

2. MECONOPSIS Viguier, Hist. Nat. Pavots Argémones, 48. 1814.

绿绒蒿属 lǜ róng hào shu

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, monocarpic or perennial, yellow lactiferous. Taproot distinct in monocarpic species, plump, extended or napiform thickened, accompanied by fibrous roots, or fibrous. Stems, when present, branched or not, bristly, setose, pubescent, or glabrous. Leaves cauline and basal or all basal and forming a rosette; rosette leaves persistent in winter or dying away to a resting bud or buds; blade entire, serrate, or pinnatifid to pinnate, glabrous to bristly; basal leaves and lower cauline leaves usually petiolate; upper cauline leaves shortly petiolate or sessile, sometimes amplexicaul. Inflorescence a raceme, panicle, or pseudoumbel, with uppermost flower opening first, or flowers solitary, then often on basal scapes. Flowers large, often bowl- or saucer-shaped. Sepals 2, very rarely 3 or 4 in terminal flowers, caducous. Petals 4–10, occasionally more, blue, purple, pink, red, or yellow, rarely white. Stamens numerous; filaments mostly linear, rarely dilated in lower part. Ovary nearly spherical, ovoid, or obovoid to narrowly terete, 1-loculed, with 3 or more carpels, containing numerous ovules; styles distinct, usually short, sometimes almost absent, regularly stout or basally expanding into a disk covering top of ovary; stigmas free or united, capitate or clavate. Capsule nearly spherical, ovoid, obovoid, or elliptic to cylindrical, spiny, setose, pubescent, or glabrous, 3–12(–18)-valvate; segments slightly lobed or divided to 1/3 length or more from apex to base. Seeds many, ovoid, reniform, falcate-oblong, or oblong, smooth or longitudinally concave, without a caruncle.

About 54 species: one in W Europe, the others in the Sino-Himalayan region; 43 species (23 endemic) in China.

The four species of *Meconopsis* sect. *Discogyne* G. Taylor (species nos. 40–43) are confined to S Xizang and the C and E Himalayan region. They are readily distinguished by the presence of a flat disk (a basal extension of the style), surmounting and overlapping the top of the ovary. All of the species form a dense rosette in the years before flowering, often with the dead leaf remains forming a thick felt beneath the living leaves. The inflorescence is a simple, often dense raceme, bracteate below, ebracteate above.

- 1a. Styles abruptly expanded (ampliate) at base and disklike, covering top of ovary and often projecting beyond its edge (*M.* sect. *Discogyne*).
 - 2a. Styles almost obsolete; petals sparsely setose outside 43. *M. torquata*
 - 2b. Styles distinct, 3–7 mm; petals glabrous.
 - 3a. Styler disk pentagonal in outline, shallowly lobed, not projecting beyond ovary edge; petals maroon; stigmas capitate; stem leafy up to inflorescence 42. *M. tibetica*
 - 3b. Styler disk sinuate, 8-angled, lobed or fringed at margin, projecting beyond ovary edge; petals pale yellow or bluish purple to deep purple, rarely red; stigmas clavate.
 - 4a. Leaf blade pinnatifid or pinnatilobate for full length; stems leafy (excluding leaflike bracts) 40. *M. pinnatifolia*
 - 4b. Leaf blade 3–5-toothed at apex, rarely subentire or entire 41. *M. discigera*
- 1b. Styles equally thick or basally expanded, but never extended and disklike (*M.* sect. *Meconopsis*).
 - 5a. Leaves basal and cauline; inflorescence compound, cymose or racemose panicles or bracteate racemes.
 - 6a. Inflorescence branched, with many flowers in cymose or racemose panicles; petals 4, mostly yellow; leaf blade pinnate or pinnately lobed.
 - 7a. Roots large, fibrous; inflorescences cymose panicles; herbaceous perennial.
 - 8a. Ovary narrowly oblong or subterete, glabrous; capsules subterete 1. *M. oliveriana*
 - 8b. Ovary elliptic, glabrous or very sparsely pilose; capsules elliptic 2. *M. chelidoniifolia*
 - 7b. Taproot present, plump, extended or napiform; inflorescence paniculate, racemose toward top; plant monocarpic.
 - 9a. Petals wine-red, wine-crimson, or purple 5. *M. wilsonii*
 - 9b. Petals yellow.
 - 10a. Flowering stems early sparsely setose and later glabrous; capsules densely setose, slightly 4–7-valvate from apex; petals ca. 3 cm 3. *M. gracilipes*
 - 10b. Flowering stems villous and densely barbellate-tomentose; capsules densely barbellate-tomentose and villous, slightly 6–12-valvate from apex; petals ca. 5 cm 4. *M. paniculata*
 - 6b. Inflorescence simple; flowers forming bracteate racemes; petals 4–8, yellow, blue, or purple, rarely white; leaf blade entire or lobed.
 - 11a. Roots fibrous, not swollen or tuberlike; stem base with persistent leaf bases, setose.
 - 12a. Cauline leaves alternate, blade trifoliolate 6. *M. smithiana*
 - 12b. Uppermost cauline leaves in a whorl, pseudovercillate, all leaves entire.
 - 13a. Flowers yellow.
 - 14a. Leaves 3-veined for at least 2/3 of their length; flowers ascending to erect at anthesis; stigmas sessile or almost so 7. *M. integrifolia*
 - 14b. Leaves pinnately veined, sometimes 3-veined at base; flowers nodding to half-nodding

- at anthesis; styles present, at least 5 mm 8. *M. pseudointegrifolia*
- 13b. Flowers purple or blue.
 - 15a. Base of leaves truncate or cordate; flowers usually 3–6 9. *M. betonicifolia*
 - 15b. Base of leaves cuneate; flowers usually 1–3 10. *M. grandis*
- 11b. Taproot radishlike; stem bases with or without persistent leaf bases, glabrous.
 - 16a. Plant with stiff spiny hairs (bristles).
 - 17a. Leaf blade pinnatipartite.
 - 18a. Styles broad; ovary densely rubiginous setose 21. *M. speciosa*
 - 18b. Styles narrow; ovary with golden fulvous to stramineous prickles 22. *M. aculeata*
 - 17b. Leaf blade entire to somewhat shallowly and irregularly lobed or toothed.
 - 19a. Leaves broad, irregularly toothed or lobed, glaucous, with dark base to sparse bristles; stigmas protruding, elongate 19. *M. rudis*
 - 19b. Leaves narrow, not toothed nor glaucous, usually rather densely bristly, without dark base to rather dense bristles.
 - 20a. Capsule with spreading bristles; tall plant usually to 1 m tall in flower; stigmas included within boss of stamens, pale green or yellowish 20. *M. prattii*
 - 20b. Capsule with appressed to ascending bristles; plant to 50 cm tall in flower; stigmas slightly protruding beyond boss of stamens, whitish 18. *M. racemosa*
 - 16b. Plant glabrous or pubescent.
 - 21a. Plant with large evergreen leaf rosettes in years before flowering.
 - 22a. Flowers white; leaves entire 11. *M. superba*
 - 22b. Flowers bluish violet; leaves pinnate to pinnatifid 17. *M. violacea*
 - 21b. Plant with overwintering buds; leaves withering in autumn.
 - 23a. Petals blue or purple.
 - 24a. Flowers 1–5 from upper cauline axils, often only 1 open; capsules narrowly oblong or subterete 14. *M. lyrata*
 - 24b. Flowers usually 3 from axillary pedicels, all open; capsules narrowly obovoid to narrowly elliptic 15. *M. primulina*
 - 23b. Petals white or yellow.
 - 25a. At least some leaves pinnate; petals white 16. *M. argemonantha*
 - 25b. All leaves entire, sometimes toothed at margin; petals yellow.
 - 26a. Taproot narrow and elongate; capsules with spreading spines 12. *M. georgei*
 - 26b. Taproot napiform; capsules glabrous or sparsely setose 13. *M. florindae*
- 5b. Leaves all basal, cauline leaves absent; flowers several, forming ebracteate racemes or simple on basal scapes.
 - 27a. Flowers several, forming ebracteate racemes; petals 4–8, blue or purple.
 - 28a. Flowers on upper flowering stems, without mixed basal scapes; capsules narrowly cylindrical; styles absent or nearly so 23. *M. forrestii*
 - 28b. Flowers on upper and lower flowering stems, often with mixed basal scapes; capsules elliptic or narrowly obovoid; styles distinct 24. *M. lancifolia*
 - 27b. Flowers solitary on basal scapes; petals 4–10, blue, purple, or red.
 - 29a. Fibrous roots fibriform; plant base with persistent leaf bases, setose.
 - 30a. Petals red; filaments straplike 25. *M. punicea*
 - 30b. Petals blue or purple; filaments linear.
 - 31a. Capsule 2.5–5 cm, sparsely usually deflexed setose; flowers 5–8 cm in diam., with 5–8 petals; ovary narrowly elliptic or oblong-elliptic 26. *M. simplicifolia*
 - 31b. Capsule 1.5–2.5 cm, densely appressed setose or glabrous; flowers 2.5–5 cm in diam., with 4–6 petals; ovary spheroidal, ovoid, or oblong 27. *M. quintuplinervia*
 - 29b. Taproot distinct.
 - 32a. Filaments clearly dilated in proximal half.
 - 33a. Flowers broadly saucer-shaped, with spreading petals; petals unblotched at base 28. *M. henrici*
 - 33b. Flowers deeply cup-shaped, with erect petals; petals dark blotched at base 29. *M. sinomaculata*
 - 32b. Filaments linear, not dilated.
 - 34a. Leaf blade with firm spines or bristles, often densely so.
 - 35a. Plant dwarfish, ca. 9 cm tall; taproot broad, ca. 5 cm in diam.; leaf blade ovate or narrowly so, margin pinnately lobed 37. *M. pseudohorridula*
 - 35b. Plant 15–20 cm tall; taproot plump and extended, 1–1.5 cm in diam.; leaf blade lanceolate, margin entire or undulate.

- 36a. Plant with dense, sharp bristles; ovary conical, with compressed or inclined, firm spines 38. *M. horridula*
 36b. Plant with stiff hairs; ovary elliptic to narrowly obovoid, adpressed setose 39. *M. impedita*
 34b. Leaf blade glabrous on both surfaces, rarely somewhat setose or pubescent.
 37a. Plant perennial, with rootstock branched at apex, each branch terminating in a single leaf
 rosette and bearing 1 basal scape 33. *M. delavayi*
 37b. Plant monocarpic, with simple rootstock terminating in a single leaf rosette bearing 1,
 several, or occasionally many scapes.
 38a. Leaf blades entire; plant with persistent, fibrous leaf bases.
 39a. Petals normally 6, with a dark base, 4 cm or more; filaments ca. 15 mm; style ca. 4 mm 30. *M. barbisetia*
 39b. Petals normally 4, without a dark base, 2–3 cm; filaments 6–8 mm; style 1.5–2 mm 34. *M. zangnanensis*
 38b. Leaf blades usually pinnately lobed, rarely entire on same plant, glabrous or
 almost so; plant with or without persistent fibrous leaf bases.
 40a. Basal scapes few, not more than 5; taproot napiform or shortly elongated; plant
 without persistent fibrous leaf bases.
 41a. Leaf blade pinnate or bipinnate, small, subfleshy; petals 1–1.5 cm 31. *M. concinna*
 41b. Leaf blade lobed, large, thin; petals ca. 3 cm 32. *M. wumungensis*
 40b. Basal scapes usually 8 or more; taproot stout and elongated; plant with persistent
 fibrous leaf bases.
 42a. Capsule ovoid to narrowly ellipsoid, 4–10 × longer than wide; petals usually
 more than 4 35. *M. pseudovenusta*
 42b. Capsule narrowly oblong or subterete, scarcely 4 × longer than wide; petals 4 36. *M. venusta*

1. *Meconopsis oliveriana* Franchet & Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64: 312. 1896.

柱果绿绒蒿 *zhu guo lü rong hao*

Herbs, perennial, 50–100 cm tall in flower, colorless hyaline lactiferous. Roots many, slender; rootstock with persistent leaf bases, densely yellow-brown barbellate-setose. Stems erect, branched, obviously channeled, near base sparsely setose. Cauline leaves glaucous abaxially, dark green adaxially, ovate or narrowly ovate, 5–10 × 3–5 cm, both surfaces sparsely yellow-brown hirsute, near base pinnatisect, near apex pinnatilobate; lobes 3–5, distant, petiolulate to almost sessile, pinnatifid; lobules ovate to obovate, base broadly cuneate, truncate, or slightly cordate, apex obtuse; lower cauline leaves like basal leaves, petiolate, but upper ones smaller, sessile or nearly so, slightly amplexicaul. Flowers 1 or 2, at uppermost leaf axils, forming cymose panicles, ascending to half-nodding. Pedicel 5–10 cm, slender. Flower buds spherical or ovoid. Sepals 2, elliptic, 7–10 mm, glabrous. Petals 4, yellow, broadly ovate to orbicular, 1–1.5(–2) × 0.8–1.5(–2) cm. Filaments filiform, 4–7 mm; anthers yellow, narrowly ovoid, ca. 1 mm. Ovary narrowly oblong or almost terete, ca. 8 × 1 mm, glabrous; styles very short; stigmas 4- or 5-lobed, lobes slightly decurrent. Capsule narrowly oblong or almost cylindrical, 2.4–4.5 cm × 3.5–5 mm, glabrous, gibbous costate, 4- or 5-valvate, slightly divided downward from apex. Seeds many, brown, shiny, elliptic-ovoid, ca. 1 mm, seed coat distinctly longitudinally striate and clathrate impressed. Fl. May–Aug.

• Forest understories on slopes, among shrubs; 1500–2400 m. Chongqing, Henan, W Hubei (Badong, Shennongjia), S Shaanxi, ?E Sichuan.

2. *Meconopsis chelidoniifolia* Bureau & Franchet, J. Bot. (Morot) 5: 19. 1891 [*“chelidoniifolia”*].

椭圆绿绒蒿 *tuo guo lü rong hao*

Herbs, perennial, 50–150 cm tall in flower. Roots long,

slender, 3–5 mm in diam., much branched, fibrous; rootstock with persistent leaf bases, densely barbellate-setose. Stems erect, greenish purple, branched, longitudinally channeled, near base shortly barbellate-setose. Basal and lower cauline leaves: petiole densely yellow-brown setose; blade abaxially glaucous, ovate-oblong or broadly ovate, 7–8 × 6.5–7 cm, pinnatisect in lower part, apically pinnatilobate; lobes 3–5, distant, pinnatifid or pinnatilobate again; lobules ovate, both surfaces sparsely hirsute, apex obtuse or subrounded; upper cauline leaves sessile or nearly so, small; blade broadly ovate, slightly pilose, 3-pinnatisect or 3-pinnatifid. Flowers 1 or 2 in uppermost leaf axils, forming cymose panicles, ascending to half-nodding. Pedicel slender, glabrous. Flower buds spherical. Sepals 2, suborbicular, ca. 1 cm, glabrous, with one margin membranous. Petals 4, yellow, obovate to suborbicular, 1.5–2.3 cm. Filaments filiform, ca. 7 mm; anthers yellow, narrowly oblong, 3–4 mm. Ovary elliptic, 5–6 × 4–5 mm, glabrous or near base slightly hispid; styles short; stigmas capitate. Capsule elliptic, 1–1.5 cm × 7–10 mm, glabrous, 4(–6)-valvate for a short distance from apex. Seeds falcate-oblong, less than 1 mm; seed coat with shallow impressions forming longitudinal stripes. Fl. May–Aug.

• Shade of forest understories, creek sides, roadsides; 1400–2700 m. N and W Sichuan, NE Yunnan (Daguan, Yongshan).

3. *Meconopsis gracilipes* G. Taylor, Gen. Meconopsis, 38. 1934.

细梗绿绒蒿 *xi geng lü rong hao*

Plants monocarpic, 40–60 cm tall. Stems branched, yellow-brown barbellate-setose, later glabrous or only with remaining scabrous firm bases. Basal leaves absent at flowering time, pinnate with 3 or 4 pairs of lateral lobes; lobules alternate to subopposite, ovate to oblong, 1.5–5 × 1.4–2.5 cm, end lobe larger than lateral ones, both surfaces and margin sparsely yellow-brown shortly barbellate-setose, later glabrous or only with remaining scabrous firm bases, base auriculate, margin pin-

nately lobate, apex obtuse to rounded. Upper cauline leaves lanceolate, 5–12 × 2–3 cm, merging with bracts, often auriculate at base. Inflorescence many flowered, paniculate below, racemose above, lower branches usually 3-flowered, upper ones 1-flowered; peduncles 4–8.5 cm, pubescent like stems. Pedicel 4–5.8 cm, slender, pubescent like stems, but apically more densely so. Petals 4, pale yellow, obovate or suborbicular, 1.8–3.1 × 1.6–2.8 cm. Filaments filiform; anthers orange to black-brown. Ovary spherical to elliptic, 1.5–1.8 cm × 8–10 mm, densely appressed or inclined setose; styles distinct, 7–8 mm; stigmas capitate. Capsule elliptic or oblong-elliptic, sparsely setose, or only with remaining scabrous firm bases, 4–7-valvate for a short distance from apex. Seeds black, reniform, ca. 0.5 mm.

3300–4800 m. S Xizang (Nyalam) [C Nepal].

4. *Meconopsis paniculata* (D. Don) Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64: 316. 1896.

锥花绿绒蒿 zhui hua lü rong hao

Papaver paniculatum D. Don, Prodr. Fl. Nepal. 197. 1825; *Meconopsis napaulensis* Candolle; *M. paniculata* var. *elata* Prain; *Stylophorum nepalense* (Candolle) Sprengel.

Herbs, monocarpic, to 2.5 m tall in flower. Taproot radish-like, or long and narrow, to 18 × 2 cm. Stems terete, branched, yellow or rufous barbellate-pubescent, with a sparse underlay of similar but much shorter hairs. Basal leaves in a dense evergreen rosette; petiole to 28 cm; blade variously shaped, lanceolate, oblong, or oblong-elliptic to oblanceolate, 25–49 × 6.5–12 cm, usually near base pinnatisect, near apex pinnatifid; lobes 6–10 pairs, lanceolate, oblong, or deltoid, margin entire or lobed, apex acute or rounded; lower lobes distant, both surfaces densely yellow barbellate-setose, with an underlay of similar but much shorter hairs. Lower cauline leaves similar to basal leaves but shortly petiolate; upper cauline leaves sessile, lanceolate, pilose like basal leaves, base amplexicaul or auriculate, apex obtuse or rounded. Inflorescence paniculate below, racemose above, with lowermost peduncles 3–9-flowered; flowers cup- to saucer-shaped, horizontal to nodding; peduncles 11–19 cm, pubescent like stems. Pedicel 4.7–13.5 cm (to 20 cm in fruit), slender, pubescent like stems, densely so apically. Petals 4, rarely 5, cream to yellow, obovate to suborbicular, 3.2–5.7 × 3–4.8 cm. Filaments similar in color to petals, filiform; anthers yellow to orange. Ovary spherical or nearly so, golden barbellate-tomentose; styles distinct, 6–9 mm (to 13 mm in fruit), near base obviously thickened; stigmas purple or reddish purple, 6–12-lobed. Capsule ellipsoid to ellipsoid-oblong, 1.5–4 × 1.1–1.5 cm, densely golden barbellate-tomentose, sometimes becoming subglabrescent, 6–12-valvate a short distance from top. Seeds reniform, shorter than 1 mm, adaxially alveolate when dried. Fl. Jun–Aug.

Grassy slopes, forest understories and margins, channel sides, roadsides, shrublands; 3000–4400 m. S Xizang [Bhutan, NE India, Nepal].

5. *Meconopsis wilsonii* Grey-Wilson, Curtis's Bot. Mag. 23: 195. 2006.

尼泊尔绿绒蒿 ni bo er lü rong hao

Herbs, monocarpic, 70–150 cm tall, throughout with stiff, barbellate, grayish hairs, with an underlay of similar shorter or substellate hairs. Taproot dauciform. Stem erect, present in flowering specimens, terete, to 15 mm in diam. at base, slightly ridged above. Leaf rosette dense, spreading, evergreen, bluish green, to 70 cm in diam.; basal leaves long petiolate, withered or partly withered at flowering time; blade lanceolate to lanceolate-elliptic, to 26 × 10 cm, pinnatisect to subentire, with obtuse lobes, both surfaces with rather sparse gray, stiff, barbellate hairs, midvein distinct, lateral veins less obvious. Lower cauline leaves similar to basal ones but shorter petiolate; middle and upper cauline leaves gradually smaller upward on stem; uppermost sessile and semi-amplexicaul, pinnatifid, with fewer lobes than lower ones. Inflorescence a fastigiate or semi-fastigiate panicle, racemose above, many flowered; lowermost flowers in lateral cymules of 1–5, uppermost solitary; bracts similar to uppermost leaves, decreasing in size upward on inflorescence; peduncles erect to obliquely ascending, 0.6–3.8 cm (to 10.4 cm in fruiting specimens), stout, pubescent like stem. Pedicel 0.4–1.8 cm (to 5 cm in fruit). Flowers semi-nutant; buds nutant, narrowly ovoid, with ascending to appressed barbellate hairs. Sepals pale gray-green, oval. Petals 4, purple to wine-purple, deep wine-crimson, or “light maroon,” occasionally white flushed with wine-purple, obovate to ± orbicular, 2.2–4.2 × 2.2–4.2 cm, generally rather crimped. Stamens numerous; filaments same color as petals; anthers orange to orange-yellow. Ovary ovoid, with ascending to appressed barbellate bristles; styles 4–7 mm; stigmas purple, capitate. Capsule ovoid to ellipsoid, 14–20 × 8–14 mm, generally 5-valved, covered in ascending barbellate bristles; style persistent, 6–8 mm. Fl. Jun–Sep.

Forest and scrub margins, shrublands, open scrub, rocky and stony places, grassy places, cliffs; 2700–4000 m. W Sichuan, NW and W Yunnan [N Myanmar].

- 1a. Basal and lower leaves with 6–8 pairs of primary segments, middle and upper cauline leaves and bracts deeply divided with 6–8 pairs of segments; peduncle and pedicel hairs ascending to subappressed 5a. subsp. *wilsonii*
- 1b. Basal and lower leaves with 4 or 5 pairs of primary segments, middle and upper cauline leaves and bracts shallowly divided, with 3–5 pairs of segments; peduncle and pedicel hairs spreading 5b. subsp. *australis*

5a. *Meconopsis wilsonii* subsp. *wilsonii*

尼泊尔绿绒蒿(原亚种) ni bo er lü rong hao (yuan ya zhong)

Basal and lower leaves with 6–8 pairs of primary segments, middle and upper cauline leaves and bracts deeply divided with 6–8 pairs of segments. Peduncle and pedicel hairs ascending to subappressed.

• Grassy places, open scrub; 3300–4000 m. W Sichuan (Baoping, Mianing).

5b. *Meconopsis wilsonii* subsp. *australis* Grey-Wilson, Curtis's Bot. Mag. 23: 197. 2006.

少裂尼泊尔绿绒蒿 *shao lie ni bo er lu rong hao*

Basal and lower leaves with 4 or 5 pairs of primary segments, middle and upper cauline leaves and bracts shallowly divided, with 3–5 pairs of segments. Peduncle and pedicel hairs spreading.

Rocky and stony places, cliffs, forest and scrub margins, shrublands; 2700–3700 m. NW and W Yunnan [N Myanmar].

6. *Meconopsis smithiana* (Handel-Mazzetti) G. Taylor ex Handel-Mazzetti, *Symb. Sin.* 7: 337. 1931.

贡山绿绒蒿 *gong shan lu rong hao*

Cathcartia smithiana Handel-Mazzetti, *Anz. Akad. Wiss. Wien. Math.-Naturwiss.* 60: 182. 1923.

Herbs, perennial, 30–90 cm tall in flower. Rootstock short, plump, with persistent leaf bases, densely caespitose, brown, usually shortly branched, hirsute. Stems simple, distantly compressed or slightly deflexed, barbellate-hirsute, becoming glabrescent, invested at base with dead leaf remains. Cauline leaves distant, lowermost petiolate; petiole 2.5–4 cm, compressed- or slightly deflexed hirsute; blade trifoliate, ca. 8 × 7–8 cm, both surfaces sparsely appressed barbellate-hirsute; terminal leaflet broadly ovate or suborbicular, often 7-lobed; lateral leaflets 1–2 cm or more distant from terminal leaflet, usually 3-lobed, petiolules ca. 1 cm or absent; upper leaves sessile or with petiole to 1 cm; blade broadly ovate, pinnatilobate, upward gradually smaller and fewer lobed. Flowers ca. 4, forming racemes, bracteate. Sepals pilose. Petals 4, yellow, broadly obovate, ca. 18 × 1.8 mm, apically slightly incised. Ovary spheroidal, densely appressed brown hirsute; styles very short or absent; stigmas 5-lobed. Capsule obconical, ca. 1.5 cm, apex ca. 1 cm, sparsely brown villous, 7-valvate from apex for 1/3 capsule length. Seeds elliptic, with raised longitudinal stripes. Fl. Jun–Aug.

Moist forests, forest margins, moist grasslands on slopes; 3100–3400 m. NW Yunnan (Gongshan) [NE Myanmar].

7. *Meconopsis integrifolia* (Maximowicz) Franchet, *Bull. Soc. Bot. France* 33: 389. 1886.

全缘叶绿绒蒿 *quan yuan ye lu rong hao*

Herbs, monocarpic, to 1 m tall in flower, throughout with long barbellate hairs, underlain with often dense, long, rufous or golden, barbellate hairs. Stem erect, to 2 cm in diam. near base, simple, longitudinally striate, pilose when young but nearly glabrous when old, base with persistent leaf bases densely shortly branched villous. Basal leaves in a deciduous rosette, among often mixed scalelike leaves; blade oblanceolate, obovate, elliptic, or nearly spatulate, 8–37 (including petiole) × 1–5 cm, both surfaces pilose, usually with 3(–5) or more longitudinal veins, base attenuate, not decurrent into petiole, margin entire and densely pilose, apex rounded or acute. Lower cauline leaves similar to basal leaves but gradually smaller; upper ones almost sessile, narrowly elliptic, lanceolate, oblanceolate, or linear-lanceolate, smaller than lower ones; uppermost leaves bractlike, forming a whorl beneath flowers, narrowly lanceolate or narrowly oblanceolate to linear, 5–11 × 0.5–1 cm. Flowers usually

3–5, rarely to 10-flowered, to 20 cm in diam., erect to suberect at maturity, arising from axils of uppermost leaves, occasionally with a few smaller flowers alternatively from stem below whorl of leaves. Pedicel (3–)6–37(–52 in fruit) cm. Flower buds broadly ovoid, spreading hairy. Sepals cymbiform, ca. 3 cm, abaxially pilose, glabrous within, with many distinct longitudinal veins. Petals 6–8, mid- to deep yellow, suborbicular to obovate, 4–9.5 × 3–5 cm, often markedly incurved. Filaments of same color as petals, golden brown at maturity, filiform; anthers yellow or yellowish brown, ovoid to oblong, 1–2(–4) mm. Ovary broadly elliptic-oblong or ovoid to narrowly ellipsoidal, densely appressed golden hirsute; styles obsolete or very short to 4 mm, glabrous; stigmas capitate, 4–7-lobed, decurrent and slightly actinomorphic at apex of ovary. Capsule broadly elliptic or oblong to elliptic, 2–3 × 1–1.2 cm, ascending to appressed golden or brown hirsute, 4–7-valvate for 1/3 distance from apex. Fl. May–Aug.

Grassy and rocky slopes, forest understories, open shrublands, mountain moorlands, stabilized moraines; 2700–5100 m. SW Gansu, E and S Qinghai, W Sichuan, E and S Xizang, NE and NW Yunnan [NE Myanmar].

- 1a. Stem with scattered leaves and superfluous flowers below leaf whorl; petals mid- to deep yellow, incurved; stigmas sessile, 10–12 mm in diam. 7a. subsp. *integrifolia*
- 1b. Stem leafless below whorl or with 1 or 2 leaves but no superfluous flowers; petals lemon yellow, often very pale, not incurved; stigmas 5–7 mm in diam., styles very short (2–4 mm) 7b. subsp. *lijiangensis*

7a. *Meconopsis integrifolia* subsp. *integrifolia*

全缘叶绿绒蒿(原亚种) *quan yuan ye lu rong hao* (*yuan ya zhong*)

Cathcartia integrifolia Maximowicz, *Bull. Acad. Imp. Sci. Saint-Petersbourg*, Sér. 3, 23: 310. 1877; *Meconopsis brevistyla* (Prain) Kingdon Ward; *M. integrifolia* var. *souliei* Fedde; *M. pseudointegrifolia* Prain var. *brevistyla* Prain.

Plants mostly 50–100 cm tall, with a prominent stem bearing several alternate leaves and often superfluous flowers below whorl of leaflike bracts. Flowers several, deeply cup- or goblet-shaped. Petals often markedly incurved, mid-yellow to deep gamboge. Ovary barrel-shaped, densely hairy; stigmas sessile, with 4–6 broad radiating arms, forming a cap usually 10–12 mm in diam.

Grassy and rocky slopes, forest understories, open shrublands; 2700–5100 m. SW Gansu (Huichuan, Xiahe), E and S Qinghai, NW and W Sichuan, E and S Xizang, NE and NW Yunnan [NE Myanmar].

7b. *Meconopsis integrifolia* subsp. *lijiangensis* Grey-Wilson, *New Plantsman* 3(1): 33. 1996.

垂花全缘叶绿绒蒿 *chui hua quan yuan ye lu rong hao*

Plants mostly 45–75 cm tall, with a well-defined stem but

few cauline leaves except for whorl beneath flowers. Flowers cup-shaped. Petals not markedly incurved, pale to mid-lemon yellow. Ovary narrowly obconical, densely hairy; styles short but distinct, 2–4 mm, glabrous; stigmas 5–7 mm in diam., with 4–7 rays.

• Mountain moorlands, open shrublands. SW Sichuan, NW Yunnan.

8. *Meconopsis pseudointegrifolia* Prain, Ann. Bot. (Oxford) 20: 353. 1906.

横断山绿绒蒿 *heng duan shan lü rong hao*

Herbs, monocarpic, 25–120 cm tall, covered for most part in soft golden or rufous hairs, overwintering as a large bud at ground level. Stem usually present, erect, or flowers scapose; when present with a whorl of bractlike leaves subtending flowers. Leaves mostly aggregated into a basal rosette, elliptic to oblanceolate, 14–40 × 2–5 cm, pinnately veined for most part, although base generally 3-veined, sometimes becoming glabrescent above, base narrowed into petiole, margin entire; middle and upper leaves similar to basal ones but generally smaller and shortly petiolate or sessile. Pedicel (or scape) to 45 cm, lengthening in fruit, spreading pubescent to subglabrous. Flowers often 6–9 (occasionally to 18), nodding to half-nodding (becoming gradually erect as flowers fade). Sepals oval, spreading pubescent. Petals 6–8, generally spreading widely apart, pale lemon- or sulphur yellow, oval to elliptic or elliptic-obovate, 5.5–10.5 cm. Stamens numerous; filaments of same color as petals, filiform; anthers yellow to orange-yellow. Ovary obovoid to ellipsoidal, densely to sparsely appressed hairy; styles distinct, 3–11 mm; stigmas rather narrow, stigmatic rays usually 7–10. Capsule obovoid to ellipsoidal, 2.5–3.5 × 0.8–1.2 cm, densely hairy to almost glabrous, 7–10-valvate. Fl. Jun–Aug.

Mountain moorlands, *Rhododendron* moorlands and woodlands, woodland margins, grassy slopes, rocky slopes, stabilized moraines, scree, margins of swamps, ravines, open shrublands; 2700–4200 m. S Gansu, SW Sichuan, S and SE Xizang, NW Yunnan [NE Myanmar].

Both this species and *Meconopsis integrifolia* vary greatly in height. Plants can be robust and bear a number of flowers or they can be dwarf and few flowered, sometimes reduced to a single flower per plant. High-altitude forms, particularly those from the bleaker exposed habitats of the Xizang Plateau, can be very dwarf, sometimes as little as 15 cm, and bear a solitary flower; however, they appear to be linked by intermediates to more robust plants at lower elevations and are probably best considered to be ecotypes (there is some evidence, for instance, that this dwarf habit is to some extent maintained in cultivation). Dwarf plants of this kind have been described as *M. integrifolia* var. *uniflora* C. Y. Wu & H. Chuang, described from NW Yunnan (Zhongdian), but similar plants are certainly to be found in W Sichuan and S and SE Xizang.

- 1a. Small, densely sericeous plant, not more than 25 cm tall; flowers erect to suberect 8c. subsp. *daliensis*
- 1b. Larger plant, mostly 30–120 cm tall, hairy or bristly but not sericeous; flowers nodding or half-nodding.
 - 2a. Flowers appearing to be scapose and solitary; ovary densely

- hairy, styles bristly 8a. subsp. *pseudointegrifolia*
- 2b. Flowers several, often more than 3, on top of a distinct stem, often with several leaves and 1 or 2 superfluous flowers below “bracts”; ovary sparsely hairy, styles glabrous 8b. subsp. *robusta*

8a. *Meconopsis pseudointegrifolia* subsp. ***pseudointegrifolia***

横断山绿绒蒿(原亚种) *heng duan shan lü rong hao* (yuan ya zhong)

Plants seldom more than 50 cm tall, with leaflike bracts held close to basal leaf rosette. Flowers appearing to be scapose, nodding to half-nodding, pale sulfur yellow. Ovary densely hairy; styles and stigmatic rays shortly bristly, styles 3–6 mm. Capsule densely hairy.

• Mountain moorlands, scree, woodland margins; 2700–4200 m. SE Xizang, NW Yunnan.

8b. *Meconopsis pseudointegrifolia* subsp. ***robusta*** Grey-Wilson, New Plantsman 3(1): 35. 1996.

单花横断山绿绒蒿 *dan hua heng duan shan lü rong hao*

Plants rather robust, 50–120 cm tall, always with a well-developed and stout stem, often with several alternate leaves and superfluous flowers below whorl of leaflike bracts. Flowers several, often more than 3, on top of a distinct stem, often with several leaves and 1 or 2 superfluous flowers below “bracts,” nodding to half-nodding, pale lemon or sulphur yellow, to 20 cm in diam. Petals spreading widely apart. Ovary sparsely hairy; styles 7–11 mm, glabrous. Capsule glabrous or subglabrous.

Rhododendron moorlands and woodlands, margins of swamps, rocky slopes, stabilized moraines; ca. 3400 m. SW Sichuan, S and SE Xizang, NW Yunnan [NE Myanmar].

8c. *Meconopsis pseudointegrifolia* subsp. ***daliensis*** Grey-Wilson, New Plantsman 3(1): 36. 1996.

多花横断山绿绒蒿 *duo hua heng duan shan lü rong hao*

Plants not more than 25 cm tall, densely sericeous on stems, leaves, and pedicels. Stem short, not exceeding 10 cm. Leaves elliptic to oblanceolate, 3-veined only at base, otherwise pinnately veined. Bracts like leaves, in a single whorl just above basal leaf rosette. Flowers erect to suberect, yellow, to 9 cm in diam. Ovary densely sericeous; styles short but distinct, 2–5 mm. Capsule barrel-shaped, densely hairy.

• Rocky slopes, mountain moorlands. NW Yunnan.

9. *Meconopsis betonicifolia* Franchet, Pl. Delavay. 1: 42. 1889.

藜香叶绿绒蒿 *huo xiang ye lü rong hao*

Cathcartia betonicifolia (Franchet) Prain.

Herbs, perennial, occasionally biennial. Rootstock short, plump, with persistent petiolar bases, densely shortly branched rubiginous villous. Stems erect, 30–90(–150) cm tall, stout, to 1.3 cm in diam. at base, simple, glabrous or sparsely rubiginous barbellate-villous. Basal leaves slightly glaucous abaxially,

ovate-lanceolate or ovate, 5–15 cm, base 4–7 cm wide, both surfaces shortly branched sparsely barbellate-villous, more densely so on margin and abaxially, midvein prominent, with several transverse bifurcate lateral veins, base cordate or truncate, often decurrent onto petiole, base ampliate to sheath, margin broadly incised-toothed, apex rounded to acute. Lower cauline leaves similar to basal, often more oblong; middle and upper cauline leaves similar but gradually smaller, sessile, auriculate-amplexicaul; uppermost 3 or 4 often aggregated into a false whorl. Inflorescence subumbellate, 3–6-flowered, often with several flowers at leaf axil below whorl, more rarely from lower cauline leaf axils. Flowers nodding to half-nodding, saucer-shaped. Pedicel erect, to 28 cm (elongating in fruit). Flower buds broadly ovoid, 6–8 cm in diam., sparsely rubiginous barbellate-villous. Petals 4, or in terminal flowers 5 or 6, blue or purple, rarely white, broadly ovate, orbicular, or obovate, 3–5 × 2–3.5 cm, obtuse to subacute. Filaments white, filiform, 5–10 mm; anthers orange or golden, oblong, ca. 1 mm. Ovary elliptic-oblong, glabrous or rarely rubiginous barbellate-villous to subglabrous; styles clavate, 2–6 mm; stigmas virescent, 4- or 5(-7)-lobed, decurrent to styles. Capsule oblong-elliptic, 2.5–4.5 × 0.8–1 cm, rufous-barbellate to glabrous, slightly 4–7-valvate for ca. 1/3 its length from apex. Seeds reniform, ca. 1 mm, longitudinally striate, with alveolate foveolae. Fl. Jun–Aug.

Forest understories, grassy slopes; 3000–4000 m. SE Xizang (Cona, Mainling, Nyingchi), NW Yunnan [N Myanmar].

10. *Meconopsis grandis* Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64: 320. 1895.

大花绿绒蒿 da hua lü rong hao

Herbs, perennial. Taproot narrowly radishlike or fibrous; rootstock shortly branched, rubiginous villous. Stems erect, 40–120 cm tall, stout, sparsely extended or slightly deflexed setose. Basal leaves: petiole 10–17 cm, sparsely brown barbellate-villous, basally with ampliate sheath; blade pale green abaxially, green adaxially, narrowly oblanceolate to lanceolate-oblong or elliptic-oblong, 15–26 × 5–8.4 cm, both surfaces brown barbellate-pilose, midvein broad, lateral veins distinct, base attenuate into petiole, margin distantly irregularly serrate or broadly crenate, apex acute or nearly acute. Lower cauline leaves similar to basal leaves, but upper cauline leaves increasingly smaller, uppermost 3–5-pseudovercillate, sessile. Flowers rarely more than 3, from upper leaf whorl, very rarely from lower cauline axils. Pedicel to 45 cm at fruiting. Flowers nutant, large. Petals 4, rarely 5, blue, purple, or lilac-purple, nearly orbicular or broadly obovate, 6.2–8 × 4.8–7.6 cm. Filaments white, filiform, 7–15 mm; anthers orange or yellow, oblong, 1–2 mm. Ovary green, ovoid or oblong, glabrous or densely pilose; styles 7–10 mm; stigmas green, clavate, 4–6-lobed. Capsule elliptic-oblong, 2.8–4.4 × 1.2–1.5 cm, 4–6-valvate from apex for a short distance. Seeds reniform, seed coat longitudinally shallowly pitted. Fl. Jun–Aug.

Understories of *Picea* forests, forest margins, among shrubs on slopes; 3000–4100 m. SC Xizang [Bhutan, NE India, E and W Nepal].

11. *Meconopsis superba* King ex Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64: 317. 1896.

高茎绿绒蒿 gao jing lü rong hao

Herbs, monocarpic, to 1 m tall in flower, throughout appressed, usually silvery white barbellate-pilose. Taproot napiform. Basal leaves in a large, dense, evergreen rosette; petiole 7–15 cm; blade oblanceolate, oblanceolate-oblong, elliptic, or ovate-oblong, ca. 35 × 9 cm, sericeous and barbellate-villous when young, base attenuate, margin serrulate, apex acute. Lower cauline leaves similar to basal leaves, but petioles shorter; upper cauline leaves sessile, base auriculate. Inflorescence racemose. Flowers nodding or half-nodding. Pedicel to 12 cm (to 25 cm in fruit), stout, densely appressed barbellate-tomentose. Petals 4, 6 in terminal flowers, white, obovate to suborbicular, ca. 6 × 6 cm. Filaments white, filiform; anthers deep yellow. Ovary spheroidal to narrowly elliptic, appressed barbellate-tomentose; styles distinct, 9–11 mm; stigmas deep purple, obviously lobed. Capsule narrowly ellipsoid-oblong, 7–11-valvate from apex for a short distance. Seeds reniform, seed coat densely papillate.

4100–4300 m. SC Xizang [W Bhutan].

12. *Meconopsis georgei* G. Taylor, Gen. Meconopsis, 86. 1934.

黄花绿绒蒿 huang hua lü rong hao

Herbs, monocarpic, to 33 cm tall in flower. Taproot ca. 7.5 × 1.2 cm. Leaves aggregated near base of plant with a few higher up on stem; petiole linear, ca. 5 cm; blade oblanceolate, ca. 10 × 1.8 cm, both surfaces glabrous or sparsely setose, abaxially glaucous, base tapered into petiole, sheath at base, margin entire or repand, apex acute or rounded. Inflorescence racemose, with up to 10 flowers, nearly glabrous or densely spreading setose, only lowermost bracteate. Pedicel ca. 20 cm, usually setose. Petals 5–8, yellow, obovate, ca. 3.8 × 2.5 cm, apex obtuse, acute, or serrulate. Filaments filiform; anthers orange, to black on aging. Ovary elliptic to narrowly elliptic, usually densely extended yellowish setose; styles ca. 7 mm; stigmas capitate. Capsule narrowly elliptic, spreading setose, 3–5-valvate for a short distance from apex. Seeds falcate-elliptic, seed coat irregularly rugose or inconspicuously pitted.

• 3600–4300 m. NW Yunnan (Weixi).

13. *Meconopsis florindae* Kingdon Ward, Gard. Chron., ser. 3, 79: 232. 1926.

西藏绿绒蒿 xi zang lü rong hao

Herbs, monocarpic, with a slender stem to 45 cm tall. Taproot radishlike, ca. 3.7 cm. Stems tenuous, glabrous, rarely sparsely villous. Basal leaves few, soon withering; petiole ca. 2.5 cm, lower part ampliate; blade oblanceolate, ca. 3.7 × 1.2 cm, both surfaces glabrous or slightly tomentose, abaxially glaucous, base attenuate and extending into petiole, margin entire, deeply undulate, broadly crenate, bipinnatifidate, or bipinnatifid, apex acute or rounded. Lower cauline leaves similar to basal leaves; upper cauline leaves with margin serrate, basally slightly amplexicaul, or like basal leaves. Flowers 2–6 from upper cauline leaf axils, semi-nutant. Pedicel ca. 13 cm at fruiting, only apically sparsely setose. Petals usually 5–7, rarely 4, lemon yellow, ovate or obovate, ca. 1.3 × 1 cm, apex acute or rounded, usually irregularly serrulate. Filaments filiform; an-

thers pale orange. Ovary ovoid to elliptic-oblong, glabrous or sparsely setose; styles distinct, ca. 6 mm; stigmas yellow, almost clavate or with separate lobes. Capsule elliptic-oblong, glabrous or sparsely setose, 3–5(or 6)-valvate for ca. 1/3 its length from apex.

- Woodlands; 3300–3900 m. SE Xizang.

14. *Meconopsis lyrata* (H. A. Cummins & Prain) Fedde ex Prain, Bull. Misc. Inform. Kew 1915: 142. 1915.

琴叶绿绒蒿 qin ye lü rong hao

Cathcartia lyrata H. A. Cummins & Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64: 325. 1896; *C. polygonoides* Prain; *Meconopsis compta* Prain; *M. polygonoides* (Prain) Prain.

Herbs, monocarpic, 5–50 cm tall. Taproot usually narrowly ovoid, ca. 1 cm, sometimes long and narrow. Stems tenuous, thin, curved or compressed yellow-brown pubescent, sometimes glabrous. Basal leaves few, soon withering; petiole 1.5–4 cm; blade pale green abaxially, green adaxially, ovate, oblong-ovate, spatulate, or oblanceolate, 1.5–4 × 0.5–2 cm, both surfaces sparsely yellow-brown pilose or glabrous, base cuneate or slightly cordate, margin entire, lobed, pinnatifid or pinnatifid, apex rounded or acute. Cauline leaves similar to basal but lower ones with petiole ca. 6 cm, upper ones shortly petiolate. Flowers opening in succession, 1–5 in axils of upper cauline leaves, usually only terminal flowers open, half nutant, 1.5–2.5 cm in diam. Sepals glabrous. Petals 4, rarely 5 or 6, pale blue or rarely pink, pale rose, or white, ovate, broadly ovate, or sometimes broadly lanceolate, 1.2–1.9 × 0.4–1.5 cm, apex rounded or acute. Stamens 24–36; filaments of same color as petals, filiform, 5–8 mm; anthers golden, oblong to suborbicular, ca. 1 mm. Ovary oblong or elliptic-oblong to narrowly oblong, ca. 5 × 2 mm, glabrous; styles very short; stigmas green. Capsule narrowly oblong or nearly cylindrical, ca. 4 cm, 3- or 4-valvate for ca. 1/3 its length from apex. Seeds falcate-elliptic, seed coat rugose. Fl. and fr. May–Sep.

Grassy slopes, alpine meadows; 3400–4200(–4800) m. S Xizang (Gyirong, Yadong), NW Yunnan (Dêqên, Gongshan) [Bhutan, India (Sikkim), Nepal].

15. *Meconopsis primulina* Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64: 319. 1896.

报春绿绒蒿 bao chun lü rong hao

Herbs, monocarpic, to 20 cm tall. Taproot radishlike or long and narrow, ca. 7.5 cm × 7.5 mm; rootstock napiform, with a dense tuft of fibrous leaf base remains. Stems short, slender. Basal leaves spatulate, 1–2 cm, soon withering, with only densely caespitose persistent membranous leaf bases when flowering. Cauline leaves near stem base; blade oblanceolate to elliptic, ca. 4 × 1 cm, both surfaces glabrous or densely setose, entire; petiole ca. 3.7 cm; upper leaves sessile. Flowers usually 3, rarely solitary, simple, from leaf axils, ca. 2.5 cm in diam., glabrous to sparsely reflexed setose. Sepals glabrous. Petals 4–8, blue, narrowly ovate, ca. 2.5 × 1 cm. Stamens many; filaments same color as petals, filiform, longer than ovary; anthers golden. Ovary narrowly ovoid, ca. 1.5 cm, glabrous; styles ca. 5 mm; stigmas almost clavate, 4-lobed, lobes ± nutant. Capsule

narrowly obovoid to narrowly elliptic, 4-valvate at top, glabrous or slightly setose.

- 3900–4500 m. SC Xizang [W Bhutan].

16. *Meconopsis argemonantha* Prain, Bull. Misc. Inform. Kew 1915: 161. 1915.

白花绿绒蒿 bai hua lü rong hao

Herbs, monocarpic. Taproot napiform to cylindrical, swollen, with a few fibers at top. Stem very short, sometimes extending to 13 cm. Basal leaves few; petiole long, 2–5.5 cm; blade glaucous abaxially, narrowly oblong to elliptic-oblong, 1.5–6.2 × 0.8–1.4 cm, both surfaces subglabrous or sparsely setose, base narrowed into petiole, margin entire to slightly lobed. Middle and upper leaves: petiole ca. 2.5 cm; blade generally larger, 4.5–7 × 1.6–2 cm, pinnately lobed, with up to 5 pairs of pinnae; lobes acute to rounded, apically undulate. Flowers solitary at leaf axils, half-nodding. Pedicel 6.7–25 cm, sparsely setose or glabrous. Sepals oval, sparsely setose to glabrous. Petals 4–8, white, ovate to orbicular, 18–28 × 2.2–2.8 cm, apex rounded, fluted, with an undulate margin. Filaments white, linear; anthers yellow or orange. Ovary elliptic, densely appressed setose; styles 3–5 mm. Capsule cylindrical-fusiform, 15–25 × 6–7 mm, with sparse ascending stiff hairs; styles 4–5 mm, stigmas capitate. Fl. Jul–Aug.

- Moist mossy banks, cliff ledges, open leafy banks; 3700–4600 m. SE Xizang.

17. *Meconopsis violacea* Kingdon Ward, Gard. Chron., ser. 3, 82: 150. 1927.

紫花绿绒蒿 zi hua lü rong hao

Herbs, monocarpic, to 2 m tall in flower. Taproot radishlike. Basal leaves in a dense, evergreen, sea-green rosette; petiole ca. 7.5 cm; blade elliptic-oblong, ca. 16 × 4 cm, both surfaces especially midvein and margin villous and mixed barbellate-pubescent, pinnatisect or pinnatifid; lobes oblong or lanceolate-oblong, margin entire or irregularly lobed, apex acute. Lower cauline leaves similar to basal ones but shorter petiolate; upper cauline leaves sessile, basally auriculate-amplexicaul, pinnatifid. Inflorescence racemose, barbellate-tomentose. Flowers nutant, bracteate. Pedicel ca. 6.2 cm, to 13 cm at fruiting, slender, apically densely pilose. Petals 4(–6), pale blue, bluish violet, or sometimes purple, obovate to suborbicular, ca. 3.7 × 2.5 cm. Filaments of same color as petals but white at base, filiform; anthers bright orange. Ovary elliptic to elliptic-oblong, densely appressed or inclined slightly golden pubescent; styles distinct, to 7–9 mm, usually slender; stigmas virescent, nearly clavate or sometimes with separate lobes. Capsule elliptic-oblong, 3.5–3.7 × 1.4–1.5 cm, densely ascending pubescent or basally setose, 7–9-valvate for a short distance from apex. Seeds elliptic-oblong to reniform, seed coat densely papillose. Fl. Jun–Jul.

- Steep alpine meadows, gravelly slopes; 3000–3900 m. SE Xizang [N Myanmar].

18. *Meconopsis racemosa* Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 9: 713. 1876.

总状绿绒蒿 zong zhuang lü rong hao

Herbs, monocarpic, 20–50 cm tall, throughout with fulvous or yellowish, firm spines. Taproot terete, attenuate toward base, ca. 20 × 0.5–1.5 cm. Stem erect, terete, 5–10 mm in diam. near base, basally with smooth persistent leaf bases. Basal leaves: petiole 3–8 cm, narrowly winged; blade green on both surfaces, oblong-lanceolate, oblanceolate, or rarely narrowly ovate, 5–20 × 0.7–4.2 cm, both surfaces with fulvous or yellowish, pale, spreading spines, midvein ridged abaxially, lateral veins obscure on both surfaces, base narrowly cuneate, decurrent into petiole, margin entire or undulate, rarely irregularly crenate or shallowly lobed, apex acute or obtuse. Lower cauline leaves few, shortly petiolate, like basal leaves, decreasing in size upward on stem and merging with bracts; uppermost leaves sessile. Inflorescence a simple raceme with up to 14 flowers, sometimes with additional, solitary, scapose flowers in axils of basal leaves. Pedicel 2–5 cm. Flower buds nodding, suborbicular or ovoid, ca. 1 cm in diam. Sepals oblong-ovate, adaxially spiny-hairy. Petals 5–8, blue or blue-purple, sometimes wine-purple or reddish, obovate-oblong, 2–3 × 1–2 cm, glabrous. Filaments of same color as petals, often rather darker, ca. 1 cm; anthers yellow or cream, oblong, 1.25–1.5 mm. Ovary ovoid, 5–8 mm, densely spiny-hairy; styles conical, 2–4 mm, ridged, glabrous, protruding from boss of stamens; stigmas whitish, oblong, 1–2 mm. Capsule ovoid or narrowly ovoid, 0.5–1.5 × 0.4–1 cm, with dense, spreading bristles, 4–6-valvate to 1/3 its length from apex; persistent styles 7–10 mm. Seeds oblong, 1–2 mm, seed coat clathrate-tessellate. Fl. May–Aug.

• Grassy slopes, stony slopes, sometimes in forest understories; 3000–4600(–4900) m. S Gansu, E and S Qinghai, NW and W Sichuan, Xizang, NW Yunnan.

- 1a. Petals without spines on both sides 18a. var. *racemosa*
- 1b. Petals: medial and lower with sparse slender spines on both sides 18b. var. *spinulifera*

18a. *Meconopsis racemosa* var. *racemosa*

总状绿绒蒿(原变种) zong zhuang lü rong hao (yuan bian zhong)

Meconopsis horridula J. D. Hooker & Thomson var. *racemosa* (Maximowicz) Prain.

Petals without spines on both sides.

• Grassy slopes, stony slopes, sometimes in forest understories; 3000–4600(–4900) m. S Gansu, E and S Qinghai, NW and W Sichuan, Xizang, NW Yunnan.

18b. *Meconopsis racemosa* var. *spinulifera* (L. H. Zhou) C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 2: 375. 1980.

刺瓣绿绒蒿 ci ban lü rong hao

Meconopsis horridula var. *spinulifera* L. H. Zhou, Acta Phytotax. Sin. 17(4): 113. 1979.

Petals sparsely thinly spiny below middle on both sides. Filaments narrowly linear. Styles with 4 ridges, membranous winged, ca. 1.5 mm wide.

• About 4000 m. S Qinghai (Yushu).

One of us (Grey-Wilson) has not seen authenticated material of this taxon and is unable to evaluate its status.

19. *Meconopsis rudis* (Prain) Prain, Ann. Bot. (Oxford) 20: 347. 1906.

宽叶绿绒蒿 kuan ye lü rong hao

Meconopsis horridula J. D. Hooker & Thomson var. *rudis* Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64: 314. 1896.

Herbs, monocarpic, to 90 cm tall in flower, often 20–45 cm. Stem terete, 5–10 mm in diam., sparsely to moderately densely stiffly hairy. Leaves all in a basal rosette; petiole narrowly winged, 2.2–10.5 cm; blade pale abaxially, glaucous adaxially, elliptic to elliptic-oblanceolate, 6–14 × 1.5–4.2 cm, adaxially with sparse, purple-black-based bristles, midvein abaxially ridged, lateral veins rather obscure on both surfaces, base attenuate into petiole, margin shallowly lobed and somewhat undulate, apex acute to subacute. Inflorescence racemose, with up to 15 flowers, only lowermost bracteate. Flowers nodding to lateral-facing, 4.4–8.4 cm in diam.; sometimes with an additional solitary scapose flower, from axils of basal leaves. Pedicel 0.7–8.5(–11.5) cm (to 18 cm in fruit), with sparse, stiff, spreading bristles. Sepals oblong-ovate, abaxially bristly, bristles with a purple-black base. Petals 5–7(or 8), blue, purple, or violet-blue, occasionally pale blue or pinkish purple, obovate to ovate, 2–3.8 × 1.8–3.2 cm, glabrous. Filaments of same color as petals, often darker; anthers gray or yellowish gray, 0.5–1.25 mm. Ovary ovoid, densely bristly; styles narrowly conical, 1–3 mm; stigmas yellowish, 1.5–2 mm, protruding beyond boss of stamens. Capsule ovoid, 8–15 × 7–14 mm, with stiff, erect bristles, 4–6-valvate for a short distance from apex; persistent styles 6–7 mm. Fl. Jun–Sep.

• Grassy slopes, stony pastures, rocky places, scree, cliff ledges; 3400–4800 m. SW and W Sichuan, NW Yunnan.

20. *Meconopsis prattii* (Prain) Prain, Bot. Mag. 140: ad t. 8568. 1914.

草甸绿绒蒿 cao dian lü rong hao

Meconopsis sinuata Prain var. *prattii* Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64: 314. 1896.

Herbs, monocarpic, 30–92 cm tall in flower. Stem stiffly erect, 10–15 mm in diam. at base, spreading bristly, pale overall. Basal leaves in a spreading rosette; petiole to 6.5 cm; blade pale green abaxially, mid-green adaxially, elliptic-oblanceolate to oblanceolate, 8–20 × 1.4–3.6 cm, both surfaces with spreading, pale, stiff, bristlelike hairs to 6 mm, base attenuate into petiole, margin undulate, entire to shallowly and unevenly lobed, apex acute to subacute. Lower cauline leaves similar to basal leaves, decreasing in size upward on stem and merging with lower bracts, but most of inflorescence ebracteate. Inflorescence a simple raceme with up to 32 flowers, sometimes with several solitary, scapose, depauperate flowers from axils of basal leaves. Pedicel 0.8–7.2 cm, with stiff bristlelike hairs. Flowers lateral-facing to half-nodding, 3.8–7 cm in diam., fragrant. Sepals oblong to oblong-ovate, adaxially with spreading

pale bristles. Petals 5 or 6, blue, purple, blue-purple, or lavender, occasionally wine-purple or whitish, obovate to oblong, 1.8–3.6 × 1.5–3 cm, glabrous. Filaments of same color as petals, often darker; anthers white to orange-yellow or yellowish gray, 1–1.5 mm. Ovary ovoid, spiny; styles narrowly conical, 2–4 mm, glabrous; stigmas pale green or cream, 2–3 mm, included within boss of stamens. Capsule ovoid to ovoid-elliptic, 1.7–2 × 0.8–1 cm, with rather sparse, spreading, pale-colored bristles, 5–7-valvate. Fl. Jun–Sep.

Open stony pastures and meadows, cliffs, scree, roadside embankments, margins of *Pinus* woodlands, forest understories; 3400–3900 m. SW and W Sichuan, SE Xizang, NW Yunnan [N Myanmar].

The position of *Meconopsis prainiana* Kingdon Ward (Gard. Chron., ser. 3, 79: 308. 1926, described from Gongbo'gyamda, SE Xizang) requires further investigation. The plants are very similar to *M. prattii* in general characteristics and proportions, but the flowers are consistently 4-petaled and these can be blue or pale yellow.

21. *Meconopsis speciosa* Prain, Trans. & Proc. Bot. Soc. Edinburgh 23: 258. 1907.

美丽绿绒蒿 mei li lü rong hao

Meconopsis cawdoriana Kingdon Ward; *M. ouvardiana* Handel-Mazzetti.

Herbs, monocarpic, 15–60 cm tall, throughout rubiginous or yellowish bristly. Taproot long and stout, ca. 30 × 2.5 cm. Stems erect, terete, rubiginous or yellowish bristly, basally with persistent leaf bases. Basal leaves: petiole 2–11 cm, including wings 2–6 mm wide; blade lanceolate or narrowly ovate, 5–13 × 2.5–4 cm, midvein broad, shallowly channeled, lateral veins slender, basally attenuate into petiole, margin pinnatipartite, apex rounded or acute; lobes oblong, apex rounded, rarely acute, usually rounded-incised. Cauline leaves like basal leaves but smaller, shortly petiolate or sessile to subsessile. Inflorescence racemose; flowers 6–20, very fragrant, only lowermost bracteate, sometimes accompanied by solitary-flowered basal scapes, rarely basal scape bases agglomerated on short stems. Pedicel erect, 2–8 cm. Flower buds spheroidal, 1–2 cm in diam. Sepals adaxially fulvous spreading bristly. Petals 4–8, blue to fleshy-mauve, obovate to suborbicular, 2–4.5 × 2–4 cm, apex rounded. Filaments of same color as petals but more deeply colored, filiform, ca. 1 cm; anthers oblong, ca. 1 mm. Ovary spheroidal to ovoid, ca. 5 mm, densely rubiginous spiny-hairy; styles 2–4 mm, ridged, sometimes near base spiny-hairy; stigmas oblong, 2–3 mm. Capsule elliptic, 1.5–2.5 × 0.5–1.2 cm, densely rubiginous but base purple or fulvous spiny-hairy; styles stout, extended to 1 cm, 4–8-valvate for ca. 1/3 its length from apex. Seeds reniform, seed coat longitudinally pitted. Fl. and fr. Jul–Oct.

• Among alpine shrubs, grasslands, rocky slopes, cliff ledges and crevices, alpine scree; 3700–4400 m. W Sichuan (Kangding), SE Xizang (Mêdog), NW Yunnan (Dêqên, Gongshan, Weixi).

22. *Meconopsis aculeata* Royle, Ill. Bot. Himal. Mts. 1: 67. 1834.

皮刺绿绒蒿 pi ci lü rong hao

Herbs, monocarpic, 30–60 cm tall in flower. Taproot long and narrow, or napiform, to 13 cm. Basal leaves in a deciduous rosette; petiole 10–15 cm, basally expanded and sheathing stem; blade variously shaped, oblong or cordate to deltoid, 10–20 × 3.5–5 cm, pinnatifid or irregularly pinnatisect, rarely bipinnatifid, usually broadly incised among lower lobes, both surfaces with rather sparse, simple bristlelike hairs, apex obtuse or rounded to acute. Lower cauline leaves similar to basal ones but upper cauline leaves sessile, smaller and with fewer divisions. Inflorescence a raceme with up to 20 flowers, all but uppermost bracteate or in axils of leaves. Flowers shallowly cup-shaped, lateral-facing to semi-nutant. Pedicel erect, 2.5–13.5 cm. Petals usually 4, rarely 5 or 6, sky blue or rarely blue-purple or red, obovate or suborbicular, ca. 3.7 × 3.7 cm. Filaments filiform, of same color as petals but deeper; anthers golden. Ovary globose to elliptic, densely golden fulvous to bristly, bristles at first appressed, later ascending to subspreading; styles distinct, ca. 1.2 cm, basally thickened in fruiting; stigma lobes free or connate, oblong or spherical. Capsule spheroidal to elliptic-oblong, densely bristly, (3 or)4–6(–8)-valvate for a short distance from apex. Seeds reniform. Fl. Jun–Aug. $2n = 56$.

Rocky habitats, scree, stream margins; 2400–4200 m. SW Xizang [NW India, Pakistan].

23. *Meconopsis forrestii* Prain, Bull. Misc. Inform. Kew 1907: 316. 1907.

丽江绿绒蒿 li jiang lü rong hao

Herbs, monocarpic, to 40 cm tall in flower (to 60 cm in fruit). Taproot conical or radishlike, 2–10 × 1–1.5 cm, with fibrous slender roots. Leaves usually all basal, deciduous; petiole 2.5–3.2 cm; blade oblanceolate to elliptic-oblong or broadly linear, 5–20 × 0.5–2 cm, both surfaces sparsely appressed bright brown hirsute, midvein prominent abaxially, distinct adaxially, apex rounded or triangular, basally attenuate to wing, wing base slightly ampliate to membranous-sheathed, margin entire or somewhat repand. Inflorescence simple scapose, erect, scape with straw-colored, soft, deflexed bristles. Flowers 3–7, on upper part of scape, ebracteate, 3–4.8 cm in diam. Pedicel nutant when young, later spreading, 1–3 cm, extended to 9 cm at fruiting, bright brown compressed-hirsute. Flower buds obovoid or globose, 1–2 × 0.7–1.3 cm. Sepals adaxially brown soft-bristly. Petals usually 4, rarely 5, slightly blue or pale indigo, occasionally whitish with a bluish base, ovate or broadly ovate, 1.4–2.5 × 1.2–2 cm. Filaments purplish, filiform, 5–10 mm; anthers golden yellow, oblong, ca. 1 mm. Ovary elliptic-oblong, glabrous or sparsely hirsute; styles very short or absent; stigmas 2–4-lobed. Capsule erect, nearly narrowly cylindrical, 3.9–6.3 cm × 4.5–7 mm, glabrous or sparsely hirsute, 2–4-valvate to 1/3 its length from apex. Seeds falcate-elliptic, seed coat inconspicuously pitted. Fl. May–Jul.

• Grassy slopes, rocky places, woodland margins, banks; (3100–)3400–4300 m. SW Sichuan, NW Yunnan (Lijiang, Yangbi, Zhongdian).

24. *Meconopsis lancifolia* (Franchet) Franchet ex Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64: 311. 1896.

长叶绿绒蒿 *chang ye lü rong hao*

Cathcartia lancifolia Franchet, Bull. Soc. Bot. France 33: 391. 1886; *Meconopsis eximia* Prain; *M. lancifolia* var. *solitariifolia* Fedde; *M. lepida* Prain.

Herbs, monocarpic, 8–35 cm tall in flower, extremely variable. Taproot radishlike, 3–8 cm × 5–10 mm. Stems erect, with fulvous, compressed or deflexed, soft bristles, or ± glabrous. Leaves mostly or all basal; petiole 2–7 cm; blade paler abaxially, green or gray-green adaxially, oblanceolate, spatulate, obovate, or elliptic-lanceolate to narrowly oblanceolate, 1–15 × 0.5–1.7 cm, both surfaces glabrous or with fulvous, deflexed or curved, soft bristles, midvein distinct, lateral veins slender, base cuneate, decurrent to wings, margin usually entire, often somewhat undulate, apex rounded or acute. Inflorescence racemose, with 3–13 ebracteate flowers, each 2.9–5 cm in diam., scape variable in thickness, sometimes, in addition, simple on basal scapes, setose to subglabrous. Pedicel 0.5–3 cm, sparsely to densely setose. Flower buds suborbicular or oblong, 5–10 mm in diam. Sepals adaxially sparsely rubiginous setose. Petals 4–8, satiny purple or blue, sometimes pale purple-blue or ruddy purple, obovate, suborbicular, or oval, 1–3 × 0.7–3 cm, apex rounded or acute, sometimes serrulate. Filaments of same color as petals, filiform, 5–10 mm; anthers yellow to black-brown, gray, or grayish white, oblong, 1–1.5 mm. Ovary oblong, elliptic-oblong, or elliptic, with sparse fulvous compressed bristly hairs, rarely glabrous; styles 1–2 mm; stigmas yellowish, capitate, (2 or)3–6-lobed. Capsule green, brown when mature, with styles and fruit ribs deep purple, narrowly obovoid, oblong-elliptic, narrowly oblong, or rarely subterete, 1.5–2.2 cm × 5–8 mm, glabrous or sparsely spreading fulvous setose, 3–6-valvate for ca. 1/3 its length from apex. Seeds reniform or falcate-elliptic. Fl. Jun–Aug.

Forest understories and margins, alpine meadows, rocky places; 3300–4800 m. SW Gansu, NW and W Sichuan, SE Xizang, NW Yunnan [NE Myanmar].

5. *Meconopsis punicea* Maximowicz, Fl. Tangut. 34. 1889.

红花绿绒蒿 *hong hua lü rong hao*

Meconopsis punicea var. *elliptica* Z. J. Cui & Y. S. Lian; *M. punicea* var. *glabra* M. Z. Lu & Y. S. Lian.

Herbs, perennial or monocarpic, 30–75 cm tall in flower, base with persistent leaf bases, armed with dense shortly branched yellowish or brown setae. Roots fibrous. Leaves all basal, forming a rosette, deciduous; petiole 6–34 cm, basally slightly ampliate sheathed; blade oblanceolate or narrowly obovate, 3–18 × 1–4 cm, both surfaces with dense, shortly branched, yellowish or brown, barbellate setae, obviously longitudinally veined, basally attenuate and decurrent into petiole, margin entire, apex acute. Scapes 1–6 from rosette leaf cluster, usually costate, fulvous barbellate-setose, ribbed. Flowers solitary on basal scapes, nutant. Flower buds ovoid. Sepals ovate, 1.5–4 cm, adaxially densely yellowish or brown barbellate-setose. Petals 4, rarely 6, intense carmine, rarely white, elliptic, 6–10 × 2.3–5 cm, apex acute or rounded. Filaments

reddish, linear, 1–3 cm, flat; anthers yellow or brownish yellow, oblong, 3–4 mm. Ovary broadly oblong or ovate, 1–3 cm, densely yellowish barbellate-setose; styles very short or obsolete; stigmas 4–6-lobed. Capsule elliptic-oblong, 1.8–2.5 × 1–1.4 cm, glabrous or densely yellowish barbellate-setose, 4–6-valvate for a short distance from apex. Seeds densely papillose. Fl. Jun–Sep.

• Grassy slopes, open shrublands, mountain heaths and moorlands; 2800–4300 m. SW Gansu, SE Qinghai, NW Sichuan, NE Xizang.

White-flowered forms have been assigned to *Meconopsis punicea* f. *albiflora* L. H. Zhou (Bull. Bot. Lab. N. E. Forest. Inst., Harbin 1980(8): 98. 1980).

26. *Meconopsis simplicifolia* (D. Don) Walpers, Repert. Bot. Syst. 1: 110. 1842.

单叶绿绒蒿 *dan ye lü rong hao*

Papaver simplicifolium D. Don, Prodr. Fl. Nepal. 197. 1825; *Meconopsis nyingchiensis* L. H. Zhou.

Herbs, monocarpic, 20–50 cm tall in flower (to 85 cm in fruit), basally with dense tuft of old leaf remains accompanied by rufous or golden barbellate bristles. Taproot ca. 13 cm, slender, or absent and fibrous-rooted. Leaves all basal, forming a rosette, deciduous; petiole linear, ca. 20 cm, basally ampliate; blade oblanceolate or lanceolate to ovate-lanceolate, 4.5–16 × 0.9–3.5 cm, both surfaces shortly barbellate-villous, abaxially midvein and lateral veins distinct, base attenuate into petiole, margin entire or irregularly serrate or crenate, apex acute or obtuse. Flowers solitary on scape, up to 5 per rosette, occasionally more, semi-nutant, barbellate-setose, hairs at first appressed, later spreading to deflexed. Flower buds broadly ovoid. Sepals adaxially densely spreading, barbellate-setose. Petals 5–8, purple to deep sky blue, obovate, 3.3–4.8 × 2.4–4.4 cm. Filaments of same color as petals, filiform, 1–1.5 cm; anthers orange, golden, or yellow, oblong, ca. 2 mm. Ovary narrowly elliptic to oblong-elliptic, 1.5–2 cm, glabrous or setose; styles distinct, 4–9 mm; stigmas green, brownish, or whitish, capitate or subclavate, 4–9-lobed. Capsule narrowly oblong to oblong-elliptic, 4.2–6.5 × 1.3–2.8 cm, reflexed barbellate-setose, 4–9-valvate for ca. 1/3 its length from apex. Seeds elliptic or reniform, seed coat densely papillose. Fl. Jun–Aug.

Grasslands on slopes, among shrubs, rock crevices, tree line margins, streamsides; 3300–4500 m. SE and SC Xizang [Bhutan, India (Sikkim), C Nepal].

27. *Meconopsis quintuplinervia* Regel, Gartenflora 25: 291. 1876.

五脉绿绒蒿 *wu mai lü rong hao*

Herbs, perennial, 30–50 cm tall in flower, basally with persistent leaf bases, accompanied by dense, yellowish or brown barbellate setae. Roots fibrous. Leaves all basal, forming a rosette, deciduous; petiole 3–9.8 cm; blade obovate to lanceolate, 2–10 × 1.4–2.2 cm, both surfaces with dense yellowish or brown barbellate setae, obviously longitudinally 3–5-veined, base attenuate and decurrent into petiole, margin entire, apex

acute or obtuse. Flowers solitary on scape, up to 3 per leaf rosette, pendent. Scape costate, with fulvous, barbellate, deflexed setae, denser toward top. Flower buds broadly ovoid. Sepals ca. 2×1.5 cm, adaxially densely fulvous barbellate-setose. Petals 4–6, pale lilac-blue to purple, obovate or suborbicular, $3-4 \times 2.5-3.7$ cm. Filaments of same color as petals or white, filiform, 1.5–2 cm; anthers yellowish, oblong, 1–1.5 mm. Ovary spheroidal, ovoid, or oblong, 5–8 mm, with dense, fulvous, barbellate setae; styles short, 1–1.5 mm; stigmas capitate, 3–6-lobed. Capsule elliptic or oblong-elliptic, 1.5–2.5 cm, densely appressed barbellate-setose, slightly 3–6-valvate for a short distance from apex. Seeds black-brown, narrowly ovoid, ca. 3 mm, seed coat tessellate and corrugate. Fl. Jun–Sep. $2n = 76$ (ca. 84)*.

• Grassy slopes, often among shrubs, alpine grasslands, forest understories and margins, meadows; 2300–4600 m. S and SW Gansu, W Hubei, NE Qinghai, Shaanxi, NW Sichuan, NE Xizang.

- 1a. Ovary and capsules densely appressed setose 27a. var. *quintuplinervia*
- 1b. Ovary and capsules glabrous 27b. var. *glabra*

27a. Meconopsis quintuplinervia var. quintuplinervia

五脉绿绒蒿(原变种) wu mai lü rong hao (yuan bian zhong)

Ovary and capsules densely appressed setose.

• Grassy slopes, among shrubs, alpine grasslands; 2300–4600 m. S and SW Gansu, W Hubei (Shennongjia), NE Qinghai, W Shaanxi (Baoji, Meixian, Taibai), NW Sichuan, NE Xizang.

27b. Meconopsis quintuplinervia var. glabra M. C. Wang & P. H. Yang, Bull. Bot. Res., Harbin 10(4): 43. 1990.

光果五脉绿绒蒿 guang guo wu mai lü rong hao

Ovary and capsules glabrous.

• Forest understories; 2400–2900 m. Shaanxi (Ningshan).

28. Meconopsis henrici Bureau & Franchet, J. Bot. (Morot) 5: 19. 1891.

川西绿绒蒿 chuan xi lü rong hao

Herbs, monocarpic, to 35 cm tall in flower (to 55 cm in fruit). Taproot plump, conical, short, $4-6 \times$ ca. 1 cm. Leaves all basal, deciduous; petiole linear, 2–6 cm; blade oblanceolate or oblong-oblanceolate, $3-14.5 \times 0.5-1.8$ cm, both surfaces with fulvous curved setae, base attenuate to petiole, margin entire or undulate, rarely sparsely serrate, apex obtuse or rounded. Scape 15–35 cm, with fulvous, flat, deflexed or curved setae. Flowers up to 11, simple on basal scapes, occasionally in an ebracteate inflorescence. Flower buds broadly ovoid, ca. 1×1.5 cm. Sepals: margin thinly membranous, adaxially fulvous curved setose. Petals (5 or)6–10, dark indigo, violet, or purple, ovate or obovate, $2.9-4 \times 1.4-2.6$ cm, apex rounded or obtuse. Filaments of same color as petals, filiform in upper 1/3 but markedly dilated below; anthers hyacinth or yellowish, ca. 1 mm. Ovary ovoid or spheroidal, ca. 5 mm, densely fulvous appressed setose; styles 5–8 mm; stigmas ca. 5 mm, lobes free or clavate-united. Capsule elliptic-oblong or narrowly obovoid, $2-2.5 \times 0.7-1.1$ cm, sparsely setose, slightly 4–6-valvate from

apex. Seeds falcate-oblong, seed coat longitudinally striate or shallowly pitted. Fl. Jun–Sep.

• Alpine grasslands, meadows, open shrublands; 3200–4500 m. SW Gansu, NW and W Sichuan.

- 1a. Inflorescence scapose, 11-flowered, sometimes partly racemose, deeply cup-shaped, often semi-nutant 28a. var. *henrici*
- 1b. Flowers: 1 per leaf rosette, lateral-facing, opening wide and almost flat 28b. var. *psilonomma*

28a. Meconopsis henrici var. henrici

川西绿绒蒿(原变种) chuan xi lü rong hao (yuan bian zhong)

Inflorescence scapose, 11-flowered, sometimes partly racemose, deeply cup-shaped, often semi-nutant.

• Alpine grasslands, meadows, open shrublands; 3200–4500 m. W Sichuan.

28b. Meconopsis henrici var. psilonomma (Farrer) G. Taylor, Gen. Meconopsis, 81. 1934.

无葶川西绿绒蒿 wu ting chuan xi lü rong hao

Meconopsis psilonomma Farrer, Gard. Chron., ser. 3, 57: 110. 1915.

Flowers: 1 per leaf rosette, lateral-facing, opening wide and almost flat.

• Alpine grasslands, open shrublands. SW Gansu, NW Sichuan.

29. Meconopsis sinomaculata Grey-Wilson, Plantsman, n.s., 1: 227. 2002.

杯状花绿绒蒿 bei zhuang hua lü rong hao

Herbs, monocarpic, to 60 cm tall in flower, with a fleshy, napiform rootstock, to 24×15 mm. Leaves all basal, rather few, ovate to ovate-lanceolate or ovate-oblanceolate, $4.5-14.5 \times 0.8-1.8$ cm, both surfaces sparsely to densely setose, weakly 3-veined from base, base attenuate into petiole 1.5–2.5 cm, apex subacute to subobtuse. Flowers solitary on scape, generally 1 per plant, occasionally 2, horizontal to half-nodding, deeply cup-shaped, with erect rather than spreading petals. Scape erect, 20–55 cm, stout, narrowed and purple-flushed toward top, with numerous spreading to downcurved pale bristles. Sepals boat-shaped, 25–34 mm, adaxially with spreading bristles. Petals (4–)6, azure, sometimes with a purple or lilac flush, with a prominent maroon-black blotch at base, suborbicular to obovate, $4.5-7 \times 2.5-4.7$ cm, margin undulate to finely and unevenly toothed. Filaments of same color as petals or blackish purple, 11–16 mm, strongly dilated in lower 1/2; anthers purplish black to whitish, 8–20 mm, with cream or white pollen. Ovary ovoid, bristly; styles 10–13 mm; stigmas cream, 3-lobed, just protruding beyond stamens. Capsule unknown. Fl. Jun–early Aug.

• Low montane scrub, grassy slopes in alpine tundra, generally as scattered colonies; 3300–3900 m. SE Qinghai, NW Sichuan.

30. Meconopsis barbisetata C. Y. Wu & H. Chuang ex L. H. Zhou, Acta Phytotax. Sin. 17(4): 113. 1979.

久治绿绒蒿 *jiu zhi lu rong hao*

Herbs, monocarpic. Taproot napiform, ca. 2 × 1.2 cm. Leaves all basal; petiole broadly strip-form, 2–3 cm, near base ampliate to membranous sheath, glabrous or sparsely fulvous setose; blade oblanceolate, 3–5 × 0.7–1 cm, both surfaces fulvous setose, base attenuate to petiole, margin entire or slightly undulate, apex obtuse or rounded. Scape 30–40 cm tall, apically slender, gradually thickened toward base, fulvous and usually reflexed setose, densely so beneath flowers. Flowers solitary on basal scapes. Petals 6, indigo, basally black-purple, obovate to obovate-oblong, 4–4.5 × 2–2.5 cm, margin slightly undulate, apex truncate. Filaments filiform, ca. 1.5 cm; anthers oblong, ca. 1.5 mm. Ovary ovoid, ca. 1 cm, densely rubiginous setose, setae near base several inversely shortly branched; styles terete, ca. 4 × 2 mm; stigmas 4–6-lobed, lobes decurrent. Fruit not seen. Fl. Jul–Sep.

- Alpine meadows; ca. 4400 m. SE Qinghai (Jigzhi).

One of us (Grey-Wilson) has not seen authenticated material of this taxon and so is unable to comment on its status; however, it appears to be very close to *Meconopsis sinomaculata*, apparently differing in its smaller leaves and flowers and in the linear filaments. As both taxa come from more or less the same area, further investigation might prove that they are one and the same species, in which case the name *M. barbisetata* would have priority.

31. *Meconopsis concinna* Prain, Bull. Misc. Inform. Kew 1915: 163. 1915.

优雅绿绒蒿 *you ya lu rong hao*

Meconopsis lancifolia (Franchet) Franchet ex Prain var. *concinna* (Prain) G. Taylor.

Herbs, monocarpic, to 20 cm tall in flower (to 30 cm in fruit). Taproot napiform, 1.5–4 cm × 5–7 mm. Leaves all basal, deciduous, rarely from flowering stem near base; petiole narrowly strap-shaped, 2–5 cm × 1–2 mm; blade variously shaped, oblanceolate, oblong-oblanceolate, elliptic-oblanceolate, or spatulate, small, 2–5.2 × 0.4–1.2 cm, almost fleshy, both surfaces glabrous, with slender veins not obvious, pinnatisect or bipinnatisect, sometimes several entire on same plant; terminal lobes rhombic, oblong, obovate, or linear; lateral lobes 2–4 pairs normally, obovate, oblong, spatulate, or linear, apex rounded. Scape basal or from axils, 4–20 cm tall, glabrous or very sparsely compressed- or curved fulvous hairy. Flowers solitary on scape, rarely several scapes agglomerated, 2.4–4.8 cm in diam. Flower buds globose, ca. 8 mm in diam. Petals 4 (or 5), purple-blue to violet-blue, broadly obovate, oval, or suborbicular, 1.1–2.2 × 0.7–1.5 cm, apex rounded or acute. Filaments of same color as petals, filiform, ca. 4 mm; anthers cream to gray-yellow, oval, ca. 0.5 mm. Ovary elliptic or elliptic-oblong, ca. 5 mm, very sparsely fulvous hirsute; styles purplish, ca. 1–4 mm; stigmas capitate. Capsule elliptic-oblong or elliptic, 1.7–3.3(–4) cm × 3–5(–7) mm, glabrous or very sparsely hirsute, (3 or)4-valvate for a short distance from top. Fl. May–Aug.

- Grassy slopes, among *Rhododendron* shrubs, mountain moorlands and heaths, forest margins; 3300–4500 m. SW Sichuan, SE Xizang, NW Yunnan.

32. *Meconopsis wumungensis* K. M. Feng ex C. Y. Wu & H. Chuang in C. Y. Wu, Fl. Yunnan. 2: 33. 1979.

乌蒙绿绒蒿 *wu meng lu rong hao*

Herbs, monocarpic, to 12 cm tall in flower (taller in fruit). Taproot napiform, ca. 4 cm × 3–7 mm, ultimately narrowly cylindrical, to 10 cm. Leaves all basal, deciduous; petiole narrowly strap-shaped, 4–6 cm, basally ampliate to sheath ca. 4 mm wide; blade broadly ovate to lanceolate, 1.5–4.5 × 1–2 cm, both surfaces glabrous, midvein abaxially often 2 longitudinal channels, adaxially prominent, lateral veins distinct, dichotomous, base cordate-cuneate, decurrent to wings, margin basally sublobed, middle deeply lobed, apically slightly lobed, apex rounded; lobes suborbicular, sometimes mixed with a few entire leaves. Scape 1 or 2 per rosette, ca. 11 cm, fulvous appressed- or deflexed-hirsute. Flowers solitary on scape. Flower buds narrowly ovoid, ca. 1.5 cm × 6 mm. Sepals glabrous. Petals 4, indigo, obovate, ca. 3 × 2 cm. Filaments filiform, ca. 1 cm; anthers oblong, 1.5–2 mm. Ovary narrowly elliptic, ca. 8 × 3 mm, sparsely fulvous hirsute; styles ca. 2 mm; stigmas capitate, 4-lobed and decurrent to styles. Fruit not seen. Fl. Jun.

- Wet stones, rocky crags; 3600–3800 m. C Yunnan (Luquan).

33. *Meconopsis delavayi* (Franchet) Franchet ex Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64: 311. 1896.

长果绿绒蒿 *chang guo lu rong hao*

Cathcartia delavayi Franchet, Bull. Soc. Bot. France 33: 390. 1886.

Herbs, perennial, to 30 cm tall in flower (taller in fruit). Taproot cylindrical, ca. 5 mm in diam. at top, decurrent and attenuate toward base. Rootstock short, with several very short branches. Leaves all basal, deciduous, at apex of very shortly branched rootstock and forming several leaf clusters, accompanied by mixed scalelike leaf bases; petiole linear, 2–9 cm; blade glaucous abaxially, green adaxially, ovate-rhombic to lanceolate, narrowly lanceolate, or spatulate, 2–6 × 1–3.8 cm, both surfaces glabrous or sparsely appressed rubiginous villous, midvein distinct, lateral veins dichotomously branched, base attenuate and winged-decurrent, margin entire, apex rounded or argute. Scape 1–8 per rosette, 3–30 cm, to 60 cm in fruit, usually sparsely rubiginous compressed-villous. Flowers solitary on scape, semi-nutant. Petals 4, rarely 6–8, deep violet-blue or indigo, rarely rose-purple, longitudinally pleated, ovate, obovate, or suborbicular, 2–3.5 × 1.5–2.5 cm, apex acute or rarely rounded. Filaments of same color as petals, filiform, ca. 1 cm; anthers orange, oblong, ca. 1 mm. Ovary narrowly oblong-elliptic, glabrous; styles ca. 5 mm, sometimes very short, glabrous; stigmas capitate or sometimes almost clavate. Capsule narrowly oblong or subcylindrical, 5–10 cm × ca. 5 mm, glabrous, 3(–5)-valvate for 1/3 or less its length from apex. Seeds falcate-oblong, seed coat smooth or longitudinally striate. Fl. May–Jul.

- Grassy slopes, stabilized moraines, rocky meadows; 2700–4000 m. NW Yunnan (Heqing to Yulong Xueshan).

34. *Meconopsis zangnanensis* L. H. Zhou, Acta Phytotax. Sin. 17(4): 112. 1979.

藏南绿绒蒿 zang nan lü rong hao

Herbs, perennial, caespitose, with very dense fibrous leaf bases. Taproot cylindrical, plump, ca. 5 mm in diam. Leaves all basal; petiole linear, 1.5–2.5 cm; blade glaucous abaxially, green adaxially, lanceolate or narrowly rhombic, (5–)10–15(–20) × (2–)3–5(–8) cm, both surfaces glabrous or rarely abaxially sparsely setose, veins basal, dichotomously branched, abaxially distinct, base cuneate and decurrent to petiole, margin entire, apex rounded. Scape 1–5, 8–15 cm, fulvous extended setose. Flowers solitary on scape, often nutant; buds ovoid, ca. 1 cm. Sepals adaxially pilose, margin membranous. Petals 4, blue, broadly obovate, 2–3 × 1.5–2 cm, apex rounded or truncate, irregularly incised. Filaments filiform, 6–8 mm; anthers yellow, oblong, ca. 1.5 mm. Ovary elliptic, 5–7 mm, inclined setose; styles 1.5–2 mm; stigmas 4-lobed, lobes decurrent. Capsule (immature) elliptic, 1–1.2 cm, sparsely setose (mature fruit not seen). Fl. Jul–Aug.

- Alpine meadows; 4300–4600 m. SE Xizang (Cona).

35. *Meconopsis pseudovenusta* G. Taylor, Gen. Meconopsis, 85. 1934.

拟秀丽绿绒蒿 ni xiu li lü rong hao

Herbs, monocarpic, tufted, to 17 cm tall in flower, with dense persistent leaf bases. Taproot plump, extended, more than 10 cm, ca. 2.5 cm in diam. at top. Leaves all basal, rarely from lower flower stems; petiole linear, to 11 cm; blade ovate, elliptic, lanceolate, or oblanceolate, 2–7 × 1–3.6 cm, usually pinnatifid or bipinnatifid, rarely entire or undulate, both surfaces glabrous or midvein sparsely setose, near base with several veins, distinct on both surfaces, base cuneate, apex acute or rounded. Scapes 4–15, usually separate, occasionally partly agglomerated below, 10–20 cm (to 35 cm in fruit), glabrous or spreading setose. Flowers to 18, 4–6.4 cm in diam., semi-nutant from basal scapes, rarely from ebracteate flowering stems mixed with basal scapes. Flower buds globose, 1–1.5 cm in diam. Sepals glabrous or sparsely setose. Petals 4–10, wine-purple, ruddy-purple, lilac-purple, elliptic, obovate, or suborbicular, 2.5–3.5 × 1–2.5 cm, base cuneate, margin irregularly incised, apex rounded or acute. Filaments of same color as petals, filiform, ca. 1 cm; anthers orange to yellow-gray, oblong, ca. 1 mm. Ovary elliptic or elliptic-oblong, 3–6 mm, sparsely appressed or extended setose; styles 1.5–2.8 mm; stigmas capitate. Capsule narrowly obovoid to narrowly elliptic, 2–3 cm × 5–10 mm, sparsely rubiginous, compressed- or deflexed setose, slightly 3- or 4-valvate from apex; styles prolonged, 3–6 mm. Seeds falcate-elliptic, seed coat not obviously longitudinally pitted. Fl. Jun–Aug.

- Alpine meadows, rocky slopes, scree; 3400–4200 m. SW Sichuan, SE Xizang (Bomi), NW Yunnan (Weixi, Zhongdian).

36. *Meconopsis venusta* Prain, Bull. Misc. Inform. Kew 1915: 164. 1915.

秀丽绿绒蒿 xiu li lü rong hao

Meconopsis leonticifolia Handel-Mazzetti.

Herbs, monocarpic, to 25 cm tall in flower, often not more

than 12 cm tall, with tufted, persistent leaf bases. Taproot plump, to 23 cm, upper part ca. 2 cm in diam. Leaves all basal; petiole broadly or narrowly strap-shaped, 3–8 cm; blade glaucous abaxially, green adaxially, ovate to oblong, 1.5–3.7 × 1–1.8 cm, thick, almost fleshy, both surfaces glabrous, or abaxially sparsely setose, abaxially with obvious veins tenuous, adaxially with obscure veins, pinnatifid or 3-lobed; terminal lobes ovate or suborbicular; lateral lobes spatulate to obovate, apically rounded to somewhat apiculate. Scape 4–16, 6–20 cm (to 30 cm in fruit), glabrous or sparsely hirsute. Flowers solitary on scape, 3–7.4 cm in diam.; buds oval, 8–12 × 5–8 mm. Petals 4, slightly blue, lilac, lavender, or wine-purple, obovate to suborbicular, 2.5–4 × 2–3.6 cm, apex rounded to subacute. Filaments of same color as petals, filiform, ca. 8 mm; anthers orange, oblong. Ovary narrowly elliptic or elliptic-oblong, ca. 6 mm, inclined hirsute; styles 4–5 mm; stigmas capitate, 3- or 4-lobed. Capsule narrowly oblong or cylindrical, 3.6–9 cm × 4–5 mm, with sparse rubiginous or spreading bristles, 3- or 4-valvate for ca. 1/4 its length from apex. Seeds narrowly oblong or elliptic-oblong, seed coat longitudinally thinly striate. Fl. Jun–Aug.

- Stony pastures, scree, cliff ledges, humus pockets among boulders; 3300–4700 m. NW Yunnan.

37. *Meconopsis pseudohorridula* C. Y. Wu & H. Chuang in C. Y. Wu, Fl. Xizang. 2: 234. 1985.

拟多刺绿绒蒿 ni duo ci lü rong hao

Herbs, monocarpic, to 10 cm tall in flower, throughout with fulvous firm and spreading spines. Taproot long, ca. 5 mm in diam. at top. Leaves all basal; petiole 1.5–2 cm, winged, basally ampliate; blade glaucous abaxially, green adaxially, ovate to narrowly ovate, 1.5–2.5 × 0.7–1 cm, both surfaces with fulvous firm spines, abaxially veins obvious, base cuneate, decurrent to petiole, margin pinnately lobed, apex rounded or obtuse; lobes ca. 3 pairs. Scapes several, 5–9 cm, stout, with fulvous firm spreading bristles, dense especially at top. Flowers solitary on scape; buds spheroidal. Sepals adaxially bristly. Petals pale blue, broadly obovate, ca. 1.7 × 1.3 cm. Filaments of same color as petals, filiform, 5–7 mm; anthers orange, orbicular to oblong, ca. 0.5 mm. Ovary ovoid, 0.8–1.3 cm × 5–8 mm, with fulvous bristles; styles 2–3 mm; stigmas capitate. Fruit not seen.

- Mountain regions; ca. 4700 m. SE Xizang (Nyingchi).

One of us (Grey-Wilson) has not seen authenticated material of this taxon and so is unable to comment on its status.

38. *Meconopsis horridula* J. D. Hooker & Thomson, Fl. Ind. 1: 252. 1855.

多刺绿绒蒿 duo ci lü rong hao

Herbs, monocarpic, to 30 cm tall in flower, (often rather taller in fruit), overall with fulvous or yellowish, firm, sharp, spreading, straw-colored bristles, 5–10 mm, generally dark blackish or purplish black and somewhat enlarged at base. Taproot plump, prolonged, terete, to 20 cm or longer, 1–2 cm in diam. at top. Leaves all basal, deciduous; petiole 1–11 cm; blade lanceolate to elliptic-oblanceolate or oblanceolate, 5–12 × 1–3.6 cm, both surfaces with fulvous or yellowish compressed

spines, base attenuate to petiole, margin entire or undulate, occasionally slightly lobed or toothed, apex obtuse or acute. Flowers solitary on scape, 4–8.2 cm in diam., semi-nutant, to 29 per plant, erect, these sometimes partly agglomerated especially in lower 1/2; scapes green or purplish, 10–27 cm, firm, with fulvous spreading bristles. Flower buds nodding, globose, 8–12 mm in diam. Sepals adaxially bristly. Petals 5–10, indigo, pale to deep blue, purplish, lilac, violet-blue, or occasionally wine-purple, broadly obovate, 2–4 × 1.5–3.4 cm. Filaments of similar color as petals, often rather darker, filiform, 10–14 mm; anthers yellow or orange-yellow, oblong, 1.5–2 mm. Ovary conical, with fulvous compressed- or inclined spines; styles 6–7 mm, slightly exceeding stamens; stigmas yellow, conical, 2.5–4 mm. Capsule obovoid or elliptic-oblong, rarely broadly ovate, 1.2–2 × 0.6–1.1 cm, with rubiginous or fulvous spreading spines, spine bases thickened, usually 3–5-valvate to 1/3 its length from apex. Seeds reniform, seed coat clathrate-tessellate. Fl. Jun–Sep.

Grassy slopes, scree, rock ledges, stabilized moraines; 3600–5400 m. W Gansu, Qinghai, W Sichuan, Xizang [Bhutan, NE India, N Myanmar, Nepal].

39. *Meconopsis impedita* Prain, Bull. Misc. Inform. Kew 1915: 162. 1915.

滇西绿绒蒿 dian xi lü rong hao

Herbs, monocarpic, to 25 cm tall in flower (to 40 cm in fruit), basally with persistent leaf bases. Taproot plump, to 30 cm, ca. 1.3 cm in diam. at top. Leaves all basal; petiole 3–7.2 cm; blade virescent abaxially, green adaxially, narrowly elliptic, lanceolate, oblanceolate, or spatulate, 2.5–10 × 0.7–2.2 cm, both surfaces rubiginous or fulvous spiny, midvein distinct, lateral veins dichotomous, base attenuate and decurrent to wings, margin entire or undulate, sometimes with irregular and incised lobes or pinnatipartite, apex obtuse to subacute. Flowers scapose, up to 21 per plant, nutant, 3–6.7 cm in diam. Scapes to 25 cm, with rubiginous or fulvous spreading spines. Flower buds globose, 8–11 mm in diam. Sepals adaxially rubiginous or fulvous hirsute, obviously striate. Petals 4–10, dark purple, deep wine-purple, reddish purple, purple-maroon, or indigo, obovate or suborbicular, 1.5–3.2 × 1.5–2.1 cm. Filaments of same color as petals or deeper, occasionally whitish, filiform, ca. 1 cm; anthers ivory, yellow, or golden, ovoid, ca. 1 mm. Ovary greenish, ellipsoidal, elliptic-oblong, or narrowly obovoid, fulvous appressed hirsute; styles clavate, 3–10 mm; stigmas ivory or green, capitate. Capsule brownish gray, narrowly obovoid to oblong-elliptic, 2–3.6 cm × 5–8 mm, with fulvous or rubiginous spreading setae, often rather sparse, 3(–5)-valvate for up to 1/3 distance from apex. Seeds black, falcate-elliptic, seed coat striate or inconspicuously longitudinally pitted. Fl. and fr. May–Nov.

Grassy slopes, rocky slopes, alpine meadows, stony pastures; 3400–4700 m. SW Sichuan (Daocheng, Muli, Xiangcheng), SE Xizang (Zayü), NW Yunnan [NE Myanmar].

40. *Meconopsis pinnatifolia* C. Y. Wu & H. Chuang ex L. H. Zhou, Acta Phytotax. Sin. 17(4): 114. 1979.

吉隆绿绒蒿 ji long lü rong hao

Herbs, monocarpic, 58–100 cm tall in flower. Taproot plump, ca. 18 cm, ca. 1.5 cm in diam. at top, attenuate toward base. Stems stout, to 2.5 cm in diam. at base, longitudinally striate, sparsely fulvous, shortly branched setose, basally with persistent leaf bases, leaf bases rubiginous, shortly branched setose. Basal leaves: petiole 2.5–15 cm, ca. 5 mm in diam., basally ampliate, sparsely fulvous, shortly branched setose, near base with sparse short spines; blade elliptic to elliptic-oblong or lanceolate, 1.5–7.5 × 1.6–6 cm, both surfaces and margin sparsely fulvous, setose, midvein broad, lateral veins slender, pinnatipartite, apex obtuse; lobes 3–6 pairs, asymmetrically elliptic to lanceolate-oblong, to 50 × 16 mm, distant, subapically pinnatilobate. Lower cauline leaves like basal leaves; upper cauline leaves elliptic to ovate, both surfaces pilose; leaves sessile. Flowers several in upper axils of stem, uppermost ebracteate. Pedicel 0.6–2.5 cm, setose. Petals 4, mauve-blue, purple, or deep purplish blue, broadly obovate, 3–7.2 × 2.8–6.8 cm, apex truncate, irregularly serrulate. Filaments of same color as petals, linear, 1–1.5 cm; anthers yellow or golden, oblong, 1.5–2 mm. Ovary globose, 1–1.8 cm, densely fulvous, shortly branched setose; styles terete, 5–11 mm, terminating in clavate stigmas 4–5 mm, basally ampliate to disk and covering ovary; disk 6–9 mm in diam., margin deeply divided, lobes thinly deltoid. Capsule (immature) oblong, 1.6–2 cm × 7–10 mm, both ends truncate, densely pilose; persistent styles to 12 mm, stylar disks 10–12 mm in diam. Fl. Jun–Sep.

Rock crevices on slopes, stony and grassy places, rocky stream-sides; 3500–4900 m. S Xizang (Gyirong, Nyalam) [NC Nepal].

41. *Meconopsis discigera* Prain, Ann. Bot. (Oxford) 20: 356. 1906.

毛盘绿绒蒿 mao pan lü rong hao

Plants monocarpic, 30–60 cm tall (to 100 cm in fruit). Taproot dauciform, ca. 10 × 2 cm, below usually branched. Stems erect, stout, longitudinally striate, fulvous, barbellate-setose, basally ca. 1.5 cm in diam., with a thick wad of persistent leaf bases, leaf bases densely rubiginous or brown, barbellate-setose. Basal leaves forming a dense rosette; petiole long, to 1/2 length of blade, basally ampliate, densely fulvous setose; blade oblanceolate, including petiole 7.5–18 × 0.8–3 cm, both surfaces fulvous, barbellate-setose, midvein broad, lateral veins very slender, base attenuate, margin entire, but shallowly 3- or 5-lobed or toothed or incised at apex, or rarely subentire, apex acute or rounded. Cauline leaves few or more often absent, stem leafless immediately below inflorescence. Inflorescence racemose; flowers 8–30, densely arranged on rachis. Pedicel 1–4 cm, densely barbellate-setose. Bracts leaflike, generally much smaller than leaves, absent from upper flowers. Petals 4, dark purple, purplish blue, blue, or red, sometimes pale yellow (Nepal; India: Sikkim), obovate to suborbicular, 4–5.2 × 3.7–4.5 cm, margin undulate. Filaments filiform, of same color as petals, often deeper, ca. 1.2 cm; anthers yellow, narrowly oblong, 1.5–2 mm. Ovary broadly oblong, ca. 1 cm, with dense fulvous spreading setae; styles terete, 3–6 mm (to 7 mm in fruit) terminated by 4–7 mm clavate stigmas that split into 6–10 linear twisted lobes, base ampliate to broad glabrous disk, disk covering and extended beyond ovary, margin fim-

briate; stigmas lobed, lobes free, contorted, or clavate. Capsule oblong, 18–30 cm × 11–16 mm, obviously costate, 6–10-valvate, slightly divided from style disk below, splitting for a short distance from top, stylar disk 14–27 mm in diam. Seeds reniform, seed coat longitudinally pitted or inconspicuously tessellate. Fl. Jun–Aug.

Rock crevices on slopes, ravines, alpine meadows, stabilized scree, moraines, cliffs; [3600–]4100–4900 m. S Xizang (Nyalam, Tingri) [Bhutan, India (Sikkim), C and E Nepal].

42. *Meconopsis tibetica* Grey-Wilson, *Alpine Gardener* 74: 222. 2006.

康顺绿绒蒿 kang shun lü rong hao

Plants monocarpic, with an erect stem to 40 cm tall in flower, basally with few or no persistent leaf bases, greenish or flushed with red, particularly in upper part, 6–7 mm in diam., covered in dense, slender, silky, barbellate hairs, mostly 5–7 mm. Basal leaves forming a lax rosette, rather pale green with a whitish midvein; basal and lower cauline leaves elliptic-ob-lanceolate, 4–7.8 × 0.7–5.4 cm, attenuate below into a narrow petiole 2.5–5.4 cm, margin entire or with several coarse teeth on either side, moderately covered in hairs similar to stem; upper cauline leaves similar to basal ones but gradually decreasing in size upward on stem, shortly petiolate or sessile; upper 3 sometimes forming a false whorl below inflorescence. Inflorescence a simple raceme, 7–14-flowered; bracts present in lower part of inflorescence, leaflike, lanceolate-ovate, 20–36 × 4–5 mm. Flowers semi-nutant to horizontal. Pedicel flushed with red, 12–25 mm, thickened somewhat at top, covered in spreading hairs, particularly at top. Petals 4 or 5, brilliant maroon, broadly obovate to elliptic-ob-lanceolate, 3.1–4 × 1.9–3.6 cm, margin finely and unevenly toothed. Stamens numerous, forming a distinct ring around ovary but not enveloping it; filaments similar in color to petals, linear; anthers bright yellow. Ovary greenish, with stiff ascending bristles, with a glabrous caplike stylar disk at top, disk pentagonal in outline, 5–6 mm in diam., slightly narrower than ovary, shallowly lobed at margin; styles 5–7 mm, glabrous, terminating in white 4- or 5-lobed capitate stigmas. Capsule unknown. Fl. Jul–Aug.

• *Rhododendron* thickets and heathlands; 4200–4700 m. S Xizang (Kangshung area on E side of Qomolangma Feng).

43. *Meconopsis torquata* Prain, *Ann. Bot. (Oxford)* 20: 355. 1906.

毛瓣绿绒蒿 mao ban lü rong hao

Plants, monocarpic. Stems erect, 25–53 cm tall, basally with persistent leaf bases, leaf bases rubiginous barbellate-setose. Basal leaves many, forming a rosette; petiole linear, basally vaginate and densely setose; blade oblanceolate, including petiole 13–28 cm, 1.4–4.2 cm wide, both surfaces fulvous shortly branched setose, base cuneate, margin entire or irregularly undulate, apex obtuse or almost acute. Lower cauline leaves same as basal leaves; upper cauline leaves sessile, smaller, margin irregularly lobed. Flowering stems ca. 53 cm tall, stout, densely compressed- or slightly reflexed shortly barbellate-setose. Flowers usually 20–25, densely arranged. Pedicel 6–10 mm, densely setose, apically ampliate to broad

receptacle. Upper flowers ebracteate. Petals 4, occasionally more, blue to pale red, oval to obovate, 3.8–6 × 2.8–4.5 cm, adaxially sparsely setose with fawn-colored hairs. Filaments filiform, ca. 1.2 cm; anthers yellow, narrowly oblong, ca. 2 mm. Ovary obovoid or elliptic-oblong, ca. 1 cm in diam., densely inclined, shortly barbellate-setose; styles very short, basally ampliate to mauve glabrous disk, disk covering and extended beyond ovary, margin undulate, 8-ridged; stigmas sessile or subsessile, almost capitate. Capsule obovoid or elliptic-oblong, 10–16 cm × 11–14 mm, obviously costate, 7- or 8-valvate, slightly divided from style disk below, with dense spreading, barbellate bristles; stylar disk 10–12 mm in diam. Seeds oval, seed coat tessellate. Fl. Jun–Aug.

• Slopes, scree, bouldery places; 3400–4700 m. SC Xizang.

