

MAGNOLIA MAYAE (MAGNOLIACEAE), A NEW SPECIES FROM CHIAPAS, MEXICO

J. ANTONIO VÁZQUEZ-GARCÍA^{1,3}, MIGUEL ÁNGEL PÉREZ-FARRERA², NAYELY MARTÍNEZ-MELÉNDEZ²,
GREGORIO NIEVES-HERNÁNDEZ¹ AND MIGUEL ÁNGEL MUÑOZ-CASTRO¹

¹Herbario IBUG, Instituto de Botánica, Departamento de Botánica y Zoología,
Universidad de Guadalajara, Guadalajara, Mexico

²Herbario Eizi Matuda, Facultad de Ciencias Biológicas,
Universidad de Ciencias y Artes de Chiapas, Tuxtla Gutiérrez, Chiapas, Mexico

³Corresponding author: jvazquez@cucba.udg.mx

Abstract: A new species of *Magnolia* from Chiapas, Mexico is described and illustrated. A table of morphological characters contrasting species of *Magnolia* Sect. *Magnolia* in Chiapas is provided. *Magnolia mayae* is similar to *M. grandiflora*, but it differs from the latter in having longer leaves, less coriaceous and abaxially glabrous vs abaxially densely ferrugineous pubescent; smaller flowers with less than half of the stamens, and a smaller number of carpels.

Key words: *Magnolia* aff. *yoroco*, Magnoliaceae, *Magnolia grandiflora*, *Magnolia sharpii*, section *Magnolia*, section *Theorhodon*.

Resumen: Se describe e ilustra una especie nueva de *Magnolia* de Chiapas, México. Se proporciona un cuadro de caracteres morfológicos que contrasta las especies de *Magnolia* Sect. *Magnolia* de Chiapas. *Magnolia mayae* es similar a *M. grandiflora*, pero difiere de ésta última en tener hojas más largas, menos coriáceas y abaxialmente glabras vs abaxialmente densamente ferrugíneas pubescentes; flores más pequeñas con menos de la mitad de estambres y con menor número de carpelos.

Palabras clave: *Magnolia* aff. *yoroco*, Magnoliaceae, *Magnolia grandiflora*, *Magnolia sharpii*, sección *Magnolia*, sección *Theorhodon*.

Neotropical Magnoliaceae are quite diverse and still much too poorly understood (Vázquez-García, 1994). A circumscription of the genus *Magnolia* L. is still controversial; Figlar and Noteboom (2004) and Figlar (2006) merge various genera, including the genus *Talauma* DC. within *Magnolia*. However, recent nuclear molecular evidence shows that Neotropical *Talauma* forms a basal monophyletic clade, sister to the Asiatic counterpart, *Aromadendron* (Nie *et al.*, 2008), and both are sister to a large clade where *Magnolia* and other genera are grouped. *Talauma* and *Aromadendron*, are tropical disjuncts that have occurred prior to the disjunctions of temperate taxa (Azuma *et al.*, 2001). Molecular evidence (RFLP, ndhF,) shows that species of *Magnolia*, Sect. *Theorhodon* Spach., except for those Caribbean species of Sect. *Splendentes sensu* Vázquez-García (1994), form a

monophyletic clade together with *Magnolia virginiana* of Sect. *Magnolia* Dandy (Qiu *et al.*, 1995; Kim *et al.*, 2001). Thus, New World Sect. *Magnolia* now includes 16 species, *M. virginiana* from eastern U.S.A. and Cuba, *M. grandiflora* from eastern U.S.A., nine species from Mexico and five species from Central America (Vázquez-García, 1994). Only two species are native to Chiapas, *M. sharpii* Miranda and *M. aff. yoroco* Dandy (Vázquez-García, 1994). Here, we propose *Magnolia mayae*, as a new species and member of Sect. *Magnolia*.

Magnolia mayae A. Vázquez & Pérez-Farrera sp. nov. (Figure 1).

Arbores 15 a 25 m altae, trunci usque 35 a 50 cm diam. Folia anguste obovata acuminata, lamina 33-43 longa, 8.5-

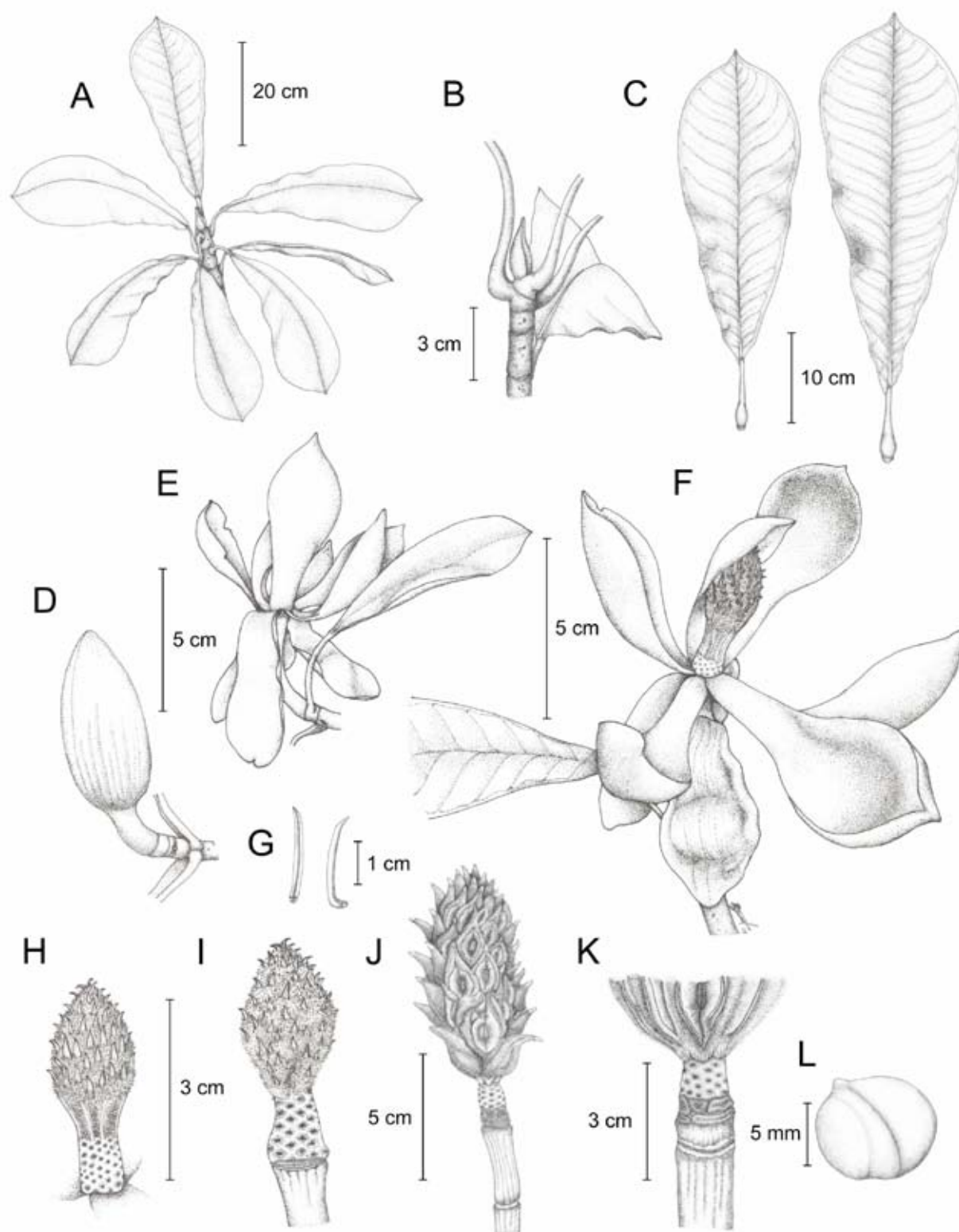


Figure 1. *Magnolia mayae* A. Vázquez & Pérez-Farrera. A. Leaf arrangement. B. Terminal twig with petioles and leaf bud. C. Leaves and leaf venation. D. Flower bud. E. Flowering branch in lateral view. F. Flower in anthesis. G. Stamens. H and I. Gynoecium and floral axis with stamen scars. J. Mature polyfollicle. K. Peduncle and floral axis with stamen scars. L. Seed. Illustrations drawn by Osvaldo Zuno Delgadillo: A-C from *Martínez-Meléndez* 2480 (Holotype-HEM), D-F from *Martínez-Meléndez* 2888 (HEM), H-L from *Martínez-Meléndez* 2480 (Holotype-HEM).

13.5 cm lata, glabra; stipulae ignoti. Flores 12-18 cm diam; fructus ellipsoidei, 8-10 cm longi; 4-5 cm lati. Folliculi 42-57, dense fulvo-velutini, uncinato-rostrati. Semina 8.6 a 9 mm longi, 8.2 a 8.5 mm lati.

TYPE: México, Chiapas, Mpio: Trinitaria, Carretera Tziscac-Las Nubes, 16° 06' 33.7" N, 91° 33' 34.2" W, 1,079 m, 11/11/2008 (fruit), **Nayely Martínez Meléndez 2480** (Holotype: HEM; Isotypes: MO, IBUG).

Trees 15 a 25 m height, 35-50 cm dbh; first branches 3-5 m height; outer bark pale brown, inner bark yellow to ocher after oxidation; twigs 9-10 mm thick, glabrous, lenticellate, internodes 3-11 mm long; **leaves** 33-43 × 8.5-13.5 cm, oblong-obovate, cuneate at the base, abruptly and shortly acuminate at the apex, thin, glabrous; secondary anastomate veins 15-16, curved, inclined 46-50 degrees, abaxially more evident; stipules unknown; **petioles** 4.5-5.7 × 0.3-0.4 cm, slightly canaliculate to flattened, rough and darker at the abaxial base, glabrous; foliar bud ovoid acuminate 1.7 × 0.8 cm; **flower buds** 3.1-12.2 × 1.6-3.6 cm, ellipsoid, light green, pubescent at the tip; bracts 4, deciduous, the uppermost spatheous; **peduncles** 4.3-8.5 × 0.8-1.3 cm, glabrous, striate, lenticellate; **open flower** 7.2-10 × (8.8-) 12-18 cm, white; **sepals** 3, 7-8 × 4.6-4.9 cm, oblong obovate, concave, abaxially light greenish; **petals** of external cycle 3, 5.5-9.6 × 2.8-5.5 cm, cuneate obovate; **petals** of internal cycle 3, 5-8.3 × 2.2-4.5 cm, cuneate obovate, widest at the upper fourth; **stamens** 95 (staminal scars semicircular); **styles** 1-2 × 1 mm; **polyfollicles** 8-10 × 4-5 cm, oblongoid to ovoid;

follicles 42-57, 9-13 × 4-8 mm, oblongoid, apiculate, elongated up to 8 mm long, densely felty yellowish (hairs 2 mm long); **seeds** 8.6-9 × 8.2-8.5 mm (Figure 1).

Distribution and ecology. This species is present in lower montane rainforest, at 760-1,200 m elevation, with a mean annual rainfall of 3,200 mm, at temperate moist climate, and clay soils. *Magnolia mayae* is known only from the state of Chiapas, Mexico, at the municipality of Yajalón, growing together with *Clethra nicaraguensis* C.W.Ham., *Licaria capitata* (Schltdl. & Cham.) Kosterm., *Ocotea leucoxydon* (Sw.) Laness., *Saurauia yasicae* Loes., and *Zanthoxylum foliolosum* Donn.Sm. and sharing habitat at the municipality of Trinitaria with *Alchornea latifolia* Sw., *Annona reticulata* L., *Arachnothryx buddleioides* (Benth.) Planch., *Astrocaryum mexicanum* Liebm. ex Mart., *Belotia mexicana* (DC.) K.Schum., *Chamaedorea elatior* Mart., *C. ernesti-augusti* H.Wendl., *Clusia guatemalensis* Hemsl., *Costus* sp., *Heliconia* sp., *Inga vera* Willd., *Miconia glaberrima* (Schltdl.) Naudin, *Piper* spp., and *Podocarpus matudae* Lundell.

Phenology. Flowering during late spring and fruiting from September to December.

Etymology. The specific epithet for this new taxon is from "maya", the Spanish name of the Mayan culture that dominated the region where it occurs.

Conservation. *Magnolia mayae* is only known from three locations, in Chiapas, Mexico, but may occur in Guatemala

Table 1. Contrasting characters among geographically close and morphologically related species of *Magnolia* Sect. *Magnolia* in Chiapas

Characters	<i>M. sharpii</i>	<i>M. aff. yoroconte</i> *	<i>M. grandiflora</i> (cultivated)	<i>M. mayae</i>
Leaf shape	broadly obovate to ovate	narrowly elliptic to oblong elliptic or narrowly lanceolate	narrowly to broadly oblanceolate to elliptic, less commonly obovate or ovate	cuneate and narrowly obovate, shortly and abruptly acuminate,
Leaf length (cm)	17-30 (-39)	(7-) 9-19 (-23)	12-20	33-43
Leaf width (cm)	9-18 (-24)	3.7-6	6-12	8.5-13.5
Abaxial leaf pubescence	densely short-appressed	glabrous to sparsely pubescent	densely ferrugineous	glabrous
Flower diameter (cm)	15-20	10-14	17.5-20 (-30)	12-18
Perianth	3 sepals, 6 petals	3 sepals, 6 petals	9-15 tepals	3 sepals, 6 petals
No. of stamens	220-240	100-145	>250	95
Basal diameter (mm) of staminal axis of mature polyfollicles	12-14	5-6	5-9 (10)	9-11
Size of mature polyfollicles (cm)	(6) 9-15 × 3-5.3	4-6 × 2-4	8-12 × 4-5	8-10 × 4-5
No. of follicles	85-99 (-100)	(25-) 40-42	75-90	42-57
Polyfollicle pubescence	densely yellowish	glabrous	densely ferrugineous	densely yellowish

*An insufficiently understood species, perhaps corresponding with *M. yoroconte* Dandy (Vázquez-García, 1990, 1994).

as well. At municipality Trinitaria only 11 individuals were observed between the highway and the forest slope, along a 400 m long transect, close to a coffee plantation, only two of those trees were mature (ca. 13 m tall). This extremely rare species should be given a protected status immediately in the Mexican endangered species act (*Norma Oficial Mexicana*), most likely, within the critically endangered species category.

Magnolia mayae is only distantly related to *M. grandiflora* L. (native to southeastern U.S.A.), it has somewhat similar large ellipsoid fruits, however the former has less carpels (42-57) vs 75-90 in *M. grandiflora*; leaves of *M. mayae* are narrowly obovate, shortly acuminate, thin and glabrous, while in *M. grandiflora* are oblanceolate to elliptic and rarely obovate, obtuse at the apex, coriaceous and abaxially ferruginous pubescent; flowers of *M. mayae* are smaller, 12-18 cm vs 17.5-20 (-30), perianth with 3 sepals and 6 petals vs 9-15 tepals, with less stamens, 95 vs > 250 (Table 1). *Magnolia mayae* has yellowish pubescent, fruits similar to those of *M. sharpii*, however, it differs from the latter in having narrower leaves, 8.5-13.5 cm vs 9-18 (-24) cm, cuneate at the base and shortly acuminate at the apex vs obtuse at the base and apex; abaxially glabrous vs abaxially densely appressed pubescent; fewer stamens 95 vs 220-240; and fewer carpels 45-57 vs 85-99 (-100). *Magnolia mayae* has glabrous leaves as those of *M. aff. yoroconte*, however, it differs from the latter in having longer leaves 33-43 cm vs (7-) 9-19 (-23) cm; fewer stamens 95 vs 100-145; longer fruits 8-10 cm vs 4-6 cm, with more carpels 42-57 vs (25-) 40-42, and the dorsal wall of carpels densely yellowish pubescent vs glabrous. In addition, *Magnolia mayae* differs from *M. guatemalensis* Donn.Sm. in having longer leaves 33-43 cm vs 7-20 (-25) cm, abaxial blades glabrous vs ferruginous-sericeous when young, longer fruits 8-10 cm vs 3-5.7, and a larger number of follicles 42-57 vs 22-38.

Additional specimen examined. México, **Chiapas**, municipality of La Independencia, 45-50 km east of Lagos de Montebello National Park, on road from Ixcán to Santa Elena, 760 m, in lower montane rainforest (sterile), 22/01/1982, *Breedlove* 5776 (MEXU); municipality of La Trinitaria, km 23.4 Hw. from Lagos de Montebello National Park to Las Nubes, Ejido Cuauhtémoc, 16° 06' 34" N, 91° 33' 41" W, 1,094 m, in lower montane rainforest (flower), 07/05/2011, *N. Martínez-Meléndez* 2888 (HEM, IBUG, MEXU); municipality of Yajalón, Ejido San Pedro Sotolá, Hw. from Ojo de

Agua to Lucio Blanco, Rancho Ojo de Agua, 17° 12' 06.8" N, 92° 15' 44.2" W, 961 m, (flower), 13/4/2011, *H. Gómez-Domínguez* 3142 (HEM, IBUG); municipality of Yajalón, Sierra Anover, Hw. Ojo de Agua to Lucio Blanco, Rancho Ojo de Agua (sterile), 17° 11' 30" N, 92° 15' 44" W, 1,000-1,200 m, 10/4/2000, *M.A. Pérez-Farrera* 2330 (HEM).

Acknowledgements

We thank to Gladis Yareni Pérez López, Héctor Gómez Domínguez, and Manuel Martínez Melendez from Universidad de Ciencias y Artes de Chiapas, Jesús G. González Gallegos and Marcelino Vázquez García, from Universidad de Guadalajara-CUCBA. To Heraclio and Alonso, for their valuable support during our fieldtrip in the mountains of Chiapas in November and December 2009. The second and third authors give special thanks to Christopher Davidson and Sharon Christopher for their support during a visit to Yajalón, Chiapas in December 2009. To Osvaldo Zuno Delgadillo for the nice illustration.

Literature Cited

- Azuma H., García-Franco J.G., Rico-Gray V. and Thien L.B. 2001. Molecular phylogeny of the Magnoliaceae: The biogeography of tropical and temperate disjunctions. *American Journal of Botany* **88**:2275-2285.
- Figlar R.B. and Nooteboom H.P. 2004. Notes on Magnoliaceae IV. *Blumea* **49**:87-100.
- Figlar R.B. 2006. Taxonomy topics - a new classification for *Magnolia*. In: Royal Horticultural Society. Eds. *Rhododendrons with Camellias and Magnolias*, pp. 69-82, MPG Books Ltd., Bodmin.
- Kim S., Park C.W., Kim Y.D. and Suh Y. 2001. Phylogenetic relationships in family Magnoliaceae inferred from *ndhF* sequences. *American Journal of Botany* **88**:717-728.
- Nie Z.L., Wen J., Azuma H., Qiu Y.L., Sun H., Meng Y., Sun W.B. and Zimmer E.A. 2008. Phylogenetic and biogeographic complexity of Magnoliaceae in the Northern Hemisphere inferred from three nuclear data sets. *Molecular Phylogenetics and Evolution* **48**:1027-1040.
- Qiu Y.L., Chase M.W. and Parks C.R. 1995. A chloroplast DNA phylogenetic study of the eastern Asia-eastern North America disjunct section *Rytidospermum* of *Magnolia* (Magnoliaceae). *American Journal of Botany* **82**:1582-1588.
- Vázquez-García J.A. 1990. Taxonomy of the genus *Magnolia* (Magnoliaceae) in Mexico and Central America. M.S. Thesis. University of Wisconsin-Madison. 224 pp.
- Vázquez-García J.A. 1994. *Magnolia* (Magnoliaceae) in Mexico and Central America: a synopsis. *Brittonia* **46**:1-23.

Recibido: 25 de febrero de 2012

Aceptado: 20 de abril de 2012