

***Angelica muliense* sp. nov. (Apiaceae), a new species from Sichuan, southwest China**

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*Angelica muliense* C. Y. Liao & X. G. Ma sp. nov. (Apiaceae), a new species from Sichuan Province, southwest China, is described and illustrated. The new species resembles *A. biserrata*, but is mainly differed by the shapes of leaflets and sheaths, umbel number and size, especially mericarp features. The distinguishing characters of these two species are presented and compared.

*Angelica* L. (Apiaceae subfamily Apioideae) is one of the most complicated genera in Apiaceae and consists of approximately 90 species widely distributed in the Northern Hemisphere (Shan 1992, Wen 1999, Pan and Watson 2005). Southwest China is the most significant diversity center of genus *Angelica* for its diverse climatic and geological environment. There are more than thirty species recorded from this region up to now, all of which are observed as perennial hermecryptophytes (Liao et al. 2012, 2013).

During a botanical expedition to Muli County of Southwest Sichuan Province in 2010, a species of strong Umbelliferous plants with fruits was collected. Based on primary analysis on morphology, especially on fruit, we confirmed that it is a species of the genus *Angelica*. Then careful examination and comparison of the species of *Angelica* and a lot of herbarium work were carried out, and eventually we recognized that it represented a new species of *Angelica*.

***Angelica muliense* C. Y. Liao & X. G. Ma sp. nov. (Fig. 1 – 2)**

**Type:** China, Sichuan Province: Yi Autonomous Prefecture of Liangshan, Muli County, Shuiluo Town, elevation 2900 m a.s.l., N28°17'10", E100°38'48", 29 Sep 2010, X. G. Ma *et al.* m10092905, fruiting (holotype: SZ).

### ***Etymolog***

The specific epithet refers to the type locality, Muli County of Sichuan Province in China.

### ***Description***

Perennial herb, strongly aromatic, 0.6–1.5 m high. Root cylindric, branched, succulent, up to 15–25 × 2–4 cm. Stem purplish green, thinly ribbed, glabrous. Petioles 15 – 30 cm, sheaths narrow-oblong, glabrous; blade triangular-ovate, 20–30 × 15–25 cm, 2–3-ternate-pinnate; leaflets long-ovate – lanceolate, 5–8 ×

2.5–4 cm, base gradually narrow and slightly decurrent along rachis, margin irregularly coarse-cuspidate-serrate, middle leaflet often 3-lobed, both surfaces glabrous. Cauline leaves reduced upward, with conspicuously tubular. Umbels 10–15 cm across, peduncles 10–15 cm, glabrous; bracts absent; rays 15–20, 5–8 cm, glabrous; bracteoles 2–4, linear, 8–10 mm, umbellules 10–15-flowered. Calyx teeth obsolete. Petals unknown. Stylopodium yellow-green, short conic. Fruit oval or ellipse,  $8\text{--}10 \times 5\text{--}6$  mm; dorsal ribs prominent, lateral ribs broad-winged (green-white in immature fruit); endosperm dorsally compressed with 4 dorsal grooves; vittae relatively thick, 1 in each furrow and 2 on commissure.

### ***Phenology***

Flowering from August till September and fruiting from September till October.

### ***Distribution, habitat and ecology***

*Angelica muliense* is known only from its type locality, the mountains around Shuiluo Town, Muli County, Yi Autonomous Prefecture of Liangshan, Sichuan Province, the Southwest China. It usually grows in open forest with humid and fertile humus, at elevations of 2300–3200 m a.s.l., mainly with *Pinus yunnanensis*, *Lonicera* sp. and *Spiraea* sp.

### ***Similar species***

Morphologically, this new species is most similar to *A. biserrata*, which is distributed in the lower-elevation mountains (500–1800 m) of East and Central China. However, the two species could be easily distinguished by many characters, especially by their upper cauline sheaths and mature fruits (Fig. 3). The main morphological differences between them are summarized in Table 1.

### ***Additional specimens examined (selection)***

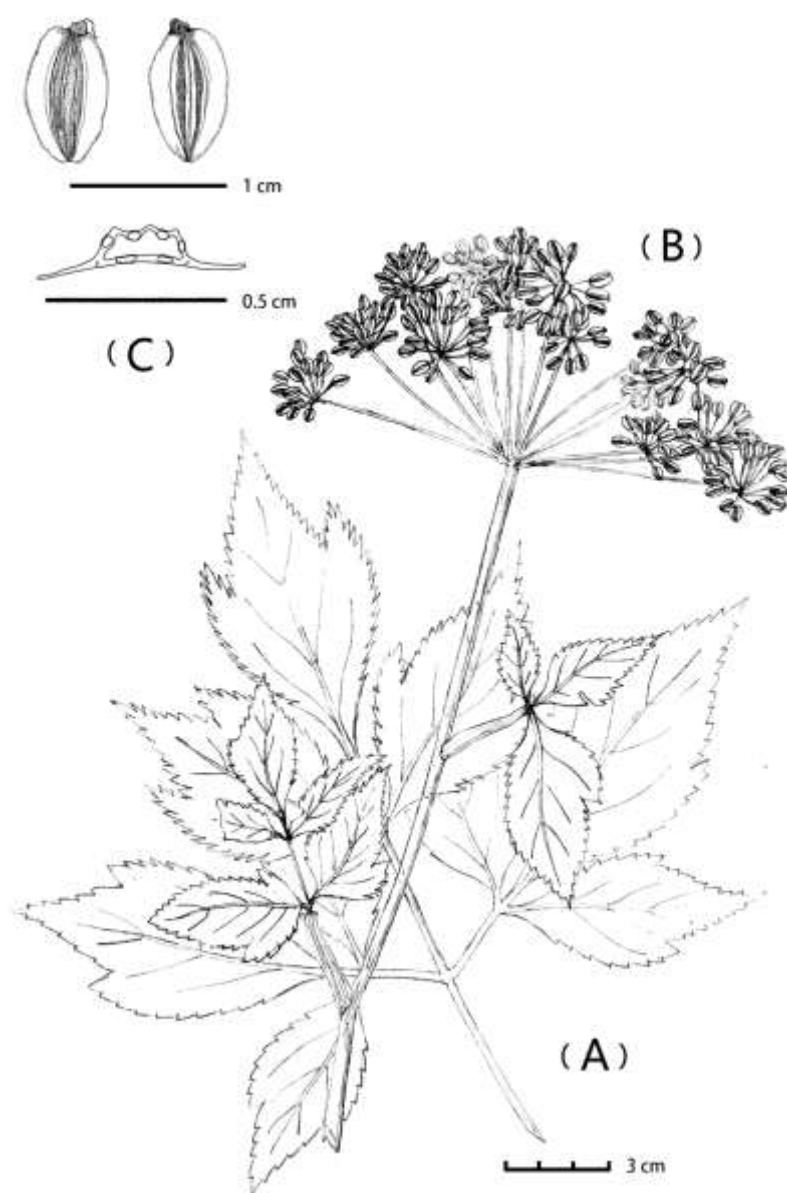
China. Jiangxi: Suichuan, 27 Sep 1963, J. S. Yue et al. 4347 (NAS); Anfu, 8 Aug 1963, J. S. Yue et al. 3167 (NAS); Xunwu, 10 Sep 1962, J. S. Yue et al. 2266 (NAS); Lushan, Y. H. Xiong 9873 (NAS); Wuning, 20 Aug 2000, J. H. Zhang 1078 (PE); ibidem, 15 Aug 2000, J. H. Zhang 1088 (PE); Yanshan, 21 Aug 1958, M. X. Nie & K. S. Lai 4403 (WUK). Hubei: Xuanen, 17 Jul 1988, Y. M. Wang 5390 (PE). Changyang, 6 Aug 1939, T. P. Wang 11535 (WUK); Xingshan, 11 Jul 1957, H. J. Li 1009 (PE) (SZ); 12 Oct 1957, H. J. Li 1285 (WUK) (PE). Chongqing: Shizhu, 11 Jul 1978, W. H. Wang 1897 (SZ); Wuxi, 11

Oct 1964, M. L. She et al. 6491 (NAS); G. H. Yang 59425 (KUN); Wushan, Aug 1964, H. F. Zhou & H. Y. Su 109958 (SZ); Chengkou, 8 Aug 1958, T. L. Dai 105944 (KUN). Anhui: Jinzhai, 25 Oct 1984, M. B. Deng 82070 (NAS); 23 Oct 1984, M. B. Deng & H. T. Wei 82025 (NAS).

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**FIGURE LEGENDS****Figure 1:** *Angelica muliense* (from the holotype). (A) blade, (B) umbel, (C) fruit.

**Figure 2:** The infructescences and fruits of *Angelica muliense* and *A. biserrata* respectively in their habits. (A) *A. muliense*, (B) *A. biserrata*.



**Figure 3:** Comparison of fruit morphology between *Angelica muliense* and *A. biserrata*.

(A) dorsal face of *A. muliense*, (B) commissural face of *A. muliense*, (C) paraffin section of *A. muliense*, (D) dorsal face of *A. biserrata*, (E) commissural face of *A. biserrata*, (F) paraffin section of *A. biserrata*.

