



Thismia bryndonii (Thismiaceae), a new species from Maliau Basin, Sabah, Borneo

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Thismia Griffith (1845: 341) in Thismiaceae or Burmanniaceae (*sensu* APG 2016) consists of more than 60 species (Ridley 1924, Jonker 1948, Stone 1980, van Steenis 1982; Merckx 2008). Many new species in this genus have been discovered, and 12 have been described after 2010 (*e.g.*, Dančák *et al.* 2013, Nuraliev *et al.* 2014, 2015, Chantanaorrapint & Sridith 2015, Li & Bi 2013, Hroneš *et al.* 2015). Considering that the majority of these species were collected only once (Jonker 1948), it is likely that many more undescribed species remain hidden in the forests, particularly in the tropical rain forests of Southeast Asia. Borneo is one of the most biodiverse areas for mycoheterotrophs, and our recent botanical exploration in Borneo revealed many previously undescribed mycoheterotrophic species (*e.g.*, Tsukaya *et al.* 2011, 2014a,b, 2016, Tsukaya & Okada 2005, 2012a,b,c, 2013a,b, Tsukaya & Hidayat 2016, Tsukaya & Suetsugu 2014). In 2016, we conducted a botanical survey in the Maliau Basin, Sabah, Borneo, with the permission of the Maliau Basin Management Committee (YS/MBMC/2016/184) and the Sabah Biodiversity Council [access license JKM/MBS.1000-2/2JLD.5(23)]. The Maliau Basin Conservation Area (MBCA) is a huge basin surrounded by sandstone ridges and covers approximately 39,000 ha. Few botanical explorations have previously been conducted in this area. During the survey, we encountered a specimen from the MBCA that apparently belongs to *Thismia* section *Euthismia* Schltr. subsect. *Odoaroda* Schlechter (1921: 31) because it has a free inner perianth, spreading, creeping and vermiform roots, perianth lobes equal in length and size, but it differs from all known species. Here, we describe this new species with a revised key to the species of this genus in Malesia.

Taxonomic Treatment

Thismia bryndonii Tsukaya, Suetsugu & M.Suleiman, *sp. nov.* (Fig. 1).

Type:—MALAYSIA. Sabah: Maliau Basin Conservation Area, along the Belian Trail, elev. ca. 260 m, 04°41'50"N, 116°54'27"E, 30 Sept 2016, Tsukaya, Suetsugu, & Suleiman TSS-14 (holotype: BORH; isotype: TI, a flower in the spirit collection).

Thismia bryndonii is similar to *T. mullerensis* and *T. lauriana* in having a free perianth lobes equal in size and bifid stigmas, but differs in having two anther appendages and pale-orange streaks on the perianth tube with brown-orange transverse bars inside. Asymmetrical coloration of the perianth lobes is also unique to this species.

Small, achlorophyllous mycoheterotrophic herbs. Roots creeping, branched, ivory white. *Stems* simple, solitary-flowered, 1.5 cm tall, pale brownish white. Leaves and bracts reduced, up to 6 mm long, apex acute. Coloration of the perianth asymmetric, darker on one lobe. Flower perianth of 6 tepals fused to form a basal perianth tube, free apically; perianth tube actinomorphic, 9.0 mm long, 5.5 mm diameter, white with 12 thin, basally pale-orange streaks, leading down from each perianth lobe and from joints between the lobes. Brown-orange transverse bars throughout the perianth tube inside. Lobes triangular, 2 mm long, white or dark brown at the base, terminated by pale purplish brown tentacles 10–11 mm long. Annulus prominent, white. Filaments 6, flattened, borne on the thickened margin of the perianth tube, down-curved, free, ribbon-shaped, apically lobed, white, apically tinged with purple; stamen apically connate, forming an anther tube, 3.8 mm long; individual stamen bearing 2 anthers of 0.6 mm long; a round gland seen around the apex on the fused line between connectives; apex of stamen with 2 filiform appendages of 0.6 mm; style 0.7 mm; stigmas 3, bifid, dark purple, 1.3 mm long. Fruits not seen.

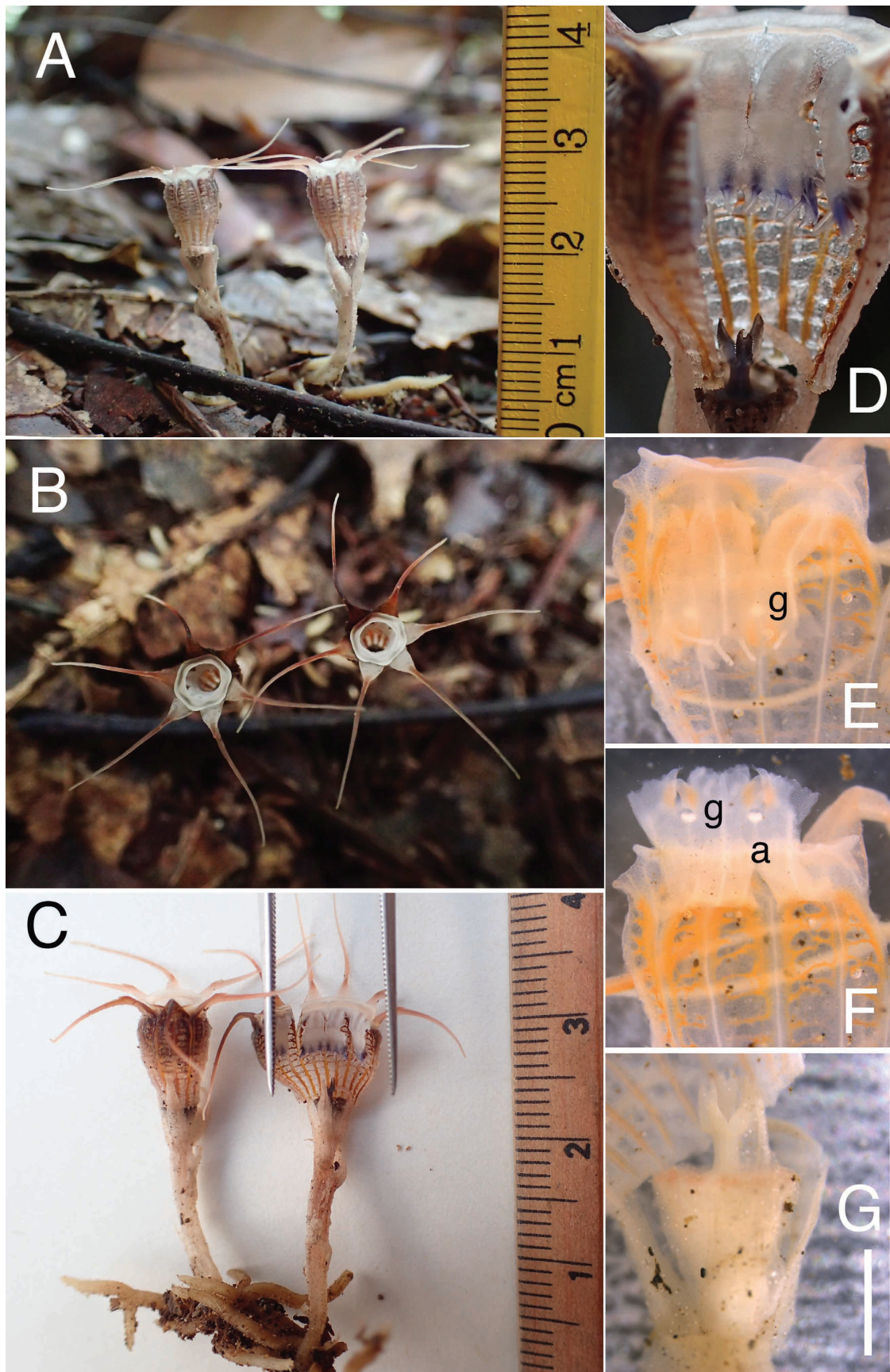


FIGURE 1. *Thismia brydonii*. A. Lateral view of the species flowers in its native habitat. Note the asymmetric coloration of the flower. B. Front view. C. Gross morphology of the whole plant with a flower opened to show the inside; scale in cm. D. Color and shape of stamens, pistil, and perianth tube in the living state. E. Stamens in their natural position. F. Stamens turned: g, gland; a, anther. G. Ovary and stigma. (E–G at the same magnification; scale bar, 2 mm.) Photographs (A, B) were taken in the Maliau Basin Conservation Area on 30 September 2016.

Notes:—In view of the classification of Jonker (1948), *T. bryndonii* appears to belong to sect. *Euthismia* Schlechter. (1921:31) in having a free inner perianth, spreading, creeping, and vermiform roots and belongs to subsect *Odoardoa* Schlechter (1921:31), in having perianth lobes equal in length and size. Only *T. mullerensis* Tsukaya & Okada (2005: 129) and *T. lauriana* Jarvie (1996: 259) share bifid stigmas in subsect. *Odoardoa*, and *T. bryndonii* has two anther appendages. *Thismia bryndonii* differs in having pale-orange streaks on the perianth tube with brown-orange transverse bars inside, differently sized perianth lobes (12–13 mm vs. 17 or 70 mm, respectively) and its slight asymmetric coloration of the perianth lobes, whereby one perianth lobe is darker than the other lobes. Asymmetry in the perianth tube is known in some species of *Thismia*, but *T. bryndonii* is unique in having a symmetric perianth tube with asymmetric coloration.

Distribution:—This species was found in the understory of a dipterocarp forest and is only known from the type locality in the Maliau Basin, Sabah, Borneo.

Etymology:—The species name *T. bryndonii* was chosen in honour of our guide in the Maliau Basin Conservation Area, Bryndone Farone Bernard, who first discovered this new species on a botanical expedition.

Based on the observations, the following can be inserted into the key to species of *Thismia* in *Flora Malesiana* I, 4 (Jonker 1948: 22) with modifications by Tsukaya *et al.* (2005), Chantanaorrapint (2012) and Dančák *et al.* (2013).

7. Stigmas bifid.
 8. Anther appendages filiform, 2; perianth tube with longitudinal streaks and many transverse bars inside.
 9. Perianth white with 12 pale-orange streaks and brown-orange transverse bars inside; lobes with tentacles 12–13 mm *T. bryndonii* Tsukaya, Suetsugu et M.Suleiman
 9. Perianth white with 12 brownish purple streaks and white transverse bars inside; lobes with tentacles ca. 17 mm *T. mullerensis* Tsukaya et H.Okada
 9. Perianth white with 12 white streaks and white transverse bars inside; lobes with tentacles ca. 70 mm..... *T. lauriana* Jarvie
 8. Anther appendages more than 3
 10. Anther appendages 3
 11. Transverse bars found only in the basal part of the perianth tube *T. bifida* M.Hotta
 11. No transverse bars found in the perianth tube *T. filiformis* Chantanaorr.
 10. Anther appendages 4
 12. Four filliform appendages; perianth lobes 7–18 mm *T. hexagona* Dančák, Hroneš, Koblrová & Sochor
 12. Two tooth-like appendages and two filiform appendages; perianth lobes 29–43 mm *T. hexagona* var. *grandiflora* Tsukaya, M.Suleiman & H.Okada
7. Stigmas not bifid..... 13 (no. 10 in Tsukaya & Okada 2012)

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