

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

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(Received January 15, 2008; Accepted February 6, 2009)

ABSTRACT. *Mahonia jingxiensis* (Berberidaceae), a new species from Guangxi Zhuangzu Autonomous Region, China, is described. Its distinguishing characters and description are given, along with a detailed illustration, color photographs, and taxonomic comments. The species is compared with two similar species (*Mahonia shenii* W.Y. Chun and *M. microphylla* Ying et G.R. Long) and a species (*M. subimbricata* W.Y. Chun et F. Chun) from adjacent locality in the genus. The species is distinguishable from the three species in having big entire leaflets, distinct adaxial venation; the lowest pair of leaflets is small (0.5-3.0 × 0.3-1.5 cm) and situated a short distance (ca. 1 cm) from the petiole base; racemes are sometimes branched, middle sepals (3.7-4.1 × 1.9-2.1 mm) and inner sepals (4.1-4.3 × 2.2-2.5 mm) almost equal; berry pyriform, small (3.5-5 mm). Its pollen and seed morphology are reported.

Keywords: Berberidaceae; China; *Mahonia*; *Mahonia jingxiensis*; New species; Pollen morphology; Seed morphology.

INTRODUCTION

Mahonia Nutt. is the second largest genus in the Berberidaceae, next to the genus *Berberis*. Fedde (1902) recorded 37 species and Ahrendt (1961) recorded ca. 200 species. The genus is often recognized as the genus *Berberis* by some authors (McCain and Hennen, 1982; Moran, 1982; Whetstone et al., 1997; Kim et al., 2004). (True *Berberis*, however, have simple leaves). Ying (2001) treated the genus *Mahonia* as distinct with ca. 60 species total in the world, distributed mainly in East and Southeast Asia, also in 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. Although high in diversity because of species numbers, many species are narrowly distributed, and few works have focused on *Mahonia*, which are threatened because of over-exploitation for their medicinal use. In May 2007, the fourth author came across *Mahonia* materials collected from Guangxi Province in a medicinal plant agora. After several days, he collected the specimens without flowers and fruit and sent them to the first author. The first author

thought that the specimens, being collected from the adjacent locality of *Mahonia subimbricata* W. Y. Chun et F. Chun (Chun and Chun, 1948) represented a plant similar to *Mahonia shenii* W. Y. Chun (Chun, 1928) and *Mahonia microphylla* Ying et G. R. Long (Ying and Long, 1999) but could be a different species. However, the collections lacked flowers and fruit, making positive identification impossible. In October 2007, the first two and the fourth authors made a botanical expedition to Jingxi, Guangxi. They found a population of these same plants with flowers and fruit in an area of about 3 km². Following field observations, a thorough examination of specimens, and research in the literature, it was concluded that the plant from Guangxi represented a hitherto undescribed species. We propose it as a new species, *Mahonia jingxiensis*, which is described and illustrated here.

NEW SPECIES

Mahonia jingxiensis J. Y. Wu, M. Ogisu, H. N. Qin & S. N. Lu, sp. nov.—TYPE: CHINA. Guangxi Province: Jingxi Xian, Sanhe Xiang, Niansi Tun, alt. ca. 500 m, in thickets and forest, 23 Oct 2007, J. Y. Wu & M. Ogisu 1023 (holotype: PE; isotype: IBK).

靖西全缘叶十大功劳 (Figures 1, 2A-D)

Mahonia jingxiensis aspectu similis *M. shenii* and *M. microphylla*, sed foliolis 5-7 jugis, ovatis vel oblongis,

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magnus et edentatis, supera nervis lateralibus conspicuis, basi rotundatis, interdum obliquis; eis jugi infimi ovatis, 0.5-1.5 cm longis, 0.3-1 cm latis, minoribus quam eis superioribus, 0.5-1 cm a basi petioli distantibus; racemo, interdum ramoso; flore aureo, sepalis exterioribus 1.2-1.4 mm longis, 1-1.2 mm latis, sepalis medianis 3.7-4.1 mm longis, 1.9-2.1 mm latis, eis interioribus fere aequimagnis, sepalis interioribus 4.1-4.3 mm longis, 2.2-2.5 mm latis; petalis basi glandulis 2 praeditis; baccis pyriformibus, 3.5-5 mm, deffert.

Shrubs ca. 1 m tall. Leaves abaxially pale green, adaxially dark green, narrowly elliptic, 15-35 × 8-12 cm, with 5-7 pairs of leaflets, lowest pair close to ca. 1 cm above base of petiole, abaxially venation conspicuous, adaxially with slightly raised midvein, lateral veins conspicuous, rachis 2-3 mm in diam.; internodes 2-5.5 cm; lowest pair of leaflets ovate, 0.5-3 × 0.3-1.5 cm, entire, rarely 1-dentate; those above increasing, then decreasing, in length from base to apex, becoming 2-9 × 1.2-3.6 cm, then 2.8-6.3 × 1.4-2.7 cm, ovate or ovate-oblong, base slightly oblique,

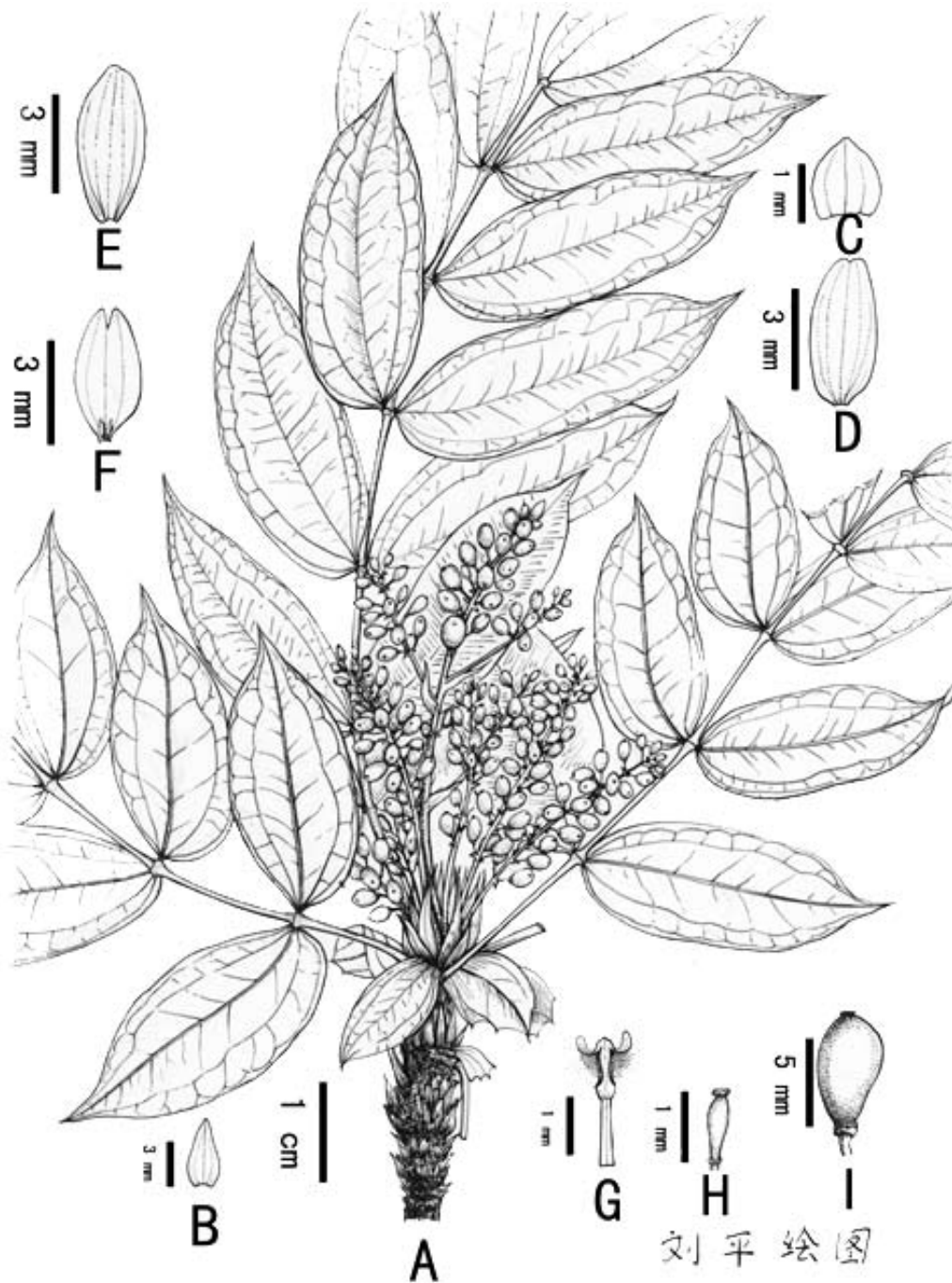


Figure 1. *Mahonia jinxienensis* J. Y. Wu, M. Ogisu, H. N. Qin & S. N. Lu. A, Habit; B, Floral bract; C, Outer sepal; D, Median sepal; E, Inner sepal; F, Petal; G, Stamen; H, Ovary; I, Berry.

rounded, margin entire, apex acuminate; terminal leaflet slightly larger than others, oblong-elliptic, 4.5-9.5 × 1.8-4.6 cm, petiolule 0.7-2 cm. Inflorescence of 4-12 fascicled racemes, sometimes branched racemes, 5-13 cm long; pedicels 2.5-3.5 mm; floral bracts ovate, 2.5-3 × 1.2-1.6

mm, apex acuminate. Flowers golden-yellow, sweet smelling. Outer sepals ovate, 1.2-1.4 × 1-1.2 mm; median sepals elliptic, 3.7-4.1 × 1.9-2.1 mm, apex obtuse or slightly concave; inner sepals broadly elliptic, 4.1-4.3 × 2.2-2.5 mm, apex obtuse, rounded. Petals elliptic, 3.6-4 × 1.5-1.8

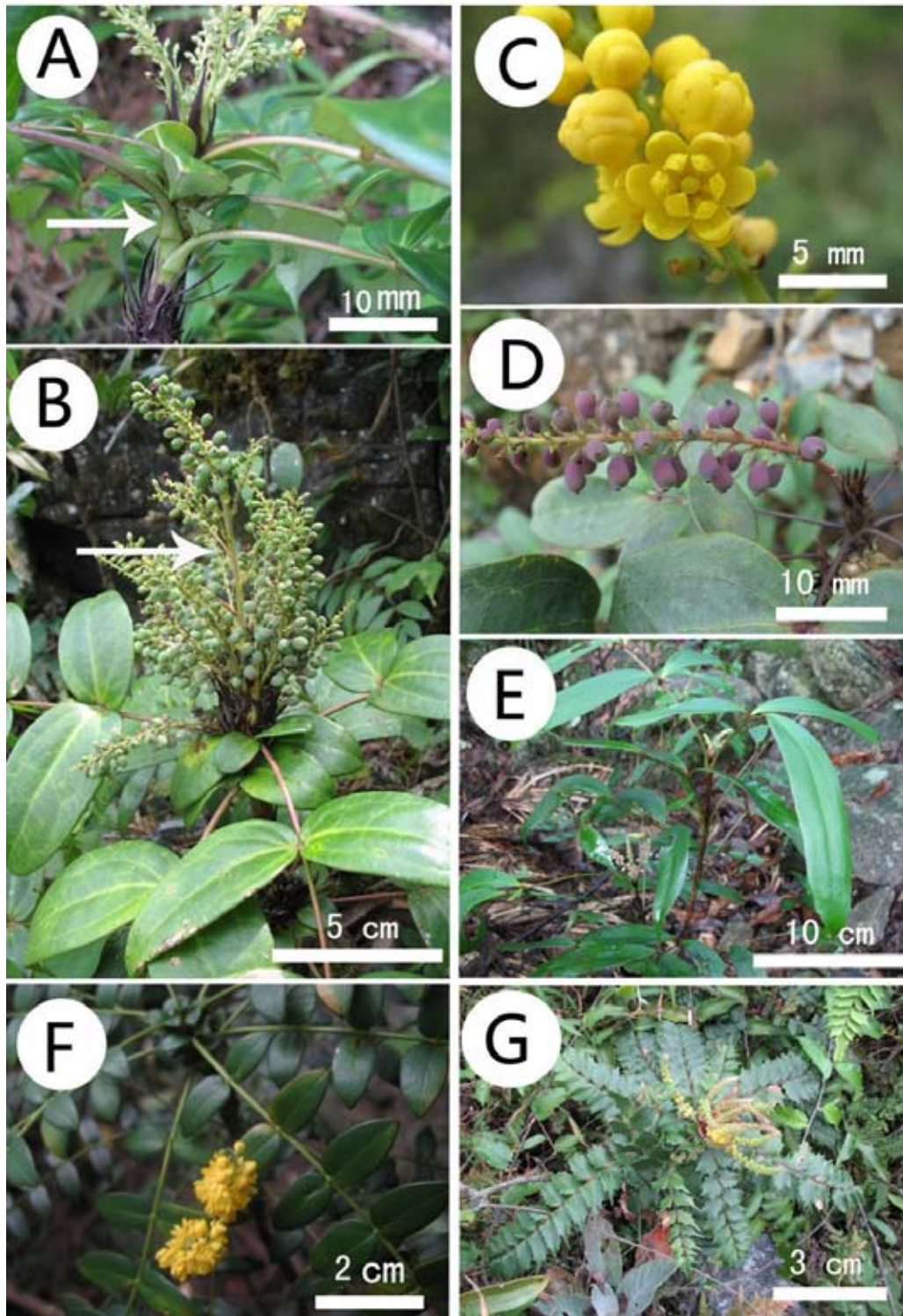


Figure 2. *Mahonia jinxiensis* J. Y. Wu, M. Ogisu, H. N. Qin & S. N. Lu, A-D, A, Petiole; B, Racemes; C, Flower; D, Fruit. *Mahonia shenii* W. Y. Chun; E, Habit. *Mahonia microphylla* Ying et G. R. Long; F, Habit. *Mahonia subimbricata* W. Y. Chun et F. Chun; G, Habit.

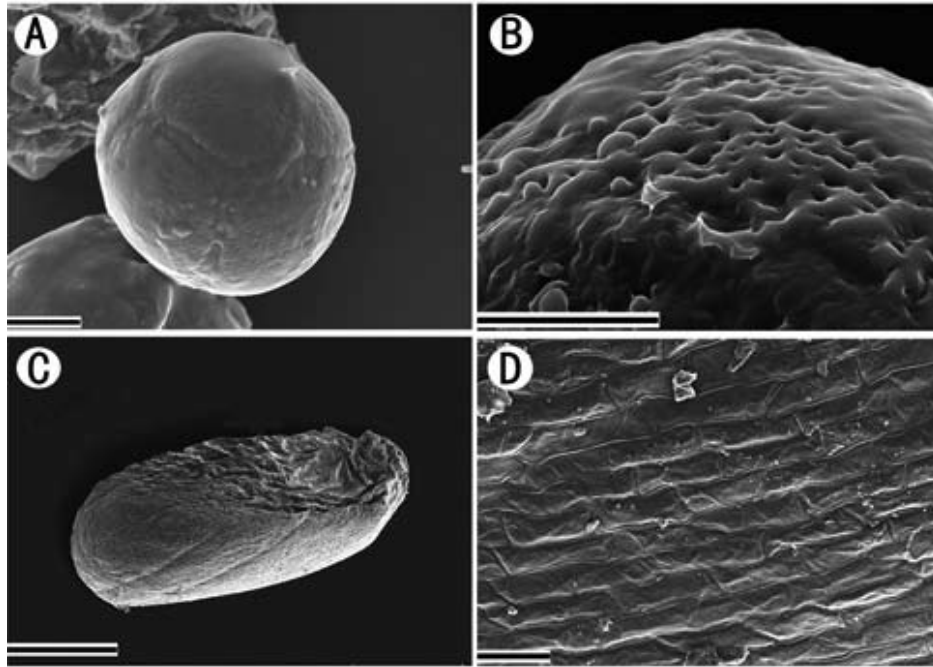


Figure 3. Scanning electron micrographs of Pollen (A, B) and Seeds (C, D) of *Mahonia jingxiensis* J. Y. Wu, M. Ogisu, H. N. Qin & S. N. Lu. A, pollen overview; B, surface of pollen exine; C, seed overview; D, testa cells of seed. Scale bars: A=10 μ m, B=5 μ m, C=1 μ m, D=50 μ m.

mm, base with two glands, apex narrowly incised. Stamens ca. 2 mm; anther connective not prolonged, rounded. Ovary ca. 1 mm; ovules 1 or 2; style almost absent. Berry blue-black, pyriform, 3.5-5 mm, not stylose; seeds usually 2. Fl. Sep-Oct, fr. Oct-Nov.

Etymology. The specific epithet '*jingxiensis*' refers to Jingxi Xian (=county) where the type specimens were collected.

Distribution and habitat. The new species occurs at ca. 500 m altitude in evergreen forests in Jingxi, Guangxi Province, known only from the type locality (Figure 4).

Notes. The new species, differs from *M. subimbricata* W. Y. Chun et F. Chun (Figure 2G) in an adjacent locality, but appears related to *M. shenii* W. Y. Chun (Figure 2E) and *M. microphylla* Ying et G. R. Long (Figure 2F). The distribution of the four species is shown in Figure 4. It resembles *M. shenii* and *M. microphylla* in having leaves entire, but differs from the two species in having the lowest leaves small, and a short distance (Figure 2A) from the base of petiole, branched racemes (Figure 2B), and almost equal middle and inner sepals. A detailed comparison of the salient characters of the four species is shown in the key. Previous studies (Nowicke and Skvarla, 1979, 1981) have examined pollen morphology of several *Mahonia* species to discuss relationships in Berberidaceae. However, no scanning electron micrographs of seeds have been reported in *Mahonia*. We finished a scanning electron microscope survey of pollen and seed features in *M. jingxiensis*. *Mahonia jingxiensis* has the pollen morphology: globose, ca. 37 μ m in diam.; the surface of the exine is unspecialized and randomly variable: punc-

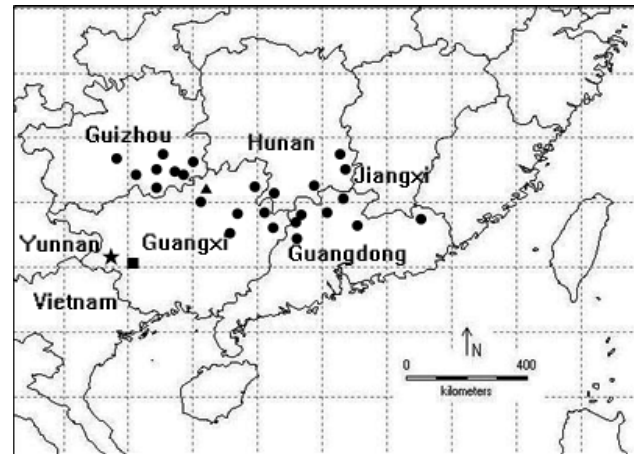


Figure 4. Distribution map of *Mahonia jingxiensis* (★), *Mahonia microphylla* (▲), *Mahonia shenii* (●) and *Mahonia subimbricata* (■) in China.

tuat and psilate (Figure 3A, B). The seed of *Mahonia jingxiensis* is oblong, 3.1-3.5 \times 1.5-2 mm, and the testa cells are almost rectangular (Figure 3C, D). A key to the species is given as follows.

1. Leaflets 8-14 pairs, small, 1.5-3.5 \times 0.8-1.5 cm
 2. Leaflets entire; pedicel longer than floral bracts, pedicel 3-4 mm; floral bracts ovate, 2-2.2 \times ca. 1 mm.....
.....*M. microphylla*
 2. Leaflets margin with 2-7 teeth on each side; pedicel shorter than floral bracts or equal, pedicel 2.2-3 mm; floral bracts ovate-oblong, 2-3 \times 1.2-1.5 mm.....
.....*M. subimbricata*

1. Leaflets 1-7 pairs, big, 2-13 × 1.2-5 cm
3. Distance of lowest pair to base of petiole 3.5-14 cm; racemes, unbranched; median sepals 4-4.1 × 2-3 mm, inner sepals 4.5-5 × 2.2-3 mm, median sepals smaller than inner sepals *M. shenii*
3. Distance of lowest pair to base of petiole ca. 1 cm; racemes, sometimes branched; median sepals 3.7-4.1 × 1.9-2.1 mm, inner sepals 4.1-4.3 × 2.2-2.5 mm, median sepals almost equal to inner sepals
.....*M. jingxiensis*

Acknowledgements. We would like to thank Professor Wen-tsai Wang for checking the Latin diagnosis, Mr. Yin-Hou Xiao for technical assistance with the SEM, Dr. A. R. Brach (MO c/o A, GH) for editorial advice, Ping Liu for drawing, and the curators of the herbaria PE, IMD, GXDC, GXMI, GZTM, KUN, SZ, CDBI, and IBK for allowing to us to examine their *Mahonia* specimens. The work was supported by funds from the National Basic Research Program of China (2006CB403207-2b) and the National Science and Technology Support Program (2007BAC03A08).

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中國產小檗科十大功勞屬 (*Mahonia*) 一新種： 靖西全緣葉十大功勞

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本文報導產於中國廣西的小檗科十大功勞屬 (*Mahonia*) 植物一新種靖西全緣葉十大功勞 (*Mahonia jingxiensis*)，該新種的區別特點、描述、詳細插圖、彩圖和分類評述被給出。把該新種與其他 3 個相似 (*Mahonia shenii* and *M. microphylla*) 或產地相近 (*M. subimbricata*) 的種進行了比較。但 *M. jingxiensis* 與其他 3 個種不同在於該新種具小葉 5-7 對，小葉較大，全緣，上面脈明顯凸起，最下面一對小葉較小 (0.5-3 × 0.3-1.5 cm) 且到葉柄基部的距離較短 (約 1 cm)，總狀花序有時分枝，中萼片 (3.7-4.1 × 1.9-2.1 mm) 與內萼片 (4.1-4.3 × 2.2-2.5 mm) 幾乎等大；漿果梨形，較小 (3.5-5 mm) 該新種的花粉和種子形態被報導。

關鍵詞：小檗科；中國；十大功勞屬；靖西全緣葉十大功勞；新種；花粉形態；種子形態。