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A new species of *Mahonia* (Berberidaceae) from China

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A new species, ***Mahonia monodens*** J.Y.Wu, H.N.Qin & S.Z.He, **sp. nov.** (Berberidaceae), is described from Guangxi, China. Its distinguishing characters, description, detailed illustration and taxonomic comments are given. The species was compared with the related species, *M. microphylla*, and a diagnostic key is provided. The new species is critically endangered (CR) according to the categories and criteria of the World Conservation Union. *Botanical Journal of the Linnean Society*, 2009, **159**, 357–361.

ADDITIONAL KEYWORDS: conservation – endemic – IUCN red list – *Mahonia monodens* sp. nov. – single dentate.

INTRODUCTION

Mahonia Nutt. is the second largest genus in Berberidaceae. Fedde (1902) recorded 37 species and Ahrendt (1961) recorded *c*. 200 species. It has included in *Berberis* by some authors (McCain & Hennen, 1982; Moran, 1982; Whetstone, Atkinson & Spaulding, 1997; Kim, Kim & Landrum, 2004); however, true *Berberis* spp. have simple leaves. Ying (2001) treated the genus *Mahonia* as distinct with *c*. 60 species in total in the world, distributed mainly in East and South-east Asia, western North America, Central America and western South America, including 31 species in China (23 endemic species, one endemic subspecies), mainly in Sichuan, Yunnan, Guizhou and Xizang Provinces. In April 2006, the first author came across specimens of *Mahonia* collected from Guangxi Province by Feng-sheng Huang in 1959, conserved in GXDC and GXMI, and others from Guizhou Province collected by Shun-zhi He in 2000, conserved in GZTM. The specimens are of a plant similar to *Mahonia microphylla* T.S.Ying & G.R.Long (Ying & Long, 1999). However, the collection from Guangxi lacks flowers, so it could not be identified. In addition, the collection from Guizhou was noticeably different from any described species of *Mahonia*. In October 2006, the first author made a botanical expedition to Tiandeng, Guangxi, where he found a population of these same plants. Following field observations, a thorough examination of specimens and consultation with the literature, it was concluded that the specimens from Guangxi and Guizhou represented a hitherto undescribed species. The species can be distinguished from *M. microphylla* by its leaf, sepal and petal morphology, and shape and size of the berry, i.e. leaves with singly dentate margins, middle and inner sepals almost equal, distinguishing shape of the sepals, petal having three glands, berry oblong, 3.5–5 × 2–3 mm. Therefore, the total number of *Mahonia* species known from China can now be reported as 32.

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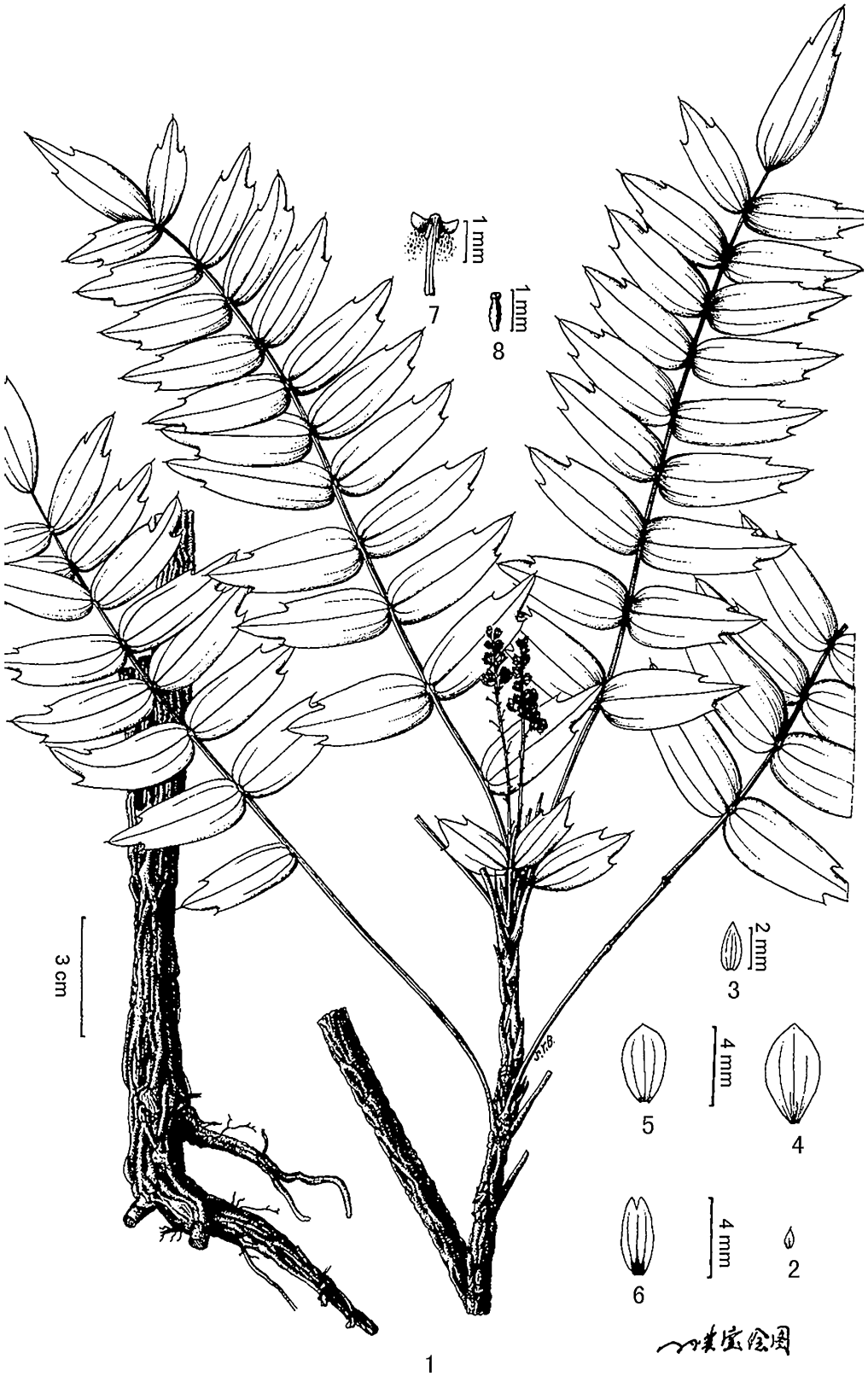
DESCRIPTION OF THE SPECIES

MAHONIA MONODENS J.Y.WU, H.N.QIN & S.Z.HE, SP. NOV. (FIGS 1–12)

Type: China: Guangxi, Tiandeng, 600 m, open rocky slopes in thickets, 5.x.2006, *Jian-yong Wu* 06101 (holotype, PE); Guizhou, Guiyang, Gaopo, Jiading, 28.ix.2000, *Shun-zhi He 20264* (paratype, GZTM).

Diagnosis: Species nova foliolis 6–13 jugis ellipticis ad oblongo-ellipticis magnis margine 1- raro 2-dentatis, racemis 4–8 cm longis, sepalis medianis internis fere



Figures 1–8. ***Mahonia monodens*** **sp. nov.** Fig. 1. Habit. Fig. 2. Bract. Fig. 3. Outer sepal. Fig. 4. Median sepal. Fig. 5. Inner sepal. Fig. 6. Petal. Fig. 7. Stamen. Fig. 8. Pistil.

Figure 9–12. ***Mahonia monodens*** **sp. nov.** Fig. 9. Habit. Fig. 10. Flower. Fig. 11. Fruit. Fig. 12. Sepal.

aequi longis, petalis ellipticis, basi glandulis 3, baccis plerumque oblongis 3.5–5 mm longis 2–3 mm latis *M. microphyllae* affinis, sed foliolis 10–14 jugis ovatis ad ovatis-ellipticis minoribus margine edentatis, racemis 4–13 cm longis, sepalis medianis conspicue minoribus, petalis anguste ellipticis basi glandulis 2, baccis plerumque subglobosis 7–9 mm longis, 6–8 mm latis, differt.

Notes: Similar to *M. microphylla* in having a small leaf and a short plant height, but differs by its singly dentate margins, shape and size of the sepals, shape of the petals, three glands on the petals, shape and size of the berry and habitat.

Description: Shrubs 30–50 cm tall. Leaves abaxially pale yellow–green, adaxially green, narrowly elliptical, 18–25 × 5–7 cm, with 6–13 pairs of leaflets, the lowest pair close to 1–5 cm above base of petiole; abaxially venation inconspicuous; adaxially with slightly impressed midvein; lateral veins slightly conspicuous; rachis 2–3 mm in diameter; internodes 1–2.5 cm; lowest pair of leaflets elliptical, 2.5–3.5 × 1–1.5 cm, apex acuminate, base rounded, margin singly dentate; those above increasing then decreasing in length from base to apex, from 4.8 × 2.1 cm to 3.5 × 1.3 cm, elliptical to oblong-elliptical; base slightly oblique, rounded or slightly cordate, margin singly dentate, rarely doubly dentate; apex acuminate; terminal leaflet slightly larger than others, oblong-elliptical, apex acuminate, base rounded, margin singly dentate, sessile or petiolule 5–8 mm. Inflorescence of four to eight fascicled racemes, 4–8 cm; pedicels 3–5 mm; floral bracts ovate-elliptical, 1.5–2 × *c.* 1 mm, the apex acuminate. Flowers golden-yellow, sweet smelling. Outer sepals triangular-ovate, *c.* 2 × 1–1.7 mm; median sepals elliptical, 3.8–4.2 × 1.8–2.2 mm, the apex acuminate; inner sepals broadly elliptical, 4–4.4 × 2.2–2.6 mm, the apex obtuse, rounded. Petals elliptical, 4–4.2 × 1.9–2.1 mm, the base with three glands, the apex narrowly incised. Stamens *c.* 1.5 mm; anther

DIAGNOSTIC KEY TO THE TWO SPECIES

1. Leaflets elliptical to oblong-elliptical, 3.5–4.8 × 1.3–2.1 cm; margin singly dentate; outer sepals triangular-ovate, median sepals elliptical, inner sepals broadly elliptical, median sepals almost equal to inner sepals in size; petals elliptical, the base with three glands; berry oblong, 3.5–5 × 2–3 mm ..... ***M. monodens***
1. Leaflets ovate to ovate-elliptical, 1.5–2.5 × 0.8–1.2 cm; margin entire; outer sepals ovate, median sepals obovate-oblong, inner sepals elliptical, inner sepals conspicuously larger than median sepals; petals narrowly elliptical, the base with two glands; berry subglobose, 7–9 × 6–8 mm ..... ***M. microphylla***

connective not prolonged, rounded. Ovary *c*. 2 mm; ovules 2 or 3; style absent. Berry blue–black, oblong, 3.5–5 × 2–3 mm, slightly pruinose, not stylose; seeds usually 2.

Phenology: Flowers from September to October; fruits from October to November.

Habitat: Thickets on mountain ridges, summits of limestone mountains; 600–700 m.

Etymology: The name '*monodens*' refers to the vegetative structure of this species, which is generally more delicate than that of other species.

Distribution and proposed conservation status: Mahonia monodens is endemic to limestone mountains in south-west China and is known only from two populations at the holotype and paratype localities (according to the collector, it is now almost impossible to re-locate in Guiyang, Guizhou). The population occurs in an area of only approximately 2 km^2, and the population size is only approximately 50–100 individuals. Because *Mahonia* spp. are used medicinally, they are often harvested and sold in markets. Consequently, the number of individuals is decreasing. Therefore, the species should be regarded as critically endangered (CR) according to the World Conservation Union (IUCN) threat categories (IUCN, 2001).

Ecology: Mahonia monodens grows sparsely scattered on open rocky slopes in thickets. Associated species at the holotype locality include: *Chirita longgangensis* W.T.Wang (Gesneriaceae), *Guihaia argyrata* (Lee & Wei) S.K.Lee, F.N.Wei & Dransf. (Arecaceae), *Lespedeza bicolor* Turcz. (Fabaceae), *Pterolobium punctatum* Hemsl. ex Forb. & Hemsl. (Fabaceae), *Rosa laevigata* Michx. (Rosaceae), *Smilax china* L. (Smilacaceae), *Tirpitzia ovoidea* Chun & F.C.How & W.L.Sha (Linaceae), *Wikstroemia indica* (L.) C.A.Mey. (Thymelaeaceae), *Caryopteris incana* Miq. (Lamiaceae) and *Cipadessa cinerascens* (Pellegr.) Hand.-Mazz (Meliaceae). The species has been collected in flower from September to October and in fruit from October to November.

DISCUSSION

Mahonia monodens is endemic to limestone mountains in south-west China and is known only from two localities, Tiandeng Xian, south-west Guangxi and Guiyang, central Guizhou, China, growing among shrubs. *Mahonia microphylla* is endemic to Rong'an County, north Guangxi, China. It is known only from its type locality, growing within a forest.

The first author undertook a botanical expedition to Hubei, Sichuan, Guizhou, Yunnan and Guangxi Provinces in 2006, but did not find another locality for either *M. monodens* or *M. microphylla* in the field. *Mahonia monodens* is similar to *M. microphylla* in the shape of its leaves and plant height, but differs in having singly dentate leaf margins and middle sepals equal to the inner sepals. In *M. microphylla*, the leaves are entire, and the middle sepals are conspicuously smaller than the inner sepals.

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