

Diospyros leei (Ebenaceae), a new species from limestone areas in Guangxi, China

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Diospyros leei Yan Liu, S. Shi & Y.S. Huang, a new species of Ebenaceae from limestone areas in Guangxi, China is described and illustrated. It is similar to *D. rostrata* and *D. chunii*, but differs by its 3.5–12 cm long and 1–4 cm wide leaf blade with a cuneate or obtuse base; 4-lobed calyx; and fruit which is elliptic, ca. 3.3 cm in diam. in the middle, glabrous or sometimes sparsely brown strigose, its apex being prominently rostrate, with a beak longer than 1 cm.

Diospyros is a genus of more than 600 species (Duangjai *et al.* 2009) and is mainly distributed in tropical regions, with only a few species extending into the temperate zones. In China, there are so far more than 60 species (43 endemic) recorded, most of them from southwestern and southeastern China (Lee *et al.* 1996). In the Guangxi Autonomous Region, there are 23 species recognized, two of them endemic (Qin & Liu 2010, Lee 2011). During a fieldwork in limestone areas in Guangxi in 2014, an unfamiliar species of *Diospyros* was found in karst forest in Long'an and Du'an counties. After further study of herbarium material and literature (Merrill 1916, 1923, Merrill & Chun 1935, 1940, Chun & Chen 1936, Backer & Bakhuizen Van Den Brink 1965, Wu & Li 1965, Lee 1983, 1987, 1998, Lee *et al.* 1996, Pham 1999, Li *et al.* 2006), we found that the specimens represented an undescribed species.

Diospyros leei Yan Liu, S. Shi & Y.S. Huang, *sp. nova* (Fig. 1)

TYPE: China. Guangxi, Long'an county, Dujie town, in hillside of limestone area, rare, alt. 240 m a.s.l., 27 June 2014 Wei-Bin Xu & Yu-Song Huang Y2968 (holotype IBK; isotype IBK, PE). — PARATYPE: China. Guangxi, Du'an county, Laren town, on margin of forests of limestone area, rare, alt. 175 m a.s.l., 23 Feb. 2015 Yu-Song Huang Y3029 (IBK).

ETYMOLOGY: The specific epithet is in honor of Prof. Lee Shu-kang, who has made outstanding contributions to our knowledge of *Diospyros* in China.

Evergreen trees or shrubs, 2–6 m tall. Bark fissured, gray-brown; branches brown, young branches densely rusty pubescent, glabrescent when old. Leaves alternate; petiole 2–5 mm long, densely brown strigose; leaf blade leathery, oblong-lanceolate, 3.5–12 cm long, 1–4 cm wide; apex acuminate; margin brown strigose, slightly revolute; base cuneate or obtuse, with brown strigose; adaxially glabrous, glossy, paler

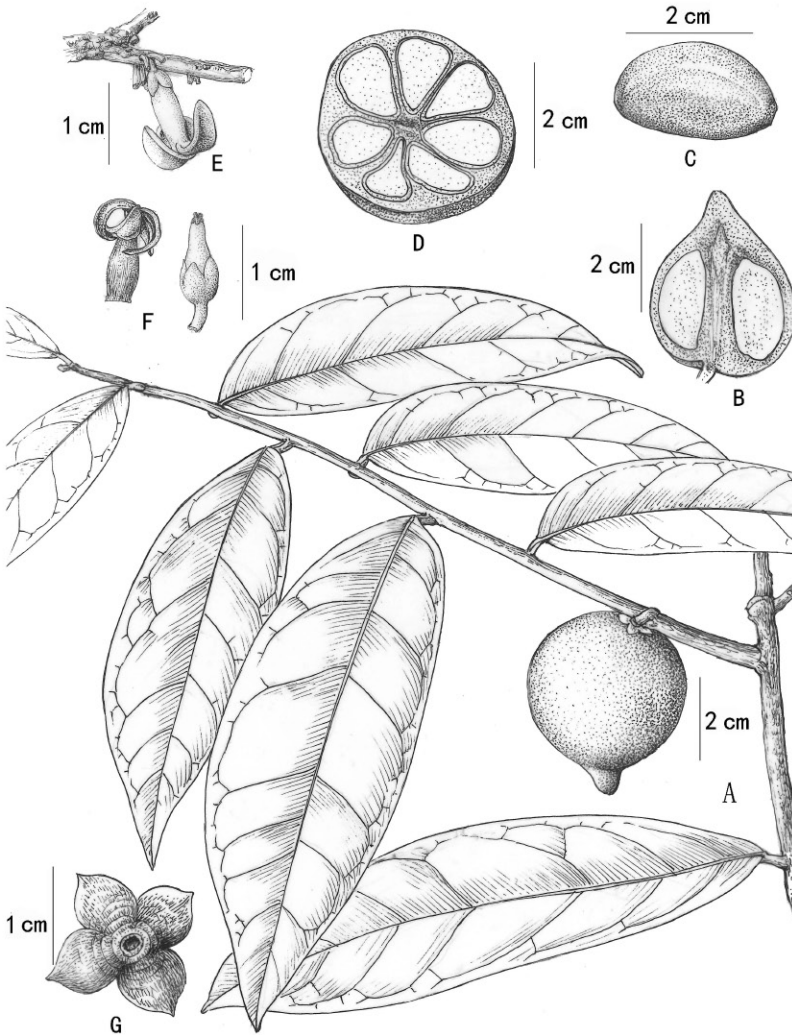


Fig. 1. *Diospyros leei* (from the holotype and isotype, drawn by Wen-Hong Lin). — **A:** Branch. — **B:** Fruit (transverse section). — **C:** Seed. — **D:** Fruit (vertical section). — **E:** Male flower. — **F:** Female flower (pistil and corolla tube). — **G:** Fruiting calyx.

when dry; abaxially sparsely brown strigose; midrib adaxially slightly concave, abaxially conspicuously raised and densely brown strigose; lateral veins anastomosing, 5–10 pairs, adaxially inconspicuous, abaxially conspicuous and slightly raised. Male flowers in axillary clusters on current year's or older branches; pedicel ca. 2 mm long, brown strigose; calyx lobes 4, triangular-ovate, ca. 4 mm long, ca. 3 mm wide, slightly brown strigose outside, glabrous inside; corolla yellowish; corolla tube tubular, ca. 1 cm long, glabrous or slightly brown strigose outside; corolla lobes 4, recurved, ca. 7 mm long, ca. 3 mm wide, glabrous or slightly brown strigose; stamens 12, adnate to base of corolla; filaments

glabrous, ca. 1.5 mm long; anthers linear, glabrous, ca. 3.5 mm long. Female flowers solitary, axillary on current year's branches; calyx lobes 4, triangular-ovate, ca. 3.5 mm long, ca. 2.5 mm wide, glabrous or slightly brown strigose outside; corolla yellowish; corolla tube tubular, ca. 9 mm long; corolla lobes 4, ca. 7 mm long, ca. 3 mm wide; staminodes 8–10, ca. 4 mm long, glabrous; ovary 6–8-locular, globose, glabrous or slightly brown strigose, ca. 3 mm long, ca. 2 mm wide; style apex 2-lobed. Fruits solitary, axillary; pedicel ca. 4 mm long; persistent calyx lobes 4, leathery, triangular-ovate, ca. 4 mm long, ca. 3.5 mm wide, apex acute. Berry ellipsoid, ca. 4.2 cm long, ca. 3.3 cm in diam. in the middle; peri-

carp orange when mature, dark-brown when dry, glabrous or sometimes sparsely brown strigose; apex prominently beaked, beak stout, longer than 1 cm. Seeds 6–8, kidney-shaped, brown, ca. 2.5 cm long, ca. 1.5 cm in diam. in middle. Flowering April–May, fruiting June–August.

Diospyros leei is similar to *D. rostrata* and *D. chunii*, but it can be easily distinguished from the latter two by several characters, especially leaves, calyx and fruit (Table 1). *Diospyros leei* can further be distinguished from all morphologically close species by the following key.

Key to *Diospyros leei* and its morphologically similar species

- 1. Branchlets with hairs, which conceal much of epidermis 2
- 1. Branchlets glabrous to inconspicuously pubescent
..... *D. siderophylla*
- 2. Berry diam. equal or greater than 1.5 cm 3
- 2. Berry diam. smaller than 1.5 cm *D. eriantha*
- 3. Winter buds and young shoots with prominent dark brown to almost black hairs *D. hainanensis*
- 3. Winter buds and young shoots with pale or yellow to reddish brown hairs 4
- 4. Fruiting calyx lobes flat, appressed to berry 5
- 4. Fruiting calyx lobes with recurved to strongly reflexed margins 6

- 5. Berry apex beaked, seeds 6–8, calyx at fruit stage ca. 4 × 3.5 mm 7
- 5. Berry apex acuminate, not beaked, seeds 4, calyx at fruit stage ca. 6 × 7 mm *D. chunii*
- 6. Leaf blade abaxially with small but sharply delimited sunken glands scattered between lateral veins and 3–12 mm from midrib, lateral veins 10–14 per side; berry ca. 8 cm in diam., densely and persistently villose
..... *D. philippensis*
- 6. Leaf blade without sunken glands, lateral veins (6–)7–10 per side; berry 3–3.5 cm in diam., glabrescent
..... *D. ehretoides*
- 7. Beak longer than 1 cm *D. leei*
- 7. Beak shorter than 1 cm *D. rostrata*

DISTRIBUTION AND HABITAT. At present, *D. leei* is known only from Long'an and Du'an counties in southwestern Guangxi (Fig. 2). In Long'an County, *D. leei* grows on a karst limestone hillside within a forest at an elevation of 240 m a.s.l., on the up to 50° NE slope. The tree layer is up to 15 m tall, with a canopy cover of 70%, and includes *Excentrodendron tonkinense*, *Pterospermum truncatolobatum*, *Sterculia monosperma*, *Choerospondias axillaris* and *Cinnamomum saxatile*. The shrub layer cover is 80%, and includes *Diospyros eriantha*, *D. siderophylla*, *Neolitsea hainanensis*, *Cipadessa baccifera*, *Litsea glutinosa*, *Mallotus repandus*, *Orophea*

Table 1. Morphological comparison among *Diospyros leei*, *D. rostrata* and *D. chunii*.

Characters	<i>Diospyros leei</i>	<i>D. rostrata</i>	<i>D. chunii</i>
Leaves			
shape	oblong-lanceolate	oblong	oblong to oblong-lanceolate
size	3.5–12 cm long, 1–4 cm wide	9–23 cm long, 4–7 cm wide	7–7.5 cm long, 2–3.3 cm wide
Leaf base	cuneate or obtuse	cordate	obtuse
adaxially	paler when dry	dark-brown when dry	paler when dry
abaxially	brown strigose densely on the midrib	pubescent on the midrib	brownish tomentose on the midrib
Lateral veins	5–10 pairs	13 pairs	4–7 pairs
Calyx			
lobes	lobes 4	lobes 3	lobes 4
shape	triangular-ovate	oblong-ovate	broadly ovate
Fruit			
size	ca. 4.2 cm long, ca. 3.3 cm in diam. in the middle	ca. 4.5 cm long, 2 cm in diam. in the middle	ca. 3 cm in diam. in the middle
surface	glabrous or sparsely brown strigose	apical part sparingly appressed-pubescent	glabrous except apex appressed-pubescent
apex	prominently rostrate, beak more than 1 cm long	prominently rostrate, beak shorter than 1 cm	acuminate, not rostrate
shape	ellipsoid, rounded at base	oblong-ellipsoid, narrowed at base	subglobose, rounded at base



Fig. 2. Distribution of *Diospyros leei* in Long'an and Du'an counties of Guangxi (China).

anceps, *Xylosma controversum*, *Micromelum integerrimum*, *Boehmeria nivea* var. *tenacissima* and *Zanthoxylum dissitum*. The herb layer cover is 85%, and consist of *Nephrolepis cordifolia*, *Arthraxon hispidus*, *Miscanthus sinensis*, *Phymatosorus cuspidatus*, *Drynaria roosii*, *Asplenium sampsonii*, and *Senecio scandens*. In Du'an County, *D. leei* grows on the margin of a forest on karst limestone at an elevation of 175 m a.s.l., on the up to 50° NE slope. The tree layer is up to 14 m tall, the canopy cover being 60%, and it includes *Bridelia retusa*, *Canthium dicoccum*, *Radermachera sinica* and *Sterculia euosma*. The shrub layer cover is 80%, and includes *Oreocnide kwangsiensis*, *Cipadessa baccifera*, *Pittosporum kwangsiense*, *Tarenna attenuata*, *Murraya paniculata*, *Alchornea trewioides* and *Zanthoxylum dissitum*. The herb layer is relatively sparse, covering only 45%, and it includes *Arthraxon hispidus*, *Nephrolepis cordifolia*, *Pilea longicaulis*, *Primulina liboensi* and *Echinacanthus lofouensis*. Those two localities are not within protected areas and they are being seriously affected by the local residents, through clearance for cultivation, tree-cutting, grazing, etc.

CONSERVATION STATUS. *Diospyros leei* is a rare species, and currently only two small populations (fewer than 50 plants altogether) are known, one from the type locality and one from Du'an County; those localities are about 140 km apart. We therefore consider *D. leei* to be Data Deficient (DD) (IUCN 2001).

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