Corydalis (Papaveraceae: Fumarioideae) in Nepal

Magnus Lidén
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Corydalis (Papaveraceae: Fumarioideae) in Nepal

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Synopsis

The genus Corydalis DC. in Nepal is revised. 44 species are recognized, 12 of which are known only from Nepal. A new section (sect. Mucroniferae Fedde ex Lidén) and ten new species are described: C. lowndesii, C. simplex, C. shakya, C. uncinate, C. uncinatea, C. terracina, C. stipulata, C. spicata, C. calycina, and C. pseudelongipes. C. elegans subsp. robusta is recognized as a new subspecies.

Introduction

During the last three decades large collections of plants have been made in Nepal by European, Nepalese, and Japanese botanists, setting the basis for the momentous work An enumeration of the flowering plants of Nepal (Hara et al., 1978–82). However, many genera, including Corydalis, have not been thoroughly studied.

Corydalis DC. is a large genus of about 300 species, only parts of which have been revised, and only on a regional basis (Michalkova, 1981, 1982; Ownbey, 1947). For the Himalayan representatives no comprehensive treatise has appeared since Prain’s revision of the Indian species (1896). Frank Ludlow devoted much of his later years to a study of the Himalayan Corydalis, and several new species were posthumously published (Ludlow & Stearn, 1975). Recently D. G. Long (1984) revised the species occurring in Bhutan and Sikkim, and added C. cavei to the flora of Nepal. The contributions of Wu et al. (1980, etc.) and Jafri (1974), from west China and Pakistan respectively, are also relevant.

Compared with Whitmore’s checklist (in Hara & Williams, 1979) twenty-one species (including five name changes) are added in the present treatise, while nine names are excluded or put in synonymy.

Materials and methods

The study is based chiefly on herbarium studies, where the collections of BM and KATH form the major parts. During a trip to Nepal in 1985 I saw several species in the field and collected some live material.

All collections studied are cited by their collector, number, and location. Polunin, Sykes & Williams and Stainton, Sykes & Williams are abbreviated as PSW and SSW respectively. My own observations (from the Annapurna area, and the region between Trisuli and Poykotang


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SE. of Ganesh Himal) are briefly given in quotations at the end of the distribution. All cited specimens have been seen by me, unless the contrary is indicated. Distribution maps are presented for all taxa, and distributions outside Nepal are briefly summarized. Shaded drawings were made from fresh flowers, contour drawings from resoftened flowers.

**Systematic summary**

**CORYDALIS DC.**

in Lamarck & De Candolle, 1805: 637, nom. cons. Type species: *C. solida* (L.) Clairville.

Herbs. Leaves ternately to pinnately divided, alternate or rarely opposite. Flowers zygomorphic, in bracteate racemes. Sepals petaloid, caducous. Upper petal spurred. Inner petals coherent at tip, flexible. Stamens two, each with a central diathecal and two lateral monothecal anthers. Upper stamen with a nectary protruding into the spur of the upper petal. Fruit a usually many-seeded capsule with black seeds carrying elaiosomes.

The genus can be subdivided into about twenty sections, seven of which are represented in Nepal:

1. *Leonticoides* is an Irano-Turanian section of tuberous plants. One species in Nepal.
2. *Fasciculatae* is probably the largest section in the genus, distributed in Himalaya, east Tibet, and west China. Seven species in Nepal.
3. *Hamatae* is a small group confined to high mountains in Tibet and west China. One species in Nepal.
4. *Capnogorium* comprises rosulate perennials and is especially important in west Himalaya and Tibet. It is not clearly delimited from the following sections. Seventeen species in Nepal.
5. *Mucroniferae* consists of dwarf high alpine species, some of which have a wide distribution on the Tibetan plateau (Wu & Shu, 1980). Three Nepalese species are provisionally placed here, following Wu & Shu (1980).
6. *Ramoso-sibiricae* is widely distributed in temperate Asia with disjunct occurrences in eastern Europe and East Africa. Many species of unknown affinities are often lumped together in this section. Twelve species in Nepal.
8. *Strictae* is a central Asiatic and Tibetan section with largely xerophytic taxa. Two representatives in Nepal, both widespread in western Tibet.

**Patterns of distribution**

The distribution of the Nepalese *Corydalis* is fairly congruent with Dobremez’ (1972) subdivision of Nepal into four phytogeographical regions (east, central, west, and northwest/Tibetan), and with Stainton’s (1972) more detailed ecologically oriented scheme. Some Tibetan species occur in Stainton’s ‘inner valleys’ as well as in Dobremez’ Tibetan division.

Of the western endemic (or nearly endemic) species, seven are described here, and the remaining two were described by Ludlow & Stearn as recently as 1975. West Nepal is perhaps still the most rewarding area to hunt for new species.

The taxa can be roughly distributed under the following phytogeographical headings:

1. Western taxa that do not extend beyond the Jumla area: *C. diphylla*, *C. nana*, *C. elegans* subsp. *elegans*, *C. shakya*, and *C. vaginans*.
2. Western taxa reaching the Arun valley: *C. govaniana*.
3. Western endemics: *C. pseudojuncea*, *C. elegans* subsp. *robusta*, *C. simplex*, *C. uncinata*, *C. uncinatella*, *C. clavibracteata*, *C. spicata*, and *C. calycina*.
4. Tibetan species: *C. conspersa*, *C. hendersonii*, *C. hookeri*, *C. stricta*, and *C. flabellata* (*C. uncinata* may also belong here).
5. Species endemic to central Nepal, or most of Nepal: *C. lowndesii*, *C. terracina*, *C. stipulata*, *C. megacalyx*, and *C. longipes*.
Corydalis in Nepal

6. Eastern species with their western limit in east or central Nepal: C. trifoliata, C. ecristata, C. polygalina, C. sikkimensis, C. geraniifolia, C. cavei (almost endemic), and C. pseudolongipes.

Life forms and ecology

The Nepalese species of Corydalis are essentially alpine. Three species only are found below 2000m (C. leptocarpa, C. terracina, C. chaerophylla). The first two of these are sometimes found in man-made habitats. Among the high altitude species there are also some which are favoured by human activities, for example C. hookeri and C. uncinata which are often found in, or close to, villages, fields, and herdsmen’s camps.

Corydalis casimiriana, C. calycina, and C. filicina usually grow in organic soil, in the grass turf of wet grazed meadows. They are apparently favoured by fire or animal trampling. Grassland is also the main habitat for some of the geophytic species of section Fasciculatae, but these species are often sensitive to grazing. In heavily grazed meadows C. juncea is frequently found concealed in low shrubs (e.g. Juniperus squamata), which give support to the very slender petioles and stem-bases, as well as protection from herbivores. The Fasciculatae are rarer in much disturbed ground or in burnt areas.

In the upper alpine zone, Corydalis species may form the bulk of the vegetation in certain habitats. Corydalis nana and C. hendersonii are found at the upper limit of vascular plant vegetation, over 6000m. In rough scree on the north side of the main Himalayan range, C. latiflora is sometimes dominant. Corydalis megacalyx is also common here, but prefers a finer substrate. These scree-species often have very long rhizomes, where the annual growth may
amount to one or a few decimetres, and the total length, which may involve several shoot
generations, up to at least seven dm. The ability to produce very long shoots in order to reach
the surface is essential to perennial scree-plants, as repeated covering by mobile material is
frequent. Storage tissues are always located in the oldest parts of the rhizome or usually in the
taproot, if it persists. Above the surface, these scree plants form low, loose cushions.
Yet another life form is represented by other species of section Capnogorium: rosulate
plants with axillary flowering shoots. They usually grow on more stable slopes, along tracks,
among boulders, etc., often close to running water, e.g. C. meifolia, C. stracheyi, and C.
govaniana. They have thick, more or less vertical, long rhizomes apically crowned by dense
remnants of dead petiole-bases and cataphylls. The rhizome splits with age into several
discrete conductive elements (which ultimately supply different rosettes), like a multistranded
rope. If taken apart, each element is able to sprout along its whole length.

Key to the species

1 Flowers blue, pink, or purple ......................................................... 2
   Flowers yellow .................................................................................. 9
2(1) Racemes capitate; pedicels c. 5 mm long ........................................ 8. conspersa (p. 495)
   Racemes not capitate; pedicels more than 5 mm long ....................... 3
3(2) Spur much shorter than limb of upper petal ............................... 4
   Spur equalling or longer than limb of upper petal ........................... 6
4(3) Stems 50–130 cm ........................................................................ 25. flaccida (p. 523)
   Stems less than 20 cm .................................................................... 5
5(4) Ultimate leaf-lobes obovate-obtuse .............................................. 9. latiflora (p. 499)
   Ultimate leaf-lobes narrow, acute .................................................. 10. nana (p. 503)
6(3) Fasciculate storage-roots present; stems with one cauline leaf .......................... 7
   Fasciculate storage-roots absent; stems with two or more leaves ....... 8
7(6) Bracts entire; cauline leaf trifoliolate .......................................... 2. trifoliata (p. 484)
   Bracts divided; cauline leaf more divided ...................................... 3. cashmeriana group (p. 485)
8(6) Stems with two opposite leaves, tuberous ................................... 1. diphylla (p. 484)
   Stems with alternate leaves, not tuberous .................................... 41. leptocarpa (p. 534)
9(1) Fasciculate storage-roots present on a short rhizome; stems leafless towards the tapering
   underground portion, basal rosette absent ..................................... 10
   Fasciculate storage-roots absent; stems (if leafless at base) originating from a basal rosette 13
10(9) Cauline leaves undivided, linear to lanceolate ................................ 11
   Cauline leaves pinnate ................................................................... 12
11(10) Bracts 30–50 mm; racemes 2–5-flowered ..................................... 4. pseudojuncea (p. 488)
   Bracts 5–20(–40) mm; racemes (3–)10–30(–40)-flowered .................. 5. juncea (p. 488)
12(10) Flowers 11–14 mm, dull yellow .............................................. 7. lowndesi (p. 491)
   Flowers 14–19 mm, yellow with dark apex .................................... 6. polygalina (p. 490)
13(9) Spur of upper petal much shorter than limb ................................ 14
   Spur of upper petal equalling limb ............................................... 19
14(13) Bracts entire ............................................................................... 15
   Bracts divided .............................................................................. 17
15(14) Racemes lax, corolla 8–12 mm long ......................................... 16
   Racemes very dense, corolla 15–17 mm long .................................. 42. stricta (p. 535)
16(15) Small slender plant; pedicels 5–20 mm, erecto-patent in fruit ......... 40. lathyroides (p. 534)
   Robust plant; pedicels 2–3 mm, bent downwards in fruit ................ 43. flabellata (p. 535)
17(14) Stems ascending, branched; racemes lax; seeds minutely papillose .............................................. 11. stracheyi (p. 505)
   Stems erect, not or slightly branched; racemes dense; seeds smooth .... 18
18(17) Basal leaf-remnants with persistent fibres; racemes 12–35-flowered .... 12. meifolia (p. 507)
   Basal leaf-remnants membranous; racemes 5–10-flowered ............... 13. sikkimensis (p. 508)
19(13) Flowers 8–12 mm; stigma lacking basal papillae ......................................................... 20
Flowers more than 13 mm; stigma usually with basal papillae ........................................... 25

20(19) Leaves pinate; bracts entire ......................................................................................... 40. lathyroides (p. 534)
Leaves binate; lower bracts divided ....................................................................................... 21

21(20) Nectary more than 1.5 mm, fused to the spur; lower petal with or without a basal pouch ... 22
Nectary 1 mm or less, not fused to the spur; lower petal with a basal pouch ......................... 24

22(21) Lower petal lacking a basal pouch ................................................................................ 23
Lower petal with a basal pouch ............................................................................................. 36. filiformis (p. 530)

23(22) Sepals 2–3 mm; fruit obovoid ....................................................................................... 37. calycina (p. 532)
Sepals 0.5–1 mm; fruit linear .................................................................................................. 39. casimiriana (p. 533)

24(21) Outer petals long-acuminate; inner petals not tipped with blackish purple; stigma with 6 stalked apical papillae ................................................................. 35. longipes (p. 530)
Outer petals acute; inner petals tipped with blackish purple; stigma with 4 stalked apical papillae .................................................................................................................. 38. pseudolongipes (p. 532)

25(19) Cauline leaves two, small, opposite ............................................................................ 26
Cauline leaves alternate ......................................................................................................... 27

26(25) Bracts pectinate ............................................................................................................ 14. govaniana (p. 514)
Bracts entire ............................................................................................................................ 15. simplex (p. 514)

27(25) Pedicels more than 10 mm ........................................................................................... 28
Pedicels less than 10 mm ....................................................................................................... 36

28(27) Small cushion-plants, less than 8 cm high ................................................................... 29
Not cushion-forming, more than 8 cm high ......................................................................... 31

29(28) Leaves pinate; bracts entire or slightly divided, clavate .............................................. 27. clavibracteata (p. 525)
Leaves ternately divided; bracts much divided, leaf-like ..................................................... 30

30(29) Flowers 14–17 mm; sepals broad, much dentate ......................................................... 26. megacalyx (p. 524)
Flowers 20–22 mm; sepals narrowly linear ............................................................................ 28. henderonii (p. 525)

31(28) Fruiting pedicels apically hooked, erect ....................................................................... 32
Fruiting pedicels arcuate to straight, not erect ..................................................................... 33

32(31) Bracts entire; flowers 15–17 mm long ........................................................................... 19. uncinata (p. 520)
Bracts divided; flowers 13–14 mm long ................................................................................. 20. uncinatella (p. 520)

33(31) Flowering stems several; rhizome crowned by persistent straw-like leaf-bases ........ 17. stantoni (p. 518)
Flowering stems one to few; rhizome not crowned by straw-like leaf-remnants ................. 34

34(33) Stems robust; leaves pinate; fruit obovoid ................................................................... 16. elegans (p. 518)
Stems slender; leaves usually ternate; fruit linear .................................................................. 35

35(34) Upper petal with broad blunt crest; spur shorter than limb .......................................... 34. cavei (p. 529)
Upper petal acute; spur about as long as limb ....................................................................... 33. filicina (p. 529)

36(27) Bracts obovate to broadly lanceolate, crispate-puberulent; upper leaves with stipule-like lower leaflets ................................................................. 24. stipulata (p. 522)
Bracts linear to divided, glabrous; upper leaves without stipule-like leaflets ....................... 37

37(36) Stems zigzagged; leaves 3–4 times ternate with leaf-lobes often less than 1 mm broad 18. shakya (p. 519)
Stems not zigzagged; leaves less divided with ultimate leaf-lobes more than 1 mm broad .... 38

38(37) Fruit linear .................................................................................................................... 34. cavei (p. 529)
Fruit obovoid ........................................................................................................................ 39

39(38) Robust rhizomatous perennials; stems leafy in upper half only .................................... 40
Slender taprooted biennials or perennials; stems leafy throughout ........................................ 42

40(39) Bracts large, divided; racemes lax .................................................................................. 22. geraniifolia (p. 522)
Bracts small, linear; racemes dense, secund ......................................................................... 41

41(40) Stems unbranched, 25–50 cm high, with 1–3 leaves; with a basal rosette; lower petal with a distinct pouch ................................................................. 23. terracina (p. 522)
Stems branched above, 60–100(–130) cm high, leafy; rosulate leaves few, very long-petioloed; lower petal usually without a distinct pouch .............................................. 21. chaerophylla (p. 521)
42(39) Leaves pinnate with the first pair of leaflets smaller than the second pair; most bracts entire; racemes 10–40-flowered ................................................................. 43
Leaves subternate to pinnate with lowest pair of leaflets largest; most bracts divided racemes 8–15-flowered ................................................................. 44

43(42) Pedicels filiform; corolla not cristate .......................................................... 30. spicata (p. 528)
Pedicels not filiform; corolla cristate ................................................................. 29. hookeri (p. 526)

44(42) Seeds punctulate; crest of upper petal entire; pedicels 2–5 mm ................ 32. cornuta (p. 528)
Seeds smooth; crest of upper petal dentate; pedicels 4–10 mm ....................... 31. vaginans (p. 528)

Revision of the species
Sect. LEONTICOIDES DC.

De Candolle, 1821: 114. Type species: C. verticillata DC.

Tuberos, tuber perennial; flowering stems lacking a basal scale leaf, usually with two opposite leaves on the stem and a lax raceme.

1. C. diphylla Wallich

C. rutifolia auct., non Sibth. & Sm.

Tuber (not seen on Nepalese specimens) 2–5 cm, rounded or somewhat irregular. Stems leafless towards the tapering underground portion. Cauline leaves opposite, two, petiolate (in the other species in this section they are sessile), biternate with deeply divided leaflets, petiolules longer than petioles, ultimate leaflets obovate-obtuse. Racemes 3–5-flowered, lax. Pedicels c. 10 mm long, elongating in fruit to 15–30 mm. Bracts 4–9 mm, ovate-lanceolate. Flowers white with ± purplish face, 18–19 mm long, with spur c. 12 mm, upwardly curved. Inner petals 10 mm long. Fruit 15–20 mm including style 4 mm, 5–8-seeded, elliptic-oblong. Seeds shiny, 1.9 mm.

HABITAT. In forest; 2600 m.

DISTRIBUTION. From west Nepal to Kashmir.
Kawa Kater Dara, 29° 31’ N., 81° 57’ E., 26 April 1952. PSW 846 (BM).
The Kumaon and Nepalese specimens are unusual in having narrow corollas and axillary branches.

Sect. FASCICULATAE Maxim.

Sect. Trachycarpeae (Fedde) Fedde, 1936: 128. Type species: C. trachycarpa Maxim.

Flowering stems leafless below, arising from the axils of fleshy scales forming small bulbils on a short vertical rhizome. Some bulbil-scales terminating in radical leaves. Fleshy storage roots produced anew each year from the rhizome. Cauline leaves few.

2. C. trifoliata Franchet

Franchet, 1886: 392; C. trifoliolata in orig. icon and Index Kewensis. Type: Yunnan, montis Tsang-chan supra Tali, 4000 m, 4 August 1884, Delavay 82 (not seen).

Stems simple, 8–25 cm. Tubers napiform, sessile. Radical leaves small, trifoliolate with long slender petioles. Leaflets entire or slightly divided. Cauline leaf solitary, shortly stalked, trifoliolate with broadly obovate entire leaflets. Racemes dense, 2–5-flowered. Bracts broadly obovate to elliptic, entire, 10–15 mm, longer than the 5–8 mm long pedicels. Flowers blue, 11–16 mm, with spur 3–7 mm, not or very narrowly cristate. Fruits and seeds unknown. Immature capsules like those of C. cashmeriana.
**Habitat.** In *Rhododendron*; 3800–4300 m.

**Distribution.** Central and east Nepal, east Himalaya to SW. China.

1 July–1 October (earliest and latest collection in flower).

*Beer* 9546 (BM), 25520 (BM); *Kanai & Shakya* 672215 (KATH); *Polunin* 1044 (BM); Chuar, 11 August 1932, *K. N. Sharma* E420 (BM, E).

3. **C. cashmeriana** group

Similar to *C. trifoliata*, but tubers often more elongate, sometimes branched. Flowering stems 5–20 cm, usually with one sessile, bi- to tri-ternate leaf with narrowly lanceolate segments. Radical leaves few with a small ternate lamina on a very long filiform petiole. Leaflets ovate, lobed, segments broader than those of the cauline leaf, rarely with long petiolules and again ternate. Racemes corymbose, 2–8-flowered, slightly elongating in fruit. Bracts 8–10 mm, deeply cut into narrowly lanceolate segments, shorter than the pedicels. Pedicels (10–)15–30(–40) mm in fruit, erecto-patent to suberect, apically hooked. Flowers intensely blue (inner petals whitish), 11–21 mm long from apex of spur to the tips of the inner petals. Spur 4–13 mm, lower petal 7–14 mm. Outer petals narrowly cristate or not cristate.
3a. *C. cashmeriana* Royle


Lower petal with rhombic-acute limb, surpassing the upper by 1–4 mm. Ultimate leaflets (0.7–)1–1.7(–2.5) mm broad. Bracts 2–7–fid. Capsule 11–15 mm, linear, pendent on erect pedicels, 10–20-seeded. Style 2–3 mm.

Habitat. Open slopes; 2800–5500 m.


14 April–27 August.

*Bailey* 115 (BM), s.n. 31 May 1936 (E); *Bowes-Lyon* 2107 (BM); *Burnet* 17 (BM); *Dobremez* 2198 (BM); *Duthie* 5315 (BM); *Einarsson* et al. 201 (BM, LD, S); *Gardner* 646 (BM); *Lowndes* 1156 (BM), 1467
In W. Himalaya, the racemes are 3–9-flowered, whereas E. of Annapurna they are (1–)2-flowered. There are also other minor differences. High mountain forms from the Tibetan border may constitute a third distinct taxon. A revision of this group is in preparation.

3b. **C. ecrisata** (Prain) D. Long


Usually smaller than *C. cashmeriana*. Lower petal with very broad truncate limb, surpassing the upper by 2–7 mm. Ultimate leaf-lobes 0.5–1.1–1.7 mm broad. Bracts 3–13–fied. Racemes less elongated in fruit. Capsule 5–8 mm, oblong, c. 10–seeded. Style 2–3 mm.

**Habitat.** Mossy rocks, screes; 4000–5000 m.

**Distribution.** East Nepal from Arun Khola to Sikkim, Bhutan and Arunachal Pradesh. 18 June–1 September.

*Beer* 8302 (BM), 8321 (BM), 8357 (BM), 9550 (BM); *Binnis* 169 (BM, E); *McCosh* 283 (BM, E, KATH); *Shrestha* 15769 (KATH); *Shrestha & Joshi* 333 (BM, KATH); *G. F. Smith* 13 (BM), 5 (BM), 130 (BM), 175 (BM); *Stainton* 883 (BM, E, KATH); *Williams* 770 (BM).

4. *C. pseudojuncea* Ludlow

Map 2; Fig. 4D; 5D in Ludlow & Stearn, 1975: 62. Type: West Nepal, near Jangla Banjyang, 28° 5' N., 82° 56' E., 4000 m, 2 July 1952. *PSW* 2360 (BM—holotype, E, KATH).

Storage roots fusiform, sessile. Stems 9–35 cm (including underground part) with one linear leaf 3–6(–8) cm. Radical leaves few with very long filiform petioles, biternate with long leaflets similar to the cauline leaf. Racemes 2–5–flowered. Bracts 30–50 mm, like the cauline leaf, much longer than the short, 3–5 mm long pedicels. Flowers yellow, veined with greenish brown, not tipped with dark purple, 13–16 mm long including spur 7–9 mm. Dorsal crest very narrow or absent. Fruit linear, deflexed, 22 mm long with style 2.5 mm, 8–10-seeded. Seeds (immature) 1–2 mm.

**Habitat.** Grassy slopes; 3800–4500 m.


*Einarssson* et al. 692 (BM), 815 (BM); *PSW* 136 (BM), 2360 (BM, E, KATH, 4319 (BM), 4688 (BM, E); *Shrestha* 5218 (BM, KATH).

5. *C. juncea* Wallich


Storage roots fusiform, often attenuate or shortly stalked at base, not branched. Stems 10–45 cm with 0–2, entire, linear to lanceolate cauline leaves, 1–6 x 0.2–1 cm long, exceptionally ternate. Radical leaves usually biternate with linear to obovate leaflets, rarely trinerved with deeply cut leaflets. Racemes 5–20 cm, spicate, (3–)10–30(–40)-flowered. Bracts 5–20(–40) mm, linear to broadly lanceolate. Pedicels 5–15(–20) mm. Flowers 10–20 mm, yellow, inner petals almost always tipped with blackish purple. Upper petal usually rather broadly cristate with a slightly upwardly curved or straight spur, shorter than to as long as remainder of corolla. Fruit c. 13 mm long, linear-lanceolate, c. 10-seeded. Style 3 mm. Seeds shiny, 1–0 mm.

**Habitat.** Grassland; in heavily grazed pastures frequently hiding in low shrubs; 2500–5100 m.

**Distribution.** From Dhaulagiri eastward to Arunachal Pradesh, SE. Tibet. ‘Common in alpine meadows N. of Annapurna and Daulaghiri, and around Poykotang.’

27 April–5 October.

*Banerji & Shakya* 3757 (KATH); *Bailey* s.n. (BM), ‘Balugang’ (E); *Beer* 9442 (BM), 9535 (BM), 10088 (BM), 25329 (BM); *Bowes-Lyon* 83 (BM), 2164 (BM); *Dhwoj* 165 (BM, E), 199 (BM, E); *Dobremez* 91 (BM), 405 (BM), 1670 (BM); *deHaas* 2123 (BM); *Gardner* 835 (BM); *Idzumi & Togashi* sep. 1979 (TI); *Joshi & Battacharya* 74–2397 (KATH); *Kanai & Malla* 674668 (KATH, TI); *Kanai & Shakya* 214 (TI), 2200 (TI), 2330 (TI), 2323 (TI); *Lowndes* 1122 (BM), 1239 (BM); *McBeath* 1499 (E); *McCosh* 202 (BM, KATH), 203 (BM, E, KATH), 341 (BM, TI); *Malla* 9169 (BM); *Miehe* 262 (BM), 879 (BM), 994 (BM), 983 (BM), 5433 (Xining), 7354 (GOET), 8268 (BM), 8461 (Xining), 9201 (GOET), 9297 (BM), 10917 (BM), 11681 (BM), 13835 (BM), 13873 (BM); *Langtang, Poelt* s.n. (GZU); *Polunin* 283 (BM), 1010 (BM), 1079 (BM); *K. R. Rajbandari* 7682 (KATH), 8402 (BM), 8750 (KATH), 9828 (KATH); *Rajbandari & Roy* 1704 (KATH); *Ramola, Mangu & Saha* 311 (KATH); *Schilling & Sayers* 3757.
Fig. 3  A, B: Corydalis cashmeriana (A. Lowndes 1467; B, PSW 266). C, D: C. ecristata (C, Beer 8357; D, Williams 770). × ¼.
(KATH); Shrestha & Joshi 296 (BM), 449 (BM); Shrestha & Shakya 3757 (KATH); Smith 51 (BM); Stainton 4538 (BM, E), 4776 (BM), 4779 (BM, E); SSW 1329 (BM), 1762 (BM, E, KATH), 1991 (BM, KATH), 3148 (BM, KATH), 6027 (BM, KATH). Cultivated in GBG (Göteborg Botanical Garden).

6. *C. polygalina* Hook. f. & Thomson

Hooker & Thomson, 1855: 263. Type: Sikkim, 4250–4900m, *Hooker & Thomson* (K—lectotype, BM, E).

*C. graminea* Prain, 1896: 23. Type: Sikkim, Peykiong-La, 3950m, *King’s collector* (CAL—holotype, photos in BM, E, S).

Tubers long, attenuate, into a distinct stalk, often branched. Stems 12–25cm, simple or branched, weak. Radical leaves with long thin petioles, ternate to biternate, or sub-pinnate with narrowly lanceolate segments. Cauline leaves 1–3, pinnate, with 2–3 pairs of linear-lanceolate leaflets, upper leaves less divided. Racemes 5–15-flowered. Lower bracts leaflike, the upper shorter and entire, usually shorter than the pedicels. Pedicels 10–20mm long.
Flowers 14–19 mm long, yellow, crista, with spur equalling or slightly shorter than limb. Inner petals dark brownish purple at tip. Fruit 8 mm, 6–9-seeded, obovoid, style 3 mm. Seeds shiny, 1–2 mm.

Habitat. Grassland; 3950–4600 m.

Distribution. East Nepal, Sikkim, Bhutan, SE. Tibet.

30 June–26 July.

Beer 8332 (BM); McCosh 327 (BM, KATH); Shrestha & Joshi 343 (BM).

7. *C. lowndesii* Lidén, sp. nov.

Map 4; Fig. 5E; 6A–B

*Corydali polygalinae* similis sed caulis pluribus humilibus adscententibus. Folia radicalia paucis ternatis vel pinnatis foliolis ternatis vel subditernatis segmentis ultimis angustis linearibus vel lanceolatis. Folia caulina 2–4, radicalibus similia. Racemi 2–7-flori, densiusculi, in fructu elongati. Flores lutei, 11–14 mm,
Fig. 4  A–C: Corydalis juncea (A, Stainton 4779; B, SSW 1991; C, Stainton 4538). D: C. pseudojuncea (Einarsson et al. 692). × ¼.
anguste cristati. Capsula immatura anguste obovata, 9 mm longa. Pedicelli fructiferi reflexi. Semina nitida, 1–6 mm longa.


Corydalis polygalina var. micrantha Wu 1984: 285 p.p. (excl. type ?).

Somewhat similar to C. polygalina, but stems usually several, 10–20 cm. Tuberous roots long, attenuate into a distinct stalk, often branched. Radical leaves few with long thin petioles, ternate to pinnate with ternate to sub-binate leaflets. Ultimate leaf-lobes linear to lanceolate. Cauline leaves 2–4, like the radical, sessile. Racemes 2–7-flowered, rather dense, elongating in fruit. Lower bracts leaf-like, uppermost sometimes entire, lower bracts longer, upper ones shorter, than the 5–10 mm long pedicels. Flowers 11–14 mm, ‘dull yellow masked with greyish ochre’, narrowly crista with spur slightly shorter than lamina. Immature fruits to 9 mm long, narrowly obovoid, borne on sharply deflexed pedicels, 6-seeded. Style 2.5 mm. Seeds 1–6 mm, shiny.

HABITAT. Stony turf among boulders on open hillside; 4100–5700 m.
DISTRIBUTION. Central and east Nepal, south Tibet (Rhamne, 7 July 1939, *Gould* 2333, K!). 20 June–1 October.

*Lowndes* 1289 (BM); *Miehe* 13036? (BM, sterile); *Polunin* 667C (BM); *Rajbandari & Roy* 1854 (KATH); *Stainton* 4702 (BM, KATH).

Sect. **HAMATAE** C. Y. Wu & Z. Y. Su


Caespitose perennials with short rootstock emitting numerous long, soft, somewhat fleshy roots. Stems leafy, leaves crowded towards the base, much divided, with sheathing petioles. Racemes many-flowered, very compact. Flowers short-stalked, yellow, often tinged with brown, blue or purplish. Upper petal with a hamately curved spur. Tibet and west China.
8. *C. conspersa* Maxim.


*C. hamata* sensu Whitmore in Hara & Williams, 1979: 34, non Franchet.

Stems several, 15–30 cm, leafy, unbranched. Cauline leaves 5–10, glaucous, pinnate, with 2–4 pairs of pinnate to pinnatisect leaflets. Ultimate lobes small, broadly oblong to obovate, obtuse, often imbricate. Racemes capitate, very dense, 3–4 × 2–2.5 cm, c. 30-flowered. Bracts 6–8 mm long, broadly spatulate with irregularly erose apex, distal part purplish brown. Pedicels 5 mm long. Flowers 15–16 mm long with short much curved spur. Sepals large, fimbriate, dark brownish purple (?). Outer petals 'pale yellow tipped blue', winged and cristate, tipped with the same colour as the sepals when dry. Fruit unknown.

**DISTRIBUTION.** Tibetan Plateau, with one record from Nepal.

Namdo N. of Mustang (29° 14' N., 84° 58' W.), 5000 m, 9 August 1954, *SSW 2316* (BM, KATH).
Fig. 6 A, B: Corydalis lowndesii (A, Stainton 4702; B, type). C: C. polygalina (Beer 8332). D: C. trifoliata (Beer 9546). × ¼.

Sect. CAPNOGORIUM (Bernh.) Endlicher


A loosely circumscribed section in which are included perennials with vertical monopodial rhizomes, which are apically clothed with cataphylls, withered leaf-bases and/or rosettes of leaves from which axillary flowering stems arise. Stems often sparingly leafy, and not or slightly branched. Flowers usually yellow, ± cristate, acute. Stigma ± square with usually pronounced lateral and basal double papillae. The section is closely related to sections Oocapnos, Ramoso-Sibiricae and Mucroniferae. It has its main distribution in drier parts of the Sino-Himalayan area.
Fig. 7  A, B: Corydalis latiflora (A, Lowdes 1316; B, Stainton 5485). C: C. nana (Arnold 164). D: C. stracheyi (Stainton 849). × ¼.
Fig. 8  A: Corydalis latiflora (Liden 85, Thorung La, cult. in GBG). B: C. nana (Arnold 164). C: C. simplex (type). D: C. govaniana (Liden 85, N. of Pangsing Banyang, cult. in GBG). E, F: C. stracheyi (E. Beer 8349; F. PSW 5365). G: C. sikkimensis (Beer 9555). H, I: C. meifolia (H. Malla 9538; I. Stainton 993). Flowers, stigmas, and (in E) bracts. For scales see Fig. 2.
9. **C. latiflora** Hook. f. & Thomson


*C. gerdæ* Fedde, 1922: 30. Type: Bhutan, Chumolari (border Tibet–Bhutan), 4880m, September 1912, *Rhoma Lepcha* 525 (E—holotype); Whitmore in Hara & Williams, 1979: 33.


Rootstock often very long, slender. Whole plant with a greyish-purple hue, forming loose cushions between boulders on rough screes. Flowering stems 5–15cm, often several, simple or branched, with two opposite leaves below the inflorescence. Shade grown plants often with longer and more leafy stems, the upper leaves subopposite only. Radical leaves biternate or pinnate with ternately divided leaflets. Ultimate lobes linear-obovate to obovate, obtuse to acute, very variable. Cauline leaves like the radical, or sometimes smaller, rarely lacking. Racemes (1–)2–8-flowered, corymbose. Bracts linear to broadly flabellate-divided, very variable, shorter or often longer than the pedicels which are 10–30mm, erect and apically hooked in fruit. Flowers 14–20mm, greyish blue to very pale violet, very strongly scented, spongy, with short downwardly curved spur, usually broadly cristate and often with the crest.

![Fig. 9 A, B: Corydalis meifolia (A, deHaas 2214; B, Stainton 4759). C: C. sikkimensis (Beer 9555). × ¼.](image-url)
decurrent to the apex of the spur, making the profile of the flower very broad. Upper petal with a notch behind the apex; keel green. Inner petals dark-tipped. Fruit c. 10 × 2–4 mm, obovoid, 3–5-seeded, pendent on erect pedicels, explosively dehiscent. Style c. 3 mm. Seeds c. 1–5 mm, smooth in Nepalese specimens as far as noted. Self-sterile.

Habitat. Rough, otherwise bare, screes; 4300–5500 m.

Distribution. West Nepal to Bhutan. ‘Common in rough screes N. of Annapurna’.

1 July–27 August.

Einarsson et al. 2880 (BM); Grey-Wilson & Phillips 628 (BM, K); Lowndes 1304 (BM), 1316 (BM), 1330 (BM, KATH); McBeath 1428 (E); Miehe 364 (BM), 365 (BM), 540 (BM); Joshi & Amatya 73/721

Fig. 11  A: Corydalis elegans subsp. elegans (Shakya, Adhikari & Subedi 8107). B: C. elegans subsp. robusta (PSW 425). C, D: C. shakyae (C, type; D, Shakya, Adhikari & Subedi 8022). E. C. conspersa (SSW 2316). F, G: C. staintonii (F, Stainton 5408; G, PSW 63). Flowers, stigmas, and (in C) bract and seed. For scales see Fig. 2.
Fig. 12  A: Corydalis conspersa (SSW 2316). B: C. staintonii (Williams 776). C, D: C. shakyae (C, type; D, Shakya, Adhikari & Subedi 8022). ×¼.
(KATH); Joshi & Battacharya 74/2309 (KATH); Nakao s.n. (BM, KI); PSW 46 (E, KATH), 236 (BM), 3532 (KATH); Rajbandari, K. R. 8232 (KATH), 8558 (KATH); Shyakya & Adhikari 5276 (KATH); Shrestha 5280 (BM, KATH), 5341 (KATH), 5435 (KATH); Smith 11 (BM), 67 (BM); Stainton 5485 (BM, E, KATH), 5523 (E), 5570 (BM, E); SSW 1827 (BM, KATH), 1859 (BM), 2075 (BM, KATH), 2323 (BM, KATH). Cultivated in GBG.

Very variable in leaf shape, width of crests, division of bracts, etc. There is no strict geographic correlation, though specimens with undivided bracts and narrow leaflets seem to be more common east of Nepal. Small-flowered and large-flowered populations may occur close to each other. In two specimens from Sikkim (Cooper 863, 865, E) the seeds are dull, papillose. However, most specimens lack seeds. Shrestha 5280 and Stainton 5485 (Fig. 7B) from Toridwari Banjyang in west Nepal are notable for their extremely large flowers and small pinnate leaves.

10. **C. nana** Royle

Royle, 1833: 68. Type: Soongnum in Kunawur, Royle s.n. (K—holotype).

**C. hoffmeisteri** Klotzsch & Garcke, 1862: 129. Type: Hoffmeister 1845 (B—holotype).

Rhizome often long and slender. Stems 5–15cm, simple or branched above, usually tapering below. Radical leaves bipinnate with leaflets dissected into linear-lanceolate, acute segments. Cauline leaves 3–4, the lower often subopposite, situated near the middle of the stem. Racemes dense, corymbose, 5–10-flowered, not overtopping the leaves. Bracts broadly flabellate, much dissected into linear segments, ± equaling the pedicels which are 15–25mm, erect, apically hooked. Sepals c. 1 × 1 mm, apically dentate. Corolla greyish blue (according to Prain, 1896, not noted on Nepalese specimens), cristate, 15–16mm, with a 4.5–6mm long, somewhat downcurved spur. Lower petal broadly boat-shaped, except for the cristate deflexed

![A: Corydalis uncinata (Stainton 5547). B: C. uncinatella (type). × ¼.](image-url)
Fig. 14  A, B: Corydalis chaerophylla (A, Shakya, Subedi & Upret 8403; B, Stainton 5584). C, D: C. terracina (C, Dobremez 77; D, type). $\times \frac{1}{4}$. 
Corydalis in Nepal

Fig. 15  A, B: Corydalis chaerophylla (A, SSW 4697; B, Stainton 1310).  C, D: C. geraniifolia (C, Beer 9484; D, Stainton 1811).  E: C. stipulata (type).  F: C. terracina (Dobremez 77).  Flowers, stigmas, and (in D, E) bracts.  For scales see Fig. 2.

Apex.  Apex of inner petals dark.  Fruit c. 6mm, narrowly obovoid, to 10-seeded.  Style long, 3–3.5mm, sharply bent below stigma.  Seeds small, to 0.8mm, smooth, shiny.

Habitat.  Bare screes; 4700–6100m.

Distribution.  Extreme west of Nepal, west Himalaya.

1 July–23 August.

Arnold 164 (BM); Tyson 69 (BM).

11.  C. stracheyi Prain

Prain, 1896: 37.  Type: Kumaon, Pindari, 3650m, Strachey & Winterbottom 9 (K).

C. nana var. jaquemontii Fedde, 1922: 29. Type: W. Himalaya, Hangarang, Jacquemont 729 (K—holotype).

Rootstock often very long, split into several firm strands, crowned by the withered remnants of leaf-sheaths and scales.  Whole plant very glaucous with a wide lax rosette at base.  Stems (10–)20–40cm, leafy, branched, slender, ascending.  Leaves vagnate at base, ovate-triangular, ± equalling petioles; upper cauline leaves with short petioles.  Lamina bipinnate with deeply divided leaflets.  Segments narrowly linear to lanceolate.  Racemes lax, 2–10-flowered.  Upper bracts narrowly oblanceolate, entire, equalling or shorter than the pedicels.  Lower bracts longer and often much divided.  Pedicels 10–15(20)mm, recurved in fruit.  Sepals 1–2 × 1–2mm, dentate.  Corolla yellow, sometimes almost orange, with purplish brown and green markings on the keel of the upper petal and often on the spur, cristate, sometimes narrowly so, 12–14mm long with slender spur c. 4–5mm.  Capsule c. 6mm long, broadly obovoid, 5–9-seeded, with c. 10 prominent veins, explosively dehiscent.  Style 2–2.5mm, Seeds biseriate, 1.0–1.2mm, dull, minutely papillose.
Fig. 16 A: *Corydalis geraniifolia* (Stainton 1811). B, C: *C. stipulata* (B, Polunin 1629; C, type). × ¼.
HABITAT. Deeply rooted among boulders on alpine slopes, often close to running water; 3800–5000 m.

DISTRIBUTION. From west Himalaya to Bhutan. ‘Around Poykotang’.

23 June–15 October

Beer 8349 (BM), 9544 (BM), 10025 (BM), 10758 (BM); Binns, Mason & Wright 167 (BM, E); Dhwoj 43 (E), 300 (BM, E); Dobremez 357 (BM, KATH), 1684 (BM); deHaas 2203 (BM); Kanai & Shakya 672279 (KATH, TI); Malla & Kanai 674880 (TI), 674886 (TI); Miehe 4859, 6200, 8911, 10972 (GOET); Polumin 785 (BM), 1429 (BM); Langtang, Poelt s.n. (GZU); PSW 5365 (BM, E, KATH); Shrestha & Joshi 270 (BM, KATH); Rajbandari, K. R. 10077 (KATH); Smith 9 (BM); Stainton 849 (BM, KATH); SSW 6264 (BM, KATH), 6285 (BM); Wigram 121 (E); Williams 888 (BM, KATH). Cultivated in GBG.

12. C. meifolia Wallich


C. meifolia var. sikkimensis Prain, 1896: 40. Type: not designated.

Showy, very glaucous plant with very thick rootstock consisting of several twisted rope-like strands, apically with dense remnants of old leaf-bases with persistent fibrous veins. Stems 10–40 cm, leafy, simple or often branched above, erect. Lowermost cauline leaves situated near the middle of the stem, often subopposite. Basal leaves almost as long as the stems, with sheathing petioles about equalling the lamina. Lamina triangular to oblong, tripinnate, with numerous narrowly linear to filiform segments. Cauline leaves oblong, shortly petioled, bipinnate. Racemes very dense, corymbose, 12–35-flowered, elongating in fruit. Bracts oblong to flabellate, pectinately deeply cut into narrowly linear segments. Pedicels 10–30 (–40) cm, erecto-patent, apically arcuate in fruit. Sepals 3–4 mm, dentate, or deeply lobed. Corolla yellow to orange, marked with purplish brown at base, 13–17 mm long, with spur 2–5–3 mm. Inner petals tipped with dark brownish purple. Outer petals broadly cristate. Fruit 8–9 mm, broadly elliptic, to 10-seeded. Style 3–4 mm. Seeds 1.2–1.3 mm, shiny, smooth.

HABITAT. ‘Wet scree’, ‘Glacial grassland’, ‘Boulder slope, very wet’; 4000–5200 m.

DISTRIBUTION. Kumaon to Bhutan, widespread but scattered.

Fig. 17 A: Corydalis megacalyx (type). B: C. clavibacteata (type). C: C. hendersonii (PSW 34). Flowers, stigmas, and (in A, B) bracts, and (in B) fruit. For scales see Fig. 2.
21 June–17 October.

Arnold 246 (BM); Basukala 6271 (KATH); Beer 9560 (BM); Dhwoj 5 (BM, E), 6 (BM, E), 42 (BM, E), 636 (BM, E); deHaas 2214 (BM), 2289 (BM); Malla 9538 (BM, KATH), 16216 (KATH); Malla & Kanai s.n. (KATH); Miehe 4901 (BM), 5392 (GOET), 5976 (GOET), 6115 (GOET, Xining), 6671 (GZU), 6832 (GOET), 8591 (GZU), 8605 (GZU), 8978 (BM), 12563 (Xining); Polunin 828 (BM), 1143 (BM); PSW 4809 (BM, KATH), 5393 (BM), 5397 (BM, E, KATH); Rajbandari, K. R. 10024 (KATH); Shakya, Adhikari & Subedi 8223 (KATH); Sharma 36/94 (BM); Shrestha & Joshi 471 (KATH); Smith 34 (BM), 99 (BM); Stainton 993 (BM, KATH), 4759 (BM); SSW 2360 (BM), 3216 (BM, KATH), 6286 (BM, E, KATH); 6294 (BM, E, KATH); Tilman s.n. (BM); Wigram 68 (E).

13. C. sikkimensis (Prain) Fedde

Fedde, 1921: 201. – C. duthiei var. sikkimensis Prain, 1896: 33. Type: Sikkim, Tholoong, very high near the snow, May 1886, King’s collector (K).

C. meifolia var. sikkimensis sensu Whitmore in Hara & Williams, 1979: 33 p.p., non Prain.
Rootstock long, rather thick apically, crowned by membranous (not fibrous as in meifolia!) old leaf-bases and cataphylls. Stems 10–15(–20) cm, leafy, simple, erect, with short dense racemes. Leaves bipinnate with dissected pinnulae. Ultimate leaf-lobes narrowly lanceolate, pointed, 3–4 × 1 mm. Basal leaves with long petioles; uppermost subsessile, similar to the lower bracts. Middle bracts smaller and less divided, longer than to equalling pedicels, uppermost bracts sometimes entire. Racemes 5–10-flowered, elongating in fruit. Pedicels 5–12 mm, deflexed in fruit. Sepals 1 × 1 mm, dentate. Corolla 15–16 mm long with spur 5–6 mm, broadly cristate, yellow. Fruit 8–9 mm, narrowly obovoid, 3–8-seeded. Style 3–4 mm. Stigma with basal papillae reduced. Seeds 1.0–1.3 mm, smooth.

**Habitat.** 'Open wet rock scree'; 4250 m.

**Distribution.** Sikkim and Bhutan, one record from Nepal.

Barun Khola, 4250 m, open wet rock scree, 9 August 1971, *Beer 9555* (BM).
Fig. 18  A: *Corydalis hendersonii* (PSW 34). B: *C. megacalyx* (Lowndes 1256). C: *C. clavibracteata* (Stainton 5511). × $\frac{1}{4}$. 
Fig. 19  A: Corydalis uncinata (type).  B: C. uncinatella (type).  C, D: C. hookeri (C, PSW 1435; D, Stainton 7153).  E: C. spicata (type).  F: C. cornuta (PSW 2507).  G: C. vaginans.  H: C. filicina.  I: C. cavei (Beer 8394).  Flowers, stigmas, and (in E) lower petal and ovary. For scales see Fig. 2.
Fig. 20  A: Corydalis hookeri (Stainton 7153). B: C. spicata (type). C: C. vaginans (PSW 5274). D: C. cornuta (PSW 2507). $\times \frac{1}{4}$. 
Fig. 21 A, B: Corydalis cavei (A, Beer 8394; B, Stainton 4751). C: C. filicina (SSW 6542). D: C. lathyroides (PSW 2454). ×⅛.
14. **C. govaniana** Wallich


Rhizome thick, fibrous, multistranded, densely crowned by the membranous remnants of old leaf-sheaths and cataphylls. Stems (10–)15–35(–50) cm, stout, naked or usually with two opposite leaves below the middle of the stem. Radical leaves ovate to triangular-ovate. Petiole sheathing at base, as long as or often shorter than the lamina, glabrous or finely puberulent with one-celled hairs at base abaxially (also the stems may sometimes be puberulent at base). Lamina bi-(tri-)pinnate with lanceolate ultimate lobes. cauline leaves usually much smaller with vaginate bases. Racemes 10–25(–35)-flowered, dense, 5–15 mm long. Bracts (10–)15–30 mm, oblong, pectinate-incised, longer than the pedicels. Pedicels 10–20(–30) mm, arcuate-deflexed in fruit. Sepals 0.5–2 × 0.5–1.5 mm, dentate. Flowers 17–22 mm, yellow, broadly ciliate at the end of the spur. Fruit c. 10 mm, 4–7-seeded, obovoid. Style 3.5–4 mm. Seeds 1.9 mm, shiny. Self-sterile.

**Habitat.** By and just above the tree-line, slopes, often by track sides; 3000–4400 m.

**Distribution.** NW Himalaya to east Nepal. ‘Poykotang’.

19 April–20 June (–13 August), spring-flowering.

*Bailey* 78 (BM), s.n. ‘Ram gen, Tibet–Nepal border’ (E); *Bowes Lyon* 151 (BM), 2006 (BM); *Dhwoj* 147 (BM, E); *Dobrenez* 2074 (BM, KATH), 2200 (BM), 2324 (BM); *Einarsson* et al. 42a (BM), 433 (BM), 548 (BM), 700 (BM); *Fell* 22 (BM); *Gardner* 467 (BM); *Manandar & Joshi* 6594 (KATH); *Maser* 137 (BM); *McCosh* 156 (BM, E); *Miehe* 296 (BM)?, 2447 (GZU); *PSW* 172 (BM), 418 (BM, KATH), 2055 (BM, E, KATH), 4078 (BM, KATH), 4673 (BM, KATH); *Rao* 14189 (KATH); *Stainton* 562 (BM), 2927 (KATH), 4672 (BM), 4882 (BM, KATH), 8138 (KATH); *Shrestha* 2927 (KATH), 4129 (KATH), 8138 (KATH); *SSW* 245 (BM, KATH), 1010 (BM, KATH), 2652 (BM, E, KATH), 6397 (BM); *Tyson* 24 (BM). Cultivated in GBG.

15. **C. simplex** Lidén, sp. nov.

**Herba** perennis. Rhizoma elongatum quam in *C. govaniana* tenuior basibus petiolorum vetustorum squamatum instructum. Folia rosulata petiolata subtus glauca verosimiliter carnosa pinnata, foliolis

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Fig. 23  A: Corydalis longipes (Maire 338). B: C. filiformis (Bista & Joshi 513). C: C. calycina (PSW 5438). D: C. pseudolongipes (type). E, F: C. casimiriana (E, SSW 3871, eastern form); F, Shakya, Subedi & Uprety 8744, western form). × ¼.

Type: W. Nepal, Jangla Banjyang, 4300m, 12 vii 1973, Einarsson, Skärby & Wetterhall 1970 (BM—holotype).

Similar to C. govaniana in detail, but with a very different habit; much smaller with less divided, somewhat fleshy leaves which are glaucous beneath. Rhizome narrow, not split with age, scaly. Stems few, simple, 6–15cm, usually with a pair of small opposite leaves near the base. Leaves pinnate with deeply divided leaflets. Ultimate lobes broadly lanceolate to obovate, mucronate. Racemes 4–11-flowered, rather dense, laxer in fruit. Bracts lanceolate,
entire, equalling to shorter than the arcuate-recurved pedicels, which are 8–15 mm, elongating to 20–25 mm in fruit. Flowers as in *C. govaniana* but smaller, 16–18 mm long, and lower petal lacking a basal pouch.

HABITAT. grassy slopes; 4000–4500 m.

DISTRIBUTION. Nepal Himalaya west of Annapurna.

14 June–21 July.

Einarsson et al. 1970 (BM); [Miehe 296 (BM)?]; PSW 3109 (BM); SSW 2343 (BM, E); Synge & Barclay 2492 (BM, K).

This was named *C. pachypoda* (Franchet) Hand.-Mazz. (= *C. tibetica* var. *pachypoda* Franchet) by Ludlow, but differs in several characters. The closest relative seems to be *C. swatensis* which, however, has narrow leaflets and a pouch to the lower petal.
16. **C. elegans** Hook. f. & Thomson


Flowers 24–26mm ................................................................. subsp. robusta
Flowers 20–22mm ................................................................. subsp. elegans

16a. subsp. **robusta** Lidén, **subsp. nov.**  

Tota planta robustior, pedunculi breviores, bracteae et pedicelli longiores, flores majores. Aliter ut in subsp. *elegans*.


Rhizome thick, crowned by membranous scales and withered leaf bases. Stems robust 10–25cm with a lax raceme c. 10cm long. Most leaves basal, 6–20cm long, with ovate lamina ± equalling petiole, pinnate with deeply divided leaflets, very glaucous. Ultimate lobes broadly obovate-acute. Racemes 11–17-flowered, dense at anthesis, elongating in fruit. Bracts large, broadly lanceolate, the lowermost sometimes divided; lower bracts longer, uppermost ones shorter, than the long arcuate fruiting pedicels that reach 3–5cm. Sepals 2 × 2–3mm, fimbriate-dentate. Corolla 24–26mm with spur about half as long, yellow, broadly cristate with inner petals tipped dark purplish brown. Lower petal with a conspicuous pouch. Fruit (immature) 10–12mm, broadly oblongate. Style 3–4mm long. Seeds unknown.

**Habitat.** ‘Open slopes’; 2700–3500m.

**Distribution.** West Nepal, Jumla area, endemic.

13 July–13 August.

*Manandhar & Joshi* 6653 (KATH); *PSW* 425 (BM), 4633 (BM, E, KATH).

16b. subsp. **elegans**  

Map 10; Fig. 10D; 11A

Differs from subsp. *robusta* in the more slender habit with longer peduncles, smaller bracts, pedicels, and flowers, and in the often obtuse leaflets; sepals 1 × 1mm, deeply dentate; style 6mm long.

**Habitat.** Open slopes, 4000–4500m.

**Distribution.** Extreme west of Nepal, Kumaon.

25 July–26 August.

*Arnold* 136 (BM); *Bista & Joshi* 625 (KATH); *Shakya, Adhikari & Subedi* 8076 (KATH), 8107 (KATH).

17. **C. staintonii** Ludlow  

Map 11; Fig. 11F–G; 12B


*C. chasmophila* Ludlow, 1975: 52; Whitmore in Hara & Williams, 1979: 35. Type: Jangla Banyang (28° 50' N., 82° 57' E.), 4000m, on limestone rocks, 30 May 1966, *Stainton* 5408 (BM—holotype, E).


A densely tufted perennial with a branched fibrous rootstock apically crowned by straw-like persistent leaf-bases. Stems often many, 4–13(–18)cm, leafless or with 1–3 leaves. Basal leaves about as long as the stems, oblong, with petiole equalling or longer than lamina, pinnate with 2–5 pairs of leaflets. Leaflets small, sub-binate to sub-pinnatisect or deeply cut into 3–6 small obovate segments. Stems 2–12(–17)-flowered, lax, flowers borne along most of the stem. Lower bracts entire, or often pinnatisect, upper usually entire, 10–30mm. Pedicels very long, 30–80mm, apically arcuate, erecto-patent in fruit. Sepals (0.5–)1–2mm, deeply dentate. Corolla 14–25mm including spur 6–13mm, yellow with brown tips, cristate. Lower petal with
Fig. 24  A: *Corydalis flaccida* (Williams 845). B: *C. diphylla* (PSW 846). \( \times \frac{1}{4} \).

deflexed apex. Fruit 14–20 mm, linear to narrowly lanceolate, up to 15-seeded. Style 3–4 mm. Seeds (immature) 0.8 mm.

**Habitat.** Cliff crevices, wet slopes; 3600–5300 m.

**Distribution.** West Nepal to Bhutan (only Nepalese specimens seen).

30 May–5 July.

*Bowes-Lyon* 2163 (BM); *Polunin* 190 (BM); *PSW* 63 (BM, E), 1528 (BM); *Shrestha* 5298 (BM); *Stainton* 638 (BM, E), 5408 (BM, KATH), 5484 (BM, E, KATH); *SSW* 2999 (BM, E); *Williams* 776 (BM).

Very variable. *PSW* 63 deviates in its numerous, only 14 mm long, flowers in umbellate racemes, and very small sepals. The type specimen (and *Shrestha* 5298) provides the other extreme with a 25 mm long corolla with a broad upwardly curved spur.

18. **C. shakyae** Liden, sp. nov.

Herba ad 40 cm alta (?). Caules ramosi plus minus flexuosi. Folia 3–4-ternata vel sub-pinnata segmentis ultimas anguste lanceolatis acuminatis. Racemi 5–14-flori. Bracteae profunde lobatae lobis angustis plus minusve dentatis. Pedicelli arcuati, 7–10 mm longi. Sepala reniformia dentata, 1–1.5 mm. Corolla 18–22 mm longa, calcari 10–11 mm longo attenuato incluso, flava, petalis interioribus ad apicem fuscoviolaceis. Petala exteriora late cristata crista erosa. Fructus (immaturus) obovatus, 8–10 mm longus, 6–7-ovulatus stylo 3.5–4 mm longo instructus.

*Type:* West Nepal, Mechchra, Darchula district, c. 29° 45' N., 81° 05' E., 3640 m, 23 vii 1974, *Shakya, Adhikari & Subedi* 8044 (KATH—holotype).
To 40 cm long (?), basal parts unknown). Stems leafy, zigzagged, branched. Leaves 3–4 times ternate to sub-pinnate with divided leaflets. Lower petioles often longer than lamina, upper much shorter. Ultimate leaf-segments narrowly oblanceolate to oblong with acuminate apices. Racemes 5–14-flowered, 2–6 cm long with a usually short peduncle. Bracts deeply divided with narrow, irregularly divided or dentate segments, progressively smaller upwards, glabrous. Pedicels 7–10 mm, about as long as the bracts, arcuate, more recurved in fruit. Sepals reniform, dentate, c. 1.5 mm. Corolla yellow with brownish green keel to the upper petal and dark apices to the inner petals, 18–22 mm long. Outer petals with broad, eroded crests. Spur of upper petal 10–11 mm, tapering, slightly curved downwards, with nectary about 2/5 as long. Fruit (immature) 8–10 mm with 5–7 ovules, obovoid, abruptly narrowed into a long style 3.5–4 mm. Mature capsules 2–6-seeded. Seeds glossy, 1.5–2 mm. Stigma ± square with prominent basal horns.

Habitat. ‘Open subalpine steep slope, on rock crevices’; 3600–3900 m.

Distribution. West Nepal, Mechchra, Darchula district; Kumaon (above Budhi, 3200 m, 22 July 1886, J. R. Reid s.n., E).

22 July–23 July. Shakya Adhikari & Subedi 8022 (KATH), 8044 (KATH), 8076 (KATH).

Description of mature seeds taken from Reid’s specimen. The west Himalayan C. thyrsiflora Prain and C. pakistanica Jafri are probably the closest relatives.

19. C. uncinata Lidén, sp. nov.


Type: West Nepal, Phoksumdo Tal, 29° 05’ N., 82° 57’ E., 3650 m, 11 vii 1966, Stainton 5508 (BM—holotype, KATH).

Very glaucous and apparently fleshy. Stems 7–20 cm, leafy, branched, arising from a vertical, often branched rhizome with some remnants of leaves and cataphylls at apex. Most leaves cauline, ovate, pinnate, with lamina equalling the slightly vaginate petiole. Leaflets pinnatifid to variously lobed with ultimate segments broadly obovate, often imbricate. Racemes 5–10-flowered, very dense at anthesis, elongating in fruit. Bracts 15–25 × 5–11 mm, broadly elliptic, large, concealing the buds. Pedicels much lengthening in fruit to 20–30 mm, erect, apically hooked like a shepherd’s crook, often papillose towards the apex. Flowers dull yellow with greenish grey veins, inner petals dark at apex. Sepals small, less than 1 mm. Corolla 15–17 mm with slightly downwardly curved spur 7–8 mm long. Outer petals cristate. Fruit 10 × 3.5 mm, elliptic to obovoid, pendent, 6–10-seeded. Style 2.5 mm. Seeds 1.6 mm, shiny.

Habitat. ‘scree’, ‘wet shaly slope’, ‘margin of field by irrigation channel’; 3650 m–5300 m.

Distribution. Endemic to Dolpo in west Nepal.

24 June–27 August.

Grey-Wilson & Phillips 480 (BM, K), 536 (BM, K); Lowndes 1232 (BM); Miehe 540 (BM); PSW 1200 (BM); Shrestha 5416 (KATH); Stainton 4382 (BM), 5508 (BM, E, KATH), 5535 (BM, E), 5547 (BM).

20. C. uncinatella Lidén, sp. nov.

Affinis C. uncinatae Lidén sed differt statura minore, foliis minoribus minus carnosis, lobis ultimis angustioribus non imbricatis, bracteis flabellatis ± incisis, floribus et fructibus minoribus sepalis majoribus.

Type: West Nepal, Toridwari Banjyang, 28° 50’ N., 82° 42’ E., 3800 m, 3 vii 1966, Stainton 5481 (BM—holotype, E).

Similar to a miniature, less fleshy C. uncinata, but a scree-plant with long slender rhizomes.
Aerial parts of stems to 10 cm, branched, leafy. Leaves much smaller than in _uncinata_; lamina about as long as the somewhat vaginate petiole, 3–4 cm, similar to the _uncinata_-leaf, but ultimate lobes narrower, discrete, not imbricate. Racemes 2–9-flowered, dense, slightly elongating. Bracts to 15 mm long, flabellate, deeply lobed, or the uppermost entire, concealing the buds, ± equalling the erect, apically hooked fruiting pedicels. Sepals 2 mm long, irregularly dentate, broadly acuminate, comparatively much larger than in _uncinata_. Corolla 13–14 mm, with downwardly curved spur. Fruit as in _uncinata_ but smaller and narrower. Stigma with rudimentary basal papillae.

**Habitat.** Sandy scree; 3600–3800 m.

**Distribution.** Endemic to Toridwari Banjyang near Jumla. 3 July–12 July.

_Shrestha_ 5360 (BM, KATH); _Stainton_ 5481 (BM, E).

21–24. **_C. chaerophylla_** complex

Medium to tall perennial herbs, glabrous to crispate-puberulent. Rootstock reddish when dry. Radical leaves rather large, triangular in outline, ternately divided. Leaflets pinnate to bipinnate with coarsely dentate lobes, often decurrent on rachis. Cauline leaves smaller, becoming sessile upwards, confined to the middle and upper parts of the stem. Stems solitary to few, simple or branched above. Racemes simple to much-branched, few- to many-flowered, rather dense, spicate, usually secund, 6–40-flowered. Bracts usually small, linear to ovate, entire, or in _C. geraniifolia_, larger and deeply divided. Pedicels 4–5 mm long, deflexed in fruit. Flowers yellow, often with brownish veins. Fruit 8–10 mm, obovoid to oblanceolate, 5–11-seeded, with style _c_. 2–2.5 mm, explosively dehiscent. Seeds uni- to biseriate, 0.9–1.9 mm, shiny.

A difficult complex from a taxonomic point of view, widespread in humid parts of Himalaya. In Nepal four species are distinguished: _C. chaerophylla_ s.str. which is widespread in forests throughout Nepal, often close to running water; _C. geraniifolia_ which occurs from east Nepal to Bhutan in margins and clearings of humid forests; _C. terracina_, locally common on the south side of Annapurna, usually growing on terrace banks or by roadsides; and _C. stipulata_, found by streams in the forests of the Langtang area in central Nepal. _C. borii_ is a related species from east Himalaya.

_C. chaerophylla_ and _terracina_, which look distinct in the field, can sometimes be difficult to distinguish in the herbarium, and the habit, the habitat, and the flower-colour should be noted.

21. **_C. chaerophylla_** DC.


Tall herb, 60–100 (–130) cm, glabrous to crispate-puberulent below. Stems naked below, leafy and branched above. Basal leaves few, large with long petioles, lamina with much divided leaflets and ultimate lobes rather deeply cut, whole leaf somewhat fern-like. Racemes simple and few-flowered to much-branched and showy, 6–40-flowered, dense at anthesis, somewhat elongating in fruit, secund. Bracts small, linear to narrowly ovate, entire. Flowers pale yellow, usually without brownish veins, 16–20 mm including long spur, usually narrowly cristate. Lower petal without a prominent basal pouch. Seeds 0.9–1.4 mm.

**Habitat.** In forests and clearings, often close to running water; 1800–3400 (3800?) m.

**Distribution.** Kumaon to east Himalaya. ‘Common in _Rhododendron_ forest S. of Annapurna’.

30 April–12 November.

_Banerji & Shaktiy 5602_ (KATH); 9484 (K), _Beer_ 9528 (BM); 25678 (BM); _Dhwoj_ 135 (E), 153 (BM), 177 (BM, E); _Dobrezn_ 304 (BM); _Flatt_ 157 (BM); _Ms Gurung & Pradhan_ 10564 (KATH); _de Haas_ 2158 (BM), 2710 (BM); _Hara_ et al. 6302866 (KATH); October 1978, _Idzumi & Togasho_ (TI); _Kanai_ 673881.
(KATH, TI); Kanai, Murata et al. 1175 (TI); Kanai & Shakya 672378 (KATH); Malla 4862 (KATH), 26152 (KATH); Malla, Shrestha & Rajbandari 13823 (KATH); Manandar 101 (KATH), 7093 (KATH); Manandar & Batterla 8929 (KATH), 8951 (KATH); Manandar & Joshi 6425 (KATH), 6527 (KATH); McCosh 266 (BM, KATH); Miehe 758 (BM); Nicolson 2260 (BM, KATH), 2748 (KATH); Polunin 1796 (BM); PSS 4861 (BM, E, K, KATH), 5468 (BM), 5593 (BM, KATH); Rajbandari 13823 (KATH); Rajbandari & Roy 2189 (KATH); Schilling 608 (K,KATH); Shakya, Subedi & Uprety 8403 (KATH); Shrestha 1961 (KATH), 2713 (KATH); Shrestha & Bista 1704 (KATH); Shrestha & Joshi 476 (KATH); Stainton 626 (BM, KATH), 1310 (BM, KATH), 4931 (BM), 5104 (BM, KATH), 5584 (KATH); SSW 332 (BM, KATH), 1663 (BM), 1979 (BM), 3267 (BM, KATH), 3542 (BM, KATH), 4967 (BM), 6515 (BM, KATH), 7401 (KATH), 8519 (BM, E, KATH), 8568 (BM); P. N. Suwal et al. 907 (KATH). A low-growing robust form from below Pangong Banyang is cultivated in GBG.

Quite variable. In west Nepal there is a form with a 20 mm long corolla and deeply dentate, long-acuminate sepals (PSW 4861, 5468; SSW 3267, 4697). The common form with flowers 16–19 mm in many-flowered branched racemes is scattered throughout Nepal.

22. **C. geraniifolia** Hook. f. & Thomson


Type: Sikkim, 2440–2740 m, Hooker & Thomson (K).

Similar to **C. chaerophylla** but racemes lax, 10–15-flowered, frequently branched at base.

Bracts 7–10(–15) mm, usually deeply divided, or the upper ovate, entire. Corolla 22–23 mm, ecristate, with long, apically recurved spur.

**Habitat.** Margins and clearings in humid forests, 2440–3300 m.

**DISTRIBUTION.** East Nepal to Bhutan.

27 July–13 August (17 November–3 December, fruiting specimens).

**Beer** 9484 (BM); **Hara, Kanai** et al. 6302870 (TI, fruiting specimen); **Kanai, Murata** et al. 6302871 (TI, fruiting specimen); **Stainton** 1811 (BM, KATH).

23. **C. terracina** Lidén, sp. nov.

Affinis Corydali chaerophyllae DC. sed differt habitu humiliore robustiore, caulibus paucifoliatis non ramosis, sepalis majoribus, floribus majoribus fusco-luteis petalo inferiore ad basin saccato, seminibus majoribus.

Type: Central Nepal N. of Pokhara, 28° 20' N., 84° 03' E., 2440 m, 18 iv 1954, Stainton, Sykes & Williams 4880 (BM–holotype. KATH).

Similar to **C. chaerophylla** but more robust and low-growing. Rhizome stout, vertical, densely clothed at apex by small fibrous leaf-remnants. Basal leaves in a distinct rosette, smaller and with much shorter petioles than those of **C. chaerophylla**. Stems 25–50 cm, one or few from each rosette, not or only slightly branched with 1–3 leaves. Racemes 20–40-flowered, dense. Sepals usually larger than in **C. chaerophylla**. Corolla 18–24 mm, dirty yellow with brownish veins. Lower petal with a distinct basal gibbosity. Seeds 1.5–1.9 mm.

**Habitat.** On terrace banks and by tracksides; 1700–2700 m.

**Distribution.** South side of Dhulagirhi, Annapurna and Himal Chuli. Endemic. ‘Locally common by roadsides, in walls, and on banks of cultivated terraces S. of Annapurna’.

18 April–22 August.

**Dobremez** 77 (BM); SSW 2819 (BM, KATH), 3944 (BM, KATH), 4880 (BM, KATH), 5434 (BM, KATH).

24. **C. stipulata** Lidén, sp. nov.

Corydalis in Nepal

Fig. 25  A: *Corydalis flaccida* (cult. in GBG, origin: Sikkim). B: *C. leptocarpa* (Dobremez 3194). C: *C. flabellata* (cult. in GBG, origin Kashmir). D: *C. stricta* (Stainton 5532). Flowers and stigmas. In A also dorsal view of upper petal and inner petal. In D also lower petal. For scales see Fig. 2.

Type: Central Nepal, Mailung Khola S. of Ganesh Himal (28° 12’ N., 85° 12’ E.), 3350m, *Abies-Rhododendron* forest, 1-2m high, flowers yellow, 18 ix 1965, Stainton 5127 (BM—holotype, E, KATH).

*C. chaerophylla* var. *geraniifolia* sensu Whitmore in Hara & Williams, 1979: 33 p.p., non (Hook. f. & Thomson) Hara. Similar to *C. chaerophylla*, but crispate-puberulent throughout. Lowest pair of leaflets on upper cauline leaves, small, stipule-like (in this character similar to the related species *C. borii* from east Himalaya). Leaves bi-pinnate with coarsely and deeply dentate lobes with lamina decurrent on rachis. Racemes 12–25-flowered, rather long, laxer than in *C. chaerophylla*, simple or branched below, densely crispate-puberulent. Bracts obovate to broadly lanceolate, longer than the 5mm long pedicels which are deflexed in fruit. Corolla 15mm long, broadly cristate, yellow, suffused with brown. Inner petals with darker tips. Spur equalling limb, bent downwards. Seeds 1-3mm, with large elaiosomes.

Habitat. Along streams in forests; 2800–3500m.

Distribution. Endemic to Langtang area, central Nepal.

1 August–1 October.

Dhwoj 214 (E); Nicolson 2498 (BM); Langtang, Poelt s.n. (GZU); Polunin 1629 (BM); Stainton 5127 (BM, E, KATH).

The following species is provisionally included in this section:

25. *C. flaccida* Hook. f. & Thomson

Hooker & Thomson, 1855: 260. Type: Sikkim, 3350–3650m, *Hooker & Thomson* (K, not seen).

Robust herb, 50–130cm, from a stout long rhizome. Stems erect, stiff, leafy throughout, but branched only above, glabrous. Basal leaves 20–45cm, with petiole usually shorter than lamina, tripinnate with opposite pinnae; leaflets incised, ultimate lobes rounded, mucronate. Leaves thin, green above, glaucous beneath. Cauline leaves like the basal, becoming smaller,
less divided and sessile upwards. Racemes 8–20-flowered, dense. Lower bracts usually similar to the upper leaves but smaller; upper bracts linear to lanceolate, often with a distinct stalk, entire to dentate, ± equalling the short (5–10, or the lower ones to 30 mm long) slender pedicels. Flowers red, purple, mauve or bluish purple, 15–18 mm, with short attenuate spur c. 6 mm. Outer petals not cristaite, with narrow base and broad blunt apex. Sepals rather large, 1.5–2 mm, orbicular, finely circum-dentate. Fruit linear, 25–30 mm, 8–15-seeded, dorsiventraly flattened. Style attenuate, c. 5 mm long. Seeds 1.9–2.0 mm, shiny, with small elaiosomes. Self-fertile.

HABITAT. Forests, clearings; 3000–4000 m.

DISTRIBUTION. Central and east Nepal, eastward to SW. China.

12 June–26 July.

Bailey 17/7 37 ‘Balugang’ (E); Beer 8360 (BM), 9468 (BM); Dhwoj 143 (BM, E), 485 (E, KATH); Gardner 963 (BM); Kanai & Shakya 672558 (TI); McCosh 295 (BM, KATH); PSW 2411 (BM, E, KATH); Sharma 34/94 (BM), E379 (BM, E); Shrestha 15700 (KATH), 15711 (KATH); Shrestha & Joshi 344 (KATH), 410 (KATH); Williams 845 (BM).

Sect. MUCRONIFERAE Fedde ex Lidén, sect. nov.


Dwarf cushion-forming scree-plants, often with long slender rhizomes. Stems leafy, branched. Petioles sheathing at base, often ciliate along the margins. Racemes short and dense, corymbose, usually not elevated above the leaves. Bracts leaf-like, ternately or flabellately divided, often ciliate along the margins and/or with aristate segments. Pedicels elongating, often apically hooked in fruit. Flowers sometimes with a ciliate claw to the lower petal. Capsule few-seeded with a long style. Seeds with very short ‘aril base’ (Brückner, 1985).

26. C. megacalyx Ludlow

in Ludlow & Stern, 1975: 58. Type: East of Chalike Pahar (28° 40' N., 83° 04' E.), 4600 m, 31 July 1954, Stainton, Sykes & Williams 3697 (BM—holotype, KATH).

C. nana Whitmore in Hara & Williams, 1979, p.p., non Royle.

Small cushion-forming perennial 3–6(–10) cm, very glaucous with one to several, often branched stems from a long slender rootstock. Leaves greyish, bi- to tri-ternate or the lowermost sub-pinnate with small deeply divided leaflets. Ultimate lobes small, obovate-lanceolate to narrowly linear, slightly mucronate. Petioles usually longer than lamina, sheathing at base, often papillose or ciliate on the margins. Racemes dense, corymbose, 4–10-flowered. Bracts like the leaves, smaller. Pedicels 10–20 mm, shorter than the bracts, erect in fruit with downcurved apex. Sepals large, 3–5 × 2–3 mm, deeply dentate, persistent after the corolla has fallen. Corolla 14–17 mm, yellow to cream, rarely white, with the inner petals blotched with blackish purple, and with two dark spots on the upper petal close to the apex, sweetly scented. Upper petal broadly auriculate, usually acute, broadly to narrowly ciliate. Spur about as long as limb, tapering. Lower petal broadly rhombic, acute to subobtuse. Fruit pendent, 4–5 × 1.5–2.5 mm, obovoid, 3–10-seeded, explosively dehiscent. Style c. 3 mm. Seeds 0.8–1.4 mm, shiny.

HABITAT. Scree at high altitudes; 3800–5500 m. Commonly found together with C. latiflora but preferring finer substrate. Rarely in cliff crevices.

DISTRIBUTION. Almost throughout Nepal. ‘Common N. of Dhaulagiri, N. of Annapurna, and around Poykotang’.

12 July–4 October.
Variable with respect to width of leaflets and colour of flowers. East of Annapurna the leaflets are usually short and narrow. Around Poykotang (central Nepal) specimens with cream flowers are common.

27. **C. clavibracteata** Ludlow  

in Ludlow & Stearn, 1975: 53. Type: Ringmigaon, 29° 04' N., 82° 56' E., 4700m, 21 September 1952, **Polunin, Sykes & Williams** 3540 (BM—holotype, E).  

Very similar to **C. megacalyx** with which it occurs, but differing in a number of characteristics. Lower leaves larger, oblong, thrice pinnately cut into small, linear to lanceolate segments. Racemes dense, 10–15(–20)-flowered. Bracts different from the leaves, 12–20mm, clavate-obtuse, entire or with one or two small lobes or teeth, about as long as the pedicels. Flowers as in **C. megacalyx**, but sepals smaller, 1.5–2mm long. Fruits reflexed on erect pedicels, 3–6-seeded, oblong, c. 5mm long. Style 3–3.5mm. Seeds 1.2mm, shiny.  

**HABITAT.** Scrags, streamside gravel, slopes; 3700–4700m.  

**DISTRIBUTION.** Endemic to west Nepal.  

11 July–21 September.  

**Einarsson et al.** 2707 (BM; mixed with **C. megacalyx**); **PSW 2595** (BM, E, KATH), 3540 (BM, E); **Stainton 5509** (BM, E), 5511 (BM, E).

28. **C. hendersonii** Hemsley  

Hemsley, 1894: 108. Type: Yarkand beyond Karakorum, Liagzi Thang and Lak Zung, 5500m, 1870, **Henderson** (K).  

**C. nepalensis** Kitam., 1955: 2. Type: Thaple Himal, 4300m, 20 June 1953, **Nakao** s.n. (KYO—holotype).  

Very densely tufted, small, fleshy and brittle. Stems 3–5cm, arising from the apex of a long rootstock which is apically crowned by the persistent leaves of previous years, often in distinct stages. Leaves fleshy, very glaucous, trinerved with small triangular lamina and broad sheathing petioles which are usually ciliate along the margins. Ultimate leaflets narrowly linear to lanceolate, very small. Racemes very dense, 3–8-flowered, corymbose. Pedicels 12–18mm, erect and apically reflexed in fruit. Bracts much divided. Sepals narrowly linear. Flowers vertically held with only the apices protruding above the dense mass of leaves and bracts, 20–22mm long, yellow, rather broadly winged with rhombic-acute limb, cristate. Spur 10–11mm long, slender. Fruit hidden among the bracts, 5–11mm, oblong, 1–9-seeded. Style very long, 5–6mm. Seeds 1.8mm, shiny.  

**HABITAT.** 'silty scree'; 4000–6100m.  

**DISTRIBUTION.** Widely distributed on the Tibetan plateau. See also Wu & Shu, 1980.  

26 June–30 June.  

**McCallum D30** (K1); *Nakao* s.n. (K1); **PSW 34** (BM, E, KATH), 1418 (BM), 1425 (BM).

Sect. **RAMOSO-SIBIRICA** Fedde ex Wendelbo  


Annual, biennial, or perennial herbs with branched leafy stems. Flowering stems terminal as well as axillary. Flowers usually yellow.  

The section is not clearly demarcated from *Capnogorium*.  

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**Beer** 25400 (BM), 9564 (BM); *de Haas* 2499 (BM), 2567 (BM); **Einarsson et al.** 2707 p.p (BM); **Lowndes** 1256 (BM, E); *Maire* (BM); *McBeath* 1568 (E); **Manandar** 10138 (KATH); **Miche** 369 (BM), 639 (BM), 13305 (BM), 13338 (GZU); **PSW** 3564 (BM, E), 4714 (E, KATH); *K. R. Rajbandari* 8317 (KATH), 8679 (KATH); *Shakya, Adhikari & Anamata* 5254 (KATH); *Shrestha* 5360 (KATH); *Shrestha & Bista* 2553 (KATH); *Stainton* 7465 (BM); **SSW 1796** (BM, E), 2050 (BM, E), 3697 (BM, E, KATH), 3767 (BM, E, KATH, T1), 4520 (BM), 4695 (BM), 4714 (BM), 7777 (BM, E).
29. **C. hookeri** Prain

Prain, 1896: 34. Type: Nepalese Tibet, Hooker (K—holotype).

*C. denticulatobracteata* Fedde, 1928: 219; Type: Sikkim, Lungma Chu, 4880m, August 1909, Smith & Cave 2244 (E—holotype). Differs by larger flowers.

Usually perennial herb. Stems 10–50cm, leafy, much-branched, arising from a slender rootstock. Leaves very glaucous, somewhat fleshy, ± scabrid on the veins beneath, pinnate with pinnatisect to ternatisect leaflets. Ultimate lobes often imbricate, obovate to lanceolate, usually shortly mucronate. Lamina oblong, about as long as or often longer than the petiole; lowermost pair of leaflets often smaller. Racemes dense, branched, 10–30-flowered. Bracts about as long as pedicels, 5–8mm, narrowly linear or lower bracts often divided. Flowers yellow, tinged brown, 14–16mm with spur about half as long, acute to shortly acuminate with...
rather broad crests which reach the tips. Inner petals usually pale, rarely tipped with brownish purple. Fruit 8–10mm, 2–4-seeded, oblong. Style 3–4mm. Seeds 1.8mm, shiny. Self-fertile.

**Habitat.** Hillsides, edges of fields, 'scree', 'Caragana-steppe'; 3000–5000m.

**Distribution.** South Tibetan area. 'A common weed in Muktinath, and by roadsides between Thorung La and Manang'.

15 May–22 September.

*Banerji & Shakya 5682 (KATH); Einarsson et al. 3002 (BM); Grey-Wilson & Phillips 460 (BM), 479 (BM); Joshi & Battacharya 74–2231 (KATH); Lowndes 1044 (BM), 1151 (BM), 1197 (BM, KATH); Manandar 10073 (KATH), 10096 (KATH); McBeath 1501 (E); PSW 1435 (BM); K. R. Rajbandari 8283 (KATH), 8378 (KATH); Shakya, Adhikari & Amatya 5139 (KATH); Shrestha 5270 (KATH), 5387 (BM, KATH); Stainton 4368 (BM), 5496 (BM, E), 5502 (BM, E), 5536 (BM, E), 7153 (BM); SSW 2021 (BM, KATH), 2113 (BM, KATH), 2217 (BM, KATH), 2334 (BM, KATH).
30. C. spicata Lidén, sp. nov.


Type: West Nepal, Jumla district, Kabra, 29°20' N., 82°20' E., 2580 m, 'herb up to 0.5 m, in caves', 24 viii 1985, P. R. Shakya, M. N. Subedi & R. Uprety 8802 (GB—holotype, KATH).

Glaucus herb up to c. 0.5 m, basal parts unknown. Stems leafy, branched, slender. Leaves very glaucous on both sides. Petiole 5-10 cm. Lamina oblong, pinnate, c. 15 cm long. Primary leaflets ternate to sub-pinnate, stalked. Secondary leaflets sessile or shortly stalked, ± divided into broad obtuse segments. Racemes spicate, elongating, 15-40-flowered. Bracts small, lanceolate, or the lowermost larger and ± divided. Pedicels filiform, c. 5 mm long, ± equalling the bracts. Sepals small, c. 0.5 mm broad. Corolla slender, yellow, 14 mm long including an 8-9 mm long tapering spur. Upper petal with a very narrow rim, not truly cristate. Lower petal 6-7 mm long, broadly obovate-acute, not saccate at base. Inner petals 6 mm long, probably darker at apex. Nectary 5 mm long, partly fused to the spur. Fruit and seeds unknown; ovary with 2 ovules. Stigma as in C. vaginans and cornuta. Style 2 mm long, thickened below the stigma.

Only known from the type specimen. Similar to C. hookeri in leaves and bracts, but differing in the spicata racemes, the small ecrisate subacute pure yellow corollas, and the thin pedicels.

31. C. vaginans Royle


C. ramosa Hook. f. & Thomson, 1855: 267 nom. superfl. (Art. 63.1); Whitmore in Hara & Williams, 1979: 35. Type: Kumaon, Blinkworth, Wallich Cat. 1434 (K-W—lectotype; specimen in BM is C. stracheyi).

Annual to biennial, densely branched from the base with branched leafy angular stems, erect to decumbent, 15-50 cm. Leaves triangular-oblong, bi-tri-pinnate to sub-ternate with sheathing petioles, becoming smaller upwards. Ultimate lobes lanceolate. Racemes simple or branched at base, 8-15-flowered, elongate. Bracts to 10 mm, the lower leaf-like, deeply divided, often papillose-scabrid on the veins beneath, the upper bracts linear, entire. Pedicels 4-10 mm in fruit, reflexed. Corolla yellow, often with brownish veins, 14-17 mm, including spur about half as long. Crests of outer petals dentate. Lower petal with a conspicuous basal pouch. Fruit 9-12 mm, obovoid, 7-11 seeded, explosively dehiscent. Style 2.5 mm. Seeds 1.2-1.4 mm, shiny, smooth. Self-fertile.

Habitat. 'Open stony slope'; 3200 m.

Distribution. Kashmir to west Nepal.

17 August.

PSW 5274 (BM).

32. C. cornuta Royle

Royle, 1833: 68. Type: Choor mountains, Royle (K, LIVU—lectotype).


Similar to C. vaginans in habit but leaves bi- to tri-pinnate with opposite pinnae, glaucous beneath. Ultimate lobes broadly obtuse, mucronate. Racemes 10-15-flowered. Pedicels 2-5 mm. Bracts 4-8 mm, usually divided, or the uppermost entire. Flowers 14-16 mm, more slender than those of C. vaginans with entire crests and comparatively longer spur. Lower petal with a conspicuous basal pouch. Inner petals tipped with blackish purple, or very rarely concolorous. Fruit 8-9 × 2-3 mm, more narrowly obovoid, 8-16-seeded. Seeds dull, punctulate, 1-0 mm.
Habitat. Hillsides, often in man-made habitats; 2300–4000 m.

Distribution. Kashmir to Sikkim.

24 April–18 September.

Bailey s.n., ‘Insung La 31/5 1935’ (BM); Battari, Sharma & Dahal 80123 (KATH); Dhwoj 182A, ‘Soongorey 1929’ (BM, E.p.p.), 063, ‘Dorpu, 1930’ (BM, E); deHaas 2307 (BM); Manandhar 9751 (KATH); Miehe 2838 (BM), 10332 (BM), 11158 (BM); Langtang, Poelt s.n. (GZU); Polunin 134 (BM), 766 (BM), 1560 (BM); PSH 111 (KATH), 2438 (KATH), 2507 (BM, KATH); Sharma E233 (BM); Shrestha 4221 (KATH); Stainton 4937 (BM); 5128 (BM); Tyson 100 (BM).

33. C. filicina Prain

Prain, 1896: 30. Type: Sikkim, Ney-go-La on the Singale-La range, September 1887, King’s collector (CAL—holotype, BM—photograph).

Stems slender, simple or branched with 2–5 cauline leaves, 15–30(–40) cm, arising from a deeply buried elongate smooth rootstock, with a diffuse few-leaved rosette. Leaves triangular, bi-pinnate (in SSW 6542), to usually bi- or triternate with long petioles. Leaflets cut into small linear-lanceolate (in SSW 3732) or usually broadly obovate lobes. Racemes lax, 3–10(–15)-flowered. Pedicels 10–20 mm, much longer than the bracts which are either divided into linear segments, or oblongate and dentate, or entire. Flowers yellow with darker veins, rarely white, 16–20 mm long. Spur about as long as remainder of corolla. Crest of upper petal decurrent on spur. Outer petals broadly auriculate, acute at apex. Fruit (immature) linear, c. 10-seeded. Style 3–5 mm. Seeds unknown.

Habitat. Wet organic soil, pastures, grass-turf, also in burnt patches, often together with C. casimiriaca or C. calycina; 3000–4500 m.

Distribution. Sikkim, Bhutan, central Nepal. ‘North of Dhaulaghi (above Marpha), common between Pangsing Banyak and Poykotang’.

30 April–1 September.

deHaas 2332 (BM); Miehe 10799 (GZU); Sharma E294 (BM); SSW 3732 (BM), 6542 (BM). Cultivated in GBG.

34. C. cavei D. Long

D. Long, 1984: 104. Type: Sikkim, Phallut, 27° 12’ N, 88° 01’ E., 3350 m, 1 September 1919, Cave s.n. (E—holotype).

C. longipes sensu Whitmore in Hara & Williams, 1979: 34 p.p., non DC.

Perennial with slender weak stems, much branched from the base. Rootstock narrow. Leaves bi-pinnate to bi-ternate with deeply divided segments, glaucous beneath. Ultimate lobes broadly obovate, obtuse. Petioles of lower leaves longer than lamina, upper shorter. Racemes 5–25-flowered, rarely with a basal branch, elongate, rather dense at anthesis. Bracts leaf-like below, dentate to entire above, usually shorter than the slender 5–15 mm long pedicels which are downwardly arcuate in fruit. Flowers 16–19 mm, yellow to orange with the tips of the inner petals dark. Upper petal with a broad crest reaching the apex and there abruptly terminating, narrowly decurrent on the short (7–9 mm) spur. Lower petal broadly winged, acute-acuminate, shortly cristate. Fruit 10–13 mm, linear, 5–7-seeded. Style 2.5 mm. Seeds unknown.

Habitat. ‘Sandy scree’, ‘grassy meadow’; 2700–4300 m.

Distribution. Endemic to east Nepal and west Sikkim.

12 June–5 October.

Beer 8394 (BM), 25393 (BM); Dhwoj 093 (BM, E); Dobremez 1719 (BM); Horsfall 10 (BM); Sharma E492 (BM, E); Stainton 647 (BM), 1124 (BM, TI), 4751 (BM, TI); Wraber 407 (BM); Zimmerman (‘Bernhardt’ in Whitmore in Hara & Williams, 1979) 1372 (BM).

Corydalis cavei is related to the east Himalayan C. crispa, which is more richly branched and
has smaller flowers with more slender spurs and 3–4-seeded fruit. C. cavei is similar to C. filicina in habit.

35–40. C. sibirica group

Annual to perennial small-flowered slender plants, reminiscent of Fumaria in habit. They are found from Siberia through west China and east Tibet and throughout the Himalayas. Their most distinctive attribute is the peculiar stigma. The Himalayan representatives of the group have (except for the rather different C. lathyroides) been lumped together in a collective ‘C. longipes’ s.lat., but there are several vicariant species.

35. C. longipes DC.


Ascending to subscandent annual or short-lived perennial with leafy slender branched trailing stems. Leaves twice ternate, segments deeply lobed, lobes 1–4 mm broad, narrowly obovate, obtuse. Upper leaves smaller and less divided. Lower petioles long, upper short. Racemes long and slender, lax, 5–14(–19)-flowered, soon longer than the short peduncle, elongating in fruit. Bracts 1/5–1/2 as long as the slender pedicels, dentate to lobed, the lower often leaf-like, the upper sometimes entire. Pedicels 10–20 mm, slender, somewhat elongating in fruit. Sepals 1(–1.5) × 1–1.5 mm, whitish, deeply circumdentate, broadly reniform, shed together with the corolla. Corolla pale to bright yellow (in Polunin 1627 white with lemon-yellow tips and purple tinged at apex of the very long-aristate outer petals), 9–12 mm long from apex of spur to the apices of the inner petals, broadly cristate, jasmine fragrant. Outer petals long acuminate, often with the crest reaching the apex. Inner petals equalling spur, never dark at apex. Lower petal usually shortly cristate, 7–9 mm long, with a basal pouch and a constriction in the middle. Nectary very short but conspicuous, up to 1/5 the length of the spur. Fruit 5–10 × 2–3 mm, obovoid, 8–15-seeded, abruptly narrowed into a 2–3 mm long style. Seeds shiny, biseriate, 1.0–1.2 mm. Stigma with 6 stalked apical papillae. Self-sterile.

Habitat. Along shady paths in forests, wet stony places, field-margins, roadsides; 2000–3500(4300?) m.

Distribution. Endemic to central Nepal, not in drier areas. ‘Common S. and SW. of Annapurna, and N. and NW. of Trisuli Bazar’.

3 June–1 October.

Bista 3209 (KATH), 3210 (KATH); Dhwoj 144 (BM, E), 182 (BM, E p.p); Grey-Wilson & Phillips 325 (BM, K); de Haas 2076 (BM); Lowndes 1461 (BM, E, KATH); Maire 338 (BM); Malla 4866 (KATH); Manandhar 10329 (KATH); Miehe 850 (BM); Langtang, Poelt s.n. (GZU); Polunin 1627 (BM, E); Pradhan & Shrestha 37 (KATH); S. B. Shah 187 (KATH); Stainton 4588 (BM), 5096 (BM), 8425 (E); SSW 1642 (BM, KATH), 4369 (BM, KATH), 4504 (BM, KATH), 6263 (BM, KATH), 7459 (BM, KATH); Troth 978 (BM, KATH); Uphadiya & Rajbandari 2224 (KATH); Wallich 1433 (BM, G, K); Williams & Stainton (BM).

Plants with rows of papillae on the fruit, usually correlated with papillose or fringed crests to the outer petals, occur scattered throughout the distribution area.

36. C. filiformis Royle


C. longipes in Prain, 1896 and Jafri, 1974, non DC.

Very similar to C. longipes. Racemes 3–11-flowered. Lower bracts leaf-like, upper often clavate-entire, shorter than the slender 10–20 mm long fruiting pedicels. Sepals large, 2–3 × 1.5–2 mm, deeply fimbriate. Corolla pale yellow, 10–12 mm. Outer petals cristate, acuminate. Lower petal not constricted in the middle, 9(–10) mm, with a prominent basal pouch, almost like a short broad spur, with a short low crest. Inner petals pale, or tipped with blackish purple, but with pale dorsal wings. Nectary about half as long as the spur, partly fused to it.
Fig. 26  A: Corydalis leptocarpa (Stainton 4536). B: C. stricta (PSW 1136). C. C. flabellata (Grey-Wilson & Phillips 374). × 1/4.
Fruit 8–10 mm, 8–18-seeded, biseriate. Style 3 mm long. Seeds 1.1–1.3 mm. Stigma with 6 apical papillae, of which the 4 central are conspicuously longer.

**Habitat.** 'shady place', 'exposed slopes in oak-Rhodo-forest', 'alpine meadow'; 2500–4000 m.

**Distribution.** From south-central Nepal (S. of the main Himalayan range) to Kashmir. 28 July–17 August.

Bista & Joshi 174 (KATH), 513 (KATH); Kanai 673312 (KATH, TI); Shakya, Subedi & Uprety 8425 (KATH, GB).

The Kashmir specimens have conspicuously larger, often reddish-tinted sepals, and smaller yellow corollas with dark apices. In this and the following species some, probably perennating, specimens have thickened adventitious roots.

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37. **C. calycina** Lidén, sp. nov.  

*Map 20; Fig. 22C; 23C*


**Type:** W. Nepal, Maharigaon (29° 22' N., 82° 24' E.), 3200 m, 14 vii 1952, *Polunin, Sykes & Williams* 158 (BM—holotype).

Similar to *C. longipes* and *filiformis* but usually smaller. Racemes 5–14-flowered. Upper bracts small, entire. Sepals 2–3 × 1.5–2 mm, dentate to lacerate, often early caducous. Corolla 9–11 mm. Spur of upper petal slightly longer than to sub-equalling the inner petals. Wings and crests of upper petal broad, abruptly terminating, leaving the short filiform apex free. Lower petal not crested, c. 6 mm long, devoid of basal pouch and not constricted in the middle, broad at apex. Nectary fused to the spur, 2–4 mm long. Fruit 5–9 × 2 mm, narrowly obovoid, 8–10(–14)-seeded, similar to that of *C. longipes*. Style 2–2.5 mm. Seeds 1.2 mm, shiny, biseriate. Stigma with 4 stalked apical papillae.

**Habitat.** Moist open grassy slopes, pastures; 3100–4600 m.

**Distribution.** Nepal westwards from Annapurna, endemic. 'Locally common N. of Dhaulaghar (above Marpha). Also recorded between Thorung La and Manang N. of Annapurna'.

1 July–27 September.

Arnold 135 (BM); Grey-Wilson & Phillips 786 (K); PSW 158 (BM), 4593 (BM), 5438 (BM); Shakya, Subedi & Uprety 8625 (KATH, GB); SSW 3329 (BM). Cultivated in GBG.

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38. **C. pseudolongipes** Lidén, sp. nov.  

*Map 20; Fig. 22D; 23D*


**Type:** East Nepal, Bharatee Himal S. Makalu, Barun Khola below the Yangla pasture, 3500 m, 4 x 1972, T. Wraber 385 (BM—holotype).

*C. longipes var. burkillii* Fedde, 1920: 314. Type: Sikkim, Singale-La, 3660 m, September 1906, *J. H. Burkill* 27664 (K).


*C. longipes* sensu D. Long, 1984, non DC.
Similar to *C. longipes* and *casimiriana*. Racemes 3–10-flowered. Bracts usually divided throughout the inflorescence, more than half as long as the 5–10(–15) mm long slender pedicels, rarely the upper bracts entire. Sepals small, c. 1 mm, often deeply divided, rarely minute, entire. Corolla 9–12 mm long. Upper petal acute or very shortly acuminate. Spur of upper petal 5–6 mm long, curved upwards, slender, longer than the short inner petals which are externally tipped with black-purple. Lower petal c. 5–6 mm with a basal pouch and a constriction in the middle. Nectary short, prominent, up to 1 mm long, not fused to the spur. Fruit 5(–7) × 2 mm, ovoid, often minutely papillose all over the surface, up to 10-seeded. Seeds 1.2 mm, shiny, biseriate. Stigma with 4 stalked apical papillae.

**Habitat.** ‘slopes’; 2800–3960 m.

**Distribution.** East Nepal, Sikkim, Bhutan. 18 July–4 October.

**Banerji, Shrestha & Upadhyia** 2773 (deviating in small entire bracts, KATH); **Beer** 9527 (BM, K); **Shrestha & Joshi** 124 (BM, KATH); **Saiju, Goshi, Pradhan & Subedi** 28 (KATH); **Wraber** 335 (BM), 386 (BM).

39. **C. casimiriana** Prain  

Prain, 1896: 27; **C. prainiana** Kanodia & Mukerjee in Mukerjee, 1973, nom. superfl. (Art. 63.1). Type: Kumaon, **Duthie** 5312 (CAL?, BM, same number from two other localities).

*C. longipes* sensu Whitmore in Hara & Williams, 1979: 34 p.p., non DC.

Similar to *C. pseudolongipes*. Racemes 4–11-flowered with rather long peduncles. Middle and upper bracts often entire, shorter than the 5–10(–13) mm long slender pedicels. Sepals 0.5–1 mm, dentate, reniform. Corolla 8–10(–11) mm long, slender, more narrowly winged than in *C. pseudolongipes*. Outer petals acute at apex or very shortly acuminate. Spur equalling or often longer than the inner petals, narrow, often curved upwards. Lower petal not cristate, 5–6 mm, without a basal pouch and a constriction in the middle. Nectary fused to the spur, 2–3 mm long. Inner petals usually tipped with blackish purple. Fruit 6–15 × 1(–2) mm, linear, 6–13-seeded. Style 1.5–2 mm. Seeds shiny, 0.9–1.1 mm, usually uniseriate. Stigma with 4 stalked apical papillae. Self-fertile.

**Habitat.** ‘scree’s, open grassy slopes, pastures, frequent in burnt areas; 2800–4700 m.

**Distribution.** Almost throughout the Himalayas, but absent from the Annapurna area. ‘Common N. of Trisuli from Sing La to Poykotang’.

**Arnold 77** (BM); **Banerji 1249** (KATH); **Banerji & Shakya 5601** (KATH); **Beer 9425** (BM), 9464 (BM), 25480 (BM); **Dep. Med. Plants 147** (KATH); **Dhwoj 22** (BM, K), 280 (BM, E); **Duthie 5312** (BM); **Einarsson et al. 2240** (KATH), 2241 (BM), 2473 (BM, KATH); **deHaas 2105** (BM), 2254 (BM), 2701a (BM); **Horsfall 10** p.p. (BM); September 1978, **Idzumi & Togashi** (TI), September 1979, **Idzumi & Togashi** (TI); **Itok & Rajbandari** 1180 (KATH); August 1969, **Kanai & Malla** (TI); **Malla 1612** (KATH); **Malla & Rajbandari** (KATH); **Manandar 165** (KATH); **Manandar & Joshi** 6709 (KATH); **Miehe 4111** (BM), 7497 (BM), 7540 (BM), 7611 (BM), 8117 (GOET), 8557 (BM), 9436 (Xining), 10634 (BM), 10814 (GOET), 11119 (BM), 11147 (GOET), 11427 (Xining), 11875 (GOET), 12308 (BM); **Nicolson 2651** (BM, KATH); **Langtang, Poelt s.n. (GZU)**; **Polunin 1068** (BM), 1214 (BM), 1769 (BM), 1785 (BM); **PSW 111** (BM), 402 (BM, KATH), 2438 (BM), 4165 (BM); **K. R. Rajbandari** 9733 (KATH); **Shaka, Adhikari & Subedi 8247** (KATH); **Shakya, Subedi & Uprety** 8454 (KATH), 8744 (KATH), 8812 (KATH); **Shrestha & Shakya** 3761 (KATH); **Shrestha & Joshi** 482 (BM, KATH); **Smith** 176 (BM); **Stainton 1700** (BM, KATH), 5115 (BM); **SSW 3526** (BM), 3871 (BM, KATH), 4397 (BM, E, K); **Yon 170** (BM). Cultivated in GBG.

There seems to be two vicariant forms which perhaps could be recognized as subspecies. From Annapurna eastwards all specimens have short, 6–10 mm long, linear to very narrowly obovoid fruits which are uni- to incompletely biseriate. This seems to be the same as *C. gracilis* Franchet, non Ledebour, from SW. China. Westwards from Annapurna the fruits are 12–15 mm long, linear and uniseriate, with one exception, SSW 4397 (83° 13' E.), which has short fruits.
40. **C. lathyroides** Prain

Prain, 1896: 23. Type: Kumaon, Ralam valley, 3050–3350m, on rocks, *Duthie* 7208 (K).


Delicate plant, branched from the base with sparingly leafy stems 10–20 cm. Leaves narrowly oblanceolate, once pinnate, lower with long petioles, upper sessile. Leaflets in 3–5(–6) pairs, entire or usually divided into 2–5 segments which are ovate-obtuse. Racemes terminal and axillary from the upper leaves, 4–10-flowered, lax. Bracts 3–4 mm, entire, much shorter than the slender erecto-patent pedicles which attain 5–15 mm in flower, 15–20 mm in fruit. Sepals 0.75–1.5 mm, shallowly dentate, Corolla 8–10 mm long, not or very narrowly ciliate. Upper petal acute with a short spur 3.5–5 mm long, slightly curved upwards. Lower petal 7 mm long, acute, without a basal pouch. Nectary very slender, 2/3 as long as the spur. Fruit 6–8 × 1.5–2 mm, narrowly obovoid, to 15-seeded. Style 2 mm long. Seeds small, 0.7 mm, with very long elaiosomes, glossy, biseriate. Stigma with 4 stalked apical papillae.

**Habitat.** Cliff ledges, shady rocks; 2500–3900 m.

**Distribution.** Kumaon, west Nepal (Sikkim, Bhutan).

1 July–6 August.

*Mallia* 14138 (BM, KATH); *PSW* 2454 (BM, KATH), 4684 (BM, E); *K. R. Rajbandari* 8269 (KATH); *Shakya, Subedi & Uprety* 8531 (KATH, GB); *SSW* 1706 (BM, KATH), 6547 (BM).

The east Himalayan specimens have distinctly larger corollas.

**Sect. ASTEROSTIGMATA** (Fedde) Fedde

Fedde, 1936: 135. Type species: *C. temulifolia* Franchet.

Annual to perennial herbs, with ternately to pinnately divided leaves, frequently with bulbils in the axils. Flowers pink, usually with long narrow spurs, subtended by ± foliaceous bracts. Fruits linear.

41. **C. leptocarpa** Hook. f. & Thomson


Annual or perennial. Stems 10–40 cm, densely branched from the base with slender branched branches. Leaves triangular, biternate with broad, obtuse, ± divided leaflets, glaucous beneath. Racemes lax, (1–)2–4-flowered (5–9-flowered in east Himalaya). Bracts 6–12 mm, ovate-lanceolate, stalked, the lower ones lobed, the upper entire. Pedicels 5–8 mm, deflexed in fruit. Flowers 22–25 mm with spur equalling limb, mauve, pink or purple, ± ciliate, rather broadly winged but acute or mucronate at apex. Fruit 24–35 mm, linear, 10–20-seeded. Style attenuate, 4 mm. Seeds 1.2 mm, glossy. Self-fertile.

**Habitat.** Stony places, walls, roadsides, etc., scattered; 1900–3000 m.

**Distribution.** Central and east Nepal to SW. Yunnan. ‘Ulleri, SW. of Annapurna’.

9 May–25 July.

*Dobremez* 3194 (BM, KATH); *McCosh* 71 (BM); *Shrestha* 15–454 (KATH); *Stainton* 4536 (BM, E); *SSW* 5756 (BM); *Williams* 437 (BM, E).

The Nepalese specimens differ in their more slender flowers and few-flowered racemes. *C. leptocarpa*, together with *C. chaerophylla* and *C. terracina*, is one of only three species occurring below 2000 m.

**Sect. STRICTAE** (Fedde) Wendelbo

Wendelbo, 1974: 8; Fedde, 1936: 133 as subsect. Type species: *C. stricta* DC.


**Sect. Flabellatae** Fedde ex Michalkova, 1981: 82. Type species: *C. flabellata* Edgew.

42. **C. stricta** DC.  

Rootstock very thick but weakly lignified, papery, dark brown, sometimes split up, densely crowned with leaf-bases and scales. Stems 15–40 cm, stout, fleshy, leafy. Leaves crowded at base, pinnate to bi-pinnate with ternately divided segments; ultimate lobes oblanceolate. Upper cauline leaves smaller, subsessile. Racemes very dense, oblong with thick rachis, 30–60-flowered. Bracts 5–7 mm, scarious, linear-acuminate, as long as or longer than the pedicels which are 4–5 mm. Sepals 4 × 1–5 mm, dentate-fimbriate. Flowers yellow, 15–17 mm long, narrowly winged, acuminate, with a short saccate spur. Fruit 15–18 mm, broadly linear, pendent, 6–9-seeded with attenuate style 4–5 mm.

**HABITAT.** Dry sandy slopes; 4000–5400 m.

**DISTRIBUTION.** Dolpo in Nepal, Tibet, Altai.  
15 June–15 July.

* Dobromez 2931 (BM, KATH); *PSW* 1136 (BM, E, KATH); *Stainton* 4353 (BM, KATH), 5532 (BM, E).

The Nepalese and south Tibetan specimens have shorter bracts, denser racemes, and more finely cut leaves than those from Altai and north Tibet.

43. **C. flabellata** Edgew.


Very glaucous fleshy plant. Stems erect, 15–30 cm, leafy, simple or branched, arising from a thick rootstock crowned by the fragile remnants of older leaves. Leaves pinnate with 3–5 pairs of distant, broadly flabellate, entire or deeply dissected leaflets. Racemes long, spicate, lax, 10–30-flowered. Bracts small linear, caudate, slightly longer than the very short (2–3 mm) pedicels which are bent downwards in fruit. Sepals large, 3–4 mm, caudate, laciniate at base. Flowers 12 mm long, narrow, curved, with a short saccate spur, yellow, shortly rostellate. Fruit 15–20 mm long with a 3 mm long style, linear, pendent, 5–8-seeded. Seeds shiny, 1·3 mm with a short beak to the elaiosome. Self-fertile.

**HABITAT.** Dry gravel, cliffs; 3000–3500 m.

**DISTRIBUTION.** Upper Kali Gandaki valley, west Himalaya, SW. Tibet.  
18 May–17 August.

* Dobromez 3030 (BM, KATH); *Grey-Wilson & Phillips* 374 (BM, K), 694 (K); *Joshi & Battacharya* 74–2068 (KATH); *Shakya, Adhikari & Amatya* 5097 (KATH); *SSW* 7301 (BM, KATH).
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British Museum (Natural History)

MACROLICHENS OF EAST AFRICA

T. D. V. Swinscow and H. Krog

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