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A new species of *Begonia* (Begoniaceae) from the Gayo Plateau area, Northern Sumatra

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ABSTRACT: A new species of *Begonia* section *Jackia* (Begoniaceae) is described from the Gayo Plateau area, northern Sumatra, Indonesia under the name *Begonia antoi* Rezeki, Mustaqim, Girm. & Ardi, based on a specimen collected from Samar Kilang, Bener Meriah, Aceh Province. A detailed morphological description, geographical distribution, habitat and ecology, preliminary evaluation of its conservation status, diagnostic and taxonomic notes, and a photo plate are provided.

KEY WORDS: *Begonia antoi*, *Begonia olivacea*, *Begonia yenyeniae*, herb, lowland, section *Jackia*, Sumatra, taxonomy.

INTRODUCTION

Begonia L. (Begoniaceae), which currently has a total of 2184 accepted species (Hughes *et al*., 2015-onwards), is one of the largest genera of vascular plants. The genus has a wide distribution throughout the tropical and subtropical regions of the world (Gu *et al*., 2007; Moonlight *et al.*, 2018). The current diversity of the genus in the Malesian region is the result of diversification beginning in the mid-Miocene (Thomas *et al*., 2011).

Sumatra is one of the centres of *Begonia* diversity in Indonesia, with 78 native and wild *Begonia* species known from the island (Hughes and Girmansyah, 2011a,b; Mustaqim *et al*., 2021-onwards), many of which were only described recently (Ardi and Hughes, 2010, 2018; Hughes *et al*., 2009, 2015; Girmansyah, 2012; Girmansyah *et al*., 2022).

The Gayo Plateau area, located at the northern tip of Sumatra, has many suitable habitats for *Begonia*. The Gayo Plateau extends into three regencies within the Aceh Province, Indonesia, i.e. Aceh Tengah, Bener Meriah, and Gayo Lues. It has a topography dominated by undulating terrains and extensive natural forest cover (Uryu *et al*., 2010). Many areas in the Gayo Plateau have not been explored much so every carried-out botanical expedition has the potential to produce new records and new taxa.

A population of an unidentified *Begonia* was observed in this area. It is a member of *Begonia* section *Jackia* as it has a rhizomatous habit, inflorescences borne from the rhizome, four tepals in the pistillate flowers, actinomorphic androecium, and an ovary with unilamellate placentae (Moonlight *et al*., 2018). Further examination of the available literature, herbarium specimens in BO, E, K, L, LGS, and SING (abbreviations follow Thiers, 2024-continuously updated) as well as from the Begonia Resource Centre (Hughes *et al*., 2015-onwards), showed that the plants represent a species new to science and is described here.

TAXONOMIC TREATMENT

Begonia antoi Rezeki, Mustaqim, Girm. & Ardi, ***sp. nov.*** **§ *Jackia*** **Fig. 1**

Type**:** INDONESIA, Sumatra, Aceh, Bener Meriah, Syiah Utama, Samar Kilang, 180 m, flower collected from cultivated plants, 25 Jan 2023 and Aug 2024, *Rezeki et al. 31* (holotype: UIDEP; isotype: LGS)

Diagnosis: *Begonia antoi* is similar to *Begonia yenyeniae* J.P.C.Tan in habit and in having similarly variegated leaves rounded at the apex. However, *B. antoi* differs in having stipules ended with long filiform appendages, at least equalling the length of the basal laminar part (*vs*. tapering or appendages short) and covered with dense hairs (*vs*. with very few long hairs to subglabrous), flowers with sparsely hairy (*vs*. glabrous) pedicels, bracts lanceolate (*vs*. ovate or obovate), male flowers with larger (*c*. 11 × 11 mm *vs*. 5–7 × 6 mm) outer tepals with stiff red hairs (*vs*. glabrous) on the abaxial side, larger (15 × 6 mm *vs*. 7 × 2 mm) inner tepals with an acute (*vs.* rounded or retuse) apex, as well as female flowers with 4 (*vs*. 3) tepals, with the outer tepals being longer (8 mm *vs*. 4 mm) and with some stiff red hairs (*vs*. glabrous) on the abaxial side.

Small monoecious ***herbs***, 11–13 cm tall. ***Stem*** rhizomatous, *c*. 1 cm in diam., internodes light green, short, *c*. 5 mm long, glabrous. ***Stipules*** persistent, pale red, broadly triangular, *c*. 4 × 7 mm, adaxially glabrous, abaxially with thin and dense hair especially on the veins, apex acute, terminated by 3–7 mm long filiform appendage

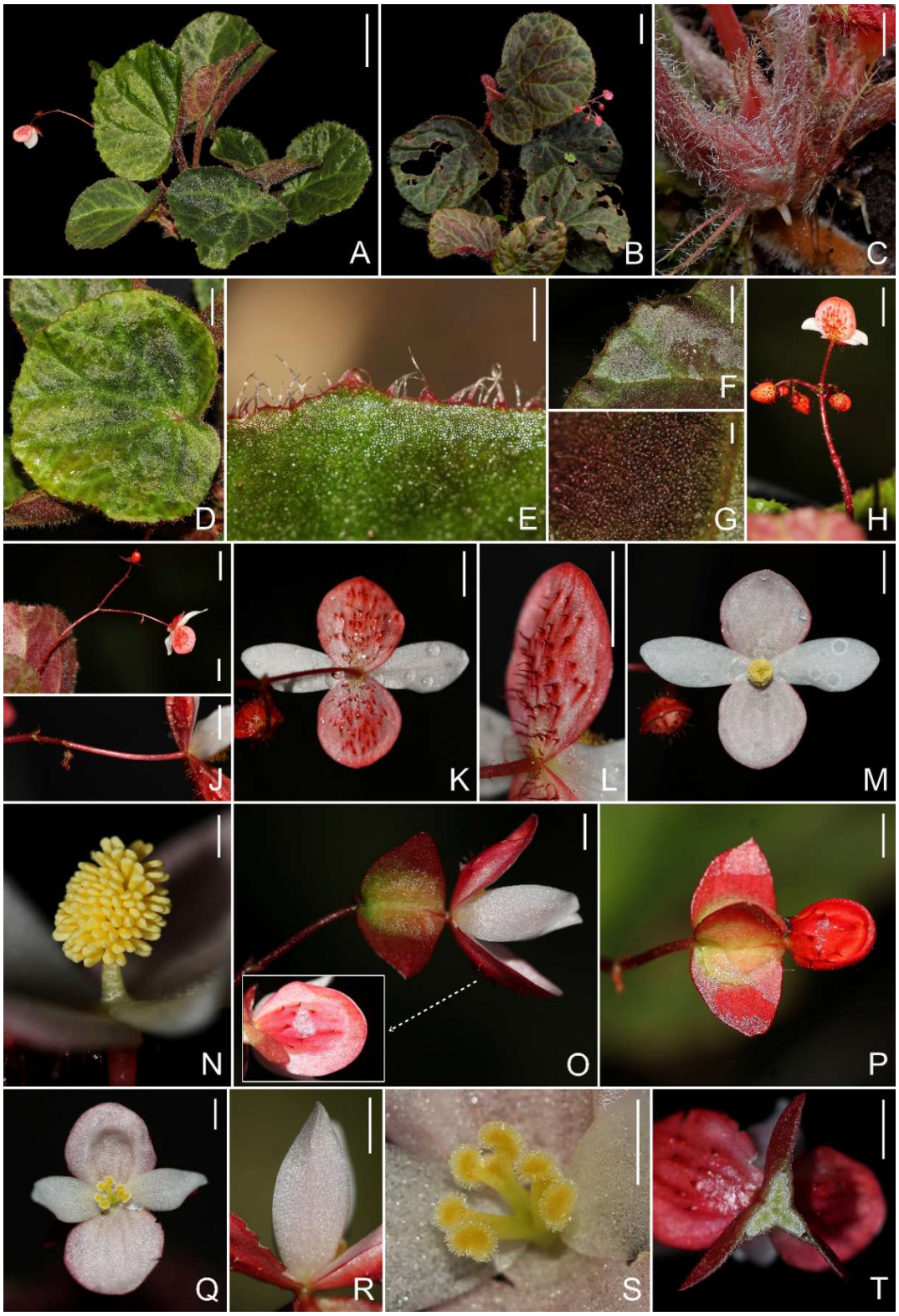

Fig. 1. ***Begonia antoi*** Rezeki, Mustaqim, Girm. & Ardi, sp. nov. **A–B.** Living plant. **C.** Stipules. **D.** Leaf, adaxial. **E.** Leaf margin. **F.** Leaf, abaxial. **G.** Close-up of the abaxial leaf surface. **H.** Inflorescence at early stage. **I.** Inflorescence when female flowers start to develop. **J.** Male flower's pedicel. **K.** Male flower, dorsal view. **L.** Dorsal side of outer tepal. **M.** Flower, front view. **N.** Stamens. **O.** Female flower, lateral view and with (inset. dorsal surface of outer tepal). **P.** Young female flower, lateral view. **Q.** Female flower, front view. **R.** Male flower's tepal. **S.** Stigma. **T.** Ovarium. Scale bar. A, B = 2 cm; C, F, J, K, L, M = 5 mm; D, H, I = 1 cm; E, O, P, Q, R, S, T = 2 mm; G, N. 1 mm. Photographs. A, D–T by Wendy A. Mustaqim; B–C by Juli T.S. Rezeki.

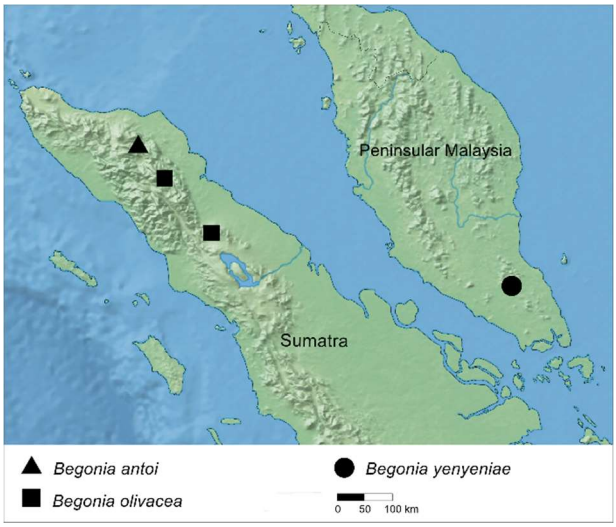

Fig. 2. Distribution of ***Begonia antoi*** and two morphologically similar species, i.e. ***Begonia olivacea*** (data from Hughes *et al*., 2015) and ***B. yenyeniae*** (data from Tan *et al*., 2018). Map created using Simplemappr (Shorthouse, 2010).

covered with whitish, long patent hairs. ***Leaves*** with terete petiole, 3–6 cm long, 3–5 mm diam., dark red, covered by long and thin white hairs; lamina sub-symmetric, basifixed, suborbicular, 5–9 × 5–9.5 cm, papyraceous when dry, adaxially purplish dark green, abaxially red, base cordate, basal lobes overlapping, margin crenate, apex rounded, venation palmate with 7–8 primary veins, adaxially glabrous, abaxially hairy. ***Inflorescences*** axillary, cymose, branching 2–3 times, flowers 6–7, bisexual, protandrous, peduncle 8.5–10 cm long, thin and sparsely hairy. ***Bracts*** lanceolate, *c*. 1 mm long, with long hairs. ***Male flowers*** with pedicel 1–1.5 cm long, thin and sparsely hairy, tepals 4; outer 2 ovate-orbicular, 10–11 mm long and wide, adaxially white, glabrous; abaxially red, covered with sparse red and stiff hairs; margin entire, apex obtuse; inner 2 elliptic-oblong, 12–15 × 4.5–6 mm, white, margin entire, apex obtuse to rounded, glabrous on both surfaces; stamens 60–70, torus *c*. 1.2 mm long, stamen mass actinomorphic, subglobose to broadly ellipsoid, 2.5–3 × 1–2.5 mm, androecium pale yellow, filaments *c*. 0.5 mm long, anthers obcordate, *c*. 1 × 0.8 mm, dehiscing by lateral slits. ***Female flowers*** with pedicel *c*. 8 mm long, glabrous or laxly minutely hairy; tepals 4; outer tepals 2, ovate-suborbicular, 7.5–8.5 × 5.5–6.5 mm, apex rounded, inner surface white, outer surface reddish with red hairs on dorsal side; inner tepals 2, lanceolate, 5–6.5 × 3 mm, white, obtuse to subrounded, glabrous; ovary light green, 5.5 × 11 mm including wings, base cordate, glabrous; capsule elliptic, *c*. 4.5 × 3.5 mm, locules 3, placentae unilamellate, wings 3, equal, triangular, up to *c*. 3.2 mm high, apex acute; styles and stigmas 3, *c*. 2.5 mm long, stigma U-shaped, yellow, papillose. ***Fruits*** not known.

Distribution: Endemic to northern part of Sumatra: only known from type locality in Samar Kilang, Bener Meriah Regency, Aceh Province (**Fig. 2**).

Habitat: Lowland riverine forest, around 180 m above sea level.

Phenology: Flowering recorded in January to May and August; fruiting unknown. The observation of flowering period was also made from cultivated plant in shade.

Etymology: This species is named after Anto, a plant diversity and conservation enthusiast from Takengon, Aceh Province, who provided specimens used in this study and various further information.

Proposed IUCN conservation status: This species is known only from a small population of less than 10 individuals in one location. The locality is being threatened by land conversion for agriculture and also possible expansion for settlements and hence the only known population is at a high risk of extinction. Many recent explorations in some areas of Aceh Tengah and Bener Meriah regencies show that this species is yet to be found elsewhere. Local people informed us that the species was once sold as ornamental, but with the lack of further materials, this process has already stopped. Based on the available information, and assessment using guidelines by the IUCN Standards and Petitions Committee (2024) following the IUCN categories and criteria (IUCN, 2012), the species can be assigned as Critically Endangered (CR) (B1ab(iii)+2ab(iii), D).

Notes: *Begonia antoi* is a member of *Begonia* sect. *Jackia* due to its rhizomatous stem, inflorescences borne from the rhizome, four tepals in the female flowers, actinomorphic androecium, and an ovary with entire placentae (Moonlight *et al*., 2018). The overall look of this species also resembles species from *B.* sect. *Baryandra*, which is distributed from Borneo, the Philippines, Sulawesi, and New Guinea. However, the latter section is different in having branched placentae (Rubite *et al*., 2013).

The most similar species is *B. yenyeniae* J.P.C.Tan, a species endemic to Johor, Peninsular Malaysia (**Fig. 2**). *Begonia yenyeniae* is also a narrow endemic species with a geographic range of around 1.5 km^2. It grows in primary lowland mixed dipterocarp forest on a shaded site (Tan *et al*., 2018). The original habitat of *B. antoi* is also a lowland mixed dipterocarp forest but highly disturbed due to conversion into agricultural lands and settlements.

From the other 33 species of section *Jackia* in Sumatra (Girmansyah *et al*., 2022), the new species is also similar to *B. olivacea* Ardi which so far known from Aceh Tenggara Regency in Aceh Province and Karo Regency, Sumatera Utara Province (**Fig. 2**). However, *B. antoi* has larger (5–9 × 5–10 cm *vs*. 2.7–4.5 × 2.6–3.7 cm) leaves and larger (11 × 11 mm *vs*. 7–8 × 6–7 mm) outer tepals of male flowers with stiff red hairs (*vs*. glabrous) on the outer surface. *Begonia olivacea* is also a species that grows in lowland tropical rainforest from 300 to 500 m asl. (Hughes *et al.*, 2015-onwards), while *B. antoi* is so far known from a lower elevation at around 180 m. The

addition of *B. antoi* increases the number of species of *Begonia* sect. *Jackia* in Aceh to five and in Sumatra to 34 species.

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