

## **BEGONIA HEMICARDIA (SECT. PETERMANNIA, BEGONIACEAE), A RESURRECTED HETEROTYPIC SYNONYM AND NOMEN NUDUM**

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The *nomen nudum* *Begonia hemicardia* Elmer ex Merr. (*Begonia* sect. *Petermannia*) was coined by A.D.E. Elmer in 1915. He annotated one of his collections (14366 from Mount Bulusan, Luzon) in the PNH herbarium with the name but did not formally publish it. E.D. Merrill in 1923 recognised the name as a synonym of *Begonia binuangensis* Merr. After thorough studies of living and preserved specimens and the relevant literature, we found *Begonia hemicardia* to be different from *B. binuangensis*. *Begonia hemicardia* is allied to a group of climbing *Begonia* in the Philippines with axillary inflorescences and numerous, subsymmetrical, ovate to lanceolate-ovate leaves, namely *B. aequata* A.Gray, *B. binuangensis*, *B. edanoi* Merr., *B. gracilipes* Merr., *B. lagunensis* Elmer, *B. megacarpa* Merr., *B. sarmentosa* L.B.Sm. & Wassh. and *B. wenzelii* Merr. However, a combination of characters such as long internodes, large persistent stipules, serrate leaf margins, and long inflorescence with staminate flowers borne on a jointed rachis readily distinguish *Begonia hemicardia* from these other species, and we validly describe the new species here.

**Keywords.** Bulusan Volcano Natural Park, endemic, nomenclature, taxonomy.

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### **Introduction**

During a botanical expedition jointly organised by the University of the Philippines Manila, the Philippine National Herbarium, and the Biodiversity Research Center, Academia Sinica, Taiwan, in the Bicol Region of the Philippines in 2006, an interesting *Begonia* was found at Bulusan Volcano Natural Park. After comparing the plant with the protologues and herbarium specimens of three species collected and described from the area by Elmer (Elmer, 1939), it was found that this *Begonia* did not match any of them.

Ten years later, the primary author, together with her students, went back to the Park and conducted a thorough study of the plant *in situ*. During this expedition, the unidentified *Begonia* was found to closely resemble specimens collected at Mount Bulusan by Elmer and annotated as *B. hemicardia*, a name that unfortunately has not been validly published.

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In his enumeration of Philippine flowering plants, Merrill (1923) published the name *Begonia hemicardia* without description as a synonym of *B. binuangensis* Merr., which had previously been considered endemic to Mount Binuang in Quezon Province. After thorough studies of the new collection and comparison with the type specimens and protologue of *Begonia binuangensis*, we found our collection and the collections of Elmer to represent a different species, which we here describe as *Begonia hemicardia* Elmer ex Rubite. The herbarium specimens examined are listed in the [Appendix](#).

### Taxonomic treatment

***Begonia hemicardia* Elmer ex Rubite, sp. nov.**

*Begonia hemicardia* Elmer, *in sched.*; Merrill, Enum. Philipp. Fl. Pl. 3: 120 (1923), *nom. nud.*

*Begonia hemicardia* is easily recognised by its combination of long internodes, large persistent stipules, serrate leaf margins, and long inflorescence on which staminate flowers are borne on a jointed rachis. It is similar to *Begonia megacarpa* Merr. in its habit, large broad ovate leaves, and pink and white flowers but is distinguished by having lanceolate stipules (vs ovate to oblong-ovate), leaf base obliquely cordate (vs broadly truncate or subcordate-truncate), leaf apex attenuate (vs acuminate), shorter petioles 2–4 cm (vs up to 8 cm), smaller leaves 4–8.5 × 2.5–7 cm (vs 8–15 × 8–15 cm), separate male and female inflorescences (vs male and female flowers in the same inflorescence), male inflorescence pedunculate 1.5–2.5 cm (vs fascicled), and smaller capsules 1.2–1.6 × 1.2–1.6 cm (vs 3 × 2 cm). – Type: Philippines, Luzon, Sorsogon Province, Municipality of Bulusan, Bulusan Volcano Natural Park, elevation 350 m, 12°45'02"N, 124°05'41"E, 24 v 2006, R. Rubite, Luisito T. Evangelista, Chien-I Huang and Tsui-Ya Liu 297 (holotype PNH [PNH258565]; isotypes HAST [HAST115385, HAST115386], PNH [PNH258566]).

Figures 1, 2.

Plant entirely glabrous, monoecious, perennial. *Stem* scandent 3–4 m long and 4–7 mm in diameter, internodes 6–8 cm long, rooting at the nodes. *Stipules* pale green, hyaline, lanceolate, 22–25 × 7–8 mm, glabrous, slightly keeled, margin entire, apex acuminate; persistent. *Leaves* alternate; petioles succulent, green becoming reddish green when mature, 20–40 × 1 mm; blade asymmetrical, obliquely, broad ovate, 4–8.5 × 2.5–7 cm, margin serrate or dentate and shallowly undulate; base obliquely cordate, apex attenuate; primary veins 6 or 7, grooved. *Inflorescences*: separate male and female inflorescences arise in the uppermost leaf axils or opposite a leaf; male inflorescence 8–9 cm long, cymose with c.5 × dichotomous branching, becoming rachis-like as lower flowers and pedicels dehisce; female inflorescence bearing 1 or 2 pairs of pistillate flowers on a 1.5–2.5 cm long peduncle. *Staminate flower*: bracteoles boat-shaped, 4–6 × 5–8 mm, pink, pedicel 6–8 mm long, tepals 2, orbicular, 7–10 × 8–12 mm, pink with white base; stamens 25–30, filaments 1 mm long shortly united at the base; anthers yellow, oblong 2 mm long. *Pistillate flower*:

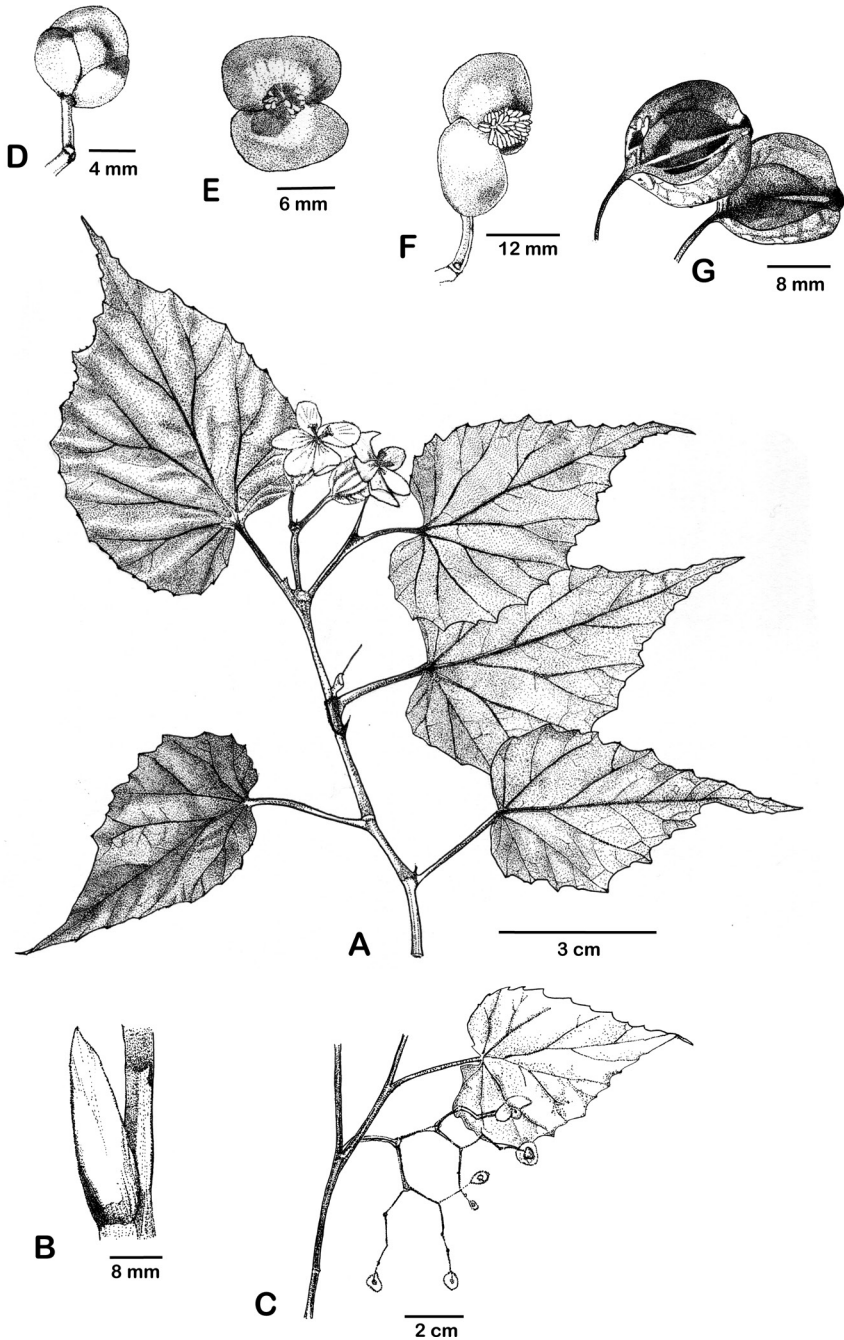
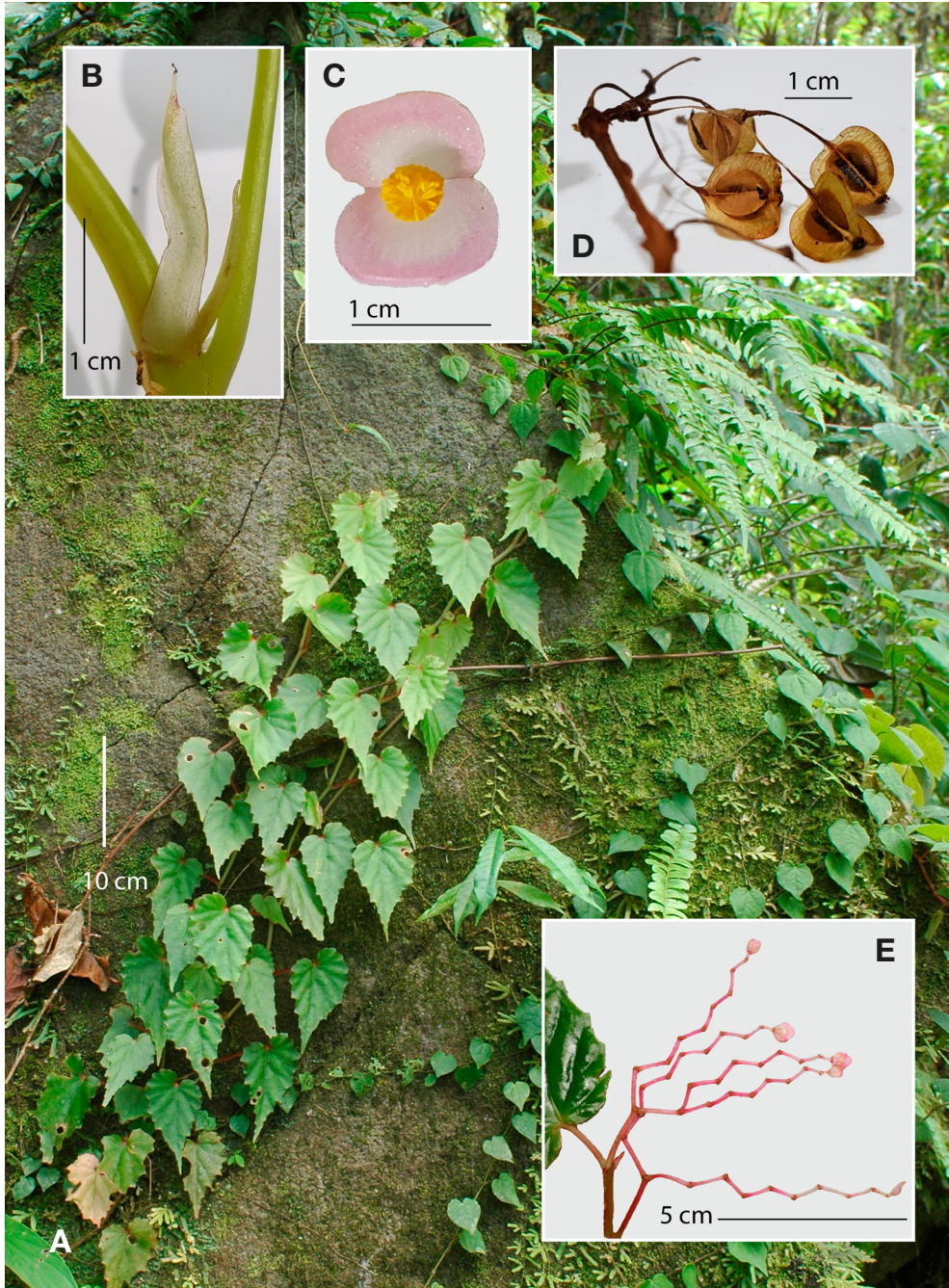


Figure 1. *Begonia hemicardia* Elmer ex. Rubite, sp. nov. A, Habit with female flowers; B, stem and stipule; C, branching pattern; D, staminate flower bud; E and F, male flower (front and side views, respectively); G, fruit. Drawn by D. N. Tandang from R. Rubite 297.



**Figure 2.** *Begonia hemicardia* Elmer ex. Rubite, *sp. nov.* A, Climbing habit; B, stipule; C, male flower; D, ripe fruit; E, male inflorescence with most flowers dehiscent. A and E: photographs of *R. Rubite* 297, taken by Chien-I Huang. B–D: photographs of *R. Rubite* 982, taken by Cecil H. Ubaldo.



pedicel 10–14 mm long; tepals 5, pinkish white, margin entire, elliptic, 7–13 × 3–5 mm; ovary trigonous-ellipsoid, 8–10 × 6–8 mm (wings excluded), pink to brownish pink, 3-locular, placentation axile; 3-winged, wings equal, round, c. 10 × 2–3 mm; styles 3, yellow, c. 3 mm long; stigmas in a spiral band. *Capsule* obovoid to turbinate, brown 12–16 × 12–16 mm; pedicel 14–18 mm long; wings 3, equal, rounded 12–16 × 2–4 mm.

*Distribution and ecology.* Endemic to Mount Bulusan, Sorsogon Province, Luzon, Philippines. Observed climbing on old *Cyathea* Sm., and scrambling over boulders, at an elevation of 350 m.

*Etymology.* The epithet *hemicardia* is derived from the Greek *hemi* ('half' or 'partial') and *cardia* ('heart'). It refers to the heart-shaped leaf base of the species.

*Proposed IUCN conservation category.* *Begonia hemicardia* is currently known only from the Bulusan Volcano Natural Park. In 2006, several populations were found along the forested road towards and inside the Park. During our expedition in 2017, only two populations were located. The Park is a popular tourist destination, thus roadsides are regularly cleared and planted with ornamental plants. Therefore, based on the *IUCN Red List categories and criteria* (IUCN Standards and Petitions Subcommittee, 2019), *Begonia hemicardia* is hereby proposed as Endangered (EN C1) due to this observed decline.

*Additional specimens examined.* PHILIPPINES. Luzon: Sorsogon, Mt Bulusan, x 1915, A.D.E. Elmer 14366 (B, BM [2], K, L, P, U); *ibid.*, xi 1916, A.D.E. Elmer 15262 (B, BM [2], K, L, P, U); *ibid.*, v 1916 A.D.E. Elmer 16083 (B, BM [2], K, L, P, U); Sorsogon Province, Municipality of Bulusan, Bulusan Volcano Natural Park, 24 iv 2006, R. Rubite 297 (PNH); *ibid.*, 30 xi 2017, R. Rubite with J. Salcedo and D. Ubaldo 982 (PNH).

*Begonia hemicardia* is allied to a group of climbing species of *Begonia* from the Philippines that can be recognised by their axillary inflorescences, 2-tepaled staminate flowers, and numerous asymmetrical to subsymmetrical leaves, for example *B. aequata* A.Gray, *B. binuangensis* Merr., *B. edanoi* Merr., *B. gracilipes* Merr., *B. lagunensis* Elmer, *B. megacarpa* Merr., *B. sarmentosa* L.B.Sm. & Wash. and *B. wenzelii* Merr. The new species, however, can be distinguished from the allied species by its long internodes, large persistent stipules, serrate or dentate leaf margins, and long inflorescence on which staminate flowers are borne on a jointed rachis.

The features distinguishing *Begonia hemicardia* from allied species are summarised in the [Table](#). We chose a contemporary collection rather than one of Elmer's specimens as the type, because it matches the description morphologically, is associated with a georeferenced locality, and will be more feasible for generating DNA barcode data.








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Table. Comparison of *Begonia hemicardia* with allied species

Character	<i>B. hemicardia</i>	<i>B. aequata</i>	<i>B. binuangensis</i>	<i>B. edanoi</i>	<i>B. gracilipes</i>	<i>B. lagunensis</i>	<i>B. megacarpa</i>	<i>B. sarmentosa</i>	<i>B. wenzelii</i>
Stem vestiture	Glabrous	Glabrous	Glabrous	Glabrous	Villous	Glabrous	Glabrous	Glabrous	Glabrous
Petiole length (cm)	2-4	Up to 0.7	1-3	0.5	5-7	1-3	Up to 8	1-2	Up to 1
Leaf size (cm)	4-8.5 × 2.5-7	4.2 × 1.8	5-8 × 2-3	4-5 × 1.5-2	4-8 × 2.5-5	9 × 2.5	8-15 × 8-15	4.3 × 2.2	4 × 2
Leaf apex	Attenuate	Caudate	Attenuate	Attenuate	Caudate	Attenuate	Acuminate	Attenuate	Attenuate
Leaf base	Obliquely cordate	Rounded or obtuse	Rounded or obtuse	Rounded or obtuse	Rounded	Rounded	Broadly truncate or subcordate-truncate	Obtuse to broadly rounded	Rounded to acute
Capsule Shape	Obovoid to turbinate	Orbicular	Turbinate	Elliptic	Triangular	Elliptic	Obovoid to turbinate	Semicircle	Suborbicular
Size (cm)	1.2-1.6 × 1.2-1.6	1-1.2 × 1.2-1.4	1.5 × 2	1.7 × 1.5	1.2 × 1.5	1.2-1.5 × 1.2-1.5	3 × 2	1 × 1.5-2	1.4 × 1.4
Apex	Rounded	Rounded	Truncate	Truncate	Truncate	Truncate	Rounded-truncate	Truncate	Rounded
Wings	Equal	Equal	Unequal	Equal	Equal	Equal	Subequal	Unequal	Subequal

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## Appendix

### *Herbarium specimens examined*

- Begonia aequata* A.Gray. Luzon: Laguna, Los Banos, 11 iv 1906, A.D.E. Elmer 8324 (PNH [PNH112538], US [US115234]).
- Begonia binuangensis* Merr. Luzon: Tayabas, Mt Banahaw, v 1917, M. Ramos & G. Edano 28813 (PNH [PNH112566], US [US115256]).
- Begonia edanoi* Merr. Luzon: Rizal, Mt Susong Dalaga, viii 1917, M. Ramos & G. Edano 29374 (PNH [PNH112703], US [US115302]).
- Begonia gracilipes* Merr. Luzon: Cagayan, iii 1909, M. Ramos 7395 (PNH [PNH112726], US [US115326]).
- Begonia hemicardia* Elmer ex Rubite. Luzon: Sorsogon, Mt Bulusan, x 1915, ADE Elmer 14366 (B, BM [2], K, L, P, U); *ibid.*, xi 1916, A.D.E. Elmer 15262 (B, BM [2], K, L, P, U); *ibid.*, v 1916, A.D.E. Elmer 16083 (B, BM [2], K, L, P, U); Luzon: Sorsogon, Bulusan Volcano Natural Park, 24 v 2006, R. Rubite 297 (PNH); *ibid.*, 30 xi 2017, R. Rubite 982 (PNH) with J. Salcedo and D. Ubaldo.
- Begonia lagunensis* Elmer. Luzon: Tayabas, Lucban, v 1907, A.D.E. Elmer 932 (NY [NY118747], US [US115351]).
- Begonia megacarpa* Merr. Leyte: Dagami, 11 ix 1913, C.A. Wenzel 457 (US [US115386]).
- Begonia neopurpurea* L.B.Sm & Wassh. Luzon: Aurora Province, Municipality of Maria Aurora, Barangay. Villa Aurora, 12 iv 2012, J.R.C. Callado 434 with J.F. Barcelona & P. Pelsler (PNH [PNH255686]).
- Begonia purpurea* Elmer. Luzon: Sorsogon, Irosin, Mt Bulusan, vii 1916, A.D. Elmer 16565 (NY [NY118657]).
- Begonia sarmentosa* L.B.Sm. & Wassh. Mindanao: Agusan Del Norte, Cabadbaran, Mt Urdaneta, ix 1912, A.D.E. Elmer 13672 (MO [MO1922714], NY [NY118743]).
- Begonia sorsogonensis* Elmer. Luzon: Sorsogon, Irosin, Mt Bulusan, x 1915, A.D.E. Elmer 14515 (B, BM [3], L, NY, P, U).
- Begonia wenzelii* Merr. Leyte, Jaro, 11 ii 1914, C.A. Wenzel 580 (US [US115365, US324169]).