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Two new species of *Begonia* (section *Petermannia*, Begoniaceae) from Zamboanga del Norte, southwestern Philippines

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ABSTRACT: Two new species of *Begonia* section *Petermannia*, *Begonia kelumaged* Mazo & Rubite and *B. pinulon* Mazo & Rubite from the province of Zamboanga del Norte, southwestern Philippines, are hereby described. *Begonia kelumaged* is morphologically similar to *B. bangsamoro* but can be distinguished in having triangular stipules, axillary and solitary inflorescence, and smaller ovary. *Begonia pinulon* resembles *B. everettii* but differs in having oblanceolate to obovate leaf with obliquely cordate leaf base, longer panicles, narrower capsules with unequal wings. Detailed descriptions, illustrations, ecology, and proposed conservation status for the two new species are provided.

KEY WORDS: *Begonia amamampang*, *Begonia bangsamoro*, *Begonia everettii*, *Begonia oblongata*, Mindanao Island, vulnerable.

INTRODUCTION

Begonia L. is a large and fastest-growing genus comprised of about 2150 species distributed in tropical and subtropical regions (Hughes *et al*., 2015–; Moonlight *et al.*, 2018). In the Philippines, a total of 172 species of *Begonia* were reported, and the region of Zamboanga Peninsula harbours 20 taxa (Mazo *et al.*, 2023; Pelser *et al*., 2011 onwards).

The Zamboanga Peninsula in the Southwestern part of the Philippines is one of the important biodiversity hotspots and botanically underexplored regions in the country. The region is composed of provinces namely: Zamboanga Sibugay, Zamboanga del Norte, and Zamboanga del Sur. In 2020, the forest coverage of the region is about 173,056 hectares, and about half of this is found in the province of Zamboanga del Norte (DENR-FMB, 2022).

During 2023 ecological fieldwork in the province of Zamboanga del Norte, interesting species of *Begonia* were documented. All of the specimens belong to *Begonia* section *Petermannia* because of their erect to suberect habit, 3-locular ovary, and axillary or terminal inflorescences where staminate flowers are distal and pistillate flowers are basal, two to four tepaled staminate flowers and five-tepaled pistillate flowers (Rubite, 2012). After careful observation and study of the morphological characters, comparison of closely related species, and review of literature, we concluded that collected specimens represent undescribed taxa. Therefore, we describe two new species of *Begonia*.

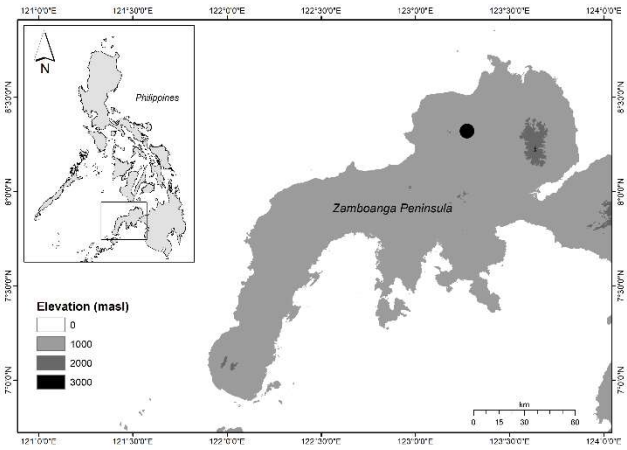

Fig 1. Map of Zamboanga Peninsula showing the type locality of *Begonia* species (indicated by a black circle).

MATERIAL AND METHODS

All specimens were collected in the municipality of President Manuel A. Roxas, Zamboanga del Norte under Wildlife Gratuitous Permit (GP) No. IX-2023-11 issued by the Department of Environment and Natural Resources (DENR) Region 9. The descriptions of the species are based on fresh and dried materials and photographs images. The dimensions were measured using a ruler and digital caliper.

Specimens of *Begonia* section *Petermannia* from the Philippines and its neighboring countries, including recent publications on *Begonia* were scrutinized and examined. Specimens were deposited at PNH and FEUH.

Table 1. Morphological comparison between ***Begonia kelumaged*** and allied species.

Character	*B. kelumaged*	*B. bangsamoro*	*B. amamampang*
Stem			
Internode length (mm)	6–13	33–66	10–45
Stipules			
Persistence	persistent	persistent	deciduous
Shape	triangular	ovate	lanceolate
Dimension (mm)	5.5–8 × 2.4–3.6	6–10 × 7–7.5	9–15 × 2.5–4
Margin	ciliate	entire	ciliate
Petiole			
Vestiture	strigose	pilose	strigose
Length (mm)	2–4.5	1.5–2.1	3–5
Lamina			
Shape	oblanceolate to obovate	lance-ovate	obovate
Dimension (cm)	6–8 × 2–3.5	7.6–10.8 × 3.1–4.1	5–12 × 3–5
Margin	lacerated, serrate to double serrate	lacerate, serrated to double serrate	distantly serrate
Venation	pinnately vein, secondary veins 4–5 pairs	basally palmate, primary veins *ca.* 7	pinnately vein, secondary veins 5–7 pairs
Inflorescence			
Position	axillary	terminal	axillary
Type	solitary	dichasial cymes, branching 3–4 times	1(–3)
Ovary			
Dimension (mm)	5.3–5.5 × 4.2–4.5	6–7 × 5	9–12 × 4.5–8.0
Wings			
Symmetry	equal	subequal	equal

The conservation assessments of species were made following the IUCN Standards and Petitions Subcommittee (2024).

TAXONOMIC TREATMENT

Begonia kelumaged Mazo & Rubite, ***sp. nov.***

Fig. 2

§ *Petermannia*

Type: PHILIPPINES. Mindanao Island, Zamboanga del Norte, municipality of President Manuel A. Roxas, Barangay Sebod, 305 m.a.s.l., 20 April 2023, *K.R.F. Mazo 111* (holotype PNH [PNH 258924]; isotype: FEUH).

Diagnosis: *Begonia kelumaged* is similar to *B. bangsamoro* D.P.Buenavista, Pranada & Y.P.Ang (Buenavista *et al.*, 2021) in having an erect habit, persistent stipules and lacerated leaf. However, it can be easily recognized in having stipules triangular (vs. ovate), inflorescence axillary, solitary (vs. terminal, cymose), and smaller ovary 5.3–5.5 × 4.2–4.5 mm (vs. 6–7 × 5 mm).

Description: Herb monoecious, perennial, lithophilic, up to 35 cm tall. **Stem** branched, erect, 1–3 mm in diameter, green, sparsely villose, internodes 6–13 mm long, rooting on the lower nodes. **Stipules** persistent, triangular, 5.5–8 × 2.4–3.6 mm, keeled, translucent green, sparsely scabrib, margin ciliate, apex aristate, arista up to 0.8 mm long. **Leaves** alternate; **petiole** terete, 2–4.5 mm long, 1–1.5 mm in diameter, green, strigose; **lamina** asymmetric, basifixed, oblanceolate to obovate, 6–8 × 2–3.5 cm; adaxially green, echinate on young leaves and becoming glabrous on mature leaves, abaxially pale green, puberulent, pubescent on the primary and secondary veins; base equilateral, cordate, margin lacerated, serrate to double serrate, apex acuminate; secondary veins 4–5 pairs. **Inflorescence** axillary, solitary. **Staminate flower** bracteoles persistent, lanceolate, 2.3–3 × 0.5–0.8 mm, green, sparsely puberulous, margin ciliate, apex acuminate; pedicel 4–4.5 mm long, white, minutely strigose; tepals 4, white, glabrous on both surfaces; outer tepals 2, broadly ovate, 8.5–9 × 6.5–7.5 mm, margin entire, apex obtusely rounded; inner tepals 2, oblong, 4–5 × 1.3–1.5 mm, margin entire, apex rounded or acute; androecium zygomorphic, stamens 20–23, filaments ca. 0.3 mm long, fused at base; anthers obovoid, ca 0.7 mm long, apex retuse, dehiscing through 2 slits. **Pistillate flower** bracteoles persistent, lanceolate, 2.3–3 × 0.5–0.8 mm, green, sparsely puberulous, margin ciliate, apex acuminate; pedicel 2–2.5 mm long, white, minutely strigose; tepals 5, white, glabrous; outer tepals 2, obovate, 5.8–6.2 × 3.4–3.8 mm, margin entire, apex rounded; inner tepals 3, lanceolate to oblong, 6–7 × 2–2.8 mm, margin entire, apex obtuse or rounded; styles 3, yellow, apically bifid, 2.7–3 mm long; stigmas in spiral band and papillose all around. **Ovary** trigonous-ellipsoid, 5.3–5.5 × 4.2–4.5 mm (wings excluded), greenish-white to pinkish white, echinate; locules 3, placenta bilamellate. **Capsule** trigonous-ellipsoid, 7.5–8 × 10.5–11 mm; pedicel 2.3–3 mm long; wings three, equal, truncate distally, obtusely rounded proximally, sparsely echinate, 6.5–7 mm long, 3.7–6 mm wide.

Distribution and ecology: *Begonia kelumaged* is only known from a single population in Barangay Sebod,

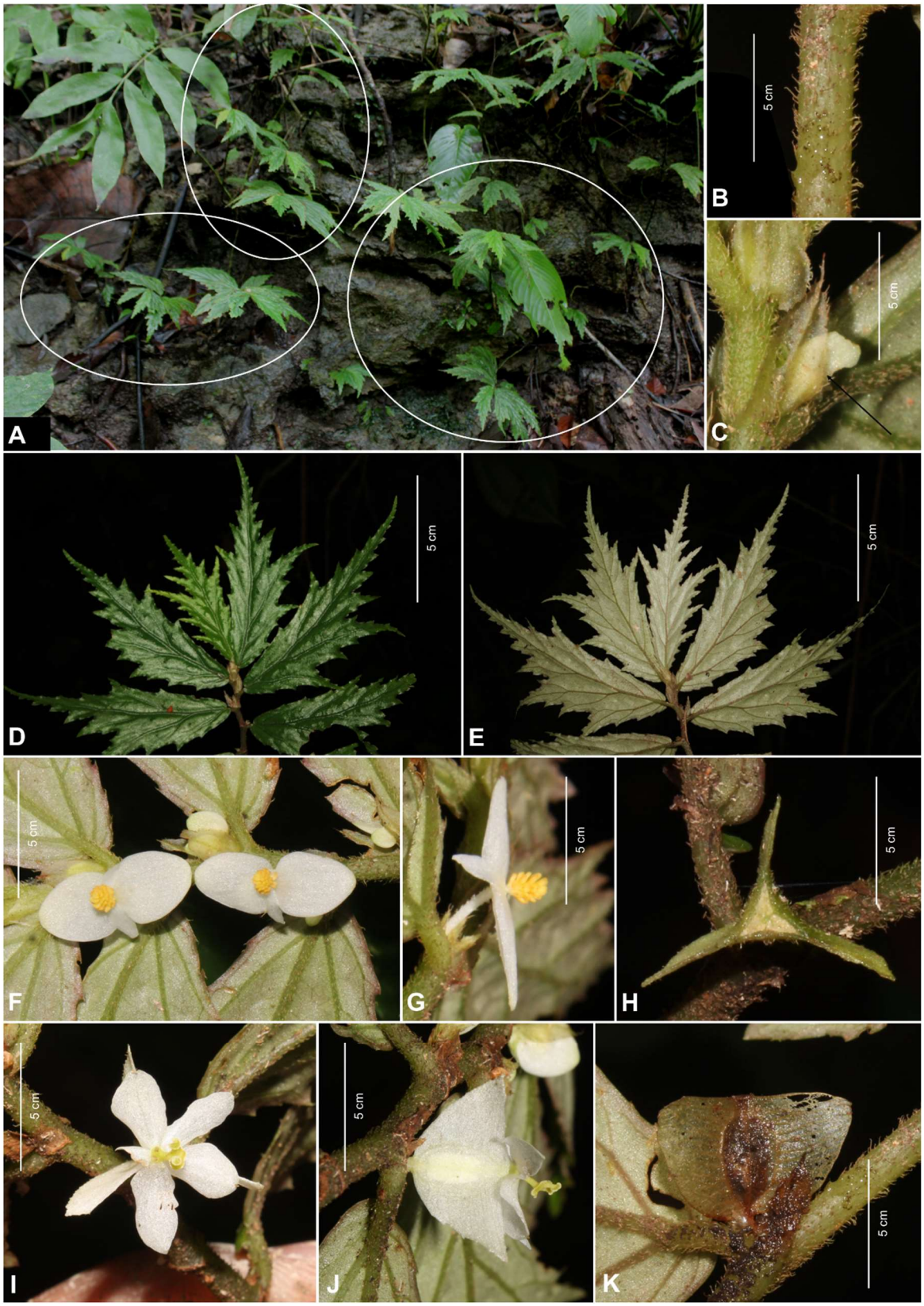

Fig. 2. ***Begonia kelumaged*** Mazo & Rubite. **A.** Habit and habitat; **B.** Portion of the stem; **C.** Stipules; **D.** Leaf adaxial surfaces; **E.** Leaf abaxial surfaces; **F.** Staminate flowers, front view; **G.** Staminate flower, side view; **H.** Cross-section of the ovary; **I.** Pistillate flower, front view; **J.** Pistillate flower, side view showing the ovary; **K.** Capsule. All from *K.R.F. Mazo 111*. Photos: *K.R.F. Mazo*

Municipality of Roxas, Zamboanga del Norte. It was found growing on vertical cliffs and rocks at 300–350 m elevation.

Phenology: Observed flowering and fruiting from October to June.

Etymology: The specific epithet is derived from the Subanen dialect referring to the lacerated leaf margin of the species.

Proposed conservation assessment: This new species is only known from a single population with about 30 individuals. The exact number of populations and extent of distribution of the *B. kelumaged* is still unknown. Further explorations in the remaining forest areas near the type locality and its neighboring municipalities and provinces will reveal information on the species. We hereby classified *B. kelumaged* as Data Deficient (DD) following the IUCN Standards and Petitions Committee (2024).

Notes: *Begonia kelumaged* is also similar to *B. amamampang* (Mazo and Rubite, 2022) in having an erect habit, axillary inflorescences with 4-tepaled staminate and pistillate flowers and 3 equal winged capsules. However, *B. kelumaged* can be easily recognized in having stipules persistent (vs. deciduous), internodes 6–13 mm long (vs. 10–45 mm), margins lacerated, incised, serrate to double serrate (vs. distantly serrate), secondary veins 4–5 pairs (vs. 5–7 pairs), and relatively smaller capsules 7.5–8 × 10.5–11 mm (vs. 11–13 × 10.8–13 mm). Detailed comparison of morphological characters is presented in Table 1.

Begonia pinulon Mazo & Rubite**, *sp. nov.***

Fig. 3

§ *Petermannia*

Type: PHILIPPINES, Mindanao, Zamboanga del Norte, municipality of President Manuel A. Roxas, Barangay Sebod, 8°26'36.20"N, 123°13'14.62"E, 305 m. a.s.l., 4 June 2023, *K.R.F. Mazo 114* (holotype PNH [PNH 258921]; isotype: FEUH).

Diagnosis: This new species resembles *Begonia everettii* Merr. (Merrill, 1911) in having glabrous stem, deciduous stipules, terminal inflorescence with 2-tepaled staminate flowers and 5-tepaled pistillate flowers, and 3-winged capsules. However, it differs from *B. everettii* in having oblanceolate to obovate (vs. oblong-ovate to broadly oblong) leaf, leaf base obliquely cordate (vs. strongly obliquely truncate or very obscurely cordate), longer panicles 10–16 cm (vs. up to 8), narrower capsules 17–27 × 14–16 mm (vs. 16–18 × 16–20 mm) with unequal wings (vs. equal).

Description: Herb monoecious, perennial, up to 55 cm tall. **Stem** branched, erect, 6–9 mm in diameter, green, glabrous, internodes (3)6–11 mm long. **Stipules** deciduous, oblong-lanceolate, 11–15.5 × 4–6 mm, keeled, green, glabrous, margin entire, apex mucronate. **Leaves** alternate; **petiole** terete, 1–3.7(–7.7) cm long, 2–4 mm in diameter, green, glabrous; **lamina** asymmetric, basifixed, oblanceolate, 11–25 × 4.5–8.5 cm; adaxially green, abaxially pale green, glabrous; base obliquely cordate, margin irregularly serrate, apex acuminate; venation palmate-pinnate, 5–8 major lateral veins on both side. **Inflorescence** terminal, bisexual, protogynous; panicle 10–16 cm long, many-flowered; peduncle 5–10 cm long, greenish-red, glabrous; pistillate flower 1–2, arising from the base of inflorescence; staminate flower distal, on cyme branching 5–7 times. **Bracts** caducous, green; glabrous; lowermost bract lanceolate, 7.5–7.5 × 2.3–2.5 mm, margin entire, apex attenuate; uppermost bract lanceolate, 4.5–5.6 × 1.4–1.6 mm, margin entire, apex acute or rounded. **Staminate flower** pedicel 5.5–7.5 mm long, greenish red, glabrous; tepals 2, broadly ovate to suborbicular, 5.2–6.5 × 4–5 mm, white or pink, glabrous, margin entire, apex rounded; androecium zygomorphic, stamens 19–25, filaments fused at base; anthers obovoid, *ca.* 0.9 mm, apex retuse, dehiscing through 2 slits. **Pistillate flower** pedicel 10–14 mm long, green, glabrous; tepals 5, white to pinkish, glabrous on both surfaces; outer tepals 2, ovate to broadly ovate, 10–11 × 7–8 mm, margin entire, apex acute to obtuse; inner tepals 3, lanceolate to obovate, 9.5–11.6 × 7.5–10 mm, margin entire, apex acute to obtuse; styles 3, 5–5.6 mm long, yellow, apically bifid, stigmas in spiral band and papillose all around. **Ovary** trigonous–ellipsoid, 15–16.4 × 5–5.5 mm (wings excluded), green, glabrous; locules 3, placenta bilamellate. **Capsule** trigonous-ellipsoid, slightly curved, 17–27 × 14–16 mm; pedicel 13–19 mm long; wings 3, unequal, larger wing 16 mm wide, base obtuse lateral wings 14 mm wide, base acute, apex truncate.

Distribution and Ecology: *Begonia pinulon* is only known in the municipality of President Manuel A. Roxas, Zamboanga del Norte. It grows on soils and rocks near rivers and creeks in full and partially shaded areas at 200–350 m elevation.

Phenology: Observed flowering and fruiting from April to August.

Etymology: This species epithet “pinulon” is derived from the Subanen language referring to the dish where the leaves of this new species is used as a souring agent.

Proposed conservation assessment: *Begonia pinulon* is currently known from the type locality in Manuel A. Roxas, Zamboanga del Norte. About 100 populations each with 10–20 individuals were observed. The leaves of this new species are used by the locals as a souring agent in dishes. Threats such as forest clearings for charcoal making and plantation for agricultural crops were observed. Following IUCN Standards and Petitions Committee (2024), we placed *B. pinulon* as Vulnerable (VU).

Notes: *Begonia pinulon* also resembles *B. oblongata* Merr. (Merrill, 1912) in having glabrous stem, deciduous stipules, terminal inflorescence with 2-tepaled staminate flowers and 5-tepaled pistillate flowers, and 3-winged capsules. However, it can be distinguished from *B. oblongata* in having larger oblong-lanceolate stipules 11–

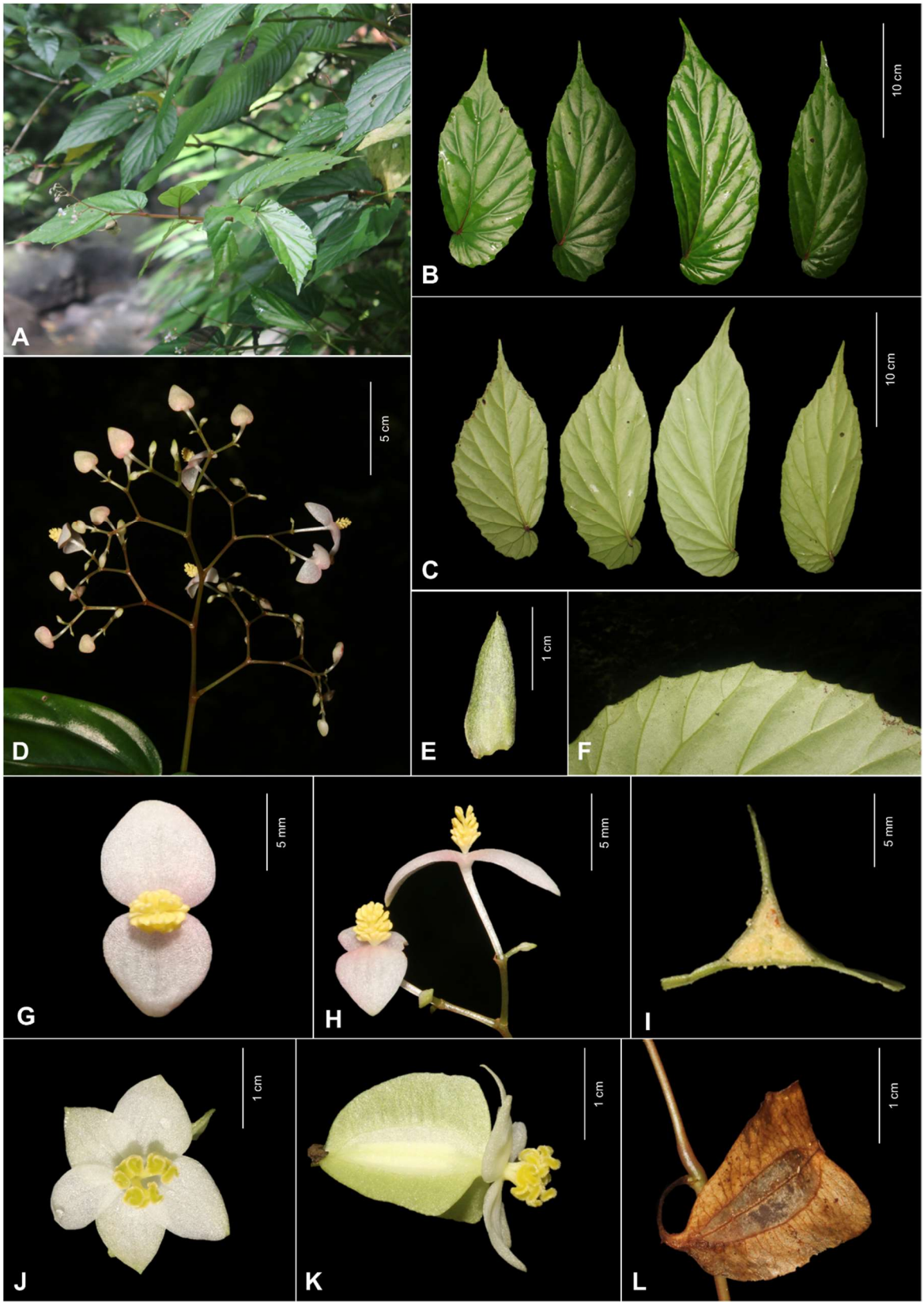

Fig. 3. ***Begonia pinulon*** Mazo & Rubite. **A.** Habit; **B.** Leaf adaxial surface; **C.** Leaf abaxial surface; **D.** Inflorescence; **E.** Stipule; **F.** Leaf margin; **G.** Staminate flower, front view; **H.** Staminate flowers, side view; **I.** Cross-section of the ovary; **J.** Pistillate flower, front view; **K.** Pistillate flower, side view; **L.** Capsule. All from *K.R.F. Mazo 114*. Photos: *K.R.F. Mazo*

Table 2. Morphological comparison between ***Begonia pinulon*** and allied species.

Character	*B. pinulon*	*B. everettii*	*B. oblongata*
Stem			
Vestiture	glabrous	glabrous	glabrous
Petiole			
Length (cm)	1–3.7(–7.7)	2	1.5–8
Lamina			
Shape	oblanceolate to obovate	oblong-ovate to broadly oblong	oblong to lanceolate
Dimension (cm)	11–25 × 4.5–8.5	11–16 × 3.5–6.5	8 – 19 × 1.2 – 5.5
Base	obliquely cordate	strongly obliquely truncate or very obscurely cordate	obliquely cordate
Margin	irregularly serrate	denticulate to serrate	irregularly, distantly dentate
Lateral veins	5–8	7–9	5–6
Inflorescence			
Type	terminal	terminal	terminal
Panicles length (cm)	10–16	up to 8	2–6
Capsule			
Dimension (mm)	17–27 × 14–16	16–18 × 16–20	12–18 × 5.3–6.6
Wings			
Symmetry	unequal	equal	equal

15.5 × 4–6 mm (vs. 9–10 × 3.5–4 mm, ovate); leaves larger 11–25 cm (vs. 8–12 cm), wider 4.5–8.5 cm (vs. 1.2–5.5 cm); longer peduncles 5–10 cm (vs. 1–2.5 cm); and broader capsules 17–27 mm (vs. 15 mm) wings unequal (vs. equal). Detailed comparison of morphological characters is presented in Table 2.

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