

A SYNOPSIS OF THE GENUS PISCIDIA (LEGUMINOSAE)

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Piscidia is a genus of faboid legumes, usually arborescent, occurring chiefly in the northern neotropics. As indicated by the name, it is one of several genera known as "fish-poison" plants. Members of the genus are most readily recognized by their pods, which are 4-winged.

The generic name, Piscidia, based on Erythrina piscipula L., was published by Linnaeus in 1759 after his pupil, Pehr Löfving, observed that the species belonged to a separate genus, not to Erythrina. Linnaeus' original description of E. piscipula (Sp. Pl. 707. 1753) was based on Sloane's work ("Sloan. Jam. 143. hist. 2. p. 39. t. 176. f. 45" [4 and 5]). Linnaeus may have seen specimens in Sloane's herbarium in the course of his visit to Chelsea in 1736, but most likely would have had little time for careful examination of the material.

On March 4, 1755, Löfving (Loefling) found in Venezuela a tree there known as "barbasco", which he recorded as "Piscidia erythrina. Sp. Pl. 707. n. 3", a reference to Linnaeus' Erythrina piscipula. He wrote a full description and noted that [translated] the figure of the flower shows that it is scarcely a species of Erythrina, rather a separate special genus (Iter Hisp. 275. 1758). Actually, the species Löfving observed probably was P. carthagenensis Jacq. rather than Erythrina piscipula L. Unfortunately, none of Löfving's Venezuelan collections are known to exist. Linnaeus accepted the separation of this species from Erythrina but changed the name of the new genus to Piscidia, and the species to Piscidia erythrina (Syst. Nat. ed. 10, 1151, 1155, 1358, 1376. 1759).

In the meantime, P. Browne had published Ichthyomethia (Civ. Nat. Hist. Jam. 296. 1756) with two "species", but without specific names, polynomial nomenclature having been used. Under the first, "Dog-wood", were cited references to works of Linnaeus, Sloane, and Plukenet, all referable to Piscidia erythrina L. The description of the second "species", "Mountain Dog-wood", suggests some species of Lonchocarpus.

A few years later, P. Miller published yet another synonym, Robinia alata Miller (Gard. Dict., ed. 8, Robinia no. 6. 1768), citing "Plum. cat. 19" and Linnaeus' "Sp. pl. 707." The Plumier plant might very well have been Piscidia carthagenensis Jacq., but the other citation referred to Piscidia erythrina L.

In 1760 Jacquin published his Piscidia carthagenensis, from Colombia (Enum. Pl. Carib. 27. 1760). This species was included by Linnaeus in his subsequent works, but with the reservation, "an varietas prioris ?" [ie., P. erythrina L.]. For some time P. carthagenensis more or less fell into limbo through lack of new collections from Colombia and through confusion with the similar Jamaican species, P. erythrina.

Additional collections of Piscidia made in the Antilles and Mexico in the latter part of the 18th and the early 19th centuries were mostly identified as P. erythrina, although some are now correctly referred to P. carthagenensis. Sessé and Mociño, in about 1792, collected what they considered to be a new species, P. americana, but publication was delayed almost a century (Plantae Novae Hispaniae, in La Naturaleza, ser. 2 (1), append. 116. 1889). It now appears to belong in synonymy under P. carthagenensis. Humboldt and Bonpland cited as P. erythrina two collections from Mexico (Nov. Gen. et Sp. 6: 382. 1823). I have not seen those specimens, both from near Acapulco, but should expect them to be P. carthagenensis.

Two species based on early Mexican collections, P. punicea Cav. (Icon. 4: 8. 1797) and P. longifolia (Cav.) Willd. (Sp. Pl. 3: 920. 1803) are now treated as species of Sesbania, sensu lato.

Vellozo erroneously reported Piscidia erythrina as occurring in Brazil (Fl. Flum. 303. 1825; Icon. 7: pl. 100. 1835) but his illustration was later cited as referable to Dahlstedtia pinnata (Benth.) Malme (Arkiv. Bot. Stockh. 4 (9): 4. 1905).

No additions to Piscidia were made until the belated publication of Plantae Novae Hispaniae, cited above. Not long after, Rose published P. mollis based on a Mexican collection made by Palmer in 1890 (Contr. U. S. Nat. Herb. 1: 98. June 1891). In September 1891 (Garden and Forest 4: 436. 1891) Sargent stated that the correct name for the "Jamaican dogwood" should be Piscidia piscipula, not P. erythrina. A month later (op. cit. 4: 472. 1891) he published excerpts from a letter in which Hitchcock pointed out that Browne's Ichthyomethia had priority over Piscidia. Sargent agreed, "there seems to be no reason why the name of the West Indian Dogwood should not be Ichthyomethia piscipula, Hitchcock."

The Second International Botanical Congress, held in Vienna in 1905, adopted a list of nomina conservanda prepared by Harms. Included was the name Piscidia Linnaeus, to be conserved over the earlier names Ichthyomethia P. Browne and Piscipula Loefling.

Urban published P. cubensis (Symb. Ant. 7: 229. 1912) which Britton later transferred to a new genus, Canizaresia (Mem. Torr. Club 16: 69. 1920).

In 1917, Britton and Wilson, adhering to the American Code of Botanical Nomenclature, which rejected the principle of nomina conservanda (Bull. Torr. Bot. Club. 34: 167-178. 1907), published another new species from Cuba, Ichthyomethia havanensis (Bull. Torr. Club. 44: 34. 1917).

In 1919 Blake, also following the American Code, published the first comprehensive study of the genus, "Revision of Ichthyomethia, a genus of plants used for poisoning fish" (Jour. Wash. Acad. Sci. 9: 241-252. 1919). He treated eight species, including those previously assigned to Piscidia, two described as new, I. acuminata and I. communis, and one, I. grandifolia (Donn. Sm.) Blake, transferred from Derris.

Sandwith added a new variety, P. grandifolia var. glabrescens, based on two Mexican collections (Kew Bull. 1936: 3. 1936). In 1942 Pittier transferred his Venezuelan Lonchocarpus guaricensis to Piscidia (Mesa Guanipa 49. 1942). Gentry described a new species of Piscidia from Mexico, P. sinaloensis (Brittonia 6: 316. 1948) but the next year it was transferred to Lonchocarpus by Hermann (Jour. Wash. Acad. Sci. 39: 311. 1949). In 1948 Stehlé and Quentin reduced Blake's species, I. acuminata, to a variety of I. piscipula (Fl. Guadeloupe et Depend. et Martinique 2 (2): 124. 1948).

In this present paper I am treating Piscidia as comprising seven species including one being described as new.

#### Economic consideration

The names of Piscidia and its synonyms, Piscipula and Ichthyomethia, were inspired by the observation that Jamaican natives used these plants to poison fish. According to Sloane (Hist. 2: 39, 40. 1725), "The Bark of this Tree stamp'd and thrown into the standing Pool where Fish are, intoxicates them for some Time, they turning their Bellies up, and coming above Water, but if they are not presently caught, they come to themselves and recover . . . The Indians and Negro's make use of this Bark to take Fish . . . The Fish caught after this manner, are counted very wholesome and good food . . . This is a Providence of God to those barbarous People, being a natural Help for present Food and Sustenance." Browne (Nat. Hist. Jam. 296. 1756) provided a similar account. He also mentioned that "The tree is generally considered one of the best timber trees on the island. The wood is very hard and resinous; and lasts almost equally in or out of water."

Over the years the wood of Piscidia has been used locally for fuel and building purposes. Extracts, chiefly of the root and stem bark, have been used medicinally as a narcotic. According to G. F. Gaumer (data on herbarium sheet of P. piscipula, Gaumer no. 23219, Sisal, Yucatan, March 1916) "a fluid extract of the root bark is a local anaesthetic of great value; it is also a powerful anti-inebriate; internally it relieves the pain of fractures and surgical operations; it calms the nervous system and produces sound sleep without any of the bad effects of opium." According to Reko, Piscidia is one of the ingredients of a Mexican tea, "Sinicuichi, the magic drink causing oblivion" (Pharm. Montsh. 16: 155. 1935).

More recent chemical and pharmacological studies have been summarized by E. Gautier Auxence in "A pharmacognostic study of Piscidia erythrina L." (Econ. Bot. 7: 270-284. 1953) and in a series involving several authors, on "The extractives of Piscidia erythrina L." (Tetrahedron 20: 1317-1330, 1331-1338. 1964; Suppl. 7: 333-348. 1966). Among the products isolated have been piscidic acid, the isoflavons, ichthynone, jamaicin, lisetin, piscerythronone, and piscidone, and the rotenoids, dehydromilletone, isomilletone, milletone, rotenone, and sumatrol.

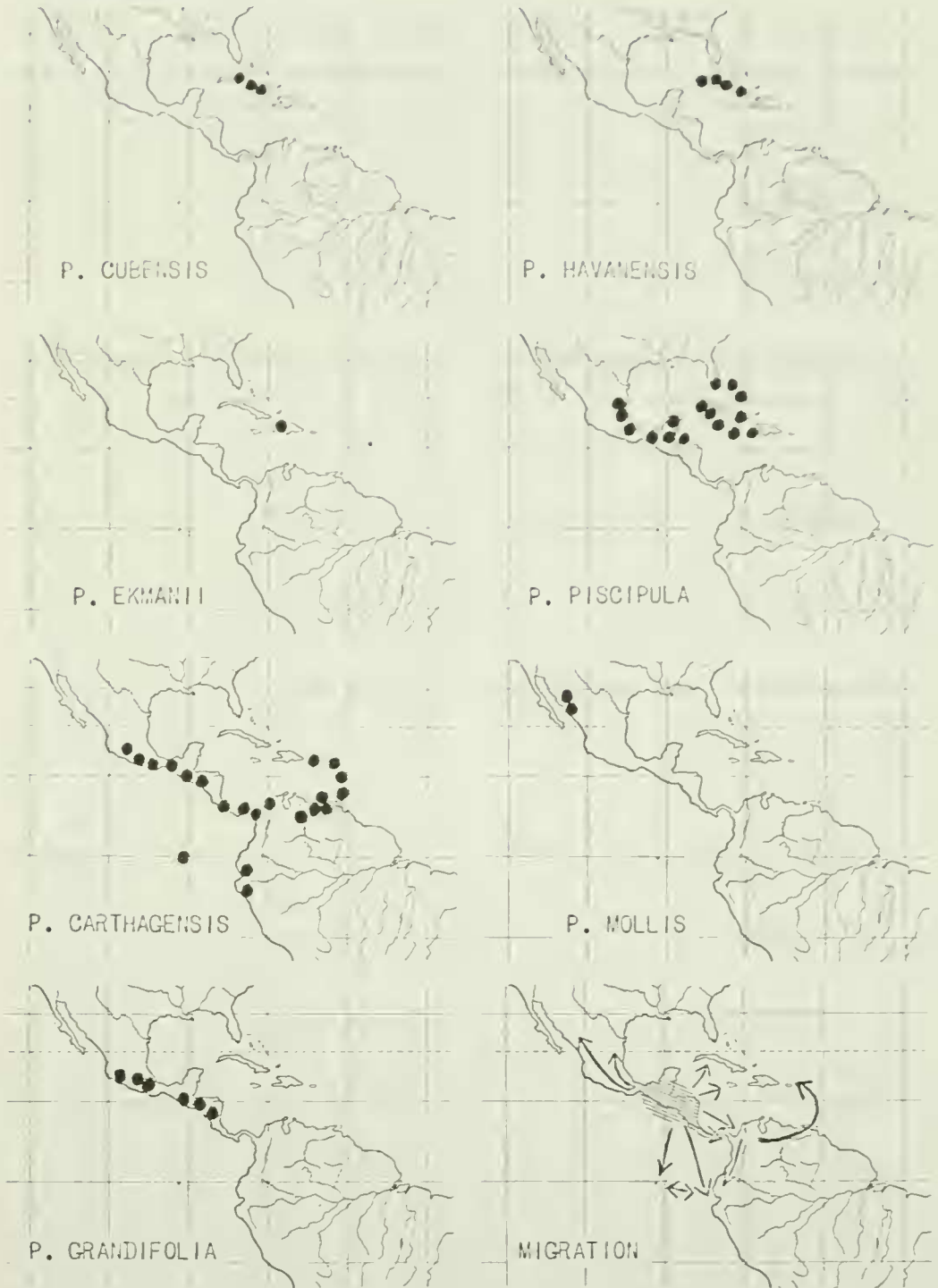


Fig. 1 - Geographic distribution of species of *Piscidia*; hypothetical area of origin of *Piscidia* (shaded) and routes of migration.

## Geography

Piscidia is known from Sonora, Mexico and southern Florida southward through Central America and the West Indies to northern Peru and Venezuela, chiefly in dry woodlands. Some species appear to be restricted to limestone areas, one to serpentine, and others seem to be more tolerant of acidity, such as in volcanic and siliceous soils. For most of the specimens in herbaria the soil data are lacking.

Four of the seven species of Piscidia here recognized are now known from Mexico, P. carthagenensis, P. grandifolia, P. mollis, and P. piscipula. It is probable that the genus originated on the old geologic nucleus of Guatemala and southern Mexico. From there it spread northward to Sonora, or beyond, southward into South America, and eastward into the Antilles and southern Florida. Although the winged pods are readily dispersible by wind, the major eastward migration could have taken place during Tertiary time when there was a land connection between Central America and the Greater Antilles.

Volcanism and orogenic movements in Miocene time, again in the Pliocene, and continuing to the present, would alter the ecological conditions and encourage speciation. In some areas igneous activity would completely destroy the vegetation, in others, the effect would be selective. Calciphilous species such as P. piscipula and P. mollis would be eliminated where the limestone soils were modified by volcanic or siliceous material, but could be replaced by more tolerant species such as P. carthagenensis and P. grandifolia. The three species endemic to the Antilles, P. havanensis, in Cuba, and P. ekmanii, in Hispaniola, both on limestone, and P. cubensis, on serpentine in Cuba, appear to have been derived from P. piscipula, a species of the Greater Antilles and eastern Mexico.

## Morphological characters

All species of Piscidia are woody and unarmed; the plants may be low and sprawling or trees up to about 20 m. tall with the trunk to about 60 cm. in diameter; the bark is rough and grayish. The wood characters have been summarized as hard, heavy, and strong, the grain often roey, the heartwood yellowish-brown, darkening on exposure, the sapwood whitish (Record & Mell, *Timbers of Tropical America* 298, 299. 1924; Record & Hess, *Timbers of the New World* 308. 1943).

The young plants are generally pubescent, with the stems and leaves sometimes glabrescent. The stipules are paired at the base of the petiole and serve as bud scales; they are early caducous; their shape, varying from obliquely-ovate to reniform, can be used to some degree in specific identification. Stipels are lacking.

The leaves are alternate, imparipinnate, 5-27-foliolate. The axis of the leaves, the petiole and rachis, varies from about 2 cm. long in P. cubensis to 30 cm. or more in P. grandifolia.

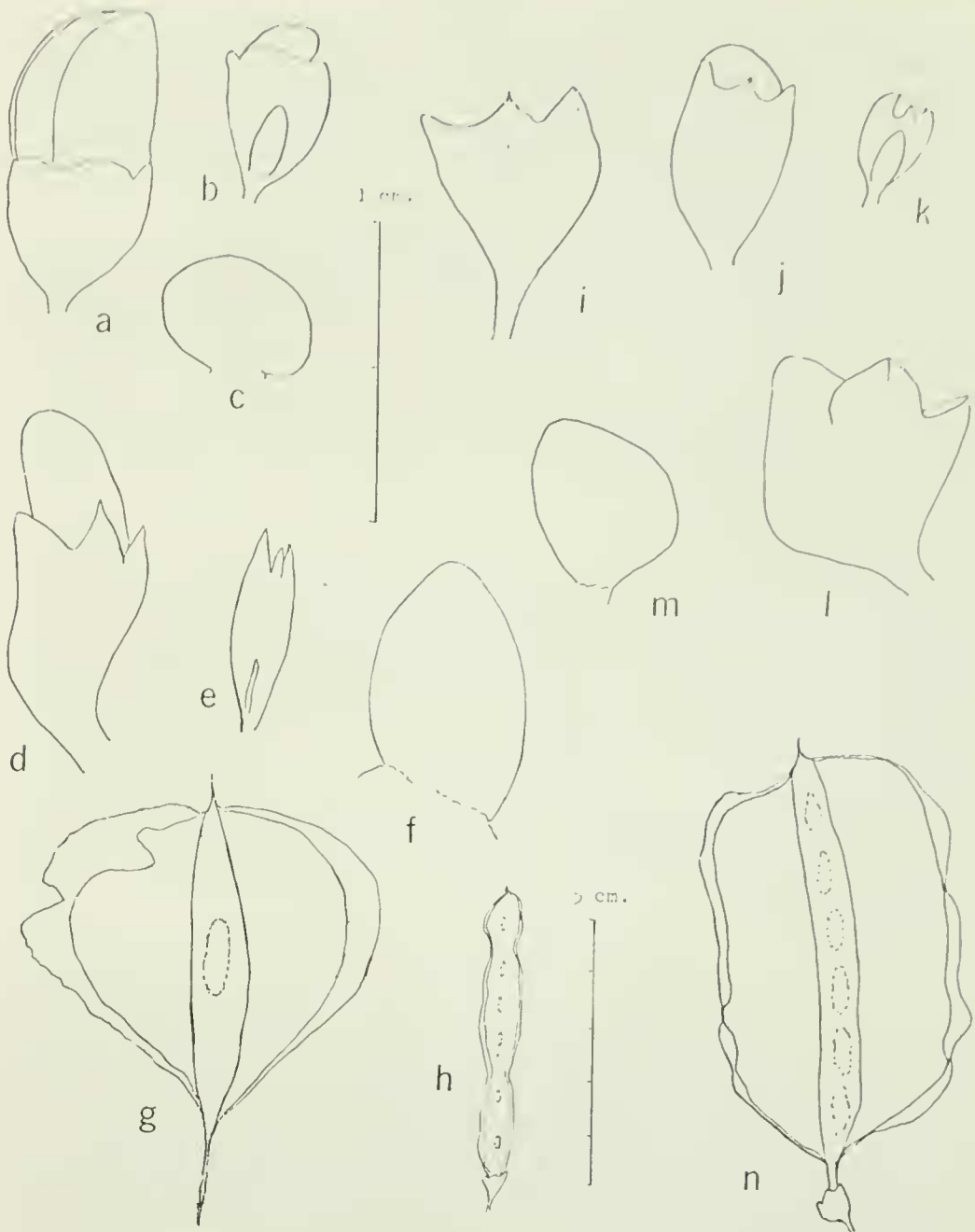


Fig. 2 - *Piscidia piscipula*: a, flower bud showing calyx; b, young flower bud with bracteole; c, stipule. *P. grandifolia* var. *grandifolia*: d, flower bud with calyx; e, flower bud with bracteole; f, stipule. *P. grandifolia* var. *glabrescens*: g, fruit. *P. cubensis*: h, fruit. *P. carthagenensis*: i, calyx from Lesser Antilles; j, flower bud with calyx; k, young flower bud with bracteole; l, calyx from Mexico; m, stipule; n, fruit.

The lateral leaflets are paired, coriaceous or subcoriaceous at maturity, elliptic to oblong, ovate, or obovate, 1-20 cm. long and 0.5-13 cm. broad. The terminal leaflet often is obovate and slightly larger than the laterals. The venation is pinnate with the secondary veins essentially parallel and the tertiary veins reticulate, sometimes conspicuously so. The blades of P. piscipula show a micro-alveolar structure on the lower surface.

The inflorescences are racemose, axillary or pseudoterminal, sometimes few-flowered as in P. cubensis, sometimes with large panicles as in P. carthagenensis, or spicate as in P. grandifolia. The bracts and bracteoles are small and early caducous; they are lanceolate to linear in P. grandifolia, ovate to elliptic in the other species.

The flowers are papilionoid, 12-18 mm. long. The calyx is campanulate with 5 short lobes, broad and obtuse in some species, deltoid, acute in others. The two vexillar lobes are connate, at least in part. The corolla is white, sometimes with pink, red, or lavender markings. The vexillum, or standard, is suborbicular, pubescent on the outer face except glabrous in P. grandifolia. The wing petals are usually a little longer than the vexillum and keel and are adherent to the keel. The keel petals are connate above.

The stamens are 10, monadelphous, but with the vexillar filament free at the base. The anthers are oblong, dorsifixed. The ovary is pubescent, essentially sessile, with up to 10 ovules; the style is glabrous above, the stigma terminal and minutely penicillate.

The fruits are indehiscent, 2-17 cm. long, 1-10-seeded, the body compressed but with 4 longitudinal wings that may stand out forming a broad X in cross-section. The wings vary from 1-2 mm. wide in P. cubensis to as much as 3 cm. wide in P. grandifolia vars. gentryi and glabrescens. The body is from 2 mm. wide in P. havanensis to 13 mm. wide in P. grandifolia. In most cases the pods are short-stipitate, the stipe about 1-6 mm. long, but in some species, especially P. carthagenensis, the stipe may appear to be as long as 20 mm. or more due to abortion of the lower ovules. At maturity the fruits become brittle and break, releasing the seeds. The seeds are reniform, 3-13 mm. long, lustrous, tan to reddish or dark brown. The hilum is lateral, orbicular or elliptic, 0.5-2 mm. long and 0.5-1.5 mm. wide.

A chromosome count of  $2n = 22$  has been reported by Atchison (Amer. Journ. Bot. 38: 541, 544. 1951) for her collection no. 139 from Atkins Garden, Soledad, Cuba. The specimens of that number, with flowers only, were originally identified as P. piscipula but they have acute calyx lobes and appear, rather to be referable to P. carthagenensis. Unfortunately, the origin of the trees, whether native or introduced, has not been noted. I can find no record of other chromosome studies dealing with Piscidia.

Anatomical data on stems and leaves of P. piscipula are given by Gautier in her "Pharmacognostic study of Piscidia erythrina" (Econ. Bot. 7: 270-284. 1953).

## Taxonomic relationships

Piscidia is a faboid genus that has been variously placed in "Sect. Phaseoli" by Adanson (Fam. 2: 326. 1763), "Spartieen" by Sprengel (Anleit, ed. 2, 748. 1818), tribe Loteae subtribe Galegeae by DeCandolle (Prod. 2: 267. 1825), tribe Dalbergieae by Bentham (Comm. Leg. Gen. 27, 42. 1837), Dalbergieae subtribe Lonchocarpeae by Bentham (Proc. Linn. Soc. London 4, Suppl. 27, 116. 1860), and in the tribe Lonchocarpeae by Hutchinson (Gen. Fl. Pl. 1: 384. 1964). Either of the latter two positions is acceptable in view of our current knowledge.

It is one of several leguminous genera with longitudinally 4-winged, or 4-angled pods. In each case the modification seems to have developed independently, since the genera exhibiting this character are not closely related, and the position of the wings differs somewhat. In two species, for example, the African Tetrapleura tetraptera (Schum. & Thonn.) Taubert, in the Mimosoideae, and the widespread Cassia alata L., in the Caesalpinioideae, the larger pair of wings have developed as costae on the surface of the valves, with a slightly narrower pair of wings along the closed sutures of the indehiscent pods. Faboid species with tetrapterous fruits, such as Sophora tetraptera Ait., from Chile, S. chrysophylla (Salisb.) Seem., from Hawaii, Tetragonolobus purpureus Moench, from Europe, Sesbania punicea (Cav.) DC., from tropical and subtropical America, and Psophocarpus tetragonolobus (L.) DC., from Africa, as well as the caesalpinoid Lophocarpinia aculeatifolia (Burk.) Burk., from Argentina and Paraguay, exhibit wings that, as in Piscidia, are extensions of the margins. Another Cassia, C. pentagonia Mill., from tropical America, has fruits with a similar structure but there is a fifth wing along one margin. The generic circumscriptions have not been uniform. In some cases, such as in Sophora and Sesbania, the current interpretation of the genera include some species with winged and others with wingless fruit. Lophocarpinia, Psophocarpus, and Piscidia are restricted to species with winged pods. Additional studies of morphology, cytology, and chemistry are needed to help in resolving such seemingly inconsistent divisions.

On the basis of floral and vegetative characters, the nearest relatives appear to be in Derris, Lonchocarpus, Muellera, and Pongamia, as pointed out by Bentham in his "Synopsis of the Dalbergieae" (Jour. Linn. Soc. London 4, suppl. 18-24. 1860). The most striking differences are found in the fruits. In contrast to the 4-winged pods of Piscidia, Muellera and Pongamia have somewhat thickened pods and those of Derris and Lonchocarpus are laterally compressed. The nearest approach to tetrapterous fruits occurs in Lonchocarpus. A few species, notably L. xuul Lundell, or L. yucatanensis Pittier, sens. lat., L. dipteroneurus Pittier, and L. guilleminianus (Tul.) Malme, are somewhat winged along one or both sutures. Somewhere in this complex of incipient-winged Lonchocarpus one should seek either ancestral or derived species that form the hypothetical link between these two genera.



## Systematic treatment

PISCIDIA L. Syst. Nat. ed. 2. 1151, 1155, 1376. 1759, nom. cons.

Type: P. piscipula (L.) Sarg. Jamaica.

Ichthyomethia P. Browne, Nat. Hist. Jam. 296. 1756, in part.

Type: "Ichthyomethia l." = P. piscipula (L.) Sarg.

Piscipula Loefling, Iter Hisp. 275. 1758. Based on Erythrina piscipula L. = P. piscipula (L.) Sarg.

Canizaresia Britton, Mem. Torr. Bot. Club 16: 69. 1920. Type:

C. cubensis (Urban) Britton = Piscidia cubensis Urban.

Trees or shrubs, unarmed. Leaves alternate, imparipinnate, 5-27-foliolate; leaflets opposite; stipules (bud scales) obliquely ovate, semi-orbicular, or reniform, early caducous; stipels absent. Flowers white with pink to purplish markings, in axillary or lateral inflorescences, usually racemose, sometimes spicate. Bracts, at base of pedicels, minute, ovate, elliptic, or lanceolate, early caducous; bracteoles paired at base of calyx, ovate, oblong to linear, caducous. Calyx campanulate with 5 short, subequal lobes, the vexillar pair often connate. Corolla with vexillum suborbicular, usually pubescent on the outer face, but glabrous in one species; wing petals falcate, oblong, commonly a little longer than the vexillum, adherent to the keel; keel petals connate at the base. Stamens 10, monadelphous but the vexillar filament free at the base; anthers oblong, dorsifixed. Ovary sessile, many-ovulate; style glabrous above, the stigma minutely penicillate. Fruit indehiscent, 1-10-seeded, compressed, with 4 longitudinal wings. Seeds reniform, tan to reddish or dark brown, laterally compressed; hilum lateral, elliptic to suborbicular.

Key to species of Piscidia

Flowers with vexillum pubescent on the outer face; vexillar filament partially united with the others; stipules ovate to oblong or reniform; body of fruit 2-6 (-7) mm. wide; seeds 3-10 mm. long, 2-5 mm. wide.

Fruit about 6-8 mm. wide with wings 1-2 mm. wide, much narrower than the body; leaflets 1-2 cm. long, 0.5-1 cm. wide (Cuba)

1. P. cubensis

Fruit about 1-5.5 cm. wide with wings much broader than the body; leaflets 2-20 cm. long, 1-11 cm. wide.

Leaflets oblong to elliptic, 2-6.5 cm. long, 1-3 cm. wide, the lower surface minutely crisp-pubescent, the tertiary veins raised, strongly reticulate; fruit 2-3 cm. wide with body 2-2.5 mm. wide (Cuba) . . . . 2. P. havanensis

Leaflets ovate or obovate to elliptic, 3-20 cm. long, 2-11 cm. wide, the lower surface pubescent to subglabrous, the tertiary veins not conspicuously raised; fruit 1.5-5 cm. wide with body 2.5-5 mm. wide.

Fruit 1.5-2 mm. wide, the wings 1 cm. wide or less, the body 2.5-3 mm. wide; lower surface of leaflets tomentulose (Hispaniola) . . . . . 3. P. ekmanii

Fruit 2-5.5 cm. wide, the wings 1-2.5 cm. wide, the body 3-6 (-7) mm. wide; lower surface of leaflets pubescent to subglabrous but not tomentulose.

Flowers 12-15 mm. long, predominantly less than 15 mm.

long, the calyx 4-6 mm. long with lobes obtuse; body of fruit 3-4 mm. wide; lower surface of leaflets minutely pubescent with subappressed to crispate hairs; stipules reniform (Florida; Bahamas; Greater Antilles; eastern Mexico; Guatemala; British Honduras; Isla Roatán, Honduras) . . . . . 4. P. piscipula

Flowers 13-18 mm. long, predominantly more than 15 mm., the calyx 5-8 mm. long with lobes obtuse to acuminate; body of fruit 4-6 (-7) mm. wide; lower surface of leaflets minutely appressed-pubescent to sericeous; stipules suborbicular to broadly ovate.

Leaflets silvery, conspicuously so when young, the lower surface sericeous or subsericeous, the upper surface minutely pubescent, glabrescent; stipules suborbicular; calyx lobes obtuse; bracteoles 3-4 mm. long, 2.5-3 mm. wide; seeds 8-10 mm. long, 4-5 mm. wide (Mexico: Sonora, Sinaloa) . . . . 6. P. mollis

Leaflets not silvery, the lower surface minutely appressed-pubescent or the hairs lax to patent, the upper surface essentially glabrous; stipules broadly ovate; calyx lobes acute to acuminate; bracteoles 1.5-2 mm. long, 1-1.2 mm. wide; seeds 5-8 mm. long, 3-4 mm. wide (Lesser Antilles; western and southern Mexico; Central America; Venezuela; Colombia; Ecuador; northern Peru) . 5. P. carthagenensis

Flowers with vexillum glabrous; vexillar filament free from the others; stipules linear; body of fruit (6-) 8-13 mm. wide; seeds 12-13 mm. long, 6 mm. wide.

Leaflets 9-19, elliptic to ovate or obovate, puberulent above at maturity or glabrescent, tomentose below.

Flowers 15-18 mm. long; calyx 7-8 mm. long; fruit 1.5-4 cm. wide including wings 0.5-1.5 cm. wide and body 6-10 mm. wide; leaflets 9-13, mostly elliptic to obovate, the base rounded (Guatemala; El Salvador; Honduras; Nicaragua) . .

7a. P. grandifolia var. grandifolia

Flowers about 15 mm. long; calyx 6-7 mm. long; fruit 3-6 cm. wide including wings to 3 cm. wide and body 6-8 mm. wide; leaflets 13-19, mostly elliptic to ovate, the base rounded to cordate (Mexico: Oaxaca, Puebla) . . . . .

7b. P. grandifolia var. gentryi

Leaflets 15-27, elliptic to elliptic-oblong, essentially glabrous above at maturity, moderately pubescent with lax hairs below, glabrescent; flowers 13-15 mm. long; calyx 5-7 mm. long; fruit 3-6 cm. wide including wings 1.5-3 cm. wide and body 8-13 mm. wide (Mexico: Colima, Guerrero, Mexico, Michoacan, Morelos, Puebla) 7c. P. grandifolia var. glabrescens

## 1. PISCIDIA CUBENSIS Urban, Symb. Ant. 7: 229. 1912.

Lectotype: Shafer 1171. Cuba (Designated by Blake, l. c.)  
Ichthyomethia cubensis (Urban) Blake, Jour. Wash. Acad. Sci.  
 9: 251. 1919.

Canizaresia cubensis (Urban) Britton, Mem. Torr. Club 16: 69.  
 1920.

Shrub, to about 2 m. high; young stems ferrugino-puberulent or subsericeous, glabrate; stipules obliquely ovate, obtuse or subacute, about 1 mm. long; leaves (3-) 5-9-foliolate; leaflets with blades coriaceous, elliptic, slightly revolute, 1-2 cm. long, 0.5-1 cm. broad, obtuse, mucronulate, sometimes retuse, rounded at the base, the upper surface sparsely pubescent, glabrate, nitid, the lower surface moderately appressed-pubescent, glabrate, the secondary veins visible but not conspicuous, the tertiary veins inconspicuous; inflorescences short-racemose, 1.5-3.5 cm. long; bracts ovate, acute, 1 mm. long and wide, or less; bracteoles ovate to oblong, acute, 1-1.5 mm. long and  $\frac{1}{2}$  mm. wide; flowers about 12-15 mm. long; calyx ferrugino-sericeous, 4-5 mm. long with tube 3-3.5 mm. long and 3-3.5 mm. in diameter, the three carinal lobes rounded or acute, the vexillar pair adnate forming one broad, emarginate lobe; corolla with vexillum white, rose toward the center, pubescent on the outer face; fruit dark brown, puberulent, 1-8-seeded, about 2-7 cm. long including stipe about 3 mm. long, 6-8 mm. wide including wings 1-2 mm. wide and body 4-5 mm. wide; seeds reddish-brown, 3-4.5 mm. long, 3 mm. broad, lustrous, the hilum whitish, suborbicular, 0.8-1 mm. in diameter.

Distribution: Dry serpentine barrens of Cuba.

## CUBA:

Matanzas: Ceiba Mocha, Ekman 18598 (S). NW of Pan de Matanzas, SE of Canasí, Ekman 16504 (GH, NY, S).

Las Villas (Santa Clara): Santa Clara, Britton, Britton & Wilson 6051 (NY, US); Britton & Cowell 10179 (NY, US), 13293 (F, GH, NY, US); Ekman 14058 (S), 16335 (BM, F, S, US); Howard et al. 409 (A, MICH, NY, UC). El Cumbre, Ekman 18983 (A, NY, S, UPS). Loma Cruz, Alain 3992 (GH, US). Placetas, León 8173 (GH, NY). Sabanas de Motembo, León 11380 (NY).

Camagüey: Riverside to Minas, Shafer 1171 (F, NY lectotype, US). Near Camagüey, Britton, Britton & Cowell 13137 (NY).

Oriente: Between Holguín and Cacocum, Shafer 1549 (NY syntype) Yareyal, Holguín, León 15515 (GH, US).

This species is most readily distinguished from others of the genus by its small fruits with very narrow marginal wings, and by its small, somewhat revolute leaflets. On the basis of available specimens it would appear that leaves are present at the time of flowering, in February to April.

2. *PISCIDIA HAVANENSIS* (Britton & Wilson) Urban & Ekman, Fedde Rep. Spec. Nov. 22: 362. 1926. Type: León & Roca 6194. Cuba. Ichthyomethia havanensis Britton & Wilson, Bull. Torr. Bot. Club 44: 34. 1917.

Shrub or small tree, to about 2 m. high; young stems ferruginous- or fusco-tomentulose, glabrate; stipules suborbicular to ovate, obtuse, about 1.5-2 mm. long and 2 mm. wide; leaves 9-13-foliolate; leaflets with blades coriaceous, oblong to elliptic, 2-6.5 cm. long, 1-3 cm. wide, obtuse to subacute, sometimes mucronulate, rounded to cuneate at the base, the upper surface minutely crisp-pubescent, the secondary veins conspicuous, the tertiary veins conspicuously reticulate; bracts ovate, about 1 mm. long, 1 mm. wide; bracteoles caducous, not seen; inflorescences racemose, about 5-15 cm. long; flowers 12-14 mm. long; calyx subsericeous, about 5 mm. long with tube 3.5 mm. long, 3.5 mm. in diameter, the lobes rounded, 1.5 mm. long, the vexillar pair adnate, forming one broad, retuse or emarginate lobe; corolla with vexillum white with reddish markings, pubescent on the outer surface; fruit light brown, puberulent, about 2-6-seeded, 2-6.5 cm. long including stipe 2-3 cm. long, 2-3 cm. wide including wings 0.6-1.5 cm. broad and body 2-2.5 mm. wide; seeds reddish-brown, 4-5 mm. long, 2.5-3 mm. wide, the hilum whitish, suborbicular, 1 mm. long and 0.8 mm. wide.

Distribution: Limestone areas of Cuba, especially in coastal thickets.

CUBA: Without exact locality, Wright 3539 (NY).

Pinar del Río: Mariel, Tinaja, Ekman 12869 (S). Mendoza, in forests at Boquerón, Ekman 18750 (BM, F, NY, S, US). Peninsula de Guanahacabibes, Ekman 18798 (S). Chorrera, León 5192 (NY). "Pare Real de Guane". Roig 1072 (NY).

Habana: Near Cojimar, León & Roca 6194 (NY type); León 7154 (GH, NY). Santa Fé, Ekman 13280 (S, US), 13647 (K, NY, S, UPS). Rio Almendares, Ekman 13476 (S), 13736 (NY, S, US); Regnell (Ekman) III-357 (S). Tarará, León 13317 (GH, IJ). Playa de Mariano, Britton & Cowell 10339 (NY).

Matanzas: Peninsula de Hicacos, Alain 5959 (IJ, US).

Las Villas: María Aguilar, Ekman 18898 (S).

Camagüey: Between Pastelillo and Tarafa, Ekman 15455 (GH, S).

Oriente: Sabanazo, near Mir, Ekman 6533 (BM, F, NY, S). Banes, Ekman 6592 (S). Manatí, Wright s. n. in 1865 (GH).

Local names: Guamá candelón, guamá jiquí.

Piscidia havanensis appears to be a derivative of P. piscipula but easily recognizable by its strongly reticulate, oblong to elliptic leaflets and smaller fruits. Flowering occurs in March and April when the plants are more or less leafless.

## 3. PISCIDIA EKMANII Rudd, sp. nov.

Frutex vel arbuscula P. havanensis affinis, a qua imprimis differt foliolis paucioribus, amplioribus, subtus tomentulosis, minus reticulatis; fructibus cum alis angustioribus; seminibus minoribus.

Shrub or small tree, 1-3 m. tall, sometimes sprawling; young stems fulvo-tomentulose, glabrescent; stipules obliquely-ovate, acute, about 3 mm. long, 2-3 mm. wide; leaves 5-9-foliolate; leaflets with blades ovate to elliptic or sometimes obovate, 3-8 cm. long, 2-6 cm. wide, obtuse, sometimes mucronulate, sometimes retuse, the upper surface puberulent, glabrescent, subnitid, the lower surface tomentulose, the secondary veins usually conspicuous, the tertiary veins inconspicuously reticulate because of the dense pubescence; bracts ovate, 1 mm. long and wide or less; bracteoles ovate to ovate-oblong, 2-3 mm. long, 1 mm. wide; inflorescences racemose, about 6-20 cm. long; flowers 12-15 mm. long; calyx fulvous, subsericeous, 4-5 mm. long, the tube 3-4 mm. long, 3-4 mm. in diameter, the lobes obtuse to subacute, about 1 mm. long, the vexillar pair adnate forming one broad, emarginate lobe; corolla with vexillum cream-colored to lavender, pubescent on the outer face; fruit medium to reddish-brown, commonly 3-8-seeded, 3-5 cm. long including stipe 3-5 mm. long, 1.5-2 cm. wide including wings 0.8-1 cm. wide, the body 2.5-3 mm. wide; seeds reddish-brown, about 3 mm. long and 2 mm. wide, the hilum suborbicular, about 0.5 mm. in diameter.

Type collected by E. L. Ekman, no. H. 4517, "Presqu'ile du Nord-Ouest, Baie de Henne, slope of Morne Chien, 2-300 m., Rep. Haiti," 9 July 1925. Holotype at S; isotypes at NY and US.

Distribution: Limestone areas of Hispaniola.

## HAITI:

Nord Ouest: Baie de Henne, slope of Morne Chien, Ekman H. 4517 (NY, S type, US). Port de Paix to Jean Rabel, Ekman H. 3613 (S). Baie des Moustiques, W of Caberet, Leonard & Leonard 12034 (US).

Artibonite: Gonaïves, Buch 201 (IJ).

Ouest: Thomazeau, Morne à Cabrits, Ekman H. 995 (IJ, S). Morne à Cabrits, Holdridge 894 (MICH, NY, US). "Along road on ridge N of Cul de Sac plain," Holdridge 331 (NY).

The specimens cited above were all collected some years after Dr. Blake's revision of Ichthyomethia. On the US sheet of Ekman H. 4517 he noted, "Form of havanensis or n. sp. SFB '36."

According to Bro. Alain Liogier, Piscidia occurs in the vicinity of Santiago, Dominican Republic. He has seen it in the field and also has examined a specimen collected by Bertero in that same locality. Not having seen the material myself I cannot make a positive determination but should expect it to be P. ekmanii rather than P. piscipula, the other species known from Haiti.

4. *PISCIDIA PISCIPULA* (L.) Sarg. Gard. & For. 4: 436. 1891.  
*Erythrina piscipula* L. Sp. Pl. 707. 1753. Type: Sloane, Jam.  
 Hist. 2: t. 176, f. 4, 5. 1725. Type: Sloane s. n.  
 Jamaica.  
*Piscidia erythrina* L. Syst. Nat., ed. 10, 1155. 1759. Based on  
E. piscipula L.  
*Robinia alata* Miller, Gard. Dict., ed. 8, Robinia no. 6. 1768.  
 Based on E. piscipula L.  
*Piscidia inebrians* Medikus, Vorl. Churpf. Phys.-Öken Ges. 2:  
 394. 1787. Based on P. erythrina L.  
*Piscidia toxicaria* Salisbury, Prodr. 336. 1796. Based on  
P. erythrina L.  
*Ichthyomethia piscipula* (L.) Hitchc. in Sarg. Gard. & For. 4:  
 472. 1891.  
*Ichthyomethia communis* Blake, Jour. Wash. Acad. Sci. 9: 247.  
 1919. Type: Curtiss 685. Florida.  
*Piscidia communis* (Blake) Harms, Verhandl. Bot. Ver. Brandenb.  
 65: 91. 1923.  
*Ichthyomethia piscipula* var. typica Stehlé & Quentin, Fl.  
 Guad. et Depend. et Mart. 2(2): 123. 1948.

Tree or shrub, to about 20 m. tall; young stems fulvo-sericeous to strigillose, glabrescent; stipules obliquely reniform, 3-5 mm. long, 3-6 mm. wide; leaves 7-11-foliolate; leaflets with the blades ovate to elliptic, 4-17 cm. long, 2-11 cm. wide, obtuse to acute or acuminate, the terminal leaflet sometimes obovate, the base rounded to cuneate, the upper surface sericeous or minutely pilose, glabrescent, the lower surface micro-alveolate, sericeous or the hairs somewhat crispate, usually more abundant on the veinlets, sometimes glabrescent, the secondary veins evident, the tertiary veins relatively inconspicuous; bracts ovate to elliptic, obtuse, 1-1.5 mm. long, 1 mm. wide; bracteoles ovate to elliptic, acute, 2-3 mm. long, 1 mm. wide; flowers 12-15 mm. long, usually less than 15 mm.; calyx sericeous, 4-6 mm. long, the tube 3-4 mm. long, about 4 mm. in diameter, the lobes obtuse to subacute, 1-2 mm. long, the vexillar lobes somewhat adnate; corolla with petals white with pink or reddish markings, the vexillum pubescent on the outer face; fruits 4-10 cm. long including stipe 1-3 mm. long, 3-4.5 cm. wide including wings 1-2 cm. wide and body 3-4 mm. wide, commonly about 3-8-seeded; seeds reddish brown to dark brown, 4.5-6 mm. long, 2.5-3.5 mm. wide, the hilum orbicular, 1 mm. in diameter or less.

Distribution: On calcareous soil in Florida, Bahama Islands, Cuba, Haiti, Jamaica, eastern and southern Mexico, British Honduras, Guatemala, coastal islands of northern Honduras. It has also been introduced in Puerto Rico and Hawaii.

UNITED STATES: Florida: Palm Cape, Chapman 34 (US).

Lee Co.: Punta Rassa, Hitchcock 76 (F, GH, MO, NY, US); J. Standley 257 (F, GH, MO, POM, US); Eaton 1106 (A); Harshberger s. n. (NY). Coconut, Moldenke 5779 (NY).

Collier Co.: Marco, Standley 12732 (US), 57660 (F); Steyermark 63274 (F).

Dade Co.: Miami, Garber s. n. in 1877 (A, F, GH, NY, US); Britton 77 (F, NY); Small & Wilson 1658 (NY). Buena Vista, Eaton 456 (A). Between Miami and Coconut Grove, Small & Small 4797 (MO, NY). Brickell Hammock, near Miami, Caldwell 8756 (MO, NY, US); Duckett 232 (A, F, POM, US); Small & Carter 2563 (NY). Sands Key, Small 7370 (NY, S).

Monroe Co.: Key Largo, Curtiss s. n. (US); Small & Carter 3053 (NY). Joe Kemp's Key, Small 8012 (NY). Tavernier Key, Duckett 204 (A, F, NY, POM, S, US). Long Island, Small 3890 (NY). No Name Key Curtiss s. n. (A). Upper Matecumbe Key, Miller 1686 (US); Brass 20458 (US). Lower Matecumbe Key, Thorne 15225 (IJ, US). Big Pine Key, Small 10505 (GH, NY); Small, Carter, & Small 3531 (NY); Killip 31420 (US), 31461 (US), 42081 (US), 44274 (F, US); Killip & Swallen 40412 (US); Brizicky & Stern 186 (A, US); Stern 1506 (US) Cooley, et al. 6216 (GH, NY, US). Ramrod Key [flowers], Jewish Key [fruits], Curtiss 685 (A, BM, F, GH, MO, NY, US type of I. communis). Torch Key, Killip 31612 (US). Cudjoe Key, Killip 31376 (F, US). Boca Chica Key, Small & Small 4989 (NY). Key West, Rugel 155 (BM, GH, NY); Blodgett s. n. (NY); "Herb. Nuttall" (BM); Curtiss 5656 (GH, MO, NY, POM, US); Palmer 130 in 1874 (F, MO, NY); Small 8165 (NY, S, US); Lansing 2035 (NY). East Cape, Simpson s. n. (A). Flamingo, near Cape Sable, Simpson s. n. (A). Middle Cape Sable, Robertson 248 (GH). Cooks Island, Newfound Harbour Key, Killip 31391 (US).

#### MEXICO:

Tamaulipas: Tampico, Palmer 510 in 1910 (BM, F, GH, MO, NY, US); Fisher 46115 (F, S). Zaragoza, Martin 101 (MICH). Chamal, Martin 111 (MICH). Between Ciudad del Maíz and Antigua Morelos, Johnston & Crutchfield 5669 (MEXU, MICH). Morón, LeSueur 265 (F). Between Victoria and Ciudad Mante, Moore & Wood 3626 (MEXU).

San Luis Potosí: Rascón, Pringle 4110 (A, BM, F, GH, MEXU, MO, NY, S, UC, US). Tamazunchale, Lundell & Lundell 7152 (MEXU, MICH, NY). Ciudad Valles, Vines 3312 (US). 30 mi. E of Ciudad del Maíz, Manning & Manning (53575 (GH).

Veracruz: Papantla, Schiede & Deppe 1332 (F fragm. ex LE); Liebmann 4542 (F); "Herb. Liebmann" s. n. (O). Near Tantoyuca, Ervendberg 9 (GH). Pueblo Viejo, Palmer 541 in 1910 (A, BM, F, GH, MO, NY). Jalapa, C. L. Smith 1565 (F). Cuitláhuac, Matuda 1439 (A, MEXU, MO, NY). Along route 150, about 26 mi. E of Cuitláhuac, King 2685 (DS, MICH, NY). Between Yecuatla and Colipa, Manuel Martínez 2-1 (A, MEXU). San Lorenzo Tenochtitlan, Chavelas, Esparza, & Aceves ES-2640 (MEXU), ES-2788 (MEXU). Campo experimental de Cotaxtla, Brigada Dioscóreas 7428 (MEXU), 7469 (MEXU), 7500 (MEXU). Gutiérrez Zamora, Miranda 8442 (MEXU). Laguna Encantada, Los Tuxtlas, Sousa 2140 (MEXU).

## MEXICO:

Puebla: Villa Juárez, Cottam 10566 (US). "Bosque Ajencihe", Bravo 5 (MEXU), 194 (MEXU).

Oaxaca: Temascal, Janzen s. n. (MICH, UC); Souba 1033 (MEXU); Comisión Dioscóreas 6865 (MEXU). Km. 19 carretera La Granja a Temascal, Brigada Dioscóreas 6613 (MEXU).

Chiapas: Ocozocoautla, Miranda 6265 (MEXU, US). Cintalapa, Miranda 7121 (MEXU, US). E of San Nicolás, near Cupía, Miranda 6057 (MEXU, US).

Tabasco: Mercedes, Balancán, Matuda 3012 (A, F, MEXU, MICH, NY). Isla del Carmen, Barlow 7/1C (MEXU); West 7/1 (GH).

Campeche: Konchen, Lundell 1397 (F, MICH). Ciudad del Carmen, Mell 2005 (NY, US). Between Ceibaplaya and Champoton, Miranda 8009 (MEXU). Santa Rosa, E of Campeche, Miranda 7962 (US). Campo Experimental Forestal Tropical "El Tormento", between Escárcega and Candelaria, Chavelas & Pérez ES-810 (MICH).

Yucatan: Without exact locality, Gaumer 524 (A, BM, DS, F, GH, MICH, MO, NY, S, UC, UPS, US), 23946 (F, GH, MO, UC, US). Merida, Schott 260 (F, US). Sisal, Gaumer 23219 (A, F, GH, MO, NY, US). Izamal, Gaumer s. n. (F). Kancabconat, Gaumer 23854 (F, GH, POM, S, US), 23855 (F, GH, MO, POM, S). Chichankanab, Gaumer 1882 (F); Miranda 8080 (MEXU). Santa Rosa, Miranda 7962 (MEXU). Celestun, Enríquez 447 (MEXU). Xtum, Miranda 8033 (MEXU). Chichen Itza, Bruff 1462 (MEXU).

Quintana Roo: Cozumel, Gaumer 16107 (F).

## BRITISH HONDURAS:

Belize: Gracie Rock, Sibun R., Gentle 1640 (MO).

El Cayo: El Cayo, Bartlett 13014 (A, F); Chanek 79 (BM, F).

All Pines: In sandy places along sea beach, Schipp 795 (A, BM, F, GH, MICH, MO, NY, S, UC), 798 (A, BM, F, GH, MICH, MO, NY, S).

## GUATEMALA:

Peten: Tikal, between Yaxmoxan and Yaxha, Cook & Martin 218 (US). La Libertad, Lundell 2817 (BM, F, MICH, US), 3075 (F, MICH, S). Uaxactum, Bartlett 12573 (A).

HONDURAS: Isla Roatán, Gaumer 105 (F). Swan Isl., G. Nelson 123 (GH).

BAHAMAS: Without exact locality, Swainson s. n. (CGE). South Bimini, Howard & Howard 10161 (A, GH, NY, S, US). Acklin, Brace 4437 (F, NY). Great Bahama, Pinder's Point, Britton & Millspaugh 2541 (F, NY). Anguilla, Wilson 8004 (F, MO, NY), 8058 (F, MO, NY). Andros, Northrop 588 (A, F, GH, NY). New Providence, Brace 251 (F), 252 (F); Roe s. n. (MICH); Saunders s. n. (MO). Eleuthera, Coker 327 (NY).

PUERTO RICO: Mayagüez, introduced, Moore 3344 (US).

HAITI: Sud: Miragoane, Ekman 6538 (IJ, S, US), 7959 (S).



## CUBA:

Pinar del Río: Peninsula de Guanahacabibes, between Remates and Yayales, Ekman 18773 (S).

Habana: Isla de Pinos, Ekman 12477 (S); Killip 41282 (US), 44197 (US); Morton 10278 (US); Britton & Wilson 14848 (NY); Britton, Wilson, & Selby 14523 (NY).

Oriente: Cabo Cruz, Santiago, Ekman 1481 (S, US), 7795 (S). Santiago de Cuba, between Cabaña and Punta de Sal, Ekman 9479 (BM, F, S, UPS). Corojo, Ekman 7298 (S). El Cuero, Britton & Cowell 12722 (NY). Manzanillo, Ekman 5638 (PCM, S); Shafer 12349 (F, MO, NY, US). Rioja, E of Mir, Ekman 4907 (A, S). Cabañas Bay, Britton & Cowell 12808 (NY). Rente, Santiago, Bro. Clemente 3012 (GH); Leon, Clement, & Roca 9801 (GH).

GRAND CAYMAN: 1 mi. SE of Georgetown, Kings GC 318 (BM, MO).

JAMAICA: Without exact locality, Sloane s. n. (BM); Eggers 131 (MICH); Swartz s. n. (S, UPS); Alexander [Prior] s. n. (O).

St. Mary: 1 mi. E of Rio Nuevo, Proctor 29298 (IJ, US). Oracabessa, Roe s. n. (MICH).

St. Andrew: Long Mountain, Skudamore 12 (IJ); Yuncker 18756 (F, MO, MICH). S of Knutsford Park, Barry s. n. (IJ). Antrim, Mountain View, von der Porten s. n. (IJ). Gordon Town, Hart 580 (US). Kingston, Brown 364 (A, NY). Hope Garden, Maxon & Killip 1703 (GH, US); Harris 8518 (A, NY). Berwick Hill, Harris 7708 (F, NY, US). Morant Bay, Alexander [Prior] s. n. (NY).

St. Catherine: Little Goat Island, Proctor 28590 (IJ, US). Great Goat Island, Harris 9221 (A, NY, US). Pigeon Island, Proctor 11657 (IJ). Fresh River, Caymanas sugar estate, Facey s. n. (IJ). Port Henderson, Barry s. n. (IJ); Bengry s. n. (IJ); Harris & Lawrence C15591 (US).

St. James: Ironshore, Proctor 28865 (IJ).

St. Elizabeth: Lewistown, 1 mi. S of Brompton, Proctor 28631 (IJ).

Hanover: 6 mi. W of Lucea, Proctor 28562 (IJ, US).

Manchester: Spur Tree Hill, near Eglinton, Proctor 28753 (IJ, US).

HAWAII: Oahu: Honolulu, introduced, Klawe & Vann 1613 (US).

Local names: Borrego, borrego de cerro, borrego prieto (Mexico: Oaxaca); chichol, chijol (Mexico: Tamaulipas, Veracruz); dogwood (Florida, Jamaica); fish-fuddle tree (Florida); guamá, guamá candelón (Cuba); haabin, habim, habin, jabin (Mexico: Veracruz, Campeche, Yucatan); Jamaica dogwood (Florida); Maytree of the Creoles (British Honduras).

This species of Piscidia is one of the two with a relatively wide distribution. As the first known to Europeans, its name has often been misapplied to other species, particularly to P. carthagensis.

Hypothetically, P. piscipula originated on the ancient land mass of southern Mexico and northern Central America. Its principal route of migration would have been eastward along the Antillean geanticline and over whatever islands existed at the time. As igneous activity increased, especially in the Pleiocene, edaphic conditions over much of the range, notably in central Mexico and western Central America, must have become unsuitable for calciphilous species such as P. piscipula. Later, however, in Pleistocene time, the species was able to spread over the newly emerged limestone areas of the Yucatan Peninsula, Florida, and the Bahamas, resulting in the present pattern of distribution.

5. PISCIDIA CARTHAGENENSIS Jacq. Enum. Pl. Carib. 27. 1760;  
Select. Stirp. Amer. Hist. 210. 1763. Type: Jacquin s. n.  
Colombia.
- Piscidia americana Sessé & Moc. La Naturaleza ser. 2 (1),  
append. 116. 1889. Type: Sessé & Moc. 1913. Mexico.
- Ichthyomethia americana (Sessé & Moc.) Blake, Journ. Wash.  
Acad. Sci. 9: 248. 1919.
- Ichthyomethia acuminata Blake, Journ. Wash. Acad. Sci. 9:  
249. 1919. Type: Rose, Fitch, & Russell 3419. Antigua,  
West Indies.
- Piscidia acuminata (Blake) I. M. Johnston, Contr. Gray Herb.  
n. s. 70: 71. 1924.
- Lonchocarpus guaricensis Pittier, Trab. Mus. Com. Venezuela  
4: 231. 1928; Arbol y arbust. Legum. 3: 301. 1928. Type:  
Pittier 11455. Venezuela.
- Piscidia guaricensis (Pittier) Pittier, Mesa Guanipa 49. 1942.
- Ichthyomethia piscipula var. acuminata (Blake) Stehlé & Quen-  
tin, Fl. Guad. et Depend. et Mart. 2 (2): 124. 1948.

Tree, to about 15 m. tall; young stems puberulent, glabrescent; stipules obliquely ovate, 3-5 mm. long, 3-5 mm. broad; leaves 5-15-foliolate; leaflets with blades ovate or obovate to elliptic, about 4-20 cm. long, 2-10.5 cm. wide, obtuse to acute or breviacuminate, the base rounded, glabrous or nearly so above, the lower surface sparsely to densely pubescent with short, appressed hairs, or some hairs lax to patent, the secondary veins evident, the tertiary veins usually inconspicuous; bracts ovate, 1 mm. long and 1 mm. wide or less; bracteoles ovate-oblong, obtuse to subacute, 1.5-2 mm. long, 1-1.2 mm. wide; flowers pink, 13-18 mm. long, usually more than 15 mm.; standard pubescent on the outer face; calyx sericeous, 5-8 mm. long, the tube 4-6 mm. long and 4-6 mm. in diameter, the lobes 1-2 mm. long, acute to acuminate, often strongly imbricate; fruit 1-8-seeded, 3-11 cm. long including stipe 6-20 mm. long, 3-4.5 cm. broad including wings 1-2 cm. wide and body 4-6 (-7) mm. wide, sometimes glabrescent; seeds reddish-brown, 5-8 mm. long, 3-4 mm. wide, the hilum elliptic, 2 mm. long and 1 mm. wide.

Distribution: Mexico, Lesser Antilles, southward to Venezuela and northern Peru, in dry woods at elevations of 50-1000 meters.

## MEXICO:

Mexico: Temascaltepec, Guayabal, Hinton 3578 (A, MEXU, US), 7524 (NY, US).

Michoacán: [Apatzingán ?], Sessé & Mociño 1913 (F, MA presumably type of P. americana). Apatzingán, Leavenworth & Hoogstral 1491 (GH, MO, NY), 1762 (F, MO). Coahuayula, Emrick 47 (F). Hacienda Guadalupe, near Rio Balsas, E. Nelson 6969 (GH, NY, US). Huetama, Hinton 5626 (A, BM, F), 5803 (A, BM), 11802 (DS, GH, MICH, NY, US).

Guerrero: Acapulco, Howell 8512 (A, F, US). La Junta, near La Unión, E. Nelson 6991 (GH, NY, US). Mina, Placeres, Hinton 9995 (BM, F, GH, MO, NY, US), 10008 (BM, F, GH, MEXU, MO, NY, US). Nuxco, Langlassé 936 (GH, MEXU, US). Temixco, Reko 5119 (US).

Oaxaca: Plain of Tehuantepec, Alexander 217 (F, MO, NY, US).

Chiapas: Barranca de Pishtimbak, N of Tuxtla Gutiérrez, Miranda 5233 (MEXU, US). "Altos carretera a S. Fernando (N. O. Tuxtla G.)", Miranda 5595 (MEXU). Pijijiapan, Mell s. n. (US). Padernón, Tonalá, Matuda 16319 (US). Near Tuxtla Gutiérrez, Breedlove 9564 (F, NY), 9575 (F, MEXU).

## GUATEMALA:

Escuintla: Naranjo, J. D. Smith 2815 (GH, NY, US).

Chiquimula: Near Chiquimula, Sasmó, Mt. Tojás, Steyermark 30223 (F).

Huehuetenango: Sierra de los Cuchamatanes, between Santa Ana Huista and woods of Rancho Lucas, Steyermark 51359 (F, US).

## EL SALVADOR:

San Vicente: San Vicente, Standley 21651 (GH, NY, US). Apastepeque, Allen 7272 (F, GH, NY, US).

Sonsonate: Acajutla, Calderón 1669 (NY, US).

## HONDURAS:

Copán: Between Santa Rosa and Copán, Molina 11719 (F, NY, US).

Comayagua: Between El Agua Salada and Comayagua, Molina 13697 (F, NY, US).

Santa Bárbara: Near Jutiapa, Standley & Linderlie 7297 (F).

## COSTA RICA:

Guanacaste: Orillas del Río Corobici, Jiménez 3099 (F). Finca Taboga, Las Cañas, Madriz 54 (F).

## PANAMA:

Canal Zone: Near Madden Dam, Allen 4315 (F, GH, NY, S, US).

Darién: Thorn forest near Punta Garachine, Duke 10500 (2)(US).

CUBA: Las Villas: Cienfuegos, Soledad, probably introduced, Atchison 139 (GH, US).

PUERTO RICO: Cabo Rojo, Sintenis 662 (GH, S, US); Alain 9371 (LJ) Fajardo, Britton & Shafer 1575 (NY, US); Sintenis 1627 (EM, US). Punta Guaniquilla, Britton, Cowell, & Brown 4576 (F, MO, NY, US). Isla Culebra, Britton & Wheeler 62 (F, NY, US). Aguirre, Earle 7076 (NY). Isla Vieques, Shafer 2912 (NY, US).

## LESSER ANTILLES:

St. Croix: Britton, Britton, & Kemp 47 (NY, US); Rose, Fitch, & Russell 3579 (US); Ricksecker 296 (F, MO), 320 (F, GH, MO, NY, US).

St. Thomas: Eggers 361 (GH), s. n. (US); Morrow 118 (US); Archer 2227 (US); Holdridge 125 (NY).

St. John: Caneel Bay, Woodworth 215 (F); Holdridge 125 (A).

St. Jan: Britton & Shafer 336 (NY, US).

Tortola: Fishlock 41 (NY, US); Britton & Shafer 684 (NY, US); D'Arcy 4 (A), 5 (A).

St. Martin: Rijgersmaa 117 (S), s. n. (S); Goodwin & Goodwin 1 (NY, US).

Jost Van Dyke: Little 21939 (BM).

St. Barthélemy: Forsström s. n. (S, UPS); Euphrasen (S, UPS); von Goës s. n. (S); Questel 222 (US).

St. Kitts: Proctor 19628 (BM, LJ, US).

"St. Christopher": Euphrasen s. n. (UPS).

Antigua: Gregory s. n. (BM); Rose, Fitch, & Russell 3419 (GH, NY, US type of I. acuminata); A. C. Smith 10471 (A, LJ, S, US); Box 1446 (US); Beard 276 (A, MO, NY).

Montserrat: Shafer 462 (F, NY, US).

Guadeloupe: Duss 2662 (F, NY, US); Questel 578 (US), 482 (US); Stehlé 1564 (A, US), 5594 (US).

Martinique: Botanical Garden, cultivated, Duss 120 B (NY).

St. Lucia: Horne s. n. in 1782 (BM); Proctor 17657 (LJ, US).

St. Vincent: "From Hooker, 1831" (GH); H. H. & G. W. Smith 1632 (BM, GH, NY).

Barbados: Waby 83 (US), s. n. in 1895 (F).

Cannouan Isl.: Fairchild 2790 (A, US).

Grenada: Howard 10860 (GH, LJ, NY).

TOBAGO: Broadway 4808 (GH, MO, S, US), s. n. (BM, F, GH, NY, US).

## VENEZUELA:

Nueva Esparta: Isla Margarita, Macanao, Ginés 2818 (US); Bernardi 2386 (NY, US).

Monagas: San Félix, Pursell 8374 (US), 8443 (US).

Guárico: Carretera Pariaguán- El Sombrero, near Pariaguán, Aristeguieta 3009 (US, VEN). Between El Socorro and Valle de la Pascua, Pittier 14731 (US, VEN). El Sombrero, Pittier 11455 (US, VEN type of L. guaricensis), 11796 (US). El Sombrero-Chaguaramas, Tamayo 3522 (VEN). Altagracia de Orituco-Chaguaramas, Aristeguieta 6007 (VEN).

Anzoátegui: Cantaura, F. D. Smith 6 (US), 43 (US), 212 (US). Barcelona, Karsten s. n. (US photo no. 1865 ex W).

Portuguesa: Sta. Rosalía, Turén, Aristeguieta 1527 (VEN).

## COLOMBIA:

Atlántico: Between Penedera and Palmar, Dugand 285 (US). Finca "El Paraíso", near Río Magdalena, region of Palmar-Ponedera, Dugand 4-b (US). Los Pendales, Dugand 1125 (F, GH, US). Arroyo Leon, Dugand 637 (F).

Bolívar: Cartagena, Jacquin s. n. (BM type). Sincé, Romero-Casteñeda 9650 (NY).

## ECUADOR:

Guayas: Between Guayaquil and Salinas, Mexia 6760 (F, GH, K, NY, US). Guayaquil, Anthony & Tate 78 (US); Little 6593 (US); 6774 (US); Mille 863 (F); Valverde 546 (US); Asplund 17576 (K, NY, UPS); Fagerlind & Wibom 78 (S, UPS). Río Macará, Townsend 849 (US). Durán, Rose & Rose 23596 (GH, NY, US). E of Chongon, Fagerlind & Wibom 277 (S, UPS). Isidro Ayora, Asplund 17608 (F, NY).

Islas Galápagos: Santa Cruz (Indefatigable): Chapin 1112 (NY); Colinvaux 434 (DS), 511 (DS); Fagerlind & Wibom 3052 (S); Fosberg 44729 (US); Harling 5214 (S), 5223 (S); Itow 37 (DS); Rorud 4 (O) Stewart 1605 (CAS, GH, US), 1606 (CAS, GH), 1607 (CAS, GH). Von Hagen 99 (BM, NY); Wiggins 18734 (DS, US); Wiggins & Porter 697 (US). San Cristóbal (Chatham): Darwin s. n. (CGE); Snodgrass & Heller 503 (DS, GH); Stewart 1608 (CAS, GH, US); Wiggins & Porter 372 (CAS, US).

PERU: Tumbes: Hualtaco, Vargas 47 (F).

Local names: Arepo (Colombia); barbasco, barbasco blanco, barbasco de agua dulce (Venezuela, Peru); cachimbo (Costa Rica); cahuirica (Mexico); cuchiván (Venezuela); frijolillo (Mexico); matapez (Mexico, Colombia); tatzungo (Mexico); palo santo (Ecuador); ventura (Puerto Rico); zopilocuavo (El Salvador).

After examining specimens of P. carthagenensis, P. acuminata, P. americana, and P. guaricensis, including the types, I can see no satisfactory criteria for separating them. Having arrived at this conclusion, I was pleased to note Blake's comment (op. cit. 243) that his I. acuminata and P. carthagenensis might prove to be identical. I was further encouraged to discover in the herbarium at NY, a letter from Dr. Blake to N. L. Britton, dated Sept. 25, 1919, stating, "I can now make a belated reply to your letter of 28 July referring to the Ichthyomethia collected by Dr. Rose (23596) in Ecuador. It is identical, so far as I can tell from the fruiting specimen, with my I. acuminata from the Lesser Antilles. I have little doubt that Jacquin's Piscidia carthagenensis will prove to be an earlier name for the same thing."

There are small differences to be found in different parts of the range. For example, the calyx lobes of the specimens from central Mexico are more strongly imbricate, those from the Lesser Antilles more acuminate with a stronger costa; the leaflets of the collections from the Galápagos Islands and some from Venezuela have lax to patent hairs on the undersurface instead of the more common short, appressed hairs in other parts of the range.

I should have considered maintaining P. guaricensis as a separate species, or variety, had I not found that some of the Venezuelan leaflets have both appressed and patent hairs, together. No other characters were evident to warrant segregation.

Piscidia carthagenensis is the most widespread species of the genus. Like P. piscipula, it probably originated in Mexico or northern Central America but instead of migrating eastward toward Cuba and Jamaica, it spread southward to dry areas of Colombia, Ecuador, and Peru, and then eastward across the Venezuelan llanos to the Lesser Antilles and northward as far as Puerto Rico. Soil data are lacking for almost all collections of this species, the few exceptions citing marl as the substrate. It would be interesting to have comparative soil analyses from habitats of P. carthagenensis and P. piscipula. It appears that the former has a greater tolerance of lower soil pH, such as might result from proximity to volcanic activity.

6. PISCIDIA MOLLIS Rose, Contr. U. S. Nat. Herb. 1: 98. 1891.

Type: Palmer 355 in 1890. Mexico.

Ichthyomethia mollis (Rose) Blake, Jour. Wash. Acad. Sci. 9: 246. 1919.

Tree, to about 16 m. tall; young stems silvery-velutinous; stipules suborbicular, obtuse, 2.5-3 mm. long, 2.5-4 mm. wide; leaves 5-13-foliolate; leaflets predominantly ovate, sometimes elliptic, 2-9 cm. long, (1-) 2-5 cm. wide, acute to obtuse, mucronulate, rounded to subcordate at the base, the terminal leaflet sometimes obovate, the upper surface subsericeous, glabrescent, the lower surface silvery-sericeous or subsericeous, sometimes glabrescent, the secondary veins prominent, the tertiary veins inconspicuous because of pubescence; inflorescences racemose, about 6-15 cm. long; bracts ovate, about 1 mm. long, 2.5-3 mm. wide; bracteoles ovate-elliptic, 3-4 mm. long, 2.5-3 mm. wide; flowers 15-17 mm. long; calyx silvery-sericeous, 6-7 mm. long, the tube about 5 mm. long, 3-5 mm. in diameter, the lobes rounded, 1-2 mm. long, the vexillar lobes adnate in part; corolla white with pink or reddish markings, the standard pubescent on the outer face; fruit pubescent, commonly about 2-4-seeded, about 3-6 cm. long including stipe 4-5 mm. long, 3-5.5 cm. wide including wings 1.5-2.5 mm. wide, the body about 4-5 mm. wide; seeds tan to reddish-brown, 8-10 mm. long, 4-5 mm. wide, the hilum suborbicular, about 1 mm. long and 0.8 mm. wide.

Distribution: In dry, open woods, Sonora and Sinaloa, Mexico at elevations of about 200-2000 m., on sandy, granitic alluvium.

MEXICO:

Sonora: Alamos, Palmer 355 in 1890 (GH, US type); Rose, Stanley, & Russell 12906 (F, GH, MO, NY, US); Gentry 2250 (A, F, MO, S, UC, US), 4780 (DS, F, GH, MICH, MO, NY). Between Misa and Mina San José, Wiggins 6309 (DS, US). N of Ures, Wiggins 7343 (A, DS,

MICH, US). Between Colorado and Mazatán, Wiggins & Rollins 322 (A, DS, MICH, MO, NY, UC, US). S of Cajeme, Miranda 8955 (MEXU). Ciudad Obregón, Gentry 305 M (DS, MICH, US). San Bernardo, near Río Mayo, Gentry 17725 (US); Gentry, Barclay, & Arguelles 19279 (US). Near Torres, Coville 1659 (F, US). Arroyo near Estación Moreno, Shreve 6091 (F). Between Navajoa and Alamos, Rudd 2092 (US). "Camino a San Bernardo," Cedillo Trigos 38 (MEXU).

Sinaloa: Without exact locality, González Ortega 3129 (US). Las Palmas, González Ortega 713 (MEXU), 4555 (US). Choix, Tasa-jera, González Ortega 703 (MEXU); Narvaez Montes & Salazar 863 (US). Fuerte, Rose, Standley, & Russell 13515 (NY, US). NE of Los Mochis, Waterfall 12804 (GH, MICH, US).

Local names: Palo blanco, palo blanco duro.

This species, whose known range does not overlap with the others of the genus, is readily recognized by its silvery pubescence. It shows relationship both to P. piscipula and P. carthagensis. At one time the range of the three species probably was continuous, but for some reason, presumably edaphic, there now is a disjunction. Exploration of eastern Sinaloa might yield additional localities for P. mollis.

7. PISCIDIA GRANDIFOLIA (Donn. Sm.) I. M. Johnston, Contr. Gray Herb. n. s. 70: 71. 1924. Lectotype: Heyde & Lux 3709.

Guatemala. (Designated by Blake, l. c.).

Derris grandifolia Donn. Sm. Bot. Gaz. 56: 55. 1913.

Ichthyomethia grandifolia (Donn. Sm.) Blake, Jour. Wash. Acad. 9: 245. 1919.

Tree, to about 20 m. tall; young stems ferrugino- to fulvo-tomentulose, glabrescent; stipules obliquely ovate, acute, 7-8 mm. long, 4-6 mm. wide, caducous; leaves 9-27-foliolate; leaflets with blades elliptic to oblong, ovate or obovate, 4-20 cm. long, 2-13 cm. wide, obtuse to acute, sometimes mucronulate, the base rounded to subcuneate or cordate, the upper surface puberulent, often glabrescent, the secondary veins evident, the tertiary venation relatively inconspicuous; inflorescences racemose or long and spicate, about 15-20 cm. long; bracts caducous, lanceolate, about 2 mm. long, 1 mm. wide; bracteoles linear, 2-4 mm. long and less than 1 mm. wide; flowers 13-18 mm. long; calyx 5-8 mm. long, the tube about 4-6 mm. long, 5 mm. in diameter, the lobes deltoid acute, 1-2 mm. long, the two vexillar lobes somewhat adnate; petals white to pinkish, the vexillum glabrous on the outer face, the wings and keel petals somewhat pubescent along the margins; fruit dark brown, densely pubescent, commonly 2-6-seeded, 4-15 cm. long including stipe 5-15 mm. long, 1.5-6 cm. wide including wings 0.5-3 cm. wide and body (6-) 8-13 mm. wide; seeds reddish-brown, 12-13 mm. long, 6 mm. wide, the hilum white, orbicular, 1.5 mm. in diameter.

This species, with its three varieties, is notably different from all other known species of *Piscidia* in such characters as the glabrous vexillum and linear bracteoles. The fruits and leaflets are somewhat distinctive and usually can be recognized at a glance. In leaf or flower only, typical *P. grandifolia* is most likely to be confused with *Lonchocarpus costaricensis* (Donn. Sm.) Pittier. With fruit, however, the difference is obvious. It is interesting to note that *P. grandifolia*, on the basis of a flowering specimen, was originally placed in *Derris*, sometimes considered congeneric with *Lonchocarpus*.

The locality of origin of *P. grandifolia* probably was in the same area as that of *P. piscipula* and *P. carthagenensis*, the ancient geologic nucleus of southern Mexico and northern Central America. It apparently is more tolerant of acidity than most other species of *Piscidia* since it is found in or near areas of volcanic activity. None of the collections of this species that I have seen bears specific soil data. Gentry, et al 20285, the type of var. gentryi, is cited as found "over limestone hills", and Hinton 14869, a collection of var. glabrescens, as on a "rocky slope in oak forest."

7a. PISCIDIA GRANDIFOLIA (Donn. Sm.) I. Johnst. var. GRANDIFOLIA

Tree, to about 20 m. tall. The vegetative parts of typical *P. grandifolia* are generally pubescent; the leaflets are fewer in number and average larger than those of the other varieties; the flowers tend to be larger; the fruits have narrower wings and are usually longer, with up to 7 (or more ?) seeds.

Distribution: in dry forest from Guatemala southward to Nicaragua at elevations of about 1000-3000 meters.

GUATEMALA: Without exact locality, Tejada 246 (US).

El Quiché: Near Sacapulas, Molina, Burger, & Wallenta 16428 (F, NY, US).

Baja Verapaz: Santa Rosa, von Tuerckheim II.2323 (US syntype).

Jalapa: Volcán Imay, Kellermann 8048 (F, NY, UC, US).

Amatitlán: Amatitlán, Morales Ruano 542 (US).

Sacatepéquez: Between Ciudad Vieja and Calderas, Breedlove 11437 (US). Near Antigua, Standley 58614 (A). Near Pastores, Standley 59901 (NY).

Santa Rosa: Cerro Gordo, Heyde & Lux 3709 (US lectotype).

EL SALVADOR: Without exact locality, Calderón 1090 (GH, US).

Ahuachapán: Without exact locality, Padilla 311 (US).

Sonsonate: Cerro Verde, Allen & van Severen 6932 (F, GH, NY, US).

La Libertad: Comasagua, Calderón 1396 (GH, NY, US). Finca Germania, near Comasagua, Carlson 208 (F, UC).

La Paz: Zacatecoluca, Calderón 326 (GH, NY, US).



## HONDURAS:

Comayagua: Siguatepeque, Standley 55986 (A, F, US); Standley & Chacon 6070 (F); Edwards 487 (A, F, UC, US); Yuncker, Dawson, & Rouse 5605 (F, GH, MICH, MO, S, US).

Morazan: Suyapa, Williams & Molina 13447 (F, GH), 14352 (F, GH, MO, US); Molina 2783 (F, GH); Standley & Williams 93 (F), 1423 (F); Standley 26250 (F). Guimaca, Molina 2804 (F). Mont de la Flor, Tegucigalpa, von Hagen & von Hagen 1152 (F, NY).

Choluteca: Along Río Comalí, near Comolí, Williams & Molina 18972 (F). Vicinity of San Marcos de Colón, Standley 15848 (F).

## NICARAGUA:

Jinotega: Tuma Lake, N of Jinotega, Williams, et al. 27400 (F, NY, US).

Siquia: El Recreo, Río Mico, White 5344 (F, MICH).

Local names: Capetillo, palo sope (Guatemala); palo de zope, zopilocuavo, zopilote (El Salvador).

According to collectors' notes, this species is "used for fuel" and is a "medicinal tree used for coffee shade."

7b. *PISCIDIA GRANDIFOLIA* var. *GENTRYI* Rudd, var. nov.

Arbor ad 15 m. alta, a varietate typica floribus brevioribus, fructibus cum alis amplioribus, foliolis circa 13-19, ellipticis vel ovatis, basi obtusis vel cordatis differt; floribus fructibusque ut in var. glabrescens sed foliolis subtus tomentosus.

As indicated in the key, this variety resembles the typical in the pubescence of the leaflets but its smaller flowers and shorter fruits, with the wings sometimes as much as 3 cm. broad, are more like those of var. glabrescens.

Type collected by H. S. Gentry, A. S. Barclay, and J. Arguelles, no. 20285, in Puebla, Mexico "near Acatepec along road to Huajuapán. Arid Thorn Forest over limestone hills; alt. about 6000 ft.", August 19, 1963. Holotype at US, no. 2451068.

Distribution: In dry forests of Oaxaca and Puebla at elevations of about 1000-2000 meters.

## MEXICO:

Puebla: Near Acatepec, SW of Huajuapán, Gentry, Barclay, & Arguelles 20285 (US type). Acatepec, SW of Zapotitlán, Sousa 2667 (F, MEXU, US). Zapotitlán, Purpus "2648" (BM, F, GH, MO, NY, US).

Oaxaca: Jayacatlán, L. C. Smith 486 (GH, US). Dominguillo, E. Nelson 1826 (F, GH, US). Carrizal, Miranda 1043 (MEXU). Vicinity of Cerro Zempoatepetl, between Tlahuitoltepec and Santo Domingo Albarradas, Hallberg 1006 (MICH, US).

Local name: Pata de León (Puebla).

It would be interesting to know why there are no specimens of *P. grandifolia*, particularly var. *gentryi* or var. *glabrescens*, from Chiapas, since both *P. piscipula* and *P. carthagenensis* have been found there. Lack of collecting does not appear to be the complete answer.

7c. *PISCIDIA GRANDIFOLIA* var. *GLABRESCENS* Sandwith, Kew Bull. 1936: 3. 1936. Lectotype: Hinton 5419. Mexico. (Here designated).

Tree, to about 10 m. tall. Specimens of var. *glabrescens* are less pubescent in general than those of the other two varieties. The leaflets are essentially glabrous above and only moderately pubescent with lax hairs on the lower surface, usually *glabrescent*; they average somewhat smaller and more oblong than those of var. *grandifolia* or var. *gentryi*. The flowers, like those of var. *gentryi*, are a little smaller than those of var. *grandifolia*. The fruits of var. *glabrescens* are similar to those of var. *gentryi*, i.e., shorter, commonly 1-4-seeded, and broader, the wings to as much as 3 cm., than those of the typical variety.

Distribution: Open, dry woods on rocky slopes in central and western Mexico at elevations of about 500-1600 meters.

#### MEXICO:

Morelos: El Parque, Martínez s. n., Nov. 1943 (F). Cañon de Lobos, near Yautepec, Miranda 1451 (MEXU); Rivera 5 (MEXU).

México: Temascaltepec, Chorrera, Hinton 1193 (A, BM, F, K syn-type), 5419 (A, BM, F, K lectotype, US), 8079 (A, BM, F, GH, MO, NY, S, US), 8603 (A, BM, F, GH, MEXU, NY, S, US). Tonatico, Matuda 27508 (MEXU). Palmar Chico, Cerro de los Capulines, Matuda 31347 (MEXU).

Michoacán: Zitacuaro-La Florida, Hinton 13057 (DS, GH, MEXU, MICH, NY, US).

Colima: Colima, McVaugh & Koelz 1571 (MICH). S of Colima, toward Tecoman, Miranda 9113 (MEXU).

Guerrero: Mina, Hinton 10518 (GH, MEXU, MO, NY), 14869 (GH, NY).

Puebla: Matamoros, Miranda 2125 (MEXU).

Local names: Cahuirrica, cahirrica prieta.

Noted by the collector, Hinton 13057, "Flower white and sweet of smell. Wood used for making plows."

Sandwith designated Hinton 1193 as *typis floris* and Hinton 5419 as *typis fructus*. I have chosen the latter as lectotype because it is by the fruits that one most readily distinguishes *Piscidia* from the related genera.

The two specimens from Colima cited above, possibly from the same tree, have unusually thick pods. Examination of material from McVaugh & Koelz 1571 revealed an abnormal proliferation of tissue in place of the seeds.

Soil and habitat data are inadequate to explain the geographic distribution of this variety. From the label of only one collection, Miranda 9113, we have the information, "in cerros calizos y yesosos" (on limestone and gypsum hills). Other collectors have indicated the habitat as "steep hillside" and "rocky slope in oak forest."

Species excluded from PISCIDIA

- P. acutata Mart. ex Benth. *Comm. Leg. Gen.* 42. 1837 (preprint); *Ann. Wien Mus. Nat.* 2: 106. 1838. Nomen in synonymy under Phellocarpus acutus Benth. = PTEROCARPUS ANCYLOCALYX Benth.
- P. corallo dendrum Steud. *Nom. ed.* 2, 2: 344. 1841, nomen = ERYTHRINA CORALLODRENDRUM L. ?
- P. erythrina sensu Vell. *Fl. Flum.* 303. 1825; *Icon.* 7: pl. 100. 1835, non L. = DAHLSTEDTIA PINNATA (Benth.) Malme.
- P. florida Mart. ex Benth. *Comm. Leg. Gen.* 42. 1837 (preprint); *Ann. Wien Mus. Nat.* 2: 106. 1838 = PTEROCARPUS ROHRII Vahl.
- P. longifolia (Cav.) Willd. *Sp. Pl.* 3: 920. 1803 = SESBANIA LONGIFOLIA (Cav.) DC.
- P. ovalifolia Larrañaga, *Escritos D. A. Larrañaga, Publ. Inst. Hist. Geogr. Uruguay* 2: 235. 1923 = SESBANIA PUNICEA (Cav.) Benth.
- P. ovalis Larrañaga (as "Piscidia (cisplatina) ovalis"), *Escritos D. A. Larrañaga, Publ. Inst. Hist. Geogr. Uruguay, Atlas* 1, Bot. pl. 95. 1927 = SESBANIA PUNICEA (Cav.) Benth.
- P. punicea Cav. *Icones* 4: 8. 1797 = SESBANIA PUNICEA (Cav.) Benth.
- P. sinaloensis Gentry, *Brittonia* 6: 316. 1948 = LONCHOCARPUS SINALOENSIS (Gentry) F. J. Hermann.

New taxa

PISCIDIA EKMANII Rudd, sp. nov.

PISCIDIA GRANDIFOLIA var. GENTRYII Rudd, var. nov.