

## THE OCCURRENCE AND TAXONOMIC RELATIONSHIPS OF *BURMANNIA WALLICHII* (BURMANNIACEAE) IN MALESIA

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### SUMMARY

*Burmattia wallichii* (Miers) Hook. f. (Burmanniaceae) is shown to occur in Malesia. The similarities between this species and related saprophytic *Burmattia* species from Southeast Asia are discussed, and the *Flora Malesiana* key published by Jonker (1948) is amended accordingly. A new taxonomic description of the species is provided.

### INTRODUCTION

The family *Burmanniaceae sensu lato* (inclusive of the segregate family *Thismiaceae*) consists of 13 genera and c. 130 species of small herbaceous saprophytes and autotrophs. The geographical distribution of the family is essentially pantropical, although also extending into some temperate regions. The autotrophic species generally occur as sparse individuals in open fields and savannahs, whereas the saprophytes occur almost exclusively on decaying leaves, wood and roots in the deep shade of wet tropical forests. The saprophytes can easily be overlooked by collectors, since they possess underground tubers that only produce aerial parts when flowering or fruiting; as a consequence comparatively few specimens are available for study in herbaria.

The most recent comprehensive taxonomic revision of the family Burmanniaceae is the monograph by Jonker (1938), although later regional revisions of Southeast Asian taxa have been published (Jonker, 1948; Backer & Bakhuizen van den Brink f., 1968: 213–215; Saunders, in press).

Ridley (1907, 1924) believed that the species *Burmattia wallichii* (Miers) Hook. f. was indigenous to the Malay Peninsula, citing four of his own collections from Singapore, Pahang, Selangor and Kedah in the former publication. Probably as a consequence of these reports, Jonker (1938) included the Malay Peninsula within the distributional range of the species, despite the fact that he had not examined any Malesian collections of the species during the preparation of his monograph. It was presumably the lack of unequivocal *B. wallichii* specimens from the Malay Peninsula that subsequently led Jonker (1948) to omit the species entirely from his *Flora Malesiana* account. During the preparation of the account of the *Burmanniaceae* for the *Angiosperm Flora of Singapore* (Saunders, in press), however, a Singaporean specimen was identified as *B. wallichii*; the occurrence and taxonomic relationships of this species in Malesia are therefore discussed.

Table 1. Comparison of morphological characteristics of *Burmannia wallichii* and four closely related species. Data for *B. wallichii* based on measurements of four herbarium collections, using 10 counts per collection where possible; data for other species abstracted from Jonker (1938, 1948) except where otherwise stated.

	<i>B. malasica</i>	<i>B. oblonga</i>	<i>B. steenisii</i>	<i>B. tridentata</i>	<i>B. wallichii</i>
Plant height at anthesis:	5.5–8 cm	7–15 cm	2–6 cm	6–14 cm	4.5–6.5–11 cm
Leaf length:	1.5–2 mm	c. 1.5 mm	0.5–1.5 mm	1.5–2 mm	1–2–2.8 mm
Number of flowers per inflorescence:	1 (or 2)	1 or 2	1 or 2	1–3	1(–3)
Perianth colour:	Purple or white with yellow limb	White, sometimes with yellow limb	Pure white with yellow limb	?	White or bluish
Outer perianth lobes:	Triangular with acuminate to apiculate apex	Obtuse-bifid, with two involute, narrow, triangular lateral lobes	Triangular with sub-obtuse apex	Triangular to ovate with obtuse apex	Triangular with obtuse apex
Inner perianth lobes:	Lanceolate-ovate <sup>1</sup> , c. 0.5 mm	Absent	Orbiculate, minute	Absent	Orbiculate, minute
Perianth wings:	Half-orbiculate to half-elliptical, c. 4 × 2 mm	Half-obovate, truncate, c. 5–7.5 × 3–4 mm	Half-elliptical to half-quadrangular, c. 4.5 × 1.5 mm	Half-elliptical to half-orbiculate, c. 4 × 2 mm	Half-linear to half-elliptical (c. 4.5 × 0.5 mm) <sup>2</sup>
Stamen structure:	Two apical crests; basal spur absent	Apical crests absent; basal spur absent	Two apical crests; basal spur present	Single apical crest; basal spur present	Apical crests absent; basal spur present

1) Occasionally orbiculate (pers. observ.).

2) Fide Jonker (1938).

## TAXONOMIC RELATIONSHIPS

*Burmannia wallichii* possesses close taxonomic affinities with four other species within the Malesian phytogeographical region, viz. *B. malasica* Jonker, *B. oblonga* Ridl. *B. steenisii* Jonker and *B. tridentata* Becc. (Table 1). All five species are small achlorophyllous saprophytes, lacking the basal rosette of leaves typical of the autotrophic species of the genus; the leaves are reduced to small bract-like structures that are appressed to the stem. Similarities also exist in the formation of only 1 or 2 flowers per inflorescence (rarely 3 in *B. tridentata*).

The most important diagnostic features for distinguishing between these taxa are characters of the perianth and androecium (Table 1). Although the outer perianth segments of all five species are somewhat enlarged and carnosely at the margin, considerable variation exists in the size and shape of the inner perianth segments: according to Jonker (1938, 1948), they are largest in *B. malasica* (lanceolate, to c. 0.5 mm long), highly reduced in *B. steenisii* and *B. wallichii*, and entirely absent in *B. oblonga* and *B. tridentata*. *Burmannia malasica* appears to show considerable variation in this character, however, and the distinction between this species and its close relative *B. lutescens* Becc. is consequently not as absolute as suggested by Jonker (l.c.). The three perianth wings attached to the outside of the perianth tube are also diagnostically important: they are typically up to 4 mm in diameter in *B. oblonga*, up to c. 2 mm in diameter in *B. malasica*, *B. steenisii* and *B. tridentata*, but reduced to only c. 0.5 mm diameter in *B. wallichii*.

Although the stamens are fused to the inner wall of the perianth tube and are reduced to just a pair of thecae separated by a connective, the structure of this connective is highly variable within the genus and taxonomically valuable. Many species of *Burmannia* possess connectives with two dorsolaterally positioned papillose apical crests, and a single pendent basal spur. *Burmannia steenisii* is typical of this form, but the other four species all differ by lacking either the apical crests (*B. oblonga* and *B. wallichii*) and/or the basal spur (*B. malasica* and *B. oblonga*), or else by possessing a single, centrally positioned apical crest (*B. tridentata*).

The key to Malesian species provided by Jonker (1948: 15) can be amended to include *B. wallichii* by replacing couplets 11–14 with the following:

- 11. Inner perianth lobes absent.
  - 12. Perianth lobes simple. Connective with an apical, papillose crest and a basal, hanging, obtuse spur ..... *B. tridentata*
  - 12. Perianth lobes bifid. Connective without crest and spur ..... *B. oblonga*
- 11. Inner perianth lobes present, sometimes very small.
  - 13. Connectives lacking basal spur.
    - 14. Plant flowering up to 8 cm height; 1 (or 2) flowers per inflorescence; flowers sessile ..... *B. malasica*
    - 14. Plant flowering up to 23 cm height; up to 11 flowers per inflorescence; flowers pedicellate ..... *B. lutescens*
  - 13. Connectives with basal spur.
    - 15. Plant flowering up to 6 cm height; connectives with two lateral apical crests ... *B. steenisii*
    - 15. Plant flowering up to 11 cm height; connectives lacking apical crests ..... *B. wallichii*

The identification of these saprophytic *Burmannia* species is complicated by their highly reduced structure, and by the variation apparent in all the diagnostically important characters, including: the size and shape of the inner perianth segments; the width of the perianth wings; and the size and shape of the dorsal and ventral staminal connective appendages. For most species, the classification has also necessarily been based on a very small number of collections. Although the *Flora Malesiana* key has been amended to include *B. wallichii*, this must therefore still be regarded as preliminary until a more detailed revision is undertaken, enabling an appreciation of the pattern of variation in the species over their entire geographical distributions.

#### TAXONOMIC TREATMENT

##### *Burmannia wallichii* (Miers) Hook. f.

*Burmannia wallichii* (Miers) Hook. f., Fl. Brit. India 5 (1888) 666; Wright, J. Linn. Soc. 36 (1903) 5; Ridl., Mat. Fl. Mal. Pen. 2 (1907) 71; Gagnep. in Lecomte, Fl. Gén. Indo-Chine 6 (1908) 21; Ridl., Fl. Malay Penins. 4 (1924) 305; Jonker, Meded. Bot. Mus. Rijks Univ. Utrecht 51 (1938) 145; R.M.K. Saunders, Gard. Bull., Singapore (in press). — *Gonyanthes wallichii* Miers, Trans. Linn. Soc. 18 (1841) 537; Benth., Fl. Hongkong. (1861) 364. — Type: *Wallich 399* (BM lecto; B, G isolecto), Kilaben, Burma.

*Burmannia griffithii* Becc., Malesia 1 (1877) 254. — Type: *Griffith 5592* (CAL, P, W), Burma.

Saprophytes with highly reduced colourless leaves; flowering at 4.5–6.5–11 cm height. Stem simple, filiform. Basal rosette of leaves absent. Stem leaves achlorophyllous, ± appressed, scale-like, subulate-triangular, with acute apex, sometimes keeled; 1–2–2.8 mm long. Bracts lanceolate, 2.5–4 mm long. Flowers solitary or occasionally in pairs or threes, subsessile, 6–7–9.5 mm long; perianth white or bluish; perianth tube cylindrical, c. 3 mm long; outer perianth lobes triangular with obtuse apex, to c. 1 mm long; inner perianth lobes minute, orbiculate, with rounded apex; lateral perianth wings narrow, ± linear, c. 4.5 × 0.5 mm; staminal connective without apical crests, but with short basal spur; gynoeceum as long as perianth tube; ovary c. 2.5 mm long. Fruit a capsule, dehiscent ± irregularly by transverse splits. n = 16 (Larsen, 1963).

Distribution — India, Burma, Indochina, Thailand, Malay Peninsula and southern China (Guangdong and Hong Kong) (Jonker, 1938).

Ecology — Little is known of the ecology of *B. wallichii*, although it is clearly saprophytic; it therefore presumably grows on decaying leaf litter, wood or roots in the deep shade of wet tropical forests, as is seen with other saprophytic *Burmannia* species.

*Representative specimens studied:* *Kerr 926*, 2 Jan. 1910, Doi Sootep, Chungmai, Thailand (BM); *Ridley's collector s.n.* [without date], Kranji, Singapore (SING); *Wallich 399* [without date], Kilaben, Burma (B, BM, G); *Wilford 1444*, Dec. 1857, Hong Kong (BM).

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