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STUDIES IN *IPOMOEA* (CONVOLVULACEAE) I. THE *ARBORESCENS* GROUP¹

GORDON MCPHERSON²

ABSTRACT

The taxon containing the arborescent species of *Ipomoea* is heterogeneous as it is presently recognized. A reclassification of the group has resulted in a taxon that can be characterized by several correlated features (involving habit, inflorescence type, sepal size, shape, texture, and pubescence, corolla color and pubescence, and seed pubescence) in contrast to its historical antecedent. The relationships of the ten constituent species are briefly discussed, and a detailed key and complete descriptions incorporate my conclusions concerning the limits of these species.

Despite the long history and general acceptance of the taxon historically ancestral to it, the group comprising the arborescent species of *Ipomoea* and their close relatives has not been accurately circumscribed and the boundaries of its constituent species remain inadequately defined. As one result of a study of most of the species of *Ipomoea* in Mexico and Central America, I now recognize a taxon, the *Arborescens* group, which includes many of the erect, woody species traditionally considered closely related but excludes certain others. The composition suggested below permits the recognition of the group on a broader morphological basis than previously, and brings into association with the arborescent species certain woody vines.

Choisy (1845) recognized the group "*Arborescentes*" and defined it as the subsection of the erect species (section *Orthipomoea*) of *Ipomoea* that are arborescent. In this subsection he placed *I. murucoides*, *I. arborescens*, *I. batatilla*, *I. haenkeana*, and *I. coriacea*. House (1908), in treating the North American species of the genus, added *I. fistulosa* (a synonym of *I. carnea*), *I. glabriuscula*, *I. nicaraguensis*, *I. cuernavacensis*, *I. intrapilosa*, *I. calva*, and *I. wolcottiana*. Matuda (1964), in dealing with the genus as it is represented in Mexico, added *I. chilopsidis* and *I. pauciflora* to the list of arborescent species, and he placed *I. wolcottiana* into synonymy with *I. pauciflora*. O'Donnell (1950) added *I. calodendron* and *I. vargasiana* from Peru, and commented that the group is "de sistemática bastante confusa."

Among the names in the above roster, there are several that do not belong there. *Ipomoea coriacea* Choisy is a Brazilian species described as having herbaceous to membranous sepals, purple corollas, and glabrous seeds in contrast to the coriaceous sepals, white corollas, and pilose seeds of the *Arborescens* group. Therefore, although I have not seen the type, I have no hesitation in regarding this species as misplaced among those of the *Arborescens* group. *Ipomoea glabriuscula* House, although described by House as a tree, is in fact a vine closely related to and perhaps synonymous with *I. microsticta* Hallier f., as

¹ I wish to express my thanks to Drs. R. McVaugh, W. R. Anderson, and E. G. Voss of the Herbarium of the University of Michigan for their advice during the course of the study partially represented in this paper. I also thank the curators of the herbaria from which I borrowed specimens (BM, DS, F, GH, K, MO, NY, UC, and US).

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Williams (1970) has pointed out. My study of the type specimen confirms his conclusion. *Ipomoea carnea* Jacq. and *I. haenkeana* Choisy are distinctive, usually shrubby species that are properly placed in another group of species of which *I. jalapa* (L.) Pursh is typical. *Ipomoea carnea* lacks such key features of the *Arborescens* group as the inflorescence of one (or rarely few) flowers, the adaxially much-pubescent sepals, the marginally long-pilose seeds, and the white corolla. It resembles *I. jalapa* in its corolla and seed pubescence, its large inflorescence, and its calyx morphology. Similarly the Brazilian *I. haenkeana* deserves to be disassociated from the tree species and to be placed near *I. durangensis* House of the *Jalapa* group because of its corolla color and pubescence, its short-petiolate leaves, and its sepal morphology.

Ipomoea fistulosa is merely a synonym for the twining form of the widespread and variable *I. carnea*, as Verdcourt (1963) first suggested. Austin (1977) agreed with him, and furthermore rightly sank into synonymy the names *I. batatilla* House and *I. nicaraguensis* (H.B.K.) G. Don. The description of the former species contains no characteristics that do not fall easily within the variation exhibited by *I. carnea*. Of the latter I have seen the type (Valles de Aragua, Caracas, Cumana, *Humboldt & Bonpland s.n.* (P, holotype)).

With the exclusion of *I. haenkeana*, *I. glabriuscula*, and *I. carnea* and its synonyms, the "Arborescentes" becomes more homogeneous. The group must, however, be expanded to include four species, three of which were hitherto not associated with any of its elements. Two of these, *I. populina* and *I. praecana*, probably owe their previous independence to their vining habit, which distinguishes them from the rest of the *Arborescens* group. In the diagnostically important features, however, they closely resemble the tree species. The third new inclusion is a recently described tree species, *I. teotitlanica*, and the fourth is *I. pulcherrima* van Ooststroom, a little known species from Peru.

The thirteen resulting names are reduced to ten when three of them are relegated to various synonymies in the discussion to follow.

The group is plainly a derived one within the genus. Its pseudoracemose inflorescence is formed by the gathering on reduced branches of usually one-flowered cymes, and its arborescent habit depends upon an anomalous type of wood formation (Lujan, 1974). Because of the apparent relationship of the group to two other groups of which *I. jalapa* and *I. pedicellaris* are representative, (McPherson, in prep.), it may be speculated that among the ancestors of the *Arborescens* group was a pubescent vine with ovate leaves and a strongly pubescent corolla. This description also applies to *I. praecana*, and this species can furthermore be regarded as morphologically central within the group, related on the one hand to *I. arborescens* and on the other to *I. murucoides*, and through them to the rest of the species. These two species, alone among those of the *Arborescens* group, resemble *I. praecana* in their dense sepal and corolla pubescence.

Related to *I. arborescens* are *I. wolcottiana*, *I. pauciflora* and *I. populina*, which are alike in having reduced corolla pubescence, smaller, sometimes squat sepals, and shortened adaxial sepal pubescence. Unique to this trio is the possession of cylindrical stigmas 1.5 to 3 times as long as wide. To my knowledge the stigmas of all other *Ipomoea* species are globose; the character is a useful

one for rapidly distinguishing *Ipomoea* from such other superficially similar genera as *Convolvulus*. The linking of these three species with *I. arborescens* depends upon the close similarity of *I. wolcottiana* with the latter species. In some incomplete collections only the very fine nature of the adaxial sepal hairs, a condition presumably derived from that of *I. arborescens*, allows accurate discrimination of the two. *I. pauciflora* and *I. populina* are also very similar; indeed the only character that allows identification of certain glabrous extremes of *I. populina* is its twining habit. This habit must be regarded as secondarily derived if the arrangement of species proposed here is accepted.

The remaining four species seem most nearly similar to *I. murucoides*. *Ipomoea teotitlanica* resembles it in leaf pubescence, sepal pubescence and texture, and in the tendency of the sepals to lack adaxial hairs. *Ipomoea intrapilosa* differs from *I. murucoides* mainly by its near lack of any pubescence except that on the adaxial surface of the sepals. *Ipomoea chilopsidis* is also principally distinguished from *I. murucoides* by its nearly glabrous condition, but is additionally more narrowly leaved. Many collections of *I. murucoides* indicate that that species has a tendency to develop narrow leaves, as well. The closest relationship of *I. chilopsidis* is therefore with either *I. murucoides* or *I. intrapilosa*. The little-known *I. pulcherrima* appears to be most similar to *I. teotitlanica* because of its glabrous sepals and corolla, and its orbicular, densely pubescent leaves.

TAXONOMY

Trees or woody vines. Pubescence soft. Leaves entire, large, ovate-lanceolate, linear or orbicular, truncate or cordate at the base, often absent at the time of flowering. Inflorescence reduced to 1–2 (rarely –5)-flowered cymes typically more or less clustered on a reduced shoot into a pseudoraceme. Peduncles short, the pedicels exceeding them (often greatly so). Sepals large (mostly 10–28 mm long), ovate with obtuse-mucronate apices, mostly pubescent on the adaxial surface and often on the abaxial surface, coriaceous, about equal. Corolla white, large (5–9 cm long), twisted in bud, mostly pubescent on the interplical regions. Seeds long-pilose on the dorsal margins, otherwise glabrous.

Key to the Species of the *Arborescens* Group

Specimens of these species are often difficult to identify because they frequently flower and fruit while leafless. Moreover, they exhibit considerable variation in size of floral parts, as well as in density of pubescence. This key attempts to take into consideration these problems. Provision is also made for those specimens for which the habit is neither obvious nor stated by the collector.

- 1a. Plants vining.
 - 2a. Sepals, leaves, and stems tomentose-woolly, sometimes glabrescent; sepals 15–25 mm long. ----- 7. *I. praecana*
 - 2b. Sepals, leaves, and stems glabrous or merely pubescent; sepals 5.5–10 mm long. -- ----- 6. *I. populina*
- 1b. Plants erect, or habit unknown.
 - 3a. Youngest stems pubescent, sometimes eventually glabrescent, but then retaining some pubescence in sheltered places on the most recent growth.
 - 4a. Sepals 14–28 mm long (if 14 mm long, then rarely less than 10 mm wide at the base); corolla usually pubescent over most of the exterior surface.

- 5a. Stem villous and glabrescent; leaves at least twice as long as wide, truncate at the base; tree. ----- 4. *I. murucoides*
- 5b. Stem densely tomentose; leaves about as wide as long, cordate at the base; vine. ----- 7. *I. praecana*
- 4b. Sepals 5.5–15(–17) mm long (if over 14 mm long, then 5–8 (rarely –10) mm wide); corolla pubescent only at the tips and/or along the margins of the interplical regions, or glabrous.
- 6a. Hairs of the stem straight to curved, mostly erect, 0.5 mm long or longer; hairs of the corolla restricted to the margins of the interplical regions or absent in some specimens; vine; Guerrero to Chiapas and Central America. ----- 6. *I. populina*
- 6b. Hairs of the stem more or less curly, somewhat matted, usually less than 0.5 mm long; hairs of the corolla on the tips of the interplical regions as well as on the margins, or absent in two species (one Peruvian and one known only from northern Oaxaca); trees; throughout Mexico, as well as further south.
- 7a. Corolla glabrous; leaves orbicular or broadly ovate; adaxial surface of the sepals glabrous or bearing curly hairs up to 0.7 mm long.
- 8a. Sepals 11–16 mm long; northern Oaxaca. ----- 9. *I. teotitlanica*
- 8b. Sepals 5–10 mm long; Peru. ----- 8. *I. pulcherrima*
- 7b. Corolla pubescent; leaves ovate to lanceolate; adaxial surface of the sepals bearing straight hairs up to 0.5 mm long.
- 9a. Adaxial surface of the sepals densely puberulent with hairs ca. 0.1 mm long; stamens 1.2–2.8 cm long; flowering pedicels 6–17(–19) mm long; fruiting pedicels 16–27(–30) mm long; central and southern Mexico. ----- 10. *I. wolcottiana*
- 9b. Adaxial surface of the sepals pubescent with hairs 0.25 mm long or longer; stamens 3–4 cm long; flowering pedicels (13–) 15–30 mm long; fruiting pedicels (13–) 15–45 mm long; central and northern Mexico. ----- 1. *I. arborescens*
- 3b. Youngest stems glabrous, even in sheltered places.
- 10a. Leaves very narrow (rarely to 1 cm wide). ----- 2. *I. chilopsidis*
- 10b. Leaves wider (rarely less than 3 cm wide) or absent from the specimen.
- 11a. Sepals 13–19 mm long, glabrous abaxially, the outer sepals usually bearing hairs up to 0.5 mm long on the adaxial surface (rarely completely glabrous). ----- 3. *I. intrapilosa*
- 11b. Sepals 5–14(–16) mm long, glabrous or pubescent abaxially (if glabrous abaxially, then 10 mm long or less; if 13 mm long or longer, then pubescent or puberulent at least at the base), the outer sepals bearing hairs rarely up to 0.3 mm long on the adaxial surface.
- 12a. Trees.
- 13a. Sepals pubescent or puberulent abaxially, at least at the base. ----- 10. *I. wolcottiana*
- 13b. Sepals glabrous abaxially. ----- 5. *I. pauciflora*
- 12b. Plants of unknown habit.
- 14a. Sepals glabrous abaxially; corolla glabrous on the tips and margins of the interplical regions (compare also with *I. populina*). ----- 5. *I. pauciflora*
- 14b. Sepals pubescent or puberulent abaxially (usually); corolla usually pubescent on the tips and/or margins of the interplical regions.
- 15a. Adaxial surface of the sepals densely puberulent with fine, tiny hairs; stamens 12–28 mm long. ----- 10. *I. wolcottiana*
- 15b. Adaxial surface of the sepals pubescent with coarse, bulbous-based hairs; stamens 10–13 mm long. -- 6. *I. populina*

1. *Ipomoea arborescens* (Humb. et Bonpl. ex Willd.) G. Don, Gen. Syst. 4:267. 1838.

Convolvulus arborescens Humb. et Bonpl. ex Willd., Enum. 1:204. 1809. TYPE: Between Acaguisotla and Chilpancingo, *Humboldt & Bonpland s.n.* (P, holotype).

Argyreia (?) *oblonga* Benth., Bot. Voy. Sulphur 133. 1845. TYPE: Tepic, *Hinds* (?) *s.n.* (BM, holotype, not seen; K, isotype).

Ipomoea murucoides var. *glabrata* Rose, Contr. U.S. Natl. Herb. 1:107. 1891. TYPE: *Palmer 316* (1890) (US, holotype).

Trees 5–15 m tall, the trunks up to 50 cm in diameter, the bark light colored. Stems producing a white latex, usually tomentose when young, with usually curly and somewhat matted hairs 0.10–0.25 mm long, glabrescent by the third year, often ridged or sulcate longitudinally on drying. Leaf blades entire, 9–19 cm long, 6–9 cm wide, with 12–18 lateral veins on each side of the midrib, ovate to lanceolate, acuminate at the apex, cordate at the base, usually tomentose [the hairs 0.1–0.3(–0.7) mm long with tiny swollen bases] especially on the lower leaf surface and on the veins of the lower leaf surface, often rendering that surface grey green as opposed to the green of the upper leaf surface, sometimes sparsely pubescent and at maturity bearing hairs only on the veins and along the margin, or rarely (*McVaugh & Koelz 1582*) glabrous at maturity. Blades often biglandular at the base of the midrib beneath with glands 1–2 mm long, or bearing (nectariferous?) projections less than 1 mm long. Petioles 1–9 cm long, usually tomentose with curly hairs up to 0.4 mm long.

Inflorescences terminal or axillary, each cyme consisting of 1 (or rarely 2) flowers, these reduced cymes usually borne on shortened, tomentose, ridged branches 1–14 cm long. Peduncles 0.3–1.0 cm long, tomentose; secondary peduncles (if present) 2–4 mm long, tomentose. Bracts 4–6 mm long, 2–3 mm wide, ovate-lanceolate to hemispherical, tomentose on the abaxial surface, tomentose or glabrous on the adaxial surface, caducous. Pedicels 1.5–4.5 cm long, thicker at the apex than at the base, often sulcate on drying, tomentose, thickening in fruit. Sepals 6–14 mm long, 6–8 mm wide (the outer the same size as, or slightly larger than the inner), ovate or occasionally suborbicular, obtuse or obtuse-mucronate at the apex, tomentose abaxially at least where exposed, tomentose on the margins and on the adaxial surface at least along the midline with hairs 0.25 mm long or longer, the abaxial surface often pitted or wrinkled. Corolla 4–6 cm long, 4–6 cm in diameter, slightly twisted in bud, funnelform, tomentose without on the tips of the interplacae, tomentose or sericeous along their margins, white with greenish tube, the interplical regions cream, the throat reddish or purplish within. Stamens 25–40 mm long, the anthers 4–8 mm long, the basal hairs up to 5 mm long, gland tipped. Style 20–30 mm long, the basal 1–2 mm thickened and persistent, the stigmas 2, globose, 2–2.5 mm long. Capsule 2-locular, 4-valved, the valves 17–25 mm long; seeds pilose on the dorsal margins with hairs 10–15 mm long.

Ipomoea arborescens inhabits open thorn forests, oak savannas, and dry deciduous forests. Its distribution is indicated in Fig. 1. This species grows at elevations of 50 to 1800 m and usually flowers and fruits between November and April.

MEXICO. SONORA: Las Durasnillas, 18 May 1892, *Brandegge s.n.* (UC); 0.3 miles SE of La Noria, *Carter et al. 71–35* (UC); San Bernardo, Río Mayo, *H. S. Gentry 1158* (MO) and *1277* (MICH); Sierra de Alamos, *H. S. Gentry 3000* (MO, UC, US) and *H. S. Gentry 4888* (MICH, MO); Arroyo Cuchuhuaqui, near Alamos, *H. S. Gentry 876M* (DS); near Alamos, *Rose 12815* and *12882* (US); Alamos, 26 Mar–8 Apr 1890, *Palmer 316* (US); Alamos, *Goldman 291* (US); Bacatejaca, *Hartman 268* (UC); Baromena, *H. S. Gentry 6127* (MICH); 18 miles S of Mictizuma, *Wiggins 7439* (MICH); above

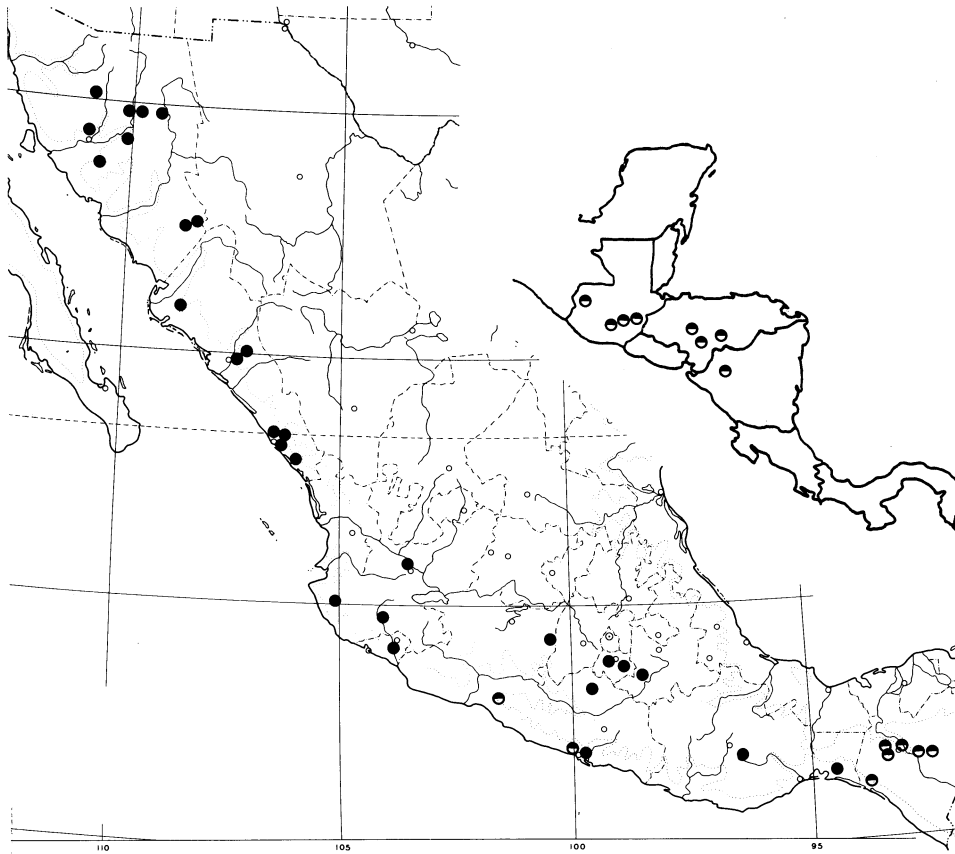


FIGURE 1. Distribution of *Ipomoea arborescens* (solid circles) and *I. populina* (half circles).

Fabrica de Los Angeles, *Wiggins* 7291 (MICH); between Bacadéhuachi and Granados, *White* 2923 (MICH); canyon W of Río Sonora, Baviácora, *Drouet, Richards, & Lockhart* 3623 (DS); near Torres, *Coville* 1662 (US); 22 miles N of Hermosillo, *Moran* 9971 (US). SINALOA: Culiacán, 25 Oct 1904, *Brandege* s.n. (UC); NE of Los Mochis on road to Choix, *Carter & Kellog* 3254 (MICH, US); Mesa Malqueson, Cerro Colorado, *H. S. Gentry* 5158 (MO, UC); Imala, *H. S. Gentry* 4976 (MICH, MO); 10 km E of Concordia, *McVaugh* 23583 (MICH); 3 miles W of Concordia, *Graber* 7 (MICH); Rosario, *Rose* 1409 (US) and *Rose* 14529 (US); *Montes & Salazar* 173 (US); Mazatlán, *Ortega* 4956 (US); Balboa, *Ortega* 5034 (US). JALISCO: 10–13 km SE of El Tuito, *McVaugh* 25414 (MICH); between La Huerta and Autlán, *Templeton* 9485 (MICH); La barranca, Guadalajara, *M. E. Jones* 27317 (DS). COLIMA: 11 miles SSW of Colima, *McVaugh & Koelz* 1582 (MICH). MICHOACÁN: Zitácuaro, *Hinton* 13562 (MICH, MO, US). GUERRERO: Iguala, *Gooding* 2190 (UC). MORELOS: near Cuernavaca, *Rose* 6863 (US); Yautepec, *Rose* 5339 (US). OAXACA: 2 km S of Niltepec, *King* 1766 (MICH); S of Mitla, *Ernst* 2294 (US). PUEBLA: 5 km S of Izúcar de Matamoros, *Henrickson* 2087 (MICH).

2. *Ipomoea chilopsideis* Standley, Field Mus. Nat. Hist., Bot. Ser. 17:206. 1937.
 TYPE: *H. S. Gentry* 2391 (F, holotype, not seen; MO, UC, US, isotypes).

Shrubs 2–5 m high. Stems broadly ridged on drying, glabrous. Leaf blades entire, 10–20 cm long, 0.5–1.3 cm wide, with 18–30 lateral veins on each side of the midrib, linear, acute at the apex, acute at the base, glabrous. Blades biglandular at the base of the midrib beneath with glands ca. 1 mm long. Petiole 0.5–1.2 cm long, glabrous.

Inflorescences terminal on un-reduced branches, each cyme consisting of 1(–3) flowers. Peduncles in the axils of unmodified leaves, 0.4–2.2 cm long, glabrous. Bracts unknown, caducous. Pedicels 1.5–2.5 cm long, somewhat ridged on drying, glabrous. Sepals coriaceous, 12–16 mm long, 7–9 mm wide, equal in size or the outer slightly smaller than the inner, ovate, obtuse or acute at the apex, glabrous abaxially, coarsely short-pubescent adaxially over the entire surface, the hairs less than 0.10 mm long. Corolla 8–9.5 cm long, 8–9 cm in diameter, strongly twisted in bud, funnellform, glabrous, white with purple throat. Stamens 50–55 mm long, the anthers 8–9 mm long, the basal hairs 1–1.5 mm long, gland tipped. Capsule 2-locular, 4-valved, the valves 18–20 mm long; seeds 4, long-pilose on the dorsal margins and also sparsely so on the ventral margin with hairs about 10 mm long.

The rarely collected *I. chilopsidis* flowers between July and September and is described by the collector of the type as “singularly of the high and arid crags.” Its known distribution is indicated in Fig. 2.

MEXICO. CHIHUAHUA: La Bufa, SE of Creel, *Knobloch 516* (MICH); Mpio of Batopilas, E of La Bufa, *Bye 7738* (MICH); Guasaremos, Rio Mayo, *H. S. Gentry 2391* (type) (MO, UC, US); SW Chihuahua, Aug–Nov 1885, *Palmer 297* (US).

3. *Ipomoea intrapilosa* Rose, Gard. & Forest 7:367. 1894. Syntypes: *Palmer 703* (1886) (US), *Pringle 2443* (DS, MICH, US). *Palmer 703* (1886) (US) is here designated as the lectotype.

I. murucoides var. *glabrata* A. Gray, Proc. Amer. Acad. Arts 22:440. 1887. TYPE: *Palmer 703* (1886) (GH, holotype, not seen; US, isotype).

Trees 3–10 m high, the trunks up to 50 cm in diameter, the bark light colored. Stems producing a white latex, ridged on drying, glabrous. Leaf blades entire, 7–14 cm long, 3–5.5 cm wide, with 10–17 lateral veins on each side of the midrib, lanceolate to narrowly ovate, acuminate at the apex, truncate or shallowly cordate at the base, glabrous or sparsely pubescent on the lower surface near the base of the midrib. Blades sometimes biglandular at the base of the midrib beneath with glands ca. 1 mm long, or more often bearing (nectariferous?) projections up to 1 mm high instead. Petioles 3–9 cm long, glabrous.

Inflorescences terminal or axillary, each cyme consisting of 1–3(–5) flowers, these reduced cymes often borne on shortened, glabrous, ridged branches, which sometimes bear reduced leaves. Peduncles 0.4–2.0 cm long, glabrous, darkened and often ridged on drying. Bracts 3–6 mm long, 1–2.5 mm wide, ovate to oblong, glabrous on both surfaces or pubescent within, caducous. Flowering pedicels 1.8–4.0 cm long; fruiting pedicels 3.0–5.0 cm long, darkened and ridged on drying, thickening distally, glabrous. Sepals coriaceous, 13–19 mm long, 7–13 mm wide (about equal in size or the outer slightly smaller than the inner at fruiting), ovate, obtuse or obtuse-mucronate or acute at the apex, the abaxial surface glabrous, usually wrinkled on drying, the adaxial surface of at least the outermost sepals bearing long (0.25–0.5 mm), soft, straight, appressed hairs (rarely all 5 sepals with the adaxial surface smooth and glabrous). Corolla 5–8 cm long, 5–7 cm in diameter, funnellform, glabrous or sparsely pubescent along the margins of the interplical regions, white or yellowish white, the tube and the interplical regions greenish yellow. Stamens 3–4 cm long, the anthers 8–10.5 mm long, the basal

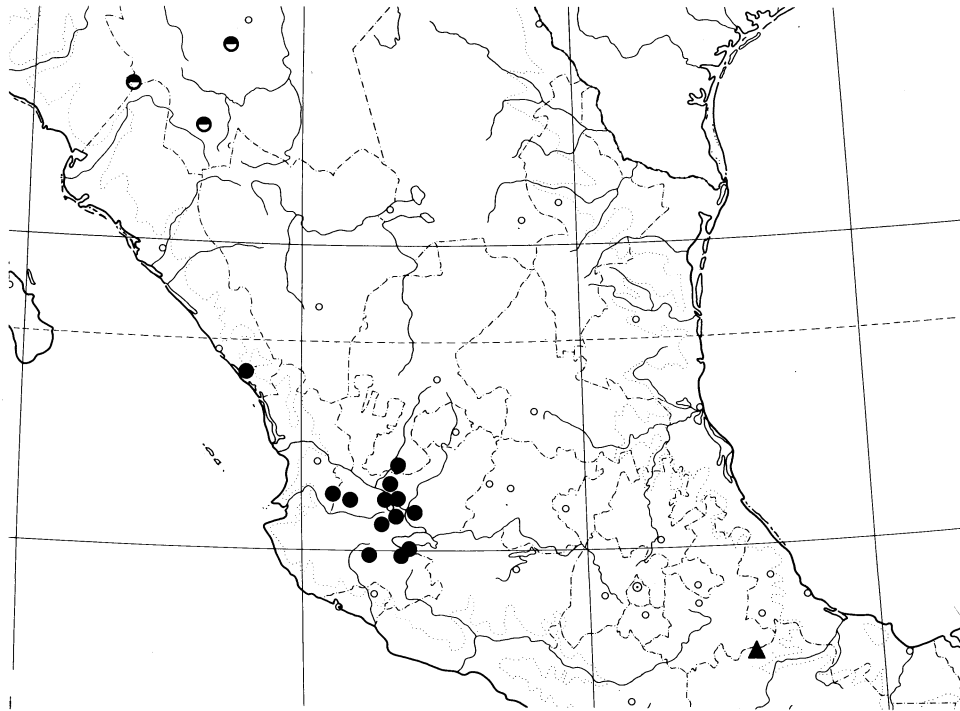


FIGURE 2. Distribution of *Ipomoea chilopsidis* (half circles), *I. intrapilosa* (solid circles), and *I. teotitlanica* (triangle).

hairs up to 2.5 mm long, gland tipped. Style 3.5–4 cm long; stigmas 2, globose to slightly elongate, 1 mm long. Capsule 2-locular, 4-valved, the valves 2–2.5 cm long; seeds 4, pilose on the dorsal margins with hairs 10–15 mm long.

Ipomoea intrapilosa inhabits dry shrublands, oak forests and tropical deciduous woodlands. Its distribution is indicated in Fig. 2. This species grows at elevations of 900 to 2200 m and flowers and fruits between October and April.

MEXICO. ZACATECAS: 8 miles S of Moyahua, *Webster 1092* (MICH). SINALOA: Near Colomos, foothills of Sierra Madre, *Rose 1680* (US). NAYARIT: Ixtlán, *H. S. Gentry 6814* (MICH). JALISCO: 6–7 km E of Plan de Barranca, *McVaugh 23507* (MICH); Guadalajara, *Boutin 2116* (MICH); near Guadalajara, *Pringle 2443* (MICH, MO, UC, US); 5 km NE of Guadalajara, *McVaugh 23503* (MICH); between Guadalajara and San Luis Soyatlán, *Templeton 9410* (MICH); 37 miles N of Guadalajara, *Hess & Hall 620* (MICH); 25 miles SW of Guadalajara, *McVaugh 13304* (MICH); Baños de Oblatos, S slope of barranca near Guadalajara, *Moran 14710* (MICH); 40 km SW of Guadalajara, *McVaugh 24429* (MICH); near Guadalajara, *Safford 1420*; between Copimatlán and Tizapán, *Templeton 9442* (MICH); 17 km N of Zapotlanejo, *Rzedowski 15640* (MICH); Ixtlahuacán de los Membrillos, *Detling 8701* (MICH) and *Detling 8749* (MICH); barranca S of Rio Verde, *McVaugh & Koelz 249* (MICH); Chapala, Oct–Nov 1886, *Palmer 703* (type) (US); near Chapala, *Rose 7689* (US); Cuesta de San Marcos, 15 km SSE of Acatlán de Juárez, *McVaugh & Koelz 321* (MICH); S of Jocotepec, *Frye 3014* (UC).

4. *Ipomoea murucoides* Roem. & Schult., Syst. Veg. 4:248. 1819. TYPE: not determined (“e horto valentino”).

Convolvulus macranthus H.B.K., Nov. Gen. Sp. 3:95. 1819. TYPE: Guanajuato, *Humboldt & Bonpland s.n.* (P, holotype).

Ipomoea macrantha (H.B.K.) G. Don, Gen. Syst. 4:267. 1838, not *I. macrantha* Roem. & Schult., Syst. Veg. 4:251. 1819.

Trees 3–13 m high, the trunks up to 40 cm in diameter, the bark light colored. Stems producing a white latex, floccose or tomentose when young with somewhat matted hairs up to 1.3 mm long, glabrescent in exposed places. Leaf blades entire, 9–20 cm long, 1–7 cm wide, with 12–22 lateral veins on each side of the midrib, lanceolate, elliptical or linear, acuminate at the apex, truncate at the base, variously pubescent, usually villous with hairs 0.5–1.3 mm long at least when young, often partially or completely glabrescent at maturity, the hairs remaining longest on the lower surface along the veins and in their axils with the midrib. Blades often biglandular at the base of the midrib beneath with glands ca. 1 mm long, or bearing (nectariferous?) fingerlike projections 0.5–1.5 mm long. Petioles 1–6 cm long, tomentose, often glabrescent.

Inflorescences terminal or axillary, each cyme reduced to 1(–2) flowers, the reduced cymes usually borne on a shortened, villous branch in the axils of closely spaced, somewhat reduced leaves, these often fallen at flowering. Peduncles 0.2–2.0 cm long, or if bearing more than one flower, up to 2.5 cm long, densely villous. Bracts 10–19 mm long, 5–10 mm wide, villous abaxially, more densely so adaxially, caducous. Pedicels 1.5–5 cm long, densely villous, usually longitudinally grooved on drying, gradually thickened distally. Sepals coriaceous, 14–28 mm long, 9–20 mm wide (the outer usually ca. 5 mm longer than the inner), ovate to broadly oblong, obtuse or acute at the apex, villous abaxially and usually at least partially so adaxially, the marginal $\frac{2}{3}$ of the inner sepals often glabrous and smooth abaxially, the outer sepals partially glabrescent abaxially. Corolla 5–8 cm long, 5–9 cm in diameter, funnellform, twisted in bud, villous at least along the apical margins of the interplical regions and often over most of the exterior, white with some dull red or purple in the throat, the interplical regions and the tube greenish or yellowish white without. Stamens 25–40 mm long, the anthers 9–10 mm long, the basal hairs 1.5–3 mm long, gland tipped. Style 25–40 mm long; stigmas 2, globose 1–1.5 mm long. Capsule 2-locular, 4-valved, the valves 20–25 mm long, 4-seeded; seeds pilose on the dorsal margins with hairs 10–18 mm long.

Ipomoea murucoides is a relatively common species inhabiting dry, thorny shrublands and sparse, deciduous forests, as well as roadsides and dry, cut-over woodland-pastures. Its distribution is indicated in Fig. 3. This species grows at elevations of 600 to 2400 m and usually flowers and fruits between October and April.

MEXICO. DURANGO: 36 miles S of Cd. Durango on road to Mesquital, *H. S. Gentry 22090* (US); 40–60 miles SSE of Cd. Durango on road to Mezquital, *Maysilles 7413* (MICH). NAYARIT: Near Jesús María, *Feddema 1302* (MICH); SW of Yxtlán, *Mexia 800* (MICH, MO, UC). JALISCO: 10 km NW of Huejuquilla, *Rzedowski 17625* (MICH); 7 miles N of Colotlán, *Webster 12* (MICH); 5 miles E of Atotonilco, *Moldenke 1663* (MICH); about 10 km SW of Villa Guerrero, *McVaugh 25811* (MICH); 5 miles SW of Huacasco, *McVaugh 11994* (MICH); 12 miles SE of junction at Lagos de Moreno (near road to León, Gto), *McVaugh 17794* (MICH); Cerro Gordo, 12 miles SE of Tepatlán, *McVaugh 17490* (MICH); Jocotepec, *H. S. Gentry 6813* (MICH); 12–13 km from Amacueca towards Tapalpa, *McVaugh 25957* (MICH); 10 km N of Sayula, *Illis 816* (MICH); 8 miles S of Autlán toward La Resolana, *Wilbur 2399* (MICH). ZACATECAS: On road to Huejuquilla el Alto, 1 mile W of road junction 18 miles S of Valparaíso on road to Mezquitic, *McVaugh 17720* (MICH); about 15 km NE of Huejuquilla el Alto, *McVaugh 25716* (MICH); 8–15 km W toward Tlaltenango from road junction W of Jalpa, *McVaugh 25659* (MICH). GUANAJUATO: Salvatierra, *Rzedowski 26972* (MICH). AGUASCALIENTES: 12 miles W of Aguascalientes, *McVaugh 23792*. QUERETARO: Tetillas, *Kelly 650* (MICH),

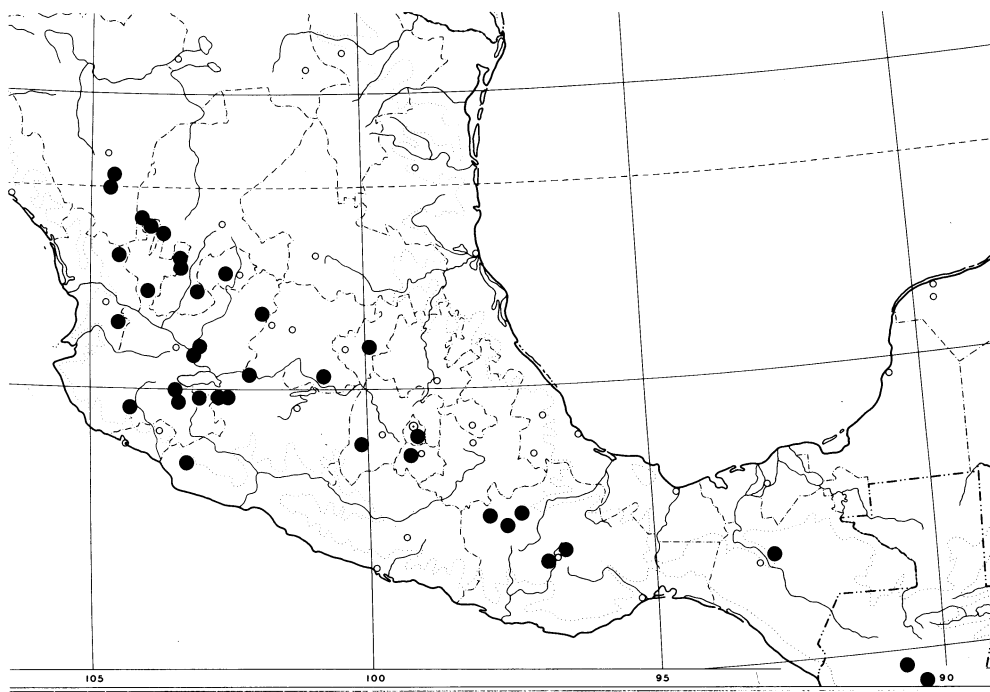


FIGURE 3. Distribution of *Ipomoea murucoides*.

UC); 2 miles S of Cavillo, *McVaugh & Koelz 60* (MICH). MICHOACÁN: 17 miles W of Jiquilpan, *McVaugh 21968* (MICH); 5 miles N of Cotija and 22 miles S of Jiquilpan, Cerro Potrerillos, *King & Soderstrom 4597* (MICH); 3 km E and 8–10 km NE of Cotija de la Paz, *McVaugh 24930* (MICH); Coalcomán, *Hinton 12692* (MICH); 1 mile E of Iratzio, *Weber & Charette 11861* (UC); La Piedad, *Moldenke 1666* (MICH). MORELOS: Near Nepantla, *Converse 38* (MICH, UC); near Cuernavaca, *Lemmon 209* (UC). MEXICO: Salitre, District of Temascaltepec, *Hinton 8730* (MICH). DISTRITO FEDERAL: Hill E of Shrine of Guadalupe, *Alexander & Hernandez X. 4* (MICH); Sierra de Guadalupe, extreme S of Cerro del Risco, *Rzedowski 23498c* (MICH). OAXACA: 20 km S of Huajuapán de León, *Funk 2373* (MICH); valley of Oaxaca, *Pringle 6066* (MICH, MO, UC); 6–8 miles NE of Cd. Oaxaca, *H. S. Gentry 12072* (MICH); Albán, near Oaxaca, *Messer 152* (MICH); 8 km NW of Tamazulapán, *McVaugh 22477* (MICH); 4 km W of Magdalena Jicotlán, *Cruz C. 2649* (MICH, MO); Cerrado San Filipe, *Langman 3488* (US). PUEBLA: Near San Luis Tultitlánapa, near border with Oaxaca, *Purpus 3531* (MICH, UC); ladera E of Cerro Tecajete, near San Miguel Papaxtla, *Rzedowski 24916* (MICH). CHIAPAS: 5 km above Soyaló along road to Bochil, *Breedlove 21298* (MICH, MO).

GUATEMALA. Santa Rosa, *Heyde & Lux 4733* (MICH); near Antigua, *Standley 60312* (MICH).

5. *Ipomoea pauciflora* Mart. & Gal., Bull. Acad. Roy. Sci. Bruxelles 12:266. 1845.
 TYPE: *Galeotti 1403* (BR, holotype, not seen; P, presumed isotype).

Key to the Subspecies

- | | |
|--|------------------------------|
| 1a. Peduncles 3–12 mm long; Mexico, Guatemala. ----- | 5a. subsp. <i>pauciflora</i> |
| 1b. Peduncles 2–30 mm long; Peru. ----- | 5b. subsp. <i>vargasiana</i> |

5a. *I. pauciflora* Mart. & Gal. subsp. *pauciflora*

Trees or shrubs 3–8 m high, the trunks up to 25 cm in diameter, the bark light brown, the branches disposed to twining. Stems producing a white latex, glabrous, usually strongly ridged on drying. Leaf blades entire, 5–15 cm long, 3–8.5

cm wide, with 10–15 lateral veins on each side of the midrib, ovate, acuminate at the apex, truncate or shallowly cordate at the base, glabrous on both surfaces. Blades often biglandular at the base of the midrib beneath with glands less than 1 mm long, or bearing (nectariferous?) projections less than 1 mm long. Petioles 3–8 cm long, glabrous.

Inflorescences terminal or axillary, each cyme consisting of 1–5 flowers, the cymes borne on shortened, glabrous, ridged branches which sometimes bear reduced leaves. Peduncles 0.3–1.2 cm long, glabrous. Bracts triangular, 1.5–3 mm long, ca. 1–1.5 mm wide, glabrous, caducous. Flowering pedicels 0.8–3.0 cm long; fruiting pedicels 2.0–3.9 cm long, both usually ridged on drying, gradually thickening distally, glabrous. Sepals coriaceous, 5–9 mm long, 6–9.5 mm wide, ovate to oblong, obtuse (and usually mucronate) or acute at the apex, glabrous abaxially, densely pubescent adaxially (at least near the apex) with squat, broad-based hairs up to 0.3 mm long, often only the bulbous bases well developed. Corolla 6–8 cm long, 5–11 cm in diameter, funnelform, glabrous, white with deep red or purple throat. Stamens 9–11 mm long, the anthers 5–7.5 mm long, the basal hairs up to 2 mm long, gland tipped. Style 6–8 cm long; stigmas 2, cylindrical, 2.5–3 mm long, 1–2 mm wide. Capsule 2 (or rarely 3)-locular, 4-valved, the valves 17–22 mm long; seeds 4 (or rarely 5), pilose on the dorsal margins with hairs 10–14 mm long.

Ipomoea pauciflora subsp. *pauciflora* inhabits sparse, low woodlands and deciduous forests as well as roadsides. Its distribution is indicated in Fig. 4. This subspecies grows at altitudes of 400 to 2000 m and usually flowers and fruits between September and February.

MEXICO. MICHOACÁN: 50 km N of Arteaga, *McVaugh* 22528 (MICH); La Florida, District of Zitácuaro, *Hinton* 13406 (GH, MICH, US). GUERRERO: Near Acapulco, Oct 1894–Mar 1895, *Palmer* 619 (MICH). MORELOS: S of Cuernavaca at km 79 marker on road to Acapulco, 24 Sep 1964, *Palacios s.n.* (MICH); S of Cuernavaca at km 93 marker on road to Acapulco, 25 Nov 1964, *Palacios s.n.* (MICH); Cuernavaca, *Rose* 4339 (US) and *Rose* 6965 (GH, US); Cuernavaca, *Lemmon* 210 (GH, UC); E of Cuernavaca, *Dunn* 18615 (NY); plain below Cuautla, *Converse* 37 (UC). MEXICO: Punganancho, District of Temascaltepec, *Hinton* 7404 (MICH, US); Temascaltepec, *Hinton* 8754 (GH, US). OAXACA: 8 km NW of Tamazulapan, Mpio of Huajuapán, *McVaugh* 22478 (MICH); near Mitla, *Messer* 56 (MICH) and *Messer* 255 (MICH); N of San Miguel de Valle, *Schoenwetter JSOX-131* (US); Monte Albán, *Pringle* 4965 (NY, UC); 32 miles SE of Oaxaca, *Webster* 11653 (GH); floodplain of Río Atoyac near Oaxaca, *Camp* 2435 (NY); Comaltepec, *Liebmann* 12474 (GH); *Galeotti* 1403 (type) (P). PUEBLA: 8 km SE Tehuizingo on road to Acatlán, *Rzedowski* 19298 (MICH); near Tehuacán, *Rose* 9905 (US) and *Rose* 11393 (US); 8 miles N of Tehuacán, *Anderson* 5323 (MICH); 18 miles N of Tehuacán, *H. S. Gentry* 20215 (US); near Pueblo Nuevo, S of Coxcatlán, *Smith & Tejeda* 4508 (US); near San Luis Tultitlanapa, *Purpus* 3532 (UC); Amatiitlan, *Miranda* 2256 (GH); 18–20 km from Oaxaca border on road from Huajuapán de León to Izúcar de Matamoros, *Anderson* 5651 (MICH). VERA CRUZ: Chapulco, *Liebmann* 12465 (UC). CHIAPAS: Near Monte Bonito, Mpio of Arriaga, *Ton* 3380 (MICH); along Mex 190 in the Zinacantan paraje of Muctajoc, Mpio of Ixtapa, *Breedlove* 13817 (MICH).

GUATEMALA. Near Zacapa, *Pittier* 1762 (US).

5b. *I. pauciflora* Mart. & Gal. subsp. *vargasiana* (O'Donell) McPherson, comb. nov.

I. vargasiana O'Donell, Bol. Soc. Peruana Bot. 1:5. 1948. TYPE: *Vargas* 1021 (not seen).

Trees or shrubs to 7 m tall. Stems ridged on drying, glabrous. Leaf blades entire, 6–10 cm long, 3.5–8 cm wide, with 11–14 lateral veins on each side of the midrib, ovate, acuminate at the apex, shallowly cordate at the base, glabrous on both

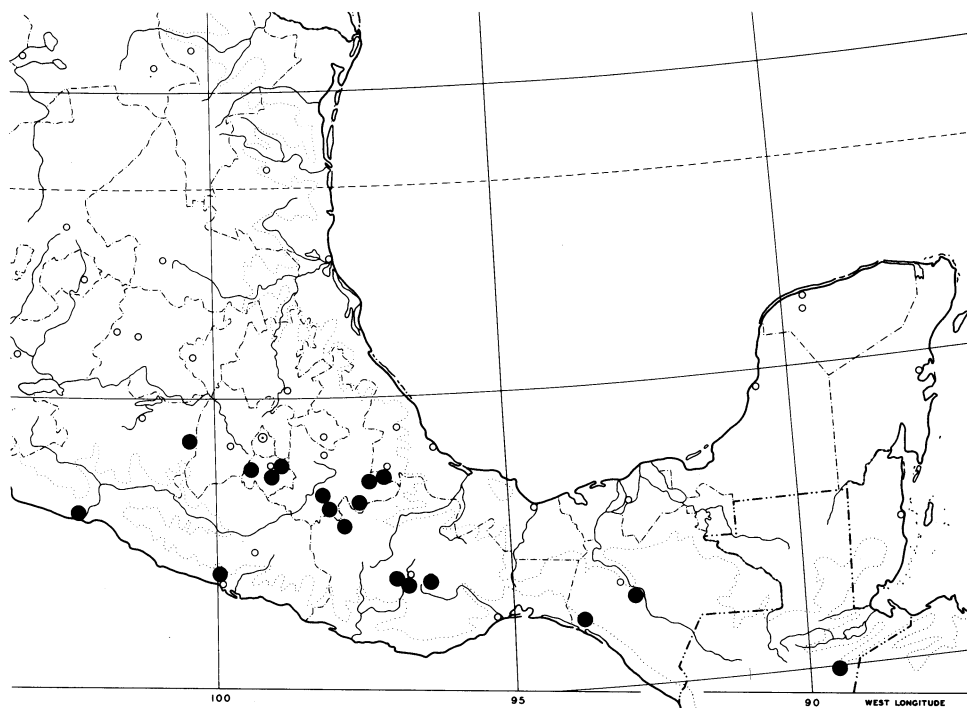


FIGURE 4. Distribution of *Ipomoea pauciflora* subsp. *pauciflora* in Mexico and Central America.

surfaces. Blades often bearing 2 (nectariferous?) projections up to 1 mm long at the base of the midrib beneath. Petioles 1.5–9 cm long, glabrous.

Inflorescences terminal or axillary, each cyme consisting of 1–3 flowers, the cymes usually borne on shortened, glabrous branches on which the subtending leaves are somewhat reduced or absent. Peduncles 0.2–3.0 cm long, glabrous, ridged and darkened on drying. Bracts ca. 3 mm long, 1 mm wide, oblong, glabrous, caducous. Pedicels 2.0–3.0 cm long, slender, sometimes thickened distally, ridged and darkened on drying, glabrous. Sepals coriaceous, 7–11 mm long, 6–9 mm wide, broadly ovate, acute at the apex, somewhat auriculate at the base, glabrous abaxially, densely strigose adaxially with squat hairs up to 0.1 mm long including the swollen, papillalike base. Corolla 5–7 cm long, 6–7 cm in diameter, funnelform, glabrous, white. Stamens 11–12 mm long, the anthers 6–8 mm long, the basal hairs to 1 mm long, gland tipped. Style ca. 6 cm long; stigmas 2, cylindrical, ca. 2 mm long, 1 mm wide. Capsule 2-locular, 4-valved, the valves over 12 mm long; seeds unknown.

These plants grow at elevations of 400 to 2600 m and flower and fruit in May and June.

This subspecies is only weakly distinguished from the typical subspecies. The chief difference is the sometimes greater length of the peduncles of subsp. *vargasiana*. Therefore, recognition of the two taxa as separate species seems quite inappropriate, despite their wide disjunction. In fact, were it not for this disjunct distribution, the Peruvian populations might not be recognized at all.

PERU. AYACUCHO: between Ayacucho and Huanta, *Weberbauer 5665* (US) (det. O'Donell); below Huanta, *Weberbauer 5667* (US) (det. O'Donell). APURIMAC: Apurimac, *Weberbauer 5899* (US) (det. O'Donell). ABANCAY: Limatambo, *Balls 6838* (F, US) (det. O'Donell).

6. *Ipomoea populina* House, Ann. New York Acad. Sci. 18:226. 1908. TYPE: *Palmer 482* (1894–1895) (NY, holotype).

Woody vines or prostrate trailers to 4 m long (probably reaching greater lengths), once recorded as an "arching shrub." Stems ridged and grooved on drying, glabrous or pubescent with somewhat curly hairs to 0.8 mm long. Leaf blades entire, 4.5–13 cm long, 3–9 cm wide, with 9–14 lateral veins on each side of the midrib, ovate to ovate-lanceolate, acuminate at the apex, truncate or somewhat cordate at the base, usually pubescent at least on the lower surface near the junction with the petiole, sometimes fairly densely pubescent on both surfaces, or sparsely pubescent beneath, or glabrous (the amount of pubescence often varying on one plant, as it does on the type collection), the hairs up to 0.8 mm long, usually somewhat curly. Blades often biglandular at the base of the midrib beneath with glands 1 mm long, or bearing (nectariferous?) projections ca. 1 mm long.

Inflorescences terminal or axillary, each cyme consisting of 1–5 flowers, these reduced cymes usually borne on shortened, glabrous or pubescent, often ridged branches up to 9 cm long. Peduncles 0.3–2.6 cm long, often ridged and darkened on drying, glabrous or pubescent. Bracts 2–4 mm long, 1–1.5 mm wide, triangular to oblong, glabrous, caducous. Pedicels 1.3–3.5 cm long, thickened distally (sometimes only slightly), ridged and darkened on drying, glabrous or pubescent. Sepals coriaceous, 5.5–12 mm long, 6–9 mm wide (the outer usually slightly smaller than the inner), ovate to broadly ovate to suborbicular, acute or obtuse at the apex, often somewhat auriculate at the base, glabrous or sometimes pubescent on the apical half, the abaxial surface usually wrinkled on drying, the adaxial surface covered with coarse, bulbous-based, appressed hairs up to 0.2 mm long. Corolla 5.5–8(–10) cm long, 7–11 cm in diameter, funnelform, usually sparsely pubescent especially along the margins of the interplical regions, but often glabrous, white with a purple throat. Stamens 10–13 mm long, the anthers 6–7 mm long, the basal hairs up to 1.5 mm long, gland tipped. Style ca. 5 mm long, the basal 2 mm thickened and persistent; stigmas 2, cylindrical, 2–3 mm long, 1 mm wide. Capsule 2-locular, 4-valved, the valves 15–25 mm long, 4-seeded; seeds long-pilose along the dorsal margins, the hairs 10–15 mm long.

Ipomoea populina inhabits tropical deciduous forests as well as cut-over areas, roadsides, and riverbanks. Its distribution is indicated in Fig. 1. This species grows at elevations of 200 to 2000 m and usually flowers and fruits between November and January.

MEXICO. GUERRERO: Acapulco and vicinity, Oct 1894–Mar 1895, *Palmer 482* (type) (GH, NY, UC, US); Sierra Madre of Michoacán and Guerrero, *Langlassé 612* (US); Montes de Oca, *Hinton 11528* (MICH, NY, US). CHIAPAS: Mpio of Ocozocoautla de Espinosa, near Derna, *Breedlove 30290* (UC); between Hacienda Juncaná and San Vicente, *Nelson 3509* (US); between Chiapa de Corzo and Tuxtla Gutiérrez, *Breedlove 22952* (MICH); El Chorreadero, 5.6 miles E of Chiapa de Corzo, *Breedlove 9561* (F); 13 km N of Arriaga, *Breedlove 30544* (UC); 8 km SW of Berriozábal, *Breedlove 23054* (MICH).

GUATEMALA. Agua Caliente and Sanarate, *Holway 856* (US); near Río Hondo, Zacapa, *Williams*

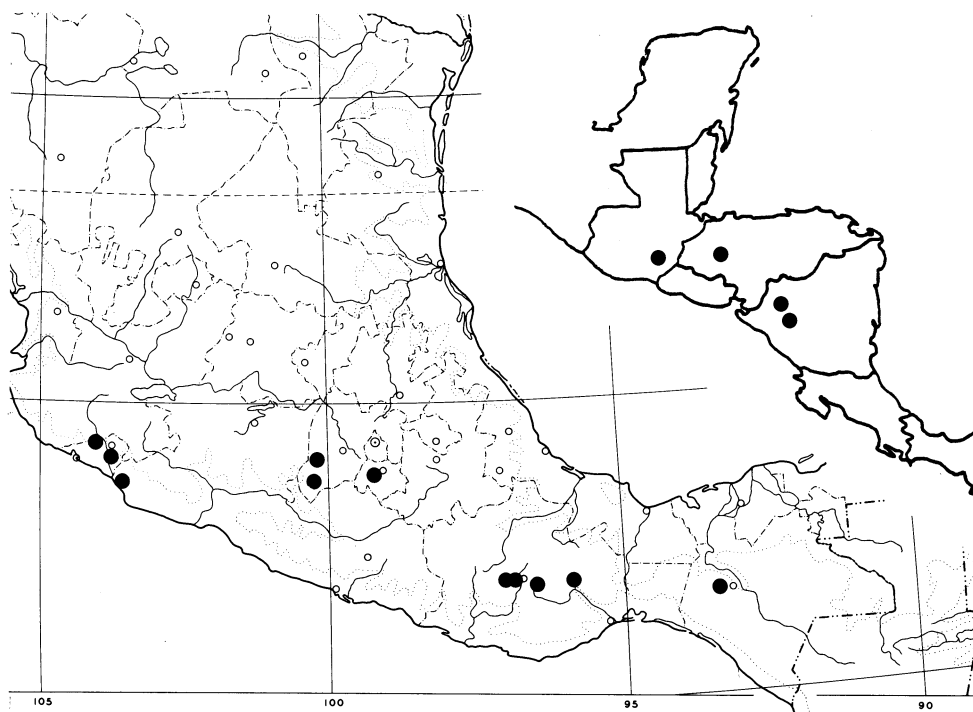


FIGURE 5. Distribution of *Ipomoea praecana*.

41887 (NY); Guatemala City, *Popenoe 360a* (US); 40 km NW of Huehuetenango, *Williams 41308* (US); Cuilco, Huehuetenango, *Shannon 415* (US); near Zacapa, *Pittier 1762* (NY).

HONDURAS. Between Tegucigalpa and El Picacho, *Molina R. 8785* (US); 20 km S of Tegucigalpa, *Molina R. 18464* (NY); near San Francisco, Rio Yeguaré valley, *Williams 11481* (GH).

NICARAGUA. 3–7 km NW of Pueblo Nuevo, Estelí, *Williams 42423* (US); 15 km N of Estelí, *Williams 20209* (NY).

7. *Ipomoea praecana* House, Ann. New York Acad. Sci. 18:227. 1908. TYPE: *Nelson 1823* (GH, presumed holotype; US, presumed isotype).

Trailing or clambering woody vines or sprawling shrubs to 10 m long. Stems often longitudinally ridged, short-tomentose with hairs 0.25 mm long. Leaf blades entire, 8–23 cm long, 9–21 cm wide, with 8–12 lateral veins on each side of the midrib, ovate to orbicular, acuminate at the apex, cordate at the base, pubescent above, at least on the main veins, densely tomentose beneath with hairs up to 1 mm long, often the lower surface grey green. Blades biglandular at the base of the midrib beneath with glands 1–2 mm long. Petioles 4–11 cm long, short-tomentose.

Inflorescences terminal or axillary, the 1-flowered cymes often borne in dense clusters on reduced, sometimes short-branched axes which occasionally bear reduced leaves, these axes 2–6 cm long, often ridged, pubescent like the stem. Peduncles 0.3–0.8(–10) cm long, densely tomentose. Bracts 10–20 mm long, 4–6 mm wide, densely tomentose on both surfaces, caducous. Pedicels 1.3–3.5 cm

long, usually markedly grooved longitudinally on drying, densely tomentose. Sepals coriaceous, 15–25 mm long, 10–15 mm wide (the outer equal to or slightly larger than the inner), ovate, obtuse at the apex, often longitudinally grooved on drying, densely tomentose abaxially, usually partially tomentose adaxially near the apex, the hairs up to 0.3 mm long. Corolla 6–12 cm long, 7–10 cm in diameter, funnellform, pubescent over most of the outer surface, the hairs occasionally arising in pairs, white within the interplical regions yellowish white without. Stamens 30–45 mm long, the anthers 10–12 mm long, the basal hairs 1–2 mm long, gland tipped. Style ca. 40 mm long; stigmas 2, globose, ca. 1.5 mm long. Capsule 2-locular, 4-valved, the valves 18–24 mm long, 4-seeded; seeds pilose on the dorsal margins and sometimes also on the ventral margin, the hairs 10–20 mm long.

Ipomoea praecana is known from tropical deciduous forests, especially dry oak forests. Its distribution is indicated in Fig. 5. This species grows at elevations of 150 to 1300 m and flowers and fruits between September and March.

MEXICO. COLIMA: 9–10 km E or SE by winding road from Minatitlán, *McVaugh 26236* (MICH); 11 miles SSW of Colima, *McVaugh & Koelz 1567* (MICH); 17–18 km SSW of Colima on the Manzanillo road, *McVaugh 22972* (MICH). MICHOACÁN: 3–6 km SE of San Juan de Lima, *McVaugh 22994* (MICH); 5 km N of Cruz de Campo, *Dieterle 3176* (MICH). MORELOS: Near Cuernavaca, *Pringle 7229* (GH). MEXICO: Guayabal, District of Temascaltepec, *Hinton 8739* (F, MO, US). OAXACA: Between Alanoloyas and Santa Catarina, *Conzatti 1656* (GH); near Reyes, *Nelson 1823* (type) (GH, US). CHIAPAS: Mpio of Ocozocoautla de Espinosa, near Derna, *Breedlove 30288* (DS); Mpio of Terán, Crispin, *Breedlove 30365* (DS); Escuintla, *Matuda 582* (MICH); 5.6 miles SE of Chiapa de Corzo on Mex 190, *Ton 3257* (MICH); above El Chorreadero, Mpio of Chiapa de Corzo, *Breedlove 23044* (DS, MICH).

GUATEMALA. Department of Jalapa, *Kellerman 5645* (US).

HONDURAS. Oturo valley, Department of La Paz, *Molina R. 23332* (F).

NICARAGUA. S of Darío, Matagalpa, *Seymour & Atwood 2595* (MICH); 3–7 km NW of Pueblo Nuevo, Estelí, *Williams 42419* (US).

8. *Ipomoea pulcherrima* van Ooststroom, Recueil Trav. Bot. Néerl. 30:206. 1933.
TYPE: *Weberbauer 5875* (B, holotype, not seen; GH, US, isotypes).

Trees or shrubs. Stems producing a white latex, ridged on drying, densely puberulent with curly hairs up to 0.2 mm long, the older stems partially glabrescent. Leaf blades entire, 5–9 cm long, 4–8.5 cm wide with 8–12 lateral veins on each side of the midrib, broadly ovate to orbicular, obtuse at the apex, subcordate or truncate at the base, pubescent above with very slender, more or less appressed hairs 0.2–0.5 mm long, much more densely pubescent beneath (the lower surface completely obscured and appearing much lighter than the upper) with similar hairs. Midrib apparently not glandular. Petioles 1.5–3.5 cm long, densely puberulent like the stem.

Inflorescences terminal or axillary, each cyme consisting of 1 (or rarely 2) flowers, these reduced cymes often borne on shortened, puberulent branches up to 3 cm long. Peduncles 0.2–0.4 cm long, densely puberulent. Bracts ovate, 1.5–2 mm long, 1 mm wide, glabrous or puberulent abaxially on the midrib, caducous. Pedicels 0.8–1.4 cm long, puberulent, ridged on drying. Sepals unequal (the outermost 5–6 mm long, 4–5 mm wide, the innermost 9–10 mm long, 6–7 mm wide), broadly oblong, glabrous on the abaxial surface and apparently also on the adaxial surface. Corolla 4–5 cm long, ca. 2.5 cm in diameter, funnellform, glabrous, prob-

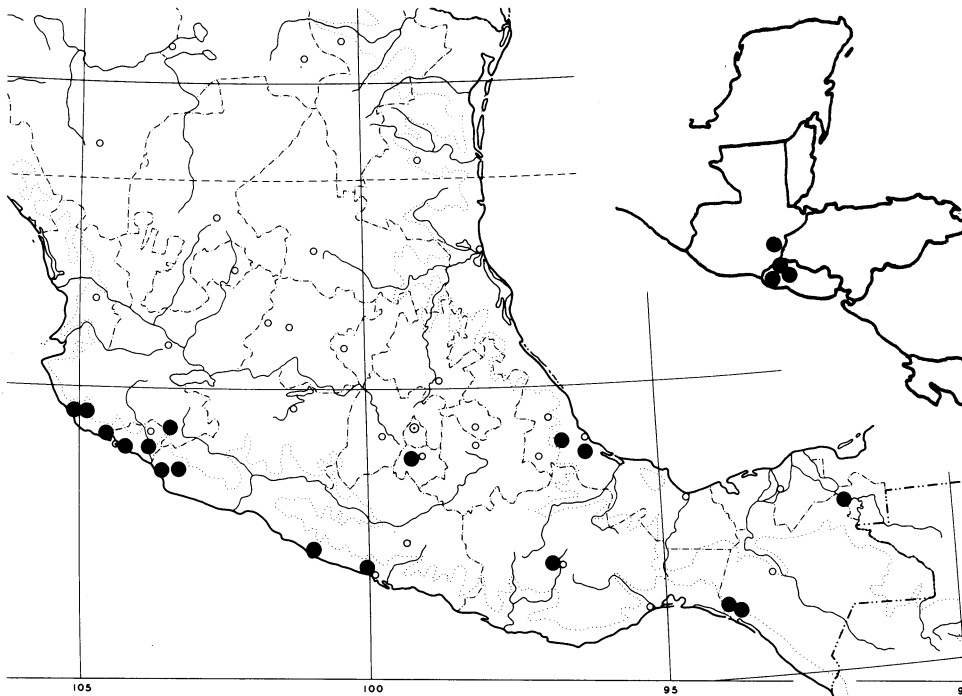


FIGURE 6. Distribution of *Ipomoea wolcottiana* subsp. *wolcottiana* in Mexico and Central America.

ably white. Stamens 18–25 mm long, the anthers 5–6 mm long, the basal hairs up to 1 mm long, gland tipped. Style ca. 10 mm long; stigmas 2, apparently globose, ca. 1.2 mm long. Capsule unknown.

This little-known species has been collected at 1100 m elevation and was flowering in June.

PERU. Apurimac, *Weberbauer 5875* (type) (GH, US).

9. *Ipomoea teotitlanica* McPherson, Contr. Univ. Mich. Herb. 14:85. 1980. TYPE: *H. S. Gentry 22475* (GH, holotype).

“Small trees with gray trunks” (collector’s notes). Young stems somewhat ridged on drying, densely tomentose with soft, curly hairs ca. 0.5 mm long; older stems more strongly ridged to much roughened, glabrescent. Leaf blades (immature?) entire, 3–4 cm in diameter with 7–8 lateral veins on each side of the midrib, orbicular, obtuse at the apex, cordate at the base, pubescent above with very slender, more or less appressed hairs 0.3–1.0 mm long, much more densely pubescent beneath (the lower surface completely obscured and appearing lighter in color) with similar hairs, apparently not glandular at the base of the midrib beneath. Petioles 0.8–1.5 cm long, densely tomentose like the stem.

Inflorescences axillary, each cyme consisting of 1 flower, these reduced cymes often borne on shortened tomentose branches up to 5 mm long. Peduncles ca.

0.1 cm long, tomentose. Bracts broadly ovate, 1–1.5 mm long, 1 mm wide, tomentose on the abaxial surface and centrally on the adaxial surface, caducous. Pedicels 1.0–1.5 cm long, stout, tomentose and glabrate, ridged on drying, slightly thickened distally. Sepals 11–16 mm long, 7–10 mm wide, subequal, elliptical to broadly ovate, at least the outer sepals tomentose over the abaxial surface and partially so on the adaxial surface, the curly hairs up to ca. 0.7 mm long. Corolla 5.5–6.5 cm long, ca. 4 cm in diameter, funnelform, glabrous, “light clear yellow” (collector’s notes). Stamens 28–38 mm long, the anthers 8 mm long, the basal hairs up to 1 mm long, gland tipped. Style ca. 45 mm long; stigmas 2, globose, ca. 1.5 mm long. Capsule unknown.

The limestone canyon that was the origin of the single specimen of *I. teotitlanica* is indicated in Fig. 2. The specimen was in flower in November.

MEXICO. OAXACA: Tambor, ca. 17 mi. W of San Antonio, District of Teotitlan, *H. S. Gentry* 22475 (type) (GH).

10. *Ipomoea wolcottiana* Rose, Gard. & Forest 7:367. 1894. TYPE: *Palmer 1342* (1891) (US, holotype).

I. calva House, Bot. Gaz. (Crawfordsville) 43:410. fig. 1. 1907. TYPE: *Nelson 6992* (US, holotype).

Key to Subspecies

- 1a. Flowering pedicels 6–17(–19) mm long; Mexico, Central America. subsp. *wolcottiana*
 1b. Flowering pedicels 23–34 mm long; Peru. subsp. *calodendron*

10a. *I. wolcottiana* Rose subsp. *wolcottiana*

Trees 3–13 m high, the trunk up to ca. 30 cm in diameter. Stems producing a white latex, ridged on drying, usually puberulent when young with hairs up to 0.2 mm long, the branch ends disposed to twining. Leaf blades entire, 6–16 cm long, 3–11 cm wide, with 11–17 lateral veins on each side of the midrib, narrowly to broadly ovate to ovate-lanceolate, acuminate at the apex, truncate or shallowly cordate at the base, the lower surface pubescent with hairs up to 0.3 mm long or merely puberulent on the veins, glabrescent, the upper surface glabrous or occasionally pubescent and glabrescent like the lower surface. Blades biglandular at the base of the midrib beneath with glands 1–2 mm long. Petioles 2–9 cm long, glabrous or pubescent.

Inflorescences terminal or axillary, each cyme consisting of 1 flower, these reduced cymes usually borne on shortened, puberulent branches 2–10 cm long, which sometimes bear reduced leaves. Peduncles 0.1–0.4 cm long, pubescent or glabrous. Bracts 2–6 mm long, 0.5–2.5 mm wide, puberulent and partially glabrescent abaxially, more densely pubescent adaxially, caducous. Flowering pedicels 0.6–1.7(–1.9) cm long; fruiting pedicels 1.6–2.7(–3.0) cm long, usually longitudinally grooved on drying, slightly thickening distally, pubescent. Sepals 6–14(–16) mm long, 5–8(–10) mm wide, subequal or with the outer somewhat smaller than the inner, elliptical, broadly obtuse at the apex (the sides of the sepals only slightly tapering), the abaxial surface puberulent (at least near the base) or short-pubescent (the hairs up to 0.25 mm long), the adaxial surface densely pubescent

with tiny hairs ca. 0.05–0.15 mm long. Corolla 4.5–7 cm long, 6–10 cm in diameter, funnelform, somewhat pubescent near their tips and along their margins, white with deep red in the throat, the interplical regions faintly yellowish. Stamens 12–29 mm long, the anthers 5–7 mm long, the basal hairs ca. 0.5 mm long. Style 18–25 mm long; stigmas 2, globose to cylindrical, 1–3 mm long, 1 mm wide. Capsule 2-locular, 4-valved, the valves 17–22 mm long; seeds 4, long-pilose on the dorsal margins with hairs 10–15 mm long.

Ipomoea wolcottiana subsp. *wolcottiana* inhabits dry, deciduous forests of various densities, including woodlands subject to much grazing. Its distribution is indicated in Fig. 6. It grows at elevations of 50 to 900 m and flowers and fruits between December and March.

MEXICO: JALISCO: Vicinity of Estacion Biologica, UNAM, 3 km SE of Chamela, *McVaugh 26291* (MICH); 9–11 km E of Chamela, *McVaugh 25179* (MICH); 8 miles SW of Pihuamo, *McVaugh & Koelz 1799* (MICH). COLIMA: 15–25 km NW of Santiago, *McVaugh 23019* (MICH); 17–18 km SSW of Colima, *McVaugh 22968* (MICH); between Armeria and Colima, *Templeton 9479* (MICH); Manzanillo, 2–18 Mar 1891, *Palmer 1342* (type) (GH, NY, US). MICHOACÁN: 3–6 km SE of San Juan de Lima, *McVaugh 22992* and *22995* (MICH); Coalcomán, *Hinton 16241* (US). GUERRERO: Papanoa, *Langlassé 736* (GH, P, US); La Jurita, *Nelson 6992* (type of *I. calva* House) (US); near Acapulco, Oct 1894–Mar 1895, *Palmer 619* (GH, NY, UC, US). MORELOS: Near Cuernavaca, *Lemmon 210* (MICH). PUEBLA: Near San Luis Tultitlanapa, *Purpus 3532* (MICH). OAXACA: Monte Albán, *Pringle 4965* (MICH). VERA CRUZ: Carrizal, *Goldman 707* (US); 5 miles W of José Cardel, *Fryxell & Bates 848* (US); Mata de Caña, Mpio de Dos Ríos, *Ventura A. 2917* (MICH, NY). TABASCO: Near Plan del Rio, Mpio de Emiliano Zapata, *Gilly, Simpson, & Dodds 72* (MICH). CHIAPAS: Near La Reforma, *Collins & Doyle 42* (US); near Monte Bonito, Mpio of Arriaga, *Ton 3379* (F, MICH); 13 km N of Arriaga, *Breedlove 30632* (DS).

GUATEMALA: Near Chiquimula, *Pittier 1859* (US).

EL SALVADOR: *Renson 228* (US); vicinity of Ciudad Arce, La Libertad, *Allan 7109* (US); Department of Ahuachapán, *Padilla 256* (US); Sonsonate, *Calderon 632* (US); near Acajutla, Sonsonate, *Standley 21941* (US); near Santa Ana, *Standley 19697* (US).

10b. *I. wolcottiana* Rose subsp. *calodendron* (O'Donell) McPherson, comb. nov.

I. calodendron O'Donell, Lilloa 23:480. 1950. TYPE: *Weberbauer 6396* (US, holotype).

Trees to 10 m high, the trunks up to 30 cm in diameter. Stems producing a white latex, ridged and grooved on drying, finely pubescent with hairs ca. 0.1 mm long, glabrescent. Leaf blades entire, 6–23 cm long, 5.5–14 cm wide, with 10–15 lateral veins on each side of the midrib, ovate, acuminate at the apex, cordate at the base (often deeply so), glabrous above or slightly puberulent near the base, puberulent beneath especially on the midrib and the veins at least when young, glabrescent. Blades biglandular at the base of the midrib beneath with glands 1–2 mm long. Petioles 3–8 cm long, puberulent, glabrescent.

Inflorescence terminal or axillary, each cyme consisting of one flower, these reduced cymes usually borne on shortened, finely pubescent, glabrescent branches. Peduncles 0.2–0.6 cm long, puberulent. Bracts ca. 2.5 mm long, 1.5 mm wide, pubescent on the abaxial surface, caducous. Pedicels 2.3–3.4 cm long, sparsely puberulent, glabrescent. Sepals coriaceous, 8–12 mm long, 5–6 mm wide (the outer about equal to the inner, or slightly smaller), elliptical, obtuse at the apex, finely pubescent and glabrescent abaxially, densely pubescent adaxially with tiny, coarse hairs less than 0.05 mm long. Corolla 5.5–9 cm long, ca. 7 cm in diameter, funnelform, sparsely short-pubescent near the tips of the interplical regions, white

with reddish throat within. Stamens 19–25 mm long (cf. O'Donell's 2.6–3.5 cm), the anthers 7–8 mm long, the basal hairs to ca. 1 mm long, gland tipped. Style described by O'Donell as ca. 26 mm long; stigmas 2, globose. Ovary 2-locular, 4-ovuled. Capsule unknown.

This rarely collected subspecies is known from elevations of 700 to 800 m and flowers between January and July.

Like *I. pauciflora* subsp. *vargasiana*, this taxon is scarcely distinct from its Mexican counterpart. The Peruvian subspecies has, however, several larger ranges in size variation—in leaf length and width, in peduncle and (especially) pedicel length, and in corolla length. Despite this greater variability, the Peruvian plants are so similar to subsp. *wolcottiana* that were it not for their great disjunction, no separate taxonomic rank would be accorded them.

PERU: Valley of the river Quiros, *Weberbauer 6396* (type) (US); Tumbes Valley, *Haught 60* (US); Jalara, *Haught 60a* (US); Cerro Viento, *Haught 201* (US).

SPECIES INQUIRENDAE

Convolvulus arboreus Balb. ex Steudel, *Nomencl.*, ed. 2. 1:407. 1841, nomen nudum. Steudel included this species in *C. arborescens* H.B.K.

C. arboreus Sessé & Moc., *Pl. Nov. Hisp.* 23. 1888. TYPE: not determined. House referred this species to *I. cuernavacensis*, which is discussed below. The description is inadequate to identify this species. McVaugh (1980) stated that specimens in the Sessé & Mociño herbarium (MA) bearing this name represent both *I. murucoides* and *I. intrapilosa*.

C. quahutzehualt Sessé & Moc., *Pl. Nov. Hisp.* 23. 1888. TYPE: not determined. McVaugh (1980) stated that specimens in the Sessé & Mociño herbarium (MA) bearing this name represent *I. murucoides*.

Ipomoea cuernavacensis House, *Bot. Gaz.* (Crawfordsville) 43:410. 1907. TYPE: *Rose & Painter 6963* (US, holotype), not *Rose & Painter 6863*, as stated in House (1908). *Ipomoea cuernavacensis* is probably a synonym of *I. arborescens* because, although the leaf base of the type material of the former resembles that of *I. murucoides* in being truncate, in details of the stem and leaf pubescence it strongly resembles *I. arborescens*. It is completely sterile, and therefore some doubt must remain about its identity. Since no other similar specimens have been seen, I suspect that it came from a somewhat unusual individual of *I. arborescens*.

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