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A SYNOPSIS OF *ASPIDOSPERMA* (APOCYNACEAE) IN MEXICO AND CENTRAL AMERICA WITH A TAXONOMIC CLARIFICATION OF *ASPIDOSPERMA CRUENTUM* AND A NEW CRYPTIC SPECIES

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ABSTRACT

We present a synopsis of *Aspidosperma* (Apocynaceae, Rauvolfioideae) in Mexico and Central America, recognizing seven species, including a new species described as **Aspidosperma crypticum** J.F. Morales & N. Zamora. *Aspidosperma cruentum* is accepted as a valid species and *A. desmanthum* and *A. spruceanum* are excluded of the Central America flora. A key to the species, relevant synonymy, and illustrations are included. Lectotypes are selected for *Aspidosperma excelsum* and *Geissospermum myristicifolium*.

Aspidosperma Mart. & Zucc. (Apocynaceae, Rauvolfioideae) occurs from southern Mexico to northern Argentina (excluding Chile) and the Antilles. The total number of accepted species has varied between monographs: Woodson (1951) recognized 52 species, whereas Marcondes-Ferreira (1988) accepted 34 and Potgieter (1999) 36 species. Floristics treatments or publications dealing with *Aspidosperma* also reported different species numbers during the last 26 years: 43 (Koch & Kinoshita 1999; Simões & Kinoshita 2002), 44 (Marcondes-Ferreira 1999; Morokawa et al. 2013; Pereira et al. (2016), 45 (Marcondes-Ferreira & Kinoshita 1996; Morales 2005), 46 (Morales 2009 a,b), 50 (Ezcurra 1981), and 55 Machate et al. (2016) among others. Therefore, the current number of species is uncertain. The intraspecific variation of some species makes *Aspidosperma* one of the most complex genera of the Neotropical Apocynaceae. Most species have a large number of synonyms and the circumscriptions of several species still need to be clarified.

Brazil is the center of diversity of *Aspidosperma* with more than 39 species reported, ten of them endemic there (Machate et al. 2016; Pereira et al. 2016). In contrast, Mexico and Central America have a low diversity, with only 6 species recorded (Potgieter 2010). However, some species have been involved in a dispute concerning the correct names that should be used for them.

Aspidosperma megalocarpon Müll. Arg. (1860), was the first species described for Mexico (Veracruz) and Central America. The type consists of a single collection with fruits. The fruit surface is smooth, without longitudinal ribs and with a short basal stipite.

Cufodontia Woodson (Woodson 1934a) was considered distinct from *Aspidosperma* by its bilobed calyx. Two species were described in the original publication: *C. lundelliana* Woodson and *C. stegomeris* Woodson. Woodson (1934b) described one additional species (*C. arborea* Woodson), increasing the number to three species. In the prologue, he stated that the fruits were unknown for the

three species. Matuda (1950) proposed *C. escuintlensis* Matuda, which was the first type collection with both flowers and fruits.

The type collection of *Aspidosperma lundellianum* Woodson from Campeche, Mexico, with flowers (bilobed calyx) and fruits, resembles *A. megalocarpon* (Woodson 1935). In the same publication, *A. cruentum* Woodson was described based on a fruiting collection from Guatemala. The type collection of *A. cruentum* has fruits with a conspicuous stipite ca. 3.5 cm long.

In the Flora of North America (Woodson 1938) reported three species of *Aspidosperma* in Mexico and Central America: *A. cruentum*, *A. lundellianum* Woodson, and *A. megalocarpon*. Lundell (1939) and Matuda 1950) described two additional species, *A. matudae* Lundell and *A. chiapense* Matuda, respectively, the last including a form (*A. chiapense* f. *tenax* Matuda).

Woodson (1951) reduced *Cufodontia* into *Aspidosperma*, proposing *A. stegomeris* (Woodson) Woodson and relegating the remaining species of *Cufodontia* and *A. lundellianum* into the synonymy (all with bilobed calyces). However, he relegated *A. cruentum*, *A. matudae*, *A. chiapense*, and *A. chiapense* f. *tenax* into the synonymy of *A. megalocarpon*, even though the differences on leaf venation, number of calyx lobes (5 vs 2), and fruit shape (conspicuously stipitate vs. shortly stipitate or non-stipitate). After this, *A. cruentum* would be involved in taxonomic confusion that would last more than 80 years.

Allen (1956), probably following Woodson (1951), included a detailed description and illustration of *Aspidosperma* (which matched with the type of *Aspidosperma cruentum*) but was named as *A. megalocarpon*. The voucher collection (*Allen 5544*, CR) has flowers with five sepals (instead of bilobed calyces as those reported in *A. megalocarpon*) and fruits with a well developed basal stipite (which is very small in *A. megalocarpon*).

Standley and Williams (1969) recognized two species of *Aspidosperma* in Guatemala, *A. megalocarpon* and *A. stegomeris*, probably following Woodson (1951). Nowicke (1970) reported *A. darienense* Woodson ex Dwyer and *A. megalocarpon* from Panama but followed Woodson (1951) and maintained *A. cruentum* in the synonymy.

Two unpublished monographs of *Aspidosperma* (Marcondes-Ferreira 1988; Potgieter 1999) have clarified the circumscription of *A. megalocarpon*, including in the synonymy *Cufodontia stegomeris*, *C. lundelliana*, *C. arborea*, *A. lundellianum*, and *C. escuintlensis*. They removed *A. cruentum*, *A. matudae*, and *A. chiapense* (including *A. chiapense* f. *tenax*) from the synonymy of *A. megalocarpon* and placed them under *A. spruceanum* Benth. ex Müll. Arg. or *A. desmanthum* Benth. ex Müll. Arg., respectively. Woodson (1951) reported *A. spruceanum* as endemic to northern Brazil, occurring on periodically inundated Amazonian forest, whereas *A. desmanthum* was distributed in Colombia, Venezuela, Guianas, and Brazil.

Morales (2005) accepted the circumscription proposed by Marcondes-Ferreira (1988), but in his treatment of the Apocynaceae of Guatemala and Honduras (Morales, 2009 a, b) he removed *Aspidosperma cruentum*, *A. matudae*, and *A. chiapense* from the synonymy of *A. spruceanum* (considered restricted to the Amazonian basin) and placed them under *A. desmanthum*, as proposed by Potgieter (1999). These works were overlooked by Pereira et al. (2016), who still reported *A. spruceanum* for Mexico and Central America.

Studying material for the Flora of Colombia series and working on a new treatment of the Apocynaceae of Panama, all the type collections of *Aspidosperma* reported for those countries have been examined. As result, we found that the name *A. desmanthum* has been misapplied for the

material of Mexico, Central America, and Colombia (partially), including collections of an undescribed species

In order to clarify the taxonomic confusion around *Aspidosperma cruentum* Woodson, (which need to be reinstated here as a valid species), we provide a brief synopsis of *Aspidosperma* in Mexico and Central America.

KEY TO THE SPECIES OF *ASPIDOSPERMA* IN MEXICO AND CENTRAL AMERICA

1. Calyx 2-lobed; follicles creamish-lepidote ..... 5. **Aspidosperma megalocarpon**
1. Calyx 4-5-6-lobed; follicles tomentose, tomentulose, inconspicuously puberulent to glabrous or glabrate, black, ferrugineous, brown, white to creamish white.

2. Trunk irregularly and longidutinally channelled; venation brochidodromous, secondary veins not parallel between them; follicles without longitudinal ribs.

3. Corolla lobes 1.5–2 mm; fruits conspicuously and irregularly verrucose ..... 4. **Aspidosperma excelsum**
3. Corolla lobes 3–8 mm; fruits smooth.

4. Twigs glabrous; calyx 5-lobed, sepals 1.5–2 mm; follicles glabrous, black when dry ..... 7. **Aspidosperma rigidum**
4. Twigs ferrugineous-tomentulose; calyx 2- or 4-lobed, sepals 2–4 mm; follicles tomentose or lepidote; tan, brown or ferrugineous when dry ..... 6. **Aspidosperma myristicifolium**

2. Trunk more or less cylindric or irregularly and longidutinally channelled (*A. darienense*); venation craspedodromous, secondary veins more or less parallel between them; follicles with or without longitudinal ribs.

5. Calyx 5–6-lobed; inflorescence lateral and ramiflorous or axillary; follicles without longitudinal ribs ..... 3. **Aspidosperma darienense**
5. Calyx 5-lobed; inflorescence terminal or subterminal; follicles with longitudinal ribs.

6. Trunk with milky sap, twigs with red o orange sap; leaf blades with 28–36 pairs of secondary veins; pedicels 1–3 mm; calyx lobes 1–2 mm long, glabrous on the inner surface; corolla lobes 1.3–2.2 mm; stipite 3.5–6 cm ..... 1. **Aspidosperma cruentum**
6. Trunk and twigs with milky sap; leaf blades with 38–50(+) pairs of secondary veins; pedicels 0–1.5 mm; calyx lobes 2.5–3.1 mm long, tomentulose only at the apex on the inner surface; corolla lobes 4–5 mm; stipite 1.5–3 cm ..... 2. **Aspidosperma crypticum**

1. ASPIDOSPERMA CRUENTUM Woodson, Amer. J. Bot. 22: 634. 1935. **TYPE: GUATEMALA**. **Petén**. Uaxactún, 16 Apr 1931, *H. Bartlett 12750* (holotype: MO; isotypes: MICH, NY 00061273, S 04-1706, US 00111786). Figs. 1 A–D, 2A, 3B, 4.

Aspidosperma matudae Lundell, Phytologia 1: 339. 1939. **TYPE: MEXICO**. **Chiapas**. Escuintla, Jan 1938, *E. Matuda 2030* (holotype: MICH; isotypes: A 00057208, CAS 0000787, F 0095442F, 0095443F, photo F neg. 64654, GH 00057207, K 000975145, LL 00000191, LL 00372516, MEXU 00090166, MEXU 00537836, MO, NY, US 00111806).

Aspidosperma chiapense Matuda, Madroño 10: 172. 1950. **TYPE: MEXICO. Chiapas**. Escuintla, La Esperanza, 15 Feb 1946, *E. Matuda 16361* (holotype: MEXU [MEXU00109025]; isotypes: CAS, EAP 90583, ENCB, F 0092440F, photo F neg. 64015, MEXU 00090368, MICH, NY 00061274, US 00111784).

Aspidosperma chiapense Matuda f. *tenax* Matuda, Madroño 10: 173. 1950. **TYPE: MEXICO. Chiapas**. Escuintla, La Esperanza, 25 Jan 1948, *E. Matuda 17386* (holotype: MEXU; isotypes: ENCB, F 0092439F, photo F neg. 63797, MEXU 00108898, MICH, NY 00061274).

Trees 8–40 m tall, trunk straight and cylindric, young branchlets somewhat angulate and densely adpressed-tomentulose, lepidote, subterete to terete when old, old branchlets with indument more sparse, drying olive green or tan, trunk with milky sap, twigs with red o orange sap. **Leaves**: blade 8–21 × 3.5–7.3 cm, narrowly elliptic to narrowly obovate-elliptic, the apex acute to shortly acuminate, the base obtuse to acute, glabrous on both surfaces (including the midvein), venation craspedodromous, with 28–36 pairs of secondary veins, tertiary veins more or less parallel to the secondary veins, petiole 18–31 mm. **Inflorescence** terminal, many-flowered, densely adpressed-tomentulose, peduncles 15–72 mm, pedicels 1–3 mm; calyx 5–lobed, lobes 1–2 × 0.8–1 mm, ovate, acute to obtuse at the apex, densely tomentulose externally, glabrous on the inner surface; **corolla** white to yellow, externally glabrous, tube 3.9–4.1 mm, lobes 1.3–2.2 × 0.3–0.4 mm, narrowly ovate, the apex acute, no twisted; anthers 0.6–0.7 mm, ovary ca. 1 mm, style-head ca. 0.4 mm. **Follicles** 21–24 × 9.5–12.5 cm, stipitate, the stipite 3.5–6 cm, obovoid, drying white to creamish white, densely tomentulose, usually with conspicuous longitudinal ribs, sometimes with a conspicuous medial rib, without lenticels; seeds 8–10 cm in diam.

Distribution. Mexico to Colombia.

Aspidosperma cruentum is easily distinguished by its corolla lobes not twisted, 1.3–2.2 mm length, calyx lobes 1–2 mm length, and fruits with a well developed basal stipite 3.5–6 cm length (fig. 2A). *Aspidosperma cruentum* is recognized again as a valid species after being included in the synonymy of *A. desmanthum*, *A. megalocarpon*, and *A. spruceanum* (e.g., Allen 1956; Woodson 1951; Marcondes-Ferreira 1988; Morales 2005, 2009 a,b). *Aspidosperma megalocarpon* differs by its bilobed calyx (a character uncommon in *Aspidosperma*), and lepidote fruits, without longitudinal ribs.

We agree with the circumscription of *Aspidosperma spruceanum* given by Woodson (1951) and (Potgieter 1999), partially with that of Pereira et al. (2016) (excluding the distribution range), and disagree with that of Marcondes-Ferreira (1988). *Aspidosperma spruceanum* should be considered restricted to the Amazonian basin. It is a remarkable species by its leaf blades, which are white abaxially (by the minute and dense glaucous indument). This character is easy to see even in dried specimens. In *A. cruentum* and *A. desmanthum*, sometimes the leaves are inconspicuously glaucous underneath when fresh, but turning to olive green or brown when dry.

Aspidosperma desmanthum should be also considered restricted to the Amazonian basin. The distribution range given by Potgieter (1999), Morales (2009 a,b), Potgieter (2010), and Pereira et al. (2016) is based on material of *A. cruentum*.

Lundell (1939) described the calyx lobes of *Aspidosperma matudae* ca. 2.6 mm length and corolla lobes ca. 3 mm, but the type has the calyx lobes ca. 2 mm length and corolla lobes ca. 2 mm length.

Representative specimens examined. MEXICO. Chiapas. Esperanza, Escuintla, 15 Aug 1948, *Maduta 18412* (JEPS, MEXU). **Quintana Roo**. La Unión, 9 km al N, 4 Mar 1980, *Téllez & Cabrera 1664* (MEXU, MO). **BELIZE. Cayo**. Hummingbird Highway, 19.5 mi S of Western Highway, 15 Jul 1995, *Atha & Walker 1156* (NY). **Orange Walk**. 3.6 km S of Program For Belize Camp, 12 May 1991, *Arvigo et al. 489* (NY, WAG). **Stann Creek**. Middlesey, 25 May 1939, *Gentle 2800* (K). **Toledo**. Firetail Creek, drainage into the Blades branch of the Monkey river, 4 Oct 2004, *Brewer 1859* (MO). **GUATEMALA. Petén**. Póptum, 21 Jan 1965, *Meneses 36* (USCG). **HONDURAS. Gracias a Dios**. Al N de Krausirpe, 7 Aug 1994, *House 2080* (TEFH).

NICARAGUA. Jinotega. San Andrés, municipio de Wiwili, reserva de Bosawas, comunidad de San Andrés, río Coco, 4 Feb 2006, *Coronado et al. 3335* (MO). **Rio San Juan**. Municipio El Castillo, refugio Bartola, 15 Feb 2005, *Rueda et al. 17872* (MO). **COSTA RICA. Cartago**. Cajón de Turrialba, 15 May 1974, *Poveda s.n.* (CR). **Heredia**. Sarapiqui, llanura de San Carlos, Los Arbolitos, al N de Puerto Viejo, 4 km aguas arriba unión Río Toro y Sarapiquí, 9 Mar 1993, *Araya 198* (CR, MO). **Puntarenas**. Esquinas, area between Rio Esquinas and Palmar Sur de Osa, 22 May 1950, *Allen 5544* (CR, MO). **San José**. Tarrazú, zona protectora Cerro Nara, entre Cruce de Quebrada Llano Grande y camino al acueducto, 8 Mar 2008, *Morales 16238* (CR). **PANAMA. Coclé**. Road to Coclesito W fork of Rio Rancheria, 8 Dec 1983, *Churchill et al. 3972* (MO, WAG). **Colón**. Santa Rita ridge, E of transisthmian highway, 16 Dec 1972, *Gentry 6560* (CR, MO). **Panama**. Barro Colorado Island, Canal Zone, 6 Mar 1969, *Croat 8421a* (CR, MO). **San Blas**. Cerro San José, continental divide between Cangandi and San Jose, 5 Feb 1986, *de Nevers & Herrera 7015* (MO).

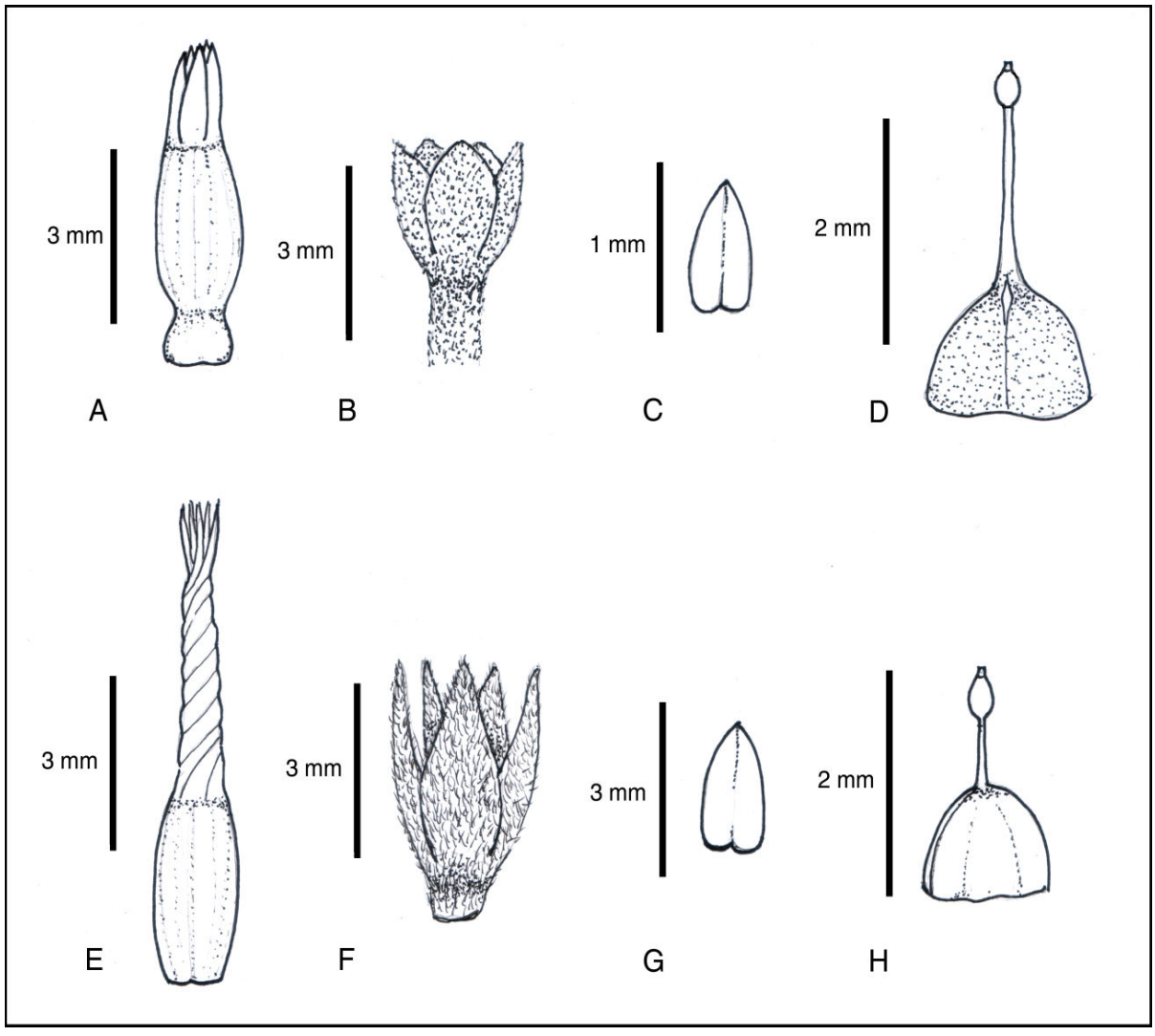

Figure 1. Flowers in *Aspidosperma*. *A. cruentum* (A-D *Thomsen 859*, CR). *A. crypticum* (E-H, *Aguilar et al. 871*, USJ). A, E. Corolla. B, F. Calyx. C, G. Anther. D, H. Ovary, style, and style-head.

2. ASPIDOSPERMA CRYPTICUM J.F. Morales & N. Zamora, **sp. nov**. **TYPE: COSTA RICA**. **Puntarenas**. Refugio de Vida Silvestre Golfito, 3 km al N del aeropuerto, 26 Jan 1992, *Aguilar, Martín, Formoso, & Grayum 871* (holotype: CR; isotypes: MO, USJ). Figs. 1 E–H, 2B, 5.

Aspidosperma crypticum J.F. Morales & N. Zamora resembles *A. desmanthum* Benth. ex Müll. Arg, but differs by its white latex (vs. red), leaf blades acute to shortly acuminate at the apex (vs. rounded to obtuse or acute), with 38–50(+) pairs of secondary veins (vs. 21–26), corolla yellow (vs. white), and larger follicles (13–15 × 10–11 cm vs. 10.4-10.6 × 6.8-7.2 cm). It is also similar to *A. cruentum* Woodson, but *A. crypticum* has linear corolla lobes (vs. narrowly ovate) and fruits with the stipite 1.5–2 cm (vs. 3.5–6 cm).

Trees 8–40 m tall, trunk straight and cylindric, young branchlets subterete to terete and densely lepidote puberulent, old branchlets sparsely puberulent to glabrescent, drying black, trunk and stems with conspicuous milky sap. **Leaves**: blade 10.5–21 × 3–6.3 cm, narrowly elliptic, the apex acute to shortly acuminate, the base obtuse to acute, glabrous on both surfaces (including the midvein), venation craspedodromous, with 38–50(+) pairs of secondary veins, tertiary veins more or less parallel to the secondary veins, petiole 19–33 mm. **Inflorescence** terminal, many-flowered, densely papillate-puberulent, peduncles 15–68 mm, pedicels 0–1.5 mm; calyx 5-lobed, lobes 2.5–3.1 × 0.8–1.1 mm, ovate, acute at the apex, densely tomentulose externally, tomentulose only at the apex internally; **corolla** white, externally glabrous, tube 3.9–4.1 mm, lobes 4–5 × 0.2–0.3 mm, linear, the apex long acuminate, twisted; anthers 0.7–0.8 mm, ovary ca. 1 mm, style head ca. 0.4 mm. **Follicles** 13–15 × 10–11 cm, stipitate, the stipite 1.5–2 cm, obovoid, dark brown when old, densely tomentulose, usually with conspicuous longitudinal ribs, sometimes with a conspicuous medial rib, without lenticels; seeds 7–8.5 cm in diam.

Distribution. Costa Rica, Panama, and Colombia, in tropical wet forest, at 0–700 m.

Aspidosperma crypticum has been misidentified as *A. desmanthum* Benth. ex Müll. Arg., which is otherwise restricted to the Amazonian basin. It differs from *A. desmanthum* by its white latex (vs. red), leaf blades with 38–50(+) pairs of secondary veins (vs. 21–26), acute to shortly acuminate at the apex (vs. rounded to obtuse or acute), corolla yellow (vs. white), and larger follicles (13–15 × 10–11 cm vs. 10.4-10.6 × 6.8-7.2 cm). Sterile or flowering material resembles *A. cruentum*, but *A. crypticum* is separated by the characters summarized in the key.

Specimens examined. COSTA RICA. Puntarenas. Golfito, entre el Pueblo de Bahia Chal y Punta Camibar, 14 Dec 1991, *Aguilar 743* (CR, MO); Refugio de Vida Silvestre Golfito, 3 km al N del aeropuerto, 29 May 1993, *Morales et al. 1530* (CR, MO). **San José**. Puriscal, cuenca del Tulín, Fila Cangreja, costado Sur, 15 Sep 1998, *Acosta 25* (CR, MO); Tarrazú, cerros Diamante, camino a Quepos, 28 Jan 1998, *Estrada 1442* (CR, MEXU); Zona Protectora La Cangreja, Santa Rosa de Puriscal, Rio Negro, 12 Aug 1992, *Morales 358* (CR, MO). **PANAMA. Panama**. Along Llano-Cartí road, near Nussagandi, 21 Jul 1986, *McPherson 9752* (CR, MO). **COLOMBIA. El Valle**. Buenaventura, Cartón de Colombia timber concession, near Bajo Calima, 11 Feb 1984, *Juncosa 2121* (CR, MO).

3. ASPIDOSPERMA DARIENENSE Woodson ex Dwyer, Ann. Missouri Bot. Gard. 53: 104. 1966. **TYPE: PANAMA. Darién**. Between Chucunaque river and Canglón river, 12 Jun 1961, *Sexton & Knight s.n*. (holotype: MO 2958523). Figs. 2C, 5.

Aspidosperma helstonei Donsel., Acta Bot. Neerl. 21(3); 253. 1972. **TYPE: SURINAME**. District Brokopondo, E bank of Suriname river, SW of Redi Doti, 27 Jul 1964, *Donselaar 1487* (holotype: U 0000474; isotypes: K 000587702, NY 00297970).

Distribution. Panama, Colombia to Brazil and Ecuador.

Aspidosperma darienense is distinguished by its leaf blades with more than 45 pairs of secondary veins, lateral inflorescences, 5-6-lobed calyx, and minutely lenticellate fruits, without longitudinal ribs.

Representative specimens examined. PANAMA. Darién. Entre río Chucunaque y Chiatí, cerca del poblado de Buena Vista, 1 Apr 2001, *Quiroz s.n.* (PMA). **San Blás**. Montañas encima de Puerto Obaldia, 18 Aug 1971, *Gentry 1497* (MO).

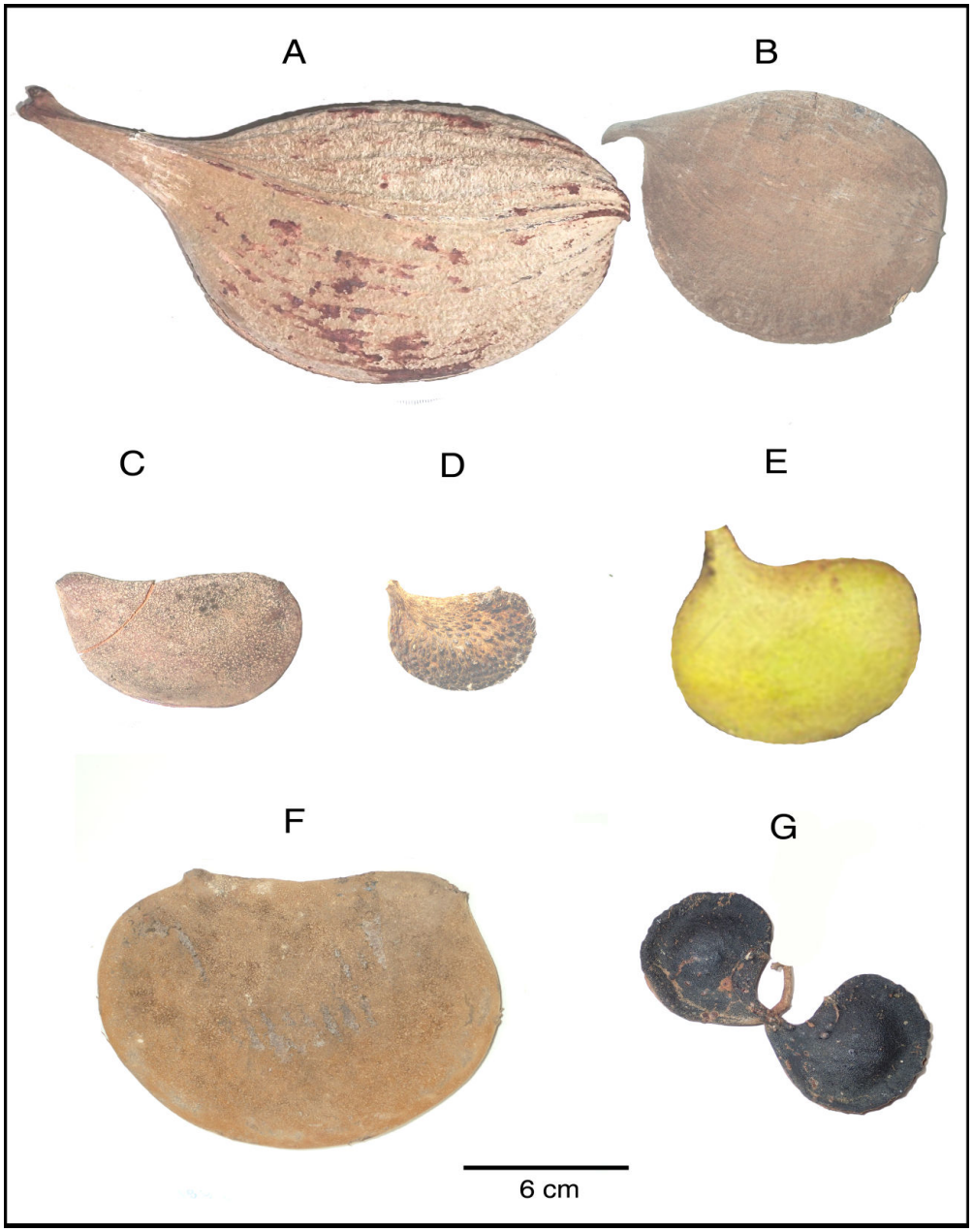

Figure 2. Fruits in *Aspidosperma*. A. *A. cruentum* (*Zamora et al. 1487*, CR). B. *A. crypticum* (*Morales 358*, CR). C. *A. darienense* (*Dik 438*, MO). D. *A. excelsum* (*Morales s.n.*, CR). E. *A. megalocarpon* (*Morales s.n.*, CR). F. *A. myristicifolium* (*Morales et al. 18648*, CR). G. *A. rigidum* (*Zamora et al. 2088*, CR).

Figure 3. Venation types in *Aspidosperma*. A. Brochidodromous (*A. myristicifolium*, Morales 21437, USJ). B. Craspedodromous (*A. cruentum*, Morales 6601, CR).

4. ASPIDOSPERMA EXCELSUM Benth., J. Bot. (Hooker) 3: 245. 1841. *Macaglia excelsa* (Benth.) Kuntze, Revis. Gen. Pl. 2: 416. 1891. **LECTOTYPE (**here designated): **GUYANA**. Berbice, 1837, *Schomburgk 468* (K 000975141; isolectotypes, B [destroyed, photo F neg. 4409], BR 0000006956097, G 00169287, G 00169288, K 000587685, L 0931170, MO 2598572, P 00645106, RB, TCD 0006575, W). Figs. 2D, 5.

Distribution. Costa Rica to Brazil and Bolivia.

Woodson (1951, p. 171) designated *Schomburgk 468* as the type of *Aspidosperma excelsum* but without indicating a specific herbarium. Following the article 9.15 of the Code, we have selected a specific specimen as the lectotype.

In Mexico and Central America, three species have deeply and irregularly channelled trunk: *Aspidosperma excelsum*, *A. myristicifolium*, and *A. rigidum*. *Aspidosperma excelsum* is differentiated by its corolla lobes 1.5–2 mm and verrucose follicles.

Representative specimens examined. COSTA RICA. Limón. Talamanca, Amubri, 24 Jun 1989, *Hammel et al. 17510* (CR, F, MO). **PANAMA. Colón**. Santa Rita lumber road, 15 km E of Colón, 21 Mar 1968, *Dressler 3440* (F, GH, MO). **Panamá**. Alto de Pacora, 21 Mar 1997, *Galdames 3765* (MO, PMA). **San Blas**. El Llano-Cartí road, km 26.5, 11 Apr 1985, *de Nevers et al. 5827* (MO).

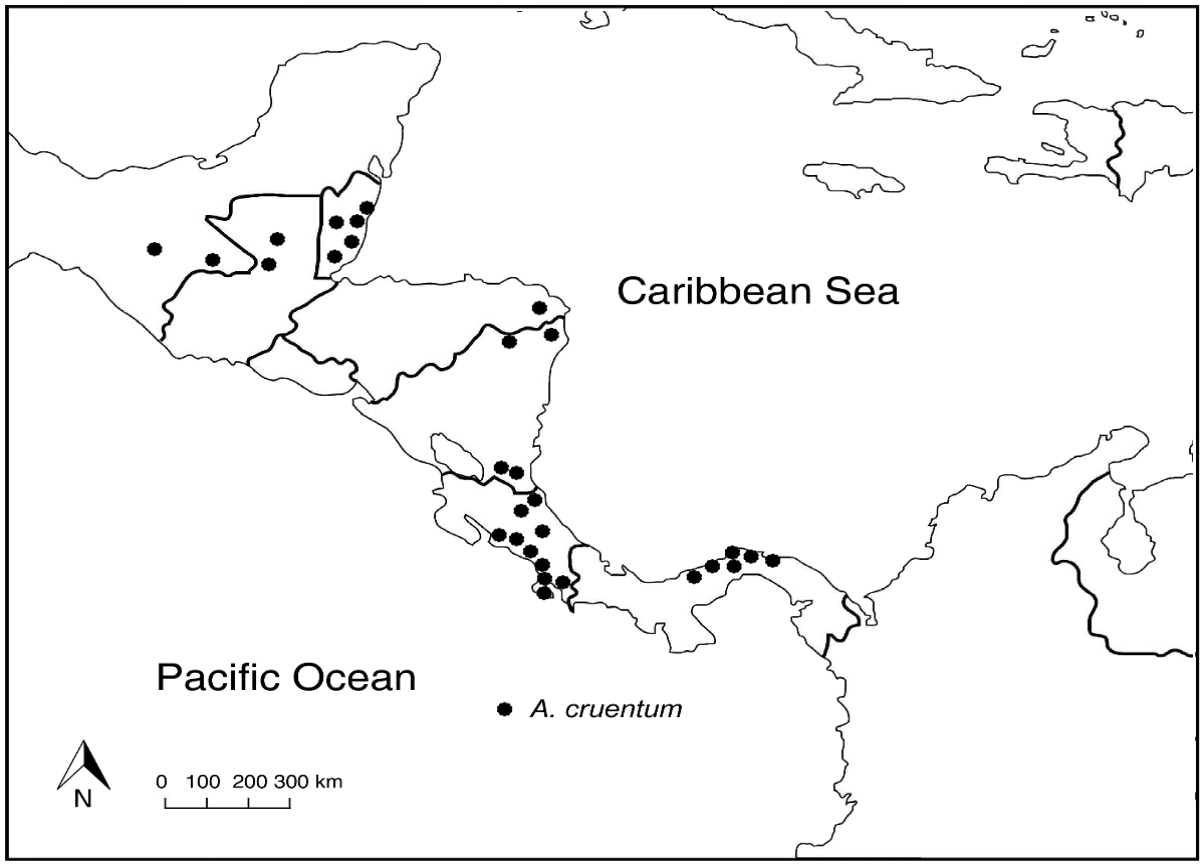

Figure 4. Distribution of *Aspidosperma cruentum*.

5. ASPIDOSPERMA MEGALOCARPON Müll. Arg., Linnaea 30: 400. 1860. *Macaglia megalocarpa* (Müll. Arg.) Kuntze, Revis. Gen. Pl. 2: 416. 1891. **TYPE: MEXICO**. **Veracruz**. Colipa, 1841-1842, *Karwinsky 1348* (holotype: LE). Figs. 2E, 6

Cufodontia stegomeris Woodson, Arch. Bot. Sist. 10: 39, t. 2. 1934. *Aspidosperma stegomeris* (Woodson) Woodson, Ann. Missouri Bot. Gard. 38: 178, f. 10. 1951. **TYPE: COSTA RICA**. **Puntarenas**. Finca Santa María, Jiménez, 31 Mar 1930, *Cufodontis 220* (holotype W [photo F neg. 30935]; isotypes: F 0048156F, photo F neg. 56460, G 00169400; MO 2958639).

Cufodontia lundelliana Woodson, Arch. Bot. Sist. 10: 40. 1934. **TYPE: GUATEMALA**. **Petén**. La Libertad, 26 May 1933, *Lundell 3408* (holotype: MO; isotypes: F 0048155F, photo F neg. 56459, GH 00078694, K 000587636, LL 00000192, MICH, NY 00298027, S 04-1872, US 00111772).

Aspidosperma lundellianum Woodson, Amer. J. Bot. 22: 684. 1935. **TYPE: MEXICO**. **Campeche**. Tuxpeña, 4 Feb 1932, *Lundell 1284* (holotype: MO 2958640; isotypes: F, 0092441F, photo F neg. 56433, GH 00057212, NY, US 00111804).

Cufodontia arborea Woodson, Ann. Missouri Bot. Gard. 21: 617. 1934. **TYPE: MEXICO**. **Oaxaca**. Cafetal, Concordia, 1-15 Apr 1933, *Morton & Makrinius 2692* (holotype: US; isotypes: CAS 0001589, F 0048153F, photo F neg. 56458, K 000587635, MICH 1111545, US 00111771).

Cufodontia escuintlensis Matuda, Madroño 10: 174. 1950. **TYPE: MEXICO**. **Chiapas**. Calcuta, Acacovagua, 17 Aug 1947, *E. Matuda 16978* (holotype: MEXU 00025418; isotypes: CAS 0001590, CAS 0001591, EAP 90592, F photo F neg 51100, MEXU 00025419, NY 00298026, US 01013868)

Distribution. Mexico to Colombia.

Aspidosperma megalocarpon is easily differentiated by its bilobed calyx, corolla lobes 5–6 mm and fruits without longitudinal ribs.

Representative specimens examined. MEXICO. Campeche. Champotón, 20 km E de Carlos Salinas de Goltari, camino a El Pozo, 19 May 1998, *Martínez et al. 30880* (M, MEXU). **Chiapas**: Ocosingo, comunidad Lacandona de Lacanha-Chansayab, 130 km SE de Palenque, 15 Feb 1994, *Levy & Durán140* (MEXU). **Oaxaca**. Tehuantepec, Santiago Astata, Panauhithu, El Aguaje, 1 Apr 2009, *Lott et al. 5845* (MEXU). **Veracruz**. Along road to Hotel Las Cabañas, Playa Escondida, Las Tuxtlas región, 31 May 1981, *Gentry et al. 32502* (CR, MEXU, MO). **GUATEMALA. Escuintla**. Nueva Concepción, finca Santa Marta, s.d., *Ruano s.n.* (BIGU). **Petén**. Lago Petén Itzá, ca. 1.3 km NNE-NE of San José, 28 Aug 1993, *Wallnöfer et al. 6073* (M, U, USCG, W). **Retalhuleu**. around Retalhuleu, 17 Feb-1 Mar 1941, *Standley 80803* (F, MO). **BELIZE. Cayo**. Valentín, Jun-Jul 1936, *Lundell 6220* (MO, NY). **Toledo.** Las Sierritas, 20 km W of Big Creek, 7 Dec 1997, *Hawkins 1731* (CR, MO). **HONDURAS. Comayagua**. Río Sulaco, al N de Santa Cruz de Yojoa, 18 Feb 1981, *Nelson et al. 7648* (MO, TEFH). **EL SALVADOR. Ahuachapán.** San Francisco Menéndez, San Benito, 20 Feb 1992, *Sandoval & Chinchilla 272* (B, LAGU, MO). **Cabañas.** Cinquera, quebrada la Creciente, 22 Apr 2001, *Carballo et al. 301* (CR, LAGU, MO). **NICARAGUA. Estelí**. 24 km al N de Estelí, 19 Dec 1984, *Moreno 25159* (MO). **COSTA RICA**. **Guanacaste**. Parque nacional Barra Honda, Los Mesones, 25 Sep 1991, *Zamora et al. 1869* (CR, MO, USJ). **Puntarenas**. Golfito, Dos Brazos de Río Tigre, Jiménez, 1 Sep 1990, *Herrera 4190* (CR, MO). **San José**. Reserva biológica Carara, sector Agrominas, 20 Sep 1991, *Zuñiga 460* (CR, MO). **PANAMA. Chiriquí**. Burica Peninsula, along quebrada Punta de Piedra, 2 mi SW of Puerto Armuelles, 1 Mar 1973, *Croat 22450* (CR, MO, USF, WAG). **Darién**. Cerro Tacarcuna, along río Pucuro, above Pucuro, 8 Feb 1975, *Gentry & Mori 14189* (MO).

6. ASPIDOSPERMA MYRISTICIFOLIUM (Markgr.) Woodson, Ann. Missouri Bot. Gard. 38: 169. 1951. *Geissospermum myristicifolium* Markgr., Notizbl. Bot. Gart. Berlin-Dahlem 11(108): 787. 1933. **LECTOTYPE** (here designated): **ECUADOR. Guayaquil**. Guayas, 1799, *Tafalla s.n.* (MA 814484; isolectotypes, B [destroyed], G, MA 814485, MA814486, photo F neg. 29217). Figs. 2F, 3A, 6.

Distribution. Costa Rica, Colombia and Brasil to Ecuador and Peru. Expected in Panama.

Aspidosperma myristicifolium is distinguished by its channelled trunk, ferrugineous stems, leaf blades with brochidodromous venation, calyx 4-lobed, corolla lobes 6–8 mm, and follicles tomentose or tomentulose, without longitudinal ribs.

The specimen MA814484 is selected as the lectotype of *Geissospermum myristicifolium* because is the best preserved sheet and the only one with flowers.

Representative specimens examined. COSTA RICA. Puntarenas. Golfo Dulce, Rincón, 22 Oct 1993, *Morales et al. 1925* (CR, F, MO, NY, U, USJ). **San José**. Río Carara, 2 Apr 1993, *Gentry et al. 79279* (CR, MO).

7. ASPIDOSPERMA RIGIDUM Rusby, Mem. New York Bot. Gard. 7: 323. 1927. **TYPE: BOLIVIA. La Paz**. Bopi river, 12 Sep 1921, *Rusby 593* (holotype: NY 00297991). Figs. 2G, 5.

Aspidosperma jaunechense A.H. Gentry, Phytologia 4: 98. 1980. **TYPE: ECUADOR. Los Ríos**. Jauneche forest, km 70, Quevedo-Palenque via Mocachi, Canton Vinces, 26 Mar 1980, *Dodson & Gentry 9920* (holotype: MO; isotypes: QCNE 13, SEL 001170).

Distribution. Costa Rica to Brazil and Bolivia.

Aspidosperma rigidum is very distinctive by its deeply channelled trunk, leaf blades with brochidodromous venation, calyx 5-lobed, corolla tube 2.9–3.7 mm, lobes 5.5–6.8 mm, and follicles with longitudinal ribs, drying black.

Representative specimens examined. COSTA RICA. Puntarenas. Entre Guadoral y Colinas Miz de los Uvas, 20 Jul 1995, *Aguilar 4230* (CR, MO). **San José**. Turrubares, reserva biológica Carara, rio del Sur, desembocadura de la quebrada Chimarruda, 19 Apr 1995, *Zamora & Morales 2249* (CR, MO). **PANAMA. Los Santos**. Tonosi, Río Pedregal, 23 Apr 1968, *Holdridge 6236* (MO).

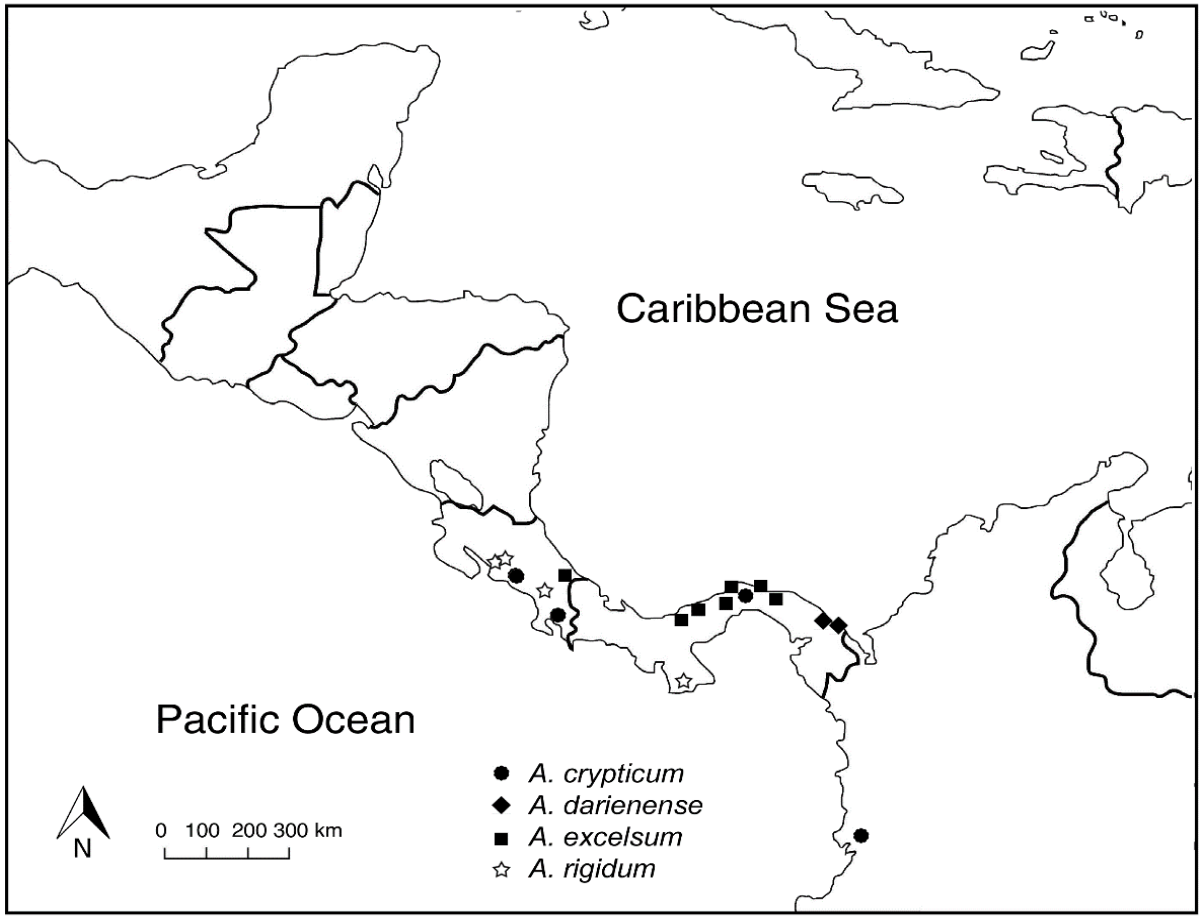

Figure 5. Distribution of *Aspidosperma crypticum*, *A. darienense*, *A. excelsum*, and *A. rigidum*.

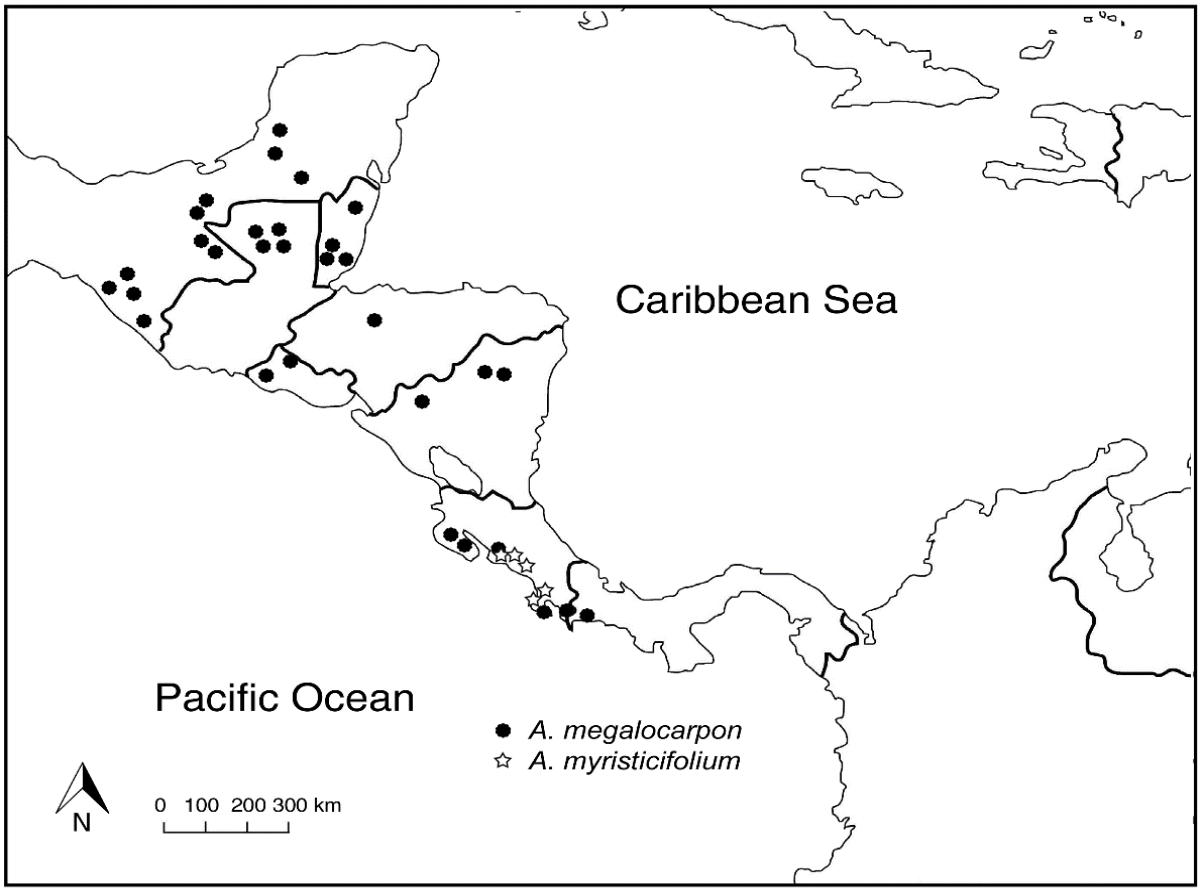

Figure 6. Distribution of *Aspidosperma megalocarpon* and *A. myristicifolium*.

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