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Two new species of *Mahonia* (Berberidaceae) from Yunnan, China

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Two new species of *Mahonia* (Berberidaceae), *M. dulongensis* H. Li and *M. lushuiensis* T.S. Ying & H. Li, are described and illustrated from Yunnan, China. *Mahonia dulongensis* is morphologically similar to *M. taronensis*, but it differs in having 16–18 teeth on each leaflet margin side, adaxially with conspicuous lateral veins, and inflorescence of 11 fascicled racemes, 5–13 cm long, sometimes with branches. *Mahonia lushuiensis* is similar to *M. polyodonta*, but can be easily distinguished by its having 3–4 pairs of leaflets, adaxially with lateral veins flat or inconspicuous, and bracts of inflorescence ovate, 1 × 0.8 cm.

Key words: Berberidaceae, *Mahonia*, new species, taxonomy

Berberidaceae is a large family with 17 genera and about 650 species. It is widely distributed in the northern temperate zone and subtropical mountainous region. According to Ying (2001) 11 genera and 303 species occur in China.

Mahonia is one of the biggest genera in Berberidaceae. About 60 species are widely distributed in E and SE of Asia, also in western North America, Central America and western South America. There are 31 species in China (including 23 endemic species and one endemic subspecies), mainly in Sichuan, Yunnan, Guizhou and SE of Xizang provinces (Ying 2001). Fifteen species were recorded for Yunnan Province by Bao (1997).

During our fieldwork in Yunnan from 2004 to 2005, thousands of specimens were collected. Two species of *Mahonia* were identified as new after investigating their morphological characteristics (Grierson 1984, Bao 1997, Ying 2001) and examining specimens in the herbaria in KUN and PE.

Mahonia dulongensis H. Li, *sp. nova* (Fig. 1)

Species nova M. taronensi affinis sed folio margine 16–18 spinoso-serraturo, racemis 11 fasciculatis aliquot ramosis, pedicellis bracteis aequilongis vel longioribus differt.

Type: China. Yunnan Province, Gongshan, Dulongjiang, 27°55´46.2´´N, 98°20´1.9´´E, on roadside, alt. 1620 m above sea level, 5.XI.2004 *Gaoligongshan Biodiversity Survey 21834* (holotype KUN; isotypes CAS, E). — Paratypes:

Fig. 1. *Mahonia dulongensis* (from the holotype, drawn by Yi-Tao Liu). — **A**: Habit. — **B**: Flower. — **C**: Outer sepal. — **D**: Median sepal. — **E**: Inner sepal. — **F**: Petal with two glands. — **G**: Stamen. — **H**: Ovary.

China. Yunnan Province, Gongshan County, Dulongjiang town: Dulongjiang elementary school, in broad-leaved forest beside river, alt. 1320 m, 29.XII.1990 *Dulongjiang Valley Exped. 1378* (KUN); Moqiewang village, in everygreen forest valley, alt. 1600 m, 10.I.1991 *Dulongjiang Valley Exped. 1838* (KUN); Kongdang village, in everygreen broad-leaved forest, alt. 1480 m, 30.XII.1990 *Dulongjiang Valley Exped. 1498* (KUN); Dizhengdang village, in everygreen forest, alt. 1800 m, 12.IV.1991 *Dulongjiang Valley Exped. 5594* (KUN); Xuebalaka mountains, in broad-leaved forest, alt. 2000 m, 15.IV.1991 *Dulongjiang Valley Exped. 5942* (KUN).

Etymology. The specific epithet is derived from the name of the county where the specimens were collected.

Shrub, 1.5-m tall, evergreen. Leaves imparipinnate alternate, narrowly obovate, ca. 43.6 × 23 cm, abaxially green, adaxially dark olivaceous-green, with 8 pairs of leaflets, lowest pair smaller and ca. 1 cm above base of petiole, abaxially with conspicuously raised midvein and lateral veins, adaxially with conspicuous midvein, lateral veins also conspicuous; rachis stout, ca. 0.3 cm in diameter, internodes 3.5–4.5 cm; lowest pair of leaflets ovate or narrowly ovate, 2–3 × 1–1.5 cm, margin with 4–6 teeth per side; middle pair of leaflets ovate-lanceolate, 6–14 × 3–3.5 cm, base broadly cuneate or subrounded, margin with 9–18 teeth per side, apex caudate-acuminate; terminal leaflet obovate-

lanceolate, 14.5 × 3.5 cm, petiolule ca. 2 cm, base cuneate, apex caudate-acuminate, margin with 16–18 teeth per side. Inflorescence of 11 fascicled racemes, 5–13 cm long, 3 of 11 with branches; bracts of inflorescence ovate to ovate-oblong, 1–2.5 × 0.7–1 cm. Pedicel 0.4–0.8 cm long; floral bract lanceolate, 0.4–0.6 × 0.5–1 mm. Flowers yellow. Outer sepals ovate, ca. 2 × 1 mm; median sepals oblong-elliptic, ca. 3.5 × 1.5 mm; inner sepals oblong, ca. 4 × 2.5 mm. Petals oblong-obovate, ca. 3 × 1.5 mm, base with 2 distinct glands, apex entire. Stamens ca. 2 mm; anther connective not prolonged, truncate. Ovary ca. 2.5 mm; ovules 2. Flowering in November, fruit not seen.

Mahonia dulongensis is similar to *M. tarnoensis*, but it is not difficult to distinguish them from each other. *Mahonia dulongensis* is characterized by having 16–18 teeth on each leaflet margin side, adaxially with conspicuous lateral veins, and inflorescence consisting of 11 fascicled racemes, 5–13 cm long, sometimes with branches, pedicels longer than bracts or equal. *Mahonia tarnoensis* has 6–8 teeth per leaflet margin side, adaxially with inconspicuous lateral veins, and inflorescence consisting of 3–5 fascicled racemes, 5–8 cm long, without branches, and bracts longer than pedicels (*see* Table 1).

This species was also collected during the investigation of the Dulongjiang Region in October 1990 to June 1991. *Mahonia dulongensis* H. Li was first mentioned as a nomen nudum in *The Flora of Dulongjiang Region* (Li 1993). This species is currently known to be distributed only

Table 1. Morphological differences among *Mahonia dulongensis*, *M. taronensis*, *M. lushuiensis* and *M. polyodonta*.

	M. dulongensis	*M. taronensis*	*M. lushuiensis*	*M. polyodonta*
Leaflets	8 pairs	5–10 pairs	3–4 pairs	4–8 pairs
Leaflet margin	16–18 teeth per side	6–8 teeth per side	9–12 teeth per side	10–16 teeth per side
Distance between lowest pair of leaflets and petioles	0.5 cm	1 cm	0.5 cm	0.5–2.5(–4) cm
Adaxial lateral veins	conspicuous	inconspicuous	inconspicuous	conspicuous
Top leaflet	obovate-lanceolate, margin with 16–18 teeth per side	lanceolate, margin with 5–11 teeth per side	ovate-lanceolate, margin with 9–12 teeth per side	ovate-oblong, margin with 8–12 teeth per side
Racemes	11 fasciled 5–13 cm long, sometimes has branches	3–5 fasciled 5–8 cm, no branches	5 fasciled 4–5 cm long, no branches	3–5 fasciled 5–6 cm long, no branches
Bracts of inflorescence	1–2.5 × 0.7–1 cm	1–2 × 0.7–1 cm	1 × ca. 0.8 cm	2 × ca. 1 cm
Bracts/ pedicels	bracts shorter than pedicels or equal	bracts longer than pedicels	bracts longer than pedicels	bracts longer than pedicels
Petals	apex entire	apex entire	apex acutely emarginate, lobes rounded	apex acutely emarginate, lobes rounded
Habitat	in everygreen broad-leaved forest, alt. 1320–2000 m	in forests or edge of forests, alt. 1500–3000 m	growing on granite, along roadside in sun, alt. 3125 m	in forest, scrubby slopes, bamboo thickets, roadsides, rocky areas, alt. 1300–3100 m
Distribution	Dulong River region in Gongshan County of Yunnan, China	SE Xizang, Dulong River region in Gongshan County of Yunnan, China	Lushui County in western Yunnan, China	Myanmar, Indian Assam, China: NE Guizhou, W Hubei, Sichuan, Xizang, Yunnan (Luquan, Suijiang, Tengchong, Yanshan)

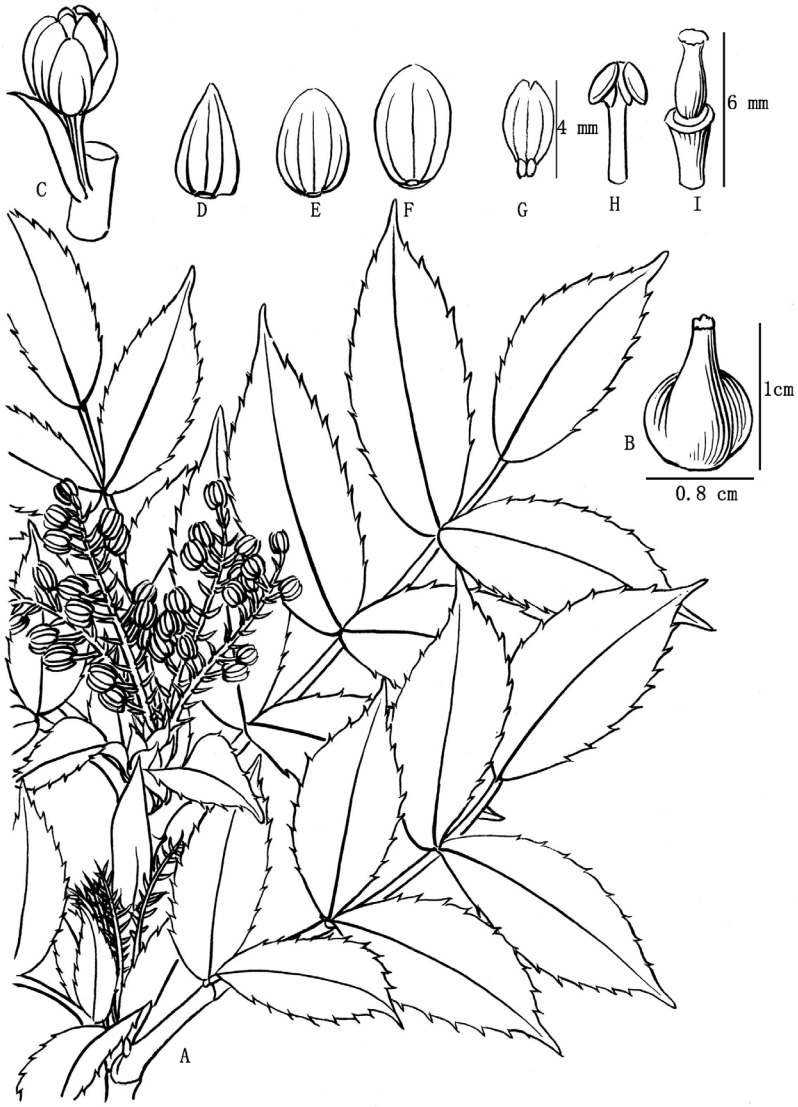

Fig. 2. *Mahonia lushuiensis* (from the holotype, drawn by Yi-Tao Liu). — **A**: Habit. — **B**: Bract of inflorescence. — **C**: Flower. — **D**: Outer sepal. — **E**: Median sepal. — **F**: Inner sepal. — **G**: Petal with two glands. — **H**: Stamen. — **I**: Ovary.

in the Dulong River region in Gongshan County (Li 2000).

Mahonia lushuiensis T.S. Ying & H. Li, *sp. nova* (Fig. 2)

Species affinis M. polyodontae, sed foliolis 3–4 jugis, in sicco superne nervis planis, inconspicuis, bracteis fasciculatis ca. 1 × 0.8 cm differt.

Type: China. Yunnan Province, Lushui County, Luzhang Township, 25°58′24′′N, 98°41′15′′E, growing in bamboo thicket, alt. 3125 m above sea level, 19.V.2005 *Gaoligongshan Biodiversity Survey 24522* (holotype KUN; isotypes CAS, E). — Paratype: Same locality, 19.V.2005 *Gaoligongshan Biodiversity Survey 24531* (KUN, CAS, E).

Etymology. The specific epithet is derived from the name of the county where the specimens were collected.

Shrub 0.5 m tall, evergreen. Leaves imparipinnate alternate, narrowly obovate, ca. 16–18 × 7–8 cm, abaxially deep green, adaxially dark green, with 3–4 pairs of leaflets, lowest pair smaller and ca. 0.5 cm above base of petiole, abaxially with conspicuously raised midvein and lateral veins, adaxially with conspicuous mid-

vein, lateral veins flat or inconspicuous; rachis stout, ca. 2 mm in diameter, internodes ca. 4 cm; lowest pair of leaflets ovate, apex caudate-acuminate, 2.5 × 1.5 cm, margin with 7–8 teeth per side; middle pair of leaflets elliptic or lanceolate, 7 × 2.5 cm, base cuneate, oblique, margin with 11–12 teeth per side, apex caudate-acuminate; terminal leaflet ovate-lanceolate, 7 × 2.5 cm, petiolule ca. 2 cm, base cuneate, apex caudate-acuminate, margin with 9–12 teeth per side. Inflorescence of 5 fascicled racemes, 4–5 cm long; bracts of inflorescence ovate, 1 × 0.8 cm. Pedicel 0.4 cm long; floral bract broadly lanceolate, 0.6 × 3 mm. Flowers yellow. Outer sepals ovate-lanceolate, ca. 6 × 3 mm; median sepals oblong-elliptic, ca. 4.2 × 2.5 mm; inner sepals oblong, ca. 5 × 2.5 mm; petals oblong, ca. 4 × 2 mm, base with 2 distinct glands, apex acutely emarginate, lobes rounded. Stamens ca. 3 mm; anther connective not prolonged, truncate. Ovary ca. 3 mm; ovules 2. Flowering in May, fruit not seen.

Mahonia lushuiensis is similar to *M. polyodonta*, but it is easily distinguished by having 3–4 pairs of leaflets, adaxial lateral veins flat or inconspicuous, and by the bracts of the inflorescence ovate, 1 × 0.8 cm. *Mahonia polyodonta* has 4–8 pairs of leaflets, adaxial lateral veins conspicuous, and bracts of inflorescence ovate-lanceolate, 2 × 1 cm (*see* Table 1).

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References

Bao, S. Y. 1997: [*Flora of Yunnan*, vol. VII]: 1–27. — Sci. Press, Beijing. [In Chinese].

Grierson, A. J. C. & Long, D. G. 1984: *Flora of Bhutan*, vol. I, part 2: 322–328. — Royal Bot. Garden, Edinburgh.

Li, H. 1993: *Flora of Dulongjiang Region*: 67. — Sci. Press, Yunnan. [In Chinese with English abstract].

Li, H., Guo, H. J. & Dao, Z. L. 2000: *Flora of Gaoligong Mountains*: 504. — Sci. Press, Beijing. [In Chinese with English abstract].

Ying, J. S. 2001: [*Flora of China*, 29]: 50–249. — Sci. Press, Beijing. [In Chinese].