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A new species of *Bomarea* (Alstroemeriaceae) from an historically documented location in Ecuador

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Bomarea Mirbel (1804: 71) is the only genus of Alstroemeriaceae Dumortier (1829: 58) native to Ecuador (Harling & Neuendorf 2003). There are 42 species of *Bomarea* in Ecuador (Harling & Neuendorf 2003, Fierro-Minda *et al.* 2024), including this new addition, distributed mainly in the cloud forests of the Andes. This area is one of the most diverse and species-rich regions for the genus (Hofreiter & Tillich 2002, Hofreiter 2005, Hofreiter & Rodríguez 2006, Hofreiter 2008a, 2008b, Clark *et al.* 2023, Tribble *et al.* 2023, Fierro-Minda *et al.* 2024).

Floristic explorations and inventories continue in the Andes of Ecuador, with new discoveries still being made (Pérez *et al.* 2023, 2024, 2025), even in well explored areas. This is the case for the Chiriboga Road, also often referred to as the old Quito-Santo Domingo Road, which has been a historically active route for commerce since the 1200s (Ortiz 2017). It was officially consolidated as the main connecting road between Quito and Santo Domingo de los Tsáchilas in 1888 and continued as such until the construction of the Alóag-Santo Domingo route in 1969, which led to its gradual disuse (Ortiz 2017, Caspa 2020). The old road originates in Quito at an elevation of 2700 m and extends westward following the Saloya and Guajalito Rivers, reaching Santo Domingo de los Tsáchilas Province at approximately 700 m (Nieder & Barthlott 2001, Ortiz 2017). The varied topography along the road supports a highly biodiverse and ecologically dynamic biota and has subsequently become a favorable collection site (Dodson & Gentry 1991, Nieder & Barthlott 2001, León-Yánez *et al.* 2011, Ortiz 2017).

Here we present a detailed taxonomic description for a new species of *Bomarea* collected along the old Chiriboga Road in a roadside secondary forest remnant. Additionally, we include photographs, distribution map, conservation status assessment (IUCN 2024), dichotomous key, and discussion of its likely relationships with morphologically similar species. Subsequent data curation revealed three observations from *iNaturalist* (https://www.inaturalist.org) and photographic evidence from Andreas Kay's archives on Flickr (https://www.flickr.com/search/?text=andreas+kay) for this new species in the surroundings of Mindo town, photographed prior to the start of this study. This discovery highlights the importance of citizen science and cybertaxonomy, which contribute observational data from regions that are otherwise overlooked or difficult to access or survey, thus allowing for the discovery of new species and monitoring of existing ones (Dickinson *et al.* 2012, Henning *et al.* 2025, Zhang *et al.* 2022).

Morphological observations and measurements were made from live collections, herbarium specimens, and digital images using ImageJ (https://imagej.nih.gov/ij/). The *Bomarea* collections at QCA and QCNE (Thiers 2024, continually updated) were reviewed, and the *Bomarea* treatments in Harling & Neuendorf (2003), Killip (1936), and Hofreiter & Rodríguez (2006) were used to differentiate the new species from the most morphologically similar taxa. We also reviewed high-resolution images of type material in Tropicos (https://www.tropicos.org/) and JSTOR Global Plants (http://plants.jstor.org/).

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Taxonomic treatment

Bomarea globosa Fierro-Minda, Tribble & Á.J.Pérez, *sp. nov.* (Figs 1,2)

Type:—ECUADOR. Santo Domingo de los Tsáchilas: Cantón Santo Domingo de los Tsáchilas, vía antigua Quito-Chiriboga, entre Bellavista y El Tránsito, 00°17'13"S, 78°51'03"W, 1500–1700 m, 12 Jun 2024, *Pérez et al. 12153* (holotype: QCA-251808; isotype: QCNE).

Bomarea globosa resembles *Bomarea campanularia* Harling & Neuendorf (2003: 33) in having campanulate flowers and short inflorescences but can be differentiated by falcate leaves (vs. lanceolate to narrowly ovate or elliptic), flowers widely open at anthesis (vs. nearly closed) and a glabrous perianth (vs. hirsute).

Terrestrial herbs with multiple underground fusiform to globose root tubers, 2.0–3.4 × 3.0–3.6 cm, pale yellow to white, 1 root tuber emerging from each root. Stem twining 3–4 m long and 0.2–0.3 cm in diameter, terete, glabrous, internodes (1.3–)2.7–5.5 cm long, last internode 7.0–11.5 cm long; basal leaves reduced to lanceolate scales, 0.8–2 × 0.1–0.2 cm. Leaves falcate, 10.0–16.5 × 1.5–2.2 cm, base asymmetrical to attenuate, apex attenuate, abaxially and adaxially glabrous; blades with 7 prominent parallel veins, midvein raised above creating a keel-like structure; petioles resupinate, 1.0–1.4 cm long. Inflorescence umbelliform, compound and dense, with 4–15(–20) flowers, rays forked near the base, each ray forms a drepanium with 2–4 flowers; peduncle 0.1–0.2 cm long, terete, involucral bracts 5–7, lanceolate, 0.8–1.2 × 0.1–0.2 cm, bracteoles lanceolate to linear, 0.20–0.40 × 0.06–0.10 cm, present in some flowers; pedicels 1.0–1.7 cm long, terete. Flowers campanulate, bisexual, radially symmetrical, wide open at anthesis; perianth epigynous, globose, glabrous, sepals and petals free to base; sepals 3, 1.4–1.6 × 0.7–0.8 cm, oblong to elliptical, slightly convex, with a 1 mm black to red apical claw, outer surface red and inner surface pale yellow; petals 3, unguiculate, spathulate, apex acuminate, 1.6–1.7 × 0.8–1.0 cm, inner surface slightly spotted towards the edges and outer surface with a red midvein, the color sometimes expanded towards the apex; subdivided in blade and claw, claw 0.4 × 0.3 cm, blade 1.2 × 1.0 cm. Androecium of 6 free stamens; filaments 0.7–0.9 cm long; anther pseudo-basifixed, 0.5 cm long, fusiform; thecae 0.1 cm long; pollen grains lilac. Style 0.7 cm long, ovary 0.3–0.6 × 0.3–0.5 cm, covered with purple trichomes. Fruit a dehiscent capsule, glabrous, round-trigonous, wall coarse and uneven, divided in three valves, 1.7 × 1.3 cm, brown when mature. Seeds 9–15, spherical, 0.5–0.7 mm in diameter, sarcotesta red.

Etymology:—Referring to the perianth shape.

Distribution, habitat and ecology:—Known thus far only from two localities, the old Quito-Santo Domingo Road in Santo Domingo de los Tsachilas Province and the surroundings of Mindo in Pichincha Province (Fig. 3). According to the Ministerio del Ambiente del Ecuador (2013), this area corresponds to the low montane evergreen forest of the Western Cordillera of northern Ecuador (forest type BsBn04), where the largest number of endemic Ecuadorian species are found (León-Yánez *et al.* 2011). Field observations show that *B. globosa* likely climbs only 1–2 m on forest vegetation and flowers in shaded areas, making it hard to find. This is likely one of the reasons for the lack of prior collections despite the history of botanical collecting in the area. The new species grows sympatrically with *B. pardina* Herber (1837: 120).

Phenology:—Flowering and fruiting throughout the year.

Conservation status:—*Bomarea globosa* is known from the western slopes in Santo Domingo de los Tsachilas and Pichincha Provinces, in secondary and mature forest remnants surrounded by farmlands and roadside vegetation. Based on the available information and according to IUCN (2024), *B. globosa* should be considered as vulnerable (VU B2ab(iii)) because of its area of occupancy (AOO <350 km^2) and only six known localities. It is potentially an ornamental species that needs propagation assays to determine suitability for cultivation.

Additional specimens examined:—ECUADOR. Santo Domingo de los Tsáchilas (Pichincha on the label): Chiriboga, en la carretera vieja Quito-Sto. Domingo, Reserva Forestal "La Favorita", 00°12'S, 78°47'W, 1600–1800 m, 8 Feb 1990 (fl), *Cerón & Iguago 8488* (QCNE-46772, MO-2077315); vía antigua Quito-Chiriboga, entre Bellavista y El Tránsito, 00°18'09" S, 78°51'35"W, 1500–1700 m, 12 Jun 2024 (fl), *Pérez et al. 12152* (QCA-251807).

Three additional localities are provided from photographic evidence:

https://www.inaturalist.org/observations/198834012

https://www.inaturalist.org/observations/105475527

https://www.inaturalist.org/observations/20894668

https://www.flickr.com/photos/andreaskay/16346837085/in/album-72157634744510659/

Notes:—Sequential flowering (Fig. 2D) makes the inflorescence resemble a drepanium. In some cases, it is possible to find mature flowers and immature fruits in the same inflorescence (Fig. 1B). The fruit capsule measurements are approximations based on close-up photographs of Fig. 1B, since there were no ripe unopened fruits in the available collections.

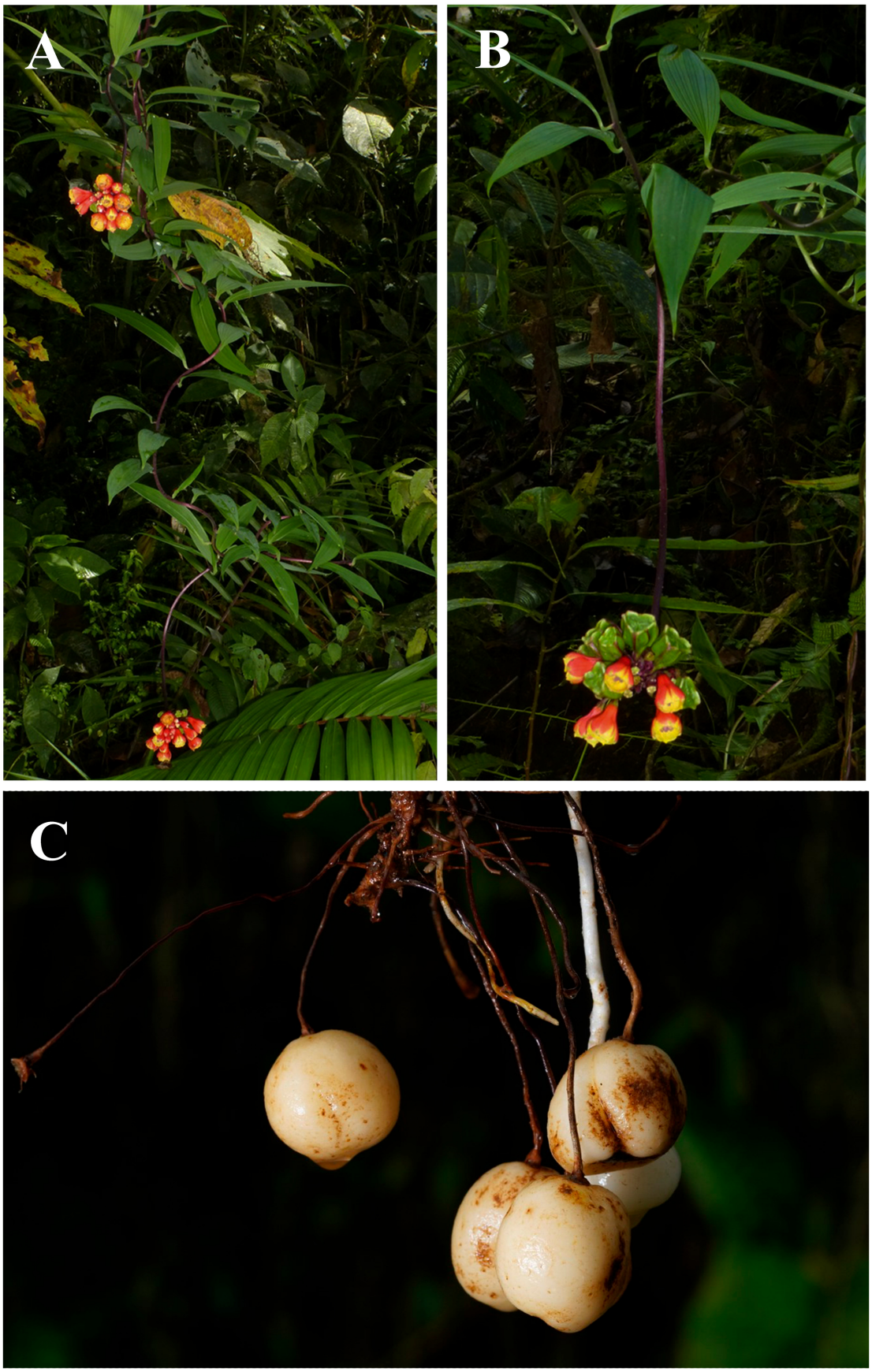

FIGURE 1. *Bomarea globosa.* A. Habit. B. Terminal section showing the pendent inflorescence. C. Tuberous roots. A, B from https://www.flickr.com/photos/andreaskay/16346837085/in/album-72157634744510659/; C from *Pérez et al. 12153*, photograph by Martín Morocho and Daniela Zapata.

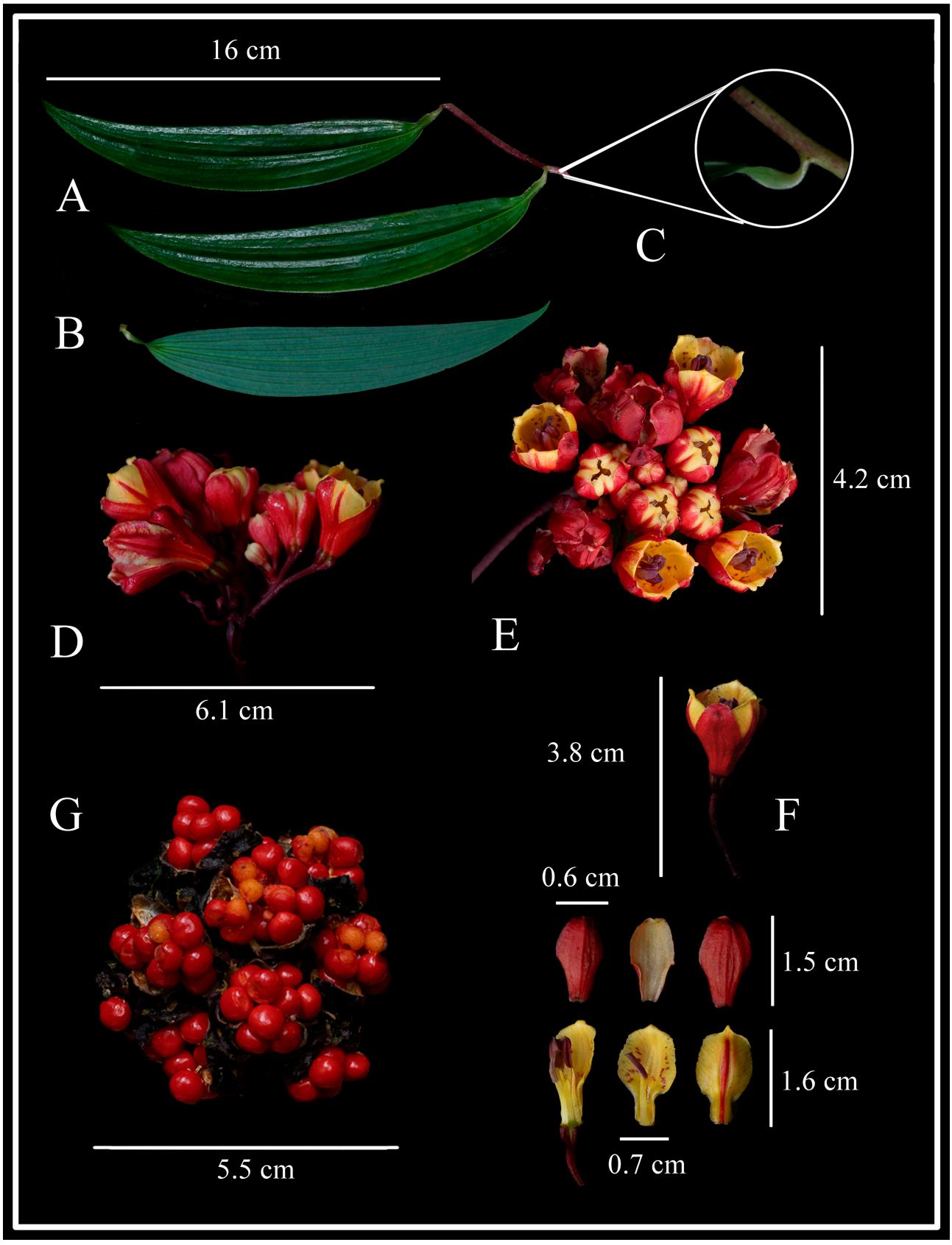

FIGURE 2. Lankester Composite Dissection Plate (LCDP) of *Bomarea globosa*. A. Abaxial leaf surface. B. Adaxial leaf surface. C. Petiole close-up. D, E. Inflorescence with mature flowers. F. Flower dissection. G. Mature fruits. A–F from *Pérez et al. 12153.* Photographs by Martín Morocho and Daniela Zapata.

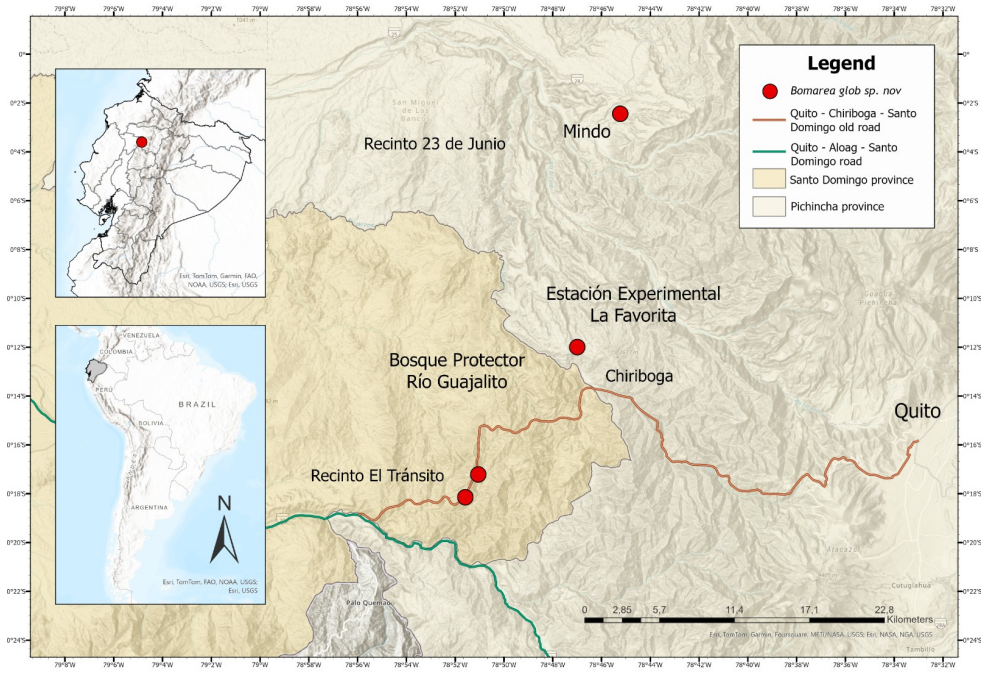

FIGURE 3. The occurrences of *Bomarea globosa* based on collection data.

Bomarea globosa differs from other similar members of *Bomarea* based on its leaf shape, perianth pubescence, openness at anthesis, and floral morphology (Table 1). However, the most important difference between *B. globosa* and both *B. campanularia* and *B. obovata* Herbert (1837: 112) is the degree of floral openness at anthesis: the flowers of *B. globosa* are widely open but nearly closed for *B. campanularia* and *B. obovata*; also, clear differences are found in their inflorescence configuration, being simple and dense for *B. globosa* and *B. campanularia*, whereas compound and widely spaced for *B. obovata*.

TABLE 1. Comparison of morphological characters and general geographic distribution of *Bomarea globosa*, *B. campanularia* and *B. spissiflora*.

	B. globosa	*B. campanularia*	*B. spissiflora*
Leaf shape	Falcate	Lanceolate to narrowly ovate or elliptical	Lanceolate to ovate
Leaf base	Asymmetrical, attenuate	Symmetrical, attenuate to round	Symmetrical, round
Leaf pubescence	None	Sparsely white-hirsute on nerves beneath	None
Leaf wide (cm)	1.5–2.2	2.5–4.5	3.5–6
Petiole size (cm)	1.0–1.4	0.5–0.8	0.4–1.3
Perianth pubescence	None	Sparse, white-brown	Dense, red
Sepal-petal ratio	Sepal shorter than petals	Sepals longer than petals	Sepals equal to petals or slightly shorter
Sepal horn	Vestigial	Ecornute	Vestigial to distinct but short
Sepal color	Red externally and yellow internally	Pink to orange	Red with dark spots outside distally
Petal external pattern	Red midvein	None	Sometimes few spots near apex
Distribution	Northern Ecuador (Santo Domingo de los Tsáchilas and Pichincha)	Southern Ecuador (El Oro, Loja) and Northern Peru (Huancabamba)	Southern Ecuador (Morona Santiago and Zamora Chinchipe)

Bomarea globosa has previously been misidentified as *B. spissiflora* Harling & Neuendorf (2003: 44) because of its glabrous leaves, as well as its short, dense inflorescence. However, flowers of *B. globosa* are campanulate versus infundibuliform in *B. spissiflora*.

Bomarea globosa has falcate leaves, whereas leaves of *B. campanularia* are lanceolate to narrowly ovate versus lanceolate to ovate in *B. spissiflora*. Involucral bracts are absent in *B. globosa*, differentiating it from *B. campanularia, B. obovata,* and *B. spissiflora*, in which they are present. Also, the perianth of *B. globosa* is glabrous, whereas it is white-brown hirsute in *B. campanularia* and densely red hirsute in *B. spissiflora*. *Bomarea globosa* has only been found on the northwestern Andean slopes of Pichincha and Santo Domingo de los Tsáchilas, whereas *B. campaularia* and *B. spissiflora* occur from the south-western (El Oro and Loja) and south-eastern (Morona Santiago and Zamora Chinchipe) Andean slopes of Ecuador, respectively. *Bomarea campaularia* also occurs in northern Peru (Huancabamba Province).

There has been inconsistent use of bract terminology in previous *Bomarea* treatments. Bracts are defined as modified leaf-like structures located at the base of a flower or inflorescence (Beentje 2016, Harris & Harris 2006) and can be categorized according to their position on the inflorescence; involucral bracts are modified leaves subtending the peduncle, and bracteoles are (usually) much smaller modified leaves subtending the pedicel (Song *et al.* 2024).

Harling & Neuendorf (2003) differentiated bract terminology based on inflorescence configuration. They used involucral bracts and bracteoles for describing simple inflorescences and used involucral and subtending bracts for describing compound inflorescences. They used the term involucral bract in both cases, defined as the modified leaves subtending the inflorescence, but they changed the term for referring to the modified leaves subtending the pedicels between bracteoles and subtending bracts depending on the inflorescence type. However, the description of *Bomarea trimorphophylla* Harling & Neuendorf (2003: 62) included the term bracteole as a third category for describing a compound inflorescence; this species has involucral bracts, subtending bracts and bracteoles all in the same inflorescence. Also, for the descriptions of *B. cornuta* Herbert (1837: 114), *B. moritziana* Klotzsch in Kunth (1850: 797), and *B. spissiflora*, the term bractlet is mentioned but refers to the same feature as bracteole.

In other revisions, Hofreiter stopped using these terms and only refers to bracts of primary flower and bracts of secondary flowers when describing thyrse-like or compound inflorescences (Hofreiter 2006, Hofreiter 2008a, Hofreiter 2008b, Hofreiter & Tillich 2003). Similarly, Alzate-Guarín (2016) divided bract terminology into bract and bracteole. In this case, bracteole is used for every bract that is not involucral, like the use in Hofreiter's revisions.

Here, as an attempt to standardize bract terminology, we propose the use of involucral bracts for describing the modified leaves that subtend *Bomarea* inflorescences and bracteoles for the modified leaves along the pedicel. We avoid the use of "subtending" because it is ambiguous: involucral bracts subtend the inflorescence and bracteoles subtend the flowers.

Key to distinguish morphologically similar species

1. Flowers campanulate 2
- Flowers infundibuliform ..... *B. spissiflora*
2. Congested (dense) inflorescence 3
- Lax (widely spaced) inflorescence ..... *B. obovata*
3. Perianth almost closed at anthesis ..... *B. campanularia*
- Perianth wide open at anthesis ..... *B. globosa*

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