

A new species of *Magnolia* (Magnoliaceae) from the Alto Mayo, San Martín, Peru

Una nueva especie de *Magnolia* (Magnoliaceae) del Alto Mayo, San Martín, Perú

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Abstract

A new species of Magnoliaceae, *Magnolia bankardiorum*, is described from the Altomayo region in the Department of San Martín, Peru. An illustration, photographs, and a discussion of potential relationships are presented. The new species is rare and considered endangered due to habitat destruction.

Key words: *Magnolia*, sp. nov., Dpto. San Martín.

Resumen

Se describe una nueva especie de Magnoliaceae, *Magnolia bankardiorum*, procedente de la cuenca alta del río Mayo, provincia de Rioja, Departamento de San Martín, Perú. Se acompaña una ilustración, fotografías y se replantea una discusión de las relaciones potenciales de esta especie. La especie nueva es rara y consideramos que su actual distribución en el área tipo de colección está en peligro debido a la destrucción del hábitat.

Palabras clave: *Magnolia*, sp. nov., Dpto. San Martín.

Introduction

The Magnoliaceae has 225-240 species with worldwide distribution and contained in as few as two genera or as many as nine, depending upon concepts adopted (Dandy, 1927; Kawasaki, 2004). It is distributed in temperate Asia and eastern North America to tropical and subtropical South America. The Neotropical species range from Mexico to Brazil and the West Indies. The greatest diversity in the Neotropics is in Colombia with ca. 24 species; diversity declines southward. This marks only the third species recorded for Peru and only the second to be described from Peruvian material. The following new species was collected over a decade ago while exploring and documenting the flora of the Río Alto Mayo watershed in northern San Martín (Dillon & Sánchez, 2001; Sánchez *et al.*, 2002).

Magnolia bankardiorum M.O. Dillon & I. Sánchez-Vega (Figs. 1 - 3)

TYPE: PERU. **Dept. San Martín.** Prov. Rioja. Dist. Pardo Miguel, entre Aguas Verdes a Paraiso, arriba de Río Serranoyacu, 1120 m, 5°40'S, 77°38'W, 15 Jun 1998. *I. Sánchez V., M.O. Dillon, & M. Zapata 9338* (Holotype: F, unicate).

Arbor 8-15 m usque alta. Lamina foliorum elliptica, 15.5-18.5 cm longa, 7.5-9.5 cm lata, coriacea; petiolo 2-3.5 cm longo utraque margine cicatrice stipulari. Flos singularis terminalis; sepala 3, ca. 4.5 cm longa, 1.5-2 cm lata; petala 8, alba, 5-5.5 cm longa, 1.2-1.5 cm lata; stamina 10-15 mm longa, apice sterili triangulari; carpella 13-15, connata, apice libera, stylis 3-4 mm longis. Fructus ovoideus, ca. 2 cm longa, 1.2-1.5 cm crassa.

Tree to 8-15 m tall. Leaves distinctly alternate; blades elliptic, 15.5-18.5 cm long, 7.5-9.5 cm wide, coriaceous, apex obtuse-apiculate, the tip acute, ca. 5 mm long, bases cuneate, subequal; surfaces abaxially and adaxially glabrous. Flowers terminal; sepals 3, oblong to obovate, ca. 4.5 cm long, 1.5-2 cm wide, pale green, obtuse; petals 8, white, oblong, 5-5.5 cm long, 1.2-1.5 cm wide, obtuse; stamens early deciduous, strongly curved, 10-15 mm long, apex triangular, sterile; carpels 13-15, connate, apices free, styles 3-4 mm long. Fruit (immature) ovoid to ovate, ca. 2 cm long, 1.2-1.5 cm wide; seeds unknown.

Additional specimens examined: Peru. Dept. San Martín. Prov. Rioja. Dist. Pardo Miguel, entre Aguas Verdes y Perla del Mayo, 1150 m, 5°39'S, 77°38'W, 15 Jul 1999, I. Sánchez-Vega, M. Zapata, G. Iberico, & R. Diéguez 10062 (F, CPUN).

Etymology: This handsome new species is named in honor of Susan and James Bankard, longtime patrons of science at The Field Museum and supporters our ongoing efforts to record and document Peru's endangered plant life.

Habitat and distribution: The type locality was on the steep slopes of a quebrada directly above the Río Serranoyacu which contained a mixed evergreen forest at 1120-1150 m (Fig. 3). Since a very few individuals were encountered in 1998 and 1999, it is assumed that this is a rather narrow endemic confined to the region. While there have been reports of a *Magnolia* from further south in the Río Alto Mayo watershed (V. Quipuscoa, pers. com.), it may be that this species has a more extended range. Collections from these areas (e.g., *Quipuscoa et al.* 3923, HUSA) have not been examined in this study.

Diversity and relationships: The segregate genera *Talauma* Juss. and *Dugandiodendron* Lozano have been distinguished from *Magnolia* by having fruits with partially fused follicles and circumscissile dehiscence (Lozano, 1994). Lozano (1983, 1994) accepted *Talauma* at the generic level, as have most floristic workers (Nee, 1994). Molecular studies by Nie et al. (2008) and others (Azuma et al., 2001; Kim et al. 2001; Qiu et al., 1993), have shown the Neotropical taxa to be a monophyletic group; however, *Talauma* has been considered to be a sectional

category within a broadly defined and monophyletic *Magnolia s.l.* (*Magnolia* subgen. *Magnolia* section *Talauma*) (Frodin & Govaerts, 1996). The present species may well have the fleshy fruits characteristic of *Talauma*; however, the broad *Magnolia* generic concept is accepted in this study with the acknowledgement that future changes in classification are possible as our knowledge of South American taxa increases.

The family was not treated by MacBride in the *Flora of Peru* series and the family was not recorded in Brako & Zarucchi (1993). The family was reported from Peru by Lozano (1994) and was known to occur there by Alwyn Gentry, who had collected it with the senior author (MOD) in 1978 in Dept. Amazonas (*Gentry et al.* 22968, MO) and several additional collections.

This marks the third *Magnolia s.l.* recorded for Peru and the first from the uplands of the *selva alta* of Dept. San Martín. The other two species were originally described as *Talauma* (Lozano, 1994) from lowland habitats of the *selva baja* typically below 500 m. The first, *M. amazonica* (Ducke) Govaerts is widely distributed in the western Amazon basin with reports from Brazil (where it was described from), Ecuador, Bolivia, and several departments in Peru, including Amazonas, Cusco, Junín, Loreto, Madre de Dios, and Pasco. The second, *M. rimachii* (Lozano) Govaerts was described from Dept. Loreto and has been recorded from lowland localities in Bolivia and Ecuador. Both these taxa are readily distinguished from *M. bankardiorum* by the former species much larger, elliptic to obovate or strap-shaped leaves, 25-30 cm long.

Our species falls into Lozano's (1994) group of Neotropical *Magnolia* with ellipsoid fruits, fewer than 30 carpels, and glabrous internodes, such as, *M. henaoui* (Lozano) Govaerts described from Colombia at elevations of nearly 2000 m, and *M. morii* (Lozano) Govaerts from lowland forests in Panama at 350 m. These two species have oblong – elliptic leaves with acute apices and narrowly elliptic apical buds. In *M. bankardiorum*, in contrast, the leaves are elliptic to oval, obtuse apically and with a with terminal acute tip. The gynoecium is ovate to globose, not ellipsoidal, and the 13-15 carpels are tightly fused. Further, the petals are longer and

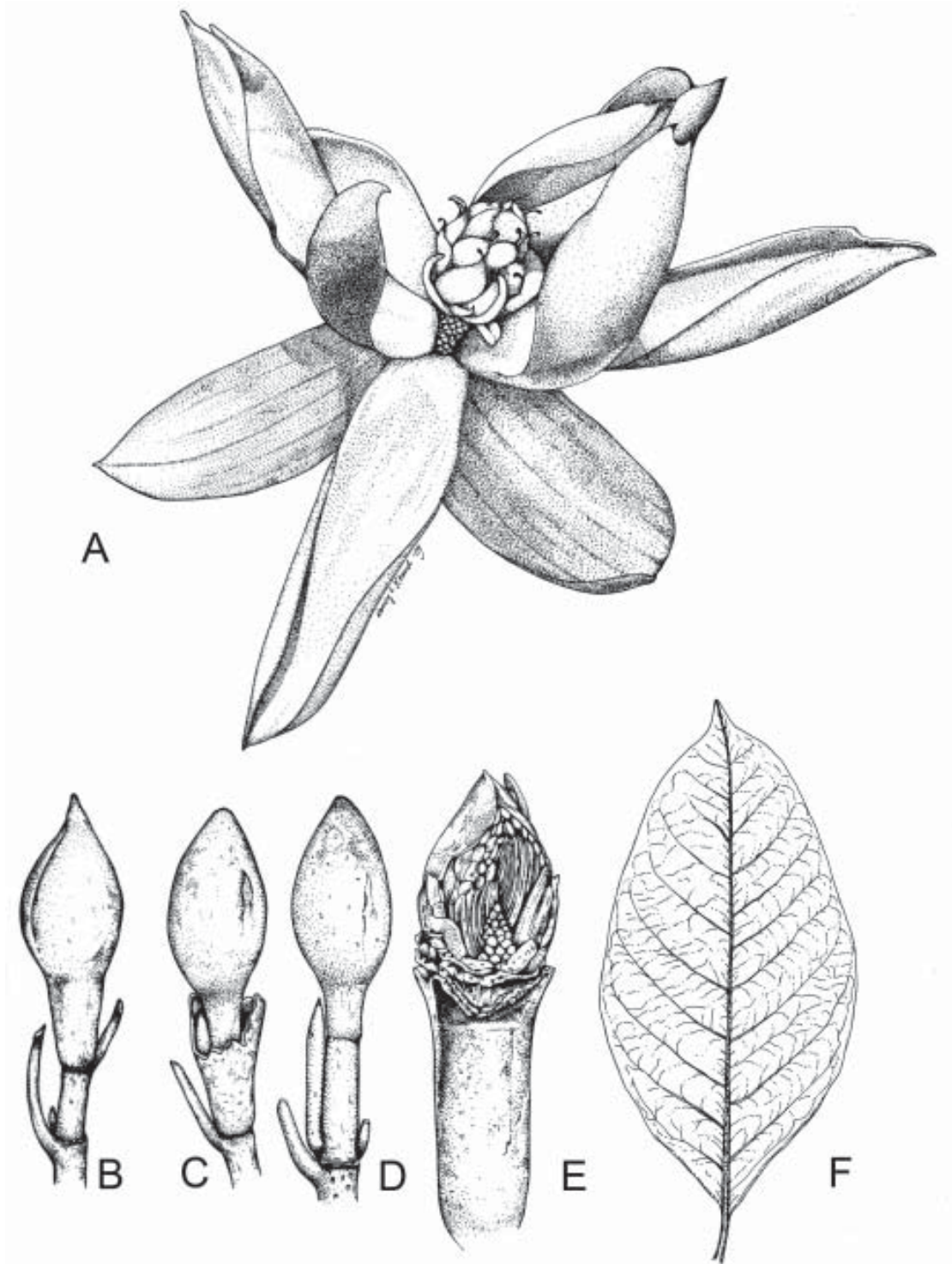


Fig. 1. Illustration of *Magnolia bankardiorum*. A. Flower. B. Flower buds, C. Leaf (drawn from Sánchez *et al.* 9338, F).



Fig. 2. *Magnolia bankardiorum*. A. Flower. B. Close-up of carpels and caducus, strongly curved stamens in the foreground. Photographs were taken of the holotype collection (Sánchez *et al.* 9338, F).

narrower and distinct from any of the previously mentioned congeners. Speculation on relationships must await planned molecular studies on South American Magnoliaceae (J. Wen, pers. comm.).

A second collection of *Magnolia* from the region of the type of *M. bankardiorum* in 1999 (Sánchez-Vega, *et al.* 10062, F and CPUN) has leaf blades more oval to orbicular in shape and slightly shorter at ca. 11 cm long. The differences in leaf shape may be due to environmental or seasonal differences, but until further samples are made, interpretation of this phenotypic variability is not possible.

Conservation status: When we first encountered this small tree species in 1998, we were only successful in finding one individual during our search of the area. We felt sure there were likely more in the area, but we were not prepared to spend an extended time in one locality. When the second author (ISV) returned to the same area in 1999, again, an single individual was encountered in

the area of the type locality. In June 2008, after nearly a decade, we returned to the upper Rio Alto Mayo valley in an attempt to relocate *M. bankardiorum* in the forests near Aguas Verdes. We visited the type locality and were dismayed that the forest had largely been clear cut and planted in coffee. It is probable that additional trees exist somewhere in the area, but at present, we fear that it is extirpated in the locality of the type collection. We are continuing our efforts at finding this beautiful, rare and endangered species, emblematic of all organisms threaten in this habitat.

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Fig. 3. *Magnolia bankardiorum*. Scanned herbarium sheet of the holotype (Sánchez *et al.* 9338, F).

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We wish to give a special acknowledgement to the late Dr. Gustavo Lozano-Contreras (1938-2000), noted Colombian botanist and Professor of Botany at the Instituto de Ciencias Naturales de la Universidad Nacional in Bogota. He contributed so much to our fundamental knowledge of Neotropical Magnoliaceae and has provided a valuable foundation for future work.

Literature cited

- Azuma, H., J.G. García-Franco, V. Rico-Gray, & L.B. Thien.** 2001. Molecular phylogeny of the Magnoliaceae: the biogeography of tropical and temperate disjunctions. *Am. J. Bot.* 88: 2275-2285.
- Brako, L. & J. L. Zarucchi.** 1993. Catalogue of the Flowering Plants and Gymnosperms of Peru. *Syst. Bot. Monogr.* 45. Missouri Botanical Garden. 1286 pp.
- Dandy, J. E.** 1927. XXXIII. The Genera of Magnoliaceae. *Bull. Misc. Inform. Kew* 7: 257-264.
- Dillon, M.O. & I. Sánchez-V.** 2001. Floristic Inventory of the *Bosque de Protección del Río Alto Mayo* (San Martín, Peru) URL: <http://www.sacha.org/envir/eastlow/intro.html>
- Frodin, D. & R. Govaerts.** 1996. World checklist and bibliography of Magnoliaceae. Richmond Surrey, U.K.: Royal Botanic Gardens, Kew.
- Kim, S. C.-W. Park, Y.-D. Kim, & Y. Shu.** 2001. Phylogenetic relationships in family Magnoliaceae inferred from *NDHF* sequences. *Amer. J. Bot.* 88: 717-728.
- Lozano-C., G.** 1983. Magnoliaceae. In *Flora de Colombia*. Ed. P. Pinto. 1-120.
- Lozano-C., G.** 1994. *Dugandiodendron y Talauma* (Magnoliaceae) en de Neotrópico. Bogotá: Instituto de Ciencias Naturales. Colección Jorge Alvarez Lleras, no. 3, 147 p.
- Nee, M.** 1994. A new species of *Talauma* (Magnoliaceae) from Bolivia. *Brittonia* 46: 265-269.
- Nie, Z., Wen, J., Azuma, H., Qiu, Y., Sun, H., Meng, Y., Sun, W. 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(3): 1027-1040.
- Qiu, Y.L., M.W. Chase, D.H. Les, & C.R. Parks.** 1993. Molecular phylogenetics of the Magnoliidae: cladistic analysis of nucleotide sequences of the plastid gene *rbcL*. *Ann. Missouri Bot. Gard.* 80: 587-606.
- Sánchez-V., I., G. Iberico V., M. Zapata, C., M. L. Kawasaki & M.O. Dillon.** 2001. Nuevos registros para la flora de San Martín, Perú. *Arnaldia* 8(2): 45-52.