

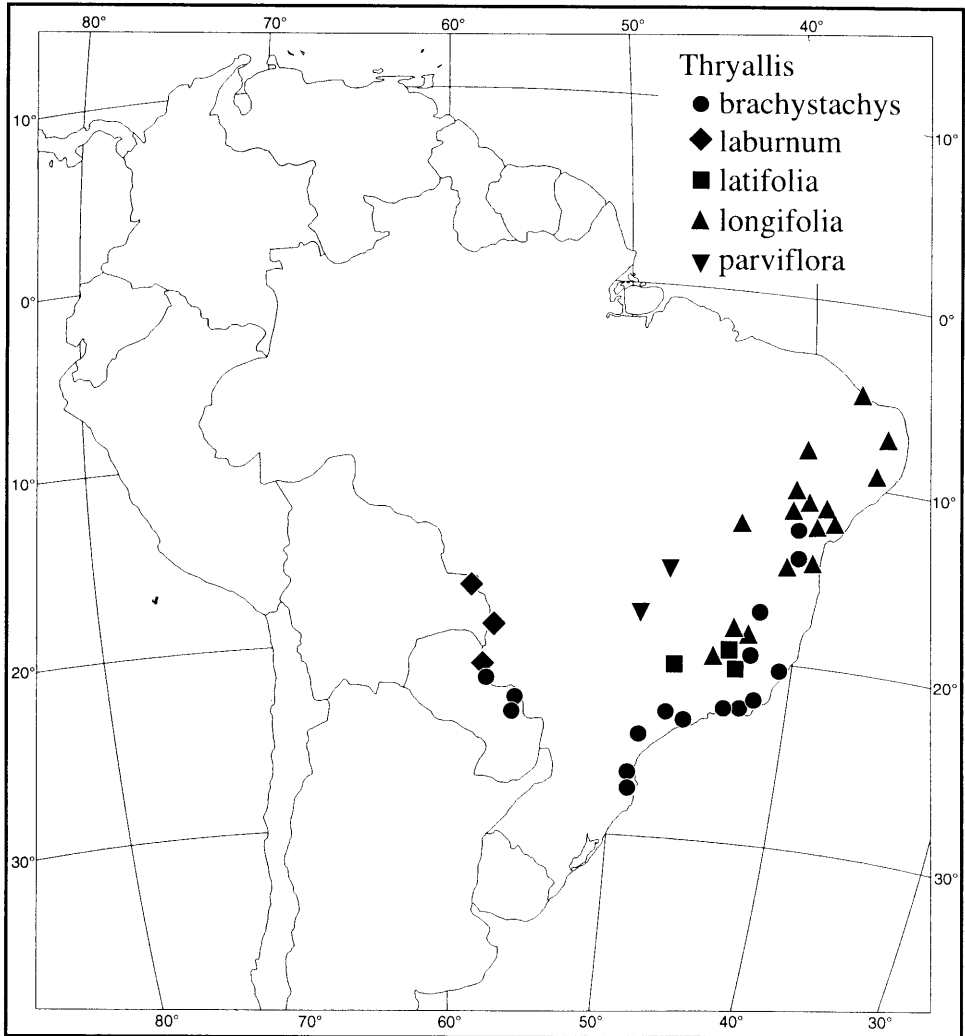
REVISION OF THRYALLIS (MALPIGHIACEAE)

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Thryallis comprises five species found in Brazil and adjacent Paraguay and Bolivia (Fig. 1). The genus is distinctive in its stellate pubescence covering nearly all parts, yellow flowers with eglandular sepals and petal limbs wider than long, and schizocarps of three nutlets subtended by a persistent spreading calyx. *Thryallis* is not similar to any other genus in the family, and its affinities are unknown; it is included in a current study by W. R. Anderson and M. C. Chase, who are investigating the phylogeny of the Malpighiaceae by comparing evidence from chloroplast DNA and morphology.

Although the genus differs greatly from other members of the Malpighiaceae, the species are morphologically similar and are best separated by characters of the abaxial leaf vesture and of the glands found at the base of the lamina and/or apex of the petiole (Fig. 2). The flowers are relatively uniform; only *T. parviflora* differs notably in its small petals and short styles. They are arranged opposite to subopposite on axes that are grouped into dichasia, compound dichasia, or small thyrses. Each short peduncle is subtended by a bract and bears a much longer pedicel, which is subtended by two bracteoles. The eglandular sepals are reflexed to revolute during anthesis, but as the fruit matures they elongate and become stiff and spreading. The three nutlets are then subtended by the rotate persistent calyx, which may aid in dispersal. The claw of the petal is ribbonlike, ca 1–1.5 mm wide, and expands into an oblate/reniform limb. The stamens differ only in that the anthers of those opposing the petals are slightly shorter than those opposing the sepals. The 3-carpellate ovary bears three slender styles; the capitate stigma is slightly reflexed and also slightly decurrent adaxially. Each rugose nutlet has the developing seed embedded in spongy tissue, presumably perisperm, that fills the locule, an unusual condition in the family. At maturity, the seed entirely replaces the spongy tissue.

The laminas are adaxially stellate-pubescent only when very young and soon become glabrous, whereas they are always abundantly pubescent abaxially. The unicellular hairs vary from subsessile to stalked. The stalk is up to 0.4 mm long, and from its apex radiate 5–13 (–15) branches up to 0.3 mm long. The abaxial lamina may also bear sessile hairs, the body ca 0.5 (–0.7) mm in diameter with 8–19 short branches up to 0.2 (–0.3) mm long. It is the mixture of sessile hairs and hairs with stalks of variable length that give the abaxial vesture its distinctive aspect. In *T. brachystachys* the sessile and short-stalked hairs (mostly only up to 0.01 mm long) are so densely packed that the vesture has a felty aspect and obscures the secondary and tertiary veins. In contrast, the pubescence of *T. latifolia* and *T. parviflora* is much looser; the stalks of the hairs vary from 0.03 to 0.4 mm long and are individually discernible. In all three species a basal cover of sessile hairs aids in hiding the epidermis. Such sessile hairs are absent in *T. longifolia*, in which the vesture is a mixture of long-stalked hairs (up to 0.3 mm long)

FIG. 1. Distribution of *Thryallis*.

with the branches radiating only from the apex and shorter, somewhat stouter hairs in which branches radiate from the body of the stalk as well. The epidermis is always visible, owing to the loose arrangement of the hairs and the absence of sessile hairs. In *T. laburnum* the sessile hairs are lost as the leaf matures, and the epidermis is generally visible among the stalked hairs in older leaves. Yet, in a few instances (e.g., the NY duplicate of *Moore 970*) the larger leaves of the flowering branches that constitute the specimens still have the sessile hairs and, since the stalked hairs are only up to 0.1 mm long, thus are reminiscent of the leaves of *T. brachystachys*.

A pair of glands occurs at the base of the lamina or at the apex of the petiole, or the glands are borne along the margin a short distance from the base. Occasionally the glands are branched, and there may also be a second smaller pair. The glands are generally nearly circular and prominent (mostly to 0.5 mm but sometimes to 1 mm long). In *T. longifolia* and *T. parviflora* the glands are commonly elongated and knob- or peglike, up to 5.5 mm long; these, too, may be branched (Fig. 2c, d, m).

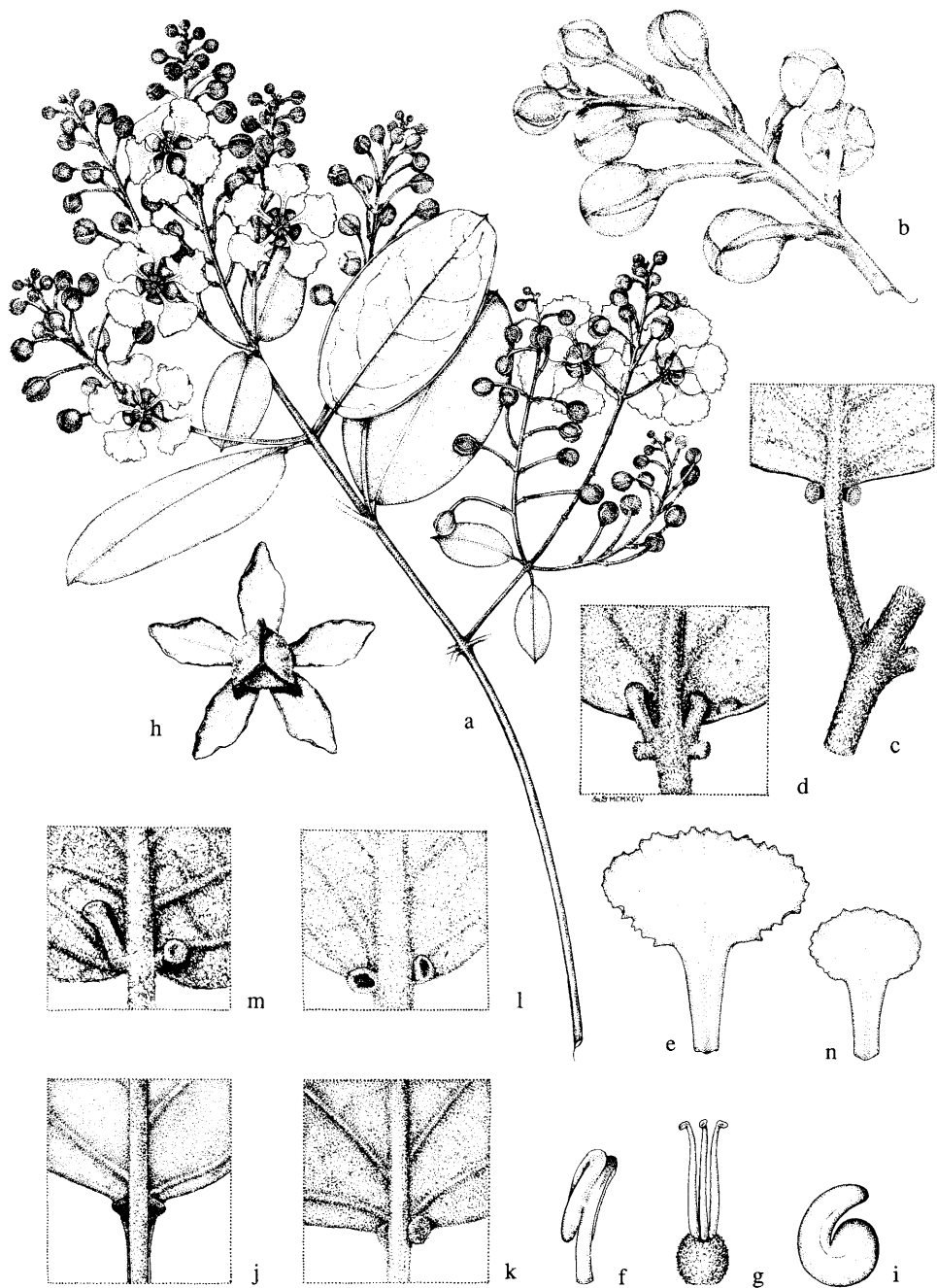


FIG. 2. *Thryallis*. a-i. *T. longifolia*. a. Flowering branch ($\times 0.5$). b. Apex of young inflorescence branch showing bracts and bracteoles ($\times 4$). c. Base of lamina, abaxial view, and petiole attachment, showing glands and epipetiolar stipules ($\times 2.5$). d. Base of lamina, abaxial view showing branched peglike glands at apex of petiole and sessile glands on margin of lamina ($\times 2.5$). e. Lateral petal ($\times 2.5$). f. Stamen ($\times 5$). g. Gynoecium ($\times 5$). h. Fruit with persistent calyx ($\times 1.5$). i. Embryo ($\times 5$). j. *T. brachystachys*, base of lamina, abaxial view showing glands ($\times 2.5$). k. *T. laburnum*, base of lamina, abaxial view showing glands ($\times 2.5$). l. *T. latifolia*, base of lamina, abaxial view showing glands ($\times 2.5$). m, n. *T. parviflora*. m. Base of lamina, abaxial view showing branched peglike glands ($\times 2.5$). n. Lateral petal ($\times 2.5$). (Based on: a-c, Harley 16195; d, Harley 16429; e-g, i, Anderson 11379; h, Lützelburg 25770; j, Sucre 1442; k, Fröes 11690; l, Heringer 3815; m, n, Irwin 11341.)

The confusion surrounding the generic name *Thryallis* was discussed by Morton and Cuatrecasas (1967), who proposed conservation of the name *Thryallis* Mart. Linnaeus (1762) first published the name *Thryallis* with the species *T. brasiliensis*. Lindley (1828) published his *T. brachystachys* from Rio de Janeiro and Martius (1829) his *T. longifolia* and *T. latifolia* from Bahia; Martius also included a generic description. Jussieu (1832), the first monographer of the Malpighiaceae, noted that Lindley's and Martius's species were not congeneric with that of Linnaeus. He assigned *T. brasiliensis* L. to the genus *Galphimia* Cav., as *G. brasiliensis* (L.) Adr. Juss. (1832), and recognized *Thryallis* sensu Mart., in which he included *T. longifolia*, *T. latifolia*, and *T. brachystachys* (1840). Kuntze (1891) retained *Thryallis* L. and proposed *Hemsleya* to replace *Thryallis* sensu Mart. In this he was followed most notably by Small (1910), who included species of *Galphimia* in *Thryallis* L. Niedenzu (1914, 1928), the second monographer of the family, rejected Kuntze's *Hemsleya* and followed Jussieu in accepting *Thryallis* Mart. The proposal by Morton and Cuatrecasas (1967) for conservation of *Thryallis* Mart. was accepted by the Nomenclature Section of the 11th International Botanical Congress in 1969, and *Thryallis* Mart. thus is included in the list of conserved names of the *International Code of Botanical Nomenclature* (Greuter et al. 1988). Regrettably, in some herbaria species of *Galphimia* are still routinely filed under *Thryallis*, perhaps in the mistaken belief that because *Thryallis* is a conserved name it displaces *Galphimia*. The correct disposition of names published in *Thryallis* that apply to species of *Galphimia* is beyond the scope of this revision; the reader is referred to Niedenzu's list of names excluded from *Thryallis* Mart. (1928, p. 577).

Thryallis Martius, Nov. gen. sp. 3: 77. 1829, nom. cons., non *Thryallis* L., nom. rej.—LECTOTYPE, designated by Morton and Cuatrecasas, 1967: *Thryallis longifolia* Martius.

Hemsleya Kuntze, Rev. gen. pl. 1: 88. 1891.—LECTOTYPE, here designated: *Hemsleya longifolia* (Martius) Kuntze [= *Thryallis longifolia* Martius].

Scandent shrubs to woody vines. Stems and branches densely stellate-pubescent, the larger vegetative axes becoming glabrate to glabrous in age. Laminas elliptical to lanceolate or broadly so to sometimes suborbicular, apex apiculate to acuminate or apiculate-emarginate or obtuse-apiculate, base truncate or slightly cordate, adaxially stellate-pubescent when very young but soon glabrous, abaxially abundantly stellate-pubescent, with 1–2 pairs of glands at the apex of the petiole and/or the base of the lamina; petioles densely stellate-pubescent; stipules narrowly triangular, epipetiole. Flowers borne opposite to subopposite on axes grouped in dichasia or compound dichasia or small thyrses, sometimes with 4 axes at a node; each peduncle subtended by a bract, each pedicel subtended by 2 bracteoles, pedicels always longer than the peduncles, bracts and bracteoles deciduous during anthesis or some retained through the fruiting stage or all caducous; axes, peduncles, pedicels, bracts, and bracteoles densely stellate-pubescent. Sepals 5, imbricate, elliptical to broadly so to broadly ovate, eglandular, densely stellate-pubescent adaxially and abaxially but with a glabrous patch at the base adaxially, reflexed to revolute during anthesis, elongating and becoming stiff and spreading in fruit. Petals 5, bright lemon-yellow, glabrous, the claw ribbonlike, ca. 1–1.5 mm wide, the limb wider than long, oblate/reniform, margin irregularly dentate to erose or nearly lacerate, the lateral petals subequal or the anterior-lateral petals slightly larger than the posterior-lateral petals, the posterior petal with a thicker claw and

a little smaller than the lateral petals. Stamens 10, all fertile, glabrous, anthers abaxially with a gland on the connective, those of stamens opposing the petals slightly shorter than of those opposing the sepals. Gynoecium 3-carpellate (sometimes 2-carpellate); styles 3 (sometimes only 2), slender, glabrous, erect, stigma capitate but somewhat reflexed and briefly decurrent adaxially, posterior styles slightly shorter than the anterior one; ovary densely stellate-pubescent. Fruit a schizocarp of (2–) 3 tardily separating nutlets subtended by the persistent calyx; nutlets rugose, with a prominent dorsal ridge or a small winglet; developing seed embedded in spongy tissue (perisperm?) filling the locule, mature seed filling the locule and then spongy tissue absent; seed and embryo ovoid, the large outer cotyledon distally folded over the smaller inner cotyledon.

KEY TO THE SPECIES OF THRYALLIS

1. Abaxial vestiture of all or at least the mature, larger leaves composed only of stalked hairs, sessile hairs absent and thus the epidermis readily visible.
 2. Limb of lateral petals 7–10 mm long, 11–14 mm wide; laminas with a pair of prominently raised to peglike glands at the apex of the petiole, each gland 0.5–3.5 mm long, 0.5–0.7 mm in diameter, sometimes branched, often also with a second prominent pair at the base of the lamina or along the margin near the base; abaxial vestiture of leaves of hairs with the stalk 0.1–0.3 mm long, in longer hairs the branches radiating from the apex only, the shorter hairs commonly with a stouter stalk and the branches radiating from along the stalk as well, sessile hairs always absent; eastern Brazil (Ceará to Bahia, and eastern Minas Gerais). *T. longifolia*.
 2. Limb of lateral petals 6.5–8 mm long, (9–) 10–12 mm wide; laminas with a pair of prominently raised (never knob- or peglike) glands at the apex of the petiole, each gland 0.2–0.5 mm long, 0.7–1.2 mm in diameter; abaxial vestiture of leaves of hairs with the stalks 0.01–0.1 mm long, the branches all radiating from the apex, in young leaves and in the reduced ones associated with the inflorescence sessile hairs present and thus obscuring the epidermis; southwestern Brazil (Mato Grosso do Sul) and adjacent Bolivia and Paraguay. *T. laburnum*.
1. Abaxial vestiture of all leaves composed of short- to long-stalked hairs and sessile hairs, the epidermis not readily visible.
 3. Laminas not rugose, adaxially the costa impressed but the secondary veins only slightly so or not at all, abaxially the costa prominently raised, the secondary veins prominulous, and the tertiary veins indistinct and mostly hidden by the dense indumentum; abaxial vestiture of laminas composed of a mixture of stalked hairs and sessile hairs, the stalks to 0.1 (–0.2) mm long, the vestiture very dense and forming an even covering, the stalks of individual hairs barely discernible (vestiture sometimes looser in specimens from Santa Catarina); Brazil (eastern Minas Gerais, Espírito Santo to Santa Catarina) and eastern Paraguay. *T. brachystachys*.
 3. Laminas rugose, the costa and all veins impressed adaxially, abaxially the costa, secondary, and tertiary veins prominently raised and the areoles sharply distinct; abaxial vestiture of laminas composed of a mixture of short- to long-stalked hairs and sessile hairs, the stalks to 0.4 mm long, the vestiture with a loose aspect, the stalks of individual hairs discernible.
 4. Limb of lateral petals 4–5.5 (–6) mm long, 6–8 mm wide; laminas with a pair of glands at the apex of the petiole or at the base of the lamina at insertion of petiole, each gland knoblike to commonly peglike, 1.4–5.5 mm long, 0.5–1.4 mm in diameter, sometimes branched and the two pairs unequal in size; stalked hairs of abaxial laminar pubescence with 5–8 radiating branches; bracts and bracteoles deciduous or persistent during anthesis and sometimes retained in fruit; Brazil (Distrito Federal and Goiás). *T. parviflora*.
 4. Limb of lateral petals 10–11 mm long, 13–14 mm wide; laminas with a prominently raised pair of glands (sometimes branched, rarely peglike) at the apex of the petiole, each gland 0.3–1 (–2) mm long, 0.7–1.2 mm in diameter, sometimes also with a second prominent pair at base of the lamina or along the margin near the base; stalked hairs of abaxial laminar pubescence with 6–13 radiating branches; bracts and bracteoles caducous or deciduous during anthesis, not retained in fruit; Brazil (Minas Gerais and adjacent São Paulo). *T. latifolia*.

Thryallis brachystachys Lindley, Bot. Reg. 14: 1162. 1828. *Hemsleya brachystachys* (Lindley) Kuntze, Rev. gen. pl. 1: 88. 1891.—TYPE: [BRAZIL.] Specimen prepared from plants grown at the garden at Chiswick from seed sent by Forbes from Rio de Janeiro to the Horticultural Society of London (holotype: CGE, photo: MICH!).

Banisteria mutabilis Vellozo, Fl. flum. 193, Icones 4: t. 168. 1829.—TYPE: unknown.

Thryallis rotundifolia A. Gray, U.S. Expl. Exp. 15(1): 264. 1854.—TYPE: BRAZIL. Rio de Janeiro, *U.S. Expl. Exp.* 873 (lectotype, here designated: US!, photo: MICH!, isoelectotypes: GH! K!).

Thryallis ovatifolia Niedenzu, Bot. Jahrb. Syst. 14, Beibl. 30: 5. 1891. *Thryallis latifolia* var. *ovatifolia* (Niedenzu) Niedenzu, Arbeiten Bot. Inst. Königl. Akad. Braunsberg 5: 12. 1914.—TYPE: BRAZIL. Rio de Janeiro: “ad radices montium Serra d’Estrella” (fide Niedenzu), *Glaziou* 12487 (holotype: B, destroyed, fragment: NY!; isotypes: G! K! P!, photo of G isotype: MICH!).

Thryallis brachystachys var. *obtus*a Niedenzu, Arbeiten Bot. Inst. Königl. Akad. Braunsberg 5: 12. 1914.—TYPE: BRAZIL. Rio de Janeiro, *Glaziou* 1058 (lectotype, here designated: BR!, photo: MICH!).

Scandent shrubs to woody vines to 8 m. Laminas 6–14 cm long, 3.8–7.5 cm wide, elliptical to broadly lanceolate to sometimes suborbicular, apex apiculate or obtuse-apiculate or acuminate, abaxially very densely stellate-pubescent with a mixture of subsessile to short-stalked hairs [the stalks up to 0.1 (–0.2) mm long, the 7–12 branches 0.02–0.2 mm long] and sessile hairs with 8–12 (–15) branches 0.01–0.1 mm long, the epidermis hidden; with a pair of prominently raised glands (sometimes branched) at the apex of the petiole, each gland 0.1–1 mm long, 0.5–1.5 mm in diameter, or with the pair of glands flush or slightly sunken at base of the lamina, sometimes also with a second prominent pair along the margin near the base, each gland ca 0.5 mm in diameter, or rarely glands absent; adaxially the costa impressed but the secondary veins only slightly so or not at all impressed, abaxially the costa prominently raised, the secondary veins prominulous, and the tertiary veins indistinct and mostly hidden by the dense indumentum; petioles 0.3–1.8 cm long; stipules 0.5–1.7 mm long, 0.4–0.8 mm wide. Flowers (6–) 10–20 per axis; peduncles (0.5–) 2–4.5 mm long, pedicels (6–) 7.5–14 mm long, pedicels 2.4–9 (–13) times as long as the peduncles; bracts 1.2–2.5 mm long, 0.6–1 mm wide, bracteoles 1–1.5 mm long, 0.4–0.5 mm wide, bracts and bracteoles mostly deciduous during anthesis but frequently some retained in fruit (caducous in specimens from Paraguay). Sepals in flower (5.5–) 6–6.5 mm long, 3.5–5 mm wide, elliptical to broadly elliptical, in fruit (7.5–) 9–11 mm long, (3.5–) 4.5–6 mm wide. Lateral petals: claw 4–5.5 mm long, limb 7–8 mm long, (9–) 10–11 mm wide; posterior petal: claw 2.8–3.5 (–4.5) mm long, limb 7.5–8 mm long, (9–) 10–11 mm wide. Filaments (1.5–) 2–2.3 mm long, anthers of stamens opposing petals 1.5–2 mm long, of those opposing sepals 1.8–2.3 mm long. Anterior style (3–) 4–5 mm long, longer than the posterior two; posterior styles (2.7–) 3.5–4 mm long; stigma 0.3–0.4 mm long. Nutlets 4–4.5 mm high, with a dorsal ridge or winglet up to 1.5 mm wide; outer cotyledon ca 4 mm long, ca 2.5 mm wide, the distal 1/3 folded over the inner cotyledon, inner cotyledon ca 5.4 mm long, ca 2 mm wide, folded over at the distal 4/5. Fig. 2j.

Phenology. Collected in flower from December to June, in fruit from December to July.

Distribution (Fig. 1). Brazil (eastern Minas Gerais and Bahia to Santa Catarina) and eastern Paraguay; along seashore, in restingas, caatingas, capoeiras, woods, and at roadsides; sea level to 1000 m.

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** BAHIA: Mpio. Jequié, ca 4 km a E de Jequié, *Mori & dos Santos 11833* (MICH); Itaberaba, BA-046, Itaberaba/Iaçu, a 10 km ao S de Itaberaba, *Mori 13427* (MICH, NY); Jequié, *Belém & Mendes 202* (UB, US).—ESPIRITO SANTO: Vitória-V. Velha, *Brade 18083* (RB).—MINAS GERAIS: ca 5 km NE of Francisco Sá, rd to Salinas, *Irwin et al. 23213* (F, MICH, MO, NY, RB, UB, US); Inhapim, 19°30'S, 42°W, *Lindeman & de Haas 4572* (NY, WIS).—PARANÁ: Mpio. Adrianópolis, Col. 7 Barras, *Hatschbach 37839* (MICH, MO, NY, SP).—RIO DE JANEIRO: Rio de Janeiro, *Barboza s.n.* (BR); Nictheroy, Jurujuba, *Brade 216* (GH), *10040* (R), *11364* (US); Itaipuassú, *Brade 14155* (RB); Rio de Janeiro, *Burchell 1853* (GH, K); Nouvelle Fribourg, [Oct 1842] *Claussen 33* (G); without locality, *Claussen 31* (G), *Claussen 38* (BM); Rio de Janeiro, *Dusén 180* (F, G, US); Rio de Janeiro, *Glaziou 723* (BR, K); without locality, *Guillemín 33* (G, P); base de Corcovado, le long de l'aqueduc, *Guillemín 160* (F, G, NY, P, RB); route de S. Clemente, *Guillemín 731* (P); *Houllet s.n.* (BR); Rio de Janeiro, *J. G. Kuhlmann RB15920* (RB); Serra dos Orgãos, *Martius 535* (BM, BR, G, GH, K, M, MO, NY, P); without locality, *Raben 382* (BR); Rio de Janeiro, *Riedel 365* (NY); Faz. Chanaan, Campos, *Sampaio 7893* (R); without locality, *Schott s.n.* (G), *Schüch s.n.* (BR); Santa Teresa, *Schwacke 2950* (RB); Itapirú, *Schwacke 7333* (RB); Praia de Grumari, próximo à Guaratiba, *L. B. Smith 6542* (US); estrada p. Irmação dos Busios, *Sucre 1442* (MICH, UB); Rio de Janeiro, *Vauthier 119* (G), *Vauthier s.n.* (G, K, P); Cabo Frio, *Vidal R39271* (R); Rio Janeiro, *Widgren 741* (BR).—SANTA CATARINA: Porto Belo, Ponta da Enseada, *Cervi 2607* (MBM, MICH); Morro do Ribeirão, *Klein 7049* (MICH, P); *Mueller 188* (K); Sabiá, Vidal Ramos, *Reitz & Klein 6561* (MICH, P, US); Capivary bei Tuberão, *Ule 1007* (NY-fragment, P, US).—SÃO PAULO: Amparo, *de Araujo SP20939* (GH, SP); without locality, *Gaudichaud 47* (P); Ribeira, *Hatschbach 2956* (K, MICH, RB); Monte Alegre do Sul, Faz. Nossa Senhora da Encarnação, *Kuehn & M. Kuhlmann 1143* (SP), *M. Kuhlmann 1785* (SP); Amparo, *Recch SP17819* (SP); Estação de Cunha, *Viegas et al. RB42113* (RB).—Without locality: *Pohl s.n.* (M); *Pohl d.1539* (BR), *Wied Neuwied s.n.* (BR). **Paraguay.** ALTO PARAGUAY: Collina Yaté, ca 80 km ad meridiem Fuerte Olimpo, *Bernardi 20452* (MO).—AMAMBAY: cerca del Parque Nacional Cerro Corá, junto a Gas Ory, *Fernández Casas 6119* (MO, NY); 20 km al N del cruce de Bellavista y Pedro Juan Caballero, *Fernández Casas 6184* (MO, NY); Estância Santa Teresa, *Soria 4479* (MO).—CONCEPCIÓN: zwischen Río Apa und Río Aquidaban, *Fiebrig 4530* (BM, G, GH, K, M, NY-fragment); entre Paso Horqueta y Concepción, *Krapovickas et al. 14231* (MICH); Puerto Fonciere, 10 km al N, sobre Río Paraguay, *Palacios 1949* (MO).

The disjunction between the Paraguayan populations and those from eastern Brazil is surprising; however, the plants do not differ in any aspect. Perhaps additional collections from Paraguay, especially in fruit (none are available now), may reveal characters that would permit recognition of the Paraguayan element at subspecific rank.

Thryallis laburnum S. Moore, Trans. Linn. Soc. London, ser. 2, Bot. 4: 324. 1895. *Thryallis latifolia* var. *acuminata* f. *laburnum* (S. Moore) Niedenzu, Arbeiten Bot. Inst. Königl. Akad. Braunsberg 5: 12. 1914.—TYPE: BRAZIL. Mato Grosso do Sul: prope Corumbá, Jan 1892, *Moore 970* (lectotype, here designated: BM!, photo: MICH!; isoelectotypes: K! NY!).

Thryallis laburnum var. *minor* S. Moore, Trans. Linn. Soc. London, ser. 2, Bot. 4: 324. 1895. *Thryallis brachystachys* var. *acuminata* Niedenzu, Arbeiten Bot. Inst. Königl. Akad. Braunsberg 5: 12. 1914, nom. superfl.—TYPE: BRAZIL. Mato Grosso do Sul: prope Corumbá, Jan 1892, *Moore 969* (holotype: BM!, photo: MICH!; isotype: NY!).

Scandent shrubs to woody vines to ca 3 m (fide Moore). Laminas 6.5–12 cm long, 3.5–8 cm wide, elliptical to broadly ovate, apex acuminate or sometimes apiculate, abaxially the younger laminas and the reduced ones near and in the

inflorescence densely stellate-pubescent with a mixture of long- and short-stalked hairs [the stalks 0.01–0.1 mm long, the 6–11 branches (0.04–) 0.1–0.2 (–0.3) mm long] as well as sessile hairs with 8–10 branches (0.01–) 0.03–0.1 mm long, in mature leaves only the stalked hairs retained and the epidermis readily visible; with a prominently raised pair of glands at the apex of the petiole, each gland 0.2–0.5 mm long, 0.7–1.2 mm in diameter, rarely also with a second prominent pair along the margin near the base, each gland ca 0.5 mm in diameter, adaxially the costa impressed but the secondary veins only slightly or not at all impressed, abaxially the costa and secondary veins prominently raised, the tertiary veins prominulous; petioles 0.7–2 cm long; stipules 0.7–1 mm long, 0.4–0.5 mm wide. Flowers 10–18 per axis; peduncles 1–3.5 mm long, pedicels 6–13 mm long, pedicels 2.7–6.4 times as long as the peduncles; bracts 1.5–2.8 mm long, 0.5–0.7 mm wide, bracteoles 0.9–1.2 (–1.7) mm long, 0.3–0.4 mm wide, bracts and bracteoles caducous (seen only in youngest parts of inflorescence). Sepals in flower 5.7–7 mm long, (3.5–) 4–5 mm wide, elliptical to broadly elliptical, in fruit 9–11.3 mm long, (3–) 3.5–4.3 mm wide. Lateral petals: claw 4.5–6 mm long, limb 6.5–8 mm long, (9–) 10–12 mm wide; posterior petal: claw 3.5–4 mm long, limb 7.5–8 mm long, (9–) 10–11 mm wide. Filaments 1.7–2.2 mm long, anthers of stamens opposing petals 1.6–2 mm long, of those opposing sepals 2–2.4 mm long. Anterior style 3–3.7 mm long, longer than the posterior two; posterior styles 2.7–3.2 mm long; stigma 0.3–0.4 mm long. Nutlets ca 4 mm high, with a dorsal ridge or winglet to 2 mm wide; outer cotyledon ca 6 mm long, ca 3.5 mm wide, the distal 2/5 folded over the inner cotyledon, inner cotyledon ca 5.5 mm long, ca 2 mm wide, folded over at the distal 2/5. Fig. 2k.

Phenology. Collected in flower in January and February, in fruit in February and May.

Distribution (Fig. 1). Brazil (Mato Grosso do Sul), Bolivia (Santa Cruz), and Paraguay (Alto Paraguay); dry and secondary forest and at roadsides; 100–300 m.

ADDITIONAL SPECIMENS EXAMINED. **Bolivia**. SANTA CRUZ: Quiapaca, 10 km N of Santiago, valley of Río Tucuvaca, 18°20'S, 59°30'W, *Gentry 73895* (MICH, MO). **Brazil**. MATO GROSSO DO SUL: Corumbá, *Fróes 11690* (A, F, MO, NY), *Hoehne SP30251* (SP), *Robert 762* (BM). **Paraguay**. ALTO PARAGUAY: [vicinity of Fort Olimpo, fide Urban (1916)] *Weddell 3017* (P).

Thryallis latifolia Martius, Nov. gen. sp. 3: 79. 1829. *Hemsleya latifolia* (Martius) Kuntze, Rev. gen. pl. 1: 88. 1891. *Thryallis latifolia* var. *acuminata* Niedenzu, Arbeiten Bot. Inst. Königl. Akad. Braunschweig 5: 11. 1914.—TYPE: BRAZIL. Bahia: “in herbidi udis ad canalem Dique prope Soteropolin,” *Martius s.n.* (holotype: M!; photo: MICH!).

Scandent shrubs to woody vines to 3 m. Laminas 7.5–13.2 cm long, 4.6–10.2 cm wide, elliptical to broadly ovate to rarely suborbicular, apex apiculate or emarginate-apiculate to acuminate, abaxially densely stellate-pubescent with a mixture of short- and long-stalked hairs [the stalks 0.04–0.3 (–0.4) mm long, the 7–13 branches (0.04–) 0.1–0.3 mm long] as well as sessile hairs with 9–19 branches 0.02–0.2 (–0.3) mm long, the epidermis hidden, with a prominently raised pair of glands (sometimes branched, rarely peglike) at the apex of the petiole, each gland 0.3–1 (–2) mm long, 0.7–1.2 mm in diameter, sometimes also with a second prominent pair at the base of the lamina or along the margin near the base, each gland 0.5–1 mm in diameter; rugose, adaxially the costa and veins impressed, abaxially the

costa and veins prominently raised; petioles 0.8–1.2 cm long; stipules 1–1.5 mm long, 0.5–0.7 mm wide. Flowers 12–22 per axis; peduncles 1.5–3.5 mm long, pedicels 8.5–13.5 mm long, pedicels 2.8–6.6 times as long as the peduncles; bracts 1.8–4.5 mm long, 1–1.3 mm wide, bracteoles 1–1.5 mm long, 0.4–0.6 mm wide, bracts and bracteoles deciduous during anthesis. Sepals in flower 5–5.5 mm long, 4–4.5 mm wide, elliptical, in fruit (7–) 9–10.5 mm long, 3.5–4.7 mm wide. Lateral petals: claw ca 6 mm long, limb 10–11 mm long, 13–14 mm wide; posterior petal: claw ca 4 mm long, limb ca 10 mm long, ca 13.5 mm wide. Filaments ca 2 mm long, anthers of stamens opposing petals ca 1.8 mm long, of those opposing sepals ca 2.2 mm long. Anterior style ca 3.2 mm long, longer than the posterior two; posterior styles ca 2.7 mm long; stigma 0.3–0.4 mm long. Nutlets 3.5–4 mm high, with a dorsal ridge up to 0.3 mm wide, rarely expanded into a winglet up to 1.5 mm wide; mature seed not seen. Fig. 21.

Phenology. Collected in flower from January to May, in fruit from March to June.

Distribution (Fig. 1). Brazil (Minas Gerais and adjacent São Paulo); in campo, campo sujo, and at forest edge.

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** MINAS GERAIS: Mpio. Santa Luzia, Lagôa Santa, *Barreto* 4768 (F); Mpio. Belo Horizonte, Jardim Botânico, *Barreto* 7475 (F, UB, US); Mpio. Belo Horizonte, Gorduras de Cima, *Barreto* 8680 (UB); Ouro Preto, *Campos SPI8840* (SP); without locality, *Claussen s.n.* (523) in 1838 (F, G, GH, NY), *Claussen s.n.* (40A) in 1840 (BM, BR, G, NY, RB), *Claussen* 41A in 1840 (BR), *Claussen* 42A in 1840 (BR, G, M), *Claussen* 128 (BM), *Claussen* 409 (BR), *Claussen* 413 in 1840 (BM, G), *Claussen* 585 in 1840 (G), *Claussen* 587 in 1840 (G), *Claussen* 1413 in 1840 (BR, G); chemin de la Serra da Piedade, *Damazio* 861 (G); bords du Rio Paranna [sic], *Glaziou* 18946 (K, P); Caraça, *Gounelle s.n.* (P); Morro do Paú Lavrado, *Herlinger* 3815 (SP, UB, US); Hôrtio Florestal de Paraopeba, *Herlinger* 7159 (UB); without locality, *Langsdoff & Riedel* 781 (NY); Mpio. Belo Horizonte, Mazargão, *Roth RB1808* (RB); without locality, *Saint-Hilaire* 124AC (P); Sabará, *Vauthier* 558 (G, P); Mpio. Nova Lima, Serra da Mutuca, *Williams & Assis* 5384 (GH); Mpio. Belo Horizonte, Morro das Pedras, *Williams & Assis* 6329 (GH); Mpio. Belo Horizonte, Resaca, near Pampulha, *Williams & Assis* 7395 (US).—SÃO PAULO: Via Anhuanguera, 1 km S de Ituperava, *Hatschbach* 42788 (MICH).

The type of *Thryallis latifolia* is said to be from wet places at the large ditch or moat, “Dique,” at the fortification of São Pedro in the city of Salvador Bahia. It is likely that the type was mislabeled. All other collections seen are from Minas Gerais, and *Thryallis* is not found in wet localities.

Thryallis longifolia Martius, Nov. gen. sp. 3: 78, t. 230. 1829. *Hemsleya longifolia* (Martius) Kuntze, Rev. gen. pl. 1: 88. 1891.—TYPE: BRAZIL. Bahia: in sylvis catingas ad Mt. Sanctum [Monte Santo], *Martius s.n.* (holotype: M!, photo: MICH!; isotype: M! P-JU, photo of P-JU isotype: MICH!).

Scandent shrubs to woody vines to 10 m. Laminas 6.3–20.5 cm long, 3.2–14 cm wide, elliptical to lanceolate to broadly ovate, apex obtuse-apiculate or apiculate-emarginate to acuminate, abaxially stellate-pubescent with stalked hairs (the stalk 0.1–0.3 mm long, the 7–10 branches 0.04–0.3 mm long, in longer hairs the branches radiating from the apex only, the shorter hairs commonly with a stouter stalk and the branches radiating from along the stalk as well), sessile hairs absent and the epidermis visible; the reduced leaves associated with the inflorescence sometimes pubescent adaxially and densely pubescent abaxially; with a pair of prominently raised to knob- or peglike glands at the apex of the petiole, each gland 0.5–3.5 mm long, 0.5–0.7 mm in diameter, sometimes branched, often also with a second prom-

inent pair at the base of the lamina or along the margin near the base, each gland 0.5–1 mm in diameter; adaxially the costa impressed and the secondary veins less deeply or not at all impressed, abaxially the costa and secondary veins prominently raised, the tertiary veins prominulous; petioles 0.6–2 cm long; stipules 0.8–2.3 mm long, 0.4–0.7 mm wide. Flowers (6–) 10–20 per axis; peduncles 0.5–3.5 mm long, pedicels 10–23 mm long, pedicels 4–13 times as long as the peduncles; bracts 1.8–3.2 mm long, (0.4–) 0.6–1 mm wide, bracteoles 1–2 mm long, 0.4 mm wide, bracts and bracteoles usually deciduous early in anthesis, commonly associated only with buds, sometimes retained through fruiting stage. Sepals in flower 4.6–7 mm long, 3.6–5.8 mm wide, broadly elliptical to broadly ovate, in fruit 8.5–10.5 mm long, 3.8–6.5 mm wide. Lateral petals: claw 6–7.5 mm long, limb 7–10 mm long, 11–14 mm wide; posterior petal: claw 3.5–4.5 mm long, limb 9–10 mm long, 11–13 mm wide. Filaments 1.8–2.3 mm long, anthers of stamens opposing petals 1.9–2.2 mm long, of those opposing sepals 2–2.5 mm long. Anterior style 2.9–3.8 mm long, longer than the posterior two; posterior styles 2.6–3.2 mm long; stigma 0.3–0.5 mm long. Nutlets 3.6–4.2 mm high, with a dorsal ridge or winglet up to 1.5 mm wide; outer cotyledon ca 4 mm long, ca 2.1 mm wide, the distal 1/3 folded over the inner cotyledon, inner cotyledon ca 1.5 mm long, ca 1.9 mm wide, folded over at the distal 1/2. Fig. 2a–i.

Phenology. Collected in flower from December to April, and in fruit from December to August.

Distribution (Fig. 1). Eastern Brazil (Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Bahia, and eastern Minas Gerais; probably also in Alagoas and Sergipe); caatingas, woodlands, roadsides, on limestone and granite; 50–1130 m.

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** BAHIA: 18 km NW of Conceição do Coité on rd to Santaluz, ca 11°30'S, 39°20'W, *Anderson 11739* (MICH, MO, NY); 3 km S of Senhor do Bonfim, 10°25'S, 40°10'W, *Anderson 11741* (BR, MICH, MO, NY); Mpio. Poções, 2.5 km W of Poções on rd to Bom Jesus da Serra, *Anderson 12515* (MICH, RFA); Mpio. Jacobina, 20 Km E of Jacobina on rd to Capim Grosso, *Anderson 13692* (MICH); Jacobina, *Blanchet 3628* (BR, F, G, K, MO, P); Rod. Juazeiro–Senhor do Bonfim (BR-407), Km 100, 10°19'S, 40°10'W, *Coradin et al. 5998* (K); Porto Castro Alves Cachoeira, vale dos rios Cachoeira e Jacuípe, 12°32'S, 39°05'W, *do Cavalo 1017* (MICH); Mpio. Senhor do Bonfim, Fazenda Campo Verde, *Döbenreiner & Tokarnia 1477* (MICH); Mpio. Jequié, ao SW do Km 38 da Rod. Jequié–Contendas do Sincorá, *dos Santos et al. 3491* (MICH, NY); Mpio. Poções, perto de Victória da Conquista, 5 km entrando na estrada para Boa Nova, *Gottsberger & Gottsberger 25-25173* (NY); Serra de Itiuba ca 6 km E of Itiuba, ca 10°41'S, 39°48'W, *Harley 16195* (K, MICH, MO, NY, RB); Monte Santo, ca 10°27'S, 39°20'W, *Harley 16429* (K, MICH, NY); ca 2 km from Estiva, ca 12 km N of Senhor do Bonfim on BA-130 to Juazeiro, ca 10°23'S, 40°10'W, *Harley 16516* (MICH, MO, NY); Morro de Nossa Senhora dos Milagres, just W of Milagres, 12°54'S, 39°52'W, *Harley 19461* (MICH, NY, RB, US); valley of the Rio das Ondas, ca 5 km E of Barreiras, *Irwin 31638* (F, MICH, NY, RB, SP); Senhor do Bonfim, Serra de Santana, *Lewis et al. SPF 36619* (MICH); Mpio. Poções, Km 2–4 da estrada que liga Poções (BR-116) ao povoado de Bom Jesus da Serra (ao W de Poções), *Mori et al. 9491* (MICH, NY); Jacobina, 11°16'S, 40°27'W, *Orlandi 256* (RB, UB).—CEARÁ: Aracati, *Fernandes & Matos EAC3130* (MICH); Estação Ecológica de Aiuaba, *Martins EAC10187* (MICH).—MINAS GERAIS: Mpio. Datas, 5 km E of Datas on rd to Serro, *Anderson 13657* (MICH); ca 10 km S of Serra do Cipó at Cardeal Mota, *Anderson 36271* (F, MICH, MO, NY, UB, US); S. Paraíso, Faz. Fortaleza, *Brade 17801* (RB); ca 2 km N of Joaquim Felício, *Irwin 27358* (F, G, MICH, MO, NY, UB); Felixlandia para Brasília, *Pires 57941* (MICH, NY); Serra de Pitangui (fide Niedenzu, 1928), *Sellow III. it. B1851 c1322* (NY); without locality, *Saint-Hilaire 180A* (P).—PARAÍBA: Encosta do Pico do Jabre–Teixeira, *Fernandes & Matos EAC6633*, (MICH).—PERNAMBUCO: Triunfo, *Heringer et al. 934* (RB, UB); Inajá, *Heringer et al. 980* (RB, UB); Serra Catingueira, *Lützelburg 25770* (F, M).—RIO GRANDE DO NORTE: Mossoró, Olho d'Água da Escada, *Tavares 714* (US).

Thryallis parviflora C. Anderson, n. sp.—TYPE: BRAZIL. Distrito Federal: Córrego Landím, ca 20 km N of Brasília, gallery forest and creek margin, 950 m, 16 Dec 1965, *Irwin 11341* (holotype: RB!, photo: MICH!; isotypes: F! MO! NY! UB! US!).

Differt a *Thryalle latifolia* petiolo infra apicem 2 (–4) glandulis longe stipitatis (usque 5.5 mm) instructo et petalis parvulis (limbo usque 6 mm longo et 8 mm lato).

Scandent shrubs to woody vines to 5 m. Laminas 8.5–13.5 cm long, 5–9.5 cm wide, narrowly elliptical to elliptical to ovate, apex apiculate or emarginate-apiculate to acuminate, abaxially densely stellate-pubescent with a mixture of short- and long-stalked hairs (the stalks 0.05–0.3 mm long, the 5–8 branches 0.1–0.3 mm long) and sessile to subsessile hairs (stalk up to 0.01 mm long, the 5–8 branches 0.03–0.08 mm long) as well as sessile hairs with 8–12 branches 0.01–0.06 (–0.09) mm long, the epidermis hidden; with a pair of knob- to peglike glands at the apex of the petiole or at the base of the lamina at insertion of petiole, each gland 1.4–5.5 mm long, 0.5–1.4 mm in diameter, sometimes branched and the second pair smaller; rugose, adaxially the costa and veins impressed, abaxially the costa and veins prominently raised; petioles 1–1.8 cm long; stipules 1–2.5 mm long, 0.6–0.8 mm wide. Flowers 12–22 per axis; peduncles 0.5–3 mm long, pedicels 7–11.5 mm long, pedicels 3.1–9 (–17) times as long as the peduncles; bracts 2–4.2 mm long, 1–1.6 mm wide, bracteoles 1.5–2.8 mm long, 0.5–0.8 mm wide, bracts and bracteoles deciduous or persistent during anthesis and sometimes retained in fruit. Sepals in flower 5.5–6 mm long, 3.5–4 mm wide, elliptical, in fruit 8–9 mm long, 3–4 mm wide. Lateral petals: claw 4–5 mm long, limb 4–5.5 (–6) mm long, 6–8 mm wide; posterior petal: claw 2–3.5 mm long, limb 4–5.5 mm long, 6–8 mm wide. Filaments 1.5–2 mm long, anthers of stamens opposing petals 1.7–1.9 mm long, of those opposing sepals 2–2.4 mm long. Anterior style 2.7–3.1 mm long, longer than the posterior two; posterior styles 2.4–2.7 mm long; stigma 0.3–0.4 mm long. Nutlets ca 3.8 mm high, with a dorsal ridge up to 0.2 mm wide; mature seed not seen. Fig. 2m, n.

Phenology. Collected in flower in January, October, and December, in fruit from April to June.

Distribution (Fig. 1). Brazil (Distrito Federal and Goiás); in gallery forest, capoeira, secondary woods, and cerrado; 900–950 m.

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** Distrito Federal: Brasília, camino de Fercal, *Barroso 609* (RB); Brasília, Sobradinho, Fercal, *Heringer 14262* (K, MICH); Chapada da Contagem, ca 10 km E of Brasília, *Irwin 15733* (MICH); Brasília, *Pires et al. 9304* (UB); Brasília, Fundação Zoobotânica, *Pires et al. 9574* (NY, UB, US); Felixlândia para Brasília, *Pires 57941* (UB).—Goiás: Mpio. Formosa, JK, *Hatschbach 39355* (MICH); Rio Contagem, ca 35 km N of Brasília, *Irwin 15733* (NY, UB); Itumbiara, proximo o Rio Paranaíba, *Rizzo 8704* (MICH).

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