

9. GENTIANA Linnaeus, Sp. Pl. 1: 227. 1753.

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Herbs annual, biennial, or perennial. Rootstock with a fibrous primary root and secondary rootlets, with a stout ± fleshy or woody taproot, or with several linear-cylindric roots from a collar. Stems ascending to erect, striate or angled, in perennial species sometimes both flowering and vegetative. Leaves opposite, rarely whorled, sometimes forming a basal rosette. Inflorescences axillary or terminal, 1- to few-flowered cymes, sometimes in terminal clusters and/or axillary whorls. Flowers (4- or) 5- (or 6–8)-merous. Calyx lobes filiform to ovate, with a prominent midvein. Corolla tubular, salverform, funnelliform, obconic, or urceolate, very rarely rotate; tube usually much longer than lobes; plicae between lobes. Stamens inserted on corolla tube; filaments basally ± winged; anthers free or rarely contiguous. Glands 5–10 at ovary base. Pistil sessile or on a long gynophore. Style usually short, linear, less often long and filiform; stigma lobes free or connate, recurved, usually oblong to linear, rarely expanded and rounded. Capsule cylindric to ellipsoid and wingless or narrowly obovoid to obovoid (narrowly ellipsoid in *G. winchuanensis*) and winged, many seeded. Seeds wingless or winged; seed coat minutely reticulate, rugose, simply areolate, or with complex spongy areolation.

About 360 species: NW Africa (Morocco), America, Asia, E Australia, Europe; 248 species in China.

Gentiana pseudazurea Grubov, *G. subpolytrichoides* Grubov, and *G. tischkovii* Grubov have been described from Xizang by Grubov (J. Jap. Bot. 69: 18–21. 1994). However, specimens have not been seen by the authors, and the species are not included in this treatment.

- 1a. Plicae reduced to a small tooth or auricle on side of lobe, less than 1 mm.
 - 2a. Corolla lobes as long as or longer than tube Sect. I. *Otophora*
 - 2a. Corolla lobes shorter than tube Sect. XI. *Chondrophyllae* (in *G. prainii*)
- 1b. Plicae usually wider and/or longer than 1 mm.
 - 3a. Corolla throat with a ring of multicellular hairs (not to be confused with fringed plicae between corolla lobes) Sect. XII. *Fimbricorona*
 - 3b. Corolla throat naked.
 - 4a. Style almost as long as or longer than ovary; calyx winged or sharply angled or if terete then stems, leaves, and calyces densely covered with purple and white pilosity.
 - 5a. Plants 5–12 cm tall, densely branched from base and toward stem apex; stem leaves ± crowded toward apex, leaf blades lanceolate; stamens straight; seed coat alveolate Sect. VIII. *Microsperma*
 - 5b. Plants (5–)10–50 cm tall, not densely branched; stem leaves widely separated, leaf blades ovate-lanceolate, ovate, or cordate; stamens decurved; seed coat minutely to coarsely reticulate Sect. IX. *Stenogyne*
 - 4b. Style usually much shorter than ovary (about as long as ovary in some species of sects. *Isomeria* and *Microspermae*); calyx not winged, usually terete.
 - 6a. Stigma lobes connate or contiguous, expanded into a discoid or funnelliform structure; calyx completely enveloped by upper pair of broad obovate leaves Sect. VI. *Phyllocalyx*
 - 6b. Stigma lobes free, recurved, linear to oblong; calyx usually not concealed by upper leaves or leaves narrower.
 - 7a. Stamens unequal and plants perennial; flowers 4-merous or if 5-merous then corollas 3–4.5 cm Sect. III. *Kudoa*
 - 7b. Stamens equal or if unequal then plants annuals with solitary flowers (flowers of *G. picta* and *G. yunnanensis* in clusters) and corollas 0.6–2.5 mm; flowers 5-merous.
 - 8a. Perennials; basal leaves persistent at flowering time, blades (excluding petiole) mostly over 3 cm and much larger than stem leaves or vegetative rosettes present along with flowering stems and their leaves distinctly larger than those of flowering stems.
 - 9a. Flowering stems arising singly from slender stolons, often creeping and rooting at lower nodes, without a well-developed caudex or stout rhizome and without a stout persistent taproot; larger leaves generally distinctly pseudopetiolate, with blades less than 1.8 cm, spatulate, elliptic, ovate-elliptic, obovate, or suborbicular, base obtuse, rounded, or truncate, only midvein prominent; flowers solitary or to 8 in terminal clusters, sessile Sect. VII. *Isomeria*
 - 9b. Flowering stems arising from a ± stout erect caudex, often with a well-developed ± stout taproot and/or in a dense tuft (sometimes also stoloniferous); leaves and inflorescences diverse but above combination of characters generally not present.
 - 10a. Remains of old leaf bases fibrous and conspicuous on caudex; seed coat

- reticulate, usually minutely so (also winged at 1 end in *G. waltonii*) Sect. II. *Cruciata*
- 10b. Remains of old leaf bases at base of current season's growth absent or membranous, not distinctly fibrous or if somewhat fibrous then with stem leaves numerous, closely spaced, less than 5 mm wide, and with flowers solitary; seed coat with membranous lamellae forming spongy complex hexagonal pits.
- 11a. Stems several to many, ± tufted, strongly decumbent; stem leaves opposite or whorled, numerous, closely spaced (9 or more pairs or whorls per stem and/or upper leaves exceeding internodes) Sect. III. *Kudoa*
- 11b. Stems 1 to several, decumbent or erect; stem leaves opposite, usually fewer than 9 pairs per stem, closely spaced only basally and on short stems.
- 12a. Sepals 3–9 mm, ± erect, 2 conspicuously larger than other three; base of current season's growth without blackish membranous remains of old leaf bases Sect. III. *Kudoa*
- 12b. Sepals smaller, often recurved or if over 3 mm then sepals subequal and/or base of current season's growth covered with blackish membranous remains of old leaf bases Sect. IV. *Frigida*
- 8b. Annuals or if perennials then without conspicuously larger basal or rosette leaves (largest leaves at flowering time usually well above base of stem), and/or with all basal leaves less than 1.5 cm.
- 13a. Perennials, without a stout caudex; flowers solitary.
- 14a. Corolla over 2.5 cm, often much larger; capsule wingless Sect. III. *Kudoa*
- 14b. Corolla usually to 1.5 cm (2.3–3 cm in *G. qiujiangensis* and *G. jamesii*); capsule winged along sutures toward apex Sect. XI. *Chondrophyllae*
- 13b. Annuals or if perennial then with a stout caudex and clustered flowers; flowers solitary or clustered.
- 15a. Perennials; stems usually over 20 cm, from a stout caudex; larger stem leaf blades usually over 3.5 cm; flowers clustered.
- 16a. Calyx lobes subequal or irregularly unequal, linear to narrowly triangular, base not or scarcely narrowed; calyx tube often split along 1 side (except in *G. manshurica*); lowermost stem leaves scalelike; seed coat coarsely reticulate, winged at ends Sect. V. *Pneumonanthae*
- 16b. Calyx lobes dimorphic, 2 larger than other 3, lanceolate to spatulate, base distinctly narrowed; calyx tube entire; lowermost stem leaves larger or scalelike; seed coat alveolate, not winged Sect. III. *Kudoa*
- 15b. Annuals; stems usually shorter than 20 cm, caudex none; all stem leaf blades usually less than 3 cm; flowers solitary or clustered.
- 17a. Seed coat alveolate, with hexagonal pits; flowers solitary or clustered in axillary or terminal inflorescences, if clustered then with corollas over 1.5 cm and/or with calyx lobes each with distinct blade and petiole Sect. VIII. *Microsperma*
- 17b. Seed coat finely reticulate, without hexagonal pits; flowers usually solitary, if ± clustered in terminal inflorescences then with corolla 0.7–1.1 cm and calyx lobes without petiole.
- 18a. Capsule conspicuously winged along sutures at apex Sect. XI. *Chondrophyllae*
- 18b. Capsule not winged Sect. X. *Dolichocarpa*

I. Sect. *Otophora*

- 1a. Corolla lobes distinctly shorter than tube.
- 2a. Basal rosettes present at flowering time, with leaves almost 3 × as long as larger stem leaves; stem leaves 3–5 pairs, 7–11 mm; corolla 1.7–2.2 cm; seed coat alveolate 5. *G. doxiongshangensis*
- 2b. Basal rosettes absent or poorly developed, with leaves only slightly larger than stem leaves; stem leaves numerous, 1.5–4 mm; corolla (0.4–)0.7–1.5 cm; seed coat minutely reticulate.
- 3a. Stem leaf blades 3.5–4 mm; calyx tube 5–6 mm, lobes 3–3.5 mm; corolla white or pale yellow-white; plicae triangular, 2–2.5 mm 2. *G. leucantha*
- 3b. Stem leaf blades 1.5–3 mm; calyx tube 2–2.5 mm, lobes 1.8–2.2 mm; corolla dark blue; plicae auricular, 0.3–0.5 mm 4. *G. infelix*
- 1b. Corolla lobes about as long as or longer than tube.
- 4a. Basal rosettes absent at flowering time or poorly developed, with leaves no larger than those of flowering stems; stem leaves numerous; corolla blue or blue-purple, rarely yellow.
- 5a. Apex of leaf blades and calyx lobes acuminate, with an aristate tip to 1 mm 1. *G. caryophyllea*

- 5b. Apex of leaf blades and calyx lobes acute to obtuse, without an aristate tip 3. *G. decorata*
- 4b. Basal rosettes well developed at flowering time, larger rosette leaves usually more than twice as long as leaves of flowering stems; stem leaves 2–5 pairs; corolla white or pale yellow with pale blue streaks and/or spots.
- 6a. Basal leaf blades 5–12 × (0.8–)1–2.5 cm; flowers usually in axillary or terminal cymes, occasionally solitary 7. *G. otophora*
- 6b. Basal leaf blades 1–5 × 0.2–1.2 cm; flowers usually solitary, rarely in cymes of 2 or 3 in *G. sichitoensis*.
- 7a. Corolla 2.5–3 cm, lobes about as long as tube 8. *G. otophoroides*
- 7b. Corolla 1.6–2 cm, lobes distinctly longer than tube.
- 8a. Basal leaf blades linear to oblanceolate, 2–4 mm wide; stem leaf blades linear-lanceolate to ovate-lanceolate, 2–3 mm wide 6. *G. damyonensis*
- 8b. Basal leaf blades spatulate to oblong-spatulate, 7–12 mm wide; stem leaf blades ovate to suborbicular, 6–8 mm wide 9. *G. sichitoensis*

II. Sect. *Cruciata*

- 1a. Some or all flowers pedicellate or inflorescences divided into small pedunculate cymules; axillary flowers or cymules pedunculate.
- 2a. Calyx tube split 1/3 or more of its length on 1 side forming a spathe.
- 3a. Calyx lobes subulate, 0.5–4(–7) mm.
- 4a. Corolla dark blue; rosette leaf blades linear-lanceolate to linear-elliptic, 3.5–16 × 0.4–1.8 cm 10. *G. decumbens*
- 4b. Corolla greenish white or pale yellow-green with green spots, occasionally with pale blue suffusion; rosette leaf blades broadly lanceolate to ovate-elliptic, 6–20 × 0.8–4 cm 11. *G. straminea*
- 3b. Calyx lobes linear, lanceolate, or narrowly elliptic, 4–10 mm or, if subulate, over 4 mm.
- 5a. Stem leaf blades lanceolate to ovate-elliptic; corolla lobes 9–11 mm; plicae 4–6 mm; anthers 3.5–4 mm; seeds winged along 1 side 12. *G. waltonii*
- 5b. Stem leaf blades linear to linear-lanceolate; corolla lobes 4–7 mm; plicae 1.5–2.5 mm; anthers 2–3 mm; seeds not winged.
- 6a. Corolla dark blue-purple; capsule sessile 17. *G. dahurica*
- 6b. Corolla pale blue or yellow; mature capsule on a gynophore 7–10 mm 18. *G. tianschanica*
- 2b. Calyx tube not split.
- 7a. Stems, peduncles, and both surfaces of leaves densely papillate; calyx lobes oblanceolate 14. *G. tenuicaulis*
- 7b. Plants not papillate; calyx lobes linear, linear-lanceolate, narrowly triangular, or narrowly elliptic.
- 8a. Flowers usually solitary; calyx lobes narrowly elliptic, base narrowed 13. *G. lhassica*
- 8b. Flowers generally in axillary or terminal cymes (occasionally solitary in *G. kaufmanniana*); calyx lobes linear, linear-lanceolate, or narrowly triangular, base not narrowed.
- 9a. Sinus between calyx lobes cuneate to acute; corolla obconic; plicae 3.5–4.5 mm, margin 2-cleft 15. *G. oliveri*
- 9b. Sinus between calyx lobes truncate; corolla tubular-campanulate, campanulate, or funnel-form; plicae 1.5–3 mm, margin entire or denticulate.
- 10a. Plicae auriculate 16. *G. kaufmanniana*
- 10b. Plicae ovate or triangular.
- 11a. Corolla dark blue-purple; capsule sessile 17. *G. dahurica*
- 11b. Corolla pale blue or yellow; mature capsule on a 7–10 mm gynophore 18. *G. tianschanica*
- 1b. Whole terminal inflorescences dense clusters of sessile flowers; axillary inflorescences, if any, usually sessile clusters on main stems, rarely pedunculate clusters of sessile flowers.
- 12a. Stem leaves increasing in size toward stem apex, upper stem leaf blades 3–5.5(–7) cm wide.
- 13a. Corolla 2–2.2 cm, blue-purple, basally pale yellow 19. *G. crassicaulis*
- 13b. Corolla 2.6–3.2 cm, pale yellow or yellow-green, lobes outside suffused with purplish brown 20. *G. tibetica*
- 12b. Stem leaves decreasing in size toward stem apex, upper stem leaf blades 0.7–2(–3) cm wide.
- 14a. Rosette leaf blades elliptic-lanceolate to elliptic-ovate, 2–6 cm wide.
- 15a. Corolla blue-purple 21. *G. macrophylla*
- 15b. Corolla yellow-white, yellow-green, or pale yellow.
- 16a. Calyx tube not split; lobes 6–8 mm 23. *G. walujewii*
- 16b. Calyx tube split on 1 side; lobes 0.5–5 mm.
- 17a. Corolla (1.5–)1.8–2(–2.5) cm, lobes 3–3.5 mm; calyx lobes dentiform; mature capsule sessile 24. *G. officinalis*
- 17b. Corolla 3–3.5 cm, lobes 5–6 mm; calyx lobes filiform; mature capsule on a gynophore 2–3 mm 26. *G. robusta*
- 14b. Rosette leaf blades linear, narrowly elliptic, or oblanceolate, 0.6–1.8(–2.5) cm wide.
- 18a. Corolla blue or purple-blue.

- 19a. Calyx lobes linear, 7–10 mm; ovary on a gynophore 7–10 mm 18. *G. tianschanica*
 19b. Calyx lobes filiform to subulate, 0.5–5 mm; ovary sessile.
 20a. Corolla 2.3–2.6 cm, dark blue or purple-blue 22. *G. siphonantha*
 20b. Corolla 1.5–2 cm, pale blue (often only limb blue) 25. *G. zekuensis*
 18b. Corolla pale yellow.
 21a. Corolla 2.5–3.5 cm.
 22a. Stem leaves 4 or 5 pairs; plicae triangular; stamens inserted at basal part
 of corolla tube 27. *G. dendrologi*
 22b. Stem leaves 2 or 3 pairs; plicae lanceolate; stamens inserted at middle of
 corolla tube 28. *G. olgae*
 21b. Corolla 1.5–2(–2.5) cm.
 23a. Calyx lobes dentiform; corolla pale yellow throughout; lobes obtuse 24. *G. officinalis*
 23b. Calyx lobes filiform; corolla limb usually suffused with pale blue; lobes
 acute 25. *G. zekuensis*

III. Sect. *Kudoa*

- 1a. Base of vegetative stems forming a stout caudex; leaves (especially toward stem apex) and calyx
 lobes with white cartilaginous margin and midrib keel.
 2a. Basal and rosette leaves distinctly contracted into petioles; calyx lobes obovate to spatulate, base
 distinctly narrowed 35. *G. stipitata*
 2b. Basal and rosette leaves not distinctly contracted into petioles; calyx lobes lanceolate, elliptic, or
 elliptic-triangular, base scarcely narrowed.
 3a. Corolla white with blue stripes and greenish spots when fresh, drying pale yellow or pale blue;
 lobes 5–6 mm 36. *G. szechenyii*
 3b. Corolla ruddy purple with paler base when fresh, usually without stripes or spots; lobes 7–10
 mm 37. *G. georgei*
 1b. Base of vegetative axis usually slender; leaves and calyx lobes without white cartilaginous margin and
 midrib keel.
 4a. Calyx lobes dissimilar in shape to upper leaves; plicae always asymmetrical.
 5a. Flower in clusters of more than 3; stamens equal.
 6a. Basal rosettes none or poorly developed; lowermost stem leaves scalelike, membranous 29. *G. rigescens*
 6b. Basal rosettes usually well developed; lowermost stem leaves not scalelike but with expanded
 herbaceous blades.
 7a. Stems 3–15(–28) cm; corolla lobes caudate 30. *G. davidii*
 7b. Stems (10–)20–50 cm; corolla lobes not caudate 31. *G. cephalantha*
 5b. Flowers 1–3; stamens unequal.
 8a. Flowers 4-merous; corolla nearly cylindrical 32. *G. jingdongensis*
 8b. Flowers 5-merous; corolla funnelliform.
 9a. Blades of rosette leaves obovate to elliptic, abruptly narrowed into a petiole; corolla
 blue 33. *G. melandriifolia*
 9b. Blades of rosette leaves narrowly spatulate to oblong-ob lanceolate, gradually narrowed
 into a petiole; corolla rose 34. *G. duclouxii*
 4b. Calyx lobes similar in shape to upper leaves; plicae always symmetrical.
 10a. Stem leaves in whorls of 3–8.
 11a. Corolla lobes without a caudate tip.
 12a. Margin of stem leaves and calyx lobes scabrous-ciliate 38. *G. ecaudata*
 12b. Margin of stem leaves and calyx lobes smooth.
 13a. Flowering stems with largest leaves toward apex; corolla 4.5–6 cm, lobe margin
 entire 39. *G. ternifolia*
 13b. Flowering stems with largest leaves near middle; corolla 2.5–4.2 cm, lobe
 margin erose 40. *G. yakushimensis*
 11b. Corolla lobes with a caudate tip to 3 mm.
 14a. Style 5–7 mm; corolla narrowly obconic 44. *G. viatrix*
 14b. Style 3–5 mm; corolla tubular to tubular-campanulate.
 15a. Corolla lobes 2–2.5 mm, caudate tip less than 1 mm; stamens inserted just below
 middle of corolla tube 41. *G. tetraphylla*
 15b. Corolla lobes 4–6 mm, caudate tip 2–2.5 mm; stamens inserted at basal part of
 corolla tube.
 16a. Upper stem leaves and calyx lobes linear-spatulate, apex acute to obtuse
 42. *G. hexaphylla*

- 16b. Upper stem leaves and calyx lobes linear, apex acuminate 43. *G. arethusae*
- 10b. Stem leaves opposite.
- 17a. Corolla 1.5–2 cm; calyx lobes spreading 46. *G. altigena*
- 17b. Corolla 2.5–7.5 cm; calyx lobes straight or ascending.
- 18a. Basal rosettes or abbreviated vegetative shoots generally present at flowering time, their leaves usually conspicuously longer than those of flowering stems.
- 19a. Stems papillate; corolla narrowly funnelform, 4–6 cm 50. *G. veitchiorum*
- 19b. Stems not papillate; corolla campanulate, 2.5–4.7 cm.
- 20a. Corolla lobes 4.5–6 mm; plicae 2–3 mm; anthers 3–3.5 mm 51. *G. nyalamensis*
- 20b. Corolla lobes 2.5–3.5 mm; plicae 0.5–1 mm; anthers 1.5–2 mm 52. *G. ornata*
- 18b. Basal rosettes and abbreviated vegetative shoots generally poorly developed or absent at flowering time, lowest leaves sometimes smaller and/or wider but not longer nor otherwise well differentiated.
- 21a. Upper stem leaves orbicular, ovate, or elliptic.
- 22a. Basal rosette absent; corolla cylindrical 45. *G. prolata*
- 22b. Basal rosette present; corolla not cylindrical.
- 23a. Corolla dark blue, obconic, lobes usually mucronate 47. *G. obconica*
- 23b. Corolla pale blue, not obconic, lobes not mucronate.
- 24a. All stem leaves elliptic 48. *G. altorum*
- 24b. Lower stem leaves ovate, upper ones elliptic 49. *G. caelestis*
- 21b. Upper stem leaves linear or linear-lanceolate.
- 25a. Flowering stems 3–5 cm; corolla 3–3.8(–4.5) cm, lobes 3–4 mm; plicae 1.5–2 mm 55. *G. oreodoxa*
- 25b. Flowering stems 5–15(–20) cm; corolla 5–7.5 cm, lobes 6–9 mm; plicae 2–5 mm.
- 26a. Flowers usually pedicellate.
- 27a. Calyx lobes and middle to upper leaves broadly linear, 2–3 mm wide; corolla campanulate-tubular, inflated at middle of tube; anthers 3.5–4 mm 53. *G. dolichocalyx*
- 27b. Calyx lobes and middle to upper leaves linear, often 1–1.5 mm wide; corolla narrowly obconic to funnelform; anthers 2.5–3 mm 54. *G. lawrencei*
- 26b. Flowers sessile.
- 28a. Corolla 7–7.5 cm, inner surface blue-purple 56. *G. helophila*
- 28b. Corolla 5–6 cm, inner surface blue.
- 29a. Corolla conspicuously spotted; lower stem leaves oblong 57. *G. futtereri*
- 29b. Corolla unspotted or inconspicuously spotted; lower stem leaves linear-lanceolate 58. *G. sinoornata*

IV. Sect. *Frigida*

- 1a. Corolla 3–6 cm.
- 2a. Corollas almost white, pale yellow, or yellowish green, with dark blue spots and/or stripes.
- 3a. Usually only lowermost axillary flowers with true pedicels or all flowers sessile above bracts; pedicels generally less than 1 cm 69. *G. algida*
- 3b. All or most flowers distinctly pedicellate; basal pedicels often over 4 cm 73. *G. purdomii*
- 2b. Corollas pale to dark blue (basal part of tube may be whitish or yellowish).
- 4a. Calyx lobes 2–8.5 mm.
- 5a. Flowering stems ± decumbent, 3–10(–17) cm; flowers sessile or subsessile; stamens inserted at basal part of corolla tube 71. *G. nubigena*
- 5b. Flowering stems erect, 15–35 cm; flowers pedicellate; stamens inserted near middle of corolla tube 74. *G. trichotoma*
- 4b. Calyx lobes 1–2(–3) mm.
- 6a. Stems densely papillate; calyx tube not split 67. *G. striolata*
- 6b. Stems glabrous to subglabrous; calyx tube split down 1 side or not.
- 7a. Upper stem leaves scarcely reduced; petiole of basal leaves 4–8 cm; calyx lobes straight 68. *G. omeiensis*
- 7b. Upper stem leaves distinctly reduced; petiole of basal leaves 1–3 cm; calyx lobes spreading or reflexed.
- 8a. Basal leaves linear-lanceolate to linear-elliptic; corolla blue 59. *G. wilsonii*

- 8b. Basal leaves oblong, narrowly elliptic, or oblanceolate; corolla dark blue 61. *G. atuntsiensis*
- 1b. Corolla 1.5–3.5 cm.
- 9a. Corollas almost white, pale yellow, or yellowish green, with dark blue spots and/or stripes.
- 10a. Flowers distinctly pedicellate; calyx lobes erect.
- 11a. Basal leaves oblong to spatulate; corolla obconic 72. *G. erectosepala*
- 11b. Basal leaves linear, linear-elliptic, or rarely oblong; corolla tubular-campanulate to funnelform 73. *G. purdomii*
- 10b. Flowers sessile (axillary cymules may be pedunculate below bracts) or lowest axillary flowers rarely on pedicels to 1 cm; calyx lobes spreading or reflexed.
- 12a. Stems papillate, most so toward apex 62. *G. handeliana*
- 12b. Stems glabrous.
- 13a. Calyx tube split on 1 side, lobes 1–1.5 mm 63. *G. phyllopoda*
- 13b. Calyx tube not split, lobes 3.5–5.5 mm 64. *G. apiata*
- 9b. Corollas pale to dark blue (basal part of tube may be yellowish or whitish).
- 14a. Flowers solitary; corolla 1.5–2 cm 70. *G. himalayaensis*
- 14b. Flowers in narrow panicles, cymes, whorls, or clusters; corolla 2–3.5 cm.
- 15a. Flowers in cymes; gynophore 2.1–2.7 cm; calyx lobes 3–6 mm 75. *G. laxiflora*
- 15b. Flowers in narrow panicles, whorls, or clusters; gynophore 0.8–2 cm; calyx lobes 1–3 mm.
- 16a. Flowers in narrow panicles; all but uppermost flowers consistently pedicellate 65. *G. microdonta*
- 16b. Flowers in whorls or clusters; flowers sessile or lowest occasionally short pedicellate.
- 17a. Basal leaves oblong, narrowly elliptic, or oblanceolate; corolla dark blue.
- 18a. Corolla tubular, lobes 1.5–2 mm 60. *G. subuliformis*
- 18b. Corolla funnelform, lobes 3.5–5 mm 61. *G. atuntsiensis*
- 17b. Basal leaves linear-lanceolate or linear-elliptic; corolla pale blue.
- 19a. Calyx lobes straight 66. *G. wasenensis*
- 19b. Calyx lobes spreading to reflexed 59. *G. wilsonii*

V. Sect. *Pneumonanth*e

- 1a. Leaf margin and veins on abaxial surface slightly rough 76. *G. scabra*
- 1b. Leaf margin and veins smooth.
- 2a. Flowers solitary (or 2) and terminal (flowers occasionally also solitary in axils of upper leaves); corolla lobes acuminate; stamens inserted at basal part of corolla tube 79. *G. manshurica*
- 2b. Flowers (1–3 to) many in axillary or terminal clusters; corolla lobes obtuse to rounded; stamens inserted at middle of corolla tube.
- 3a. Bracts ovate-lanceolate, 2–3 cm; calyx tube 1.4–1.6 cm 77. *G. uchiyamae*
- 3b. Bracts linear-lanceolate to lanceolate, 0.8–1.2 cm; calyx tube 0.8–1.2 cm 78. *G. triflora*

VI. Sect. *Phyllocalyx*

- Only species: 80. *G. phyllocalyx*

VII. Sect. *Isomeria*

- 1a. Margin of leaves and calyx lobes conspicuously whitish, membranous or cartilaginous.
- 2a. Leaf blade lanceolate, broadly oblong, elliptic, or ovate, apex acuminate to obtuse.
- 3a. Margin of leaves and calyx lobes membranous, scabrous 85. *G. depressa*
- 3b. Margin of leaves and calyx lobes cartilaginous, smooth.
- 4a. Corolla 4.5–6 cm, blue-purple; stamens equal 86. *G. amplicrater*
- 4b. Corolla 2.5–2.8 cm, pale blue; stamens unequal 87. *G. confertifolia*
- 2b. Leaf blade obovate to flabelliform, apex rounded to truncate and emarginate.
- 5a. Margin of leaves membranous, minutely lacerate 88. *G. lacerulata*
- 5b. Margin of leaves cartilaginous, not lacerate.
- 6a. Margin of leaves and calyx lobes minutely papillate; corolla 1.5–2 cm; seeds 1.3–1.5 mm 90. *G. emodii*
- 6b. Margin of leaves and calyx lobes smooth; corolla 2–3 cm; seeds 2.3–2.5 mm 89. *G. urnula*
- 1b. Margin of leaves and calyx lobes neither membranous nor cartilaginous (leaf margin cartilaginous in *G. tubiflora*).
- 7a. Flowers several in a subcapitate inflorescence; petiole of upper leaves conspicuously widened.
- 8a. Upper pairs of leaves as long as or longer than flowers, clustered, enveloping much of inflorescence; petiole longer or slightly shorter than blades 81. *G. sikkimensis*
- 8b. Upper pairs of leaves shorter than flowers, enveloping only base of inflorescence; petiole poorly defined or much shorter than blades.
- 9a. Corolla 2–2.6 cm; calyx lobes spreading to recurved; flowering stems erect, without adventitious roots; style 1–2 mm 82. *G. elwesii*
- 9b. Corolla 2.6–3.5 cm; calyx lobes erect; flowering stems decumbent, with adventitious roots from

- lower nodes; style 3–5 mm.
- 10a. All leaf blades ovate-oblong to ovate-orbicular; stems papillate; corolla 3–3.5 cm 83. *G. chinensis*
- 10b. Upper stem leaf blades spatulate to obovate; stems smooth; corolla 2.6–3 cm 84. *G. harrowiana*
- 7b. Flowers generally solitary; petiole slender.
- 11a. Calyx lobes oblanceolate-spatulate to orbicular-spatulate, base distinctly narrowed.
- 12a. Corolla 3–3.5(–4.5) cm, with dark blue stripes and spots 92. *G. gilvostrata*
- 12b. Corolla 4.5–5.5 cm, without stripes or spots 91. *G. stragulata*
- 11b. Calyx lobes not oblanceolate-spatulate to orbicular-spatulate, base scarcely or not at all narrowed.
- 13a. Style 7–14 mm, longer than ovary, filiform.
- 14a. Leaf blade spatulate to obovate, apex rounded; calyx lobes lanceolate to narrowly oblong, apex subacute to obtuse 93. *G. filistyla*
- 14b. Leaf blade oblong to elliptic, apex acute to obtuse and sometimes caudate; calyx lobes ovate to triangular, apex acute and sometimes caudate 94. *G. tubiflora*
- 13b. Style 1.5–5 mm, shorter than ovary, cylindric.
- 15a. Corolla 3–3.5 cm.
- 16a. Stolons well developed; leaf blade ovate-elliptic to ovate-orbicular; style 4–5 mm 83. *G. chinensis*
- 16b. Stolons poorly developed; leaf blade spatulate to obovate; style 1.5–2.5 mm 96. *G. wardii*
- 15b. Corolla to 2.6 cm.
- 17a. Stolons well developed; leaf blades of flowering stems narrowly elliptic to ovate-elliptic, those of stolons linear to linear-lanceolate 95. *G. namlaensis*
- 17b. Stolons poorly developed; leaf blades all spatulate to obovate 96. *G. wardii*

VIII. Sect. *Microsperma*

- 1a. Flowers 4-merous; keeled midveins of calyx lobes decurrent as conspicuous wings on tube.
- 2a. Corolla 2–3.5 cm; stamens inserted near base of corolla tube 97. *G. lineolata*
- 2b. Corolla 3.5–6 cm; stamens inserted at middle of corolla tube 98. *G. praeclara*
- 1b. Flowers 5-merous; calyx lobes and tube not keeled or winged.
- 3a. Plants 3–5(–10) cm tall, much branched from base, branches spreading or decumbent; leaf blade orbicular to reniform; flowers solitary at ends of branches; stamens equal.
- 4a. Corolla yellow, with dark blue streaks and spots, (1.4–)2–2.4 cm; stamens inserted at middle of corolla tube 105. *G. tongolensis*
- 4b. Corolla blue or dark purple, without streaks or spots, (0.8–)1–2 cm; stamens inserted at apical part of corolla tube.
- 5a. Corolla dark purple; plicae ovate, margin denticulate; style 1.2–1.5 mm; capsule included in corolla; seed coat alveolate 103. *G. atropurpurea*
- 5b. Corolla light blue; plicae strongly oblique and auricular to triangular, margin entire; style 4–7 mm; capsule usually exerted from corolla; seed coat smooth at maturity 104. *G. vernayi*
- 3b. Plants often taller, with 1 to several ± erect stems, if decumbent usually not branched near base; leaf blade linear, lanceolate, spatulate, narrowly elliptic, or obovate; flowers in terminal and often also axillary clusters; stamens unequal.
- 6a. Leaves densely crowded at apex of branches, subtending clusters of flowers (or stems very short, terminating in a cluster of flowers subtended by several pairs of leaves); flowers mostly confined to terminal clusters; corolla dark blue or violet, without conspicuous streaks or spots 99. *G. delavayi*
- 6b. Leaves ± evenly spaced along stem; flowers in terminal and axillary clusters along upper half or more of stem; corolla yellow or pale blue, with dark blue streaks and spots.
- 7a. Leaf blade linear; calyx lobes linear 100. *G. picta*
- 7b. Leaf blade spatulate to obovate; calyx lobes narrowly elliptic or suborbicular.
- 8a. Calyx lobes narrowly elliptic, unequal; style 2–3 mm 101. *G. yunnanensis*
- 8b. Calyx lobes suborbicular, equal; style 3.5–5.5 mm 102. *G. suborbisepala*

IX. Sect. *Stenogyne*

- 1a. Plicae margin fringed.
- 2a. Annuals; calyx tube with broad wings; corolla 2.3–2.5 cm 107. *G. alata*
- 2b. Perennials; calyx tube with narrow wings or merely sharply ridged along veins; corolla 2.5–4.5 cm.
- 3a. Stems, leaves, and calyces densely white and purple pilose; calyx tube prominently veined but not winged 106. *G. villifera*
- 3b. Plant glabrous or puberulent on petioles and leaf veins only; calyx tube narrowly winged 108. *G. rhodantha*
- 1b. Plicae margin erose, denticulate, or short lacinate.
- 4a. Corolla yellow, greenish yellow, or yellowish white.
- 5a. Corolla tube outside puberulent along veins, sometimes purple suffused but not distinctly striped;

- lobes slightly acuminate to subacute; plicae horizontally truncate, margin erose; stamens inserted near base of corolla tube 110. *G. souliei*
- 5b. Corolla tube glabrous, distinctly dark striped; lobes long acuminate to caudate; plicate obliquely truncate, margin denticulate; stamens inserted at middle of corolla tube 109. *G. striata*
- 4b. Corolla pale to dark blue, violet, or purple.
- 6a. Calyx tube angled, sometimes with slightly rough sharp ridges but without conspicuous wings.
- 7a. Corolla blue, 2.5–3.2 cm, tubular to funnelform; limb to 12 mm wide 111. *G. leptoclada*
- 7b. Corolla violet to purple, 1–2 cm, salverform; limb 7–10 mm wide.
- 8a. Calyx lobes subulate; plicae triangular, 2.5–3 mm, margin erose 112. *G. primuliflora*
- 8b. Calyx lobes narrowly ovate to triangular; plicae lanceolate, 4–6 mm, margin denticulate 113. *G. expansa*
- 6b. Calyx tube conspicuously winged.
- 9a. Corolla 3–4.5 cm; calyx lobes narrowly elliptic, lanceolate, or ovate-lanceolate, base narrowed.
- 10a. Leaf blade 1.3–2.5 cm; internodes 3–8 cm; calyx tube broadly winged; corolla lobes obtuse; seeds broadly winged 114. *G. pterocalyx*
- 10b. Leaf blade 0.7–1.2 cm; internodes 1–2.5 cm; calyx tube narrowly winged; corolla lobes acuminate; seeds narrowly winged or wingless 115. *G. eurycolpa*
- 9b. Corolla 2.2–3 cm; calyx lobes linear to subulate, base not narrowed.
- 11a. Leaves toward stem apex adaxially hispidulous on veins; plicae margin erose; ovary gynophore 8–10 mm 116. *G. gentilis*
- 11b. Leaves all adaxially glabrous; plicae margin denticulate; ovary gynophore 5–7 mm 117. *G. serra*

X. Sect. *Dolichocarpa*

- 1a. Pedicel exerted from upper leaves.
- 2a. Corolla 1.1–1.5 cm; plicae ovate, apex obtuse.
- 3a. Calyx lobes lanceolate; corolla outside with blue-gray stripes; valves of capsules not membranous and transparent 127. *G. caeruleogrisea*
- 3b. Calyx lobes triangular; corolla outside blue without dark stripes; valves of capsules membranous and transparent 126. *G. clarkei*
- 2b. Corolla 1.8–2.6 cm; plicae oblong to broadly oblong, apex truncate.
- 4a. Leaf apex mucronate with a recurved tip; plicae margin serrulate 124. *G. pudica*
- 4b. Leaf apex not mucronate; plicae margin lacinate 125. *G. producta*
- 1b. Pedicel enveloped by upper leaves (rarely exerted in *G. prostrata*) or leaves sessile.
- 5a. Stem leaves rigid, shiny, margin broadly membranous except at apex.
- 6a. Stem branches abbreviated and crowded in a dense tuft; corolla (1–)1.5–2 cm, without bluish gray lines in throat 128. *G. micans*
- 6b. Stem branches not abbreviated nor crowded in a tuft; corolla (2–)2.5–3 cm, with bluish gray lines in throat 129. *G. haynaldii*
- 5b. Stem leaves herbaceous, not shiny, margin narrowly membranous, cartilaginous, or not modified.
- 7a. Corolla throat blackish; stamens inserted on apical part of corolla tube 118. *G. gyirongensis*
- 7b. Corolla throat mostly similar in color to rest of corolla, sometimes with black streaks; stamens inserted at middle or basal part of corolla tube.
- 8a. Corolla salverform.
- 9a. Stems not papillate; leaf blade margin membranous, apex acute to obtuse; plicae ovate, margin serrulate 120. *G. stellata*
- 9b. Stems papillate; leaf blade margin cartilaginous, apex rounded; plicae oblong, margin erose 122. *G. crenulatotruncata*
- 8b. Corolla tubular to funnelform.
- 10a. Stems not papillate; leaves overlapping in 4 distinct ranks; stamens inserted near base of corolla tube; filaments 1.5–2.5 mm 119. *G. tetrasticha*
- 10b. Stems usually papillate (not papillate in *G. prostrata* var. *karelinii*); leaves usually lax, not in well-defined ranks; stamens inserted at middle of corolla tube; filaments (2–)3–6.5 mm.
- 11a. Seeds with several irregular spongy edges; stem leaf blades suborbicular 121. *G. nanobella*
- 11b. Seeds without spongy edges; stem leaf blades spatulate to obovate 123. *G. prostrata*

XI. Sect. *Chondrophyllae*

- 1a. Capsule narrowly ellipsoid to narrowly obovoid, apex long attenuate; corolla salverform.
- 2a. Corolla 1.7–2.2 cm, lobes 4–5 mm, throat with short dark lines 245. *G. piasezkii*

- 2b. Corolla 2.5–3.5 cm, lobes 6–8 mm, throat without lines.
- 3a. Calyx 1.3–1.7 cm, lobes 1.5–2 mm; corolla throat with yellow and blackish spots 244. *G. winchuanensis*
- 3b. Calyx 2–2.7 cm, lobes 6–8 mm; corolla throat unmarked 246. *G. shaanxiensis*
- 1b. Capsule narrowly obovoid, ellipsoid, or ovoid, apex rounded to truncate or rarely acute; corolla tubular, obconic, campanulate, or funnellform (salverform in *G. qiujiangensis* and occasionally in *G. curviphylla*).
- 4a. Plicae margin laciniate or fringed (deeply few dentate in *G. epichysantha*).
- 5a. Plicae margin fringes with expanded tips.
- 6a. Stem leaf petioles 4–7 mm; stem branches divaricate 134. *G. divaricata*
- 6b. Stem leaf petioles 0.5–1.5 mm; stem branches narrowly divergent.
- 7a. Corolla outside bluish gray, inside white 135. *G. oligophylla*
- 7b. Corolla blue or blue-purple.
- 8a. Leaf blade margin distinctly densely papillate-ciliolate; corolla lobes erose-undulate; filaments inserted near base of corolla tube 136. *G. deltoidea*
- 8b. Leaf blade margin smooth or minutely papillate; corolla lobes entire; filaments inserted near middle of corolla tube 137. *G. recurvata*
- 5b. Plicae margin filiform-fringed or laciniate with acuminate tips or deeply few dentate.
- 9a. Calyx lobes ovate, spreading to recurved; corolla 2.3–3 cm 222. *G. jamesii*
- 9b. Calyx lobes filiform to narrowly triangular, erect; corolla 0.8–1.5 cm (2.2–2.6 cm in *G. qiujiangensis*).
- 10a. Plicae margin deeply few dentate, not truly fringed; corolla white to yellowish green, outside with blue-gray stripes 133. *G. epichysantha*
- 10b. Plicae margin truly fringed; corolla pale to dark blue, violet, or purple (sometimes pale yellow or white in *G. mairei* and *G. formosa*).
- 11a. Stems at least 2 × dichotomously branched at various levels (occasionally simple in *G. exquisita*).
- 12a. Annuals with at least remains of basal leaves; calyx ca. 1/2 as long as corolla; plicae shorter than corolla lobes.
- 13a. Corolla inside with short blackish lines in throat; plicae margin usually with 8–10 fringes; filaments inserted near base of corolla tube 138. *G. mairei*
- 13b. Corolla inside without short blackish lines in throat; plicae margin usually with 15–20 fringes; filaments inserted near middle of corolla tube 139. *G. panthaica*
- 12b. Perennials with stolons but lacking distinctive basal leaves at anthesis; calyx 1/4–1/3 as long as corolla; plicae slightly shorter to as long as corolla lobes.
- 14a. Corolla with dark blue spots; plicae 3–4 × as wide as linear lobes 143. *G. exquisita*
- 14b. Corolla without spots; plicae not wider than ovate-elliptic to ovate lobes 145. *G. grata*
- 11b. Stems generally simple or branched only near base (occasionally few branched in *G. formosa* and *G. burmensis*).
- 15a. Corolla salverform, 2.2–2.6 cm 140. *G. qiujiangensis*
- 15b. Corolla tubular-campanulate, obconic, or funnellform, 0.8–1.5 cm.
- 16a. Plicae less than 1/2 as long as corolla lobes, margin laciniate; stamens inserted at apical part of corolla tube.
- 17a. Corolla lobes suborbicular, base distinctly contracted, apex rounded, plicae broadly oblong; style 1.5–2 mm 141. *G. lacinulata*
- 17b. Corolla lobes ovate-triangular to ovate-lanceolate, base not contracted, apex obtuse; plicae ovate; style 3–4 mm 142. *G. muscicola*
- 16b. Plicae as long as or slightly shorter than corolla lobes, margin filiform-fringed; stamens inserted at middle or basal part of corolla tube.
- 18a. Flowers nodding on pedicel bent near apex; calyx lobes filiform to subulate; corolla white to pale blue 144. *G. formosa*
- 18b. Flowers ± erect; calyx lobes narrowly triangular; corolla purple 146. *G. burmensis*
- 4b. Plicae margin entire, crenulate, 2-cleft, dentate, or erose (irregularly laciniate in *G. aristata* and *G. leucomelaena*, few laciniate in *G. stellulata*).
- 19a. Plants perennial with stolons and/or fleshy roots.
- 20a. Leaves congested, recurved and ± folded, leathery, margin thickened cartilaginous; basal leaves scarcely or not at all larger than stem leaves.
- 21a. Leaf blade leathery but scarcely rigid, narrowly linear-elliptic, 1–2 mm wide; calyx lobes subulate, (3–)5–6 mm 156. *G. kwangsiensis*
- 21b. Leaf blade rigid, lanceolate, ovate-elliptic, or ovate, 2–3.5 mm wide; calyx lobes ovate-lanceolate to triangular, 2–3 mm 243. *G. arisanensis*

- 20b. Leaves not congested, neither recurved nor folded, rarely upper leaves occasionally \pm recurved, herbaceous, margin membranous or indistinctly cartilaginous; basal leaves distinctly larger than stem leaves.
- 22a. Roots stout, fusiform; stems as long as or slightly longer than basal leaves; basal leaves linear to linear-lanceolate 240. *G. napulifera*
- 22b. Roots slender, cylindric; stems apparently longer than basal leaves; basal leaves elliptic to ovate-lanceolate.
- 23a. Flowers clustered in \pm involucrate heads, subsessile; anthers 1–1.5 mm 241. *G. praticola*
- 23b. Flowers solitary on short to long branches, subsessile to pedicellate; anthers 1.8–2.5 mm 242. *G. loureiroi*
- 19b. Plants annual or biennial with fibrous roots.
- 24a. Calyx lobes spreading, recurved, or reflexed (rarely erect in *G. bryoides*, *G. crassuloides*, and *G. pedicellata*).
- 25a. Calyx lobes needlelike, straight spreading, rigid 157. *G. asterocalyx*
- 25b. Calyx lobes not needlelike, recurved, not rigid.
- 26a. Corolla 4–5 mm 186. *G. pluviarum*
- 26b. Corolla 5.5–23 mm.
- 27a. Leaf blade pubescent to hirsute.
- 28a. Stem leaf blades deltate-spatulate, 3–4.5 mm; corolla 5.5–6 mm 175. *G. nyngchiensis*
- 28b. Stem leaf blades ovate to ovate-triangular, 2.5–3 mm; corolla 8–10 mm 185. *G. hirsuta*
- 27b. Leaf blade glabrous or merely papillate, not pubescent (margin sometimes ciliolate).
- 29a. Stem leaf blades lanceolate, narrowly elliptic, ovate, ovate-triangular, or cordate (occasionally oblanceolate in *G. pedicellata*).
- 30a. Leaves and calyx lobes without a distinctly thickened margin.
- 31a. Corolla yellow or pale yellow, with dark spots in throat 167. *G. scabrida*
- 31b. Corolla outside pale yellow-green, inside pale blue, blue, or blue-purple, without spots in throat.
- 32a. Corolla twice as long as calyx, inside blue to blue-purple with yellow to orange throat 168. *G. pedicellata*
- 32b. Corolla scarcely exceeding calyx, inside pale blue 169. *G. moniliformis*
- 30b. Leaves and calyx lobes with a distinctly thickened cartilaginous margin (calyx lobes margin membranous in *G. scabrifilamenta*).
- 33a. Leaves and calyx lobes with a somewhat fleshy to subcoriaceous aristate tip to 0.7 mm; flowering branches usually short, erect, crowded.
- 34a. All stem leaf blades ovate or cordate; anthers 0.5–0.8 mm 170. *G. yokusai*
- 34b. Upper stem leaf blades narrowly elliptic; anthers 0.8–1 mm 171. *G. sutchuenensis*
- 33b. Leaves and calyx lobes with an herbaceous apiculate or cuspidate tip; flowering branches long, spreading, lax.
- 35a. Corolla 12–14 mm; calyx lobes narrowly triangular; stamens inserted at middle of corolla tube; filaments 1–1.2 mm, scabrous or papillate 172. *G. scabrifilamenta*
- 35b. Corolla 7–8 mm; calyx lobes ovate; stamens inserted at basal part of corolla tube; filaments 2–2.5 mm, glabrous 174. *G. alsinoides*
- 29b. Stem leaf blades oblong, spatulate, obovate, spatulate-orbicular, or (at least upper leaves) reniform.
- 36a. Calyx lobes inside papillate, margin not distinctly thickened 176. *G. mailingensis*
- 36b. Calyx lobes inside not papillate, margin distinctly cartilaginously thickened.
- 37a. Upper stem leaf blades wider than long, reniform 177. *G. crassuloides*
- 37b. All stem leaf blades longer than wide, spatulate or obovate.
- 38a. Stems often solitary (occasionally to 10), simple toward base, fastigiately short branched toward apex; flowers in a \pm capitate or corymbose inflorescence.
- 39a. Flowering branches \pm crowded into a head; corolla

- 6–7 mm, pale blue 223. *G. intricata*
- 39b. Flowering branches corymbose; corolla 11–14 mm, purplish 224. *G. subintricata*
- 38b. Stems 2 to several, simple or branched only near base, if branched higher than ultimate branches distinctly longer than flowers, not fastigiate; flowers not in heads or dense corymbs.
- 40a. Basal leaves poorly developed, 4–7 mm.
- 41a. Calyx tube uniformly herbaceous; stem leaf blades and calyx lobes rounded at apex 178. *G. crassula*
- 41b. Calyx tube membranous; stem leaf blades and calyx lobes deltate-acute at apex 179. *G. curviphylla*
- 40b. Basal leaves well developed, (5–)6–30 mm.
- 42a. Corolla pale blue, throat with short dark blue lines, lobes mucronate.
- 43a. Stems branched only at base; stem leaf blades obovate 180. *G. bryoides*
- 43b. Stems branched throughout; stem leaf blades spatulate to oblanceolate 181. *G. ludingensis*
- 42b. Corolla blue to dark blue, throat unmarked, lobes obtuse.
- 44a. Corolla scarcely exceeding calyx; seeds dark brown 182. *G. squarrosa*
- 44b. Corolla twice as long as calyx; seeds pale brown 183. *G. pseudosquarrosa*
- 24b. Calyx lobes erect and ± appressed to corolla (rarely slightly spreading in *G. simulatrix*).
- 45a. Plants with 1 or occasionally few conspicuous main stems, branched above middle or fastigiate throughout, rarely simple.
- 46a. Stem solitary, lower part simple and leafless, upper part much branched with internodes very short and leaves plus flowering branches congested into a dense head.
- 47a. Margin of all stem leaf blades cartilaginous.
- 48a. Calyx lobes subulate, apex acuminate and awned; stamens inserted near base of corolla tube; stigma lobes narrowly oblong 216. *G. xingrenensis*
- 48b. Calyx lobes suborbicular, apex rounded and cuspidate; stamens inserted at or about middle of corolla tube; stigma lobes semiorbicular 221. *G. globosa*
- 47b. Margin of upper stem leaf blades membranous.
- 49a. Margin of lower stem leaf blades conspicuously membranous.
- 50a. Calyx campanulate, 7–8.5 mm, lobes ovate-elliptic; corolla 8–9 mm 217. *G. albomarginata*
- 50b. Calyx obconic, 4–4.5 mm, lobes oblong to suborbicular; corolla 7–8 mm 220. *G. albicalyx*
- 49b. Margin of lower stem leaf blades not membranous but usually cartilaginous.
- 51a. Leaves and calyx pubescent; corolla 1.2–1.4 cm; stamens unequal 214. *G. pedata*
- 51b. Leaves and calyx glabrous; corolla 0.7–1.1 cm; stamens equal.
- 52a. Calyx campanulate, 8–9 mm; corolla lobes 2–3 mm 219. *G. huxleyi*
- 52b. Calyx tubular, 4.5–7 mm; corolla lobes 1–1.5 mm.
- 53a. Calyx lobes ovate to triangular, 2.5–3.5 mm; plicae ovate; stamens inserted at or about middle of corolla tube, filaments 1.5–2 mm 215. *G. scytophylla*
- 53b. Calyx lobes broadly oblong, 1.5–2 mm; plicae semi-orbicular; stamens inserted near base of corolla tube, filaments 3–3.5 mm 218. *G. capitata*
- 46b. Stems solitary or several from base, leafy throughout or most of their length, usually ± fastigiate branched near or above middle, branches forming dense or ± corymbose inflorescences (occasionally unbranched in small plants).
- 54a. Calyx lobes filiform to filiform-subulate.
- 55a. Corolla 1–1.8 cm, outside yellowish green, inside pale blue 147. *G. delicata*
- 55b. Corolla (1.5–)1.8–6 cm, purple or blue.

- 56a. Calyx lobes shorter than tube; corolla purple; style 1.5–2.5 mm 148. *G. rubicunda*
- 56b. Calyx lobes twice as long as tube; corolla blue; style 3–4.5 mm 149. *G. itzershanensis*
- 54b. Calyx lobes lanceolate, elliptic-lanceolate, ovate, or triangular.
- 57a. Stem leaf blades spatulate or obovate.
- 58a. Calyx lobes about as long as or longer than tube.
- 59a. Leaves densely pubescent on both surfaces and calyx pubescent outside; corolla pale yellow, scarcely exceeding calyx 233. *G. kunmingensis*
- 59b. Leaves and calyx lobes glabrous or merely papillate on adaxial surface or midvein, sometimes ciliolate on margin; corolla pale blue or blue, distinctly longer than calyx.
- 60a. Midrib of leaves and calyx lobes densely papillate; stamens equal; lateral branches well developed 234. *G. papillosa*
- 60b. Midrib of leaves and calyx lobes glabrous; stamens unequal; lateral branches short and weak 232. *G. maulchanensis*
- 58b. Calyx lobes shorter than tube.
- 61a. Upper stem leaf blades linear to narrowly elliptic; corolla throat with short blackish lines 236. *G. bomiensis*
- 61b. Upper stem leaf blades spatulate; corolla throat without lines or spots.
- 62a. Whole plant blackish purple; petiole of stem leaves longer than blade; flowering branches lax 237. *G. daochengensis*
- 62b. Whole plant green except sometimes for purple stems; petiole of stem leaves shorter than blade; flowering branches crowded at apex of stem.
- 63a. Corolla blue, funnelform 238. *G. riparia*
- 63b. Corolla outside yellow-green and inside pale blue, tubular 239. *G. densiflora*
- 57b. Stem leaf blades oblong, lanceolate, narrowly elliptic, elliptic-ovate, ovate, ovate-orbicular, or orbicular.
- 64a. Corolla 0.6–1 cm.
- 65a. Stamens unequal; stem leaf blades lanceolate 228. *G. exigua*
- 65b. Stamens equal; stem leaf blades elliptic, ovate-lanceolate, ovate-elliptic, or ovate.
- 66a. Calyx lobes ovate; corolla lobes 1.5–2 mm; stamens inserted at basal part of corolla tube 173. *G. simulatrix*
- 66b. Calyx lobes linear-lanceolate; corolla lobes 1–1.2 mm; stamens inserted near middle of corolla tube 227. *G. franchetiana*
- 64b. Corolla 1–2.5 cm.
- 67a. Stems consistently simple, 1-flowered; leaf blade margin thickened 235. *G. tentyoensis*
- 67b. Stems at least of larger plants generally branched, 2- to several flowered (rarely 1-flowered in *G. zollingeri*); leaf blade margin not thickened.
- 68a. Corolla 2–2.5 cm; seeds winged; margin of leaf blade and calyx lobes not distinctly cartilaginous or membranous 225. *G. taiwanica*
- 68b. Corolla 1–2 cm; seeds wingless; margin of leaf blade and calyx lobes distinctly cartilaginous or membranous.
- 69a. Flowering branches not crowded together; stamens equal 226. *G. zollingeri*
- 69b. Flowering branches crowded together; stamens unequal.
- 70a. Leaf blade and calyx lobe margins irregularly long ciliate, midribs produced into a prominent ciliate wing or crest; stem leaf blades ovate-orbicular 229. *G. cristata*
- 70b. Leaf blade and calyx lobe margins not long ciliate, midribs prominent but not winged; stem

- leaf blades oblong to lanceolate.
- 71a. Middle to upper stem leaves incurved; basal leaf blades scarcely larger than stem leaves; calyx 1–1.2 mm 159. *G. linoides*
- 71b. Middle to upper stem leaves arcuately spreading; basal leaf blades conspicuously larger than stem leaves; calyx 6–10 mm.
- 72a. Stem leaf blades lanceolate, apex aristate; corolla 1–1.3 cm; plicae margin entire or emarginate 230. *G. taliensis*
- 72b. Stem leaf blades oblong to oblong-lanceolate, apex mucronate; corolla 1.3–2 cm; plicae margin denticulate 231. *G. anisostemon*
- 45b. Plants with stems usually branched only near base, without a distinct main stem, rarely simple in depauperate specimens.
- 73a. Stem leaf blades linear, lanceolate, or spatulate.
- 74a. Anthers straight.
- 75a. Calyx lobes as long as or longer than tube; anthers subglobose 158. *G. asparagoides*
- 75b. Calyx lobes shorter than tube (as long as tube in *G. linoides*); anthers linear to oblong.
- 76a. Margin of leaf blade and calyx lobes broadly membranous; corolla blue-purple with yellow-green base, lobe margin entire; stamens unequal; stem leaves incurved and folded 159. *G. linoides*
- 76b. Margin of leaf blade and calyx lobes narrowly membranous; corolla outside blue-gray and inside white to bluish gray, lobe margin serrate to erose; stamens often equal; stem leaves straight but apex sometimes recurved 162. *G. heleonastes*
- 74b. Anthers curved.
- 77a. Corolla throat with dark spots and stripes.
- 78a. Margin of lower stem leaves cartilaginous and of upper leaves membranous; corolla purple; stamens inserted at basal part of corolla tube 160. *G. syringea*
- 78b. Margin of all stem leaves membranous; corolla blue with yellow-green base; stamens inserted at middle of corolla tube 161. *G. grumii*
- 77b. Corolla throat without dark spots or stripes.
- 79a. Stems papillate toward apex, pedicel papillate; corolla tubular 164. *G. tricolor*
- 79b. Stems and pedicels not papillate; corolla obconic.
- 80a. Lower stem leaf blades ovate to ovate-orbicular; corolla lobes ovate-orbicular 165. *G. choanantha*
- 80b. Lower stem leaf blades linear to linear-lanceolate; corolla lobes ovate-elliptic to ovate.
- 81a. Pedicel 5–20 mm; corolla lobes 3–4 mm; plicae oblong, 1.5–2 mm, margin irregularly laciniate 163. *G. aristata*
- 81b. Pedicel 3–4 mm; corolla lobes 2–2.5 mm; plicae ovate-elliptic, 1–1.2 mm, margin denticulate 166. *G. curvianthera*
- 73b. Stem leaf blades broader than linear, lanceolate, or spatulate.
- 82a. Calyx lobes usually filiform or filiform subulate.
- 83a. Calyx 2–4 mm; corolla 4–7 mm.
- 84a. Stem leaves recurved; calyx 3.5–4 mm; corolla blue; plicae obliquely truncate, margin irregularly crenulate 130. *G. myrioclada*
- 84b. Stem leaves spreading; calyx 2–3.5 mm; corolla white or blue-gray; plicae symmetrical, margin entire, 2-cleft, or few lacinate.
- 85a. Stem leaf blades ovate; corolla 4–6 mm, tube longer than lobes; plicae margin entire; calyx 2–3 mm 131. *G. microphyta*
- 85b. Stem leaf blades elliptic-lanceolate to sometimes ovate-lanceolate; corolla 6–7 mm, tube shorter than lobes; plicae margin 2-cleft to few lacinate; calyx 3–3.5 mm 132. *G. stellulata*
- 83b. Calyx (4–)4.5–9 mm; corolla 8–20 mm.
- 86a. Corolla purple, throat with many short dark lines.
- 87a. Leaf blade margin hirsute; corolla 0.9–1 cm; calyx coarsely papillate 150. *G. baoxingensis*

- 87b. Leaf blade margin almost smooth; corolla 1.7–2 cm; calyx not papillate 151. *G. filisepala*
- 86b. Corolla white to pale yellow or pale blue to pale purple, throat unmarked or with yellow spots.
- 88a. Corolla with yellow spots in throat; plicae almost as long as lobes 152. *G. flavomaculata*
- 88b. Corolla without spots in throat; plicae shorter than lobes.
- 89a. Leaf blade adaxially densely papillate; corolla white, yellowish white, or yellowish green, blue on outside only; plicae margin deeply few dentate 133. *G. epichysantha*
- 89b. Leaf blade adaxially glabrous; corolla pale blue at least in throat; plicae margin entire or 2-cleft.
- 90a. Leaf blade broadly ovate or cordate, base rounded and contracted into a slender petiole; stem branches divaricate 153. *G. vandellioides*
- 90b. Leaf blade lanceolate, narrowly elliptic, or ovate, base attenuate or obtuse, subsessile; stem branches narrowly divergent.
- 91a. Stems purple, densely papillate; basal leaf blades linear-elliptic, 13–17 × 2–3.5 mm; corolla pale purple 154. *G. tatakensis*
- 91b. Stems green, not papillate; basal and stem leaf blades lanceolate, 6–11 × 1–2.5 mm; corolla yellowish white, throat pale blue 155. *G. yiliangensis*
- 82b. Calyx lobes lanceolate or triangular.
- 92a. Plicae very small, auriculate, attached to right side of corolla lobe 184. *G. prainii*
- 92b. Plicae large, oblong, ovate, or triangular, borne between corolla lobes.
- 93a. Calyx lobes and/or corolla lobes caudate.
- 94a. Leaves and calyx lobes glabrous except for minute marginal cilia; leaf blade margin on at least uppermost stem broadly membranous (not or scarcely so in *G. ninglangensis* var. *glabrescens*).
- 95a. Leaf blade margin not membranous; corolla 1.4–1.6 cm 191b. *G. ninglangensis*
- 95b. Leaf blade margin broadly membranous; corolla 1.7–2.2 cm 211. *G. chungtienensis*
- 94b. Leaves and usually also calyx papillate or puberulent to hirsute at least on midribs; leaf blade margin not membranous (sometimes narrowly cartilaginous).
- 96a. Leaves and calyx hirsute.
- 97a. All stem leaf blades ovate to ovate-orbicular 189. *G. pubiflora*
- 97b. At least lower stem leaf blades obovate or spatulate.
- 98a. All stem leaf blades obovate or spatulate 190. *G. pubigera*
- 98b. Lower stem leaf blades obovate or spatulate, middle to upper elliptic to linear-lanceolate 191. *G. ninglangensis*
- 96b. Leaves and calyx papillate or puberulent.
- 99a. Corolla lobes caudate with tips 1–1.5 mm; stem leaf blade margins narrowly cartilaginous.
- 100a. Stem leaf blades spatulate to obovate; corolla 0.8–1 cm; stamens equal; stems much branched 187. *G. xanthonnos*
- 100b. Stem leaf blades elliptic to ovate; corolla 1.2–1.4 cm; stamens unequal; stems 1–3-branched 188. *G. parvula*
- 99b. Corolla lobes obtuse to acute, sometimes mucronate but not caudate; stem leaf blade margins broadly membranous.
- 101a. All stem leaf blades ovate or basally some-

- times obovate; calyx 6–8 mm 212. *G. subuniflora*
- 101b. Stem leaf blades lanceolate; calyx 13–15 mm 213. *G. radiata*
- 93b. Neither calyx lobes nor corolla lobes caudate.
- 102a. Stamens unequal.
- 103a. Corolla throat with blackish stripes and spots.
- 104a. All stem leaf blades spatulate to obovate; stems usually branched only at base; corolla (1.3–)1.4–2 cm 195. *G. bella*
- 104b. Upper stem leaf blades linear to elliptic; stems 2- or 3-branched; corolla 1–1.5 cm 196. *G. forrestii*
- 103b. Corolla throat without stripes or spots.
- 105a. Stem leaf blade margins cartilaginous; corolla outside yellowish green 197. *G. complexa*
- 105b. Stem leaf blade margins indistinctly membranous; corolla outside blue or purple.
- 106a. Whole plant subglabrous; corolla 1.2–1.6 cm, clear pale blue 198. *G. flexicaulis*
- 106b. Stems densely papillate and margins of leaves and calyx lobes ciliolate; corolla 0.7–1 cm, purple 199. *G. inconspicua*
- 102b. Stamens equal.
- 107a. Basal leaves well developed, involucriform.
- 108a. Lower stem leaf blades spatulate, upper elliptic; calyx lobes 1.2–1.5 mm; plicae triangular, apex 2-cleft 192. *G. licentii*
- 108b. Stem leaf blades oblong or lanceolate; calyx lobes 2.5–3 mm; plicae oblong or ovate, apex obtuse or rounded.
- 109a. Stems much branched; corolla tubular; calyx lobes broadly triangular; plicae ovate, apex obtuse 193. *G. macrauchena*
- 109b. Stems few branched; corolla funnel-form; calyx lobes narrowly triangular; plicae broadly oblong, apex rounded 194. *G. thunbergii*
- 107b. Basal leaves poorly developed, not involucriform.
- 110a. Stem leaf blades spatulate or obovate, widest above middle.
- 111a. Stem leaf blade apices triangular acute, cartilaginous margin indistinct; corolla purple.
- 112a. Leaves and calyx glabrous 200. *G. spathulifolia*
- 112b. Leaves and calyx densely pubescent 201. *G. abaensis*
- 111b. Stem leaf blade apices rounded, cartilaginous margin distinct; corolla blue.
- 113a. Calyx \pm 1/2 as long as corolla, obconic, tube without longitudinal white stripes 202. *G. pseudoaquatica*
- 113b. Calyx slightly shorter than corolla, tubular, tube with 5 longitudinal white stripes 203. *G. burkillii*
- 110b. Stem leaf blades oblong, lanceolate, elliptic, or ovate, widest below middle or with parallel sides.
- 114a. Margins of at least upper leaves and calyx lobes broadly membranous.
- 115a. Corolla throat with short dark blue lines; stem leaf blades linear, linear-lanceolate, oblong, or ovate, all with membranous margins; calyx outside and leaves not

- papillate 209. *G. micantiformis*
 115b. Corolla throat with dark blotches or unmarked; stem leaf blades ovate, navicular, or spatulate, lower with cartilaginous margins, upper with membranous margins; calyx outside and leaves abaxially papillate 210. *G. tatsienensis*
 114b. Margins of leaves and calyx lobes cartilaginous or narrowly membranous.
 116a. Corolla campanulate, with spots in throat.
 117a. Corolla with yellow-green spots; plicae deeply 2-cleft 204. *G. aperta*
 117b. Corolla with dark blue spots; plicae irregularly laciniate 205. *G. leucomelaena*
 116b. Corolla tubular, without spots in throat.
 118a. Corolla lobes yellowish white; leaves distinctly ciliolate 206. *G. prattii*
 118b. Corolla lobes pale blue or blue-purple; leaves not ciliolate.
 119a. Flowers sessile; calyx lobes ovate, base contracted, margin thick cartilaginous; corolla 7–8 mm 173. *G. simulatrix*
 119b. Flowers with pedicels 2–4 mm; calyx lobes triangular, base not contracted, margin narrowly membranous; corolla 9–20 mm.
 120a. Corolla blue, staying closed, lobe apices obtuse; plicae ovate; stamens inserted at basal part of corolla tube 207. *G. aquatica*
 120b. Corolla blue-purple with pale yellow-green base and blackish ring in throat, opening normally, lobe apices acute; plicae oblong; stamens inserted at middle of corolla tube 208. *G. conduplicata*

XII. Sect. *Fimbricorona*

- 1a. Corolla throat with 5 distinct bundles of hairs; style 4–5 mm, filiform 247. *G. cuneibarba*
 1b. Corolla throat with a sparse ring of hairs; style 1–2 mm, cylindrical 248. *G. faucipilosa*

I. Sect. *Otophora* Kusnezow, Trudy S.-Peterburgsk. Obsch. Estestvoisp., Otd. Bot. 24(2): 102. 1894.

耳褶龙胆组 *er zhe long dan zu*

Perennials. Taproot cylindrical or fusiform, stout, slightly fleshy. Stem branching monopodially. Corolla usually lobed to middle or below; tube as long as or shorter than lobes (except in *Gentiana doxiongshangensis*); plicae reduced to a small tooth or auricle on side of lobe. Anthers ellipsoid. Seed coat usually minutely reticulate, rarely alveolate with simple shallow hexagonal pits.

Twelve species: Bhutan, China, NE India, Nepal; nine species in China.

1. *Gentiana caryophyllea* Harry Smith, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 101. 1926.

石竹叶龙胆 shi zhu ye long dan

Perennials 3–5 cm tall. Taproot cylindric, 5–10 × ca. 0.5 cm. Stems perennial, many, forming a cushion, prostrate to ascending, slender, simple. Basal rosette leaves absent or very small; leaf blade triangular, less than 5 mm. Stem leaves many, crowded, withering toward stem base; petiole 3–5 mm; leaf blade lanceolate, oblanceolate, or ovate, 3–8 × 1–2.5 mm, base obtuse, margin cartilaginous and scabrous, apex acuminate and awned with a tip to 1 mm, veins 1–3. Flowers terminal, solitary, slender, sessile or on pedicels 2–4 mm. Calyx shallowly cupular, tube 3–4 mm; lobes slightly spreading, lanceolate to oblong, 3–5 mm, unequal, margin cartilaginous and scabrous; apex acuminate and with a tip to 1 mm. Corolla dark blue, tubular to tubular-campanulate, 1.5–1.8 cm; lobes elliptic, 7–8 mm, margin entire, apex obtuse; plicae 0.5–1 mm, auricular. Stamens inserted at basal part of corolla tube; filaments 7–9 mm; anthers 1.5–2 mm. Style 1.5–2 mm; stigma lobes narrowly triangular. Capsules subsessile, ellipsoid, 1.2–1.4 cm. Seeds dark brown, fusiform, 0.8–1 mm. Fl. and fr. Aug-Sep.

Alpine meadows; 4000–4300 m. NW Yunnan [NE Myanmar].

2. *Gentiana leucantha* Harry Smith ex T. N. Ho & S. W. Liu, Bull. Nat. Hist. Mus. London (Bot.) 23: 55. 1993.

黄耳褶龙胆 huang er zhe long dan

Perennials 2–5 cm tall. Taproot cylindric, 5–10 × ca. 0.5 cm. Stems perennial, many, prostrate to ascending, slender, simple. Basal rosette leaves absent or very small; leaf blade triangular, less than 5 mm. Stem leaves many, crowded, withering toward stem base; petiole 3–5 mm; leaf blade elliptic to ovate, 3.5–4 × 1.8–2.2 mm, base obtuse, margin cartilaginous and scabrous, apex acute and mucronate, vein 1. Flowers terminal, solitary, sessile. Calyx shallowly cupular, tube 5–6 mm; lobes slightly spreading, elliptic to ovate, 3–3.5 mm, unequal, apex acute to obtuse. Corolla white or pale yellow-white, tubular to tubular-campanulate, 1.3–1.5 cm; lobes elliptic-ovate to ovate, 4–5 mm, apex obtuse; plicae triangular, 2–2.5 mm, 2-cleft. Stamens inserted at middle of corolla tube; filaments 6–8 mm; anthers 1.5–2 mm. Style 1–1.5 mm; stigma lobes narrowly triangular. Capsules sessile, narrowly ellipsoid, 1–1.2 cm. Seeds brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jun-Aug.

Grassy and stony slopes, alpine meadows; 4000–4600 m. SE Xizang [NE Bhutan].

3. *Gentiana decorata* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 220. 1912.

美龙胆 mei long dan

Gentiana tsarongensis I. B. Balfour & Forrest.

Perennials 2–5 cm tall. Taproot cylindric, 5–10 cm × ca. 5 mm. Stems perennial, many, prostrate to ascending, slender,

simple. Basal rosette leaves absent or very small; leaf blade triangular, less than 5 mm. Stem leaves many, crowded to widely spaced, withering toward stem base; petiole 3–5 mm; leaf blade spatulate, elliptic, ovate, or obovate, 3–8 × 2–3 mm, base obtuse, margin cartilaginous and smooth, apex acute to obtuse, veins 1–3. Flowers terminal, solitary. Pedicel 2–4 mm, slender. Calyx shallowly cupular, tube 3–4 mm; lobes slightly spreading, elliptic to ovate, 2–5 mm, unequal, margin cartilaginous and smooth, apex acute to obtuse. Corolla dark blue to blue-purple, tubular to tubular-campanulate, 1.5–1.8(–2) cm; lobes elliptic, 7–11 mm, apex obtuse; plicae triangular, 1–2 mm. Stamens inserted at basal part of corolla tube; filaments 6–8(–10) mm; anthers 1.5–2 mm. Style 1.5–2 mm; stigma lobes linear. Capsules sessile, ellipsoid, 1.4–1.6 cm. Seeds dark brown, ellipsoid to ovoid, 0.6–1 mm. Fl. and fr. Aug-Nov.

Meadows along streams and on slopes; 3200–4600 m. SE Xizang, NW and W Yunnan [NE Myanmar].

4. *Gentiana infelix* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 111. 1883.

小耳褶龙胆 xiao er zhe long dan

Gentiana microtophora C. Marquand; *G. minuta* N. E. Brown.

Perennials 2–5 cm tall. Taproot cylindric, 3–5 × 0.2–0.3 cm. Stems perennial, many, prostrate to ascending, slender, simple. Basal rosette leaves absent or very small; leaf blade triangular, less than 5 mm. Stem leaves crowded, withering toward stem base; petiole 3–5 mm; leaf blade elliptic to ovate, 1.5–3 × 1.2–1.5 mm, papillate, base obtuse, margin cartilaginous and scabrous, apex acute to obtuse, vein 1. Flowers terminal, solitary. Pedicel 2–3 mm, slender. Calyx shallowly cupular, tube 2–2.5 mm; lobes slightly spreading, ovate, 1.8–2.2 mm, unequal, margin cartilaginous and scabrous, apex acute to obtuse. Corolla dark blue, tubular, (4–)7–10 mm; lobes ovate-elliptic, 3–3.5 mm, apex obtuse; plicae auricular, 0.3–0.5 mm. Stamens inserted at middle of corolla tube; filaments 2.7–3 mm; anthers 0.8–1 mm. Style 0.5–1 mm; stigma lobes narrowly triangular. Capsules sessile, ellipsoid, 8–10 mm. Seeds dark brown, nearly globose, 1.1–1.3 mm. Fl. and fr. Aug-Oct.

Alpine meadows; 4100–4500 m. S and SE Xizang, W Yunnan [Bhutan, NE Myanmar, Nepal, Sikkim].

5. *Gentiana doxiongshangensis* T. N. Ho, Bull. Bot. Res., Harbin 4(1): 73. 1984.

多雄山龙胆 duo xiong shan long dan

Perennials 5–10 cm tall. Taproot cylindric, long, usually 3–5 mm in diam. Vegetative stems sometimes prolonged and few branched; branches prostrate, stout, with dense brown membranous remnants of old petioles, each with an apical rosette; flowering stems annual, ascending, simple. Basal leaves in 2–5 usually lax rosettes; petiole 5–7 mm, membranous; leaf blade narrowly elliptic, 1–2.5 cm × 2.5–4.5 mm, base narrowed, margin scabrous, apex obtuse, vein 1.

Stem leaves 3–5 pairs, very widely spaced; petiole 3–5 mm; leaf blade elliptic to ovate-elliptic, 7–11 × 3–4.5 mm, base narrowed, apex obtuse, vein 1. Flowers terminal, solitary. Pedicel (0.5–)1–2 cm. Calyx cupular, tube 6–7 mm; lobes linear-lanceolate, 2–2.5 mm, equal, apex acute, vein 1. Corolla dark blue, unspotted, tubular to tubular-campanulate, 1.7–2.2 cm; lobes ovate, 4–4.5 mm, margin entire, apex obtuse; plicae auricular, 0.5–1 mm, apex acute. Stamens inserted at basal part of corolla tube; filaments 0.9–1.1 cm; anthers 1.2–1.5 mm. Style absent; stigma lobes linear. Capsules narrowly ellipsoid, 1.3–1.5 cm; gynophore 6–7 mm. Seeds brown, ellipsoid, 0.8–1 mm; seed coat alveolate. Fl. and fr. Aug–Oct.

Alpine meadows; 3900–4300 m. S and SE Xizang [Bhutan, NE India].

6. *Gentiana damyonensis* C. Marquand, Bull. Misc. Inform. Kew 1928: 51. 1928.

深裂龙胆 shen lie long dan

Perennials 5–10 cm tall, sometimes forming mats. Taproot cylindric, long, usually 3–5 mm in diam. Vegetative stems sometimes prolonged; branches prostrate, stout, with dense brown membranous remnants of old petioles, each with an apical rosette; flowering stems annual, ascending, simple. Basal leaves in 3–6 or more rosettes, crowded in a cushion; petiole 2–3 cm, membranous; leaf blade usually linear-lanceolate, rarely linear or oblanceolate, 2–3.5 cm × 2–4 mm, base narrowed, apex acuminate to obtuse, veins 3. Stem leaves 3–5 pairs, widely spaced; petiole 3–5 mm; leaf blade linear-lanceolate to ovate-lanceolate, 8–11 × 2–3 mm, base narrowed, apex obtuse, vein 1. Flowers terminal, solitary, sessile or pedicel to 5 mm. Calyx cupular, tube 3.5–4.5 mm; lobes linear-lanceolate, 1–3 mm, unequal, apex obtuse. Corolla white or pale yellow, with pale blue spots, tubular to tubular-campanulate, 1.6–2 cm; lobes elliptic, 1.3–1.7 cm, margin entire, apex obtuse; plicae triangular, 1–1.5 mm, apex acute. Stamens inserted at basal part of corolla tube; filaments 1–1.4 cm; anthers 1.5–2 mm. Ovary narrowly ellipsoid, ca. 1 cm. Style absent; stigma lobes linear. Fl. and fr. Aug–Oct.

Alpine meadows, bamboo thickets, alpine scree; 3300–4200 m. SW Sichuan, SE Xizang, NW Yunnan [NE Myanmar].

7. *Gentiana otophora* Franchet in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 130. 1890.

耳褶龙胆 er zhe long dan

Perennials 5–15 cm tall. Taproot cylindric, long, 5–8 mm in diam. Vegetative stems sometimes prolonged, few branched; branches prostrate, to 1 cm in diam., with dense blackish membranous remnants of old petioles, each with an apical rosette; flowering stems tinged purple, annual, simple, ascending to erect. Basal leaves in 3–6 or more rosettes, usually crowded; petiole 1–5 cm, membranous; leaf blade oblong-spatulate, oblong, narrowly elliptic, or spatulate-

obovate, 5–12 × 1–2.5 cm, base narrowed, apex rounded, veins 3–5. Stem leaves 2–5 pairs, widely spaced; petiole 5–10 mm; leaf blade ovate-elliptic, 1–3 × 0.8–1.5 cm, both ends obtuse, veins 3. Cymes axillary or terminal, few to many flowered, occasionally flowers solitary. Pedicel 0.5–3 cm, slender. Calyx cupular, 4–6.5 mm; lobes lanceolate, oblong, or ovate, 1.5–5 mm, unequal, apex obtuse, vein 1. Corolla yellow, with pale blue streaks and spots, tubular to tubular-campanulate, (1.8–)2–2.5 cm; lobes ovate-elliptic, 1.3–1.5 cm, margin entire, apex obtuse; plicae triangular, 2–3 mm, apex acute. Stamens inserted at middle of corolla tube; filaments 7–9 mm, unequal; anthers 1.5–2 mm. Style absent; stigma lobes linear. Capsules subsessile, ellipsoid, 1.3–1.6 cm. Seeds light brown, fusiform, 1.8–2 mm.

Grassland on slopes or in valleys, *Rhododendron* scrub; 2800–4200 m. SE Xizang, NW Yunnan [NE Myanmar].

Gentiana otophora var. *otophora* is endemic to China. *Gentiana otophora* var. *ovatisejala* C. Marquand occurs in NE Myanmar and differs from var. *otophora* by the smaller corolla.

8. *Gentiana otophoroides* Harry Smith, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 101. 1926.

类耳褶龙胆 lei er zhe long dan

Perennials 5–10 cm tall. Taproot cylindric, long, 5–8 mm in diam. Vegetative stems sometimes prolonged, few branched; branches usually short, to 8 mm in diam., with dense blackish membranous remnants of old petioles, each with an apical rosette; flowering stems annual, ascending, slender, simple. Basal leaves in 1–3 rosettes, usually crowded; petiole 0.5–2 cm, membranous; leaf blade linear-lanceolate, oblong-spatulate, oblanceolate, or narrowly elliptic, 1.5–3 cm × 2–12 mm, base narrowed, apex rounded, veins 3. Stem leaves 2 or 3 pairs, widely spaced; petiole 3–5 mm; leaf blade ovate-lanceolate to ovate-elliptic, 1–1.8 cm × 4–8 mm, base broadly cuneate to subrounded, apex acuminate to obtuse, veins 3. Flowers terminal, solitary. Pedicel 2–11 mm, slender. Calyx cupular, tube 4–5 mm; lobes linear-lanceolate, 4–7 mm, subequal, apex obtuse, vein 1. Corolla white or yellow, with pale blue streaks, tubular, 2.5–3 cm; lobes ovate-elliptic, 1.2–1.5 cm, margin entire, apex obtuse; plicae auricular, 2–3 mm, apex acute. Stamens inserted at middle of corolla tube; filaments 8–10 mm; anthers 2–2.5 mm. Style 3–4 mm; stigma lobes linear. Capsules ellipsoid, ca. 1.2 cm. Seeds light brown, fusiform, ca. 1.5 mm. Fl. and fr. Aug–Sep.

• Meadows on rocky slopes; 3200–4100 m. SE Xizang, NW Yunnan.

9. *Gentiana sichitoensis* C. Marquand, Bull. Misc. Inform. Kew 1928: 56. 1928.

短管龙胆 duan guan long dan

Perennials 5–15 cm tall. Taproot cylindric, long, 5–8 mm in diam. Vegetative stems sometimes prolonged, few branched; branches short, to 1 cm in diam., with dense blackish membranous remnants of old petioles, each with

an apical rosette; flowering stems annual, ascending to erect, simple. Basal leaves in 2–5 rosettes, crowded; petiole 1–3 cm, membranous; leaf blade spatulate to oblong-spatulate, 1–5 × 0.7–1.2 cm, base narrowed, apex rounded, veins 3. Stem leaves 2–4 pairs, widely spaced; petiole 2–5 mm; leaf blade ovate to suborbicular, 8–10 × 6–8 mm, base obtuse to rounded, apex rounded, veins 3. Flowers terminal, solitary, rarely in cymes. Pedicel 1–1.5 cm, slender. Calyx cupular, 4–5 mm; lobes lanceolate, elliptic, ovate, or orbicular, 1–2(–3) mm, unequal, base sometimes narrowed, apex rounded, vein 1. Corolla yellow, with pale blue streaks and spots, tubular-

II. Sect. *Cruciata* Gaudin, Fl. Helv. 2: 269. 1828.

秦艽组 qin jiao zu

Perennials. Roots fleshy, usually several contiguous and twisted into a cylindrical stout structure. Stems branching monopodially; caudex covered with conspicuously fibrous remains of leaf bases. Basal leaves large, forming a well-developed rosette. Seed coat minutely reticulate (thick reticulate in *Gentiana olivieri*).

Twenty-one species: Asia, Europe; 19 species in China.

10. *Gentiana decumbens* Linnaeus f., Suppl. Pl. 174. 1781.

斜升秦艽 xie sheng qin jiao

Gentiana adscendens Pallas; *G. gebleri* Ledebour ex Bunge.

Perennials 15–45 cm tall. Roots to 1.5 cm in diam. Stems ascending, stout, glabrous, simple. Basal leaves petiole 1–3 cm, membranous; leaf blade linear-lanceolate to linear-elliptic, 3.5–16 × 0.4–1.8 cm, base narrowed, margin scabrous, apex acuminate, veins 1–3. Stem leaves 2 or 3 pairs, smaller and with shorter petioles toward apex; petiole 1–1.5 cm; leaf blade linear to lanceolate, 1.7–5 cm × 3–6 mm, base obtuse, margin scabrous, apex acuminate, veins 1–3. Cymes axillary or terminal, forming a narrow panicle, axillary cymes sometimes on pedunclelike branches; peduncle to 5 cm. Pedicel to 1 cm. Calyx tube spathe-like, 1–1.5 cm, split on 1 side to near base, membranous; lobes 1–5, subulate, 0.5–1 mm. Corolla dark blue, tubular-campanulate, 3–3.5 cm; lobes ovate-orbicular, 4–5 mm, margin entire, apex rounded; plicae ovate-triangular to truncate, 1–1.5 mm, oblique, margin entire. Stamens inserted just below middle of corolla tube; filaments 1–1.3 cm; anthers narrowly ellipsoid, 2–3 mm. Style 1.5–2 mm; stigma lobes linear. Capsules ovoid-ellipsoid to ovoid, 2–2.5 cm; gynophore to 2.2 cm. Seeds brown, ovoid-ellipsoid, 1.2–1.5 mm. Fl. and fr. Aug.

Along streams, grassland slopes, clearings in forests, dry steppes; 1200–2700 m. NE Nei Mongol, NW Xinjiang [Kazakhstan, E Mongolia, Russia; NE Europe].

11. *Gentiana straminea* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, 27: 502. 1881.

麻花艽 ma hua jiao

Perennials 10–35 cm tall. Roots to 20 × 1.5 cm. Stems ascending, stout, simple, glabrous. Basal leaves petiole 2–4 cm, membranous; leaf blade broadly lanceolate to ovate-elliptic, 6–20 × 0.8–4 cm, base narrowed, margin scabrous, apex acuminate, veins 3–5. Stem leaves 3–5 pairs, distinctly smaller and with shorter petioles toward apex; petiole 0.5–2.5

campanulate, 1.8–2 cm; lobes ovate-elliptic, 1.2–1.5 cm, margin entire, apex obtuse; plicae lanceolate, 1–1.5 mm, apex acute. Stamens inserted at middle of corolla tube; filaments 7–9 mm, equal; anthers 1.5–2 mm. Style absent; stigma lobes triangular. Capsules ellipsoid, 1.4–1.6 cm; gynophore to 4 mm. Seeds light brown, fusiform, 1.5–2 mm. Fl. and fr. Sep-Nov.

Meadow and rocky slopes, bamboo thickets; 3300–4200 m. SE Xizang, NW Yunnan [NE Myanmar].

cm; leaf blade linear to linear-lanceolate, 2.5–8 cm × 5–10 mm, base obtuse, margin scabrous, apex acuminate, veins 1–3. Cymes axillary or terminal, forming a narrow panicle, axillary cymes sometimes on pedunclelike branches; peduncle to 9 cm. Pedicel to 4 cm. Calyx tube purple, spathe-like, 1.5–2.8 cm, split on 1 side to near base, membranous; lobes 2–5, subulate, 0.5–1 mm. Corolla greenish white to pale yellow-green, occasionally suffused with pale blue, outside sometimes tinged brown, with green spots in throat, funnellform, (3–)3.5–4.5 cm; lobes ovate-elliptic to ovate, 5–6 mm, margin entire, apex obtuse; plicae triangular, 2–3 mm, oblique, margin entire or denticulate, apex obtuse. Stamens inserted just below middle of corolla tube; filaments 1.1–1.5 cm; anthers narrowly ellipsoid, 2–3 mm. Style 3–5 mm; stigma lobes oblong. Capsules ovoid-ellipsoid, 2.5–3 cm; gynophore 7–12 mm. Seeds light brown, narrowly ellipsoid to ellipsoid, 1.1–1.3 mm. Fl. and fr. Jul-Nov.

Along streams, valleys, rocky slopes, alpine meadows, scrub, forests, clearings in forests; 2000–5000 m. Gansu, Hubei, Ningxia, Qinghai, Xizang [Nepal].

12. *Gentiana waltonii* Burkill, J. Proc. Asiat. Soc. Bengal 2: 310. 1906.

长梗秦艽 chang geng qin jiao

Gentiana lhasaensis Hsiao & K. C. Hsia.

Perennials 10–30 cm tall. Roots to 1.5 cm in diam. Stems ascending to erect, stout, simple, glabrous. Basal leaves petiole 0.5–3 cm, membranous; leaf blade linear-elliptic to elliptic-lanceolate, 3–16 × 0.8–2.3 cm, thick herbaceous, base narrowed, margin scabrous, apex acuminate, veins 3–5. Stem leaves 3–5 pairs; petiole to 1.5 cm, shorter toward apex; leaf blade lanceolate to ovate-elliptic, 1–6 × 0.6–1.5 cm, base obtuse, margin scabrous, apex acuminate, veins 1–3. Cymes axillary or terminal, usually forming a thyrse, axillary cymes rarely on pedunclelike branches; peduncle purple, to 2 cm. Pedicel purple, to 7 cm. Calyx tube purple, spathe-like, 1.5–2.5 cm, split on 1 side; lobes lanceolate to narrowly elliptic, 5–8 mm, unequal, margin scabrous, apex acute to obtuse, veins

distinct. Corolla white or blue, funnellform, 4–4.5 cm; lobes ovate-elliptic to ovate, 0.9–1.1 cm, margin entire, apex obtuse; plicae triangular, 4–6 mm, oblique, margin denticulate, apex acute. Stamens inserted just below middle of corolla tube; filaments 1.2–1.5 cm; anthers ellipsoid, 3.5–4 mm. Style 3–4 mm; stigma lobes narrowly triangular. Capsules narrowly ellipsoid, 1.5–1.8 cm; gynophore 1–1.5 cm. Seeds light brown, ellipsoid, 1.2–1.5 mm, winged at 1 end. Fl. and fr. Aug–Oct.

• Meadow slopes, rocky pastures, forests; 3000–4800 m. S and SE Xizang.

13. *Gentiana lhassica* Burkill, J. Proc. Asiat. Soc. Bengal 2: 311. 1906.

全萼秦艽 *quan e qin jiao*

Perennials 7–10 cm tall. Roots to 15 cm. Stems ascending, slender, simple, glabrous. Basal leaves petiole 0.5–2 cm, membranous; leaf blade linear-lanceolate to linear-elliptic, 4–10 cm × 5–8 mm, base narrowed, margin scabrous, apex acuminate, veins 1–3. Stem leaves 2 or 3 pairs; petiole 5–10 mm; leaf blade elliptic-lanceolate to elliptic, 1.5–3 cm × 4–6 mm, both ends obtuse, margin scabrous, midvein distinct. Flowers solitary, rarely in cymes. Pedicel purple, to 2.5 cm. Calyx tube narrowly obconic, 8–10 mm, membranous, margin entire; lobes 5, narrowly elliptic, subequal, 6–9 mm, herbaceous, base narrowed, margin scabrous, apex obtuse, midvein distinct. Corolla inside pale blue to blue, outside dark brown, tubular to funnellform, 2.4–2.8 cm; lobes ovate-orbicular, 4–5.5 mm, margin entire, apex rounded; plicae narrowly triangular, 2–2.5 mm, margin denticulate, apex acute. Stamens inserted just below middle of corolla tube; filaments 5–8 mm; anthers narrowly ellipsoid, 2–2.5 mm. Style 1–2 mm; stigma lobes oblong. Capsules sessile, ovoid-ellipsoid, 1.2–1.5 cm. Seeds brown, ellipsoid, 1.4–1.6 mm. Fl. and fr. Aug–Sep.

• Alpine meadows; 4200–4900 m. SW Qinghai, E Xizang.

14. *Gentiana tenuicaulis* Ling, Contr. Inst. Bot. Natl. Acad. Peiping 3: 380. 1935.

纤茎秦艽 *xian jing qin jiao*

Perennials 10–15 cm tall. Stems ascending, stout, simple, densely papillate. Basal leaves petiole 1–2 cm, membranous; leaf blade linear-elliptic to narrowly elliptic, 5–8 × 0.6–1.5 cm, densely papillate, base narrowed, margin ciliolate, apex acuminate to obtuse, veins 1–3. Stem leaves 3 or 4 pairs; petiole to 8 mm; leaf blade oblong to ovate-lanceolate, 1–7 cm × 3–7 mm, base obtuse, margin ciliolate, apex obtuse to rounded, veins 1–3. Cymes axillary or terminal, forming a lax panicle; axillary cymes sometimes on pedunclelike branches; peduncle purple, densely papillate, to 2 cm. Pedicel 5–10 mm. Calyx tube 8–9 mm, membranous, entire; lobes 5, oblanceolate, 7.5–9.5 mm, base narrowed and oblique, margin ciliolate, apex obtuse. Corolla pale blue, with pale yellow base, tubular to narrowly funnellform, 3–3.7 cm; lobes ovate-triangular, 8–9 mm, margin entire, apex acute; plicae ovate, 2.5–3 mm, margin denticulate, apex obtuse. Stamens inserted at basal part of corolla tube; filaments 0.9–1.1 cm; anthers

narrowly ellipsoid, 2–3.5 mm. Style 4–5 mm; stigma lobes oblong. Capsules ovoid-ellipsoid, 1.5–1.8 cm; gynophore 4–5 mm. Seeds brown, narrowly ellipsoid, 1.8–2 mm. Fl. and fr. Jul–Aug.

• Limestone slopes; 700–1800 m. Hebei.

15. *Gentiana olivieri* Grisebach, Gen. Sp. Gent. 278. 1838.

楔湾缺秦艽 *xie wan que qin jiao*

Gentiana regeliana Gandoger; *G. weschniakowii* Regel.

Perennials 10–30(–40) cm tall. Stems erect, slender, simple, glabrous. Basal leaves petiole 1–3.5(–10) cm, membranous; leaf blade linear-elliptic to elliptic-lanceolate, rarely oblanceolate, 2–10 cm × 4–8(–10) mm, base narrowed, margin scabrous, apex acuminate to obtuse, veins distinct. Stem leaves 2 or 3 pairs; petiole 3–5 mm; leaf blade linear to linear-lanceolate, 1.5–3 cm × 3–6(–10) mm, base obtuse, margin scabrous, apex acuminate, midvein distinct. Inflorescences terminal corymbose cymes of 3–5 flowers. Pedicel to 3(–5) cm, slender. Calyx tube obconic, 4–8 mm, entire; lobes triangular, unequal, 5–7 mm, apex acute, sinus between lobes cuneate-acute. Corolla blue, obconic, (1.8–)2–2.5(–3) cm; lobes oblong, 5–6 mm, margin entire, apex obtuse; plicae triangular, 3.5–4.5 mm, 2-cleft. Stamens inserted just below middle of corolla tube; filaments 6–8 mm; anthers linear, 2.5–3 mm. Style 4–5 mm; stigma lobes oblong. Capsules ellipsoid. Seeds brown, ellipsoid, 0.8–1 mm; seed coat thick reticulate. Fl. and fr. Aug–Oct.

Limestone slopes, marly steppes, wet grasslands; 600–2300 m. Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan; SW Asia].

16. *Gentiana kaufmanniana* Regel & Schmalhausen, Trudy Imp. S.-Peterburgsk. Bot. Sada 6: 331. 1879.

中亚秦艽 *zhong ya qin jiao*

Perennials 10–25(–40) cm tall. Roots ± fleshy, sometimes several contiguous and twisted into a stout structure to 15 cm. Stems ascending, stout, simple, glabrous. Basal leaves petiole 1–2 cm, membranous; leaf blade linear, elliptic-lanceolate, or narrowly elliptic, 3–8 × 0.5–1.8 cm, base narrowed, margin smooth, apex acuminate to obtuse, veins 3–5. Stem leaves 2 or 3 pairs; petiole 5–12 mm, shortened toward apex; leaf blade linear-lanceolate to narrowly elliptic, 3–5.2 × 0.7–1.2 cm, base obtuse, margin smooth, apex acuminate, veins 1–3. Inflorescences terminal, 1-flowered or cymes, rarely terminal and subapical axillary cymes on pedunclelike branches to 6 cm. Pedicel to 1.8 cm, very unequal. Calyx tube narrowly obconic, 1–1.4 cm, membranous, entire; lobes linear, linear-lanceolate to linear-oblong, 0.6–2.1 cm, very unequal, as long as or longer than tube, midvein decurrent into angles of tube. Corolla blue-purple to dark blue, tubular-campanulate, 4–5 cm; lobes ovate, 6–9 mm, margin entire, apex obtuse; plicae auriculate, 2–3 mm, oblique, margin crenulate, apex obtuse. Stamens inserted at middle of corolla tube; filaments 0.9–1.1 cm; anthers narrowly ellipsoid, 3–4.5 mm. Style 1.5–2 mm; stigma lobes linear. Capsules narrowly ellipsoid to ovoid-ellipsoid, 1.3–2 cm; gynophore 7–11 mm. Seeds light brown,

ellipsoid, 1.4–1.6 mm, narrowly winged on 1 side. Fl. and fr. Jul-Sep.

Grasslands, wet meadows, valleys; 1800–3500 m. N Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan].

Gentiana kaufmanniana var. *affghanica* (Kusnezow) Schiman-Czeika occurs in Afghanistan and Pakistan and differs from var. *kaufmanniana* in having the flowers in a thyrse and the calyx lobes shorter than the tube.

17. *Gentiana dahurica* Fischer, Mem. Soc. Imp. Naturalistes Moscou 3: 63. 1812.

达乌里秦艽 da wu li qin jiao

Perennials 10–25 cm tall. Roots to 20 × 1.5 cm. Stems ascending, stout, simple, glabrous. Basal leaves petiole 2–4 cm, membranous; leaf blade linear-elliptic to elliptic-lanceolate, 5–15 × 0.8–1.4 cm, base narrowed, margin scabrous, apex acuminate, veins 3–5. Stem leaves 3–5 pairs; petiole 5–10 mm, shortened toward apex; leaf blade linear to linear-lanceolate, 2–5 cm × 2–4 mm, base obtuse, margin scabrous, apex acuminate, veins 1–3. Cymes few to many flowered. Pedicel to 3 cm. Calyx tube 7–10 mm, membranous, entire or rarely slightly split on 1 side; lobes 1–5, linear to subulate, 3–8 mm, unequal. Corolla dark blue-purple, with yellow spots in throat, funnelform or campanulate, 2.5–4.5 cm; lobes ovate-elliptic to ovate, 4–7 mm, margin entire, apex obtuse; plicae ovate to triangular, 1.5–2 mm, margin entire or erose, apex obtuse. Stamens inserted at or just below middle of corolla tube; filaments (0.8–)1–1.2 cm; anthers narrowly ellipsoid, 2–3 mm. Style 2–4 mm; stigma lobes oblong. Capsules sessile, narrowly ellipsoid, 2.3–3 cm. Seeds light brown, ellipsoid, 1.2–1.5 mm. Fl. and fr. Jul-Sep.

800–4500 m. Hebei, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, N and NW Sichuan [Mongolia, Russia (E Siberia)].

- 1a. Corolla funnelform, 3.5–4.5 cm 17a. var. *dahurica*
1b. Corolla campanulate, 2.5–3 cm
..... 17b. var. *campanulata*

17a. *Gentiana dahurica* var. *dahurica*

达乌里秦艽 (原变种) da wu li qin jiao (yuan bian zhong)

Gentiana biflora Regel ex Kusnezow; *G. gracilipes* Turill; *G. kurroo* Royle var. *brevidens* Maximowicz ex Kusnezow; *G. pseudodecumbens* Harry Smith; *G. tianschanica* Ruprecht var. *koslowii* Kusnezow.

Cymes axillary or terminal, many flowered, forming a lax narrow raceme or panicle, axillary cymes sometimes on pedunclelike branches; peduncle to 5.5 cm. Corolla funnelform, 3.5–4.5 cm.

Roadsides, stream banks, sandy places around lakes, sunny slopes, dry steppes, edges of cultivated land; 800–4500 m. Hebei, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, N and NW Sichuan [Mongolia, Russia (E Siberia)].

17b. *Gentiana dahurica* var. *campanulata* T. N. Ho, Bull. Bot. Res., Harbin 4(1): 75. 1984.

钟花达乌里秦艽 zhong hua da wu li qin jiao

Inflorescences 1–3-flowered cymes. Corolla campanulate, 2.5–3 cm.

• Alpine meadows, scrub; 4200–4400 m. Qinghai, NW Sichuan.

18. *Gentiana tianschanica* Ruprecht, Mém. Acad. Imp. Sci. Saint Pétersbourg, sér. 7, 14(4): 61. 1869.

天山秦艽 tian shan qin jiao

Gentiana glomerata Kusnezow; *G. regelii* Maximowicz ex Kusnezow; *G. regelii* Kusnezow var. *glomerata* Kusnezow; *G. tianschanica* var. *glomerata* Kusnezow; *G. tianschanica* var. *intermedia* Kusnezow; *G. tianschanica* var. *pumila* Kusnezow.

Perennials 15–25 cm tall. Roots to 1.5 cm in diam. Stems ascending, simple, glabrous. Basal leaves petiole 2–5 cm, membranous; leaf blade linear-elliptic to elliptic-lanceolate, 8–16 × 0.8–1.8 cm, base narrowed, margin smooth or scabrous, apex acuminate, veins 3–5. Stem leaves 3–5 pairs; petiole 0.5–2.5 cm, shortened toward apex; leaf blade linear to linear-lanceolate, 3.2–7 cm × 5–9 mm, base obtuse, margin smooth or scabrous, apex acuminate, veins 1–3. Cymes axillary or terminal, forming a narrow panicle, axillary cymes sometimes on pedunclelike branches; peduncle purple, to 4 cm. Flowers sessile, rarely with pedicel to 1 cm. Calyx tube 7–9 mm, membranous, sometimes split on 1 side; lobes linear to linear-subulate, 7–10 mm, unequal. Corolla pale blue or yellow, funnelform, 2–3(–3.5) cm; lobes ovate-elliptic to ovate, 4–6 mm, margin entire, apex obtuse; plicae narrowly triangular, 2–2.5 mm, 2-cleft. Stamens inserted at middle of corolla tube; filaments 0.9–1.2 cm; anthers narrowly ellipsoid, 2–3 mm. Style 2–2.5 mm; stigma lobes narrowly ellipsoid. Capsules narrowly ellipsoid, 1.2–1.5 cm; gynophore 7–10 mm. Seeds light brown, ellipsoid, 1.2–1.5 mm. Fl. and fr. Aug-Sep.

Along streams, grassland slopes, forests; 1200–3900 m. N Xinjiang, W Xizang [NW India, Kazakhstan, Kyrgyzstan, Nepal, Pakistan].

19. *Gentiana crassicaulis* Duthie ex Burkill, J. Proc. Asiat. Soc. Bengal 2: 311. 1906.

粗茎秦艽 cu jing qin jiao

Perennials 25–40 cm tall. Roots to 30 × 2 cm. Stems ascending, stout, simple, glabrous. Basal leaves petiole 5–8 cm, membranous; leaf blade narrowly elliptic to ovate-elliptic, 12–20 × 4–6.5 cm, base narrowed, margin scabrous, apex acute, veins 5–7. Stem leaves 3–5 pairs, distinctly larger toward apex, sessile, spreading, and surrounding flower cluster; petiole to 3 cm, membranous, completely connate; leaf blade ovate-elliptic to ovate-triangular, 6–16 × 3–4.5(–7) cm, base obtuse to truncate, margin scabrous, apex acute to obtuse, veins 3–5. Inflorescences crowded, many-flowered terminal clusters, rarely also few-flowered axillary whorls. Flowers sessile. Calyx tube spathe-like, 4–6 mm, membranous, split on 1 side, apex truncate; lobes 1–5, dentiform, 0.5–1 mm. Corolla blue-purple, base pale yellow base or sometimes

white or dark green, urceolate, 2–2.2 cm; lobes ovate-triangular, 2.5–3.5 mm, margin entire, apex acute; plicae triangular, 1–1.5 mm, oblique, margin denticulate, apex acute. Stamens inserted at middle of corolla tube; filaments 6–8 mm; anthers narrowly ellipsoid, 1.5–2.5 mm. Style 2–2.5 mm; stigma lobes oblong. Capsules sessile, ovoid-ellipsoid, 1.8–2 cm. Seeds light brown, ellipsoid, 1.2–1.5 mm. Fl. and fr. Jun–Nov.

• Wastelands, grasslands, roadside slopes, alpine meadows, scrub, forest margins, forests; 2100–4500 m. NW Guizhou, W Sichuan, SE Xizang, NW Yunnan.

Gentiana crassicaulis is similar to the Himalayan *G. tibetica*, with which it has been confused in past literature. The former differs by having smaller urceolate corollas.

20. *Gentiana tibetica* King ex J. D. Hooker, Hooker's Icon. Pl. 15: 33. 1883.

西藏秦艽 xi zang qin jiao

Gentiana brevidens Regel.

Perennials 40–50 cm tall. Roots to 30 × 2 cm. Stems erect, stout, simple, glabrous. Basal leaves petiole 5–7 cm, membranous; leaf blade narrowly elliptic to ovate-elliptic, 9–16 × 4–5.5 cm, base narrowed, margin scabrous, apex acuminate to acute, veins 7–9. Stem leaves 3–5 pairs; petiole to 3.5 cm, membranous; leaf blade elliptic-lanceolate to ovate-elliptic, 9–16 × 4–5.5 cm, base obtuse to subtruncate, margin scabrous, apex acuminate to acute, veins 3–5; upper leaves distinctly larger, sessile, spreading, and surrounding flower cluster. Inflorescences crowded into terminal clusters, many flowered, rarely also in few-flowered axillary whorls. Flowers sessile. Calyx tube spathe-like, 6–8 mm, membranous, split on 1 side, apex truncate; lobes 5, dentiform, 0.3–0.5 mm. Corolla inside pale yellow to yellow-green; limb outside tinged dark brown, broadly tubular, (2.6–)3–3.2 cm; lobes ovate-triangular, 4–5 mm, margin entire, apex acute; plicae triangular, 0.5–1.5 mm, oblique, margin denticulate, apex acute. Stamens inserted at middle of corolla tube; filaments 7–9 mm; anthers narrowly ellipsoid, 1.5–2 mm. Style 2.5–3 mm; stigma lobes oblong. Capsules sessile, ellipsoid to ovoid-ellipsoid, 1.8–2.2 cm. Seeds light brown, ellipsoid, 1.3–1.5 mm. Fl. and fr. Jun–Aug.

Edges of cultivated land, roadsides, forest margins; 2100–4200 m. S and SE Xizang [Bhutan, Nepal, Sikkim].

21. *Gentiana macrophylla* Pallas, Fl. Ross. 1(2): 108. 1789.

秦艽 qin jiao

Perennials 30–60 cm tall. Roots to 30 × 2 cm. Stems ascending to erect, stout, simple, glabrous. Basal leaves petiole 3–5 cm, membranous; leaf blade elliptic-lanceolate to elliptic-ovate, 6–28 × 2.5–6 cm, base narrowed, margin scabrous, apex acuminate, veins 5–7. Stem leaves 3–5 pairs; petiole to 4 cm, membranous; leaf blade elliptic-lanceolate to narrowly elliptic, 4.5–15 × 1.2–3.5 cm, base obtuse, margin scabrous, apex acuminate, veins 3–5. Inflorescences crowded into terminal clusters, many flowered, sometimes also in few-flowered axillary whorls; axillary whorls sessile, rarely on

pedunclelike branches. Flowers sessile. Calyx tube spathe-like, membranous, split on 1 side; lobes 4 or 5, dentiform, 0.5–1 mm. Corolla blue-purple, with pale yellow base, tubular or urceolate; lobes ovate, 3–4.5 mm, margin entire, apex obtuse to subrounded; plicae triangular, 1–1.5 mm, margin entire, apex acute. Stamens inserted just below middle of corolla tube; filaments 5–7 mm; anthers narrowly ellipsoid, 2–2.5 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules ovoid-ellipsoid, 1.5–1.7 cm; gynophore short. Seeds light brown, ellipsoid, 1.2–1.5 mm. Fl. and fr. Jul–Oct.

400–3700 m. Hebei, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi [Kazakhstan, N Mongolia, Russia (Siberia)].

- 1a. Calyx ca. 1/3 as long as corolla;
corolla urceolate 21a. var. *macrophylla*
1b. Calyx ca. 1/2 as long as corolla;
corolla tubular 21b. var. *fetissowii*

21a. *Gentiana macrophylla* var. *macrophylla*

秦艽 (原变种) qin jiao (yuan bian zhong)

Gentiana jakutensis Bunge ex Grisebach; *G. quinquerivaria* Turill.

Calyx ca. 1/3 as long as corolla. Corolla urceolate, 1.8–2 cm, lobes 3–4 mm.

Stream and river banks, roadsides, grassland slopes, wet meadows, forest margins, forests; 400–2400 m. Hebei, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi [N Mongolia, Russia (Siberia)].

21b. *Gentiana macrophylla* var. *fetissowii* (Regel & Winkler) Ma & K. C. Hsia, Acta Sci. Nat. Univ. Intramongol. 6(1): 43. 1964.

大花秦艽 da hua qin jiao

Gentiana fetissowii Regel & Winkler, Trudy Imp. S.-Peterburgsk. Bot. Sada 7: 548. 1881; *G. wutaensis* C. Marquand.

Calyx ca. 1/2 as long as corolla. Corolla tubular, 2–2.5 (–2.8) cm, lobes 3.5–4.5 mm. Fl. and fr. Jul–Oct.

River banks, roadsides, grassland slopes; 600–3700 m. Hebei, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi [Kazakhstan].

22. *Gentiana siphonantha* Maximowicz ex Kusnezow, Bull. Acad. Imp. Sci. Saint-Petersbourg 34: 506. 1891.

管花秦艽 guan hua qin jiao

Gentiana siphonantha var. *latifolia* C. Marquand.

Perennials 10–25 cm tall. Roots to 25 × 1.5 cm. Stems ascending to erect, slender, simple, glabrous. Basal leaves petiole 3–6 cm, membranous; leaf blade linear, rarely broadly linear, 4–14 × 0.8–1 (–2.5) cm, base narrowed, margin scabrous, apex acuminate, veins 3–5. Stem leaves 2–5 pairs; petiole to 2 cm, membranous; leaf blade linear, 3–8 cm × 3–9 mm, base obtuse, margin scabrous, apex acuminate, veins 1–3. Inflorescences crowded into terminal clusters, many flowered, rarely also in few-flowered axillary whorls; axillary

whorls sessile, rarely on pedunclelike branches. Flowers sessile. Calyx tube 4–6 mm, sometimes split on 1 side; lobes 5, filiform to subulate, 1–3.5 mm, unequal. Corolla dark blue-purple, tubular-campanulate to funnelform, 2.3–2.6 cm; lobes oblong, 3.5–4 mm, margin entire, apex rounded; plicae triangular, 2.5–3 mm, oblique, margin entire or 2-cleft, apex acute. Stamens inserted at basal part of corolla tube; filaments 1.1–1.4 cm; anthers ellipsoid, 1.5–2.5 mm. Style 2–3 mm; stigma lobes oblong. Capsules sessile, narrowly ellipsoid to ellipsoid, 1.4–1.7 cm. Seeds brown, ellipsoid, 1.1–1.5 mm. Fl. and fr. Jul-Sep.

• River banks, meadows, dry steppes, scrub; 1800–4500 m. Gansu, Ningxia, Qinghai, NW Sichuan.

23. *Gentiana walujewii* Regel & Schmalhausen, Trudy Imp. S.-Peterburgsk. Bot. Sada 6: 334. 1879.

新疆秦艽 xin jiang qin jiao

Gentiana kesselringii Regel; *G. walujewii* var. *kesselringii* (Regel) Kusnezow.

Perennials 25–40 cm tall. Stems ascending, simple, glabrous. Basal leaves petiole 1.5–3 cm, membranous; leaf blade narrowly elliptic-lanceolate to elliptic-ovate, (7–)15–20 × (1.5–)2–4.5 cm, base narrowed, margin scabrous, apex obtuse, veins 3–5. Stem leaves 2 or 3 pairs; petiole to 1.5 cm, shorter toward apex, membranous; leaf blade lanceolate to ovate-elliptic, (3.5–)5–7 × 0.7–2.5 cm, base obtuse, margin scabrous, apex obtuse, veins 1–3; uppermost leaves sessile, spreading, surrounding flower cluster. Inflorescences crowded into terminal clusters, many flowered. Flowers sessile. Calyx tube 6–11 mm, membranous; lobes linear-lanceolate to oblanceolate, 6–8 mm, almost as long as tube, margin scabrous, apex acute to obtuse, midvein distinct. Corolla pale yellow, tubular to tubular-funnelform, (2.1–)2.5–3(–3.5) cm; lobes ovate-oblong, 4–5 mm, margin entire, apex obtuse; plicae lanceolate, 2.5–3 mm, margin entire or 2-cleft. Stamens inserted at middle of corolla tube; filaments 8–11 mm; anthers narrowly ellipsoid, 1.5–2.5 mm. Style 2–2.5 mm; stigma lobes oblong. Capsules ellipsoid, 1.3–1.5 cm; gynophore 8–10 mm. Seeds brown, ellipsoid, 1.2–1.5 mm. Fl. and fr. Aug-Sep.

River banks, hillsides; 2200–2600 m. N Xinjiang [Kazakhstan].

24. *Gentiana officinalis* Harry Smith in Handel-Mazzetti, Symb. Sin. 7: 979. 1936.

黄管秦艽 huang guan qin jiao

Gentiana gannanensis Y. Wang & Z. C. Lou; *G. macrophylla* Pallas var. *albolutea* H. Limpricht.

Perennials 15–35 cm tall. Roots to 25 × 1.5 cm. Stems ascending, simple, glabrous. Basal leaves petiole 3.5–5 cm, membranous; leaf blade lanceolate to broadly lanceolate, 7–25 × 1.5–4 cm, base narrowed, margin scabrous, apex acuminate, veins 3–7. Stem leaves 3–5 pairs; petiole to 2 cm, membranous; leaf blade lanceolate, 3–6 × 0.5–2.2 cm, base obtuse, margin scabrous, apex acuminate, veins 1–3. Inflorescences crowded into terminal clusters, many flowered, rarely also in few-flowered axillary whorls. Flowers sessile. Calyx tube 4.5–7 mm, membranous, usually split on 1 side; lobes 5, triangular, 0.5–1 mm. Corolla pale yellow, tubular,

(1.5–)1.8–2(–2.5) cm; lobes ovate, 3–3.5 mm, margin entire, apex obtuse; plicae triangular, 1–1.5 mm, oblique, margin entire, apex acute. Stamens inserted at basal part of corolla tube; filaments 5–8 mm; anthers narrowly ellipsoid, 2–2.5 mm. Style 2–2.5 mm; stigma lobes oblong. Capsules sessile, narrowly ellipsoid, 1.3–1.5 cm. Seeds light brown, ellipsoid, 1.4–1.6 mm. Fl. and fr. Aug-Sep.

• River banks, edges of cultivated land, meadow slopes, scrub, alpine meadows; 2300–4200 m. S Gansu, SE Qinghai, S Shaanxi, N Sichuan.

Gentiana gannanensis is said to be allied to *G. macrophylla*. The authors have not seen its type, but from the illustration it is apparently synonymous with *G. officinalis*.

25. *Gentiana zekuensis* T. N. Ho & S. W. Liu, Bull. Nat. Hist. Mus. London (Bot.) 23: 56. 1993.

泽库秦艽 ze ku qin jiao

Perennials 15–40 cm tall. Roots to 20 × 1.5 cm. Stems ascending, slender, simple, glabrous. Basal leaves petiole 1–3 cm, membranous; leaf blade linear-lanceolate to narrowly elliptic, 8–22.5 × 0.5–2.5 cm, base narrowed, margin scabrous, apex acuminate, veins 3–5. Stem leaves 3–5 pairs; petiole to 2 cm, membranous; leaf blade linear-lanceolate to elliptic-lanceolate, (1.2–)1.8–5.5 cm × 6–12 mm, base obtuse, margin scabrous, apex acuminate to obtuse, veins 1–3. Inflorescences crowded into terminal clusters, many flowered, rarely also in few-flowered axillary whorls. Flowers sessile. Calyx tube 4–7 mm, membranous, split on 1 side; lobes 5, filiform, 0.5–5 mm, unequal. Corolla usually pale yellow but pale blue toward limb, rarely entire corolla pale blue, tubular, 1.5–2 cm; lobes ovate, 2.5–3.5 mm, margin entire, apex acute; plicae triangular, 1–1.5 mm, oblique, margin entire, apex acute. Stamens inserted at basal part of corolla tube; filaments 6–8 mm; anthers narrowly ellipsoid, 1.5–2.5 mm. Style 2–2.5 mm; stigma lobes oblong. Capsules sessile, narrowly ellipsoid, 1.3–1.5 cm. Seeds light brown, ellipsoid, 1.4–1.6 mm. Fl. and fr. Jul-Sep.

• Moist meadows, scrub; 3200–3600 m. SE Qinghai.

26. *Gentiana robusta* King ex J. D. Hooker, Hooker's Icon. Pl. 15: 31. 1883.

粗壮秦艽 cu zhuang qin jiao

Gentiana lhakangensis C. Marquand; *G. pharica* Burkill; *G. tibetica* King ex J. D. Hooker var. *robusta* (King ex J. D. Hooker) Kusnezow.

Perennials 10–30 cm tall. Roots to 20 × 1.5 cm. Stems ascending, simple, glabrous. Basal leaves petiole 2–3 cm, membranous; leaf blade elliptic-lanceolate to ovate-elliptic, 8–23 × 2–4.5 cm, base narrowed, margin scabrous, apex acuminate, veins 3–5. Stem leaves 3–5 pairs; petiole ca. 2 cm, shorter toward apex, membranous; leaf blade lanceolate, 3.5–6.5 × 0.7–1.7 cm, base obtuse, margin scabrous, apex acuminate, veins 1–3; uppermost leaves sessile, spreading, surrounding flower cluster. Inflorescences crowded into terminal clusters, many flowered, sometimes also in few-flowered axillary whorls rarely subapical on pedunclelike branches. Flowers sessile. Calyx tube 1.2–2 cm, membranous,

split on 1 side; lobes (3–)5, filiform, 0.5–5 mm, unequal. Corolla yellow-white, greenish white, or yellow-green, tubular-campanulate to campanulate, 3–3.5 cm; lobes ovate to ovate-triangular, 5–6 mm, margin entire, apex acute to obtuse; plicae triangular to truncate, 2–2.5 mm, oblique, margin denticulate. Stamens inserted at basal part of corolla tube; filaments 1–1.3 cm; anthers narrowly ellipsoid, 2.5–3 mm. Style 2–2.5 mm; stigma lobes oblong. Capsules ovoid-ellipsoid, 1.8–2 cm; gynophore 2–3 mm. Seeds dark brown, narrowly ellipsoid, 1.5–1.7 mm. Fl. and fr. Jul-Oct.

Edges of cultivated land, roadsides, hillsides, alpine meadows; 3500–4800 m. S and SE Xizang [Nepal, Sikkim].

27. *Gentiana dendrologi* C. Marquand, Bull. Misc. Inform. Kew 1931: 79. 1931.

川西秦艽 chuan xi qin jiao

Perennials 20–35 cm tall. Stems erect, slender, simple, glabrous. Basal leaves petiole 6–14 cm, membranous; leaf blade linear-lanceolate to linear-elliptic, 10–24 × 0.8–1.5 (–2.5) cm, base narrowed, margin scabrous, apex acuminate, veins 5–7. Stem leaves 4 or 5 pairs; petiole to 3 cm, membranous; leaf blade similar to those of rosette leaves, 3–10 cm × 6–10(–12) mm; upper leaves smaller and with shorter petioles; uppermost leaves sessile, spreading, surrounding flower cluster. Inflorescences crowded into terminal clusters, many flowered, sometimes also in few-flowered axillary whorls, subapical whorls rarely on pedunclelike branches. Flowers sessile. Calyx tube spathe-like, 1.2–1.5 cm, membranous, split on 1 side; lobes 5, filiform, 1–2 mm. Corolla pale yellow, tubular-funnelform, 2.5–3 cm; lobes ovate, 4–5 mm, margin entire, apex acute; plicae triangular, 1.5–2.5 mm, oblique, margin dentate, apex acute. Stamens inserted at basal part of corolla tube; filaments 1–1.3 cm; anthers narrowly ellipsoid, 1.5–2 mm. Style 1.5–2 mm; stigma lobes linear. Capsules sessile, ovoid-ellipsoid, 1.8–2 cm. Seeds light brown, ellipsoid, 1.4–1.6 mm. Fl. and fr. Jul-Aug.

III. Sect. *Kudoa* (Masamune) Satake & Toyokuni ex Toyokuni, J. Jap. Bot. 35: 202. 1960.

多枝组 duo zhi zu

Kudoa Masamune, J. Soc. Trop. Agric. 2: 29. 1930; *Gentiana* sect. *Monopodiae* (Harry Smith) T. N. Ho; *Gentiana* subsect. *Monopodiae* Harry Smith.

Perennials. Roots linear-cylindric, lax, fleshy, arising from a collar. Stems branching monopodially. Stamens unequal (equal in *Gentiana altorum*). Seed coat alveolate, with simple shallow hexagonal pits.

Thirty-nine species: Asia; 30 species in China.

29. *Gentiana rigescens* Franchet in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 134. 1890.

滇龙胆 dian long dan

Gentiana esquirolii H. Léveillé; *G. rigescens* var. *stictantha* C. Marquand; *G. rigescens* var. *violacea* Harry Smith.

Perennials (10–)20–50 cm tall. Flowering stems simple, erect, rigid, woody at base, papillate when young. Basal

• Meadow slopes; 3000–4500 m. N and W Sichuan.

Gentiana dendrologi has been considered to be a synonym of *G. straminea* or *G. robusta*. However, it differs from the former by its smaller, sessile flowers crowded into a capitulum, and from the latter by the much narrower basal rosette leaves and tubular-funnelform corollas only 6–8 mm diam. at the throat.

28. *Gentiana olgae* Regel & Schmalhaus, Izv. Obshch. Ljubit. Estestv. Moskovsk. Univ. 34(2): 55. 1882.

北疆秦艽 bei jiang qin jiao

Gentiana grombczewskii Kusnezow; *G. renardii* Regel.

Perennials 25–35 cm tall. Roots 0.9–1.2 cm in diam. Stems ascending, slender, simple, glabrous. Basal leaves petiole 3–4.5 cm, slender, membranous; leaf blade linear-lanceolate, linear-elliptic, or oblanceolate, (5–)8–13 × 0.8–(–2.2) cm, base narrowed, margin scabrous, apex obtuse, veins 3–5. Stem leaves 2 or 3 pairs; petiole to 3.5 cm, shorter toward stem apex, membranous; leaf blade linear to linear-elliptic, 2.5–9 × 0.4–1.5 cm, base obtuse, margin scabrous, apex acuminate to obtuse, veins 1–3; uppermost leaves sessile, spreading, surrounding flower cluster. Inflorescences crowded into terminal clusters, many flowered, sometimes also in few-flowered axillary whorls; subapical whorls rarely on pedunclelike branches. Flowers sessile. Calyx tube 6–13 mm, membranous, usually split on 1 side; lobes 5, linear to dentiform, (2–)3–4 mm, unequal. Corolla pale yellow, sometimes with brown spots in throat, tubular-funnelform, (2.5–)3–3.5 cm; lobes ovate-oblong, 4–5 mm, margin entire, apex obtuse; plicae lanceolate, 2–2.5(–3.5) mm, slightly 2-cleft. Stamens inserted at middle of corolla tube; filaments 0.9–1.1 cm; anthers narrowly ellipsoid, 1–2 mm. Ovary ellipsoid, 1.3–1.5 cm; gynophore 0.9–1.1 cm. Style 1–1.5 mm; stigma lobes oblong. Fl. Aug-Oct.

Steppes; 3000–3100 m. N Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan].

rosette absent or very poorly developed. Stem leaves 7–15 pairs; lower leaves 2 or 3 pairs, scalelike, membranous; middle to upper leaves with petiole 5–8 mm, margin ciliate; leaf blade oblong, ovate-oblong, obovate-lanceolate, or obovate, 1.2–4.5 × 0.7–2.2 cm, thick herbaceous to subleathery, margin slightly revolute and scabrous, apex obtuse to rounded, veins 1–3. Inflorescences terminal clusters, 3–10-flowered, rarely also subapical axillary clusters on pedunclelike branches. Flowers sessile. Calyx narrowly obconic, 1–1.2 cm, tube membranous; lobes very unequal,

larger 2 lobes oblong to obovate-oblong, 5–8 mm, base narrowed, apex obtuse, vein 1; smaller 3 lobes, linear to lanceolate, 2–3.5 mm, base not narrowed, apex acuminate, vein 1. Corolla violet, with blue spots in throat, tubular-campanulate, 2.5–3 cm; lobes broadly ovate, 5–5.5 mm, margin entire or denticulate, apex acute; plicae triangular, 1.5–2 mm, oblique, margin entire, apex obtuse. Stamens inserted at basal part of corolla tube; filaments 1.4–1.6 cm; anthers narrowly ellipsoid, 2.5–3 mm. Style 2–3 mm; stigma lobes linear. Capsules ovoid-ellipsoid to ellipsoid, 1–1.2 cm; gynophore to 1.5 cm. Seeds light brown, subglobose, 0.6–1 mm. Fl. and fr. Aug-Dec.

Grassland slopes, valleys, scrub, forests; 1100–3000 m. Guizhou, Sichuan, Yunnan [Myanmar].

30. *Gentiana davidii* Franchet, Pl. David. 5: 211. 1884.

五岭龙胆 *wu ling long dan*

Perennials 3–15(–28) cm tall. Vegetative stems usually short; flowering stems simple, ascending, apically papillate, not horizontally elongated basally nor producing a basal rosette. Leaf blade linear-lanceolate to elliptic-lanceolate, base narrowed, margin slightly revolute and scabrous, apex acuminate to obtuse, veins 1–3. Basal rosette leaves 3–5 pairs; petiole 5–11 mm, membranous; leaf blade 3–7 cm × 6–12 mm. Stem leaves 5–10 pairs, distinctly larger toward apex, apically crowded and subtending flower cluster; petiole 4–7 mm; leaf blade 1.3–5.5 × 3–8 mm. Inflorescences terminal clusters, (1–)3–10-flowered. Flowers sessile, 5-merous. Calyx narrowly obconic, 0.9–1.6 cm, tube membranous; lobes 3–7 mm, very unequal, 2 larger and 3 smaller, linear-lanceolate to lanceolate, base ± narrowed, margin scabrous, apex acuminate, midvein distinct. Corolla blue, tubular-campanulate to funnelform, 1.5–4 cm; lobes ovate to triangular, 2.5–4 mm, margin entire, apex acute and caudate; plicae triangular or subtruncate, 0.5–2.5 mm, oblique, margin entire or denticulate, apex acute to subtruncate. Stamens inserted at basal part of corolla tube; filaments 0.6–1.5 cm; anthers narrowly ellipsoid, 1.5–2 mm. Style 4–6 mm; stigma lobes linear. Capsules narrowly ellipsoid to ovoid-ellipsoid, 1–1.7 cm; gynophore to 2.5 cm. Seeds light brown, subglobose, 0.6–1 mm. Fl. and fr. Aug-Nov.

• 300–3000 m. Anhui, Fujian, Guangdong, Guangxi, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Taiwan, Zhejiang.

- 1a. Plicae subtruncate 30c. var. *fukienensis*
- 1b. Plicae triangular.
- 2a. Corolla 3–4 cm 30a. var. *davidii*
- 2b. Corolla (1.5–)2–2.5 cm 30b. var. *formosana*

30a. *Gentiana davidii* var. *davidii*

五岭龙胆 (原变种) *wu ling long dan (yuan bian zhong)*

Gentiana atkinsonii Burkill.

Plants 5–15 cm tall. Corolla 3–4 cm, plicae triangular.

• Grasslands and roadside slopes, forest margins, forests; 300–2500 m. Anhui, Fujian, Guangdong, Guangxi, Hainan, Henan, Hubei,

Hunan, Jiangsu, Jiangxi, Taiwan, Zhejiang.

30b. *Gentiana davidii* var. *formosana* (Hayata) T. N. Ho, Fl. Reipubl. Popularis Sin. 62: 103. 1988.

台湾龙胆 *tai wan long dan*

Gentiana formosana Hayata, J. Coll. Sci. Imp. Univ. Tokyo 22: 242. 1906; *G. fasciculata* Hayata.

Plants 5–10 cm tall. Corolla (1.5–)2–2.5 cm, plicae triangular.

• Grasslands; 500–3000 m. Taiwan.

30c. *Gentiana davidii* var. *fukienensis* (Ling) T. N. Ho, Novon 4: 370. 1994.

福建龙胆 *fu jian long dan*

Gentiana fukienensis Ling, Contr. Inst. Bot. Natl. Acad. Peiping 6(4): 217. 1949.

Plants 2.5–4 cm tall. Corolla 1.5–2 cm, plicae subtruncate.

• Sunny slopes, 1300–1500 m. Fujian, Taiwan.

31. *Gentiana cephalantha* Franchet in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 125. 1890.

头花龙胆 *tou hua long dan*

Perennials (10–)20–50 cm tall. Stems glabrous or copiously glandular toward apex; vegetative stems short; flowering stems simple, ascending, base usually woody, basally horizontal, with a basal rosette. Basal leaves with petiole 0.7–3 cm, membranous; leaf blade 3.5–10 × 0.8–2.2 cm, narrowly elliptic to elliptic-lanceolate, uppermost leaves oblanceolate, base narrowed, margin slightly revolute and scabrous, apex acuminate to obtuse, veins 1–3. Stem leaves 4–10 pairs, distinctly larger toward apex, apically crowded and subtending terminal flower cluster; petiole 5–12 mm; leaf blade 3–7 × 1.2–2.2 cm. Inflorescences terminal clusters, (3–)5–12-flowered, occasionally also subapical axillary clusters on pedunclelike branches. Flowers sessile. Calyx obconic, 1.5–2 cm, tube membranous; lobes very unequal, herbaceous, base narrowed, margin ± scabrous, apex acuminate, midvein distinct; larger 2 lobes, spatulate, 7–9 mm, apex obtuse; smaller 3 lobes linear-lanceolate, 5.5–6.5 mm. Corolla blue, tubular-campanulate to funnelform, 2.5–3.5 cm; lobes ovate to triangular, 4–5 mm, margin entire, apex acute; plicae triangular, 1–1.5 mm, oblique, margin entire, apex acute. Stamens inserted at basal part of corolla tube; filaments 1.3–1.5 cm; anthers ellipsoid, 2.5–3 mm. Style 2–3 mm; stigma lobes linear. Capsules ellipsoid, 1.2–1.5 cm; gynophore to 1.7 cm. Seeds light brown, ellipsoid to subglobose, 0.4–0.6 mm. Fl. and fr. Aug-Nov.

1800–4500 m. Guangxi, Guizhou, Sichuan, Yunnan [Myanmar, Thailand, Vietnam].

- 1a. Stems completely glabrous 31a. var. *cephalantha*
- 1b. Stems copiously glandular toward

apex 31b. var. *vaniotii*

31a. *Gentiana cephalantha* var. *cephalantha*

头花龙胆 (原变种) tou hua long dan (yuan bian zhong)

Stems completely glabrous.

Grassland and roadside slopes, scrub, forest margins, forests; 1800–4500 m. Guangxi, Guizhou, Sichuan, Yunnan [Myanmar, Thailand, Vietnam].

31b. *Gentiana cephalantha* var. *vaniotii* (H. Léveillé) T. N. Ho, *Novon* 4: 370. 1994.

腺龙胆 xian long dan

Gentiana vaniotii H. Léveillé, *Repert. Sp. Nov. Regni Veg.* 12: 182. 1913.

Stems copiously glandular toward apex.

• Grassland slopes, forests; 1800–1900 m. Yunnan.

The two syntypes of *Gentiana vaniotii* belong to different taxa. The lectotype, *Bodinier* 31, corresponds to the original description, whereas *Esquirol* 701 is *G. rigescens*.

32. *Gentiana jingdongensis* T. N. Ho, *Acta Phytotax. Sin.* 23: 46. 1985.

景东龙胆 jing dong long dan

Perennials 1–2 cm tall. Stems short, with crowded leaves and few flowering branches crowded into a tuft. Petiole 5–12 mm, slender; leaf blade ovate, 8–10 × 5–8 mm, base obtuse to subtruncate, margin slightly revolute, apex acute, midvein distinct. Leaves of flowering branches 2–3 mm, bractlike. Inflorescences subapical, axillary, 1- or 2-flowered. Flowers sessile, 4-merous. Calyx campanulate, 6–7 mm; lobes linear, 1.5–2 mm, equal. Corolla blue, subcylindric, 1.7–2 cm; lobes ovate, 2.5–3 mm, margin entire, apex obtuse; plicae oblique, truncate, margin entire. Stamens inserted at middle of corolla tube; filaments 1.1–1.3 cm, unequal; anthers ellipsoid, 1–1.5 mm. Ovary ellipsoid to obovoid-ellipsoid, 6–7 mm; gynophore 4–5 mm. Style 2.5–3 mm; stigma lobes linear. Fl. Apr.

• Roadside slopes; 2800–2900 m. C Yunnan.

33. *Gentiana melandriifolia* Franchet in F. B. Forbes & Hemsley, *J. Linn. Soc., Bot.* 26: 129. 1890.

女娄菜叶龙胆 nu lou cai ye long dan

Perennials 5–7 cm tall. Vegetative stems usually prolonged; flowering stems simple, ascending, apically papillate, basally prostrate, producing a basal rosette. Leaf blade oblong, ovate-oblong, elliptic, ovate, or obovate, base abruptly narrowed, margin slightly revolute, apex obtuse, veins 1–3. Basal rosette leaves well developed; petiole 0.8–2 cm, slender; leaf blade 1.4–3.2 × 0.6–1.8 cm. Stem leaves 4 or 5 pairs, distinctly larger toward apex, crowded close to calyx; petiole 5–10 mm, slender; leaf blade 7–13 × 3–10 mm. Inflorescences terminal, 1–3-flowered. Flowers sessile. Calyx obconic, 1.2–1.5 cm, tube membranous; lobes narrowly

triangular, 3–5 mm, equal, margin membranous, apex acute, midvein distinct. Corolla pale blue, with dark blue spots in throat, funnelform, 3.2–4.5 cm; lobes ovate, 4.5–5.5 mm, margin entire or denticulate, apex acute; plicae ovate, 1–1.5 mm, oblique, margin denticulate, apex obtuse. Stamens inserted at basal part of corolla tube; filaments 1.1–1.5 cm; anthers ellipsoid, 1.2–1.5 mm. Style 5–6 mm; stigma lobes linear. Capsules ellipsoid to ovoid-ellipsoid, 1–1.2 cm; gynophore to 1.7 cm. Seeds light brown, subglobose, 0.7–0.9 mm. Fl. and fr. May–Oct.

• Rocky slopes; 2200–3000 m. C and NW Yunnan.

34. *Gentiana duclouxii* Franchet, *Bull. Soc. Bot. France* 46: 305. 1899.

昆明龙胆 kun ming long dan

Perennials 4–7 cm tall. Vegetative stems usually prolonged; flowering stems simple, erect, glabrous, basally prostrate, producing a basal rosette. Leaf blade spatulate to oblong-oblancheolate, base gradually narrowed into a broad petiole, margin slightly revolute, veins 1–3. Basal rosette leaves well developed; petiole 1–3.5 cm, narrowly winged; leaf blade 1–4 cm × 5–12 mm. Stem leaves several pairs, crowded close to calyx; petiole 7–10 mm; leaf blade 8–10 × 2–3 mm. Inflorescences subapical, 1–3-flowered. Flowers sessile. Calyx narrowly obconic, 1.3–1.5 mm, tube membranous; lobes triangular, 1–1.5 mm, unequal, margin membranous, apex acute, midvein distinct. Corolla rose with blue spots in throat, funnelform, 3–4 cm; lobes ovate-triangular, 4–5 mm, margin entire, apex obtuse; plicae ovate, 1.5–2 mm, oblique, margin denticulate, apex obtuse. Stamens inserted at basal part of corolla tube; filaments 1–1.4 cm; anthers ellipsoid, 1–1.3 mm. Style 3–4 mm; stigma lobes linear. Capsules ellipsoid, 1.2–1.5 cm; gynophore to 2 cm. Seeds light brown, ellipsoid, 0.8–1 mm. Fl. and fr. Apr–Oct.

• Hillsides; 1800–1900 m. C Yunnan.

35. *Gentiana stipitata* Edgeworth, *Trans. Linn. Soc. London* 20: 84. 1846.

短柄龙胆 duan bing long dan

Perennials 4–10 cm tall, base surrounded by numerous black remnants of old leaves. Taproot short, stout. Stems ascending, 6–7 cm, simple, sometimes papillate. Leaves flat; petiole to 1 cm, membranous; leaf blade base narrowed, margin cartilaginous, apex acute to obtuse, midvein scabrous. Basal leaves forming a rosette; leaf blade narrowly elliptic to elliptic-lanceolate, 1.5–2 cm × 4–6 mm. Stem leaves 7–12 pairs; lower leaves widely spaced, leaf blade broadly oblong, ovate, or ovate-orbicular, 4–7 × 2.5–4 mm; upper leaves crowded, leaf blade elliptic-lanceolate, elliptic, or oblanceolate, 1–1.6 cm × 4–8 mm. Flowers terminal, solitary, sessile. Calyx tube obconic, 0.8–1.2 cm, membranous; lobes obovate to spatulate, 5–10 mm, unequal, herbaceous, base narrowed, margin cartilaginous, apex obtuse, midvein scabrous. Corolla pale blue-gray, rarely white, with dark blue spots and stripes, tubular-campanulate to campanulate, 2.5–4

cm; lobes ovate, 4–4.5 mm, margin entire, apex obtuse and cuspidate, awned; plicae ovate, 2–2.5 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube; filaments 0.8–1.2 cm; anthers narrowly ellipsoid, 4–4.5 mm. Style 1–1.5 cm; stigma lobes narrowly triangular. Capsules ovoid-ellipsoid, 1.5–1.7 cm; gynophore to 6 mm. Seeds dark brown, ellipsoid, 1.3–1.5 mm. Fl. and fr. Jun–Nov.

3200–4600 m. Gansu, Qinghai, W Sichuan, Xizang [NW India, Nepal].

- 1a. Corolla lobes distinctly awned 35a. subsp. *stipitata*
1b. Corolla lobes indistinctly awned 35b. subsp. *tizuensis*

35a. *Gentiana stipitata* subsp. *stipitata*

短柄龙胆 (原变种) *duan bing long dan* (*yuan bian zhong*)

Corolla 2.5–3 cm, lobes distinctly awned.

Stream and river banks, alpine meadows; 3200–4200 m. E Xizang [NW India, Nepal].

35b. *Gentiana stipitata* subsp. *tizuensis* (Franchet) T. N. Ho, *Novon* 4: 371. 1994.

提宗龙胆 *ti zong long dan*

Gentiana tizuensis Franchet, *Bull. Soc. Bot. France* 43: 494. 1896.

Corolla (2.5–)3–4 cm, lobes indistinctly awned.

• Stream and river banks, alpine scrub and meadows; 3200–4600 m. Gansu, Qinghai, W Sichuan, Xizang.

36. *Gentiana szechenyii* Kanitz, *Pl. Exped. Szechenyi in As. Centr. Coll.* 40. 1891.

大花龙胆 *da hua long dan*

Gentiana callistantha Diels & Gilg; *G. rosularis* Franchet.

Perennials 5–7 cm tall. Taproot short, stout. Stems ascending, 2–3 cm, simple, glabrous; caudex sheathed by black membranous remnants of old petioles. Leaf blade sometimes folded, base slightly broadened, margin cartilaginous, apex acuminate, midvein scabrous. Basal rosette leaves well developed; petiole to 1 cm, membranous; leaf blade lanceolate to ensiform-lanceolate, 4–6 cm × 3–10 mm. Stem leaves 2–4 pairs, upper leaves 2 (or 3) pairs, surrounding calyx; petiole to 6 mm, membranous; leaf blade lanceolate, ovate-lanceolate, or ovate-triangular, 1.5–3 cm × 3–6 mm. Flowers terminal, solitary, sessile. Calyx tube obconic, 1.2–1.7 cm, membranous; lobes lanceolate to elliptic, 0.7–1.7 cm, unequal, margin and midvein cartilaginous and scabrous, apex acuminate to obtuse. Corolla white when fresh but pale yellow or pale blue when dry, with greenish spots and blue stripes, campanulate, 4–6 cm; lobes broadly ovate, 5–6 mm, margin entire, apex rounded and cuspidate; plicae ovate, 2.5–3 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube; filaments 1.5–1.7 cm; anthers narrowly ellipsoid, 4–5 mm. Style 1–1.3

cm; stigma lobes triangular. Capsules narrowly ellipsoid, 1.7–2 cm; gynophore to 2.3 cm. Seeds dark brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jun–Nov.

• Alpine meadows; 3000–4800 m. S Gansu, Qinghai, W Sichuan, SE Xizang, NW Yunnan.

Gentiana szechenyii is a very common and variable species. The calyx lobes show considerable variation. They are unequal and usually lanceolate to elliptic, but sometimes even on the same plant the calyx lobes can be elliptic, lanceolate, and toothlike. The corolla color has been described as blue or pale yellow, but in living plants is white with blue stripes and spots, and it changes color on drying.

37. *Gentiana georgei* Diels, *Notes Roy. Bot. Gard. Edinburgh* 5: 221. 1912.

滇西龙胆 *dian xi long dan*

Perennials 5–7 cm tall. Taproot short, stout. Stems ascending 2–3 cm, simple, glabrous; caudex sheathed by black membranous remnants of old petiole. Leaf blade sometimes folded, base slightly broadened, margin cartilaginous and scabrous, apex acuminate, midvein distinct. Basal rosette leaves well developed; petiole to 1 cm, membranous; leaf blade lanceolate, ensiform-lanceolate, or ovate-triangular, 4–8 cm × 3–13 mm. Stem leaves 2–4 pairs, upper leaves 2 (or 3) pairs, surrounding calyx; petiole to 6 mm, membranous; leaf blade lanceolate to ovate-lanceolate, 1.5–4 cm × 3–8 mm. Flowers terminal, solitary, sessile. Calyx tube obconic, 1.2–2 cm, membranous; lobes lanceolate, elliptic, or elliptic-triangular, 0.7–1.7 cm, unequal, margin and midvein cartilaginous and scabrous, apex acuminate to obtuse. Corolla ruddy purple, with paler base when fresh, usually without spots and stripes, campanulate, 4–6 cm; lobes broadly ovate, 7–10 mm, margin entire, apex rounded and cuspidate; plicae ovate, 3–5 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube; filaments 1.5–1.7 cm; anthers narrowly ellipsoid, 4–5 mm. Ovary ovoid-ellipsoid, 1.3–1.5 cm; gynophore 8–10 mm. Style 1–2 cm; stigma lobes triangular. Fl. and fr. Aug–Nov.

• Grassland slopes, alpine meadows; 3000–4200 m. S Gansu, S Qinghai, N Sichuan, NW Yunnan.

38. *Gentiana ecaudata* C. Marquand, *Bull. Misc. Inform. Kew* 1928: 51. 1928.

无尾尖龙胆 *wu wei jian long dan*

Perennials 4–10 cm tall. Stems ascending, simple, papillate. Basal rosette leaves absent or poorly developed; leaf blade triangular, 3–7 × 1–1.5 mm, membranous, apex acute. Stem leaves in whorls of 4(–6), larger and more crowded toward apex, uppermost surrounding calyx; leaf blade base connate for 2–3 mm, margin scabrous-ciliate, midvein abaxially distinct. Lower stem leaves withered at anthesis, ovate, 2–3 × 1.5–2 mm, apex acute; middle to upper leaves linear to linear-lanceolate, 5–10 × 1.5–2 mm, apex acuminate. Flowers terminal, solitary, sessile, 5(–8)-merous. Calyx tube obconic, 6–8 mm, membranous; lobes linear, 8–10 mm, herbaceous, margin scabrous-ciliate, apex acuminate, midvein distinct. Corolla pale blue-gray, with dark blue stripes, usually closed, tubular, 3–3.5 cm; lobes triangular, 4.5–5.5 mm,

margin denticulate, apex acute and not caudate; plicae broadly triangular, 1–2 mm, margin entire or denticulate, apex obtuse. Stamens inserted just below middle of corolla tube; filaments 6–8 mm; anthers ellipsoid, 2–2.5 mm. Style 4–5 mm; stigma lobes triangular. Capsules ellipsoid, 1–1.2 cm; gynophore to 1.2 cm. Seeds dark brown, ellipsoid, 1–1.2 mm. Fl. and fr. Oct.

• Meadow slopes; 3000–4500 m. SE Xizang, NW Yunnan.

39. *Gentiana ternifolia* Franchet, Bull. Soc. Bot. France 31: 377. 1884.

三叶龙胆 san ye long dan

Perennials 4–10 cm tall. Stems ascending, simple, papillate. Basal rosette leaves poorly developed; leaf blade triangular, 5–10 × 1.5–2 mm, herbaceous, apex acute. Stem leaves in whorls of ca. 3, larger and more crowded toward apex, uppermost leaves surrounding calyx; leaf blade base connate for 2–3 mm, margin smooth, midvein abaxially distinct. Lower stem leaves withered at anthesis, lanceolate to ovate, 5–8 × 1.5–2 mm, apex acute; middle to upper leaves linear to linear-lanceolate, 0.8–1.7 cm × 1.5–2 mm, apex acuminate. Flowers terminal, solitary, sessile, 5-merous. Calyx tube obconic, 1.2–1.4 cm, membranous; lobes linear, 1–1.7 mm, herbaceous, margin smooth, apex acuminate, midvein distinct. Corolla blue, with dark blue stripes, tubular-campanulate to funnelliform, 4.5–6(–7) cm; lobes ovate-triangular, 5–6 mm, margin entire, apex obtuse and cuspidate; plicae ovate, 2–2.5 mm, margin denticulate, apex obtuse. Stamens inserted at middle of corolla tube; filaments 1–1.2 cm; anthers ellipsoid, 2–2.5 mm. Ovary narrowly ellipsoid, 1.1–1.3 cm; gynophore 1.6–1.8 cm. Style 3–4 mm; stigma lobes triangular. Fl. Apr-May.

• Wet meadows; 3000–4100 m. N Yunnan.

40. *Gentiana yakushimensis* Makino, Bot. Mag. (Tokyo) 23: 252. 1909.

台湾轮叶龙胆 tai wan lun ye long dan

Perennials 10–15 cm tall. Stems erect, simple, glabrous. Basal rosette leaves poorly developed; leaf blade triangular, 3–7 × 1–1.5 mm, membranous, margin weakly hispid, apex acute, midvein distinct. Stem leaves in whorls of 3 or 4, middle leaves larger than lower or upper leaves, uppermost leaves surrounding calyx; leaf blade linear-lanceolate, 1–1.5 cm × 1.5–3 mm, base connate for 2–3 mm, margin smooth and slightly revolute, midvein abaxially distinct. Flowers terminal, solitary, sessile, 6–8-merous. Calyx tube campanulate, 6–8 mm, membranous; lobes narrowly elliptic, 3.5–4.5 mm, herbaceous, base narrowed, margin smooth and slightly revolute, apex obtuse, midvein distinct. Corolla blue, tubular-campanulate, 2.5–4.2 mm; lobes ovate, 2.5–3 mm, margin erose, apex obtuse; plicae narrowly triangular, as long as lobes, margin erose, apex obtuse. Stamens inserted at basal part of corolla tube; filaments 8–10 mm; anthers ellipsoid, 1.5–2 mm. Ovary narrowly obovoid, ca. 1 cm; gynophore ca. 5 mm. Style ca. 4 mm; stigma lobes narrowly oblong. Capsules ellipsoid; gynophore short. Seeds fusiform.

Grassland slopes. Taiwan [Japan].

41. *Gentiana tetraphylla* Maximowicz ex Kusnezow, Bull. Acad. Imp. Sci. Saint-Petersbourg 35: 349. 1894.

四叶龙胆 si ye long dan

Gentiana ×quaterna Harry Smith; *G. ×quaterna* subsp. *longiflora* Harry Smith.

Perennials 8–13 cm tall. Stems ascending, simple, papillate. Basal rosette leaves absent or poorly developed; leaf blade triangular, 3–7 × 1–1.5 mm, membranous, apex acute. Stem leaves in whorls of 4 (or 5), larger and more crowded toward apex, uppermost leaves surrounding calyx; leaf blade base connate for 2–3 mm, margin smooth, apex obtuse, midvein abaxially distinct. Lower to middle stem leaves oblong to ovate, 2–3 × 1–1.5 mm, apex acute; upper leaves linear-spatulate to narrowly oblong, 4–8 × 1–1.5 mm. Flowers terminal, solitary, sessile, 6–8-merous. Calyx tube narrowly obconic, 0.9–1.2 cm; lobes linear-spatulate to narrowly oblong, 4–5 mm, herbaceous, base narrowed, margin smooth, apex obtuse, midvein distinct. Corolla pale blue, with pale yellow base and dark blue stripes, tubular to tubular-campanulate, 4–4.5 cm; lobes ovate, 2–2.5 mm, margin denticulate, apex obtuse with a caudate tip less than 1 mm; plicae oblong to broadly ovate, 0.8–1 mm, margin denticulate, apex obtuse. Stamens inserted just below middle of corolla tube; filaments 0.9–1.1 cm; anthers ellipsoid, 2–2.5 mm. Ovary ovoid-ellipsoid, 7–8 mm; gynophore 0.9–1.1 cm. Style 4–4.5 mm; stigma lobes linear. Fl. Aug.

• Grassland slopes; 3300–4500 m. N and W Sichuan.

42. *Gentiana hexaphylla* Maximowicz ex Kusnezow, Bull. Acad. Imp. Sci. Saint-Petersbourg 35: 349. 1894.

六叶龙胆 liu ye long dan

Gentiana hexaphylla var. *caudata* C. Marquand; *G. hexaphylla* var. *pentaphylla* Harry Smith; *G. hexaphylla* var. *septemloba* Harry Smith; *G. ×quaterna* Harry Smith var. *octoloba* Harry Smith; *G. ×quaterna* subsp. *sankarensis* Harry Smith.

Perennials 5–20 cm tall. Stems ascending, simple, papillate. Basal rosette leaves absent or poorly developed; leaf blade triangular, 5–10 × 1.5–2 mm, membranous, base connate for 2–3 mm, margin smooth, midvein distinct. Stem leaves in whorls of 6 or 7, larger and more crowded toward apex, uppermost surrounding calyx; leaf blade margin smooth, apex acute, midvein abaxially distinct. Lower stem leaves withered at anthesis, lanceolate to ovate, 2.5–6 × 1–2 mm, apex acute; middle to upper leaves linear-spatulate, 5–15 × 1.5–3 mm. Flowers terminal, solitary, sessile, (5- or 6- or 7- (or 8)-merous. Calyx tube narrowly obconic, 8–10 mm; lobes linear-spatulate, 5–11 mm, herbaceous, margin smooth, midvein distinct, apex obtuse. Corolla blue, with pale yellow-white base and dark blue streaks, tubular-campanulate, 3.5–5 cm; lobes broadly ovate to ovate-orbicular, 4.5–6 mm, margin erose, apex acute to obtuse and with a caudate tip 2–2.5 mm; plicae broadly triangular, 0.5–1 mm, margin erose, apex

obtuse. Stamens inserted at basal part of corolla tube; filaments 2–3 mm; anthers narrowly ellipsoid, 2–3 mm. Style 3–5 mm; stigma lobes oblong. Capsules ovoid-ellipsoid, 1.3–1.7 cm; gynophore to 5 cm. Seeds light brown, ellipsoid to ovoid, 1.2–1.5 mm. Fl. and fr. Jul-Sep.

• Grassland and roadside slopes, alpine meadows, scrub; 2700–4400 m. S Gansu, SE Qinghai, Shaanxi (Taibai Shan), N and W Sichuan.

43. *Gentiana arethusae* Burkill, J. Proc. Asiat. Soc. Bengal 2: 309. 1906.

川东龙胆 chuan dong long dan

Perennials 10–15 cm tall. Stems very numerous, ascending, simple, papillate. Basal rosette leaves poorly developed; leaf blade triangular, 3–7 × 1–1.5 mm, membranous, margin weakly hispid, apex acute, midvein distinct. Stem leaves in whorls of 6 (or 7), larger toward apex, uppermost surrounding calyx; leaf blade base connate for 2–3 mm, margin smooth, apex acute to acuminate, midvein abaxially distinct. Lower stem leaves withered at anthesis, ovate-elliptic, 3–5 × 1–1.5 mm; middle to upper leaves 1–1.7 cm × 1–1.5 mm. Flowers terminal, solitary, sessile, (5- or 6- or 7-merous. Calyx tube narrowly obconic, 1–1.3 cm; lobes linear, 1–1.4 cm, herbaceous, margin smooth, apex acuminate, midvein distinct. Corolla blue, with dark blue stripes, tubular-campanulate or campanulate-funnelform, 3.5–6 cm, throat 1.5–2.5 cm in diam.; lobes ovate, 4–5 mm, margin entire, apex obtuse with a caudate tip 2–2.5 mm; plicae broadly ovate, 1–1.5 mm, margin entire, apex obtuse. Stamens inserted at basal part of corolla tube; filaments 1.7–2 cm; anthers ellipsoid, 2–2.5 mm. Style 3–5 mm; stigma lobes linear. Capsules ellipsoid, 1.4–1.6 cm; gynophore to 3 cm. Seeds light brown, ellipsoid, 0.8–1 mm. Fl. and fr. Aug-Sep.

• 2000–4800 m. E Sichuan, SE Xizang, NW Yunnan.

Gentiana arethusae is very similar to *G. hexaphylla*, supposedly differing only by the linear and acuminate upper stem leaves and calyx lobes. However, these character states are not consistent, and perhaps *G. arethusae* should be included within *G. hexaphylla*.

- 1a. Corolla tubular to tubular-campanulate 43a. var. *arethusae*
1b. Corolla campanulate-funnelform 43b. var. *delicatula*

43a. *Gentiana arethusae* var. *arethusae*

川东龙胆 (原变种) chuan dong long dan (yuan bian zhong)

Corolla tubular to tubular-campanulate, 5–6 cm, throat 1.5–1.8 cm in diam. Style 3–5 mm.

• Grassland slopes; 2000–3000 m. E Sichuan.

There is a specimen from W Sichuan, *G. L. Chu s.n.* collected in 1935, which is inadequate for certain identification but may well be *Gentiana arethusae* var. *arethusae*, which would extend the distribution farther west.

43b. *Gentiana arethusae* var. *delicatula* C. Marquand, Bull. Misc. Inform. Kew 1931: 81. 1931.

七叶龙胆 qi ye long dan

Gentiana arethusae var. *rotundatalobata* C. Marquand; *G. heptaphylla* I. B. Balfour & Forrest; *G. heptaphylla* var. *mixta* Harry Smith; *G. subocculata* C. Marquand.

Corolla campanulate-funnelform, 3.5–4.5(–5) cm, throat 1.7–2.5 cm in diam. Style 2–3 mm. Fl. and fr. Aug–Nov.

• Grassland slopes, alpine meadows, scrub meadows, forest margins, roadsides; 2700–4800 m. SE Xizang, NW Yunnan.

44. *Gentiana viatrix* Harry Smith, Bull. Misc. Inform. Kew 1937: 127. 1937.

五叶龙胆 wu ye long dan

Perennials 8–15 cm tall. Stems ascending, simple, papillate. Basal rosette leaves poorly developed; leaf blade triangular, 3–7 × 1–1.5 mm, membranous, apex acute. Stem leaves sessile, in whorls of 5 (or 6), larger toward apex, uppermost leaves surrounding calyx, base connate for 2–3 mm, margin smooth, apex obtuse, midvein distinct. Lower stem leaves withered at anthesis, linear-spatulate, 2–3 × 1–1.5 mm; middle to upper leaves linear to linear-lanceolate, 5–7 × 1.5–2 mm, apex acuminate. Flowers terminal, solitary, sessile, 5-merous. Calyx tube narrowly obconic, 6–8 mm; lobes linear-spatulate, 4–4.5 mm, herbaceous, base narrowed, margin smooth, apex obtuse, midvein distinct. Corolla blue, with dark blue streaks, narrowly obconic, 3.5–5 cm; lobes broadly triangular, 2–3 mm, margin entire, apex obtuse with a caudate tip 1–2 mm; plicae broadly ovate, 1–1.5 mm, margin erose, apex obtuse. Stamens inserted at basal part of corolla tube; filaments 8–10 mm; anthers narrowly ellipsoid, 2–2.5 mm. Ovary narrowly ellipsoid, 0.9–1.1 cm; gynophore 1.1–1.5 cm. Style 5–7 mm; stigma lobes linear. Fl. Jul–Sep.

• Alpine meadows, forest margins; 3400–4800 m. N and W Sichuan.

45. *Gentiana prolata* I. B. Balfour, Trans. & Proc. Bot. Soc. Edinburgh 27: 266. 1918.

观赏龙胆 guan shang long dan

Perennials 3–7 cm tall. Stems ascending, simple, papillate. Basal rosette leaves few, indistinct; leaf blade triangular, 4–8 × 1.5–2 mm, membranous, apex acute. Stem leaves larger toward apex, uppermost surrounding calyx; petiole tube 2–3 mm; leaf blade ovate to orbicular or sometimes upper leaves lanceolate to elliptic, 4–6(–12) × 3–4 mm, margin smooth, apex obtuse to rounded or rarely acute, midvein distinct. Flowers terminal, solitary, sessile, 5-merous. Calyx tube tubular, 7–10 mm, membranous; lobes erect, lanceolate to oblong, 4–7(–9) mm, herbaceous, base slightly narrowed, margin smooth, apex acute to obtuse, midvein distinct. Corolla blue, with pale yellow-white base and dark blue stripes, streaks, and spots, usually closed, tubular to narrowly funnelform, 3–4 cm; lobes ovate to triangular, 4–5 mm, margin entire, apex obtuse; plicae broadly triangular to subtruncate, 0.5–1 mm, margin entire or denticulate, apex

obtuse. Stamens inserted at middle of corolla tube; filaments 6–8 mm; anthers narrowly ellipsoid, 1.8–2 mm. Style 1.5–2.5 mm; stigma lobes suborbicular. Capsules ellipsoid, 1.3–1.5 cm; gynophore to 5 cm. Seeds light brown, ellipsoid, 1–1.2 mm. Fl. and fr. Aug–Nov.

Grassland slopes, dry rocky hillsides, wet meadows; 3400–4500 m. SE Xizang [Bhutan, NE India, Nepal, Sikkim].

46. *Gentiana altigena* Harry Smith, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 99. 1926.

椭圆龙胆 tuo ye long dan

Perennials 3–7 cm tall. Stems numerous, ascending, simple, papillate. Basal rosette leaves few, indistinct; leaf blade triangular, 4–8 × 1.5–2 mm, membranous, apex acute. Stem leaves larger toward apex, uppermost leaves surrounding calyx; petiole membranous, papillate, petiole tube 1.5–2 mm; leaf blade base obtuse, margin ciliolate, apex obtuse, midvein distinct. Lower stem leaves withered at anthesis, elliptic to ovate-orbicular, 3–4.5 × 1.5–2.5 mm; middle to upper leaves lanceolate to elliptic, 6–9 × 1.5–3 mm. Flowers terminal, solitary, sessile. Calyx tube tubular, 4–5 mm, membranous; lobes spreading, lanceolate to elliptic, 4–6 mm, herbaceous, base slightly narrowed, margin ciliolate, apex obtuse, midvein distinct. Corolla blue, with dark blue streaks, usually closed, tubular, 1.5–2 cm; lobes ovate, 3–3.5 mm, margin entire, apex obtuse; plicae ovate, 1–1.2 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube; filaments 5–6 mm; anthers narrowly ellipsoid, 1–1.5 mm. Style 1.5–2 mm; stigma lobes linear. Capsules ellipsoid to ovoid-ellipsoid, 5–8 mm; gynophore to 8 mm. Seeds light brown, broadly ellipsoid to subglobose, 0.6–0.8 mm. Fl. and fr. Aug–Oct.

Meadow slopes; 3700–4200 m. SE Xizang, NW Yunnan [NE India].

47. *Gentiana obconica* T. N. Ho, Acta Phytotax. Sin. 23: 45. 1985.

倒锥花龙胆 dao zhui hua long dan

Perennials 4–7 cm tall, sometimes appearing stoloniferous. Stems ascending, simple, with several shoots not flowering, glabrous. Basal rosette leaves poorly developed; leaf blade lanceolate to triangular, 1–2 cm × 2–4 mm, base connate for 3–5 mm, margin smooth or scabrous, apex acuminate, midvein distinct. Stem leaves larger toward apex, uppermost surrounding calyx; leaf blade base obtuse and connate for 2–3 mm, margin smooth or scabrous, apex acute, midvein distinct. Lower to middle stem leaves ovate, 2–5 × 2–4 mm; upper leaves elliptic to ovate-elliptic, 5–11 × 2–3 mm. Flowers terminal, solitary, sessile, 5-merous. Calyx tube tubular, 6–10 mm; lobes green, elliptic to ovate-elliptic, 5–8 mm, base slightly narrowed, margin smooth or scabrous, apex obtuse, midvein distinct. Corolla dark blue, sometimes with pale yellow-white base, with black stripes, sometimes with black spots, obconic, 3–4 cm, 2–3 mm wide inside calyx tube, throat 1.8–2.2 cm in diam.; lobes ovate, 2.5–3 mm, margin entire, apex obtuse and mucronate; plicae broadly

triangular to subtruncate, 1–1.5 mm, margin erose, apex obtuse. Stamens inserted just below middle of corolla tube; filaments 1.3–1.5 cm; anthers ellipsoid, 1–1.5 mm. Ovary narrowly ellipsoid, 1–1.2 cm; gynophore 1.4–1.6 cm. Style 4–5 mm; stigma lobes oblong. Fl. Aug–Sep.

Alpine meadows and scrub; 4000–5500 m. S and SE Xizang [Bhutan, E Nepal, Sikkim].

48. *Gentiana altorum* Harry Smith, Bull. Misc. Inform. Kew 1937: 129. 1937.

道孚龙胆 dao fu long dan

Perennials 4–7 cm tall. Stems ascending, simple, with several shoots not flowering, glabrous. Basal rosette leaves poorly developed; leaf blade lanceolate, 5–10 × 2.5–4 mm, base connate for 2–4 mm, margin smooth or scabrous, apex acuminate, midvein distinct. Stem leaves larger toward apex, uppermost surrounding calyx; leaf blade narrowly elliptic to elliptic, 5–8(–13) × 2.5–4 mm, base obtuse and connate for 2–3 mm, margin smooth or scabrous, apex acute to obtuse, midvein distinct. Flowers terminal, solitary, sessile, 5-merous. Calyx tube narrowly obconic, 7–11 mm; lobes green, equal, narrowly elliptic to elliptic, 5–7 mm, base slightly narrowed, margin smooth or scabrous, apex obtuse, midvein distinct. Corolla pale blue, with pale yellow base and dark blue streaks, sometimes with dark blue spots, funnelform, 3–4.5 cm; lobes ovate, 4–6 mm, margin entire, apex acute to obtuse; plicae broadly ovate, 2–2.5 mm, margin denticulate, apex obtuse. Stamens equal, inserted just below middle of corolla tube; filaments 7–9 mm; anthers narrowly ellipsoid, 2–3 mm. Style 4–5 mm; stigma lobes linear. Capsules ovoid-ellipsoid, 1.1–1.4 cm; gynophore to 1.5 cm. Seeds light brown, subglobose, 1–1.2 mm. Fl. and fr. Aug–Sep.

• Meadow slopes; 3700–4200 m. W Sichuan, SE Xizang.

49. *Gentiana caelestis* (C. Marquand) Harry Smith in Handel-Mazzetti, Symb. Sin. 7: 972. 1936.

天兰龙胆 tian lan long dan

Gentiana veitchiorum Hemsley var. *caelestis* C. Marquand, Bull. Misc. Inform. Kew 1931: 84. 1931; *G. ampla* Harry Smith.

Perennials 5–8 cm tall. Stems ascending, simple, with several shoots not flowering, glabrous. Basal rosette leaves poorly developed; leaf blade lanceolate, 0.5–2 cm × 2–4 mm, base connate for 2–4 mm, margin smooth or scabrous, apex acuminate, midvein distinct. Stem leaves larger toward apex, uppermost surrounding calyx; leaf blade base obtuse and connate for 2–3 mm, margin smooth or scabrous, apex acute, midvein distinct. Lower to middle stem leaves ovate, 3–8 × 2–4 mm; upper leaves linear-elliptic to elliptic, 1.1–1.8 cm × 2–4 mm. Flowers terminal, solitary, sessile. Calyx tube narrowly obconic, 1–1.3 cm; lobes green, linear-elliptic to elliptic, 8–11 mm, base slightly narrowed, margin smooth or scabrous, apex obtuse, midvein distinct. Corolla pale blue, sometimes with a few dark blue streaks in tube, tubular-campanulate, (3.5–)4–5 cm; lobes ovate to triangular, 5–7 mm, margin entire, apex acute to obtuse; plicae ovate, 2–3 mm, margin entire or denticulate, apex obtuse. Stamens

inserted just below middle of corolla tube; filaments 1–1.3 cm; anthers narrowly ellipsoid, 2.5–3 mm. Ovary narrowly ellipsoid, 1–1.2 mm; gynophore 1.4–1.8 cm. Style 4–5 mm; stigma lobes linear. Fl. Aug–Sep.

Grassland slopes, alpine meadows, scrub, roadsides in valleys; 2600–4500 m. SW Sichuan, SE Xizang, NW Yunnan [NE Myanmar].

50. *Gentiana veitchiorum* Hemsley, Gard. Chron., ser. 3, 46: 178. 1909.

蓝玉簪龙胆 lan yu zan long dan

Gentiana ornata (Wallich ex G. Don) Grisebach var. *acutifolia* Franchet; *G. ornata* var. *obtusifolia* Franchet.

Perennials 5–8 cm tall, sometimes ± rhizomatous or stoloniferous. Stems ascending, simple, papillate. Basal rosette leaves well developed; leaf blade linear-lanceolate to linear-elliptic, 3–5.5 cm × 2–5 mm, base connate for 2–4 mm, margin scabrous, apex acuminate, midvein distinct. Stem leaves larger and more crowded toward apex, uppermost surrounding calyx; leaf blade base narrowed and connate for 2–3 mm, margin scabrous, apex acuminate to acute, midvein distinct. Lower stem leaves ovate, 2.5–7 × 2–4 mm; middle to upper leaves linear, linear-elliptic, narrowly elliptic, or elliptic-lanceolate, 0.7–1.5 cm × 3–4.5 mm. Flowers terminal, solitary, sessile. Calyx tube tubular to narrowly obconic, 1.2–1.4 cm; lobes green, linear-elliptic, 6–11 mm, base slightly narrowed, margin scabrous, apex acuminate, midvein distinct. Corolla intense blue, with pale yellow-white base and black streaks and spots, occasionally corolla cream white to very pale lavender, narrowly funnellform, 4–6 cm; lobes ovate to triangular, 5–7 mm, margin entire, apex acute; plicae ovate, 2.5–3.5 mm, margin entire or erose, apex obtuse. Stamens inserted just below middle of corolla tube; filaments 1–1.3 cm; anthers narrowly ellipsoid, 3–3.5 mm. Style 5–6 mm; stigma lobes linear. Capsules ellipsoid to ovoid-ellipsoid, 1.5–1.7 cm; gynophore 1.5–2 cm. Seeds light brown, ellipsoid, 1–1.3 mm. Fl. and fr. Jul–Oct.

River banks, grassland slopes, alpine meadows, scrub, forests; 2500–4800 m. Gansu, Qinghai, W Sichuan, S and SE Xizang, NW Yunnan [Bhutan, Myanmar, Sikkim].

51. *Gentiana nyalamensis* T. N. Ho, Acta Phytotax. Sin. 23: 46. 1985.

聂拉木龙胆 nie la mu long dan

Perennials 5–10 cm tall. Stems ascending, simple, glabrous. Basal rosette leaves well developed; leaf blade linear-lanceolate, 3–4 cm × 4–6 mm, base connate for 2–4 mm, margin scabrous, apex acuminate, midvein distinct. Stem leaves larger and more crowded toward apex, uppermost surrounding calyx; leaf blade base obtuse and connate for 2–3 mm, margin scabrous, apex acuminate, midvein distinct. Lower stem leaves ovate, 7–11 × 3–4 mm; middle to upper leaves linear-lanceolate to elliptic, 1–2 cm × 3–5.5 mm. Flowers terminal, solitary, sessile, 5-merous. Calyx tube obconic, 1.1–1.4 cm; lobes green, linear-lanceolate to elliptic, 0.9–1.4 cm, base slightly narrowed, margin scabrous, apex obtuse, midvein distinct. Corolla pale blue, with pale yellow-white base and dark blue streaks and spots, campanulate, 2.5–

4.7 cm; lobes ovate, 4.5–6 mm, margin entire, apex obtuse and mucronate; plicae ovate, 2–3 mm, margin entire or 2-cleft, apex obtuse. Stamens inserted just below middle of corolla tube; filaments 8–10 mm; anthers narrowly ellipsoid, 3–3.5 mm. Style 5–6 mm; stigma lobes oblong. Capsules ellipsoid, 1.3–1.5 cm; gynophore to 2 cm. Seeds light brown, ellipsoid, 0.8–1 mm. Fl. and fr. Aug–Sep.

3500–4700 m. S Xizang [Bhutan].

- 1a. Corolla 4.2–4.7 cm 51a. var. *nyalamensis*
1b. Corolla 2.5–3 cm 51b. var. *parviflora*

51a. *Gentiana nyalamensis* var. *nyalamensis*

聂拉木龙胆 (原变种) nie la mu long dan (yuan bian zhong)

Corolla 4.2–4.7 cm.

Alpine meadows; 3500–3600 m. S Xizang [Bhutan].

51b. *Gentiana nyalamensis* var. *parviflora* T. N. Ho, Acta Phytotax. Sin. 23: 46. 1985.

小花聂拉木龙胆 xiao hua nie la mu long dan

Corolla 2.5–3 cm.

• Alpine meadows; 4500–4700 m. S Xizang.

52. *Gentiana ornata* (Wallich ex G. Don) Grisebach, Gen. Sp. Gent. 277. 1838.

华丽龙胆 hua li long dan

Pneumonanthe ornata Wallich ex G. Don, Gen. Hist. 4: 194. 1837.

Perennials 4–7 cm tall. Stems ascending, simple, glabrous. Basal rosette leaves developed; leaf blade linear, 1.8–3.5 cm × 2–4 mm, base connate for 2–4 mm, margin scabrous, apex acuminate, midvein distinct. Stem leaves larger, more crowded toward apex, uppermost surrounding calyx; leaf blade base obtuse and connate for 1.5–2 mm, margin scabrous, apex acute to obtuse, midvein distinct. Lower stem leaves elliptic to ovate, 3–7 × 1–2.5 mm; middle to upper leaves linear, 0.8–1.5 cm × 1–1.5 mm; rarely all stem leaf blades linear to narrowly elliptic. Flowers terminal, solitary, sessile. Calyx narrowly obconic, 1–1.3 cm; lobes green, linear, (0.5–)0.9–1.1 cm, margin scabrous, apex obtuse, midvein distinct. Corolla pale blue, with pale yellow-white base and dark blue streaks and spots, campanulate, 2.5–4 cm; lobes broadly triangular, 2.5–3.5 mm, margin entire, apex obtuse and sometimes mucronate; plicae ovate, 0.5–1 mm, margin entire, apex obtuse. Stamens inserted just below middle of corolla tube; filaments 8–10 mm; anthers narrowly ellipsoid, 1.5–2 mm. Style 5–5.5 mm; stigma lobes suborbicular. Capsules ovoid-ellipsoid, 1.2–1.3 cm; gynophore to 3.5 cm. Seeds light brown, ellipsoid, 1–1.2 mm. Fl. and fr. Aug–Nov.

Stony pastures, grassland slopes; 3300–5000 m. S Xizang

[Bhutan, E Nepal, Sikkim].

53. *Gentiana dolichocalyx* T. N. Ho, Acta Phytotax. Sin. 23: 43. 1985.

长萼龙胆 *chang e long dan*

Perennials 10–15 cm tall. Stems ascending, simple, glabrous. Basal rosette leaves poorly developed; leaf blade lanceolate, 4–6(–20) × 2.5–3.5 mm, base connate for 2–4 mm, margin scabrous, apex acuminate, midvein distinct. Stem leaves widely spaced, larger toward apex; leaf blade base connate for 2–3 mm, margin smooth or scabrous, apex acuminate, midvein distinct. Lower stem leaves oblong, 4–6 × 1.5–2 mm; middle to upper leaves broadly linear, 2–4.5 cm × 2–3 mm. Flowers terminal, solitary. Pedicel 0.5–1.5 cm, glabrous, sometimes purple. Calyx narrowly obconic, 1.5–1.7 cm; lobes green, broadly linear, 2.3–3.5 cm, margin smooth or scabrous, apex obtuse, midvein distinct. Corolla pale blue, with pale yellow-white tube, outside with blue streaks, campanulate-tubular, inflated at middle of tube, 6–7 cm; lobes ovate, 6–7.5 mm, margin entire, apex obtuse; plicae ovate, 2–3 mm, margin entire or erose, apex obtuse. Stamens inserted just below middle of corolla tube; filaments 0.9–1.1 cm; anthers ellipsoid, 3.5–4 mm. Style 5–7 mm; stigma lobes linear. Capsules ellipsoid, 1.5–1.7 cm; gynophore to 2.6 cm, stout. Seeds light brown, ellipsoid, 1–1.2 mm. Fl. and fr. Aug–Sep.

• Alpine meadows, roadside slopes, scrub; 2900–3800 m. SE Qinghai, NW Sichuan.

Gentiana dolichocalyx is similar to *G. lawrencei* var. *farreri*. Although T. N. Ho treats them as distinct, J. S. Pringle considers *G. dolichocalyx* as a synonym of *G. lawrencei* var. *farreri*.

54. *Gentiana lawrencei* Burkill, Gard. Chron., ser. 3, 38: 307. 1905.

湖边龙胆 *hu bian long dan*

Perennials 5–10 cm tall. Stems ascending, simple, glabrous. Basal rosette leaves poorly developed; leaf blade lanceolate, 4–6(–20) × 2–3 mm, base connate for 2–4 mm, margin scabrous, apex acuminate, midvein distinct. Stem leaves larger and more crowded toward apex; leaf blade base connate for 2–3 mm, margin smooth or scabrous, apex acuminate, midvein distinct. Lower stem leaves narrowly oblong, 3–6 × 1.5–2 mm; middle to upper leaves linear, 0.6–2 cm × 1–1.5(–2) mm. Flowers terminal, solitary. Pedicel 5–10 mm. Calyx tube narrowly obconic, 1.5–1.6 cm; lobes green, linear, 1–2.5 cm, margin scabrous, apex acuminate, midvein distinct. Corolla pale blue, narrowly obconic to funnelform, 4.5–5.5(–6) cm, tube pale yellow-white with blue streaks; lobes ovate-triangular, 6–7.5 mm, margin entire, apex acute; plicae broadly ovate, 4–5 mm, margin entire or erose, apex obtuse. Stamens inserted at middle of corolla tube; filaments 7–9 mm; anthers narrowly ellipsoid, 2.5–3 mm. Style 5–6 mm; stigma lobes linear. Capsules ellipsoid, 1.8–2 cm; gynophore to 2.8 cm, slender. Seeds light brown, ellipsoid, 1–1.2 mm. Fl. and fr. Aug–Oct.

• 2400–4600 m. SW Gansu, Qinghai, W and N Sichuan.

Gentiana lawrencei is a very common species native to the

Qinghai-Xizang Plateau. It includes two taxa with intermediate morphological characters.

1a. Calyx lobes about as long as tube

..... 54a. var. *lawrencei*

1b. Calyx lobes at least 1.8 × as long

as tube 54b. var. *farreri*

54a. *Gentiana lawrencei* var. *lawrencei*

湖边龙胆 (原变种) *hu bian long dan* (*yuan bian zhong*)

Calyx lobes about as long as tube. Fl. and fr. Aug–Oct.

• Alpine meadows, scrub; 2400–4600 m. SW Gansu, N Sichuan.

Gentiana lawrencei was described from a garden plant grown from seed collected by M. Jules Brocherel on a journey from Lake Baikal into Mongolia. It is probable that the original seeds were actually collected from SW Gansu (China) rather than from near Lake Baikal, because there are no collections from the Baikal area.

54b. *Gentiana lawrencei* var. *farreri* (I. B. Balfour) T. N. Ho, Novon 4: 371. 1994.

线叶龙胆 *xian ye long dan*

Gentiana farreri I. B. Balfour, Trans. & Proc. Bot. Soc. Edinburgh 27: 248. 1918.

Calyx lobes at least 1.8 × as long as calyx tube.

• Alpine meadows; 2400–4000 m. SW Gansu, Qinghai, W Sichuan.

55. *Gentiana oreodoxa* Harry Smith, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 99. 1926.

山景龙胆 *shan jing long dan*

Gentiana sinoornata I. B. Balfour var. *punctata* C. Marquand.

Perennials 3–5 cm tall. Stems ascending, simple, glabrous, with several shoots not flowering. Basal rosette leaves poorly developed; leaf blade lanceolate to linear-elliptic, 0.8–2.5 cm × 2–2.5 mm, base connate for 2–4 mm, margin smooth or scabrous, apex acuminate, midvein distinct. Stem leaves incurved, larger and more crowded toward apex, uppermost surrounding calyx; leaf blade 0.8–1.5 cm × 0.8–1.5 (–2) mm, base obtuse and connate for 2–3 mm, margin smooth, apex acuminate, midvein distinct. Flowers terminal, solitary, sessile. Calyx tube narrowly obconic, 5–7 mm; lobes green, linear, 6–13 mm, margin smooth or scabrous, apex acuminate, midvein distinct. Corolla pale blue, with pale yellow-white base and dark blue streaks and spots, obconic, 3–3.8(–4.5) cm; lobes ovate-triangular, 3–4 mm, margin entire, apex obtuse and mucronate; plicae ovate, 1.5–2 mm, margin denticulate, apex obtuse. Stamens inserted just below middle of corolla tube; filaments 8–10 mm; anthers narrowly ellipsoid, 2.5–3 mm. Style 2–3.5 mm; stigma lobes linear. Capsules ovoid-ellipsoid, 1.5–1.7 cm; gynophore to 2.5 cm. Seeds light brown, ellipsoid, 1–1.2 mm. Fl. and fr. Aug–Oct.

Grassland slopes, alpine meadows; 3000–4900 m. SE Xizang, NW Yunnan [Bhutan, NE Myanmar].

56. *Gentiana helophila* I. B. Balfour & Forrest in C. Marquand, Bull. Misc. Inform. Kew 1928: 60. 1928.

喜湿龙胆 xi shi long dan

Perennials 6–12 cm tall. Stems ascending, usually short branched, glabrous. Basal rosette leaves poorly developed; leaf blade lanceolate, 2–3 cm × 1–2 mm, base connate for 2–4 mm, margin scabrous, apex acuminate, midvein distinct. Stem leaves larger and more crowded toward apex, uppermost surrounding calyx; leaf blade base connate for 2–3 mm, margin scabrous, apex acuminate, midvein distinct. Lower stem leaves ovate-lanceolate, 5–7 × 1.5–2 mm; middle to upper leaves linear to linear-lanceolate, 2.5–4 cm × 1–2 mm. Flowers terminal, solitary, sessile. Calyx tube narrowly obconic, 1.5–1.8 cm; lobes green, linear to linear-lanceolate, 1.3–1.5 cm, margin scabrous, apex acuminate, midvein distinct. Corolla blue-purple, with pale yellow-white base, with blue streaks and indistinct spots, narrowly obconic, 7–7.5 cm; lobes ovate-triangular, 8–9 mm, margin entire, apex acute; plicae triangular, 2.5–3 mm, margin entire, apex acute. Stamens inserted at basal part of corolla tube; filaments 1.2–1.4 cm; anthers narrowly ellipsoid, 3–3.5 mm. Ovary ovoid-ellipsoid, 1.5–1.7 cm; gynophore 2.7–3 cm. Style 4–5 mm; stigma lobes oblong. Fl. Aug–Nov.

- Wet meadows; ca. 3100 m. NW Yunnan.

57. *Gentiana futtereri* Diels & Gilg in Futterer, Durch Asien, Bot. Repr. 3: 14. 1903.

青藏龙胆 qing zang long dan

Perennials 5–10 cm tall. Stems ascending, simple, glabrous. Basal rosette leaves poorly developed; leaf blade linear-lanceolate, 1–2 cm × 2–2.5 mm, base connate for 2–4 mm, margin scabrous, apex acuminate, midvein distinct. Stem leaves larger, more crowded toward apex, uppermost surrounding calyx; leaf blade base obtuse and connate for 2–3 mm, margin scabrous, apex acuminate. Lower stem leaves narrowly oblong, 3–6 × 1.5–2 mm; middle to upper leaves linear, 0.6–2 cm × 1.5–2 mm. Flowers terminal, solitary, sessile. Calyx tube tubular to narrowly obconic, 1–1.4 cm; lobes green, linear, 0.6–1.4 cm, margin scabrous, apex acuminate, midvein distinct. Corolla dark blue, with pale yellow-white base and dark blue streaks and spots, tubular-campanulate to funnelform, 5–6 cm; lobes ovate-triangular, 6–7.5 mm, margin entire, apex acute; plicae broadly ovate, 4–5 mm, margin denticulate, apex obtuse. Stamens inserted at middle of corolla tube; filaments 7–11 mm; anthers narrowly ellipsoid, 2.5–3 mm. Style 4–5 mm; stigma lobes oblong. Capsules ellipsoid, 1.5–1.8 cm; gynophore to 2.5 cm, slender. Seeds light brown, broadly ellipsoid to subglobose, 0.8–1 mm. Fl. and fr. Jul–Oct.

• Alpine meadows, forests; 2800–3400 m. SW Gansu, SE Qinghai.

58. *Gentiana sinoornata* I. B. Balfour, Trans. & Proc. Bot. Soc. Edinburgh 27: 253. 1918.

类华丽龙胆 lei hua li long dan

Perennials 10–15 cm tall. Stems ascending, usually short branched, with several shoots not flowering, glabrous. Basal rosette leaves poorly developed; leaf blade narrowly triangular, 4–6 × 2–5 mm, base connate for 2–4 mm, margin scabrous, apex acute. Stem leaves incurved, larger and more crowded toward apex, uppermost surrounding calyx; leaf blade ± lanceolate, base connate for 2–3 mm, margin scabrous, apex acute, midvein distinct. Lower to middle stem leaves 7–10 × 2–2.5 mm; upper leaves 1–3.5 cm × 2–3 mm. Flowers terminal, solitary, sessile. Calyx tube narrowly obconic, 1.3–1.5 cm; lobes green, linear-lanceolate to lanceolate, 1.3–1.5 cm, margin scabrous, apex acute, midvein distinct. Corolla pale blue, usually pale yellow-white at base, with dark blue streaks and indistinct blue spots, obconic or obconic-tubular, 5–6 cm; lobes ovate, 7–8 mm, margin entire, apex obtuse; plicae ovate, 2–3 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube; filaments 1–1.2 cm; anthers narrowly ellipsoid, 3–3.5 mm. Style 6–7 mm; stigma lobes linear. Capsules ovoid-ellipsoid, 2.5–2.7 cm; gynophore to 2.5 cm. Seeds light brown, ellipsoid, 0.8–1 mm. Fl. and fr. May–Oct.

2800–4400 m. S and W Sichuan, E Xizang, NW Yunnan [Myanmar].

- 1a. Stem leaf blades linear-lanceolate to lanceolate; corolla narrowly obconic 58a. var. *sinoornata*
- 1b. Stem leaf blades elliptic-lanceolate; corolla obconic-tubular 58b. var. *gloriosa*

58a. *Gentiana sinoornata* var. *sinoornata*

类华丽龙胆 (原变种) lei hua li long dan (yuan bian zhong)

Gentiana ornata (Wallich ex G. Don) Grisebach var. *veitchii* Irving.

Stem leaf blades linear-lanceolate to lanceolate. Corolla narrowly obconic.

• Grassland slopes, wet meadows on river banks, alpine meadows, scrub, forests; 2800–4400 m. W Sichuan, E Xizang, NW Yunnan.

58b. *Gentiana sinoornata* var. *gloriosa* C. Marquand, Bull. Misc. Inform. Kew 1928: 57. 1928.

瘦华丽龙胆 shou hua li long dan

Stem leaf blades elliptic-lanceolate. Corolla obconic-tubular.

Wet meadows on river banks, alpine meadows, scrub meadows; 3000–4300 m. SW Sichuan, NW Yunnan [Myanmar].

IV. Sect. *Frigida* Kusnezow, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 61. 1893.

高山龙胆组 gao shan long dan zu

Perennials. Roots long, rarely short, ± fleshy. Rhizomes stout, rarely slender, fleshy, sometimes short but conspicuous. Stems branching sympodially, with 1 to few basal rosettes and 1 to few flowering stems. Stems sheathed basally by black membranous remnants of old leaf bases. Base of basal leaves long connate. Seeds coated with a membranous lamella forming spongy, complex hexagonal pits.

Nineteen species: North America, Asia, Europe; 17 species in China.

59. *Gentiana wilsonii* C. Marquand, Bull. Misc. Inform. Kew 1928: 59. 1928.

川西龙胆 chuan xi long dan

Perennials 12–30 cm tall. Rhizomes short. Stems 1 or 2, erect, simple, glabrous. Basal leaves in 1–3 erect rosettes; petiole 1–3 cm, membranous; leaf blade linear-lanceolate to linear-elliptic, 2.5–11 × 0.5–1.4 cm, base narrowed, apex acuminate to obtuse, veins 1–3. Stem leaves 1–3 pairs; petiole to 2 cm, shorter or absent toward apex; leaf blade linear-oblong or narrowly elliptic, 2–4 cm × 3–15 mm, base narrowed, apex acuminate to obtuse, veins 1–3. Inflorescences terminal clusters, sometimes also in few-flowered subapical axillary clusters, axillary clusters rarely on pedunclelike branches. Flowers sessile. Calyx tubular to narrowly obconic, 1–1.2 cm, tube sometimes split on 1 side; lobes spreading to reflexed, subulate to triangular, 1–2(–3) mm, unequal. Corolla pale blue, unspotted, tubular-funnelform, (2–)3.5–5.5 cm; lobes ovate, 3–3.5 mm, apex obtuse; plicae triangular, 2–2.5 mm, base oblique, margin entire, apex obtuse. Stamens inserted just below middle of corolla tube; filaments 1–1.3 cm; anthers ellipsoid, 2.5–3 mm. Style 1.5–2 mm; stigma lobes semiorbicular. Capsules narrowly ellipsoid to ovoid-ellipsoid, 1.5–1.7 cm; gynophore to 2 cm. Seeds light brown, subglobose, 1–1.2 mm. Fl. and fr. Jul-Sep.

• Grassland slopes, scrub, forests; 2800–4000 m. SW Sichuan, SE Xizang, NW Yunnan.

Gentiana wilsonii is similar to *G. microdonta*. Although T. N. Ho treats them as distinct, J. S. Pringle considers *G. wilsonii* as a synonym of *G. microdonta*.

60. *Gentiana subuliformis* S. W. Liu in T. N. Ho & S. W. Liu, Bull. Nat. Hist. Mus. London (Bot.) 23: 59. 1993.

钻萼龙胆 zhuan e long dan

Perennial 12–20 cm tall. Rhizomes short. Stems erect. Leaves mostly basal; petiole 0.5–2 cm; leaf blade narrowly elliptic to oblong, rarely oblong-spatulate, 1.5–3.5 cm × 5–9 mm, base attenuate, apex obtuse to subrounded, veins 3 and abaxially distinct. Stem leaves 1 or 2 pairs, similar to basal leaves, sessile or short petiolate; leaf blade 2–3.5 × ca. 1.2 cm. Inflorescences terminal subcapitate clusters. Flowers numerous. Calyx tubular, ca. 1 cm, often split on 1 side; lobes spreading to recurved, subulate, 1–2 mm. Corolla dark blue, unspotted, tubular, 2.3–2.5 cm; lobes ovate, 1.5–2 mm, apex obtuse; plicae short, truncate, margin entire or denticulate. Stamens inserted at basal part of corolla tube; filaments

subulate, ca. 9 mm; anthers linear, ca. 1.5 mm. Gynophore present; style short; stigma linear.

• Alpine meadows; ca. 4800 m. SE Xizang.

Gentiana subuliformis is similar to *G. atuntsiensis* and *G. wilsonii*. The relationship of these three species to *G. microdonta* and other closely related species needs further study.

61. *Gentiana atuntsiensis* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 121. 1913.

阿墩子龙胆 a dun zi long dan

Gentiana trichotoma Kusnezow var. *brevicaulis* C. Marquand.

Perennials 5–25 cm tall. Rhizomes to 15 cm. Stems 1–3 or more, erect, simple, glabrous. Basal leaves in 2–5 erect rosettes; petiole 2–7 cm, membranous; leaf blade oblong, narrowly elliptic, or oblanceolate, 3–8 cm × 4–13 mm, base narrowed, apex obtuse to rounded, veins 3. Stem leaves 3 or 4 pairs; petiole to 2 cm, shorter toward stem base and absent toward apex; leaf blade spatulate to oblanceolate, 2.5–3.5 cm × 5–10 mm, both ends obtuse. Inflorescences terminal clusters of (3–)5–10 flowers, sometimes also few-flowered axillary clusters, axillary clusters rarely on pedunclelike branches. Flowers sessile or subsessile. Calyx purple, narrowly obconic, 8–10 mm, outside sometimes papillate, tube entire or rarely slightly split on 1 side; lobes spreading to reflexed, subulate to triangular, 2–3 mm, unequal. Corolla dark blue, rarely pale yellow-white with blue spots basally, funnelform, 2.3–3.5 cm; lobes ovate, 3.5–5 mm, margin denticulate, apex obtuse; plicae obliquely triangular to truncate, 1–1.5 mm, margin denticulate. Stamens inserted at middle of corolla tube; filaments 8–10 mm; anthers narrowly ellipsoid, 2.5–3.5 mm. Style 4–5 mm; stigma lobes ovate. Capsules cylindric to ovoid-ellipsoid, 1.5–2 cm; gynophore 1–1.5 cm, slender. Seeds light brown, broadly ellipsoid to subglobose, 1.5–2 mm. Fl. and fr. Jun-Nov.

• Alpine meadows, scrub, forests; 2700–4800 m. SE Xizang, NW Yunnan.

Gentiana atuntsiensis is similar to *G. microdonta*. Although T. N. Ho treats them as distinct, J. S. Pringle considers *G. atuntsiensis* as a synonym of *G. microdonta*.

62. *Gentiana handeliana* Harry Smith, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 98. 1926.

斑点龙胆 ban dian long dan

Gentiana handeliana var. *brevisepala* C. Marquand; *G. stictantha* C. Marquand.

Perennials 10–15 cm tall. Rhizomes short. Stems purple, 2 or 3, erect, simple, papillate, densely toward apex. Basal leaves in 2–5 erect rosettes; petiole 2–5 cm, membranous; leaf blade oblong, narrowly elliptic, or oblanceolate, 2–7 × 0.5–2.3 cm, base narrowed, apex obtuse to rounded, veins 3–5. Stem leaves 2 or 3 pairs; petiole to 1 cm, absent apically; leaf blade narrowly elliptic, lanceolate, or oblanceolate, 1.5–2.5 cm × 2–5 mm, base narrowed, apex obtuse, veins 1–3. Inflorescences terminal clusters, sometimes also in axillary whorls. Flowers sessile. Calyx narrowly obconic, 0.9–1.1 cm; tube sometimes split on 1 side, outside papillate; lobes spreading to reflexed, subulate to triangular, 1–2(–3) mm, unequal, ciliolate, apex obtuse. Corolla pale yellow to yellow, rarely white, with distinct dark blue spots, tubular-funnelform, 2.5–3 cm; lobes ovate, 3–4 mm, apex obtuse to rounded; plicae triangular to obliquely truncate, 1–1.5 mm, margin entire. Stamens inserted at basal part of corolla tube; filaments 0.8–1.2 cm; anthers narrowly ellipsoid, 2.5–3.5 mm. Style linear, 3.5–4 mm; stigma lobes semiorbicular. Capsules ovoid-ellipsoid, 0.8–1.2 cm; gynophore to 1.8 cm. Seeds light brown, broadly ellipsoid to subglobose, 1.5–1.7 mm. Fl. and fr. Jul–Nov.

Alpine meadows; 3500–4600 m. SE Xizang, NW Yunnan [NE Myanmar].

63. *Gentiana phyllopoda* H. Léveillé, Bull. Acad. Int. Géogr. Bot. 25: 21. 1915.

叶柄龙胆 ye bing long dan

Perennials 20–30 cm tall. Rhizomes to 15 cm. Stems 1–3, erect, simple, glabrous. Basal leaves in 1–4 erect rosettes; petiole 3–6 cm, membranous; leaf blade linear-lanceolate to linear-elliptic, 3.5–8.5 × 0.8–1.5 cm, base narrowed, apex acuminate to obtuse, veins 3 and abaxially distinct. Stem leaves 2 or 3 pairs; petiole to 2 cm, shorter or absent toward apex; leaf blade narrowly elliptic-lanceolate to elliptic, 3.5–5 × 0.7–1.3 cm, base narrowed, apex acuminate to obtuse, veins 1–3. Inflorescences terminal clusters, sometimes also in axillary whorls. Flowers sessile. Calyx narrowly obconic, 0.8–1.2 cm, outside papillate; tube spathe-like, split on 1 side; lobes spreading to reflexed, subulate, 1–1.5 mm, apex acute. Corolla pale yellow, with distinct dark blue spots, tubular to tubular-funnelform, 2.5–3 cm; lobes broadly ovate, 3–4 mm, margin entire, apex rounded; plicae triangular to obliquely truncate, 1–1.5 mm, margin denticulate, apex obtuse. Stamens inserted at basal part of corolla tube; filaments 1–1.2 cm; anthers ellipsoid, 1.5–2 mm. Style 1.5–2 mm; stigma lobes semiorbicular. Capsules ovoid-ellipsoid, 1–1.2 cm; gynophore 1–1.2 cm. Seeds light brown, ellipsoid to ovoid-ellipsoid, 1–1.2 mm. Fl. and fr. Jul–Aug.

• Alpine meadows; 2600–3800 m. SW Sichuan, NE Yunnan.

64. *Gentiana apiata* N. E. Brown, Bull. Misc. Inform. Kew 1914: 187. 1914.

太白龙胆 tai bai long dan

Gentiana tsinlingensis H. Limpricht.

Perennials 10–25 cm tall. Rhizomes short. Stems 1–3, erect, simple, glabrous. Basal leaves in 1–4 erect rosettes; petiole 2–5 cm, membranous; leaf blade linear-lanceolate to linear-elliptic, 1.5–8 cm × 4–7 mm, base narrowed, apex acuminate to obtuse, vein 1. Stem leaves 2–4 pairs; petiole to 2.5 cm, shorter to absent toward apex; leaf blade narrowly elliptic to lanceolate, 2–3.5 cm × 3–6 mm, both ends attenuate, vein 1. Inflorescences large terminal clusters, sometimes also in few-flowered subapical axillary clusters on pedunclelike branches. Flowers sessile. Calyx narrowly obconic, 1–1.5 cm, tube entire; lobes spreading to reflexed, linear to narrowly triangular, 3.5–5.5 mm, subequal, apex acuminate. Corolla yellow, with dark blue spots, funnelform, 2–3 cm; lobes ovate, 3–3.5 mm, margin denticulate, apex rounded; plicae triangular to obliquely truncate, 1–1.5 mm, margin denticulate. Stamens inserted at basal part of corolla tube; filaments 6–9 mm; anthers narrowly ellipsoid, 2.5–3.5 mm. Style 1.5–2(–3) mm; stigma lobes linear. Capsules ovoid-ellipsoid, 1.1–1.5 cm; gynophore to 1.7 cm. Seeds light brown, ellipsoid, 2–2.5 mm. Fl. and fr. Jun–Aug.

• Hillsides; 1900–3400 m. Shaanxi (Taibai Shan).

65. *Gentiana microdonta* Franchet in F. B. Forbes & Hemslley, J. Linn. Soc., Bot. 26: 130. 1890.

小齿龙胆 xiao chi long dan

Gentiana trichotoma Kusnezow var. *albescens* C. Marquand.

Perennials 25–35 cm tall. Rhizomes to 15 cm. Stems 1 or 2, erect, simple, densely papillate. Basal leaves in 1 or more erect rosettes; petiole 2–2.5 cm, membranous; leaf blade narrowly elliptic, elliptic, or oblong, 2.5–3.5 × 0.8–1.8 cm, base narrowed, apex obtuse, veins 1–3. Stem leaves 3 or 4 pairs; petiole 0.5–1.5 cm, shorter to absent toward apex; leaf blade oblong, oblanceolate, or elliptic, 2–4 × 0.4–1.5 cm, base narrowed, apex obtuse to rounded, veins 1–3. Cymes axillary or terminal, forming a narrow panicle, cymes sometimes on pedunclelike branches; peduncles to 4.5 cm. Pedicel 0.5–2.5 cm, densely papillate. Calyx narrowly obconic, 7–10 mm; tube spathe-like, split on 1 side; lobes erect, subulate, 1–1.5 mm. Corolla dark blue, unspotted, narrowly funnelform, 2.2–2.5(–3.2) cm; lobes ovate, 3–4 mm, margin entire, apex obtuse; plicae triangular to obliquely truncate, 1.5–2 mm, margin denticulate, apex obtuse. Stamens inserted at middle of corolla tube; filaments 7–11 mm; anthers ellipsoid, 2–2.5 mm. Style 2–2.5 mm; stigma lobes semiorbicular. Capsules ovoid-ellipsoid, 1–1.2 cm; gynophore 8–10 mm. Seeds light brown, ellipsoid to subglobose, 1–1.2 mm. Fl. and fr. Jul–Nov.

• Alpine meadows, forests; 2600–4200 m. NW Yunnan.

The two syntypes of *Gentiana microdonta* belong to different taxa. The lectotype, *Delavay s.n.* from Dali, Yunnan, corresponds to the original description, whereas *Faber 46* from Emei Shan (Sichuan) belongs to *G. omeiensis*.

66. *Gentiana wasenensis* C. Marquand, Bull. Misc. Inform. Kew 1931: 80. 1931.

瓦山龙胆 wa shang long dan

Perennials 10–25 cm tall. Rhizomes to 10 cm. Stems 1 or 2, erect, simple, glabrous. Basal leaves in 2 or 3 erect rosettes; petiole 1.5–2.5 cm, membranous; leaf blade linear-lanceolate to linear-elliptic, 3–7 × 0.7–1.5 cm, base narrowed, apex acuminate to obtuse, veins 1–3. Stem leaves 2 or 3 pairs; petiole 0.7–2 cm, shorter to absent toward apex; leaf blade linear-lanceolate to oblanceolate, 2–3 cm × 3–11 mm, base narrowed, apex acuminate to obtuse, vein 1. Inflorescences terminal clusters, sometimes also in few-flowered axillary whorls. Flowers sessile. Calyx narrowly obconic, 7.5–9 mm, tube entire or rarely split on 1 side; lobes erect, subulate, 1–1.5 mm, subequal. Corolla pale blue, unspotted, narrowly funnelform, 2.3–2.8 cm; lobes ovate, 3–3.5 mm, apex obtuse; plicae obliquely truncate, margin erose. Stamens inserted at basal part of corolla tube; filaments 1–1.2 cm; anthers narrowly ellipsoid, 3–4 mm. Style 1–2 mm; stigma lobes semi-orbicular. Capsules ovoid-ellipsoid, 9–10 mm; gynophore to 1.5 cm. Seeds light brown, ellipsoid, 1.2–1.5 mm. Fl. and fr. Jul-Sep.

- Hillsides; 2900–3600 m. N Sichuan.

Gentiana wasenensis is similar to *G. microdonta*. Although T. N. Ho recognizes both as distinct species, J. S. Pringle suggests that perhaps *G. wasenensis* should be recognized at the infraspecific level.

67. *Gentiana striolata* T. N. Ho, Acta Phytotax. Sin. 23: 51. 1985.

多花龙胆 duo hua long dan

Perennials 10–40 cm tall. Rhizomes to 10 cm. Stems 1–3, erect, simple, densely papillate. Basal leaves in 1–4 erect rosettes; petiole 2–3.5 cm, membranous; leaf blade spatulate, narrowly elliptic, or elliptic, 4–7 × 0.8–1.4 cm, base narrowed, apex obtuse to rounded, veins 3–5. Stem leaves 4–7 pairs; lower leaves with petiole 0.6–2 cm; leaf blade oblong to narrowly elliptic, 3.5–4.5 × 0.8–1.4 cm, base narrowed, apex obtuse, veins 3; upper leaves usually folded; petiole less than 5 mm, completely connate; leaf blade linear-lanceolate to lanceolate, 1.5–5 cm × 3–9 mm, apex acuminate, vein 1. Inflorescences axillary or terminal clusters, subapical axillary clusters rarely on pedunclelike branches. Flowers sessile. Calyx tubular to narrowly obconic, 1.2–1.6 cm, tube entire; lobes erect, subulate, 1–1.5 mm, subequal. Corolla pale blue, with pale yellow base and blue streaks and spots, funnelform, (4–)5–5.5 cm; lobes ovate, 4–4.5 mm, margin entire, apex obtuse; plicae triangular to obliquely truncate, 1.2–1.5 mm, apex obtuse and 2-cleft or erose. Stamens inserted at middle of corolla tube; filaments 1.2–1.4 cm; anthers narrowly ellipsoid, 2.5–3 mm. Style 2–3 mm; stigma lobes linear. Capsules ovoid-ellipsoid, 2.2–2.5 cm; gynophore to 2 cm. Seeds light brown, ellipsoid to subglobose, 1.5–2 mm. Fl. and fr. Jul-Sep.

- Alpine meadows, scrub meadows, moist slopes; 3700–4600 m. SW Sichuan.

68. *Gentiana omeiensis* T. N. Ho, Acta Phytotax. Sin. 23: 49.

1985.

峨眉龙胆 e mei long dan

Perennials 30–40 cm tall. Rhizomes to 15 cm. Stems 2–4, erect, simple, subglabrous. Basal leaves in 1–3 erect rosettes; petiole 4–8 cm, membranous; leaf blade elliptic-lanceolate, narrowly elliptic, or elliptic, 5.5–12 × 1–1.5 cm, base narrowed, apex acuminate to obtuse, veins 3. Stem leaves 2–4 pairs; petiole 1–4.5 cm, shorter to absent toward apex; leaf blade spatulate, rarely narrowly elliptic, 4–7.5 × 1–2 cm, base narrowed, apex obtuse to rounded, veins 1–3. Inflorescences axillary or terminal clusters, subapical axillary clusters rarely on pedunclelike branches. Flowers sessile. Calyx obconic, 1.1–1.3 cm; tube spathe-like, split on 1 side; lobes erect, subulate, 1–1.5 mm. Corolla blue, sometimes with pale yellow base, unspotted, tubular-campanulate, 3.5–4 cm; lobes ovate, 4.5–5.5 mm, apex obtuse to rounded and erose; plicae triangular to obliquely truncate, 1–1.5 mm. Stamens inserted at basal part of corolla tube; filaments 1.3–1.6 cm; anthers narrowly ellipsoid, 3–3.5 mm. Style 2–2.5 mm; stigma lobes semi-orbicular. Capsules narrowly ellipsoid, 1.3–1.5 cm; gynophore 1–2 cm. Seeds light brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jul-Sep.

- Hillsides; 1100–3200 m. S Sichuan (Emei Shan).

Gentiana omeiensis is similar to *G. microdonta*. Although T. N. Ho recognizes both as distinct, J. S. Pringle considers that perhaps *G. omeiensis* should be recognized at the infraspecific level.

69. *Gentiana algida* Pallas, Fl. Ross. 1(2): 107. 1789.

高山龙胆 gao shan long dan

Gentiana algida var. *sibirica* Kusnezow; *G. frigida* Haenke var. *algida* (Pallas) Ledebour; *G. romanzovii* Ledebour ex Bunge.

Perennials 8–20 cm tall. Rhizomes short. Stems 1 or 2, erect, simple, subglabrous. Basal leaves in 1–3 erect rosettes; petiole 1–3.5 cm; leaf blade usually folded, linear-elliptic to lanceolate, 2–5.5 cm × 3–5 mm, base narrowed, apex obtuse, veins 1–3. Stem leaves 1–3 pairs; petiole 5–10 mm; leaf blade narrowly elliptic to ovate-lanceolate, 1.8–2.8 cm × 4–8 mm, both ends obtuse, veins 1–3. Flowers solitary, rarely in terminal 2- or 3(–8)-flowered cymes, mostly sessile or subsessile, only basal axillary flowers occasionally pedicellate. Calyx obconic to campanulate, 2–2.2 cm, tube entire or slightly split on 1 side; lobes erect, ovate to triangular, 5–6 mm, apex obtuse. Corolla pale yellow to pale yellow-green, with blue stripes, sometimes with blue spots in limbs, tubular-campanulate to funnelform, 4–5 cm; lobes ovate to triangular, 5–6 mm, apex obtuse; plicae obliquely truncate, margin entire or indistinctly denticulate. Stamens inserted at middle of corolla tube; filaments 1.3–1.6 mm; anthers narrowly ellipsoid, 2.5–3.2 mm. Style 4–6 mm; stigma lobes linear. Capsules ovoid-ellipsoid, 2–3 cm; gynophore to 4.5 cm. Seeds light brown, broadly ellipsoid to subglobose, 1.4–1.6 mm. Fl. and fr. Jul-Sep.

Grassy hillsides, stony hillsides, alpine meadows; 1200–4200 m. Xinjiang, Xizang [Bhutan, Japan, Kazakhstan, Kyrgyzstan, Korea, Mongolia, E Russia, Sikkim, North America].

70. *Gentiana himalayaensis* T. N. Ho in T. N. Ho & S. W.

Liu, Bull. Nat. Hist. Mus. London (Bot.) 23: 57. 1993.

喜马拉雅龙胆 *xi ma la ya long dan*

Gentiana nubigena Edgeworth var. *parviflora* C. B. Clarke (1883), not *G. parviflora* Gilg (1896).

Perennials 4–7 cm tall. Rhizomes short, slender. Stems 1 or 2, ascending to erect, simple, glabrous. Basal leaves in 1 or more erect rosettes; petiole 0.5–1.5 cm; leaf blade oblong, narrowly elliptic, elliptic, or rarely ovate, 1.5–2(–3) cm × 2–7 mm, base narrowed, apex acute to obtuse, veins 3. Stem leaves 2 or 3 pairs; petiole to 1 cm; leaf blade narrowly elliptic to oblong, 1.5–3 cm × 2–4 mm, base narrowed, apex obtuse, vein 1. Flowers terminal, solitary, sessile or subsessile. Calyx tubular, 1.2–1.4 cm; lobes erect, lanceolate to oblong, 4–8 mm, unequal, margin ciliolate, apex acute. Corolla dark blue, tubular to tubular-funnelform, 1.5–2 cm; lobes semiorbicular, 1.5–2 mm, margin denticulate, apex rounded; plicae obliquely truncate, margin denticulate. Stamens inserted at basal part of corolla tube; filaments 1–1.2 cm; anthers narrowly ellipsoid, ca. 2.5 mm. Capsules ellipsoid, 1.7–2 cm; gynophore to 2 cm. Fl. and fr. Aug–Oct.

Grassy and stony hillsides; 4000–4200 m. S and SE Xizang [Bhutan, Nepal, Sikkim].

71. *Gentiana nubigena* Edgeworth, Trans. Linn. Soc. London 20: 85. 1846.

云雾龙胆 *yun wu long dan*

Gentiana algida Pallas var. *nubigena* (Edgeworth) Kusnezow; *G. przewalskii* Maximowicz.

Perennials 3–10(–17) cm tall. Rhizomes short. Stems 1 or 2, erect, simple, papillate at first, glabrescent. Basal leaves in 1–4 erect rosettes; petiole 1–3 cm, membranous; leaf blade sometimes folded, narrowly elliptic, lanceolate, or spatulate, 2–6 cm × 2–11 mm, base narrowed, apex obtuse to rounded, glabrous or papillate when young, veins 1–3 and prominent. Stem leaves 1–3 pairs; petiole 5–10 mm; leaf blade narrowly elliptic to elliptic-lanceolate, 1.5–3 cm × 3–7 mm, apex obtuse; veins 1–3, abaxially prominent. Inflorescences terminal, 1–3-flowered clusters. Flowers sessile or subsessile. Calyx obconic, 1.5–2.7 cm, tube entire; lobes erect, unequal, usually narrowly oblong, 2–8.5 mm, apex obtuse. Corolla dark blue to blue-purple, with pale yellow-white base and dark blue streaks, tubular-campanulate, 3.5–6 cm; lobes ovate, 3–4.5 mm, margin entire or denticulate, apex obtuse; plicae obliquely truncate, margin erose. Stamens inserted at basal part of corolla tube; filaments 1.2–2.2 cm; anthers linear to narrowly ellipsoid, 2–3.5 mm. Style 3–6 mm; stigma lobes linear. Capsules ovoid-ellipsoid, 2–3 cm; gynophore to 3 cm. Seeds light brown, broadly ellipsoid to subglobose, 1.6–2 mm. Fl. and fr. Jul–Sep.

Bog meadows, alpine meadows and scrub, rocky places in high mountains; 3000–5300 m. Gansu, Qinghai, Xizang [Bhutan, NW India, Kashmir, Nepal, Sikkim].

Most material labeled as *Gentiana przewalskii* is correctly placed in *G. algida*.

72. *Gentiana erectosepala* T. N. Ho, Acta Phytotax. Sin. 23: 47. 1985.

直萼龙胆 *zhi e long dan*

Perennials 8–20 cm tall. Rhizomes short. Stems 2–6, erect, simple, glabrous. Basal leaves in 1–4 erect rosettes; petiole 2–4 cm, membranous; leaf blade oblong to spatulate, 3–6.5 × 0.6–1.4 cm, base narrowed, apex obtuse to rounded, veins 3. Stem leaves 2–4 pairs; petiole to 1 cm; leaf blade narrowly elliptic to oblanceolate, 2–4.5 cm × 5–7 mm, base narrowed, apex obtuse, veins 1–3. Cymes axillary or terminal, forming a lax panicle, cymes sometimes on pedunclelike branches. Pedicel 7–12 mm at anthesis but elongated to 2.5 cm in fruit. Calyx obconic, 1.5–1.8 cm, tube entire; lobes erect, linear to linear-lanceolate, 3.5–7 mm, margin ciliolate. Corolla pale yellow or white, with blue stripes and streaks, obconic, 2.5–2.8 cm; lobes ovate, 3–3.5 mm, margin erose, apex rounded; plicae very short, obliquely truncate, margin erose. Stamens inserted at basal part of corolla tube; filaments 8–10 mm; anthers ellipsoid, 2–3 mm. Style 4–6 mm; stigma lobes oblong. Capsules ovoid-ellipsoid, 1.3–1.5 cm; gynophore 1.7 cm. Seeds light brown, broadly ellipsoid to subglobose, 1.2–1.5 mm. Fl. and fr. Aug–Sep.

• Mountains; 3600–4600 m. SE Xizang.

73. *Gentiana purdomii* C. Marquand, Bull. Misc. Inform. Kew 1928: 55. 1928.

岷县龙胆 *min xian long dan*

Perennials 4–25 cm tall. Rhizomes to 15 cm. Stems 1–3, erect, simple, glabrous. Basal leaves in 2–4 erect rosettes; petiole 2–3.5 cm, membranous; leaf blade usually folded, linear, linear-elliptic, or rarely narrowly oblong, 2–6 cm × 2–9 mm, base narrowed, apex acuminate to obtuse, vein 1. Stem leaves 2–4 pairs; petiole 6–10 mm; leaf blade narrowly elliptic to lanceolate, 1–3 cm × 3–6 mm, apex obtuse. Cymes axillary or terminal, forming racemelike cymes. Pedicel ca. 4 cm, unequal, slender. Calyx obconic, 1.4–1.7 cm, tube entire; lobes lanceolate to narrowly oblong, 2.5–8 mm, subequal, apex obtuse. Corolla pale yellow, with pale blue stripes and streaks, tubular-campanulate to funnelform, (3–)3.5–5 cm; lobes ovate, 3–3.5 mm, margin denticulate, apex acute; plicae obliquely truncate, margin denticulate. Stamens inserted at middle of corolla tube; filaments 0.9–1.1 cm; anthers narrowly ellipsoid, 3–3.5 mm. Style 3–4 mm; stigma lobes linear. Capsules ovoid-ellipsoid, 1.8–2.5 cm; gynophore to 2 cm. Seeds light brown, broadly ellipsoid to subglobose, 1.5–2 mm. Fl. and fr. Jul–Oct.

• Alpine meadows, rocky places in high mountains; 2700–5300 m. SW Gansu, Qinghai, NW Sichuan, NE Xizang.

74. *Gentiana trichotoma* Kusnezow, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 61. 1893.

三歧龙胆 *san qi long dan*

Perennials 15–35 cm tall. Rhizomes to 15 cm. Stems 1–3, erect, simple, glabrous. Basal leaves in 2–5 erect rosettes; petiole 1.5–5 cm, membranous; leaf blade linear, narrowly elliptic, or oblanceolate, 2–8 cm × 3–13 mm, base narrowed,

apex obtuse, veins 3. Stem leaves 3–5 pairs; petiole to 2.5 cm, shorter to absent toward apex; leaf blade lanceolate, narrowly elliptic, or elliptic, base narrowed, apex obtuse, veins 1–3. Cymes axillary or terminal, 3-branched, forming a panicle, subapical axillary cymes sometimes on pedunclelike branches. Pedicel 0.5–5 cm. Calyx obconic, 1.5–2 cm, tube entire; lobes erect to rarely slightly spreading, linear-triangular to narrowly elliptic, 2–6 mm, unequal, apex obtuse. Corolla pale blue, sometimes pale yellow-white at base, with dark blue streaks in tube, narrowly funnellform to funnellform, 4–5 cm; lobes ovate, 3–4.5 mm, margin entire, apex obtuse; plicae obliquely truncate, margin denticulate. Stamens inserted at middle of corolla tube; filaments 1.3–1.5 cm; anthers narrowly ellipsoid, 3–4 mm. Style 2–2.5 mm; stigma lobes semiobicular. Capsules narrowly ellipsoid, 2–2.5 cm; gynophore 1.7–2.1 cm. Seeds brown, ellipsoid, 2–2.5 mm. Fl. and fr. Jul-Sep.

• 3000–4600 m. Qinghai, NW and W Sichuan, Xizang.

- 1a. Basal leaf blades oblanceolate to narrowly elliptic; flowers many 74a. var. *trichotoma*
1b. Basal leaf blades linear; flowers few 74b. var. *chingii*

74a. *Gentiana trichotoma* var. *trichotoma*

三歧龙胆 (原变种) san qi long dan (yuan bian zhong)

Gentiana phob Franchet.

Basal leaf blades oblanceolate to narrowly elliptic. Flowers many.

• Alpine meadows and scrub, forests; 3000–4600 m. Qinghai, NW and W Sichuan.

74b. *Gentiana trichotoma* var. *chingii* (C. Marquand) T. N. Ho, *Novon* 4: 372. 1994.

短茎三歧龙胆 duan jing san qi long dan

Gentiana chingii C. Marquand, *Bull. Misc. Inform. Kew* 1931: 83. 1931.

Basal leaf blades linear. Flowers few.

• Alpine meadows; 3300–3800 m. Qinghai, Xizang.

75. *Gentiana laxiflora* T. N. Ho in T. N. Ho & S. W. Liu, *Bull. Nat. Hist. Mus. London (Bot.)* 23: 56. 1993.

疏花龙胆 shu hua long dan

Perennials 10–15 cm tall. Rhizomes short. Stems 1–3, erect, simple, subglabrous. Basal leaves in 1–4 erect rosettes; petiole 2.5–4 cm, membranous; leaf blade linear-elliptic to narrowly oblong, 2.5–8 cm × 3–6 mm, base narrowed, apex acuminate to obtuse, vein 1. Stem leaves 2 or 3 pairs; petiole 0.5–1.5 cm, shorter toward apex; leaf blade linear to narrowly oblong, 2–3.5 cm × 2–4 mm, base narrowed, apex obtuse, vein 1. Cymes axillary or terminal, subapical axillary cymes sometimes on pedunclelike branches. Pedicel 0.5–2.1 cm, slender. Calyx narrowly obconic, 1–1.2 cm, tube entire; lobes erect to rarely slightly spreading, linear to triangular, 3–6 mm, apex acuminate. Corolla dark blue, with pale yellow-white base and blue streaks in tube, tubular to tubular-funnelform, 2.2–3(–3.5) cm; lobes ovate, 1.5–3 mm, margin entire, apex acute; plicae triangular to truncate, 1–1.5 mm, margin almost entire. Stamens inserted at basal part of corolla tube; filaments 8–10 mm; anthers ellipsoid, ca. 2 mm. Style 2–3 mm; stigma lobes oblong. Capsules ellipsoid, 1.5–2 cm; gynophore 2.1–2.7 cm. Seeds light brown, ellipsoid to subglobose, 2–2.5 mm. Fl. and fr. Jul-Aug.

• Alpine meadows; 4100–4200 m. SE Xizang.

V. Sect. *Pneumonanthe* Gaudin, *Fl. Helv.* 2: 269. 1828.

龙胆草组 long dan cao zu

Perennials. Rhizomes horizontal to vertical, short, thick, ± fleshy. Stems branching sympodially, with 1 to few erect simple flowering stems but nonflowering basal rosette usually absent. Lowermost stem leaves scalelike. Bracts 2 per flower, well developed. Capsules broadly ellipsoid. Seeds linear to fusiform, winged at both ends; seed coat coarsely reticulate.

Thirty-eight species: North America, Asia, Europe; four species in China.

76. *Gentiana scabra* Bunge, *Mém. Acad. Imp. Sci. Saint-Pétersbourg, Sér. 6, Sci. Math., Second Pt. Sci. Nat.* 2: 543. 1835.

龙胆 long dan

Gentiana fortunei J. D. Hooker; *G. scabra* subsp. *australis* M. Y. Liou.

Perennials 30–60 cm tall. Stems apically papillate. Stem leaves sessile; lowermost leaves scalelike, 4–6 mm; middle to upper leaves linear-lanceolate, ovate-lanceolate, or ovate, 2–7 × (0.4–)2–3 cm, base rounded to subcordate, margin scabrous and revolute, apex acuminate to acute, veins 3–5. Upper

leaves slightly smaller, shorter than flowers and surrounding their bases. Inflorescences 1- to many flowered, terminal or in axillary clusters, axillary clusters rarely on pedunclelike branches; bracts linear-lanceolate to lanceolate, 2–2.5 cm. Flowers sessile. Calyx tube 1–1.2 cm, entire; lobes spreading to erect, linear, 8–10 mm, margin scabrous, apex acute. Corolla blue-purple, sometimes with yellow-green spots in throat, tubular-campanulate to funnellform, 4–5 cm; lobes ovate to ovate-orbicular, 7–9 mm, apex rounded and apiculate; plicae obliquely and narrowly triangular, 3–4 mm, apex acute or slightly 2-cleft. Stamens inserted at middle of corolla tube; filaments 0.9–1.2 cm; anthers free, narrowly ellipsoid, 3.5–4.5 mm. Style 3–4 mm. Capsules 2–2.5 cm;

gynophore to 1.5 cm. Seeds 1.8–2.5 mm. Fl. and fr. May–Nov.

River banks, grassland and roadside slopes, moist meadows, scrub, forest margins, forests; 400–1700 m. Fujian, Jiangsu, Zhejiang [Japan, Korea, E Russia].

Gentiana scabra var. *buergeri* (Miquel) Maximowicz occurs in Japan and differs from var. *scabra* in having calyx lobes linear-lanceolate and longer than tube.

77. *Gentiana uchiyamae* Nakai, Bot. Mag. (Tokyo) 23: 107. 1909.

朝鲜龙胆 *chao xian long dan*

Perennials 30–70 cm tall. Stems glabrous. Lower stem leaves scalelike, 1–3 cm; middle to upper leaves lanceolate, 5.5–15 × 1–1.5 cm, both ends narrowed, margin slightly revolute and smooth, veins 1–3 and prominent; upper leaves slightly smaller, longer than flower clusters but not surrounding them. Inflorescences of few- to many-flowered terminal clusters, also in subapical, axillary clusters on short pedunclelike branches; bracts ovate-lanceolate, 2–3 cm × 4–7 mm. Flowers sessile. Calyx tube 1.4–1.6 cm, sometimes split on 1 side; lobes linear to narrowly triangular, (3.5–)8–10 mm, unequal, margin smooth, apex acuminate to obtuse. Corolla blue-purple, tubular-campanulate to funnelform, 4–5 cm; lobes ovate, 6–7 mm, apex obtuse; plicae oblique, broadly triangular to truncate, 1–1.5 mm, margin entire or denticulate. Stamens inserted at middle of corolla tube; filaments 0.9–1.2 cm; anthers narrowly ellipsoid, 3.5–4.5 mm. Style 3–4 mm. Capsules 1.7–2 cm; gynophore to 1.3 cm. Seeds 1.8–2.5 mm, broadly winged. Fl. and fr. Aug–Sep.

Steppes, clearings in forests. Jilin [Korea].

78. *Gentiana triflora* Pallas, Fl. Ross. 1(2): 105. 1789.

三花龙胆 *san hua long dan*

Perennials 35–80 cm tall. Stems glabrous. Stem leaf blades linear to linear-lanceolate, base obtuse to rounded, margin slightly revolute and smooth, apex acuminate to acute, veins 1–3 and prominent. Lowermost leaves pale purple, 1–1.2 cm; middle leaves 5–10 cm × 3–9(–20) mm; upper leaves slightly smaller, surrounding flowers. Inflorescences formed by crowded axillary or terminal clusters, few to many

flowered; bracts 0.8–1.2 cm. Flowers sessile. Calyx tube 0.8–1.2 cm, usually split on 1 side; lobes irregular, linear to narrowly triangular, 4–8(–16) mm, margin slightly revolute, apex acute, vein 1. Corolla blue-purple, tubular-campanulate, 3.5–4.5 cm; lobes ovate-orbicular, 5–8 mm, margin entire or erose, apex obtuse to rounded; plicae triangular to truncate, 1–1.5 mm, oblique, margin entire. Stamens inserted at middle of corolla tube; filaments subulate, 7–10 mm; anthers narrowly ellipsoid, 4–4.5 mm. Style 2–3 mm. Capsules 1.5–1.8 cm; gynophore to 1 cm. Seeds 2–2.5 mm. Fl. and fr. Aug–Sep.

Meadows, forests; 600–1000 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol [Japan, Korea, Mongolia, E Russia].

Gentiana triflora var. *japonica* (Kusnezow) H. Hara occurs in Japan.

79. *Gentiana manshurica* Kitagawa, Bot. Mag. (Tokyo) 48: 103. 1934.

条叶龙胆 *tiao ye long dan*

Perennials 20–30 cm tall. Stems glabrous. Lower stem leaves pale purple, 5–8 mm; middle to upper leaves linear to linear-lanceolate, 3–10 cm × 3–9(–14) mm, base narrowed to obtuse, margin slightly revolute and smooth, apex acuminate to acute, veins 1–3; upper leaves slightly smaller, longer than but not surrounding flowers. Flowers terminal, solitary, sessile or subsessile, rarely also few in axils of upper leaves; bracts linear-lanceolate, 1.5–2 cm. Calyx tube 8–10 mm, entire; lobes linear to linear-lanceolate, 0.8–1.5 cm, margin slightly revolute, apex acute, vein 1. Corolla violet to blue-purple, tubular-campanulate, 4–5 cm; lobes ovate-triangular, 7–9 mm, margin entire, apex acuminate; plicae obliquely ovate, 3.5–4 mm, margin irregularly denticulate, apex obtuse. Stamens inserted at basal part of corolla tube; filaments 0.9–1.2 cm; anthers narrowly ellipsoid, 3.5–4 mm. Style 2–3 mm. Capsules 1.5–1.8 cm; gynophore to 2 cm. Seeds 1.8–2.2 mm. Fl. and fr. Aug–Sep.

• Grassland slopes, wet meadows, roadsides; 100–1100 m. Anhui, Fujian, Guangdong, Guangxi, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Taiwan, Zhejiang.

VI. Sect. *Phyllocalyx* (Kusnezow) T. N. Ho, Bull. Bot. Res., Harbin 5(4): 14. 1985.

叶萼组 *ye e zu*

Gentiana sect. *Frigida* β *Phyllocalyx* Kusnezow, Trudy Imp. S.-Peterburgsk. Bot. Sada 15: 287. 1898.

Perennials. Stems branching sympodially, with short stolons. Calyx membranous, completely surrounded by upper pair of broad obovate obtuse leaves. Stigma lobes expanded, connate or contiguous, forming a discoid or funnelform structure but free after anthesis. Seeds with a discoid wing; seed coat alveolate, with simple, shallow, and hexagonal pits.

One species: Bhutan, China, India, Myanmar, Nepal, Sikkim.

80. *Gentiana phyllocalyx* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 116. 1883.

叶萼龙胆 *ye e long dan*

Perennials 3–12 cm tall. Roots few, slender. Stolons to 5 cm. Stems ascending to erect, simple, glabrous. Leaves crowded toward base of stem. Stem leaves 3–5 pairs, widely spaced; petiole 5–8 mm; leaf blade obovate, 0.6–2.6 × 0.4–1.6 cm, base decurrent into petiole, apex rounded and emarginate,

veins 1–3. Flowers terminal, solitary, sessile. Calyx pale yellow-green; tube broadly tubular, 3.5–4.5 mm; lobes linear to lanceolate, 3–4 mm, subequal, apex obtuse, veins indistinct. Corolla blue, with dark blue stripes, broadly tubular to tubular-campanulate, 3–4.7 cm; lobes ovate to broadly ovate, 3–4 mm, margin entire or erose, apex obtuse; plicae horizontally truncate, margin erose. Stamens inserted at basal part of corolla tube; filaments 1.2–1.4 cm; anthers linear

to ellipsoid, 2.5–5 mm. Style 4–5 mm, linear; stigma lobes suborbicular. Capsules ovoid-ellipsoid, 2.3–2.5 cm; gynophore to 4.6 cm. Seeds compressed, orbicular, 1.4–1.6 mm. Fl. and fr. Jun–Oct.

Grassland and rocky slopes, stony pastures, scrub; 3000–5200 m. SE Xizang, NW Yunnan [Bhutan, India, N Myanmar, Nepal, Sikkim].

VII. Sect. *Isomeria* Kusnezow, Trudy Imp. S.-Petersburgsk. Obshch. Estetvoisp., Otd. Bot. 24(2): 198. 1894.

匍茎组 pu jing zu

Perennials, with stolons, without well-developed caudices, stout rhizomes, or persistent taproots. Stems branching sympodially; flowering stems arising singly from slender stolons, often creeping and rooting at lower nodes. Inflorescences terminal. Flowers usually sessile, solitary or in few-flowered clusters. Stigma lobes free, recurved, linear or oblong. Seed coat alveolate, with simple and shallow or spongy and complex hexagonal pits.

Eighteen species: North America, Asia; 16 species in China.

81. *Gentiana sikkimensis* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 114. 1883.

锡金龙胆 xi jin long dan

Gentiana pseudosikkimensis C. Marquand ex Wilkie.

Perennials 3–10 cm tall. Stolons usually 10–15 cm, much branched. Stems ascending to erect, simple, glabrous. Leaf blade base narrowed, margin smooth or ciliolate, apex rounded, vein distinct abaxially. Basal leaves usually withered at anthesis, leaf blade suborbicular, 6–10 mm. Stem leaves mostly crowded around flowers; petiole 4–13 × 2–4.5 mm, slightly shorter to longer than leaf blade, conspicuously broadened toward stem apex; leaf blade oblong to spatulate, 0.6–1.6 cm × 3.5–8 mm. Inflorescences 3–8-flowered. Calyx tube 6–8 mm, membranous; lobes linear to linear-lanceolate, 1.5–4(–5) mm, unequal, herbaceous, 1-veined, margin smooth or ciliolate, apex acute. Corolla blue, with dark blue streaks, tubular, 2–2.5 cm; lobes ovate, 2.8–3.2 mm, margin entire, apex obtuse; plicae obliquely triangular to truncate, 0.5–1 mm, margin entire or denticulate. Stamens inserted at middle of corolla tube; filaments 5–8 mm; anthers narrowly ellipsoid, 1.5–2 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules ellipsoid, 1–1.2 cm; gynophore to 1.2 cm. Seeds light brown, ellipsoid to subglobose, 0.6–1 mm; seed coat with spongy complex pits. Fl. and fr. Aug–Nov.

Grassland slopes, scrub, forest margins, forests; 2700–5000 m. S and SE Xizang, NW Yunnan [Bhutan, E and NW India, NE Myanmar, Nepal, Sikkim].

82. *Gentiana elwesii* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 115. 1883.

壶冠龙胆 hu guan long dan

Perennials 8–20 cm tall. Stolons to 5 cm, simple or few branched. Stems purple, erect, simple, papillate. Petiole 3–8 × 2–3 mm, slightly broadened toward stem apex; leaf blade oblong to elliptic, (0.6–)1–2 cm × (3–)5–8 mm, base narrowed, margin smooth or ciliolate, apex obtuse; vein 1, abaxially distinct. Lower to middle stem leaves widely spaced; upper leaves crowded and surrounding base of

flowers. Inflorescences 3–8-flowered. Flowers in clusters, sessile or rarely lower pedunculate. Calyx tube narrowly obconic, 6–7 mm, membranous; lobes lanceolate, (0.7–)2.5–3 mm, unequal, margin smooth or ciliolate, apex acute, midvein indistinct. Corolla blue to blue-purple, urceolate, 2–2.6 cm; lobes ovate, 2–3 mm, margin entire, apex obtuse; plicae auricular to truncate, 1–1.5 mm, oblique, margin entire or denticulate. Stamens inserted at basal part of corolla tube; filaments 1.1–1.3 cm; anthers narrowly ellipsoid, 2–2.5 mm. Style 1–2 mm; stigma lobes oblong. Capsules ovoid-ellipsoid, 1.3–1.5 cm; gynophore to 8 mm, slender. Seeds light brown, ellipsoid to subglobose, 0.8–1 mm; seed coat with spongy complex pits. Fl. and fr. Sep.

Scrub slopes; ca. 4200 m. S and SE Xizang [Bhutan, NE India, Nepal, Sikkim].

83. *Gentiana chinensis* Kusnezow, Bull. Acad. Imp. Sci. Saint-Petersbourg 35: 350. 1894.

中国龙胆 zhong guo long dan

Perennials 5–15 cm tall. Stolons to 20 cm, much branched. Stems ascending, simple, papillate. Leaves widely spaced, uppermost crowded and surrounding base of flower cluster; petiole 3–4 mm, slightly broadened toward stem apex; leaf blade ovate-elliptic to ovate-orbicular, 0.6–1.5 cm × 3–7 mm, both ends obtuse, margin ciliolate; vein 1, abaxially distinct. Inflorescences 1–3(–5)-flowered. Calyx tube 7–10 mm, membranous; lobes linear, ovate, or triangular, 1.5–2(–4) mm, unequal, ciliolate, apex acute. Corolla blue, tubular, 3–3.5 cm; lobes ovate to triangular, 3–3.5 mm, margin entire or denticulate, apex acute; plicae obliquely triangular to truncate, 0.8–1.2 mm, margin entire or denticulate. Stamens inserted just below middle of corolla tube to base of lobes; filaments 0.9–1.1 cm; anthers narrowly ellipsoid, 1.5–2 mm. Style 4–5 mm; stigma lobes linear. Capsules narrowly ellipsoid to ovoid-ellipsoid, 1.3–1.5 cm; gynophore to 9–10 mm, slender. Seeds light brown, broadly ellipsoid to subglobose, 0.8–1 mm; seed coat with simple pits. Fl. and fr. Jul–Oct.

• Grassland slopes, rocky places, roadsides, forests; 2400–4500 m. W Hubei, SW Sichuan, NW Yunnan.

84. *Gentiana harrowiana* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 221. 1912.

扭果柄龙胆 niu guo bing long dan

Gentiana streptopoda I. B. Balfour & Forrest.

Perennials 3–6 cm tall. Stolons to 20 cm, much branched, somewhat woody. Stems ascending, simple, glabrous. Petiole 3–5 × 2–4 mm, conspicuously broadened toward stem apex, membranous; leaf blade basally narrowed, margin ciliolate, apex obtuse to rounded; vein 1, abaxially distinct. Lower stem leaves widely spaced; leaf blade elliptic to suborbicular, 8–14 × 4–5 mm; uppermost leaves crowded, surrounding base of flower cluster; leaf blade spatulate to obovate, 1.4–2.5 cm × 6–12 mm. Inflorescences (2–)4–8-flowered. Calyx tube narrowly obconic, 0.9–1.1 cm, membranous, slightly split on 1 side; lobes triangular, 2–4 mm, unequal, ciliolate, apex acute. Corolla blue, tubular, 2.6–3 cm; lobes ovate, 4–5 mm, margin entire or denticulate, apex obtuse; plicae obliquely triangular to truncate, 0.8–1 mm, margin entire or denticulate. Stamens inserted at middle of corolla tube; filaments 6.5–8 mm; anthers ellipsoid, 1–1.2 mm. Style 3–4 mm; stigma lobes linear. Capsules ellipsoid, 1.2–1.5 cm; gynophore to 3.7 cm. Seeds light brown, ellipsoid to subglobose, 0.6–0.8 mm; seed coat with spongy complex pits. Fl. and fr. Aug–Oct.

Grassland slopes; 3600–4500 m. NW Yunnan [NE Myanmar].

Gentiana harrowiana appears to intergrade with *G. chinensis*.

85. *Gentiana depressa* D. Don, Prodr. Fl. Nepal. 125. 1825.

平龙胆 ping long dan

Perennials 3–6 cm tall. Stolons to 15 cm, much branched. Stemless or stems very short, erect, simple. Stem leaves crowded and surrounding flowers; petiole 5–12 mm; leaf blade broadly oblong to ovate, 0.9–1.5 cm × 7–9 mm, membranous, margin scabrous, apex obtuse; vein 1, abaxially distinct. Flowers solitary. Calyx campanulate; tube 6–8 mm, membranous; lobes ovate to broadly oblong, 4–6 mm, herbaceous, base narrowed, margin scabrous and membranous. Corolla pale pinkish purple, broadly tubular to campanulate, throat sometimes slightly constricted, 2.5–3 cm; lobes ovate, 5–7 mm, margin entire, apex obtuse and cuspidate; plicae pale blue, triangular, 2–3 mm, margin entire, apex obtuse. Stamens inserted at basal part of corolla tube; filaments 8–10 mm; anthers ellipsoid, 2–3 mm. Style 6–8 mm; stigma lobes linear. Fl. Aug.

Steep banks, cliff faces; 3000–4500 m. S Xizang [Bhutan, India (Madras), Nepal, Sikkim].

Only var. *depressa* grows in China. *Gentiana depressa* var. *stenophylla* T. N. Ho occurs in Nepal.

86. *Gentiana amplicrater* Burkill, J. Proc. Asiat. Soc. Bengal 2: 312. 1906.

硕花龙胆 shuo hua long dan

Perennials 7–20(–25) cm tall. Stolons 3–5 cm, simple to 3-branched. Stems erect, simple, glabrous. Basal leaves withered at anthesis. Stem leaves with petiole 0.8–1.2 cm; leaf blade ovate-elliptic to ovate, 2–4 × 0.7–1.7 cm, base obtuse, margin thick cartilaginous, apex obtuse; vein 1, abaxially distinct. Inflorescences (1- or) 2–4-flowered. Calyx obconic; tube 1.7–2.3 cm, membranous; lobes oblong to elliptic, 6–10 mm, subequal, margin cartilaginous, apex acute to obtuse and apiculate, midvein outside prominent. Corolla blue-purple, with pale yellow-green base and dark blue stripes, tubular-campanulate, 4.5–6 cm; lobes broadly ovate, 4–6 mm, margin entire, apex rounded; plicae ovate, 1.5–2.5 mm, margin denticulate or rarely entire, apex obtuse. Stamens inserted at basal part of corolla tube; filaments 1.2–1.4 cm; anthers narrowly ellipsoid, 2.5–3.5 mm. Style 4–5 mm; stigma lobes linear. Fl. and fr. Aug–Oct.

Bog meadows, seeps on slopes; 3900–4800 m. SE Xizang [India, Nepal].

87. *Gentiana confertifolia* C. Marquand, Bull. Misc. Inform. Kew 1928: 50. 1928.

密叶龙胆 mi ye long dan

Perennials 4–6 cm tall. Stolons to 15 cm, much branched. Stemless or stems very short, erect, simple. Basal leaves withered, persistent. Stem leaves crowded and surrounding flowers; petiole 4–8 mm; leaf blade linear-elliptic to lanceolate, 2–4 cm × 3–5 mm, base narrowed, margin distinctly cartilaginous, apex acuminate to obtuse, vein 1. Flowers solitary, rarely to 3 and crowded. Calyx obconic; tube membranous; lobes narrowly oblong to oblanceolate, 8–10 mm, margin distinctly cartilaginous, apex acute to obtuse, vein distinct inside. Corolla pale blue, broadly tubular to tubular-campanulate, 2.5–2.8 cm; lobes broadly ovate, 4–6 mm, margin entire, apex rounded and cuspidate; plicae broadly ovate to semiorbicular, 2–3 mm, margin entire, apex rounded. Stamens inserted at basal part of corolla tube, unequal; filaments 2–2.2 cm; anthers ellipsoid, 2–3 mm. Style 8–10 mm, linear; stigma lobes oblong. Fl. Apr.

• Sunny limestone cliffs; 3000–3400 m. NW Yunnan.

88. *Gentiana lacerulata* Harry Smith, Kew Bull. 15: 52. 1961.

撕裂边龙胆 si lie bian long dan

Perennials 3–5 cm tall. Stolons to 5 cm, simple or few branched. Stems erect, simple. Basal leaves withered, persistent. Stem leaves overlapping, crowded; petiole 3–6 mm; leaf blade obovate to truncate-flabelliform, 4–10 × 5.5–12 mm, base narrowed, margin broadly membranous and minutely lacerate, apex rounded to truncate and emarginate, midvein crested and minutely lacerate. Flowers solitary. Calyx broadly tubular; tube 0.8–1.3 cm, membranous; lobes broadly truncate-flabelliform, 4.5–5.5 mm, herbaceous, margin broad, membranous, and lacerulate, apex truncate and emarginate, midvein crested and lacerulate. Corolla blue-purple, tubular, 2.5–3.5 cm; lobes broadly ovate, 4.5–5.5 mm, margin erose, apex rounded and cuspidate; plicae ovate, 3–4 mm, margin erose. Stamens inserted at basal part of corolla tube; filaments ca. 1 cm; anthers ellipsoid, 2–3 mm. Style

filiform, 1–1.2 cm; stigma lobes oblong. Fl. Sep.

Alpine meadows; 4200–4500 m. S and SE Xizang [Bhutan, NE India, Nepal, Sikkim].

89. *Gentiana urnula* Harry Smith, Kew Bull. 15: 51. 1961.

乌奴龙胆 wu nu long dan

Gentiana amoena C. B. Clarke var. *major* Burkill.

Perennials 4–6 cm tall. Stolons to 10 cm, much branched. Stems erect, simple. Basal leaves withered, persistent. Stem leaves overlapping, crowded; petiole 3–6 mm, membranous; leaf blade truncate-flabelliform, 0.7–1.7 cm × 5–10 mm, margin cartilaginous and smooth, apex truncate and emarginate, midvein cartilaginous and crested. Flowers solitary or to 3 and crowded. Calyx obconic; tube 5–6 mm, membranous; lobes 3–4 mm, similar to leaves. Corolla pale blue-purple, sometimes with pale yellow base, with blue streaks, urceolate, 2–3 cm; lobes broadly ovate, 2–3 mm, margin entire, apex rounded and cuspidate; plicae broadly ovate to subtruncate, 1–1.5 mm, margin entire or denticulate. Stamens inserted just below middle of corolla tube; filaments 6–8 mm; anthers ellipsoid, 2.5–3 mm. Style 0.9–1.1 cm; stigma lobes triangular. Capsules ovoid-ellipsoid, 1.5–1.8 cm; gynophore to 4 cm, slender. Seeds dark brown, ellipsoid, 2.3–2.5 mm; seed coat with simple pits. Fl. and fr. Aug–Oct.

Gravel slopes, alpine meadows, gravel zone on high mountains; 3900–5700 m. SW Qinghai, E Xizang [Bhutan, Nepal, Sikkim].

90. *Gentiana emodii* C. Marquand ex Sealy, Bot. Mag. 170: pl. 230. 1954.

扇叶龙胆 shan ye long dan

Gentiana amoena C. B. Clarke (1883), not Weddell (1859).

Perennials 3–5 cm tall. Stolons to 5 cm, much branched. Stems erect, simple. Basal leaves withered, persistent. Stem leaves overlapping, crowded; petiole 3–6 mm, membranous; leaf blade truncate-flabelliform, 5–7 × 3.5–5.5 mm, margin cartilaginous and ciliolate, apex rounded to truncate and emarginate, midvein cartilaginous and crested. Flowers solitary, rarely to 3 and crowded. Calyx obconic; tube 4.5–5.5 mm, membranous; lobes 2–3 mm, similar to leaves. Corolla pale blue-purple, rarely white, with blue streaks, urceolate, 1.5–2 cm; lobes broadly ovate, 2.5–3 mm, margin entire, apex rounded and cuspidate; plicae broadly ovate, 2–2.5 mm, margin entire or denticulate, apex subtruncate. Stamens inserted; filaments 7–8 mm; anthers ellipsoid, 2–2.5 mm. Style 4–5 mm; stigma lobes linear. Capsules ovoid-ellipsoid, 1.5–1.8 cm; gynophore to 3.5 cm, slender. Seeds dark brown, ellipsoid, 1.3–1.5 mm; seed coat with simple pits. Fl. and fr. May–Oct.

Alpine meadows, gravel zone on high mountains; 4300–5700 m. S and SE Xizang [Bhutan, Sikkim].

91. *Gentiana stragulata* I. B. Balfour & Forrest in C. Marquand, Bull. Misc. Inform. Kew 1928: 61. 1928.

匙萼龙胆 chi e long dan

Perennials 5–7 cm tall. Stolons to 10 cm, much branched. Stems erect, simple, densely purple papillate. Leaves apically crowded into a rosette; petiole 3–7 mm, slender, abaxially ciliolate and papillate; leaf blade oblong, spatulate, or rarely ovate, 5–7 × 2–4 mm, adaxially sometimes papillate, abaxially 1-veined, base contracted into a tongue, purple-ciliolate, apex obtuse to rounded. Flowers solitary or to 3 and crowded. Calyx tubular; tube outside ± purple papillate; lobes orbicular-spatulate, 5–7 mm, herbaceous, base contracted into a tongue, purple ciliolate, apex rounded, midvein prominent. Corolla blue, unspotted, tubular, 4.5–5.5 cm; lobes broadly ovate, 5–7 mm, margin entire or denticulate, apex acute; plicae broadly ovate, 1.5–2.5 mm, margin denticulate, apex obtuse to rounded. Stamens inserted just below middle of corolla tube; filaments 1.8–2.5 cm, unequal; anthers ellipsoid, 1.5–2.5 mm. Style 8–10 mm; stigma lobes linear. Capsules ellipsoid, 1.8–2 cm; gynophore to 3 cm. Seeds light brown, ellipsoid to subglobose, 0.8–1 mm; seed coat with spongy complex pits. Fl. and fr. May–Jun.

• Grassland slopes; 3000–4300 m. SE Xizang, NW Yunnan.

92. *Gentiana gilvostriata* C. Marquand, Bull. Misc. Inform. Kew 1931: 83. 1931.

黄条纹龙胆 huang tiao wen long dan

Gentiana gilvostriata var. *stricta* C. Marquand.

Perennials 1–7 cm tall. Stolons to 10 cm, much branched. Stems erect, simple, densely papillate. Leaves apically crowded into a rosette; petiole 3–6 mm, slender, abaxially ciliolate and papillate; leaf blade oblanceolate, spatulate, or obovate, 5–7 × 2–4 mm, base narrowed, margin smooth or ciliolate, apex rounded; vein 1, abaxially distinct. Flowers solitary or to 3 and crowded. Calyx obconic; tube 1–1.2 cm, membranous, outside sometimes papillate; lobes orbicular-spatulate, 2.5–3.5 mm, herbaceous, base contracted into a tongue, margin ciliolate, apex rounded, midvein indistinct. Corolla pale bright blue, with pale yellow base and blue stripes, streaks, and spots, campanulate, 3–3.5(–4.5) cm; lobes broadly ovate, 5–7 mm, margin entire or denticulate, apex acute; plicae broadly ovate, 1.5–2.5 mm, margin denticulate, apex obtuse to rounded. Stamens inserted just below middle of corolla tube; filaments 1.6–2 cm, unequal; anthers narrowly ellipsoid, 1.5–2.5 mm. Style 7–9 mm; stigma lobes linear. Capsules ellipsoid to ovoid-ellipsoid, 1.3–1.5 cm; gynophore to 2 cm. Seeds light brown, ellipsoid to subglobose, 0.8–1 mm; seed coat with spongy complex pits. Fl. and fr. Aug–Nov.

Grassland slopes, forests; 3000–3900 m. SE Xizang, NW Yunnan [Bhutan, NE India, NE Myanmar].

93. *Gentiana filistyla* I. B. Balfour & Forrest in C. Marquand, Bull. Misc. Inform. Kew 1928: 60. 1928.

丝柱龙胆 si zhu long dan

Gentiana filistyla var. *parviflora* C. Marquand.

Perennials 2–5 cm tall. Stolons 3–5 cm, usually few branched. Stems erect, simple, glabrous. Leaves crowded;

petiole 3–5 mm, membranous; leaf blade spatulate to obovate, 4–8.5 × 2.5–5 mm, base narrowed, apex rounded; veins 1–3, abaxially distinct. Flowers solitary. Calyx tubular to narrowly obconic, tube 8–11 mm; lobes lanceolate to narrowly oblong, 5–6 mm, apex subacute to obtuse, midvein indistinct. Corolla blue, unspotted, tubular to narrowly funnelform, (2.3–)3–4 cm; lobes broadly ovate, 3–4 mm, margin entire, apex rounded; plicae obliquely ovate to truncate, 1–1.5 mm, margin erose, apex obtuse to rounded. Stamens inserted at middle of corolla tube; filaments 1.3–1.5 cm; anthers narrowly ellipsoid, 2–3.5 mm. Style 1.1–1.4 cm, filiform, longer than ovary; stigma lobes oblong. Capsules ellipsoid, 1–1.2 cm; gynophore to 1 cm. Seeds light brown, subellipsoid to globose, 0.8–1 mm; seed coat with spongy complex pits. Fl. and fr. Jul–Sep.

Alpine meadows, grassland slopes, rocky places; 2900–4500 m. SE Xizang, NW Yunnan [NE Myanmar].

94. *Gentiana tubiflora* (Wallich ex G. Don) Grisebach, Gen. Sp. Gent. 277. 1838.

筒花龙胆 tong hua long dan

Ericala tubiflora Wallich ex G. Don, Gen. Hist. 4: 189. 1837; *Gentiana longistyla* T. N. Ho; *G. tubiflora* var. *longiflora* Turrill; *G. tubiflora* var. *namlaensis* C. Marquand.

Perennials 4–5 cm tall. Stolons 2–5 cm, simple to 3-branched. Stems erect, simple. Leaves crowded; petiole 3–5 mm; leaf blade oblong to elliptic, 6–9 × 2–3 mm, base narrowed, margin cartilaginous and ± ciliate, apex acute to obtuse and sometimes caudate; vein 1, abaxially indistinct. Flowers solitary. Calyx tubular to narrowly obconic, tube (0.8–)1.2–1.5 cm; lobes ovate to triangular, 4–7 mm, margin usually ± ciliate, apex acute and sometimes caudate, midvein indistinct. Corolla dark blue, unspotted, tubular, (2.5–)3.2–4.2 cm; lobes 4–6 mm, ovate, margin entire, apex obtuse; plicae obliquely truncate, 1–1.5 mm, margin erose. Stamens inserted at middle of corolla tube; filaments (4–)6–10 mm; anthers linear, 1.5–2.5 mm. Style filiform, 1.2–1.4 cm, longer than ovary; stigma lobes oblong. Capsules ellipsoid to ovoid-ellipsoid, 0.9–1.3 cm; gynophore to 4 cm. Seeds brown, ellipsoid, 0.7–1 mm; seed coat with simple pits.

Grassy hillsides, dry hillsides, alpine meadows; 4200–5300 m. S and SE Xizang [Bhutan, NW India, Nepal, Sikkim].

95. *Gentiana namlaensis* C. Marquand, J. Linn. Soc., Bot. 48: 205. 1929.

墨脱龙胆 mo tuo long dan

Gentiana monochroa T. N. Ho; *G. sherriffii* C. Marquand.

Perennials 3–5 cm tall. Stolons to 10 cm, much branched. Stems erect, simple. Leaves of stolons widely spaced; petiole completely connate; leaf blade linear to linear-lanceolate, 0.8–1.2 cm × 2–3 mm. Leaves of flowering stems crowded into a rosette; petiole 1–1.5 cm, membranous; leaf blade narrowly elliptic to ovate-elliptic, 1.2–2 cm × 2–5 mm, base narrowed, apex obtuse; veins 1–3, abaxially distinct. Flowers solitary. Calyx campanulate, tube 6–9 mm; lobes lanceolate to ovate, 2–7 mm, unequal, apex acute, midvein

indistinct. Corolla clear blue, with pale yellow-white base and blue streaks and spots, campanulate, (1.6–)2–2.5 cm; lobes broadly ovate, 2.5–3.5 mm, margin entire, apex rounded; plicae broadly ovate, 0.5–1 mm, margin entire, apex rounded to truncate. Stamens inserted at basal part of corolla tube; filaments 8–10 mm; anthers ellipsoid, 1.5–2 mm. Style 2–3 mm; stigma lobes oblong. Capsules ellipsoid to ovoid-ellipsoid, 1–1.2 cm; gynophore to 1 cm. Seeds light brown, ellipsoid to subglobose, 1–1.2 mm; seed coat with spongy complex pits. Fl. and fr. Aug.

• Alpine meadows; 4600–4900 m. SE Xizang.

96. *Gentiana wardii* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 122. 1913.

矮龙胆 ai long dan

Perennials 3–5 cm tall. Stolons 1–3 cm, simple to 3-branched. Stems erect, simple. Leaves crowded into a rosette; petiole 3–5 mm; leaf blade spatulate to obovate, 4–11 × 3–6 mm, base narrowed, apex rounded; veins 1–3, abaxially distinct. Flowers solitary. Calyx obconic; tube 6–8 mm, membranous; lobes ovate, 2–3 mm, subequal, herbaceous, apex obtuse to rounded, midvein indistinct. Corolla blue, unspotted, campanulate, less than 1 cm or 2–3.5 cm; lobes broadly ovate, 1.5–2.5 mm, margin entire, apex rounded; plicae broadly ovate and 1–1.5 mm or triangular and 2–2.5 mm, margin entire or denticulate, apex obtuse. Stamens inserted at basal part of corolla tube; filaments 7–9 mm; anthers ellipsoid, 1.5–2 mm. Style 1.5–2.5 mm; stigma lobes oblong. Capsules ovoid-ellipsoid, 1.4–1.6 cm; gynophore to 1.7 cm. Seeds light brown, ellipsoid to subglobose, 1–1.3 mm; seed coat with spongy complex pits. Fl. and fr. Aug–Nov.

3000–4900 m. SW Sichuan, SE Xizang, NW Yunnan [Myanmar].

- 1a. Corolla less than 1 cm 96b. var. *micrantha*
1b. Corolla 2–3.5 cm.
2a. Corolla 2–2.2(–2.6) cm; plicae broadly ovate, 1–1.5 mm 96a. var. *wardii*
2b. Corolla 3–3.5 cm; plicae triangular, 2–2.5 mm 96c. var. *emergens*

96a. *Gentiana wardii* var. *wardii*

矮龙胆 (原变种) ai long dan (yuan bian zhong)

Corolla 2–2.2(–2.6) cm; plicae broadly ovate, 1–1.5 mm.

• Alpine meadows, gravel slopes; 3500–4600 m. SE Xizang, NW Yunnan.

96b. *Gentiana wardii* var. *micrantha* C. Marquand, Bull. Misc. Inform. Kew 1937: 187. 1937.

小花矮龙胆 xiao hua ai long dan

Corolla less than 1 cm; plicae broadly ovate, 1–1.5 mm.

SE Xizang [Myanmar].

96c. *Gentiana wardii* var. *emergens* (C. Marquand) T. N. Ho, Novon 4: 372. 1994.

露萼龙胆 lu e long dan

Gentiana emergens C. Marquand, Bull. Misc. Inform. Kew 1931: 82. 1931.

Corolla 3–3.5 cm; plicae triangular, 2–2.5 mm.

• Grassland slopes, alpine meadows, gravel places on high mountains; 3000–4900 m. SW Sichuan.

VIII. Sect. *Microsperma* T. N. Ho, Bull. Bot. Res., Harbin 5(4): 14. 1985.

微籽组 wei zi zu

Annuals. Capsule cylindric to narrowly ellipsoid, wingless. Seed coat alveolate, with simple shallow hexagonal pits.

Ten species: Bhutan, SW China, Nepal; nine species in China.

97. *Gentiana lineolata* Franchet, Bull. Soc. Bot. France 31: 375. 1884.

四数龙胆 si shu long dan

Gentiana lineolata var. *verticillaris* F. B. Forbes & Hemsley.

Annuals 5–10 cm tall. Stems erect, with laxly spreading branches, densely papillate. Basal leaves withered at anthesis, similar to stem leaves. Stem leaves shorter than internodes; petiole 2–3 mm, densely papillate; leaf blade lanceolate to ovate, 6–12 × 2.5–4 mm, larger toward stem apex, margin ciliolate, apex acute, midvein prominent. Flowers terminal, solitary, sessile or subsessile, 4-merous. Calyx tubular, 1.3–1.6 cm; lobes ovate-triangular, 5–6 mm, margin densely ciliolate, apex acuminate and caudate, midveins strongly keeled and decurrent as conspicuous wings of calyx tube. Corolla purple, with blackish streaks, salverform, 2–3.5 cm; lobes ovate-elliptic, 4–5 mm, margin entire, apex obtuse; plicae ovate to suborbicular, 2–2.5 mm, margin entire or denticulate, apex obtuse to subtruncate. Stamens inserted at basal part of corolla tube, unequal, 2 longer and 1–1.2 cm, 2 shorter and 6–8 mm; anthers narrowly ellipsoid, 1.2–1.5 mm. Style filiform, 8–9 mm; stigma lobes linear. Capsules ovoid-ellipsoid to narrowly ellipsoid, 1–1.2 cm; gynophore 0.9–1.1 cm, slender, often twisted. Seeds dark brown, ellipsoid, 0.6–0.8 mm. Fl. and fr. Aug-Dec.

• Grasslands, forest margins, forests; 600–4000 m. SW Sichuan, Yunnan.

98. *Gentiana praeclara* C. Marquand, Bull. Misc. Inform. Kew 1928: 54. 1928.

脊萼龙胆 ji e long dan

Annuals 3–12 cm tall. Stems erect, with laxly spreading branches, densely papillate. Basal leaves withered at anthesis, similar to stem leaves. Stem leaves shorter than internodes; petiole 2–3 mm, densely papillate; leaf blade ovate-lanceolate to ovate, 0.6–2 cm × 2.5–9 mm, larger toward stem apex, margin ciliolate, apex acute, midvein prominent. Flowers terminal, solitary, sessile or subsessile, 4-merous. Calyx tubular, 2–2.7 cm; lobes ovate-triangular, 0.9–1.1 cm, margin densely ciliolate, apex acuminate and caudate, midvein strongly keeled and decurrent as conspicuous wings of calyx tube. Corolla blue-purple, with blackish streaks, salverform,

3.5–6 cm; lobes ovate-elliptic, 0.8–1.2 cm, margin entire, apex obtuse; plicae ovate to subtruncate, 1.5–2.5 mm, margin denticulate, apex obtuse to subtruncate. Stamens inserted at middle of corolla tube, unequal, 2 longer and 1.2–1.4 cm, 2 shorter and 8–10 mm; anthers narrowly ellipsoid, 2.5–3 mm. Style filiform, 1.2–1.4 cm, slightly shorter or as long as ovary; stigma lobes narrowly oblong. Capsules narrowly ellipsoid, 1.6–2 cm; gynophore 0.9–1.1 cm, slender. Seeds dark brown, ellipsoid to ovoid, 0.8–1 mm. Fl. and fr. Sep-Oct.

• Roadside slopes, meadows, forests; 1500–4200 m. SW Sichuan, NW Yunnan.

99. *Gentiana delavayi* Franchet, Bull. Soc. Bot. France 31: 377. 1884.

微籽龙胆 wei zi long dan

Annuals 3–12(–20) cm tall, densely purple papillate. Stems purple, erect, branched. Basal leaves usually withered at anthesis; petiole 3–5 mm; leaf blade narrowly elliptic to lanceolate, 1–1.5 cm × 4–6 mm, apex obtuse, veins 3. Stem leaves with petiole 5–10 mm; leaf blade narrowly elliptic to elliptic-lanceolate, 2–5 cm × 5–7 mm, larger toward stem apex, apex obtuse; veins 3–5, prominent. Inflorescences terminal clusters. Flowers sessile or subsessile, 5-merous. Calyx tube tinged purple, narrowly obconic, 8–10 mm; lobes oblanceolate, 8–11 mm, slightly unequal, margin densely ciliolate, apex obtuse, midvein prominent. Corolla dark blue to violet, with inconspicuous blackish streaks, funnellform, (1.5–)2.8–4 cm; lobes ovate-triangular, 5–6 mm, margin entire, apex acute; plicae ovate to subtruncate, 1.5–2.5 mm, margin denticulate, apex obtuse. Stamens inserted at middle of corolla tube, sometimes unequal; filaments 1.2–1.8 cm; anthers linear, 3–4 mm. Style filiform, 8–10 mm; stigma lobes triangular. Capsules narrowly ellipsoid to ovoid-ellipsoid, 1.5–1.8 cm; gynophore to 1.8 cm. Seeds brown, ellipsoid, 0.5–0.7 mm. Fl. and fr. Sep-Dec.

• Grassland slopes, roadsides, scrub; 1400–3900 m. SW Sichuan, NE and NW Yunnan.

100. *Gentiana picta* Franchet in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 131. 1890.

着色龙胆 zhuo se long dan

Annuals 10–15 cm tall. Stems erect, branched, glabrous. Basal leaves withered at anthesis. Stem leaves with petiole 2–3 mm, base broadened; leaf blade linear, 1–3 cm × 1–3 mm,

apex acuminate, midvein indistinct. Inflorescences axillary or terminal clusters. Flowers sessile or subsessile, 5-merous. Calyx tube with pale blue streaks, narrowly obconic, membranous, 6–8 mm; lobes linear, 7–12 mm, unequal, herbaceous, midvein indistinct. Corolla pale blue, with blackish streaks, broadly tubular, 2.5–3.2 cm; lobes ovate, 4–5 mm, margin entire, apex acute; plicae oblong, 2–2.5 mm, margin entire, apex obtuse to subtruncate. Stamens inserted at basal part of corolla tube, unequal; filaments 0.8–1.5 cm; anthers narrowly ellipsoid, 1–1.5 mm. Style linear, 3–4 mm, much shorter than ovary; stigma lobes linear. Capsules narrowly ellipsoid, 1.1–1.3 cm; gynophore to 4 cm. Seeds brown, ellipsoid to subglobose, 0.5–0.7 mm. Fl. and fr. Aug–Nov.

• River banks, grassland slopes; 2400–3000 m. SW Sichuan, C and NW Yunnan.

101. *Gentiana yunnanensis* Franchet, Bull. Soc. Bot. France 31: 376. 1884.

云南龙胆 yun nan long dan

Annuals 5–30 cm tall. Stems purple, erect, branched, densely papillate. Petiole equal or slightly longer than leaf blade, slender; leaf blade spatulate to obovate, 1–3.5 cm × 4–13 mm, base narrowed, margin scabrous, apex rounded, veins 1–3. Inflorescences elongated with terminal and many axillary clusters. Flowers sessile or subsessile, 5-merous. Calyx tube narrowly obconic, 6–9 mm; lobes narrowly elliptic, unequal, 3 larger and 8–10 mm, 2 smaller and 4–6 mm, base narrowed, margin scabrous, apex obtuse, midvein prominent. Corolla pale yellow-white to pale blue, with blackish streaks and spots, tubular, (1.5–)2.2–2.6 cm; lobes ovate, 3–5 mm, margin entire, apex obtuse; plicae broadly ovate, 0.7–1 mm, symmetric, margin slightly 2-cleft or denticulate. Stamens inserted at middle of corolla tube, usually exerted, unequal, 3 longer and 1–1.2 cm, 2 shorter and 7–9 mm; anthers ellipsoid, 1–1.5 mm. Style linear, 2–3 mm, much shorter than ovary; stigma lobes narrowly oblong. Capsules narrowly ellipsoid, 1.1–1.3 cm; gynophore 1.1–1.3(–3.5) cm, slender. Seeds brown, subglobose, 0.5–0.7 mm. Fl. and fr. Aug–Nov.

• Grassland slopes, roadsides, alpine meadows, scrub, forests; 2300–4400 m. Guizhou, SW and W Sichuan, SE Xizang, NE and NW Yunnan.

102. *Gentiana suborbisepala* C. Marquand, Bull. Misc. Inform. Kew 1928: 58. 1928.

圆萼龙胆 yuan e long dan

Annuals 6–15 cm tall. Stems purple, ascending, branches spreading to prostrate, densely papillate. Petiole equal or slightly longer than leaf blade, slender; leaf blade spatulate to obovate, 5–10(–15) × 3.5–7 mm, base narrowed, margin scabrous, apex rounded, veins 1–3. Inflorescences axillary or terminal clusters, 1–3-flowered. Flowers sessile or subsessile, 5-merous. Calyx tube narrowly obconic, 7–10 mm; lobes suborbicular, 6–8 mm, equal, base contracted into a tongue, margin scabrous, apex rounded, midvein prominent. Corolla pale yellow-white to pale blue, usually with blackish streaks and spots, tubular, less than 1.5(–2) cm or 2.5–3 cm; lobes ovate, 2.5–4 mm, symmetric, margin entire, apex

obtuse; plicae broadly ovate, 1.5–2 mm, margin slightly 2-cleft or denticulate. Stamens inserted at middle of corolla tube, usually exerted, unequal; filaments 5–8 mm; anthers narrowly ellipsoid, 1–1.5 mm. Style linear, 3.5–5.5 mm, much shorter than ovary; stigma lobes narrowly oblong. Capsules narrowly ellipsoid, 1.3–1.5 cm; gynophore to 3 cm, slender. Seeds brown, subglobose, 0.5–0.7 mm. Fl. and fr. Aug–Nov.

• 2200–4400 m. Guizhou, SW and W Sichuan, NE Yunnan.

1a. Corolla 2.5–3 cm 102a. var. *suborbisepala*
1b. Corolla less than 1.5(–2) cm 102b. var. *kialensis*

102a. *Gentiana suborbisepala* var. *suborbisepala*

圆萼龙胆 (原变种) yuan e long dan (yuan bian zhong)

Corolla 2.5–3 cm.

• Grassland slopes, wastelands, alpine meadows, scrub; 2200–4400 m. Guizhou, SW and W Sichuan, NE Yunnan.

102b. *Gentiana suborbisepala* var. *kialensis* (C. Marquand) T. N. Ho, Novon 4: 372. 1994.

卡拉龙胆 ka la long dan

Gentiana yunnanensis Franchet var. *kialensis* C. Marquand, Bull. Misc. Inform. Kew 1937: 166. 1937; *G. blinii* H. Léveillé.

Corolla less than 1.5(–2) cm.

• Grassland slopes; 3700–3800 m. Guizhou, SW and W Sichuan, NE Yunnan.

103. *Gentiana atropurpurea* T. N. Ho, Bull. Bot. Res., Harbin 4(1): 76. 1984.

黑紫龙胆 hei zi long dan

Annuals 3–5 cm tall. Stems purple, ascending, much branched with prostrate branches, densely papillate. Petiole 2.5–5 mm; leaf blade reniform to suborbicular, 1.5–3 × 2–4.5 mm, base rounded, margin smooth, apex rounded, midvein distinct. Flowers terminal, solitary, sessile or subsessile, 5-merous. Calyx tube narrowly obconic, 6–8 mm; lobes reniform to suborbicular, 1–2.5 mm, equal, base contracted into a tongue, margin scabrous, apex rounded, midvein distinct. Corolla dark purple, tubular, (0.8–)1–1.5 cm; lobes ovate, 1.5–2.5 mm, symmetric, margin entire, apex obtuse; plicae ovate, 1–1.5 mm, margin denticulate, apex obtuse. Stamens inserted at apical part of corolla tube, included in corolla, equal; filaments 1–2 mm; anthers ellipsoid, 0.4–0.5 mm. Style 1.2–1.5 mm, much shorter than ovary; stigma lobes subcapitate. Capsules narrowly ellipsoid, 6.5–7.5 mm; gynophore to 3 mm. Seeds brown, ellipsoid, 1–1.2 mm. Fl. and fr. Aug.

• Grassland slopes; 3200–3800 m. SW Sichuan.

104. *Gentiana vernayi* C. Marquand, Hooker's Icon. Pl. 34: t. 3330. 1937.

露蕊龙胆 lu rui long dan

Annuals 3–5 cm tall. Stems purple, erect, branched, glabrous or papillate. Petiole 2–4 mm; leaf blade suborbicular, 1.5–3 mm in diam., base abruptly contracted, margin cartilaginous and smooth, apex rounded, midvein distinct. Flowers terminal, solitary, sessile or subsessile, 5-merous. Calyx tube with distinct purple veins, tubular, 5–10 mm, membranous; lobes spreading to recurved, similar to leaves, 1.5–2.5 mm. Corolla clear pale blue, with pale yellow-white base, unspotted, salverform, rarely tubular, 1–2 cm; lobes ovate-elliptic, 2–5 mm, margin entire, apex obtuse; plicae extremely oblique, triangular to auricular, 1–1.5 mm, margin entire. Stamens inserted at apical part of corolla tube, usually exerted, equal; filaments 1.5–3.5 mm; anthers narrowly ellipsoid, 0.5–3 mm. Style usually exerted, linear, 4–7 mm, ± equaling ovary; stigma lobes narrowly oblong. Capsules narrowly ellipsoid, 7–10 mm; gynophore to 2.5 cm. Seeds black, subglobose, 0.8–1 mm. Fl. and fr. Jul-Sep.

Alpine meadows; 4200–5200 m. S and SE Xizang [Bhutan, Nepal].

105. *Gentiana tongolensis* Franchet, Bull. Soc. Bot. France 43: 490. 1896.

东俄洛龙胆 dong e luo long dan

Annuals 3–10 cm tall. Stems purple, much branched with prostrate branches, papillate. Petiole 3–6 mm, papillate; leaf blade suborbicular, 3–5 mm in diam., base abruptly contracted, margin cartilaginous and smooth, apex rounded, midvein distinct. Flowers terminal, solitary, sessile or subsessile, 5-merous. Calyx tube tubular, 6–9 mm, membranous, sometimes papillate; lobes spreading to recurved, similar to leaves, 2–4 mm. Corolla pale yellow, basally with blue spots, salverform, (1.4–)2–2.4 cm; lobes ovate-elliptic, 2–4.5 mm, margin entire, apex obtuse; plicae extremely oblique, triangular to auricular, 1–1.5 mm, margin entire. Stamens inserted at middle of corolla tube, usually exerted, equal; filaments 7–9 mm; anthers narrowly ellipsoid, 0.7–1.2 mm. Style usually exerted, filiform, 4–7 mm, ± equal to ovary; stigma lobes linear. Capsules narrowly ellipsoid, 6–12 mm; gynophore to 7 mm. Seeds brown, ellipsoid, 0.8–1 mm. Fl. and fr. Aug-Sep.

• Meadows, roadside slopes; 3500–4800 m. W Sichuan, E Xizang.

IX. Sect. *Stenogyne* Franchet, Bull. Soc. Bot. France 31: 375. 1884.

狭蕊组 xia rui zu

Annuals, rarely perennials. Petioles of stem leaves 0.5–1 mm, entirely connate. Calyx keeled or winged. Plicae asymmetrical, very oblique. Style filiform, longer to slightly shorter than the ovary. Capsules cylindrical, wingless. Seeds triquetrous with three winged edges, rarely wingless or areolate; seed coat reticulate.

Fourteen species: Asia; 12 species in China.

106. *Gentiana villifera* H. W. Li in T. N. Ho, Bull. Bot. Res., Harbin 4(1): 75. 1984.

紫毛龙胆 zi mao long dan

Perennials 20–30 cm tall, densely white and purple pubescent. Stems purple, ascending to erect, slender, branched from base. Basal leaves sessile, oblong to subspatulate, 4–6 × 1–1.5 mm, apex acute. Stem leaves widely spaced; leaf blade ovate to cordate, 5–10 × 3–9 mm, shorter than internodes, base rounded, apex acute, vein 1. Flowers terminal, solitary, sessile. Calyx tube narrowly obconic, 6–9 mm, membranous, prominently 5-veined; lobes linear-lanceolate, 3–4 mm, apex acuminate, midvein outside prominent. Corolla purple, tubular, 3–4 cm; lobes ovate-triangular, 5–7 mm, margin entire, apex acute; plicae oblong, 5–6 mm, apex rounded and fringed. Stamens inserted at basal part of corolla tube, unequal, 2 longer and ca. 2.1 cm, 3 shorter and ca. 1.5 cm; anthers ellipsoid, 2–2.5 mm. Ovary narrowly ellipsoid, 1.3–1.5 cm; gynophore to 9 mm, stout. Style 1–1.2 cm; stigma lobes linear. Fl. Apr.

• Valleys; ca. 800 m. SE Sichuan.

107. *Gentiana alata* T. N. Ho in T. N. Ho & S. W. Liu, Bull. Nat. Hist. Mus. London (Bot.) 23: 57. 1993.

翅萼龙胆 chi e long dan

Gentiana kusnezowii Franchet (Nov 1896), not Gilg (May 1896).

Annuals 15–25 cm tall. Stems erect, branched or rarely simple, glabrous. Basal leaves withered at anthesis. Stem leaves widely spaced; leaf blade ovate to cordate, 3–7 × 3–6 mm, shorter than internodes, abaxially scabrous pubescent on veins, base rounded, margin serrulate, apex acute, veins 3. Flowers terminal, solitary, sessile. Calyx campanulate, 1.8–2.2 cm, broadly winged; lobes linear-triangular, 0.9–1.1 cm, apex acute, midvein outside strongly keeled and decurrent into wings of calyx tube. Corolla pale purple, broadly tubular to funnellform, 2.3–2.5 cm; lobes ovate, 6–8 mm, margin entire, apex obtuse; plicae triangular, ca. 2 mm, apex long fringed. Stamens inserted at basal part of corolla tube, unequal, 2 longer and 1.3–1.5 cm, 3 shorter and 5–6 mm; anthers narrowly ellipsoid, 2–2.5 mm. Style 1–1.2 cm; stigma lobes narrowly ellipsoid. Fl. and fr. Oct.

• Clearings in forests; 1200–2000 m. C Yunnan.

108. *Gentiana rhodantha* Franchet in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 133. 1890.

红花龙胆 hong hua long dan

Gentiana jankae Kanitz; *G. rhodantha* var. *wilsonii* C. Marquand.

Perennials 20–50 cm tall, with a short rhizome. Stems erect; branches spreading, glabrous. Basal leaves withered

at anthesis; petiole 5–10 mm; leaf blade elliptic, ovate, or obovate, 2–4 × 0.7–2 cm, base narrowed, margin serrulate, apex acute, midvein distinct. Stem leaves widely spaced; leaf blade ovate-triangular, broadly ovate, or cordate, 1–3 × 0.5–2 cm, shorter than internodes, abaxially pubescent, base rounded, margin serrulate, apex acute; veins 3–5, prominent. Flowers terminal, solitary, sessile. Calyx tube tinged purple, narrowly obconic, 0.7–1.3 cm, membranous, narrowly winged; lobes linear-lanceolate, 5–10 mm, margin ciliolate, apex acuminate, midvein outside prominent, minutely hispid, decurrent into wings of calyx tube. Corolla pale purple, with blackish streaks, tubular to funnelliform, 2.5–4.5 cm; lobes ovate to ovate-triangular, 5–9 mm, margin entire, apex acuminate to obtuse; plicae broadly triangular, 4–5 mm, apex long fringed. Stamens inserted at basal part of corolla tube, unequal; filaments 5–12 mm; anthers narrowly ellipsoid, 2.5–3 mm. Style 6–8 mm; stigma lobes linear. Capsules ellipsoid, 2–2.5 cm; gynophore to 2 cm. Seeds light brown, subglobose, ca. 1 mm in diam., broadly winged. Fl. and fr. Oct-Feb.

• Grasslands, alpine scrub, forests; 500–1800 m. Gansu, Guangxi, Henan, W Hubei, S Shaanxi, SW Sichuan, Yunnan.

109. *Gentiana striata* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 27: 501. 1881.

条纹龙胆 tiao wen long dan

Gentiana schlechteriana H. Limpricht; *G. tricholoba* Franchet.

Annuals 10–30 cm tall. Stems purple, ascending to erect; branches few, spreading. Basal leaves withered at anthesis. Stem leaves widely spaced; leaf blade ovate-lanceolate, 1–3 cm × 5–12 mm, shorter than internodes, abaxially densely pubescent on midvein, base rounded, margin scabrous to ciliolate, apex acuminate to acute, veins 1–3. Flowers terminal, solitary, sessile. Calyx tubular, 1–1.3 cm; lobes linear to subulate, 8–11 mm, margin scabrous or ciliolate, apex acuminate, midvein outside minutely hispid, strongly keeled, decurrent into wings of calyx tube. Corolla pale yellow, with blackish streaks, tubular, 4–6 cm; lobes ovate, 5–7 mm, margin entire, apex acuminate with a caudate tip 1–2 mm; plicae obliquely truncate, margin denticulate. Stamens inserted at middle of corolla tube, unequal; filaments (0.2–)0.5–1.5 cm; anthers narrowly ellipsoid, 2.5–3 mm. Style 1–1.5 cm; stigma lobes linear. Capsules ellipsoid, 2–3.5 mm; gynophore 1.5–2 cm. Seeds brown, ellipsoid, 3–3.5 mm. Fl. and fr. Aug-Oct.

• Grassland and scrub slopes; 2200–3900 m. Gansu, Ningxia, Qinghai, W Sichuan.

110. *Gentiana souliei* Franchet, Bull. Soc. Bot. France 43: 491. 1896.

毛脉龙胆 mao mai long dan

Gentiana pterocalyx Franchet var. *flavoviridis* C. Marquand.

Annuals 10–40 cm tall. Stems erect; branches spreading,

angled, pubescent along angles. Basal leaves withered at anthesis. Stem leaves widely spaced; leaf blade ovate-lanceolate to triangular, 1–2.6 cm × 8–11 mm, much shorter than internodes, abaxially weakly pubescent on veins, base rounded, margin ciliolate, apex acute; veins 3–5, prominent. Flowers terminal, solitary, sessile. Calyx tube campanulate, 1–1.3 cm, membranous, broadly winged, pubescent along wings; lobes linear-lanceolate, 8–10 mm, margin ciliolate, apex acuminate, midvein outside strongly keeled and decurrent into wings of calyx tube. Corolla pale yellow to yellow, tubular to funnelliform, 3–4.5 cm, tube puberulent along veins; lobes ovate, 5–8 mm, margin entire, apex slightly acuminate to subacute; plicae horizontally truncate, margin erose. Stamens inserted at basal part of corolla tube, unequal; filaments 0.7–1.8 cm; anthers narrowly ellipsoid, 2.5–3 mm. Style 1–1.3 cm; stigma lobes linear. Capsules ellipsoid, 2.5–3 cm; gynophore to 5 mm. Seeds dark brown, ellipsoid, 2–2.5 mm. Fl. and fr. Sep-Dec.

• Grassland slopes, *Abies* forests; 3200–3900 m. W Sichuan, NW Yunnan.

111. *Gentiana leptoclada* I. B. Balfour & Forrest, Notes Roy. Bot. Gard. Edinburgh 4: 71. 1907.

蔓枝龙胆 man zhi long dan

Gentiana hapalocaula C. Marquand.

Annuals 20–35 cm tall. Stems ascending to erect; branches spreading, angled, glabrous. Basal leaves withered at anthesis. Stem leaves widely spaced; leaf blade broadly ovate to cordate, 0.5–1.6 × 0.6–1.6 cm, shorter than internodes, base rounded to cordate, margin serrulate, apex acute, veins 3–5. Flowers terminal, solitary, sessile. Calyx narrowly obconic, 1.2–1.5 cm; tube membranous, angled, smooth, papillate to puberulent along angles; lobes subulate, 2–3 mm, apex acuminate, midvein prominent, minutely hispid outside, and decurrent into angles of calyx tube. Corolla pale blue to blue, tubular to funnelliform, 2.5–3.2 cm; lobes lanceolate to ovate, 0.9–1.1 cm, margin entire, apex acuminate to acute; plicae lanceolate, 3–4 mm, margin denticulate, apex acuminate. Stamens inserted at basal part of corolla tube, unequal; filaments 1–1.2 cm; anthers narrowly ellipsoid, 2–2.5 mm. Style 9–10 mm; stigma lobes linear. Capsules ellipsoid, 2–2.5 cm; gynophore to 2 cm. Seeds dark brown, ellipsoid, 0.8–1 mm, wingless.

• Forests; 2100–3000 m. NW Yunnan.

112. *Gentiana primuliflora* Franchet, Bull. Soc. Bot. France 31: 375. 1884.

报春花龙胆 bao chun hua long dan

Annuals 5–20 cm tall. Stems ascending to erect, slender; branches spreading, papillate to pubescent. Basal leaves sessile, elliptic, 0.8–1.2 cm × 2–4 mm, margin serrulate, apex obtuse, veins 3. Stem leaves widely spaced; leaf blade ovate to cordate, 3–10 × 2–8 mm, shorter than internodes, base rounded, margin serrulate, apex acute; veins 3–5, prominent. Flowers terminal, solitary, sessile or subsessile. Calyx tubular, 5–7 mm; tube membranous, angled; lobes subulate, 1.5–2

mm, midvein prominent outside and decurrent into angles of calyx tube. Corolla violet, salverform, 1–1.8(–2) cm; tube 2.5–3.5 mm wide but with abruptly expanded limb 7–10 mm wide; lobes ovate, 5–7 mm, margin entire, apex obtuse; plicae triangular, 2.5–3 mm, margin erose, apex obtuse. Stamens inserted at middle of corolla tube, unequal or equal; filaments 5–8 mm, linear; anthers narrowly ellipsoid, 1–2 mm. Style 5–6 mm; stigma lobes linear. Capsules ellipsoid, 1.4–1.6 cm; gynophore ca. 2 mm. Seeds brown, ellipsoid to ovoid, 0.5–1 mm, wingless. Fl. and fr. Sep–Oct.

• Grassland slopes, forests; 1800–3900 m. SW Sichuan, C and NW Yunnan.

113. *Gentiana expansa* Harry Smith in Handel-Mazzetti, Symb. Sin. 7: 951. 1936.

盐丰龙胆 yan feng long dan

Annuals 20–40 cm tall. Stems erect, slender, angled, papillate along angles; branches few, short. Basal leaves withered at anthesis. Stem leaves widely spaced; leaf blade broadly ovate to cordate, 5–10 × 4–8 mm, shorter than internodes, abaxially papillate on veins, base subcordate, margin serrulate, apex acute; veins 3–5, abaxially distinct. Flowers terminal, solitary, sessile. Calyx tubular, 8–10 mm; tube membranous, angled, minutely hispid along angles; lobes narrowly ovate to triangular, 1.5–2 mm, apex acuminate, midvein prominent outside and decurrent into angles of calyx tube. Corolla purple, salverform, 1.5–2 cm; tube 3–3.5 mm wide but with an abruptly expanded limb 8–10 mm wide; lobes lanceolate, 6–8 mm, margin entire, apex acute; plicae lanceolate, 4–6 mm, margin denticulate. Stamens inserted at basal part of corolla tube, unequal; filaments 8–10 mm; anthers narrowly ellipsoid, 1.5–2 mm. Ovary ellipsoid, 5–7 mm; gynophore ca. 3 mm. Style 4–6 mm; stigma lobes linear. Fl. and fr. Jul–Nov.

• Grassland and gravel slopes, forest margins; 1100–2100 m. C and NW Yunnan.

114. *Gentiana pterocalyx* Franchet in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 132. 1890.

翼萼龙胆 yi e long dan

Annuals 15–35 cm tall. Stems erect, stout; branches few, short spreading, 4-angled. Basal leaves usually withered at anthesis. Stem leaves very widely spaced; leaf blade broadly ovate to cordate, (0.7–)1.3–2.5 × 0.7–1.8 cm, shorter than internodes, base rounded, margin serrulate and ciliate, apex acute; veins 3, prominent, abaxially pubescent. Flowers terminal, solitary, sessile. Calyx tube obconic, 1–1.2 cm, membranous, broadly winged, purple and white pubescent along wings; lobes lanceolate to ovate-lanceolate, 5–9 mm, apex acuminate, midvein outside keeled and decurrent into wings of calyx tube. Corolla blue to blue-purple, tubular, 3–4 cm; lobes ovate, 8–11 mm, margin entire, apex obtuse; plicae oblong, 1–2 mm, margin denticulate, apex rounded. Stamens inserted at basal part of corolla tube, unequal; filaments 1.5–1.7 cm; anthers ellipsoid, 2.5–3 mm. Style 0.8–1.2 cm; stigma

lobes linear. Capsules ellipsoid, 2–2.5 cm; gynophore (0.5–) 1–1.5 cm. Seeds brown, ellipsoid to subglobose, 2.5–3 mm. Fl. and fr. Aug–Nov.

• Grassland slopes; 1700–3500 m. W Guizhou, SW Sichuan, N Yunnan.

115. *Gentiana eurycarpa* C. Marquand, Bull. Misc. Inform. Kew 1931: 71. 1931.

滇东龙胆 dian dong long dan

Annuals 10–20 cm tall. Stems ascending to erect, with spreading branches, 4-angled. Basal leaves withered at anthesis. Stem leaves widely spaced; leaf blade broadly ovate to cordate, 7–12 × 4–5 mm, usually shorter than internodes, base rounded, margin serrulate and ciliate, apex acute, veins 3, prominent, and abaxially pubescent. Flowers terminal, solitary, sessile. Calyx tube tubular, 0.9–1.1 cm, membranous, narrowly and distinctly winged, ± minutely hispid along wings; lobes spreading, lanceolate to narrowly elliptic, 5–6 mm, base narrowed, apex acute, midvein decurrent outside into wings of calyx tube. Corolla pale purple, tubular, 3.5–4.5 cm; lobes ovate-elliptic, 8–10 mm, margin entire, apex subacuminate; plicae oblong, 3.5–4.5 mm, margin short lacinate. Stamens inserted at basal part of corolla tube, unequal; filaments 1.5–1.8 cm; anthers ellipsoid, 2–2.5 mm. Fl. and fr. Aug–Nov.

• Grassland slopes; 2400–3000 m. Guizhou, NE Yunnan.

116. *Gentiana gentilis* Franchet, Bull. Soc. Bot. France 43: 491. 1896.

高贵龙胆 gao gui long dan

Annuals 10–30 cm tall. Stems erect, slender, branches short, angled, minutely hispid along angles. Basal leaves withered at anthesis. Stem leaves widely spaced; leaf blade broadly ovate to cordate, 5–10 × 3–6 mm, shorter than internodes, abaxially densely minute hispid on veins, toward stem apex adaxially hispidulous on veins, base rounded, margin ciliate, apex acute, veins 3. Flowers terminal, solitary, sessile. Calyx tube 7–10 mm, obconic, membranous, winged, minutely hispid along wings; lobes linear to subulate, 3–5 mm, margin ciliate, apex acuminate, midvein minutely hispid outside, keeled, and decurrent into wings of calyx tube. Corolla purple, tubular, 2.2–3 cm; lobes ovate, 6–8 mm, margin entire, apex obtuse; plicae oblong, 4–6 mm, margin erose, apex rounded. Stamens inserted at basal part of corolla tube, unequal; filaments 0.8–1.6 cm; anthers ellipsoid, 2–2.5 mm. Style 1–1.2 cm; stigma lobes linear. Capsules ellipsoid, 1.3–1.5 cm; gynophore 8–10 mm. Seeds brown, ellipsoid, 1.3–1.5 mm. Fl. and fr. Oct.

• Woodland margins, forests; 2000–2700 m. C Yunnan.

117. *Gentiana serra* Franchet, Bull. Soc. Bot. France 31: 376. 1884.

锯齿龙胆 ju chi long dan

Gentiana pulchra Harry Smith.

Annuals 15–40 cm tall. Stems ascending to erect, branched with spreading branches, angled, scabrous to papillate along angles. Basal leaves withered at anthesis. Stem leaves widely spaced; leaf blade ovate to cordate, 6–10 × 4–8 mm, shorter than internodes, abaxially scabrous on veins, base rounded to cordate, margin serrulate and ciliolate, apex acute, veins 3. Flowers terminal, solitary, sessile. Calyx tube narrowly obconic, 8–10 mm, membranous, winged, minutely hispid along wings; lobes subulate to linear, 4–5 mm, margin

ciliolate, apex acuminate, midvein minutely hispid outside, keeled, and decurrent into wings of calyx tube. Corolla blue-purple, tubular to tubular-funnelform, 2.5–3 cm; lobes ovate, 5–7 mm, margin entire, apex obtuse; plicae oblong, 2–4 mm, margin denticulate, apex rounded. Stamens inserted at basal part of corolla tube, unequal; filaments 6–12 mm; anthers ellipsoid, 1.5–2 mm. Style 1–1.2 cm; stigma lobes linear. Capsules ellipsoid, 1.2–1.5 cm; gynophore 5–7 mm. Seeds brown, ellipsoid, 1–1.5 mm. Fl. and fr. Sep-Oct.

• Meadows, forest margins, forests; 2400–4400 m. NW Yunnan.

X. Sect. *Dolichocarpa* T. N. Ho, Bull. Bot. Res., Harbin 5(4): 16. 1985.

柱果组 zhu guo zu

Annuals. Flowers terminal, solitary, small. Plicae symmetrical. Capsules cylindrical to narrowly oblong, apex obtuse, wingless. Seeds wingless at maturity, rarely winged when young; seed coat minutely reticulate.

Fourteen species: America, Asia, Europe; 12 species in China.

Some authors question the separation of this section from sect. *Chondrophyllae*.

118. *Gentiana gyirongensis* T. N. Ho, Bull. Bot. Res., Harbin 4(1): 79. 1984.

吉隆龙胆 ji long long dan

Annuals 2–3.5 cm tall. Stems ascending to erect, branched from base, glabrous. Basal leaves with petiole 1–2 mm; leaf blade ovate to ovate-orbicular, 3–4 × 1.4–1.6 mm, margin cartilaginous and smooth, apex obtuse to rounded and cuspidate, midvein distinct. Stem leaves with petiole tube 1.5–3 mm; leaf blade linear to linear-lanceolate, 4–6 × 1–1.2 mm, larger toward apex, margin narrowly membranous and smooth, apex acuminate, midvein prominent. Pedicel 2–3 mm, surrounded by upper leaves, glabrous. Calyx tubular to narrowly obconic, 1.1–1.4 cm; lobes triangular, 2–2.5 mm, narrow, apex acute, midvein prominent. Corolla dark blue, blackish in throat, salverform to funnelform, 1.8–2 cm; lobes ovate, 2.5–3 mm, margin entire, apex obtuse; plicae ovate, 2–2.5 mm, margin serrulate, apex obtuse. Stamens inserted at apical part of corolla tube, equal; filaments 1.2–1.5 mm; anthers ellipsoid, 1–1.2 mm. Ovary ellipsoid, 6–7 mm; gynophore ca. 4 mm. Style 2–2.5 mm; stigma lobes semiorbicular. Capsules cylindrical to narrowly ellipsoid. Fl. and fr. Aug-Sep.

Scrub on shady slopes; ca. 4500 m. SW Xizang [Nepal].

119. *Gentiana tetrasticha* C. Marquand, Hooker's Icon. Pl. 34: t. 3330. 1937.

四列龙胆 si lie long dan

Annuals 2–3 cm tall. Stems ascending to erect, 2–5-branched from base, glabrous. Leaves overlapping, 4-ranked; petiole tube 0.8–1.2 mm, papillate on margin and abaxially; leaf blade ovate, 3–7 × 1.5–2 mm, margin cartilaginous and ciliolate, apex acute, midvein prominent. Flowers sessile.

Calyx tubular, 7–10 mm; lobes triangular, 2–2.5 mm, margin narrowly membranous and smooth, apex obtuse, midvein prominent. Corolla blue-purple, tubular, 1.2–1.7 cm; lobes ovate-orbicular, 2–2.5 mm, margin entire, apex rounded; plicae oblong to broadly ovate, 1.5–2 mm, margin erose, apex obtuse. Stamens inserted at basal part of corolla tube, equal; filaments 1.5–2.5 mm; anthers narrowly ellipsoid, 1.5–2 mm. Ovary ellipsoid, 3–4 mm; gynophore 1–1.5 mm. Style 0.8–1 mm; stigma lobes broadly oblong. Fl. Aug-Sep.

Alpine meadows; 4200–5300 m. S Xizang [Sikkim].

120. *Gentiana stellata* Turrill, Bull. Misc. Inform. Kew 1922: 153. 1922.

珠峰龙胆 zhu feng long dan

Annuals 1.5–3.5 cm tall. Stems ascending to erect, branched from base, glabrous. Leaves widely spaced; petiole 2–3 mm; leaf blade lanceolate, ovate-lanceolate, or ovate, 2–9 × 0.5–2.5 mm, shorter to slightly longer than internodes, margin narrowly membranous, apex acute to obtuse, midvein abaxially distinct. Flowers sessile. Calyx 1.4–1.6 cm, tubular; lobes triangular, 3–4 mm, margin narrowly membranous and smooth, apex acute, midvein strongly keeled and decurrent into conspicuous wings of calyx tube. Corolla purple, salverform; tube 2–2.5 cm, narrow; limb to 5 mm in diam.; lobes ovate-elliptic to ovate, 4–5 mm, margin entire, apex obtuse; plicae ovate, 1–3.5 mm, margin serrulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 2–3 mm; anthers narrowly ellipsoid, 1.5–2.5 mm. Style 2.5–3 mm; stigma lobes semiorbicular. Capsules narrowly ellipsoid; gynophore ca. 6 mm. Fl. and fr. Aug-Sep.

High mountain; 4000–6000 m. SE Xizang [Bhutan, NW India, Nepal].

Gentiana stellata var. *acuminata* (C. B. Clarke) T. N. Ho occurs in the W Himalayas of NW India. It has calyx 4.5–5 mm with acuminate lobes 2.5–3 mm, and corolla 7–9 mm with a limb 1.5–2 mm in diam. and lobes 1.5–2 mm.

Gentiana stellata is somewhat intermediate between *G. tetrasticha* and *G. gyirongensis* but differs by the ovate lower leaves, ovate-lanceolate upper leaves, and stamens inserted at middle of the corolla tube.

121. *Gentiana nanobella* C. Marquand, Bull. Misc. Inform. Kew 1928: 53. 1928.

钟花龙胆 zhong hua long dan

Gentiana aphrosperma Harry Smith.

Annuals 4–8 cm tall. Stems ascending to erect, branched from base, papillate. Leaves usually widely spaced; petiole tube 2–2.5 mm, papillate on margin and abaxially; leaf blade suborbicular, 5–8 × 3–4 mm, shorter than internodes, margin cartilaginous and smooth or ciliolate, apex rounded and cuspidate, midvein abaxially distinct. Pedicel 6–8 mm, surrounded by upper leaves, sometimes papillate. Calyx tubular to narrowly obconic, 1–1.2 cm; lobes triangular, 2–3 mm, margin narrowly membranous and smooth, apex acute and cuspidate, midvein strongly keeled and decurrent into conspicuous wings of calyx tube. Corolla dark blue to blue-purple, sometimes with greenish yellow base, outside tinged blackish, inside with short blackish stripes in throat, tubular to narrowly funnelform, 2–2.2 cm; lobes ovate, 3–5 mm, margin entire, apex obtuse; plicae ovate, 2.5–4 mm, margin erose, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 5.5–6.5 mm; anthers ellipsoid, 1.2–2 mm. Style 1.2–2 mm; stigma lobes oblong. Capsules cylindrical to narrowly ellipsoid, 1–1.2 cm; gynophore to 7 cm. Seeds light brown, ellipsoid, 1–1.2 mm, edges several, irregular, and spongy. Fl. and fr. Aug–Oct.

• Grassland slopes; 2700–4300 m. W Sichuan, SE Xizang, NW Yunnan.

122. *Gentiana crenulotruncata* (C. Marquand) T. N. Ho, Fl. Reipubl. Popularis Sin. 62: 163. 1988.

圆齿褶龙胆 yuan chi zhe long dan

Gentiana prostrata Haenke var. *crenulotruncata* C. Marquand, J. Linn. Soc., Bot. 48: 205. 1929; *G. prostrata* var. *bilobata* C. Marquand.

Annuals 2–3.5 cm tall. Stems ascending to erect, branched from base, papillate. Leaves widely spaced; petiole tube 1–1.5 mm, margin ciliolate; leaf blade obovate, 3.5–5 × 2.5–4.5 mm, ± equal to internodes, margin cartilaginous and smooth or ciliolate, apex rounded, midvein abaxially prominent. Flowers sessile or subsessile. Calyx tubular, 6.5–11 mm; lobes triangular, 1.5–2 mm, margin entire and narrowly membranous, apex acute, midvein strongly keeled and decurrent into conspicuous wings of calyx tube. Corolla deep blue to purple, salverform, 1.3–2.2 cm, tube narrowly tubular but limb abruptly expanded and 5–7 mm in diam.;

lobes ovate-elliptic to ovate, 2.5–3 mm, margin smooth, apex obtuse; plicae oblong, 2–2.5 mm, margin erose, apex truncate. Stamens inserted at middle of corolla tube, equal; filaments 1–2.5 mm; anthers narrowly ellipsoid, 1.5–1.7 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules narrowly ellipsoid, 8–10 mm; gynophore to 7 mm. Seeds light brown, ellipsoid, 0.6–0.8 mm. Fl. and fr. Aug–Sep.

• Alpine meadows; 4600–5300 m. Qinghai, SE Xizang.

123. *Gentiana prostrata* Haenke in Jacquin, Collectanea 2: 66. 1789.

匍地龙胆 pu di long dan

Annuals 3–7 cm tall. Stems ascending to erect, branched from base, glabrous or papillose. Petiole tube 1–1.5 mm; leaf blade spatulate to obovate, (2–)4–7 × (1–)1.5–3.5 mm, margin smooth to papillate, apex rounded, midvein distinct. Pedicel 4–7 mm, surrounded by upper leaves to rarely exerted. Calyx tubular, 0.8–1.4 cm; lobes triangular, 2–3 mm, margin narrowly membranous and smooth, apex acute, midvein strongly keeled and decurrent into conspicuous wings of calyx tube. Corolla blue, basally greenish yellow, tubular, (1–)1.5–2 cm; lobes ovate-elliptic to ovate, 2.5–3(–4.5) mm, margin entire, apex obtuse; plicae ovate, 2–2.5(–3.5) mm, margin erose, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 2–5 mm; anthers narrowly ellipsoid, 1.2–2 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules narrowly ellipsoid, 0.9–1.1 cm; gynophore to 1.5 (–4.2) cm. Seeds brown, ellipsoid, 0.5–0.7 mm, winged on 1 side.

2000–4700 m. W Qinghai, N Xinjiang, S and SW Xizang [Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Russia, Tajikistan; North America, C Europe].

Gentiana prostrata is variable in leaf margins and the ratio between calyx and corolla length. The calyx length increases and the amount of stem papillae decreases from the Himalayas to Kashmir and C Asia. Of the three varieties included in the species, two occur in China. *Gentiana prostrata* var. *prostrata* grows in North America, N and W Asia, and Europe.

1a. Stems not papillate 123a. var. *karelinii*
1b. Stems papillate 123b. var. *ludlowii*

123a. *Gentiana prostrata* var. *karelinii* (Grisebach) Kusnezow, Trudy Imp. S.-Peterburgsk. Bot. Sada 15: 368. 1904.

新疆龙胆 xin jiang long dan

Gentiana karelinii Grisebach in A. de Candolle, Prodr. 9: 106. 1845; *G. longipes* Turczaninow; *G. variabilis* Ruprecht. Stems glabrous. Leaf margin smooth or less papillate. Calyx usually 3/4 as long as corolla.

Slopes, roadsides, valleys, alpine meadows; 2000–3100 m. N Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan].

123b. *Gentiana prostrata* var. *ludlowii* (C. Marquand) T. N.

Ho, Novon 4: 371. 1994.

短蕊龙胆 *duan rui long dan*

Gentiana ludlowii C. Marquand, Bull. Misc. Inform. Kew 1937: 189. 1937.

Stems and leaf margin papillate. Calyx usually 1/2 as long as corolla.

Roadside slopes, alpine meadows; 3500–4700 m. W Qinghai, S and SE Xizang [Nepal].

124. *Gentiana pudica* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 26: 497. 1880.

偏翅龙胆 *pian chi long dan*

Annuals 3–12 cm tall. Stems ascending to erect, branched from base, glabrous. Petiole tube 3–4 mm; leaf blade obovate, 4.5–9 × 1.2–3.5 mm, shorter than internodes, margin narrowly membranous and smooth or ciliolate, apex rounded and mucronate with a recurved tip, midvein abaxially distinct. Pedicel 1–2.5 cm, exerted from upper leaves, glabrous. Calyx tubular to narrowly obconic, 1–1.2 cm; lobes triangular, 2.5–3 mm, margin narrowly membranous and smooth, apex acute, midvein strongly keeled and decurrent into conspicuous wings of calyx tube. Corolla dark blue to blue-purple, with greenish yellow base, tubular to narrowly funnellform, 2–2.6 cm, 6–8 mm in diam. at throat; lobes ovate-elliptic to ovate, 4–5 mm, margin entire, apex obtuse; plicae oblong, 2.5–3.5 mm, margin serrulate, apex truncate. Stamens inserted at middle of corolla tube, equal; filaments 4–5 mm; anthers narrowly ellipsoid, 1.5–1.7 mm. Style 1.5–2 mm; stigma lobes semiorbicular. Capsules narrowly ellipsoid, 8–10 mm; gynophore to 7 mm. Seeds brown, ellipsoid, 1–1.2 mm, sometimes winged when young. Fl. and fr. Jun-Sep.

• River banks, grassland slopes, alpine meadows; 2200–5000 m. Gansu, Qinghai, Shaanxi, N Sichuan.

125. *Gentiana producta* T. N. Ho, Bull. Bot. Res., Harbin 4(1): 80. 1984.

伸梗龙胆 *shen geng long dan*

Annuals 6–12 cm tall. Stem ascending to erect, branched from base, glabrous. Leaves widely spaced; petiole tube 1–2 mm; leaf blade obovate, 5–8 × 2–3 mm, shorter than internodes, margin narrowly membranous and smooth or ciliolate, apex rounded, veins indistinct. Pedicel 1.7–4 cm, exerted from upper leaves, glabrous. Calyx narrowly obconic, 9–10 mm; lobes triangular, 1.5–1.7 mm, margin narrowly membranous and smooth, apex acute, midvein strongly keeled and decurrent into conspicuous wings of calyx tube. Corolla blue to blue-purple, with short blackish streaks in throat, narrowly tubular, 1.8–2 cm; lobes ovate-elliptic, 3–3.5 mm, margin entire, apex obtuse; plicae broadly oblong, 2–2.5 mm, margin lacinate, apex truncate. Stamens inserted at middle of corolla tube, equal; filaments 3–4.5 mm; anthers linear-ellipsoid, 1.4–1.6 mm. Style 1.5–2 mm; stigma lobes semiorbicular. Capsules linear-ellipsoid, 1–1.3 cm; gynophore

to 5 mm. Seeds brown, linear-ellipsoid, 1–1.2 mm. Fl. and fr. Sep.

• Slopes. W Sichuan.

126. *Gentiana clarkei* Kusnezow, Trudy Imp. S.-Peterburgsk. Bot. Sada 15: 419. 1904.

西域龙胆 *xi yu long dan*

Gentiana hyalina T. N. Ho; *G. pygmaea* C. B. Clarke (1883), not Regel & Schmalhausen (1812).

Annuals 1.5–3 cm tall. Stems ascending to erect, branched from base, glabrous. Leaves widely spaced; petiole tube 2–3 mm; leaf blade spatulate to obovate, 2.5–4.5 × 1–1.5 mm, shorter than internodes, base narrowed, margin membranous and smooth, apex rounded, midvein abaxially indistinct. Pedicel 2–6 mm, exerted from upper leaves, glabrous. Calyx tubular to narrowly obconic, 7–9 mm; lobes triangular, 1–1.2 mm, margin narrowly membranous and smooth, apex acute, midvein strongly keeled and decurrent into conspicuous wings of calyx tube. Corolla blue, tubular, 1.2–1.5 cm, 1.5–2 mm in diam. at throat; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae ovate, 1.2–1.5 mm, margin serrulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 1–1.5 mm; anthers narrowly ellipsoid, 0.8–1 mm. Style 0.5–0.7 mm; stigma lobes semiorbicular. Capsules cylindrical to narrowly ellipsoid, 8–10 mm, valves membranous and transparent; gynophore to 1.8 cm. Seeds light brown, ellipsoid, 0.8–1 mm. Fl. and fr. Aug-Sep.

• Alpine meadows; 4600–5300 m. Qinghai, W Xizang.

127. *Gentiana caeruleogrisea* T. N. Ho, Bull. Bot. Res., Harbin 4(1): 77. 1984.

蓝灰龙胆 *lan hui long dan*

Annuals 6–12 cm tall. Stems ascending to erect, branched from base, glabrous. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate to suborbicular, 4–6 × 3.5–5 mm, margin narrowly membranous and smooth, apex rounded, veins 1–3. Stem leaves widely spaced; petiole tube 1.5–5 mm with increasing connate length toward apex; leaf blade 2–6 × 1–2.5 mm, shorter than internodes, spatulate toward stem base but linear to elliptic from middle to stem apex, margin indistinctly membranous and smooth, apex acuminate, obtuse, or rounded, veins indistinct. Pedicel 0.3–1.7 cm, exerted from upper leaves, glabrous. Calyx narrowly obconic, 6.5–7.5 mm; lobes lanceolate, 0.7–1 mm, margin narrowly membranous and smooth, apex acute, midvein strongly keeled and decurrent into conspicuous wings of calyx tube. Corolla outside with blue-gray stripes, inside white or pale blue, tubular to narrowly funnellform, 1.1–1.3 cm; lobes ovate, 1.5–3.5 mm, margin entire, apex obtuse; plicae broadly ovate, 1.5–2 mm, margin denticulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 1.2–1.7 mm; anthers narrowly ellipsoid, 0.8–1 mm. Style 0.5–0.7 mm; stigma lobes semiorbicular. Capsules cylindrical to narrowly ellipsoid, 7.5–8.5 mm; gynophore 1.5–2 mm, slender. Seeds

brown to dark brown, ellipsoid, 1–1.2 mm. Fl. and fr. Aug–Sep.

- Alpine meadows; 3600–4300 m. Gansu, Qinghai, Xizang.

128. *Gentiana micans* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 112. 1883.

亮叶龙胆 liang ye long dan

Gentiana sororcula Burkill.

Annuals 3–6 cm tall. Stems branched from base, with many short branches crowded into a dense tuft, glabrous. Basal leaves withered at anthesis; petiole 0.5–1.5 mm; leaf blade ovate to ovate-orbicular, 4–7 × 2–3 mm, margin cartilaginous, apex obtuse and mucronate; veins 1–3, prominent. Stem leaves crowded, folded; petiole tube 1–2 mm; leaf blade subulate, 0.8–1.2 cm × 1.5–2 mm, subleathery, rigid, glossy, margin basal half broadly membranous and ciliolate, apical half cartilaginous and smooth, apex acute, midvein abaxially prominent. Flowers few, subsessile. Calyx narrowly obconic, (0.8–)1.1–1.5 cm, tube membranous; lobes subulate, 6–11 mm, as long as or longer than tube, subleathery, rigid, glossy, margin basal half broadly membranous and ciliolate, apical half cartilaginous and smooth, apex acuminate and apiculate, midvein prominent. Corolla pale blue, tubular, (1.1–)1.5–2 cm; lobes ovate, (3–)4–6 mm, margin entire, apex obtuse and mucronate; plicae oblong, 1.5–2 mm, margin entire or 2-cleft with both segments denticulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments (2.5–)4–8 mm; anthers linear, 1–1.2 mm. Style 1–1.5 mm; stigma lobes broadly oblong. Capsules obovoid-ellipsoid, 6–7 mm; gynophore to 2.5 cm, slender. Seeds dark brown, ellipsoid, 0.5–0.7 mm. Fl. and fr. May–Sep.

Alpine meadows; 4300–4800 m. SE Xizang [Bhutan, Nepal,

Sikkim].

Gentiana micans var. *latifolia* T. N. Ho is endemic to Bhutan.

129. *Gentiana haynaldii* Kanitz, Pl. Exped. Szechenyi in As. Centr. Coll. 39. 1891.

钻叶龙胆 zuan ye long dan

Gentiana rockhillii Hemsley; *G. scariosa* I. B. Balfour & Forrest.

Annuals 3–10 cm tall. Stems ascending to erect, branched from base, glabrous. Basal leaves, withered at anthesis; petiole 0.5–1.5 mm; leaf blade lanceolate to ovate, 2.5–7 × 1.5–2.5 mm, margin cartilaginous, apex acute, midvein prominent. Stem leaves with petiole tube 1–2 mm; leaf blade subulate, 0.7–1.5(–5) cm × 1.5–2 mm, longer toward apex, subleathery, rigid, glossy, margin basal half broadly membranous and ciliolate, apical half cartilaginous and smooth, apex acuminate, midvein abaxially prominent. Flowers few, subsessile. Calyx narrowly obconic, 1.3–1.7 cm, tube membranous; lobes subulate, 7–9 mm, subleathery, rigid, glossy, margin basal half broadly membranous and ciliolate, apical half cartilaginous and smooth, apex acuminate and apiculate, midvein prominent. Corolla pale blue, with blue-gray short streaks in throat, tubular, (2–)2.5–3 cm; lobes ovate, 3–5 mm, margin entire or indistinctly crenulate, apex acuminate to obtuse; plicae ovate, 2.5–4 mm, margin entire or erose, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 2.5–4 mm; anthers narrowly ellipsoid, 1.2–2 mm. Style 1.5–2 mm; stigma lobes ovate-orbicular. Capsules ellipsoid, 1.1–1.3 cm; gynophore to 4 cm, slender. Seeds light brown, ellipsoid to ovoid-ellipsoid, 0.5–0.7 mm. Fl. and fr. Jul–Nov.

- Grassland slopes, alpine meadows, shady forest slopes; 2100–4200 m. SW Qinghai, W Sichuan, SE Xizang, NW Yunnan.

XI. Sect. *Chondrophyllae* Bunge, Nouv. Mém. Soc. Imp. Naturalistes Moscou 1(7): 207. 1829.

小龙胆组 xiao long dan zu

Annuals, rarely perennials. Flowers terminal, solitary, small. Plicae usually symmetrical. Capsules narrowly obovoid to obovoid, conspicuously winged; wing strong and broad at apex but gradually narrowed toward base. Seed coat minutely reticulate.

Some 156 species: N Africa (Morocco), America, Asia, Australia, Europe; 117 species in China.

130. *Gentiana myrioclada* Franchet, Bull. Soc. Bot. France 43: 487. 1896.

多枝龙胆 duo zhi long dan

Annuals 10–15 cm tall. Stems ascending, slender, 3 or 4 × dichotomously branched from base. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade lanceolate to obovate, 1–2 cm × 4–6 mm, margin cartilaginous and smooth, apex acute to obtuse, veins 3–5. Stem leaves widely spaced, recurved, folded; petiole tube 0.5–0.7 mm; leaf blade broadly ovate, 3.5–4.5 × 1–1.5 mm, much shorter than internodes, base cordate, apex acute, veins 1–3. Flowers many. Pedicel

0.7–1.5 cm. Calyx narrowly obconic, 3.5–4 mm; lobes filiform to filiform-subulate, 1.5–2 mm, base 0.5–1 mm wide, apex acuminate. Corolla blue, obconic to narrowly so, 5.5–7 mm; lobes ovate-orbicular, 1.5–2 mm, margin entire, apex obtuse to rounded; plicae truncate, margin irregularly crenulate. Stamens inserted just below middle of corolla tube, equal; filaments 1.2–1.5 mm; anthers ovoid, 0.3–0.8 mm. Style 0.6–0.8 mm; stigma lobes linear. Capsules obovoid, 3–4 mm; gynophore 2–5 mm. Seeds brown, ellipsoid, 1–1.2 mm. Fl. and fr. Aug–Sep.

- 2000–2500 m. E Sichuan.

- 1a. Plants almost entirely glabrous 130a. var. *myrioclada*
 1b. Plants densely hispidulous 130b. var. *wuxiensis*

130a. *Gentiana myrioclada* var. *myrioclada*

多枝龙胆 (原变种) duo zhi long dan (yuan bian zhong)

Plants almost entirely glabrous. Fl. and fr. Aug-Sep.

- Hillsides; 2000–2500 m. E Sichuan.

130b. *Gentiana myrioclada* var. *wuxiensis* T. N. Ho & S. W. Liu in T. N. Ho, Novon 4: 370. 1994.

无锡龙胆 wu xi long dan

Plants densely hispidulous. Fl. and fr. Aug.

- Hillsides; ca. 2500 m. E Sichuan.

131. *Gentiana microphyta* Franchet in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 130. 1890.

小叶龙胆 xiao ye long dan

Annuals 1.5–8 cm tall. Stems ascending to erect, weak, 2 or 3 × dichotomously branched from base or rarely simple, glabrous. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate-elliptic, 5–9 × 2–4 mm, abaxially glabrous, adaxially densely and minutely papillate, apex obtuse, midvein distinct. Stem leaves spreading; petiole tube 0.5–0.7 mm; leaf blade ovate, 3–5 × 2–3 mm, much shorter than internodes, abaxially glabrous, adaxially densely and minutely papillate, base rounded, apex acute, midvein distinct. Flowers 1 or few. Pedicel 3–8 mm, slender, glabrous. Calyx tubular to narrowly obconic, 2–3 mm; lobes filiform to filiform-subulate, 1–1.5 mm, base 0.5–1 mm wide, apex acuminate. Corolla outside pale blue, inside white, narrowly obconic, 4–6 mm; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae ovate, 1–1.5 mm, margin entire, apex acute. Stamens inserted at middle of corolla tube, equal; filaments 1–1.2 mm; anthers ellipsoid, 0.5–0.7 mm. Style 0.8–1 mm; stigma lobes linear. Capsules obovoid, 2–3 mm; gynophore 1–2 mm. Fl. and fr. Aug.

- Hillsides; ca. 4000 m. NW Yunnan [NE Myanmar].

132. *Gentiana stellulata* Harry Smith in Handel-Mazzetti, Symb. Sin. 7: 968. 1936.

星状龙胆 xing zhuang long dan

Annuals 4–10 cm tall. Stems ascending to erect, weak, 2 or 3 × dichotomously branched from base and with few branches, glabrous. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate-elliptic, ovate, or ovate-orbicular, 0.8–1.3 cm × 4–7 mm, abaxially glabrous, adaxially densely and minutely papillate, margin ciliolate, apex obtuse, veins 3–5. Stem leaves spreading; petiole tube 0.5–0.7 mm, abaxially papillate; leaf blade elliptic-lanceolate to sometimes ovate-lanceolate, 3.5–5 × 2–3 mm, much shorter than internodes, abaxially glabrous, adaxially densely and minutely papillate,

base rounded to cordate, margin ciliolate, apex acute, midvein distinct. Flowers few to many. Pedicel 5–10 mm, glabrous. Calyx tubular to narrowly obconic, 3–3.5 mm; lobes filiform to filiform-subulate, 1.5–2.2 mm, base 0.5–1 mm wide, apex acuminate. Corolla blue-gray or outside with blue-gray broad stripes and inside white, narrowly obconic, 6–7 mm; lobes ovate, 3–4 mm, margin entire, apex obtuse; plicae deeply 2-cleft, segment margins entire, serrulate, or sometimes few lacinate. Stamens inserted just below middle of corolla tube, equal; filaments 1–1.5 mm; anthers ovoid, 0.5–0.8 mm. Style 0.6–0.8 mm; stigma lobes linear. Capsules obovoid, 2–3 mm; gynophore 2–5 mm. Fl. and fr. Jun-Sep.

- 3200–4000 m. NW Yunnan.

- 1a. Corolla outside with blue-gray broad stripes, plicae segments serrulate to sometimes few lacinate 132a. var. *stellulata*
 1b. Corolla outside without blue-gray broad stripes, plicae segments entire 132b. var. *dichotoma*

132a. *Gentiana stellulata* var. *stellulata*

星状龙胆 (原变种) xing zhuang long dan (yuan bian zhong)

Corolla outside with blue-gray broad stripes, inside white; plicae segments serrulate to sometimes few lacinate.

- Grassland slopes; 3300–4000 m. NW Yunnan.

132b. *Gentiana stellulata* var. *dichotoma* Harry Smith in Handel-Mazzetti, Symb. Sin. 7: 968. 1936.

歧伞星状龙胆 qi san xing zhuang long dan

Corolla blue-gray; plicae segments entire.

- Grassland slopes; 3200–3300 m. NW Yunnan.

133. *Gentiana epichysantha* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 57: 173. 1920.

齿褶龙胆 chi zhe long dan

Gentiana dentiformis T. N. Ho.

Annuals 5–10 cm tall. Stems purple, ascending to erect, 2 or 3 × dichotomously branched from base or rarely simple, glabrous. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate-triangular, 6–10 × 2.5–3.5 mm, abaxially glabrous, adaxially densely and minutely papillate, apex acute, veins 1–3, distinct, and slender. Stem leaves spreading; petiole tube 0.5–0.7 mm, papillate on margin and abaxially; leaf blade ovate-lanceolate to ovate-triangular, 3–6 × 1.5–2.5 mm, much shorter than internodes, abaxially glabrous, adaxially densely and minutely papillate, base cordate, apex acute; veins 1–3, distinct, slender. Flowers (1 or) few to many. Pedicel 0.5–1.5 cm, glabrous. Calyx campanulate, 5–5.5 mm; lobes filiform to filiform-subulate, 2.5–3 mm, base 1–1.5 mm wide, apex acuminate, midvein prominent. Corolla white or pale yellow-green, outside with blue-gray stripes, campanulate, 0.9–1.2 cm; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae ovate, 1.2–1.8 mm, margin deeply few dentate, apex obtuse. Stamens inserted at basal part of

corolla tube, equal; filaments 2.5–3.5 mm; anthers ellipsoid, 0.5–0.7 mm. Style 1.5–2 mm; stigma lobes linear. Capsules narrowly obovoid to obovoid, 5–6 mm; gynophore to 6 mm. Seeds light brown, ovoid, 1.5–1.7 mm. Fl. and fr. Aug-Oct.

- Pine forests; 3700–3900 m. NW Yunnan.

134. *Gentiana divaricata* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 19. 1984.

叉枝龙胆 cha zhi long dan

Annuals 3–4 cm tall. Stems ascending to erect, 3 or 4 × divaricate from base, glabrous. Basal leaves withered at anthesis; petiole 4–7 mm; leaf blade broadly ovate, 3–9 × 2.5–5 mm, abaxially glabrous, adaxially densely and minutely papillate, base rounded to cordate, margin cartilaginous and smooth, apex acute; veins 1–3, distinct, slender. Stem leaves spreading, much shorter than internodes. Flowers few. Pedicel 3–10 mm, glabrous. Calyx obconic, 3.5–5.5 mm; lobes filiform-subulate, 1–2 mm, base 0.5–1 mm wide, margin cartilaginous and smooth, apex acuminate, midvein prominent. Corolla pale blue, narrowly obconic, 1.1–1.4 cm; lobes ovate-elliptic, 3.5–4 mm, margin entire, apex obtuse; plicae oblong, 2.5–3 mm, margin clavate fringed with expanded tips. Stamens inserted at middle of corolla tube, equal; filaments 3–3.5 mm; anthers ellipsoid, 0.6–0.8 mm. Ovary ellipsoid, 2.5–3 mm; gynophore 4–5 mm, stout. Style 2–3 mm; stigma lobes linear. Fl. Jul.

- Shady forest slopes; ca. 2300 m. SW Sichuan.

135. *Gentiana oligophylla* Harry Smith, Bull. Misc. Inform. Kew 1937: 130. 1937.

少叶龙胆 shao ye long dan

Annuals 8–12 cm tall. Stems erect, 2–4 × dichotomously branched from base, glabrous. Basal leaves withered at anthesis; petiole 3–10 mm, slender, glabrous; leaf blade ovate-lanceolate to ovate-elliptic, 0.9–2 cm × 4–7 mm, abaxially glabrous, adaxially densely and minutely papillate, apex obtuse, veins 1–3. Stem leaves spreading; petiole tube 1–1.3 mm, papillate on margin and abaxially; leaf blade linear-lanceolate to ovate-triangular, 5–8 × 1.5–2 mm, much shorter than internodes, abaxially glabrous, adaxially densely and minutely papillate, base cordate, apex acute, midvein distinct. Flowers few to many. Pedicel purple, 0.4–1.7 cm, glabrous. Calyx obconic, 4–5.5 mm; lobes filiform-subulate, 2–2.5 mm, base 0.8–1.2 mm wide, apex acuminate, midvein prominent. Corolla outside pale blue-gray, inside white, obconic, 8–10 mm; lobes ovate-orbicular, 2–2.5 mm, base slightly narrowed, margin entire, apex obtuse to rounded; plicae margin clavate fringed with expanded tips. Stamens inserted just below middle of corolla tube, equal; filaments 2.5–3 mm; anthers ellipsoid, 0.5–0.7 mm. Style 0.5–1 mm; stigma lobes oblong. Capsules narrowly obovoid to obovate, 3.5–4.5 mm; gynophore to 5 mm. Seeds light brown, ellipsoid, 1.3–1.5 mm. Fl. and fr. May-Aug.

- Grassland and roadside slopes, forest margins; 1800–2800 m. Guizhou, Hubei, Hunan, E Sichuan.

The separation between *Gentiana oligophylla* and *G. deltoidea*

is not clear.

136. *Gentiana deltoidea* Harry Smith in Handel-Mazzetti, Symb. Sin. 7: 966. 1936.

三角叶龙胆 san jiao ye long dan

Annuals 4–6 cm tall. Stems ascending to erect, weak, 1 or 2 × dichotomously branched from base or rarely simple, glabrous. Basal leaves withered at anthesis; petiole 1–2 mm, papillate adaxially and on margins; leaf blade ovate to ovate-triangular, 4–10 × 2.5–4 mm, abaxially glabrous, adaxially densely and minutely papillate, margin densely ciliate, apex acute, veins 1–3, distinct, and slender. Stem leaves spreading; petiole tube 1–1.5 mm, papillate on margin and abaxially; leaf blade ovate-triangular to triangular, 2.5–5 × 2–2.5 mm, much shorter than internodes, abaxially glabrous, adaxially densely and minutely papillate, base rounded to cordate, margin ciliate, apex acute; veins 1–3, distinct, slender. Flowers few. Pedicel 0.9–2 cm, glabrous. Calyx campanulate, 5.5–6 mm; lobes filiform-subulate, 1.5–3 mm, base 1–1.5 mm wide, apex acuminate, midvein prominent. Corolla blue, campanulate, 9–10 mm; lobes ovate to ovate-orbicular, 2.5–3.5 mm, margin erose-undulate, apex obtuse; plicae ovate, 2–2.5 mm, margin clavate fringed with expanded tips. Stamens inserted at basal part of corolla tube, equal; filaments 2–3 mm; anthers ellipsoid, 0.5–0.7 mm. Style 0.8–1 mm; stigma lobes oblong. Capsules obovoid, 3.5–4 mm; gynophore to 4 mm. Seeds brown, ellipsoid, 1.3–1.6 mm. Fl. and fr. Jul-Aug.

- Grassland slopes; 3300–3700 m. SW Sichuan, NW Yunnan.

137. *Gentiana recurvata* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 110. 1883.

外弯龙胆 wai wan long dan

Annuals (3–)9–22 cm tall. Stems ascending to erect, 3 or 4 × dichotomously branched from base, glabrous. Basal leaves withered at anthesis; petiole 2–4 mm; leaf blade ovate-elliptic to ovate, 5–12(–15) × 3–7 mm, abaxially glabrous, adaxially densely and minutely papillate, apex acute to obtuse; veins 1–3, distinct, slender. Stem leaves spreading; petiole tube 0.5–1 mm; leaf blade lanceolate, narrowly elliptic, or ovate, (3–)5–11 × 1.5–4 mm, much shorter than internodes, abaxially glabrous, adaxially densely and minutely papillate, base rounded to cordate, apex acuminate to acute, midvein distinct. Flowers few to many. Pedicel 0.7–1.6 cm, glabrous. Calyx narrowly obconic, 4–5.5 mm; lobes filiform-subulate, 1.5–2 mm, base 0.5–1 mm wide, apex acuminate, midvein prominent. Corolla blue-purple, obconic to narrowly so, 1–1.4 cm; lobes ovate-elliptic to ovate, 3.5–4 mm, margin entire, apex obtuse; plicae ovate-oblong, 2–2.5 mm, margin clavate fringed with expanded tips. Stamens inserted at middle of corolla tube, equal; filaments 1.5–2.5 mm; anthers ellipsoid, 0.7–0.9 mm. Style 1–1.5 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 4–5 mm; gynophore to 1.4 cm. Seeds light brown, ellipsoid to ovoid-ellipsoid, 1.2–1.5 mm. Fl. and fr. Aug-Oct.

- Meadows; 3000–4000 m. SE Xizang, NW Yunnan [NE Myanmar, E Nepal, Sikkim].

138. *Gentiana mairei* H. Léveillé, Bull. Acad. Int. Géogr. Bot. 25: 22. 1915.

寡流苏龙胆 *gua liu su long dan*

Annuals 8–15 cm tall. Stems purple, ascending to erect, 2 or 3 × dichotomously branched from base, glabrous. Basal leaves withered at anthesis; petiole 1.5–3 mm; leaf blade ovate-elliptic to ovate, 0.7–1.5 cm × 3–7 mm, abaxially glabrous, adaxially densely and minutely papillate, margin ciliolate, apex acute; veins 1–3, distinct, slender. Stem leaves spreading; petiole tube 1–1.5 mm, papillate on margin and abaxially; leaf blade ovate-lanceolate to ovate-triangular, 5.5–11 × 2.5–4 mm, much shorter than internodes, abaxially glabrous, adaxially densely and minutely papillate, base rounded to cordate, margin ciliolate, apex acute; veins 1–3, distinct, slender. Flowers few to many. Pedicel 5–11 mm, to 3 cm in fruit, glabrous. Calyx obconic, 5–5.5 mm; lobes filiform-subulate, 2–2.5 mm, base 1–1.5 mm wide, apex acuminate, midvein prominent. Corolla outside with blue-gray stripes, inside pale blue with blackish short lines in throat, sometimes white or pale yellow, obconic, 0.8–1.2 cm × ca. 5 mm, to 8 mm in diam. in fruit; lobes ovate-orbicular, 2.5–3 mm, margin entire, apex subrounded; plicae ovate-oblong, 2–2.5 mm, with a fringe of usually 8–10 filaments. Stamens inserted at basal part of corolla tube, equal; filaments 3–3.5 mm; anthers ellipsoid, 0.7–1 mm. Style 0.7–1.5 mm; stigma lobes linear. Capsules obovoid, 4.5–5.5 mm; gynophore to 1.3 cm. Seeds light brown, ellipsoid, 1.3–1.5 mm. Fl. and fr. May–Sep.

• Bogs, alpine meadows, scrub meadows, forests; 2400–4000 m. SW Sichuan, NE Yunnan.

139. *Gentiana panthaica* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 2: 313. 1906.

流苏龙胆 *liu su long dan*

Gentiana reynieri H. Léveillé; *G. robustior* Burkill ex Diels.

Annuals 4–30 cm tall. Stems ascending to erect, 2–4 × dichotomously branched from base, glabrous. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate-elliptic to ovate, 0.9–2 cm × 4–10 mm, abaxially glabrous, adaxially densely and minutely papillate, apex acute; veins 1–3, distinct, slender. Stem leaves spreading; petiole tube 1–1.5 mm, papillate on margin and abaxially; leaf blade lanceolate, narrowly elliptic, or ovate-triangular, 6–8 × 2.5–3.5 mm, much shorter than internodes, abaxially glabrous, adaxially densely and minutely papillate, base rounded to cordate, margin ciliolate, apex acuminate to acute; veins 1–3, distinct, slender. Flowers few to many. Pedicel 3–12 mm, glabrous. Calyx obconic, 4.5–7 mm; lobes filiform to filiform-subulate, 1.5–3 mm, base 1–1.5 mm wide, apex acuminate, midvein prominent. Corolla pale blue, outside with blue-gray stripes, obconic, (0.8–)1–1.4 cm; lobes ovate, 2.5–3.5 mm, margin entire or indistinctly denticulate, apex obtuse; plicae ovate, 2–

2.5 mm, fringed usually with 15–20 filaments. Stamens inserted just below middle of corolla tube, equal; filaments 3–4 mm; anthers ellipsoid, 0.6–1 mm. Style 0.7–1.2 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 4–5 mm; gynophore to 8 mm. Seeds light brown, ellipsoid, 1.3–1.5 mm. Fl. and fr. May–Aug.

• River banks, roadsides, grassland slopes, scrub, forest margins, forests; 1600–3800 m. Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Yunnan.

140. *Gentiana qiujiangensis* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 17. 1984.

侏江龙胆 *qiu jiang long dan*

Perennials 4–10 cm tall, with long stolons. Stems ascending to erect, simple, glabrous. Basal leaves many, in a rosette. Petiole 2–3.5 mm; leaf blade spatulate, oblong, or suborbicular, 6–9 × 2.5–4 mm, abaxially glabrous, adaxially densely and minutely papillate, base narrowed, apex rounded; veins 1–3, distinct, slender. Stem leaves few, widely spaced, much shorter than internodes. Flowers few. Pedicel 0.5–1.5 cm, glabrous. Calyx tubular, 8–9 mm; lobes filiform to filiform-subulate, 1.2–1.5 mm, base 0.5–0.8 mm wide, margin narrowly membranous, apex acuminate, midvein prominent. Corolla blue-purple, salverform, 2.2–2.6 cm; lobes ovate-oblong, 5–6 mm, margin entire, apex obtuse; plicae oblong, 2.5–3 mm, margin filiformly fringed. Stamens inserted at apical part of corolla tube, equal; filaments 2–2.5 mm; anthers ellipsoid, 1–1.2 mm. Ovary ellipsoid, 3.5–4.5 mm. Style 1.5–2 mm; stigma lobes oblong. Fl. Aug.

• Alpine bogs and meadows; ca. 3900 m. NW Yunnan.

141. *Gentiana lacinulata* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 18. 1984.

条叶龙胆 *tiao ye long dan*

Perennials 3–4 cm tall, with short stolons. Stems ascending to erect, simple, glabrous. Petiole 1.5–3 mm; leaf blade elliptic to ovate-elliptic, 3.5–6 × 1.5–2 mm, abaxially glabrous, adaxially densely and minutely papillate, base narrowed, apex obtuse, veins indistinct. Basal leaves withered at anthesis. Stem leaves spreading, much shorter than internodes. Pedicel 1–3 mm, glabrous. Calyx tubular, 6–7 mm; lobes filiform to filiform-subulate, 2–2.5 mm, base 0.8–1 mm wide, margin narrowly membranous, apex acuminate, midvein prominent. Corolla bright blue to blue-purple, with pale yellow-green base, funnellform, 1.2–1.5 cm; lobes 2.5–3 mm, suborbicular, base distinctly narrowed, margin erose, apex rounded; plicae broadly oblong, 0.7–1 mm, margin lacinate. Stamens inserted at apical part of corolla tube, equal; filaments 1.5–2 mm; anthers ellipsoid, 0.7–1 mm. Ovary ellipsoid, 3.5–4 mm; gynophore 2.5–3 mm, stout. Style 1.5–2 mm; stigma lobes linear. Fl. Aug.

• Alpine meadows; 3900–4300 m. SE Xizang.

142. *Gentiana muscicola* C. Marquand, Bull. Misc. Inform. Kew 1937: 189. 1937.

藓生龙胆 *xian sheng long dan*

Perennials 3–6 cm tall, with long slender stolons. Stems erect, simple, glabrous. Petiole 2–2.5 mm; leaf blade ovate, 4–5 × 3–4 mm, abaxially glabrous, adaxially densely and minutely papillate, base rounded to cordate, margin narrowly membranous, apex acute; veins 1–3, slender. Pedicel 2–3 mm, glabrous. Calyx tubular, 4.5–5.5 mm; lobes filiform to filiform-subulate, 1.5–2 mm, base 0.8–1.2 mm wide, margin narrowly membranous, apex acuminate, midvein prominent. Corolla purple, funnellform, 1–1.1 cm; lobes ovate-lanceolate to ovate-triangular, 2.5–3.5 mm, margin entire, apex obtuse; plicae ovate, 0.7–1 mm, margin lacinate. Stamens inserted at apical part of corolla tube, equal; filaments 2–2.5 mm; anthers ellipsoid, 0.6–0.8 mm. Ovary ellipsoid, 2.5–3 mm; gynophore ca. 2 mm, stout. Style 3–4 mm; stigma lobes linear. Fl. Jul.

Among mosses on stones or under forests; 2700–3200 m. SE Xizang, NW Yunnan [NE Myanmar].

143. *Gentiana exquisita* Harry Smith, Notes Roy. Bot. Gard. Edinburgh 26: 251. 1965.

丝瓣龙胆 si ban long dan

Perennials 10–20 cm tall, with short slender stolons. Stems ascending to erect, slender, simple or few branched, glabrous. Basal leaves withered at anthesis. Petiole 1.5–2.5 mm; leaf blade ovate-lanceolate to ovate, 3–6 × 1.5–3 mm, abaxially glabrous, adaxially densely and minutely papillate, base rounded to cordate, apex acuminate, veins 1–3, distinct, and slender. Stem leaves spreading, much shorter than internodes. Flowers few. Pedicel slender, 1–3 cm, glabrous. Calyx narrowly obconic, 5–6 mm; lobes filiform to filiform-subulate, 2–3 mm, base 1–1.5 mm wide, margin narrowly membranous, apex acuminate, midvein prominent. Corolla violet, inside with dark blue spots, obconic, 1.2–1.5 × 0.9–1 cm; lobes linear, 1.5–1.8 mm, base ca. 1 mm, margin entire, apex obtuse; plicae broadly oblong, 1.5–1.8 × 3–4 mm, slightly 2-cleft, margin of both segments filiform fringed. Stamens inserted at basal part of corolla tube, equal; filaments 4–5 mm; anthers narrowly ellipsoid, 0.8–1 mm. Ovary ellipsoid, 3–3.5 mm; gynophore ca. 4.5 mm, slender. Style 0.8–1 mm; stigma lobes oblong. Fl. Sep.

Grassland slopes; 3300–4000 m. NW Yunnan [NE Myanmar].

144. *Gentiana formosa* Harry Smith, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 104. 1926.

美丽龙胆 mei li long dan

Perennials 3–8 cm tall, with short slender stolons. Stems ascending to erect, simple or few branched, glabrous. Petiole tube 1–1.5 mm; leaf blade elliptic toward stem base but others ovate, 4–7 × 3–5 mm, larger toward stem apex, abaxially glabrous, adaxially densely and minutely papillate, base rounded to cordate, apex acute to obtuse; veins 1–3, distinct, slender. Basal leaves withered at anthesis. Stem leaves spreading, much shorter than internodes. Flowers 1 to few. Pedicel 5–6 mm, glabrous. Calyx obconic, 4.5–5.5 mm; lobes filiform to filiform-subulate, 2.5–3 mm, base 1–1.5 mm wide, margin narrowly membranous, apex acuminate, midvein prominent. Corolla white or pale blue, tubular-campanulate to obconic, (1–)1.2–1.5 cm; lobes ovate, 2–2.5 × 2.5–3 mm,

margin entire, apex obtuse; plicae ovate, 2–2.5 × 3–4 mm, margin filiform fringed. Stamens inserted at basal part of corolla tube, equal; filaments 4–5 mm; anthers ellipsoid, 0.8–1 mm. Ovary ellipsoid, 2–2.5 mm; gynophore 4.5–6.5 mm, slender. Style 0.7–1.2 mm; stigma lobes oblong. Fl. Jul-Sep.

• Grassland slopes, forests; 2700–4200 m. SE Xizang, NW Yunnan.

145. *Gentiana grata* Harry Smith, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 103. 1926.

长流龙胆 chang liu long dan

Perennials 8–25 cm tall, with short slender stolons. Stems erect, slender, few branched, glabrous. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate-elliptic to ovate, 6–8 × 3–4.5 mm, abaxially glabrous, adaxially densely and minutely papillate, apex obtuse; veins 1–3, distinct, slender. Stem leaves spreading; petiole tube 0.5–1 mm; leaf blade narrowly elliptic, ovate-elliptic, or ovate, 3–7 × 1–2.5 mm, much shorter than internodes, base rounded to cordate, margin ciliolate, apex acute; veins 1–3, distinct, slender, abaxially glabrous, adaxially densely and minutely papillate. Flowers few. Pedicel 0.5–1.5 cm, glabrous. Calyx tubular, 3–4 mm; lobes filiform-subulate, 1–1.5 mm, base 0.5–1 mm wide, apex acuminate, midvein prominent. Corolla pale blue to blue, tubular to narrowly obconic, 1.2–1.4 cm; lobes ovate-elliptic to ovate, 2.5–3.5 mm, margin entire, apex obtuse; plicae ovate, 1.5–3 mm, deeply 2-cleft, margin of both segments filiform fringed. Stamens inserted at middle of corolla tube, equal; filaments 2–3 mm; anthers ellipsoid, 0.8–1 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 4–5 mm; gynophore to 1.2 cm. Seeds light brown, ellipsoid to ovoid, 1–1.2 mm. Fl. and fr. Aug-Sep.

Grassland slopes, meadow bogs; 2900–4100 m. SE Xizang, NW Yunnan [NE Myanmar].

146. *Gentiana burmensis* C. Marquand, Bull. Misc. Inform. Kew 1928: 49. 1928.

缅甸龙胆 mian dian long dan

Perennials 4–7 cm tall, with long slender stolons. Stems ascending to erect, simple or few branched, glabrous. Petiole 1.5–2 mm; leaf blade ovate-elliptic, ovate, or ovate-orbicular, 4–6 × 2.5–3.5 mm, abaxially glabrous, adaxially densely and minutely papillate, base rounded to cordate, margin narrowly membranous, apex obtuse; veins 1–3, distinct, slender. Basal leaves withered at anthesis. Stem leaves spreading, usually shorter than internodes. Flowers 1 to few. Pedicel 4–6 mm, glabrous. Calyx tubular, 3.5–4.5 mm; lobes narrowly triangular, 1–1.5 mm, base 0.5–1 mm wide, margin narrowly membranous, apex acute, midvein prominent. Corolla purple, narrowly obconic to obconic, 1.2–1.5 cm; lobes ovate-lanceolate to ovate, 2.5–3.5 mm, margin entire, apex obtuse; plicae 2.5–3.5 mm, deeply 2-cleft, margin of both segments filiform fringed. Stamens inserted at middle of corolla tube, equal; filaments 3.5–4 mm; anthers ellipsoid, 0.7–0.9 mm. Ovary ellipsoid, ca. 3 mm; gynophore ca. 3.5 mm, stout. Style 3–4 mm; stigma lobes linear. Fl. Aug.

Sandy places, sunny gravel slopes, forests; 3900–4200 m. SE Xizang, NW Yunnan [N Myanmar].

147. *Gentiana delicata* Hance, J. Bot. 21: 324. 1883.

黄山龙胆 huang shan long dan

Gentiana heterostemon Harry Smith var. *chingii* (C. Marquand) Harry Smith, *G. pedicellata* (Wallich ex D. Don) Grisebach var. *chingii* C. Marquand.

Annuals 4–10 cm tall. Stems purple, erect, rigid, simple or few branched from base, densely papillate. Basal leaves with petiole 1–2 mm; leaf blade broadly elliptic to ovate, 6–10 × 0.5–6 mm, margin narrowly membranous and ciliate, apex obtuse and apiculate, midvein distinct. Stem leaves with petiole tube 0.5–1 mm, adaxially papillate; leaf blade linear-lanceolate, oblong, or elliptic, 6–10 × 0.5–6 mm, shorter than internodes, margin narrowly membranous and ciliate, apex acuminate to obtuse, midvein distinct. Flowers few. Pedicel purple, 2–6 mm, rigid, densely papillate. Calyx narrowly obconic, 6.5–7.5 mm; lobes filiform to filiform-subulate, 3–4 mm, margin narrowly membranous, apex acuminate, midvein distinct. Corolla outside pale yellow-green, inside pale blue, obconic, 1.2–1.8 cm; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae broadly ovate, 1–1.5 mm, margin denticulate, apex truncate. Stamens inserted at middle of corolla tube, equal; filaments 4.5–5 mm; anthers linear, 2–2.5 mm. Style 3–4.5 mm; stigma lobes linear. Capsules narrowly obovoid, 6–7 mm; gynophore to 1.5 cm. Seeds light brown, ovoid-ellipsoid, 1.2–1.4 mm. Fl. and fr. May–Jul.

• Roadsides, hillsides, wet places; 400–2100 m. Anhui (Huang Shan).

148. *Gentiana rubicunda* Franchet, Bull. Soc. Bot. France 31: 373. 1884.

深红龙胆 shen hong long dan

Annuals 8–15 cm tall. Stems erect, simple or few branched from middle, glabrous. Basal leaves with petiole 2–3 mm, adaxially papillate; leaf blade ovate-elliptic, ovate, or ovate-orbicular, 1–2.5 cm × 4–10 mm, margin ciliate, apex obtuse to rounded; veins 1–3, distinct, slender. Stem leaves widely spaced; petiole tube 1–1.5 mm, adaxially papillate; leaf blade lanceolate, ovate-elliptic, ovate, or obovate-orbicular, 0.4–2.2 cm × 2–7 mm, shorter than internodes, margin ciliate, apex obtuse, veins 1–3. Flowers 1 to few. Pedicel (0.3–)1–1.5 cm, glabrous. Calyx narrowly obconic; lobes filiform to filiform-subulate, margin smooth, apex acuminate, midvein distinct. Corolla purple, 1.5–6 cm; tube outside usually with blackish short lines and spots, narrowly obconic; lobes ovate, margin entire, apex obtuse; plicae ovate, margin entire, erose, or 2-cleft. Stamens inserted at middle of corolla tube, equal; filaments 0.7–1.5 cm; anthers narrowly ellipsoid, 2.5–4 mm. Style 1.5–2.5 mm; stigma lobes linear. Capsules narrowly obovoid, 7–9 mm; gynophore to 4(–5.5) cm. Seeds brown, ellipsoid, 1–1.3 mm. Fl. and fr. Mar–Oct.

• 500–3300 m. SE Gansu, Guizhou, Hubei, Hunan, Sichuan,

Yunnan.

- 1a. Stem leaf blades obovate-orbicular 148d. var. *samolifolia*
- 1b. Stem leaf blades lanceolate, ovate-elliptic, or ovate.
 - 2a. Corolla 1.5–1.8 cm, plicae 2-cleft 148c. var. *biloba*
 - 2b. Corolla 2–6 cm, plicae entire or erose.
 - 3a. Corolla 2–3 cm 148a. var. *rubicunda*
 - 3b. Corolla 4.5–6 cm 148b. var. *purpurata*

148a. *Gentiana rubicunda* var. *rubicunda*

深红龙胆 (原变种) shen hong long dan (yuan bian zhong)

Gentiana bodinieri H. Lévillé.

Stem leaf blades lanceolate, ovate-elliptic, or ovate. Corolla 2–3 cm; plicae entire or erose.

• Along streams, roadsides, cliffs, valleys, grassland slopes, wastelands, forests; 500–3300 m. SE Gansu, Guizhou, Hubei, Hunan, Sichuan, Yunnan.

148b. *Gentiana rubicunda* var. *purpurata* (Maximowicz ex Kusnezow) T. N. Ho, Fl. Reipubl. Popularis Sin. 62: 178. 1988.

大花深红龙胆 da hua shen hong long dan

Gentiana purpurata Maximowicz ex Kusnezow, Bull. Acad. Imp. Sci. Saint-Petersbourg, sér. 4, 2: 506. 1892.

Stem leaf blades lanceolate, ovate-elliptic, or ovate. Corolla 4.5–6 cm; plicae entire or erose.

• Roadsides, hillsides, wastelands; 2400–2700 m. Sichuan.

148c. *Gentiana rubicunda* var. *biloba* T. N. Ho, Fl. Reipubl. Popularis Sin. 62: 178. 1988.

二裂深红龙胆 er lie shen hong long dan

Gentiana bellidifolia Franchet (1896), not J. D. Hooker (1844).

Stem leaf blades lanceolate, ovate-elliptic, or ovate. Corolla 1.5–1.8 cm; plicae 2-cleft.

• E Sichuan.

148d. *Gentiana rubicunda* var. *samolifolia* (Franchet) C. Marquand, Bull. Misc. Inform. Kew 1937: 172. 1937.

小繁缕叶龙胆 xiao fan lu ye long dan

Gentiana samolifolia Franchet, Bull. Soc. Bot. France 43: 485. 1896.

Stem leaf blades obovate-orbicular. Corolla 1.5–2 cm.

• W Hubei, E Sichuan.

149. *Gentiana itzershanensis* Liu & Kuo, Bull. Exp. Forest

Natl. Taiwan Univ. 114: 181. 1974.

伊泽山龙胆 *yi ze shan long dan*

Annuals 15–20 cm tall. Stems purple, erect, rigid, few branched from middle, slightly 4-angled, papillate. Basal leaves with petiole 1–2 mm; leaf blade lanceolate to ovate-elliptic, 1.8–2 cm × 6–8 mm, margin indistinctly cartilaginous, apex acute and apiculate, midvein distinct. Stem leaves widely spaced; petiole tube 1.5–2 mm; leaf blade lanceolate to ovate-elliptic, 1.2–1.5 cm × 4–5 mm, shorter than internodes, margin indistinctly cartilaginous, apex acute and apiculate, midvein distinct. Flowers few, subsessile. Calyx campanulate, 1.4–1.6 cm; lobes filiform-subulate, 9–10 mm, margin ciliolate, apex acuminate and apiculate, midvein distinct. Corolla blue, tubular-campanulate, 1.8–2.2 cm; lobes broadly ovate, 3.5–4 mm, margin entire, apex acute; plicae ovate-oblong, 2–3 mm, 2- or 3-dentate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 5–7 mm; anthers ellipsoid, 2.5–3 mm. Style 3–4.5 mm; stigma lobes linear. Capsules narrowly obovoid, 7–8 mm; gynophore to 1.5 cm. Seeds brown, ovoid-ellipsoid, 1.2–1.4 mm. Fl. and fr. Jul–Oct.

• Grassland slopes; ca. 3300 m. Taiwan.

150. *Gentiana baoxingensis* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 21. 1984.

宝兴龙胆 *bao xing long dan*

Annuals 3–4 cm tall. Stems purple, ascending, few branched from base, glabrous. Basal leaves with petiole 0.7–1 mm; leaf blade ovate, 4–6 × 3–4 mm, margin hirsute, apex acute and apiculate, veins 1–3. Stem leaves widely spaced, shorter than internodes; petiole tube 0.5–0.7 mm; leaf blade ovate, 2.5–3.5 × 2–3 mm, margin hirsute, apex acute and apiculate, midvein distinct. Flowers few to many. Pedicel purple, 5–10 mm, glabrous. Calyx purple, narrowly obconic, 4–5 mm, coarsely papillate; lobes filiform to filiform-subulate, 1.5–2 mm, margin hirsute, apex acuminate, midvein distinct. Corolla purple, with numerous blackish short lines in throat, obconic, 9–10 mm; lobes 1.2–1.5 mm, ovate, margin entire, apex obtuse; plicae triangular to broadly ovate, 1–1.2 mm, margin entire or denticulate, apex obtuse. Stamens inserted just above to middle of corolla tube, equal; filaments 1–1.2 mm; anthers ellipsoid, 0.8–1 mm. Ovary ellipsoid, 1.5–2 mm; gynophore ca. 1.5 mm. Style 0.8–1 mm; stigma lobes narrowly oblong. Fl. Aug.

• Grassland slopes; ca. 4000 m. W Sichuan.

151. *Gentiana filisepala* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 21. 1984.

丝萼龙胆 *si e long dan*

Annuals 10–20 cm tall. Stems ascending, much branched from base, glabrous. Basal leaves with petiole 1–2 mm; leaf blade spatulate to ovate-orbicular, 1–1.5 × 0.6–1.3 cm, margin almost smooth, apex obtuse to rounded, veins 1–3. Stem leaves widely spaced; petiole tube 0.5–1 mm; leaf blade

ovate, 5–8 × 3–3.5 mm, shorter than internodes, margin almost smooth, apex obtuse, veins 1–3. Flowers many. Pedicel 1–1.5 cm, glabrous. Calyx with blackish short lines in tube, narrowly obconic, 7–9 mm; lobes filiform to filiform-subulate, 3.5–4.5 mm, margin smooth, apex acuminate, midvein distinct. Corolla purple, with numerous blackish short lines in throat, obconic, 1.7–2 cm; lobes ovate, 2.5–3 mm, margin entire, apex obtuse; plicae broadly oblong, 1.5–2 mm, margin erose, apex truncate. Stamens inserted at middle of corolla tube, equal; filaments 3.5–4 mm; anthers narrowly ellipsoid, 1.3–1.5 mm. Style 2.5–3 mm; stigma lobes linear. Capsules narrowly obovoid, 9–10 mm; gynophore to 1.5 cm. Seeds brown, ellipsoid, 1.1–1.3 mm. Fl. and fr. Jun–Aug.

• Roadsides, hillsides; 3000–3300 m. W Sichuan.

152. *Gentiana flavomaculata* Hayata, Icon. Pl. Formos. 6: Suppl. 49. 1917.

黄花龙胆 *huang hua long dan*

Gentiana flavescens Hayata (1908), not Schur (1866).

Annuals 4–8 cm tall. Stems ascending, branched from base, densely papillate. Basal leaves with petiole 0.5–1 mm; leaf blade ovate-elliptic, 0.7–1.7 cm × 3–5 mm, margin ciliolate, apex acuminate to obtuse and apiculate, midvein distinct. Stem leaves widely spaced; petiole tube 0.5–1 mm, margin ciliolate; leaf blade lanceolate to ovate, 5–8 × 2–5 mm, shorter than internodes, margin ciliolate, apex acute and apiculate, midvein distinct. Flowers few to many. Pedicel 2–3 mm, to 8 mm in fruit, densely papillate. Calyx campanulate, 5–6 mm; lobes 2–2.5 mm, filiform to filiform-subulate, margin ciliolate, apex acuminate, midvein distinct. Corolla pale yellow or white, with pale purple base and yellow spots in throat, tubular-campanulate to narrowly obconic, 1.2–1.5 cm; lobes ovate, 2.5–3 mm, margin entire, apex obtuse and mucronate; plicae 2.5–3 mm, ovate, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 4.5–5.5 mm; anthers ellipsoid, 1–2 mm. Style 1.5–2 mm; stigma lobes linear. Capsules narrowly obovoid to obovoid, 5–6 mm; gynophore to 1.2 cm, stout. Seeds brown, ellipsoid, 0.6–0.9 mm. Fl. and fr. Aug–Oct.

• Grassland slopes; 1800–3000 m. Taiwan.

153. *Gentiana vandellioides* Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 137. 1890.

母草叶龙胆 *mu cao ye long dan*

Annuals 6–10 cm tall. Stems ascending, 2–4 × dichotomously branched from base, glabrous. Basal leaves with petiole 2–3 mm; leaf blade spatulate to ovate, 8–10 × 5–6.5 mm, base narrowed, margin smooth or ciliolate, apex acute to obtuse, midvein distinct. Stem leaves widely spaced; petiole tube 0.5–1 mm; leaf blade broadly ovate to subcordate, 6.5–12 × 3.5–6 mm, shorter than internodes, base rounded, margin ciliolate, apex acute; veins 3–5, distinct, slender. Flowers few to many. Pedicel 0.8–1.5 cm, glabrous. Calyx narrowly obconic, 4.5–5.5 mm, tube membranous; lobes purple, filiform to filiform-subulate, 2–2.5 mm, margin smooth or ciliolate, apex acuminate, midvein distinct. Corolla pale blue, narrowly obconic, 1.2–1.5 cm; lobes ovate-

orbicular, 1.5–2 mm, apex obtuse; plicae ovate, 1.2–1.8 mm, margin entire or 2-cleft. Stamens inserted just below middle of corolla tube, equal; filaments 4–5 mm; anthers ellipsoid, 1–1.5 mm. Style 0.5–1 mm; stigma lobes linear. Capsules narrowly obovoid, 4–5 mm; gynophore to 1.8 cm. Seeds light brown, narrowly ellipsoid, 1.3–1.5 mm. Fl. and fr. Jul-Sep.

- 1100–3500 m. W Hubei, S Shaanxi, E Sichuan.

1a. Corolla plicae entire 153a. var. *vandellioides*
1b. Corolla plicae 2-cleft 153b. var. *biloba*

153a. *Gentiana vandellioides* var. *vandellioides*

母草叶龙胆 (原变种) mu cao ye long dan (yuan bia zhong)

Corolla plicae entire, apex acute.

- Roadsides, forest margins, forests; 1100–3500 m. W Hubei, S Shaanxi, E Sichuan.

153b. *Gentiana vandellioides* var. *biloba* Franchet, Bull. Soc. Bot. France 43: 486. 1896.

二裂母草叶龙胆 er lie mu cao ye long dan

Corolla plicae deeply 2-cleft.

- Grassland slopes, gravel places; 1600–2600 m. E Sichuan.

154. *Gentiana tatakensis* Masamune, Trans. Nat. Hist. Soc. Taiwan 33: 110. 1943.

塔塔卡龙胆 ta ta ka long dan

Biennials 2–8 cm tall. Stems purple, ascending, simple or few branched from base, densely papillate. Basal leaves with petiole 2.5–3 mm; leaf blade linear-elliptic to narrowly elliptic, 1.3–1.7 cm × 2–3.5 mm, margin ciliolate, apex acuminate, midvein distinct. Stem leaves widely spaced; petiole tube 0.7–1 mm, abaxially papillate; leaf blade lanceolate, elliptic, or ovate, 3–8 × 1.5–2.5 mm, shorter than internodes, margin ciliolate, apex obtuse, midvein distinct. Flowers few to many. Pedicel purple, 2–7 mm, densely papillate. Calyx narrowly obconic, 5–6 mm; lobes filiform to filiform-subulate, 1.5–2 mm, margin smooth, apex acuminate, midvein distinct. Corolla pale purple, narrowly obconic, 8–10 mm; lobes ovate, 2.5–2.7 mm, margin entire, apex obtuse; plicae ovate, 1–1.2 mm, margin entire or 2-cleft, apex obtuse. Stamens inserted just below middle of corolla tube, equal; filaments 3.5–4 mm; anthers ellipsoid, 0.8–1 mm. Style 0.5–0.7 mm; stigma lobes oblong. Capsules narrowly obovoid, 5–6 mm; gynophore to 1.3 cm. Seeds light brown, ellipsoid to ovoid, 0.7–0.9 mm. Fl. and fr. Apr.

- Grassland slopes; 1400–2400 m. Taiwan.

155. *Gentiana yiliangensis* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 22. 1984.

弈良龙胆 yi liang long dan

Annuals 7–12 cm tall. Stems erect, 3–5 × dichotomously branched from base, glabrous. Petiole tube 0.5–1 mm; leaf blade lanceolate, 6–11 × 1–2.5 mm, margin ciliolate, apex

acute, midvein distinct. Flowers many. Pedicel 5–7 mm, almost glabrous. Calyx campanulate, 5–6 mm; lobes filiform to filiform-subulate, 2–2.5 mm, base 0.8–1 mm wide, margin narrowly membranous, apex acute, midvein distinct. Corolla pale yellow-white, pale blue in throat, narrowly obconic, 8–10 mm; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae triangular, 1–1.5 mm, margin entire, apex acute. Stamens inserted at middle of corolla tube, equal; filaments 1.8–2 mm; anthers ellipsoid, 0.7–0.9 mm. Style 0.8–1 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 3.5–4.5 mm; gynophore to 8 mm. Seeds light brown, ellipsoid to ovoid, 0.9–1.1 mm. Fl. and fr. Jul-Sep.

- Roadsides under forests; ca. 1800 m. NE Yunnan.

156. *Gentiana kwangsiensis* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 23. 1984.

广西龙胆 guang xi long dan

Perennials 3–6 cm tall, with developed slender stolons. Stems prostrate to ascending, slender, branched from base, papillate. Leaves linear-elliptic, 6–12 × 1–2 mm, longer than internodes, subleathery, margin cartilaginous and smooth or ciliolate, apex obtuse and apiculate, midvein prominent. Basal leaves withered at anthesis; petiole 0.5–1.5 mm. Stem leaves recurved, folded; petiole tube 1–2 mm. Flowers few, subsessile. Calyx narrowly obconic, (5–)9–10 mm, tube membranous; lobes subulate, (3–)5–6 mm, subleathery, margin cartilaginous and ciliolate, apex acuminate and apiculate, midvein prominent. Corolla purple, outside with yellow-green stripes, tubular-funnelform, (0.9–)1.2–1.8 cm; lobes ovate, (1.5–)2–3 mm, margin entire, apex obtuse; plicae oblong, 1–2 mm, margin denticulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments (3–)4–5 mm; anthers narrowly ellipsoid, 1.2–1.5 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules narrowly ellipsoid, 3–5 mm; gynophore to 6 mm, slender. Seeds dark brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jun-Oct.

- Grassland slopes, gravelly areas; 1300–1700 m. Fujian, Guangdong, Guangxi.

157. *Gentiana asterocalyx* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 220. 1912.

星萼龙胆 xing e long dan

Annuals 7–15 cm tall. Stems erect, branched from base, with spreading branches, densely papillate. Leaves crowded; leaf blade subulate to lanceolate, 0.8–1.2 cm × 1.5–2.5 mm, longer than internodes, longer toward stem apex, subleathery, rigid, glossy, margin basal half broadly membranous and ciliolate, apical half cartilaginous and smooth, apex acuminate; veins 1–3, abaxially prominent. Basal leaves withered at anthesis; petiole 0.5–1.5 mm. Stem leaves spreading; petiole tube 1–2 mm. Flowers few, subsessile. Calyx tube tubular, 7–9 mm, membranous, with 15 prominent longitudinal veins; lobes spreading rigidly, needlelike, as long as tube, subleathery, glossy, base narrowed, margin basal half broadly membranous and ciliolate, apical half cartilaginous and smooth, apex acuminate and apiculate, veins 1–3 and prominent. Corolla blue-purple, with pale yellow-white base, tubular-funnelform, 1.8–2 cm; lobes ovate-elliptic, 4–5 mm,

margin entire, apex obtuse; plicae oblong, 2.5–3 mm, margin denticulate, subtruncate. Stamens inserted at middle of corolla tube, equal; filaments 3–4 mm; anthers narrowly ellipsoid, 1–1.5 mm. Style 3–4 mm; stigma lobes linear. Capsules narrowly obovoid, 8–9 mm; gynophore to 2.5 cm, stout. Seeds light brown, ellipsoid, 1.1–1.3 mm. Fl. and fr. Jul-Aug.

- Grasslands on limestone; 3000–3200 m. NW Yunnan.

158. *Gentiana asparagoides* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 26. 1984.

天冬叶龙胆 tian dong ye long dan

Annuals 4–7 cm tall. Stems ascending, slender, few branched from base, glabrous. Basal leaves with petiole 0.5–1.5 mm; leaf blade ovate-elliptic to ovate, 3.5–4.5 × 2–2.5 mm, margin cartilaginous and ciliolate, apex acute and apiculate, midvein prominent. Stem leaves spreading, folded; petiole tube 1–1.5 mm; leaf blade linear to linear-lanceolate, 2.5–3.5 × 0.7–1.2 mm, shorter than internodes, margin narrowly membranous and ciliolate, apex acuminate and apiculate, midvein abaxially prominent. Flowers few. Pedicel 2–12 mm, glabrous. Calyx 7–8 mm, narrowly obconic; lobes linear-lanceolate, 3.5–5 mm, as long as or longer than tube, margin narrowly membranous, apex acuminate and apiculate, midvein distinct. Corolla blue-purple, with yellow-green base, and with blue-gray stripes, narrowly funnellform, 1.1–1.4 cm; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae ovate, 1.2–1.8 mm, margin entire or denticulate, apex obtuse. Stamens inserted at middle of corolla tube, unequal; filaments 3–4 mm; anthers subglobose, 0.5–0.6 mm. Style 1–2 mm; stigma lobes oblong. Capsules ellipsoid, ca. 6 mm; gynophore ca. 6 mm, slender. Seeds brown. Fl. and fr. Aug.

- Alpine bogs; 3500–3800 m. NW Yunnan.

159. *Gentiana linooides* Franchet in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 129. 1890.

亚麻状龙胆 ya ma zhuang long dan

Annuals 5–15 cm tall. Stems erect; branches few, from middle or apically, short, erect; flowering branches crowded together, or rarely simple, densely papillate. Petiole tube 1–2 mm; leaf blade linear-lanceolate, 0.8–1.2 cm × 1–3 mm, apex acute and apiculate; veins 1–3, prominent. Basal leaves withered at anthesis, margin cartilaginous. Stem leaves incurved, folded, margin broadly membranous. Flowers few. Pedicel 2–4 mm, densely papillate. Calyx narrowly obconic, 1–1.2 cm, tube membranous; lobes incurved, ovate-lanceolate, 5–6 mm, margin broad, apex acuminate and caudate, midvein prominent. Corolla blue-purple, with yellow-green base, tubular, 1.5–1.8 cm; lobes ovate, 3–5 mm, margin entire, apex obtuse; plicae ovate, 2–4 mm, margin entire or denticulate, apex obtuse. Stamens inserted just below middle of corolla tube, unequal; filaments 3.5–5.5 mm; anthers narrowly ellipsoid, 1.2–1.5 mm. Style 2–3 mm; stigma lobes oblong. Capsules narrowly obovoid, 8–9 mm; gynophore to 2 cm, slender. Seeds dark brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jul-Aug.

- Grassland slopes; 3000–4000 m. NW Yunnan.

160. *Gentiana syringea* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 24. 1984.

紫花龙胆 zi hua long dan

Annuals 3–5 cm tall. Stems ascending, branched from base, glabrous or papillate. Basal leaves with petiole 0.5–1.5 mm; leaf blade ovate to ovate-orbicular, 5–8 × 3–7.5 mm, margin cartilaginous and smooth, apex rounded and mucronate; veins 1–3, distinct. Stem leaves folded; petiole tube 1–2 mm; leaf blade narrowly oblong, rarely lanceolate or lower leaf blades spatulate, 4–6 × 1–2 mm, margin of lower stem leaf blades cartilaginous and of upper leaf blades membranous, apex acuminate to obtuse and apiculate, midvein abaxially prominent. Flowers few. Pedicel 5–10 mm, papillate. Calyx narrowly obconic, 6.5–8 mm; lobes triangular, 2–2.5 mm, margin narrowly membranous, apex acute and apiculate, midvein prominent. Corolla purple, with blackish spots in throat and blackish stripes in tube, narrowly obconic, 1–1.3 (–1.6) cm; lobes ovate-elliptic, 2–3 mm, margin entire, apex obtuse; plicae ovate-elliptic, 1.5–2 mm, margin entire or denticulate, apex obtuse. Stamens inserted at basal part of corolla tube, equal; filaments 4.5–5 mm; anthers curved, ellipsoid, 0.8–1 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 4.5–5 mm; gynophore to 2 cm, slender. Seeds brown, narrowly ellipsoid, 1.2–1.3 mm. Fl. and fr. Jun-Aug.

- River banks, grassland slopes, alpine meadows; 2200–3900 m. S Gansu, S Qinghai, W Sichuan.

161. *Gentiana grumii* Kusnezow, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 63. 1893.

南山龙胆 nan shan long dan

Gentiana ivanoviczii C. Marquand.

Annuals 2.5–4 cm tall. Stems few branched from base, basally glabrous, apically papillate. Basal leaves withered at anthesis; petiole 0.5–1.5 mm; leaf blade ovate to ovate-orbicular, 6.5–10 × 3.5–6 mm, margin cartilaginous, apex rounded and mucronate, veins 1–3. Stem leaves folded; petiole tube 1–1.5 mm; leaf blade linear-lanceolate to lanceolate, 5–6 × 1–2 mm, margin narrowly membranous, apex acuminate to obtuse and apiculate, midvein abaxially prominent. Flowers few. Pedicel 2–5 mm, surrounded by leaves, papillate. Calyx 5–6 mm, narrowly obconic; lobes triangular, 1.5–2 mm, margin narrowly membranous, apex acute and apiculate, midvein prominent. Corolla blue, with yellow-green base, outside with blue-gray stripes, inside with blackish spots in throat, obconic, 1–1.2 (–1.4) cm; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae ovate, 1.5–2 mm, margin entire or denticulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 3–4 mm; anthers curved, ellipsoid, 1.3–1.5 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 3–4 mm; gynophore to 1.2 cm, slender. Seeds dark brown, narrowly ellipsoid, 1–1.2 mm. Fl. and fr. Jun-Jul.

- Bog meadows, wet meadows; 3200–3300 m. Qinghai.

162. *Gentiana heleonastes* Harry Smith, Bull. Misc. Inform. Kew 1937: 132. 1937.

针叶龙胆 zhen ye long dan

Annuals 5–15 cm tall. Stems ascending to erect, branched from base, glabrous. Basal leaves withered at anthesis; petiole tube 1–2 mm; leaf blade obovate to ovate-orbicular, 4.5–7 × 2.5–5 mm, margin cartilaginous, apex rounded and mucronate, veins 1–3. Stem leaves folded; leaf blade shorter than internodes, longer toward apex, margin narrowly membranous and smooth, apex sometimes recurved, midvein abaxially prominent. Lower stem leaves spatulate, 4–6 × 1.5–2 mm, apex rounded; middle to upper leaves needlelike, apex acuminate and apiculate. Flowers few. Pedicel 1.3–2 cm, exserted from uppermost leaves, glabrous. Calyx narrowly obconic, 7–9 mm; lobes linear-triangular, 2–3 mm, margin narrowly membranous and smooth, veins slender and distinct, apex acuminate and apiculate. Corolla outside blue-gray, inside white or pale blue-gray, tubular, 1.4–1.6 cm; lobes ovate to broadly ovate, 2.5–3.5 mm, margin erose to serrate, apex obtuse; plicae oblong, 1.5–2 mm, margin irregularly denticulate, apex obtuse to truncate. Stamens inserted at basal part of corolla tube, equal or unequal; filaments 2.5–3.5 mm; anthers ellipsoid, 0.8–1 mm. Style 1.5–2 mm; stigma lobes narrowly oblong. Capsules narrowly obovoid to obovoid, 6–7 mm; gynophore 4–10 mm, stout. Seeds light brown, narrowly ellipsoid, 1.3–1.6 mm. Fl. and fr. Jun-Sep.

• River banks, moist meadows, scrub meadows, bog meadows; 3200–4200 m. Qinghai, Sichuan.

163. *Gentiana aristata* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 26: 497. 1880.

刺芒龙胆 ci mang long dan

Annuals 3–10 cm tall. Stems ascending to erect, branched from base, glabrous. Basal leaves withered at anthesis; petiole 0.5–1.5 mm; leaf blade ovate-elliptic to ovate, 7–9 × 3–4.5 mm, margin cartilaginous, apex acute and awned, midvein prominent. Stem leaves folded; petiole tube 1.5–2.5 mm; leaf blade linear, 5–10 × 1.5–2 mm, longer toward apex, margin narrowly membranous, apex acuminate and awned, midvein abaxially prominent. Flowers few. Pedicel 0.5–2 cm, exserted from uppermost leaves, glabrous. Calyx narrowly obconic, 7–10 mm; lobes linear-lanceolate, 3–4 mm, margin narrowly membranous and smooth, apex acuminate and awned, midvein prominent. Corolla blue to pale purple, with yellow-green base and blue-gray stripes, obconic, 1.2–1.5 cm; lobes ovate-elliptic to ovate, 3–4 mm, margin entire, apex obtuse; plicae oblong, 1.5–2 mm, margin irregularly lacinate, apex truncate. Stamens inserted at middle of corolla tube, equal; filaments 3–4 mm; anthers curved, ellipsoid to reniform, 0.7–1 mm. Style 1.5–2 mm, cylindrical; stigma lobes narrowly oblong. Capsules narrowly obovoid to obovoid, 5–6 mm; gynophore to 2 cm, slender. Seeds light brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jun-Sep.

• River banks, bog meadows, alpine meadows, scrub meadows, steppes, forest clearings, sunny gravel places, valleys; 1800–4600 m. Gansu, Qinghai, Sichuan, Xizang.

164. *Gentiana tricolor* Diels & Gilg in Futterer, Durch Asien Bot. Repr. 3: 15. 1903.

三色龙胆 san se long dan

Annuals 3–5 cm tall. Stems purple, ascending to erect, branched from base, basally glabrous, apically papillate. Basal leaves withered at anthesis; petiole 2–3 mm; leaf blade obovate, 7–11 × 5–6.5 mm, margin cartilaginous, apex rounded and mucronate, midvein prominent. Stem leaves folded; petiole tube 2–2.5 mm; leaf blade linear, 4–7 × 1.5–2.5 mm, longer toward apex, margin narrowly membranous and smooth, apex acuminate and awned, midvein abaxially prominent. Flowers few. Pedicel purple, 2–5.5 mm, surrounded by leaves, papillate. Calyx obconic, 7–8 mm; lobes triangular to lanceolate, 2.5–3 mm, margin narrowly membranous and smooth, apex acute and awned, midvein prominent. Corolla pale blue to blue, with yellow-green base, tubular, 1.1–1.3 cm; lobes ovate-elliptic to ovate, 1.2–2 mm, margin entire, apex obtuse and sometimes mucronate; plicae ovate, 1.5–2 mm, margin entire or denticulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 4–5 mm; anthers curved, ellipsoid, 1–1.5 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 5–7 mm; gynophore to 1.5 cm, stout. Seeds dark brown, ellipsoid, 1.1–1.4 mm. Fl. and fr. Jun-Aug.

• Meadows on river banks, bog meadows, forests, roadsides; 2200–3200 m. Qinghai.

165. *Gentiana choanantha* C. Marquand, Bull. Misc. Inform. Kew 1931: 85. 1931.

反折花龙胆 fan zhe hua long dan

Gentiana crassuloides Franchet (Aug 1891), not Bureau & Franchet (Apr 1891).

Annuals 3–5 cm tall. Stems ascending to erect, branched from base, glabrous. Basal leaves withered at anthesis; petiole 0.5–1.5 mm; leaf blade ovate to ovate-orbicular, 4–8 × 2–5 mm, margin cartilaginous and ciliolate, apex rounded and mucronate, veins 1–3. Stem leaves folded; petiole tube 1.5–2.5 mm; lower leaf blades ovate to ovate-orbicular, 4–8 × 2–5 mm, margin cartilaginous and ciliolate, apex rounded and mucronate, veins 1–3; middle to upper leaf blades filiform-linear, 4–6 × 0.5–1 mm, longer toward stem apex, margin narrowly membranous and smooth, apex acuminate and awned, midvein abaxially prominent. Flowers few. Pedicel 3–7 mm, surrounded by leaves, glabrous. Calyx narrowly obconic, 5–6(–9) mm; lobes subulate to linear-triangular, 2–2.5(–3.5) mm, margin narrowly membranous, apex acuminate and awned, midvein prominent. Corolla purple, with yellow-green base, obconic, 8–10(–14) mm; lobes recurved, ovate-orbicular, 1.5–2 mm, margin entire, apex obtuse; plicae ovate, 1.5–1.7 mm, margin slightly 2-cleft or erose, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 4–5 mm; anthers curved, subreniform, 0.8–1 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules narrowly obovoid, 4–5 mm; gynophore to 1.4 cm, stout. Seeds light brown, ellipsoid, 0.8–1 mm. Fl. and fr. Apr-Aug.

• Stream and river banks, bogs, alpine meadows, scrub meadows; 2700–4600 m. W Sichuan.

166. *Gentiana curvianthera* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 25. 1984.

弯药龙胆 wan yao long dan

Annuals 5–6 cm tall. Stems ascending to erect, branched from base, glabrous. Basal leaves withered at anthesis; petiole 0.5–1.5 mm; leaf blade elliptic, 5–8 × 3–4.5 mm, abaxially pubescent, adaxially glabrous, margin cartilaginous and ciliate, apex acuminate and caudate, midvein prominent. Stem leaves folded; petiole tube 1–2 mm; leaf blade linear-lanceolate, 5–7 × 1.5–2 mm, longer toward apex, abaxially pubescent, adaxially glabrous, margin narrowly membranous and ciliate, apex acuminate and caudate, midvein abaxially prominent. Flowers few. Pedicel 3–4 mm, surrounded by leaves, glabrous. Calyx narrowly obconic, 7–9 mm; lobes linear-lanceolate, 4–5 mm, margin narrowly membranous and smooth, apex acuminate and apiculate, midvein prominent. Corolla purple, with blue-gray stripes, obconic, 1.2–1.3 cm; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae ovate-elliptic, 1–1.2 mm, margin denticulate, apex obtuse. Stamens inserted just below middle of corolla tube, equal; filaments 3–4 mm; anthers curved, subreniform, ca. 1 mm. Style 1–1.5 mm; stigma lobes linear. Capsules narrowly obovoid, 5–6 mm; gynophore to 1.7 cm. Seeds light brown, ellipsoid, 1–1.3 mm. Fl. and fr. Sep.

• Alpine meadows; ca. 4200 m. W Sichuan.

167. *Gentiana scabrida* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25(19): 168. 1908.

玉山龙胆 yu shan long dan

Annuals 3–20 cm tall. Stems dark purple, ascending to erect, branched from base, densely papillate. Petiole tube 2–2.5 mm, papillate adaxially and on margins; leaf blade ovate-elliptic to ovate, 0.9–1.5 cm × 3–5 mm, abaxially glabrous, adaxially densely and minutely papillate, base obtuse, apex acuminate to acute and cuspidate, midvein distinct. Pedicel dark purple, 2–10 mm, densely papillate. Calyx narrowly obconic, 6–10 mm; lobes spreading to recurved, spatulate to ovate-lanceolate, 2–4 mm, base narrowed, apex obtuse and mucronate, midvein prominent. Corolla pale yellow to yellow, with dark spots in throat, obconic, 0.9–2.3 cm; lobes broadly ovate, 1.5–5 mm, margin entire, apex obtuse and mucronate; plicae broadly ovate, 1.2–4 mm, margin entire or erose, apex cuspidate to obtuse. Stamens inserted at middle of corolla tube, equal; filaments 5–7 mm; anthers narrowly ellipsoid, 2–3 mm. Style 2–3 mm; stigma lobes linear. Capsules narrowly obovoid to obovoid, 5–7 mm; gynophore to 2 cm, stout. Seeds dark brown, ellipsoid, 1–1.3 mm. Fl. and fr. Jul-Oct.

• 2300–3800 m. Taiwan.

- 1a. Corolla 2–2.3 cm, lobes 4–5 mm,
plicae 3–4 mm 167a. var. *scabrida*
1b. Corolla 0.9–1 cm, lobes 1.5–2
mm, plicae 1.2–1.5 mm 167b. var. *horaimontana*

167a. *Gentiana scabrida* var. *scabrida*

玉山龙胆 (原变种) yu shan long dan (yuan bian zhong)

Annuals 15–20 cm tall. Corolla 2–2.3 cm, lobes 4–5 mm; plicae 3–4 mm, apex obtuse.

• Grassland slopes; 2300–3500 m. Taiwan.

167b. *Gentiana scabrida* var. *horaimontana* (Masamune) Liu & Kuo, Bull. Exp. Forest Natl. Taiwan Univ. 114: 188. 1974.

矮玉山龙胆 ai yu shan long dan

Gentiana horaimontana Masamune, Trans. Nat. Hist. Soc. Taiwan 26: 56. 1936.

Annuals scarcely 3 cm tall. Corolla 0.9–1 cm, lobes 1.5–2 mm; plicae 1.2–1.5 mm, apex obtuse and cuspidate.

• Grassland slopes; ca. 3800 m. Taiwan.

168. *Gentiana pedicellata* (Wallich ex D. Don) Grisebach, Gen. Sp. Gent. 273. 1838.

糙毛龙胆 cao mao long dan

Ericala pedicellata Wallich ex D. Don, London Edinburgh Philos. Mag. & J. Sci. 8: 76. 1836; *E. procumbens* D. Don ex G. Don; *Gentiana pedicellata* var. *wallichii* Kusnezow; *G. quadrifaria* Blume var. *pilosula* C. B. Clarke.

Annuals 3–10 cm tall. Stems ascending to erect, branched from base, densely papillate. Basal leaves withered at anthesis; petiole 0.5–1.5 mm; leaf blade narrowly elliptic to elliptic-lanceolate, 1–2 cm × 4–6 mm, densely and minutely papillate but especially adaxially, base narrowed, apex acuminate to obtuse and apiculate, veins 1–3. Stem leaves with petiole tube 1–1.5 mm, densely papillate on margin and abaxially; leaf blade linear-elliptic, lanceolate, or occasionally oblanceolate, 5–10 × 1.5–2 mm, densely and minutely papillate but especially adaxially, base obtuse, apex acuminate and apiculate, veins 1–3. Pedicel purple, 2–15 mm, densely papillate. Calyx tubular, 3–5 mm; lobes spreading, recurved, or rarely erect, ovate-elliptic to ovate, 1.2–1.5 mm, outside densely and minutely papillate, base not or slightly narrowed, apex obtuse and cuspidate, midvein prominent. Corolla outside pale yellow-green, inside blue to blue-purple with yellow to orange throat, tubular to funnellform, 6–10 mm, twice as long as calyx; lobes ovate, 1.5–2 mm, margin entire, apex obtuse and mucronate; plicae broadly ovate, 0.9–1.1 mm, margin denticulate, apex obtuse to rounded. Stamens inserted just below middle of corolla tube, equal; filaments 2.5–3 mm; anthers ellipsoid, 0.7–1 mm. Style 1–1.5 mm; stigma lobes narrowly oblong. Capsules narrowly obovoid to obovoid, 2–3 mm; gynophore to 2 cm, stout. Seeds dark brown, ellipsoid to ovoid, 0.5–0.8 mm. Fl. and fr. Apr-Jul.

Bogs, clearings in forests, meadow and roadside slopes, wastelands; 2100–3400 m. SW Xizang, W Yunnan [Bhutan, NW and E India, N Myanmar, Nepal, Pakistan, Sikkim].

169. *Gentiana moniliformis* C. Marquand, Bull. Misc. Inform. Kew 1931: 86. 1931.

念珠脊龙胆 nian zhu ji long dan

Annuals 4–6 cm tall. Stems purple, ascending to erect, branched from base, densely papillate. Basal leaves withered at anthesis; petiole 0.5–1 mm; leaf blade spatulate to narrowly elliptic, 0.8–1.7 cm × 4–6 mm, densely and minutely papillate but especially adaxially, base obtuse, apex acuminate to obtuse and apiculate, midvein distinct. Stem leaves with petiole tube 1–2 mm, papillate; leaf blade linear-elliptic to lanceolate, 3.5–8 × 1–3 mm, densely and minutely papillate but especially adaxially, base obtuse, apex acuminate and apiculate, midvein distinct. Pedicel purple, 2–5 mm, densely papillate. Calyx tubular, 4.5–6 mm; lobes spreading, narrowly triangular to ovate, 1.5–2.5 mm, outside densely and minutely papillate, base not or slightly narrowed, apex acuminate to acute and cuspidate, midvein prominent. Corolla outside pale yellow-green, inside pale greenish blue, tubular, 7–9 mm, scarcely exerted from calyx; lobes ovate, 1.2–1.5 mm, margin entire, apex obtuse and mucronate; plicae ovate, 0.7–1 mm, margin entire, apex obtuse. Stamens inserted at basal part of corolla tube, equal; filaments 2–2.5 mm; anthers ellipsoid, 0.6–0.8 mm. Style 1–1.2 mm; stigma lobes narrowly oblong. Capsules narrowly obovoid to obovoid, 3.5–4 mm; gynophore to 5.5 mm, stout. Seeds dark brown, 0.5–0.6 mm, oblong. Fl. and fr. May.

- Hillsides; 2100 m. W Yunnan.

170. *Gentiana yokusai* Burkill, J. Proc. Asiat. Soc. Bengal 2: 316. 1906.

灰绿龙胆 hui lu long dan

Annuals 2.5–14 cm tall. Stems ascending to erect, branched throughout, usually with 2–5 crowded flowering branches, densely papillate. Petiole 1.5–2.5 mm, margin ciliolate; leaf blade adaxially sometimes densely and minutely papillate, base obtuse, margin thick cartilaginous, apex acuminate and with an aristate tip to 0.7 mm, midvein prominent. Basal leaf blades lanceolate to ovate-lanceolate, 0.7–2.2 cm × 4.5–8 mm. Stem leaves spreading; leaf blade ovate or cordate, 4–12 × 3–6 mm. Pedicel 1.2–1.5 mm, papillate. Calyx narrowly obconic, 5–8 mm; lobes slightly spreading, lanceolate to ovate, 2–3 mm, slightly unequal, base slightly narrowed, margin thick cartilaginous and ciliolate, apex acuminate and with an aristate tip to 0.7 mm, midvein prominent. Corolla blue to blue-purple, funnellform, 7–12 mm; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae ovate, 1–1.5 mm, margin entire or denticulate, apex obtuse. Stamens inserted just below middle of corolla tube, equal; filaments 2–2.5 mm; anthers narrowly ellipsoid, 0.5–0.8 mm. Style 1.5–2 mm; stigma lobes linear. Capsules narrowly obovoid to obovoid, 3–6.5 mm; gynophore to 1.3 cm, stout. Seeds light brown, oblong to ellipsoid, 0.7–1 mm. Fl. and fr. Mar-Sep.

Below 100–2700 m. Anhui, Fujian, Guizhou, Hebei, Hubei, Hunan, Jiangsu, Jiangxi, Nei Mongol, Shaanxi, Shanxi, Sichuan, Taiwan, Zhejiang [Japan, Korea].

- 1a. Stem leaf blades ovate 170a. var. *yokusai*
- 1b. Stem leaf blades cordate 170b. var. *cordifolia*

170a. *Gentiana yokusai* var. *yokusai*

灰绿龙胆 (原变种) hui lu long dan (yuan bian zhong)

Gentiana agrorum Harry Smith; *G. tenuissima* Hayata; *G. yokusai* var. *japonica* Burkill.

Stem leaves dark green; leaf blade ovate.

Along streams, wet places, roadsides, edges of cultivated land, wastelands, sunny slopes, scrub, forests; below 100–2700 m. Anhui, Fujian, Guizhou, Hebei, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shanxi, Sichuan, Taiwan, Zhejiang [Japan, Korea].

170b. *Gentiana yokusai* var. *cordifolia* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 42. 1984.

心叶灰绿龙胆 xin ye hui lu long dan

Stem leaves light green; leaf blade cordate.

- Hillsides, valleys; ca. 1000 m. Hebei, Nei Mongol, Shaanxi, Shanxi.

171. *Gentiana sutchuenensis* Franchet in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 136. 1890.

四川龙胆 si chuan long dan

Gentiana decipiens Harry Smith; *G. rigidifolia* Harry Smith.

Annuals 2.5–8 cm tall. Stems erect, branched throughout, usually with 2–5 crowded flowering branches, sparsely papillate. Petiole tube 1–1.5 mm, papillate; leaf blade glabrous, base narrowed to obtuse, margin thick cartilaginous and ciliolate, apex acuminate and aristate with a tip ca. 0.7 mm, midvein prominent. Basal leaves withered at anthesis; leaf blade elliptic to narrowly so, 1.5–4.5 cm × 5–9 mm. Stem leaf blades lanceolate, narrowly elliptic, or ovate, 0.5–2 cm × 2.5–6 mm, narrowed toward stem apex. Pedicel 2–10 mm, sparsely papillate. Calyx obconic, 5–7.5 mm; lobes spreading, lanceolate to ovate-lanceolate, 2–2.5 mm, slightly unequal, base slightly narrowed, margin thick cartilaginous and densely ciliolate, apex acuminate and aristate with a tip ca. 0.7 mm, midvein prominent. Corolla blue to blue-purple, with pale yellow-green base, funnellform, 0.9–1.2 cm; lobes ovate, 2–3 mm, margin entire, apex obtuse; plicae ovate, 1–1.5 mm, margin entire or denticulate, apex obtuse. Stamens inserted at basal part of corolla tube, equal; filaments 2.5–3 mm; anthers ellipsoid, 0.8–1 mm. Style 2–2.5 mm; stigma lobes narrowly oblong. Capsules narrowly obovoid to obovoid, 3.5–5 mm; gynophore to 1.2 cm, stout. Seeds light brown, ellipsoid, 0.7–1 mm. Fl. and fr. Apr-Jul.

- Along streams, river banks, roadsides, grassland slopes, forests; 400–2500 m. S Gansu, Guizhou, S Shaanxi, Sichuan, Yunnan.

172. *Gentiana scabrifilamenta* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 42. 1984.

毛蕊龙胆 mao rui long dan

Annuals 2–5 cm tall. Stems erect, branched from base, densely papillate. Basal leaves with petiole 1–1.5 mm; leaf

blade ovate, 4–7 × 3–5 mm, base obtuse, margin cartilaginous and ciliolate, apex acute, midvein distinct. Stem leaves with petiole tube 1–1.5 mm, abaxially papillate; leaf blade elliptic-lanceolate to elliptic, 5–9 × 1–3 mm, base obtuse, margin cartilaginous and ciliolate, apex acute and apiculate, midvein prominent. Flowers subsessile. Calyx tubular, 8–10 mm, tube membranous; lobes spreading, narrowly triangular, 3–3.5 mm, base not narrowed, margin narrowly membranous, apex acuminate and apiculate, midvein prominent. Corolla blue, with dark blue short lines in throat, tubular, 1.2–1.4 cm; lobes ovate-elliptic, 2–2.5 mm, margin entire, apex obtuse; plicae ovate, 1.5–2 mm, margin 2-cleft or denticulate. Stamens inserted at middle of corolla tube, equal; filaments 1–1.2 mm, scabrous or papillate; anthers ellipsoid, 0.8–1 mm. Ovary narrowly ellipsoid, 2.5–3.5 mm; gynophore 1–1.5 mm. Style 1–1.5 mm; stigma lobes narrowly oblong. Fl. Aug.

- Forests; ca. 4000 m. SE Xizang.

173. *Gentiana simulatrix* C. Marquand, Bull. Misc. Inform. Kew 1937: 190. 1937.

厚边龙胆 hou bian long dan

Annuals 2–6 cm tall. Stems ascending to erect, branched throughout, densely papillate. Basal leaves withered at anthesis; petiole 0.5–1 mm; leaf blade ovate, 6–8 × 3–5 mm, base obtuse, margin thick cartilaginous, apex acute and cuspidate, midvein distinct. Stem leaves crowded to sometimes widely spaced; petiole tube 0.5–1 mm, papillate; leaf blade elliptic to ovate-elliptic, 5–7 × 2–4 mm, base obtuse, margin thick cartilaginous, apex obtuse and cuspidate, midvein distinct. Flowers subsessile. Calyx narrowly obconic, 4.5–7 mm, tube membranous; lobes erect to rarely slightly spreading, ovate, 1.5–3 mm, base narrowed, margin thick cartilaginous, apex acute and cuspidate, midvein prominent. Corolla blue, tubular, 7–8 mm; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae ovate, 1–1.5 mm, margin entire or few dentate, apex obtuse. Stamens inserted at basal part of corolla tube, equal; filaments 1.5–2.5 mm; anthers narrowly ellipsoid, 0.7–0.9 mm. Style 0.7–1 mm; stigma lobes narrowly oblong. Capsules narrowly obovoid to obovoid, 4–5 mm; gynophore 8–9 mm, stout. Seeds light brown, ellipsoid, 0.6–0.8 mm. Fl. and fr. May–Aug.

Grassland slopes; ca. 3000 m. SW Sichuan, SE Xizang [Bhutan].

174. *Gentiana alsinoides* Franchet, Bull. Soc. Bot. France 31: 374. 1884.

繁缕状龙胆 fan lu zhuang long dan

Annuals 3.5–7 cm tall. Stems erect, branched from base, densely papillate. Petiole tube 0.5–1 mm, papillate; leaf blade ovate-lanceolate to ovate-triangular, subleathery, rigid, base obtuse, margin thick cartilaginous and smooth or ciliolate, apex acute and cuspidate, midvein prominent. Basal leaves withered at anthesis; leaf blade 0.9–1.2 cm × 2–4 mm. Stem leaves crowded; leaf blade 2–8 × 1–3 mm. Flowers subsessile. Calyx tubular to narrowly obconic, 4.5–5 mm; tube membranous; spreading, ovate, 1–1.2 mm, base slightly or not narrowed, margin thick cartilaginous and smooth or ciliolate, apex acute and cuspidate, midvein prominent. Corolla pale

blue to blue, tubular, 7–8 mm; lobes ovate-lanceolate, 2–2.5 mm, margin entire, apex obtuse; plicae ovate, 1–1.5 mm, margin erose, apex obtuse. Stamens inserted at basal part of corolla tube, equal; filaments 2–2.5 mm; anthers ellipsoid, 0.6–0.8 mm. Style 1–1.2 mm; stigma lobes narrowly oblong. Capsules narrowly obovoid, 3.5–4 mm; gynophore 1.2–1.5 mm, stout. Seeds brown, ellipsoid, 0.9–1.1 mm. Fl. and fr. Jul–Sep.

- Dry grassland slopes, limestone slopes; 2700–3400 m. W Sichuan, NW Yunnan.

175. *Gentiana nyingchiensis* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 31. 1984.

林芝龙胆 lin zhi long dan

Annuals 2–3 cm tall. Stems ascending, much branched from base, densely papillate. Basal leaves withered at anthesis; petiole 1–2 mm, membranous, densely papillate; leaf blade ovate-elliptic, 4–6 × 2.5–3 mm, densely pubescent especially adaxially, base narrowed, margin densely ciliolate, apex acute and cuspidate, veins indistinct. Stem leaves crowded to widely spaced, reflexed to recurved; petiole tube 0.5–1 mm, papillate; leaf blade deltate-spatulate, 3–4.5 × 1–1.5 mm, densely pubescent especially adaxially, base narrowed, margin densely ciliolate, apex deltate acute and cuspidate, veins indistinct or only midvein adaxially distinct. Pedicel 1.5–2.5 mm, densely papillate. Calyx obconic, 3.5–4.5 mm, tube membranous; lobes recurved, ovate, 1–1.3 mm, densely pubescent especially outside, base narrowed, margin densely ciliolate, apex deltate acute, veins indistinct or only midvein distinct outside. Corolla pale blue, with pale yellow-green base and blue-gray throat, tubular, 5.5–6 mm; lobes semiorbicular, 0.9–1.1 mm, margin entire, apex rounded and mucronate; plicae ovate-orbicular, 0.7–1 mm, margin denticulate, apex rounded. Stamens inserted at middle of corolla tube, equal; filaments 1.2–1.5 mm; anthers ellipsoid, 0.5–0.7 mm. Style 0.7–1 mm; stigma lobes linear. Capsules narrowly obovoid to obovoid, 3.5–4 mm; gynophore to 6 mm, stout. Seeds brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jul–Sep.

- Scrub, cliffs; 4300–4500 m. SE Xizang.

176. *Gentiana mailingensis* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 30. 1984.

米林龙胆 mi lin long dan

Annuals 2–5 cm tall. Stems ascending, much branched from base, basally glabrous, apically sparsely papillate. Basal leaves withered at anthesis; petiole 0.8–1 mm, glabrous; leaf blade elliptic to ovate-elliptic, 5–6 × 2–3.5 mm, glabrous, base narrowed, margin indistinctly cartilaginous and densely ciliolate, apex acute and cuspidate, midvein indistinct. Stem leaves widely spaced, flat; petiole longer than leaf blade, papillate, petiole tube 0.7–1.5 mm; leaf blade spatulate to orbicular-spatulate, 4–6 × 1.5–2.5 mm, shorter to longer than internodes, abaxially glabrous, adaxially glabrous or papillate, base narrowed, margin densely ciliolate, apex rounded and mucronate, veins indistinct. Pedicel 2–15 mm, sparsely papillate. Calyx obconic, 5–7 mm, tube membranous; lobes recurved, suborbicular, 1.5–2 mm, papillate, base narrowed,

margin densely ciliolate, apex rounded and mucronate, veins indistinct. Corolla blue, with pale yellow-green base and blue-gray throat, tubular, 7–9 mm; lobes ovate-orbicular, 1–1.2 mm, margin entire, apex rounded and mucronate; plicae ovate, 0.8–1 mm, margin denticulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 2.5–3 mm; anthers ellipsoid, 0.5–0.7 mm. Style 1–1.5 mm; stigma lobes oblong. Capsules narrowly obovoid, 3.5–5 mm; gynophore 1.3–2 cm, slender. Seeds light brown, ellipsoid, 1–1.4 mm. Fl. and fr. Jul-Aug.

- Alpine meadows, scrub meadows; 3900–4500 m. SE Xizang.

177. *Gentiana crassuloides* Bureau & Franchet, J. Bot. (Morot) 5: 104. 1891.

肾叶龙胆 shen ye long dan

Annuals 3–6 cm tall. Stems ascending, much branched from base, densely papillate. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate-lanceolate, ovate-elliptic, or ovate, 3–10 × 1.5–6 mm, base rounded, margin thick cartilaginous, apex acute and cuspidate, midvein prominent. Stem leaves widely spaced, shorter than internodes; petiole tube 0.5–1 mm, papillate; leaf blade base rounded, margin thick cartilaginous, midvein prominent; lower to middle stem leaf blades ovate-triangular, 1.5–3 × 1.5–3.5 mm, apex acute and cuspidate with a recurved tip; upper leaf blades reniform, 1.5–4 × 2–4.5 mm, apex rounded to truncate and mucronate with a recurved tip. Pedicel 1.5–3 mm, densely papillate. Calyx tubular, 5–12 mm; tube membranous; lobes recurved, or rarely erect, obovate to reniform, 1.2–1.5 × 1.5–2 mm, base rounded to cordate and contracted, margin thick cartilaginous, apex rounded to truncate and mucronate with a recurved tip, midvein prominent. Corolla blue to blue-purple, with pale yellow-green base, tubular to tubular-salverform, 0.9–2.1 cm, 1.5–5 mm in diam. at throat; lobes ovate, 1.5–2.5 mm, margin entire, apex obtuse to rounded; plicae broadly ovate, 1–1.5 mm, margin erose, apex obtuse. Stamens inserted just above to middle of corolla tube, equal; filaments 1.2–4 mm; anthers narrowly ellipsoid, 1–1.2 mm. Style 1.5–3.5 mm; stigma lobes narrowly elliptic. Capsules narrowly obovoid to obovoid, 3.5–5 mm; gynophore to 1.8 cm, stout. Seeds light brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jun-Sep.

Stream and river banks, grassland slopes, bogs, scrub, forests; 2700–4500 m. S Gansu, W Hubei, SE Qinghai, W Sichuan, S and SE Xizang, NW Yunnan [Bhutan, NW India, Nepal, Sikkim].

178. *Gentiana crassula* Harry Smith, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 104. 1926.

景天叶龙胆 jing tian ye long dan

Annuals 4–10 cm tall. Stems ascending, mostly branched from base, sparsely papillate. Basal leaves poorly developed, withered at anthesis; petiole 1–1.5 mm, densely papillate; leaf blade ovate, 5–7 × 3–3.5 mm, base narrowed, margin cartilaginous and ciliolate, apex acute and cuspidate, midvein prominent. Stem leaves widely spaced, recurved; petiole tube 1–1.5 mm, papillate; leaf blade spatulate to obovate, 3–6 × 1.5–2 mm, shorter than internodes, fleshy, base narrowed, margin cartilaginous and ciliolate, apex rounded and

mucronate, midvein prominent. Flowers subsessile. Calyx 0.7–1.3 cm, narrowly obconic; lobes recurved, ovate-orbicular, 2.5–4 mm, base rounded and contracted, margin cartilaginous and ciliolate, apex rounded and mucronate, midvein prominent. Corolla blue-purple, tubular, 1.2–1.5 cm; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae ovate, 1–1.2 mm, margin entire or 2-cleft, apex obtuse. Stamens inserted at middle of corolla tube, slightly unequal; filaments 1.2–2.5 mm; anthers ellipsoid, 0.5–0.7 mm. Style 1–1.5 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 6–8 mm; gynophore 0.5–2.2 cm, stout. Seeds light brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jul-Aug.

- Grassland slopes; 3400–4200 m. Sichuan, NW Yunnan.

179. *Gentiana curviphylla* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 27. 1984.

弯叶龙胆 wan ye long dan

Annuals 3–7 cm tall. Stems ascending, branched from base or rarely basally simple and branched from middle, densely papillate. Basal leaves poorly developed, withered at anthesis; petiole 1–1.5 mm, densely papillate; leaf blade narrowly triangular to ovate-lanceolate, 4–6 × 1.5–2.5 mm, base narrowed, margin thick cartilaginous and smooth, apex deltate acute and cuspidate, midvein prominent. Stem leaves usually widely spaced, recurved; petiole tube 0.5–1 mm, membranous with 3 green herbaceous veins, papillate; leaf blade spatulate, 3–4 × 1.5–2 mm, usually shorter than internodes, base rounded, margin thick cartilaginous and smooth, apex acute and apiculate, midvein prominent. Flowers subsessile. Calyx obconic, 4.5–6 mm; tube membranous, with 15 green veins; lobes recurved, ovate-deltate, 1.4–1.6 mm, herbaceous, base distinctly narrowed, margin thick cartilaginous and smooth or ciliolate, apex deltate acute and cuspidate, midvein prominent. Corolla blue to blue-purple, with pale yellow-green base, tubular to salverform, 1–1.2 cm, 4–6 mm in diam. at throat, inside minutely papillate; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae ovate, 1–1.5 mm, slightly asymmetric, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 2.5–3 mm; anthers narrowly ellipsoid, 0.7–1 mm. Style 2–2.5 mm; stigma lobes narrowly oblong. Capsules narrowly obovoid, 3.5–4.5 mm; gynophore to 8 mm. Seeds dark brown, triquetrous, 1–1.2 mm. Fl. and fr. Jun-Aug.

- Grassland slopes, clearings in forests; 2800–4300 m. W Sichuan, Yunnan.

180. *Gentiana bryoides* Burkill, J. Proc. Asiat. Soc. Bengal 2: 316. 1906.

卵萼龙胆 luan e long dan

Gentiana stylosa Biswas.

Annuals 2–5 cm tall. Stems ascending to erect, 2 to few branched from base, sparsely papillate. Basal leaves withered at anthesis; petiole 1–1.5 mm, margin ciliolate or sometimes papillate; leaf blade ovate to ovate-orbicular, 5–7 × 3–4.5 mm, base narrowed, margin thick cartilaginous and smooth

or ciliolate, apex acute to obtuse and mucronate, veins 1–3, distinct, and slender. Stem leaves crowded to spreading; petiole tube 0.5–1 mm, margin ciliolate, abaxially glabrous or sometimes papillate; leaf blade obovate, 3–4.5 × 1–1.5 mm, shorter to longer than internodes, base narrowed, margin thick cartilaginous and smooth or ciliolate, apex rounded and mucronate, midvein distinct. Flowers subsessile or on pedicels to 1.2 cm, sparsely papillate. Calyx obconic, 5–6 mm; lobes recurved to rarely erect, ovate to ovate-orbicular, 1.5–2 mm, base slightly narrowed, margin cartilaginous and smooth or sparsely ciliolate, apex acute to rounded and cuspidate, midvein prominent. Corolla pale blue, with short dark blue lines in throat, tubular to narrowly obconic, 9–10 mm; lobes ovate, 2–2.5 mm, margin entire, apex obtuse and mucronate; plicae broadly ovate, 1–1.3 mm, margin entire or crenulate, apex obtuse. Stamens inserted just below middle of corolla tube, equal; filaments 2.5–3 mm, linear-subulate; anthers narrowly ellipsoid, 0.8–1 mm. Style 1.2–1.5 mm; stigma lobes narrowly oblong. Capsules narrowly obovoid, 3–5 mm; gynophore 1.5–1.8 cm, slender. Seeds brown, ovoid, 0.8–1 mm. Fl. and fr. May–Jun.

Alpine meadows, forests; 3800–4500 m. S and SE Xizang [Bhutan, Nepal, Sikkim].

181. *Gentiana ludingensis* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 29. 1984.

泸定龙胆 lu ding long dan

Annuals 3–6 cm tall. Stems ascending, branched throughout, papillate. Basal leaves withered at anthesis; petiole 1–2 mm, densely papillate; leaf blade narrowly elliptic to elliptic, 1.5–3 cm × 4–6 mm, base narrowed, margin cartilaginous and ciliolate, apex obtuse and cuspidate, midvein distinct. Stem leaves widely spaced; petiole tube 1–1.5 mm, papillate; leaf blade oblanceolate to spatulate, 6–9 × 1–2.2 mm, shorter than internodes, base narrowed, margin cartilaginous and ciliolate, apex rounded and mucronate, midvein distinct. Flowers subsessile. Calyx obconic, 5–6 mm, tube membranous; lobes recurved, ovate-elliptic to ovate, 1.5–1.8 mm, outside minutely papillate, base rounded and contracted, margin cartilaginous and ciliolate, apex acute and cuspidate, midvein prominent. Corolla pale blue, with short dark blue lines in throat, tubular, 7–8 mm; lobes ovate, 1.8–2 mm, margin entire, apex obtuse and mucronate; plicae ovate, 1–1.2 mm, margin entire, apex obtuse. Stamens inserted just below middle of corolla tube, equal; filaments 2–2.5 mm; anthers ellipsoid, 0.5–0.8 mm. Style 1–1.5 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 3.5–4.5 mm; gynophore to 9 mm. Seeds light brown, ellipsoid, 0.6–1 mm. Fl. and fr. Mar–Jun.

• River banks, roadsides, grassland slopes, wastelands, scrub, forests; 2300–3000 m. W Sichuan.

182. *Gentiana squarrosa* Ledebour, Mém. Acad. Imp. Sci. Saint-Petersbourg, Sér. 6, Sci. Math., Second Pt. Sci. Nat. 5: 520. 1812.

鳞叶龙胆 lin ye long dan

Annuals 2–8 cm tall. Stems ascending, branched throughout, densely papillate. Basal leaves withered at anthesis; petiole 1–2 mm, densely papillate; leaf blade ovate-elliptic, ovate, or ovate-orbicular, 6–10 × 5–9 mm, base narrowed, margin thick cartilaginous and ciliolate, apex obtuse and cuspidate, midvein distinct. Stem leaves recurved; petiole tube 0.5–1 mm, papillate; leaf blade spatulate to obovate, 4–7 × 1.5–3 mm, shorter to longer than internodes, base narrowed, margin thick cartilaginous and densely ciliolate, apex rounded and mucronate, midvein distinct. Pedicel 2–8 mm, densely papillate. Calyx obconic, 5–8 mm, tube outside sometimes densely papillate; lobes recurved, ovate to ovate-orbicular, 1.5–2 mm, base narrowed, margin thick cartilaginous and densely ciliolate, apex acute, midvein prominent. Corolla blue, tubular to funnelliform, 7–10 mm, scarcely exerted from calyx; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae ovate, 1–1.2 mm, margin entire or denticulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 2–2.5 mm; anthers ellipsoid, 0.7–1 mm. Style 1–1.5 mm; stigma lobes broadly oblong or semiorbicular. Capsules narrowly obovoid to obovoid, 3.5–5.5 mm; gynophore to 8 mm, stout. Seeds dark brown, ellipsoid, 0.8–1 mm. Fl. and fr. Apr–Sep.

River banks, roadsides, valleys, wastelands, steppes, scrub, alpine meadows; 100–4200 m. Hebei, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi [NW India, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Nepal, Pakistan, E Russia].

183. *Gentiana pseudosquarrosa* Harry Smith in Handel-Mazzetti, Symb. Sin. 7: 963. 1936.

假鳞叶龙胆 jia lin ye long dan

Annuals 3–6 cm tall. Stems ascending, branched throughout, densely papillate. Basal leaves withered at anthesis; petiole 1–2 mm, densely papillate; leaf blade ovate-lanceolate, ovate-elliptic, or ovate, 0.6–1.5 cm × 4–6 mm, base narrowed, margin thick cartilaginous and densely ciliolate, apex obtuse and cuspidate, midvein distinct. Stem leaves widely spaced, recurved; petiole tube 0.7–1.5 mm, papillate; leaf blade spatulate to obovate, 3–7 × 1.5–2.2 mm, shorter than internodes, base narrowed, margin thick cartilaginous and densely ciliolate, apex rounded and mucronate, midvein distinct. Pedicel 2–6 mm, densely papillate. Calyx obconic, 4–6 mm, tube sometimes densely papillate outside; lobes recurved, ovate to ovate-orbicular, 1.5–2 mm, base narrowed, margin thick cartilaginous and densely ciliolate, apex acute, midvein prominent. Corolla dark blue, tubular to funnelliform, 1–1.2 cm; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae ovate, 1.5–2 mm, margin entire or 2-cleft, apex obtuse. Stamens inserted just below middle of corolla tube, equal; filaments 3–3.5 mm; anthers ellipsoid, 0.7–1 mm. Style 2–2.2 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 3–4 mm; gynophore to 1.2 cm, stout. Seeds light brown, ellipsoid to ovoid-ellipsoid, 0.5–1 mm. Fl. and fr. Apr–Sep.

• Grassland slopes, alpine meadows, scrub; 1400–3800 m. SW Qinghai, W Sichuan, SE Xizang, NW Yunnan.

184. *Gentiana prainii* Burkill, J. Proc. Asiat. Soc. Bengal 2: 317. 1906.

柔软龙胆 rou ruan long dan

Gentiana gracilentia T. N. Ho.

Annuals 4–10 cm tall. Stems prostrate to ascending, weak, 1 or 2 × dichotomously branched from base, glabrous. Leaf blade papery, glabrous, apex obtuse, veins indistinct. Basal leaves withered at anthesis; petiole 0.5–1 mm; leaf blade elliptic, 1.5–5 × 1.2–3 mm. Stem leaves widely spaced; petiole 0.5–0.7 mm, entirely connate; leaf blade ovate to cordate, 4–6 × 2–3 mm, shorter than internodes. Flowers few. Pedicel 0.5–1.5 cm, glabrous. Calyx campanulate, 2–2.5 mm; lobes triangular-subulate, 0.8–1 mm, margin narrowly membranous, apex acute, midvein indistinct. Corolla outside pale blue-gray, inside pale yellow-white, campanulate, 5–6 mm, to 9 mm in fruit; lobes obliquely ovate, 1.2–4.5 mm, margin entire, apex obtuse; plicae extremely oblique, auricular, attached to right side of each lobe, 0.3–0.4 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 1.5–2.5 mm; anthers ellipsoid, ca. 0.3 mm. Style short but distinct, only ca. 0.3 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 3.5–4.5 mm, apex rounded, 3- or 4-seeded; gynophore to 1.5 cm, stout. Seeds dark brown, ellipsoid, 1.3–1.4 mm. Fl. and fr. Sep.

Steep open grassy hillsides; 3800–4500 m. S Xizang [Bhutan, Sikkim].

185. *Gentiana hirsuta* Ma & E. W. Ma ex T. N. Ho, Acta Biol. Plateau Sin. 3(3): 38. 1984.

硬毛龙胆 ying mao long dan

Annuals 3–8 cm tall. Stems purple, ascending to erect, weak, branched from base, glabrous. Leaf blade sparsely hirsute, margin long ciliate, apex obtuse, veins indistinct. Basal leaves withered at anthesis; petiole 0.5–1 mm; leaf blade ovate to ovate-orbicular, 5–6 × 3–3.5 mm. Stem leaves spreading to recurved; petiole 1.5–2 mm, entirely connate, purple hirsute; leaf blade ovate to ovate-triangular, 2.5–3 × 1.5–2 mm, much shorter than internodes. Flowers few. Pedicel purple, 6–12 mm, glabrous. Calyx narrowly obconic, 3.5–4 mm, outside sparsely hirsute; lobes spreading to recurved, lanceolate, 2–2.5 mm, sparsely hirsute, base narrowed, margin long ciliate, midvein indistinct, apex obtuse. Corolla pale blue-purple, with blackish lines in throat, funnelform, 8–10 mm; lobes ovate, 1.2–1.5 mm, margin denticulate, apex obtuse; plicae broadly ovate, 0.9–1.1 mm, margin entire or 2-cleft, apex obtuse. Stamens inserted at apical part of corolla tube, equal; filaments 1.2–1.4 mm; anthers ellipsoid, 0.8–1 mm. Style 1–1.5 mm; stigma lobes oblong. Capsules narrowly obovoid, 4–4.5 mm; gynophore to 6 mm, stout. Seeds brown, narrowly ellipsoid, 1–1.2 mm. Fl. and fr. Aug.

• Grassland slopes; ca. 2900 m. W Sichuan.

186. *Gentiana pluviarum* W. W. Smith subsp. *subtilis* (Harry Smith) T. N. Ho, Novon 4: 371. 1994.

纤细龙胆 xian xi long dan

Gentiana subtilis Harry Smith, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 103. 1926.

Annuals 2–4.5 cm tall. Stems prostrate to ascending, weak, branched from base, glabrous. Basal leaves withered at anthesis; petiole 1–1.2 mm; leaf blade spatulate, 2.5–6 × 1–2 mm, glabrous, margin cartilaginous, apex acute, veins 1–3. Stem leaves widely spaced, recurved; petiole 0.5–1 mm, entirely connate; leaf blade spatulate to elliptic 1–2.2 × 0.6–1 mm, shorter than internodes, apex obtuse, midvein indistinct. Flowers few to many. Pedicel 0.5–1 mm, surrounded by upper leaves, glabrous. Calyx campanulate, 3–3.5 mm; lobes spreading to recurved, lanceolate to elliptic, 1.2–1.5 mm, apex acute and apiculate, midvein indistinct. Corolla white, with (4 or) 5 large blackish spots in throat, tubular, 4–5 mm; lobes ovate, 0.4–0.6 mm, margin entire, apex obtuse; plicae ovate, 0.3–0.5 mm, margin entire, apex acute. Stamens inserted at basal part of corolla tube, equal; filaments 0.7–1 mm; anthers ellipsoid, 0.3–0.4 mm. Style 0.3–0.4 mm; stigma lobes ellipsoid. Capsules narrowly obovoid, 2–3 mm; gynophore 3–5 mm. Seeds brown, ellipsoid, 0.8–1 mm.

• Grassland slopes; 3700–4200 m. NW Yunnan.

Gentiana pluviarum subsp. *pluviarum* occurs in NW India, Nepal, and Sikkim and has linear leaves and calyx lobes.

187. *Gentiana xanthonanos* Harry Smith, Notes Roy. Bot. Gard. Edinburgh 26: 253. 1965.

小黄花龙胆 xiao huang hua long dan

Annuals 2–3 cm tall. Stems erect, branched from base, with short crowded branches. Leaf blade puberulent, margin narrowly cartilaginous and ciliate, apex obtuse to rounded, midvein distinct. Basal leaves withered at anthesis; petiole 0.5–1 mm; leaf blade oblanceolate to spatulate, 5–7 × 3–4 mm. Stem leaves crowded; petiole 0.3–0.5 mm, entirely connate; leaf blade spatulate to obovate, 4–5 × 2–3 mm. Flowers few to many, sessile. Calyx tubular, 4–5 mm, outside puberulent; lobes ovate-lanceolate, 2–2.5 mm, margin narrow, membranous, and ciliate, apex acute and caudate, midvein distinct. Corolla greenish yellow or inside sometimes pale blue, tubular, 8–10 mm; lobes ovate-lanceolate, 2–2.5 mm, apex acuminate and caudate; plicae suborbicular, 0.9–1.1 mm, margin entire, apex rounded. Stamens inserted at middle of corolla tube, equal; filaments 1.4–1.6 mm; anthers ellipsoid, 0.8–1 mm. Style 0.8–1 mm; stigma lobes oblong. Capsules obovoid, 4–4.5 mm; gynophore to 1 cm. Seeds light brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jun.

• Hillsides, forests; 2100–2400 m. NW Yunnan.

188. *Gentiana parvula* Harry Smith in Handel-Mazzetti, Symb. Sin. 7: 961. 1936.

小龙胆 xiao long dan

Annuals 1.5–2.5 cm tall. Stems erect, 2 or 3 × branched from base or simple. Leaf blade puberulent, margin narrowly cartilaginous, apex rounded; veins 1–3, abaxially distinct. Basal leaves withered at anthesis; petiole 0.5–1 mm; leaf blade broadly elliptic to suborbicular, 0.7–2.2 cm × 4–8 mm. Stem leaves crowded, 3 or 4 pairs; petiole 1–1.5 mm, entirely connate; leaf blade elliptic to ovate, 5–8 × 3–5 mm. Flowers

few, sessile. Calyx tubular, 8–9 mm, outside puberulent; lobes ovate-lanceolate, 2–2.5 mm, margin narrowly cartilaginous, apex acute and caudate, midvein distinct. Corolla greenish yellow or inside sometimes pale blue, tubular, 1.2–1.4 cm; lobes ovate-lanceolate, 2–3 mm, margin entire, apex acute and caudate; plicae ovate, 1.5–2.5 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, unequal; filaments 1.5–3 mm; anthers narrowly ellipsoid, 1.2–1.5 mm. Style 2–3 mm; stigma lobes linear. Capsules narrowly obovoid to obovoid, 6–9 mm; gynophore to 8 mm, stout. Seeds brown, ellipsoid, (1.2–)1.5–1.8 mm. Fl. and fr. Apr–Aug.

- Sandy places; ca. 3300 m. SW Sichuan.

189. *Gentiana pubiflora* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 36. 1984.

毛花龙胆 mao hua long dan

Annuals 3–5 cm tall. Stems erect, short branched from base, densely hirsute. Basal leaves withered at anthesis; petiole 0.5–1 mm; leaf blade ovate-orbicular, 7–12 × 5.5–9 mm, abaxially hirsute and glabrescent, adaxially glabrous, margin strongly ciliate, apex rounded, veins 1–3. Stem leaves crowded to widely spaced, shorter than internodes; petiole 0.5–0.7 mm, entirely connate, densely hirsute; leaf blade broadly ovate to ovate-orbicular, 5–8 × 4–6 mm, abaxially hirsute and glabrescent, adaxially glabrous, margin strongly ciliate, apex rounded and caudate, midvein distinct. Flowers few to many. Pedicel purple, 2–4 mm, surrounded by upper leaves, densely hirsute. Calyx tubular, 1–1.2 cm, outside hirsute; lobes ovate-lanceolate, 3–3.5 mm, margin strongly ciliate and sometimes narrowly membranous, apex acuminate and caudate, midvein distinct. Corolla greenish yellow or inside sometimes pale blue, tubular, 1.8–2.1 cm, outside puberulent and glabrescent; lobes ovate-lanceolate, 4–4.5 mm, margin entire, apex acute and caudate; plicae broadly ovate, 1.2–1.5 mm, margin entire or denticulate, apex rounded. Stamens inserted at middle of corolla tube, unequal; filaments 3.5–6.5 mm; anthers ellipsoid, 1–1.2 mm. Style 1–1.5 mm; stigma lobes oblong. Capsules narrowly ellipsoid, 7–8 mm; gynophore ca. 4 mm. Seeds brown, triquetrous-ellipsoid, 1–1.2 mm. Fl. and fr. Apr–May.

- Scrub, forests; 2600–3300 m. NW Yunnan.

190. *Gentiana pubigera* C. Marquand, Bull. Misc. Inform. Kew 1928: 59. 1928.

柔毛龙胆 rou mao long dan

Gentiana puberula Franchet (1890), not Michaux (1803).

Annuals 2–3.5 cm tall. Stems erect, much branched from base, with short branches, glabrous. Leaf blade spatulate to obovate, hirsute and glabrescent, margin long ciliate, apex rounded, veins 1–3. Basal leaves withered at anthesis; petiole 0.5–1 mm; leaf blade 0.9–1.2 cm × 4.5–8 mm. Stem leaves crowded; petiole 0.5–0.7 mm, entirely connate, hirsute; leaf blade 4–6 × 1.7–3.5 mm, as long as or longer than internodes. Flowers few to many. Pedicel 2–4 mm, surrounded by upper leaves, glabrous. Calyx tubular to narrowly obconic, 7.5–11 mm, outside hirsute and glabrescent; lobes ovate-lanceolate,

2–2.5 mm, margin long ciliate, apex acuminate and caudate, midvein distinct. Corolla greenish yellow or inside sometimes pale blue, tubular, ca. 1.4 cm, glabrous; lobes ovate-lanceolate, 1.5–2.5 mm, margin entire, apex acute and caudate; plicae broadly ovate, 1.2–1.5 mm, margin entire or erose, apex rounded. Stamens inserted at middle of corolla tube, unequal; filaments 2.5–6 mm; anthers ellipsoid, 0.8–1 mm. Style 1.5–2 mm; stigma lobes narrowly oblong. Capsules obovoid, 8–9 mm; gynophore to 1.3 cm. Seeds light brown, ellipsoid, 1.2–1.5 mm. Fl. and fr. May.

- Grassland slopes; 2400–3800 m. NW Yunnan.

191. *Gentiana ninglangensis* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 37. 1984.

宁蒭龙胆 ning lang long dan

Annuals 2–3.5 cm tall; leaves and calyces densely puberulent or glabrescent. Stems erect, branched from base, with short branches, glabrous. Basal and lower stem leaves with petiole 0.5–1 mm; leaf blade spatulate to obovate, 0.5–2 cm × 3.5–5.5 mm, abaxially hirsute and glabrescent, adaxially glabrous, margin strongly ciliate, apex acute to rounded, veins 1–3. Middle to upper stem leaves with petiole 1–1.5 mm, entirely connate, hirsute and glabrescent; leaf blade linear-lanceolate to elliptic, 6–10 × 1.5–2.5 mm, abaxially hirsute and glabrescent, adaxially glabrous, apex acuminate. Flowers few to many. Pedicel 3–5 mm, surrounded by upper leaves, glabrous. Calyx tubular, 6.5–9 mm, outside hirsute and glabrescent; lobes ovate-lanceolate, 3–4 mm, margin long ciliate, apex acuminate and caudate, midvein distinct. Corolla greenish yellow or inside sometimes pale blue, tubular, 1.4–1.6 cm, glabrous; lobes ovate-lanceolate, 2–3 mm, margin entire, apex acute and caudate; plicae ovate-orbicular, 1.2–1.5 mm, margin entire or indistinctly denticulate, apex rounded. Stamens inserted at middle of corolla tube, unequal; filaments 3.5–6.5 mm; anthers narrowly ellipsoid, 1.2–1.5 mm. Style 1.2–1.5 mm; stigma lobes narrowly oblong. Capsules narrowly obovoid, 5–6.5 mm; gynophore to 1 cm. Seeds brown, ellipsoid, 1.2–1.5 mm. Fl. and fr. May.

- 2400–3300 m. S Sichuan, NW Yunnan.

- 1a. Leaves and calyces densely puberulent 191a. var. *ninglangensis*
- 1b. Leaves and calyces glabrescent 191b. var. *glabrescens*

191a. *Gentiana ninglangensis* var. *ninglangensis*

宁蒭龙胆 (原变种) ning lang long dan (yuan bian zhong)

Leaves and calyces densely puberulent.

- Wet meadows; 2500–3000 m. NW Yunnan.

191b. *Gentiana ninglangensis* var. *glabrescens* (Harry Smith) T. N. Ho, Novon 4: 371. 1994.

脱毛龙胆 tuo mao long dan

Gentiana pubigera C. Marquand var. *glabrescens* Harry Smith in Handel-Mazzetti, Symb. Sin. 7: 961. 1936.

Leaves and calyces glabrescent.

- Hillsides; 2400–3300 m. S Sichuan.

192. *Gentiana licentii* Harry Smith, Bull. Misc. Inform. Kew 1937: 132. 1937.

苞叶龙胆 bao ye long dan

Annuals 3–5 cm tall. Stems ascending, few branched from base, papillate. Basal leaves with petiole 1–2 mm; leaf blade involucrifoliate, ovate-orbicular, 1.2–2.4 × 0.9–1.6 cm, margin cartilaginous and ciliolate, apex rounded and mucronate, veins 1–3. Stem leaves 2–4 pairs, widely spaced; petiole 1.5–2 mm, entirely connate; leaf blade 5–8 × 1–3.5 mm, shorter than internodes, apex obtuse, vein 1. Lower stem leaf blades spatulate, margin narrowly cartilaginous and ciliolate; upper leaf blades elliptic, margin narrowly membranous and smooth or ciliolate. Flowers few. Pedicel 7–10 mm, papillate. Calyx narrowly obconic, 7–8 mm; lobes triangular, 1.2–1.5 mm, margin narrowly membranous, apex acute and apiculate, midvein distinct. Corolla blue, outside tinged pale yellow-green, funnellform, 1.5–1.7 cm; lobes ovate-orbicular, 2–2.5 mm, margin entire, apex rounded and mucronate; plicae triangular, 1.5–2 mm, margin entire or 2-cleft. Stamens inserted at middle of corolla tube, equal; filaments 2.5–3 mm; anthers ellipsoid, 1–1.2 mm. Style 1–1.5 mm; stigma lobes oblong. Capsules obovoid, 6–8 mm; gynophore to 3.5 cm. Seeds light brown, triquetrous, 1.2–1.4 mm.

- Slopes. SE Gansu.

193. *Gentiana macrauchena* C. Marquand, Bull. Misc. Inform. Kew 1931: 85. 1931.

大颈龙胆 da jing long dan

Gentiana incompta Harry Smith.

Annuals 3–7 cm tall. Stems dark brown, ascending to erect, stout, much branched from base, glabrous. Basal leaves withered at anthesis; petiole 1–2 mm, glabrous; leaf blade involucrifoliate, ovate to ovate-orbicular, 8–10 × 5–7 mm, margin cartilaginous and smooth, apex obtuse to rounded and mucronate, midvein distinct. Stem leaves 2–4 pairs, widely spaced; petiole 1.5–2 mm, entirely connate, membranous; leaf blade lanceolate to oblong, 4.5–6 × 1.5–2 mm, shorter than internodes, margin broadly membranous, apex obtuse, midvein distinct. Flowers few. Pedicel 2–4 mm, stout, to 1.2 cm in fruit. Calyx narrowly obconic, 8–11 mm; lobes broadly triangular, 2.5–3 mm, margin membranous, apex acute, midvein distinct. Corolla blue, tubular, 1.3–1.5 cm; lobes ovate, 2–3 mm, margin entire, apex obtuse; plicae ovate, 1–1.5 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 2–3 mm; anthers ellipsoid, 1.3–1.5 mm. Capsules obovoid, 4.5–5.5 mm; gynophore to 5 cm, stout. Seeds brown, triquetrous-ellipsoid, 0.8–1 mm. Fl. and fr. Apr-Jul.

- Roadside and grassland slopes, valleys, scrub, forests; 800–2800 m. W Hubei, S Shaanxi, E Sichuan, SE Xizang.

194. *Gentiana thunbergii* (G. Don) Grisebach in A. de Candolle, Prodr. 9: 108. 1845.

丛生龙胆 cong sheng long dan

Annuals or biennials 5–15 cm tall. Stems ascending to erect, few branched from base, glabrous. Basal leaves withered at anthesis; petiole 1–2 mm, glabrous; leaf blade involucrifoliate, ovate-elliptic, ovate, or rarely obovate-oblong, 1–3 × 0.7–2.2 cm, margin cartilaginous and smooth, apex acuminate to rarely rounded, midvein distinct. Stem leaves 3–5 pairs, widely spaced; petiole 1.5–2 mm, entirely connate, glabrous; leaf blade lanceolate to oblong, 6–8 × 1–4.5 mm, shorter than internodes, margin of lower stem leaves narrowly cartilaginous, that of upper stem leaves broadly membranous, apex obtuse, vein 1. Flowers few. Pedicel 2–4 mm, sometimes to 1.2 cm in fruit, glabrous. Calyx narrowly obconic, (6–)8–9 mm; lobes narrowly triangular, 2.5–3 mm, margin membranous, apex acuminate, midvein distinct. Corolla blue, funnellform, (1.2–)1.5–2 cm; lobes ovate, 2–3 mm, margin entire, apex obtuse; plicae broadly oblong, 1–1.5 mm, margin entire or denticulate, apex rounded. Stamens inserted at middle of corolla tube, equal; filaments 2–2.5 mm; anthers ellipsoid, 1.2–1.5 mm. Style 2–2.5 mm; stigma lobes linear-oblong. Capsules narrowly obovoid, 6–8 mm; gynophore to 2.8 cm. Seeds brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jul-Sep.

1300–1800 m. Guangdong, Guangxi, Heilongjiang, Hunan, Jiangxi, Jilin, Liaoning, Shanxi [Japan, Korea].

- 1a. Corolla 1.5–2 cm 194a. var. *thunbergii*
- 1b. Corolla ca. 1.2 cm 194b. var. *minor*

194a. *Gentiana thunbergii* var. *thunbergii*

丛生龙胆 (原变种) cong sheng long dan (yuan bian zhong)

Ericala thunbergii G. Don, Gen. Hist. 4: 192. 1837;
Gentiana japonica Maximowicz.

Plants medium sized. Corolla 1.5–2 cm.

Hillsides; 1300–1800 m. Guangdong, Guangxi, Hunan, Jiangxi, Jilin, Shanxi [Japan, Korea].

194b. *Gentiana thunbergii* var. *minor* Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg 12: 758. 1888.

小丛生龙胆 xiao cong sheng long dan

Plants small. Corolla ca. 1.2 cm.

Heilongjiang, Jilin, Liaoning [Japan].

195. *Gentiana bella* Franchet in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 124. 1890.

秀丽龙胆 xiu li long dan

Annuals 2–6 cm tall. Stems ascending, branched from base, glabrous. Basal leaves in rosette or withered at anthesis; petiole 1–2 mm; leaf blade ovate-orbicular, 1.2–3 cm × 7–10 mm, margin cartilaginous and smooth, apex rounded with a recurved tip, veins 3–5, distinct, and slender. Stem leaves 2 or 3 pairs, widely spaced; petiole tube 1.5–2 mm; leaf blade

spatulate to obovate, 4.5–6 × 2–3 mm, shorter to slightly longer than internodes, margin of upper leaves indistinctly membranous, apex obtuse to rounded with a recurved tip, midvein indistinct. Flowers few. Pedicel 3–4(–20) mm, glabrous. Calyx narrowly obconic, 6–7 mm; lobes narrowly triangular, 2–2.5 mm, margin narrowly membranous, apex acute, midvein distinct. Corolla blue-purple, with blackish stripes and spots in throat, funnellform, (1.3–)1.4–2 cm; lobes ovate, 2.5–3 mm, margin entire, apex obtuse; plicae ovate, 2–2.5 mm, margin entire or denticulate, apex obtuse. Stamens inserted just below middle of corolla tube, unequal; filaments 4–5 mm; anthers ellipsoid, 0.8–1 mm. Style 2.5–3 mm; stigma lobes linear. Capsules narrowly obovoid, 6–8 mm; gynophore to 5 mm, stout. Seeds dark brown, ellipsoid, 0.9–1.1 mm. Fl. and fr. Jun–Aug.

Grassland slopes, alpine meadows, forests; 3000–4100 m. NW Yunnan [N Myanmar].

196. *Gentiana forrestii* C. Marquand, Bull. Misc. Inform. Kew 1928: 52. 1928.

苍白龙胆 cang bai long dan

Gentiana pallescens Harry Smith.

Annuals 3–5 cm tall. Stems purple, prostrate to ascending, 2 or 3 × dichotomously branched from base, glabrous. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade involucriform, ovate-orbicular, 0.7–1.7 × 0.7–1.3 cm, margin indistinct and cartilaginous, apex rounded with a recurved tip; veins 1–3, distinct, slender. Stem leaves 2 or 3 pairs, widely spaced; petiole tube 1.5–2 mm; leaf blade 4–5 × 2–4.5 mm, much shorter to slightly longer than internodes. Lower stem leaves spatulate to obovate; upper leaves linear to elliptic, margin membranous and smooth or ciliate, apex acuminate to obtuse, veins 1–3. Flowers few. Pedicel 0.5–2.5 cm, glabrous. Calyx narrowly obconic, 5–7 mm; lobes narrowly triangular, 2–3 mm, margin narrowly membranous, apex acute and apiculate, midvein distinct. Corolla inside white or pale blue, with blackish stripes in throat and sometimes blackish spots, funnellform, 1–1.3(–1.5) cm; lobes ovate, 2.5–3 mm, margin entire, apex obtuse; plicae oblong to ovate-orbicular, 1–1.5 mm, margin entire or denticulate, apex obtuse to truncate. Stamens inserted just below middle of corolla tube, unequal; filaments 2.5–4 mm; anthers ellipsoid, 0.5–0.7 mm. Style 1–1.5 mm; stigma lobes linear. Capsules narrowly obovoid, 3.5–4.5 mm; gynophore to 3.2 cm, stout. Seeds light brown, triquetrous, 1–1.2 mm. Fl. and fr. Apr–Aug.

• Grassland slopes, alpine meadows; 3000–4200 m. SE Xizang, NW Yunnan.

197. *Gentiana complexa* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 34. 1984.

莲座叶龙胆 lian zuo ye long dan

Annuals 2–3 cm tall. Stems purple, ascending; branches basal, short, stout, glabrous. Basal leaves with petiole 1–2 mm; leaf blade involucriform, obovate-orbicular to suborbicular, 1–1.6 × 0.9–1.6 cm, margin cartilaginous and smooth, apex rounded; veins 1–3, distinct, slender. Stem leaves 2 or 3 pairs, widely spaced; petiole tube 1.5–2 mm;

leaf blade spatulate to obovate, 5–7 × 3–4.5 mm, shorter or as long as internodes, margin cartilaginous and ciliate, apex obtuse to rounded with a recurved tip, midvein indistinct. Flowers few. Pedicel 3–5 mm, elongated in fruit, surrounded by upper leaves, glabrous. Calyx narrowly obconic, 6.5–7.5 mm; lobes triangular, 1.5–2 mm, margin narrowly membranous, apex acute, midvein distinct. Corolla outside pale yellow-green, inside pale blue, tubular, 1.1–1.3 cm; lobes ovate, 1–1.5 mm, margin entire, apex obtuse and mucronate; plicae oblong, 0.5–0.7 mm, margin crenulate, apex rounded. Stamens inserted at middle of corolla tube, unequal, generally 3 longer and 1.5–2 mm, 2 shorter and 1–1.5 mm; filaments linear-subulate; anthers ellipsoid, 0.5–0.7 mm. Style 0.5–0.8 mm; stigma lobes narrowly oblong. Capsules narrowly obovoid, 4–5 mm; gynophore to 1.1 cm. Seeds brown, oblong to ellipsoid, 0.9–1.1 mm. Fl. and fr. Apr–May.

• Roadside and wasteland slopes; 2300–2800 m. S Sichuan (Emei Shan).

198. *Gentiana flexicaulis* Harry Smith, Bull. Misc. Inform. Kew 1937: 133. 1937.

弯茎龙胆 wan jing long dan

Annuals 4–6 cm tall, almost glabrous. Stems prostrate to ascending, slender, 2 or 3 × dichotomously branched from base, glabrous. Basal leaves with petiole 1–2 mm; leaf blade involucriform, ovate-elliptic to ovate-orbicular, 1–1.7 cm × 6–8 mm, margin indistinct and membranous, apex obtuse to rounded with a recurved tip; veins 3–5, distinct, slender. Stem leaves 3–6 pairs, spreading, widely spaced; petiole tube 1–1.5 mm; leaf blade spatulate to obovate, 5–10 × 2–7 mm, much shorter than internodes, margin indistinct and membranous, apex obtuse to rounded with a recurved tip, veins 1–3, distinct, and slender. Flowers few. Pedicel 4–6 mm, papillate. Calyx narrowly obconic, 8–9 mm; lobes triangular, 1.5–2 mm, margin narrowly membranous, apex acute, midvein distinct. Corolla clear pale blue, usually with pale yellow-white base, funnellform, 1.2–1.6(–1.9) cm; lobes ovate, 1.5–3 mm, margin entire, apex obtuse; plicae ovate, 1–2 mm, margin entire, apex obtuse. Stamens inserted just below middle of corolla tube, unequal, generally 3 longer and 5–6 mm, 2 shorter and 3–4 mm; filaments linear; anthers ellipsoid, 0.8–1 mm. Style 1.5–2 mm; stigma lobes narrowly oblong. Capsules narrowly obovoid to obovoid, 5–6.5 mm; gynophore to 3 cm, stout. Seeds brown, triquetrous-ellipsoid, 1.2–1.5 mm. Fl. and fr. May–Sep.

• River banks, valleys, hillsides, grasslands; 2400–4600 m. N Sichuan.

199. *Gentiana inconspicua* Harry Smith, Bull. Misc. Inform. Kew 1937: 131. 1937.

糙毛龙胆 cao mao long dan

Annuals 2–3.5 cm tall. Stems prostrate to ascending, 1 × dichotomously branched from base, papillate. Basal leaves with petiole 1–2 mm; leaf blade involucriform, ovate-orbicular, 6–10 × 5–7 mm, margin indistinct, membranous, and ciliate, apex rounded with a recurved tip; veins 3–5, distinct, slender. Stem leaves 2–4 pairs, recurved; petiole tube

1–1.5 mm; leaf blade obovate-orbicular, 3–7 × 2–4 mm, equal or slightly longer than internodes, margin narrowly membranous and ciliate, apex rounded with a recurved tip, veins distinct. Flowers few; subsessile to pedicel ca. 6 mm, surrounded by upper leaves, papillate. Calyx narrowly obconic, 3.5–4.5 mm; lobes triangular, 1.2–1.7 mm, margin narrowly membranous and ciliate, apex acute, midvein indistinct. Corolla purple, tubular to funnelform, 7–10 mm; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae ovate, 0.5–1 mm, margin entire, apex subacute. Stamens inserted at middle of corolla tube, unequal; filaments 2.8–3.5 mm; anthers ovoid, 0.6–0.8 mm. Style 0.5–1 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 4.5–5.5 mm; gynophore to 5 mm. Seeds brown, triquetrous-ellipsoid, 1.2–1.5 mm. Fl. and fr. Jul.

- *Rhododendron* scrub; 4100–4300 m. N Sichuan.

200. *Gentiana spathulifolia* Maximowicz ex Kusnezow, Bull. Acad. Imp. Sci. Saint-Petersbourg 35: 351. 1894.

匙叶龙胆 *chi ye long dan*

Annuals 8–12 cm tall. Stems purple, ascending to erect, branched from base, densely papillate. Basal leaves withered at anthesis; petiole 0.7–1 mm; leaf blade broadly ovate to suborbicular, 4–5.5 × 4–5 mm, margin indistinctly cartilaginous, apex rounded and mucronate, midvein prominent. Stem leaves 4–7 pairs, widely spaced; petiole tube 0.5–1 mm; leaf blade ovate-spatulate or upper leaves linear to narrowly elliptic, 4–5 × 1.3–2 mm, shorter than internodes, margin indistinctly cartilaginous and smooth or ciliate, apex triangular acute, midvein abaxially prominent. Flowers few. Pedicel purple, 3–10 mm, exerted from uppermost leaves, densely papillate. Calyx narrowly obconic, 5–7 mm; lobes narrowly triangular, 1.5–2.5 mm, margin narrowly membranous, apex acute, midvein prominent. Corolla purple, sometimes with blackish lines and spots in tube, funnelform, (1–)1.2–1.4 cm; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae ovate, 1.5–2 mm, margin entire or 2-cleft, apex obtuse. Stamens inserted just below middle of corolla tube, equal; filaments 3–3.5 mm; anthers ellipsoid, 0.5–0.8 mm. Style 1–1.5 mm; stigma lobes linear. Capsules narrowly obovoid to obovoid, 5–6 mm; gynophore to 1.5 cm, stout. Seeds brown, ellipsoid, 1.2–1.5 mm. Fl. and fr. Aug-Sep.

- 2800–3800 m. S and W Gansu, SE Qinghai, Shaanxi (Taibai Shan), N Sichuan.

- 1a. All stem leaf blades spatulate,
margin smooth 200a. var. *spathulifolia*
1b. Upper stem leaf blades linear
to narrowly elliptic, margin ciliate 200b. var. *ciliata*

200a. *Gentiana spathulifolia* var. *spathulifolia*

匙叶龙胆 (原变种) *chi ye long dan* (*yuan bian zhong*)

All stem leaf blades spatulate, margin smooth.

- Hillsides; 2800–3800 m. S Gansu, SE Qinghai, Shaanxi (Taibai Shan), N Sichuan.

200b. *Gentiana spathulifolia* var. *ciliata* Kusnezow, Bull.

Acad. Imp. Sci. Saint-Petersbourg, 35: 351. 1894.

紫红花龙胆 *zi hong hua long dan*

Upper stem leaf blades linear to narrowly elliptic, margin ciliate.

- Grassland slopes; ca. 3500 m. W Gansu, N Sichuan.

201. *Gentiana abaensis* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 35. 1984.

阿坝龙胆 *a ba long dan*

Annuals 8–12 cm tall. Stems purple, ascending to erect, branched from base, densely papillate. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate to orbicular, 6–9 × 4.5–5.5 mm, margin cartilaginous and ciliolate, apex obtuse to rounded and mucronate, midvein prominent. Stem leaves 4–7 pairs, widely spaced; petiole 5–8 mm; leaf blade spatulate, 4–6 × 1.5–2.5 mm, shorter than internodes, abaxially pubescent, adaxially glabrous, margin indistinctly cartilaginous and ciliate, apex triangular acute, midvein abaxially prominent. Flowers few. Pedicel purple, 8–10 mm, slightly elongated in fruit, densely papillate. Calyx narrowly obconic, 6–7 mm, densely pubescent but glabrescent; lobes narrowly triangular, 2.5–3.5 mm, margin narrowly membranous, apex acute, midvein prominent. Corolla purple, with blackish lines and spots in tube, funnelform, 1–1.2 cm; lobes ovate, 2–3 mm, margin entire, apex obtuse; plicae ovate, 1.5–2 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 4–5 mm; anthers ellipsoid, 0.5–0.8 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 4.5–5.5 mm; gynophore to 1.3 cm, stout. Seeds dark brown, broadly oblong, 1.2–1.5 mm. Fl. and fr. Aug-Sep.

- Hillsides, scrub on shady slopes; ca. 3300 m. S Gansu, N Sichuan.

202. *Gentiana pseudoaquatica* Kusnezow, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 63. 1893.

假水生龙胆 *jia shui sheng long dan*

Annuals 3–5 cm tall. Stems ascending, branched from base, densely papillate. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate-orbicular to orbicular, 3–6 × 3–5 mm, margin distinctly cartilaginous and ciliolate, apex rounded and mucronate, midvein prominent. Stem leaves with petiole tube 1–1.5 mm, margin ciliolate; leaf blade spatulate to obovate, 3–5 × 2–3 mm, margin distinctly cartilaginous and ciliate, apex rounded, midvein abaxially prominent. Flowers few. Pedicel 2–13 mm, densely papillate. Calyx narrowly obconic, 5–6 mm; lobes triangular, 1.5–2 mm, margin narrowly membranous, apex acute, midvein prominent. Corolla dark blue, outside usually with yellow-green stripes, funnelform, 0.9–1.4 cm; lobes ovate, 2–2.5 mm, margin entire, apex acute to obtuse; plicae ovate, 1.5–2 mm, margin entire or denticulate, apex obtuse. Stamens inserted just below middle of corolla tube, equal; filaments 3–4 mm; anthers ellipsoid, 1–1.5 mm. Style 1.5–2 mm; stigma lobes linear. Capsules narrowly obovoid to obovoid, 3–4 mm; gynophore to 1.8 cm, stout. Seeds brown, ellipsoid, 1–1.2 mm. Fl. and fr.

Apr-Aug.

Along streams, river banks, wet places in valleys, grassland slopes, bog meadows, scrub meadows, forests, clearings in forests; 1100–4700 m. Hebei, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Xizang [Kashmir, Korea, Mongolia, Russia].

203. *Gentiana burkillii* Harry Smith in Handel-Mazzetti, Symb. Sin. 7: 953. 1936.

白条纹龙胆 bai tiao wen long dan

Gentiana pseudohumilis Burkill (1906), not Makino (1904).

Annuals 3–8 cm tall. Stems pale purple, ascending, branched from base, densely papillate. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate-lanceolate to ovate-orbicular, 4–6 × 2–3 mm, margin distinctly cartilaginous and ciliate, apex rounded and mucronate, midvein prominent. Stem leaves with petiole tube 1–1.5 mm, margin ciliate; leaf blade obovate, 3–5 × 1.5–3 mm, margin distinctly cartilaginous and ciliate, apex rounded, midvein abaxially prominent. Flowers few. Pedicel pale purple, 3–7 mm, densely papillate. Calyx tube tubular, 5–7 mm, with 5–7 white, membranous, and longitudinal stripes; lobes incurved, triangular, 1.5–2 mm, margin narrowly membranous, apex acute, midvein crested. Corolla blue, tubular, 0.9–1.1 cm, slightly exerted from calyx; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae ovate, 1.5–2 mm, margin entire or denticulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 1.5–2 mm; anthers narrowly ellipsoid, 0.8–1 mm. Style 1.5–2 mm; stigma lobes linear. Capsules narrowly obovoid, 5–7 mm; gynophore to 2.7 cm, stout. Seeds light brown, ellipsoid, 0.8–1 mm. Fl. and fr. Jun-Aug.

Slopes, valleys; 3600–4300 m. Hebei, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi [Afghanistan, NW India, Kashmir, Nepal, Russia].

204. *Gentiana aperta* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 27: 500. 1881.

开张龙胆 kai zhang long dan

Annuals 2–10 cm tall. Stems prostrate to ascending, branched from base, glabrous. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate, 5–7 × 3–4 mm, margin narrowly and indistinctly membranous, apex obtuse, veins 1–3, distinct, and slender. Stem leaves 3–5 pairs, widely spaced; petiole tube 1–2 mm; leaf blade elliptic, rarely ovate toward base of stem, 5–9 × 1–2.5 mm, much shorter than internodes, margin narrowly and indistinctly membranous, apex obtuse, veins 1–3, distinct, and slender. Flowers few. Pedicel 0.5–1.5 cm, much exerted from uppermost leaves, glabrous. Calyx campanulate, 5.5–6.5 mm; tube herbaceous, with 5 membranous longitudinal veins; lobes linear-lanceolate to lanceolate, 2.5–3.5 mm, margin narrowly membranous, apex acuminate, midvein prominent. Corolla open, white or pale blue to blue, inside with or without dark blue stripes but with pale yellow spots in throat, campanulate, 0.9–1.2 cm; lobes elliptic to ovate-elliptic, 2–3(–4) mm, margin entire, apex obtuse; plicae oblong, 1.5–2(–3) mm, apex deeply 2-cleft with both segments entire and acute. Stamens inserted

at basal part of corolla tube, equal; filaments 4–5 mm; anthers ellipsoid, 0.6–0.8 mm. Style 1.5–2 mm; stigma lobes linear. Capsules narrowly obovoid, 4–5 mm; gynophore to 1 cm, stout. Seeds light brown, ellipsoid, 0.9–1.1 mm. Fl. and fr. Jun-Aug.

• 2000–4000 m. NE Qinghai.

1a. Corolla pale blue to blue 204a. var. *aperta*
1b. Corolla white 204b. var. *aureopunctata*

204a. *Gentiana aperta* var. *aperta*

开张龙胆 (原变种) kai zhang long dan (yuan bian zhong)

Gentiana maximoviczii Kanitz.

Corolla pale blue to blue, inside with dark blue stripes.

• Along streams, foothills, scrub, alpine meadows; 2000–4000 m. NE Qinghai.

204b. *Gentiana aperta* var. *aureopunctata* T. N. Ho & J. H. Li in T. N. Ho, Acta Biol. Plateau Sin. 3(3): 34. 1984.

黄斑龙胆 huang ban long dan

Corolla white. Fl. and fr. Jun-Aug.

• Alpine meadows, scrub; 2900–3500 m. NE Qinghai.

205. *Gentiana leucomelaena* Maximowicz ex Kusnezow, Bull. Acad. Imp. Sci. Saint-Petersbourg 34: 505. 1892.

蓝白龙胆 lan bai long dan

Gentiana humilis Steven var. *evolutionior* C. B. Clarke; *G. leucomelaena* var. *alba* Kusnezow; *G. leucomelaena* var. *pusilla* Krylov.

Annuals 2–10 cm tall. Stems prostrate to ascending, branched from base, glabrous. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate-elliptic to ovate-orbicular, 5–8 × 2–3 mm, margin indistinctly membranous, apex obtuse to rounded; veins 1–3, indistinct. Stem leaves 3–5 pairs; petiole tube 1.5–3 mm; leaf blade lanceolate to elliptic, rarely basally spatulate to ovate, 3–9 × 0.7–2 mm, usually shorter than internodes, margin narrowly and indistinctly membranous, apex acuminate to obtuse, midvein abaxially distinct. Flowers few. Pedicel 0.4–4 cm, glabrous. Calyx campanulate, 4–5 mm; lobes triangular, 1.5–2 mm, margin narrowly membranous, apex acute, midvein indistinct. Corolla pale blue, rarely white, with blue-gray stripes, with dark blue spots in throat, campanulate, 0.8–1.3 cm; lobes ovate, 2.5–3 mm, margin entire, apex obtuse; plicae oblong, 1.2–1.5 mm, margin irregularly lacinate, apex obtuse. Stamens inserted at basal part of corolla tube, equal; filaments 2.5–3.5 mm; anthers ellipsoid, 0.7–1 mm. Style 0.5–0.7 mm; stigma lobes oblong. Capsules obovoid, 3.5–5 mm; gynophore to 2 cm, stout. Seeds broadly dark brown, ellipsoid, 0.6–0.8 mm. Fl. and fr. May-Oct.

Along streams, bog meadows, meadows, alpine meadows, scrub; 1900–5000 m. Gansu, Qinghai, Sichuan, Xinjiang, Xizang [Kashmir, Kazakhstan, Kyrgyzstan, N Mongolia, Nepal, Pakistan, Russia, Sikkim, Tajikistan].

The widespread *Gentiana leucomelaena* is similar to the much more narrowly distributed *G. aperta*. Although T. N. Ho treats them as distinct species, J. S. Pringle considers *G. leucomelaena* as a synonym of *G. aperta*.

206. *Gentiana prattii* Kusnezow, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 63. 1893.

黄白龙胆 huang bai long dan

Annuals 2–5 cm tall. Stems purple, ascending to erect, branched from base, densely, very minutely papillate. Basal leaves withered at anthesis; petiole 1–1.5 mm; leaf blade ovate-orbicular, 3–3.5 × 2.5–3 mm, margin cartilaginous and ciliate, apex rounded and mucronate, midvein prominent. Stem leaves 4–9 pairs; petiole tube 0.5–1 mm, margin ciliate; leaf blade 4–5 × 1.5–2 mm, shorter to as long as internodes. Lower stem leaves ovate or rarely spatulate, margin cartilaginous; middle to upper leaves elliptic, margin narrowly membranous and ciliate, apex obtuse and apiculate, midvein abaxially prominent. Flowers few. Pedicel 1–3 mm, surrounded by leaves, densely papillate. Calyx narrowly obconic, 5–6 mm; lobes ovate-lanceolate to triangular, 1.5–2 mm, margin narrowly membranous and ciliate, apex acuminate to acute and apiculate, midvein prominent. Corolla pale yellow-white, with blackish stripes, closed, tubular, 8–9 mm; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae oblong, 0.7–1 mm, margin erose, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 1.5–2 mm; anthers ellipsoid, 0.8–1 mm. Style 1.5–2 mm; stigma lobes linear. Capsules narrowly obovoid to obovoid, 4–5 mm; gynophore to 8 mm, stout. Seeds dark brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jun-Sep.

• Meadow and grassland slopes; 3000–4000 m. Qinghai, W Sichuan, NW Yunnan.

207. *Gentiana aquatica* Linnaeus, Sp. Pl. 1: 229. 1753.

水生龙胆 shui sheng long dan

Ericala aquatica (Linnaeus) Borkhausen; *Gentiana humilis* Steven.

Annuals 5–10 cm tall. Stems ascending, branched from base, glabrous. Basal leaves with petiole 0.5–1 mm; leaf blade ovate-orbicular to orbicular, 5–9 × 2.5–6 mm, margin cartilaginous, apex obtuse to rounded and mucronate, midvein distinct. Stem leaves 3–6 pairs, widely spaced; petiole tube 1–2 mm; leaf blade margin narrowly membranous, midvein abaxially distinct. Lower stem leaf blades oblanceolate, ovate-elliptic, or obovate, 3–4 × 1.5–2 mm, apex obtuse to rounded and mucronate; middle to upper leaf blades navicular to oblong, 3.5–5 × 1.5–2 mm. Flowers few. Pedicel 2–4 mm, slightly longer in fruit. Calyx narrowly obconic, 6–10 mm; lobes triangular, 1.5–2 mm, apex acute, midvein distinct. Corolla blue, closed, tubular, 1.2–2 cm; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae ovate, 1–1.5 mm, margin entire or denticulate, apex obtuse. Stamens inserted at basal part of corolla tube, equal; filaments 2–3 mm; anthers ellipsoid, 0.8–1 mm. Capsules obovoid, 4–6 mm; gynophore to 2.5 cm, slender. Fl. and fr. Jun-Aug.

Cold steppes; 4600–5200 m. W Xizang [Kazakhstan, Mongolia, Russia, Tajikistan].

North American material formerly included in this species is better separated as *Gentiana fremontii* Torrey.

208. *Gentiana conduplicata* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 33. 1984.

对折龙胆 dui zhe long dan

Annuals 2–3 cm tall. Stems ascending, branched from base, glabrous. Basal leaves with petiole 0.5–0.8 mm; leaf blade ovate-lanceolate to ovate, 2–5 × 2–2.5 mm, margin cartilaginous and smooth, apex acute and apiculate, midvein distinct. Stem leaves 5–8 pairs, folded; petiole tube 1–1.5 mm; leaf blade 2.5–4 × 1–1.5 mm, ± as long as internodes, basal half margin narrowly membranous and ciliate but apical half cartilaginous and smooth, apex acute to obtuse, midvein abaxially prominent. Lower stem leaf blades ovate; middle to upper leaves oblong to elliptic. Flowers few. Pedicel 3–4 mm, surrounded by leaves, glabrous. Calyx narrowly obconic, 5–7 mm; lobes triangular, 1–1.3 mm, margin narrowly membranous, apex acute, midvein prominent. Corolla blue-purple, with pale yellow-green base and a blackish ring in throat, tubular to narrowly funnelform, 0.9–1.1 cm; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae oblong, 1–1.5 mm, margin denticulate, apex truncate. Stamens inserted at middle of corolla tube, equal; filaments 2.5–3 mm; anthers narrowly ellipsoid, 0.8–1 mm. Style 1–1.5 mm; stigma lobes oblong. Capsules narrowly obovoid, 5–6 mm; gynophore to 2.5 cm, stout. Seeds brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jun.

• Grassland slopes; ca. 4000 m. SW Sichuan.

209. *Gentiana micantiformis* Burkill, J. Proc. Asiat. Soc. Bengal 2: 315. 1906.

类亮叶龙胆 lei liang ye long dan

Annuals 2–4 cm tall. Stems prostrate to ascending, branched from base, glabrous. Basal leaves withered at anthesis; petiole 0.5–1.5 mm; leaf blade broadly ovate to ovate-orbicular, 4–6 × 3–4 mm, margin cartilaginous, apex rounded and mucronate, midvein prominent. Stem leaves 3–7 pairs; petiole tube 1–1.5 mm; leaf blade 3.5–5 × 1–1.5 mm, shape very variable, linear, linear-lanceolate, oblong, or ovate, margin broadly membranous, apex acuminate to obtuse, midvein abaxially prominent. Flowers few, subsessile. Calyx narrowly obconic, 6–7 mm, tube membranous; lobes triangular, 1.5–2.5 mm, margin broadly membranous, apex acute and apiculate, midvein prominent. Corolla blue, with short dark blue lines in throat, funnelform, 1–1.2 cm; lobes ovate, 1.5–2 mm, margin entire, apex acute; plicae ovate, 0.5–1 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 1.5–2 mm; anthers ellipsoid, 0.6–0.8 mm. Style 0.5–1 mm; stigma lobes linear. Capsules narrowly obovoid, 3–4 mm; gynophore to 1.3 cm, slender. Seeds light brown, ellipsoid, 0.6–0.8 mm. Fl. and fr. Jul-Oct.

Alpine meadows; 4200–4500 m. Qinghai, S and SE Xizang [Bhutan, Sikkim].

210. *Gentiana tatsienensis* Franchet, Bull. Soc. Bot. France 43: 489. 1896.

打箭炉龙胆 da jian lu long dan

Annuals 3–5 cm tall. Stems prostrate to ascending, branched from base, glabrous. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate-lanceolate to ovate, 6–10 × 3–4 mm, glabrous, margin cartilaginous and ciliolate, apex acute and apiculate, midvein prominent. Stem leaves 3–6 pairs; petiole tube 1.5–2 mm; leaf blade ovate or toward stem base spatulate, 3–6 × 1–1.5 mm, abaxially papillate, adaxially glabrous, margin broadly membranous or basally cartilaginous, apex acute to obtuse, midvein abaxially prominent. Flowers few. Pedicel 2–3 mm, surrounded by leaves, glabrous. Calyx narrowly obconic, 5–6 mm, outside densely papillate; lobes ovate-lanceolate to ovate, 2–3.5 mm, margin broadly membranous, apex acute and apiculate, midvein prominent. Corolla blue, tubular, 1–1.2 cm; lobes ovate, 1.5–2 mm, margin entire, apex obtuse and mucronate; plicae broadly ovate, 0.8–1 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 2–3 mm; anthers ellipsoid, 1.2–1.5 mm. Style 0.5–1 mm; stigma lobes linear. Capsules narrowly obovoid, 4–5 mm; gynophore to 7 mm. Seeds light brown, ellipsoid, 1–1.2 mm. Fl. and fr. Apr-Jul.

• Along streams, roadsides, valleys, open grassy hillside; 3300–5000 m. W Sichuan, Xizang.

211. *Gentiana chungtienensis* C. Marquand, Bull. Misc. Inform. Kew 1928: 50. 1928.

中甸龙胆 zhong dian long dan

Annuals 3–5 cm tall. Stems erect, branched from base, glabrous. Basal leaves with petiole 3–5 mm; leaf blade ovate to ovate-orbicular, 5–15 × 3.5–8 mm, margin cartilaginous and ciliolate, apex obtuse to rounded and mucronate, veins 3–5. Stem leaves 4–7 pairs, folded; petiole tube 1.5–2 mm; leaf blade navicular, 3–9 × 2.5–3.5 mm, equal or slightly longer than internodes, margin broadly membranous, apex obtuse and cuspidate, midvein abaxially distinct. Flowers few. Pedicel 4–9 mm, surrounded by leaves. Calyx narrowly obconic, 0.9–1.1 cm; lobes triangular, 3–4 mm, margin broadly membranous, apex acute, midvein slender. Corolla pale blue, outside with yellow-green stripes, narrowly obconic, 1.7–2.2 cm; lobes ovate, 4–5 mm, margin entire, apex caudate with a tip to 1.5 mm; plicae ovate, 2–2.5 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, unequal; filaments 4–5.5 mm; anthers narrowly ellipsoid, 1–1.5 mm. Style 1.5–2 mm; stigma lobes linear. Capsules narrowly obovoid, 8–9 mm; gynophore to 1.7 cm, stout. Seeds dark brown, ellipsoid, 1–1.3 mm. Fl. and fr. May-Jun.

• Hillsides, forest margins; 3000–3700 m. NW Yunnan.

212. *Gentiana subuniflora* C. Marquand, Bull. Misc. Inform. Kew 1931: 87. 1931.

单花龙胆 dan hua long dan

Annuals 2–4 cm tall. Stems purple, erect, simple or few branched from base. Basal leaves withered at anthesis; petiole 1.5–2 mm; leaf blade obovate to ovate-orbicular, 6–8 × 2–5

mm, densely papillate, margin cartilaginous, apex rounded and mucronate, midvein prominent. Stem leaves crowded; petiole tube 0.5–0.8 mm; leaf blade ovate or toward stem base spatulate to obovate, 2.5–5 × 2.5–3.5 mm, densely papillate, margin broadly membranous or toward stem base cartilaginous, apex acute, midvein abaxially prominent. Flowers few; sessile or pedicel 2–3 mm, purple, surrounded by leaves, densely papillate. Calyx narrowly obconic, 6–8 mm, densely pubescent; lobes narrowly triangular to lanceolate, 2.5–3.5 mm, margin broadly membranous, apex acuminate and caudate, midvein prominent. Corolla pale blue, with dark blue stripes, narrowly obconic, (1.4–)2–2.5 cm; lobes broadly ovate, 2–4.5 mm, margin entire, apex obtuse to rounded; plicae broadly ovate, 1.5–2.5 mm, margin rounded crenulate. Stamens inserted at middle of corolla tube, unequal; filaments 3.5–4.5 mm; anthers narrowly ellipsoid, 1.3–1.5 mm. Style 2.5–3 mm; stigma lobes broadly oblong. Capsules narrowly obovoid, 8–9 mm; gynophore ca. 4 mm. Seeds brown, ellipsoid, 0.9–1.1 mm. Fl. and fr. Apr-Jul.

• Hillsides, foothills; 3600–4500 m. W Sichuan.

213. *Gentiana radiata* C. Marquand, Bull. Misc. Inform. Kew 1931: 87. 1931.

辐射龙胆 fu she long dan

Annuals 2.5–6 cm tall. Stems ascending to erect, few branched from base, densely papillate. Basal leaves withered at anthesis; petiole 0.4–0.6 mm; leaf blade obovate to ovate-orbicular, 6–8 × 4–5 mm, densely papillate but glabrescent, margin cartilaginous, apex rounded and mucronate, midvein prominent. Stem leaves 3 or 4 pairs, folded; petiole tube 1–1.5 mm, densely papillate; leaf blade lanceolate, 5–7 × 2–4.5 mm, densely papillate but glabrescent, margin broadly membranous, apex acuminate and caudate, midvein abaxially prominent. Flowers few. Pedicel purple, 0.8–1.2 cm, surrounded by leaves, densely papillate. Calyx narrowly obconic, 1.3–1.5 cm, outside densely papillate but glabrescent; lobes subulate to narrowly triangular, 3.5–5.5 mm, margin broadly membranous, apex acuminate and caudate, midvein prominent. Corolla blue, with blackish stripes, narrowly obconic, 2–2.5 cm; lobes ovate, 3–4 mm, margin entire, apex acute; plicae ovate, 2–3 mm, margin entire or crenulate, apex obtuse. Stamens inserted at middle of corolla tube, unequal; filaments 3–4 mm; anthers ellipsoid, 1.2–1.5 mm. Ovary narrowly ellipsoid, 3–3.5 mm. Style 1.5–2 mm; stigma lobes oblong. Fl. Apr-Jun.

• Hillsides; 4100–4500 m. SW Sichuan.

214. *Gentiana pedata* Harry Smith in Handel-Mazzetti, Symb. Sin. 7: 967. 1936.

鸟足龙胆 niao zu long dan

Annuals 2–8 cm tall. Stems erect, lower half simple and leafless, upper half much branched with short internodes, and apically with many leaves and flowering branches crowded into a capitulum, angled, sparsely puberulent on angles. Leaves overlapping, crowded, recurved, folded; leaf blade subleathery, rigid, abaxially densely pubescent, adaxially glabrous. Lower leaves with petiole tube 0.5–1 mm; leaf blades narrowly elliptic to ovate-lanceolate, 1.5–2.2 cm × 4–7

mm, base narrowed, margin cartilaginous and ciliolate, apex acuminate to acute and apiculate, veins distinct; upper leaves with petiole tube 1–1.5 mm, membranous, papillose; leaf blades spatulate, 5–7 × 2–3 mm, base obtuse, margin cartilaginous to broadly membranous and ciliolate, apex obtuse and cuspidate, midvein distinct. Flowers many, sessile. Calyx campanulate, 8–9 mm, tube membranous; lobes triangular, 4–4.5 mm, as long as tube, outside pubescent, margin broadly membranous and ciliolate, apex acute and cuspidate, midvein prominent. Corolla blue-purple, tubular, 1.2–1.4 cm; lobes ovate-triangular, 2.5–3 mm, margin entire, apex acuminate to acute; plicae ovate, 0.8–1 mm, margin entire, apex obtuse. Stamens inserted at basal part of corolla tube, unequal; filaments 3.5–6 mm; anthers narrowly ellipsoid, 1.3–1.5 mm. Style 2.5–3 mm; stigma lobes linear. Capsules narrowly obovoid, 4–5 mm; gynophore 1.5–2 mm, stout. Seeds brown, ellipsoid, 1–1.2 mm. Fl. and fr. Mar–May.

• Grassland slopes; 1900–3000 m. Guizhou, SW Sichuan, NE Yunnan.

215. *Gentiana scytophylla* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 39. 1984.

革叶龙胆 ge ye long dan

Annuals 3–7 cm tall. Stems erect, lower half simple and leafless, upper half much branched with short internodes, and apically with many leaves and flowering branches crowded into a capitulum, angled, densely puberulent on angles. Leaves overlapping, crowded, decreasing in size toward stem apex; petiole tube 0.5–1 mm; leaf blade recurved, folded, lanceolate to ovate-lanceolate, 6–9 × 1.5–2.5 mm, subleathery, rigid, glossy, base narrowed, margin of lower leaf blades cartilaginous, that of upper blades membranous, apex acute and cuspidate, midvein distinct. Flowers many, sessile. Calyx tubular, 6–6.5 mm, tube membranous; lobes ovate to triangular, 2.5–3.5 mm, about as long as tube, margin ciliolate with basal half membranous and apical half cartilaginous, apex acute and cuspidate, midvein prominent. Corolla pale blue, tubular, 8–9 mm; lobes 1–1.5 mm, ovate, margin entire, apex obtuse; plicae ovate, 0.7–1 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 1.5–2 mm; anthers 0.9–1.1 mm, ellipsoid. Style 1–1.2 mm; stigma lobes narrowly oblong. Capsules narrowly obovoid, 5.5–6 mm; gynophore 1–1.5 mm, stout. Seeds light brown, ellipsoid, 0.7–0.8 mm. Fl. and fr. Feb.

• Dry slopes; ca. 2700 m. NE Yunnan.

216. *Gentiana xingrenensis* T. N. Ho, Novon 4: 370. 1994.

兴仁龙胆 xing ren long dan

Annuals 3–4 cm tall. Stems erect, lower half simple and leafless, upper half much branched with short internodes, and apically with many leaves and flowering branches crowded into a capitulum, angled. Lower leaves with petiole tube 0.5–1 mm; leaf blade oblong, obovate, or orbicular, 1.4–2 × 0.8–1.6 cm, base narrowed, margin cartilaginous, apex obtuse to rounded and cuspidate with a recurved tip, midvein distinct. Upper leaves with petiole tube 1–1.5 mm; leaf blade

linear-lanceolate to linear, 5–7 × 1–2.5 mm, base obtuse, margin cartilaginous and ciliolate, apex acuminate and awned, midvein distinct. Flowers many, sessile. Calyx tubular, 6–7 mm; lobes subulate, 2.5–3 mm, margin cartilaginous and ciliolate, apex acuminate and awned, midvein prominent. Corolla outside pale yellow-green, inside pale blue, tubular, 8–10 mm; lobes ovate, 1–1.5 mm, margin entire, apex obtuse; plicae ovate, 0.5–0.8 mm, margin denticulate, apex obtuse. Stamens inserted at basal part of corolla tube, equal; filaments 2–2.5 mm; anthers ellipsoid, 0.8–1 mm. Style 0.8–1 mm; stigma lobes oblong. Capsules obovoid, ca. 3 mm; gynophore ca. 2 mm, stout. Fl. and fr. Aug.

• Scrub; ca. 1300 m. Guizhou.

217. *Gentiana albomarginata* C. Marquand, Bull. Misc. Inform. Kew 1937: 175. 1937.

膜边龙胆 mo bian long dan

Gentiana argentea (D. Don) Grisebach var. *albescens* Franchet.

Annuals 2–8 cm tall. Stems erect, lower half simple and leafless, upper half much branched with short internodes, and apically with many leaves and flowering branches crowded into a capitulum, angled, densely puberulent. Leaves overlapping, crowded; petiole tube 1–1.5 mm; leaf blade abaxially densely and minutely papillate, adaxially glabrous, base narrowed to obtuse, margin ca. 0.7 mm wide, membranous, and densely ciliolate, apex obtuse to rounded and cuspidate, midvein crested. Lower leaf blades ovate-lanceolate to ovate, 1–1.5 cm × 4–7 mm. Upper leaf blades oblanceolate, oblong, or narrowly elliptic, 7–9 × 3–4 mm. Flowers many, sessile. Calyx campanulate, 7–8.5 mm; lobes ovate-elliptic, 3–4 mm, margin membranous, ca. 0.7 mm wide, and ciliolate, apex obtuse and cuspidate, midvein crested. Corolla pale blue-purple, broadly tubular, 8–9 mm; lobes ovate, 0.7–1 mm, margin entire, apex obtuse; plicae ovate, 0.5–0.8 mm, margin entire, apex obtuse. Stamens inserted at basal part of corolla tube, equal; filaments 2–2.5 mm; anthers narrowly ellipsoid, 1–1.2 mm. Style 0.5–0.8 mm; stigma lobes oblong. Capsules narrowly obovoid, 4–4.5 mm; gynophore 1–1.5 mm, stout. Seeds dark brown, ellipsoid, 0.5–0.7 mm. Fl. and fr. Apr–May.

• Grasslands; 1900–3300 m. NW Yunnan.

218. *Gentiana capitata* Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 126. 1825.

头状龙胆 tou zhuang long dan

Ericala capitata (Buchanan-Hamilton ex D. Don) D. Don; *Gentiana cephalodes* Edgeworth.

Annuals 2–5.5 cm tall. Stems erect, lower half simple and leafless, upper half much branched with short internodes, and apically with many leaves and flowering branches crowded into a capitulum, angled, sparsely puberulent on angles. Lower leaves with petiole tube 0.5–1 mm; leaf blade elliptic to ovate, 0.8–1.5 cm × 6.5–10 mm, base narrowed to obtuse, margin cartilaginous, apex acute to obtuse, midvein distinct. Upper leaf blades oblong to elliptic, 6–8 × 1.5–2 mm, base obtuse, margin white or purple, broad, and membranous,

apex obtuse, midvein distinct. Flowers many, subsessile. Calyx tubular, 4.5–7 mm, tube membranous; lobes broadly oblong, 1.5–2 mm, margin white or purple and broadly membranous, apex obtuse and cuspidate, midvein prominent. Corolla pale blue-purple, broadly tubular, 8–11 mm; lobes ovate-orbicular to semiorbicular, 1–1.2 mm, margin entire, apex obtuse to rounded; plicae semiorbicular, 0.8–1 mm, margin with 2 or 3 teeth to denticulate, apex rounded. Stamens inserted at basal part of corolla tube, equal; filaments 3–3.5 mm; anthers ellipsoid, 0.8–1 mm. Style 0.5–0.8 mm; stigma lobes oblong. Capsules narrowly obovoid, 4–7 mm; gynophore 1–1.5 mm, stout. Seeds brown, 0.8–1.1 mm, ellipsoid. Fl. and fr. Apr-Jun.

Meadow slopes, scrub meadows, forest margins; 2800–4200 m. S and SE Xizang [Bhutan, NE India, Kashmir, Myanmar, Nepal, Sikkim].

219. *Gentiana huxleyi* Kusnezow, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 64. 1893.

藏南龙胆 zang nan long dan

Gentiana kumaonensis Biswas.

Annuals 1.5–4 cm tall. Stems erect, lower half simple and leafless, upper half much branched and with short internodes, and apically with many leaves and flowering branches crowded into a capitulum, angled. Petiole tube 0.5–1.5 mm, membranous; leaf blade spatulate to obovate, 5–10 × 3–6 mm, base narrowed, apex rounded to emarginate with a recurved tip, midvein crested. Lower leaf blades with margin cartilaginous; upper leaf blades with margin membranous. Flowers many, subsessile. Calyx campanulate, 8–9 mm, tube membranous; lobes oblong to ovate, 2–2.5 mm, margin membranous, apex obtuse and cuspidate, midvein crested. Corolla blue, broadly tubular, 7–11 mm; lobes ovate, 2–3 mm, margin entire, apex obtuse; plicae ovate, 2–2.5 mm, margin erose, apex obtuse. Stamens inserted at basal part of corolla tube, equal; filaments 4–4.5 mm; anthers narrowly ellipsoid, 1.8–2 mm. Ovary obovoid, 4.5–5 mm. Style 0.8–1 mm; stigma lobes oblong. Fl. and fr. Apr-Jun.

Hillsides; 3800–4000 m. S Xizang [Bhutan, NW India, Nepal, Pakistan, Sikkim].

220. *Gentiana albicalyx* Burkill, J. Proc. Asiat. Soc. Bengal 2: 314. 1906.

银萼龙胆 yin e long dan

Gentiana capitata Buchanan-Hamilton ex D. Don var. *strobiliformis* C. B. Clarke.

Annuals 1.5–4 cm tall. Stems erect, lower half simple and leafless, upper half angled, much branched with short internodes, apically with many leaves and flowering branches crowded into a capitulum, densely puberulent. Leaves overlapping, crowded; petiole tube 0.5–1 mm; leaf blade obovate to flabellate, 3–5 × 3.5–6 mm, glabrous, base narrowed to obtuse, margin ca. 0.5 mm wide, membranous, and smooth, apex rounded to truncate and mucronate with a recurved tip, midvein crested. Flowers many, subsessile. Calyx obconic, 4–4.5 mm, tube membranous; lobes oblong to suborbicular, 1.2–1.5 mm, herbaceous, margin membranous,

ca. 0.5 mm wide, and smooth, apex rounded and mucronate with a recurved tip, midvein crested. Corolla blue, with pale yellow base, broadly tubular, 7–8 mm; lobes broadly ovate, 1.2–1.5 mm, margin entire, apex obtuse to rounded; plicae semiorbicular, 0.5–0.8 mm, margin entire or indistinctly denticulate, apex rounded. Stamens inserted at middle of corolla tube, equal; filaments 1.5–2 mm; anthers narrowly ellipsoid, 0.5–0.7 mm. Style 1–1.3 mm; stigma lobes narrowly oblong. Capsules ovoid, ca. 2 mm; gynophore 0.7–1 mm. Fl. and fr. Jun.

Alpine meadows; 2600–4500 m. S Xizang [Bhutan, NW India, Nepal, Sikkim].

221. *Gentiana globosa* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 40. 1984.

圆球龙胆 yuan qiu long dan

Annuals 1.5–2.5 cm tall. Stems erect, lower half simple and leafless, upper half much branched with short internodes, apically with many leaves and flowering branches crowded into a capitulum, angled. Leaves overlapping, crowded; petiole tube 0.5–1.5 mm; leaf blade 2–6 × 2–4 mm, larger toward stem apex, margin distinctly cartilaginous, apex obtuse to rounded and cuspidate, midvein crested. Lower leaf blades broadly ovate; upper leaf blades broadly obovate to flabellate. Flowers many, subsessile. Calyx tubular, 6–7 mm, tube membranous; lobes suborbicular, 2–2.5 mm, herbaceous, margin distinctly cartilaginous, apex rounded and cuspidate, midvein crested. Corolla blue, with pale yellow-white base, broadly tubular, 8–10 mm; lobes ovate-triangular, 1–1.2 mm, margin entire, apex acute; plicae deeply 2-cleft with both segments ovate, ca. 0.5 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 1.5–2 mm; anthers narrowly ellipsoid, 0.8–1 mm. Ovary ellipsoid, 1.8–2 mm. Style 1.5–2 mm; stigma lobes semiorbicular. Fl. and fr. Jul-Oct.

Alpine meadows, scrub meadows; 3700–4300 m. SW Sichuan, SE Xizang [Nepal].

222. *Gentiana jamesii* Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 128. 1890.

长白山龙胆 chang bai shan long dan

Gentiana kawakamii Makino.

Perennials 10–20 cm tall, with short stolons. Stems erect, fastigiate branched from base or simple, glabrous. Leaves petiolate; leaf blade lanceolate to ovate-elliptic, 0.7–1.5 cm × 2.5–4 mm, abaxially glabrous, adaxially densely papillate, margin ± revolute, apex obtuse, midvein indistinct. Flowers 1 to few, subsessile. Calyx obconic, 8.5–10 mm, tube membranous; lobes spreading to recurved, broadly ovate, 1.5–3 mm, equal, inside densely papillate, base narrowed, apex obtuse and rounded, midvein indistinct. Corolla blue to blue-purple, broadly tubular, 2.3–3 cm; lobes oblong to ovate-elliptic, 6–7 mm, margin entire, apex obtuse to rounded; plicae broadly ovate, 2.5–3 mm, margin lacinate. Stamens inserted at middle of corolla tube, equal; filaments 5–6 mm; anthers narrowly ellipsoid, 1.5–2 mm. Style 1.5–2 mm, linear; stigma lobes oblong. Capsules narrowly obovoid, 6–9 mm; gynophore to 1.6 cm, stout. Seeds brown, ellipsoid, 0.9–1.1

mm. Fl. and fr. Jul-Sep.

Meadow slopes, roadsides, stony places; 1100–2400 m. Heilongjiang, Jilin, Liaoning [Japan, Korea, E Russia].

223. *Gentiana intricata* C. Marquand, Bull. Misc. Inform. Kew 1937: 170. 1937.

帚枝龙胆 zhou zhi long dan

Gentiana fastigiata Franchet (1884), not Bentham (1844).

Annuals 2.5–3.5 cm tall. Stems erect, with branches crowded into a dense apical head, densely purple papillate. Leaves long petiolate; leaf blade obovate-spatulate to orbicular-spatulate, base narrowed, margin cartilaginous and ciliolate, apex rounded and sometimes with a short recurved mucronate tip, midvein prominent. Basal leaves withered at anthesis; petiole shorter than blade; leaf blade 7–9 × 4–5 mm. Stem leaves with petiole longer than blade; leaf blade 5–10 × 1.5–5.5 mm. Flowers many, subsessile. Calyx obconic, 3.5–5 mm; lobes recurved, 1–1.5 mm, equal, ovate-elliptic to ovate, base narrowed, margin cartilaginous and smooth or ciliolate, apex obtuse and cuspidate, midvein prominent. Corolla pale blue, outside tinged yellow-green, tubular, 6–7 mm; lobes ovate, 1–1.5 mm, margin entire or crenulate, apex obtuse; plicae ovate, 0.8–1 mm, margin entire or erose, apex obtuse. Stamens inserted at basal part of corolla tube, equal; filaments 2.5–3.5 mm; anthers ellipsoid, 0.4–0.6 mm. Style 1.5–2 mm; stigma lobes linear. Capsules narrowly obovoid to obovoid, 3–4 mm; gynophore to 6 mm, stout. Seeds light brown, ellipsoid, 0.9–1.1 mm. Fl. and fr. May-Aug.

• Grassland slopes, scrub, forests; 2200–3500 m. SE Xizang, NW Yunnan.

224. *Gentiana subintricata* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 41. 1984.

假帚枝龙胆 jia zhou zhi long dan

Annuals 2.5–7 cm tall. Stems purple, erect, basally simple, middle fastigiate branched with branches corymbose, densely purple papillate. Basal leaves withered at anthesis. Stem leaves with petiole longer than blade; leaf blade oblong to obovate-spatulate, 4–6 × 1.7–3 mm, papillate, base narrowed, margin cartilaginous and distinctly ciliate, apex rounded and mucronate with a short recurved tip, midvein prominent. Flowers many, subsessile. Calyx tubular, 6–8 mm; tube membranous; lobes recurved, spatulate to ovate, 1.5–2 mm, equal, base slightly narrowed, margin cartilaginous and smooth or ciliate, apex obtuse and mucronate, midvein prominent. Corolla outside with blackish stripes, inside pale purple, funnelform, 1.1–1.4 cm; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae ovate, 1.5–2 mm, margin denticulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 1.2–1.5 mm; anthers ellipsoid, 1–1.2 mm. Ovary ellipsoid, 2.5–3 mm; gynophore ca. 1.5 cm, slender. Style 1–1.2 mm; stigma lobes suborbicular. Fl. Jul-Aug.

• Grassland slopes; 3400–3700 m. NW Yunnan.

225. *Gentiana taiwanica* T. N. Ho in T. N. Ho & S. W. Liu, Bull. Nat. Hist. Mus. London (Bot.) 23: 59. 1993.

台湾龙胆 tai wan long dan

Gentiana angusta (Masamune) Liu & Koo (1974), not M. E. Jones (1908); *G. scabrida* Hayata var. *angusta* Masamune.

Annuals 10–15 cm tall. Stems purple, erect, rigid, fastigiate branched from base, densely papillate. Leaf blade abaxially glabrous, adaxially papillate, apex acuminate and apiculate. Basal leaves with petiole 2–4 mm, papillate; leaf blade lanceolate to ovate, 1–2 cm × 5–7 mm. Stem leaves widely spaced, petiolate; leaf blade linear-lanceolate to lanceolate, 0.8–1.5 cm × 3–5 mm, shorter than internodes. Flowers few. Pedicel purple, 2–3 mm, densely papillate. Calyx narrowly obconic, 1–1.3 cm; lobes elliptic-lanceolate, 6–7 mm, subequal, as long as to slightly longer than tube, base slightly narrowed, apex acuminate to obtuse, midvein prominent. Corolla blue, tubular to funnelform, 2–2.5 cm; lobes broadly ovate, 4.5–5.5 mm, margin entire, apex obtuse and mucronate; plicae ovate-elliptic, 3.5–4 mm, margin entire or denticulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 8–10 mm; anthers narrowly ellipsoid, 2.5–3 mm. Style 7–8 mm; stigma lobes oblong. Capsules exerted from corolla, narrowly obovoid to obovoid, 8–10 mm. Fl. and fr. Jul.

• Hillsides in mountains; ca. 3200 m. Taiwan.

226. *Gentiana zollingeri* Fawcett, J. Bot. 21: 183. 1883.

笔龙胆 bi long dan

Annuals 3–6 cm tall. Stems purple, erect, branched from base or rarely simple, glabrous. Leaves usually widely spaced; petiole tube 1–2 mm; leaf blade broadly ovate to suborbicular, 1–1.3 cm × 3–8 mm, margin cartilaginous, smooth or ciliolate, apex rounded and mucronate, veins 1–3. Leaves sometimes narrowed toward stem apex; leaf blade lanceolate to narrowly elliptic, 7–9 × 1.5–2 mm, margin narrowly membranous and ciliolate, apex acuminate and apiculate, midvein distinct. Flowers (1 or) few to many. Pedicel purple, 1–1.5 mm, glabrous. Calyx narrowly obconic, 7–9 mm; lobes narrowly triangular to ovate-elliptic, 3.5–4.5 mm, equal, as long as tube, margin narrowly membranous and smooth, apex acute, midvein prominent. Corolla pale blue, with pale yellow base, funnelform, 1.4–1.7 cm; lobes ovate, 2.5–3 mm, margin entire, apex obtuse; plicae broadly oblong to ovate, 1–1.5 mm, margin slightly 2-cleft to denticulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 4–5 mm; anthers ellipsoid, 1.5–2 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules narrowly obovoid, 6–7 mm; gynophore to 1 cm, stout. Seeds brown, ellipsoid, 0.3–0.5 mm. Fl. and fr. Apr-Jun.

Meadows, scrub, forests; 500–1600 m. Anhui, Fujian, Gansu, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Qinghai, Xinjiang, Zhejiang [Japan, Korea, E Russia].

227. *Gentiana franchetiana* Kusnezow, Trudy Imp. S.-Peterburgsk. Bot. Sada 15: 385. 1904.

密枝龙胆 mi zhi long dan

Gentiana pulla Franchet (1890), not Grisebach (1874).

Annuals 2–3.5 cm tall. Stems purple, erect, branched from middle, apically, or rarely from base, densely papillate. Leaves crowded; petiole tube 0.5–1 mm, abaxially papillate; leaf blade ovate-lanceolate to ovate, subleathery, rigid, margin cartilaginous and ciliolate, apex acuminate to acute and apiculate, midvein prominent. Basal leaves withered at anthesis; leaf blade 7–10 × 2.5–6 mm. Stem leaf blades 5–9 × 1–3 mm. Flowers few to many, subsessile. Calyx narrowly obconic, 5–6 mm; lobes linear-lanceolate, 2.5–3 mm, equal, as long as tube, subleathery, rigid, margin cartilaginous and ciliolate, apex acute and apiculate, midvein prominent. Corolla outside tinged green, inside dark blue, tubular, 8–9 mm; lobes ovate, 1–1.2 mm, margin entire, apex obtuse; plicae ovate, 0.6–0.8 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 2–3 mm; anthers narrowly ellipsoid, 1–1.2 mm. Style 1–1.5 mm; stigma lobes oblong. Capsules obovoid, 3–3.5 mm; gynophore to 6 mm, stout. Seeds brown, ovoid, 0.5–0.7 mm. Fl. and fr. Apr–Oct.

- Hillsides; 1400–2300 m. SW Sichuan, C and NW Yunnan.

228. *Gentiana exigua* Harry Smith in Handel-Mazzetti, Symb. Sin. 7: 957. 1936.

弱小龙胆 ruo xiao long dan

Annuals 3–6 cm tall. Stems purple, erect, fastigiate branched from base, densely papillate. Petiole 1–2 mm, papillate; leaf blade subleathery, rigid, margin cartilaginous and ciliolate, apex acuminate and apiculate, midvein prominent. Basal leaf blades ovate-lanceolate to ovate, 0.7–1.5 cm × 3–9 mm. Stem leaves overlapping, crowded; leaf blade lanceolate, 4–9 × 1–3 mm, smaller toward apex. Flowers few to many, subsessile. Calyx narrowly obconic, 5.5–6.5 mm, tube membranous; lobes linear-lanceolate, 2.5–3 mm, as long as tube, subleathery, rigid, margin cartilaginous and ciliolate, apex acuminate and apiculate, midvein prominent. Corolla blue, tubular, 6–10 mm; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae ovate-orbicular, 0.8–1.5 mm, margin entire or denticulate, apex obtuse. Stamens inserted at basal part of corolla tube, unequal; filaments 2.5–4 mm; anthers narrowly ellipsoid, 0.5–1 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules obovoid, 3–3.5 mm; gynophore to 5 mm, slender. Seeds light brown, ellipsoid, 0.6–0.8 mm. Fl. and fr. May–Sep.

- Grassland slopes, bog meadows, roadsides in valleys; 1500–3200 m. SW Sichuan, NW Yunnan.

229. *Gentiana cristata* Harry Smith, Notes Roy. Bot. Gard. Edinburgh 26: 251. 1965.

脊突龙胆 ji tu long dan

Annuals or biennials, 2–4.5 cm tall. Stems purple, erect, branched from base, with flowering branches crowded together, densely papillate. Basal leaves withered at anthesis; petiole 1–3 mm; leaf blade broadly ovate to suborbicular, 1–1.5 × 0.7–1 cm, margin cartilaginous and long irregularly ciliate, apex rounded, midvein crested and long irregularly ciliate. Stem leaves widely spaced basally and in middle, crowded apically, petiolate; leaf blade ovate-orbicular, 3–7 × 2–6 mm, margin broadly membranous and long irregularly

ciliate, apex rounded, midvein crested and long irregularly ciliate. Flowers many, solitary or 2 or 3 crowded together, subsessile. Calyx narrowly obconic, 8–9 mm; lobes narrowly triangular, 5–6 mm, margin broadly membranous and long irregularly ciliate, apex acute and apiculate, midvein crested and long irregularly ciliate. Corolla pale blue, tubular, 1–1.2 cm; lobes ovate-triangular, 2–2.5 mm, margin entire, apex acute and apiculate; plicae ovate, 0.8–1 mm, margin entire, apex obtuse. Stamens inserted at basal part of corolla tube, unequal; filaments 2.5–4 mm; anthers ellipsoid, 0.6–0.8 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules narrowly obovoid, 5.5–6.5 mm; gynophore to 5 mm, stout. Seeds light brown, narrowly ellipsoid, 1–1.2 mm. Fl. and fr. Jul.

- Grassland slopes; ca. 4200 m. SE Xizang, NW Yunnan.

230. *Gentiana taliensis* I. B. Balfour & Forrest, Notes Roy. Bot. Gard. Edinburgh 4: 75. 1907.

大理龙胆 da li long dan

Gentiana heterostemon Harry Smith; *G. heterostemon* subsp. *bietii* Harry Smith; *G. heterostemon* subsp. *cavaleriei* Harry Smith; *G. heterostemon* subsp. *glabricaulis* Harry Smith; *G. pedicellata* (Wallich ex D. Don) Grisebach var. *chinensis* Kusnezow.

Annuals 2–10 cm tall, very variable in habit. Stems purple, erect, rigid, branched from base, with flowering branches crowded together, densely papillate. Basal leaves with petiole 1–3 mm; leaf blade lanceolate to elliptic-lanceolate, 1–3 cm × 3–10 mm, margin cartilaginous and ciliolate, apex obtuse, midvein distinct. Stem leaves widely spaced, petiolate; leaf blade narrowly to broadly lanceolate, or ovate-lanceolate, 0.5–2 cm × 1.5–4 mm, smaller toward apex, margin membranous and ciliolate, apex acute to obtuse and aristate, midvein distinct. Flowers many. Pedicel purple, 1.5–3.5 mm, densely papillate. Calyx narrowly obconic, 6–8 mm; lobes lanceolate to ovate-lanceolate, 3.5–4 mm, equal, as long as to longer than tube, margin membranous, apex acute and awned, midvein prominent. Corolla pale blue, tubular-funnelform, 1–1.3 cm; lobes ovate, 2–3 mm, margin entire, apex acute; plicae ovate, 1–1.2 mm, margin entire or emarginate, apex obtuse. Stamens inserted at basal part of corolla tube, unequal, 3 longer and 4–6 mm, 2 shorter and 2.5–3 mm; filaments linear-subulate; anthers ellipsoid, 1.4–1.6 mm. Style 1.5–2 mm; stigma lobes linear. Capsules obovoid, 4–5 mm; gynophore to 7 mm, stout. Seeds brown, ellipsoid to ovoid, 0.5–0.7 mm. Fl. and fr. Mar–Nov.

- Grassland slopes, valleys, forest margins; 1200–2800 m. Guizhou, SW Sichuan, Yunnan [N Myanmar].

231. *Gentiana anisostemon* C. Marquand, Bull. Misc. Inform. Kew 1931: 88. 1931.

异药龙胆 yi yao long dan

Annuals 4–7 cm tall. Stems erect, rigid, fastigiate branched from base, with flowering branches crowded together, glabrous or papillate. Basal leaves withered at anthesis; petiole 0.5–1 mm; leaf blade broadly ovate, 7–10 × 5–8 mm, margin cartilaginous and ciliolate, apex rounded and mucronate, midvein indistinct. Stem leaves overlapping,

petiolate; leaf blade oblong-lanceolate to oblong, 3–9 × 1.5–3.5 mm, margin broadly membranous, apex obtuse and mucronate, midvein indistinct. Flowers few to many. Pedicel 2–4 mm, densely papillate. Calyx narrowly obconic, 7–10 mm; lobes elliptic-lanceolate, 3–4 mm, equal, ca. as long as tube, margin broadly membranous, apex acute and apiculate, midvein indistinct. Corolla blue-purple, funnelform, 1.3–2 cm; lobes ovate-orbicular, 3.5–4.5 mm, margin entire, apex rounded; plicae ovate-oblong to ovate, 2–2.5 mm, margin denticulate, apex obtuse. Stamens inserted at middle of corolla tube, unequal; filaments 3–6 mm; anthers narrowly ellipsoid, 1.5–1.7 mm. Style 2–3 mm; stigma lobes linear. Capsules narrowly obovoid, 6–7 mm; gynophore to 7 mm, stout. Seeds brown, ellipsoid, 1.1–1.3 mm. Fl. and fr. Apr–May.

- Grassland slopes, forests; 3600–4300 m. NW Yunnan.

232. *Gentiana maechanensis* Franchet, Bull. Soc. Bot. France 43: 488. 1896.

马耳山龙胆 ma er shan long dan

Annuals 2–10 cm tall. Stems erect, fastigiate branched from base, with short weak branches, densely purple papillate. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate, 0.7–2.5 × 0.5–1.4 cm, margin cartilaginous and often ciliolate, apex acute; veins 1–3, slender. Stem leaves 4–6 pairs, widely spaced; petiole tube 1–1.5 mm; leaf blade spatulate to obovate, 4–8 × 1.5–5 mm, much shorter than internodes, margin ciliolate, apex rounded and mucronate, midvein slender. Flowers few to many, subsessile. Calyx tubular, 6–6.5 mm; lobes narrowly lanceolate, 3–3.5 mm, as long as tube, equal, margin membranous, apex acute and apiculate, midvein slender. Corolla pale blue, with blue-gray stripes, tubular, 1–1.2 cm; lobes ovate, 1.5–2 mm, margin entire, apex obtuse and mucronate; plicae ovate, 1–1.5 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, unequal, 2 longer and 2.5–3 mm, 3 shorter and 1.5–2 mm; filaments linear-subulate; anthers ellipsoid, 0.7–1 mm. Style 1.5–2 mm; stigma lobes linear. Capsules narrowly obovoid to obovoid, 3–4 mm; gynophore to 8 mm. Seeds light brown, ellipsoid, 0.8–1 mm. Fl. and fr. Apr–Jul.

Grassland slopes, dry hillsides; 2500–3600 m. S Xizang, NW Yunnan [Bhutan, N Myanmar, Sikkim].

233. *Gentiana kunmingensis* S. W. Liu in T. N. Ho, Novon 4: 369. 1994.

昆明龙胆 kun ming long dan

Annuals or biennials, 2–5 cm tall. Stems erect, rigid, fastigiate-branched from base, flowering branches crowded into a capitulum, papillate toward apex. Basal leaves with petiole 1–3 mm; leaf blade spatulate, oblanceolate, or obovate, 0.5–2.2 cm × 3–13 mm, densely pubescent, margin densely ciliolate, apex rounded, midvein prominent. Stem leaves petiolate; leaf blade 5–11 × 1.5–3.5 mm, smaller toward apex, densely pubescent, margin densely ciliolate, apex rounded, midvein distinct. Lower stem leaves widely spaced, shorter than internodes, leaf blade spatulate to obovate; upper leaves crowded, leaf blade elliptic. Flowers

many, subsessile. Calyx narrowly obconic, 7–8 mm, outside pubescent; lobes narrowly triangular, 3–3.5 mm, almost as long as tube, equal, margin membranous and densely ciliolate, apex acute, midvein prominent. Corolla pale yellow, tubular, 8–9 mm, scarcely exceeding calyx; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae ovate, 0.8–1 mm, margin entire or crenulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 1.2–1.5 mm; anthers ellipsoid, 0.4–0.6 mm. Style 1–1.2 mm; stigma lobes linear. Capsules narrowly obovoid to obovoid, 4–4.5 mm; gynophore to 5 mm, stout. Seeds brown, ellipsoid to ovoid, 0.7–1 mm. Fl. and fr. Apr.

- Hillsides; 1800–1900 m. Yunnan (Kunming Shi).

234. *Gentiana papillosa* Franchet, Bull. Soc. Bot. France 31: 374. 1884.

乳突龙胆 ru tu long dan

Annuals 3–5 cm tall. Stems erect, fastigiate branched from base, densely papillate. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate-lanceolate, 7–10 × 2–5 mm, abaxially glabrous, adaxially densely papillate, margin cartilaginous and densely ciliolate, apex obtuse, midvein distinct and papillate. Stem leaves petiole tube 1–1.5 mm, densely papillate; leaf blade spatulate to obovate, 7–10 × 1.5–4 mm, toward stem apex sometimes narrowly elliptic, 3–5 × 0.8–1.2 mm, abaxially glabrous, adaxially densely papillate, margin cartilaginous and densely ciliolate, apex obtuse to rounded and mucronate, midvein distinct and papillate. Flowers many. Pedicel 2–5 mm, densely papillate. Calyx narrowly obconic, 6–7 mm; lobes lanceolate, 3–4 mm, as long as to longer than tube, equal, margin cartilaginous and densely ciliolate, apex acuminate, midvein distinct and papillate. Corolla blue, tubular, 0.9–1.2 cm; lobes ovate, 1–1.5 mm, margin entire, apex obtuse; plicae ovate, 0.8–1.2 mm, margin erose, apex obtuse. Stamens inserted just below middle of corolla tube, equal; filaments 3–4 mm; anthers ellipsoid, 0.5–0.7 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 3–4 mm; gynophore to 8 mm, stout. Seeds light brown, ellipsoid, 0.8–1 mm. Fl. and fr. Apr–Sep.

• Hillsides, roadsides, grasslands; 2200–2800 m. SW Sichuan, C and NW Yunnan.

235. *Gentiana tentyoensis* Masamune, Trans. Nat. Hist. Soc. Taiwan 32: 1. 1942.

厚叶龙胆 hou ye long dan

Annuals 2–3 cm tall. Stems erect, simple, glabrous. Basal leaves with petiole 1–2 mm; leaf blade ovate to obovate, ca. 10 × 8 mm, margin thick herbaceous and ciliolate, apex rounded and mucronate, midvein prominent. Stem leaves petiolate; leaf blade dark green, oblong to orbicular, ca. 6 × 4–6 mm, margin thick herbaceous and ciliolate, apex obtuse, midvein distinct. Flowers subsessile. Calyx narrowly obconic, 7–8 mm; lobes ovate-oblong, 3–3.5 mm, equal, margin ciliolate, apex acuminate, midvein prominent. Corolla purple, campanulate, 1.6–1.8 cm; lobes ovate, 2.5–3 mm, margin entire, apex acuminate. Stamens

inserted at basal part of corolla tube, equal; filaments 3–4 mm; anthers ellipsoid, 1.2–1.5 mm. Ovary narrowly obovoid, ca. 1.2 cm. Style 1–1.2 mm; stigma lobes linear.

- Cliffs near coast. Taiwan.

236. *Gentiana bomiensis* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 43. 1984.

波密龙胆 bo mi long dan

Annuals (4–)7–14 cm tall. Stems erect, fastigiate branched from base, papillate. Basal leaves withered at anthesis; petiole 1–2 mm; leaf blade ovate-orbicular, 0.6–1.5 cm × 2.5–7 mm, margin cartilaginous and ciliolate, apex rounded, veins 1–3. Stem leaves widely spaced; petiole tube 1–1.5 mm; leaf blade spatulate to obovate or upper leaves linear to elliptic, 1.5–5 × 1–5 mm, shorter than internodes, narrowed toward stem apex, margin cartilaginous and ciliolate, apex acuminate to rounded, midvein distinct. Flowers many. Pedicel 5–11 mm, exerted from uppermost leaves. Calyx narrowly obconic, 4–5 mm; lobes lanceolate to triangular, 1.5–1.8 mm, margin narrowly membranous and smooth, apex acute and apiculate, midvein smooth. Corolla blue, with short blackish lines in throat, tubular to narrowly funnelliform, 8–10 mm, to 1.5 cm in fruit; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae ovate-elliptic, 1.5–2 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 2–2.5 mm; anthers ellipsoid, 0.8–1 mm. Style 0.7–1 mm; stigma lobes linear. Capsules narrowly obovoid, 3.5–4.5 mm; gynophore to 2 cm, stout. Seeds brown, ellipsoid, 0.7–1 mm. Fl. and fr. Apr–Sep.

- Meadow slopes, forests; 2100–3600 m. SE Xizang.

237. *Gentiana daochengensis* T. N. Ho, Acta Biol. Plateau Sin. 3(3): 44. 1984.

稻城龙胆 dao cheng long dan

Annuals 1.5–2.5 cm tall, blackish purple. Stems erect, fastigiate branched from base, usually papillate. Petiole longer than blade, margin densely ciliolate; leaf blade spatulate, 3–5 × 2–2.5 mm, margin cartilaginous and ciliolate, apex triangular acute and apiculate, midvein distinct. Flowers many. Pedicel ca. 2 mm, densely papillate. Calyx narrowly obconic, 4–5 mm; lobes triangular, 1.3–1.5 mm, margin membranous and smooth, apex acute, midvein prominent. Corolla dark purple, with yellow-green base, tubular, 9–10 mm; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae oblong, 1.5–1.8 mm, margin denticulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 1.5–2 mm; anthers narrowly ellipsoid, 0.7–0.9 mm. Style 0.5–1 mm; stigma lobes linear. Capsules narrowly obovoid, 3.5–4 mm; gynophore to 8 mm, stout. Seeds brown, ellipsoid, 0.6–0.8 mm. Fl. and fr. Aug.

- Grassland slopes; 3700 m. SW Sichuan.

238. *Gentiana riparia* Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 14: 706. 1841.

河边龙胆 he bian long dan

Annuals 2–8 cm tall. Stem erect, fastigiate branched

from middle with branches crowded into a capitulum, papillate. Leaves overlapping, crowded; petiole tube 1–1.5 mm; leaf blade spatulate to orbicular-spatulate, 5–7 × 1.2–7 mm, narrowed toward stem apex, margin of lower leaves cartilaginous and upper leaves narrowly membranous, apex rounded and mucronate, midvein prominent. Flowers many. Pedicel 2–8 mm, surrounded by upper leaves, papillate. Calyx narrowly obconic, 6.5–8 mm; lobes lanceolate to ovate, 1.2–1.5 mm, margin membranous and smooth, apex obtuse and mucronate, midvein prominent. Corolla blue, funnelliform, 1–1.2 cm; lobes ovate, 2.5–3 mm, margin entire, apex obtuse; plicae ovate, 1.5–2 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 2.5–3 mm; anthers ellipsoid, 1–1.3 mm. Style 1.5–2 mm; stigma lobes oblong. Capsules obovoid, 3–3.5 mm; gynophore to 8 mm. Seeds brown, ellipsoid, 0.8–1 mm. Fl. and fr. Apr–May.

River banks, sandy grasslands; 600–1200 m. Gansu, Shanxi, Xinjiang [Kashmir, Kazakhstan, Mongolia, Russia (Siberia); SW Asia].

239. *Gentiana densiflora* T. N. Ho, Novon 4: 369. 1994.

密花龙胆 mi hua long dan

Annuals 3–13 cm tall. Stems purple, erect, fastigiate branched from base, with short slender branches and 2–6 crowded flowering branches, papillate. Basal leaves withered at anthesis; petiole 2–3 mm; leaf blade ovate to broadly ovate, 1–2.5 × 0.7–1.3 cm, margin cartilaginous and ciliolate, apex obtuse; veins 1–3, slender. Stem leaves widely spaced; petiole tube 1–1.5 mm, abaxially papillate; leaf blade spatulate to obovate, 0.5–1.5(–2) × 0.2–1(–1.5) cm, shorter than internodes, smaller toward stem apex, margin narrowly membranous and ciliolate, apex rounded; veins 1–3, slender. Flowers many. Pedicel purple, 2–3.5 mm, surrounded by upper leaves, papillate. Calyx narrowly obconic, 5–6.5 mm; lobes broadly triangular, 1–2 mm, margin narrowly membranous and smooth, apex acute and apiculate, midvein prominent. Corolla outside pale yellow-green, inside pale blue, tubular, 1–1.3 cm; lobes ovate, 1.5–2 mm, margin entire, apex obtuse; plicae semiorbicular, 0.8–1 mm, margin entire or crenulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 2.5–3 mm; anthers narrowly ellipsoid, 1.3–1.5 mm. Style 1–1.5 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 4.5–6 mm; gynophore to 1.8 cm, stout. Seeds brown, ellipsoid, 1–1.2 mm. Fl. and fr. Apr–Jun.

- Grassland and roadside slopes, wet grasslands, scrub, forest margins, forests; 900–3000 m. Guizhou, E Sichuan.

240. *Gentiana napulifera* Franchet, Bull. Soc. Bot. France 43: 488. 1896.

蕨根龙胆 fu gen long dan

Gentiana sarcorrhiza Ling & Ma ex T. N. Ho.

Perennials 1–4 cm tall. Roots fusiform, 1.5–4.5 cm × 3–4 mm, fleshy. Stems purple, erect, as high as to slightly higher than basal leaves, simple or apically few branched, cespitose, densely papillate. Leaves with petiole tube 0.7–1 mm, margin

ciliolate, abaxially puberulent; leaf blade linear-lanceolate, elliptic, or narrowly obovate, abaxially glabrous, adaxially minutely and densely papillate, margin indistinctly cartilaginous and ciliate, apex acuminate and cuspidate, midvein prominent and densely hirsute. Basal leaves crowded, leaf blades 1.2–2.5 cm × 3–9 mm. Stem leaves 1–3 pairs, widely spaced; leaf blade 4–10 × 1.5–2.5 mm. Flowers 1–3, subsessile. Calyx narrowly obconic, 5–7 mm, tube outside puberulent; lobes linear-lanceolate, 2–3 mm, outside glabrous, margin cartilaginous and densely ciliate, midvein prominent and hirsute, apex acuminate and cuspidate, apically puberulent. Corolla pale blue-purple, funnelform, 1–1.5 cm; lobes ovate, 2–3 mm, margin entire, apex obtuse; plicae ovate-oblong, 1.5–2 mm, margin denticulate, apex truncate. Stamens inserted at middle of corolla tube, equal; filaments 2.5–3 mm; anthers linear, 2–2.2 mm. Style 0.8–1 mm; stigma lobes semiorbicular. Capsules narrowly obovoid, 2.5–3 mm; gynophore to 7 mm. Seeds brown, ellipsoid, 0.6–1 mm. Fl. and fr. Apr–Jul.

• Grassland slopes; 1500–1900 m. SW Sichuan, C and NW Yunnan.

Gentiana napulifera is similar to *G. loureiroi*. Although T. N. Ho recognizes both as distinct species, J. S. Pringle considers *G. napulifera* to be synonymous with *G. loureiroi*.

241. *Gentiana praticola* Franchet, Bull. Soc. Bot. France 43: 489. 1896.

草甸龙胆 cao dian long dan

Perennials 5–11 cm tall. Roots cylindrical, slender, fleshy. Stems purple, erect, dichotomously branched from base, densely papillate. Basal leaves developed, not withered at anthesis; petiole 3–5 mm, margin densely ciliolate; leaf blade elliptic to ovate-lanceolate, 1.5–2.5 cm × 4–7 mm, abaxially glabrous, adaxially densely and minutely papillate, margin indistinctly cartilaginous and densely ciliolate, apex obtuse, midvein distinct and slender. Stem leaves widely spaced; petiole tube 0.5–0.7 mm; leaf blade broadly elliptic to ovate, 5–13 × 2.5–8 mm, shorter than internodes, abaxially glabrous, adaxially densely and minutely papillate, margin indistinctly cartilaginous and densely ciliolate, apex obtuse, midvein slender. Flowers many, 2 or 3 crowded into uppermost leaf axils, subsessile. Calyx campanulate, 6.5–7.5 mm, tube membranous; lobes green, usually recurved, elliptic-lanceolate to elliptic, 2–3 mm, subleathery, margin indistinctly cartilaginous and densely ciliolate, apex acute to caudate, midvein distinct. Corolla blue to dark blue, outside with stripes, broadly tubular, 0.7–1.5 cm; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae semiorbicular, 1–1.2 mm, margin denticulate, apex rounded. Stamens inserted at middle of corolla tube, equal; filaments 2.5–3 mm; anthers ellipsoid, 1–1.5 mm. Style 1–1.5 mm; stigma lobes linear. Capsules obovoid, 4–4.5 mm; gynophore to 8 mm. Seeds brown, ellipsoid, 0.7–0.8 mm. Fl. and fr. Jun–Oct.

• Grassland slopes, dry hillsides, forests; 1200–3200 m. Guizhou, Sichuan, NW Yunnan.

242. *Gentiana loureiroi* (G. Don) Grisebach in A. de

Candolle, Prodr. 9: 108. 1845.

华南龙胆 hua nan long dan

Ericala loureiroi G. Don, Gen. Hist. 4: 192. 1837; *Gentiana pedicellata* (Wallich ex D. Don) Grisebach var. *rosulata* Kusnezow.

Perennials 3–8 cm tall, sometimes with stolons to 2.5 cm. Roots cylindrical, fleshy. Stems purple, erect, simple or few branched, loosely cespitose, densely papillate. Basal leaves usually developed; petiole 3–7 mm, ciliolate; leaf blade elliptic, 1.5–3 cm × 3–5 mm, abaxially glabrous, adaxially densely and minutely papillate, margin indistinctly cartilaginous, densely minute ciliolate, apex obtuse to acute, often mucronate, midvein indistinct or abaxially slender. Stem leaves widely spaced; petiole 5–8 mm, ciliolate; leaf blade lanceolate to elliptic, 4–8 × 1–2.5 mm, shorter than internodes, abaxially glabrous, adaxially densely minute papillate, margin indistinctly cartilaginous and densely minute ciliolate, apex acute, ± cuspidate, midvein indistinct or abaxially slender. Pedicel 4–12 mm, densely papillate. Calyx campanulate, 5–6.5 mm; lobes erect to sometimes spreading, linear-lanceolate to lanceolate, 2.5–4 mm, margin indistinctly membranous and ciliolate, apex acute and cuspidate, midvein indistinct. Corolla blue to blue-purple, rarely outside pale yellow-green, funnelform, 1–1.7 cm; lobes ovate, 2–2.5 mm, margin entire, apex obtuse; plicae ovate-orbicular, 1–1.5 mm, margin entire or denticulate, apex rounded. Stamens inserted at middle of corolla tube, equal; filaments 3–6 mm; anthers 1.8–2.5 mm. Style 1.5–2 mm; stigma lobes narrowly oblong. Capsules narrowly obovoid to obovoid, 4.5–5.5 mm; gynophore to 1.8 cm. Seeds brown, ellipsoid, 0.7–0.9 mm. Fl. and fr. Feb–Sep.

Roadside slopes, hillsides, forests; 300–3200 m. Fujian, Guangdong, Guangxi, Hainan, Hunan, Jiangsu, Jiangxi, Taiwan, Zhejiang [Bhutan, NE India, Myanmar, Thailand, Vietnam].

243. *Gentiana arisanensis* Hayata, Icon. Pl. Formos. 6: Suppl. 48. 1917.

阿里山龙胆 a li shan long dan

Gentiana caespitosa Hayata (1908), not M. Martens & Galeotti (1844).

Perennials 4–10 cm tall, with short slender stolons. Stems ascending to erect, rigid, basally much branched and cespitose, glabrous. Leaves crowded, recurved; petiole tube 1–1.5 mm, papillate on margin and abaxially; leaf blade ovate-elliptic to ovate, 5–8 × 2.5–3.5 mm, leathery, rigid, margin thick cartilaginous and ciliolate, apex obtuse, midvein distinct. Flowers subsessile. Calyx funnelform, 7–9 mm; lobes ovate-lanceolate to triangular, 2–3 mm, leathery, margin smooth, apex acute, midvein prominent. Corolla purple, funnelform, 1.7–2 cm; lobes ovate, 3–5 mm, margin entire, sometimes erose, apex obtuse; plicae ovate, 1.5–2 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 4–4.5 mm; anthers ellipsoid, 2–2.2 mm. Style 2.5–3 mm; stigma lobes oblong. Capsules narrowly obovoid, 5–6 mm; gynophore to 2 cm. Seeds brown, ellipsoid, 1–1.2 mm. Fl. and fr. Aug–Oct.

• Alpine grasslands; 2700–3700 m. Taiwan.

244. *Gentiana winchuanensis* T. N. Ho in T. N. Ho & S. W. Liu, Bull. Nat. Hist. Mus. London (Bot.) 23: 59. 1993.

汶川龙胆 wen chuan long dan

Annuals 8–10 cm tall. Stems ascending, branched from base. Leaves widely spaced; petiole 2–3 mm; leaf blade ovate, 4–6 × 2–4 mm, shorter than internodes, margin cartilaginous and ciliolate, apex acute, midvein distinct. Flowers many, sessile. Calyx narrowly obconic, 1.3–1.7 cm; lobes triangular, 1.5–2 mm, margin cartilaginous and ciliolate, apex acuminate, midvein strongly keeled and decurrent basally into conspicuous wings of calyx tube. Corolla blue-purple, with yellow and blackish spots in throat, salverform, 2.5–3 cm; lobes ovate, 6–7 mm, margin entire, apex acute and cuspidate; plicae ovate, 5–6 mm, margin denticulate, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 4.5–5 mm; anthers ellipsoid, 1–1.5 mm. Style 1–1.5 mm; stigma lobes oblong. Capsules narrowly ellipsoid, ca. 1 cm, apex long attenuate; gynophore ca. 5 mm. Seeds brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jul.

• Forests; ca. 2400 m. N Sichuan.

245. *Gentiana piasezkii* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 26: 498. 1880.

陕南龙胆 shan nan long dan

Gentiana pubicaulis Harry Smith.

Annuals 7–10 cm tall. Stems purple, ascending to erect, branched from base, densely papillate. Basal leaves with petiole 2–3 mm; leaf blade involucriform, narrowly elliptic, ovate-elliptic, or ovate, 1.7–2 cm × 4–6 mm, margin densely ciliolate, apex acute to obtuse, veins 1–3. Stem leaves widely spaced; petiole 1–1.5 mm, entirely connate; leaf blade lanceolate, narrowly elliptic, or rarely ovate, 5–9 × 2–3 mm, base obtuse, margin densely ciliolate, apex obtuse, veins 1–3. Flowers few to many. Pedicel purple, 4–8 mm, surrounded

by upper leaves, densely purple papillate. Calyx narrowly obconic, 1–1.2 cm; lobes triangular, 2.5–3 mm, apex acute, midvein strongly keeled and decurrent basally into conspicuous wings of calyx tube. Corolla blue-purple to purple, with pale yellow-green base, and with blackish short lines in throat, salverform, 1.7–2.2 cm; lobes ovate, 4–5 mm, margin entire, apex obtuse; plicae ovate, 2–3 mm, margin entire or 2-cleft. Stamens inserted at middle of corolla tube, equal; filaments 4–5 mm; anthers narrowly ellipsoid, 1.5–2 mm. Style 2–4 mm; stigma lobes linear. Capsules narrowly obovoid, 6–8 mm, apex long attenuate; gynophore to 2.5 cm. Seeds light brown, ellipsoid, 1–1.2 mm. Fl. and fr. Apr-Sep.

• River banks, roadsides, valleys, meadow slopes, forests; 1000–4300 m. SE Gansu, N Sichuan.

246. *Gentiana shaanxiensis* T. N. Ho in T. N. Ho & S. W. Liu, Bull. Nat. Hist. Mus. London (Bot.) 23: 59. 1993.

陕西龙胆 shan xi long dan

Annuals 7–12 cm tall. Stems purple, ascending, branched from base, densely papillate. Basal leaves with petiole 2–3 mm; leaf blade narrowly elliptic, 2.5–4.2 cm × 3–8 mm, margin densely ciliolate, apex obtuse, midvein prominent. Stem leaves widely spaced; petiole 2–3 mm; leaf blade linear, 0.9–2.2 cm × 1.5–3 mm, base obtuse, margin densely ciliolate, apex acuminate, midvein prominent. Pedicel 2–10 mm, densely purple papillate. Calyx narrowly obconic, 2–2.7 cm, extending to corolla throat; lobes linear, 6–8 mm, margin densely ciliolate, apex acuminate, midvein strongly keeled and decurrent basally into conspicuous wings of calyx tube. Corolla purple, salverform, 2.5–3.5 cm; lobes lanceolate, 6–8 mm, margin entire, apex acuminate and caudate; plicae ovate, 4–5 mm, margin entire or denticulate, apex acute. Stamens inserted at middle of corolla tube, equal; filaments 5–5.5 mm; anthers linear, 1.5–2 mm. Style 4–5 mm; stigma lobes linear. Capsules narrowly obovoid, 0.9–1.1 cm, apex long attenuate; gynophore 2.5–4 cm. Seeds light brown, ellipsoid, 1–1.2 mm. Fl. and fr. Jul.

• Hillsides. Shaanxi.

XII. Sect. *Fimbricorona* T. N. Ho, Bull. Brit. Mus. (Nat. Hist.), Bot. 20(2): 184. 1990.

喉毛组 hou mao zu

Annuals. Corolla throat with a ring of multicellular hairs (not to be confused with fimbriate plicae between corolla lobes). Capsules obovoid, conspicuously winged; wing broad at apex but gradually narrowed toward base. Seed coat minutely reticulate.

Four species; Bhutan, SW China, Kashmir, Myanmar; two species in China.

247. *Gentiana cuneibarba* Harry Smith, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 102. 1926.

髯毛龙胆 ran mao long dan

Annuals 4.5–7 cm tall. Stems ascending, branched from base, papillate. Basal leaves withered at anthesis; petiole 2–3 mm; leaf blade ovate-elliptic to ovate, 5.5–7.5 × 2–4 mm, margin cartilaginous and ciliolate, apex acute and apiculate, veins 1–3. Stem leaves widely spaced, folded; petiole tube 0.5–1.5 mm; leaf blade linear to linear-lanceolate, 2.5–10 × 1–1.5 mm, margin ± ciliolate with lower stem leaves

cartilaginous and upper stem leaves membranous, apex acuminate and apiculate, midvein distinct. Flowers few to many. Pedicel 2–4 mm, surrounded by upper leaves, papillate. Calyx tubular, 9–10 mm; lobes linear-lanceolate, 3.5–6 mm, margin ± ciliolate with basal half membranous and apical half cartilaginous, apex acuminate and apiculate, midvein prominent. Corolla blue-purple but throat white with dark spots, tubular, 1.7–2.1 cm, throat hairs ca. 2 mm and in 5 fascicles; lobes ovate-elliptic, 3–4 mm, margin entire, apex obtuse; plicae ovate, 2–2.5 mm, margin erose, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments

1–1.5 mm; anthers ellipsoid, 1–1.2 mm. Style filiform, 4–5 mm; stigma lobes broadly oblong. Capsules narrowly obovoid, 6–7 mm, conspicuously winged; gynophore 3.5–4.5 mm, stout. Seeds brown, narrowly ellipsoid, 0.9–1.1 mm. Fl. and fr. Aug–Oct.

Grassland slopes, forests; 3100–4000 m. SE Xizang, NW Yunnan [Bhutan, N Myanmar].

248. *Gentiana faucipilosa* Harry Smith, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 102. 1926.

毛喉龙胆 mao hou long dan

Gentiana faucipilosa var. *caudata* C. Marquand.

Annuals 5–10 cm tall. Stems ascending, branched from base, papillate. Basal leaves withered at anthesis; petiole 2–3 mm, membranous; leaf blade ovate-elliptic to ovate-orbicular, 0.7–1.3 cm × 4–7 mm, margin cartilaginous and ± ciliate, apex acute and cuspidate, veins 1–3. Stem leaves widely spaced, folded; petiole tube 1–1.5 mm, membranous, adaxially papillate; leaf blade linear to linear-lanceolate, 3–11 × 1–1.5 mm, margin ± ciliate with lower stem leaves cartilaginous and upper stem leaves membranous, apex acuminate and apiculate, midvein distinct. Flowers few to many. Pedicel 2–6 mm, surrounded by upper leaves, papillate. Calyx tubular to narrowly obconic, 7–9 mm; lobes linear-lanceolate, 3.5–5 mm, apex acuminate and apiculate, midvein prominent, margin ± ciliate with basal half membranous and apical half cartilaginous. Corolla blue, with greenish yellow base, tubular, 1–2.1 cm, throat hairs scattered; lobes ovate-elliptic, 3–4.5 mm, margin entire to 3-dentate, apex acuminate; plicae ovate, 2–3 mm, margin entire or denticulate, apex obtuse. Stamens inserted just below middle of corolla tube, equal; filaments 3–4 mm; anthers ellipsoid, 0.8–1 mm. Style 1–2 mm; stigma lobes oblong. Capsules narrowly obovoid to obovoid, 4–5 mm, conspicuously winged; gynophore to 1.5 cm. Seeds brown, ellipsoid, 0.8–1 mm. Fl. and fr. Jun–Oct.

Grasslands on gravel places, forests; 2200–3800 m. SE Xizang, NW Yunnan [Bhutan].

