REVISION OF MECONOPSIS SECTION FORRESTIANAE (PAPAVERACEAE)\textsuperscript{1}

TOSHIYO YOSHIDA\textsuperscript{2,3} AND HANG SUN\textsuperscript{4}


Keywords: \textit{Meconopsis}, section \textit{Forrestianae}, revision, new species, series \textit{Barbisetae}, series \textit{Forrestianae}, series \textit{Henricinae}

\textit{Meconopsis lancifolia} (Franch.) Franch. ex Prain of section \textit{Forrestianae} C. Y. Wu & H. Chuang (Papaveraceae) was first collected on 7 June 1886 by Jean Marie Delavay, French missionary and botanist, on calcareous rocky hills around the depression of Yen-tze-hay, Lan-kong, at 3200 m in elevation according to the type specimen, \textit{J. M. Delavay} 2080 (P). On another sheet of \textit{J. M. Delavay} 2080 (P), which was not annotated as one of the type specimens, it is written on the label: “on a calcareous rocky hill above the pass of Konalapo (Ho-kin), 3500 m in elevation on 13 July 1886.” Ho-kin, or Heqing (鹤庆) in modern Chinese, is the main region where Delavay was engaged as a missionary and where he conducted many of his botanical activities. The exact location of the type locality of \textit{M. lancifolia}, Yen-tze-hay, was unknown until one of us (Yoshida) discovered it in July 2018 through information provided by Siyuan Wang (王思源), committee secretary of Xiyi Village (西邑村), located at the eastern foot of Ma-er Shan (马耳山). According to Mr. Wang, Yen-tze-hay, or Yen-tzu-ai in more precise pronunciation, is a place name in the language of the local people, the Bai-zu (白族), referring to a depression with two lakes on Ma-er Shan. On the basis of the information from Mr. Wang, Yoshida successfully reached Yen-tze-hay with a key local person as a guide, and there on the slopes near Yen-tze-hay was a blue poppy resembling the plant in the photograph of \textit{Meconopsis lancifolia} taken by him on Shika Xueshan. It was the first collection of \textit{M. lancifolia} at the type locality in some 130 years since Delavay made his collections. New collections of \textit{M. lancifolia} and field observations enabled us to compare the features to related taxa.

Plants resembling typical \textit{Meconopsis lancifolia} have been collected in many places in northwest Yunnan, northeast Myanmar, southeast Xizang (Tibet), western Sichuan, and southern Gansu by others since Delavay’s time. Some were described as new species, such as \textit{M. eximia} Prain and \textit{M. lepida} Prain, or included in \textit{M. lancifolia}.

Taylor (1934) included \textit{Meconopsis eximia} and \textit{M. lepida} within \textit{M. lancifolia} var. \textit{solitariiflora} Fedde in his monograph of the genus. He treated \textit{M. concinna} Prain as \textit{M. lancifolia} var. \textit{concinna} (Prain) G. Taylor in the monograph, but \textit{M. concinna} is quite different from \textit{M. lancifolia}, especially in having pinnately or bi-pinnately lobed leaves. Grey-Wilson (2014) treated \textit{M. eximia} as \textit{M. lancifolia} subsp. \textit{eximia} (Prain) Grey-Wilson, and \textit{M. lepida} as \textit{M. lancifolia} subsp. \textit{lepida} (Prain) Grey-Wilson in his monograph of the genus. \textit{Meconopsis lepida} in southern Gansu is, however, distinct from \textit{M. lancifolia} in the elliptic or rounded anthers with incurved thecae (short oblong or ellipsoid anthers with straight thecae in the latter) and in the inflorescence with 1–4, most often 2, flowers, and without flowers at the base (3–7 flowers, often with basal flowers in the latter), as mentioned by Yoshida and Sun (2017).

On the basis of our studies of \textit{Meconopsis lancifolia} and related plants using herbarium specimens, newly collected materials, and field observations, we present a revision of section \textit{Forrestianae} in which we recognize three series; \textit{Forrestianae} C.Y. Wu & H. Chuang, \textit{Henricinae} C.Y. Wu & H. Chuang, and \textit{Barbisetae} T. Yoshida & H. Sun, provided with descriptions of the included species, except those recently revised or described by T. Yoshida and H. Sun (2017, 2018).

In this paper, “scapose” refers to plants with the stem, peduncle, and rachis all contracted and not exposed above ground and with flowers borne on long erect or ascending pedicels; subscapose refers to plants with a short inflorescence rachis partly or entirely exposed above ground and with long ascending pedicels.

The taxa treated below are mapped to show their distributions (Fig. 1).

We are grateful to members of the Blue Poppy Society, Japan, the Major Program of the National Natural Science Foundation of China (grant no. 31590823 to Hang Sun), and the Second Tibetan Plateau Scientific Expedition and Research (STEP) program (grant no. 2019QZKK0502 to Hang Sun) for financial support for field research, and to T. Kobayash, Yuhong Liu (刘渝宏), Yang Niu (牛洋), and Xinxin Zhu (朱鑫鑫) for providing field data and photographs of the plants described here. The curators of the herbaria in Edinburgh (E), Harvard (A/GH), Kunming (KUN), London (BM, K), Paris (P), and Tokyo (TI) are thanked for facilitating study of types and other specimens. Special thanks go to Hiroshi Ikeda, University Museum, University of Tokyo, for his support in studying the surface of leaves using electron microscopy.

\textsuperscript{1}Corrections and comments by the authors are in square brackets. Figures 85–100 (S.E.M. images) are cited out of sequence throughout the text.

\textsuperscript{2}Hoshiya 330-6, Oamishirasato-shi, Chiba 299-3222, Japan.

\textsuperscript{3}Corresponding author: kharka@wa2.so-net.ne.jp

\textsuperscript{4}Key Laboratory for Plant Diversity and Biogeography of East Asia, Kunming Institute of Botany, Chinese Academy of Sciences, Kunming 650201, Yunnan, China; sunhang@mail.kib.ac.cn

© President and Fellows of Harvard College, 2019
ISSN: 1938-2944, DOI: 10.3100/hpib.v24iss2.2019.n20, Published online: 31 December 2019
**Figure 1.** Distribution of taxa of *Meconopsis* Vig. section *Forrestianae* based on Google Earth with proposed delineation of 39 regions that include the locality of at least one specimen of the taxa of concern. **Region 1:** NE Yunnan, Qiaoqiao Xian, Yao Shan; **Region 2:** SW Sichuan, Luoqi Shan; **Region 3:** NE Yunnan, Dongchuan Qu; **Region 4:** SW Sichuan, Yan-yuang Xian; **Region 5:** SW Sichuan, Muli Xian; **Region 6:** NW Yunnan, Lijiang Shi; **Region 7:** NW Yunnan, Heqing Xian; **Region 8:** NW Yunnan, Yangbi Xian and Dali Shi, Cang Shan; **Region 9:** NW Yunnan, Jianchuan Xian; **Region 10:** NW Yunnan, Xianggelila Shi, around Shika Xueshan; **Region 11:** NW Yunnan, Xianggelila Shi; **Region 12:** SW Sichuan, Daocheng Xian, Daocheng Gongga Shan; **Region 13:** NW Yunnan, Xianggelila Shi, and SW Sichuan, Xiangcheng Xian, Da Xueshan; **Region 14:** NW Yunnan, Deqin Xian, Yuning including Baima Xueshan; **Region 15:** NW Yunnan, Deqin Xian and Gongshan Xian, and SE Xizang, Chuyu Xian, northern part of Nu Shan including Meili Xueshan; **Region 16:** SW Sichuan, Daocheng Xian and Xiangcheng Xian, Wuming Shan; **Region 17:** SW Sichuan, Daocheng Xian, Bowa Shan; **Region 18:** SW Sichuan, Litang Xian, Haizi Shan; **Region 19:** SW Sichuan, Juulong Xian, Jichou Shan; **Region 20:** SW Sichuan, Yajiang Xian, west of Yajiang; **Region 21:** SW Sichuan, Batang Xian; **Region 22:** W Sichuan: Yajiang Xian, Kazi La Shan; **Region 23:** W Sichuan, Baiyuan Xian, Ganbu-bi Yaku; **Region 24:** NW Sichuan, Ganzi Xian, around Zhaoda La; **Region 25:** NW Sichuan, Wenga Xian, Laozhe Shan; **Region 26:** NW Sichuan, Dege Xian, Dege Haizi Shan; **Region 27:** SE Qinghai, Bama Xian, Makehe; **Region 28:** SE Qinghai, jiuzhi Xian, around Nianhuayuze Shan; **Region 29:** S Gansu, Diebu Xian, W of Zhagana; **Region 30:** S Gansu, Diebu Xian, Gansu Min Shan; **Region 31:** S Gansu, Zhouqiu Xian and Dangchang Xian, Leigu Shan; **Region 32:** S Gansu, Zhouqiu Xian, around Xueshanliang; **Region 33:** N Sichuan, Songpan Xian, around Xueshanliang; **Region 34:** N Sichuan, Songpan Xian, around Xueshanliang; **Region 35:** N Sichuan, Heishui Xian and Hong-yuan Xian, Yanggong Shan; **Region 36:** NW Sichuan, Xiaoqin Xian, Mengbi Shan; **Region 37:** W Sichuan, Xiaoqin Xian, Baling Shan; **Region 38:** W Sichuan, Xiaoqin Xian, Jiain Shan; **Region 39:** W Sichuan, Kanding Shi, Baoding Shan; **Region 40:** W Sichuan, Kanding Shi. Taxa treated and their region(s) of distribution: *M. aprica* T. Yoshida & H. Sun: Region 24; *M. barbiseta* C.Y. Wu & H. Chuang ex L.H. Zhou: Region 27, 28; *M. forrestii* Prain: Region 5, 6, 8, 11; *M. henrici* Bureau & Franch.: Region 5, 40; *M. hispida* T. Yoshida & H. Sun: Region 35; *M. huanglongensis* T. Yoshida & H. Sun: Region 34; *M. inaperta* T. Yoshida & H. Sun: Region 22, 23; *M. lancifolia* (Franch.) ex Prain, var. daliensis T. Yoshida & H. Sun: Region 3; *M. lancifolia* subsp. *daliensis* T. Yoshida & H. Sun: Region 3, 8; *M. lancifolia* subsp. *extima* (Prain) Grey-Wilson: Region 11, 12, 13, 14, 15; *M. lancifolia* subsp. *lancifolia*: Region 7, 9; *M. lancifolia* subsp. *shikaensis* T. Yoshida & H. Sun: Region 10; *M. lancifolia* subsp. *xiangchengensis* (R. Li & Z.L. Dao) T. Yoshida & H. Sun: Region 4, 5, 16, 17, 18, 19, 20, 21; *M. leptida* Prain: Region 32; *M. pleurogyra* W.T. Wang: Region 28, 35, 36; *M. psilonomma* Farrer var. *calicica* T. Yoshida & H. Sun: Region 29; *M. psilonomma* var. *psilonomma*: Region 30, 31; *M. psilonomma* var. *sinomaculata* (Grey-Wilson) H. Ohba: Region 33; *M. psilonomma* var. *zhaganaensis* T. Yoshida & H. Sun: Region 29; *M. purpurea* T. Yoshida & H. Sun: Region 37, 38, 39; *M. trichogyra* T. Yoshida & H. Sun: Region 26; *M. wengdaensis* T. Yoshida & H. Sun: Region 25; *M. yaoshanensis* T. Yoshida, H. Sun & Boufford var. *luoijiensis* T. Yoshida & H. Sun: Region 2; *M. yaoshanensis* var. *yaoshanensis*: Region 1.

### Taxonomy

**Meconopsis section Forrestianae** C.Y. Wu & H. Chuang, nomem emend.


**Key to Series of Section Forrestianae**

1a. Hairs on ovary simple ................................................................. 2
1b. Hairs on ovary branched near base ................................................. 2
2a. Filaments filiform throughout ...................................................... 2
2b. Filaments, at least innermost ones, dilated toward base ................. 2

**Series Forrestianae** C.Y. Wu & H. Chuang, nomem emend.


Filaments filiform throughout. Hairs on ovary simple.


**Key to Species of Series Forrestianae**

1a. Inflorescence racemose, lowermost 2 or 3 flowers bracteate ................... 2
1b. Inflorescence racemose, subscapose or scapose; flowers of raceme, except basal ones, ebracteate ................ 2
2a. Style indistinct, less than 1 mm long; capsules to 6 cm long; inflorescence without basal flowers ............ 2
2b. Style distinct, more than 1 mm long; capsules less than 4.5 cm long; inflorescence with or without basal flowers ........ 3
3a. Flowers cup-shaped, often half-closed at mouth ................................... 2
3b. Flowers widely open ......................................................................... 4

*Plant Diversity and Resources*

**KEY TO SPECIES OF SERIES FORRESTIANAE CONT.**

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4a</td>
<td>Inflorescence racemose, occasionally subcapose with short rachis and long ascending pedicels</td>
<td>.......................... 5</td>
</tr>
<tr>
<td>4b</td>
<td>Inflorescence scapose</td>
<td>.......................... 8</td>
</tr>
<tr>
<td>5a</td>
<td>Anthers short oblong or ellipsoid, thecae straight</td>
<td>.......................... 6</td>
</tr>
<tr>
<td>5b</td>
<td>Anthers ellipsoid or rounded, thecae incurved</td>
<td>.......................... 7</td>
</tr>
<tr>
<td>6a</td>
<td>Taproot dauciform or elongate, inflorescence with or without basal flowers, ovary uniformly colored</td>
<td>.......................... <em>M. lancifolia</em></td>
</tr>
<tr>
<td>6b</td>
<td>Taproot napiform, inflorescence without basal flowers, ovary with dark purple streaks</td>
<td>.......................... <em>M. wengduanensis</em></td>
</tr>
<tr>
<td>7a</td>
<td>Taproot napiform, inflorescence without basal flowers, anthers uniformly colored</td>
<td>.......................... <em>M. lepida</em></td>
</tr>
<tr>
<td>7b</td>
<td>Taproot elongate; inflorescence with basal flowers; anthers bicolored, with dark purple central part and pale yellow periphery</td>
<td>.......................... <em>M. purpurea</em></td>
</tr>
</tbody>
</table>

8a. Leaves dimorphic, lamina to 19 mm wide, petals to 3.1 cm long, filaments to 8 mm long, ovary densely to sparsely bristly or occasionally glabrous .......................................................... *M. pleurogyna*

8b. Leaves uniform, lamina to 9 mm wide, petals to 4.2 cm long, filaments to 12 mm long, ovary densely covered with bristles in close contact with each other .......................................................... *M. aprica*

---

**Meconopsis yaoshanensis**


*Herbs,* monocarpic, 15–50 cm tall in flower, to 60 cm tall or more in fruit. *Taproot* elongate, 7–20 cm long, 5–13 mm across, sometimes few branched near head. Most part of plant bristly; *bristles* golden brown or reddish brown, to 4–6 mm long, stiff but not spine-like. *Stem* (below uppermost leaf) simple, 1–8 cm long, 5–10 mm across. *Leaves* crowded on short stem; *petiole* broadly linear, 1.5–8 cm long, 1.5–5 mm wide; *lamina* oblong, obovate, elliptic or ovate, 2–18 cm long, 0.7–3 cm wide, base cuneate or attenuate, margin entire, sometimes coarsely crenate or toothed, sometimes undulate, apex obtuse or acute, rarely acuminate, lower surface somewhat canescent, both surfaces covered with bristles. *Inflorescence* racemose, composing most of plant above ground, ebracteate except for few lowest flowers; *pedicels* erect along rachis, 1–7 cm long in flower, to 12 cm long or more in fruit, recurving distally, abruptly swollen at base of calyx. *Flowers* 5–16 per individual, half nodding, cup- or bowl-shaped in fine weather, 2.0–3.5 cm across. *Calyx* 1.0–1.5 cm long. *Petals* 4–7, pale blue or violet, elliptic, obovate, broadly ovate or broadly obovate, 1.5–2.4 cm long, 0.7–1.7 cm wide, margin often coarsely and irregularly dentate near apex, apex triangularly obtuse, acute or rounded. *Stamens* numerous; *filaments* filiform, 7–11 mm long, similar to or paler than petals; *anthers* dark purple, orange, yellow, pale brown, or white, ellipsoid, 0.8–1.5 mm long. *Ovary* ellipsoid, 5–9 mm long, densely hairy with ascending or patent bristles; *style* 1.0–2.5 mm long, to 7.0 mm long in fruit; *stigma* capitate, lobes 3–5, 0.5–1.5 mm long. *Capsules* ellipsoid, narrowly obovoid, or cylindrical-oblong, 1.5–2.2 cm long, 5–10 mm across, densely covered with patent or retrorse bristles; carpels 4–5.

**Distribution:** CHINA. NE Yunnan: Qiaojia Xian, Yao Shan, SW Sichuan: Xichang Shi, Puge Xian and Dechang Xian, Luoji Shan. 3650–3900 m elevation.

**Habitat:** stony or grassy slopes at edge of thickets.

---

**Meconopsis yaoshanensis** var. *yaoshanensis,* Fig. 1–4.

*Herbs,* monocarpic, 20–50 cm tall in flower, to 60 cm tall or more in fruit. *Taproot* elongate, 8–20 cm long, 6–13 mm across, sometimes few branched near head. Most parts of plant bristly; *bristles* golden brown or reddish brown, to 5–6 mm long, stiff but not spine-like, patent except those on fruit. *Stem* (below uppermost leaf) simple, 2–8 cm long, 5–10 mm across. *Leaves* 12–25 per individual, on short stem; *petiole* broadly linear, 2–8 cm long, 2–3 mm wide; *lamina* oblong or obovate, rarely elliptic, 4–17 cm long, 1–3 cm wide, base cuneate or attenuate, margin entire, sometimes coarsely crenate and undulate, apex obtuse or acute, rarely acuminate, both surfaces somewhat yellowish green, covered with patent bristles, less densely so on lower surface; lower surface canescent in dried specimens. *Upper leaves* (bracts) short petiolate or sessile; *lamina* similar to basal leaves but gradually smaller. *Inflorescence* racemose, composing most of plant above ground, ebracteate except for few lowest flowers; *rachis* thick and hollow in lower part; *pedicels* erect, 2–7 cm long in flower, to 12 cm long or more in fruit, often winding around rachis in fruit, recurving distally, abruptly swollen at base of calyx; base of pedicel decurrent as rounded ridges on rachis. *Flowers* 8–16 per individual, half nodding, cup- or bowl-shaped in fine weather, 2.0–3.5 cm across. *Calyx* 1.0–1.5 cm long. *Petals* 4 or 5, rarely 6, pale blue or violet, elliptic, broadly ovate or obovate, 1.5–2.4 cm long, 0.7–1.7 cm wide, margin often coarsely and irregularly dentate near apex, apex triangularly obtuse, acute or rounded. *Stamens* numerous; *filaments* filiform, 7–11 mm long, similar to petals; *anthers* dark purple, yellow, or orange, ellipsoid, 1.0–1.5 mm long, often curved. *Ovary* ellipsoid, 5–7 mm long, with dense ascending hairs; *style* 1–2 mm long, to 7 mm long in fruit; *stigma* capitate, 1.0–1.5 mm long. *Capsules* cylindrical-oblong, 3.5–5.2 cm long, 6–10 mm across, narrowed at both ends, with 3–5 ridges, densely covered with retrorse bristles; mature fruits often spirally arranged around rachis, pedicel twisted, elongate. *Seeds* blackish, 2.3–2.9 mm long.

**Distribution:** CHINA. NE Yunnan: Qiaojia Xian, Yao Shan, only in the vicinity of the type locality, 3650–3800 m elevation.

**Habitat and ecology:** South-, southeast-, and east-facing steep slopes covered with basaltic debris and scattered grasses and herbs among the stones, subject to wet monsoon in summer.

**Additional specimens examined:** CHINA. NE Yunnan: Qiaojia Xian, (巧家县), Region 1: Yao Shan (药山), 27°12′40″N, 103°04′31″E, 3750 m, 2 August 2010, T. Yoshida *K46* (KUN); same locality, 7 July 2011, T. Yoshida *K55* (KUN).
Meconopsis yaoshanensis var. luojiensis T. Yoshida & H. Sun, var. nov. TYPE: CHINA. SW Sichuan: Luoji Shan (螺髻山), near boundary of Xichang Shi (西昌市), Puge Xian (普格县), and Dechang Xian (德昌县), 27°36′57″N, 102°20′37″E, 3900 m, 1 July 2013, T. Yoshida K91 (Holotype: KUN; Isotype: TI). Fig. 1, 5–7.

Var. luojiensis differs from var. yaoshanensis in the ellipsoid or narrowly obovoid capsules to 2.5 cm long (cylindrical-oblong, to 5.2 cm long in the latter), the lamina to 2.2 cm wide (to 3 cm wide in the latter), and petals (4 or)5–8 (4 or 5, rarely 6, in the latter).

_Herbs_, monocarpic, 15–40 cm tall. _Taproot_ elongate, to 18 cm long or more, 5–12 mm across. Most parts of plant with patent or retrorse bristles; _bristles_ pale reddish brown except pale apex and pale green base, to 4(–5) mm long, dense on rachis, pedicels, calices and ovaries, less dense on leaves. _Stem_ (below uppermost leaf) simple, usually less than 1.5 cm long, rarely to 6 cm long in plants growing among shrubs. _Leaves_ crowded near base of stem; _petiole_ broadly linear, 1.5–2.4 cm long, 0.7–1.7 cm wide, apex usually triangular, obtuse or rarely rounded. _Stamens_ numerous; _filaments_ filiform, 8–11 mm long, similar to or paler than petals; _anthers_ white or pale brown, ellipsoid, 0.8–1.2 mm long. _Ovary_ ellipsoid, 5–9 mm long, densely hairy with ascending or patent whitish bristles; _style_ 2.0–2.5 mm long in flower, to 4 mm long in fruit; _stigma_ capitulate, 1.0–1.5 mm across; _seeds_ 4–5, 0.5–1.0 mm long. _Capsules_ ellipsoid or narrowly ovoid, 1.5–2.5 cm long, 5–8 mm across, with dense patent or retrorse bristles; _carpels_ 4 or 5. _Seeds_ unknown.

**Distribution:** CHINA. SW Sichuan: Xichang Shi, Puge Xian and Dechang Xian, Luoji Shan, only in the vicinity of the type locality, ca. 3900 m elevation.

**Habitat and ecology:** with other herbs at edge of thickets of _Berberis_ L., _Spiraea_ L., and _Rhododendron_ L., on a gentle west-facing slope in calcareous soil.

Meconopsis forrestii Prain, _Bull. Misc. Inform., Kow., 1907: 316. 1907. TYPE: CHINA. NW Yunnan: Lijiang Shi (丽江市); eastern flank of Lichiang Range [Yulong Xueshan,玉龙雪山], 10,000–11,000 ft, June 1906, G. Forrest 2314 (Lectotype: E, designated here; Isolectotypes: BM, E, K, P). Fig. 1, 8–10, 85–86.

_Herbs_, monocarpic, 15–42 cm tall in flower, to 47 cm tall in fruit. _Taproot_ dauciform, napiform or slightly elongate, 2–7 cm long, 6–13 mm across, often fusiform with contracted head, distally gradually narrowed and with a slender extension. Most parts of plant bristly; _bristles_ to 2.5(–3.5) mm long, sometimes tinged reddish brown except at base. _Stem_ (below uppermost leaf) simple, 0.3–5.5 cm long. _Leaves_ crowded near base of stem, petiolar; _petiole_ linear or broadly linear, 1.5–7.0 cm long, 1.5–3.0 mm wide; _lamina_ oblanceolate or narrowly oblanceolate or lanceolate, elliptic or ovate in small leaves, 1.5–14.0 cm long; 0.5–3.0 mm wide, base attenuate, occasionally cuneate in small leaves, margin entire, apex acute or obtuse, upper surface green, lower surface somewhat paler, both surfaces moderately or sparsely bristly. _Inflorescence_ racemose, without basal flowers, ebracteate; _peduncle_ 1–6 mm across in dried specimens; _pedicels_ 1–7 cm long in flower, to 12 cm long in fruit, those of racemose flowers shorter; _peduncle_, _rachis_ and _pedicels_ sparsely or moderately hairy with retrorse bristles, bristles denser on peduncle. _Flowers_ (2 or)3–7(–10), usually on upper half of plant, nodding, half nodding, or facing laterally, opening flat or dish-shaped, 2.5–3.8 cm across. _Calyx_ 0.8–1.2 cm long, densely or moderately bristly. _Petals_ 4, rarely 5, pale blue, occasionally tinged purple, ovate, broadly ovate or rhombic, 1.2–2.2 cm long, 1.0–1.8 cm wide, base rounded or cuneate, margin entire, occasionally crenulate near apex, apex triangular-acute or obtuse, rarely rounded. _Stamens_ numerous; _filaments_ darker than petals, paler near base, filiform, 4–7 mm long; _anthers_ orange, ellipsoid, 0.7–1.1 mm long, thecae straight. _Ovary_ narrowly ovoid or narrowly ellipsoid, 4–10 mm long, sparsely or moderately hairy with ascending bristles, occasionally glabrous; _style_ less than 1 mm long, often negligible even in fruit; _stigma_ capitulate, 0.7–1.0 mm across; _seeds_ 2–4, 0.8–1.5 mm long, erect in fruit. _Capsules_ cylindrical-oblong, 3–6 cm long, 3.5–5.5 mm across, sparsely bristly or glabrous; _carpels_ 2–4, upper 1/7–1/6 dehiscent. _Seeds_ unknown.

**Distribution:** CHINA. NW Yunnan: Lijiang Shi, Xianggelila Shi (香格里拉市), or Shangri-La County in (English), Yangbi Xian (漾濞县). SW Sichuan: Muli Xian (木里县), 3300–3800 m elevation.

**Habitat and ecology:** humid grassy slopes with scattered dwarf shrubs, with or without moss; rooting in blackish, stony soil or sometimes growing close to or within dwarf shrubs with rachis protruding through canopy.

**Additional specimens examined:** CHINA. SW Sichuan, Muli Xian, _Region 6_: NE of Yangtze bend, 27°45′N, 11,000–12,000 ft, August 1913, G. Forrest 10799 (E); eastern slopes of Likiang Snow Range, Yangtze watershed, 11,500 ft, June 1922, G. Forrest 21251 (K); Szechuan aust. [probably in Muli Xian], 3200–3500 m, June 1913, Schneider 1514 (A, K). NW Yunnan, Lijiang Shi, _Region 6_: NE of Yangtze bend, 27°45′N, 11,000–12,000 ft, August 1913, G. Forrest 10799 (E); eastern slopes of Likiang Snow Range, Yangtze watershed, 11,500 ft, June 1923, J. F. Rock 8681J (K); Lichung [Lijiang], July 1933, McLaren collection 53 (K); Nguluko, Lichiang (丽江雪松), 3400 m, 7 June 1937, T. T. Yü (俞德俊) 15136 (KUN); Sandaowan, Yulong Shan, Lijiang, 3500 m, 7 June 1985, Chamberlain et al. 625 (E); Yulong Xueshan, 27°11′04″N, 101°13′18″E, 3700 m, 24 June 2010, T. Yoshida K29 (KUN, TI). NW Yunnan, Yangbi Xian, _Region 8_: above Malutang [马鹿塘], W side of Diancang Shan [点苍山], Yangbi Xian, 54′46″N, 100′01′E, 3450 m, 26 June 1984, Bartholomew et

Herbs, monocarpic, 8–35 cm tall in flower. Taproot dauciform or elongate, 1.5–12.0 cm long, 4–15 mm across, distally gradually narrowed and with a slender extension. Most parts of plant bristly; bristles to 2.5–4.0(–5.0) mm long. Stem (below uppermost leaf) simple, 0.3–7.0 cm long. Leaves crowded near base of stem, petiolate; petiole membranous, linear or broadly linear, 0.5–7.0 cm long, 1–5 mm wide; lamina oblanceolate, linear-oblong, strap-shaped or oblanceolate, 2–13 cm long, 0.3–2.5 cm wide, smaller leaves elliptic or ovate, base attenuate, margin entire, occasionally undulate, apex acute, obtuse or rounded. Inflorescence racemose or subcapose, with or without basal flowers, ebracteate except lowermost flowers, occasionally with lowest flower bud(s) borne on diminutive pedicel and much smaller and abortive; rachis 2–9 mm across in dried specimens; pedicels (except those of abortive flower buds) 1–12 cm long in flower, to 15 cm long in fruit. Flowers 4–13, half nodding, occasionally nodding, or facing laterally, bowl- or dish-shaped, 2.3–7.0 cm across. Calyx 0.7–1.5 cm long. Petals 4–9, violet, purple, magenta-purple, deep purplish blue, pale purplish blue, obovate, broadly obovate, rhombic, elliptic or ovate, 1.5–4.0 cm long, 0.6–3.0 cm wide, base cuneate or rounded, margin entire, sometimes irregularly crenulate near apex, occasionally cleft in various degree, apex obtuse, rounded or triangular-acute. Stamens numerous; filaments filiform, 5–12 mm long; anthers pale yellow, yellow or orange, ellipsoid or oblong, 0.8–2.0 mm long, thecae straight. Ovary ovoid, ellipsoid or narrowly ellipsoid, 4–8 mm long; style 1–4 mm long in flower; stigma capitate or ovoid, ca. 1 mm across; lobes 3–5, ovate, 0.8–3.5 mm long in flower, erect, occasionally ascending, in fruit. Capsules cylindrical-oblong, oblong, narrowly ellipsoid, ellipsoid, broadly ellipsoid, obovate, or narrowly obovate, 1.0–4.5 cm long, 3–12 mm across; carpels 3–5, upper 1/7–2/3 dehiscent.

Distribution: CHINA. NW Yunnan: Heqing Xian (鹤庆县), Jianchuan Xian (剑川县), Dali Shi (大理市), Yangbi Xian (漾濞县), Xianggelila Shi (香格里拉市), Deqin Xian (德钦县), Gongshan Xian (贡山县). SE Xizang: Chayu Xian (察隅县), or Zayu County. SW Sichuan: Xiangcheng Xian (乡城县), Daocheng Xian (稻城县), Jiulong Xian (九龙县), Litang Xian (理塘县), Yan-yuang Xian (盐源县), and Muli Xian (木里县). 3200–4700 m.

We were unable to find a specimen to support Grey-Wilson’s (2014) claim of Meconopsis lancifolia on Yulong Xueshan, or even from Lijiang Shi (丽江市), which includes Yulong Xueshan.
or yellowish green, lower surface somewhat canescent, both surfaces sparsely or moderately bristly, occasionally glabrous. Inflorescence racemose, usually without basal flowers, ebracteate, lowest flower occasionally in axil of uppermost leaf (bract), occasionally with lowest flower bud borne on diminutive pedicel much smaller and abortive; rachis 2.8–5.5 mm across in dried specimens; pedicels 1–10 cm long in flower, to 13 cm long in fruit; rachis and pedicels densely hairy with patent or retrorse bristles. Flowers 5–12, half nodding, bowl- or dish-shaped, 2.3–3.8 cm across. Calyx 7–9 mm long, densely bristly. Petals 4–7, often 5 or 6, violet or purple, obovate, elliptic or ovate, 1.5–2.2 cm long, 0.6–1.5 cm wide, base cuneate or rounded, margin entire, sometimes irregularly crenulate near apex, occasionally cleft to various degrees, apex triangular-acute, obtuse or rounded. Stamens numerous; filaments similar to or paler than petals, filiform, 5–8 mm long; anthers pale yellow, ellipsoid, 0.8–1.3 mm long, thecae straight. Ovary ellipsoid, 4–5 mm long, sparsely or moderately hairy with ascending bristles, occasionally glabrous; style 1–2 mm long in flower, to 5 mm long in fruit; stigma capitate, ca. 1 mm across; lobes 3 or 4, ovate, 1.0–1.5 mm long, erect in fruit. Capsules cylindrical-oblong, 2.0–4.5 cm long, 3.0–5.5 mm across, sparsely or moderately hairy with patent or retrorse bristles, occasionally glabrous; carpels 3 or 4, upper 1/6–1/5 dehiscent. Seeds blackish, 1–1.3 mm long.

Distribution: CHINA. NW Yunnan: Heqing Xian (鹤庆县), Jianchuan Xian (剑川县), 3200–3900 m elevation.

Habitat and ecology: west-facing humid, steep, rocky slopes covered with mosses, often below lower margin of dwarf thickets; rooting in humus-rich soil among rocks.

Specimens examined: CHINA. NW Yunnan, Heqing Xian, Region 7: Yen-tze-hay, Lankong, 3200 m, 7 June 1886, J. M. Delavay 2080 (E, K, P); same locality, 8 July 1886, J. M. Delavay s.n. (P); same locality, 9 May 1887, J. M. Delavay s.n. (E); same locality, 3300 m, 6 June 1888, J. M. Delavay s.n. (P); same locality, 3500 m, 6 June 1888, J. M. Delavay s.n. (P); same locality, 3200 m, 7 August 1888, J. M. Delavay s.n. (P); same locality, 3500 m, 7 August 1888, J. M. Delavay s.n. (P); Lao-long-tong, Yen-tze-hay [without elevation], 18 July 1889, J. M. Delavay s.n. (P); Yen-tze-hay, 3500 m [without collection date], J. M. Delavay s.n. (K); Kona-lo-po, Ho-kin, 3500 m, 13 July 1886, J. M. Delavay 2080 [duplicated number assigned to a different collection] (P); Fang-yang-tchang, Mo-so-yn, 3200 m, 17 June 1887, J. M. Delavay s.n. (P); Maeulchan [probably Mchang, 马厂], Gno-kay, 9 July 1889, J. M. Delavay s.n. (P); Sung-kwe pass between Likiang and Ho-king, south of Likiang, 13,500 ft, July–August 1932, J. F. Rock 25192 (KUN) [there are no mountains higher than 13,000 ft between Likiang (Lijiang) and Ho-king (Heqing). The locality, Sung-kwe pass, could be in the vicinity southwest of Songgugi (松桂), south of Heqing.]; Ma-er Shan (马耳山), 26°16′32″ N, 100°06′05″ E, 3500 m, 21 July 2018, T. Yoshida K127 (KUN, TI). NW Yunnan, Jianchuan Xian (剑川县), Region 9: Chienchuan [Chienchuan, 剑川], Me kang divide, 26°45′ N, 99°40′ E, 13,000 ft, G. Forrest 21576 (E) [the locality seems to be on the northwestern spur of Laojun Shan (老君山), NW of Jianchuan (Chienchuan), according to the locality records].

Meconopsis lancifolia (Franch.) Franch. ex Prain subsp. daliensis T. Yoshida & H. Sun, subsp. nov. TYPE: CHINA. NW Yunnan, Yangbi Xian (漾濞县): western flank of Tali Range, 12,000 ft, July 1917, G. Forrest 15502 (Holotype: K; Isotypes, BM, E). Fig. 1, 14–15.

Subsp. daliensis differs from subsp. lancifolia in the elongate taproot (dauciform in the latter), ellipsoid, obovoidal or narrowly obovoidal capsules (cylindrical-oblong in the latter), differs from subsp. shikaensis, subsp. xiangchengensis, and subsp. extima in the petals 4 or more (5 or more in the latter three subspecies) and the lamina to 2.5 cm wide (less than 1.3 cm wide in the latter three subspecies).

Herbs, monocarpic, 13–25 cm tall in flower, to 35 cm tall in fruit, Taproot elongate, to 12 cm long or more, 5–12 mm across, distally gradually narrowed and with slender extensions. Most parts of plant bristly; bristles rather hard, to 4(–5) mm long. Stem (below uppermost leaf) simple, 1–5 cm long. Leaves crowded on short stem, distinctly petiolate; petiole membranous, linear or broadly linear, 1–5 cm long, 1–3 mm wide; lamina oblong, elliptic or narrowly oblanceolate, rarely ovate in small leaves, 2.5–13.0 cm long, 1.0–2.5 cm wide, base attenuate, rarely cuneate, margin entire, occasionally undulate, apex obtuse or acute, both surfaces sparsely or moderately bristly, occasionally glabrescent. Inflorescence short racemose, sometimes subcapose with short rachis and long ascending rachis, with or without basal flowers, ebracteate except basal flowers; rachis 4–8 mm across in dried flowering specimens; pedicels (scapes) 1.5–12.0 cm long in flower, to 15 cm long in fruit; rachis and pedicels moderately, densely, or sparsely hairy with patent bristles. Flowers 4–11, three-dimensional shape unknown. Calyx 0.9–1.5 cm long, densely, moderately, or sparsely bristly. Petals 4, 5 or occasionally 6, deep satiny purple, deep purple, deep purplish blue, or pale purplish blue (according on G. Forrest 1950, 1999, 2950, 13517, 13714, 15502), obovate or broadly obovate, 2.2–3.4 cm long, 1.5–2.7 cm wide, base cuneate, margin entire, occasionally irregularly crenate near apex, apex rounded or occasionally obtuse. Stamens numerous; filaments filiform, 6–12 mm long; anthers ellipsoid or oblong, 1.0–1.7 mm long; thecae straight. Ovary ellipsoid, 4–8 mm long, densely hairy with ascending bristles; style 1.0–2.5 mm long in flower, to 5 mm long in fruit; stigma ovoid, c. 1 mm across; lobes 3 or 4, 1–2 mm long, erect in fruit. Capsules ellipsoid, obovoidal or narrowly obovoidal, 1.8–2.5 cm long, 5.0–7.5 mm across, moderately, densely, or sparsely hairy with patent stiff bristles; carpels 3 or 4, dehiscent in upper 1/4–1/3. Seeds unknown.

Distribution: CHINA. NW Yunnan: Dalı Shi (大理市) and Yangbi Xian (漾濞县), Cang Shan (苍山). NE Yunnan: Kunming Shì (昆明市), Donchuan Qu (东川区). 3500–4100 m elevation.

Habitat and ecology: among shifting stones, among stones near ridge and on granite rocks near ridge, according to label data on specimens, J. M. Delavay s.n. 19 August 1887 (P) and J. M. Delavay s.n. 29 August 1889 (P).

Specimens examined: CHINA. NW Yunnan, Yangbi Xian and Dalı Shi, Region 8: western flank of Tali Range [Cang Shan, 苍山], 12,000 ft, July 1917, G. Forrest 15502.
**Figures 14–17.**


Meconopsis lancifolia (Franch.) Franch. ex Prain subsp. shikaensis T. Yoshida & H. Sun, subsp. nov. TYPE: CHINA. NW Yunnan: Siannrentung (仙人洞雪山) [Shika Xueshan, Shika Snow Mountain], Chungtien, 4200 m, 21 June 1937, T. T. Yü (俞德俊) 12093 (Holotype: KUN); Zhongdian Team (中甸队), 3400–4350 m, 12 July 1937, T. T. Yü 12127 (KUN); Juatze, Chungtien, 3700 m, 20 July 1937, T. T. Yü 12135 (KUN); Zhongdian Xian Shika Xueshan (中甸石卡雪山) [Shika Xueshan], Dege Niuchang Houshan (德哥牛场后山), 6 July 1939, K. M. Feng (冯国楣) 1519 (KUN); Zhongdian Chengjiao (中甸城郊), Buluzhai (布吕寨), near Songlu (松如), 4200 m, 20 July 1963, Zhongdian Team (中甸队) 3626 (KUN); Zhongdian Xian Shika Xueshan (中甸县石卡雪山), 4200 m, 21 June 1981, Qinghai-Xizang Team (青藏队) 1295 (KUN); Shika Xueshan, 27°47'41"N, 102°55'40.2"E, 4100 m, 18 July 2009, Liu Ende & Fang Wei 21000 (KUN).

As far as known, there is no recent record of collection or photography of the subspecies from Cang Shan since the collection by Hanchen Wang in 1941. The specimen collected from Dongchuan Qu, Liu Ende & Fang Wei 21000 (KUN), is in fruit and with a note “Flower: blue.” Identification of the specimen needs further studies, especially the inflorescence and the number and size of the petals.

**Meconopsis lancifolia** (Franch.) Franch. ex Prain subsp. *shikaensis* T. Yoshida & H. Sun, subsp. nov. TYPE: CHINA. NW Yunnan: Siannrentung (仙人洞雪山) [Shika Xueshan, 石卡雪山], Chungtien, 4200 m, 12 July 1937, T. T. Yü (俞德俊) 12093 (Holotype: KUN). Fig. 1, 16–20, 88.

Subsp. *shikaensis* differs from the related subsp. *lancifolia* in the taproot usually elongate, occasionally dauciform (dauciform in the latter), and the petals 5 or more (4 or more in the latter), the inflorescence always with basal flowers (usually without basal flowers in the latter). It differs from the related subsp. *xiangchengensis* in the petals 5–7 (6–9 in the latter), the style 2–4 mm long (1–1.8 mm long in the latter), and the capsules narrowly obovoid, to 3 cm long (narrowly ellipsoid, to 1.8 cm long in the latter).

**Habitat and ecology:** on southwest- or south-facing stony slopes covered with thin layer of soil composed of old plants, partly covered with mosses; occasionally growing among dwarf shrubs.

**Habitat and ecology:** on southwest- or south-facing stony slopes covered with thin layer of soil composed of old plants, partly covered with mosses; occasionally growing among dwarf shrubs.

**Additional specimens examined:** CHINA. NW Yunnan: Xianggelila Shi (香格里拉市), around Shika Xueshan (石卡雪山), 3400–4530 m elevation.

**Distribution:** CHINA. NW Yunnan: Xianggelila Shi, around Shika Xueshan, Region 3: Xianggelila Shi, around Shika Xueshan, 3400–4350 m elevation.
Figure 18. *Meconopsis lancifolia* (Franch.) Franch. ex Prain subsp. *shikaensis* T. Yoshida & H. Sun on Shika Xueshan, 4400 m. Photograph by T. Yoshida, July 27, 2005.
Meconopsis lancifolia (Franch.) Franch. ex Prain, subsp. eximia (Prain) Grey-Wilson, *The Genus Meconopsis—Blue Poppies and Their Relatives*: 324. 2014. TYPE: CHINA. NW Yunnan, Deqin Xian (德钦县): Kari Pass, Mekong-Yangtzi divide, 27˚40'N, alt. 12,000 ft, August 1914, G. Forrest 13020 (Lectotype: E, designated by Grey-Wilson, 2014; Isolectotype: K). Fig. 1, 21–27, 89.


*Herbs*, monocarpic, 15–35 cm tall in flower, to 40 cm tall in fruit, occasionally to 58 cm tall on lower edge of shrubberries (around Hong Shan) in fruit. *Taproot* hard and woody, elongate, to 10 cm long or more, 7–12 mm across, often fusiform, distally gradually narrowed and with slender extensions. Most parts of plant bristly; *bristles* to 3.5 mm long, occasionally to 4 or 5 mm long. *Stem* (below uppermost leaf) simple, 3–12 mm long. *Leaves* all basal, petiolate; *petiole* not membranous, linear or broadly linear, 0.5–3.5 cm long, 1.5–3.0 mm wide; *lamina* rather thick, strap-shaped, oblong or oblanceolate, 2.5–6.0 cm long, 5–10 mm wide, base attenuate, margin entire, often undulate, apex obtuse or acute, upper surface green or dark green, densely or moderately bristly, lower surface pale green, moderately or sparsely bristly. *Inflorescence* racemose, with basal flowers, occasionally subscapose with short rachis and long ascending pedicels in windy habitats, ebracteate except basal flowers; *rachis* 4–9 mm across in dried flowering specimens; *pedicels* (scapes) 2–11 cm long in flower, to 13 cm long in fruit; rachis and pedicels densely or moderately hairy with retrorse or patent bristles. *Flowers* 6–11, half nodding or occasionally facing laterally, bowl-shaped or occasionally dish-shaped in fine weather, 3.5–7.0 cm across. *Calyx* 1.0–1.5 cm long, densely bristly. *Petals* 5–9, purple or magenta-purple, obovate or broadly obovate, 1.8–4.0 cm long, 0.8–3.0 cm wide, base cuneate, margin entire, occasionally crenulate near apex, sometimes cleft in various degree, apex rounded or obtuse. *Stamens* numerous; *filaments* darker than petals, filiform, rather thick, 7–12 mm long; *anthers* yellow, pale yellow or dull orange, oblong, 1.3–2.0 mm long; thecae straight. *Ovary* ovoid or ellipsoid, 4–8 mm long, densely hairy with ascending bristles; *style* 1–2 mm long in flower, to 3 mm long in fruit; *stigma* ovoid, 1–2 mm across; lobes 4–5, 2.0–3.5 mm long, erect or

Figure 27. Habitat of *Meconopsis lancifolia* (Franch.) Franch. ex Prain subsp. *eximia* (Prain) Grey-Wilson on Baima Xueshan, 4650 m. Photograph by T. Yoshida, July 25, 2018.
ascending in fruit. Capsules ellipsoid or broadly ellipsoid, 1.2–2.2 cm long, 8–12 mm across, densely bristly; carpels 4–5, upper 1/3–2/3 dehiscent. Seeds unknown.

**Distribution**: CHINA. NW Yunnan: Xianggelila Shi (香格里拉市), Deqin Xian (德钦县), Gongshan Xian (贡山). SE Xizang: Chayu Xian (察隅县). SW Sichuan: Xiangcheng Xian (乡城县), Daocheng Xian (稻城县). 3500–4700 m elevation.

**Habitat and ecology**: on southwest-, west-, or south-facing stony slopes or stable scree slopes covered with thin soil composed of old plants; occasionally growing among dwarf shrubs.

**Additional specimens examined**: CHINA. NW Yunnan, Xianggelila Shi, **Region 11**: mountains of Chungtien Plateau, 27°30′N, 12,000 ft, July 1914, G. Forrest 12691 (E, K); same locality, September 1914, G. Forrest 13352 (K); Geza (格咋) – Langdou (浪都), 4400 m, 25 June 1988, Z. D. Fang & X. H. Li 753 (KUN); Shangri-La County, Geza Township, 28°08′23.7″N, 99°54′28.8″E, 4385 m, 16 July 2007, R. Li & Z. Yao 907C (MO); Hon Shan (红山), 28°06′35″N, 99°53′59″E, 4200 m, 27 July 2018, T. Yoshida K133 (KUN, TI). NW Yunnan, Xianggelila Shi, Da Xueshan (大雪山), **Region 13**: Da Xueshan (大雪山), 4400 m, 25 June 1988, Langdou (浪都) – Langdou (浪都), 28°06′35″N, 99°53′59″E, 4200 m, 27 July 2018, T. Yoshida K133 (KUN, TI).

**Distribution**: CHINA. NW Yunnan, Xianggelila Shi, **Region 11**: mountains of Chungtien Plateau, 27°30′N, 12,000 ft, July 1914, G. Forrest 12691 (E, K); same locality, September 1914, G. Forrest 13352 (K); Geza (格咋) – Langdou (浪都), 4400 m, 25 June 1988, Z. D. Fang & X. H. Li 753 (KUN); Shangri-La County, Geza Township, 28°08′23.7″N, 99°54′28.8″E, 4385 m, 16 July 2007, R. Li & Z. Yao 907C (MO); Hon Shan (红山), 28°06′35″N, 99°53′59″E, 4200 m, 27 July 2018, T. Yoshida K133 (KUN, TI). NW Yunnan, Xianggelila Shi, Da Xueshan (大雪山), **Region 13**: Da Xueshan (大雪山), 4400 m, 25 June 1988, Langdou (浪都) – Langdou (浪都), 28°06′35″N, 99°53′59″E, 4200 m, 27 July 2018, T. Yoshida K133 (KUN, TI).

**Habitat and ecology**: on southwest-, west-, or south-facing stony slopes or stable scree slopes covered with thin soil composed of old plants; occasionally growing among dwarf shrubs.

**Additional specimens examined**: CHINA. NW Yunnan, Xianggelila Shi, **Region 11**: mountains of Chungtien Plateau, 27°30′N, 12,000 ft, July 1914, G. Forrest 12691 (E, K); same locality, September 1914, G. Forrest 13352 (K); Geza (格咋) – Langdou (浪都), 4400 m, 25 June 1988, Z. D. Fang & X. H. Li 753 (KUN); Shangri-La County, Geza Township, 28°08′23.7″N, 99°54′28.8″E, 4385 m, 16 July 2007, R. Li & Z. Yao 907C (MO); Hon Shan (红山), 28°06′35″N, 99°53′59″E, 4200 m, 27 July 2018, T. Yoshida K133 (KUN, TI). NW Yunnan, Xianggelila Shi, Da Xueshan (大雪山), **Region 13**: Da Xueshan (大雪山), 4400 m, 25 June 1988, Langdou (浪都) – Langdou (浪都), 28°06′35″N, 99°53′59″E, 4200 m, 27 July 2018, T. Yoshida K133 (KUN, TI).

**Distribution**: CHINA. NW Yunnan, Xianggelila Shi, **Region 11**: mountains of Chungtien Plateau, 27°30′N, 12,000 ft, July 1914, G. Forrest 12691 (E, K); same locality, September 1914, G. Forrest 13352 (K); Geza (格咋) – Langdou (浪都), 4400 m, 25 June 1988, Z. D. Fang & X. H. Li 753 (KUN); Shangri-La County, Geza Township, 28°08′23.7″N, 99°54′28.8″E, 4385 m, 16 July 2007, R. Li & Z. Yao 907C (MO); Hon Shan (红山), 28°06′35″N, 99°53′59″E, 4200 m, 27 July 2018, T. Yoshida K133 (KUN, TI). NW Yunnan, Xianggelila Shi, Da Xueshan (大雪山), **Region 13**: Da Xueshan (大雪山), 4400 m, 25 June 1988, Langdou (浪都) – Langdou (浪都), 28°06′35″N, 99°53′59″E, 4200 m, 27 July 2018, T. Yoshida K133 (KUN, TI).

**Habitat and ecology**: on southwest-, west-, or south-facing stony slopes or stable scree slopes covered with thin soil composed of old plants; occasionally growing among dwarf shrubs.

**Additional specimens examined**: CHINA. NW Yunnan, Xianggelila Shi, **Region 11**: mountains of Chungtien Plateau, 27°30′N, 12,000 ft, July 1914, G. Forrest 12691 (E, K); same locality, September 1914, G. Forrest 13352 (K); Geza (格咋) – Langdou (浪都), 4400 m, 25 June 1988, Z. D. Fang & X. H. Li 753 (KUN); Shangri-La County, Geza Township, 28°08′23.7″N, 99°54′28.8″E, 4385 m, 16 July 2007, R. Li & Z. Yao 907C (MO); Hon Shan (红山), 28°06′35″N, 99°53′59″E, 4200 m, 27 July 2018, T. Yoshida K133 (KUN, TI). NW Yunnan, Xianggelila Shi, Da Xueshan (大雪山), **Region 13**: Da Xueshan (大雪山), 4400 m, 25 June 1988, Langdou (浪都) – Langdou (浪都), 28°06′35″N, 99°53′59″E, 4200 m, 27 July 2018, T. Yoshida K133 (KUN, TI).

**Distribution**: CHINA. NW Yunnan, Xianggelila Shi, **Region 11**: mountains of Chungtien Plateau, 27°30′N, 12,000 ft, July 1914, G. Forrest 12691 (E, K); same locality, September 1914, G. Forrest 13352 (K); Geza (格咋) – Langdou (浪都), 4400 m, 25 June 1988, Z. D. Fang & X. H. Li 753 (KUN); Shangri-La County, Geza Township, 28°08′23.7″N, 99°54′28.8″E, 4385 m, 16 July 2007, R. Li & Z. Yao 907C (MO); Hon Shan (红山), 28°06′35″N, 99°53′59″E, 4200 m, 27 July 2018, T. Yoshida K133 (KUN, TI). NW Yunnan, Xianggelila Shi, Da Xueshan (大雪山), **Region 13**: Da Xueshan (大雪山), 4400 m, 25 June 1988, Langdou (浪都) – Langdou (浪都), 28°06′35″N, 99°53′59″E, 4200 m, 27 July 2018, T. Yoshida K133 (KUN, TI).
Figure 28. Holotype of *Meconopsis xiangchengensis* R. Li & Z.L. Dao, *R. Li & Z. L. Dao 036* (KUN).
**Yoshida and Sun, **Mecanopsis Section Forrestianae (Papaveraceae) 399

*Herbs,* monocarpic, 8–27 cm tall in flower, to 30 cm tall in fruit. *Taproot* often elongate, occasionally dauciform in milder habitats, to 10 cm long or more, 7–15 mm across, distally gradually narrowed and with slender extensions. Most parts of plant bristly; *bristles* to 3.5 mm long, occasionally to 4 or 5 mm long. *Stem* (below uppermost leaf) simple, 0.5–2.2 cm long. *Leaves* all basal, petiolate; *petiole* membranous, linear, 1–7 cm long, 1–2 mm wide; *lamina* linear-oblong or oblanceolate, 2–8 cm long, 3–11 mm wide, base attenuate, margin entire, usually coarsely undulate, apex obtuse, occasionally acute, upper surface green or yellowish green, lower surface somewhat paler, both surfaces densely, moderately, or occasionally sparsely bristly. *Inflorescence* racemose often with basal flowers or occasionally without basal flowers in milder habitats, occasionally subcapose with short rachis and long ascending pedicels in windy habitats especially when uppermost flower buds are damaged or removed, ebracteate except in basal flowers; *rachis* 2.0–3.5 mm across in flower, to 4.5 mm across in fruit; *pedicels* (scapes) 1–10 cm long in flower, to 13 cm long in fruit; rachis and pedicels densely, moderately or occasionally sparsely hairy with retrorse or patent bracttles. *Flowers* 6–11, rarely 4 or 5, half nodding or facing laterally, dish- or occasionally bowl-shaped, 2.8–4.5 cm across. *Calyx* 8–12 mm long, densely bristly. *Petals* 6–9, often 6 or 7, violet or purple, occasionally magenta purple, obovate, rhombic, broadly obovate or elliptic, 1.7–2.5 cm long, 0.7–2.2 cm wide, base cuneate, margin entire, apex triangular-obtuse or rounded, occasionally irregularly crenulate, scarcely cleft. *Stamens* numerous; *filaments* similar to or darker than petals, filiform, 7–11 mm long; *anthers* yellow, pale orange, or orange, ellipsoid or oblong, 0.8–1.5 mm long. *Ovary* ellipsoid, 5–7 mm long, densely hairy with ascending bristles; *style* 1.0–1.8 mm long in flower; *stigma* capitate, ca. 1 mm across; lobes 3–4, rarely 5, to 2.5 mm long in fruit, erect in fruit. *Capsules* narrowly ellipsoid, 1.0–1.8 cm long, 3–6 mm across, moderately or densely hairy with patent or ascending bristles; carpels 3 or 4, rarely 5. *Seeds* unknown.

**Distribution:** CHINA. SW Sichuan: Daocheng Xian (稻城县), Xiangcheng Xian (香城区), Jiulong Xian (九龙县), Yajiang Xian (雅江县), Litang Xian (理塘县), Batang Xian (巴塘县), Yan-yuang Xian (盐源县), Muli Xian (木里县), 3500–4650 m elevation.

**Habitat and ecology:** on rocky slopes covered with humid blackish soil composed of old plants and partly covered with moss; with other herbs and grasses, often among dwarf shrubs of *Rhododendron* or *Potentilla* L. (*Dasiphora* Raf.).

**Additional specimens examined:** CHINA. SW Sichuan, Yan-yuang Xian, Region: 4, at foot of Huolu Shan (火焰山), Yan-yuan Yuanbao Qu (盐源元宝区) [Yuanbao is located at 27°16′15″N, 101°26′15″E, southwest of town of Yan-yuan], 3600 m, 21 July 1983. Qinghai-Xizang Team (青藏队) 12816 (KUN). SW Sichuan, Muli Xian, Region: 5, Muli mountains, 28°12′N, 13000 ft, August 1908, G. Forrest 16657 (BM, E, K); mountains around Muli, 28°12′N, 100°E, 14,000 ft, July 1930, G. Forrest 28388 (E); Yenching Shan, N. 6 days from Muli, 1931, G. Forrest 30086 (BM); Litang River divide, just below the pass south of Muli, 12,000 ft, 6 June 1921, F. Kingdon-Ward 4008 (E); Muli Kingdom, 10,000–14,000 ft, June 1922, J. F. Rock 5501 (E, K); same locality and date, J. F. Rock 5557 (E); Muti Konka, snow range east of the Yalung, Mutirong, territory of Muli, 14,000–15,000 ft, May–June 1932, J. F. Rock 23771 (BM, E, K); mountains of Kuli, Muli territory, 13,000 ft, June 1932, J. F. Rock 23946 (BM, E); Muli, 21 June 1937, T. T. Yu (俞德俊) 6524 (KUN). SW Sichuan, Daocheng Xian and Xiangcheng Xian, Region: 16: Xiangcheng Xian, Shagong (沙贡) township, Wuming Snow Mountains Pass (无名山), 29°08′15.5″N, 100°02′38.6″E, 4684 m, 19 July 2007, R. Li & Z. Dao 039 (KUN); Dacoching Xian, Wuming Shan (无名山), 29°08′42″N, 100°04′15″E, 4550 m, 21 June 2017, T. Yoshida K114 (KUN, TI); same locality, 29°08′02″N, 100°02′33″E, 4600–4700 m, 2 July 1998, D. E. Boufford et al. 28160 (A, KUN). SW Sichuan, Dacoching Xian, Region: 17: near pass of Dacoching Bowa Shan (稻城波瓦山丫口附近), 4600 m, 29 June 1973, Sichuan Team (四川省植被调查队) 1934 (KUN). SW Sichuan, Litang Xian, Region: 18: Haizi Shan (海子山), 29°31′00″N, 100°16′22″E, 4550 m, 20 June 2017, T. Yoshida K133 (KUN). SW Sichuan, Jiulong Xian, Region: 19; Jichou Shan (鸡丑山), 29°20′03″N, 101°29′58″E, 4365–4620 m, 21 July 2005, Boufford et al. 33308 (A); Jichou Shan, 29°20′00″N, 101°30′11″E, 4400 m, 30 June 2018, T. Yoshida K126 (KUN, TI). SW Sichuan, Yajiang Xian, Region: 20: Yajiang County, Jian Zikou pass (雅江县, 甲曲口), 29°08′02″N, 100°15′40″E, 4380 m, 2 September 2010, Kunming & Edinburgh Expedition to Sichuan 126 (E). SW Sichuan, Batang Xian, Region: 21: Tibet oriental, province de Batang (巴塘), Yar-gong, 1903, J. A. Soulié 3919 (P).

On Wuming Shan, which is located along the boundary between Xiangcheng Xian and Dacoching Xian, SW Sichuan, subsp. *xiangchengensis* grows around the pass on the main ridge of the mountain and adjacent eastern (Dacocheng–side) slopes from 4400 m to 4650 m in elevation. The inflorescence in this population is racemose with basal flowers, or occasionally subcapose with a short rachis and long ascending pedicels in windy habitats especially when the uppermost flower buds are damaged or removed.

The holotype of *Mecanopsis xiangchengensis* was collected near the pass on Wuming Shan. According to the description, the plant has a scapose inflorescences with solitary flowers borne on slender pedicels arising from the basal rosette. In the type specimens of *M. xiangchengensis*, R. Li & Z. Dao 036 (Holotype: KUN) and R. Li & Z. Dao 039 (Paratype: KUN), however, it is discernible that a few central pedicels were removed above the base. In the photograph of the fresh plants before pressing in Grey-Wilson (2014: 289), they appear to have been damaged by animal grazing. The thicker pedicels in the damaged center of each plant could possibly be peduncles with a few flowers.

*Mecanopsis purpurea* T. Yoshida & H. Sun, *sp. nov.*

**TYPE:** CHINA. W Sichuan, Xiaojin Xian (小金县): northern side of Jiajin Shan Yakou (夹金山垭口), 30°52′16″N, 102°41′02″E, 3950 m, 28 June 2018, T. Yoshida K124 (Holotype: KUN; Isotypes: KUN, TI). Fig. 1, 35–39, 91.
Meconopsis purpurea differs from the related *M. lancifolia* in having both surfaces of the lamina covered with bristles shorter and thinner than those on other parts of the plant (with similar bristles on all parts of the plant in the latter); anthers bicolored with a dark purple central part and pale yellow periphery (unicolor in the latter), ellipsoid or rounded (ellipsoid or short oblong in the latter); and thecae incurved (straight in the latter).

*Herbs*, monocarpic, 12–30 cm tall in flower, to 38 cm tall in fruit. *Taproot* elongate, to 20 cm long or more, 4–10 mm across, distally gradually narrowed and with a slender extension. Most parts of plant bristly; *bristles* to 3–(4) mm long, often tinged reddish brown. *Stem* (below uppermost leaf) simple, 0.3–2.0 cm long. *Leaves* all basal, petiolate; *petiole* linear or broadly linear, 1.5–4.0 cm long, 1.0–3.5 mm wide; *lamina* oblong, narrowly lanceolate, narrowly elliptic, elliptic, or small leaves occasionally ovate, 1.5–7.0 cm long, 0.5–1.5 cm wide, base cuneate or attenuate, margin entire, sometimes undulate, occasionally coarsely toothed, apex obtuse, triangular or subacute, both surfaces moderately or sparsely covered with shorter and thinner bristles (as seen in Fig. 91). *Inflorescence* racemose with basal flower(s) or entirely scapose, ebracteate except in petiole (below uppermost leaf) simple, 0.3–2.0 cm long. *Leaves* all basal, petiolate; *petiole* linear or broadly linear, 1.5–4.0 cm long, 1.0–3.5 mm wide; *lamina* oblong, narrowly lanceolate, narrowly elliptic, elliptic, or small leaves occasionally ovate, 1.5–7.0 cm long, 0.5–1.5 cm wide, base cuneate or attenuate, margin entire, sometimes undulate, occasionally coarsely toothed, apex obtuse, triangular or subacute, both surfaces moderately or sparsely covered with shorter and thinner bristles (as seen in Fig. 91). *Inflorescence* racemose with basal flower(s) or entirely scapose, ebracteate except in petiole (below uppermost leaf) simple, 0.3–2.0 cm long. *Leaves* all basal, petiolate; *petiole* linear or broadly linear, 1.5–4.0 cm long, 1.0–3.5 mm wide; *lamina* oblong, narrowly lanceolate, narrowly elliptic, elliptic, or small leaves occasionally ovate, 1.5–7.0 cm long, 0.5–1.5 cm wide, base cuneate or attenuate, margin entire, sometimes undulate, occasionally coarsely toothed, apex obtuse, triangular or subacute, both surfaces moderately or sparsely covered with shorter and thinner bristles (as seen in Fig. 91).


See revision of *Meconopsis lepida* Prain by Yoshida and Sun (2017).

*Distribution*: CHINA. S Gansu: Zhouqu Xian (舟曲县) and Dangchang Xian (安昌县), around Leigu Shan (雷古山), 3450–3900 m elevation.

*Additional specimens examined*: CHINA. S Gansu, Zhouqu Xian and Dangchang Xian, around Leigu Shan, *Region 32*: mountains of Thundercrown (Lei-gu-shan), Siku Alps, 12,000–13,000 ft, June 1914, *R. Farrer* 123 (BM, E, K); Danchang Xian, northern side of Leigu Shan [Thundercrown in Farrer], 33°53′36″N, 104°19′01″E, 3500 m, 16 July 2016, *T. Yoshida* K108 (KUN, TI).

*Meconopsis wengdaensis* T. Yoshida & H. Sun, *sp. nov*. TYPE: CHINA. NW Sichuan, Wengda Xian (翁达县); northern side of laozhe Shan (老折弯) 31°46′15″N, 100°45′19″E, 3950 m, 27 June 2016, *T. Yoshida* K104 (Holotype: KUN; Isotypes: KUN, TI). Fig. 1, 42–46, 92.

*Meconopsis wengdaensis* differs from the related *M. lepida* in its larger size, to 40 cm tall (to 33 cm tall in the latter), rachis to 4.5 mm across (to 3.0 mm across in the latter), longer bristles to 4.0–(5.0) mm long (to 2.5 mm long in the latter), pedicels scarcely warty distally (prominently warty distally in the latter), petals 4–8 (6–9 in the latter), to 3.2 cm long (to 2.5 cm long in the latter), straight thecae (incurved thecae in the latter), and ovary streaked with dark purple (scarceley streaked with dark purple in the latter).

*Herbs*, monocarpic, 17–40 cm tall in flower, to 45 cm tall in fruit. *Taproot* napiform, 1.0–2.5 cm long, 7–10


The plants in the photographs in Grey-Wilson (2014: 323, above left, below center, and below right), cited as *Meconopsis lancifolia* subsp. *eximia*, are *M. purpurea*, the upper plant on the same publication, on page 296, cited as *M. pulchella* and on page 297, cited as *M. aff. pulchella*, are not *M. pulchella*, but *M. purpurea*.
mm across, distally abruptly narrowed and with a slender extension. Most parts of plant bristly; bristles to 4–5 mm long, often tinged purple except near base. Stem (below uppermost leaf) simple, 0.8–2.0 cm long. Leaves all basal, petiolate; petiole membranous, linear or broadly linear, 2.0–4.5 cm long, 1–3 mm wide; lamina narrowly oblanceolate, oblong or narrowly elliptic, or small leaves elliptic, 1.5–6.0 cm long, 5–13 mm wide, base attenuate or cuneate, margin entire, apex obtuse or acute, upper surface green, lower surface somewhat paler or canescent, both surfaces moderately, densely, or sparsely bristly. Inflorescence short racemose, without basal flowers, ebracteate; rachis and pedicels densely or moderately hairy with retrorse, patent or occasionally glabrous; carpels (3 or)4 or 5.

Distribution: CHINA. NW Sichuan: Wengda Xian (翁达县), known only from the vicinity of the type locality, 3950 m elevation.

Habitat and ecology: among shrubs such as Salix and Potentilla (Dasiphora) on southwest-facing, moist, moss-clad slopes; with other herbs and grasses; rooting in humus-rich soil.


Herbs, monocarpic, 7–25 cm tall in flower, to 35 cm tall in fruit. Taproot hard and woody, elongate, to 12 cm long or more, 8–13 mm across, sometimes fusiform, distally gradually narrowed and with slender extension. Most parts of plant bristly; bristles to 3 mm long. Stem (below uppermost leaf) simple, 0.4–4.0 cm long. Leaves all basal, dimorphic (as shown in Fig. 48); rosette leaves on vegetative shoots with distinct long petioles and ovate or elliptic lamina, central leaves of flowering plants with indistinct short petiole and oblong, oblanceolate or narrowly elliptic lamina. Petiole pale green, linear or broadly linear, 1.5–4.5 cm long, 1.5–4.0 mm wide; lamina oblong, oblanceolate, elliptic or ovate, 1.5–6.0 cm long, 7–18 mm wide, base attenuate or cuneate, occasionally rounded in ovate lamina, margin entire, sometimes coarsely undulate, apex obtuse or acute, upper surface green or yellowish green with canescent sheen, lower surface somewhat paler, both surfaces densely hairy with shorter and narrower bristles, entirely covered with raised and thickened reticulation formed by adjacent epidermal cell walls (Fig. 94–95) resulting in canescent appearance of leaves. Inflorescence scapose, occasionally with central scapes ciliate to various degree in less windy habitats, few lowest (outermost) flower buds occasionally borne on diminutive scapes and much smaller and abortive; scapes 4–18 cm long in flower, to 28 cm long in fruit, densely or moderately hairy with retrorse, patent or occasionally ascending bristles. Flowers (4 or)5–13, facing laterally or half nodding, dish- or bowl-shaped in fine weather, 2.8–4.5 cm across. Calyx 1.0–1.6 cm long, usually densely bristly. Petals 5 or 6, occasionally 4 or 7, purple or violet, obovate, broadly to narrowly obovate, 1.8–3.1 cm long, 0.8–2.7 cm wide, base cuneate, margin entire, sometimes irregularly crenate near apex, apex rounded, obtuse or triangular. Stamens numerous; filaments similar to petals, filiform, 4–8 mm long; anthers pale yellow or dull orange, ellipsoid, 0.8–1.0 mm long; thecae straight or slightly incurved. Ovary ellipsoid, 4–7 mm long, densely, moderately or sparsely hairy with ascending bristles, occasionally glabrous, often with 3 or 4(or 5) dark purple streaks; style 1–2 mm long in flower, to 4 mm long in fruit; stigma capitate, ca. 1 mm across; lobes 3 or 4, or 5, 1–2 mm long, to 3 mm long in fruit, erect in fruit. Capsules narrowly ellipsoid or narrowly obovoid, 1.5–2.0 cm long, sparsely to moderately bristly, occasionally glabrous; carpels (3 or)4 or 5. Seeds unknown.

Distribution: CHINA. N Sichuan: Heishui Xian (黑水县), Hong-yuan Xian (红原县), Xiaoqiong Xin (小金县), Mian-yang Shi (绵阳市). SE Qinghai: Jiuzhi Xian (久治县), Hong-yuan Xian, near the top of Yanggong Shan (玉则山峰), 32˚13'13"N, 102˚36'18"E, 3900 m, 26 June 2011, Y. Niu (牛洋) K92 (KUN). Additional specimens examined: CHINA. SE Qinghai, Jiuzhi Xian (久治县), Region 28: Nianbaoyuze Shan (年保玉则山), above Emu Cuo (鄂木措), 4400 m, 3 July 2013, Y. Niu (牛洋) QH2013048 (KUN). N Sichuan, Heishui Xian (黑水县) and Hong-yuan Xian (红原县), Region 35: Hong-yuan Xian, near the top of Yanggong Shan (羊拱山), pass, 32˚14’01"N, 102˚35’56"E, 4200 m, 24 August 2011, T. Yoshida (汤宗孝) K76 (KUN, TI); same locality, 16 July 2013, T. Yoshida K92 (KUN, TI); Heishui Xian, eastern side of Yanggong Shan, 32˚13’13"N, 102˚36’18"E, 3900 m, 26 June 2018, T. Yoshida K122 (KUN, TI). NW Sichuan, Maerkang Xian (马尔康县) and Xiaoqiong Xin (小金县), Region
**Meconopsis aprica** T. Yoshida & H. Sun, sp. nov. TYPE: CHINA. NW Sichuan, Ganzi Xian (甘孜县): Zhuoda La (卓达拉), 31°24′14″N, 99°57′58″E, 4650 m, 28 June 2016, T. Yoshida K106 (Holotype: KUN; Isotypes: KUN, TI). Fig. 1, 62–63.

**Meconopsis aprica** differs from the related *M. pleurogyna* W.T. Wang in the uniform leaves (dimorphic in the latter), lamina less than 9 mm wide (to 19 mm wide in the latter), surfaces of the lamina without prominently raised and thickened reticulation formed by epidermal cell walls (prominently raised and thickened reticulation formed by epidermal cell walls in the latter), flowers fewer than 6 (to 12 in the latter), petals larger, to 4.2 cm long, 3.7 cm wide (less than 3.1 cm long, 2.7 cm wide in the latter) and usually prominently concave (only slightly concave in the latter), filaments to 12 mm long (less than 8 mm long in the latter), ovary densely bristly with bristles in close contact with each other (densely, moderately, or sparsely bristly, or occasionally glabrous, in the latter) and capsules narrowly ellipsoid (obovoid or narrowly obovoid in the latter).

**Herbs**, monopercarpic, 12–25 cm tall in flower. **Taproot** hard and woody, elongate, to 6 cm long or more, 6–10 mm across, sometimes fusiform, distally gradually narrowed and with slender extension. Most parts of plant bristly; **bristles** to 3 mm long. **Stem** (below uppermost leaf) diminished, 3–5 mm long. **Leaves** all basal, petiolate; **petiole** pale green, linear or broadly linear, 1.5–4.0 cm long, 1.0–3.5 mm wide; **lamina** rather thick, linear-oblong, strap-shaped, narrowly oblanceolate, 1.5–6.0 cm long, 3–9 mm wide, base attenuate, margin entire, sometimes coarsely undulate, apex obtuse or acute, upper surface green or dark green, lower surface somewhat paler, both surfaces moderately, densely, or sparsely bristly. **Inflorescence** scapose, occasionally lowest (outermost) flower bud borne on diminutive much smaller and abortive scape; **scapes** 8–19 cm long in flower, densely, moderately, or sparsely hairy with retrorse (occasionally patent) bristles. **Flowers** 4–6, ascending, facing upward or laterally, parabola-shaped, bowl-shaped, or dish-shaped in fine weather, 4.0–7.5 cm across. **Calyx** pale green, occasionally tinged dark purple, 1.3–1.6 cm long, densely or moderately bristly; bristles sometimes with thick, blackish base. **Petals** 5–7, purple, occasionally tinged dark red near base, broadly obovate, rounded or obovate, usually prominently concave, 2.5–4.5 cm long, 1.1–3.8 cm wide, base cuneate, margin entire, occasionally crenate and undulate near apex, apex usually rounded, occasionally obtuse. **Stamens** numerous; **filaments** more deeply colored or similar to petals, sometimes bluish distally, filiform, 7–12 mm long; **anthers** pale yellow or whitish, ellipsoid or oblong, 1.0–1.5 mm long; **stigma** narrowly ovoid, 1.5–2.0 mm across; lobes 3–5, often 4, 2–3 mm long in flower, to 5 mm long in fruit, erect in fruit. **Capsules** narrowly ellipsoid, 1–2 cm long, 3–5 mm across, densely or moderately bristly. **Seeds** unknown.

**Distribution:** CHINA. NW Sichuan: Ganzi Xian (甘孜县), known only from the vicinity of the type locality, 4150–4900 m elevation.

**Habitat and ecology:** south-, southwest-, and southeast-facing, windy and relatively dry, stony slopes thinly covered with herbs and grasses; rooting in sandy soil among stones. Flies frequent the flowers in fine weather.

**Additional specimens examined:** CHINA. NW Sichuan, Ganzi Xian, around Zhuoda La, **Region 24:** S of Ganzi on road (Gan-Bai Lu) to Baiyu, first pass after Ganzi, 31°24′14″N, 99°57′58″E, 4785–4900 m, 3 August 2015, **Boufford et al.** 34065 (A); Zhuoda La, 31°24′14″N, 99°57′58″E, 4650 m, 28 June 2016, T. Yoshida K106 (KUN, TI).

Various forms of a hybrid between *Meconopsis aprica* and *M. wengdaensis* grow intermixed on a roadside flat densely covered with dwarf herbs and grasses and scattered dwarf shrubs on the northern flank of Zhuoda La, 31°25′28″N, 99°57′50″E, at 4150 m elevation.


**Distribution:** CHINA. W Sichuan: Baiyu Xian (白玉县), Litang Xian (理塘县), Yajiang Xian (雅江县), 3950–4200 m elevation.
Additional specimens examined: CHINA. W Sichuan, Yajiang Xian, Region 22: Kazi La Shan (卡子拉山), 30°01′05″N, 100°48′42″E, 4150 m, 19 June 2017, T. Yoshida K112 (KUN). W Sichuan, Baiyu Xian, Region 23: western side of Ganbuai Yakou near Acha, 31°06′25″N, 99°26′17″E, 4000 m, 16 July 2017, T. Yoshida K120 (KUN, TI).


Inflorescence scapose. Filaments, at least innermost ones, dilated toward the base. Hairs on ovary simple. Three species are included: *Meconopsis henrici* Bureau & Franch., *M. huanglongensis* T. Yoshida & H. Sun, and *M. psilonomma* Farrer.

**Key to Species of Series Henricanae**

1a. Flowers cup-shaped even in fine weather ............................................................... *M. psilonomma*
1b. Flowers opening flat or dish-shaped in fine weather .............................................. 2
2a. Flowers 2–12; all filaments similarly dilated in lower half ...................................... *M. henrici*
2b. Flower 1; inner filaments dilated toward base, outermost filaments often scarcely dilated ............................................................... *M. huanglongensis*


*Herbs*, monocarpic, 8–25 cm tall in flower, to 30 cm tall in fruit. *Taproot* nailiform or dauciform, occasionally slightly elongate, 1.5–7.0 cm long, 4–12 mm across, contracted at junction with stem, distally with slender roots. Most parts of plant bristly; *bristles* usually pale colored, occasionally straw-colored, rather weak, to 4 mm long. *Stem* (below uppermost leaf) simple, 0.3–2.5 cm long. *Leaves* crowded near base of stem, petiolate; *petiole* membranous, linear or broadly linear, 0.4–4.5 cm long, 1.0–2.3 cm wide; *lamina* rather thick, lanceolate, oblong or elliptic, or lowest small leaves ovate, 1.5–10.0 cm long, 0.4–1.5 cm wide, base attenuate, margin usually entire, sometimes coarsely wavy, rarely coarsely toothed, apex acute or obtuse, both surfaces densely hairy with weaker and shorter bristles. *Inflorescence* scapose, central scapes rarely conuate in various degree; *scapes* 1–3 mm across when dried, with dense retorse bristles. *Flowers* 1 per scape, 2–12, often 3–6, rarely solitary per individual, laterally facing, dish-shaped in fine weather, 3.0–5.5 cm across. *Calyx* 1.0–1.5 cm long, densely hairy. *Petals* 4–8, often 6, mauve or purple, obovate, broadly obovate or elliptic, 1.8–3.6 cm long, 0.8–2.7 cm wide, base cuneate, margin entire or sometimes undulate and denticulate near apex, apex rounded or occasionally obtuse. *Stamens* numerous; *filaments* 0.7–1.7 cm long, lower half usually pale, dilated to 0.8 mm wide, somewhat boat-shaped, overlapping and surrounding ovary, upper half purple, filiform, usually erect along style; *anthers* orange, ellipsoid or globose, 0.7–1.0 mm long. *Ovary* ellipsoid, 4–7 mm long, densely hairy with ascending whitish bristles; style 1–3 mm long in flower, to 7 mm long in fruit; *stigma* capitate, ca. 1 mm across; lobes 3–5, to 3 mm long in fruit. *Capsules* obovoid, 1.0–2.3 cm long, 4–7 mm across, densely bristly. *Seeds* unknown.

**Distribution**: CHINA. W Sichuan: Kangding Shi (康定市) and Muli Xian (木里县), 3800–4500 m elevation.

**Habitat and ecology**: alpine slopes of various aspects; with herbs, grasses, mosses, and scattered dwarf shrubs such as *Rododendron nivale* Hook. f. subsp. boreale M.N. Philipson & Philipson, rarely on bare slopes; sometimes with dwarf shrubs; rooting in humid blackish, stony soil. Flies frequent the flowers in fine weather.

Additional specimens examined: CHINA. SW Sichuan, Muli Xian, Region 5: Litang [理塘]; Yangon [雅隆], 巴格拉; Yajiang Xian, Regions 22: Kazi La Shan (卡子拉山), 3800–4500 m elevation.

C. Grey-Wilson (2014, p. 306) wrote, “In both *M. henrici* and *M. sinomaculata* [*M. psilonomma* var. *sinomaculata* in this paper] and to some extent *M. psilonomma* also, the most prominently dilated filaments are those of the outer stamens and they are not so obviously air-filled but simply expanded in the lower half, and neither do the stamens form a protective jacket around the ovary.” However, the outermost filaments of *M. psilonomma* Farrer, including *M. psilonomma* var. *sinomaculata* (Grey-Wilson) H. Ohba, are sometimes scarcely dilated, whereas the innermost filaments are usually dilated toward the base. The dilated parts of the filaments are considered to provide a protective jacket for the ovary, even if they are not air-filled.

2. Fig. 1, 64–67.

3. 1a. Flowers cup-shaped even in fine weather ............................................................... *M. psilonomma*
   1b. Flowers opening flat or dish-shaped in fine weather .............................................. 2
   2a. Flowers 2–12; all filaments similarly dilated in lower half ...................................... *M. henrici*
   2b. Flower 1; inner filaments dilated toward base, outermost filaments often scarcely dilated ............................................................... *M. huanglongensis*
Meconopsis huanglongensis T. Yoshida & H. Sun, *Harvard Papers in Botany* 23 (2): 313. 2018. TYPE: CHINA. N Sichuan, Songpan Xian (松潘县): Xueshanliang (雪山梁), near Huanglong (黄龙), 32°44'23"N, 103°44’02"E, 4000 m, 11 July 2016, *T. Yoshida* K107 (Holotype: KUN; Isotype: TI); Fig. 1, 68–70.

**Distribution:** CHINA. N Sichuan; Songpan Xian, around Xueshanliang near Huanglong, 3900–4100 m elevation.

**Additional specimens examined:** CHINA. N Sichuan, Songpan Xian (松潘县), *Region 34*: Top of Pass “Deng Zhanzwa” toward Huanglong Si [黄龙寺], 32°45’08"N, 103°44’46"E, 2 July 2000, *SBQE* (Sino-British Qinghai Alpine Garden Society expedition) 594 (E); Xueshanliang, near Huanglong, 32°44’23”N, 103°44’02"E, 4000 m, 28 July 2014, *T. Yoshida* K98 (KUN, TI); same locality, 11 July 2016, *T. Yoshida* K107 (KUN, TI).


**Distribution:** CHINA. S Gansu and N Sichuan, 3400–4150 m elevation.

---


**Distribution:** CHINA. S Gansu: Zhuoani Xian (卓尼县) and Diebu Xian (迭部县), eastern Die Shan (迭山), head of Dayagou (大斜沟) valley, 3500–3800 m elevation.


**Distribution:** CHINA. N Sichuan; Songpan Xian, *Region 33*: top of Gonggan Len [Gonggaling, 贡嘎岭], 33°00’46’’N, 103°42’53”E, 3400–3600 m, 29 June 2000, *SBQE* (Sino-British Qinghai Alpine Garden Society expedition) 500 (Holotype: E; Isoepitypes: E, GB, HNWP, WSY); same locality, 30 June 2000, *SBQE* 511 (E); same locality, *SBQE* 513 (E); top of Huangshen Guan, 45 km east [mistaken for west according to the coordinates] from Chuanzhushi [川主寺], 32°57’41”N, 103°20’52”E, 1 July 2000, *SBQE* 569 (E); on western side of Gonggaling pass, 33°02’58”N, 103°41’42”E, 3700 m, 9 July 2017, *T. Yoshida* K116 (KUN, TI).
Figures 93–96. Scanning electron microscope images of surface of a dried leaf from a specimen of *Meconopsis pleurogyyna* W.T. Wang, T. Yoshida K122. Reticulation formed by cell walls of epidermis is prominent. 93. Upper surface of leaf at 100x magnification. 94. Upper surface of leaf at 500x magnification. Reticulation raised and thickened. 95. Lower surface of the leaf at 500x magnification. Reticulation raised and thickened and more prominent than on upper surface. 96. Lower surface of the leaf at 5000x magnification. More studies are needed to clarify structures of epidermis visible in the image.
Figures 97–100. Scanning electron microscope images of the surface of a dried leaf from the type specimen of *Meconopsis aprica* T. Yoshida & H. Sun, *T. Yoshida K106*. Reticulation formed by cell walls of epidermis is indistinct. 97. Upper surface of leaf at 100x magnification. 98. Upper surface of the leaf at 500x magnification. 99. Lower surface of leaf at 500x magnification. 100. Lower surface of the leaf at 5000x magnification. Surface appears be densely covered with minute fibrous emergences to 5 µm long. More studies are needed to clarify epidermal structures visible in image.
**Meconopsis psilonomma** var. *zhaganaensis* T. Yoshida & H. Sun, *Harvard Papers in Botany* 22 (2): 183. 2017. **Type:** CHINA. S Gansu, Diebu Xian (迭部县): W of Zhagana (尕那), 34°16′14″N, 103°03′57″E, 4050 m, 24 July 2014, T. Yoshida K97 (Holotype: KUN; Isotype: TI). Fig. 1, 77–78. **Distribution:** CHINA. S Gansu: Diebu Xian, western Die Shan (迭山), 4000–4150 m elevation.

**Additional specimen examined:** CHINA. S Gansu, Diebu Xian, *Region 29:* W of Zhagana, 34°15′27″N, 103°06′10″E, 3700 m, 23 July 2014, T. Yoshida K96 (Holotype: KUN; Isotype: TI). Fig. 1, 75–76.


1a. Inflorescence short racemose, with basal flowers; flowers opening widely; hairs on ovary with root-like branches at base and several rounded ridges on surface ........................................... *M. trichogyna*

1b. Inflorescence a solitary scape and solitary flower; flower cup-shaped

2a. Hairs on ovary usually incurved, with branches in lower half and with several rounded longitudinal ridges on surface, apex rather obtuse; branches of hairs retrorse, imbricate, not upturned ........................................... *M. hirsuta*

2b. Hairs on ovary usually incurved, with branches in lower half and with several rounded longitudinal ridges on surface, apex rather obtuse; branches of hairs retrorse, imbricate, not upturned........................................... *M. barbiseta*


**Meconopsis barbiseta** C.Y. Wu & H. Chuang ex L.H. Zhou was revised by Yoshida and Sun (2018).

**Distribution:** CHINA. SE Qinghai: Jiuzhi Xian (久治县) and Banna Xian (班玛县), 3650–4100 m elevation.

**Additional specimens examined:** CHINA. SE Qinghai, Banna Xian, *Region 27:* Makehe (玛可河) Forest Reserve, southern side of Nianbao Yuze (年保玉则), 32°47′53″N, 101°04′42″E, 3650 m, 25 June 2016, T. Yoshida K103 (KUN, TI).

**Additional specimens examined:** CHINA. SE Qinghai, Jiuzhi Xian, *Region 28:* eastern bank of Xiemu Cuo, north side of Nianbao Shan, 4400 m, 1971, *Guoluo Team* (果洛队) 438 (HNWP); Jiuzhi (久治), July 1974, *Guoluo Grassland Station* (果洛草原站) 289 (HNWP); Sangchi Shan (桑赤山), 33°22′03″N, 101°19′18″E, 3950 m, 21 June 2016, T. Yoshida K100 (KUN, TI); Luanshoutou Yakou (乱石头丫口), 33°25′23″N, 101°13′30″E, 4000 m, 23 June 2016, T. Yoshida K101 (KUN, TI).

**Meconopsis hispida** T. Yoshida & H. Sun, *Harvard Papers in Botany* 23 (2): 323. 2018. **Type:** CHINA. N Sichuan, Hongyuan Xian (红原县): western side of Yanggong Shan (羊拱山), 32°13′22″N, 102°35′04″E, 3850 m, 20 June 2016, T. Yoshida K99 (Holotype: KUN; Isotype: TI). Fig. 1, 81–82.

**Distribution:** CHINA. N Sichuan: Hongyuan Xian and Heishui Xian (黑水县), Yanggong Shan, 3750–4000 m elevation.

**Additional specimen examined:** CHINA. N Sichuan, Hongyuan Xian, *Region 35:* western side of Yanggong Shan, 32°13′22″N, 102°35′04″E, 3850 m, 20 June 2016, T. Yoshida K99 (KUN, TI).

**Meconopsis trichogyna** T. Yoshida & H. Sun, *Harvard Papers in Botany* 23 (2): 325. 2018. **Type:** CHINA. NW Sichuan, Dege Xian (德格县): Dege Haizi Shan (德格海子山), 32°03′13″N, 99°00′43″E, 4450 m, 14 July 2017, T. Yoshida K119 (Holotype: KUN; Isotype: TI). Fig. 1, 83–84.

**Distribution:** CHINA. NW Sichuan: Dege Xian (德格县), 4400–4550 m elevation.

**Additional specimen examined:** CHINA. NW Sichuan, Dege Xian, *Region 26:* Dege Haizi Shan, 32°03′13″N, 99°00′43″E, 4450 m, 14 July 2017, T. Yoshida K119 (KUN, TI).

**Literature Cited**


