



## Three new species of *Begonia* (sect. *Petermannia*, Begoniaceae) from Sarawak, Borneo

CHE-WEI LIN<sup>1</sup>, SHIH-WEN CHUNG<sup>1</sup> & CHING-I PENG<sup>2,3</sup>

<sup>1</sup>Division of Botanical Garden, Taiwan Forestry Research Institute, No. 53, Nanhai Road, Taipei 10066, Taiwan

<sup>2</sup>Herbarium (HAST), Biodiversity Research Center, Academia Sinica, Nangang, Taipei 115, Taiwan

<sup>3</sup>Author for correspondence, e-mail: bopeng@sinica.edu.tw

### Abstract

Borneo is a hotspot for *Begonia*. About 140 species of *Begonia* have been described from Borneo, 75 of which occur in Sarawak. In this study we report the discovery of three undescribed species of *Begonia*, namely *B. amidalae*, *B. darthvaderiana* and *B. anserina* from southwestern Sarawak. They are assignable to sect. *Petermannia* based on the cane-like habit, protogynous inflorescence and pistillate flowers with three locules each with two placentas. The new species *B. amidalae* somewhat resembles *B. subisensis* K.G. Pearce, but is sharply distinct by the leaf shape, tepal color, much fewer stamens and smaller pistillate tepals and fruits. *Begonia darthvaderiana* is similar to *B. chlorosticta* Sands differing in the leaf shape, orientation and maculation, much fewer stamens, color of staminate tepals as well as shape of fruit wings. *Begonia anserina* approaches *B. pleioclada* Irmsch. in the sympodial branching, differing in being a much taller plant with shorter inflorescence and larger fruits.

### Introduction

Inventory of *Begonia* in Peninsular Malaysia has been relatively complete and a monograph was recently published (Kiew, 2005). By contrast, there are many under-explored areas in Borneo, which is a hotspot for *Begonia*. About 140 species of *Begonia* have been described from Borneo, 75 of which occur in Sarawak (Hughes, 2008; Tawan *et al.*, 2009; Julia *et al.*, 2013; Kiew and Julia 2007, 2009; Lin *et al.*, 2014a, b). During the first author's recent (2013) field trip to Sarawak, a variety of geological formations such as limestones, sandstones, granites, mudstones, lignites, and siltstones were encountered, which create diverse terrains and varied microhabitats. In the field trip to Batang Ai, located in southwestern Sarawak bordering Kalimantan of Indonesia, a number of species of *Begonia* from varied habitats were collected. Consultation of herbarium specimens (BM, BO, E, K, KNP, KEP, SAN, SING) and relevant literature (Golding & Wasshausen, 2002; Hughes, 2008; Hughes & Pullan, 2007; Julia *et al.*, 2013; Kiew & Geri, 2003; Kiew & Julia, 2007, 2009; Lin *et al.*, 2014a, b; Pearce, 2003; Smith, *et al.*, 1986) supports the recognition of three new species, namely *Begonia amidalae*, *B. darthvaderiana* and *B. anserina*, which we describe herein. They are assignable to sect. *Petermannia* based on the cane-like habit, protogynous inflorescence and pistillate flowers with three locules each with two placentas. Measurements made in the description below were based on over a dozen living plants for each of the three species in the field. In addition to the taxonomic account, color plates, line drawings, a distribution map and comparison with phenetically similar species are provided to aid in identification.

### Taxonomic treatment

1. *Begonia amidalae* C. W. Lin & C.-I Peng, *sp. nov.* (Figures 1, 2)

Sect. *Petermannia*

**Type:**—MALAYSIA. Borneo, Sarawak, Sri Aman, Lubok Antu, Batang Ai, 100–150 m elev., 5 July 2013, C. W. Lin 547 (holotype SAR; isotypes E, HAST, KEP, TAIF)

**Staminate flower:** pedicel 3–4 mm long, appressed purple-red hairy, tepals 2, white; ovate to suborbicular, adaxially glabrous, abaxially puberulent, 4–6 mm long, 3.5–4.8 mm wide, margin entire; androecium symmetric, stamens *ca.* 18, filaments slightly fused at base; anther *ca.* 0.5 mm, subequal to filament. **Pistillate flower:** pedicel *ca.* 4 mm long, purple-red puberulent; ovary body trigonous-ellipsoid, *ca.* 8 mm long, 3.5 mm across, 3-winged, wings right-triangular, subequal, *ca.* 9 mm long, 5 mm tall, sparingly puberulent, minutely denticulate on upper margins; ovary 3-locular, placentae bilamellate; tepals 5, outer 2 white, oblong to ovate-oblong, 6–8 mm long, 2–3 mm wide, glabrous above, purple-red puberulent on lower surface, margin dentate; inner 3 white, oblong to ovate-oblong, 8–12 mm long, 4–5 mm wide, glabrous on both surfaces, purple-red puberulent, margin dentate; styles 3, golden yellow, apically split, 2.5–3 mm long, stigmas in a spiral band and papillose all around. **Fruit** a capsule, on stalk 9–11 mm long, 12–14 mm wide (wings included), puberulous; wings 3, subequal, truncate distally, *ca.* 5 mm wide, rounded or narrowed proximally.

**Distribution and ecology:**—Endemic in Batang Ai, Sarawak, Borneo. On soil slopes beside streams or ledges above a steep slopes, in dark to light shady dipterocarp forest, elevation *ca.* 100–250 m. This species is relatively common locally.

**Etymology:**—The epithet *anserina* refers to the resemblance of the many pairs of pseudo-opposite leaves in the new species to a flock of flying geese.

**Notes:**—*Begonia anserina* is similar to *B. pleioclada* Irmsch. (1954: 488) in branching sympodially, differing in being erect and more robust. *Begonia anserina* is 30–100 cm tall (vs. 15–25 cm) and leaves are much larger (11–15.5 cm long, 4–6.5 cm wide) than the latter (5.5–10 cm long, 2–3 cm wide). The new species was sometimes found to co-occur with *B. amidalae* or *B. darthvaderiana*.

**TABLE 3.** Comparison of *Begonia anserina* and *B. pleioclada*.

	<i>B. anserina</i> (Figures 5, 6)	<i>B. pleioclada</i>
<b>Stem height</b>	30–100 cm	15–20 cm
<b>Leaf size</b>	11–15.5 cm × 4–6.5 cm	5.5–10 cm × 2–3 cm
<b>Super inflorescence (length)</b>	3–9 mm	40–60 mm
<b>Staminate cymes</b>	highly congested	well-spaced, 1.2–2.4 cm long at the lowermost node
<b>Fruit length</b>	9–11 mm	<i>ca.</i> 7.5 mm

## Acknowledgements

The authors are grateful for detailed reviews of the manuscript by two anonymous reviewers. Robert Tseu and Amos Yu are thanked for accompanying the first author's expedition to Sarawak and many Sarawakian natives who guided and assisted with the expedition. This work was supported in part by grants from Academia Sinica, Taiwan to Ching-I Peng.

## References

- Golding, J. & Wasshausen, D.C. (2002) Begoniaceae, Edition 2. Part I: Annotated Species List, Part II: Illustrated Key, Abridgement and Supplement. Smithsonian Institution Contributions from the United States National Herbarium 43: 1–289.
- Hughes, M. (2008) An Annotated Checklist of Southeast Asian Begonia. Royal Botanic Garden Edinburgh.
- Hughes, M. & Pullan, M. (2007) *Southeast Asian Begonia Database*. Electronic publication accessible via [www.rbge.org.uk](http://www.rbge.org.uk).
- Irmscher, E. (1954) Neue Begoniaceen, von O. Beccari in Malesien gesammelt. *Webbia* 9(2): 469–509.  
<http://dx.doi.org/10.1080/00837792.1954.10669621>
- Julia, S., Kiew, R. & Geri, C. (2013) Revision of *Begonia* (Begoniaceae) from the Melinau Limestone in Gunung Mulu National Park and Gunung Buda National Park, Sarawak, Borneo, including thirteen new species. *Phytotaxa* 99(1): 1–34.  
<http://dx.doi.org/10.11646/phytotaxa.99.1.1>
- Kiew, R. (2005) *Begonias of Peninsular Malaysia*. Natural History Publications (Borneo), Malaysia, 308 pp.
- Kiew, R. & Geri, C. (2003) Begonias from the Bau Limestone, Borneo, including a new species. *Gardens' Bulletin Singapore* 55: 113–123.
- Kiew, R. & Julia, S. (2007) *Begonia* (Begoniaceae) from Limestone Hills in the Kuching Division, Sarawak, Borneo, including nine new species. *Gardens' Bulletin Singapore* 58(2): 199–232.
- Kiew, R. & Julia, S. (2009) Seven new species of *Begonia* (Begoniaceae) from the Ulu Merirai and bukit Sarang limestone areas in

- Sarawak, Borneo. *Gardens' Bulletin Singapore* 60(2): 351–372.
- Lin, C.W., Chung, S.W. & Peng, C.-I (2014a) Two new species of *Begonia* (Begoniaceae) from sandstone areas in Sarawak, Malaysia. *Nordic Journal of Botany* [published online].  
<http://dx.doi.org/10.1111/njb.00641>
- Lin, C.W., Chung, S.W. & Peng, C.-I (2014b) *Begonia hosensis* (sect. *Reichenheimia*), a new species from Sarawak, Malaysia. Taiwan (in press).
- Pearce, K.G. (2003) Five new *Begonia* species (Begoniaceae) from the Niah National Park, Sarawak, Malaysia. *Gardens' Bulletin Singapore* 55: 73–88.
- Sands, M.J.S. (1982) *Begonia chlorosticta*. *Curtis's Botanical Magazine* 183:131–137.
- Smith, L.B., Wasshausen, D.C., Golding, J. & Karegeannes, C.E. (1986) *Begoniaceae*. Part 1: Illustrated Key; Part 2; Annotated Species List. *Smithsonian Contributions to Botany* 60: 1–584.  
<http://dx.doi.org/10.5479/si.0081024X.60>
- Tawan, C.S., Ipor, I.B., Hidir, M., Ampeng, A., Marzuki, B. & Meekiong, K. (2009) Two new *Begonia* species (Begoniaceae) and notes on extended distribution of *Begonia calcarea* Ridl. from Sarawak, Borneo. *Folia Malaysiana* 10: 47–58.