

MAGNOLIA PEREZFARRERAE, A NEW SPECIES AND A KEY TO MEXICAN SPECIES OF MAGNOLIA (SECTION TALAUMA, SUBSECTION TALAUMA, MAGNOLIACEAE)

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Abstract: A new rainforest species of *Magnolia*, from the eastern Selva Zoque of Chiapas, Mexico, is described and illustrated. *Magnolia perezfarrerae* belongs to section *Talauma*, subsection *Talauma*. It differs from *M. equatorialis* in having shorter leaf blades that are elliptic rather than lanceolate, longer petioles, and much shorter apices of the carpels. Unlike any published Mexican species of subsection *Talauma*, this new species presents a circumscissile dehiscence with abaxial portions of carpels detaching in large irregular and united many-carpelled masses, a trait shared with several Amazonian *Magnolia*. The flowers are used and valued by the Zoque culture for medicinal purposes.

Key words: *Magnolia equatorialis*, *Magnolia lacandonica*, *Magnolia mexicana*, Neotropical.

Resumen: Se describe e ilustra una nueva especie de *Magnolia* del oriente de la Selva Zoque de Chiapas, México. *Magnolia perezfarrerae* pertenece a la sección *Talauma*, subsección *Talauma*, difiere de *M. equatorialis* por sus láminas foliares de menor tamaño, elípticas en lugar de lanceoladas; pecíolos más largos y ápice carpelar mucho más corto. A diferencia de las especies mexicanas conocidas de la subsección *Talauma*, las porciones abaxiales de sus numerosos carpelos se desprenden en varias masas grandes e irregulares, característica compartida con varias especies de *Magnolia* del Amazonas. Las flores son usadas y valoradas por la cultura Zoque para propósito medicinal.

Palabras clave: *Magnolia equatorialis*, *Magnolia lacandonica*, *Magnolia mexicana*, Neotrópico.

Except for the genus *Liriodendron* L., based on morphological grounds, all genera of Magnoliaceae (ca. 11, depending on different authors) have recently been merged with *Magnolia* L. (Nootboom, 1993, 1998, 2000; Figlar and Nootboom, 2004; Figlar, 2006). However, preliminary nuclear molecular evidence shows that Neotropical *Talauma* Juss. (= *Magnolia* section *Talauma* Baillon, subsection *Talauma*) forms a basal clade distinct from other studied Asian counterparts (Nie *et al.*, 2008). According to Azuma *et al.* (2001), this Neotropical clade diverged ca. 42 million years ago during the mid-Eocene. Thus, it may be monophyletic and may eventually merit recognition at the genus level. Nevertheless,

for now we treat all Neotropical Magnoliaceae as consisting of a single genus, *Magnolia*, with two sections, *Magnolia* and *Talauma*, the latter with three subsections: *Cubenses* Imchanickaja, with stipules free, or appearing so, from the petiole, a long connective appendage embedded in the gynoeceum, and carpels longitudinally dehiscent; *Dugandiodendron* (Lozano) Figlar and Nootboom, with stipules free, or appearing so, from the petiole, a long connective appendage often embedded in the gynoeceum, and carpels with circumscissile dehiscence; and *Talauma*, with stipules adnate to the petiole, with a short connective acute to obtuse, and carpels with circumscissile dehiscence (Figlar and Nootboom, 2004).

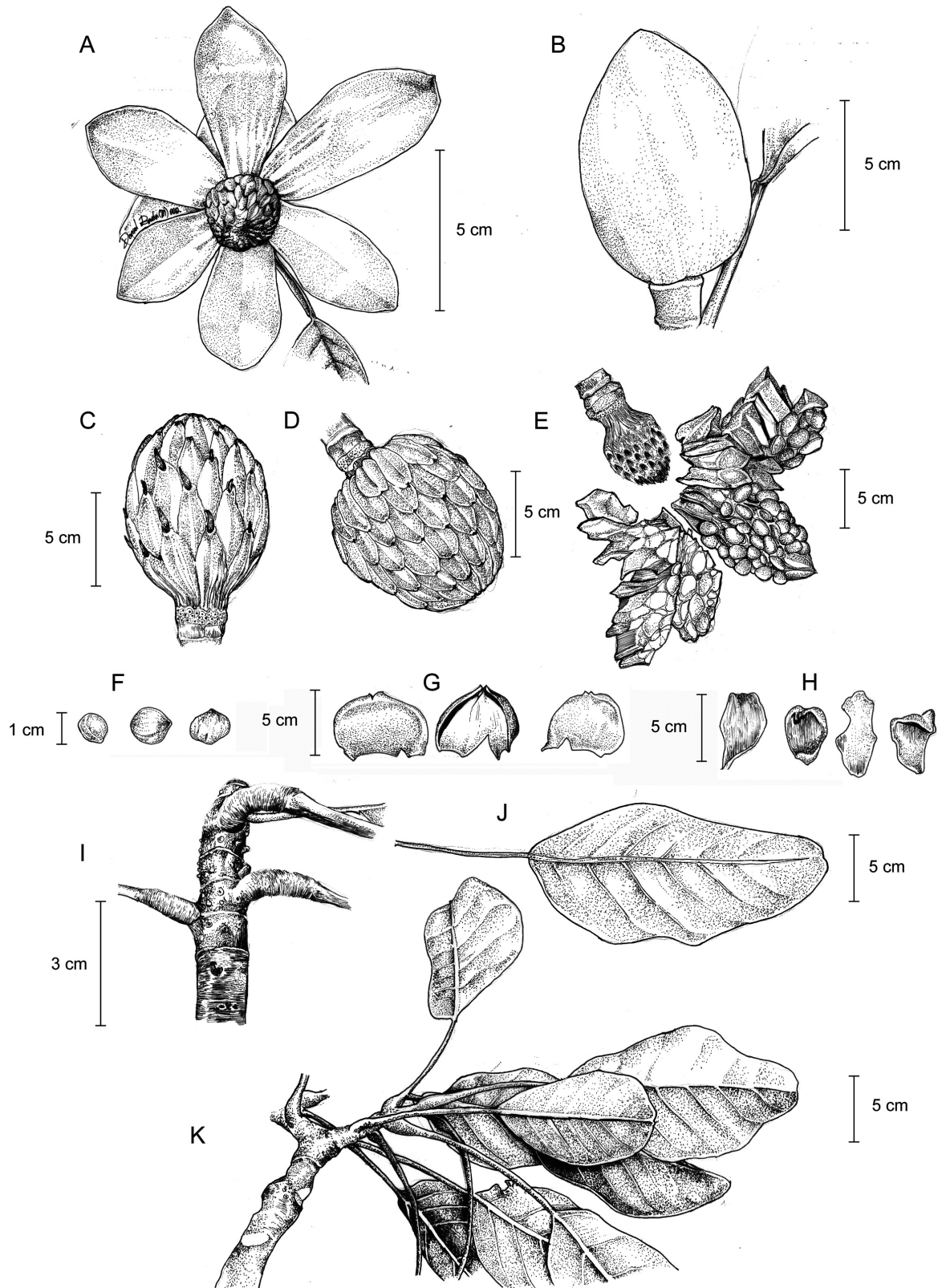


Figure 1. *Magnolia perezfarrerae*. **A.** Flower. **B.** Flower bud. **C-D.** Fruit, before dehiscence. **E.** Fruit, developing fruit with styles (upper left) and during dehiscence, with abaxial portions of carpels falling in clusters. **F.** Seeds. **G.** Spathaceous bracts. **H.** Dried petals. **I.** Terminal twig with thickened petiole bases. **J.** Leaf. **K.** Leaf arrangement. Illustrations by Daniel Barba.

The taxonomy of Mesoamerican *Magnolia* s.l. has been rather poorly studied until recently, particularly that of section *Talauma* subsection *Talauma*. Additionally, at least ten Mesoamerican species of subsection *Talauma*, including the new species described here, have been erroneously included in *Magnolia mexicana* DC. [= *Talauma mexicana* (DC.) G. Don.], a species actually confined to Central Mexico. This is largely because of incomplete and poor specimens obtained from remote tropical mountain forest relicts where most *Magnolia* species occur as usually scattered individuals (Vázquez-García, 1990, 1994; Lozano-Contreras, 1994; Vázquez-García *et al.*, 2012c).

There are 27 species of *Magnolia* s.l. reported for Mesoamerica, of which 19 (70%) belong to section *Talauma* subsection *Talauma* (Lozano-Contreras, 1994; Vázquez-García *et al.*, 2012a, 2012c, 2013a, b), and eight (30%) to section *Magnolia* (Vázquez-García, 1990, 1994; Figlar and Nooteboom, 2004; Jiménez and Cruz, 2005; Jiménez-Ramírez *et al.*, 2007; Cruz *et al.*, 2008; Vázquez-García *et al.*, 2012a, b, c).

Currently, six species of Magnoliaceae have been reported from Chiapas, four belong to *Magnolia* section *Magnolia*: *Magnolia mayae* A. Vázquez & Pérez-Farr., *M. poasana* (Pittier) Dandy, *M. sharpii* Miranda, and *M. yoroconte* Dandy (Breedlove, 1986; Vázquez-García, 1994, Vázquez-García *et al.*, 2012b); and two species belong to section *Talauma* subsection *Talauma*: *M. lacandonica* A. Vázquez & Pérez-Farr. & Mart.-Camilo (2013a), and the new species published here.

Here we describe and illustrate *Magnolia perezfarrerae* (subsection *Talauma*, Magnoliaceae), a new tree species from the Selva Zoque, Berriozabal-Ocozocauhtla, Chiapas.

Magnolia perezfarrerae A. Vázquez & H. Gómez sp. nov. (Figures 1-3, 4).

Arbores 20-25 m altae, trunci usque 30-80 cm diam.; folia elliptica obtusata, lamina 17.8-25 cm longa, 9.5-14.3 cm lata, glabra; stipulae ignoti; flores 12-17 cm diam.; fructus ellipsoidei, 10.4-14.8 cm longi, 7.9-9.2 cm lati; deiscentia ut in *Magnolia amazonica*; carpelis 89-92, glabrescentis, apiculatis; semina 1-1.3 cm longi, 0.7-1 cm lati.

TYPE: Mexico, Chiapas, Municipio de Berriozabal, Ejido El Divisadero, 16° 56' 36" N, 93° 22' 57" W, 820 m, bosque tropical perennifolio, 30 jun 2012 (fl and fr), Héctor Gómez-Domínguez 3143 (Holotype: IBUG; Isotypes: HEM, MEXU, MO).

Trees 18-20 m tall, 0.3-0.8 m dbh, height of first branch ca 6 m; the bark fissured, grayish, covered with lichens and mosses, inner bark reddish; **leaf blades** 17.8-25 × 9.5-14.3 cm, elliptic, glabrous, adaxially lustrous; **petioles** 8-12.7 cm, thickened and somewhat lignified at the base, glabrous; **stipules** 8-12.5 cm long, early caducous (inferred from sti-

pular scar, not seen), **hypsohylls** 2, the outer one 2.3-2.7 × 1.2-1.7 cm, abaxially densely pubescent, adaxially glabrous; the inner one 4-5.3 × 3.2-4.2 cm, spatheous, broadly ovate, concave abaxially golden-yellowish pubescent, adaxially glabrous; **peduncle** pubescent in the two upper internode, **flower bud** 8-12 × 5.6-8.4 cm, broadly ovoid, creamy white; **flowers** 12-17 cm in diam.; **sepals** 4-7.9 × 3.7-6 cm, 1-2 cm wide at the base, concave, creamy white, glabrous; **petals** 6, gradually narrowed basally, creamy white; outer petals 5.9-8.6 × 2.2-3.5(-4.2) cm, concave; inner petals 4.4-6.9 × 2.1-3 cm, concave; **stamens** 175, 0.8-1 × 0.12-0.13 cm, linear to slightly arched, creamy white; **gynoecium** 4.1-4.8 × 2.9-3.5 cm, ovoid, glabrous; **styles** 3-4 mm long, linear, white at anthesis, becoming dark before falling; **fruits** 10.4-14.8 × 7.9-9.2 cm, ellipsoid, greenish-brown; **carpels** 89-92, 1.8-3.6 × 1.5-1.8 cm, 1.8 cm thick, y-shaped, falling in large irregular masses, dorsal wall of ripe carpels basically flat, apex ascending; **seeds** 1-1.3 × 0.7-1 cm, with red sarcotesta.

Discussion

Magnolia perezfarrerae is similar to *M. equatorialis* A. Vázquez (2012) in terms of fruit size (10.4-14.8 vs. 11-12.5 cm), number of carpels (89-92 vs. 78-122), flat ripe carpels falling in large irregular masses, and number of stamens (175 vs. 166). However, it differs from the latter in its shorter leaf blades (17.8-23.5 vs. 28-55 cm long), longer petioles (8-12.5 vs. 6.9-7.3 cm), and apices of carpels (shortly apiculate vs. prominently beaked) (Table 1). *M. perezfarrerae* shares the shape and length of the leaf blades (17.8-23.5 vs. 12-22.4 cm) with *M. mexicana*, but it differs from the latter in its longer petioles (8-12.5 vs. 5.2-7.8 cm), the form of the basal narrowing of petals (gradually vs. abruptly), larger number of carpels (89-92 vs. 38-40), larger fruits (10.4-14.8 × 7.9-9.2 vs. 10-12 (7-8 cm), the falling of carpels (in large irregular masses vs. individually), and the shape of dorsal wall of ripe carpels (flat, with a shortly emergent apex vs. convex and with sunken apex).

The circumcissile dehiscence with abaxial portions of carpels (basal to apical ones) of ripe fruits detaching and falling mostly individually is common in all published Mexican species of *Magnolia* subsection *Talauma*. Sometimes, however, a few carpels, usually the basal ones, may remain laterally attached together forming small groups (Pennington and Sarukhán, 1998). These small groups of carpels are particularly evident early in dehiscence; nevertheless, hardly any intermediate or apical carpels remain attached to each other. *Magnolia perezfarrerae*, in contrast, would be the first published Mexican species with abaxial portions of carpels (basal to apical ones) of ripe fruits detaching and falling in large, irregular and many-carpelled masses, internally resembling the inner side of a pomegranate peel. This interesting feature is shared with many Amazonian species, two from Central America and one from the Caribbean, as



Figure 2. *Magnolia perezfarrerae*. **A.** Tree. **B.** Trunk and bark. **C.** Miguel Ángel Pérez Farrera. Photographs by Héctor Gómez-Domínguez.

Table 1. Differences between *Magnolia mexicana*, *M. perezfarrerae* and *M. equatorialis*

	<i>M. mexicana</i>	<i>M. perezfarrerae</i>	<i>M. equatorialis</i>
Length of leaf blades (cm)	12-22.4	17.8-23.5	28-55
Leaf shape	elliptic	elliptic	lanceolate
Petiole length (cm)	5.2-7.8	8-12.5	6.8-7.3
Petals	abruptly narrowed basally	gradually narrowed basally	unknown
Fruit size (cm)	10-12 × 7-8	10.4-14.8 × 7.9-9.2	11-12.5 × 6-8
No. of carpels	38-40	89-92	78-122
Dehiscence with detachment of abaxial portions of carpels	singly	in large, irregular, and many-carpelled masses	in large, irregular, and many-carpelled masses
Dorsal wall of carpels in ripe fruits	convex with sunken apex	flat with short ascending apex	flat with long emergent beaks at the apex
Distribution	MEXICO. Morelos, Puebla, Veracruz and northern Oaxaca.	MEXICO. Chiapas: Berriozabal and Ocozocuaula.	ECUADOR. Pastaza, Cantón

well as with an undescribed species from the Chimalapa-Uxpanapa region, in southern México.

Distribution and ecology. *Magnolia perezfarrerae* is endemic to the eastern portion of the Selva Zoque (Figure 5), which consists of three regions: Uxpanapa (Veracruz) in the northwest, Chimalapa (Oaxaca) in the southwest, and El Ocote (Chiapas) in the east. This region is located between the Neotropical provinces Tehuantepequense and Pacificquense, and within the southern boundaries of the Atlántiquense province (SEMARNAT-CONANP, 2001) and it may have functioned as a refuge for Neotropical floras and faunas (Wendt, 1987). *Magnolia perezfarrerae* grows on gentle slopes (ca 23%) of southeastern exposure in lower mountain tropical rainforest (“selva mediana perennifolia”); at Berriozabal, it grows together with *Allophylus psilospermus* Radlk., *Annona. lutescens* Saff., *Cedrela odorata* L., *A. purpurea* Moc. & Sessé ex Dunal, *Cinnamomum triplinerve* (Ruiz & Pav.) Kosterm., *Cordia alliodora* (Ruiz & Pav.) Cham., *Cupania dentata* Glaz., *Eugenia* sp., *Gliricidia sepium* (Jacq.) Kunth, *Gutteria* sp., *Guazuma ulmifolia* Wall., *Inga vera* Kunth, *Lonchocarpus* sp., *Manilkara zapota* (L.) P.Royen, *Pouteria sapota* (Jacq.) H.E.Moore & Stearn, *Tabebuia rosea* DC., and *Toxicodendron striatum* Kuntze; at Ocozocuaula, together with *Brosimum alicastrum* Sw., *Ficus* spp., and *Quararibea* sp.

Flowering has been recorded from March to August, and fruiting from July to October. *Magnolia perezfarrerae* has a low population density. Three populations are so far known within an area of approximately 600 km², and only ten adult trees were found at the type locality. No regeneration has been observed, this in part due to seed predation by squirrels and several birds (*Columbina passerina*, *Melanerpes aurifrons*, *Ortalis leucogastra*, and *Zenaida asiatica*).

Eponymy, ethnobotany and conservation. The species is named after Dr. Miguel Ángel Pérez Farrera, for his contri-

bution to the systematics, ecology, and conservation of the flora of Chiapas, and particularly for providing the impetus that led to the discovery of this species. *Magnolia perezfarrerae* is locally known as “flor de corazón” or heart flower, at Berriozabal and Ocozocuaula, and is considered a medicinal plant in the Zoque culture. The petals are used to treat heart diseases, stomach pain and stomach ache. It is prepared as a tea boiling the petals together with orange peel. Some people cut the flowers and sell them in the local market in Ocozocuaula. Fortunately, this species is being propagated and cultivated by rural people known as *ejidatarios*. The current threats to populations of *M. perezfarrerae* include the transformation of their habitat to coffee and corn plantations as well as for pasturelands. Thus, considering its extremely reduced populations without regeneration, and other anthropogenic threats, *M. perezfarrerae* should be protected under the Endangered IUCN category.

This plant was discovered while visiting the Eizi Matuda Herbarium at the Escuela de Biología of Universidad de Ciencias y Artes de Chiapas (UNICACH) in November 2009. The first author pointed out that the specimen Ortiz-T. 38 (HEM), from Ocozocuaula de Espinoza had unusually long petioles and relatively small petals, and he questioned its identification as *Talauma mexicana*, a synonym of *Magnolia mexicana*, which is confined to Central Mexico. Early in June 2012, Dr. Miguel Pérez-Farrera and his colleagues located a flowering *Magnolia* with immature fruits from El Divisadero, Berriozabal, not very far from Ocozocuaula de Espinoza. Late in June 2012, Héctor Gómez-Domínguez went back to El Divisadero in search of mature fruiting material. Surprisingly, a day after collecting it, carpels started to fall in large irregular many-carpelled masses unlike any other published Mexican species of *Magnolia*, allowing us to conclude that we were dealing with an undescribed species belonging to section *Talauma*, subsection *Talauma*, the second one for the flora of Chiapas.

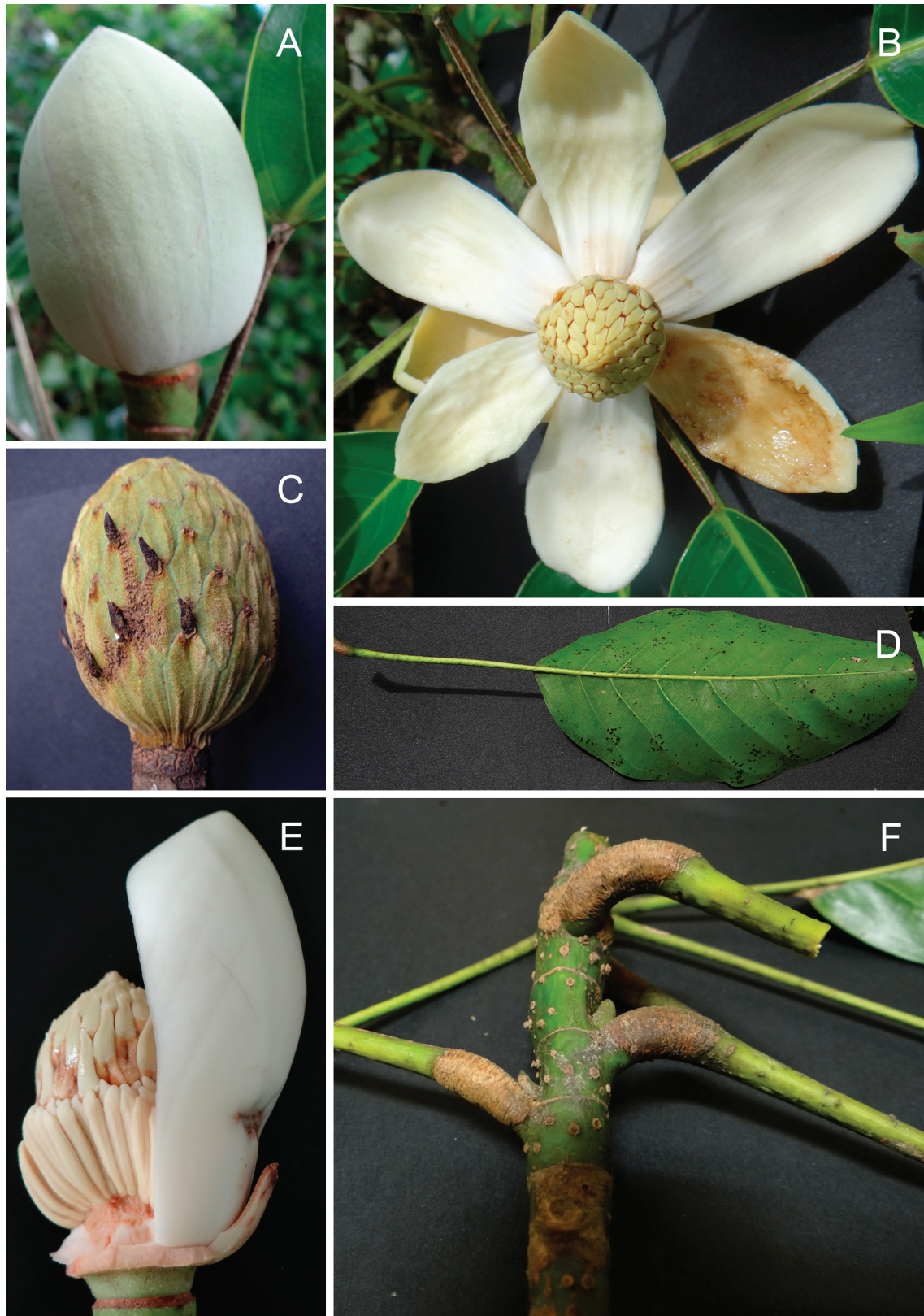


Figure 3. *Magnolia perezfarrerae*. **A.** Flower bud. **B.** Flower with fresh styles. **C.** Gynoecium with a few styles remaining. **D.** Leaf. **E.** Stamens, gynoecium and one of the inner petals. **F.** Terminal twigs with thickened bases of petioles. Photographs by Miguel Ángel Pérez-Farrera.

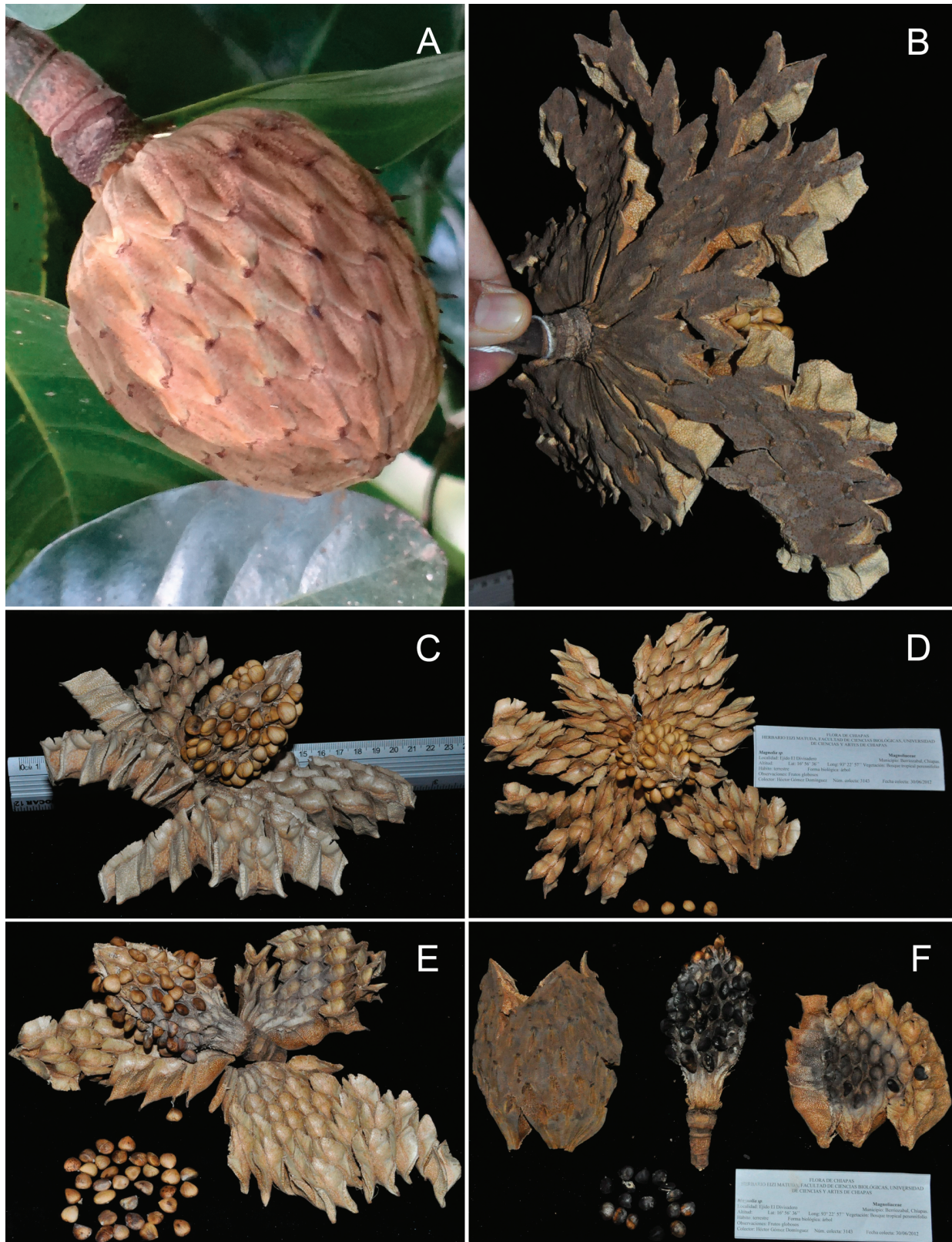


Figure 4. *Magnolia perezfarrerae*. A-F. Fruit showing various perspectives of circumscissile dehiscence with abaxial portions of carpels detaching in large, irregular and many-carpelled masses and seeds attached to the axis of the fruit before hanging from their funicle. Photographs by Héctor Gómez-Domínguez, from Gómez-Domínguez 3142.

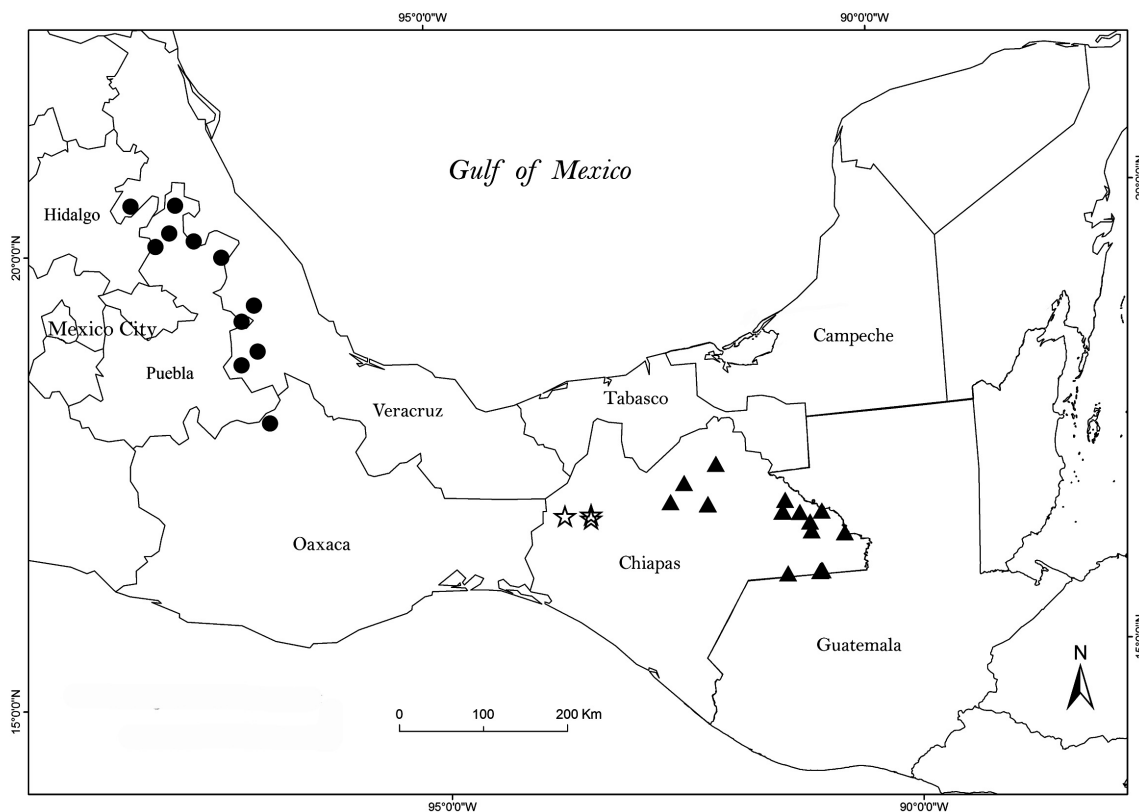


Figure 5. Distribution of *Magnolia* section *Talauma* subsection *Talauma* in Chiapas, Mexico [*M. perezfarrearae* (☆), *M. lacandonica* (▲)], with the occurrence of *M. mexicana* s.s. (●) added for reference.

Additional specimens examined: Mexico, **Chiapas**, Municipality of Berriozabal, Ejido El Divisadero, 16° 54' 00.6" N, 93° 23' 10.8" W, 800 m, 12 jun 2012 (fl), *Gómez-Domínguez 3142* (HEM, IBUG, MEXU, MO); Municipality of Ocozocuatla de Espinoza, 9 km al NW de Emilio Rabasa, 0.5 km al SE de El Aguajito, 16° 57' N, 93° 40' W, 4 mar 1992 (fl), *S. Ochoa-Gaona 3891* (XAL); Municipio Ocozocuatla de Espinoza, 20 May 1990 (fl bud), *Ortiz-T. 38* (HEM).

Key to Mexican species of Magnolia

(Section *Talauma*, subsection *Talauma*, Magnoliaceae)

(1) Abaxial portions of carpels detaching from fruit axis and falling mostly in large irregular many-carpelled (> 15) masses:

(3) Fruit ellipsoid, 10.4 - 14.8 × 7.9 - 9.2; carpels 89-92, Selva Zoque, Chiapas*M. perezfarrearae*

(4) Fruit spheroid, 6 cm in diam.; carpels 36-42, Selva Chimalapa-Uxpanapa, Oaxaca-Veracruz
..... *M. sp. nov. ined.*

(2) Abaxial portions of carpels detaching from fruit axis and falling mostly singly, occasionally in few-carpelled (< 8) masses:

(5) Leaves mostly lanceolate to broadly lanceolate:

(7) Carpels 20-28, 1.8-3.75 × 1.7-2.1 cm, lateral walls

of carpels thin, curved outward, resembling wings, Los Tuxtlas, Veracruz *M. sinacacolinii*

(8) Carpels 30-35, 3.4-5 × 1.7-2.1 cm, lateral walls of carpels thick, not recurving outward, San Martín, Veracruz*M. lopezobradorii*

(6) Leaves mostly elliptic:

(9) Fruit globose to subglobose, rarely very widely ovoid:

(11) Carpels 30-56, basal ones 3.5-5.5 cm long, split at the tip (ca. 1/3 of its length), Santa Marta, Veracruz*M. zoquepopoluca*

(12) Carpels 61-70, basal ones 3-3.7 cm long, split at the tip (1/2 of its length or more), Selva Lacandona, Chiapas *M. lacandonica*

(10) Fruit ovoid to widely ovoid:

(13) Fruit ovoid, slightly obtuse at the base, glabrous; petals gradually narrowed basally, Manantlán region, Jalisco-Colima
.....*M. jaliscana*

(14) Fruit widely ovoid to depressed ovoid, sometimes truncate at the base, brownish puberulous; petals abruptly narrowed basally, Central MEXICO: (Morelos, Puebla, Veracruz, Oaxaca)*M. mexicana*

Acknowledgments

The authors acknowledge Dr. Christopher Davidson and Sharon Christoph, for supporting field trips to Berriozabal and El Ocote through project titled “Floristic diversity and evolutionary ecology of endangered species in protected natural areas from Chiapas, México”. We specially thank Tom Wendt and anonymous reviewers of Botanical Sciences for their valuable suggestions. We thank local field guides Juan Vázquez Pérez, Santana Vázquez Castellano, Venturina Pérez and their family from Ejido El Divisadero, Berriozabal, Chiapas, and we also thank Sergio Avedaño, from Instituto de Ecología, for kindly sharing a picture of a specimen from Ocozocuahtla, deposited at the XAL Herbarium. We thank Daniel Barba for the great illustration of *M. perezfarrerae*. We thank Susana Vázquez García for proofreading the manuscript.

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Received: February 5th, 2013

Accepted: April 30th, 2013