



Two new huge-leaved *Begonia* (Begoniaceae) from Betung Kerihun National Park, West Kalimantan, Indonesia

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ABSTRACT: Two huge-leaved species of *Begonia* were discovered during a biodiversity expedition in Betung Kerihun National Park, West Kalimantan in October 2024, which are described in this paper as *B. lawar* and *B. sadtataiana*. In the wild, *B. lawar* leaves can reach a size of 52 × 22 cm, while *B. sadtataiana* can reach 72 × 38 cm, making it the *Begonia* with the largest leaves ever recorded in Borneo. Complete descriptions are provided, along with full-color image plates.

KEY WORDS: *Begonia chlorosticta*, *Begonia kuchingensis*, *Begonia lawar*, *Begonia sadtataiana*, Kalimantan, west Malesia.

INTRODUCTION

Begonias are a common component of the forest understorey and are often conspicuous for their leaves that have attractive shapes, colour, patterns and textures, making the genus of high potential value as ornamental plants (Chong *et al.*, 2015). In Borneo, *Begonia* is widespread and can easily be found in the lowland to montane forest. There are 280 species of *Begonia* recorded so far in Borneo (Hughes *et al.*, 2015–), and the estimated total expected species number is 600, making it the largest genus on the island (Julia and Kiew, 2014).

Kalimantan is part of Borneo which is administratively under the Republic of Indonesia, covering 73% of the island's land area. A total of 32 *Begonia* species have been recorded so far in Kalimantan (Randi *et al.*, 2025), up from only 5 species known about a decade ago (Julia and Kiew, 2014). This increase in discoveries is inseparable from the increasing number of *Begonia* specimens collected from the wild in Kalimantan, especially through biodiversity expedition activities in nature reserves and national parks.

Betung Kerihun National Park is one of the largest national parks in Kalimantan with a total area of 816,693 hectares which has a variety of ecosystem types. However, the available information regarding plant diversity in this very large national park is very limited so that it attracts the attention of the park management to explore the diversity of plant species in unique habitats within the area.

A long-term expedition plan was designed to inventory the park's biodiversity. The first expedition was conducted in October 2024, facilitated by the Betung

Kerihun and Danau Sentarum National Park Agency, and supported by the Ministry of Forestry of the Republic of Indonesia. One of the objectives of the expedition was to discover scientifically unknown species, and we found at least seven candidate new plant species from the families Begoniaceae, Gesneriaceae, Orchidaceae, and Rubiaceae. In this paper, we describe two new *Begonia* species resulting from the expedition, namely *Begonia lawar* and *Begonia sadtataiana*, bringing the total number of *Begonia* species in Kalimantan to 34. Both species are placed in section *Petermannia* due to their caulescent habit and inflorescence structure with paired pistillate flowers at the base of the inflorescence which has a many-flowered distal portion. The species were confirmed as new after examining specimens and specimen images of *Begonia* from Borneo in herbaria BO, E, K and WAN.

TAXONOMIC TREATMENT

Begonia lawar Randi & M.Hughes, *sp. nov.* **Fig. 1**
§. *Petermannia*

Type: INDONESIA. West Kalimantan: Kapuas Hulu Regency, Tanjung Lokang Village, Betung Kerihun National Park, Bungan riverside, 0°51'2.22"N, 113°41'2.93"E, 180 m elev., 26 October 2024, A. Randi AR-1389 (holotype WAN!; isotype BO!, FIPIA!).

Diagnosis: In having leaves variegated with pale spots and margin, *B. lawar* is similar to *B. chlorosticta* Sands (1982: 134), however, there are significant differences to easily distinguish the two, including: *B. lawar* is a short (up to 30 cm tall), unbranched herb with only 2–4 leaves, while *B. chlorosticta* can reach 60 cm tall or more with several branches and many leaves. The

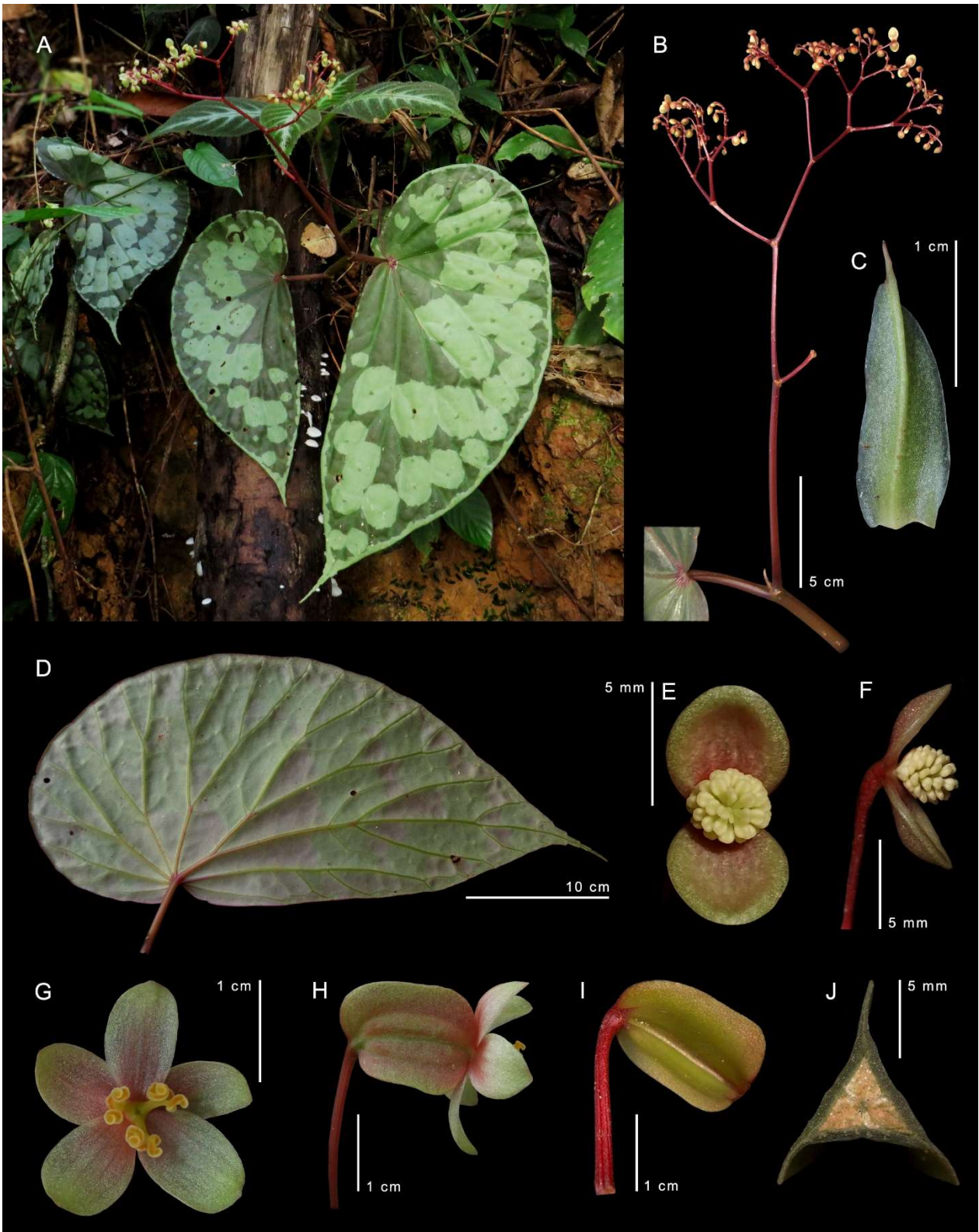


Fig. 1. *Begonia lawar* Randi & M.Hughes. A. Plant habit. B. Inflorescence. C. Stipule. D. Leaf abaxial surface. E–F. Staminate flower (top and side view). G–H. Pistillate flower (top and side view). I. Fruit. J. Cross section of ovary.



leaves of *B. lawar* are much larger, more than twice the size of *B. chlorosticta* leaves (24–52 × 13–22 cm vs. 14–24.5 × 7.5–10.8 cm), leaves on adaxial surface with silvery white spots with a green dot in the middle tipped with a hair (vs. light green uniform glabrous spots), more stamens (41–45 vs. 35–40), pistillate flower pedicel much shorter (16–24 mm vs. 27–39 mm long), and ovary and capsules ellipsoid-rectangular on a recurved pedicel (vs. obtriangular on a fine pendent pedicel).

An erect, terrestrial herb, up to 30 cm tall, with 2–4 leaves. **Stem** unbranched, 5–9 mm in diameter, with indumentum present when young, fleshy and succulent, bright red to brownish, lowermost stem rather woody; nodes swollen, internodes 2–7 cm long. **Stipules** caducous, asymmetric, lanceolate to falcate, 1.7–2.4 × 0.7–1.1 cm, glabrous, pale green to slightly yellowish; midrib prominent on abaxial surface, apex acute or sometimes not symmetrical, with a 2–3 mm long acumen from the extension of the midrib. **Leaves** alternate, petiole 2–5 cm long, with few hairs to glabrous, shallowly channeled above and rounded below, yellowish green to red or brownish red; lamina strongly asymmetric, elliptic to lanceolate, 24–52 × 13–22 cm; base cordate, margins minutely dentate to entire, thinly revolute, apex caudate; adaxial surface variegated, dark green with silvery white spots between the venation, on each spot has a small green dot in the center, and in the middle of green dot there is a fine hair, sometimes surrounded by silvery white again, which is clearly visible when the leaves are still young, leaves edges almost surrounded by 3–6 mm wide silvery white band, except around leaf base; abaxial surface pale grey to pale green, glabrous, tinged with a very pale pink pattern; venation palmate-pinnate, actinodromous, midrib distinguishable, with 3–5 lateral veins each side, other primary veins branching dichotomously. **Inflorescence** protogynous, terminal, erect, up to 30 cm long; basally with 1–2 pairs of pistillate flowers on a 2–3 cm long peduncle, a small leaves sometimes present at the first branch; upper part of the inflorescence to 20 cm long, cymose, branching to 4 orders, red to crimson; inflorescence at early stage with scattered indumentum, glabrescent then glabrous by ageing; bract at basal node ovate-triangular, sometimes elliptic, 10–12 × 6–7 mm, caducous, glabrous, pale green to dull cream to pinkish, margin entire, apex acute, with 1–2 mm long acumen, bracts size decreasing towards the apex; upper bracts ovate, broadly elliptic to oblanceolate, 3–8 × 2–6 mm, light to pale green or creamy to pink, slightly translucent. **Staminate flower:** pedicel slender, to 9–15 mm long, pink to red, glabrous; tepals 2, each tepal ovate to suborbicular, 4.5–6.5 × 4.1–6.2 mm, pale green with pink at base to pink throughout, glabrous, margin entire, apex rounded or obtuse; androecium symmetric, with 41–45 yellow stamens, filaments 0.7–1.2 mm long, anthers obovate 0.6–1.0 mm long, opening by apical slits. **Pistillate flower** 20–28 mm across at anthesis;

pedicel 16–24 mm long, 1.0–1.8 mm wide, red, glabrous; ovary 3-locular, ellipsoid-rectangular from side view, 14–20 × 13–17 mm (wings included), asymmetric, pale green to pink; tepals 5, glabrous, 2 outer and 3 inner, pink at half base and the rest are green to yellowish green, all roughly similar in size, or sometimes outer tepals are often slightly smaller than the inner ones, 12–15 × 7–8.5 mm, apex acute to slightly mucronate; styles 3, 5–7 mm long, bifid, golden yellow; stigmas Y-shaped, forming a papillose spiral band. **Fruits** nodding, 16–23 × 14–17 mm (wings included), green to pink or yellowish green, glabrous; wings 3, unequal, 4–5 mm wide at the widest point, apex rounded.

Distribution: Endemic to Kalimantan, Borneo: Known only from Betung Kerihun National Park, quite common in Nanga Bungan and Tanjung Lokang Village. This species appears to be widespread in the upper Kapuas River system.

Habitat: Grows on slopes near streams under a dense canopy of lowland mixed dipterocarp forest at 100–450 m elev.

Etymology: Lawar means beautiful and attractive in West Kalimantan Malay, referring to its patterned leaves.

Provisional conservation status: Endangered (EN) B1+B2bc (IUCN, 2024). This species is observed in six localities within the park with EOO 467.031 km² and AOO 24 km². However, these populations can be threatened by small-scale forest clearing because their habitat, which is always close to rivers, is often cleared for use as shifting cultivation by local communities, leading to extirpation of populations. Another, perhaps more serious threat is extraction by plant hunters to be sold as an ornamental, as this beautiful species is well known among *Begonia* enthusiasts, leading to ongoing decline in number of individuals. It has the popular trade name *Begonia* “umbrella” and is sold on commercial sites and social media at prices ranging from US\$ 3–6 for the local market, and up to US\$ 75 in the international market. This species is also commonly cultivated within the province.

Notes: *B. lawar* is a very distinctive species among all Bornean begonias with its short stems, huge leaves, and combined with a beautiful pattern that is so attractive, making it a plant that has been sought after, even before it was scientifically described. The pattern is persistent in mature leaves. At first glance, it is very similar to *B. chlorosticta* from the appearance of the leaf pattern, but the differences between the two are significant and consistent as mentioned in the diagnosis, and we have observed both related species from fresh material and herbarium specimens. The unequal fruit wings are an unusual character in *B. sect. Petermannia* species, and further differentiate *B. lawar* from *B. chlorosticta*. This character is poorly recorded and hence not well known, however it is also found in *B. recurvata* Girm. & M. Hughes (2020: 54) endemic to East Kalimantan, which differs in being a much larger, woody plant, with several



pairs of pistillate flowers at the base of each inflorescence, with the staminate cymes being much shorter in comparison to the lax cymes of *B. lawar*. This species is also quite easy to cultivate and can be easily found among local plant breeders as well as plant collectors abroad. Locally, *B. lawar* is known to be eaten raw, with its young leaves and stems, and as a seasoning in soups with a refreshing sour taste, especially fish dishes.

Begonia sadtataiana Randi, *sp. nov.*

Fig. 2

§. *Petermannia*

Type: INDONESIA. West Kalimantan: Kapuas Hulu Regency, Tanjung Lokang Village, Dataran Opet Karst Landscape in Betung Kerihun National Park, 0°48'13.24"N, 113°43'25.51"E, 300 m elev., 24 October 2024, *A. Randi AR-1384* (holotype WAN!; isotype BO!, FIPIA!).

Diagnosis: *Begonia sadtataiana* resembles *B. kuchingensis* C.W.Lin & C.-I Peng (2017: 108) in its overall appearance, leaf shape, colour, lamina with scattered hispid hairs adaxially, and the short inflorescence, but *B. sadtataiana* can easily be differentiated by its much larger leaf size (26–72 × 16–38 cm vs. 15–25 × 5–9.5 cm), pistillate flowers in pairs on each node, up to 2 pairs at inflorescence base (vs. single flowers on each node, up to 4 flowers), much fewer stamens (23–25 vs. ca. 45), and fruit capsule more or less parallel to pedicel (vs. pedicel clearly curved).

A semi-erect herb on limestone surfaces, up to 45 cm tall, with 2–4 leaves; in mature plants, the old stems often lie on the substrate, and the young stems with leaves remain upright. **Stem** grooved, 6–12 mm in diameter, green, puberulous; nodes slightly swollen, internodes 4–8 cm long. **Stipules** subpersistent, asymmetric, slightly arching, elliptic, 2.5–3.5 × 0.9–1.5 cm, light green; midrib conspicuous, adaxial surface glabrous, abaxial with scattered black indumentum, margin entire and becoming recurved with age, apex cuspidate. **Leaves** alternate, oblique; petiole 1.8–6.5 cm long, 2–6 mm across, hispidulous, deeply channelled above and rounded below, yellowish green to pinkish green, generally red at the ends; lamina strongly asymmetric, oblong, broadly elliptic to broadly oblanceolate, 26–72 × 16–38 cm, slightly bullate between veins; base cordate, margins dentate, apex attenuate to acuminate; adaxial surface plain green, sometimes yellowish in sun-exposed areas, and bluish iridescent in individuals growing under dense canopies, covered with hispid hairs scattered between the veins; abaxial surface pale green, hairs only present on the veins; venation palmate-pinnate, actinodromous, red at the base, midrib distinguishable with up to 5 lateral veins each side, other primary veins branching dichotomously. **Inflorescence** protogynous, terminal, erect and short, up to 8 cm long, red; pistillate flowers in pairs on basal nodes, 1 or 2 pairs at inflorescence base, each pair resting on a very short peduncle less than 1 mm long; upper inflorescence up to 9 cm long, thyrsoid, with secondary

cymes branching to 2 orders, containing ca. 50 staminate flowers arranged very closely to each other; bracts similar to stipules but smaller, 13–17 × 6–9 mm at basal node, size decreases towards the apex, glabrous, or sometimes with some hairs on midrib adaxially. **Staminate flower:** pedicel slender, 6–15 mm long, 0.7–1.0 mm across, pink to red, with sparse white hairs; tepals 2, broadly ovate to orbicular or obovate, 5–7 × 4–7 mm, margin entire, apex rounded, white, cream to pink, glabrous on both sides or with sparsely rusty indumentum abaxially; androecium symmetric, 3–4 mm high, with 23–25 yellow stamens; filament slender, 0.7–1.1 mm long, anthers obovate, 0.8–1.2 × 0.5–0.8 mm, retuse at apex, opened by apical slits. **Pistillate flower** 21–26 mm across at anthesis; pedicel 6–16 mm long, ca. 1.2 mm across, red; ovary 3-locular, slightly asymmetric, 13–18 × 10–15 mm (wings included), green to yellowish green, covered by scattered rusty indumentum; tepals 5, 2 outer and 3 inner, all white or with light green at apex, margin serrate (the teeth sometimes thinner and resemble bristles), apex acute to obtuse, adaxial surface glabrous, abaxial with rusty indumentum particularly at base; outer tepals ovate to obovate or elliptic, 9–11 × 6–7 mm; inner tepals same as outer ones but a bit narrower, 9–11 × 5–6 mm; styles 3, 4–5 mm long, bifid, pale yellow; stigmas Y-shaped, forming a short papillose spiral band. **Fruit** on a pedicel 9–18 mm long, red to brownish red; capsule not recurved, held perpendicular to the axis, 20–24 × 18–22 mm (wings included); yellowish green, with scattered rusty indumentum; wings 3, subequal, 4–7 mm wide at the widest point, apex rounded.

Distribution: Endemic to Kalimantan, Borneo: So far only found in Tanjung Lokang Karst landscape in Betung Kerihun National Park, West Kalimantan Province.

Ecology and Habitat: This species was observed only on limestone, often hanging on vertical cliffs with very wet substrate and low light intensity at 250–400 m elev.

Etymology: The epithet of *Begonia sadtataiana* is derived from the name of Mr. Sadtata N. Adirahmanta, Head of the Betung Kerihun and Danau Sentarum National Park (2024–2025) who initiated a biodiversity expedition at the location where the species was discovered and the co-collector of this new species. He has taken great interest in the discovery of new plant species and has initiated and participated in many expeditions in conservation areas.

Provisional conservation status assessment: Critically Endangered (CR) B2ab(ii). This new species is recorded in three localities quite close together in Tanjung Lokang Village karst landscape with EOO 9.495 km² and AOO 12 km² (Bachman *et al.*, 2011). Although the habitat is a protected area, land fires from shifting cultivation activities of local communities are still very active in the surrounding type locality. The populations could also be threatened due to collection by plant hunters for selling as an ornamental plant. These threats can push

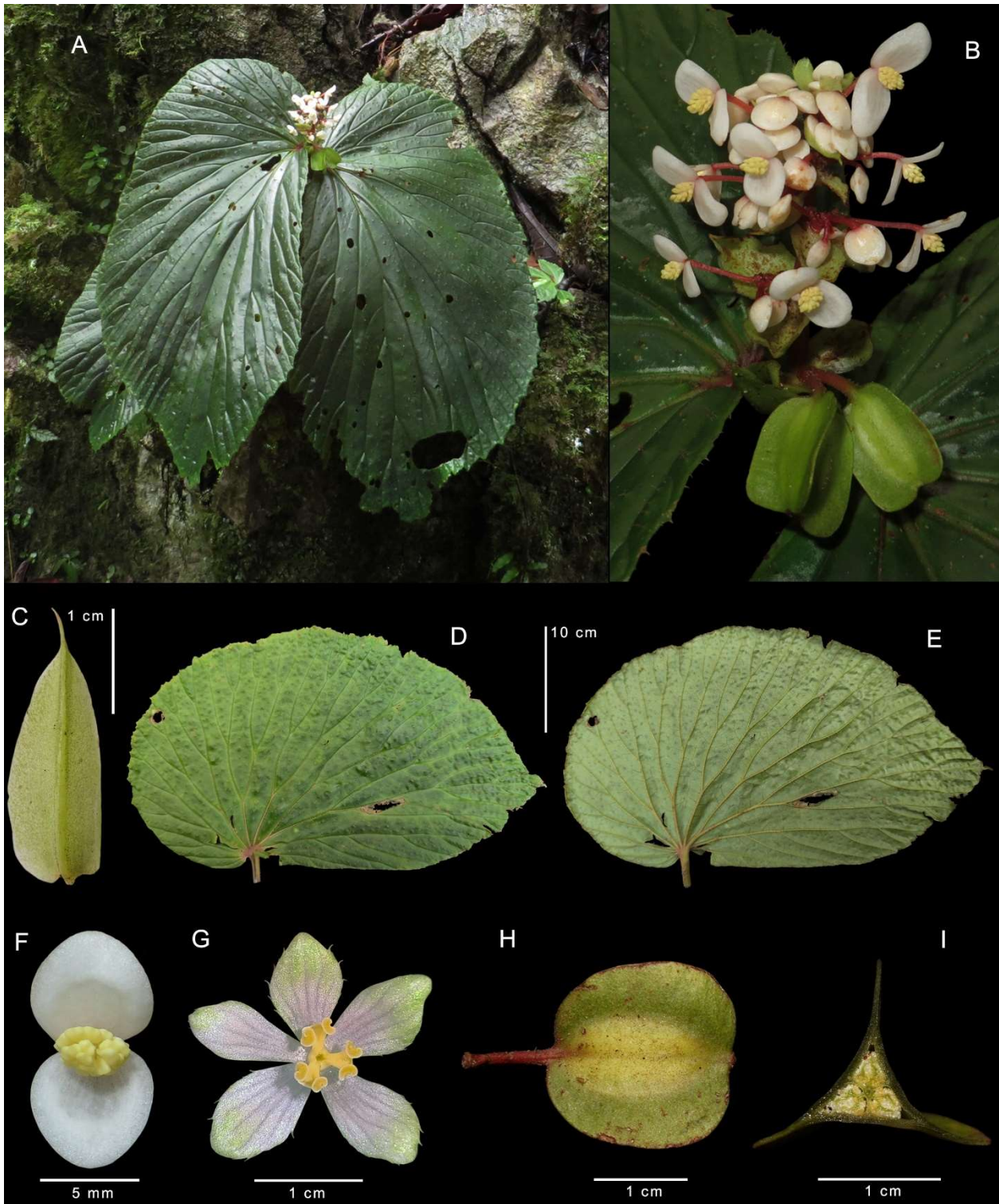


Fig. 2. *Begonia sadtataiana* Randi. **A.** Plant habit. **B.** Inflorescence. **C.** Stipule. **D.** Leaf adaxial surface. **E.** Leaf abaxial surface. **F.** Staminate flower. **G.** Pistillate flower. **H.** Fruit. **I.** Cross section of ovary.

this species towards extinction in the future if there are no protection efforts. Therefore, ex-situ conservation of this species is needed.

Notes: This *Begonia* has huge leaves which is not

common among *Begonia* species in Borneo. The size of the leaves reaches 72 cm long and 38 cm wide and look very striking hanging on the limestone cliffs. With its giant leaf size, *B. sadtataiana* is the *Begonia* species with



the largest leaves in Borneo so far. The only other species with similar leaf size is *B. sirukitii* S.Julia & C.Y.Ling (2015: 151) with leaves that can reach 60 × 30 cm, but it can be easily distinguished due to the sub-erect habit of *B. sadtataiana*, as *B. sirukitii* is an erect cane-like species. In addition, *B. sadtataiana* leaves are plain green and covered with scattered hispid hairs, while *B. sirukitii* leaves have white spots and are glabrous.

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