

Magnolia hookeri var. *longirostrata* (Magnoliaceae), a new taxon from Yunnan, China

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Magnolia hookeri var. *longirostrata* D.X. Li & R.Z. Zhou, a new variety from Yunnan, China is described and illustrated. Its pollen morphology is also analyzed. It is morphologically closely allied to *M. hookeri*, but differs in its smaller carpels, longer and narrower gynoecea, longer and glabrous peduncles, longer fruit aggregates, and small-tuberculate follicles with longer beaks at the apex.

Magnolia, a very large genus of the family Magnoliaceae, includes all the species of Magnolioideae (Figlar & Nooteboom 2004). It occurs in the tropical, subtropical and warm-temperate regions of Asia and America. The south and southwest of China and the adjacent regions are considered to be the center of distribution, conservation and diversity of Magnoliaceae (Law 1984, 1996, 2000, 2004, Law *et al.* 1995). The species of *Magnolia* are an important element in the evergreen broad-leaved forests.

Since 1980s, the researchers of The South China Botanical Garden, Chinese Academy of Sciences, and The Yunnan Academy of Forestry have been carrying out a detailed survey of the Magnoliaceae all over China. In Yunnan, they found specimens of *Magnolia* with a long and glabrous peduncle, an ellipsoid fruit aggregate, and small-tuberculate follicles with long beaks at the apex. After careful study it was concluded that the specimens represented an undescribed variety of *Magnolia hookeri*.

Herbarium material for the morphological study was obtained from IBSC, YCP and KUN. The morphological observations were performed on the field collections and the young trees cultivated in the Magnolia Garden of the South China Botanical Garden, Chinese Academy of Sciences. Detailed information on this variety's habitat, population size, ecology and distribution were gathered during the latest field trips to Yunnan in January, May and September of 2010. Morphological characters of the comparable species were examined during our field work and taken from the relevant literature (Chen & Nooteboom 1993, Xia *et al.* 2008, Nooteboom & Charlermglin 2009). Mature pollen samples of the new taxon and *M. hookeri* were taken from two specimens (*X. M. Hu & Q. W. Zeng 00131*, *X. M. Hu & Q. W. Zeng 00128*) collected in Dayanqian, Maocaoping, Malipo county, Yunnan province and inside the Yunnan Academy of Forestry respectively. Pollen morphological characters were examined under a JEOL JSM-6360 LV

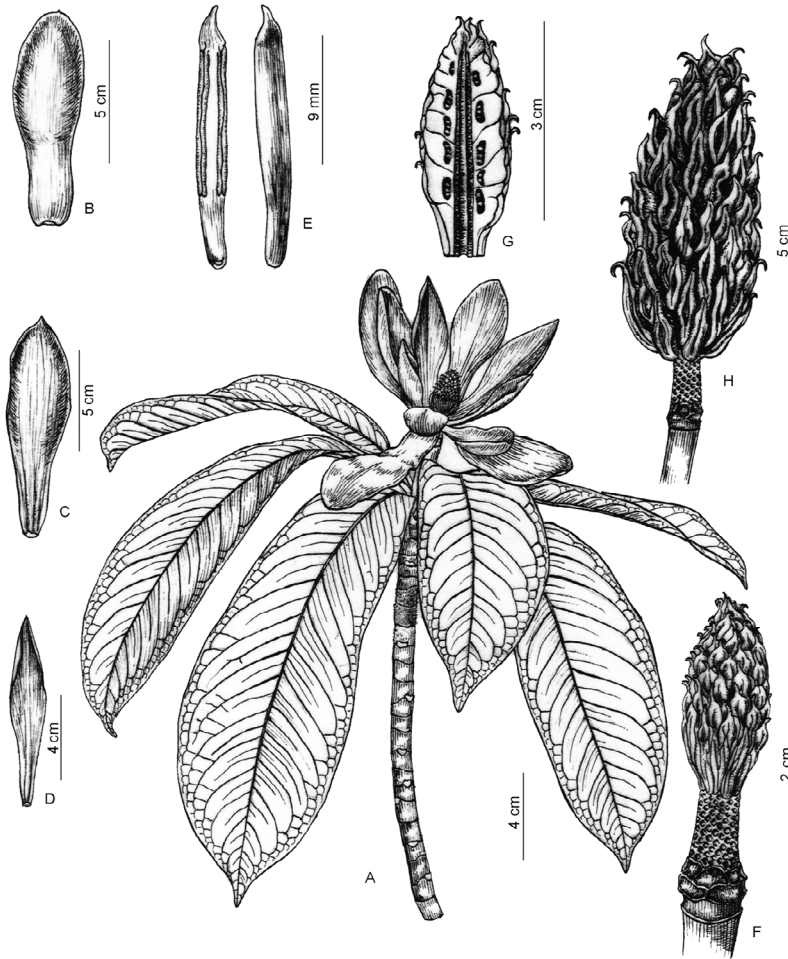


Fig. 1. *Magnolia hookeri* var. *longirostrata* (from the holotype). — **A:** Flowering twig. — **B:** Outer tepal. — **C:** Mid tepal. — **D:** Inner tepal. — **E:** Stamens. — **F:** Gynoecium. — **G:** Longitudinal section of gynoecium. — **H:** Fruit aggregate.

scanning electron microscope (SEM) operated at 25 kV. For the SEM observations, pollen grains were dispersed on the stubs, then gold-coated in a JFC-1600 auto fine coater.

***Magnolia hookeri* var. *longirostrata* D.X.**
Li & R.Z. Zhou, *var. nov.* (Figs. 1 and 2)

TYPE: China, Yunnan province, Malipo county, Mali town, Maocaoping, Dayanqian, in the corn field at the mountain foot at alt. 1000–1200 m, 23°03′29″N, 104°42′53″E, 18 Sep. 2010 X. M. Hu & Q. W. Zeng 00231 (holotype and isotype IBSC). — PARATYPES: China, Yunnan province, Malipo county, Mali town, Maocaoping, Dayanqian, in the corn field at the mountain foot at alt. 1000–1200 m, 3 May 2010 X. M. Hu & Q. W. Zeng 00131; the same locality, 17 Oct. 1993 R. Z. Zhou 9309 (IBSC).

ETYMOLOGY. The varietal epithet *longirostrata* refers to the long-beaked apex of the follicles.

Evergreen trees to 20 m tall and 35 cm in diam.; bark grayish-brown, smooth; twigs stout, grayish-yellow villose, young ones pale green, smooth, old ones grayish-brown, with elevated white lenticels; terminal buds long-conical, pale golden villose. Lower surfaces of young leaves pale golden villose. Leaves rigid and leathery, narrowly obovate-elliptic, 13.5–30 × 4–9.6 cm, apex short-obtuse, base broadly cuneate, dark green, glabrous and slightly wavy above, pale green and glabrous beneath, midribs impressed above, elevated beneath, lateral veins 12–17 on each side, curved and connivent near margin, impressed above, elevated beneath, reticulate veins sparse, slightly impressed above and elevated beneath; petioles stout, sulcate, expanded at base, 2–4 cm long, stipular scars as long as 1/2 of petioles. Flower buds yellowish-green,

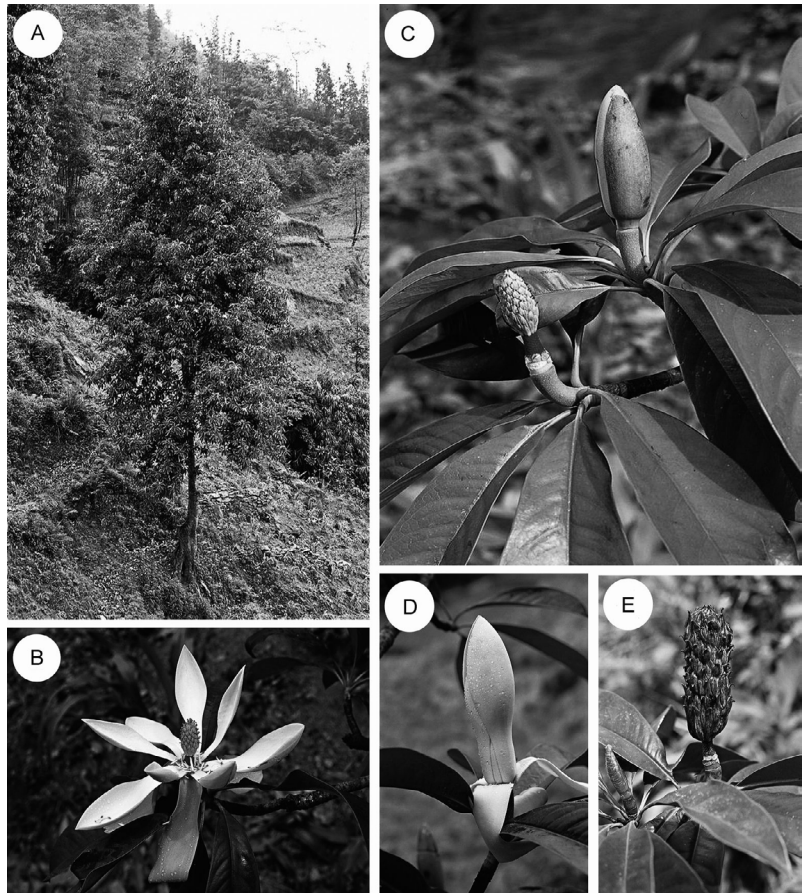


Fig. 2. *Magnolia hookeri* var. *longirostrata*. — **A:** Habitat. — **B:** Flower in full bloom. — **C:** Flower bud with bract and gynoecium. — **D:** Flower in semi-bloom. — **E:** Fruit aggregate.

long cylindrical, acuminate along top, 9.9–11.5 × 2.6–2.8 cm, with 1 bract, yellowish-brown; peduncles 3–4.8 × 0.9–1.1 cm, glabrous, pedicels absent or 2–7 mm long; flowers terminal, solitary and fragrant, tepals 11, obovate-spathulate, outer 3 yellowish-green, thinner, with 7 longitudinal veins, 10.8–12 × 3.9–4.5 cm, mid 3 creamy white, fleshy, 10.8–12 × 3.3–4 cm, narrowed to unguicular from ca. 4 cm to base, inner 5 creamy white, fleshy, acute at apex, 9.5–10.7 × 3–3.5 cm, become narrow to unguicular from ca. 3.5 cm to base; androecia creamy yellow, stamens ca. 160, 18–20 × ca. 2 mm, purplish-red at base, anthers introrsely dehiscent, connective produced into 3–4 mm long triangular appendages, scars of stamens along torus dark purplish-red, 1.1–1.2 × 0.7–0.8 cm, gynoecia ellipsoid, green, 3.5–3.9 × 1.4–1.7 cm, carpels 76–85, 4–6-ovulate in 2 lines per carpel, 2–3-ovulate at top of gynoecia, upper carpels with 1 longitudi-

nal vein, basal ones with 3–5 elevated longitudinal ridges, decurrent, stigmas ca. 4 mm long, outcurved. Fruit aggregates fresh red at maturity, ellipsoid, 11–15 × 4–4.5 cm; fruiting peduncles 3–4.8 × 0.9–1.1 cm, fruiting pedicels absent or 2–7 mm long; follicles woody, dehiscent along dorsal sutures, apex with 0.8–1 cm long beaks, (2–3) 4–6 seeded. Flowering from April to May, fruiting from September to October.

POLLEN MORPHOLOGY (Fig. 3 and Table 1). The pollen grains of the two taxa were bilaterally symmetrical, heteropolar, monocolpate, broadly long-elliptic in polar view, and boat-shaped in equatorial view, having a colpus which is deep, wide and long to the polars. The observations agreed with previous reports of various species of *Magnolia* (Agababian 1972, Pragłowski 1974, Lin & Yu 2003, Xu *et al.* 2004). According to Walker's standard (1976), the pollen grains were big and they had a very similar size.

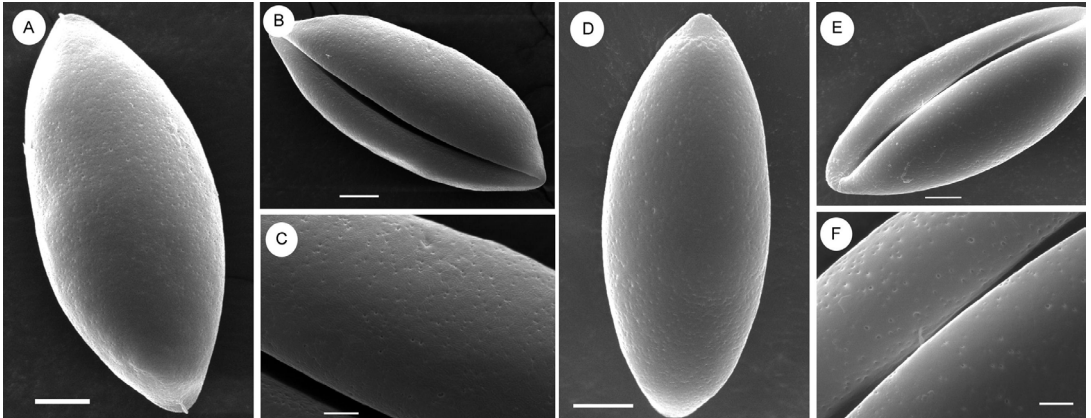


Fig. 3. Scanning electron micrographs of pollen grains. — **A–C:** *Magnolia hookeri* var. *longirostrata*. — **A:** Proximal polar view. — **B:** Lateral view. — **C:** Detail of exine surface. — **D–F:** *M. hookeri*. — **D:** Proximal polar view. — **E:** Distal polar view. — **F:** Detail of exine surface. Scale bars: **A** = 20 μm ; **B, D, E** = 10 μm ; **C** and **F** = 5 μm



Fig. 4. Geographical distribution of *Magnolia hookeri* var. *longirostrata* (\blacktriangle) and *M. hookeri* (\bullet).

Magnolia hookeri var. *longirostrata* is endemic to Maocaojing, Malipo county, Yunnan province, China (Fig. 4). It grows in a corn field at a mountain foot at alt. 1000–1200 m, where there were evergreen broad-leaved forests before. So far only three mature individuals have been found, and there were no seedlings or young trees around the mature individuals.

Magnolia hookeri var. *longirostrata* differs from *M. hookeri* mainly in the shape of the tepals (obovate-spathulate vs. obovate-oblong or obovate), longer and glabrous peduncles (vs. rusty pubescent), longer and narrower ellipsoid gynoecea (vs. ovoid), smaller carpels, longer fruit aggregates (ellipsoid, 11–15 cm vs. cylindrical, 7–10 cm), and small-tuberculate follicles (vs. smooth) with longer beaks (0.8–1 cm vs. 0.2–0.3 cm) at the apex (cf. Table 2).

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Table 1. Comparison of pollen morphological characters of *Magnolia hookeri* var. *longirostrata* and *M. hookeri*.

Taxon	Equatorial axis (μm) (mean and range)	Polar axis (μm) (mean and range)	Exine sculpture
<i>M. hookeri</i> var. <i>longirostrata</i>	65.14(50.00–76.40)	27.85(20.00–41.00)	slightly rough, foveolar
<i>M. hookeri</i>	64.42(46.50–75.60)	29.82(16.20–52.70)	smooth, more foveolar

Table 2. Morphological comparison between *Magnolia hookeri* var. *longirostrata* and *M. hookeri*.

Characters	<i>M. hookeri</i> var. <i>longirostrata</i>	<i>M. hookeri</i>
Buds	pale-golden appressed villose	grayish-white or rusty appressed pubescent
Twigs	grayish-yellow villose	grayish-white or rusty pubescent
Leaves	rigid leathery, dark green and crispate above, glabrous on both sides	leathery, yellowish-green and smooth above, glabrous on both sides
Lateral veins	12–17, distinctly impressed above	12–20, smooth above
Petioles	2–4 cm, glabrous, swollen at base	1.7–5 cm, rusty pubescent, slightly swollen at base
Stipule scars	1–2 cm long	1–3 cm long
Bract	yellowish-brown with pale green spot	pale red with green longitudinal veins
Peduncles	3–4.8 × 0.9–1.1 cm, glabrous	1.2–2.7 × 1.1–1.3 cm, rusty pubescent
Pedicels	absent or 2–7 mm long	2–13 mm long
Tepals	11, obovate-spathulate, outer 3, 10.8–12 × 3.9–4.5 cm; mid 3, 10.8–12 × 3.3–4 cm, inner 5, 9.5–10.7 × 3–3.5 cm	11, outer 3, obovate-oblong, 9–10 × 4.5 cm; obovate, mid 3, 9.6–10 × 4.2–4.6 cm; inner 5, 8–9.5 × 3.4–4.4 cm
Stamens	creamy yellow, purplish-red at base, 1.8–2 × 0.2 cm	white, purplish-red at base, 1.6–2.1 × 0.2–0.25 cm
Gynoecia	ellipsoid, 3.5–3.9 × 1.4–1.7 cm	ovoid, 2.9–3.4 × 1.8–2.1 cm
Scars of stamens	dark purplish-red, 1.1–1.2 × 0.7–0.8 cm	purplish-red, 1.5–1.9 × 0.7–0.8 cm
Carpels	72–85, (2–3)4–6 ovules in 2 lines in a carpel	50–110, (4)5–6(7) ovules in 2 lines in a carpel
Stigmas	ca. 4 mm long, outcurved	ca. 3–5 mm long, outcurved
Fruits	ellipsoid, 11–15 × 4–4.5 cm	cylindric, 7–10 × ca. 6 cm
Follicles	small-tuberculate with 0.8–1 cm long beaks at apex	smooth with 0.2–0.3 cm short beaks at apex

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