



Begonia daunhitam, a new species of *Begonia* (Begoniaceae) from West Kalimantan, Indonesia

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ABSTRACT: *Begonia daunhitam*, a new species from West Kalimantan, Indonesia with strongly bullate black leaves is described and illustrated here, and details of the distribution, ecology and conservation status are provided.

KEY WORDS: *Begonia darthvaderiana*, *Begonia daunhitam*, Begoniaceae, Borneo, Indonesia, new taxa, taxonomy.

INTRODUCTION

The pantropical genus *Begonia* L. (Begoniaceae) is the sixth largest genus of flowering plants, comprises 1944 species (Hughes *et al.* 2015–), and is distributed in the tropics and subtropics of Asia, America and Africa (Kiew *et al.* 2015). Asia has the richest diversity of *Begonia* (ca. 1000 species), and Indonesia is one of the centers of *Begonia* diversity in Southeast Asia (Hughes 2008), where the number of species is now estimated to be more than 200, which are distributed from Sumatra to Papua, including numerous small islands (Hughes *et al.* 2015–; Siregar 2017). For Kalimantan, where only twelve species are currently named (Ardi *et al.* 2019), the total number of un-named species is likely to be higher than that of either Sabah or Sarawak considering that Kalimantan occupies a larger land area, its mountains and limestone areas are hardly collected and the *Begonia* flora has hardly been studied at all (Sang & Kiew 2014).

Begonia sect. *Petermannia* (Klotzsch) de Candolle is one of the largest sections in the genus, with 432 species covering 23% of species diversity (Girmansyah *et al.* 2019). The section is characterised by protogynous, terminal inflorescences often with paired or solitary female flowers at the base, with a larger terminal cyme of male flowers, and often a cane-like or shrubby habit, 3 locular, placenta bifid, capsule with three subequal wings (Doorenbos *et al.* 1998, Moonlight *et al.* 2018).

In this paper we report a very attractive *Begonia* with dark olive to black leaves, originally from west Kalimantan, has recently entered into cultivation in China. It is immediately distinct from all other known Kalimantan species in its dark olive nearly black leaves,

with bullae on the leaf surface and pink to red flowers. The new species is similar to *B. darthvaderiana* C. W. Lin & C.-I Peng (Lin *et al.* 2014) in having dark olive leaves and pink flowers, but differing in having a dichasial cyme inflorescence, bullate upper leaf surface · denticulate at the margin and without a narrow silvery band along the leaves margin, and many more stamens. We describe this species using measurements of herbarium specimens made from living plants cultivated in Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences. In addition to the full taxonomic account, colour plates, line drawings, and a comparison to a phenetically similar species are provided to aid in identification.

TAXONOMIC TREATMENT

Begonia daunhitam W.G. Wang, C.X.L. Wang, S.Z. Zhang & A. Randi, *sp. nov.*

黑森林秋海棠 Figs. 1, 2 & 4

Sect. *Petermannia*

Type: INDONESIA. Borneo. West Kalimantan Province. Kapuas Hulu Regency, Boyan Tanjung District, Sri Wangi Village, (0°20'16"N, 112°27'41"E, 260 m alt.), 23 September 2016, A. Randi AR-855-KB (holotype BO!, isotype BO!).

Diagnosis: This new species is similar to *B. darthvaderiana* in having dark olive nearly black leaves and pink flowers, but differing in having a dichasial cyme inflorescence, adaxial surface of leaves being strongly bullate, denticulate at the margin and without a narrow silvery band along the leaves margin and many more stamens (fig. 3).

Low herb, terrestrial, perennial. **Stem** erect to 20 cm

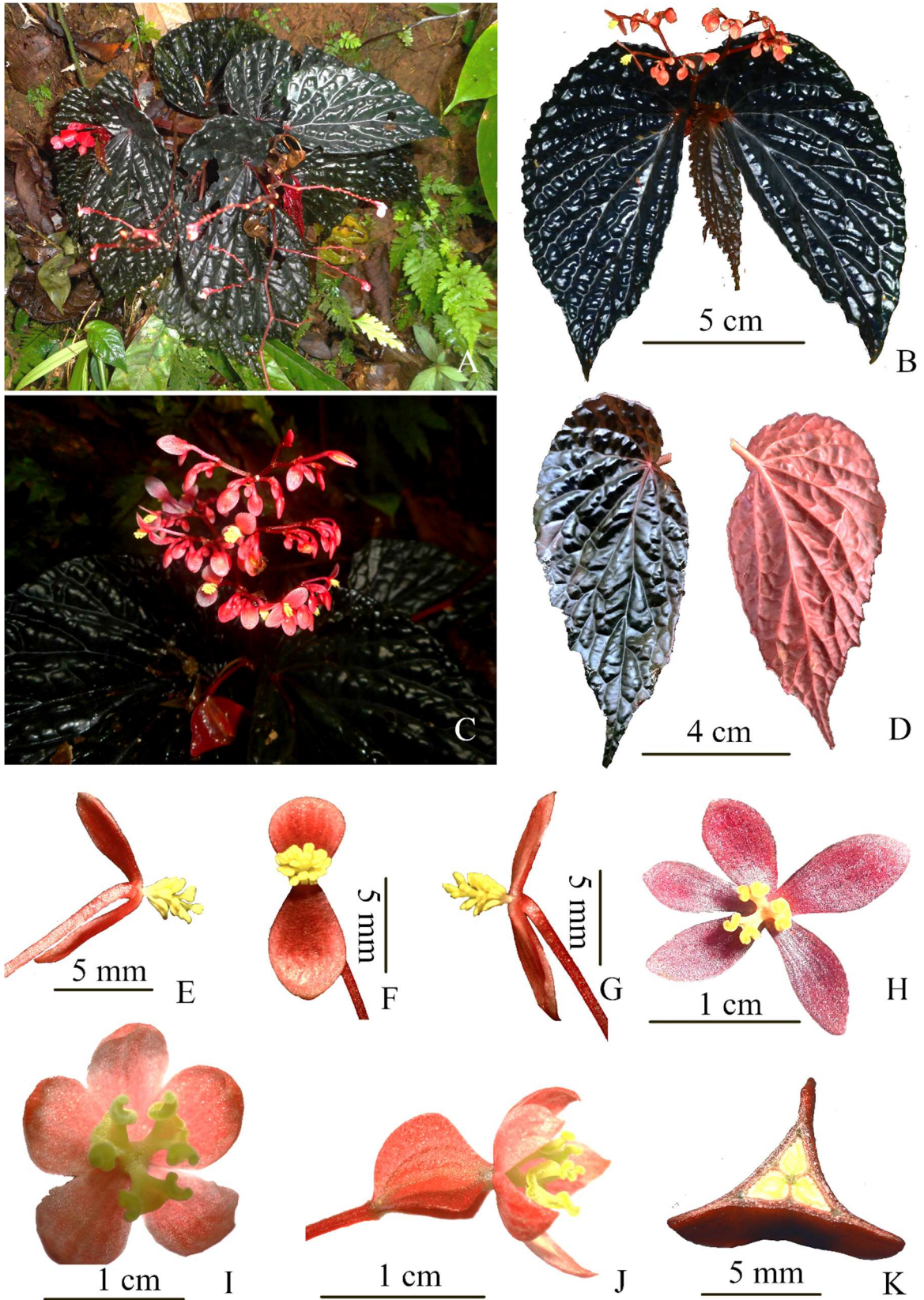


Fig. 1. *Begonia daunhitam* W.G.Wang, C.X.L Wang, S.Z. Zhang & A. Randi, *sp. nov.* **A.** Habit; **B.** Cultivated individual; **C.** Inflorescence; **D.** Both side surface of the leaves; **E, G.** Side view of staminate flower; **F.** Front view of staminate flower; **H, I.** Front view of pistillate flower; **J.** Side view of pistillate flower; **K.** Cross section of ovary. (A, C, H: Photo by Ripin; B, D, E, F, G, I, J, K: Photo by C. X. L. Wang).

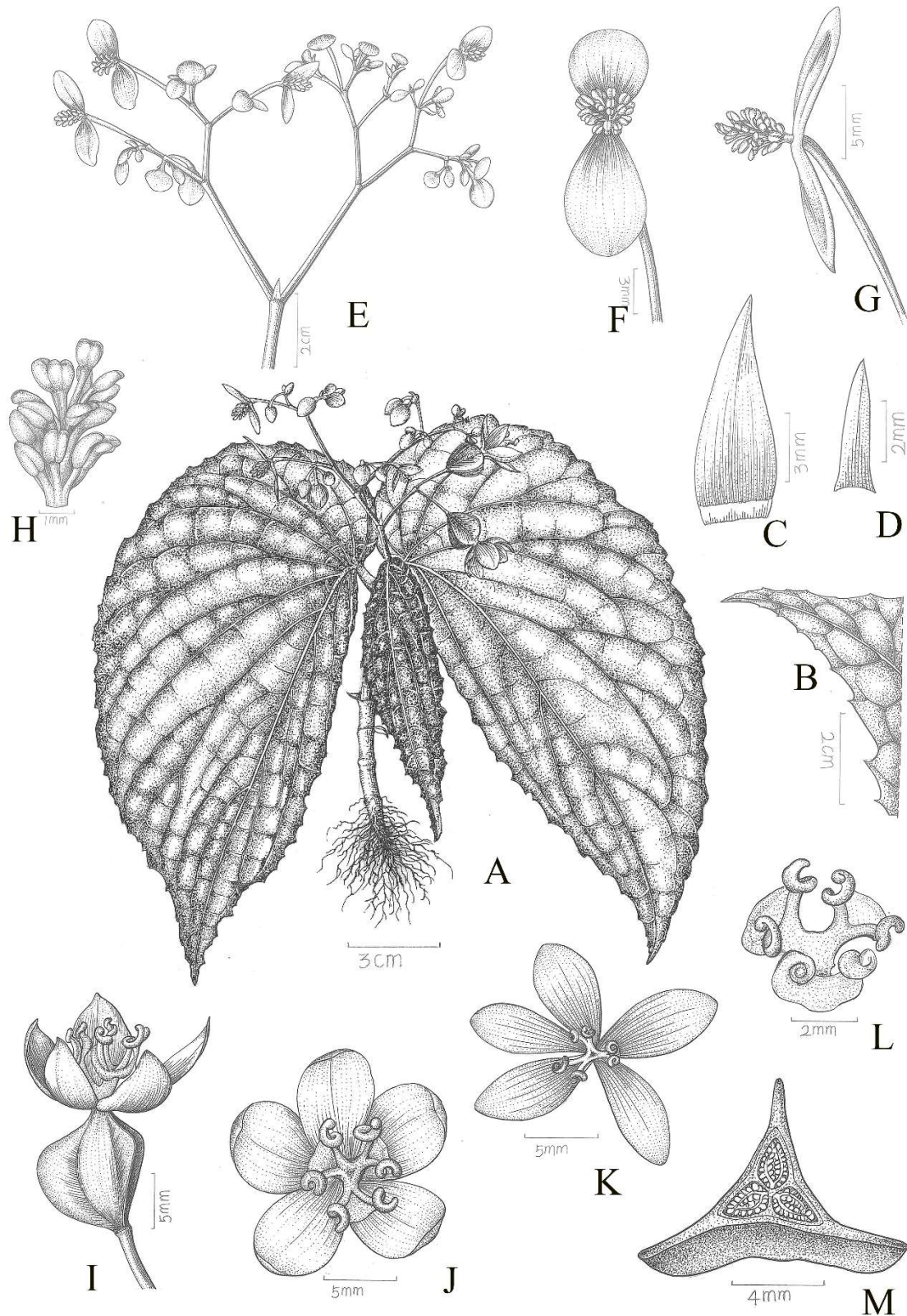


Fig. 2. *Begonia daunhitam* W.G.Wang, C.X.L Wang, S.Z. Zhang & A. Randi, *sp. nov.* **A.** Habit; **B.** The margin of the leaf; **C.** Petiole; **D.** Bract; **E.** Inflorescence; **F.** Front view of staminate flower; **G.** Side view of staminate flower; **H.** Androecium; **I.** Side view of pistillate flower; **J, K.** Front view of pistillate flower; **L.** Styles; **M.** Cross section of ovary. (Drawn by Mr. Zhi-Ming Li, based on the plants cultivated in XTBG).



Fig. 3. *Begonia darthvaderiana* C.W. Lin & C.-I Peng. **A.** Habit; **B.** Inflorescence; **C, D.** pistillate flowers. (A: Photo by Hui Lang; B: Photo by W.G. Wang; C, D: Photo by C.X.L. Wang).

high, 4–8 mm in diameter, old stem yellowish and slightly woody, young part red to brownish, fleshy and succulent, surface glabrous, internodes 1–3 cm long. **Stipule** red to brownish or purplish, ovate-triangular, 8–10 mm long, 4–8 mm wide, keeled, margin entire, short cusp ca.1 mm long. **Petiole** terete, 5–20 mm long, 2–5 mm wide, brownish red, glabrous. **Leaves** up to 10 on branched stems, alternate, simple, lamina elliptic-ovate to oblong-ovate, 13–20 cm long (basal lobes included), 7–10 cm wide, broad side 3–4.5 cm wide, strongly asymmetric with a well-developed basal lobe on one side giving a cordate appearance, base unequal, basal lobes cordate, 2–3 cm long, overlapping when mature, margin

denticulate, apex shortly acuminate; adaxially shiny, dark olive to solid black at maturity, immature stage dark bluish green, young leaves brown with a narrow red rim at margin, adaxial surface strongly bullate, giving a bubble-like appearance; abaxially light red to crimson, glabrescent; venation palmate-pinnate, midrib distinguishable, with ca. 3 major lateral veins on each side, other 4–5 primary veins branching dichotomously. **Inflorescence** bisexual, protogynous, terminal or axillary, erect, 10–25 cm long; basal branch with a pair of female flowers placed on short peduncle ca. 1 cm; upper distal branching dichasially cymose to 15 cm long, zig-zag, peduncle to 8 cm long, cymes branching to 4 orders,

**Table 1.** Comparison of *Begonia daunhitam* and *B. darthvaderiana*.

Characters	<i>Begonia daunhitam</i>	<i>B. darthvaderiana</i>
Plant height	15–25 cm	25–70 cm
Leaves		
size	13–20 × 7–10 cm	13–15 × 5–7 cm
color	dark olive to solid black · without a silvery ring at edge	dark olive or deep red to nearly black · with silvery ring at edge
adaxially	strongly bullate	slightly raised between the veins
color	denticulate	subentire
Inflorescence		
position	terminal or axillary, dichasial cymose	staminate inflorescence terminal cymose panicle
length	to 25 cm long	to 20 cm long
Stamens number	20–30	9–16
Fruit	light red to crimson	reddish green

crimson to purplish or brownish, glabrous or with sparse white scales; bract at base of inflorescence narrowly lanceolate ca. 4 × 1 mm, red to brown, margin entire, apex cusped; bracts at apex smaller than bract ca. 2 × 1 mm. **Staminate flower:** pedicel 5–12 mm long, glabrous; tepals 2, pink-red, elliptic, glabrous, 6–8 × 3–5 mm, margin entire; androecium symmetric, stamens 20–30, yellow; filaments 1–2 mm long, subequal, slightly fused at base; anthers obovate, 0.8–1 × 0.6–0.8 mm. **Pistillate flower:** pedicel 10–16 mm long, 1–2 mm in diameter, pink-red, glabrous; ovary 3-locular, 10–14 × 12–16 mm, light red to crimson, glabrous, placenta bilamellate; tepals 5, pink to light red, glabrous, base cuneate to rounded, apex acute to obtuse or slightly pointed, outer tepals 2, broadly elliptic, 8–10 × 4–8 mm, inner tepals 3, narrowly elliptic, 7–9 × 3–4.5 mm; styles 3, golden yellow, bifid, ca. 4 mm long, stigmas broadly Y-shaped, forming a spiral band, papillose. **Capsule** nodding, 12–16 × 14–18 mm (wings included), pink to crimson, glabrous, wings 3, subequal, nearly parallel but rounded or truncate distally, ca. 12 mm long, 3–5 mm wide.

Distribution: Endemic to Borneo, so far only recorded from Sri Wangi village, Boyan Tanjung district, Kapuas Hulu regency, West Kalimantan province, Indonesia (Fig. 4).

Habitat: Grows in wet areas on slopes near the river under dense canopies of dipterocarp forest at elevation 200–300 m asl.

Etymology: The specific epithet refers to the color of the leaves in Bahasa Indonesia, daun hitam = black leaves (daun = leaves, hitam = black).

Phenology: Flowering December to January, fruiting February to March according to observation in cultivation at Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences.

Conservation status: Vulnerable (VUD2) (IUCN, 2019), only four subpopulations found in a very restricted area, not yet known from other populations. The population could be threatened due to plant hunters to be sold as ornamental plants, and traditional cultivation activity is also observed near the populations. In the future, these threats could drive the taxon to CR or EX in a short time.

Additional specimen examined: INDONESIA. Borneo.

West Kalimantan Province. Kapuas Hulu Regency, Boyan Tanjung District. Specimen pressed from cultivated plant in Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, China, 20 January 2019, *Wen-Guang Wang 1820* (paratype, HITBC!).

Notes: This new species is similar to *B. darthvaderiana* in having dark olive to black leaves and pink flowers, but differing in having a dichasial cyme inflorescence, adaxial surface of leaves strongly bullate, margin denticulate and without a narrow silvery band along the leaves margin, and many more stamens. Details of comparison between *B. daunhitam* and *B. darthvaderiana* are shown in table 1.

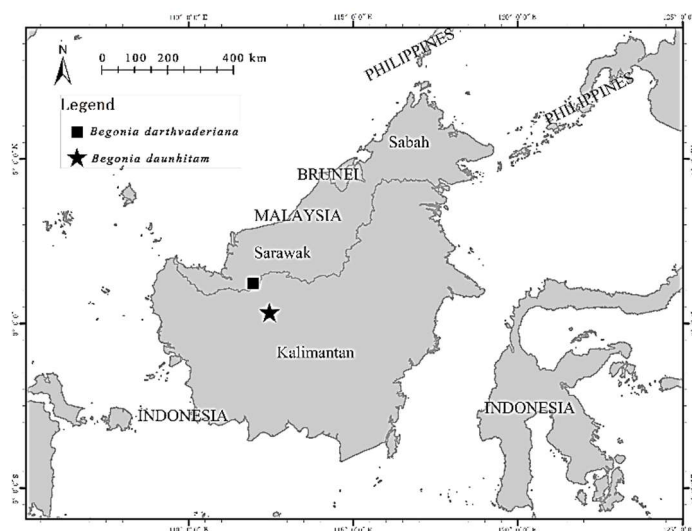


Fig. 4. Distribution of *Begonia daunhitam* and *B. darthvaderiana*: Black-square shows *B. darthvaderiana* in Sarawak, Malaysia; Black-pentastar shows *B. daunhitam* in West Kalimantan, Indonesia.

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