

148. GLYCYRRHIZA Linnaeus, Sp. Pl. 2: 741. 1753.

甘草属 gan cao shu

Bao Bojian (包伯坚); Kai Larsen

Liquiritia Medikus.

Subshrubs or perennial herbs. Roots and rhizomes very developed. Stem erect, much branched. Leaves imparipinnate, (3 or)5–17-foliolate; stipules 2, free, caducous or persistent; leaflets entire or serrulate. Racemes axillary; bracts caducous. Calyx campanulate or cylindrical, 5-toothed, slightly bilabiate. Corolla white, yellow, purple, or purple-red; standard shortly clawed; wings shorter than standard, obliquely oblong; keels joined. Stamens diadelphous or monadelphous. Ovary sessile, 2–10-ovuled. Legume ovoid, oblong, or linear, rarely moniliform, straight or curved, flat or inflated, prickly or rarely smooth, indehiscent or dehiscent. Seeds reniform or orbicular.

About 20 species: mainly in Asia and Europe, extending to Australia, and in North and South America; eight species (two endemic) in China.

- 1a. Legume orbicular, reniform, or ovoid, yellow spiny or tuberculate, with 2 seeds; leaflets lanceolate to oblong, margin spiny-serrulate.
 - 2a. Legume tuberculate; racemes not globose; leaflets retuse or obtuse at apex 8. *G. squamulosa*
 - 2b. Legume rigidly spiny; racemes globose or oblong; leaflets acuminate at apex.
 - 3a. Racemes oblong or globose; legume abruptly acuminate at apex, sparsely rigidly spiny 6. *G. pallidiflora*
 - 3b. Racemes globose or subglobose; legume cuspidate at apex, densely rigidly spiny 7. *G. yunnanensis*
- 1b. Legume linear, oblong, or orbicular, scaly glandular punctate, glandular hairy, or smooth, rarely tuberculate, with 2–8 seeds; leaflets elliptic, oblong, or ovate, rarely lanceolate.
 - 4a. Legume moniliform, smooth 5. *G. aspera*
 - 4b. Legume not moniliform, scaly glandular punctate, glandular hairy, or tuberculate.
 - 5a. Legume zigzag 3. *G. glandulosa*
 - 5b. Legume not zigzag.
 - 6a. Legume linear, falcate or curved into a ring 1. *G. uralensis*
 - 6b. Legume oblong, straight or slightly curved.
 - 7a. Leaflets 3–7(–9); calyx with upper 2 teeth joined to 1/2 from base 2. *G. inflata*
 - 7b. Leaflets 11–17; calyx with upper 2 teeth mostly joined 4. *G. glabra*

1. *Glycyrrhiza uralensis* Fischer ex Candolle, Prodr. 2: 248. 1825.

甘草 gan cao

Glycyrrhiza asperrima Linnaeus f. var. *desertorum* Regel; *G. asperrima* var. *uralensis* (Fischer ex Candolle) Regel; *G. shiheziensis* X. Y. Li.

Herbs, perennial. Roots and rhizomes strong. Stem 30–120 cm tall, densely scaly glandular punctate and white or brown tomentose. Leaves 5–20 cm, 5–17-foliolate; stipules triangular-lanceolate, ca. 5 × 2 mm, densely white pubescent; petiole densely brown glandular punctate and pubescent; leaflets ovate, narrowly ovate, or orbicular, 1.5–5 × 0.8–3 cm, densely glandular punctate and pubescent, base rounded, margin entire or repand, apex obtuse and mucronate. Racemes much flowered; rachis shorter than leaf, densely brown glandular punctate and pubescent; bracts brown, oblong-lanceolate, 3–4 mm, membranous, yellow glandular and pubescent. Calyx campanulate, 7–14 mm, densely yellow glandular punctate and pubescent, inflated to saccate at base, 5-toothed; upper 2 teeth mostly joined. Corolla purple, white, or yellow, 1–2.4 cm; standard oblong, base shortly clawed, apex retuse; wings shorter than standard; keel shorter than wings. Ovary densely glandular. Legume falcate to curved into a ring, densely tuberculate and glandular hairy. Seeds 3–11, dark green, orbicular or reniform, ca. 3 mm.

Fl. Jun–Aug, fr. Jul–Oct. $2n = 16^*$.

Sandy lands, dry riverbanks, grasslands on hills; 400–2700 m. Gansu, Hebei, Heilongjiang, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan].

2. *Glycyrrhiza inflata* Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 11: 484. 1891.

胀果甘草 zhang guo gan cao

Glycyrrhiza eurycarpa P. C. Li; *G. hediniana* Harms; *G. paucifoliolata* Hance.

Herbs, perennial. Roots and rhizomes strong. Stem 50–150 cm tall, woody at base. Leaves 4–20 cm, 3–7(or 9)-foliolate; stipules caducous, brown, triangular-lanceolate, small, ca. 1 mm; petiole densely brown glandular punctate, densely pubescent when young; leaflets ovate, elliptic, or oblong, 2–6 × 0.8–3 cm, brown glandular punctate, sparsely pubescent on veins, base rounded, margin somewhat undulate, apex acute or obtuse. Racemes with rachis shorter than or ca. as long as leaves, densely glandular punctate, densely hairy when young; bracts oblong-lanceolate, ca. 3 mm, densely glandular punctate and pubescent. Calyx campanulate, 5–7 mm, densely glandular punctate and pubescent, 5-toothed; upper 2 teeth joined to 1/2 from base. Corolla purple or light purple; standard narrowly elliptic, 6–9(–12) × 4–7 mm, base shortly clawed, apex

rounded; wings ca. as long as standard, obviously auriculate and clawed; keel shorter, auriculate and clawed. Legume straight or slightly curved, elliptic or oblong, 8–30 × 5–10 mm, inflated or somewhat constricted between seeds, brown glandular punctate and glandular hairy, sparsely villous. Seeds 1–4, green, orbicular, 2–3 mm in diam. Fl. May–Jul, fr. Jun–Oct. $2n = 16^*$.

Riverbanks, dry stream banks, margins of farms, wastelands; ca. 1100 m. Gansu, Nei Mongol, Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan, Uzbekistan].

3. *Glycyrrhiza glandulosa* X. Y. Li, Bull. Bot. Res., Harbin 13: 29. 1993.

无腺毛甘草 wu xian mao gan cao

Herbs, perennial. Roots and rhizomes strong. Stem 50–90 cm tall, sparsely brown glandular punctate, prickly, white hairy. Leaves 15–22 cm, 11–15-foliolate; petiole sparsely glandular, prickly, white hairy; leaflets ovate or elliptic, 2.3–4.5 × 0.6–1.4 cm, adaxially sparsely puberulent, densely brown glandular, base rounded or slightly cordate, margin undulate, apex obtuse. Racemes 11–19 cm, ca. as long as or longer than leaves, sparsely glandular, prickly, hairy; bracts lanceolate, white hairy. Calyx campanulate, 9–10 mm, densely brown glandular punctate and pilose; upper 2 teeth nearly joined completely. Corolla 1.2–1.6 cm; standard narrowly elliptic, 13–15 × 3–5.5 mm, base shortly clawed; wings oblong, ca. 6.5 × 1.9–2.5 mm, claw linear, auriculate. Ovary straight, densely puberulent. Legume zigzag, oblong, flat, 12–30 × 5–7 mm, pilose. Seeds 1–9. Fl. Jun–Aug, fr. Jul–Oct. $2n = 16^*$.

• Sandy areas, grasslands on hills; 300–2000 m. Xinjiang.

4. *Glycyrrhiza glabra* Linnaeus, Sp. Pl. 2: 742. 1753.

洋甘草 yang gan cao

Glycyrrhiza alalensis X. Y. Li; *G. brachycarpa* Boissier; *G. glabra* var. *caduca* X. Y. Li; *G. glabra* subsp. *glandulifera* (Waldstein & Kitaibel) Ponert; *G. glabra* var. *glandulifera* (Waldstein & Kitaibel) Regel & Herder; *G. glabra* var. *glandulosa* X. Y. Li; *G. glabra* var. *laxifoliolata* X. Y. Li; *G. glabra* var. *violacea* (Boissier & Noë) Boissier; *G. glandulifera* Waldstein & Kitaibel; *G. pallida* Boissier; *G. violacea* Boissier & Noë; *Liquiritia officinarum* Medikus, nom. illeg. superfl.

Herbs, perennial. Stem 50–150 cm tall, woody at base, densely scaly glandular punctate, white hairy. Leaves 5–14 cm, 11–17-foliolate; stipules caducous, linear, 1–2 mm; petiole densely yellow-brown glandular hairy and villous; leaflets ovate-oblong, oblong-lanceolate, or elliptic, 1.7–4 × 0.8–2 cm, abaxially densely yellow scaly glandular punctate and pubescent on veins, adaxially glabrescent or pilose, base rounded, apex rounded or retuse and with mucro. Racemes much and densely flowered; rachis densely brown scaly glandular punctate, white villous and tomentose; bracts lanceolate, ca. 2 mm, membranous. Calyx campanulate, 5–7 mm, sparsely yellow glandular punctate and pubescent, 5-toothed; upper 2 teeth mostly joined. Corolla purple or light purple, 9–12 mm; standard ovate or oblong, 1–1.1 cm, base clawed, apex retuse; wings 8–9 mm; keel straight, 7–8 mm. Ovary glabrous. Leg-

ume oblong, flat, 17–35 × 4.5–7 mm, rarely constricted between seeds, glabrous or sparsely hairy, rarely glandular hairy. Seeds 2–8, dark green, ca. 2 mm in diam., smooth. Fl. May–Jun, fr. Jul–Sep. $2n = 16^*$.

Margins of farms, roadsides, saline areas; 500–1300 m. Xinjiang [Afghanistan, India, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; N Africa, SW Asia, E and S Europe, Indian Ocean islands (Maldives); introduced in Australia, C Europe, and North America].

5. *Glycyrrhiza aspera* Pallas, Reise Russ. Reich. 1: 499. 1771.

粗毛甘草 cu mao gan cao

Glycyrrhiza asperrima Linnaeus f.; *G. laxiflora* X. Y. Li & D. C. Feng; *G. laxissima* Vassilczenko; *G. macrophylla* X. Y. Li; *G. nutantiflora* X. Y. Li; *G. prostata* X. Y. Li & D. C. Feng; *G. purpureiflora* X. Y. Li.

Herbs, perennial. Roots and rhizomes slender. Stem erect or diffuse, 10–30 cm tall, sparsely pubescent and glandular hairy. Leaves 2.5–10 cm, (5 or) 7- or 9-foliolate; stipules ovate-triangular, 4–6 × 2–4 mm; petiole sparsely pubescent and glandular hairy; leaflets gray-green, ovate, broadly ovate, obovate, or elliptic, 10–30 × 3–18 mm, abaxially sparsely pubescent and glandular hairy, adaxially glabrous, base cuneate, margin small spiny-hairy. Racemes much flowered; rachis longer than leaves, pilose, glandular hairy; bracts linear-lanceolate, 3–6 mm, membranous. Calyx cylindric, 7–12 mm, sparsely pubescent, 5-toothed; upper 2 teeth slightly joined. Corolla light purple or purple; standard oblong, 13–15 × 5–6.5 mm, base narrowed to claw, apex rounded; wings 1.2–1.4 cm; keel 1–1.1 cm. Ovary glabrescent. Legume usually falcate to curved into a ring, brown, moniliform, 1.5–2.5 cm, glabrous. Seeds 2–10, black-brown, orbicular. Fl. May–Jun, fr. Jul–Aug. $2n = 16^*$.

Margins of farms, riverbanks, steppes; 100–800 m. Gansu, Nei Mongol, Qinghai, Shaanxi, Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Turkmenistan, Uzbekistan; C and SW Asia, Europe (native only in Russia)].

6. *Glycyrrhiza pallidiflora* Maximowicz, Prim. Fl. Amur. 79. 1859.

刺果甘草 ci guo gan cao

Herbs, perennial. Stem 1–1.5 m tall, striped, densely yellow-brown scaly glandular punctate, nearly glabrous. Leaves 6–20 cm, 9–15-foliolate; stipules lanceolate, ca. 5 mm; petiole glabrous, densely glandular punctate; leaflets lanceolate or ovate-lanceolate, 2–6 × 1.5–2 cm, glabrous, densely scaly glandular punctate, base cuneate, margin serrulate, apex acuminate with mucro. Racemes much flowered, oblong or globose; rachis shorter than leaves, densely brown glandular punctate and pubescent; bracts ovate-lanceolate, 6–8 mm, membranous, glandular punctate. Calyx campanulate, 4–5 mm, densely glandular punctate and sparsely pubescent at base, lanceolately 5-toothed. Corolla light purple, purple, or purple-red; standard ovate, 6–8 mm, base shortly clawed, apex rounded; wings 5–6 mm; keel shorter than wings. Legume ovoid, 10–17 × 6–8 mm, rigidly spiny, apex abruptly acuminate. Seeds 2, black, ca. 2 mm. Fl. Jun–Jul, fr. Jul–Sep. $2n = 16^*$.

Riverbanks, open valleys by streams, open slopes, margins of

farms, roadsides; 2600–3100 m. Hebei, Heilongjiang, Henan, N and NE Jiangsu, Liaoning, Nei Mongol, Shaanxi, Shandong, Yunnan [Mongolia, Russia].

7. *Glycyrrhiza yunnanensis* S. H. Cheng & L. K. Dai ex P. C. Li, Acta Bot. Boreal.-Occid. Sin. 4: 117. 1984.

云南甘草 yun nan gan cao

Herbs, perennial. Stem 60–100(–120) cm tall, densely scaly glandular punctate, sparsely pubescent. Leaves 8–10 cm, 7–15-foliolate; stipules lanceolate, 5–7 × 2–3 mm, glandular punctate, glabrous; petiole densely scaly glandular punctate, densely villous; leaflets lanceolate or ovate-lanceolate, 2–5 × 0.7–1.5 cm, densely scaly glandular punctate, sparsely pubescent, base cuneate, apex acuminate. Racemes much flowered, globose or subglobose; rachis shorter than leaf, densely scaly glandular punctate, villous when young; bracts lanceolate, 6–7 mm, densely glandular punctate. Calyx campanulate, ca. 5 mm, sparsely scaly glandular punctate and pubescent, 5-toothed; upper 2 teeth partly joined. Corolla purple; standard narrowly ovate or elliptic, 6–9 mm, very shortly clawed; wings 5–6 mm; keel slightly shorter than wings, clawed, auriculate. Legume dense, narrowly ovoid, 12–18 × 4–6 mm, densely spiny, apex cuspidate. Seeds brown, ca. 4 mm. Fl. May–Jun, fr. Jul–Sep. $2n = 16^*$.

• Near forests, open grassy slopes, farms, roadsides; ca. 2700 m. Yunnan.

8. *Glycyrrhiza squamulosa* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 5: 245; Pl. David. 1: 93. 1883.

圆果甘草 yuan guo gan cao

Astragalus glanduliferus Debeaux.

Herbs, perennial. Roots and rhizomes slender. Stem 30–60 cm tall, densely yellow scaly glandular punctate, glabrous or sparsely pubescent. Leaves 5–15 cm, 9–13-foliolate; stipules lanceolate, 2–3 mm, sparsely white pubescent, glandular punctate; petiole densely scaly glandular punctate, sparsely pubescent; leaflets narrowly elliptic to oblong-obovate, densely scaly glandular punctate, base cuneate, margin serrulate, apex usually retuse. Racemes much flowered; rachis longer than leaves, densely scaly glandular punctate, sparsely pubescent; bracts lanceolate, membranous, glandular punctate, pubescent. Calyx campanulate, 2.5–3.5 mm, densely scaly glandular punctate, sparsely pubescent, 5-toothed; upper 2 teeth slightly joined. Corolla white, abaxially densely yellow glandular punctate; standard ovate-oblong, 5–7 × 2.5–3.5 mm; wings 4–5 mm; keel straight, slightly shorter than wings. Legume brown, orbicular or broadly reniform, 5–10 × 4–7 mm, tuberculate, apex mucronate. Seeds 2, green, ca. 2 mm. Fl. May–Jul, fr. Jun–Sep.

Roadsides, wastelands; 100–1100 m. Hebei, Henan, Nei Mongol, Ningxia, Shaanxi, Shanxi, Xinjiang [Mongolia].

