



A new *Begonia* species from Arunachal Pradesh, and some notes on *Begonia scintillans*

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ABSTRACT: A new species, *Begonia pasighatensis* D.Borah, Taram & Wahlsteen (Begoniaceae) is described and illustrated. It is easily distinguished from all other species in the section *Platycentrum* by its swollen, spherical ovary with two wings reduced to ridges and a long, pointing upper wing. The new species belongs to *Begonia* section *Platycentrum* and is distributed in southern Arunachal Pradesh in East India. We also report a finding of the rare species *Begonia scintillans* in the Namdapha National Park. This species is similar to *B. thomsonii* but differs in number of styles and color of the indumentum. Both species are illustrated by photographs and a distribution map is provided.

KEY WORDS: *Begonia pasighatensis*, *Begonia thomsonii*, *Diploclinium*, *Platycentrum*, new species, rediscovery, taxonomy.

INTRODUCTION

Begonia L. (Begoniaceae) is one of the largest and fastest growing angiospermic genus with over 2000 accepted species (Hughes *et al.*, 2015). The Northeastern region of India including Myanmar is a hotspot for the genus *Begonia*, from where several species are described recently and many are under review (e.g. Borah *et al.* 2021a, 2021b; Wahlsteen, 2018, 2019; 2021; Taram *et al.*, 2020, 2021).

Northeast India is a transition zone not only between three biogeographic regions (Indian, Indo-Malayan and Indo-Chinese) but also between lowlands, and highlands of the Himalayas, thus results in a high diversity of habitats with correspondingly high species diversity (Roy and Joshi, 2002). The ideal combination of topography and climate creates large areas of favorable habitat for *Begonias* which can be found from 100 m to 2600 m a.s.l. (Camfield and Hughes, 2018). It is so far represented by a total of 41 species of *Begonia*, falling under four different sections (*Begonia* sect. *Diploclinium* (Lindl.) A.DC., sect. *Parvibegonia* A.DC., sect. *Platycentrum* (Klotzsch) A.DC. and sect. *Monophyllum* A.DC.) (Camfield and Hughes, 2018; Taram *et al.*, 2020; Krishna *et al.*, 2021).

While conducting routine explorations to different districts of Arunachal Pradesh, Northeast India, the authors collected several interesting specimens of *Begonia*. One such interesting specimen collected in Sirki waterfalls of Pasighat, East Siang District, was found to be an undescribed species. Another specimen turned out to be *Begonia scintillans* (section *Diploclinium*), a rare species only occasionally found in the wild with only one herbarium record (ARUN) after the type gathering.

Begonia scintillans was collected for the first time by

Isaac Henry Burkill (1870–1965) in Rottung (Abor Hill), now East Siang District of Arunachal Pradesh in the year of 1911. In 1920 Stephen Troyte Dunn (1868–1938) published it as *Begonia scintillans* Dunn. citing Burkill's collections (Dunn, 1920). The taxonomic status for the two species was established after critical evaluation of relevant literature (Clarke, 1879; Gu *et al.*, 2007; Camfield and Hughes, 2018) and type materials deposited in different herbaria (ASSAM, CAL, E, K, PE).

The two largest sections of *Begonia* in eastern Himalaya are *Diploclinium* (about 85 species) and *Platycentrum* (about 171 species). They are phylogenetically close (Moonlight *et al.*, 2018) but can be distinguished by a rhizomatous versus tuberous habit, two versus three locules and anther connectives extended or not (*Platycentrum* versus *Diploclinium*). Morphologically, section *Platycentrum* may be divided by several characters as leaf shape (deeply divided versus entire), plant habit (caulescent versus acaulescent), fruit maturing (dehiscent versus fleshy) or hairiness (glabrous versus different kind of hairs). The most extended revision with keys is found in Camfield and Hughes (2018).

TAXONOMIC TREATMENT

1. *Begonia pasighatensis* D.Borah, Taram & Wahlsteen, *sp. nov.* **Figs 1 & 2**

Type: INDIA. Arunachal Pradesh, East Siang District, Pasighat, Sirki Waterfalls 210–500 m, 28°06'09.2"N 95°15'42.8"E, 16 April 2019, M. Taram & D.Borah 3271 (holotype: CAL; Isotype: CAL).

Diagnosis: *Begonia pasighatensis* is easily distinguished from all other species in the section *Platycentrum* by its swollen, spherical ovary with two wings reduced to ridges and a long, pointing upper wing.

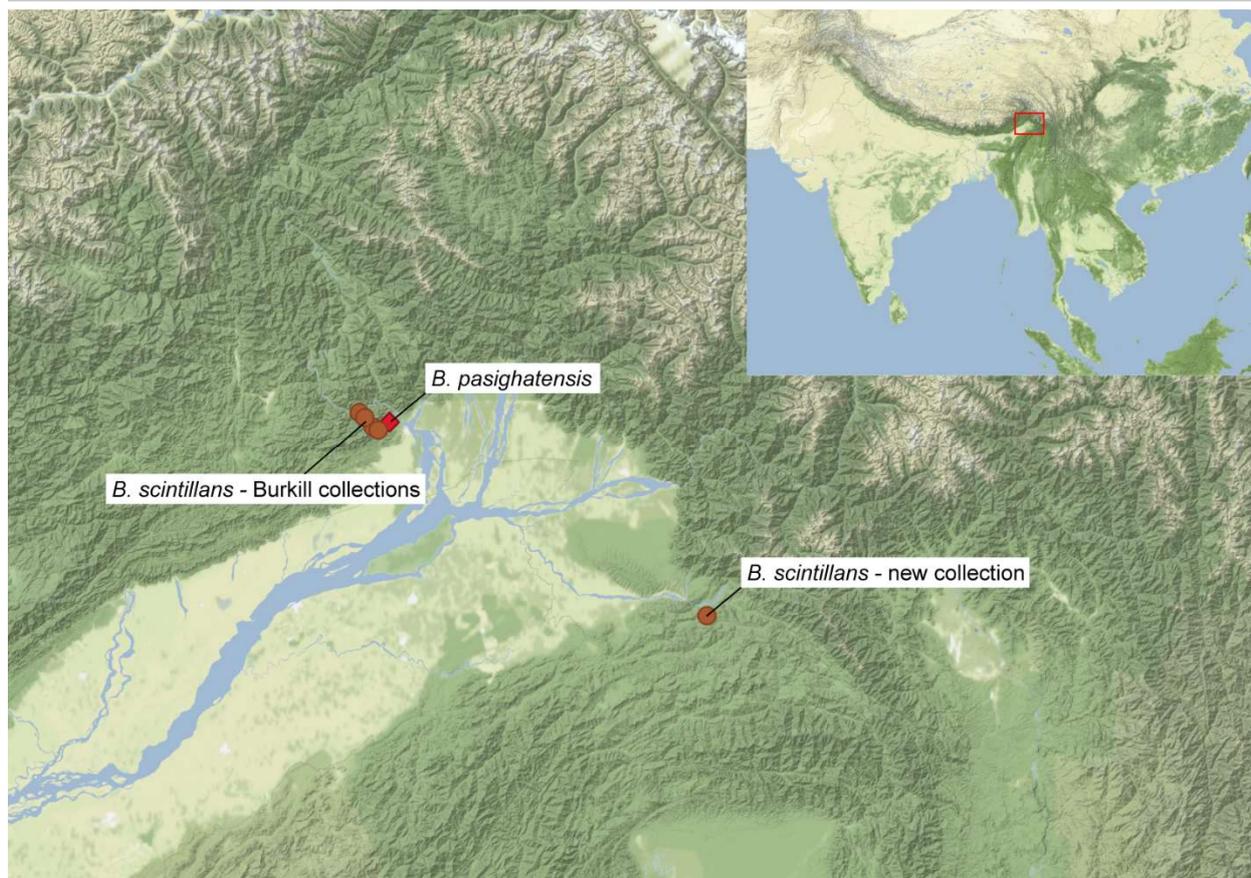


Fig. 1. Distribution of *Begonia pasighatensis* D.Borah, Taram & Wahlsteen and the new locality of *B. scintillans* Dunn in northeast Arunachal Pradesh.

Description: Perennial rhizomatous monoecious herb. **Stem** creeping with erect apex, dichotomously branched, olive to red brown, 12–40 cm × 0.4–0.7 cm, villous-tomentose, internodes 2–8 cm long. **Stipules** greenish-maroon, hyaline at maturity, elliptic-ovate, 0.7–1.5 × 0.5–1 cm, keeled, abaxially densely hispid on the mid vein, margin entire to sparsely denticulate, apex long mucronate. **Petioles** terete, 3–15 cm × 0.2–0.3 cm, brownish-maroon, villous-hispid. **Leaves** 6–15; lamina 5–10 × 2.5–6 cm, ovate-cordate sometimes palmate, basifixed, more or less asymmetric, base round-cordate, margin ciliate, serrulate, apex acute-acuminate, dark green adaxially, light green abaxially, young leaves densely strigose, turning glabrous at maturity, veins puberulent to tomentose, more prominent on lower surface, venation reddish, palmate-pinnate, lateral veins 5–7, mid vein distinguishable. **Inflorescence** terminal or axillary in upper leaf axils, peduncle maroon-brownish green, 5–11 × 0.1–0.2 cm. **Bracts** 0.3–1.3 × 0.3–0.8 cm, brownish green-maroon, hyaline, elliptic-ovate to ovate-lanceolate, apex acute, margin sub-entire; **pedicel** 0.3–3 cm long, sparsely hairy, 2–10 flowered; **staminate flower** tepals 4, pinkish white, margin entire, outer 2 tepals elliptic to ovate, 0.5–1.1 × 0.5–0.8 cm, sparsely red hirsute outside, inner 2 tepals narrowly

elliptic to oblanceolate, glabrous, 0.4–1.0 × 0.3–0.6 cm; **stamens** 50–90, filaments sub-equal, shortly fused at base; **anthers** obovate, ca.1 mm long, dehiscing via two slits nearly as long as the anther. **Pistillate flower**, pedicel greenish red, 2–3 cm, tepals 5, unequal, white, glabrous on both sides, ovate to elliptic-ovate, 0.4–1 cm × 0.3–0.7 cm, entire; **styles** fused, 1 mm long; **stigma** 2, yellow; **ovary** 3–4 mm long, greenish red, pubescent, 3 winged, swollen to a spherical body. **Capsule** 3 cm long, larger upper wing developed into a beak, up to 2 cm; lateral wings reduced to ridges, up to 0.3 cm; locules 2.

Distribution: India, Arunachal Pradesh, East Siang District, Pasighat, 210–500 m,

Etymology: The specific epithet refers to Pasighat, from where the species was discovered.

Phenology: Flowering and fruiting late June to early August

Habitat and ecology: About 250 individuals were growing on rocky slopes near the Sirki waterfalls. It was associated with scattered plants of *Phoenix rupicola* T.Anderson, *Impatiens* sp., *Pandanus* sp., *Henckelia pumila* (D.Don) A.Dietr., *Henckelia grandifolia* A.Dietr., *Impatiens latiflora* Hook.f & Thomson, *Argostemma verticillatum* Wall, *Argostemma sarmentosum* Wall., *Strobilanthes tubiflos* (C.B.Clarke) J.R.I.Wood,

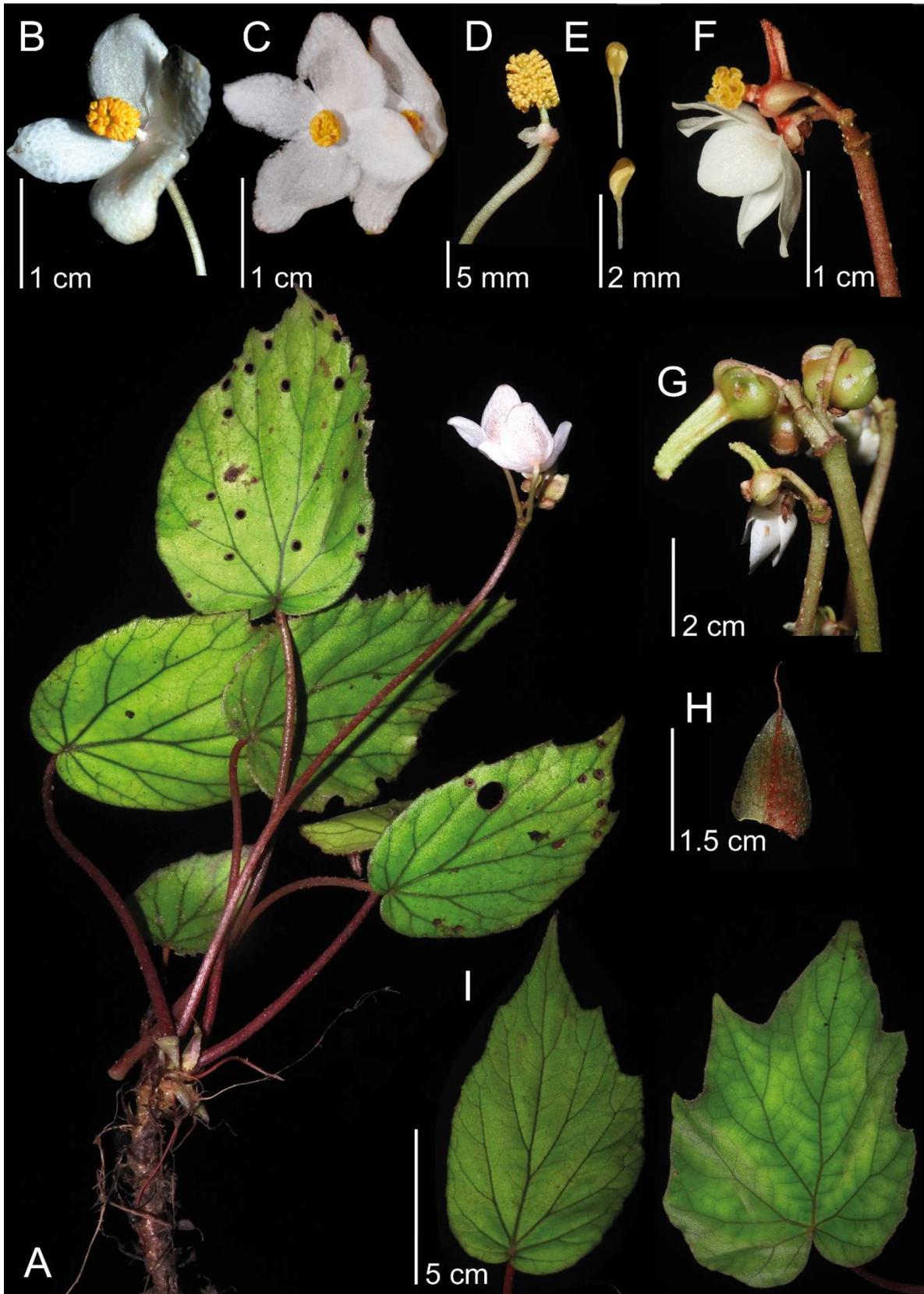


Fig. 2. *Begonia pasighatensis* D.Borah, Taram & Wahlsteen. **A.** Habit. **B.** & **C.** Staminate flowers. **D.** Androecium. **E.** Stamens. **F.** Pistillate flowers and ovary. **G.** Immature seed capsules. **H.** Stipule. **I.** Leaves showing different shapes.



Fig. 3. *Begonia scintillans* Dunn in its habitat in Namdhapa National Park. **A.** Habit. **B.** Immature fruit.

Elatostemma sp., *Zeuxine flava* (Wall. ex Lindl.) Trimen at an altitude of just above 500 m.

Notes: The new species shares characters mainly with *Begonia* section *Platycentrum* but also with section *Diploclinium*. *Begonia pasighatensis* has 2-locular ovary, anthers opening via side slits and rhizomatous habit (corresponding to *Platycentrum*) but connectives only rudimentarily extended (corresponding to *Diploclinium*). Species with characters shared between those two sections are likely to be found, since the traditional section division have weak phylogenetic support (Moonlight *et al.* 2018). However, for practical reasons the two sections are separated until further and we suggest placing *B. pasighatensis* into section *Platycentrum*.

The ovaries are highly characteristic for the new species in the combination of a nearly spherical main body, an upper, long pointing wing and the two lower wings reduced to ridges. The leaf shape shows some variation within populations from nearly entire to shallowly incised into a few acute lobes.

2. *Begonia scintillans* Dunn. Bull. Misc. Inform. Kew 1920(3): 111, (1920). **Type:** INDIA, Arunachal Pradesh, Bapu Mountain, Rottung, Nov. 1911, March 1912, *Burkill s.n.* (lectotype K000761475).

Fig. 1 & 3

Distribution: Arunachal-Pradesh and Meghalaya; 500–2000 m. Fig. 2.

Habitat: It grows in moist shady places or along stream sides in association with *Selaginella* species, mosses, liverworts, *Nephrolepis cordifolia* (L.)C.Presl, *Carlemannia griffithii* Benth. and *Hydrocotyle* sp. etc.

Phenology: Flowering from November-December

and fruiting from January – March

Notes: *Begonia scintillans* has ovate and asymmetric, hairy leaves, sometimes variegated by markings between the veins. The number of styles and the color of the indumentum differ it from *B. thomsonii* A.DC. The latter has unicolored leaves, two styles and red indumentum on both sides of the leaves (versus *B. scintillans* with white hairs on upper leaf surface).

Specimens examined: India: Arunachal-Pradesh: Bapu Mountain, Nov. 1911 – Mar. 1912, *Burkill 36928* (K); Bapu Mountain, Ripshing Sieng, Nov. 1911 – Mar. 1912, *Burkill 36543* (K); Bapu Mountain, Rottung, Nov. 1911 – Mar. 1912, *Burkill 36219* (K); Bapu Mountain, Rottung- Ripshing Sienge Ridge, Nov. 1911 – Mar. 1912, *Burkill 36820* (K); Palin to Deed, *Pal 513* (ARUN). Meghalaya: Sillet Hills, *De Silva s.n.*, Wallich Cat. No. 3679 p.p. (K); Arunachal Pradesh, Changlang District, Namdhapa National Park, 700 m a.s.l, 22 January 2017, *D.Borah & M.Taram 7621* (Herbarium of Arunachal University).

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