







Species boundaries in *Lippia asperrima* and *Lippia turnerifolia* complex (Verbenaceae)

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Abstract. Species boundaries in *Lippia asperrima* and *Lippia turnerifolia* complex (Verbenaceae) The specific boundaries of *Lippia asperrima* and *L. turnerifolia* are discussed. *Lippia contermina* is accepted as segregated of *L. asperrima*, while *L. modesta* and *L. Morongii* are rehabilitated of the synonym of *L. turnerifolia*. *Lantana ovata* and *Lippia contermina* var. *hirsuta* are recognized as new synonymies of *Lippia contermina*, whereas *Lippia trachyphylla* is treated as cospecific of *L. modesta*, and *L. asperima* f. *angustifolia* is reduced under *L. Morongii*. All treated species are described and illustrated, and information on taxonomic relationships and morphological limits are discussed. A Dichotomous key for distinguishing the species of *Lippia* sect. *Dioicolippia* is proposed. *Lippia* sect. *Dioicolippia* comprises 21 species distributed mainly in southern and central-western Brazil, northeast and northern Argentina, Paraguay and Uruguay.
Keywords: Argentina, Bolivia, Brazil, Conservation, *Dioicolippia*, Paraguay, taxonomy, Uruguay.

Resumo. Limites específicos no complexo de *Lippia asperrima* e *Lippia turnerifolia* (Verbenaceae) Os limites específicos de *Lippia asperrima* e *L. turnerifolia* são discutidos. *Lippia contermina* é reconhecida como distinta de *L. asperrima*, enquanto *L. modesta* e *L. Morongii* são reabilitados da sinonímia de *L. turnerifolia*. *Lantana ovata* e *Lippia contermina* var. *hirsuta* são considerados novos sinônimos de *Lippia contermina*, enquanto *Lippia trachyphylla* é considerada coespecífica de *L. modesta*, e *L. asperima* f. *angustifolia* é reduzida a sinonímia de *L. Morongii*. Todas as espécies tratadas são descritas e ilustradas, sendo inferidas informações sobre relações taxonômicas e limites morfológicos, além de ser proposta chave para a distinção das espécies de *Lippia* sect. *Dioicolippia*. *Lippia* sect. *Dioicolippia* compreende 21 espécies distribuídas principalmente no sul, sudeste e centro-oeste do Brasil, nordeste e norte da Argentina, Paraguai e Uruguai.
Palavras-chave: Argentina, Bolívia, Brasil, Conservação, *Dioicolippia*, Paraguai, taxonomia, Uruguai.

In view of the high number of species and the different morphological groups recognized in *Lippia* Linnaeus (1753: 633), its taxa were grouped into infrageneric categories (Schauer 1847, Grisebach 1866, Briquet 1897, Troncoso 1961, 1974). The section *Dioicolippia* was described by Troncoso (1974) to include nineteen species: *Lippia aberrans* (Briquet, 1904: 1160) Troncoso (1961: 267), *L. angustifolia* Chamisso (1832: 377), *L. asperrima* Chamisso (1832: 215), *L. Arechavaletae* Moldenke (1940: 420), *L. contermina* Briquet (1904: 1157), *L. coriacea* Briquet (1904: 1160), *L. hieraciifolia* Chamisso (1832: 375), *L. intermedia* Chamisso (1832: 378), *L.*

longepedunculata Kuntze (1898: 253), *L. modesta* Briquet (1904: 311), *L. Morongii* Kuntze (1898: 253), *L. phaeocephala* Briquet (1904: 1158), *L. polytricha* Briquet (1904: 1158), *L. Rodriguezii* Moldenke (1940: 426), *L. scaposa* Briquet (1904: 1162), *L. tegulifera* Briquet (1904: 309), *L. trachyphylla* Briquet (1904: 312), *L. tristis* Briquet (1904: 1159) and *L. villafloridana* Kuntze (1898: 253). Subsequently, Troncoso (1975) added *Lippia coarctata* Troncoso (1975: 490) to *Dioicolippia*. Múlgura (2000) revised *Dioicolippia* and reduced the number of valid taxa to fifteen (14 species and a variety), establishing new synonyms for *Lippia asperrima*, *L. hieracifolia* and *L. turnerifolia*

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Chamisso (1832: 217) and including *L. pumila* Chamisso (1832: 218) in *Dioicolippia*. Salimena & Múlgura (2015) added *Lippia nana* Schauer (1847: 582) to the synonymy of *L. pumila* and this treatment was followed for Brazilian Flora (BFG 2015, 2018, 2021 [2022]). Later, Cardoso *et al.* (2019) reestablished *Lippia nana* as a distinct taxon from *L. pumila*. More recently, Moreira *et al.* (2021) described *Lippia crucifera*, including it in *Dioicolippia*. In one last contribution, Moreira *et al.* (2022) rehabilitated *Lippia Rodriguezii* from the synonymy of *L. asperrima*, and currently, 17 taxa are recognized for *Lippia* sect. *Dioicolippia* (IBODA 2022+). *Lippia* sect. *Dioicolippia* 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 corolla yellow or yellow-orange (Múlgura 2000).

During the analysis of exsiccates of species of *Lippia*, it was evidenced a problematic to recognize the limits between *Lippia asperrima* and *L. turnerifolia*, two taxa described by Chamisso (1832) that have a wide geographic distribution, phenotypic plasticity, extensive list of synonyms and, with often have their names assigned to different species of *Lippia*. In view of the restriction to the recognition of species based solely on the analysis of dry material, field trips were carried out in southern Brazil, Uruguay, northeastern Argentina and southern Paraguay to search for type locations and identify different populations that represent the morphologic variations of these taxa. With the data obtained, four species previously recognized as synonyms are re-established as valid species, new synonyms are recognized within the section *Dioicolippia*, and an updated key for the species of *Lippia* sect. *Dioicolippia* is proposed.

Results

Lippia asperrima Chamisso, *Linnaea* 7: 215. 1832. Typus: BRAZIL. “E Brasilia tropica misit Sellow” (holotypus: B destroyed). Lectotypus (designated by Múlgura 2000: 248): BRAZIL. Rio Grande do Sul: ebenda von Alegrete über die Misiones durch den nördlichen Teil des Staates nach Porto Alegre, May–November 1826, *F. Sellow s.n.* [=3743] (K000470912 image seen! isolectotypi P00713661 image seen! HAL0098269 image seen!).

Dioecious subshrubs, 30–80 cm high, with long rhizomes and 2–5 branches, branches 2–4-branched at proximal third, with 2–6 sterile nodes with internodes 1–7 cm long, and up to 10 fertile nodes with internodes 3–7 cm long; densely covered by pedicellate glandular trichomes 240–480 μm long, with a 3–6-celled foot and strigose trichomes with verrucose wall and 400–800 μm long. Leaves opposite, sessile or shortly petiolate; blades elliptic or oblanceolate, 2.5–11 \times 1–4 cm, apex acute, base attenuate, chartaceous, concolorous, abaxial surface with strigose trichomes scattered, pedicellate glandular trichomes scarce accompany the veins, scabrous trichomes few, restricted to the veins, adaxial surface with strigose trichomes scattered and mixed with pedicellate glandular trichomes; leaf margin irregularly toothed, up to 12 teeth on each side, acute or obtuse, spaced, slightly revolute, the most basal leaves smaller and ovate or broadly oblong. Synflorescence in axillary racemes, arranged on up to 10 fertile nodes. Inflorescence pedunculate, on capituliform racemes; peduncles 3.5–8 cm long, with of equal length or a few shorter or a few longer than the leaf corresponding to the fertile node, with dense glandular and non-glandular strigose trichomes. Staminate spike broadly ovate, 8–10 \times 6–10 mm. Bracts lanceolate, apex acuminate, adaxial surface with dense strigose trichomes mixed with pedicellate trichomes; the outermost 3.5–5 \times 1–2 mm, the innermost 4–5 \times 1–1.5 mm. Staminate flowers lacking a calyx; corolla 4–5 mm long, light yellow, infundibuliform, tube hairy on the distal half, stamens with anthers visible at apex of the throat; anthers 0.2–0.3 mm long, pollen yellow; pistil absent. Pistillate spike ovate, 6–10 \times 6–10 mm. Bracts lanceolate or oblanceolate, apex acute, adaxial surface with dense strigose trichomes mixed with pedicellate glandular trichomes; the outermost 3–4.5 \times 1.5–2 mm, the innermost 4–6 \times 1.5–2 mm. Pistillate flowers with diminutive calyx, bilobed, ca. 0.3 mm long, externally sericeous; corolla 4–5 mm long, light yellow, infundibuliform, tube hairy on the distal half; stamens absent; gynoecium 2–2.5 mm long; ovary ca. 0.5 mm long. Fruit a schizocarp, globose or depressed-globose, 1.2–2 \times 1.2–2 mm long.

Material examined— ARGENTINA. Without precise place, Jan 1821, *M. A. Bonpland* 516 (P03607949 image seen!). Chaco: Colonia Benitez, 26 Oct 1968, *G. Schulz* 16438 (P03788244 image seen!). Colonia Vanguardia, May 1876, *M. Calot* 47 (P03607952 image seen!). Colonia Vanguardia,

May 1876, *M. Calot 48* (P03607950 image seen! P03607951 image seen!). Santa Fecino, Mocovi, 16 Sep 1903, *S. Venturi s.n.* (P03607947 image seen!). Corrientes: Alredores de Colonia Carolina, 59 10'W 29 12'S, 10 km S, 8 Mar 1995, *A. Schinini et al. 29170* (CTES!). Berón de Astrada, Santa María y ruta 12, 23 Oct 1979, *R. Carnevali 4004* (CTES!). Capital, 10 km S de Corrientes, 27 Dec 1974, *A. Schinini 10757* (CTES!). Concepción, 6 km E de Santa Rosa, estancia Millán, 27 Mar 1975, *M. M. Arbo et al. 910* (CTES!). Esquina, Quinta Los Olivos, 11 Mar 1975, *A. Krapovickas 27333* (CTES!); INTA, camino vecinal proximo al acceso a la casa Paiva, 15 Dec 2004, *F. Nuñez 1105* (CTES!). General Paz, Lomas de Vallejos, 29 Aug 1973, *A. Schinini & C. Quarín 7014* (CTES!); General Paz, Villanueva, 11 Oct 1982, *T. M. Pedersen 13428* (CTES!). Itatí, ruta 12, 37 km E del desvío a Itatí, 18 Feb 1983, *A. Schinini & R. Carnevali 23306* (CTES!). Ituzaingó, 8 km de ruta 12 en camino vecinal a Ea. San José, 18 Feb 2002, *S.G. Tressens et al. 6713* (CTES!); Ituzaingó, 9 km de ruta 12, camino a San Carlos, 11 Apr 1974, *A. Krapovickas et al. 24898* (CTES!); Ituzaingó, 15 km E de ruta 12, camino a San Carlos, 11–13 Feb 1971, *A. Krapovickas et al. 18089* (P03607943 image seen! CTES!); Ituzaingó, 40 km al NE de Colares, ruta 41, 8 Mar 1974, *C. Quarín et al. 2712* (P03607943 image seen! CTES!); Ituzaingó, Isla Apipé Chico, 29 Sep 1978, *A. Schinini & R. Vanni 15464* (CTES!). Ituzaingó, Isla Apipé Grande, Puerto San Antonio, 10 Dec 1973, *A. Krapovickas et al. 24098* (CTES!). Mercedes, Pellegrini, antes del piedraplen, 6 Mar 1973, *C. Quarín & A. Schinini 1031* (CTES!). Mburucujá, 32 km E Saladas Ez. Pindapoy, 26 Nov 1970, *R. Carnevali 2276* (CTES). Mburucujá, Estancia Santa Teresa, 14 Oct 1954, *A. Burkart 19566* (P03788246 image seen! SI!). San Luis del Palmar, 14 km E de S.L. del Palmar, camino a Herlitzka, 29 Jan 1972, *L. Mroginski et al. 511* (CTES!). San Martín, Carlos Pellegrini, 11 km al N, 30–31 Oct 1971, *A. Krapovickas et al. 20193* (CTES!). San Martín, Carlos Pellegrini, 8 km al N, Ruta 14, 8 Oct 1971, *A. Krapovickas et al. 20127* (CTES!). San Martín, Ruta 14, 20 km de Col. Pellegrini, 1 Nov 2001, *A. Schinini et al. 35705* (CTES!). San Martín, orillas de laguna Iberá, 5 Nov 1973, *A. Schinini 7806* (CTES!). San Martín, Estero Cambá Trapo desde ruta 40, Paraje Cambá Trapo, 28°32'00"S, 57°05'00"W, 26 Apr 2006, *M. M. Arbo et al. 9131* (CTES!). San Miguel, camino a Loreto, ruta prov. 118 a 18km S de ruta 12 orilla de camino, 26 Sep 2007, *A. Schinini 36858* (CTES!). Entre Ríos: Colón, Parque Nacional El Palmar, 15 Dec 2014, *M. Ferrucci et al. 3321* (CTES!). Concordia, Salto Grande Casa de Piedra, 3 Oct 1978, *S. A. Renvoize 2883* (P03607945 image seen!). Federación, Santa Ana, 15 Oct 1968, *E. G. Sosa 92* (CTES!). Paraná, cerro próximo al hospicio, 1 Nov 1970, *A. Burkart 28068b* (P03788247 image seen!). Ubajay, Palmar de Colón, arroyo Capilla, 1 Dec 1969, *A. Burkart 27763* (CTES! SI!). Selva marginal del rio Uruguay, 15 Dec 2014, *M. S. Ferrucci et al. 3321* (CTES! HUEFS236038!). Formosa: Pirané, Casco Cué, 31 Jan 1946, *I. Morel 785* (U1756260 image seen!). Estancia El Ombu, bosque de ribera, 17 Dec 2004, *H. Maturo & D. Prado 219* (CTES!). BRAZIL. [doubtful place]: Rio de Janeiro, Floresta da Tijuca, 25 Oct 1872, *A. Glaziou 4998* (P03607967 image seen!). Rio Grande do Sul: without precise place, 1816–1821, *A. Saint-Hilaire 2606* (P03607966 image seen!). Dom Pedrito, BR293, Santa Zilda, 30 Nov 2018, *L. P. Deble 16851* (CTES!). Itaquí, BR472 23 km após entrada para Maçambará na beira da estrada, 12 Oct 2018, *L. P. Deble*

& *B. P. Moreira 17328* (CTES!). Uruguaiana, Estación experimental de Uruguaiana, 27 Feb 1969, *A. Pott 49* (RB145054!). PARAGUAY. Concepción: "Iter ad Paraguayam septentrionalem, prope Concepcion", Sep 1901–2, *E. Hassler 7456* (BM000098713 image seen!, NY00137797 image seen!, original syntypes of *Lippia phaeocephala*). Cordillera: Cordillera de los Altos, Jan 1898, *E. Hassler 3769* (P03607955 image seen!). Cerros de Tobaty, Sep 1900, *E. Hassler 6348* (P03607959 image seen! P03607962 image seen!). Lacus Ypacarai, Jan 1898, *E. Hassler 3728* (P03607960 image seen!). Itú, Caacupé, cercanías de arroyo, Feb 1969, *A. Schinini 2714* (CTES!). Piribebuy, 18 Dec 1965, *T.M. Pedersen 7571* (U0182349 image seen!). Guairá: Col. Independencia, Ca. Propiedad Tilinski, borde del agua, 6 Oct 1967, *A. Lourteig 1909* (P03607961 image seen!). Misiones: 12 km W de San Ignacio, camino a Pillar, 15 Nov 1978, *M. Arbo et al. 1906* (CTES!). Paraguari: Cerro Pelado, 29 Oct 1874, *B. Balanse 1036a* (P03607958!). Salto de Piraretá, afloramientos rocosos, márgenes del arroyo Yhaguy Guazú, 14 Nov 1978, *M. Arbo et al. 1689* (CTES!).

Nomenclatural notes— Chamisso (1832) not provided a precise indication of the place of collection and he mentioned in the protologue <*E Brasilia tropica misit Sellow*>. The lectotype chosen by Múlgura (2000: 248) deposited at K herbarium has the following information <Reliquiae d. Sello> <*Ex Museo botanico Berolinensi. 15 Nov 1907*>, the number 3743 is handwritten. According to Urban (1893) in his study of Sellow's itineraries in Brazil and Uruguay, the collection *Sellow 3743* was made <*ebenda von Alegrete über die Misiones durch den nördlichen Teil des Staates nach Porto Alegre, V-XI 1826*>. At P and HAL Herbaria there are materials with the indication *Sellow s.n.* which supposedly represent duplicates of the material at K Herbarium.

Discussion— *Lippia asperrima* is very similar to *L. Morongii* and *L. turnerifolia*, all these species share similar leaves, inflorescences and flowers. However, *L. asperrima* can be distinguished from *L. turnerifolia* by its bigger size (30–80 cm vs. 5–40 cm), by its slender and long rhizomes (vs. short and tuberose rhizome), by its glandular trichomes with 3–5-celled foot, 240–450 µm long (vs. glandular trichomes 2–3-celled foot, 160–240 µm long), covering abundantly stems and peduncles (vs. absent on stems and scarce on peduncles) and by its globose or depressed-globose fruits, 1–2 mm long (vs. ovoid-turbinate fruits, 3.5–5 mm long). *Lippia asperrima* differs from *L. Morongii* by its glandular trichomes with 3–5-celled foot, 240–480 µm long (vs. glandular trichomes 2–3-celled foot, 90–180 µm long), covering abundantly stems and peduncles



Figure 1. *Lippia asperrima*. A. Basal part of the plant showing the rhizome. B. Distal part showing the flowering branch. C. Leaf, abaxial and adaxial view. D. Staminate spike. E. Staminate flower. F. Outer bract of staminate spike. G. Inner bract of staminate spike. H. Pistillate spike. I. Pistillate flower. J. Outer bract of pistillate spike. K. Inner bract of pistillate spike. L. Fruit. M. Gladular trichome. N. Strigose trichome. A-G, M-N from Deble 16851. H-L from Deble & Moreira 17328.

(vs. absent or scarce on stems and absent or scarce on peduncles), by its leaves acute or obtuse at apex, with blades elliptic or oblanceolate, 2.5–11 × 1–4 cm (vs. acuminate at apex, with blades linear-elliptic, elliptic-lanceolate or linear-oblanceolate, 3–10 × 0.5–1.5 cm); leaf margin irregularly toothed, up to 12 teeth on each side, acute or obtuse, spaced (vs. leaf margin irregularly serrated in its distal half, up to 8 teeth on each side, small, acute, appressed) and by its globose or depressed-globose fruits, 1–2 mm long (vs. broadly ovoid fruits, 2–2.5 mm long).

Lippia contermina Briquet, Bulletin de l'Herbier Boissier, ser. 2, 4: 1157. 1904. Typus: PARAGUAY. "in dumeto pr. Fort Lopez, Sept., n. 912 (...) in valle fluminis Y-aca, in campo pr. Valenzuela, Jan., n. 6941". Lectotypus (designated by Troncoso 1961: 270): PARAGUAY. Cordillera: Valenzuela, "in valle fluminis Y-aca, in campo pr. Valenzuela [Valenzuela]", ♀, January 1900, *E. Hassler 6941* (G00307900 image seen! isolectotypus BM000098690 image seen!)

= *Lippia turnerifolia* var. *camporum*. Typus: ARGENTINA. Tucumán: Prov. Tucumán. [Post Rozo al alto nah Tucumán], ♂, 22 December 1871, *P.G. Lorentz 54* (holotypus GOET011515 image seen! isotypi CORD00006128 image seen! K000470931 image seen!).

= *Lantana ovata* Hayek, Repertorium Specierum Novarum Regni Vegetabilis 2: 163. 1906. Typus: BOLIVIA. Without specific place and date, ♀, *H. Cumming 150* (holotypus W0074839 image seen!). **syn. nov.**

= *Lippia contermina* var. *hirsuta* Moldenke, Phytologia 51 (2): 162. 1982. Typus: PARAGUAY. Paraguari "between Caapucú and Villafloresta, Paraguay, in a dry field about 8 km from Villafloresta" ♂, 15 September 1980, *J. Fernandez Casas & J. Molero 3660* (holotypus K not seen, isotypus NY00064121 image seen!). **syn. nov.**

Dioecious subshrubs, 20–50 cm high, with tuberose rhizome from which several branches depart, branches unbranched or 2-branched at proximal third, erect-ascending, with 2–5 sterile nodes with internodes 1–4 cm long, and 2–3 fertile nodes with internodes 2.5–5 cm long; densely covered by pedicellate glandular trichomes with a 3–6-celled foot and 280–520 µm long, and strigose trichomes with verrucose wall and 650–1.000 µm long. Leaves opposite, shortly petiolate, petioles up to 1 cm long; blades obovate, broadly elliptic or oblanceolate, 2.5–7 × 1.5–4 cm, apex obtuse or rounded, base attenuate, chartaceous, concolorous or slightly discolorous, abaxial surface with strigose trichomes scattered, pedicellate glandular trichomes scarce accompany the veins, scabrous

trichomes few, restricted to the veins, adaxial surface with scabrous trichomes scattered and mixed with pedicellate glandular trichomes; leaf margin irregularly toothed, up to 8 teeth on each side, acute or obtuse, spaced, slightly revolute, the most basal smaller and broadly obovate or nearly circular. Synflorescence in axillary racemes, arranged on 2–3 fertile nodes. Inflorescence pedunculate, on capituliform racemes; peduncles 4.5–10 cm long, with of equal length or up to twice as long that the leaf corresponding to the fertile node, with dense glandular and non-glandular strigose trichomes. Staminate spike hemispheric or broadly campanulate, 4–7 (9) × 3.5–7 mm. Bracts linear-lanceolate to lanceolate, apex long acuminate, the innermost revolute at apex, adaxial surface with dense strigose trichomes mixed with pedicellate glandular trichomes; the outermost 4–7 × ca. 1 mm, the innermost 3–4 × 1–1.5 mm. Staminate flowers lacking a calyx; corolla 1.5–3.5 mm long, light yellow to orange, infundibuliform, tube glabrous or 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 hemispheric or campanulate, 4–7 × 3–6 mm. Bracts linear-lanceolate to lanceolate, apex long acuminate, the innermost revolute at apex, adaxial surface with dense strigose trichomes mixed with pedicellate glandular trichomes; the outermost 4–6 × ca. 1 mm, the innermost 4–6 × 1.5–2 mm. Pistillate flowers with diminutive calyx, bilobed, ca. 0.1 mm long, externally sericeous; corolla 2–4 (6) mm long, light yellow or greenish-yellow, infundibuliform, tube glabrous or with few hairs on the distal half; stamens absent; gynoecium 1.5–2 mm long; ovary ca. 0.5 mm long. Fruit a schizocarp, globose or broadly ovoid, 1.5–2 × 1–1.6 mm long.

Material examined– ARGENTINA. Chaco: 1° de Mayo, Colonia Benitez, Nov 1931, *A. Schulz 132* (CTES!); idem, 16 Sep 1956, *A. Schulz 9087* (CTES! MBM!); idem, 26 Oct 1968, *A. Schulz 16438* (CTES!); idem, Nov 1937, *A. Schulz* (CTES!). Corrientes: Capital, Perichón, 9 Oct 1975, *L. Anzotegui et al. 255* (CTES!); costa del río Paraná, 7 Apr 1974, *A. Schinini 8728* (CTES!). Esquina, sobre ruta 25, 2 Mar 1980, *O. Ahumada et al. 3465* (CTES!). Ituzaingó, Frente a Saltos del Apipé, 21 Nov 1973, *A. Lourteig et al. 2938* (P03607948 image seen!); idem 1 Sep 1979, *M. Arbo et al. 2358* (CTES!). Santo Tomé, Ea. Timbó, Ayo, Ciriaco y ruta 40, 27 Feb 1983, *A. Schinini et al. 23474* (CTES!). Formosa: Laishi, Reserva Ecológica El Bagual, 2 Oct 1998, *A. Di Giacomo 396* (CTES!). Misiones: Candelaria, Santa Ana, 22 Sep 1945, *J. E. Montes 1088* (P03607954 image seen!); ruta prov. 3, de Cerro Corá a ruta Nac. 12, 4 km de Cerro Corá, 23 Mar 1998, *F.O. Zuloaga 6582* (SI!).



Figure 2. *Lippia contermina*. A. Plant, showing the tuberous rhizome. B. Fertile staminate node, showing a staminate spike and pedicel. C. Leaf, adaxial view. D. Staminate flower. E. Bracts of staminate spike. F. Pistillate spike. G. Pistillate flower. H. Bract of pistillate spike. I. Fruit. J. Glandular trichomes. K. Strigose trichomes. A-E, J-K from Deble & Moreira 18406. F-I from Schinini et al. 23474.

Concepción, alrededores de Concepción de la Sierra, 25 Feb 2001, R. Vanni et al. 4580 (CTES!). San Ignacio, Pastoreo, 19 Apr 1956, J. E. Montes 14869 (US031994417 image seen!). Jujuy: Capital, quebrada de Jaire, A.L. Cabrera et al. 34316 (SI!). Manuel Belgrano, Sierra de Zapla, 12 Feb 2010, F.O. Zuloaga et al. 11584 (SI!). SALTA: Caldera, Yacones, 11 Mar 1952, H. Sleumer & F. Verveorst 2778 (SI!). Rosario de Lerma, ruta 51, camino de ciudad de Salta a San Antonio de Los Cobres, 16 Feb 2002, A.M. Cialdella et al. 372 (SI!). Tucumán: San Javier, 29 Mar 1888, M. Lillo 371 (P03607942 image seen!). Tafi Viejo, Ruta Provincial 338, 5 Nov 1978, S. A. Renvoize 3371 (P03607946 image seen!); Sierra de San Javier, 11 Feb 1925, S. Venturi 3614 (US03198699 image seen!). BOLIVIA. Marbán: La Laguna, A. d'Orbigny 1146 (W127452 image seen!). BRAZIL. Rio Grande do Sul: Without precise place, 1816–1821, A. Saint-Hilaire (P03607587 image seen!). Ijuí, BR285, km 352, 20 Feb 1984, O. L. Bueno et al. 3926 (HAS19877! MBM0161864 image seen!). Palmeira das Missões, Oct 1957, K. Hagelund 689 (MBM 113227!). Panambi, Colônia Neu-Württemberg estância L. Gomez, 18 Oct 1904, A. Bornmüller 500 (W6631 image seen!). São Borja, p. Garruchos, 4 Feb 2013, L. P. Deble et al. 14328 (CTES!). São Luiz das Missões, 4 Feb 1949, A. Sehnen 3604 (PACA!). PARAGUAY. Without precise place, 1885–1895, E. Hassler 912 (P03607965 image seen!). Chaco: Ad. Ripam occidentalem flum. Paraguay, Oct 1903, E. Hassler 2359 (P03607963 image seen!). Caaguazú: Mar 1905, E. Hassler 9312 (P03607957 image seen!). Guairá. Col. Independencia, ca. propiedad Tilinski, borde del agua, 6 Dec 1967, A. Lourteig 1909 (US03198708 image seen! SI!). BRAZIL/URUGUAY. Without precise place “Banda oriental del Uruguay”, 1816–1821, A. Saint-Hilaire 2408 (P03607964 image seen!). URUGUAY. Rivera: ruta 30, subida de Peña, 2 Nov 2019, L.P. Deble & B.P. Moreira 18406 (MVFA! CTES!).

Nomenclatural notes I— The type of *Lantana ovata* differs from *Lippia contermina* by the larger diameter of the inflorescence (up to 9 mm) and by the outer bracts, acute and with a non-reflex apex (vs. acuminate, at apex reflexes) and by the female flowers up to 6 mm long (vs. 2–4 mm); however, the other morphological characteristics demonstrate that *Lantana ovata* and *Lippia contermina* are conspecific.

Nomenclatural notes II— The type of *Lippia contermina* var. *hirsuta* slightly differs from the type of *L. contermina* by its longer internodes and branches and leaves with abundant strigose trichomes. However, no additional morphological features were observed that could justify both taxa as distinct.

Discussion— *Lippia contermina* is easily recognized by its inflorescences born on longer

peduncles and in small spikes, hemispherical or campanulate in shape, and by its outermost bracts linear-lanceolate, with long acuminate and reflexes apices. This species is closely related to *L. modesta*; however, differs by its cushion-like habit, with erect-ascending branches (vs. diffuse habit, with ascending-prostrate branches), by its pedicellate glandular trichomes abundant on stems and peduncles, 280–520 µm long and 3–6-celled foot (vs. pedicellate glandular trichomes scarce to abundant on stems and peduncles, 90–180 µm long, and 2–3-celled foot), and by its smaller spikes with outermost bracts linear-lanceolate, with long acuminate and reflexes apices. *Lippia contermina* was considered synonym of *L. asperrima* by Múlgura (2000); however, the species is easily separated by its cushion-like habit, shape of leaves, and mainly by the shape of inflorescences and smaller size of staminate and pistillate flowers.

Lippia modesta Briquet, *Annuaire du Conservatoire & du Jardin Botaniques de Genève* 7-8: 311. 1904. Typus: PARAGUAY. Guairá: “Plaine située à l’ouest du Cerro-Peron [Perõ], près de Pirayu, juin 1874 (n. 1036c)” ♂ and ♀, June 1874, B. Balansa 1036c (holotypus P00713710 image seen! isotypus SI003557!) = *Lippia trachyphylla* Briquet, *Annuaire du Conservatoire & du Jardin Botaniques de Genève* 7-8: 312. 1904. Typus: PARAGUAY. Cordillera: “Bords argileux près de l’Y-acanguazu, près de Valenzuela, novembre 1882, tiges couchées, fleus d’un rose violet (n. 4626)” ♀, B. Balansa 4626 (holotypus G00307837 image seen! isotypus P00166258 image seen!). **syn. nov.**

Diocious subshrubs, 10–40 cm high, with tuberous rhizome from which 3–8 branches depart and several branches, branches unbranched or 2-branched at proximal third, prostrate or prostrate-ascending, with 1–4 sterile nodes with internodes 1–4 cm long, and 1–3 fertile nodes with internodes 1.5–3 cm long; with abundant strigose trichomes with verrucose wall and 750–1.200 µm long, and scarce to dense pedicellate glandular trichomes 90–180 µm long, with a 2–3-celled foot, ad often hidden by the strigose trichomes. Leaves opposite, shortly petiolate, petioles up to 1 cm long; blades obovate, obovate-elliptic or oblanceolate, 1–5 × 0.5–2.5 cm, apex obtuse or rounded, base attenuate, chartaceous, concolorous or slightly discolors; abaxial surface with strigose trichomes scattered, pedicellate glandular trichomes absent or scarce accompany the veins,



Figure 3. *Lippia modesta*. A. Plant, showing part of rhizome. B. Fertile staminate node, showing a staminate spike, pedicel and leaf. C. Leaf, abaxial and adaxial view. D. Staminate flower. E. Staminate bracts. F. Pistillate spike. G. Pistillate flower. H. Pistillate bracts. I. Pistil. J. Fruit with dry corolla. K. Glandular trichome. L. Strigose trichome. M. Sericeous trichome. N. Hirsute trichome from abaxial surface of the leaf. All from Deble & Moreira 17327.

sericeous trichomes absent or abundant, with smooth wall and 70–120 µm long, adaxial surface with scabrous trichomes abundant, 240–500 µm long; leaf margin irregularly toothed, up to 6 teeth on each side, acute or obtuse, spaced, slightly revolute, the most basal smaller and broadly obovate or nearly circular. Synflorescence in axillary racemes, arranged on 1–3 fertile nodes. Inflorescence pedunculate, on capituliform racemes; peduncles 1.5–5 cm long, with of equal length or up to twice as long that the leaf corresponding to the fertile node, with abundant strigose trichomes and scarce pedicellate glandular-trichomes. Staminate spike campanulate to hemispheric, 5–10 × 3.5–8 mm. Bracts lanceolate, elliptic-lanceolate or linear-elliptic, apex acuminate, adaxial surface with dense strigose trichomes mixed with pedicellate glandular trichomes; the outermost 4–5 × ca. 1 mm, the innermost 3–4.5 × 0.7–1.5 mm. Staminate flowers lacking a calyx; corolla 3.5–4.5 mm long, light yellow, infundibuliform, tube glabrous or with few hairs on the distal half, stamens with anthers visible at apex of the throat; anthers ca. 0.2 mm long, pollen yellow; pistil absent or rudimentary. Pistillate spike campanulate become ovoid at fruit maturity, 5–10 × 3–6 mm. Bracts lanceolate to elliptic, apex acuminate, adaxial surface with dense strigose trichomes mixed with pedicellate glandular trichomes; the outermost 4–5 × 1–1.5 mm, the innermost 4–5 × 1.5–2 mm. Pistillate flowers with diminutive calyx, bilobed, ca. 0.1 mm long, externally sericeous; corolla 3–4 mm long, light-yellow or greenish-yellow, infundibuliform, tube glabrous or with few hairs on the distal half; stamens absent; gynoecium 1.5–2 mm long; ovary ca. 0.5 mm long. Fruit a schizocarp, globose or broadly ovoid, 1–1.5 × 1–1.5 mm long.

Material examined— ARGENTINA. Corrientes: Empedrado, Arroyo Gonzáles y Ruta 12, 27 Feb 1974, C. Quarin et al. 2247 (CTES!); Lavalle, Ruta 12, 7 km N de empalme con Ruta 120, 29–31 Oct 1974, S. Tressens et al. 670 (CTES!). Rincón del Madregón, 24 Mar 1972, R. Carnevali 2932 (CTES!); Ruta Nac. 12, km 958, Ayo San Lorenzo, 5 Apr 2005, O. Morrone et al. 5326 (CTES!). Ituzaingó, Ea. Santa Rita, 2 Mar 1987, A. Krapovickas et al. 41046 (CTES!); 20 km E de Ituzaingó, ruta nac. 12, 20 Sep 1970, A. Krapovickas & C. L. Cristóbal 16082 (CTES!). Frente a Saltos del Apipé, 21 Nov 1973, A. Lourteig et al. 2938 (CTES!). Mburucuyá, Parque Nacional Mburucuyá, Pastizal al borde del estero Santa Lucía, 17 Oct 2006, M. Arbo et al. 9310 (CTES!). San Martín, Ruta 14, Est. “Itá Berá” (25 km N de C. Pellegrini), 22 Feb 1976, J. Irigoyen 264 (CTES!); Arrocería Drews, 10 km NE de Carlos Pellegrini, 20 Feb 1976, A. Krapovickas et al. 29393 (CTES!); Carlos Pellegrini, 8 km al N. Estero Cambá Trapo, 1 Nov 1971, A. Krapovickas et al. 20319

(CTES!). Santo Tomé, Gobernador Virasoro, Ruta Nac. No. 14, 30 Nov 1970, A. Krapovickas et al. 16661 (CTES!); de Santo Tomé a Virasoro Ruta Nac. 14, 11 Apr 1996, F. Zuloaga et al. 5370 (CTES!); ruta 38, 26km NW de ruta 14, 1 Dec 1981, S.G. Tressens et al. 1391 (CTES!). ENTRE RÍOS: Concordia, Salto Grande, casa de Piedra, 3 Oct 1978, S.A. Renvoize 2883 (SI! K image seen!). Formosa: Bermejo, establ. El Bellaco Aug 1971, P. Insfrán 844 (CTES!). JUJUY: Capital, camino a la Alynona, 17 Nov 1988, A. Cabrera et al. 34564 (CTES!). Capital, camino de Lozano a Tiraxi, ruta 29, 3 Nov 1974, A. Schinini et al. 10260 (CTES!). Manuel Belgrano, 13 km del desvío de la ruta nac. 9 camino a Tiraxi, 10 Dec 1998, O. Morrone et al. 3220 (SI! MBM346207 image seen!). Misiones: Candelaria, ruta 204, entre ruta 12 y Profundidad, 29 Sep 1972, A. Schinini 5412 (MBM032241 image seen!). BOLIVIA. Santa Cruz: Vallegrande, estrada Guadalupe – Postrer Valle 7 km Guadalupe, 10 Dec 2002, R.C. Forzza et al. 2324 (CTES! SPF 156983 image seen!). BRAZIL. Mato Grosso do Sul: Bela Vista, rio Guavira, 23 Oct 1987, G. Hatschbach & J.M. Silva 51604 (MBM 118661!). Paraná. Balsa Nova, Barra rio Papagaios, 12 Sep 1968, G. Hatschbach 19716 (MBM). Palmas, rio Chopim 20 Oct 1966, G. Hatschbach 15042 (MBM01891 image seen!). Palmeira, recanto dos Papagaios, 10 Oct 2002, A. Cervi et al. 8342 (HUCP0001934 image seen!); rio Papagaios 15 Oct 1985, P.I. Oliveira 973 (MBM105041); BR 277, descida para o rio Capivara, 5 Jul 1997, O.S. Ribas & L.B.S. Pereira 1870 (MBM!); 7 Nov 2004, M.G. Caxambu 730 (CEFET image seen!); Corrego das Antas, 11 Oct 1989, J. Cordeiro & J.M. Silva 51 (MBM132452 image seen!); estrada Palmeira-Lago, km 104, 26 Nov 1946, R. Maack 166 (MBM005349 image seen!). Ponta Grossa, Passo do Pupo, 11 Oct 1967, G. Hatschbach 17413 (MBM005470!), idem, 12 Oct 1995, C.B. Poliquesi & J.M. Cruz 455 (MBM!). Rio Grande do Sul. Uruguaiana, BR472 afloramento de arenito na divisa com Itaqui, 1 km do rio Ibicuí, 12 Oct 2018, L. P. Deble & B. P. Moreira 17327 (PACA!). PARAGUAY. Without precise place, “N. Paraguay, Zwischen río Apa und Aquidaban, February 1908-09, K. Fiebrig 4777 (NL2765879 image seen!). Capital: Camino a Santa Ana, Laguna Soto, 1 Nov 1975, A. Schinini 12127 (CTES!). Pto. Itá Enramada, 6 Sep 1976, A. Schinini & E. Bordas 13335 (CTES!). Central: Acosta Nhú, 4 km de Ytororó al el río Paraguay, 16 Oct 1994, R. Harley et al. 28016 (CTES!). Guairá: Cerro Nelville, 5 km E de Mbocayaty, 24 Mar 1993, A. Schinini et al. 27866 (CTES!). Villarica, Ybytyruzú, 2km east of Villarica, 8 Feb 1989, E. Zardini & A. Aguajo 10434 (FCQ!). Ñeembucú, Yacaré: Guazu Cuá, 26 Oct 1991, R.P. Spichiger et al. 5223 (CTES!).

Nomenclatural notes— The type of *Lippia trachyphylla* displays scarce sericeous trichomes on abaxial surface of leaves and the inflorescence born in short peduncles when compared with the type of *L. modesta*; however, the analysis of specimens show variation in the abundance and type of trichomes, and inflorescence peduncle length, not being possible to distinguish between both taxa.

Discussion— *Lippia modesta* is easily recognized by its smaller habit and small size of its inflorescences. The species was recognized as synonym of *L. turnerifolia* by Múlgura (2000); nevertheless, *L. modesta* is easily segregated from *L. turnerifolia* by its smaller staminate spikes (5–10 × 3.5–8 mm vs. 8–14 × 8–12 mm), smaller pistillate spikes (5–10 × 3–6 mm vs. 10–15 × 8–14 mm) and mainly by size and shape of fruits (globose or broadly ovoid, 1–1.5 × 1–1.5 mm vs. ovate-turbinate, 3.5–5 × 3–4 mm). *Lippia modesta* is closely related to *Lippia contermina* and *L. Morongii*. However, differs from *L. Morongii* by its smaller habit (10–40 cm vs. 30–100 cm) by its prostrate or ascending-prostrate branches (vs. erect or ascending-erect), by its leaves with obovate, obovate-elliptic or oblanceolate blades, 1–5 × 0.5–2.5 cm (vs. leaves with linear-elliptic, elliptic-lanceolate or oblanceolate blades, 3–10 × 0.5–1.5 cm), obtuse or rounded at apex (vs. acuminate). From *Lippia contermina* differs by its diffuse habit, with ascending-prostrate branches (vs. cushion-like habit, with erect-ascending branches, by its pedicellate glandular trichomes scarce to abundant on stems and peduncles, 90–180 µm long, and 2–3-celled foot (vs. pedicellate glandular trichomes abundant on stems and peduncles, 280–520 µm, and 3–6-celled foot, and by its spikes with outermost bracts lanceolate, elliptic-lanceolate, elliptic or linear-elliptic, straight at apex (vs. linear-lanceolate, with long acuminate and reflexes apices).

Lippia Morongii Kuntze, Revisio Generum Plantarum 3 (3): 253. 1898. Typus: PARAGUAY. Without specific department [Boquerón or Presidente Hayes]: Pilcomayo [Pillkumayu] river, ♂ and ♀ 9 January 1890, *T. Morong 860* (holotypus NY00137788 image seen! isotypi BM000098703 image seen! G00307905 image seen! NY00137787 image seen! NY00468439 image seen!). = *Lippia asperrima* f. *angustifolia* Moldenke, Phytologia 41: 88. 1980. Typus: ARGENTINA. Formosa: Pueblo Laguna Blanca, Pilcomayo [Pillkumayu] river, 7 January 1948, *I. Morel 4353* (holotypus NY00064124 image seen!) **syn.nov.**

Dioecious subshrubs, 30–100 cm high, with long rhizomes, with 2–4 branches, branches unbranched or 2–3-branched at proximal third, erect-ascending or erect, with 1–4 sterile nodes with internodes 2.5–6 cm long, and 2–4 fertile nodes with internodes 2.5–5 cm long; with abundant strigose trichomes, strongly appressed, and verrucose wall, 350–700 µm long, pedicellate

glandular trichomes absent or scarce, 90–180 µm long, with a 2–3-celled foot. Leaves opposite, shortly petiolate, petioles up to 1 cm long; blades linear-elliptic, elliptic-lanceolate or oblanceolate, 3–10 × 0.5–1.5 cm, apex acuminate, base attenuate, chartaceous, concolorous or slightly discolors; abaxial surface with strigose trichomes scattered, pedicellate glandular trichomes absent, adaxial surface with scabrous trichomes abundant, 280–560 µm long; leaf margin irregularly serrated in its distal half, up to 8 teeth on each side, small, acute, appressed, slightly revolute; the most basal leaves smaller and broadly obovate or elliptic. Synflorescence in axillary racemes, arranged on 2–4 fertile nodes. Inflorescence pedunculate, on capituliform racemes; peduncles 2.5–9 cm long, of equal length or a few shorter or a few longer than the leaf corresponding to the fertile node, with abundant strigose trichomes and scarce pedicellate glandular-trichomes. Staminate spike campanulate, 8–10 × 5–8 mm. Bracts lanceolate or elliptic-lanceolate, apex acute or acuminate, adaxial surface with dense strigose trichomes glandular trichomes absent or few; the outermost 4–5 × ca. 1.5 mm, the innermost 3–4.5 × 1–1.5 mm. Staminate flowers lacking a calyx; corolla 3.5–5 mm long, golden-yellow, infundibuliform, tube hairy on the distal half, stamens with anthers visible at apex of the throat; anthers ca. 0.2 mm long, pollen yellow; pistil absent or rudimentary. Pistillate spike campanulate become ovoid at fruit maturity, 5–10 × 5–6 mm. Bracts lanceolate to elliptic, apex acute or acuminate, adaxial surface with dense strigose trichomes glandular trichomes absent or few; the outermost 4–5 × 1–1.5 mm, the innermost 4–5 × 1–1.5 mm. Pistillate flowers with diminutive calyx, bilobed, ca. 0.1 mm long, externally sericeous; corolla 3.5–4.5 mm long, golden-yellow, infundibuliform, tube hairy on the distal half; stamens absent; gynoecium 2–2.5 mm long; ovary ca. 0.5 mm long. Fruit a schizocarp broadly ovoid 2–2.5 × 2–2.5 mm long.

Material examined— ARGENTINA. Corrientes: Bella Vista, Estancia Esperanza, 26 Feb 1970, *T. Pedersen 9650* (P03607944 image seen!). Berón de Astrada, 46km W de Itá Ibaté, Valencia, *A. Schinini 14041* (CTES!). Concepción, Tabay, 29 Mar 1975, *M.M. Arbo et al.* 1061 (CTES!). Goya, Camino prov. 24, aprox. 4 km E del Estero Espadaña, 13 Jan 1970, *R. Carnevali 1853* (CTES!). Ituzaingó, 9 km de ruta 12, camino a San Carlos, 11 Mar 1974, *A. Krapovickas et al.* 24897 (CTES!). Mburucuyá, Loma Alta, 4 Jan 1961, *T. Pedersen 6424* (P03607956 image seen!). Mercedes, Laguna Iberá, Paso Picada, Reserva Natural Provincial del Iberá,



Figure 4. *Lippia Morongii*. A. Basal part of the plant showing the rhizome. B. Distal part showing the flowering branch. C. Leaf, adaxial view. D. Leaf, abaxial view. E. Staminate spike. F. Staminate flower. G. Outer bract of staminate spike. H. Inner bract of staminate spike. I. Pistillate spike. J. Pistillate flower. K. Outer bract of pistillate spike. L. Inner bract of pistillate spike. M. Fruit with dry corolla. N. Sepal of pistillate flower. O. Schizocarp frontal view. P. Gladular trichomes. Q. Strigose trichomes from adaxial surface of the leaf. R. Strigose trichome from stem. A-H, P-R from *Tressens 3710*. I-O from *Schinini 14041*.

24-28 Feb 1989, S.G. Tressens et al. 3710 (CTES!). San Miguel, ruta prov. 17, 12 km N de Loreto, 8 Mar 1974, A. Schinini 8344 (CTES!). BRAZIL. Mato Grosso do Sul: Miranda, 12 Oct 1972, G. Hatschbach & P. Scherer 30403 (NY00956081 image seen!). Porto Murтинho, 2 Jan 1903, A. Robert 892 (K000887875 image seen!). Porto Murтинho, 2 Jan 1903, G. Malme 2791 (NY02042835 image seen!). Porto Murтинho, Rodovia municipal Porto Murтинho-Bonito Fazenda Dona Gertrudes, 16 Nov 2006, E. Barbosa & J. Silva 1921 (MBM000001088!). São Paulo: Jales, Pastos do Retiro, 12 Jan 1950, F. Hoehne 2662 (NY01788595 image seen! SPF12662 image seen!). PARAGUAY. Capital: Camino a Santa Ana, Laguna Soto, 1 Nov 1975, A. Schinini 12127 (CTES!). Pto. Itá Enramada, 6 Sep 1976, A. Schinini & E. Bordas 13335 (CTES!). Central: Acosta Nhú, 4 km de Ytororó al el río Paraguay, 16 Oct 1994, R. Harley et al. 23016 (CTES!). Itá, Granja Isapy Orilla Aye Lazarille, 30 Jan 1966, A. Krapovickas et al. 12251 (CTES!). San Lorenzo, Barrio Santa Maria, 29 May 1985, E. Bordas 4138 (CTES!). Guairá: Cerro Nelville, 5 km E de Mbocayaty, 24 Mar 1993, A. Schinini et al. 27866 (CTES!). Ñeembucú: estancia Espinillo, 8km N de Pto. Bermejo, 13 Dec 1950, A.G. Schulz 7813 (CTES!). Paraguari: Plaine de Pirayu, dans les liux humides, 1 Jun 1874, B. Balansa 1036 (P03607540 image seen!).

Nomenclatural notes— The type of *Lippia asperrima* f. *angustifolia* slightly differs from the type of *L. Morongii* by its more thickened rhizomes and abundant glandular trichomes on peduncles; however, this morphologic pattern was observed in specimens of *L. Morongii* with grow in more sandy and dry environments.

Discussion— *Lippia Morongii* was treated as synonym of *L. turnerifolia* by Múlgura (2000) and this criterion was followed by all later authors (e.g. Múlgura 2012, BFG 2015, 2018, 2021 [2022], IBODA 2022+). However, *Lippia Morongii* distinguishes from *L. turnerifolia* by its bigger habit (30–100 cm vs. 5–30 cm high), with long and slender rhizomes (vs. short and tuberous rhizome), by its erect-ascending or erect branches (vs. prostrate or prostrate-ascending branches), by its inflorescence with peduncles covered by scarce and strongly appressed trichomes, 350–700 µm long (vs. abundant strigose trichomes, non-appressed, 900–1.400 µm long), and mainly by its smaller fruits, completely hidden by calyx (broadly ovoid, 2–2.5 × 2–2.5 mm long vs. ovate-turbinate, 3.5–5 × 3–4 mm).

Lippia turnerifolia Chamisso Linnaea 7: 217. 1832. Typus: BRAZIL. Without specific place “E Brasilia misit Sellow” *F. Sellow s.n.* (holotypus W 0074832 image seen! isotypi BR0000009817142 image seen! E00373273 image seen! G00366527

image seen! HAL0098266 image seen! K000470911 image seen! K000470930 [fragment] image seen! P00166266 image seen! NY00137839 [fragment] image seen! UVMVT026137 image seen!).

= *Lippia turnerifolia* var. *angusta* Kuntze, Revisio Generum Plantarum 3 (3): 253. 1898. Typus: PARAGUAY. Without specific place: “Süd-Paraguay”, November 1892, O. Kuntze s.n. (holotypus NY00064126 image seen!)

= *Lippia turnerifolia* var. *sessilifolia* Moldenke, Typus: BRAZIL. Rio Grande do Sul: Nonoai “Brasilia, RGS, Nonoai ad fl. Uruguay médium in campestribus dumetosis 3 Mar 1954, B. Rambo s.n. (holotypus PACA 28180 image seen!)

Dioecious subshrubs, 5–30 cm high, with tuberous rhizome from which 2-several branches depart, branches unbranched or 2-branched in its distal half, prostrate or prostrate-ascending, with 1–3 sterile nodes with internodes 1–3 cm long, and 1–3 fertile nodes with internodes 0.5–2.5 cm long; with abundant strigose trichomes with verrucose wall and 900–1.400 µm long, glandular trichomes absent. Leaves opposite, sessile or shortly petiolate, petioles up to 0.5 cm long; blades oblong, oblanceolate or elliptic 1.5–4 × 0.5–2 cm, apex obtuse or rounded, base attenuate, chartaceous, concolorous or slightly discolors; abaxial surface with strigose trichomes scattered, pedicellate glandular trichomes absent, sericeous trichomes absent or few, with smooth wall and 70–120 µm long, adaxial surface with scabrous trichomes abundant, 350–1.000 µm long; leaf margin slightly revolute, irregularly toothed, up to 6 teeth on each side, acute or obtuse, spaced, the most basal smaller and broadly obovate or nearly circular. Synflorescence in axillary racemes, arranged on 1–3 fertile nodes. Inflorescence pedunculate, on capituliform racemes; peduncles 0.5–3.5 cm long, with ca. of ½ of the length that the leaf corresponding to the fertile node, with abundant strigose trichomes, 1.100–1.600 µm long and scarce pedicellate glandular-trichomes, 180–240 µm long, with a 2–3-celled foot. Staminate spike broadly campanulate, 8–14 × 8–12 mm. Bracts lanceolate or elliptic-lanceolate, apex acute, adaxial surface with dense strigose trichomes; the outermost 5–7 × 1.5–2 mm, the innermost 5–7.5 × 1–1.5 mm. Staminate flowers with a diminutive calyx; corolla 4.5–6.5 mm long, golden-yellow, infundibuliform, tube hairy on the distal half, stamens with anthers visible at apex of the throat; anthers ca. 0.3 mm long, pollen yellow; pistil absent or rudimentary. Pistillate spike campanulate become broadly ovoid at fruit maturity, 10–15 × 8–14 mm.



Figure 5. *Lippia turnerifolia*. A. Plant, showing the rhizome. B. Fertile staminate node, showing a staminate spike, pedicel and leaf. C. Leaf, abaxial and adaxial view. D. Staminate flower. E. Outer bract staminate spike. F. Inner bract of staminate spike. G. Pistillate spike. H. Pistillate flower. I. Bracts of pistillate spike. J. Fruit. K. Glandular trichome. L. Strigose trichome from pedicel. M. Strigose trichome from adaxial surface of the leaf. A-F, K-M from Deble & Moreira 21904. G-J from Keller et al. 11631.

Bracts ovate-lanceolate to elliptic, apex acute, adaxial surface with dense strigose trichomes; the outermost 5–7 × 1.5–2.5 mm, the innermost 5.5–7.5 × 1.5–2 mm. Pistillate flowers with diminutive calyx, bilobed, ca. 0.2–0.3 mm long, externally sericeous; corolla 5–8 mm long, golden-yellow, infundibuliform, tube hairy on the distal half; stamens absent; gynoeceum 2–3 mm long; ovary ca. 0.8 mm long. Fruit a schizocarp, ovate-turbinate, 3.5–5 × 3–4 mm.

Nomenclatural notes I— The type of *L. turnerifolia* var. *angusta* is more pilose and with narrowed leaves. During the analysis of herbarium exsiccates, it was possible to verify that Múlgura linked specimens that present this morphological pattern under the name *Lippia turnerifolia* var. *polytricha*. *Lippia polytricha* is a distinct species, with ovate or ovate-oblong leaves, densely covered by hirsute trichomes, absence of glandular trichomes, and smaller and broadly ovate fruits (see Moreira et al. 2021).

Nomenclatural notes II— The type of *L. turnerifolia* var. *sessilifolia* differs from the type of *L. turnerifolia* by its apparently erect branches. However, no additional features were observed that could separate both taxa.

Material examined— ARGENTINA. Corrientes: Concepción, 30 Dec 1982, *T. Pedersen* 13475 (CTES!). Concepción, Tabay, 29 Mar 1975, *M. Arbo et al.* 1000 (CTES! MBM048411 image seen!). Concepción, 1 km NW de Santa Rosa, 15 Dec 1977, *S. Tressens et al.* 981 (CTES!). Ituzaiingó, desemocadura del Ayo, Garapé en el Río Paraná, 45 km al E de Ituzaiingó, 24 Apr 1975, *A. Schinini et al.* 11125 (CTES!). Ituzaiingó, Ea. Santa Rita, Ayo próximo al casco, 4 Mar 1987, *A. Krapovickas et al.* 41095 (CTES!). Ituzaiingó, Pto. Valle, 30 km E de Ituzaiingó, 2 Oct 1978, *A. Schinini y R. Vanni* 15684 (CTES!). Ituzaiingó, 40 km E de Ituzaiingó, 1 km S de ruta 12, 23–24 Oct 1974, *S. Tressens et al.* 481 (CTES!). Ituzaiingó, 16 km NE de Ituzaiingó, costa Río Paraná, 9 Apr 1978, *O. Ahumada* 2294 (CTES!). Lavalle, 3 km E de Yataity Calle, ruta 120, 25 Nov 1979, *A. Schinini et al.* 19122 (CTES!). Mburucuyá, Estancia Santa Teresa, 17 Nov 1954, *T. M. Pedersen* 2996 (U0249836 image seen!); Parque Nacional de Mburucuyá, 19 Mar 2005, *M. Dematteis et al.* 1883 (CTES!). Paraje Galarza, 23 Nov 1999, *M. Arbo et al.* 8434 (CTES!). San Miguel, 12 km NE de San Miguel, Ea. Curupayty, 28 Feb 1990, *R. Vanni et al.* 1497 (CTES!). Santo Tomé, Estancia San Lorenzo, Ruta 41 4 km N de Galarza, 15 Nov 1994, *M. Arbo et al.* 6245 (CTES!). Santo Tomé, Río Aguapey y ruta 14, 7 Dec 1974, *C. Quarín et al.* 2647 (CTES!). Santo Tomé, ruta 41, Galarza, 16 Nov 1994, *M. Arbo et al.* 6311 (CTES!). Santo Tomé, 15 km N de S. Tomé, ruta 40, 8 Feb 1969, *A. Krapovickas y C. Cristóbal* 14801 (CTES!). Misiones: Apóstoles, Parque Provincial de la Sierra Ing. Raúl

Martinez Crovetto, campos cerca de la entrada al parque, 7 Nov 2000, *M. Múlgura de Romero et al.* 2401 (CTES!). Bella Vista, Toropí, Ruta 27, 10 km S de Bella Vista, 13 Oct 1974, *A. Schinini y C. Cristóbal* 9862 (CTES!). Capital, Arroyo Itaembé, ruta 12, 17 Jan 1966, *A. Krapovickas y C. Cristóbal* 12087 (CTES!). Capital, Ruta 14, Arroyo Garupá Norte, 14 Mar 1969, *A. Krapovickas et al.* 15282 (CTES!). Concepción de la Sierra, 3 Feb 1948, *A. Schulz* 6983 (CTES!). Ituzaiingó, Ea. San Pedro, 10–13 Nov 1976, *M. Arbo et al.* 1108 (CTES!). Ituzaiingó, Establecimiento Puerto Valle, 28 Mar 2000, *S. Tressens et al.* 6559 (CTES!). Ituzaiingó, Isla Apipé Grande, Puerto Mora, 11 Dec 1973, *A. Krapovickas et al.* 24405 (CTES!). Ituzaiingó, Puerto Valle, 3 Oct 2013, *H. Keller et al.* 11631 (CTES!). BRAZIL. Mato Grosso do Sul: Caracol, 6km L. da Rod para Bela Vista 10 Feb 1993, *G. Hatschbach et al.* 58856 (MBM!). Paraná: Amazonas, Fda. S. Ludovico, 18 Nov 1983, *R. Kummrow* 2441 (MBM087835 image seen!). Barreirinha, 12 Sep 1975, *A. Dziewa* 47 (MBM037817!). Campo do Tenente, Ribeirão da Fazenda, 25 Jan 1968, *G. Hatschbach & C. Kocziński* 18472 (MBM005461 image seen!). Carambei, Dec 1954, *R. Van der Veen* 31 (U1756397 image seen!). Colombo, rio Canguiri, 3 Oct 1967, *G. Hatschbach* 17269 (MBM005457 image seen!). Curitiba, Bairro Pinheirinho, 26 Nov 2015, *M. Brotto et al.* 2156 (HUEFS283067! MBM401015! RB786663!). Curitiba, campo, 18 Oct 1928, *F. Hoehne* 23037 (NY02360603!). Curitiba, in campo, 29 Nov 1944, *C. Stellfeld* 1039 (NY01788596!). Curitiba, Jardim Botânico, 21 Oct 1993, *J. Silva* 1270 (K000887873!). Curitiba, Parque Barigui, 6 Nov 1996, *C. Kozera & V. Dittrich* 329 (NY01015143!); Rod. Xisto, rio Barigui, 22 Oct 1967, *G. Hatschbach* 17534 (MBM005833!). Curitiba, S. Brás, Oct 1964, *L. Dombrowski* 456 (HUEFS000155908!). Curitiba spp. in campo, 12 Mar 1914, *G. Jönsson* 35a (K000887874! NY01015141!); Sta Candida 4 Nov 1970, *G. Hatschbach* 25347 (MBM016032 image seen!); BR 116, rio Iguacu, 8 Oct 1974, *R. Kummrow* 637 (MBM031796 image seen!). Guarapuava, águas Sta. Clara, 17 Nov 1963, *E. Pereira & Hatschbach* 10555 (RB121758!); 15 Dec 1965, *R. Reitz, M. Klein* 17722 (US03199422 image seen!). Lapa, Eng. Bley, 26 Oct 1948, *G. Hatschbach* 1006 (NY01015140!); Volta Grande, 20 Dec 1979, *P.I. Oliveira* 164 (MBM67567 image seen!). Laranjeiras do Sul, Rincão Grande, 12 Oct 1974, *G. Hatschbach* 35204 (MBM034335 image seen!). Monte Alegre, 28 Mar 1954, *J. Kuhlmann* (RB150806!). Palmeira, without date, *L. Dec* 1990, *Dombrowski s.n.* (MBM306772! MBM306773!); 40 km E of Irati, 15 Sep 1966, *J.C. Lindeman & J.H. de Haas* 2461 (MBM015006 image seen!); Fazenda Padre Ignacio, estrada Curitiba-Palmeira 10km antes de Palmeira, 17 Oct 1947, *G. Tessmann* 2508 (NY01788597!). Piraquara, Autodromo Pinhaes, 26 Dec 1973, *G. Hatschbach* 33574 (MBM028288 image seen!). Ponta Grossa, Parque Estadual Vila Velha lagoa Tarumã, 19 Nov 2013, *E. Lozano* 2496 (HCF000014494, MBM399930); PR 151, km 167, 16 Dec 2021, *J. Paula-Souza* 12115 (FLOR0070048 image seen!); rio Guavirova, Vila Velha, 3 Mar 1962, *G. Hatschbach* 8982 MBM042986 image seen!). São José dos Pinhães, Roseira, 15 Nov 1972, *G. Hatschbach* 30636 (MBM023508 image seen!). Senges, PCH Fazenda Entre Rios, 26 Mar 2016, *J.M. Silva* 9269 (MBM406529). Tibagi, Rio Tibagi, Cerrado Bowman 24°33'09"S, 50°24'22" W Alt.: 720m, 6 Oct 2018, *R. Völtz & M. Brotto* 1798 (HCF000030739! MBM414976!); Harmonia,

Fda. Mte. Alegre, 19 Sep 1953, *G. Hatschbach 3755* (MBM042988 image seen!). Rio Grande do Sul: Without precise place, *F. Sellow s/n* [MIB 532] (P03607593). Dom Pedrito, Três Vendas, em afloramento rochoso na beira da estrada, 17 Oct 2021, *L.P. Deble & B.P. Moreira 21904* (PACA). Santana do Livramento, Cerro Chato, 16 Nov 2008, *A. Stival-Santo et al. 334* (FURB03718); Cerro Tobatinga, 24 Feb 1947, *A. Castellanos s.n.* (NY01015142 image seen!). Santa Catarina: Campos Novos, Cerro Chato, 16 Dec 2008, *A. Stival-Santos et al. 334* (FURB10949 image seen!). Zortéa, 16 Dec 2008, *A. Stival-Santos et al.* (FURB10949!). Chapecó, Fazenda campo São Vicente, 24km west of Campo Erê 26-28 Dec 1956, *L.B. Smith & R. Reitz 9535* (US03199418 image seen!); idem, 20-21 Feb 1957, *L.B. Smith & R. Reitz 11592* (US03199419 image seen!). São Paulo: Without precise place, 1816–1821, *A. Saint-Hilaire 1300* (P03607591, P03607592). PARAGUAY. Concepción: Parque San Luis, 15 Oct 2001, *F. Mereles 8612* (CTES). Canindeyú: Mbaracayú, Aguara Guajú, 30 Oct 2003, *E. Zardini 60834* (SI!). Central: Itá, Granja Isapy, orilla Ayo. Lazarillo, 30 Jan 1966, *A. Krapovickas et al. 12251* (US03199423 image seen!). Cordillera: Itacurubi, 1885–1895, *E. Hassler 308* (P03607539). Tucangua, 1885–1895, *E. Hassler 782* (P03607546 image seen!). Guairá: Itapé dans les prairies, 9 Sep 1874, *B. Balansa 1036b* (P03607542). URUGUAY. Tacuarembó: Arroyo Malo, 22 Feb 2005, *M. Dematteis & A. Schinini 1724* (HUEFS000154809!). ARTIGAS: Sta Rosa, Cuareim, 27 Nov 1927, *G. Herter 989* (U1756236 image seen! MVM!).

Discussion— *Lippia turnerifolia* is easily recognized by its reduced habit, by its prostrate or prostrate-ascending branches, by its short internodes, by its bigger staminate and pistillate spikes and mainly by its ovate or ovate-turbinate fruits, with 3.5–5 × 3–4 mm. *Lippia turnerifolia* is more closely related to *Lippia coarctata*, however it differs by its leaves more rigid and lacking glandular trichomes, by its inflorescence with peduncles covered by abundant strigose trichomes, non-appressed, 900–1.400 µm long (vs. peduncles with scarce strigose trichomes strongly appressed, 500–800 µm long) and by its bigger staminate and pistillate flowers. *Lippia turnerifolia* distinguishes from *L. Morongii* by its smaller habit (5–30 cm vs. 30–100 cm), with short and tuberous rhizome (vs. long and slender rhizomes), by its prostrate or prostrate-ascending branches (vs. erect-ascending or erect branches), (vs. peduncles covered by scarce and strongly appressed trichomes, 350–700 µm long), and mainly by its bigger fruits (ovate or ovate-turbinate, 3.5–5 × 3–4 mm vs. ovate, 2–2.5 × 2–2.5 mm long). *L. turnerifolia* differs from *L. modesta* by its bigger staminate spikes (8–14 × 8–12 mm vs. 5–10 × 3.5–8 mm), bigger pistillate spikes (10–15 × 8–14 mm vs. 5–10 × 3–6 mm) and mainly by size and shape of fruits (ovate-turbinate, 3.5–5 × 3–4 mm vs. globose or broadly elliptic, 1–1.5 × 1–1.5 mm).

Doubtful taxa

Lippia phaeocephala Briquet, Bulletin de l'Herbier Boissier ser. 2, 4: 1158. 1904. Typus: PARAGUAY. “Suffrutex 0,4-0,5 m. altus, petala citrina, in valle fluminis Y-aca, in campo pr. Chololo, Dec., n. 6798a; suffrutex 0,3-0,6 m. altus, petala aurantiaca, prope Concepcion, in campo argilloso, Sept. n. 7456.” Lectotypus (designated by Troncoso 1961: 275): PARAGUAY. Cordillera: Chololo, “in valle fluminis Y-aca, in campo pr. Chololo” Dec. 1900, *E. Hassler 6798a* (G00634744 not seen).

Lippia phaeocephala was considered a synonym of *L. asperrima* by Múlgura (2000) and this treatment was followed in later works (Múlgura 2012, FBO 2015, FBO 2018). During the analysis of the syntype *E. Hassler 7456* deposited at BM and NY herbaria, it was confirmed that this voucher corresponds to *L. asperrima*, as previously mentioned by Troncoso (1961: 275-276): “Briquet describe su especie basándose en dos sintipos: Hassler 6798a y 7456. Estos ejemplares, del Herbario de Ginebra, son una mezcla de dos especies diferentes. He debido seleccionar como lectotipo Hassler 6798a, a pesar de no ser el que figura en los fototipos de la serie del Museo de Chicago, pues el otro ejemplar, Hassler 7456, parece pertenecer a una especie ya conocida, *L. asperrima* Cham.”. Troncoso (1961: 276) proposed lectotypification and amendment for this species: “Como la descripción de Briquet se basa en los dos ejemplares, el lectotipo requiere una redescipción”. However, it was not possible to locate the lectotype chosen by Troncoso. It is still possible to show that the illustration presented by Troncoso (1961: 277) is a distinct taxon from *L. asperrima*. Thus, in the absence of type analysis, we prefer to consider the species as a doubtful taxon.

Lippia turnerifolia* var. *normalis Kuntze, Revisio Generum Plantarum 3 (3): 253. 1898. Typus: ARGENTINA/BOLIVIA: Jujuy, October 1892, O. Kuntze s.n. (holotype NY? isotype? US03198705 image seen!).

It was not possible to confirm whether the material deposited at the US herbarium here mentioned as a possible isotype is an original material from *L. turnerifolia* var. *normalis*. However, the location indication coincides with that indicated in the protologue by Kuntze (1898: 253). The analysis of this exsiccate indicates that it is *Lippia modesta*. Thus, it is probable that *L. modesta* var. *normalis* is a synonym of *Lippia modesta*.

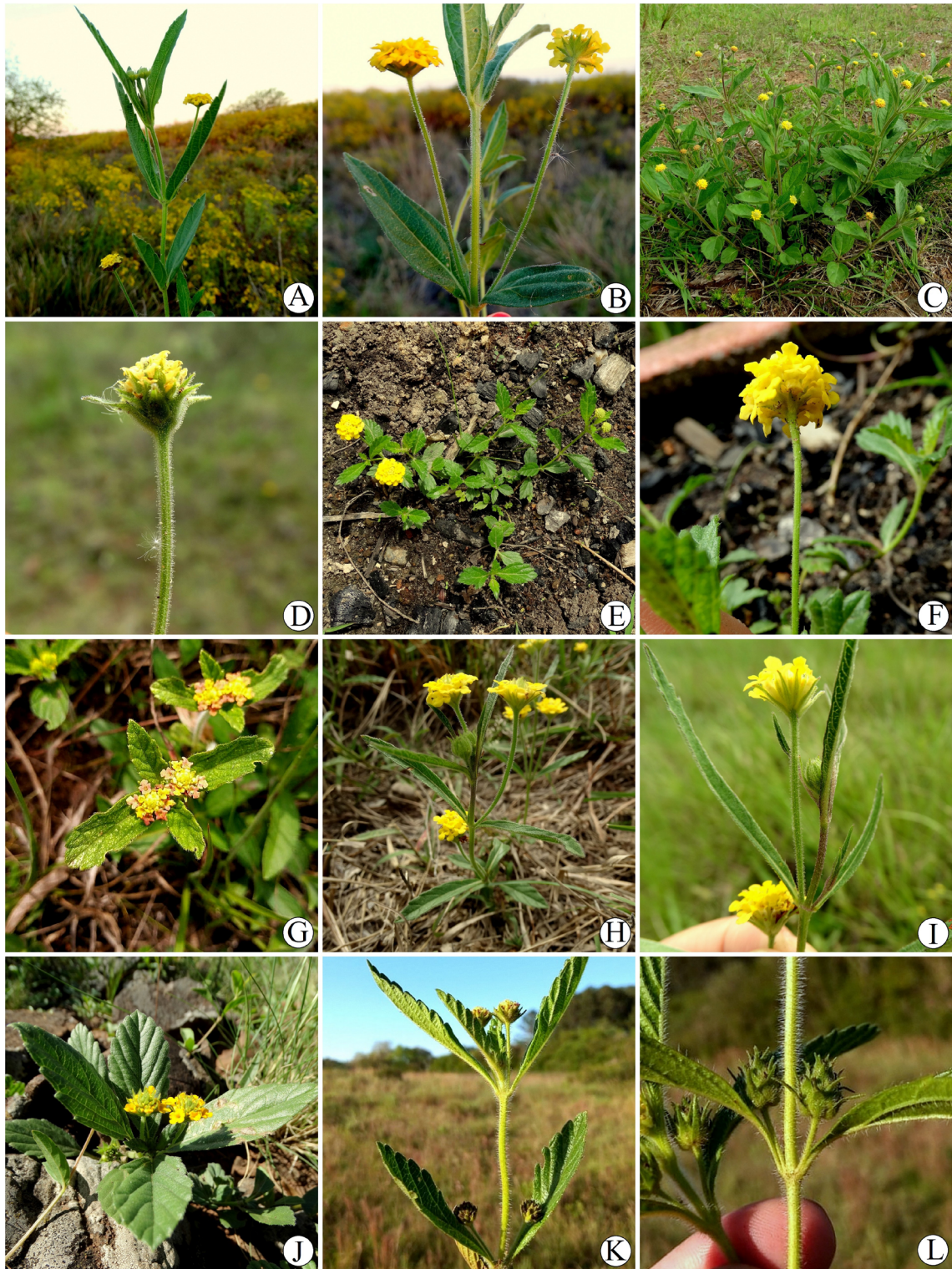


Figure 6. *Lippia asperrima* (A-B) A. Distal part showing the flowering branch. B. Fertile node showing leaf, pedicel and staminate spike. *Lippia contermina* (C-D) C. Habit. D. Staminate spike showing apex of the pedicel. *Lippia modesta* (E-F-G) E. Habit. F. Staminate spike, showing apex of the pedicel. G. Specimen with pattern of *L. trachiphylla*. *Lippia Morongii* (H-I) H. Distal part showing the flowering branch. I. Fertile node showing leaf, pedicel and staminate spike. *Lippia turnerifolia* (J-K-L) J. Staminate individual with dwarf habit. K. Distal part showing the flowering branch. L. Fertile node showing leaf, pedicel and pistillate spike.

Key to distinguish 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 peduncles 2–4 times longer than the leaf corresponding to the fertile node 4
 - Inflorescence not exceeding the branches (exceptionally slightly exceeding: *L. contermina*), with peduncles 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 10
7. Glandular trichomes abundant on stems, peduncles and bracts 8
 - Glandular trichomes absent or few, restricted to the peduncles and bracts 9
8. Leaves elliptic or ovate, margin irregularly toothed, base cuneate. Fruits 3–4.5 mm. Stony grasslands in Campos regions of Río de La Plata Grasslands (Uruguay and Rio Grande do Sul [Brazil]) *Lippia coarctata*
 - Leaves obovate, oblanceolate or spatulate, margin crenulate base long attenuate (exceptionally rounded in young leaves). Fruits 2–3 mm. Cerrados and Campos Rupestres in central Brazil (Distrito Federal, Goiás and Minas Gerais) *Lippia nana*
9. Leaves with adaxial surface of the blade covered by strigose pubescence, with the 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 the trichomes erect or ascending, 1.4–3 mm long *Lippia crucifera*
10. Leaves usually ascending or erect, sometimes applied to the stem, with rounded, truncated, subauriculate or cordate blades 11
 - Leaves patent (exceptionally the most distal ascending), with attenuate or cuneate blades (rarely rounded at the bases, so leaves notably patent) 15
11. 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 12
12. Leaves 3–6.5 cm long *Lippia coriacea*
 - Leaves 0.5–3 cm long 13
13. 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 14
14. 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*
15. Leaves discolorous by presence of abundant sericeous trichomes on abaxial surface of the blade; blades with margin regularly serrate provides of 16–24 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 12 teeth on each side 16

16. Inflorescence with peduncles with abundant strigose or hirsute trichomes, 1.1–3.2 mm long. Fruits ovate-turbinate, 3–5 mm long, with its distal part visible above the calyx 17
- Inflorescence with peduncles 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 18
17. 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*
18. Leaves with margin entire or with 1–4-teeth on each side *Lippia tristis*
- Leaves with margin irregularly toothed provides of 6–12 teeth on each side 19
19. Plants provides of long horizontal rhizomes at the base 20
- Plants provides of tuberose rhizome at the base 21
20. 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, peduncles 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 peduncles, and absent in leaves *Lippia Morongii*
21. Plants with a cushion-like habit. Pedicellate glandular trichomes abundant, 280–520 µm long. Spikes with outermost bracts with long acuminate and reflexes 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*

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Declaration of competing of interest

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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