

## Contents

	<b>Page</b>
Introduction . . . . .	173
Historical consideration . . . . .	173
Economic consideration . . . . .	175
Geographical distribution . . . . .	175
Morphological characters . . . . .	176
Taxonomic position . . . . .	178
Systematic treatment . . . . .	179
Key to species and varieties . . . . .	179
Excluded and doubtful taxa . . . . .	196
Collections of <i>Nissolia</i> cited . . . . .	198
Index . . . . .	204

## Figures

	<b>Page</b>
1. Geographic distribution of the genus <i>Nissolia</i> . . . . .	176
2. Geographic distribution of <i>Nissolia hintonii</i> , <i>N. hirsuta</i> , <i>N. laxior</i> , <i>N. leiogyne</i> , <i>N. montana</i> , <i>N. platycalyx</i> , <i>N. platycarpa</i> , <i>N. pringlei</i> , <i>N. schottii</i> , <i>N. setosa</i> , and <i>N. wislizenii</i> . . . . .	183
3. Geographic distribution of <i>Nissolia fruticosa</i> . . . . .	194

# A REVISION OF THE GENUS *NISSOLIA*

BY VELVA E. RUDD

## Introduction

*Nissolia* is a genus of papilionaceous legumes characterized by jointed fruits, or loment, with the terminal article expanded, flat, and winglike. The plants are slender vines, more or less woody climbers or, in one species, prostrate herbs. The genus is known only from the New World, from southern Arizona and Texas southward to Argentina and Paraguay.

Some 65 species have been ascribed to *Nissolia*, most of which have since been transferred to other genera. The present paper retains 12 species, one of which is divided into two varieties. Eleven taxa have been reduced to synonymy and 42 are excluded from the genus or cannot be placed satisfactorily.

In addition to the material at the U. S. National Museum (US), specimens from herbaria of the following institutions have been consulted: Arnold Arboretum (A), Gray Herbarium of Harvard University (GH), U. S. National Arboretum (NA), New York Botanical Garden (NY), Philadelphia Academy of Natural Sciences (Ph), University of California at Berkeley (UC), Instituto Botánico, Ministerio de Agricultura y Cría, Caracas (Ven). Thanks are due the curators who made such material available. Abbreviations of herbarium names are those of the Index Herbariorum (Lanjouw and Stafleu, ed. 2, 1954).

The maps presented in this paper are based on Goode Base Maps No. 201 HCW, copyright 1938 by the University of Chicago, and are used by permission of the University of Chicago Press.

## Historical consideration

The name *Nissolia*, in honor of William Nissole, a French botanist (1647–1735), was originally used by Tournefort (Inst. Rei Herb. 656. 1700) to segregate one species from *Lathyrus*, which he designated as *Nissolia vulgaris*.

Linnaeus did not recognize that generic separation, however. In the first edition of his "Species Plantarum" (729. 1753), as well as in subsequent editions, he cited that same taxon as *Lathyrus nissolia*.

Miller (Gard. Dict. ed 4, 1754), following Tournefort, validated the genus *Nissolia*, and included three species, *N. vulgaris*, *N. orientalis*, and *N. americana*. The first two are now placed in *Lathyrus*, and the other in *Rhynchosia*. Actually, Miller's specific names in this 1754 edition may be rejected as illegitimate because he did not consistently employ the Linnaean system of binary nomenclature. In his eighth edition (1768), where he first consistently used binomials, Miller referred his species of *Nissolia* to *Lathyrus*.

A second genus *Nissolia* was published by Jacquin (Enum. Pl. Carib. 7. 1760). It was based on two species—*N. fruticosa*, now considered the type of the genus, and *N. arborea*, later transferred to the genus *Machaerium*.

Because the name *Nissolia* Jacq. was a later homonym of *Nissolia* Mill., it was proposed for conservation (Kew Bull. 1935: 440. 1935). The proposal was accepted by the Special Committee for Phanerogamae and Pteridophyta appointed by the 6th International Botanical Congress, Amsterdam (1935), and *Nissolia* Jacq. was added to the list of Nomina Generica Conservanda (Kew Bull. 1940: 106. 1940).

In the second edition of his "Species Plantarum" (992. 1763), Linnaeus adopted Jacquin's *Nissolia*, with its two species.

Four additional species of *Nissolia*—*N. quinata* Aubl., *N. punctata* Poir., *N. reticulata* Poir., and *N. ferruginea* Willd.—were published before 1807, when Persoon introduced his genus *Machaerium* (Syn. Pl. 2: 276. 1807), based on these latter species. The two earlier species, *N. fruticosa* and *N. arborea*, he retained in *Nissolia*.

The next noteworthy consideration of *Nissolia* Jacq. was by de Candolle (Mem. Legum. 6: 269–273. 1825; Prodr. 2: 257–259. 1825). He preferred to maintain *Machaerium* as a section of the genus *Nissolia* until the species should be better known. For *N. fruticosa* and two new species, *N. hirsuta* and *N. racemosa*, he proposed the section *Nissolaria*. *Nissolia arborea* and *N. glabrata* he placed in another section, *Gomezium*. Five species "non satis notae" he left unplaced. His treatment included a total of 17 species ascribed to *Nissolia*.

Vellozo (Fl. Flum. 295–299. 1825; Icon. 7: pls. 75–88. 1835) published descriptions and illustrations of 14 new species of *Nissolia*, but all have subsequently been transferred to other genera.

Vogel (Linnæa 11: 177–204. 1837) returned *Nissolia* and *Machaerium* to the status of separate genera, and believed that *N. arborea* and *N. glabrata* belonged to *Machaerium*.

During the next 60 years 16 new species were assigned to *Nissolia*, only six of which remain in the genus as interpreted today. By 1899, when Rose published his "Synopsis of the North American Species of *Nissolia*" (Contr. U. S. Nat. Herb. 5: 157-163. 1899), references to some 50 species were to be found in the botanical literature. By excluding those species transferred to other genera, reducing three species to synonymy within *Nissolia*, and adding six new species, Rose's treatment included only 12 species for the entire genus, plus two items that he was unable to place.

Standley, in his "Trees and Shrubs of Mexico" (Contr. U. S. Nat. Herb. 23: 487-489. 1922), gave a rather complete resumé of *Nissolia*. His interpretation of the species differs somewhat from Rose's but is more in accord with this present treatment.

Five species of *Nissolia* have been published since 1899, two by Sandwith, and one by J. Donnell Smith. Another taxon published by Smith, *Machaerium verapazense* Donn. Sm., has been recognized as identical with typical *Nissolia fruticosa* Jacq. A new genus, *Pseudomachaerium* Hassler, with one species, *P. rojasianum*, is referable to *Nissolia fruticosa* var. *guatemalensis*.

#### Economic consideration

The species of *Nissolia* seem never to form an important or conspicuous element of the vegetation, and scarce mention has been made of their economic uses.

In El Salvador, *Nissolia fruticosa* Jacq., known locally as "hierba del tamagás," is said to be used as an antidote for bite of the "tamagás," a snake (Standley & Calderon, Pl. Salv., 115. 1927; data on label of plant specimen, Standley No. 19123).

*Nissolia fruticosa* has also been listed among the fish-poison plants (Greshoff, Med. Lands Pl. 29: 53. 1900; Pittier, M. A. C. Serv. Bot. Bol. Tecn. 5: 35. 1944) but apparently it is little used.

#### Geographical distribution

*Nissolia* is an American tropical and warm temperate genus ranging from southern Arizona and Texas southward to Argentina and Paraguay (fig. 1). It has not been reported from the Antilles nor from eastern South America. The greatest diversity of taxa is in México, where all the known species are represented.

Available collection data indicate that the species all are mesophytes with rather similar ecological requirements and tolerances. Mostly the plants are cited as climbing on trees or clambering over

shrubs. The habitats mentioned suggest moist and open locations such as edges of woods, banks of gulleys, roadsides, forested hills and forested bluffs, lower slopes of mountains, bases of north-facing cliffs, chaparral slopes of canyons, arroyo margins, sandy valley floors, moist swales, or stream sides.

As indicated by the maps and locality citations in connection with the species descriptions in this paper, one species, *Nissolia fruticosa*, is wide ranging, from México to Argentina and Paraguay. The other

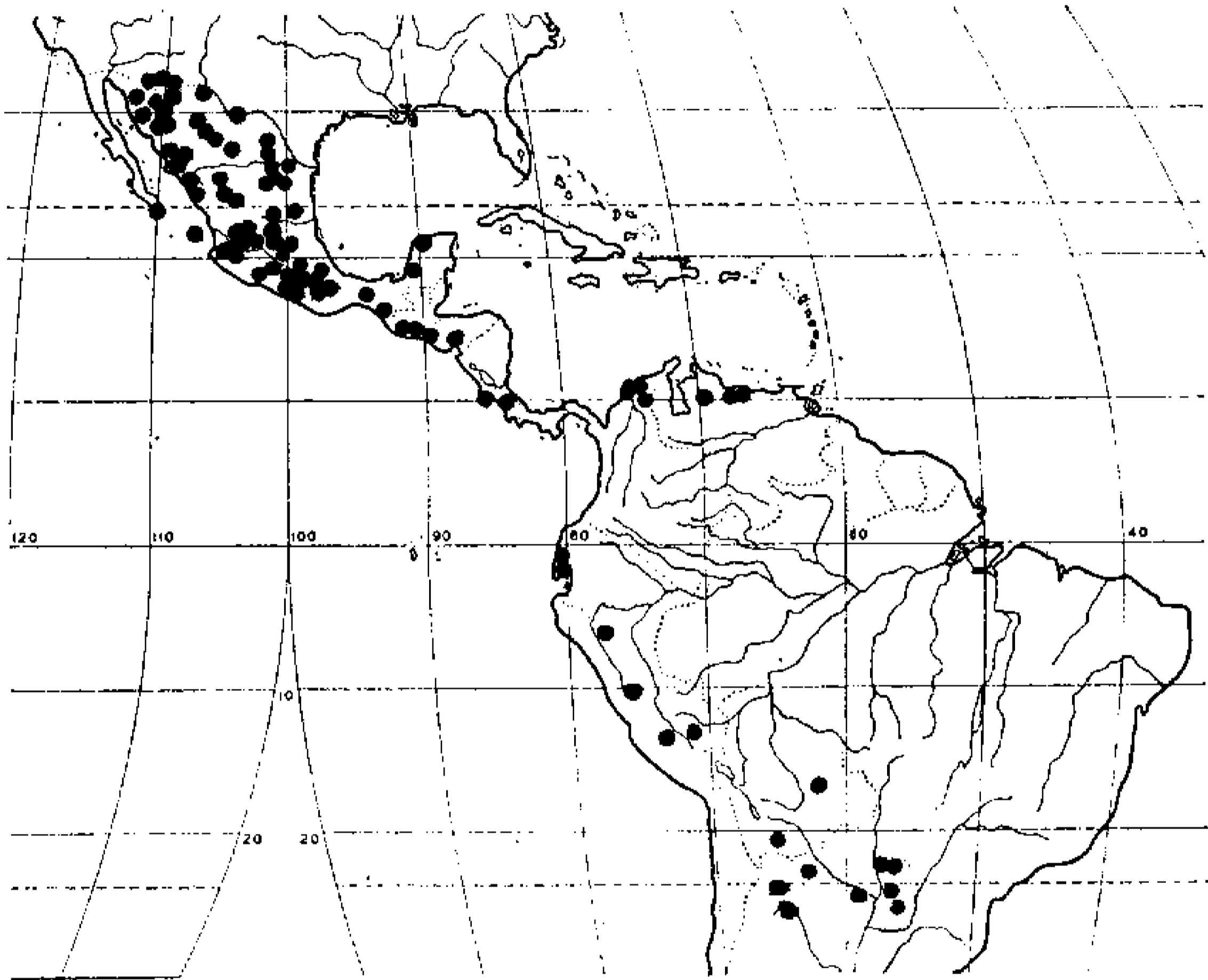


FIGURE 1.—Geographical distribution of the genus *Nissolia*.

species of *Nissolia* are known only from México or just across the border in southern Arizona or Texas. A few species are known solely from very limited areas.

#### Morphological characters

With the exception of *Nissolia wislizenii*, which is prostrate in habit, the species of *Nissolia* are all perennial climbing vines, sometimes several meters long. The stems, usually numerous from a woody root, are herbaceous, becoming woody with age, subterete, striate, about 1–3 mm. in diameter. The surface may be glabrous or pubescent with more or less crispate, white hairs, and may be beset with yellowish, glandular setae.

Stipules are paired, attached at the base, deltoid to lanceate, acute to attenuate, glabrous or pubescent, entire or glandular-denticulate. Stipels are lacking. Bud scales are deltoid, subglabrous to tomentulose.

The leaves are pinnately 5-foliolate, or, in *Nissolia platycalyx*, sometimes 7-foliolate. The axis, glabrous to pubescent, essentially like the stem, is about 2–10 cm. long, with the petiole comprising one-half to three-fourths the total length. The leaflets are elliptic to orbicular, obovate to obcordate, or subrhombic, ranging in diameter from about 5 to 50 mm. The margin is entire in all species. The apex is mucronulate and obtuse to acute, or retuse. The base commonly is rounded but may be cuneate, truncate, or subcordate. The surfaces are micropunctulate, glabrous to densely pubescent. The venation is pinnate, the costa and a few secondary veins obvious, the others inconspicuous. The petiolules are pulvinate, about 1–2 mm. long.

The inflorescences are axillary and, in most species, fasciculate. In others, the peduncle is elongated, producing a raceme or panicle. Sometimes the flowering branches are leafless, and with closely spaced fascicles present the appearance of elongated racemes. The bracts and stipules intergrade, the latter usually being slightly longer and more attenuate. Bracteoles, the pair of small bracts subtending the calyx, have been observed only in *N. wislizenii*, and there only occasionally. In all species there is an articulation at the base of the calyx. The bracteoles, if present, occur immediately below that line and usually remain on the pedicel after the flowers or fruits are shed. The axis, like the stem, may be glabrous to pubescent, sometimes beset with glandular setae. The length and pubescence of the pedicels are approximately constant for most species, and are somewhat useful diagnostic characters.

The flowers are relatively small. Measured from the articulation at the base of the calyx to the apex of the standard petal, they range from a minimum of 4 mm. long in *Nissolia hirsuta* to a maximum of 20 mm. long in *N. platycalyx*.

The calyx is campanulate with five subequal lobes or truncate with the five nerves extended as subulate teeth. The tube may be glabrous or pubescent, and in some species glandular setae are present. The basal portion of the tube, about 0.5–1 mm. long, is abruptly narrowed to essentially the diameter of the pedicel and within it all the floral parts appear to be more or less adnate.

The corolla is papilionaceous, usually yellowish, occasionally almost white, sometimes purplish or pinkish. Collection data are too scanty to indicate specific constancy. The standard, or vexillum, is the longest petal. It is spatulate, usually with a well developed claw; the blade is pubescent on the outer face. The keel and wings are

nearly as long as the standard, commonly less than 1 mm. shorter. They are clawed and glabrous or pubescent. Although the total flower length is a useful character, the petals otherwise are not particularly useful or convenient for species identification.

There are 10 stamens, subequal, about as long as the keel. The filaments are free from the apex to about midlength, but below that they are united, forming a sheath that splits along the vexillar side as the fruit begins to develop. In many flowers one of the end filaments appears to be less firmly united than all the others, which suggests a tendency toward a diadelphous 9:1 arrangement. The anthers are dorsified and ellipsoidal, the longest scarcely 1 mm. long.

The ovaries are 2-4-ovulate or, less commonly, 1-ovulate; they are sessile or short-stipitate, glabrous in at least one species, pubescent in most. The style is glabrous, the stigma capitate.

The fruits are samara-like, 2-5-articulate loment with the terminal joint sterile, flat, and winglike. Venation is usually prominent, with longitudinal costae and secondary reticulations. The fruit of most species is crisp-pubescent, and usually somewhat glabrate; one species has glabrous fruit, and a few are beset with glandular setae.

The seeds are reniform, sublustrous, reddish brown, laterally compressed, with a small circular hilum. The inside of the pod is villous and a few hairs usually adhere to the seed coat.

Apparently no chromosome counts of *Nissolia* have been published.

#### Taxonomic position

*Nissolia* is a genus of papilionaceous legumes, placed in the tribe Hedysareae because of its more or less jointed fruits. Taubert (in Engler and Prantl, *Die Natürlichen Pflanzenfamilien* 3(3): 309. 1894) included *Nissolia* in his subtribe Aeschynomeneae, a group characterized by stamens with filaments united to form a sheath or in two phalanges 5:5. The other genera of this subtribe are: *Aeschynomene*, *Amicia*, *Balisaea*, *Brya*, *Chaetocalyx*, *Climacorachis* (= *Aeschynomene*), *Cyclocarpa*, *Diphaca*, *Discolobium*, *Fiebrigiella*, *Geissaspis*, *Isodesmia*, *Pictelia*, *Poiretia*, *Pseudomachaerium* (= *Nissolia*), *Raimondianthus*, *Smithia*, *Soemmeringia*, and *Weberbauerella*.

*Nissolia*, unique because of its loment with a sterile, flattened, winglike terminal article, is most closely related to *Chaetocalyx*, whose fruits have articles all essentially equal. There appears to be intergradation through *Nissolia wislizenii* (originally published as *Chaetocalyx wislizenii*), a species with the terminal article flat and sterile but scarcely larger than the fertile, basal articles. Several species of *Nissolia* have the calyx beset with glandular setae as is customary in *Chaetocalyx*. Vegetatively the two genera are essentially identical.

## Systematic treatment

*Nissolia*

*Nissolia* Jacq. Enum. Pl. Carib. 7. 1760, nom. conserv., non *Nissolia* [Tourn.] Mill. 1754.

*Pseudomachaerium* Hassler, Bull. Herb. Boiss. II, 7: 1. 1907.

Climbing or prostrate vines, herbaceous or somewhat woody; leaves pinnately compound, 5- (or rarely 7-) foliolate; stipules lanceate to deltoid-ovate, attached at the base; inflorescences axillary, fasciculate or racemose, sometimes paniculate; flowers 5-merous; calyx campanulate with five subequal teeth or lobes; petals papilionaceous, usually yellowish, sometimes white or purplish; stamens 10, the filaments united to form a sheath, which, at maturity, splits along the vexillar side; fruit a samara-like, 2-5-articulate loment, the terminal article sterile, flat, and winglike; seeds reniform, laterally compressed, sublustrous, reddish brown, the hilum small, circular.

The type of the genus is *Nissolia fruticosa* Jacq. Of the two species cited by Jacquin in the original description of *Nissolia*, *N. fruticosa* alone remains in the genus. The other species, *N. arborea*, has been transferred to *Machaerium*.

In this paper, both in the key and in the text, the taxa are arranged in what I believe to be approximately a natural sequence; *N. wislizenii* is at one extreme, *N. fruticosa* at the other, and the intermediate species are placed with what seem to be their next of kin. Allowance must be made for the probability that evolutionary development within the genus has been reticulate rather than lineal.

There is no one good distinguishing character for separating all the species. A few species are essentially unique in at least one feature, which aids in their recognition. For example, *Nissolia wislizenii* has but slight development of the sterile, terminal fruit article, and has leaflets that usually fold when disturbed; *N. laxior* has broad stipules, although in other respects it may be very similar to *N. schottii* and *N. montana*; *N. fruticosa* has an elongated fruit stipe; *N. setosa* has attenuate, glandular-tipped calyx teeth. However, for identification of material in various stages of maturity, it is most satisfactory to utilize different combinations of characters such as flower length, calyx length and the ratio of length of calyx tube and calyx teeth, fruit stipe length, glandular development, and type of inflorescence.

## Key to species and varieties

Terminal article of fruit scarcely larger than the fertile articles; stems prostrate; leaflets usually conduplicate when dry, the axis usually recurved (southern Arizona; southward in México to Jalisco and Hidalgo) . . . 1. *N. wislizenii*



Terminal article of fruit expanded, conspicuously larger than the fertile articles; stems climbing; leaflets usually drying or wilting without folding, the axis essentially straight.

Stipe of fruit exceeded by the calyx, about 1-2.5(-4) mm. long; inflorescences fasciculate, usually without elongation of the axis (conspicuous exception is *N. hintonii* with racemes or panicles); flowers 4-20 mm. long.

Calyx teeth terminating in attenuate, glandular setae 1-2 mm. long; calyx tube not setose (México: Baja California) . . . . . **2. *N. setosa***

Calyx teeth not terminating in attenuate setae, or the setae much less than 1 mm. long.

Fruit, and usually the calyx, beset with numerous, glandular setae.

Stems commonly densely white-pubescent, with moderate or no development of glandular setae; flowers (8-)10-12 mm. long; inflorescences fasciculate (México: Sonora and Sinaloa, Coahuila to Puebla).

**3. *N. platycarpa***

Stems conspicuously beset with glandular setae, otherwise glabrous; flowers 12-15 mm. long; inflorescences elongated, racemose or paniculate (south-central México: México and Guerrero).

**4. *N. hintonii***

Fruit glabrous to pubescent but lacking glandular setae; calyx usually without setae.

Flowers 14-20 mm. long; calyx tube 4.5-6 mm. long, 4-5 mm. in diameter (southwest Texas and northeast México) . . . . . **5. *N. platycalyx***

Flowers less than 14 mm. long; calyx tube about 4 mm. long, or less.

Stipules broadly lanceate, (1.5-)2-3 mm. wide at the base (southwest México: Jalisco to Guerrero) . . . . . **6. *N. laxior***

Stipules lanceate, about 1 mm. wide at base or less.

Tube of calyx (2-)2.5-4 mm. long, 2-4 mm. in diameter; calyx teeth 1-4 mm. long.

Calyx, pedicels, leaflets, and rachis of leaf glabrous or but sparingly pubescent, exclusive of glandular setae; leaflets thin, mostly membranous.

Teeth of calyx (2-)3-4 mm. long; flowers (8-)10-12 mm. long; inflorescences fasciculate, 1-8-flowered, the pedicels 6-10 mm. long (southern Arizona and northwestern México).

**7. *N. schottii***

Teeth of calyx 1-2 mm. long; flowers 11-13 mm. long; inflorescences fasciculate or sometimes racemose, 1-18-flowered, the pedicels 6-13 mm. long (México: Guerrero).

**8. *N. montana***

Calyx, pedicels, and rachis of leaves pubescent, the leaflets mostly thickened, often pubescent, especially along the margins and nerves (México: Chihuahua to Puebla) . . . . . **9. *N. pringlei***

Tube of calyx 1-2 mm. long, about 1.5 mm. in diameter; calyx teeth 0.5-1.5(-2) mm. long.

Flowers 7-10 mm. long; calyx 3.5-5 mm. long; fruit and calyx glabrous or nearly so (México: Guerrero) . . . . . **10. *N. leiogyne***

Flowers 4-7.5 mm. long; calyx 2-2.5 mm. long; fruit and calyx pubescent (México: Sonora and Chihuahua to Oaxaca).

**11. *N. hirsuta***

Stipe of fruit exceeding the calyx, about 3-6 mm. long; inflorescences sometimes fasciculate, commonly racemose or paniculate with considerable elongation of the axis; flowers 5-10 mm. long.

Flowers 5-8 mm. long; calyx teeth about 0.5 mm. long or less (México to Venezuela) . . . . . 12a. *N. fruticosa* var. *fruticosa*

Flowers 8-10 mm. long; calyx teeth 0.5-1 mm. long (Guatemala to north-western Argentina and Paraguay).

12b. *N. fruticosa* var. *guatemalensis*.

1. *Nissolia wislizenii* (A. Gray) A. Gray, Journ. Linn. Soc. 5: 25. 1861, as *N. wislizeni*.

*Chaetocalyx wislizeni* A. Gray, Pl. Wright. 1: 51. 1852.

Prostrate herb, the stems moderately white-pubescent and also sparsely beset with yellowish, glandular setae; stipules lanceate to deltoid-ovate, acute to acuminate, commonly 5-7 mm. long, 1-2.5 mm. wide, pubescent to subglabrous, entire or glandular-denticulate; leaves 0.5-5 (commonly 2-4) cm. long; leaflets essentially orbicular or sometimes elliptic, 4-20 mm. in diameter, obtuse to emarginate, mucronulate, the base obtuse to subcordate, the upper surface glabrous, the lower moderately pubescent to subglabrous; inflorescences fasciculate, 1-5-flowered, the pedicels 3-15 mm. long, pubescent; flowers (8-)10-15 mm. long, the standard straight or scarcely recurved; calyx pubescent and setose, (3-)4-5 mm. long, the tube (2-)3-4 mm. long, about 3 mm. in diameter, the teeth deltoid-subulate, about 1 mm. long; fruit commonly 2-4 cm. long, 2-5 articulate, pubescent to subglabrous, the stipe 1-2 mm. long, the fertile articles about 7-10 mm. long, 3-7 mm. wide, the terminal, sterile article flat and winglike but scarcely broader than the fertile articles; seeds about 5 mm. long and 3 mm. broad.

TYPE LOCALITY: Sacramento, Chihuahua, México. Type collected by Wislizenus (No. 151), cited below.

DISTRIBUTION: Southern Arizona and southward in México to Jalisco and Hidalgo (fig. 2).

#### UNITED STATES

ARIZONA: Cochise County: "San Pedro River, Mexican boundary line," *International Boundary Commission (Mearns)* 1549 (US). "Johnston's Ranch, 11 m. east of San Pedro River," *International Boundary Commission (Merton)* 1706 (US). Naco, *Harrison* 8261 (US). Huachuca Mountains, *Lemmon* 2668 (Ph, UC, US).

#### MÉXICO

SONORA: San Pedro, *Hartman* 870 (GH).

CHIHUAHUA: Sacramento, *Wislizenus* 151 (GH TYPE). Ciudad Juárez, *Wright* 1007 (GH, NY, US). Chihuahua, *Pringle* 618 (GH, NY, Ph, US). Cañón de las Varas, *Shreve* 9048 (GH, NA, UC). "Santa Clara Canyon," *LeSueur* 722 (GH).

DURANGO: *Rose* 2278 (GH, US), 2298 (GH, US). Durango, *Fisher* 44177 (GH, NY). Otinapa, *Palmer* 371 in 1906 (GH, NY, UC, US). Jaral, *Schumann* 188 (US).

ZACATECAS: Near Monte Escobedo, *Rose* 2651 (GH, US). Sombrerete, *Gentry* 8473 (US).

SAN LUIS POTOSÍ: *Parry & Palmer* 133 in 1878 (GH, Ph, US); *Palmer*, "July 21 and Aug. 1898" (US); *Schaffner* 592 (NY, US). San Miguelito, *Schaffner*

793 (GH, Ph). San Rafael, *Schaffner* 794 (GH, Ph). Charcas, *Lundell* 5385 (US), 5459 (US).

JALISCO: Guadalajara, *Pringle* 5482 (GH).

QUERÉTARO: San Juan del Río, *Rose, Painter, & Rose* 9533 (GH, NY, US).

HIDALGO: Dublán, near Tula, *Pringle* 9639 (US).

This species seems to be the only one of the genus with a prostrate habit. The slightly recurved axis of the leaflet and the tendency of the leaflets to fold when disturbed makes herbarium specimens of *N. wislizenii* rather distinctive. In fruit the species is easily recognized by the slight development of the sterile, terminal article, in contrast to the enlarged wing of all the other species. Illustrations of the fruit and flowers are given by Torrey (*Bot. Mex. Bound. pl. 18.* 1859) and by Rose (*Contr. U. S. Nat. Herb. 5: 158, fig. 17.* 1899).

The specific name, originally published as "*wislizeni*," is here changed to *wislizenii*, following Recommendation 82C (b) of the International Code of Botanical Nomenclature (1952).

2. *Nissolia setosa* Brandegee, *Proc. Calif. Acad. ser. 2, 3: 127.* 1891.

Twining vine, the stems sparingly pubescent; stipules lanceate, 3–5 mm. long, about 1 mm. wide at base, acute, subglabrous or pubescent, especially along the margins; leaves 2–5 cm. long; leaflets, elliptic to orbicular, about 7–25 mm. long, 5–18 mm. wide, obtuse or retuse, mucronulate, the base obtuse, the upper surface glabrous, the lower glabrous or nearly so; inflorescences fasciculate, 1–5-flowered, the pedicels 4–7 mm. long, subglabrous; flowers (9–)10–13 mm. long, the standard slightly recurved; calyx 6–7 mm. long, sometimes ciliate, otherwise glabrous or sparingly pubescent, the tube 2.5–3.5 mm. long, 2.5–3 mm. in diameter, the teeth deltoid-subulate, 3–4 mm. long, each terminating in an attenuate, glandular seta 1–2 mm. long; fruit 1.5–2.5 cm. long, 2- or 3-articulate, pubescent and also beset with glandular setae, the stipe less than 1 mm. long, the fertile articles about 5–10 mm. long and 3 mm. wide, the terminal, sterile article 10–15 mm. long, 5–6 mm. wide; seeds about 4 mm. long and 2 mm. wide.

TYPE LOCALITY: San Pedro, Baja California, México. Type collected by Brandegee (No. 140), cited below.

DISTRIBUTION: Known only from southern Baja California (fig. 2).  
MÉXICO

Baja California: San Pedro, *Brandegee* 140 (GH, Ph, UC TYPE, US). Todos Santos, *Brandegee*, Oct. 22, 1893 (UC). About 10 miles south of La Paz, *Hammerly* 239 (US).

This is the only species of *Nissolia* known from Lower California. It is unique in having its calyx teeth tipped with attenuate, glandular setae. Other species may have a slight suggestion of glandular points on the calyx teeth, but these points are never so long nor so pronounced. Rose reduced *N. setosa* to synonymy under *N. schottii*, but I believe

those two species to be distinct. It seems to me that *N. wislizenii* and *N. platycarpa* are more closely related to *N. setosa*.

In the original description, Brandegee gives the flower length of *N. setosa* as 4 mm. That must be a misprint for 9 mm. The type

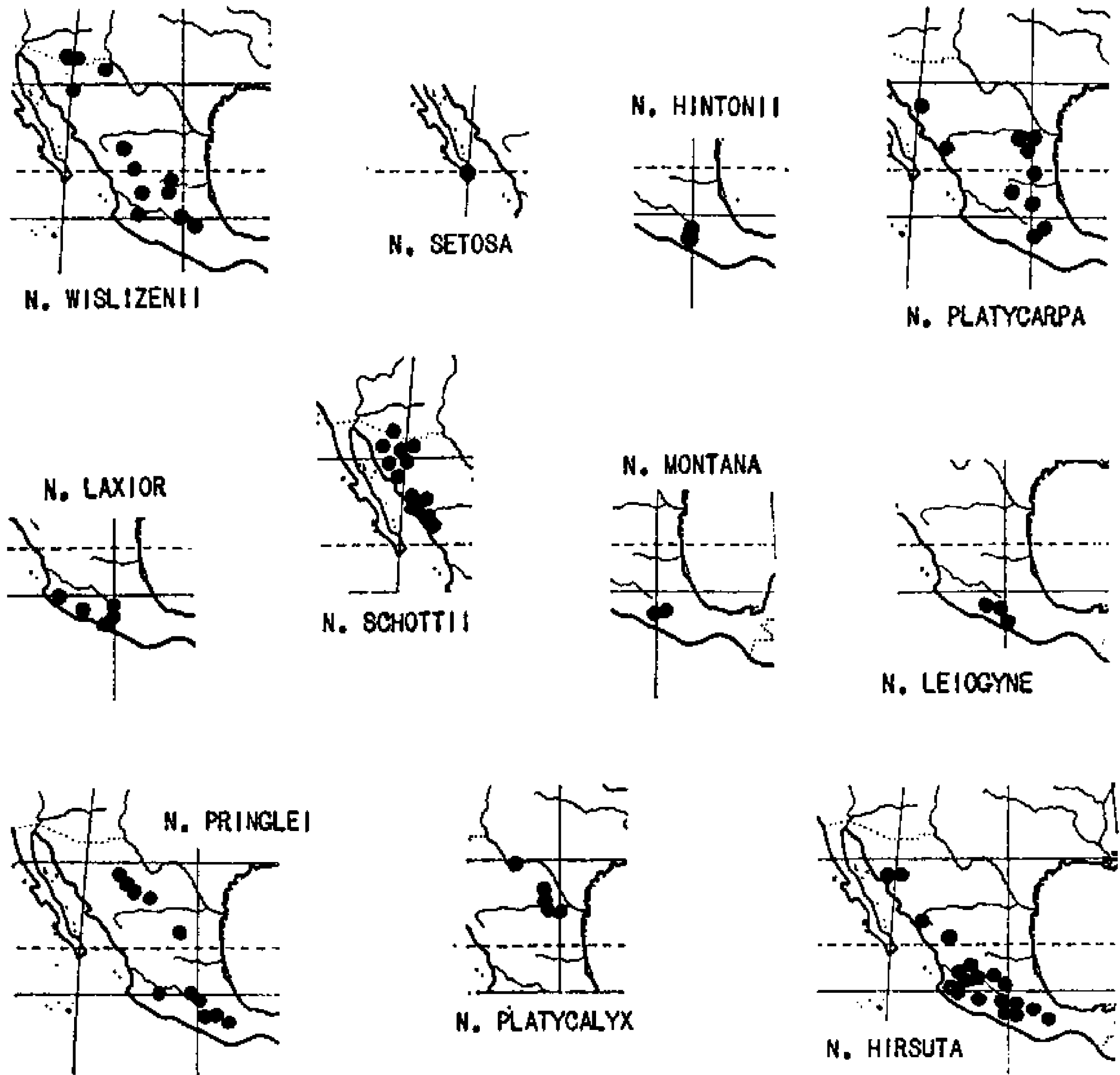


FIGURE 2.—Geographical distribution of *Nissolia hintonii*, *N. hirsuta*, *N. laxior*, *N. leiogyne*, *N. montana*, *N. platycalyx*, *N. platycarpa*, *N. pringlei*, *N. schottii*, *N. setosa*, and *N. wislizenii*.

specimen has one shriveled flower, about 9 mm. long, and other collections show the mature flowers commonly to be about 10–13 mm. long.

3. *Nissolia platycarpa* Benth. in Mart. Fl. Bras. 15 (1): 77. 1859.

*Nissolia dodgei* Rose, Contr. U. S. Nat. Herb. 5: 161, fig. 23. 1899.

Scandent vine, the stems densely white-pubescent, usually glabrescent, sometimes with a few glandular setae; stipules lanceate, attenuate, entire or glandular-denticulate, 2.5–5 mm. long, 0.5–1.5 mm. wide at base, the upper surface glabrous or subglabrous, the lower surface pubescent; leaves 1.5–8 cm. long; leaflets elliptic to orbicular, 5–45 mm. long, 4–40 mm. wide, acute, obtuse, or retuse, mucronulate, the base obtuse, the upper surface moderately pubescent to glabrous, the lower surface densely pubescent to subglabrous; inflorescences

fasciculate, 1-8-flowered, the pedicels 5-12 mm. long, pubescent, sometimes beset with a few glandular hairs; flowers (8-)10-12 mm. long, the standard somewhat recurved; calyx 6-7 mm. long, the tube 2-3 mm. long, 2-3 mm. in diameter, pubescent along the margin, otherwise pubescent or subglabrous, beset with glandular setae, the teeth subulate or deltoid-subulate, 2-4 mm. long; fruit 1.5-3.5 cm. long, 2-5-articulate, white-velutinous when young, somewhat glabrescent, beset with a few yellowish, glandular setae, the stipe 0.5-2.5 mm. long, the fertile articles 5-7 mm. long, 5-6 mm. wide, the terminal, sterile article about 10 mm. long, 5-10 mm. wide; seeds about 3 mm. long and 2 mm. wide.

TYPE LOCALITY: Zimapán, Hidalgo, México. Type collected by Coulter, cited below.

DISTRIBUTION: México, along the Sierra Madre Oriental from Coahuila to Puebla and Vera Cruz and in Sonora and Sinaloa (fig. 2).

#### MÉXICO

SONORA: Cañón Guadalupe, Río Mayo, *Gentry* 1382 (GH, NY, UC).

COAHUILA: Saltillo, *Palmer* 248 in 1880 in part (GH, US). Cañón Bocatoche, *Muller* 3117 (NA, UC).

NUEVO LEÓN: Monterrey, *Dodge* 131 (US TYPE of *N. dodgei*); *Pringle* 11813 (GH, US).

TAMAULIPAS: Miquihuana, *Stanford, Retherford, & Northcraft* 785 (NY, UC).

SINALOA: Cofradía, *Brandege*, Oct. 29, 1904 (UC, US). Cuesta de Ratamoza, *Gentry* 5383 (GH, NA, NY). Capadero, Sierra Tacuichamona, *Gentry* 5627 (GH, NA, NY).

SAN LUIS POTOSÍ: Aguaje de García, *Sohns* 1501 (US).

HIDALGO: Zimapán, *Coulter* (sketch from TYPE ex K).

VERA CRUZ: Orizaba *Botteri* 771 (GH).

PUEBLA: Matamoros, *Miranda* 2168 (GH).

The fruits of *N. platycarpa* are the most densely white-pubescent of all the species and are beset with glandular setae. The stems also are rather conspicuously white-pubescent, especially when young. The leaflets are extremely variable in size.

The collections cited from Sonora and Sinaloa were at first believed to represent a new taxon, but scrutiny of submature fruit reveals a few, weak glandular hairs, and it appears that the material may be referable to *N. platycarpa*.

Comparison of the type of *N. dodgei* with a sketch made from the type of *N. platycarpa* shows the two taxa to be the same.

4. *Nissolia hintonii* Sandw. in Hook. Icon. Pl. 33: pl. 3248. 1934, as *N. hintoni*.

Twining vine, the stems conspicuously beset with glandular setae, otherwise glabrous; stipules lanceate to ovate, glandular-denticulate, acuminate, 5-9 mm. long, 1-2 mm. wide; leaves about 4-8 cm. long, glandular-setose toward the base of the petiole; leaflets orbicular to elliptic, or sometimes obovate, 10-60 mm. long, 6-35 mm. wide,

obtuse, sometimes retuse, mucronate, the base rounded, glabrous on both surfaces; inflorescences racemose, sometimes paniculate, many-flowered, the peduncles and sometimes the pedicels conspicuously setose, the pedicels 6–11 mm. long; flowers 12–15 mm. long, the standard slightly recurved; calyx 6–7 mm. long, the tube about 4 mm. long, 4–5 mm. in diameter, ciliate and beset with a few glandular setae, otherwise glabrous, the teeth subulate, 2–3 mm. long; fruit 3–4.3 cm. long, 2- or 3-articulate, pubescent, somewhat glabrate, the lower portion beset with glandular setae, the stipe 1.5–2.5 mm. long, the fertile articles 5–10 mm. long, 4–8 mm. wide, the terminal, sterile article 15–20 mm. long, 10–15 mm. broad; seeds about 6 mm. long and 4 mm. wide.

**TYPE LOCALITY:** Carboneras, Temascaltepec, México. Type collected by Hinton (No. 2334); isotypes cited below.

**DISTRIBUTION:** México: México and northern Guerrero (fig. 2).

#### MÉXICO

MÉXICO: Carboneras, *Hinton* 2334 (ISOTYPES: NY, US), 5603 (GH, NY, US). Volcán, *Hinton* 2213 (GH). Bejuecos, *Hinton* 2520 (GH, NY, US). Ixtapán, *Hinton* 2922 (GH, NY, US). "San Lucas del Maiz," *Hinton* 3335 (NY, US). Rincón, *Hinton* 5075 (NY, US). Tejupilco, *Hinton* 7086 (GH, NY, US). Temascaltepec, *Hinton* 7189 (GH, US).

GUERRERO: "Sierra Madre del Sur, north of Río Balsas, Temisco, Barranca de la Guacamaya," *Mexia* 8848 (GH, NY, UC, US).

The most conspicuous feature of this species is the setose inflorescence, which is usually a long raceme or panicle. The flowers are fairly large for the genus and the leaflets often are large.

#### 5. *Nissolia platycalyx* S. Wats. Proc. Am. Acad. 17: 344. 1882.

Climbing vine, the stems moderately crisp-pubescent, glabrate; stipules lanceate, 3–5 mm. long, 0.5–1 mm. wide, entire, pubescent to subglabrous; leaves 4–7 cm. long; leaflets elliptic, 5–25 mm. long, 4–15 mm. wide, glabrous or nearly so, obtuse, mucronulate, the base obtuse; inflorescences 1–4-flowered, the pedicels 6–8 mm. long, pubescent; flowers 14–20 mm. long, the standard essentially straight; calyx 6.5–10 mm. long, the tube 4.5–6 mm. long, 4–5 mm. in diameter, pubescent to subglabrous, the teeth subulate, 1.5–4.5 mm. long; fruit 3–4 cm. long, 2–4-articulate, pubescent when young, subglabrous at maturity, the stipe about 4 mm. long, the fertile articles 5–7 mm. long, about 5 mm. wide, the terminal, sterile article 2–3 cm. long and about 1 cm. wide; seeds about 5 mm. long and 3 mm. wide.

**TYPE LOCALITY:** Mountains, 6 miles east of Saltillo, Coahuila, México. Type collected by Palmer (No. 248 in part), cited below.

**DISTRIBUTION:** Southwest Texas and northeast México (fig. 2).

## UNITED STATES

TEXAS: Brewster County: Chisos Mountains, *Ferris & Duncan* 2762 (NY, US); *Marsh* 175 (GH).

TEXAS? [region of the Chisos Mountains]: "Santa Rosa, Coahuila," *Mexican Boundary Survey (Parry)* 253 (NY). "Mt. Carmel Nov. 8th," *Mexican Boundary Survey (Bigelow)* 253 (NY). "Last camp on Rio [illegible; appears to be "from el"] Oct. 30th," *Mexican Boundary Survey (Bigelow)* 253 (NY).

## MÉXICO

COAHUILA: Saltillo, *Palmer* 248 in 1880 in part (GH TYPE, Ph, US). Cañon del Pajarito, *Muller* 3175 (NA, UC). Sierra de la Paila, *Hinton* 16532 (GH, NY, US).

NUEVO LEÓN: Alamar, *Mueller & Mueller* 629 (A), 639 (A).

Local name: "Vetchling" (Texas).

*Nissolia platycalyx* has the largest flowers of the genus; when the species is in fruit, the persistent, large calyx serves to identify it. It apparently is the only member of the genus in which 7-foliolate, as well as 5-foliolate, leaves are to be found.

The collections of the Mexican Boundary Survey, cited above, were reported as *Chaetocalyx wislizeni* by Torrey in his report of the Survey (56. 1859).

6. *Nissolia laxior* (Robins.) Rose, *Contr. U. S. Nat. Herb.* 5: 162, *fig. 25*. 1899.  
*Nissolia confertiflora* var. *laxior* Robins. *Proc. Amer. Acad.* 29: 315. 1894.

Climbing vine, the stems crisp-pubescent, glabrate, usually beset with glandular setae; stipules broadly lanceate, acute to acuminate, entire or sometimes glandular-denticulate, about 7–10 mm. long, (1.5–) 2–3 mm. wide at base, the upper surface subglabrous, the lower surface pubescent, usually densely white-tomentose, especially toward the apex; leaves 5–10 cm. long; leaflets ovate to elliptic, 15–50 mm. long, 10–25 mm. wide, acute to obtuse, mucronulate, the base obtuse, the upper surface subglabrous, the lower moderately crisp-pubescent to subglabrous; inflorescences fasciculate, about 8–20-flowered, the pedicels 8–13 mm. long; flowers 9–11 mm. long, the standard straight or slightly recurved; calyx 6–7 mm. long, subglabrous to pubescent, especially along the margin, sometimes beset with glandular setae, the tube 2.5–3 mm. long, 2.5–3 mm. in diameter, the teeth subulate, 3–4 mm. long; mature fruit and seed not seen.

TYPE LOCALITY: "Barranca of Beltran," Jalisco, México. Type collected by Pringle (No. 4379), cited below.

DISTRIBUTION: Southwestern México, from Jalisco to México and Guerrero (fig. 2).

## MÉXICO

JALISCO: "Barranca of Beltran" [near Platanar], *Pringle* 4379 (GH TYPE of *N. confertiflora* var. *laxior*, NY, Ph, UC, US).

QUERÉTARO: San Juan del Río, *Rose, Painter, & Rose* 9531 (NY, US).

MÉXICO: Tejupilco, *Hinton* 771 (NY, US). Temascaltepec, *Hinton* 4028 (GH).

MICHOACÁN: Coalcomán, *Hinton* 13886 (GH, NY, Ph, US).

GUERRERO: Galeana, *Hinton* 14369 (US).

The broadly lanceate stipules, 2–3 mm. wide at the base, usually tomentulose beneath, serve as ready identification for this species. In general, *N. laxior* appears to be closely related to *N. schottii*, *N. montana*, and *N. pringlei* rather than to *N. confertiflora* (= *N. hirsuta*), to which it was originally referred.

7. *Nissolia schottii* (Torr.) A. Gray, Journ. Linn. Soc. 5: 26. 1861.

*Chaetocalyx schottii* Torr. Bot. Mex. Bound. 56, pl. 18. 1859.

Scandent vine, the stems moderately crisp-pubescent to subglabrous, occasionally glandular-setose; buds often densely tomentose; stipules lanceate, attenuate or acute, entire, pubescent, about 3–5 mm. long, 0.5–1 mm. wide at base; leaves 3–8 cm. long; leaflets elliptic to subrhombic, 5–35 mm. long, 3–25 mm. wide, acute to obtuse, mucronulate, the base obtuse, subglabrous on both surfaces; inflorescences axillary, fasciculate, 1–8-flowered, the pedicels 6–10 mm. long, glabrous to sparsely pubescent, sometimes setose; flowers (8–) 10–12 mm. long, the standard straight or but slightly recurved; calyx 5–7 mm. long, usually pubescent along the margin, otherwise glabrous or lightly pubescent, sometimes with a few glandular setae, the tube (2–) 3–4 mm. long, 2–3 mm. in diameter, the teeth subulate, 2–4 mm. long; fruit 2–3 cm. long, pubescent when young, subglabrous at maturity, 2–4-articulate, the stipe 1–2 mm. long, the fertile articles 4–6 mm. long, 4–5 mm. wide, the terminal, sterile article 10–15 mm. long, 6–10 mm. wide; seeds about 3 mm. long, 2–2.5 mm. wide.

TYPE LOCALITY: "Sierra Verde, Arroyo de los Samotas, Sonora." Type collected by Schott (No. 253a), cited below.

DISTRIBUTION: Southern Arizona and northwestern México (fig. 2).

#### UNITED STATES

ARIZONA: Pima County: Tucson, Wootton, July 21, 1911 (US); Bartram 371 (US), 372 (Ph); Rose, Standley, & Russell 15180 (US). Sabino Canyon, Kearney & Peebles 10323 (US); Jones, Aug. 20, 1903 (US). Sells, Peebles, Harrison, & Kearney 2743 (US); Clark 11180 (GH). Baboquivari Canyon, King & Loomis 3258 (US); Peebles, Harrison, & Kearney 2760 (US); Peebles & Swingle 7923 (NA, NY); Kearney & Peebles 14927 (NY). Baboquivari Mountains, Peebles 8967 (US); Harrison 6821 (NY); Jones 24931 (GH, UC); Gilman 114 (NA). Santa Catalina Mountains, Pringle, Aug. 3, 1881 (GH).

#### MÉXICO

SONORA: "Sierra Verde, Arroyo de las Samotas," Mexican Boundary Survey (Schott) 253a (GH, NY TYPE of *Chaetocalyx schottii*). Altar, Pringle, Aug. 26, 1884 (NY, US). Magdalena, Rose, Standley, & Russell 15130 (US). Ber-ruga, Wiggins 6021 (US). Pozo Serna, Wiggins 6038 (US). Cumpas, Wiggins 7430 (A, US). Tajitos, Wiggins 8300A (US). Cañón de Bavispe, White 3268 (GH, Ph); Phillips 543 (GH). Río Bavispe near Colonia Oaxaca, White 734 (GH). Los Arrieros, Wiggins & Rollins 242 (NY, UC, US). Colorado, Wiggins & Rollins 307 (NY, UC, US). Guaymas, Palmer 170 in 1887 (GH, NY, UC, US); Gentry 4713 (NA, NY). Alamos, Palmer 638 in 1890 (GH, US); Rose, Standley, & Russell 12971 (NY, US).



Cañón de las Estacas, *White* 3033 (GH), 3075 (GH, NA). Cañón del Agua Amargo, *White* 3587 (GH). Valle de Teras, near La Angostura, *White* 3557 (GH). Colonia Morelos, *White* 4524 (GH). Cañón de Santa Rosa, near Bavispe, *White* 354 (GH). Fronteras, *White* 3886 (GH).

CHIHUAHUA: "Hacienda San Jose, 25 m. S. of Batopilas," *Palmer* 57 in 1885 (GH, US). "Hacienda San Miguel near Batopilas," *Palmer* 113 in 1885 (GH, US). Guasaremos, Río Mayo, *Gentry* 2382 (GH, UC, US).

SINALOA: El Fuerte, *Rose, Standley, & Russell* 13495 (NY, US). Mocorito, *Collins & Kempton* 61 (US). Culiacán, *Brandege*, Sept. 7, 1904. (GH, UC, US). El Pozole, *Ortega* 5564 (US). San Blas, *Jones* 22878 (UC).

The subglabrous calyx with its long teeth is one of the easily recognized features of this species. A few specimens of *N. schottii* have glandular setae on the calyx and a few have some pubescence approaching that of *N. pringlei*.

The well developed wing of the fruit serves to distinguish *N. schottii* from *N. wislizenii*, which has a similar geographic range. The fruit is rather variable in shape, sometimes straight, sometimes falcate. The wing tip varies from rounded to acuminate but that seems not to be of diagnostic significance.

8. *Nissolia montana* Rose, Contr. U. S. Nat. Herb. 8: 48. 1903.

Climbing vine, the stems pubescent to subglabrous, sometimes with a few glandular setae; stipules lanceate, attenuate, entire, about 4–6 mm. long, scarcely 1 mm. wide at the base, moderately pubescent on both surfaces; leaves 2–8 cm. long; leaflets elliptic to suborbicular, 10–50 mm. long, 6–35 mm. wide, obtuse, mucronulate, the base obtuse, subglabrous on both surfaces; inflorescences fasciculate, or sometimes with a slight elongation of the axis, 1–18-flowered, the pedicels 6–13 mm. long, essentially glabrous; flowers 11–13 mm. long, the standard but slightly recurved; calyx 4–5 mm. long, the tube about 3 mm. long, 3–4 mm. in diameter, ciliate but otherwise glabrous, the teeth subulate, 1–2 mm. long; fruit 2.5–3.5 cm. long, 2- or 3-articulate, moderately pubescent, the stipe 1–3 mm. long, the fertile articles 6–8 mm. long, about 8 mm. wide, the terminal, sterile article 15–20 mm. long, about 10 mm. wide; seeds 3–4 mm. long, 2–2.5 mm. wide.

TYPE LOCALITY: Mountains near Iguala, Guerrero, México. Type collected by Pringle (No. 9259), cited below.

DISTRIBUTION: Known only from Guerrero, México (fig. 2).

#### MÉXICO

GUERRERO: Iguala, *Pringle* 9259 (GH, US TYPE), 10329 in part (GH, Ph, NY, UC, US); *Holway* 43 (US), 57 (US). San Antonio, Montes de Oca, *Hinton* 11675 (US).

This species most resembles *N. laxior* and *N. schottii*. It is distinguished from both by flowers that average slightly larger and by short calyx teeth. *Nissolia montana* has the narrow stipules characteristic

of *N. schottii* and the inflorescences with longer pedicels and more numerous flowers, as is customary in *N. laxior*.

Apparently a number of sheets of *Pringle* 30329 were distributed, all with a mixture of material—flowers of *N. montana* and fruits of *N. fruticosa*.

9. *Nissolia pringlei* Rose, Contr. U. S. Nat. Herb. 5: 159, fig. 20. 1899.

*Nissolia diversifolia* Rose, Contr. U. S. Nat. Herb. 5: 160, fig. 21. 1899.

*Nissolia multiflora* Rose, Contr. U. S. Nat. Herb. 5: 161, fig. 24. 1899, in part.

Climbing vine, the stems pubescent, somewhat glabrescent, sometimes sparsely beset with glandular setae; stipules lanceate, attenuate, entire or glandular-denticulate, pubescent, 3–5 mm. long, 1 mm. wide or less; leaves 2–6 cm. long; leaflets elliptic to orbicular, 7–30 mm. long, 5–15 mm. wide, acute to obtuse, mucronulate, the base rounded to subcordate, the lower surface pubescent to subglabrous, the upper surface glabrous or subglabrous; inflorescences fasciculate, 4–many-flowered, the pedicels pubescent, 6–10 mm. long; flowers 8–12 mm. long, the standard recurved; calyx 4–6 mm. long, pubescent, occasionally glandular-setose, the tube 2.5–4 mm. long, 2.5–3 mm. in diameter, the teeth 1.5–2.5 mm. long; fruit 2–3 cm. long, 2–5-articulate, pubescent, somewhat glabrescent, the stipe 1–2 mm. long, the fertile articles 5–7 mm. long, 4–7 mm. wide, the terminal, sterile article 8–15 mm. long, 5–10 mm. wide; seeds 3–3.5 mm. long, 2–2.5 mm. wide.

TYPE LOCALITY: Santa Eulalia Mountains, Chihuahua, México. Type collected by Pringle (No. 324), cited below.

DISTRIBUTION: México: Chihuahua to Puebla (fig. 2).

#### MÉXICO

CHIHUAHUA: Santa Eulalia Mountains, *Pringle* 324 (GH, NY, Ph, US TYPE).

Camargo, *Johnston* 7918 (GH). Jiménez, *Shreve* 8864 (NA, US).

COAHUILA: Santa Elena mines, *Stewart* 232 (GH).

ZACATECAS: Cedros, *Kirkwood* 77 (GH); *Lloyd* 122 (US).

JALISCO: La Venta, *Lemmon & Lemmon* in 1905 (UC). Lago de Chapala, *Lemmon & Lemmon* 16 (UC).

QUERÉTARO: San Juan del Río, *Rose, Painter, & Rose* 9532 (GH, NY, US).

Between San Juan del Río and Cadereyta, *Rose, Painter, & Rose* 9689 (US).

Querétaro, *Altamirano* 1600 (US); *Rose & Rose* 11155 in part (GH, US).

PUEBLA: *Purpus* 5589 (UC). Tehuacán, *Pringle* 6693 (GH, NY, UC, US TYPE of *N. diversifolia*). Puebla, *Arsène* 1883 (US), 2054 (A, GH, NY, US), (*Nicholas*) 5453 (US), (*Nicholas*) 5464 (US); *Nicholas*, Oct. 10, 1909 (US). San Luis Tultitlanapa, *Purpus* 3199 (GH, NY, UC, US). Matamoros, *Rose & Hough* 4693 (US). "Cerro de Baxtla," *Purpus*, July 1907 (UC).

MORELOS: Jojutla, *Pringle* 8662 (GH, NY, UC, US).

The larger-flowered, less pubescent specimens of *N. pringlei* approach *N. schottii* in appearance, while the smaller-flowered, more pubescent specimens suggest *N. hirsuta*, but there is such intergradation that no satisfactory distinction can be made. The type material

of *N. diversifolia* is somewhat intermediate and, I believe, referable to *N. pringlei*. This follows Standley's treatment in his "Trees and Shrubs of Mexico" (1922).

Most of the material of *Pringle* 6064, from Oaxaca, distributed as *N. multiflora*, is actually *N. hirsuta*. However, the type sheet, at US, is a mixture of *N. pringlei* and *N. hirsuta*, and Rose's description of *N. multiflora* includes characters of both elements. The name *Nissolia multiflora* is, therefore, to be rejected according to Article 76 of the International Code of Botanical Nomenclature (1952).

10. *Nissolia leiogyne* Sandw. Kew Bull. 1937: 302. 1937.

Climbing vine, the stems moderately pubescent to glabrous; stipules lanceate, attenuate, about 2–4 mm. long and 0.5 mm. wide, subglabrous, entire; leaves 2–7 cm. long; leaflets obcordate, obovate, or suborbicular, 5–30 mm. long, 5–20 mm. wide, obtuse or retuse, mucronulate, rounded or cuneate at the base, glabrous or subglabrous; inflorescences fasciculate or the axis sometimes slightly elongated, 1–15-flowered, the pedicels 5–7 mm. long, glabrous; flowers 7–10 mm. long, the standard slightly recurved; calyx 3.5–5 mm. long, glabrous or nearly so, the tube about 2 mm. long and 1.5 mm. in diameter, the teeth subulate, 1–1.5 mm. long; fruit 2.5–3 cm. long, 2- (rarely 3-) articulate, glabrous or nearly so, the stipe 2–3 mm. long, the fertile articles 5–7 mm. long, about 5 mm. wide, the terminal, sterile article about 15 mm. long, 6–8 mm. wide; seeds about 2 mm. long and 1.5 mm. wide.

TYPE LOCALITY: In a barranca, Santa Bárbara, Coyuca, Guerrero, México. Type collected by Hinton (No. 6291); isotypes cited below.

DISTRIBUTION: Known only from the State of Guerrero, México (fig. 2).

MÉXICO

GUERRERO: Santa Bárbara, Coyuca, *Hinton* 6291 (ISOTYPES: A, GH, NY, US).

Between Coyuca and Chacamérito, *Hinton* 6616 (A, NY, US). Tario, Coyuca, *Hinton* 7861 (A, NY, US). "El Calabazal." *Langlassé* 473 (GH, US).

Acapulco, *Palmer* 7 in 1894–95 (A, GH, NY, UC, US).

*Nissolia leiogyne* is characterized by fruits that are glabrous or nearly so. Its nearest relative probably is *N. schottii*, but the flowers of *N. leiogyne* are somewhat smaller, and the leaflets, frequently obcordate or obovate, are rather distinctive.

11. *Nissolia hirsuta* DC. Prodr. 2: 257. 1825.

*Nissolia confertiflora* S. Wats. Proc. Am. Acad. 21: 424. 1886.

*Nissolia multiflora* Rose, Contr. U. S. Nat. Herb. 5: 161, fig. 24. 1899, in part.

Climbing vine, the stems crisp-pubescent, sometimes glabrate, sometimes with a few glandular setae; stipules lanceate, acuminate, 3–5 mm. long, about 1 mm. wide or less, entire or glandular-denticu-

late, moderately pubescent; leaves 3–10 cm. long; leaflets elliptic, 10–50 mm. long, 10–35 mm. wide, densely pubescent to subglabrous, obtuse to acute, mucronate, the base acute or truncate; inflorescences fasciculate, many-flowered, the pedicels 2–6 (–8) mm. long, pubescent; flowers 4–7.5 mm. long, the standard recurved, sometimes as much as 90°; calyx crisp-pubescent to subglabrous, 2–2.5 mm. long, the tube about 1.5 mm. long and 1.5 mm. in diameter, the teeth subulate, 0.5–1.5 mm. long; fruit 2–4 cm. long, 2–4-articulate, pubescent, somewhat glabrescent, the stipe 1–2 mm. long, the fertile articles 5–7 mm. long, 4–5 mm. wide, the terminal, sterile article 10–15 mm. long, 7–10 mm. wide; seeds about 4 mm. long and 2.5 mm. wide.

TYPE LOCALITY: Near Guanajuato. Type collected by Née, photo cited below.

DISTRIBUTION: México, from Sonora and Chihuahua southward to Oaxaca (fig. 2).

#### MÉXICO

SONORA: Arroyo Gochico, Río Mayo, *Gentry* 1649 (GH, NY, UC, US).

CHIHUAHUA: "Hacienda San Jose, 25 m. S. of Batopilas," *Palmer* 42 in 1885 (GH TYPE of *N. confertiflora*, NY, Ph, US).

SINALOA: *Ortega* 6362 (US). Culiacán, *Palmer* 1496 in 1891 (GH, NY, US); *Brandegee*, Oct. 30, 1904 (GH, UC, US).

DURANGO: *Rose* 2301 (GH, US).

ZACATECAS: San Juan Capistrano, *Rose* 3541 (US).

JALISCO: Colotlán, *Rose* 2813 (GH, US). Guadalajara, *Rose & Painter* 7382 (US); *Pringle* 5421 (GH), 9767 (GH, NY, US); *Holway* 542 (NY), 5039 (US). Cuautla, *Holway* 9 (US), 5230 (US). Sayula, *Holway* 5127 (US); *Reko* 4509 (US). Tequila, *Palmer* 388 in 1886 (GH, NY, US). Bolaños, *Rose* 2852 (US). Between Atequiza and Chapala, *Rose & Painter* (GH, US). Chapala, *Holway* 3450 (GH). Etzatlan, *Rose & Painter* 7538 (US).

GUANAJUATO: *Née* (Field Museum negative 6943, photo presumably of TYPE ex G); *Dugés* in 1891 (US); *Rose & Hough* 4838 (US).

QUERÉTARO: Querétaro, *Rose & Rose* 11155 in part (NY, US); *Kuntze* 23468 (NY); *Arsène (Agniel 32)* 10307 (US), (*Agniel*) 10435 (US).

PUEBLA: Tehuacán, *Rose & Hay* 5918 (NY, US); *Rose, Painter, & Rose* 9878 (US). "El Riego, plains," *Purpus*, July 1905 (UC). "El Riego, rocks," *Purpus* 1189 (GH, NY, UC). Santa Lucía, *Purpus*, May 1908 (UC).

MORELOS: Cuernavaca, *Pringle* 6395 (GH, NY, Ph, UC, US); *Rose & Painter* 6914 (US), 6978 (GH, NY, US); *Rose, Painter, & Rose* 10200 (US); *Rose & Rose* 11076 (NY, US). Yautepec, *Pringle* 11346 (GH, US); *Rose, Painter, & Rose* 8534 (NY, US). Xochiltepec, *Lyonnet* 2176 (US).

MÉXICO: Chorrera, Temascaltepec, *Hinton* 1197 (NY, US). Luvianos, *Hinton* 4319 (US). Ixtopán de la Sal, *Matuda* 27090 (NY).

MICHOACÁN: Morelia, *Arsène* 5716 (NY, US).

GUERRERO: Iguala, *Rose, Painter, & Rose* 9297 (GH, NY, US); *Pringle* 10393 (GH, US). Querendas, Coyuca, *Hinton* 6280 (GH, US). Pungarabato, *Hinton* 6692 (GH, US). Taxco, *Abbott* 297 (GH), 326 (GH).

OAXACA: "Santa Catarina del Rio," *L. C. Smith* (GH). Santa Catarina, *Rusby* 72 (NY, US). Tomellín Cañón, *Pringle* 7467 (GH, US). Between Mitla and Oaxaca, *Rose & Rose* 11289 (NY, US). Monte Albán, *Pringle* 6064 in part (GH, NY, Ph, UC, US TYPE of *N. multiflora*).

The smallest flowers of the genus are to be found on specimens of *Nissolia hirsuta*, but, in general, they are about equal to those of typical *N. fruticosa*. It is sometimes difficult to tell those two species apart when mature inflorescences or fruit are lacking. In fruit, the short stipe, 1–2 mm. long, shorter than the calyx, distinguishes *N. hirsuta* from *N. fruticosa*, which has fruit stipe 3–6 mm. long, exceeding the calyx. Flowers of *N. hirsuta* may be as much as 7 mm. long, suggesting a transition to *N. pringlei*.

*Nissolia multiflora*, listed in synonymy in part, is a name to be rejected, according to Article 76 of the International Code of Botanical Nomenclature (1952), since it is based on two elements. The type specimen, Pringle 6064 at US, is mostly *N. hirsuta*, with some material of *N. pringlei*. From Rose's original description of *N. multiflora* and from his key to species of *Nissolia*, it is obvious that characters both of *N. hirsuta* and of *N. pringlei* were utilized. All the isotypes of *N. multiflora* that I have seen are entirely *N. hirsuta*.

**12. *Nissolia fruticosa* Jacq. Enum. Pl. Carib. 27. 1760.**

Scandent vine; stems pubescent, glabrate; stipules deltoid-lanceate, attenuate, entire, about 2–6 mm. long, 1–2 mm. wide at base, pubescent; leaves commonly 6–8 cm. long; leaflets elliptic to ovate, commonly 30–80 mm. long, 20–50 mm. wide, acute, the base obtuse, the upper surface moderately pubescent to subglabrous, the lower surface moderately pubescent; inflorescence racemose, sometimes paniculate, rarely fasciculate, many-flowered, the pedicles 2–8 mm. long, pubescent to subglabrous; flowers 5–10 mm. long, the standard recurved; calyx pubescent, rarely subglabrous, 2–4 mm. long, the tube 2–3 mm. long, 2–3 mm. in diameter, the teeth subulate, 0.3–1 mm. long; fruit 3–4 cm. long, pubescent, often glabrate, 3–6-articulate, the stipe 3–6 mm. long, the fertile articles about 3–4 mm. long, 3–4(–5) mm. wide, the terminal, sterile article about 20 mm. long, 10–15 mm. wide; seeds about 4.5 mm. long and 2 mm. wide.

**12a. *Nissolia fruticosa* var. *fruticosa*.**

*Nissolia fruticosa* Jacq. Enum Pl. Carib. 27. 1760.

*Nissolia racemosa* DC. Prodr. 2: 257. 1825.

*Nissolia polysperma* Bert. ex DC. Prodr. 2: 257. 1825, nomen in synon. under *N. racemosa*.

*Nissolia nelsoni* Rose, Contr. U. S. Nat. Herb. 5: 162, fig. 26. 1899.

*Machaerium verapazense* Donn. Sm. Bot. Gaz. 40: 2. 1905.

*Nissolia costaricensis* Donn. Sm. in Coult. Bot. Gaz. 44: 108. 1907.

Typical variety characterized by small flowers, 5–8 mm. long, with calyx teeth about 0.5 mm. long or less; inflorescences commonly racemose, frequently paniculate, but rarely fasciculate.

TYPE LOCALITY: Cartagena, Colombia. Type presumably collected by Jacquin; photo cited below.

## DISTRIBUTION: México to Venezuela (fig. 3).

## MÉXICO

SINALOA: San Ignacio, *Narvaez-Montes & Salazar* 633 (US). Capule, *Ortega* 6068 (US). Culiacán, *Brandeggee*, Oct. 22, 1904 (UC). Yervacito, near Culiacán, *Brandeggee*, Sept. 26, 1904 (UC).

SAN LUIS POTOSÍ: Los Caños, *Palmer* 271 in 1902 (GH, NY, US). Tamasopo Cañón, *Pringle* 3647 (GH).

NAYARIT: Isla María Madre, *Ferris* 5588 (US).

JALISCO: Cuautla, *Holway* 10 (US); *Kuntze* 23538 (NY).

VERA CRUZ: Córdoba, *Seaton* 398 (GH, US); *Bourgeau* 1477 (GH); *Fisher* 35293 (NY, US). Acazonica, *Purpus* 8579 (GH, NY, UC, US). Camarón, *Purpus* 11083 (US). Rancho Remudadero, *Purpus* 14246 (A). Zacuapán, *Purpus* 15306 (US), 16000 (A). Atoyac, *Kerber* 132 (US).

PUEBLA: San Luis Tultitlanapa, *Purpus* 3200 (GH, NY, UC, US).

MORELOS: Cuernavaca, *Rose & Hough* 4424 (US); *Rose, Painter, & Rose* 10199 (US).

MICHOACÁN: Naranjillo, *Hinton* 12682 (US).

GUERRERO: "El Calabazal," *Langlassé* 472 (US). "Cutzmala-Rancho," Coyuca, *Hinton* 6709 (GH). *Hinton* 8163 (GH, NY, US), "Campo Morado-Otatlan," Mina, *Hinton* 14486 (GH, NY, US). Balsas, *Halbinger* 25 (GH).

OAXACA: Oaxaca, *Nelson* 1266 (US TYPE of *N. nelsoni*); *Pringle* 4640 (A, GH, NY, Ph, UC, US); *Rose & Hough* 4612 (NY, US); *Conzatti & Gonzalez* 36 (US). Macuilzóchil, *Conzatti* 1457 (NY, US). "Calderon San Juan del Estado," *L. C. Smith* 28 (GH).

CHIAPAS: Tuxtla, *Nelson* 3086 (GH, US). Cerro Obando *Matuda* 3950 (A, GH, NY, US). Escuintla, *Matuda* 559 (US). Between Mazapa and Motozintla, *Matuda* 4874 (NY, US). Cerro Melé, *Matuda* 4587 (NY).

CAMPECHE: Tuxpeña, *Lundell* 933 (NY, UC, US).

YUCATAN: *Gaumer* 24262 (GH, US), 24322 (GH, NY). Izamal, *Gaumer* 884 (Ph, UC), 886 (US). Calotmul, *Gaumer* 2018 (GH). Suitún, *Gaumer* 23427 (GH, NY). Mérida, *Souza-Novelo* 128 (NA).

## GUATEMALA

SANTA ROSA: Estanzuela, *Heyde & Lux* 3715 in part (US). Casillas, *Heyde & Lux* 4459 (GH, NY, US).

ALTA VERAPAZ: Cubilquitz, *von Türckheim* 8508 (US TYPE of *Machaerium verapazense*).

## HONDURAS

MORAZÁN: Along Río Choluteca, near Tegucigalpa, *Williams & Molina* 10494 (A, Ph, UC). Between Tegucigalpa and Suyapa, *Molina* 1459 (GH).

## EL SALVADOR

SAN SALVADOR: San Salvador, *Calderón* 141 (GH, NY, US), 141AB (GH, NY, US); *Standley* 19123 (GH, NY, US).

SANTA ANA: Santa Ana, *Standley* 20439 (GH, NY, US).

## COSTA RICA

ALAJUELA: Surubres, *Biolley* 7088 (US TYPE of *N. costaricensis*) San Ramón, *A. Smith* P2320 (UC).

PUNTARENAS: Nicoya, *Tonduz [Herb. Pittier]* 13535 (NY, US).

SAN JOSÉ: Alajuelita, *Pittier* 9664 (NY, US).

## VENEZUELA

MIRANDA: Los Moriches, *Pittier* 11959 (NY, Ph, US, Ven). La Envidia, *Pittier* 8375 (GH, US, Ven).

DISTRITO FEDERAL: Caracas, *Pittier* 7391 (GH, US, Ven); *Tamayo* 1428 (UC, US, Ven); *Lt. Williams* 10594 (Ven), 10594a (Ven).

ARAGUA: Between El Limón and El Sombrero, *Archer* 3009 (NA, US). Colonia Tovar, *Fendler* 194 (GH, NY, US).

CARABOBO: Valencia, *Pittier* 8693 (GH, NY, US, Ven).

LARA: Barquisimeto, *Saer* 384 (Ven).

#### COLOMBIA

MAGDALENA: Santa Marta, *Bertero* (Field Museum negative 33427, photo of TYPE of *N. racemosa* ex G). Bonda, *H. H. Smith* 280 (A, GH, NY, Ph, UC, US). Valledupar, *Haught* 4397 (US). Cerrejón, *Haught* 6714 (NY, UC, US). Codazzi, *Haught* 3784 (US). Riohacha, *Haught* 4479 (US).

BOLÍVAR: Cartagena, *Jacquin* (Killip negative 629, photo of TYPE ex BM); *Heriberto* 160 (US). La Popa, *Killip & Smith* 14086 (A, GH, NY, US). Torrecilla, near Turbaco, *Killip & Smith* 14422 (A, GH, NY, US). Arjona, *Killip & Smith* 14509 (A, GH, NY, US). Soplaviento, *Killip & Smith* 14623 (A, GH, NY, US).

Local names: "Box-ak" (Yucatán, México); "riatilla" [or "reatilla"?] (Sinaloa, México); "hierba del tamagás" (El Salvador); "gallito" (Honduras).

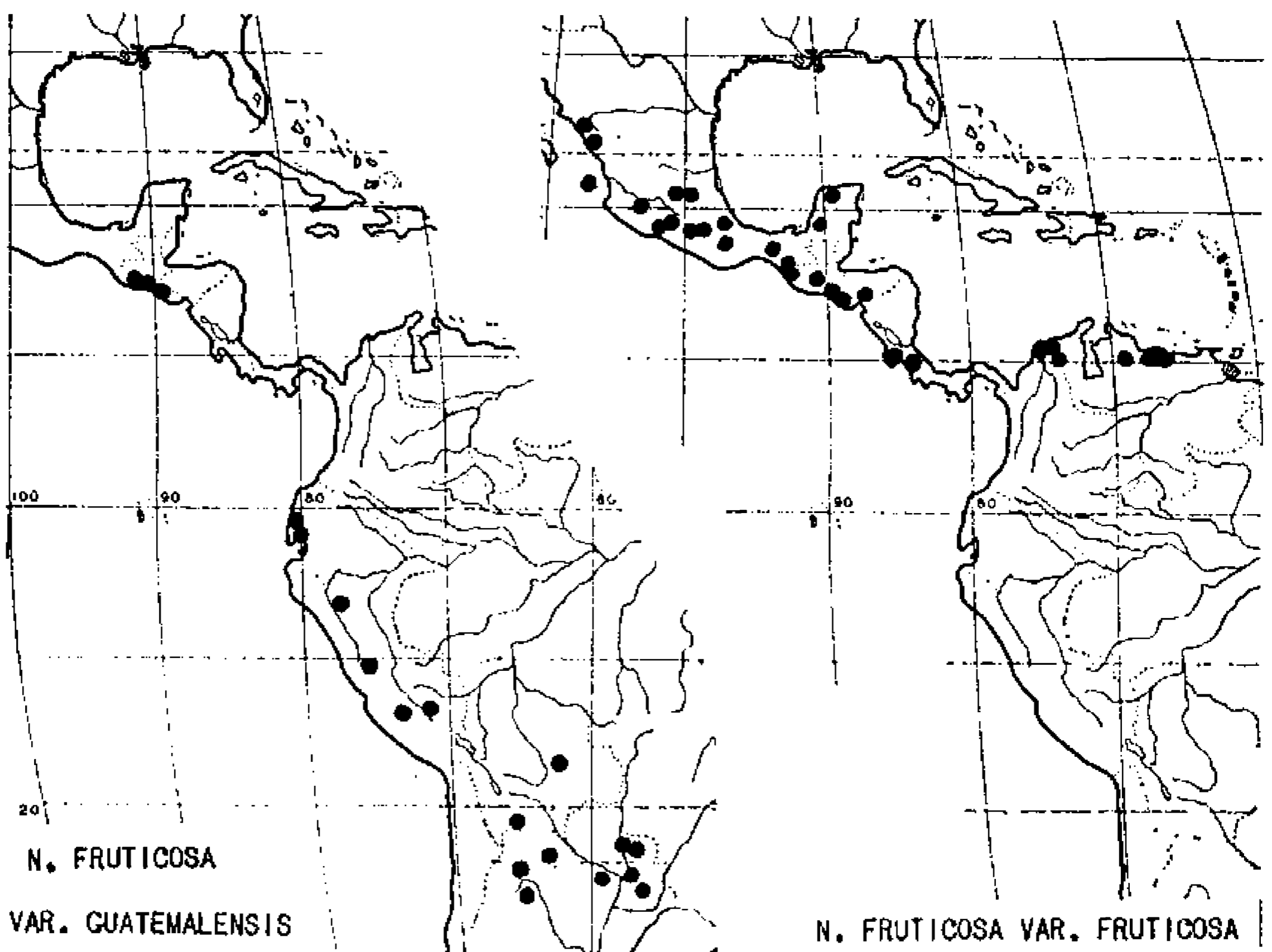


FIGURE 3.—Geographical distribution of *Nissolia fruticosa*.

The loment with stipe exceeding the calyx readily distinguish *Nissolia fruticosa* from other species of the genus. As mentioned above, the typical variety has smaller flowers than var. *guatemalensis*, the calyx teeth are obsolete or rather inconspicuous, and the inflorescences are commonly racemose, often paniculate. A few specimens from Central America and from Colombia show characters transitional to var. *guatemalensis*.

Examination of photographs of the types of *N. fruticosa* and *N. racemosa* and of the type specimens of *N. nelsoni*, *N. costaricensis*, and *Machaerium verapazense* shows all five taxa to be essentially identical. Accordingly, they are placed in synonymy under the oldest name, *Nissolia fruticosa* Jacq.

There are three Mexican collections that may belong to this species, possibly as another variety, but which I have not placed: *Ortega* 6362 and *Stork & Horton* 8603, from Sinaloa, and *Hinton* 14546, from Guerrero. All have small flowers, in fascicles, suggesting *N. fruticosa* or *N. hirsuta*. The glabrous nature of the calyx, pedicels, and the small leaflets suggests *N. leiogyne*. I have seen no mature fruit. A few immature fruits of the Hinton collection appear to have elongating stipes, characteristic of *N. fruticosa*. However, such evidence can be misleading, and it seems best to reserve judgment until mature fruits are available.

**12b. *Nissolia fruticosa* var. *guatemalensis* (Rose) Rudd, comb. et stat. nov.**

*Nissolia guatemalensis* Rose, Contr. U. S. Nat. Herb. 5: 162. 1899.

*Pseudomachaerium rojasianum* Hassler, Bull. Herb. Boiss. II, 7: 2. 1907.

Flowers about 8–10 mm. long, the calyx teeth 0.5–1 mm. long; inflorescences commonly racemose but not infrequently fasciculate.

**TYPE LOCALITY:** Near Escuintla, Guatemala. Type collected by Hayes, cited below.

**DISTRIBUTION:** Central America, in Guatemala and El Salvador, and in South America from Ecuador to Paraguay (fig. 3).

#### GUATEMALA

ESCUINTLA: Near Escuintla, *Hayes*, Nov. 1860 (GH TYPE, US fragment).

SANTA ROSA: Cuajiniquilpa, *Heyde & Lux* 6112 (GH, NY, US).

#### EL SALVADOR

AHUACHAPÁN: Ahuachapán, *Standley* 19948 (GH, NY, US).

SAN SALVADOR: San Salvador, *Standley* 19641 (GH, US).

#### ECUADOR

MANABÍ: El Recreo, *Eggers* 15767 (US).

GUAYAS: Guayaquil, *Anthony & Tate* 47 (US).

#### PERÚ

SAN MARTÍN: Juan Jui, *Klug* 4320 (A, NY, UC, US).

JUNÍN: Río Mantaro, *Weberbauer* 6555 (GH, NY, US). La Merced, *Macbride* 5434 (US).

AYACUCHO: Kimpitiriki, *Killip & Smith* 22940 (NY, US).

CUZCO: Echarate, *Stork, Horton, & Vargas* 10480 (NA, UC).

#### BOLIVIA

SANTA CRUZ: Incahuasi, Cordillera, *Cárdenas* 4720 (US).

Río Piray, *Steinbach* 7459 (GH, NY, Ph, UC).

TARIJA: Tarija, *Fiebrig* 2673 (A, GH, US).

PARAGUAY: "Alto Parana," *Fiebrig* 6041 (GH, US).

CENTRAL: Lago Ypacaray, *Hassler* 12526 (A, GH, NY, UC, US), 12526a (A, GH, NY, UC, US).



GUAIRÁ: Villarrica, *Jørgensen* 4194 (GH). Cordillera de Villarrica, *Hassle* 8619 (NY SYNTYPE of *Pseudomachaerium rojasianum*), 8619a (NY SYNTYPE of *P. rojasianum*).

CONCEPCIÓN: San Luis de la Sierra, *Piebrig* 4458 (GH).

#### ARGENTINA

JUJUY: Jujuy, *Bartlett* 20281 (GH, US).

SALTA: Candelaria, *Venturi* 3713 (US). Mojotoro, *Meyer* 3566 (GH). Embareación, *West* 8435 (GH, UC).

TUCUMÁN: *Tweedie* 2628 (GH). Tafi Viejo, *Venturi* 146 (US). Cerro del Campo, *Burruyaco*, *Venturi* 10364 (A). Yerba Buena, *Lillo* 12053 (GH).

FORMOSA: Guayculec, *Jørgensen* 3214 (GH, US).

The specimens referred to var. *guatemalensis* are somewhat larger flowered than those of typical *N. fruticosa*. The largest flowers are from Perú and Ecuador. There is a transition to smaller flowers, with shorter calyx teeth, and some of the material from Argentina is very similar to *N. fruticosa* var. *fruticosa*. In Colombia and in Central America a few specimens designated as var. *fruticosa* approach var. *guatemalensis*.

Because of this intergradation, with no satisfactory delimitation, Rose's taxon *guatemalensis* is reduced from specific to varietal status.

The syntypes of *Pseudomachaerium rojasianum* are essentially identical with specimens of *Nissolia* from Paraguay, all of which have been assigned to *N. fruticosa* var. *guatemalensis*. Hassler's genus and species both revert to synonymy.

#### Excluded and doubtful taxa

*Nissolia aculeata* (Raddi) DC. Prodr. 2: 258. 1825=*Machaerium aculeatum* Raddi.

*Nissolia aculeata* Spreng. Syst. 3: 190. 1826=*Machaerium berteroniana* (Steud.) Urb.

*Nissolia aculeata* Vell. Fl. Flum. 296. 1825; Icon. 7: pl. 79. 1835=*Machaerium vellozianum* Benth.

*Nissolia aculeata* Willd. ex. Vog. Linnaea 11: 194. 1837=*Machaerium humboldtianum* Vog.

*Nissolia acuminata* (H. B. K.) DC. Prodr. 2: 258. 1825=*Machaerium acuminatum* H. B. K.

*Nissolia acuminata* Vell. This apparently was a misprint in the Kew Index for *N. uncinata*.

*Nissolia americana* Mill. Gard. Dict. ed. 4. 1754=*Rhynchosia americana* (Mill.) Metz.

*Nissolia arborea* Jacq. Enum. Pl. Carib. 27. 1760=*Machaerium arboreum* (Jacq.) Vog.

*Nissolia arrabidae* Steud. Nom. ed. 2, 2: 196. 1841=*Machaerium vellozianum* Benth.

*Nissolia berteroniana* Steud. Nom. ed. 2, 2: 196. 1841=*Machaerium berteroniana* (Steud.) Urb.

*Nissolia bicallosa* Vog. Linnaea 11: 178. 1837. The description is inadequate for identification of this taxon, and I have not seen the type, which presumably is at Berlin.

- Nissolia debilis* Vell. Fl. Flum. 297. 1825; Icon. 7: pl. 81. 1835=**Machaerium debile** (Vell.) Stellfeld
- Nissolia declinata* Vell. Fl. Flum. 296. 1825; Icon. 7: pl. 77. 1835=**Machaerium declinatum** (Vell.) Stellfeld
- Nissolia diadelpha* DC. Prodr. 2: 258. 1825=**Machaerium quinata** (Aubl.) Sandw.
- Nissolia dubia* Poir. in Lam. Encyc. Suppl. 4: 99. 1816. The description is inadequate for identification. *Nissolia*, as now interpreted, is not known to occur in Cayenne, the type locality of this taxon.
- Nissolia ferruginea* Willd. Sp. Pl. 3 (2): 900. 1802=**Machaerium quinata** (Aubl.) Sandw.
- Nissolia firma* Vell. Fl. Flum. 297. 1825; Icon. 7: pl. 83. 1835=**Machaerium firmum** (Vell.) Benth.
- Nissolia fruticosa* Jacq. sensu H. B. K. Nov. Gen. Amer. 6: 504. 1824. This may be *N. hirsuta* DC. or *N. fruticosa* Jacq., but it is impossible to make positive identification without seeing the type.
- Nissolia fruticosa* Vell. Fl. Flum. 298. 1825; Icon. 7: pl. 86. 1835=**Machaerium fruticosum** (Vell.) Hoehne
- Nissolia glabrata* Link, Enum. Hort. Berol. 2: 221. 1809=**Machaerium arboreum** (Jacq.) Vog.
- Nissolia hirta* Vell. Fl. Flum. 296. 1825; Icon. 7: pl. 78. 1835=**Machaerium hirtum** (Vell.) Stellfeld
- Nissolia incorruptibilis* Vell. Fl. Flum. 297. 1825; Icon. 7: pl. 82. 1835=**Machaerium incorruptibile** (Vell.) Allem.
- Nissolia lanceolata* Vell. Fl. Flum. 299. 1825; Icon. 7: pl. 87. 1835=**Machaerium lanceolatum** (Vell.) Macbr.
- Nissolia legalis* Vell. Fl. Flum. 298. 1825; Icon. 7: pl. 84. 1835=**Machaerium legale** (Vell.) Benth.
- Nissolia leiophylla* DC. Prodr. 2: 258. 1825=**Machaerium leiophyllum** (DC.) Benth.
- Nissolia microptera* Poir. in Lam. Encyc. Suppl. 4: 98. 1816=**Machaerium micropterum** (Poir.) Benth.
- Nissolia nictitans* Vell. Fl. Flum. 295. 1825; Icon. 7: pl. 75. 1835=**Machaerium nictitans** (Vell.) Benth.
- Nissolia orientalis* Mill. Gard. Dict. ed. 4. 1754=**Lathyrus amphicarpos** L.  
The name *Nissolia orientalis* is illegitimate because Miller did not use binary nomenclature consistently in that publication.
- Nissolia parviflora* Moench. Meth. 140. 1794=**Lathyrus inconspicuus** L.
- Nissolia polyphylla* Poir. in Lam. Encyc. Suppl. 4: 98. 1816=**Machaerium polyphyllum** (Poir.) Benth.
- Nissolia punctata* Poir. in Lam. Ill. pl. 600, fig. 1. 1794; Encycl. 4: 492. 1797=**Machaerium punctatum** Pers.
- Nissolia quinata* Aubl. 2: 743, pl. 297. 1775=**Machaerium quinata** (Aubl.) Sandw.
- Nissolia reticulata* Poir. in Lam. Ill. pl. 600, fig. 2. 1794. Encycl. 4: 492. 1797=**Machaerium reticulatum** Pers.
- Nissolia reticulata* Vell. Fl. Flum. 299. 1825; Icon. 7: pl. 88. 1835=**Pterocarpus violaceus** (Aubl.) Vog.
- Nissolia retusa* Willd. Enum. Hort. Berol. 2: 742. 1809=**Machaerium?** One must see the type of this species to place it. According to the original description, this taxon has four pairs of leaflets, a character that would seem to exclude its being a *Nissolia*. DeCandolle listed it among his "species non satis notae."

- Nissolia robiniaefolia* DC. Prodr. 2: 258. 1825=*Machaerium robiniaefolium* (DC.) Vog.  
*Nissolia robusta* Vell. Fl. Flum. 298. 1825; Icon. 7: pl. 85. 1835=*Centrolobium robustum* (Vell.) Mart. ex Benth.  
*Nissolia scandens* Kön. ex Spreng. Syst. 3: 191. 1826. This taxon with "foliis pinnatis 2 jugis," from "Ind. or." is not likely to be a *Nissolia*. On the basis of description alone, I cannot place it.  
*Nissolia spinosa* Vell. Fl. Flum. 296. 1825; Icon. 7: pl. 80. 1835=*Machaerium spinosum* (Vell.) Benth.  
*Nissolia stipitata* DC. Ann. Sci. Nat. 4: 99. 1825=*Machaerium stipitatum* (DC.) Vog.  
*Nissolia uncinata* Vell. Fl. Flum. 295. 1825; Icon. 7: pl. 76. 1835=*Machaerium uncinatum* (Vell.) Benth.  
*Nissolia uniflora* Moench. Meth. 140. 1794=*Lathyrus nissolia* L.  
*Nissolia vulgaris* [Tourn.] Mill. Gard. Dict. ed. 4. 1754=*Lathyrus nissolia* L.  
 The name *Nissolia vulgaris* is illegitimate, since Miller did not consistently use binary nomenclature in that publication.

Collections of *Nissolia* cited

ABBOTT, R. Q.	BIGELOW, J. M.
297. <i>hirsuta</i>	(MEXICAN BOUNDARY SURVEY)
326. <i>hirsuta</i>	253. <i>platycalyx</i>
AGNIEL, BRO. (SEE ARSÈNE)	BIOLLEY, P.
ALTAMIRANO, F.	7088. <i>fruticosa</i> var. <i>fruticosa</i>
1600. <i>pringlei</i>	BOTTERI, M.
ANTHONY, H. E., AND TATE, G. H. H	771. <i>platycarpa</i>
47. <i>fruticosa</i> var. <i>guatemalensis</i>	BOURGEAU, E.
ARCHER, W. A.	1477. <i>fruticosa</i> var. <i>fruticosa</i>
3009. <i>fruticosa</i> var. <i>fruticosa</i>	BRANDEGEE, T. S.
ARSÈNE, BRO. G.	140. <i>setosa</i>
1883. <i>pringlei</i>	s. n. <i>fruticosa</i> var. <i>fruticosa</i>
2054. <i>pringlei</i>	s. n. <i>hirsuta</i>
5453 (Nicholas). <i>pringlei</i>	s. n. <i>platycarpa</i>
5464 (Nicolas). <i>pringlei</i>	s. n. <i>schottii</i>
5716. <i>hirsuta</i>	s. n. <i>setosa</i>
10307 (Agniel 32). <i>hirsuta</i>	CALDERÓN, S.
10435 (Agniel). <i>hirsuta</i>	141. <i>fruticosa</i> var. <i>fruticosa</i>
BARTLETT, H. H.	141AB. <i>fruticosa</i> var. <i>fruticosa</i>
20281. <i>fruticosa</i> var. <i>guatemalensis</i>	CÁRDENAS, M.
BARTRAM, E. B.	4720. <i>fruticosa</i> var. <i>guatemalensis</i>
371. <i>schottii</i>	CLARK, O. M.
372. <i>schottii</i>	11180. <i>schottii</i>
BERTERO, C. G.	COLLINS, G. N. AND KEMPTON, J. H.
s. n. <i>fruticosa</i> var. <i>fruticosa</i>	61. <i>schottii</i>

CONZATTI, C. (AND WITH V. GONZALEZ)

36. fruticosa var. fruticosa  
1457. fruticosa var. fruticosa

DODGE, C. K.

131. platycarpa

DUGÉS, A.

- s. n. hirsuta

EGGERS, H. F. A.

15767. fruticosa var. guatemalensis

FENDLER, A.

194. fruticosa var. fruticosa

FERRIS, R. S. (AND WITH C. D. DUNCAN)

2762. platycarpa  
5588. fruticosa var. fruticosa

FIEBRIG, K.

2673. fruticosa var. guatemalensis  
4458. fruticosa var. guatemalensis  
6041. fruticosa var. guatemalensis

FISHER, G. L.

35293. fruticosa var. fruticosa  
44177. wislizenii

GAUMER, G. F.

884. fruticosa var. fruticosa  
886. fruticosa var. fruticosa  
2018. fruticosa var. fruticosa  
23427. fruticosa var. fruticosa  
24262. fruticosa var. fruticosa  
24322. fruticosa var. fruticosa

GENTRY, H. S.

1382. platycarpa?  
1649. hirsuta  
2382. schottii  
4713. schottii  
5383. platycarpa?  
5627. platycarpa?  
8473. wislizenii

GILMAN, M. F.

114. schottii

HALBINGER, C.

25. fruticosa var. fruticosa

HAMMERLY, B. J.

239. setosa

HARRISON, G. J.

6821. schottii  
8261. wislizenii

HARTMAN, C. V.

870. wislizenii

HASSLER, E.

8619. fruticosa var. guatemalensis  
8619a. fruticosa var. guatemalensis  
12526. fruticosa var. guatemalensis  
12526a. fruticosa var. guatemalensis

HAUGHT, O.

3784. fruticosa var. fruticosa  
4397. fruticosa var. fruticosa  
4479. fruticosa var. fruticosa  
6714. fruticosa var. fruticosa

HAYES, S.

- s. n. fruticosa var. guatemalensis

HERIBERTO, BRO.

160. fruticosa var. fruticosa

HEYDE, E. T., AND LUX, E.

- 3715 in part. fruticosa var. fruticosa  
4459. fruticosa var. fruticosa  
6112. fruticosa var. guatemalensis

HINTON, G. B.

771. laxior  
1197. hirsuta  
2213. hintonii  
2334. hintonii  
2520. hintonii  
2922. hintonii  
3335. hintonii  
4028. laxior  
4319. hirsuta  
5075. hintonii  
5603. hintonii  
6280. hirsuta  
6291. leiogyne  
6616. leiogyne  
6692. hirsuta  
6709. fruticosa var. fruticosa  
7086. hintonii

## HINTON, G. B.—Continued

7189. *hintonii*  
 7861. *leiogyne*  
 8163. *fruticosa* var. *fruticosa*  
 11675. *montana*  
 12682. *fruticosa* var. *fruticosa*  
 13886. *laxior*  
 14369. *laxior*  
 14546. *fruticosa* var. ?  
 14486. *fruticosa* var. *fruticosa*  
 16532. *platycalyx*

## HOLWAY, E. W. D.

9. *hirsuta*  
 10. *fruticosa* var. *fruticosa*  
 43. *montana*  
 57. *montana*  
 542. *hirsuta*  
 3450. *hirsuta*  
 5039. *hirsuta*  
 5127. *hirsuta*  
 5230. *hirsuta*

INTERNATIONAL BOUNDARY  
COMMISSION

- 1549 (Mearns). *wislizenii*  
 1706 (Merton). *wislizenii*

## JOHNSTON, I. M.

7918. *pringlei*

## JONES, M. E.

22878. *schottii*  
 24931. *schottii*  
 s. n. *schottii*

## JÖRGENSEN, P.

3214. *fruticosa* var. *guatemalensis*  
 4194. *fruticosa* var. *guatemalensis*

## KEARNEY, T. H., AND PEEBLES, R. H.

10323. *schottii*  
 14927. *schottii*

## KERBER, E.

132. *fruticosa* var. *fruticosa*

## KILLIP, E. P., AND SMITH, A. C.

14086. *fruticosa* var. *fruticosa*  
 14422. *fruticosa* var. *fruticosa*  
 14509. *fruticosa* var. *fruticosa*  
 14623. *fruticosa* var. *fruticosa*  
 22940. *fruticosa* var. *guatemalensis*

## KING, C. J., AND LOOMIS, H.

3258. *schottii*

## KIRKWOOD, J. E.

77. *pringlei*

## KLUG, G.

4320. *fruticosa* var. *guatemalensis*

## KUNTZE, O.

23468. *hirsuta*  
 23538. *fruticosa* var. *fruticosa*

## LANGLASSÉ, E.

472. *fruticosa* var. *fruticosa*  
 473. *leiogyne*

LEMMON, J. G. (AND WITH MRS.  
LEMMON)

16. *pringlei*  
 2668. *wislizenii*  
 s. n. *pringlei*

## LESUEUR, H.

722. *wislizenii*

## LILLO, M.

12053. *fruticosa* var. *guatemalensis*

## LLOYD, F. E.

122. *pringlei*.

## LUNDELL, C. L.

933. *fruticosa* var. *fruticosa*  
 5385. *wislizenii*  
 5459. *wislizenii*

## LYONNET, E.

2176. *hirsuta*

## MACBRIDE, J. F.

5434. *fruticosa* var. *guatemalensis*

## MARSH, E.

175. *platycalyx*

## MATUDA, E.

599. *fruticosa* var. *fruticosa*  
 3950. *fruticosa* var. *fruticosa*  
 4587. *fruticosa* var. *fruticosa*  
 4874. *fruticosa* var. *fruticosa*  
 27090. *hirsuta*

## MEARNS, E. A.

(INTERNATIONAL BOUNDARY COMMISSION)

1549. wislizenii

## MERTON, E. C.

(INTERNATIONAL BOUNDARY COMMISSION)

1706. wislizenii

## MEXIA, Y.

8848. hintonii

## MEXICAN BOUNDARY SURVEY

253 (Bigelow). platycalyx

253 (Parry). platycalyx

253a (Schott). schottii

## MEYER, C.

3566. fruticosa var. guatemalensis

## MIRANDA, F.

2168. platycarpa

## MOLINA R., A.

1459. fruticosa var. fruticosa

MUELLER C. H., AND MUELLER. M. Y.  
(SEE MULLER)

Muller, C. H.

629. platycalyx

639. platycalyx

3117. platycarpa

3175. platycalyx

NARVAEZ-MONTES, M., AND  
SALAZAR, A. E.

633. fruticosa var. fruticosa

## NÉE, L.

s. n. hirsuta

## NELSON, E. W.

1266. fruticosa var. fruticosa

3086. fruticosa var. fruticosa

NICHOLAS, BRO. (SEE ALSO ARSÈNE)

s. n. pringlei

## ORTEGA, J. G.

5564. schottii

6068. fruticosa var. fruticosa

6362. fruticosa var.?

## PALMER, E.

7 in 1894-95. leiogyne

42 in 1885. hirsuta

57 in 1885. schottii

113 in 1885. schottii

170 in 1887. schottii

248 in 1880, in part. platycalyx  
in part. platycarpa

271 in 1902. fruticosa var. fruticosa

371 in 1906. wislizenii

388 in 1886. hirsuta

638 in 1890. schottii

1496 in 1891. hirsuta

s. n. in 1898. wislizenii

PARRY, C. C. (MEXICAN BOUNDARY  
SURVEY)

253. platycalyx

## PARRY, C. C., AND PALMER, E.

133. wislizenii

## PEEBLES, R. H., ET AL.

2743. schottii

2760. schottii

7923. schottii

8967. schottii

## PHILLIPS, E. A.

543. schottii

## PITTIER, H.

7391. fruticosa var. fruticosa

8375. fruticosa var. fruticosa

8693. fruticosa var. fruticosa

9664. fruticosa var. fruticosa

11959. fruticosa var. fruticosa

## PRINGLE, C. G.

324. pringlei

618. wislizenii

3647. fruticosa var. fruticosa

4379. laxior

4640. fruticosa var. fruticosa

5421. hirsuta

5482. wislizenii

6064, in part. hirsuta  
in part. pringlei

6395. hirsuta

6693. pringlei

7467. hirsuta

8662. pringlei

## PRINGLE, C. G.—Continued

9259. *montana*  
 9639. *wislizenii*  
 9767. *hirsuta*  
 10329, in part. *fruticosa* var. *fruticosa*  
           in part. *montana*  
 10393. *hirsuta*  
 11346. *hirsuta*  
 11813. *platycarpa*  
 s. n. *schottii*

## PURPUS, C. A.

1189. *hirsuta*  
 3199. *pringlei*  
 3200. *fruticosa* var. *fruticosa*  
 5589. *pringlei*  
 8579. *fruticosa* var. *fruticosa*  
 11083. *fruticosa* var. *fruticosa*  
 14246. *fruticosa* var. *fruticosa*  
 15306. *fruticosa* var. *fruticosa*  
 16000. *fruticosa* var. *fruticosa*  
 s. n. *hirsuta*  
 s. n. *pringlei*

## REKO, B. P.

4509. *hirsuta*

## ROSE, J. N., ET AL.

2278. *wislizenii*  
 2298. *wislizenii*  
 2301. *hirsuta*  
 2651. *wislizenii*  
 2813. *hirsuta*  
 2852. *hirsuta*  
 3541. *hirsuta*  
 4424. *fruticosa* var. *fruticosa*  
 4612. *fruticosa* var. *fruticosa*  
 4693. *pringlei*  
 4838. *hirsuta*  
 5918. *hirsuta*  
 6914. *hirsuta*  
 6978. *hirsuta*  
 7382. *hirsuta*  
 7538. *hirsuta*  
 7612. *hirsuta*  
 8534. *hirsuta*  
 9297. *hirsuta*  
 9531. *laxior*  
 9532, in part. *pringlei*  
           in part. *wislizenii*  
 9533. *wislizenii*  
 9689. *pringlei*

## ROSE, J. N., ET AL.—Continued

9878. *hirsuta*  
 10199. *fruticosa* var. *fruticosa*  
 10200. *hirsuta*  
 11076. *hirsuta*  
 11155, in part. *hirsuta*  
           in part. *pringlei*  
 11289. *hirsuta*  
 12971. *schottii*  
 13495. *schottii*  
 15130. *schottii*  
 15180. *schottii*

## RUSBY, H. H.

72. *hirsuta*

## SAER, J.

384. *fruticosa* var. *fruticosa*

## SCHAFFNER, J. G.

592. *wislizenii*  
 793. *wislizenii*  
 794. *wislizenii*

## SCHOTT, A. (MEXICAN BOUNDARY SURVEY)

- 253a. *schottii*

## SCHUMANN, W.

- s. n. *wislizenii*

## SEATON, H. E.

398. *fruticosa* var. *fruticosa*

## SHREVE, F.

8864. *pringlei*  
 9048. *wislizenii*

## SMITH, A.

- P2320. *fruticosa* var. *fruticosa*

## SMITH, H. H.

280. *fruticosa* var. *fruticosa*

## SMITH, L. C.

28. *fruticosa* var. *fruticosa*  
 959. *hirsuta*

## SOHNS, E. R.

1501. *platycarpa*

## SOUZA-NOVELO, N.

128. *fruticosa* var. *fruticosa*

## STANDLEY, P. C.

19123. fruticosa var. fruticosa  
 19641. fruticosa var. guatemalensis  
 19948. fruticosa var. guatemalensis  
 20439. fruticosa var. fruticosa

STANFORD, L. R.; RETHERFORD, K. L.,  
AND NORTHCRAFT, R. D.

785. platycarpa

## STEINBACH, J.

7459. fruticosa var. guatemalensis

## STEWART, R. M.

232. pringlei

STORK, H. E., AND HORTON, O. B.  
(AND WITH C. VARGAS)

8603. fruticosa var.?  
 10480. fruticosa var. guatemalensis

## TAMAYO, F.

1428. fruticosa var. fruticosa

## TONDUZ, A.

- 13535 (Herb. Pittier). fruticosa var.  
 fruticosa

## TWEEDIE, J.

2628. fruticosa var. guatemalensis

## VENTURI, S.

146. fruticosa var. guatemalensis  
 3713. fruticosa var. guatemalensis  
 10364. fruticosa var. guatemalensis

## WEBERBAUER, A.

6555. fruticosa var. guatemalensis

## WEST, J.

8435. fruticosa var. guatemalensis

## WHITE, S. S.

534. schottii  
 734. schottii  
 3033. schottii  
 3075. schottii  
 3268. schottii  
 3557. schottii  
 3587. schottii  
 3886. schottii  
 4524. schottii

## WIGGINS, I. L.

6021. schottii  
 6038. schottii  
 7430. schottii  
 8300A. schottii

## WIGGINS, I. L., AND ROLLINS, R. C.

242. schottii  
 307. schottii

## WILLIAMS, LL.

10594. fruticosa var. fruticosa  
 10594a. fruticosa var. fruticosa

## WILLIAMS, L. O., AND MOLINA R., A.

10494. fruticosa var. fruticosa

## WISLIZENUS, A.

151. wislizenii

## WOOTON, E. O.

- a. n. schottii

## WRIGHT, C.

1007. wislizenii



## INDEX

(Synonyms in *italics*. Page numbers of principal entries in **boldface**).

- Aeschynomene, 178  
 Aeschynomeninae, 178  
 Amicia, 178  
 Balisaea, 178  
 box-ak, 194  
 Brya, 178  
 Centrolobium robustum, 198  
 Chaetocalyx, 178  
     *schottii*, 187  
     *wislizenii*, 178, 181  
 Climacorachis, 178  
 Cyclocarpa, 178  
 Diphaca, 178  
 Discolobium, 178  
 Fiebrigiella, 178  
 gallito, 194  
 Geissaspis, 178  
 Gomezium, 174  
 Hedysareae, 178  
 Isodesmia, 178  
 Lathyrus, 173, 174  
     *amphicarpos*, 197  
     *inconspicuus*, 197  
     *nissolia*, 174, 198  
 Machaerium, 174, 179  
     *aculeatum*, 196  
     *acuminatum*, 196  
     *arboreum*, 196, 197  
     *berteronianum*, 196  
     *debile*, 197  
     *declinatum*, 197  
     *firmum*, 197  
     *fruticosum*, 197  
     *hirtum*, 197  
     *humboldtianum*, 196  
     *incorruptibile*, 197  
     *lanceolatum*, 197  
     *legale*, 197  
     *leiophyllum*, 197  
     *micropterum*, 197  
     *nictitans*, 197  
     *polyphyllum*, 197  
     *punctatum*, 197  
     *quinata*, 197  
     *reticulatum*, 197  
     *robiniaefolium*, 198  
     *spinosum*, 198  
     *stipitatum*, 198  
     *uncinatum*, 198  
     *vellozianum*, 196  
     *verapazense*, 175, 192, 195  
 Nissolaria, 174  
 Nissolia, 179  
     *aculeata* (Raddi) DC., 196  
     *aculeata* Spreng., 196  
     *aculeata* Vell., 196  
     *aculeata* Willd. ex Vog., 196  
     *acuminata*, 196  
     *Nissolia*—Continued  
         *americana*, 174, 196  
         *arborea*, 174, 179, 196  
         *arrabidae*, 196  
         *berteroniana*, 196  
         *bicallosa*, 196  
         *confertiflora*, 187, 190  
             var. *laxior*, 186, 187  
         *costaricensis*, 192, 195  
         *debilis*, 197  
         *declinata*, 197  
         *diadelpha*, 197  
         *diversifolia*, 189, 190  
         *dodgei*, 183, 184  
         *dubia*, 197  
         *ferruginea*, 174, 197  
         *firma*, 197  
         *fruticosa* Jacq., 174, 175, 176, 179,  
             189, 192, 194, 195, 196, 197  
             var. *fruticosa*, 181, 192, 196  
             var. *guatemalensis*, 175, 181, 194,  
                 195  
         *fruticosa* sensu H. B. K., 197  
         *fruticosa* Vell., 197  
         *glabrata*, 174, 197  
         *guatemalensis*, 195  
         *hintonii*, 180, 184  
         *hirsuta*, 174, 177, 180, 187, 189, 190,  
             192, 195, 197  
         *hirta*, 197  
         *incorruptibilis*, 197  
         *lanceolata*, 197  
         *laxior*, 179, 180, 186, 188  
         *legalis*, 197  
         *leiogyne*, 180, 190, 195  
         *leiophylla*, 197  
         *microptera*, 197  
         *montana*, 179, 180, 187, 188, 189  
         *multiflora*, 189, 190, 192  
         *nelsoni*, 192, 195  
         *nyctitans*, 197  
         *orientalis*, 174, 197  
         *parviflora*, 197  
         *platycalyx*, 177, 180, 185, 186  
         *platycarpa*, 180, 183, 184  
         *polyphylla*, 197  
         *polysperma*, 192  
         *pringlei*, 180, 187, 188, 189, 190, 192  
         *punctata*, 174, 197  
         *quinata*, 174, 197  
         *racemosa*, 174, 192, 195  
         *reticulata* Poir., 174, 197  
         *reticulata* Vell., 197  
         *retusa*, 197  
         *robiniaefolia*, 198  
         *robusta*, 198  
         *scandens*, 198

## Nissolia—Continued

- schottii*, 179, 180, 182, 187, 188, 189, 190  
*setosa*, 179, 180, 182, 183  
*spinosa*, 198  
*stipitata*, 198  
*uncinata*, 196, 198  
*uniflora*, 198  
*vulgaris*, 173, 174, 198  
*wislizenii*, 176, 177, 178, 179, 181, 183, 186, 188  
Pictetia, 178  
Poiretia, 178  
*Pseudomachaerium*, 175, 178, 179  
   *rojasianum*, 175, 195, 196  
Pterocarpus violaceus, 197  
Raimondianthus, 178  
reatilla, 194  
Rhynchosia americana, 174, 196  
riatilla, 194  
Smithia, 178  
Soemmeringia, 178  
tamagás, hierba del, 175, 194  
vetchling, 186  
Weberbauerella, 178