A REVISION OF MECONOPSIS LYRATA (CUMMINS & PRAIN) FEDDE EX PRAIN AND ITS ALLIES

Toshio Yoshida, Sun Hang and Christopher Grey-Wilson

Summary. Three new species of Meconopsis (Papaveraceae), *M. bulbilifera*, *M. exilis* and *M. lamjungensis*, members of the *M. lyrata* aggregate, are described and characterised. Differences separating them from similar species are discussed and photos showing the diagnostic features are provided. Diagnostic features and distributions of the related species, *M. lyrata*, *M. compta*, *M. polygonoides* and *M. wumungensis* are also provided as is a key to the species.

With about 50 species, *Meconopsis* has proved to be a complicated genus taxonomically. While some of the species are relatively uniform and often restricted geographically, others are far more widespread in the wild and reveal a considerable amount of variation. While chromosome details and DNA studies are beginning to prove an important adjunct to studying the genus, much of this work is still in its infancy, allowing the taxonomist to base interpretation primarily on morphological studies and other data. At the same time, many recent studies have concentrated on the larger and more spectacular species (the bold evergreen monocarpic species in Series *Superbae* and *Robustae*, or the famous ‘blue poppies’ of series *Grandes*), while many of the smaller taxa have been virtually ignored. Among these latter, few have been neglected more than the demure species of series *Primulinae*, yet they form a significant and interesting association; undoubtedly field observations by keen-eyed naturalists in recent years have provided a great deal more useful information. Although they would be of interest also to horticulturists and gardeners, primarily in the alpine garden, none of the species in the series are presently in cultivation.

Series *Primulinae* contains about 10 species including *Meconopsis primulina* Prain itself, *M. argemonantha* Prain and *M. florindae* Kingdon Ward and an aggregate of 7 other closely related species which are here referred to as the *Meconopsis lyrata* aggregate. While there is little doubt of the close relationship of the members within the aggregate, its relationship to *M. primulina* is more questionable and the series may require redefining when it has been more fully analysed. In the meantime the details of the series are presented here.

Series Primulinae is characterised by small, generally slender, monocarpic plants, rarely more than 50 cm tall (often 10–30 cm), usually with a rather short, napiform or subnapiform taproot. Plants are moderately to sparsely hairy or subglabrous, the hairs weak and easily broken or rubbed off. The leaves are usually membranous, generally lobed, crenate or sinuate at the margin, but sometimes entire. The 1–5 flowers are borne on a leafy stem, the uppermost first to open, the others lateral and borne in the axils of leaf-like bracts, but sometimes appearing to be solitary and scapose because the leaves are congested close to the base of the plant (prominent in plants which appear to have all their leaves in a basal rosette). The fruit capsule is generally slender, subcylindrical to ellipsoid-oblong or narrow-ovoid, glabrous to moderately but weakly bristly, often 4-, but 3-6-valved.

**Meconopsis Lyrata Aggregate.** With a wide distribution from central Nepal to Sikkim, Bhutan, southern and south-eastern Tibet (Xizang), northern Myanmar and northern and north-western Yunnan, this small complex of taxa presents considerable problems of interpretation. In his monograph of the genus published in 1934, George Taylor highlights some of the variation found in the aggregate and the difficulty of interpretation; however, he concludes by treating all as a single species without subdivision. As there is considerable variation involved, some clearly geographically based, it is difficult to accept this conclusion, particularly in view of the material, including photographs and field notes collected in more recent years. In analysing these materials two courses have presented themselves to us, either to recognise a single species with a series of subspecies, or to recognise a series of closely related species. We have decided on the latter course, but no doubt there will be those who would draw a different conclusion.

Close to the type locality (the southern Biluo Xueshan in Bijiang region, western Yunnan) of *Meconopsis bijiangensis*, which we (T. Yoshida & H. Sun), together with H. Ohba, described as a new species in 2009, we collected (in the same year, 2008) another undescribed plant related to the *M. lyrata* association. As a result of following studies of this and related taxa, we came to the conclusion that this Bijiang plant

© The Board of Trustees of the Royal Botanic Gardens, Kew 2012. 195
was a distinct taxon which is described here as *M. exilis*. At the same time, specimens collected in the Lamjung Himal in central Nepal (particularly Stainton, Sykes & Williams 6254, collected in 1954) show a close affinity to *M. exilis* but differ in a number of key features and it is here described as *M. lamjungensis*. These studies coincided with those of the third author (Grey-Wilson) and so it seemed appropriate to combine these findings into a single paper. In examining material assigned to *M. lyrata* from Nepal and Sikkim we also found a third new taxon with distinctive bulbils not found elsewhere in the aggregate and have applied the appropriate epithet *bulbilifera* to these. Interestingly, once all the bulbil-bearing material had been removed from the circumscription of *M. lyrata*, that species is found to be limited to a relatively small area of the eastern Himalaya centred upon Sikkim.

The members of the *Meconopsis lyrata* aggregate, that include the new species referred to above, are particularly difficult to observe in the wild. They generally grow amongst rather coarse, lush herbage and are easily overlooked in flower and very difficult to locate in the fruiting stage; they are not nearly so conspicuous in the field as are other species of *Meconopsis* which are generally prominent at both the flowering and fruiting phases. Certainly more field observations and collections of these various taxa would be a valuable and an important addition to the ongoing studies of the genus as a whole.

The floral characters of the *M. lyrata* aggregate are remarkably similar: all have rather pale, nodding, basically four-petalled (rarely 5-6-) flowers, bearing relatively few stamens (generally 12-24 (-36)) compared to other species in the genus. In addition, the fruit characters are rather similar, the capsules being oblong- to linear-cylindrical and generally 3-4-valved, the top of the capsule splitting for a quarter to about a third of its length at maturity. These factors have undoubtedly swayed interpretation in the past and yet the plants can look very different in other respects, particularly in the stem, inflorescence and leaf characteristics as the following key reveals.

**Key to species in the *Meconopsis lyrata* aggregate**

1a Leaves all petiolate, shallowly to deeply trilobed with a much larger terminal lobe, or trifoliate; stem decumbent towards the base, with adventitious buds or fibrous-roots often born at the lower nodes. ......................... 2
1b Leaves all petiolate or the upper sessile or subsessile, entire to pinnately divided, not trilobed; stem erect to ascending, rarely decumbent at the base, without adventitious buds or fibrous-roots at the lower nodes. .............. 3

2a Delicate plants with thread-like, somewhat zigzag stems, narrowed and extended at the base, often bearing tiny bulbils at the nodes; lower-surface of leaves stellately patterned; flowers solitary, generally smaller, the petals 12-17 mm long. ............... \textit{M. bulbilfera} (Nepal, Sikkim)

2b More robust plants with shorter and firmer stems more or less uniform throughout, without bulbils at the nodes; lower surface of leaves not stellately patterned; flowers 1-5, generally larger, the petals 13–22 mm long. ...................... \textit{M. lyrata} (Darjeeling district of India)

3a Plants 6–25 cm tall in flower; upper leaves petiolate or subsessile; lamina pinnately lobed, coarsely toothed or crenate, rarely entire. ............ 4

3b Plants 20–50 cm tall in flower; upper leaves sessile; lamina entire, sinuate or crenate, not lobed. .................................................. 5

4a Inflorescence often scapose with elongate pedicels and a reduced stem; leaf-lobes often rounded with contracted bases (especially in scapose plants); petals with a obtuse to acute apex. ........................................... \textit{M. wumungensis} (SW China; N Yunnan)

4b Inflorescence not scapose, usually with a single terminal flower borne on a leafy stem; leaf-lobes broadly ovate to oblong; petals with a rounded to obtuse apex. .................................................. \textit{M. compta} (SE Tibet, N Myanmar, SW China: NW Yunnan)

5a. Flowers solitary, terminal; stem leaves (including bracts) 3-4, not subtending shoots; lamina of upper leaves with semi-amplexicaule base; petals narrow-obovate to narrow-elliptic, the apex acute to acuminate. .................... \textit{M. polygonoides} (W Bhutan, S Tibet)

5b. Flowers both terminal and axillary; stem leaves (including bracts) 3-8, often subtending a lateral shoot with a flower and 0-2 leaves (bracteoles); lamina of upper leaves with or without a semi-amplexicaule base; petals obovate or broad-obovate, the apex rounded to subacute. ................. 6

6a. Uppermost 2–3 leaves subopposite or in a pseudowhorl normally; lamina of lower leaves with a rounded to attenuate base, those of the upper leaves with a semi-amplexicaule base. ........................................ \textit{M. exilis} (SW China: NW Yunnan, NE Myanmar)

6b. All leaves alternate; lamina of lower leaves with shallowly cordate to truncated base, those of the upper leaves without a semi-amplexicaule base. ......................... \textit{M. lamjungensis} (C Nepal: Lamjung Himal)

\textbf{Meconopsis lyrata} (Cummins & Prain) Fedde ex Prain in Engl. Pflanzenreich, Papav. Hypec. & Papav. 246 (1909). Fig. 1A & 2. Table 1.

**Description.** Monocarpic herb, 8–15 cm tall in flower, to 25 cm tall in fruit, with a napiform taproot or a rootstock, often bearing adventitious fibrous-roots at the lower nodes; rootstock ovoid to more or less cylindrical, 6–20 mm long, 3–6 mm diameter, bearing adventitious fibrous-roots on the surface and partly covered with the remnants of old petioles, the entire plant scattered with 2 mm long yellow-brown hairs, weak but somewhat crisp. Stem rather firm, 1–2 mm diameter, obscurely four-ridged and striate, erect or ascending except the decumbent base, subglabrous to pubescent, occasionally with adventitious buds and adventitious fibrous-roots born at the lower nodes, occasionally branched near the base above the ground. Leaves 3–5, yellowish green, subglabrous or sparsely pubescent, generally with a few scattered hairs beneath; basal leaves often withered at flowering time, the petioles elongate to 13 cm long; cauline leaves 2–4 (often 3), the uppermost leaves occasionally subopposite, the lamina thin, ovate to oblong-ovate, or lyre-shaped, 1.5–5 cm long, 0.7–3 cm wide, broad-cuneate, subcordate or cordate at the base, rounded to acute at the
Fig. 2. *Meconopsis lyrata*: herbarium specimen Kanai et al. 1723895, S. Sikkim, Phulut (= Phulloot) 3600 m, the type locality.
apex, entire to deeply three-lobed or trifoliate with much larger terminal lobes (sometimes transitional on the same plant), the terminal lobes ovate with entire or coarsely and shallowly toothed margins, the petiole narrow-linear, 1–6 cm long, often narrowly winged towards the base. Pedicels 4–11 cm long in flower (to 17 cm long in fruit), subglabrous to sparsely pubescent, the hairs patent to subappressed. Flowers 1–5, semi-pendulous, the lower lateral flowers accompanied by 1–2 bracteoles. Sepals subglabrous. Petals 4, rarely 5, pale blue, lavender-blue, pale purple, mauve, obovate to elliptic, 13–22 mm long, 7–15 mm wide, rounded or subacute at the apex, the upper margin minutely toothed. Stamens 16–24, about half the length of the petals, erect together and surrounding the pistil, the filaments linear, 4–7 mm long, gradually narrowed at the apex, similar to or darker than the petals in colour, the anthers ca. 2 mm long, orange-yellow. Ovary narrow-oblong to cylindrically-ellipsoid, 5–7 mm long, 1–2 mm diameter, glabrous; style 2–3 mm long in flower, to 3 mm long in fruit bearing a capitulate stigma, 0.7–1 mm diameter. Fruit capsule narrow oblong-cylindrical, 30–58 mm long, 3–5 mm diameter, 3–4-valvate, glabrous, splitting for a third of its length from the apex when mature.

**Distribution.** Darjeeling District of India; only known from the limited area around Mt Phalut (3596 m).

**Habitat.** Grassy and stony slopes, low open shrubberies, cliffs, banks. Flowering July to August.

**Specimens examined.** Cave s.n. Naya Yari, July 24, 1919(E), s.n. July 25, 1919(E), s.n. Alsokthang, September 1, 1919 (E); Kanai et al 723894 (TI), 723895 (KATH, TI).

**Meconopsis bulbilifera** T. Yoshida, H. Sun & Grey-Wilson, sp. nov. *Meconopsis lyratae* (Cummins & Prain) Fedde ex Prain affinis sed bulbilis plerumque natis ad nodis inferioribus et ordinatione minuta pilis stellata tegenti in inferis paginis foliorum differt. Type: Central Nepal, Bagmati Zone, Rasuwa District, Ganesh Himal, Seto Kund to Chyauche Kharka, 3910 m, August 11, 1994, F. Miyamoto et al 9400079 (holotype TI; isotype KATH).

Syn. *M. lyrata* sensu Taylor pro parte in *Meconopsis*: 73 (1934). Fig. 1B & 3. Table 1.

**Diagnosis.** *Meconopsis bulbilifera* is similar to *M. lyrata*, but differs from the latter in having bulbils usually born at the lower nodes and also in the minute stellate pattern covering the lower surface of the leaves.

**Description.** Slender monocarpic herb to 35 cm tall in flower but as little as 6 cm, with a napiform taproot or a rootstock, the rootstock ovoid to more or less cylindrical, 6–20 mm long, 3–5 mm diameter, bearing adventitious fibrous-roots and covered with remnants of the old petioles, occasionally with a tail-like extension, this being a slender stolon with short internodes, the entire plant scattered with yellow-brown hairs, weak but somewhat crisp, to 1.3 mm long. Stem slender and delicate, 0.3–1 mm diameter, rounded in section, erect or ascending (with the support of surrounding herbes), decumbent towards the base, often zigzagged above, subglabrous to pubescent, narrowed and extended
Fig. 3. *Meconopsis bulbilifera*; holotype specimen (T), Miyamoto et al 9400079, C Nepal, Ganesh Himal, 3910 m.
Table 1. Comparison of characters separating *Meconopsis lyrata* and *M. bulbilifera*.

<table>
<thead>
<tr>
<th>Character</th>
<th><em>Meconopsis lyrata</em></th>
<th><em>Meconopsis bulbilifera</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant</td>
<td>8–15 cm tall in flower</td>
<td>6–35 cm tall in flower</td>
</tr>
<tr>
<td>Stem</td>
<td>Rather firm, 1–2 mm diameter, obscurely four-ridged and striate, occasionally branched near the base, more or less uniform throughout</td>
<td>Slender and delicate, 0.3–1 mm diameter, rounded in section, usually unbranched near the base, narrowed and extended underground to the root</td>
</tr>
<tr>
<td>Stolon</td>
<td>Absent</td>
<td>Occasionally present</td>
</tr>
<tr>
<td>Bulbils</td>
<td>Absent</td>
<td>Mostly present</td>
</tr>
<tr>
<td>Cauline leaves</td>
<td>2–4 (often 3), uppermost leaves occasionally subopposite</td>
<td>2–6, alternate</td>
</tr>
<tr>
<td>Terminal lobes of cauline leaves</td>
<td>Ovate with entire or coarsely and shallowly toothed margins</td>
<td>Ovate to ovate-lanceolate with entire, crenate or 1–2-lobed margins</td>
</tr>
<tr>
<td>Lower-surface of leaves</td>
<td>Somewhat paler, scattered with yellow-brown hairs to 2 mm long, not stellately patterned</td>
<td>Whitish in dried specimens, glabrous or with scattered yellow-brown hairs to 1.3 mm long, minutely stellately-patterned</td>
</tr>
<tr>
<td>Petioles of cauline leaves</td>
<td>Narrow-linear, often narrowly winged towards the base</td>
<td>Narrow-linear or filiform, often expanded at the base and part-covering the bulbils</td>
</tr>
<tr>
<td>Flowers</td>
<td>1–5 per individual</td>
<td>Solitary</td>
</tr>
<tr>
<td>Petals</td>
<td>13–22 mm long, 7–15 mm wide, rounded to subacute at the apex</td>
<td>12–17 mm long, 6–11 mm wide, rounded to acute at the apex</td>
</tr>
<tr>
<td>Filaments</td>
<td>Linear, 4–7 mm long, with gradually narrowed apex</td>
<td>Filiform, 3.5–4 mm long, more or less uniform throughout</td>
</tr>
<tr>
<td>Anthers</td>
<td>ca. 2 mm long</td>
<td>1.5–2 mm long</td>
</tr>
<tr>
<td>Ovary</td>
<td>Narrow-oblong to cylindrically-ellipsoidal, 5–7 mm long, 1–2 mm diameter</td>
<td>Narrow-ovoid to cylindrically-ellipsoidal, 4–6 mm long, 1–1.5 mm diameter</td>
</tr>
</tbody>
</table>
underground to the root, usually bearing bulbils in the axils of the cauline leaves or at the bare nodes near the base; the bulbils ovoid-conical, 1.5–2.5 mm long, often with petiole remnants at the apex, occasionally developing and enlarged at a node near the stem base, bearing fibrous adventitious roots. Leaves 3–7, alternate, yellowish green, subglabrous or sparsely pubescent; basal and lower leaves often withered at flowering time; cauline leaves 2–6, alternate, the lamina thin, ovate to oblong-ovate, triangular-ovate or lyre-shaped, rarely rounded, 1–2.5 cm long, 0.5–2 cm wide, broad-cuneate, subcordate or cordate at the base, rounded to acute at the apex, the margin entire to deeply three-lobed or trifoliate with an enlarged terminal lobe and often with a subopposite pair of oval-ovate lobes at the base (sometimes transitional on the same plant), the terminal lobe ovate to ovate-lanceolate entire or crenate or with one to two marginal lobes, the lower-surface of lamina whitish in dried specimens, glabrous to rather sparsely hairy, drying to a minutely stellate-pattern, petiole narrow-linear or filiform, 0.5–6 cm long, often with an expanded base part-covering the bulbils, the upper cauline leaves smaller and with shorter petioles. Pedicels 3–10 cm long, very slender (less than 0.8 mm diameter), subglabrous to sparsely pubescent, the hairs patent to subappressed. Flowers semi-pendulous, solitary, terminal. Sepals subglabrous. Petals 4, very rarely 5, pale blue, pale purple, mauve, rarely white, obovate, elliptic, or ovate-elliptic, 12–17 mm long, 6–11 mm wide, rounded, obtuse or acute at the apex, the upper margin minutely erose. Stamens 16–24, half or slightly less than the length of the petals, erect and surrounding the pistil, the filaments filiform, 3.5–4 mm long, more or less uniform throughout, similar to or darker than the petals in colour, the anthers 1.5–2 mm long, orange-yellow. Ovary narrow-ovoid to cylindrically-ellipsoid, 4–6 mm long, 1–1.5 mm diameter, glabrous; style ca. 2 mm long with a capitate stigma ca. 0.7 mm diameter. Fruit capsule narrow oblong-cylindrical, 3–4-valvate, glabrous (mature fruits unknown).

**Distribution.** Himalaya (C & E Nepal: Annapurna Himal, Ganesh Himal, Khumbu Himal; NE India: Sikkim); 3500–4300 m.

**Habitat.** Amongst densely growing coarse herbs on wet, stony slopes, banks, or in low open shrubberies. Flowering July to September.

**Specimens examined.** L.W. Beer 10027 (BM); H.A. Cummins s.n.* Sikkim 1893 (K); Long et al 504 (E); Lowndes 734 (E); F. Miyamoto et al 9400077 (BM, E, KATH, TI), 9400079 (KATH, TI), 9584087 (E!, KATH, TI); Ribu & Rohmoo 5091 (K); Rohmoo 1120 (E); K.N. Sharma 40/94 (BM), E402 (BM); Stainton 902 (BM); Stainton, Sykes & Williams 1954 (BM), 6599 (BM, E, KATH), 8583 (BM); Wakabayashi et al 9715077 (KATH, TI), 9720304 (TI), 9730137 (TI).

**NOTE:** *H.A. Cummins s.n. collected in 1893 in Sikkim has been designated an isosyntype of *M. lyrata* by David Long for the *Flora of Bhutan* but is here transferred to *M. bulbilifera*.

The pattern of minute stellate speckles covering the lower leaf surface has been observed in all the dried specimens of *M. bulbilifera*. It is not due to stellate hairs nor is it known if this pattern is
observable in living material. Whatever the cause it is interesting enough for further investigation.

**Meconopsis exilis** T. Yoshida, H. Sun & Grey-Wilson, sp. nov. *Meconopsis comptae* Prain, *M. polygonoidi* Prain et *Meconopsis lyratae* (Cummins & Prain) Fedde ex Prain affinis sed a *M. comptae* laminis integeris vel crenatis non lobatis atque superis foliis sessilibus et semiamplexicaulis differt, a *M. polygonoidi* floribus non solitariis atque petalis obovatis non acuminate differt, a *M. lyratae* superis foliis sessilibus et semiamplexicaulis atque basi caulis crassiore et erecta non decumbenti differt. Type: China, Yunnan Province: on a western slope of Biluo Xueshan in Bijiang region, Fugong Xian, 26°35′05″N, 99°00′29″E, 3700–3800 msm, July 9, 2008, *Yoshida* K2 (holotype KUN; isotypes KUN).

**Diagnosis.** *Meconopsis exilis* is similar to *M. comptae*, *M. polygonoides* and *M. lyrata*, but differs from *M. comptae* in the entire or crenate, not lobed, leaf-lamina and in the upper leaves being sessile with half-clasping bases; it differs from *M. polygonoides* primarily in the inflorescence with the presence of axillary flowers in addition to the terminal one, and also in the obovate non-acuminate petals; it differs from *M. lyrata* in the sessile, half-clasping upper cauline leaves and in the thicker, erect, non-decumbent, stem base.

**Description.** *Plant monocarpic*, 12–45 cm tall in flower, with a napiform taproot, 6–15 mm long, 4–6 mm diameter, with a caudal extension and fibrous

Fig. 4. *Meconopsis exilis* habitat, NW Yunnan, Bijiang Xueshan, 3750 m. Photo: Toshio Yoshida.
roots, most parts of the plant hairy or subglabrous, the hairs weak but somewhat crisp, to 1.5 mm long, easily rubbing off. Stem erect, 2–3 mm diameter near the base, obscurely four-angled, scattered with retrorse hairs or glabrous, bearing a few vestiges of old petioles at the base. Leaves yellowish green above, somewhat paler beneath; basal leaves 1–2, often withering before the flowers appear, the petiole 2–5 cm long, partly buried under ground, the lamina membranous, rounded to ovate, 7–15 mm long, the base rounded to attenuate, the apex obtuse, margin entire or shallowly sinuate; cauline leaves 4–7, more or less regularly alternate except uppermost ones, the lower rather smaller than the upper, petiolate, the petiole 2–6 cm long, ascending, often subtending a shoot with a flower bud and 1–2 leaves (bracteoles), the lamina ovate to ovate-elliptic or oblong-spatulate, the base rounded to attenuate, the apex obtuse or acute, the margin entire or shallowly 1-6-sinuate; upper cauline leaves (bracts) sessile and subtending a flower bud, the uppermost 2-3 often aggregated into a false whorl, the lamina ovate-lanceolate, 2-6 cm long, 1-2.8 cm wide, the base semi-auriculate (half-clasping), the apex obtuse or acute. Pedicels 2-11.4 cm long (extending to 16 cm long in fruit) in the terminal flower, erect but abruptly curved 1-2 cm from the top. Inflorescence racemose with a terminal flower; flowers 1-5 per individual including immature flower buds, nodding, lantern to saucer-shaped, 2.5-3.4 cm across. Sepals 7-10 mm long, sparsely hairy. Petals 4(-5),
pale blue-purple, usually obovate to elliptic-obovate, 15-22 mm long, 8-16 mm wide, the apex rounded to subobtuse, the upper margin minutely and irregularly erose. 

Stamens 12-24, with filiform filaments, 7-9 mm long, similar to petals in colour; anthers 1.75-2 mm long, curved inward, orange-yellow. 

Ovary ellipsoid-oblong, glabrous with a 2-4 mm long style and a ca. 1 mm capitate stigma. Fruit capsule narrowly oblong or cylindrical, 3-5 cm long, 3-4 mm diameter, glabrous, 3-4-valved.

**Distribution.** China, Yunnan (Fugong Xian, on the western slopes of Biluo Xueshan); Myanmar (western slopes of Gaoligong Shan, around Chimili Pass); 3600–3900 m.s.m.

**Habitat.** Seasonally wet slopes with a dense assemblage of herbs, open shrubberies: in the Bijiang type locality the plants are found scattered on south-facing steep, wet slopes densely covered with tall herbs such as Anemone, Angelica, Epilobium, Geranium, Ligularia, Nomochoris, Phlomis, Potentilla and Salvia, the slopes often shrouded in dense fog in summer and deep snow in winter that can lie until early May. Flowering June to July.

**Specimens examined.** R. Farrer 1123 (E); G. Forrest 18276 (BM, E), 25047 (BM, E), 25530 (BM), 25991 (BM), 26939 (BM, E), 26942 (BM), 27289 (BM, E), 29921 (BM!), 30098 (BM!), 30350 (BM!); T. Yoshida K2 (KUN, TI).

Although this plant has been known for almost 100 years its relationship to *M. lyrata* has not been recognised until now. In his 1934 monograph of *Meconopsis*, George Taylor makes no specific mention
of specimens from north-western Yunnan nor the neighbouring part of Myanmar (then Burma). In fact Taylor took a very broad view of the species, sinking all the variants known at the time into *M. lyrata* without subdivision and with only scant reference to the geographical separation of the various entities. Since the publication of his monograph, more material has been collected and, more importantly, field observations along with photographs have greatly added to our knowledge. As a result we are now able to present the *M. lyrata* aggregate as a series of species. They are, although very closely related, nonetheless, distinct in various botanical details as well as in their geography and habitat preferences.

The key features of *Meconopsis exilis* are as follows: Stem relatively rigid, not weak, erect straight from the base. Cauline leaves 4-7, more or less regularly alternate except uppermost 2-3 leaves that are aggregated; lower leaves petiolate; lamina ovate-elliptic to oblong-spatulate, with a rounded to attenuate base; uppermost leaf sessile, with a semi-amplexicaule base. Flowers 1-5, terminal and axillary; lower flowers, when present, borne on lateral shoots accompanied by 1-2 bracteoles. Petals 4(-5), 15-22 mm long, rounded to subobtuse at the apex.

**Meconopsis lamjungensis** T. Yoshida, H. Sun & Grey-Wilson, sp. nov. *Meconopsis lamjungensis* a *M. exilis* arcte affinis, sed foliis summis non aggregatis, laminis inferiorum caulinarum foliorum subcordatis, atque laminis superiorum caulinarum foliorum non amplexentibus differt. Type: central Nepal, Lamjung Himal, near Rambrong, 4050 m elevation, July 10, 1954, Stainton, Sykes & Williams 6254 (holotype BM; isotypes E, KATH, TI).

**Diagnosis.** *Meconopsis lamjungensis* is closely related to *M. exilis*, but differs from the latter in the non-aggregation of the uppermost leaves, in the lower leaves having a shallowly cordate or truncated base to the lamina, and in the subsessile, non-clasping uppermost leaves.

**Description.** *Plant monocarpic*, 18-40 cm tall in flower, to 50 cm tall in fruit, with a napiform to subcylindrical taproot, 10-25 mm long, 4-7 mm diameter, the lowermost leaves generally withered by flowering time, the entire plant sparsely white-hairy or subglabrous, the hairs, weak but somewhat crisped, to 1.5 mm long. **Stem** stout and erect, 2-3 mm diameter near the base and bearing a few vestiges of old petioles bases. **Leaves** few, the basal with long petioles, to 22 cm long, the lamina ovate-elliptic to ovate-oblong, 4-10 cm long, 1.5-4 cm wide, with a shallowly cordate or truncate base and an obtuse apex, the margin coarsely crenate or subentire; cauleine leaves 2-4, often 3, the lower and middle ovate, ovate-oblong, spatulate, or lyrate, 2.5-6 cm long, 1-2.5 cm...
wide, often partly parallel-sided, with a shallowly cordate or truncated base and a subobtuse apex, the margin somewhat sinuate to more or less entire, the petioles 0.5-5 cm long, linear with narrow wings; uppermost cauleine leaves subsessile, ovate-lanceolate, to 3.3 cm long and 1.5 cm wide, with a cuneate base and a triangularly acute apex. Pedicels stout and erect, 4-16 cm long, extending to 22 cm long in fruit in the terminal flower, similar to the stem in diameter. Flowers often solitary and terminal, occasionally accompanied by a flower with or without a bracteole at the axil of a lower stem leaf, nodding or half-nodding, lantern to saucer-shaped, 2.2-3 cm across. Petals 4, pale blue, or white flushed with violet, ovate or ovate-elliptic, 15-18 mm long and 7-11 mm wide, with a rounded to subsacate apex. Stamens 12-24, 2/3 the length of the gynoeicum, the filaments white or pale violet, filiform, 5-8 mm long, the anthers yellow, ca. 1.5 mm long. Ovary ellipsoid to oblong, 5-7 mm long, ca. 2 mm diameter, glabrous, the style 2-4 mm long, the stigma capitate, 0.7-1 mm diameter. Fruit capsule narrow oblong-cylindrical, 3.3-5.8 cm long, 3-4.5(-6) mm diameter, four-valved, somewhat curved at the base into the pedicel, green marked with red, glabrous, the persistent style 2-4.5 mm long.


Habitat. On open south-facing slopes amongst coarse herbs or in open scrub. Flowering June to July.

Specimens examined. Stainton, Sykes & Williams 1954 (BM), 6254 (BM, E, KATH, TI); 6599 (BM, KATH), 8583 (BM, E); K.N. Sharma 40 (BM).

Meconopsis lamjungensis is a slender plant with a rather small flower and, as a consequence, it is easily overlooked in the field, especially when it is in fruit. It comes from a relatively well-botanised part of Nepal, yet there are very few specimens of it in herbaria. Once more material has come to light it may well be possible to expand the description. The species finds its closest ally in M. exilis (also described in this paper) and, although the two look superficially very similar, there are significant differences on close inspection. Notably, in the former the leaves are always strictly alternate, the uppermost not aggregated into a false whorl towards the top of the plant. In addition, the leaf-lamina base of M. lamjungensis is noticeably subcordate or truncated, while the uppermost leaf is subsessile (in M. exilis the uppermost leaves are sessile with clasping subaurculate bases). Another significant difference can be observed in flowering plants: M. exilis has a subracemose inflorescence with up to five flowers (terminal, and axillary) while M. lamjungensis bears a terminal flower, while towards the stem base there is often, in addition, a single flowerbud, borne on a short ‘pedicel’ with or without a bracteole. The two species are located at a considerable distance from each
other, *M. exilis* in northeastern Myanmar and northwestern Yunnan, while *M. lamjungensis* is restricted to a small region of central Nepal, as far as we know at present. Within the *Meconopsis lyrata* aggregate *M. lamjungensis* has the westernmost distribution while *M. wumungensis* has the easternmost.

The key features of *Meconopsis lamjungensis* are as follows: Stem stout, erect straight from the base. Cauline leaves 2–4, strictly alternate; lower leaves petiolate; lamina ovate, ovate-oblong, spatulate or lyrata, often partly parallel-sided, with a subcordate to truncated base; uppermost leaf subsessile, without a semi-amplexicaule base. Flower often solitary, terminal, occasionally accompanied by a flower with or without a bracteole at the axil of the lowest cauline leaves. Petals 4, 15–18 mm long, rounded to subacute at the apex.

**Meconopsis compta** Prain in Bull. Misc. Inf. Kew 1918: 212 (1918). Type: SE Tibet (Xizang), Sarong (= Chawalong, Tsawarong), 12-13 000 ft, G. Forrest 14306 (K, holotype; E, isotype). Fig. 1C, 7 & 8. [syn. *M. lyrata* sensu Taylor pro parte in *Meconopsis*: 73 (1934)].

**Description.** *Plant* monocarpic, rarely more than 25 cm tall in flower, sometimes as little as 6 cm, with a napiform taproot, 6-15 mm long, 4-6 mm diameter, with a caudal extension. *Stem* erect, to 15 cm long, generally 1-7 cm, occasionally more or less obsolete, 2-3 mm diameter at ground level, patent-bristly, especially in the lower half, glabrescent or glabrous above; basal underground portion of stem, short, curved up from the taproot. *Leaves* generally 5-7, crowded towards the base of the plant, reduced in size up the stem, the lamina elliptic-lanceolate to ovate, linear-lanceolate or oblong-spatulate, occasionally lyre-shaped, 10-40 mm long 7-16 mm wide, the margin entire to slightly lobed or pinnately-lobed, generally with two to four pairs of lateral lobes; the leaves generally transitional on the plant, the lowermost being entire, the uppermost lobed, sometimes much reduced in size; all leaves petiolate, the petiole 0.5-4.8 cm long, somewhat expanded, submembranous and sheathing at the base, the petiole of uppermost leaves shortening. *Pedicels* 3.5-11.4 cm long (to 23 cm long in fruit), glabrous or with a few scattered hairs. *Flowers* solitary, half-nodding, terminal, rarely with 1-2 smaller axillary flowers borne from the uppermost leaf axils. *Petal* 4, pale blue or lavender-blue, narrowly obovate-elliptic, 12-18 mm long, 7-9 mm wide, more or less entire, with a rounded to obtuse apex. *Stamens* 10-24, the filaments the same colour as the petals, the anthers yellow or golden. *Ovary* green often with purplish ribs, glabrous, the style 1-2 mm long, the stigma capitate, c. 1 mm diameter; stigma and style green. *Fruit capsule* narrowly oblong or cylindrical, 3-4.7 cm long, 3-4 mm diameter, glabrous, 3(-4)-valved.
Fig. 7. *Meconopsis compta*, NW Yunnan, Biluo Xueshan Lansey, 3750 m. Photo: Toshio Yoshida.

Fig. 8. *Meconopsis compta*, NW Yunnan, Biluo Xueshan Lansey, 3750 m. Photo: Toshio Yoshida.
**Distribution.** N Myanmar (Adung Valley, Seinghku Valley), SE Tibet (Chawalong (Sarong), north-western side of Meili Xueshan (Ka-gwr-pu), Doshong La); SW China; NW Yunnan (Meili Xueshan (Ka-gwr-pu, Doker La), northern Gaoligong Shan (Salwin-Kiu-chiang divide), northern Biluo Xueshan (Sewalongba, Si La, Mekong-Salwin divide), Baima Xueshan (Bei-ma Shan), Mekong-Yangtze divide, Lichiang range, Cang Shan (Tali or Dali range); 3658–4268 m.

**Habitat.** Wet grassy and stony slopes, open shrubberies, at the lower edge of rhododendrons and other scrub on mountain slopes. June-August.

**Specimens examined.** K.M. Feng 5137 (KUN), 6213 (KUN); G. Forrest 14 306 (BM, E, K), 14 463 (E, K), 15 491 (BM, E), 16 762 (BM, E, K), 18 276 (E), 18 869 (BM, E), 19 727 (BM, E), 19 729 (E), 25 530 (BM, E), 25 991 (BM, E), 29 921 (E), 30 098 (BM, E), 30 350 (E); Handel-Mazzetti 9066 (E); Kingdon Ward 7003 (BM), 9775 (BM); Ludlow, Sherriff & Taylor 5226 (E), 5228 (BM); 5228A (BM); McLaren 161d (BM, E); Rock 22 328 (BM, E), 22 419 (E), 22 994 (E, KUN); T.T. Yü 22 519 (E, KUN), T. Yoshida K74 (KUN).

*Meconopsis compta* (sometimes incorrectly *compacta*) is perhaps the most widely distributed species in the *M. lyrata* aggregate, with a centre of distribution in the border region between Yunnan and Tibet. It is a small plant with neatly, generally lobed, leaves that are clustered together in the lower part of the plant. As in some other species of *Meconopsis* (notably *M. impedita* Prain) the leaves on individual plants can be transitional in form with the lowermost undivided, while those above are increasingly lobed. In *M. compta* all the leaves are petiolate, the lowermost with the longest petioles. The flowers, which are closely similar to those of *M. exilis* and *M. polygonoides*, are generally solitary and terminal but occasionally they can be accompanied by 1-2 axillary, usually rather smaller, flowers issued from the uppermost leaf-axils; this applies particularly to plants found growing at lower elevations.


**Cathcartia polygonoides** Prain in Journ. As. Soc. Bengal 64 (2): 326 (1896). Type.

S Tibet, Chumbi, Dr King’s Collector July 13, 1884 (syntype BM; isosyntypes BM, K): *Meconopsis lyrata* sensu Taylor pro parte in *Meconopsis*: 73 (1934).

**Description.** A more substantial plant either *M. lyrata* or *M. compta*, being 15-40 cm tall in flower, with a napiform taproot, 10-40 mm long and 4-6 mm diameter. Stem erect but thin, to 27 cm long, 2-3 mm diameter near the base, hairy or subglabrous, the hairs weak, to 2 mm long; bulbils absent. Leaves often 4, evenly scattered, although the upper two sometimes subopposite at flowering time; lowermost leaves long-petiolate, the lamina ovate, triangular-ovate or
oblong-spathulate (resembling a species of *Bistorta*), 2-7 cm long, 0.6-2.2 cm wide, the petiole 1-5.2 cm long, slender, linear but broadening towards the base; upper leaves sessile, elliptic to lanceolate-ovate, ovate-elliptic, usually with a subamplexicaule base, the margin often coarsely crenate with narrow sinus, and undulate. Flowers solitary, terminal, nodding. Pedicels slender, 3-10 cm (to

Fig. 9. *Meconopsis polygonoides*, Bhutan, Paro Chu. Photo: Tim Lever.
19.5 cm long in fruit). Petals 4(5), pale blue to lavender-blue, narrow-obovate to narrow-elliptic, 15-22 mm long, 11-15 mm, the apex acute to somewhat acuminate, the margin minutely erose. Stamens 16-24, the filaments the same colour as the petals, anthers orange-yellow. Ovary ellipsoid-oblong, glabrous, with a 1-3 mm long style. Fruit capsule linear-cylindrical, 22-45 mm long, 2.5-4 mm diameter, the persistent style greenish, 2–4 mm long.

**Distribution.** S Tibet (Chumbi; Jilong (= Kyirong)); W Bhutan; 3500–4100 m.

**Habitat.** Among tall herbs, ferns and shrubs on the wet, shady floor of forests, on the edge of shrubberies.

**Specimens examined.** *Dr King’s Collector* July 17, 1884 (BM, K); *C.Y. Wu* *et al* 75-636 (KUN).

In recent years this interesting, yet little-collected species, has been observed and photographed by various travellers in western Bhutan, especially on the Chomolhari trail. These photos show the unique habit of the species that are clearly different from those of the closely related *M. lyrata*: plants are free-standing and support themselves without the aid of other tall herbs and surrounding shrubs. Because of collecting restrictions in Bhutan, few additional herbarium specimens have been made and yet this species seems quite distinct within the *M. lyrata* aggregate.

**Meconopsis wumungensis** K.M. Feng ex C.Y. Wu & H. Chuang in *Fl. Yunnanica*, 2: 33 (1979). Type: N Yunnan, Wumung Shan (Jiaozi Shan), 3600 m, June 1, 1952, *P.Y. Mao* 1081 (KUN!, holotype). Fig. 1D, 10 & 11.

**Description.** *A small monocarpic herb* to 25 cm tall in flower (taller in fruit), but often less than 10 cm tall in scapose plants, with a narrow-napiform to subcyllindrical taproot, 3-6 cm long, 0.3-0.7 cm diameter, usually elongate with a gradually narrowed extention. *Stem* when present to 15 cm long, often very short or plant acaulесent. *Leaves* rather bright green, 5-10, often forming a lax basal rosette, dying away in the autumn to a resting bud below ground level, the lamina broadly ovate to oblong, or lanceolate, 1-6 cm long, 1-2 cm wide, coarsely crenate, pinnatifid, pinnately lobed, or entire, sometimes with one or two pairs of lobes separated from the rest of the lamina by a slender rachis, often rounded with somewhat contracted bases, the base shallowly cordate, truncate or attenuate, somewhat decurrent onto the petiole, the apex obtuse, acute or acuminate, glabrous overall or with scattered patent whitish hairs above, the petiole slender, 2.5-6 cm long, slightly expanded towards the base into a 2-4 mm wide sheath; stem leaves, when present, 2-4, with a short petiole or subsessile, the lamina similar to, or larger than, the basal leaves, the upper 2-3 aggregated into a false whorl. *Flowers* solitary borne on basal scapes, or terminal on a short leafy stem and with 1-2 additional axillary flowers in caulose plants. *Pedicels* (scapes) ascending, rather slender, 4.5-11 cm long, arched over at
Fig. 10. *Meconopsis wumungensis*, NE Yunnan, Wumeng Shan, Jiaozi Shan, 3550 m. Photo: Toshio Yoshida.

Fig. 11. *Meconopsis wumungensis*, plant showing distinct, if short, stem; NE Yunnan, Wumeng Shan. Photo: Pam Everleigh.
the top in flower, glabrous or patent to somewhat deflexed white-hirsute. **Buds** nodding, narrow ovoid, 12-15 mm long, 5-6 mm wide, pale green. **Sepals** oval, glabrous to sparingly patent-hirsute. **Petals** 4, rarely 5, pale blue or lilac-blue with a deeper blue staining outside towards the base, obovate to elliptic, 17-24 mm long, 8-12 mm wide, with an obtuse to acute apex. **Stamens** 12-24, with whitish narrow-linear filaments, 8-12 mm long, and orange-yellow anthers 1.5-2 mm long. **Ovary** narrow-ellipsoidal, sparingly fulvous-hirsute; style 1.5-3 mm long with a 3-4-lobed capitate stigma, 1-1.5 mm diameter. **Fruit capsule** narrowly oblong-cylindrical, 3-5 cm long, 2-3.5 mm diameter.

**Distribution.** C Yunnan, Luquan Xian; known only from Wumeng Shan (Jioazi Shan). June to August.

**Habitat.** Rocky, often moss-covered, banks in damp semi-shaded places, rocky crags, rock ledges, rock fissures; 3600-3800 m.

**Specimens examined.** P.Y. Mao 1081 (KUN); R.Z. Fang & Z.W. Lu 44 (KUN), 113 (KUN); H. Peng et al 9284 (KUN); T. Yoshida K75 (KUN).

This interesting species has been associated with the small scapose species such as *Meconopsis concinna* and *M. delavayi*. However, although the species was based on a scapose specimen, recent collections along with ample photographic evidence shows that it can have a distinct stem. This evidence clearly places the species in the *M. lyrata* aggregation. Within this, *M. wumungensis* closely matches *M. compta* in various details. Both are found in Yunnan; however, whereas *M. compta* is distributed in NW Yunnan, N Myanmar and SE Tibet, *M. wumungensis* appears to be confined to Wumeng Shan (Wumung Shan), northern Yunnan. The mountain where *M. wumungensis* was found is called Jiaozi Shan which is located near the village of Wumeng at the western end of Wumeng Shan range: the range itself extends east into Guizhou Province. Because the area is relatively easily accessed from the Yunnan capital Kunming, just to the south, and because it has long been a famed area for the abundance of medicinal herbs, Jiaozi Shan has been botanised several times by Chinese botanists. As a result several new endemic taxa, including species of *Cypripedium*, *Rhododendron* and *Corydalis*, as well as *Meconopsis*, have been described in recent years. Besides *M. wumungensis*, the far larger and more obvious *M. wilsonii* subsp. *orientalis* was recorded recently from the same mountain. Although the flora of northern and northeastern Yunnan has yet to be fully recorded, the Jiaozi Shan does appear to represent an outlier from other *Meconopsis* populations in Yunnan.

*Meconopsis wumungensis* in its dwarf habit and in the transitional nature of its leaves (from entire at the base of the plant to pinnatifid higher up) looks very similar to *M. compta*, yet the leaves
are generally larger and paler and the leaf lobes less well defined and more rounded. In addition, scapose plants are often found with all the leaves aggregated into a basal rosette. The unique habitat of *M. wumungensis* is also interesting: plants grow characteristically in rock crevices and pockets filled with moist soil into which the subcylindrical taproot delves.

**ACKNOWLEDGEMENTS.** We are grateful to the following for providing valuable field data and allowing us access to their photographs: Makoto Amano, John & Hilary Birks, Pam Everleigh, Tim Lever, Rosie Steele, David & Margaret Thorne, Minoru Tomiyama, Hirokazu Tsukaya and Martin Walsh. Sun Hang would also like to thank the Natural Science Foundation of China for part-funding the field work.

**REFERENCES**


