Begonia section *Petermannia* of Luzon Island, the Philippines

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Following a systematic study and recircumscription of Philippine *Begonia* section *Baryandra*, an initial revision of *Begonia* section *Petermannia* on Luzon Island is presented. Using field surveys in order to find as many species as possible, sixteen species are rediscovered in pristine forests of Luzon Island. Thirteen species are endemic to Luzon and ten are known from fewer than four localities. In the wild, many of these species were found to be represented by one population only. These results contribute not only to the future phylogenetic studies of the genus *Begonia*, but also to help define and refine conservation policies in the Philippines in order to offer better protection for narrowly endemic plant taxa.

Key Words: *Begonia*, conservation, Luzon, Philippines, Section *Petermannia*

INTRODUCTION

The family Begoniaceae is readily distinguished by having asymmetric leaves, petaloid tepals, unisexual flowers with bilaterally symmetrical staminate flowers and inferior winged ovaries. As currently recognized, it contains two genera, the species rich *Begonia* L., widely distributed in tropical and subtropical regions of the world, and the monotypic *Hillebrandia sandwicensis* Oliver, endemic to the Hawaiian Islands (Kiew 2005, Tebbitt 2005).

*Begonias* are valued world-wide as ornamental plants. It is therefore surprising that the last comprehensive account of Philippine *Begonia*, recording 59 species (Merrill 1912) is now a century old, with no recent revision (Rubite & Madulid 2009). A more up-to-date checklist (Hughes 2008) lists 104 Philippine species, with 103 of these being endemic. Globally, about 1,500 species have been named and there are undoubtedly many more to be discovered.

Continental Asia, from the Himalayas to southern China and Malesia are the secondary centre of diversity for *Begonias* after South America (Tebbitt 2005). In Southeast Asia, the Philippines ranks first in the diversity of endemic *Begonias* with 104 species, followed by Borneo (95), New Guinea (79) and Burma (57) (Hughes 2008).

The 104 Philippine species of *Begonia* are classified into three sections (Doorenbos et al. 1998, Golding & Wasshausen 2002, Hughes 2008, Rubite 2009). The majority are placed in Section *Petermannia* (Klotzsch) A.DC. with 63 species, and Section *Diploclinium* (Lindl.) A.DC. with 39 species. Section *Baryandra* A.DC. contains one species. An initial intensive systematic study on *Begonia* section *Diploclinium* was conducted by Rubite (2012).

The study presented here deals with the species of *Begonia* section *Petermannia* found in Luzon Island. The research includes the re-discovery and re-examination of previously reported species. The data gathered will
facilitate future taxonomic and phylogenetic studies in the genus. In addition, actual field observations of populations provide better information on which to base the status of each species and its proposed IUCN category.

Sixteen species were rediscovered in the wild on Luzon Island. From these living specimens as well as herbarium materials, morphological studies were carried out. The following is the re-description of the species of Begonia sect. Petermannia distributed in Luzon.

**Key to Luzon species of Begonia section Petermannia**

1a. Scandent herbs ........................................... 2

1b. Erect herbs ................................................. 4

2a. Leaf ovate; base rounded; blade width 3–5 cm ........... .......................... B. gracilipes

2b. Leaf oblong-lanceolate; base rounded or obtuse; blade width less than 3 cm ......................... 3

3a. Leaf base rounded; margin apiculate; leaf 2.5–5 × 1.5–2 cm ........................................ B. lagunensis

3b. Leaf base obtuse; margin dentate; leaf 5–8 × 2 cm ........................................ B. binuangensis

4a. Capsules obscurely winged; capsules not or very tardily dehiscing. .................................. B. pseudolateralis

4b. Capsules distinctly winged; capsules dehiscing early .............. 5

5a. Leaf base subequilateral ...................... ........................ B. brevipes

5b. Leaf base inequilateral ........................................ 6

6a. Leaves deeply laciniately pinnatifid .................. B. incisa

6b. Leaves entire, toothed, or lobed, not laciniately pinnatifid ........................................ 7

7a. Petioles 3–5 mm long ................................. 8

7b. Petioles 7–55 mm long ................................. 9

8a. Ovary 12–15 mm long; fruit 20 × 20 mm ...................... .................................. B. apayaoensis

8b. Ovary 8–10 mm long; fruit 10 × 8 mm .................. .................................. B. cumingiana

9a. Lamina rugulose ........................................ 10

9b. Lamina smooth ........................................... 11

10a. Flowers orange; staminate tepals broadly ovate, tip acute, 13 × 12 mm; leaf blade 3–5 cm wide .... B. cumingii

10b. Flowers pink or white; staminate tepals orbicular, tip rounded, 5 × 5 mm; leaf blade 7–9 cm wide .................................................. B. platyphylla

11a. Leaves glabrous ........................................ 12

11b. Leaves pubescent ...................................... 14

12a. Staminate flowers 3.0–3.5 cm in diameter; tepals bicoloured, abaxial surface red, adaxial side pink ........................................ B. merritti

12b. Staminate flowers less than 1.5 cm in diameter; tepals concolorous, both abaxial and adaxial surfaces pink or white ........................................ B. megalantha

13a. Leaf blade 9–12 × 3–5 cm; capsule 15–20 × 15–20 mm ........................................ B. contracta

13b. Leaf blade 13–18 × 6–8 cm; capsule 10–13 × 10–13 mm ........................................ B. ramosii

14a. Hairs densely covering the entire plant ........................................ B. maagregorii

14b. Hairs present but sparsely distributed .................. 15

15a. Leaf margin doubly dentate; inflorescence racemose; bracts persistent, staminate flowers 10–13 mm wide ........................................ B. casiguranensis

15b. Leaf margin sub-entire to shallowly dentate; inflorescence cymose; bracts caducous, staminate flowers ca. 20–25 mm wide ........................................ B. megulariana

**TAXONOMIC TREATMENT**

1. **BEGONIA APAYAOENSIS** (Figure 1A)


Monoeccious, perennial, erect, branched herb about 50 cm, the stem dark-brown, terete, somewhat decumbent and rooting, ferruginous-hirsute, 3–4 mm in diameter, internodes 5–6 cm long. _Stipules_ maroon, oblanceolate with prominent keel, ca 10 × 4 mm, apex acuminate, margin entire, caducous. Leaves alternate; _petiole_ maroon becoming brown, terete, succulent, 3–5 mm long and 2 mm in diameter, with scattered greenish brown hairs (ca. 1 mm); _blade_ adaxial surface dark green, abaxial surface maroon, inequilateral, obovate 9–12 × 3–5.5 cm, apex acuminate, base narrowed and obliquely cordate, the wider lobe rounded extending to the length of the petiole...
with 4–5 prominent lateral nerves while the other lobe is acute with 3 lateral nerves, the margins irregularly and coarsely dentate-lobed and denticulate; ferruginous-hirsute at the veins (ca. 1 mm). Inflorescences terminal, 3–5 cm long, few-flowered, the basal flower pistillate, the others staminate, peduncles green 15–20 mm long and 3 mm in diameter, glabrous; bracts green, membranaceous, oblong, tip acuminate, ca. 7 × 3 mm, caducous. Staminate flowers white; pedicels green, ca. 5–10 mm long; tepals 2, broadly ovate, tip obtuse, base pink ca. 13 × 12 mm, stamens 40–50, crowded on an elongated axis, ca. 5 mm in length; anthers obovoid, ca. 1 mm long. Carpellate flowers white, tepals 5 broadly ovate, tip obtuse, ca. 13 × 13 mm; ovary pinkish green, broadly oblong, 12–15 × 2.5–3 mm, 3 equal wings, carpels 3, placentas 2 per locule; styles three, ca. 2 mm long, stigmas in a spiral band. Fruit with a short pedicel 5–10 mm; capsule brown, oblong, glabrous, 18–20 × 18–20 mm, wings 3, equal, 18–20 × 4–7 mm, apex truncate, base rounded, splitting between locule and wing.

Note: This species resembles Begonia brevipes Merr. to which it is most closely allied. It is distinguished by its larger size, denser indumentum, and very much larger flowers and capsules.

Habitat: On deeply shaded rocky slope up to about 100 m altitude growing on rock surfaces at the mouth of the cave.

Specimens examined: Luzon, Apayao Province, Mt. Sulu, E. Fenix 28403 (PNH 112558, US 115243).
**Distribution:** Endemic to Luzon: Apayao Province only.

**Proposed IUCN category:** EN B2ab(iii). A small population was seen at the locality which is being developed as a tourist attraction. The advent of people will cause the destruction of this species.

2. **BEGONIA BINUANGENSIS** (Figure 1B)

**Monoecious**, perennial, scandent, branched herb about 150 cm, glabrous, rooting at some of the nodes, the **stems** light brown, terete, 4-5 mm in diameter, the internodes 1.5–3 cm long. **Stipules** pinkish to light maroon, lanceolate with keel 10 × 3 mm, apex acuminate, margin entire, caducous. **Leaves** alternate; **petiole** pinkish to green, terete, succulent 1–3 cm long and 2.3 mm in diameter; **blades** olivaceous green, inequilateral, oblong to oblong-lanceolate 5–9 × 2.4 cm, apex acuminate, base rounded or obtuse, margins irregularly serrate-dentate, the basal nerves 5 or 7, slender, ascending, lamina not flat but appears wavy. **Inflorescences** terminal or in the uppermost axils, 4–8 cm long, few-flowered, the basal flower pistillate, the others staminate, **peduncles** pinkish green 3–5 cm long and 3 mm in diameter, glabrous; **bracts** pink, membranaceous, rounded, 7 × 7 mm, caducous. **Staminate flowers** pink, pedicels pinkish green 10–15 mm; the **tepals** 2, broadly ovate, 10 × 8 mm, tip obtuse; **stamens** 20–30, filaments ca. 2 mm in length; **anthers** oblong, ca. 1 mm long. **Carpellate flowers** pink, the tepals 5 broadly ovate, tip obtuse, 12 × 11 mm; **ovary** pinkish green, oblong, 12 × 5 mm wings unequal, carpels 3, placentas 2 per locule; **styles** three, 2 mm long, stigmas in a spiral band. **Fruit** pedicel, 3–4 cm long, **capsules** brown, turbinate, 15 × 20 mm, unequally 3-winged, adaxial wing rounded 15 × 6 mm, lateral wings upper outer corners acute, 15 × 4 mm, the apex truncate, narrowed below to the sub-acute base.

**Note:** This species is closely allied to *Begonia wenzelii* Merr. from which it is readily distinguished by its larger, differently shaped, longer petioled leaves and distinctly larger capsules.

**Habitat:** Climbing on tree trunks in damp forest near the summit of the mountain at about 1, 000 m altitude.

**Specimens Examined:** Quezon, Mt. Binuang, *M. Ramos* and *G. Edaño 28813*, PNH 112566, US 115256; Rizal, Balabac, A. Loher 13065 (PNH 112570); Laguna, Sta. Maria, G. Taguibao 42528 (PNH 112569); Albay, Mt. Malinao, *G. Edaño 8523* (PNH 34506); Sorsogon, Mt. Bulusan, A. D. E. Elmer 15262 (PNH 112571); Rizal, Irig, *M. Ramos 41882* (PNH 112567); Capiz, Mt. Macosolon, *M. Ramos* and *G. Edaño 30742* (PNH 112573).

**Distribution:** Widespread in Luzon and Visayas

**Proposed IUCN category:** LC. This scandent species is widespread in Luzon and Visayas.

3. **BEGONIA BREVIPES** (Figure 1C)

**Monoecious**, perennial, erect, branched **herb** about 30 cm, the **stem** maroon turning brown, terete, the petioles, branches and branchlets somewhat brown-setose; internodes 1-2 cm long. **Stipules** green, lanceolate with keel, 5 × 2 mm, apex acuminate, margins entire, persistent. **Leaves** alternate; **petioles** brown, terete, 2–4 mm long and 1.5 mm in diameter; **blades** green, mottled with brown spots, inequilaterally oblong or oblong-ovate, 5–7 × 2–3 cm, apex acuminate, base both narrowed and acute both sides, or acute on one side and wider and rounded on the other, the margin distinctly and irregularly lobed-dentate, and more or less denticulate; veins brown, distinct beneath, very slightly setose. **Inflorescence** consists of separate staminate and pistillate flowers on the same plant both in the upper axils or terminal; **peduncles** greenish maroon 15-20 mm long and 2 mm in diameter brown-setose. **Staminate flowers** pink; pedicels green 5 mm long; **tepals** 2, broadly ovate, tip obtuse, 5 × 5 mm; **stamens** 15–20; filaments 2 mm in length; **anthers** narrowly obovoid, 1 mm long. Pistillate inflorescence is three-flowered. **Carpellate flowers** pink; pedicels 1–1.5 cm long; **tepals** 5 narrowly obovate, tip obtuse, 5–6 × 3–4 mm; **ovary** green, oblong, 15 × 4 mm, wings equal, carpels 3, placentas 2 per locule, **styles** three, united for the lower 1 mm, the arms about 2 mm long each cleft near the apex, **stigmas** in a spiral band. **Fruits** with long pedicel, 15–20 mm, brown-setose; **capsules** brown, turbinate, apex truncate, base rounded about 12–15 × 15–20 mm, the wings equal, 12-15 × 7-10 mm the upper outer corners acute.

**Note:** A species manifestly allied to *Begonia cumingiana*.
A. DC, but with smaller, more distinctly lobed-dentate and mottled leaves, and with the staminate and pistillate flowers on separate inflorescences.

**Habitat:** On rocky slope, by stream bank, shaded and moist at about a 100 m elevation.

**Specimens Examined:** Cagayan Province: Pampona, M. Ramos 7431 (PNH 112535, US 115263); Sta. Praxedes, Portablaga Falls, Rubite 113 (new locality record, HAST 111062).

**Distribution:** Endemic to Luzon: Cagayan Province only.

**Proposed IUCN category:** EN B2ab(iii). A small population was seen at the locality. The falls is a tourist destination in the area so the influx of people threatens this species with destruction.


**Monoecious**, perennial, erect, branched herb 30–50 cm high; **stems** green, terete, 1 cm in diameter, pubescent with short, appressed, reddish brown hairs (ca. 0.5 mm), the internodes 4-6 cm long. **Stipules** green, oblong, 15–20 × 5 mm, apex acuminate, pubescent, membranaceous and persistent. **Leaves** alternate; **petioles** green, 0.7–1.5 cm long and 5 mm in diameter, the lower ones usually longer, up to 3 cm long with scattered brown hairs (ca. 0.5 mm); **blades** green, inequilateral oblong-ovate to obovate, 7–15 × 4–9 cm, apex rounded, base obliquely subcordate, the narrower side acute to narrowly rounded, the wider rounded and 0.5–2.5 cm wide, margins irregularly dentate, sometimes with acute lobes, these lobes never more than 1 cm deep, the upper surface glabrous, olivaceous, the lower much paler, clothed with short dense reddish brown hairs, particularly on the nerves and reticulations, and the whole surface covered with numerous small whitish dots; veins 8 to 10, subpalmately arranged, mostly forked, reddish brown, prominent, much darker than the other parts of the lower surface, the reticulations somewhat distinct. **Inflorescence** unisexual, in the upper axils or terminal, 10–20 cm long, **peduncles** green, 10-15 mm long and 4 mm in diameter pubescent; **bracts** white, membranaceous, oblong, tip obtuse, 15 × 12 mm caducous. **Staminate flowers** white, pedicels green, pubescent, 5-10 mm; **tepals** 2, oblong-ovate, tip obtuse, 7-nerved, 6–7 mm × 5-7 mm; **stamens** 15 to 20; anthers oblong, 1–1.5 mm long; filaments 1.5 mm. **Carpellate flowers** white, the **tepals** 2, oblong-ovate, tip obtuse, 10–12 × 8–10 mm, 3-nerved; **ovary** white to pink, oblong, 15-23 × 4 mm, 3 subequal wings, carpels 3, placetas 2 per locule; **styles** three, 2 mm long, stigmas in a spiral band. **Fruits** with pedicels 0.8–1.2 cm long, **capsule** brown, turbinate, glabrous, 18-25 × 15-25 mm, subequally 3-winged 18-25 × 7-12 mm, apex truncate, base acute, the upper outer corners acute.

**Note:** The leaves resemble those of Begonia robinsonii Merr. It differs, in its elongated, racemose, simple, staminate inflorescences, and the prominently bracteolate flowers that are the most striking characters of the species.

**Habitat:** On a deeply shaded slope growing on soil at about 100 m altitude.

**Specimens examined:** Quezon Province, Casiguran, Cabulig River, M. Ramos & G. Edaño 45277 (NY 118738, US 115274)

**Distribution:** Endemic to Luzon: Quezon Province only.

**Proposed IUCN category:** EN B2ab(iii). A small population was seen at the locality which is a known logging site.

5. **BEGONIA CONTRACTA** (Figure 2A) Begonia contracta Warb. in Perkins [§ Petermannia], Fragn. Fl. Philipp. (1904) 54; Merrill, Philipp. J. Sci. 6 (’1911’, 1912) 386; Merrill, Enumeration of Philippine Flowering Plants 3 (1923) 121; Doorenbos, Sosef and De Wilde, Studies in Begoniaceae 6 (1998) 151; Golding and Wasshausen, Begoniaceae (2002) 35; Hughes, An Annotated Checklist of Southeast Asian Begonia (2008) 29. Type: O. Warburg 13085, February 1911, Luzon, Tayabas, Sampaloc (holotype B).

**Monoecious**, perennial, erect, branched glabrous herb about 80 cm, the **stem** brown, terete, 3–4 mm in diameter, internodes 3-5 cm long. **Stipules** maroon, oblong-ovate with prominent keel, 9 × 4 mm, apex acuminate, margin entire, persistent. **Leaves** alternate; **petioles** maroon becoming brown, terete, 15–20 mm long and 3 mm in diameter; **blades** green, obovate, inequilateral, 9–11 × 3–4 cm, apex acuminate, base obliquely cordate, the wider lobe rounded while the other lobe is acute, the margins irregularly and coarsely dentate and denticulate. **Inflorescence** terminal, 3 to 5 cm long, pistillate flowers at times separate from staminate flowers but more often both in one inflorescence, **peduncles** maroon, 20–30 mm long 3 mm in diameter; **bracts** maroon, membranaceous, oblong-ovate, acuminate, 8 × 4 mm, caducous. **Staminate flowers** white, pedicels maroon turning brown 5-10 mm; the **tepals** 2, broadly ovate, tip obtuse, 6 × 8 mm, the **stamens** 20–30, crowded on an elongated axis about 5 mm in length; **anthers** obvoid 1 mm long. **Carpellate
flowers white, the tepals 5 ovate, tip obtuse, 5 × 6 mm; ovary green, oblong, 12 × 3 mm, wings 3, subequal, carpels 3, placentas 2 per locule; styles three, 2 mm long, stigmas in a spiral band. Fruits with a stiff pedicel, 10–15 mm, bent back so the fruit occupies a horizontal position under the leaves, capsules brown, wide ovate, glabrous, 15–20 × 15–20 mm, wings 3 subequal, 15–20 × 4–7 mm wide, apex truncate, narrowed below to the sub-acute base, the upper outer corners acute.

Note: A species manifestly allied to Begonia merrittii Merr. It differs, in its larger leaves and very small flowers.

Habitat: On steep, rocky slope by stream, shaded and moist, growing on soil at about 50 m elevation.

Specimens examined: Isabela, San Mariano M. Ramos and G. Edaño 46749 (PNH 112666); Zamboanga del Norte, Laknapan River, G. O. Frake (PNH 20312); Samar, Mt. Sarawa, G. Edaño s.n. (PNH 15364); Negros Oriental, Tanjay, Lake Balinsasayao, G. Edaño s.n. (PNH 112630); Leyte, Tacloban, C.A. Wenzel 1451 (PNH 112647); Quezon, Infanta, W. Kobe s.n. (PNH 112626); Bataan, Lamao River, E.B. Copeland s.n. (PNH 112632). Ilocos Norte, Pagudpud, Paraíso ni San Antonio, Rubite 120 (new provincial record, HAST 111068).
Distribution: Widespread in the Philippines.

Proposed IUCN category: LC. This is one of the most widespread species in the Philippines, occurring in low to medium altitude forests.

6. BEGONIA CUMINGIANA (Figure 2B)

Monoeccious, perennial, erect, branched glabrous herb about 100 cm, the stems green, terete, 4 to 5 mm in diameter, internodes 2.5–4 cm. Stipules green, oblongate with prominent keel, apex acuminate, margin entire, soon falling, 9 × 3 mm. Leaves alternate; petiole green turning brown, 3–5 mm long and 3 mm in diameter; blade adaxial surface dark green while abaxial surface is paler, obovate, inequilateral, 9–12 × 2.5–3.5 cm, apex acuminate, base obliquely truncate or obtuse, not cordate, the margins irregularly dentate; abaxial leaf brown setose at the veins (ca. 1 mm). Inflorescence terminal 4–8 cm long, the basal flower pistillate, the others staminate, peduncles green 15–20 mm long 3 mm in diameter, glabrous; bracts membranaceous, oblong, acuminate, 9 x 4 mm, caducous. Staminate flowers white, pedicels maroon 5–10 mm long; the tepals 2, broadly ovate, tip obtuse, 13 × 12 mm, the stamens 20–30, crowded on an elongated axis about 5 mm in length; anthers obovoid, 1 mm long. Carpellate flowers pinkish white, the tepals 5 broadly ovate, tip obtuse, 13 × 13 mm; ovary pinkish green, broadly oblong, 8–10 × 4 mm wings 3 equal, carpels 3, placenta 2 per locule; styles three, 2 mm long, stigmas in a spiral band. Fruits with a stiff pedicle 6–12 mm, bent back so the fruit occupies a horizontal position under the leaves, capsules brown, oblong, glabrous 10 × 18 mm, wings 3 equal, 10 x 5–7 mm, apex subtruncate and base rounded.

Note: A species manifestly allied to Begonia rizalensis Merr. It differs, in its very short petiole and leaves setose only on the veins.

Habitat: On moist soil slope, semishaded about 350 m elevation.

Specimens Examined: Cagayan, Bagio Cave, M. S. Allen 5781 (PNH 150007); Albay, H. Cuming 836 (K); Albay, H.M. Curran 12260 (PNH 112674); Sorsogon, M. Ramos 23483 (PNH 112676); Sorsogon, Lake Bulusan, Rubite 294 (new locality record, HAST 115382).

7. BEGONIA CUMINGII (Figure 2C)

Synonym: Begonia philippinensis A. DC. nom. superfl., Prodromus 15(1) (1864) 320; Fernández-Villar, Novissima Appendix ad Floram Philippinarum (1880) 98; Vidal, Phanerogamaceae Cumingianae Philippinarum. (1885) 116; Vidal, Revision de Plantas Vasculares Filipinas (1886) 146. Type: H. Cuming 1897, yr 1811, Luzon, Tayabas, Mt. Banahao (lectotype K, isolectotype FI, here designated).

Monoeccious perennial erect branched glabrous herb about 150 cm tall, stems maroon turning brown, terete, 3 to 4 mm in diameter, internodes 4–8 cm. Stipules greenish brown, lanceolate with keel, apex acuminate, margin entire, caducous 8 × 3 mm. Leaves alternate; petiole green, terete, 3–5 cm long and 3 mm in diameter; blades green, inequilateral, rugolose, 10–15 × 3–5 cm, apex acuminate, base strongly cordate, the wider lobe rounded extending to 10–15 mm length of the petiole with 5–7 veins, the narrow lobe is rounded, the margins irregularly and coarsely dentate and denticulate. Inflorescence terminal, 4–7 cm long, few-flowered, the basal flower pistillate, the others stamine, peduncles maroon turning brown 15–20 mm long 3 mm in diameter, glabrous; bracts orange, membranous, lanceolate, tip acuminate, 6 × 2 mm, caducous. Staminate flowers orange; pedicels orange turning brown 5–10 mm long; the tepals 2, broadly ovate, tip obtuse, 13 × 12 mm, the stamens 20–30, crowded on an elongated axis about 5 mm in length; anthers obovoid, 1 mm long. Carpellate flowers orange, tepals 5, oblong, tip obtuse, 13 × 13 mm; ovary yellow orange, oblong, 12 × 6 mm, wings 3 equal, carpels 3, placenta 2 per locule; styles three, 2 mm long, stigmas in a spiral band. Fruit pedicel, 8–15 mm, capsules wide oblong glabrous 15 × 25 mm, wings 3 equal, 15 × 5–8 mm wide, apex truncate, rounded below.

Distribution: Endemic to Luzon: Cagayan, Albay and Sorsogon.

Proposed IUCN category: VU D2. The distribution of this species includes Bicol Region, a threatened rain forest eco-region of Luzon.
Note: A species manifestly allied to Begonia crispipila Merr. It differs, in its long petioles, early deciduous bracts and orange flowers.

Habitat: On deeply shaded slopes growing on soil.

Specimens examined: Laguna, Mt. Makiling, A.D.E. Elmer 8521 (PNH 112685); Camarines Sur, Alanao, J. Sinclair and G. Edaño 9554 (PNH 55129); Laguna, Mt. Makiling, M. Ramos 19572 (PNH 112688); Mt. Province, Bontoc, M. Steiner 41584 (PNH 41584), Ifugao, Bauninian, H. Conklin 801 (PNH 78637); Laguna, Mt. Banahaw, Quisumbing 1418(112690); Laguan, Mt. Makiling, Pancho and Hernaez 3636 (CAHUP 25231).

Distribution: Endemic to Luzon: Laguna, Camarines Sur, Ifugao and Mt. Province.

IUCN category: LC. This species is widespread in Luzon.

8. BEGONIA GRACILIPES (Figure 2D)

Monoecious, perennial, scandent, suffrutescent, branched herb about 100 cm, the stem maroon turning brown, terete, with scattered brown hairs (ca. 1 mm), rooting at the nodes, 3-4 mm in diameter, the internodes 2-4 cm long. Stipules greenish brown, oblanceolate with keel, apex acuminate, margin entire, caducous, 7 × 3 mm. Leaves alternate; petiole greenish brown, terete, succulent 5–7 cm long and 2 mm in diameter with scattered greenish brown hairs (ca. 1 mm); blades ovate, slightly inequilateral, glabrous, olivaceous, 4–8 × 3–5 cm, apex acuminate, base rounded, subequalateral, not cordate, the margins distantly and irregularly dentate also denticulate and ciliate; basal veins 5. Inflorescence axillary, 1 cm long, few-flowered; peduncle maroon, 1 cm long and 2 mm in diameter, glabrous; bracts greenish brown, membranaceous, lanceolate, tip acuminate, 4 × 2 mm, caducous. Stamine flowers pinkish green, pedicels maroon 8-10 mm long; tepals 5, ovate, tip obtuse 10 × 8 mm; stamens 20–30; anthers broadly ovoid, 1 mm long; filaments about 1 mm long, united at the base. Carpellate flowers pinkish green; tepals 5, ovate, tip obtuse 10 × 8 mm; ovary pinkish green oblong, 8 × 4 mm, 3 equal wings, carpels 3, placenta 2 per locule; styles three, 2 mm long, stigmas in a spiral band. Fruit pedicel 10-12 mm long; capsules brown, widely ovate, glabrous 1.3–1.5 × 1.5–1.8 cm, equally 3-winged 1.3–1.5 × 5-7, apex truncate, base obtuse.

Notes: A species manifestly allied to Begonia lagunensis Elm., differing in its relatively broader leaves and its long petioles.

Habitat: On a tree trunk by stream bank, shaded and moist at about 100 m altitude.

Specimens examined: Cagayan Province: Claveria, M. Ramos 7395 (PNH 112726); ibid: Sta. Praxedes, Portabaga Falls, Rubite 110 (new locality record, HAST 111059).

Distribution: Endemic to Luzon: Cagayan only

Proposed IUCN category: EN B2ab(iii). Only one population was seen at the Portabaga Falls that is a tourist destination so the influx of people will threaten the species with destruction.

9. BEGONIA INCISA (Figure 3A)

Monoecious, perennial, erect, branched herb about 50 cm tall, the stem brown, terete, the petioles, branches and branchlets somewhat brown-setose; 5 to 7 mm in diameter, internodes 4-7 cm long. Stipules brown, lanceolate with keel, apex acuminate, margin entire, caducous, 7 × 2 mm. Leaves alternate; petioles brown, terete, succulent 1–1.7 cm long and 2-3 mm in diameter; blade adaxial leaf dark green while abaxial leaf is pale green and veins maroon and brown setose, outline is asymmetric oblong 7–12 × 3–5 cm, apex long acuminate, base cordate, the margins deeply incised and irregularly dentate and ciliate. Inflorescence terminal, 2 to 5 cm long, few-flowered, the basal flower pistillate, the others staminate; peduncles light brown 8–10 mm long 3 mm in diameter, glabrous; bracts light brown, membranaceous, ovate, tip obtuse, 5 × 4 mm, caducous. Stamine flowers white; pedicels brownish green 3-6 mm; the tepals 2, broadly ovate, tip acute 8 × 10 mm, the stamens 30–35, crowded on an elongated axis about 5 mm in length; anthers obovoid 1 mm long. Carpellate flowers white, the tepals 5 broadly ovate, tip acute, 6 × 8 mm; ovary, green with pinkish tinge, oblong, 6 × 4 mm 3 unequal wings, carpels 3, placenta 2 per locule; styles three, 2 mm long, stigmas in a spiral band. Fruit pedicel 8–13 mm, bent back so the fruit occupies a horizontal position under the leaves, capsules brown, wide ovoid, glabrous 10 × 12 mm, wings 3 unequal...
adaxial wing 7 mm lateral wings 4 mm, apex truncate, rounded below.

**Note:** This is a well characterized species by its deeply incised leaves.

**Habitat:** On soil slope with limestone outcrops, semishaded and moist at about 300 m elevation.

**Specimens examined:** Quezon, Atimonan, E. Merrill 3994 (PNH 112736); Camarines Sur, Mt. Isarog, P. Convocar 85 (PNH 2903); Capiz, Mt. Timbalan, G. Edaño BS 46070 (PNH 112738); Capiz, Jamindan, G. Edaño and M. Ramos BS 30879 (PNH 112744); Laguna, Sta. Maria, G. Taguibao BS 42505 (PNH 112739); Pampanga, Mt. Pinatubo, A.D.E. Elmer (PNH 55568); Antique, Mt. Balingaso, M.J. Sands and W. Vendivil 3266 (PNH169911); Ilocos Norte, Mt. Pico de Loro, G. Edaño BS 5167 (PNH 18019); Quezon, Atimonan, Quezon National Park, Rubite 264 (new provincial record, HAST 115348).

**Distribution:** Widespread in Luzon: Laguna, Quezon, Pampanga, Ilocos Norte, Camarines Sur; and Panay: Antique and Capiz.

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**Figure 3.** A. *Begonia incisa* A.D.C.; B. *Begonia lagunensis* Elm.; C. *Begonia taguiabaei* Merr.; D. *Begonia megalantha* Merr.
Proposed IUCN category: LC. This species is widespread in Luzon and Visayas.

10. BEGONIA LAGUNENSIS (Figure 3B)

Monoecious, perennial, scandent, glabrous, branched herb about 100 cm and forming interlaced masses, rooting at some of the nodes. Stem maroon turning brown, terete, succulent, 1.5 cm in diameter, internodes 2-4 cm long. Stipules maroon, lanceolate with prominent keel, apex acuminate, margin entire, caducous 10 × 2 mm. Leaves alternate rigidly coriaceous and breaking with a snap; petioles maroon, terete, succulent, 2-4 cm long and 2 mm in diameter; blade adaxial surface light green, paler green beneath, 2.5–5 × 1.5–2 cm oblong or ovately oblong, apex acuminate, base rounded, margins apiculate or irregularly dentate and ciliate; nerves 3. Inflorescence unisexual, terminal, 3 to 5 cm long, few-flowered; peduncles maroon, 1 cm long and 3 mm in diameter; bracts green, membranaceous, lanceolate, tip acuminate 6 × 2 mm caducous. Staminate flower pink: pedicels pink 5-10 mm long; tepals 2, ovately oblong, tip obtuse, 10 × 11 mm; stamens 30–40 clustered in an elongated axis ca. 5 mm in length; anthers ellipsoid, 1 mm long. Carpellate flower pink: the tepals 5 ovate, tip acute 12 × 15 mm; ovary pink, oblong 8 × 4 mm, 3 equal wings, carpels 3, placenta 2 per locule; styles three, 2 mm long, stigmas in a spiral band. Fruit pedicel 10–15 mm, capsules brown, glabrous 18 × 15 mm, wings 3 equal, 18 × 5-6 mm, apex truncate, rounded below.

Note: Manifestly closely allied to Begonia aequata, but distinct by long petioles and larger fruits.

Habitat: Scandent and forming bushes upon small stems of tall trees at about 250 m elevation.


Distribution: Endemic to Luzon: Quezon and Laguna.

Proposed IUCN category: NT. The species is found in Quezon and Laguna with one to two populations in each locality only.

11. BEGONIA MACGREGORII (Figure 3C)

Monoecious, perennial, erect branched plant about 100 cm high, the stem brown, terete, densely covered with long, slender, brownish hairs (ca. 5 mm), 4-5 mm in diameter, internodes 2-4 cm. Stipules maroon, lanceolate with keel, apex acuminate, margin entire, caducous, 12 × 2 mm. Leaves alternate; petioles maroon turning brown 1 to 3 cm, prominently ciliate-setose with brown hairs (ca. 5 mm); blades oblong, dark-green on the adaxial surface and often blotched with gray, the abaxial surface deep red, inequilateral, 15–25 × 5–8 cm, base strongly obliquely cordate, the broad lobe rounded, the narrow one subacute or obtuse, the apex acuminate, margins shallowly, distantly, and irregularly sinuate-toothed or lobed, ciliate-denticulate, the adaxial surface glabrous, while the abaxial surface brownish-pubescent and ciliate-setose on the nerves; basal nerves radiate, about 8, prominent. Inflorescence unisexual, axillary, few-flowered, 5-8 cm long, branched; peduncles maroon 2-3 cm long and 3 mm in diameter, with scattered brown hairs (ca. 5 mm); bracts white, membranaceous, lanceolate, tip acuminate, 3 × 1.5 mm, caducous. Staminate flowers white: pedicels 1-1.5 cm long; tepals 2, ovate, tip obtuse, base pink, 8 × 6 mm, the stamens 30–40; anthers narrowly oblong-obovate, 2 mm long, filaments about 1 mm long. Carpellate flowers white, the tepals 5, ovate, tip acuminate, 8–10 × 4 × 5 mm; ovary white, oblong 12 × 4 mm, 3 unequal wings, carpels 3, placenta 2 per locule; styles 2 mm long, stigmas forked, spirally twisted, about 2 mm long. Fruit pedicel 1.5 - 2 cm long, capsules brown, oblong, glabrous 2–2.5 × 2 cm, apex truncate the outer upper angles acute, unequally 3-winged, adaxial wing 8 mm, rounded and broader at its base, the lateral wings 5 mm narrowed and acute at the base.

Note: This distinct species is closely allied to Begonia cumingii, from which it is distinguished by its long ciliate-setose hairs and by its small male flowers.

Habitat: Growing on soil in the forest along a small stream at about 100 m elevation.

Specimens examined: Nueva Vizcaya, Dupax, R.C. McGregor 11334 (US 115378); Isabela, Palanan, photograph by A. Arbias (new provincial record).

Distribution: Endemic to Luzon: Nueva Vizcaya and Isabela.
Proposed IUCN category: EN B2ab(iii). Only one population was seen at the locality.

12. BEGONIA MEGALANTHA (Figure 3D)

Monoecious, perennial erect, branched shrub about 1–2 m, the stems woody, branches and branchlets zig-zag, with scattered pale-brown hairs (ca. 2 mm), 4-6 mm in diameter, internodes 4-6 cm long. Stipules green, oblong with prominent keel 7 × 3 mm, apex acuminate, margin entire, caducous. Leaves alternate: petioles brown, terete, 2 to 4 cm long and 3 mm in diameter, with scattered pale-brown hairs (ca. 2 mm); blade adaxial surface olivaceous green, the abaxial surface paler, inequilateral, oblong, 5–10 × 2–4 cm, densely punctulate, glabrous except the midrib and nerves which are prominently brown-pubescent, the hairs similar to those on the branchlets, the apex acuminate, the base broadly rounded on the wider side, slightly narrowed and acute or somewhat cordate on the narrower side, the margins distantly and slightly dentate, the base 6 or 7-nerved, nerves prominent on the lower surface. Inflorescences unisexual, terminal cymes, 5–10 cm long, peduncles pinkish green 3–5 cm long 3 mm in diameter, glabrous; bracts pink, membranaceous, ovate, tip obtuse, 12 × 10 mm caducous. Staminate flowers pinkish white; pedicel pink 1.5-2 mm long; tepals 2, broadly ovate, membranaceous, glabrous, the apex broadly rounded, the base broadly cordate, 2–2.5 × 2–2.5 cm wide; the stamens 40–50, crowded on an elongated axis about 5 mm in length; filaments 2.5 mm long; anthers narrowly oblong-obovoid, about 1.5 mm long. Carpellate flowers white; pedicel pink, pubescent 2-3 cm long; tepals 5 broadly ovate, tip obtuse, 2 × 3 cm; ovary white, broadly oblong, 12 × 6 mm wings 3 subequal, carpels 3, placentas 2 per locule; styles three, 2 mm long, stigmas in a spiral band. Fruits with a stiff pedicel 2–3 cm long; capsules brown, turbinate, glabrous 15 × 15 mm, wings 3 subequal, 15 × 3–6 mm wide, apex truncate, the tips of the wings broadly rounded, the base acute or subtruncate.

Note: A striking species, closely allied to Begonia merrittii, from which it is distinguished by its large size, the development of woody tissue in the stems, and its very large flowers.

Habitat: On steep, rocky slope by roadside, semishaded and moist at about 1750 m elevation

Specimens examined: Ifugao, Mt. Polis, R.C. McGregor (PNH 19860); Mt. Province, Mt. Data, G.L. Alcasid (PNH 1842).

Distribution: Endemic to Luzon: Ifugao and Mt. Province.

Proposed IUCN category: EN B2ab(iii). Only one population was seen at the locality. The habitat was observed to have little remaining forest cover and receives no legal protection.

13. BEGONIA MERRITTII (Figure 4A)

Monoecious, perennial erect shrub, 1–2 m high, the stem reddish-brown, terete, glabrous 4–5 mm in diameter, internodes 2–5 cm long. Stipules green with maroon edges, oblongate with prominent keel, membranaceous, 10-15 × 4 mm, apex slenderly acuminate, margin entire and undulate, caducous. Leaves alternate: petioles maroon turning green, terete 7–10 mm long and 2 mm wide; blades olivaceous green, paler beneath, inequilaterally lanceolate-ovate to oblong-lanceolate, 5–7 × 2–3 cm, apex acuminate, base obliquely subcordate, the lower lobe rounded, broad, the upper narrow, acute, the margins variously dentate or dentate-sublobed, somewhat denticulate, reddish to brown edges; the abaxial surface is densely and obscurely white-punctate and the nerves are prominent and reddish. Inflorescences unisexual, terminal, once or twice dichotomous, 4–8 cm long; peduncles maroon 2 cm long and 3–4 mm in diameter, glabrous; bracts dark pink membranaceous, rounded, 8 × 7 mm, caducous. Staminate flowers outer surface is red inner side is pink; the pedicels 1 to 2 cm long, tepals 2, orbicular, tip rounded, the base broadly cordate, 1.5–2 × 1.5–2 cm; the stamens 20-30, crowded on an elongated axis about 5 mm in length; anthers obovoid 1 mm long. Carpellate flowers outer surface is red inner side is pink; tepals 5, broadly ovate, tip obtuse, 1.5–2 × 1.5–2 cm; ovary red, orbicular, 12 × 10 mm, wings 3 equal, carpels 3, placentas 2 per locule; styles three, 2 mm long, stigmas in a spiral band. Fruits with a stiff pedicel 2–3 cm long; capsules brown, wide ovate, glabrous 15 × 25 mm, wings 3 equal, 15 × 7 mm, apex truncate and base acute.

Note: The species is allied to Begonia cumingiana and is recognizable at once by its smaller, relatively narrower, and glabrous leaves.
**Habitat:** In the wet mossy forest above 2,250 m in high mountains.

**Specimens examined:** Benguet, Mt. Sto. Tomas, *A.D.E. Elmer* 6254 (US 115388); Benguet, Mt. Pulag, *M. Jacobs 7028* (PNH 103680); Benguet, Baguio, *A.D.E. Elmer 14277* (PNH 196301); Mt. Province, Bontoc, *McVittie 9357* (PNH 9357); Mt. Province, Mt. Panai, *M.D. Sulit s.n.*(PNH 7494).

**Distribution:** Endemic to Luzon: Benguet and Mt. Province.

**Proposed IUCN category:** LC. This species occurs in the Pulag National Park and the upper and lower Agno River Basin Resource Reserves. Forest at high altitude in these areas, to which this species is limited, is in reasonable condition.

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**Figure 4.** A. *Begonia merrittii* Merr.; B. *Begonia platyphylla* Merr.; C. *Begonia pseudolateralis* Warb.; D. *Begonia ramosii* Merr.
14. BEGONIA PLATYPHYLLA  (Figure 4B)

Monoecious, perennial, erect branched herb about 50 cm, the stem brown, terete, glabrous, 4-5 mm in diameter, internodes 4-9 cm long. Stipules green, lanceolate, 20 × 5 mm, apex acuminate, margin entire, caducous. Leaves alternate; petioles brown-furfuraceous, terete, 3.5–5.5 cm long and 2-3 mm wide; blade adaxial surface olivaceous green while abaxial surface is much paler, inequilateral, broadly obovate to oblong-ovate, rugulose 11–18 × 7–9 cm, the apex acuminate, the base scarcely narrowed, one side much narrower than the other, acute, the broader side very broadly rounded, forming a shallow, wide sinus with the petiole, the margins irregularly and rather coarsely toothed, not at all lobed, the primary teeth very broad, short, acute, the shallow sinuses denticate; glabrous except for the slightly subfurfuraceous nerves; nerves prominent, nearly straight, forked, the basal ones usually 9, of which 2 or 3 are on the narrower side of the lamina, the lateral nerves above the base 2 on the narrower side, 3 on the broader side, ascending, the reticulation lax, indistinct. Inflorescences unisexual, terminal, branched 4-10 cm long, peduncles light brown, 2 cm long and 2 mm in diameter, glabrous; bracts pink, membranaceous, oblong, tip acute, 4 × 3 mm, caducous. Stamine flowers pink; pedicels pink 4-5 mm long; tepals 2, orbicular, 5 × 5 mm; the stamens 20-30 filaments 1 mm in length; anthers ellipsoid, about 1 mm long. Carpellate flowers pink, the tepals 5 oblong, tip acute 15 × 5 mm long; ovary pink, oblong 15 × 6 mm, 3 equal wings, carpels 3, placentas 2 per locule; styles three, 2 mm long, stigmas in a spiral band. Fruits with pedicel 2-3 cm long, capsules brown turbinate, glabrous 2 × 2.5 cm, wings 3 equal, 20 × 7 mm, the apex truncate, the upper outer corners of the wings rounded, the base broadly rounded.

Note: This species resembles Begonia cumingii to which the species is manifestly allied. It is distinguished by its small stamine flowers and the relatively broad, nearly glabrous leaves.

Habitat: Growing on soil in the forest along a small stream at about 100 m elevation.

Specimens examined: Nueva Vizcaya, R. C. McGregor 20074 (PNH 112893, US 115424); Palanan, Isabela photograph by A. Arbias (new locality record).

Distribution: Endemic to Luzon: Nueva Vizcaya and Aurora.

Proposed IUCN category: EN B2ab(iii). Only one population was seen at Aurora.

15. BEGONIA PSEUDOLATERALIS  (Figure 4C)


Monoecious perennial erect branched herb about 1.5–2 m, the stem green, terete, glabrous, 10-15 mm in diameter, internodes 2-5 cm long. Stipules green, lanceolate 12 × 4 mm, with prominent keel, apex acuminate, margin entire, caducous. Leaves alternate; petioles green, terete, succulent, 4–12 cm long and 5–10 mm in diameter, glabrous; blades green, young leaves are sometimes associated with blotches, inequilateral, broadly obovate, 9–20 × 10–25 cm, apex acuminate, base rounded and obliquely cordate, with 8-9 primary veins and prominent secondary veins, the margins scalloped, irregularly and coarsely dentate and glabrous. Inflorescence dense and axillary, pistillate and stamine flowers are congested on the same axilla, 2–4 cm long, peduncles green 15–20 cm long 4 mm in diameter, glabrous; bracts green, membranaceous, orbicular, 10 × 10 mm, caducous. Stamine flowers white, tepals 2, broadly ovate to oblong with prominent 6-8 veins, tip obtuse to rounded, 10 × 8-10 mm, the stamens 30–40; anthers obvoid 1 mm long. Carpellate flowers white, tepals 5 oblong with prominent 6-8 veins, tip rounded, 13 × 10 mm; ovary whitish green, broadly oblong, 12 × 6 mm obscurely winged, carpels 3, placenta 1 per locule, styles three, 2 mm long, stigmas in a spiral band. Fruits short pedicel 8–10 mm long; capsules, brown, turbinate, glabrous, indehiscent, 20 × 10 mm, obscure wings 3.

Notes: Well characterized by its scalloped leaf margins and capsules that are obscurely winged and not dehiscing.
Habitat: On rocky slope by stream bank, semishaded and moist at about 50 m elevation.

Specimens examined: Cagayan, M. Ramos BS 14555 (PNH 112941); Surigao, C.A. Wenzell 817 (PNH 112937); Quezon, Casiguran, M. Ramos BS 45733 (PNH 112931); Bukidnon, F. L. Rola 26570 (PNH 112916); Camarines, Mt. Isarog, M. Ramos BS 22017 (PNH 112924); Laguna, Majayjay, R.C. McGregor 22801 (PNH 112923); Davao, Mt. Mayo, M. Ramos & G. Edaño BS 49451 (PNH 112929); Cagayan, M. Ramos (PNH 112910); Samar, Laquillacon, R.C. McGregor 43759 (PNH 112930); Albay, Mt. Malinao, G. Edaño s.n. (PNH 34447).

Distribution: Widespread in the Philippines.

Proposed IUCN category: LC. This species is widespread in the Philippines.

16. BEGONIA RAMOSII (Figure 4D)

Monoecious, perennial erect, sparingly branched herb about 50 cm, the stem greenish brown becoming strong, terete, succulent, glabrous, the lower parts prostrate or ascending, often rooting, 4 mm in diameter, internodes 4-5 cm long. Stipules green, oblanceolate 10–15 × 5 mm apex acuminate, margin entire, membranaceous, caducous. Leaves alternate; petioles greenish brown becoming brown, terete, succulent 4 to 8 cm long and 3 mm in diameter; blades olivaceous green, obliquely inquadrilateral, oblong-ovate, glabrous, 13–18 × 6–8 cm, apex prominently acuminate, base obliquely and prominently cordate, both lobes rounded, one much narrower than the other, margins irregularly and rather distantly dentate, basal nerves 7, the outer ones short the lateral nerves above the base usually about 3 on each side of the midrib. Inflorescences unisexual, terminal, 2–4 cm long, peduncles greenish brown 8-10 mm long and 2 mm in diameter, glabrous; bracts greenish brown, membranaceous, orbicular, 10–15 × 10 mm, caducous. Stamineate flowers pink; pedicels green 5-10 mm long; tepals 2, suborbicular or orbicular-ovate, tip obtuse, 8 × 7 mm; stamens 20-30; anthers obvoid 1 mm long. Carpellate flowers pink, tepals 5, oblong, tip obtuse, 9-10 × 6 mm, ovary, pinkish green, broadly oblong, 10 × 4 mm, 3 equal wings, carpels 3, placens 2 per locule; styles three, 2 mm long, stigmas in a spiral band. Fruits with a short pedicel 5–10 mm long, bent back so the fruit occupies a horizontal position under the leaves, capsules brown, turbinate, glabrous 10–13 × 14–18 mm, wings 3 equal, 10-13 x 4-6 mm, apex truncate, base rounded, splitting between locule and wing.

Notes: The species is allied to Begonia contracta but differing by its larger leaves and smaller capsules.

Habitat: Growing on soil in the forest along small stream in about 50 m elevation.

Specimens examined: Laguna: San Antonio, M. Ramos 10942 (PNH 112948); ibid: Sta. Maria, photograph by R. Rubite (new locality record).

Distribution: Endemic to Luzon: Laguna only.

Proposed IUCN category: EN B2ab(iii). Only one population was seen at Sta. Maria, Laguna.

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