



A new species of *Lippia* (Verbenaceae) from the *Campos* eco-region of the Grassland Ecosystems of Río de la Plata, Southeast South America

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Abstract. A new species of *Lippia* (Verbenaceae) from the *Campos* eco-region of the Grassland Ecosystems of Río de la Plata, Southeast South America. Based on field surveys, studies of nomenclatural types and other specimens and review of literature we found a new species belonging to *Lippia* sect. *Dioicolippia*, which is here described as *Lippia misionica*. It is easily segregated from the others species by its shorter internodes, thicker rhizomes, cushion-like habit, shorter pedicels of pistillate spikes, wider bracts and glandular trichomes covering all the plant. Even with these characteristics, it presents affinity with *Lippia coarctata* and *L. contermina*. It dwells in dry environments, mainly on shallow and rocky soils developed on basalts and rhyolites in western and northwestern Rio Grande do Sul state, Brazil, northeast Corrientes and southern Misiones provinces, Argentina, and eastern Alto Paraná department, Paraguay. The new species is detailing illustrated, and data regarding its geographic distribution, phenology, habitat, conservation, and morphological affinities with similar species are given. Furthermore, a key for recognizing of the 22 species currently belonging to *Lippia* sect. *Dioicolippia* is provided.

Key words: Argentina, Brazil, *Dioicolippia*, grasslands, Pampa Biome, Paraguay.

Resumo. Uma nova espécie de *Lippia* (Verbenaceae) da ecorregião dos Campos dos Ecossistemas Campestres do Rio de la Plata, Sudeste da América do Sul. Com base em levantamentos de campo, estudos de tipos nomenclaturais e outros exemplares, e revisão de literatura encontramos uma nova espécie pertencente *Lippia* sect. *Dioicolippia*, aqui descrita como *Lippia misionera* Deble & B.P. Moreira. Este táxon é facilmente segregado das demais espécies pelos entrenós mais curtos, rizomas mais grossos, hábito almofadado, espigas pistiladas com pedicelos curtos, brácteas largas e tricomas glandulares cobrindo toda a planta. Mesmo com essas características apresenta afinidade com *Lippia coarctata* Troncoso e *L. contermina* Briquet. Habita ambientes secos, principalmente em solos rasos e rochosos desenvolvidos em basaltos e riolitos no oeste e noroeste do estado do Rio Grande do Sul, Brasil, nordeste da província de Corrientes e sul da província de Misiones, Argentina, e leste do departamento de Alto Paraná, Paraguai. A nova espécie é detalhadamente ilustrada e são fornecidos dados sobre sua distribuição geográfica, fenologia, habitat, conservação e afinidades morfológicas com espécies semelhantes. Além disso, uma chave para o reconhecimento das 22 espécies atualmente pertencentes à *Lippia* sect. *Dioicolippia* é fornecida.

Palavras-chave: Argentina, Brasil, *Dioicolippia*, Campos, Bioma Pampa, Paraguai.

The genus *Lippia* L. (Verbenaceae) comprises ca. 140 species, mainly distributed in the neotropics (Atkins 2004, Cardoso et al. 2021). *Lippia* sect. *Dioicolippia* Troncoso comprises dioecious subshrubs with slender or tuberose rhizomes, flowers arranged in subglobose, ovoid or hemispherical capituliform spikes, forming axillary racemes or, more rarely, terminal bracteiform racemes, and yellow or orange corolla (Troncoso 1974, Múlgura 2000, Múlgura et al. 2012, Moreira

et al. 2021, 2022). *Lippia* sect. *Dioicolippia* encompasses 21 species distributed in northeastern and northern Argentina, southern Bolivia, southern and central-western Brazil, Paraguay and Uruguay (Deble et al. 2022), mainly in the Southeast South America Grasslands (SESA grasslands, sensu Azpiroz et al. 2012), The SESA grasslands comprise the most extensive grassland area in South America and form an arc around the Río de la Plata, covering about 1,150,000 km² in east and northeast

Accepted on December 19, 2023.

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Argentina, southern Paraguay, southern Brazil and all Uruguayan territory, and includes the Río de la Plata Grasslands, with the Campos and the Pampas eco-regions (sensu Soriano et al. 1992), the Campos de Altitude of southern Brazil (Overbeck et al. 2007), and the Chaco húmedo (Clay et al. 2008). The Campos eco-region comprises one of the richest and most diverse grassland regions on the planet (Andrade et al. 2023), with more than 4,000 plant species, approximately 10% of which are endemic (Andrade et al. 2018, Andrade et al. 2023, Deble 2021).

During our work with *Lippia* sect. *Dioicolippia*, *Lippia* specimens were collected by us in Santiago and Unistalda municipalities, western Rio Grande do Sul state, Brazil, that differs from other known species in the genus. Comparison of material in the herbaria CTES, ICN and SI revealed that exsiccates of the same pattern were identified as *Lippia coarctata* Troncoso. During further field work in the same region in 2021 and 2022, more populations were discovered and more material collected, proving that these specimens are hitherto an undescribed taxon belonging to *Lippia* sect. *Dioicolippia*.

Material and Methods

The research was part of the revision of *Lippia* sect. *Dioicolippia* in the Campos eco-region of the Grassland Ecosystems of Río de la Plata, Southeast South America, and was carried out by field surveys (central, north and northeastern Argentina, southern Brazil, Paraguay and Uruguay), and analysis of herbarium specimens of the herbaria CTES, FCQ, HDCF, ICN, MVHM, MVM, MVFA, MVJB, P, PACA, PY, SI and SMDB and digital images of the Herbaria B, G, K, MBM, NY, P and US (acronyms according to Thiers 2023). Collected specimens were deposited into CTES and PACA herbaria. The description of the new taxon is based on morphological characteristics of plants observed in natural habitat and on dry material. Figure 1 was elaborated using Indian ink, and the illustrations are based on both live specimens and dry material. Figures 2 were made from photos of specimens in nature or in cultivation and the boards were edited with the Adobe photoshop software, version 24.5. For the elaboration of figure 3, it was utilized the software ArcMap version 10.7, and the features were reated from the map base titled Topographic.

Results

***Lippia misionera* Deble & B.P. Moreira, sp. nov.**
Typus:—Brazil, Rio Grande do Sul, Santiago, RS287, 2,6 km após trevo acesso à RS168, 12 Oct 2019 (fl., ♂), L.P. Deble & B.P. Moreira 18404 (holotypus: PACA, isotypi CTES, ICN). Figs. 1, 2 and 3.
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Lippia misionera is morphologically closer related to *L. contermia* Briquet and *L. coarctata* Tronc.; however, can be promptly distinguished from the former by its shorter pedicels of the staminate spikes (1.5–5 cm long vs. 6.5–10 cm long), briefer pedicels of pistillate spikes (0.5–2 cm long vs. 4.5–6 cm long), bracts of staminate spikes ovate or ovate-elliptic, acute at apex (vs. linear-lanceolate or lanceolate, long acuminate at apex), bracts of pistillate spikes ovate or triangular, cuspidate at apex (vs. linear-lanceolate or lanceolate, long acuminate at apex), and shape and size of fruits (globose or depressed-globose, 2–3 × 2–3.5 mm vs. broadly ovate or globose, 1.5–2 × 1–1.6 mm). From *Lippia coarctata* differs by its tuberous rhizome (vs. slender rhizome), longer sterile internodes, larger leaves, 2–9 × 1.5–4.5 cm, with coriaceous texture and margin with 8–16 teeth on each side (vs. 1.5–4 × 0.9–2 cm, with chartaceous texture and margin with 2–6 teeth on each side), and globose or depressed-globose fruits, 2–3 × 2–3.5 mm (vs. ovate, 3–4.5 × 3–4 mm).

Dioecious subshrubs, 5–20 cm high, with tuberose rhizome with obconical or obcordate shape and ca. 4–20 cm diameter, from which several branches depart, forming a cushion-like habit. Branches unbranched or 2-branched at proximal third, up to 20 cm long, prostrate-ascending, with 2–3 sterile nodes with internodes 1–4 cm long, and 1–2 fertile nodes with internodes 0.3–4 cm long; densely covered by pedicellate glandular trichomes with a 2–3-celled foot and 140–280 µm long, and strigose trichomes with verrucose wall and 280–600 µm long. Leaves opposite, shortly petiolate, petioles up to 0.5 cm long; blades nearly circular, ovate or broadly elliptic, 2–9 × 1.5–4.5 cm, apex obtuse or rounded, base cuneate, coriaceous, slightly discolorous, abaxial surface with strigose trichomes scattered, pedicellate glandular trichomes scarce accompany the veins, scabrous trichomes few, scattered, adaxial surface bullate, with scabrous trichomes scattered and mixed with pedicellate glandular trichomes; leaf margin irregularly toothed, 8–16 teeth on each side, obtuse, appressed to the margin or slightly reflexes. The most basal leaves smaller and broadly obovate or nearly circular. Synflorescence in axillary racemes, arranged on 1–2 fertile nodes. Inflorescence pedicellate, on capituliform racemes.

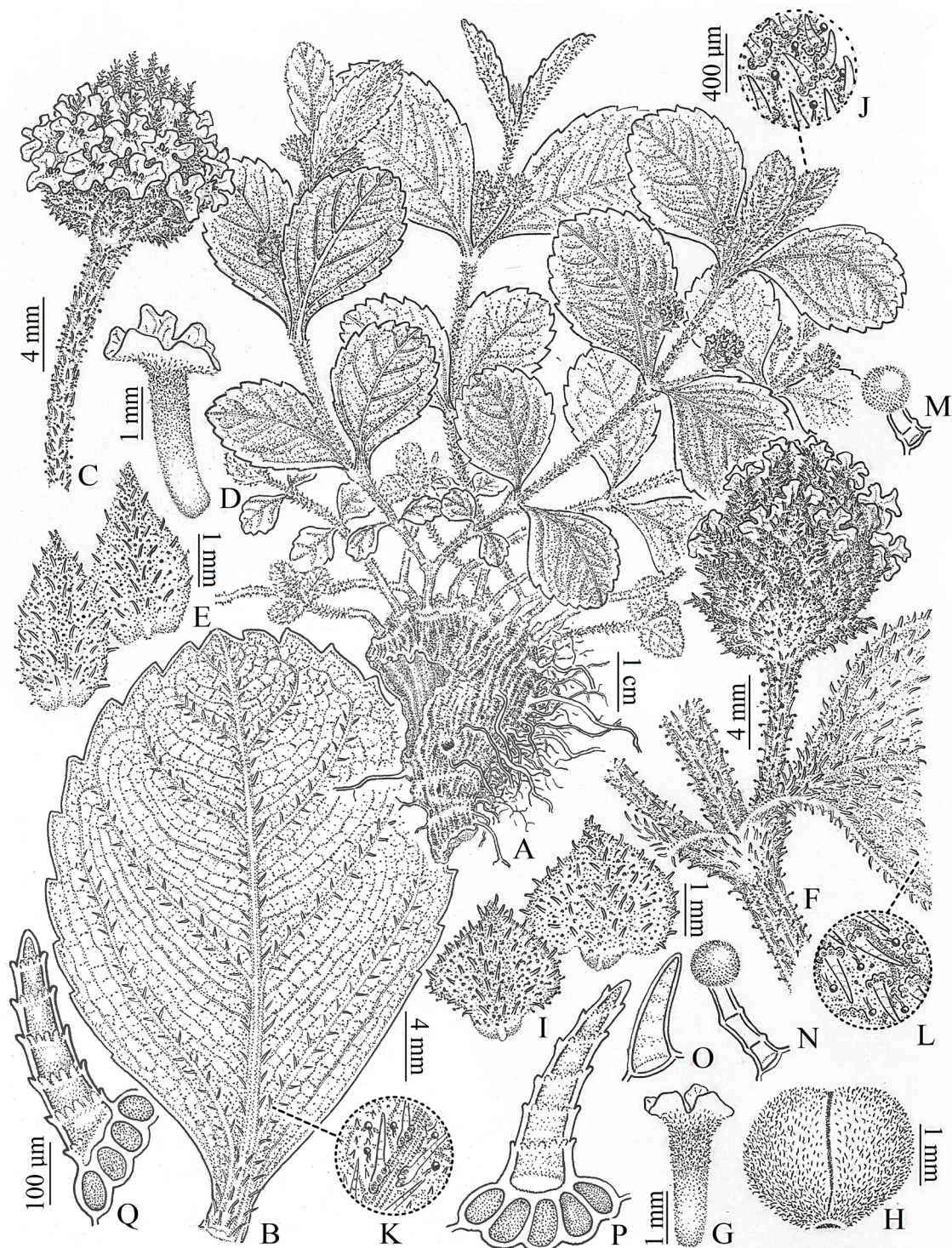


Fig. 1. *Lippia misionera*. A. Habit. B. Leaf, abaxial surface. C. Staminate spike. D. Staminate flower. E. Bracts of staminate spike. F. Pistillate spike and fertile node, showing proximal part of the leaf. G. Pistillate corolla. H. Schizocarp with calyx. I. Bracts of pistillate spike. J. Detail of margin of leaf, adaxial surface. K. Detail of leaf, abaxial surface. L. Detail of leaf. Adaxial surface. M. Glandular trichome from the leaf. N. Glandular trichome from stem. O. Sericeous trichome, from abaxial surface of the leaf. P. Strigose trichomes from adaxial surface of the leaf. Q. Strigose trichome from abaxial surface of the leaf. (Scale bar near J also applies to K and L; scale bar near Q also applies to M, N, O and P); A–B, F–Q from the isotype, Deble & Moreira 18804, CTES; C–E from Deble & Moreira 18805, PACA; illustration drawn by Leonardo Paz Deble.)

Staminate spike hemispheric or broadly campanulate, 5–9 × 4–7 mm. Pedicels of staminate spike 1.5–5 cm long, of equal length or shorter than the leaf corresponding to the fertile node, with dense glandular and non-glandular strigose trichomes. Bracts ovate or ovate-elliptic, apex slight acute, adaxial surface with dense strigose trichomes mixed with pedicellate glandular trichomes and sessile spherical glandular trichomes; the outermost 4–6 × ca. 2 mm, the innermost 3–5 × 2–2.5 mm. Staminate flowers lacking a calyx; corolla 2–3.5 mm long, light yellow to orange, infundibuliform, tube with few hairs on the distal half, stamens with anthers visible at apex of the throat; anthers 0.15–0.2 mm long, pollen yellow; pistil absent. Pistillate spike ovoid, 8–10 × 7–10 mm. Pedicels of pistillate spike 0.5–2 cm long, up to ½ of the length of the leaf corresponding to the fertile node, with dense glandular and non-glandular strigose trichomes. Bracts ovate or triangular, apex acute or cuspidate, adaxial surface with dense strigose trichomes mixed with pedicellate glandular trichomes and sessile spherical glandular trichomes; the outermost 3–4 × 2.5–3.5 mm, the innermost 3–4 × 2–3 mm. Pistillate flowers with diminutive calyx, bilobed, ca. 0.2 mm long, externally sericeous; corolla 2–3 mm long, yellow or orange, infundibuliform, tube with few hairs on the distal half; stamens absent; gynoecium 1.5–2.5 mm long; ovary ca. 0.5 mm long. Fruit a schizocarp, globose or depressed-globose, 2–3 × 2–3.5 mm long.

Etymology— Misionero means an inhabitant or belonging to the former Jesuit missions, established in lands in the northeast of Argentina, the western portion of Rio Grande do Sul state (Brazil) and Paraguay, which perfectly corresponds to the geographic distribution of *Lippia misionera*.

Phenology— The species blooms intensely between September and November and sporadically at other times of the year. Flowering is stimulated after fires, as constated during observations of populations in the field. The plants exude a mild watermelon odor when they are in bloom.

Additional material examined— ARGENTINA. Corrientes: Santo Tomé, 36 km N de Santo Tomé, ruta prov. 40, en campos altos, 2 Feb 1976 (fl., ♀), *A. Krapovickas & C.L. Cristóbal 29109* (CTES); Arroyo Chimiray, borde del pantano, sobre el caminho, 12 Apr 1974 (fl., ♀), *A. Krapovickas et al. 25190* (CTES); idem, borde del caminho, 23 Sep 1974 (fl., ♀), *A. Krapovickas et al. 26147* (CTES); 2 km al S de Garruchos, ruta prov. 40, 23 Apr 1996, *F. Zuloaga & al. 5807* (SI!); 1 km

al S de Garruchos, 30 Apr 1997 (st.), *O. Morrone & al. 2242* (SI). BRAZIL. Rio Grande do Sul: Palmeira das Missões, Oct 1957 (fl, ♂), *K. Hagelund 689* (ICN, MBM). Santiago, 12 Oct 2019 (fl, ♂), *L.P. Deble & B.P. Moreira 18405* (PACA). São Francisco de Assis, RS377, em afloramento de basalto, 26 Nov 2020 (fl, ♂), *L.P. Deble & B.P. Moreira 20294* (PACA). Tupantuba, 2km ao s. da vila, 16 February 2022 (fl., ♀), *L.P. Deble & B.P. Moreira 21857* (PACA). Unistalda, RS277, em campo pós-fogo, 16 Oct 2021 (fl., ♀), *L.P. Deble & B.P. Moreira 21858* (PACA). PARAGUAY. Alto Paraná: Hernandarias, Reserva Tati Yupi, 9 September 1987 (fl., ♂), *N. Buttura 838* (MBM, CTES); idem, campo alto, 24 Sep 1980 (fl., ♂), *G. Caballero-Marmori 855* (CTES).

Distribution and habitat— *Lippia misionera* occurs in western and northwestern Rio Grande do Sul state, Brazil, northeast Corrientes and southern Misiones provinces, Argentina, and eastern Alto Paraná department, Paraguay. The specimens develop in dry environments, mainly on shallow and rocky soils developed on basalts and rhyolites of the Mesozoic fissure volcanic domain (CPRM 2009). The individuals display a characteristic cushion-like habit, growing associated with several others rare and interesting species characteristics of the shallow soils of the Misiones region, among them *Aloysia chamaedrifolia* Cham. (Verbenaceae), *Aspicarpa pulchella* (Griseb. ex Mart.) O'Donnell & Lourteig (Malpighiaceae), *Borreria poaya* DC. (Rubiaceae), *Croton subpannosus* Griseb. (Euphorbiaceae), *Galactia australis* (Malme) Ceolin & Miotto (Fabaceae), *Rhynchosia Hauthalii* Harms ex Kuntze (Fabaceae), *Notocactus oxycostatus* Buining and Brederoo (Cactaceae), *Oxypetalum aurantiacum* Malme and *O. coccineum* Griseb. (Apocynaceae), *Sida rubifolia* A. St.-Hil. (Malvaceae), *Piriqueta suborbicularis* (A. St.-Hil. and Naudin) Arbo (Turneraceae), several Asteraceae (among them *Chrysolaena propinqua* (Hieron.) H. Rob., *Praxelis missionum* (Malme) R.M. King & H. Rob., *Trichocline macrocephala* Less., and *Vernonanthura chamaedrys* (Less.) H. Rob.), and many bulbous species belong to the Amaryllidaceae (*Zephyranthes americana* (Hoffmanns.) Ravenna, *Z. caerulea* Baker, *Z. mesochloa* Herb. and *Z. tubispatha* (L'Hér.) Herb.) and Iridaceae (*Cypella fucata* Ravenna, *C. opalina* (Ravenna) Deble, *C. pusilla* (Link & Otto) Benth. & Hook.f. ex B.D. Jacks., *C. Ravenniana* Deble and F.S. Alves, *Kelissa brasiliensis* (Baker) Ravenna). *Lippia turnerifolia* Cham. was found in environments close to *L. misionera* in the municipality of Unistalda (Rio Grande do Sul, Brazil). However, no populations of both species were found growing side by side, and no intermediate specimens were recorded either.

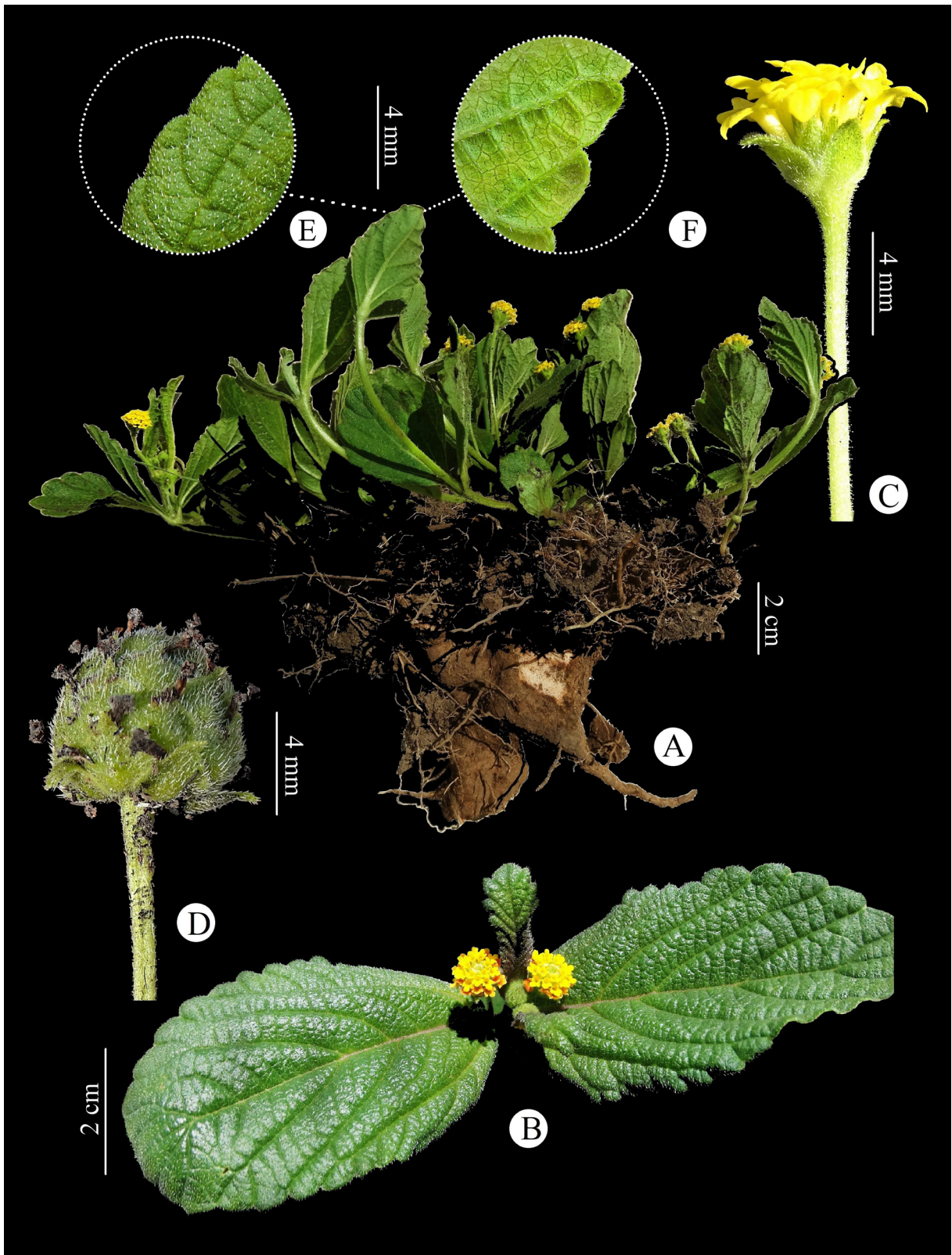


Figure 2. *Lippia misionera*. A. Habit from a staminate specimen. B. Branch of a pistillate specimen, upper view. C. Staminate spike. D. Pistillate spike, starting fruiting process. E. Leaf, adaxial surface. F. Leaf, abaxial surface.

Conservation— Nine populations of *Lippia misionera* are recognized, all containing few individuals, five of them are distributed in the west and northwest of the state of Rio Grande do Sul, Brazil, three populations are found in the provinces of Corrientes and Misiones in Argentina, and there are collections from a population in department of Alto Paraná in Paraguay. After determining the number of populations and geographic distribution of *L. misionera*, it was possible to verify, according to the GeoCat tool (Bachman et al. 2011), that the species has an extension of occurrence (EOO) of 42,293,720 km² and an area of occupation (AOO) of 36,000 km² which suggests its inclusion as “Near Threatened” (NT), according to the IUCN criteria (IUCN 2012, 2019). *Lippia misionera* has few known populations and requires a specific environment in shallow or undeveloped soils of volcanic origin. These environments are being modified by agriculture, mainly monocultures (soy and wheat), which may, in the near future, place the species in some degree of threat, according to the IUCN.

Observation— Múlgura (2000: 247) cited *Lippia coarctata* from Corrientes province, Argentina, mentioning the following information: “los ejemplares recolectados en Corrientes presentan las hojas de mayor tamaño que el indicado en la descripción original. Los caracteres morfológicos vegetativos y florales, son similares al ejemplar tipo, en cuanto a la forma y pubescencia de las hojas, morfología de la inflorescencia, flores etc”. We analyzed these materials and, although incomplete, due to the absence of complete rhizomes and ripe fruits, by the other morphological characteristics observed they must be attributed to *Lippia misionera*. Thus, *Lippia coarctata* should be excluded from the Argentinian flora.

Discussion— *Lippia misionera* is morphologically close related to *Lippia contermina*, both species show tuberous rhizomes, cushion-like habit and leaves similar in size, shape and texture. However, *Lippia misionera* displays glandular trichomes with 2–3-celled foot, 140–280 µm long (vs. 3–6-celled foot, 280–520 µm long), pedicels of the staminate spikes 1.5–5 cm long (vs. 6.5–10 cm long), pedicels of pistillate spikes 0.5–2 cm long (vs. 4.5–6 cm long), bracts of staminate spikes ovate or ovate-elliptic, acute at apex (vs. linear-lanceolate or lanceolate, long acuminate

at apex), bracts of pistillate spikes ovate or triangular, cuspidate at apex (vs. linear-lanceolate or lanceolate, long acuminate at apex), and fruits globose or depressed-globose, 2–3 × 2–3.5 mm (vs. broadly ovate or globose, 1.5–2 × 1–1.6 mm).

Lippia misionera also resembles *Lippia coarctata*, due its often reduced internodes, shorter pedicels of pistillate spikes, spikes with larger bracts and glandular trichomes covering all the plant. Nevertheless, the new species can be separated by its tuberous rhizome, 4–20 cm in diameter (vs. slender rhizome up to 1 cm in diameter), longer internodes of sterile nodes, larger leaves, 2–9 × 1.5–4.5 cm, with coriaceous texture and margin with 8–16 teeth on each side (vs. 1.5–4 × 0.9–2 cm, with chartaceous texture and margin with 2–6 teeth on each side), and globose or depressed-globose fruits, 2–3 × 2–3.5 mm (vs. ovate, 3–4.5 × 3–4 mm).

Lippia misionera is still morphologically related to *Lippia nana* Schauer, both species have a reduced habit with cushion-like habit, glandular trichomes covering leaves, stems, pedicels and bracts, leaves with similar shape, and bracts ovate, ovate-elliptic or triangular. However, *L. misionera* is a more robust plant, with longer internodes of sterile nodes (1–4 cm long vs. 0.5–1.5 cm), leaves with coriaceous blades, cuneate towards the base (vs. chartaceous blades, attenuate or long attenuate towards the base), with margin having 8–16 teeth on each side (vs. 3–8 teeth on each side, concentrated in its distal third), terminal sinflorescence (vs. basal), and shorter pedicels of staminate and pistillate spikes.

Lippia misionera easily differs from *L. asperrima* Cham. by its reduced habit, 5–20 cm high (vs. 30–80 cm high), with tuberose rhizome with obconical or obcordate shape and ca. 4–20 cm diameter (vs. slender rhizome with cylindrical shape and less than 2 cm diameter), shorter pedicels of staminate and pistillate spikes, broader bracts of staminate and pistillate spikes, and bigger fruits. *Lippia misionera* promptly differs from *L. turnerifolia* by its stems, leaves and pedicels densely covered by glandular trichomes and smaller size of staminate and pistillate flowers.

From the other species of the section *Diocolippia*, the new species is easily differentiated by a series of morphological characteristics. To facilitate their identification, below is presented a key to distinguish the species of the section *Diocolippia* modified of Deble et al. (2022).

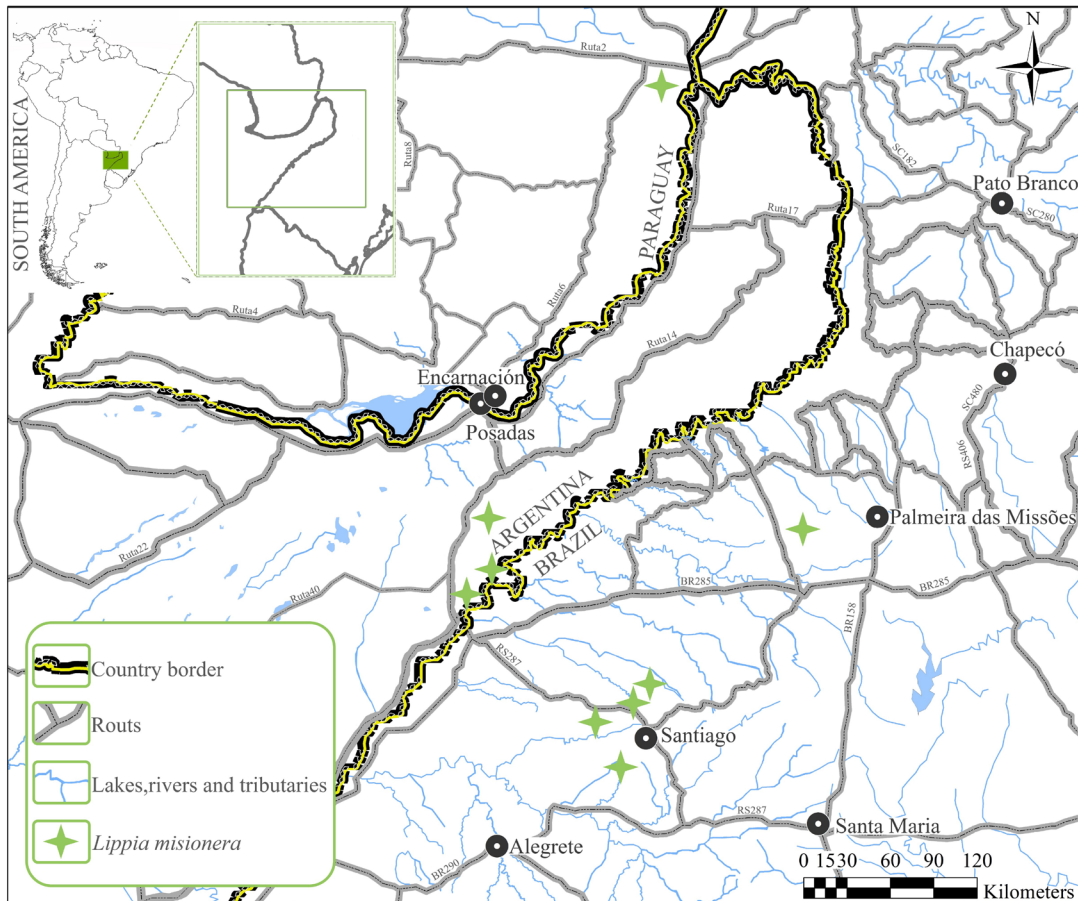


Figure 3. Geographic distribution of *Lippia misionera*.

Key to the species of *Lippia* sect. *Dioicolippia*

1. Fertile nodes with bracteiform leaves. Sinflorescence borne in terminal bracteiform racemes 2
 - Fertile nodes with developed leaves. Sinflorescence borne in axillar foliose racemes 3
2. Sterile nodes 2–4 concentrate in the proximal third of the plant *Lippia hieraciifolia*
 - Sterile nodes 8–12 (or more) extending in the proximal half of the plant *Lippia angustifolia*
3. Inflorescence much exceeding the branches, with pedicels 2–4 times longer than the leaf corresponding to the fertile node 4
 - Inflorescence not exceeding the branches (exceptionally slightly exceeding: *L. contermina*), with pedicels shorter or up to two times longer than the leaf corresponding to the fertile node 6
4. Subshrubs with slender rhizomes, branches erect or erect-ascending, 30–40 cm long. Leaves linear-elliptic or linear-oblong, blades with margin entire *Lippia aberrans*
 - Subshrubs with short and tuberous rhizomes, branches ascending or prostrate, 5–20 cm long. Leaves ovate, ovate-oblong or elliptic, blades with margin entire or toothed 5
5. Leaves with margin entire, rarely provide of 1–2-teeth on each side *Lippia longepedunculata*
 - Leaves with margin toothed, with 3–8-teeth on each side *Lippia villafloridana*
6. Dwarf subshrubs (usually less than 10 cm high), with few and very short internodes and 1–2 fertile nodes 7
 - Subshrubs or shrubs with 10–170 cm high, with 2 or more fertile nodes 11
7. Glandular trichomes abundant on leaves, stems, pedicels and bracts 8
 - Glandular trichomes absent or few, restricted to the pedicels and bracts 10

8. Fertile nodes basal. Pedicels of inflorescence up to two times longer than the leaf corresponding to the fertile node. Cerrados and Campos Rupestres in central Brazil (Distrito Federal, Goiás and Minas Gerais) *Lippia nana*
 – Fertile nodes terminal. Pedicels of inflorescence of equal length or shorter than the leaf corresponding to the fertile node. Campos region of Uruguay, Rio Grande do Sul (Brazil), northeast Argentina and southeast Paraguay 9
9. Plants forming a cushion-like habit. Rhizome tuberous, 4–20 cm in diameter larger. Leaves, 2–9 × 1.5–4.5 cm, with coriaceous texture and margin with 8–18 teeth on each side *Lippia misionera*
 – Plants with diffuse habit. Rhizome slender, up to 1 cm diameter. Leaves 1.5–4 × 0.9–2 cm, with chartaceous texture and margin with 2–6 teeth on each side *Lippia coarctata*
10. Leaves with adaxial surface of the blade covered by strigose pubescence, with trichomes applied to the blade, 0.5–1.2 mm long *Lippia turnerifolia*
 – Leaves with adaxial surface of the blade covered by hirsute pubescence, with trichomes erect or ascending, 1.4–3 mm long *Lippia crucifera*
11. Leaves usually ascending or erect, sometimes applied to the stem, with rounded, truncated, subauriculate or cordate blades 12
 – Leaves patent (exceptionally the most distal ascending), with attenuate or cuneate blades (rarely rounded at the bases, so leaves notably patent) 16
12. Leaves with crenulate margins along their entire length, veins well pronounced, adaxial surface bullate *Lippia Sandwithiana*
 – Leaves with entire or few toothed margins, only the principal veins pronounced 13
13. Leaves 3–6.5 cm long *Lippia coriacea*
 – Leaves 0.5–3 cm long 14
14. Leaves ovate, apex acute or acuminate, base cordate. Fruits with ca. 2 mm *Lippia tegulifera*
 – Leaves lanceolate or oblong-lanceolate, apex slightly acute, base subauriculate or truncate. Fruits with ca. 3–4 mm 15
15. Sterile nodes 5–10 or more, fertile nodes along of distal half of the plant. Internodes shorter than the leaves. Leaves discolorous by presence of abundant sericeous trichomes on abaxial surface of the blade *Lippia arechavaletae*
 – Sterile nodes 2–4 (rarely more), fertile nodes in the distal third of the plant. Internodes longer than the leaves. Leaves concolorous or slightly discolorous, sericeous trichomes when present restrict to the margins, veins or young leaves *Lippia pumila*
16. Leaves discolorous by presence of abundant sericeous trichomes on abaxial surface of the blade; blades with margin regularly serrate provides of 16–28 teeth on each side *Lippia Rodriguezii*
 – Leaves concolorous or slightly discolorous, sericeous trichomes when present restrict to the margins and veins; blades with margin irregularly toothed provides of up to 16 teeth on each side 17
17. Inflorescence with pedicels with abundant strigose or hirsute trichomes, 1.1–3.2 mm long. Bracts of pistillate spike ovate or triangular. Fruits ovate-turbinate, 3–5 mm long, with its distal part visible above the calyx 18
 – Inflorescence with pedicels with scarce strigose trichomes, up to 1 mm long. Fruits depressed-globose, globose or broadly ovoid. 1–3 mm long, completely hidden by the calyx 19
18. Leaves attenuate at the base. Blades with adaxial surface covered by strigose pubescence, with trichomes applied to the blade, 0.5–1.2 mm long *Lippia turnerifolia*
 – Leaves cuneate or rounded at the base. Blades with adaxial surface covered by hirsute pubescence, with trichomes ascending or erect-ascending, 1.4–3.2 mm long *Lippia polytricha*
19. Leaves with margin entire or with 1–4-teeth on each side *Lippia tristis*
 – Leaves with margin irregularly toothed provides of 6–16 teeth on each side 20
20. Plants provides of long horizontal rhizomes at the base 21
 – Plants provides of tuberose rhizome at the base 22
21. Leaves elliptic or oblanceolate, 2.5–11 × 1–4 cm, acute or obtuse at apex, with margin irregularly toothed, up to 12 teeth on each side, spaced. Pedicellate glandular trichomes with 240–450 µm long, covering stems, pedicels and leaves *Lippia asperrima*
 – Leaves linear-elliptic, elliptic-lanceolate or linear-oblanceolate, 3–10 × 0.5–1.5 cm, acuminate at apex, with margin irregularly serrated in its distal half, up to 8 teeth on each side, small, acute, appressed. Pedicellate glandular trichomes 90–180 µm long, absent or scarce on stems and pedicels, and absent in leaves *Lippia Morongii*
22. Staminate spikes with ovate or ovate-elliptic bracts, pistillate spikes with ovate or triangular bracts, 2–3.5 mm wide *Lippia misionera*

- Staminate and pistillate spikes with linear-lanceolate or lanceolate bracts, up to 2 mm wide 23
23. Plants with a cushion-like habit. Pedicellate glandular trichomes abundant, 280–520 µm long. Spikes with outermost bracts with long acuminate and reflexed apices *Lippia contermina*
- Plants with diffuse habit. Pedicellate glandular trichomes scarce to abundant, 90–180 µm long. Spikes with outermost bracts with acute and straight apices *Lippia modesta*

Acknowledgments

We are indebted to the curators and staff who helped us when consulting the different herbaria visited. We are also grateful to Andrés González and Hector Alejandro Keller for providing support during our trips in search of *Lippia* populations.

Declaration of conflicts of interest/competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to undermine the objectivity or integrity of the work reported in this paper.

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