

## PAPAVERACEAE

罂粟科 ying su ke

Zhang Mingli (张明理)<sup>1</sup>, Su Zhiyun (苏志云 Shu Tsi-yun)<sup>2</sup>, Magnus Lidén<sup>3</sup>, Christopher Grey-Wilson<sup>4</sup>

Herbs, annual, biennial, monocarpic perennial, perennial, or shrubby. Laticifers or elongated idioblasts present. Leaves alternate or in a basal rosette, rarely opposite or whorled, usually without stipules; leaf blade entire to compound. Inflorescences racemes, panicles, dichasia, pseudoumbels, or solitary flowers. Flowers actinomorphic, bisymmetric, or zygomorphic, always bisexual, usually 2-merous, rarely 3- or 4-merous. Calyx caducous, green or petaloid. Corolla choripetalous or quasi-sympetalous, very rarely absent. Anthers opening by slits. Ovary superior, syncarpous with 2 to several carpels; placentation parietal.

Forty genera and ca. 800 species: mainly in the N Hemisphere of both the Old and New Worlds, extending into Central and South America, a few in Africa; 19 genera (one endemic, two introduced) and 443 species (295 endemic, five introduced, one requiring verification) in China.

Many species are used medicinally due to the high content of alkaloids.

The two subfamilies recognized here are often treated as separate families.

Wu Chengyi, Chuang Hsuan & Su Ziyun. 1999. Papaveraceae. *In*: Wu Chengyi, ed., *Fl. Reipubl. Popularis Sin.* 32: 1–483, 541–545.

- 1a. Laticifers present; sap watery or milky; sepals green, entire, enclosing corolla in bud, imbricate or (in *Eschscholzia*) fused into a caducous hood; corolla actinomorphic, with (0–)4–8 (rarely more) petals; petals all similar, flat, imbricate and crumpled in bud; stamens several with filiform filaments; nectaries absent ..... 1. Subfam. Papaveroideae
- 1b. Laticifers lacking; sap watery, but sometimes colored; sepals usually petaloid, not enclosing petals in bud; corolla bisymmetric or zygomorphic; petals 4 in 2 very dissimilar whorls, with wings, crests, and/or spurs, pairwise valvate in bud; androecium of 8 thecae distributed on 2, 4, or 6 “stamens” with broad hyaline filaments; nectaries usually present ..... 2. Subfam. Fumarioideae

### 1. Subfam. PAPAVEROIDEAE

罂粟亚科 ying su ya ke

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, annual, biennial, perennial, or shrubby, with milky or watery latex. Leaves alternate, rarely opposite or pseudowhorled. Inflorescences solitary flowers, or racemes, corymbs, panicles, or umbels. Flowers actinomorphic. Sepals in 1 whorl of 2 or 3 (or 4), free, caducous. Petals 4–10, occasionally more, in 2 whorls, usually caducous, rarely absent. Stamens many, free. Ovule anatropous to subcampylotropous, bitegmic, crassinucellate. Fruit syncarpous, multicarpellate, many seeded.

Twenty-three genera and ca. 230 species: mainly in the N Hemisphere, extending into Central and South America, a few in Africa; 12 genera (one endemic, two introduced) and 67 species (29 endemic, five introduced) in China.

- 1a. Perianth 3-merous; pistils at least 3-carpellate ..... 1. *Argemone*
- 1b. Perianth 2-merous or petals absent; pistils 2-carpellate, rarely more.
- 2a. Flowers small, apetalous, in large panicles ..... 12. *Macleaya*
- 2b. Flowers medium to large, with 4 petals or more.
- 3a. Inflorescences usually corymbs or panicles; seeds cristately carunculate.
- 4a. Stems scapose; leaves all basal, blade cordate, margin repand ..... 11. *Eomecon*
- 4b. Stems not scapose; leaves cauline and basal, blade not cordate, margin with teeth to pinnatifid.
- 5a. Cauline leaves alternate; stems cymosely branched; fruit nearly moniliform ..... 10. *Chelidonium*
- 5b. Leaves nearly opposite on stem apices; stems simple; fruit not moniliform.
- 6a. Flowers bracteate; ovary shortly pubescent; capsules 2–4-valvate from apex to base ..... 8. *Stylophorum*
- 6b. Flowers ebracteate; ovary glabrous; capsules 2-valvate from base to apex ..... 9. *Hylomecon*
- 3b. Inflorescences simple or racemose; seeds without cristate caruncle.
- 7a. Pistils 3-carpellate to polycarpellate; inflorescence racemose or paniculate, flowers sometimes solitary.
- 8a. Styles generally obvious, stigmas claviform or capitate, free or united, actinomorphic, decurrent; plant yellow lactiferous ..... 2. *Meconopsis*

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- 8b. Flowers astylous, stigmas actinomorphic, united into compressed or steeped disks; plant white lactiferous ..... 3. *Papaver*
- 7b. Pistils 2-carpellate (rarely 4-carpellate); flowers solitary, terminal.
- 9a. Petals purple or red; capsules (2–)4-valvate ..... 7. *Roemeria*
- 9b. Petals yellow or orange, rarely red; capsules 2-valvate.
- 10a. Anthers linear, longer than filaments; cauline leaves and basal leaves similar, blade ternate, polypinnately lobed, lobes linear ..... 4. *Eschscholzia*
- 10b. Anthers not linear, shorter than filaments; basal leaves many, pinnatilobate or pinnatipartite, lobes with teeth and petiolules, cauline leaves fewer, obviously smaller than basal leaves, sessile.
- 11a. Ovary 1-loculed; seeds ovoid and tessellate; plant frequently yellow lactiferous ..... 5. *Dicranostigma*
- 11b. Ovary with 2 false locules caused by septas forming spongy cells; seeds ovoid, reniform, alveolate; plant orange- or red lactiferous ..... 6. *Glaucium*

## 1. ARGEMONE Linnaeus, Sp. Pl. 1: 508. 1753.

罂粟属 *ji ying su shu*

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, annual, biennial, or perennial, usually stout, mostly branched, spiny, bitter yellow lactiferous. Stems mostly erect. Leaves pinnate, lobes repand dentate, teeth apically spiny. Flowers solitary, terminal or arranged in cyme, trimerous; receptacles narrowly conical. Flower buds erect. Sepals (2 or)3, caducous, apex with horned appendices. Petals (4–)6, in 2 whorls, contorted or imbricate in bud, orange, yellow, yellow-white, or white, occasionally pink or mauve. Stamens many, free; filaments filiform or slightly ampliate below middle, apically subulate; anthers linear, nearly basal, bifid, extrorse, curved after dehiscence. Ovary ovoid, conical-ovoid, or nearly elliptic; carpels (3 or)4–6, united; ovules many; styles very short or absent; stigmas as many as carpels, actinomorphic. Capsule spiny, rarely not spiny, apex divided for a short distance into 3–6 valves, rarely parting nearly to base. Seeds many, spheroidal; caruncle very small or absent, seed coat tessellate.

Twenty-nine species: mainly in North America from United States to C Mexico and the West Indies, nine species in South America (three in Chile), one in Hawaii, and the others scattered along the NW and W coasts of the Americas; one species (introduced) in China.

### 1. *Argemone mexicana* Linnaeus, Sp. Pl. 1: 508. 1753.

罂粟 *ji ying su*

Herbs, annual or occasionally short-lived perennial, 30–100 cm tall, usually stout. Stems mostly short, branched, with sparse explanate fulvous spines. Basal leaves dense; petiole 5–10 mm; blade glaucous with blue-green markings on veins, paler abaxially, broadly oblanceolate or obovate to elliptic, 5–20(–25) × 2.5–7.5(–8) cm, glabrous, sparsely sharply spiny on veins, base cuneate, margin pinnatipartite, apex acute; lobes undulate teeth, teeth apically spiny. Cauline leaves alternate, similar to basal leaves, but upper leaves smaller and sessile, often subamplexicaul. Flowers solitary, sometimes in few-flowered cymes. Pedicel very short. Flower buds ovoid, ca. 1.5 cm. Sepals 2(or 3), cymbiform, ca. 1 cm, apex spurred, glabrous or

sparsely spiny. Petals 6, yellow or orange, broadly obovate, 1.7–3 cm, base broadly cuneate, apex rounded. Filaments ca. 7 mm; anthers narrowly oblong, 1.5–2 mm, coiling after dehiscence. Ovary elliptic or oblong, 7–10 mm, with explanate fulvous spines; styles very short; stigmas dark red, 4–6-lobed. Capsule oblong to broadly elliptic, 2.5–5 × 1.5–3 cm, sparsely fulvous spiny, 4–6-valved dehiscing from apex to 1/4–1/3 of length. Seeds spherical, 1.5–2 mm in diam., obviously tessellate. Fl. and fr. Mar–Oct.  $2n = 28$ .

Naturalized along coasts, introduced in courtyards. Naturalized in Fujian, Guangdong, Taiwan, ?Yunnan; introduced in many provinces in China [native to Central and tropical America].

This is a widely cultivated plant which has become a naturalized weed in many parts of the world, particularly in subtropical regions. The seeds are poisonous.

## 2. MECONOPSIS Viguier, Hist. Nat. Pavots Argémons, 48. 1814.

绿绒蒿属 *lü rong hao shu*

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, monocarpic or perennial, yellow lactiferous. Taproot distinct in monocarpic species, plump, extended or napiform thickened, accompanied by fibrous roots, or fibrous. Stems, when present, branched or not, bristly, setose, pubescent, or glabrous. Leaves cauline and basal or all basal and forming a rosette; rosette leaves persistent in winter or dying away to a resting bud or buds; blade entire, serrate, or pinnatifid to pinnate, glabrous to bristly; basal leaves and lower cauline leaves usually petiolate; upper cauline leaves shortly petiolate or sessile, sometimes amplexicaul. Inflorescence a raceme, panicle, or pseudumbel, with uppermost flower opening first, or flowers solitary, then often on basal scapes. Flowers large, often bowl- or saucer-shaped. Sepals 2, very rarely 3 or 4 in terminal flowers, caducous. Petals 4–10, occasionally more, blue, purple, pink, red, or yellow, rarely white. Stamens numerous; filaments mostly linear, rarely dilated in lower part. Ovary nearly spherical, ovoid, or obovoid to narrowly terete, 1-loculed, with 3 or

more carpels, containing numerous ovules; styles distinct, usually short, sometimes almost absent, regularly stout or basally expanding into a disk covering top of ovary; stigmas free or united, capitate or clavate. Capsule nearly spherical, ovoid, obovoid, or elliptic to cylindrical, spiny, setose, pubescent, or glabrous, 3–12(–18)-valvate; segments slightly lobed or divided to 1/3 length or more from apex to base. Seeds many, ovoid, reniform, falcate-oblong, or oblong, smooth or longitudinally concave, without a caruncle.

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

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

- 1a. Styles abruptly expanded (ampliate) at base and disklike, covering top of ovary and often projecting beyond its edge (*M.* sect. *Discogyne*).
  - 2a. Styles almost obsolete; petals sparsely setose outside ..... 43. *M. torquata*
  - 2b. Styles distinct, 3–7 mm; petals glabrous.
    - 3a. Styler disk pentagonal in outline, shallowly lobed, not projecting beyond ovary edge; petals maroon; stigmas capitate; stem leafy up to inflorescence ..... 42. *M. tibetica*
    - 3b. Styler disk sinuate, 8-angled, lobed or fringed at margin, projecting beyond ovary edge; petals pale yellow or bluish purple to deep purple, rarely red; stigmas clavate.
      - 4a. Leaf blade pinnatifid or pinnatifid for full length; stems leafy (excluding leaflike bracts) ..... 40. *M. pinnatifolia*
      - 4b. Leaf blade 3–5-toothed at apex, rarely subtire or entire ..... 41. *M. discigera*
- 1b. Styles equally thick or basally expanded, but never extended and disklike (*M.* sect. *Meconopsis*).
  - 5a. Leaves basal and cauline; inflorescence compound, cymose or racemose panicles or bracteate racemes.
    - 6a. Inflorescence branched, with many flowers in cymose or racemose panicles; petals 4, mostly yellow; leaf blade pinnate or pinnately lobed.
      - 7a. Roots large, fibrous; inflorescences cymose panicles; herbaceous perennial.
        - 8a. Ovary narrowly oblong or subterete, glabrous; capsules subterete ..... 1. *M. oliveriana*
        - 8b. Ovary elliptic, glabrous or very sparsely pilose; capsules elliptic ..... 2. *M. chelidoniifolia*
      - 7b. Taproot present, plump, extended or napiform; inflorescence paniculate, racemose toward top; plant monocarpic.
        - 9a. Petals wine-red, wine-crimson, or purple ..... 5. *M. wilsonii*
        - 9b. Petals yellow.
          - 10a. Flowering stems early sparsely setose and later glabrous; capsules densely setose, slightly 4–7-valvate from apex; petals ca. 3 cm ..... 3. *M. gracilipes*
          - 10b. Flowering stems villous and densely barbellate-tomentose; capsules densely barbellate-tomentose and villous, slightly 6–12-valvate from apex; petals ca. 5 cm ..... 4. *M. paniculata*
    - 6b. Inflorescence simple; flowers forming bracteate racemes; petals 4–8, yellow, blue, or purple, rarely white; leaf blade entire or lobed.
      - 11a. Roots fibrous, not swollen or tuberlike; stem base with persistent leaf bases, setose.
        - 12a. Cauline leaves alternate, blade trifoliolate ..... 6. *M. smithiana*
        - 12b. Uppermost cauline leaves in a whorl, pseudoverticillate, all leaves entire.
          - 13a. Flowers yellow.
            - 14a. Leaves 3-veined for at least 2/3 of their length; flowers ascending to erect at anthesis; stigmas sessile or almost so ..... 7. *M. integrifolia*
            - 14b. Leaves pinnately veined, sometimes 3-veined at base; flowers nodding to half-nodding at anthesis; styles present, at least 5 mm ..... 8. *M. pseudointegrifolia*
          - 13b. Flowers purple or blue.
            - 15a. Base of leaves truncate or cordate; flowers usually 3–6 ..... 9. *M. betonicifolia*
            - 15b. Base of leaves cuneate; flowers usually 1–3 ..... 10. *M. grandis*
  - 11b. Taproot radishlike; stem bases with or without persistent leaf bases, glabrous.
    - 16a. Plant with stiff spiny hairs (bristles).
      - 17a. Leaf blade pinnatifid.
        - 18a. Styles broad; ovary densely rubiginous setose ..... 21. *M. speciosa*
        - 18b. Styles narrow; ovary with golden fulvous to stramineous prickles ..... 22. *M. aculeata*
      - 17b. Leaf blade entire to somewhat shallowly and irregularly lobed or toothed.
        - 19a. Leaves broad, irregularly toothed or lobed, glaucous, with dark base to sparse bristles; stigmas protruding, elongate ..... 19. *M. rudis*
        - 19b. Leaves narrow, not toothed nor glaucous, usually rather densely bristly, without dark base to rather dense bristles.

- 20a. Capsule with spreading bristles; tall plant usually to 1 m tall in flower; stigmas included within boss of stamens, pale green or yellowish ..... 20. *M. prattii*
- 20b. Capsule with appressed to ascending bristles; plant to 50 cm tall in flower; stigmas slightly protruding beyond boss of stamens, whitish ..... 18. *M. racemosa*
- 16b. Plant glabrous or pubescent.
- 21a. Plant with large evergreen leaf rosettes in years before flowering.
- 22a. Flowers white; leaves entire ..... 11. *M. superba*
- 22b. Flowers bluish violet; leaves pinnate to pinnatifid ..... 17. *M. violacea*
- 21b. Plant with overwintering buds; leaves withering in autumn.
- 23a. Petals blue or purple.
- 24a. Flowers 1–5 from upper cauline axils, often only 1 open; capsules narrowly oblong or subterete ..... 14. *M. lyrata*
- 24b. Flowers usually 3 from axillary pedicels, all open; capsules narrowly obovoid to narrowly elliptic ..... 15. *M. primulina*
- 23b. Petals white or yellow.
- 25a. At least some leaves pinnate; petals white ..... 16. *M. argemonantha*
- 25b. All leaves entire, sometimes toothed at margin; petals yellow.
- 26a. Taproot narrow and elongate; capsules with spreading spines ..... 12. *M. georgei*
- 26b. Taproot napiform; capsules glabrous or sparsely setose ..... 13. *M. florindae*
- 5b. Leaves all basal, cauline leaves absent; flowers several, forming ebracteate racemes or simple on basal scapes.
- 27a. Flowers several, forming ebracteate racemes; petals 4–8, blue or purple.
- 28a. Flowers on upper flowering stems, without mixed basal scapes; capsules narrowly cylindrical; styles absent or nearly so ..... 23. *M. forrestii*
- 28b. Flowers on upper and lower flowering stems, often with mixed basal scapes; capsules elliptic or narrowly obovoid; styles distinct ..... 24. *M. lancifolia*
- 27b. Flowers solitary on basal scapes; petals 4–10, blue, purple, or red.
- 29a. Fibrous roots fibriform; plant base with persistent leaf bases, setose.
- 30a. Petals red; filaments straplike ..... 25. *M. punicea*
- 30b. Petals blue or purple; filaments linear.
- 31a. Capsule 2.5–5 cm, sparsely usually deflexed setose; flowers 5–8 cm in diam., with 5–8 petals; ovary narrowly elliptic or oblong-elliptic ..... 26. *M. simplicifolia*
- 31b. Capsule 1.5–2.5 cm, densely appressed setose or glabrous; flowers 2.5–5 cm in diam., with 4–6 petals; ovary spheroidal, ovoid, or oblong ..... 27. *M. quintuplinervia*
- 29b. Taproot distinct.
- 32a. Filaments clearly dilated in proximal half.
- 33a. Flowers broadly saucer-shaped, with spreading petals; petals unblotched at base ..... 28. *M. henrici*
- 33b. Flowers deeply cup-shaped, with erect petals; petals dark blotched at base ..... 29. *M. sinomaculata*
- 32b. Filaments linear, not dilated.
- 34a. Leaf blade with firm spines or bristles, often densely so.
- 35a. Plant dwarfish, ca. 9 cm tall; taproot broad, ca. 5 cm in diam.; leaf blade ovate or narrowly so, margin pinnately lobed ..... 37. *M. pseudohorridula*
- 35b. Plant 15–20 cm tall; taproot plump and extended, 1–1.5 cm in diam.; leaf blade lanceolate, margin entire or undulate.
- 36a. Plant with dense, sharp bristles; ovary conical, with compressed or inclined, firm spines ..... 38. *M. horridula*
- 36b. Plant with stiff hairs; ovary elliptic to narrowly obovoid, adpressed setose ..... 39. *M. impedita*
- 34b. Leaf blade glabrous on both surfaces, rarely somewhat setose or pubescent.
- 37a. Plant perennial, with rootstock branched at apex, each branch terminating in a single leaf rosette and bearing 1 basal scape ..... 33. *M. delavayi*
- 37b. Plant monocarpic, with simple rootstock terminating in a single leaf rosette bearing 1, several, or occasionally many scapes.
- 38a. Leaf blades entire; plant with persistent, fibrous leaf bases.
- 39a. Petals normally 6, with a dark base, 4 cm or more; filaments ca. 15 mm; style ca. 4 mm ..... 30. *M. barbisetia*
- 39b. Petals normally 4, without a dark base, 2–3 cm; filaments 6–8 mm; style 1.5–2 mm ..... 34. *M. zangnanensis*
- 38b. Leaf blades usually pinnately lobed, rarely entire on same plant, glabrous or almost so; plant with or without persistent fibrous leaf bases.
- 40a. Basal scapes few, not more than 5; taproot napiform or shortly elongated; plant without persistent fibrous leaf bases.
- 41a. Leaf blade pinnate or bipinnate, small, subfleshy; petals 1–1.5 cm ..... 31. *M. concinna*

- 41b. Leaf blade lobed, large, thin; petals ca. 3 cm ..... 32. *M. wumungensis*  
 40b. Basal scapes usually 8 or more; taproot stout and elongated; plant with persistent fibrous leaf bases.  
 42a. Capsule ovoid to narrowly ellipsoid, 4–10 × longer than wide; petals usually more than 4 ..... 35. *M. pseudovenusta*  
 42b. Capsule narrowly oblong or subterete, scarcely 4 × longer than wide; petals 4 ..... 36. *M. venusta*

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

柱果绿绒蒿 zhu guo lü rong hao

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

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

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

椭圆绿绒蒿 tuo guo lü rong hao

Herbs, perennial, 50–150 cm tall in flower. Roots long, slender, 3–5 mm in diam., much branched, fibrous; rootstock with persistent leaf bases, densely barbellate-setose. Stems erect, greenish purple, branched, longitudinally channeled, near base shortly barbellate-setose. Basal and lower cauline leaves: petiole densely yellow-brown setose; blade abaxially glaucous, ovate-oblong or broadly ovate, 7–8 × 6.5–7 cm, pinnatisect in lower part, apically pinnatifid; lobes 3–5, distant, pinnatifid or pinnatifid again; lobules ovate, both surfaces sparsely hirsute, apex obtuse or subrounded; upper cauline leaves sessile or nearly so, small; blade broadly ovate, slightly pilose, 3-pinnatisect or 3-pinnatifid. Flowers 1 or 2 in uppermost leaf axils, forming cymose panicles, ascending to half-nodding. Pedicel slender, glabrous. Flower buds spherical. Sepals 2, suborbicular, ca. 1 cm, glabrous, with one margin membranous. Petals 4, yellow, obovate to suborbicular, 1.5–2.3 cm.

Filaments filiform, ca. 7 mm; anthers yellow, narrowly oblong, 3–4 mm. Ovary elliptic, 5–6 × 4–5 mm, glabrous or near base slightly hispid; styles short; stigmas capitate. Capsule elliptic, 1–1.5 cm × 7–10 mm, glabrous, 4(–6)-valvate for a short distance from apex. Seeds falcate-oblong, less than 1 mm; seed coat with shallow impressions forming longitudinal stripes. Fl. May–Aug.

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

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

细梗绿绒蒿 xi geng lü rong hao

Plants monocarpic, 40–60 cm tall. Stems branched, yellow-brown barbellate-setose, later glabrous or only with remaining scabrous firm bases. Basal leaves absent at flowering time, pinnate with 3 or 4 pairs of lateral lobes; lobules alternate to subopposite, ovate to oblong, 1.5–5 × 1.4–2.5 cm, end lobe larger than lateral ones, both surfaces and margin sparsely yellow-brown shortly barbellate-setose, later glabrous or only with remaining scabrous firm bases, base auriculate, margin pinnately lobate, apex obtuse to rounded. Upper cauline leaves lanceolate, 5–12 × 2–3 cm, merging with bracts, often auriculate at base. Inflorescence many flowered, paniculate below, racemose above, lower branches usually 3-flowered, upper ones 1-flowered; peduncles 4–8.5 cm, pubescent like stems. Pedicel 4–5.8 cm, slender, pubescent like stems, but apically more densely so. Petals 4, pale yellow, obovate or suborbicular, 1.8–3.1 × 1.6–2.8 cm. Filaments filiform; anthers orange to black-brown. Ovary spherical to elliptic, 1.5–1.8 cm × 8–10 mm, densely appressed or inclined setose; styles distinct, 7–8 mm; stigmas capitate. Capsule elliptic or oblong-elliptic, sparsely setose, or only with remaining scabrous firm bases, 4–7-valvate for a short distance from apex. Seeds black, reniform, ca. 0.5 mm.

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

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

锥花绿绒蒿 zhui hua lü rong hao

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

Herbs, monocarpic, to 2.5 m tall in flower. Taproot radish-like, or long and narrow, to 18 × 2 cm. Stems terete, branched, yellow or rufous barbellate-pubescent, with a sparse underlay of similar but much shorter hairs. Basal leaves in a dense evergreen rosette; petiole to 28 cm; blade variously shaped, lanceolate, oblong, or oblong-elliptic to oblanceolate, 25–49 × 6.5–12 cm, usually near base pinnatisect, near apex pinnatifid; lobes 6–

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

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

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

尼泊尔绿绒蒿 ni bo er lü rong hao

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

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

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

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

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

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

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

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

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

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

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

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

贡山绿绒蒿 gong shan lü rong hao

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

Herbs, perennial, 30–90 cm tall in flower. Rootstock short, plump, with persistent leaf bases, densely caespitose, brown, usually shortly branched, hirsute. Stems simple, distantly compressed or slightly deflexed, barbellate-hirsute, becoming glabrescent, invested at base with dead leaf remains. Cauline leaves distant, lowermost petiolate; petiole 2.5–4 cm, compressed- or slightly deflexed hirsute; blade trifoliolate, ca. 8 × 7–8 cm, both surfaces sparsely appressed barbellate-hirsute; terminal leaflet broadly ovate or suborbicular, often 7-lobed; lateral leaflets 1–2 cm or more distant from terminal leaflet, usually 3-lobed, petiolules ca. 1 cm or absent; upper leaves sessile or with petiole to 1 cm; blade broadly ovate, pinnatifid, upward gradually smaller and fewer lobed. Flowers ca. 4, forming racemes, bracteate. Sepals pilose. Petals 4, yellow, broadly obovate, ca. 18 × 1.8 mm, apically slightly incised. Ovary spher-

oidal, densely appressed brown hirsute; styles very short or absent; stigmas 5-lobed. Capsule obconical, ca. 1.5 cm, apex ca. 1 cm, sparsely brown villous, 7-valvate from apex for 1/3 capsule length. Seeds elliptic, with raised longitudinal stripes. Fl. Jun–Aug.

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

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

全缘叶绿绒蒿 *quan yuan ye lü rong hao*

Herbs, monocarpic, to 1 m tall in flower, throughout with long barbellate hairs, underlain with often dense, long, rufous or golden, barbellate hairs. Stem erect, to 2 cm in diam. near base, simple, longitudinally striate, pilose when young but nearly glabrous when old, base with persistent leaf bases densely shortly branched villous. Basal leaves in a deciduous rosette, among often mixed scalelike leaves; blade oblanceolate, obovate, elliptic, or nearly spatulate, 8–37 (including petiole) × 1–5 cm, both surfaces pilose, usually with 3(–5) or more longitudinal veins, base attenuate, not decurrent into petiole, margin entire and densely pilose, apex rounded or acute. Lower cauline leaves similar to basal leaves but gradually smaller; upper ones almost sessile, narrowly elliptic, lanceolate, oblanceolate, or linear-lanceolate, smaller than lower ones; uppermost leaves bractlike, forming a whorl beneath flowers, narrowly lanceolate or narrowly oblanceolate to linear, 5–11 × 0.5–1 cm. Flowers usually 3–5, rarely to 10-flowered, to 20 cm in diam., erect to suberect at maturity, arising from axils of uppermost leaves, occasionally with a few smaller flowers alternatively from stem below whorl of leaves. Pedicel (3–)6–37(–52 in fruit) cm. Flower buds broadly ovoid, spreading hairy. Sepals cymbiform, ca. 3 cm, abaxially pilose, glabrous within, with many distinct longitudinal veins. Petals 6–8, mid- to deep yellow, suborbicular to obovate, 4–9.5 × 3–5 cm, often markedly incurved. Filaments of same color as petals, golden brown at maturity, filiform; anthers yellow or yellowish brown, ovoid to oblong, 1–2(–4) mm. Ovary broadly elliptic-oblong or ovoid to narrowly ellipsoidal, densely appressed golden hirsute; styles obsolete or very short to 4 mm, glabrous; stigmas capitate, 4–7-lobed, decurrent and slightly actinomorphic at apex of ovary. Capsule broadly elliptic or oblong to elliptic, 2–3 × 1–1.2 cm, ascending to appressed golden or brown hirsute, 4–7-valvate for 1/3 distance from apex. Fl. May–Aug.

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

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

diam., styles very short (2–4 mm)

..... 7b. subsp. *lijiangensis*

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

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

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

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

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

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

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

Plants mostly 45–75 cm tall, with a well-defined stem but few cauline leaves except for whorl beneath flowers. Flowers cup-shaped. Petals not markedly incurved, pale to mid-lemon yellow. Ovary narrowly obconical, densely hairy; styles short but distinct, 2–4 mm, glabrous; stigmas 5–7 mm in diam., with 4–7 rays.

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

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

横断山绿绒蒿 *heng duan shan lü rong hao*

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

7–10. Capsule obovoid to ellipsoidal, 2.5–3.5 × 0.8–1.2 cm, densely hairy to almost glabrous, 7–10-valvate. Fl. Jun–Aug.

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

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

- 1a. Small, densely sericeous plant, not more than 25 cm tall; flowers erect to suberect ..... 8c. subsp. *daliensis*
- 1b. Larger plant, mostly 30–120 cm tall, hairy or bristly but not sericeous; flowers nodding or half-nodding.
- 2a. Flowers appearing to be scapose and solitary; ovary densely hairy, styles bristly ..... 8a. subsp. *pseudointegrifolia*
- 2b. Flowers several, often more than 3, on top of a distinct stem, often with several leaves and 1 or 2 superfluous flowers below “bracts”; ovary sparsely hairy, styles glabrous ..... 8b. subsp. *robusta*

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

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

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

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

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

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

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

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

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

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

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

• Rocky slopes, mountain moorlands. NW Yunnan.

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

藿香叶绿绒蒿 huoxiang ye lü rong hao

*Cathcartia betonicifolia* (Franchet) Prain.

Herbs, perennial, occasionally biennial. Rootstock short, plump, with persistent petiolar bases, densely shortly branched rubiginous villous. Stems erect, 30–90(–150) cm tall, stout, to 1.3 cm in diam. at base, simple, glabrous or sparsely rubiginous barbellate-villous. Basal leaves slightly glaucous abaxially, ovate-lanceolate or ovate, 5–15 cm, base 4–7 cm wide, both surfaces shortly branched sparsely barbellate-villous, more densely so on margin and abaxially, midvein prominent, with several transverse bifurcate lateral veins, base cordate or truncate, often decurrent onto petiole, base ampliate to sheath, margin broadly incised-toothed, apex rounded to acute. Lower cauline leaves similar to basal, often more oblong; middle and upper cauline leaves similar but gradually smaller, sessile, auriculate-amplexicaul; uppermost 3 or 4 often aggregated into a false whorl. Inflorescence subumbellate, 3–6-flowered, often with several flowers at leaf axil below whorl, more rarely from lower cauline leaf axils. Flowers nodding to half-nodding, saucer-shaped. Pedicel erect, to 28 cm (elongating in fruit). Flower buds broadly ovoid, 6–8 cm in diam., sparsely rubiginous barbellate-villous. Petals 4, or in terminal flowers 5 or 6, blue or purple, rarely white, broadly ovate, orbicular, or obovate, 3–5 × 2–3.5 cm, obtuse to subacute. Filaments white, filiform, 5–10 mm; anthers orange or golden, oblong, ca. 1 mm. Ovary elliptic-oblong, glabrous or rarely rubiginous barbellate-villous to subglabrous; styles clavate, 2–6 mm; stigmas virescent, 4- or 5(–7)-lobed, decurrent to styles. Capsule oblong-elliptic, 2.5–4.5 × 0.8–1 cm, rufous-barbellate to glabrous, slightly 4–7-valvate for ca. 1/3 its length from apex. Seeds reniform, ca. 1 mm, longitudinally striate, with alveolate foveolae. Fl. Jun–Aug.

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

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

大花绿绒蒿 da hua lü rong hao

Herbs, perennial. Taproot narrowly radishlike or fibrous;



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

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

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

高茎绿绒蒿 gao jing lü rong hao

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

4100–4300 m. SC Xizang [W Bhutan].

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

黄花绿绒蒿 huang hua lü rong hao

Herbs, monocarpic, to 33 cm tall in flower. Taproot ca. 7.5 × 1.2 cm. Leaves aggregated near base of plant with a few higher up on stem; petiole linear, ca. 5 cm; blade oblanceolate, ca. 10 × 1.8 cm, both surfaces glabrous or sparsely setose, abaxially glaucous, base tapered into petiole, sheath at base, margin entire or repand, apex acute or rounded. Inflorescence racemose, with up to 10 flowers, nearly glabrous or densely spreading setose, only lowermost bracteate. Pedicel ca. 20 cm, usually setose. Petals 5–8, yellow, obovate, ca. 3.8 × 2.5 cm,

apex obtuse, acute, or serrulate. Filaments filiform; anthers orange, to black on aging. Ovary elliptic to narrowly elliptic, usually densely extended yellowish setose; styles ca. 7 mm; stigmas capitate. Capsule narrowly elliptic, spreading setose, 3–5-valvate for a short distance from apex. Seeds falcate-elliptic, seed coat irregularly rugose or inconspicuously pitted.

• 3600–4300 m. NW Yunnan (Weixi).

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

西藏绿绒蒿 xi zang lü rong hao

Herbs, monocarpic, with a slender stem to 45 cm tall. Taproot radishlike, ca. 3.7 cm. Stems tenuous, glabrous, rarely sparsely villous. Basal leaves few, soon withering; petiole ca. 2.5 cm, lower part ampliate; blade oblanceolate, ca. 3.7 × 1.2 cm, both surfaces glabrous or slightly tomentose, abaxially glaucous, base attenuate and extending into petiole, margin entire, deeply undulate, broadly crenate, bipinnatilobate, or bipinnatisect, apex acute or rounded. Lower cauline leaves similar to basal leaves; upper cauline leaves with margin serrate, basally slightly amplexicaul, or like basal leaves. Flowers 2–6 from upper cauline leaf axils, semi-nutant. Pedicel ca. 13 cm at fruiting, only apically sparsely setose. Petals usually 5–7, rarely 4, lemon yellow, ovate or obovate, ca. 1.3 × 1 cm, apex acute or rounded, usually irregularly serrulate. Filaments filiform; anthers pale orange. Ovary ovoid to elliptic-oblong, glabrous or sparsely setose; styles distinct, ca. 6 mm; stigmas yellow, almost clavate or with separate lobes. Capsule elliptic-oblong, glabrous or sparsely setose, 3–5(or 6)-valvate for ca. 1/3 its length from apex.

• Woodlands; 3300–3900 m. SE Xizang.

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

琴叶绿绒蒿 qin ye lü rong hao

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

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

oblong, ca. 5 × 2 mm, glabrous; styles very short; stigmas green. Capsule narrowly oblong or nearly cylindrical, ca. 4 cm, 3- or 4-valvate for ca. 1/3 its length from apex. Seeds falcate-elliptic, seed coat rugose. Fl. and fr. May–Sep.

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

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

报春绿绒蒿 bao chun lü rong hao

Herbs, monocarpic, to 20 cm tall. Taproot radishlike or long and narrow, ca. 7.5 cm × 7.5 mm; rootstock napiform, with a dense tuft of fibrous leaf base remains. Stems short, slender. Basal leaves spatulate, 1–2 cm, soon withering, with only densely caespitose persistent membranous leaf bases when flowering. Cauline leaves near stem base; blade oblanceolate to elliptic, ca. 4 × 1 cm, both surfaces glabrous or densely setose, entire; petiole ca. 3.7 cm; upper leaves sessile. Flowers usually 3, rarely solitary, simple, from leaf axils, ca. 25 cm in diam., glabrous to sparsely reflexed setose. Sepals glabrous. Petals 4–8, blue, narrowly ovate, ca. 2.5 × 1 cm. Stamens many; filaments same color as petals, filiform, longer than ovary; anthers golden. Ovary narrowly ovoid, ca. 1.5 cm, glabrous; styles ca. 5 mm; stigmas almost clavate, 4-lobed, lobes ± nutant. Capsule narrowly obovoid to narrowly elliptic, 4-valvate at top, glabrous or slightly setose.

3900–4500 m. SC Xizang [W Bhutan].

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

白花绿绒蒿 bai hua lü rong hao

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

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

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

紫花绿绒蒿 zi hua lü rong hao

Herbs, monocarpic, to 2 m tall in flower. Taproot radish-

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

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

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

总状绿绒蒿 zong zhuang lü rong hao

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

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

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

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

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

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

Petals without spines on both sides.

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

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

刺瓣绿绒蒿 ci ban lü rong hao

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

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

• About 4000 m. S Qinghai (Yushu).

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

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

宽叶绿绒蒿 kuan ye lü rong hao

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

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

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

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

草甸绿绒蒿 cao dian lü rong hao

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

Herbs, monocarpic, 30–92 cm tall in flower. Stem stiffly erect, 10–15 mm in diam. at base, spreading bristly, pale overall. Basal leaves in a spreading rosette; petiole to 6.5 cm; blade pale green abaxially, mid-green adaxially, elliptic-oblongate to oblanceolate, 8–20 × 1.4–3.6 cm, both surfaces with spreading, pale, stiff, bristlelike hairs to 6 mm, base attenuate into petiole, margin undulate, entire to shallowly and unevenly lobed, apex acute to subacute. Lower cauline leaves similar to basal leaves, decreasing in size upward on stem and merging with lower bracts, but most of inflorescence ebracteate. Inflorescence a simple raceme with up to 32 flowers, sometimes with several solitary, scapose, depauperate flowers from axils of basal leaves. Pedicel 0.8–7.2 cm, with stiff bristlelike hairs. Flowers lateral-facing to half-nodding, 3.8–7 cm in diam., fragrant. Sepals oblong to oblong-ovate, adaxially with spreading pale bristles. Petals 5 or 6, blue, purple, blue-purple, or lavender, occasionally wine-purple or whitish, obovate to oblong, 1.8–3.6 × 1.5–3 cm, glabrous. Filaments of same color as petals, often darker; anthers white to orange-yellow or yellowish gray, 1–1.5 mm. Ovary ovoid, spiny; styles narrowly conical, 2–4 mm, glabrous; stigmas pale green or cream, 2–3 mm, included within boss of stamens. Capsule ovoid to ovoid-elliptic, 1.7–2 × 0.8–1 cm, with rather sparse, spreading, pale-colored bristles, 5–7-valvate. Fl. Jun–Sep.

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

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

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

美丽绿绒蒿 mei li lü rong hao

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

Herbs, monocarpic, 15–60 cm tall, throughout rubiginous or yellowish bristly. Taproot long and stout, ca. 30 × 2.5 cm. Stems erect, terete, rubiginous or yellowish bristly, basally with persistent leaf bases. Basal leaves: petiole 2–11 cm, including wings 2–6 mm wide; blade lanceolate or narrowly ovate, 5–13 × 2.5–4 cm, midvein broad, shallowly channeled, lateral veins slender, basally attenuate into petiole, margin pinnatifid, apex rounded or acute; lobes oblong, apex rounded, rarely acute, usually rounded-incised. Cauline leaves like basal leaves

but smaller, shortly petiolate or sessile to subsessile. Inflorescence racemose; flowers 6–20, very fragrant, only lowermost bracteate, sometimes accompanied by solitary-flowered basal scapes, rarely basal scape bases agglomerated on short stems. Pedicel erect, 2–8 cm. Flower buds spheroidal, 1–2 cm in diam. Sepals adaxially fulvous spreading bristly. Petals 4–8, blue to fleshy-mauve, obovate to suborbicular, 2–4.5 × 2–4 cm, apex rounded. Filaments of same color as petals but more deeply colored, filiform, ca. 1 cm; anthers oblong, ca. 1 mm. Ovary spheroidal to ovoid, ca. 5 mm, densely rubiginous spiny-hairy; styles 2–4 mm, ridged, sometimes near base spiny-hairy; stigmas oblong, 2–3 mm. Capsule elliptic, 1.5–2.5 × 0.5–1.2 cm, densely rubiginous but base purple or fulvous spiny-hairy; styles stout, extended to 1 cm, 4–8-valvate for ca. 1/3 its length from apex. Seeds reniform, seed coat longitudinally pitted. Fl. and fr. Jul–Oct.

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

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

皮刺绿绒蒿 pi ci lü rong hao

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

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

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

丽江绿绒蒿 li jiang lü rong hao

Herbs, monocarpic, to 40 cm tall in flower (to 60 cm in fruit). Taproot conical or radishlike, 2–10 × 1–1.5 cm, with fibrous slender roots. Leaves usually all basal, deciduous; petiole 2.5–3.2 cm; blade oblanceolate to elliptic-oblong or broadly linear, 5–20 × 0.5–2 cm, both surfaces sparsely appressed bright

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

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

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

长叶绿绒蒿 chang ye lü rong hao

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

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

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

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

红花绿绒蒿 hong hua lü rong hao

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

Herbs, perennial or monocarpic, 30–75 cm tall in flower, base with persistent leaf bases, armed with dense shortly branched yellowish or brown setae. Roots fibrous. Leaves all basal, forming a rosette, deciduous; petiole 6–34 cm, basally slightly ampliate sheathed; blade oblanceolate or narrowly obovate, 3–18 × 1–4 cm, both surfaces with dense, shortly branched, yellowish or brown, barbellate setae, obviously longitudinally veined, basally attenuate and decurrent into petiole, margin entire, apex acute. Scapes 1–6 from rosette leaf cluster, usually costate, fulvous barbellate-setose, ribbed. Flowers solitary on basal scapes, nutant. Flower buds ovoid. Sepals ovate, 1.5–4 cm, adaxially densely yellowish or brown barbellate-setose. Petals 4, rarely 6, intense carmine, rarely white, elliptic, 6–10 × 2.3–5 cm, apex acute or rounded. Filaments reddish, linear, 1–3 cm, flat; anthers yellow or brownish yellow, oblong, 3–4 mm. Ovary broadly oblong or ovate, 1–3 cm, densely yellowish barbellate-setose; styles very short or obsolete; stigmas 4–6-lobed. Capsule elliptic-oblong, 1.8–2.5 × 1–1.4 cm, glabrous or densely yellowish barbellate-setose, 4–6-valvate for a short distance from apex. Seeds densely papillose. Fl. Jun–Sep.

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

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

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

单叶绿绒蒿 dan ye lü rong hao

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

Herbs, monocarpic, 20–50 cm tall in flower (to 85 cm in fruit), basally with dense tuft of old leaf remains accompanied by rufous or golden barbellate bristles. Taproot ca. 13 cm, slender, or absent and fibrous-rooted. Leaves all basal, forming a rosette, deciduous; petiole linear, ca. 20 cm, basally ampliate; blade oblanceolate or lanceolate to ovate-lanceolate, 4.5–16 × 0.9–3.5 cm, both surfaces shortly barbellate-villous, abaxially midvein and lateral veins distinct, base attenuate into petiole, margin entire or irregularly serrate or crenate, apex acute or obtuse. Flowers solitary on scape, up to 5 per rosette, occasionally more, semi-nutant, barbellate-setose, hairs at first appressed, later spreading to deflexed. Flower buds broadly ovoid. Sepals adaxially densely spreading, barbellate-setose. Petals 5–8, purple to deep sky blue, obovate, 3.3–4.8 × 2.4–4.4 cm. Filaments

of same color as petals, filiform, 1–1.5 cm; anthers orange, golden, or yellow, oblong, ca. 2 mm. Ovary narrowly elliptic to oblong-elliptic, 1.5–2 cm, glabrous or setose; styles distinct, 4–9 mm; stigmas green, brownish, or whitish, capitate or sub-clavate, 4–9-lobed. Capsule narrowly oblong to oblong-elliptic, 4.2–6.5 × 1.3–2.8 cm, reflexed barbellate-setose, 4–9-valvate for ca. 1/3 its length from apex. Seeds elliptic or reniform, seed coat densely papillose. Fl. Jun–Aug.

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

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

五脉绿绒蒿 wu mai lü rong hao

Herbs, perennial, 30–50 cm tall in flower, basally with persistent leaf bases, accompanied by dense, yellowish or brown barbellate setae. Roots fibrous. Leaves all basal, forming a rosette, deciduous; petiole 3–9.8 cm; blade obovate to lanceolate, 2–10 × 1.4–2.2 cm, both surfaces with dense yellowish or brown barbellate setae, obviously longitudinally 3–5-veined, base attenuate and decurrent into petiole, margin entire, apex acute or obtuse. Flowers solitary on scape, up to 3 per leaf rosette, pendent. Scape costate, with fulvous, barbellate, deflexed setae, denser toward top. Flower buds broadly ovoid. Sepals ca. 2 × 1.5 cm, adaxially densely fulvous barbellate-setose. Petals 4–6, pale lilac-blue to purple, obovate or suborbicular, 3–4 × 2.5–3.7 cm. Filaments of same color as petals or white, filiform, 1.5–2 cm; anthers yellowish, oblong, 1–1.5 mm. Ovary spheroidal, ovoid, or oblong, 5–8 mm, with dense, fulvous, barbellate setae; styles short, 1–1.5 mm; stigmas capitate, 3–6-lobed. Capsule elliptic or oblong-elliptic, 1.5–2.5 cm, densely appressed barbellate-setose, slightly 3–6-valvate for a short distance from apex. Seeds black-brown, narrowly ovoid, ca. 3 mm, seed coat tessellate and corrugate. Fl. Jun–Sep.  $2n = 76$  (ca. 84)\*.

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

1a. Ovary and capsules densely

appressed setose ..... 27a. var. *quintuplinervia*

1b. Ovary and capsules glabrous ..... 27b. var. *glabra*

**27a. *Meconopsis quintuplinervia* var. *quintuplinervia***

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

Ovary and capsules densely appressed setose.

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

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

光果五脉绿绒蒿 guang guo wu mai lü rong hao

Ovary and capsules glabrous.

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

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

川西绿绒蒿 chuan xi lü rong hao

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

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

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

**28a. *Meconopsis henrici* var. *henrici***

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

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

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

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

无葶川西绿绒蒿 wu ting chuan xi lü rong hao

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

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

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

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

杯状花绿绒蒿 bei zhuang hua lü rong hao

Herbs, monocarpic, to 60 cm tall in flower, with a fleshy, napiform rootstock, to 24 × 15 mm. Leaves all basal, rather few, ovate to ovate-lanceolate or ovate-oblanceolate, 4.5–14.5 × 0.8–

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

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

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

久治绿绒蒿 jiu zhi lü rong hao

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

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

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

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

优雅绿绒蒿 you ya lü rong hao

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

Herbs, monocarpic, to 20 cm tall in flower (to 30 cm in fruit). Taproot napiform, 1.5–4 cm × 5–7 mm. Leaves all basal, deciduous, rarely from flowering stem near base; petiole narrowly strap-shaped, 2–5 cm × 1–2 mm; blade variously

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

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

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

乌蒙绿绒蒿 wu meng lü rong hao

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

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

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

长果绿绒蒿 chang guo lü rong hao

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

Herbs, perennial, to 30 cm tall in flower (taller in fruit). Taproot cylindrical, ca. 5 mm in diam. at top, decurrent and attenuate toward base. Rootstock short, with several very short branches. Leaves all basal, deciduous, at apex of very shortly branched rootstock and forming several leaf clusters, accompanied by mixed scalelike leaf bases; petiole linear, 2–9 cm; blade glaucous abaxially, green adaxially, ovate-rhombic to lan-

ceolate, narrowly lanceolate, or subspatulate, 2–6 × 1–3.8 cm, both surfaces glabrous or sparsely appressed rubiginous villous, midvein distinct, lateral veins dichotomously branched, base attenuate and winged-decurrent, margin entire, apex rounded or argute. Scape 1–8 per rosette, 3–30 cm, to 60 cm in fruit, usually sparsely rubiginous compressed-villous. Flowers solitary on scape, semi-nutant. Petals 4, rarely 6–8, deep violet-blue or indigo, rarely rose-purple, longitudinally pleated, ovate, obovate, or suborbicular, 2–3.5 × 1.5–2.5 cm, apex acute or rarely rounded. Filaments of same color as petals, filiform, ca. 1 cm; anthers orange, oblong, ca. 1 mm. Ovary narrowly oblong-elliptic, glabrous; styles ca. 5 mm, sometimes very short, glabrous; stigmas capitate or sometimes almost clavate. Capsule narrowly oblong or subcylindrical, 5–10 cm × ca. 5 mm, glabrous, 3(–5)-valvate for 1/3 or less its length from apex. Seeds falcate-oblong, seed coat smooth or longitudinally striate. Fl. May–Jul.

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

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

藏南绿绒蒿 zang nan lü rong hao

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

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

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

拟秀丽绿绒蒿 ni xiu li lü rong hao

Herbs, monocarpic, tufted, to 17 cm tall in flower, with dense persistent leaf bases. Taproot plump, extended, more than 10 cm, ca. 2.5 cm in diam. at top. Leaves all basal, rarely from lower flower stems; petiole linear, to 11 cm; blade ovate, elliptic, lanceolate, or oblanceolate, 2–7 × 1–3.6 cm, usually pinnatipartite or bipinnatipartite, rarely entire or undulate, both surfaces glabrous or midvein sparsely setose, near base with several veins, distinct on both surfaces, base cuneate, apex acute or rounded. Scapes 4–15, usually separate, occasionally partly agglomerated below, 10–20 cm (to 35 cm in fruit), glabrous or spreading setose. Flowers to 18, 4–6.4 cm in diam., semi-nutant from basal scapes, rarely from ebracteate flowering stems mixed with basal scapes. Flower buds globose, 1–1.5 cm in diam. Sepals glabrous or sparsely setose. Petals 4–10, wine-

purple, ruddy-purple, lilac-purple, elliptic, obovate, or suborbicular, 2.5–3.5 × 1–2.5 cm, base cuneate, margin irregularly incised, apex rounded or acute. Filaments of same color as petals, filiform, ca. 1 cm; anthers orange to yellow-gray, oblong, ca. 1 mm. Ovary elliptic or elliptic-oblong, 3–6 mm, sparsely appressed or extended setose; styles 1.5–2.8 mm; stigmas capitate. Capsule narrowly obovoid to narrowly elliptic, 2–3 cm × 5–10 mm, sparsely rubiginous, compressed- or deflexed setose, slightly 3- or 4-valvate from apex; styles prolonged, 3–6 mm. Seeds falcate-elliptic, seed coat not obviously longitudinally pitted. Fl. Jun–Aug.

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

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

秀丽绿绒蒿 xiu li lü rong hao

*Meconopsis leonticifolia* Handel-Mazzetti.

Herbs, monocarpic, to 25 cm tall in flower, often not more than 12 cm tall, with tufted, persistent leaf bases. Taproot plump, to 23 cm, upper part ca. 2 cm in diam. Leaves all basal; petiole broadly or narrowly strap-shaped, 3–8 cm; blade glaucous abaxially, green adaxially, ovate to oblong, 1.5–3.7 × 1–1.8 cm, thick, almost fleshy, both surfaces glabrous, or abaxially sparsely setose, abaxially with obvious veins tenuous, adaxially with obscure veins, pinnatipartite or 3-lobed; terminal lobes ovate or suborbicular; lateral lobes spatulate to obovate, apically rounded to somewhat apiculate. Scape 4–16, 6–20 cm (to 30 cm in fruit), glabrous or sparsely hirsute. Flowers solitary on scape, 3–7.4 cm in diam.; buds oval, 8–12 × 5–8 mm. Petals 4, slightly blue, lilac, lavender, or wine-purple, obovate to suborbicular, 2.5–4 × 2–3.6 cm, apex rounded to subacute. Filaments of same color as petals, filiform, ca. 8 mm; anthers orange, oblong. Ovary narrowly elliptic or elliptic-oblong, ca. 6 mm, inclined hirsute; styles 4–5 mm; stigmas capitate, 3- or 4-lobed. Capsule narrowly oblong or cylindrical, 3.6–9 cm × 4–5 mm, with sparse rubiginous or spreading bristles, 3- or 4-valvate for ca. 1/4 its length from apex. Seeds narrowly oblong or elliptic-oblong, seed coat longitudinally thinly striate. Fl. Jun–Aug.

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

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

拟多刺绿绒蒿 ni duo ci lü rong hao

Herbs, monocarpic, to 10 cm tall in flower, throughout with fulvous firm and spreading spines. Taproot long, ca. 5 mm in diam. at top. Leaves all basal; petiole 1.5–2 cm, winged, basally ampliate; blade glaucous abaxially, green adaxially, ovate to narrowly ovate, 1.5–2.5 × 0.7–1 cm, both surfaces with fulvous firm spines, abaxially veins obvious, base cuneate, decurrent to petiole, margin pinnately lobed, apex rounded or obtuse; lobes ca. 3 pairs. Scapes several, 5–9 cm, stout, with fulvous firm spreading bristles, dense especially at top. Flowers solitary on scape; buds spheroidal. Sepals adaxially bristly. Petals pale

blue, broadly obovate, ca. 1.7 × 1.3 cm. Filaments of same color as petals, filiform, 5–7 mm; anthers orange, orbicular to oblong, ca. 0.5 mm. Ovary ovoid, 0.8–1.3 cm × 5–8 mm, with fulvous bristles; styles 2–3 mm; stigmas capitate. Fruit not seen.

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

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

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

多刺绿绒蒿 duo ci lü rong hao

Herbs, monocarpic, to 30 cm tall in flower, (often rather taller in fruit), overall with fulvous or yellowish, firm, sharp, spreading, straw-colored bristles, 5–10 mm, generally dark blackish or purplish black and somewhat enlarged at base. Taproot plump, prolonged, terete, to 20 cm or longer, 1–2 cm in diam. at top. Leaves all basal, deciduous; petiole 1–11 cm; blade lanceolate to elliptic-oblong or oblanceolate, 5–12 × 1–3.6 cm, both surfaces with fulvous or yellowish compressed spines, base attenuate to petiole, margin entire or undulate, occasionally slightly lobed or toothed, apex obtuse or acute. Flowers solitary on scape, 4–8.2 cm in diam., semi-nutant, to 29 per plant, erect, these sometimes partly agglomerated especially in lower 1/2; scapes green or purplish, 10–27 cm, firm, with fulvous spreading bristles. Flower buds nodding, globose, 8–12 mm in diam. Sepals adaxially bristly. Petals 5–10, indigo, pale to deep blue, purplish, lilac, violet-blue, or occasionally wine-purple, broadly obovate, 2–4 × 1.5–3.4 cm. Filaments of similar color as petals, often rather darker, filiform, 10–14 mm; anthers yellow or orange-yellow, oblong, 1.5–2 mm. Ovary conical, with fulvous compressed- or inclined spines; styles 6–7 mm, slightly exceeding stamens; stigmas yellow, conical, 2.5–4 mm. Capsule obovoid or elliptic-oblong, rarely broadly ovate, 1.2–2 × 0.6–1.1 cm, with rubiginous or fulvous spreading spines, spine bases thickened, usually 3–5-valvate to 1/3 its length from apex. Seeds reniform, seed coat clathrate-tessellate. Fl. Jun–Sep.

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

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

滇西绿绒蒿 dian xi lü rong hao

Herbs, monocarpic, to 25 cm tall in flower (to 40 cm in fruit), basally with persistent leaf bases. Taproot plump, to 30 cm, ca. 1.3 cm in diam. at top. Leaves all basal; petiole 3–7.2 cm; blade virescent abaxially, green adaxially, narrowly elliptic, lanceolate, oblanceolate, or spatulate, 2.5–10 × 0.7–2.2 cm, both surfaces rubiginous or fulvous spiny, midvein distinct, lateral veins dichotomous, base attenuate and decurrent to wings, margin entire or undulate, sometimes with irregular and incised lobes or pinnatipartite, apex obtuse to subacute. Flowers scapose, up to 21 per plant, nutant, 3–6.7 cm in diam. Scapes to 25 cm, with rubiginous or fulvous spreading spines. Flower buds globose, 8–11 mm in diam. Sepals adaxially rubiginous or fulvous hirsute, obviously striate. Petals 4–10, dark purple, deep



wine-purple, reddish purple, purple-maroon, or indigo, obovate or suborbicular, 1.5–3.2 × 1.5–2.1 cm. Filaments of same color as petals or deeper, occasionally whitish, filiform, ca. 1 cm; anthers ivory, yellow, or golden, ovoid, ca. 1 mm. Ovary greenish, ellipsoidal, elliptic-oblong, or narrowly obovoid, fulvous appressed hirsute; styles clavate, 3–10 mm; stigmas ivory or green, capitate. Capsule brownish gray, narrowly obovoid to oblong-elliptic, 2–3.6 cm × 5–8 mm, with fulvous or rubiginous spreading setae, often rather sparse, 3(–5)-valvate for up to 1/3 distance from apex. Seeds black, falcate-elliptic, seed coat striate or inconspicuously longitudinally pitted. Fl. and fr. May–Nov.

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

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

吉隆绿绒蒿 *ji long lü rong hao*

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

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

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

毛盘绿绒蒿 *mao pan lü rong hao*

Plants monocarpic, 30–60 cm tall (to 100 cm in fruit). Taproot dauciform, ca. 10 × 2 cm, below usually branched. Stems erect, stout, longitudinally striate, fulvous, barbellate-setose, basally ca. 1.5 cm in diam., with a thick wad of persistent leaf bases, leaf bases densely rubiginous or brown, barbellate-setose. Basal leaves forming a dense rosette; petiole

long, to 1/2 length of blade, basally ampliate, densely fulvous setose; blade oblanceolate, including petiole 7.5–18 × 0.8–3 cm, both surfaces fulvous, barbellate-setose, midvein broad, lateral veins very slender, base attenuate, margin entire, but shallowly 3- or 5-lobed or toothed or incised at apex, or rarely subentire, apex acute or rounded. Cauline leaves few or more often absent, stem leafless immediately below inflorescence. Inflorescence racemose; flowers 8–30, densely arranged on rachis. Pedicel 1–4 cm, densely barbellate-setose. Bracts leaflike, generally much smaller than leaves, absent from upper flowers. Petals 4, dark purple, purplish blue, blue, or red, sometimes pale yellow (Nepal; India: Sikkim), obovate to suborbicular, 4–5.2 × 3.7–4.5 cm, margin undulate. Filaments filiform, of same color as petals, often deeper, ca. 1.2 cm; anthers yellow, narrowly oblong, 1.5–2 mm. Ovary broadly oblong, ca. 1 cm, with dense fulvous spreading setae; styles terete, 3–6 mm (to 7 mm in fruit) terminated by 4–7 mm clavate stigmas that split into 6–10 linear twisted lobes, base ampliate to broad glabrous disk, disk covering and extended beyond ovary, margin fimbriate; stigmas lobed, lobes free, contorted, or clavate. Capsule oblong, 18–30 cm × 11–16 mm, obviously costate, 6–10-valvate, slightly divided from style disk below, splitting for a short distance from top, stylar disk 14–27 mm in diam. Seeds reniform, seed coat longitudinally pitted or inconspicuously tessellate. Fl. Jun–Aug.

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

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

康顺绿绒蒿 *kang shun lü rong hao*

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

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

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

毛瓣绿绒蒿 mao ban lü rong hao

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

barbellate-setose. Flowers usually 20–25, densely arranged. Pedicel 6–10 mm, densely setose, apically ampliate to broad receptacle. Upper flowers ebracteate. Petals 4, occasionally more, blue to pale red, oval to obovate, 3.8–6 × 2.8–4.5 cm, adaxially sparsely setose with fawn-colored hairs. Filaments filiform, ca. 1.2 cm; anthers yellow, narrowly oblong, ca. 2 mm. Ovary obovoid or elliptic-oblong, ca. 1 cm in diam., densely inclined, shortly barbellate-setose; styles very short, basally ampliate to mauve glabrous disk, disk covering and extended beyond ovary, margin undulate, 8-ridged; stigmas sessile or subsessile, almost capitate. Capsule obovoid or elliptic-oblong, 10–16 cm × 11–14 mm, obviously costate, 7- or 8-valvate, slightly divided from style disk below, with dense spreading, barbellate bristles; stylar disk 10–12 mm in diam. Seeds oval, seed coat tessellate. Fl. Jun–Aug.

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

### 3. PAPAVER Linnaeus, Sp. Pl. 1: 506. 1753.

罂粟属 ying su shu

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, annual, biennial, or perennial, rarely monocarpic. Roots fusiform or attenuate, simple. Stems 1 or more, erect or ascending, terete, branched or not, very constricted or extended, usually setose, rarely glabrous, ivory malodorous lactiferous, with leaves or not. Basal leaves petiolate, usually glaucous adaxially, variously shaped, both surfaces setose, pinnatifid, pinnatipartite, pinnatisect, or bipinnatifid, sometimes incised, serrate, or crenate, rarely entire. Cauline leaves if present, similar to basal leaves, but usually sessile, sometimes amplexicaul. Flowers solitary, rarely in cymose racemes, pedunculate or sometimes scapose, erect, extended, usually setose. Flower buds nutant, ovoid or spherical. Sepals 2, rarely 3, shedding as flowers open, mostly setose. Petals 4, rarely 5 or 6, on short receptacles, often caducous, mostly red, rarely white, yellow, orange, or lavender, vivid and beautiful, usually obovate, in 2 whorls, outer whorl larger. Stamens many; filaments white, yellow, green, purple, or red, occasionally blackish, mostly filamentous; anthers spheroidal or oblong. Ovary 1-loculed, superior, usually ovoid, rarely terete-oblong; carpels 4–18, united, setose or glabrous; ovules many, astylous; stigmas 4–18, actinomorphic, united into compressed or steeped disk covering ovary; disk margin crenate or divided. Capsule narrowly terete, obovoid, or spherical, setose or glabrous, rarely spiny, obviously costate or not costate, poricidal under actinomorphic stigmas. Seeds many, black, brown, dark gray, or white, reniform, small, longitudinally striate or alveolate; albumen white, fleshy and rich in oil; embryo hidden in albumen.

About 100 species: mainly in C and S Europe to temperate Asia, some in the Americas and Oceania, one in South Africa; seven species (three cultivated) in China.

1a. Perennial herb, ± stemless; leaves all basal; flowers scapose.

2a. Plant 20–60 cm tall ..... 5. *P. nudicaule*

2b. Plant 5–15 cm tall.

3a. Petals yellow or orange; flowers 3–5 cm in diam. .... 6. *P. canescens*

3b. Petals pistachio-colored; flowers 2–3 cm in diam. .... 7. *P. radicum*

1b. Annual or rarely perennial herb with an elongated stem; leaves basal and cauline; flowers solitary on leafy stem at branch apices, or axillary.

4a. Perennial herb with simple stems; petals 4–6, red ..... 4. *P. orientale*

4b. Annual herb, generally branched; petals 4.

5a. Plant glabrous or sparsely setose; stems simple, with 1 or few flowers; cauline leaves amplexicaul, margin irregularly undulate-serrate; filaments white ..... 1. *P. somniferum*

5b. Plant setose; stems branched, often multiflorous; cauline leaves pinnatifid, not amplexicaul; filaments mauve or purplish.

6a. Ovary and capsule glabrous; flower buds oblong-obovoid; leaf blade bipinnatipartite ..... 2. *P. rhoeas*

6b. Ovary and capsule setose; flower buds oval; leaf blade pinnatipartite or pinnatisect ..... 3. *P. pavoninum*

**1. *Papaver somniferum*** Linnaeus, Sp. Pl. 1: 508. 1753.

罂粟 ying su

Herbs, annual, 30–60(–100) cm tall (to 1.5 m in cultivation), glabrous or rarely slightly setose on plant below or on

peduncle. Taproot erect, almost conical. Stems erect, glaucous, glabrous, occasionally somewhat setose. Leaves alternate; blade ovate or oblong, 7–25 cm, both surfaces glabrous, glaucous and rather waxy, veins distinct, slightly raised, base cordate, margin irregularly undulate-serrate, apex acuminate to obtuse; leaves

below shortly petiolate but above sessile and amplexicaul. Flowers solitary, deeply cup-shaped, 5–12 cm in diam. Pedicel to 25 cm, glabrous or rarely sparsely setose. Flower buds nutant at first, erect at anthesis, oval-oblong or broadly ovoid, 1.5–3.5 × 1–3 cm, glabrous. Sepals 2, green, broadly ovate, margin membranous. Petals 4, white, pink, red, purple, or various, often with a dark basal blotch, suborbicular or almost flabellate, 4–7 × 3–11 cm, margin undulate or variously lobed. Stamens many; filaments white, linear, 1–1.5 cm; anthers yellowish or cream, oblong, 3–6 mm. Ovary green, spherical, 1–2 cm in diam., glabrous; stigmas 5–12(–18), actinomorphic, united into compressed disk, disk margin deeply divided, lobes crenulate. Capsule brown when mature, spherical or oblong-elliptic, 4–9 × 4–5 cm, glabrous. Seeds many, black or deep gray, adaxially alveolate. Fl. Mar–Aug.  $2n = 18, 22–23, 25, 32$ .

Cultivated at many medicinal institutes in China and also illegally [cultivated in Afghanistan, India, Laos, Myanmar, and N Thailand; native to S Europe where it is also widely cultivated ornamentally and for the pharmaceutical industry].

This species is the source of heroin, morphine, and other alkaloids used in the drug trade and in medicine. The seeds are widely used as a condiment.

## 2. *Papaver rhoeas* Linnaeus, Sp. Pl. 1: 507. 1753.

虞美人 yu mei ren

Herbs, annual, setose throughout, rarely glabrous. Stems erect, 25–90 cm tall, branched, yellowish setose. Leaves alternate; blade lanceolate or narrowly ovate, 3–15 × 1–6 cm, both surfaces yellowish setose, veins prominent abaxially and slightly concave adaxially, pinnatifid, below divided; lobes lanceolate and bipinnatifid, above parted or again lobed; lobes lanceolate, uppermost one serrate-pinnatifid, terminal lobes usually large; lobules apically acuminate; lower leaves petiolate but upper ones sessile. Flowers solitary on stem and branch apices, bowl-shaped, 6–9 cm in diam. Pedicel 10–15 cm, compressed yellowish setose. Flower buds nutant, oblong-obovoid, setose. Sepals 2, green, broadly elliptic, 1–1.8 cm, adaxially setose. Petals 4, rich scarlet, occasionally mauvish, pink, orange, or white, with or without a basal dark blotch or flecking, orbicular, transversely broadly elliptic or broadly obovate, 2.5–4.5 cm, overlapping, entire, rarely crenate or apex incised. Stamens many; filaments dark mauve or purplish, filamentous, ca. 8 mm; anthers blue, oblong, ca. 1 mm. Ovary obovoid, 7–10 mm, glabrous; stigmas 8–12, actinomorphic, united into compressed disk, margin crenate. Capsule broadly obovoid, 10–18 mm, glabrous, inconspicuously costate. Seeds many, reniform-oblong, ca. 1 mm. Fl. Mar–Aug.  $2n = 14$ .

Cultivated in China, sometimes escaping (in Taiwan) [native to N Africa, SW Asia, and Europe].

This species is used ornamentally and includes flowers in various colors as well as bicolored and semidouble forms.

## 3. *Papaver pavoninum* C. A. Meyer in Fischer & Avé-Lallemant, Index Sem. Hort. Petrop. 9: 82. 1843.

黑环罂粟 hei huan ying su

Herbs, annual, throughout long setose. Taproot terete, long and slender, attenuate toward base. Stems erect, 20–30(–45) cm

tall, branched close to ground, moderately setose. Basal leaves long petiolate, narrowly ovate to narrowly lanceolate, including petiole 3–10 cm, both surfaces sparsely long setose, pinnatifid or pinnatisect to bipinnatifid; lobes lanceolate, sparsely serrate or rarely pinnatifid again. Lower cauline leaves long petiolate, upper ones shortly petiolate to almost sessile, like basal leaves but generally less dissected. Flowers 1(or 2) at stem or branch apices, 3.5–5.5 cm in diam. Pedicel 3–7 cm, slightly flat, sparsely long setose. Flower buds nutant, oval, 1–1.2 cm, densely long setose, terminating in a pair of hollow hornlike projections. Sepals 2, caducous, cymbiform. Petals 4, scarlet, with a prominent black, often white-edged, basal blotch, flabellate-obovate or suborbicular, 2–3.5 cm. Stamens many; filaments purplish red, filiform, 4–5 mm, gradually broader upward; anthers violet or blackish, oblong, ca. 1 mm; pollen blue. Ovary ovoid or oval in outline, 5–10 mm, densely yellow setose, usually longitudinally 5–7-costate; stigmas 4–8(–11)-rayed. Capsule oval or oblong, ca. 1 cm, costate, densely yellow setose. Fl. Apr–Jul.  $2n = 12$ .

Stony slopes on low mountains, grasslands at field sides, arable lands; ca. 900 m. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Pakistan, S Russia, Turkmenistan, Uzbekistan; SW Asia (Iran)].

Various color forms have been recognized but are of little consequence taxonomically. White-flowered forms are assigned to *Papaver pavoninum* f. *album* X. J. Ge (Bull. Bot. Res., Harbin 11(1): 55. 1991) and are recorded from Xinjiang (Gongliu) at ca. 900 m.

## 4. *Papaver orientale* Linnaeus, Sp. Pl. 1: 508. 1753.

鬼罂粟 gui ying su

Herbs, perennial, setose throughout, ivory lactiferous. Roots whitish, fusiform, fleshy, with numerous fibrous roots. Stems erect to ascending, tufted, 60–90 cm tall (cultivated plants over 100 cm), erect, terete, almost compressed- or appressed setose, leafy in lower 2/3. Basal leaves green on both surfaces, ovate to lanceolate, 20–30 cm including petiole (longer in cultivated plants), sparsely serrate or incised, teeth bristle-tipped, both surfaces setose, bipinnatifid; lobules lanceolate or oblong. Cauline leaves many, alternate, similar to basal leaves, but smaller; lower leaves long petiolate, uppermost sessile. Flowers solitary, terminal, bowl-shaped, large, 10–16 cm in diam. Pedicel densely setose. Flower buds erect, ovoid or broadly ovoid, 2–3 cm, spreading setose. Sepals 2, sometimes 3, outside green, inside whitish. Petals 4–6, red or carmine, with or without a basal dark blotch or flecking, broadly obovate or flabellate, (3–)5–8 cm, basally shortly clawed, abaxially with thick veins. Stamens numerous; filaments dark, filiform, below ampliate; anthers indigo-violet, oblong. Stigma 10–16-rayed, actinomorphic, indigo, uniting into compressed disk, margin sparsely thickly serrate. Capsule spheroidal, 2–3.5 cm in diam., glabrous, with a flat 10–16-rayed stigmatic disk. Seeds brown, orbicular-reniform, broadly striate, with small foveolae. Fl. Jun–Jul.  $2n = 28$ .

Widely cultivated as an ornamental in Taiwan [native to the Caucasus, N Iran, and NE Turkey].

Many cultivated forms are recorded in a wide range of colors, including orange, reds, mauve, purple, pink, and white. These are mostly of hybrid origin between *Papaver orientale* and the closely related *P. bracteatum* Lindley.

### 5. *Papaver nudicaule* Linnaeus, Sp. Pl. 1: 507. 1753.

野罂粟 ye ying su

*Papaver alpinum* Linnaeus *lusus chinense* Regel; *P. chinense* (Regel) Kitagawa; *P. croceum* Ledebour; *P. croceum* subsp. *chinense* (Regel) Rändel; *P. nudicaule* var. *chinense* (Regel) Fedde; *P. nudicaule* var. *corydalifolium* Fedde; *P. nudicaule* var. *isopyroides* Fedde; *P. nudicaule* subsp. *rubroaurantiacum* (Fischer ex Candolle) Fedde; *P. nudicaule* var. *saxatile* Kitagawa; *P. nudicaule* var. *subcorydalifolium* Fedde; *P. rubroaurantiacum* Fischer ex Candolle; *P. tenellum* Tolmatchew.

Herbs, perennial, 20–60 cm tall, very variable. Taproot terete, extended, upper part 2–5 mm in diam., attenuate or fusiform toward base; rootstock short, thickened, usually simple. Stems very short or apparently absent. Leaves tufted, all basal; petiole (1–)5–12 cm, basally amplate to sheath, inclined-setose; blade slightly glaucous on both surfaces, ovate to lanceolate, 3–8 cm, both surfaces densely or sparsely gray setose, rarely nearly glabrous, pinnatifid, pinnatifid, or pinnatisect; lobes 2–4 pairs, entire or pinnatifid or pinnatisect again; lobules narrowly ovate, narrowly lanceolate, or oblong, apex acute, obtuse, or rounded. Scapes 1 to several, erect, terete, densely or sparsely inclined compressed-setose. Flowers solitary, terminal, scapose, cup-shaped, 4–6 cm in diam. Flower buds usually nutant, broadly ovoid to globose, 1.5–2 cm, densely brown setose. Sepals 2, caducous, corymbiform-elliptic. Petals 4, yellowish, yellow, or orange, rarely red, broadly cuneate or obovate, (1.5–)2–3 cm, basally shortly clawed, margin undulate-crenate. Stamens many; filaments yellow or olive, subulate, 6–10 mm; anthers yellow-white, yellow, or rarely reddish, oblong, 1–2 mm. Ovary obovoid to narrowly obovoid, 5–10 mm, densely appressed setose; stigmas 4–8, actinomorphic. Capsule narrowly obovoid, obovoid, or obovoid-oblong, 1–1.7 cm, densely appressed whitish- or red-brown setose, slightly broadly 4–8-costate; stigma disk flat, distantly incised-crenate. Seeds many, brown, almost reniform, small, striate with alveolate foveolae. Fl. May–Sep.  $2n = 14, 28^*, 42$ .

Forest margins, grasslands, grassy steppes, slopes, meadows, valleys, river gravel, moraines, roadsides; (200–)1000–2500(–3500) m. Gansu, Hebei, Heilongjiang, W Hubei, Jilin, Nei Mongol, Ningxia, Shaanxi, Shanxi, E Sichuan, Xinjiang; cultivated in many provinces [Afghanistan, Kazakhstan, Kyrgyzstan, Korea, Mongolia, Russia (including Siberia), Tajikistan, Uzbekistan].

Cultivated plants, commonly referred to as “Iceland poppies,” are of complex origin involving several other closely related species, including *Papaver radicum* Rottbøll.

This is a very variable species, with a number of variants recognized at the rank of forma, including plants with petals yellow or orange, ovary and capsule setose (*Papaver nudicaule* f. *nudicaule*, distribution as for the species); similar characters but petals white (*P. nudicaule* f. *seticarpum* (P. Y. Fu) H. Chuang, recorded from Heilongjiang, Jilin, and Nei Mongol); petals yellow or orange, ovary and capsule glabrous (*P. nudicaule* var. *aquilegioides* Fedde, recorded from Gansu, Hebei, Heilongjiang, W Hubei, Nei Mongol, Ningxia, Shaanxi, Shanxi, and E Sichuan); and same characters but petals white (*P. nudicaule* f. *amurense* (N. Busch) H. Chuang, recorded from Heilongjiang, Jilin, and Nei Mongol).

### 6. *Papaver canescens* Tolmatchew, Zhurn. Russk. Bot. Obshch. 16: 77. 1931.

灰毛罂粟 hui mao ying su

*Papaver pseudocanescens* Popov; *P. tianschanicum* Popov ex Pavlov.

Herbs, perennial, small and tufted, 5–15(–20) cm tall, setose throughout. Taproot terete, prolonged, above 2–3 mm in diam.; rootstock branched or not. Leaves all basal; petiole 2–7 cm, flat, appressed setose, basally with an amplate sheath; blade lanceolate to ovate, 2–5 × 1–2 cm, both surfaces appressed setose, pinnatifid; lobes 2 or 3 pairs, oblong, elliptic, or lanceolate, entire or 2–4-lobed or parted again. Scapes 1 to several, erect or sometimes curved, terete, appressed setose. Flowers solitary, terminal, scapose, 3–5 cm in diam. Flower buds elliptic or elliptic-orbicular, 1–1.2 cm, brown or golden setose. Sepals 2, cymbiform or broadly ovate. Petals 4, yellow or orange, broadly obovate or flabellate, 1.5–3 cm. Stamens numerous; filaments filiform, 7–10 mm, 3–5 appressed setose. Stigmas ca. 6, actinomorphic. Capsule oblong or obovoid-oblong, ca. 1 cm, appressed setose; stigma disk flat. Fl. Jun–Aug.

Alpine meadows, grasslands, slopes, stony slopes; 1500–3500 m. C and NW Xinjiang [Mongolia, Russia].

### 7. *Papaver radicum* Rottbøll var. *pseudoradicatum* (Kitagawa) Kitagawa, Neo-Lin. Fl. Manshur. 325. 1979 [*“pseudoradicatum”*].

长白山罂粟 chang bai shan ying su

*Papaver pseudoradicatum* Kitagawa, Rep. Inst. Sci. Res. Manchoukuo 6: 122. 1942 [*“pseudoradicatum”*].

Herbs, perennial, small and tufted, 5–15 cm tall, setose throughout. Taproot terete, to 15 cm, 2.5–3 mm in diam. at top, gradually narrowed toward base, with a few lateral roots and fibrous slender roots. Leaves all basal; petiole 2–4 cm, flat, appressed setose, basally with amplate sheath; blade gray-green, ovate to broadly ovate, 1–2(–4) × 0.8–1.2 cm, both surfaces appressed setose, pinnatifid or bipinnatifid; primary lobes 2 or 3 pairs, narrowly elliptic or oblong, or ovate and 2–4-parted again. Scapes 1 to several from each rosette, densely appressed or inclined-spreading setose. Flowers solitary on scape, 2–3 cm in diam. Flower buds suborbicular to broadly elliptic, densely appressed or inclined-spreading setose. Sepals 2, cymbiform or broadly ovate, 1–1.2 cm. Petals 4, pistachio-colored or yellowish, broadly obovate, 1.8–2.3 cm. Stamens many; filaments filiform, 4–7 mm; anthers yellow, oblong, 1–1.5 mm. Ovary oblong, 4–5 mm, densely appressed setose; stigmas ca. 6, actinomorphic. Capsule obovoid, ca. 1 cm, densely appressed or inclined-spreading setose; stigma disk flat. Fl. Jun–Aug.

Gravel slopes, rocky slopes, alpine tundra; above 1600 m. Jilin (Changbai Shan) [Korea].

*Papaver radicum* as a species has a wide distribution in arctic and subarctic regions, which include North America, Greenland, and Russia (including Siberia).

#### 4. *ESCHSCHOLZIA* Chamisso in Nees, Horae Phys. Berol. 73. 1820.

花菱草属 hua ling cao shu

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, perennial to annual, glabrous, slightly hyaline lactiferous. Leaves alternate, generally tripinnatifid; lobes mostly linear, narrow. Flowers solitary on long pedicels, yellow or orange, occasionally white or cream, large; receptacles cupular-inflated, flowers perigynous. Sepals 2, fused, usually herbaceous in one piece, oblong or conical, in bud margins joined to caplike, at flowering pushed off in one piece due to expanding corolla, apically acute or acuminate. Petals 4, broad, from margin of cupular receptacle, imbricate or contorted in bud. Stamens many, from margin of cupular receptacles; filaments short; anthers linear or oblong, usually longer than filaments, basifixed, 2-celled, introrse. Ovary linear, 1-loculed, 2-carpellate, from bottom of cupular receptacles; styles very short; stigmas 2 or more, almost broadly linear. Capsule narrowly terete, 10-ribbed, 2-valved, dehiscent from base to apex, later usually curved. Seeds many, spherical, tessellate, tuberculate, not carunculate. Cotyledons linear, entire or 2-incised, lobes linear.

About 12 species: widely distributed in the Pacific region of North America in deserts and grasslands; one species (introduced) in China.

##### 1. *Eschscholzia californica* Chamisso in Nees, Horae Phys. Berol. 73. 1820.

花菱草 hua ling cao

Herbs, annual or short-lived perennial, glaucous, glabrous. Stems erect to spreading, 30–60 cm, obviously longitudinally costate, with many branches spreading, dichotomous. Basal leaves several, 10–30 cm, petiolate; blade tripinnatifid; lobes various, acutely linear, acutely oblong, or obtusely spatulate-oblong, with 3 terminal lobes, middle mostly broad and short. Cauline leaves similar to basal leaves, but progressively smaller and shortly petiolate. Flowers solitary, terminal. Pedicel 5–15 cm. Receptacles concave, funnelform or nearly tubular, 3–4 mm in diam., cupular after flowering, margin undulately re-

flexed. Calyx ovoid, ca. 1 cm, apically shortly conical, caplike. Petals 4, yellow, sometimes with orange flecks at base, deltoid-flabellate, 2.5–3 cm. Stamens many, more than 40; filaments filiform, basally inflated, ca. 3 mm; anthers orange, linear, 5–6 mm. Ovary long, narrow; styles short; stigmas 4, subulate-linear, unequally long. Capsule narrowly terete, 5–8 cm. Seeds spherical, 1–1.5 mm in diam., obviously tessellate. Fl. Apr–Aug, fr. Jun–Sep.  $2n = 12$ .

Widely introduced as courtyard ornamentals in China [native to United States (California)].

This species is widely cultivated in temperate and Mediterranean-type gardens. Cultivated forms include those with single and semi-double flowers in a wide range of colors from white and cream to yellow, orange, red, pink, and purple.

#### 5. *DICRANOSTIGMA* J. D. Hooker & Thomson, Fl. Ind. 1: 255. 1855.

秃疮花属 tu chuang hua shu

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, annual or biennial, occasionally short-lived perennial, shortly pubescent or glabrous, yellow lactiferous. Roots narrowly fusiform. Stems terete, few to many branched. Basal leaves many in a rosette, petiolate, pinnatifid, pinnatilobate, pinnatifid, or bipinnatifid; lobes distant, margin undulate or serrate. Cauline leaves alternate, sessile, pinnatifid or with irregular large thick teeth. Flowers terminal, solitary or in few-flowered cymes, ebracteate. Pedicel slender, usually glabrous, ebracteate. Sepals 2, ovate or broadly ovate, glabrous or shortly pubescent, apically acuminate to shortly horned, or spatulate. Petals 4, yellow or orange, obovate or suborbicular. Stamens many; filaments filiform; anthers oblong, 2-celled, longitudinally divided, basifixed. Ovary 1-loculed, 2-carpellate, terete or narrowly so, pubescent or tuberculate; styles very short; stigmas capitate. Capsule terete or linear, shortly pubescent or glabrous, 2-valvate, splitting from apex nearly to base. Seeds many, usually ovoid, small, tessellate, not carunculate.

Three species: China, two in the Himalayas and adjacent areas, one in the Loess Plateau region; three species (two endemic) in China.

- 1a. Capsule linear; calyx usually glabrous outside; ovary densely verrucose shortly pubescent ..... 3. *D. leptopodum*  
 1b. Capsule cylindrical, slightly broader toward base; calyx pilose outside.  
 2a. Plant 100–200 cm tall; stems glabrous, cauline leaves amplexicaul; capsules glabrous, 6–8 cm; ovary glabrous ..... 1. *D. platycarpum*  
 2b. Plant 15–60 cm tall; stems shortly pubescent, cauline leaves not amplexicaul; capsules shortly pubescent, 5–6(–11) cm; ovary yellow pubescent ..... 2. *D. lactuoides*

##### 1. *Dicranostigma platycarpum* C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 7: 87. 1985.

宽果秃疮花 kuan guo tu chuang hua

Herbs, 1–2 m tall. Root narrowly conical, 10–15 cm, upper part ca. 1.5 cm in diam. Stems erect, stout, glabrous,

basally with dense withered residual leaf bases. Leaves glabrous with netted lateral veins, basal ones several pinnatifid, lobes distant, petiolate, petiolar base with inflated sheath. Lower cauline leaves sessile and almost amplexicaul, oblanceolate or narrowly oblanceolate, 20–27 × 8–14 cm, pinnatifid, lobes 4–6 pairs, distant, bilaterally alternate, margin with irreg-

ular thick teeth. Upper cauline leaves broadly ovate, gradually smaller upward, basally amplexicaul, margin with irregular large thick acute to obtuse teeth, apex acuminate. Flowers 1–3. Pedicel ca. 7 cm, to 15 cm at fruiting, glabrous. Flower buds broadly ovoid to suborbicular, ca.  $1.5 \times 1$  cm. Sepals cymbiform, broadly ovate, outside sparsely shortly pubescent, margin membranous on one side, apically acute and extending into spur ca. 1 cm. Petals yellow, obovate,  $2-3 \times 1.2-1.5$  cm. Stamens many; filaments 6–10 mm; anthers oblong, ca. 2 mm. Ovary terete,  $1-1.5 \text{ cm} \times 2-3 \text{ mm}$ , apex acuminate, glabrous; styles ca. 1 mm; stigmas capitate, 2-divided. Capsule cylindrical, slightly broader toward base,  $6-8 \times 5-8 \text{ mm}$ , glabrous, 2-valvate from apex nearly to base. Seeds ovoid, ca. 1 mm, tessellate. Fl. and fr. Jul–Sep.

• Alpine meadows, rock crevices at ditch sides; 3300–3500(–4000) m. S Xizang (Yadong), NW Yunnan (Lijiang, Zhongdian).

**2. *Dicranostigma lactuoides*** J. D. Hooker & Thomson, Fl. Ind. 1: 255. 1855.

莖叶秃疮花 ju ye tu chuang hua

*Chelidonium dicranostigma* Prain, nom. illeg. superfl.; *C. lactuoides* (J. D. Hooker & Thomson) Prain; *Glaucium lactuoides* (J. D. Hooker & Thomson) Bentham & J. D. Hooker; *Stylophorum lactuoides* (J. D. Hooker & Thomson) Baillon.

Herbs, biennial or short-lived perennial, 15–60 cm tall, shortly pubescent. Roots 10–15 cm, upper part ca. 1.2 cm in diam., with dense withered leaf bases. Stems 3 or 4, ascending to spreading, sparsely villous. Basal leaves in a rather flat rosette; petiole 3.5–5 cm, winged, sparsely shortly pubescent; blade glaucous adaxially, paler abaxially,  $12-25 \times 3-5 \text{ cm}$ , both surfaces sparsely shortly pubescent, pinnatilobate or pinnatifid, lobes with thick, mucronate teeth or base entire. Upper cauline leaves sessile,  $3-8 \times 2.5-4 \text{ cm}$ , otherwise like basal leaves but smaller. Flowers solitary or several in a lax cyme, bracteate. Pedicel 5–7.5 cm. Flower buds ovoid,  $1.5-2 \text{ cm}$ . Sepals broadly ovate,  $1.5-2 \text{ cm}$ , shortly pubescent, margin membranous. Petals yellow or orange-yellow, broadly obovate,  $2-2.5 \times 1.5-2 \text{ cm}$ ; filaments 5–7 mm; anthers yellow, linear-oblong, 2–3 mm. Ovary narrowly oval, 7–10 mm, shortly pubescent; styles 2–3 mm. Capsule cylindrical, slightly broader toward base,  $5-6(-11) \text{ cm} \times 5-8 \text{ mm}$ , shortly pubescent, both ends acuminate. Seeds ovoid, small, tessellate. Fl. and fr. Jun–Sep.

Stony slopes, rock crevices, riverside rocks, stabilized moraines; (2900–)3700–4300 m. NW Sichuan (Barkam, Garzê), S Xizang [N India, Nepal].

**3. *Dicranostigma leptopodum*** (Maximowicz) Fedde, Bot. Jahrb. Syst. 36(Beibl. 82): 45. 1905.

秃疮花 tu chuang hua

*Glaucium leptopodum* Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 9: 714. 1876; *Chelidonium franchetianum* Prain; *C. leptopodum* (Maximowicz) Prain; *Dicranostigma franchetianum* (Prain) Fedde.

Herbs, biennial to short-lived perennial, 25–80(–100) cm tall, throughout yellow lactiferous, shortly pubescent, rarely glabrous. Taproot terete. Stems many, green, glaucous, apex with many equal branches. Basal leaves in a rosette; petiole strip-form, 2–5 cm, sparsely shortly white pubescent, several striate; blade pale green abaxially, green adaxially, narrowly oblanceolate,  $10-15 \times 2-4 \text{ cm}$ , sparsely shortly white pubescent, pinnatifid; lobes 4–6 pairs, pinnatifid or pinnatilobate again; lobules apically acuminate, apical lobules 3-lobed. Cauline leaves few at stem apices, sessile, 1–7 cm, pinnatifid, pinnatilobate, or bipinnatifid; lobes sparsely serrate, apex deltoid-acuminate. Flowers in cymes of 2–5, sometimes solitary. Pedicel 2–2.5 cm, glabrous, bracteate. Flower buds broadly ovoid, ca. 1 cm. Sepals ovate, 0.6–1 cm, apically acuminate to shortly horned, spur end obviously ampliate spatulate, glabrous or shortly pubescent. Petals slightly overlapping, yellow, obovate to orbicular,  $10-20 \times 10-13 \text{ mm}$ , undulate. Stamens many; filaments 3–4 mm; anthers yellow, oblong, 1.5–2 mm. Ovary green, narrowly terete, ca. 6 mm, densely verrucose-pubescent; styles erect, short; stigmas 2-divided. Capsule green, linear,  $4-7.5 \text{ cm} \times \text{ca. } 2 \text{ mm}$ , glabrous, 2-valvate from apex almost to base. Seeds rufous, ovoid, ca. 0.5 mm, tessellate. Fl. Mar–Jul, fr. Jun–Sep.  $2n = 12^*$ .

• Grassy slopes and roadsides, field ridges, corners of walls, housetops, rocky embankments; 400–2900(–3700) m. S to SE Gansu, SW Hebei, NW Henan, E Qinghai, Shaanxi (N Qin Ling), S Shanxi, NW and W Sichuan, N Xizang, NW Yunnan.

One of us (Grey-Wilson) notes that typical *Dicranostigma leptopodum* is a rather small plant (25–50 cm tall) with petals rarely more than 14 mm. The status of *D. franchetianum* is unclear and requires further investigation; plants are generally more robust than *D. leptopodum* (to 1 m) and bear larger flowers, with petals 15–20 mm. However, the two taxa appear to be linked by intermediates. In cultivation, *D. franchetianum* behaves as an annual.

The status of *Dicranostigma henanense* S. Y. Wang & L. H. Wu (Bull. Bot. Res., Harbin 17: 43. 1997, “*henanensis*”), described from Henan, is uncertain and requires further investigation. It will probably prove to be a form of the very variable *D. leptopodum*.

## 6. **GLAUCIUM** Miller, Gard. Dict. Abr., ed. 4. 1754.

海罂粟属 hai ying su shu

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, biennial or perennial, rarely annual, lactiferous. Taproot slender. Stems erect or ascending, terete, glabrous or villous. Basal leaves many, petiolate; leaf blade usually pinnatifid; lobes ampliate to sheath at base, serrate or crenate at margin. Cauline leaves alternate, sessile, cordate-amplexicaul at base, incised or undulate at margin. Flowers solitary, terminal or axillary, usually long pedunculate, large. Sepals 2, caducous, glabrous or villous. Petals 4, convolute in bud, yellow, orange, or red. Stamens numerous. Ovary terete or linear, 2-carpellate, placentas 2-pseudo-loculed from cellular spongy septum connecting placentas; stigmas 2-

divided, almost sessile. Capsule terete, slender, horned and often shortly tridentlike at apex, when mature divided into 2 narrow segments from apex to base or rarely from base to apex. Seeds many, ovoid-reniform, seed coat alveolate, not carunculate.

Twenty-one to 25 species: mainly in temperate Europe, the Mediterranean region, also in C to SW Asia; three species in China.

- 1a. Herbs annual; stems dichotomously branched; basal leaves obovate-oblong, pinnatilobate; carpodium 0.5–1 cm; petals orange, reddish basally ..... 1. *G. elegans*  
 1b. Herbs annual, biennial, or perennial; stems simple; basal leaves narrowly oblanceolate, pinnatipartite; carpodium very long; petals golden, yellow, or orange.  
 2a. Herbs annual; flower buds fusiform, smooth; petals yellow or orange, blotched; capsules dehiscing from apex to base; bracts with thick teeth ..... 2. *G. fimbriigerum*  
 2b. Herbs biennial or perennial; flower buds oval, much lepidote-aculeate; petals golden, not blotched; capsules dehiscing from base to apex; bracts 3–5-pinnatipartite ..... 3. *G. squamigerum*

**1. *Glaucium elegans*** Fischer & C. A. Meyer, Ind. Sem. Hort. Petrop. 1: 29. 1835.

天山海罂粟 tian shan hai ying su

Herbs, annual, 10–20 cm tall. Taproot terete, prolonged, upper part 2–4 mm in diam. Stems erect, glaucous, dichotomously branched from near base, glabrous. Basal leaves: petiole flat, 1.5–2.5 cm; leaf blade glaucous on both surfaces, obovate-oblong, pinnatilobate, 4–8 × 1–5 cm, both surfaces glabrous; lobes broadly ovate, margin crenate, apex setose mucronate. Cauline leaves ovate-suborbicular, 2–4 × 1–3 cm, base cordate, amplexicaul, margin undulate-serrate. Flowers solitary, terminal. Flower buds fusiform, 10–20 × 4–7 mm, papillose. Petals orange, reddish at base, broadly obovate, ca. 2 cm. Stamens 6–11 mm; filaments linear, gradually broader toward base; anthers oblong, ca. 1.8 mm. Ovary terete, ca. 1.5 cm, nearly glabrous, almost astylous; stigmas 2-lobed. Capsule linear-terete, 10–16 cm × ca. 2 mm, sparsely subconically aculeate, dehiscing from base to apex; carpodium 5–10 mm, thick. Seeds reniform-oblong, 1.7–2 mm, seed coat black-brown, alveolate. Fl. and fr. May–Jul.  $2n = 12$ .

Deserts, stony slopes on low mountains, river sands and gravel; 700–800 m. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan; SW Asia (Caucasus, Iran)].

This taxon probably equates with *Glaucium pumilum* Boissier and *G. temue* Regel & Schmalhaus.

**2. *Glaucium fimbriigerum*** Boissier, Fl. Orient. 1: 120. 1867.

海罂粟 hai ying su

*Dicranostigma iliense* C. Y. Wu & H. Chuang; *Glaucium vitellinum* Boissier & Buhse.

Herbs, annual or biennial, 30–60 cm tall. Stems erect, rather robust, branched. Basal leaves: petiole flat; leaf blade narrowly oblanceolate, pinnatipartite, 7–10 cm; proximal lobes deltoid, distal lobes ovate, smooth, with irregular thick teeth, terminal lobe almost square, distally with thick teeth. Cauline leaves broadly oblong, pinnatifid, 1–3 cm, base cordate, am-

plexicaul, apex acuminate. Flowers solitary, terminal. Bracts broadly ovate, with thick teeth. Pedicel long and thick. Flower buds fusiform, 1.5–2 cm × ca. 5 mm, adaxially smooth. Petals yellow or orange, blotched at base or not, 2–2.5 cm. Capsule linear-terete, 12–18 cm, sparsely appressed papillary aculeate, when mature dehiscing from apex to base; carpodium very long. Fl. and fr. Jun–Oct.  $2n = 12$ .

Deserts, dry slopes, pebbly riverbeds. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Uzbekistan; SW Asia (Iran)].

**3. *Glaucium squamigerum*** Karelín & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 15: 141. 1842.

新疆海罂粟 xin jiang hai ying su

Herbs, biennial or perennial, 20–40 cm tall. Taproot terete, prolonged, upper part 2–7 mm in diam. Stems 3–5, erect, simple, sparsely white aculeate. Basal leaves: petiole flat, 3–8 cm, aculeate or smooth, base sheathlike, densely covering stem base; leaf blade celadon on both surfaces, narrowly oblanceolate, pinnatipartite, 4–13 × 1–3 cm, both surfaces aculeate when young but smooth when old; proximal lobes deltoid, distal lobes broadly ovate, broadly obovate, or suborbicular, margin irregularly incised or crenate with teeth cartilaginous mucronate at apex. Cauline leaves 1–3, sessile or shortly petiolate, pinnatifid or bipinnately trifid, 2–5 × 0.5–3 cm, aculeate or smooth; lobes cartilaginous mucronate at apex. Flowers solitary, terminal. Bracts pinnatipartite. Pedicel terete, aculeate or smooth. Flower buds oval, 1.5–2 cm, membranous at margin, adaxially numerous lepidote-aculeate, apically argute. Petals golden, suborbicular or broadly ovate, 1.5–2.5 cm. Filaments filamentous, ca. 1 cm; anthers oblong, ca. 1 mm. Ovary terete, 1–1.2 cm, densely spiny lepidote; stigmas 2-lobed, sessile. Capsule linear-terete, 15–21 × 2–3 mm, sparsely spiny lepidote, dehiscing from base to apex in age; carpodium 12–18 cm, thick, with many seeds. Seeds reniform, ca. 1 mm, seed coat black-brown, alveolate. Fl. and fr. May–Oct.  $2n = 12$ .

Riverbeds, rocky slopes, roadsides, deserts, sandy places; 900–2600 m. Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan].

## 7. ROEMERIA Medikus, Ann. Bot. (Usteri) 1(3): 15. 1792.

疆罂粟属 jiang ying su shu

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, annual. Leaves bipinnatipartite, petiolate; lobes narrow; lobules linear, sometimes ovate-oblong, glabrous or pubescent. Flowers solitary, terminal, axillary, or terminal to leaf, pedicellate. Sepals 2, caducous, pubescent. Petals 4, purple, mauve, or red,

overlapping in bud. Stamens many. Ovary terete, 2–4-carpellate, 1-loculed; styles short; stigmas capitate, 2–4-divided. Capsule narrowly terete, siliquose, (2–)4-valved, divided from apex to base. Seeds many, reniform, not carunculate, seed coat alveolate.

About seven species: Mediterranean region to C and SW Asia; two species in China.

- 1a. Petals purple; capsules apically sparsely setose, stigmas not appendiculate ..... 1. *R. hybrida*  
 1b. Petals orange-red to scarlet when fresh, basally dark purple; capsules usually glabrous, between 2 segments of stigmas with 1 setaceous appendix ..... 2. *R. refracta*

**1. *Roemeria hybrida*** (Linnaeus) Candolle, Syst. Nat. 2: 92. 1821.

紫花疆罂粟 *zi hua jiang ying su*

*Chelidonium hybridum* Linnaeus, Sp. Pl. 1: 506. 1753; *Glaucium violaceum* Jussieu; *Roemeria violacea* (Jussieu) Medikus, nom. superfl.

Herbs, annual, 10–50 cm tall. Stems erect, terete, few branched, nearly glabrous. Basal leaves several, glabrous or slightly bristly; petiole long, basally with inflated sheath; blade ovate, bipinnatifidate to tripinnatifidate; lobules linear, apex acute or almost acute, rarely obtuse. Cauline leaves similar to basal leaves, but smaller and shortly petiolate to almost sessile. Flowers solitary, terminal or axillary, short-lived, petals generally dropping by afternoon. Pedicel 5–7.5 cm. Flower buds oblong-ovoid, ca. 1 cm, outside pubescent, apically rounded. Sepals caducous, ovate, pubescent. Petals purple, broadly ovate to suborbicular, 1.5–3 cm. Stamens numerous; filaments deep purple; anthers yellow. Ovary terete; styles short; stigmas capitate, 4-lobed, lobes suborbicular. Capsule narrowly terete, 5–10 cm, only apically sparsely setaceous, when mature usually 4-valvate from apex to base. Seeds many, reniform, adaxially alveolate.  $2n = 22, 24$ .

Dry slopes, sands, grasslands, fallow and cultivated lands. Xinjiang [NW Africa, C and SW Asia, S Europe].

**2. *Roemeria refracta*** Candolle, Syst. Nat. 2: 93. 1821.

红花疆罂粟 *hong hua jiang ying su*

*Roemeria bicolor* Regel; *R. rhoeadiflora* Boissier.

Herbs, annual, 20–40 cm tall. Taproot terete, vertical, to 8 cm, few branched. Stems erect, terete, branched, sparsely dark setaceous. Basal leaves many; petiole 3–8 cm, dark setaceous, basally with inflated sheath; blade green, ovate, 3–8 cm, bipinnatifidate, abaxially sparsely setaceous, both surfaces with distinct veins; lobules linear or linear-oblong. Cauline leaves similar to basal but smaller and shortly petiolate to almost sessile. Flowers solitary, axillary. Pedicel to 14 cm, with appressed dark bristles. Flower buds semi-nodding, oval, 1.5–2 cm. Sepals ovate, galeate, sparsely setaceous. Petals orange-red to scarlet, often with a black, white-margined, basal blotch, ovate to suborbicular, 2–3 cm. Stamens numerous; filaments linear, ca. 1 cm; anthers oblong, ca. 1 mm. Ovary terete, 1–1.8 cm, glabrous; styles short; stigmas 4-lobed, decurrent. Capsule narrowly terete, upward attenuate, 4–5 cm, glabrous, with 1 setaceous appendix between 2 lobes of stigmas, incurved and extending beyond stigmas, when mature usually 4-valvate from apex to base, smooth or somewhat bristly. Seeds many, reniform, adaxially alveolate. Fl. and fr. Apr–Jun.  $2n = 14$ .

Slopes, deserts, plains, meadows, weed of oases and arable lands; 900–1100 m. Xinjiang (Ili He valley) [Afghanistan, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan; SW Asia (Caucasus to Iran)].

## 8. *STYLOPHORUM* Nuttall, Gen. N. Amer. Pl. 2: 7. 1818.

金罂粟属 *jin ying su shu*

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, perennial, yellow or orange lactiferous, rather brittle. Stems 1(–3), erect, terete, striate, pubescent or glabrous. Basal leaves few, long petiolate; blade pinnatifidate or pinnatisect; lobes deeply undulate or irregularly serrate. Cauline leaves 2–7, shortly petiolate, apical 2 leaves (rarely 3) almost opposite, or almost terminal from peduncle bottom, shortly petiolate or sessile; blade like basal leaves. Flowers in corymb or umbel, pedunculate, bracteate. Sepals 2, caducous, broadly ovate, villous. Petals 4, yellow, suborbicular, imbricately arranged. Stamens many (20 or more); filaments filiform; anthers oblong or linear-oblong, 2-celled, longitudinally divided. Ovary ovoid or terete, pubescent, 1-loculed, 2–4-carpellate; ovules many; styles terete; stigmas capitate, 2–4-lobed, lobes alternate with placentas. Capsule narrowly ovoid or narrowly oblong, pubescent, 2–4-valvate from apex to base, with many seeds. Seeds small, tessellate, cristately carunculate.

Three species: China, one in North America (Atlantic coast); two species (both endemic) in China.

- 1a. Plant yellow lactiferous, villous; cauline leaves 4–7; stigma lobes small; capsules oblong, 2.5–3.5 cm, densely brown curved villous ..... 1. *S. sutchuenense*  
 1b. Plant orange-red lactiferous, glabrous; cauline leaves 2 or 3; stigma lobes large, almost flat; capsules narrowly terete, 5–8 cm, pubescent ..... 2. *S. lasiocarpum*

**1. *Stylophorum sutchuenense*** (Franchet) Fedde in Engler, Bot. Jahrb. Syst. 36(Beibl. 82): 45. 1905 [“*sutchuense*”].

四川金罂粟 *si chuan jin ying su*

*Chelidonium sutchuenense* Franchet, J. Bot. (Morot) 8: 293. 1894; *Hylomecon sutchuenensis* (Franchet) Diels.

Herbs, 30–60 cm tall, yellow lactiferous. Roots and stems



black-brown. Stems erect or ascending, usually simple, leafy in lower part, crisped-pubescent. Basal leaves several; petiole 10–15 cm, hazel crisped-pubescent; blade white-glaucous abaxially, green adaxially, narrowly obovate or oblanceolate, 10–25 × 4–10 cm, abaxially crisped-pubescent on veins (especially midvein), adaxially glabrous, pinnatifid or pinnatisect; lobes 4–8 pairs, distant, ovate-lanceolate or oblong, 2–5 × 1–2 cm, lower lobes smaller, margin irregularly deeply crenate, apically obtuse. Cauline leaves 4–7, alternate, shortly petiolate, apical 2 leaves almost opposite, nearly sessile, others similar to basal leaves. Flowers several, forming terminal pseudo-corymbs. Pedicel 5–7 cm. Bracts lanceolate, 2–4 mm. Flower buds obovoid or suborbicular, 4–5 mm in diam. Sepals ovate, 5–7 mm, outside sparsely villous, apex acuminate. Petals yellow, obovate, 1–2 × 1–1.5 cm. Filaments 5–6 mm; anthers linear, ca. 1.5 mm. Ovary terete, densely white villous; styles 4–5 mm; stigmas 2-lobed, lobes small. Capsule oblong, 2.5–3.5 cm × 5–6 mm, densely crisped-pubescent. Seeds many, black-brown, ovoid or suborbicular, ca. 1 mm, tessellate, tuberculate, one lateral cristately carunculate. Fl. Apr–May, fr. May–Jul.

• Shaded moist areas in woodlands, ravines; 1100–1700 m. Chongqing, Gansu, Shaanxi, NE Sichuan.

**2. *Stylophorum lasiocarpum*** (Oliver) Fedde in Engler, Pflanzenz. 40(IV.104): 209. 1909.

金罂粟 *jin ying su*

*Chelidonium lasiocarpum* Oliver, Hooker's Icon. Pl. 18: t. 1739. 1888; *Hylomecon lasiocarpa* (Oliver) Diels.

Herbs, biennial or short-lived perennial, 30–50(–100) cm tall, orange-red lactiferous. Stems erect, usually simple, glabrous. Basal leaves several in a lax rosette, glabrous; petiole 7–10 cm, glabrous; blade glaucous abaxially, green adaxially, narrowly obovate, 13–25 cm, with a large pinnatifid terminal lobe; lateral lobes 4–7 pairs, distant, ovate-oblong, 3–5 cm, margin irregularly serrate or crenate; basal lobes smaller; apical lobes broadly ovate, 7–10 × 5–7 cm. Cauline leaves 2 or 3 from upper stem, almost opposite or whorled, similar to lower leaves but shortly petiolate. Flowers 4–7, in an umbel-like cluster, opening in succession. Bracts narrowly ovate, 1–1.5 cm, apex acuminate. Pedicel 5–15 cm. Sepals ovate, ca. 1 cm, outside pubescent, apex acute. Petals yellow, obovate-orbicular, 16–20 mm. Stamens ca. 1.2 cm; anthers oblong, ca. 1.5 mm. Ovary terete, ca. 1.2 cm, spreading pubescent; styles ca. 3 mm; stigmas 2-lobed, lobes large and almost flat. Capsule narrowly terete, 5–8 cm × ca. 5 mm, pubescent. Seeds many, oval, ca. 1 mm, tessellate, cristately carunculate. Fl. Apr–Aug, fr. Jun–Sep.

• Forest understories, glades, ditch sides; 600–1800 m. W Hubei, S Shaanxi, E Sichuan.

## 9. *HYLOMECON* Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9: 36. 1859.

荷青花属 *he qing hua shu*

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, perennial, yellow lactiferous. Rootstock short, oblique, with dense orbicular brown membranous scales, at fruiting orange fleshy. Stems erect, simple, leafless or rarely with 1 or 2 leaves. Basal leaves few in a lax rosette, long petiolate; blade pinnatisect, lobes 2 or 3 pairs, lowest pair smaller. Cauline leaves 2 from stem apex, rarely 3, opposite or subopposite, shortly petiolate, otherwise similar to basal leaves. Inflorescences terminal or axillary, 1–3-flowered. Sepals 2, caducous, imbricate. Petals 4, yellow, shortly clawed. Stamens many; anthers erect. Ovary terete or oblong, glabrous, 1-loculed, 2-carpellate; ovules many; styles short; stigmas 2-lobed, plump, alternate with placentas. Capsule narrowly terete, 2-valvate upward from base. Seeds many, small, carunculate.

One species: C, E, and N China, Japan, Korea, Russia (E Siberia).

**1. *Hylomecon japonica*** (Thunberg) Prantl in Engler & Prantl, Nat. Pflanzenfam. 3(2): 139. 1889.

荷青花 *he qing hua*

Herbs, perennial, 15–40 cm tall, yellow lactiferous, sparsely pubescent, glabrous in age. Rootstock oblique, 2–5 cm, white, at fruiting orange, fleshy, with brown membranous scales; scales orbicular, 4–8 mm in diam. Stems erect, green to red or purple, simple, herbaceous, striate, glabrous. Basal leaves few, long petiolate; blade virescent abaxially, green adaxially, 10–15(–20) cm, pinnatisect; lobes 2 or 3 pairs, broadly lanceolate-rhombic, obovate-rhombic, or nearly elliptic, 3–7(–10) × 1–5 cm, both surfaces glabrous, base cuneate, margin irregularly crenate or biserrate, sometimes parted or incised, or pinnatifid and lobes irregularly incised again, apex acuminate. Cauline leaves usually 2, rarely 3. Inflorescences terminal, sometimes axillary, 1- or 2( or 3)-flowered. Pedicel erect, tenuous, 3.5–7 cm. Flower buds oval, 8–10 mm, glabrous or sparsely

hairy. Sepals ovate, 1–1.5 cm, scattered floccose or glabrous abaxially, imbricate in bud. Petals obovate or suborbicular, 1.5–2 cm, imbricate in bud, suddenly inflated at flowering, basally shortly clawed. Stamens yellow, ca. 6 mm; anthers orbicular or oblong. Ovary ca. 7 mm; styles very short; stigmas 2-lobed. Capsule 5–8 cm × ca. 3 mm, glabrous, 2-valvate, with 1 persistent style to 1 cm. Seeds ovoid, ca. 1.5 mm. Fl. Apr–Jul, fr. May–Aug.  $2n = 24$ .

Forest understories, forest margins, ditch sides, shaded habitats; 300–2400 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Zhejiang [Japan, Korea, Russia (E Siberia)].

- 1a. Basal leaf lobes irregularly crenate or biserrate ..... 1a. var. *japonica*
- 1b. Basal leaf segments parted, incised, or pinnatifid.
  - 2a. Lowest leaf segments usually

unilaterally or bilaterally parted  
or incised ..... 1b. var. *subincisa*

2b. Leaf segments pinnatipartite, lobes  
irregularly incised again ..... 1c. var. *dissecta*

### 1a. *Hylomecon japonica* var. *japonica*

荷青花(原变种) he qing hua (yuan bian zhong)

*Chelidonium japonicum* Thunberg in Murray, Syst. Veg., ed. 14, 489. 1784; *Hylomecon vernalis* Maximowicz; *Stylophorum japonicum* (Murray) Miquel.

Basal leaf lobes 2 or 3 pairs, margin irregularly crenate or biserrate.

Forest understories, forest margins, ditch sides; 300–1800(–2400) m. Anhui, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, NE Sichuan, Zhejiang [Japan, Korea, Russia (E Siberia)].

The following variants have been recognized, but one of us (Grey-Wilson) notes that they do not appear to be of great significance and numerous intermediates can be found in the wild.

**1b. *Hylomecon japonica* var. *subincisa*** Fedde in Engler, Pflanzenz. 40(IV.104): 210. 1909.

锐裂荷青花 rui lie he qing hua

Lowest leaf segments usually unilaterally or bilaterally parted or incised.

• Forest understories; 1000–2400 m. Gansu, Henan, Hubei, Shaanxi, Shanxi, Sichuan.

**1c. *Hylomecon japonica* var. *dissecta*** (Franchet & Savatier) Fedde in Engler, Pflanzenz. 40(IV.104): 210. 1909.

多裂荷青花 duo lie he qing hua

*Stylophorum japonicum* var. *dissectum* Franchet & Savatier, Enum. Pl. Jap. 1: 27. 1873.

Leaf segments pinnatipartite, lobes irregularly incised again.

Forest understories; 1000–2000 m. Hubei, Shaanxi, Sichuan [Japan].

## 10. CHELIDONIUM Linnaeus, Sp. Pl. 1: 505. 1753.

白屈菜属 bai qu cai shu

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, perennial, erect, blue-gray, yellow lactiferous. Rootstock brown. Stems erect, terete, cymosely branched. Basal leaves in a lax rosette, long petiolate, pinnatisect; lobes obovate-oblong, broadly obovate, or lanceolate, margin crenate, deltoid-lobed, or nearly pinnatisect. Cauline leaves alternate, shortly petiolate; blade like basal leaves. Flowers many, forming axillary umbels, bracteate. Flower buds ovoid. Sepals 2, olivine. Petals 4, yellow, in 2 whorls. Stamens many. Ovary terete, 1-loculed, 2-carpellate, glabrous; styles distinct; stigmas 2-lobed. Capsule narrowly terete, almost moniliform, glabrous, when mature 2 segments divided from base to apex; stigmas persistent. Seeds many, shiny, small, tessellate, cristately carunculate.

One species: Old World temperate areas, from temperate Europe to Japan, widely distributed in China.

### 1. *Chelidonium majus* Linnaeus, Sp. Pl. 1: 505. 1753.

白屈菜 bai qu cai

*Chelidonium grandiflorum* (Candolle) Candolle; *C. majus* subsp. *grandiflorum* (Candolle) Printz; *C. majus* var. *grandiflorum* Candolle.

Herbs, perennial, 30–60(–100) cm tall. Taproot conical, stout, lateral roots many. Stems cymose, branched; branches often pubescent, densely so on nodes, later glabrous. Basal leaves few, caducous; petiole 2–5 cm, pubescent or glabrous, base ampliate to sheath; blade glaucous abaxially, green adaxially, obovate-oblong or broadly obovate, 8–20 cm, abaxially sparsely shortly pubescent, adaxially glabrous, pinnatisect; lobes 2–4 pairs, obovate-oblong, irregularly parted or lobed; lobe margin crenate. Upper cauline leaves: petiole 5–15 mm; blade 2–8 × 1–5 cm. Inflorescence an umbel, multiflorous. Pedicel tenuous, 2–8 cm, villous when young, later glabrous. Bracts

ovate, small, 1–2 mm. Flower buds ovoid, 5–8 mm in diam. Sepals caducous, ovoid, cymbiform, 5–8 mm, glabrous or sparsely pubescent. Petals yellow, obovate, ca. 1 cm, entire. Stamens ca. 8 mm; filaments yellow, filamentous; anthers oblong, ca. 1 mm. Ovary green, linear, ca. 8 mm, glabrous; styles ca. 1 mm; stigmas 2-lobed. Capsule narrowly terete, 2–5 cm × 2–3 mm; pedicel usually shorter than fruit. Seeds dark brown, shiny, ovoid, ca. 1 mm or shorter, alveolate. Fl. and fr. Apr–Sep.  $2n = 10, 12$ .

Slopes, forest margins, grasslands, roadsides, stone crevices, shaded banks, streamsides; 500–2200 m. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jilin, Liaoning, Qinghai, Shaanxi, Shandong, Shanxi, C and NE Sichuan, Yunnan, Zhejiang [Japan, Korea, Russia; Europe].

One of us (Grey-Wilson) notes that the Asian plant is often distinguished as *Chelidonium majus* var. *grandiflorum* on account of its larger flowers (flowers to 3.5 cm wide; rarely over 2.5 cm in European and SW Asian specimens).

## 11. EOMECON Hance, J. Bot. 22: 346. 1884.

血水草属 xue shui cao shu

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, perennial, orange-red lactiferous. Rootstock stoloniferous, much branched. Leaves several, all basal, long petiolate; blade cordate, palmately veined. Scape erect; flowers forming lax, scapose, cymose clusters. Sepals 2, caducous, cymbiform, mem-

branous, united into a spathe, apex acuminate. Petals 4, white, obovate, 2-whorled, imbricate in bud. Stamens numerous, more than 70; filaments filiform; anthers oblong, 2-loculed, longitudinally divided, with broad connectives. Ovary 2-carpellate, 1-loculed; ovules many; styles distinct; stigmas 2-lobed, alternate with placentas. Capsule narrowly elliptic. Seeds carunculate.

- One species: China.

**1. Eomecon chionantha** Hance, J. Bot. (Morot) 22: 346. 1884.

血水草 xue shui cao

Herbs, perennial, patch-forming, glabrous. Roots orange; rootstock stoloniferous. Leaves all basal; petiole blue-gray, 10–30 cm, slender, basally with slightly inflated sheath; blade abaxially gray-green, often flushed lilac, cordate or reniform, rarely cordate-sagittate, 5–26 × 5–20 cm, palmately 5–7-veined, margin undulate, scalloped, apex acuminate or acute. Scape blue-gray and slightly mauve, 20–40 cm, 3–5-flowered. Bracts and bractlets ovate-lanceolate, 2–10 mm, margin thinly membra-

nous, apex acuminate. Pedicel erect, 0.5–5 cm. Flower buds ovoid, ca. 1 cm, apex acuminate. Sepals 0.5–1 cm, glabrous. Petals white, obovate, 1–2.5 × 0.7–1.8 cm. Filaments 5–7 mm; anthers yellow, ca. 3 mm. Ovary ovoid or narrowly ovoid, 5–10 mm, glabrous; styles 3–5 mm; stigmas 2-lobed, decurrent to styles. Capsule narrowly elliptic, ca. 2 cm × 5 mm, styles to 1 cm (fruit immature). Fl. Mar–Jun, fr. Jun–Oct.  $2n = 18^*$ .

- Forest understories, under shrubs, ravines, roadsides; 1400–1800 m. Anhui, N and W Fujian, Guangdong, Guangxi, Guizhou, SW Hubei, Hunan, Jiangxi, E and SE Sichuan, NE and SE Yunnan, SW Zhejiang.

**12. MACLEAYA** R. Brown, Obs. Pl. Denham Clapperton, 218. 1826.

博落回属 bo luo hui shu

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, perennial, erect, robust, basally lignified, 0.8–4 m tall, yellow lactiferous. Roots stoloniferous. Stems glaucous, terete, hollow, herbaceous, smooth. Leaves alternate, petiolate; blade pale glaucous abaxially, green or blue-green adaxially, broadly ovate or suborbicular, abaxially pilose or glabrous, adaxially glabrous, basal veins usually 5, lateral veins 1–3 pairs, veinlets netted, base cordate, usually 7- or 9-lobed, apex acute, obtuse, acuminate, or rounded; lobes undulate to serrulate. Flowers small, many forming large terminal panicles. Flower buds clavate or terete. Sepals 4, milky. Petals absent. Stamens 8–12 or 24–30; filaments filiform, not longer than anthers; anthers oblong. Ovary 1-loculed, 2-carpellate; ovules 1 or 4–6, basifixed or bilaterally attached; styles very short; stigmas 2-lobed. Capsule narrowly obovoid, oblanceolate, or suborbicular, shortly petiolate, 2-valvate. Seeds 1 and basifixed, or 4–6 and bilaterally attached, ovoid.

- Two species: China and Japan; two species (one endemic) in China.

- 1a. Flower buds clavate; stamens 24–30, filaments almost as long as anthers; capsules narrowly obovoid or oblanceolate; seeds 4–6, attached bilaterally ..... 1. *M. cordata*
- 1b. Flower buds terete; stamens 8–12, filaments obviously shorter than anthers; capsules suborbicular; seed 1, basifixed ..... 2. *M. microcarpa*

**1. Macleaya cordata** (Willdenow) R. Brown, Obs. Pl. Denham Clapperton, 218. 1826.

博落回 bo luo hui

*Bocconia cordata* Willdenow, Sp. Pl. 2: 841. 1797; *Macleaya cordata* var. *yedoensis* (André) Fedde; *M. yedoensis* André.

Herbs, erect, basally lignified, yellow lactiferous. Stems green, glaucous, 1–4 m, smooth, branched above in inflorescence. Leaves: petiole 1–12 cm, adaxially shallowly channeled; blade glaucous abaxially, gray-green adaxially, broadly ovate or suborbicular, 5–27 × 5–25 cm, usually 7- or 9-parted or lobed, apex acute, acuminate, obtuse, or rounded; lobes semicircular, quadrate, deltoid, or orbicular, margin undulate, incised, or serrate to serrulate, abaxially sparsely villous, adaxially glabrous, basal veins usually 5, lateral veins 2 pairs, rarely 3, veinlets netted. Panicles large, terminal and axillary, multiflorous, 15–40 cm; bracts narrowly lanceolate. Pedicel 2–7 mm. Flower buds almost white, clavate, ca. 10 mm. Sepals yellowish white, obovate-oblong, cymbiform, ca. 10 mm. Stamens 24–30; filaments ca. 5 mm; anthers linear, ca. equal to filaments. Ovary obovoid

to narrowly obovoid, 2–4 mm, base attenuate, apex rounded; styles ca. 1 mm; stigmas 2-lobed, decurrent to styles. Capsule narrowly obovoid or oblanceolate, 1.3–3 cm × 5–7 mm, glabrous, base attenuate, apex rounded or obtuse. Seeds 4–6(–8), ovoid, 1.5–2 mm, attached bilaterally, sessile, seed coat with regular alveolate foveolae, narrowly carunculate. Fl. and fr. Jun–Nov.  $2n = 10, 20^*$ .

Foothills, forests, among shrubs or tussocks on low mountains, riversides, pool sides; 100–800 m. Anhui, S Gansu, Guangdong, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Shanxi, Sichuan, Taiwan, Zhejiang [Japan].

**2. Macleaya microcarpa** (Maximowicz) Fedde, Bot. Jahrb. Syst. 36(Beibl. 82): 45. 1905.

小果博落回 xiao guo bo luo hui

*Bocconia microcarpa* Maximowicz, Trudy Imp. S.-Peterburgsk. Bot. Sada 11: 45. 1889.

Herbs, erect, basally lignified, yellow lactiferous. Stems 0.8–1 m, usually pistachio-colored, glaucous, smooth, hollow, much branched in inflorescence. Leaves: petiole 4–11 cm, up-

per explanate, usually not channeled; blade glaucous abaxially, green adaxially, broadly ovate or suborbicular, 5–14 × 5–12 cm, abaxially villous, adaxially glabrous, basal veins usually 5, lateral veins 1 pair, rarely 2, veinlets netted, base cordate, usually 7- or 9-parted or -lobed, apex acute, obtuse, or rounded; lobes semicircular, flabellate, or oblong, margin undulate, incised, serrate to serrulate. Panicles large, multiflorous, 15–30 cm, arising from stem and branch apices. Pedicel 2–10 mm. Flower buds terete, ca. 5 mm. Sepals narrowly oblong, cymbiform, ca. 5

mm. Stamens 8–12; filaments very short; anthers 3–4 mm, longer than filaments. Ovary obovoid, 1–3 mm; styles very short; stigmas 2-lobed. Capsule suborbicular, ca. 5 mm in diam. Seeds 1, basifixed, erect, ovoid, ca. 1.5 mm, seed coat foveolate, not carunculate. Fl. and fr. Jun–Oct.  $2n = 10^*$ ,  $20^*$ .

• Slopes, roadsides, grasslands, thickets, open shrublands; 400–1600 m. SE Gansu, Henan, W Hubei, Jiangsu, SW Jiangxi, Shaanxi, SE Shanxi, NE Sichuan.

## 2. Subfam. FUMARIOIDEAE

荷包牡丹亚科 he bao mu dan ya ke

Zhang Mingli (张明理), Su Zhiyun (苏志云 Shu Tsi-yun); Magnus Lidén

Herbs, perennial or annual, juicy, often glaucous, usually glabrous, sometimes with 1-celled hairs, rarely with crispate hairs. Cotyledons usually 2, but only 1 in most geophytic species. Leaves alternate, rarely opposite or in a basal rosette, compound (simple in *Corydalis ludlowii*). Stipules absent or entire to fimbriate membranous appendages. Inflorescences bracteate, terminal (axillary in *Adlumia*), cymose or racemose. Flowers dimerous, bisymmetric or zygomorphic. Sepals 2, not completely enclosing petals in bud, green or usually petaloid, often slightly peltate, entire or dentate. Petals 4 in 2 dissimilar whorls, pairwise valvate in bud. Androecium of 8 thecae supplied by 6 vascular bundles, organized in 2, 4, or 6 “stamens” with rather broad and flat filaments, usually nectariferous at base; anthers opening by slits. Ovule campylotropous, bitegmic, crassinucellate. Fruit syncarpous, bicarpellate, 1- to many seeded. Seeds at dispersal with small embryo and copious endosperm. Base chromosome number = 8 (rarely 7).

Twenty genera and ca. 570 species: Africa and Asia outside of the tropics, Europe, North America; seven genera and 376 species (266 endemic, one requiring verification) in China.

- 1a. Petals free; stamens 4 (rosulate annuals) ..... 13. *Hypecoum*  
 1b. Inner petals united at apex; stamens 2, or 6 in 2 bundles.  
 2a. Flowers zygomorphic (with 1 plane of symmetry).  
 3a. Fruit a capsule with black seeds; style persistent ..... 18. *Corydalis*  
 3b. Fruit a small rounded nut; style caducous ..... 19. *Fumaria*  
 2b. Flowers bisymmetric (with 2 planes of symmetry).  
 4a. Plant not scandent; stems ca. 5 mm in diam.  
 5a. Flowers pinkish red, cordate; leaflets with few acute lobes ..... 14. *Lamprocapnos*  
 5b. Flowers cream, oblong; leaflets discrete, regularly serrate ..... 15. *Ichtyoselmis*  
 4b. Plant scandent with tendrils; stems 1–4 mm in diam.  
 6a. Flowers pink; inflorescences axillary; petiolules tendriform ..... 16. *Adlumia*  
 6b. Flowers yellow; inflorescences leaf-opposed; apex of most leaves transformed into a branched tendril ..... 17. *Dactylicapnos*

## 13. HYPECOUM Linnaeus, Sp. Pl. 1: 124. 1753.

角茴香属 jiao hui xiang shu

Zhang Mingli (张明理); Magnus Lidén

*Chiazospermum* Bernhardt.

Herbs, annual, low, usually glaucous, glabrous, taprooted, rosulate. Leaves in a basal rosette, lanceolate, oblanceolate, to narrowly obovate in outline, imparipinnate with deeply divided segments. Flowers in long pedunculate dichasia from rosette, bisymmetric. Petals 4, yellow, white, or bluish pink; outer petals flat, shallowly 3-lobed to entire; inner petals deeply 3-lobed; lateral lobes oblong, entire; median lobe with a narrow base and a rounded to oblong limb with a fimbriate or ± denticulate margin, specialized for secondary pollen presentation, initially pressed to stamens/gynoecium. Stamens 4, each with 2 thecae, but median ones with 2 vascular bundles, lateral ones with 1 vascular bundle; filaments flat, ± translucent, with lateral basal nectaries; anthers oblong, extrorse. Style with 2 narrow commissural stigmatic branches. Fruit linear, with many seeds in 1 row, dehiscent with 2 valves or breaking up into 1-seeded units. Seeds flattish, covered with oxalate crystals. Pollen with 2 long colpi, sometimes fused into a synaperture. Chromosome base number = 8.

Eighteen species: Mediterranean region to C Asia and China; four species (one endemic) in China.

See the paper by Dahl, “Infrageneric division of the genus *Hypecoum* L. (Papaveraceae)” (Nordic J. Bot. 10: 129–140. 1992).

- 1a. Ultimate leaf lobes linear to setaceous; petals yellow.

- 2a. Fruit dehiscent with 2 valves, ± erect; margin of central lobe of inner petals not fimbriate; dry plant not smelling of coumarin; outer petals > 10 mm wide (*H. sect. Chiazospermum* (Bernhardi) Å. E. Dahl) ..... 1. *H. erectum*
- 2b. Fruit nutant, breaking up into 1-seeded indehiscent units; margin of central lobe of inner petals fimbriate; dry plant smelling of coumarin; outer petals < 5 mm wide (*H. sect. Pendula* Å. E. Dahl) ..... 4. *H. parviflorum*
- 1b. Ultimate leaf lobes obovate-lanceolate; outer petals white, pinkish, or bluish (*H. sect. Leptocarpa* Å. E. Dahl).
- 3a. Outer petals 6–9 × 4–6 mm; anthers 1–1.5 mm; inner petals pale ..... 2. *H. leptocarpum*
- 3b. Outer petals 11–12 × 9–10 mm; anthers 3–3.5 mm; inner petals ?orange ..... 3. *H. zhukanum*

**1. *Hypecoum erectum*** Linnaeus, Sp. Pl. 1: 124. 1753.

角茴香 jiao hui xiang

*Chiazospermum erectum* (Linnaeus) Bernhardi; *Hypecoum millefolium* H. Léveillé & Vaniot.

Herbs, winter annual, very glaucous. Cotyledons linear. Leaves very numerous; petiole 1–3 cm, vaginate at base; blade oblanceolate, 4–11 × 0.8–2.5 cm, 2 or 3 × pinnate with deeply divided segments; ultimate lobes linear to setaceous, 1–3 mm. Flowering stalks usually several (up to 20) from rosette, usually regular dichasia, but sometimes branched below terminal dichasium, eventually with numerous flowers; first flower produced 5–15 cm from base; whole dichasium (from base to ultimate flower) with widely divergent branches, reaching 10–40 cm when fruiting; bracts/bracteoles paired, lower ones leaf-like, ca. 3 × ternately divided into setaceous lobes, progressively smaller and less divided upward on dichasium. Sepals rather long persistent, ovate, ca. 2 mm, margin entire, apex acuminate. Petals yellow, sometimes with darker spots or streaks; outer petals 10–12 × 10–19 mm, 3-lobed with broad rounded lateral lobes and smaller triangular mid-lobe; inner petals 3-parted to ca. 1/2; lateral lobes broadly oblong; middle lobe elliptic, base truncate, shortly stalked, margin slightly denticulate. Capsule erect, 4–6 cm × ca. 1 mm, slightly flattened, dehiscent with 2 valves. Seeds 30–40, blackish, sharply rectangular, ca. 1 mm, slightly flattened, both sides with a cross-shaped elevation. Fl. and fr. Apr–Oct.  $2n = 16$ .

Slopes, grasslands, riversides, gravel sands; 400–1200(–4500) m. Gansu, Heilongjiang, Hubei, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Xinjiang [Mongolia, Russia (Siberia)].

The flowers are wide open in the morning, then closing and slightly nodding in the afternoon.

**2. *Hypecoum leptocarpum*** J. D. Hooker & Thomson, Fl. Ind. 1: 276. 1855.

细果角茴香 xi guo jiao hui xiang

*Hypecoum chinense* Franchet.

Herbs, summer annual, ± glaucous. Cotyledons lanceolate. Leaves numerous; petiole 1.5–8 cm, shortly and broadly vaginate at base; blade narrowly oblanceolate, 5–20 × 1–3 cm, pinnate; primary leaflets 4–9 pairs, broadly ovate, 0.4–2 cm, almost sessile, pinnatifid; lobules lanceolate, ovate, or narrowly elliptic to obovate, 2–4 mm, apex acute. Flowering stems few to many, 5–40 cm, dichotomously branched; bracts paired, 0.5–3 cm, lower ones biternate to sub-bipinnate, gradually smaller and less divided upward, uppermost linear. Sepals green, ovate or ovate-lanceolate, 2–3(–4) × 1–1.5(–2) mm, margin membranous, entire, rarely toothed. Petals white or pale lavender, api-

cally green (in type description *Hypecoum chinense* said to have yellowish flowers); outer petals obovate, 6–9 × 4–6 mm, entire; inner petals 3-parted to less than 1/2; lateral lobes broadly oblong, apex obtuse; middle lobe spatulate-orbicular, ca. 2 mm, shortly stalked or sessile, margin incurved, almost entire or slightly denticulate. Stamens with obscure nectaries; anthers 1–1.5 mm. Ovary with up to ?20 ovules. Capsule erect, linear, 3–4 cm × 1–1.5 mm, breaking up into 15–18 segments when mature, each segment with 1 seed. Seeds flattened, D-shaped. Fl. and fr. Jun–Sep.  $2n = 42$ .

Slopes, grasslands, valleys, river sands, gravel slopes, sandstone; (1700–)2700–5000 m. Gansu, NW Hebei, Nei Mongol, Qinghai, Shaanxi, Shanxi, W Sichuan, Xinjiang, Xizang, NW Yunnan [Afghanistan, Bhutan, India, Mongolia, Nepal, Tajikistan].

The specimen *Harry Smith 4371* (Sichuan: Barkam Xian, Matang, 31°53'N, 102°43'E, 3400 m, 17 Sep 1922, UPS) deviates considerably in its less divided leaves with very broad serrate leaflets and possibly represents an undescribed taxon.

*Hypecoum alpinum* C. H. An (Fl. Xinjiang. 2(2): 373. 1995: type not recoverable, possibly lost) has, according to the description, leaves and flowers like *H. leptocarpum* but differs in being very dwarf, perennial, fleshy, and in having a very short capsule and smooth seeds.

**3. *Hypecoum zhukanum*** Lidén, Nordic J. Bot. 25: 33. 2008.

芒康角茴香 mang kang jiao hui xiang

Herbs, annual, ± glaucous. Leaves numerous; petiole 2–6 cm, shortly and broadly vaginate at base; blade narrowly oblanceolate, 5–10 × 1.5–2.5 cm, pinnate; primary leaflets in 4–6 pairs, almost sessile, broadly ovate, 0.4–2 cm, pinnatifid; lobules lanceolate, ovate, or narrowly elliptic to obovate, 3–4 mm, apex acute. Flowering stems several, 10–23 cm, dichotomously branched; bracts paired, 0.5–2 cm, lower ones biternate to sub-bipinnatisect, gradually smaller and less divided upward. Sepals green, ovate or ovate-lanceolate, 3–4 × 2–3 mm, margin membranous, subentire. Outer petals white, with tip of keel greenish, 11–12 × 9–10 mm, very shallowly 3-lobed; inner petals ?orange, 3-parted to less than 1/2; lateral lobes not divergent, broadly oblong, apex obtuse; middle lobe broadly elliptic, ca. 4 mm, sessile, almost entire. Stamens with prominent nectaries at base; anthers 3–3.5 mm. Ovary with 24 ovules. Fruit and seeds unknown. Fl. Jul.

• Open slopes; ca. 3600 m. E Xizang (Markam).

**4. *Hypecoum parviflorum*** Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 15: 141. 1842.

小花角茴香 xiao hua jiao hui xiang

*Hypecoum pendulum* Linnaeus var. *parviflorum* (Karelin & Kirilov) Krylov.

Herbs, annual, glaucous. Cotyledons linear. Radical leaves many; petiole flat, vaginate at base; blade narrowly obovate, 5–7 cm, bipinnate; lobules linear, 3–10 × ca. 1 mm, apex acute. Flowering stems many, terete, 1–1.5 mm in diam., dichotomously branched. Flowers small, forming dichotomous cymes; bracts narrowly lobed, sessile. Pedicel 5–15 mm, nutant after flowering. Sepals early falling, broadly ovate, 1–1.5 mm. Corolla yellow, often with dark spots on inner petals; outer petals broadly elliptic, ca. 5 mm, entire; inner petals 3-parted to ca. 1/2; lateral lobes slightly divergent, shorter than median one; median lobe clearly stalked with fimbriate margin. Capsule nutant, 4–5 cm, angular in cross section, eventually breaking up into 1-seeded units, epidermis often persistent as a membranous

sheath. Seeds pale brown, D-shaped, ca. 2 mm. Fl. and fr. May–Aug.

Plains, deserts, stony slopes. N and S Xinjiang [Afghanistan, Kashmir, Kazakhstan, Kyrgyzstan, Pakistan, Russia (Gorno-Altai), Tajikistan, Turkmenistan, Uzbekistan; SW Asia (Iran)].

This is possibly better treated as a variety of *Hypecoum pendulum* Linnaeus.

*Hypecoum ferrugineomaculatum* C. H. An (Fl. Xinjiang. 2(2): 373. 1995; type not recoverable, possibly lost) is said to differ from *H. parviflorum* by brownish spots on the inner petals. However, this is not uncommon in *H. parviflorum* and other species of *H. sect. Pendulae*.

#### 14. LAMPROCAPNOS Endlicher, Gen. Suppl. 5: 32. 1850.

荷包牡丹属 he bao mu dan shu

Zhang Mingli (张明理); Magnus Lidén

*Capnorchis* Borkhausen (1797), not Miller (1754); *Eucapnos* Siebold & Zuccarini (1843), not Bernhardt (1833).

Herbs, rhizomatous, with branched leafy stems. Inflorescences racemelike, with pendent flowers. Sepals petaloid. Corolla with 2 planes of symmetry, flattened, broadly cordate in profile. Stamens mostly free, only shortly cohering below anthers. Seeds black, carunculate.

One species: NE China, N Korea, extreme SE Russia.

**1. Lamprocapnos spectabilis** (Linnaeus) Fukuhara, Pl. Syst. Evol. 206: 415. 1997.

荷包牡丹 he bao mu dan

*Fumaria spectabilis* Linnaeus, Sp. Pl. 2: 699. 1753; *Capnorchis spectabilis* (Linnaeus) Borkhausen; *Dicentra spectabilis* (Linnaeus) Lemaire; *Diclytra spectabilis* (Linnaeus) Candolle; *Dielytra spectabilis* (Linnaeus) G. Don; *Eucapnos spectabilis* (Linnaeus) Siebold & Zuccarini.

Herbs, perennial, glabrous, with ± erect, branched, leafy, rather thick, juicy stems 50–90 cm. Petiole 5–12 cm; leaf blade glaucous abaxially, green adaxially, broadly triangular in outline, 10–30 × 10–30 cm, 2 to almost 3 × ternately divided; leaflets cuneate, ± deeply divided into broad acute lobes or coarse teeth. Inflorescences terminal and axillary from upper leaves, racemelike, almost horizontal, long, lax, 7–15-flowered, subtended by linear bracts 3–5(–10) mm. Pedicel 5–15 mm, thin,

with tiny paired bracteoles. Flowers with 2 planes of symmetry, ± cordate, 20–25 mm wide. Sepals early falling, 3–4 mm, entire. Outer petals pink or occasionally white, base broadly pouchlike; inner petals white, usually with red and yellow markings, 22–25 mm, projecting far beyond strongly reflexed outer petals and each with a prominent whitish crest. Stamens rather wide and undulate, petaloid, free from each other, each triplet only shortly fused below anthers; nectar secreted from base of each central stamen. Ovary green, fusiform; style persistent; stigma oblong, slightly 2-lobed at base and apically. Capsule oblong, 2–8-seeded, 25–35 mm, including a long straight persistent style. Seeds black, rounded, (2.5–)3 mm, smooth, with a large lobed elaiosome. Fl. and fr. Apr–Jun.  $2n = 16$ .

Moist grasslands, slopes, open deciduous forests; 800–2800 m. Heilongjiang, Jilin, Liaoning [N Korea, extreme SE Russia].

This is a very long-cultivated ornamental plant, sometimes found as a garden escape.

#### 15. ICTHYOSELMIS Lidén & Fukuhara, Pl. Syst. Evol. 206: 415. 1997.

黄药属 huang yao shu

Zhang Mingli (张明理); Magnus Lidén

*Dicentra* sect. *Macranthos* K. R. Stern, Brittonia 13: 24. 1961.

Herbs, rhizomatous, with branched leafy stems. Leaflets discrete, serrate. Inflorescences cymose, pendent. Flowers with 2 planes of symmetry, oblong-subpandurate in profile. Outer petals not or only slightly saccate at base. Stamens mostly free, only shortly fused below anthers. Capsule with numerous small seeds. Seeds black, carunculate.

One species: China, N Myanmar.

**1. Ichtyoselmis macrantha** (Oliver) Lidén, Pl. Syst. Evol. 206: 415. 1997.

黄药 huang yao

*Dicentra macrantha* Oliver, Hooker's Icon. Pl. 20: t. 1937. 1890.

Herbs, perennial, erect, 0.6–1.5 m tall, glabrous. Rhizome

horizontal, long, slender. Stems rather stiff, leafless at base, branched above, with 2–4 alternate leaves, swollen at nodes. Petioles of radical leaves 10–50 cm, of cauline leaves 5–15 cm; blade glaucous abaxially, green adaxially, broadly triangular, 10–20 cm, bi- to usually triternate to sub-tripinnate; primary petiolules 2–10 cm; leaflets discrete, ovate, 3–9 × 1.5–4 cm, regularly serrate. Inflorescences nutant, terminal and sometimes axillary, 3–14-flowered; bracts linear, 3–8 mm. Pedicel 1–2 cm. Sepals lanceolate, 10–22 × 2–5 mm, entire. Corolla ivory white or pale yellow, sometimes with a greenish tint, (4–)4.5–5 × 1–1.5 cm; outer petals slightly bent outward in apical 1/3, base not or very shallowly pouchlike, apex rather broad, acute. Stamens almost free, each triplet loosely cohering only just below an-

thers; nectar secreted at base of central stamens. Style persistent, 7–10 mm; stigma oblong-pandurate, slightly 2-lobed at apex. Fruit narrowly elliptic, 5–7 × 0.5–0.8 cm including stiff persistent style, dehiscent, but keeping together below and above. Seeds numerous (to 100), slightly flattened, ovoid, ca. 1.5 mm, smooth, with lobed elaiosome. Fl. and fr. Apr–Jul.

Woods, glades, also secondary and disturbed vegetation, humid but well-drained soils; 1500–2700 m. Guizhou, Hubei (Jianshi), S Sichuan, NE and NW Yunnan [N Myanmar].

This species is used medicinally and has several popular names: 黄药 *huang yao* (in Sichuan), 黄三七 *huang san qi* (in Yunnan), and 丁三七 *ding san qi* (in Zhaotong, Yunnan). The name 黄药 *huang yao* means “yellow medicine.”

## 16. *ADLUMIA* Rafinesque ex Candolle, Syst. Nat. 2: 111. 1821, nom. cons.

荷包藤属 *he bao teng shu*

Zhang Mingli (张明理); Magnus Lidén

Herbs, scandent, annual or often biennial, with indefinite leafy main shoot and numerous axillary cymes. Petals fused for most of their length, spongy. Nectaries absent. Seeds without elaiosomes.

Two species: one endemic to E North America, the other in NE China, Korea, and Russia (Far East).

### 1. *Adlumia asiatica* Ohwi, Bot. Mag. (Tokyo) 45: 387. 1931.

荷包藤 *he bao teng*

Climbing herbs, with a simple taproot, summer annual or more often biennial, forming a basal rosette in first year and developing a leafy branched scandent indefinite stem 1–3 m in second year. Lowermost leaves stalked (petiole to 9 cm), upper ones subsessile; blade slightly glaucous abaxially, pale green adaxially, ovate, 2 or 3(or 4) × pinnate; terminal petiolules cirrose; leaflets ovate or obovate, 5–15 × 5–10 mm, entire or shallowly cut into 2–4 acute or obtuse segments. Inflorescences cymose, axillary, 2–10(–20)-flowered; peduncle 2–5 cm (occasionally to 15 cm), basally shortly fused to subtending petiolar base; bracts/bracteoles early withering, 1.5–2.5 mm, lanceolate,

scarious, ± dentate. Sepals early falling, broadly ovate, petaloid, ca. 2 mm, apex acuminate. Corolla white or usually pale pink with darker apex, bisymmetric, drooping, urn-shaped, 11–16 × 3–7 mm. All petals and stamens fused for most of their length, very spongy, eventually becoming detached from petiole, but remaining on capsule when withered. Outer petals each with 2 sharp keels or wings, rendering corolla sharply rectangular in cross section, apex long acuminate, base of outer petals slightly saccate, reaching ca. 1 mm beyond point of attachment of flower. Stigma shortly 2-lobed. Capsule linear-elliptic, 1.5–2 cm × 3–4 mm, 10–16-seeded, dehiscent. Seeds black, reniform, 1.5–1.7 mm, smooth. Highly autogamous. Fl. and fr. Jul–Sep.

Understories of coniferous forests, forest margins. Heilongjiang, Jilin (Changbai Shan) [Korea, Russia (Far East)].

## 17. *DACTYLICAPNOS* Wallich, Tent. Fl. Nepal. 2: 51. 1826.

紫金龙属 *zi jin long shu*

Zhang Mingli (张明理); Magnus Lidén

Herbs, scandent, perennial or annual, glabrous. Stems thin, 1–8 m, forming a sympodium of several shoots. Leaf blade ternately or pinnately compound; leaflets once to 3 × compound; apex of leaf transformed into a branched tendril (except in basalmost leaves). Inflorescences terminal (leaf-opposed), corymbose, pendent, 2–14-flowered; bracts linear, entire to fimbriate-dentate. Flowers with 2 planes of symmetry, cordate to oblong, 12–26 × 4–10 mm. Petals pale yellow to orange (often rubescent); apices of outer petals slightly bent outward, base pouchlike. Stamens 2 (i.e., filaments of each triplet completely fused); each stamen with a basal nectary extending into pouch of corresponding outer petal. Style persistent; stigma almost square, upper corners each with 1 small stigmatic papilla, basal corners each with 1 large papilla (small in *Dactylicapnos burmanica*). Capsule dehiscent with 2 valves with persistent replum (in *D. scandens* indehiscent and berrylike). Seeds several to many, carunculate.

Twelve species: Himalayas to W China; ten species (three endemic) in China.

*Dactylicapnos ventii* (Khánh) Lidén (Nordic J. Bot. 25: 35. 2008) is similar to *D. grandifoliolata* but has fruit lanceolate with thin walls and seeds evenly colliculate and slightly flattened. It is known from India (Sikkim) and might occur in Yadong, S Xizang.

### 1a. Bracts and sepal margins fimbriate-dentate; plant a squashy annual; stems weak, sharply angular or winged

(*D.* sect. *Minicalcara* (Khanh) Lidén).

2a. Flowers sharply keeled, 8–13 mm wide; stems conspicuously winged-ridged ..... 7. *D. roylei*

2b. Flowers not keeled, 4–6 mm wide; stems with narrow ridges.

- 3a. Capsule constricted between seeds; seeds shiny, radially reticulate-striate; first flowers 1–2 m up stem ..... 8. *D. torulosa*  
 3b. Capsule smooth; seeds smooth or densely echinulate; first flowers usually 0.1–1 m up stem.  
 4a. Seeds echinulate; sinus between basal pouches to 1 mm deep ..... 9. *D. lichiangensis*  
 4b. Seeds smooth; sinus between basal pouches ca. 2 mm deep ..... 10. *D. leiosperma*
- 1b. Bracts entire, sepals subentire; leaves (tendrils excepted) with 2 primary leaflets (rarely 4, but then opposite); plant a perennial; stems terete to sulcate, but not winged (*D. sect. Dactylicapnos*).  
 5a. Primary leaflets 2, alternate; nectary even or tapering toward apex.  
 6a. Capsule very fleshy, not dehiscent by regular valves; nectary sigmoid, even or apex shortly acute ..... 1. *D. scandens*  
 6b. Capsule membranous with thin marginal wing, dehiscent with valves; nectary sharply geniculate, apex long and thin ..... 2. *D. macrocapnos*
- 5b. Primary leaflets 2 or 4, opposite; nectary much thicker toward apex.  
 7a. Primary leaflets bi- to triternate, each with 8–16 ultimate leaflets; seeds with small elaiosomes; fruit 3–6 × as long as wide.  
 8a. Most leaves with 2 pairs of lateral leaflets; stems 2–4 mm in diam.; nectary not T-shaped; stigma broader than long with large basal papillae; crests of inner petals overtopping apex by 2 mm ..... 3. *D. schneideri*  
 8b. Leaves with 1 pair of lateral leaflets; stems 1–2 mm in diam.; nectary T- or Y-shaped; stigma longer than broad with small basal papillae; crests of inner petals overtopping apex by 4 mm ..... 4. *D. burmanica*
- 7b. Primary leaflets each with 2–8 ultimate leaflets; seeds with large deeply dissected elaiosomes that keep them together in a clump after valves open; fruit 1.7–2.5 × as long as wide (longer in *D. ventii*).  
 9a. Primary leaflets each with 4–8 obtuse to subacute ultimate leaflets; fruit with 15–30 seeds ..... 5. *D. gaoligongshanensis*  
 9b. Primary leaflets each with 3–5 acute to subacute ultimate leaflets; fruit with 30–50 seeds.  
 10a. Fruit thin-walled, lanceolate; seeds colliculate ..... *D. ventii* (see note above)  
 10b. Fruit thick-walled, broadly elliptic; seeds echinulate ..... 6. *D. grandifoliolata*

**1. *Dactylicapnos scandens*** (D. Don) Hutchinson, Bull. Misc. Inform. Kew 1921: 105. 1921.

紫金龙 zi jin long

*Diclytra scandens* D. Don, Prodr. Fl. Nepal. 198. 1825; *Dactylicapnos multiflora* Hu; *D. thalictrifolia* Wallich; *Dicentra scandens* (D. Don) Walpers; *Diclytra thalictrifolia* (Wallich) G. Don.

Climbers, perennial, herbaceous, from a stout simple or branched carrotlike rootstock. Stems (1–)2–5 m, thin, sulcate, branched and leafy throughout. Leaves ± reflexed on a zigzag stem; petiole 0.5–3 cm; leaf blade glaucous abaxially, dark green adaxially, with 1 pair of primary pinnae usually displaced (alternate); rachis ending in a thin branched cirrose tendril; primary leaflets twice to 3 × ternately compound; ultimate leaflets ovate, 5–30 × 4–18 mm, margin entire, apex obtuse, with small hooked mucro. Raceme 1–5 cm, 6–14-flowered, nutant; peduncle 2–8 cm; bracts narrowly oblanceolate, 3–6 × ca. 1 mm, margin entire or slightly dentate, apex acute. Pedicel thin, 10–20 mm, elongating in fruit to 30 mm. Sepals ovate-lanceolate, 3–4 × ca. 2 mm, entire. Corolla yellow, often pinkish toward apex, oblong-cordate to obtusely triangular in profile, 18–21 × 8–10 mm; outer petals saccate, ± sharply keeled or narrowly winged at base; sinus at petiole insertion narrow, 3–4 mm deep; dorsal crest of inner petals overtopping petal apex 1–2 mm; nectary sigmoidally curved, 3–4 mm, apex acute. Stigma almost square, slightly notched at apex, with small papillae in forward corners and more prominent rounded papillae in basal corners. Capsule purple, red, whitish, or pale yellow when mature, ovoid to lanceolate, 15–20(–25) × (5–)6–8 mm, very

fleshy and without sclerified veins, not dehiscent by valves, but dispersed entire (presumably by birds) or when dry irregularly disintegrating, 25–50(–100)-seeded, tipped by stiff style 5–7 mm. Seeds black, colliculate (less prominently so toward hilum), 1.7–2 mm, ovoid, with small or rudimentary elaiosome. Fl. Jul–Nov, fr. Aug–Dec.

Forest understories, slopes, stony places, ditch sides, grasslands, valleys; 1600–2500 m. W Guangxi, S Xizang (Yadong), S Yunnan [Bhutan, India (Assam, Sikkim), Myanmar, Nepal, Sri Lanka, N Thailand, N Vietnam].

Plants from the Huanglian Shan Nature Reserve near Lüchun (S Yunnan) have narrow capsules and echinulate seeds and seem to correspond to *Dactylicapnos scandens* var. *siamensis* Craib (Fl. Siam. Enum. 75. 1925), except for their longer capsules.

**2. *Dactylicapnos macrocapnos*** (Prain) Hutchinson, Bull. Misc. Inform. Kew 1921: 105. 1921.

薄壳紫金龙 bao ke zi jin long

*Dicentra macrocapnos* Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 12. 1896.

Climbers, perennial, herbaceous, from a stout rootstock. Stems (1–)2–8 m, thin, sulcate, branched and leafy throughout. Petiole 0.5–3 cm; leaf blade glaucous abaxially, with 1 pair of usually alternate pinnae; rachis ending in a thin branched cirrose tendril; leaflets twice (rarely to 3 ×) ternately compound; ultimate leaflets ovate, 10–25 × 7–20 mm, margin entire, apex obtuse with small mucro. Raceme 1–3 cm, 6–14-flowered, obliquely nutant; peduncle 2–4 cm; bracts linear to narrowly oblanceolate, 3–10 × 1–2 mm, margin entire, apex acute. Pedi-



cel thin, reflexed at base, 10–20 mm, elongating in fruit to 30 mm. Sepals 3–4 × ca. 2 mm, abruptly tapering from a broad base, slightly dentate. Corolla yellow, sometimes with reddish tips, flattened, oblong-cordate to subtriangular in profile, 18–20 × 8–11 mm; outer petals saccate, sharply keeled, at base often narrowly winged; sinus at petiole insertion ca. 3 mm deep; dorsal crest of inner petals overtopping petal apex ca. 2 mm; nectary sharply bent forward in distal 1/3, tapering to slender curved apex. Stigma almost square, slightly notched at apex, with small papillae in forward corners and more prominent rounded papillae in basal corners. Capsule tapering to both ends, flattened, with a narrow marginal wing, 20–25 × 4–5 mm, tipped by style 5–6 mm. Seeds black, rounded-ellipsoid, 1.7–2 mm, with rather small elaiosome. Fl. Aug, fr. Sep.

Forest understories; 2300–2700 m. S Xizang (Nyalam) [N India (Garhwal, Kumaon), Nepal].

The Nyalam plants most probably correspond to the C Nepal plants with echinulate seeds (seeds not seen on Xizang material).

**3. *Dactylicapnos schneideri*** (Fedde) Lidén, *Nordic J. Bot.* 25: 35. 2008.

粗茎紫金龙 cu jing zi jin long

*Dicentra schneideri* Fedde, *Repert. Spec. Nov. Regni Veg.* 17: 198. 1921.

Climbers, herbaceous. Stems 2–4 m, sulcate, thicker than in any other species (2–4 mm in diam.), branched and leafy throughout. Petiole 1–4 cm; leaf blade glaucous abaxially, green adaxially, with usually 2 pairs of opposite leaflets; rachis ending in a thin branched cirrose tendril; primary leaflets twice ternately compound; ultimate leaflets ovate to broadly lanceolate, 6–25 × 4–15 mm, margin entire, apex obtuse with small scabrid mucro. Raceme ca. 1 cm, 2–10-flowered, nutant; peduncle 2–4 cm; bracts linear, ca. 5 × 1 mm, margin entire or slightly dentate, apex acute. Pedicel 7–15 mm, thin. Sepals ovate-lanceolate, 2–3 × ca. 1 mm, entire. Corolla yellow, oblong-cordate in profile, 18–20 × 8–10 mm; outer petals saccate; sinus at petiole insertion narrow, 3–4 mm deep; dorsal crest of inner petals overtopping petal apex ca. 2 mm; nectary curved, thickened at apex, 3–4 mm. Ovary with 50–60 ovules; stigma slightly broader than long, slightly notched at apex, with small papillae in forward corners and more prominent rounded papillae in basal corners. Capsule oblong, 27–35 × ca. 4 mm, tipped by permanent style 6–7 mm; replum persistent with very prominent spongy knotty placenta. Seeds black, 1.7–2 mm, tuberculate, with small elaiosome. Fl. Jul–Aug, fr. Jul–Dec.

- ?Forest margins; 2400–3000 m. Yunnan.

**4. *Dactylicapnos burmanica*** (K. R. Stern) Lidén, *Nordic J. Bot.* 25: 35. 2008.

缅甸紫金龙 mian dian zi jin long

*Dicentra burmanica* K. R. Stern, *Brittonia* 19: 280. 1967.

Climbers, herbaceous. Stems thin, sulcate, branched and leafy throughout. Petiole short (0.5–1 cm) but petiolules to 5 cm; leaf blade ?pale green, thin, with 2 opposite leaflets; rachis ending in a thin branched cirrose tendril; primary leaflets twice

to almost 3 × ternately compound; ultimate leaflets 10–15, ovate, 10–40 × 7–30 mm, margin entire, apex obtuse with small mucro. Raceme nutant, ca. 1 cm, 5–10-flowered; peduncle 2–4 cm; bracts linear-lanceolate, 3–4 mm. Pedicel thin, 7–15 mm, elongating to 30 mm in fruit. Sepals narrowly triangular, 2–3 × 1–2 mm. Corolla pale yellow, rounded-cordate in profile, 23–26 × 8–10 mm; outer petals saccate; sinus at petiole insertion narrow, 4(–5) mm deep; blade of inner petals almost equaling claw (in other species ca. 1/2 as long as claw); dorsal crest of inner petals conspicuous, overtopping petal apex ca. 4 mm; nectary reflexed into spur, thickened and prominently forked at apex. Stigma longer than broad, with rather small papillae. Capsule (immature) lanceolate, ca. 21 × 5 mm, thin-walled, with ca. 30 ovules; style ca. 7 mm. Fl. and fr. Aug.

Shaded places in forests; [700–1800 m]. SW Yunnan (Wanding) [E Myanmar, E Nepal].

**5. *Dactylicapnos gaoligongshanensis*** Lidén, *Nordic J. Bot.* 25: 34. 2008.

滇西紫金龙 dian xi zi jin long

Climbers, herbaceous. Stems 2–4 m, branched and leafy throughout. Petiole 1–2 cm; leaf blade pale green abaxially, darker green adaxially, with 2 opposite leaflets; rachis ending in a thin branched cirrose tendril; primary leaflets irregularly compound, with 4–8 broadly ovate, obtuse to subacute, entire ultimate leaflets, 10–25 × 8–20 mm. Raceme ca. 1 cm, 2–7-flowered, nutant; peduncle 2.5–6 cm; bracts linear, 2–4 mm. Pedicel thin, ca. 5 mm, elongating to 10–16 mm in fruit. Sepals ca. 2 × 1 mm, shallowly dentate. Corolla golden yellow to red (or ?rubescent), 18–20 × 7–8 mm; outer petals saccate at base; sinus at petiole insertion narrow, ca. 3 mm deep; dorsal crest of inner petals overtopping petal apex ca. 2 mm; nectary directed downward, gradually thickened toward apex. Stigma squarish, slightly broader than long. Capsule grayish green to pale brown when ripe, 9–12 × 4–5 mm, tipped with style ca. 6 mm, 15–30-seeded, dehiscent with valves; valves often long persistent, attached at their base, dark outside, pale and conspicuously transversely wrinkled on inner side; style eventually falling, but replum long persistent with conspicuous tooth-shaped flattened funiculi. Seeds 1.3–1.5 mm, obtusely beaked, surface colliculate, occasional cells with low papillae; elaiosome large, deeply divided, easily detached from seed. Fl. Jul–Nov, fr. Aug–Nov.

- Forest understories; 1900–2500 m. NW Yunnan (Gongshan: Gaoligong Shan).

**6. *Dactylicapnos grandifoliolata*** Merrill, *Brittonia* 4: 64. 1941.

厚壳紫金龙 hou ke zi jin long

*Dicentra grandifoliolata* (Merrill) K. R. Stern; *D. paucinervia* K. R. Stern.

Climbers, herbaceous. Stems thin, sulcate, branched and leafy throughout. Petiole 1–2 cm; leaf blade with 2 opposite leaflets; rachis ending in a thin branched cirrose tendril; primary leaflets unequally compound into (1 or) 2–5, ovate, subacute, entire ultimate leaflets, (10–)25–50 × 10–25 mm. Raceme nu-

tant, 1–4 cm, 8–10-flowered; peduncle 6–12 cm; bracts linear, 4–10 mm. Pedicel thin, 5–10 mm in flower, elongating to 20–30 mm in fruit. Sepals broadly lanceolate, 3–4 × 1–1.5 mm, apex acute. Corolla pale yellow, rounded-cordate in profile, 20–25 × 9–11 mm; outer petals saccate; sinus at petiole insertion ca. 2.5 mm deep; dorsal crest of inner petals overtopping petal apex ca. 1 mm; nectary abruptly and irregularly thickened toward apex. Ovary with 50–55 ovules; stigma almost squarish. Capsule 16–20 × 7–10 mm, tipped with style 8–9 mm; valves thick, leathery, dark when dry with prominent midvein; replum persistent, prominent, flat. Seeds numerous (up to 50), slowly released from a mesh of fibrous elaiosomes that initially holds seeds after valves have fallen, 1.5–2 mm with prominent beak, colliculate-echinulate; elaiosome very large (ca. 2 × seed diam.) consisting of long free tubular cells, like a cotton wad. Fl. Feb, fr. Mar and Aug.

Forest understories, secondary forests; 800–2200 m. SE Xizang (Médog) [Bhutan, India (Assam, Darjeeling, Sikkim), N Myanmar].

**7. *Dactylicapnos roylei*** (J. D. Hooker & Thomson) Hutchinson, Bull. Misc. Inform. Kew 1921: 104. 1921.

宽果紫金龙 kuan guo zi jin long

*Dicentra roylei* J. D. Hooker & Thomson, Fl. Ind. 1: 273. 1855.

Climbers, summer annual. Stems 2–5 m, weak, hollow, prominently winged-ridged (wings decurrent from petioles), much branched. Petiole 1–3(–6) cm, flattish, with thin margins; leaf blade virescent abaxially, green adaxially, oblong-lanceolate in outline, pinnately compound with 3–6 leaflets alternate on a zigzag rachis, ending in a long thin branched cirrose tendril; primary leaflets once to twice ternately divided; ultimate leaflets ovate, (4–)12–20(–26) × (2–)4–8(–11) mm, base cuneate, usually asymmetric, margin entire, apex acute or obtuse, mucronate. Raceme corymbose, 2–7-flowered, nutant; peduncle (2–)5–11 cm; bracts usually purplish on both sides, lanceolate, (5–)9–15 × 2–3 mm, irregularly lacerate. Pedicel 12–25 mm, thin. Sepals with broad, whitish, deeply lacerate base and long, narrow, sparsely dentate, purplish green apical part, 5–10 × 1–3 mm. Corolla yellow, sometimes streaked with mauve at very base, sometimes rubescent with age, flat, rounded in profile, 16–19 × 8–14 mm; outer petals very sharply keeled in basal 3/4, base broadly saccate, apex narrower, slightly divergent, bullate-navicular at very tip; sinus between pouches (i.e., where pedicel is inserted) wide, 1–2 mm deep; inner petals 14–17 mm, apically with broad pale slightly undulate dorsal crests, overtopping petal apex ca. 1 mm; nectary tapering to a slender apex, 3–4 mm. Style 3–5 mm; stigma almost square, slightly notched at apex, with very prominent papillae in basal corners. Capsule linear-oblong, 4–5 cm × 3–4 mm, to 20-seeded. Seeds black, shiny, rounded-reniform in outline, faintly colliculate, ca. 2 mm, with large cap-shaped slightly lobed elaiosome. Self-compatible. Fl. Jul–Oct, fr. Aug–Dec.

Forest understories, scrub on slopes, among ferns, roadsides, rare and scattered; 2000–3000 m. W Sichuan (Kangding, Xiaojin), S Xizang, NW Yunnan (Gongshan, Zhongdian) [?Bhutan, NW India, Nepal].

**8. *Dactylicapnos torulosa*** (J. D. Hooker & Thomson) Hutchinson, Bull. Misc. Inform. Kew 1921: 104. 1921.

扭果紫金龙 niu guo zi jin long

*Dicentra torulosa* J. D. Hooker & Thomson, Fl. Ind. 1: 272. 1855; *Corydalis erythrocarpa* H. Léveillé; *D. torulosa* var. *yunnanensis* Fedde; *D. wolfdietheri* Fedde.

Climbers, summer annual. Stems green to purplish, 2–5 m, branched, sharply angular, very weak and squashy. Petiole 0.3–1 (lower leaves to 5 cm) with broad membranous base; leaf blade pale green and glaucous abaxially, oblong-ovate in outline, 4–14 cm (tendrils excepted), pinnate, with 3–5 alternate pinnae, terminating in a long thin branched cirrose tendril; pinnae once or usually twice ternate; ultimate leaflets ovate to lanceolate, (3–)7–18(–30) × (2–)3–8(–15) mm, base broadly cuneate, margin entire, apex acute or obtuse, with a small ± curved mucro. Inflorescence corymbose, 2–7-flowered, nutant; peduncle 1–5 cm; bracts linear-lanceolate, 5–12 × ca. 1 mm, irregularly lacerate. Pedicel 8–14 mm, often with rudimentary bracteoles at base. Sepals lanceolate, 5–6 × ca. 1 mm, margin lacerate, apex long acuminate. Corolla pale yellow to orange-yellow (apices of outer petals deeper yellow to greenish orange), narrowly cordate-oblong in profile, 11–15 × 4–6 mm; outer petals saccate at base; sinus between pouches (i.e., where pedicel is inserted) 1–2 mm deep; apices of outer petals only slightly diverging, bullate, mucronate; inner petals with rather broad dorsal crests in apical 1/3, crest attenuate and prolonged beyond apex proper ca. 1.5 mm; nectary 2–3 mm, curved, shortly acute. Stigma squarish, 2 apical corners with small stigmatic papillae, basal papillae conspicuous. Capsule green and rubescent, mauve when ripe, linear-oblong, moniliform, 4–7 cm × 2–3 mm, 10–20-seeded. Seeds black, shiny, rounded-reniform in outline, with slightly raised radially much elongated testa cells, 1.5–2 mm, with prominent pure white elaiosome (in other species more whitish translucent). Self-compatible. Fl. Jul–Oct, fr. Aug–Jan.  $2n = 16$ .

Forest understories, shrubs, ditch sides, roadsides, probably nitrophilous; 1200–2500 m. W Guizhou, W Sichuan (N to Shimian), SE Xizang, Yunnan [Bangladesh, Bhutan, India (Assam), Myanmar].

**9. *Dactylicapnos lichiangensis*** (Fedde) Handel-Mazzetti, Symb. Sin. 7: 338. 1931.

丽江紫金龙 li jiang zi jin long

*Dicentra lichiangensis* Fedde, Repert. Spec. Nov. Regni Veg. 17: 199. 1921.

Climbers, summer annual. Stems 0.5–2(–4?) m, branched, angular, very thin, with a tiny taproot. Petiole 8–15(–20) mm (in lower leaves to 5 cm), thin; leaf blade glaucous abaxially, green adaxially, oblong-ovate in outline, 2–5 cm (tendrils excepted), with 3 alternate often reflexed stalked pinnae; rachis terminating in a long thin branched cirrose tendril; primary leaflets once or twice ternate; ultimate leaflets ovate to lanceolate, 3–30 × 2–13 mm, base broadly cuneate, margin entire, apex acute or obtuse, with a small ± curved mucro. Inflorescence 1–3-flowered; peduncle 5–20 mm (rarely more) in fruiting stage; bracts linear-lanceolate, 2–8 × 0.5–1 mm, irregularly lacerate.

Pedicel 5–10 mm, apically thickened and ± papillose-scabrid along ridges in fruit. Sepals 4–6 × ca. 1 mm, with broader deeply dentate base and narrowly oblong to linear apical part. Corolla pale yellow, oblong, 12–16 × 4–4.5(–5) mm, slightly broader at base; outer petals slightly saccate at base; sinus between basal pouches (i.e., where pedicel is inserted) to 1 mm; apices of outer petals only slightly diverging, bullate, mucronate; blade of inner petals ca. 1/4 as long as petal, with dorsal crest prolonged beyond apex proper 1–1.5 mm; nectary sigmoidally curved, tapering to a fine short tip. Stigma squarish, 2 apical corners with small stigmatic papillae, basal papillae conspicuous, hornlike reflexed-prolonged. Capsule green, linear-oblong, 3–6 cm × 2–3 mm, not constricted between seeds, with thin flat valves that leave a persistent replum behind upon falling, 10–27-seeded. Seeds black, dull, rounded-reniform in outline, 1.7–2 mm, densely echinulate, with small rounded elaiosome. Self-compatible. Fl. Apr–Oct, fr. Jul–Jan.  $2n = 16$ .

Forest margins, shrubs, slopes, limestone scree, roadsides; 1700–3300 m. SW Sichuan (Muli), SE Xizang, C and NW Yunnan [India (Assam)].

**10. *Dactylicapnos leioperma*** Lidén, *Nordic J. Bot.* 25: 35. 2008.

平滑籽紫金龙 ping hua zi zi jin long

Climbers, summer annual. Stem ca. 2 m, branched, thin, narrowly winged-ridged. Leaves slightly reflexed on a zigzag stem; petiole 1–2 cm; leaf blade glaucous abaxially, green adaxially, oblong-ovate in outline, 4–6 cm (tendrils excepted), with 4 or 5 alternate stalked pinnae; rachis terminating in a long thin branched cirrose tendril; primary leaflets twice ternate; ultimate leaflets narrowly ovate, 4–12 × 2–5 mm, base cuneate, margin entire, apex subacute or obtuse. Inflorescence 2–5-flowered; peduncle 2–4 cm; bracts linear-oblongate, 5–8 × 0.5–1 mm, irregularly lacerate. Pedicel 7–12 mm. Sepals ca. 6 × 2 mm, narrower at apex, with long teeth, except in upper 1/3, often arcuately reflexed. Corolla 13–14 × 5–5.5 mm; outer petals distinctly mucronate at apex, with comparatively well-developed basal pouches (sinus at petal insertion ca. 2 mm deep); blade of inner petals ca. 1/3 as long as petal, with dorsal crest prolonged beyond apex proper 1–1.5 mm; nectary rather thick, subsigmoidally curved with pointed tip. Capsule green, oblong, 25–33 × 3–4 mm including short style, not constricted between seeds, 10–12-seeded; replum persistent. Seeds black, shiny, smooth, round in profile, slightly flattened with obtuse back, ca. 2 mm; elaiosome small. Fl. and fr. Aug.

• Forests; ca. 1500 m. W Yunnan (Gaoligong Shan).

**18. CORYDALIS** Candolle in Lamarck & Candolle, *Fl. Franç.*, ed. 3, 4: 637. 1805, nom. cons., not Medikus (1789), nor Ventenat (1803–1804).

紫堇属 zi jin shu

Zhang Mingli (张明理), Su Zhiyun (苏志云 Shu Tsi-yun); Magnus Lidén

*Pistolochia* Bernhardt.

Herbs, annual, biennial, or perennial, soft, juicy, usually glabrous. Leaves usually alternate, pinnately or ternately divided. Inflorescence a simple bracteate raceme (compound with cymose or racemose partial inflorescences in some species of *Corydalis* sect. *Strictae*). Flowers blue, purple, orange, yellow, or white. Sepals petaloid, usually dentate. Corolla zygomorphic; upper petal spurred. Stamens 2 (i.e., filaments of each triplet completely fused); median upper stamen with a nectariferous appendage at base frequently fused to spur for a shorter or longer portion. Stigma variable. Fruit a usually many-seeded capsule with persistent style. Seeds black, with whitish elaiosomes (except in *C.* sect. *Bipapillatae*).

Three subgenera and ca. 465 species: mainly N temperate (but one species in subarctic Russia/North America, one species in the mountains of E Africa, and three species in subtropical Indochina); three subgenera and 357 species (262 endemic, one requiring verification) in China.

- 1a. Fruit inflated, like a balloon; flowers pale blue or white (high alpine, Xinjiang and C and W Xizang) ..... 14. *C.* sect. *Oocapnos* (p. 325)
- 1b. Fruit not inflated like a balloon.
  - 2a. Stems tapering to a leafless underground base; perennials with underground tuber or a fascicle of ± thickened storage roots (see also 277. *C. anthocrene*: stems pale and underground at base, but leafy throughout; storage roots pale and fleshy, but not fasciculate; leaves finely divided, crispate).
  - 3a. Plant with a fleshy underground tuber; fruit dehiscence explosive or not.
    - 4a. Cauline leaves opposite ..... 8. *C.* sect. *Leonticoides* (p. 313)
    - 4b. Cauline leaves alternate.
      - 5a. Stigma transversely oblong; tuber small (pea-sized), rounded or elongated, usually with leaves or leaf scars, tuber without a papery brownish outer skin ..... 7. *C.* sect. *Duplotuber* (p. 312)
      - 5b. Stigma flattened, rounded to squarish to obtriangular in outline; tuber with a brownish skin.
        - 6a. Fruiting pedicels straight and erect; fruit explosively dehiscent; alpine plant ..... 16. *C.* sect. *Dactylotuber* (p. 326)
        - 6b. Fruiting pedicels recurved; fruit not explosive.
          - 7a. Tuber oblong, usually basally branched; plant of alpine scree ..... 9. *C.* sect. *Benecinctae* (p. 313)
          - 7b. Tuber rounded, entire.

- 8a. Plant with a single conspicuous scale leaf at soil surface; non-alpine plant of early spring ..... 10. *C. sect. Corydalis* (p. 314)
- 8b. Plant without a conspicuous scale leaf; alpine plant ..... 79. *C. gyrophylla* (p. 326)
- 3b. Plant with an underground fascicle of  $\pm$  swollen storage roots; fruit explosively dehiscent so that valves become coiled after dehiscence.
- 9a. Cauline leaf simple, linear ..... 31. *C. sect. Trachycarpae* (p. 365)
- 9b. Cauline leaves divided.
- 10a. Fruiting pedicels recurved.
- 11a. Flowers yellow ..... 31. *C. sect. Trachycarpae* (p. 365)
- 11b. Flowers blue or purple.
- 12a. Flowers clear blue with indistinct venation; cauline leaves sessile, palmately divided ..... 32. *C. ser. Appendiculatae* (p. 383)
- 12b. Flowers blue or purple, often with distinct veins; leaves usually pinnately divided, often rather stiff with raised midvein below ..... 31. *C. sect. Trachycarpae* (p. 365)
- 10b. Fruiting pedicels straight with pendent fruit.
- 13a. Cauline leaves twice to 3  $\times$  ternately or pinnately divided.
- 14a. Stems slender, branched, more than 10 cm tall; bulblike apical rhizome bud not prominent ..... 35. *C. ser. Kokiana* (p. 394)
- 14b. Stems less than 10 cm tall, glaucous plant growing in scree; bulblike apical rhizome bud very prominent ..... 36. *C. ser. Clavatae* (p. 395)
- 13b. Cauline leaves less divided, often digitately cut.
- 15a. Dorsal wings of inner petals very pronounced, overtopping apex; spur broad and short; bulblike apical rhizome bud small ..... 33. *C. ser. Curviflorae* (p. 386)
- 15b. Dorsal wings of inner petals low, not overtopping apex; spur variable; bulblike apical rhizome bud often prominent.
- 16a. Plant very dense, fleshy and glaucous, less than 5 cm tall; flowers pale blue with whitish marks ..... 36. *C. ser. Clavatae* (p. 395)
- 16b. Stem slender; flowers clear blue ..... 34. *C. ser. Fusiformes* (p. 390)
- 2b. Lower part of stem leafy or leafless, but not tapering to a thin underground base; annual, biennial, or non-tuberous perennial.
- 17a. Annual or biennial.
- 18a. Flowers pink to purple.
- 19a. Bracts small, entire; fruiting pedicels  $\pm$  arcuate or recurved.
- 20a. Flowers ca. 15 mm; stigma transversely fusiform, each end with a papilla; capsule linear-oblong, not exploding ..... 5. *C. sect. Aulacostigma* (27. *C. edulis*: p. 308)
- 20b. Flowers < 10 mm, stigma flattened with 2–6 apical papillae; capsule obovoid, explosively dehiscent ..... 19. *C. sect. Fumarioides* (p. 336)
- 19b. Bracts divided; fruiting pedicels straight or arcuate to recurved.
- 21a. Capsules pendent from straight erecto-patent pedicels ..... 40. *C. sect. Incisae* (p. 419)
- 21b. Fruiting pedicels arcuate.
- 22a. Spur tapering to tip ..... 29. *C. sect. Asterostigma* (p. 358)
- 22b. Spur cylindrical.
- 23a. Pedicels 10–30 mm ..... 30. *C. sect. Pubicaules* (p. 364)
- 23b. Pedicels 3–10 mm ..... 44. *C. sect. Chinenses* (p. 426)
- 18b. Flowers yellow or white; fruiting pedicels  $\pm$  arcuate or recurved.
- 24a. Fruit obovoid, explosively dehiscent.
- 25a. Inner petals not, or only internally, tipped with blackish purple ..... 19. *C. sect. Fumarioides* (p. 336)
- 25b. Inner petals externally tipped with blackish purple.
- 26a. Upper petal 9–12 mm; stems diffusely branched ..... 22. *C. sect. Himalayanae* (p. 343)
- 26b. Upper petal 14–18 mm; stems and branches suberect ..... 24. *C. sect. Ramososibiricae* (p. 345)
- 24a. Fruit linear to oblong.
- 27a. Bracts large, much divided (Xinjiang) ..... 23. *C. sect. Tetragonia* (132. *C. capnoides*: p. 345)
- 27b. Bracts small, entire.
- 28a. Flowers < 10 mm, fruit narrowly linear ..... 4. *C. sect. Cheilanthisfoliae* (p. 306)
- 28b. Flowers > 11 mm; fruit linear-oblong to fusiform.
- 29a. Fruit explosively dehiscent; stigma flat, longer than broad; spur thin, straight, equaling inner petals ..... 21. *C. sect. Angustiflorae* (125. *C. pseudodrakeana*: p. 343)
- 29b. Fruit not explosive; stigma not flat, 2-armed; spur saccate, shorter than inner petals ..... 6. *C. sect. Sophorocapnos* (p. 308)

- 17b. Perennial.
- 30a. Body of stigma ± terete, often transversely oblong; bracts small, lanceolate, often scarious; flowers usually with short rounded spur; fruit not explosively dehiscent; plant often xerophytic or chasmophytic.
- 31a. Stigma with 6 simple and 2 paired distinct papillae; herb of dry areas with glaucous fragile foliage ..... 2. *C. sect. Strictae* (p. 299)
- 31b. Stigma with much fewer or not distinct papillae.
- 32a. Stigma with 2 large erect papillae on a small body; seeds lacking elaiosome; erect robust herb ..... 1. *C. sect. Bipapillatae* (p. 299)
- 32b. Stigma transversely oblong with indistinct papillae; low-growing chasmophytic herb.
- 33a. Leaves very glaucous, up to twice divided with obtuse leaflets ..... 3. *C. sect. Thalictrifoliae* (p. 303)
- 33b. Leaves finely divided with acute leaflets ..... 4. *C. sect. Cheilanthifoliae* (p. 306)
- 30b. Stigma flattened, often ± squarish in outline; bracts small or large.
- 34a. Fruiting pedicels 3–6 cm.
- 35a. Plants forming loose cushions; outer petals white; apex of inner petals yellow, turning red after fertilization ..... 45. *C. sect. Vermiculares* (357. *C. brevisrostrata*: p. 427)
- 35b. Plants not cushion-forming; flowers blue.
- 36a. Leaves finely divided, crispate ..... 277. *C. anthocrene* (p. 398)
- 36b. Leaves flat with rounded leaflets ..... 15. *C. sect. Rupifragae* (78. *C. rupifraga*: p. 325)
- 34b. Fruiting pedicels shorter.
- 37a. Spur very strongly curved (to a semicircle or more); racemes very compact with numerous flowers; fruiting pedicels erect ..... 42. *C. sect. Hamatae* (p. 424)
- 37b. Spur less curved.
- 38a. Rhizome with thick fleshy scales or bulbous persistent petiolar bases.
- 39a. Flowers yellow.
- 40a. Bracts small, undivided; pedicels < 8 mm, recurved in fruit ..... 18. *C. sect. Davidianae* (p. 330)
- 40b. Bracts divided; pedicels > 8 mm, erect in fruit.
- 41a. Upper petal 19–23 mm (W Yunnan) ..... 176. *C. kiukiangensis* (p. 361)
- 41b. Upper petal 23–33 mm (N Sichuan) ..... 39. *C. sect. Ellipticarpa* (p. 416)
- 39b. Flowers blue, purple, pink, or white.
- 42a. Capsule linear, smoothly continuing pedicel, not explosive ..... 29. *C. sect. Asterostigma* (p. 358)
- 42b. Capsule sharply reflexed from erect pedicel, explosively dehiscent, linear to obovoid.
- 43a. Leaf rosette with several large leaves with swollen petiolar bases to 3 cm forming prominent bulb; spur of upper petal slightly downcurved, tapering to tip; bracts much divided ..... 39. *C. sect. Ellipticarpa* (p. 416)
- 43b. Leaf rosette few leaved, swollen part of petiole base to 1.5 cm.
- 44a. Corolla pink, conspicuously mucronate, spur straight or upcurved, tapering to thin apex; leaves bi- to tripinnate with crenate-dentate leaflets; bracts 2–8 mm ..... 38. *C. sect. Mucronatae* (p. 414)
- 44b. Not as above; bracts usually larger.
- 45a. Stigma at least as broad as long; corolla blue to purple, rarely white ..... 37. *C. sect. Elatae* (p. 398)
- 45b. Stigma much longer than broad; corolla white or pink, often with yellow apex ..... 38. *C. sect. Mucronatae* (p. 414)
- 38b. Rhizome without fleshy scales or bulbous persistent petiolar bases or prominent bulblike terminal buds.
- 46a. Flowers blue or purple.
- 47a. Sepals entire, 4–10 × 3–4 mm, early falling; spur 16–30 mm; inner petals 8–12 mm; rootstock robust, vertical; corolla acute; capsule obovoid, pendent from erect pedicel; cauline leaves with rounded whitish membranous auricles/stipules; robust erect forest floor herb ..... 17. *C. sect. Archaeocapnos* (p. 329)
- 47b. Sepals dentate or much smaller, not early falling; spur comparatively shorter.
- 48a. Fruiting pedicels straight and erect, but sharply curved at tip ..... 26. *C. sect. Latiflorae* (p. 348)
- 48b. Fruiting pedicels straight and erect, or recurved from base or middle.
- 49a. Capsules reflexed from straight erect pedicels.
- 50a. Leaves bi- to tripinnate; low-growing plant in alpine scree; leaf rosette prominent, many leaved, 2-sided ..... 43. *C. sect. Polyphyllae* (p. 426)

- 50b. Leaves biternate; stems slender, usually longer; leaf rosette few leaved, not obviously 2-sided ..... 41. *C. sect. Priapos* (p. 422)
- 49b. Capsules not reflexed from straight erect pedicels.
- 51a. Lower bracts leaflike with long stalk, distant; lower pedicels 15–30 mm; upper leaves with distinct auricles ..... 30. *C. sect. Pubicaules* (p. 364)
- 51b. Lower bracts and pedicels shorter; leaves without auricles.
- 52a. Rhizome 1–2 × ca. 0.5 cm; stems slender; fruit linear ..... 29. *C. sect. Asterostigma* (p. 358)
- 52b. Rhizome larger, cylindrical; stems often robust; fruit oblong.
- 53a. Stem 7–15 cm; fruit explosively dehiscent; raceme capitate ..... 168. *C. milarepa* (p. 357)
- 53b. Stem 15–70 cm; fruit not explosively dehiscent; raceme not capitate.
- 54a. Stigma rounded to squarish with several marginal papillae ..... 13. *C. sect. Flaccidae* (p. 320)
- 54b. Stigma broadly semilunate with 2 flat triangular apical papillae ..... 12. *C. sect. Kingiana* (p. 319)
- 46b. Flowers yellow or cream.
- 55a. Rhizome short with dense cluster of long wiry roots; bracts small, entire; pedicels short, recurved in fruit ..... 18. *C. sect. Davidiana* (p. 330)
- 55b. Rhizome without dense cluster of long wiry roots.
- 56a. Fruiting pedicels straight and erect for most of their length, but hooked at tip; low-growing alpine plants from Xizang and Qinghai.
- 57a. Stigma conspicuously asymmetric with stalked papillae; cushion-forming “tap-rooted” perennials 2–7(–13) cm tall; flowers 8–15 mm, yellow or whitish, but inner petals often yellow at tip ..... 25. *C. sect. Mucroniferae* (p. 346)
- 57b. Stigma symmetric; papillae not clearly stalked; stems and/or flowers often (but not always) larger ..... 26. *C. sect. Latiflorae* (p. 348)
- 56b. Fruiting pedicels straight and erect, or recurved from base or middle.
- 58a. Rhizome inconspicuous, 1–3 cm; stems erect to procumbent, thin, branched.
- 59a. Upper petal 20–30 mm ..... 29. *C. sect. Asterostigma* (p. 358)
- 59b. Upper petal 10–17 mm.
- 60a. Lower bracts much longer than pedicels, 20–30 mm; stigma with basal lobes and basal papillae; fruiting pedicels erect; rhizome apically with a sterile leaf rosette ..... 41. *C. sect. Priapos* (p. 422)
- 60b. Bracts shorter than pedicels, 4–10 mm; stigma lacking basal lobes and basal papillae, apical papillae ± clearly stalked or constricted at base; sterile leaf rosette lacking.
- 61a. Rhizome thin, with or without few fleshy lateral roots; stigma with a pair of geminate lateral papillae; inner petals dark tipped (except in 126. *C. longipes*) ..... 22. *C. sect. Himalayanae* (p. 343)
- 61b. Plant with ± deeply buried cylindrical rootstock; stigma usually lacking geminate papillae; inner petals not dark tipped (except in 122. *C. diffusa* and 124. *C. cavei*) ..... 20. *C. sect. Radicosae* (p. 341)
- 58b. Rhizome/rootstock thick and hollow, or long and cylindrical, 5–20 cm; plant robust, often erect to suberect.
- 62a. Rhizome swollen, irregular, eventually hollow; stems sharply ridged, hollow; raceme capitate; flowers acute, inner petals externally tipped with blackish purple ..... 11. *C. sect. Capnogorium* (61. *C. nobilis*: p. 319)
- 62b. Rhizome cylindrical, solid.
- 63a. Rootstock deeply buried without remnants of previous years growth; stems diffusely branched, thin; stigma lacking basal papillae, apical papillae ± constricted at base ..... 20. *C. sect. Radicosae* (p. 341)
- 63b. Rhizome/rootstock reaching surface, with withered remnants of previous years petiolar bases and stems; stems often robust, erect to suberect; stigma with basal geminate papillae.
- 64a. Fruiting pedicel not rigidly recurved, capsule oblong, not explosively dehiscent ..... 13. *C. sect. Flaccidae* (p. 320)
- 64b. Fruiting pedicel rigidly recurved, capsule usually obovoid, explosively dehiscent.
- 65a. First pair of leaflets of cauline leaves small, stipulelike ..... 28. *C. sect. Geraniifoliae* (169. *C. borii*: p. 358)
- 65b. First pair of leaflets not stipulelike ..... 27. *C. sect. Chrysocapnos* (p. 351)

1. *Corydalis* subg. *Cremnocapnos* (Wendelbo) Fukuhara & Lidén, Pl. Syst. Evol. 206: 419. 1997.

岩生紫堇亚属 yan sheng zi jin ya shu

*Corydalis* sect. *Cremnocapnos* Wendelbo in K. H. Rechinger, Fl. Iran. 110: 10. 1974.

Herbs, perennial (sometimes short-lived), usually with remnants of dry petioles and stems at base. Bracts lanceolate, small, scarios, entire or often dentate. Petals not or only slightly fused to each other at base; spur obtuse, always less than 1/2 as long as corolla, and frequently only 1/5 as long; inner petals with narrow dorsal crest. Capsule not explosively dehiscent; replum frequently persistent on pedicel.

Twenty-seven species: C Asia from Iran eastward to W China; 14 species (eight endemic) in China.

1. *Corydalis* sect. *Bipapillatae* Lidén, Opera Bot. 88: 27. 1986 [*"Bipapillata"*].

裂柱紫堇组 lie zhu zi jin zu

*Corydalis* sect. *Bilobatae* Michajlova.

Herbs, perennial, with stout caudex. Stems thick, hollow, ± branched, leafy. Bracts small, entire or slightly dentate. Flowers with short saccate spur. Stigma with small body, tipped with 2 large forward-projecting papillae. Capsule linear, not explosive. Seeds lacking elaiosome.

Two species: China, Kazakhstan, Kyrgyzstan; two species (one endemic) in China.

Plants of this section are similar to those of *Corydalis* sect. *Strictae* but differ in having leaves thin, leaflets broad with either large dentate or serrate margins, stigma different, and elaiosome lacking.

- 1a. Flowers blood-red, 9–11 mm; leaflets to ca. 10 cm, serrate ..... 1. *C. heracleifolia*  
 1b. Flowers cream, ca. 15 mm; leaflets to ca. 2 cm, with a few coarse teeth ..... 2. *C. semenowii*

1. *Corydalis heracleifolia* C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 11: 315. 1989.

独活叶紫堇 du huo ye zi jin

Herbs, perennial, erect, glaucous, 0.5–1 m tall from a stout caudex. Stems ca. 5 mm in diam., hollow, ridged, branched, leafy. Lower cauline leaves long petiolate, upper ones shortly petiolate to nearly sessile; blade pale abaxially, green adaxially, bi-(tri-)pinnate with 2(or 3) pairs of shortly stalked primary pinnae; ultimate leaflets sessile, ovate, slightly to deeply lobed, with sharply serrate margin; terminal leaflet large, 6–14 cm, deeply 3(–5)-divided with lobes 1.5–4 cm wide; lateral leaflets smaller. Raceme simple, 5–10 cm, 15–25-flowered, dense; bracts lanceolate, small, ca. 6 × 2 mm, margin entire or apex ± lobate. Pedicel 3–5 mm. Flowers blood-red. Sepals narrowly lanceolate, ca. 4 × 1 mm, entire. Outer petals acute-acuminate, without crest; upper petal 9–11 mm including saccate spur ca. 2 mm; nectary ca. 1 mm, apex slightly thickened; lower petal straight, 7–8 mm; inner petals ca. 7 mm, narrowly crested, claw slightly shorter than limb. Capsule linear, 2–4 cm, often somewhat contorted, subtorulose, 10–18-seeded. Seeds ?pitted, caruncle absent. Fl. Jun–Aug, fr. Aug–Sep.

• Valleys, forest understories, roadsides; 2800–3400 m. N Sichuan.

2. *Corydalis semenowii* Regel & Herder, Bull. Soc. Imp. Naturalistes Moscou 37(1): 407. 1864.

中亚紫堇 zhong ya zi jin

Herbs, perennial, erect, glaucous, 30–60 cm tall, with taproot. Stems stout, ridged, hollow, leafy, branched. Lower cauline leaves shortly petiolate, 15–30 × 7–12 cm, upper ones nearly sessile, smaller; petiole with membranous margin; blade pale abaxially, green adaxially, narrowly ovate in outline, thin, bipinnate with 4–8 pairs of shortly stalked pinnae, each with 1–3 pairs of subsessile pinnules; ultimate leaflets broadly ovate to oblong, 1–2.5 cm, irregularly cleft into broad mucronate segments. Raceme cylindric to capitate, 3–7 cm, 20–40-flowered; bracts narrowly ovate to linear, slightly longer than pedicel, entire or with a few long teeth. Pedicel 3–5 mm, at fruiting downcurved. Sepals ovate, 2–3 × ca. 1 mm, margin ± toothed, apex long acuminate. Flowers nutant, pale yellow to nearly white. Outer petals with sharply set off mucro up to 2 mm, without crest, sometimes limb slightly crenate; upper petal ca. 15 mm; spur rounded, 3–4 mm; nectary short, ca. 1 mm; lower petal straight, 12–13 mm; inner petals 10–11 mm, crested, claw slightly shorter than limb, slender. Style long, slender, sharply bent below stigma. Capsule drooping, linear, 1.5–2 cm, slightly contorted, ?5–8-seeded. Seeds rounded, ca. 2 mm, smooth; caruncle absent. Fl. and fr. Jul–Aug.

Margins of *Picea* forests; 1500–3000 m. N Xinjiang (Tian Shan) [Kazakhstan, Kyrgyzstan].

2. *Corydalis* sect. *Strictae* (Fedde) Wendelbo in K. H. Rechinger, Fl. Iran. 110: 8. 1974.

直茎黄堇组 zhi jing huang jin zu

*Corydalis* "Gruppe" *Strictae* Fedde, Repert. Spec. Nov. Regni Veg. 21: 52. 1925; *C.* subsect. *Flabellatae* Fedde ex Michajlova; *C.* sect. *Roborowskia* (Batalin) H. Chuang & Z. Y. Su; *Roborowskia* Batalin.

Herbs, perennial, glaucous, slightly fleshy and often rather stiff and fragile. Stems often several, simple or usually branched, ± leafy, from a thick rootstock with some narrow strands lignified, ending in a thick multi-headed dryish caudex usually with dense dead residual petiolar bases. Leaves 1–3 × pinnately divided. Flowers yellow, usually narrow, with short obtuse spur. Inner petals with inconspicuous dorsal crest. Stigma with a small transversely set ellipsoid body with 6 usually distinct marginal papillae plus 2 pairs of submarginal papillae close to style (10 papillae altogether). Capsule linear to oblong. Seeds in 1 row; elaiosome present, set below a protruding hilum area.

Twenty-five species: a very uniform and easily recognized group, in dry mountains of C Asia from Iran eastward to the Himalayas, W China, and Mongolia; 12 species (seven endemic) in China.

Some of the Pamir border species might occur in China: *Corydalis bucharica* Popov (in Schischkin, Fl. URSS 7: 752. 1937), *C. fimbriifera* Korshinsky (Izv. Imp. Akad. Nauk, ser. 5, 9: 406. 1898), and *C. hindukushensis* Wendelbo & Grey-Wilson (in K. H. Rechinger, Fl. Iran. 110: 9. 1974). They are accounted for in the key.

- 1a. Primary leaflets broadly fan-shaped, apically dentate.
- 2a. Bracts 4–10 mm; sepals long acuminate, 4–8 mm; pedicels 2–8 mm ..... 7. *C. adiantifolia*
- 2b. Bracts 1–3 mm; sepals 2–3 mm; pedicels 2–4 mm ..... 6. *C. flabellata*
- 1b. Primary leaflets not fan-shaped; margin not dentate.
- 3a. Plant 2–10 cm; inflorescence 1–4-flowered; leaves 0.5–4 cm, with 2 or 3 pairs of leaflets; style 8–9 mm ..... 3. *C. mira*
- 3b. Plant more than 10 cm; inflorescence with numerous flowers; leaves longer; style shorter.
- 4a. Limb of outer petals ± expanded, dentate or fimbriate; (inflorescence very dense).
- 5a. Stems 20–60 cm; leaves bipinnate with much cut leaflets; outer petals slightly dilated apically, usually with a short dentate dorsal crest ..... 5. *C. stricta*
- 5b. Stems 15–25 cm; leaves pinnate with broad leaflets; outer petals much dilated apically, crest absent.
- 6a. Limb of outer petals densely long fimbriate; spur ca. 1/2 as long as limb or longer; sepals 6–7 mm, fimbriate-dentate ..... *C. fimbriifera* (see note above)
- 6b. Limb of outer petals slightly dentate; spur ca. 1/3 as long as limb; sepals 2–3 mm, entire ..... 4. *C. kashgarica*
- 4b. Limb of outer petals narrow, entire.
- 7a. Spur of upper petal ca. 1/2 as long as limb [or longer].
- 8a. Sepals 2–3 mm; spur ca. 1/2 as long as limb ..... 12. *C. tianshanica*
- 8b. Sepals 4–6 mm; spur longer ..... *C. bucharica* or *C. hindukushensis* (see note above)
- 7b. Spur of upper petal ca. 1/3 of limb or shorter.
- 9a. Inflorescences branched, with cymose lateral inflorescences.
- 10a. Inflorescences long and narrow, with 2- or 3-flowered lateral cymes only at base; pedicels 4–7 mm; capsules erect ..... 13. *C. laxiflora*
- 10b. Inflorescences broadly pyramidal, with many 3–10-flowered lateral cymes; pedicels 6–13 mm; capsules pendent ..... 14. *C. bibracteolata*
- 9b. Inflorescences simple racemes, sometimes several forming a cluster.
- 11a. Leaves twice or almost 3 × pinnate; ultimate leaf lobes 1–2(–3) mm wide; fruit erect ..... 8. *C. adunca*
- 11b. Leaves once or almost twice pinnate; ultimate leaf lobes 2–6 mm wide; fruit pendent.
- 12a. Leaves with 3 pairs of stalked lateral leaflets; racemes 15–40-flowered; flowers clearly apiculate; stems 35–45 cm ..... 9. *C. longistyla*
- 12b. Leaves with 1 or 2 pairs of subsessile lateral leaflets; racemes ca. 10-flowered; flowers obscurely apiculate; stems 10–30 cm.
- 13a. Plant sparingly branched; racemes few ..... 10. *C. krasnovii*
- 13b. Plant much branched above with clustered racemes ..... 11. *C. pseudomicrophylla*

**3. *Corydalis mira*** (Batalin) C. Y. Wu & H. Chuang in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 415. 1999.

疆堇 jiang jin

*Roborowskia mira* Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 91. 1893; *Corydalis osmastonii* Fedde.

Herbs, perennial, 2–10 cm tall, glaucous, glabrous. Caudex many headed, overlaid by dense remnants of slightly shiny dead petioles and stems. Stem without leaf or with 1 leaf. Basal leaves many, dense; petiole 0.5–3 cm, base long sheathed; blade ovate, 0.5–4 × 0.5–1.5 cm, slightly thick, pinnate; leaflets 2 or 3(or 4?) pairs, narrowly obovate to obovate, 2–7 × 1–4 mm,

entire or deeply 2–4-lobed, apex obtuse. Cauline leaf (if present) like basal leaves. Inflorescence 1–4-flowered; bracts lanceolate, 5–7 mm, entire or with small distant teeth, apex long caudate. Pedicel straight, 1–2 cm. Sepals 5–8 × ca. 1 mm, fimbriate-incised, apex long caudate. Petals yellow; outer petals acuminate, apically diverging, with short dentate crests; upper petal 17–18 mm with broadly saccate spur 3–4 mm; nectary thick, extended through 5/6 of spur; inner petals 10–12 mm, claw shorter than limb. Ovary almost globose, ca. 1 mm; ovules (1 to) several; style 8–9 mm; stigma: see section description. Capsule almost globose, 7–8 mm in diam., with thickish, leathery valves, 1(–11)-seeded. Seeds black, shiny, nearly reniform or spheroid, ca. 2 mm. Fl. and fr. Jun–Aug.



Rock crevices; 2600–3400 m. W Xinjiang [N Kashmir (Baltistan)].

**4. *Corydalis kashgarica*** Ruprecht, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 14(4) [Sert. Tiansch.]: 38. 1869.

喀什黄堇 ka shi huang jin

Herbs, perennial, 10–30 cm tall. Rootstock ca. 10 × 1.5 cm, with 1- to many-headed caudex with dry residues of leaves. Stems 1 to few, leafy and branched. Basal leaves early withering. Cauline leaves 4–10 cm, including petiole 1–6 cm (upper leaves shortly stalked); blade ovate to oblong, 2–4 × 1.5–2 cm, abaxially ± glaucous, simply pinnate; leaflets 3–7, ovate, ca. 1 × 1–1.2 cm, fleshy, deeply 3-divided; segments slightly 2- or 3-divided; ultimate segments rounded-obtuse. Racemes (?branched), many flowered, dense, elongating in fruit; bracts broadly ovate to broadly oblanceolate, 3–5 mm, herbaceous with scarious margin, pointed. Pedicel ca. 5 mm. Sepals ovate, 2–3 × ca. 1 mm, dentate or almost entire. Flowers yellow; upper petal 16–18 mm with narrow spur 4–6 mm, with a rather broad slightly dentate pointed apex; inner petals ca. 12 mm; lower petal with a minute gibbosity at very base and narrow claw gradually widened into a broad acuminate slightly dentate limb. Stigma: see section description. Capsule linear, subtorulose, ca. 16 mm; style ca. 4 mm. Seeds in 1 row, ca. 1.7 mm, smooth, with a short beak from under which caruncle protrudes.

• Stony mountains, desert grasslands, clayey soil near irrigation channels; 1200–1800 m. W Xinjiang.

**5. *Corydalis stricta*** Stephan ex Fischer in Candolle, Syst. Nat. 2: 123. 1821.

直茎黄堇 zhi jing huang jin

*Corydalis astragalina* J. D. Hooker & Thomson; *C. schlagintweitii* Fedde; *C. stricta* subsp. *holosepala* Michajlova; *C. stricta* var. *potaninii* Fedde; *C. stricta* subsp. *spathosepala* Michajlova.

Herbs, perennial, glabrous, glaucous. Caudex thick, dry, with only some central strands lignified, often split up, crowned by dead petioles and stems. Stems erect, glaucous, 20–60 cm, few to several, sulcate, rather thick throughout, stout, fleshy, leafy throughout, simple or sparingly branched. Leaves very glaucous; lower leaves with petiole 5–12 cm, upper ones progressively more shortly stalked to subsessile; blade oblong, bipinnate, with 4–7 pairs of primary pinnae (or fewer in uppermost leaves); leaflets deeply cut into obovate-oblong to oblanceolate acute lobes. Raceme very dense, 20–50-flowered, 3–6 cm in flowering stage, elongating to 5–9 cm in fruit, sometimes with a small branch at base; bracts 5–7(–13) mm, margin scarious, with occasional teeth, apex often long acuminate. Pedicel 4–8(–12) mm, arcuately recurved in fruit. Sepals 3–5 × 1–3 mm, deeply dentate, sometimes long acuminate, or rarely (Nan Shan) entire and to 7 × 4 mm. Corolla yellow, often with a brownish suffusion, 15–18 mm; outer petals slightly dilated toward apex that is sharply pointed and usually ± dentate and with a short dentate crest; spur of upper petal short and rounded; nectary 1/2–2/3 as long as spur. Stigma: see section description. Fruit oblong, 15–20 mm, attenuate into style 4–5 mm, 6–9-seeded. Fl. Jun–Aug, fr. Jul–Sep.

Dry hillsides; (2300–)3000–5400 m. Gansu (Jiuquan, Xiahe), Qinghai, Sichuan (Batang), Xinjiang, Xizang [?Afghanistan, NW India, Kashmir, Mongolia, Nepal, Pakistan, Russia].

Some plants from Gansu and Qinghai have large, entire sepals (*Corydalis stricta* subsp. *holosepala*).

**6. *Corydalis flabellata*** Edgeworth, Trans. Linn. Soc. London 20: 30. 1846.

扇叶黄堇 shan ye huang jin

Herbs, perennial, glabrous, glaucous. Caudex often thick, crowned by fragile remnants of old petioles. Stems erect, glaucous, 20–50 cm, turgid, brittle, leafy, branched, sometimes profusively so, especially above. Lower leaves long stalked (petiole 4–8 cm); blade oblong, 8–18 cm, pinnate with 3–5 pairs of leaflets; leaflets rather distant, subsessile, broadly flabellate, marginally ± dentate or shallowly dissected; lowermost leaflets usually markedly smaller than others. Upper leaves much smaller. Inflorescence branched with spikelike racemes; racemes dense at first, soon elongating, 10–20(–30)-flowered, or lateral racemes fewer flowered; bracts small, membranous, pointed, rarely with a few teeth, not exceeding short pedicels. Pedicel 2–4 mm, ± recurved in fruit. Sepals ovate, 2–3 × 1–1.5 mm, dentate. Corolla yellow, 11–15 mm, narrow; outer petals hardly dilated at apex, shortly mucronate, without or with very narrow and short crest; spur of upper petal 3–3.5 mm; inner petals 9–12 mm. Stigma: see section description. Fruit linear, 12–18 mm, 5–9-seeded; style ca. 4 mm. Seeds in 1 row, shiny, ca. 1.5 mm, with hilum and elaiosome set on a short protruding beak. Fl. and fr. Jun–Aug.

Alpine stony areas; 3000–4500 m. W Xizang (Gar) [N India, NC Nepal, N Pakistan].

**7. *Corydalis adiantifolia*** J. D. Hooker & Thomson, Fl. Ind. 1: 271. 1855.

铁线蕨叶黄堇 tie xian jue ye huang jin

Herbs, perennial, glabrous, glaucous. Caudex often thick, with many heads, crowned by fragile remnants of old petioles. Stems erect, glaucous, 20–60 cm, stiff, branched from base and above. Lower leaves long stalked (petiole 3–8 cm); blade oblong, 4–9 cm, pinnate with 2–4 pairs of leaflets; leaflets shortly stalked or subsessile, broadly flabellate to almost reniform, entire to slightly divided, apex dentate. Uppermost leaves much reduced. Raceme 15–25-flowered (or fewer flowered in lateral racemes), at first dense, becoming lax, especially below; bracts 4–10 mm, apex long acuminate. Pedicel 2–5(–8) mm, not elongating in fruit, downcurved. Flowers yellow, apex pale brown. Sepals lanceolate, 4–8 × 1–1.5 mm, margin dentate, apex long acuminate. Outer petals shortly and abruptly mucronate, sometimes with a short narrow dentate crest; upper petal 16–18 mm; spur 4–5 mm, rounded-obtuse; nectary extended through ca. 2/3 of spur. Stigma: see section description. Capsule oblong, 15–25 × 2–3 mm, including a narrow apical portion grading into style, together 5–8 mm. Fl. and fr. Jul–Aug.

Gravelly areas, desert grasslands; 2300–5000 m. W Xinjiang (Wuqia, Yecheng) [Kashmir, Pakistan].

This species is similar to *Corydalis flabellata* but with much longer and more long-acuminate bracts and sepals (very obvious in bud

stage when the tips of the bracts render the budding racemes a shaggy appearance), longer pedicels, and longer and often more crested flowers.

**8. *Corydalis adunca*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 24: 29. 1878.

灰绿黄堇 hui lü huang jin

*Corydalis adunca* var. *humilis* Maximowicz; *C. adunca* subsp. *microsperma* Lidén & Z. Y. Su; *C. adunca* subsp. *scaphopetalata* (Fedde) C. Y. Wu & Z. Y. Su; *C. albicaulis* Franchet; *C. odontostigma* Fedde; *C. scaphopetalata* Fedde.

Herbs, perennial (though often short-lived and often flowering first year), very glaucous. Caudex not strongly developed; basal leaf residues not prominent. Stems few to several, erect or decumbent, 20–70 cm, leafy, sparingly branched to rather much branched. Petiole of basal leaves 5–10 cm; blade narrowly ovate, 5–10 × 2–3 cm, bipinnate with 4 or 5 pairs of primary leaflets, these with 1 or 2 (or 3) pairs of secondary leaflets; secondary leaflets nearly sessile, deeply 3-divided, sometimes segments slightly 2- or 3-divided; ultimate segments oblong-obovate, 1–2(–3) mm wide, apex rounded to retuse, mucous or very slightly mucronate. Upper leaves smaller. Raceme simple, lax, 8–25-flowered, usually with an axillary raceme from uppermost leaf; bracts 3–5 mm, equaling or usually shorter than pedicels, attenuate into a slender apex. Pedicel 4–6(–10) mm, erect-spreading in fruit. Flowers yellow to orange-yellow, often suffused with brownish red. Sepals ovate, 1.5–4 × 1–2 mm, circumdentate, acute or very shortly acuminate. Outer petals with narrow limb, without crest, apex mucronate; upper petal 12–18 mm; spur 3–5 mm, rounded-obtuse; nectary extended through 1/2 of spur or more; inner petals 9–14 mm; claw equaling limb. Stigma: see section description. Capsule suberect, straight or often curved, linear-oblong, 15–27 mm including style ca. 4 mm. Seeds in 1 row, black, shiny, very faintly reticulate, with elaiosome set below a protruding hilum area. Fl. May–Sep, fr. Jun–Oct.

• Dry mountains, dry river sands, stone crevices, road cuts; 1000–3900 m. Gansu, Nei Mongol, Ningxia, Qinghai, Shaanxi, W Sichuan, Xizang, NW Yunnan.

This is a variable species as to size, habit (erect or ascending), and size of flowers, seeds, and elaiosomes. The variation is partly geographically correlated but not fully understood at present.

**9. *Corydalis longistyla*** Z. Y. Su & Lidén, Novon 17: 479. 2007.

长柱黄堇 chang zhu huang jin

Herbs, perennial, glaucous, glabrous. Stems few from a stout base with remnants of dead leaf bases, erect, 35–45 cm, with 7–10 leaves scattered along whole length of stem; branches mainly from upper leaves. Petiole 1–7 cm; leaf blade ovate in outline, 3–10 × 1.5–4 cm, pinnate to sub-bipinnate with 3 pairs of broadly ovate leaflets, deeply cut into obtuse, sometimes slightly overlapping lobes 2–5 mm wide; petiolules 1–10 mm (uppermost leaves progressively smaller and shortly stalked). Raceme terminal on main stem and branches (occasionally with a lateral raceme), simple, dense, shortly stalked, 15–40-flowered, to 13 cm in fruiting stage; bracts narrowly lan-

ceolate, 2–6 mm. Pedicel 4–9 mm, rather thin. Flowers yellow. Sepals ovate, 2.5–3 × ca. 1.5 mm, shallowly dentate, acute. Upper petal ca. 14 mm, ecristate, apiculate, with very short rounded spur. Stigma: see section description. Capsule (including style) ca. 20 mm, 2–4-seeded, ± constricted between seeds, attenuate apically and terminated by a style ca. 5 mm (seedless narrow apical portion of capsule together with style 7–11 mm). Seeds 1.75–2 mm, strongly keeled, smooth, beaked, with a short elaiosome. Fl. and fr. Jun–Jul.

• 3100–3600 m. NW Sichuan.

**10. *Corydalis krasnovii*** Michajlova, Novosti Sist. Vyssh. Rast. 19: 95. 1982.

南疆黄堇 nan jiang huang jin

Herbs, perennial, glaucous. Caudex dryish, thick, branched, densely set with dry residual petioles and stems. Stems 10–25 cm, sulcate, simple or sparingly branched. Leaves pinnate, with (1 or) 2 pairs of shortly stalked leaflets; leaflets broadly ovate; terminal one ca. 1.6 × 1.2 cm, 3-divided; segments ovate, entire or middle one slightly 2- or 3-divided; lateral leaflets smaller. Raceme simple, 2–4 cm; bracts ovate to lanceolate, 2–3.5 mm, herbaceous, margin narrow and scarious. Pedicel 3–7 mm. Flowers yellow, apex with brown keels. Sepals deltoid, 2–3 mm, finely dentate. Outer petals narrow, without or with very slightly mucronate tips; upper petal 14–16 mm; spur saccate, 3–4 mm; lower petal with degenerated small spur; inner petals 12–13 mm. Capsules oblong-linear, nearly moniliform, 15–20 × ca. 2 mm; style 4–6 mm; capsules in lower part of raceme ± nutant. Seeds nearly orbicular, ca. 1.5 × 1 mm, with small caruncle, tightly adhering to seed, set below a conspicuously protruding hilum.

About 2000 m. W Xinjiang (Kashi) [Kyrgyzstan (Tien Shan)].

**11. *Corydalis pseudomicrophylla*** Z. Y. Su in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 545. 1999.

假小叶黄堇 jia xiao ye huang jin

Herbs, perennial, glaucous. Caudex dryish, thick, much branched, densely set with dry residual petioles and stems. Stems many, 15–30 cm, leafy and branched, especially above. Basal leaves 6–8 cm, long petiolate, simply pinnate or frequently ternate with only 1 pair of lateral leaflets; leaflets thick, often with pale flecks; terminal leaflet large, ca. 1.8 × 1–1.5 cm, petiolulate, base cuneate, apex shallowly 3-fid; segments rounded-obtuse, ± mucronate; lateral leaflets smaller, subsessile, ca. 10 × 7 mm, shallowly 2- or 3-fid. Cauline leaves several, like basal leaves, but smaller. Raceme ca. 10-flowered, dense, several, forming a cluster; bracts ovate to lanceolate, 3–4 × ca. 1 mm, margin scarious, entire, apex shortly acuminate, sometimes lowermost ones herbaceous, lobate. Pedicel ca. 8 mm, at fruiting arcuately decurved. Flowers yellow. Sepals ovate, ca. 3 mm, margin coarsely dentate, apex acuminate. Outer petals navicular, slightly mucronate, without crest; upper petal ca. 14 mm; spur obtuse, 3–4 mm; nectary 1–1.5 mm; lower petal ca. 11 mm, base narrow; inner petals 10–11 mm. Stigma: see section description. Capsule arcuately reflexed, linear, 16–20 mm including style ca. 6 mm. Seeds in 1 row, seeds like in *Corydalis krasnovii*. Fl. and fr. Jun–Jul.

- Stony areas; 2000–2400 m. W Xinjiang (Aksu).

**12. *Corydalis tianshanica*** Lidén, *Nordic J. Bot.* 25: 34. 2008.

天山黄堇 *tian shan huang jin*

Herbs, perennial, at base with pale dry residues of stems and petioles (complete caudex not seen). Stems 11–16 cm (in Jun), sparingly branched, with 2–4 leaves. Lower cauline leaves: petiole 3–6 cm; blade narrowly triangular-ovate in outline, 2.5–5 cm, bipinnate with 2(or 3) pairs of lateral leaflets; leaflets stalked; blade ca. 1 × 1 cm, once to twice ternately divided, with oblong-obovate, obtuse lobes 2–4 × 1–3 mm. Basal leaves and upper cauline leaves smaller, with 1 or 2 pairs of lateral leaflets. Raceme 8–12-flowered, lax; bracts lanceolate, ca. 3 mm, much shorter than 7–12 mm pedicels, apex acuminate. Flowers yellow. Sepals ovate, 2–3 mm, margin finely dentate, apex acute. Outer petals narrow, slightly mucronate, ecristate; upper petal 14–15 mm, with comparatively long, slender spur ca. 6 mm; nectary extended through ca. 3/4 of spur. Stigma: see section description. Fruit and seed unknown. Fl. Jun–Aug.

- Rocky places; ca. 1900 m. Xinjiang.

**13. *Corydalis laxiflora*** Lidén, *Nordic J. Bot.* 25: 34. 2008.

疏花黄堇 *shu hua huang jin*

Herbs, perennial, glaucous, glabrous. Caudex dryish, often with leaf and stem residues. Stems 30–60 cm, leafy and much branched throughout. Petiole of lower cauline leaves 5–8 cm; blade ovate to oblong, 4–8 × 1.5–3 cm, with 2 or 3 pairs of shortly stalked leaflets; leaflets ternate to ternatifid, with segments shallowly to deeply divided into (2 or)3 often slightly overlapping obtuse lobes 2–5 × 2–4 mm. Upper cauline leaves smaller, with 1 or 2 pairs of pinnae. Inflorescences terminal and axillary from upper leaves, very long and lax, 15–30 cm, 20–35-flowered, usually in lowermost part with lateral cymose 2–5-flowered partial inflorescences subtended by small scarious bracts; bracts and bracteoles ovate, 2–4 mm, margin membranous, entire or with a few teeth, apex acute. Stalks of lateral

partial inflorescences 1–3 cm; pedicels 3–6 mm. Flowers yellow. Sepals ovate, 3–4 × 1.5–2 mm, denticulate. Outer petals narrow, without crest, apex clearly mucronate; upper petal ca. 14 mm; spur 4–5 mm, apex saccate; nectary extended through 2/3–3/4 of spur; inner petals ca. 10 mm. Stigma: see section description. Capsule erect, oblong, 17–19 × ca. 2 mm including persistent style 4–5 mm, 5–7-seeded. Fl. Jul, fr. Jul–Sep.

- Rocky places; ca. 1200 m. Xinjiang (E Tian Shan).

**14. *Corydalis bibracteolata*** Z. Y. Su in C. Y. Wu, *Fl. Reipubl. Popularis Sin.* 32: 545. 1999.

梗苞黄堇 *geng bao huang jin*

Herbs, perennial, glaucous, glabrous. Caudex dryish, thick, densely branched, densely set with dry residual petioles and stems. Stems 15–30(–40) cm, sulcate, with 2 or 3 scattered leaves, branched. Basal leaves many; petiole 5–8 cm; blade ovate to oblong, 5–8 cm, once to almost twice pinnate with 3 or 4 pairs of shortly stalked leaflets; leaflets orbicular to oblong, base cuneate, deeply 3-fid to pinnatifid with 2- or 3-lobed secondary leaflets; ultimate lobes broadly ovate. Upper cauline leaves smaller with fewer pinnae. Inflorescences terminal and axillary from upper leaves, compound with numerous lateral long-stalked cymose 3–10-flowered partial inflorescences; bracts and bracteoles ovate, 1.5–3 mm, margin membranous, apex acute. Stalks and internodes of lateral partial inflorescences 1–3 cm; pedicels 6–13 mm, often with 1 or 2 bracteoles, at fruiting often bent. Flowers yellow. Sepals ovate, ca. 4 × 1.5–2 mm, margin denticulate, apex rather long pointed. Outer petals narrow, without crest, clearly mucronate at apex; upper petal 14–15 mm; spur 4–5 mm, apex saccate, slightly bent; nectary extended through 2/3–3/4 of spur; inner petals ca. 12 mm. Stigma: see section description. Capsule reflexed, linear-oblong, 15–20 (including style ca. 5 mm) × ca. 2 mm, subtorulose, 4–8-seeded. Seeds in 1 row. Fl. and fr. Jun–Jul.

- Riverbanks, stony areas; 2600–3000 m. N and W Xinjiang.

Records of *Corydalis paniculigera* Regel & Schmalhausen from W Xinjiang in FRPS (31: 414. 1999) refer to this species.

**2. *Corydalis* subg. *Sophorocapnos*** (Turczaninow) Fukuhara & Lidén, *Pl. Syst. Evol.* 206: 419. 1997.

黄堇亚属 *huang jin ya shu*

*Sophorocapnos* Turczaninow, *Bull. Soc. Imp. Naturalistes Moscou* 21: 570. 1848.

Herbs, taprooted, annual, biennial, or chasmophytic (often short-lived) perennial, without persistent petiolar residues at base. Bracts lanceolate to ovate, small, often scarious, entire or slightly dentate. Petals not or only slightly fused to each other; spur obtuse, always less than 1/2 as long as corolla, and frequently only 1/5 as long; inner petals with rather broad rounded dorsal crests that usually overtop apex. Stigma bifid, with divaricate, ascending or deflexed-geniculate arms, usually with indistinct papillae. Capsules not explosively dehiscent, usually linear; replum sometimes persistent.

Thirty species: C Asia from Iran eastward to W China, from the Himalayas to Japan, one section also in North America; 24 species (15 endemic, one requiring verification) in China.

**3. *Corydalis* sect. *Thalictrifoliae*** (Fedde) Lidén, *Opera Bot.* 88: 28. 1986.

石生黄堇组 *shi sheng huang jin zu*

*Corydalis* “Gruppe” *Thalictrifoliae* Fedde, *Repert. Spec. Nov. Regni Veg.* 20: 359. 1924; *C.* subsect. *Thalictrifoliae* (Fedde) Fedde.

Herbs, perennial, caespitose, with taproot. Stems ± frail and fleshy, densely branched and condensed. Leaf pinnate to bipinnate.

Bracts elliptic or lanceolate to linear, apex acute. Flowers yellow, rarely white or white with purplish tip. Spur short, obtuse; inner petals with dorsal crest overtopping apex. Stigma arms each with 2 papillae.

• Six species: China.

- 1a. Flowers white, sometimes with purplish apex, usually narrowly crested ..... 16. *C. fangshanensis*  
 1b. Flowers yellow, never purple tipped.  
 2a. Plants densely hairy with short vesicular hairs ..... 18. *C. tomentella*  
 2b. Plants glabrous.  
 3a. Leaflets green, discrete, 2–3 cm wide; growth lax; outer petals with high short dorsal crests, not extending to apex ..... 15. *C. saxicola*  
 3b. Leaves very glaucous, more divided with less distinct and much smaller leaflets; growth much condensed; crest of outer petals low or absent.  
 4a. Leaves ovate-lanceolate, with 4–7 pairs of leaflets; pedicels 3–6 mm, not elongating but sharply reflexed in fruit; capsule linear, 25–35 × 1.5–2 mm, quadrangular in cross section; seeds ca. 1 mm; stigma bifid with ascending lobes, each with 2 confluent papillae ..... 17. *C. wilsonii*  
 4b. Leaves broadly ovate, with 2–5 pairs of leaflets; pedicels 6–12 mm in anthesis, often elongating and recurved in fruit; capsule oblong, 10–25 × 3–4 mm; seeds ca. 1.5 mm; stigma with widely divergent lobes, upper inner pair of papillae distinct.  
 5a. Racemes elongate, equaling leaves; stem internodes usually distinct but sometimes short; fruiting pedicels 10–20 mm; capsules 15–20 mm ..... 19. *C. latiloba*  
 5b. Racemes condensed, much shorter than leaves; stem internodes very short; fruiting pedicels 15–30 mm; capsules ca. 6 mm ..... 20. *C. pseudorupestris*

**15. *Corydalis saxicola*** Bunting, *Baileya* 13: 172. 1966.

岩黄连 *yan huang lian*

*Corydalis thalictrifolia* Franchet, *J. Bot. (Morot)* 8: 283. 1894, not W. Jameson ex Regel (1861).

Herbs, perennial, pale green, 30–40 cm tall, with large taproot and 1- to many-headed rootstock. Stems simple or branched. Basal leaves 10–15 cm, long petiolate; blade ca. equal to petiole, broadly ovate, pinnate with usually 2 pairs of stalked leaflets; leaflets orbicular to ovate, 2–4 × 2–3 cm, unequally 2- or 3-divided or margin with broad rounded teeth. Raceme 7–18 cm, many flowered, at first dense, then lax; bracts ovate to lanceolate, entire, lower ca. 15 × 10 mm; upper smaller, attenuate, longer than pedicels. Pedicel 3–5 mm. Flowers yellow to golden yellow. Sepals orbicular, 0.5–2 mm, entire. Outer petals rather broad and acuminate at apex, with a high short crest abruptly terminating ca. 2 mm from apex; upper petal 23–26 mm; spur ca. 7 mm, obtuse; nectary extended through ca. 1/2 of spur; lower petal straight, 18–22 mm; inner petals 14–18 mm, with rounded dorsal crest extending shortly beyond apex. Stigma arms forward-arcuate, each with 2 indistinct papillae at apex. Capsule reflexed, linear, ca. 25 × 1.5 mm. Seeds in 1 row. Fl. and fr. May–Jul.

• Rock crevices; 600–1400(–3900?) m. Chongqing (Chengkou), Guangxi (Debao, Fengshan, Jingxi), Guizhou (Dushan, Weng'an, Zunyi), Hubei (Yichang), Shaanxi (Mianxian), Sichuan, SE Yunnan (Xichou), Zhejiang (Ningbo).

Habitually, *Corydalis saxicola* differs from the other species in this section in its more upright and more lax growth and its larger, less divided, less glaucous leaves with broad leaflets.

This species is an important herb in traditional Chinese medicine.

**16. *Corydalis fangshanensis*** W. T. Wang ex S. Y. He, *Fl. Beijing*, ed. 2, 1: 670. 1984.

房山紫堇 *fang shan zi jin*

Herbs, glaucous, 15–30 cm tall, with taproot. Stems much branched with condensed lower internodes, with most leaves crowded at base, or with 1 or 2 leaves higher up. Petiole ca. as long as blade; blade ovate-lanceolate, bipinnate; primary pinnae 4 or 5(–7) pairs, petiolulate; ultimate pinnae obovate, 15–20 × 13–20 mm, base cuneate, deeply 3-divided; segments usually slightly 2- or 3-divided. Raceme stalked, sometimes with a basal branch, 7–15(–20)-flowered, 5–10 cm; bracts lanceolate, ca. equal to pedicels. Pedicel 4–5 mm. Flowers white, apex of flower either purplish or white with greenish keels. Sepals orbicular, ca. 2 mm in diam., finely dentate. Outer petals with broad reflexed margins at apex, obtuse to acute, very narrowly crested; upper petal 19–21 mm, spur saccate, ca. 6 mm; nectary extended through ca. 1/2 of spur; inner petals 13–14 mm, with broad crest clearly overtopping apex; claw shorter than limb. Stigma with widely divergent arms. Capsule drooping, linear, 2–3 cm. Seeds in 1 row, reniform, ca. 1.5 mm; caruncle tightly adhering. Fl. and fr. Apr–Jun.

• Rocky slopes; 500–1600 m. Hebei, Henan (Huixian, Linxian, Xiuwu), Shanxi (Jincheng, Licheng, Taihang Shan).

Young plants have comparatively broader and considerably less divided leaves.

**17. *Corydalis wilsonii*** N. E. Brown, *Gard. Chron.*, ser. 3, 34: 123. 1903 [*“wilsoni”*].

川鄂黄堇 *chuan e huang jin*

Herbs, perennial, clustered, very glaucous, 15–30 cm tall, with taproot, much branched with condensed internodes. Leaves gray-glaucous, 7–13 cm (rarely to 20 cm); petiole shorter than to equaling limb; blade bipinnate, ovate-lanceolate; primary pinnae 4–7 pairs, shortly petiolulate to subsessile, each with 1 or 2 pairs of sessile slightly divided pinnules; ultimate lobes broadly ovate. Raceme shortly stalked, densely 10–23-flowered, elongating in fruit; bracts lanceolate, pointed, with scarious margin, ca. equal to pedicels. Pedicel 3–6 mm. Flowers

golden yellow, keel of outer petals greenish at apex. Sepals early withering, ovate to lanceolate, 3–6 mm, entire to slightly dentate. Outer petals gradually narrowed toward pointed apex that is usually strongly curved outward, without or rarely with a low crest; upper petal 20–22 mm; spur obtuse, ca. 6 mm; nectary ca. 1/2 as long as spur; lower petal 15–16 mm; inner petals 14–15 mm, crest extended beyond apex, claw shorter than limb. Stigma bifid, lobes erect-spreading, each with 2 indistinctly set off papillae. Capsule strongly reflexed, linear, ± arcuate, squarish in cross section, 25–35 × 1.5–2 mm. Seeds in 1 row, shiny, ca. 1 mm, smooth, with broad elaiosome. Fl. and fr. Apr–Sep.

- Rock crevices; ca. 3000 m. W Hubei (Fangxian, Yichang).

**18. *Corydalis tomentella*** Franchet, J. Bot. (Morot) 8: 292. 1894.

毛黄堇 *mao huang jin*

*Corydalis tomentosa* N. E. Brown.

Herbs, perennial, clustered, glaucous, 15–25 cm tall, shortly white tomentose throughout (except flowers), much branched with condensed internodes. Stems, bracts, sepals, and keels of outer petals often with a reddish brown tint. Petiole shorter than to almost equaling blade; blade lanceolate, bipinnate; primary pinnae 5 or 6 pairs, distant, petiolulate; secondary pinnules almost sessile, ovate to almost orbicular; terminal one larger, ca. 1 × 1.2 cm, deeply 3-divided; lateral ones 5–6 × ca. 5 mm, entire to bifid to trifid; ultimate lobes obovate. Raceme 10–35-flowered, at first very dense, soon becoming rather lax; bracts lanceolate, 6–9 mm, pointed. Pedicel 5–10 mm. Flowers yellow to golden yellow. Sepals ovate, ca. 2 mm, entire to shallowly dentate. Outer petals retuse to acute at apex, without or with low crest; upper petal 16–18 mm; spur obtuse, 5–6 mm; nectary extended through ca. 1/2 of spur; lower petal 13–15 mm; inner petals 11–13 mm; claw shorter than limb. Capsule linear, 3–4 cm, hairy. Seeds black, shiny, smooth. Fl. and fr. in early summer.

- Rock crevices; 700–1000 m. Chongqing, W Hubei (Badong, Fangxian), S Shaanxi (Zhenping), E and S Sichuan.

This species is similar to *Corydalis wilsonii* but differs in having hairy leaves with obovate, less crowded lobes and longer, narrower, and more many-flowered racemes of smaller flowers.

**19. *Corydalis latiloba*** (Franchet) Handel-Mazzetti, Symb. Sin. 7: 342. 1931.

宽裂黄堇 *kuan lie huang jin*

Herbs, perennial, glaucous, clustered, 10–30 cm tall, with bulky taproot and many-headed rootstock. Basal leaves ca. equal to stems, sometimes longer or shorter than stems, long petiolate; blade glaucous, oblong-ovate, bipinnate; primary pinnae 3–5 pairs, petiolulate; secondary pinnules 1 or 2 pairs, lateral ones nearly opposite, all broadly ovate, 1–1.5 × 1–2 cm, deeply 3-divided. Raceme 5–10 cm, at first dense, then lax; bracts narrowly ovate, 3–5 mm, apex acuminate. Pedicels more than 2 × as long as bracts. Flowers yellow. Sepals ovate, ca. 2 mm, finely dentate. Outer petals without crest; upper petal ca. 1.5 cm; spur slightly downcurved, ca. 1/4 as long as petal,

obtuse; nectary extended through ca. 1/2 of spur; inner petals retuse at apex, crest broad and extended beyond apex, claw ca. equal to petal lobe; stigma horizontal with 2 arms, each apex with 2 indistinct papillae. Capsule inclined-extended or arcuately decurved, oblong, 1.5–2 cm × 3–4 mm, both ends attenuate. Seeds ca. 1.5 mm in diam., with thin concave dots; caruncle obvious, orbicular, large. Fl. May–Jul, fr. Jun–Aug.

- Rock crevices; 1300–3200 m. SW Sichuan, E Xizang, Yunnan.

This is a very variable and possibly heterogeneous taxon, here divided into three subspecific taxa.

- 1a. Stems leafy and branched above, with prominent internodes ..... 19c. var. *wumungensis*
- 1b. Stems simple or few branched; internodes condensed.
  - 2a. Leaves not or only slightly overtopping flowers ..... 19a. var. *latiloba*
  - 2b. Leaves much overtopping flowers ..... 19b. var. *tibetica*

**19a. *Corydalis latiloba* var. *latiloba***

宽裂黄堇(原变种) *kuan lie huang jin* (*yuan bian zhong*)

*Corydalis albicaulis* Franchet var. *latiloba* Franchet, Pl. Delavay. 51. 1889.

Stems simple or few branched; internodes condensed. Leaves not or only slightly overtopping flowers.

- Rock crevices; 1300–2400 m. SW Sichuan, W Yunnan.

**19b. *Corydalis latiloba* var. *tibetica*** Z. Y. Su & Lidén, Acta Bot. Yunnan. 19: 234. 1997.

西藏宽裂黄堇 *xi zang kuan lie huang jin*

Stems simple or few branched; internodes condensed. Leaves much overtopping flowers.

- Rock crevices; ca. 3200 m. E Xizang (Jomda).

**19c. *Corydalis latiloba* var. *wumungensis*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 19: 234. 1997.

乌蒙宽裂黄堇 *wu meng kuan lie huang jin*

Stems leafy and branched above, with prominent internodes. Raceme lax, few flowered. Outer petals crested; spur short but wide; nectary slender.

- Rock crevices; 1600–2500 m. C Yunnan (Dongchuan, Luquan, Nanhua).

**20. *Corydalis pseudorupestris*** Lidén & Z. Y. Su, Acta Bot. Yunnan. 19: 234. 1997.

短葶黄堇 *duan ting huang jin*

Herbs, clustered, ca. 9 cm tall, with taproot. Stems scape-shaped, very short, ca. 2.5 cm, without leaves. Basal leaves ca. 9 cm, long petiolate, bipinnate; primary pinnae ca. 6, petiolulate; secondary pinnules ca. 3, sessile, obovate, ca. 9 × 6 mm, deeply 3-divided; segments oblong-lanceolate, 4–5 mm. Raceme densely 5- or 6-flowered; bracts lanceolate, 5–6 mm. Pedicel ca. 5 mm, at fruiting elongated to 15–30 mm. Flowers

almost erect, yellow. Sepals ovate, ca. 2 mm. Outer petals broad and flat, acuminate, without crest; upper petal ca. 1.2 cm; spur short, ca. 1/4 as long as petal, rounded-obtuse; lower petal ca. 8 mm, base narrow; inner petals crested, thickened and extended

beyond apex. Capsule oval, ca. 6 × 4 mm; style ca. 6 mm. Fl. May–Jul, fr. Jun–Aug.

- Rock crevices, stony areas; 2800–3000 m. SW Sichuan (Muli).

**4. *Corydalis* sect. *Cheilanthifoliae*** Lidén, Opera Bot. 88: 28. 1986.

小花黄堇组 xiao hua huang jin zu

*Corydalis* subsect. *Cheilanthifoliae* (Lidén) C. Y. Wu & Z. Y. Su; *C.* “Gruppe” *Racemosae* Fedde; *C.* sect. *Racemosae* (Fedde) Z. Y. Su; *C.* subsect. *Racemosae* (Fedde) Fedde.

Herbs, annual, biennial, or perennial, glabrous. Stems erect or diffuse, ± leafy and branched, rarely scapose. Leaves bipinnate. Bracts small, entire. Flowers in elongated racemes, yellow to pale, usually with short obtuse spur. Stigma 2-armed, arms deflexed-geniculate. Capsule oblong to narrowly linear; elaiosome not membranous and easily detached from seed.

Six species: Bhutan, China, India (Sikkim), Japan; six species (four endemic) in China.

- 1a. Subscapose with (apparently) leafless flowering stems, shorter than to ca. as long as basal leaves; (short-lived) perennial.
- 2a. Herbs glaucous; primary pinnae ovate, in 5 or 6 pairs; ultimate lobes obtuse; spur usually almost as long as limb of upper petal ..... 22. *C. moupinensis*
- 2b. Herbs green; primary pinnae 6–12 pairs, narrowly lanceolate; ultimate lobes pointed; spur usually distinctly shorter than limb ..... 21. *C. cheilanthifolia*
- 1b. Plants with leafy flowering stems longer than basal leaves; annual or biennial.
- 3a. Fruit contorted; seeds ovoid.
- 4a. Seeds pitted, ca. 1 mm; inner petals dark tipped; raceme 20–40(–70)-flowered; biennial (rarely perennial? or annual), with firm, erect, conspicuously winged stem ..... 23. *C. ophiocarpa*
- 4b. Seeds finely reticulate, to 1.3 mm; inner petals pale; raceme fewer flowered; ?annual, rather slender and diffuse ..... 24. *C. campulicarpa*
- 3b. Fruit straight; seeds rounded in profile; annual, with slender, diffusely branched stems.
- 5a. Outer petals broadly crested; seeds pitted ..... 25. *C. giraldii*
- 5b. Outer petals narrowly crested; seeds tuberculate ..... 26. *C. racemosa*

**21. *Corydalis cheilanthifolia*** Hemsley, J. Linn. Soc., Bot. 29: 302. 1892.

地柏枝 di bai zhi

*Corydalis daucifolia* H. Léveillé & Vaniot.

Herb, perennial (though often short-lived), taprooted, subscapose, 10–30(–40) cm, glabrous, bronze-tinted in spring, becoming green, eventually with a silvery tinge. Leaves crowded at base in a dense broad rosette, very fernlike (like *Cheilanthus*), 10–25 × 3–6 cm; petiole 4–9 cm; blade lanceolate, (sub-)bipinnate; primary leaflets 6–12 pairs, sessile to subsessile, narrowly oblong-lanceolate; secondary leaflets sessile, broadly to narrowly ovate, lower ones 3–5-lobed, upper ones entire, segments pointed. Raceme dense at first, elongating, 10–20(–32)-flowered, shortly stalked, 10–25 cm, sometimes with a basal branch; bracts narrowly lanceolate, equal to or slightly longer than pedicels. Pedicel 2–5 mm. Flowers pale to bright yellow, sometimes with a slight brownish tint toward keel of outer petals, sometimes small, narrow, cleistogamous and without spur. Sepals ovate to lanceolate, 3–4 mm, dentate. Outer petals acute to acuminate, without crest; upper petal 12–17 mm, rather strongly upcurved; spur ascending, 2–6 mm, obtuse; nectary extended through over 1/2 of spur; inner petals 10–13 mm, narrowly crested; claw shorter than limb. Stigma bifid, lobes rather broad and flat, reflexed-geniculate, each with 2 apical papillae and a pair of geminate basal submarginal papillae. Capsule straight or slightly arcuate, linear. Seeds in 1 row, rounded

in profile, slightly flattened, subobtusely keeled, faintly colliculate, ca. 1.3 mm, with conspicuous clavate elaiosome. Fl. May–Jun, fr. May–Jul.

• Shaded slopes, stone crevices; 800–1700 m. Chongqing, Gansu (Wenxian), C Guizhou (Anshun, Guiyang, Xingren), W Hubei, E Sichuan, E Yunnan.

**22. *Corydalis moupinensis*** Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 198. 1885.

尿罐草 niao guan cao

Herbs, perennial, (sub-)scapose, glaucous, with taproot, sometimes with persistent withered leaf residues. Leaves all crowded at base, 10–25 cm; petiole 5–10 cm; blade lanceolate, 10–15 cm, bipinnate; primary pinnae ca. 5 pairs, petiolulate, lower ones with 2 pairs of pinnules; ultimate leaflets subsessile, ovate to obovate, 5–10 × 3–5 mm (to 15 × 12 mm in shade-grown plants), shallowly 3-lobed with rounded, sometimes obscurely mucronate, segments. Flowering stems several, leafless except at very base, 10–20 cm (to 30 cm in shade-grown plants). Raceme rather lax, 7–23-flowered, usually longer than peduncle; bracts lanceolate, 3–5 mm, apex acuminate. Pedicel 5–6 mm, at fruiting to 1 cm. Flowers yellow, 16–21 mm. Sepals ovate, 1–2 mm, margin shallowly dentate, apex mucronate. Outer petals mucronate, without crest; spur ascending-curved, 6–8 mm, obtuse; nectary extended through 2/3–3/4 of spur; inner petals 10–13 mm, with low crest, not or only slightly overtopping apex, claw equaling limb. Stigma bifid, lobes

rather broad and flat, reflexed-geniculate, each with 2 apical papillae and a pair of geminate lateral submarginal papillae. Capsule suberect, linear, 3–4 cm. Seeds in 1 row, slightly keeled.

• Mixed forests, stone crevices; 1000–2500 m. W Sichuan (Baoping, Tianquan, Yuexi), NW Yunnan (Weixi).

**23. *Corydalis ophiocarpa*** J. D. Hooker & Thomson, Fl. Ind. 1: 259. 1855.

蛇果黄堇 she guo huang jin

*Corydalis japonica* Makino; *C. makinoana* Matsumura, nom. illeg. superfl.; *C. streptocarpa* Maximowicz.

Herbs, biennial (rarely annual), taprooted, glaucous. Stems few to several, ± erect, 40–100 cm, sometimes very thick, especially at base, conspicuously winged-ridged, leafy, branched. Basal leaves many, 10–50 cm; petiole ca. equal to blade, winged, especially broadly so toward base; blade oblong, bipinnate; primary pinnae 4–6 pairs, petiolulate; secondary pinnules 2 (or 3) pairs, sessile, obovate to oblong, entire to 3–5-lobed; segments 3–10 × 1–5 mm, apex obtuse to rarely acute. Lower cauline leaves like basal leaves, upper ones smaller and much more shortly stalked. Racemes spikelike, long, 10–30 cm, 20–40(–70)-flowered (or fewer flowered in lateral racemes), with short peduncle; bracts linear-lanceolate, 2–5 mm. Pedicel 5–7 mm. Flowers pale yellow to whitish, usually dark tipped, 11–12 mm. Sepals ca. 1 × 1 mm, rarely to 3 mm, margin finely dentate, apex acute. Outer petals obtuse; spur ± ascending, broadly saccate, ca. 3 mm; nectary extended through ca. 1/2 of spur; inner petals 8–10 mm, tipped with dark purple, with crest clearly extending beyond apex, claw shorter than limb. Stigma bifid, lobes narrow, reflexed-geniculate with 2 papillae flanking apical division, one papilla terminating each lobe, and each lobe usually with a pair of submarginal geminate lateral papillae. Capsule reflexed, linear, strongly contorted, 20–30 × ca. 1.5 mm. Seeds in 1 row, black, shiny, ovoid, ca. 1 mm, pitted, keeled, with extended narrow straight caruncle. Fl. and fr. May–Aug.

River valleys, forest margins, woods, meadows; (200–)1100–2700(–4000) m. Anhui, Gansu, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangxi, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Taiwan, Xizang, Yunnan [Bhutan, India (Sikkim), Japan].

**24. *Corydalis campulicarpa*** Hayata, Icon. Pl. Formosan. 3: 15. 1913.

弯果黄堇 wan guo huang jin

Like *Corydalis ophiocarpa*, but a less robust possibly annual plant with lower and more diffuse habit, often wholly white flowers, slightly broader capsules and larger seeds to 1.3 mm with surface not pitted, but faintly reticulate. More research is needed to determine its status in relation to *C. ophiocarpa*.

• Taiwan.

The plant treated as *Corydalis ophiocarpa* by Liu and Yang (in Fl. Taiwan, ed. 2, 2: 728, pl. 342, photo 320. 1996) is *C. campulicarpa*.

**25. *Corydalis giraldii*** Fedde, Repert. Spec. Nov. Regni Veg. 20: 50. 1924.

小花宽瓣黄堇 xiao hua kuan ban huang jin

Herbs, annual, glaucous, (10–)20–50 cm tall, with taproot. Stems leafy, branched, rather weak and diffuse. Leaves long stalked; petiole 7–10 cm; blade pale glaucous abaxially, green adaxially, bipinnate, narrowly ovate in outline, 6–16 × 3–7 cm; pinnae (2 or) 3 or 4 pairs, petiolules 5–15 mm, pinnules 1 or 2 pairs per pinna, ovate, 7–15 × 6–12 mm, base cuneate, margin irregularly rounded incised-dentate. Upper leaves sometimes almost simply pinnate with larger pinnae. Racemes terminal, and sometimes axillary from upper leaves, 10–27-flowered, 5–10 cm in flower, elongating to 10–22 cm in fruit; bracts narrowly lanceolate, 2–3 mm, apex mucronate. Pedicel 2–3 mm, at fruiting recurved. Flowers pale yellow. Sepals early falling, subcordate, ca. 1 mm. Outer petals with rounded-obtuse to almost retuse apex, shortly mucronate; at least upper petal usually with a short, broad, entire dorsal crest; upper petal 9–10 mm; spur 2.5–3 mm, rounded-obtuse; nectary extended through ca. 1/2 of spur; inner petals 7–8 mm; dorsal crest rounded, extending beyond apex; claw equaling limb. Stigma bifid with deflexed-geniculate lobes, with 4 papillae. Capsules pendent, linear, straight to usually slightly arcuate, 20–34 × ca. 1.5 mm. Seeds black, shiny, ca. 1 mm, rounded, keeled, with concentrically arranged small linear pits. Fl. May–Aug, fr. Jun–Sep.

• Stony riversides, shaded valleys; 600–2000 m. Gansu (Pingliang, Tianshui), Hebei, Henan (Lingbao, Lushi), Shaanxi, Shandong (Feixian, Laoshan, Tai'an), Shanxi (Yicheng, Yuanqu), Sichuan (Maoshan).

**26. *Corydalis racemosa*** (Thunberg) Persoon, Syn. Pl. 2: 270. 1806.

小花黄堇 xiao hua huang jin

*Fumaria racemosa* Thunberg, Nova Acta Acad. Sci. Imp. Petrop. Hist. Acad. 12: 103. 1801; *Corydalis edulis* Maximowicz var. *cicutariifolia* Fedde; *C. fumaria* H. Léveillé & Vaniot; *C. handel-mazzettii* Fedde.

Herbs, summer annual, 20–50 cm tall, with thin taproot. Stems ridged, leafy, much branched, weak, diffuse. Basal leaves long petiolate, often early withering. Cauline leaves petiolate; blade gray abaxially, green adaxially, deltoid, bipinnate with 3 or 4 pairs of distant shortly stalked pinnae; secondary pinnules 1 or 2 pairs, ovate to broadly ovate, ternately divided; ultimate segments rounded-obtuse, slightly mucronate. Raceme 3–10(–15)-flowered, dense at first, elongating in fruit; bracts lanceolate to subulate, 3–5 mm, margin scarios, apex acuminate to mucronate. Pedicel 3–5 mm. Flowers yellow to pale yellow. Sepals caducous, ovate, small. Outer petals obtuse or acute, without or with very narrow slightly dentate crest; spur broadly saccate, ca. 2 mm; nectary extended through ca. 1/2 of spur; inner petals 6–7 mm, with dorsal crest shortly overtopping apex. Stigma bifid, lobes narrow, reflexed-geniculate with 2 papillae flanking apical division, one terminating each lobe, and each lobe usually with a pair of submarginal geminate lateral papillae. Capsule straight, linear, 20–30 × ca. 1.5 mm. Seeds black, rounded in profile, with concentrically arranged small tubercles. Fl. and fr. Feb–Sep.

Shaded forest margins, stony brook sides, thickets, also as a weed in wastelands, even along roadsides in cities; 400–2000 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan,

Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Japan].

This species is similar to *Corydalis giraldii* but is a usually weaker plant with smaller, narrower flowers in less floriferous racemes.

**5. *Corydalis* sect. *Aulacostigma* Lidén, Opera Bot. 88: 28. 1986.**

紫堇组 *zi jin zu*

Herbs, annual, taprooted, with branched leafy stems. Bracts small. Flowers pink to amaranth. Stigma transverse, fusiform, each end with 1 erect papilla, above grooved. Capsule linear. Seeds lenticular, with 2 whitish dots flanking hilum area; elaiosome large, membranous, easily detached.

- One species: China, possibly also in Japan but confirmation needed.

**27. *Corydalis edulis* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 24: 30. 1878.**

紫堇 *zi jin*

*Corydalis chinensis* Franchet; *C. micropoda* Franchet.

Herbs, annual, glaucous, 20–50 cm tall, with thin taproot. Stems leafy, branched. Basal leaves long petiolate; blade pale abaxially, green adaxially, nearly deltoid, 5–9 cm, pinnate to bipinnate; once lobed blades 2 or 3 pairs, shortly petiolulate; twice lobed blade nearly sessile, obovate, pinnately lobate; segments narrowly ovate, apex obtuse, nearly mucronate. Cauline leaves like basal leaves. Raceme distantly 3–10-flowered; bracts narrowly ovate to lanceolate, apex acuminate, margin entire, sometimes upper bracts distant with teeth, ca. equal to pedicels or slightly longer. Pedicel ca. 5 mm. Sepals nearly orbic-

ular, small, ca. 1.5 mm, dentate. Flowers pink to amaranth, flat. Outer petals broad and flat, apex retuse, without crest; upper petal 1.5–2 cm; spur cylindrical, base slightly downcurved, ca. 1/3 as long as petal; nectary long, ultimately nearly extended to spur, most adhering on spur, nectary end not narrow; lower petal near base attenuate; inner petals crested; claw slender, slightly longer than petal lobes. Stigma horizontal, fusiform, each end with a papilla, apex grooved, groove with very small papilla. Capsule drooping, linear, 3–3.5 cm, with seeds in 1 row. Seeds lenticular, pitted, with whitish dots flanking hilum area, ca. 1.5 mm. Fl. and fr. Apr–Jul.

- Channel sides, stony places, roadsides; 400–1200 m. Anhui, Fujian, Gansu, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning (Qianshan), Shaanxi, Shanxi, Sichuan, Yunnan, Zhejiang [?Japan].

**6. *Corydalis* sect. *Sophorocapnos* (Turczaninow) Popov in Schischkin, Fl. URSS 7: 700. 1937.**

黄堇组 *huang jin zu*

*Sophorocapnos* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 21: 570. 1848.

Herbs annual or biennial, with taproot. Stems hollow, ridged, branched, leafy. Leaves 2–4 × pinnate. Bracts small, acuminate with scarious margin, entire or slightly dentate. Pedicel short. Flowers yellow, rarely white. Spur saccate, shorter than remainder of corolla. Stigma with 2 arms, each with (2 or)3 or 4 papillae; geminate papillae lacking. Fruit linear, oblong, or narrowly elliptic. Seeds pitted or spinulose, with large membranous easily detached elaiosome ± folded back over seed.

Eighteen species: disjunct between E Asia and North America; 11 species (four endemic, one requiring verification) in China.

Some species of this section (*Corydalis balansae*, *C. cryptogama*, *C. foetida*, and *C. parviflora*) may produce cleistogamous flowers, which are not accounted for in the key.

- 1a. Capsule moniliform, constricted between seeds; flowers usually rather broad at apex.
  - 2a. Seeds ovoid/pear-shaped, surface low-colliculate or with linear pits; stigma transverse with 8 indistinct papillae; leaf blade longer than broad.
    - 3a. Flowers whitish with yellow tip; upper petal 16–17 mm ..... 33. *C. changbaishanensis*
    - 3b. Flowers yellow; upper petal 17–22 mm ..... 32. *C. speciosa*
  - 2b. Seeds rounded in outline, spinulose or rarely almost smooth; stigma more crescent-shaped with (4 or)6 indistinct papillae; leaves variable.
    - 4a. Leaf blade triangular, ca. as broad as long; lowermost pair of primary pinnae larger than second pair ..... 34. *C. wilfordii*
    - 4b. Leaf blade longer than broad; lowermost pair of primary pinnae as large as second pair ..... 35. *C. pallida*
- 1b. Capsule not constricted between seeds; flowers often narrow at apex.
  - 5a. Capsule oblong, 3–4 mm wide, seeds ± in 2 rows.
    - 6a. Seeds without spines; flowers less than 10 mm; apex of outer petals with a narrow crest, not acute; capsule fusiform ..... 29. *C. cryptogama*
    - 6b. Seeds usually ± spinulose, at least toward margin; flowers 17–20 mm; outer petals acute, with purplish brown keel and very narrow margins, dorsal crests lacking; capsule oblong, ± flattened, slightly contorted.
      - 7a. Lowermost leaflets almost as large as rest of leaf; seeds ± sharply colliculate, shortly spinulose toward margin; stigma transverse, with 2 small forward-projecting papillae and broad diffuse lateral papillae ..... 30. *C. orthopoda*



- 7b. Lowermost leaflets considerably smaller than remainder of leaf; seeds ± spinulose all over; stigma with ascending branches tipped with diffusely set off papillae ..... 31. *C. heterocarpa*
- 5b. Capsule linear, 2–2.5 mm wide, with 1 row of seeds; apex of outer petals obtuse with ± spreading-reflexed margins, usually with a short dorsal crest.
- 8a. Leaves biternate with broad, serrate, distant leaflets; seeds with rounded back with rows of small tubercles toward keel ..... 28. *C. parviflora*
- 8b. Leaves bipinnate with entire leaf lobes; seeds lenticular, keeled, with linear impressions in concentric rows.
- 9a. Leaf ultimate lobes ovate, obtuse; fruit straight, 3–4.4 cm ..... 36. *C. balansae*
- 9b. Leaf ultimate lobes lanceolate, acute; fruit shorter and often ± arcuate.
- 10a. Inflorescence 5–10 cm ..... 37. *C. foetida*
- 10b. Inflorescence very short, ca. 1 cm ..... 38. *C. brevipedunculata*

**28. *Corydalis parviflora*** Z. Y. Su & Lidén, *Edinburgh J. Bot.* 54: 55. 1997.

贵州黄堇 *gui zhou huang jin*

Herbs, annual (sometimes ?perennial), 25–35 cm, glabrous, with taproot. Stems angular, branched above, leafy. Basal leaves with long petiole to 20 cm; blade deltoid, 7–10 × 10–15 cm, biternate; ultimate leaflets well spaced, petiolulate, ovate, 3–10 × 1.5–2 cm, entire to slightly lobate, sparingly large dentate. Cauline leaves like basal leaves, but smaller. Racemes 5–10-flowered, dense in flower, slightly elongating in fruit; peduncle to 5 cm; bracts lanceolate, 2–5 mm. Pedicel 2–5 mm, not elongating in fruit. Flowers yellow, 10–14 mm, or sometimes only 7 mm in cleistogamous flowers. Sepals minute. Outer petals shortly crested; spur of upper petal absent to 4 mm, with small or obsolete nectary; inner petals 6–10 mm. Stigma horizontal, oblong, small, apex of each arm with 1 large papilla, lower part with 1 pair of small papillae. Capsule linear, ca. 2.5 cm × 2 mm. Seeds in 1 row, ca. 1.2 mm, slightly flattened, not keeled, smooth on sides, but with several concentric rows of small tubercles on rounded-obtuse back; elaiosome thin and broad, folded over seed. Fl. and fr. Mar–Jun.

• Rock crevices; 400–1500 m. E Guangxi (Guibei, Huanjiang, Lingui), SW Guizhou (Anlong), SE Yunnan (Wenshan).

**29. *Corydalis cryptogama*** Z. Y. Su & Lidén, *Novon* 17: 480. 2007.

无距黄堇 *wu ju huang jin*

Herbs, probably annual, with branched leafy angular stems to 20 cm. Leaves broadly ovate in outline, bipinnate with 3 or 4 pairs of stalked pinnae, each with 1 or 2 pairs of shortly stalked distant leaflets that are entire to deeply divided into ovate dentate lobes. Upper leaves and leaves of late branches much smaller than those of middle of stem. Racemes shortly stalked, “leaf-opposed,” very dense at first, soon elongating, up to 10-flowered; bracts rhombic-obovate, obtuse to acuminate, with a short indistinct stalk, equaling or longer than pedicels. Pedicel 1–2 mm (to 4 mm in fruit) rather thick, slightly arcuately recurved in fruit. Sepals ovate, 1–2 × ca. 1 mm, dentate. Corolla closed, very small (ca. 5 mm) and ecalcarate, as if stunted in bud stage, completely cleistogamous; outer petals with very narrow dentate crests. Stigma transversely oblong with indistinct lateral papillae and 2 apical papillae. Capsule fusiform, ca. 20 × 4 mm, many seeded, usually crowned at apex by withered corolla, which is broken loose from pedicel by growing fruit.

Seeds in 2 rows, ca. 1.75 mm, rounded in outline, rounded on back (i.e., not keeled), sides with small linear impressions, toward back finely tuberculate; elaiosome flat, membranous, partly folded back over seed, easily becoming detached; hilum broad. Fl. and fr. May.

• Sunny hill slopes; 600–700 m. Sichuan (Daxian).

This species is known only from the type collected from Daxian on the Sichuan-Hubei border.

**30. *Corydalis orthopoda*** Hayata, *Icon. Pl. Formosan.* 3: 16. 1913.

密花黄堇 *mi hua huang jin*

*Corydalis brachystyla* H. Koidzumi; *C. koidzumiana* Ohwi.

Herbs, biennial, glaucous, 20–50 cm, with taproot. Stems stout, 5–10 mm in diam., striate, branched and leafy throughout. Leaves: petiole 5–20 cm; blade glaucous on both surfaces or green adaxially, triangular, broader than long, 7–17 × 8–25 cm, bi- to tripinnate; pinnae (2 or) 3 pairs, petiolulate, lowermost pinnae of large low leaves almost as large as remainder of leaf; pinnules 2 or 3 pairs, subsessile; ultimate leaflets ovate, crenately lobed to deeply dentate, segments or teeth rounded to oblong, mucronate to shortly acuminate. Racemes 15–28-flowered, 10–20 cm in fruit; bracts narrowly ovate to lanceolate, 5–10 mm, often long acuminate. Pedicel 4–7 mm, at fruiting slightly decurved. Sepals triangular, 1–1.5 mm, slightly dentate. Corolla yellow, abaxially purplish brown toward apex. Outer petals straight, narrow, apically acuminate, without dorsal crest; upper petal 15–18 mm, spur downcurved at apex, 4–6 mm, rounded-obtuse; nectary 1/2–2/3 as long as spur, thin; inner petals 11–13 mm. Stigma transverse, straight, with 2 forward-projecting papillae and ?3 diffuse terminal/lateral papillae. Capsule oblong, flattened, 19–25 × ca. 4 mm, with beak 3–4 mm and style ca. 2.5 mm, ca. 20-seeded. Seeds in 2 rows, orbicular, 1.6–2 mm, face ± sharply colliculate, back rounded, spinulose; caruncle cupular, large. Fl. and fr. May–Oct.

Taiwan [Japan (Bonin, Ryukyu Islands)].

**31. *Corydalis heterocarpa*** Siebold & Zuccarini, *Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss.* 4(2): 173. 1845.

异果黄堇 *yi guo huang jin*

Herbs, biennial, 25–60 cm, with taproot. Stems angular, stout, 5–8 mm in diam., branched, leafy. Leaves: petiole 5–15

cm; blade glaucous on both surfaces or green adaxially, ovate to narrowly triangular, 10–20 × 7–12 cm, bipinnate; pinnae 4 or 5 pairs, shortly petiolulate or upper pinnae sessile; pinnules 2–4 pairs, sessile, ± deeply pinnatifid to coarsely dentate; lobes rounded to oblong, mucronate. Racemes spicate, 5–15 cm, densely 10–40-flowered; bracts linear-lanceolate to oblanceolate, 5–7(–10) mm, often long acuminate. Pedicel 4–6(–10) mm, decurved in fruit. Flowers yellow, abaxially brownish purple toward apex. Sepals ovate-triangular, 1–1.5 mm, slightly dentate. Outer petals narrowly acute, without crest; upper petal 18–20 mm; spur downcurved/saccate at apex, 5–6 mm, rounded-obtuse; nectary extended through ca. 2/3 of spur, apex hooked-curved; lower petal 12–14 mm; inner petals 11–13 mm. Stigma dichotomous, with ascending branches tipped with diffusely set off papillae, or with a central pair of longer distinct papillae. Capsule oblong, flattened, 20–26 × ca. 4 mm, ± slightly contorted but not torulose, 16–21-seeded with a beak 3–4 mm, tipped with style 3–3.5 mm. Seeds in 2 rows, 1.5–2 mm, spinulose; caruncle cap-form. Fl. and fr. May.

Coastal sands. Shandong, NW Zhejiang (Putuo) [Japan].

**32. *Corydalis speciosa*** Maximowicz, Gartenflora 7: 250. 1858.

珠果黄堇 zhu guo huang jin

*Corydalis maximowicziana* Nakai; *C. pallida* (Thunberg) Persoon var. *ramosissima* Komarov; *C. speciosa* var. *ramosissima* (Komarov) Kitagawa.

Herbs, biennial (sometimes short-lived perennial), glaucous, 20–40(–60) cm, with taproot. Stems leafy with late branches (i.e., plant appearing rather different late in year). Rosette leaves withered at flowering time, with broad slightly fleshy base with membranous margin. Lower cauline leaves shortly petiolate, upper leaves sessile; blade glaucous on both surfaces or green adaxially, oblong, 5–14 × 3–6 cm, bipinnate (to almost tripinnate); pinnae 4 or 5 pairs, lower ones distant; pinnules 1–3 pairs, ovate-elliptic, pinnately deeply divided into lanceolate acute mucronate segments; leaves of late branches sometimes much less divided. Racemes dense, spikelike, 15–20(–30)-flowered (much less in late lateral racemes), elongating in fruit; bracts lanceolate to rhombic-lanceolate, 5–10 mm, long acuminate, entire or with a few thin narrow teeth. Pedicel 5–7 mm, at fruiting decurved. Flowers golden yellow, soon slightly nodding. Sepals nearly orbicular, 1–2 mm, dentate. Outer petals broad, acuminate to obtuse or even slightly emarginate; dorsal crests short, not reaching apex, sometimes lacking; upper petal 17–22 mm; spur rounded, 5–8 mm, apex saccate; nectary geniculate, 1/3–2/3 as long as spur; inner petals 11–13 mm, dorsal crests rounded, clearly overtopping apex. Stigma transversely oblong, each arm with 4 simple papillae, central pair often more distinct. Capsule pendent, linear, moniliform, 25–30 × ca. 2 mm, ca. 10-seeded; beak 2–3 mm; style 2.5–3 mm. Seeds in 1 row, almost pear-shaped, 2–2.2 × 1.7–1.9 mm, colliculate or (in northernmost localities) with small linear depressions; caruncle cupular, large, folded back over seed. Fl. and fr. Apr–Sep.

Forest margins, roadsides, water sides, stony areas; sea level to 500 m. Hebei, Heilongjiang, Hubei (Wangping), Jilin, Liaoning, Shandong, Zhejiang [Japan, Korea, Mongolia, Russia (Far East)].

This is a variable species as to size and shape of the upper petal, whether obtuse or broad and acute.

**33. *Corydalis changbaishanensis*** M. L. Zhang & Y. W. Wang, Bull. Bot. Res., Harbin 23: 386. 2003.

长白山黄堇 chang bai shan huang jin

Plants similar to *Corydalis speciosa* but with paler and smaller flowers, almost white but yellow at apex. Sepals ca. 1 mm, deeply dentate. Upper petal 16–17 mm, subobtuse, with short slightly dentate crest not reaching apex; spur obtuse, ca. 6 mm; nectary ca. 1/2 as long as spur, thin. Seeds and stigma as in *C. speciosa*.

Distribution insufficiently known. Jilin [Korea, ?Russia].

The distinction between this and *Corydalis speciosa* is obscure and needs further corroboration.

**34. *Corydalis wilfordii*** Regel, Bull. Soc. Imp. Naturalistes Moscou 34(2): 148. 1861 [“*wilfordi*”].

阜平黄堇 fu ping huang jin

*Corydalis chanetii* H. Léveillé; *C. formosana* Hayata var. *microphylla* Sasaki; *C. pallida* (Thunberg) Persoon var. *chanetii* (H. Léveillé) Govaerts; *C. pallida* var. *microphylla* (Sasaki) Ohwi; *C. pallida* var. *sparsimamma* (Ohwi) Ohwi; *C. pallida* var. *zhejiangensis* Y. H. Zhang; *C. sparsimamma* Ohwi; *C. taiwanensis* Ohwi.

Herbs, annual to biennial, (20–)30–40 cm, glabrous, with taproot. Stems few to several, ascending-erect, ridged, branched, leafy. Basal leaves often many; petiole 5–10 cm, with broad base with membranous margin; blade pale abaxially, green adaxially, triangular, ca. as broad as long, 7–12 × 5–12 cm, bipinnate; pinnae 2–4 pairs, lower pair petiolulate, larger than second pair, upper almost sessile; pinnules sessile, ovate, ± deeply and coarsely crenate-dentate to lobed; teeth/lobes subacute, mucronate. Racemes 5–11 cm, 10–25-flowered; bracts ovate to lanceolate, 4–8(–15) mm, long acuminate. Pedicel 4–8 mm. Sepals rounded to triangular, 1.5–2.5 mm, dentate. Corolla yellow to pale yellow. Outer petals slightly undulate-dentate, usually acuminate, without or with short often dentate crest not reaching apex; upper petal 16–20 mm; spur 6–9 mm, with broad saccate slightly reflexed apex; nectary 1/2–2/3 as long as spur; inner petals 10–13 mm with broad rounded dorsal crests overtopping apex. Stigma 2-forked, each part with 3 papillae, central pair distinct, lateral sometimes indistinct. Capsule linear, moniliform, 18–32 × ca. 2 mm, 7–12-seeded; beak ca. 3 mm; style 3–3.5 mm. Seeds in 1 row, rounded, 1.6–1.9 mm, with rounded back, often densely spinulose, rarely almost glabrous; caruncle thin, membranous, folded back over seed, covering ca. 1/2 of seed. Fl. and fr. Apr–Jul.

Forest margins, riversides, stony slopes, roadsides; 200–900 m. Anhui, Guangdong, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Taiwan, Zhejiang [Japan (Tsushima Island), S Korea].

One of us (Zhang) prefers to treat this species as part of a wide-spread *Corydalis pallida* s.l. (see 35. *C. pallida*).

**35. *Corydalis pallida*** (Thunberg) Persoon, Syn. Pl. 2: 270. 1806.

黄堇 huang jin

*Fumaria pallida* Thunberg, Nova Acta Acad. Sci. Imp. Petrop. Hist. Acad. 12: 103. 1801; *Sophorocapnos pallida* (Thunberg) Turczaninow.

Plants differing from *Corydalis wilfordii* by having leaves oblong, more divided, with small and narrow lobes (though late leaves often much smaller and conspicuously less divided with broader lobes); corolla apically broader; seeds smaller, keeled, with smaller spines.

?China [Japan, ?Korea].

This species was recorded from several provinces of China in FRPS (32: 435–437. 1999) but those records refer, according to M. Lidén, to 34. *Corydalis wilfordii* (or to 32. *C. speciosa* and 33. *C. changbaishanensis* for the NE provinces), whereas *C. pallida* s.str. has not been verified for China. See 34. *C. wilfordii* for a different opinion.

**36. *Corydalis balansae*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 25. 1896.

北越紫堇 bei yue zi jin

*Corydalis cavalieriei* H. Léveillé & Vaniot; *C. ecalcarata* (Z. Y. Su) Y. H. Zhang; *C. formosana* Hayata; *C. lofouensis* H. Léveillé; *C. nokoensis* Hayata; *C. omphalocarpa* Hayata; *C. orthocarpa* Hayata; *C. pseudotomentella* Fedde; *C. racemosa* (Thunberg) Persoon var. *ecalcarata* Z. Y. Su; *C. taitoensis* Hayata; *C. tashiroi* Makino.

Herbs, annual, glaucous, 15–50 cm, with simple taproot. Stems ridged, slender, branched and leafy throughout. Leaves: petiole 4–13 cm; blade pale abaxially, green adaxially, ovate to ovate-oblong, or lower leaves triangular, 7–15 × 6–10 cm, bipinnate; pinnae distant, (2 or) 3 or 4 pairs, petiolulate; pinnules 1 or 2 pairs, almost sessile, deeply divided into 3–5 oblong to ovate mucronulate lobes. Raceme lax, 3–15-flowered, first produced raceme usually longer and many flowered; bracts ovate to lanceolate, 4–7 mm, acute to shortly acuminate. Pedicel 3–5 mm. Sepals ovate, 1(–2?) mm, dentate. Corolla yellow to yellowish white. Outer petals narrow, retuse to truncate, dentate with short dentate crest not reaching apex; upper petal 15–17 mm (smaller in cleistogamous flowers); spur saccate, ca. 3 mm; nectary 1/3–1/2 of spur; inner petals 10–12 mm, dorsal crests rounded, overtopping apex. Stigma horizontally extended 2-armed, each 1/2 with 1 distinct apical forward-projecting papillae and diffuse terminal papillae (possibly 2 confluent). Capsule linear, straight, 30–44 × 2–3 mm; style 3–4 mm. Seeds in 1 row, 1.5–1.8 mm, lenticular with linear impressions in concentric rows; caruncle large, membranous, folded back over seed. Fl. and fr. May–Aug.

Valleys, wet areas, thickets on foothills; 200–700 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Taiwan, Yunnan (Funing, Hekou), Zhejiang [Japan (Ryukyu Islands), Laos, Vietnam].

Some plants from Taiwan differ in the broader limbs of outer petals.

**37. *Corydalis foetida*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 9: 39. 1987.

臭黄堇 chou huang jin

Herbs, annual, 10–30(–50) cm, glabrous, with taproot.

Stems several from base, ridged, branched, leafy. Basal leaves many, ca. 10 cm; petiole ca. equal to blade, base sheathed; blade ovate-oblong, bipinnate to tripinnate; pinnae 2–4 pairs, petiolulate; pinnules 1 or 2 pairs, sessile, deeply ternatisect into lanceolate-oblong mucronate segments, 2–6 × 1–2 mm. Racemes 3–13-flowered, at first dense, then distant, 5–10 cm; bracts ovate to lanceolate, slightly longer than pedicels. Pedicel ca. 3 mm. Corolla pale yellow to yellow. Sepals rounded, 1.5–2 mm, slightly and shallowly dentate. Outer petals subobtusely, slightly dentate, with short dentate crest not reaching apex; upper petal 15–19 mm, spur decurved, broadly saccate, 4–5 mm; nectary ca. 1/2 as long as spur; inner petals 10–12 mm, dorsal crest only slightly overtopping apex. Stigma horizontally extended 2-armed, each 1/2 with 1 distinct apical forward-projecting papillae and diffuse terminal papillae (possibly 2 confluent). Capsule usually curved, linear, 19–23 × ca. 2 mm, 8–12-seeded. Seeds in 1 row, 1.5–1.6 mm, lenticular with linear impressions in concentric rows; caruncle large, membranous, folded back over seed. Fl. May–Jun, fr. May–Jul.

• River valleys; 2100–3100 m. Sichuan, NW Yunnan (Dêqên, Gongshan, Weixi).

This species is like *Corydalis balansae* in flower, but the foliage is rather different.

**38. *Corydalis brevipedunculata*** (Z. Y. Su) Z. Y. Su & Lidén in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 442. 1999.

短轴黄堇 duan zhou huang jin

*Corydalis foetida* C. Y. Wu & Z. Y. Su var. *brevipedunculata* Z. Y. Su, Acta Bot. Yunnan. 9: 41. 1987.

Herbs, annual, glaucous, 25–50(–70) cm tall, with taproot and many suberect to trailing stems. Stems branched and leafy throughout. Basal leaves ca. 10 cm; petiole slightly longer than blade, base ± sheath-form; blade pale abaxially, green adaxially, ovate-lanceolate, bipinnate; pinnae 2 or 3 pairs, petiolulate; pinnules 1(or 2) pairs, terminal deeply 3-divided, lateral ones smaller, almost sessile, deeply 3-divided, terminal segments 3-lobed, lateral segments 2- or 3-lobed, sometimes not lobate; ultimate segments lanceolate, 3–5 × ca. 2 mm. Cauline leaves like basal leaves, but petiolar base sheathed. Racemes subsessile, ca. 1 cm, 3–5-flowered; bracts ovate-lanceolate, 3–4 mm. Pedicel 2–4 mm, recurved in fruit. Flowers pale yellow. Sepals caducous, ovate, ca. 1 mm. Outer petals acuminate, without or with very narrow crest; upper petal 12–13 mm; spur broadly saccate, ca. 3 mm; nectary extended through ca. 1/2 of spur, thin; inner petals 8–9 mm. Stigma horizontally extended 2-armed, each 1/2 with 1 distinct apical forward-projecting papillae and diffuse terminal papillae. Capsules very densely set, drooping, linear-oblong, slightly curved, 15–20 × ca. 2 mm, 5–9-seeded. Seeds in 1 row, with concentric rows of small linear impressions, compressed-lenticular, keeled, ca. 1.5 mm, with cupular caruncle. Fl. and fr. Apr–Aug.

• Mountain slopes, wastelands, roadsides, walls; 1000–2200 m. SE Gansu (Wenxian, Wudu), Sichuan (Maoxian, Nanping).

This species is very similar to *Corydalis foetida*, but the flowers are smaller and the racemes are tightly congested, sessile, few flowered.

3. *Corydalis* subg. *Corydalis*紫堇亚属 *zi jin ya shu*

Herbs, annual, biennial, or perennial, mostly mesophytic. Bracts herbaceous, often large. Stigma flat with distinct marginal papillae and usually with geminate papillae in basal corners and laterally (submarginally). Capsules soft, often explosively dehiscent.

More than 400 species: almost throughout the range of the genus, but rare in dry lowlands, absent from E North America; 319 species (239 endemic) in China.

7. *Corydalis* sect. *Duplotuber* Ryberg, Acta Hort. Berg. 19: 223. 1960.叠生延胡索组 *die sheng yan hu suo zu**Corydalis* sect. *Ceratotuber* Popov ex Z. Y. Su & C. Y. Wu.

Tuber small, from inflated stem base, often with leaf traces externally; new tubers formed directly on old tuber, on tip of tuber elongation, or axillary. Stems 1 to several, with 2 or more cauline leaves; lower part with scales or not. Leaves ternate to biternate. Bracts green, rather small, entire or dentate. Spur straight or slightly curved, shorter than limb; nectary short, apex pointed. Stigma horizontal, oblong, with 4 papillae. Capsule linear. Seeds 1-ranked, keeled, papillose.

Three species: a typical Sino-Japanese floristic element, two species in NE China, Korea, and SE Russia, one species in E China and Japan.

- 1a. Leaflets serrate; lower part of stem with axillary tubers ..... 39. *C. ternata*  
 1b. Leaflets entire; stem without axillary tubers.  
 2a. Stems decumbent, simple; tubers rounded; racemes lax; scale leaves absent ..... 40. *C. decumbens*  
 2b. Stems erect, sometimes branched; tubers long and narrow, inflated at ends; racemes dense; scale leaves  
 1–3 at base of stems ..... 41. *C. buschii*

39. *Corydalis ternata* (Nakai) Nakai, Bot. Mag. (Tokyo) 28: 29. 1914.

三裂延胡索 *san lie yan hu suo*

*Corydalis bulbosa* (Linnaeus) Candolle f. *ternata* Nakai, Bot. Mag. (Tokyo) 26: 91. 1912; *C. nakaii* Ishidoya; *C. remota* Fischer ex Maximowicz var. *ternata* (Nakai) Makino; *C. turtschaninovii* Besser var. *ternata* (Nakai) Ohwi.

Tuber rounded to oblong, small, 5–12 mm; accessory tubers often formed in axils of scales or rarely of lowermost cauline leaves. Stems 10–25 cm, underground part slender, near base with 2 scales, ascending to erect, with 3 or 4 leaves, usually branched. Leaves ternate, lower ones with vaginate petioles; leaflets elliptic, serrate, sometimes with a purplish blotch. Raceme 7–12-flowered, rather lax; bracts ovate, entire or dentate. Pedicels 5–9 mm, equaling or longer than bracts, slender. Sepals minute. Flowers amaranth. Outer petals not much diverging, apex obtuse to slightly emarginate; upper petal 15–17 mm; spur straight, 5–8 mm; nectary extended through ca. 1/3 of spur; inner petals ca. 10 mm. Capsule linear, ca. 15 mm, 6–10-seeded. Seeds keeled, covered with vesicular papillae. *2n* = 16.

Water sides. ?Jilin, Liaoning (Andung) [Korea].

40. *Corydalis decumbens* (Thunberg) Persoon, Syn. Pl. 2: 296. 1806.

夏天无 *xia tian wu*

*Fumaria decumbens* Thunberg, Nova Acta Acad. Sci. Imp. Petrop. Hist. Acad. 12: 102. 1801; *Corydalis amabilis* Migo; *C. eduloides* Fedde; *C. eduloides* var. *haimensis* Fedde; *C. gracilipes* S. Moore; *C. kelungensis* Hayata; *Pistolochia decumbens* (Thunberg) Holub.

Tuber rounded, 4–13 mm in diam.; new tubers arising directly on old tuber, mainly from axils of radical leaves. Stems

usually several from each tuber, 10–25 cm, slender, weak, simple, with 2 or 3 leaves, without scales. Leaves twice to 3 × ternate; leaflet entire or deeply cut into subacute lobes. Raceme lax, 3–10-flowered; bracts ovate, 5–8 mm, entire. Pedicel 10–20 mm. Flowers nearly white or pale pink, sometimes marked with light blue, smelling like *Viola odorata*. Sepals caducous. Upper petal 14–18 mm, usually narrowly crested, with spreading limb; spur straight or slightly curved, distinctly shorter than limb; nectary 1/3–1/2 as long as spur, apex acuminate; lower petal broadly spatulate; inner petals with broad, rounded crests exceeding apex. Capsule linear, slightly torulose, 13–18 mm, 6–14-seeded. Seeds keeled, covered with vesicular papillae. Self-compatible. Fl. and fr. Feb–May.

Mountain slopes, roadsides, wastelands near coast; 100–300 m. Anhui, Fujian, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi (Hua Shan), Taiwan, Zhejiang [S Japan (including Ryukyu Islands)].

This species is an important herb in traditional Chinese medicine.

A plant possibly related to *Corydalis decumbens* but more robust with crenately lobed leaflets and larger lobed tuber has recently been recorded in Hunan. We have yet only photographic documentation of this possibly new species.

41. *Corydalis buschii* Nakai, Bot. Mag. (Tokyo) 28: 328. 1914.

东紫堇 *dong zi jin*

*Corydalis chosensis* Ohwi; *Pistolochia buschii* (Nakai) Soják.

Rhizome with narrowly oblong stolonlike parts and more ovoid swellings ca. 5 mm in diam., sometimes several together. Stems erect, 10–20(–30) cm, slender, base with 1–3 scales, with 2–4 leaves, often branched. Leaves long petiolate, petiolar base of lowermost leaves with thin vaginate sheath; blade biternate; leaflets deeply divided, margin and vein papillose scabrid; seg-

ments lanceolate. Raceme short, densely 5–10(–15)-flowered; bracts broadly ovate to obovate, 5–7 mm, often apically dentate, sometimes lower bract divided. Pedicel 3–5(–7) mm, slender. Sepals caducous. Flowers amaranth. Outer petals with re-use apex; upper petal (15–)18(–20) mm, spur 6–8 mm; nectary ca. 1/3 as long as spur; lower petal straight or with a broad

shallow pouch; inner petals narrowly crested. Capsule linear, 14–18 mm, 5–12-seeded. Seeds keeled, covered with vesicular papillae. Self-incompatible. Fl. and fr. May–Jun.

Shaded areas in forests; 500–1100 m. SE Jilin (Linjiang) [Korea, Russia (Vladivostok)].

#### 8. *Corydalis* sect. *Leonticoides* Candolle, Syst. 2: 114. 1821.

薯根延胡索组 shu gen yan hu suo zu

*Cryptoceras* Schott & Kotschy.

Herbs, perennial. Seedlings with one cotyledon. Tuber large, rounded to irregular; roots fascicled, from scattered positions. Stems and radical leaves attenuate toward long thin underground base; stem leaves 2, opposite, sessile, biternate to triternate; primary leaflets long petiolate, often appearing like 6 whorled leaves. Bracts entire. Lower petal usually strongly reflexed; nectary long, apex obtuse.

About 21 species: W Turkey to NW China and W Nepal, mainly in the Irano-Turanian region; one species in China.

**42. *Corydalis ledebouriana*** Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 14: 377. 1841.

薯根延胡索 shu gen yan hu suo

*Corydalis cabulica* Gilli; *Pistlochchia ledebouriana* (Karelin & Kirilov) Soják.

Herbs, perennial. Tuber like a small potato, 2–6 cm. Stems ascending or erect, 10–25 cm, simple, with 2 opposite leaves. Leaves sessile, biternate to triternate; ultimate leaflets very unequal in size, broadly ovate to elliptic, terminal one ca. 2.5 × 2 cm, lateral ones smaller. Raceme longer than leaves, 4–10(–14)-flowered; bracts elliptic to obovate, margin entire, apex ± mucronate. Pedicels 3–9 mm, shorter than bracts, at

fruiting ± erect. Flowers with dark lavender apex and pink or nearly white spur, rarely red-purple or nearly white. Sepals minute. Outer petals narrowly acute to acuminate; upper petal 16–27 mm; spur 10–15 mm, often upwardly curved, near end often ± inflated, rarely slender and straight; nectary extended through ca. 2/3 of spur (other species in section with longer nectaries); lower petal strongly reflexed; inner petals 10–14 mm. Capsule erect, elliptic, ca. 10–15 × 5–6 mm. Seeds in 2 rows, 2–2.5 mm; caruncle thick, rounded, closely capping seed. Fl. and fr. Mar–May.

NW Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan].

Records of *Corydalis sewerzowii* Regel from NW Xinjiang in FRPS (32: 477. 1999) refer to this species.

#### 9. *Corydalis* sect. *Benecinctae* (Fedde) C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 4: 1. 1982.

伞花紫堇组 san hua zi jin zu

*Corydalis* “Gruppe” *Benecinctae* Fedde, Repert. Spec. Nov. Regni Veg. 25: 221. 1928; *C.* subsect. *Benecinctae* (Fedde) Lidén.

Seedlings with 1 cotyledon. Herbs, perennial with elongate, usually branched tuber. Underground part of stem flexuous, narrow, with 2–4 scales. Leaves fleshy, glaucous, ternate to pinnate. Inflorescence a corymbose raceme. Pedicel reflexed and much elongating in fruit. Flowers lavender or amaranth. Capsule not explosively dehiscent.

• Three species: China.

This section in FRPS included *Corydalis hemidicentra*, *C. hepaticifolia*, and *C. ludlowii*, but features of the pedicels, stigmas, fruits, and seeds, as well as DNA sequences, show that those species are not related to *C.* sect. *Benecinctae*; they have been transferred to *C.* sect. *Dactylotuber*.

- 1a. Leaves with several leaflets; flowers narrowly to broadly crested ..... 45. *C. dajingensis*  
 1b. Leaves with 3 entire leaflets; flowers narrowly crested.  
 2a. Leaflets obovate; racemes often branched at base ..... 43. *C. benecincta*  
 2b. Leaflets nearly orbicular; racemes simple ..... 44. *C. trilobipetala*

**43. *Corydalis benecincta*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 98. 1916.

囊距紫堇 nang ju zi jin

Tuber elongate, with yellow flesh, 3–6 cm, ± branched. Stems 15–30 cm, with 2–4 scales, with 3 or 4 leaves, branched; lower 1/2 of plant buried beneath surface. Leaves trifoliolate, long petiolate; leaflets glaucous on both surfaces, often mottled with irregular streaks, obovate, 2–2.5 × 1.5–2 cm, base often cuneate. Inflorescence without a distinct stalk, loosely corymbose, 5–15-flowered, often branched at base; bracts obovate-oblong to oblanceolate, (1–)2–3(–4.5) cm × 3–8 mm, acute,

entire, lower one sometimes slightly lobate. Fruiting pedicel arcuately downcurved, elongating to 25–70 mm, soft and slightly thickened. Flowers pale pink to pale amaranth, with pinkish veins, often with bluish tints, broad in profile, strongly fragrant. Sepals nearly orbicular, ca. 2 mm, circumdentate. Upper petal 18–25 mm with narrow crest, apically with rather broad margins flanking inner petals; spur downcurved, large, 10–13 mm, very broad and saccate; nectary ca. 1/2 as long as spur; lower petal with reflexed apex; inner petals 9–10 mm. Stigma nearly square, broader than long, with 4 apical papillae and lateral and basal geminate papillae. Capsule elliptic, 7–10 × 4–5 mm, 5–15-seeded; style ca. 4 mm, usually sharply bent at

base in fruit. Seeds 2–2.5 mm, faintly colliculate, with very broad elaiosome. Self-incompatible. Fl. and fr. Jul–Sep.  $2n = 16^*$ .

• Alpine scree, on “shale” and on limestone; 4000–6000 m. ?SW Sichuan, SE Xizang, NW Yunnan (Dêqên to Weixi).

**44. *Corydalis trilobipetala*** Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 60: 114. 1924.

三裂瓣紫堇 san lie ban zi jin

*Corydalis benecincta* W. W. Smith subsp. *trilobipetala* (Handel-Mazzetti) Lidén.

Tuber with whitish flesh, oblong, ± branched. Stems 10–15 cm, lower 1/2 usually buried underground, with 2–4 scales, simple or few branched, aerial part with 2–4 leaves. Leaves ternate, long petiolate, base sheathed; leaflets sessile or nearly so, very glaucous, sometimes apparently pruinose, often mottled with gray and dark greenish streaks and blobs, nearly orbicular, 1.5–2.5 cm, fleshy. Raceme corymbose, simple, 2–10-flowered; bracts ovate or obovate, (5–)10–15 mm, apex obtuse. Pedicel 2.5–5 cm, slightly swollen and arcuately recurved in fruit. Sepals nearly orbicular, 1–1.5 mm, dentate. Corolla pale pink to pale amaranth, with pinkish veins, often with bluish tints, more saturated toward apex, but margins of outer petals often almost white, broad in profile, strongly fragrant. Outer petals narrowly crested, apically often 3-lobed; upper petal 17–22 mm; spur 9–10 mm, not or slightly thickened toward apex, obtuse; nectary ca. 1/2 as long as spur; lower petal often shallowly saccate at base; inner petals ca. 8 mm. Stigma broader than long, apex with 4 papillae, lateral geminate papillae sometimes missing. Capsule broadly ovoid, 6–8 × ca. 4 mm, 4–11-seeded; style ca. 3 mm, usually sharply bent at base in fruit. Fl. and fr. Jul–Sep.

• Limestone scree; 4000–5000 m. Sichuan, NW Yunnan.

In NW Yunnan, there are populations intermediate between this species and *Corydalis benecincta*.

**45. *Corydalis dajingensis*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 4: 4. 1982.

大金紫堇 da jin zi jin

*Corydalis cristata* Maximowicz var. *pseudoflaccida* Fedde; *C. geocarpa* Harry Smith ex Lidén; *C. tuberipisiformis* Z. Y. Su.

Herbs, perennial, glaucous. Tuber vertical, 3–10 × 0.5–1 cm, branched below, sometimes splitting with age; roots mainly at tips of tuber branches. Stems 1 or few from each tuber, branched and leafy throughout; underground parts of stems meandering, pale, soft, 5–40 cm; aboveground stems green to reddish, 5–10(–15) cm, often much branched, with 2–5 leaves; frequently forming a loose cushion. Leaves fleshy, long petiolate; blade glaucous abaxially, green or glaucous adaxially, orbicular to oblong in outline, 2–6 × 1–5 cm, ternate to pinnate with 1 or 2(or 3) pairs of leaflets, glabrous or papillose-scabrid along veins and margin (papillose margin sometimes distinctly purplish); terminal leaflet 1–3 × 1–3 cm, shortly petiolate, lateral ones usually smaller, sessile; leaflets entire or usually cut into obovate obtuse lobes. Raceme corymbose, 3–10-flowered, shortly stalked; bracts narrowly obovate with long cuneate base, 10–50 × 3–8 mm, entire or coarsely dentate apically, or ± deeply cut into subacute lobes. Pedicel 2–6 cm, somewhat fleshy, at fruiting arcuately recurved. Flowers bluish to reddish purple or white; inner petals pale. Sepals peltate, 1–2 mm, much dentate, rounded. Outer petals ± crested, limb with prominent lateral lobes; upper petal 15–20(–22) mm; spur almost straight or often strongly downcurved, cylindric, 6–13 mm; nectary ca. 2/3 as long as spur; inner petals 7–8 mm, with low crests. Stigma compressed, broadly rectangular, with 4 apical papillae and lateral and basal geminate papillae. Capsule often oblong, 5–10 × ca. 3 mm, 4–9-seeded; style ca. 3 mm. Seeds black, shiny, obscurely colliculate, ca. 2 mm, with lobed elaiosome clinging to seed. Fl. and fr. Jun–Sep.

• Alpine scree, stone crevices; (3500–)3900–5000 m. N and W Sichuan, E Xizang.

This species is sometimes divided according to leaf division, flower size, and spur length, but the variation is reticulate.

## 10. *Corydalis* sect. *Corydalis*

实心延胡索组 shi xin yan hu suo zu

*Corydalis* sect. *Pes-gallinaceae* Irmisch; *C.* sect. *Raphanituber* Khokhryakov.

Seedlings with 1 cotyledon. Tuber solid, rounded, 0.5–3 cm in diam., base with a single fascicle of roots, apex with a tuft of small scales, from where usually (1 or)2 stems grow; each flowering stem regenerating 1 new tuber. Stems attenuate toward base, with 1 amplexicaul membranous ovate prophyll (scale leaf) at ground level, simple or with late branches from scale leaf, rarely branched from cauline leaves. Radical leaves not present in flowering individuals; cauline leaves 2 (rarely 1 or 3), alternate, petiolate, once to 4 × ternately or pinnately divided. Inflorescence a simple raceme; bracts green, large, entire to divided. Sepals usually small. Outer petals without crest, apex usually broad, obtuse to deeply emarginate; nectary obtuse to acuminate. Stigma squarish, flat, with marginal simple papillae and geminate papillae laterally and in basal corners or on basal lobes.

About 54 species: C Europe to E Asia, and N Algeria; 15 species (seven endemic) in China.

1a. Nectary apically acute to acuminate.

2a. Stem straight, erect; capsule linear, or if elliptic, then flowers “bladdery.”

3a. Nectary extended through ca. 2/3 of spur; leaves ternate to biternate.

4a. Lower petal strongly saccate at base; capsule obovoid, ca. 1 cm ..... 49. *C. saccata*

4b. Lower petal straight; capsule linear to oblong, to 2 cm ..... 46. *C. linjiangensis*

- 3b. Nectary extended through 1/3 or less of spur; leaves biternate to triternate.  
 5a. Lower petal not or slightly saccate; capsule linear-oblong ..... 47. *C. fumariifolia*  
 5b. Lower petal very broadly saccate; capsule elliptic; flowers "bladdery" ..... 48. *C. ussuriensis*
- 2b. Stem geniculate at nodes, ascending; capsule elliptic, with 2 rows of seeds.  
 6a. Inner petals 8 mm or more; dorsal crests of inner petals not or slightly extended beyond apex.  
 7a. Flowers pale indigo; inner petals almost purple; lower petal base obviously saccate; capsule obovoid, ca. 1 cm ..... 49. *C. saccata*  
 7b. Flowers blue; inner petals pale; lower petal straight, almost without sac; capsule fusiform, 1.5–2.2 cm ..... 50. *C. humilis*
- 6b. Either inner petals shorter (to 7 mm) or dorsal appendages/crests of inner petals clearly extended beyond apex or both.  
 8a. Spur sigmoidally upcurved, 11–14 mm; inner petals 9–10 mm (dorsal crest excluded) ..... 51. *C. kiautschouensis*  
 8b. Spur not or slightly curved, 6–9 mm; inner petals 5–8 mm.  
 9a. Dorsal appendages of inner petals obtuse, overtopping petal apex 1/7–1/5 ..... 52. *C. repens*  
 9b. Dorsal appendages of inner petals narrowly acute, extended beyond apex 1/3 of length of petal ..... 53. *C. watanabei*
- 1b. Nectary obtuse.  
 10a. Nectary very short, less than 1/4 as long as spur; flowers pink (Xinjiang).  
 11a. Flowers 2–2.5 cm; flowers broad at apex; capsule lanceolate ..... 54. *C. glaucescens*  
 11b. Flowers 3.5–4.5 cm; flowers narrow; capsule linear ..... 55. *C. schanginii*
- 10b. Nectary 1/3–2/3 as long as spur; flowers blue to purple, rarely pink (E and NE China).  
 12a. Ultimate leaflets rounded with long thin petiolules; fruit ovoid; racemes 1–8-flowered; pedicels much longer than bracts; stems geniculate, much branched.  
 13a. Flowers blue or indigo, ca. 2 cm; spur 1.2–1.4 cm; nectary extended through ca. 3/4 of spur; inner petals 7–8 mm; raceme 3–8-flowered ..... 56. *C. caudata*  
 13b. Flowers white, 1–1.2 cm; spur 5–7 mm; nectary extended through 1/3–1/2 of spur; inner petals ca. 4 mm; raceme 1–3-flowered ..... 57. *C. humosa*
- 12b. Petiolules short or indistinct; racemes 8–20-flowered; pedicels equaling bracts; stems usually erect.  
 14a. Most bracts entire; leaflets lanceolate, entire; corolla upcurved ..... 60. *C. yanhusuo*  
 14b. Most bracts divided; leaflets lobed or dentate; corolla straight or curved.  
 15a. Stems stout, simple or branched from prophyll; petioles basally not vaginate; outer petals dentate, apex retuse and mucronulate ..... 58. *C. turtschaninovii*  
 15b. Stems weak, branched from cauline leaves; lower leaves basally vaginate; petal limbs entire and not or only slightly mucronulate ..... 59. *C. gamosepala*

**46. *Corydalis linjiangensis*** Z. Y. Su ex Lidén, Willdenowia 26: 28. 1996.

临江延胡索 *lin jiang yan hu suo*

Herbs, perennial, nearly erect, 10–22 cm tall, glabrous or rarely with rust-colored minute hairs on stem and in vein furcations on leaves abaxially. Tuber rounded, ca. 1 cm; stem with 2 leaves, simple or with a late branch from prophyll. Leaves ternate to biternate; leaflets cuneate at base, entire or deeply 3-cleft, lobes dentate or entire. Raceme 4–15-flowered; bracts cuneate at base, margin pectinately or digitately dentate or nearly entire, lower bract ca. 1.5 cm. Pedicel 5–6 mm at flowering, to ca. 10 mm at fruiting. Flowers blue. Sepals very small. Upper petal 23–27 mm, apically emarginate; spur nearly straight, cylindric, 12–13 mm; nectary 1/2–2/3 as long as spur, apically acuminate; lower petal straight or shallowly saccate, with shallowly emarginate limb; inner petals 12–14 mm, crest obtuse, not or slightly extended beyond apex. Stigma broadest toward apex, with prominent papillae. Capsule (immature) linear, 1.5–2 cm, up to ?10-seeded. Seeds in 1 row. Fl. and fr. Apr–May.

- Forests; 1000–1100 m. SE Jilin, W Liaoning.

**47. *Corydalis fumariifolia*** Maximowicz, Mém. Acad. Imp.

Sci. St.-Petersbourg Divers Savans 9 [Prim. Fl. Amur.]: 39. 1859.

莖叶延胡索 *jin ye yan hu suo*

*Corydalis ambigua* Chamisso & Schlechtendal var. *amurensis* Maximowicz; *C. ambigua* f. *dentata* Y. H. Chou; *C. ambigua* f. *fumariifolia* (Maximowicz) Kitagawa; *C. ambigua* f. *multifida* Y. H. Chou; *C. ambigua* lusus *rotundiloba* Maximowicz; *C. lineariloba* Siebold & Zuccarini var. *fumariifolia* (Maximowicz) Kitagawa; *C. lineariloba* f. *pectinata* (Komarov) Kitagawa; *C. remota* Fischer ex Maximowicz var. *fumariifolia* (Maximowicz) Komarov; *C. remota* var. *pectinata* Komarov; *C. turtschaninovii* Besser f. *fumariifolia* (Maximowicz) Y. H. Chou.

Herbs, perennial, glabrous or rarely with minute vesicular hairs. Tuber rounded, 1–1.5 cm. Stems erect or basally ascending, 8–21(–28) cm, simple or with a late branch from prophyll, above with 2 (rarely 3) leaves. Leaves green, biternate to triternate, glabrous, sometimes veins and leaf margin papillose-scabrid; leaflets highly variable, entire to deeply divided; ultimate segments linear, lanceolate, elliptic, or ovate, entire, rarely serrate or undulate. Raceme 5–12(–15)-flowered; bracts broadly lanceolate, ovate, or obovate, entire or usually pecti-

nately or digitately dentate or divided. Pedicel straight, 5–14 mm, slender. Sepals minute. Flowers light blue or indigo, rarely purple or white; inner petals nearly white. Upper petal 20–25 mm, petal margin  $\pm$  upcurved; spur 8–12 mm; nectary extended through ca. 1/3 of spur, apex shortly acute; lower petal straight or shallowly saccate, with short claw, limb clearly set off, broadest at base, 6–10 mm wide, apex emarginate without a mucro in sinus; inner petals 8–13 mm. Stigma nearly square, with 4–6 apical papillae and lateral and basal geminate papillae. Capsule often streaked reddish brown, linear-oblong, (15–)20–25(–30)  $\times$  2.5–3 mm, with a distinct margin. Seeds in 1 row, ca. 2 mm in diam., smooth; caruncle obovate. Fl. and fr. Mar–May.

Forest margins, among shrubs; ca. 600 m. Heilongjiang (Yichun), Jilin (Linjiang, Liuhe, Tonghua), Liaoning (Fengcheng, Xingcheng, Yalu Jiang) [Korea, Russia (Far East)].

This species is represented in China by subsp. *fumariifolia*.

**48. *Corydalis ussuriensis*** Aparina, Novosti Sist. Vyssh. Rast. 3: 108. 1966.

吉林延胡索 *ji lin yan hu suo*

Herbs, perennial, glabrous. Tuber rounded, 1–1.5 cm. Stem suberect to erect, 15–25 cm, 2-leaved. Leaves biternate, green, soft, delicate; leaflets stalked, orbicular to obovate, entire to sparingly crenate-dentate, sometimes more deeply divided. Raceme 3–10-flowered; bracts orbicular, or upper ones broadly lanceolate, margin entire or often apically crenate-dentate, much shorter than pedicels. Pedicels 10–18 mm, in fruiting stage to 25 mm. Sepals minute. Corolla blue with white center, with an inflated look, very broad, strongly fragrant; spur of upper petal broad, 10–12 mm, with acute nectary less than 1/3 as long as spur; lower petal with broadly saccate claw and shallowly emarginate entire limb 12–14 mm wide; inner petals 10–13 mm; dorsal crests narrow, not overtopping apex. Fruit elliptic, 10–15  $\times$  5–6 mm, 4–9-seeded. Seeds ca. 1.8 mm, with a botryoid elaiosome. Fl. and fr. Apr–May.

Forests. NC Jilin (Xiaogujia) [SE Russia (Kedrovaja Padj)].

This species is here recorded from China for the first time: 43°09'N, 127°25'E, 1943, *T. Makino 185803* (TI).

**49. *Corydalis saccata*** Z. Y. Su & Lidén, Acta Bot. Yunnan. 19: 231. 1997.

囊瓣延胡索 *nang ban yan hu suo*

Herbs, perennial, glabrous. Tuber rounded, 8–15 mm in diam. Stems ascending to erect, 12–20 cm, simple or with a late branch from prophyll, with 2 leaves. Leaves biternate; leaflets lanceolate to ovate, entire or deeply cut into lanceolate lobes; segments entire to ?serrate. Raceme 3- or 4(–12)-flowered, at first dense then lax; bracts ovate, equal to or slightly shorter than pedicels, entire or apically dentate. Pedicel 5–10 mm, at fruiting slightly elongated. Flowers pale indigo, margin of outer petals deep purple. Upper petal ca. 20 mm, curved; spur upwardly directed, 10–14 mm; nectary extended through 1/2–2/3 of spur, apex shortly acuminate; lower petal with broad emarginate limb and conspicuously saccate claw; inner petals ca. 8 mm, crest short, not extended beyond petal apex. Stigma compressed-square, apex with 4 papillae. Capsule ovoid to obovoid, ca. 1 cm. Fl. and fr. Apr–May.

• Wet zones. S Jilin, E and SE Liaoning.

**50. *Corydalis humilis*** B. U. Oh & Y. S. Kim, Korean J. Pl. Taxon. 17: 24. 1987.

矮生延胡索 *ai sheng yan hu suo*

Herbs, perennial, glabrous or with minute 1-celled hairs. Tuber rounded, 1–2 cm in diam. Stems geniculate at nodes, ascending, 4–15 cm, simple or usually branched from prophyll, usually with 2 leaves. Leaves (ternate or) biternate; blade pale green, sometimes with white dots or markings; leaflets entire to divided; segments obovate to linear-oblong. Raceme densely (1–)4–10-flowered; bracts flabellate or obovate, equal to or slightly shorter than pedicels, dentate to pectinately divided, rarely entire. Pedicel straight, at flowering 4–14 mm, at fruiting 10–15 mm. Flowers pale blue, sometimes with purplish tone; inner petals white. Outer petals broad, margin entire, apex re-tuse; upper petal 20–26 mm; spur straight, cylindric, (9–)11–14 mm; nectary extended through (1/2–)2/3 of spur, apex acuminate; lower petal straight or slightly saccate in middle, limb broad at base, smoothly narrowed toward apex, with prominent smooth rounded emargination; inner petals 8–12 mm with dorsal crest not or very slightly surpassing petal apex. Capsule fusiform to oblong, 15–22  $\times$  3–4 mm, 4–10-seeded. Seeds in 2 rows. Fl. and fr. Mar–Apr(–May).

Deciduous forests. Heilongjiang, Jilin, Liaoning [Korea].

**51. *Corydalis kiautschouensis*** Poellnitz, Repert. Spec. Nov. Regni Veg. 45: 103. 1938.

胶州延胡索 *jiao zhou yan hu suo*

*Pistolochia kiautschouensis* (Poellnitz) Holub.

Herbs, perennial, 10–15(–30) cm tall, glabrous. Tuber rounded, 1–2 cm in diam. Stems slender, weak, sharply geniculate at nodes, often branched from prophyll, usually with 2 leaves. Leaves long petiolate, biternate or nearly triternate with long petiolules; leaflets entire or deeply 3-divided, broadly to narrowly obovate to ovate-lanceolate, apex obtuse. Raceme laxly 3–10-flowered; bracts ovate to obovate, entire or usually flabellately divided, at fruiting  $\pm$  enlarged. Pedicels 1–2(–2.5) cm, longer than bracts, slender. Flowers purple,  $\pm$  curved. Sepals caducous, small or absent. Outer petals broad, flat, margin entire, apically with a smooth rounded emargination; spur up-curved,  $\pm$  sigmoid, cylindric, 12–14 mm; nectary extended through 1/2–2/3 of spur, apex acuminate; lower petal straight or slightly saccate at base, 11–14 mm; inner petals 9–10 mm, with triangular dorsal crests clearly extending beyond apex. Capsule broadly lanceolate, together with style ca. 2 cm, 5–10-seeded. Seeds ca. 2 mm in diam., smooth. Fl. and fr. Apr–May.

• Shaded rocks and sands; 100–900 m. N Jiangsu, Jilin (Liuhe, Shulan, Zuoja), ?Liaoning, E Shandong.

**52. *Corydalis repens*** Mandl & Muehldorf, Bot. Közlem. 19: 90. 1921.

全叶延胡索 *quan ye yan hu suo*

*Corydalis lineariloba* Siebold & Zuccarini var. *micrantha* Ohwi; *C. lineariloba* var. *papillata* (Ohwi) Ohwi; ?*C. repens* var. *manshurica* Skvortzov; ?*C. repens* var. *pubescens* Skvortzov.



zov; *C. turtschaninovii* Besser var. *papillata* (Ohwi) Ohwi; *Pistolochia repens* (Mandl & Muehldorf) Soják.

Herbs, perennial, 8–14(–20) cm tall. Tuber globose, 1–1.5 cm in diam., flesh white, slightly bitter. Stems ascending, sharply geniculate at nodes, slender, weak, often with several branches from prophyll. Leaves biternate with rather discrete leaflets, glaucous abaxially, green or glaucous adaxially; leaflets orbicular to obovate, 6–25(–40) × 5–16(–20) mm, entire, sometimes divided, often with white stripes or flecks, smooth or margin with small scabrous papillae. Raceme (3–)6–14-flowered; bracts lanceolate to ovate, margin entire or apex slightly divided; lower bracts 8–12 × 3–6 mm; upper bracts smaller. Pedicel slender, 6–14 mm, sometimes at fruiting to 20 mm, glabrous or with small vesicular hairs. Flowers white, pale blue, or pale amaranth, often with darker pink midvein. Outer petals broad, flat, with smooth margin, apex smoothly emarginate, without mucro; upper petal 14–18 mm; spur straight, cylindric, 6–9 mm; nectary extended through ca. 1/2 of spur, acuminate; inner petals 5–7 mm; dorsal crests prolonged beyond petal apex 1/7–1/5. Capsule broadly elliptic or ovoid, 8–10 mm, 4–6-seeded. Seeds in 2 rows, ca. 1.5 mm, smooth. Fl. and fr. Apr–May.

Shrubs, forest margins, forests; 700–1000 m. Heilongjiang, Jilin, Liaoning [Korea, Russia (Far East)].

**53. *Corydalis watanabei*** Kitagawa, Rep. Inst. Sci. Res. Manchoukuo 6: 122. 1942.

角瓣延胡索 jiao ban yan hu suo

*Corydalis ivaschkeviczii* Aparina; *C. repens* Mandl & Muehldorf var. *watanabei* (Kitagawa) Y. H. Chou.

Herbs, perennial. Tuber globose, ca. 1 cm in diam. Stems geniculate at nodes, 8–15 cm, slender, branched from prophyll. Leaves biternate, glaucous abaxially, green adaxially; leaflets orbicular to obovate, 6–25 × 5–20 mm, entire, sometimes divided. Raceme very lax, 3–9-flowered; bracts ovate to obovate, 5–8 × 3–6 mm, entire or coarsely dentate at apex. Pedicel 8–15 mm, slender, glabrous or with small vesicular hairs. Flowers white, pale blue, or pale amaranth. Outer petals broad, with deep and narrow apical emargination; limb of upper petal with upwardly reflexed margin; spur straight or slightly upcurved, 6–9 mm; nectary extended through ca. 1/2 of spur, acuminate; lower petal with broad flat sometimes slightly undulate limb; inner petals 5–7 mm with dorsal crests prolonged much beyond apex (at least 1/3) into 2 white acute horns. Fl. and fr. Mar–May.

Forests, forest margins. Heilongjiang, Jilin, Liaoning [N Korea, Russia].

The distribution is insufficiently known.

**54. *Corydalis glaucescens*** Regel, Bull. Soc. Imp. Naturalistes Moscou 43(1): 253. 1870.

新疆元胡 xin jiang yuan hu

*Corydalis kolpakovskiana* Regel; *C. kolpakovskiana* var. *hennigii* Fedde; *Pistolochia glaucescens* (Regel) Soják.

Herbs, perennial. Tuber rounded, 1–2.5 cm in diam. Stems

ascending, 10–25 cm, slender, usually with many axillary stems from large prophyll, rarely branched also from cauline leaves. Leaves glaucous, thin, long stalked; blade twice to 3 × ternately to pinnately divided, petiolules distinct; ultimate leaflets entire or deeply cleft into ovate to lanceolate entire obtuse lobes, 4–12 × 2–3 mm. Raceme longer than leaves, laxly 5–12(–22)-flowered; bracts rhombic-ovate to lanceolate, ca. equal to or slightly shorter than pedicels, entire. Pedicel 5–15 mm, thin and slender. Flowers gracefully nodding. Sepals small. Outer petals pale pink to white with purple to green dark keels, with broad emarginate limb; upper petal 2–2.5 cm; spur slightly upcurved, 10–14(–17) mm, attenuate; nectary very short, 1–1.5 mm, apex obtuse; lower petal broad, flat, claw short with shallow sac; inner petals 7–9 mm, with broad pale crest not extending beyond apex. Stigma nearly orbicular, with 8 papillae. Capsule broadly lanceolate, 11–17 × ca. 4 mm. Seeds 1.7–2 mm, with long narrow elaiosome with brownish base. Fl. and fr. May(–Jun).

Among shrubs, forests, slopes; 1300–1800 m. N Xinjiang [SE Kazakhstan, Kyrgyzstan].

**55. *Corydalis schanginii*** (Pallas) B. Fedtschenko, Trudy Imp. S.-Peterburgsk. Bot. Sada 23(2): 372. 1904.

长距元胡 chang ju yuan hu

*Fumaria schanginii* Pallas, Acta Acad. Sci. Imp. Petrop. 2: 267. 1779 [“*schangini*”]; *Corydalis longiflora* (Willdenow) Persoon; *F. longiflora* Willdenow; *Pistolochia schanginii* (Pallas) Soják.

Herbs, perennial, ascending or nearly erect, 10–35 cm tall, robust. Tuber rounded to oblong, 1.5–3 cm in diam. Stems simple or with 1 branch from prophyll, often with 2 leaves. Leaves glaucous, slightly thick; petiole ca. 1/3 as long as blade; blade biternate with entire or deeply divided leaflets; segments ovate to lanceolate, usually acute. Raceme 5–25-flowered, rather dense; bracts ovate-lanceolate to linear-lanceolate, ca. as long as or often longer than pedicels, entire. Pedicel 5–10(–15) mm, to 10–20 mm in fruit. Sepals small. Flowers pink, often with darker veins, long, narrow; inner petals with sharply contrasting blackish purple apex. Outer petals subacute, with narrow margins; upper petal 35–45 mm; spur ± downcurved in distal 1/2, 21–28 mm, attenuate to a slender acute apex; nectary ca. 5 mm, apex obtuse; lower petal straight, narrow, without sac; inner petals 14–16 mm. Stigma nearly square, with 6–8 papillae. Capsule linear, 18–25 × 2–3 mm, 4–8-seeded. Seeds ca. 2.5 × ca. 2 mm, smooth; elaiosome long, narrow, with brownish base. Fl. and fr. May.

Mountain meadows, among shrubs, grasslands; 500–2000 m. NW Xinjiang (Altai, Tacheng, Yining) [Kazakhstan, N Kyrgyzstan, W Mongolia, S Russia].

This species is represented in China by subspp. *schanginii*.

**56. *Corydalis caudata*** (Lamarck) Persoon, Syn. Pl. 2: 269. 1806.

小药八旦子 xiao yao ba dan zi

*Fumaria caudata* Lamarck, Encycl. 2: 569. 1788; *Corydalis longiflora* Persoon var. *caudata* (Lamarck) Candolle; *C. repens* Mandl & Muehldorf var. *humosoides* Y. H. Zhang.

Herbs, perennial. Tuber rounded or oblong, 8–20 × 8–12 mm. Stems geniculate at nodes, 10–25 cm, slender, weak, usually with several branches both from prophyll and from normal leaves. Leaves glaucous abaxially, green adaxially, bi- to triternate, with long slender petiole and petiolules; petiolar base of lower leaf broadly vaginate; leaflets very discrete, orbicular to elliptic, 9–25 × 7–15 mm, margin entire or sometimes slightly divided, apex obtuse. Raceme lax, 3–8-flowered; bracts ovate to obovate, 4–7 × 3–4 mm, margin entire, apex acute. Pedicels much longer than bracts, 10–25(–40) mm, slender. Sepals caducous, small. Flowers blue or indigo, rarely purplish or white. Upper petal ca. 20 mm, petal lobes broad and flat, apex retuse; spur sigmoidally upcurved, cylindric, (10–)12–14 mm; nectary extended through ca. 3/4 of spur, apex obtuse; lower petal 10–12 mm, broad and flat, slightly emarginate, claw broadly saccate; inner petals 7–8 mm, dorsal crests not overtopping apex. Stigma square, apex with 4 papillae. Capsule ovoid to elliptic, 8–15 mm, 4–9-seeded. Seeds ca. 2 mm, smooth, with long, narrow caruncle. Fl. and fr. Apr–May.

• Mountain slopes, forest margins; 100–1200 m. Anhui, E Gansu, Hebei, Henan, Hubei, Jiangsu, Shaanxi, Shandong, Shanxi.

**57. *Corydalis humosa*** Migo, J. Shanghai Sci. Inst. Sect. 3(4): 146. 1939.

土元胡 tu yuan hu

Herbs, perennial. Tuber globose, 6–8 mm in diam. Stems 9–20 cm, slender, with 1–3 branches from prophyll, sometimes branched also from lower cauline leaf. Leaves glaucous abaxially, green adaxially, biternate, with long petiole and petiolules; leaflets very discrete, elliptic to ovate, 8–14 × 4–12 mm, entire, sometimes divided into obovate segments. Raceme lax, 1–3-flowered; bracts ovate to ovate-lanceolate, 4–6 × 2–3 mm. Pedicel 7–15 mm, slender. Sepals caducous, small. Flowers white. Upper petal 10–12 mm, limb broad and flat, apex retuse; spur upcurved, 5–7 mm; nectary extended through 1/3–1/2 of spur, obtuse; lower petal ca. 6 mm, base saccate, apex retuse; inner petals ca. 4 mm. Capsule ovoid, together with beak and style ca. 12 × 3–4 mm, 5–9-seeded. Seeds in 2 rows. Fl. and fr. Mar–May.

• Forests, forest margins; 800–1000 m. NW Zhejiang (Tianmu Shan).

**58. *Corydalis turtschaninovii*** Besser, Flora 17(Beibl. 1): 6. 1834.

齿瓣延胡索 chi ban yan hu suo

Herbs, perennial, usually glabrous, sometimes finely papillose-hairy. Tuber yellow, rounded, 1–2.5 cm. Stems ± erect, 10–30 cm; prophyll often with late branch or sometimes with axillary tuber; cauline leaf axils usually without branches. Cauline leaves 2 (rarely 3), slightly thick, once to 3 × ternate, dark green, ± glaucous; leaflets entire to deeply cut; segments broadly elliptic to oblanceolate or linear, margin entire to coarsely dentate, apex obtuse or mucronate. Raceme 5–20-flowered; bracts ca. equal to pedicels, cuneate, usually much divided, rarely less divided. Pedicel at flowering 5–10 mm, at fruiting 10–20 mm. Sepals small, not obvious. Flowers blue, white, or royal blue, sometimes with a purplish tint. Outer petals apically emarginate with a distinct mucro in notch, margin of limb shallowly den-

tate; spur of upper petal straight or apex slightly downcurved, 10–14 mm; nectary extended through 1/3–2/3 of spur, apex obtuse; inner petals 9–12 mm. Stigma compressed-square, apically with 4 simple marginal papillae; geminate papillae lateral and on well-developed basal lobes. Capsule linear, smooth to subtorulose, 16–26 mm. Seeds in 1 row, ca. 1.5 mm, smooth; caruncle narrow. Fl. and fr. Apr–Jun.

Open forests, forest margins. NE Hebei, Heilongjiang, Jilin, Liaoning, NE Nei Mongol [Japan, Korea, SE Russia (Far East)].

The distribution in China is insufficiently known.

- 1a. Leaves twice to 3 × ternate; racemes (6–)10–20-flowered; nectary 1/3–1/2 as long as spur ..... 58a. subsp. *turtschaninovii*
- 1b. Leaves once to twice ternately divided with distant broad large dentate leaflets; racemes 5–12-flowered; nectary 1/2–2/3 as long as spur ..... 58b. subsp. *vernii*

**58a. *Corydalis turtschaninovii*** subsp. *turtschaninovii*

齿瓣延胡索(原亚种) chi ban yan hu suo (yuan ya zhong)

*Corydalis bulbosa* (Linnaeus) Candolle var. *remota* (Fischer ex Maximowicz) Nakai; *C. remota* Fischer ex Maximowicz; *C. remota* var. *lineariloba* Maximowicz; ?*C. remota* var. *punctata* Skvortzov; *C. remota* var. *rotundiloba* Maximowicz; *C. solida* (Linnaeus) Clairville subsp. *remota* (Fischer ex Maximowicz) Korshinsky.

Leaves twice to 3 × ternate. Racemes (6–)10–20-flowered. Nectary 1/3–1/2 as long as spur.

Open forests, forest margins. NE Hebei (Chengde Diqu), Heilongjiang, Jilin, Liaoning, NE Nei Mongol [SE Russia (Far East)].

**58b. *Corydalis turtschaninovii*** subsp. *vernii* (Franchet & Savatier) Lidén, Willdenowia 26: 28. 1996.

少花齿瓣延胡索 shao hua chi ban yan hu suo

*Corydalis vernii* Franchet & Savatier, Enum. Pl. Jap. 2: 273. 1878; *C. remota* f. *papillosa* (Kitagawa) C. Y. Wu & Z. Y. Su; *C. remota* var. *papillosa* (Kitagawa) Baranov & Skvortzov; *C. turtschaninovii* var. *papillosa* Kitagawa; *C. turtschaninovii* var. *ternata* Ohwi; *C. wandoensis* Y. Lee.

Leaves once to twice ternately divided with distant broad large dentate leaflets. Racemes 5–12-flowered. Nectary 1/2–2/3 as long as spur.

Liaoning, Heilongjiang (Harbin, Siaolin) [Japan, Korea].

**59. *Corydalis gamosepala*** Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9 [Prim. Fl. Amur.]: 38. 1859.

北京延胡索 bei jing yan hu suo

*Corydalis remota* Fischer ex Maximowicz f. *haitaoensis* (Y. H. Chou & C. Q. Xu) C. Y. Wu & Z. Y. Su; *C. remota* f. *heteroclita* (K. T. Fu) C. Y. Wu & Z. Y. Su; *C. remota* var. *heteroclita* K. T. Fu; *C. turtschaninovii* Besser f. *haitaoensis* Y. H. Chou & C. Q. Xu.

Herbs, perennial. Tuber 1–1.5 cm. Stems suberect to ascending, rarely decumbent, (7–)10–22 cm, with 1 or 2 scale leaves and often with 3 cauline leaves; lower leaf with broad vaginate base. Axillary branches from prophyll and often from lower cauline leaf; axillary tubers absent. Leaves biternate to triternate; leaflets entire to deeply cleft into obovate-obtuse to sharply acute lobes; sometimes upper and lower leaves clearly different (upper with rounded lobes, lower with narrow acute lobes). Raceme 7–13-flowered; lower bracts with coarse teeth, upper bracts entire or with 1 or 2 teeth. Pedicels slender, 5–13 mm at flowering, equal to or slightly longer than bracts, at fruiting 10–20 mm. Flowers pink, purple, or white, rarely blue. Sepals caducous, small. Outer petals broad, margin even or almost so, apex emarginate, usually with a mucro in sinus; spur slightly upcurved, 10–13 mm; nectary extended through 1/2–2/3 of spur, obtuse; inner petals (8–)9–10 mm, with angular dorsal crests not or very slightly overtopping apex. Capsule linear, 1–2 cm. Seeds in 1 row, ca. 1.5 mm in diam., with narrow caruncle. Fl. and fr. May–Jun.

• Mountain slopes, shrubs, shaded wet zones; (500–)1500–2500 m. E Gansu, Hebei, ?Hubei, SW Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi.

**60. *Corydalis yanhusuo*** (Y. H. Chou & C. C. Hsu) W. T. Wang ex Z. Y. Su & C. Y. Wu, Acta Bot. Yunnan. 7: 269. 1985.

延胡索 *yan hu suo*

*Corydalis turtschaninovii* Besser f. *yanhusuo* Y. H. Chou & C. C. Hsu, Acta Phytotax. Sin. 15(2): 82. 1977; *C. ternata* (Nakai) Nakai f. *yanhusuo* (Y. H. Chou & C. C. Hsu) Y. C. Zhu.

Herbs, perennial. Tuber yellow, rounded, (0.5–)1–2.5 cm in diam. Stems erect, 10–30 cm, with 1 or sometimes 2 scale leaves, with 2 or often 3(or 4?) cauline leaves, scales and lower cauline leaves often with axillary tuber. Leaves biternate or nearly triternate; leaflets 2–2.5 cm × 5–8 mm, entire to deeply trifid with lanceolate entire acute segments; lowermost cauline leaf often long petiolate and vaginate at base. Raceme lax, 5–15-flowered; bracts lanceolate or narrowly ovate, 5–12 × 2–5 mm, margin entire, apex acute, sometimes lower bracts slightly divided. Pedicel ca. 10 mm at flowering, in fruit to 20 mm. Flowers amaranth. Sepals caducous, small. Outer petals with broad dentate limbs, emarginate with a mucro in notch; spur of upper petal upcurved, cylindric, 11–13 mm; nectary extended through ca. 1/2 of spur, apex obtuse; lower petal with short claw; inner petals 8–9 mm, claw longer than petal lobes. Stigma nearly orbicular, papillae longer than in preceding species. Capsule linear, 20–28 mm. Seeds in 1 row. Fl. and fr. Apr–Jun.

• Grasslands on highlands. Anhui, Henan (Tanghe, Xinyang), Hubei, Hunan, Jiangsu, Zhejiang; cultivated in Beijing, Gansu, Shaanxi, Sichuan, and Yunnan.

This species is an important herb in traditional Chinese medicine.

### 11. *Corydalis* sect. **Capnogorium** (Bernhardi) Endlicher, Gen. Pl. Suppl. 5: 32. 1850.

空根紫堇组 *kong gen zi jin zu*

*Capnogorium* Bernhardi, Selectus Sem. Horto Erfurt. [1]. 1842; *Calocapnos* Spach; *Corydalis* sect. *Calocapnos* (Spach) Popov.

Herbs, perennial, with branched hollow rootstock. Basal leaf rosette prominent. Stems thick, hollow, conspicuously ridged. Racemes capitate. Fruit not explosively dehiscent.

One species: China, Kazakhstan, Mongolia, Russia (Siberia).

**61. *Corydalis nobilis*** (Linnaeus) Persoon, Syn. Pl. 2: 269. 1806.

阿山黄堇 *a shan huang jin*

*Fumaria nobilis* Linnaeus, Syst. Nat., ed. 12, 2: 469. 1767; *Calocapnos nobilis* (Linnaeus) Spach; *Capnogorium nobile* (Linnaeus) Bernhardi.

Herbs, perennial. Rootstock swollen, irregularly branched, becoming hollow with age, crowned by several scale leaves. Stems few to several, erect, 30–50(–80) cm, thick, hollow, strongly sulcate with sharp ridges, usually not branched, with 3–5 leaves in upper 1/2. Radical leaves: petiole long, 10–20 cm, with vaginate base; blade ovate, 12–20 × 10–17 cm, bipinnate; primary leaflets petiolulate; secondary leaflets shortly petiolulate to sessile, ca. 3.5 × 3 cm, base decurrent, deeply divided; ultimate segments oblong, obtuse to subacute. Cauline leaves like basal leaves, but shortly petiolate and smaller, rapidly decreasing in size upward. Racemes capitate, densely 20–35-flow-

ered, elongating in fruit; lower bracts to 3 × 2 cm, much cut into linear lobes; upper bracts lanceolate, entire. Pedicel 4–10(–17) mm. Sepals 2–3 mm, ovate, coarsely toothed, acute, rarely acuminate. Flowers yellow, apex sometimes orangish; apex of inner petals contrastingly blackish purple; upper petal 18–22 mm, narrow, narrowly crested and acute at apex; spur straight or slightly curved apically, cylindric, ca. 10 mm, thick, rounded-obtuse; nectary extended through ca. 2/3 of spur; lower petal navicular, acute; inner petals 8–11 mm. Stigma nearly orbicular, with 8 papillae. Capsule ovoid or elliptic, dorsiventrally flattened, 10–20 × 5–7 mm. Seeds in 2 rows, black, shiny, ca. 2 mm; caruncle ca. 1.5 mm, narrow. Fl. and fr. May.

Shaded slopes on mountains, conifer forest margins; 1900–2000 m. N Xinjiang (Fuhai, Hoboksar, Tacheng) [Kazakhstan, Mongolia, Russia (Siberia)].

The Xinjiang and Kazakhstan form deviates from the Russian form in the considerably longer spurs (in the type only ca. 7 mm).

### 12. *Corydalis* sect. **Kingiana** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 18: 399. 1996 [*“Kingiae”*].

帕里紫堇组 *pa li zi jin zu*

Rootstock elongate, with radical leaves and axillary stems from apex. Claw of inner petals much longer than limb. Stigma

broad, with rounded base, flat, with semilunate body and 2 large triangular acute apical papillae; geminate papillae rudimentary or absent. Capsule linear-oblong, not explosively dehiscent. Seeds in 1 row.

• Two species: China.

- 1a. Fruit glabrous; outer petals with very narrow entire crest; stems simple; spur usually longer than limb; bracts entire ..... 62. *C. kingii*  
 1b. Fruit finely papillose-pubescent; outer petals with short dentate crest; stems frequently branched; spur usually shorter than limb; bracts often finely dentate apically ..... 63. *C. lasiocarpa*

**62. *Corydalis kingii*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 30. 1896.

帕里紫堇 pa li zi jin

?*Corydalis kingii* var. *minuticalcarata* C. Y. Wu.

Herbs, perennial. Rootstock long, 3–6 mm in diam., without or with branches. Stems 1 to several, axillary from radical leaves, ascending, terete, 10–40 cm, slender, simple or rarely branched, with 1–3 leaves in upper 1/2. Radical leaves few, 7–9 cm; petiole ca. equal to blade; blade glaucous abaxially, dark green adaxially, triangular-ovate, biternate to bipinnate; pinnae in 2 or 3 pairs, shortly petiolate; pinnules nearly sessile, deeply divided into obovate to lanceolate, 4–5 × ca. 2 mm, acute lobes. Cauline leaves bipinnate, shortly petiolate to nearly sessile. Racemes subsecund, densely 5–15-flowered, elongating in fruit; bracts spatulate-lanceolate, 2–7 × 1–4 mm, entire, pointed. Pedicel 4–8 mm, elongating to 7–12 mm and ± arcuate in fruit. Flowers amaranth to pink, with greenish keels; margin of lower petal often darker. Sepals 1.5–3 × 1–2 mm, ovate, dentate, acute to acuminate. Outer petals subacute, ecristate or with narrow entire crests; spur of upper petal straight, cylindrical, 10–13 mm; nectary extended through 1/2–3/5 of spur; lower petal straight with long narrow claw, apically with indistinct lateral rounded lobes; inner petals 9–10 mm, claw ca. 2 × as long as limb. Capsule linear, slightly contorted, ca. 2 cm, glabrous. Seeds in 1 row, rounded, ca. 1.5 mm; caruncle adhering tightly to seed. Fl. and fr. Jul–Sep.

• Slopes, meadows, stone crevices; 3300–4800 m. C and S Xizang.

**63. *Corydalis lasiocarpa*** Lidén & Z. Y. Su, Edinburgh J. Bot. 54: 82. 1997.

毛果紫堇 mao guo zi jin

*Corydalis kingii* Prain var. *megalantha* C. Y. Wu & Z. Y. Su.

Roots not seen. Stems ascending, 30–50 cm, upper part with 3 or 4 leaves, usually branched. Blade of lower cauline leaves shortly petiolate, triangular-ovate, 4–8 × 2.5–7 cm, bipinnate; primary leaflets 2 or 3 pairs, shortly petiolate; secondary leaflets sessile, entire or ± split into 2 or 3 acute ovate segments. Upper leaves smaller, sessile. Racemes subsecund, densely 13–22-flowered, at fruiting elongated; bracts 3–4 mm, often slightly dentate apically. Pedicel slender, 5–10 mm, at fruiting to 10–20 mm. Flowers pale mauve. Sepals ovate, 3–5 × ca. 2 mm, dentate, acuminate. Outer petals with short dentate crest, apex acuminate, laterally with distinct auricles; upper petal 21–25 mm; spur cylindrical, 9–11 mm; nectary 1/2–3/5 as long as spur; lower petal with much broader claw than in *Corydalis kingii*, apically with distinct rounded auricles; inner petals 10–11 mm. Stigma wider than long, with 2 large flat deltoid apical papillae; geminate papillae indistinct or absent. Capsule linear, densely papillose-puberulent. Fl. and fr. Jul–Sep.

• Alpine grasslands; ca. 4500 m. C Xizang (N of Lhasa).

### 13. *Corydalis* sect. **Flaccidae** C. Y. Wu, Acta Bot. Yunnan. 18: 399. 1996.

裂冠紫堇组 lie guan zi jin zu

Herbs, perennial, with an elongate fibrous rootstock, sometimes rhizomatous. Apex of rootstock with scales, a lax rosette of leaves, and 1 to several axillary stems. Stems leafy above. Inner petals with narrow dorsal crests. Stigma rounded with (6 or) 8 papillae, usually only basalmost pair geminate. Capsule linear-oblong, not explosively dehiscent. Seeds in 1 row.

Twelve species: China, one species (*Corydalis flaccida*) widespread from C Nepal east to SW Sichuan; 12 species (11 endemic) in China.

Here, this section is taken in a wider sense than in FRPS, including species previously placed in *Corydalis* sect. *Capnogorium*.

- 1a. Radical leaves bipinnate or tripinnate; cauline leaves simply pinnate to tripinnate.  
 2a. Flowers cream or yellow.  
   3a. Flowers not crested; petals concolorous ..... 67. *C. straminea*  
   3b. Flowers clearly crested, lower petal with red margins ..... 68. *C. cheilosticta*  
 2b. Flowers pink or purple.  
   4a. Sepals 5–8 mm; crest of outer petals very broad ..... 69. *C. lophophora*  
   4b. Sepals 1–3 mm; crest of outer petals low or absent.  
     5a. Leaves tripinnate; spur thin, 5–9 mm ..... 64. *C. flaccida*  
     5b. Leaves bipinnate; spur thick, 8–15 mm.  
       6a. Lower bracts like upper leaf, to 3.5 cm; lower pedicels 20–30 mm; sepals ca. 3 mm; inner petals tipped with dark purple ..... 66. *C. regia*  
       6b. Lower bracts shorter; lower pedicels 10–15 mm; sepals 1–2.5 mm; inner petals not or obscurely darker tipped ..... 65. *C. livida*

1b. All leaves simply pinnate.

7a. Lower leaves obovate-oblong; lowermost pair of leaflets smaller than second pair; stems 10–30 cm.

8a. Flowers purple; crest 1–2 mm ..... 71. *C. praecipitatorum*

8b. Flowers yellow or white with purple blotch at apex; crest 2–4 mm.

9a. Flowers yellowish white, lower petal with a large purplish blotch across apex and crest;

spur almost as long as limb; stems often leafy also in lower 1/2 ..... 72. *C. crista-galli*

9b. Flowers pure yellow; spur less than 1/2 as long as limb; lower 1/2 of stem leafless ..... 70. *C. grandiflora*

7b. Lower leaves ovate; lowermost pair of leaflets ca. as large as or larger than second pair; stems 28–60 cm.

10a. Flowers ca. 2 cm, very narrow, without crest; spur ca. 1.5 mm wide ..... 75. *C. hebeophylla*

10b. Flowers 2–2.7 cm, broad with very broad crests; spur ca. 2.5 mm wide.

11a. Flowers purple ..... 74. *C. sigmantha*

11b. Flowers yellow ..... 73. *C. potaninii*

**64. *Corydalis flaccida*** J. D. Hooker & Thomson, Fl. Ind. 1: 260. 1855.

裂冠紫堇 lie guan zi jin

Herbs, perennial, 50–100(–130) cm tall, glabrous. Rootstock elongate, usually thicker at apex, often with fibrous leaf residues apically. Stems 1 to few, erect, terete, stiff, leafy throughout but branched only above. Radical leaves in a lax rosette, long stalked; petiole terete, 6–25 cm, vaginate at very base; blade thin, pale abaxially, green adaxially, triangular-ovate, 8–25 × 7–20 cm, tripinnate with distinct petiolules; leaflets to 1 cm, ± deeply cut into rounded mucronate lobes. Cauline leaves like radical leaves, but smaller, shortly petiolate to sessile. Racemes 5–20-flowered, dense; middle and upper bracts lanceolate, acute, often with distinct stalk, entire or ± toothed; lower bracts often like uppermost leaves. Pedicels 5–10 mm, lowermost sometimes to 30 mm. Flowers purple or variegated with pink and blue; spur and center of outer petals pink, margin often blue; inner petals with dark purple apex, except for pale dorsal wings. Sepals often pink, rounded, 1.5–2 mm, dentate. Outer petals without or with small crest, with narrow base and broad obtuse apex; upper petal 15–19 mm; spur downcurved or nearly straight, 5–9 mm, rather thin; nectary prominent, ca. 2/3 as long as spur; inner petals ca. 8 mm, claw longer than limb. Stigma nearly orbicular, with 8 papillae. Capsule linear, 20–35 × 2–3 mm, slightly constricted between seeds, 8–15-seeded. Seeds in 1 row, ca. 2 mm, with small caruncle. Fl. Jun–Jul, fr. Jul–Aug.

Understories of subalpine forests; 3000–4000 m. SW Sichuan (Hongxi, Meigu), SE Xizang, NW Yunnan (Dali, Dêqên, Gongshan) [Bhutan, India (Sikkim), Myanmar, Nepal].

**65. *Corydalis livida*** Maximowicz, Fl. Tangut. 49. 1889.

红花紫堇 hong hua zi jin

Herbs, perennial, 15–70 cm tall. Rootstock thickened toward apex, crowned with scales and residual petiolar bases. Stems ascending from axils of radical leaves, lower part without leaves, upper part often much branched with 4–8 leaves decreasing in size upward. Radical leaves few, ca. 1/2 as long as stems; petiole ca. as long as blade, vaginate at base; blade pale abaxially, green adaxially, bipinnate, primary leaflets 5 or 6 pairs; ultimate leaflets petiolulate to sessile, cuneate-ovate, 10–20 × 8–15 mm, 3–5-parted, lobes ovate, ± mucronate. Cauline leaves pinnate (to sub-bipinnate), shortly stalked or sessile. Ra-

cemes 10–20-flowered; bracts rhombic-ovate, 3–6 × 1–4 mm, often shortly stalked, entire to apically dentate, apex pointed, lowermost bracts sometimes larger and more divided. Pedicel 6–10 mm, at fruiting elongated to 15(–20) mm and ± arcuate. Sepals ovate, 1–2.5 mm, dentate, apex often shortly acuminate. Corolla amaranth or lavender; upper petal 18–23(–27) mm, crest narrow, entire, sometimes not obvious, rarely high and dentate (var. *denticulatocristata*); spur straight or slightly curved apically, cylindric, 8–13(–15) mm, obtuse; nectary extended through ca. 1/2 of spur; lower petal navicular, abaxially shallowly saccate near middle, contracted suddenly into short claw; inner petals pale yellowish, 9–12 mm, slightly longer than limb. Stigma compressed-orbicular, with 8 papillae, only basal pair geminate. Capsule oblong, 12–18 mm; style short, ca. 1.5 mm. Seeds in 1 row, orbicular, ca. 2.5 mm; caruncle covering to 1/3 of seeds. Fl. and fr. May–Aug.

• Understories of conifer forests, forest margins; 2400–4000 m. Gansu, Qinghai, N and NW Sichuan.

1a. Outer petals: crest narrow (0.5–1 mm),

entire ..... 65a. var. *livida*

1b. Outer petals: crest broader

(1–2 mm), dentate ..... 65b. var. *denticulatocristata*

**65a. *Corydalis livida* var. *livida***

红花紫堇(原变种) hong hua zi jin (yuan bian zhong)

*Corydalis punicea* C. Y. Wu ex Govaerts; *C. rosea* Maximowicz (1878), not Zeyher ex Steudel (1840).

Crest of outer petals 0.5–1 mm, entire to slightly dentate.

• Understories of conifer forests, stone crevices of forest margins; 2400–4000 m. Gansu, Qinghai, N Sichuan (Nanping).

One collection from Qinghai Hu, Qinghai, is remarkably large flowered (cf. *Corydalis straminea* var. *megacalyx*).

**65b. *Corydalis livida* var. *denticulatocristata*** Z. Y. Su in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 544. 1999 [“*denticulatocristata*”].

齿冠红花紫堇 chi guan hong hua zi jin

Crest of outer petals 1–2 mm, deeply dentate.

• Forest margins; 3100–3600 m. SE Qinghai (Maqên, Nangqên), NW Sichuan (Dêgê).

**66. *Corydalis regia* Z. Y. Su & Lidén, sp. nov.**高雅紫堇 *gao ya zi jin*

Type: China. Xizang: Baxoi Xian, valley of Dū Chu, alt. 12,000 feet, light dry soil, very light pine forest, 4 Jul 1936, *J. Hanbury Tracy 60* (holotype, BM).

*Corydalis lividae affinis, sed ab ea bracteis pedicellisque longioribus, sepalis majoribus, floribus latioribus atque apicibus petalorum interiorum atroviolaceis differt.*

Herbs, (perennial), ca. ?24 cm tall, glabrous. Rootstock and radical leaves unknown. Stem (possibly only upper part) with 2 leaves, simple. Cauline leaves subsessile; blade glaucous on both surfaces, less so above, oblong, 4–8 × 2–3 cm, pinnate, with 3 pairs of widely spaced pinnae; pinnae ovate, deeply cleft to pinnatifid into 3–5 obovate lobes (lowermost pinnae sometimes divided to midvein). Racemes 15-flowered, ca. 10 cm; lower 3 bracts distant, pinnate like upper leaf, 1.5–3.5 cm, middle and upper bracts entire, much smaller, rhombic-ovate, often shortly stalked, pointed, 3–6 × 1–4 mm. Lower pedicels 20–30 mm, upper pedicels 7–12 mm. Sepals purple, ca. 3 × 2 mm, rounded, distinctly acuminate, dentate. Corolla with broad profile, “pale magenta,” inner petals dark tipped; upper petal broadly spreading, 20–22 mm, obtuse and shortly pointed; crest very narrow or absent; spur slightly downcurved apically, cylindrical, 11–12 mm, very thick (ca. 4 mm), obtuse; nectary conspicuous, ca. 1/2 as long as spur; lower petal 13–14 mm, shallowly saccate near middle, contracted into short claw, limb broadly obtuse, shortly pointed; inner petals ca. 11 mm, dorsal crest small, not reaching apex. Stigma, fruit, and seeds unknown. Fl. Jul.

• Light dry soils in open *Pinus* forests; 3600–3700 m. E Xizang (Baxoi).

The specific epithet is derived from Latin *regius* (“of a king” or “regal”), appropriate for this stately plant.

**67. *Corydalis straminea* Maximowicz, Fl. Tangut. 44. 1889.**草黄堇 *cao huang jin*

Herbs, perennial, 30–75 cm tall. Rootstock stout, crowned with scales and residual petiolar bases. Stems ascending from scales or radical leaf axils, much branched, lower part without leaves, upper 1/2 with 4–7 leaves. Radical leaves ca. 1/2 as long as stems, long petiolate; blade pale glaucous abaxially, green adaxially, ovate or ovate-oblong, bipinnate; primary leaflets ca. 4 pairs, petiolulate; secondary leaflets sessile, 3-fid, sometimes again bifid to trifid; ultimate lobes lanceolate, 6–20 × 2–10 mm. Cauline leaves like radical leaves, but smaller and less divided, shortly petiolate to sessile. Racemes dense, 10–30-flowered, 3–10 cm; lowermost bracts leaflike or 3-lobed, others broadly lanceolate and entire, often with a distinct stalk, shorter to ca. as long as pedicels. Pedicel slender, 6–16 mm, to 20 mm and ± arcuate in fruit. Sepals small, 1–2 × 0.5–1 mm (ca. 8 × 3.5 mm in var. *megacalyx*), slightly dentate. Flowers straw-colored to yellow. Upper petal 16–23(–28) mm, without or with very narrow crest, straight; spur cylindrical or often thicker toward apex, 8–12(–15) mm, rounded at tip; nectary extended through ca. 1/2 of spur; lower petal navicular, base contracted; inner petals 8–

10 mm, claw ca. as long as limb. Stigma compressed-orbicular, with 8 papillae. Capsule linear, 13–19 mm. Seeds in 1 row, black, shiny, orbicular, 1.5–2 mm; caruncle broadly spreading, flat, appressed. Fl. and fr. Jul–Aug.

• Coniferous forests and margins; 2600–2700(–3800) m. SW Gansu, E Qinghai, ?N Sichuan.

- 1a. Sepals 1–2 mm; corolla 16–23 mm without crest ..... 67a. var. *straminea*  
 1b. Sepals ca. 8 mm; corolla ca. 28 mm with narrow crest ..... 67b. var. *megacalyx*

**67a. *Corydalis straminea* var. *straminea***草黄堇(原变种) *cao huang jin* (yuan bian zhong)

Sepals 1–2 mm. Corolla 16–23 mm without crest.

• Coniferous forests and margins; 2600–2700(–3800) m. SW Gansu (Jonê, along Tao He, Xiahe), E Qinghai (Anduo, Datong), ?N Sichuan (?Songpan).

**67b. *Corydalis straminea* var. *megacalyx* Z. Y. Su, var. nov.**大萼草黄堇 *da e cao huang jin*

Type: China. Qinghai: Haiyan Xian, Kokonor [Qinghai Hu], *P. Q. Zhong 8360* (holotype, KUN; isotypes, HNWP, PE, WUK).

*A var. straminea sepalis quadruplo majoribus corolla multo longiore differt.*

Sepals ca. 8 × 3.5 mm. Corolla ca. 28 mm with narrow crest.

• E Qinghai (Haiyan).

The varietal epithet refers to the large sepals, from Greek μέγας (*megas*, “big”) and κάλυξ (*calyx*, “calyx”).

**68. *Corydalis cheilosticta* Z. Y. Su & Lidén, Novon 17: 494. 2007.**斑花紫堇 *ban hua zi jin*

Herbs, perennial. Rootstock vertical, stout, densely clothed at apex with dead petiolar bases. Stems rather long and slender, 25–55(–85) cm × 1.5–5 mm, lower 1/3 leafless, with 4–8 leaves above, branched. Radical leaves: petiole 4–10 cm; blade 6–11 × 3–5 cm; cauline leaves subsessile; blade narrowly oblong-ovate in outline, pinnate with 5(or 6) pairs of leaflets; basal pair of pinnae smallest; lower and middle leaves 8–17 × 3–5 cm; upper leaves much smaller. Leaflets shortly stalked, subpinnately or ternately divided with leaflets cut into 2–5 broadly obovate usually mucronate lobes. Racemes 7–15-flowered, dense, elongating in fruit; bracts obovate-rhombic, 3–7 mm, cuneate at base, tapering to a pointed apex, entire or lowermost usually divided, often slightly erose-dentate apically; upper bracts smaller. Pedicel 6–7 mm, 9–15 mm and slightly arcuately recurved in fruit. Sepals ovate to lanceolate, 3–4 × 1–2 mm, dentate. Corolla either cream with distinct red margins to lower lip or muddy pink-purple, narrowly crested; spur of upper petal straight or slightly sigmoidally curved, cylindrical, 9–12 mm, obtuse; nectary 1/2–2/3 as long as spur; lower petal with a narrow straight basal 1/3, slightly and broadly saccate at middle, with sharply contrasting crimson or purplish brown margins in distal

1/3; inner petals 9–11 mm. Stigma with 8 papillae. Capsule narrowly oblong, subtorulose, 10–20 mm, 3–6-seeded. Seeds slightly flattened, ca. 2 mm, smooth, with large elaiosome. Fl. and fr. Jul.

• Among shrubs on steep rocky hillsides, mossy calcareous ledges under *Juniperus*, steep rocky sides of river gorges, rocky banks by streams; 3300–4000 m. Gansu, Qinghai.

- 1a. Outer petals cream with red margins to lower petal; nectary ca. 1/2 as long as spur ..... 68a. subsp. *cheilosticta*  
 1b. Outer petals muddy pink-purple; nectary ca. 2/3 as long as spur ..... 68b. subsp. *borealis*

**68a. *Corydalis cheilosticta* subsp. *cheilosticta***

斑花紫堇(原亚种) ban hua zi jin (yuan ya zhong)

Outer petals cream with distinct red margins to lower lip; nectary ca. 1/2 as long as spur.

• Mossy calcareous ledges under *Juniperus*, steep rocky sides of river gorges, rocky banks by streams; 3300–3600 m. Qinghai.

**68b. *Corydalis cheilosticta* subsp. *borealis* Lidén & Z. Y. Su, Novon 17: 495. 2007.**

北邻斑花紫堇 bei lin ban hua zi jin

Outer petals muddy pink-purple, broader, without contrasting margins; nectary ca. 2/3 as long as spur.

• Among shrubs on steep rocky hillsides; 3500–4000 m. Gansu (Nanshan), Qinghai (Maqên).

**69. *Corydalis lophophora* Lidén & Z. Y. Su, Novon 17: 495. 2007.**

齿冠紫堇 chi guan zi jin

Herbs, perennial. Rootstock stout, crowned by fibrous remnants of petioles. Stems few to several, 20–30 cm, sparingly branched, with 4 or 5 leaves. Radical leaves 14–25 cm, including petiole 7–8 cm, triangular in outline, bipinnate with stalked primary leaflets; leaflets ternately cut to ca. 2/3 into obovate lobes often again shallowly 2- or 3-fid. Cauline leaves simply pinnate to sub-bipinnate, subsessile, lowermost pair of pinnae small, distant from other and “stipular” in appearance; leaflets ovate in outline, shallowly cut into broad obtuse lobes. Racemes subsecund, 9–15-flowered, dense, elongating in fruit; axillary racemes from uppermost leaves common; bracts obovate-rhombic, 5–7 mm, cuneate or with a distinct stalk, entire, acuminate at apex, upper ones smaller and narrower; lowermost bract sometimes larger and slightly divided. Pedicel 7–8 mm, elongating to 12 mm and arcuately recurved in fruit. Sepals 5–8 × 3–4 mm, lacerate-dentate, often with narrow apex. Corolla purple, lilac, dull pink, or white flushed with red; outer petals with high short dentate crests; spur 10–13 mm, not tapering toward obtuse slightly downcurved apex; nectary ca. 1/2 as long as spur; lower petal broadly saccate except for short claw, with broad distal 1/3; inner petals 10–12 mm, darker at apex. Stigma with 8 papillae. Capsule oblong, 5–8-seeded. Fl. and fr. Jun–Aug.

• Cliffs, scree; 2600–3800 m. Qinghai (Maqên).

**70. *Corydalis grandiflora* C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 11: 314. 1989.**

丹巴黄堇 dan ba huang jin

Herbs, perennial, glaucous, fleshy. Rootstock cylindrical, 10–15 × 1–1.5 cm, with fibrous remains of leaf- and stem-bases. Stems 1–4, pale purple-green, 15–30 cm, simple, above middle with 2 or 3 leaves. Radical leaves few to several; petiole 5–10 cm; blade obovate-oblong, 9–14 × 4–6 cm, simply pinnate with 3 or 4 pairs of leaflets; lateral pinnae 2–4 × 2–3 cm, cleft to middle or less into 2–4 rounded lobes, entire or with a couple of coarse teeth. Cauline leaves: petiole to 1 cm with 1 or 2 pairs of leaflets, or uppermost leaves simple; leaflets like in radical leaves. Racemes 4–6 cm, densely 7–25-flowered, subsecund; lower bract broadly ovate, ca. 3 × 2.5 cm, trifid; middle and upper bracts ovate to broadly lanceolate, 12–20 × 5–9 mm, cuneate at base, entire. Pedicel ca. 10 mm in flower, 10–20 mm in fruit. Flowers yellow. Sepals ovate, 4–6 × 1.5–2 mm, denticulate, attenuate into a long slender tip. Outer petals broad, acute, crest high, entire, shortly extending beyond petal apices; upper petal 27–29 mm, spur slightly downcurved at tip, cylindrical, short and broad, 7–8 × 3–4 mm, rounded-obtuse; nectary nearly extended to spur base, apex slightly thickened; inner petals ca. 15 mm, claw equal to limb. Stigma nearly orbicular, with 8 papillae. Capsule linear-oblong, 18–21 mm, 5–8-seeded; style ca. 4 mm. Seeds rounded, ca. 2.6 mm, smooth, with shallowly lobed appressed elaiosome.

• Alpine stone crevices. W Sichuan.

**71. *Corydalis praecipitorum* C. Y. Wu, Z. Y. Su & Lidén, Edinburgh J. Bot. 54: 83. 1997.**

峭壁紫堇 qiao bi zi jin

Herbs, perennial, glabrous. Rootstock cylindrical, elongate, ca. 1 cm in diam., simple or branched, apically with fibrous remains of leaf- and stem-bases. Stems 1–3, 10–26 cm, simple, lower 1/2 without leaves, upper 1/2 with 1–3 small leaves. Radical leaves few; petiole 5–7 cm; blade obovate-oblong, 5–9 × 3–4 cm, simply pinnate, with (3 or)4(or 5) pairs of leaflets. Leaflets sessile to shortly (1–3 mm) stalked, ovate to orbicular, 1.5–2.2 × 1–2.4 cm, shallowly to deeply cleft into 2–5 broad obtuse lobes; lowermost leaflets smaller and often entire. Cauline leaves subsessile with 1(or 2) pairs of usually entire leaflets; terminal leaflet shallowly trifid. Racemes subsecund, 4–10-flowered, dense, much elongating in fruit. Pedicel 5–8 mm, elongating to 10–17 mm in fruit. Bracts shortly stalked; lowermost broadly ovate, 10–20 × 10–20 mm, entire or trifid; upper 5–10 × 2–5 mm, entire. Flowers red-purple. Sepals broadly ovate-triangular, 3–4 × 2.5–3 mm, finely dentate. Outer petals broad, with 6–8 × 1–2 mm, entire to slightly undulate crest extending shortly beyond apex; spur straight, 7–8 × ca. 4 mm, obtuse; nectary ca. 2/3 as long as spur; inner petals 12–13 mm, claw slightly shorter than limb. Stigma rounded, with 8 papillae. Capsule (immature) oblong, ca. 5-seeded; style 3–4 mm. Fl. and fr. Jul–Aug.

• Cliffs, limestone crevices; 3400–3500 m. S Gansu (Têwo).

**72. *Corydalis crista-galli*** Maximowicz, Fl. Tangut. 47. 1889.鸡冠黄堇 *ji guan huang jin*

Herbs, perennial, glabrous. Rootstock cylindrical, elongate, 1–1.5 cm, with fibrous remains of leaf- and stem-bases at apex. Stems 1 to several, 10–26 cm, simple, with 2–4 leaves, naked at lower 1/4–1/3. Radical leaves few; petiole 4–9 mm; blade oblong, 5–11 × 2–4 cm, simply pinnate; lateral pinnae 2–4 pairs, sessile or shortly petiolulate, cordate-orbicular, 10–24 × 11–22 mm, coarsely dentate to shallowly cut; ultimate lobes or teeth rounded, mucronate. Cauline leaves like radical, shortly stalked; upper ones progressively smaller and less divided, subsessile. Racemes dense, 5–15-flowered, elongating in fruit; bracts obovate, 4–10 × 2–4 mm, cuneate at base, subentire, or lowermost much larger and ± divided. Pedicel 5–13 mm. Flowers 20–25 mm, yellowish white with a large brownish purple blotch across limb and crest of apex of lower petal. Sepals green-purple, with rounded body 2–3 × 2–3 mm and long narrow tip to 3 mm. Outer petals subacute with short broad dentate crests; spur ± decurved, cylindrical, ca. 10 × 3 mm, obtuse; inner petals 12–14 mm, claw equaling or slightly longer than limb; lower petal with short narrow basal 1/4, shallowly saccate at middle. Stigma rounded, with 8 papillae.

• Alpine meadows and shrubs, along rivers; 4300–4600 m. SW Qinghai (Kongqionqu River).

**73. *Corydalis potaninii*** Maximowicz, Fl. Tangut. 48. 1889 [*“potanini”*].半裸茎黄堇 *ban luo jing huang jin*

Herbs, perennial, 28–50 cm tall. Rootstock elongate, branched, to 4 cm in diam. at apex, with fibrous remnants of leaf bases and old stems. Stems 1–4, suberect to ascending, simple or branched, lower part without leaves, upper 1/2–3/4 with 2–4 leaves. Radical leaves few to several; petiole 8–14 cm; blade pale abaxially, green adaxially, ovate to ovate-triangular, 5–10 × 5–10 cm, pinnate, usually with 3 pairs of shortly stalked to sessile leaflets; terminal one larger, elliptic, base cuneate, 3-parted, lobes bifid to trifid; lateral ones broadly ovate, deeply trifid; ultimate lobes ovate or lanceolate, coarsely dentate, acute. Cauline leaves shortly stalked to sessile; blade 4–6 × 3–5 cm. Racemes dense, 9–20-flowered; lower bracts incised, others linear-lanceolate, all longer than pedicels. Pedicel 5–8 mm, at fruiting slightly elongated. Sepals deltoid, ca. 2 mm, dentate. Flowers yellow, rarely nearly white (or ?purple, see *Corydalis sigmantha*), sigmoidally curved, 20–25 mm. Outer petals with short very high crests extending conspicuously beyond petal apex; spur recurved at apex, cylindrical, 9–11 mm, obtuse; nectary ca. 2/3 as long as spur; lower petal with narrow basal part ca. 5 mm, slightly expanded; inner petals 13–14 mm, claw ca. equal to petal lobes, slender. Stigma rounded to square, with 8 papillae. Capsule linear, moniliform, 1–1.5 cm, ca. 5-seeded; style ca. 3 mm. Seeds in 1 row.

• Forest margins, alpine grasslands; 2500–4000 m. SW Gansu (Jonê, Xiahe, Xigu), E Qinghai (Anduo, Datong, Menyuan), NW Sichuan.

**74. *Corydalis sigmantha*** Z. Y. Su & C. Y. Wu, Acta Bot. Yunnan. 19: 228. 1997.甘南紫堇 *gan nan zi jin*

*Corydalis hebephylla* C. Y. Wu & Z. Y. Su var. *glabrescens* C. Y. Wu & Z. Y. Su.

Herbs, perennial, erect, 40–60 cm tall. Rootstock elongate, 1–1.5 cm thick, thicker at apex with dense fibrous residual petiolar bases, sparingly branched. Stems sulcate, leafy in upper 2/3 but branched mainly in upper 1/3. Radical leaves few; petiole 5–15 cm; blade gray abaxially, dull glaucous green adaxially, ovate-oblong, 8–20 × 5–10 cm, simply pinnate with 2–4 pairs of leaflets; leaflets shortly stalked to sessile, ovate, 3–5 × 1.5–3.5 cm, largely and irregularly sharply serrate to obtusely lobed. Cauline leaves like radical leaves, but much smaller, petiolate or sessile, with 1 or 2 pairs of leaflets, decreasing in size upward, uppermost simple, deeply and sharply lobed. Racemes dense, 10–25-flowered, 5–10 cm in flower, much elongating in fruit; lower bracts often like leaflet of uppermost leaf; upper bracts lanceolate, 10–20 × 1–5 mm, entire. Pedicel 6–15 mm. Flowers purple, inner petals pale. Sepals dark purple, ca. 5 × 2 mm, long attenuate, dentate at base. Upper petal sigmoidally curved, apically with broad rounded margins; crest ca. 3 mm high, entire, much extended beyond petal apex; spur decurved, cylindrical, 11–13 mm, 3–4 mm wide, obtuse; nectary extended through ca. 2/3 of spur; lower petal apically like upper petal with rather broad front 1/3, slightly saccate middle 1/3, and narrow basal 1/3; inner petals ca. 15 mm, claw slightly longer than limb. Stigma with 8 papillae. Capsule linear, to 20 mm, ± constricted between seeds, 3–6-seeded; style ca. 4 mm. Fl. and fr. Jul–Aug.

• Alpine grasslands among rocks; 2800–4300 m. S Gansu (Zhugu), N Sichuan (Maonian, Songpan).

This taxon is very similar to *Corydalis potaninii* but with purple (not yellow) flowers.

**75. *Corydalis hebephylla*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 11: 312. 1989.毛被黄堇 *mao bei huang jin*

Herbs, perennial, ca. 50 cm tall. Roots and radical leaves not seen. Stems ridged, lower part without leaves, upper part with 4 or 5 leaves, papillose. Cauline leaves shortly petiolate to sessile, lowermost leaf 10–13 × 7–10 cm, upper leaves much smaller; blade pale abaxially, green adaxially, oblong or broadly ovate, simply pinnate with 1–3 pairs of leaflets, or uppermost simple; leaflets 4–5 × 3–4 cm, deeply 2- or 3-fid, lobes with a few coarse teeth. Main raceme 6–7 cm, dense, 20–35-flowered; axillary racemes from small uppermost leaves ca. 10–15-flowered; bracts narrowly lanceolate, ca. 10 mm. Pedicel 8–12 mm, slightly elongating and recurved in fruit. Sepals ovate, small, with distant teeth, apex caudate-mucronate. Flowers yellow, apex purplish, narrow. Upper petal without crest, 19–20 mm; spur cylindrical, ca. 9 mm, narrow; nectary extended nearly to spur end; lower petal 12–14 mm, without crest; inner petals ca. 12 mm, claw ca. equal to petal lobes. Stigma nearly orbicular, with 8 papillae. Capsule oblong, 10–14 × ca. 3 mm excluding style ca. 3 mm, 4- or 5-seeded. Seeds in 1 row, ca. 2 mm.

• Forest understories, grasslands on slopes; 4100–4400 m. N Sichuan (Barkam, Jinchuan).



14. *Corydalis* sect. *Oocapnos* Popov ex Wendelbo in K. H. Rechinger, Fl. Iran. 110: 11. 1974.

囊果紫堇组 nang guo zi jin zu

*Cysticorydalis* Fedde.

Seedlings with 1 cotyledon. Herbs, perennial, gray-glaucous, fleshy, with long thin rootstock. Stems from basal leaf axillary, near base attenuate, upper part with 1 or 2 (or 3) leaves. Flowers white to light blue, in dense racemes. Fruit inflated, globose, indehiscent, with many seeds.

Three or four species: from C Asian alpine regions to the W Himalayas and C Xizang, occurring in cold and dry alpine scree; two species (one endemic) in China.

The Himalayan *Corydalis crassifolia* Royle (Ill. Bot. Himal. Mts. 1: 68. 1834) is not known from China, but its occurrence there is highly probable.

1a. Leaves almost entire to ternatisect to sub-pinnatifid, rounded in outline ..... *C. crassifolia* (see note above)

1b. Leaves much more divided, ovate.

2a. Leaves tripinnate; bracts entire to incised; spur almost as long as limb ..... 76. *C. fedtschenkoana*

2b. Leaves (bi-)pinnate; bracts more divided; spur ca. 1/5 as long as limb ..... 77. *C. retingensis*

**76. *Corydalis fedtschenkoana*** Regel in Regel & Schmalhausen, Izv. Obsh. Ijub. Estv. Antr. Etnogr. 34(2) [Descr. Pl. Nov. Fedtsch.]: 3. 1882.

Alpine scree; 3700–4500 m. W Xinjiang (Taxkorgan, Tian Shan) [Afghanistan, Tajikistan; C Asia (Pamir-Alai)].

**77. *Corydalis retingensis*** Ludlow, Bot. Not. 121: 278. 1968.

囊果紫堇 nang guo zi jin

天山囊果紫堇 tian shan nang guo zi jin

*Cysticorydalis fedtschenkoana* (Regel) Fedde.

Herbs, perennial, metallic gray-glaucous, fleshy, basal part hidden in scree. Rootstock elongate, narrow, branched. Stems ascending, 10–15 cm, base thin and leafless, upper part with 1–3 small leaves. Radical leaves several, spreading on scree; petiole 7–15 cm; blade ovate, 10–18 × 5–8 cm, tripinnate with ca. 10 pairs of primary leaflets; ultimate lobes densely crowded, ovate, folded/channeled, obtuse to mucronate. Cauline leaves much reduced. Raceme capitate, 20–40-flowered; lowermost bract(s) leaflike, middle and upper bracts oblong to lanceolate, slightly longer than pedicels, entire. Sepals 2–5 mm, dentate, with ovate body abruptly narrowed into a narrow tip. Flowers straight, white with blackish purple apical keels. Upper petal ca. 2 cm, without crest; spur swollen and downcurved at tip, 8–9 mm; inner petals 11–12 mm, claw shorter than limb. Stigma rounded, with 8–10 papillae. Capsule globose, inflated, 2–3.5 cm, fruit wall membranous when dry, with reticulate veins. Seeds brownish black, ca. 2 mm, flattened with obtuse back; caruncle small, deeply divided. Fl. and fr. Jul.

Herbs, perennial, gray-glaucous, fleshy. Rootstock branched, apex with residual leaf bases. Stems simple, 15–17 cm in total, lower part thin and pale, buried within scree, with 1 or 2 leaves close below inflorescence. Radical leaves (one seen): petiole 6–7 cm, including narrow underground part; blade broadly ovate, ca. 4 × 3 cm, biternate; primary leaflets stalked, secondary leaflets ± deeply 2–4-fid; segments obovate, ca. 10 × 5 mm, obtuse. Cauline leaves: petiole 1–1.5 cm; pinnae sessile. Raceme very dense, 10–12-flowered; lower bracts leaflike, shortly petiolate to sessile; upper bracts smaller, narrower, less divided. Pedicel ± recurved and much elongating in fruit to 2.5 cm, apex thickened. Flowers dirty white, ca. 1.7 cm; spur saccate, ca. 3.5 mm; nectary broad, short, extended through ca. 1/2 of spur. Stigma nearly square, with 8 papillae. Capsule inflated, globose, 1.5–2 × ca. 1.5 cm, 8–10-seeded; style ca. 2.5 mm. Seeds black, shiny, orbicular, ca. 1.5 mm in diam. Fr. Aug.

• Alpine stony scree; ca. 4800 m. C Xizang (Dangxiong, Lhasa, Linzhou).

15. *Corydalis* sect. *Rupifragae* C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 15: 135. 1993.

石隙紫堇组 shi xi zi jin zu

Herbs, perennial. Rootstock stout, covered with residual petiolar bases. Stems without or with only 1 leaf. Radical leaves many, long petiolate; blade glaucous, fleshy; bracts entire. Pedicel elongating considerably in fruit. Flowers blue. Stigma square, apex with 4 papillae. Capsule oblong, with 2 rows of seeds, probably not explosively dehiscent.

• One species: China.

**78. *Corydalis rupifraga*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 15: 135. 1993.

石隙紫堇 shi xi zi jin

Herbs, perennial, clustered, glaucous, 10–18 cm tall, glabrous. Rootstock elongate, ca. 8 × 1–1.5 cm, stout, covered throughout with residues of petiolar bases, apex with 2–5 stems

and many basal leaves. Stems simple, naked or with 1 (rarely 2) leaves. Radical leaves ca. as long as stems; petiole 10–15 cm; blade glaucous on both surfaces, paler abaxially, 3–6 × 3–6 cm, ternate (rarely simple); leaflets petiolulate, broadly ovate, 2.5–3 × 3–3.5 cm, trifid to 1/3–2/3, leaflets again shallowly lobed; ultimate lobes rounded-obtuse; lateral leaflets smaller, subsessile. Racemes dense at first, much elongating in fruit, 4–11-flowered; bracts spatulate, lower 20–30 × 5–10 mm, entire,

upper smaller and narrower. Pedicel suberect, slender, 10–15(–20) mm in flower, in fruit elongating considerably to 25–50 mm, becoming slightly thicker and irregularly curved, possibly geocarpic. Flowers indigo. Sepals broadly ovate, ca. 3 × 3 mm, finely dentate. Upper petal ca. 2 cm, acute, without crest; spur cylindric, 9–10 mm; nectary 4–5 mm; lower petal with broad indistinct claw and short subacute limb; inner petals ca. 11 mm, claw ca. as long as limb. Ovules ca. 16; stigma square,

with 4 apical papillae and didymous lateral and basal papillae. Capsule (immature) oblong, ca. 10 × 3 mm, probably not explosively dehiscent; style 3–4 mm. Seeds in 2 rows.

• Limestone cliffs near river; ca. 2800 m. C Yunnan (Jingdong: above Gongpinghe).

This is a very peculiar, taxonomically isolated species known only from the type gathering.

**16. *Corydalis* sect. *Dactylo tuber* (Ruprecht) Popov in Schischkin, Fl. URSS 7: 674. 1937.**

指裂延胡索组 zhi lie yan hu suo zu

*Capnites* sect. *Dactylo tuber* Ruprecht, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 15(2): 58. 1869; *Corydalis* subsect. *Elongatae* Poellnitz.

Tuber/rootstock almost rounded to oblong, not hollow, usually branched below. Stems branched or not, lower part often underground, usually with 1–3 scales and 2–6 leaves. Leaves once to 3 × ternately compound (entire in *Corydalis ludlowii*); petiole vaginate at base. Racemes corymbose, few flowered; bracts usually entire. Capsule nutant from straight pedicel, obovoid, explosively dehiscent (except probably in *C. gyrophylla* and *C. hepaticifolia*, which might be erroneously placed in this section).

Thirteen species: C Asia from Sayan Mountains to NW North America, Caucasus to NW Turkey, China, Himalayas; nine species (seven endemic) in China.

The W Mongolian/S Siberian *Corydalis pauciflora* (Stephan ex Willdenow) Persoon (Syn. Pl. 2: 269. 1806) has been given for N Xinjiang (FRPS 32: 448. 1999). We have been unable to locate any Xinjiang material of this species, but the Altai occurrences in W Mongolia are geographically close. *Corydalis pauciflora* is easily distinguished from related species by its tall straight simple erect stem, more floriferous raceme (up to 10 flowers), larger bracts, larger sepals (ca. 2 × 2 mm), broader corolla, and much larger pouch or spurlet at the base of the lower petal.

We have not seen *Corydalis pauciflora* var. *foliosa* L. H. Zhou (Fl. Qinghai. 1: 508. 1997), described from E Qinghai.

- 1a. Leaves uni- or trifoliolate.
- 2a. Leaf simple ..... 81. *C. ludlowii*
- 2b. Leaf with 3 entire leaflets.
- 3a. Peduncle erect in fruit; inner petals 9–13 mm ..... 82. *C. hemidicentra*
- 3b. Peduncle arcuately recurved in fruit; inner petals 6–7 mm.
- 4a. Flowers sky-blue; tuber elongate, branched below ..... 80. *C. hepaticifolia*
- 4b. Flowers pale pinkish blue; tuber rounded ..... 79. *C. gyrophylla*
- 1b. Leaves more divided.
- 5a. Limb of lower petal 5–9 mm wide, much broader than claw.
- 6a. Stems erect, simple ..... *C. pauciflora* (see note above)
- 6b. Stems ascending, branched.
- 7a. Peduncle erect; fruiting pedicels erect; limb of lower petal subacute ..... 83. *C. alaschanica*
- 7b. Peduncle arcuately recurved in fruit; limb of lower petal emarginate ..... 79. *C. gyrophylla*
- 5b. Limb of lower petal 3–4 mm wide, slightly broader than claw.
- 8a. Stigma with 6 apical papillae; “lower petal obtuse, with small spur; spur of upper petal almost 2 × as long as lower petal” (NW Xinjiang) ..... 84. *C. pseudoalpestris*
- 8b. Stigma with 4 apical papillae; lower petal acute, straight or saccate, but not spurred; spur of upper petal 0.9–1.4 × as long as lower petal.
- 9a. Peduncle 3–8 cm, overtopping leaves ..... 85. *C. hsiaowutaishanensis*
- 9b. Peduncle 0.5–3 cm, not overtopping leaves.
- 10a. Flowers yellow ..... 86. *C. tianzhuensis*
- 10b. Flowers blue to purplish blue ..... 87. *C. tangutica*

**79. *Corydalis gyrophylla* Lidén, Willdenowia 26: 33. 1996.**

裸茎延胡索 luo jing yan hu suo

Herbs, perennial, 10–20 cm tall, tuberous, glabrous. Tuber short, 1–2 × ca. 1 cm. Stems ascending, weak, with thin underground base without scale leaves, leafy and branched. Cauline leaves 4–5 cm stalked; blade glaucous abaxially, green adaxially, 1–2 × 1–2 cm, ternately compound; leaflets obovate, entire to deeply 3-fid. Racemes corymbose, 2–4-flowered, with long

peduncle, at first suberect, in fruit recurved and approaching ground; bracts ovate, ca. 4 × 3 mm, entire. Pedicel erect, 10–15 mm, slightly elongating and somewhat arcuate in fruit. Flowers pale blue, with pinkish suffusion. Sepals ca. 1 mm, ± deeply divided. Outer petals without crest, limbs broad and flat, entire to denticulate, apex emarginate; upper petal 17–20 mm; spur straight to sigmoidally curved and slightly tapering toward apex, 11–13 mm; nectary ca. 3/5 as long as spur; lower petal 9–10 mm, shortly clawed, at very base sometimes with small nar-

row spurlet; limb 7–9 mm wide, rounded, emarginate; inner petals ca. 6 mm. Ovules 12; stigma rounded, with 8 papillae; basal papillae close to style didymous. Capsule (immature) dorsiventrally flattened, broadly ovoid, abruptly narrowed into a short beak, ?probably not explosively dehiscent. Fl. and fr. Jun–Jul.

• Stony places in meadows, among rocks; 3800–4500 m. NW Sichuan (Dêgê), E Xizang (Nian La).

**80. *Corydalis hepaticifolia*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 4: 2. 1982.

假樟耳紫堇 *jia zhang er zi jin*

Herbs, perennial. Tuber oblong, 20–30 × 3–5 mm, branched. Underground part of stem 2–5 cm, with 1 or 2 small scale leaves; aerial part 3–7 cm, branched, with 2–5 leaves. Petiole 3–7 cm with vaginate base; blade glaucous abaxially, green adaxially, trifoliolate; leaflets sessile, broadly ovate to obovate, 5–15(–20) × 4–10 mm, fleshy, obtuse. Racemes terminal and axillary, densely 1–5-flowered; peduncle 3–5 cm, at fruiting recurved and slightly thickened, burying capsules at base of plant; bracts ovate to obovate, 3–5 × 1–3 mm. Pedicel erect, straight, 3–11 mm, slender. Flowers blue. Sepals rounded, 1–2 × 1–2 mm, finely dentate. Outer petals with narrow crest; upper petal 13–14 mm; spur straight, cylindrical, 7–8 mm; nectary very thin, ca. 2/3 as long as spur; lower petal ca. 9 mm, with broad claw expanded into a broad limb ca. 5 mm, obtuse or usually abruptly narrowed into an acute tip, often slightly saccate at base; inner petals whitish with indigo apex, ca. 7 mm. Stigma with 4 prominent apical papillae and smaller lateral and basal papillae. Capsule obovoid, 5–7 × ca. 3 mm, ?possibly not explosively dehiscent, 7–10-seeded; style ca. 2 mm. Seeds compressed-orbicular, ca. 1.5 mm; caruncle small. Fl. and fr. Jun–Aug.

• Alpine stony scree (“siliceous metamorphites”); 4500–5100 m. SE Xizang (Gyaca).

**81. *Corydalis ludlowii*** Stearn, Bull. Brit. Mus. (Nat. Hist.), Bot. 5: 57. 1975.

单叶紫堇 *dan ye zi jin*

Herbs, perennial. Rootstock ca. 6 cm × 4–7 mm, branched below. Stems few, underground part 3–4 cm, with 2–4 amplexicaul lanceolate or ovate scales 5–8 mm; aerial part 10–17 cm, branched, with 3 or 4 leaves crowded at base. Leaves simple; petiole 4–8 cm; blade glaucous abaxially, green adaxially, nearly orbicular, 1.2–4 × 1–4.3 cm, fleshy, glabrous, base cordate, margin entire. Racemes 3–6-flowered, condensed; peduncle 10–16 cm; bracts obovate or oblanceolate, 5–10 × ca. 3 mm. Pedicel 1–1.5 cm, slender. Flowers light blue, inner petals white. Sepals persistent, ovate, ca. 1 mm, dentate, acute. Outer petals with broad obtuse limb, ecristate; upper petal ca. 24 mm; spur straight or slightly curved, cylindrical, 11–13 mm, obtuse; nectary 6–8 mm; lower petal ca. 13 mm, base shallowly saccate, limb extended beyond upper petal; inner petals 9–10 mm. Stigma slightly broader than long with 8 prominent papillae, lowermost pair geminate. Capsule elliptic to lanceolate, 10–15 × ca. 3 mm, ca. 10-seeded; style ca. 2 mm. Fl. and fr. Jun.

• Sandy marshes; 3600–3700 m. E Xizang (Bomi).

**82. *Corydalis hemidicentra*** Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 57: 86. 1920.

半荷包紫堇 *ban he bao zi jin*

Herbs, perennial. Tuber cylindrical, 3–6 cm, branched or not. Stems branched, with long pale slender underground parts with 2 or 3 scales. Leaves crowded at base, long petiolate, trifoliolate; leaflets sessile, grayish blue-green, densely mottled with darker and lighter spots and streaks, resembling a lichen-covered rock, orbicular to ovate, 1–3 × 1–2.5 cm, fleshy, obtuse. Racemes umbellate, dense, 3–9-flowered; peduncle 3–10 cm; bracts obovate, (3–)5–15 mm, obtuse. Pedicel straight, 7–30 mm, stout. Sepals rounded, ca. 1.5 mm, shallowly dentate. Flowers light blue, with slightly darker margins. Outer petals acute, usually crested; upper petal ± arcuately upcurved, (1.6–)1.8–2.3 cm; spur nearly straight or upcurved, sometimes downcurved at apex, 1.2–1.5 cm; nectary extended through 2/3–3/4 of spur, apex obtuse; lower petal with rhombic-acute limb, base with shallow sac; inner petals 9–13 mm. Stigma much wider than long, thick, with 2 distinct apical papillae and 2 large diffuse lateral papillae; geminate papillae lacking. Capsule nutant on erect pedicel, obovoid, 7–12 × 3–4.5 mm, explosively dehiscent, 5–10-seeded; style 2–3 mm. Fl. and fr. Jul–Sep.

• Alpine stony scree; 3500–5300 m. SE Xizang (Shu La N of Meili Xueshan on border with Yunnan), NW Yunnan.

**83. *Corydalis alaschanica*** (Maximowicz) Peschkova, Bot. Zhurn. 75: 86. 1990.

贺兰山延胡索 *he lan shan yan hu suo*

*Corydalis pauciflora* (Stephan ex Willdenow) Persoon var. *alaschanica* Maximowicz, Enum. Pl. Mongol. 37. 1889; *C. pauciflora* var. *holaschanica* Fedde.

Herbs, perennial. Tuber cylindrical or oblong, branched or not. Stems 5–15 cm, soft, branched, with leaves. Leaves pale glaucous abaxially, green adaxially, ternate; terminal leaflet petiolulate, lateral ones nearly sessile; leaflets deeply 3–5-divided, lobes obovate obtuse. Racemes dense, ca. 5-flowered; bracts ovate, 4–5 mm, subacute. Pedicel 5–10 mm. Flowers amaranth to blue. Sepals rounded, 0.5–1 mm, shallowly dentate. Outer petals broad, acute, without or with short crest; upper petal 19–23 mm; spur straight to subsigmoidally curved, cylindrical, 9–11 mm; nectary extended through 1/3–2/3 of spur; lower petal with broad rhombic subacute limb and narrow claw, sometimes with small subacute spurlet at base; inner petals 8–10 mm. Stigma square with 4 apical papillae and 2 small geminate papillae on each side. Capsule obovoid-oblong, 10–12 × ca. 3 mm, ca. 10-seeded.

• Rock crevices; 1700–3400 m. Gansu (Helan Shan), Nei Mongol (Helan Shan), Ningxia (Helan Shan).

**84. *Corydalis pseudoalpestris*** Popov in Schischkin, Fl. URSS 7: 750. 1937.

假高山延胡索 *jia gao shan yan hu suo*

Herbs, perennial. Tuber oblong, 2–4 cm. Stems 5–10 cm, branched, with 2–4 leaves, underground pale part with 2 scale leaves. Leaves long petiolate, vaginate at base; blade  $\pm$  glaucous, slightly thick, ternate; leaflets sessile or terminal one petiolulate, deeply 2- or 3-cleft; segments again shallowly bifid to trifid; ultimate segments obovate to elliptic or oblong, apex subobtusate to acute. Racemes not overtopping leaves, densely 1–4-flowered; peduncle 2–4 cm; bracts obovate, 4–6 mm, apex obtuse. Pedicel erect, 2–5 mm. Sepals ca. 1 mm, shallowly dentate. Corolla (not seen, based on original description) whitish or light blue, apex bluish violet; upper petal ca. 1.7 cm, obtuse; spur straight but downcurved at apex, almost  $2 \times$  as long as lower petal, slender; lower petal with short acute spurlet, limb obtuse. Stigma with broad apex, rounded-cuneate at base, with 6 apical papillae and 1 pair of small lateral papillae. Capsule 10–12  $\times$  4–5 mm, ca. 10-seeded; style ca. 1.5 mm. Fl. and fr. Jun–Jul.

Alpine rocks and rocky streams. NW Xinjiang (Tarbagatay Shan) [Kazakhstan].

**85. *Corydalis hsiaowutaishanensis*** T. P. Wang, Contr. Inst. Bot. Nat. Acad. Peiping 2: 301. 1934.

五台山延胡索 *wu tai shan yan hu suo*

Herbs, perennial. Tuber oblong, 5–20  $\times$  5–10 mm, base divided or not. Stems ascending to erect, 4–18 cm, branched, at base with 1–3 scales. Cauline leaves long petiolate, vaginate at base, strongly glaucous abaxially, green or glaucous adaxially, ternate; leaflets sessile, deeply divided into 2 or 3 obovate segments, entire or again shallowly divided into overlapping lobules. Racemes densely (1 or) 2–5-flowered; peduncle 3–8 cm, thickened; bracts broadly obovate, 5–10 mm. Pedicel 3–6 mm, straight at fruiting. Flowers nutant, pale purple. Outer petals narrow, acute, narrowly crested or ecristate; upper petal (15–)18–21 mm; spur straight or downcurved at tip, 10–12 mm; nectary extended through ca. 2/3 of spur, apex obtuse; lower petal navicular; inner petals 7–8 mm. Stigma with broad apex, rounded-cuneate at base, apically with 4 papillae, lateral geminate papillae small or absent. Capsule pendent from erect pedicel, obovoid, 8–12  $\times$  3–5 mm, 4–10-seeded; style ca. 1.5 mm. Fl. and fr. May–Jul.

• Mountain slopes; 2000–3000 m. W Hebei (Xiaowutai Shan), NE Shanxi (Wutai Shan).

**86. *Corydalis tianzhuensis*** M. S. Yan & C. J. Wang, Bull. Bot. Res., Harbin 9(3): 21. 1989.

天祝黄堇 *tian zhu huang jin*

*Corydalis bokuensis* L. H. Zhou.

Herbs, perennial. Tuber rounded, 6–10 mm in diam., not divided or base bifid. Stems 5–10 cm, below with 2 or 3 scales, above with 2 or 3 closely set leaves, branched. Leaves long petiolate, vaginate at base; blade glaucous, thick, fleshy, ternate; lateral leaflets sessile, terminal one shortly petiolulate, deeply 3-divided; segments again slightly 3-divided; ultimate lobes obtuse to acute. Racemes not overtopping leaves, 2–5-flowered; peduncle 1.5–2 cm; bracts obovate to ovate, 5–7(–10)  $\times$  4–5

mm. Pedicel erect, 3–6 mm. Sepals small, ca. 1 mm. Flowers yellow. Outer petals broad and flat, apex nearly acute, without crest; upper petal ca. 1.7 cm; spur cylindrical to slightly tapering to obtuse tip, 1–1.1 cm; nectary ca. equal to spur, apex not thickened, often bent; lower petal ca. 7 mm, petal lobes inside purple-black. Ovary ovoid; ovules 2-ranked; style ca. 1.5 mm; stigma with broad apex, rounded-cuneate at base, apically with 4 papillae, lateral geminate papillae small or absent. Fl. and fr. Jun–Aug.

• Mountain slopes, *Rhododendron* forests; 2300–3300 m. Gansu (Tianzhu), E Qinghai (Datong, Ledu).

**87. *Corydalis tangutica*** Peschkova, Bot. Zhurn. 75: 87. 1990.

唐古特延胡索 *tang gu te yan hu suo*

Herbs, perennial. Tuber oblong, 1–1.5  $\times$  0.5–1 cm. Stems nearly erect, 4–10 cm, lower part with 2 or 3 scales, middle and upper part with 3–5 leaves, usually with late branches. Leaves long petiolate, vaginate at base; blade pale abaxially, green adaxially, ternate; lateral leaflets sessile, terminal one shortly petiolulate, all deeply 3-divided, ultimate lobes subobtusate to acute. Racemes not overtopping leaves, densely 2–5-flowered; rachis 0.5–3 cm; bracts ovate to obovate, ca. 6  $\times$  4 mm. Pedicel 3–5 mm. Flowers pale blue to pale purple (in S Xizang clear blue). Sepals 0.5(–1) mm. Outer petals acute, without crest or rarely with narrow crest; upper petal 1.4–1.8 cm, spur straight or tip slightly downcurved, 8–10 mm; nectary extended at least through 3/4 of spur; ultimately rounded-obtusate; lower petal 7–10 mm; inner petals 6–7 mm. Stigma rounded-cuneate at base, apex broad and with 4 papillae, lateral geminate papillae small or absent. Capsule nutant, obovoid, 8–10  $\times$  3–4 mm, 6–14-seeded; style ca. 1.5 mm. Seeds ca. 1.3 mm, with small elaiosome, slightly flattened, surface faintly colliculate. Fl. and fr. Jun–Aug.

Alpine sandy scree, among alpine shrubs, alpine meadows; 2600–5800 m. Gansu, Qinghai, N Sichuan, SE Xizang, NW Yunnan [Bhutan, ?Kashmir].

This species is distinguished from *Corydalis tianzhuensis* by flower color.

- 1a. Lower petal straight; stigma with 1 pair of lateral small didymous papillae ..... 87a. subsp. *tangutica*
- 1b. Lower petal with obvious sac; stigma without lateral didymous papillae ..... 87b. subsp. *bullata*

**87a. *Corydalis tangutica* subsp. *tangutica***

唐古特延胡索(原亚种) *tang gu te yan hu suo* (yuan ya zhong)

*Corydalis pauciflora* (Stephan ex Willdenow) Persoon var. *latiloba* Maximowicz, Fl. Tangut. 38. 1889; ?*C. pauciflora* var. *foliosa* L. H. Zhou.

Lower petal straight. Stigma with 1 pair of lateral small didymous papillae.

• Alpine sandy scree; 2600–4900 m. Gansu, Qinghai (Qinghai Hu, Yushu), N Sichuan (Xiaojin).

**87b. *Corydalis tangutica*** subsp. ***bullata*** (Lidén) Z. Y. Su in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 450. 1999.

长轴唐古特延胡索 chang zhou tang gu te yan hu suo

*Corydalis tianzhuensis* M. S. Yan & C. J. Wang subsp. *bullata* Lidén, Willdenowia 26: 33. 1996.

**17. *Corydalis* sect. *Archaeocapnos*** Popov ex Michajlova, Novosti Sist. Vyssh. Rast. 19: 99. 1982.

古紫堇组 gu zi jin zu

Herbs, perennial. Rootstock very robust, broad at apex. Stems naked in lower 1/2. Cauline leaves with membranous rounded stipules. Flowers purple, with spur much longer than short narrow limb, and (in all Chinese species) with large, entire, early falling sepals. Stigma ovoid-triangular to oblong, central apical pair of papillae ± confluent. Capsule pendent from short erect pedicel, obovoid to oblong, explosively dehiscent, few seeded.

Seven species: disjunct between C Sichuan (two species), E Asia (three species), and W North America (two species); three species (two endemic) in China.

1a. Stems 50–120 cm, 9–15 mm in diam.; ultimate leaflets 3–7 × 1.5–3 cm (NE China) ..... 88. *C. gigantea*

1b. Stems 30–80 cm, 4–8 mm in diam.; ultimate leaflets much smaller (C Sichuan).

2a. Ultimate leaflets incised-dentate ..... 89. *C. anthriscifolia*

2b. Ultimate leaflets rounded, entire ..... 90. *C. longicalcarata*

**88. *Corydalis gigantea*** Trautvetter & C. A. Meyer in Middendorff, Reise Sibir. 1(3) [Fl. Ochot.]: 13. 1856.

巨紫堇 ju zi jin

*Corydalis curvicalcarata* Miyabe & Kudô; *C. gigantea* var. *amurensis* Regel; *C. gigantea* var. *macrantha* Regel; *C. macrantha* (Regel) Popov; *C. zeaensis* Michajlova.

Herbs, perennial, 50–120 cm tall. Young rootstock with single head, 2–3 × 1–1.2 cm, thickened when old with 2 or 3 heads and few fibrous roots. Stems pale brown, shiny, hollow, ca. 1 cm in diam., naked below, leafy and sparingly branched above. Radical leaves 2–4 × ternate to pinnate. Cauline leaves glaucous abaxially, dark green adaxially, biternate to pinnate; ultimate leaflets unequally deeply 2- or 3-divided; segments lanceolate, 3–7 × 1.5–3 cm. Racemes simple or sparingly branched at base, densely 10–20(–50?)-flowered; axillary inflorescence smaller; bracts linear, usually shorter than 3–6 mm erect pedicels, or lowermost bract(s) much larger. Sepals early falling, ovate to oblong, 4–10 × 2–4 mm, entire, acute. Flowers nutant, purplish red to almost red. Upper petal 3–4 cm, apex acute, ± curved; spur straight (upcurved in bud), broad, slightly narrowed toward obtuse apex, 20–27 mm, ca. 2 × as long as limb or more; nectary extended through ca. 2/3 of spur; lower petal navicular, 11–12 mm; inner petals 9–10 mm. Stigma oblong, upper part with 4 papillae, base with 2 papillae. Capsule obovoid, 7–9 × 3–4 mm, explosively dehiscent; style ca. 4 mm. Seeds angular, ca. 3 mm, smooth, with small elaiosome. Fl. Jun–Aug.

Understories of deciduous and broad-leaved *Pinus koraiensis* mixed forests, ditch sides. Heilongjiang (Dailing, along Heilong Jiang, Yichun), SE Jilin (Linjiang) [Japan (Hokkaido), N Korea, Russia (Far East)].

In FRPS (32: 157. 1999), this species was treated as *Corydalis macrantha*. That name is a synonym of *C. gigantea* here, whereas the plant described as *C. gigantea* in FRPS (loc. cit.: 159) seems to be re-

Lower petal with obvious sac. Stigma without lateral didymous papillae.

Among alpine shrubs, sandy scree, alpine meadows where snow has lingered; 4000–5800 m. SE Xizang, NW Yunnan (Zhongdian) [Bhutan, ?Kashmir].

This taxon is very variable as to the flower size and its habitat; it is possibly heterogeneous. A Himalayan/S Xizang form has larger clear blue flowers.

ferable to the closely related species *C. multiflora* Michajlova (Novosti Sist. Vyssh. Rast. 19: 100. 1982), which does not occur in China but was previously called *C. gigantea* in Russian floras.

**89. *Corydalis anthriscifolia*** Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 196. 1885.

峨参叶紫堇 e shen ye zi jin

Herbs, perennial, 30–70 cm tall. Rootstock 5–20 × 1–2.5 cm, apex with remnants of vaginate petiolar bases. Stems erect, 3–6 mm in diam., naked below, leafy and sparingly branched in upper 1/2 or 1/3. Radical leaves few, ca. 2/3 as long as stem; petiole 15–22 cm; blade glaucous abaxially, green adaxially, triangular, ca. 20 × 20 cm, thin, bi- to tripinnate; primary leaflets alternate, long petiolulate; ultimate pinnae sessile, ovate to oblong, 1–3 × 1–2 cm, coarsely serrate. Cauline leaves 2–4, like radical leaves but shortly stalked to sessile, and rapidly decreasing in size upward. Racemes 10–15-flowered, 4–10 cm, rather dense, often branched below; bracts linear, 2–5(–10) × 0.5–1 mm, acute. Pedicel erect, straight, 4–7(–10) mm, thin. Sepals early falling, broadly ovate, 4–5 × ca. 3 mm, entire, mucronate. Flowers nodding, pale purple to bluish purple, often paler toward apex, limb of outer petals usually with narrow reddish purple margin. Outer petals narrow without spreading margins; spur straight or upcurved, 15–20 mm, narrower toward tip, upwardly directed; nectary extending almost to end of spur; lower petal navicular; inner petals 8–10 mm, narrowly crested, claw ca. as long as limb. Stigma with 7–10 papillae, 2 central apical papillae confluent. Capsule narrowly obovoid, with broad placentas, 12–15 × 3–4 mm, 5–10-seeded. Seeds in 1 or 2 rows. Fl. Apr–Jul, fr. May–Aug.

• Shaded brook sides, forests; 1800–3600 m. N and W Sichuan.

**90. *Corydalis longicalcarata*** H. Chuang & Z. Y. Su, Acta Bot. Yunnan. 15: 356. 1993.

长距紫堇 chang ju zi jin

Herbs, perennial, 30–80 cm tall. Rootstock 5–9 × 1–1.2 cm, with few fibrous roots, apex with brown scales and leaf remnants, cross section brimstone-colored, bitter flavored. Stems 1 or few, naked below, leafy and sparingly branched in upper 1/3. Radical leaves few; petiole 10–20 cm, vaginate at base; blade triangular-ovate, bi- to tripinnate, or tetrapinnate; primary leaflets with petiolules to 25 mm; ultimate pinnules nearly sessile, obovate to orbicular, 10–15 × 5–10 mm, entire, mucronate. Cauline leaves like radical leaves, but smaller, shortly stalked, less divided and with whitish membranous rounded stipules. Racemes dense, 2–7-flowered; bracts narrowly lanceolate or subulate, lowest one sometimes leaflike. Pedicel 1–1.2 cm, slender. Sepals usually ovate, (3–)4–5 × (1.5–)3–4 mm, entire. Flowers amaranth, 2.4–3.7 cm. Upper petal acute, without crest; spur 16–29 mm, cylindrical at base, but gradually narrowed toward apex; nectary slender, ultimately nearly extended to spur; lower petals ca. 1 cm, base with broad large sac; sac 4–5 mm wide; inner petals 8–11 mm, limb ca. as long as claw, with low dorsal crest. Stigma deltoid, with 7–10 papillae, apical 2 confluent. Capsule oblong, ca. 12 × 2–3 mm, 5–7-seeded. Seeds ca. 1.5 mm in diam. Fl. and fr. Apr–Jul.

• Among shrubs, margins of mixed forests, mixed forests of *Pseudosasa japonica* and *Abies*, shaded brook sides, meadows; 1800–3000 m. S and W Sichuan.

- 1a. Outer petals 3–3.5 cm; lower petal with large sac ..... 90a. var. *longicalcarata*  
 1b. Outer petals ca. 2.5 cm; lower petal without sac.  
 2a. Leaves bipinnate; ultimate pinnules large ..... 90b. var. *nonsaccata*

- 2b. Leaves tripinnate or tetrapinnate; ultimate pinnules small ..... 90c. var. *multipinnata*

**90a. *Corydalis longicalcarata* var. *longicalcarata***

长距紫堇(原变种) chang ju zi jin (yuan bian zhong)

Racemes few flowered. Outer petals large, 3–3.5 cm; lower petal base with large sac.

• Among shrubs, margins of mixed forests, mixed forests of *Pseudosasa japonica* and *Abies*; 1800–2800 m. W Sichuan.

**90b. *Corydalis longicalcarata* var. *nonsaccata* Z. Y. Su, Acta Bot. Yunnan. 15: 357. 1993 [“*non-saccata*”].**

无囊长距紫堇 wu nang chang ju zi jin

Leaves bipinnate; ultimate pinnules large. Racemes many flowered. Flowers small, ca. 2.5 cm, slender. Spur ± upcurved; lower petal navicular, not saccate.

• Among shrubs, margins of mixed forests of *Pseudosasa japonica* and *Abies*, shaded brook sides; 2400–3000 m. S and W Sichuan.

**90c. *Corydalis longicalcarata* var. *multipinnata* Z. Y. Su, Acta Bot. Yunnan. 15: 357. 1993.**

多裂长距紫堇 duo lie chang ju zi jin

Leaves tripinnate or tetrapinnate; ultimate pinnules small, ca. 8 × 4–5 mm. Sepals nearly violin-form, narrow, 4–5 × ca. 1.5 mm, middle slightly contracted. Flowers slender. Spur arcuately upcurved; lower petal navicular, not saccate.

• W Sichuan (Shimian).

**18. *Corydalis* sect. *Davidianae* C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 12: 279. 1990.**

南黄堇组 nan huang jin zu

Herbs, perennial, erect to diffuse or climbing. Rootstock short, with very dense cluster of long wiry roots that often turn black on drying. Cauline leaves several, much divided. Accessory branches common in axils of upper leaves. Bracts small, usually entire. Pedicel short, recurved in fruit. Corolla yellow, usually with long straight or upturned spur. Capsule explosively dehiscent.

Fourteen species: Bhutan, China, India (Sikkim), N Myanmar; 14 species (seven endemic) in China.

Species nos. 96–104 have a peculiar stigma form, with sublateral/subapical geminate papillae supported by oblique vascular bundles; apical papillae stipitate, basal part of stigma usually with pronounced rounded lobes that are usually devoid of papillae; and style firm all the way into stigma.

This section has a center of variation in the mountains between Yunnan and Myanmar, with many local forms. This treatment is provisional.

- 1a. Limb of outer petals broad, dentate; upper petal with short broad dentate crest not reaching apex.  
 2a. Branches broadly spreading, arcuate; ultimate leaflets rounded, entire; spur curved almost in a semicircle ..... 102. *C. liana*  
 2b. Branches straight, suberect; leaflets ternatifid or deeply dentate; spur straight or slightly curved ..... 103. *C. tenerrima*  
 1b. Limb of outer petals not dentate; crest of upper petal, if present, entire and often reaching or exceeding apex.  
 3a. Nectary ca. 1/2 as long as spur or shorter, sometimes very thin.  
 4a. Delicate climber; pedicels very thin, strongly deflexed at base so racemes appear “upside down”; corolla ecristate; nectary very thin (W Yunnan) ..... 104. *C. saltatoria*  
 4b. Erect, robust plant; racemes straight; pedicels not deflexed; corolla broadly crested; nectary thick (S Xizang) ..... 95. *C. laelia*  
 3b. Nectary ca. 2/3 as long as spur or longer, sometimes very thin, rarely absent.  
 5a. Spur usually straight; dorsal crests of inner petals not overtopping petal apex; racemes simple; stigma with apical papillae not stipitate, with median sinus absent or shallow, vasculature T-shaped, with lateral and basal geminate papillae, basal corners not prolonged, style weak immediately below stigma (*C. davidii* group).

- 6a. Bracts 6–12 × 2–4 mm; racemes very lax ..... 91. *C. luquanensis*  
 6b. Bracts much smaller.  
 7a. Crest of outer petals ca. 1 mm wide; petioles of middle leaves basally with rounded auricles; stigma with 10 marginal papillae; racemes lax ..... 92. *C. triternatifolia*  
 7b. Crest of outer petals less than 0.5 mm wide or absent; petioles vaginate at base, but not auriculate; stigma with 6 or 8 marginal papillae; racemes dense.  
 8a. Upper petal 20–28 mm, without or with narrow crest, spur cylindrical; racemes 5–15-flowered, peduncle ± equaling raceme; seeds 1.5–1.7 mm ..... 93. *C. davidii*  
 8b. Upper petal 17–20 mm, narrowly crested; spur tapering toward apex; racemes 10–26-flowered, peduncle much shorter than raceme; seeds 0.9–1.1 mm ..... 94. *C. longicornu*  
 5b. Spur upcurved; dorsal crests of inner petals ± overtopping petal apex; racemes simple or branched; stigma with apical papillae stipitate, median sinus dividing stigma to 1/3, vasculature V-shaped, basal corners usually without papillae, usually prolonged like “earlobes,” style firm all the way into stigma (*C. yunnanensis* group).  
 9a. Racemes 4–8-flowered; spur ca. 1/3 as wide as long, ca. as long as inner petals; nectary conspicuous, ca. 2/3 of spur (S Xizang) ..... 101. *C. delicatula*  
 9b. Racemes 10–25-flowered; spur narrower, usually longer than inner petals; nectary longer.  
 10a. Stems 2–4 mm thick at base; racemes usually simple, not in a panicle; stigma basally truncate, apically with shortly stalked papillae ..... 100. *C. yunnanensis*  
 10b. Stems 4–8 mm thick at base; racemes clustered, often branched; stigma with obvious basal lobes and long-stalked apical papillae.  
 11a. Climber, 2–4 m; ovules ca. 15 ..... 99. *C. ampelos*  
 11b. Erect, 0.4–1.3 m; ovules 7–10.  
 12a. Crest of upper petal narrow or absent, not reaching apex ..... 98. *C. delphinoides*  
 12b. Crest of upper petal broad, overtopping apex.  
 13a. Leaflets 5–13 × 4–9 mm; bracts spatulate, clearly longer than pedicels; stigma narrowed at base, with basal “auricles” clinging to style; capsule obovoid, with seeds in 2 rows ..... 97. *C. auricilla*  
 13b. Leaflets larger; bracts linear, equaling pedicels; stigma not narrowed at base; capsule narrowly oblong, with seeds in 1 row ..... 96. *C. pterygopetala*

**91. *Corydalis luquanensis*** H. Chuang, Acta Bot. Yunnan. 12: 281. 1990.

禄劝黄堇 *lu quan huang jin*

Herbs, large, glabrous; lower parts not seen. Stems erect, ridged, upper part few branched. Petiole of upper cauline leaves ca. 2 cm; blade glaucous abaxially, deltoid, ca. 12 cm, triternate; primary leaflets long petiolulate, middle petiolule ca. 6 cm, lateral petiolule ca. 4 cm; secondary pinnules shortly petiolulate, middle petiolule 2.5–3 cm, lateral petiolule 1–1.5 cm; ultimate leaflets broadly ovate to nearly orbicular, 1.5–3 cm, obtuse. Raceme very lax, to 22 cm, secund, ca. 20-flowered; lateral racemes shorter; bracts entire, lowest elliptic, ca. 1.2 cm, middle broadly obovate, ca. 8 mm, uppermost narrowly obovate, ca. 6 mm. Pedicels slightly thickened, at flowering shorter than bracts, at fruiting slightly extended, arcuate. Sepals early falling. Petals yellow; upper petal ca. 20 mm, limb navicular-oblong, apex obtuse, abaxially with very short crest; spur cylindrical, ca. 3/5 as long as upper petal; nectary ca. 3/4 as long as spur; lower petal spatulate, ca. 10 mm, crest short; inner petals ca. 8 mm, claw nearly as long as limb. Ovules few, 2-ranked; stigma compressed-quadrate, with 10 papillae. Capsule not seen. Fl. Jul.

• Forest margins, brook sides; 2100–2200 m. C Yunnan (Luquan).

**92. *Corydalis triternatifolia*** C. Y. Wu, Acta Bot. Yunnan. 12: 280. 1990.

重三出黄堇 *chong san chu huang jin*

*Corydalis triternata* Franchet, J. Bot. (Morot) 8: 290. 1894, non Zuccarini (1843).

Herbs, perennial, 50–100 cm tall. Roots several, linear, stout, to 12 cm. Stems several, diffuse, branched from base, often densely and finely papillose-pubescent in lower part, sometimes with accessory branches in inflorescence. Radical leaves several; petiole very long; blade glaucous abaxially, green adaxially, triternate; primary petiolule 3–8 cm; secondary petiolule 1–2 cm, ultimate petiolule 3–6 mm; leaflets broadly ovate, 1–3 cm, entire, obtuse to subacute. Cauline leaves several, distant, alternate; petiole 5–10 cm with broad slightly erose auricles at base; blade like radical leaves. Racemes 3–7 cm, at fruiting to 12 cm, 10–15-flowered, at first dense then distant, secund; bracts obovate to oblanceolate, 2–7 mm, entire. Pedicel 2–3(–5) mm, arcuate in fruit. Sepals to 0.5 mm. Petals yellow; outer petals: limb navicular-ovate, apex acute, dorsal crest ca. 1 mm high, reaching apex; upper petal 18–25 mm; spur straight, cylindrical, 14–19 mm; nectary extended through ca. 4/5 of spur; lower petal often with peglike process at base; inner petals 8–9 mm, claw shorter than limb; stigma with 10 marginal papillae and with lateral submarginal geminate papillae. Capsule obovoid, 6–11 × ca. 3 mm, 4–8-seeded; style ca. 3 mm. Seeds in 2 rows, ca. 1.5 mm, smooth; caruncle lingulate, small. Fl. and fr. May–Nov.

Forest understories, forest margins, grasslands on slopes; 2000–3200 m. WC Yunnan [NW Myanmar].

**93. *Corydalis davidii*** Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 198. 1885.

南黄堇 nan huang jin

*Corydalis pseudoclematis* Fedde.

Herbs, perennial, 20–100 cm tall. Roots several, yellow, dark brown and wiry when dried, linear, 8–10 cm, stout, 1–1.5 mm in diam.; rootstock short, with bases of rosette leaf petioles becoming fleshy, forming a bulblike structure at apex. Stems few to several, narrowly winged-ridged, sparingly branched, with 3–6 leaves throughout, erect to ascending or some stems far creeping, rooting at nodes. Radical leaves few, very long stalked; petiole 9–22 cm, vaginate and fleshy at base; blade glaucous abaxially, green adaxially, broadly triangular, 7–13 × 8–13 cm, triternate; pinnae long petiolulate; pinnules shortly petiolulate; ultimate leaflets ovate to obovate to nearly orbicular, 1–2(–3) × 0.5–1.5(–2.5) cm, entire, obtuse, mucronulate. Cauline leaves like radical leaves but smaller, vaginate at base, petiole forming small angle to stem. Racemes 3–10 cm, dense, 5–15-flowered, secund; bracts often with a pinkish hue, oblanceolate, 2–5 mm, entire. Pedicel 3–5 mm, slender, recurved in fruit. Sepals minute, ca. 0.5 mm, dentate. Petals yellow; upper petal 20–28 mm; limb navicular-ovate, acute, not crested or with very narrow crest; spur cylindric, 13–21 mm; nectary 3/4–5/6 as long as spur; lower petal navicular-oblong, 9–11 mm, base sometimes with tiny protuberance; inner petals 8–10 mm, claw equaling or shorter than limb, dorsal crests not or slightly overtopping apex. Stigma nearly quadrate, with 8 marginal papillae and 2 submarginal lateral geminate papillae. Capsule oblong to narrowly obovoid, 8–14 × 2–2.5 mm, 3–11-seeded; style ca. 3 mm. Seeds 1.5–1.7 mm, smooth; elaiosome small. Fl. and fr. Apr–Oct.

Clearings, forest margins, among shrubs, grasslands on slopes, roadsides, walls; 2000–3500 m. Chongqing (Nanchuan), S and W Sichuan, Yunnan [E Myanmar].

This taxon is probably heterogeneous. Plants from Gaoligong Shan (W Yunnan, E Myanmar) have dense racemes, frequent accessory branches, and a narrow upturned nectary. Plants from SE Yunnan are very low-growing with a short thick spur. There is a gap in distribution between Sichuan and SE and W Yunnan.

**94. *Corydalis longicornu*** Franchet, Bull. Soc. Bot. France 33: 394. 1886.

开阳黄堇 kai yang huang jin

*Corydalis clematis* H. Léveillé.

Herbs, perennial, 40–80 cm tall. Roots several, not turning black upon drying, linear, stout. Stems diffuse to suberect, brown, branched from base. Basal leaves early withering. Cauline leaves many, weak, long petiolate; blade triternate, abaxially glaucous and finely papillose with papillose-scabrid veins, adaxially green or slightly glaucous; primary pinnae long petiolulate; secondary pinnules shortly petiolulate; ultimate leaflets subsessile, broadly elliptic to ovate, 1–3 × 0.5–2 cm, entire, subacute, mucronate. Racemes dense, 10–26-flowered, secund, shortly stalked; bracts linear-lanceolate, 2–5 mm, entire. Pedicel slender, 3–6 mm, slightly elongating and recurved in fruit. Sepals ca. 0.5 × 1 mm, deeply lacerate-dentate. Petals yellow;

outer petals with narrow (ca. 0.5 mm) crest reaching apex, limb navicular, acute, not expanded; upper petal 17–20 mm; spur straight, 11–14 mm, slender, evenly tapering toward tip; nectary ca. 3/4 as long to as long as spur, thin; lower petal navicular-obovate with narrow base, 7–8 mm; inner petals 6–7 mm, claw ca. as long as limb. Capsule 7–12 × 1–1.5 mm, 4–8-seeded; style ca. 3 mm. Seeds round, ca. 1 mm, “*minutissime punctulata*” or smooth, with small elaiosome. Fl. and fr. May–Aug.

• Disturbed limestone scree, roadside slopes; 1700–3000 m. W Guizhou (Kaiyang, Panxian), NE Yunnan.

A specimen (*Teng 90525*) from Xifeng, C Guizhou, close to Kaiyang (type locality for *Corydalis clematis*), deviates by biternate leaves with very large leaflets (to 4 cm), short and broad fruit (ca. 6 × 2.5 mm), and smooth seeds, and may represent a separate taxon.

**95. *Corydalis laelia*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 25. 1896.

高冠黄堇 gao guan huang jin

*Corydalis laelia* subsp. *bhutanica* D. G. Long.

Herbs, perennial, 30–75(–100) cm tall. Roots many, linear, to 9 cm, stout, 2–3 mm in diam. from a short rhizome. Stems erect, sharply ridged, much branched in upper 1/2. Radical leaves early withering, but petiolar bases long persistent; petiole 15–25 cm; blade triangular, 10–14 × 8–14 cm, bipinnate with 3 or 4 pinnae and 2 pinnules; leaflets pinnatifid into lanceolate acute lobes. Cauline leaves several; lower with petiole to 12 cm; upper shortly stalked to subsessile with broad auriculate bases; blade glaucous, often with anthocyan tint, triangular, triternate with leaflets deeply dissected into lanceolate to linear lobes; uppermost leaves much smaller. Racemes many from axils of upper leaves, densely 15–30-flowered, not secund; bracts linear, ca. 10 mm, lowermost sometimes larger and slightly divided. Pedicel 5–10 mm, slender, slightly elongating and recurved in fruit. Sepals ovate, ca. 2 mm, finely dentate. Corolla yellow; inner petals with brownish purple apex; outer petals with ca. 3 mm wide crests clearly overtopping apex, margin with subapical auriculate lobes; upper petal 20–25 mm, crest apically broad, narrowed and decurrent on spur; spur slightly upwardly directed, cylindric, 10–11 mm; nectary conspicuous, ca. 1/2 as long as spur; inner petals (7–)9–10 mm. Stigma squarish, with 4 low apical papillae, geminate lateral papillae and conspicuous geminate papillae set on triangular basal lobes. Capsule oblong, 10–12 × ca. 2 mm, with minutely papillose ridges, 3–5-seeded, style ca. 4 mm. Seeds ca. 2 mm. Fl. and fr. Jul–Sep.

Forest margins, river valleys; 3600–4000 m. S Xizang (Yadong) [Bhutan, India (Sikkim)].

**96. *Corydalis pterygopetala*** Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 62: 222. 1925.

翅瓣黄堇 chi ban huang jin

Herbs, erect, 30–120 cm tall. Roots many, when dried black-brown, linear, to 10 cm or more, stout. Stems strong, stout, when dried ridged, sparsely branched in upper 1/2, lower part usually without leaves. Radical leaves: petiole 20–30 cm; blade glaucous abaxially, green adaxially, broadly ovate, 6–12



cm, bi- to triternate; primary pinnae long petiolulate, ultimate leaflets entire or deeply cleft; lobules obovate or elliptic, margin entire, apex obtuse, mucronate. Cauline leaves 3–6, lower ones petiolate, upper ones subsessile, like radical leaves. Racemes simple or basally branched, often many together in a panicle, 10–25-flowered; bracts linear-lanceolate, 3–10 mm, entire. Pedicel 3–6 mm, thin, straight in flower, reflexed in fruit. Sepals caducous, broadly ovate, 0.5–1 × 1–1.5 mm, deeply dentate. Corolla yellow, fragrant; outer petals with dorsal crests reaching apex, subacute or shortly acuminate; upper petal 16–20 mm, crest decurrent on spur or crest absent; spur upcurved, cylindrical, 9–14 mm; nectary extended through 3/4–9/10 of spur and thin, or absent; inner petals 7–9 mm, claw nearly equal to petal lobes. Stigma with median apical lobes long stalked, basal lobes moderately developed. Capsule linear-oblong, 12–17 × ca. 1.5 mm, 5–8-seeded; style ca. 3.5 mm. Seeds black, shiny, elliptic, ca. 1 × 1.3 mm. Fl. and fr. May–Sep.

Forests, forest margins, shrubs, grasslands on slopes, roadsides; 1800–4200 m. SE Xizang, SW and W Yunnan [N and NE Myanmar].

This is a very variable species, here provisionally divided into five varieties.

- 1a. Upper petal without crest ..... 96c. var. *ecristata*  
 1b. Upper petal with crest.  
 2a. Flowers 21–28 mm ..... 96b. var. *megalantha*  
 2b. Flowers 16–21 mm.  
 3a. Plant with widely spreading branches; spur broad at apex; nectary ca. 3/4 as long as spur ..... 96d. var. *divaricata*  
 3b. Plant erect, with suberect branches; spur narrowed toward apex; nectary reaching 4/5–9/10 of spur or absent.  
 4a. Spur 6–7 mm; nectary absent; basal geminate papillae present ..... 96e. var. *parviflora*  
 4b. Spur longer; nectary present; basal geminate papillae absent ..... 96a. var. *pterygopetala*

**96a. *Corydalis pterygopetala* var. *pterygopetala***

翅瓣黄堇(原变种) *chi ban huang jin* (*yuan bian zhong*)

Plant erect, with suberect branches. Flowers 16–21 mm. Upper petal with crest; spur narrowed toward apex; nectary reaching 4/5–9/10 of spur. Basal geminate papillae absent.

Forests, shrubs, grasslands on slopes, roadsides; 1900–4200 m. SE Xizang (Zayü), W Yunnan [N Myanmar].

**96b. *Corydalis pterygopetala* var. *megalantha* (Diels) Lidén & Z. Y. Su, **comb. nov.****

大花翅瓣黄堇 *da hua chi ban huang jin*

Basionym: *Corydalis yunnanensis* Franchet var. *megalantha* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 255. 1912.

Flowers 21–28 mm. Upper petal with crest.

• Forests, forest margins, grasslands; (1800–)2700–3400(–4000) m. W Yunnan (Gongshan, Weixi).

**96c. *Corydalis pterygopetala* var. *ecristata* H. Chuang, Acta Bot. Yunnan. 12: 283. 1990.**

无冠翅瓣黄堇 *wu guan chi ban huang jin*

Upper petal without crest.

• Forests, forest margins, shrubs, grasslands on slopes; 1800–3100 m. SW Yunnan.

**96d. *Corydalis pterygopetala* var. *divaricata* Z. Y. Su & Lidén, **var. nov.****

展枝翅瓣黄堇 *zhan zhi chi ban huang jin*

Type: Myanmar. N Triangle (camp II, Tama Bum), alt. 7000–8000 feet, “weak stemmed herb growing several feet tall. Leaves like *Thalictrum*, flowers bright yellow. By streams in the forest forming colonies,” 16 Jun 1953, *F. Kingdon Ward 20987* (holotype, A).

*A ceteris varietatibus ramis manifeste divaricatis calcaribus brevis et late oblongis differt.*

Plant with widely spreading branches. Flowers 16–21 mm. Upper petal with crest; spur broad at apex; nectary ca. 3/4 as long as spur.

By streams in forests; 2100–2500 m (in Myanmar). W Yunnan (Gaoligong Shan) [NE Myanmar].

The varietal epithet refers to the widely spreading branches, from Latin *divaricatus* (“spreading apart at a wide angle”).

**96e. *Corydalis pterygopetala* var. *parviflora* Lidén, **var. nov.****

小花翅瓣黄堇 *xiao hua chi ban huang jin*

Type: China. Yunnan: Gongshan Xian, Cikai, Near Yip-saka Lake, 2.1 direct km SSE of the Heipa Pass tunnel on the new road from Gongshan to the Dulong Jiang valley, E side of Gaoligong Shan, 27°45′18.1″N, 98°27′21″E, along stream in bamboo scrub in loam on granite, NW-facing slope, alt. 3450 m, 13 Aug 2006, *Gaoligong Shan Biodiversity Survey (GSBS) 32243* (holotype, KUN; isotypes, CAS, UPS).

*A ceteris varietatibus floribus minoribus, calcaribus multo brevioribus atque lobis basalibus stigmatum papillatis differt.*

Flowers 16–21 mm. Upper petal with crest; spur 6–7 mm; nectary absent. Basal geminate papillae present.

• W Yunnan (Gaoligong Shan).

The varietal epithet refers to the small flowers, from Latin *parvus* (“small”) and *flos* (“flower”).

**97. *Corydalis auricilla* Lidén & Z. Y. Su, **sp. nov.****

高黎贡山黄堇 *gao li gong shan huang jin*

Type: China. Yunnan: Fugong Xian, Lumadeng Xiang, Yaping Cun, in the vicinity of Yaping Yakou just E of the pass near Myanmar border, E side of Gaoligong Shan, 27°12′37″N, 98°41′46″E, sloping wet meadow in loam on granite, alt. 3640 m, 5 Aug 2005, *Gaoligong Shan Biodiversity Survey (GSBS) 26428* (holotype, UPS; isotypes, CAS, KUN).

*Haec species a Corydalis pterygopetala foliis magis divisis,*

*bracteis et sepalis majoribus, capsulis obovoideis seminibus biseriatis atque lobis basalibus stigmatum stylo approximatis differt.*

Paratypes: *R. Farrer 1013* (E), *G. Forrest 8972* (E), *G. Forrest 9151* (E), *GSBS 20207* (CAS, KUN, UPS), *GSBS 28577* (KUN).

Herbs, perennial, 40–75 cm tall. Roots very numerous, fasciculate, black when dry, linear. Stems erect, few to several from a thick caudex, 3–5 mm thick at base, strongly ridged, branched in upper 1/2, with 3–6 leaves. Radical leaves early withering; petiole 5–15 cm, long vaginate at base; blade glaucous abaxially, less so adaxially, triangular, 6–12 × 7–12 cm, 3–4 × ternately divided; primary and secondary pinnae long petiolulate, ultimate leaflets shortly stalked or sessile, 5–13 × 4–9 mm, entire or irregularly deeply 2–5-divided; lobes obovate, apex mucronulate. Racemes 8–20-flowered, simple or rarely with a basal branch; bracts spatulate to oblanceolate, (5–)7–13 mm, entire. Pedicel 3–6 mm, elongating in fruit to 5–8 mm and strongly reflexed. Sepals ovate, 2–3 × ca. 2 mm, lacinate-dentate. Corolla yellow, fragrant; outer petals with broad obtuse crests reaching or overtopping apex; upper petal 14–15 mm; spur upcurved, sometimes slightly downcurved at very apex, slightly attenuate, 7–10 mm; nectary almost as long as spur, thickened at apex; inner petals 8–10 mm, claw slightly shorter than limb; dorsal crests rounded, clearly overtopping apex. Stigma narrowed at base, with basal lobes close to style, broader at apex, with narrow median sinus closely flanked by a long stipitate papilla on each side, lateral apical papillae broad and confluent. Fruit obovoid, 12–13 × 3–4 mm, ca. 10-seeded; style ca. 3 mm. Fl. May–Aug, fr. Aug.

Wet meadows, open slopes near water; 2900–3600 m. W Yunnan (Gaoligong Shan) [E Myanmar].

*Corydalis auricilla* differs from the related *C. pterygopetala* in having more finely cut leaves with smaller leaflets, larger spatulate bracts, larger sepals, obovoid fruit with seeds in 2 rows, and a peculiar stigma narrowed at base with basal auricles clinging to style.

The specific epithet refers to the basal lobes of the stigma, from Latin *auricilla* (“earlobe”).

**98. *Corydalis delphinioides*** Fedde, Repert. Spec. Nov. Regni Veg. 23: 181. 1926.

飞燕黄堇 fei yan huang jin

Herbs, perennial, (30–)60–120 cm tall. Roots many, linear, stout. Stems erect, stout, with prominent ridges, 4–8 mm at base, upper part many branched, lower part nearly without leaves. Radical leaves few; petiole 10–30 cm; blade very glaucous abaxially, dark green or slightly glaucous adaxially, nearly deltoid, 10–20 × 10–25 cm, 3–4 × ternate; primary pinnae long petiolulate; ultimate leaflets shortly stalked or sessile, deeply 3–5-lobed; lobules lanceolate or lanceolate-oblong, mucronate. Cauline leaves several, lower ones long petiolate, upper ones nearly sessile. Inflorescence paniculate, constituted by many racemes terminal and axillary from uppermost leaves; main raceme often branched at base, 10–25-flowered (branches excluded); bracts lanceolate, 2–7 mm, entire. Pedicel 3–6 mm, slender, straight in flower, recurved in fruit. Sepals white, 0.5–1

× ca. 1 mm, finely dentate. Corolla yellow; outer petals acute, narrowly crested with crest attenuate in both directions and not reaching apex, rarely absent; upper petal 13–16 mm; spur clearly upcurved, cylindric or slightly attenuate; nectary 3/4–5/6 as long as spur, thin; lower petal navicular, 6–8 mm; inner petals 7–8 mm, claw slightly shorter than limb; dorsal crests rounded, clearly overtopping apex. Stigma with narrow apical sinus flanked by 2 long-stipitate closely set papillae; basal lobes prominent. Capsule oblong to obovoid, 10–13 × 2–2.5 mm, apically truncate, 3–5-seeded. Seeds black, shiny, nearly globose, 1.5–2 mm; caruncle small. Fl. and fr. May–Sep.

• Forests, forest margins, shrubs, grasslands, burned areas; 3000–4000 m. SW Sichuan (Lugu Hu, ?Muli), NW Yunnan.

**99. *Corydalis ampelos*** Lidén & Z. Y. Su, sp. nov.

攀援黄堇 pan yuan huang jin

Type: China. W Yunnan: Lushui Xian, Luobenzhuo Xiang, E’ ga Cun, vicinity of pass from China to Myanmar at border marker 27, E side of Gaoligong Shan, 26°26’30”N, 98°45’30”E, N-facing 30°–60° slope, alt. 3400 m, “*Abies* forest, and bamboo thickets, undisturbed. Scandent herb, ca. 2 m. Occasional. In loam on granite,” 9 Aug 2005, *Gaoligong Shan Biodiversity Survey (GSBS) 25904* (holotype, KUN; isotypes, CAS, UPS).

*Corydalis ampelos caulibus longis scandentibus a speciebus affinis facile distinguitur.*

Paratypes: *GSBS 25645* (CAS, KUN, UPS), *GSBS 25936* (CAS, KUN, UPS).

Herbs (perennial), scandent, 2–4 m tall. Basal parts unknown. Stems 3–5 mm in diam. (thinner distally), with numerous leaves, much branched; accessory branches common. Middle cauline leaves: petiole ca. 6 cm; blade glaucous abaxially, triangular, 10–15 × 14–18 cm, triternate; primary and secondary pinnae long petiolulate, ultimate leaflets shortly stalked, decurrent on petiolule, ovate, 1.5–3 × 1–2 cm, lobed into 3–6 broadly obovate to oblong obtuse lobes not overlapping. Leaves of lateral branches much smaller and less divided, shortly stalked to sessile. Racemes several at stem and branch tips, 10–25-flowered, simple or with a basal branch; bracts lanceolate, 1.5–3(–5) mm, acute. Pedicel 4–6 mm, thin, straight in flower, recurved in fruit. Sepals ca. 0.5 × 1 mm, dentate. Corolla yellow; outer petals with broad limb abruptly narrowed into acuminate apex; upper petal 14–16 mm, with crest attenuate in both directions, reaching almost to tip of spur; spur strongly upcurved, cylindric, 8–9 mm; nectary 2/3–3/4 as long as spur, very thin; lower petal prominently acuminate, crest small; inner petals 8–9 mm, claw slightly shorter than limb, dorsal crests rounded, clearly overtopping apex. Ovary with 13–15 ovules; stigma with narrow median sinus closely flanked by a long stipitate papilla on each side; basal lobes very prominent. Fruit and seeds unknown. Fl. Aug.

• Undisturbed forests on granite substrate; 3000–3500 m. W Yunnan (Gaoligong Shan).

*Corydalis ampelos* differs from other species in the *C. yunnanensis* group by the scandent habit with up to 4 m long stems and the very different leaves.

The specific epithet refers to the scandent habit of the plants, from Greek *ἀμπέλως* (*ampelos*, "vine").

**100. *Corydalis yunnanensis*** Franchet, Bull. Soc. Bot. France 33: 394. 1886.

滇黄堇 dian huang jin

Herbs, perennial, 0.4–1.5 m tall, sometimes to 2 m. Roots densely fasciculate, long, narrow. Stems pale green or often purplish, much branched, especially in upper 1/2, erect to scrambling over other vegetation, ca. 2 mm in diam. at base. Radical leaves early withering; cauline leaves 4–8, distant; petiole often purplish, 10–20(–31) cm, or upper leaves sessile; blade very glaucous abaxially, dark green or slightly glaucous adaxially, deltoid, 7–10(–18) × 7–15(–20) cm, bi- to triternate; primary pinnae long petiolulate, ultimate leaflets shortly stalked or sessile, entire or irregularly deeply 2–5-divided; lobes broadly ovate to obovate to oblanceolate, apex mucronate. Racemes not forming a dense panicle, usually simple, 6–12 cm, 10–22-flowered; bracts lanceolate, 3–7 mm, entire (lowermost sometimes larger and divided). Pedicel 3–6 mm, slender, straight in flower, recurved in fruit. Sepals white, scalelike, 0.5–1 × ca. 1 mm, dentate. Corolla yellow; outer petals rather broad at apex, subacute, mucronate, narrowly crested, crest long decurrent on spur, rarely absent; upper petal 12–16 mm; spur upcurved, sometimes slightly downcurved at very apex, cylindrical or slightly attenuate, 8–12 mm; nectary ca. 4/5 as long to almost as long as spur; inner petals ca. 7 mm, claw slightly shorter than limb; dorsal crests rounded, clearly overtopping apex. Stigma often dark, didymous, apex with 4(or 6) short papillae, basal lobes not developed. Capsule oblong, 7–13 × ca. 2 mm, 3–6-seeded; style 2.5–3 mm. Seeds nearly orbicular, smooth. Fl. and fr. Jun–Sep.

• Forests, forest margins, among shrubs, grasslands, slopes, burned areas; (1800–)2100–3400(–4000) m. SW Sichuan (Muli, Yanyuan), N and NW Yunnan.

**101. *Corydalis delicatula*** D. G. Long, Notes Roy. Bot. Gard. Edinburgh 42: 97. 1984.

娇嫩黄堇 jiao nen huang jin

Herbs, perennial, 30–60 cm tall. Rootstock short, with densely fasciculate wiry roots. Stems erect to ascending, often several, often reddish, branched above, with 2–4 leaves. Radical leaves: petiole 3–14 cm, base vaginate; upper leaves: petiole 2–6 cm (shorter above); blade glaucous abaxially, green adaxially, broadly ovate-deltoid, 4–10 × 6–10 cm, triternate; primary pinnae petiolule 2–4 cm; secondary pinnae petiolule 0.3–2 cm; ultimate leaflets sessile, obovate, 3–10 × 2–7 mm, base cuneate, margin entire, apex obtuse or truncate, slightly mucronate. Racemes 3–4 cm in flower (or lowermost flower more distant), 4–8-flowered; peduncle 4–10 cm; lowermost bract sometimes like upper cauline leaves, middle and upper bracts oblanceolate, 3–10 mm, entire. Pedicel 3–5 mm, straight in flower, recurved in fruit. Sepals 0.5–1 mm, dentate. Corolla yellow; outer petals rather broad and obtuse with 1.5–2 mm wide crest reaching apex and decurrent on spur; upper petal 13–15 mm; spur upturned, cylindrical, 7–10 mm, broad (3–3.5 mm wide); nectary ca. 2/3 of spur; inner petals 8–10 mm; dorsal crests rounded, slightly overtopping apex; claw equaling limb. Stigma with 4

apical papillae, near apex with a pair of lateral papillae in conjunction with a pair of geminate papillae; basal lobes rather short. Capsule (immature) oblanceolate, 10–11 × 2–3 mm; style ca. 3 mm. Fl. May–Jun.

Forest understories; 2700–3200 m. SE Xizang (Nangxian, Zariqu) [Bhutan].

**102. *Corydalis liana*** Lidén & Z. Y. Su, Edinburgh J. Bot. 54: 64. 1997.

绕曲黄堇 rao qu huang jin

Basal parts unknown. Stem > 50 cm, apparently scandent, branched, with branches diverging at wide angles, with arcuate internodes; accessory branches present in upper leaf axils. Middle cauline leaves shortly stalked, upper sessile; blade green, 4–5 × ternately compound; all divisions opposite and petiolulate; ultimate leaflets ovate to obovate, 0.5–1.5 × 0.5–1 cm, thin, entire. Rachis of leaf slightly geniculate at nodes with conspicuously arcuate internodes. Racemes 6–10-flowered; bracts lanceolate, 3–5 mm, entire. Pedicel 3–4 mm, thin. Sepals ca. 1 mm, deeply lacerate-dentate. Corolla yellow; outer petals with broad, rounded, acuminate, dentate limbs; upper petal narrowly crested; spur very strongly curved upward/forward, ca. 16 mm; nectary ca. 2/3 as long as spur; lower petal with very short claw and 6–7 mm wide rounded acuminate limb; inner petals ca. 7 mm, with broad rounded dorsal crests projecting beyond petal apex ca. 1 mm; claw shorter than limb. Stigma broader than long, apically cleft to almost 1/2, with 4 stalked apical papillae, and near apex with a pair of lateral papillae in conjunction with a pair of geminate papillae; basal corners rounded, without papillae. Fruit and seeds unknown. Fl. Jun.

• Mossy rocks in forests; ca. 3000 m. NW Yunnan (Lijiang; Judian).

**103. *Corydalis tenerrima*** C. Y. Wu, Acta Bot. Yunnan. 18: 401. 1996.

柔弱黄堇 rou ruo huang jin

Herbs, perennial, 50–140 cm tall. Rootstock short, with dense cluster of wiry roots to 20 cm. Stem usually single, erect (rarely diffuse), 4–7 mm in diam. at base, hollow, sharply ridged, leafy throughout, simple below, much branched above. Radical leaves early withering; radical and basal cauline leaves long stalked, progressively smaller and more crowded upward (5–15 leaves on main stem); petiole 4–10 cm (or longer in radical leaves), upper leaves sessile; blade glaucous abaxially, green adaxially, broadly triangular, 8–20 × 10–30 cm (or uppermost leaves 4–5 cm), 3–4 × ternately to pinnately divided with opposite pinnae; ultimate leaflets ovate, ± deeply ternatifid to pinnatifid into broadly to narrowly obovate, mucronate lobes. Racemes several, simple or branched at base, 10–20-flowered, dense at first, soon elongating; bracts linear to oblong, equaling pedicels, entire to slightly lobed or dentate. Pedicel thin, 2–5 mm in flower, in fruit recurved, 5–6 mm. Sepals whitish, rounded, 2–3 mm, margin lacerate. Corolla golden yellow, fragrant; outer petals with broad dentate limb and short dentate crest not reaching apex; upper petal 15–19 mm; spur straight or upcurved, narrowed toward tip, 9–12 mm; nectary 3/4–4/5 as long as spur; lower petal with distinctly set off, ovate, acute to acuminate limb 7–9 × 5–6 mm, claw ca. 3 mm; inner petals 7–9

mm, dorsal crests rounded, slightly overtopping apex, claw much shorter than limb. Stigma with geminate lateral papillae and 4 apical papillae, basal lobes without papillae. Capsule oblong, 9–11 × ca. 2 mm, 5–8-seeded; style 3–3.5 mm. Seeds ca. 1.5 mm, smooth. Fl. Jun–Sep, fr. Jul–Oct.

• Wet slopes in forests, clearings; 3200–4000 m. SE Xizang, NW Yunnan (Dèqên).

**104. *Corydalis saltatoria*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 20. 1917.

中緬黃堇 *zhong mian huang jin*

Herbs, perennial, 40–100 cm, scandent. Rootstock small, with few slender roots. Stems sharply angular, sparingly leafy, branched. Leaves: petiole 6–12 cm; blade triangular, 6–15 cm, triternate; petioles and petiolules very slender. Leaflets long stalked, slightly glaucous abaxially, ovate, 10–17 × 5–10 mm,

thin, entire, obtuse. Racemes lax, 10–20-flowered, zigzag; bracts narrowly oblanceolate or linear, 5–10 mm, reflexed. Pedicel 10–30 mm, extremely thin, sharply deflexed at base. Sepals yellow or red, ovate, ca. 2 × 1 mm, shallowly dentate. Corolla golden yellow; outer petals with rather broad acute to acuminate limbs, without crest; spur of upper petal straight or slightly sigmoidally curved, ca. 11 mm, slender; nectary rudimentary, 3–4 mm, very thin; lower petal ca. 9 mm, with broad short claw and rounded shortly acuminate limb; inner petals ca. 9 mm, dorsal crests rounded, very slightly overtopping apex. Stigma with shallow median sinus, 4 apical papillae, and near apex with a pair of lateral papillae in conjunction with a pair of geminate papillae, basal corners not prolonged, without papillae. Fruit unknown.

Marshy leaf mold by streams in shade of dwarf forests; ca. 3000 m. W Yunnan [Myanmar (Mpimaw Hills)].

### 19. *Corydalis* sect. *Fumarioides* Lidén, Rheede 1: 32. 1991.

类烟堇组 *lei yan jin zu*

Herbs, annual or biennial, with thin or swollen taproot. Stems erect to diffuse, ridged or narrowly winged, much branched, often hollow and weak. Leaves bipinnate to triternate. Pedicel short, recurved in fruit. Corolla yellow or white, inner petals not dark tipped. Fruit explosively dehiscent.

Seventeen species: E and NE Asia; 16 species (12 endemic) in China.

- 1a. Spur 7–20 mm, if 7–9 mm, downcurved; stigma with papillae all around ..... 19a. *C. ochotensis* group  
1b. Spur 3–7 mm, not downcurved; stigma lacking basal papillae, apical papillae stalked ..... 19b. *C. sibirica* group

#### 19a. *Corydalis ochotensis* group

黄紫堇类群 *huang zi jin lei qun*

Herbs, biennial, with thin or swollen taproot. Leaves bipinnate to triternate. Outer petals usually with short rounded crest overtopping apex. Stigma square, with papillae all around.

Eight species: E and NE Asia; seven species (five endemic) in China.

- 1a. Spur ca. 2 × as long as petal lobe.  
2a. Nectary extended through ca. 1/3 of spur ..... 105. *C. pseudofargesii*  
2b. Nectary extended through 2/3–4/5 of spur ..... 106. *C. fargesii*  
1b. Spur equaling petal lobe.  
3a. Bracts 5–8 × 5–8 mm, entire, rounded; sepals ca. 3 × 4 mm, rounded to cordate; capsules broadly obovate to obovate in outline, 1.2–1.5 × as long as broad; root swollen as a small radish; spur strongly upcurved ..... 107. *C. shennongensis*  
3b. Sepals much smaller; capsules 3–6 × as long as broad; root not swollen; spur straight or downcurved.  
4a. Crest of upper petal narrow, not overtopping apex ..... 110. *C. lauchiana*  
4b. Crest of upper petal apically rounded-obtuse, overtopping apex.  
5a. Bracts divided ..... 111. *C. acropteryx*  
5b. Bracts entire.  
6a. Raceme 10–20-flowered; bracts 3–6 mm; capsule 10–20 × ca. 2 mm, with 1 row of seeds ..... 108. *C. raddeana*  
6b. Raceme 4–8-flowered; bracts 5–14 mm; capsule 10–14 × ca. 3 mm, with 2 rows of seeds ..... 109. *C. ochotensis*

**105. *Corydalis pseudofargesii*** H. Chuang, Acta Bot. Yunnan. 12: 284. 1990.

假北岭黄堇 *jia bei ling huang jin*

Herbs, ?biennial, ca. 1 m tall, glabrous. Stems suberect to diffuse, leafy and much branched throughout, often with accessory branches above. Petiole 3–7 cm; blade glaucous abaxially,

green adaxially, ovate, 8–20 × 6–12 cm (upper leaves smaller), tripinnate; petiolules long; ultimate leaflets obovate, 2–5-divided into obovate obtuse mucronulate lobes. Racemes several, 6–10 cm, 10–22-flowered; lowest bracts ovate, 7–8 mm, deeply 3-divided; upper ones gradually smaller upward and less divided or entire, apex acuminate. Pedicel 2–4 mm, recurved in fruit. Sepals ovate, ca. 0.5 mm, dentate. Corolla yellow; outer

petals subacute with very short obtuse crest clearly overtopping apex; upper petal 25–28 mm; spur gracefully curved, 17–18 mm, very narrow, apex attenuate; nectary ca. 1/3 as long as spur; lower petal 8–9 mm, base saccate; inner petals 7–8 mm. Stigma square with 4 apical papillae, and lateral and basal geminate papillae. Capsule obovoid, 7–12 × 3–4 mm; style ca. 3 mm. Seeds in 2 rows, ca. 1.5 mm, smooth, elaiosome small. Fl. and fr. Jul–Sep.

• Forest margins on slopes; 1600–2800 m. S Gansu (Wenxian), N Sichuan (Nanping, Pingwu).

**106. *Corydalis fargesii*** Franchet, J. Bot. (Morot) 8: 290. 1894.

北岭黄堇 bei ling huang jin

Herbs, biennial, 0.6–1 m tall, glabrous. Taproot swollen, like a tiny carrot. Stem sulcate, leafy and branched, especially above. Basal leaves early withering; petiole of middle and upper leaves 1–5 cm (or longer in shade forms); blade glaucous abaxially, ovate, 5–12 × 3–8 cm, bi-(tri-)pinnate; primary leaflets distant, petiolulate; secondary leaflets once to twice ternate, lobes broadly ovate, obtuse. Racemes 4–5 cm, 10–22-flowered; bracts ovate to narrowly ovate, small, 2–3 mm, apex entire. Pedicel 2–3 mm. Sepals ca. 0.5 mm, rounded, finely dentate. Corolla yellow; outer petals subacute, with obtuse crest reaching or slightly overtopping apex; upper petal 17–20 mm; spur slightly sigmoidally curved, cylindric, 12–14 mm; nectary 2/3–4/5 as long as spur; lower petal shallowly saccate, base shortly clawed; inner petals 7–8 mm. Stigma rectangular, with 4 apical papillae, and lateral and basal geminate papillae. Capsule narrowly obovoid-cylindric, 8–12 × 1.5–2 mm, 2–6-seeded; style 2(–2.5) mm. Seeds in 1 row, ca. 1.5 mm, smooth. Fl. and fr. Jul–Sep.

• Roadsides and grasslands of forest districts; 1500–2700 m. Chongqing (Chengkou), SE Gansu (Dangchuan, Tianshui), W Hubei (Shennongjia), S Ningxia (Guyuan, Longde), S Shaanxi.

**107. *Corydalis shennongensis*** H. Chuang, Acta Bot. Yunnan. 12: 285. 1990.

鄂西黄堇 e xi huang jin

Herbs, biennial, 0.4–1 m tall. Taproot swollen like a radish. Stems suberect, narrowly winged, base 3–7 mm in diam., leafy and branched, accessory branches common in upper part. Basal leaves early withering; petioles of middle leaves 5–10 cm; upper ones shorter; blade broadly ovate, to 15 × 12 cm, (bi-)tripinnate; primary pinnae petiolulate; ultimate leaflets entire to shallowly 2–4-divided, ovate to obovate, or narrowly obovate, abaxially veins with dense thin papillae, apex obtuse, obscurely mucronulate. Racemes several, spikelike, 6–12 cm, 10–20-flowered; bracts rounded, 5–8 × 5–8 mm, entire, reflexed in fruit. Pedicel 2–5 mm, recurved in fruit. Sepals cordate, ca. 3 × 3–4 mm, margin entire. Petals yellow; outer petals navicular-ovate, apex acuminate, crest 1–1.5 mm tall, extended beyond apex, spur often strongly upcurved, cylindric, 9–10 mm; nectary very slender, extended through ca. 3/4 of spur; inner petals 8–9 mm; lower petal conspicuously saccate, but with a short narrow claw at very base; stigma square, apex with 4 papillae, lateral geminate papillae obvious, basal geminate papillae small. Capsule obcordate, 5–8 × 4–6 mm, apex rounded or retuse, 4–

9-seeded; style ca. 3 mm. Seeds in 2 rows, black, orbicular, ca. 1.75 mm, smooth, elaiosome small. Fl. and fr. Jul–Sep.

• Forest margins along cliffs, tussocks along channels; 1300–2300 m. W Hubei (Shennongjia).

**108. *Corydalis raddeana*** Regel, Bull. Soc. Imp. Naturalistes Moscou 34(2): 143. 1861.

黄花地丁 huang hua di ding

*Corydalis ochotensis* Turczaninow var. *raddeana* (Regel) Nakai.

Herbs, biennial, 60–100 cm tall, glabrous. Stems erect, rather stout, base to 1 cm in diam., prominently ridged, leafy throughout, usually branched throughout, accessory branches and racemes sometimes occurring above. Lower leaves with vaginate petioles; leaf blade glaucous abaxially, broadly ovate, 4–13 × 2–9 cm, bipinnate to tripinnate or triternate; primary petiolules 1–2.5 cm; secondary petiolules 2–5 mm; ultimate leaflets deeply or slightly 2- or 3-divided into obovate lobes, apex subobtuse, mucronate. Racemes 5–9 cm, at fruiting to 15 cm, 10–20-flowered, often branched below; bracts ovate to lanceolate, entire, 3–6 mm or lowermost often larger. Pedicel 2–4 mm, reflexed in fruit. Sepals reniform, ca. 1 mm, deeply dentate. Corolla yellow; outer petals with narrow obtuse crests overtopping apex; upper petal 18–20 mm; spur slightly curved, cylindric, 9–10 mm; nectary extended through 2/5–1/2 of spur; lower petal shallowly saccate; inner petals 8–9 mm. Stigma compressed-quadrate, apex with 4 papillae. Capsule cylindric, 10–20(–25) × ca. 2 mm, 4–12-seeded. Seeds in 1 row, black, shiny, nearly orbicular, 1.5–2 mm in diam. Fl. and fr. Jun–Oct.

Mixed forests, streamsides; (200–)800–1400(–2500) m. Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Taiwan, Zhejiang [Japan, Korea, Russia (Far East)].

**109. *Corydalis ochotensis*** Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 13: 62. 1840.

黄紫堇 huang zi jin

Herbs, biennial, 50–90 cm tall, glabrous. Stems often zigzag, squashy, winged-ridged, branched and leafy throughout. Basal leaves long petiolate; blade glaucous abaxially, broadly ovate or deltoid, triternate; primary petiolules long; secondary petiolules short; leaflets deeply or slightly divided, obovate, rhombic-obovate, or ovate, obtuse, mucronate. Lower cauline leaves long petiolate, upper ones shortly petiolate, like basal leaves. Racemes 3–5 cm, at fruiting to 9 cm, 4–8-flowered; bracts ovate to broadly ovate, 0.5–1.4 cm, entire, partly concealing flowers. Pedicel 2–4 mm, recurved in fruit. Sepals reniform, to 0.5 mm, dentate. Corolla yellow, keels of outer petals often with a purplish gray tint; outer petals acuminate, with short obtuse crest extended clearly beyond petal apex; upper petal 17–20 mm; spur cylindric, 8–11 mm, apex slightly downcurved; nectary 2/5–1/2 as long as spur; lower petal shallowly saccate, 10–12 mm; inner petals 8–9 mm. Stigma compressed-quadrate, with marginal papillae. Capsule narrowly obovoid, 10–14 × ca. 3 mm, 6–10-seeded. Seeds in 2 rows, 1.5–2 mm, smooth. Fl. and fr. Jun–Sep.

Mixed forests, streamsides. NE Hebei, Heilongjiang, E Jilin, Liaoning, Taiwan [Japan, N Korea, Russia (Okhotsk Sea region, E Siberia)].

**110. *Corydalis laucheana*** Fedde, Repert. Spec. Nov. Regni Veg. 20: 356. 1924.

紫苞黄堇 *zi bao huang jin*

*Corydalis urbaniana* Fedde.

Herbs, biennial, 50–100 cm tall, glabrous. Stems weak, squashy, hollow, narrowly winged-ridged, leafy throughout, diffusely branched, often with accessory branches above. Petiole narrowly winged, 5–10 cm in lower leaves, absent to 3 cm in upper leaves; blade of middle leaves triangular in outline, to 15 × 20 cm, upper leaves much smaller, glaucous abaxially, green or slightly glaucous adaxially, bi- to tripinnate, primary and secondary leaflets long stalked; ultimate leaflets deeply divided into oblong to obovate, obtuse, slightly mucronate lobes. Racemes 7–17-flowered, soon becoming rather lax; bracts entire, broadly ovate, apically finely dentate; uppermost bracts oblanceolate, 3–5 × 1–3 mm. Pedicel 3–5 mm, curved in fruit. Sepals minute. Corolla pale yellow or usually white, often with purplish suffusion toward keels; outer petals acute; dorsal crest usually very narrow, hardly overtopping apex; spur of upper petal 7–10 mm, tapering to tip, slightly downcurved; nectary ca. 1/2 as long as spur; lower petal 7–8 mm, apical part reflexed, navicular, lower part conspicuously saccate (rarely shallowly saccate) but constricted at very base into short narrow claw; inner petals 6–8 mm. Capsule cylindrical, 10–15 × ca. 2 mm, 5–8-seeded. Seeds in 1 row, ca. 1.5 mm, smooth; elaiosome linguulate, small. Fl. and fr. Jun–Sep.

- Slopes, among shrubs, margins of farms, roadsides, channels

in understories of coniferous forests; (1600–)2700–3800 m. Ningxia (Guyuan, Longde), Qinghai (Huzhu), N Sichuan, E Xizang (Jomda, Qamdo).

**111. *Corydalis acropteryx*** Fedde, Repert. Spec. Nov. Regni Veg. 20: 357. 1924.

松潘黄堇 *song pan huang jin*

*Corydalis pseudacropteryx* Fedde.

Herbs, biennial, 25–70 cm tall. Stems suberect to diffuse, branched, sometimes with accessory branches distally. Petiole vaginate, 2–7 cm; blade glaucous abaxially, green adaxially, ovate, 6–18 × 5–14 cm, bi- to tripinnate; primary pinnae 3(or 4) pairs, long petiolate (1–3 cm), distant; ultimate leaflets ovate, deeply 2–6-divided; lobes obovate-oblong, apex obtuse, obscurely mucronate (lowermost and uppermost leaves smaller). Racemes (4–)10–15(–27)-flowered (lateral racemes smaller), dense in flower, slightly elongating in fruit; lower bracts biterminal, upper ones less divided. Pedicel 2–3(–5) mm, recurved in fruit. Sepals ca. 0.5 mm. Corolla yellow; outer petals acuminate, rather narrow, crest short, obtuse, much exceeding apex; upper petal with slender spur gracefully downcurved, tapering to apex, 10–13 mm; nectary ca. 1/2 as long as spur; inner petals 7–8 mm. Stigma square, apex with 2 central papillae and broad lateral papillae, narrowed at base with small geminate papillae in basal corners. Capsule narrowly obovoid, (5–)8–11 × 2–3 mm, 2–8-seeded; style ca. 2.5 mm. Fl. and fr. Jul–Aug.

- Understories of *Abies* forests, forest margins; (2300–)3300–3800 m. N and W Sichuan (Kangding, Pingwu, Songpan).

### 19b. *Corydalis sibirica* group

北紫堇类群 *bei zi jin lei qun*

Herbs, annual (rarely biennial) with small taproots (in *Corydalis pinnatibracteata* root robust). Flowers small; dorsal crests of inner petals prominently protruding. Stigma with (2–)4 ± stipitate apical papillae, flanked by a sessile double (geminate) papilla on each side close to apex; base without papillae.

Nine species: China, Mongolia, Russia (Siberia); nine species (seven endemic) in China.

*Corydalis pinnatibracteata*, *C. pseudosibirica*, *C. tongolensis*, and *C. yui* (and possibly other species) are notable for the coexistence of muricate and smooth seeds within a population.

- 1a. Nectary 2/3–4/5 as long as spur; flowers white or cream, rarely dull purple in exposed situations; stigma with broad median sinus and (2–)4 indistinct apical papillae.
  - 2a. Flowers (spur) broad in profile; crest narrow, not overtopping apex; bracts 4–8 × 2–4 mm; nectary ca. 2/3 as long as spur ..... 112. *C. zhongdianensis*
  - 2b. Flowers narrow; crest distinct, overtopping apex; bracts narrow, 2–5 × ca. 1 mm; nectary ca. 4/5 as long as spur ..... 113. *C. rostellata*
- 1b. Nectary ca. 1/2 as long as spur; flowers yellow, rarely white; stigma with narrow median sinus and 4 or 6 distinct apical papillae.
  - 3a. Racemes 20–35-flowered; spur 6–7 mm.
    - 4a. Crest of outer petals entire; sepals less than 1 mm, coarsely lobed ..... 114. *C. tongolensis*
    - 4b. Crest of upper petal irregularly sinuate-dentate; sepals 1.5–2 mm, fimbriate-dentate ..... 115. *C. yui*
  - 3b. Racemes 5–20(–24)-flowered; spur 3–5 mm.
    - 5a. Lower petal without a pouch; fruit narrowly oblong.
      - 6a. Lower and middle bracts divided; plants 30–80 cm; capsule 7–10 × 1–1.5 mm; seeds 1–1.2 mm; racemes 10–24-flowered ..... 116. *C. pseudoimpatiens*
      - 6b. Bracts entire; plants 10–40 cm; capsule 10–12 × ca. 2 mm; seeds 1.6–1.7 mm; racemes 5–11-flowered ..... 117. *C. impatiens*
    - 5b. Lower petal usually with a distinct pouch; fruit obovoid.

- 7a. Bracts broad, much divided ..... 118. *C. pinnatibracteata*  
 7b. Bracts entire, narrowly lanceolate.  
 8a. Sepals to 0.5 mm; stems 50–80 cm; stigma with deep narrow sinus; spur 4–5 mm ..... 119. *C. pseudosibirica*  
 8b. Sepals 1–1.5 mm; stem 20–50 cm; stigma with shallow sinus; spur 3–4 mm ..... 120. *C. sibirica*

**112. *Corydalis zhongdianensis*** Z. Y. Su & Lidén, *Rheedea* 5: 16. 1995.

中甸黄堇 *zhong dian huang jin*

Herbs, annual, 25–90 cm tall, with small taproot. Stems diffuse to suberect, branched throughout, narrowly winged-ridged. Petiole long vaginate, 5–13 cm, shorter in upper leaves; blade triangular, 3–12 × 4–12 cm, (bi-)tripinnate or (bi-)trternate; leaflets shallowly cleft; ultimate lobes obovate, mucronate. Racemes dense at first, 5–16-flowered, much elongating in fruit; bracts broadly lanceolate to rhombic, 4–8 × 2–4 mm, irregularly papillose-scabrid along margin, entire, apex acuminate. Pedicel 2–4 mm, recurved in fruit. Sepals minute. Corolla dull white, with yellowish green keels, rarely (in sunny situations) dull purple; outer petals rather narrow at apex, acute, margin dentate, very narrowly crested; spur of upper petal ca. 5 mm, broad, obtuse; nectary 2/3–3/4 as long as spur; lower petal shallowly to strongly saccate; inner petals 5.5–7 mm. Stigma with broad median sinus, apical papillae 4. Fruit obovoid, 8–10 × 3–4 mm, smooth or very finely papillose-puberulent, (1–)6–9-seeded; style ca. 2 mm. Seeds in 2 rows, 1.5–1.6 mm, smooth, with small elaiosome. Fl. and fr. Jul–Oct.

• Disturbed places in humid forests, creeks, rarely in open gravelly disturbed soil, rare and scattered, often single individuals; 3100–3700 m. S Sichuan (Yanyuan), NW Yunnan.

**113. *Corydalis rostellata*** Lidén, *Rheedea* 5: 20. 1995.

具喙黄堇 *ju hui huang jin*

Herbs, annual, 20–70 cm tall, with small taproot. Stem suberect, weak, ridged, flexuous, leafy and branched throughout; accessory branches sometimes occurring above. Leaves glaucous abaxially, green adaxially, thin; petiole 3–7 cm, vaginate at base; uppermost leaves shortly stalked; blade triangular, 3–10 × 4–11 cm, triternate to sub-tripinnate; leaflets entire to deeply lobed; ultimate lobes obovate-obtuse to lanceolate-acute, mucronate. Racemes (5–)10–15(–20)-flowered, shortly stalked; bracts lanceolate to narrowly oblong, thin, entire or usually slightly dentate, apex often acuminate, upper ones 2–4 mm, lower ones to 1 cm. Pedicel ca. 2 mm, strongly reflexed in fruit. Sepals ca. 1 mm, finely and deeply dentate. Corolla cream, with greenish keels, very small; outer petals narrow, long acuminate at apex, with narrow obtuse entire crests overtopping apex; spur of upper petal straight, 5–6 mm, narrow; nectary ca. 4/5 as long as spur; lower petal slightly saccate to almost straight; inner petals 4–5 mm, not dark tipped. Stigma small, with broad irregular median sinus, 2–4 apical papillae, not sharply set off. Capsule obovoid, 5–8 × ca. 2 mm, 3–9-seeded; style sharply set off, ca. 2 mm. Seeds 1.2–1.3 mm, smooth, with small elaiosome. Fl. and fr. Sep.

• Shaded places in secondary bushlands on disturbed slopes, rare and scattered; 3300–3500 m. SW Sichuan (Dèrong), E Xizang (Qamdo), NW Yunnan (Dèqèn).

**114. *Corydalis tongolensis*** Franchet, *J. Bot. (Morot)* 8: 285. 1894.

全冠黄堇 *quan guan huang jin*

Herbs, annual, 50–130 cm tall, with thin taproot. Stems erect to suberect at first, later diffuse, weak, hollow, sharply winged-ridged, branched mainly in upper 1/2 or 2/3. Lower petioles 5–10 cm, in upper leaves 1–5 cm, slightly vaginate at base; blade glaucous abaxially, green adaxially, ovate, 5–13 × 4–8 cm, bi- to tripinnate; primary leaflets ca. 3 pairs, long petiolulate; ultimate leaflets 1 or 2 pairs, shortly stalked, deeply 2–5-divided; lobules obovate to oblong, mucronate. Racemes (10–)20–35-flowered, subsecund; accessory racemes sometimes in upper axils; bracts oblanceolate, acute, often shortly stalked; lower ones divided or with a few acute teeth; middle and upper bracts dentate to entire, sometimes undulate, 3–6 mm. Pedicel 3–5 mm, strongly recurved in fruit. Sepals whitish, ca. 1 mm, deeply dentate. Flowers yellow. Outer petals with broad entire crests usually reaching well beyond apex; spur upcurved, 6–7 mm; nectary ca. 1/2 as long as spur; lower petal without pouch, but sometimes with a minute cornute spurlet at base, slightly constricted between claw and limb; inner petals 6–7 mm. Stigma with deep narrow median sinus, 4 long-stipitate apical papillae, and 2 lateral geminate papillae. Fruit narrowly obovoid to oblong, 8–9 × 2(–2.5) mm, 3–7-seeded; style ca. 2.5 mm. Seeds 1.3–1.5 mm, smooth or densely tuberculate (often in same population); elaiosome small. Fl. May–Sep, fr. Jun–Sep.

• Forest margins, ditches, disturbed sites; 2700–4000 m. W Sichuan, E Xizang (Batang), NW Yunnan.

**115. *Corydalis yui*** Lidén, *Rheedea* 1: 35. 1991.

瘤籽黄堇 *liu zi huang jin*

Herbs, annual, 45–100 cm tall, glabrous, with thin taproot. Stems erect, weak, ridged, hollow, leafy throughout, branched mainly above. Petiole 5–13 cm below, upward gradually shorter, base conspicuously long vaginate; blade glaucous abaxially, green adaxially, triangular, 5–12 × 4–10 cm, tripinnate; primary leaflets 3 or 4 pairs, petiolulate; secondary leaflets 2 or 3 pairs, shortly petiolulate; ultimate leaflets deeply or slightly 2–7-divided; lobules obovate to oblanceolate, apex obtuse to acute, shortly mucronate; upper leaves smaller and less divided. Raceme spikelike, 5–15 cm, densely 20–40-flowered, lateral inflorescence shorter and fewer flowered; lower bract deeply divided, upper ones obovate to oblanceolate, entire to slightly divided or dentate, often purple and ± undulate, 2–5 mm. Pedicel 2–3 mm, sharply recurved in fruit. Sepals white or purple, 1.5–2 mm, deeply fimbriate. Corolla yellow, or apical keels of outer petals often purplish green; outer petals with rather broad acuminate dentate limb, and conspicuous dentate crests, attenuate toward tip, decurrent to tip of spur; spur upturned, 6(–7) mm; lower petal without pouch; inner petals 6(–7) mm. Stigma with 4 long-stipitate apical papillae, and 2 lateral geminate papillae. Capsule cylindrical, 4–7 × 1.5–2 mm, 2–5-seeded; style 3–3.5 mm. Seeds in 1 row, nearly orbicular, 1.3–1.5 mm, smooth or usually densely tuberculate (in same population); elaiosome small. Fl. and fr. Jul–Sep.

• Forest margins, grassy slopes, among shrubs, wet slate slopes, in running water; 2600–3200 m. SW Sichuan (N of Muli).

**116. *Corydalis pseudoimpatiens*** Fedde, Repert. Spec. Nov. Regni Veg. 21: 46. 1925 [*“pseudimpatiens”*].

假赛北紫堇 jia sai bei zi jin

*Corydalis impatiens* (Pallas) Fischer var. *maxima* Michajlova.

Herbs, annual, 30–80 cm tall, with thin taproot. Stems erect to suberect, sulcate, sparingly branched mostly above. Petioles of lower leaves 5–6 cm, upper petioles shorter; blade 4–8 × 3–8 cm, bipinnate; leaflets deeply divided into elliptic, obtuse to subacute lobes. Racemes dense, 10–24-flowered, subsecund; bracts small, dentate or divided throughout inflorescence, or upper ones entire, equaling pedicels. Pedicel 3–4 mm, recurved in fruit. Sepals minute, ca. 0.5 mm, deeply divided. Corolla yellow; outer petals obtuse, with narrow to broad, short or long dentate crests; spur of upper petal slightly upcurved, 3–4 mm, obtuse; nectary ca. 2/3 as long as spur; lower petal without basal pouch; inner petals 4–5 mm. Stigma with narrow sinus, 4 apical stalked papillae, and a pair of geminate papillae close to apex. Fruit linear-oblong, 7–10 × 1–1.5 mm, 3–7-seeded; style ca. 1.5 mm. Seeds in 1 row, 1–1.2 mm. Fl. and fr. Jun–Sep.

• Subalpine coniferous forests, slopes, roadsides; (1300–)1700–3300(–4000) m. C and S Gansu, E and S Qinghai, N Sichuan.

**117. *Corydalis impatiens*** (Pallas) Fischer in Candolle, Syst. Nat. 2: 124. 1821.

赛北紫堇 sai bei zi jin

*Fumaria impatiens* Pallas, Reise Russ. Reich. 3: 286. 1776; *Corydalis impatiens* var. *minima* Michajlova; *C. sibirica* (Linnaeus f.) Persoon subsp. *impatiens* (Pallas) A. Gubanov; *C. sibirica* var. *impatiens* (Pallas) Regel.

Herbs, annual or more often ?biennial, 10–40 cm tall, glabrous, with taproot. Stems erect to suberect, often purplish, winged-ridged, branched from base and above. Petiole of basal leaves 4–6 cm, vaginate at base; blade glaucous abaxially, green or glaucous adaxially, bi- to triternate; leaflets deeply divided into 2 or 3 obovate to oblanceolate, obtuse to subacute mucronate lobes. Racemes 5–11-flowered, rather lax in fruit; lowermost bract often large and divided, middle and upper bracts usually entire, lanceolate, 5–7 mm. Pedicel 3–5 mm, recurved in fruit. Sepals minute, ca. 0.5 mm, dentate. Corolla pale yellow; outer petals obtuse, mucronate, with narrow usually dentate crests slightly overtopping apex; spur of upper petal 2–3 mm, obtuse; nectary ca. 1/2 as long as spur; lower petal without basal pouch; inner petals 4–5 mm. Stigma with narrow sinus, 4 apical stalked papillae, and a pair of geminate papillae close to apex. Fruit oblong, 9–14 × ca. 2 mm, 3–8-seeded; style short, 1(–1.5) mm. Seeds in 1 row, 1.6–1.7 mm, smooth; elaiosome small. Fl. and fr. Jun–Oct.

Forest understories, shrubs on slopes, tussocks, roadsides; ca. 1700 m. N Gansu, Jilin, Nei Mongol (Wulashan), N Qinghai, Shanxi (Dawutai Shan) [Mongolia, Russia (Siberia)].

**118. *Corydalis pinnatibracteata*** Y. W. Wang, Lidén, Q. R. Liu & M. L. Zhang, Ann. Bot. Fenn. 40: 295. 2003.

羽苞黄堇 yu bao huang jin

Herbs, biennial, 20–40 cm tall, with taproot. Stems erect, hollow, narrowly winged-ridged, leafy and branched throughout, especially above. Petiole 3–7 cm, long and rather broadly vaginate, 3–7 cm; upper leaves shortly stalked; blade triangular, 2–7 × 2–6 cm, bipinnate, glaucous, especially abaxially; leaflets cut into 2–5 oblanceolate to obovate obscurely mucronate segments. Racemes 3–5 cm, 12–20-flowered, 7–9 cm in fruit; lowermost bracts triangular-ovate, to 12 mm, bipinnately divided; upper ones 4–8 mm, palmatilobate, with 5–7 segments. Pedicel 3–5 mm, reflexed in fruit. Sepals ca. 1 mm, divided to base into narrow lobes. Corolla pale to bright yellow, keels of outer petals and veins at petal base often brownish purple, broadly triangular; outer petals with broad entire crest 1–2 mm high, much overtopping apex; upper petal 7–9 mm; spur short, 3–4 mm, obtuse; nectary ca. 2/3 as long as spur; inner petals 5–6 mm; lower petal 6–8 mm, base distinctly saccate. Stigma with 4 apical papillae. Capsule short, broad, 6–8 × 4–5 mm, 5–8-seeded; style sharply set off, ca. 3 mm. Seeds in 2 rows, 1.3–1.6 mm, smooth or densely muricate (at least sometimes coexisting in a population). Fl. and fr. Jul–Sep.

• River terraces with pebbles; 3200–4200 m. Qinghai.

**119. *Corydalis pseudosibirica*** Lidén & Z. Y. Su, *nom. nov.*

假北紫堇 jia bei zi jin

Replaced synonym: *Corydalis sibirica* (Linnaeus f.) Persoon subsp. *elata* Lidén, Rheedea 5: 16. 1995, not *Corydalis elata* Bureau & Franchet, J. Bot. (Morot) 5: 20. 1891.

Herbs, annual, 50–80 cm tall, glabrous, with tiny taproot. Stems suberect to diffuse, sharply ridged, leafy and branched especially above; accessory branches sometimes in upper part. Petiole long vaginate, 2–7 cm (shorter distally); blade triangular to ovate, 3–10 × 2–8 cm, bipinnate with leaflets deeply divided into obovate lobes. Racemes 6–15(–24)-flowered, subsecund; bracts narrowly lanceolate, acute, entire or lowermost divided, equaling pedicels. Pedicel 3–5 mm, strongly recurved in fruit. Corolla pale to bright yellow; outer petals often dentate, with a broad crest reaching beyond apex; spur of upper petal upwardly directed, triangular-obtuse, 2.5–4 mm, with nectary reaching ca. 1/2 way; inner petals 4–5 mm, dorsal crests overtopping apex; lower petal basally usually clearly saccate. Stigma with 4 apical papillae and a deep and narrow median sinus. Capsule obovoid, 6–8 × 2–4 mm with a sharply set off style 1.5–2 mm, 2–7-seeded. Seeds 1.3–1.5 mm, smooth or densely muricate (at least sometimes coexisting in a population). Fl. and fr. Jul–Sep.

• Open forests and shrubs, rarely in scree; 3200–4100 m. SE Qinghai (Yushu), NW and WC Sichuan, E Xizang.

Plants in Qinghai do not have lower petal saccate.

The specific epithet means “false *sibirica*,” from Greek ψευδής (*pseudēs*, “false”).

**120. *Corydalis sibirica*** (Linnaeus f.) Persoon, Syn. Pl. 2: 270. 1806.

北紫堇 bei zi jin

*Fumaria sibirica* Linnaeus f., Suppl. Pl. 314. 1782.



Herbs, biennial, 20–50 cm tall, glabrous. Stems erect, ridged, branched. Petiole 3–5 cm, long vaginate; blade glaucous abaxially, triangular-ovate, biternate to triternate or bipinnate; primary segments petiolulate; ultimate leaflets  $\pm$  2- or 3-divided; lobes lanceolate to oblanceolate, apex acute to obtuse, mucronate. Racemes 7–10-flowered, subsecund; lower bracts ovate-lanceolate, shortly acuminate, upper bracts subulate, 4–8 mm, entire or slightly dentate. Pedicel 3–7 mm, bent after flowering. Sepals orbicular, 1–1.5 mm, margin lacerate. Petals white or yellow, often with purplish suffusion; outer petals

often sinuate-dentate, with a broad or narrow crest reaching beyond apex; spur of upper petal upwardly directed, triangular-obtuse, 3–4 mm, with nectary reaching ca. 1/2 way; inner petals 4–5 mm; lower petal basally clearly saccate. Stigma with 4 stalked apical papillae and shallow median sinus. Capsule obovoid, 8–10  $\times$  3–4 mm, with a sharply set off style ca. 2 mm, 3–8-seeded. Seeds 1.5–1.8 mm. Fl. and fr. Jun–Sep.

Understories of taiga forests, river sands, gravel, rocks; 1700–3900 m. Heilongjiang, Jilin, Nei Mongol [Mongolia, Russia (Siberia)].

## 20. *Corydalis* sect. *Radicosae* (Lidén) Lidén, *stat. nov.*

维波黄堇组 *chu bo huang jin zu*

Basionym: *Corydalis* subsect. *Radicosae* Lidén, *Rheede* 1: 32. 1991 [“*Radicosae*”].

Herbs, perennial, with underground elongate cylindrical rootstock, with few to several annual stems that branch at soil surface. Stems branched, leafy. Leaves repeatedly ternately or pinnately compound. Flowers yellow. Stigma with 4 or 6 papillae, all simple; basal papillae lacking.

Five species: Bhutan, China, NE India, E Nepal; four species (one endemic) in China.

*Corydalis drepanantha* D. G. Long (Notes Roy. Bot. Gard. Edinburgh 42: 101. 1984), from Bhutan and NE India, might occur in S Xizang.

- 1a. Ultimate leaf lobes flabellate [or narrowly lanceolate]; bracts deeply divided into narrow segments.
- 2a. Leaf lobes lanceolate; fruit obovoid ..... *C. drepanantha* (see note above)
- 2b. Leaf lobes flabellate; fruit oblong ..... 121. *C. pseudotongolensis*
- 1b. Ultimate leaf lobes obovate-obtuse; upper bracts entire (S Xizang).
- 3a. Inner petals tipped with dark purple; fruit narrowly obovoid; stigma with 4 papillae, all apical ..... 122. *C. diffusa*
- 3b. Inner petals pale; fruit oblong to linear; stigma with 6 papillae.
- 4a. Crest of upper petal  $\pm$  sinuate; spur equaling or longer than limb ..... 123. *C. crispa*
- 4b. Crest of upper petal broad, entire, truncate at apex; spur shorter than limb ..... 124. *C. cavei*

## 121. *Corydalis pseudotongolensis* Lidén, *Rheede* 5: 10. 1995.

假全冠黄堇 *jia quan guan huang jin*

Herbs, perennial, 20–50(–70) cm tall. Rootstock shallowly to deeply buried, usually  $\pm$  vertical, oblong, 0.5–1.5 cm in diam., with 1 to few annual stems from apex. Underground part of stem 1–13 cm, simple; aerial part 25–50(–70) cm, angular-ridged, much branched from base, with several strict branches further branched above. Leaves grayish green, glaucous abaxially, slightly thick, often slightly papillose-scabrid on veins abaxially; petioles of lower leaves 5–15 cm, long vaginate at base; upper petioles 2–6 cm; blade triangular in outline, 4–12  $\times$  5–12 cm, 2–3  $\times$  ternate (to bi-[tri]-pinnate) with shallowly to deeply divided leaflets with blade decurrent on petiolules; ultimate lobes oblong to flabellate, with few mucronate teeth at apex. Racemes long and narrow, (5–)10–20-flowered, simple, rarely branched at base; bracts 4–10 mm, shortly stalked, once to twice deeply ternately or digitately cleft into narrow acute lobes. Pedicel 2–5(–8) mm, strongly reflexed in fruit. Sepals whitish, 0.5–1 mm, finely dentate. Corolla orange to dark yellow, with darker veins; inner petals not dark tipped; outer petals subacute to obtuse, with dentate margin; upper petal usually upcurved, crest  $\pm$  decurrent on spur, shorter than, reaching, or overtopping apex, much dentate; spur 6–7 mm; nectary ca. 2/3 as long as spur; lower petal straight or minutely saccate at base,

with small dentate crest; inner petals 6–7 mm. Stigma obtusely square, with 4 simple apical papillae. Fruit oblong, (6–)8–10  $\times$  1.5–2 mm, 3–6-seeded; style ca. 2 mm. Seeds 1.3–1.5 mm, smooth, with small, shortly lobed elaiosome. Fl. and fr. Jul–Oct.

• Disturbed hillsides, roadsides, small fine gravel slopes, understories of open subalpine coniferous forests; 2700–4500 m. SW Sichuan, NW Yunnan (Dèqên, Zhongdian).

## 122. *Corydalis diffusa* Lidén, *Rheede* 5: 6. 1995.

展枝黄堇 *zhan zhi huang jin*

Herbs, perennial, 15–40 cm tall. Rootstock long and slender, with annual stems from apex. Underground part of stem simple, with distant remnants of old petioles; aerial parts diffusely branched from base. Leaves long stalked, vaginate at base; blade small, biternate, with obovate ultimate lobes. Racemes 10–15-flowered, dense at anthesis, elongating in fruit; bracts broadly elliptic-acute, shorter than pedicels, entire or with few lateral teeth. Pedicels 8–15 mm, reflexed in fruit (lower bracts and pedicels sometimes much longer). Sepals 0.5(–1) mm, coarsely dentate. Corolla yellow, with inner petals dark purple at apex; outer petals broad, subacute, with broad entire dorsal crest; spur of upper petal slightly upcurved, cylindrical or slightly tapering toward apex, 7–10 mm; nectary almost as long as spur; lower petal gradually narrowed into short indistinct

claw; inner petals ca. 8 mm. Stigma with 4 apical papillae. Capsule narrowly obovoid, 10–11 × ca. 2 mm, including sharply set off style 3–4 mm, 3–8-seeded.

4000–4700 m. SE Xizang (Cona, Nangxian) [NE Bhutan].

**123. *Corydalis crispa*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 30. 1896.

雏波黄堇 chu bo huang jin

Herbs, perennial, 20–50 cm tall, papillose-scabrid on veins and petioles (less so on stems), rarely densely papillose throughout, usually ± glaucous. Rootstock underground, vertical, cylindrical-elongate, robust, often branched below, apically with 1–5 annual stems. Stems with few scales or petiolar remnants on simple or sparingly branched underground portion; aerial part weak, diffusely much branched from soil surface. Leaves stalked; blade triangular-ovate, 4–5 cm, bipinnate to triternate; pinnules ternate, with ± divided lobes; ultimate segments obovate, mucronate. Racemes 5–20-flowered; bracts oblanceolate, mostly entire, or lower and middle ones more divided (especially in subsp. *laeviangula*). Pedicel 5–15 mm, recurved in fruit. Sepals 1.5–2 mm, rounded, deeply lacerate-dentate. Flowers golden yellow, not dark tipped, sometimes with orange or brownish suffusion; upper petal broadly obtuse, usually with irregularly sinuous broad dorsal crest; spur upcurved, 6–9 mm; nectary ca. 3/4 as long as spur; inner petals 6–8 mm; lower petal broad, obtuse, with small crest. Stigma with 6 simple papillae. Fruit sometimes spotted or streaked with blackish purple, oblong, 6–11 × ca. 2 mm, with finely and densely papillose ridges, 3–10-seeded; style ca. 2 mm. Seeds in 1 row, ca. 1.5 mm, smooth or rugose. Fl. and fr. Jun–Oct.

Among trees and shrubs on flat moist ground, among rank herbage in grazing ground, cliff ledges, disturbed wet scree, also near cultivation; 3000–5000 m. C, S, and SE Xizang [Bhutan].

- 1a. Crests and margins of outer petals sinuous or undulate; bracts usually entire; seeds smooth; spur of upper petal 8–9 mm ..... 123a. subsp. *crispa*  
 1b. Crests and margins of outer petals entire; most bracts divided; seeds rugose; spur of upper petal 6–7 mm ..... 123b. subsp. *laeviangula*

**123a. *Corydalis crispa*** subsp. *crispa*

雏波黄堇(原亚种) chu bo huang jin (yuan ya zhong)

*Corydalis bowes-lyonii* D. G. Long; *C. crispa* var. *setulosa* C. Y. Wu & H. Chuang; *C. crispa* var. *waltonii* Fedde; *C. stracheyioides* Fedde.

Bracts usually entire. Crests and margins of outer petals sinuous or undulate; spur of upper petal 8–9 mm. Seeds smooth.

Among trees and shrubs on flat moist ground, among rank herbage in grazing ground, cliff ledges, disturbed wet scree, also near cultivation; 3000–5000 m. C and S Xizang (common from 91°–95°E) [Bhutan].

**123b. *Corydalis crispa*** subsp. *laeviangula* (C. Y. Wu & H. Chuang) Lidén & Z. Y. Su, *stat. nov.*

光棱雏波黄堇 guang leng chu bo huang jin

Basionym: *Corydalis crispa* var. *laeviangula* C. Y. Wu & H. Chuang in C. Y. Wu, Fl. Xizang. 2: 315. 1985; *C. pseudothyrsiflora* C. Y. Wu & H. Chuang.

Bracts usually divided. Crests and margins of outer petals entire; spur of upper petal 6–7 mm. Capsule usually smooth. Seeds rugose.

• SE Xizang (Cona, Dêngqên, Lhünzhub).

**124. *Corydalis cavei*** D. G. Long, Notes Roy. Bot. Gard. Edinburgh 42: 103. 1984.

聂拉木黄堇 nie la mu huang jin

*Corydalis papillipes* C. Y. Wu.

Herbs, perennial, 15–50 cm tall, glabrous or sparingly papillose-hairy. Rootstock underground, slender to rather stout, apically with slender stems, which branch freely once reaching soil surface. Aerial stems weak, branched from base, sometimes supported by surrounding vegetation. Petioles of lower leaves 5–9 cm, upper ones shorter; blade glaucous abaxially, green adaxially, triangular in outline, 2–3 × ternately divided or sub-bipinnate with deeply divided leaflets, often papillose-scabrid on veins; ultimate lobes narrowly to broadly obovate, apex obtuse. Racemes 5–25-flowered, simple or rarely with a basal branch, rather dense at first, lax in fruit; lower bracts leaflike, once to twice ternate to ternatifid, upper ones entire or dentate, usually shorter than pedicels. Pedicel 5–15 mm, slender, arcuately reflexed in fruit. Sepals ca. 1 mm, rounded, finely dentate. Corolla yellow to orange, with tips of inner petals purplish black, sometimes only minutely so; upper petal with broad entire crest reaching apex and there abruptly terminating, narrowly decurrent on spur; spur 7–8 mm, broadly triangular-obtuse; nectary 1/2–2/3 as long as spur; lower petal broad, acute-acuminate, shortly crested; inner petals ca. 9 mm. Stigma with 6 simple papillae. Capsule linear, 12–15 × ca. 2 mm, including style ca. 2.5 mm, 5–7-seeded. Seeds in 1 row. Fl. and fr. Jun–Sep.

Roadsides, stone crevices, scree; (2500–)3800(–4300) m. S Xizang (Nyalam) [India (Sikkim), E Nepal].

## 21. *Corydalis* sect. *Angustiflorae* (Lidén) Lidén, *stat. nov.*

狭花黄堇组 xia hua huang jin zu

Basionym: *Corydalis* subsect. *Angustiflorae* Lidén, Rheedeia 1: 32. 1991.

Herbs, annual, taprooted, with slender branched stems. Racemes long, lax, ± secund. Pedicel strongly recurved in fruit. Flowers narrow, with thin straight spur. Stigma with 4 apical papillae and a pair of geminate lateral/subapical papillae. Fruit linear, explosively dehiscent.

• One species: China.

**125. *Corydalis pseudodrakeana*** Lidén, *Rheedea* 1: 32. 1991.甲格黄堇 *jia ge huang jin**Corydalis drakeana* Prain var. *tibetica* C. Y. Wu & H. Chuang.

Herbs, annual, 25–80 cm tall, with slender taproot. Stems zigzag, slender, stiff, leafy and branched throughout. Leaves: petiole 2–10 cm, sheathing at base; blade triangular, 3–8 × 3–6 cm, 3–4 × ternate (or sub-bipinnate); ultimate leaflets entire to deeply divided into 2–4 obovate obtuse mucronate lobes. Racemes long, lax, ± secund, 4–10-flowered; bracts oblanceolate, 3–6 mm, entire or apically dentate, (lowermost sometimes

larger and much divided), ± papillose on abaxial veins. Pedicel 3–4 mm, strongly recurved in fruit. Sepals ca. 0.5 × 0.5–1 mm, dentate. Corolla yellow, with greenish markings, sometimes spur purplish; outer petals narrow, without or with very narrow crest, subacute; upper petal 12–14 mm; spur straight, 7–9 mm, thin; nectary ca. 2/3 as long as spur; inner petals 6–8 mm. Stigma with 4 apical papillae and geminate lateral/subapical papillae. Fruit pendent, linear, 13–17 × ca. 1.5 mm, 8–15-seeded. Seeds orbicular, ca. 1.5 mm, smooth. Fl. and fr. Jul–Sep.

• Forest understories, among shrubs, burned areas, river gravel; 3000–3900 m. SE Xizang.

**22. *Corydalis* sect. *Himalayanae*** (Lidén) Lidén, *stat. nov.*喜马拉雅黄堇组 *xi ma la ya huang jin zu*Basionym: *Corydalis* ser. *Himalayanae* Lidén, *Rheedea* 1: 32. 1991.

Herbs, annual to perennial, slender, diffusely branched. Fleshy lateral roots often produced (not in *Corydalis gracillima*). Leaves thin, bi-(tri)-ternate. Crest of upper petal tapering at both ends, not reaching apex. Fruit explosively dehiscent. Seeds smooth.

Eleven species: throughout the Himalayas plus Khasia hills (India) and Chin hills (Myanmar); six species in China.

1a. Nectary less than 1/4 as long as spur.

2a. Outer petals acuminate; inner petals pale at tip ..... 126. *C. longipes*2b. Outer petals acute; inner petals tipped with blackish purple ..... 127. *C. pseudolongipes*

1b. Nectary 1/3–1/2 as long as spur.

3a. Lower petal straight, not gibbous at base.

4a. Seeds uniseriate to sub-biseriate; plant with fleshy adventitious roots (probably perennial); upper bracts entire; seeds ca. 1 mm ..... 128. *C. casimiriana*4b. Seeds biseriate; plant annual (rarely biennial), with simple taproot; most bracts divided; seeds 0.7–0.8 mm ..... 131. *C. gracillima*

3b. Lower petal with a distinct gibbosity or a short spur at base.

5a. Spur 5–7 mm; taprooted annual or biennial ..... 131. *C. gracillima*

5b. Spur of upper petal 7–8 mm; fleshy adventitious roots present.

6a. Outer petals not black tipped; sepals minute ..... 129. *C. changuensis*6b. Outer petals black tipped; sepals 1–1.5 mm ..... 130. *C. rubrisepala***126. *Corydalis longipes*** Candolle, *Prodr.* 1: 128. 1824.毛长梗黄堇 *mao chang geng huang jin**Corydalis longipes* var. *pubescens* (C. Y. Wu & H. Chuang) C. Y. Wu; *C. pubescens* C. Y. Wu & H. Chuang.

Herbs, (annual to) short-lived perennial, glabrous or papillose-hairy, ascending to subscandent with leafy slender branched trailing stems 20–75 cm. Petiole of lower leaves 3–11 cm, upper ones 1–4 cm, narrowly vaginate at base; blade 2–5 × 2–6 cm, biternate, segments deeply lobed; lobes narrowly obovate, obtuse; upper leaves smaller and less divided. Racemes long, slender, lax, 5–15-flowered, soon longer than short peduncle, elongating in fruit; bracts 2–9 mm, dentate to lobed; lower ones larger, often leaflike; upper ones smaller, sometimes entire. Pedicel slender, 10–20 mm, somewhat elongating, recurved in fruit. Sepals whitish, broadly reniform, ca. 1 × 1–1.5 mm, deeply circumdentate. Corolla pale to bright to lemon yellow, keels greenish, rarely white, jasmine-scented; upper petals long acuminate, with crest not reaching tip, long decurrent on spur, rarely absent; spur broadly based, 6–8 mm; nectary very short but prominent, to 1/5 as long as spur; inner petals 6–8 mm, never dark at apex; lower petal with or without a short crest,

saccate at base, sometimes conspicuously so. Stigma with (4 or)6 apical papillae. Fruit obovoid, 6–10 × 2–3 mm, 8–15-seeded, abruptly narrowed into style 2–3 mm. Seeds in 2 rows, 1–1.2 mm, smooth. Self-incompatible. Fl. and fr. May–Sep. 2n = 16.

Along shaded paths in forests, wet stony places, field margins, roadsides; 2000–3500 m. S Xizang (Nyalam) [C Nepal].

**127. *Corydalis pseudolongipes*** Lidén, *Bull. Brit. Mus. (Nat. Hist.)*, Bot. 18: 532. 1989.短腺黄堇 *duan xian huang jin**Corydalis longipes* Candolle var. *burkillii* Fedde; *C. longipes* var. *phallutiana* Fedde; *C. longipes* var. *smithii* Fedde.

Herbs, (annual to) short-lived perennial, 15–40 cm tall, glabrous. Stem weak, slender, leafy and branched throughout. Petiole 1–4 cm (longer in shade-grown plants or in nutrient-rich soil); blade glaucous on both surfaces, 1–4 cm, biternate; primary segments petiolate; ultimate leaflets sessile, entire to 2–4-divided into obovate, obtuse, obscurely mucronate lobes. Racemes 3–12-flowered, lax; bracts much divided or rarely uppermost entire, 3–6 mm. Pedicel 5–15 mm, slender, recurved in

fruit. Sepals ca. 1 mm, often deeply divided, rarely minute, entire. Corolla yellow; inner petals with blackish purple apex; upper petal acute or very shortly acuminate, narrowly cristate with crest long decurrent on spur; spur upcurved, 5–7 mm; nectary thick, to 1 mm; lower petal with a basal pouch; inner petals 5–7 mm. Stigma with 4 stalked apical papillae. Fruit obovoid, 5–7 × ca. 2 mm, smooth or minutely papillose all over surface, 4–10-seeded; style ca. 1.5 mm. Seeds in 2 rows, ca. 1.2 mm, smooth. Fl. Jul–Sep, fr. Jul–Oct.

*Abies* forest margins, slopes, among shrubs; 3000–4000 m. S Xizang (Yadong) [Bhutan, India (Sikkim), Nepal].

**128. *Corydalis casimiriana*** Duthie & Prain subsp. **brachycarpa** Lidén, *Rheedea* 5: 27. 1995.

铺散黄堇 *pu san huang jin*

Herbs, (annual to) short-lived perennial, 20–70 cm tall, glabrous. Stems slender, weak, many branched from base, with many leaves. Petiole of lower leaves 2–10 cm, upper ones 0.5–3 cm; blade glaucous abaxially, 1–4 cm, thin, bi-(tri-)ternate; primary leaflets: petiolule 0.3–2 cm, ultimate leaflets shortly petiolate or sessile, deeply 2–5-divided; lobules obovate, obtuse, obscurely mucronate. Racemes 4–12-flowered; peduncle distinct; lower bracts divided; middle and upper bracts often entire, 2–8 mm. Pedicel 5–15 mm, slender, arcuately recurved in fruit. Sepals reniform, 0.5–1 mm, dentate. Corolla yellow; inner petals tipped with blackish purple; outer petals narrow, acute; upper petal with narrow crest; spur often upcurved, 5–6 mm, narrow; nectary ca. 1/2 as long as spur; lower petal usually straight, not crested, very rarely with a cornute minute spur at base; inner petals 4.5–5.5 mm. Stigma with 4 stalked apical papillae. Fruit narrowly obovoid to oblong, 8–10 × ca. 2 mm, 6–10-seeded; style 1.5–2 mm. Seeds uniseriate to sub-biseriate, 1–1.1 mm, smooth. Self-compatible. Fl. and fr. Jul–Oct.

Open grassy slopes, pastures, frequent in burned areas, understories of open subalpine coniferous forests, among shrubs; 2800–4700 m. S Xizang [Bhutan, India (Darjeeling, Sikkim), C and E Nepal].

*Corydalis casimiriana* subsp. *casimiriana* occurs in N India, Kashmir, and W Nepal.

**129. *Corydalis changuensis*** D. G. Long, *Notes Roy. Bot. Gard. Edinburgh* 42: 102. 1984.

显囊黄堇 *xian nang huang jin*

Herbs, (annual to) short-lived perennial, 12–30 cm tall. Stems slender, weak, branched from base. Leaves biternate; leaflets deeply divided into obovate obtuse segments. Racemes lax, 3–6-flowered; bracts shorter than pedicels, lowermost often deeply divided, upper ones entire, broad at apex. Pedicel 4–10(–15) mm. Sepals ca. 0.5 × 1 mm, dentate. Corolla yellow; inner petals tipped with black; outer petals acute; upper petal crested, with crest decurrent on spur and attenuate toward apex; spur 7–10 mm; nectary ca. 1/2 as long as spur; lower petal broad, abruptly narrowed to an acute apex, not crested, very deeply saccate or with a short spur to 2 mm; inner petals 7–8 mm. Stigma widened at apex with 4 apical stalked papillae. Fruit narrowly ellipsoid to oblong, 6–8 × 1.5–2 mm, to 6-seeded; style 2–3 mm. Seeds 1.2–1.4 mm.

Along rivers; ca. 3100 m. S Xizang (Changi, Nyingchi) [India (Sikkim)].

**130. *Corydalis rubrisepala*** Lidén subsp. **zhuangiana** Lidén, *Rheedea* 5: 30. 1995.

西藏红萼黄堇 *xi zang hong e huang jin*

*Corydalis longipes* Candolle var. *megalantha* H. Chuang.

Herbs, (annual to) short-lived perennial, 20–70 cm tall, glabrous. Stems slender, weak, branched from base, with many leaves. Petiole of lower leaves 2–10 cm, upper ones 0.5–3 cm; blade glaucous abaxially, 1–4 cm, thin, bi-(tri-)ternate; primary leaflets: petiolule 0.3–2 cm; ultimate leaflets shortly petiolate or sessile, deeply 2–5-divided; lobules obovate, obtuse, obscurely mucronate. Racemes 3–8-flowered; bracts divided, or upper ones entire, 3–7 mm. Pedicel 5–15 mm, slender, recurved in fruit. Sepals red, 1–1.5 mm, finely dentate. Corolla bright yellow, all petals black tipped; upper petal narrowly crested; spur upcurved, ca. 7 mm; nectary ca. 3 mm; inner petals ca. 6 mm; lower petal with a minute cornute spur. Stigma with 4 stipitate apical papillae. Fruit obovoid, 7–9 × ca. 2 mm, to 15-seeded; style 1–1.5 mm. Seeds ca. 1.1 mm, smooth. Fl. and fr. Aug.

• Damp grassy stream banks; 4000–4200 m. SE Xizang (Mira La in Qusum, Nyingchi).

*Corydalis rubrisepala* subsp. *rubrisepala* occurs in NE India.

**131. *Corydalis gracillima*** C. Y. Wu ex Govaerts, *World Checkl. Seed. Pl.* 3(1): 20. 1999.

纤细黄堇 *xian xi huang jin*

*Corydalis gracilis* Franchet, *Bull. Soc. Bot. France* 33: 395. 1886, not Ledebour (1842).

Herbs, annual or biennial, 10–30(–60) cm tall, with simple taproot, never with adventitious fleshy roots. Stems weak, diffusely branched and leafy throughout. Petiole of lower leaves 1.5–7 cm, upper ones 1–4 cm; blade glaucous abaxially, green to glaucous adaxially, 1–3(–5) × 1–3(–6) cm (larger in shade), 2–3 × ternate; primary pinnae long stalked; leaflets ± deeply divided into 2–4 obovate to oblanceolate lobes. Racemes subsecund, 3–9-flowered; bracts 3–8 mm, divided into 3–6 obovate lobes, or upper ones entire; lowermost often biternatisect into acute lobes. Pedicel strongly recurved in fruit, 4–8 mm. Sepals 0.5–1 mm, rounded, circumdentate. Corolla golden yellow or white (often mixed populations); apex of inner petals blackish purple; outer petals with broad limb, acute to shortly acuminate at tip; upper petal with crest not reaching apex, long decurrent on spur; spur upcurved, 5–7 mm, narrow; nectary 1/3–1/2 as long as spur; inner petals 4.5–5 mm; lower petal with narrow claw and rhombic acute limb, straight or sometimes saccate at base, not or very narrowly crested. Stigma with prominent geminate papillae and 4 stipitate apical papillae. Fruit narrowly obovoid, 6–10 × 2–2.5 mm, 7–14-seeded; style 1–1.5 mm. Seeds in 2 rows, ca. 0.8 mm, smooth, with short thick elaiosome. Self-compatible.

Disturbed stony hillsides, roadside gravel, grassy slopes, mossy cliffs; 2500–4500 m. W Sichuan, SE Xizang (Zayü), Yunnan [N Myanmar].

There are two types: a summer annual and a biennial type. Individuals with a saccate lower petal have been called “var. *microcalcarata*” (see note below). They are encountered in both types and occur mixed with non-saccate plants.

Type A (*Corydalis gracillima* s.str.). Plants summer annual. Fl. Jul–Oct. Disturbed stony hillsides, roadside gravel, grassy slopes; 2500–4500 m. W Sichuan (very common), SE Xizang (Zayü), W Yunnan [N Myanmar].

Type B. Plants biennial. Fl. Mar–Apr. Mossy cliffs; 3000–3500 m. NW Yunnan (Dêqên, Zhongdian) [?N Myanmar].

“*Corydalis gracillima* var. *microcalcarata* H. Chuang” (Acta Bot. Yunnan. 13: 17. 1991) was not validly published because the species name to which it was assigned, “*C. gracillima* C. Y. Wu,” was not at that time validly published (*Vienna Code*, Art. 43.1), having been proposed by Chuang and Su (in Fl. Xizang. 2: 319. 1985) but without a full and direct reference to the place of valid publication of the replaced synonym (Art. 33.4).

### 23. *Corydalis* sect. *Tetragonia* Z. Y. Su & Lidén, **sect. nov.**

方茎紫堇组 fang jing zi jin zu

Type: *Corydalis capnoides* (Linnaeus) Persoon, Syn. Pl. 2: 270. 1806.

*Herbae annuae vel biennes ramosae. Bracteae foliaceae. Petala pallide lutea. Capsulae lineari-oblongae, in sectione transversali tetragonae, abrupte dehiscentes.*

Herbs, annual or biennial, diffusely branched. Bracts large, leaflike. Petals pale yellow. Capsule linear-oblong, squarish in cross section, explosively dehiscent.

One species: C Europe to E Siberia, south to C Asia and Xinjiang, China.

The sectional epithet refers to the 4-angled cross section of the capsule, from Greek τετρά- (*tetra*-, “four” in compound words) and γωνία (*gonia*, “corner” or “angle”).

**132. *Corydalis capnoides*** (Linnaeus) Persoon, Syn. Pl. 2: 270. 1806.

方茎黄堇 fang jing huang jin

*Fumaria capnoides* Linnaeus, Sp. Pl. 2: 700. 1753; *Corydalis gebleri* Ledebour.

Herbs, annual or biennial, 20–40 cm tall. Stems ridged, diffusely much branched from base and above. Cauline leaves: petiole 3–8 cm, vaginate; blade slightly glaucous abaxially, triangular-ovate, 1–5 × 1.5–6 cm, thin, ternate to biternate; leaflets shortly petiolate, deeply 2–4-divided, sometimes again cut; ultimate lobules obovate, obtuse. Racemes 3–8-flowered, very dense in flower, much elongating in fruit; lower bracts like upper cauline leaves, upper bracts smaller and less divided. Pedicel to 5 mm in flower, elongating to 10–20 mm and ± arcu-

ate in fruit. Sepals ca. 0.5 × 1 mm, dentate. Corolla pale yellow, with pale green keels; outer petals navicular-ovate, apex acute or shortly acuminate, not crested or with short dentate crest; upper petal 11–15 mm; spur slightly attenuate and slightly downcurved toward apex, 4–6 mm; nectary extended through ca. 1/2 of spur; inner petals 7–8 mm, claw ca. as long as limb. Stigma square, with 4 short and broad apical papillae, a pair of lateral geminate papillae, and a pair of basal geminate papillae on distinct basal lobes. Capsule linear-oblong, square in cross section, 15–20 × ca. 2 mm, 6–10-seeded, apically attenuate into narrow beak 2–3 mm, tipped by short style ca. 1 mm. Seeds in 1 row, 1.7–1.9 mm, smooth. Fl. and fr. Jun–Aug.

*Picea* forests on slopes, wetlands within forests; 1800–2600 m. Xinjiang (Altay, Tian Shan) [Kazakhstan, Mongolia, Russia; C and SE Europe].

### 24. *Corydalis* sect. *Ramososibiricae* Fedde ex Wendelbo in K. H. Rechinger, Fl. Iran. 110: 4. 1974 [“*Ramoso-sibiricae*”].

鞘黄堇组 qiao huang jin zu

Herbs, annual to biennial, taprooted, with branched leafy angular stems. Leaves stalked, triangular to oblong, 2–3 × pinnate or ternate. Pedicel recurved in fruit. Flowers yellow. Stigma compressed-quadrangle, with 2–4 apical papillae, and lateral and basal geminate papillae, basal papillae on basal lobes. Fruit explosively dehiscent.

Three species: Himalayas and W China; two species (one endemic) in China.

1a. Racemes 10–15-flowered, dense; lower petal saccate; capsules obovoid, 8–10 mm; seeds muricate ..... 133. *C. cornuta*  
1b. Racemes 4–7-flowered, lax; lower petal not saccate; capsules oblong, 14–17 mm; seeds smooth ..... 134. *C. drakeana*

**133. *Corydalis cornuta*** Royle, Ill. Bot. Himal. Mts. 1: 69. 1834.

角状黄堇 jiao zhuang huang jin

*Corydalis casimiriana* Duthie & Prain var. *meeboldii* Fedde; *C. cornuta* var. *meeboldii* Fedde; *C. debilis* Edgeworth; *C. longipes* Candolle var. *chumbica* Prain ex W. W. Smith; *C. mildbraedii* Fedde; *C. thalictrifolia* Jameson ex Regel.

Herbs, annual or biennial, 15–50 cm tall. Stems erect or ascending, many branched from base, stems and branches ribbed, with many leaves. Leaves all petiolate, lower leaves long stalked, upper ones shortly stalked; petiolar base sheathed; blade glaucous abaxially, triangular-oblong, bipinnate to tripinnate; leaflets opposite; ultimate leaflets cuneate-obovate or oblong, mucronate. Racemes 10–15-flowered; bracts 4–8 mm, divided into acute lobes, or upper ones entire. Pedicel 2–5 mm,

rigidly arcuately recurved in fruit. Sepals ca. 0.5 mm, dentate. Petals yellow, sometimes with distinct veins; inner petals tipped with blackish purple; outer petals acute, abaxially with entire narrow crest; upper petal 14–16 mm; spur straight or slightly downcurved, 6–8 mm, slightly tapering toward apex; nectary extended through ca. 3/5 of spur; lower petal 6–7 mm, broadly saccate at base; inner petals 6–7 mm, claw shorter than limb. Stigma square with 4 apical papillae, a pair of lateral geminate papillae and basal geminate papillae on distinct basal lobes. Capsule obovoid, 8–10 × 2–3 mm, 8–16-seeded. Seeds in 2 rows, muricate, ca. 1 mm in diam. Fl. and fr. Jul–Sep.

Forest margins; 2400–3600 m. S Xizang (Gyirong, Yadong) [India (Kumaon, Sikkim), Kashmir, Nepal, Pakistan; Africa (Kenya, Tanzania)].

**134. *Corydalis drakeana*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 31. 1896.

短爪黄堇 *duan zhua huang jin*

*Corydalis ecremocarpa* W. W. Smith.

Herbs, annual, 15–50 cm tall, glabrous. Stems ascending at very base, very strict and erect, green or often reddish, conspicuously attenuate toward tip, much branched from base, sharply ridged, leafy and branched throughout with erect

branches. Petiole 3–4 cm, base with long broad sheath; blade glaucous on both surfaces, bipinnate; primary leaflets 2 or 3 pairs, petiolate; secondary leaflets cut into 3–5 obovate, obtuse, mucronate lobes. Racemes 4–7-flowered, lax, further elongating in fruit; lowest bracts often like upper cauline leaf, middle and upper bracts often reddish, lanceolate-spatulate to rhombic-obovate, 4–10 mm. Pedicel 4–6 mm, rigidly arcuately recurved at base in fruit (lowermost pedicels sometimes to 11 mm). Sepals whitish, ovate to obovate, 2–2.5 × ca. 2 mm, dentate to bidentate. Petals yellow to dirty orange-yellow with darker veins; inner petals tipped with dark purplish brown. Outer petals narrow, navicular, subacute, sometimes with short mucro, not crested; upper petal 15–18 mm; spur straight, 8–10 mm, slender, tapering toward apex; nectary extended through ca. 2/3 of spur; inner petals 6–8 mm, claw ca. 1/3 as long as limb. Style swollen below stigma; stigma peculiar, with apical and lateral simple papillae, a pair of geminate lateral submarginal papillae and 2 basal geminate papillae set on prominent basal lobes; stigma slightly narrowed above basal lobes. Capsule oblong, 14–17 × 2.5–3 mm, explosively dehiscent, 10–16-seeded; style ca. 2 mm. Seeds ca. 1.5 mm, smooth. Fl. and fr. Aug.

• Open stony pastures, disturbed patches in grass turf, roadsides, sandy soil; 2700–4100 m. W Sichuan (Kangding), NW Yunnan (Lijiang).

**25. *Corydalis* sect. *Mucroniferae*** Fedde ex Lidén, Bull. Brit. Mus. (Nat. Hist.), Bot. 18: 524. 1989.

尖突黄堇组 *jian tu huang jin zu*

Herbs, perennial, very small, pulvinate, taprooted. Petiole ribbonlike; blade pinnate or biternate to triternate. Leaves and bracts usually pale in lower 1/2, green distally. Racemes corymbose, mostly shorter than leaves; bracts large trifid or flabellately divided, margin often with hairs or lobes aristate. Pedicel erect, at fruiting apically hooked. Flowers yellow or whitish; inner petals with yellow dorsal wings. Stigma conspicuously oblique, with stalked papillae. Fruit with few seeds and slender long styles, usually buried in bracts.

Seven species: Kashmir and Nepal to W China; five species (four endemic) in China.

*Corydalis megacalyx* Ludlow & Stearn (Bull. Brit. Mus. (Nat. Hist.), Bot. 5: 58. 1975), described from Nepal, is close to the Chinese border but currently is not known from China.

1a. Bract segments aristate-mucronate.

2a. Crest narrow, not reaching apex; stigma with 4 apical papillae ..... 136. *C. mucronifera*

2b. Crest broad, reaching apex; stigma with 6 apical papillae ..... 137. *C. chryso-sphaera*

1b. Bract and leaf segments not or shortly mucronate, sometimes ciliate.

3a. Ultimate lobes linear to oblanceolate.

4a. Flowers 14–17 mm; plant without horizontal runners ..... *C. megacalyx* (see note above)

4b. Flowers 9–12 mm; plant with prominent horizontal runners ..... 135. *C. pygmaea*

3b. Ultimate lobes rounded, obtuse.

5a. Upper petal 8–9 mm; stigma with 4 papillae; leaves ternatisect to ternate with entire median lobe ..... 138. *C. spathulata*

5b. Upper petal 9–15 mm; stigma with 8 papillae; leaves 2–3 × ternate with crowded lobes; lower petal usually with ciliate claw ..... 139. *C. inopinata*

**135. *Corydalis pygmaea*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 2: 208. 1980.

矮黄堇 *ai huang jin*

Herbs, perennial, 2–5 cm tall, with taproot, forming small spreading cushions by means of creeping stems rooting at nodes. Stems branched near base, with leaves. Basal leaves many, 2.5–5 cm, long petiolate; petiole flat, base ca. 2 mm

in diam., upwardly attenuate; blade oblong-deltoid, ca. 10 × 8 mm, bipinnate to nearly tripinnate; ultimate segments linear to narrowly lanceolate, 2–3 × ca. 0.5 mm, apex acuminate; cauline leaves like basal leaves, smaller. Racemes corymbose, 4–10-flowered; bracts 5–8 mm with stalk 2–3 mm and blade digitately cut into 4–8 narrow mucronate lobes (lowermost bracts sometimes larger and more divided). Pedicel 5–10 mm, erect, apex hooked in fruit. Flowers yellowish green, keels of outer

petals darker purplish green. Sepals semicircular, ca. 1 mm, shallowly dentate. Upper petal 9–10 mm, not or very narrowly crested; spur slightly downcurved at apex, cylindrical, ca. 4 mm; nectary ca. 2/3 as long as spur; lower petal not crested, ca. 7 mm, limb narrow, finely dentate; claw broad and flat, ca. 4 mm; inner petals ca. 6 mm, limb equaling claw. Stigma square, bifid, with 6 or 7 short papillae, including 1 basal geminate papilla. Capsule obovoid, ca. 5 × 3 mm, reflexed, buried in bracts. Seed margin with small protracted dots; caruncle cap-form.

• Alpine meadows, among shrubs; ca. 4900 m. SE Xizang (Lhünzê, Nyingchi).

**136. *Corydalis mucronifera*** Maximowicz, Fl. Tangut. 51. 1889.

尖突黄堇 jian tu huang jin

*Corydalis boweri* Hemsley.

Herbs, perennial, forming small cushions, 2–4(–6) cm tall, with long taproot, glabrous to densely papillose-hairy. Stems several from base. Leaves many, longer than inflorescence, 2–5 cm; petiole flat, 1–4 cm × 2–5 mm; blade not sharply set off from pale cuneate petiole, ca. 1 × 1–1.5 cm, biternatisect; ultimate segments oblong, obtuse, mucronate to shortly aristate. Racemes corymbose, 5–10-flowered; bracts pale to purplish at base, green distally, flabellate, 1–2 cm, apically divided into 7–13 oblong long-aristate lobes. Pedicel 7–12 mm, erect, at fruiting hooked at very apex. Flowers whitish or cream with yellow apex. Sepals 1–2 × 1–2 mm, largely dentate. Upper petal straight, 8–11 mm, with short dorsal crest attenuate in both directions, and not reaching apex; spur straight or slightly downcurved, cylindrical or narrowed toward apex, 4–5 mm; nectary extended through ca. 2/3 of spur; inner petals 4–5 mm, apex yellow, claw shorter than limb. Stigma with 4(or 5) apical stalked papillae, rarely also with a single geminate papilla on “upper” side. Capsule elliptic, 4–6 × ca. 2 mm, 2–4-seeded; style 2.5–3 mm. Seeds ca. 1.3 mm, almost smooth or often peculiarly papillate.

• Alpine scree; 4200–5300 m. W Gansu (Sunan), S Qinghai, E Xinjiang (Ruoqiang), Xizang.

**137. *Corydalis chrysosphaera*** C. Marquand & Airy Shaw, J. Linn. Soc., Bot. 48: 160. 1929.

金球黄堇 jin qiu huang jin

Herbs, perennial, forming small cushions, yellowish green, 3–8(–13) cm tall, with taproot. Stems many, red, fleshy, branched, with leaves. Leaves yellowish green, 3–7 cm, long petiolate; petiole flat, 1–3 mm in diam.; blade 1–1.6 × ca. 1 cm, bipinnate; ultimate segments oblong, 1–3 mm, acute. Racemes corymbose, 5–10-flowered; bracts flabellate, 10–17 × 5–10 mm, lacinate to 1/2 way, segment apex long aristate. Pedicel 8–14 mm, erect, in fruit sharply hooked at tip. Flowers bright yellow, keels of outer petals darker greenish purple. Sepals buff-colored, reniform, 0.5–1 × 1–2 mm, with few teeth. Upper petal 11–15 mm, with broad crest overtopping apex; spur straight or slightly downcurved at tip, cylindrical or slightly attenuate, 6–8 mm; nectary 1/2–2/3 as long as spur; lower petal 7–8 mm, limb broad, obtuse; claw slightly shorter than limb; inner petals 5–6

mm, claw shorter than limb. Stigma with 6 simple stalked papillae, and often also a geminate papilla on adaxial side, close to style. Capsule 3–5 × 2–2.5 mm, 2–6 seeded; style 3–3.5 mm. Seeds compressed-orbicular, ca. 1.5 mm; caruncle small.

• River sands; (3000–)3800–5500 m. Xizang.

**138. *Corydalis spathulata*** Prain ex Craib, Bull. Misc. Inform. Kew 1910: 73. 1910.

匙苞黄堇 shi bao huang jin

Herbs, perennial, forming small cushions, 2–6 cm tall, glabrous, with taproot. Stems many branched, with leaves. Outer leaves longer than stems; petiole 2–5 cm; blade 8–15 × 7–15 mm, deeply ternatisect with lobes again shallowly cut into broad obtuse fleshy lobes; inner leaves and bracts with much shorter and broader membranous petiole, clearly ternate, with central lobe rounded-obtuse, 3–5 × 2–4 mm, with 3–6 mm flat pale petiolule; lateral leaflets more divided. Racemes corymbose, 2–5-flowered; bracts like leaves, but smaller. Pedicel 6–13 mm, erect, hooked at apex in fruit. Flowers pale yellow. Sepals ca. 1 × 0.5 mm, slightly dentate. Upper petal with rather broad short crest reaching apex, 8–9 mm; spur narrow, ca. 3 mm; nectary thin, 1/2–2/3 as long as spur; lower petal spatulate, limb finely dentate, claw slightly shorter than limb; inner petals ca. 5 mm. Stigma with 4 apical stalked papillae. Capsule ovoid, 4.5–7 × ca. 2.5 mm, 2–6-seeded; style ca. 3.5 mm. Seeds 1.7–1.9 mm, with small elaiosome.

• Riverbanks; ca. 4700 m. Xizang.

**139. *Corydalis inopinata*** Prain ex Fedde, Repert. Spec. Nov. Regni Veg. 22: 26. 1925.

卡惹拉黄堇 ka re la huang jin

*Corydalis fimbripetala* Ludlow & Stearn; *C. inopinata* var. *glabra* C. Y. Wu & Z. Y. Su.

Herbs, perennial, forming cushions, 2–7 cm tall, glabrous or usually ± papillose-pubescent, with long taproot. Stems several, branched, with leaves. Leaves many, 2–4(–7) cm, with long weak flat petiole; blade rounded, 5–10 × 7–10 mm, 2–3 × ternatisect into orbicular to obovate closely imbricate fleshy lobules, obtuse or shortly mucronate, glabrous or sparsely ciliate. Racemes corymbose, 2–8-flowered; bracts cuneate-flabellate, 5–12 mm, 3–6 mm wide at apex, lower ones biternatisect into oblong to narrowly obovate mucronate lobes, often ciliate. Pedicel 6–12 mm, erect, apically hooked in fruit. Flowers yellow. Sepals 0.5–2 × 1–1.5 mm, finely dentate. Upper petal 9–15 mm; spur cylindrical, 4–7 mm; nectary 2/3–4/5 as long as spur; lower petal 6–9 mm, with broad ciliate claw and obtuse to subacute entire to sharply dentate limb; inner petals (5–)6–8 mm. Stigma slightly bifid, with 8 papillae. Capsule elliptic, 4–6 × ca. 2 mm, 2–6-seeded; style ca. 3 mm. Seeds 0.8–1 mm, with peculiar papillate surface; elaiosome small.

Alpine scree, steppes, sands; 4400–5500 m. S Xizang (widespread W of 93°E) [Kashmir (Rupshu)].

Plants from the western part of the range (Burang in SW Xizang, and Kashmir) have small flowers with small dorsal crests not reaching the apex.

**26. *Corydalis* sect. *Latiflorae*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 18: 398. 1996.

宽花紫堇组 kuan hua zi jin zu

Herbs, perennial, of high elevations, usually low growing, very pale-glaucous (covered with a waxy bloom). Leaves crowded at base. Flowers blue or yellow. Capsule explosively dehiscent. Fruiting pedicel suberect, apically hooked (in *Corydalis stracheyi* arcuately recurved).

Fifteen species: alpine areas of the Himalayas; 11 species (three endemic) in China.

The length and appearance of rootstocks and underground parts of petioles and stems are dependent on the degree of covering of mobile material in scree.

*Corydalis uncinata* Lidén (Bull. Brit. Mus. (Nat. Hist.), Bot. 18: 520. 1989), with bipinnate leaves with rounded lobes, broad entire bracts partly concealing flowers, and yellow corolla, occurs in Dolpo on the Nepal side of the Chinese border and most probably grows also in Xizang.

- 1a. Flowers pale blue to pale purplish blue, or partly white.
- 2a. Spur equaling inner petals ..... 147. *C. tsangensis*
- 2b. Spur less than 1/2 as long as inner petals.
- 3a. Crest of outer petals not decurrent on spur; corolla not spongy ..... 149. *C. nana*
- 3b. Crest of outer petals reaching tip of spur; corolla spongy, very broad ..... 148. *C. latiflora*
- 1b. Flowers yellow, sometimes partly suffused with purplish brown.
- 4a. Bracts entire, partly concealing flowers ..... *C. uncinata* (see note above)
- 4b. Most or all bracts divided.
- 5a. Spur of upper petal shorter than inner petals; stems usually longer than 15 cm.
- 6a. Fruiting pedicels arcuately recurved, 10–15 mm; racemes to 10-flowered ..... 146. *C. stracheyi*
- 6b. Fruiting pedicels erect, apically hooked, 10–30 mm; racemes 10–35-flowered.
- 7a. Outer petals not or narrowly crested; spur at least 1/2 as long as inner petals; blade of basal leaves ca. 5 × longer than broad ..... 144. *C. lhasaensis*
- 7b. Outer petals with broad entire crests; spur less than 1/3 of inner petals; blade of basal leaves 1.5–3 × longer than broad ..... 145. *C. meifolia*
- 5b. Spur of upper petal equaling or longer than inner petals; stems shorter than 10 cm.
- 8a. Leaves with small triternate blade and broad petiole; last year's leaves often persistent; style 5–6 mm ..... 141. *C. hendersonii*
- 8b. Leaf blade pinnate; only petiolar bases persistent from last year's leaves; style 2–4 mm.
- 9a. Lobes of bracts terminating in long arista ..... 140. *C. uranoscopa*
- 9b. Lobes of bracts mucronulate or muticous.
- 10a. Spur of upper petal 7–9 mm; nectary ca. 1/2 as long as spur (W Xizang) ..... 150. *C. tibetoalpina*
- 10b. Spur of upper petal 11–13 mm; nectary ca. 2/3 as long as spur (Qinghai, S Xizang).
- 11a. Sepals divided to base into a few narrow lobes; outer petals broadly crested ..... 142. *C. qinghaiensis*
- 11b. Sepals dentate; outer petals narrowly crested ..... 143. *C. dubia*

**140. *Corydalis uranoscopa*** Lidén, Edinburgh J. Bot. 55: 347. 1998.

立花黄堇 li hua huang jin

Herbs, perennial, 4–5 cm tall, very condensed with leaves, stems, and bract tips on same level. Rootstock vertical, tapering below, 0.5–1 cm in diam. at apex. Stems 4–5 cm, leafless at base, above with a few bractlike leaves with axillary racemes. Radical leaves crowded, vaginate at base, with broad flattened petiole (1.5–3 cm) and rachis; blade ovate, 2–3 × 1.5–2 cm, bi-(tri-)pinnate; ultimate leaflets divided into 3–7 small lanceolate mucronate lobules. Racemes very dense, 3–10-flowered; bracts obtriangular, 10–20 mm, with cuneate flat pale base, above repeatedly cut into 15–30 small narrow lobes; lobes acute, with long scabrid arista. Pedicels 10–15 mm, equaling or usually shorter than bracts, thin, erect, at fruiting hooked at very apex. Flowers vertically held with spur hidden in cushion. Sepals long persistent, deeply divided into 2 or 3 widely diverging acute lobes, to 1 mm wide. Corolla pale orange-yellow; outer petals with very short apical dorsal crests conspicuously surpassing

apex; spur straight or slightly downcurved, 7–8 mm, narrow, tapering; nectary ca. 1/2 as long as spur, thin; inner petals ca. 6 mm. Capsule oblong, 3–11 × ca. 1.5 mm (length depending on number of developed seeds), 1–6-seeded; style 2–2.5 mm.

Bare ground; 3900–5000 m. S Xizang (Burang) [India (Kumaon)].

**141. *Corydalis hendersonii*** Hemsley, J. Linn. Soc., Bot. 30: 109. 1894.

尼泊尔黄堇 ni bo er huang jin

Herbs, perennial, tufted, 3–5(–8) cm tall, fleshy, brittle. Rootstock horizontal, long, at apex crowned by dense leaf rosette, usually preceded by successive persistent leaf crowns from 1 or 2 previous years. Stem sparingly branched. Leaves fleshy, very glaucous; petiole flat, 1.5–3 cm × 4–5 mm, usually with ciliate margin; blade deltoid, ca. 1 × 1 cm, triternate; ultimate segments linear-oblong, 2–3 × ca. 1 mm. Racemes corymbose, very dense, 3–8-flowered; bracts flabellate, much divided; lower bracts 2–3 cm. Pedicel 12–18 mm, erect, at fruiting



hooked-curved at apex. Flowers yellow, vertically held, only apically extended above leaves and bracts. Sepals narrowly linear. Outer petals rhombic, acute, without or with low (rarely high) crest; upper petal 18–22(–30) mm; spur straight or slightly downcurved, tapering to apex, 10–11(–16) mm; nectary ca. 2/3 as long as spur, thin; lower petal navicular; inner petals 10–12 mm. Stigma square-obovate, base rounded, apex shallowly bifid, with 2 small central papillae flanked by broader diffuse papillae, sublateral geminate papillae present. Capsule hidden by bracts, pruinose, oblong, 5–11 × 2.5–3 mm, 1–9-seeded; style ca. 5 mm, curved. Seeds 1.5–2 mm; caruncle small. Fl. and fr. Jul–Sep.

Sands, stony scree, shrub forest margins; 4200–5500 m. S Qinghai, W Xinjiang, Xizang [Kashmir, Nepal].

- 1a. Upper petal 1.8–2.2 cm; outer petals with crest slight or absent ..... 141a. var. *hendersonii*  
 1b. Upper petal ca. 3 cm; outer petals with high crest ..... 141b. var. *altocristata*

**141a. *Corydalis hendersonii* var. *hendersonii***

尼泊尔黄堇(原变种) ni bo er huang jin (yuan bian zhong)

*Corydalis nepalensis* Kitamura.

Upper petal 1.8–2.2 cm; outer petals with crest absent or to 1.5 mm, tapering at both ends.

River sands, stony scree; 4200–5200 m. W Xinjiang (Yecheng), C and W Xizang [Kashmir, Nepal].

**141b. *Corydalis hendersonii* var. *altocristata*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 2: 205. 1980 [*“alto-cristata”*].

高冠尼泊尔黄堇 gao guan ni bo er huang jin

Bracts large, ca. 3 cm. Upper petal ca. 3 cm; outer petals with high, broad crest.

• Shrub forest margins, sands; 4500–4700 m. S Qinghai (Zadoi), E Xizang (Lhari).

**142. *Corydalis qinghaiensis*** Z. Y. Su & Lidén, Edinburgh J. Bot. 54: 62. 1997.

青海黄堇 qing hai huang jin

Herbs, perennial, caespitose, low-growing. Rootstock long, apically branched into several stems, clad along underground parts (ca. 10 cm × 3–4 mm) with scaly remnants of old cataphylls or leaves. Aerial part of stems 3–10 cm, much branched from base, with leaves. Petiole of basal leaves ca. 4 cm, flat, base slightly sheath-form; blade oblong, 4–6 × ca. 2.5 cm, bipinnate; primary leaflets 3 or 4 pairs, shortly petiolate to sessile; ultimate leaflets 1 or 2 pairs, sessile, deeply 3- or 4-divided; segments overlapping or imbricate, obovate, (2–)3–5 × (1.5–)2–3 mm, ± mucronate. Lower cauline leaves like basal leaves, upper ones like lower bracts. Racemes corymbose, very dense, 10–20-flowered; bracts 2–4 × ca. 2 cm, with flat petiole, biterminately deeply divided; segments spatulate to oblanceolate, 4–8 × 1–3 mm, slightly mucronate. Pedicel erect, 1–3 cm, at fruiting 2–4 cm and apically hooked-curved. Flowers dirty yellow, vertically held. Sepals 1.5–2 mm, deeply 3-divided into linear lobes. Outer petals rather broadly crested, subobtusely; upper pet-

al 21–24 mm; spur straight, slightly downcurved at apex, cylindrical, 12–13 mm; nectary ca. 2/3 as long as spur; inner petals 9–10 mm. Stigma like that of *Corydalis hendersonii*, but base with downward-pointing lobes tipped with papillae. Capsule ovoid, ca. 10 × 3–4 mm, descending-curved from fruit neck apex and buried in bract; style ca. 3 mm.

• Alpine steppe, gravel, and sands; 4400–4900 m. W Qinghai (Golmud, Hoh Xil, Qumar Heyan).

**143. *Corydalis dubia*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 36. 1896.

稀花黄堇 xi hua huang jin

*Corydalis cornutioides* (C. Marquand & Airy Shaw) C. Y. Wu & Z. Y. Su; *C. meifolia* Wallich var. *cornutioides* C. Marquand & Airy Shaw; *C. tsariensis* Ludlow & Stearn.

Herbs, perennial, low-growing, condensed, very glaucous. Rhizome ± vertical, long, slender, often branched, crowned by long obtuse papery scales. Stems with tapering bases, 5–10 cm, with 0–2(–4) subopposite leaves above, usually supporting branches or axillary racemes. Radical leaves several; petiole 2–4 cm, broadly vaginate at base; blade oblong-ovate, 4–7 × 2–4(–5) cm, tripinnate with 4–6 pairs of primary leaflets; ultimate leaflets entire to divided into small oblanceolate lobes 2–3 × ca. 0.5 mm. Cauline leaves like radical leaves but smaller and less divided; uppermost cauline leaves like lower bracts. Racemes corymbose, very dense, 5–13-flowered; bracts with cuneate stalks, 1.5–2.5 × 1–2 cm, 2–4 × ternately cut into narrow lobes. Pedicel 10–20 mm, erect, at fruiting hooked at apex. Flowers yellowish white to dirty yellow, vertically held, spur usually covered in bracts. Sepals flabellate, ca. 2 × 3 mm, margin with teeth. Outer petals rather broad, without or with narrow crest; upper petal 2–2.5 cm; spur straight, apical part slightly curved, 10–11 mm; nectary extended through ca. 2/3 of spur; lower petal claw broad and flat, equal to limb; limb ± undulate-dentate; inner petals ca. 9 mm. Stigma nearly square, with 8 papillae. Capsule very glaucous, with bluish white waxy bloom, obovoid, ca. 7 × 3 mm, ca. 5-seeded; style 3.5–4 mm.

Alpine stony sands, siliceous scree slopes; 4800–5200 m. Xizang [Bhutan].

The type of *Corydalis tsariensis* has broader leaflets, bracts much divided with broader lobes, broader crests to the outer petals, and a more obtuse spur.

**144. *Corydalis lhasaensis*** C. Y. Wu & Z. Y. Su in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 280. 1999.

拉萨黄堇 la sa huang jin

*Corydalis meifolia* Wallich var. *ecristata* C. Y. Wu & Z. Y. Su in C. Y. Wu, Fl. Xizang. 2: 312. 1985.

Herbs, perennial, 20–30 cm tall, glaucous. Rhizome (mostly unknown) at apex with lax rosette of leaves and few flowering stems. Stems 20–30 cm, slender, simple (rarely branched?), with 1 or 2 leaves above. Basal leaves with vaginate petiole 5–8 cm; blade narrowly obovate-oblong, 8–15 × 1.5–3 cm, ± pruinose, bi- to tripinnate with 5–7 pairs of widely spaced alternate, shortly stalked to sessile primary leaflets; secondary leaflets closely spaced, deeply divided into several

lobes; lobes lanceolate, small and narrow, 2–3 × ca. 1 mm, acute. Cauline leaves broadly vaginate, shortly stalked, much smaller and less divided than radical leaves. Racemes ca. 10-flowered, dense, corymbose in flower, much elongated at fruiting; bracts leaflike, lower ones to 3 × 1 cm, broadly petiolate, bipinnately divided; upper ones smaller, cuneate-pinnate or palmatisect. Pedicel slender, ca. 15 mm in flower, elongating to 20–30 mm at fruiting. Sepals ca. 0.5 × 1 mm, dentate. Flowers dirty yellow; keels of outer petals purplish; upper petal 11–12 mm, with narrow crest; spur conical-obtuse, ca. 4 mm; nectary small (1 mm) or absent; lower petal navicular; inner petals ca. 7 mm. Stigma square, apex with 4 papillae, laterally with 2 inconspicuous papillae, basally with papillate lobes. Capsule (immature) obovoid, 3–4 × ca. 2 mm, 4-seeded, with papillate lines; style ca. 3 mm.

- Alpine grasslands; ca. 4800 m. C Xizang (Lhasa).

The type specimens give the impression of a shade-grown plant.

**145. *Corydalis meifolia*** Wallich, Tent. Fl. Nepal. 55. 1826.

细叶黄堇 xi ye huang jin

Herbs, perennial, 10–45 cm tall, very glaucous. Rootstock stout, thick at apex, branched or not, apex with very dense residual petiolar bases with persistent fibrous veins. Stems simple or branched above, or with axillary inflorescences above, lowest leaves at middle of stem, subopposite. Radical leaves long petiolate; petiole to 10 cm, broadly vaginate at base; blade ovate, 10–18 × 6–12 cm, finely tripinnate with 5–8(–10) pairs of pinnae; secondary leaflets 1 or 2 pairs per pinna, ca. 2 × 1 cm; ultimate lobes linear to lanceolate, 3–10 × 0.3–1.5 mm. Cauline leaves shortly petiolate, ca. 5 × 2 cm, bipinnate. Racemes corymbose, 3–5 cm, very broad and dense, 15–20(–35)-flowered, elongated at fruiting; bracts oblong to flabellate, equal to pedicels or slightly shorter, pinnately to pectinately deeply divided into linear segments. Pedicel erect-spreading, 1–2 cm, at fruiting 2–4 cm and hooked at apex. Sepals 1–3 × 1–2.5 mm, finely dentate to deeply divided. Corolla very broad in profile, somewhat spongy, yellow to orange, base of corolla often brownish to purplish brown; apical keels (excluding crests) of outer petals greenish; inner petals darker at tip, but dorsal crests usually pale; wholly pink flowered forms occurring (although not reported from China?); outer petals subacute, broadly crested; crest often surpassing apex; upper petal 13–18 mm, crest narrowly decurrent on spur; spur short, 3(–4) mm, very broad; nectary ca. 1/2 as long as spur, thick; lower petal broadly and shallowly saccate at base; apical 1/2 usually sharply reflexed, with short broad crest; inner petals 9–13 mm; dorsal crests low, slightly overtopping apex. Stigma square, apex broadly and shallowly emarginate; marginal papillae broad and diffuse; sublateral geminate papillae present; base with papillate lobes. Capsule nutant, elliptic, 7–10(–12) × 3–4 mm, 4–6-seeded; style 3–4 mm. Seeds 1.2–1.5 mm, smooth. Fl. and fr. Jul–Sep.

Stony stacks, stony sands; 4600–5200 m. S Xizang (Nyalam, Yadong) [Bhutan, N India, Nepal, Pakistan].

**146. *Corydalis stracheyi*** Duthie ex Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 37. 1896.

折曲黄堇 zhe qu huang jin

Herbs, perennial, very glaucous. Rootstock vertical, ± cylindrical, often very long, with age splitting like a multi-stranded rope, crowned by withered remnants of petioles, a lax rosette of leaves and few to several, ascending, angular, leafy and branched stems 20–40(–60) cm. Petiole of basal leaves 5–12 cm; blade narrowly ovate, 5–12 × 3–6 cm, bipinnate to almost tripinnate; ultimate segments lanceolate to linear, 3–5 mm, acuminate. Cauline leaves like basal leaves, but petiole shorter and blade smaller and less divided. Racemes 4–10-flowered, rather dense at first, soon elongating; lower bracts often leaflike, petiolate, 1–1.5 cm; upper ones smaller, pinnatifid to entire. Lower pedicels 1–1.5(–2) cm, upper ones shorter, spreading in flower, arcuately recurved at fruiting. Sepals whitish, 1–2 × 1–2 mm, dentate. Corolla yellow, spur and keel of outer petals with purplish brown suffusion, or keels green; outer petals subacute, usually crested; upper petal 11–14 mm, crest high and entire; spur slightly downcurved, conical, ca. 5 mm; nectary ca. 1/2 as long as spur; inner petals ca. 7 mm. Stigma like in *Corydalis meifolia*. Capsule broadly obovoid, 6–7 × 3–4 mm, 5–9-seeded, with 10 prominent papillose veins; style 2–2.5 mm. Seeds dull, 1–1.3 mm.

Stony slopes, near brooks; 3600–4800 m. S Xizang, NW Yunnan [Bhutan, N India (Kumaon, Sikkim), Nepal].

- 1a. Outer petals crested ..... 146a. var. *stracheyi*  
 1b. Outer petals without crest ..... 146b. var. *ecristata*

**146a. *Corydalis stracheyi* var. *stracheyi***

折曲黄堇(原变种) zhe qu huang jin (yuan bian zhong)

*Corydalis nana* Royle var. *jacquemontii* Fedde; *C. purpureocalcarata* C. Y. Wu & Z. Y. Su.

Outer petals crested.

Stony slopes, near brooks; 3600–4800 m. S Xizang (Yadong, Zayü) [Bhutan, N India (Kumaon, Sikkim), Nepal].

**146b. *Corydalis stracheyi* var. *ecristata*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 38. 1896.

无冠折曲黄堇 wu guan zhe qu huang jin

Outer petals without crest.

• Slopes; 3600–4200 m. S Xizang (Yadong, Zayü), NW Yunnan (Dêqên).

The Dêqên plant (*Kingdon Ward 9703*) is aberrant in having glabrous fruit.

**147. *Corydalis tsangensis*** Lidén & Z. Y. Su, Edinburgh J. Bot. 54: 63. 1997.

藏紫堇 zang zi jin

Herbs, (perennial), alpine, very small. Roots and radical leaves unknown. Stems 5–6 cm, slender at base. Cauline leaves 2, opposite at middle of stem, 1–2 cm, pinnate with 2 or 3 pairs of entire to deeply cleft leaflets; ultimate lobes lanceolate. Racemes corymbose, densely 4- or 5-flowered; bracts petiolate, 7–12 mm, blade obtriangular, flabellate-divided into 7–12 linear-

oblong lobes. Pedicel at flowering straight, 4–9 mm. Sepals ca.  $1.5 \times 1$  mm, dentate. Corolla pale blue; outer petals crested, rather broad and obtuse; upper petal ca. 17 mm; spur slightly downcurved, ca. 8 mm, slender, acuminate; nectary ca. 2/3 as long as spur; lower petal straight, ca. 9 mm, with slightly undulate margin; inner petals ca. 8 mm. Ovary oblong-ovoid; ovules 10, in 2 rows; style ca. 3 mm; stigma with 4 terminal papillae and 2 pairs of lateral geminate papillae, base rounded. Fl. Jul.

• Alpine flowstone sands; ca. 5100 m. Xizang.

On the label of the type specimen the locality is given only as "Tsang, Logrum Phu," the exact location of which could not be identified other than it is in Xizang. Tsang (Zang) is one of the three major old divisions of Tibet.

**148. *Corydalis latiflora*** J. D. Hooker & Thomson, Fl. Ind. 1: 270. 1855.

宽花紫堇 kuan hua zi jin

*Corydalis alburysii* Ludlow & Stearn; *C. gerdæ* Fedde; *C. latiflora* subsp. *gerdæ* (Fedde) Lidén ex C. Y. Wu, H. Chuang & Z. Y. Su; *C. mitae* Kitamura.

Herbs, perennial, grayish purple, 5–15 cm tall, lax cushion plant. Rootstock long (often very long), narrow, crowned by a lax rosette of leaves and usually several stems. Stems naked below, above usually with 2 opposite leaves; basal parts of stems and petioles often long, thin and flexuous, partly buried in scree. Leaf blade 3–7  $\times$  2–7 cm, biternate (to bipinnate); leaflets entire to 2–5-divided; segments from broadly obovate and obtuse to lanceolate and acute. Racemes corymbose, 4–7-flowered; bracts lanceolate-entire to flabellate-divided, 10–30 mm. Pedicel suberect, straight, 10–30 mm, at fruiting hooked at apex. Sepals ca.  $0.5 \times 1$  mm, shallowly to deeply dentate. Corolla pale grayish blue to lavender or almost white, very broad in profile, conspicuously spongy-undulate, with strong pleasant scent, apex of inner petals (excluding dorsal crests) and keels of outer petals dark tipped; outer petals with broadly triangular subobtuse apex, usually broadly crested; upper petal 15–18 mm, crest high and entire, gradually attenuate to spur end; spur slightly downcurved, short, 3(–4) mm, broad; nectary ca. 1/2 as long as spur; inner petals 9–10 mm. Stigma rounded, with broad confluent marginal papillae; submarginal geminate papillae present; basal lobes well developed, with geminate papillae. Capsule obovoid, ca.  $10 \times 3$ –4 mm, 3–5-seeded; style ca. 3 mm. Seeds ca. 1.5 mm, smooth (Nepal) or dull (India: Sikkim), not known in China. Self-incompatible. Fl. Jul–Sep.

Rough alpine scree; 4300–5500 m. S Xizang (Nyalam, Yadong) [Bhutan, India (Sikkim), Nepal].

**149. *Corydalis nana*** Royle, Ill. Bot. Himal. Mts. 1: 68. 1834.

矮紫堇 cuo zi jin

Herbs, perennial, 4–10 cm tall, very blue-glaucous and

fleshy, condensed. Rootstock long, slender, 3–5 mm at apex, crowned by a lax rosette of leaves and 1 to several stems. Stems simple or often branched, with 3 or 4 leaves, with lowermost leaves set at middle of stem, often subopposite; basal parts of stems and petioles of radical leaves pale and flexuous, partly buried in scree. Radical leaves: blade triangular, 2–4  $\times$  1–3 cm, bi- to tripinnate; secondary leaflets deeply divided into oblanceolate fleshy crowded lobes. Cauline leaves like radical ones, but narrower and shortly stalked. Racemes dense, corymbose, 6–15-flowered, usually overtopping leaves; bracts with broad cuneate base, above flabellately dissected into 3–10 linear segments, 10–25 mm. Pedicel suberect, straight, 15–25 mm, at fruiting hooked at apex. Sepals  $0.5$ – $1 \times 0.5$ – $1$  mm, dentate. Corolla pale blue or white with darker apex, white part with distinct pinkish venation, apex of inner petals tipped with blackish purple, dorsal crests slightly paler; outer petals with triangular subobtuse limb, usually crested; upper petal 14–16 mm, crest not reaching spur, and not overtopping apex; spur slightly downcurved, 3–5(–6) mm; nectary 1/2–2/3 as long as spur, thin; inner petals 9–10 mm. Stigma with broad confluent marginal papillae; submarginal geminate papillae present; basal lobes well developed, with geminate papillae. Capsule obovoid, ca.  $6 \times 2$ –3 mm, 5–10-seeded; style 3–3.5 mm. Seeds ca. 0.8 mm, smooth. Fl. Jul.

Bouldery scree; 4500–6100 m (elevational span for total distribution). S Xizang (Burang) [India (NE Kumaon), NW Nepal].

**150. *Corydalis tibetoalpina*** C. Y. Wu & Z. Y. Su in C. Y. Wu, Fl. Xizang. 2: 294. 1985.

西藏高山紫堇 xi zang gao shan zi jin

Herbs, perennial, condensed, very glaucous, glabrous. Rootstock long, slender, clothed at least apically with straw-colored shiny membranous lanceolate scales and remnants of petioles. Stems 1–4, simple, 4–7 cm, naked below, above with 1 or 2 (subopposite) leaves. Radical leaves many; petiole slightly longer than blade, broadly vaginate; blade oblong,  $1.5$ – $3 \times 1$ – $1.5$  cm, bipinnate; primary leaflets 3 or 4 pairs; secondary leaflets in 1–3 pairs, deeply 3–6-divided; lobes  $\pm$  overlapping, obovate to lanceolate, 2–4  $\times$  1–2 mm, very fleshy, usually with minute purple spots. Racemes dense, 3–6(–8)-flowered; bracts 6–12 mm; lower ones cuneate-palmatisect or pinnatifid; upper ones 3-divided. Pedicel 8–15 mm, suberect, at fruiting arcuately recurved at apex. Sepals  $0.5$ – $1$  mm, finely dentate. Corolla pale yellow, with distinct veins; outer petals slightly darker (purplish brown?) toward apex, without or with narrow and short crest; upper petal ca. 16 mm, acute; spur straight or slightly downcurved, cylindrical, 7–9 mm; nectary 1/2–2/3 as long as spur; inner petals 7–8 mm. Stigma square, apically broadly and shallowly emarginate, marginal papillae broad and confluent; style swollen below stigma. Fruit pendent, narrowly obovoid,  $10$ – $13 \times$  ca. 2.5 mm, 4–10-seeded; style ca. 2 mm. Seeds smooth.

Alpine slopes; [?4100–]5000–5400 m. W Xizang (Zanda) [Kashmir (Ladakh)].

**27. *Corydalis* sect. *Chrysocapnos*** Wendelbo in K. H. Rechinger, Fl. Iran. 110: 5. 1974.

须弥黄堇组 xu mi huang jin zu

Herbs, perennial. Rootstock elongate, simple or often branched, crowned at apex by membranous scales and petiolar remnants,

in some species becoming very robust and ropelike, composed of parallel twisted elements. Flowers yellow (mauve in *Corydalis milarepa*). Capsule explosively dehiscent, set on recurved pedicel.

Thirty species: W Himalayan area from Afghanistan to Bhutan, one species north to Altai; 18 species (ten endemic) in China.

- 1a. Flowers mauve (possibly in *C.* sect. *Trachycarpae*) ..... 168. *C. milarepa*
- 1b. Flowers yellow.
- 2a. Stems with 3 or more leaves, usually branched and ascendant; radical leaves not usually in a dominating rosette.
- 3a. Leaf blade 5 × as long as broad ..... 155. *C. wuzhengyiana*
- 3b. Leaf blade 1.5–4 × as long as broad (see also 146. *C. stracheyi*).
- 4a. Leaf blade pinnate, leaf lobes broad, densely imbricate distally; upper petal 14–17 mm ..... 154. *C. imbricata*
- 4b. Leaf lobes discrete, or blade bipinnate, or flowers larger.
- 5a. Cauline leaves 3 ..... go to 9a
- 5b. Cauline leaves 4 to several.
- 6a. Pedicels 14–20(–30) mm; flowers 20–23 mm, hardly crested; stem simple or sparsely branched above; radical leaves several, larger than cauline leaves ..... 165. *C. franchetiana*
- 6b. Pedicels usually shorter; flowers 14–20 mm; stems branched throughout.
- 7a. Pedicels 4–8 mm; racemes 10–25-flowered ..... 156. *C. hookeri*
- 7b. Pedicels 10–20 mm; racemes 5–10-flowered ..... 161. *C. tibetica*
- 2b. Stems leafless or with 1 or 2 leaves, simple, usually erect; radical leaves several.
- 8a. Corolla very small, ca. 11 mm ..... 162. *C. anagिनova*
- 8b. Corolla 15 mm or larger.
- 9a. Crest tapering to both ends, not or scarcely exceeding apex of petal (or lacking).
- 10a. Racemes 15–30-flowered.
- 11a. Leaf blade 3–5 × as long as broad, pinnate; pinnae cut into few broad overlapping lobes ..... 153. *C. dasyptera*
- 11b. Leaf blade 2 × as long as broad, bi- to tripinnate; pinnae not overlapping ..... 163. *C. govaniiana*
- 10b. Racemes 4–15-flowered.
- 12a. Outer petals with obvious entire crest ..... 151. *C. pachypoda*
- 12b. Outer petals not crested or with narrow dentate crest.
- 13a. Bracts usually entire; plant usually papillose-puberulent; fruiting pedicels 10–20 mm ..... 161. *C. tibetica*
- 13b. Bracts usually pinnatifid to palmatisect; plant glabrous; fruiting pedicels more than 20 mm.
- 14a. Flowers without or with very narrow entire crest, margins entire; leaf lobes not very crowded, green adaxially ..... 164. *C. tibeto-oppositifolia*
- 14b. Flowers with narrow usually dentate crest, margins crispate-dentate; leaf lobes crowded, gray-glaucous ..... 152. *C. megalosperma*
- 9b. Crest of upper petal broad and blunt, exceeding apex of petal.
- 15a. Leaf blade pinnate, 3–5 × longer than broad ..... 153. *C. dasyptera*
- 15b. Leaf blade bipinnate, 3 × longer than broad.
- 16a. Racemes 4–10(–15)-flowered; stems 5–20 cm (E and SE Xizang, NW Yunnan).
- 17a. Nectary almost as long as spur; stem 12–20 cm; raceme 2–4 cm, 5–10-flowered ..... 166. *C. bimaculata*
- 17b. Nectary 1/2(–2/3) as long as spur; stem 5–15 cm.
- 18a. Spur 6–8 mm; raceme occupying upper 1/2 of stem, 4–8-flowered ..... 167. *C. corymbosa*
- 18b. Spur 10–15 mm; raceme occupying most of stem, 5–15-flowered ..... 151. *C. pachypoda*
- 16b. Racemes 10–30-flowered; stems (10–)15–40 cm (SW Xizang, N and SW Xinjiang).
- 19a. Leaf lobes obovate, obtuse; racemes 10–17-flowered ..... 160. *C. elegans*
- 19b. Leaf lobes acute; racemes densely 10–30-flowered.
- 20a. Leaves thin; plant completely glabrous ..... 157. *C. gortschakovii*
- 20b. Leaves slightly fleshy; margin and veins of leaves and bracts papillose-scabrid.
- 21a. Leaf lobes not overlapping ..... 158. *C. moorcroftiana*
- 21b. Leaf lobes crowded, densely overlapping ..... 159. *C. onobrychis*

**151. *Corydalis pachypoda*** (Franchet) Handel-Mazzetti, *Symb. Sin.* 7: 347. 1931.

粗梗黄堇 cu geng huang jin

*Corydalis tibetica* J. D. Hooker & Thomson var. *pachypoda* Franchet, *Bull. Soc. Bot. France* 33: 392. 1886.

Herbs, perennial, caespitose, ± glaucous, 5–15 cm tall, glabrous. Rootstock long, branched, apically with membranous residual petiolar bases. Stems simple, without leaves or base with 1 leaf (rarely 2 leaves). Radical leaves many, slightly shorter than scapes; petiole 2–6 cm, long vaginate; blade oblong, 3–5 × 1–2 cm, pinnate; pinnae 2–4 pairs, subsessile, orbicular to ovate, deeply ternatisect to pinnatifid or sub-biteratisect; lobes often overlapping, obovate to lanceolate, 3–5 × 1–3 mm, acute. Raceme lax, 5–15-flowered, occupying 1/2 of stem or more; lower bracts 15–25 × 5–10 mm, cuneate, pinnatifid with 3–5(–10) acute lobes; upper bracts (ob)lanceolate, 9–15 × 2–4 mm, entire, acute to acuminate. Pedicel thick, 1–3 cm, in fruit arcuately recurved, 2–4(–6) cm. Sepals whitish, 1–2 × 1–2 mm, sharply dentate. Corolla very fragrant, orange or yellow, with greenish and brownish markings toward keels of outer petals, veins often distinct, brown; outer petals acute to subobtusate, broadly crested, with spreading margin; upper petal 20–27 mm, crest not reaching spur; spur almost straight, slightly downcurved at tip, cylindrical, 10–15 mm, thick, obtuse; nectary ca. 1/2 as long as spur, thick; lower petal broadly and indistinctly saccate at base; inner petals 10–11 mm; claw slightly shorter than limb. Stigma square with 4 apical papillae, laterally and on basal lobes with geminate papillae. Capsule obovoid, 8–15 × 3–4 mm, 1–6-seeded (or more?); style ca. 4 mm. Seeds ca. 2 × 2.5 mm, smooth; caruncle small, appressed. Fl. May–Jul, fr. Jun–Aug.

- Stone crevices, limestone scree; 3500–4700 m. NW Yunnan.

**152. *Corydalis megalosperma*** Z. Y. Su, *Acta Bot. Yunnan.* 19: 230. 1997.

少子黄堇 shao zi huang jin

Herbs, perennial, caespitose, 5–20 cm tall, often very glaucous. Rootstock at apex with many grass-yellow residual petiolar bases. Stems several, from radical leaf axils, simple or few branched, with 1 or 2 leaves. Radical leaves many, 5–15 cm; petiole broadly vaginate; blade oblong, 3–6 × 1.5–2.5 cm, bipinnate; pinnae 2 or 3 pairs, sessile or lower ones shortly stalked; pinnules deeply divided into small crowded imbricate obovate-lanceolate mucronate lobes. Cauline leaves like radical leaves; petiole and leaf midvein broad. Raceme 7–10-flowered, dense at first, at fruiting elongating to 9 cm; lower bract 2–2.5 cm, leaflike or pinnately lobate, upper one 1–1.5 cm. Pedicel 12–15 mm in flower, at fruiting 25–30 mm, arcuately recurved. Sepals early falling, whitish, semicircular, small, fimbriate, incised. Corolla yellow; outer petals narrowly crested, attenuate to both ends; limb elliptic, acute, crest and margins usually crispate-dentate; upper petal 20–22 mm; spur cylindrical, 10–12 mm; nectary extended through ca. 1/2 of spur; lower petal ca. 1 cm, shallowly crested; inner petals ca. 8 mm, apex purple-brown, at least adaxially (“internally”); claw shorter than limb. Stigma square, with 4 apical papillae, laterally and on basal

lobes with geminate papillae. Capsule nutant, obovoid, 8–12 × 3–4 mm. Seeds in 1 or 2 rows, nearly orbicular, 2–2.5 mm, smooth, ± with beak; caruncle strip-form, ca. 1.5 mm, thick, not appressed, lower 1/2 black, upper 1/2 yellow-brown.

- Stony scree; 4200–4500 m. NW Yunnan (Zhongdian).

**153. *Corydalis dasyptera*** Maximowicz, *Bull. Acad. Imp. Sci. Saint-Pétersbourg, Sér.* 3, 24: 28. 1878.

迭裂黄堇 die lie huang jin

Herbs, perennial, (5–)10–20(–30) cm tall, slightly to usually very glaucous. Rhizome long, branched, with pale brown scales and residual petiolar bases throughout, but especially at apex. Stems from radical leaf axil, simple, very rarely branched, with 1–3 leaves toward base. Radical leaves many, 10–15 cm; petiole 3–8 cm, vaginate; blade oblong, 5–12 × 1.5–2.5 cm, pinnate; pinnae in 4–7 pairs, closely set, entire or usually cleft into 2–5 broadly obovate mutually overlapping lobes. Raceme very dense at first, (8–)15–30-flowered, much elongating in fruit; lower bracts ca. 2 × 1 cm, pinnatifid with acute lobes, upper ones narrowly lanceolate, all longer than pedicels, dentate to entire. Pedicel (5–)10–15 mm, at fruiting recurved and 10–20 mm. Sepals whitish, ca. 1 × 1 mm, dentate. Corolla pale yellow to orange-yellow with darker veins; outer petals with broad entire crest, subacute; upper petal 20–21 mm, crest extended to spur or shortly decurrent on spur; spur downcurved at apex, cylindrical, 9–10 mm; nectary extended through ca. 1/2 of spur; rest of lower petal short and broad; inner petals ca. 10 mm; claw shorter than limb. Stigma square, with 4 apical papillae, laterally and on basal lobes with geminate papillae. Capsule oblong, 10–14 × 2–3.5 mm, 3–7-seeded; style ca. 3 mm. Seeds in 1 row, nearly orbicular, ca. 2.5 mm; caruncle broadly ovate, small, appressed to seeds. Fl. and fr. Jul–Sep.

- Alpine grasslands, stony scree; 2700–5000 m. S and SW Gansu, Qinghai, N Sichuan (Songpan, Zoigê), E Xizang.

**154. *Corydalis imbricata*** Z. Y. Su & Lidén, *Edinburgh J. Bot.* 54: 59. 1997.

银瑞 yin rui

Herbs, perennial, 7–25 cm tall. Rootstock long, 5–8 mm in diam., simple or often branched, apically with some remnants of petiolar bases. Stems few to several, branched, with 3–5 leaves. Leaves fleshy, papillose-scabrid along margins and veins; lower ones 7–12 cm, with broad sheathing petioles; blade oblong, 5–8 × 2–2.5 cm, pinnate; leaflets 4–7 pairs, 10–12 × 9–12 mm, cut into 3–8 broadly ovate or obovate, overlapping lobes (sometimes not overlapping in luxurious or shade-grown individuals); upper leaves like basal leaves, but smaller and shortly stalked. Racemes very dense, 20–30-flowered, slightly elongating in fruit; lower bracts entire to 3-fid or pinnatifid, upper ones entire, broadly oblanceolate to subs spatulate, densely papillose-scabrid along margin and veins, fleshy. Pedicel recurved in fruit, 5–10 mm. Flowers dirty yellow, darker toward keels of outer petals. Sepals 0.3–1.5 × 0.4–1.5 mm, dentate. Outer petals narrow, subacute, with narrow to rather broad entire to slightly dentate crest reaching or overtopping apex; upper petal 14–17 mm; spur arcuately downcurved, cylindrical, 6–9 mm; nectary extended through 1/2–2/3 of spur; lower petal

ca. 8 mm; inner petals ca. 7 mm, claw shorter than limb. Stigma square, with 4 apical papillae, laterally and on basal lobes with geminate papillae. Capsule narrowly obovoid, 7–8 × ca. 2 mm; style ca. 2 mm. Seeds in 1 row. Fl. Jul–Sep, fr. Aug–Sep.

- Stony slopes, meadows; 3800–5000 m. C and E Xizang.

**155. *Corydalis wuzhengyiana*** Z. Y. Su & Lidén, Edinburgh J. Bot. 54: 59. 1997.

齿苞黄堇 *chi bao huang jin*

Herbs, perennial, spreading, 10–30 cm tall. Rootstock to 25 × 0.3–1 cm, branched. Stems several, ascending, leafy and branched from base. Lower leaves: petiole 3–6 cm, vaginate; blade oblanceolate, 5–10 × 1–2 cm, obtuse, pinnate with 4–6 pairs of distant pinnae; leaflets decreasing in size toward base of leaf, shallowly to deeply 3–6-parted; lobes obovate, papillose-scabrid along margin and veins. Racemes rather dense in flower, much elongating and rather lax in fruit, 10–18-flowered; bracts lanceolate, 7–15 mm, lower ones pinnatifid, upper ones entire, lanceolate, papillose-scabrid. Pedicel 5–10 mm, sharply recurved in fruit. Flowers yellow or dirty yellow; keels often purplish brown; outer petals acute, with crest to 1 mm wide, overtopping apex; upper petal 17–18 mm; spur straight or arcuately decurved, cylindrical, 8–10 mm; nectary extended through 1/2–2/3 of spur; lower petal 9–10 mm with rhombic-subacute blade; claw ca. as long as petal lobe; inner petals ca. 8 mm; claw shorter than limb. Stigma square with 4 apical papillae, laterally and on basal lobes with geminate papillae. Capsule obovoid to oblong, 8–9 × 2–3 mm, 1–6-seeded; style ca. 3 mm. Seeds ca. 1.7 mm, smooth.

- Stony slopes, river sands; 3800–4100 m. W Sichuan (Litang), E Xizang (Baxoi, Zogang).

**156. *Corydalis hookeri*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 34. 1896.

拟锥花黄堇 *ni zhui hua huang jin*

*Corydalis denticulatobracteata* Fedde; *C. paniculata* C. Y. Wu & H. Chuang.

Herbs, perennial, very glaucous, 8–50 cm tall, slightly fleshy. Rootstock slender, 3–5 mm in diam., simple or often branched. Stems few to several, ascending to suberect, leafy and branched throughout. Petiole shorter than to ca. as long as blade; radical leaves few, vaginate; blade ovate-oblong, 6–17 × 4–10 cm, bipinnate; pinnae 3–6 pairs, petiolulate; pinnules ca. 3, shallowly to deeply cut into 2–5 obovate, obtuse to acute lobes; uppermost leaves much smaller, ± scabrid on veins below. Racemes 10–25-flowered, often branched at base or with lateral racemes from uppermost leaves, dense, elongating in fruit; bracts narrowly lanceolate to linear, 5–9 mm, lower ones often larger and divided, usually papillose-scabrid along veins and margins. Pedicel 4–8 mm, recurved in fruit. Sepals rounded, 1–2 mm, finely dentate. Flowers dirty yellow to orange. Outer petals acuminate, broadly to very narrowly crested, crest overtopping apex, ± dentate; upper petal 14–18 mm; spur slightly downcurved, 6–8 mm, slightly tapering toward obtuse apex; nectary extended through ca. 1/2 of spur; lower petal rhombic, acute, distal 1/2 reflexed, margin undulate;

inner petals 7–8 mm. Stigma square, apex with 2 pillar-form central papillae flanked by a pair of broader and diffuse papillae, laterally and on basal lobes with geminate papillae. Capsule ovoid or oblong, 6–8 × 2–3(–4) mm, 2–4-seeded. Seeds 1.8–2 mm, smooth; caruncle small. Fl. May–Sep, fr. Jul–Oct.

Alpine grasslands, stony scree, field margins, disturbed sites; 3700–5000 m. SW and W Xizang [Bhutan, India (Sikkim), Nepal].

**157. *Corydalis gortschakovii*** Schrenk, Enum. Pl. Nov. 1: 100. 1841.

新疆黄堇 *xin jiang huang jin*

Herbs, perennial, green or glaucous, 10–40 cm tall, glabrous. Rootstock with some residual long pale petiolar bases at apex. Stems erect, ridged, simple or branched, with 1–3 leaves. Radical leaves several; petiole 5–11 cm, base long vaginate; blade oblong, 7–12 × 2–4 cm, rather thin, bipinnate; pinnae 4 or 5 pairs, shortly petiolulate; pinnules 1 or 2 pairs, sessile, ovate to obovate, deeply to shallowly cut into 3–6 obovate to oblanceolate, acute, not or only slightly overlapping lobes, 2–7 × 1.5–4 mm, slightly decurrent on midvein. Cauline leaves shortly stalked with broad petioles 1–2 cm; blade of lower cauline leaf like radical leaves or with lowest pair of leaflets distant and small; upper leaves smaller and less divided. Racemes 3–10 cm, densely 10–30-flowered; lower bracts deeply pinnatilobate, ca. 2 cm, sometimes like uppermost leaf; middle and upper ones lanceolate, 7–13 mm, entire, acuminate. Pedicel 5–12(–25) mm, sharply recurved in fruit. Sepals whitish, 0.5–1 × 1–2 mm, dentate. Corolla yellow to orange, 18–25 mm, at first erect-spreading, soon slightly nodding; outer petals with very high (to 3 mm) rounded-obtuse crest extended beyond petal apex; spur cylindrical, broad and rather short, 7–11 mm; nectary extended through ca. 1/2 of spur; lower petal with broad claw, shallowly saccate; inner petals 10–12 mm. Stigma square, with confluent apical papillae, geminate papillae lateral and on pronounced basal lobes. Capsule narrowly obovoid, 10–15 × 3–4 mm, 5–10-seeded; style ca. 3 mm. Seeds in 2 rows, ca. 1.5 mm in diam., smooth. Fl. and fr. Jul–Sep.

*Picea* forest margins, stony shaded moist areas; 2100–3600 m. N Xinjiang [C Asia].

**158. *Corydalis moorcroftiana*** Wallich ex J. D. Hooker & Thomson, Fl. Ind. 1: 266. 1855.

革吉黄堇 *ge ji huang jin*

*Corydalis onobrychoides* Fedde.

Herbs, perennial, glaucous, (10–)15–30(–40) cm tall, papillose-scabrid on veins and bract margins. Rootstock long, 1(–2) cm in diam. at apex, often branched, crowned with residual petiolar bases. Stems 2–4, from radical leaf axils, ridged, simple or sparingly branched, 2(–4)-leaved. Radical leaves ca. 2/3 as long as stems; petiole ca. as long as blade, long vaginate; blade oblong, sub-bipinnate with 3 or 4 pairs of pinnae; pinnae stalked to sessile, subpinnate to ternate with leaflets deeply cut into obovate to oblanceolate, acuminate, not or only slightly overlapping lobes, 4–18 × 2–5 mm. Lower cauline leaves subopposite, like radical leaves; upper smaller and less divided. Racemes 3–7 cm, 10–30-flowered, very dense at first, con-

siderably elongating in fruit; bracts longer than pedicels, lower ones often pinnatilobate, middle and upper ones entire, elliptic to lanceolate, 10–20 mm, acute to acuminate. Pedicel 6–16 mm, sharply recurved in fruit. Sepals whitish, small, fimbriate-dentate. Flowers bright yellow, at first suberect, soon slightly nodding. Outer petals: crest high, much extended beyond apex; upper petal 19–22 mm, acute; spur broad, slightly tapering to obtuse tip, 8–10 mm; nectary extended through ca. 1/2 of spur; lower petal base ± shallowly saccate; inner petals 9–10 mm. Stigma square, with confluent apical papillae, geminate papillae lateral and on pronounced basal lobes. Capsule narrowly obovoid, ca. 10 × 3 mm. Seeds in 2 rows, reniform, smooth. Fl. and fr. Jul–Aug.

Stony scree, river sands, gravelly areas; 4000–5400 m. SW Xizang [India, Kashmir].

**159. *Corydalis onobrychis*** Fedde, Repert. Spec. Nov. Regni Veg. 10: 565. 1912.

假驴豆 jia lü dou

*Corydalis gortschakovii* Schrenk subsp. *onobrychis* (Fedde) Wendelbo.

Herbs, perennial, 10–25 cm tall, very gray-glaucous, papillose-hairy on veins and margins of cauline leaves and bracts. Rootstock cylindrical, apex often crowned with pale residual petiolar bases. Stems 1–4, from radical leaf axils, 1–3-leaved, simple or sparingly branched. Radical leaves: petiole ca. 1/2 as long as blade, long vaginate; blade narrowly oblong, 7–12 × 2.5–4 cm, bipinnate with 4–6 pairs of sessile ovate pinnae, lower ones distant, distal ones dense; pinnules densely crowded, deeply cut into 3–6 obovate crispate-imbricate clearly mucronate small lobes. Lower cauline leaves like radical leaves; upper ones (if present) smaller and less divided. Racemes 11–33-flowered, very dense at first, considerably elongating in fruit; lower and middle bracts (10–)15–25 mm, often shortly stalked, pinnatilobate; upper ones lanceolate, usually entire, acute. Pedicel 5–20 mm, sharply recurved in fruit. Sepals 1–1.5 × 1.5–3.5 mm (midvein often prolonged into slender tail), deeply dentate. Flowers bright yellow, at first suberect, soon slightly nodding. Outer petals: crest high, much extended beyond apex, slightly undulate; upper petal 19–22 mm, acute; spur slightly arcuately downcurved, cylindrical, 8–10 mm; nectary extended through ca. 1/2 of spur; inner petals 9–10 mm. Stigma square, with confluent apical papillae, geminate papillae lateral and on pronounced basal lobes. Capsule narrowly obovoid, 13–15 × 2–3 mm, 5–10-seeded, when ripe with rows of small papillae; style ca. 2.5 mm. Seeds smooth. Fl. and fr. Jun–Aug.

Rocky places, bouldery scree; 3500–4500 m. SW Xinjiang (Gar, Rutog) [E Afghanistan (Karakoram range), N Kashmir].

**160. *Corydalis elegans*** Wallich ex Hooker & Thomson, Fl. Ind. 1: 265. 1855.

幽雅黄堇 you ya huang jin

Herbs, perennial, caespitose, 10–25 cm tall. Rootstock elongate, robust, densely crowned by membranous petiolar residues. Stems 2–4, simple or sparingly branched, without leaves

or with 1 or 2 leaves. Radical leaves to 20 cm; petiole ca. as long as blade, long vaginate; blade oblong, 6–10 × 2–4 cm, sub-bipinnate with 3 or 4 pairs of pinnae; pinnae shortly stalked, deeply cut into obovate obtuse lobes. Cauline leaves like radical leaves but smaller and less divided. Racemes 6–12 cm, lax, 10–17-flowered, considerably elongating in fruit; bracts obovate, entire or lowermost one pinnatilobate, 10–23 mm. Pedicel 12–30 mm, arcuately recurved in fruit. Sepals to 1 mm, dentate. Corolla bright yellow, inner petals darker at tip; outer petals very broadly crested; upper petal 20–23 mm, acute; spur slightly downcurved, cylindrical, 9–10 mm; nectary ca. 1/2 as long as spur; lower petal base ± shallowly saccate, distal 1/2 reflexed; inner petals 9–11 mm. Stigma square, apically with 2 pillar-form papillae flanked by a pair of broader diffuse papillae, laterally and on basal lobes with geminate papillae. Capsule obovoid, 6–10 × ca. 3 mm; style ca. 5 mm. Seeds in 2 rows. Fl. Jul–Sep, fr. Aug–Oct.

Open slopes; 4000–5000 m. S Xizang (Burang) [India (Kumaon), NW Nepal].

**161. *Corydalis tibetica*** J. D. Hooker & Thomson, Fl. Ind. 1: 265. 1855.

西藏黄堇 xi zang huang jin

*Corydalis pseudocrithmifolia* Jafri.

Herbs, perennial, very glaucous, 5–20 cm tall, slightly fleshy, glabrous or usually with scattered to dense 1-celled hairs. Rootstock vertical, elongate, often branched, upper parts densely clothed with shiny straw-colored residual petiolar bases. Stems simple or often branched, with 1–3 leaves. Radical leaves 7–13 cm, petiolar base vaginate; blade ovate-oblong, 4–7 × 2–3 cm, bipinnate; primary pinnae 3–5 pairs; pinnules 3, 2–6-parted; lobes oblong to obovate, 2–6 × 1.5–2 mm, obtuse, mucronulate. Cauline leaf similar, but shortly stalked. Raceme 5–10-flowered; bracts lanceolate, 7–15 × ca. 2 mm, entire, or lowermost ones ternatisect to pinnatifid. Pedicel 10–20 mm, erect-spreading and straight in flower, arcuately recurved in fruit. Sepals whitish, rounded, 1–2 mm, fimbriate-dentate. Corolla yellow, brownish orange with age, rather narrow and straight, slightly upwardly facing; outer petals shortly acuminate with narrow often dentate crest, crest sometimes absent; upper petal (1.5–)1.8(–2) cm; spur nearly straight, cylindrical, 9–12 mm; nectary extended through ca. 1/2 of spur; lower petal ca. 1 cm, distal part sharply reflexed; inner petals 8–9 mm, claw ca. as long as limb. Stigma square, apex with 4 papillae, laterally and on basal lobes with geminate papillae. Capsule oblong, usually with a couple of faint papillose ridges, 10–15 × ca. 2 mm; style 3–3.5 mm, 4–12-seeded. Seeds ca. 1.5 mm, densely papillose-spinulose; caruncle small.

Alpine stony scree; 4500–5600 m. Xinjiang (Karakorum Shan), W Xizang (Zingrul) [Kashmir, Pakistan].

**162. *Corydalis anagimova*** Lidén & Z. Y. Su, Edinburgh J. Bot. 54: 61. 1997.

藏中黄堇 zang zhong huang jin

Herbs, perennial, 10–20 cm tall, glabrous. Rootstock elongate, densely clothed with long, narrow, straw-colored, shiny,

residual petiolar bases. Stems simple, near base with 1 or 2 opposite leaves (sometimes very small). Radical leaves many; petiole 2–5 cm, vaginate at base; blade oblong, 2.5–5 × 1–2 cm, sub-bipinnate with 3 or 4 pairs of pinnae; pinnae ovate, deeply pinnatifid; lobes lanceolate, 4–7 × 2–3 mm, acute. Racemes long and lax, 6–16-flowered; bracts lanceolate, 5–13 × 1–2.5 mm, entire. Pedicel 10–20(–25) mm, slender, at fruiting recurved. Sepals minute. Corolla dirty yellow; outer petals acute, crest broad; upper petal ca. 11 mm; spur short, ca. 4 mm, narrow, attenuate toward slightly downcurved apex; nectary ca. 1/2 as long as spur, slender; inner petals 5.5–6 mm. Ovary elliptic; style 2–2.5 mm; stigma square, apically emarginate, with diffuse confluent apical papillae, base with prominent lobes tipped with papillae. Fl. Jun–Jul.

- Slopes; 4000–5000 m. C Xizang (Lhasa, Reting).

**163. *Corydalis govaniana*** Wallich, Tent. Fl. Nepal. 55. 1826.

库莽黄堇 ku mang huang jin

Herbs, perennial, caespitose, dark green, 15–35(–50) cm tall, glabrous or finely papillose-puberulent at base. Rootstock ± vertical, elongate, thick, fibrous, multistranded, with 1 or several heads, densely crowned by membranous remnants of old leaf sheaths and cataphylls. Stems 1 to few from radical leaf axils, erect, without leaves or with 1 or usually 2 opposite leaves below middle. Radical leaves many; petiole 5–10 cm, base vaginate; blade ovate to triangular-ovate, 6–14 × 3–7 cm, bi-(tri-)pinnate; pinnae 4 or 5 pairs, shortly petiolulate; pinnules 3–5, sessile, deeply divided; ultimate lobes oblong to lanceolate, obtuse to acute, ± mucronate. Cauline leaves usually much smaller, vaginate. Raceme 5–15 cm, densely 10–25(–35)-flowered; bracts oblong, (1–)1.5–3(–4) × 0.5–1 cm, cuneate, pinnatifid, upper ones smaller and less divided or entire, all longer than pedicels. Pedicel 1–2(–3) cm, at fruiting arcuately recurved. Sepals whitish, 0.5–2 × 0.5–1.5 mm, deeply dentate. Corolla yellow; outer petals with rhombic-acute limb, crest 0.5–1.5 mm wide, shortly decurrent, not reaching spur; upper petal 17–25 mm; spur tapering, 8–12 mm; nectary extended through ca. 1/2 of spur; inner petals 9–11 mm, claw slightly shorter than limb. Stigma square, apex slightly emarginate, apical papillae distinct or often confluent, laterally and on basal lobes with geminate papillae. Capsule obovoid, 10–15 × 3–4 mm, 4–8-seeded. Seeds in 2 rows, 1.5–2 mm, smooth. Fl. and fr. Jun.

[Forest understories], moist slopes; 3500–4400 m. S Xizang [Kashmir, Nepal].

**164. *Corydalis tibeto-oppositifolia*** C. Y. Wu & Z. Y. Su in C. Y. Wu, Fl. Xizang. 2: 299. 1985.

西藏对叶黄堇 xi zang dui ye huang jin

Herbs, perennial, caespitose, (5–)10–15(–20) cm tall. Rootstock often much branched at apex, with some scales and residual petiolar bases. Stems from scales or radical leaf axil, usually with 2 opposite or nearly opposite small leaves on lower part, or with 1–3 scattered leaves. Radical leaves many, ca. as long as stems or slightly longer; petiole broadly vaginate at base, 3–7 cm; blade glaucous abaxially, green adaxially, oblong, 4–8 × 2–3.5 cm, pinnate; pinnae 3 or 4 pairs, petiolulate or sessile, deeply divided into oblanceolate or obovate distinctly

mucronate lobes 3–10 × 2–5 mm, sometimes lobes again divided. Cauline leaves small, shortly petiolulate, vaginate. Racemes corymbose, 5–10-flowered; bracts 15–20 mm, cuneate, palmately lobate, or upper ones entire; lower pedicels 20–35 mm. Sepals ca. 1 × 1 mm, dentate. Corolla yellow; outer petals without crest, or rarely with narrow crest; upper petal 2–2.2 cm, subacute; spur nearly straight, cylindrical, 9–10 mm; nectary thin, extended through ca. 1/2 of spur; lower petal ca. 1 cm, base broadly and shallowly saccate, apical 1/2 reflexed, rather broad, subobtusate; inner petals 8–9 mm, claw ca. 1/2 as long as limb. Ovules 8–10 in 2 rows; stigma square, apex slightly emarginate, apical papillae often confluent, laterally and on basal lobes with geminate papillae.

- Forest margins, gravelly areas; 4400–4600 m. SE Xizang (Cona, Nyngchi).

**165. *Corydalis franchetiana*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 34. 1896.

春丕黄堇 chun pi huang jin

Herbs, perennial, caespitose, 25–40 cm tall. Roots not seen. Stems (2 to many, from radical leaf axils) simple or branched above, with 5–10 scattered leaves. Radical leaves many; petiole 6–12 cm, broadly and long sheathing at base; blade oblong, 6–12 × 2.5–4 cm, bipinnate; primary pinnae 2–4 pairs, petiolulate; secondary pinnules 3–5, sessile, usually 3-parted; lobes lanceolate, acute to acuminate. Cauline leaves with short, winged petioles, pinnate, small, grading into bracts. Racemes 5–10 cm, 7–15-flowered, at first dense then distant; bracts cuneate, lower ones ca. 2.5 cm, 3–5-parted, upper ones lanceolate and entire. Pedicel 14–20(–30) mm, recurved in fruit. Sepals not recorded. Corolla yellow; outer petals purplish at apex; inner petals with dark purple tips; outer petals very narrowly crested; upper petal 20–23 mm, mucronate; spur nearly straight, 12–13 mm, slender; nectary ca. 1/2 as long as spur; lower petal with sharply deflexed distal 1/2; inner petals ca. 9 mm. Fruit elliptic, ca. 13 × 3 mm.

SE Xizang (Yadong) [Bhutan].

**166. *Corydalis bimaculata*** C. Y. Wu & Z. Y. Su in C. Y. Wu, Fl. Xizang. 2: 305. 1985.

双斑黄堇 shuang ban huang jin

Herbs, perennial, caespitose, 12–20 cm tall. Rhizome long, narrow, with distant scales and buds, apically with some long remnants of old petioles. Stems few from radical leaf axils, usually simple, with 2 or 3 small leaves. Radical leaves many; petiole vaginate at base, 3–6 cm; blade glaucous abaxially, deep green adaxially, oblong, 4–8 × 1.5–3 cm, bipinnate; pinnae 4–7 pairs, shortly petiolulate; pinnules 1 or 2 pairs, sessile, deeply 2–4-cleft; lobes lanceolate or obovate, ca. 7 × 2–3 mm, acute. Cauline leaves much smaller and less divided, shortly stalked. Raceme 2–4 cm, 5–10-flowered; lower bracts shortly stalked, deeply cut into acute lanceolate lobes; upper bracts lanceolate, entire, all slightly shorter than pedicels. Lower pedicels 10–15 mm, upper ones 5–10 mm, soon arcuately recurved. Sepals small, dentate. Corolla yellow; inner petals: apex sometimes with 2 purple flecks; outer petals with rhombic-acute limb and broad truncate crest; upper petal 14–16 mm, crest ca. 2 mm



wide, decurrent on spur; spur straight or slightly upturned, tapering toward apex, 6–8 mm; nectary nearly extended to spur end; lower petal 10–11 mm; claw ca. as long as petal lobe, base suddenly contracted; inner petals ca. 9 mm, claw slightly shorter than limb. Style ca. 3 mm; stigma nearly square, apex with 4 short pillar-form papillae, laterally each side with 2 papillae, basal lobes absent.

• Stony slopes, ?shaded moist areas; 4000–4200 m. C and E Xizang.

**167. *Corydalis corymbosa*** C. Y. Wu & Z. Y. Su in C. Y. Wu, Fl. Xizang. 2: 304. 1985.

伞花黄堇 san hua huang jin

Herbs, perennial, densely caespitose, 4–10 cm tall, slightly to very glaucous. Rootstock elongate, simple or often branched, apically with remnants of dead petioles and scales (in FRPS reported to have scales with axillary bulbils). Stems few to several from radical leaf axils, simple, naked or with 1 or 2 leaves in lower 1/3. Radical leaves many, longer than stems; petiole 3–6 cm, broadly vaginate at base; blade crisped, oblong, 3–6 × 1–2 cm, bipinnate; pinnae 4–6 pairs, lower ones distant, sessile; pinnules 2 or 3 pairs, dense, sessile, twice 3–5-parted; ultimate lobes ovate, ca. 2 × 1 mm, fleshy. Cauline leaves like radical leaves but smaller or much reduced. Racemes ± corymbose, 4–8-flowered; lower bracts oblong, acute, coarsely dentate to lobed, ca. 10 × 8 mm; upper bract lanceolate and entire; lowermost bract sometimes without flower. Pedicel 10–15(–20) mm, stout, soon arcuate, becoming more recurved in fruit. Sepals long persistent, whitish, ovate to reniform, ca. 2 × 2 mm, deeply dentate. Corolla yellow; outer petals with broad obtuse entire crests, slightly overtopping apex, limb rather broad or with rounded lobes; upper petal 16–17 mm, crest nearly extended to spur central part; spur cylindric, short and broad (rarely narrow), 6–8 mm; nectary extended through 1/2–2/3 of spur; inner petals 8–9 mm, claw shorter than limb. Stigma broader than long, apically emarginate, each 1/2 with 4 papillae; geminate papillae lacking. Mature capsule unknown, presumably narrowly oblong; style 2–2.5 mm.

• Stony slopes; 3300–4600 m. E Xizang (Bomi, Mêdog), NW Yunnan (Dêqên, Zhongdian).

**168. *Corydalis milarepa*** Lidén & Z. Y. Su, Novon 17: 481. 2007.

米拉紫堇 mi la zi jin

Herbs, perennial, glaucous, fleshy, glabrous. Underground parts unknown. Stems ascending, 7–15 cm tall, simple, with 3 or 4 leaves. Lower cauline leaves triangular in outline, subsessile, ternately divided with rather long-stalked primary leaflets, these pinnate with 2 or 3 pairs of entire to bi- or trifold pinnae ca. 10 mm; central primary leaflet 35–40 mm, lateral leaflets 20–25 mm; ultimate leaf segments not or slightly overlapping, lanceolate to broadly oblanceolate, 2–4(–5) mm wide, acute; middle and upper cauline leaves sessile, smaller (ca. 20 mm and ca. 10 mm, respectively, in type), narrowly ovate in outline with basalmost pair of lateral leaflets sessile and short, hardly longer than second pair. Racemes dense, 10–30-flowered, to 4 cm in anthesis; lower bracts subpinnately divided to dentate, with lower lobes often again divided or dentate; upper bracts narrower, less divided or entire. Pedicels soon becoming slightly arcuate recurved, 6–8 mm, equaling bracts. Sepals whitish, to 1 mm, apically deeply divided into few long narrow teeth. Corolla pale to dark mauve, often more blue toward spur, with keels of outer petals darker; inner petals whitish at tip (except for inner hidden adaxial side, which has a dark purple blotch like most *Corydalis*); outer petals broadly crested, acute at apex, or lower one subobtusate; upper petal ca. 17 mm; spur slightly downcurved, ca. 8 mm, somewhat tapering toward obtuse tip; nectary ca. 5 mm; inner petals ca. 8 mm. Ovary with ca. 7 ovules; stigma almost squarish, with 4 apical papillae, laterally and on basal lobes with geminate papillae. Fruit and seeds unknown. Fl. Jul.

• Open ground, scree; 4800–5100 m. C Xizang (Mi La between Maizhokunggar and Gongbo'gyamda).

This species is possibly misplaced in this section; it will key out also in *Corydalis* sect. *Trachycarpae*.

**28. *Corydalis* sect. *Geraniifolia*** C. Y. Wu, Acta Bot. Yunnan. 18: 399. 1996.

那加黄堇组 na jia huang jin zu

Herbs, perennial, medium to tall, with stout rhizome. Stems solitary to few, erect, naked below, simple or branched above. Radical leaves long petiolate; blade deltoid, large, pinnate to bipinnate with coarsely dentate lobes, usually decurrent on midvein. Racemes few to many flowered, secund, often branched. Flowers yellow, often with brown veins. Stigma square, lateral marginal papillae broad and confluent, submarginal lateral geminate papillae present; basal lobes pronounced, with geminate papillae. Capsule obovoid, explosively dehiscent, set on recurved pedicel.

Five species: Himalayas from Kumaon to W Yunnan; one species in China.

Although one species is recorded in Yunnan, China, it is highly probable that the following species are also present in S Xizang: *Corydalis stipulata* Lidén (Bull. Brit. Mus. (Nat. Hist.), Bot. 18: 522. 1989), from NC Nepal; *C. chaerophylla* Candolle (Prodr. 1: 128. 1824), from the Himalayas; and perhaps *C. geraniifolia* J. D. Hooker & Thomson (Fl. Ind. 1: 269. 1855), from the E Himalayas.

1a. First pair of leaflets of cauline leaves very small, stipulelike, far removed from second pair.

2a. Bracts small, equaling pedicels, glabrous ..... 169. *C. borii*

2b. Bracts broad, much longer than pedicels, crispate-puberulent ..... *C. stipulata* (see note above)

1b. First pair of leaflets of cauline leaves not stipulelike.

3a. Bracts small, linear, entire ..... *C. chaerophylla* (see note above)

3b. Bracts large, coarsely lobed ..... *C. geraniifolia* (see note above)

**169. *Corydalis borii*** C. E. C. Fischer, Bull. Misc. Inform. Kew 1940: 31. 1940.

那加黄堇 *na jia huang jin*

Herbs, erect, 25–60 cm tall. Rhizome cylindrical, extended, upper part ca. 5 mm in diam., densely set with petiolar residues at apex. Stems 1 or 2, below without leaves, upper part with leaves and few branches. Radical leaves several; petiole 9–17 cm, base vaginate; blade glaucous abaxially, triangular-ovate, 7–20 × 5–16 cm, abaxially with raised veins, bi- to tripinnate with 4–6 pairs of opposite primary pinnae; leaflets narrowly ovate to oblong, distal ones decurrent on stalk, ± deeply pinnatifid with coarsely dentate lobes. Cauline leaves 3–5, sessile; blade 5–14 × 3–10 cm, pinnate to sub-bipinnate; lowest pair stipulelike, much smaller than second pair and separated from it by “secondary” petiole 1–5 cm. Racemes terminal and axillary from upper leaves, 3–6 cm, at fruiting 6–9(–17) cm, 8–10(–18)-

flowered; bracts narrowly ovate to lanceolate from broad base, 2–5 mm, margin entire. Pedicel 2–4 mm, slightly elongating and recurved in fruit. Sepals rounded, 1–1.5 × 0.75–1.5 mm, finely dentate. Corolla [brownish] yellow; outer petals subacute to subobtusate, shortly and narrowly crested, rather narrow; upper petal 20–22(–25?) mm; spur slightly downcurved, cylindrical, 11–12 mm; nectary 2/3–4/5 as long as spur; lower petal navicular, narrowly obovate, 9–10 mm, claw straight or with minute gibbosity at base; inner petals 8–9 mm, claw slightly longer than limb. Stigma square, lateral marginal papillae broad and confluent, laterally and on pronounced basal lobes with geminate papillae. Capsule narrowly obovoid, 10–14 × 3–4 mm, 6–10-seeded; style 2.5–3 mm. Seeds orbicular, 1.5–2 mm, smooth. Fl. and fr. Jul–Nov.

Understories of humid mixed forests; (400–)2100–2500 m. Yunnan (Jingdong) [India (Assam), Myanmar].

**29. *Corydalis* sect. *Asterostigma*** Fedde ex C. Y. Wu & H. Chuang in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 541. 1999  
[“*Asterostigmata*”].

大叶紫堇组 *da ye zi jin zu*

Herbs, perennial, erect or ascending. Rootstock short or long, with one or few sterile rosette leaves at apex; petiolar bases small or very large and fleshy. Stems 1 to several, leafy and often branched. Pedicel slender, arcuately spreading to recurved in fruit. Flowers usually purple, rarely blue or yellow. Lower petal with long narrow claw; nectary 1/4–1/2 as long as spur. Stigma rounded to square, with 6, 8, or 10 simple marginal papillae, and geminate papillae lateral (submarginal) and on basal lobes. Capsule (except in *Corydalis kiukiangensis*, which might be better placed in *C. sect. Priapos*) oblong to linear, many seeded, not forming a sharp angle to pedicel, not explosively dehiscent.

Sixteen species: Bhutan, China, NE India, Myanmar, E Nepal, N Thailand, Vietnam; 15 species (11 endemic) in China.

- 1a. Stem erect, simple, with up to 13 small leaves, above with bulbils ..... 172. *C. esquirolii*  
1b. Stem with 1–4 leaves, or branched.
- 2a. Spur conical, tapering to tip (*C. temulifolia* group).
- 3a. Upper petal truncate, not crested; nectary ca. 2 mm ..... 173. *C. ternatifolia*  
3b. Upper petal acute, usually with narrow crest; nectary 3–5 mm.
- 4a. Leaflets coarsely lobed into rounded segments but not crenate-dentate.
- 5a. Seeds keeled; pedicels 5–7 mm ..... 174. *C. shimiensis*  
5b. Seeds rounded on back; pedicels 7–12 mm ..... 175. *C. hongbashaensis*
- 4b. Leaflets broad, distinct, crenate-dentate.
- 6a. Spur longer than limb of upper petal; inner petals tipped with dark purple; seeds tuberculate ..... 171. *C. sheareri*  
6b. Spur equaling or shorter than limb of upper petal; inner petals pale or slightly darker at tip; seeds smooth ..... 170. *C. temulifolia*
- 2b. Spur cylindrical, not or very slightly tapering (*C. taliensis* group).
- 7a. Rootstock long and often thick, often multistranded; crest of outer petals overtopping apex.
- 8a. Crest of upper petal 1.5–2.5 mm wide, overtopping apex by 1–2 mm; angle of petiole to stem often < 30°, petioles long sheathing ..... 178. *C. bulleyana*  
8b. Crest of upper petal 1–1.5 mm wide, overtopping apex by 0.5–1 mm; petioles more spreading, usually not conspicuously long vaginate ..... 177. *C. taliensis*
- 7b. Rootstock small, firm; crest of outer petals not overtopping apex.
- 9a. Crest of upper petal short and broad, not reaching apex; seeds sharply keeled; flowers ca. 20 mm ..... 184. *C. carinata*  
9b. Crest reaching apex, narrow; seeds not keeled; flowers usually longer.
- 10a. Flowers yellow.
- 11a. Stems suberect; capsule ca. 10 mm, reflexed on erect pedicel; nectary ca. 1/2 as long as spur of upper petal ..... 176. *C. kiukiangensis*  
11b. Stems decumbent; leaf axils thickened; capsule 20–25 mm, not reflexed from pedicel; nectary ca. 1/3 as long as spur ..... 181. *C. “yellow-leptocarpa”*
- 10b. Flowers pink.
- 12a. Racemes 7–18-flowered; capsule 1–1.5 mm wide ..... 179. *C. duclouxii*

- 12b. Racemes 4–7-flowered; capsule 1.5–2.5 mm wide.  
 13a. Seeds 24–30 in 2 rows, 0.8–1 mm ..... 183. *C. microsperma*  
 13b. Seeds 10–20, in 1 row, 1.2–2 mm; axillary buds thickened.  
 14a. Seeds 1.5–1.7 mm; capsule 19–26(–38) mm ..... 180. *C. leptocarpa*  
 14b. Seeds ca. 1.2 mm; capsule 10–15 mm ..... 182. *C. dulongjiangensis*

**170. *Corydalis temulifolia*** Franchet, J. Bot. (Morot) 8: 290. 1894.

大叶紫堇 da ye zi jin

Herbs, perennial, 20–50(–90?) cm tall, glabrous or finely papillose-pubescent in part. Rhizome short, stout, with terminal rosette with large fleshy petiolar bases forming bulblike structure, eventually fibrous; roots thin to rather thick. Stems 1–3, pale red to green, 5-ridged, simple or sparsely branched, leafy above. Basal leaves several; petiole (6–)10–20(–37) cm, base very broad and thick; blade gray-glaucous abaxially, green adaxially, deltoid, (4–)8–18 × (4–)7–15 cm, rather thin, biternate (rarely bipinnate), with terminal leaflets larger than lateral ones; primary leaflets long petiolulate, broadly ovate to deltoid; ultimate leaflets discrete, petiolulate or almost sessile, ovate or broadly ovate-triangular, entire to slightly lobed, base cuneate to truncate, apex subacute to shortly acuminate, margin crenate-dentate, teeth mucronulate. Cauline leaves 1–3(or 4), like radical leaves, but smaller. Racemes lax, 8–15-flowered; bracts ovate to obovate, 5–15 × 2–10 mm, base cuneate, large dentate. Pedicel 5–10 mm, elongating to 10–13 mm and slightly arcuate to spreading in fruit. Sepals 0.5–1 × ca. 1 mm, lacerate-lobate. Corolla pale amaranth to bluish pink to “royal blue”; upper petal 27–32 mm, limb rhombic-acute, margin spreading, usually with short and narrow abaxial crest; spur straight, conical, 13–17 mm; nectary 3–5 mm; lower petal 16–24 mm, with long narrow claw and short rhombic limb, abaxially shortly crested; inner petals 14–21 mm, claw ca. 2 × as long as limb; crest of inner petals pale, slightly overtopping apex. Stigma rounded, with 10 marginal papillae and usually a pair of submarginal lateral geminate papillae. Capsule straight, linear, almost moniliform, (20–)30–45 × 1.5–2 mm, 8–18-seeded; style 3–4 mm. Seeds 1–1.5 mm, smooth. Fl. and fr. Mar–Jun.

Evergreen broad-leaved and mixed forests, margins of woods, among shrubs, brook sides, channel sides, roadsides; 1300–2700 m. Chongqing, SE Gansu, Guangxi, Guizhou, W Hubei, S Shaanxi, C, S, and SW Sichuan, SE Yunnan [N Vietnam].

The variation in this complex species is reticulate, and a division into two subspecies may be arbitrary.

- 1a. Spur shorter than limb, thick at base; stigma with rounded apex; 2 median apical papillae close together, large; submarginal geminate papillae often absent ..... 170a. subsp. *temulifolia*  
 1b. Spur ca. as long as limb, thin; stigma broader; median papillae not close together, equal in size to other papillae; submarginal geminate papillae present ..... 170b. subsp. *aegopodioides*

**170a. *Corydalis temulifolia*** subsp. *temulifolia*

大叶紫堇(原亚种) da ye zi jin (yuan ya zhong)

Spur shorter than limb, thick at base. Stigma with rounded apex; median 2 apical papillae close together, large; submarginal geminate papillae often absent.

• Evergreen broad-leaved and mixed forests, among shrubs, brook sides; 1800–2700 m. Chongqing, SE Gansu, W Hubei, S Shaanxi, C Sichuan (Wawu Shan).

**170b. *Corydalis temulifolia*** subsp. *aegopodioides* (H. Léveillé & Vaniot) C. Y. Wu, Fl. Yunnan. 8: 76. 1997.

鸡雪七 ji xue qi

*Corydalis aegopodioides* H. Léveillé & Vaniot, Bull. Acad. Int. Géogr. Bot. 11: 173. 1902; *C. martini* H. Léveillé & Vaniot.

Spur ca. as long as limb, thin. Stigma broader; median papillae not close together, equal in size to other papillae; submarginal geminate papillae present.

Forest understories, margins of woods, among shrubs, channel sides, roadsides; 1300–2700 m. Guangxi, Guizhou, S and SW Sichuan, SE Yunnan [N Vietnam].

**171. *Corydalis sheareri*** S. Moore, J. Bot. 13: 225. 1875.

地锦苗 di jin miao

*Corydalis chelidonifolia* H. Léveillé & Vaniot; *C. echinocarpa* Franchet; *C. sheareri* var. *changyangensis* Fedde; *C. suaveolens* Hance.

Herbs, perennial, (10–)20–40(–60) cm tall, glabrous or papillose-hairy on inflorescence, sometimes also on capsules. Rhizome with short firm swollen body, crowned by leaf rosette with thick, fleshy, petiolar bases, sending out simple or branched underground stolons 3–15 cm × 2–3 mm, apically and in axils of scales swelling into tubers, similar to those of *Helianthus tuberosus* (tubers rarely collected in herbarium specimens). Stems 1–4, erect to ascending, green or reddish, sparsely branched above, with 2–4 leaves. Radical leaves several; petiole 5–10 cm; blade glaucous abaxially, green adaxially (or glaucous at center of leaflets), triangular-ovate, 5–13 × 3–10 cm, bi-(tri-)pinnate; pinnae shortly petiolulate, ovate; pinnules sessile, ovate, entire or deeply divided, crenate-dentate, base broadly cuneate. Cauline leaves like radical leaves; petiolar base with small whitish membranous auricles, sometimes with large dark pointed bulbils (*Corydalis sheareri* f. *bulbillifera* Handel-Mazzetti) in axils. Racemes 4–10 cm, (5–)10–15(–20)-flowered, at first dense, soon elongating, subsecund; lower bracts rounded, deeply 3–5-divided; middle bracts obovate, slightly 3-divided; upper bracts narrowly obovate to oblanceolate, entire. Pedicels usually longer than bracts, 4–7 mm, to 12 mm and slightly arcuate in fruit. Sepals nearly orbicular, ca. 1 mm, deeply dentate. Corolla pale amaranth to pale blue, apex of inner petals dark purple; limb of outer petals rhombic, subacute, with short, entire to finely erose-dentate crest; upper petal 22–28 mm, spur straight or gracefully recurved at apex, conical, 12–18 mm,

apex thin; nectary extended through ca. 2/5 of spur; lower petal with long narrow claw and short rhombic limb; inner petals 11–15 mm, claw longer than limb. Stigma with 8–10 marginal papillae; geminate papillae lateral and on basal lobes. Capsule linear, 15–30 × 1.5–2 mm, 10–25-seeded; style ca. 3 mm. Seeds in 1 or almost 2 rows, 1–1.3 mm, with scattered tubercles all over; elaiosome large, flat. Fl. and fr. Mar–Jun.

Riversides, wetlands, forest understories, channel sides, roadsides; 200–2700 m. S Anhui, S Fujian, Guangdong, NE Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Sichuan, NE and SE Yunnan, Zhejiang [Vietnam].

**172. *Corydalis esquirolii*** H. Léveillé, Repert. Spec. Nov. Regni Veg. 10: 349. 1912.

籽纹紫堇 zi wen zi jin

Herbs, 20–50 cm tall, glabrous. Rhizome short (sometimes stoloniferous?). Stems 2–5, with up to 13 alternate leaves in upper 1/2–2/3, simple or with a branch from lowermost leaf axil; uppermost leaf axil with a lateral branch seemingly continuing growth of main stem. Basal rosette lax; petiole only slightly swollen at base, 5–15 cm; blade pruinose abaxially, green adaxially, triangular, 2–5 × 3–5 cm, biternate; leaflets shortly stalked, entire to deeply cleft into 2 or 3 ovate lobes, large crenate-dentate. Cauline leaves like basal leaves but shorter stalked, becoming gradually smaller upward, each carrying an easily detached bulbil in its axil; blade ternate to biternate, terminal divisions larger than lateral, rarely uppermost leaf simple. Raceme densely 5–20-flowered; lower bracts ovate or obovate, apex irregularly shallowly rounded-divided, upper ones obovate to oblanceolate, sometimes with small pale auricles at base. Pedicel 5–14 mm, very thin. Sepals caducous. Corolla purple or white, apex purple; outer petals rhombic, subacute, shortly mucronate, with short crests reaching apex; upper petal 22–25 mm; spur straight or slightly bent, 11–13 mm, slightly tapering to obtuse apex; nectary ca. 1/3 as long as spur; lower petal with long narrow claw; inner petals 11–12 mm, claw longer than limb. Stigma with 10 marginal papillae and prominent submarginal geminate papillae. Capsule linear, subtorulose, 19–23 × ca. 1.5 mm, 10–18-seeded; style ca. 5 mm. Seeds 1.2–1.5 mm, with scattered tubercles throughout. Fl. and fr. Mar–Apr.

• Channel sides, grasslands on slopes, evergreen forests in limestone areas; 600–900 m. NW Guangxi (Leye, Lingyun), S Guizhou.

**173. *Corydalis ternatifolia*** C. Y. Wu, Z. Y. Su & Lidén, Edinburgh J. Bot. 54: 70. 1997.

神农架紫堇 shen nong jia zi jin

*Corydalis asplenifolia* Lidén & Z. Y. Su.

Herbs, perennial, 20–40 cm tall, glabrous or with 1-celled hairs in inflorescence. Rhizome short, 3–4 mm in diam., sometimes ?with slender stolons; leaf rosette present, lax. Stems ascending, leafy and branched throughout. Rosette leaves with slender petiole 9–15 cm, base broadly and shortly vaginate or slightly swollen; blade triangular, 3–5 cm, biternate. Cauline leaves 4–8; petiole 2–9 cm, shortly and narrowly vaginate,

often with small free acute “stipules”; blade 5–10 × 5–10 cm, biternate to bipinnate; ultimate leaflets 1–5 × 1–3 cm, shortly petiolate, terminal ones larger, lateral ones smaller, large dentate or (lower cauline leaves and rosette leaves) ± deeply cut into oblong lobes; uppermost leaves smaller and less divided. Racemes lax, 3–9-flowered; lower bract large, ternate with broad dentate lobes, middle and upper ones smaller, ovate, cut into a few long sharp teeth. Pedicel 4–6 mm, at fruiting to 10 mm, slightly and inconsistently arcuate. Sepals 0.5–1 mm, deeply dentate. Corolla red, amaranth, or white; outer petals re-tuse to shallowly emarginate at apex, without crest; upper petal (15–)20(–25) mm; spur 9–12 mm, nectary very short, ca. 2 mm; inner petals 9–11 mm, claw slightly longer than limb. Stigma rounded, with 10 simple papillae, and prominent lateral and basal geminate papillae. Capsule linear, 20–30 × 1–1.5 mm, 10–20-seeded; style ca. 5 mm. Seeds ca. 1.5 mm, keeled, margin with radial striae, with large flabellate caruncle. Fl. Mar–May.

• Valleys, streamsides; 700–1600 m. Chongqing (Chengkou), Gansu, W Hubei (Badong, Fangxian, Xingshan), S Shanxi (Wenxian), N Sichuan (Beichuan, Xuanhan).

This plant is variable with regards to leaf division and flower size. *Corydalis asplenifolia* was based on a plant with much divided leaves with oblong lobes decurrent on the midvein, dense racemes, short pedicels, and large flowers, but there is a continuous variation.

**174. *Corydalis shimienensis*** C. Y. Wu & Z. Y. Su in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 543. 1999.

石棉紫堇 shi mian zi jin

Herbs, 15–40 cm tall, (short-lived) perennial, flowering second year (rarely annual?). Rhizome short, firm, with lax leaf rosette at apex. Stems 1 to few, erect to ascending, with 3–5 leaves, branched especially above; uppermost branch continuing lead of main shoot, i.e., terminal raceme eventually pseudo-lateral. Rosette leaves: petiole 7–12 cm, vaginate at base; blade glaucous abaxially, green or glaucous adaxially, ovate, 3–7 × 2–5 cm, biternate with terminal pinna larger; ultimate leaflets sessile, deeply 4–7-divided; lobules broadly obovate to oblanceolate, apex rounded-obtuse, mucronate. Cauline leaves similar, but upper ones smaller with shorter petioles. Racemes 3–6 cm (to 9 cm in fruit), 5–13-flowered; bracts obovate, deeply 3–7-divided; uppermost bracts oblanceolate, 4–6 mm, entire. Pedicel 5–7 mm, slender, slightly arcuate in fruit. Sepals rounded, 0.5–1 mm, dentate. Corolla pale bluish purple to reddish purple, slightly darker at apex; outer petals spreading, shortly acuminate, with slightly dentate short crest 0.5–1 mm wide; upper petal 23–28 mm; spur straight or often arcuately down-curved, tapering to fine tip, 10–15 mm; nectary 1/3–2/5 as long as spur; lower petal with long narrow claw; inner petals 10–12 mm, claw slightly longer than limb. Stigma with (8–)10 marginal papillae; geminate papillae lateral and on basal lobes. Capsule linear, 20–25 × ca. 1.5 mm, 14–30-seeded; style ca. 3 mm. Seeds in 1 row, ca. 1 mm, smooth, sharply keeled; caruncle small. Fl. and fr. Mar–Aug.

• Forest understories, slopes, channel sides, roadsides; 1000–2800 m. W Sichuan.

**175. *Corydalis hongbashaensis*** Lidén & Y. W. Wang, *sp. nov.*

洪坝山紫堇 hong ba shan zi jin

Type: China. Sichuan: W of Shimian, Hongbasha, gravel by roadside, alt. 1800 m, *M. Lidén & Y. W. Wang 2006-69* (holotype, UPS; isotype, PE).

*Ab affini Corydalis shimienensis habitu diffuso, racemis paucifloris, foliis subtus minute papillatis atque seminibus non carinatis differt. A specie similari C. duclouxii rhizomate simplici, racemis paucifloris atque pedicellis longioribus distinguenda.*

Paratypes: *M. Lidén & Y. W. Wang 2006-70* (PE, UPS).

Herbs, perennial or biennial, with simple or branched slightly fleshy taproot crowned by small leaf scars, a leaf rosette, and 2 or 3 stems. Main stems 30–50 cm, thin, with 3 or 4(–6) leaves, diffusely branched especially above; branch below raceme continuing lead of shoot, displacing terminal raceme to a pseudolateral position. Lower cauline leaves: petiole 7–12 cm; blade ca. 9 × 8 cm, biternate; primary leaflets long stalked, secondary ones shortly stalked; upper leaves smaller; leaflets broadly obovate, shallowly cut into acute lobes, strongly glaucous, very finely and densely papillose abaxially. Racemes 5–10-flowered, leaf-opposed; bracts shorter than pedicels, shortly stalked, obovate, lower bracts divided with lateral lobes; upper ones progressively smaller, uppermost entire. Pedicel 7–12 mm. Flowers unknown. Fruit linear, 15–20 × ca. 1 mm, 10–20-seeded; style ca. 3 mm. Seeds ca. 1 mm, with rounded obtuse back; caruncle prominent.

• Roadside gravel, cliffs; 1800–2000 m. W Sichuan (Shimian).

*Corydalis hongbashaensis*, of which the flowers are not known, is vegetatively similar to *C. duclouxii*, which differs in having a thick knotty and contorted rhizome, more floriferous racemes, and shorter pedicels. It is, according to DNA sequences, closely related to *C. shimienensis*, which grows in similar situations at slightly lower elevations in the same area, but the latter is more erect, has denser more floriferous racemes, and sharply keeled seeds. Further, it lacks the minute papillae on the leaf underside.

The specific epithet is based on the geographic locality of the type.

**176. *Corydalis kiukiangensis*** C. Y. Wu, Z. Y. Su & Lidén, *Edinburgh J. Bot.* 54: 67. 1997.

依江紫堇 qiu jiang zi jin

*Corydalis lutescens* C. Y. Wu ex H. Chuang, p.p. (excluding type).

Herbs, perennial, glaucous, 20–60 cm tall, glabrous. Rootstock 1–4 × 0.6–0.7 cm, apical leaf rosette with very fleshy petiolar bases ca. 1 cm, dark and hard in dry state. Stems few, suberect to ascending, main stems and low branches with 3 or 4 leaves, upper branches with 2 leaves. Rosette leaves and lower cauline leaves: petiole 6–17 cm; blade 4–8 × 2–6 cm, biternate; leaflets ± deeply cut into 2–7 obovate to oblong lobules; upper cauline leaves smaller. Racemes 6–10-flowered; lower bract like a very small leaf, basally with small auricles, upper ones shallowly lobed to entire, 6–12 mm, segments mucronate. Ped-

icel 8–12 mm, very thin. Sepals reniform, ca. 0.5 × 1 mm, dentate. Corolla pale yellow, greenish yellow at apex; outer petals with limb navicular, acute, very narrowly and shortly crested; upper petal 19–23 mm, spur slightly downcurved, cylindric or slightly tapering, 10–12 mm; nectary 1/2–2/3 as long as spur; lower petal shallowly saccate at middle; inner petals 10–11 mm. Stigma with 6 marginal simple papillae in apical part (lateral ones sometimes pairwise confluent); 2 geminate papillae clearly submarginal and 2 on well-developed basal lobes. Capsule pendent from erect pedicel, oblong-lanceolate, 10–13 × ca. 2 mm, 5–10-seeded, probably explosively dehiscent; style ca. 3.5 mm. Seeds 1.4–1.5 mm, smooth, slightly flattened, not keeled; caruncle small, narrow. Fl. Apr–Sep, fr. Aug–Oct.

• Disturbed forests, field margins; 1600–1900 m. NW Yunnan (Dulong Jiang valley).

This species might be better placed in *Corydalis* sect. *Priapos* (capsule pendent from erect pedicel).

**177. *Corydalis taliensis*** Franchet, *Pl. Delavay.* 48. 1889.

金钩如意草 jin gou ru yi cao

Herbs, perennial, 20–60(–90) cm tall, glabrous. Rootstock long, 0.5–1 cm in diam. Stems few to several, prostrate to ascending or rarely erect in young plants, pale green, branched, with many leaves. Leaves several, crowded at base but many all along stem; petiole 3–15 cm; blade pruinose abaxially, green adaxially, broadly ovate, biternate with terminal leaflet larger; pinnae longer petiolulate; pinnules petiolulate or sessile, broadly obovate, shallowly cut into broadly obovate lobes, or deeply ternatisect, lobes again shallowly 2–4-divided. Racemes 2–10 cm, 7–12-flowered, dense, much elongating in fruit; bracts broadly obovate, 4–10 mm, lower ones slightly 3–5-divided, upper ones entire, acute to acuminate. Pedicel 5–9(–12) mm, recurved in fruit. Sepals white, ca. 1 × 1.5 mm, finely dentate. Corolla purple, purplish blue, or pink; outer petals acute to shortly acuminate with entire crest 1–1.5 mm, overtopping apex 0.5–1 mm; upper petal 20–23 mm; spur straight to slightly downcurved, cylindric, 10–11 mm, obtuse; nectary 1/3–2/5 as long as spur; lower petal with long narrow claw, apically gradually broadened into rhombic-acute limb; inner petals 9–11 mm. Stigma with 6 simple marginal papillae; geminate papillae sublateral and on basal lobes. Capsule linear, 19–24 × ca. 1.5 mm, 9–12-seeded; style ca. 2.5 mm. Seeds ca. 1.5 mm, smooth. Fl. and fr. Mar–Nov.

• Forest understories, among shrubs, near houses and farms, on walls; (?1500–)1900–2300 m. W Yunnan (Dali to Lijiang).

**178. *Corydalis bulleyana*** Diels, *Notes Roy. Bot. Gard. Edinburgh* 5: 256. 1912.

滇西紫堇 dian xi zi jin

Herbs, perennial, 15–60 cm tall, glabrous. Rootstock (in older plants) long, 0.5–2 cm in diam., deeply furrowed or with intertwining contorted elements; soft roots arising from base of leaf crown. Stems 1 to usually several, glaucous, green, ascending to erect or prostrate in older plants, branched, with many leaves. Leaves several, crowded at base but many all along stem; petiole 3–15 cm, forming rather acute angle with stem, long vaginate; blade pruinose abaxially, green adaxially,

broadly to narrowly ovate, biternate, with terminal leaflet larger; pinnae petiolulate; pinnules shortly petiolulate or sessile, deeply ternatisect, lobes often again 2–4-divided; ultimate divisions obovate to oblanceolate, obtuse. Racemes 7–15-flowered, dense, much elongating in fruit; bracts broadly obovate, 5–10 mm, lower ones slightly 3–5-divided, upper ones entire, acute to acuminate. Pedicel 5–9 mm, much recurved in fruit. Sepals whitish, reniform to broadly ovate, ca. 1 × 1.5 mm, finely dentate. Corolla dull purple (inner petals paler); outer petals with entire crest 1.5–2(–2.5) mm conspicuously overtopping apex (i.e., petal apex prolonged to slender tip carrying crest); upper petal 19–25 mm; spur cylindrical or slightly tapering, 8–11 mm, obtuse; nectary 1/3–2/5 as long as spur; lower petal with long narrow claw, apically gradually broadened into rhombic-acute limb; inner petals 9–13 mm. Stigma with (6–)8 simple marginal papillae; geminate papillae sublateral and on basal lobes. Capsule linear, 16–24 × 1.7–2 mm, 9–12-seeded; style ca. 2.5 mm. Seeds ca. 1.7 mm, smooth. Fl. and fr. May–Aug.

• Disturbed limestone scree and limestone gravel, stone walls, forests, riversides; 2200–3700 m. Sichuan, NW Yunnan.

- 1a. Corolla straight or spur  
downcurved at tip ..... 178a. subsp. *bulleyana*  
1b. Corolla slightly upcurved ..... 178b. subsp. *muliensis*

**178a. *Corydalis bulleyana* subsp. *bulleyana***

滇西紫堇(原亚种) dian xi zi jin (yuan ya zhong)

*Corydalis taliensis* Franchet var. *bulleyana* (Diels) C. Y. Wu & H. Chuang.

Corolla straight or spur of upper petal slightly downcurved at tip.

• Disturbed limestone scree and limestone gravel, stone walls; 2200–3700 m. SW Sichuan (Lugu Hu), NW Yunnan (Lijiang).

**178b. *Corydalis bulleyana* subsp. *muliensis*** Lidén & Z. Y. Su in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 543. 1999.

木里滇西紫堇 mu li dian xi zi jin

Spur of upper petal upcurved, ca. 9 mm.

• Forests, riversides; 2600–3000 m. Sichuan (Muli).

**179. *Corydalis duclouxii*** H. Léveillé & Vaniot, Bull. Acad. Int. Géogr. Bot. 11: 174. 1902.

师宗紫堇 shi zong zi jin

*Corydalis asterostigma* H. Léveillé; *C. pseudasterostigma* Fedde; *C. schochii* Fedde; *C. taliensis* Franchet var. *ecristata* Handel-Mazzetti.

Herbs, perennial, 15–40 cm tall, glabrous. Rhizome short, tight, knotty, with 1 to few prominent persistent roots at base, with 1 to few sterile leaf rosettes. Stems 1–4, erect to ascending, or later diffuse, ridged, leafy and branched, from axils of previous year's rosette leaves. Rosette leaves: petiole 5–30 cm, vaginate at base, vaginae becoming fleshy in autumn; blade green adaxially, deltoid, 3–10 × 2–8 cm, abaxially pruinose, glabrous or very finely papillose, 2(–3) × ternate (to sub-bipinnate); pinnae petiolulate; ultimate leaflets base long cuneate, decurrent on

midvein, entire to deeply lobed, apically cut into rounded mucronate teeth or lobes. Cauline leaves all clearly petiolate, like basal leaves but often less divided and with larger more coarsely cut leaflets (lower cauline leaves small, long stalked, early withering). Racemes 3–8 cm, 7–18-flowered, much elongating in fruit to 7–14 cm; bracts obovate, 4–8 × 2–8 mm, entire or lower ones deeply 3–7 palmately divided into acute to shortly acuminate lobes, upper ones often oblanceolate. Pedicels 4–10 mm, in fruit elongating to 6–12 mm and spreading-arcuate, longer than bracts. Sepals late caducous, white, rounded, 1–1.5 × 1–2 mm, richly circumdentate. Petals pale purple, slightly darker toward apex; inner petals whitish; outer petals with limb spreading, subacute to shortly acuminate, margin shallowly dentate, with narrow entire to shallowly dentate crest; upper petal 19–24 mm; spur straight to slightly downcurved, cylindrical, 10–12 mm; nectary 2–3 mm; lower petal 11–12 mm, narrow at base, gradually widened to front 1/3; inner petals 9–11 mm, claw longer than limb; dorsal crest low, slightly overtopping apex. Stigma with 6 marginal papillae: median 2 distinct, lateral ones distinct or confluent; geminate papillae submarginal and on basal lobes. Capsule linear, moniliform, 18–27 × 1–1.5 mm, 10–17-seeded; style proper ca. 2.5 mm, but fruit with seedless apical beak 1–3 mm; replum subpersistent. Seeds 0.9–1.1 mm, smooth. Fl. and fr. Mar–Aug.

• Among shrubs, roadsides, disturbed limestone scree, rocks; 1500–3000 m. S Chongqing, W Guizhou, C, E, and NE Yunnan.

**180. *Corydalis leptocarpa*** J. D. Hooker & Thomson, Fl. Ind. 1: 260. 1855.

细果紫堇 xi guo zi jin

Herbs, perennial, glabrous, flowering second (rarely first) year, diffuse, 15–50 cm tall. Taproot persistent, crowned by very short firm knotty rhizome 5–10 × 3–5 mm, with tiny traces of previous year's rosette leaves, apically with lax leaf rosette and few to several stems. Stems decumbent, weak, branched. Rosette leaves few, mostly withered at flowering; petiole 6–12 cm, base sheathed; cauline leaves: petiole 3–7 cm, base with membranous auricles, axillary buds thick, black; blade glaucous abaxially, green adaxially, triangular, 2–8 × 2–6 cm, biternate; pinnae long petiolulate; pinnules shortly petiolulate, narrowly flabellate, entire to divided, coarsely crenate-dentate to lobed; teeth/lobules rounded, mucronate. Racemes 2–7(–9)-flowered, 2–5 cm; bracts broadly obovate to oblong-cuneate, 6–11 mm, deeply 3-divided or coarsely dentate with acute teeth to almost entire; upper ones entire. Pedicel 3–6 mm in flower, in fruit elongating to 5–10 mm. Sepals rounded, peltate, 1–2 mm, finely dentate. Corolla purple or white; upper petal 23–28 mm, acuminate, abaxially with short crest ca. 1 mm wide; spur straight, slightly tapering to apex, 11–14 mm; nectary 1/3–1/2 as long as spur; lower petal 12–15 mm, abaxially shortly crested; claw with narrow basal 1/3, slightly broader straight or saccate middle 1/3, distal 1/3 widened into elliptic acuminate limb; inner petals 11–14 mm. Stigma square, with 6 marginal simple papillae (lateral ones sometimes confluent); geminate papillae lateral (submarginal) and on basal lobes. Capsule 19–26(–38) × ca. 2 mm, 10–20-seeded; style ca. 2 mm. Seeds 1.5–1.7 mm, smooth; caruncle broad, spreading. Fl. and fr. Apr–Dec.

Forest understories, slopes, along channels, roadsides stone crevices, evergreen broad-leaved forests in subtropics; 1200–2600 m. S and W Yunnan [Bhutan, India (Assam), N Myanmar, E Nepal, N Thailand].

This species and the following four species make up the *Corydalis leptocarpa* complex. The taxonomy of this complex is as yet partly unresolved, and its treatment here is to be regarded as preliminary.

### 181. *Corydalis* “yellow-leptocarpa”

大围山紫堇 da wei shan zi jin

Herbs, perennial, glabrous, 40–100 cm tall. Taproot persistent, crowned by very short firm, knotty rhizome 5–10 × 3–5 mm, with tiny traces of previous year’s rosette leaves, apically with lax leaf rosette and few to several long trailing leading stems. Stems procumbent to ascending or climbing, sometimes rooting at ± thickened leaf nodes, sparingly branched. Rosette leaves: petiole 6–13 cm; cauline leaves: petiole 3–7 cm; blade glaucous abaxially, green or slightly glaucous adaxially, triangular, 2–7 × 2–8 cm (lower leaves larger, uppermost smaller), biternate; pinnae long petiolulate; pinnules shortly petiolulate (or long stalked in shaded situations), obovate-cuneate, entire to deeply divided, coarsely crenate-dentate to lobed; teeth/lobules rounded, mucronate. Racemes 2–5-flowered; bracts broadly obovate, 4–8 mm, almost entire to coarsely dentate. Pedicel 2–5 mm in flower, hardly elongating in fruit. Sepals rounded, minute or to 1.5 mm, deeply dentate. Corolla yellow (but see note); upper petal 25–28 mm, subacute, usually with short narrow dentate crest ca. 1 mm wide; spur slightly downcurved, cylindrical or slightly tapering to apex, 12–14 mm; nectary ca. 1/3 as long as spur; inner petals 12–15 mm. Stigma square; marginal simple papillae: median 2 distinct, lateral ones broad, diffuse; geminate papillae lateral (submarginal) and on basal lobes. Capsule narrowly lanceolate, 20–25 × ca. 3 mm, 10–20-seeded; style ca. 2 mm. Seeds in 2 rows or almost so, ca. 1.2 mm, smooth. Fl. and fr. Apr–Jun.

• Shrubs, forest understories along rivers; 1500–1600 m. SE Yunnan (Pingbian: Dawei Shan).

This poorly known taxon, not yet formally described, is closely similar to *Corydalis leptocarpa* and *C. dulongjiangensis* and needs further study, for example on geographic variation. A very similar purple-flowered plant (*C. taliensis* Franchet var. *potentillifolia* C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 13: 137. 1991), from further west in the same general area (Lüchun), deviates in having smaller leaves, longer pedicels, and shorter spurs, and may be distinct.

**182. *Corydalis dulongjiangensis*** H. Chuang, Acta Bot. Yunnan. 13: 128. 1991.

独龙江紫堇 du long jiang zi jin

Herbs, perennial, 20–50 cm, glabrous. Taproot slender, 1–1.5 mm in diam.; rootstock short, apically with a few-flowered rosette. Stems decumbent, slender, at first with few branches. Cauline leaves several; middle petiole 3–7 cm, upward gradually shorter, base expanded into short rounded fleshy sheath with pale membranous margins; leaf axils (except those with “normal” branches) with bulbils that become almost black in plant press, eventually falling off or growing out to short shoots while still attached; blade glaucous on both surfaces, but more so adaxially, broadly triangular; lower blade 2–4 × 3–5 cm,

biternate; primary pinnae shortly petiolulate; ultimate leaflets sessile, ± deeply divided into few broadly obovate obtuse mucronate lobes (uppermost leaves very small). Raceme 2–6-flowered, slightly elongating in fruit; bract suborbicular to broadly obovate, irregularly deeply or slightly divided, or uppermost one narrowly obovate and entire, 3–6 mm. Pedicel 4–6 mm, considerably elongating in fruit to 10–20 mm. Sepals whitish, orbicular, peltate, ca. 1 mm, margin deeply dentate. Petals pale purple. Outer petals shortly acuminate, dorsal crest short, narrow, slightly dentate, not quite reaching apex; upper petal 23–25 mm; spur straight, cylindrical or slightly tapering from broad base to obtuse tip, ca. 12 mm; nectary ca. 3 mm; lower petal 13–14 mm, with narrow base widened in front 1/3 to rounded shortly acuminate limb; inner petals ca. 12 mm. Stigma with 6 distinct marginal papillae; geminate papillae lateral (submarginal) and on well-developed rounded basal lobes. Capsule narrowly oblong, 10–15 × 1.5–2 mm, 8–10-seeded. Seeds in 1 row, ca. 1.2 mm, smooth. Fl. and fr. Mar–Jul.

Channel sides on slopes, roadsides; 1500–1800 m. W Yunnan (Gongshan) [Myanmar (Haka)].

This is very similar to *Corydalis leptocarpa* but differs in having leaves smaller, axillary bulbils present, pedicels longer than bracts, nectary comparatively shorter, and fruit and seeds smaller.

### 183. *Corydalis microsperma* Lidén, sp. nov.

小籽紫堇 xiao zi zi jin

Type: China. Yunnan: Lushui Xian, Pianma Xiang, waterfall in the vicinity of Ganhe, ca. 12 km N of Pianma on the road to Gangfang, W side of Gaoligong Shan, 26°03′43″N, 98°37′09″E, SW-facing disturbed forest slope on limestone, alt. 2057 m, 13 May 2005, *Gaoligong Shan Biodiversity Survey (GSBS) 24094* (holotype, KUN; isotypes, CAS, UPS).

*Corydalis leptocarpace similis, sed ab ea seminibus minutis numerosis differt.*

Paratypes: *GSBS 22772* (CAS, KUN, UPS), *GSBS 22820* (CAS, KUN, UPS), *GSBS 24036* (CAS, KUN, UPS).

Herbs, perennial, 15–50 cm tall. Rhizome short, tight, knotty, with prominent persistent taproot at base, apically with 1 (to few) sterile leaf rosettes. Stems 1–5 from axils of previous year’s rosette leaves, suberect to ascending, ridged, leafy and branched. Rosette leaves: petiole 5–20 cm, vaginate at base; blade adaxially green, ovate, 3–8 × 2–7 cm, abaxially pruinose, glabrous or finely papillose, biternate (to pinnate with ternate basal leaflets), pinnae petiolulate; leaflets ± deeply divided into few broadly obovate obtuse lobes. Cauline leaves: petiole 4–10 cm; blade like rosette leaves; lower leaves smaller. Racemes 3–5-flowered, elongating to 5–8 cm in fruit; bracts obovate, 5–15 × 2–10 mm, entire or lower ones deeply 3–7 palmately divided, upper ones often oblanceolate. Pedicel 5–10 mm, in fruit elongating to 10–25 mm. Sepals ca. 1 × 1 mm, sharply dentate. Petals pale purple; outer petals narrowly and shortly crested, acute to shortly acuminate, limb slightly spreading, shallowly dentate to entire; upper petal 23–25 mm; spur straight, cylindrical, 13–15 mm; nectary ca. 3.5 mm; lower petal 12–13 mm, with narrow base widened in front 1/3 to rounded shortly acuminate limb; inner petals 10–11 mm. Stigma with marginal pa-

pillae: median 2 apical distinct, lateral ones confluent; geminate papillae submarginal and on basal lobes. Capsule slightly arcuate, oblong, 20–24 × ca. 3 mm, 24–30-seeded; style proper ca. 2.5 mm, but fruit with seedless apical beak 1–3 mm; replum long persistent. Seeds 0.8–1 mm, smooth, not keeled. Fl. and fr. May–Aug.

- 1800–2200 m. W Yunnan (Gaoligong Shan).

*Corydalis microsperma* is similar to *C. leptocarpa* but is distinguished by the numerous very small seeds and rather different foliage.

The specific epithet refers to the small seeds, from Greek μικρός (*micros*, “small”) and σπέρμα (*sperma*, “seed”).

#### 184. *Corydalis carinata* Lidén & Z. Y. Su, sp. nov.

龙骨籽紫堇 long gu zi zi jin

Type: China. Yunnan: Longyang Qu, Bawan Xiang, vicinity of km 22 on the Baoshan to Tengchong Road via Dahaoping Yakou, E side of Gaoligong Shan, 24°55'52"N, 98°47'47"E, SE-facing disturbed forest slope on limestone, alt. 1920 m, 30 May 2005, *Gaoligong Shan Biodiversity Survey (GSBS) 26039* (holotype, KUN; isotypes, CAS, UPS).

*Species ad gregem Corydalis leptocarpace pertinens, sed ab omnibus speciebus gregis habitu suberecto, caule basi foliis aggregatis praedito, petalis exterioribus late breviterque cristatis, cristis apices petalorum non attingentibus atque seminibus valde carinatis differt.*

Paratypes: *GSBS 17630* (CAS, KUN, UPS), *GSBS 23671* (CAS, KUN, UPS).

Herbs, (?short-lived) perennial, 10–40 cm tall, above papillose-scabrid at petiole margins and veins abaxially on leaves

and bracts. Rhizome small, with prominent persistent taproot at base, apically with 1 (to few) sterile leaf rosettes. Stems several from axils of previous year's rosette leaves, leafy and branched throughout, angular. Rosette leaves: petiole 3–8 cm, shortly vaginate at base; blade glaucous abaxially, olive-green adaxially, ovate to triangular, 2–5 × 1.5–5 cm, bi- to triternate, with leaflets ± deeply cut into coarsely crenate-dentate lobes, teeth obtuse, distinctly mucronate. Cauline leaves similar, but lateral pinnae less divided and petioles shorter, at base with membranous dentate auricles. Racemes (3–)6–12(–19)-flowered, dense in flower, elongating in fruit; bracts obovate to oblanceolate, 3–6 mm, ± divided into few to many mucronate lobes. Pedicel 3–5 mm, only slightly elongating and arcuate in fruit. Flowers white to purplish pink, darker at apex. Sepals rounded, 1–1.5 mm, finely serrate. Outer petals with short high crest not reaching apex, margin undulate-dentate, apex shortly acuminate; upper petal 19–22 mm; spur 10–12 mm, slender, slightly tapering; nectary ca. 4 mm; lower petal with narrow straight base; inner petals ca. 10 mm. Stigma square, with well-developed rounded basal lobes; marginal papillae 4, apical; geminate papillae lateral (submarginal) and on basal lobes. Fruit linear, subtorulose, 18–21 × 1–1.5 mm, (5–)9–13-seeded; style proper ca. 2.5 mm, but seedless beak of fruit 1–3 mm. Seeds 1–1.2 mm, smooth, sharply keeled with distinct uneven marginal rim; elaiosome large, lobed. Fl. and fr. May(–Aug).

- Disturbed subtropical forests; 1500–1900 m. W Yunnan (Gaoligong Shan).

This species is easily distinguished from other species in the *Corydalis leptocarpa* group by the more upright stems with leaves crowded at base, short broad crests of outer petals, and the small sharply keeled seeds.

The specific epithet refers to the keeled seeds, from Latin *carinatus* (“keeled”).

#### 30. *Corydalis* sect. *Pubicaules* C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 13: 369. 1991.

毛茎紫堇组 mao jing zi jin zu

Herbs, biennial (to perennial). Stems leafy and branched throughout, not tapering to base. Root in *Corydalis pubicaulis* with lateral storage roots to 1 cm in diam. Leaves all clearly stalked; basal leaf rosette withered at anthesis; petiole with distinct vaginae or auricles at base. Lower bracts leaflike, distant from upper. Flowers red, purple, or blue, rarely “creamy greenish.” Pedicel long, slender, arcuate in fruit. Capsule oblong, not forming angle with pedicel.

- Three species: China.

- 1a. Crest very narrow or absent; stems pubescent, especially below; racemes 4–10-flowered; stigma cleft to 1/2; prominent fleshy lateral storage roots present ..... 187. *C. pubicaulis*  
 1b. Outer petals crested; stems glabrous; racemes 10–15-flowered; stigma not or slightly cleft.  
 2a. Stems ascending, long and slender; petioles 4–14 cm, bases with rounded erose-dentate auricles; crest of upper petal to 1 mm wide ..... 186. *C. auriculata*  
 2b. Stems suberect; petioles 3–6 cm; crest of upper petal 1–2 mm wide ..... 185. *C. smithiana*

#### 185. *Corydalis smithiana* Fedde, Repert. Spec. Nov. Regni Veg. 20: 55. 1924.

箐边紫堇 qing bian zi jin

*Corydalis lutescens* C. Y. Wu ex H. Chuang, p.p. (type only).

Herbs, biennial, (10–)15–30(–42) cm tall, glabrous. First year with 1 or sometimes several leaf rosettes; second year with

flowering stems and membranous remnants of broad petiolar bases of rosette leaves; head of root 2–4 mm in diam., rarely to 2 cm and multi-headed. Stems suberect, densely leafy from base (though basal leaves sometimes withering early), much branched, sulcate. Cauline leaves all stalked: petiole 3–6 cm, base ?conspicuously vaginate; blade glaucous abaxially, green or glaucous adaxially, ovate-triangular, 2–6 × 2–5 cm, triternate to bi-(tri-)pinnate; leaflets deeply lobed into oblanceolate lobes 2–5 × 1–2 mm, apex acute, mucronate. Raceme 4–12-flowered,



very lax below, with lowest flower apparently from axil of cauline leaf, in fruit lowest internodes ca. 3 cm; central bracts flabellate-divided, segments acute; uppermost bracts obovate, entire. Pedicel ca. 5 mm above, basal ones 20–30 mm, slender, arcuate in fruit. Sepals deeply fimbriate-dentate, 1–2 × 1.5–2 mm. Petals pale red (rarely blue?); outer petals: limb broadly spreading, subacute, mucronate, crest 1–2 mm wide, entire, just reaching tip; upper petal 16–22 mm; spur straight to slightly upturned, sometimes slightly arcuately downcurved, cylindrical, 8–11 mm, broad; nectary 2.5–3 mm; lower petal spatulate, 11–13 mm, claw slightly saccate or bisaccate, limb rounded, apex mucronate, crest short; inner petals 9–11 mm. Stigma square, with 4–6 marginal apical papillae; geminate papillae lateral and on basal lobes (basal lobes often indistinct). Capsule narrowly lanceolate-oblong, flattened, 17–26 × 2–3 mm, 9–19-seeded, explosively dehiscent. Seeds sub-biseriate, 1.6–1.8 mm, smooth. Fl. and fr. Apr–Sep.

• Rock walls, crevices, gravel, stony slopes, roadsides; (2000–) 2800–3600 m. S Sichuan (Jiulong), NW Yunnan.

**186. *Corydalis auriculata*** Lidén & Z. Y. Su, *Edinburgh J. Bot.* 54: 71. 1997.

耳柄紫堇 *er bing zi jin*

Herbs, at least 35 cm tall (probably more), slender. Basal parts not seen. Stems long, slender, leafy, sparingly branched. Cauline leaves: petiole 4–14 cm (lower ones long, upper shorter), slender, at base with rounded membranous finely erose-dentate auricles; blade bi-(tri-)ternate, 3–7 × 3–7 cm; pinnae long petiolulate; pinnules shortly petiolulate to sessile, deeply 3-divided; segments deeply to shallowly cut into oblong lobes. Racemes 10–15-flowered, subsecund, soon elongating; lowermost bracts leaflike, upper ones gradually smaller, slightly lobate, obviously shorter than pedicels. Pedicel filiform, 10–32 mm. Sepals 0.5–1.5 × 0.5–1.5 mm, irregularly dentate. Corolla “pale green” or “cream fading to dull red”; outer petals with rather broad rhombic-subacute limb, with short entire to dentate crest; upper petal 19–20 mm; spur straight or slightly downcurved, cylindrical, 8–10 mm; nectary ca. 2/5 as long as spur; lower petal 10–11 mm, near base small saccate; inner petals ca. 9 mm. Style ca. 2.5 mm; stigma compressed-square with prominent basal lobes; apical emargination shallow; median 2 marginal papillae distinct, lateral marginal papillae broad, confluent; geminate papillae lateral (submarginal) and on basal lobes. Fruit and seed unknown; developing capsule ca. 8 × 2.5 mm; style ca. 2 mm. Fl. Apr.

**31. *Corydalis* sect. *Trachycarpae*** (Fedde) Fedde in Engler & Prantl, *Nat. Pflanzenfam.*, ed. 2, 17b: 128. 1936.

糙果紫堇组 *cao guo zi jin zu*

*Corydalis* “Gruppe” *Trachycarpae* Fedde, *Repert. Spec. Nov. Regni Veg.* 20: 287. 1924; *C. ser. Feddeanae* C. Y. Wu & H. Chuang.

Herbs, perennial; stems and petioles of radical leaves attenuate to filiform underground base. Rhizome small, with fascicle of spindle-shaped to oblong, fleshy storage roots, apically with usually small pale overwintering bulblike bud. Stems simple or branched above. Radical leaves few. Cauline leaves 1–6. Leaflets often lanceolate, entire, with raised parallel veins abaxially. Fruiting pedicel recurved. Corolla usually yellow, rarely purple, very rarely blue, usually with distinct veins. Capsule explosively dehiscent.

Fifty-two species: a homogeneous and easily circumscribed section in C and W China, the Himalayas, and N India: 52 species (46 endemic) in China.

• Shaded disturbed places, hedges, streamsides; 1500–1800 m. SE Xizang.

**187. *Corydalis pubicaulis*** C. Y. Wu & H. Chuang in C. Y. Wu, *Fl. Xizang.* 2: 266. 1985 [*“pubicaula”*].

毛茎紫堇 *mao jing zi jin*

Herbs, biennial or perennial?, 15–60 cm tall, with prominent 1-celled hairs to 0.4 mm, especially at base of stem, above glabrous except for base of branches and base of pedicels. Root with few tightly set fleshy-thickened storage roots, 3–7 cm, 0.5–1 cm in diam. at attachment, long tapering. Stems few, first erect, later diffuse and scrambling through herbage, leafy and branched throughout, not tapering below. Radical leaves few, early withering; petiole 5–12 cm. Cauline leaves 3–5, all stalked; petiole 3–10 cm, all with small membranous dentate auricle at base; blade pruinose abaxially, green adaxially, broadly biternate, 3–5 × 3–4 cm; pinnae long petiolulate; pinnules shortly stalked or subsessile; ultimate leaflets unequally ternatisect, segments again shallowly 2- or 3-lobed; ultimate segments oblong to obovate, obtuse, mucronate. Racemes 4–10-flowered, corymbose at young anthesis, considerably elongating in fruit; lower bracts like upper cauline leaves: petiole 1.5–2 cm, blade 2–3 × 2–3 cm; middle bracts deeply ternatisect with cuneate-flabellate shallowly lobed segments; uppermost ones lanceolate with long narrow lateral teeth or laciniae. Pedicel 12–30 mm, very slender, gracefully arcuate in fruit. Sepals 0.3–1 × 0.2–1 mm, slightly to deeply dentate. Petals pale blue to red or lilac, or with mauve spur, blue apex, and paler middle; outer petals rather narrow, subacute; dorsal crest absent; upper petal 15–19 mm; spur straight or slightly downcurved at apex, cylindrical, 7–9 mm; nectary ca. 2/5 as long as spur; lower petal subspatulate, 9–11 mm, spur with short gibbosity near base; inner petals 8–10 mm, claw ca. as long as limb. Stigma narrowly cleft to 40%–60%; papillae flanking cleft narrow, distinct; laterally with broad indistinct papillae; lateral geminate papillae clearly submarginal (laminal); basal lobes short, tipped with geminate papilla. Capsule oblong, 15–22 × 2–2.5(–3) mm, 10–17-seeded; style ca. 2.5 mm. Seeds ± in 2 rows, ca. 1.2 mm, smooth; caruncle cupular, small. Fl. (Feb–)Apr–Jul, fr. May–Jul.

• Evergreen broad-leaved forests or forest margins, in hedges around fields; 2000–3000 m. SE Xizang.

The spelling of the specific epithet was corrected to “*pubicaulis*” by C. Y. Wu and H. Chuang (*Acta Bot. Yunnan.* 13: 369. 1991).

- 1a. Fruiting pedicels erect in basal 2/3, curved at apex.
- 2a. Corolla pale to golden yellow; inner petals distinctly dark tipped; leaves 2–3 × pinnate ..... 238. *C. scaberula*
- 2b. Corolla pale purple to purplish red, rarely pale yellow; inner petals not distinctly dark tipped; leaves 1–2 × pinnate ..... 237. *C. glycyphyllos*
- 1b. Fruiting pedicels recurved from base.
- 3a. Flowers blue to purple.
- 4a. Cauline leaves simply pinnate, or rarely innermost pinnae again divided; pinnae lanceolate-acute (cf. also 168. *C. milarepa*, roots unknown; stem leafy at base).
- 5a. Storage roots distinctly set off on long thin stalks.
- 6a. Leaflets stiff, adaxially glossy dark green, abaxially with stiff 1-celled hairs on veins (Sichuan, NW Yunnan) ..... 205. *C. eugeniae*
- 6b. Leaflets slightly fleshy, glaucous, glabrous.
- 7a. Bracts entire (N Sichuan) ..... 207. *C. degensis*
- 7b. Bracts divided (S Xizang) ..... 196. *C. sherriffii*
- 5b. Storage roots sessile or with indistinct stalks.
- 8a. Spur broadly conical, 5–7 mm ..... 209. *C. lathyrophylla*
- 8b. Spur longer.
- 9a. Cauline leaves stiff, adaxially glossy, with narrow leaflets; bracts entire to divided ..... 203. *C. atuntsuensis*
- 9b. Cauline leaves soft, glaucous, with elliptic leaflets; bracts entire, much shorter than pedicels ..... 197. *C. kuruchuensis*
- 4b. Cauline leaves bi- to triternate or bi- to tripinnate.
- 10a. Racemes capitate; spur shorter than inner petals, downcurved ..... 208. *C. brachyceras*
- 10b. Racemes not capitate or spur longer.
- 11a. Capsule with lines of dense papillae.
- 12a. Corolla white, at least in early anthesis ..... 235. *C. trachycarpa*
- 12b. Corolla purple to slate purplish blue.
- 13a. Radical leaves bipinnate with 3 or 4 primary pinnae; upper petal 22–30 mm ..... 234. *C. calcicola*
- 13b. Radical leaves bi- to tripinnate; upper petal shorter.
- 14a. Leaves with 4–8 primary pinnae; upper petal 17–22 mm with spur 9–14 mm ..... 232. *C. lhorongensis*
- 14b. Leaves with 3 or 4 pinnae; upper petal 12–13 mm with spur ca. 6 mm ..... 276. *C. striatocarpa*
- 11b. Capsule glabrous.
- 15a. Cauline leaves stalked, bi- to triternate with stalked leaflets; stems slender.
- 16a. Spur (4–)5–7 mm, narrow, straight ..... 188. *C. lupinoides*
- 16b. Spur 16–18 mm, downcurved ..... 189. *C. dorjii*
- 15b. Cauline leaves bi- to tripinnate; stems slender or short.
- 17a. Stems 10–15 cm; plant of alpine scree.
- 18a. Spur ca. 18 mm; bracts entire ..... 233. *C. dolichocentra*
- 18b. Spur 8–10 mm; bracts divided ..... 236. *C. nubicola*
- 17b. Stems 20–60 cm.
- 19a. Spur 12–13 mm ..... 226. *C. tsayulensis*
- 19b. Spur 14–17 mm.
- 20a. Corolla light blue ..... 225. *C. nemoralis*
- 20b. Corolla dark purple ..... 227. *C. porphyrantha*
- 3b. Flowers yellow.
- 21a. Cauline leaves simple.
- 22a. Racemes 10–30-flowered; inner petals black tipped; bracts 5–20 mm ..... 191. *C. juncea*
- 22b. Racemes 2–6-flowered; inner petals pale; bracts 15–50 mm ..... 192. *C. pseudojuncea*
- 21b. Cauline leaves compound.
- 23a. Storage roots with thin simple or branched stalks at least 10 mm (sometimes only stalks present in herbarium specimens).
- 24a. Cauline leaves pinnatifid, not cut quite to midvein, lower segments often again divided ..... 219. *C. delavayi*
- 24b. Leaves pinnately to ternately divided with discrete leaflets.
- 25a. Cauline leaves ternate to biternate or bipinnate; stem branched.
- 26a. Spur of upper petal 11–12 mm; plant 40–65 cm; racemes 9–25-flowered ..... 223. *C. jiulongensis*
- 26b. Spur of upper petal 5–8 mm; plant 10–35 cm; racemes 2–9-flowered.
- 27a. Cauline leaves stalked; leaflets divided into obovate to oblanceolate lobes ..... 224. *C. homopetala*
- 27b. Cauline leaves sessile; leaflets linear to narrowly lanceolate ..... 193. *C. lowndesii*
- 25b. Cauline leaves once pinnate; stem simple (rarely branched).
- 28a. Raceme 10–25-flowered; spur 6–9 mm.
- 29a. Spur upwardly directed, broadly conical ..... 206. *C. prattii*

- 29b. Spur of upper petal horizontal ..... 194. *C. polygalina*
- 28b. Raceme 4–10-flowered.
- 30a. Inner petals 6–7 mm; spur 6–9 mm ..... 194. *C. polygalina*
- 30b. Inner petals 8–10 mm; spur 7–12 mm.
- 31a. Bracts entire ..... 204. *C. mayae*
- 31b. Lower bracts divided ..... 205. *C. eugeniae*
- 23b. Storage roots not or indistinctly stalked, or stalks shorter than 8 mm.
- 32a. Most bracts divided.
- 33a. Cauline leaves simply pinnate with narrow entire leaflets; stems simple.
- 34a. Crest of outer petals broad, rounded, much overtopping apex; spur strongly sigmoidally curved, 12–15 mm ..... 199. *C. rheinbabeniana*
- 34b. Crest of outer petals not overtopping apex; spur straight to slightly curved, 8–11 mm.
- 35a. Leaflets glossy green adaxially, stiff; storage roots oblong ..... 203. *C. atuntsuensis*
- 35b. Leaflets glaucous, soft; storage roots fusiform ..... 202. *C. linarioides*
- 33b. Cauline leaves more divided; stem branched, rarely simple.
- 36a. Ovary and fruit with lines of papillae.
- 37a. Spur of upper petal 15–18 mm, tapering to narrow apex ..... 231. *C. chandoensis*
- 37b. Spur shorter.
- 38a. Spur of upper petal 12–14 mm ..... 230. *C. temolana*
- 38b. Spur of upper petal 8–10 mm ..... 229. *C. stramineoides*
- 36b. Fruit glabrous.
- 39a. Racemes ± corymbose; lower pedicels 10–25 mm; stems 5–15 cm above soil surface.
- 40a. Upper petal entire; crest attenuate to both ends; spur tapering to acute apex; plant glabrous ..... 220. *C. tenuipes*
- 40b. Upper petal dentate; crest broadly obtuse, ± dentate; spur cylindrical; plant usually papillose-hairy.
- 41a. Spur 10–11 mm, slightly upturned ..... 239. *C. petrodoxa*
- 41b. Spur 6–9 mm, downcurved at apex ..... 221. *C. oligosperma*
- 39b. Racemes elongate; lower pedicels 5–12 mm; stems 15–65 cm above soil surface.
- 42a. Racemes lax, 5–7-flowered; spur 7–8 mm ..... 224. *C. homopetala*
- 42b. Racemes dense, 10–30-flowered; spur longer.
- 43a. Spur 14–16 mm, cylindrical, usually strongly recurved; stems usually simple, erect; corolla pale yellow ..... 222. *C. pseudodensisipica*
- 43b. Spur tapering to apex, 8–13 mm; stems branched, ascending to suberect; corolla bright yellow, with darker veins ..... 228. *C. densispica*
- 32b. Bracts entire or lowermost sometimes divided; stem usually simple (but sometimes branched in *C. kingdonis*, *C. quinquefoliolata*, *C. sophronitis*, and *C. trisecta*).
- 44a. Spur of upper petal 5–8 mm.
- 45a. Inner petals tipped with contrasting dark purple.
- 46a. Cauline leaves pinnate, sessile; leaflets linear ..... 210. *C. helodes*
- 46b. Cauline leaves biternate, shortly stalked; leaflets lanceolate ..... 190. *C. kingdonis*
- 45b. Inner petals pale at apex.
- 47a. Crest of upper petal broad, clearly overtopping apex.
- 48a. Lower petal conspicuously saccate; bracts sharply reflexed in fruit ..... 215. *C. gaoxinfeniae*
- 48b. Lower petal not or slightly saccate; bracts not sharply reflexed in fruit.
- 49a. Spur broad, cylindrical, straight; stems simple ..... 214. *C. linearis*
- 49b. Spur slender, tapering, curved; stem ± branched ..... 200. *C. sophronitis*
- 47b. Crest not overtopping apex, or absent.
- 50a. Upper petal ca. 13 mm.
- 51a. Outer petals without crest; stigma square ..... 218. *C. mediterranea*
- 51b. Outer petals crested; stigma much broader than long with distinct marginal papillae, geminate papillae lacking or indistinct ..... 195. *C. quinquefoliolata*
- 50b. Upper petal 15–17 mm.
- 52a. Leaflets linear to narrowly lanceolate, stiff, glossy green adaxially ..... 203. *C. atuntsuensis*
- 52b. Leaflets broadly elliptic, fleshy, glaucous ..... 198. *C. trisecta*
- 44b. Spur of upper petal 9–20 mm.
- 53a. Lower petal not or very slightly saccate.
- 54a. Leaflets glossy green adaxially, stiff; storage roots oblong ..... 203. *C. atuntsuensis*
- 54b. Leaflets glaucous, soft; storage roots fusiform.

- 55a. Spur of upper petal tapering to apex, 8–10 mm ..... 198. *C. trisecta*  
 55b. Spur of upper petal cylindrical.  
     56a. Stem 8–20 cm; bracts obovate, 2–9 mm wide; upper petal 22–27 mm ..... 201. *C. cristata*  
     56b. Stem 10–50 cm; bracts linear-lanceolate, 1–3 mm wide; upper petal 16–23 mm ..... 202. *C. linarioides*  
 53b. Lower petal broadly saccate.  
 57a. Bracts sharply reflexed in fruit; spur slightly to strongly downcurved.  
     58a. Spur slightly downcurved, tapering, 11–15 mm; leaflets of cauline leaves 2–5 mm wide ..... 216. *C. feddeana*  
     58b. Spur strongly curved, cylindrical, 15–20 mm; leaflets 3–14 mm wide ..... 217. *C. pseudocristata*  
 57b. Bracts not sharply reflexed in fruit; spur sigmoidally curved to straight.  
     59a. Inner petals pale; leaflets linear, 20–50 mm ..... 213. *C. sigmoides*  
     59b. Inner petals with contrasting dark purple apex; ultimate leaflets shorter.  
     60a. Spur attenuate to thin apex; cauline leaves biternate ..... 211. *C. lopinensis*  
     60b. Spur cylindrical or slightly attenuate; cauline leaves tripinnate ..... 212. *C. bijiangensis*

**188. *Corydalis lupinoides*** C. Marquand & Airy Shaw, J. Linn. Soc., Bot. 48: 160. 1929.

米林紫堇 mi lin zi jin

*Corydalis napuligera* C. Y. Wu.

Herbs, perennial, (12–)30–50 cm tall, glabrous or papillose-pubescent along petiolules and veins; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fascicled, narrowly spindle-shaped, 1.5–5 cm × 1.5–3 mm, fleshy. Stems few, erect to ascending, often reddish, branched, naked in lower 1/3–2/3, with 2 or 3 leaves. Radical leaves few; petiole to 20 cm, very slender. Cauline leaves: petiole 0.5–4 cm, or upper leaves sessile, membranous shortly vaginate at base; blade glaucous abaxially, green adaxially, triangular, 4–7 × 3–6 cm (or uppermost very small), unequally bi- or triternate; primary petiolules long; ultimate lobes entire, broadly obovate to broadly lanceolate, obtuse to acute. Racemes spikelike, simple or rarely branched, terminal and axillary from uppermost leaf, 3–10 cm, at fruiting extended to 15 cm, 10–20-flowered; bracts narrowly rhombic-ovate to lanceolate, 4–8 mm, entire. Pedicel 5–8 mm, recurved in fruit. Sepals minute (ca. 0.1 mm). Corolla blue, with purplish spots at apex (keels, margins) and tip of spur, “pale indigo, whitish mauve, lilac blue or blue”; outer petals navicular-acute, with narrow to rather broad entire crest slightly overtopping apex; upper petal 9–12 mm, spur upwardly directed, tapering to a rather thin apex, (4–)5–7 mm; nectary ca. 3/4 as long as spur, thin; lower petal 7–9 mm, conspicuously saccate at base, central part contracted, distal 1/3 slightly reflexed; inner petals 6–7 mm, inside apically purple-black, elliptic. Ovules 9–12; style sigmoidally curved; stigma very peculiar, transverse with 4 long erect-spreading papillae and geminate lateral papillae. Capsule narrowly elliptic, 7–9 × ca. 2.5 mm; style 2–2.5 mm. Fl. and fr. Jul–Aug.

• *Picea* forests, shrubs, moist ground; 3600–4000 m. SE Xizang (Bomi, Mainling, Nyingchi).

**189. *Corydalis dorjii*** D. G. Long, Notes Roy. Bot. Gard. Edinburgh 42: 93. 1984.

不丹紫堇 bu dan zi jin

Herbs, perennial, 30–50 cm tall; stems and petioles of radical leaves attenuate toward base. Storage roots spindle-shaped, 1.5–2 cm. Stems erect, with 2 or 3 leaves and 1–3 branches, naked in lower 1/3. Radical leaves few; petiole 10–14

cm, slender; blade glaucous abaxially, green adaxially, broadly triangular, 7–11 × 7–11 cm, triternate; pinnae with petiolule 2.5–4.5 cm; pinnules with petiolule 0.5–2 cm; segments elliptic-obovate, 1.2–2.2 × 0.5–1.3 cm, entire, obtuse. Cauline leaves: petiole 2–6 cm; blade like radical leaves. Raceme terminal, 2–4 cm; peduncle 3–20 cm; bracts elliptic, 3–6 × 1.5–3 mm, margin entire, apex acute. Pedicel 1.5–3 mm, slender. Sepals nearly orbicular, very small, margin nearly entire. Corolla light blue, lavender, or amaranth; outer petals: limb navicular, acute, without or with very narrow crest; upper petal 25–28 mm; spur arcuately downcurved, cylindrical, 16–18 mm; lower petal: limb navicular, central part contracted, basally conspicuously saccate; nectary 1/3–1/2 as long as spur. Stigma quadrate, without basal lobes, with 8 marginal papillae, laterally and in basal corners with geminate papillae. Capsule (immature) narrowly elliptic, ca. 15 × 3 mm; style ca. 2 mm. Fl. and fr. Apr–May.

Forests; 2000–2600 m. SE Xizang (Bomi) [Bhutan, NE India].

**190. *Corydalis kingdonis*** Airy Shaw, Bull. Misc. Inform. Kew 1940: 267. 1940.

多雄黄堇 duo xiong huang jin

*Corydalis wardii* C. Marquand & Airy Shaw, J. Linn. Soc., Bot. 48: 161. 1929, not W. W. Smith (1916).

Herbs, perennial, 15–30 cm tall, glabrous or very finely papillose; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots several, fascicled, spindle-shaped, 1–3 cm × ca. 3 mm, fleshy-thickened, without distinct stalk. Radical leaves few; petiole 8–16 cm; blade glaucous abaxially, 3–6 × 2–3 cm, abaxially with prominent veins, biternate, with long thin petiolules; ultimate lobes lanceolate, acute. Stems 1–4, suberect to ascending, usually supported by shrubs, simple or branched, leafy above, rarely also in lower 1/3. Cauline leaves usually 2, alternate, like radical leaves but usually slightly larger and shortly stalked. Racemes rather lax, 4–11-flowered; bracts oblanceolate, entire or lowermost trifold, 5–10 mm, acute. Pedicel 5–10(–15) mm, recurved in fruit. Sepals to 0.5 mm, dentate. Petals yellow; inner petals with sharply contrasting dark brownish purple tip; outer petals acute with entire crest; upper petal 9–11 mm, petal lobes navicular-lanceolate, apex subacute, crest shortly decurrent on spur; spur conical, 4–5 mm; nectary 2/3–4/5 as long as spur; lower petal 6–8 mm, distal 1/2 reflexed, crest short, central part contracted, lower 1/2

obviously saccate; inner petals 5–7 mm. Capsule (immature) broadly obovoid, 5–7 × ca. 3 mm; style 2.5–3 mm; ovules 5–7, in 2 rows. Fl. Jun–Jul.

• Shrubs, meadows, moist ground; 3300–4700 m. SE Xizang (Bomi, Mainling).

**191. *Corydalis juncea*** Wallich, Tent. Fl. Nepal. 54, t. 42. 1826.

裸茎黄堇 *luo jing huang jin*

Herbs, perennial, 10–45 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots several, spindle-shaped, 1–5 cm × 2–6 mm, fleshy, sessile or shortly stalked. Stems 1–5, simple, with 0–2 leaves. Radical leaves few; petiole 10–25 cm; blade pruinose abaxially, green adaxially, deltoid, 4–7 × 4–10 cm, bi- to triternate; pinnae with petiolule 2–3 cm; pinnules sessile, entire to deeply 3- or 4-divided; lobules narrowly lanceolate to broadly oblanceolate, acute. Cauline leaf or leaves simple, sessile; blade lanceolate or linear-lanceolate, 1–5 cm × 1–4 mm, entire. Raceme 5–20 cm, 10–30-flowered; bracts linear or linear-lanceolate, 5–20 mm, entire. Pedicel 5–15 mm, recurved in fruit. Sepals 0.1–0.8 mm, shallowly dentate. Petals pure yellow, inner petals with sharply contrasting black-purple apex; upper petal ovate, 10–15 mm, crest decurrent on spur; spur cylindrical, 5–7 mm; nectary ca. 1/2 as long as spur; lower petal obovate, 7–9 mm; inner petals 6–8 mm. Stigma broad, bifid, with 8 papillae of which basal ones geminate. Capsule oblong, 10–13 × ca. 2 mm, 8–10-seeded; style ca. 3 mm. Seeds ca. 1 mm, smooth. Fl. and fr. Jun–Sep.

Alpine shrubs, grasslands, often in shrubs in pastures; 3600–4400 m. S Xizang [Bhutan, NE India, Nepal].

**192. *Corydalis pseudojuncea*** Ludlow & Stearn, Bull. Brit. Mus. (Nat. Hist.), Bot. 5: 62. 1975.

拟裸茎黄堇 *ni luo jing huang jin*

Herbs, perennial, 10–30 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots several, fascicled, spindle-shaped, sessile. Stems simple, with 1 leaf. Radical leaves few, with very long thin petiole; blade small, biternate, with long narrow leaflets. Cauline leaf sessile; blade lanceolate, 2–6 cm × 4–5 mm, entire. Raceme 2–3(–6) cm, sparsely 2–6(–10?)-flowered; bracts narrowly lanceolate to linear-lanceolate, 15–50 mm, entire. Pedicel 3–5 mm. Sepals white, margin lacerate. Petals pale yellow, with greenish keels and purplish veins, often turning purplish with age, especially at apex; upper petal 15–19 mm, petal lobes navicular-ovate, apex subacute, abaxial crest very narrow or absent; spur slightly attenuate, 7–11 mm; nectary ca. 2/3 as long as spur; lower petal navicular-oblanceolate, 9–11 mm; inner petals 8–9 mm. Stigma broad, bifid, with 8 papillae of which basal ones geminate; apical papillae rather long. Fruit linear, 19–22 × ca. 2 mm, 8–10-seeded; style ca. 2.5 mm. Fl. May–Jun [Jun–Jul in Nepal].

Grasslands on slopes; 2600–2700 m. S Xizang (Nyalam) [N India (Kumaon), W Nepal (3800–4500 m)].

**193. *Corydalis lowndesii*** Lidén, Bull. Brit. Mus. (Nat. Hist.), Bot. 18: 491. 1989.

齿瓣黄堇 *chi ban huang jin*

*Corydalis polygalina* J. D. Hooker & Thomson var. *micrantha* C. Y. Wu, p.p. (excluding type).

Herbs, perennial, glaucous, 10–20 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots several, 1.5–5 cm × 3–4 mm, gradually narrowed into equally long often branched stalk. Stems 2–6, with 2–4 leaves, nearly always with late branches. Radical leaves few, with very long thin petiole; blade ternate to biternate, 2–4 cm; leaf lobes linear to lanceolate. Cauline leaves sessile, 2–4 × 2–4 cm, like radical leaves. Racemes 1–2 cm, 2–7-flowered, dense, elongating in fruit; lower bracts deeply divided into linear acute lobes, 8–12 mm, uppermost often entire. Pedicel 4–10 mm, recurved in fruit. Sepals ca. 0.5 × 1 mm, dentate. Corolla dull yellow, masked with grayish ochre; upper petal 10–14 mm, subacute; crest narrow, attenuate to both ends, not reaching apex; spur slightly downcurved, 5–7 mm, attenuate; nectary ca. 1/2 as long as spur; lower petal navicular-oblanceolate, ca. 7 mm, margin dentate, crest usually lacking; inner petals 6–7 mm. Stigma square; 2 marginal median papillae distinct, lateral marginal papillae broad and indistinct; geminate papillae sublateral and in basal corners (basal lobes hardly developed). Fruit narrowly obovoid, ca. 1 cm, 6-seeded; style ca. 2.5 mm. Seeds ca. 1.6 mm, smooth. Fl. Jun–Sep.

Stony turf among boulders on open hillsides; 4000–5700 m. S Xizang (Yadong) [C Nepal].

**194. *Corydalis polygalina*** J. D. Hooker & Thomson, Fl. Ind. 1: 263. 1855.

远志黄堇 *yuan zhi huang jin*

?*Corydalis graminea* Prain; *C. polygalina* var. *micrantha* C. Y. Wu, p.p. (type only).

Herbs, perennial, 10–40 cm tall, glabrous or papillose-scabrid on leaf veins abaxially or very rarely with scattered 1-celled hairs; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots long, attenuate into distinct sometimes branched stalk. Stems few, simple or often with late branches, with 1–4 leaves in upper 1/2. Radical leaves with long thin petiole; blade ternate to biternate or pinnate; pinnae narrowly lanceolate, below with raised parallel veins. Cauline leaves subsessile; blade 2–5 × 2–6 cm, pinnate; pinnae in 2 or 3 pairs, linear, 1–5 cm, sometimes lowermost pinna again cleft to base. Racemes 3–4 cm, at fruiting elongate, 7–15-flowered; bracts lanceolate, deeply pectinate, dentate to entire; upper ones less divided. Pedicels longer than bracts, (5–)10–20(–25) mm, recurved in fruit. Sepals whitish, 0.5–1 × 0.5–2 mm, dentate. Outer petals yellow (rarely purple), often with distinct veins, limb broadly rhombic-acute to shortly acuminate; upper petal 13–17 mm, with narrow to broad crest tapering to both ends, barely reaching apex, often long decurrent on spur; spur straight, cylindrical to slightly tapering, 6–9 mm; nectary ca. 1/2 as long as spur; lower petal 7–8 mm with short low crest and slightly dentate margin; inner petals 6–7 mm. Stigma square; 2 marginal median papillae distinct, lateral marginal papillae broad and indistinct; geminate papillae sublateral and terminating well-developed basal lobes. Capsule oblong to narrowly

obovoid, 5–10 mm, 2–8-seeded; style 2.5–3 mm. Seeds ca. 1.2 mm, smooth. Fl. and fr. Jun–Aug.

Slopes, mountain summits, among shrubs, stony crevices; (3100–)4000–5100 m. S Xizang [Bhutan, India (Sikkim), E Nepal].

**195. *Corydalis quinquefoliolata*** Ludlow & Stearn, Bull. Brit. Mus. (Nat. Hist.), Bot. 5: 64. 1975.

朗县黄堇 lang xian huang jin

Herbs, perennial, 25–40 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fasciculate, 3–4 cm × 2–5 mm, narrowed at base. Stems 1–3, simple or branched, lower part without leaves, above with 1–3 leaves. Radical leaves few; petiole 5–18 cm; blade glaucous abaxially, green adaxially, imparipinnate with 2 closely set pairs of lanceolate leaflets 3–7 × 0.5–1 cm. Cauline leaves similar, shortly stalked. Racemes 4–8 cm, 6–12-flowered; bracts lanceolate, ca. 1 cm, entire. Pedicel 7–12 mm. Sepals 0.3–1 mm, dentate. Petals golden yellow; upper petal ca. 13 mm, limb broadly ovate-acute, crest ca. 0.5(–1?) mm wide, attenuate to both ends, decurrent on spur; spur slightly downcurved, cylindric, ca. 6 mm; nectary ca. 3/4 as long as spur, thin; lower petal 7–9 mm, with very short crest, middle slightly contracted, basally slightly saccate; inner petals 6–7 mm. Style ca. 2 mm; stigma very peculiar, much broader than long with 6 forward-pointing stalked marginal papillae, and small rounded basal lobes; geminate papillae lacking. Fruit not seen. Fl. Jun.

• Wet grasslands at shrub margins; ca. 3600 m. SE Xizang (Nangxian).

**196. *Corydalis sherriffii*** Ludlow, Bull. Brit. Mus. (Nat. Hist.), Bot. 5: 288. 1976.

巴嘎紫堇 ba ga zi jin

Herbs, perennial, 15–25 cm tall. Storage roots apparently with long thin stalks (only stalks seen). Stems erect, simple, with 2 leaves in upper 1/2. Radical leaves several; petiole 7–15 cm; blade broadly ovate, 2–4 cm, pinnate; pinnae 2 or 3 pairs, shortly petiolulate, again 2–4-divided; lobules linear to lanceolate, 1–2 cm × 2–5 mm, acute, with 3 inconspicuous veins. Cauline leaves 2, lower leaf shortly petiolate, upper leaf nearly sessile or sessile; blade like basal leaves. Raceme 2–4 cm, 6–12-flowered, dense; bracts pinnatifid or palmatisect, 6–15 mm, rarely uppermost lanceolate, entire. Pedicel 8–15 mm. Sepals ca. 1 × 1 mm, lacerate-dentate. Corolla purple, inner petals white. Upper petal 17–18 mm, subacute, dorsal crest entire to dentate, 1–1.5 mm wide, just reaching apex, barely decurrent on spur; spur straight, cylindric, ca. 8 mm; nectary ca. 1/2 as long as spur; lower petal obovate, ca. 10 mm, crested, subobtusate, slightly dentate; inner petals ca. 8 mm. Stigma square; simple marginal papillae: median 2 distinct, lateral broad and indistinct; geminate papillae lateral and terminating well-developed basal lobes. Fruit and seeds unknown. Fl. Jul.

• Open grassy slopes, stony slopes; ca. 4500 m. SE Xizang (Mainling).

**197. *Corydalis kuruchuensis*** Lidén, *sp. nov.*

库如措紫堇 ku ru cuo zi jin

Type: China. Xizang: Kuru Chu SW of Lhozak [Lhozagh] valley, 28°18'N, 90°51'E, subalpine moist rock ledges in *Rhododendron* scrub, alt. 4420 m, 22 Jul 1994, *W. B. Dickoré 9809* (holotype, GOET; isotype, UPS).

*Ab affini* *Corydalis sherriffii caulibus brevioribus, radicibus fusiformibus non longe stipitatis atque bracteis minoribus integris differt.*

Paratype: *W. B. Dickoré 9794* (GOET).

Herbs, perennial, 10–15 cm, glabrous, very glaucous, slightly fleshy; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots sessile or on short thick indistinct stalk, fusiform, 10–20 × 2–4 mm, also thin long stalks (probably stolons) present. Stems few, simple, with 1 or 2 leaves. Radical leaves: petiole 3–5 cm; blade 1–3 × 1–2.5 cm, ternate or bipinnate or imparipinnate; pinnae broadly lanceolate to elliptic, acute to shortly acuminate. Cauline leaves subsessile; blade 1–2 × 1–2 cm, pinnate; pinnae 2 pairs, 8–15 × 3–6 mm. Racemes 5–11-flowered; bracts entire, broadly lanceolate, 4–6 mm, or upper smaller. Pedicel 8–12 mm, recurved in fruit. Sepals whitish, ca. 0.5 × 0.5 mm, dentate. Corolla purple, inner petals whitish. Upper petal ca. 15 mm, acute to shortly acuminate, with entire to slightly dentate crest ca. 1.5 mm wide, decurrent on spur; spur slightly downcurved at apex, tapering to apex, ca. 7 mm; nectary ca. 1/2 as long as spur; lower petal ca. 8 mm, subobtusate, slightly dentate; inner petals ca. 7 mm. Stigma square; simple marginal papillae: 2 median distinct, lateral broad and indistinct; geminate papillae lateral (submarginal) and terminating well-developed basal lobes. Fruit and seeds unknown; style ca. 3 mm. Fl. and fr. Jul–Aug.

• Subalpine moist rock ledges in *Rhododendron* scrub; ca. 4400 m. S Xizang (Lhozagh).

The specific epithet is based on the geographic locality of the type.

**198. *Corydalis trisecta*** Franchet, J. Bot. (Morot) 8: 284. 1894.

秦岭紫堇 qin ling zi jin

*Corydalis cristata* Maximowicz var. *ramosa* C. Y. Wu & H. Chuang.

Herbs, perennial, 10–28 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots numerous, fasciculate, oblong to obovoid, 2–4 cm × 1.5–4 mm. Stems 1 or few, slender, simple or branched, with (1 or)2(or 3) leaves in upper 2/3. Radical leaves long petiolate; blade quinately; segments broadly elliptic, fleshy, sessile. Cauline leaves (1 or)2(or 3); petiole 1–5 cm, or upper leaf subsessile; blade gray-glaucous abaxially, glaucous adaxially, ternate to imparipinnate with 2 pairs of leaflets, rarely bipinnate; ultimate lobes broadly elliptic, 2–4 × 0.8–1.5 cm, fleshy, abaxially with thick raised parallel veins, apex obtuse to acute. Raceme 5–12-flowered, at first dense, soon lax, simple or with a basal branch; bracts ovate-lanceolate to ovate-rhombic, 6–10 mm, entire. Pedicel 6–10 mm, recurved in fruit. Sepals ca. 0.2 mm, dentate. Corolla yellow; upper petal 19–22 mm, petal lobes navicular-ovate, apex acute to shortly acuminate, abaxial crest 1–1.5 mm wide, tapering to both ends, narrowly decurrent on spur; spur

slightly downcurved, conical, 8–10 mm; lower petal ca. 11 mm, apex acuminate, abaxial crest short, claw almost straight but with a small appendage at base; inner petals ca. 9 mm. Capsule oblong, 10–16 × 2–2.5 mm, 5–8-seeded; style ca. 2 mm. Seeds in 1 row, 1.5–1.8 mm, smooth. Fl. and fr. Jul–Aug.

• Mountain summits, grassy slopes, stony crevices; (1400–)2500–3300(–3800) m. Chongqing (Chengkou), Henan (Lushi), W Hubei, Shaanxi (Baoji, Foping, Taibei), NE Sichuan (Wuxi).

**199. *Corydalis rheinbabeniana*** Fedde, Repert. Spec. Nov. Regni Veg. 20: 294. 1924.

扇苞黄堇 shan bao huang jin

Herbs, perennial, 15–45 cm tall, with small to medium 1-celled hairs abaxially on leaves, and more densely in raceme, rarely glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots several, fascicled, spindle-shaped, 1–2 cm × 2–4 mm, gradually narrowed into thick stalk. Stems 1–3, simple or very rarely with 1 branch, with 2–4 leaves. Radical leaves not seen. Lower cauline leaves: petiole 1–4 cm; blade pruinose abaxially, green adaxially, broadly ovate, 6–14 × 5–12 cm, pinnate with 2–4 pairs of pinnae; pinnae narrowly lanceolate to linear, 1–6 cm × 3–5 mm, entire, rarely lowest segment 2- or 3-divided; upper leaves much smaller with more crowded leaflets, sessile. Raceme dense, 15–35-flowered, subsecund; bracts 10–20 × 4–14 mm, deeply pectinate-flabellate with some lobes again divided, segments linear-acute. Pedicel 8–10 mm, soon spreading-arcuate, sharply recurved in fruit. Sepals white, orbicular to triangular, 1–2 × ca. 2 mm, richly dentate. Petals lemon yellow or sometimes with an orange tint; veins often not obvious; outer petals broadly elliptic, subobtusate, margin slightly undulate; crest very broad, obtuse, much overtopping apex, long decurrent on spur; upper petal 20–24 mm; spur strongly incurved at apex, sigmoidally curved, cylindrical, 12–15 mm; nectary 7–10 mm; lower petal broadly navicular-saccate, 9–12 mm; inner petals 8–10 mm. Stigma square, slightly emarginate; median 2 apical papillae distinct, lateral marginal papillae confluent; geminate papillae submarginal and on basal lobes; style 2–3 mm, apex bent. Capsule narrowly obovoid, 8–10 × ca. 2.5 mm. Seeds ca. 1.5 mm, smooth. Fl. and fr. Jun–Sep.

• Among shrubs, grassy slopes; 3100–4100 m. SW Gansu, E and SE Qinghai, N Sichuan.

- 1a. Bracts densely white papillose  
on veins and margins ..... 199a. var. *rheinbabeniana*  
1b. Bracts glabrous ..... 199b. var. *leioneura*

**199a. *Corydalis rheinbabeniana* var. *rheinbabeniana***

扇苞黄堇(原变种) shan bao huang jin (yuan bian zhong)

Bracts densely white papillose on veins and margins.

• Among shrubs, grassy slopes; 3500–4100 m. SW Gansu, SE Qinghai, NW Sichuan.

**199b. *Corydalis rheinbabeniana* var. *leioneura*** H. Chuang, Acta Bot. Yunnan. 13: 272. 1991.

无毛扇苞黄堇 wu mao shan bao huang jin

Bracts glabrous.

• Shrubs, grassy slopes; 3100–4000 m. E Qinghai (Jigzhi, Tongren, Zèkog).

**200. *Corydalis sopronitis*** Z. Y. Su & Lidén, Novon 17: 491. 2007.

石渠黄堇 shi qu huang jin

Herbs, perennial, glaucous, 18–70 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots narrowly oblong, tapering to indistinct stalk. Radical leaf: petiole ca. 8 cm; blade triangular, ca. 5 × 5 cm, ternate with leaflets deeply tripartite into linear lobes. Stem sparingly branched, with 2–4 leaves. Cauline leaves shortly stalked, pinnate with 1–3 pairs of leaflets, lowermost leaflets sometimes divided; leaflets narrowly lanceolate to linear, 20–65 × 2–7 mm, with 3 parallel abaxially raised veins. Racemes 10–29-flowered, dense at first, soon elongating to 10–15 cm in fruit; bracts usually with short stalk, entire or rarely lowermost with a tooth or lobe, narrowly lanceolate, 5–13 mm. Pedicel 6–10 mm, strongly recurved in fruit. Sepals orbicular, 0.2–1 × 0.2–1.5 mm, dentate. Corolla pale yellow, with greenish keels; veins not obvious; outer petals 14–15 mm, shortly and broadly crested, crest overtopping apex; spur downcurved, 5–8 mm, tapering toward apex, slender; nectary ca. 1/2 as long as spur; lower petal obovate, 7(–8) mm, gradually narrowed to base, apically with short high entire to often apically dentate crest; inner petals ca. 7 mm, claw slightly shorter than limb. Stigma square, with 6 marginal indistinct papillae; geminate papillae sublateral and on distinct basal lobes. Capsule oblong, ca. 9 × 2 mm; smooth or usually finely papillose on veins, 2–5-seeded; style 2.5–3 mm. Seeds rounded, ca. 1.9 mm, smooth. Fl. and fr. Jul–Aug.

• Among shrubs, in moss in open forests; 3500–4000 m. SE Qinghai (Yushu), NW Sichuan (Sèrxū).

**201. *Corydalis cristata*** Maximowicz, Trudy Imp. S.-Peterburgsk. Bot. Sada 11: 47. 1890.

具冠黄堇 ju guan huang jin

Herbs, perennial, usually very glaucous, 8–20(–30) cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots spindle-shaped, 1–2 cm × 3–6 mm, not stalked. Stems 1(or 2), simple, stout (slender if shade-grown), with 2 usually closely set or sometimes even opposite leaves 4–8 cm below lowermost flower, sometimes with a third small leaf close to inflorescence. Radical leaves few; petiole 3–12 cm; blade 1–3 cm, with 3 or 5 broad leaflets. Cauline leaves: petiole 0.1–1.5 cm; blade gray-glaucous abaxially, darker adaxially, 2–5 × 2–6 cm, imparipinnate (or simply ternate in small specimens); pinnae 2 or 3 pairs, entire or deeply 2- or 3-divided into lanceolate to elliptic lobes, 1.5–3(–5) × 0.2–1 cm. Raceme to 8 cm, 2–14-flowered, lax; bracts lanceolate to rhombic or obovate, 5–15 × 2–9 mm, entire or with a few narrow (curved) teeth, rarely more divided. Pedicel (7–)10–25 mm, stout, often early arcuately recurved, and more so in fruit. Sepals 0.1–0.5 × 0.4–1 mm, dentate. Corolla yellow, with distinct dark veins, rarely with a dark line on dorsal crest of inner petals; upper petal 22–27 mm, limb spreading, abruptly acuminate to subobtusate apex, abaxial crest 1.5–3 mm wide, en-

tire or rarely slightly dentate, reaching petal apex or slightly beyond,  $\pm$  decurrent on spur, sometimes to tip; spur slightly downcurved at apex, slightly sigmoid, cylindrical, 11–16 mm; nectary extended through  $(1/3-1/2)$  of spur; lower petal 11–13 mm, limb often reflexed, crest like that of upper petal, but shorter, claw broadly and shallowly navicular-saccate; inner petals 9–11 mm. Capsule (immature) oblong,  $7-13 \times$  ca. 2 mm, 2–6-seeded; style ca. 3.5 mm. Seeds in 1 row. Fl. Jul–Aug.

- Alpine meadows, stabilized limestone scree; (?3000–)3600–4600 m. N Sichuan.

At higher elevations, the plant is shorter, more glaucous, with broader leaflets.

**202. *Corydalis linarioides*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 24: 27. 1878.

条裂黄堇 tiao lie huang jin

?*Corydalis linarioides* var. *fissibracteata* Fedde; ?*C. schlechteriana* Fedde.

Herbs, perennial, 10–50 cm tall, glabrous or sparsely pillose at base of stem and sometimes abaxially on leaf; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots few to several, spindle-shaped, 1–2 cm, narrowed into short or indistinct stalk (more distinct on young tubers). Stems 1–5, usually simple, rarely with 1 or 2 branches, with 2 or 3 leaves in upper 1/2. Radical leaves few; petiole to 14 cm; blade  $2-4 \times 2-5$  cm, pinnate; leaflets cut to base into 2 or 3 linear to oblong lobes. Cauline leaves sessile; blade pinnate; pinnae 2–4 pairs, linear,  $2-5 \text{ cm} \times 1-5 \text{ mm}$ , entire. Raceme 6–20-flowered, dense, elongating in fruit; bracts lanceolate, entire or lower and middle bracts deeply pectinate-dentate to palmatifid, equaling pedicels. Pedicel 5–10 mm in flower, 10–15 mm and reflexed in fruit. Sepals whitish,  $0.3-1 \times 0.3-2$  mm, finely and sharply dentate. Petals yellow, usually with distinct darker veins, apex usually orange, dorsal crest of inner petals often with small brown mark; upper petal 16–23 mm, subacute to subobtuse, abaxial crest 1–2 mm wide, from apex extended to spur, sometimes not reaching apex; spur straight or slightly downcurved at apex, cylindrical, 8–15 mm; nectary ca. 1/2 as long as spur; lower petal obovate, 9–11 mm, abaxial crest smaller than that of upper petal; inner petals 7–9 mm. Stigma square; simple marginal papillae: median 2 distinct, lateral broad and indistinct; geminate papillae lateral (submarginal) and terminating well-developed basal lobes. Capsule narrowly oblong,  $10-14 \times 1.5-2$  mm, smooth or sometimes with thin papillose lines, 3–8-seeded. Seeds 1-ranked, ca. 1.5 mm, smooth, with rather large elaiosomes. Fl. and fr. Jun–Sep.

- ?Forests, forest margins, shrubs, meadows, alpine pastures; (2100–)3200–4500 m. Gansu, Ningxia (Guyuan), Qinghai, Shaanxi, Shanxi, Sichuan, Xizang.

As here circumscribed, this taxon is probably heterogeneous. At least the following two forms can be recognized, but more research is needed to establish their status. The capsule and seed characters in the above description refer to Type B.

Type A. Stem robust, 10–25 cm, simple, glabrous; leaves stiff, adaxially dark glossy green, abaxially frequently with coarse 1-celled hairs on veins, leaflets 1–2 mm wide; lower and middle bracts pecti-

nate-dentate with long narrow teeth; spur 10–15 mm. Open areas. This corresponds to *Corydalis linarioides* var. *fissibracteata* Fedde, p.p., and is similar to *C. eugeniae* in general appearance.

Type B. Stem slender, 20–50 cm, simple or rarely branched, glabrous or sometimes papillose-hairy at base; leaves soft, slightly glaucous, glabrous, leaflets 1–5 mm wide; bracts lanceolate, entire; spur 8–11 mm. More shaded places, e.g., in shrubs. This possibly corresponds to the type of *Corydalis linarioides*.

The complex comprising *Corydalis linarioides*, *C. eugeniae*, *C. atuntsuensis*, and *C. mayae* is far from satisfactorily elucidated, and the variation is reticulate. We have here taken storage root form as a primary discriminant: a) oblong with distinct thin long branched stalks (*C. eugeniae*); b) short fusiform with indistinct or short thick stalks (*C. linarioides*); c) long narrowly fusiform, gradually attenuate to base (*C. atuntsuensis*); d) similar, but stalks narrower (*C. mayae*).

**203. *Corydalis atuntsuensis*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 97. 1916.

阿墩紫堇 a dun zi jin

*Corydalis spinulosa* H. Chuang.

Herbs, perennial, (5–)10–20(–30) cm tall; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots numerous, fascicled, narrowly spindle-shaped, 1–5 cm, 2–4 mm thick, attenuate to base. Stems few to several, simple, with 2 alternate or subopposite leaves in upper 1/2. Radical leaves few; petiole 2–9 cm; blade glaucous abaxially, green-glossy adaxially, pinnate,  $1-3 \times 1-4$  cm, abaxially nearly always with stiff 1-celled hairs along very prominent veins, sometimes with finer papillae along margin; pinnae 2 or 3 pairs, linear-lanceolate,  $5-25 \times 1-4$  mm, entire. Cauline leaves subsessile; blade like radical leaves; pinnae lanceolate to linear,  $7-20 \times 1-4$  mm. Raceme 1.5–3 cm, 6–13-flowered; lower bracts lanceolate, entire or usually deeply 5–7-divided to deeply pectinate-dentate, upper bracts less divided. Pedicel 10–12 mm, stout, recurved in fruit. Sepals whitish,  $0.2-0.5 \times 1(-2)$  mm, dentate. Petals sky blue, purple, or yellow; upper petal navicular-ovate, 15–17 mm, abaxial crest 1–1.5 mm wide; spur straight or apically slightly downcurved, slightly tapering to apex; nectary  $1/2-2/3$  as long as spur; lower petal 7–9 mm; inner petals 6–8 mm. Stigma square, rather broad; simple marginal papillae: median 2 distinct, lateral broad and indistinct; geminate papillae lateral (submarginal) and in basal corners. Capsule narrowly elliptic, 4–7 mm, 3–6-seeded. Seeds ca. 1 mm; caruncle small. Fl. and fr. Jun–Sep.

- Among shrubs, grasslands on slopes, alpine meadows; 3900–5000 m. S Qinghai (Nangqên), W Sichuan, E Xizang, NW Yunnan.

This species is very variable, usually yellow, but purple and blue forms occur. It is similar to *Corydalis eugeniae* but with very different roots and smaller flowers. As here circumscribed, it is possibly heterogeneous. The form from Nangqên is very slender and lacks the coarse hairs on veins abaxially, but it agrees with *C. atuntsuensis* in the long storage roots without distinct stalks.

Specimens that are apparently intermediate between this species and *Corydalis mayae* might be encountered in NW Yunnan.

**204. *Corydalis mayae*** Handel-Mazzetti, Symb. Sin. 7: 351. 1931.

马牙黄堇 ma ya huang jin



*Corydalis delavayi* Franchet var. *euryphylla* Fedde; ?*C. delavayi* var. *stenophylla* Fedde; ?*C. mayae* var. *stenophylla* (Fedde) C. Y. Wu.

Herbs, perennial, 15–40 cm tall, glabrous or papillose-pubescent; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots several, fascicled, narrowly oblong, 1–3 cm × 1.5–2.5 mm, with slender stalk 1–8 cm, simple or sometimes branched. Stems 1 or 2, erect, slender, simple, with (1 or)2(or 3) leaves in upper 1/2. Radical leaves few; petiole 6–11 cm; blade 2–3 × 3–4 cm, sub-binate; lobules narrowly to broadly lanceolate, closely spaced, acute. Cauline leaves shortly stalked; blade 1.5–4(–6) × 1.5–4(–6) cm, pinnate; pinnae 2 or 3 pairs, entire or deeply 2-cleft; ultimate lobes narrowly to broadly lanceolate, 1–2(–3) × 0.2–0.5(–1.2) cm, abaxially with 3(–5) parallel raised veins. Raceme 2–6(–10) cm, 4–10-flowered; bracts elliptic to narrowly lanceolate, 5–15 mm, entire, acute. Pedicel 5–15 mm, stout, recurved in fruit. Sepals to 0.5 mm, dentate. Petals yellow, veins distinct (rarely violet?); outer petals shortly acuminate, with obvious lateral rounded lobes; upper petal 14–19(–25?) mm; abaxial crest 1–2 mm wide, attenuate in both directions, sometimes narrowly decurrent on spur; spur straight or very slightly upcurved, 7–12(–15?) mm, attenuate, apex rounded; nectary ca. 1/2 as long as spur; lower petal 8–12 mm, shortly crested, gradually narrowed to base; inner petals (7–)8–10 mm; claw nearly as long as petal lobe; lower margin of limb with semicircular extension. Ovules in 1 row; style 4–5 mm; stigma square, slightly emarginate; median 2 apical papillae distinct, lateral marginal papillae confluent; geminate papillae submarginal and on basal lobes. Fruit not seen. Fl. Jun–Aug.

Grassy slopes, stony slopes, shrubs, grasslands; 3400–4300 m. SE Xizang (Mainkung), NW Yunnan (Dèqèn, Gongshan, Weixi) [Myanmar].

**205. *Corydalis eugeniae*** Fedde, Repert. Spec. Nov. Regni Veg. 12: 501. 1913.

粗距紫堇 cu ju zi jin

?*Corydalis crassicalcarata* C. Y. Wu & H. Chuang; *C. eugeniae* subsp. *fissibracteata* (Fedde) Lidén ex C. Y. Wu, H. Chuang & Z. Y. Su; *C. linarioides* Maximowicz var. *fissibracteata* Fedde; *C. pseudoschlechteriana* Fedde.

Herbs, perennial, erect, 10–25(–35) cm tall; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots oblong, 8–25 × 2–3 mm, terminal and lateral on thin often branched stalks 1–10 cm. Stems 1–5, simple, with 2 leaves in middle part. Radical leaves: petiole 6–19 cm; blade very glaucous abaxially, dark green adaxially, imparipinnate (or deeply pinnatifid) with 2 or 3 pairs of leaflets; basal pair sometimes binate, 1.5–5 × 0.1–0.5(–1) cm, slightly thick, firm, abaxially with thick and conspicuously raised parallel veins nearly always with coarse 1-celled hairs or papillae, lanceolate, mucronate. Cauline leaves like radical, sessile or subsessile. Raceme 4–11-flowered; bracts 5–11 mm, lanceolate-acuminate, entire, or lower ones usually with broader base with long lateral teeth; sometimes all flabellate-divided with acute narrow lobes. Pedicel 4–10 mm, at fruiting recurved and 7–15 mm. Sepals 0.5–1 × 1–1.5 mm, dentate. Petals yellow, with dis-

tinged darker veins (rarely purple?); upper petal navicular-ovate, 15–20 mm, apex subobtusate, abaxial crest 1–1.5 mm wide, from apex extended to spur middle, margin undulate; spur slightly downcurved at tip, cylindrical or slightly tapering, 9–11(–13) mm; nectary 1/2–2/3 as long as spur; lower petal navicular-obovate, 8–10 mm, abaxial crest short, without obvious claw; inner petals 7–8 mm. Stigma square; median 2 apical papillae distinct, lateral marginal papillae confluent; geminate papillae submarginal and on basal lobes. Capsule elliptic-obovoid, 10–19 × 3–4 mm, (2–)5–8-seeded; style 2.5–3 mm. Seeds in 2 rows, ca. 2 mm, smooth, with small cap-shaped elaiosome. Fl. Jun–Aug.

• Alpine shrubs or meadows; 3400–4600 m. NW and W Sichuan, NW Yunnan.

A form from NW Sichuan has extremely narrow leaflets (20–30 × 0.3–1 mm) and possibly oblong capsules with seeds in one row. It might constitute a separate species, but the material seen is fragmentary. *Corydalis crassicalcarata* might be worthy of distinction (flowers purple?). It has not been studied satisfactorily for this treatment.

**206. *Corydalis prattii*** Franchet, J. Bot. (Morot) 8: 284. 1894.

草甸黄堇 cao dian huang jin

Herbs, perennial, (20–)30–60 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots several, oblong, 10–30 × 2–4 mm, set on long thin usually simple stalks 2–5 cm. Stems 1 to few, simple, with 2 or 3 leaves in upper 1/2 or 1/3. Radical leaves: petiole 15–26 cm; blade 3–6 × 5–8 cm, binate with 7–11 linear leaflets 2–5 × 0.3–0.6 cm, abaxially with 3 raised parallel veins. Cauline leaves subsessile; blade pinnate with 3 or 4 pairs of pinnae like radical leaves. Raceme 4–12 cm, 10–25-flowered; bracts sessile or sometimes shortly stalked, pectinately to flabellately deeply incised into long linear acute lobes, or upper ones (rarely all) lanceolate and only slightly dentate, 8–20 mm. Pedicel 5–9 mm, 10–15 mm and strongly recurved in fruit. Sepals ca. 0.5 × 1 mm, dentate. Petals yellow, usually with distinct brownish purple veins; upper petal 10–13 mm, apex subacute; crest ca. 1.5 mm wide, from apex extended to spur middle or end; spur ± upwardly directed, 6–9 mm, slightly attenuate; nectary thin, extended through (1/3–)1/2(–2/3) of spur; lower petal 8–9 mm, shortly crested, claw indistinct, margin slightly undulate; inner petals 6–8 mm. Stigma square, slightly emarginate, median 2 apical papillae narrow, lateral marginal papillae confluent; geminate papillae lateral and in basal corners; basal lobes hardly developed. Capsule linear-oblong, 9–12 mm, usually glabrous but rarely papillose, 1–6-seeded; style ca. 2.5 mm. Seeds in 1 row. Fl. and fr. Jun–Aug.

• Shrubs, grassy slopes, often close to running water; (3200–)4000–4600 m. W Sichuan.

**207. *Corydalis degensis*** C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 6: 255. 1984.

德格紫堇 de ge zi jin

Herbs, perennial, glaucous, 15–30 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots cylindrical to ellipsoid, 7–18 × 4–6 mm, abruptly narrowed to usually simple stalk 8–30 mm. Stems

erect, 1–5, simple or rarely with late branch from uppermost leaf, with (2 or)3(or 4) leaves. Radical leaves few; petiole 7–10 cm; blade (biternate) 3–4 × 3–5 cm, with 5–8 closely set lanceolate leaflets. Cauline leaves subsessile to sessile; blade gray-glaucous abaxially, glaucous adaxially, 2.5–7 × 2.5–5 cm (or upper leaves smaller), abaxially with prominent parallel veins, imparipinnate, lower leaves with (2 or)3(or 4) pairs of leaflets, upper leaves with 1 or 2 pairs of linear-lanceolate subobtusate leaflets, 2–3.5 cm × 1–3 mm. Raceme 3–6 cm, 10–17-flowered, lax below, denser above; bracts narrowly lanceolate to linear, 6–16 mm, entire. Pedicel ca. 5 mm in flower, sharply recurved and ca. 10 mm in fruit. Sepals white, orbicular, ca. 1 mm, margin finely dentate. Corolla pale purplish blue, with distinct darker veins, keels of outer petals reddish purple, inner petals pale at tip, but with subapical purplish marks, crest 1–2 mm wide; upper petal 19–21 mm, with rhombic shortly acuminate limb, crest long decurrent on spur, attenuate at apex and just reaching tip, or obtuse, slightly overtopping apex; spur slightly downcurved at apex, cylindrical, 9–11 mm; nectary 2/5–1/2 as long as spur; lower petal straight, 10–12 mm, narrow at base, gradually expanding to rhombic subobtusate limb, crest short; inner petals ca. 9 mm. Stigma dark, square; marginal papillae: median 2 distinct, lateral broad, indistinct; geminate papillae lateral and in basal corners; basal lobes small. Fruit not seen. Fl. Jun–Aug.

• *Picea* forests, moist grassy slopes; 3700–4500 m. N and NW Sichuan.

**208. *Corydalis brachyceras*** Lidén & J. Van de Veire, *Ann. Bot. Fenn.* 45: 130. 2008.

江达紫堇 *jiang da zi jin*

Herbs, perennial, ca. 50 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots unknown. Stem simple, with 5 leaves in upper 1/2. Radical leaf: petiole ca. 12 cm; blade more glaucous abaxially, slightly glaucous adaxially, ovate-oblong, ca. 5 × 3.5 cm, pinnate with 2 pairs of pinnae, each divided into 2 or 3 elliptic-acute lobes 12–20 × 5–8 mm. Cauline leaves like radical but sessile, decreasing in size upward; 2 uppermost leaves not cut to midvein. Racemes capitate (at least in early anthesis), to 3 cm, ca. 25-flowered, very dense; bracts with a purplish hue, lower pinnatifid, upper entire, 5–10 mm. Pedicel 4–8 mm. Sepals ca. 1 × 1(–1.5) mm, with many long acute teeth. Corolla bluish purple; inner petals whitish; outer petals with broad obtuse dorsal crests surpassing apex; upper petal 14–15 mm; spur ca. 6 mm, tapering toward recurved apex; lower petal with broad slightly saccate claw, margin undulate; inner petals ca. 9 mm. Ovary with 6 ovules; style ca. 3.5 mm; stigma square; marginal papillae: median 2 distinct, lateral broad, indistinct; geminate papillae lateral and in basal corners; basal lobes small.

• Stony meadows in shrubs; ca. 4300 m. E Xizang (Jomda).

**209. *Corydalis lathyrophylla*** C. Y. Wu, *Acta Bot. Yunnan.* 6: 254. 1984.

长冠紫堇 *chang guan zi jin*

Herbs, perennial, 20–50 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base.

Storage roots spindle-shaped to almost round, 5–15 × 3–4 mm, sessile. Stems few, erect, slender, upper 1/2 with 2 or 3 leaves, simple or rarely branched, but often with an axillary raceme in upper leaf. Radical leaves: petiole 5–15 cm; blade ternate, pinnate, or biternate, thin; pinnae elliptic to lanceolate, 10–30 × 4–13 mm. Cauline leaves sessile; blade gray-glaucous abaxially, green-glaucous adaxially, ovate, 2–10 × 1.5–8 cm, imparipinnate; pinnae 2–4 pairs, broadly to very narrowly lanceolate, (1–)2–4(–9) cm × (1–)3–5(–10) mm, with 3 obvious parallel veins. Raceme spikelike, 8–25-flowered, 3–9 cm (to 15 cm and 40-flowered in garden conditions), at fruiting to 20 cm; bracts narrowly lanceolate to linear, 5–7(–20) mm, entire or with a few narrow teeth or laciniae. Pedicel 4–6(–10) mm, slender, soon arcuate, recurved in fruit. Flowers after opening downcurved. Sepals white, 0.5–1.5 × 1–1.5 mm, dentate. Corolla lavender to blue, often with pinkish tinge, veins distinct, fragrant; upper petal 11–14 mm, limb rhombic, abaxial crest from petal apex extended to spur end, ca. 2 mm wide, undulate to dentate; spur conical-obtuse, 5–7 mm, thick; nectary ca. 1/2 as long as spur; lower petal rhombic, ca. 9 mm, crest short; inner petals 7–8 mm. Stigma square; marginal papillae: median 2 distinct, lateral broad, indistinct; geminate papillae lateral and in basal corners. Fruit oblong, 5–10 × 2–2.5 mm, 2–4-seeded; style ca. 3 mm. Seeds 1.8–2 mm, smooth; caruncle small. Fl. Jul–Sep.

• Wet meadows, snow patches, rarely in shrubs, open herb-rich subalpine dwarf forests; 3500–4700 m. SW and W Sichuan, NW Yunnan.

- 1a. Radical leaves with petiolules absent to 5 mm; plant in wet open places ..... 209a. subsp. *lathyrophylla*  
 1b. Radical leaves with petiolules 10–50 mm; plant in drier shaded places ..... 209b. subsp. *dawuensis*

**209a. *Corydalis lathyrophylla*** subsp. *lathyrophylla*

长冠紫堇(原亚种) *chang guan zi jin* (*yuan ya zhong*)

Radical leaves with petiolules absent to 5 mm.

• Wet meadows, snow patches, rarely in shrubs; 3500–4700 m. SW Sichuan (Daocheng), NW Yunnan (Dèqèn, Gongshan, Zhongdian).

**209b. *Corydalis lathyrophylla*** subsp. *dawuensis* Lidén, **subsp. nov.**

道孚长冠紫堇 *dao fu chang guan zi jin*

Type: China. Sichuan: Dawu Xian, Tiekuangshan, 30°59' 54"N, 101°00'47"E, alt. 4100 m, 5 Aug 2006, *M. Lidén & S. X. Yu* 2006-50 (holotype, UPS; isotype, PE).

*A* subsp. *lathyrophylla petiolulifoliorum radicalium multioribus differt.*

Radical leaves with petiolules 10–50 mm.

• Open herb-rich subalpine dwarf forests; 4000–4200 m. W Sichuan (Dawu).

The subspecific epithet is based on the geographic locality of the type.

**210. *Corydalis helodes*** Lidén & J. Van de Veire, Ann. Bot. Fenn. 45: 132. 2008.

近泽黄堇 jin ze huang jin

Herbs, perennial, 20–30 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fasciculate, fusiform, sessile or indistinctly stalked, 8–14 × 1–4 mm. Stems 1 or 2, very thin, simple, with 2 leaves in upper 1/3 or 1/4. Radical leaves very few; petiole ca. 6 cm; blade ternate, with sessile narrowly elliptic leaflets ca. 1 cm. Cauline leaves: petiole of lower leaf 3–13 mm, petiole of upper leaf 1–5 mm; blade slightly glaucous abaxially, green adaxially, triangular, ternately or pinnately divided with 1 or 2 pairs of linear leaflets 1–4 cm, abaxially with raised midvein. Racemes 2–4-flowered, dense at anthesis, slightly elongating in fruit; bracts linear-lanceolate, 7–25 mm, decreasing in size upward. Pedicel ca. 4 mm, erect-spreading in flower, in fruit 6–10 mm and sharply recurved at base. Sepals ca. 0.3 × 0.5 mm, deeply dentate. Corolla yellow, with distinct brownish veins; inner petals tipped with dark brownish purple; outer petals not crested, subacute; upper petal 12–14 mm; spur almost straight or very slightly downcurved, 5–6 mm, slightly tapering; nectary prominent, ca. 1/2 as long as spur; lower petal straight, with indistinct claw and only slightly dilated limb; inner petals 6–7 mm. Fruit linear-oblong, 13–15 × ca. 2 mm, 8–10-seeded; style ca. 2 mm. Fl. Aug, fr. Aug–Sep.

• Very wet places between tussocks; ca. 4000 m. W Yunnan (Dali).

**211. *Corydalis lopinensis*** Franchet, J. Bot. (Morot) 8: 283. 1984.

罗平山黄堇 luo ping shan huang jin

*Corydalis weisiensis* H. Chuang.

Herbs, perennial, 8–20 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fasciculate, fusiform to cylindrical, 1.5–2 cm × 4–5 mm, sessile. Stems 1 or 2, simple, with 2 leaves in upper 1/3. Radical leaves not seen. Cauline leaves subsessile, ternate with shortly stalked ternate or binate leaflets; lobes lanceolate to linear, apex obtuse to usually acute or acuminate. Raceme 2–4 cm, densely 6–11-flowered; bracts ovate, 8–20 mm, entire, acuminate. Pedicel arcuate, 7–17 mm. Sepals whitish, 0.2–0.5 × 0.5–1 mm, dentate. Petals yellow; inner petals with contrasting dark purple tip; outer petals with very narrow to rather broad crest, reaching or sometimes overtopping apex; upper petal triangular-ovate, 18–25 mm, with broad base; crest shortly and narrowly decurrent on spur; spur cylindrical at base, 10–15 mm, attenuate to a rather thin slightly downcurved apex; nectary ca. 1/2 as long as spur; lower petal 11–13 mm, apical part triangular, acute, with crest often overtopping apex, whole basal 1/2 broadly and conspicuously saccate; inner petals 10–12 mm. Stigma square, slightly emarginate; median 2 apical papillae narrow, lateral marginal papillae broad, indistinct; geminate papillae lateral and on well-developed basal lobes. Fruit not seen; ovules to 32, in 2 rows; style 3–4 mm. Fl. May–Jul.

• Grassy slopes, limestone areas; 3500–3600 m. NW Yunnan (Eryuan, Weixi, Yangbi).

**212. *Corydalis bijiangensis*** C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 6: 238. 1984.

碧江黄堇 bi jiang huang jin

Herbs, perennial, 40–60 cm tall; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fascicled, spindle-shaped, 3–5 cm × to 5 mm. Stems simple, erect, with 2 or 3 leaves in upper 1/2. Radical leaves not seen. Cauline leaves: lower petiole 1–2 cm, upper leaves sessile; blade glaucous abaxially, ovate, 6–9 × 4–6 cm, tripinnate, or uppermost leaf smaller and less divided; ultimate segments narrowly lanceolate, acute. Raceme lax, 10–15-flowered; bracts rhombic-ovate to narrowly lanceolate, (10–)15–19 mm, entire, long acuminate; lowermost bract often deeply pectinate-divided. Pedicel 10–20 mm, recurved in fruit. Sepals orbicular, ca. 1.5 × 2 mm, finely dentate. Corolla yellow, inner petals with contrasting dark purple apex; outer petals very broad at base, narrowed to subacute apex, with very broad, 3(–4) mm rounded crest much overtopping apex; upper petal 21–22 mm; crest long decurrent on spur; spur slightly tapering to obtuse apex, 10–11 mm, thick; nectary ca. 1/3 as long as spur; lower petal ca. 15 mm (including crest), distal part reflexed, basal 1/2 broadly saccate; inner petals 11–12 mm. Ovules ca. 20, in 2 rows; style 4–5 mm; stigma square, emarginate, median 2 apical papillae narrow, lateral marginal papillae broad, indistinct; geminate papillae sublateral and on well-developed basal lobes. Fruit not seen. Fl. around Jun.

• Ravine sides, margins of *Picea* forests; ca. 3500 m. Yunnan (Bijiang).

**213. *Corydalis sigmoides*** C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 6: 252. 1984.

宝兴黄堇 bao xing huang jin

Herbs, perennial, 25–40 cm tall; stems and petioles of radical leaves attenuate to filiform underground base. Roots and radical leaves not seen. Stems slender, simple, with 2 or 3 leaves in upper 1/3. Cauline leaves sessile or lower petiole 0.5–1(–4) cm; blade glaucous abaxially, green adaxially, with 2 or 3 pairs of shortly stalked to sessile primary pinnae ternately to binately deeply cut into linear lobes 20–50 × 1–2 mm. Raceme 5–10 cm, 10–20-flowered; bracts lanceolate, 10–20 × 1–2 mm, entire or rarely with a few sharp teeth at base, lower long acuminate. Pedicel 12–25 mm, slender, arcuate in fruit. Sepals 0.3–1 × ca. 1 mm, deeply dentate. Corolla yellow; outer petals with broad (2–3.5 mm) obtuse crests; upper petal 19–22 mm, broadly spreading, acuminate; crest overtopping apex and decurrent on spur; spur slightly upturned and slightly downcurved at tip, cylindrical, 12–15 mm; nectary 2/5–2/3 as long as spur; lower petal broadly rhombic with spreading undulate margins, ca. 13 mm, distal 1/2 reflexed, lower 1/2 broadly saccate; inner petals 10–11 mm. Stigma square; median 2 apical papillae distinct, lateral marginal papillae broad, indistinct; geminate papillae submarginal, lateral and on well-developed basal lobes; basal lobe with small peg. Fruit not seen; style ca. 3.5 mm. Fl. Jul–Aug.

• Sichuan (Baoping, Wenchuan).

**214. *Corydalis linearis*** C. Y. Wu, Acta Bot. Yunnan. 6: 251. 1984.

线叶黄堇 xian ye huang jin

Herbs, perennial, 20–30 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots numerous, densely fascicled, spindle-shaped, 15–20 × 2–3 mm, sessile or indistinctly stalked. Stems slender, simple, with (1 or)2(or 3) leaves in upper 1/3. Radical leaves long stalked, bi-(tri-)ternate with long slender petiolules; ultimate lobes oblanceolate to linear, 10–15 × 1–3 mm, obtuse. Cauline leaves sessile or petiole to 1.5 cm; blade glaucous abaxially, green adaxially, ovate in outline, with 2 pairs of shortly stalked primary pinnae ternately to binately deeply cut into linear to oblanceolate obtuse to acute lobes 10–25 × 1–3 mm. Raceme 4–10 cm, 8–20(–25)-flowered; lower bracts broadly ovate-acute to narrowly lanceolate, 10–15 × 1–6 mm, usually with a short petiole; upper bracts smaller, ca. 5 mm. Pedicel 10–15(–20) mm, arcuate in fruit. Sepals ca. 0.2 × 1 mm, deeply dentate. Corolla yellow (or greenish?); outer petals with broad (1–2.5 mm) obtuse crest overtopping apex; upper petal 14–16 mm, broad at base, subacute; spur straight (rarely slightly downcurved), cylindrical, 5–6 mm, broad; nectary 1/3–2/5 as long as spur, very thin; lower petal 8–11 mm, distal 1/2 reflexed, central part contracted, lower part broadly saccate; inner petals 8–9 mm, claw narrow at base, but broad toward junction with limb. Ovules 14–18, in 2 rows; style 3.5–4 mm; stigma square, median 2 apical papillae narrow, lateral marginal papillae broad, indistinct; geminate papillae lateral and on well-developed basal lobes. Fruit not seen. Fl. Jul–Aug.

- Grassy slopes; 2700–4300 m. W Sichuan.

**215. *Corydalis gaoxinfeniae*** Lidén, sp. nov.

柄苞黄堇 bing bao huang jin

Type: China. Sichuan: Maoxian, Nanxin Zhen, Anxiang Cun, Dacao ping, alpine meadow, alt. 3530 m, 27 Jun 2003, X. F. Gao, Y. L. Peng & H. L. Zhao 5445 (holotype, CDBI).

*Herba perennis caulibus et foliis radicalibus basi attenuatis, radicibus fasciculatis fusiformibus. Caulis suberectus superne bi- vel trifoliatus. Folia radicalia ignota. Folia caulina petiolata trifoliolata vel pinnata, foliolis integris vel profunde bi- vel tripartitis lobis lineari-oblongis vel lanceolatis. Racemus multiflorus. Bracteae breviter petiolatae subrhombeae, post anthesin valde reflexae. Pedicelli breves fructiferi reflexi. Sepala minuta. Corolla lutea, petalis exterioribus latis apice abrupte acutis et late cristatis, cristis apices petalorum valde superantibus, calcari tenue leviter arcuato, petalo infimo saccato.*

Paratypes: M. Lidén & S. X. Yu 2006-21 (PE, UPS).

Herbs, perennial, 20–45 cm tall, glabrous to usually finely papillose-hairy; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots densely fascicled, spindle-shaped, 10–15 × 2–4 mm, sessile. Stems suberect, very slender, with 2 or 3 leaves in upper 1/3. Radical leaves not seen. Cauline leaves: petiole 1–4 cm; blade glaucous adaxially and more so abaxially, thin, ternate to pinnate with 1 or 2 pairs of

entire or deeply 2- or 3-fid pinnae, often decurrent on petiole; lobes linear-oblong to lanceolate, 3–5 × 0.3–0.9 cm. Racemes 10–20-flowered; bracts sharply reflexed in fruit, 7–15(–20) mm with distinct petiole 2–3 mm, lower broadly rhombic-acuminate, upper narrowly oblanceolate, entire or lower with 1 or 2 coarse teeth. Pedicel ca. 5 mm, to 10 mm and reflexed in fruit. Sepals minute or lacking. Corolla pure yellow, sometimes with darker veins, apex of outer petals greenish; outer petals broadly spreading at base, abruptly narrowed to acute apex, with ca. 2 mm wide, obtuse, entire or slightly dentate crest overtopping apex; upper petal 17–18 mm; spur slightly downcurved, ca. 8 mm, thin, tapering; nectary very thin, ca. 1/2 as long as spur; lower petal broadly saccate in lower 1/3, limb reflexed; inner petals 8–9 mm. Stigma with marginal papillae: median 2 distinct, lateral broad and indistinct; geminate papillae lateral (submarginal) and on basal lobes. Capsule oblong-obovoid, 11–12 × ca. 3 mm, ca. 14-seeded. Seeds (immature) ca. 1.2 mm; elaiosome small. Fl. Jun–Aug, fr. Aug.

- Subalpine meadows, among shrubs in clearings; 3100–3600 m. Sichuan (Maoxian).

*Corydalis gaoxinfeniae* belongs in the *C. pseudocristata* group, as shown by the sharply reflexed stalked entire bracts and conspicuously saccate lower petal, but it differs from related species in the short slender spur and very broad rounded crests of the outer petals.

The specific epithet is named for one of the collectors, Gao Xinfen (高信芬), of the Chengdu Institute of Biology, Chinese Academy of Sciences.

**216. *Corydalis feddeana*** H. Léveillé, Repert. Spec. Nov. Regni Veg. 12: 282. 1913.

大海黄堇 da hai huang jin

*Corydalis caespitosa* C. Y. Wu; *C. feddei* H. Léveillé ex Fedde.

Herbs, perennial, 20–30 cm tall, glabrous or sparsely papillose-pubescent at base; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots densely fascicled, spindle-shaped, 10–25 × 2–5 mm, shortly and indistinctly stalked. Stems 1 to several, erect, simple, with 1–3 leaves in upper 1/2. Radical leaves few; petiole 3–6 cm; blade small, biternate; segments linear to linear-lanceolate. Cauline leaves: petiole 0.3–2 cm; blade 3–6 × 4–9 cm, pinnate with 2 or 3 pairs of linear to narrowly lanceolate pinnae 2–4(–5) × 0.2–0.5 cm; leaflets shortly stalked to sessile, lanceolate, 3–5(–8) cm × 3–10 mm, entire, abaxially with raised parallel veins; uppermost leaf often only ternately divided. Raceme 4–6 cm, at fruiting prolonged to 10 cm, 8–16(–20?)-flowered; bracts with short 1–3 mm petiole, ovate-lanceolate, 8–20 × 2–5 mm, entire, acuminate, in fruit sharply reflexed. Pedicel 5–9 mm, in fruit recurved and 8–13 mm. Sepals ca. 0.2 × 1 mm, dentate. Corolla yellow; upper petal 18–26 mm, with expanded margin, irregularly undulate, apex acuminate, abaxial crest ca. 1.5 mm, attenuate in both directions, hardly overtopping apex, narrowly decurrent on spur, sometimes almost to tip; spur slightly downcurved, 11–15 mm, tapering; nectary ca. 1/3 as long as spur; lower petal 9–10 mm, limb rhombic-acuminate, with dorsal crest, central part contracted, claw broadly and conspicuously saccate, sometimes with a minute peglike extension at very

base; inner petals 8–9 mm. Stigma square; median 2 apical papillae distinct, closely set, lateral marginal papillae broad, indistinct; geminate papillae submarginal and on pronounced basal lobes. Capsule narrowly obovoid, 10–12 × ca. 3 mm, 8–12-seeded; style ca. 3 mm. Seeds in 2 rows, ca. 1.5 mm, smooth. Fl. and fr. Jun–Aug.

• Mountain summits, among *Rhododendron* shrubs, grassy slopes; 3200–4100 m. S Sichuan (Leibo, Meigu, Xide), NE Yunnan (Huize, Qiaojia).

**217. *Corydalis pseudocristata*** Fedde, Repert. Spec. Nov. Regni Veg. 17: 410. 1921.

美花黄堇 mei hua huang jin

*Corydalis concinna* C. Y. Wu & H. Chuang; *C. megalantha* C. Y. Wu; *C. megalantha* var. *laevis* C. Y. Wu & H. Chuang.

Herbs, perennial, 20–45 cm tall, glabrous or often sparsely papillose-pubescent at base; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots densely fascicled, spindle-shaped, 15–20 × 2–5 mm, sessile. Stems 1 (or 2), simple, erect, stout, with 2 or 3 leaves in upper 1/2. Radical leaves like cauline leaves; petiole to 10 cm. Cauline leaves: petiole 0.5–2 cm; blade 3–9 × 4–10 cm, imparipinnate with 2 or 3 pairs of entire or rarely ternately divided pinnae; leaflets shortly stalked to sessile, lanceolate, 3–5(–8) cm × 3–14 mm, abaxially with raised parallel veins, entire; uppermost leaf often only ternately divided. Raceme 4–6 cm, at fruiting prolonged to 10 cm, 6–18-flowered; bracts with short 1–3 mm petiole, broadly ovate to lanceolate, 8–20(–30) × 3–10 mm, entire, acuminate, in fruit sharply reflexed. Pedicel 5–9 mm, in fruit recurved and 8–13 mm. Sepals minute, ca. 0.1 × 0.5 mm. Corolla pale yellow, with orange-yellow apex; upper petal 27–32 mm, with expanded margin, irregularly undulate, apex acuminate, abaxial crest entire to dentate, 1.5–2(–3) mm, overtopping apex, narrowly decurrent on spur; spur downcurved to strongly incurved (up to a semicircle and more), cylindrical, 15–20 mm; nectary 1/3–1/2 as long as spur; lower petal 11–12 mm, limb rhombic-acuminate, central part contracted, claw broadly and conspicuously saccate, sometimes with a minute peglike extension at very base; inner petals 9–11 mm. Stigma square; median 2 apical papillae distinct, closely set, lateral marginal papillae broad, indistinct; geminate papillae lateral (submarginal) and on pronounced basal lobes. Capsule narrowly obovoid, 10–14 × 3–4 mm, 8–15-seeded (ovules ca. 25); style 3–4 mm. Seeds in 2 rows, ca. 1.5 mm, smooth. Fl. Jun–Jul, fr. Jul–Aug.

• Open forests, meadows; 2700–3900 m. W Sichuan.

**218. *Corydalis mediterranea*** Z. Y. Su & Lidén, Novon 17: 490. 2007.

中国紫堇 zhong guo zi jin

Herbs, perennial, to 18 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fasciculate, oblong, not distinctly stipitate. Stems slender, with 2 leaves in upper 1/3. Leaves subsessile, to 3 cm, deeply divided into linear to narrowly lanceolate-acute lobes.

Racemes 6–8-flowered, dense; bracts narrowly lanceolate, 8–18 mm, entire or with 1 or 2 teeth, lowermost more deeply cut into few acute lobes. Pedicel 6–10 mm. Sepals to 0.5 mm, dentate. Corolla yellow, with darker veins and keels; outer petals navicular, subacute, very slightly crested; upper petal ca. 13 mm; spur ca. 6 mm; nectary ca. 1/2 as long as spur, thin; lower petal ca. 7 mm, limb rather narrow, gradually narrowed to base; inner petals 6–7 mm. Ovary with 9 ovules; style ca. 2.5 mm; stigma square, median 2 apical papillae distinct, lateral marginal papillae confluent; geminate papillae submarginal and on pronounced basal lobes. Fl. Jul.

• Mixed forests of *Abies* and *Rhododendron*; ca. 3900 m. C Yunnan (Luquan).

**219. *Corydalis delavayi*** Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 198. 1885.

丽江黄堇 li jiang huang jin

Herbs, perennial, (pale) green or glaucous, 10–38 cm tall, glabrous to papillose-scabrid on abaxial leaf veins; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots oblong, 1–3 cm × 3–4 mm, sharply set off from thin simple or rarely branched stalk 2–8 cm. Stems 1 to several, erect and simple to decumbent and branched, with 2–5 leaves. Radical leaves few, some conspicuously enlarging after flowering; petiole 5–15 cm (or longer in shade); blade broadly ovate, 2–5 cm, with raised parallel veins abaxially, biternatisect to biternate; lobules narrowly obovate to lanceolate, slightly 2- or 3-divided, acute. Cauline leaves sessile or with short flat petiole; blade broadly ovate, lower one 3–5 × ca. 4 cm, upper ones smaller, grading into lowermost bracts, pinnatifid (i.e., not cut quite to midvein) with inner lobes again 2- or 3-cleft, or biternatisect; ultimate lobes narrowly lanceolate to oblanceolate, 1–2 × 0.2–0.4 cm. Raceme 4–13 cm, 10–24-flowered; lower bracts almost like uppermost cauline leaves; middle bracts deeply flabellate to pinnately divided, lobes lanceolate-acuminate; upper bracts usually narrowly lanceolate, entire. Pedicel 8–15(–20) mm, rather stout, arcuately reflexed in fruit. Sepals 0.5–1 × 0.5–1 mm, finely dentate. Corolla yellow, with darker veins, often with brownish purple marks on dorsal keel of inner petals; upper petal navicular-ovate, 14–18 mm, apex subacute, abaxial crest 1.5–2 mm wide, tapering to both ends, long decurrent on spur; spur straight or slightly downcurved at tip, subcylindrical, 6–8 mm, slightly narrowed at apex; nectary 1/2–2/3 as long as spur; lower petal broadly obovate with indistinct claw, margin slightly undulate; inner petals 7–9 mm. Stigma square; median 2 apical papillae distinct, lateral marginal papillae broad and diffuse; geminate papillae submarginal and on pronounced basal lobes. Capsule obovoid, 7–10 × 3–4 mm, 2–8-seeded; style 3.5–4 mm. Seeds ca. 1.5 mm. Fl. Jun–Sep, fr. Jun (Aug–Sep).

• Alpine shrubs on limestone, disturbed stony patches in meadows, stony scree; 3000–4600 m. SW Sichuan, NW Yunnan.

The habit of this species varies much depending upon place. If in a bush, it becomes long, slender, and simple, with leaves only in upper third. Plants growing in scree tend to be much more robust with leafy stems and, especially if the stems are horizontal or ascending, many branched (cf. *Corydalis calcicola*, species no. 234).

**220. *Corydalis tenuipes*** Lidén & Z. Y. Su, *Novon* 17: 492. 2007.

细柄黄堇 xi bing huang jin

Herbs, perennial, 8–18 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots narrowly fusiform, gradually narrowed into a short or long thick stalk. Stems usually several, weak, simple or often branched, with 2 or 3 leaves in upper 1/2. Radical leaves: petiole 3–10 cm; blade 2–4 × 2–4 cm, once to twice subternately or pinnately cleft, leaflets decurrent on midvein; leaflets glaucous, especially abaxially, sometimes spotted with anthocyan, ± deeply divided into lanceolate acute lobes, often tipped with a small black mucro. Cauline leaves like radical leaves, shortly stalked. Racemes terminal and often axillary from uppermost leaf, corymbose, later elongating, 4–15-flowered; lower bracts divided, upper ones entire, shorter than long slender 15–25(–30) mm pedicels that become arcuately recurved in fruit. Sepals whitish, to 1 mm, deeply dentate. Corolla yellow, fragrant; veins and keels of outer petals dark purplish brown. Outer petals broadly rhombic-acute, broadly crested; upper petal 13–14 mm, crest attenuate in both directions, not quite reaching apex, decurrent to tip of spur; spur straight, ca. 7 mm, rather thin, tapering; nectary ca. 3 mm, thin; lower petal with short crest and broad rhombic undulate limb gradually narrowed to base; inner petals 6–7 mm. Ovary broadly ellipsoid; style ca. 3 mm. Fl. Jun–Sep.

• Stony slopes; 4100–5300 m. W Sichuan (Jiulong, Yajiang), E Xizang (Baxoi).

**221. *Corydalis oligosperma*** C. Y. Wu & Z. Y. Su in C. Y. Wu, *Fl. Xizang*, 2: 303. 1985.

稀子黄堇 xi zi huang jin

Herbs, perennial, 10–15(–20) cm tall, glabrous or often papillose-pubescent; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots unknown. Stems simple or branched with 2–4 leaves, ascending. Radical leaves well developed at anthesis; petiole 4–8 cm; blade glaucous abaxially, adaxially dark green, or both surfaces gray-glaucous, ovate, 3–4 × 2–3 cm, pinnate to bipinnate to sub-triternate; pinnae 2 or 3 pairs, shortly stalked, deeply biternatisect; lobes oblanceolate, 3–8 × 2–3 mm, mucronate. Cauline leaves like radical leaves; lower petiole 0.5–7 cm, upper leaves sessile; uppermost leaves smaller, less divided, often not to midvein. Raceme simple or branched at base, dense at flowering, 8–20-flowered, at fruiting gradually distant; lower bracts 8–17 mm, unequally pinnate to palmatisect to pectinate-dentate; upper bracts smaller, lanceolate, entire, acute. Pedicel 5–10 mm in flower, at fruiting elongated to 12–22(–30) mm, arcuately recurved. Sepals 0.2–0.6 × 0.5–1 mm, deeply dentate. Corolla yellow, with greenish to brownish keels; veins distinct or indistinct; outer petals subobtusate, margin undulate-crenate, with apically broad (1.5–2 mm) obtuse dentate crest long decurrent on spur; upper petal 14–17 mm; spur usually slightly downcurved and tapering at apex, cylindrical, 6–9 mm; nectary 1/2(–2/3) as long as spur, slender; lower petal 8–9 mm, with broad rounded shortly mucronate limb, gradually narrowed to base, claw indistinct; inner petals 7–8 mm. Stigma square; 2 marginal central

papillae distinct, lateral marginal broad and indistinct; geminate papillae sublateral and terminating in well-developed basal lobes. Capsule narrowly obovoid to oblong, 7–8 × ca. 2 mm, 1–5-seeded. Seeds in 1 row, ca. 2 mm, smooth; caruncle large, fleshy.

• Alpine scree (limestone); 3700–4500 m. SE Xizang (Dèngqên, Lhari, Zayü).

**222. *Corydalis pseudodensisipica*** Z. Y. Su & Lidén, *Edinburgh J. Bot.* 54: 74. 1997.

假密穗黄堇 jia mi sui huang jin

Herbs, perennial, 15–30 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots narrowly oblong, gradually attenuate to short or long stalk, 3–10 cm × 2–3 mm. Stems 2 or 3, 15–30 cm, with 2–4 leaves in upper 1/2, simple or rarely with a branch from upper leaf. Radical leaves few, early withering; petiole 4–15 cm; blade 3–4 × 3–4 cm, biternate to bipinnate, lobes lanceolate to oblanceolate, rarely broadly elliptic, abaxially with distinct raised parallel veins. Cauline leaves: lower leaves with petiole to 1 cm, upper leaves sessile; blade triangular to ovate, ternate to imparipinnate, with 1–3 pairs of deeply ternatisect leaflets, lobes lanceolate; upper leaves triangular, less divided, grading into lower bracts, glabrous to papillose-scabrid on veins abaxially, very finely so along margins, especially on bracts. Racemes dense, elongating, 10–25-flowered; bracts cuneate at base, pectinately divided to coarsely pectinate-dentate, or uppermost lanceolate, entire, equaling or longer than pedicels of 5–10 mm. Sepals whitish, irregular, 0.5–1(–3) × ca. 1 mm, dentate. Corolla pale yellow; keel of outer petals and apex of inner petals orange-yellow; outer petals rhombic, acute, with 1–2 mm wide obtuse crest overtopping apex; spur of upper petal strongly incurved, almost in a semicircle, very rarely almost straight, cylindrical, 14–16 mm; nectary 5–6 mm; lower petal with broad, straight to shallowly saccate claw; inner petals 8–10 mm. Ovules 10 or 11; stigma rounded, slightly emarginate; marginal papillae: 2 central narrow and distinct, lateral broad; geminate papillae sublateral and on basal lobes. Capsule apparently oblong; style 3–4 mm.

• Wet meadows; 4200–4500 m. Sichuan (Jiulong).

**223. *Corydalis jiulongensis*** Z. Y. Su & Lidén, *Novon* 17: 489. 2007.

九龙黄堇 jiu long huang jin

Herbs, perennial, 40–65 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots oblong, simple or rarely branched with thin stalks 3–15 cm. Stems 1 to few, very slender, simple or branched, with 2–4 leaves in upper 1/2. Radical leaves: petiole to 30 cm; blade glaucous abaxially, green adaxially, 5–8 × 5–10 cm, 2–3(–4) × ternate with narrowly obovate to narrowly lanceolate ultimate leaflets, abaxially with raised parallel papillose-scabrid veins. Cauline leaves shortly stalked or sessile, decreasing in size upward, bipinnate, with entire to divided leaflets, otherwise like radical leaves; lobes often dark tipped. Racemes 9–25-flowered, elongate; bracts narrowly lanceolate, tapering toward apex, entire or lower ones often deeply divided, (5–)10–15(–20) mm,

abaxially with papillose-scabrid veins. Pedicel thin, 5–10 mm at anthesis, elongating to 10–15 mm and strongly reflexed in fruit. Sepals whitish, 1–1.5 × ca. 1 mm, finely dentate. Corolla yellow, usually with a small brownish mark laterally on crests of inner petals, keel of outer petals darker yellow, veins not distinct; outer petals with rhombic acute limb, crested; upper petal 17–20 mm; crest tapering in both directions, narrowly decurrent on spur; spur straight to slightly sigmoidally curved, cylindrical, 11–12 mm; nectary ca. 1/2 as long as spur; lower petal rhombic-acute, ca. 9 mm; inner petals ca. 7 mm. Stigma often dark green, square; marginal papillae: 2 central distinct, lateral broad and indistinct; geminate papillae sublateral and on basal lobes. Capsule oblong, 10–13 × ca. 2 mm, 1–5-seeded; style ca. 3 mm. Seeds slightly elliptic, ca. 2 mm, smooth, with small entire elaiosome. Fl. Jul–Sep, fr. Aug–Nov.

• Under deciduous shrubs and in forests in deep fertile soils; 3500–3800 m. Sichuan (Jiulong, Yanbian).

**224. *Corydalis homopetala*** Diels, Notes Roy. Bot. Gard. Edinburgh 5: 255. 1912.

同瓣黄堇 tong ban huang jin

Herbs, perennial, 20–30 cm tall, glabrous; stems attenuate to filiform underground base. Roots and radical leaves unknown. Stems ascending, flexuous, slender, with 2 alternate leaves, and often a very small leaf close to inflorescence, simple or usually with late branches. Petiole of lower leaf 2–4 cm, upper petioles 0.5–1.5 cm; blade glaucous abaxially, triangular, 4–5 × 4–5 cm, twice to almost 3 × ternate; pinnae long petiolulate; pinnules shortly petiolulate, deeply 3-lobed; ultimate segments obovate or oblanceolate, 5–10 mm, apex rounded, mucronate. Main racemes 3–4 cm, 5–7-flowered, lax, elongating in fruit, usually with a few-flowered lateral raceme from uppermost leaf; bracts 2–7 mm, lower bracts pinnatifid, upper bracts oblanceolate, entire. Pedicel 3–7 mm at anthesis, reflexed in fruit and much elongating to 10–17 mm. Sepals unknown (or crescent-shaped, ca. 5 mm, margin with irregularly incised teeth). Corolla yellow, with darker veins, turning dull purple with age, darker toward tip, fragrant; outer petals navicular-ovate, apex subacute, not crested; upper petal 14–16 mm; spur straight, slightly attenuate to obtuse apex, 7–8 mm; nectary 1/3–1/2 as long as spur; lower petal elliptic, 8–9 mm, acute, distal part often reflexed; inner petals 7–8 mm, claw nearly as long as limb. Stigma square; marginal papillae: 2 central distinct, lateral broad and indistinct; geminate papillae sublateral and on prominent basal lobes. Capsule narrowly obovoid, 12–14 × ca. 3 mm, 10–13-seeded; style ca. 3 mm. Fl. and fr. Jul.

• Open grassy situations at margins of canebrakes, along pastures; 3000–3300 m. NW Yunnan (E side of Diancang Shan).

This plant has not been collected since 1910.

**225. *Corydalis nemoralis*** C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 5: 254. 1983.

林生紫堇 lin sheng zi jin

Herbs, perennial, 60–80 cm tall; stems attenuate to filiform underground base. Roots unknown. Stems very slender, main stem with 6 leaves in upper 2/3, branches with 2 or 3 leaves. Radical leaves not seen. Cauline leaves: lower petiole to 3 cm,

upper leaves sessile; blade of lowest leaf ca. 10 × 5 cm, upper much smaller, grayish abaxially, dark green adaxially, ovate in outline, bipinnate, abaxially with dense papillae; pinnae petiolulate, distant; pinnules nearly sessile, deeply 2–5-divided; lobes obovate to oblanceolate, mucronate. Racemes 3–6 cm, at fruiting to 10 cm, densely 12–25-flowered; bracts flabellate-lobate, 4–5 mm; segments oblanceolate, often with a few long teeth, acute; uppermost bracts oblanceolate, incised. Pedicel 3–5 mm, recurved in fruit. Sepals ca. 1 × 1.5–2 mm, deeply lacerate. Petals light blue; upper petals 18–21 mm, petal lobes navicular-ovate, crest very narrow; spur straight, cylindrical, 13–15 mm; nectary 1/3–1/2 as long as spur; lower petal navicular-oblong, 7–8 mm; inner petals 6–7 mm. Stigma square; marginal papillae: 2 central distinct, lateral broad and indistinct; geminate papillae sublateral and on basal lobes. Capsule oblong, 5–8 × ca. 2 mm, 2–4-seeded. Seeds in 1 row, smooth. Fl. and fr. around Aug.

• Forests; ca. 3400 m. SE Xizang (Zayü).

**226. *Corydalis tsayulensis*** C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 5: 253. 1983.

察隅紫堇 cha yu zi jin

Herbs, perennial, 40–50 cm tall; stems and petioles of radical leaves attenuate to filiform underground base. Roots not seen. Stems suberect, branched, with 3 or 4 leaves in upper 2/3. (Radical leaves: petiole ca. 20 cm; blade glaucous abaxially, green adaxially, ovate, ca. 8 cm, tripinnate; pinnae 3 pairs, opposite, petiolulate; pinnules 2 pairs, nearly opposite, petiolulate; tertiary segments nearly sessile, irregularly deeply or slightly lobed; ultimate segments narrowly elliptic or narrowly obovate, apex obtuse, with dense transparent papillae.) Cauline leaves nearly sessile, lower and middle ones bipinnate to pinnate, 5–9 × 3–5 cm; upper ones deeply biternatisect and much smaller; lobes lanceolate, acute. Racemes 12–20-flowered, dense, slightly elongating in fruit; lower bracts 5–11 mm, deeply divided into narrow acute lobes; lowermost sometimes larger, similar to uppermost leaf, upper ones entire. Pedicel 3–6 mm, arcuately recurved in fruit. Sepals ca. 1 × 1 mm, with long narrow teeth. Petals pale purple, with distinct purplish veins, apical keel of outer petals darker; outer petals with rhombic acute limb, crest ca. 1 mm wide, acute, often dentate, not decurrent on spur, reaching apex; upper petal 18–22 mm; spur straight, 12–13 mm, slightly attenuate; nectary ca. 2/5 as long as spur; lower petal ovate (broadest 1/3 from base), 8–9 mm, acute; inner petals 7–8 mm. Stigma marginal papillae few, partly confluent; geminate papillae sublateral (clearly submarginal) and on well-developed rounded basal lobes. Capsule obovoid-oblong, 8–10 × 3–4 mm, veins distinct, 6–8-seeded. Seeds in 2 rows, smooth. Fl. and fr. Jun–Aug.

• Grasslands, forest margins; 3700–4100 m. E Xizang.

**227. *Corydalis porphyrantha*** C. Y. Wu, Acta Bot. Yunnan. 5: 248. 1983.

紫花紫堇 zi hua zi jin

Herbs, perennial, 30–45 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fascicled, narrowly oblong, 7–9 cm. Stems slen-

der, branched, with 3 or 4 leaves. Radical leaves few; petiole 7–22 cm; blade strongly glaucous abaxially, green adaxially, broadly ovate, ca. 13 × 11 cm, tripinnate; pinnae 3 pairs, long petiolulate, distant; pinnules 2 pairs, petiolulate to sessile, distant; ultimate leaflets elliptic to oblanceolate, 7–12 × 3–6 mm, mucronate. Cauline leaves sessile, lower bipinnate; upper ternate to biternate. Racemes 2–6 cm, 8–13-flowered; bracts 5–12 mm, lower ones flabellate-divided into narrow acute lobes, upper ones lanceolate with fewer teeth, uppermost subulate. Pedicel 4–6 mm, recurved in fruit. Sepals orbicular, small, margin lacerate. Corolla dark purple; upper petal ca. 25 mm, subacute, abaxial crest short and narrow; spur slightly downcurved, cylindric, 16–17 mm, tapering; nectary ca. 2/5 as long as spur; lower petal rhombic, ca. 8 mm, crest small; inner petals ca. 7 mm. Style ca. 3 mm. Fruit not seen. Fl. and fr. Aug.

• Grasslands on mountain slopes; ca. 3500 m. SE Xizang, NW Yunnan (upper reaches of Dulong Jiang).

It is uncertain whether the type gathering, from Dulong Jiang, is heterogeneous, given that one isotype looks like *Corydalis nemoralis*.

**228. *Corydalis densispica*** C. Y. Wu, Acta Bot. Yunnan. 5: 247. 1983.

密穗黄堇 mi sui huang jin

Herbs, perennial, 15–65 cm tall, glabrous or papillose-scabrid on margins and veins abaxially; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots oblong, 10–50 mm including indistinct stalk, 1.5–3(–5) mm in diam., rarely branched. Stems 1–4, suberect, ascending or straggling in bushes, slender, branched, with 2–4 leaves in upper 2/3. Radical leaves 1–5; petiole 5–10(–30) cm, slender, weak; blade glaucous abaxially, green adaxially, broadly ovate-triangular, 3–10(–20) × 2–10(–17) cm, bi- to triternate to bi-(tri-)pinnate; ultimate segments elliptic to lanceolate, 1–2 × (0.2–)0.4–1 cm, acute or obtuse, often mucronate. Cauline leaves: lower petiole to 3 cm, upper leaves shortly stalked or sessile; blade broadly ovate to deltoid, 3–10 × 3–7 cm, like radical leaves but more robust. Racemes 3–5 cm, elongating in fruit to 5–10 cm, densely 12–25(–35)-flowered, simple or with a basal branch; bracts 5–9 mm, deeply pectinately to flabellately cut into narrow acuminate lobes or teeth; lower bracts often again divided, upper ones sometimes entire, often tinged purplish. Pedicel 3–5(–10) mm, recurved in fruit. Sepals white, 0.4–1(–2) × 1–1.5 mm, fimbriate-dentate. Corolla yellow, veins distinct, tip of inner petals orange-yellow; upper petal rhombic-acute, 17–21 mm, crest 1–1.5 mm, not or shortly decurrent on spur; spur cylindric or slightly attenuate, 8–13 mm, narrow, apex slightly bent downward; nectary ca. 1/2 as long as spur; lower petal broadly obovate (broadest in distal 1/2), 7–9 mm, acute to obtuse, conspicuously undulate, ± dentate; crest short; inner petals 6–8 mm. Stigma with marginal papillae: median 2 distinct, lateral broad, diffuse; geminate papillae sublateral (clearly submarginal) and on well-developed rounded basal lobes. Capsule obovoid, 5–9 × 2–2.5 mm, glabrous, 3–6-seeded; style 2.5–3 mm. Seeds faintly colliculate, 1.2–1.4 mm. Fl. and fr. Jun–Sep.

• Shrubs in alpine meadows, sometimes in scree, common; 3200–4400 m. SW Sichuan (N to Litang and Yajiang), E Xizang, NW Yunnan.

**229. *Corydalis stramineoides*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 19: 229. 1997 [“*straminoides*”].

索县黄堇 suo xian huang jin

Herbs, perennial, 40–70 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots few, oblong, 3–4 cm × 3–4 mm, sessile. Stems suberect, branched, especially above, with 2–5 leaves. Radical leaves not seen. Cauline leaves: lower petiole 5–12 cm, shorter upward, uppermost sessile; blade pruinose abaxially, broadly ovate, lower ones 4–8 × 4–6 cm, upper ones smaller, bipinnate; pinnae 2(or 3) pairs, petiolulate; pinnules petiolulate or sessile, entire or deeply 2–4-divided; lobes oblanceolate, mucronate. Racemes 3–10 cm, 15–20-flowered; bracts flabellate to pectinate or deeply dentate, or upper ones entire, 5–10 mm. Pedicel 6–11 mm, slender, recurved in fruit. Sepals ca. 1 × 1 mm, fimbriate-dentate. Petals yellow, with greenish keel to outer petals, veins ?distinct; upper petals rhombic-acute, 14–15 mm, crest 1–2 mm wide, tapering to both ends, decurrent on spur to ca. 1/2; spur slightly downcurved at tip, cylindric, 8–9 mm; nectary ca. 1/2 as long as spur; lower petal obovate, 7–9 mm, cuneate to base, margin undulate-dentate, apex shortly acuminate, crest short; inner petals ca. 7 mm. Stigma with marginal papillae: median 2 distinct, lateral broad, diffuse; geminate papillae sublateral (clearly submarginal) and on well-developed rounded basal lobes. Capsule terete, ca. 8 × 2 mm, with lines of papillae, 2–5-seeded; style ca. 3 mm. Seeds in 1 row, black, shiny, nearly orbicular, ca. 2 mm in diam.; caruncle large. Fl. and fr. Jun–Aug.

• Shrubs, riversides; 3700–4000 m. E Xizang (Gongbo'gyamda, Nyiningchi, Sogxian).

**230. *Corydalis temolana*** C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 5: 255. 1983.

黄绿紫堇 huang lü zi jin

Herbs, perennial, 40–60 cm tall, usually papillose-scabrid on margins and veins; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots sessile, oblong, 20–30 × 2–3 mm. Stems 1–3, robust, conspicuously ridged, branched, with 3–6 leaves in upper 1/2; uppermost leaves small, with axillary racemes. (Radical leaf: petiole ca. 15 cm, slender, weak, near base attenuate; blade triternate; primary pinnae with petiolule 3–4 cm; secondary pinnules with petiolule 3–5 mm; tertiary segments sessile, entire or middle segments deeply 2- or 3-lobed.) Cauline leaves: lower ones petiolate, upper ones sessile, 3–10 × 2–6 cm; blade glaucous abaxially, dark green adaxially, pinnate with shortly stalked to subsessile pinnae deeply twice ternatisect into lanceolate acute lobes. Racemes 2–8 cm, densely 10–15-flowered; bracts 7–12 mm, deeply palmatisect into narrow acute lobes, lower one more divided, upper one lanceolate with a few teeth only. Pedicel 3–5 mm, recurved in fruit. Sepals whitish, 1–1.5 × ca. 1 mm, deeply dentate. Corolla yellow, veins distinct, keels green to orange; upper petal rhombic, 19–21 mm, acuminate, crest ca. 1.5 mm wide, subobtusely, hardly decurrent on spur; spur straight to slightly curved, cylindric, 12–14 mm; nectary ca. 1/2 as long as spur; lower petal obovate, acute, narrowed toward base, usually with diminutive spurlet at very base, 8–9 mm, margin undulate-den-



tate, crest short; inner petals 7–8 mm. Stigma with marginal papillae: median 2 distinct, lateral broad, diffuse; geminate papillae sublateral (clearly submarginal) and on well-developed basal lobes. Capsule obovoid, 8–11 × ca. 3 mm, with papillose lines, 2–5-seeded; style ca. 2.5 mm. Seeds in 1 row. Fl. and fr. around Aug.

- Meadows; ca. 3000 m. SE Xizang (Zayü).

**231. *Corydalis chamdoensis*** C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 5: 250. 1983.

昌都紫堇 chang du zi jin

*Corydalis tenuicalcarata* C. Y. Wu & Z. Y. Su.

Herbs, perennial, 10–35 cm tall, glabrous or papillose-scabrid on veins (especially bracts) and stems; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots narrowly oblong, 5–15 cm, more thickened distally. Stems few, with 4–6 scattered leaves, branched throughout. Radical leaves early withering, like lower cauline leaves. Cauline leaves with lower petiole 1–3 cm, middle and upper leaves sessile; blade glaucous abaxially, bright green adaxially, broadly ovate, 4–10 × 2–4 cm (or much less in starved specimens), bi-(tri-)pinnate; pinnae 3 or 4 pairs, nearly opposite, distant, lower ones long petiolulate, upper ones sessile; pinnules subsessile, deeply or slightly 2–6-lobed; lobes elliptic to oblanceolate, acuminate; upper leaves much smaller and less divided. Racemes 5–10 cm, 10–25-flowered; bracts 4–10 mm, from short broad stalk palmately lobate into thin linear lobes. Pedicel 4–9 mm, to 11 mm and recurved in fruit. Sepals whitish, 1–1.5 × 1–1.5 mm, rounded, finely circumdentate. Corolla pale to bright yellow, with dark veins; inner petals orange-yellow at apex; upper petal (18–)23–25 mm, limb rhombic, apex shortly acuminate; crest (1–)1.5–2 mm wide, slightly overtopping apex, shortly and narrowly decurrent on spur, entire or dentate; spur gracefully arcuate (rarely straight), attenuate to tip, (9–)14–17 mm; nectary 1/3–2/5 as long as spur; lower petal rhombic-obovate, ca. 10 mm, crest short; base shallowly saccate; inner petals 7–9 mm. Capsule obovoid, 6–13 × 3–4 mm, with lines of vesicular papillae, 3–6-seeded; style 3–3.5 mm. Fl. Jul–Aug, fr. Aug.

- Montane slopes, alpine scree; 3900–4100 m. NW Sichuan (Dêgê, Garzê), NE Xizang.

**232. *Corydalis lhorongensis*** C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 5: 245. 1983.

洛隆紫堇 luo long zi jin

Herbs, 20–55 cm tall, glabrous; stems and radical leaves attenuate to filiform underground base. Storage roots fascicled, narrowly fusiform, clublike-thickened, 3–10 cm × 2–4 mm, distally, gradually narrowed to stalk. Stems 2 or 3, simple or branched, with 2–4 leaves above. Radical leaves few; petiole 13–27 cm (including underground part); blade glaucous on both surfaces or adaxially green, ovate, 5–10 cm, bi-(tri-)pinnate; pinnae 4–8 pairs, lower ones petiolulate, upper ones sessile; pinnules 1–3 pairs, shortly stalked to sessile, deeply 3–6-divided; ultimate segments narrowly elliptic, mucronate. Cauline leaves with lower petiole 2–6 cm, upper leaves sessile; blade ovate-triangular to oblong, 4–7 × 2–4 cm (or upper leaves smaller),

like radical leaves. Raceme 3.5–7 cm, densely 15–22-flowered; bracts from short broad stalk deeply digitately cut into narrow lobes, middle ones more pectinate-dentate to pinnately 3–5-divided, upper one lanceolate with few teeth, 5–10 mm. Pedicel 5–10 mm, recurved in fruit. Sepals triangular, 1–1.5 × ca. 1.5 mm, dentate. Petals amaranth to pale bluish purple; outer petals subacute, with 1–2 mm wide obtuse crest slightly overtopping apex; upper petal navicular-ovate, 17–22 mm, subacute; spur slightly downcurved, 9–14 mm, tapering; nectary to 1/2 as long as spur; lower petal elliptic, 8–10 mm, acute; inner petals 8–9 mm. Ovary glabrous or with lines of papillae; ovules 7–9; stigma square, marginal papillae: median 2 distinct, lateral broad, confluent; geminate papillae lateral (submarginal) and on well-developed basal lobes. Fruit not seen. Fl. Jul.

- Under shrubs; 4400–4500 m. E Xizang (Bamda, Lhorong).

**233. *Corydalis dolichocentra*** Z. Y. Su & Lidén, Novon 17: 489. 2007.

雅曲距紫堇 ya qu ju zi jin

Herbs, perennial, ca. 10 cm above scree surface; stems and radical leaves attenuate to filiform underground base. Storage roots few, linear, thicker distally, to 25 cm. Stem ca. 18 cm including thin naked base, simple, with 2 leaves. Radical leaves: blade glaucous abaxially, dark green adaxially, triangular in outline, 4–7 × 4–8 cm, (pinnate) to bipinnate; pinnae 3 or 4, shortly stalked to sessile; pinnules ternatisect to pinnatifid into elliptic to oblanceolate acute lobes. Cauline leaves like radical leaves but smaller and less divided; lower petiole ca. 1 cm, upper leaves sessile. Raceme 10-flowered; bracts lanceolate to oblanceolate, 10–16 mm, entire or lowermost ones with a couple of teeth. Pedicel 7–8 mm. Sepals minute. Corolla pale bluish purple, with dark reddish purple keels and dark tips to inner petals; outer petals crest ca. 1 mm wide; upper petal 25–26 mm; spur gracefully downcurved, ca. 18 mm, slender, tapering toward apex; nectary ca. 6 mm; lower petal obovate; inner petals ca. 9 mm. Stigma square; marginal papillae: median 2 distinct, lateral broad, confluent; geminate papillae lateral (submarginal) and on well-developed basal lobes. Fruit unknown; ovary glabrous, with 8 ovules. Fl. Jul.

- Scree slopes near mountain summits, under *Quercus*; ca. 4700 m. SW Sichuan (Xiangcheng).

**234. *Corydalis calcicola*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 184. 1914.

灰岩紫堇 hui yan zi jin

*Corydalis hanna* Kanitz; *C. souliei* Franchet; *C. wardii* W. W. Smith.

Herbs, perennial, 6–20 cm above surface in alpine scree, to 60 cm tall when growing in bushes, glabrous or papillose-scabrid along margins and veins of bracts; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots numerous, fascicled, oblong, 30–70 × 2–4 mm. Stems few to several, robust to rather slender, sulcate, branched, with 2–4(–6) leaves in aerial part. Radical leaves: blade green to glaucous, triangular to ovate, 3–9 × 2–9 cm, slightly thick, bipinnate; pinnae 2–4 pairs, stalked; ultimate leaflets sessile, entire to

usually deeply dissected into ovate to lanceolate, acute-mucronate lobes. Cauline leaves: lower ones stalked, like radical leaves; upper ones sessile, smaller and less divided. Racemes 3–8 cm, usually 10–20-flowered; lower bracts repeatedly palmatisect; upper ones once palmatisect to pectinate-dentate, lobes lanceolate, acuminate; uppermost rarely almost entire. Pedicel 3–7(–15) mm, rigidly recurved in fruit. Sepals 1–1.5 × 1–2 mm, margin dentate to lacerate. Corolla purple, rarely purplish slate blue; inner petals usually with contrasting blackish purple apex; upper petal 22–30 mm; dorsal crest very variable, 0.5–2 mm wide, acute to obtuse and overtopping apex; spur usually gracefully downcurved, (12–)14–20 mm, tapering to apex; nectary 5–8 mm; lower petal broadly and shallowly saccate in basal 1/2, 10–12 mm; inner petals 9(–10) mm. Stigma square; marginal papillae: median 2 distinct, lateral broad, indistinct; geminate papillae lateral (submarginal) and on well-developed basal lobes. Capsule elliptic to broadly obovoid, 7–9 × ca. 3 mm, with raised lines of dense papillae, 2–7-seeded; style ca. 4 mm. Seeds smooth, 1.4–1.8 mm with appressed elaiosome. Fl. and fr. Jul–Oct.

• Alpine scree, in shrubs in alpine grazed meadows; 2900–4800 m. SW and W Sichuan, NW Yunnan.

Presumed hybrids (sterile) with *Corydalis densispica* and *C. lathyrophylla* have been recorded (NW Yunnan).

Slender plants growing in shrubs in meadows, often at lower elevations (2900–4000 m), are known from WC Sichuan (Xiaojin and Kangding) and have been separated as *Corydalis souliei*. In cultivation, however, plants from alpine scree look similar, so it is possible that these differences are mainly environmental modifications.

Plants from the northeast have greener leaves and slate blue flowers.

The distinction between *Corydalis calcicola* and *C. trachycarpa* is diffuse and here mainly based on the latter having white flowers in early anthesis and usually more divided and fleshier leaves. *Corydalis trachycarpa* is often more dense and robust and very rarely grows in shrubs.

**235. *Corydalis trachycarpa*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 24: 27. 1878.

糙果紫堇 cao guo zi jin

*Corydalis alpigena* C. Y. Wu & H. Chuang; *C. calcicola* W. W. Smith var. *szechuanica* Fedde; *C. deflexicalcarata* C. Y. Wu & H. Chuang; *C. leucostachya* C. Y. Wu & H. Chuang; *C. octocornuta* C. Y. Wu; *C. trachycarpa* var. *leucostachya* (C. Y. Wu & H. Chuang) C. Y. Wu; *C. trachycarpa* var. *nana* C. Y. Wu & H. Chuang; *C. trachycarpa* var. *octocornuta* (C. Y. Wu) C. Y. Wu.

Herbs, erect, 7–20 cm above scree surface, stout, glabrous or papillose-scabrid along margins and veins of bracts; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots numerous, fascicled, oblong, 30–70 × 2–4 mm. Stems few to several, sulcate, robust, usually branched, with 2–4(–6) leaves. Radical leaves few; blade ovate, 2.5–8 × 1.5–6 cm, (bi-)tripinnate; pinnae 4–6 pairs, petiolule 3–10 mm; ultimate leaflets sessile, ± deeply pinnatifid; lobes ovate to obovate, 2–9 mm, mucronate. Cauline leaves: lower petiolate, upper ones nearly sessile, narrowly ovate to oblong, 3–9 × 2–4 cm, like radical leaves. Racemes 3–8 cm, very dense, 15–30-

flowered; lower bracts 7–12 mm, from a broad flat base repeatedly palmatisect into linear to lanceolate lobes; upper bracts less divided, 4–9 mm. Pedicel 3–6 mm, rigidly arcuately recurved in fruit. Sepals 0.5–1.5 × 0.5–2 mm, dentate. Petals white (to cream), turning purplish after fertilization, rarely purple; inner petals usually with contrasting blackish purple apex; upper petal 24–29 mm, petal lobes navicular-ovate, apex obtuse, dorsal crest 1–2 mm wide, very variable, acute or obtuse and overtopping apex; spur usually gracefully downcurved, tapering to an acute apex; nectary 6–10 mm; lower petal broadly and shallowly saccate in basal 1/2, 10–12 mm; inner petals 9–10 mm. Stigma square; marginal papillae: median 2 distinct, lateral broad, indistinct; geminate papillae lateral (submarginal) and on well-developed basal lobes. Capsule elliptic to broadly obovoid, 7–10 × ca. 3 mm, with raised lines of dense papillae, 3–8-seeded; style ca. 4 mm. Seeds ca. ?1.5 mm, smooth. Fl. and fr. Apr–Sep.

• Alpine scree, very rarely in shrubs; 3500–5200 m. Gansu, E and SE Qinghai, NW and W Sichuan, NE Xizang.

A hybrid (sterile) with *Corydalis densispica* has been recorded (W of Litang).

**236. *Corydalis nubicola*** Z. Y. Su & Lidén, Novon 17: 490. 2007.

凌云紫堇 ling yun zi jin

Herbs, perennial, very glaucous, 4–10 cm above scree surface, fleshy, glabrous; stems and radical leaves attenuate to filiform underground base. Storage roots many, fascicled, tapering to both ends, 2–5 cm × 2–3 mm. Stems few, with 2 leaves ± at scree surface, and sometimes a third small leaf higher up, simple or with an axillary inflorescence from uppermost leaf. Radical leaves with long thin petioles; blade triangular-ovate, 15–45 × 12–30 mm, bipinnate; pinnae 3–6; pinnules entire to deeply cut into obovate ± overlapping lobes. Cauline leaves: petiole to 1 cm or leaves sessile; blade ovate-oblong, 2–5 × 1–3 cm, like radical leaves. Raceme capitate, 10–25-flowered; lower bracts 10–15 mm, with broad cuneate base, distal 2/3 deeply divided into 3–5 segments that are again cut into narrow lobes; upper bracts similar but smaller and less divided. Pedicel 7–12 mm, soon arcuate. Sepals ca. 1 × 2 mm, dentate. Corolla bluish purple, with dark reddish purple keels and dark tips to inner petals; outer petals with obtuse crest overtopping apex, ca. 2.5 mm wide, not or slightly decurrent on spur; upper petal 18–22 mm; spur ± downcurved, cylindric, 8–10 mm; nectary 4–5 mm; lower petal elliptic, margin undulate; inner petals 8–11 mm. Stigma square; marginal papillae: median 2 distinct, lateral confluent; geminate papillae lateral (submarginal) and on basal lobes. Fruit unknown; ovary smooth, with 7–9 ovules; style ca. 2.5 mm. Fl. Jul–Aug.

• Alpine scree slopes; 4300–5300 m. E Xizang (Qamdo, Zogang).

**237. *Corydalis glycyphyllos*** Fedde, Repert. Spec. Nov. Regni Veg. 20: 354. 1924.

甘草叶紫堇 gan cao ye zi jin

?*Corydalis scaberula* Maximowicz var. *purpurascens* C. Y. Wu.

Herbs, perennial, very glaucous, 8–12 cm above scree surface, fleshy; leaves and bracts with coarse 1-celled hairs abaxially and marginally; stems and radical leaves attenuate to filiform underground base. Storage roots many, fascicled, tapering to both ends, 3–8 cm × 2–3 mm. Stems few, with thin underground leafless part 5–20 cm, and 2 or 3 leaves above (sometimes a very small leaf below inflorescence), simple or branched, or with an axillary inflorescence high up. Blade of radical leaves variable depending on covering of plant, ternate with stalked pinnate leaflets or oblong. Cauline leaves alternate or subopposite, nearly sessile (or stalked if originating in buried part of stem); blade of lower leaves oblong, 3–7 × 2–5 cm, fleshy, pinnate; primary leaflets entire or lower ones deeply 2- or 5-lobed; ultimate lobes broadly elliptic, (6–)10–15 × 5–10 mm, obtuse. Raceme capitate, 3–6 cm, 15–30-flowered; lower bracts broadly ovate, 10–17 × 5–10 mm, deeply 5–7-divided, segments often again divided, lobes narrow, acute to acuminate. Pedicel 6–15 mm, soon slightly bent at apex, in fruit 10–20 mm, still suberect in lower part but arcuately recurved at tip. Sepals 0.5–2.5 × 1–2 mm, irregularly dentate. Corolla very broad, long persistent, almost white, or pale pink or pale purple, rarely pale yellow, turning deeper purple after pollination, veins distinct or obscure; apical keels of outer and tips of inner petals dark purple; upper petal 22–26 mm, broad, narrowed to subobtuse apex, margin ± undulate; abaxial crest 2.5–3 mm wide, obtuse, overtopping apex, hardly decurrent on spur, entire to dentate; spur strongly downcurved, 8–9 mm, slightly tapering to obtuse apex; nectary 1/3–1/2 as long as spur; lower petal with very broad saccate claw; limb slightly reflexed, short, obtuse, broadly crested, margin undulate-dentate; inner petals 11–13 mm. Stigma green, with 6 marginal papillae (lateral sometimes partly confluent); geminate papillae lateral (submarginal) and on basal lobes. Capsule obovoid, 6–8 × ca. 3 mm, 6–9-seeded; style ca. 3.5 mm. Seeds 1.4–1.7 mm, smooth; caruncle lobed. Fl. and fr. Jun–Sep.

- Alpine scree; 4200–5100 m. W Sichuan.

**238. *Corydalis scaberula*** Maximowicz, Fl. Tangut. 40. 1889.

粗糙黄堇 cu cao huang jin

*Corydalis melanochlora* Maximowicz var. *pallescens* Maximowicz; *C. pseudosaberula* Lidén & Z. Y. Su; *C. scaberula* var. *ramifera* C. Y. Wu & H. Chuang.

Herbs, perennial, 7–12 cm above scree surface; leaves and bracts with coarse 1-celled hairs abaxially and marginally; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fascicled, linear-oblong, 3–8(–15) cm × 2–4 mm. Stems 1–4, simple or branched, with long slender leafless underground part and 2 leaves at scree surface, sometimes 1 or 2 small pinnate leaves higher up. Radical leaves few; blade triangular to ovate, 3–9 × 2–6 cm, bi-(tri)-pinnate; pinnae 4–6 pairs, lower ones petiolulate, upper ones sessile; pinnules entire or lower ones deeply unequally 3-fid, elliptic-

acute, 4–7 × 2–4 mm. Cauline leaves shortly petiolate to sessile; blade oblong, 3–8 × 2–3 cm, bipinnate; pinnules like radical leaves. Raceme capitate, 2.5–4 cm, 15–30-flowered, simple or with a basal branch; bracts 10–20 mm, deeply pinnatifid, segments again deeply lobed into narrow acute to acuminate lobes. Pedicel 8–12 mm, soon arcuate at tip, 12–18 mm in fruit. Sepals 1.5–2 × ca. 2 mm, lacinate-dentate. Corolla long persistent, pale to golden yellow, broad; apex of inner petals contrasting dark purple; upper petal 18–23 mm, broad, narrowed to subobtuse apex, margin ± undulate; abaxial crest 1.5–3 mm wide, obtuse, overtopping apex, hardly decurrent on spur, entire to dentate; spur strongly arcuately downcurved, cylindrical to slightly tapering to obtuse apex, 7–9 mm; nectary 1/3–1/2 as long as spur; lower petal with very broad saccate claw; limb slightly reflexed, short, obtuse, broadly crested, margin undulate-dentate; inner petals 9–12 mm. Stigma green, with 6 marginal papillae (lateral sometimes partly confluent); geminate papillae lateral (submarginal) and on basal lobes. Capsule obovoid, 7–8 × ca. 3 mm, 8–10-seeded; style ca. 3.5 mm. Seeds in 2 rows, 1.5–1.8 mm; caruncle lobed. Fl. and fr. Jun–Sep.

- Alpine scree; (3500–)4000–5600 m. Qinghai, N and NW Sichuan, NE Xizang.

**239. *Corydalis petrodoxa*** Lidén & Z. Y. Su, Edinburgh J. Bot. 54: 81. 1997.

喜石黄堇 xi shi huang jin

Herbs, perennial, glaucous, 4–7 cm tall, with leaves papillose-puberulent abaxially; stems and radical leaves attenuate to filiform underground base. Storage roots several, long, 40–80 × 1–2 mm, simple. Stems 4–7 cm (plus 5–10 cm below lowest leaf), with 2 or 3 alternate to subopposite leaves close to soil surface, branched. Radical leaves: blade triangular, 3–5 × 3–6 cm, bipinnate; pinnae 3 pairs; pinnules 1–3 pairs, lobed into 2–5 fleshy obovate mucronate segments. Cauline leaves: petiole 0.3–2.5 cm; blade 2–5 × 2–6 cm, like radical leaves. Racemes corymbose, dense, ca. 10-flowered; lower bracts 15–20 mm, with distinct stalk, ternatisect with dentate to divided lobes, becoming smaller upward; uppermost oblanceolate, entire, margin ± papillose-scabrid. Pedicels: lower ones 20–30 mm, upper ones shorter. Sepals ca. 0.5 × 1.5 mm, finely dentate. Corolla golden yellow, with keels of outer petals brownish; upper petal 19–20 mm, obtuse, margin slightly dentate; dorsal crest ca. 2 mm wide, slightly dentate, shortly decurrent on spur; spur straight to slightly upturned, narrowly cylindrical, 10–11 mm; nectary 2/5–1/2 as long as spur; lower petal ca. 12 mm, limb rounded, mucronate, dentate; claw straight, narrow; dorsal crest short; inner petals 9–10 mm. Stigma square; marginal papillae: median 2 distinct, lateral 2 broad, indistinct; geminate papillae lateral (submarginal) and on short basal lobes. Fruit unknown. Fl. Aug.

- Alpine scree; ca. 4400 m. SE Xizang (Gongbo'gyamda).

**32. *Corydalis* ser. *Appendiculatae*** C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 6: 237. 1984.

小距紫堇系 xiao ju zi jin xi

Herbs, perennial. Stems and petioles of radical leaves attenuate to filiform underground base. Rhizome small, with fascicle of

spindle-shaped storage roots, apically with small pale bulblike bud. Stems erect, simple, slender, very rarely branched above. Cauline leaves palmate to triternate. Fruiting pedicel recurved. Corolla blue. Capsule explosively dehiscent. Cotyledons 1.

- Seven species: China.

This and the following four subdivisions (nos. 32–36), although at the rank of series, are not subordinate to 31. *Corydalis* sect. *Trachycarpae* but are independent taxa. Available series-rank names are used here in order to avoid publishing premature nomenclatural novelties at the rank of section.

- 1a. Lower pedicels 20–45 mm, erect and only apically hooked in fruit ..... 246. *C. uvaria*  
 1b. Lower pedicels 5–17 mm, recurved from base in fruit.  
   2a. Nectary ca. 1/4 as long as spur ..... 240. *C. adoxifolia*  
   2b. Nectary longer.  
     3a. Upper petal emarginate; limb of lower petal more than 2 × broader than upper petal, rounded to emarginate ..... 241. *C. yargongensis*  
     3b. Upper petal acute; limb of lower petal acute to subobtusate, less than 2 × as broad as upper petal.  
       4a. Outer petals not crested, lower petal without spurlet at base; leaflets of radical leaves coarsely dentate ..... 242. *C. ischnosiphon*  
       4b. Outer petals crested, lower petal with diminutive spur at base; leaflets of radical leaves not dentate.  
         5a. Limb of lower petal rounded, obtuse, shortly pointed; spurlet of lower petal conspicuous, ca. 1 mm wide, pouchlike; crest of outer petals 1–2 mm wide; spur 2–2.5 mm wide; nectary conspicuous ..... 243. *C. heterothylax*  
         5b. Limb of lower petal rhombic-acute; spurlet of lower petal ca. 0.2 mm wide, peglike; crest of outer petals 0.5–1 mm wide; spur 1–1.5 mm wide; nectary very thin.  
           6a. Cauline leaves deeply sub-biternatisect with ca. 5 ultimate lobes; spur cylindrical or slightly thickened at apex ..... 244. *C. pseudobalfouriana*  
           6b. Cauline leaves much divided, ultimate lobes 10–30; spur slightly tapering to apex ..... 245. *C. appendiculata*

**240. *Corydalis adoxifolia*** C. Y. Wu, Acta Bot. Yunnan. 6: 244. 1984.

东义紫堇 *dong yi zi jin*

Herbs, perennial, 15–22(–30) cm tall, glabrous. Stems and petioles of radical leaves attenuate to filiform underground base. Storage roots several, fascicled, spindle-shaped, 10–20 × 3–4 mm, usually distinctly stalked petiolate. Stems 1–3, simple, with (1 or) 2 leaves in upper 1/2. Radical leaves several; petiole 5–8 cm; blade glaucous abaxially, green adaxially, deltoid, biternate; pinnae with petiolule 0.7–2 cm; pinnules sessile, obovate, 1.5–4 × 1–1.5 cm, deeply (2 or) 3(or 4)-divided; lobes obovate to narrowly obovate. Cauline leaves sessile, 2–3 × 2–4 cm, like radical leaves but lobes narrower. Raceme 4–7 cm, 10–15-flowered, first dense then lax; bracts 5–10 × 1–2 mm, lanceolate, entire, sometimes with short stalk, rarely lowermost bract larger and divided. Pedicel 3–5 mm, recurved in fruit. Sepals minute (ca. 0.4 × 0.2 mm). Corolla indigo; upper petal 15–16 mm, rhombic-acute, with crest 0.3–0.5 mm wide; spur slightly tapering to apex and slightly downcurved, 8–9 mm; nectary ca. 1.5 mm; lower petal subspatulate, 7–8 mm, claw shorter than limb; inner petals 6–7 mm. Stigma broader than long; marginal papillae: median 2 distinct, lateral broad, confluent; geminate papillae: lateral clearly submarginal, and on basal lobes. Capsule unknown; ovules 10; style ca. 1.5 mm.

- Among shrubs, boulders by riversides; 2600–2900 m. SW Sichuan (Daocheng).

**241. *Corydalis yargongensis*** C. Y. Wu, Acta Bot. Yunnan. 6: 243. 1984.

雅江紫堇 *ya jiang zi jin*

Herbs, perennial, 7–25 cm tall, with leaves usually densely papillose below (especially radical leaves); stems and petioles of radical leaves attenuate to filiform underground base. Storage roots densely fascicled, spindle-shaped, 5–15 × (1–)2–3 mm, subsessile or with narrow stalk 5(–10) mm. Stems 1–3, erect, slender, with 1 or 2(or 3) leaves in upper 1/2. Radical leaves: petiole 2–7 cm; blade ca. 1 × 1 cm, ternate; leaflets gray-glaucous abaxially, obovate, entire to ± deeply divided. Cauline leaves sessile, 1–2 × 1–2 cm, deeply biternatisect to irregularly palmatisect; segments oblanceolate, acute, entire or often with a few lateral lobes or teeth. Raceme 3–5 cm, 4–10(–15)-flowered; lower bracts like upper cauline leaves; upper ones lanceolate, ca. 5 mm, entire. Pedicel slender, 5–10 mm in flower, in fruit sharply reflexed and 8–17 mm. Sepals white or pale pink, 0.5–1 × ca. 0.5 mm, deeply dentate. Corolla blue, sometimes with purplish or pinkish tinge; dorsal crest of inner petals dark blue, except for protruding white or pale pink tip; outer petals spreading to reflexed, not or narrowly crested; upper petal much narrower than lower petal, 14–16 mm, emarginate at apex; spur straight or downcurved at apex, cylindrical, 6–7 mm; nectary ca. 1/2 as long as spur; lower petal 9–11 mm, limb rounded to emarginate, sometimes with a mucro in notch, 6–8 mm wide, claw straight, oblong; inner petals 7–8 mm, dorsal crest clearly overtopping apex. Stigma square; marginal papillae: median 2 distinct, lateral, broad, diffuse; geminate papillae lateral (submarginal) and on large basal lobes. Capsule linear-oblong, 8–14 × ca. 1.5 mm, 7–15-seeded; style ca. 1.5 mm. Seeds in 1 row (rarely ± in 2 rows), 1–1.1 mm, smooth. Fl. Jun–Aug.

- Forest margins, bushy slopes; 3500–4500 m. SW Sichuan.

**242. *Corydalis ischnosiphon*** Lidén & Z. Y. Su, *Novon* 17: 492. 2007.

瘦距紫堇 shou ju zi jin

Herbs, perennial, 30–35 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fasciculate, fusiform, 20–25 × 2–4 mm, without distinct stalks. Stems 2–4, erect, 30–35 cm, slender, simple, with 2 leaves in upper 1/2. Petiole of radical leaves 3–10 cm; blade glaucous abaxially, green adaxially, 2.5–3.5 × 3–4 cm, ternately divided into subsessile leaflets; lateral leaflets often again deeply bifid; lobes obovate, 1.5–2.5 × 0.5–1 cm, coarsely toothed. Cauline leaves sessile, 2–4 cm, deeply digitately cut into 5–7 narrowly lanceolate acute lobes, entire or with 1 or 2 long acute lateral teeth. Raceme long and lax, 8–10 cm, 8–13-flowered; bracts linear-lanceolate, 8–15 mm, entire or lowest bracts with 1 or 2 long narrow basal lateral teeth or lobes. Pedicel 7–16 mm, reflexed in fruit. Sepals minute (ca. 0.2 × 0.2 mm). Corolla blue; outer petals without crest, rather narrow, subacute; upper petal 17–19 mm; spur slightly curved, 10–11 mm, thin, not or very slightly tapering toward apex; nectary ca. 1/2 as long as spur; inner petals 7–8 mm. Ovary fusiform; style ca. 3 mm; stigma broadly emarginate, marginal papillae 6 (lateral 4 sometimes pairwise confluent); geminate papillae lateral (submarginal) and on well-developed basal lobes.

• Alpine meadows among bushes; ca. 3300 m. NW Yunnan (Zhongdian).

**243. *Corydalis heterothylax*** C. Y. Wu ex Z. Y. Su & Lidén, *Novon* 17: 492. 2007.

异距紫堇 yi ju zi jin

Herbs, perennial, 10–20 cm tall (to 40 cm in well-fed individuals in shade); stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fasciculate, fusiform, 5–15 × 2–4 mm, sessile. Stems 1–3, erect to suberect, simple or rarely with late branches, with 1–3 leaves in upper 1/3. Radical leaves: petiole 2–7 cm; blade glaucous abaxially, green adaxially, orbicular to triangular, 10–15 × ca. 15 mm, ternate; leaflets shortly stalked, once to twice ± deeply cut into broadly obovate to lanceolate acute lobes. Cauline leaves subsessile; blade 10–20(–40) × 10–25(–40) mm, twice to 3 × deeply ternatisect into linear-lanceolate acute lobes, rarely lowermost more divided with stalked primary leaflets. Racemes 5–10(–20)-flowered, slightly elongating in fruit; bracts lanceolate, 4–12 mm, entire or lowermost sometimes to 16 and with a few narrow lateral lobes. Pedicel 5–14 mm, recurved in fruit. Sepals 0.2–0.5 mm. Corolla sky blue; keel of outer petals purplish; dorsal wing of inner petals white; outer petals broadly subacute, crest 1–2 mm wide; upper petal 14–19 mm, reaching or slightly overtopping apex, not or slightly decurrent on spur; spur straight or slightly downcurved at apex, cylindrical, 7–10 mm, broad; nectary 4–6 mm; lower petal with broad rounded limb, shortly pointed; claw with conspicuous pouch at very base, like a small spur; inner petals 7–9 mm, dorsal crest slightly overtopping apex. Stigma broader than long, slightly emarginate; marginal papillae: median 2 distinct, lateral broad, indistinct; geminate papillae lateral (submarginal) and on well-developed basal lobes. Capsule narrowly fusiform, 10–13 ×

2.5–3 mm, 5–9-seeded; style ca. 2 mm. Fl. Jul–Aug, fr. Aug–Sep.

• Moist grass turf, in low shrubs, wet scree; 3600–4400 m. SW Sichuan (Daocheng, Kangding, Xiangcheng), NW Yunnan (Zhongdian).

C. Y. Wu named this species “*Corydalis hsiangchangensis*,” a herbarium name that has never been validly published.

**244. *Corydalis pseudobalfouriana*** Lidén & Z. Y. Su, *Edinburgh J. Bot.* 54: 77. 1997.

弯梗紫堇 wan geng zi jin

Herbs, perennial, 12–25 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots numerous, fascicled, spindle-shaped, 5–13 × 2–4 mm, sessile or abruptly narrowed into thin stalk. Stems 1–3, erect, slender, simple, very rarely branched, with 1 or 2 leaves in upper 1/2. Radical leaves few, delicate; petiole 2–6(–12) cm; blade with 3 or 4 shortly stalked or sessile, obovate to oblanceolate, entire to deeply divided leaflets 6–20 × 3–5 mm. Cauline leaves: petiole 0.1–1 cm; blade ternatisect to palmatisect with usually 5 lanceolate leaflets. Raceme 6–19-flowered, long, narrow; bracts lanceolate, 4–7 mm, entire or rarely divided. Pedicel 3–5 mm, rigidly reflexed in fruit. Sepals minute. Corolla blue; outer petals ovate, acute, with narrow acute crest slightly overtopping apex; upper petal 13–17 mm; spur cylindrical, 6–10 mm; nectary ca. 2/5 as long as spur; lower petal navicular-oblanceolate, 7–8 mm, base with diminutive spurlet, distal 1/2 strongly reflexed; inner petals ca. 6 mm. Stigma rounded to square; marginal papillae: median 2 distinct, lateral indistinct; geminate papillae lateral (submarginal) and terminating basal lobes. Capsule narrowly obovoid, 5–7 × ca. 1.5 mm, 4–7-seeded; style ca. 2 mm. Seeds 0.9–1 mm, smooth. Fl. Jun–Aug, fr. Aug.

• Grasslands, stony crevices, hillsides; 3900–4300 m. SW Sichuan (Lugu Hu), NW Yunnan (Lugu Hu, Yongning).

**245. *Corydalis appendiculata*** Handel-Mazzetti, *Symb. Sin.* 7: 349. 1931.

小距紫堇 xiao ju zi jin

Herbs, perennial, often very glaucous at high elevations, 10–30 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots in dense fascicle, spindle-shaped, 10–25 × 3–4 mm, sessile or shortly stalked. Stems 1 or 2(–7), simple, very rarely with 1 or 2 branches, with 2–4 leaves in upper 1/2. Radical leaves 3–6, often rather conspicuous at flowering time; petiole 4–11 cm, slender; blade orbicular to triangular, (1–)2–4 × (1–)3–6 cm, slightly thick, (ternate to) biternate; pinnae stalked, pinnules sessile, deeply cut into lobes oblong to obovate, 4–10 mm, mucronate. Cauline leaves 2–4, alternate, decreasing in size upward; lowermost ones petiolulate or subsessile; middle and upper ones sessile; blade triangular, lower to 3 cm, biternate to sub-bipinnate; leaflets cut into obovate to oblanceolate acute lobes 0.5–1.5 cm. Raceme 4–10 cm, 10–20-flowered, soon elongating; lower bracts like uppermost cauline leaf; upper ones oblanceolate, slightly dentate to entire. Pedicel 5–12(–17) mm, recurved in fruit. Sepals 0.2–0.5 × 0.5–1 mm, deeply divided. Corolla blue to pinkish or purplish blue; inner petals often

darker at apex, but dorsal crest pale; outer petals narrow, acute, with 0.5–1 mm wide, acute crest overtopping apex; upper petal 14–23 mm; spur slender, tapering to usually gracefully down-curved apex; nectary upcurved, 1/4–1/3 as long as spur, very thin; lower petal rhombic, 8–9 mm, with small peg at base; inner petals 7–9 mm, dorsal crest white, very slightly overtopping apex. Stigma square, slightly emarginate, marginal papillae 4; geminate papillae lateral (submarginal) and on basal lobes. Capsule elliptic, 7–10 × 2–2.5 mm, 2–8-seeded; style ca. 2.5 mm. Seeds 1.1–1.2 mm, smooth; elaiosome small. Fl. and fr. Jun–Sep.

• Limestone cliffs, among shrubs, mountain slopes, low alpine scree; 2700–4100 m. SW Sichuan, NW Yunnan.

This species is variable depending upon elevation and habitat. Plants growing in scree in Yulong Xueshan (Lijiang, NW Yunnan) are small, multi-stemmed, with short spurs.

**246. *Corydalis uvaria*** Lidén & Z. Y. Su, *Edinburgh J. Bot.* 54: 78. 1997.

圆根紫堇 *yuan gen zi jin*

Herbs, perennial, (10–)15–20 cm tall (to 50 cm in shade forms); stems and petioles of radical leaves tapering to thin underground base. Storage roots densely fascicled, rounded to ellipsoid, 7–15 × 4–5 mm, attenuate to indistinct stalk. Stems simple, with 2(or 3) leaves in middle part. Radical leaves: peti-

ole 3–7 cm (including underground part); blade strongly glaucous abaxially, 1–1.5 × 1.5–2.5 cm, biternate; pinnae shortly stalked; pinnules subsessile, broadly obovate, entire, obtuse, obscurely mucronulate. Cauline leaves sessile, 2–4 × 2–3 cm, slightly thick, deeply biternatisect, with narrowly oblanceolate subacute lobes. Racemes very lax, 8–15(–20) cm at late anthesis, 5–13(–17)-flowered; lower bracts 10–20 mm, like upper leaf with up to 7 lobes; upper bracts progressively smaller, 6–10 mm, 2- or 3-fid; lobes lanceolate, subacute. Pedicels straight, lower ones 20–30 mm in flower, elongating to 30–45 mm in fruit, erect except for apical hook; upper pedicels shorter. Sepals ca. 0.2 mm. Corolla brilliant blue; outer petals not crested, rhombic, subobtusate; upper petal 13–16 mm; spur straight, cylindrical or slightly tapering, 6–8 mm; nectary ca. 1/2 as long as spur, very thin; lower petal with rhombic subobtusate limb, short indistinct claw and minute gibbosity at base; inner petals 6–7 mm, dorsal crest low, not protruding beyond apex. Stigma broader than long, apically emarginate; marginal papillae: median 2 distinct, lateral diffuse; geminate papillae on triangular basal lobes and lateral, but obviously not marginal. Fruit oblanceolate, 10–14 × ca. 3 mm, 9–15-seeded; style ca. 2.5 mm. Seeds in 2 rows, ca. 1.5 mm, smooth. Fl. and fr. Jun–Jul.

• Ditches under bushes, riversides; 2600–3700 m. S Sichuan (Miyi, Muli, Yanyuan).

This species is probably misplaced in this section and might be related to *Corydalis cheirifolia* (species no. 258), in *C. ser. Fusiformes*.

**33. *Corydalis* ser. *Curviflorae*** (Fedde) C. Y. Wu & H. Chuang, *Acta Bot. Yunnan.* 6: 245. 1984.

曲花紫堇系 *qu hua zi jin xi*

*Corydalis* “Gruppe” *Curviflorae* Fedde, *Repert. Spec. Nov. Regni Veg.* 16: 197. 1919.

Herbs, perennial; stems and petioles of radical leaves attenuate to filiform underground base. Rhizome small, with fascicle of spindle-shaped to almost linear storage roots, apically with small pale bulblike bud; sometimes with thin stolons. Stems erect, slender, simple. Radical leaves small, ternate to biternate. Cauline leaves sessile, palmate. Fruiting pedicel erect. Corolla blue, yellow, or purple; upper petal with broad obtuse usually upturned spur; inner petals broad, with upper lateral wing conspicuous; dorsal crest broad, rounded, conspicuously overtopping petal apex. Stigma emarginate, with shortly stipitate apical papillae; geminate papillae usually only in basal corners. Capsule explosively dehiscent.

• Eight species: China.

1a. Flowers yellow or cream.

2a. Flowers 12–19 mm; fruit linear-oblong ..... 249. *C. cytisiflora*

2b. Flowers 11–12 mm; fruit broadly obovoid ..... 250. *C. nematopoda*

1b. Flowers blue to purple.

3a. Storage roots rounded to oblong, sharply set off by long thin stalks ..... 254. *C. curviflora*

3b. Storage roots narrowly fusiform, smoothly tapering to base, often thin.

4a. Crest of outer petals overtopping apex; storage roots thin; most bracts entire.

5a. Outer petals entire; corolla clear blue; stigma with 4 marginal simple papillae; racemes 3–14-flowered (Lhasa) ..... 251. *C. pseudofilisecta*

5b. Outer petals usually dentate; corolla yellow, cream, blue, or purple; stigma with 6 prominent marginal simple papillae; racemes 10–30-flowered (N Sichuan) ..... 249. *C. cytisiflora*

4b. Crest of upper petal not overtopping apex; storage roots thin or thick; bracts entire or divided.

6a. Bracts palmatisect; stigma with 2 inner apical papillae very long; ovules numerous (23 or 24) ..... 252. *C. verna*

6b. Bracts entire, except sometimes lower ones; apical stigma papillae ca. as broad as long; ovules fewer.

7a. Outer petals obtuse; storage roots 1–3 mm in diam.; bracts rarely divided; capsule broadly obovoid ..... 253. *C. pachycentra*

7b. Outer petals broad, acute to acuminate; storage roots very thin, to 1 mm in diam.; lower bract often divided; capsule oblong.

- 8a. Stigma with pronounced basal lobes; racemes 10–15-flowered; inner petals white tipped; spur shorter than inner petals ..... 247. *C. shensiana*  
 8b. Basal lobes of stigma not developed; racemes 3–9-flowered; inner petals not white tipped; spur equaling inner petals ..... 248. *C. schistostigma*

**247. *Corydalis shensiana*** Lidén ex C. Y. Wu, H. Chuang & Z. Y. Su in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 219. 1999.

陕西紫堇 shan xi zi jin

*Corydalis curviflora* Maximowicz var. *girdalii* Fedde.

Herbs, perennial, 10–30 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots several, fascicled, very narrowly fusiform to almost linear. Stems 1–4, straight, often reddish, slender, simple, with 2–4 leaves in upper part. Radical leaves few; petiole 4–9 cm; blade orbicular, biternate to palmatisect into obovate lobes. Cauline leaves sessile; blade glaucous on both surfaces, palmately divided into 5–11 narrowly lanceolate to linear lobes 1.5–5 cm × 1–4 mm, entire or median lobes larger and with a few lateral teeth or lobes. Raceme 3–7 cm, 10–15-flowered, at first dense, later distant; lowest bract with 3–5 segments, middle and upper bracts narrowly lanceolate, entire. Pedicel slender. Sepals to 0.5 mm, dentate. Corolla clear blue, with purplish keels; inner petals usually conspicuously tipped with white; outer petals broadly rhombic, ± undulate-dentate, acuminate to a pointed apex; upper petal 11–13 mm, dorsal crest 0.5–1(–1.5) mm wide, tapering to both ends, not reaching apex, ± decurrent on spur; spur ± bent upward, cylindrical, 5–7 mm; nectary ca. 1/2 as long as spur; lower petal ca. 10 mm, rhombic-acute with indistinct claw, without dorsal crest; inner petals 8–9 mm, with conspicuous dorsal crest overtopping apex. Stigma shallowly cleft, with 6 simple marginal papillae and geminate papillae on well-developed basal lobes. Capsule pendent from erect pedicel, oblong-linear, 10–13 × ca. 1.5 mm, 3–6-seeded. Seeds slightly striped, 1–1.5 mm; caruncle small. Fl. and fr. Jun–Aug.

• Forests, among shrubs, mountain summits; 1300–3300 m. W Henan (Lushi, Xixia), Shaanxi, Shanxi.

**248. *Corydalis schistostigma*** X. F. Gao, Lidén, Y. W. Wang & Y. L. Peng, Novon 18: 335. 2008.

裂柱紫堇 lie zhu zi jin

Herbs, perennial, 8–20 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots almost linear. Stems 1 or 2, straight, simple, slender, with 1 or 2 leaves in upper 1/3. Radical leaves: petiole 1–10 cm; blade glaucous abaxially, rather dark green adaxially, orbicular, 10–15 mm wide, with 3–5 obovate leaflets. Cauline leaves sessile, cut to base into 3–5 narrowly lanceolate lobes 10–20 mm. Racemes 3–9-flowered; bracts lanceolate, 10–15 mm, entire or lowermost often divided. Pedicel erect, straight, 10–15(–20) mm, thin. Sepals minute. Corolla pale to deep blue, with pinkish purple keel to outer petals, and sometimes with a pinkish suffusion toward spur, sepals, and apex of inner petals (crest excepted), rarely pale blue; upper petal 15–16 mm, narrowly cristate, margin entire to dentate, acute and upcurved at apex; spur 8–9 mm tapering to apex; nectary 1/2–2/3 as long as spur; lower petal with very short claw gradually broadened into a broad rounded acuminate limb to 7 mm wide; inner petals 8–9

mm with very pronounced dorsal crest protruding conspicuously beyond junction of inner petals. Ovary with 14–16 ovules; stigma very deeply cleft, each 1/2 with 4 papillae, of which lowest shows a tendency to be geminate. Fruit unknown. Fl. Jul–Aug.

• Alpine stony meadows, rocky places on limestone; 3500–3900 m. W Sichuan (Maonian).

**249. *Corydalis cytisiflora*** (Fedde) Lidén ex C. Y. Wu, H. Chuang & Z. Y. Su in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 219. 1999.

金雀花黄堇 jin que hua huang jin

Herbs, perennial, 15–30(–40) cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots almost linear, 10–40 × 0.5–1 mm; thin stolons sometimes present, with or without axillary storage roots. Stems 1–3, straight, slender, simple, with (1 or)2 or 3 leaves in upper 1/2. Radical leaves 2–8; petiole 3–9 cm; blade orbicular, 1.5–3 cm, ternate to biternate; leaflets entire to deeply cut into obovate-obtuse to oblong lobes 5–17 × 2–8 mm. Cauline leaves sessile; blade glaucous abaxially, palmatisect to base into 5–9 oblanceolate to narrowly oblong segments 10–30(–45) × 1.5–5 mm. Raceme 3–6(–10) cm, densely (5–)10–30-flowered, at fruiting extended; bracts 6–12 mm, ovate-lanceolate to lanceolate, entire, or lowermost sometimes divided. Pedicel erect, straight, 7–11(–20) mm at anthesis, 10–20 mm in fruit. Sepals minute. Corolla yellow, cream, blue, or purple; upper petal 12–19 mm, margin broadly spreading, usually dentate, apex obtuse, often shortly mucronate; dorsal crest very variable (see subspecies); spur upwardly reflexed, cylindrical, 5–10 mm, thick; nectary 1/3–2/3 as long as spur; lower petal 9–12 mm, with short claw and broad obtuse usually dentate limb 5–8 mm wide; apex obtuse or mucronate, dorsal crest present or absent; inner petals 7–11 mm, dorsal crest broad, clearly overtopping apex. Stigma didymous, cleft to middle, each 1/2 with 3 distinct marginal papillae; geminate papillae submarginal on rounded basal lobes. Capsule pendent from erect pedicel, oblong, 8–15 × 1.5–2 mm, 5–8-seeded; style 1.5–2 mm. Seeds in one row, 1–1.5 mm, smooth; caruncle small. Fl. and fr. May–Aug.

• Among shrubs, grasslands, meadows; 2600–4000(–4500) m. S and SW Gansu, N and W Sichuan.

- 1a. Flowers yellow or cream.  
 2a. Flowers 15–18 mm; lower petal without crest; capsule 12–15 mm ..... 249a. subsp. *cytisiflora*  
 2b. Flowers 11–12 mm; lower petal usually crested; capsule 8–11 mm ..... 249b. subsp. *minuticristata*  
 1b. Flowers blue to purple.  
 3a. Crest of outer petals 2–3 mm, much overtopping apex ..... 249c. subsp. *altecrinata*

- 3b. Crest of outer petals ca.  
1 mm, not or slightly  
overtopping apex ..... 249d. subsp. *pseudosmithii*

**249a. *Corydalis cytisiflora* subsp. *cytisiflora***

金雀花黄堇(原亚种) jin que hua huang jin (yuan ya zhong)

*Corydalis curviflora* Maximowicz var. *cytisiflora* Fedde, Repert. Spec. Nov. Regni Veg. 20: 290. 1924; *C. curviflora* var. *smithii* Fedde.

Corolla yellow; upper petal 15–18 mm; dorsal crest of upper petal extended to spur end; lower petal usually without crest. Capsule 12–15 × 1.5–2 mm. Seeds ca. 1.5 mm.

- Grasslands; 3200–3300 m. S Gansu (Wenchuan), N Sichuan (Songpan).

**249b. *Corydalis cytisiflora* subsp. *minuticristata* (Fedde) Lidén, **comb. nov.****

直距金雀花黄堇 zhi ju jin que hua huang jin

Basionym: *Corydalis curviflora* var. *minuticristata* Fedde, Repert. Spec. Nov. Regni Veg. 22: 27. 1926; *C. curviflora* subsp. *minuticristata* (Fedde) C. Y. Wu.

Corolla pale yellow; upper petal 11–12 mm; dorsal crest extended to spur end. Capsule 8–11 × ca. 1.5 mm. Seed 1.2–1.3 mm.

- Wet grasslands; 3200–3300 m. N and NW Sichuan (Dawu, Songpan).

**249c. *Corydalis cytisiflora* subsp. *altecrinata* (C. Y. Wu & H. Chuang) Lidén, **comb. nov.****

高冠金雀花紫堇 gao guan jin que hua zi jin

Basionym: *Corydalis curviflora* var. *altecrinata* C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 6: 247. 1984; *C. curviflora* subsp. *altecrinata* (C. Y. Wu & H. Chuang) C. Y. Wu.

Corolla pale blue to purplish blue; upper petal 13–15 mm; crests of both outer petals conspicuous, 2–3 mm, extending far beyond apex.

- Alpine grasslands and meadows; 3400–3900 m. W Sichuan (Baoping, Maoxian; Yajiang but subspecies determination uncertain).

**249d. *Corydalis cytisiflora* subsp. *pseudosmithii* (Fedde) Lidén, **comb. nov.****

流苏金雀花紫堇 liu su jin que hua zi jin

Basionym: *Corydalis curviflora* var. *pseudosmithii* Fedde, Repert. Spec. Nov. Regni Veg. 22: 27. 1926; *C. curviflora* subsp. *pseudosmithii* (Fedde) C. Y. Wu.

Corolla purple; upper petal 13–15 mm, margin conspicuously dentate; crest of outer petals ca. 1 mm, shortly decurrent on spur, not or slightly overtopping apex. Margin of bracts scarious-denticulate. Stigma often with 6 simple papillae rather forwardly disposed, and basal lobes hardly developed.

- Among shrubs, grasslands on hillsides; (2600–)3400–4100 m. SW Gansu (Jonê), N Sichuan (Barkam, Lixian, Songpan).

**250. *Corydalis nematopoda* Lidén & Z. Y. Su, Novon 17: 494. 2007.**

线基紫堇 xian ji zi jin

Herbs, perennial, 18–26 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots long and narrow, 4–10 cm × ca. 1 mm. Stems 2, erect, 18–26 cm, slender, simple, leafless in lower 1/3 or 1/2, above with 2 or 3 leaves. Radical leaves long stalked (5–7 cm), not withered in early fruiting stage; blade glaucous abaxially, green adaxially, orbicular, 20–30 mm wide, deeply divided into 3–5 leaflets again cut into 2 or 3 linear-oblong lobes. Cauline leaves like radical leaves, deeply cut into 3–8 linear-oblong lobes ca. 2 cm × 2–4 mm. Racemes 5–16-flowered, dense at anthesis, lax in fruit; bracts narrowly lanceolate, subobtusate, 5–10 mm or lowermost much larger and occasionally divided like uppermost leaf. Pedicel very short at anthesis, elongating considerably to 12–20 mm and erect-spreading in fruit. Sepals minute. Corolla cream, with brownish yellow keels; inner petals with yellow tip turning brownish after pollination; outer petals with crest ca. 1 mm; upper petal 11–12 mm; spur ca. 4 mm; nectary ca. 1/2 as long as spur; lower petal 9–10 mm; inner petals 8–9 mm, dorsal crest overtopping apex. Stigma didymous, cleft to middle, each 1/2 with 2 distinct long apical papillae and a shorter lateral papilla; geminate papillae on basal lobes. Capsule pendent from suberect pedicel, broadly obovoid, ca. 7 × 3.5 mm, 2–5-seeded; style ca. 2.5 mm. Seeds ca. 2 × 1.5 mm, smooth, with short and broad elaiosome. Fl. Jun–Jul, fr. Jul.

- Steep hillsides with scrub cover; ca. 3400 m. SE Qinghai (Baima).

**251. *Corydalis pseudofilisecta* Lidén & Z. Y. Su, Edinburgh J. Bot. 54: 79. 1997.**

假丝叶紫堇 jia si ye zi jin

Herbs, perennial, 10–20 cm tall, glabrous or with papillose-hairy pedicels; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fascicled, long and narrow, 2–6 cm × 0.5–1.5 mm, tapering to both ends. Stems slender, simple, with 2 leaves in upper 1/2. Radical leaves few; petiole weak, 2–5 cm; blade glaucous especially abaxially, orbicular, 1–2 × 1–2 cm, sub-binate; lobes 3–6, obovate to obovate-oblong. Cauline leaves sessile, palmatifid to base into 3–6 linear lobes 8–20 × 1–3 mm. Raceme 1.5–2 cm, 3–14-flowered, at flowering dense, at fruiting extended; bracts linear-oblongate or linear, 7–10 mm, obtuse. Pedicel erect, ca. 10 mm, at fruiting prolonged to 15 mm. Sepals 0.5–1 mm, with narrow teeth. Corolla blue, inner petals whitish; outer petals navicular-acute; dorsal crest narrow (ca. 1 mm) but conspicuously overtopping apex, hardly decurrent on spur; upper petal 13–15 mm; spur straight, conical, 7–8 mm, obtuse; nectary almost 1/2 as long as spur, thin; lower petal 8–9 mm; inner petals 7–8 mm. Stigma cleft to 1/3, with 4 apical marginal papillae, lateral papillae indistinct, geminate papillae at base. Capsule elliptic, 5–7 × 2–3 mm, smooth, 2–5-seeded; style ca. 2.5 mm.

- Wet brooks; 3900–4700 m. C Xizang (Lhasa).

**252. *Corydalis verna* Z. Y. Su & Lidén, Edinburgh J. Bot. 54: 80. 1997.**

春花紫堇 chun hua zi jin

Herbs, perennial, 4–10 cm tall, glabrous; stems and peti-



oles of radical leaves attenuate to filiform underground base. Storage roots fascicled, narrowly fusiform, 10–40 × 1–3 mm. Stems 1–5, erect to ascending, simple, with 0–2 leaves. Radical leaves 2–5 or more; petiole 2–6 cm; blade glaucous, orbicular, 1–2.5 cm, ternate to sub-binate, with 5–10 broadly obovate overlapping lobes. Cauline leaves sessile or subsessile; blade palmately cut to base into 3–6 oblanceolate to narrowly obovate lobes 0.5–1.5 cm × 1–4 mm, apex obtuse. Raceme very dense, 3–7-flowered; bracts 6–10 mm, palmatisect to ca. 2/3 into 3–7 oblong lobes (median lobe often larger). Pedicel erect, 5–10 mm. Sepals minute. Corolla clear blue; outer petals obtuse, usually with narrow crest to 0.5 mm; upper petal 11–13 mm, apex upwardly reflexed; spur cylindrical or slightly tapering, 6–8 mm; nectary ca. 1/2 as long as spur; lower petal 8–10 mm, apex broad, obtuse, claw sometimes with a small gibbosity at base; inner petals 7–9 mm; dorsal crest broad, rounded, overtopping apex. Stigma didymous, cleft to 1/2–2/3, division flanked by 2 very long narrow papillae, lateral marginal papillae broad, diffuse; geminate papillae in basal corners. Capsule unknown; ovules numerous (23 or 24); style ca. 2 mm. Fl. Mar–Jun.

- Open stony slopes; 4000–5000 m. E Xizang (Zogang).

**253. *Corydalis pachycentra*** Franchet, Pl. Delavay. 45. 1889.

浪穹紫堇 lang qiong zi jin

Herbs, perennial, 5–20 cm tall, glabrous or papillose-scabrid along margins of leaves; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fascicled, 10–40 × 1–3 mm, tapering to both ends, with indistinct stalk 5–15 mm; very thin stolons often present. Stems 1–5(–8), erect to ascending, often purplish, simple, with 2(or 3) leaves. Radical leaves 2–5 or more; petiole 2–7 cm; blade glaucous abaxially, dark green to glaucous adaxially, nearly orbicular, 1–2.5(–4) cm, ternate to sub-binate, with 4–12 rounded to oblong leaflets. Cauline leaves sessile; blade palmately cut to base into 5–7(–11) lanceolate to linear-oblong leaflets 1–2 cm × 1–3 mm, apex obtuse. Raceme 2–3 cm, 4–12-flowered; bracts elliptic to linear-lanceolate, 5–16 mm, entire or rarely lowermost 3-lobed. Pedicel erect, 4–10(–15) mm, rather stout, elongating to 10–20 mm in fruit. Sepals minute. Corolla blue or indigo; tip of upper petal with white marks adaxially; tip of inner petals darker, except for dorsal pale blue crest; outer petals obtuse, undulate, without or with narrow crest to 0.5(–1) mm; upper petal 13–15 mm, apex upwardly reflexed; spur upwardly reflexed, cylindrical, 7–10 mm, thick; nectary 1/2–2/3 as long as spur; lower petal 9–10 mm, apex obtuse, claw indistinct, shallowly saccate; inner petals 7–8 mm. Stigma didymous, cleft to 1/3, each 1/2 with 3 distinct marginal papillae; geminate papillae on rounded basal lobes. Capsule obovoid, 7–10 × ca. 3 mm, 4–10-seeded, when mature reflexed from erect pedicel; style ca. 2 mm. Fl. and fr. May–Sep.

- Open stony slopes, wet alpine disturbed meadows, scree; (2700–)3500–4200(–5200) m. SW and WC Sichuan, E Xizang, NW Yunnan.

This is a very variable species: there are forms flowering in spring (NW Yunnan) and forms flowering in late summer (Sichuan), tall slender forms and low-growing forms, and forms with and without thin stolons.

**254. *Corydalis curviflora*** Maximowicz, Fl. Tangut. 41. 1889.

曲花紫堇 qu hua zi jin

Herbs, 7–20 cm tall (to 50 cm in extreme shade forms), glabrous to densely papillose-scabrid; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fascicled, oblong, 5–15 × 3–4 mm, sharply set off by long thin stalks 1–7 cm. Stems 1–4, erect, slender to robust, simple, with 2 or 3 leaves in upper 1/2. Radical leaves few; petiole (2–)4–7(–13) cm; blade orbicular to reniform, sub-binate to biternatisect into 5–10 obovate to oblong obtuse lobes 5–18 × 2–8 mm. Cauline leaves sessile; blade glaucous abaxially, palmatisect to base into linear to narrowly oblanceolate lobes 10–40 × 1–6 mm. Raceme 2.5–10 cm, densely 6–18-flowered; lower bracts cut to base into 3–5 linear-oblong to lanceolate lobes, upper bracts entire, very rarely all entire. Pedicel 5–10 mm, elongating to 10–15 mm in fruit. Sepals minute. Corolla clear light blue; outer petals obtuse, often mucronate, slightly dentate, with dorsal crest 0.5–1(–1.5) mm, shortly decurrent on spur, slightly overtopping apex; upper petal 13–15 mm; spur upwardly reflexed, cylindrical, 6–7 mm, thick; nectary 1/2(–2/3) as long as spur; lower petal broadly obovate, 8–11 mm, apex rounded, mucronate, abaxial crest short; inner petals 7–9 mm; dorsal crests rounded, clearly overtopping apex. Stigma shallowly bifid with 6 marginal simple papillae and geminate papillae in basal corners. Capsule reflexed from erect pedicel, oblong to elliptic, 12–18 × ca. 3 mm, 5–12-seeded; style ca. 2.5 mm. Seeds smooth. Fl. and fr. May–Aug.

- Among shrubs, grasslands, meadows; 2400–3900(–4600) m. SW Gansu, Ningxia, E and S Qinghai, N and NW Sichuan.

- 1a. Fruit with thick undulate lines; plant usually slender ..... 254a. subsp. *curviflora*
- 1b. Fruit with papillose lines; plant often low and robust ..... 254b. subsp. *rosthornii*

**254a. *Corydalis curviflora* subsp. *curviflora***

曲花紫堇(原亚种) qu hua zi jin (yuan ya zhong)

*Corydalis curviflora* var. *trifida* W. T. Wang ex C. Y. Wu & H. Chuang.

Stems slender. Lower petal without distinct claw, expanded almost from base. Capsule usually with thick undulate lines.

- Among shrubs, grasslands; 2400–3900(–4600) m. SW Gansu, Ningxia (Jingyuan, Longde), E and S Qinghai, NW Sichuan.

**254b. *Corydalis curviflora* subsp. *rosthornii*** (Fedde) C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 221. 1999.

具爪曲花紫堇 ju zhua qu hua zi jin

*Corydalis curviflora* var. *rosthornii* Fedde, Repert. Spec. Nov. Regni Veg. 12: 406. 1913.

Plant often low and robust. Lower petal much expanded in distal 1/2. Capsule with papillose lines.

- Grasslands on hillsides, meadows; (2400–)3000–4000(–4500) m. N and NW Sichuan.

**34. *Corydalis* ser. *Fusiformes*** C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 4: 11. 1982.

纺锤根系 fang chui gen xi

Herbs, perennial; stems and petioles of radical leaves attenuate to filiform underground base. Rhizome small, with fascicle of fleshy storage roots; resting bud small to large. Stem simple. Cauline leaves ternate to bi-(tri-)ternate. Corolla blue; dorsal crest of inner petals not or slightly overtopping apex. Capsule pendent from erect pedicel, explosively dehiscent. Cotyledon 1.

Thirteen species: Bhutan, China, N India, Kashmir, Myanmar, Nepal; 13 species (seven endemic) in China.

- 1a. Cauline leaves 2, opposite, usually with late branches in axils ..... 255. *C. enantiophylla*  
 1b. Cauline leaves alternate or solitary or lacking; stems simple, rarely with a single branch.  
 2a. "Bulb" poorly developed, 1–3 mm, hardly discernable in herbarium specimens.  
   3a. Spur downcurved; stem with 2 leaves ..... 258. *C. cheirifolia*  
   3b. Spur straight; stem with 1 leaf.  
     4a. Cauline leaf shortly stalked, trifoliolate ..... 256. *C. trifoliata*  
     4b. Cauline leaf sessile with several narrow lobes ..... 257. *C. oxypetala*  
 2b. "Bulb" prominent, 4–15 mm.  
   5a. Upper petal 9–12 mm; stem 4–7 cm, usually leafless.  
     6a. Pedicels 5–15 mm, flowers not concealed by bracts ..... 263. *C. jigmei*  
     6b. Pedicels 3–5 mm, flowers partly concealed by bracts ..... 264. *C. oxalidifolia*  
   5b. Upper petal 12–21 mm; stem 6–30 cm, with (0 or) 1 or 2 leaves.  
     7a. Leaflets obovate; radical leaves prominent (cauline leaf often absent).  
       8a. Leaves glossy green adaxially, glaucous abaxially; sepals minute; crest of upper petal  
         ca. 1 mm wide ..... 266. *C. pseudoadoxa*  
       8b. Leaves very glaucous on both surfaces; sepals 1–1.5 mm, lacinate-dentate; crest of  
         upper petal ca. 0.5 mm wide ..... 267. *C. glaucissima*  
     7b. Leaflets linear to narrowly lanceolate or oblanceolate; radical leaves subordinate (cauline  
       leaf rarely absent).  
       9a. Raceme 8–19-flowered; crest of upper petal 1–1.5 mm ..... 265. *C. oreocoma*  
       9b. Raceme 2–8-flowered; crest of upper petal usually narrow or absent.  
         10a. Cauline leaves 2; upper petal 10–11 mm ..... 260. *C. filisecta*  
         10b. Cauline leaf solitary; upper petal 13–21 mm.  
           11a. Lower petal very broad, apically truncate; leaflets of cauline leaf 0.5–1 mm  
             wide ..... 262. *C. ecristata*  
           11b. Lower petal acute to subacute; leaflets of cauline leaf 1–3 mm wide.  
             12a. Upper petal 14–15 mm, without crest; spur 7–8 mm; cauline leaf  
               divided into 5 linear lobes; pedicels 8–12 mm ..... 259. *C. longibracteata*  
             12b. Upper petal 16–21 mm, with or without crest; spur 9–12 mm; cauline  
               leaf often more divided; pedicels 10–30 mm ..... 261. *C. cashmeriana*

**255. *Corydalis enantiophylla*** Lidén, Edinburgh J. Bot. 55: 343. 1998.

对叶紫堇 dui ye zi jin

Herbs, perennial, 15–35 cm tall; leaves and bracts minutely papillose abaxially. Rhizome and radical leaves unknown. Stems attenuate to filiform underground base, very slender, simple or often with late axillary branches, with 2 leaves in upper 1/3. Cauline leaves truly opposite with petioles joined across node; petiole 0.5–2 cm; blade glaucous abaxially, green adaxially, 1–2.5 × 1–3 cm, biternate; leaflets entire or deeply cut into obovate to oblong, obtuse, obscurely mucronate lobes. Racemes dense, subumbellate, 6–11-flowered, simple or with a basal branch, elongating in fruit; peduncle 5–10 cm; bracts 4–13 mm, palmately deeply cut into oblanceolate obtuse lobes or upper ones entire. Pedicel 5–12 mm, thin. Sepals 0.5–1 × ca. 1 mm, deeply dentate. Corolla pale blue to intensely brilliant blue; outer petals very narrowly crested, margin finely dentate in apical 1/3, apex acute to acuminate; upper petal 16–

20 mm; spur straight or slightly upturned, 11–13 mm, very slender; nectary lacking; lower petal rhombic, 10–11 mm, with indistinct claw; inner petals 7–9 mm, dorsal crest slightly overtopping apex. Stigma broader than long, apically cleft 1/3–1/2, marginal papillae 6; geminate papillae lateral and on well-developed basal lobes. Fruit unknown (ovules 10–15); style 2.5–3 mm. Fl. Jul–Aug.

Alpine meadows, along streams on slopes; 3000–3200 m. W Yunnan (Fugong: Gaoligong Shan) [Myanmar].

**256. *Corydalis trifoliata*** Franchet, Bull. Soc. Bot. France 33: 392. 1886.

三裂紫堇 san lie zi jin

*Corydalis quadriflora* Handel-Mazzetti.

Herbs, perennial, 12–20(–30) cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots several, densely fascicled, spindle-shaped, 10–15 × 3–5 mm, sessile. Stems 1 or 2, erect, slender, simple, with 1

leaf in upper 1/2. Radical leaves few; petiole 3–12 cm, slender; blade 0.5–2 × 1–3 cm, ternate; leaflets shortly stalked to subsessile, obovate, entire or often slightly 2- or 3-divided at apex. Cauline leaves: petiole 0.5–2 cm; blade trifoliolate; leaflets subsessile, elliptic, 1–3 × 0.5–1.5 cm. Raceme very dense, 2–8-flowered, not elongating in fruit; bracts 8–18 mm, lowermost bracts broadly elliptic, entire or often deeply or slightly 3-divided; others ovate to lanceolate, entire. Pedicel 3–9 mm, in fruit to 7–15 mm and erect. Sepals 0.5–1 mm, fimbriate-dentate. Corolla blue with white markings; upper petal navicular, 12–18 mm, subacute, with narrow crest; spur straight to slightly downcurved at apex, cylindrical, 7–10 mm; nectary 1/2–2/3 as long as spur; lower petal broadly obovate, 8–14 mm, base narrow, often with small gibbosity, apex shortly acuminate; inner petals 7–10 mm. Stigma with 4 marginal simple papillae; geminate papillae lateral and on basal lobes. Capsule pendent from erect pedicel, elliptic, 11–15 × 3–4 mm, 18–25-seeded; style ca. 2.5 mm. Seeds 0.8–1 mm, smooth. Fl. and fr. Jul–Sep.

Among *Rhododendron*, hillsides, stony crevices; 3000–4300 m. SE Xizang (Cona, Mainling, Zayü), W Yunnan [Bhutan, India (Sikkim), N Myanmar, Nepal].

**257. *Corydalis oxypetala*** Franchet, Bull. Soc. Bot. France 33: 392. 1886.

尖瓣紫堇 *jian ban zi jin*

Herbs, perennial, 10–25(–40) cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fascicled, spindle-shaped, 10–15 × 3–5 mm, sessile or very shortly stalked. Stems 1(or 2), simple, with 1 leaf at stem middle. Radical leaves few; petiole 2–10 cm; blade very glaucous abaxially, green adaxially, orbicular, 1.5–3 cm, firm, ternate; leaflets shallowly to deeply 3-lobed. Cauline leaves sessile or shortly petiolate; blade 1.5–3(–5) cm, ternate; leaflets once to twice deeply and irregularly biternatisect; lobes entire or again deeply divided, ovate to linear. Raceme 3–9 cm, 5–20-flowered; bracts ovate to lanceolate, 6–15 mm, acute, entire or rarely lowermost lobed. Pedicel thin, 5–10(–15) mm, elongating to 7–20 mm in fruit. Sepals minute. Petals light to dark clear blue, rarely with purplish suffusion; inner petals clearly darker at apex, but dorsal crest not so dark; upper petal navicular, 11–17 mm, narrowly crested or without crest; spur conical, 4–9 mm; nectary ca. 1/2 as long as spur, extremely thin; lower petal oblanceolate, 9–11 mm, crest small; inner petals 7–9 mm. Stigma with 4 apical marginal papillae; geminate papillae lateral and on tip of large basal lobes. Capsule linear, 8–11 × 1–1.5 mm, 5–9-seeded; style ca. 2.5 mm. Seeds 1–1.2 mm, smooth, with small appressed elaiosome. Fl. May–Sep, fr. Aug–Sep.

• Among shrubs, grasslands, often very wet places, forests at mountain summits; 2000–4100 m. NW Yunnan.

- 1a. Upper petal 15–17 mm  
with spur 7–9 mm ..... 257a. subsp. *oxypetala*  
1b. Upper petal 11–12 mm  
with spur 4–6 mm ..... 257b. subsp. *balfouriana*

**257a. *Corydalis oxypetala*** subsp. *oxypetala*

尖瓣紫堇(原亚种) *jian ban zi jin* (yuan ya zhong)

*Corydalis multisepta* C. Y. Wu & H. Chuang.

Upper petal 15–17 mm with spur 7–9 mm.

• Among shrubs, grasslands, often very wet places; 3000–4100 m. NW Yunnan.

**257b. *Corydalis oxypetala*** subsp. *balfouriana* (Diels) Lidén, **comb. et stat. nov.**

小花尖瓣紫堇 *xiao hua jian ban zi jin*

Basionym: *Corydalis balfouriana* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 254. 1912.

Upper petal 11–12 mm with spur 4–6 mm.

• Open forests, among shrubs, grassy hillsides; 2000–3700 m. NW Yunnan (Dêqên, Weixi).

**258. *Corydalis cheirifolia*** Franchet, J. Bot. (Morot) 8: 285. 1894.

掌叶紫堇 *zhang ye zi jin*

Herbs, perennial, 10–20 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots densely fasciculate, broadly elliptic to nearly globose, 5–15 × 3–8 mm, sessile. Stems 1 to few, simple, with (1 or)2(–4) leaves. Radical leaves few; petiole 2–6 cm, thin; blade glaucous abaxially, green adaxially, ternate; leaflets broadly obovate, cleft into rounded lobes. Cauline leaves very shortly petiolate or sessile, ternate; leaflets sessile or shortly stalked, shallowly to deeply divided into obovate-obtuse to oblong lobes. Raceme 3–6 cm, at fruiting to 9 cm, 5–12-flowered; bracts 7–16 mm, lowest bracts larger, deeply cleft into 3 or 4 obovate obtuse lobes; middle and upper bracts obovate to lanceolate, entire or with 1 or 2 small lateral lobes. Pedicel 4–6 mm, in fruit erect and 7–12 mm. Sepals minute or to 0.5 mm, slightly dentate. Corolla clear blue to purplish blue; upper petal 16–20 mm, petal lobes navicular-subacute, without crest; spur slightly tapering to a slightly downcurved apex, 9–12 mm; nectary ca. 2/5 as long as spur; lower petal navicular-oblongate, 8–10 mm, acute; inner petals 7–8 mm. Stigma square, marginal simple papillae 4–6; geminate papillae lateral (clearly laminal, i.e., not at margin of stigma) and 2 on short basal lobes. Capsule pendent from erect pedicel, elliptic, 11–15 × ca. 3 mm, 14–20-seeded. Seeds in 2 rows, 1–1.1 mm, smooth. Fl. and fr. Jun–Sep.

• Meadows, limestone crevices; 2900–3100 m. NW Yunnan (Binchuan, Dali, Eryuan).

**259. *Corydalis longibracteata*** Ludlow & Stearn, Bull. Brit. Mus. (Nat. Hist.), Bot. 5: 56. 1975.

长苞紫堇 *chang bao zi jin*

Herbs, perennial, 10–20 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fascicled, 10–40 × 2–3 mm, attenuate to base; bulb prominent, 3–7 × 2–5 mm, of several fleshy pale ovate scales. Stems 1 to few, erect, slender, simple, with 1 leaf above middle. Radical leaves small; petiole 1–4 cm, thin; blade orbicular, ca. 1 × 1 cm, cut to base into 3–6 oblong lobes. Cauline leaves: petiole 0.5–2 cm; blade usually with 5 linear leaflets (ternate with binate lateral leaflets) 11–45 × 1–3 mm. Raceme

corymbose, 1–2 cm, densely 2–4-flowered; lower bract similar to leaf, 3–5-parted with long linear lobes, 1–1.5 cm; upper bracts linear, 0.5–1 cm, entire. Pedicel erect, 8–12 mm, thin. Sepals ca. 0.5 mm, slightly dentate. Corolla violet-purple to sky blue; upper petal rhombic-acute, 14–15 mm, without crest; spur cylindrical, 7–8 mm; nectary ca. 1/2 as long as spur; lower petal navicular, narrowly obovate, 9–11 mm, acute, without crest; inner petals 8–9 mm. Ovules ca. 20; stigma square with 4 marginal apical papillae; geminate papillae lateral and on well-developed basal lobes. Capsule pendent from erect pedicel, linear-oblong, ca. 10 × 1.5 mm. Fl. and fr. Jun–Sep.

- Open stony shale scree; 3500–4200 m. SE Xizang.

**260. *Corydalis filisecta*** C. Y. Wu, Acta Bot. Yunnan. 6: 248. 1984.

丝叶紫堇 si ye zi jin

Herbs, perennial, 25–30 cm tall. Stems simple, erect, with 2(or 3?) leaves in upper 1/2, tapering to thin base. Cauline leaves shortly stalked; blade glaucous abaxially, green adaxially, palmately cut into 3–7 linear leaflets 20–35 × 0.5–1 mm, apex acuminate. Raceme 2–4 cm, densely many flowered; lowest bract with 3 linear segments, other bracts linear, entire. Pedicels slightly longer than bracts, slender. Corolla sky blue; upper petal 10–11 mm, limb navicular, acute, without crest; spur cylindrical, ca. 6 mm; nectary ca. 1/2 as long as spur, very thin; lower petal navicular-oblongate, without crest; inner petals ca. 6 mm. Stigma square, with 4 marginal apical papillae; geminate papillae lateral and on well-developed basal lobes. Fl. Aug.

- *Picea* forests; ca. 3800 m. SE Xizang (Bomi).

This species is like *Corydalis longibracteata* but has longer stems, more numerous and smaller flowers, and thinner nectaries. It is possibly a shade form of that species.

**261. *Corydalis cashmeriana*** Royle, Ill. Bot. Himal. Mts. 1: 69. 1834.

克什米尔紫堇 ke shi mi er zi jin

Herbs, perennial, 5–20 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fascicled, 10–35 × 2–4 mm, sessile, tapering distally; resting bud bulblike, 3–4 × 2–4 mm, of several pale fleshy scales. Stems erect, slender, simple, with 1(or 2) leaves above middle. Radical leaves few; petiole 4–8 cm, slender; blade ternate, petiolules short to rather long; leaflets deeply ternatisect (rarely biternatisect); lobes narrowly elliptic, 4–11 mm. Cauline leaf sessile, rarely with petiole to 1 cm; blade 1–3 cm, bi- to triternate with narrowly oblanceolate segments 1–2 mm wide. Raceme 2–5 cm, 2–8-flowered, elongating in fruit; bracts 8–12 mm, deeply divided into 2–7 narrowly oblanceolate to linear lobes. Pedicel 10–25 mm in flower, erect and elongating to 15–30(–40) mm in fruit. Sepals minute, slightly dentate. Corolla blue, often tip of inner petals darker (except for dorsal crest); upper petal navicular, 16–21 mm, subacute, crest narrow or sometimes absent; spur slightly downcurved, cylindrical or slightly tapering, 9–12 mm; nectary 1/2–2/3 as long as spur; lower petal 11–14 mm, claw 4–6 mm, limb rhombic, 6–7 mm

wide, subacute to subobtusate; inner petals 8–10 mm. Stigma broader than long, median marginal papillae distinct, lateral broad and diffuse; geminate papillae lateral (submarginal) and on basal lobes. Capsule pendent from erect pedicel, linear-oblong, 10–15 × 1.5–2 mm, 10–20-seeded, explosively dehiscent; style ca. 2.5 mm. Seeds smooth. Fl. Apr–Aug, fr. Jun–Sep.

Alpine meadows, slopes. S Xizang [Bhutan, N India, Kashmir, Nepal].

- 1a. Racemes 3–8-flowered ..... 261a. subsp. *cashmeriana*
- 1b. Racemes 2-flowered ..... 261b. subsp. *longicalcarata*

**261a. *Corydalis cashmeriana*** subsp. *cashmeriana*

克什米尔紫堇(原亚种) ke shi mi er zi jin (yuan ya zhong)

Racemes 3–8-flowered.

Alpine meadows, slopes. S Xizang (Kangrinboqê Feng) [N India (Kumaon), Kashmir, W Nepal].

**261b. *Corydalis cashmeriana*** subsp. *longicalcarata* (D. G. Long) Lidén, **comb. in stat. nov.**

少花克什米尔紫堇 shao hua ke shi mi er zi jin

Basionym: *Corydalis ecristata* (Prain) D. G. Long var. *longicalcarata* D. G. Long, Notes Roy. Bot. Gard. Edinburgh 42: 93. 1984; *C. cashmeriana* var. *longicalcarata* (D. G. Long) R. C. Srivastava; *C. ecristata* subsp. *longicalcarata* (D. G. Long) C. Y. Wu.

Racemes 2-flowered.

3200–3900 m. S Xizang (Yadong) [Bhutan, NE India (Sikkim), E Nepal].

**262. *Corydalis ecristata*** (Prain) D. G. Long, Notes Roy. Bot. Gard. Edinburgh 42: 91. 1984.

无冠紫堇 wu guan zi jin

*Corydalis cashmeriana* Royle var. *ecristata* Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 22. 1896; *C. cashmeriana* var. *brevicornu* Prain.

Herbs, perennial, 5–10 cm above soil surface; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots few, fascicled, 12–30 × 2–4 mm, tapering distally. Bulb (resting bud) broadly ovoid, 5–8 × 5–10 mm, of several pale fleshy scales. Stems erect, thin, simple, with 1 leaf in upper 1/3, or leaf lacking. Radical leaves few; petiole 2–6 cm, thin; blade 6–15 × 8–15 mm, bi-(tri-)ternate, primary leaflets petiolulate, ultimate leaflets sessile, deeply divided into obovate to elliptic lobes. Cauline leaf sessile; blade 0.8–2.5 cm, deeply bi- to triternatisect into narrowly linear lobes 0.5–1(–1.5) mm wide. Raceme umbellate, 1–3 cm, 2–6-flowered, not elongating in fruit; bracts 8–13 mm, deeply cut into 3–13 linear lobes. Pedicel 8–25 mm, thin, erect in fruit. Sepals minute. Petals clear blue, inner petals pale but darker at tip; upper petal narrowly navicular, 13–19 mm, subacute, crest narrow or absent; spur straight or downcurved apically, cylindrical, 6–11 mm; nectary ca. 2/3 as long as spur; lower petal 10–13 mm, claw distinct, 4–5 mm, limb orbicular, much surpassing upper petal, 7–10 mm wide, apex truncate; inner petals 7–9 mm. Stigma broader than

long, median marginal papillae distinct, lateral broad and diffuse; geminate papillae lateral (submarginal) and on basal lobes. Capsule reflexed from straight pedicel, lanceolate, 5–8 × 1.5–2 mm, ca. 10-seeded; style ca. 2.5 mm. Fl. and fr. Jun–Sep.

Mossy rocks, fine scree; 4000–5000 m. S Xizang (Yadong) [Bhutan, India (Sikkim), E Nepal].

**263. *Corydalis jigmei*** C. E. C. Fischer & Kaul, Bull. Misc. Inform. Kew 1940: 266. 1940.

藏南紫堇 zang nan zi jin

Herbs, perennial, 4–7(–12) cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform base. Storage roots 10–15 × 1–3 mm, tapering distally. Bulb (resting bud) large, 8–12 × 10–15 mm, of several pale fleshy ovate scales. Stems 2–5, erect, thin, simple, without leaf or with one leaf at middle. Radical leaves: petiole 1.5–4 cm; blade gray-glaucous, sometimes with small spots, orbicular-triangular, 6–15 × 12–20 mm, fleshy, ternate; leaflets shortly stalked, once to usually twice deeply ternatisect into obovate lobes. Cauline leaf small, shortly stalked, or usually absent. Raceme subumbellate, 1–2 cm, 3–5-flowered, not elongating in fruit; bracts 4–8 mm, deeply 3–8-divided into oblanceolate lobes, upward smaller and less divided. Pedicel erect, 5–15 mm. Sepals whitish, 0.5–1 mm, deeply lacerate. Petals clear blue, sometimes masked with purple, inner petals darker at tip (except for dorsal crest); upper petal navicular, 9–12 mm, rhombic-acute, often narrowly crested; spur cylindrical, 3–6 mm; nectary ca. 1/2 as long as spur; lower petal 7–8 mm; claw distinct, 2.5–3 mm; limb rhombic, ca. 5 mm wide, acute to shortly acuminate, usually narrowly crested; inner petals 6–7 mm. Stigma with 4(or 6) broad marginal papillae; geminate papillae usually only on basal lobes. Capsule reflexed from straight pedicel, narrowly elliptic, 5–6 × ca. 1.5 mm, ca. 10-seeded; style ca. 2.5 mm. Fl. and fr. (Jun–)Jul–Sep.

Mossy cliffs, in grass turf of grazed meadows; 4300–5300 m. S Xizang [Bhutan, India (Sikkim), Nepal].

**264. *Corydalis oxalidifolia*** Ludlow & Stearn, Bull. Brit. Mus. (Nat. Hist.), Bot. 5: 61. 1975.

假酢浆草 jia cu jiang cao

Herbs, perennial, 4–7 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform base. Storage roots 1 (young plants?) to few, 0.5–1.5 cm, distally rapidly tapering to thin apex. Bulb (resting bud) prominent, 5–8 × 5–10 mm, of several pale fleshy ovate scales. Stems 1–3, erect, thin, simple, without leaf. Radical leaves almost equaling stem; petiole 3–7 cm; blade orbicular, 0.5–1.2 × 0.5–1.5 cm, ternate to biternate; leaflets sessile, crowded, obovate. Raceme umbellate, ca. 1 cm, densely 2–4-flowered; bracts 7–10 mm, lower (outer) bracts deeply 3–6-divided, inner ones broadly obovate with a few apical teeth. Pedicel erect, 3–5 mm. Flowers blue, ± concealed by bracts. Sepals minute. Upper petal navicular, 9–10 mm, acute, often narrowly crested; spur downcurved, saccate, 2–3 mm; nectary ca. 1/2 as long as spur; lower petal oblanceolate, ca. 7 mm, acute, usually narrowly and shortly crested; inner petals 6–7 mm. Stigma with 4 apical marginal papillae; geminate papillae only lateral, basal lobes not developed. Fruit unknown; style ca. 1.5 mm. Fl. Jun–Aug.

Alpine grassy hillsides; 4200–4600 m. S Xizang (Me La on border with NE Bhutan) [Bhutan].

**265. *Corydalis oreocoma*** Lidén & Z. Y. Su, Edinburgh J. Bot. 54: 77. 1997.

线足紫堇 xian zu zi jin

Herbs, perennial, 14–30 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots 3–5 cm × ca. 1 mm, tapering to both ends. Bulb prominent, white, rounded, ca. 0.5 × 0.5 cm, of several fleshy ovate scales, apparently becoming hard. Stems 1 or 2, erect, thin, simple or with 1 branch from upper leaf axil, with 2 leaves near middle. Radical leaves few; petiole 5–12 cm, very thin; blade 1–1.5 × ca. 2 cm, ternate; leaflets shortly petiolulate, deeply 2–4-divided; lobes oblanceolate. Cauline leaves subsessile or rarely lower ones with petiole to 1.5 cm; blade 2–3 cm, deeply biternatisect into narrowly lanceolate to linear lobes. Raceme 2–5 cm, 8–19-flowered, dense at first, elongating in fruit; lower bracts 10–17 mm, deeply 3–7-fid into linear lobes; upper bracts linear-lanceolate, 8–12 mm, entire. Pedicel 13–30 mm, very thin, presumably erect in fruit. Sepals minute. Corolla sky blue, inner petals pale, apparently dark blue at apex; upper petal broadly rhombic, 14–15 mm, subacute to subacuminate, crest ca. 1 mm wide, tapering to both ends, not decurrent on spur; spur straight, cylindrical, ca. 7 mm, rather narrow; nectary 1/2–2/3 as long as spur, thin; lower petal ca. 10 mm, acute, with very prominent rounded lateral flaps, broadly crested; inner petals 8–9 mm. Stigma with 4–6 marginal papillae; geminate papillae on basal lobes. Fruit and seed unknown. Fl. Jul–Aug.

• Damp ground in forests; 3900–4100 m. SE Xizang.

**266. *Corydalis pseudoadoxa*** (C. Y. Wu & H. Chuang) C. Y. Wu & H. Chuang in C. Y. Wu, Fl. Xizang. 2: 276. 1985 [*“pseudo-adoxa”*].

波密紫堇 bo mi zi jin

*Corydalis balfouriana* Diels var. *pseudoadoxa* C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 4: 8. 1982 [*“pseudo-adoxa”*]; *C. semiaquilegiifolia* C. Y. Wu & H. Chuang.

Herbs, perennial, 8–15 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Rhizome 0.5–1 cm; storage roots therefore not as densely clustered, pale, 3–8 cm × 1–1.5 mm, tapering distally. Bulb prominent, white, rounded, apical on rhizome, 0.5–1.1 × ca. 0.5 cm, of several pale fleshy ovate scales, outer becoming ?hard. Stems 1–4, erect or ascending, often reddish, simple, without leaves or with 1 leaf. Radical leaves few to several; petiole 3–13 cm; blade glaucous abaxially, (glossy) green adaxially, sometimes with small dark spots, suborbicular, 1–3 cm, slightly thick, ternate; leaflets petiolulate to sessile, slightly to deeply 2- or 3-divided; lobes obovate to oblanceolate, mucronulate. Cauline leaf absent or sessile, to 1 cm, deeply 3–5-digitate. Raceme 2–5 cm, 4–13-flowered, dense at first, elongating in fruit; bracts narrowly ovate to oblanceolate, entire or lower bracts often deeply ternatisect to sub-biternatisect. Pedicel erect, slender, 7–10 mm in flower, 10–14 mm in fruit. Sepals minute. Corolla blue with white markings and often a purplish shade on spur, inner petals pale (often appearing dark at apex due to adaxial dark spot);

outer petals acute, crest 1–1.5 mm wide, tapering to both ends, not decurrent on spur; upper petal 12–15 mm; spur straight or slightly downcurved, cylindrical, 4–7 mm; nectary 1/2–2/3 as long as spur, thin; lower petal 8–10 mm, rhombic-acute; inner petals 6–8 mm. Stigma slightly emarginate, marginal papillae 4, rather flat; geminate papillae lateral and on basal lobes. Capsule reflexed from erect pedicel, oblong to obovoid, 5–9 × 1.5–2 mm, 3–7-seeded. Seeds ca. 1 mm, smooth, with small appressed elaiosome. Fl. Jun–Oct, fr. Aug–Oct.

• Alpine meadows, often where snow has lingered, rock ledges; 3600–5000 m. SE Xizang, NW Yunnan.

**267. *Corydalis glaucissima*** Lidén & Z. Y. Su, *Edinburgh J. Bot.* 54: 78. 1997.

苍白紫堇 *cang bai zi jin*

Herbs, perennial, ca. 10 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base.

Storage roots 3–6 cm × ca. 2 mm, tapering distally. Bulb prominent, rounded, 0.5–1 × ca. 0.5 cm, of several pale fleshy ovate scales. Stems 1 or 2, erect, simple, with a single leaf at middle. Radical leaf: petiole ca. 5 cm; blade strongly glaucous on both surfaces, suborbicular, ca. 1 × 1.3 cm, slightly thick, ternate; leaflets deeply 2-divided into broadly obovate overlapping lobes. Cauline leaf: petiole ca. 8 mm; blade ca. 1 × 1 cm, like radical leaf, but lobes narrower. Raceme 5–10-flowered; bracts oblanceolate to narrowly obovate, 3–9 mm, entire or lower often with 2 or 3 smaller lateral lobes. Pedicel 6–18 mm. Sepals pinkish, 1–1.5 × 1.5–2 mm, lacinate-dentate. Corolla blue; outer petals rhombic, acute, narrowly crested; upper petal 13–14 mm; spur straight, cylindrical or slightly tapering, 6–7 mm; nectary ca. 2/3 as long as spur; lower petal rhombic, ca. 9 mm, acute; inner petals ca. 8 mm. Stigma slightly emarginate, marginal apical papillae 4; geminate papillae lateral and on basal lobes. Fruit and seed unknown. Fl. Jul.

• Alpine turf precipices; ca. 4800 m. SE Xizang, NW Yunnan.

**35. *Corydalis* ser. *Kokianae*** C. Y. Wu & H. Chuang, *Acta Bot. Yunnan.* 5: 243. 1983.

粗长簇根紫堇系 *cu chang cu gen zi jin xi*

Herbs, perennial; stems and petioles of radical leaves attenuate to filiform underground base. Rhizome small, with fascicle of long coarse storage roots. Stems leafy and branched. Radical leaves conspicuous, much divided. Corolla blue to purple or white; dorsal crest of inner petals not overtopping apex. Capsule pendent from erect pedicel, narrow, explosively dehiscent.

• Three species: China.

- 1a. Fruit and ovary with papillose ridges ..... 276. *C. striatocarpa* or 278. *C. rorida*  
 1b. Fruit and ovary smooth.  
 2a. Flowers white, inner petals tipped blue; crest of outer petals > 1.5 mm wide ..... 268. *C. nigroapiculata*  
 2b. Flowers blue to purple; crest of outer petals < 1.5 mm.  
 3a. Flowers 15–18 mm; outer petals not or slightly dentate ..... 269. *C. kokiana*  
 3b. Flowers 10–14 mm; outer petals usually clearly dentate ..... 270. *C. minutiflora*

**268. *Corydalis nigroapiculata*** C. Y. Wu, *Acta Bot. Yunnan.* 5: 246. 1983 [*"nigro-apiculata"*].

黑顶黄堇 *hei ding huang jin*

*Corydalis nigroapiculata* var. *erosipetala* C. Y. Wu & H. Chuang; *C. rockiana* C. Y. Wu, Z. Y. Su & Lidén; *C. varicolor* C. Y. Wu.

Herbs, perennial, 10–30 cm above soil, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots fascicled, oblong, attenuate toward base, 4–10 cm × 2–4 mm. Stems few to several, branched, with 2–4 leaves above. Radical leaves: petiole 4–13 cm; blade glaucous abaxially, green or glaucous adaxially, triangular-ovate, 2–7 × 2–5 cm, twice to 3 × ternate to sub-bipinnate; leaflets stalked; ultimate leaflets entire to coarsely dentate or deeply divided into obovate to narrowly oblong, obtuse to acute lobes. Cauline leaves nearly sessile, biternatisect to bipinnatifid or often more irregularly cut into very unequal lobes; ultimate lobes lanceolate to oblong, obtuse to acute; upper leaves small and similar to lowermost bracts. Racemes very dense, 15–40(–60)-flowered, 2–10 cm, at fruiting much elongating to 6–18 cm, simple or with 1 or 2 branches at base; lower bracts 5–14 mm, biternatid, middle and upper bracts pinnatifid to flabellate-divided, uppermost ones narrower, often almost entire. Pedicel erect-

spreading, straight, 8–15 mm, elongating to 13–25 mm in fruit. Sepals 0.2–1 mm. Corolla white to creamy white; dorsal crest of inner petals with contrasting blue apex; outer petals broadly obtuse, clearly mucronate, margin usually ± undulate-dentate, dorsal crest 2–3 mm wide, obtuse, short; upper petal 16–20 mm; spur distinctly downcurved at apex, cylindrical, 6–9 mm; nectary extended through 2/5–1/2 of spur; lower petal 10–11 mm with cuneate claw expanded into rounded clearly mucronate ± dentate limb; inner petals 8–11 mm. Stigma square; marginal papillae: median 2 distinct, lateral wide and indistinct; geminate papillae lateral (submarginal) and on well-developed basal lobes. Capsule pendent from erect-spreading pedicel, narrowly lanceolate to oblong, 12–15 × ca. 2 mm, 7–13-seeded; style 2–2.5 mm. Seed ca. 1.5 mm, smooth. Fl. and fr. Jul–Sep.

• Mountain slopes, forests, alpine meadows, alpine scree, wet places; 3500–4600 m. Qinghai, NW Sichuan (Dêgê), E Xizang.

Low-growing broadly crested plants from Qinghai Hu, Qinghai, have been segregated as *Corydalis rockiana* but are connected by intermediates.

**269. *Corydalis kokiana*** Handel-Mazzetti, *Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl.* 57: 52. 1920.

狭距紫堇 *xia ju zi jin*

*Corydalis kokiana* var. *robusta* C. Y. Wu & H. Chuang.

Herbs, perennial, 10–25(–40) cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots oblong, 20–60 × 3–4 mm. Stems 1–5, erect to ascending, slender, usually branched, with 2 or 3(–5) leaves. Radical leaves: petiole 2–10 cm; blade glaucous abaxially, green or glaucous adaxially, triangular, 2–4 × 2–5 cm, bi- to triternate; pinnae petiolulate; terminal leaflets sessile, entire to coarsely dentate or deeply divided into obovate to oblanceolate lobes 2–10 mm, apex mucronate. Cauline leaves sessile, once to twice ternate with pinnatifid or once to twice ternatifid leaflets; ultimate lobes ovate-lanceolate, acute or obtuse. Racemes 10–20(–30)-flowered, dense at first, becoming lax; lower bracts like uppermost cauline leaf; middle bracts once to twice ternatifid into 3–15 lobes; uppermost lanceolate, pectinate-dentate. Pedicels equaling or usually longer than bracts, 10–20 mm, thin, erect in fruit (in shade forms to 45 mm). Sepals minute or to 1 mm, deeply dentate. Petals pale blue to clear purplish blue; inner petals usually whitish; outer petals rather broad with shortly acuminate apex; dorsal crest attenuate in both directions and ca. 1 mm wide; upper petal 15–18 mm; spur usually slightly downcurved at apex, cylindrical, 7–9 mm; nectary 1/2–2/3 as long as spur; lower petal rhombic, 9–11 mm, base narrowed, apex acuminate; inner petals 7–9 mm. Stigma square, slightly bifid; marginal papillae: median 2 distinct, lateral broad, indistinct; geminate papillae lateral (submarginal) and on well-developed basal lobes. Capsule linear-oblong, 8–12 × 1–1.5 mm, 5–9-seeded. Seeds ca. 1.1 × 0.9 mm, smooth. Fl. and fr. May–Sep.

• Forests, among shrubs, meadows, limestone cliffs, limestone gravel; 3100–4200 m. W Sichuan, E Xizang, NW Yunnan.

Shade-grown plants have long and lanky stems, broader and thinner leaves, and the racemes can be much drawn out with the lower flowers on up to 45-mm-long pedicels from large leaflike bracts.

**36. *Corydalis* ser. *Clavatae*** C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 4: 7. 1982.

棒状根系 bang zhuang gen xi

*Corydalis* ser. *Fibrosae* C. Y. Wu & H. Chuang.

Plants perennial, glaucous, usually only 2–5 cm above scree surface; stems and petioles of radical leaves attenuate to often long filiform underground base. Storage roots few to several, distally tapering. Bulb (resting bud) prominent, 0.5–2 cm. Corolla blue, pale blue, or white with blue apex, rarely pink; dorsal crest of inner petals very slightly overtopping apex. Capsule pendent from erect to apically arcuate pedicel, explosively dehiscent.

Six species: N and W China, Kazakhstan, Kyrgyzstan, C and W Mongolia, ?NE Myanmar, Russia; five species (four endemic) in China.

- 1a. Radical leaves absent at flowering; cauline leaves absent; bracts conspicuous, obtriangular, apically shortly 3–7-fid, fleshy, gray with paler streaks ..... 273. *C. bulbifera*
- 1b. Radical leaves conspicuous; bracts without pale longitudinal streaks.
- 2a. Bracts much divided.
- 3a. Ultimate lobes of leaves and bracts oblong, obtuse, 1–3 mm wide; radical leaves ovate to oblong, pinnate with biternatisect leaflets; upper petal 18–25 mm, spur downcurved, (7–)9–13(–15) mm, thick; capsule 5–9 × 3–4 mm, reflexed from erect pedicel ..... 274. *C. melanochlora*
- 3b. Lobes of leaves and bracts linear, pointed, to 0.5 mm wide; radical leaves triternate; upper petal 14–18 mm, spur straight, 6–8 mm, rather thin; capsule 8–13 × 2–2.5 mm, reflexed from distally arcuate pedicel ..... 275. *C. myriophylla*
- 2b. Bracts entire (lowermost rarely slightly divided).
- 4a. Corolla blue; raceme 6–12-flowered; cauline leaf usually absent, rarely 1; radical leaves with sessile leaflets ..... 272. *C. zadoiensis*

**270. *Corydalis minutiflora*** C. Y. Wu, Acta Bot. Yunnan. 6: 243. 1984.

小花紫堇 xiao hua zi jin

*Corydalis kokiana* Handel-Mazzetti var. *micrantha* C. Y. Wu & H. Chuang.

Herbs, perennial, 20–50 cm tall, glabrous; stems and petioles of radical leaves attenuate to filiform underground base. Storage roots 30–50 × 2–3 mm, narrowed to indistinct stalk. Stems (3 or 4), slender, with long slender branches, with 2–4(or 5) leaves. Radical leaves: petiole 2–8 cm; blade broadly ovate to deltoid, 2–3 × 2–3 cm, biternate; ultimate leaflets coarsely dentate or cut to base into obovate to lanceolate segments. Cauline leaves sessile (lowermost sometimes stalked), triternate to bipinnate, 2–10 × 1.5–7 cm (lower ones larger, upper ones smaller), with long-stalked primary leaflets; ultimate leaflets ± deeply cut into oblanceolate mucronate lobes. Racemes 10–20-flowered, dense, much elongating in fruit; lower bracts 7–15 mm and irregularly biternatisect, upper ones progressively smaller and less divided upward. Pedicel thin, 6–11 mm in flower, elongating to 10–15 mm and erect in fruit. Sepals 0.5(–1) mm, dentate. Corolla blue; outer petals broadly obtuse with shallowly to deeply dentate margin, slightly to conspicuously mucronate; dorsal crest 0.2–0.6(–1.2) mm; upper petal 10–14 mm; spur downcurved at apex, cylindrical, 4–6 mm; nectary 1/3–2/3 as long as spur, thin; lower petal 6–9 mm without distinct claw; inner petals 5–7 mm. Stigma square; marginal papillae: median 2 distinct, lateral broad, diffuse; geminate papillae lateral (submarginal) and on basal lobes. Capsule linear-lanceolate, 10–15(–19) × 1.5–2 mm, 5–9-seeded; style ca. 2 mm. Seeds ca. 1 mm, smooth, with small appressed elaiosome. Fl. and fr. Jun–Aug.

• Subalpine conifer forests, among shrubs, grasslands; 3300–4500 m. W Sichuan, E Xizang.

- 4b. Corolla white or pink; raceme 2–5-flowered; cauline leaves 1 or 2, rarely absent; radical leaves with stalked leaflets ..... 271. *C. inconspicua*

**271. *Corydalis inconspicua*** Bunge ex Ledebour, Fl. Ross. 1: 104. 1842.

小株紫堇 *xiao zhu zi jin*

*Corydalis kareliniana* Pritzell ex Walpers; *C. tenella* Karelin & Kirilov (1842), not Ledebour ex Nordmann (1837).

Herbs, perennial, glaucous, 6–15 cm (3–8 cm above scree surface), glabrous. Storage roots few, 5–15 × 2–3 mm, tapering to thin apex. Bulb prominent, 15–23 × 6–7 mm, of several pale fleshy scales. Stems slender, weak, simple, with 1 or 2 leaves in upper part. Radical leaves several, equaling or exceeding stems; petiole 3–10 cm; blade glaucous on both surfaces, often with small dark dots or streaks, ovate-triangular, 2–3.5 × 2–4 cm, slightly fleshy, ternate to biternate; leaflets stalked (petiolules 5–20 mm), deeply 2–7-divided; segments obovate, obtuse. Cauline leaves shortly stalked to sessile; blade smaller than radical leaves but more divided. Raceme ca. 1 cm, 2–5-flowered; bracts oblong-spatulate, entire or lower ones deeply divided. Pedicel erect, slender, at fruiting 8–15 mm. Sepals 0.5–1 mm, deeply dentate. Petals white to pink (with a touch of yellow?); upper petal navicular, (13–)15–16 mm, subacute, crest ca. 1 mm wide, tapering to both ends, not reaching spur, rarely absent; spur downcurved at apex, (4–)7–9 mm, slightly tapering; nectary 1/2–2/3 as long as spur; lower petal 8–9 mm, distal 1/2 widened into rhombic limb, usually shortly crested; inner petals 7–8 mm. Stigma slightly emarginate, marginal apical papillae 4, sometimes diffuse; geminate papillae lateral and on basal lobes. Capsule pendent from erect pedicel, narrowly elliptic to obovoid, 10–13 × 3(–4) mm, 4–7-seeded. Seed 1.8–1.9 mm, smooth, with very small elaiosome. Fl. and fr. Jun–Jul.

Alpine scree; 2500–4700 m. Xinjiang (?Altay, Kunlun Shan, Shewan, Ürümqi) [Kazakhstan, Kyrgyzstan, C and W Mongolia, Russia (Altai)].

A specimen (*Liou 3043*) from Ürümqi lacks crests on the outer petals and is similar to *Corydalis phillippi* Michajlova (Bot. Zhurn. 85: 182. 2000), described from SW Mongolia.

**272. *Corydalis zadoiensis*** L. H. Zhou, Acta Phytotax. Sin. 20: 111. 1982.

杂多紫堇 *za duo zi jin*

Herbs, 7–12 cm (2–4 cm above soil surface), glabrous; stems and petiole of cauline leaves attenuate to thin underground base. Storage roots numerous, fascicled, oblong, 2–7 cm × 2–4 mm. Bulb of pale fleshy ovate scales, 4–7 × 3–5 mm. Stems 1–3, simple, leafless or very rarely with 1 leaf. Radical leaves several; petiole 8–14 cm, often exceeding stems; blade at soil surface, gray-glaucous abaxially, slightly or strongly glaucous adaxially, nearly orbicular, 1.5–2.5 cm, ternate; leaflets sessile, ± deeply cut into 2–6, obovate, obtuse, often overlapping lobes. Raceme 2–2.5 cm, densely 6–12-flowered, sometimes with a basal branch; bracts entire, lowermost bracts rarely slightly 2–5-divided, elliptic to obovate, 8–15 mm, sometimes with pale denticulate margin. Pedicel 5–10 mm, to 15 mm in fruit. Sepals ca. 1 × 1–2 mm, deeply dentate. Corolla very pale

blue, clear blue toward apex; keels with purplish tint; upper petal 14–17 mm, subobtusely, abaxially narrowly crested; spur slightly to strongly downcurved at apex, cylindrical, 6–8 mm, rather narrow; nectary 1/2–3/5 as long as spur; lower petal 8–9 mm, with broadly elliptic subacute limb, abaxially very shortly crested; inner petals 7–8 mm. Stigma square, apical marginal papillae 4, of which outer ones diffuse; geminate papillae lateral and on rounded basal lobes. Capsule (immature) 6–7 × 2–3 mm, 2–5-seeded; style ca. 2 mm. Seeds ca. 1.5 mm. Fl. Jun–Aug, fr. Aug.

• Alpine scree; 4200–5000 m. S Qinghai (Nangqên, Zadoi), E Xizang (Qamdo, Riwoqê).

**273. *Corydalis bulbifera*** C. Y. Wu, Acta Bot. Yunnan. 4: 10. 1982.

鳞叶紫堇 *lin ye zi jin*

Herbs, perennial, very glaucous, 7–10 cm (2–4 cm above soil surface), glabrous; stems and petioles of radical leaves attenuate to thin underground base. Storage roots few, 2–4 cm × (1–)3–5 mm, tapering distally. Bulb very prominent, 1.5–3 × 2–3 cm, with fleshy pale ovate scales 1–2 cm, apparently in 2 rows. Stems 1–3, simple, leafless. Radical leaves absent or rarely small, simple, fleshy (possibly developing late in season). Raceme capitate, 8–14-flowered, slightly elongating; bracts lead-gray (rarely green) with paler streaks and many dark small irregular spots on both surfaces, broadly obtriangular to obovate, 10–18 mm, fleshy, apically shallowly divided into 3–7 broad obtuse lobes. Pedicel straight, 5–10(–15) mm. Sepals caducous (?minute). Petals white (to very pale blue?), apical keel of outer petals blue; inner petals with purplish blue apex (dorsal crest blue); upper petal 16–18 mm, apex narrowly truncate to subacute, shortly crested; spur slightly downcurved at apex, cylindrical, 7–8 mm; nectary ca. 2/3 as long as spur; lower petal 8–10 mm, sometimes with small gibbosity at base; inner petals 8–9 mm. Ovary with 20–25 ovules; stigma slightly emarginate with 2 conspicuous marginal apical papillae; lateral marginal papillae small; geminate papillae on basal lobes. Fl. Jun–Aug.

• Alpine scree (siliceous); 4600–5100 m. E Xizang (Markam, Riwoqê, Zogang).

**274. *Corydalis melanochlora*** Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 10: 43. 1877.

暗绿紫堇 *an lu zi jin*

*Corydalis adrieni* Prain; *C. adrieni* var. *forrestii* Fedde; *C. binderae* Fedde; *C. pulchella* Franchet (1889), not Aitchison & Hemsley (1882); *C. roseotincta* C. Y. Wu & H. Chuang.

Herbs, perennial, gray-glaucous, 3–8 cm above scree surface (5–20 cm below), glabrous; stems attenuate to thin underground base. Rhizome obvious, vertical, to 2 cm; storage roots fasciculate, tapering distally, 3–9 cm × 1.5–5 mm. Bulb prominent, 1–2 × 1–2 cm, of several pale fleshy scales. Stems 2–5, usually with 2 subopposite (rarely opposite) leaves. Radical



leaves 2–5; petiole 4–10(–15) cm; blade at scree surface, gray-glaucous, sometimes with small dark spots, ovate-oblong (rarely triangular), 2–5 × 1–3 cm, fleshy, pinnate with 2 or 3 pairs of pinnae; inner pinnae stalked to subsessile, twice to often 3 × ternatisect or subternate; ultimate lobes 35–70, obovate to oblong, (0.5–)1–3(–4) mm wide, obtuse. Cauline leaves shortly petiolate to subsessile, like radical but more triangular in outline and usually less divided. Raceme corymbose, 4–10(–15)-flowered, 1–3 cm, elongating or not in fruit; bracts obtriangular, 8–17 mm, base cuneate, apically deeply 4–12-divided, lobes narrowly oblanceolate. Pedicel in flower 5–20 mm, in fruit erect, (5–)10–20(–30) mm. Sepals orbicular, 1.5–2 × 1.5–2 mm, finely and rather deeply circumdentate. Corolla blue or white with blue apical parts, inner petals darker at tip; upper petal 18–25 mm, ovate, mucronate, crest 1–2 mm wide, tapering to both ends, entire, slightly overtopping apex, not decurrent on spur; spur arcuately downcurved (rarely almost straight), broadly cylindrical, (7–)9–13(–15) mm; nectary ca. 2/3 as long as spur; lower petal (10–)11–13 mm, like upper petal, claw straight to slightly and broadly saccate; inner petals 8–11 mm. Stigma broader than long, slightly emarginate, with 4(–6) marginal rather broad papillae, median distinct, lateral broader and diffuse; geminate papillae lateral and in basal corners; basal lobes poorly developed. Capsule pendent from erect stout pedicel, broadly oblong to obovoid, 5–9 × 3–4 mm, 3–9-seeded; style 3–3.5 mm. Seeds 1.3–1.4 mm, smooth, with small elaiosome. Fl. and fr. (Jun–)Jul–Sep.

• Alpine scree; 4000–5000 m. Gansu, Qinghai, W Sichuan, SE Xizang, NW Yunnan.

**275. *Corydalis myriophylla* Lidén, sp. nov.**

富叶紫堇 fu ye zi jin

Type: China. Yunnan: Gongshan Xian, Bingzhongluo Xiang, ca. 4 direct km SW of Gawagapu mountain and 15.9 direct km WSW of Bingzhongluo in the next basin to the E of Chukuai lake, E side of Gaoligong Shan, 27°58'29.5"N, 98°28'28.9"E, SE-facing 60° scree slope, limestone, alt. 3880 m, "Leaves glaucous beneath, corolla bluish white," 25 Aug 2006, *Gaoligong Shan Biodiversity Survey (GSBS) 31410* (holotype, KUN; isotypes, CAS, UPS).

*A Corydalis melanochlora foliis triternatis lobis anguste linearibus mucronatis, floribus minoribus atque capsulis longioribus angustioribus differt.*

**The following two species are not placed to section or series**

**276. *Corydalis striatocarpa* H. Chuang, Acta Bot. Yunnan. 18: 402. 1996.**

纹果紫堇 wen guo zi jin

Herbs, perennial, 12–18 cm tall, glabrous; stems and petioles of radical leaves tapering to thin underground base. Storage roots fascicled, 2–5 cm × 1.5–2.5 mm, basally attenuate into indistinct stalk. Stems 1 or 2, simple, with 2(or 3) leaves in middle part. Radical leaves few; petiole 4.5–8 cm; blade ovate to narrowly ovate, 2.5–5 × 1.5–3 cm, (bi-)tripinnate; pinnae 3 or 4 pairs, petiolulate; pinnules petiolulate to nearly sessile; ultimate segments lanceolate, oblanceolate, or narrowly elliptic, apex

Paratypes: *GSBS 31652* (CAS, KUN), *F. Kingdon Ward 54* (E).

Herbs, perennial, gray-glaucous, 2–4 cm above scree surface (6–15 cm below), glabrous; stems and petioles of radical leaves attenuate to thin underground base. Rhizome obvious, vertical, to 1 cm; storage roots fasciculate, tapering distally, 3–9 cm × 1–2 mm. Bulb prominent, 5–14 × 4–8 mm, of several pale fleshy scales. Stems 2–5, with 2 subopposite leaves. Radical leaves 2–5; petiole underground, 7–12 cm, thin; blade gray-glaucous on both surfaces, with small dark spots or streaks, broadly ovate to triangular in outline, 2–3 × 2–2.5 cm, bi- to triternate; leaflets stalked, once to almost 3 × deeply ternatisect; ultimate lobes 80–150, narrowly linear, 0.3–0.6(–1) mm wide, acute, mucronate. Cauline leaves shortly petiolate to subsessile, like radical leaves, pinnae rather long stalked. Raceme corymbose, 4–7-flowered, 1–2 cm; bracts 10–20 mm, base narrowly cuneate, deeply divided into 7–14, narrowly linear, acute lobes. Pedicel 9–20 mm, erect in flower, 10–30 mm and apically arcuate in fruit. Sepals orbicular, ca. 1.5 × 2 mm, finely and sharply dentate. Corolla pale to bright blue; inner petals darker at tip; outer petals subobtusate, sometimes shortly acuminate, crest to 1 mm wide, tapering to both ends, slightly undulate-dentate, slightly overtopping apex; upper petal 14–18 mm, spur straight, cylindrical, 6–8 mm; nectary ca. 1/2 as long as spur; lower petal 8–10 mm with broad ovate slightly undulate limb, claw straight or with small gibbosity at very base; inner petals 7–8 mm. Stigma broader than long, slightly emarginate; marginal papillae: median distinct, lateral broader and diffuse; geminate papillae in basal corners; basal lobes poorly developed. Capsule sharply reflexed from suberect apically arcuate pedicel, narrowly oblong, 8–13 × ca. 2 mm, 4–9-seeded; style ca. 2.5 mm. Seeds 1.2–1.3 mm. Fl. Aug–Sep.

• Alpine scree on limestone; 3900–4600 m. SE Xizang, NW Yunnan (N Gaoligong Shan, Meili Xueshan) [?NE Myanmar].

*Corydalis adrieni* Prain, as described in *FRPS* (32: 268. 1999) is in part *C. myriophylla*, whereas the type of *C. adrieni* belongs to *C. melanochlora*.

This new species differs from *Corydalis melanochlora* in the more divided leaves with much narrower pointed leaf lobes, the smaller flowers with thinner straight spur, and the longer and narrower shortly styled capsule, which is reflexed from an apically slightly arcuate pedicel.

The specific epithet refers to the very numerous ultimate lobes of the leaves, from Greek *μυρίος* (*myrios*, "countless") and *φύλλον* (*phyl-lon*, "leaf").

obtusate, mucronate. Cauline leaves bipinnate, like radical leaves, 2–4 × 1.5–2.5 cm, petiolulate to nearly sessile. Raceme 3–4 cm, 10–17-flowered; bracts flabellate, 5–10 mm, with broad cuneate stalk, incised into linear lobes; lower bracts often repeatedly divided, upper bracts less. Pedicel 4–6 mm, possibly recurved in fruit. Sepals white, ca. 1 mm, irregularly deeply and sharply dentate. Petals light blue; upper petal rhombic, 12–13 mm, subacute, abaxial crest short, ca. 1.5 mm wide, obtuse; spur straight, conical, ca. 6 mm; nectary ca. 3/5 as long as spur, thin; lower petal rhombic-navicular, 7–8 mm; inner petals 6–7 mm. Ovary with 6 faint vertical ribs, formed by dense small papillae; ovules ca. 8; style 3–3.5 mm. Fruit not seen. Fl. Jul.

- About 4300 m. NW Sichuan (Sêrxü).

This is a species with obscure affinities, possibly related to *Corydalis calcicola*.

**277. *Corydalis anthocrene*** Lidén & J. Van De Veire, Ann. Bot. Fenn. 45: 129. 2008.

泉涌花紫堇 *quan yong hua zi jin*

Herbs, perennial, 10–20 cm tall, glabrous. Rhizome intricately branched. Roots yellowish, narrowly oblong, fleshy, often branched, mainly from central parts of rhizome, but also from nodes on underground stems. Stems several, ascending, with (depending on growth place) a pale flexuous branched underground portion (1–)5–10 cm and brownish red aerial parts 10–20 cm, much branched and leafy throughout. Cauline leaves usually 3–7 per stem, nearly always with flowering branches in axils; petiole brownish red, broad at base, 0.5–4.5 cm, or upper leaves sessile; blade green to glaucous, broadly triangular in outline, 2–5 × 2–5 cm, decreasing in size upward, 4–5 × ternately divided; ultimate leaflets cut into narrowly oblanceolate to linear acute somewhat channeled rather stiff lobes, 3–8 mm;

leaf lobes not held in one plane, but spreading in 3 dimensions, giving leaf a very crispy appearance. Principal racemes 10–15-flowered, lateral ones 4–10-flowered; lower bracts like upper leaves, 3 × ternately (to subdigitately) deeply cut into linear acute segments, 10–15 mm; uppermost bracts smaller and less divided. Pedicels almost straight to slightly arcuate, 30–45 mm. Sepals whitish, ca. 1 × 1–1.5 mm, deeply lacerate-dentate. Corolla brilliant blue; inner petals whitish, with blue apical 1/3 (especially dorsal crest); outer petals subacute, narrowly crested; upper petal 15–16 mm, with slightly tapering obtuse almost straight spur 7–9 mm; nectary ca. 2/3 as long as spur, thin; lower petal ca. 9 mm, with short claw expanding into broad rhombic limb ca. 6 mm wide; inner petals ca. 7 mm. Ovary with ca. 12 ovules; style 3.5–4 mm; stigma broader than long, with 4 apical papillae; geminate papillae lateral and on basal lobes. Fruit and seeds unknown. Fl. Jul–Aug.

- Steep gravelly humid NW-facing bare slopes; ca. 3000 m. W Sichuan (Shimian).

This is a species with obscure affinities, not similar to anything else.

**37. *Corydalis* sect. *Elatae*** Fedde ex C. Y. Wu & H. Chuang in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 541. 1999.

高紫堇组 *gao zi jin zu*

Herbs, perennial, with rather thin rhizome clothed with fleshy persistent petiolar bases (sometimes very densely so). Stems simple or branched. Fruiting pedicel straight and erect. Corolla blue to purple. Capsule reflexed, explosively dehiscent. Cotyledons 2.

\* Forty-four species: China.

Most of the species in this section occur in Sichuan; only six species are found in Yunnan, two in Shaanxi, and one in Chongqing.

We still have only a superficial picture of this section. Some species seem to have a clinal variation coupled to elevation, whereas others seem to have distinct ecotypes. Many species are known from very few collections, and there are probably more taxa to be found. Many species are very local.

- 1a. Axils of cauline leaves with axillary bulbils or (late) fleshy rooting dwarf shoots.
  - 2a. Stems slender, simple, with 6–15 small leaves in upper 1/2 of stem.
    - 3a. Leaflets serrate-dentate; sepals large, fimbriate-dentate ..... 315. *C. virginea*
    - 3b. Leaflets not serrate-dentate; sepals small.
      - 4a. Leaves sessile; flowers blue; spur longer than limb of upper petal ..... 314. *C. bulbiligera*
      - 4b. Leaves stalked; flowers pink; spur equaling limb of upper petal ..... 313. *C. schweriniana*
  - 2b. Main stem with fewer leaves, often leafy also in lower 1/2.
    - 5a. Outer petals conspicuously crested ..... 303. *C. calycosa*
    - 5b. Crest of outer petals absent or very small.
      - 6a. Spur tapering, longer than limb of upper petal ..... 294. *C. schusteriana*
      - 6b. Spur cylindrical, equaling or shorter than limb.
        - 7a. Plant procumbent; flowers purple ..... 318. *C. suzhiyunii*
        - 7b. Plant suberect; flowers blue.
          - 8a. Leaf lobes broad, crenate-lobate to crenate-dentate ..... 320. *C. pseudoweigoldii*
          - 8b. Leaf lobes entire, oblong.
            - 9a. Spur shorter than limb; plant with fleshy dwarf shoots in lower cauline leaves ..... 302. *C. balsamiflora*
            - 9b. Spur ca. as long as limb; plant with small bulbils in bractlike upper leaves ..... 301. *C. flexuosa*
  - 1b. Cauline leaves without axillary bulbils or fleshy dwarf shoots.
    - 10a. Outer petals with dorsal crests.
      - 11a. Racemes 15–25(–35)-flowered, densely papillose-pubescent; roots narrowly fusiform, 20–50 × 1–2 mm ..... 278. *C. rorida*
      - 11b. Racemes glabrous or with fewer flowers; roots linear.
        - 12a. Sepals deeply lacerate, (2–)3–9 × 1–6 mm.
          - 13a. Stem with thin erect branches; rhizome short with crowded globular persistent petiolar bases; leaflets coarsely serrate or cut into acute lobules; inner pair of leaflets on upper leaves stipulelike ..... 316. *C. nanwutaishanensis*

- 13b. Stems simple; persistent fleshy petiolar bases not globular.
- 14a. Plant with long branched stolons; sepals richly lacerate-dentate.
- 15a. Sepals 4–9 × 3–6 mm; radical leaves prominent ..... 285. *C. barbispala*
- 15b. Sepals 3–4 × 1–3 mm; radical leaves early withering at flowering nodes ..... 290. *C. susanna*
- 14b. Plant not stoloniferous; sepals with few long laciniae.
- 16a. Upper petal 15–19 mm ..... 283. *C. gymnopoda*
- 16b. Upper petal 23–26 mm ..... 284. *C. pseudobarbispala*
- 12b. Sepals either much smaller or not deeply divided.
- 17a. Spur longer than inner petals, or if equal, then longer than 11 mm.
- 18a. Stems simple or with a single late branch from uppermost leaf; rhizome columnar, horizontal, densely clad with fleshy persistent petiolar bases for a considerable part.
- 19a. Crest of outer petals broad, obtuse, overtopping apex ..... 303. *C. calycosa*
- 19b. Crest of outer petals narrow ..... go to 32a
- 18b. Stems branched; rhizome variable.
- 20a. Outer petals acuminate; lower petal gibbous at base; fruit obovoid, ca. 3 mm in diam.
- 21a. Racemes (3–)6–12-flowered; leaves ternate to biternate; spur 12–14 mm ..... 288. *C. aquilegioides*
- 21b. Racemes 10–30-flowered; leaves bi-(tri-)ternate; spur 10–12 mm ..... 286. *C. elata*
- 20b. Outer petals obtuse to acute or shortly mucronate; lower petal straight; fruit linear-oblong to narrowly fusiform, to 2 mm in diam.
- 22a. Spur downcurved at tip; inner petals 8–10 mm; stems usually many, suberect to ascending, 8–15(–25) cm ..... 280. *C. panda*
- 22b. Spur straight; inner petals 12–14 mm; stems erect, 20–60 cm.
- 23a. Crest of outer petals broad, obtuse, overtopping apex; radical leaves biternate ..... 303. *C. calycosa*
- 23b. Crest of outer petals narrow; radical leaves triternate ..... 301. *C. flexuosa*
- 17b. Spur shorter than inner petals, or if equal, then not longer than 10 mm.
- 24a. Crest of upper petal conspicuous, overtopping apex; racemes dense.
- 25a. Lower petal saccate; capsule elliptic; stem simple ..... 307. *C. humicola*
- 25b. Lower petal straight; capsule linear-oblong; stem usually branched.
- 26a. Crest deeply serrate, upper petal 18–19 mm ..... 304. *C. capitata*
- 26b. Crest entire, upper petal 21–29 mm ..... 303. *C. calycosa*
- 24b. Crest of upper petal narrow, not overtopping apex; racemes dense or lax.
- 27a. Stems (5–)10–20(–25) cm; racemes 3–12(–16)-flowered.
- 28a. Leaf lobes 2–3 mm wide; capsule elliptic, ca. 10 mm; upper petal 16–19 mm, spur tapering to apex ..... 279. *C. acaeae*
- 28b. Leaf lobes much broader; capsule linear, 25–30 mm; upper petal 21–26 mm, spur broad at apex.
- 29a. Outer petals emarginate ..... 298. *C. lagochila*
- 29b. Outer petals obtuse, mucronate ..... 299. *C. mucronipetala*
- 27b. Stems 30–60 cm; racemes 10–30-flowered.
- 30a. Upper petal 15–17 mm, with thin straight upturned spur without nectary; racemes long, spikelike ..... 296. *C. angusta*
- 30b. Upper petal 19–24 mm, spur straight or downcurved, nectary present.
- 31a. Stems erect, branched; pedicels 10–20 mm at anthesis ..... 286. *C. elata*
- 31b. Stems ascending, simple or with a single branch from uppermost leaf; pedicels 7–10 mm at anthesis ..... 292. *C. aeditua*
- 10b. Outer petals not crested.
- 32a. Upper petal 12–20 mm, spur 5–10 mm.
- 33a. Rhizome/rootstock horizontal, columnar, 3–9 cm, clad with thick petiolar bases.
- 34a. Raceme lax; flowers nodding; spur tapering to apex, apically downcurved ..... 293. *C. leucanthema*
- 34b. Raceme dense; flowers not nodding; spur cylindric, straight.
- 35a. Stem 40–60 cm, branched ..... 296. *C. angusta*
- 35b. Stem (10–)20–30 cm, simple ..... 309. *C. dongchuanensis*
- 33b. Rhizome shorter, not distinctly columnar.
- 36a. Stems branched.
- 37a. Spur of upper petal 5–7 mm; stems 15–30 cm.
- 38a. All bracts entire, elliptic ..... 306. *C. cataractarum*
- 38b. Lower bracts divided ..... 282. *C. pingwuensis*
- 37b. Spur of upper petal 9–11 mm; stems 30–80 cm.
- 39a. Stem with 2 or 3 leaves in upper 1/2; fruit obovoid ..... 287. *C. harrismithii*

- 39b. Stem with 5–10 scattered leaves; fruit linear.
- 40a. Stems several, strictly erect; leaflets deeply cut into lanceolate, acute to acuminate lobules ..... 321. *C. mairei*
- 40b. Stems 1 to few, suberect to ascending; leaflets cut into obovate shallowly crenate-dentate lobes ..... 320. *C. pseudoweigoldii*
- 36b. Stems simple.
- 41a. Plant finely papillose-pubescent.
- 42a. Outer petals acute ..... 281. *C. papillosa*
- 42b. Outer petals broadly obtuse to subemarginate ..... 279. *C. aeaeeae*
- 41b. Plant glabrous.
- 43a. Spur of upper petal 5–7 mm; raceme 8–14-flowered ..... 282. *C. pingwuensis*
- 43b. Spur 9–10 mm; raceme 3–8-flowered.
- 44a. Spur very thin, longer than inner petals ..... 317. *C. lidenii*
- 44b. Spur equaling inner petals.
- 45a. Lower bract leaflike; capsule linear; outer petals subacute ..... 305. *C. microflora*
- 45b. Lower bracts not leaflike; capsule fusiform; outer petals broadly obtuse to subemarginate ..... 279. *C. aeaeeae*
- 32b. Upper petal 21–30 mm, spur 11–18 mm.
- 46a. Bracts much divided into narrow lobes; leaves biternate with much divided leaflets; capsule obovoid, very thick-walled; rhizome thick, columnar, densely clad with persistent petiolar bases; upper petal broad, 25–30 mm.
- 47a. Spur thick, straight or slightly curved, ca. 15 mm ..... 312. *C. sarcolepis*
- 47b. Spur slender and curved at apex, 15–18 mm.
- 48a. Pedicels 5–10 mm at anthesis, to 15 mm in fruit; spur much curved at apex; capsule ca. 10 mm; leaves biternate; style ca. 3 mm ..... 310. *C. caput-medusae*
- 48b. Pedicels 10–15 mm at anthesis, to 20 mm in fruit; spur slightly curved; capsule 13–14 mm; leaves triternate; style ca. 5 mm ..... 311. *C. weigoldii*
- 46b. Bracts and leaves less divided; capsule thin-walled.
- 49a. Stems simple or with a single late branch above.
- 50a. Pedicels 5–10 mm in anthesis.
- 51a. Petioles of cauline leaves from 1 cm (upper) to 7 cm ..... 294. *C. schusteriana*
- 51b. Cauline leaves shortly stalked to sessile.
- 52a. Spur 15–16 mm, nectary ca. 2/5 as long as spur ..... 297. *C. procera*
- 52b. Spur 11–13 mm, nectary ca. 2/3 as long as spur ..... 292. *C. aeditua*
- 50b. Pedicels longer.
- 53a. Lower petal saccate at base.
- 54a. Upper petal 26–28 mm; lower pedicels ca. 30 mm; cauline leaf single, ternate, lobes rounded ..... 295. *C. yaoi*
- 54b. Upper petal 20–25 mm; lower pedicels 10–20 mm; cauline leaves 2–5, ultimate lobes oblong to oblanceolate.
- 55a. Outer petals long acuminate, spur of upper petal 12–13 mm with nectary ca. 2/5 as long as spur ..... 308. *C. heterocentra*
- 55b. Outer petals acute to shortly acuminate, spur of upper petal 9–10 mm with nectary ca. 3/5 as long as spur ..... 309. *C. dongchuanensis*
- 53b. Claw of lower petal straight.
- 56a. Spur shorter than inner petals ..... 302. *C. balsamiflora*
- 56b. Spur equal to or longer than inner petals.
- 57a. Leaves biternate; lower petal obtuse, upper acute ..... 301. *C. flexuosa*
- 57b. Leaves ternate to biternate; lower petal acuminate.
- 58a. Sepals 2–3.5 × 2–3 mm, early falling ..... 291. *C. omeiana*
- 58b. Sepals minute ..... 289. *C. stolonifera*
- 49b. Stems early branched or with at least 2 branches.
- 59a. Spur of upper petal shorter than or equaling inner petals, 9–13 mm.
- 60a. Upper petal 26–29 mm; pedicels 15–30 mm at anthesis ..... 302. *C. balsamiflora*
- 60b. Upper petal 20–25 mm; pedicels 7–20 mm at anthesis.
- 61a. Stems with 2–4 leaves; fruit obovoid.
- 62a. Corolla nodding; rhizome thick, columnar, to 7 cm, densely clad with fleshy petiolar bases ..... 293. *C. leucanthema*
- 62b. Corolla not nodding; rhizome not columnar ..... 287. *C. harrismithii*
- 61b. Stems with 5–10 leaves; fruit linear to oblong.

- 63a. Stems several, strictly erect; leaflets deeply cut into lanceolate, acute to acuminate lobules ..... 321. *C. mairei*  
 63b. Stems 1 to few, procumbent to ascending to suberect; leaflets cut into obovate, obtuse, sometimes crenate-dentate lobes.  
 64a. Stem pubescent below; leaf lobes not dentate ..... 320. *C. pseudoweigoldii*  
 64b. Stem glabrous; leaf lobes crenate-dentate to shallowly divided ..... 318. *C. suzhiyunii*  
 59b. Spur of upper petal clearly longer than inner petals, 12–18 mm.  
 65a. Stems leafy throughout.  
 66a. Stems erect; leaf lobes acute; corolla blue to purple ..... 321. *C. mairei*  
 66b. Stems decumbent; leaf lobes rounded; corolla creamy white ..... 300. *C. madida*  
 65b. Stems leafy only in upper 1/2.  
 67a. Lower pedicels 25–45 mm; racemes very lax, lower bracts like upper leaf, 3–5 cm; fruit linear ..... 319. *C. pseudomairei*  
 67b. Pedicels and bracts shorter; fruit obovoid.  
 68a. Outer petals conspicuously acuminate; sepals 2–3.5 × 2–3 mm, early falling ..... 291. *C. omeiana*  
 68b. Outer petals acute to very shortly acuminate; sepals smaller.  
 69a. Corolla not nodding; rhizome not columnar ..... 287. *C. harrismithii*  
 69b. Corolla nodding; rhizome thick, columnar, to 7 cm, densely clad with fleshy petiolar bases ..... 293. *C. leucanthema*

**278. *Corydalis rorida*** H. Chuang, Acta Bot. Yunnan. 18: 402. 1996.

露点紫堇 *lu dian zi jin*

Herbs, perennial, 13–30 cm tall, glabrous below, densely papillose-pubescent on inflorescence; stems and petioles of radical leaves attenuate to base. Rhizome thin, to 3 cm. Storage roots narrowly spindle-shaped, 2–5 cm × 1–2 mm. Stems 1–3, erect, simple or often with late branches, with 2 or 3 leaves in upper 1/2. Radical leaves 4–6; petiole 4–7 cm; blade abaxially pale green, adaxially green, broadly ovate, 2–3 × 2–4 cm, biternate; pinnae shortly petiolulate; pinnules sessile, deeply to slightly lobed into 2–4 obovate lobes. Cauline leaves 1–3, nearly sessile; blade 1–3 × 1–3 cm, bi- to triternatisect; lobes acute. Racemes 7–9 cm, 15–25(–35)-flowered; bracts 4–10 mm, deeply palmatisect into 5–10 narrowly lanceolate pointed lobes; lowermost bract sometimes like uppermost leaf (to 3 cm). Pedicel 4–7 mm, to 10 mm in fruit, erect. Sepals pink, suborbicular, fimbriate-dentate, 2–2.5 × 2–2.5 mm. Corolla sky blue, keel of outer petals with pinkish purple suffusion; outer petals broadly obtuse, ± dentate, shortly mucronate; crest short, 0.5–1.5(–2) mm wide, entire or often dentate; upper petal 12–14 mm; spur downcurved at apex, cylindrical, 5–6 mm; nectary ca. 2/5 as long as spur; lower petal 6–8 mm, claw oblong, distal 1/2 obovate, obtuse, dentate, shortly mucronate; inner petals 6–7 mm. Stigma broadly rectangular, emarginate, with 4 marginal apical papillae; geminate papillae on basal lobes, sometimes also lateral. Capsule (immature) reflexed from erect pedicel, narrowly elliptic, densely papillose; ovules 8–12; style ca. 2.5 mm. Fl. and fr. Jun–Aug.

• Among shrubs, meadow slopes, forest margins, ravines on hill-sides; 3000–3600 m. Sichuan (Dêgê).

This species is odd in the section because of its thicker roots and thin stem bases.

**279. *Corydalis acaea*** X. F. Gao, Lidén, Y. W. Wang & Y. L. Peng, Novon 18: 330. 2008.

艳巫岛紫堇 *yan wu dao zi jin*

Herbs, perennial, 5–16(–30) cm tall, glabrous or rarely

finely papillose on inflorescence and leaf veins abaxially. Rhizome vertical, short, thin, buried below scree- or soil-surface, with pale fleshy scales, apically with rosette of leaves from narrowly ovoid bulb, emitting several long thin slightly fleshy pale roots. Stems few to several, ascending, 5–16 cm, thin, simple or often branched, with 2 or 3(or 4) leaves, often brownish purple, especially stems and abaxial surfaces and apices of leaf lobes. Rosette leaves: petiole 2–10 cm; blade 1–4 × 1–3 cm, abaxially often densely and finely papillose, especially on veins, 2–4 × ternate with deeply lobed leaflets; primary leaflets long stalked, secondary leaflets shortly stalked; ultimate lobes narrowly obovate, 2–4 mm, shortly mucronate. Cauline leaves similar but shortly stalked. Racemes dense, 3–7-flowered, not elongating in fruit; bracts often purplish brown, 5–10 mm, 1–3 × ternatisect, with acute lobes. Pedicel 7–10 mm, thin, erect in fruit. Sepals broadly triangular to lanceolate, 1–2 mm, deeply dentate to almost entire, with purplish suffusion. Corolla pale blue to clear azure blue, sometimes with purplish suffusion; inner petals pale, dorsal crests apically deeper blue, but usually white at extreme apex; outer petals with broad obtuse lamina, ecrystate or usually with narrow crest not reaching apex; upper petal 16–19 mm; spur subsigmoidally curved, slightly tapering, 9–10 mm; nectary 1/2–3/5 as long as spur; lower petal usually with small pouch or spurlet at very base, abruptly widening into ca. 7-mm-wide shallowly emarginate limb; inner petals 9–10 mm. Stigma broad, slightly emarginate, with 4–6 simple marginal papillae; geminate papillae lateral (rarely missing) and in basal corners. Fruit pendent from erect pedicel, fusiform, ca. 10 × 3 mm, usually ± densely papillose on veins, 5–12-seeded; style ca. 3 mm. Seeds ca. 1.6 mm, smooth, with narrow elaiosome to 1 mm. Fl. Jul–Sep, fr. Aug–Sep.

• Alpine scree, stony alpine meadow slopes; 3600–4100 m. Sichuan (Maonian: Chaping Shan).

Some specimens from the S part of the Chaping Shan ridge have less-divided leaves and bracts, smaller purplish mucronate flowers, and smooth fruit.

**280. *Corydalis panda*** Lidén & Y. W. Wang, Ann. Bot. Fenn. 43: 478. 2006.

熊猫之友 *xiong mao zhi you*

Herbs, perennial, 8–15(–25) cm tall, glabrous. Rhizome 1–4 cm, buried below scree- or soil-surface, with fleshy bulblike pale terminal hibernation bud; scales numerous, 4–8 × 2–3 mm; roots numerous, 8–10 cm × 1–2 mm, slightly fleshy. Flowering stems 1–10, axillary to previous year's bud scales or leaf rosette, often reddish, suberect to ascending, with (0 or) 1 or 2(or 3) branches, with 2 or 3(or 4) leaves. Radical leaves several; petiole 6–12 cm with sheathing base; blade triangular, 1–3 × 2–4 cm, biternate, primary leaflets ovate, stalks 3–20 mm, secondary leaflets sessile to shortly stalked, ovate, deeply cut into 3–7 oblanceolate or linear obtuse lobes 1–4 mm wide, sometimes tipped with very small dark mucro. Cauline leaves evenly spaced (also at base of stem), lower with petioles 3–10 cm, uppermost shortly stalked or sessile; blade like radical leaves. Racemes 2–3 cm, dense, with obvious peduncle, (5–)8–15-flowered, slightly elongating in fruit; lowermost bract 10–15 mm, like uppermost leaf, bracts upward progressively less divided; upper ones oblanceolate, 8–13 mm, entire. Pedicel erect, slender, 8–10 mm, 10–15 mm in fruit. Sepals white, lanceolate, ca. 2 mm, with few sharp teeth. Flowers blue to purplish blue, inner petals often white at extreme tip; upper petal 18–20 mm, crest 1–2 mm wide, almost reaching apex; spur downcurved at tip, cylindrical, 11–13 mm; nectary ca. 1/2 as long as spur; lower petal 10–12 mm, claw narrow, straight or rarely slightly saccate at base, dilated into rounded limb 5–7 mm wide, usually irregularly sinuate-dentate, sometimes shortly mucronate; crest short; inner petals 8–10 mm. Stigma subquadrangular, with 4 apical marginal papillae; geminate papillae lateral and in basal corners. Capsule reflexed from erect pedicel, narrowly fusiform, ca. 10 × 1.5–2 mm, 4–10-seeded; style 3–4 mm. Mature seeds not seen. Fl. and fr. Aug–Sep.

• Open slopes, scree, roadside gravel; 3900–4200 m. NC Sichuan (Wenchuan: Balang Shan).

**281. *Corydalis papillosa*** Z. Y. Su & Lidén, *Novon* 17: 485. 2007.

冕宁紫堇 *mian ning zi jin*

Herbs, perennial, 12–20 cm tall, finely papillose-pubescent. Rhizome 1–3 cm, with many long roots ca. 1 mm in diam. Stems 2 or 3, simple, with 1 or 2 leaves in upper 1/2. Radical leaves 4–6; petiole 4–7 cm; blade orbicular, 1.5–2 × 2–3 cm, divided to base into 3–5 sessile ± deeply divided obovate leaflets; ultimate lobes oblong, 2–3 mm wide, obtuse. Cauline leaves sessile, deeply and irregularly divided into 3–7 narrowly oblanceolate obtuse lobes to 1–2 cm. Racemes shortly stalked, 6–13-flowered, rather lax, secund; bracts narrowly oblanceolate, 5–7 mm, rarely lowermost one larger and divided. Pedicel erect, 6–16 mm. Sepals ca. 0.5 × 1 mm, dentate. Corolla purple; outer petals ecristate; upper petal 14–19 mm, subacute; spur straight, hardly tapering to obtuse apex, 9–10 mm; nectary ca. 2/5 as long as spur; lower petal ca. 12 mm, claw short with very small gibbosity at base, gradually widened into broad rhombic slightly sinuate-dentate acute limb; inner petals 9–10 mm. Stigma square; marginal simple papillae: median 2 distinct, lateral diffuse; geminate papillae lateral and on triangular basal lobes. Fruit and seeds unknown; ovules ca. 20; style ca. 2.5 mm. Fl. Jun.

• About 4200 m. Sichuan (Mianning).

**282. *Corydalis pingwuensis*** C. Y. Wu, *Acta Bot. Yunnan.* 13: 135. 1991.

平武紫堇 *ping wu zi jin*

Herbs, perennial, 15–30 cm tall, glabrous. Rhizome 1–2 cm, with many long roots 1–1.5 mm in diam. Stems 1–4, erect to ascending, simple or often branched, with 2–4 leaves in upper 1/2, or rarely 1 long-stalked leaf on lower part. Radical leaves several; petiole 4–12 cm; blade glaucous abaxially, green adaxially, broadly triangular, 3–7 × 4–9 cm, (bi-)trternate; primary leaflets petiolulate; secondary leaflets almost sessile, deeply or slightly 3-divided; lobules obovate or rectangular, rounded or truncate, obscurely mucronulate. Cauline leaves subsessile; blade 2–4.5 cm, like radical leaves. Raceme 3–6 cm, 8–14-flowered; lower bract like uppermost cauline leaf, upward smaller, uppermost ones narrowly oblanceolate and entire, middle bracts 5–10 mm. Pedicel 10–15 mm, erect in fruit. Sepals minute. Petals pale red, purple, or blue; upper petal 12–15(–20?) mm, shortly acuminate, margin repand dentate, crest lacking; spur slightly downcurved, cylindrical, 5–7 mm; nectary ca. 2/5 as long as spur; lower petal 8–9 mm, limb rounded, mucronate, without crest, claw cuneate, almost as long as petal lobe; inner petals 7–8 mm. Stigma subquadrangular, with 6 marginal simple papillae; geminate papillae lateral and on well-developed basal lobes. Capsule oblong, 6–11 × 1.5–2 mm, 3–6-seeded; style ca. 1.5 mm. Seeds ca. 1.5 mm, smooth. Fl. and fr. May–Sep.

• Slopes, forest understories, wetlands at water sides; 1100–3800 m. N Sichuan.

**283. *Corydalis gymnopoda*** Z. Y. Su & Lidén, *Novon* 17: 482. 2007.

寡叶裸茎紫堇 *gua ye luo jing zi jin*

Herbs, perennial, 15–27 cm tall, glabrous. Rhizome short, with rather few fleshy scales; roots many, to 10 cm × ca. 1 mm. Stems 1–3, simple, with 2 leaves in upper 1/3. Radical leaves: petiole 9–16 cm; blade glaucous on both surfaces but more so below, 3–4 × ca. 4 cm, ternate; leaflets stalked to subsessile, ± deeply cut into broadly obovate subacute lobes, often again shallowly 3-lobed at apex. Cauline leaves subsessile, ca. 2 × 3 cm, like radical leaves or deeply palmatisect; uppermost leaf set shortly below inflorescence, smaller and less divided. Raceme very dense, 6–10-flowered, hardly elongating in fruit; bracts obovate, 6–10 mm, subacute, entire, or lowermost larger and similar to uppermost leaf. Pedicels 5–10 mm. Sepals cut to base into a few long narrow teeth 2–4 mm. Corolla blue, darker at apex; outer petals rather narrow, acute to shortly acuminate, with (0–)0.5–1.5-mm-wide crest attenuate to both ends; upper petal 15–19 mm; spur 6–9 mm, obtuse; lower petal shallowly saccate with an additional smaller gibbosity at extreme base, 9–10 mm; inner petals 8–9 mm. Stigma square, emarginate, with 4 marginal simple papillae at apex; geminate papillae lateral and on basal lobes. Fruit (immature) ca. 6 × 2 mm; style ca. 2 mm. Fl. Jun–Aug.

• Forests; 2800–3800 m. Sichuan (Jinchuan).

**284. *Corydalis pseudobarbisepala*** Fedde, Repert. Spec. Nov. Regni Veg. 20: 353. 1924.

假髯萼紫堇 jia ran e zi jin

Herbs, perennial, 12–35 cm tall, glabrous. Rhizome 1–5 cm, with many thick soft roots and apical leaf rosette; remnants of previous year's petiolar bases not prominent. Stems 1–8, erect (at lower elevations) to ascending, simple, with (1–)3(–6) scattered leaves (1 leaf usually at base of stem, similar to radical leaves). Radical (and lowermost cauline) leaves: petiole 4–15 cm with short fleshy-vaginate base; blade glaucous on both surfaces, orbicular, 2–3 × 3–5 cm, ternate to biternate (rarely triternate); leaflets shortly petiolulate (2–6 mm), broadly obovate to obtriangular to suborbicular, deeply 3-fid; segment shallowly 2–4-fid at apex, ultimate lobes obtuse, mucronate. Cauline leaves (except lowermost) sessile to shortly stalked, 1–3 × 2–5 cm, progressively smaller upward, ternate to ternatisect with leaflets shallowly cut into broad obovate obtuse lobes with small dark mucro. Raceme very dense, capitate, 3–4 cm, elongating in fruit to 6–9 cm, 9–15-flowered; lower bract broadly palmatispartite, 10–20 mm, middle broadly obovate, entire to coarsely divided, 5–13 mm, upper entire. Pedicel ca. 10 mm in flower, 15–20 mm in fruit, erect. Sepals white, 2–3.5 × 1–2 mm, deeply lacerate-dentate. Corolla clear azure blue to purplish blue with whitish clouds; inner petals darker at apex, sometimes white at very tip; outer petals with rather broad entire to dentate limb, dorsal crest 2–2.5 mm wide, entire to dentate, overtopping apex, sometimes decurrent on spur; upper petal broadly subacute, 23–26 mm; spur straight or slightly downcurved, cylindrical, 10–12 mm, broad; nectary ca. 1/2 as long as spur; lower petal 14–16 mm, claw broad, broadly and conspicuously sacate, limb rounded, ca. 8 mm wide; inner petals 11–13 mm. Stigma slightly emarginate; marginal simple papillae: median 2 distinct, lateral diffuse or confluent; geminate papillae lateral and on basal lobes. Capsule broadly elliptic to obovoid, 9–11 × 4–5 mm, 7–14-seeded; style ca. 3.5 mm. Fl. and fr. Jul–Sep.

• Disturbed gravelly slopes, bare patches on wet alpine meadow slopes, scree; 3800–4100 m. N Sichuan (Balang Shan, Niutou Shan).

**285. *Corydalis barbisepala*** Handel-Mazzetti & Fedde, Repert. Spec. Nov. Regni Veg. 17: 409. 1921.

髯萼紫堇 ran e zi jin

Herbs, perennial, 10–30(–40) cm tall, glabrous. Rhizome horizontal, slender, branched, at branch apices with more densely set small fleshy scales and petiolar bases. Stems erect, slender, simple, with 1(or 2) leaves in upper 1/2, and often a leaf at stem base similar to radical leaves. Radical leaves 2–5; petiole 3–20 cm; blade glaucous on both surfaces or green adaxially, orbicular, 2–5 × 2–6 cm, ternate to biternate; primary leaflets with petiolule 5–10 mm; secondary leaflets sessile, entire to slightly or deeply 2- or 3-cleft into broadly obovate obtuse to truncate lobes. Cauline leaves with short petiole 1–2(–5) mm; blade like radical leaves. Raceme 7–14-flowered, 2–4 cm; lower bracts to 25 mm, like upper cauline leaf, deeply 3–8-palmatisect, middle bracts 8–14 mm, obovate, trifid, upper entire, ca. 10 mm. Pedicel 10–20 mm, erect in fruit. Sepals white, rarely purple, 4–9 × 3–6 mm, deeply fimbriate-dentate. Petals pale blue to bluish purple, inner petals white but internal apical dark blotch visible through tissue from outside; outer

petals with broad dentate margin, obtuse to long mucronate at apex, dorsal crest deeply dentate to subentire, 1.5–3 mm wide, slightly to conspicuously overtopping apex; upper petal 18–24 mm, spur downcurved at apex, cylindrical, 10–13 mm; nectary ca. 1/2 as long as spur; lower petal straight to deeply saccate, 13–14 mm, gradually widened to broadly obovate dentate limb; inner petals 10–12 mm. Stigma quadrate; marginal simple papillae: median 2 distinct, lateral broad, diffuse; geminate papillae lateral and on well-developed basal lobes. Capsule obovoid, 7–9 × ca. 3 mm, 3–9-seeded; style ca. 3.5 mm. Fl. and fr. Jun–Aug.

• Forest understories, among shrubs, meadow slopes; 3300–4300 m. N Sichuan (Barkam, Pingwu, Songpan, Xiaojin).

**286. *Corydalis elata*** Bureau & Franchet, J. Bot. (Morot) 5: 20. 1891.

高茎紫堇 gao jing zi jin

Herbs, perennial, 35–60 cm tall, glabrous. Rhizome short, with fleshy scales that become dark on drying, terminating in a small rosette of leaves. Stems 1–4, erect, 35–60 cm, branched, with 2–4 leaves from middle upward. Radical leaves: petiole 8–18 cm; blade glaucous abaxially, green adaxially, 4–6 × 5–8 cm, bi-(tri)-ternate with leaflets shallowly to deeply divided into obovate entire to divided lobes; ultimate lobes 2–8 mm wide, obtuse; cauline leaves smaller, shortly stalked, less divided. Racemes dense at first, elongating in fruit, 10–30-flowered; bracts 6–11(–15) mm, upper linear to narrowly oblanceolate, entire to slightly dentate, lowermost usually larger and divided, or even similar to uppermost leaf. Pedicel thin, 10–20 mm, 13–25 mm in fruit. Sepals 1–2 mm, finely dentate. Corolla blue to purplish blue; outer petals with short dentate crest not overtopping apex; upper petal 19–24 mm; spur straight or slightly downcurved, cylindrical, not tapering, 10–12 mm; nectary ca. 2/3 as long as spur; lower petal 12–13 mm, with broadly rhombic, acuminate, dentate limb attenuate to gibbous claw; inner petals 10–12 mm. Stigma square, narrowly emarginate with 4–6 marginal simple papillae; geminate papillae lateral (submarginal) and on basal lobes. Capsule pendent from erect-spreading pedicel, obovoid to elliptic, 5–12-seeded, 10–15 × 3–4 mm, explosively dehiscent; style ca. 3 mm. Seeds ca. 1.5 mm, smooth. Fl. and fr. May–Sep.

• Understories of subalpine conifer forests, shrubs, slope grasslands or slope sides; 2900–4000 m. W Sichuan (Kangding, Luding, Wabaoshan, Xide).

**287. *Corydalis harrismithii*** Lidén & Z. Y. Su, Novon 17: 482. 2007.

康定紫堇 kang ding zi jin

*Corydalis elata* Bureau & Franchet subsp. *ecristata* C. Y. Wu.

Herbs, perennial, 35–60 cm tall, glabrous. Rhizome short (rarely with stolons?), with fleshy scales that become dark on drying, terminating in a small rosette of leaves. Stems 1–4, erect, with erect branches, with 2 or 3 leaves from middle upward. Radical leaves long persistent, long stalked; petiole 10–22 cm; blade glaucous abaxially, green adaxially, 4–7 × 5–10 cm, ternate to biternate with leaflets shallowly to deeply divided

into obovate entire to divided lobes; ultimate lobes (1–)2–15 mm wide, obtuse; cauline leaves smaller, shortly stalked, less divided. Racemes 10–32-flowered (much less in late axillary racemes); bracts 6–11(–15) mm; upper linear to narrowly oblanceolate, entire to slightly dentate; lowermost usually larger and divided, or even similar to uppermost leaf. Pedicel thin, suberect in fruit, 10–20(–30) mm. Sepals narrowly ovate, 0.5–2 × 0.5–1 mm, subentire to much dentate at base, acute. Corolla pale blue to sky blue with whitish marks; dorsal crests of inner petals clear blue in apical part but white at very tip, adaxially with dark purple blotch. Outer petals ecristate; upper petal 17–21 mm; spur straight or slightly downcurved, 8–12 mm, slender, slightly tapering; nectary 1/2–2/3 as long as spur, very thin; lower petal ca. 12 mm, with broadly rhombic, slightly acuminate, obtusely dentate limb attenuate to shallowly gibbous claw; inner petals 10–11 mm. Stigma square, narrowly emarginate with 4–6 marginal simple papillae; geminate papillae lateral (submarginal) and on basal lobes. Capsule pendent from erect-spreading pedicel, obovoid to elliptic, 9–11 × 3–4 mm, 2–8-seeded; style 4–5 mm. Seeds ca. 2 mm, smooth, with prominent uneven elaiosome. Fl. and fr. Jul–Aug.

- Slopes in shade of shrubs close to running water; 3100–4100 m. Sichuan (W of Kangding).

This species is very similar to *Corydalis elata* but differs by its spur tapering, nectary very thin, dorsal crest absent, and racemes more lax.

**288. *Corydalis aquilegioides*** Z. Y. Su, Acta Bot. Yunnan. 15: 136. 1993.

假漏斗菜紫堇 *jia lou dou cai zi jin*

Herbs, perennial, 30–40 cm tall. Rhizome to 3 cm, with fleshy fibrous roots and residual petiolar bases. Stems 1 to few from each rhizome branch but often several per plant, erect, branched and leafy above with 2–4 leaves (sometimes with a long-stalked leaf at base similar to radical leaves). Radical leaves 2–6; petiole 13–20 cm; blade glaucous abaxially, slightly glaucous adaxially, 5–6 × 7–11 cm, ternate to biternate; primary leaflets with petiolule 3–10 mm, deeply ternatisect; segments broadly obovate, entire to apically slightly 3-divided, often with conspicuous red dot in sinus of incision; lobes broad, obtuse. Cauline leaves sessile; blade like radical leaves. Raceme (3–)6–12-flowered, lax; bracts ovate to oblanceolate, 10–15 mm, lower divided, upper ones narrow, entire. Pedicel 10–20 mm, slender, erect in fruit. Sepals 0.3–1 × 0.5–1 mm, entire to finely dentate. Corolla blue to purple, inner petals whitish or sometimes dorsal crests pale blue; outer petals acuminate with short narrow dentate crest (rarely lacking); upper petal 23–25 mm; spur straight or downcurved at tip, cylindrical, 12–14 mm; nectary 1/2–2/3 as long as spur; lower petal 11–13 mm, claw with distinct subbasal gibbosity, gradually widened into rhombic acuminate limb with dentate margin; inner petals 10–11 mm. Stigma square, with 4–6 simple marginal papillae; geminate papillae lateral (clearly submarginal) and in basal corners. Capsule pendent from erect pedicel, obovoid, 9–15 × 3(–4) mm, 4–9-seeded, explosively dehiscent; style ca. 4 mm. Seeds 1.3–1.5 mm; elaiosome short, appressed. Fl. and fr. Jul–Sep.

- Gravel; 2000–2700 m. NW Sichuan (Guanxian, Maoxian).

This species is very similar to *Corydalis elata* but is a low eleva-

tion taxon and has leaves less divided with broader lobes, racemes more lax with fewer and larger flowers, and lateral geminate stigma papillae clearly laminal.

**289. *Corydalis stolonifera*** Lidén, sp. nov.

匍匐茎紫堇 *pu fu jing zi jin*

Type: China. Sichuan: Shimian Xian, on the road from Jiziping to Xishan, 29°04'N, 102°11'E, forest margin, in and at the sides of small brook, alt. 3000 m, 31 Jul 2007, M. Lidén, J. Van De Veire & J. P. Yue 2007-19 (holotype, UPS; isotypes, F, KUN).

*Species nova ad gregem complexam Corydalis elatae pertinens, sed a speciebus (praeter C. susannae) gregis rhizomate valde elongato, stolonibus praedito atque capsula sublineari differt. A C. susannae sepalis minutioribus, petalis exterioribus angustioribus ecristatis differt.*

Paratypes: M. Lidén, J. Van De Veire & J. P. Yue 2007-22 (KUN, UPS).

Herbs, perennial, 18–45 cm tall. Rhizome 1–3 cm, with several coarse roots, producing stolons 5–15 cm × ca. 1.5 mm, laxly branched, sparsely set with fleshy scales or petiolar bases, at intervals producing new dense growth with leaf rosette with dense fleshy scales and petiolar bases. Stems 1 or 2 per node, erect, with 2 or 3 leaves in upper 1/2, sometimes with a long-stalked leaf on lower part. Radical leaves since long withered at flowering nodes; petiole 3–7 cm; blade glaucous especially abaxially, 1–4 × 1–5 cm, ternate; leaflets shortly stalked, deeply ternatisect; lobes obovate, shallowly cut into obtuse to acute lobules. Cauline leaves shortly stalked to sessile, 1–5 × 2–6 cm, ternate; leaflets shallowly to deeply once to twice ternatisect into obovate to oblong, obtuse to acute lobes, progressively smaller and less divided upward. Racemes 7–21-flowered, 3–6 cm in flower, elongating to 5–10 cm in fruit; lower bracts like upper leaf, upper narrowly oblanceolate, 4–8 mm, entire. Pedicel erect, 8–20 mm. Sepals minute. Outer petals acuminate, without crest; upper petal 25–27 mm; spur almost straight or slightly downcurved, 13–14 mm, narrowly cylindrical, 12–14 mm; lower petal with straight narrow claw and rhombic acuminate dentate limb; inner petals 10–11 mm. Capsule linear to narrowly fusiform, 16–21 × 1.5–2 mm, 7–10-seeded; style ca. 4 mm. Seeds subquadrangular, 1.4–1.6 mm, smooth, with deeply lobed elaiosome.

- Along streams in forests and clearings; 3000–3400 m. Sichuan (Shimian).

This species differs substantially from other species in the *Corydalis elata* group (species nos. 286–290) by its long stolons and long narrow capsules. It seems most closely related to the vegetatively similar *C. susannae*.

The specific epithet means “bearing stolons,” referring to the habit of the plants, from Latin *stolo* (“stolon”) and *ferre* (“to bear”).

**290. *Corydalis susannae*** Lidén, sp. nov.

幽溪紫堇 *you xi zi jin*

Type: China. Sichuan: Mianning Xian, Lamagetou Nature Reserve, Niuchang above Yele Dam (Yele Xiang, above Lizi-



ping Xiang), "mixed forest primarily of *Abies* and *Salix* with understory of arborescent *Rhododendron*-bamboo mixed shrubs, along stream at edge of forest," alt. 2790–3440 m, 10 Jul 2005, D. E. Boufford, J. H. Chen, K. Fujikawa, S. L. Kelley, R. H. Ree, H. Sun, J. P. Yue, D. C. Zhang & Y. H. Zhang 32783 (holotype, UPS; isotypes, A, KUN).

*A Corydalis stolonifera sepalis multo majoribus petalis exterioribus latis dentatis dorsaliter cristatis differt. A C. barbisepala foliis radicalibus minoribus floribus majoribus longe acuminatis differt.*

Herbs, perennial, 20–40 cm tall. Rhizome 1–2 cm, with several coarse roots, producing stolons 5–10 cm × ca. 1.5 mm, laxly branched, sparsely set with fleshy scales or petiolar bases, at 3–10 cm intervals producing new growth with leaf rosette with dense fleshy scales and petiolar bases. Stems 1 or 2 per node, erect, with 1–3 leaves in upper 1/2, sometimes with a long-stalked leaf low on lower part. Radical leaves since long withered at flowering nodes; petiole 4–7 cm; blade glaucous especially abaxially, 1–2 × 1–3 cm, ternate; leaflets shortly stalked, deeply ternatisect; lobes obovate, entire to shallowly cut into obtuse mucronate lobules. Cauline leaves progressively smaller and less divided upward, shortly stalked to sessile, 2–4 × 3–4 cm, ternate; leaflets shallowly to deeply once to twice ternatisect into obovate obtuse lobes. Racemes 8–12-flowered, 3–4 cm; lower bracts like upper leaf, upper oblanceolate, 5–12 mm, entire. Pedicel erect, 8–20 mm. Sepals small or up to 4 × 3 mm, deeply lacerate-dentate. Corolla blue with purplish tint at spur; inner petals white. Outer petals broad, dentate, long mucronate, dorsal crest short, 1–2 mm wide, dentate; upper petal 27–28 mm; spur slightly downcurved, cylindrical, ca. 14 mm; nectary ca. 1/2 as long as spur; lower petal with short deeply saccate claw widened to broad rounded dentate long mucronate limb; inner petals ca. 12 mm. Capsule unknown; ovary with 10–15 ovules in basal 1/2; style ca. 2.5 mm. Fl. Jul.

- Along streams at forest margins; 2700–3500 m. Sichuan (Mianning).

*Corydalis susannae* is similar vegetatively and ecologically to the geographically close *C. stolonifera*, but its flowers (and probably fruit) are widely different. It bears a close resemblance to *C. barbisepala* but is easily distinguished from that species by the smaller shortly stalked radical leaves and the larger corolla with much broader and long acuminate outer petals.

The specific epithet is named for one of the collectors, Susan Kelley, of Harvard University Herbaria. It also refers to Susanna of Babylon, wife of Joachim, who, while taking a bath in her secret garden, was spied on by two voyeurs, just as this plant, growing in a secluded stream, was taken advantage of by uninvited botanists.

**291. *Corydalis omeiana*** (C. Y. Wu & H. Chuang) Z. Y. Su & Lidén, *Novon* 17: 485. 2007.

金顶紫堇 *jin ding zi jin*

*Corydalis flexuosa* Franchet var. *omeiana* C. Y. Wu & H. Chuang, *Acta Bot. Yunnan.* 13: 131. 1991; *C. flexuosa* subsp. *omeiana* (C. Y. Wu & H. Chuang) C. Y. Wu.

Herbs, perennial, 35–80 cm tall, glabrous or rarely pillose on inflorescence; leaves sometimes densely and finely pa-

pillose abaxially. Rhizome 1–2 cm with densely set imbricate fleshy scales that become dark on drying, terminating in a small rosette of leaves; sometimes with slender stolons. Stems 1–3, erect, 35–70 cm, simple or branched above, with 3–6 leaves in upper 1/2 (rarely a long-stalked leaf on lower part). Radical leaves few; petiole 5–10(–20) cm; blade glaucous abaxially, green adaxially, 1.5–3 × 2–4 cm, ternate to biternate; leaflets shallowly to deeply divided into obtuse or acute lanceolate to oblong lobes. Cauline leaves 2–5 × 2–5 cm, lower shortly stalked, upper sessile; blade like radical leaves. Racemes dense at first, elongating in fruit, 6–15-flowered; bracts 5–12 mm, broadly oblanceolate with lateral narrow lobes or teeth, lowermost usually larger, deeply palmatisect into obovate lobes, upper ones often entire. Pedicel thin, 10–20 mm in fruit. Sepals early falling, whitish, ovate, slightly thick, uneven, 2–3.5 × 2–3 mm, finely dentate. Corolla blue to purplish blue, slightly nutant in bud. Outer petals without crest, conspicuously acuminate; upper petal 23–31 mm, entire; spur straight, slightly tapering, 12–18 mm; nectary 2/3–3/4 as long as spur; lower petal 12–15 mm, with broadly ovate, shortly acuminate, dentate limb sharply set off from short straight claw (in bud margin of lower petal embracing upper petal); inner petals 10–14 mm. Stigma square, slightly emarginate; marginal simple papillae: median 2 distinct, lateral broad, indistinct; geminate papillae lateral and on well-developed basal lobes. Capsule pendent from straight, erect-spreading pedicel, narrowly obovoid, 10–13 × ca. 2 mm, 10–15-seeded; style ca. 3.5 mm. Seeds ca. 1 mm, smooth, with appressed elaiosome. Fl. and fr. May–Sep.

- Forest understories, shrubs at forest margins, glades, disturbed ground; 2100–3400 m. C Sichuan (Emei Shan, Wawu Shan, Yingjing).

Plants from Wawu Shan have large flowers.

**292. *Corydalis aeditua*** Lidén & Z. Y. Su, *Novon* 17: 481. 2007.

湿崖紫堇 *shi ya zi jin*

Herbs, perennial, ca. 35 cm tall, glabrous. Rhizome 2–5 cm, with dense fleshy scales and few rather thick roots; stems ascending, slender, simple or with a flowering branch from axil of uppermost leaf, with 3 or 4 shortly stalked small leaves along upper 1/2. Radical leaves few; petiole 10–12 cm; blade glaucous abaxially, green adaxially, ternate, ca. 2 × 2–3 cm, with leaflets deeply lobed into obovate segments. Cauline leaves: lowermost sometimes long-stalked, others shortly stalked to subsessile; blade ternate to biternate with obtriangular leaflets with cuneate base, apically crenate-dentate to shallowly lobed into oblong obtuse segments 2–5 mm wide. Raceme short and dense, ca. 10-flowered; bracts broadly spatulate, ca. 5 mm, obtuse, often with a few small lateral teeth. Pedicel 7–10 mm at anthesis, probably erect. Sepals rounded, thin, 2–2.5 × ca. 2 mm, richly dentate. Corolla blue to purplish blue; outer petals very narrowly crested; upper petal ca. 23 mm; spur straight, tapering to a narrow apex, 11–13 mm; nectary thin, ca. 2/3 as long as spur; lower petal 12–13 mm, with a short claw abruptly widened into broad rounded erose-dentate shortly acuminate limb; inner petals ca. 11 mm. Ovary linear, with 11–16 ovules; style ca. 3 mm, conspicuously swollen and flexible where stigma attaches. Fruit unknown. Fl. Jun–Jul.

• Almost vertical very wet cliffs above streams; 1500–1600 m. Sichuan (Emei Shan).

**293. *Corydalis leucanthema*** C. Y. Wu, Acta Bot. Yunnan. 12: 385. 1990.

粉叶紫堇 *fen ye zi jin*

Herbs, perennial, 25–40 cm tall, glabrous. Rhizome horizontal, columnar, to 7 cm, densely clad with fleshy scales and old petiolar bases, apically with leaf rosette. Stems from axils below rosette, 1 or 2, branched above, with 2–4 leaves. Rosette leaves: petiole 5–15(–25) cm; blade glaucous on both surfaces, ovate, 5–12 × 5–9 cm, biternate; primary leaflets long petiolulate; secondary shortly petiolulate, deeply once to twice ternatisect into broadly obovate to narrowly oblong lobes. Cauline leaves scattered, like radical leaves but smaller, upper ones with petiole 0.5–1 cm. Raceme becoming lax when flowers still in bud, 4–12 cm, 8–20-flowered, rachis thin; bracts narrowly oblanceolate to linear, 5–9 mm, entire; lowest bract sometimes larger and divided. Pedicel thin, 9–17 mm in flower, 13–23 mm in fruit. Sepals white, rounded, ca. 1 × 1 mm, finely dentate. Corolla gracefully nodding, pale blue to bluish purple, rarely white. Outer petals navicular, narrow, acute, without crest; upper petal 17–25 mm; spur tapering, straight or upturned at base, slightly downcurved at apex, 9–15 mm; nectary 1/2–2/3 as long as spur; inner petals 8–11 mm. Stigma square, slightly emarginate; marginal simple papillae: median 2 distinct, lateral indistinct; geminate papillae lateral (submarginal) and on well-developed basal lobes. Capsule pendent from spreading pedicel, often reddish, narrowly obovoid, 10–13 × 2.5–3 mm, 8–13-seeded, explosively dehiscent; style ca. 3.5 mm. Seeds in 2 rows, 1.3–1.5 mm, smooth; elaiosome strap-shaped. Fl. May–Jul, fr. Jun–Aug.

• Rocks in evergreen broad-leaved forests, stony ground by running water; 900–3000 m. C Sichuan (Emei Shan, Wawu Shan).

**294. *Corydalis schusteriana*** Fedde, Repert. Spec. Nov. Regni Veg. 21: 47. 1925.

甘洛紫堇 *gan luo zi jin*

*Corydalis angustiflora* C. Y. Wu, p.p. (as to type).

Herbs, perennial, 40–60 cm tall, glabrous. Rhizome columnar, 4–9 × 1–1.5 cm, clad with densely imbricate fleshy scales and petiolar bases. Stems erect, stout, simple or with a late branch, with 3–5 scattered leaves, in axils of (upper) cauline leaves often with large black spindle-shaped bulbils. Radical leaves few; petiole 11–15 cm, base fleshy; blade abaxially pruinose, adaxially green, bi-(tri)-ternate; primary leaflets petiolulate; ultimate leaflets almost sessile, deeply ternatisect; lobes again shallowly divided at apex; lobules oblong to obovate, apex obtuse. Cauline leaves: lower petiole 5–7 cm, upper 1–4 cm; blade like radical leaves, but upper leaves less divided. Raceme simple or with a basal branch, 5–10 cm, 10–20-flowered, dense in flower, elongating in fruit; bracts narrowly oblanceolate, 5–12 mm, entire, sometimes lowest bract deeply 3–5-divided. Pedicel very thin, 5–10 mm, scarcely elongating in fruit. Sepals ca. 1 × 1 mm, finely dentate. Corolla lavender or blue; outer petals navicular, narrow, acute, usually with narrow crest; upper petal 23–25 mm; spur straight, cylindrical, 12–15 mm;

nectary 2/3–3/4 as long as spur, thin; lower petal 11–13 mm, with long narrow claw widened into narrow acute limb; limb not reflexed; inner petals 10–11 mm. Stigma square, slightly emarginate; marginal simple papillae: median 2 distinct, lateral indistinct; geminate papillae lateral (submarginal) and terminating well-developed basal lobes. Capsule narrowly obovoid, 10–14 × ca. 2 mm, 5–15-seeded; style ca. 3 mm. Seeds in 1(or 2) rows, ca. 1.8 mm, smooth. Fl. and fr. May–Jun.

• Forest understories; 1700–2200 m. W Sichuan (Ganluo, Mabian).

**295. *Corydalis yaoyi*** Lidén & Z. Y. Su, Novon 17: 488. 2007.

覆鳞紫堇 *fu lin zi jin*

Herbs, perennial, 30–50 cm tall, glabrous. Rhizome clad with large fleshy imbricate scales; stems slender, simple, with 1(or 2) leaves in upper 1/3. Radical leaves few; petiole 17–30 cm; blade very glaucous abaxially, dark green adaxially, ternate, 3–4 × 4–5 cm, slightly fleshy; leaflets shortly stalked (petiolule of median leaflet 9–12 mm, lateral 2–3 mm), divided almost to base into 2 or 3 broadly obovate lobes, cut to 1/3 into 2 or 3 rounded lobules 3–7 mm wide; cauline leaves like radical leaves, but subsessile and slightly smaller. Racemes very lax, ca. 10-flowered; lowermost bract similar to cauline leaves, but smaller and less divided; upper oblanceolate, 5–9 mm, entire; lowermost pedicels up to 32 mm, upper ones much shorter, at least at anthesis, 11–15 mm. Sepals small, ca. 1 × 1.5 mm, deeply divided. Corolla purplish blue, darker toward apical keel of outer petals; outer petals acute to shortly acuminate at apex, without or with narrow crest; upper petal 26–28 mm; spur cylindrical, 12–16 mm; nectary ca. 2/3 as long as spur; lower petal acuminate, claw with a pronounced sac; inner petals 13–14 mm. Stigma with 4 or 6 prominent marginal simple papillae at apex; geminate papillae lateral and on basal lobes. Ovary with 15 ovules; style 5–6 mm. Capsule not seen. Fl. Jun–Jul.

• Under shrubs; ca. 3400 m. SC and W Sichuan (Ebian, Luding).

**296. *Corydalis angusta*** Z. Y. Su & Lidén, *sp. nov.*

细距紫堇 *xi ju zi jin*

Type: China. Sichuan: Ebian (O-pien) Xian, under woods, alt. 2000 m, 18 May 1932, *T. T. Yü* 822 (holotype, KUN; isotype, A).

*Corydalis angusta a speciebus affinis racemis subspicatis multifloris, corollis minoribus atque calcaribus brevioribus angustioribus longe distat.*

Paratype: *Medicine Identification Centre, Health Bureau of Xichang District 0506* (SM).

*Corydalis angustiflora* C. Y. Wu, p.p. (excluding type).

Herbs, perennial, 40–60 cm tall, glabrous. Rhizome columnar, 4–9 × 1–1.5 cm, clad with densely imbricate fleshy scales and petiolar bases in 2 rows. Stems few, erect, from below few-leaved apical rosette, branched above, with 4 or 5 leaves in upper 1/2, sometimes a single long-stalked leaf in lower 1/2. Radical leaves: petiole 12–22 cm, base broadly sheathed; blade glaucous abaxially, dark green adaxially, ovate-

triangular, 4–8 × 4–8 cm, biternate; primary leaflets with petiole 1–2 cm, ultimate leaflets shortly stalked, deeply ternatisect; lobes again shallowly to deeply 3–7-divided; lobules broadly lanceolate to oblong. Cauline leaves: lower petiole 3–4(–10) cm, upper ca. 1 cm; blade like radical leaves, but progressively smaller upward. Racemes long and narrow, 15–28-flowered, 7–10 cm; bracts oblanceolate, 3–7 mm, entire; lowermost bract sometimes larger and slightly divided. Pedicel filiform, 6–9 mm. Sepals ovate, 0.5–1 mm, finely dentate. Corolla purple to blue; inner petals whitish. Outer petals narrow, acute, with short narrow crest; upper petal 15–17 mm; spur cylindrical or slightly tapering, very narrow, upturned from base, straight, 9–10 mm; nectary absent; lower petal ca. 11 mm, with narrow claw and narrowly rhombic acute limb; inner petals ca. 10 mm. Ovary narrowly lanceolate; ovules 7; style 2.5–3 mm; stigma square, simple marginal apical papillae 4; geminate papillae lateral and on well-developed basal lobes. Fl. May–Jun.

• Understories of mixed forests; ca. 2000 m. SW Sichuan (Ebian, Xichang; Beimu Shan).

*Corydalis angusta* differs substantially from other species in the section by the combination of branched leafy stems and small flowers, with thin straight spur, in many-flowered racemes.

The specific epithet refers to the narrow corolla spur, from Latin *angustus* (“narrow”).

**297. *Corydalis procera*** Lidén & Z. Y. Su, *Novon* 17: 486. 2007.

白花紫堇 bai hua zi jin

Herbs, perennial, 50–60 cm tall, glabrous. Rhizome short, thick, densely clothed with fleshy scales, becoming a black and hard bulblike structure when dry. Stems slender, simple or with late branches above, with 3 or 4 leaves in upper 2/3. Rosette leaves few; petiole ca. 5 cm; blade 3–4 × 3–5 cm, bi- to triternate; leaflets stalked, deeply 3–6-divided; ultimate lobes oblong, ca. 2 mm wide. Cauline leaves like radical ones, but shortly stalked or sessile; ultimate lobes slightly broader. Racemes dense at first, soon elongating, 15–17-flowered; bracts 5–6 mm, narrowly lanceolate, entire or with a few narrow teeth; lowermost bract sometimes larger. Pedicel 7–9 mm, thin. Sepals minute. Corolla apparently white; outer petals subacute, without crest; upper petal 26–28 mm; spur almost straight to slightly bent downward at tip, 15–16 mm, slightly attenuate; nectary ca. 2/5 as long as spur; lower petal straight, ca. 12 mm, with narrow claw and rhombic limb; inner petals 11–12 mm. Ovary with 6 or 7 ovules; style ca. 4 mm; stigma square, slightly emarginate; marginal simple papillae: median 2 distinct, lateral diffuse; geminate papillae lateral (submarginal) and in basal corners. Capsule unknown. Fl. Jul.

• “W Sichuan” (without precise locality).

**298. *Corydalis lagochila*** Lidén & Z. Y. Su, *Novon* 17: 483. 2007.

兔唇紫堇 tu chun zi jin

Herbs, perennial, 11–15 cm tall, glabrous. Rhizome 1–3 cm (possibly much longer), narrow, with many slightly fleshy roots; fleshy scales mainly apical, forming a loose bulb at apical

leaf rosette. Stems 1–3, 11–15 cm, simple or rarely with a late very small branch, with (0 or)1(or 2) leaves in upper 1/2. Radical leaves several; petiole 2–5 cm; blade orbicular to triangular, 1.5–2.5 × 2–3 cm, ternate to biternate with deeply divided leaflets sometimes again shallowly divided apically; ultimate lobes obovate, 1.5–5 mm wide. Cauline leaf: petiole short, 5–10 mm; blade orbicular, 1–2 × 1–2 cm, ternately divided with leaflets deeply cut into 2 or 3 obovate lobes that may again be shallowly divided; if second cauline leaf present, similar to lowermost bract. Raceme corymbose, 6- or 7-flowered; bracts broadly obovate, 6–11 mm; lowermost larger and with small lateral lobes. Pedicels 12–22 mm, or upper ones shorter. Sepals reniform, ca. 1 mm, finely dentate. Corolla blue, possibly with a purplish hue; outer petals with short narrow slightly dentate crest not reaching apex; upper petal ca. 21 mm, deeply emarginate at apex, with rounded forward lobes; spur broad and short, 10–11 × ca. 4 mm, not tapering toward obtuse apex; nectary 4–5 mm; lower petal 16–18 mm, with distinct claw and wide emarginate limb 8–10 mm wide; inner petals ca. 12 mm. Stigma square; marginal simple papillae: median 2 distinct, lateral diffuse; geminate papillae lateral (submarginal) and on well-developed basal lobes. Ovary linear, with 40–42 ovules; style 3.5–4 mm. Fruit unknown. Fl. Jun.

• “Under forest” (doubtful); ca. 3200 m. Sichuan (Baoxing).

**299. *Corydalis mucronipetala*** (C. Y. Wu & H. Chuang) Lidén & Z. Y. Su, *Novon* 17: 485. 2007.

天全紫堇 tian quan zi jin

*Corydalis flexuosa* Franchet var. *mucronipetala* C. Y. Wu & H. Chuang, *Acta Bot. Yunnan.* 13: 132. 1991; *C. flexuosa* subsp. *mucronipetala* (C. Y. Wu & H. Chuang) C. Y. Wu.

Herbs, perennial, glaucous, 10–26 cm tall, glabrous; stems and bracts often reddish. Rhizome short, densely clad with fleshy imbricate persistent petiolar bases in 2 rows. Stems 1 or 2, erect, simple or rarely branched above, with 1–3 leaves, mainly in upper 1/2. Rosette leaves: petiole 3–9 cm, with swollen base; blade very glaucous on both surfaces, rarely green adaxially, broadly ovate, 2–4 × 2–4 cm, (once or) twice ternate; primary leaflets shortly stalked, secondary sessile, deeply 2–7-divided into obovate obtuse lobes. Cauline leaves similar, sessile, or lower with petiole to 3 cm. Raceme 5–16-flowered, rather dense; bracts broadly obovate, 8–16 mm, entire or with a few small lateral lobes or teeth, lowermost bract often deeply palmatisect. Pedicel erect, straight, 15–30 mm. Sepals 1–2 × 1–2 mm, finely and sharply dentate. Corolla clear azure blue; upper petal 22–26 mm, broad, obtuse with distinct mucro ca. 1 mm; crest 1–2 mm wide, entire or dentate, attenuate to both ends, usually short, sometimes decurrent on spur; spur cylindrical, short and broad, 10–11(–13) mm, to rather narrow, almost straight to sigmoidally curved; nectary ca. 1/2 as long as spur; lower petal with long narrow claw abruptly widened to rounded conspicuously mucronate limb 8–9 mm wide, abaxially with short entire to dentate crest; inner petals 12–15 mm. Stigma square; marginal simple papillae: median 2 distinct, lateral diffuse; geminate papillae lateral (submarginal) and on well-developed basal lobes. Capsule linear, 25–33 × ca. 1.5 mm, 15–25-seeded; style ca. 3 mm. Seeds ca. 1.3 mm, smooth, with deeply lobed elaiosome. Fl. and fr. Jun–Sep.

• Scree, seasonally flooded bouldery riverbeds, cliffs; 2800–3800 m. Sichuan (Tianquan).

Plants at lower elevations are more slender, with the upper petal with a considerably narrower and more curved spur.

**300. *Corydalis madida*** Lidén & Z. Y. Su, *Novon* 17: 484. 2007.

喜湿紫堇 xi shi zi jin

Herbs, perennial, 15–40 cm tall, gray-glaucous, finely pillose pubescent at base of stem. Rhizome horizontal, 1–6 cm, densely clothed with imbricate thick fleshy reddish scales in 2 rows. Stems few to several, reddish, leafy and branched throughout. Radical leaves like lower cauline: very glaucous on both surfaces; blade biternate to sub-bipinnate; leaflets obovate, shallowly to deeply cut into obovate obtuse lobes; uppermost leaves and leaves of shorter stems less divided, grading into bracts. Racemes very dense at anthesis, soon elongating, 10–23-flowered; lower bracts rounded, shallowly cut into few obtuse lobes, middle and upper bracts entire, broadly obovate-subspatulate, 6–10 mm. Pedicel 8–20 mm, thin, straight, erect-spreading in fruit. Sepals rounded, 1.5–2 × ca. 2 mm, finely dentate. Corolla creamy white, sometimes with faint pinkish tint toward spur, pale yellowish green toward apex; inner petals white outside, with dark purple apical blotch inside; after pollination corolla with muddy purplish suffusion. Outer petals ecristate, rather narrow, acute; upper petal 26–29 mm; spur slightly sigmoidally curved, more strongly downcurved in bud stage, narrow, slightly attenuate, 14–18 mm; nectary 1/2–2/3 as long as spur; lower petal ca. 15 mm, straight with long narrow claw gradually dilated into rhombic-acute, sometimes shallowly 3-lobed limb; inner petals 14–15 mm. Stigma with marginal simple papillae: 4 apical, 2 broad diffuse lateral; geminate papillae: lateral and on pronounced basal lobes. Capsule sharply pendent from straight pedicel, reddish when fresh, narrowly fusiform, 13–15 × ca. 3 mm, 4–15-seeded, explosively dehiscent; style ca. 4.5 mm. Seed ovoid, ca. 1.2 × 0.9 mm, with small rugose elaiosome on slightly protruding beak. Fl. Jul–Aug, fr. Aug.

• Seepage on vertical soft rocks; 2100–2200 m. Sichuan (Wenchuan).

**301. *Corydalis flexuosa*** Franchet, *Nouv. Arch. Mus. Hist. Nat.*, sér. 2, 8: 197. 1885.

穆坪紫堇 mu ping zi jin

Herbs, perennial, 20–50 cm tall, glabrous. Rhizome horizontal, ± densely clad with persistent fleshy ovate petiolar bases and scales in 2 rows, when dried black-brown. Stems 1 to few, simple or branched, with 3 or 4 scattered leaves. Radical leaves several; petiole 4–12 cm, sheathed; blade pruinose abaxially, green adaxially, deltoid or ovate to nearly orbicular, 3.5–8 × 3–6 cm, bi- to triternate; pinnae petiolulate; pinnules terminal petiolulate, lateral shortly petiolulate to sessile, deeply or slightly 3–9-divided; ultimate segments oblanceolate, obtuse. Cauline leaves lowest long petiolate; upper shortly petiolulate to sessile; blade nearly orbicular to broadly ovate; lowest 4–6 × 5–6 cm, upward gradually smaller, biternatisect to triternatisect, like radical leaves. Raceme 4–8 cm, 10–20-flowered, below distant, above dense; middle and upper bracts oblong, 5–8 mm, entire,

lower usually divided, to 15 mm (in subsp. *pseudoheterocentra* most bracts divided). Pedicel straight, 8–15(–20) mm in flower, 15–20 mm in fruit. Sepals orbicular, minute or up to 1 mm, dentate. Petals pale blue to indigo, rarely white, inner petals whitish; upper petal narrowly ovate, (20–)24–28(–29) mm, apex shortly acuminate, without or with narrow crest; spur cylindrical, 13–18 mm; nectary 1/2–3/4 as long as spur; lower petal 12–16 mm with narrow claw abruptly widened into rounded dentate limb, rarely mucronate; inner petals 11–14 mm. Stigma square to rounded, marginal simple papillae: median 2 distinct, lateral broad or confluent; geminate papillae lateral (submarginal) and on well-developed basal lobes. Capsule linear, 15–22 × 1–1.5 mm, 13–17-seeded; style ca. 3 mm. Seeds in 1 row, ca. 1 mm, smooth. Fl. and fr. Apr–Jun.

• Forests, clearings, grassy slopes, riversides, wet rocks; 1300–2700 m. C Sichuan.

- 1a. Outer petals ecristate ..... 301a. subsp. *flexuosa*  
 1b. Outer petals with narrow crest ..... 301b. subsp. *pseudoheterocentra*

**301a. *Corydalis flexuosa* subsp. *flexuosa***

穆坪紫堇(原亚种) mu ping zi jin (yuan ya zhong)

?*Corydalis flexuosa* f. *bulbillifera* C. Y. Wu; ?*C. gemmipara* H. Chuang var. *ecristata* H. Chuang.

Radical leaves few to several. Stems often with a stalked leaf in lower 1/2. Leaves mostly biternate; leaf lobes oblong to oblanceolate, obtuse. Racemes long; bracts entire, except for lower ones. Upper petal 24–28 mm, completely ecristate.

• Forests, clearings, grassy slopes, riversides, wet rocks; 1300–2700 m. C Sichuan (Baoping, Tianquan, Wenchuan).

A very complex taxon, variable as to size and branching as well as habitat. A deviating form from W Tianquan district, growing on permanently wet cliffs, produces an abundance of small easily detached bulbils in the axils of small bractlike upper leaves.

**301b. *Corydalis flexuosa* subsp. *pseudoheterocentra*** (Fedde) Lidén ex C. Y. Wu, H. Chuang & Z. Y. Su in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 119. 1999.

低冠穆坪紫堇 di guan mu ping zi jin

*Corydalis pseudoheterocentra* Fedde, *Repert. Spec. Nov. Regni Veg.* 19: 225. 1923.

Radical leaves several, much divided, triternate. Stems leafy only above. Lower bracts leaflike, upper slightly 3-divided. Upper petal 28–29 mm, with very narrow crest.

• Slopes; ca. 1500 m. C Sichuan (Wenchuan).

**302. *Corydalis balsamiflora*** Prain, *J. Asiat. Soc. Bengal*, Pt. 2, *Nat. Hist.* 65: 41. 1896.

珠芽紫堇 zhu ya zi jin

*Corydalis flexuosa* Franchet subsp. *balsamiflora* (Prain) C. Y. Wu; ?*C. flexuosa* f. *bulbillifera* C. Y. Wu; ?*C. gemmipara* H. Chuang var. *ecristata* H. Chuang.

Herbs, perennial, 20–40 cm tall, glabrous. Rhizome hori-

zontal, ± densely clad with persistent fleshy ovate petiolar bases and scales in 2 rows, when dried black-brown. Stems 1 to few, simple or branched, sometimes with detachable dwarf shoots in leaf axils late in season, with 2–4 scattered leaves. Radical leaves several; petiole 4–12 cm, sheathed; blade pruinose abaxially, green adaxially, deltoid or ovate to nearly orbicular, 3–6 × 3–6 cm, biternate; pinnae petiolulate; pinnules sessile, deeply biternatisect into oblong to oblanceolate obtuse lobes. Cauline leaves lowest long petiolate; upper shortly petiolulate to sessile; blade broadly ovate; lowest 3–5 × 3–5 cm, upward gradually smaller, biternate to bipinnate, like radical leaves. Raceme 3–4 cm, subcorymbose, 9–14-flowered; lower bract 20–30 mm, much divided into oblong lobes, progressively smaller and less divided upward; upper 8–15 mm, entire, oblanceolate. Pedicel straight, 15–30 mm in flower, 20–35 mm in fruit. Sepals ovate, 1–2 × ca. 1 mm, finely dentate. Petals pale blue to grayish blue, rarely white, inner petals whitish; outer petals without crest; upper petal 26–29 mm, broadly rhombic, apex shortly acuminate; spur broadly cylindrical, 11–13 mm; nectary ca. 1/2 as long as spur; lower petal 14–18 mm with narrow claw abruptly widened into broad rounded entire limb; inner petals 13–15 mm. Stigma square, slightly emarginate; marginal simple papillae: median 2 distinct, lateral broad and confluent; geminate papillae lateral (submarginal) and on basal lobes. Capsule linear, 16–20 × 1–1.5 mm, 20–26-seeded (fruiting apparently very sparse in some predominantly vegetatively propagated populations); style ca. 4 mm. Seeds in 1 row, ca. 1 mm, smooth. Fl. and fr. Apr–Jun.

• Riversides, in seepage on permanently wet steep cliffs; 1900–2400(–2800?) m. Sichuan (Kangding, Luding, Tianquan).

A population from Erlang Shan (W Tianquan) produces late in the season reddish axillary dwarf shoots that root while still attached to the withering mother plant.

**303. *Corydalis calycosa*** H. Chuang, Acta Bot. Yunnan. 13: 132. 1991.

显萼紫堇 xian e zi jin

*Corydalis flexuosa* Franchet subsp. *gemmipara* (H. Chuang) C. Y. Wu; *C. flexuosa* subsp. *kuanhsienensis* C. Y. Wu; *C. flexuosa* subsp. *pinnatibracteata* (C. Y. Wu & H. Chuang) C. Y. Wu; *C. flexuosa* var. *pinnatibracteata* C. Y. Wu & H. Chuang; *C. gemmipara* H. Chuang.

Herbs, perennial, 18–60 cm tall, glabrous. Rhizome 1–4 cm × ca. 2 mm, in younger part (1–1.5 cm) densely clad with remnants of petiolar bases in 2 rows; apical leaf rosette present, though sometimes early withering. Stems 1–4, firm, erect, strongly sulcate, simple or branched above, with 3(–5) scattered leaves in upper part, and often a long-stalked leaf close to base; leaves sometimes with dark axillary bulbils; branches strict, thin, erect. Basal leaves often withered at anthesis; petiole 3–10 cm, shortly and broadly vaginate; blade green or glaucous abaxially, green, sometimes with purple or pale color around mid-vein adaxially, orbicular-triangular, 2–4 × 2–5 cm, biternate; primary pinnae shortly petiolulate; ultimate leaflets sessile, deeply ternatisect, lobes entire or again shallowly 2- or 3-lobed; ultimate segments oblong, obtuse, often dark mucronate. Cauline leaves sessile, broadly ovate, 2–6 × 2–6 cm, smaller up-

ward, triternatisect with cuneate lobes. Raceme dense in flower (laxer at base), 3–8 cm, (10–)15–40-flowered (lateral racemes smaller); lower bracts like upper leaf (biternatisect); middle bracts obovate to oblanceolate, 5–10 mm, entire or often with pinnately arranged small oblong lobes or teeth. Pedicel straight, 10–15(–20) mm, thin. Sepals early falling, white, orbicular, peltate, 1.5–2.5 × 1–2.5 mm, finely circumdentate. Petals blue to purple; inner petals whitish; upper petal 21–29 mm, broadly crested (ca. 3 mm); spur cylindrical or slightly attenuate, (10–)13–15 mm; nectary ca. 2/3 as long as spur; lower petal 14–17 mm; inner petals 12–14 mm. Stigma square; marginal simple papillae: median 2 distinct, lateral diffuse or confluent; geminate papillae lateral (submarginal) and on well-developed basal lobes. Capsule linear to oblong, 10–15(–20) × 1(–2) mm, 8–13(–17)-seeded; style ca. 3 mm. Seeds in 1 or rarely almost 2 rows, rounded to subquadrangular, 1.2–1.3 mm, smooth, with small deeply lobed elaiosome. Fl. and fr. Jun–Sep.

• Wet grazed meadows, gravelly roadsides, clearings, open forests; 2800–4000 m. NC Sichuan (Wenchuan: Balang Shan).

**304. *Corydalis capitata*** X. F. Gao, Lidén, Y. W. Wang & Y. L. Peng, Novon 18: 332. 2008.

头花紫堇 tou hua zi jin

Herbs, perennial, 35–70 cm tall, glabrous. Rhizome 1–5 cm, with small bulb, and few coarse linear roots. Stems 1–4, angular, erect, branched above, with 3–5 leaves in upper 1/2–2/3; branches erect, strict, thin, with few small leaves. Radical leaves like cauline, early withering (new flush of leaves produced in autumn); petiole 3–7 cm; blade glaucous abaxially, bright green adaxially, orbicular-triangular in outline, 2–3 × 2–3 cm, twice ternate to subpinnate, with leaflets deeply cleft into oblong obtuse lobes. Cauline leaves: petiole to 2 cm or upper leaves subsessile; blade 2–6 × 2–6 cm, like radical leaves. Terminal raceme 10–25-flowered, at anthesis very dense, capitate, or rarely with basalmost flower more distant, elongating in fruit to 5–7 cm. Racemes of axillary branches few flowered; bracts 10–20 mm, narrowly obovate with 1–3 pairs of narrow lateral lobes, narrowed to distinct stalk; lower bracts like upper leaves. Pedicel 7–12 mm in flower, elongating to 20–30 mm in fruit, straight, erect. Sepals white, ovate, ca. 2.5 × 2 mm, circumdentate. Outer petals purple or rarely white with purple apex. Outer petals broad, deeply dentate, crest broad (2–3 mm), short, sharply and deeply dentate, conspicuously overtopping petal apex; upper petal 18–19 mm; spur slightly downcurved at tip, cylindrical, ca. 8 mm; nectary ca. 2/3 as long as spur; lower petal with long narrow claw abruptly widened to rounded emarginate deeply dentate limb; inner petals 11–13 mm. Stigma square with 4 apical marginal papillae; geminate papillae lateral and on well-developed basal lobes. Capsules pendent from erect-spreading pedicel, linear, 14–20 × ca. 1.5 mm, 11–18-seeded; style ca. 2 mm. Seeds 1–1.1 mm, smooth. Self-compatible. Fl. and fr. Jun–Jul.

• Deep fertile soil on slopes in open slightly disturbed forests; 3000–3300 m. Sichuan (Maoxian).

**305. *Corydalis microflora*** (C. Y. Wu & H. Chuang) Z. Y. Su & Lidén, Novon 17: 484. 2007.

叶状苞紫堇 ye zhuang bao zi jin

*Corydalis flexuosa* Franchet var. *microflora* C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 13: 132. 1991; *C. flexuosa* subsp. *microflora* (C. Y. Wu & H. Chuang) C. Y. Wu.

Herbs, perennial, 16–33 cm tall, glabrous. Rhizome short, with small crowded fleshy scales or pale callosities at base. Stems 1 to few, erect, slender, simple, with 1 or 2 leaves in upper 1/3–1/2 (possibly also with 1 or 2 early withering small leaves at base). Radical leaves 1 to few with thin petiole 9–12 cm; blade glaucous abaxially, biternate, ca. 3 × 3 cm; leaflets obovate, entire to shallowly 3-lobed. Cauline leaves shortly stalked to subsessile, ternate to biternate, 1.5–4 × 2–4 cm; petiolule of lateral primary leaflets 2–5 mm; petiolule of terminal leaflet 5–15 mm; ultimate leaflets broadly obovate, 8–15 mm, ± deeply divided into broad rounded lobes. Raceme lax, 5–7-flowered, only slightly elongating in fruit; lower bract like cauline leaf, upper progressively smaller and less divided. Pedicel thin, erect, 6–10 mm in flower, in fruit to 10–15 mm. Sepals 0.5–1 × 0.5–1 mm, large dentate. Corolla probably blue or pale purple. Outer petals subacute, without crest; upper petal 18–19 mm, spur straight or slightly downcurved, narrowly cylindrical, 9–10 mm; nectary not recorded; inner petals 9–10 mm. Stigma subcuneate at base (without basal lobes) with 4 marginal apical simple papillae; geminate papillae 1 pair. Capsule linear, 13–18 mm, 5–13-seeded; style ca. 2.5 mm. Fl. and fr. Jun.

- Sichuan (Shimian).

**306. *Corydalis cataractarum* Lidén, sp. nov.**

飞流紫堇 fei liu zi jin

Type: China. Sichuan: Baoxing Xian, T'u-pa-kou, on stone at foot of waterfall, Jul–Aug 1939, S. Y. Hu 1252 (holotype, A; isotypes, A, SZ).

*Herba perennis glabra carnosae glaucissimae. Rhizoma dense intricato-ramosum. Caulis plures ramosi bi- vel trifoliiati. Folia radicalia plura bi- vel triternata lobis ultimis obovatis obtusis. Folia caulina minora ternatisecta vel biternatisecta. Racemus 5- ad 8-florus. Bractae integrae ellipticae. Corolla ecristata angusta acuta calcari brevi tenui. Capsula lineari-oblonga subtorulosa 7- ad 11-seminalis, seminibus laevibus parvis.*

Herbs, perennial, glaucous, 20–30 cm, “very fleshy,” glabrous. Rhizome branched, dense, contorted, thick, with some thick roots, apically 1 to few leaf rosettes with fleshy petiolar bases. Stems 3–10, suberect, branched, with 2 or 3 leaves. Rosette leaves: petiole 6–11 cm; blade glaucous on both surfaces, 5–10 × 4–9 cm, bi- to triternate, primary and secondary leaflets stalked, ultimate leaflets once to twice 2–4-divided into oblong or obovate obtuse lobes 2–10 × 1.5–5 mm. Cauline leaves much smaller, sessile, ca. 2 × 1.5 cm, ternatisect to subbiternatisect. Racemes (fruiting) 3–6 cm, 5–8-flowered; bracts elliptic, 7–15 × 2–7 mm, entire. Pedicel 15–26 mm in fruit. Sepals obovate, ca. 2 × 1.5 mm, apically finely dentate. Corolla color unknown. Upper petal narrow, without crest, 17–18 mm, acute to shortly acuminate; spur cylindrical, ca. 6 mm, narrow; nectary ca. 1/2 as long as spur, thin; lower petal with long narrow claw, expanded into rounded dentate limb, abruptly and shortly acuminate; inner petals 11–12 mm. Stigma square; mar-

ginal simple papillae unknown; geminate papillae lateral (submarginal) and in basal corners. Capsule subtorulose, 12–16 × ca. 1.5 mm, 7–11-seeded; style ca. 4 mm. Seeds in 1 row, ca. 1.3 mm, smooth, with small appressed elaiosome. (Fl. and fr. Jul–Aug.

- Stones at foot of a waterfall; ca. 2000 m. Sichuan (Baoxing).

The specific epithet means “of the waterfalls,” genitive plural of Latin *cataracta*, from Greek καταράκτης (*cataractēs*, “waterfall”).

**307. *Corydalis humicola* Handel-Mazzetti, Symb. Sin. 7: 341. 1931.**

湿生紫堇 shi sheng zi jin

Herbs, perennial, 20–50 cm tall. Rhizome short, with several coarse roots, with apical leaf rosette, persistent petiolar bases not prominent. Stems 1–3, erect, base purple, above pale green, simple, with 2 or 3 (or 4) scattered leaves in upper 1/2. Basal leaves few, 2–3 × 2–3 cm; petiole 5–20 cm, base fleshy-vaginate; blade glaucous abaxially, green adaxially, broadly ovate, biternate; primary pinnae petiolulate; terminal leaflets deeply 3-divided, lobes again slightly 2- or 3-divided; lobules obovate to narrowly oblong. Cauline leaves sessile, ternate, with ± deeply ternatisect to subbiternatisect leaflets, becoming smaller and less divided upward. Raceme 3–6 cm, very dense, 10–19-flowered, more lax in fruit; most bracts elliptic, 5–13 mm, entire; lowest bract like uppermost cauline leaf, deeply palmatisect with larger mid-lobe. Pedicel erect, 7–15 mm. Sepals narrowly ovate, ca. 2 × 0.5 mm, margin dentate, apex long acuminate. Corolla blue to purple. Outer petals with short broad (ca. 2 mm) entire obtuse crest much overtopping petal apex; upper petal navicular-ovate, 19–22 mm; spur straight, cylindrical, 8–9 mm; nectary ca. 1/2 as long as spur; lower petal 10–12 mm, claw short and broad with distinct small spur at base, gradually widened to broadly rhombic limb; inner petals ca. 10 mm. Stigma square; marginal simple papillae unknown; geminate papillae lateral (submarginal) and in basal corners. Capsule elliptic, 10–12 × 3–4 mm, 10–12-seeded; style ca. 3.5 mm. Seeds smooth. Fl. and fr. Jun–Aug.

- Shrubs, grasslands on slopes; 3100–4100 m. S Sichuan (Yanyuan).

**308. *Corydalis heterocentra* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 255. 1912.**

异心紫堇 yi xin zi jin

Herbs, perennial, 25–40 cm tall, glabrous. Rhizome 1–3 cm, with coarse roots and dense remnants of petiolar bases, apically with leaf rosette. Stems suberect, simple or with a thin late branch, with 2(–4) leaves. Radical leaves several; petiole 15–20 cm, shortly fleshy-vaginate at base; blade slightly glaucous abaxially, ternate to biternate; leaflets deeply biternatisect into narrowly oblong to lanceolate, obtuse to acute mucronate lobes. Cauline leaves: lower petiole 3–10 cm, upper absent to 1 cm; blade 4–6 × 4–6 cm, like radical leaves. Raceme 11–25-flowered; bracts 8–15 mm, shortly stalked, lower deeply biternatisect or like upper cauline leaf, middle deeply or slightly 3-divided to entire, upper narrowly oblanceolate, entire. Pedicel 10–20 mm, thin. Sepals 1–1.5 × ca. 0.5 mm, deeply dentate.

Corolla blue to purplish red. Outer petals long acuminate, without or with very narrow short dentate crest; upper petal 22–25 mm; spur straight, cylindrical, 12–13 mm; nectary ca. 2/5 as long as spur; lower petal 13–14 mm, claw narrow with prominent pouch or spurlet close to base, abruptly expanded to basally rounded apically long acuminate dentate limb; inner petals 10–12 mm. Stigma square; marginal simple papillae: median 2 distinct, lateral diffuse; geminate papillae lateral and on poorly developed basal lobes. Fruit not seen; ovules ca. 20; style ca. 4 mm. Fl. Jun–Aug.

- Grasslands, forest margins; 2700–3300 m. Yunnan (Dali).

**309. *Corydalis dongchuanensis*** Z. Y. Su & Lidén, *sp. nov.*

东川紫堇 *dong chuan zi jin*

Type: China. Yunnan: Dongchuan Xian, Yinminshan, at cliff bottom, alt. 3700 m, 28 Jul 1985, S. B. Lan 489 (holotype, KUN; isotype, PE).

*Herba perennis glabra. Rhizoma horizontale partibus persistentibus valde incrassatis basalibus petiolorum densiuscule instructum. Caules suberecti 2- ad 5-foliati eramosi. Folia basalia petiolata subtus glauca ternata vel biternata, foliis in lobos oblanceolatos acutos profunde dissectis. Folia caulina superiora sessilia, parva. Racemus subsecundus multiflorus densus. Bractee infimae ad instar folii summi, bractee superiores anguste lanceolatae integrae. Corolla azurea. Petala exteriora ecristata, acuta vel breve acuminata. Calcar petali superioris strictum cylindraceum.*

Herbs, perennial, (10–)20–30 cm tall, glabrous. Rhizome horizontal, 3–7 cm, with coarse long roots and remnants of petiolar bases, apically with leaf rosette. Stems suberect, simple, with 2–5 leaves. Radical and lower cauline leaves: petiole 7–15 cm; blade glaucous abaxially, 2.5–4 × 2–4 cm, ternate to biternate; leaflets deeply much divided into oblanceolate acute lobes. Upper cauline leaves small, 1–1.5 cm, sessile, grading into lower bracts, biternatisect to palmatisect with larger median lobe. Raceme 12–20-flowered, dense, subsecund, 5–7 cm; lower bracts like upper leaves, middle and upper bracts narrowly lanceolate to linear, 6–9 mm, entire. Pedicel 8–13 mm, thin. Sepals 1–1.5 × ca. 0.5 mm, slightly dentate. Corolla blue, inner petals whitish, darker at tip. Outer petals acute to shortly acuminate, without crest; upper petal 19–21 mm; spur straight, cylindrical, 9–10 mm; nectary ca. 3/5 as long as spur, thin; lower petal 11–12 mm, limb ovate, margin dentate, claw narrow with small subbasal pouch; inner petals 10–12 mm. Stigma square; marginal simple papillae: median 2 distinct, lateral diffuse; geminate papillae lateral and on basal lobes. Fruit not seen; ovules ca. 9; style ca. 4 mm. Fl. Jul–Aug.

- Gravelly mountain slopes, clearings, by streams; 3000–3700 m. E Yunnan (Dongchuan).

The specific epithet is based on the geographic locality of the type.

**310. *Corydalis caput-medusae*** Z. Y. Su & Lidén, *Edinburgh J. Bot.* 54: 66. 1997.

泸定紫堇 *lu ding zi jin*

Herbs, perennial, 25–30 cm tall. Rhizome horizontal, 2–4

× 1–1.5 cm, densely clad with imbricate fleshy scales in 2 rows, with few-leaved apical rosette based in prominent bulb. Stems suberect, simple, with 2 or 3 (or 4) leaves in upper 1/2. Radical leaves 2–4; petiole 8–15 cm, base broad and fleshy; blade glaucous abaxially, triangular, 4–7 × 5–8 cm, biternate; primary leaflets with petiolule 1–3 cm; ultimate leaflets sessile, 2–3 × ternatisect into narrowly oblong to obovate, rounded to obtuse, mucronulate lobes. Cauline leaves: lower petiole 1–2 cm, upper almost sessile, like radical leaves. Raceme capitate, ca. 3 cm, 10–15-flowered; bracts ca. 2 cm, much divided into linear acute lobes; upper bracts smaller and less divided. Pedicel thin, 5–10 mm, elongating to 15(–20) mm in fruit. Sepals white, ca. 1 × 1.5 mm, sharply dentate. Corolla dark violet, rarely white; upper petal 25–28 mm, broad, shortly acuminate, without crest; spur much recurved at apex, narrowly cylindrical, 15–17 mm; nectary apically sigmoid, ca. 2/3 as long as spur; lower petal ca. 14 mm, with narrow claw and rhombic shortly acuminate limb; inner petals 11–13 mm. Stigma rounded, marginal simple papillae 6, geminate papillae lateral and at base, basal lobes not developed. Capsule reflexed on straight pedicel, narrowly obovoid, ca. 10 × 3–4 mm, 6–10-seeded, valves thick; style 2.5–3 mm. Seed 1.7–1.8 mm, smooth. Fl. and fr. Jul.

- Humid valleys; 2800–3200 m. NE Yunnan (Daguan, Ludian, Qiaojia).

**311. *Corydalis weigoldii*** Fedde, *Repert. Spec. Nov. Regni Veg.* 17: 408. 1921.

川西紫堇 *chuan xi zi jin*

*Corydalis crassirhizomata* (C. Y. Wu) C. Y. Wu; *C. schusteriana* Fedde var. *crassirhizomata* C. Y. Wu.

Herbs, perennial, 30–80 cm tall. Rhizome horizontal, 2–6 × 1–1.5 cm, densely clad with imbricate fleshy scales in 2 rows. Stems suberect, simple or with a branch in inflorescence, with 2–4 leaves in upper 1/2. Radical leaves 1–4; petiole 14–20 cm, base broad and fleshy; blade pruinose abaxially, green adaxially, deltoid, 5–10 × 5–9 cm, triternate; primary leaflets long petiolulate; secondary leaflets almost sessile, pinnately deeply or slightly divided to coarsely dentate; lobules oblong to obovate, rounded to obtuse, mucronulate. Cauline leaves: lower petiole ca. 2 cm, upper almost sessile, like radical leaves. Raceme ca. 3 cm, 10–17-flowered; lower bracts deeply lacinate, 10–15 mm, segments narrowly lanceolate to linear, acute; uppermost bracts often entire. Pedicel 10–15 mm, ca. 20 mm in fruit. Sepals white, 1.5–2 × 1–2 mm, dentate. Corolla pale red; upper petal 27–30 mm, shortly acuminate, without crest; spur narrowly cylindrical or slightly tapering at apex, 16–18 mm; nectary sigmoidally curved at apex, 1/2–3/5 as long as spur; lower petal 13–14 mm, spatulate with narrow claw, navicular-rhombic; inner petals 11–13 mm. Stigma square; marginal simple papillae not recorded; geminate papillae in basal corners; basal lobes not developed. Capsule reflexed from straight pedicel, narrowly elliptic, 13–14 × 3–4 mm, valves thick; style ca. 5 mm. Fl. and fr. May–Jul.

- Understories of subalpine conifer forests, streamsides; 2700–3500 m. W Sichuan (Mianning, Ya'an; old uncertain localities: Kangding, Tongolo).

**312. *Corydalis sarcolepis*** Lidén & Z. Y. Su, *Novon* 17: 486. 2007.

肉鳞紫堇 rou lin zi jin

Herbs, perennial, 30–40 cm tall, glabrous. Rhizome horizontal, densely clothed with thick fleshy scales. Stems suberect, simple, with 2–4 leaves in upper 1/2. Radical leaves 2–4; petiole 10–17 cm; blade triangular, 6–9 × 6–10 cm, biternate; leaflets deeply cut into narrowly oblong lobes. Cauline leaves like radical but smaller and upper shortly stalked. Raceme 5–11-flowered, dense in anthesis, slightly elongating in fruit; lower bracts much divided into narrow acute or acuminate lobes, progressively smaller upward; uppermost ones occasionally entire, 10–20 mm. Pedicels suberect, 15–20 mm, only slightly elongating in fruit, equaling or usually longer than bracts. Sepals rounded, 1–2 × 1–2 mm, finely dentate. Corolla purple to pale red; upper petal 28–30 mm, broadly obtuse, without crest; spur straight or slightly curved, ca. 15 mm, thick, obtuse; nectary ca. 1/2 as long as spur; lower petal straight, 19–20 mm, ecristate, claw narrow, gradually expanded to broad sub-obtuse, shortly acuminate limb; inner petals 15–17 mm. Stigma square, narrowly emarginate to 1/3, marginal simple papillae 6; geminate papillae lateral and in basal corners; basal lobes not developed. Capsule pendent from thin erect pedicel, obovoid, 10–12 × ca. 4 mm, with narrow base and broad obtuse apex, 10–16-seeded, valves thick; style ca. 4 mm. Fl. Apr, fr. May.

- Forests, forest margins; 2200–2500 m. W Sichuan (Luding).

**313. *Corydalis schweriniana*** Fedde, *Repert. Spec. Nov. Regni Veg.* 20: 293. 1924.

巧家紫堇 qiao jia zi jin

*Corydalis mianningensis* C. Y. Wu.

Herbs, perennial, 40–60 cm tall, glabrous. Rhizome short, with dense imbricate scales and petiolar bases. Stems 1 or 2, slender, weak, simple, with 15–25 small scattered leaves in upper 1/2–2/3. Basal leaves early withering. Cauline leaves: petiole thin, lowermost to 5 cm, middle and upper 0.5–2 cm, base with membranous slightly erose auricles, each with an axillary easily detached dark bulbil 3–4 mm; blade pruinose abaxially, green adaxially, broadly ovate to orbicular, 0.5–2 × 0.3–3 cm, lower biternate, middle deeply palmatisect; uppermost shallowly ternatisect to entire; lobules oblong or obovate-oblong, rounded to obtuse, sometimes mucronulate. Raceme 2–4 cm, dense, 6–13-flowered; bracts narrowly oblanceolate, 4–8 mm, entire, rarely lowest bract slightly 3-divided. Pedicel 7–12 mm, thin. Sepals rounded, ca. 1 × 1.5 mm, dentate. Petals pale amaranth; upper petal navicular-ovate, 18–20 mm, acute, margin slightly sinuate, dorsal crest very narrow; spur straight, tapering; nectary ca. 2/3 as long as spur; lower petal navicular-spatulate, 11–12 mm, narrowly crested, claw narrow, slightly longer than limb; inner petals 10–11 mm. Ovules many; style ca. 3 mm; stigma didymous, with 6 marginal simple papillae; geminate papillae lateral (submarginal) and on basal lobes. Fruit not seen (rarely produced?). Fl. Jul.

- Wet cliffs, ?clearings; 2800–3700 m. SW Sichuan (Butuo, Mianning), NE Yunnan (Qiaojia).

**314. *Corydalis bulbilligera*** C. Y. Wu, *Acta Bot. Yunnan.* 13: 125. 1991.

巫溪紫堇 wu xi zi jin

Herbs, perennial, 50–70 cm tall, glabrous. Rhizome short, with dense broadly ovate imbricate petiolar bases. Stem few, suberect, slender, sulcate, with 17–28 scattered leaves in upper 2/3. Radical leaves few; petiole 5–10 cm; blade 1–2.5 × 1–2.5 cm, biternate; leaflets deeply biternatisect. Cauline leaves sessile, glaucous abaxially, dark green adaxially; lower ca. 4 × 4 cm, biternate with long-stalked leaflets (especially median one); leaflets ovate, deeply dentate; middle cauline leaves 1–2 × ca. 1 cm, pinnate, leaflets deeply and irregularly dentate; upper broadly oblanceolate, 3–9 mm, irregularly lacinate; leaves mostly (all?) with axillary easily detached bulbils ca. 4 × 3 mm. Raceme spicate, 10–20-flowered, 3–6 cm; bracts broadly oblanceolate, 2–5 mm, with lateral teeth, uppermost entire. Pedicel 3–5 mm, slender. Sepals ovate, ca. 1 × 1 mm, finely dentate. Corolla blue. Outer petals rather narrow, subacute, with narrow and short dorsal crest; upper petal 15–17 mm; spur straight, attenuate to apex, 7–8 mm; nectary ca. 3/4 as long as spur, very thin; lower petal ca. 9 mm; inner petals ca. 8 mm. Style ca. 2.5 mm; stigma didymous, slightly emarginate, marginal simple papillae 4; geminate papillae lateral and on basal lobes. Fruit not seen (rarely produced?). Fl. May–Jun.

- Shaded moist tussocks; ca. 2500 m. Chongqing (Chengkou, Wuxi).

**315. *Corydalis virginea*** Lidén & Z. Y. Su, *Novon* 17: 487. 2007.

腋含珠紫堇 ye han zhu zi jin

Herbs, perennial, 40–45 cm tall, glabrous. Rhizome short, with few small fleshy scales. Stems simple, slender, naked below or with a long-stalked withered leaf close to base, with 6 or 7 leaves in upper 1/2. Radical leaves unknown. Cauline leaves sessile, glaucous abaxially, green adaxially, obovate, 1–3.5 × 1–3 cm, pinnate with 1 or 2 pairs of leaflets and a large terminal pinna; basal pair of leaflets distant from next (pair of) leaflet(s), smaller, stipulelike (lowermost cauline leaf sometimes different with long-stalked basal leaflets); leaflets flabellate, entire or ± 2- or 3-divided, apically conspicuously crenate-dentate; uppermost leaves small, simple, ± lobed, serrate-dentate, grading into lowermost bracts; all leaves with axillary dark bulbil 3–4 mm. Racemes subspicate, 12–14-flowered; lower bracts broadly oblanceolate with a few sharp teeth; upper bracts often entire; pedicels erect-spreading, straight, ca. 10 mm, thin, equaling bracts. Sepals rounded, ca. 4 × 4 mm, lacerate-dentate. Corolla purple. Outer petals with short and broad rounded crests conspicuously overtopping apex; upper petal ca. 16 mm; spur almost straight or slightly upcurved, cylindrical or slightly tapering, ca. 9 mm; nectary ca. 3/5 as long as spur; inner petals ca. 7 mm. Immature capsule fusiform, ca. 8 mm; style ca. 2.5 mm. Fl. Jun.

- Humid slopes; ca. 2500 m. S Shaanxi (Chang'an).

**316. *Corydalis nanwutaishanensis*** Z. Y. Su & Lidén, *sp. nov.*

南五台山紫堇 nan wu tai shan zi jin

Type: China. Shaanxi: Lingyingtai, Nansantai, under forest



along valley, 22 May 1956, *F. K. Fu & B. Z. Guo 10055* (holotype, WUK; isotype, WUK).

*A Corydalis virginea caulibus paucifoliatis non bulbilliferis, foliis majoribus atque foliolis non regulatim dentatis differt.*

Paratypes: *W. Y. Hsien 4556* (WUK); *T. T. Liou 193* (WUK).

Herbs, perennial, 25–40 cm tall, glabrous. Rhizome short, with crowded small bulbous petiolar bases. Stems slender, with thin erect branches, with 2 or 3 (or 4) leaves (if 2, confined to upper part). Radical leaves early withering; petiole 3–15 cm, thin; blade glaucous abaxially, green adaxially, 1–4 × 1–4 cm, biternate; leaflets deeply cleft into oblanceolate lobes. Cauline leaves sessile, 4–8 × 3–5 cm, pinnate with 2 or 3 pairs of pinnae, terminal pinna large; basal pair of pinnae distant from next pair, long stalked in lower leaves (in upper leaves small and stipulelike), ternate; leaflets deeply serrate or cut into acute lobes. Racemes subspicate, 7–15-flowered, 3–9 cm; bracts broadly lanceolate, 7–15 mm, acute, entire (lowermost to 25 mm with a few large teeth). Pedicel erect-spreading, straight, 5–9 mm, thin. Sepals rounded, 3–4 × 3–4 mm, lacerate-dentate. Corolla white. Outer petals with short rounded crest 1.5–2 mm wide, conspicuously overtopping apex; upper petal 20–22 mm; spur straight to slightly downcurved, cylindrical or slightly tapering, 11–13 mm, narrow; nectary ca. 1/2 as long as spur; lower petal with a conspicuous pouch ca. 1/3 from base and a smaller pouch close to base; inner petals 8–9 mm. Stigma with 6 marginal simple papillae; geminate papillae lateral and on basal lobes. Immature capsule pendent from straight pedicel, obovoid, 7–8 mm; ovules 6 or 7; style ca. 4 mm. Fl. May.

• S Shaanxi (Hua Shan, Nansantai, Nanwutai Shan).

*Corydalis nanwutaihanensis* has flowers similar to those of *C. virginea*, but that species has numerous small regularly dentate leaves with axillary bulbils.

The specific epithet is based on one of the mountains, Nanwutai Shan, where this species is found.

**317. *Corydalis lidenii*** Z. Y. Su, *Acta Bot. Yunnan.* 30: 422. 2008.

积鳞紫堇 *ji lin zi jin*

Herbs, perennial, 25–45 cm tall, glabrous. Rhizome short, with crowded thick pale bulbous (petiolar bases). Stems few, erect, very slender, simple, with 2 leaves in upper 1/2. Radical leaves early withering, few; petiole 5–9 cm, thin; blade 3–4 × 3–4 cm, thin, bi-(tri)-ternate, with long thin petiolules; leaflets obovate, 5–10 × 3–5 mm, obtuse. Cauline leaves shortly stalked or upper sessile, like radical leaves. Racemes very lax, 8–12 cm, 6–8-flowered; lowermost bract leaflike, middle and upper bracts much smaller, oblanceolate, 5–10 mm, entire. Pedicel ca. 10 mm, 12–20 mm in fruit. Sepals minute. Corolla white to pale blue or pale purple. Outer petals elliptic, acute to shortly mucronate, without crest; upper petal 17–19 mm; spur straight or slightly downcurved, very narrow, ca. 10 mm; nectary ca. 1/2 as long as spur, thin; inner petals ca. 8 mm. Stigma broad, emarginate, basal lobes absent. Capsule 10–14 × ca. 1 mm, 8–11-seeded; style ca. 2.5 mm. Seeds in 1 row. Fl. and fr. May.

• In bushes; 2000–2500 m. Sichuan (Dêgê, Luding).

**318. *Corydalis suzhiyunii*** Lidén, *sp. nov.*

茎节生根紫堇 *jing jie sheng gen zi jin*

Type: China. Yunnan: Luquan Xian, Daheiqing, ca. 26°N, 102°30'E, shady place in forest on mossy rocks in seepage water, alt. 3700 m, 26 Aug 2004, *M. Lidén & Z. Y. Su 2004-36* (holotype, KUN; isotype, UPS).

*A Corydalis pseudomairei et C. pseudoweigoldii caulibus procumbentibus, radicibus axillaribus atque corollis minoribus differt.*

Herbs, perennial, 30–100 cm tall, glabrous. Stems procumbent to ascending, slender, rooting at nodes, leafy and branched throughout; low late sterile branches procumbent, forming bulb-based leaf rosettes at nodes. Rosette leaves few; petiole 6–18 cm, with fleshy base 0.5–0.8 × 0.3–0.5 cm; blade glaucous abaxially, green adaxially, 2–5 × 2–4 cm, biternate; primary leaflets stalked, secondary shortly stalked to sessile, obovate, thin, shallowly to deeply 2–5-divided; lobes obovate, obtuse. Cauline leaves: petiole 4–10 cm; blade 2–10 × 2–6 cm, like rosette leaves. Raceme lax, 7–13-flowered; lower bracts like upper cauline leaves, 1–2.5 × 1–2 cm; middle shallowly ternate-sect, 0.5–1 cm; upper oblanceolate, ca. 0.5 cm, entire. Pedicel ca. 10 mm in flower, 10–18 mm in fruit, erect in fruit. Sepals white, ca. 1.5 × 1–1.5 mm, finely dentate. Corolla purple; inner petals whitish. Outer petals with rather narrow shortly acuminate limb, not crested; upper petal 21–25 mm; spur straight, narrowly cylindrical, 10–13 mm; nectary 1/2–3/5 as long as spur; lower petal 12–14 mm, with long claw and narrow rhombic, acute, shortly acuminate limb; inner petals 10–12 mm. Stigma subquadrangular; marginal simple papillae: 2 median distinct, lateral diffuse; geminate papillae lateral (submarginal) and in basal corners; basal lobes not developed. Capsule pendent from erect pedicel, linear, 15–22 × ca. 1.5 mm, 13–20-seeded, explosively dehiscent; style ca. 2 mm. Seeds in 1 row, 1.1–1.2 mm, smooth. Fl. and fr. Aug–Sep.

• Seepage water and mossy places in shade of trees; 3600–3800 m. C Yunnan (Luquan).

*Corydalis pseudomairei* clearly differs from *C. suzhiyunii* by its stem being suberect and branched mainly above (not procumbent and rooting at nodes), lack of bulblike dwarf shoots, very large leaflike bracts, and much longer lower pedicels.

The specific epithet is named for one of the collectors, student of *Corydalis*, Su Zhiyun (苏志云), of the Kunming Institute of Botany, Chinese Academy of Sciences.

**319. *Corydalis pseudomairei*** C. Y. Wu ex Z. Y. Su & Lidén, *Novon* 17: 486. 2007.

大花会泽紫堇 *da hua hui ze zi jin*

*Corydalis mairei* H. Léveillé var. *megalantha* C. Y. Wu, *Acta Bot. Yunnan.* 12: 138. 1991.

Herbs, perennial, 25–50 cm tall, ?glabrous. Rhizome short, densely set with fleshy scales and petiolar bases. Stems 1 to few, sulcate, with (1 or)2 leaves in upper 1/3–1/2 and an early withering leaf at extreme base; early branched from both upper leaves. Radical leaves few, early withering, long stalked, small.

Cauline leaves: petiole 0.5–4 cm; blade 3–6 × 3–8 cm, biternate, primary leaflets with petiolule ca. 1 cm; ultimate leaflets sessile, subflabellate, basally cuneate, twice ± deeply ternatisect into oblong lobes. Raceme lax, 7–12-flowered; lower bracts like upper leaf, 3–5 cm; middle smaller, biternatisect; upper narrowly oblanceolate, 5–10 mm, entire. Lower pedicels very long, 25–45 mm, upper ones 10–20 mm, thin. Sepals ca. 1 × 1–1.5 mm, shallowly to deeply dentate. Corolla ?purplish blue. Outer petals with narrow rhombic acute to shortly acuminate limb, not or very narrowly crested; upper petal 26–31 mm; spur almost straight, narrowly cylindrical, 13–17 mm; nectary ca. 1/2 as long as spur; lower petal with long claw and narrow rhombic acute limb, 14–16 mm; inner petals 12–15 mm. Stigma subquadrangular; marginal simple papillae: 2 median large, distinct, lateral diffuse; geminate papillae lateral (often missing) and in basal corners; basal lobes not developed. Capsule reflexed from straight pedicel, linear, 20–28 × 1.5–2 mm, 13–20-seeded; style ca. 2.5 mm. Seeds in 1 row, ca. 1.5 mm. Fl. May–Jul, fr. Jul–Aug.

- Wet shaded places in forests; 2300–3600 m. S Sichuan (Leibo).

**320. *Corydalis pseudoweigoldii*** Z. Y. Su in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 544. 1999.

假川西紫堇 *jia chuan xi zi jin*

Herbs, perennial, 30–80 cm tall, lower part of stem usually pubescent. Rhizome short, knotty, 10–20 × 5–10 mm, crowned by sparse leaf rosette with bulblike base (sometimes absent?). Stems 1 or few, suberect to ascending (and then sometimes rooting at lower nodes), slender, usually much branched, with 5–8 scattered leaves. Rosette leaves few at anthesis; petiole 6–15(–20) cm; blade glaucous abaxially, green adaxially, triangular, 4–6 × 4–7 cm, biternate; primary leaflets stalked; secondary subsessile, cut 1/2–2/3 into obovate lobes again shallowly divided to crenate-dentate at apex; teeth obtuse, mucronulate. Cauline leaves like radical leaves (lower ones early withering); petiole 1–10 cm, lower long, upper short; blades progressively smaller upward, uppermost often only 1–2 cm. Racemes 7–15(–20)-flowered, terminal and axillary from upper leaves, rather dense at anthesis, elongating to 7–15 cm in fruit; lower bracts to 2 cm, stalked, cut into 3–5 deeply and acutely dentate lobes; middle and upper bracts progressively smaller, entire to large dentate. Pedicel thin, 6–15 mm in flower, 10–20 mm in fruit. Sepals broadly ovate, 1.5–2.5 × 1–2 mm, finely dentate. Flowers purplish blue to reddish purple. Outer petals ecristate, subacute to shortly acuminate; upper petal 19–25 mm; spur straight to upturned at base, straight to slightly

downcurved at apex, slightly attenuate to obtuse apex, 10–13 mm; nectary 2/3–3/4 as long as spur; lower petal 12–15 mm, claw narrow, widened into a rhombic-acute limb; inner petals 11–13 mm. Stigma quadrangular; marginal apical papillae: 2 median distinct, lateral diffuse; geminate papillae lateral (submarginal) and on well-developed basal lobes. Capsule pendent from straight erect-spreading pedicel, linear, 14–20 mm, 7–11-seeded; style ca. 3 mm. Seeds in 1 row. Fl. Jul–Aug.

- Understories of *Abies* forests on slopes; 2600–3600 m. S Sichuan (Yanbian, Yanyuan).

**321. *Corydalis mairei*** H. Lévillé, Cat. Pl. Yun-Nan, 202. 1916.

会泽紫堇 *hui ze zi jin*

Herbs, perennial, 30–60 cm tall, glabrous to finely papillose-pubescent at base. Rhizome much branched. Stems many, erect, straight, ± branched throughout, often reddish at nodes, with 5–10 scattered leaves; upper branches thin with few leaves. Radical and lower cauline leaves: petiole 5–15 cm; blade glaucous abaxially, green adaxially, triangular, biternate, 4–8 × 4–9 cm; primary leaflets stalked; secondary leaflets sessile, base narrowly cuneate, deeply ternatisect, often with purplish spots at incision; lobes again ± cut into acute to shortly acuminate lanceolate lobes. Upper cauline leaves progressively smaller with short petiole; uppermost petioles 3–5 mm, blade ca. 2 cm. Racemes at first dense, at fruiting to 8–15 cm, 10–22-flowered (lateral racemes smaller); lower bracts 10–20 mm, stalked, twice deeply ternatisect into narrowly lanceolate to linear acute lobes, upper 6–9 mm, oblanceolate with a few long lateral teeth, uppermost entire. Pedicel 7–15 mm, 10–20 mm in fruit, thin, erect. Sepals white, 1.5–2.5 × 1–2 mm, margin finely lacerate-dentate. Corolla pale blue to purplish blue or purple; inner petals white. Outer petals navicular, with narrow shortly acuminate apex, without crest; upper petal 18–23 mm, spur straight or downcurved at apex, narrowly cylindrical or slightly tapering, 9–13 mm; nectary (1/2–)2/3 as long as spur; lower petal with narrowly rhombic limb, gradually narrowed to claw; inner petals (8–)9–11 mm. Stigma quadrangular; marginal apical papillae: 2 median distinct, lateral diffuse; geminate papillae lateral (sometimes lacking) and in basal corners; basal lobes poorly developed. Capsule reflexed from straight erect pedicel, linear, 14–18 × ca. 1.5 mm, 12–17-seeded; style ca. 2.5 mm. Seeds in 1 row, ca. 1 mm, smooth. Fl. and fr. Jun–Sep.

- Bamboo and *Abies* forests, clearings, brook sides; 2300–3500 m. Sichuan (Kangding, Liangshan), NE Yunnan (Huize, Petsaolin, Qiaojia).

**38. *Corydalis* sect. *Mucronatae*** (Fedde) C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 15: 353. 1993.

突尖紫堇组 *tu jian zi jin zu*

*Corydalis* “Gruppe” *Mucronatae* Fedde, Repert. Spec. Nov. Regni Veg. 24: 241. 1928.

Herbs, perennial. Rhizome horizontal, densely set with fleshy scales or almost globular persistent petiole bases. Leaflets crenate-dentate or crenately lobed. Spur of upper petal long, narrow at apex. Stigma large, elaborate; style swollen below stigma. Capsule reflexed from thin straight pedicel, obovoid to elliptic or oblong, explosively dehiscent (at least in *Corydalis mucronata* group). Seeds small.

- Six species.

- 1a. Racemes 10–20-flowered, drawn out; outer petals acuminate; stigma ca. as long as broad, with 10–12 papillae; capsule to 15-seeded (*C. mucronata* group).  
 2a. Axils of cauline leaves with conspicuous, dark, easily detached bulbils; pedicels 3–6 mm; outer petals shortly acuminate ..... 322. *C. vivipara*  
 2b. Cauline leaves without bulbils; pedicels 10–15 mm; outer petals long mucronate.  
 3a. Stigma ca. as broad as long, not emarginate at apex ..... 323. *C. mucronata*  
 3b. Stigma broader than long, emarginate at apex ..... 324. *C. pseudomucronata*
- 1b. Racemes 2–5(–9)-flowered, corymbose; outer petals obtuse; stigma clearly longer than broad; capsule 15–30-seeded (*C. longkiensis* group).  
 4a. Spur ca. 4 mm wide in middle; petals yellow at apex; inner petals 15–16 mm; capsule 20–25 mm; racemes 3–9-flowered, much elongating in fruit ..... 327. *C. pinnata*  
 4b. Spur narrow from base; petals pink or white throughout; inner petals 9–11 mm; capsule 10–15 mm; racemes 2–5-flowered, not elongating in fruit.  
 5a. Stigma without distinct papillae in apical 1/2, basally with geminate papillae; leaves pinnate with pinnatifid leaflets ..... 326. *C. longkiensis*  
 5b. Stigma shortly emarginate with 8–10 marginal papillae in apical 1/2, basal 1/2 auriculate, without papillae; leaves bipinnate ..... 325. *C. kailiensis*

**322. *Corydalis vivipara*** Fedde, Repert. Spec. Nov. Regni Veg. 21: 48. 1925.

胎生紫堇 tai sheng zi jin

Herbs, perennial, glaucous, 40–80 cm tall, glabrous. Rhizome with fleshy imbricate scales, terminating in prominent bulblike bud. Stems slender, not branched or with 1 branch from upper leaf, with 4 or 5 scattered leaves. Petioles of radical leaves 8–20 cm, petioles of lower cauline leaves 4–10 cm, petioles of upper leaves ca. 1 cm; blade glaucous abaxially, green or glaucous around midveins of leaflets adaxially, ovate-triangular, 4–6 × 4–6 cm, bi- to tripinnate; pinnae petiolulate; pinnules shortly petiolulate, ultimate leaflets ovate to oblong-ovate, crenate-dentate to pinnatifid; lobules or teeth rounded, slightly mucronulate. Upper cauline leaves progressively smaller upward, with prominent acute (dark?) bulbils 8–19 × 3–5 mm in axils of middle and upper leaves; bulbils sometimes sprouting while still attached. Raceme 4–8 cm in flower, at fruiting to 15 cm, 10–15-flowered; bracts 4–8 mm, shortly stalked, blade deeply biternatisect; upper bracts smaller and less divided. Pedicel 3–6 mm, slightly longer in fruit. Sepals 1–1.5 × ca. 1 mm, dentate, pointed. Corolla purple, straight; outer petals without crest, narrow, acuminate to sharp tip; upper petal 22–25 mm; spur straight, narrow, attenuate to tip, 15–18 mm; nectary ca. 1/4 as long as spur; lower petal narrow, apically widened to elliptic acuminate limb; inner petals ca. 10 mm. Stigma rounded, with 8 marginal papillae and geminate papillae on basal lobes. Fruit and seeds unknown, probably often not produced. Fl. and fr. Apr–Jun.

• Humid forests and bushlands; (1200–)1400–2900 m. W Sichuan.

**323. *Corydalis mucronata*** Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 197. 1885.

突尖紫堇 tu jian zi jin

Herbs, perennial, 15–60 cm tall, glabrous. Rhizome densely set with fleshy scales, terminating in conspicuous bulblike bud. Stems gray-glaucous, terete, juicy, branched especially above, with 4 or 5 leaves. Petiole terete, lower petioles 5–10 cm, upper petioles 2–5 cm; blade glaucous on both sur-

faces, adaxially paler toward midvein, often with a bronzy tint and pale dots in teeth-incisions, triangular, 6–10 × 5–7 cm, bipinnate; pinnae petiolulate; pinnules sessile, ovate, 1–2 × 0.5–1 cm, crenately dentate to lobed. Racemes 10–20-flowered, 5–10 cm, elongating to 15 cm in fruit; bracts 2–5 mm, shortly stalked, lower bracts ternatisect; upper bracts oblanceolate, almost entire. Pedicel 10–15 mm, thin, straight in fruit. Sepals purplish red, 2–3 × 2–3 mm, lacinate-dentate. Corolla rose or amaranth; outer petals without crest, narrow, acute, with long prominent mucro; upper petal 25–30 mm; spur slightly upturned from base, straight or sometimes upcurved, tapering to apex, 20–25 mm; nectary 4–5 mm; inner petals 9–11 mm. Stigma rounded-deltoid with 10 marginal papillae; geminate papillae on basal lobes. Capsule broadly elliptic to obovoid, ca. 10 × 3 mm, 5–14-seeded; style ca. 4 mm. Seeds in 2 rows, ca. 1.2 mm. Fl. Apr–May, fr. May–Jun.

• Forest understories, brook sides; 1500–2600 m. N and W Sichuan.

**324. *Corydalis pseudomucronata*** C. Y. Wu, Z. Y. Su & Lidén, Acta Bot. Yunnan. 18: 400. 1996.

长突尖紫堇 chang tu jian zi jin

Herbs, perennial, 20–60 cm tall, glabrous. Rhizome densely set with fleshy scales, terminating in conspicuous bulblike bud. Stem suberect to ascending, sometimes reddish, sparingly branched above, with 4–6 scattered leaves. Radical leaves few; petiole 4–11 cm, vaginate at base; blade glaucous abaxially, green adaxially, broadly ovate-triangular, 3–5 × 3–5 cm, bi- to tripinnate; pinnae 3 or 4 pairs, petiolulate; pinnules petiolulate or sessile, ovate, 0.7–1.7 × 0.5–1 cm, crenately dentate to lobed, teeth mucronulate. Cauline leaves: lower petiole to 16 cm, upward petioles shorter, uppermost petiole ca. 1 cm, shortly vaginate; blade like radical leaves, but lower ones larger, upward gradually smaller. Racemes 5–10 cm, at fruiting to 15 cm, 10–23-flowered; bracts oblanceolate, 2–5 mm, shortly stalked, acuminate, entire or often with a few small teeth, lowermost bract often more divided. Pedicel ca. 10 mm, thin, straight in fruit. Sepals purplish red, rounded, 1.5–2 mm, deeply dentate. Corolla rose or amaranth; outer petals without crest, narrow, acute, with long prominent mucro; upper petal

20–26 mm; spur straight or slightly upturned from base, tapering to apex, 14–20 mm; nectary 3–5 mm; inner petals 8–9 mm. Stigma broader than long, apically emarginate, with 8 simple marginal papillae; geminate papillae lateral and on basal lobes. Capsule reflexed from straight thin pedicel, elliptic, 8–13 × ca. 3 mm, 5–20 seeded; style ca. 4 mm. Seeds in 2 rows, ca. 1 mm, smooth; caruncle small. Fl. and fr. Apr–Jun.

• Forest understories, stone crevices near channels; 1100–2000 m. W Sichuan.

**325. *Corydalis kailiensis*** Z. Y. Su, Acta Bot. Yunnan. 15: 357. 1993.

凯里紫堇 kai li zi jin

Herbs, perennial, glaucous, 13–30 cm tall. Rhizome branched, horizontal, set with fleshy scales or petiolar base remnants, terminating in leaf rosette. Stems several, suberect, branched, with 2 or 3 leaves. Radical leaves several: petiole 3–8 cm, fleshy-thickened at base; blade glaucous abaxially, green or glaucous adaxially, ovate, 3–4 × 1.5–2 cm, (sub)bipinnate; pinnae petiolulate; pinnules nearly sessile, ovate, 4–13 × 3–8 mm, crenate-dentate. Cauline leaves: petiole 4–8 cm, fleshy-vaginate; blade like radical leaves. Raceme umbellate, 2–4-flowered; bracts 10–30 mm, like uppermost leaf, ternate or palmatisect into obovate lobes. Pedicel 10–20 mm in flower, in fruit 15–35 mm, straight. Sepals 1.5–2 × 1–1.5 mm, deeply dentate. Corolla purple, lavender, or white; upper petal 23–26 mm, apex retuse to slightly emarginate, ± dentate, mucronate, crest lacking; spur 15–16 mm, slender; nectary 5–6 mm; lower petal 10–11 mm, with broad truncate to shallowly emarginate limb, dentate, mucronate; claw broad, with conspicuous sub-basal pouch; inner petals 8–9 mm. Stigma shortly oblong, slightly emarginate; apical 1/2 with 8–10 marginal papillae, basal 1/2 without papillae, with basal auricles. Capsule elliptic, 12–15 × ca. 4 mm, 15–25-seeded; style ca. 2.5 mm. Seeds ca. 1.2 mm, smooth, keeled, with small caruncle.

• Brook sides, roadsides, forest understories; ca. 1000 m. NW Guangxi (Tianlin), C and SE Guizhou.

**326. *Corydalis longkiensis*** C. Y. Wu, Lidén & Z. Y. Su, Acta Bot. Yunnan. 15: 358. 1993.

龙溪紫堇 long xi zi jin

Herbs, perennial, glaucous, 15–20 cm tall. Rhizome horizontal, thin, set with small fleshy persistent petiolar bases, terminating in leaf rosette. Stems erect, 2–4, usually simple, with 1 or 2 leaves. Radical leaves: petiole 5–11 cm, shortly fleshy-vaginate at base; blade oblong, 5–9 × ca. 2 cm, pinnate with 2–4 pairs of pinnae, pinnae shortly petiolulate to sessile, ovate, 1–2 × 0.5–1 cm, base cuneate, shallowly pinnatifid with 2 or 3

pairs of obtuse mucronulate lobes. Cauline leaves like rosette leaves, long stalked. Raceme very condensed, subumbellate, rachis zigzag, 3–5-flowered; bracts obovate, 8–15 × 5–9 mm, large dentate, simple or with a couple of small free leaflets at base. Pedicel straight, 12–20 mm, hardly elongating in fruit. Sepals 1–3 × 1–2 mm, with long teeth. Corolla pink; upper petal 24–27 mm, with small subapical crest, apex retuse, ca. 4 mm wide, slightly dentate, mucronate; spur upturned from base, straight, narrow, slightly tapering, 18–23 mm; nectary 8–10 mm; lower petal 12–14 mm, with conspicuous subbasal pouch, limb ca. 5 mm wide, broadly emarginate, mucronate; inner petals 10–11 mm. Stigma oblong, with callous emarginate stigmatic area at apex, in lower 1/2 with 1 pair of simple and 1 pair of geminate lateral papillae. Capsule lanceolate, 12–15 × ca. 3 mm, 20–27-seeded; style ca. 3 mm, thickened below stigma. Seeds small. Fl. and fr. Apr–May.

• Wet cliffs; ca. ?1200 m. W Sichuan (Emei), N Yunnan (Eryuan, Yanjin).

**327. *Corydalis pinnata*** Lidén & Z. Y. Su, Acta Bot. Yunnan. 15: 359. 1993.

羽叶紫堇 yu ye zi jin

Herbs, perennial, glaucous, 8–20(–30) cm tall. Rootstock horizontal, densely set with fleshy rounded petiolar bases. Stems 1–3, suberect, simple, usually with 1 leaf in upper part. Rosette leaves: petiole 6–15 cm, with short fleshy base; blade glaucous on both surfaces, oblong, 8–14 × 4–6 cm (or some leaves much smaller), pinnate to bipinnate with 3–6 pairs of pinnae; pinnae shortly stalked, ovate, 8–20 × 4–10 mm, base cuneate, shallowly pinnatifid with 1–3 pairs of obtuse mucronulate lobes. Cauline leaf like rosette leaves but less divided and subsessile; petiolar base stipulate. Raceme corymbose in early anthesis, soon much elongating, becoming very lax, 3–9-flowered; lower bracts leaflike, pinnate, to 5 × 2 cm; middle bracts smaller, ternate, with shallowly lobed leaflets, 1–3 cm; upper bracts simple. Pedicel erect, thin, 10–40 mm. Sepals not recorded. Petals white to pale pink, with yellow apex; upper petal 30–34 mm, without crest, subobtusely; spur 17–20 mm, to 5 mm wide in middle part, tapering to apex; nectary ca. 1/3 as long as spur; lower petal 16–18 mm, with narrow claw and ovate obtuse limb; inner petals 15–16 mm; stigma oblong, apical 1/3 irregularly sinuate without distinct papillae, lower 1/3 with 1 pair of marginal papillae and geminate papillae lateral and in basal corners. Capsule narrowly lanceolate, 20–25 × 2.5–3 mm, ca. 30-seeded; style ca. 4 mm, swollen below stigma. Seeds ca. 1 mm, with small narrow spreading elaiosome. Fl. and fr. Apr.

• Wet cliffs; ca. 1300 m. W Sichuan (Chengdu, Guanxian).

### 39. *Corydalis* sect. *Ellipticarpae* Z. Y. Su, sect. nov.

橐果紫堇组 tuo guo zi jin zu

Type: *Corydalis ellipticarpa* C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 11: 311. 1989.

*Herbae perennes. Petiolis foliorum rosularum ad basin valde carnosi. Foliola dentata. Bracteae divisae. Flores magni flavi vel purpurei. Petala exteriora acuta. Capsulae e pedicellis erectis reflexae, ellipsoideae usque obovoideae eruptione dehiscentes.*

Herbs, perennial. Rhizome apically with leaf rosette with prominent bulblike base formed by very fleshy petiolar bases, turning black when dry. Late rosette leaves large, persistent long after flowering. Leaflets dentate. Bracts divided. Flowers yellow or purple, rarely white, large, acute, with spur tapering to apex (except in *Corydalis acuminata*), with or without crest. Capsule reflexed from straight pedicel, ellipsoid to obovoid, explosively dehiscent.

- Six species.

Species nos. 328–331 form a complex, here divided by flower color, but the variation is reticulate (see under *Corydalis ellipticarpa*).

The sectional epithet is derived from the specific epithet of *Corydalis ellipticarpa*.

- 1a. Spur cylindrical; corolla purple; upper petal 15–20 mm; capsule elliptic to oblong, 15–20 mm ..... 333. *C. acuminata*  
 1b. Spur tapering to tip; corolla purple or yellow; upper petal 27–33 mm; capsule broadly obovoid, shorter.  
 2a. Outer petals without crest; corolla purple, rarely white ..... 328. *C. quantmeyeriana*  
 2b. Outer petals crested or rarely without crest, but then flowers yellow.  
 3a. Corolla yellow, often turning dull purplish with age ..... 329. *C. ellipticarpa*  
 3b. Corolla purple.  
 4a. Spur of upper petal ca. 1.5 × longer than limb, with thin apex ..... 332. *C. jingyuanensis*  
 4b. Spur of upper petal equaling limb.  
 5a. Sepals 1–2 × 1–2 mm ..... 330. *C. brunneovaginata*  
 5b. Sepals 6–8 × 4–5 mm ..... 331. *C. pycnopus*

**328. *Corydalis quantmeyeriana*** Fedde, Repert. Spec. Nov. Regni Veg. 20: 295. 1924.

掌苞紫堇 zhang bao zi jin

Herbs, perennial, 30–60 cm tall, glabrous. Rhizome apically with large bulb formed by very fleshy petiolar bases, 15–25 × 15–20 mm. Stems axillary from last year's bulb scales, erect, often branched, with 0–3 scattered leaves. Rosette leaves conspicuous (earliest formed leaves much smaller and early withering); petiole 5–15 cm, base with broadly ovate black-purple sheath; blade broadly orbicular-triangular, 5–7 × 6–10 cm, (bi-)tritemate; pinnae 2.5–5 × 2.5–5 cm; petiolules 1–4 cm; leaflets broadly ovate, crenate-dentate, or sometimes deeply divided into narrowly oblong lobes. Lower cauline leaf like radical leaves, upper leaves smaller and less divided, shortly petiolulate. Racemes first dense, becoming lax, 8–15-flowered; bracts broadly ovate, 10–16 mm, pectinate-dentate, lowermost bract often more divided, uppermost entire, often with purplish tinge. Pedicel straight, 13–20 mm. Sepals late caducous, 1–2 × 1–2 mm, dentate. Flowers soon nodding, dull purple, rarely white; inner petals whitish; outer petals acute to shortly acuminate, without dorsal crest; upper petal 25–30 mm; spur straight or slightly upturned at base, downcurved apically, conical, ca. 15 mm; nectary ca. 3/5 as long as spur; lower petal broadly and shallowly saccate in middle part, base suddenly constricted into short claw, distal 1/3 navicular, acute; inner petals 11–14 mm. Stigma square, marginal papillae 4–6, median papillae distinct, lateral papillae more diffuse; geminate papillae lateral and on basal lobes. Capsule pendent from erect pedicel, narrowly obovoid, 10–12 × ca. 3 mm, explosively dehiscent, 15–18-seeded; style ca. 3 mm. Fl. and fr. Jun–Sep.

- Forest understories, among bushes; 2500–3700 m. N, NW, and WC Sichuan.

Plants from Gongga Shan have more deeply divided leaves and bracts and larger flowers than those from further north.

**329. *Corydalis ellipticarpa*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 11: 311. 1989.

椭圆紫堇 tuo guo zi jin

*Corydalis squamigera* Z. Y. Su.

Herbs, perennial, 20–40 cm tall, glabrous. Rhizome with apical leaf rosette from large bulb formed by very fleshy reddish brown scales and petiolar bases, 15–25 × 15–20 mm. Stems axillary from last year's bulb scales, erect, simple, with 1 or 2 leaves, usually in upper 1/3 of stem. Rosette leaves large (early ones smaller but early withering); petiole 8–20 cm; blade glaucous on both surfaces, more so abaxially, broadly triangular, bi- to tritemate, 5–10 × 5–15 cm; pinnae long petiolulate; pinnules petiolulate or nearly sessile, shortly decurrent, twice ternatisect into ovate to oblong or lanceolate acute to obtuse lobules, often again shallowly cut at apex. Cauline leaves like radical but much smaller and less divided. Raceme 8–14-flowered, first dense then distant; bracts elliptic, shortly stalked, deeply pectinate dentate, 10–20 mm, lower to 30 mm; upper bracts often entire. Pedicel erect, straight, 8–15 mm, to 20 mm in fruit. Sepals minute or to 2 mm, dentate. Flowers yellow or pale yellow, turning dull purplish with age, soon nodding; outer petals ecristate or narrowly to broadly crested, (23–)27–33 mm, acute to shortly acuminate; spur downcurved at tip, conical, (10–)14–18 mm; nectary 1/3–1/2 as long as spur; lower petal navicular, 15–18 mm, base usually with very conspicuous broad sac; inner petals not recorded. Stigma square, marginal papillae 6–8; geminate papillae lateral and on tips of short basal lobes. Capsule elliptic, 10–14 × 4–6 mm, to 20-seeded. Fl. and fr. May–Jun.

- Understories of *Picea* forests; 2000–3700 m. S Gansu, N Sichuan.

This is a variable species. The following forms may be recognized and might deserve recognition as separate taxa. The geographic distribution of the forms needs further study.

Type A. Sepals ca. 2 mm. Spur clearly longer than rest of petal; nectary ca. 1/2 as long as spur; lower petal not saccate; crest present, but not very broad and not overtopping apex. S Gansu, N Sichuan.

Type B. Sepals minute. Spur not or only slightly longer than limb; nectary ca. 1/3 as long as spur; lower petal broadly and deeply saccate; outer petals ecristate or almost so. N Sichuan (Barkam).

Type C (*Corydalis ellipticarpa* s.str.). Sepals 1–2 mm. Spur not or

only slightly longer than limb; nectary ca. 1/2 as long as spur; lower petal broadly and deeply saccate; outer petals with short broad crest. N Sichuan (Jinshuan, Maoxian, Xiaojin).

**330. *Corydalis brunneovaginata*** Fedde, Repert. Spec. Nov. Regni Veg. 17: 128. 1921.

褐鞘紫堇 he qiao zi jin

Herbs, perennial, 25–40 cm tall, glabrous. Rhizome with apical leaf rosette from large bulb formed by very fleshy scales and petiolar bases, 15–25 × 15–20 mm. Stems axillary from last year's bulb scales, erect, simple or branched, with 1 or 2 scattered leaves. Rosette leaves large (early ones smaller but early withering); petiole 10–18 cm; blade glaucous abaxially, triangular, bi- to triternate, 4–9 × 4–8 cm; pinnae petiolulate; pinnules petiolulate or nearly sessile, deeply divided into ovate to oblong mucronate lobules. Lower cauline leaves like rosette leaves, upper leaves smaller and less divided. Raceme dense, ca. 10-flowered; bracts shortly stalked, rhombic, 15–25 mm, deeply pectinate dentate; lower bract sometimes much more divided and to 4 cm. Pedicel erect, straight, 8–15(–30) mm. Sepals 1–2 × 1–2 mm, dentate. Corolla rose; upper petal 28–30 mm, limb rhombic, apex shortly acuminate, abaxial crest broad and short, 2.5–3 mm wide, overtopping apex; spur slightly downcurved, conical, 12–14 mm; nectary ca. 3/5 as long as spur; lower petal shallowly saccate in middle part, base constricted into short claw, distal 1/3 like upper petal; inner petals 12–14 mm. Stigma square, marginal papillae 6; geminate papillae lateral and in basal corners. Capsule (immature) elliptic, to 16-seeded; style ca. 3.5 mm. Fl. and fr. May–Aug.

• Forest understories, among shrubs; 3600–4200 m. N Sichuan (?Lixian, ?Songpan, Wenchuan).

**331. *Corydalis pycnopus*** Lidén, sp. nov.

巨萼紫堇 ju e zi jin

Type: China. Sichuan: Pengxian, Jiufengshan, Baishuihe National Natural Reserve, Pengzhou City, alt. 2000 m, *X. F. Gao et al.* 8480 (holotype, CDBI).

*A Corydalis brunneovaginata sepalis plus quam triplo majoribus valde dentatis differt.*

Paratype: *X. F. Gao et al.* 8522 (CDBI).

Herbs, perennial, 30–40 cm tall, glabrous. Rhizome with apical leaf rosette from large bulb formed by very fleshy scales and petiolar bases 15–25 × 15–20 mm. Stems axillary from last year's bulb scales, erect, simple or branched, with 2 or 3 scattered leaves. Rosette leaves large (earliest smaller but early withering); petiole 10–18 cm; blade green, triangular, 6–9 × 4–9 cm, bi- to triternate; pinnae petiolulate; pinnules petiolulate or nearly sessile, much divided into ovate to oblong mucronate lobules. Cauline leaves like rosette leaves. Raceme very dense in early stage, ca. 10-flowered; bracts 10–20 mm, deeply palmatisect. Pedicel erect, straight, 8–10 mm (young raceme). Sepals 6–8 × 4–5 mm, much dentate. Flowers purple; outer petals with broad slightly undulate margins, shortly acuminate, with short broad (ca. 3 mm) crest overtopping apex; upper petal ca. 30 mm; spur arcuately downcurved, conical, attenuate to narrow tip, ca. 15 mm; nectary ca. 2/3 as long as spur; lower petal

very shallowly saccate in middle part, base constricted into short claw; inner petals 13–14 mm. Ovary with 27 ovules; stigma square; marginal papillae: median 2 distinct, lateral ones confluent; geminate papillae lateral and in basal corners; style ca. 3 mm. Fruit unknown.

• Forest understories; ca. 2000 m. NC Sichuan (Pengxian).

This poorly known species differs from the closely related *Corydalis brunneovaginata* by its very large sepals.

The specific epithet refers to the bulb formed by the dense fleshy petiole bases of the rosette leaves, from Greek πυκνός (*pycnos*, “dense”) and πούς (*pous*, “foot”).

**332. *Corydalis jingyuanensis*** C. Y. Wu & H. Chuang, Acta Bot. Yunnan. 12: 381. 1990.

泾源紫堇 jing yuan zi jin

*Corydalis ellipticarpa* C. Y. Wu & Z. Y. Su var. *taipaica* C. Y. Wu; *C. taipaishanica* H. Chuang.

Herbs, perennial, 25–40 cm tall, glabrous or often shortly pillose, especially in inflorescence. Rhizome with apical leaf rosette from large bulb formed by very fleshy scales and petiolar bases, 15–25 × 15–20 mm. Stems 1–10, axillary from last year's bulb scales, erect, simple or often branched, with 2 or 3 scattered leaves. Radical leaves many; petiole 2–12 cm; blade glaucous on both surfaces or sometimes adaxially green, ovate-triangular, (1.5–)3–7 × (1.5–)3–8 cm, triternate; pinnae petiolulate; pinnules shortly petiolulate or subsessile; ultimate leaflets ternatisect to biternatisect into narrowly obovate mucronate lobes; ultimate lobes or teeth 0.5–1 mm wide. Cauline leaves 2 or 3; lower petioles 4–7 cm, upper petioles ca. 1 cm, like rosette leaves but less divided, and leaflets less deeply cut. Raceme 11–18-flowered, 3–10 cm, very dense at first but soon elongating; bracts flabellate, 10–20 mm, palmately to bipalmately lobate, upper bracts smaller and deeply pectinate-dentate. Pedicel 8–16 mm, to 20 mm in fruit. Sepals whitish, 1–1.5 × 1–2 mm, finely dentate to almost entire. Corolla purple (rarely yellow?), darker toward tip; upper petal navicular-ovate, 26–31(–35) mm, shortly acuminate, abaxial crest short, 0.5–2.5 mm wide, sometimes overtopping apex, rarely absent; spur gracefully arcuately recurved at apex, rarely straight, 14–19 mm, slender, tapering to thin apex; lower petal 13–14 mm, not or very slightly saccate; inner petals 11–13 mm; nectary extended through 3/5 of spur. Stigma semicircular, with 6 or 8 marginal simple papillae; geminate papillae lateral and in basal corners. Capsule elliptic or narrowly obovoid-elliptic, 13–15 mm; style 3–4 mm. Seeds 1–1.5 mm. Fl. Apr–Jun.

• Shrubs, wetlands, grasslands, understories of mixed forests; 1100–2600 m. Gansu (Jingyuan, Wenxian), ?Ningxia, W Shaanxi (Meixian, Qishan, Taibai Shan).

**333. *Corydalis acuminata*** Franchet, J. Bot. (Morot) 7: 285. 1894.

川东紫堇 chuan dong zi jin

*Corydalis acuminata* subsp. *hupehensis* C. Y. Wu.

Herbs, perennial, 15–30(–50?) cm tall. Rhizome short, with apical leaf rosette with fleshy petiolar bases, forming bulb 1–2 × 1–3 cm. Stems 2–5, erect, simple or branched, with 2

or 3 leaves. Basal leaves several; petiole 5–10 cm; blade glaucous abaxially, green adaxially, broadly ovate-triangular, 2.5–5 × 2–5 cm, triternate; pinnæ petiolulate; pinnules sessile, deeply 2–6-divided; lobes oblanceolate to narrowly oblong, obtuse to acute. Cauline leaves: lower ones petiolate, uppermost leaves nearly sessile, like basal leaves. Raceme ca. 5 cm, 5–13-flowered; bracts 10–15 mm, with cuneate base widened into deeply palmatisect blade, lower bract larger and more deeply divided; uppermost bract oblanceolate, slightly divided to entire. Pedicel 10–15 mm, 15–25 mm in fruit. Sepals 0.5–1 × 0.5–1 mm, dentate. Corolla purple; outer petals navicular, acute, shortly acuminate, without crest (rarely with low crest?); upper

petal 15–20 mm; spur downcurved at apex, cylindric, 7–10 mm; nectary 1/3–1/2 as long as spur; lower petal 10–12 mm, lower 1/2 broadly saccate (sometimes forming spurlike process), except for very short narrow part at very base; inner petals 8–11 mm. Stigma circular, with 6–8 marginal simple papillae, and with geminate papillae at base. Capsule reflexed from straight pedicel, elliptic, 15–20 × 3–3.5 mm, 15–25-seeded, sometimes with faint rows of papillae; style ca. 2.5 mm. Seeds ca. 1 mm, smooth. Fl. and fr. Apr–Aug.

• Secondary grasslands, wastelands, evergreen and deciduous broad-leaved mixed forests, slopes, roadsides; (200–)1500–3000 m. Chongqing, NE Guizhou, W Hubei, S Shaanxi, E Sichuan.

**40. *Corydalis* sect. *Incisae*** Fedde, Repert. Spec. Nov. Regni Veg. 23: 181. 1926.

刻叶紫堇组 ke ye zi jin zu

*Corydalis* sect. *Linstowianae* C. Y. Wu & Z. Y. Su.

Herbs, annual or biennial, with slender to swollen taproot with numerous small fibrous roots. All leaves stalked, with membranous auricles at base; leaflets usually dentate; lower bract often like upper leaf. Flowers purple or amaranth to blue or white. Capsule obovoid to narrowly oblong, explosively dehiscent, pendent from straight, erect-spreading pedicel.

Nine species: China, Japan (including Ryukyu Islands), Korea; nine species (eight endemic) in China.

- 1a. Leaf lobes entire; stipules deeply lacinate ..... 334. *C. linstowiana*  
 1b. Leaf lobes dentate or finely divided; stipules finely erose-dentate to entire.  
 2a. Fruit narrowly oblong to linear, with seeds in 1 row.  
   3a. Raceme 2–4-flowered; upper petal 9–13 mm, without crest ..... 342. *C. foliaceobracteata*  
   3b. Raceme 5–15-flowered; upper petal 16–22 mm, with short high crest.  
     4a. Sepals 1–2 mm; spur thick, straight, 8–10 mm; stem usually erect ..... 336. *C. incisae*  
     4b. Sepals 3–4 mm; spur thin, arcuately downcurved, ca. 11 mm ..... 341. *C. amphipogon*  
 2b. Fruit obovoid to elliptic, with seeds in 2 rows.  
   5a. Corolla strongly upcurved; sepals 5–7 × 4–6 mm ..... 335. *C. amplispala*  
   5b. Corolla ± straight; sepals much smaller.  
     6a. Leaves finely divided into linear lobes; outer petals without crest ..... 338. *C. anethifolia*  
     6b. Leaves less finely divided, serrate to ± deeply dentate; lower petal or both outer petals crested.  
       7a. Plant with tuber; flowers 11–13 mm; racemes very dense in flower, considerably enlarging  
         in fruit ..... 337. *C. heterodonta*  
       7b. Plant without tuber; flowers 15–20 mm; racemes lax.  
         8a. Stem 20–40 cm; raceme 5–13-flowered; lower bract to 2 cm, smaller than leaves;  
           stigma deeply divided with 10 distinct papillae ..... 340. *C. pseudoincisa*  
         8b. Stem 10–20 cm; raceme 4–8-flowered; lower bract to 5 cm, like stem leaf; stigma  
           not or slightly emarginate with few papillae ..... 339. *C. hemsleyana*

**334. *Corydalis linstowiana*** Fedde, Repert. Spec. Nov. Regni Veg. 21: 50. 1925.

变根紫堇 bian gen zi jin

Herbs, annual or usually biennial, 10–40 cm tall, glabrous or slightly papillose scabrid on veins and stems. Annual form with slender taproot, biennial form with root like a small pale carrot. Stems 1 or few, erect to ascending, leafy and branched from base. Lower leaves: petiole 4–13 cm; blade glaucous abaxially, green or glaucous adaxially, 3–6 × 3–7 cm, bi-(tri-)ternate; leaflets petiolate, deeply cut into 2–5 oblanceolate obtuse lobes; lobes entire. Upper leaves much smaller, with petioles 2–4 cm, at base with peculiar membranous fimbriate stipules. Raceme dense in flower, much elongating in fruit, 4–10-flowered, peduncle distinct; bracts clearly stalked, ternate-

sect with sharply dentate lobes, 4–10 mm, upper smaller. Pedicel 5–6 mm in flower, 10–15(–24) mm in fruit, thin, erect. Flowers purplish blue to pink. Sepals white, orbicular, 1–2 mm, deeply fimbriate dentate. Outer petals broadly rounded, obtuse to emarginate, sometimes with small mucro, abaxially with abrupt crest not reaching apex; upper petal 15–18 mm; spur cylindric, slightly bent downward at apex, 6–8 mm; nectary thick, ca. 1/4 as long as spur; lower petal 9–12 mm, claw straight or usually saccate near base; inner petals 8–9 mm, dorsal crests rounded, overtopping apex. Stigma square; marginal simple papillae: 2 median distinct, outer confluent; geminate papillae lateral and on well-developed basal lobes. Capsule obovoid, ca. 10 × 4 mm; style ca. 3 mm. Seeds in 2 rows, ca. 1 mm, with small caruncle.

• Forest margins, channel sides, roadsides; 1300–3400 m. W Sichuan.

**335. *Corydalis amplisejala*** Z. Y. Su & Lidén, *Novon* 17: 488. 2007.

圆萼紫堇 *yuan e zi jin*

*Corydalis pseudomucronata* C. Y. Wu Z. Y. Su & Lidén  
var. *crinata* C. Y. Wu.

Herbs, ?biennial, 20–40 cm tall. Stems few, suberect, slender, branched, with 4 or 5 scattered leaves. Petiole 3–10 cm (upper shorter, lower longer), with membranous vaginae or auricles at base; blade 3–6 × 3–5 cm, (bi-)tritermate; leaflets petiolulate; ultimate leaflets cuneate at base, deeply crenate-dentate/lobate into oblong obtuse mucronate teeth. Raceme 6–9-flowered, very lax in fruit; lower bract leaflike, 2–2.5 cm including petiole ca. 1 cm, upper progressively much smaller, 0.5–1 cm, entire. Lower pedicels 10–15 mm, upper ones 5–9 mm. Sepals 5–7 × 4–6 mm, richly fimbriate-dentate. Flowers pinkish red. Outer petals with broad rounded slightly dentate limb, dorsally with ca. 2 mm wide slightly dentate crest not at all reaching apex; upper petal strongly upcurved, ca. 25 mm (measured along curve), dorsal crest long decurrent onto spur almost to apex; spur upcurved, tapering to obtuse apex, ca. 16 mm, nectary ca. 1/4 as long as spur; lower petal ca. 12 mm, almost straight; inner petals 9–10 mm. Stigma deeply cleft with 6–8 distinct simple marginal papillae; geminate papillae on basal lobes. Capsule broadly obovoid, 7–10 × 4–5 mm, 6–9-seeded; style ca. 3 mm. Seeds unknown. Fl. and fr. (?Mar–)Apr–May.

• Brook sides in hill forests; ca. 1800 m. NW Hubei, NE Sichuan (Guangyuan).

The Hubei record is based only on photographic documentation.

**336. *Corydalis incisa*** (Thunberg) Persoon, *Syn. Pl.* 2: 269. 1806.

刻叶紫堇 *ke ye zi jin*

*Fumaria incisa* Thunberg, *Nova Acta Acad. Sci. Imp. Petrop. Hist. Acad.* 12: 104. 1801; *Corydalis incisa* var. *alba* S. Y. Wang; *C. incisa* var. *koreana* Fedde; *C. incisa* f. *liuchiensis* Nakai; *C. incisa* f. *palescens* Makino; *C. incisa* var. *pseudomakinoana* Fedde; *C. incisa* var. *tschekiensis* Fedde.

Herbs, annual or biennial, green (or glaucous?), 10–40(–60) cm tall, glabrous. Taproot simple (annual [and ?biennial] form) or swollen to radishlike tuber ca. 1 × 0.5–1 mm (biennial form). Stems leafy and branched from base, erect to suberect, angular-sulcate. Lower petioles 5–15 cm, upper 1–4 cm; blade 3–9 × 3–9 cm, bi- to tritermate; primary leaflets petiolulate; ultimate leaflets sessile, rhombic, 1–1.5 × ca. 1 cm, broadly cuneate, deeply dentate with sharp teeth; uppermost leaves smaller and sometimes grading into lowermost bract. Raceme 3–12 cm, 6–17-flowered, at first dense, then lax; bracts rhombic, 4–6(–10) mm, with sharp incised teeth. Pedicel (5–)9–15 mm, only slightly elongating in fruit. Sepals 1–2 mm, cut to base into few narrow lobes. Flowers usually pale pink or purple, with purplish red or purple apex; inner petals darker at tip but crest white. Outer petals truncate to emarginate, with short abrupt crest not reaching apex; upper petal 16–22 mm; spur nearly straight, cylindrical, 8–10 mm; nectary 1/4–1/3 as long as

spur; lower petal base usually with shallow sac. Stigma rectangular, with 4 simple marginal papillae; geminate papillae lateral and in basal corners. Capsule oblong, 12–18 × 2.5–3 mm, 6–12-seeded; style ca. 2.5 mm. Seed very finely reticulate (visible with strong lens), 1.8–2.1 mm, keeled, elaiosome small. Fl. and fr. Apr–Sep.

Forest margins, roadsides, wastelands, along irrigation channels; sea level to 1800 m. Anhui, Fujian, SE Gansu, NE Guangxi, Guizhou, S Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, S Shanxi, Sichuan, Taiwan, Zhejiang [Japan (including Ryukyu Islands), Korea].

The annual form seems to be more common in the north.

**337. *Corydalis heterodonta*** H. Léveillé, *Repert. Spec. Nov. Regni Veg.* 6: 266. 1909.

异齿紫堇 *yi chi zi jin*

Herbs, biennial, tuberous, 10–30 cm tall, glaucous. Tuber 1–1.5 × 0.5–1.5 cm with thin roots in 2–4 fascicles. Stems few, leafy and branched throughout. Petioles long, base with membranous vaginae or auricles; blade pale abaxially, green adaxially, biternate; leaflets shortly petiolulate, entire to ternatisect, deeply and sharply dentate. Raceme very dense, 3–18-flowered, at fruiting very much elongated; lower bract leaflike, 10–25 mm, ternate with sharply dentate leaflets, upper 5–15 mm, simple, lacinate-dentate. Pedicel 3–6 mm, at fruiting much elongating to 10–30(–40) mm (also bracts enlarging). Sepals minute. Flowers pale pink. Outer petals narrow, retuse to slightly emarginate, with small dentate dorsal crest not reaching apex; upper petal 11–13 mm, spur cylindrical, ca. 5 mm, slender; nectary ca. 1/3 as long as spur; lower petal near base with small pouch. Stigma slightly emarginate, with 6 marginal simple papillae; geminate papillae lateral (submarginal) and on basal lobes. Capsule obovoid, 9–13 × 3–5 mm, 6–12-seeded; style ca. 1 mm. Seeds very finely reticulate (visible with strong lens), ca. 1.8 mm; caruncle small. Fl. and fr. May.

• Forest margins; 1300–1400 m. S Chongqing (Nanchuan), C and NE Guizhou.

This species is closely related to *Corydalis incisa* but has capsules shorter and broader and flowers smaller.

Specimens rather widely distributed to herbaria around the world as "*Corydalis nanchanensis* Z. Y. Liu" (a herbarium name that has never been validly published) belong to *C. heterodonta*.

**338. *Corydalis anethifolia*** C. Y. Wu & Z. Y. Su, *Acta Bot. Yunnan.* 8: 279. 1986.

蒺藜叶紫堇 *shi luo ye zi jin*

Herbs, ?biennial, 15–20 cm tall, glabrous. Stems suberect, much branched from base. Leaves often crowded toward lower part of stem; petiole 7–10 cm, base with very broad membranous sheath; blade glaucous, when young dark purple-red abaxially, green adaxially, triangular, 4–6 × 4–6 cm, tri- to tetratermate; primary pinnae petiolulate; pinnules nearly sessile; ultimate leaflets deeply bi- to tritermate into linear to narrowly oblanceolate lobes 2–4 × ca. 1 mm. Raceme 2–4 cm, dense in flower; lower bract like upper leaf, upper progressively much smaller. Pedicels shorter than bracts, slender. Sepals orbicular, small, margin fimbriate. Corolla pale blue. Outer petals acuminate, without crest; upper petal 14–16 mm; spur straight, conical,



cal, 6–7 mm; nectary ca. 1/4 as long as spur; lower petal 10–11 mm, with pouch ca. 1/3 from base and a smaller pouch close to base; inner petals 8–9 mm. Stigma slightly emarginate, with 8 distinct marginal simple papillae; geminate papillae lateral (submarginal) and on well-developed basal lobes. Fruit not seen; ovules ca. 8; style ca. 3 mm. Fl. Mar–Apr.

- Moist humus soil; 900–1400 m. Shaanxi (Lüeyang).

**339. *Corydalis hemsleyana*** Franchet ex Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 29. 1896.

巴东紫堇 *ba dong zi jin*

Herbs, ?biennial, 10–20 cm tall, glabrous, branched from base. Leaves crowded at base of main basal branches, with broadly sheathing petioles 4–10 cm; upper leaves few, similar; blade triangular, 2–4 × 3–5 cm, (bi-)trinate to sub-bitripinnate; median leaflet longer petiolulate; ultimate leaflets cuneate at base, deeply crenate-dentate/lobate into rounded to oblong obtuse mucronate teeth. Raceme very lax, ca. 5 cm, 4–8-flowered; lower bract like leaf, to 4 cm including petiole ca. 2 cm, upper progressively much smaller, 0.5–1 cm. Lower pedicels 15–20 mm, upper ones 5–10 mm. Sepals 1.5–2 × 1–3 mm, deeply laciniate-dentate. Flowers lavender. Outer petals dentate, obtuse to subacute, usually with short crest not reaching apex; upper petal 15–19 mm; spur straight, conical, 8–12 mm; nectary 1/5–1/4 as long as spur; lower petal 9–10 mm, broadly saccate at center and with an additional pouch at base; inner petals ca. 8 mm. Stigma wider than long, with 4 simple marginal papillae; geminate papillae in basal corners. Capsule broadly obovoid, 8–12 × 3–5 mm, 4–7-seeded; style 2.5–3 mm.

- Forest understories; ca. 2100 m. Chongqing (Wushan), N Guizhou, W Hubei, S Shaanxi, SE Sichuan (Leibo).

**340. *Corydalis pseudoincisa*** C. Y. Wu, Z. Y. Su & Lidén, Edinburgh J. Bot. 54: 73. 1997.

假刻叶紫堇 *jia ke ye zi jin*

Herbs, ?biennial, 20–40 cm tall. Stems many from base, suberect, leafy and branched throughout. Leaves scattered; petiole 2–10 cm (upper shorter, lower longer), at base with membranous sheath (sheath of upper leaves more rounded to auriculate); blade glaucous abaxially, green adaxially, 2–6 × 2–5 cm, unequally biternate; primary leaflets shortly petiolate; secondary leaflets entire to ± 3-cleft, cuneate at base, deeply dentate to divided into narrowly oblong mucronate teeth or lobes. Raceme 5–13-flowered, soon lax; lowest bract leaflike, ca. 1.5 × 1 cm, shortly petiolate, ternate with dentate leaflets; upper 5–8 mm, cuneate, much flabellately to pectinately divided. Pedicel ca. 5 mm in flower, at fruiting 8–15 mm. Sepals 1–3 × 1–1.5 mm, deeply laciniate-dentate. Corolla light blue. Outer petals ± dentate, rounded to shortly mucronate, with short dentate crest not reaching apex (often lacking on upper petal); upper petal 15–19 mm; spur slightly upturned, conical, 9–11 mm; nectary ca. 1/5 as long as spur; lower petal ca. 10 mm, almost straight; inner petals 8–9 mm. Stigma deeply cleft with 8 distinct simple marginal papillae; geminate papillae lateral (clearly submarginal/laminal) and on well-developed basal lobes. Capsule narrowly elliptic to obovoid, 7–11 × 2.5–3 mm, 3–10-seeded; style ca. 2 mm. Seeds in 2 rows, ca. 1.7 mm, smooth; caruncle narrow, adhering to seed. Fl. and fr. Apr–May.

- Slopes; 1100–1900 m. E Gansu (Tianshui), W Shaanxi (Meixian, Xi'an).

**341. *Corydalis amphipogon*** Lidén, *sp. nov.*

文县紫堇 *wen xian zi jin*

Type: China. Gansu: Wenxian, Motian Ling, Baishui Jiang nature reserve, Liujiaping region, Guan Kou, 32°46'54"N, 10°45'07"E, sandy gravel near river with flanking forest, evidently periodically flooded, alt. 1300–1340 m, 15 May 2007, D. E. Boufford & Y. Jia 37619 (holotype, UPS; isotype, A).

*Ab affini* *Corydalis pseudoincisa calcaribus longioribus gracilioribus capsulis lineari-oblongis facile distinguenda. Praeterea differt a C. foliaceobracteata floribus majoribus cristatis longe calcaratis atque sepalis majoribus profunde laciniato-dentatis.*

Herbs, ?biennial, 25–40 cm tall. Stems many from base, ?decumbent, leafy and branched throughout. Leaves scattered; petiole 2–5 cm (upper shorter, lower longer), at base with membranous sheath (sheath of upper leaves more rounded to auriculate); blade glaucous abaxially, green adaxially, 3–6 × 4–5 cm, biternate; primary leaflets shortly petiolate; ultimate leaflets shallowly 3-fid, cuneate at base, deeply dentate; teeth sub-obtuse, mucronate. Raceme lax, 5–9-flowered; bracts shortly stalked, 5–10 mm, deeply flabellate-divided into numerous acute lobes, lowermost bracts sometimes like upper leaf. Pedicel 3–6(–10) mm in flower, at fruiting 10(–15) mm. Sepals 3–4 × ca. 4 mm, deeply and richly laciniate-dentate. Corolla pale purple, darker at apex. Outer petals emarginate, with short mucro in notch, dorsally with short high crest not reaching apex; upper petal ca. 20 mm; spur arcuately downcurved, ca. 11 mm, slender; nectary ca. 1/5 as long as spur; lower petal ca. 11 mm, almost straight; inner petals 8–9 mm. Stigma broadly rounded with 8 distinct simple marginal papillae; geminate papillae lateral (clearly submarginal/laminal) and on basal lobes. Capsule linear to narrowly oblong, 19–21 × 1.5–2 mm, 12-seeded, not sharply reflexed from tip of pedicel; style ca. 2.5 mm. Seeds in 1 row, smooth, flattened, keeled, ca. 1.5 mm; caruncle small. Fl. and fr. May.

- Sandy gravel close to rivers in deciduous forests; 1300–1400 m. S Gansu (Wenxian).

*Corydalis amphipogon* shares characters with *C. foliaceobracteata* (linear-oblong capsule) and *C. pseudoincisa* (rather large fimbriate-dentate sepals and short high crest to the outer petals) but differs from both in the much longer narrow spur.

The specific epithet refers to the two deeply laciniate-dentate sepals, from Greek ἀμφίς (*amphis*, “on both sides”) and πώγων (*pogon*, “beard”).

**342. *Corydalis foliaceobracteata*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 19: 232. 1997.

叶苞紫堇 *ye bao zi jin*

Herbs, ?biennial, 10–40 cm tall, glabrous or slightly papillose. Stems several, ascending, slender, leafy and branched from base. Leaves often more crowded toward base; petiole 3–9 cm, thin, with short broad membranous finely denticulate auricles at base; blade glaucous abaxially, green adaxially, or-

bicular-triangular, 1.5–5 × 2–5 cm, thin, bi-(tri-)ternate; primary leaflets shortly petiolate; secondary subsessile, broadly ovate, ± cuneate at base, entire to ± 3-divided, lobes prominently crenate-dentate with 3–10 rounded mucronate teeth. Raceme 2–4-flowered, very lax in fruit; lowermost bract: petiole 1.5–4 cm, blade like cauline leaf; upper bracts much smaller, uppermost simple, serrate. Pedicel 4–6 mm in flower, 8–25 mm in fruit, slender, flexuous. Sepals minute, deeply divided. Flowers pale purple to light blue or white. Outer petals without crest, apex ± dentate, obtuse, mucronate; upper petal 9–13(–15) mm; spur straight, cylindrical, 5–7 mm; nectary thin, 1/3(–1/2) as long as spur; lower petal 7(–10) mm, claw narrow, straight or with basal pouch, limb rounded; inner petals 7(–8) mm, dorsal crests

broad, overtopping apex. Stigma wider than long, apex with 4–6 distinct marginal simple papillae; geminate papillae lateral, submarginal; rounded basal corners without papillae. Capsule linear, 15–25 × 1.5–2 mm, 10–18-seeded, not reflexed from erect pedicel; style ca. 1.5 mm. Seeds in 1 row, 1.4–1.5 mm, smooth. Fl. and fr. Apr–Jul.

• Deciduous rich forests on slopes, clearings; 1100–2900 m. SE Gansu (Wenxian), N Sichuan.

A specimen without locality (*E. H. Wilson 3190*, K) deviates in having larger flowers (15 mm), longer nectary (1/2 of spur), and entire outer petals; it was recorded as a “climber in shady place.”

#### 41. *Corydalis* sect. *Priapos* Lidén, sect. nov.

洱源紫堇组 er yuan zi jin zu

Type: *Corydalis stenantha* Franchet, Pl. Delavay. 49. 1889.

*Herbae perennes. Rhizoma parvum verticale rosula terminali instructum. Caules ascendentes vel basi procumbentes vel erecti, foliati, saepe ramosi. Capsula e pedicello suberecto nutans, abrupte dehiscens.*

Herbs, perennial, with small short vertical rhizome with apical leaf rosette. Stems ascending to erect or procumbent at base, leafy, usually branched, arising from below leaf rosette; lower bract leaflike, upper much smaller. Flowers pale yellow, purple, blue or white. Capsule pendent from straight pedicel, explosively dehiscent.

Seven species: Bhutan, China, India (Assam), Myanmar; seven species (five endemic) in China.

The sectional epithet is derived from the initial letters of the specific epithets of the seven included species.

*Corydalis kiukiangensis* (species no. 176) might be better placed here than in *C.* sect. *Asterostigma*.

- 1a. Sepals entire, ca. 5 × 5.5 mm (flowers ivory white) ..... 344. *C. peltata*  
 1b. Sepals deeply dentate, usually much smaller (flower color variable).  
 2a. Leaflets sharply serrate-dentate ..... 349. *C. radicans*  
 2b. Leaflets crenate-dentate to obtusely lobed.  
 3a. Petioles of upper cauline leaves with membranous auricles ..... 343. *C. petrophila*  
 3b. Petioles of upper cauline leaves not auriculate.  
 4a. Racemes 2–4-flowered; leaf lobes narrowly oblong; stems 8–18 cm, with 0–3 leaves ..... 348. *C. oligantha*  
 4b. Racemes 4–12-flowered; leaf lobes usually broader; stems with 2–8 leaves.  
 5a. Corolla milky white to pale yellow; fruit obovoid ..... 345. *C. iochanensis*  
 5b. Corolla blue to purple; fruit linear.  
 6a. Sepals 3–4 × 2–3 mm; corolla dentate, narrowly crested; pedicel forming open angle (> 90°) with lower petal ..... 346. *C. ananke*  
 6b. Sepals ca. 1 × 1 mm; corolla entire or slightly dentate, not crested; pedicel forming right angle (90°) with lower petal ..... 347. *C. stenantha*

#### 343. *Corydalis petrophila* Franchet, Pl. Delavay. 47. 1889.

岩生紫堇 yan sheng zi jin

*Corydalis rockii* Fedde; *C. trigibbosa* H. Chuang.

Herbs, perennial (sometimes flowering first year), 10–45 cm tall, glabrous. Rhizome short, vertical, with apical leaf rosette. Stems few to many, leafy and branched throughout, arising from below apical rosette. Rosette leaves and lower cauline leaves similar; petiole 3–10 cm, vaginate at base; blade glaucous on both surfaces, adaxially especially on veins, often with pale marks in incisions, orbicular-triangular to broadly ovate, 3–7 × 3–8 cm, ternate to usually biternate; primary leaflets petiolulate; secondary sessile, obovate to broadly ovate, base cuneate, entire to ± deeply 3-divided; segments coarsely

dentate or shallowly lobed into oblong obtuse mucronate teeth; upper leaves smaller, shortly stalked and less divided, ternate or even simple, with shortly auriculate membranous vaginae. Raceme 2–5(–9)-flowered, dense to lax in flower, lax in fruit; lower bracts shortly stalked, blade once to twice ternatisect or palmatisect with broad apically dentate lobes, upper flabellate, deeply dentate, uppermost lanceolate, entire; lowermost bract sometimes compound like upper leaf. Pedicel 5–20(–40) mm in flower, 10–30(–40) mm in fruit. Sepals rounded, 1–2 × 1.5–2 mm, fimbriate-dentate. Corolla white or creamy white in shade or pale grayish purple, sometimes reddish purple in sunny positions, becoming deeper colored after fertilization. Outer petals broadly acute at apex with 1–1.5 mm wide crest tapering to both ends, just reaching apex; upper petal 18–25 mm; spur cylindrical or slightly tapering, downcurved to almost straight, 8–

13 mm; nectary ca. 1/2 as long as spur; lower petal usually saccate in lower 1/3 with an additional pouch close to base. Stigma square, with 6 marginal simple papillae; geminate papillae lateral (submarginal) and on basal lobes. Capsule elliptic to obovoid, 13–17 × 4–5 mm, 6–17-seeded; style 2.5–3 mm. Seeds 1.5–1.7 mm, smooth; elaiosome broad, lobed. Fl. and fr. Jun–Sep.

• Walls, roadsides, rocks, in full sun but also in shade under shrubs; 1600–3200 m. E Xizang, NW Yunnan.

The habit of the plant is different in sunny positions (many stemmed, short, with deeply colored flowers) and in deep soil in shade (few long stems, whitish flowers).

**344. *Corydalis peltata*** Lidén & Z. Y. Su, *Edinburgh J. Bot.* 54: 71. 1997.

盾萼紫堇 *dun e zi jin*

Herbs, perennial, 15–20 cm tall, glabrous. Rootstock short, with dense apical leaf rosette. Stems ascending to suberect from below rosette, simple or with late branches above, with 2–5 leaves. Rosette leaves: petiole 3–6 cm; blade glaucous abaxially, green adaxially, broadly ovate, 1–2.5 × 1–2.5 cm, ternate; leaflets deeply ternatisect, lobes obovate, again shallowly divided at apex, lobules rounded-obtuse. Cauline leaves: petiole 1–3 cm; blade 2–4 × 3–4 cm, otherwise like rosette leaves. Raceme 5–10-flowered, dense in flower, elongating to 6 cm in fruit; lower bract like cauline leaves (to 3 cm including petiole ca. 1 cm), upward smaller and less divided, uppermost one deeply 3-divided. Pedicel straight, 3–5 mm in flower, 10–15 mm in fruit. Flowers nodding, ivory white, inner petals with purple apex. Sepals rounded, entire, ca. 5 × 5.5 mm. Outer petals subacute, with crest ca. 1 mm wide, tapering to both ends, not decurrent on spur; upper petal ca. 15 mm; spur downcurved, cylindrical, ca. 7 mm; nectary ca. 1/2 as long as spur; lower petal ca. 8 mm, claw saccate in lower 1/3 with an extra small pouch at very base; inner petals ca. 7 mm. Stigma square; marginal simple papillae: median 2 distinct, lateral diffuse; geminate papillae lateral and in basal corners. Capsule obovoid, 10–12 × ca. 3 mm, 10–15-seeded. Seeds in 2 rows, ca. 1 mm, smooth; caruncle large. Fl. and fr. Jun–Jul.

• Stone crevices, *Abies* forests; 3300–3400 m. NW Yunnan (Lijiang).

**345. *Corydalis iochanensis*** H. Léveillé, *Cat. Pl. Yun-Nan*, 202. 1916.

药山紫堇 *yao shan zi jin*

Herbs, perennial, 12–30 cm tall. Rhizome short, with dense apical leaf rosette. Stems nearly erect or decumbent, ribbed, simple or often with late branches above, with 2–6 scattered leaves. Rosette leaves: petiole 5–8 cm, base vaginate; blade glaucous abaxially, green or glaucous, sometimes with purplish midvein adaxially, broadly ovate, 2–3 × 2–2.5 cm, biternate; primary leaflets petiolulate; ultimate leaflets sessile, irregularly 2–5-divided; lobules obovate to oblanceolate, mucronulate. Cauline leaves like rosette leaves, or slightly broader. Raceme 3–12-flowered, very dense at first, to 8 cm in fruit; lowermost bract like upper leaf but shortly stalked, upper much smaller, divided to often entire. Pedicel 3–4 mm in flower, 9–15 mm in

fruit, erect. Sepals 2–3 × ca. 2 mm, deeply lacerate-dentate. Corolla milky white to pale yellow. Outer petals broadly navicular, subacute, without crest; upper petal 13–16 mm; spur cylindrical, 7–8 mm; nectary ca. 1/2 as long as spur; lower petal 8–9 mm, broadly saccate along whole length, except for very base where there is often a small gibbosity; inner petals 6–8 mm. Stigma square; marginal simple papillae: median 2 distinct, lateral diffuse; geminate papillae lateral and in basal corners. Capsule obovoid to oblong, 10–13 × ca. 3 mm, 5–15-seeded. Seeds in 2 rows, ca. 1 mm, smooth; caruncle small. Fl. and fr. May–Sep.

Forest understories, shrubs, grasslands, channel sides; 2700–3900 m. ?NW Guizhou, W Sichuan (Jiulong, Kangding), SE Xizang (Cona), N Yunnan (Lijiang, Qiaojia, Zhongdian) [Bhutan].

**346. *Corydalis ananke*** Lidén, *sp. nov.*

齿瓣紫堇 *chi ban zi jin*

Type: China. Yunnan: Dêqên Prefecture, Zhongdian Xian, between Geza and Xiao Geza by Liutung He, 28°05'48"N, 99°45'55"E, broad-leaved forest by river, alt. 3100 m, "Flowers mauve, spur bluish violet, lip blue," 31 May 1993, *Kunming-Edinburgh-Gothenburg (KEG) Expedition 589* (holotype, GB; isotype, E).

*A Corydalis stenantha sepalis multo majoribus profunde fimbriato-dentatis, petalis exterioribus manifeste cristatis atque pedicello cum petalo infimo angulum 110–130° formanti (nec 90°) differt.*

Herbs, perennial, 20–50 cm tall. Rhizome short, with apical leaf rosette, some roots slightly thickened. Stems decumbent-ascending, ribbed, usually with late branches above, with 4 or 5(–8) scattered stalked leaves. Rosette leaves: petiole 2–3 cm, base vaginate; blade 1(–2) × 1(–2) cm. Cauline leaves: lower petiole 3–7 cm, upper 1–2 cm; blade abaxially glaucous and often finely papillose, adaxially green or glaucous, broadly ovate, 2–4 × 2–4 cm, unequally biternate; primary leaflets petiolulate; ultimate leaflets sessile, deeply 2- or 3-divided, lobes shallowly 2–6 cut into rounded mucronulate teeth or lobules. Raceme 5–10-flowered; lowermost bract 10–25 mm, like upper leaf but shortly stalked, middle biternatisect to flabellate-divided, uppermost oblanceolate, entire, 4–10 mm. Pedicel erect, 6–12 mm, thin, forming an open angle (> 90°) with lower petal. Sepals (2–)3–4 × 2–3 mm, finely fimbriate-dentate. Corolla purple; outer petals subobtusate, dentate, with very narrow dentate crest; upper petal 15–17 mm; spur downcurved at apex, cylindrical, 7–9 mm; nectary ca. 1/2 as long as spur; lower petal 8–9 mm, straight or with very small gibbosity at base; inner petals ca. 7 mm. Stigma square; simple marginal papillae: 2 median distinct, lateral broad, indistinct; geminate papillae lateral (submarginal) and in basal corners. Fruit unknown. Fl. May–Jul.

• NW Yunnan (Zhongdian).

The specific epithet is based on Ananke (Ανάγκη) of Greek mythology, a personification of "necessity."

**347. *Corydalis stenantha*** Franchet, *Pl. Delavay*, 49. 1889.

洱源紫堇 *er yuan zi jin*

*Corydalis chelidonium* Fedde.

Herbs, perennial, 15–60 cm tall. Rhizome short, with apical leaf rosette, some roots slightly thickened. Stems 2–7 from below rosette, decumbent-ascending, ribbed, usually with late branches above, with 3 or 4 (or 5) scattered stalked leaves. Rosette leaves: petiole 2–4 cm, base vaginate; blade 1–3 × 1–3 cm. Cauline leaves: lower petiole 3–7 cm, upper 1–2 cm; blade abaxially glaucous and often finely papillose, adaxially green or glaucous, broadly ovate, 2–5 × 2–6 cm, unequally biternate; primary leaflets petiolulate; ultimate leaflets sessile, deeply 2- or 3-divided, lobes shallowly 2–6 cut into rounded mucronulate teeth or lobules. Raceme (3–)7–13-flowered; lowermost bract 10–25 mm, like upper leaf but shortly stalked, middle biternate to flabellate-divided, uppermost oblanceolate, 4–10 mm, entire. Pedicel 5–10 mm, 10–20 mm in fruit, thin, erect, forming a right angle (90°) with lower petal. Sepals 1–1.5(–2) × 1(–2) mm, deeply and finely dentate. Corolla blue to purple (red?); outer petals acute to subobtusate, finely dentate or almost entire, without crest; upper petal (13–)16–20(–22) mm; spur straight or arcuately downcurved, cylindrical, (6–)8–12(–13) mm; nectary 1/2–3/5 as long as spur; lower petal straight, 8–11 mm; inner petals 7–10 mm. Stigma square; simple marginal papillae: 2 median distinct, lateral broad, indistinct; geminate papillae lateral (submarginal) and in basal corners. Capsule reflexed from straight pedicel, linear, ca. 10 × 1 mm, ca. 10-seeded, explosively dehiscent; style ca. 1.5 mm. Fl. and fr. May–Aug.

• Forest understories in limestone areas, meadows, bamboo tussocks; 2500–3500 m. N Yunnan.

A plant from Yungning (N Yunnan) has a very short curved spur, auriculate upper petal, and narrow leaf lobes. A plant from Lijiang differs in having large sepals and corolla (these extremes are accounted for in the description within parentheses).

**348. *Corydalis oligantha*** Ludlow & Stearn, Bull. Brit. Mus. (Nat. Hist), Bot. 5: 60. 1975.

少花紫堇 shao hua zi jin

Herbs, perennial, 8–18 cm tall. Rhizome short, with fibrous slender roots and small apical leaf rosette. Stems weak, slender, simple or branched above with (0 or) 2 or 3 leaves. Rosette leaves: petiole 2–5 cm; blade broadly triangular or ovate, 1–2 × 1–2.5 cm, biternate; primary leaflets shortly petiolulate; ultimate leaflets deeply divided into 3–6 narrowly oblong to oblanceolate obtuse lobes. Raceme 2–4-flowered, co-

rimbose; bracts shortly stalked, (ternate to) deeply ternate with ± divided lobes, 5–12 mm, upper less divided. Pedicel erect, 7–15 mm, slender. Sepals reniform, ca. 1 mm wide, dentate. Petals white, light blue, or purple; upper petal 16–18 mm, subacute, without crest, spur almost straight, narrow, 8–9 mm; nectary ca. 1/2 as long as spur; lower petal 8–9 mm, claw shallowly saccate, base with small pouch; inner petals 7–8 mm. Stigma rounded, without basal lobe; marginal simple papillae: 2 median distinct, lateral diffuse; geminate papillae lateral and at base. Capsule narrowly elliptic, 9–10 × ca. 2 mm, ca. 10-seeded; style ca. 2 mm. Seeds ca. 1 mm. Fl. and fr. May.

Forests, on mossy banks; 2100–3100 m. S Xizang (border with Bhutan), Yunnan (Gaoligong Shan) [E Bhutan, India (Assam), Myanmar].

The species is here taken in a wide sense due to sparse material.

**349. *Corydalis radicans*** Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 62: 221. 1925.

裂瓣紫堇 lie ban zi jin

Herbs, perennial, 30–60 cm tall, glabrous. Rhizome short, with small apical leaf rosette. Stems slender, procumbent at base, rooting at nodes, distally ascending to erect, branched above, with 5–9 leaves. Rosette leaves several; petiole 3–9 cm, base vaginate; blade reniform, 2.5–4.5 × 2.5–5 cm, biternate; primary leaflets stalked, secondary subsessile, entire to ± deeply ternate, with deep narrow acute teeth. Lower cauline leaves: petiole 3–6 cm, upper ca. 1 cm; blade like rosette leaves. Raceme simple or with a basal branch, ca. 10-flowered, 1.5–5 cm, at fruiting to 7 cm; lower bracts petiolate, slightly 3-divided; segments incised-dentate, uppermost bracts narrowly oblanceolate and entire. Pedicel erect, 5–12 mm, thin. Sepals broadly ovate, ca. 2 × 1.5 mm, irregularly lacerate. Corolla lavender; outer petals broadly obtuse, dentate, mucronate, dorsal crest absent or small, not extended to apex; upper petal 13–17 mm, spur narrowly cylindrical, almost straight; nectary ca. 1/2 as long as spur; lower petal 7–9 mm with short claw and broad rounded sharply dentate limb; inner petals 7–8 mm. Stigma square, with 4 simple marginal papillae; geminate papillae lateral and in basal corners. Capsule pendent from erect pedicel, linear, 10–11 × ca. 1.5 mm, 6–9-seeded, explosively dehiscent; style ca. 2 mm. Seeds in 1 row, ca. 1.3 mm, smooth. Fl. and fr. Jun–Aug.

• Forest margins, grassy slopes, valley shrub margins, channel sides; 3200–4700 m. SW Sichuan (Muli), NW Yunnan (Zhongdian).

**42. *Corydalis* sect. *Hamatae*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 8: 407. 1986.

钩距黄堇组 gou ju huang jin zu

Herbs, perennial. Rootstocks short, with many pale oblong soft roots to 1 mm in diam. Stems leafy and branched. Radical leaves usually several, broadly vaginate at base, often decussate, bipinnate. Flowers yellow or purple, shortly stalked in dense spikelike racemes; spur short, strongly curved into a semicircle. Capsule pendent from erect pedicel, explosively dehiscent.

Three species: W China, Nepal; three species (two endemic) in China.

The distinction between *Corydalis conspersa* and *C. hamata* is far from clear, and intermediates are found.

- 1a. Corolla 11–13 mm, dull purple ..... 352. *C. muliensis*  
 1b. Corolla 15–20 mm, yellow or white, sometimes with purple base and spur.

- 2a. Bracts broadly spatulate, subentire with finely erose-denticulate margin; stems ascending; racemes capitata to subspicata ..... 350. *C. conspersa*  
 2b. Bracts obovate to oblanceolate, entire or lower and middle bracts often coarsely lobed; stems ascending or erect; racemes subspicata ..... 351. *C. hamata*

**350. *Corydalis conspersa*** Maximowicz, Fl. Tangut. 49. 1889.

斑花黄堇 ban hua huang jin

*Corydalis zambuii* C. E. C. Fischer & Kaul.

Herbs, perennial, 10–30 cm tall, glabrous. Rhizome ± vertical with long soft roots and long terminal rosette with leaves in 2 rows. Stems 2–6, axillary from previous year's leaves, basally decumbent, ascending, simple or often branched above, with 3–7 leaves. Basal leaves many; petiole ca. as long as blade, long vaginate at base; blade ovate to oblong, bipinnate; pinnae 3 or 4 pairs; pinnules usually 3, deeply 3-lobed; segments dense, often imbricate, elliptic or ovate, 3–4 × ca. 2 mm. Cauline leaves like rosette leaves, becoming progressively smaller upward. Raceme capitata to subspicata, 2–4 × 2–2.5 cm, 15–27-flowered; bracts spatulate, 5–8(–10) mm; limb purple, membranous, subentire, finely erose-dentate. Pedicel 5–8 mm. Sepals early withering, brown, 3–4 × 3–4 mm, deeply lacinate-dentate. Flowers creamy white to usually yellow, often with brown flecks, spur sometimes with purplish tinge, inner petals with blue dorsal crests. Outer petals obtuse, slightly dentate, with 1.5–2-mm-wide short crest much overtopping apex; upper petal 14–18 mm; spur strongly curved in a tight semicircle, 4–6 mm (measured in center of spur), apex thickened; nectary ca. 1/2 as long as spur; lower petal with long straight claw gradually widened into rounded to obcordate dentate limb; inner petals 10–13 mm. Stigma slightly emarginate with 4 distinct marginal simple papillae in upper 1/2; geminate papillae lateral (sometimes lacking) and in basal corners. Capsule pendent from erect pedicel, oblong to obovoid, ca. 10 × 4 mm, explosively dehiscent; style ca. 4 mm. Fl. and fr. Jul–Sep.

Stony riversides, wet meadows, wet scree, brooks; 3800–5700 m. SW Gansu, C and S Qinghai, W Sichuan (Dêgê, Litang, Sêtar), C and E Xizang [Nepal].

**351. *Corydalis hamata*** Franchet, J. Bot. (Morot) 8: 292. 1894.

钩距黄堇 gou ju huang jin

*Corydalis binderae* Fedde subsp. *pseudohamata* (Fedde) Z. Y. Su; *C. fluminicola* W. W. Smith; ?*C. hamata* var. *ramosa* Z. Y. Su; *C. pseudohamata* Fedde.

Herbs, perennial, 15–40(–60) cm tall, glabrous. Rootstock 2–3 cm, stout, with long soft fleshy roots 1–2 mm in diam., with 2-sided apical leaf rosette. Stems radiating, 3–12, decumbent at base, ascending (in shaded subalpine places erect), branched, with 4–7(–10) leaves in upper 2/3. Rosette leaves several; petiole 5–11 cm, long vaginate with membranous margin; blade ob-long, 7–15(–20) × 3–6(–10) cm, bipinnate; pinnae in 3–5 pairs, nearly sessile or lower sometimes very long stalked; pinnules usually 3, deeply 3–6-lobed; segments lanceolate to oblong, 3–6 × 2–3 mm. Cauline leaves like basal leaves, lower petiolate, upper sessile; blade 3–10 × 2–4 cm, with 2–4 pairs of leaflets. Raceme subspicata, very dense, 20–40-flowered, 4–10 cm; flowers often nutant; bracts obovate to

lanceolate, 5–10(–15) mm, entire or lower (rarely most) ones often divided, sometimes with purplish margin. Pedicel erect, 5–10 mm. Sepals early withering, turning brown, broadly ovate, 2–3(–4) × 2–3 mm, finely and shallowly dentate (NE) to deeply lacinate dentate (SW). Corolla yellow or cream with yellow tip, sometimes with a purplish suffusion on spur, rarely purple with white apex; inner petals with blue dorsal crests, rarely dark purple. Outer petals rounded, obtuse to subacute, with 1–2-mm-wide entire crest usually overtopping apex; upper petal 16–20 mm; spur strongly curved in a tight semicircle, apex thickened, 4–6 mm (measured in middle of spur); nectary ca. 1/2 as long as spur; lower petal with narrow claw; inner petals 11–13 mm, with swollen dorsal crests overtopping apex. Stigma square, emarginate, with 4–6 marginal simple papillae; geminate papillae lateral (sometimes missing) and in basal corners (sometimes missing). Capsule lanceolate, ca. 15 × 4–5 mm, 8–14-seeded; style 3.5–4 mm. Seeds in 2 rows, 1.8–2.1 mm, almost smooth (finely reticulate under strong lens). Fl. and fr. Jul–Sep.

• Wet alpine scree, brook sides in alpine meadows, often in running water; 3300–5200 m. W Sichuan, E Xizang (Jomda, Sogxian, Zogang), NW Yunnan.

Plants at lower elevations in shade tend to be coarse and erect with strict erect branches. Plants in the NE part of the distribution area (NE from Yajiang, W Sichuan) tend to have much less deeply dentate sepals. A form from Daocheng (SW Sichuan) and Zogang (E Xizang), from open alpine rocky brooks, has deeply divided bracts and dark purple flowers white at apex.

**352. *Corydalis muliensis*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 8: 411. 1986.

木里黄堇 mu li huang jin

Herbs, perennial, 30–40 cm tall, rhizome with many thick soft roots. Stems several, decumbent to ascending, branched, with 4–7 leaves. Basal leaves: petiole 4–7 cm, vaginate at base; blade oblong, 5–15 × 2–4 cm, bipinnate, lower leaves large, upper leaves small; pinnae 3–5 pairs, petiolulate to nearly sessile; pinnules 1 or 2 pairs, sessile, ovate, deeply 3–5-lobed; segments lanceolate to obovate, 3–5 × ca. 2 mm. Cauline leaves like basal leaves, petiolate to sessile. Raceme oblong or nearly globose, 2–3 × ca. 2 cm, densely 10–17-flowered; bracts longer than pedicels, lower palmately lobed, ca. 10 × 6 mm, upper smaller, spatulate, 3-divided, petiolate, sometimes entire. Pedicel ca. 5 mm. Sepals ca. 2 × 1.5 mm, finely dentate. Flowers dull purple. Upper petal 11–13 mm, acute at apex, crest high, obtuse, extended beyond apex, not decurrent on spur; spur strongly hooked-curved, ca. 3 mm; nectary ca. 2/3 as long as spur; lower petal 8–9 mm with long claw and small rounded limb, broadly and shortly crested; inner petals 7–8 mm. Stigma deeply emarginate with 4 apical marginal simple papillae and geminate papillae in basal corners; basal lobes not developed. Capsule not seen.

• Forests; ca. 3600 m. SW Sichuan (Muli).

43. *Corydalis* sect. **Polyphyllae** Z. Y. Su, Acta Bot. Yunnan. 18: 398. 1996.

多叶紫堇组 duo ye zi jin zu

Herbs, perennial. Radical leaves in apical 2-sided rosette. Stems simple, without or with few leaves. Flowers blue or amaranth, rarely white, in dense racemes. Outer petals crested; spur shorter than petal limb. Capsule reflexed from erect pedicel, elliptic, explosively dehiscent.

- Two species.

- 1a. Upper petal 14–19 mm ..... 353. *C. polyphylla*  
 1b. Upper petal 21–25 mm ..... 354. *C. pseudofluminicola*

353. *Corydalis polyphylla* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 62: 222. 1925.

多叶紫堇 duo ye zi jin

Herbs, perennial, deep green, 6–20 cm tall, glabrous. Rhizome slender, sparsely set with scales, ca. 2 mm in diam. (fresh branches ca. 1 mm in diam.), terminating in thicker parts emitting long fleshy roots 1(–1.5) mm in diam., apically with 2-sided rosette of leaves with long sheathing bases. Stems 1–4, axillary from below terminal rosette, erect, simple, near base or central part often with 1 or 2 leaves, sometimes without leaf. Rosette leaves: petiole 3–12 cm; blade triangular or ovate, 2–8 × 1.5–6 cm, bi- to tripinnate; pinnae 2–4 pairs; pinnules 1 or 2(or 3) pairs, all petiolate, deeply(1 or)2(or 3) × ternatisect into lanceolate segments 1.5–4 mm, apex acute-mucronate. Cauline leaves like basal leaves. Raceme corymbose, 6–15(–20)-flowered; bracts stalked, bi- to triternate to ternatisect, shorter and less divided upward, 8–20 mm, or uppermost ones much smaller. Pedicel erect, 10–20(–30) mm, slender. Sepals late caducous, green, 0.5–1 × ca. 0.5 mm, entire or with a few deep teeth. Flowers blue to purple, rarely white; outer petals navicular, acute; upper petal 14–19 mm, crest 1–2 mm wide, tapering to both ends, not or slightly overtopping apex, usually decurrent on spur; spur usually downcurved at apex, cylindrical or slightly tapering, 4–7 mm, obtuse; nectary ca. 1/2 as long as spur; lower petal with narrow claw and rhombic acute limb; inner petals 10–11 mm. Stigma square; marginal papillae: 2 median distinct, lateral broad, indistinct; geminate papillae lateral and in basal corners. Capsule pendent from erect pedicel, fusiform, 10–13 × 3–3.5 mm, with prominent pale thick veins, explosively dehiscent; style ca. 2.5 mm. Seeds in 2 rows.

- Rocky slopes; 3600–5000 m. SE Xizang (Zayü), NW Yunnan (Dêqên, Gongshan, Zhongdian) [?Myanmar].

354. *Corydalis pseudofluminicola* Fedde, Repert. Spec. Nov. Regni Veg. 19: 283. 1924.

假多叶黄堇 jia duo ye huang jin

Herbs, perennial, glaucous, 5–17 cm tall, glabrous. Rhizome slender, 2–3 mm in diam. (fresh branches ca. 1 mm in diam.), sparsely set with scales, terminating in a thicker 10–30 × ca. 5 mm part with dense scales and petiolar remnants, emitting long fleshy roots 1–2 mm in diam., apically with 2-sided rosette of leaves. Stems 1–3, ascending, simple, with 1–3 leaves. Basal leaves equal to stem or slightly shorter; petiole ca. equal to blade, with long and broad basal sheath; blade triangular, 3–7 × 2–5 cm, bipinnate or tripinnate; pinnae shortly stalked, 3 or 4 pairs; lower pinnae with 2 or 3 pairs of sessile pinnules; ultimate leaflets deeply biternatisect into lanceolate crowded segments 2–5 × 0.5–2 mm, often with reflexed margin. Cauline leaves similar to basal ones but smaller. Raceme subcapitate, 2–5 cm, 6–20-flowered; bracts shallowly to deeply palmatisect to biternatisect into lanceolate acute lobes, 10–15 mm, upward smaller and less divided. Pedicel erect, 6–20 mm. Sepals 2–2.5 × 1–1.5 mm, dentate. Corolla pale blue, often with pinkish suffusion toward spur; inner petals (except dorsal crest) dark purple at apex; outer petals with broad subacute undulate limb, crest 2.5–3 mm wide, overtopping apex; upper petal 21–25 mm; spur broad, slightly tapering to obtuse apex (Balang Shan) or cylindrical and downcurved (Kangding), 8–10 mm; nectary ca. 1/3 as long as spur; inner petals 12–14 mm. Stigma square; marginal papillae: 2 median distinct, lateral broad, indistinct; geminate papillae lateral and in basal corners. Capsule pendent from erect pedicel, fusiform, 12–15 × 3–4 mm, with prominent pale thick veins, explosively dehiscent, 10–16-seeded; style 3–4 mm. Seeds in 2 rows, ovoid, ca. 1.5 mm, smooth, with small elaiosome. Fl. and fr. Jul–Aug.

- Among boulders, rough stabilized scree, grassland on slopes; 3800–4800 m. NC and W Sichuan (Balang Shan, Dawu, Kangding).

44. *Corydalis* sect. **Chinenses** (Gorovoj & Bassargin) C. Y. Wu & Z. Y. Su in C. Y. Wu, Fl. Reipubl. Popularis Sin. 32: 395. 1999.

地丁草组 di ding cao zu

*Corydalis* subsect. *Chinenses* Gorovoj & Bassargin, Bot. Zhurn. (Moscow & Leningrad) 66: 1331. 1981.

Herbs, annual, diffusely branched, with taproot. Leaves bipinnate to tripinnate. Bracts leaflike. Capsule not explosively dehiscent. Seeds keeled, with broad hilum.

- Two species: C, E, and N China, N Korea, SE Mongolia, and Russia (Far East); two species (one endemic) in China.

- 1a. Fruit oblong, with 2 rows of seeds; lower petal not or minutely saccate at base; upper petal broadly truncate or emarginate at apex ..... 355. *C. bungeana*  
 1b. Fruit linear, seeds in 1 row; lower petal with distinct pouch; upper petal acute ..... 356. *C. chingii*

**355. *Corydalis bungeana*** Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 13: 62. 1840.

地丁草 di ding cao

*Corydalis racemosa* Bunge, Enum. Pl. Chin. Bor. 5. 1833, not (Thunberg) Persoon (1806); *C. bungeana* var. *odontopetala* Hemsley.

Herbs, [winter] annual [?biennial], glaucous, 10–20(–50) cm tall, with taproot. Stem diffusely spreading and branched from base, ridged. Basal leaves many, 4–8 cm; petiole ca. equal to blade, base ± sheathed, margin membranous; blade pale abaxially, green adaxially, bipinnate; primary leaflets 3–5 pairs, shortly stalked; secondary leaflets 2 or 3 pairs, deeply divided into 3–10 short narrow obtuse segments. Cauline leaves like basal leaves. Racemes 6–10-flowered, at first dense, much elongating in fruit; bracts petiolate to nearly sessile, leaflike, obviously longer than petiole, 3–7(–15) mm. Pedicel 3–6 mm, ± arcuate in fruit. Sepals often caducous, broadly ovate to deltoid, 0.7–1.5 mm, with teeth. Flowers pink to lavender or white with darker keels, inner petals darker at tip; outer petals shortly crested, margin entire to dentate, apex truncate to emarginate; upper petal 11–15 mm; spur subsigmoidally curved, 4–5 mm, apex obtuse; nectary extended through ca. 2/3 of spur; lower petal with narrow claw; inner petals 7–8 mm. Stigma square, small, with 8 papillae. Capsule drooping, oblong, 12–20 × ca. 4 mm, 8–15-seeded, attenuate into style ca. 1.5 mm. Seeds in 2 rows, 2(–2.5) mm, sharply keeled, margin with faint radial small linear impressions; elaiosome large.

Stony slopes, sands; sea level to 1500 m. Gansu, Hebei, Henan, Hunan, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi [N Korea, SE Mongolia, Russia (Far East)].

**356. *Corydalis chingii*** Fedde, Repert. Spec. Nov. Regni Veg. 20: 219. 1926.

甘肃紫堇 gan su zi jin

*Corydalis chingii* var. *shansiensis* W. T. Wang ex C. Y. Wu & Z. Y. Su; *C. kansuana* Fedde.

Herbs, annual, diffusely branched, with slender taproot. Stems many, 10–40 cm, ridged, branched and leafy throughout. Petiole of lower leaves 3–6 cm, petiole of upper leaves absent to 3 cm; blade oblong-triangular, 2–6 × 1–5 cm, bipinnate to tripinnate; primary leaflets 2 or 3 pairs, stalked; secondary leaflets 1(or 2) pairs, nearly sessile, 3-parted, segments often again bifid to trifid; ultimate lobes oblong, 3–5 × 1–2 mm, apex obtuse, nearly mucronate. Racemes 6–15-flowered, elongating in fruit; bracts cuneate to shortly stalked, 3–7 mm, deeply cut into acute segments, or lowermost bracts leaflike, 10–25 mm. Pedicel 4–10 mm, slightly elongating and ± recurved in fruit. Sepals dentate, 1–2 × 0.5–2 mm. Corolla pink to purple; upper petal slightly upcurved at apex, 15–20 mm, acute; crest 1–2.5 mm high, entire, prolonged to petal lobe apex, not reaching spur; spur slightly downcurved at tip, cylindrical, 7–9 mm, obtuse at tip; nectary extended through ca. 1/2 of spur; lower petal shortly crested, broadly spreading in apical 1/3, near claw becoming narrow; claw conspicuously saccate subbasally (almost like a small spur) but narrow at very base; inner petals 9–10 mm; claw ca. as long as limb. Stigma compressed-square, apex with 4 papillae, lateral geminate papillae submarginal, basal geminate papillae on slightly protruding lobes. Capsule linear, subturulose, 14–19 × ca. 2 mm, style ca. 3 mm, replum long persistent. Seeds in 1 row, rounded, ca. 2 mm, keeled, smooth or very faintly reticulate.

• Mountain slopes, roadsides, shaded wet zones; 1400–3300 m. NE Gansu (Lintao, Yongdeng), N Shaanxi (Jingbian), W Shanxi (Fangshan, Pianguan).

#### 45. *Corydalis* sect. *Vermiculares* Z. Y. Su & Lidén, Acta Bot. Yunnan. 19: 227. 1997.

蔓生黄堇组 man sheng huang jin zu

Herbs, perennial (?biennial). Flowers white, with yellow apex. Fruiting pedicel recurved and much elongating; capsule geotropic, not explosively dehiscent.

• One species: China.

**357. *Corydalis brevirostrata*** C. Y. Wu & Z. Y. Su, Acta Bot. Yunnan. 2: 205. 1980.

蔓生黄堇 man sheng huang jin

Herbs, perennial (?biennial or short-lived perennial), glaucous, with taproot, forming loose rounded cushions 5–20 cm in diam. Stems fleshy, much branched and leafy throughout, (5–)10–15 cm (to 30 cm in shade-forms). Leaves long stalked; petiole 2–10 cm; blade glaucous abaxially, green to glaucous adaxially, orbicular, 1–2 × 1–3 cm, ternate to biternate; leaflets entire to divided, ultimate segments obovate, 5–13 × 2–8 mm, glabrous or often papillose-hairy to ciliate on margins and veins, apex mucronate. Racemes many, corymbose, 3–10-flowered; lower bracts leaflike, long petiolate, 1.5–5 cm, biternate, upper one smaller, 3-divided, margin papillose. Pedicel 1–3 cm in anthesis, basally recurved and elongating in fruit to 3–5(–8) cm. Flowers white or with a slight pink tinge; inner petals with yellow

dorsal crests turning reddish brown after fertilization. Sepals peltate, 1–1.5 × 1–1.5 mm, deeply dentate. Outer petals with broad flat ovate, obtuse to acute limb, with short high undulate dentate or entire crests not reaching apex; upper petal 14–17 mm; spur straight or bent downward at apex, cylindrical, 5–8 mm, thin; nectary ca. 3/4 as long as spur; lower petal 9–13 mm, with sharply set off limb 5–7 × 4–7 mm; claw ca. 1.5 mm wide; inner petals 8–10 mm, with rather broad dorsal crests slightly overtopping apex. Stigma peculiar with 4 apical narrow papillae, small lateral geminate papillae, and usually (except in subsp. *tibetica*) basally with a rounded “ear-lobe” on each side devoid of papillae. Capsule oblong, 5–12 × ca. 2 mm, 1–6-seeded, with basally sharply bent style 5–8 mm. Seeds black, ca. 2 mm, smooth; elaiosome very large, lobed, folded back over seed.

• Limestone cliffs, (?secondarily) in gravel below cliffs and by roadsides; 3500–4300 m. S Qinghai, NW Sichuan, ?E and NE Xizang.

This species is strikingly similar to the Mediterranean chasmo-phyte *Sarcocapnos enneaphylla* (Linnaeus) Candolle.

- 1a. Stigma with prominent basal auricles ..... 357a. subsp. *brevirostrata*  
 1b. Stigma cuneate at base ..... 357b. subsp. *tibetica*

**357a. *Corydalis brevirostrata* subsp. *brevirostrata***

蔓生黄堇(原亚种) man sheng huang jin (yuan ya zhong)

*Corydalis vermicularis* Lidén & Z. Y. Su.

Stigma with prominent basal auricles.

• 3500–4300 m. S Qinghai (Qumarlêb, Zhidoi), NW Sichuan, ?E Xizang.

**357b. *Corydalis brevirostrata* subsp. *tibetica* (Maximowicz) Lidén, **comb. et stat. nov.****

西藏蔓生黄堇 xi zang man sheng huang jin

Basionym: *Corydalis capnoides* (Linnaeus) Persoon var. *tibetica* Maximowicz, Fl. Tangut. 50. 1889.

Stigma cuneate at base.

• S Qinghai, NE Xizang.

**19. FUMARIA Linnaeus, Sp. Pl. 2: 699. 1753.**

烟堇属 yan jin shu

Zhang Mingli (张明理); Magnus Lidén

Herbs, summer annual, glaucous, glabrous, with slender taproot. Stems angular, leafy and branched throughout. Leaves alternate, 2 or 3(or 4) × pinnate, or lower leaves 2 or 3 × ternatisect; lower leaves long petiolate; upper leaves shortly petiolate or sessile. Inflorescences leaf-opposed [i.e., displaced-terminal], racemose, subspicate, soon elongating; bracts linear-oblong, scarious. Flowers zygomorphic, on short pedicels. Sepals petaloid, dentate. Upper outer petal with short saccate spur; inner petals fused at apex; nectary short, obtuse. Stamens 2 (= filaments of each triplet completely fused). Stigma transversely oblong, with indistinct papillae. Fruit a ± globular nut, with 2 small depressions at apex. All species self-compatible, and many predominantly selfing.

Fifty species: Canary Islands to C Asia, most diverse in N Africa and SW Europe, one species in E Africa, a few species widely naturalized as weeds; two species in China.

When grown in shade or under severe water stress, plants of *Fumaria* tend to be longer and more lax and the flowers smaller, paler, and often cleistogamous.

- 1a. Nut broader than long, subreniform; flowers 7–9 mm ..... 1. *F. officinalis*  
 1b. Nut globose, rounded or apiculate at apex; flowers 5–6 mm ..... 2. *F. vaillantii*

**1. *Fumaria officinalis* Linnaeus, Sp. Pl. 2: 700. 1753.**

烟堇 yan jin

Herbs, 15–50 cm tall, diffusely branched and leafy throughout. Leaf lobes linear to narrowly oblong, to 1.5 mm wide. Raceme 10–40-flowered, usually shortly stalked; bracts oblong, ca. 1/2 to as long as spreading to erect-spreading rigid fruiting pedicels 4–6 mm. Sepals 2–3.5 × 1–1.5 mm, dentate. Corolla pink or pale amaranth; upper petal 7–9 mm, spur 2–2.5 mm, marginal wings often darker; lower petal narrowly spatulate with long claw, limb ± dentate; inner petals tipped with dark purple. Infructescence 4–9 cm; fruiting pedicels 5–6 mm, straight and slightly thickened. Nut subreniform-truncate in profile, broader than long, ca. 2 × 2.5 mm, faintly rugulose. Fl. and fr. May–Sep. *2n* = 32.

Weeds in fields and wastelands. Taiwan [cosmopolitan, possibly of E European origin].

**2. *Fumaria vaillantii* Loiseleur-Deslongchamps, J. Bot. (Desvaux) 2: 358. 1809.**

短梗烟堇 duan geng yan jin

Herbs, 10–30 cm tall. Stems suberect to diffuse, branched and leafy throughout. Leaf lobes linear to narrowly lanceolate, to 1 mm wide. Raceme subsessile or shortly stalked, 10–20-flowered; bracts lanceolate, 1.5–3 mm, scarious. Sepals 0.5–1 mm, incised-dentate. Corolla pink or pale amaranth, darker at apex; upper petal 5–6 mm, margin dentate, apex obtuse-emarginate, spur rounded, 1–1.5 mm; lower petal spatulate, with short rounded to usually emarginate dentate limb; inner petals tipped with dark purple. Infructescence 2–5 cm; fruiting pedicels 3–4 mm, straight and ± thickened. Nut globose, ca. 2 mm, finely rugose. Fl. and fr. May–Aug. *2n* = 32.

Usually weeds; 600–2200 m. Xinjiang [NW Africa (mountains), C and SW Asia, Europe].

Records of *Fumaria schleicheri* Soyier-Willemet from Xinjiang in FRPS (32: 482. 1999) refer to this species.