

# Flora of Nepal

# नेपालका वनस्पति

## Papaveraceae

### Papaveraceae: Webedition 3 (2012)

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See printed volumes of the Flora of Nepal ([www.rbge.org.uk/publications/floraofnepal](http://www.rbge.org.uk/publications/floraofnepal)) and the project website ([www.floraofnepal.org](http://www.floraofnepal.org)) for further information on the Flora of Nepal and acknowledgement of the institutes and people involved with this international collaborative project.



Royal  
Botanic Garden  
Edinburgh



## Papaveraceae

## Papaveraceae

Paul A. Egan, Colin A. Pendry & Sangita Shrestha

Herbs, annual or perennial, monocarpic or polycarpic. Latex usually copious, white, yellow or clear. Glabrous or with a more or less dense indumentum, rarely prickly. Leaves alternate, entire or lobed, often in more or less dense basal rosettes. Petioles shorter in upper leaves. Flowers solitary and scapose, terminal or axillary, or in racemes, panicles or few-flowered cymes, usually large and showy, bisexual, actinomorphic. Sepals 2 or 3, free, with or without an apical horn, soon caducous. Petals 4–6(–10), in 2 whorls on short receptacle, free, crumpled in bud. Stamens numerous, free, filaments filiform, anthers basifixed, longitudinally dehiscent. Ovary superior, 1-locular, 4–12(–18)-carpellate. Style absent to conspicuous, stigmas capitate or variously lobed. Fruit a capsule, dehiscing by subapical pores or valves leaving persistent placentae attached to stigma. Seeds small, numerous.

A cosmopolitan family of about 40 genera and 800 species, tropical to alpine. In Nepal five genera and 29 species.

### Key to Genera

- 1a Plants with straw-coloured prickles to 1 cm throughout. Leaves glaucous green with pale markings on venation above ..... **2. Argemone**
- b Plants glabrous to setose, but not prickly. Leaves evenly coloured above.....2
- 2a Leaves palmately lobed or trifoliolate ..... **4. Cathcartia**
- b Leaves pinnately lobed or pinnately veined.....3
- 3a Stigmas united into a sessile, lobed disc on the apex of the ovary. Style absent. Latex white..... **1. Papaver**
- b Stigmas united on a distinct style. Latex yellow .....4
- 4a Ovary at least 4-carpellate. Sepals acute or rounded, but without apical horn..... **3. Meconopsis**
- b Ovary 2-carpellate. Sepals with short apical horn ..... **5. Dicranostigma**

### 1. *Papaver* L., Sp. Pl. 1: 506 (1753).

Colin A. Pendry

Annual herbs, glabrous or setose, glaucous or not, latex whitish, milky. Taproot slender. Stems erect, simple or branched throughout. Leaves cauline and sometimes in a lax basal rosette. Lower leaves petiolate, upper leaves sessile. Leaves evenly coloured above, entire or lobed with irregularly undulate-serrate margin or variously pinnatifid. Flowers solitary, terminal or axillary, on long leafless peduncles. Flowers nodding in bud, erect at anthesis. Sepals 2, very early caducous, apical horn absent. Petals 4(–6), mostly red, rarely white, or purplish, usually obovate, those of outer whorl larger. Ovary 6–12(–18)-carpellate, obovoid or globose, glabrous. Style absent, stigmas sessile, 6–18, united into a radiating lobed disc covering the apex of the ovary. Capsule obovoid, or globose, obviously ribbed or not, dehiscing by pores just below the lobes of the persistent stigmatic disc. Seeds reniform, pitted.

Worldwide 80–100 species, mainly in temperate regions of Europe and Asia, some in the Americas and one in S Africa. Three species in Nepal.

*Papaver orientale* L. is cultivated in Nepal, but is not known to naturalize. It is therefore included in the key but not treated further.

### Key to Species

- 1a Leaves amplexicaul, margin irregularly undulate-serrate ..... **1 P. somniferum**
- b Leaves sessile or petiolate, but never amplexicaul, pinnatifid with entire or irregularly toothed margin .....2
- 2a Flowers 2–3 cm across. Petals 1–2 cm long ..... **2 P. dubium**
- b Flowers 5–10 cm across. Petals more than 2.5 cm long .....3
- 3a Solitary-stemmed annual..... **3 P. rhoeas**
- b Densely tufted perennial. Cultivated..... **P. orientale**

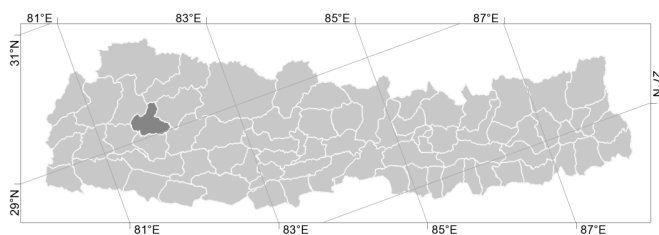
1. *Papaver somniferum* L., Sp. Pl. 1: 508 (1753).  
*Papaver amoenum* Lindl.

अफीम Aphim (Nepali).

Annual herb, 30–60(–100) cm tall (to 1.5 m in cultivation). Stems and leaves glabrous or rarely slightly setose on stem below. Lower leaves shortly petiolate, upper leaves sessile and amplexicaul. Leaves entire or obscurely lobed, ovate or oblong, 7–25 × 8–15 cm, base cordate, apex acuminate to obtuse, margin irregularly undulate-serrate, glaucous and rather waxy on both surfaces, glabrous, veins distinct, slightly raised. Peduncle to 25 cm, glabrous or rarely sparsely setose. Flowers deeply cup-shaped, 5–12 cm across. Sepals green, broadly ovate, 1.5–3.5 cm, margin membranous, glabrous. Petals white, pink, red, purple, or various, often with a dark basal blotch, suborbicular or almost fan-shaped, 3–7(–9) × 2–10 cm, apex undulate or variously lobed. Filaments white, 1–1.5 cm, anthers yellowish or cream, oblong, 3–6 mm. Ovary, globose, 1–2 cm, glabrous. Stigmas 5–12(–18), margin of stigmatic disc deeply divided, lobes crenulate. Capsule globose, ca. 5 cm, inconspicuously ribbed, glabrous. Seeds reniform, ca. 1 mm.

Fig. 1a–b

**Distribution:** Cosmopolitan.



**Altitudinal range:** ca. 2000 m.

**Ecology:** Cultivated and naturalizing in disturbed areas.

**Flowering:** March–August. **Fruiting:** July–September.

Native to SE Europe and possibly SW Asia, but unknown in the wild. Under recorded in Nepal.

Widely cultivated throughout the world as an ornamental and as the source of legal and illegal pain relieving opiate drugs including heroin, morphine, opium and codeine. The plant is also used to cure coughs, bronchitis, diarrhoea and dysentery. The seeds are widely used as a spice, condiment, thickener or main ingredient in curries and baked products.

2. *Papaver dubium* L., Sp. Pl. 2: 1196 (1753).

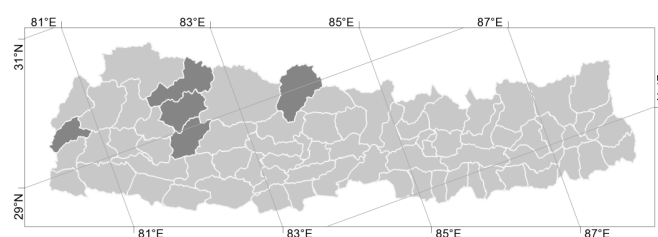
1. *Papaver dubium* subsp. *glabrum* (Royle) Kadereit, Notes Roy. Bot. Gard. Edinburgh 45(2): 247 (1989).  
*Papaver glabrum* Royle; *Papaver dubium* var. *glabrum* Koch;  
*P. dubium* var. *laevigatum* (M.Bieb.) Elkan; *P. laevigatum* M.Bieb.

Annual herb, 20–40 cm. Stems and leaves glabrous or sparsely pale, appressed setose. Leaves elliptic to narrowly

obovate, pinnatifid, 4–8 × 1–2 cm, lobes acute, margin entire or with a few large teeth, venation slightly sunken above, prominent below. Peduncle 10–25 cm, glabrous or sparsely appressed setose. Sepals green, elliptic, 8–10 mm, glabrous or sparsely setose. Flowers bowl-shaped, 2–3 cm across. Petals red or orange, sometimes with a dark or blackish blotch at base, obovate, 1.0–2.0 × 1.0–1.2 cm, apex erose. Filaments black, 5–6 mm, anthers oblong, ca. 1 mm. Ovary obovoid, 6–8 mm. Stigmas 6–8, margin of stigmatic disc deeply crenate. Capsule obovoid, 14–18 mm, rather prominently ribbed, glabrous. Seeds reniform, ca. 1 mm.

Fig. 1c

**Distribution:** Nepal, W Himalaya, S Asia, SW Asia, Europe and N America.



**Altitudinal range:** 2500–2900 m.

**Ecology:** Weed of cultivation (common in cornfields in Jumla).

**Flowering:** May–June. **Fruiting:** June–July.

*Papaver dubium* subsp. *glabrum* is distinguished from *P. rhoeas* L. by its narrower capsules with more prominent ribs and the peduncle which is either glabrous or with appressed rather than spreading hairs. *Papaver dubium* is a complex of five subspecies, found predominantly in Europe and into Asia as far E as Nepal. *Papaver dubium* subsp. *glabrum* is native from Afghanistan to Nepal and has been introduced as far as N. America.

Petals said to be useful medicinally to increase sweating.

3. *Papaver rhoeas* L., Sp. Pl. 1: 507 (1753).

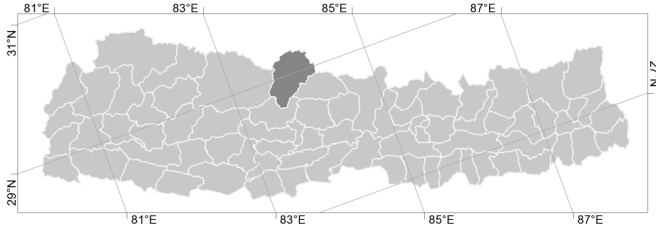
सेती विराउली Seti birauli (Nepali).

Annual herb, 25–50(–90) cm. Stem and leaves yellowish setose. Leaves elliptic or narrowly ovate, pinnatifid, 3–12(–15) × 1–5(–9) cm, both surfaces yellowish setose, veins slightly sunken above and prominent below. Lobes narrow, pinnatilobate or more or less toothed, terminal lobes usually larger, lobules apically acuminate. Peduncle 10–15 cm, yellowish setose. Sepals green, broadly elliptic, 1–1.8 cm, setose outside. Flowers bowl-shaped, 5–9 cm across. Petals rich scarlet, with or without a basal dark blotch or flecking, orbicular, transversely broadly elliptic or broadly obovate, 2.5–4.5 × 3–3.5 cm, entire, rarely apex crenate or incised. Filaments pale green, yellow or blackish, ca. 8 mm, anthers yellow or bluish, oblong, ca. 1 mm. Ovary obovoid, 7–10 mm, glabrous. Stigmas 8–12, margin of stigmatic disc crenate. Capsule broadly obovoid, 10–18 mm, inconspicuously ribbed, glabrous. Seeds reniform-oblong, ca. 1 mm.

## Papaveraceae

Fig. 1d

**Distribution:** Cosmopolitan.



**Altitudinal range:** 2500–3100 m.

**Ecology:** Weed of cultivation.

**Flowering:** May–June. **Fruiting:** June–July.

*Papaver rhoeas* is thought to be of eastern Mediterranean origin (Kadereit, Bot. J. Linn. Soc. 103: 221. 1990), but it has been a weed of cultivation since ancient times and can now be found on all the continents except Antarctica.

## 2. *Argemone* L., Sp. Pl. 1: 508 (1753).

Colin A. Pendry

Annual, biennial, or perennial polycarpic herbs, prominently prickly-spiny throughout, otherwise glabrous, and somewhat glaucous, latex yellow, bitter. Taproot slender. Stems erect, branched. Leaves in lax basal rosettes and cauline. Lower leaves petiolate, upper leaves sessile. Leaves with prominent pale markings over venation above, pinnatilobed, lobes repand-dentate, teeth apex spiny. Flowers solitary, terminal and axillary, subtended by 1 or 2 leaf-like bracts. Peduncles very short. Flower buds erect, globose, ovoid or oblong. Sepals usually 3, caducous, concave, with a prominent spinous horn below apex. Petals 6 in 2 whorls, yellow, obovate. Stamens yellowish green, anthers coiling after dehiscence. Ovary 4–6 carpellate, 1-locular, ovoid, elliptical or oblong, spiny. Style obsolete or very short, stigmatic lobes 3–5, capitate or spreading. Capsule ellipsoid, 4–6-valvate (ribbed), prickly, septicidal, dehiscing from below the stigma for  $\frac{1}{4}$ – $\frac{1}{3}$  of length, rarely separating nearly to base. Seeds spherical, pitted.

About 23–29 species native to N and S America, with some widely introduced as pantropical weeds. Two introduced species in Nepal.

### Key to Species

- 1a Stigmatic lobes broad, appressed to style. Flowers yellow ..... **1 *A. mexicana***  
 b Stigmatic lobes narrow, spreading. Flowers pale yellow ..... **2 *A. ochroleuca***

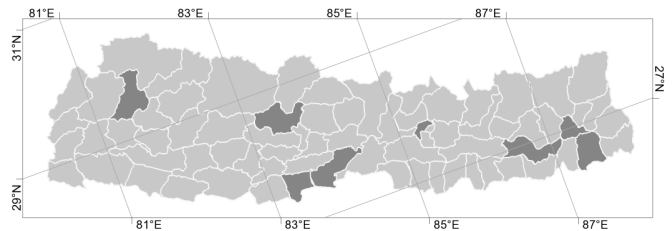
## 1. *Argemone mexicana* L., Sp. Pl. 1: 508 (1753).

सुँगुरे काँडा Sungure kanda (Nepali).

Herbs to 30–100(–120) cm tall. Stems rather stout, usually branching, glabrous apart from sparse, spreading, straw-coloured spines to 1 cm long. Basal leaves shortly petiolate, cauline leaves sessile and upper leaves subamplexicaul. Leaves obovate to elliptic, pinnatilobed, 5–22 × 2.5–7 cm, becoming progressively smaller up the stem, glabrous, somewhat glaucous, sparsely spiny on veins, especially below. Flower buds subglobose to slightly oblong, to 1.5 cm, sparsely spiny. Petals broadly obovate, 1.7–3 × 1.5–2 cm, apex entire. Stamen filaments ca. 7 mm, anthers 1.5–2 mm. Ovary elliptic or oblong, 7–11 mm, spiny. Style 0–1 mm, stigmas dark red, 4–6-lobed, the lobes broad, appressed to the style and completely obscuring the non-receptive surfaces between them. Capsule ovate to broadly elliptic, 2.5–4 × 1.5–2 cm, style scarcely visible. Seeds 1.5–2 mm.

Fig. 1e–f

**Distribution:** Nepal, W Himalaya, E Himalaya, S Asia, E Asia, Africa, N America and S America.



**Altitudinal range:** 100–1400 m.

**Ecology:** Disturbed open areas.

**Flowering:** Flowering and fruiting March–October, but can probably be found flowering somewhere in Nepal at any time.

Native to Mexico, a pantropical weed, introduced and naturalised in the lowlands of the Himalaya. Under-recorded in Nepal and of much wider distribution than the map indicates.

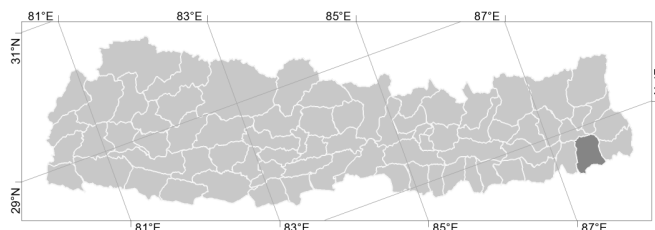
All parts used medicinally to treat a wide variety of conditions. The roots are used for chronic skin disease, intestinal complaints and as a poison antidote, the leaves for

coughs and skin diseases, and the seed oil is a laxative and also useful for skin disorders. The seeds are poisonous.

**2. *Argemone ochroleuca*** Sweet, Brit. Fl. Gard. Ser.1 3(2): pl. 242 (1828).

Herbs 30–100 cm tall. Stems branching in the upper part, glabrous apart from sparse, spreading, straw-coloured spines to 9 mm long. Basal leaves shortly petiolate, cauline leaves sessile and upper leaves subamplexicaul. Leaves obovate to elliptic or ovate, pinnatilobed, 10–30 × 4–10 cm, becoming progressively smaller up the stem, glabrous, sparsely spiny on veins below. Flower buds oblong, to 1.8 cm, sparsely spiny. Petals broadly obovate, 2.8–3 × 1.5–1.8 cm, apex entire. Stamen filaments ca. 7 mm, anthers 1.5–2 mm. Ovary ovoid, 8–10 mm, spiny. Style ca. 1 mm, stigmas dark red, 4–6-lobed, deeply dissected and spreading so that the bluish non-receptive surfaces between them are visible. Capsule oblong to broadly elliptic, 2.5–4 × 1.5–2 cm, style clearly visible. Seeds 1.5–2 mm.

**Distribution:** Nepal, W Himalaya, S Asia, N America, S America and Australasia.



**Altitudinal range:** 100–200 m.

**Ecology:** Disturbed open areas along roads and waste places.

**Flowering:** April–June. **Fruiting:** April–June.

*Argemone ochroleuca* has been treated as a synonym of *A. mexicana* L. and is almost certainly much more widely distributed than is indicated here. The stigma is the most reliable way to distinguish the two species, with narrower, spreading lobes in *A. ochroleuca* compared with the broader, appressed lobes of *A. mexicana*.

### 3. *Meconopsis* Vig., Hist. Nat. Pavots Argémones: 48 (1814).

Paul A. Egan & Sangita Shrestha

Erect to ascending, monocarpic or polycarpic perennial herbs. Taproot fleshy. Latex yellow-orange. Indumentum barbellate-bristly, tomentose, or glabrous. Not glaucous. Stems solitary, simple or with divergent branches, or scapose, with withered leaf remains sometimes persistent at base. Basal leaves in rosettes, distinctly petiolate. Cauline leaves present or absent, uppermost cauline leaves sessile. Leaves evenly coloured above, elliptic, lanceolate, or oblong, rarely ovate in outline, entire to 2-pinnatifid-pinnatisect. Inflorescence determinate, flowers in racemes or lax panicles of leafy axillary cymules, or solitary on basal scapes. Pedicels bracteate or ebracteate in uppermost flowers, glabrous to uniformly pubescent, sometimes with dense tufts immediately below flowers. Flower buds erect or nodding. Flowers nodding to lateral-facing. Sepals 2(–4), lacking apical horn. Corolla saucer-shaped to deeply cupulate. Petals 4–8(–10), variously coloured, rarely white, obovate to orbicular, apex rounded or rarely acute, margins entire, to denticulate or dentate. Ovary 4–8(–12)-carpellate, ellipsoid-oblong to subglobose, glabrous to densely bristly. Style usually conspicuous, rarely expanded basally into a disc surmounting apex of the ovary. Stigmatic lobes free, contiguous or connate, clavate to capitate. Capsule 4–8(–12)-valvate, dehiscing by subapical pores or slits in upper third. Seeds subreniform or ellipsoid-oblong, smooth, papillose or rugose.

Worldwide about 55 species from the Himalaya to W China. 22 species in Nepal, 11 of which are endemic and mostly very local in distribution.

#### Key to Species

- 1a Style abruptly expanded at the base into a broad glabrous disc surmounting the ovary .....2  
 b Style when present of uniform thickness throughout or swollen at base, but never expanded into a disc .....5
- 2a Stems multiple, narrow, partially fusing above the rootstock crown ..... **14 *M. manasluensis***  
 b Stem single and prominent, fleshy .....3
- 3a Leaves pinnately-lobed, the lobes in 3–6 subopposite pairs. Flowers deep purple to lavender ..... **13 *M. pinnatifolia***  
 b Leaves entire or coarsely toothed. Flowers blue, yellow or cream .....4
- 4a Leaves lobed in upper third only, in 1 or 2 lateral pairs. Petals 35–50 mm long..... **15 *M. discigera***  
 b Leaf margin sub-entire or coarsely toothed along whole margin. Petals 23–39 mm long..... **16 *M. simikotensis***

## Papaveraceae

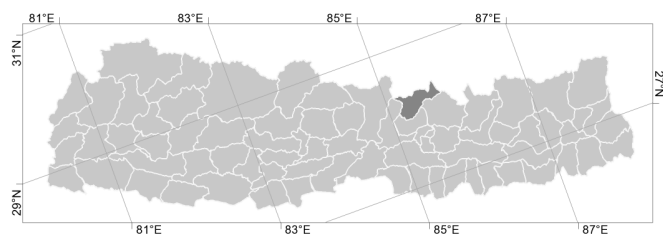
- 5a Basal rosettes lax, usually not more than 30 cm wide, dying back to a resting bud over winter.....6  
 b Basal rosettes dense, usually from 50 cm wide, persistent during winter.....11
- 6a Inflorescence racemose, with flowers borne in the axils of the upper stem leaves .....7  
 b Inflorescence scapose, with flowers borne on basal scapes, these sometimes partly aggregated, resembling a central stem .....9
- 7a Flowers 4–8. Leaf margins coarsely or finely sinuate-lobed or subentire. Capsule sparsely to moderately hairy, bristles ascending..... **21 M. sinuata**  
 b Flowers 1–5. Leaf margins pinnatilobate, lyrate or subentire. Capsule glabrous to glabrescent .....8
- 8a Polycarpic herb 40–100 cm. Ovary densely covered in reflexed or spreading bristles..... **17 M. grandis**  
 b Monocarpic herb 12–35 cm. Ovary glabrous or rarely sparsely bristly ..... **22 M. lyrata**
- 9a Flowers borne on 1 or rarely 2 scapes. Scapes 60–110 cm. Capsules 30–50 mm..... **18 M. simplicifolia**  
 b Flowers borne on 2–18 scapes. Scapes 5–40 cm. Capsules 5–20 mm.....10
- 10a Indumentum glabrous or sparse with softly barbellate bristles. Petals 4 ..... **19 M. bella**  
 b Indumentum sparse to dense with spiny bristles. Petals 6(–10)..... **20 M. horridula**
- 11a Basal leaf margin entire or minutely serrate. ....12  
 b Basal leaf margins deeply to shallowly pinnately lobed.....13
- 12a Petals yellow. Capsule oblong-ellipsoidal..... **11 M. regia**  
 b Petals light to deep pink. Capsule narrowly clavate or ellipsoid ..... **12 M. taylorii**
- 13a Petals red, purple or blue .....14  
 b Petals yellow or rarely white .....17
- 14a Ovary densely appressed bristly. Capsule 22–34 mm long, with 7–10 valves ..... **9 M. staintonii**  
 b Ovary moderately to densely bristly, the bristles suberect to spreading. Capsule 11–25 mm long, with 5–7 valves.....15
- 15a Flowers borne in a large spreading panicle, the basal cymules usually 3–11-flowered ..... **10 M. wallichii**  
 b Flowers in racemose or subpaniculate inflorescence, the basal cymules 2–3-flowered.....16
- 16a Basal leaves pinnatisect to pinnatifid, narrow-oblong in outline, with ca. 5 cm petioles ..... **2 M. ganeshensis**  
 b Basal leaves bipinnatisect or pinnatisect, oval in outline, with 7–16 cm petioles..... **3 M. chankheliensis**
- 17a Inflorescence strictly racemose ..... **6 M. robusta**  
 b Inflorescence paniculate, lower flowers in 2–10-flowered cymules, flowers solitary above.....18
- 18a Stem usually 120–260 cm tall. Style stout. Stigma purple, 8–12-lobed .....19  
 b Stem generally 35–130 cm tall. Style slender. Stigma yellow-green or cream, 4–7-lobed .....20
- 19a Lamina noticeably parted towards the base. Stigmas yellow. Capsules mostly ellipsoidal, with spreading orange pubescence. Flowering July–September..... **7 M. autumnalis**  
 b Lamina mostly pinnatifid or pinnatisect towards the base. Stigmas purple. Capsules mostly globose, with appressed fawn pubescence. Flowering June–July ..... **8 M. paniculata**
- 20a Plants densely pubescent, with bristles conspicuously purple black at the base, reflexed to reflexed-spreading on capsule. Petioles usually 2–4 cm. .... **4 M. dhwojii**  
 b Plants moderately pubescent to glabrescent, the bristles uniformly coloured, spreading or glabrescent on capsule. Petioles usually 3–16 cm.....21
- 21a Style 9–14 mm. Indumentum moderate, usually with greyish bristles. Pedicels 3–14 cm ..... **1 M. napaulensis**  
 b Style 3–7 mm. Indumentum sparse, with pale brown bristles. Pedicels 4–5.8 cm ..... **5 M. gracilipes**

1. *Meconopsis napaulensis* DC., Prodr. 1: 121 (1824).

क्यासर Kyasar (Sherpa).

Monocarpic herb, 30–100(–160) cm, very variable in height. Stem 0.8–2.0 cm in diameter at base. Indumentum moderately dense, of stiff, greyish or fawn-coloured obliquely spreading barbellate bristles, to 12 mm, with shorter underlying hairs. Leaves cauline and in basal rosettes. Petioles 2–19 cm, cauline leaves mostly sessile or with winged petioles. Laminas distinctly pinnatisect at base to pinnatifid towards leaf apex, oblong to lanceolate, to 31 × 7.6 cm. Leaf segments in 6–9 subopposite pairs, oval to elliptic or obovate, 14–23 × 8–13 mm, subentire to acutely lobed. Inflorescence racemose or paniculate with 2- or 3-flowered lateral cymules, flowers solitary above. Pedicels 3–14 cm, conspicuously elongated by maturity. Petals 4, pale yellow, obovate, 2.4–4.7 × 2.0–3.1 cm. Filaments pale yellow, anthers yellow to orange-yellow. Ovary densely covered in ascending bristles. Style 9–14 mm, slender. Stigma yellow-green, capitate with 6 lobes. Capsule oval-oblong to narrow-ellipsoidal, 1.4–2.7 × 0.5–1.4 cm, dehiscent by 5 valves, indumentum spreading bristly to glabrescent.

**Distribution:** Endemic to Nepal.



**Altitudinal range:** 3200–4500 m.

**Ecology:** Meadows and stream-sides.

**Flowering:** May–August. **Fruiting:** August–September.

The circumscription of *Meconopsis napaulensis* has long been problematic, and here a narrow species concept is accepted which includes only the yellow-flowered specimens from the Langtang region of Rasuwa district. Sometimes misspelt '*nipalensis*' or '*nepalensis*' in the literature. See also notes under *M. paniculata* (D. Don) Prain.

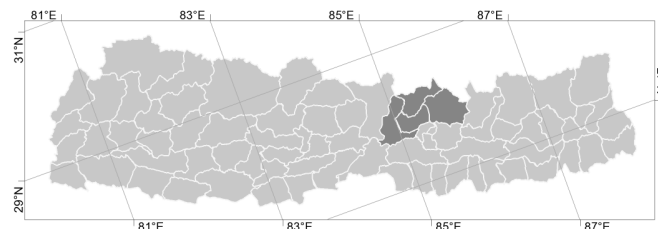
**2. *Meconopsis ganeshensis*** Grey-Wilson, Curtis's Bot. Mag. 23(2): 188 (2006).

Slender monocarpic herb 50–120 cm. Stem 8–16 mm in diameter at base. Indumentum moderately dense, of pale orange or fawn-coloured, 4–9 mm, spreading, barbellate bristles and accompanied by shorter underlying hairs. Leaves cauline and in basal rosettes. Petioles ca. 5 cm, cauline leaves mostly sessile or with winged petioles. Laminas pinnatisect to pinnatifid, narrow-oblong, to 14 × 4.2 cm. Leaf segments in 4–8 distinct subopposite pairs, oval to elliptic or elliptic ovate, 12–22 × 5–13 mm, subentire to shallowly pinnately-lobed. Flowers in racemose or subpaniculate inflorescences with basal cymules 2- or 3-flowered, flowers solitary above. Pedicels 2.5–9 cm, conspicuously pubescent distally around receptacle base. Petals 4, light purple to dark red, oval to oval-obovate, 2.2–4.0 × 2.0–3.5 cm. Filaments reddish with orange-yellow anthers. Ovary with dense suberect barbellate bristles. Style

6–8 mm, slender. Stigma yellow, capitate, 6-lobate. Capsule obovoid to ellipsoid-oblong, 1.5–2.0 × 0.6–1.0 cm, dehiscent by ca. 6 valves, indumentum reflexed to spreading bristly, to glabrescent.

Fig. 2a

**Distribution:** Endemic to Nepal.



**Altitudinal range:** 3600–4600 m.

**Ecology:** Meadows.

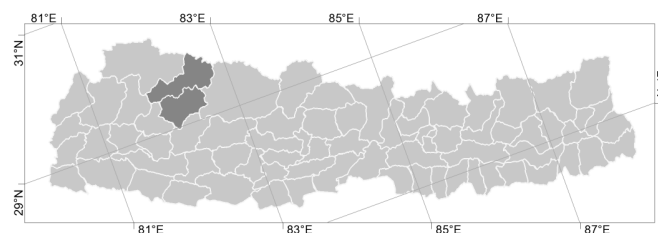
**Flowering:** July–August.

*Meconopsis ganeshensis* is akin to a red-flowered form of the closely related *M. napaulensis* DC., though is a slightly smaller and generally more slender species.

**3. *Meconopsis chankheliensis*** Grey-Wilson, Curtis's Bot. Mag. 23(2): 203 (2006).

Monocarpic herb, 40–150 cm. Stem 11–16 mm in diameter at base. Indumentum sparse throughout the whole plant, of 3–6 mm, golden brown or yellowish barbellate hairs. Leaves cauline and in basal rosettes. Petiole 7–16 cm, cauline leaves shortly petiolate or sessile. Laminas pinnatisect or bipinnatisect, oval in outline, to 24 × 9.5 cm. Leaf segments in 3–7 subopposite pairs, oval to elliptic, 2.5–5.0 × 1.7–2.6 cm. Flowers in racemose or subpaniculate inflorescences, basal cymules with 2 or 3 flowers, solitary above. Pedicels 4.5–18 cm, more densely pubescent around receptacle base. Petals 4, purple to dark red, subrounded to obovate, 2.1–4.0 × 2.1–4.2 cm. Filaments purple, anthers yellow or orange. Ovary with densely appressed to ascending orange-fawn bristles. Style 4–8 mm, slender. Stigma yellowish, subcapitate, 6-lobed. Capsule unknown.

**Distribution:** Endemic to Nepal.



**Altitudinal range:** 3100–4600 m.

**Ecology:** *Quercus-Abies* forest, rocky outcrops, stream-sides.

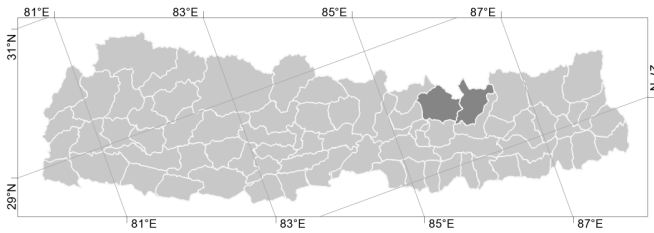
## Papaveraceae

**Flowering:** May–June.

**4. *Meconopsis dhwojii*** G.Taylor ex Hay, New Fl. & Silva 4: 225, pl. 82 (1932).

Monocarpic herb, 50–60 cm. Stem 8–13 mm in diameter at base. Indumentum dense, with 4–9 mm, golden brown barbellate bristles, widely spreading and conspicuously purple-black at base. Leaves cauline and in basal rosettes. Petioles 1.5–4 cm, cauline leaves shortly petiolate or sessile. Laminas mostly pinnatisect, pinnatifid towards leaf apex, narrowly oblong, 5–19 × 3–9.5 cm. Leaf segments in 6–9 lateral pairs, proximal pairs distinctly divided, lobes round, obtuse, or subacute. Flowers borne in leafy paniculate inflorescences, lower cymules 2–4-flowered, flowers solitary above. Pedicels 0.5–1.3 cm, bristly. Petals 4, yellow, obovate-orbicular, 1.5–4.0 × 1.2–3.0 cm. Filaments pale yellow, anthers golden yellow. Ovary with dense appressed bristles. Style 4–8 mm, stout. Stigma capitate, green or yellow-green, ca. 6-lobate. Capsules ellipsoid or oblong, 0.8–3.5 × 0.5–1.0 cm, dehiscent by 5–6 valves, indumentum of reflexed to reflexed-spreading bristles.

**Distribution:** Endemic to Nepal.



**Altitudinal range:** 3600–4800 m.

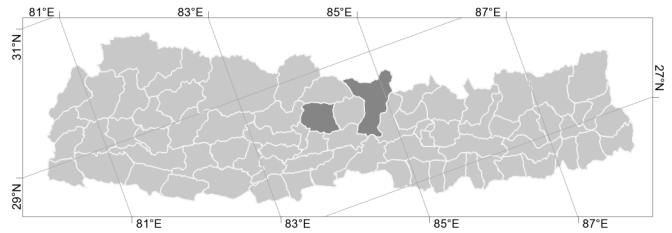
**Ecology:** Meadows, rock crevices, stream-sides.

**Flowering:** June–August. **Fruiting:** August–October.

**5. *Meconopsis gracilipes*** G.Taylor, Acc. Meconopsis: 38 (1934).

Monocarpic herb to 1 m. Stems sparsely covered with pale brown 1–9 mm, spreading bristles, later glabrescent. Leaves cauline and in basal rosettes, the latter mostly absent by flowering. Petioles 3.5–16 cm, cauline leaves shortly petiolate or sessile, auriculate at base. Laminas pinnatisect towards base, more or less deeply pinnatifid towards apex, oblong to lanceolate, 5–25.5 × 2–7.5 cm. Leaf segments in 3–5 subopposite pairs, 2.6–5 × 2–3.8 cm, lobes 3–5, acute to rounded at apex. Flowers in subpaniculate inflorescence borne on axillary branches, lower branches 3–5-flowered, upper flowers solitary. Pedicels 4–5.8 cm, bristles tufted below flowers. Petals 4, yellow, obovate-sub-orbicular, 2.0–2.5 × 1.5–2.5 cm. Filaments pale yellow, anthers orange-yellow. Ovary densely covered with appressed to obliquely spreading hairs. Style 3–7 mm, slender. Stigma capitate. Capsule ellipsoid to oblong-ellipsoid, 1.0–2.5 × 0.5–1.0 cm, dehiscent by 4–7 valves, with sparse indumentum of spreading bristles or glabrescent.

**Distribution:** Endemic to Nepal.



**Altitudinal range:** 2400–4900 m.

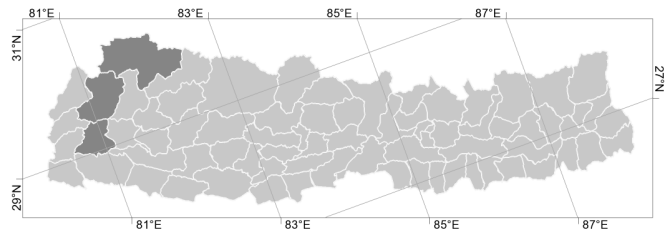
**Ecology:** Meadows, forest margins and stream-sides.

**Flowering:** June–July. **Fruiting:** July–September.

**6. *Meconopsis robusta*** Hook.f. & Thomson, Fl. Ind. 1: 253 (1855).

Monocarpic herb ca. 60–120 cm. Stem 1.0–2.0(–3.2) cm in diameter at base. Indumentum of sparse, yellowish-brown 5–6 mm, barbellate bristles, semi-glabrescent by maturity. Leaves cauline and in wide basal rosette. Petioles to 15 cm, cauline leaves mostly sessile, rarely with semi-amplexicaul base. Lamina imperfectly and deeply pinnatisect, commonly divided completely to midrib in large divisions, more pinnatifid towards apex, elliptic to elliptic-oblong, to 35 × 11 cm. Leaf segments in 3–6 lateral pairs, ovate or ovate-oblong, entire to shallowly lobed. Inflorescence strictly racemose. Pedicels 5–20 cm. Petals 4, pale to sulphur yellow, obovate, 2.8–3.3 × 1.7–2.0 cm. Filaments same colour as petals, anthers yellow-orange. Ovary moderately to densely covered in appressed or spreading bristles. Style 5–10 mm, slender. Stigma yellow, capitate, 6–9 lobed. Capsule obovoid-oblong or ellipsoidal, 1.8–2.8 × 0.9–1.3 cm, dehiscent by 6–9 valves, indumentum of sparse, spreading to ascendant bristles.

**Distribution:** Nepal and W Himalaya.



**Altitudinal range:** 2400–4100 m.

**Ecology:** Grassland and exposed alpine slopes.

**Flowering:** July–August. **Fruiting:** September–October.

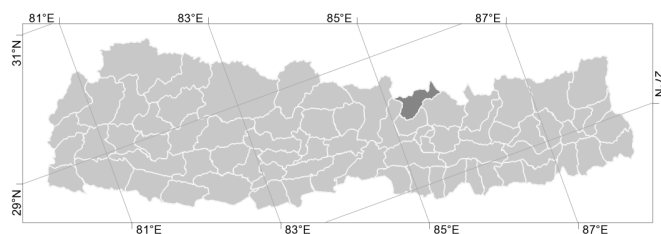
**7. *Meconopsis autumnalis*** P.A.Egan, Phytotaxa 20: 48 (2011).

Monocarpic herb, 110–160 cm. Stem 2.2–3.1 cm in diameter at base. Indumentum densely puberulent with scattered, pale fawn to orange barbellate bristles 5–9 mm. Leaves cauline and in large basal rosettes. Petioles 11–25(–31) cm, in lower



cauline leaves only. Upper cauline leaves sessile, deflexed, semi-amplexicaul, with large auricles prominent at the base. Lamina pinnatisect at base, pinnatifid only towards apex, broadly oblong, 33–55 × 8–16 cm. Leaf segments distinct, in 3–5 opposite to subopposite pairs, oblong or ovate, pinnatilobate at the margin, the lobes acute to obtuse. Inflorescence densely paniculate and markedly columnar in outline, cymules 3–8(–12)-flowered, the upper flowers solitary. Pedicels 6–17 cm. Petals 4(–6), pale yellow, obovate to suborbicular, 4.3–5.6 × 4.1–5.5 cm, occasionally widely spaced, only overlapping a short distance from the base. Filaments pale yellow, anthers yellow-orange. Ovary obviously stipitate and with large receptacle, densely covered with orange ascending bristles. Style 8–25 mm, stout. Stigma yellow, capitate, (3–)5–8 mm, 6–8-lobed. Capsule ovoid to ellipsoidal, 1.5–2.7 × 0.9–1.4 cm, dehiscent by 6–8 valves, indumentum moderately dense, spreading to ascending.

**Distribution:** Endemic to Nepal.



**Altitudinal range:** 3300–4200 m.

**Ecology:** Subalpine pastures, forest openings, stream margins and grassy alpine slopes.

**Flowering:** July–September.

*Meconopsis autumnalis* is somewhat intermediate between *M. napaulensis* DC. and *M. paniculata* (D. Don) Prain, but is most clearly differentiated from both by its distinctly larger stigma and late flowering period.

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

*Papaver paniculatum* D. Don, Prodr. Fl. Nepal.: 197 (1825); *Meconopsis longipetiolata* G. Taylor ex Hay; *M. paniculata* var. *elata* Prain.

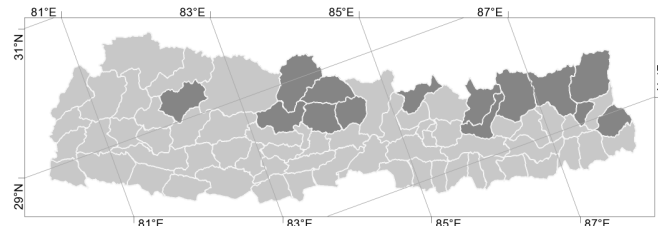
उपल सेर्बो Upal sherbo (Sherpa).

Monocarpic herb, 80–270 cm. Stem 1.4–3.9 cm in diameter at base. Indumentum sparsely to densely clothed with grey, pale yellow or brownish barbellate bristles, to 6 mm, with dense underlay of short substellate hairs. Leaves cauline and in large basal rosettes. Petioles 4–34 cm, cauline leaves shortly petiolate, or sessile with semi-amplexicaul base. Lamina very variably divided, either shallowly pinnatilobate, or pinnatisect towards base and pinnatifid towards leaf apex, usually lanceolate or ellipsoidal-oblong, 20–60 × 5–19 cm. Leaf segments in 6–10 lateral pairs, ovate-oblong, proximalmost pairs rarely deeply divided, lobes subtire to acute. Inflorescence paniculate with upper flowers solitary, cymules

2–10-flowered. Pedicels 1.8–14 cm. Petals 4, yellow, obovate or suborbicular, 2.9–6.4 × 3–4.8 cm. Filaments pale yellow, anthers yellow-orange. Ovary densely covered with appressed pale or golden yellow bristles. Style 6–14 mm, stout. Stigma purple, subcapitate, 8–12-lobed. Capsule globose to oblong-ellipsoid, 1.1–3.9 × 0.8–2.1 cm, dehiscent by 8–12 valves, indumentum of dense to moderately dense appressed to ascendant bristles.

Fig. 2b-c

**Distribution:** Nepal, E Himalaya and Tibetan Plateau.



**Altitudinal range:** 2700–5000 m.

**Ecology:** Open grassy slopes, forest margins, scrubland.

**Flowering:** June–July. **Fruiting:** August–October.

*Meconopsis napaulensis* DC. has been widely misapplied in the Himalayan region as the name for *M. paniculata* because Don (Prodr. Fl. Nepal.: 197. 1825) misapplied it when listing it in synonymy under his *Papaver paniculata*. This confusion was perpetuated by Walpers (Repert. Bot. Syst. 1: 110. 1842) and Hooker (Himal. J. 2: 53. 1854) and subsequent authors until Prain made the combination *M. paniculata* and clarified its limits. Hooker & Thomson (Fl. Brit. Ind. 1: 118. 1872) also misapplied their own name *M. robusta* Hook.f. & Thomson to this species.

The plant is used in the treatment of bile disease, swelling of limbs and sores.

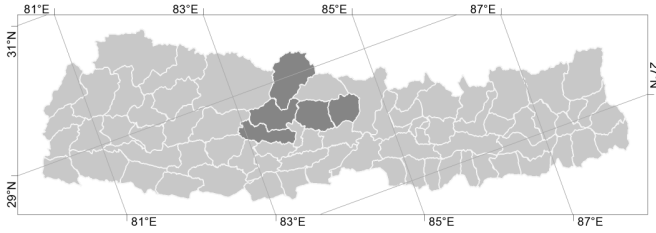
**9. *Meconopsis staintonii*** Grey-Wilson, Curtis's Bot. Mag. 23(2): 190, pl. 5-6 (2006).

Monocarpic herb to 1.8 m. Stem to 3.0 cm in diameter at base. Indumentum usually sparse, with 3–6 mm long spreading yellow barbellate and dense, short substellate hairs throughout. Leaves cauline and in wide basal rosettes, to 1 m across. Petioles 7–16 cm, cauline leaves shortly petiolate or sessile, with rounded or semi-auriculate leaf bases. Lamina pinnatisect towards leaf base, increasingly pinnatifid towards apex, oblong-oblong to lanceolate, 24–52 × 6.5–18 cm. Leaf segments in 4–8 lateral pairs, oval to oblong or ovate, serrate to subtire at margins. Inflorescence paniculate, lateral cymules 3–11-flowered, pedicels 7.8–18 cm. Petals 4, red or variously pink, rarely white, obovate to suborbicular, 3.6–6.0 × 4.0–7.5 cm. Filaments the same colour as petals, anthers orange or orange-yellow. Ovary densely covered with appressed orange-yellow bristles. Style 5–8 mm, stout. Stigma dark green to yellow, capitate. Capsule ellipsoid to obovoid, 2.2–3.4 × 0.8–1.2 cm, dehiscent by 7–10 valves, indumentum dense, with semi-appressed to ascending bristles.

Fig. 3a-b

## Papaveraceae

**Distribution:** Endemic to Nepal.



**Altitudinal range:** 2500–4300 m.

**Ecology:** Open forests, forest edges, scrub and rocky slopes.

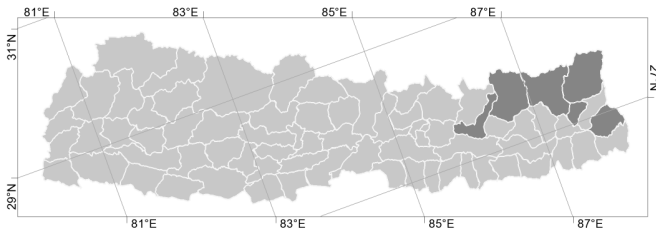
**Flowering:** May–July.

**10. *Meconopsis wallichii*** Hook., Bot. Mag. 78: pl. 4668 (1852).

*Meconopsis wallichii* var. *fuscopurpurea* Hook.f.

Monocarpic herb to 1.4 m. Stem to ca. 2.5 cm in diameter at base. Indumentum of spreading to ascending orange-yellow to brown barbellate bristles, 3–5 mm, with underlay of shorter hairs. Leaves cauline and in rather lax basal rosettes. Petioles 2–12 cm, cauline leaves shortly petiolate or sessile to subsessile. Laminas pinnatisect towards leaf base, distally more pinnatifid, oval to oval-oblong, 11–29 × 2.5–8.5 cm long. Leaf segments in 3–7 opposite to subopposite pairs, oval to elliptic, subentire to shallowly lobed. Flowers borne in large spreading paniculate inflorescence, cymules usually 3–11-flowered, flowers solitary on upper stem. Pedicels 6–14.5 cm. Petals 4, light blue to purple or dark red, obovate to suborbicular, 2.0–3.5 × 2.3–3.8 cm. Filaments darker than petals, anthers yellow or orange. Ovary covered with appressed to ascending bristles. Style 5–9 mm, slender. Stigma greenish, capitate. Capsule ellipsoidal to broadly ovoid, 1.1–2.5 × 0.7–1.2 cm, dehiscent by 5–7 valves, with moderately dense indumentum of appressed to ascending yellow to orange bristles.

**Distribution:** Nepal and E Himalaya.



**Altitudinal range:** 3100–4300 m.

**Ecology:** Open forests, forest edges, scrub, rocky slopes and stream-sides.

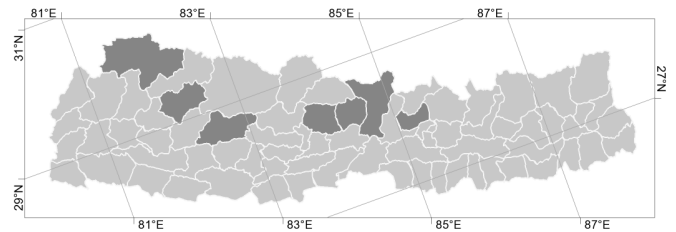
**Flowering:** July–September.

Varieties of *Meconopsis wallichii* can be differentiated on the basis of flower colour, with var. *wallichii* having sky blue or lavender petals and var. *fuscopurpurea* Hook.f. having maroon, maroon-purple or deep red petals. The sky blue forms appear to be restricted to Sikkim and Bhutan. A rare white-flowered form is also thought to exist in Nepal.

**11. *Meconopsis regia*** G.Taylor, J. Bot. 67: 259 (1929).

Monocarpic herb usually 1.5–1.8 m. Stem to ca. 3.5 cm in diameter at base. Indumentum tomentose, whole plant densely clothed with appressed, golden or silvery 4–8 mm bristles. Leaves cauline and in densely packed, persistent basal rosettes. Petioles 5–22 cm, cauline leaves shortly petiolate, or sessile. Lamina narrowly elliptic, 31–47.5 × 6.5–11.4 cm, base attenuate, apex acuminate, margin acutely serrate or subentire. Inflorescence paniculate, lateral cymules with 2–4 flowers below, 1 or 2 flowers above. Pedicels 2–20 cm. Petals 4(–6), yellow, suborbicular, 3.5–6.6 × 3.5–7 cm. Filaments pale yellow, anthers orange. Ovary densely covered with soft, appressed yellow to yellow-orange bristles. Style 4–11 mm, stout. Stigma red-purple, capitate, 7–12 lobed. Capsule oblong-ellipsoidal, 1.0–4.5 × 0.8–1.8 cm, dehiscent by 7–12 valves, densely appressed bristly.

**Distribution:** Endemic to Nepal.



**Altitudinal range:** 3000–4300 m.

**Ecology:** Alpine meadows and low scrub.

**Flowering:** June–August. **Fruiting:** August–September.

A red-flowered form of *Meconopsis regia* supposedly exists in the wild. Given this occurrence, and the otherwise very close morphological relation with *M. taylorii* L.H.J. Williams, it is conceivable that these species are conspecific.

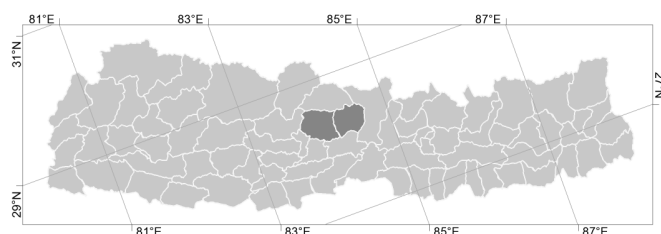
**12. *Meconopsis taylorii*** L.H.J. Williams, Trans. & Proc. Bot. Soc. Edinburgh 41: 347 (1972).

Monocarpic herb to 1.5(–1.8) m. Stem to ca. 2.8 cm in diameter at base. Indumentum dense with straw-coloured, 10–15 mm, barbellate bristles and short substellate hairs. Leaves cauline and in large, basal rosettes to 1 m wide. Petioles 12–25 cm, cauline leaves sessile or with winged petioles. Laminas narrowly elliptic to oblong-obovate, 29–60 × 7.5–16.5 cm, apex acute, base attenuate, margin subentire or crenate to shallowly lobed. Inflorescence paniculate, cymules 2–5-flowered, upper flowers solitary. Pedicels 6–18 cm, densely pubescent below ovary. Petals 4, light to deep pink, obovate to subrounded, 3.0–5.1 × 2.0–4.5 cm. Filaments whitish, anthers orange. Ovary densely pubescent, bristles orange-brown,

barbellate, ascending to appressed. Style short, 4–7 mm, stout. Stigma dark brown or purple-brown, capitate. Capsule narrowly clavate or ellipsoid, 2.5–6.0 × 1.0–2.2 cm, dehiscent by 7–12 valves, densely clothed with fine, ascending to appressed bristles, eventually glabrescent.

Fig. 3c

**Distribution:** Endemic to Nepal.



**Altitudinal range:** 3600–4600 m.

**Ecology:** Open meadows.

**Flowering:** July–August.

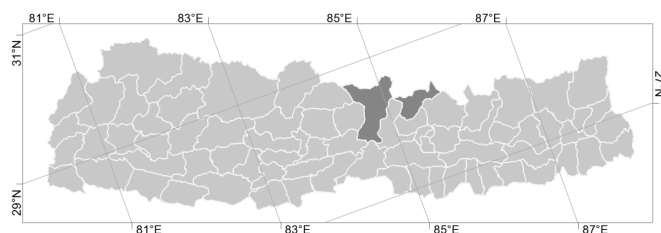
The recognition of this taxon at the species level is debatable. It is plausible that it merely constitutes a variant of *Meconopsis regia*, or a wild hybrid between *M. regia* G. Taylor and *M. staintonii* Grey-Wilson. See further notes under *M. regia*.

**13. *Meconopsis pinnatifolia*** C.Y. Wu & H. Chuang ex L.H. Zhou, Acta Phytotax. Sin. 17(4): 114, pl. 3 (1979).

Monocarpic herb, 40–100 cm. Stem to 2.5 cm in diameter at base. Indumentum sparsely to densely bristly throughout whole plant, bristles yellow to orange, barbellate, to ca. 4 mm. Leaves cauline and in spreading basal rosettes. Petioles 2–14 cm, conspicuously broad at base, occasionally winged, reduced or absent on upper cauline leaves. Lamina elliptic-oblong, distinctly pinnatifid, to ca. 23 × 7.5 cm. Leaf segments in 3–6 subopposite pairs, entire, to 50 × 16 mm; midribs prominent. Flowers 12–22(–30) in dense racemes. Pedicels 0.8–3.0 cm, bristles notably tufted around receptacle base. Petals 4, dark to lavender purple, rarely reddish, obovate, 4.2–7.2 × 3.8–6.8 cm. Filaments bluish, anthers yellow-orange. Ovary densely covered in spreading bristles. Style 5–11 mm; stilar disc surmounting ovary 6–9 mm in diameter. Stigma yellow, clavate, 4–5 mm. Capsule globose to subglobose, 1.5–1.6 × 0.8–0.9 cm, probably 5–7-valved, with indumentum of dense, spreading bristles.

Fig. 3d

**Distribution:** Nepal and Tibetan Plateau.



**Altitudinal range:** 3600–4900 m.

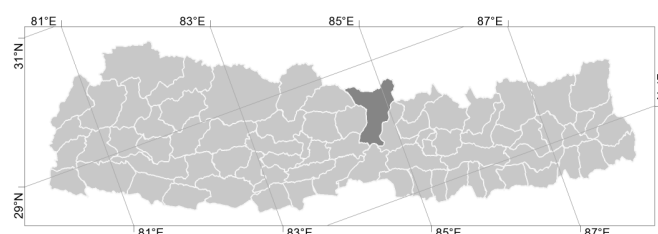
**Ecology:** Rocky grassland, stream-sides.

**Flowering:** June–August.

**14. *Meconopsis manasluensis*** P.A. Egan, Phytotaxa 20: 50 (2011).

Monocarpic herbs, 30–60 cm. Stems multiple, to 1.5 cm in diameter at base, partially fusing above the rootstock crown 2.5–3.0 cm wide. Indumentum a sparse to moderately dense cover of 3–6 mm fawn or orange barbellate bristles, present on both adaxial and abaxial leaf surfaces and petioles. Leaves cauline and in basal rosettes. Petioles 3–5 cm, winged, uppermost cauline leaves and bracts reduced and sessile. Laminas obelliptic to narrow oblanceolate, 6.5–15.5 × 1.5–3.0 cm, subacute or rounded at the apex, tapered at the leaf base, margins entire. Inflorescence racemose, ca. 30-flowered, the flowers borne singly on the central axis and on multiple, leafy lateral stems. Pedicels conspicuously elongate, 1.5–7.5 cm, decurrent on stem. Petals 4 or 5(–8), scarlet with darker, purple patches towards the base, broadly ellipsoidal to obovate, 2.0–3.0 × 1.0–2.0 cm. Filaments red-purple, anthers yellow-orange. Ovary densely covered with fawn to orange ascending bristles. Style long, 7–12 mm, slender, with stilar disc to 8 mm in diameter projecting beyond edge of ovary. Stigma yellow, capitate, 3–4 mm, generally 6-lobed. Capsule narrowly ovoid to cylindrical, 0.8–1.6 × 0.4–0.7 cm, dehiscent by 8 valves; indumentum of sparsely spreading bristles.

**Distribution:** Endemic to Nepal.



**Altitudinal range:** ca. 4000 m.

**Ecology:** Herb-rich alpine grasslands with scattered shrubs.

**Flowering:** July–August.

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

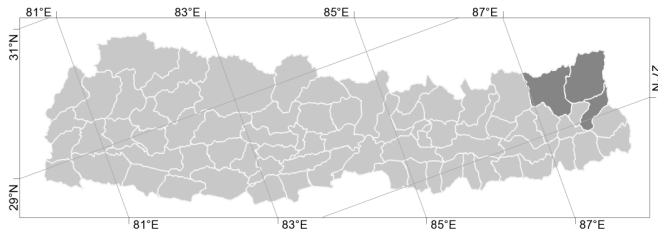
Monocarpic herb 30–60 cm, to 1 m in fruit. Stems ca. 1.5 cm in diameter at base, clothed with golden brown, barbellate, 3–5 mm spreading or reflexed bristles. Leaves mostly in dense basal rosettes. Petioles 5–14 cm, cauline leaves sessile to subsessile. Laminas oblanceolate or elliptic oblanceolate, 7.5–17 × 0.8–3 cm, base usually attenuate, apex subacute or rounded, entire to coarsely toothed or 3–5-lobed nearer apex. Flowers borne on clustered, racemose inflorescences, 10–20 flowered. Pedicels 5–10 cm, decurrent on stem. Petals 4, yellow (blue or purple), obovate, 3.5–5.0 × 2.5–4.0 cm. Filaments the same colour as petals, anthers yellow. Ovary

**Papaveraceae**

oblong, densely yellow bristly. Style 3-7 mm, slender; stylar disc lobed, surmounting ovary, to 14 mm in diameter. Stigma yellowish, capitate, generally 6-lobed. Capsules subglobose to oblong, 0.5–1.7 × 0.5–1.3 cm, dehiscent by 6–8 valves, with indumentum of appressed bristles.

Fig. 3e

**Distribution:** Nepal and E Himalaya.



**Altitudinal range:** 3100–4600 m.

**Ecology:** Open rocky slopes, scree, cliff ledges.

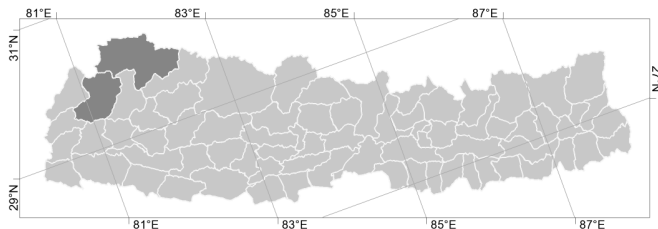
**Flowering:** June–August. **Fruiting:** August–September.

Only the yellow-flowered form of *Meconopsis discigera* is recorded from Nepal, blue and purple forms are known in other E Himalaya countries.

**16. Meconopsis simikotensis** Grey-Wilson, *Alpine Gardener* 74(2): 220 (2006).

Monocarpic herb reaching to 100 cm, or longer in fruit. Stem to 2.5 cm in diameter at base, moderately to densely covered in long, spreading, pale yellow to orange, 5–13 mm, barbellate bristles, with persistent leaf remains at base. Leaves cauline and in basal rosettes. Petioles 7.5–13.5 cm, cauline leaves mostly sessile. Lamina elliptic-oblong, 15–19 × 1.4–2 cm, base attenuate, apex subacute, margins entire to coarsely toothed. Inflorescence racemose, 8–22-flowered. Pedicels 8–10 mm, densely pubescent. Petals 4, blue or purplish blue, obovate or orbicular, 2.3–3.9 × 1.7–3.5 cm. Filaments dark purple, whitish towards base; anthers yellow. Ovary covered in semi-appressed to ascending pale yellow or orange bristles. Style 2–4 mm; stylar disc surmounting ovary 9–13 mm in diameter. Stigma cream to yellow or brownish, capitate, 8 or 9 lobed. Capsule obovoid-oblong, 0.9–1.7 × 0.7–1.1 cm, dehiscent by 9 valves, sparsely bristly.

**Distribution:** Endemic to Nepal.



**Altitudinal range:** 3300–4000 m.

**Ecology:** Alpine slopes, stream-sides.

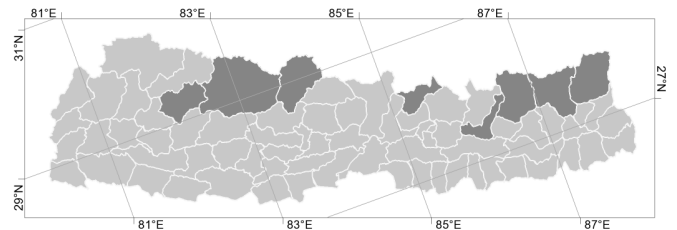
**Flowering:** June–July. **Fruiting:** August–September.

**17. Meconopsis grandis** Prain, *J. Asiat. Soc. Bengal*, Pt. 2, Nat. Hist. 64: 320 (1896).

चिल्दर Childar (Nepali).

Polycarpic herb, 12–100 cm. Stem to ca. 1.5 cm in diameter at base, mostly densely covered in spreading or reflexed pale yellow to orange, 3–7 mm, barbellate bristles. Leaves cauline and in basal rosettes. Petioles 9–20 cm, commonly winged, upper cauline leaves aggregated in false whorl, sessile. Laminas oblanceolate to lanceolate or elliptic-oblong, 6.5–28 × 1.3–5.5 cm, base rounded to attenuate, apex acute or subacute, margin sub-entire to coarsely serrate. Flowers usually 1–3, solitary in the axils of uppermost leaves. Pedicels 5–27 cm. Petals usually 4–6, blue or purple, suborbicular or broadly obovate, 4.5–7 × 3.4–6 cm. Filaments whitish, anthers yellow or orange-yellow. Ovary glabrous to densely bristly, bristles appressed to spreading. Style 2–5 mm, slender. Stigma whitish or green, clavate, 4–6-lobed. Capsule narrowly ellipsoid-oblong, 1.9–4.4 × 1.2–1.5 cm, dehiscent by 4–6 valves, usually glabrous.

**Distribution:** Nepal, E Himalaya and Tibetan Plateau.



A third subspecies (subsp. *orientalis* C. Grey-Wilson) is found mostly in NE Bhutan and Arunachal Pradesh. *M. grandis* is scarcely found in C Nepal, and populations there may be the result of naturalization following anthropogenic spread of the species.

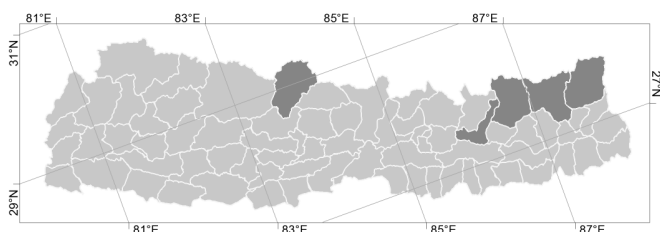
The plant is used to treat fevers associated with lung and liver diseases. Seeds are roasted and pickled by Sherpas and Tamangs.

- 1a Plants more than 40 cm tall. Basal leaves broad, 2–4.8 cm wide ..... subsp. **grandis**
- b Plants usually less than 35 cm tall. Basal leaves narrow, up to 2.7 cm wide ... subsp. **jumlaensis**

**1. Meconopsis grandis** Prain subsp. **grandis**

Plant more than 40 cm tall. Basal leaves broad, 2–4.8 cm wide.

**Distribution:** Nepal and E Himalaya.



**Altitudinal range:** 3100–4500 m.

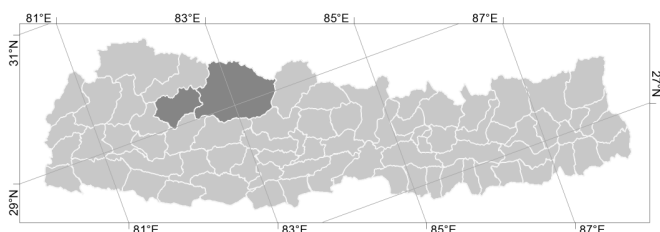
**Ecology:** Moist grasslands, shady slopes and forest margins.

**Flowering:** June–July. **Fruiting:** August–September.

**2. *Meconopsis grandis* subsp. *jumlaensis*** C.Grey-Wilson, *Sibbaldia* 8: 82 (2011).

Plant usually less than 35 cm tall. Basal leaves narrow, up to 2.7 cm wide.

**Distribution:** Endemic to Nepal.



**Altitudinal range:** 3300–4400 m.

**Ecology:** Open, grassy slopes and at forest margins under *Rhododendron*, *Abies* and *Betula*.

**Flowering:** May–July.

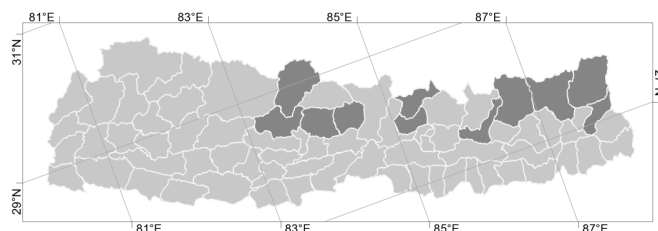
**18. *Meconopsis simplicifolia*** (D.Don) Walp., *Repert. Bot. Syst.* 1(1): 110 (1842).  
*Papaver simplicifolium* D.Don, *Prodr. Fl. Nepal.*: 197 (1825);  
*Polychaetia scapigera* Wall. nom. nud.; *Stylophorum simplicifolium* (D.Don) Spreng.

Polycarpic or monocarpic herb, 60–110 cm. Stem slender, 3–10 mm in diameter. Indumentum of sparse reflexed or spreading, soft whitish, ca. 3 mm, barbellate hairs. Leaves in basal rosettes only. Petioles variable, 5–18 cm, or leaves sessile. Laminas very variable in size and shape, oblanceolate, spatulate, elliptic-lanceolate to oblong, 3.5–16 × 1.5–4.6 cm, base attenuate, apex subacute to obtuse, margin entire or slightly toothed to sinuate lobed. Inflorescence scapose, flowers solitary on 1 or 2, slender, leafless, suberect to erect, basal scapes. Petals usually 6–10, sky blue, purple-blue or lavender, obovate, 2.0–5.0 × 1.0–3.0 cm. Filaments dark purple, anthers golden yellow or orange. Ovary glabrescent to sparsely pubescent, bristles pale yellow sometimes with reddish base, spreading. Style 2–12 mm, slender or stout. Stigma yellow-green, capitate or subclavate, 4–9-lobed, lobes frequently distinctly decurrent. Capsule

oblong-ellipsoid or oblong-obovoid, 3.1–4.9 × 0.6–1.4 cm, dehiscent by 4–9 valves, glabrescent to sparsely bristly, bristles reflexed to spreading.

Fig. 3f-g

**Distribution:** Nepal and E Himalaya.



**Altitudinal range:** 3300–4900 m.

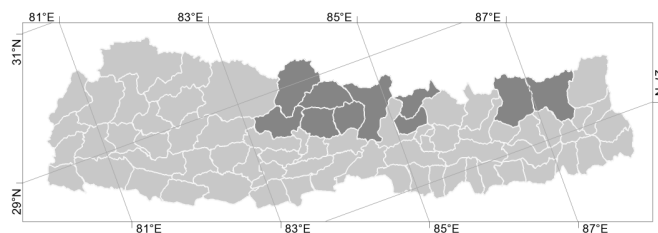
**Ecology:** Amongst low scrub and rocks on open slopes.

**Flowering:** May–June. **Fruiting:** September–October.

**19. *Meconopsis bella*** Prain, *J. Asiat. Soc. Bengal*, Pt. 2, *Nat. Hist.* 63(2): 82 (1894).

Dwarf polycarpic herb 8–20 cm. Stem to 2.5 cm in diameter. Indumentum sparse, ca. 3 mm barbellate-bristly or glabrous. Leaves all basal, numerous, crowded. Petioles 2.5–10 cm. Laminas very variable, usually elliptic, lanceolate or oblong, 1–7 × 1–4 cm, base attenuate, apex obtuse, entire to deeply and irregularly pinnatisect or bipinnatisect, ultimate segment usually 3-fid, obovate or obovate-oblong in outline. Flowers solitary on 2–8, leafless, recurved, 3–17 cm scapes. Petals 4, pale blue, pink or purple, obovate to suborbicular, 2.0–3.0 × 2.0–2.5 cm. Filaments pale to dark blue, anthers golden yellow to orange. Ovary glabrous or sparsely bristly. Style 2–3 mm, stout at base. Stigma green, capitate, 4–7 lobed. Capsules narrowly obovoid or pear shaped, 0.5–1.2 × 0.4–0.8 mm, dehiscent by 4–7 valves, glabrous or with a sparse indumentum of spreading bristles.

**Distribution:** Nepal and E Himalaya.



**Altitudinal range:** 3600–5300 m.

**Ecology:** Rock crevices, steep grassland, low scrub.

**Flowering:** June–August. **Fruiting:** September–October.

**20. *Meconopsis horridula*** Hook.f. & Thomson, *Fl. Ind.* 1: 252 (1855).

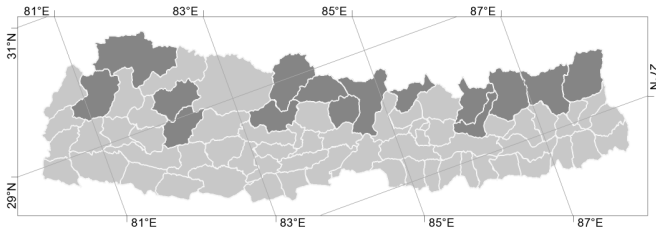
## Papaveraceae

*Meconopsis horridula* var. *rudis* Prain; *M. prattii* (Prain) Prain; *M. rudis* (Prain) Prain; *M. sinuata* var. *prattii* Prain.

ཅཱར་གུན Chhar-gun (Tibetan).

Monocarpic herb 5–39 cm. Stem 6–15 mm in diameter at base. Indumentum sparse to dense with rigid, 4–8 mm, spreading, straw-coloured to yellow-orange bristles, commonly with purple base on buds and capsules. Leaves in basal rosettes only. Petioles 0.7–7.4 cm. Laminas lanceolate, oblanceolate or elliptic-oblong, 3.2–15.9 × 1.2–6.2 cm, base usually attenuate, apex acute or subacute, rarely to subrounded, margin entire to irregularly toothed. Inflorescence of erect to recurved scapes, 6–18-flowered, or flowers borne in a raceme composed of partly fused scapes usually also with accompanying basal scapes. Petals 6(–10), light purple to sky blue, rarely white, frequently pinkish around petal base, obovate, 2.1–4.6 × 1.5–3.0 cm. Filaments dark purple, commonly pinkish towards base, anthers yellow. Ovary densely covered with appressed to ascending bristles. Style green or reddish, 2–9 mm, stout. Stigma whitish or yellow, linear or capitate, 5–8-lobed. Capsule broadly ellipsoid-oblong to ovoid, 8–18 × 5–12 mm, dehiscent by 5–8 valves, with a moderate to dense indumentum of thick spreading bristles.

**Distribution:** Nepal, E Himalaya, Tibetan Plateau, Assam-Burma and E Asia.



**Altitudinal range:** 3700–5300 m.

**Ecology:** Rocky slopes, among boulders and crevices.

**Flowering:** July–August. **Fruiting:** August–September.

Widespread in the Pan Himalayan region, but morphologically very variable and in need of taxonomic revision across its whole distribution.

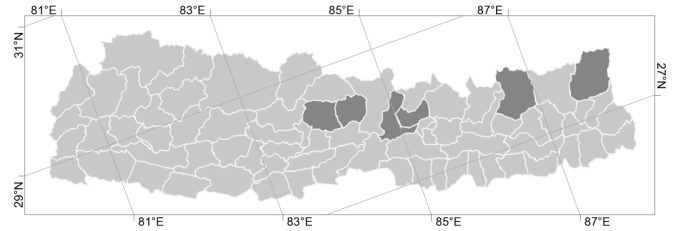
The plant is used to treat fevers, colds, sinusitis, itching, wounds and lung, skin and bile diseases.

**21. *Meconopsis sinuata*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64: 314 (1896).

Monocarpic herb, 20–80 cm. Stem to 15 mm in diameter at base. Indumentum moderately dense, with slightly reflexed to spreading yellowish or orange-brown, 2–7 mm, spiny bristles. Leaves cauline and in sparse basal rosettes. Petioles 2–9 cm, upper cauline leaves sessile, semi-amplexicaul. Laminas narrowly oblanceolate to oblong, 4–9 × 2–3 cm, base rounded or attenuate, apex obtuse, margin coarsely or finely sinuate-lobed to subentire, lobes rounded or acute. Inflorescence racemose, flowers 4–8, on 15 cm pedicels. Petals 4, blue,

purple to pale purple, obovate, 2.0–3.2 × 1.5–2.0 cm, apex rounded to subacute. Filaments the same colour as petals, anthers yellow-orange. Ovary moderately appressed bristly. Style 4–8 mm, slender. Stigma yellow, capitate or subclavate. Capsule narrowly obovoid or ellipsoidal, 1.0–4.0 × 0.5–1.0 cm, dehiscent by 3 or 4 valves, sparsely to moderately hairy, bristles ascendant.

**Distribution:** Nepal and E Himalaya.



**Altitudinal range:** 3600–4300 m.

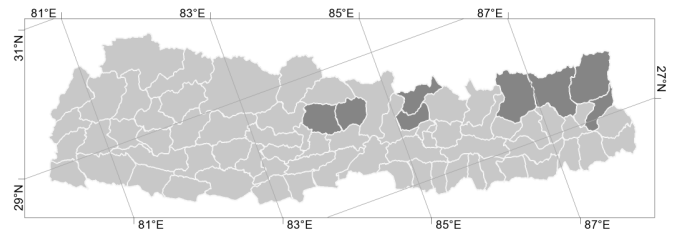
**Ecology:** Forest margins, scrub and rocky crevices.

**Flowering:** July–August. **Fruiting:** September–October.

**22. *Meconopsis lyrata*** (H.A.Cummins & Prain ex Prain) Fedde ex Prain, Kew Bull. 1915: 142 (1915). *Cathcartia lyrata* H.A.Cummins & Prain ex Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64(3): 325 (1896); *Cathcartia polygonoides* Prain; *Meconopsis compta* Prain; *M. polygonoides* (Prain) Prain.

Monocarpic herb, erect to ascending, 10–35 cm. Stems to 5 mm in diameter at base. Indumentum sparsely yellow-brown bristly, hairs 2 or 3 mm, or glabrous. Leaves cauline and basal, few. Petioles 1.5–4 cm, bulbils sometimes present in axils, upper cauline leaves sessile. Laminas very variable, ovate, oblong, spatulate or oblanceolate, 1–4.5 × 0.5–2.5 cm, base rounded or subcordate, attenuate into petiole, apex acute or rounded, margin entire to pinnatifid or lyrate. Inflorescence racemose with up to 5 flowers, or flowers solitary on basal scapes. Pedicels 2–15 cm. Petals 4(–6), blue, pale purple-pink or white, obovate, 0.9–1.9 × 0.4–2.0 cm, acute to subrounded at apex. Filaments the same colour as petals, anthers golden-yellow. Ovary glabrous. Style short, 2–4 mm. Stigma subclavate, 2–4 lobed. Capsules narrowly oblong or subcylindrical, ca. 2.5 cm long, dehiscent by 3–4 valves, glabrous.

**Distribution:** Nepal, E Himalaya, Tibetan Plateau and E Asia.



**Altitudinal range:** 3200–4600 m.

**Flowering:** July–August. **Fruiting:** September–October.

**Ecology:** Among scrub and on steep grassy slopes.

#### 4. *Cathcartia* Hook.f. ex Hook., Bot. Mag. 77: pl. 4596 (1851).

Paul A. Egan

Erect to ascending, polycarpic perennial herbs. Root short, stout, branching into fibrous rootlets, crowned with persistent remains of withered leaf bases. Latex watery. Indumentum sparsely to densely barbellate-villous or glabrescent throughout. Not glaucous. Stems multiple. Basal leaves in rosettes, distinctly petiolate. Cauline leaves petiolate to sessile. Leaves evenly coloured above, palmate or trifoliolate, ovate to orbicular, bi-pinnatifid. Inflorescence determinate, simple, or rarely sparingly branched, flowers in axils of leaf-like bracts. Flower buds erect or nodding. Flowers, semi-nutant to lateral-facing. Sepals 2, lacking apical horn. Corolla saucer-shaped. Petals 4, bright yellow, obovate to suborbicular, apex rounded, margins entire to somewhat emarginate. Ovary 4–7-carpellate, narrowly oblong, glabrous or densely appressed bristly. Style very short or absent. Stigmatic lobes stellately radiating. Capsule 4–7 valvate, septicidal, dehiscent from a third to almost to base. Seeds ovoid or subreniform with rounded ends, alveolate.

A genus of two species with a disjunct distribution between E Himalaya and NE Myanmar/NW Yunnan. One species in Nepal.

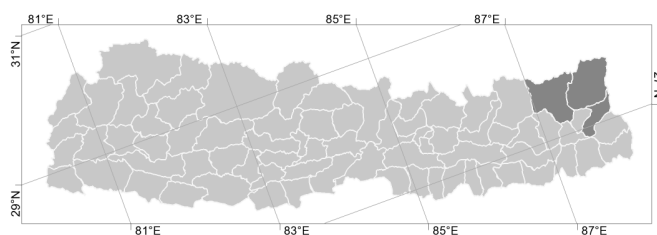
*Cathcartia* has often been united with *Meconopsis*, but the current consensus is that the genera are distinct.

##### 1. *Cathcartia villosa* Hook.f. ex Hook., Bot. Mag. 77: pl. 4596 (1851).

*Meconopsis villosa* (Hook.f. ex Hook.) G. Taylor.

Perennial, polycarpic herb to 70 cm. Stems 5–12 mm in diameter at base. Indumentum of spreading, greyish or fawn-coloured, 3–5 mm villous bristles throughout. Petioles 3–25 cm, cauline leaves more shortly petiolate or sessile. Leaves orbicular or less commonly broadly ovate, shallowly to deeply 3- or 5-palmately segmented, 3–12 × 3–11.4 cm, base cordate or broadly cuneate. Leaf segments coarsely lobed to shallowly bi-pinnatifid, lobes subacute to rounded at apex. Flowers 1–5 per stem, to 3.5–5 cm across. Pedicels 3–14 cm. Petals 4, bright yellow, obovate to suborbicular, 2.5–3.5 × 1.5–3.8 cm. Filaments golden-yellow with yellow anthers, these turning to dark-brown with age. Ovary glabrous, narrowly oblong or subcylindric, ribbed, 4.0–9.0 × 0.5–0.7 cm, glabrous. Fig. 1g–h

**Distribution:** Nepal and E Himalaya.



**Altitudinal range:** 2600–3700 m.

**Ecology:** Open rocky meadows, forests, damp clefts between boulders.

**Flowering:** June–August. **Fruiting:** August–September.

Although *Cathcartia villosa* is widely described as lacking a style, short styles have been observed in some specimens.

#### 5. *Dicranostigma* Hook.f. & Thomson, Fl. Ind. 1: 255 (1855).

Colin A. Pendry

Biennial or short-lived perennial herbs, shortly pubescent or glabrescent, latex milky yellow or orange-yellow (staining). Taproot stout, narrowly fusiform. Stems several, ascending to spreading, usually little-branched. Basal leaves many in a dense rosette, petiolate, pinnatifid, pinnatifid, or bipinnatifid. Cauline leaves alternate, sessile, similar to basal leaves. Flowers terminal, solitary, 2-merous, bracteate. Pedicel slender, usually glabrous, bracteolate. Sepals 2, ovate or broadly ovate, glabrous or shortly pubescent, apiculate. Petals 4, yellow or orange, obovate or suborbicular. Stamens many, filaments filiform, anthers oblong, 2-celled, dehiscent by longitudinal slits, basifixed. Ovary 1-locular, 2-carpellate, terete, pubescent. Style short, stout, stigmas 2, ascending, capitate. Capsule terete, 2-valvate, septicidal, splitting from below style to almost the base, remaining attached to the style, shortly pubescent or glabrous. Seeds ovoid, pitted.

## Papaveraceae

Worldwide three species in temperate or alpine regions in the Himalaya and China. One species in Nepal.

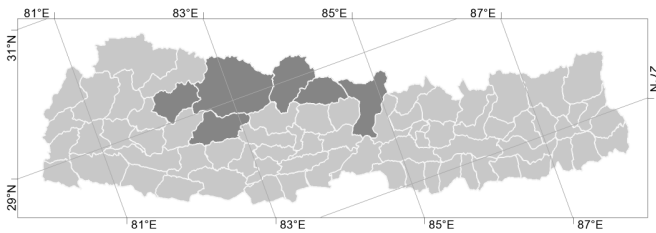
1. *Dicranostigma lactuoides* Hook.f. & Thomson, Fl. Ind. 1: 255 (1855).  
*Stylophorum lactuoides* (Hook.f. & Thomson) Benth. & Hook.f. nom. inval.

दूधै साग Dudhe saag (Nepali).

Herb 15–60 cm tall, shortly pubescent. Roots to 1.5 cm thick, apex, densely covered with persistent withered leaf bases. Stems sparsely villous or almost glabrous. Petioles of basal leaves ciliate-winged, 2–10 cm, sparsely shortly pubescent. Basal leaves glaucous above, paler below, sometimes with green or purplish blotches, elliptic to narrowly obovate, 5–15 × 1.5–6 cm (larger later in season to 25 cm), deeply pinnatilobate to pinnatisect, the basal lobes smaller, margins sinuate or with thick, mucronate teeth, both surfaces sparsely shortly pubescent. Cauline leaves sessile, 2–6 × 2.5–4 cm, similar to basal leaves but smaller, lobes 1–3 pairs. Pedicels 3.5–10(–15) cm, curved. Flower buds ovoid, 1.5–2 cm, flowers 3–5 cm diameter. Sepals ovate or broadly ovate, 1–2 cm, apex with short blunt horn, margin membranous, glabrous or shortly pubescent. Petals bright yellow or orange-yellow, broadly obovate, 1.5–2.5 × 1–2 cm. Stamens 4–7 mm, anthers yellow, linear-oblong, ca. 2 mm. Ovary narrowly ovoid, 8–10 mm, shortly pubescent, style 1–2 mm, stigmas 1.5 mm. Capsule very narrowly ellipsoid, slightly broader toward base, often slightly curved, 4–8(–11) cm × 4–5 mm, beaked, shortly puberulent or glabrous. Seeds ca. 1 mm.

Fig. 1i

**Distribution:** Nepal, W Himalaya, Tibetan Plateau and E Asia.



**Altitudinal range:** 2400–4400 m.

**Ecology:** Dry exposed open areas, bare earthen or rocky slopes, semi-stable scree, gravel banks by riversides, grassy areas or open shrubland.

**Flowering:** (May–)June–August(–September). **Fruiting:** (May–)June–September(–October).

Plant used medicinally for liver complaints, the juice used to disinfect open wounds, and powdered roots used by women to ease delivery of the after-birth.



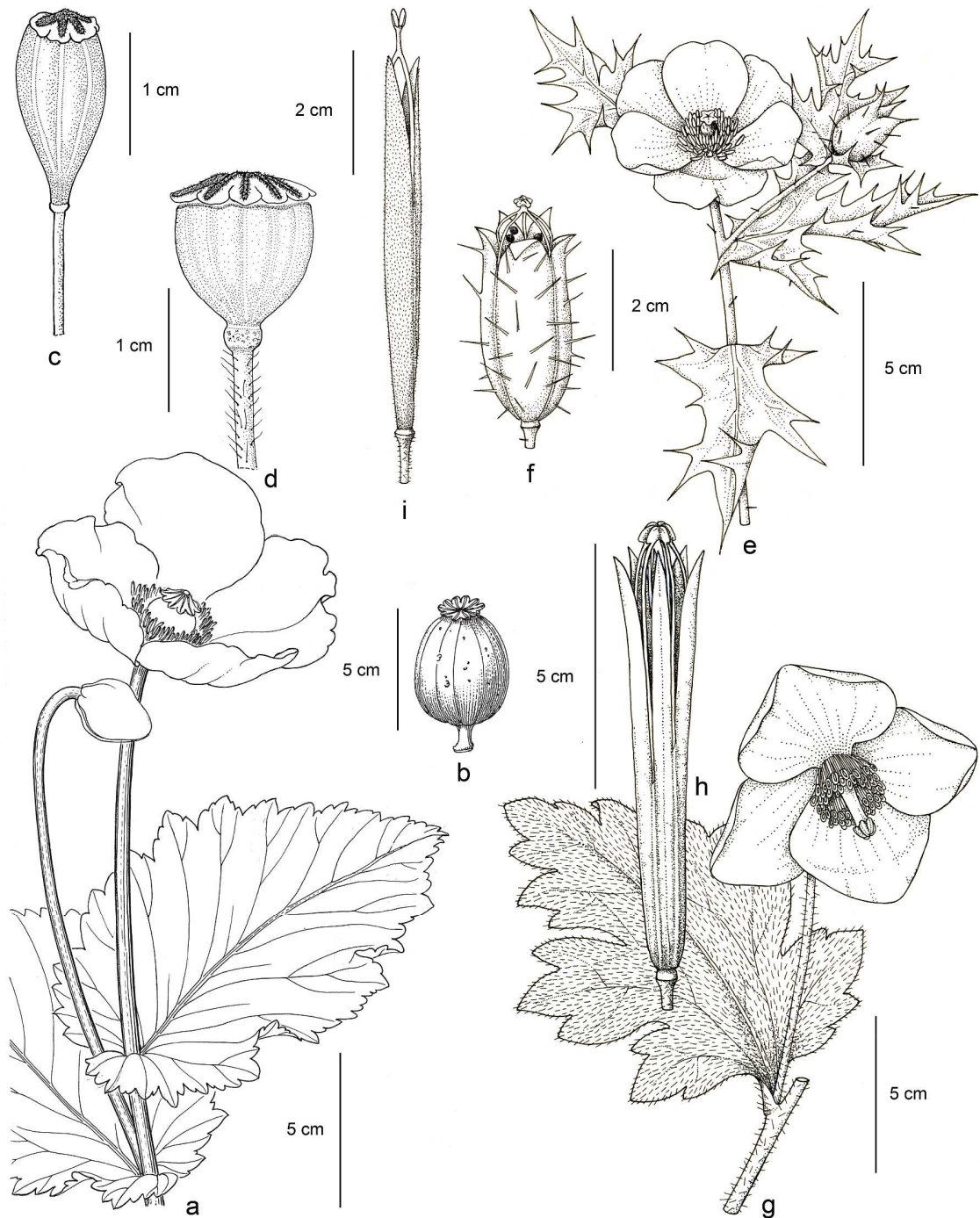


Fig. 1.  
 PAPAVERACEAE. ***Papaver somniferum***: a, leaves and flowers; b, capsule. ***Papaver dubium* subsp. *glabrum***: c, capsule. ***Papaver rhoeas***: d, capsule. ***Argemone mexicana***: e, leaves and flower; f, capsule. ***Cathcartia villosa***: g, leaf and flower; h, capsule. ***Dicranostigma lactucoides***: i, capsule.

Papaveraceae

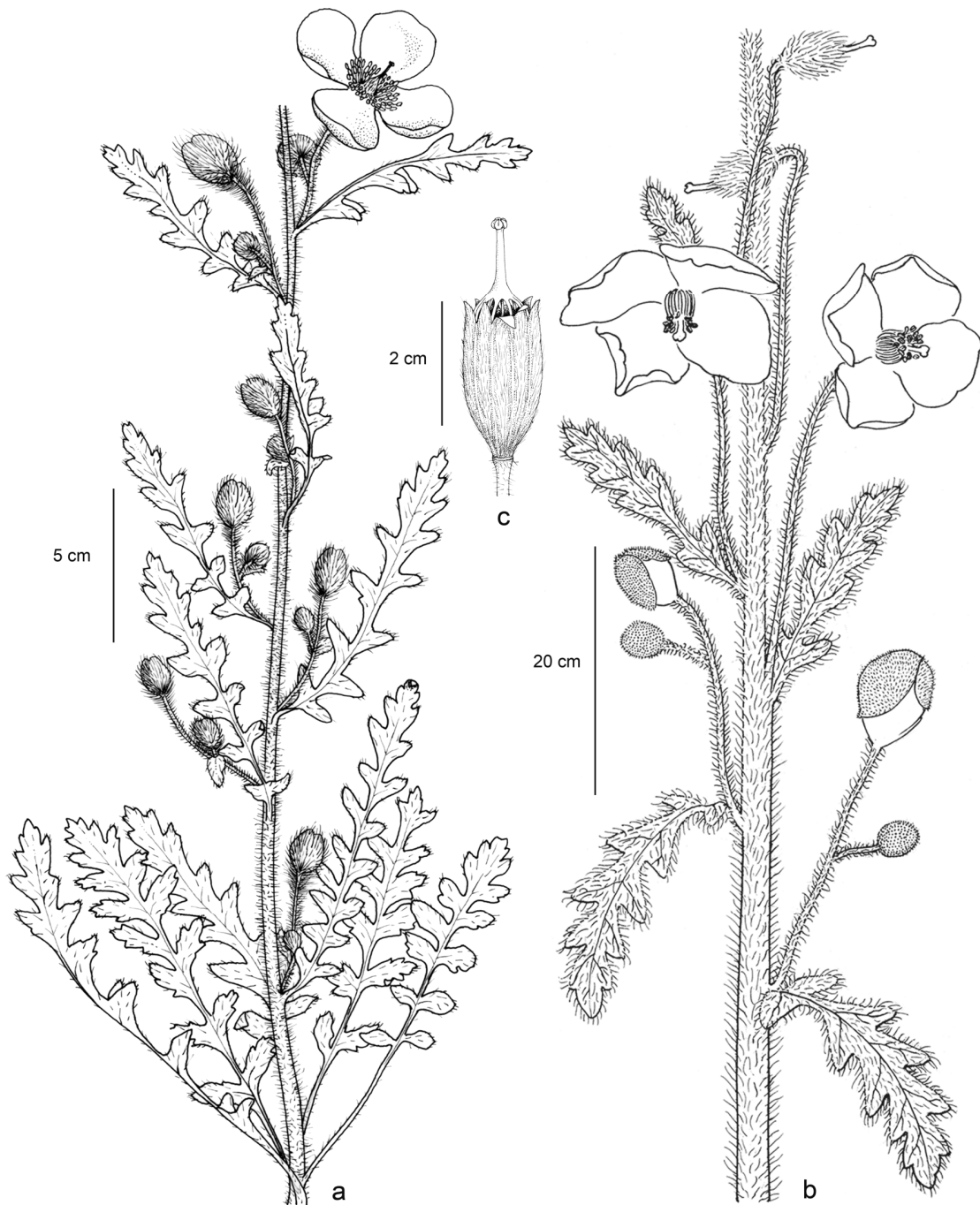


Fig. 2.  
PAPAVERACEAE. *Meconopsis ganeshensis*: a, flowering stem. *Meconopsis paniculata*: b,  
flowering stem; c, capsule.

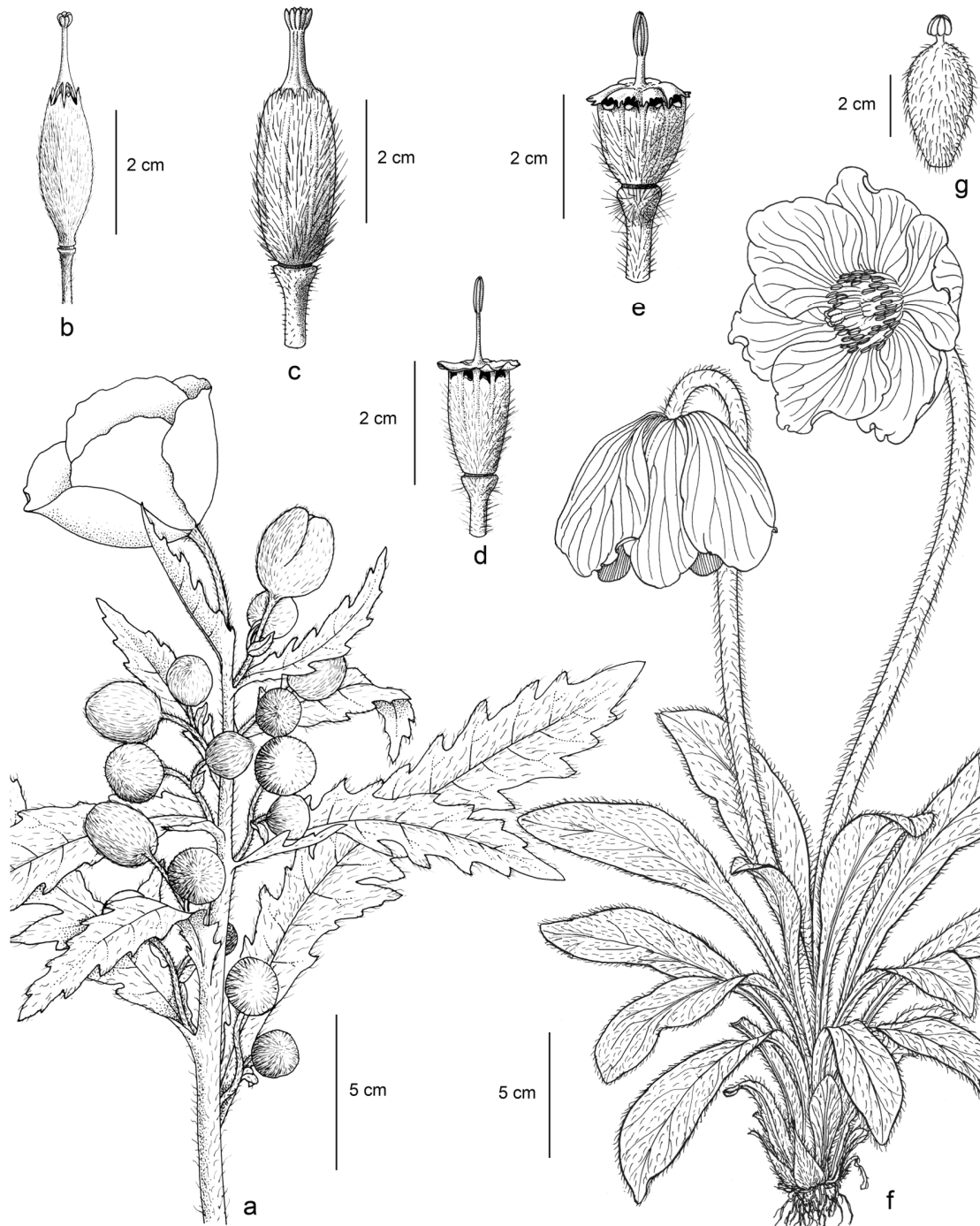


Fig. 3.  
 PAPAVERACEAE. **Meconopsis staintonii**: a, flowering stem; b, capsule. **Meconopsis taylorii**: c, capsule. **Meconopsis pinnatifolia**: d, capsule. **Meconopsis discigera**: e, capsule. **Meconopsis simplicifolia**: f, flowering plant; g, capsule.

## Papaveraceae

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### Fig. 1

- a,b FOCI 7: 290. FRPS 32: pl. 12. Yang Jiankun
- c,d FOB 1(2): fig. 32. Mary Bates
- e,f FOB 1(2): fig. 32. Mary Bates
- g FOB 1(2): fig. 32. Mary Bates

### Fig. 2

- a Louise Olley
- b,c FOCI 7: 279. FRPS 32: pl 3. Yang Jiankun

### Fig. 3

- a-e Louise Olley
- f,g FOCI 7: 283. FRPS 32: pl. 7. Li Xichou

## How to use this pdf web edition

This Web-edition pdf document forms part of a set of Flora accounts for families and genera that have been finalized, including those in volumes yet to be printed. These pdf documents are made accessible via the *Flora of Nepal* website ([www.floraofnepal.org](http://www.floraofnepal.org)) and will be periodically updated in numbered versions, permanently available and citable.

*Flora of Nepal* takes an innovative approach to Flora writing, with an underlying data base system managing the *Flora of Nepal Knowledge Base* from which the printed volumes and the 'online Flora' ([www.floraofnepal.org](http://www.floraofnepal.org)) are generated. The Internet-accessible dataset augments the printed Flora by presenting all herbarium specimen data, detailed taxonomic information (such as full nomenclatural references and typification), distribution maps with point occurrences and images used when preparing the Flora. Much of this information is accumulated as a normal part of taxonomic working practices when undertaking a floristic revision, but it is usually lost to a wider audience as it is rarely included in the traditional printed Flora.

*Flora of Nepal* includes all native and fully naturalized vascular plants recorded within the political borders of Nepal, including brief references to agricultural and horticultural plants as appropriate. For pragmatic reasons the arrangement of families in the printed *Flora of Nepal* follows a modified Englerian sequence, closely following that of the *Flora of China* and, to a lesser extent, the *Flora of Bhutan*.<sup>1,2</sup> In recent years the world view on the arrangement of families has radically changed following overwhelming phylogenetic evidence. The emergent family-level classification, now in its third iteration as APG III, is reasonably stable and widely accepted.<sup>3</sup> It has not been possible to alter the family sequence in *Flora of Nepal* printed volumes midway through the project, but as the data are stored separately in a database, the families can be reorganized electronically at a later date to reflect alternative classifications. Circumscription of families and genera, however, generally does follow a contemporary understanding of their relationships, except where group experts advise otherwise. Genera and species are treated in taxonomic order, or if there is disagreement then morphologically similar species are usually grouped together or occasionally listed alphabetically. Intraspecific taxa are always presented in alphabetical order. Intermediate ranks, such as subfamily, tribe, subgenus, section and series, are only used when they are useful in the treatment of large families or genera.

Information on nomenclature and classification is given for all accepted scientific names and synonyms pertaining to Nepal and nearby regions. Emphasis is given to those names listed in the primary checklists for Nepal: *Enumeration of the Flowering Plants of Nepal*,<sup>4</sup> *Annotated Checklist of the Flowering Plants of Nepal*,<sup>5</sup> and *Flowering Plants of Nepal (Phanerogams)*.<sup>6</sup> At the generic level, synonyms widely used in the Asian literature are included. Full bibliographic citation with authorship is given for all accepted names and their basionyms at the rank of genus and below. As far as possible, the bibliographic citations of all accepted names and their basionyms have been verified with the original literature. The basionym precedes all other synonyms, which are listed alphabetically. Misapplied names (misidentifications encountered in the literature) are not included in synonymy, but are discussed in the supporting information at the end of a taxon. Authors of plant names follow the standard forms given in *Authors of Plant Names* and its continuously updated online supplement ([www.ipni.org](http://www.ipni.org)).<sup>7</sup> Bibliographic references are given using the standard abbreviations in BPH-2 for serial publications (journals and periodicals) and in TL-2 (and its supplements) for books.<sup>8,9</sup> In some cases books were published in several fascicles on different dates, sometimes over different years, but not indicated as such in the printed work. Date of publication is critical for establishing nomenclatural priority, and so it is important to be precise when citing names published in such works. The fascicle composition and publication dates of these often complex cases are clearly explained in TL-2, but the standard abbreviation does not differentiate between them. In these instances the TL-2 abbreviation has been amended with brackets to clearly indicate which fascicle is being referred to, for example Wallich, N., Pl. As. Rar. 2[8]. 1831. Books and periodicals not included in these two standard references have been abbreviated according to the recommendation in Appendix A of BPH-2.

Where a taxon has a widely recognized local name this is given in Devanagari script, followed by its transliteration into the Latin alphabet and the language of the vernacular name in parentheses '( )'. One local name is given in the printed Flora, whereas multiple alternative vernacular names in different languages may be included in the *Flora of Nepal Knowledge Base* and made available online. Separate indexes to vernacular names in Devanagari, their Latin transliterations and scientific names are included at the end of each volume.

Descriptions are given for all taxa (family, genus, species, infraspecies and occasionally intermediate ranks) and wherever possible are based on primary observations and measurements made on specimens from Nepal. If no such material was available to authors, descriptions are taken from specimens from adjacent countries or secondary sources, and annotated as such. Most descriptions are about 150 words long, but exceptionally they are shorter or longer depending on the complexity of the taxon being described. For species with more than one infraspecific taxon, a full description is given for the species and short diagnoses for the lower taxa. Descriptions aim to be consistent and parallel between taxa of the same rank within a higher taxon. Authors were asked to standardize descriptive terms using the definitions given in *Plant Identification Terminology*.<sup>10</sup> If a single measurement is given it refers to length, and if width is also given it is in the format length x width. Ranges are separated by an en-dash (–) and discontinuous states by the word 'or'. Exceptional measurements are given in parentheses '( )'. Taxon statistics and short statements on worldwide distribution are provided for families and genera, with summary statistics of lower taxa represented in Nepal.

Identification keys are dichotomous and presented in a bracketed format, with all elements strictly parallel between the two leads of each couplet. Keys are artificial and not intended to reflect any taxonomic classification. There is usually a single key to genera within a family, combining flowering, fruiting and vegetative characters, but where this is unwieldy separate keys are given for flowering and fruiting material (e.g. Cruciferae, Rosaceae). Keys are also given for species within a genus and taxa within a species. Figures are provided to aid identification by illustrating the diagnostic characters of each family and genus, and for large genera variation in major morphological features is represented.

The geographic distribution within Nepal is indicated for each species and infraspecific taxon at the political district level by a shaded distribution map. The distribution maps are evidence-based, produced from the *Flora of Nepal Knowledge Base* using locality information taken from authenticated herbarium specimens and records of plants *in situ* made by credible observers. Ideally all specimens identified by authors should be geo-referenced and databased when they are preparing *Flora of Nepal* accounts, but where this is not possible a minimum of one specimen per district is required. Sometimes the distribution of a species is greater than the sum of the distribution maps of its infraspecific taxa. This is a result of some herbarium specimens only being identifiable to species level. Occasionally species are known only from poorly localised collections, especially those from the early 19th century. For example, Wallich often only gave 'Nepalia' as the locality for many of his 1820–1821 collections. These specimens are most likely to have come from the Kathmandu Valley, known as the 'Nepal Valley' or just 'Nepal' at that time, but they might also have been collected during his inward and outward journeys from India via Hetauda, or by pilgrims going north to 'Gossainthan' (Gossainkund). It is therefore impossible to be sure of the correct district and in such cases this is noted in the supporting information and the map omitted. The *Flora of Nepal* website gives access to the underlying distribution and specimen information through an interactive dot map plotting all geo-referenced occurrence records and a listing of all material recorded.

Distribution for species and infraspecific taxa occurring outside Nepal is indicated by a list of geographical regions, with the resolution becoming coarser with increasing distance from Nepal. In order to utilise information contained within other published Floras these areas are defined according to political borders, with countries or provinces grouped to form regions that have some underlying biogeographic basis. For example, although the Tibetan Plateau extends into parts of Sichuan and Yunnan, we limit it to Xizang and Qinghai. *Flora of Nepal* takes no stance on any politically disputed border areas and is following the current

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international mapping convention of using the 'lines of control' to delineate its regions. The names used for the regions are intended to be descriptive and non-political. The regions are:

<i>W Himalaya</i>	India (Jammu & Kashmir, Himachal Pradesh, Uttarakhand), northern Pakistan (Khyber Pakhtunkhwa, previously known as North West Frontier Province).
<i>E Himalaya</i>	Sikkim, Darjeeling, Bhutan, NE India (Arunachal Pradesh).
<i>Tibetan Plateau</i>	China (Xizang, Qinghai).
<i>Assam-Burma</i>	Assam, Nagaland, Manipur, Myanmar.
<i>S Asia</i>	Eastern Pakistan (Punjab, Sind, Islamabad), Peninsular India, Sri Lanka, Bangladesh, Maldives.
<i>E Asia</i>	China (excluding Xizang, Xinjiang, Qinghai), Korea, Japan, Taiwan.
<i>SE Asia</i>	Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, Philippines, New Guinea.
<i>N Asia</i>	China (Xinjiang), Russia, Mongolia.
<i>C Asia</i>	Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan, Kyrgyzstan.
<i>SW Asia</i>	Afghanistan, western Pakistan (Baluchistan, Federally Administered Tribal Areas), Iran, Middle East, Arabian Peninsula, Turkey, Azerbaijan, Armenia, Georgia.
<i>Asia</i>	collective term for all above areas of Asia.
<i>Europe</i>	includes Ukraine, Belarus, Baltic republics.
<i>Africa</i>	includes Madagascar.
<i>N America</i>	includes C America south to Panama.
<i>S America</i>	south of Panama.
<i>Australasia</i>	Australia, New Zealand, Pacific Islands.
<i>Cosmopolitan</i>	collective term for a generally worldwide distribution.

Altitudes (elevation above sea level) are based on herbarium specimen data or records from credible observers. They are given to the nearest 100 m rounded up or down, with exceptional altitudes given in parentheses '( )'. Likewise, flowering and fruiting times are based on specimens collected from Nepal, or on material from adjacent regions if these data are lacking and a note is provided to explain this. The short statement on the ecological preference of each species and infraspecific taxon is mostly taken from herbarium specimen data. Currently these often lack detail, a reflection of the shortcomings of poor-quality data recorded by the past collectors of herbarium material, but these will improve with more field studies.

Supplementary information is given at the end of a taxon account discussing taxonomic issues, highlighting spot characters useful for identification, noting similar species that could cause confusion, and detailing the misapplication of names. Summary information is provided for ethnobotanical and other uses, but this is not intended to be exhaustive and is derived from secondary sources, such as *Plants and People of Nepal* and *A Compendium of Medicinal Plants of Nepal*.<sup>11, 12</sup>

## Abbreviations

Standard abbreviations for the International System of Units (SI) are used for measurements. Herbaria are cited using the standard abbreviation in *Index Herbariorum*.<sup>13</sup> Other abbreviations used in the text include:

C	central.
ca.	<i>circa</i> – about, approximately.
comb. nov.	<i>combinatio nova</i> – new combination of name and epithet.
dbh	diameter at breast height – measured on tree trunks at 1.3 m above the ground.
E	east, eastern.
et al.	<i>et alia</i> – and others.
fig.	figure.
N	north, northern.



nom. cons.	<i>nomen conservandum</i> – name officially conserved in ICBN. <sup>14</sup>
nom. illegit.	<i>nomen illegitimum</i> – illegitimate name, according to ICBN. <sup>14</sup>
nom. inval.	<i>nomen invalidum</i> – invalid name, according to ICBN. <sup>14</sup>
nom. nud.	<i>nomen nudum</i> – name lacking a description, or reference to an effectively published description, and so invalid according to ICBN. <sup>14</sup>
nom. rej.	<i>nomen rejiciendum</i> – name officially rejected in ICBN. <sup>14</sup>
nom. superfl.	<i>nomen superfluum</i> – name superfluous when published, and so illegitimate according to ICBN. <sup>14</sup>
pl.	plate.
q.v.	<i>quod vide</i> – which see.
S	south, southern.
s.l.	<i>sensu lato</i> – for a taxon treated in a broad sense.
s.s.	<i>sensu stricto</i> – for a taxon treated in a narrow sense.
sect.	section.
subfam.	subfamily.
subgen.	subgenus.
subsp.	subspecies.
subvar.	subvariety.
syn.	synonym
var.	variety.
W	west, western.
>	greater than
<	less than

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