

AN UPDATED SYNOPSIS AND KEY TO THE SPECIES *MONNINA* IN THE VENEZUELAN FLORA (POLYGALACEAE, POLYGALEAE), INCLUDING TWO NEW RECORDS

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Abstract. A new checklist and key to the species of *Monnina* in the flora of Venezuela, which currently includes 16 species, are presented. *M. salicifolia* and *M. smithii*, the former previously known along the Andes from Colombia, Ecuador, Peru, and Bolivia, and the latter from Colombia, are reported here as new country records. Through the revision of the nomenclature and typification of Venezuelan *Monnina* species, six leptotypifications (*M. aestuans*, *M. cladostachya*, *M. densa*, *M. elongata*, *M. mollis* and *M. solandrifolia*) and one neotypification (*M. meridensis*) are designated. In a geographical and taxonomical context, *Monnina coriacea* is considered a synonym of *M. meridensis*, whereas *M. densa* and *M. duidae* are regarded here as distinct from *M. aestuans* and *M. cacumina*, respectively.

Keywords: Andes, Flora of Venezuela, Lectotypification, *Monnina*, Polygalaceae

Resumen. Se presenta una nueva lista y clave de las especies de *Monnina* para la Flora de Venezuela, las cuales incluyen 16 especies. Se registran para la flora de Venezuela a *M. salicifolia* y *M. smithii*, dos especies previamente conocidas de los Andes de Colombia, Ecuador, Perú y Bolivia la primera, y Colombia la segunda. A través de la revisión de la nomenclatura de las especies venezolanas de *Monnina*, se proponen seis leptotipificaciones (*M. aestuans*, *M. cladostachya*, *M. densa*, *M. elongata*, *M. mollis* and *M. solandrifolia*) y una neotipificación (*M. meridensis*). En un contexto geográfico y taxonómico, *Monnina coriacea* es considerada sinónimo de *M. meridensis*, mientras que *M. densa* y *M. duidae* son consideradas diferentes de *M. aestuans* y *M. cacumina*, respectivamente.

Palabras clave: Polygalaceae, Lectotipificación, Flora de Venezuela, *Monnina*, Andes

Monnina s. l. Ruiz & Pav. is a New World genus of Polygalaceae with ca. 170 species. The genus is distributed from the southwestern United States (New Mexico; *M. wrightii* A. Gray *sensu* Blake, 1924; Eriksen, 1993a), Mexico, Central America (Taylor, 1985; Morales-Quiros, 2014), along the Andes and Coastal Cordillera (Venezuela), the Pacific coast of Ecuador and Peru to southern Paraguay, Uruguay, dry parts of southeastern Brazil Central (Marques, 1989), Chile and northeastern and central Argentina (Río Negro; *M. dictyocarpa* Griseb] *sensu* Freire-Fierro and Pastore, 2008); it is absent in the islands of the Caribbean. The countries with the highest number of species are Peru, with 59, followed by Ecuador and Colombia with 48 and 43 species, respectively. The region with the highest number of species is the Andes of northwestern South America (Colombia, Ecuador and Peru), suggesting that this region is the center of distribution for *Monnina* (Ferreira, 1946, 1953, 1957; Eriksen et al., 2000). Moreover, this region is the most plant species-rich of the Andean ecosystems, with 10,932 species in Colombia, 8,897 in Ecuador and 8,698 in Peru (Perez-Escobar et al., 2021).

Species of *Monnina* occur from ca. sea level (e.g., *M. denticulata* Chodat in the Pacific coastal region of Ecuador) to 4000–4500 m (e.g., *M. revoluta* (Bonpl.) Kunth in Colombia and Ecuador). However, most species are from middle to high elevations in a variety of habitats in the Andes, such as montane forests, subpáramo, páramo, roadsides,

shrubby edges and *Polylepis* forests, at elevations of 1200 to 4500 m. They also occur in lowland, semiarid biomes (e.g., *M. pterocarpa* Ruiz & Pav. Ecuador, Peru and Chile), dry forests (e.g., *M. conferta* Ruiz & Pav. in Peru), over rocky slopes and Tepuis summits on the Guayana Shield (e.g., *M. cacumina* N. E. Brown), and in open savannas in Brazil (e.g., *M. stenophylla* A. St. Hil.). Some species (e.g., *M. salicifolia* Ruiz & Pav.; *M. subscandens* Triana & Planch.) are invasive and flourish in disturbed areas along the edges of roadsides, in montane forests and páramo.

The family Polygalaceae is divided at present into four tribes: *Carpolobieae* B. Eriksen, *Diclidanthereae* Reveal, *Polygaleae* Chodat and *Xanthophylleae* Chodat (Pastore et al., 2017; Mota et al., 2019). *Monnina* is included in the tribe *Polygaleae* characterized by a 3-merous, caducous corolla (rarely also with two rudimentary lateral petals), caduceus calyx, unappendaged keel, eight stamens and dehiscent fruit (Eriksen, 1993a,b,c; Eriksen and Persson, 2007).

The monophyly of *Monnina* s.l. is reflected in its subgeneric ranks (e.g., *Hebeandra* Chodat, *Monninopsis* Chodat and *Pterocarya* (DC.) Chodat) established in early classifications (Chodat, 1896a,b). However, Eriksen's morphological cladistic analysis (Eriksen, 1993a,b) showed that the genus is polyphyletic. The results of this work showed that *Monnina* subg. *Monninopsis* appeared deeply nested in *Polygaleae*, whereas *Monnina* subg. *Monnina* and *M. subg. Pterocarya* formed a rather basal clade.

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This result, based on fruit and seed characteristics, led Eriksen to assign generic rank to subg. *Monninopsis* and subg. *Pterocarya*, and creating the new genera *Ancylotropis* B. Eriksen and *Pteromonnia* B. Eriksen, respectively. Persson (2001) demonstrated the traditional view of a single origin of *Monnina*. He determined that *Monnina* subg. *Monninopsis* is the sister group to the strongly supported, but partly unresolved, clade of *M.* subg. *Monnina* and *M.* subg. *Pterocarya*. Otherwise, *Monnina* subg. *Pterocarya* does not possess any character that does not also occur in one of the other subgenera (Eriksen, 1993b). Since this monophyletic entity is difficult to circumscribe and distinguish morphologically from *Monnina* s.str., the genus *Pteromonnia* will most likely be put into synonymy (Eriksen and Persson, 2007).

In addition, the genus has been treated in North American Flora (Blake, 1924), Flora of Argentina (Grondona, 1945), Flora of Peru (Ferreyra, 1946), Flora of Colombia (Ferreyra, 1953a), Flora of Ecuador (Ferreyra, 1953b; Eriksen et al., 2000), Flora of Venezuela (Ferreyra, 1957), Flora of Central America (Taylor, 1985), Flora of Brazil (Marques, 1989),

Flora of the Venezuelan Guayana (Aymard et al., 2004), *Catálogo de las Plantas Vasculares del Cono Sur* (Freire-Fierro and Pastore, 2008) and *Manual de Plantas de Costa Rica* (Morales Quiros, 2014).

While conducting herbarium research for updating the checklist of Polygalaceae for the *Nuevo Catálogo de la Flora de Venezuela* (Aymard and Campbell, 2008), specimens of two species of *Monnina* were found that represent records new to the Venezuelan flora (*M. salicifolia* Ruiz & Pav. and *M. smithii* Chodat). This contribution increases to sixteen the number of *Monnina* species known from Venezuela. In addition, five lectotipifications (*M. cladostachya* Turcz.; *M. densa* Planch. & Linden ex Wedd.; *M. elongata* Triana & Planch.; *M. mollis* Planch. & Linden ex Wedd. and *M. solandriifolia* Triana & Planch.) and one neotypification are proposed (*M. meridensis* Planch. & Linden ex Wedd.). In a geographical and taxonomical context, *M. coriacea* Chodat is considered a synonym of *M. meridensis* Planch. & Linden ex Wedd., whereas *M. densa* Planch. & Linden ex Wedd. and *M. duidae* Blake are regarded here as distinct from *M. aestuans* (L.f.) DC. and *M. cacumina* N. E. Brown, respectively.

MATERIALS AND METHODS

This work is based on morphological (using a dissecting stereomicroscope) and herbarium studies in COL, GH, MER, MERF, MO, NY, PORT, US and VEN (herbarium codes after Thiers, 2019). Historical taxonomic literature on *Monnina* was examined using the Biodiversity Heritage Library (<http://www.biodiversitylibrary.org>), mainly Turczaninow (1854), Weddell (1857), Triana and Planchon (1862), and Chodat (1894, 1895; 1896a,b). Additional literature was reviewed: e.g., Ferreyra's contributions (1946, 1953a,b, 1957), Flora of Brazil (Marques, 1989), Flora of Ecuador (Eriksen et al., 2000), and Flora of the Venezuelan Guayana (Aymard et al., 2004). The checklists *Nuevo Catálogo de*

la Flora de Venezuela (Aymard and Campbell, 2008) and *Catálogo de plantas y Líquenes de Colombia* (Aymard and Freire-Fierro, 2016) were also reviewed.

Type specimens of *Monnina* species studied in this work were examined using online images from JSTOR Global Plants (<https://plants.jstor.org/>). In addition, the International Plant Names Index (<https://www.ipni.org/>), the online botany collections of Smithsonian Natural Museum of Natural History (<https://naturalhistory.si.edu/research/botany>), and Tropicos (<http://legacy.tropicos.org/Home.aspx>) were consulted to update the current nomenclature and geographical information.

KEY TO THE SPECIES OF *MONNINA* IN THE FLORA OF VENEZUELA

Modified from Ferreira (1957); species indicated with an asterisk (*) are endemic to Venezuela

- 1a. Leaves spatulate; inflorescence paniculate, the lateral branches usually divaricate *M. solandriifolia*
- 1b. Leaves ovate, wide-ovate, oblanceolate-elliptic, lanceolate, sometimes elliptic, lanceolate-elliptic or oblong; inflorescence racemose 2
- 2a. Leaves ovate, wide-ovate, oblanceolate-elliptic; lower sepals conspicuously joined, usually one-third to one-half united 3
- 2b. Leaves lanceolate, sometimes elliptic, lanceolate-elliptic or oblong; lower sepals free 7
- 3a. Apex of leaves acuminate or acute, mucronate; flower subtended by linear-lanceolate or lanceolate bracts; lower sepals half- to completely united, apex acute 4
- 3b. Apex of leaves obtuse, not mucronate; flower subtended by triangular bracts; lower sepals one-third to one-half united, sometimes only slightly united, obtuse, rarely acute 5
- 4a. Branches and branchlets lax foliose, not densely foliose, on the upper parts of its branches; leaves elliptic-lanceolate 4.8–11 × 1.5–5 cm, glabrous above, hirsute beneath, petiole 3–7 mm long; inflorescence 9–11 cm long; bract linear-lanceolate, 3–3.8 mm long, flower 5–5.5 mm long, pedicels 1.8–2.2 mm long; outer sepals triangular, slightly pubescent beneath; drupe ellipsoid, 6–7.5 mm long *M. cacumina*
- 4b. Branches and branchlets densely foliose on the upper parts of branches; leaves oblanceolate-elliptic, 2–5.5 × 0.5–1.2 cm, puberulent to glabrescent on both surfaces, petiole 2–3 mm long; inflorescences 2–4 cm long, bract oval-lanceolate, ca. 3 mm long; flower 3–4 mm long; pedicels 1–1.5 mm long; outer sepals ovate, glabrous beneath; drupe oblong, ca. 4 mm long *M. densa*
- 5a. Leaves ovate, about twice as long as wide, up to 3.5 × 1.8 cm; outer sepals acute, 1-nerved; keel glabrous inside *M. duidae**
- 5b. Leaves elliptic or lanceolate, more than 3 times as long as wide, up to 6.8 × 1.6 cm; outer sepals obtuse, 3–5-nerved; keel pubescent inside, rarely glabrescent 6
- 6a. Leaves elliptic, apex obtuse; flower subtended by acuminate bracts; lower sepals usually one-half united *M. aestuans*
- 6b. Leaves lanceolate, apex acute; flower subtended by acute bracts; lower sepals one-third united *M. meridensis**
- 7a. Racemes with linear-filiform or filiform bracts, apex involute 8
- 7b. Racemes with triangular to acute-triangular, ovate, hood-shaped or oblanceolate bracts, apex not involute 9

KEY TO THE SPECIES OF *MONNINA* IN THE FLORA OF VENEZUELA CONT.

Modified from Ferreira (1957); species indicated with an asterisk (*) are endemic to Venezuela

- 8a. Branches and branchlets hirsute, glabrescent when mature; petioles unwinged; racemes 8–10 cm long; bracts linear-filiform; outer sepals larger than the wings and keel, 5–6 mm long, lanceolate, apex acute; keel slightly pubescent inside. *M. bracteata*
- 8b. Branches and branchlets finely pubescent; petioles slightly winged; racemes 14–23 cm long; bracts filiform; outer sepals smaller than wings and keel, 1.4–4 mm long, triangular, apex obtuse; keel glabrous inside. *M. smithii*
- 9a. Ovary pubescent, sometimes slightly pubescent. 10
- 9b. Ovary glabrous 12
- 10a. Leaves acute; flower subtended by bracts 1.8–2.2 mm long, acute-triangular, glabrescent to slightly pubescent on the lower surface; lower sepals triangular, 3-nerved, glabrescent beneath. *M. cladostachya**
- 10b. Leaves acuminate to long-acuminate; flower subtended by bracts 6–7 mm long, triangular or oblanceolate, densely pubescent on the lower surface; lower sepals spatulate or ovate-triangular, 1-, rarely 2- or 5-nerved, glabrous or densely pubescent beneath, apex obtuse; keel pubescent beneath 11
- 11a. Leaves long-acuminate; bracts triangular, densely pubescent on the lower surface; lower sepals spatulate, 5-nerved, densely pubescent beneath, apex obtuse; keel pubescent beneath *M. tatei**
- 11b. Leaves acuminate; bracts oblanceolate, slightly pubescent on the lower surface; lower sepals ovate-triangular, 1-, rarely 2-, nerved, glabrous beneath, apex acute; keel glabrous beneath. *M. elongata*
- 12a. Flowers subtended by ovate or hood-shaped bracts 13
- 12b. Flowers subtended by triangular to acute-triangular bracts 14
- 13a. Flowers subtended by ovate bracts, apex obtuse; lower sepals spatulate, densely pubescent beneath; wings pubescent beneath. *M. venezuelensis**
- 13b. Flowers subtended by hood-shaped bracts, apex acute, lower sepals ovate-triangular; wings glabrous beneath *M. mollis*
- 14a. Leaves elliptic, canescent pubescent on both sides, 5–6 pairs of lateral veins, apex obtuse; bracts finely pubescent beneath; upper petals slightly pubescent to glabrous *M. salicifolia*
- 14b. Leaves lanceolate or elliptic-lanceolate, glabrescent above, sparsely hirsute beneath; 6–10 pairs of lateral veins, apex acute or acuminate; bracts hirsute or glabrescent beneath; upper petals dense pubescent 15
- 15a. Branches and branchlets hirsute; leaves 4–21 × 1.4–8 cm, hirsute beneath, apex acuminate; flowers subtended by bracts 3–5 mm long, 3-nerved, glabrescent beneath; outer sepals obtuse. *M. pubescens**
- 15b. Branches and branchlets glabrescent; leaves 4–8.8 × 1–2.3 cm, glabrescent beneath; apex acute; flowers subtended by bracts 1.5–2.2 mm long, 1-nerved, hirsute beneath; outer sepals acute *M. steyermarkii**

SYNOPSIS OF THE SPECIES OF *MONNINA* IN THE FLORA OF VENEZUELA*Monnina aestuans* (L.f.) DC. Prodr.1: 338. 1824.

Basionym: *Polygala aestuans* L. f., Supplementum Plantarum 315. 1781[1782]. TYPE: COLOMBIA [Nouvelle-Grenade]. *J. J. Mutis* 59 (Lectotype, designated here: LINN [882.23], image seen; Isotype: LINN [882.24], image seen).

Habitat and ecology: Shrub 1–1.5 m tall; montane forests and páramo. At elevations of 1800–4000 m.

Distribution: Along the Andes in Colombia (Antioquia, Bolívar, Boyacá, Cauca, Cesar, Cundinamarca, Huila, Magdalena, Norte de Santander, and Santander), Venezuela (Táchira and Trujillo), and Ecuador.

Linnaeus f. cited in the protologue “*Habitat* in Nova Granada. *Mutis*.” There are three specimens identified as *Polygala aestuans* in LINN (one of *Mutis* 79 [882.22] and two of *Mutis* 59 [882.23 and 882.24]). Ferreyra (1953, 1957) suggested that the type specimen probably was collected by J. C. Mutis in Cundinamarca, Colombia, but he did not propose a lectotype.

Monnina bracteata Chodat, Bulletin de l’Herbier Boissier 3: 133. 1895. TYPE: VENEZUELA. Prope Truxillo et Mérida, 4000–4500 pieds., 1842, *J. J. Linden* 339 (Holotype: G [image seen]; Isotypes: GENT [image seen], K [image seen]).

Habitat and ecology: Shrub or slender tree to 3 m tall, branched; montane forests, subpáramo shrubby edges and páramo. At elevations of 1300–3000 m.

Distribution: Andes of Colombia (Boyacá, Quindío, Norte de Santander, and Santander) and Venezuela (Barinas, Lara, Mérida, Táchira, and Trujillo).

The author cited in the protologue “*Prope Truxillo et Mérida, J. J. Linden* 339 (hr. Delessert).” The only specimen at G, where the Delessert Herbarium is housed, annotated by Chodat, is without any ambiguity the holotype.

Monnina cacumina N. E. Brown, Trans. Linn. Soc. Bot. 6: 10, 11: 1910. TYPE: GUYANA [British Guiana], Summit Roraima, 5600 ft. alt., 1898, *R. V. McConnell* & *J. J. Quelch* 645 (Holotype: K).

Heterotypic Synonym: *Monnina uaipanensis* Wurdack, Mem. New York Bot. Gard. 9: 479. 1957. TYPE: VENEZUELA, Bolivar state, cumbre Uaipán Tepui, 1900 m, 1–15 February 1948, *K. D. Phelps*; *C. B. Hitchcock* 368 (Holotype: NY).

Habitat and ecology: Erect or scandent shrub 1–6 m tall; montane forests, on rocky slopes and tepui summits. At elevations of 1300–2800 m.

Distribution: Endemic to the Guayana Shield in Brazil (Amazonas and Roraima), Guyana, and Venezuela (Amazonas and Bolívar).

Monnina cladostachya Turcz., Bull. Soc. Nat. Mosc. 27(2): 357. 1854. TYPE: VENEZUELA: Prope Porto Cabello [Carabobo state, Puerto Cabello], 01 September 1843, *N. Funck* 758 (Lectotype, designated here: KW, image seen).

Residual syntypes: VENEZUELA: Provincia Caracasana, prope la Guayra [La Guaira, La Guaira state], 1842, *N. Funck* 374 (KW, image seen); *H. G. Galeotti* 469 (KW, image seen).

Habitat and ecology: Shrub 1 to 4 m tall, branched; montane forests to subpáramo shrubby edges. At elevations of 1200–2800 m.

Distribution: Endemic to the Andes and Northern Venezuela (Coastal Cordillera); Anzoátegui, Aragua, Distrito Capital, Lara, Mérida, Miranda, and Táchira states. Probably in Boyacá, Cesar, Norte de Santander, and Santander departments, Colombia.

The author of this species cited three specimens in the protologue from the Coastal Cordillera in Venezuela: "...provincia Caracasana, prope la Guayra. *Funck* 374, *Galeotti* 469, and *Funck* 758, prope Porto Cabello." Ferreyra (1957), in his revision of the Venezuelan species of *Monnina*, did not propose a lectotype.

Monnina densa Planch. & Linden ex Wedd., *Chloris Andina* 2: 268. 1857. TYPE: [Nouvelle-Grenade] COLOMBIA. Cordillères de la province d'Ocaña [Norte de Santander Department]: 2600–3250 m, 1846–1852, *L. J. Schlim* 345 (Lectotype, designated here: BR; Isolectotypes: K [image seen], MPU [image seen]).

Protologue specimen citations: Nouvelle-Grenade: Sierra Nevada de Santa Marta!, h. 3575–3900 m (*L. J. Schlim*, n. 820); environs de Pamplona (*J. J. Linden* 734); Cordillères de la province d'Ocaña, 2600–3250 m (*L. J. Schlim* 345).

Residual syntypes: COLOMBIA [Nouvelle-Grenade]. prov. de Rio Hacha [Magdalena Department], Sierra Nevada de Santa Marta, 3575–3900 m, March, 1852, *L. J. Schlim* 820 (BR, G, MPU, P [images seen]). Environs de Pamplona [Norte de Santander Department], November, 1849, *J. J. Linden* 734 (BR, G, K, MPU [images seen]).

Habitat and ecology: Shrub to 2 m tall; montane forests and páramo. At elevations of 2800–3800 m.

Distribution: Along the Andes in Colombia (Boyacá, Cundinamarca, Magdalena, and Norte de Santander) and Venezuela (Mérida and Táchira).

In the protologue, H. A. Weddell cited three specimens from the Western Cordillera and Sierra de Santa Marta, Colombia, but he did not designate a type collection. In his revisions of the Colombian and Venezuelan species of *Monnina*, Ferreyra (1953, 1957, respectively) treated *M. densa* as a synonym of *M. aestuans* (L.f.) DC. These two taxa are small-leaved shrubs bearing single stems with a much branched crown. There are several species (i.e., *M. loxensis* Benth. and *M. pycnophylla* B. Eriksen) of *Monnina* growing in the Paramo ecosystem that are sympatric and bear the same morphological features. *Monnina aestuans* is sympatric with *M. densa* but differs in the characters cited in the key to species above.

Monnina duidae Blake, Bull. Torrey Club 58: 381. 1931. TYPE: VENEZUELA. Amazonas: Mount Duida, summit of the peak, No. 7., 7100 ft, October 1928, *G. H. G. Tate*

604 (Lectotype, effectively designated by Ferreira (1957): NY; Isosyntype: US).

Habitat and ecology: Frutescent 0.6 m tall; tepui summits. At elevations of 2200 m.

Distribution: Endemic to the Guayana Shield of Venezuela (Amazonas).

Eriksen (in Aymard et al., 2004) treated *M. duidae* as a synonym of *M. cacumina*. Here, I follow the morphological concepts proposed by Ferreyra (1957), who recognized both taxa. The main characters to separate both species are in the key to the species above.

Monnina elongata Planch. & Linden ex Triana & Planch., *Annales des Sciences Naturelles; Botanique, série 4*, 17: 137. 1862. TYPE: COLOMBIA [Nouvelle-Grenade]. La Enllanada, province d'Ocaña [Norte de Santander Department], 1500 m; 1846; *L. J. Schlim* 1137 (Lectotype, designated here: BM [image seen]; Isolectotypes: G [image seen], GH [image seen], K [image seen], P [image seen], US [image seen]).

Protologue specimen citations: Nouvelle-Grenade: La Enllanada, prov. d'Ocaña, alt. 1500 metres (*J. J. Triana s.n.*); ibid. (*L. J. Schlim* 1137); prov. de Pamplona, alt. 2600 metres et Ocaña (*L. J. Schlim* 87, 674, 679).

Residual syntypes: COLOMBIA [Nouvelle-Grenade]. prov. de Pamplona, Ocaña, 2600 m. *L. J. Schlim* 87 (G, MPU, P [images seen]), *Schlim* 674 (BM [image seen], BR [image seen], GH [image seen], K [image seen], MPU [image seen], P [image seen], US [image seen]), *Schlim* 679 (P, image seen).

Habitat and ecology: Subfrutescent to 2 m tall; montane forests and páramo. At elevations of 1500–3500 m.

Distribution: Along the Andes in Colombia (Cundinamarca, Norte de Santander, and Santander) and Venezuela (Mérida, Táchira, Trujillo, and Zulia).

In the protologue, J. J. Triana and J. E. Planchon cited four specimens from the Western Cordillera in Colombia, but they did not designate a type collection. In his revision of Colombian species of *Monnina*, Ferreyra (1953) did not make any reference to the specimens cited by Triana and Planchon. Sprague (1926), in Linden and Planchon's *Plantae Columbianaes*, suggested that *J. J. Linden* 339 from Venezuela, Trujillo state, San Urbino, may be regarded as the type specimen. However, the Venezuelan specimen is not available and, moreover, only the Colombian localities were cited by J. J. Triana and J. E. Planchon.

Monnina meridensis Planch. & Lind. ex Wedd. *Chlor. And.* 2: 268. 1857. Neotype [designated here]: VENEZUELA. Mérida. Sierra Nevada de Mérida, Río Nuestra Señora, 3100 m., 16 Junio 1911. *A. Jahn* 81 (US [images seen]).

Habitat and ecology: Frutescent, or slender tree to 6 m. tall; montane forests, subparamo and páramo. At elevations of 2000–3500 m.

Distribution: Along the Andes in Venezuela (Lara, Mérida, Táchira, and Trujillo); a single collection from Colombia (La Guajira; *H. Cuadros* 2247, MO).

In the protologue, Weddell cited a single specimen (*J. J. Linden* 586) from the Sierra Nevada de Mérida, 2870–3250 m. A search for type material of *M. meridensis* was unsuccessful, including herbaria likely to hold type material of plants described by Weddell. Currently, the interpretation of this species is based solely on Weddell's protologue and Ferreyra's description (Ferreyra, 1957). Therefore a neotype is designated here for *M. meridensis*, a species first described from Venezuela.

Monnina mollis Planch. & Linden ex Wedd. *Chloris Andina* 2: 268. 1857. TYPE: COLOMBIA [Nouvelle-Grenade]. Sierra Nevada de Santa Marta, h. 3250 m, 1852; *L. J. Schlim* 119 (Lectotype, designated here: BM [image seen]; Isolectotypes: G [image seen], GH [image seen], K [image seen], US [image seen]).

Habitat and ecology: Frutescent, or slender tree to 6 m. tall, branched; montane forests and páramo. At elevations of 1500–3500 m.

Distribution: Along the Andes in Colombia (Antioquia, Caldas, Cundinamarca, Magdalena, Norte de Santander, Putumayo, and Santander); in Venezuela in the Andes (Mérida) and Coastal Cordillera (Aragua, Distrito Capital, and Miranda).

In the protologue, Weddell cited a single specimen from the Sierra de Santa Marta in Colombia, but he did not assign a type. In his revisions of the Colombian species of *Monnina*, R. Ferreyra (1953) made no reference to the protologue or to the specimen cited by H. A. Weddell.

Monnina pubescens (Bonpl.) H.B.K. *Nov. Gen. Sp.* (quarto ed.) 5: 418, t. 505. 1821 [1823].

Basionym: *Hebeandra pubescens* Bonpl. 2: 43. 1808.

TYPE: VENEZUELA. Prope Caracas, Cerro Avila, *H. von Humboldt* & *A. Bonpland* s.n. (Lectotype, designated by Eriksen (1996): P [00677994], image seen; Isolectotype: B-W [13049-010] [image seen]; F [photograph ex B-W], US [photograph ex B-W]).

Habitat and ecology: Shrub or slender tree to 5 m. tall; montane forests, disturbed subpáramo and páramo slopes. At elevations of 1500–2900 m.

Distribution: Endemic to the Andes and Northern (Coastal Cordillera) Venezuela (Aragua, Distrito Capital, Miranda, Táchira). Probably in Boyacá, Cesar, Norte de Santander and Santander departments of Colombia.

Monnina salicifolia Ruiz & Pav., *Systema Vegetabilium Florae Peruvianae et Chilensis* 172. 1798. TYPE: PERU. Huarocherí, Tarmae et Panatahuarum Provincias, 1778–1788, *H. Ruiz* & *J. A. Pavon* s.n. (Lectotype, designated by Ferreyra (1946): US, image seen).

Habitat and ecology: Shrub 0.5 to 3 m tall; montane forests, páramo, roadsides, shrubby edges and *Polylepis* forests. At elevations of 1200–3800 m.

Distribution: Along the Andes in Venezuela (Mérida), widespread in Colombia to Ecuador, Peru, and Bolivia. The specimens *H. van der Werff* 7669 (MO, US, VEN) and

J. J. Wurdack, *M. L. Wurdack* & *H. Rodriguez* 2754 (US), identified by *J. J. Wurdack* (US), represent the first records for the flora of Venezuela.

Monnina smithii Chodat, *Bulletin de la Société Botanique de Genève* 25: 216. 1934. TYPE: COLOMBIA. Santander. Between Piedecuesta and Las Vegas, 2000–2500 m, 19–24 December 1926, *E. Killip* & *A. C. Smith* 15568 (Lectotype, designated by Ferreyra (1953): US, image seen; Isolectotypes: A [image seen], G [image seen], NY [image seen]).

Habitat and ecology: Frutescent 1 to 2 m tall; montane forests, subparamo and páramo. At elevations of 2000–3700 m.

Distribution: Along the Andes of northern Colombia (Cesar, Norte de Santander, Santander) and Venezuela (Táchira, Trujillo). The specimens *G. Aymard* 4390 (PORT, US), *A. Licata* 282 (PORT, US), *R. E. Ruiz-Terán* 8139 (MERF, US), *B. Stergios* 2548, 17575, 18969, 19119 (PORT, US), *J. A. Steyermark* 118374 (US, VEN), identified by *J. J. Wurdack* (US), represent the first records for the flora of Venezuela.

Monnina solandrifolia Triana & Planch., *Annales des Sciences Naturelles; Botanique, série 4*, 17: 138–139. 1862. TYPE: COLOMBIA [Nouvelle-Grenade]. prov. d'Antioquia, Montagnes d'Herveo, versant occidental, 2900 m, 1851, *J. J. Triana* s.n. (Lectotype: BM, designated here [image seen]; Isolectotype: K [images seen]).

Protologue specimen citations: Nouvelle-Grenade: Montagnes d'Herveo, versant occidental, près du Paramo, prov. d'Antioquia, *J. J. Triana* s.n.; prov. de Velez, entre Chiquinquirá et el Puente nacional, alt. 2270 metres, *J. J. Linden* s.n.

Residual syntypes: COLOMBIA [Nouvelle-Grenade]. prov. de Velez (Santander department), entre Chiquinquirá et el Puente nacional, alt. 2270 metres, 1842 *J. J. Linden* 742 (BM [image seen], K [image seen], G [image seen], NY [image seen]).

Habitat and ecology: Shrub 1–3 m tall; montane forests to shrubby páramo edges. At elevations of 1500–3000 m.

Distribution: Along the Andes in Colombia (Antioquia, Boyacá, Caquetá, Chocó, Cauca, Cundinamarca, and Norte de Santander) and Venezuela (Táchira).

In the protologue, *J. J. Triana* and *J. E. Planchon* cited two collections from the Central and Western Cordilleras of Colombia, but they did not designate a type. In his revision of the Colombian species of *Monnina*, Ferreyra (1953) cited *J. J. Triana* and *J. J. Linden* specimens incorrectly. Chodat (1894) later based his *Monnina platyphylla* on *Linden* 742, which is currently treated as a synonym of *M. solandrifolia* (Ferreyra, 1953).

Monnina steyermarkii Ferreyra, *Brittonia* 9: 17. 1957. TYPE: Venezuela. Anzoátegui, Cerro Peonia above Santa Cruz, headwaters of Río Manantiales, 1800–2000 m, 20 March 1945, *J. A. Steyermark* 61611 (Holotype: F, Isotypes: NY, VEN).

Habitat and ecology: Shrub 1 to 2 m tall; montane forests. At elevations of 1500–2500 m.

Distribution: Endemic to northern Venezuela (Coastal Cordillera) in Anzoátegui and Sucre states. Probably in the Andes of Venezuela.

Monnina tatei Ferreyra, Brittonia 9: 14–15. 1957. TYPE: VENEZUELA. Anzoátegui. Carapas, 1680 m, 1925, *G. H. H. Tate* 74 (Holotype: US).

Habitat and ecology: Shrub 1 to 2 m tall; montane forests at an elevation of 1680 m.

Distribution: Endemic to Northern Venezuela (Coastal Cordillera) in Anzoátegui state.

Monnina venezuelensis Ferreyra, Brittonia 9: 16. 1957. TYPE: VENEZUELA. Monagas, Valley of Caripe, summit of Cerro de la Cueva de Doña Anita, 1300 m, 07 April 1954, *J. A. Steyermark* 61926 (Holotype: F, Isotypes: NY, US, VEN).

Habitat and ecology: Shrub to 3 m tall; montane forests, over limestone outcrops at an elevation of 1380 m.

Distribution: Endemic to Northern Venezuela (Coastal Cordillera) in Monagas state.

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