Ann. Bot. Fennici 47: 301–305 ISSN 0003-3847 (print) ISSN 1797-2442 (online)
Helsinki 30 August 2010

Castanopsis malipoensis and *C. jinpingensis* (Fagaceae), two new species from Yunnan, China

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Received 5 Feb. 2009, revised version received 13 May 2009, accepted 22 May 2009

Chen, L., Li, X. W., Zhang, J. B. & Li, J. Q. 2010: *Castanopsis malipoensis* and *C. jinpingensis* (Fagaceae), two new species from Yunnan, China. — *Ann. Bot. Fennici* 47: 301–305.

Castanopsis malipoensis and *C. jinpingensis*, two new species of Fagaceae from Yunnan, China, are described and illustrated. The former grows in mixed forests on limestone hills of the Malipo County and is closely related morphologically to *C. xichouensis*, differing from it by having thinner leaves, shorter petioles, flat glabrous cupule spines, and larger nuts. The latter is restricted to the thick forest on Mt. Wutai in the Jinping County, most resembling *C. platyacantha*, but differing from it by its entire leaf-margin, slender cupule spines without pubescences, and having smaller nuts. A key to the two species and their allies is provided.

Key words: biodiversity, morphology, new species, taxonomy, vascular plants

The genus *Castanopsis* (Fagaceae) is one of the dominant components of Asian tropical and subtropical broad-leaved evergreen forests, rainforests and aseasonal montane forests. Approximately 120 species of the genus have been described, of which 58, including 30 endemics, occur in China (Huang *et al*. 1999).

Following a review of the literature (Camus 1929, Govaerts & Frodin 1998, Huang *et al*. 1999) and examination of herbarium collections from various institutions (A, BM, E, K, L, P, TI, HIB, HK, IBK, IBSC, KUN, PE) for the revision of the Chinese *Castanopsis*, we have identified two species of this genus new to science. In more recent field work, we collected several additional specimens in the Counties of Jinping and Malipo, situated at the Indo-Burma hotspot (Myers *et al*. 2000) in the Yunnan Province.

Castanopsis malipoensis C.C. Huang *ex* J.Q. Li & L. Chen, *sp. nova* (Fig. 1)

Species C. xichouensi affinis, sed foliis tenuiter coriaceis, petiolis brevioribus, spinis complanatis ad basin, glandibus majoribus differt.

Holotype: China. Yunnan, Malipo, Xiajinchang, Yunling (previously Huang-jin-in), thick evergreen forest on limestone hill, 1600 m, 19.X.2008 *J.Q. Li et al. 2099* (HIB). — Paratypes: China. Yunnan, Malipo, Xiajinchang, Chungdzai, thick evergreen forest on limestone hill, 1540 m, 19.X.2008 *J.Q. Li et al. 2100*, *2101* (HIB); ibid., 1400–1600 m, 6.XI.1947 *K.F. Feng 12939* (KUN).

Trees ca. 20 m tall. Branchlets dull brown when dry, slightly angulate; second-year branches and rachis of infructescences dull black with slightly raised lenticels. Terminal buds ovoid-

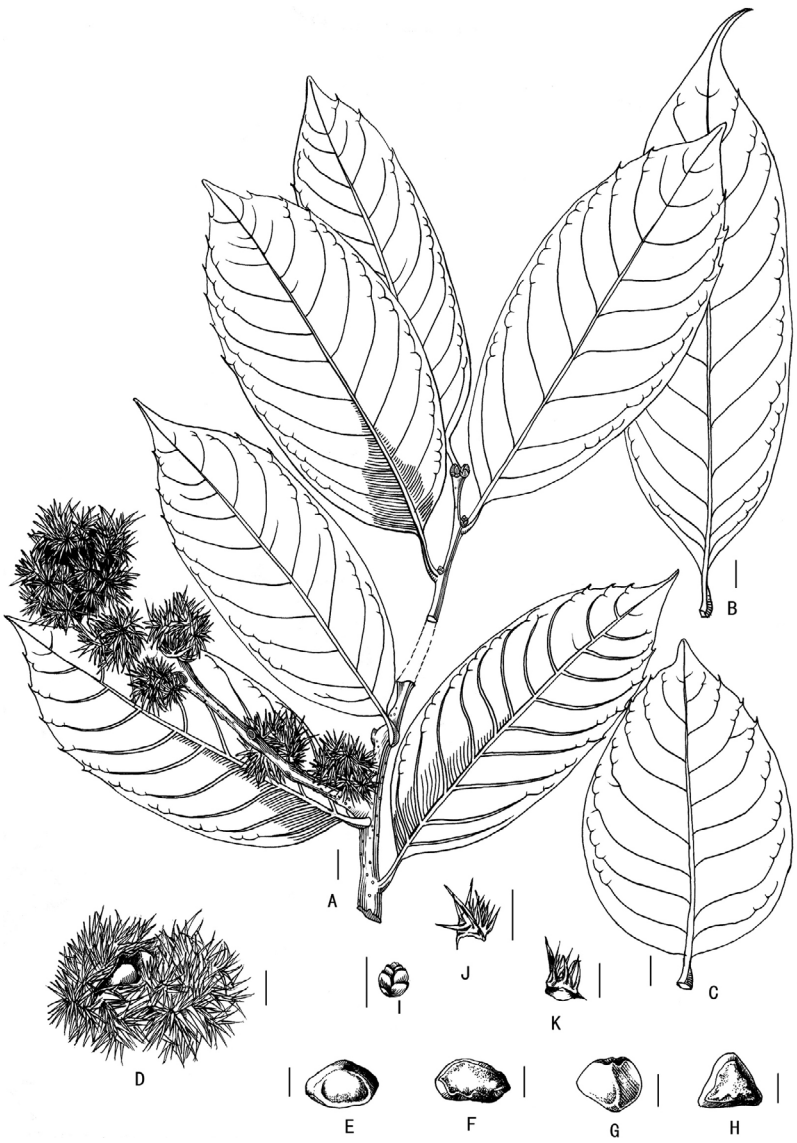

Fig. 1. *Castanopsis malipoensis* (from *J.Q. Li et al. 2099*, *2100*). — **A**: Infructescence and branch tip. — **B** and **C**: Leaves showing the variations of leaf apex, base and shape. — **D**: Cupule. — **E** and **G**: Nuts. — **F** and **H**: Nut scars. — **I**: Bud. — **J** and **K**: Spines. Scale bars = 1 cm.

elliptic or ovoid, scales with dark brown membranous margins, glabrous. Branches glabrous. Petiole 0.6–1.2(–1.5) cm long. Leaves narrowly to broadly elliptic, rarely ovate, 8–14(–20) × 3–7 cm, thinly leathery, underneath with a loose cover of brown scales and then dense pale brownish; base cuneate to broadly cuneate, rarely rounded and slightly oblique; margins with 1–4(–6) shallow teeth at apex or on the upper portion from the middle section to the apex, rarely entire, apex acute to acuminate; midvein adaxially raised; secondary veins 9–13 on each side of the midvein, and adaxially flat, rarely slightly impressed; tertiary veins nearly parallel, adaxially visible. Infructescences ca. 17 cm long, 0.4–0.5 cm thick. Cupule broadly ellipsoid, 4–5(–7) cm in diameter, at maturity regularly splitting into 4 segments; base sessile; outside wall completely covered by spines; spines 1.0–1.5 cm long, glabrous, basally flat and connate into discontinuous rings. Nuts 3(–6) per cupule, broadly conical, 1.6–2.7 cm in diameter, brown pubescent; scar basal, 1.2–2.7 cm in diameter.

This species resembles *C. xichouensis* from the Xichou and Malipo counties, differing from it by having thinner leaves, shorter petioles,

flat glabrous cupule spines, and larger nuts. Characters of *Castanopsis malipoensis* and *C. xichouensis* are compared in Table 1.

DISTRIBUTION AND HABITAT: China, Yunnan, Malipo, Xiajinchang, near the border with Ha Giang Province, Vietnam. *Castanopsis malipoensis* grows in thick evergreen forest on limestone hill, at 1200–1800 m. Fruits are ripe a year after flowering in October–November.

This species was first recognized as new by C. C. Huang; however, he only annotated the words "*Castanopsis* sp. nov." on the herbarium sheet of *Feng 12939* in deposit at KUN, without giving a specific epithet. He did not publish a new name, because the leaves of this specimen were collected from a sprouting seedling, while its cupules and nuts were collected separately from the ground. We ran an expedition to Yunnan and collected several complete specimens with fruits at Xiajinchang of the Malipo County. Based on these new specimens, we confirmed its status as a new species.

Castanopsis jinpingensis J.Q. Li & L. Chen, *sp. nova* (Fig. 2)

Species C. platyacanthae affinis, sed folia margine integra, spinis gracilibus sine pube, glandibus minoribus differt.

HOLOTYPE: China. Yunnan, Jinping, Ma-an-di, Mt. Wutai, 2490 m, 16.X.2008 *J.Q. Li et al. 2078* (HIB). — PARATYPES: China. Yunnan, Jinping, Ma-an-di, Mt. Wutai, 2500 m, 30.IX.1996 *S.K. Wu et al. 3705* (KUN).

Trees ca. 20 m tall. Branchlets brown or reddish brown when dry, slightly angulate; second-year branches and rachis of infructescences dark brown with many grey brown and raised lenticels. Terminal buds ovoid-ellipsoid, scales grey-pubescent. Branches glabrous. Petiole 0.5–1.2 cm long, thick. Leaves elliptic to ovate-elliptic, 7–14.5 × 2.5–5.0 cm, leathery, underneath with a dense cover of reddish brown or pale brown scales; base broadly cuneate to nearly rounded and slightly oblique, decurrent along petiole, margins entire, apex long-acuminate; midvein adaxially raised from the base to the middle, and flat from the middle to the apex; secondary veins (7–)8–10 on each side of midvein, and adaxially flat. Infructescences ca. 9 cm long, 0.3–0.5 cm thick. Cupule broadly ellipsoid, 3–4 cm in diameter, at maturity irregularly splitting into 2–4 segments; base sessile; outside wall completely covered by spines; spines 0.5–1.0 cm long, with brown scales, no pubescences, basally connate into bundles. Nuts 3 per cupule, conical, 0.9–1.2 cm in diameter, yellow pubescent; scar basal, 0.6–0.9 cm in diameter.

Castanopsis jinpingensis is allied to *C. platyacantha* in the characters of the leaf apex and the scales beneath the leaves, however, its leaf margins are entire, its slender cupule spines are covered with brown scales, but no pubescences and

Table 1. Comparison of major characters of *Castanopsis malipoensis* and *C. xichouensis*.

Characters	*C. malipoensis*	*C. xichouensis*
Leaf		
length × width	8–14(–20) × 3–7 cm	10–24 × 3.5–8.5 cm
texture	thin-leathery	thick-leathery
Petiole length	0.6–1.2(–1.5) cm	1.5–2.7 cm
Rachis of infructescences		
length	17 cm	30 cm
diameter	0.4–0.5 cm	0.6–1.0 cm
Cupule spine		
shape	flat base	rounded base
scale	glabrous	brown scales
arrangement	connate into discontinuous rings	connate at base sometimes to middle into 3–7-spined bundles
Nut		
diameter	1.6–2.7 cm	1.2 cm
number/cupule	3	3
scar	basal	basal

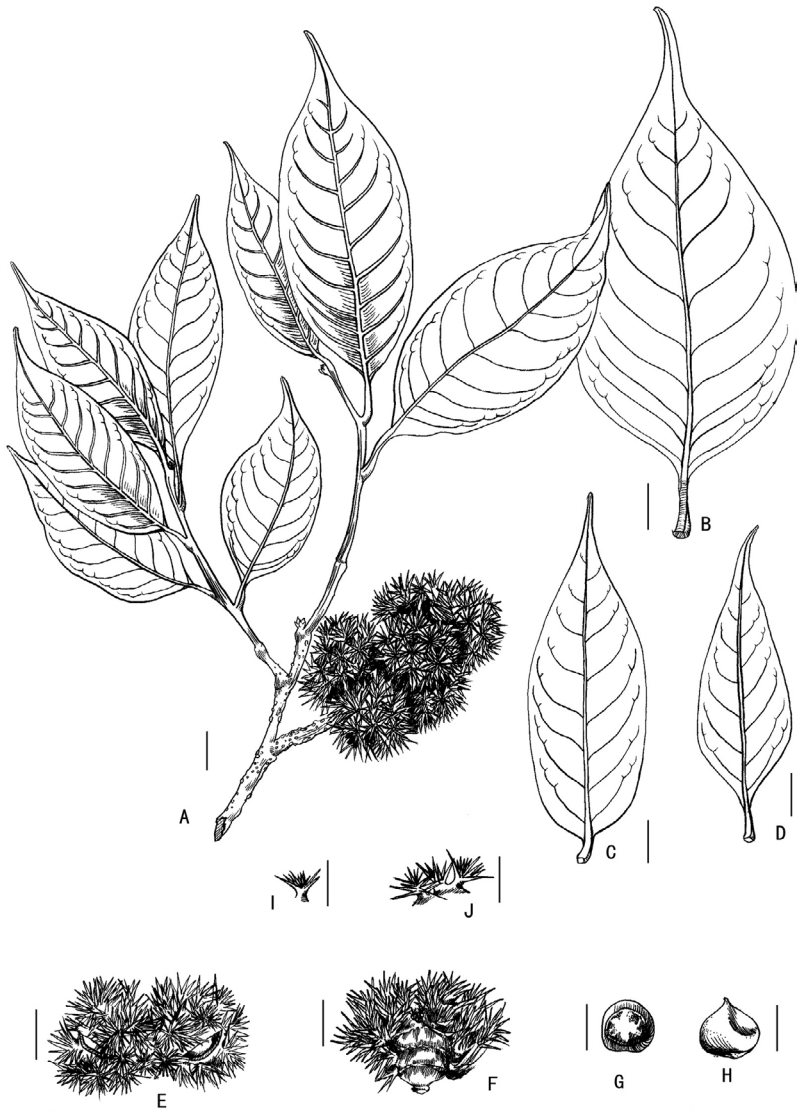

Fig. 2. *Castanopsis jinpingensis* (from *J.Q. Li et al. 2078*). — **A**: Infructescence and branch tip. — **B–D**: Leaves showing the variations of leaf base and shape. — **E**: Cupule. — **F**: Adaxial side of cupule. — **G**: Nut scar. — **H**: Nut. — **I** and **J**: Spines. Scale bar = 1 cm.

its nuts are smaller. Characters of *Castanopsis jinpingensis* and *C. platyacantha* are compared in Table 2.

Distribution and habitat: This species is only known from the type locality, which is near Lao Cai Province, Vietnam. It is found in a thick forest at about 2500 m. Fruits are ripe a year after flowering in October.

Key to *Castanopsis malipoensis*, *C. jinpingensis* and morphologically similar species

1. Cupule spines 1–2 cm long; midvein adaxially slightly raised 2
1. Cupule spines less than 1 cm long (to 1.5 cm in *C. lamontii*); midvein adaxially impressed, or from base to middle slightly raised 5
2. First-year branches, leaves and petioles densely pilose; secondary veins 16–22 on each side of midvein .... *C. tessellata*
2. Branches glabrous and leaves scaly wihout hairs; secondary veins 10–17 on each side of midvein 3
3. Leaf margins entire; secondary veins 12–17 on each side of midvein ..... *C. rockii*
3. Leaf margins serrate; secondary veins 10–14 on each side of midvein 4
4. Leaves thick-leathery; petiole 1.5–2.5 cm .... *C. xichouensis*
4. Leaves thin-leathery; petiole 0.6–1.2(–1.5) cm .... *C. malipoensis*
5. First-year branches and leaves underneath at least adja-

Table 2. Comparison of major characters of *Castanopsis jinpingensis* and *C. platyacantha*.

Characters	*C. jinpingensis*	*C. platyacantha*
Leaf		
shape	elliptic to ovate-elliptic	ovate, oblong, or obovate eiliptic
length × width	7–14.5 × 2.5–5.0 cm	10–18 × 3–6 cm
margin	entire	serrate or entire
Petiole length	0.5–1.2 cm	0.8–1.5 cm
Cupule spine		
length	0.5–1.0 cm	0.3–0.8 cm
shape	slender	flat
pubescence	no pubescences	greyish brown pubescences
scale	brown scales	brown scales
arrangement	basally connate into bundles	basally connate into bundles and frequently unite to cristate rings
Nut		
diameter	0.9–1.2 cm	1.4–2.0 cm
number/cupule	3	1–3
scar	basal	1/3 of nut

cent to midvein pilose to villous 6
5. Branches glabrous and leaves scaly wihout hairs; sometimes apex of branchlets and midvein of young leaves underneath with sparse coarse hairs 7
6. Leaves 16–30 × 5–8 cm; secondary veins 16–22 on each side of midvein ..... *C. kweichowensis*
6. Leaves 10–18 × 2–5 cm; secondary veins 13–17 on each side of midvein ..... *C. ceratacantha*
7. Nuts glabrous or with sparse short hairs only around stylopod when young ..... *C. fabri*
7. Nuts covered with appressed hairs 8
8. Leaf apex mucronate or caudate 9
8. Leaf apex acute to acuminate 10
9. Leaves firm-leathery, apex mucronate, margins slightly curled abaxially ..... *C. crassifolia*
9. Leaves thick-leathery, apex caudate and bent, margins flat ..... *C. chunii*
10. Petiole 1.5–3 cm ..... *C. lamontii*
10. Petiole 0.5–1.5 cm 11
11. First-year leaves concolorous on both sides .... *C. orthacantha*
11. First-year leaves underneath with a cover of reddish brown or greyish brown scales 12
12. Midvein adaxially impressed; secondary veins 13–19 on each side of midvein ..... *C. wattii*
12. Midvein adaxially flat, sometimes from base to middle slightly raised; secondary veins 9–13 on each side of midvein 13
13. Leaf margins entire to serrate from middle to apex; flat spines basally connate into bundles and frequently unite to cristate rings ..... *C. platyacantha*
13. Leaf margins entire; slender spines basally connate into bundles ..... *C. jinpingensis*

Acknowledgements

Comments and suggestions from Prof. Djaja Djendoel Soejarto (University of Illinois at Chicago) are sincerely appreciated. The authors are grateful to Mr. Zhi-Yong Yu, Mr. De-Xu Pu, Mr. Wan-Lu Zhu (Fenshuiling National Nature Reserve of Jinping County) and Mr. Bo Xiao (Malipo Forestry Bureau of Yunnan Province) for their assistance with field work and to Miss Nan Jia (Hubei Institute of Fine Arts) for preparing the illustrations. This work was financially supported by the grant from the National Natural Science Foundation of China (no. 30770151).

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