THE MEXICAN GENERA OF THE APOCYNACEAE (SENSU A. DC.), WITH KEY AND ADDITIONAL TAXONOMIC NOTES

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ABSTRACT

A key to the apocynaceous genera of Mexico is presented. The study is based on literature, field observations, and herbarium studies. The family is represented in Mexico by thirty genera (twenty-five native, four Old World cultivars, and one South American cultivar) and approximately ninety species (eighty-five native, four Old World cultivars, and one South American cultivar). Bibliographical references for the native genera are included, as are illustrations, a distribution list of genera by state, and a table of morphological novelties.

RESUMEN

Se presenta una clave de los géneros de Apocynaceae de México. El estudio está basado en bibliografía, observaciones de campo y estudios de herbario. La familia está representada en México por treinta géneros (veinticinco autóctonos, cuatro del Viejo Mundo y uno de Sudamérica). Se incluyen referencias bibliográficas para los géneros autóctonos, así como ilustraciones, una lista de distribución de géneros por estados y una tabla con las novedades morfológicas.

KEY WORDS: Apocynaceae, Asclepiadaceae, Flora, Mexico

In the course of revisionary studies on various apocynaceous genera it came to my attention that the identification of numerous specimens as to genus, in several major herbaria, was erroneous. The following key has been constructed to serve as a supplementary aid to the identification of the apocynaceous genera of Mexico. Considerable detail and repetition has been included in the key to insure the utmost accuracy. I have avoided the use of minute (ex. calycine colleters) and variable characters (ex. phyllotaxy) whenever possible, however, as there is considerable convergence within the family, at times their use was necessary. The characters used within the key do not necessarily represent the entire genus, but merely represent it for those species growing within Mexico. It should also be emphasized that the key is in no way meant to reflect natural groupings; after various efforts it was deemed more effective to arrange it artificially.

The native Apocynaceae genera in Mexico are in an alphabetical list following the generic key. Recognition of genera and their accepted names

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within the list and key has been adopted from Leeuwenberg (1994). Generic synonyms within the list have been included only for those names that I have seen used in the current literature and various herbaria. The number of species in Mexico (approximate or exact) for each genus is given in the list. The species epithet is given within the key for all genera represented in Mexico by one species. The most recent and pertinent revisionary studies (dating from 1930), as well as publications of newly described species (the state of the type locality is provided), have also been provided for all of the New World genera. I have not included references for any of the Old World, non-native, cultivated genera: *Carissa*, *Catharanthus*, *Nerium*, and *Vinca*. All cultivated genera are represented in Mexico by one species (given in key). A list of general works on the Apocynaceae of Mexico and related areas (References), a tentative list of the distribution of all native genera in Mexico by state (Table 1), and a list of morphological novelties (Table 2) have also been provided. Illustrations have been included for only those characters that most readily represent the particular taxon in question and that distinguish it from morphologically similar genera.

TABLE 1. A list of the distibutions, by state, of the native genera of the Mexican Apocynaceae.

SPECIES	BJN	BJS	SON	CHI	COA	NUE	TAM	SIN	DUR	ZAC	AGU	SAN	NAY	JAL
Alstonia														X
Amsonia			X	X	X				X					
Apocynum				X	X	X	X							
Aspidosperma														
Cameraria														
Echites														X
Fernaldia							X					X		
Forsteronia														X
Haplophyton			X	X	X									
Laubertia								X						X
Mandevilla			X	X	X	X	X	X	X			X		X
Mesechites														
Odantadenia														
Pentalinon												X		
Plumeria		X	X	X						X		X	X	X
Prestonia							X							X
Rauvolfia								X				X	X	X
Rhabdadenia														
Stemmadenia			X	X				X				X	X	X
Tabernaemontana							X	X				X	X	X
Telosiphonia		X	X	X	X	X	X	X	X	X		X	X	X
Thevetia			X				X	X				X	X	X
Thenardia														X
Tintinnabularia														
Vallesia		X	X	X			X							X

Lastly, it should be noted that with the recent advent of cladistic analysis it has become evident that the Apocynaceae as traditionally circumscribed is paraphyletic. Judd et al. (1994) have recently suggested the inclusion of the Asclepiadaceae within the Apocynaceae. Although this view is becoming more widely accepted (Struwe et al. 1994) I treat the Apocynaceae (sensu A. DC., de Candolle 1844) here in its traditional sense (i.e., distinct from the Asclepiadaceae).

The following key is based on literature, field observations, and herbarium studies from the following institutions: BRIT, F, LL, MEXU, MO, TEX, and US.

KEY TO THE GENERA OF MEXICAN APOCYNACEAE

1. Anthers free from pistil head, bases obtuse (prolonged into a fork in *Allamanda*, *Tabernaemontana*, and *Stemmadenia*); aestivation of corolla bud to the left (right in *Haplophyton cimicidium* A. DC.); plant an herb, shrub, or tree, rarely scandent (*Allamanda*); leaves alternate, opposite, or whorled; fruit a dry or fleshy follicle, berry or drupe; seeds entire, winged, or ciliate along margin (*Alstonia*), not comose or if so then both apically and basally comose (*Haplophyton*) 2

COL	GUA	QUE	HID	MIC	MEX	MOR	TLA	PUE	VER	GUE	OAX	TAB	CPS	CAM	YUC	QUI
					X			X	X	X	X		X			
									X	X	X		X	X	X	X
									X			X		X	X	X
				X					X	X			X	X	X	X
		X		X	X			X	X	X	X		X		X	X
X									X	X	X	X	X			
				X		X		X			X		X			
				X	X	X				X	X					
	X	X	X	X	X	X		X	X	X	X	X	X		X	X
									X				X			
													X			
									X		X		X	X		X
								X	X	X	X		X		X	X
X				X					X	X	X		X			X
X				X	X			X	X	X	X		X	X	X	X
									X			X	X	X	X	X
X				X	X	X	X	X	X	X	X	X	X	X	X	X
			X	X	X			X	X	X	X	X	X	X	X	X
	X		X	X	X			X			X					
X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X
				X	X	X				X	X		X			
													X			
		X						X	X		X		X			X

TABLE 2. External morphological novelties of Apocynaceae genera and species found in Mexico.

Plants spiny: *Carissa macrocarpa* (Ecklon) A. DC.
Plants densely yellow tomentose: *Prestonia grandiflora* L. O. Wms., *P. mexicana* Donn. Smith
Leaves alternate: *Amsonia*, *Aspidosperma*, *Haplophyton*, *Plumeria*, *Thevetia*, *Vallesia*
Leaves whorled: *Allamanda*, *Alstonia*, *Nerium*, *Rauvolfia*
Leaf hairs with multi-cellular bases: *Haplophyton*
Leaves subcordate: various species of *Mandevilla*
Leaves with colleters on the adaxial apex of petiole: *Forsteronia*, *Mandevilla*, *Mesechites*, *Telosiphonia*, *Tintinnabularia*
Leaves with glands along the adaxial midrib: *Mandevilla hirsuta* (Rich.) K. Schum., *M. subsagittata* (R. & P.) Woodson, *M. villosa* (Meirs) Woodson
Leaves with domatia in the axils of the abaxial midrib: *Forsteronia*, *Tintinnabularia*
Corolla tube twisted: *Echites umbellata* Jacq., *Laubertia*
Corolla with thickened annulus around mouth: *Laubertia*, *Prestonia*
Calyx of four sepals, the outer two fused, inner two free: *Aspidosperma megalocarpon* Müll. Arg.
Calyx colored: *Prestonia portobellensis* (Beurl.) Woodson (purple), *Tintinnabularia* (burgundy)
Filaments coiled: *Thenardia floribunda* Kunth
Anthers with distinct filamentous apical appendages: *Cameraria*, *Nerium*, *Pentalinon*, *Tintinnabularia*
Anther exserted: *Forsteronia*, *Laubertia*, *Prestonia*, *Tabernaemontana amygdalifolia* Jacq. (only slightly so in *T. alba* Mill.), *Thenardia*
Fruits of two fused follicles: various species of *Mandevilla*, *Thenardia*
Fruits spiny: *Allamanda*
Fruits red: *Carissa*, *Rauvolfia*, *Thevetia ahouai* (L.) A. DC.
Seeds winged: *Allamanda*, *Aspidosperma*, *Plumeria*
Seeds with both basal and apical coma: *Haplophyton*
Seeds with ciliate margins: *Alstonia*

2 (1). Plants with spines in the axils of the leaves; fruit an indehiscent browinsh-red berry, seeds embedded in a pulp; occasionally naturalized species ..... **Carissa macrocarpa** (Ecklon) A. DC.
2. Plants without spines; fruit a follicle, berry or drupe; native or cultivar 3
3 (2). Anthers with distinct apical filamentous appendages; inflorescence of 1–5(–8) flowers, flowers white; fruits resembling single seeded samaras ..... **Cameraria latifolia** L.
3. Anthers without distinct apical filamentous appendages; inflorescence of 1–80 flowers, flowers blue, pink, red, yellow, or white; fruits not samaras 4
4 (3). Flowers with two distinct nectaries adjacent to ovary; plant herbaceous; occasionally naturalized species 5
5 (4). Plant prostrate; flowers solitary in leaf axils, funnelform, blue; corolla tube not apically constricted; filaments bent and longer than anthers; anthers incompletely fertile; nectaries shorter than ovary ..... **Vinca minor** L.
5. Plant erect; flowers 2–4 in axillary cymes, salverform, red, white, or pink; corolla tube apically constricted; filaments straight and shorter than anthers; anthers completely fertile; nectaries as long as or longer than ovary ..... **Catharanthus roseus** (L.) G. Don
4. Flowers with a solitary annular nectary or nectary absent; plant a herb, tree or shrub; native or cultivated 6

6 (4). Suffrutescent herb; flowers yellow; inflorescence reduced to a solitary flower in leaf axil; petals of the bud overlapping to the right (*H. cimicidum* A. DC.) or overlapping to the left (*H. crooksii* (L. D. Benson) L.D. Benson); leaves alternate to subverticillate; leaf hairs with multi-cellular bases; fruit a linear follicle; seeds with both basal and apical coma ..... **Haplophyton**

6. Herb, tree, or shrub; flowers bluish, white, or yellow; inflorescence of many flowers; petals of the bud overlapping to the left; leaves alternate, opposite, or whorled; leaves glabrous or if pubescent then with simple hairs; fruit a linear or circular follicle, berry, or drupe; seeds without coma, or if pubescent then with a ciliate margin (*Alstonia*) 7

7 (6). Leaves alternate 8

8 (7). Herbaceous perennial to 0.7 m high; flowers bluish; fruit a linear follicle with many simple seeds; restricted to northern Mexico ..... **Amsonia**

8. Tree or shrub from 1–35 m tall; flowers white, yellow, or red; fruit a linear or circular follicle with many winged seeds, or drupe with one-four nutlets; distributed throughout Mexico 9

9 (8). Tree from 7–35 m; calyx of 4 sepals, outer 2 fused and inner two free (*A. megalocarpon* Müll. Arg.), or five regular sepals (*A. spruceanum* Benth.); fruit a circular follicle, with many winged seeds ..... **Aspidosperma**

9. Shrubs from 1–6 m tall; calyx of 5 free sepals; fruit a broad follicle, berry or drupe 10

10 (9). Flowers to 1.5 cm long, typically less, salverform, white; fruit a one-seeded white fleshy drupe ..... **Vallesia**

10. Flowers much longer than 1.5 cm, funnelform or salverform, white, yellow, or red; fruit a many-seeded follicle or 1–4 seeded fleshy drupe 11

11 (10). Flowers salverform, white, red, or yellowish; corolla orifice small; calyx without colleters; fruit a thick, stout, dry follicle; seeds winged ..... **Plumeria**

11. Flowers funnelform (salverform in *T. ahouai* (L.) A. DC.), bright yellow or creamy; corolla orifice large; calyx with colleters; fruit a triangulate fleshy drupe; seeds ovoid ..... **Thevetia**

7. Leaves opposite or whorled 12

12 (7). Leaves opposite; calyx with colleters; anther bases prolonged into a fork; seeds with arils 13

13 (12). Inflorescence of 1–4(–10) flowers; corolla large and showy, tube (8–)15–30 mm long, funnelform, cream-colored or yellow; anthers included; sepals mostly leafy and not clasping the corolla base ..... **Stemmadenia**

13. Inflorescence of 10–50 flowers; corolla small, tube 7–16 mm long, salverform, white; anthers exserted or inserted; sepals mostly thick and clasping the corolla base . **Tabernaemontana**

12. Leaves whorled (occasionally opposite); calyx without colleters; anther bases obtuse or prolonged into a fork (*Allamanda*); seeds without arils 14

14 (12). Anther bases prolonged into a fork; corolla large, to 8 cm long, bright yellow; leaves without glands along the petiole; ovary 1; styles not cleft at base; fruit a spiny capsule; seeds winged; occasionally naturalized species ..... **Allamanda cathartica** L.

14. Anther bases obtuse; corolla small, to 2 cm long, white; leaves with or without glands along the petiole; ovaries 2; styles cleft at base; fruit not spiny; seeds not winged; native 15

15 (14). Petiole scattered with many colleters along its length; fruit a fleshy reddish-brown drupe; seeds glabrous ..... **Rauvolfia**

15. Petiole without colleters; fruit a linear dry follicle; seeds ciliate along the margin ..... **Alstonia**

1. Anthers fused to pistil head, bases prolonged into a fork (obtuse in *Fernaldia*); aestivation of corolla bud to the right; plants typically scandent (herbaceous in *Apocynum*; shrubby in *Nerium*, *Telosiphonia*, *Mandevilla karwinskii* (Müll. Arg.) Hemsl.); leaves opposite (whorled in *Nerium*), never alternate; fruit a dry follicle, seeds apically comose 16

16 (1). Erect herbaceous perennial to 0.9 m high; flowers small, 5–12 mm long, campanulate-tubular; corolla with internal scales at base of tube; pollen in tetrads; northern Mexico ..... **Apocynum**

16. Shrubs or lianas, occasionally suffruticose herbs (*Telosiphonia*); flowers typically large and showy, 10–70 mm long (3–9 mm in *Echites* subg. *Pseudechites*, *Forsteronia* and *Thenardia*), funnelform or salverform; corolla without internal scales at base of tube; pollen granular; throughout Mexico 17

17 (16). Pistil head pentagonal (Fig. 1b); leaves with 2–4 colleters at apex of petiole above, bases cordate (Fig. 2) or rounded; "*Mandevilla*" complex 18

18 (17). Anthers with pubescent apical filamentous appendages; filaments long and pronounced; leaves with domatia in axils of veins beneath; calyx large and showy, with burgundy margins ..... **Tintinabularia mortonii** Woodson

18. Anthers without apical appendages; filaments reduced, anthers essentially sessile; leaves without domatia in axils of veins below; calyx small and green 19

19 (18). Inflorescence compound, branched (Fig. 3b); leaf base rounded ..... **Mesechites trifida** (Jacq.) Müll. Arg.

19. Inflorescence simple and unbranched (Fig. 3a), or reduced to a solitary flower (*Telosiphonia*); leaf base cordate (Fig. 2) or rounded 20

20 (19). Lianas or suffrutescent herbs; leaves with (subg. Exothostemon) or without (subg.Mandevilla) glands along midrib of the upper surface; inflorescences many flowered; flowers diurnal, red, yellow, or white ..... **Mandevilla**

20. Suffrutescent herbs, never twining; leaves without glands along midrib of the upper surface; inflorescences reduced to a solitary flower; flowers vespertine, white ..... **Telosiphonia**

17. Pistil head fusiform (Fig. 1a); leaves without colleters at apex of peti-

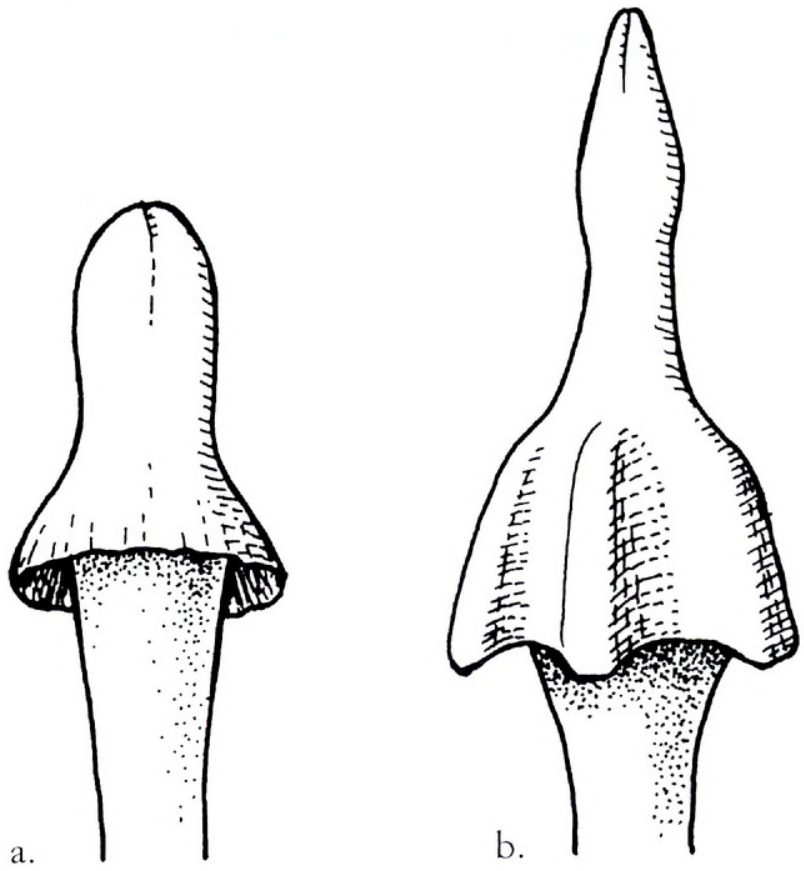

FIG. 1. Representative pistil heads: A. "*Echites*" complex. B. "*Mandevilla*" complex.

ole above, or if colleters present then solitary and leaves with domatia in the axils of veins below (*Forsteronia*), bases rounded; "*Echites*" complex 21

21 (17). Anthers with apical filamentous appendages 4–5 mm long; leaves opposite or whorled 22

22 (21). Anther appendages pubescent; shrubs; corolla with petaloid appendages within; leaves whorled (occasionally opposite); seed covered by short hairs, margins pubescent; cultivated ..... **Nerium oleander** L.

22. Anther appendages glabrous; lianas; corolla without petaloid appendages; leaves opposite; seed glabrous, coma rostrate; native and occasionally cultivated ..... **Pentalinon andrieuxii** (Muell. Arg.) Hansen & Wunderlin

21. Anthers without apical filamentous appendages; leaves opposite 23

23 (21). Sepals ovate, 5–20 mm long, 2–10 mm wide (Fig. 4b,c,d) 24

24 (23). Plants yellowish-villous or glabrous; corolla salverform; anthers exserted or included; corolla mouth with a thickened annulus; petioles subtended by pectinate glands ..... **Prestonia**

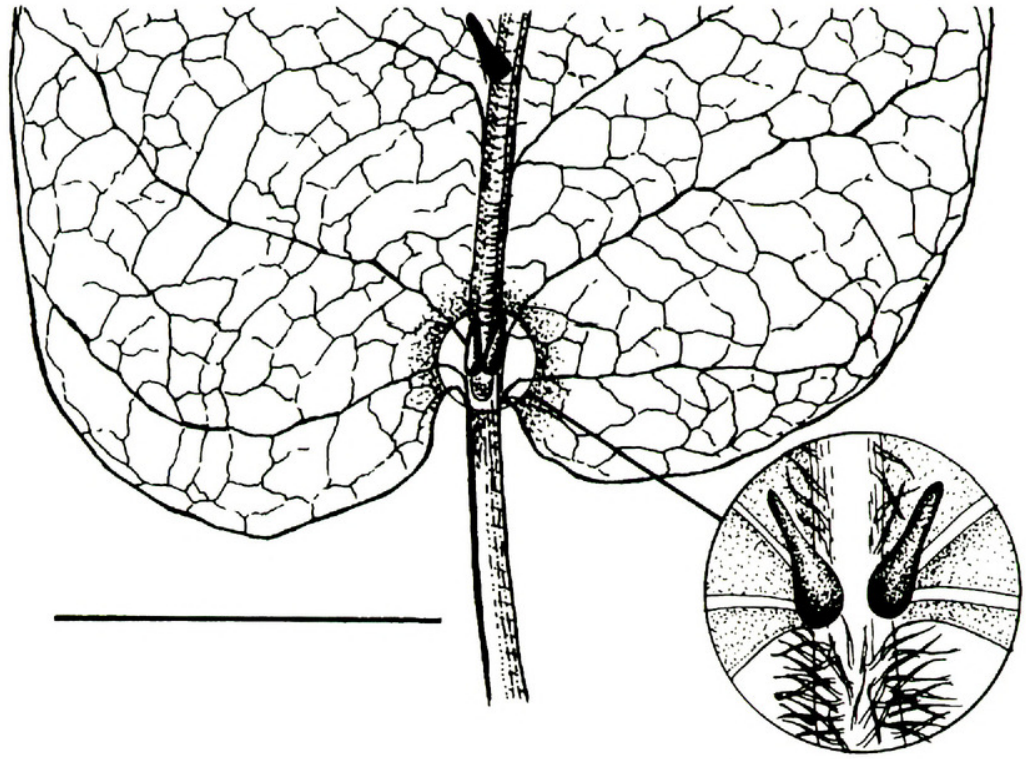

FIG. 2. Representative leaf of "*Mandevilla*" complex, showing subcordate base and position of colleters. Bar equals 5 mm.

24. Plants glabrous; corolla funnelform; anthers included; corolla mouth not thickened; petioles without pectinate glands 25
25 (24). Inflorescence of 1–4 flowers; sepals not imbricate (Fig. 4c); calycine colleters absent; anther body glabrous, the tip pubescent ..... **Rhabdadenia biflora** (Jacq.) Müll. Arg.
25. Inflorescence of 5–10 flowers; sepals imbricate (Fig. 4d); calycine colleters present, alternate the sepals; anther body pubescent, the tip glabrous ..... **Odontadenia caudigera** Woodson

23. Sepals triangular to narrowly triangular, 0.5–5.0 mm long, 0.5–1.0 mm wide (Fig. 4a) 26
26 (23). Corolla 3–5 mm long, tube 0.5–2.0 mm long; anther tip exserted 27
27 (26). Inflorescence thyrsiform; leaves inconspicuously glandular at base of midrib above, domatia in axils of veins beneath; colleters alternate calyx lobes; follicles free ..... **Forsteronia**
27. Inflorescence a subumbellate cyme; leaves eglandular above and without domatia below; colleters opposite calyx lobes; follicles fused throughout their length ..... **Thenardia**

26. Corolla 7–65 mm long, tube 7–40 mm long (4–5 mm in *Fernaldia asperoglottis* Woodson); anthers exserted (*Laubertia*) or included 28

28 (26). Anthers exserted; corolla tube twisted, mouth with a thickened annulus; sepals without colleters; ovary densely puberscent ..... **Laubertia contorta** (Mart. & Gal.) Woodson

28. Anthers included; corolla tube straight or twisted, mouth not thickened; sepals with a solitary episepalous colleter; ovary glabrous 29

29 (28). Corolla funnelform (Fig. 5c), 35–50 mm long, tube straight; corolla lobes villous ..... **Fernaldia**

29. Corolla salverform (Fig. 5a), 40–65 mm long (subg. *Echites*) or 7–9 mm long (subg. *Pseudechites*), tube straight (twisted in *E. umbellata* Jacq.); corolla lobes glabrous (villous in *E. woodsoniana* Monac.) ..... **Echites**

ALPHABETICAL LISTING OF THE NEW WORLD MEXICAN GENERA OF APOCYNACEAE

Allamanda L., Mant. 214. 1771.

TYPE SPECIES: *Allamanda cathartica* L.

Represented by one species in Mexico.

Fallen, M.E. 1985. The gynoecial development and systematic position of *Allamanda* (Apocynaceae). Amer. J. Bot. 72:572–579.

Sakane, M. and G. J. Sheperd. 1987. Uma revisão do gênero *Allamanda* L. (Apocynaceae). Rev. Brasil Bot. 9:125–149. [illus. and maps]

Note: *Allamanda* is native to South America and is represented in Mexico by the cultivated species *A. cathartica* L.

Alstonia R. Br., Mem. on Asclepiad. 64. 1810. (nom. cons.).

Type Species: *Echites scholaris* L.

Tonduzia Pittier, Contr. U.S. Natl. Herb. 12:103. 1908.

Represented by two species in Mexico.

Gentry, A. 1983. *Alstonia* (Apocynaceae): another palaeotropical genus in Central America. Ann. Missouri Bot. Gard. 70:206–207. [reduction of *Tonduzia* to *Alstonia*]

Morales, J.F. 1995 Evaluación del género *Alstonia* (Apocynaceae en Centro América). Phytologia 78:192–194.

Amsonia Walt., Fl. Car. 98. 1788.

TYPE SPECIES: *Amsonia tabernaemontana* Walt.

Represented by four species in Mexico.

McLaughlin, S.P. 1982. A revision of the southwestern species of *Amsonia* (Apocynaceae). Ann. Missouri Bot. Gard. 69:336–350. [illus. and maps]

Apocynum L., Sp. Pl. 213. 1753.

TYPE SPECIES: *Apocynum cannabinum* L.

Represented by two species in Mexico.

Woodson, R.E., Jr. 1930. Studies in the Apocynaceae I. A critical study of the Apocynoideae (with special reference to the genus *Apocynum*). Ann. Missouri Bot. Gard. 17:1–212. [maps]

FIG. 3. Inflorescence: A. *Mandevilla subsagittata* (R. & P.) Woodson. B. *Mesechites trifida* (Jacq.) Müll. Arg., scanned from *McGregor 930* (TEX), and *Contreras 2303* (TEX), respectively.

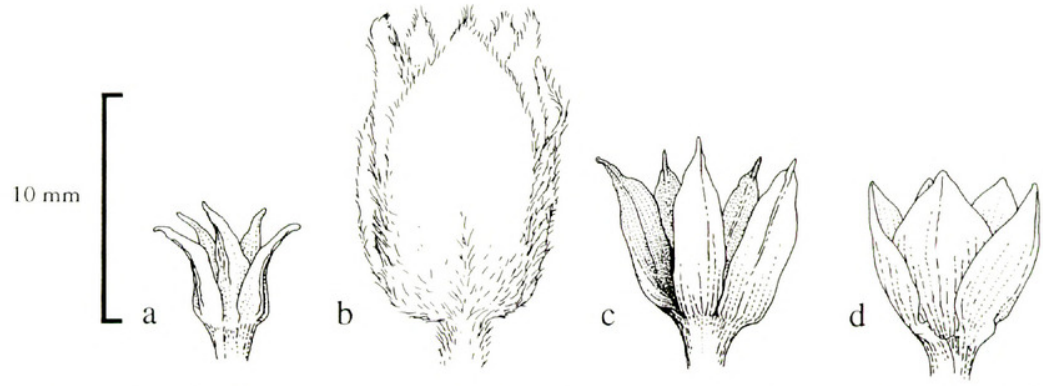

FIG. 4. Representative sepals: A. *Echites yucatanensis* Millsp. B. *Prestonia mexicana* Donn. Smith. C. *Rhabdadenia biflora* (Jacq.) Müll. Arg. D. *Odontadenia caudigera* Woodson.

Aspidosperma C. Martius & Zucc., Flora 7(1) (Beil.) 135. 1824 (nom. cons.).

TYPE SPECIES: *Aspidosperma tomentosum* C. Martius & Zucc.

Cufodontia Woodson, Arch. Bot. Sist. 10:38. 1934.

Represented by two species in Mexico.

Marcondes-Ferreira, W. 1989. *Aspidosperma* C. Martius & Zucc. nom. cons. (Apocynaceae): Estudos Taxonomicos. Doctoral Thesis, Universidade Estadual de Campinas.

Woodson, R.E., Jr. 1951. Studies in the Apocynaceae VIII. An interim revision of the genus *Aspidosperma* C. Martius & Zucc. Ann. Missouri Bot. Gard. 38:119–206. [reduction of *Cufodontia*; illus.]

Cameraria L., Sp. Pl. 210. 1753.

FIG. 5. Corolla and bud: A–B. *Echites yucatanensis* Millsp. C–D. *Fernaldia pandurata* (A. DC.) Woodson. Scanned from *Lundell 7455* (TEX), and *Williams 95-90* (TEX), respectively. **Note:** After drying, the flowers turn yellow (as seen here), however, in the field the they are in fact white.

TYPE SPECIES: *Cameraria latifolia* L.

Represented by one species in Mexico.

Woodson, R.E., Jr. 1938. *Cameraria*. In: N.L. Britton, W.A. Murrill, and J.H. Barnhart, eds. Apocynaceae. N. Amer. Fl. 29:120–121.

Note: *Cameraria* was unknown from Mexico at the time of its last revision (Woodson, cited above). It has recently been collected in the Yucatan peninsula, where represented by *C. latifolia* L.

Representative specimens. **Campeche:** 4 km W of Conhuas, 98 km along road to Escarcega, 18 Aug 1983, *Cabrera 5353* (MEXU, MO). **Tabasco:** 2 km of La N-25, along La W-0 on the road to N-20, near Un Drene, Balancan, 13 Oct 1975, *Menendez 296* (MEXU). **Quintana Roo:** Mpio. Carrillo Puerto, Sian Ka'an Biosphere Reserve, 15–20 km N of Carrillo Puerto (19° 50' N; 87° 40' W), 2 Nov 1984, *Neill 5752* (MO). **Veracruz:** Orizaba, 17 Aug 1940, *Miranda 625* (MEXU). YUCATAN: 15 kn NW of Humucma, along road Merida-Sisal, 20 Jul 1985, *Cabrera 9097* (MO).

Cascavela Raf. = **Thevetia**

Cufodontia Woodson = **Aspidosperma**

Echites P. Browne, Civ. Nat. Hist. Jamaica 182. 1756.

TYPE SPECIES: *Echites umbellata* Jacq.

Represented by five species in Mexico.

Monachino, J. 1959. A new *Echites* from Mexico. Bull. Torrey Bot. Club 86:245–247. [description of *Echites woodsoniana* Monac.; illustration; Michoacan]

Morales, J.F. 1996. A reevaluaion of the genus *Echites* (Apocynaceae). Brittonia (in press).

Woodson, R.E., Jr. 1936. Studies in the Apocynaceae IV. Ann. Missouri Bot. Gard. 23:169–438. [*Echites* 217–252]

Fernaldia Woodson, Ann. Missouri Bot. Gard. 19:48. 1932.

TYPE SPECIES: *Echites pandurata* A. DC.

Represented by two species in Mexico.

Morton, J. F., Alvarez, E., and Quiânonez, C. 1990. Loroco, *Fernaldia pandurata* (A. DC.) Woodson (Apocynaceae): a popular edible flower of Central America. Econ. Bot. 44:301–310.

Woodson, R.E., Jr. 1932. New or otherwise noteworthy Apocynaceae of tropical America II. Ann. Missouri Bot. Gard. 19:48–49. [erection of *Fernaldia*; illustration]

_____. 1936. Studies in the Apocynaceae IV. Ann. Missouri Bot. Gard. 23:169–438. [*Fernaldia* 260–263]

_____. 1939. New or otherwise noteworthy Apocynaceae of tropical America VI. Ann. Missouri Bot. Gard. 26:96–97. [description of *Fernaldia asperoglottis* Woodson; Guerrero]

Note: *Fernaldia* is often confused with *Echites* subgenus *Echites*, it can be readily distinguished from subg. *Echites* by its funnelform corolla (Fig. 5c).

Forsteronia G. Mey., Prim. Fl. Esseq. 133. 1818.

TYPE SPECIES: *Echites spicata* Jacq.

Represented by four species in Mexico.

Hansen, B.F. 1985. A monographic revision of *Forsteronia* (Apocynaceae). Doctoral Thesis. University of South Florida. [illus. and maps]

Haplophyton A. DC., Prodr. 8:412. 1844.

TYPE SPECIES: *Haplophyton cimicidum* A. DC.

Represented by two species in Mexico.

Nelson, C. 1994. *Haplophyton cimicidum* A. DC. versus *Haplophyton cinereum* (A. Rich.) Woodson (Apocynaceae). Fontqueria 40:49–52.

Williams, J.K. 1995. Miscellaneous notes on *Haplophyton* (Apocynaceae: Plumerieae: Haplophytinae). Sida 16:469–475. [maps]

Laubertia A. DC., Prodr. 8:486. 1844.

TYPE SPECIES: *Laubertia boissierii* A. DC.

Streptotrachelus Greenman, Proc. Amer. Acad. Arts 32:298. 1897.

Represented by one species in Mexico.

Woodson, R.E., Jr. 1936. Studies in the Apocynaceae IV. Ann. Missouri Bot. Gard. 23:169–438. [*Laubertia* 370–375]

Macrosiphonia Müll. Arg. subg. *Telosiphonia* Woodson = **Telosiphonia**

Mandevilla Lindl., Edwards's Bot. Reg. 26:t. 7. 1840.

TYPE SPECIES: *Mandevilla suaveolens* Lindl.

Represented by approximately 18 species in Mexico.

Lundell, C.L. 1942. Studies of American Spermatophytes II. Contr. Univ. Mich. Herb. 7:46–47. [description of *Mandevilla mollis* Lundell; Chiapas]

Woodson, R.E., Jr. 1933. Studies in the Apocynaceae IV. Ann. Missouri Bot. Gard. 20:605–790. [*Mandevilla* 645–777]

Note: *Mandevilla* is often confused with *Echites*, it can be readily distinguished from *Echites* by its colleters along the petiole apex (Fig. 2) and its pentagonal pistil head (Fig. 1b).

Mesechites Müll. Arg., Fl. Bras. 6:150. 1860.

TYPE SPECIES: *Mesechites mansoana* A. DC.

Represented by one species in Mexico.

Woodson, R.E., Jr. 1933. Studies in the Apocynaceae IV. Ann. Missouri Bot. Gard. 20:605–790. [*Mesechites* 629–645]

Note: *Mesechites* is often confused with *Mandevilla*, it can be readily distinguished from *Mandevilla* by its branching inflorescence (Fig. 3b).

Odontadenia Benth., J. Bot. (Hooker) 3:242. 1841.

TYPE SPECIES: *Odontadenia spicata* Benth.

Represented by one species in Mexico.

Woodson, R.E., Jr. 1935. Studies in the Apocynaceae IV. Ann. Missouri Bot. Gard. 22:153–306. [*Odontadenia* 270–306]

_____. 1936. Studies in the Apocynaceae IV. Ann. Missouri Bot. Gard. 23:169–438. [*Odontadenia* 384–386; description of *Odontadenia caudigera* Woodson]

Note: *Odontadenia* was unknown from Mexico at the time of its last revision (Woodson, cited above). It has recently been collected in the state of Chiapas, Mexico, where represented by the species *O. caudigera* Woodson.

Representative specimens. **Chiapas:** Mpio. Ocosingo, in Ejdo El Piró, 15 km E of Chajul, on the road to Boca Lacantum, 16 Apr 1986, *Martínez 18212* (MEXU).

Pentalinon Voigt, Hortus Suburb. Calcut. 523. 1845.

TYPE SPECIES: *Echites suberectum* Jacq.

Urechites Müll. Arg., Bot. Zeitung 18:22. 1860.

Represented by one species in Mexico.

Hansen, B.F., and R.P. Wunderlin. 1986. *Pentalinon* Voigt, an earlier name for *Urechites* Müll. Arg. (Apocynaceae). Taxon 35:166–168.

Peschiera A. DC. = Tabernaemontana

Plumeria L., Sp. Pl. 209. 1753.

TYPE SPECIES: *Plumeria rubra* L.

Represented by approximately two species in Mexico.

Bandyopadhyaya, M., and P. C. Dutta. 1986. Comparative anatomy of different species of *Plumeria*. Bull. Bot. Soc. Bengal 40:59–66.

Woodson, R.E., Jr. 1938. An Evaluation of the Genera *Plumeria* L. and *Himatanthus* Willd. Ann. Missouri Bot. Gard. 25:189–224.

Plumeriopsis Rusby & Woodson = Thevetia

Prestonia R. Br., on Asclepiad. 58. 1810 (nom. cons.).

TYPE SPECIES: *Prestonia tomentosa* R. Br.

Represented by approximately three species in Mexico.

Gentry, A. 1983. A new combination for a problematic Central American Apocynaceae. Ann. Missouri Bot. Gard. 70:205–206. [transfer of *Echites woodsoniana* Monac. to *Prestonia*]

Williams, L.O. 1968. Tropical American Plants, IX. Fieldiana, Bot. 31:402–403. [description of *Prestonia grandiflora* L. O. Wms.; Chiapas]

Woodson, R.E., Jr. 1936. Studies in the Apocynaceae IV. Ann. Missouri Bot. Gard. 23:169–438. [*Prestonia* 276–367]

Note: *Prestonia* is subdivided into four sections. Two sections (*Coalitae* and *Acutifoliae*) are not represented in Mexico, they are characterized by having small and inconspicuous sepals similar to those of *Echites* (Fig. 4a). The other two sections (*Annulares* and *Tomentosae*) are represented in Mexico by one or two species each, they are characterized by large foliaceous sepals (Fig. 4b). Gentry (cited above) transfered *Echites woodsoniana* Monac. to *Prestonia*, relating it to members of sect. *Coalitae*. Because of the confusing nature of generic delimitations in the Apocynaceae, and the lack of a corolla annulus in *E.woodsoniana*, he was not confident of his transfer. I am inclined to

maintain the species in *Echites* given that at present no other Mexican species of *Prestonia* have inconspicuous sepals and because of the taxon's lack of a corolla annulus and pectinate glands at the base of the petiole.

Rauvolfia L., Sp. Pl. 208. 1753.

TYPE SPECIES: *Rauvolfia tetraphylla* L.

Rauwolfia Gleditsch, Syst. 212. 1764 (orth. var.).

Represented by two species in Mexico.

Rao, A.S. 1956. A revision of *Rauvolfia* with particular reference to the American species. Ann. Missouri Bot. Gard. 43:253–355. [illus. and maps]

Rauwolfia Gleditsch = **Rauvolfia**

Rhabdadenia Müll. Arg., Fl. Brasil 6:173. 1860.

TYPE SPECIES: *Rhabdadenia pohlii* Müll. Arg.

Represented by one species in Mexico.

Woodson, R.E., Jr. 1936. Studies in the Apocynaceae IV. Ann. Missouri Bot. Gard. 23:169–438. [*Rhabdadenia* 205–211]

Stemmadenia Benth., Bot. Voyage Sulphur 124. 1845.

TYPE SPECIES: *Stemmadenia glabra* Benth.

Represented by six species in Mexico.

Allorge, L. 1985. Monographie des Apocynacées-Tabernaemontanoïdées Américaines, Morphologies, Systématique, Chimio-taxonomie. Mém. Mus. Natn. Hist. Nat. Paris, n.s. 30:1–216. [illus.]

Leeuwenberg, A.J.M. 1994. Index of exsiccatae of *Tabernaemontana*, the New World species, and *Stemmadenia*. Wageningen, Netherlands: Dept. of Plant Taxonomy, Wageningen Agricultural University.

_____. 1994. A revision of *Tabernaemontana*. Two. The New World species and *Stemmadenia*. The Royal Botanic Gardens, Kew, Richmond. [illus. and maps]

Streptotrachelus Greenman = **Laubertia**

Tabernaemontana L., Sp. Pl. 210. 1753.

TYPE SPECIES: *Tabernaemontana citrifolia* L.

Peschiera A. DC., Prodr. 8:360. 1844.

Represented by three species in Mexico.

Allorge, L. 1985. Monographie des Apocynacées-Tabernaemontanoïdées Américaines, Morphologies, Systématique, Chimio-taxonomie. Mém. Mus. Natn. Hist. Nat. Paris, n.s. 30:1–216. [illus.]

Leeuwenberg, A.J.M. 1994. Index of exsiccatae of *Tabernaemontana*, the New World species, and *Stemmadenia*. Wageningen, Netherlands: Dept. of Plant Taxonomy, Wageningen Agricultural University.

_____. 1994. A Revision of *Tabernaemontana*. Two. The New World Species and *Stemmadenia*. The Royal Botanic Gardens, Kew, Richmond. [illus. and maps]

Telosiphonia (Woodson) Henrickson, Aliso 14:179–195. 1995 [1996]

TYPE SPECIES: *Echites hypoleuca* Benth.

Macrosiphonia Müll. Arg. subg. *Telosiphonia* Woodson, Ann. Missouri Bot. Gard. 20:778. 1933.

Represented by six species in Mexico.

Henrickson, J. 1995 [1996]. Studies in *Macrosiphonia* (Apocynaceae): Generic recognition of *Telosiphonia*. Aliso 14:179–195. [transfer of North American *Macrosiphonia* to *Telosiphonia*; illus. and maps]

Note: It has been recently suggested by Henrickson (cited above) that *Macrosiphonia* is at present polyphyletic: the North American species (subg. *Telosiphonia*) having no relation to the South American ones (subg. *Macrosiphonia*). Henrickson has proposed the transfer of the North American species to the newly erected genus *Telosiphonia*.

Thenardia Kunth, Nova Gen. Sp. 3:209. 1819.

TYPE SPECIES: *Thenardia floribunda* Kunth

Represented by three species in Mexico.

Woodson, R.E., Jr. 1936. Studies in the Apocynaceae IV. Ann. Missouri Bot. Gard. 23:169–438. [*Thenardia* 271–276]

Williams, J.K. 1995. A new species of *Thenardia* with notes on the genus. Brittonia 47:403–407. [description of *Thenardia chiapensis* J. K. Williams; illus.; Chiapas]

Note: *Thenardia* is the only apocynaceous genus endemic to Mexico. Currently, there are five species recognized in *Thenardia*, however, recent evidence (Williams, in prep.) suggests that two of these, *T. gonolobies* Woodson and *T. tubulifera* Woodson, should be reduced to synonymy under *T. galeottiana* Baillon and *T. floribunda* Kunth, respectively.

Thevetia L., Opera Varia 212. 1758 (nom. cons.).

TYPE SPECIES: *Cerbera ahouai* L.

Cascavela Raf., Sylva Tell. 162. 1838.

Plumeriopsis Rusby & Woodson, Ann. Missouri Bot. Gard. 24:11. 1937.

Represented by six species in Mexico.

Costa, E. de L. and C.G. Costa. 1980. Consideracões sobre o fruto de *Plumeriopsis ahouai* (L.) Rusby & Woodson (Apocynaceae). Rodriguésia 32(55):65–72.

Gensel, W.H. 1969 A revision of the genus *Thevetia* (Apocynaceae). Masters Thesis. University of Connecticut. [illus. and maps]

Williams, J.K. 1996. A new combination in *Thevetia* (Apocynaceae). Sida 17:185–190. [elevation of *T. peruviana* (Pers.) K. Schum. var. *pinifolia* Standl. & Steyerm. to species; maps; Michoacan]

Woodson, R.E., Jr. 1937. New or otherwise noteworthy Apocynaceae of tropical America V. Ann. Missouri Bot. Gard. 24:11–12. [erection of *Plumeriopsis*]

Note: When Rusby and Woodson (Woodson 1937, cited above) described the monotypic *Plumeriopsis* (*P. ahouai* (L.) Rusby & Woodson) they distinguished it from *Thevetia* on the basis of its baccate fruits (vs. drupaceous) and salverform corollas with reflexed lobes (vs. funnelform and spreading or erect). They reported that both genera had "brilliant red" mesocarps. My observations in the field, however, indicate that *Plumeriopsis* has red fruits and that the fruits of *Thevetia* are green when immature and blackish when mature. *Plumeriopsis* shares all other morphological (phyllotaxy, stigma and stamen) features with *Thevetia* and I treat it is a synonym of *Thevetia*.

Tintinnabularia Woodson, Ann. Missouri Bot. Gard. 23:387. 1936.

TYPE SPECIES: *Tintinnabularia mortonii* Woodson

Represented by one species in Mexico.

Woodson, R.E., Jr. 1936. Studies in the Apocynaceae IV. Ann. Missouri Bot. Gard. 23:169–438. [*Tintinnabularia* 387–391; erection of *Tintinnabularia*; illustration]

Note: *Tintinnabularia* is an extremely beautiful and elusive monotypic genus, which has been rarely collected. I took a field trip (Summer 1995) to the two most recent collection sites from Chiapas, Mexico (see below) in order to collect fruits, which are at present unknown. However, as a result of the area being converted into grazing land, the plant was not found. The native vegetation was replaced by weedy forbs and other adventive weeds.

Representative specimens. **Chiapas:** Municipio of Solosuchiapa, steeped walled canyon along a fast moving stream with seasonal Evergreen Forest, 2–4 km below Ixhuatan along road to Pichucalco, 8 May 1973, *Breedlove 34900* (TEX); Municipio of La Trinitaria, slopes with Montane Rain Forest, E of Laguna Tzikaw, Monte Bello National Park, 1300 m, 13 May 1973, *Breedlove 35191* (TEX).

Tonduzia Pittier = **Alstonia**

Urechites Müll. Arg. = **Pentalinon**

Vallesia Ruíz & Pavón, Fl. Peruv. Prodr. 28. 1794.

TYPE SPECIES: *Rauvolfia glabra* Cav.

Represented by approximately four species in Mexico.

Woodson, R.E., Jr. 1938. *Vallesia*. In: N.L. Britton, W.A. Murrill, and J.H. Barnhart, eds. Apocynaceae. N. Amer. Fl. 29:138–141.

Note: Woodson (cited above) recognized six species of *Vallesia* in Mexico. Preliminary research suggests, however, that *V. baileyana* Woodson and *V. conzattii* Standley should be treated as synonyms of *V. lanciniata* Brand., reducing the number of species in Mexico to four. Further examination is needed, however, before a definitive treatment can be resolved.

ADDITIONAL GENUS

Trachelospermum Lemaire, Jard. Fleur. 1:pl. 61. 1851.

TYPE SPECIES: *Rhynchospermum jasminoides* Lindl.

Note: *Trachelospermum jasminoides* (Lindl.) Lemaire, a native of Asia, is occasionally cultivated in Mexico. The genus is represented by one species in North America, *T. difforme* (Walt.) A. Gray, but this species has not been reported from Mexico. *Trachelospermum* is distinguished by its scandent habit, opposite leaves, fragrant white salverform corollas (5–6 mm long), and connivent anthers. The genus has not become naturalized in Mexico. Below is the only specimen from Mexico that I have seen in any of the herbaria examined.

Representative specimens. **Sonora:** Hermosilo, cultivated, 6 May 1922, *Malsallago 503* (MEXU).

Author's note: Scanned images of representative herbarium specimens of selected Apocynaceae species in Mexico, with distribution maps, are available on the World Wide Web. These images can be found on the home page of the Plant Resources Center at the University of Texas (http://www.utexas.edu/ftp/depts/prc/).

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REFERENCES

ACOSTA, O.C. 1984. La familia Apocynaceae en el estado de Quintana Roo, Mexico. Masters Thesis. Universidad Nacional Autónoma de Mexico. [illus. and maps]

DE CANDOLLE, A.L. 1844. Apocynaceae. In: A.P. de Candolle, Prodromus systematis naturalis regni vegetabilis. Fortin, Masson & cie, Paris. 8:412–413.

GENTRY, A.H. 1993. A field guide to the families and genera of woody plants of northwest South America (Colombia, Ecuador, Peru) with supplementary notes on herbaceous taxa. Conservation International. Washington, D.C. [illus.]

JUDD, W.S., R.W. SANDERS, and M.J. DONOGHUE. 1994. Angiosperm family pairs: preliminary phylogenetic analysis. Harvard Papers in Botany 5:1–51. [reduction of the Asclepiadaceae to the Apocynaceae]

LEEUWENBERG, A.J.M. 1994. Taxa of the Apocynaceae above the genus level. Agric. Univ. Wageningen Papers 94-(3):45–60.

ROSATTI, T. 1989. The genera of suborder Apocynineae (Apocynaceae and Asclepiadaceae) in the southeastern United States, Apocynaceae. J. Arnold Arbor. 70:307–401. [illus.]

STANDLEY, P.C. and L.O. WILLIAMS. 1969 . Apocynaceae. In: Flora of Guatemala. Fieldiana, Bot. 24(8):335–407. [illus.]

STRUWE, L., V.A. ALBERT, and B. BREMER. 1994. Cladistics and family level classification of the Gentianales. Cladistics 10:175–206.

WOODSON, R.E., JR. 1933. Studies in the Apocynaceae IV. The American genera of Echitoideae. Ann. Missouri Bot. Gard. 20:605–790.

_____. 1935. Studies in the Apocynaceae IV. The American genera of Echitoideae (continuation). Ann. Missouri Bot. Gard. 22:153–306.

_____. 1936. Studies in the Apocynaceae IV. The American genera of Echitoideae (concluded). Ann. Missouri Bot. Gard. 23:169–438.

_____. 1938. Apocynaceae. In: N.L. Britton, W.A. Murrill, and J.H. Barnhart, eds. North American Flora. New York Botanical Garden, New York. vol. 29:103–192.

_____. 1940. The Apocynaceous Flora of the Yucatan Peninsula. In: C.L. Lundell, ed. Botany of the Maya Area. XV. Carnegie Inst., Washington Publ. 522:59–102.