

Lithocarpus yangchunensis (Fagaceae), a new species from Guangdong, China

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Lithocarpus yangchunensis H.G. Ye & F.G. Wang (Fagaceae) is described and illustrated. It is restricted to the evergreen broad-leaved forest on Mount Hewei, Yangchun County, Guangdong Province, China. It is most similar to *L. attenuatus*, but differs in its long-caudate leaf blade, androgynous inflorescences, pallid cupules that enclose 3/4–4/5 of the nuts, and in the smaller nuts. A key is provided to distinguish the morphologically most similar taxa.

Key words: Fagaceae, *Lithocarpus*, new species, taxonomy

Lithocarpus, the largest genus of Fagaceae, comprises over half of the subfamily Castaneoideae (Jones 1986) and includes more than 300 species. It is distributed mainly in Asia, with the northern limit on the southern flank of the Qinling Mountains in China. There are 123 species in China, and the provinces of Guangdong, Guangxi and Yunnan have the highest diversity and the most primitive of the Chinese species (Soepadmo & Bogor 1972, Huang *et al.* 1998, 1999).

The E'huangzhang Natural Reserve lies in the east of the Yunkai Mountains, southeast Guangdong Province. It occupies about 15 000 ha, and ranges between 21°50'36''–21°58'40''N and 111°21'29''–111°36'03''E. As it is well covered by natural forests, it is an area important to biodiversity conservation.

In a recent floristic inventory of the E'huangzhang Nature Reserve, 1580 species in 754 genera of vascular plants were recorded (Wang

et al. 2003). During the expedition some interesting specimens of *Lithocarpus* were collected. On further visits to the same locality, more material was collected including a range of specimens with flowers and fully mature fruits. After comparison with material of morphologically similar taxa, it could not be placed in any of the previously described taxa and is thus herein proposed as a new species. With the addition of this species the flora of the Natural Reserve contains nine species of *Lithocarpus*.

Lithocarpus yangchunensis H.G. Ye & F.G. Wang, *sp. nova* (Fig. 1)

Species affinis *L. attenuato*, sed haec species ramulis juvenibus sulcatis (nec non sulcatis), foliis longo-caudatis (nec anguste acuminatis), inflorescentiis androgynis (nec unisexualibus), floribus masculinis ad rhachidem supra medium



Fig. 1. *Lithocarpus yangchunensis* (from holotype, drawn by Yunxiao Liu). — **A:** Fruiting stem with androgynous inflorescence and mature cupule. — **B:** Mature cupule enclosing 3/4 of nut. — **C:** Mature cupule enclosing more than 4/5 of nut. — **D:** Top of nut (enlarged). — **E:** Male flower. — **F:** Enlarged male tepal. — **G:** Female flower.

insertis (nec discretis), cupulis parvis 12–17 mm altis 14–18 mm latisque (nec 30–35 × 25–30 mm), pallidis (nec fuscis), nuces 3/4–4/5 inclusis

(nec perfecte inclusis), nucibus parvis 13–17 mm altis 15–20 mm latisque, glaberis (nec 20–25 × 18–28 mm, albidis farinosis) differt.

TYPE: China. Guangdong Province, Yangchun County, Hewei mountains, altitude 550 m, 31.VII.2001 *Ye Hua-gu et al.* 6057 (holotype IBSC!).

Trees, up to 15 m tall, mostly glabrous. Young branchlets sulcate. Petiole 2.2–3 cm long, ca. 1.3 mm in diameter, slender; leaf blade thinly leathery, elliptic to ovate-elliptic, 6–10 × 2.2–3.3 cm, adaxially glabrous, abaxially with a thin layer of translucent wax and glaucous when dry, base cuneate and decurrent along petiole, apex long-caudate to 2.5–2.8 cm long, margin entire; midrib slightly prominent adaxially, flat abaxially, secondary veins 6–9 pairs, ± impressed adaxially, departing at an angle of about 30–65° to the midrib, tertiary veins rather obscure on both surfaces. Inflorescence solitary or 2–4 congested at apex of branches of last-year's growth, all androgynous, 7.5–9 cm long. Male flowers above the middle of the inflorescence, in clusters of ca. 3, sessile; tepals 6, free, ovate, apically obtuse, ca. 0.5 × 0.5 mm, sparsely white-pilose on the outside; stamens 10–12, 0.5–1.5 mm long, base of filaments densely covered with appressed white hairs. Female flowers 8–17 per inflorescence, solitary (not grouped in clusters), scattered at base of rachis, sessile; tepals similar to those of male flowers, obscure; styles 3, ca. 1 mm long. Infructescence robust, 4–6.5 cm long, often 1–3-fruited; peduncle 1.5–2.5 cm long. Mature cupules slightly oblate, 13–18 × 15–20 mm including pedicel, usually enclosing 3/4–4/5 of the nut, wall crustaceous, 0.1–0.2 mm thick; bractlets scattered, triangular, obscure; cupules sessile, fruiting pedicel thin, 1–1.5 mm long. Nut oblate, 12–17 × 14–18 mm, chestnut brown, glabrous, base flat; scar concave, ca. 1 mm thick, ca. 8 mm in diameter. Flowering from July to October, fruiting from October through to November of the following year.

ADDITIONAL SPECIMENS EXAMINED (paratypes). — **China.** Same locality as for holotype, altitude 700 m, 27.X.1999 *Ye Hua-gu et al.* 6546 (IBSC!); same locality, 10.X.1990 *Liu Nian* 797 (IBSC!).

ETYMOLOGY. The specific epithet is derived from Chinese “yangchun” of the county where the holotype of *Lithocarpus yangchunensis* was collected.

ECOLOGY AND DISTRIBUTION. In montane evergreen broad-leaved forest, granite mountains, altitude 400–750 m, in association with *Gordonia*

axillaries, *Barthea barthei*, *Homalium cochinchinense*, *Rhodomyrtus tomentosa*, *Lithocarpus* sp., *Lindernia* sp. and other *Cyperus* sp. Known only from the type locality.

Lithocarpus yangchunensis rather resembles *L. attenuatus* (Huang *et al.* 1998, 1999), which is distributed in south Guangdong and southwest Guangxi at altitudes below 1000 m, having thinly leathery elliptical to ovate-elliptical leaves, with an acuminate apex, often solitary female flowers scattered on the rachis, and the cupules sessile, slightly oblate and crustaceous. Also, the bractlets of both species are obscure, triangular and scattered, and the nuts oblate, with a flat base and a concave scar. However, the former differs primarily as follows: young branchlets sulcate, leaf blades long-caudate, inflorescences all androgynous, male flowers above the middle of inflorescence, cupules smaller, pallid, enclosing only 3/4–4/5 of the nuts, and the nuts smaller, 12–17 × 14–18 mm in size, glabrous. A morphological comparison between *L. yangchunensis*, *L. attenuatus* and also *L. caudatilimbus* is given in Table 1 (Merrill & Chun 1935, Huang *et al.* 1998, 1999).

Lithocarpus yangchunensis might also be confused with *L. encleisacarpus* (Cockburn 1972, Soepadmo 1972), which is known from Peninsular Siam (songkla) and Malesia (Sumatra, Malay Peninsula and Borneo), at altitudes up to 1300 m. The latter differs from *L. yangchunensis* by its big leaf blade 12–23 × 4–6 cm, apex acute to bluntly 1–2 cm acuminate, beneath densely glaucous adpressed stellate-hairy; cupule 15–23 × 20–32 mm, outside densely fulvous-tomentose by stellate hairs, with pedicel 10–35 mm long and 5–8 concentric flanges, covering the nut completely; nut 20–32 mm in diameter. *Lithocarpus encleisacarpus* is rather variable, and in specimens from above 900 m the cupule is usually cup-shaped and covering ca. 1/2 of the nut.

Also *L. shinsuiensis* (Liu *et al.* 1976, Huang *et al.* 1998, 1999), endemic to Taiwan at 300–1000 m altitude in forests, resembles *L. yangchunensis* in having acuminate or caudate leaves, but is distinguished by its oblong-lanceolate to lanceolate leaves, 8–18 cm long, abaxially pallid; its shorter petiole 1–1.5 cm long, its female inflorescence in clusters of 1–3, its cupule hemispherical to urceolate, 12 × 22 mm,

enclosing 1/3–1/2 of nut, stalk 7 mm long, basal bracts imbricate or in concentric rings, squamose, tawny puberulent, and its nut 17–20 × 18–20 mm. In addition, *L. shinsuiensis* flowers in February through April. Below is an identification key summarising the most important morphological differences among these taxa.

Key to *Lithocarpus yangchunensis* and its morphologically similar congeners

1. Mature cupules enclosing nut completely; nut white farinose *L. attenuatus*
1. Mature cupules not enclosing nut completely; nut without white farinose 2
2. Cupules stalked; caudate leaf apex less than 2 cm long ...

Table 1. Diagnostic characters of *Lithocarpus yangchunensis*, *L. attenuatus* and *L. caudatilimbus*.

Characters	<i>L. yangchunensis</i>	<i>L. attenuatus</i>	<i>L. caudatilimbus</i>
Young branchlet	sulcate	not sulcate	sulcate
Leaf			
Texture	thinly leathery	thinly leathery	rigidly papery
Shape	elliptical to ovate-elliptical	ovate-elliptic to lanceolate	broadly ovate to suborbicular
Apex	long-caudate up to 2.8 cm long	narrowly acuminate	abruptly acute, shortly caudate, or rarely acuminate
Margin	entire	entire or sometimes undulate	entire
Tertiary veins	obscure	evident	slender
Length (cm)	6–10	7–13	7–14
Width (cm)	2.2–3.3	2–4	3–8
Inflorescence			
Composition	androgynous, solitary or 2–4 congested at apex of branches, male flowers above middle of inflorescence	unisexual, axillary, male inflorescences paniculate or racemose, 10–14 cm long, female inflorescences racemose, 10–12 cm long	unisexual, male inflorescences in a panicle, 6–10 cm long, female inflorescences solitary or in pairs, terminal on branches
Female flowers	sessile	sessile	stipitate
Cupule			
Covering nut	3/4–4/5	completely	1/2–3/4
Height (mm)	13–17	30–35	10–15
Width (mm)	15–19	25–30	20–25
Thickness of wall (mm)	0.1–0.2	less than 0.5	(0.5)–1
Length of pedicel (mm)	1–1.5	1–1.5	up to 15
Thickness of pedicel (mm)	2–3	3–5	6
Outside	pallid	dark-brown	dark-brown
Bractlets	triangular, obscure	basal bracts united into concentric rings, apical ones reduced to a subulate tip or a wartlike appendage	wartlike, arranged in about 12 rows
Nut			
Height (mm)	12–17	20–25	14–18
Width (mm)	14–18	18–28	18–23
Colour	chestnut brown	white farinose	chestnut brown
Scar	ca. 8 mm in diameter, concave to ca. 1 mm	7–12 mm in diameter, concave to 1–1.5 mm	12–14 mm in diameter, concave to ca. 1.5 mm
Seed coat	rufous	fuscous	fuscous
Distribution	Guangdong Province in China	Guangdong and Guangxi Province in China	Guangdong and Hainan Province in China

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2. Cupules sessile; caudate leaf apex 2.5–2.8 cm long ...
..... *L. yangchunensis*
3. Leaf blades beneath densely glaucous adpressed stellate-hairy; cupules outside densely fulvous-tomentose by stellate hairs, with 5–8 concentric flanges
..... *L. encleisacarpus*
3. Leaf blades beneath and cupules outside without stellate hairs; cupules without concentric flanges 4
4. Stalk of mature cupules ca. 1.5 cm; petiole 3–4 cm
..... *L. caudatilimbus*
4. Stalk of mature cupules ca. 0.7 cm; petiole 1–1.5 cm
..... *L. shinsuiensis*

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