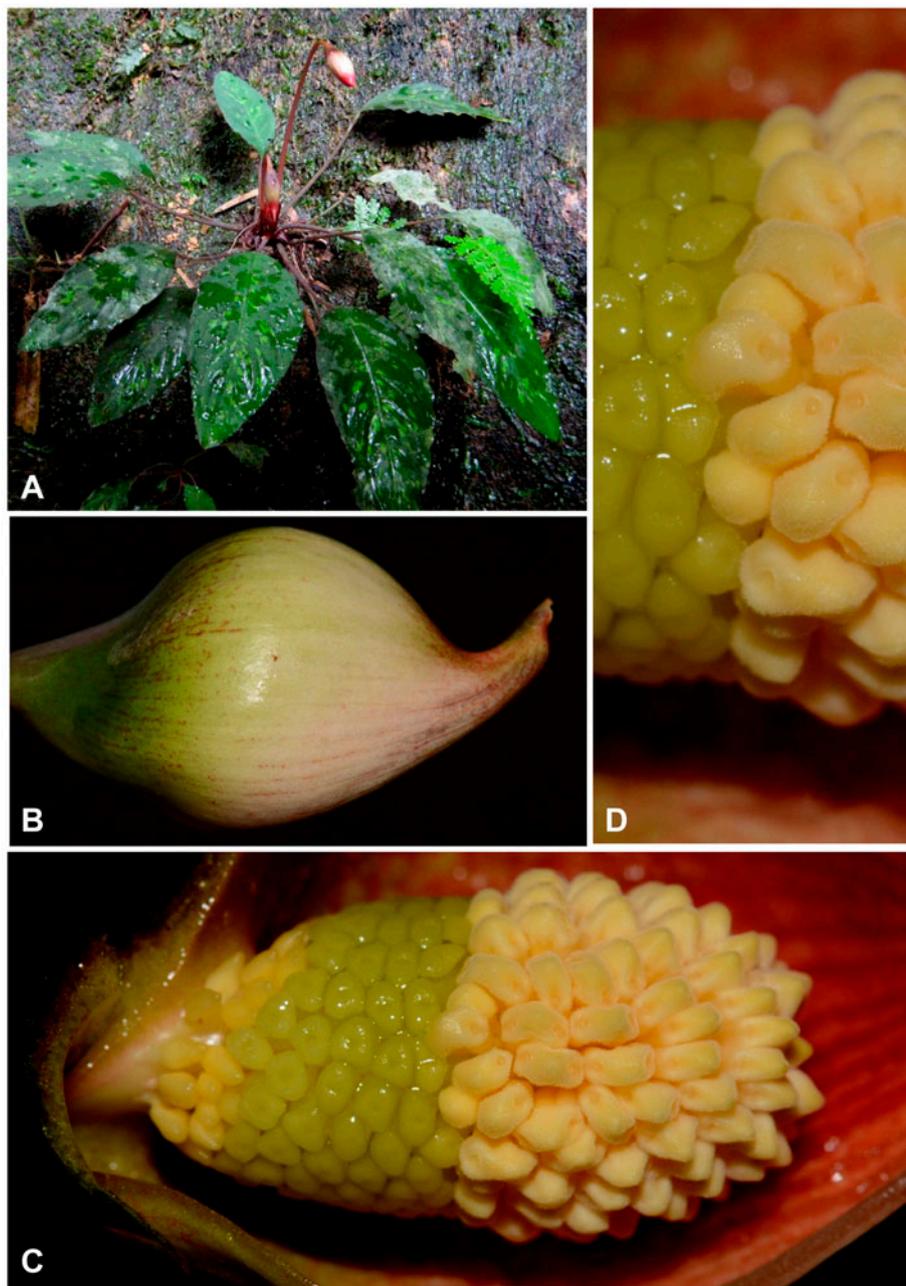


Figure 2. (A–D) *Piptospatha ridleyi* N.E.Br. ex Hook.f. (A) Plant in habitat at Endau Rompin N.P., Peninsular Malaysia. (B) Inflorescence at pistillate anthesis. Note the contrast in colour between the lower spathe and the spathe limb. (C) Spadix (nearside spathe artificially removed) at pistillate anthesis. Note the conspicuous stipe, the colour and shape of the stigmas, and the elongated stamen connectives. (D) Detail of the junction of the pistillate and staminate flower zones. Note the displaced anther pores. All from K. Nakamoto AR-4021. Photo credits: © Peter C. Boyce.

**Spadix** sessile or very briefly stipitate, 2.3–2.6 cm long, subcylindric-clavate, about two-thirds the length of the spathe; **pistillate flower zone** c.4.5 mm long × 7 mm diameter; **pistils** more or less ovoid, c.0.5 mm diameter; **stigma** very slightly raised on an indistinct style, discoid to weakly isodiametric, wider than the ovary, at anthesis densely papillose with a deep central pit, pale orange; **staminodes** restricted to an irregular whorl at the base of the pistillate zone, and white, elongate-fusiform, roughly equalling the pistils; **sterile interstice** absent; **staminate**

**flower zone** clavate-ellipsoid, somewhat broader than the pistillate zone, especially about mid-way, c.17 mm long × 10 mm diameter, fertile to apex; **stamens** finely and densely pubescent, more or less rectangular, mostly aligned in pairs, congested, very pale orange, pores terminal separated by the truncate connective; pollen released in dense strings. **Fruiting spathe** initially with the spathe limb marcescent, but this soon falling, lower persistent part of spathe broadly obconic, c.1.5 cm diameter, pale green. **Fruit** and **seed** not observed.

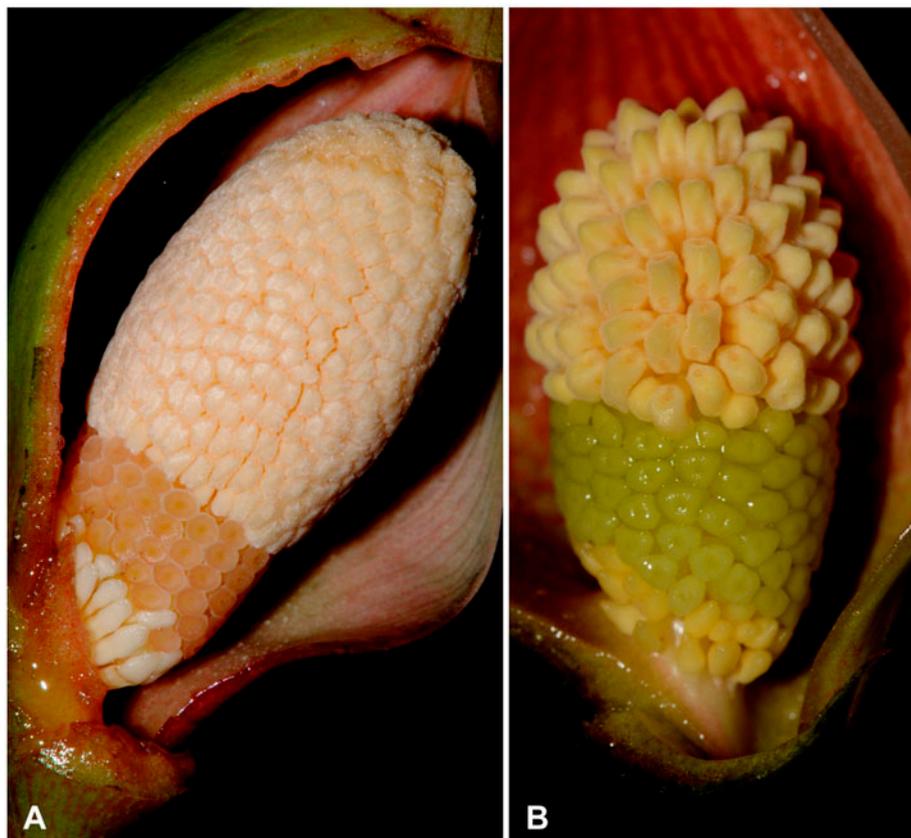


Figure 3. (A) *Piptospatha teijsmannii* P.C. Boyce & S.Y. Wong. (B) *Piptospatha ridleyi* N.E.Br. ex Hook.f. Inflorescences at pistillate anthesis, nearside spathe artificially removed, to enable comparison of the spadices. (A) from *K. Nakamoto AR-4021*. (B) from *P.C. Boyce et al. AR-3046*. Photo credits © Peter C. Boyce.

#### *Distribution*

Kepulauan Riau Province, Lingga Regency, Indonesia. Known from three localities, two on Pulau Lingga and one on Pulau Singkep. At all three sites plants of *P. teijsmannii* are fairly abundant.

#### *Ecology*

*Piptospatha teijsmannii* is an obligate rheophyte on exposed or slightly shaded granite waterfalls in lowland to upper hill perhumid forest between 100 and 800 m above sea level.

#### *Eponymy*

Named for Johannes Elias Teijsmann (1808–1882), from 1831 to 1869 Curator of the Buitenzorg Botanic Gardens (Kebun Raya, Bogor). During his long term of office Teijsmann undertook extensive botanical explorations throughout the then Dutch East Indies (modern Indonesia). In later years he did much valuable work stemming from his interest in crop plants.

#### *Notes*

*Piptospatha teijsmannii* and *P. ridleyi* are evidently very similar. Externally, apart from the colour of the spathe, the inflorescences of both species are almost identical (com-

pare Figure 1B with Figure 2B). Comparison of the spadices, however, reveals marked and consistent differences (compare Figure 1D, E with Figure 2C, D and see also Figure 3). Although yet to be investigated with molecular techniques, it seems highly probable that *P. teijsmannii* and *P. ridleyi* are closely related, with the geographical and ecological proximity raising the distinct possibility that they are vicariant taxa evolved from a common ancestral population fragmented by rising sea levels on the Sunda Shelf during the Pleistocene (Voris 2000).

*Piptospatha* now stands at 15 species, with 12 endemic to Borneo. It is an interesting observation that the only three species (*Piptospatha perakensis* (Engl.) Engl., *P. ridleyi* and *P. teijsmannii*) with a perceptible floral fragrance are extra-Bornean. In general, Bornean *Piptospatha* species have brightly coloured spathe limbs, ranging from bright pink to rich magenta (Boyce and Wong 2013a,b,c; Wong and Boyce, 2012a,b, 2013; Wong et al. 2009, 2011). Although detailed observations are wanting it seems highly probable that the Bornean species employ a different pollination strategy to the species with sombre hued but powerfully fragrant inflorescences.

#### *Other material examined*

Indonesia. Kepulauan Riau Province. Lingga Regency, Pulau Singkep, Riam Batu Ampar, 00°25'41.1" S,



Figure 4. *Piptospatha teijsmannii* P.C. Boyce & S.Y. Wong. Holotype *J.E. Teijsmann 16705* (BO). Photo credits © Peter C. Boyce.

104°31'53.4" E, 5 November 2010, *K. Nakamoto AR-3121* (BO!). Pulau Lingga, northeast of Daik Kampong, Riam Resun, 0°12'0.00" S, 104°33'00.00" E, 7 November 2010, *K. Nakamoto AR-3119* (BO!) and 25 August 2012, *K. Nakamoto AR-4022* (BO!) and 23 January 2013, *K. Nakamoto AR-4121* (BO!) and 17 May 2013, *K. Nakamoto AR-4153* (BO!).

**Key to the species of *Piptospatha* in Peninsular Malaysia and Kepulauan Riau**

1a. Spathe limb white on both surfaces; inflorescence smelling of jasmine (benzyl acetate, linalool) at anthesis; leaf blades entirely green, abaxially with conspicuously tessellate venation. Widespread in Peninsular

Malaysia and extending to southwestern Thailand .....*Piptospatha perakensis*

- 1b. Spathe limb exterior greenish speckled and suffused pale red, to pale pink, interior pale pink; inflorescence smelling powerfully fruity (methyl benzoate?) at anthesis; leaf blades with the petiole and at least the primary veins reddish, abaxially lacking tessellate venation .....2
- 2a. Spadix sessile or only very briefly stipitate; staminate flower zone three times longer than the pistillate flower zone; connective of stamen slightly domed; anthers with terminal pores; stigmas discoid to weakly isodiametric pale orange, papillate; subpistillar

staminodes white, elongate-fusiform. Pulau Lingga and Pulau Singkep .....*Piptospatha teijsmannii*

- 2b. Spadix stipitate, with stipe adnate to lower spathe; staminate flower zone equalling the pistillate flower zone; connective of stamen triangular-elevated; anthers with laterally displaced pores; stigmas isodiametric, green, glossy; subpistillar staminodes fusiform yellow, somewhat squat-fusiform. Peninsular Malaysia (Johor and Pahang) .....*Piptospatha ridleyi*

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