

26. Tribe HEDYSAREAE

岩黄耆族 yan huang qi zu

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Herbs, shrublets, shrubs, or rarely small trees. Stipules often scarious, usually basally adnate to petiole and sometimes connate around stem. Leaves imparipinnate, paripinnate, 1-foliolate, or sometimes rachis reduced and apparently digitately compound; stipels absent; leaflets opposite, margin entire. Racemes axillary, sometimes shortened and apparently fasciculate or reduced to a solitary flower; bract and bracteoles small. Corolla marcescent or deciduous; standard generally narrowed to a short claw; wings sometimes very reduced; keel with leading edge \pm truncate. Stamens diadelphous (9+1); vexillary stamen free or connate in middle with others; anthers uniform, dorsifixed, with broad connective. Ovary 1- to several ovuled. Legume mostly articulate and moniliform or flattened, some not articulate or reduced to a single article (here termed a loment), indehiscent, often with bristles or spines. Seeds reniform or subreniform, with a small hilum.

Twelve genera and 400–460 species: N and NE Africa, Asia, Europe, North America; eight genera and 121 species (52 endemic, one introduced) in China.

- 1a. Leaves 1-foliolate (but also see *Corethroedendron scoparium*) 153. *Alhagi*
- 1b. Leaves pinnately compound or sometimes rachis reduced and leaves apparently digitately compound.
 - 2a. Leaves paripinnate with rachis often extending beyond last leaflet pair or rachis reduced and leaves apparently digitate.
 - 3a. Flowers solitary with pedicel articulate with a very short peduncle or 2–5 in a fascicle at end of a very short peduncle; legume cylindric or compressed 155. *Caragana*
 - 3b. Flowers 2–5 in a raceme with a 1.5–3 cm peduncle; legume inflated 156. *Halimodendron*
 - 2b. Leaves imparipinnate.
 - 4a. Legume reduced to 1 subglobose loment; annual or perennial herbs; corolla wings ca. 1/4 as long as standard 151. *Onobrychis*
 - 4b. Legume articulate and divided into (1 or) 2–5(–7) loments or else cylindric or linear and multiseeded; perennial herbs, shrublets, shrubs, or rarely small trees; corolla wings 2/5 to as long as standard, or if 1/4–1/3 as long as standard then shrublets.
 - 5a. Legume cylindric or linear and not divided into loments 154. *Calophaca*
 - 5b. Legume articulate and divided into several loments.
 - 6a. Plants spiny 152. *Eversmannia*
 - 6b. Plants unarmed.
 - 7a. Legume adaxial suture grooved; corolla standard not turned backward at anthesis, keel with claw longer than half of lamina; shrublets with stems conspicuous; corolla marcescent on mature legume; stipules deciduous; pollen colpoidate 149. *Corethroedendron*
 - 7b. Legume sutures connate or winged; corolla standard turned backward at anthesis, keel with claw half or less than half as long as lamina; perennial herbs, if shrublets then stems inconspicuous; corolla mostly deciduous at mature legume; stipules marcescent or deciduous; pollen colpate or colpoidate 150. *Hedysarum*

149. CORETHRODENDRON Fischer & Basiner, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg 4: 315. 1845.

山竹子属 shan zhu zi shu

Xu Langran (徐朗然 Xu Lang-rang); Byoung-Hee Choi

Shrublets. Stems conspicuous. Stipules 2, opposite petiole, scarious, connate or free, deciduous. Leaves imparipinnate; leaflet blades opposite, margin entire. Racemes axillary, lax, many flowered; bracts marcescent or caducous. Bracteoles 2 at base of calyx. Calyx campanulate or obliquely campanulate; teeth 5, unequal or subequal. Corolla purple or pinkish purple, marcescent on mature legumes; standard longer than wings, slightly longer than keel, not turned backward at anthesis; keel with claw longer than half of lamina. Stamens diadelphous (9+1). Ovary sessile, hairy. Legume articulate, divided into several loments, indehiscent, adaxial suture grooved; loments compressed or biconvex, lanate, pubescent, or glabrous, with or without prickles.

Five species: China, Kazakhstan, Mongolia, Russia; five species (one endemic) in China.

- 1a. Leaves at apex without leaflet to only 1 at terminating rachis; legume densely lanate 1. *C. scoparium*
- 1b. Leaves normally imparipinnate; legume glabrous to pubescent.

- 2a. Calyx tube split between adaxial or lateral teeth; leaflet blades 15–31, broadly ovate to suborbicular.
 3a. Calyx obliquely campanulate, tube split between adaxial teeth 2. *C. multijugum*
 3b. Calyx 2-labiate, tube split between adaxial and lateral teeth 3. *C. krassnowii*
 2b. Calyx tube not split between teeth; leaflet blades (5–)11–19(–21), oblong, elliptic, broadly linear, or lanceolate.
 4a. Legume pubescent and prickly 4. *C. fruticosum*
 4b. Legume glabrous 5. *C. lignosum*

1. *Corethrodedron scoparium* (Fischer & C. A. Meyer) Fischer & Basiner, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 4: 315. 1845.

细枝山竹子 xi zhi shan zhu zi

Hedysarum scoparium Fischer & C. A. Meyer, Enum. Pl. Nov. 1: 87. 1841; *H. arbuscula* Maximowicz.

Shrublets, 0.7–2(–3) m tall. Stems pale yellow to brown, erect, with fibrous stripping. Stipules ovate-lanceolate, 5–6 mm, basally connate. Leaves 10–25 cm, basal ones 7–11-foliolate, apical ones 3- or 5-foliolate or sometimes none; leaflet blades linear-oblong to narrowly lanceolate, 1.5–3 × 0.3–0.6 cm, abaxially pilose, adaxially pubescent to glabrous. Racemes lax, with many flowers; bracts ovate, 1–1.5 mm; peduncle longer than leaves. Pedicel 2–3 mm. Calyx campanulate, 5–6 mm, pubescent; teeth triangular, unequal, abaxial 3 longer than adaxial 2. Corolla purple; standard obovate-orbicular, 1.5–1.9 cm; wings ca. 1/2 as long as standard; keel slightly shorter than standard. Ovary pubescent. Legume divided into 2–4 loments; loments broadly ovoid, 5–6 × 3–4 mm, inflated, densely white lanate. Fl. Jun–Sep, fr. Aug–Oct. $2n = 16^*$.

Sandy areas in deserts and semideserts; 600–1100 m. Gansu, W Nei Mongol, Ningxia, Qinghai, N Shaanxi, N Xinjiang [Kazakhstan, S Mongolia].

Plants of this species are important in arid regions for dune-fixing.

2. *Corethrodedron multijugum* (Maximowicz) B. H. Choi & H. Ohashi, Taxon 52: 573. 2003.

红花山竹子 hong hua shan zhu zi

Hedysarum multijugum Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 27: 464. 1881; *H. multijugum* f. *albiflorum* Y. H. Wu.

Shrublets, 30–70 cm tall. Stems caespitose, erect. Stipules ovate-lanceolate, 4–6 mm, basally connate. Leaves 6–18 cm, 15–29-foliolate; leaflet blades broadly ovate to suborbicular, 5–8(–15) × 3–5(–8) mm, abaxially pubescent, adaxially glabrous. Racemes lax, with many flowers; peduncle conspicuously longer than leaves. Pedicel 1–2 mm; bracteoles ± as long as pedicel. Calyx obliquely campanulate, 5–6 mm, pubescent; tube split ca. 1/2 between adaxial teeth; teeth subulate, 1/4–1/3 as long as tube, most abaxial one ca. 2 × as long as others. Corolla purple, pinkish purple, or rarely white; standard broadly ovate, 1.7–2 cm; wings ca. 1/2 as long as standard; keel slightly shorter than wings. Ovary pubescent. Legume usually divided into 2 or 3 loments; loments ellipsoid to semiglobose, 3.5–4.5 × 3–4 mm, pubescent and prickly. Fl. Jun–Aug, fr. Aug–Sep.

• Gravelly areas, stony slopes; 500–3800 m. Gansu, Hebei, W Henan, W Hubei, W Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, NW Sichuan, NE Xizang.

3. *Corethrodedron krassnowii* (B. Fedtschenko) B. H. Choi & H. Ohashi, Taxon 52: 573. 2003.

帕米尔山竹子 pa mi er shan zhu zi

Hedysarum krassnowii B. Fedtschenko, Bull. Herb. Boissier, sér. 2, 4: 916. 1904.

Shrublets, 60–100 cm tall. Stems erect, many branched, internodes short. Stipules brown, lanceolate, basally connate. Leaves 9–20 cm, 15–31-foliolate; leaflet blades elliptic to almost orbicular, 3–9 × 3–7 mm, abaxially slightly unevenly sericeous, adaxially glabrous, base subrounded to slightly cuneate, apex obtuse to slightly emarginate. Racemes lax, 6–16-flowered; peduncle ca. 2 × as long as leaves. Pedicel ca. 2 mm. Calyx teeth almost as long as tube. Corolla purple, 1.1–1.8 cm; standard obovate, apex emarginate; wings narrowly lanceolate, to almost 2 × as long as keel; keel almost semiorbicular to oblong, shorter than standard. Legume sericeous; loments 1 or 2, 4–7 × 4–6 mm. Fl. Jun–Jul, fr. Jul.

Mountain slopes, roadsides; 2100–3000 m. W Xinjiang (Pamir Shan) [Kyrgyzstan, Tajikistan].

4. *Corethrodedron fruticosum* (Pallas) B. H. Choi & H. Ohashi, Taxon 52: 573. 2003.

山竹子 shan zhu zi

Shrublets, 30–80 cm tall. Stems caespitose, erect. Stipules ovate-lanceolate, 4–5 mm, basally connate. Leaves 8–14 cm, 11–19-foliolate; leaflet blades elliptic to oblong, 1.4–2.2 × 0.3–0.6 cm, abaxially densely pubescent, adaxially sparsely pubescent. Racemes lax, with many flowers; bracts triangular-ovate, ca. 1 mm; peduncle longer than leaves. Pedicel 2–3 mm. Calyx campanulate, 5–6 mm, pubescent; teeth triangular, ± equal, ca. 1/2 as long as tube. Corolla purple; standard obovate-orbicular, 1.4–2 cm; wings ca. 1/3 as long as standard; keel slightly shorter than standard. Ovary pubescent. Legume divided into 2 or 3 loments; loments ellipsoid, 5–7 × 3–4 mm, inflated, pubescent, prickly or not. Fl. Jul–Aug, fr. Aug–Sep.

Sandy areas in steppes; 600–1100 m. Heilongjiang, Jilin, W Liaoning, NE Nei Mongol [E Mongolia, E Russia].

Plants of this species are cultivated for sand-dune stabilization and for fodder.

- 1a. Loments prickly 4a. var. *fruticosum*
 1b. Loments not prickly 4b. var. *mongolicum*

4a. *Corethrodedron fruticosum* var. *fruticosum*

山竹子(原变种) shan zhu zi (yuan bian zhong)

Hedysarum fruticosum Pallas, Reise Russ. Reich. 3: 753. 1776.

Loments pubescent and prickly.

Sandy areas in steppes; ca. 1100 m. Heilongjiang, Jilin, W Liaoning, NE Nei Mongol [E Mongolia, E Russia].

4b. *Corethrodedron fruticosum* var. *mongolicum* (Turczaninow) Turczaninow ex Kitagawa, Lin. Fl. Manshur. 285. 1939.

蒙古山竹子 meng gu shan zhu zi

Hedysarum mongolicum Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 15: 781. 1842; *H. fruticosum* var. *gobicum* Y. Z. Zhao, R. Sha & R. Cao; *H. fruticosum* subsp. *mongolicum* (Turczaninow) B. Fedtschenko; *H. fruticosum* var. *mongolicum* (Turczaninow) Turczaninow ex Kitagawa.

Loments pubescent but not prickly.

- Sandy areas; 600–800 m. W Liaoning, NE Nei Mongol.

Corethrodedron fruticosum var. *mongolicum* was reported from Ningxia (Fl. Ningxiaensis, ed. 2, 1: 487. 2007), but this occurrence needs to be confirmed.

5. *Corethrodedron lignosum* (Trautvetter) L. R. Xu & B. H. Choi, **comb. nov.**

木山竹子 mu shan zhu zi

Shrublets, 60–100 cm tall. Stems caespitose, erect. Stipules ovate-lanceolate, 4–5 mm, basally connate. Leaves 10–20 cm, (5–)11–21-foliolate; leaflet blades broadly linear, lanceolate, or elliptic, 2–3 × 0.2–0.4(–0.6) mm, abaxially pubescent, adaxially sparsely pubescent or glabrous. Racemes lax, with 8–12 flowers; bracts triangular, 1/4–1/3 as long as pedicel; peduncle longer than leaves. Pedicel 3–4 mm. Calyx campanulate, 4–5 mm, pubescent; teeth shortly triangular or triangular, ca. 1/3 or 1/2 as long as tube. Corolla purple; standard obovate, 1.8–2 cm; wings ca. 1/4 or 1/3 as long as standard; keels ± as long as wings. Ovary pubescent. Legume divided into 2 or 3 loments; loments ellipsoid, 4–6 × 3–4 mm, inflated, glabrous. Fl. Jul–Aug, fr. Aug–Sep.

Sandy areas. W Liaoning, Nei Mongol, E Ningxia, N Shaanxi, NW Shanxi [Mongolia].

- 1a. Calyx teeth triangular, ca. 1/2 as long as tube; wings ca. 1/3 as long as standard ... 5a. var. *lignosum*
- 1b. Calyx teeth shortly triangular, ca. 1/3 as long as tube; wings ca. 1/4 as long as standard 5b. var. *laeve*

5a. *Corethrodedron lignosum* var. *lignosum*

木山竹子(原变种) mu shan zhu zi (yuan bian zhong)

Basionym: *Hedysarum lignosum* Trautvetter, Trudy Imp. S.-Peterburgsk. Bot. Sada 1: 176. 1872; *H. fruticosum* Pallas var. *hybridum* H. C. Fu; *H. fruticosum* subsp. *lignosum* (Trautvetter) B. Fedtschenko; *H. fruticosum* var. *lignosum* (Trautvetter) Kitagawa.

Calyx teeth triangular, ca. 1/2 as long as tube. Corolla wings ca. 1/3 as long as standard.

Sandy areas. W Liaoning, NE Nei Mongol [Mongolia].

5b. *Corethrodedron lignosum* var. *laeve* (Maximowicz) L. R. Xu & B. H. Choi, **comb. nov.**

塔落山竹子 ta luo shan zhu zi

Basionym: *Hedysarum laeve* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 27: 464. 1881; *H. fruticosum* subsp. *laeve* (Maximowicz) B. Fedtschenko; *H. fruticosum* var. *laeve* (Maximowicz) H. F. Fu ex L. R. Xu.

Calyx teeth shortly triangular, ca. 1/3 as long as tube. Corolla wings ca. 1/4 as long as standard.

- Sandy areas. Nei Mongol, E Ningxia, N Shaanxi, NW Shanxi.

Plants of this taxon are effective for dune-fixing.

150. *HEDYSARUM* Linnaeus, Sp. Pl. 2: 745. 1753, nom. cons.

岩黄耆属 yan huang qi shu

Xu Langran (徐朗然 Xu Lang-rang); Byoung-Hee Choi

Stracheya Benth.

Herbs, rarely shrublets or shrubs. Stipules 2, opposite petiole, scarious, connate or free, marcescent or deciduous. Leaves imparipinnate; leaflet blades opposite, margin entire. Racemes axillary, lax to capitate; bracts marcescent or caducous. Bracteoles 2, at base of calyx. Calyx campanulate to obliquely campanulate; teeth 5, ± equal or unequal. Corolla purple, pink, yellow, or white; standard usually longer than wings, shorter or rarely as long as or longer than keel, turned backward at anthesis; keel with claw half or less than half as long as lamina. Stamens diadelphous (9+1). Ovary sessile to stipitate, with a few ovules. Legume articulate, usually divided into several loments, indehiscent, sutures connate or winged; loments compressed to biconvex, with veins, ribs, bristles, or spines, margin usually distinct.

About 160 species: N Africa, Asia, Europe, North America; 41 species (17 endemic) in China.

- 1a. Adaxial calyx teeth 1.5–4 × as long as tube; legume usually prickly or ribbed (but unknown for some species); leaflet blades leathery, lateral veins obscure.
- 2a. Legume loments without conspicuous septa, with triangular and irregular prickles along margins; stipules apically connate 1. *H. tibeticum*
- 2b. Legume loments with conspicuous septa, without prickles or with linear and regular prickles along margins; stipules mostly apically distinct.
- 3a. Stems longer than 15 cm.
 - 4a. Corolla pale yellow 29. *H. dahuricum*
 - 4b. Corolla purple or pinkish purple.

- 5a. Corolla wings ca. 2/5 as long as standard 30. *H. brachypterum*
- 5b. Corolla wings 1/2–3/4 as long as standard.
- 6a. Stems ascending, 15–20 cm tall; corolla 1.5–1.7 cm 31. *H. gmelinii*
- 6b. Stems erect to ascending at base, 30–90 cm tall; corolla 1–1.4 cm.
- 7a. Leaflet blades narrowly elliptic to lanceolate, 1–1.2 × 0.3–0.5 cm 32. *H. songaricum*
- 7b. Leaflet blades oblong-ovate, 3–3.5 × 0.6–0.7 cm 33. *H. shanense*
- 3b. Stems 4 cm or less.
- 8a. Leaflet blades adaxially glabrous, subglabrous, or with scattered trichomes.
- 9a. Calyx teeth 2–3 × as long as tube; corolla wings 1/4–1/3 as long as standard; leaflets 4–9 mm 34. *H. petrovii*
- 9b. Calyx teeth 1.5–2 × as long as tube; corolla wings ca. 1/5 as long as standard; leaflets 12–16 mm 35. *H. setigerum*
- 8b. Leaflet blades adaxially sparsely pilose, sparsely pubescent, or pubescent.
- 10a. Leaves 13–24-foliolate 36. *H. kumaonense*
- 10b. Leaves 3–13-foliolate.
- 11a. Leaflet blades ovate or broadly ovate; legume tomentose or pubescent.
- 12a. Leaves 3–7-foliolate 37. *H. iliense*
- 12b. Leaves 7- or 9-foliolate 38. *H. splendens*
- 11b. Leaflet blades narrowly ovate-lanceolate, lanceolate-elliptic, ovate-oblong, narrowly elliptic, ovate, or ovate-elliptic; legume with dense hyaline scalelike trichomes (unknown for *H. setosum*).
- 13a. Stems 1–2 cm; leaflet blades narrowly ovate-lanceolate to lanceolate-elliptic, 1.2–1.5 cm 39. *H. krylovii*
- 13b. Stems inconspicuous; leaflet blades ovate-oblong, narrowly elliptic, ovate, or ovate-elliptic, 0.6–0.9 cm.
- 14a. Corolla 1.2–1.4 cm; calyx 7–8 mm; plants 5–15 cm tall 40. *H. ferganense*
- 14b. Corolla 1.7–2 cm; calyx 8–10 mm; plants 15–20 cm tall 41. *H. setosum*
- 1b. Adaxial calyx teeth ± as long as to shorter than tube; legume surfaces without prickles or ribs; leaflet blades membranous, lateral veins conspicuous.
- 15a. Loments with a ca. 1 mm dentate margin 2. *H. dentatoalatum*
- 15b. Loments with a 0.5 mm or less dentate or entire margin (unknown for *H. xizangense*).
- 16a. Loments pyramidal 3. *H. trigonomerum*
- 16b. Loments ovoid, globose, subglobose, ellipsoid, or rhomboid (unknown for *H. xizangense*).
- 17a. Corolla yellow.
- 18a. Calyx teeth ± equal.
- 19a. Leaves 9–15-foliolate; leaflet blades 1–2 cm wide.
- 20a. Racemes distinctly longer than leaves; loment margins entire 6. *H. flavescens*
- 20b. Racemes ± as long as leaves; loment margins dentate 7. *H. semenovii*
- 19b. Leaves 13–33-foliolate; leaflet blades 0.4–0.7 cm wide.
- 21a. Leaves 13–27-foliolate; leaflet blades long ovate to ovate-lanceolate, abaxially dark brownish and adaxially greenish 4. *H. limitaneum*
- 21b. Leaves 27–33-foliolate; leaflet blades ovate-oblong, abaxially and adaxially greenish 5. *H. thiochroum*
- 18b. Most abaxial calyx tooth 2–3 × as long as others.
- 22a. Bracts marcescent, 1/4–2/3 as long as pedicels 8. *H. polybotrys*
- 22b. Bracts caducous, ca. 2/3 as long as to longer than pedicels.
- 23a. Loment wings inconspicuous, entire; calyx densely pubescent 9. *H. citrinum*
- 23b. Loment wings conspicuous, dentate; calyx sparsely pubescent.
- 24a. Adaxial most calyx tooth 0.7–1.5 × as long as tube, others less than 1/2 as long as tube; pedicel 5–6 mm 10. *H. ussuriense*
- 24b. Adaxial most calyx tooth 1.5–2 × as long as tube, others 1/2 to as long as tube; pedicel 3–4 mm 11. *H. taipeicum*
- 17b. Corolla pinkish purple to dark purple (red but apically dark purple in *H. kirghisorum*, unknown for *H. longigynophorum*).
- 25a. Auricle of corolla wing less than 1/2 as long of claw; calyx teeth subulate, apex long cuspidate 18. *H. falconeri*
- 25b. Auricle of corolla wing as long as claw; calyx teeth triangular, triangular-subulate, or lanceolate, apex not long cuspidate.
- 26a. Leaflet blades adaxially pubescent, sericeous, or tomentose.
- 27a. Corolla wings equal to or longer than keel; calyx with adaxial 2 teeth connate 19. *H. campylocarpon*
- 27b. Corolla wings shorter than keel; calyx teeth not connate.
- 28a. Leaflet blades narrowly ovate to ovate, 20–24 × 7–9 mm; bracteoles shorter, 0.4–0.7 mm; lateral veins conspicuous 28. *H. taoriparium*
- 28b. Leaflet blades broadly ovate to suborbicular, 6–10 × 5–10 mm; bracteoles longer, 3.5–5 mm; lateral veins sometimes inconspicuous 20. *H. pseudastragalus*
- 26b. Leaflet blades adaxially glabrous.

- 29a. Corolla keel shorter than standard and wing, wings not curved upward at apex; legume often inconspicuously constricted between loments at abaxial suture 12. *H. inundatum*
- 29b. Corolla keel longer than standard or wing, wings curved upward at apex; legume conspicuously constricted between loments.
- 30a. Bracts obovate to obtuse, apex usually dentate; rhizomes often with tubercle; leaflet blades obovate, elliptic, or suborbicular 21. *H. algidum*
- 30b. Bracts ovate or obovate, apex acute or acuminate; rhizomes without tubercle; leaflet blades ovate, elliptic, or oblong.
- 31a. Pedicel 1.5–2.5 cm 25. *H. jinchuanense*
- 31b. Pedicel 0.2–0.6 cm.
- 32a. Loments 1 or 2, rhomboid 24. *H. longigynophorum*
- 32b. Loments (1 or)2–5, ovate, obovate, or elliptic.
- 33a. Adaxial calyx teeth 1/5–1/3 as long as tube.
- 34a. Bract marcescent; racemes densely flowered 13. *H. alpinum*
- 34b. Bract caducous; racemes laxly flowered 14. *H. laxiflorum*
- 33b. Adaxial calyx teeth ca. 1/2 as long as to equal to tube.
- 35a. Loments acute at apex; stem and leaves sericeous.
- 36a. Corolla wings longer than standard; leaflet blades 2–4 cm; legume pubescent 26. *H. fistulosum*
- 36b. Corolla wings shorter than standard; leaflet blades 1–1.5 cm; legume glabrous 15. *H. nagarzense*
- 35b. Loments obtuse at apex; stem and leaves tomentose.
- 37a. Corolla 2.1–2.5 cm 22. *H. tanguticum*
- 37b. Corolla 1.2–2 cm.
- 38a. Leaflet blades 1.9–3 × 0.6–1.4 cm.
- 39a. Corolla red, with dark purple at apex; bracts slightly longer than pedicel; plants 15–30 cm tall 16. *H. kirghisorum*
- 39b. Corolla purple, not dark purple at apex; bracts ca. 2 × as long as pedicel, subequal to calyx teeth; plants 30–60(–90) cm tall 17. *H. neglectum*
- 38b. Leaflet blades 1–1.6 × 0.5–0.9 cm.
- 40a. Racemes dense; pedicel 2–3 mm; calyx teeth narrowly lanceolate; corolla standard long obovate, 1.2–1.4 cm, keel 1–2 mm longer than standard 23. *H. sikkimense*
- 40b. Racemes lax; pedicel 3–4 mm; calyx teeth triangular-lanceolate; corolla standard obovate, 1.4–1.5 cm, keel 2–3 mm longer than standard 27. *H. xizangense*

1. *Hedysarum tibeticum* (Benth) B. H. Choi & H. Ohashi, Taxon 52: 574. 2003.

藏豆 zang dou

Stracheya tibetica Benth, Hooker's J. Bot. Kew Gard. Misc. 5: 307. 1853; *Astragalus toktjenensis* Ulbrich.

Herbs, perennial, 4–5 cm tall. Stems abbreviated, inconspicuous. Stipules brown, ovate, 7–10 mm, membranous, apically connate. Leaves 4–7 cm, 11–15-foliolate; leaflet blades long ovate to elliptic, 8–10 × 3–5 mm, abaxially appressed pubescent, adaxially glabrous. Racemes corymbose, with 3–6 flowers; bracts ovate, ca. 2 × as long as pedicel; peduncle as long as to shorter than leaves. Pedicel 1–2 mm; bracteoles 2, small. Calyx obliquely campanulate, 7–8 mm, pilose; teeth lanceolate, as long as to slightly longer than tube. Corolla reddish; standard obovate, 1.5–1.8 cm; wings slightly shorter than standard; keel ± as long as standard. Ovary glabrous, sessile; ovules 2–5. Legume long obovoid, inconspicuously septate into 2–5 segments, 1.5–2.5 cm, slightly inflated, banded, pubescent, with 1–1.5 mm prickles along margin and lateral midline. Fl. Jul–Aug, fr. Aug–Sep.

Alpine meadows; 4000–4600 m. SW Qinghai, Xizang [India (Sikkim), Kashmir, Nepal, N Pakistan].

2. *Hedysarum dentatoalatum* K. T. Fu, Fl. Tsinling. 1(3): 448. 1981.

齿翅岩黄耆 chi chi yan huang qi

Herbs, perennial, 60–80 cm tall. Stems caespitose, erect. Stipules triangular-lanceolate, 5–6 mm, basally connate. Leaves 12–20 cm, 11–21-foliolate; leaflet blades oblong-ovate to ovate-lanceolate, 2–2.5(–5) × 1–1.7 cm, abaxially sparsely pubescent, adaxially glabrous. Racemes lax, with many flowers; bracts ± as long as pedicel; peduncle longer than to ± as long as leaves. Pedicel 3–4 mm. Calyx campanulate, 5–6(–11) mm; teeth linear-lanceolate, 1.5–2 × as long as tube. Corolla unknown. Legume divided into 2 or 3(or 4) loments; loments subglobose to ellipsoid, 8–12 × 7–10(–12) mm, compressed, pilose, margin 1(–3) mm and deeply dentate. Fr. Jun.

• Shrublands; ca. 1200 m. Shaanxi (E Qin Ling).

This species is a good fodder plant.

One of us (Choi) has seen no specimens of this species.

3. *Hedysarum trigonmerum* Handel-Mazzetti, Symb. Sin. 7: 562. 1933.

三角莢岩黄耆 san jiao jia yan huang qi

Herbs, perennial, 50–70 cm tall. Stems erect. Stipules small. Leaves 8–13 cm, 7–13-foliolate; leaflet blades elliptic to ovate-oblong, 1.2–2.5 × 0.4–0.8 cm. Racemes lax, with many flowers; peduncle ± as long as leaves. Pedicel 5–8 mm. Calyx obliquely campanulate; teeth unequal, most abaxial tooth linear and ca. 2 × as long as others, other 4 teeth triangular. Legume divided into 4 loments; loments pyramidal, ca. 7 × 5–6 mm.

- Meadows, shrublands. S Gansu (Zhugqu).

No specimens of this species have been seen by the authors.

4. *Hedysarum limitaneum* Handel-Mazzetti, Symb. Sin. 7: 564. 1933.

滇岩黄耆 *dian yan huang qi*

Herbs, perennial, 20–40 cm tall. Stems caespitose, erect. Stipules broadly lanceolate, 1.5–2 cm, connate farther than middle. Leaves 8–14 cm, 13–27-foliolate; leaflet blades long ovate to ovate-lanceolate, 1.5–2 × 0.5–0.7 cm, abaxially dark brownish and pilose along veins, adaxially glabrous. Racemes lax, with many flowers; bracts subulate-lanceolate, slightly longer than pedicel; peduncle longer than leaves. Pedicel 2–3 mm. Calyx campanulate, 8–10 mm, pubescent; teeth lanceolate-triangular, ± as long as tube, most abaxial tooth slightly longer than others. Corolla yellow; standard long obovate, 1.4–1.6 cm; wings ± as long as standard; keel 1–2 mm longer than standard. Ovary pubescent. Legume divided into 2 or 3 loments; loments ellipsoid to long ovoid, 5–6 × 3–4 mm, compressed, pubescent, margin narrow and dentate. Fl. Jun–Aug, fr. Aug–Sep.

- Forests, meadows; 3200–4000 m. Qinghai, SW Sichuan, E Xizang, NW Yunnan.

5. *Hedysarum thiochrom* Handel-Mazzetti, Symb. Sin. 7: 563. 1933.

中甸岩黄耆 *zhong dian yan huang qi*

Herbs, perennial, ca. 75 cm tall. Stems caespitose, erect. Stipules triangular-lanceolate, 1–1.5 cm, connate farther than middle. Leaves 8–12 cm, 27–33-foliolate; leaflet blades ovate-oblong, 1.4–1.7 × 0.4–0.5 cm, abaxially usually pubescent along veins, adaxially glabrous. Racemes lax, with many flowers; bracts subulate-lanceolate, ca. 1.5 × as long as pedicel; peduncle longer than leaves. Pedicel 2–3 mm. Calyx campanulate, 5–6 mm, pubescent; teeth lanceolate-triangular, ca. 1/2 as long as tube, most abaxial tooth slightly longer than others. Corolla yellow; standard long obovate, ca. 1.2 cm; wings slightly longer than standard; keel 2–3 mm longer than standard. Ovary pubescent. Legume divided into 2 or 3 loments; loments subglobose, 3–4 mm in diam., compressed, pubescent, margin narrow and entire. Fl. Jul–Aug, fr. Aug–Sep.

- Forests; ca. 3200 m. SW Sichuan, NW Yunnan.

6. *Hedysarum flavescens* Regel & Schmalhausen, Izv. Imp. Obsc. Ljubit. Estestv. Moskovsk. Univ. 34(2): 21. 1882.

乌恰岩黄耆 *wu qia yan huang qi*

Herbs, perennial, 30–40[–150] cm tall. Stems erect. Stipules lanceolate, 1–1.2 cm, basally connate. Leaves 10–15 cm, 9–13-foliolate; leaflet blades ovate-elliptic to ovate-orbicular, 1.2–1.5[–3.5] × 1–1.3[–2] cm, abaxially with appressed trichomes, adaxially glabrous. Racemes lax, with many flowers, distinctly longer than leaves; bracts lanceolate, slightly shorter than pedicel; peduncle longer than leaves. Pedicel 3–4 mm. Calyx shortly campanulate, 4–5 mm, pubescent; teeth subulate to triangular at base, slightly shorter than tube. Corolla yellow; standard long elliptic, 1.4–1.5 cm; wings ± as long as standard; keel ca. 2 mm longer than standard. Ovary pubescent. Legume divided into 2 or 3(or 4) loments; loments globose-ellipsoid, 5–

6 mm in diam., compressed, pubescent, margin narrow and entire. Fl. Jul–Aug, fr. Aug–Sep.

Gravelly areas along rivers; 2900–3100 m. SW Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan].

B. Fedtschenko (in Komarov, Fl. URSS 13: 278. 1948) reported this species to be 1.5 m tall, with leaflet blades 2–3.5 × 1.7–2 cm and the most abaxial calyx tooth longer than the calyx tube.

This species is a good fodder plant.

7. *Hedysarum semenovii* Regel & Herder, Bull. Soc. Imp. Naturalistes Moscou 39(2): 39. 1866.

天山岩黄耆 *tian shan yan huang qi*

Hedysarum junatovii Yakovlev.

Herbs, perennial, 40–60[–120] cm tall. Stems caespitose, erect. Stipules lanceolate, 1–1.5 cm, connate less than to middle. Leaves 10–15 cm, 9–15-foliolate; leaflet blades ovate to elliptic, 2.5–3.5 × 1.5–2.2 cm, abaxially with appressed trichomes, adaxially glabrous. Racemes ± dense, ± as long as leaves, with many flowers; bracts narrowly lanceolate, slightly shorter than leaves; peduncle ± as long as leaves. Pedicel 4–5 mm. Calyx campanulate, ca. 5 mm, glabrous or pubescent at base; teeth subulate, ± equal, pubescent. Corolla yellow; standard long obovate, 1.2–1.4 cm; wings ± as long as standard; keel ca. 2 mm longer than standard. Ovary appressed pubescent. Legume divided into 3 or 4 loments; loments globose, ellipsoid, or obovoid, 6–7 mm in diam., compressed, pubescent to subglabrous, margin irregularly dentate. Fl. Jul–Aug, fr. Aug–Sep.

Gravelly or stony slopes; 1400–1900 m. Xinjiang (Tian Shan) [Kazakhstan, Kyrgyzstan].

B. Fedtschenko (in Komarov, Fl. URSS 13: 278. 1948) reported this species to be 50–120 cm tall and (in fig. 47-9) the most abaxial calyx tooth to be only slightly longer than the calyx tube.

8. *Hedysarum polybotrys* Handel-Mazzetti, Symb. Sin. 7: 563. 1933.

多序岩黄耆 *duo xu yan huang qi*

Herbs, perennial, 7–12 cm tall. Stems caespitose, erect. Stipules lanceolate, 5–7 mm, connate less than to middle. Leaves 5–9 cm, 11–19-foliolate; leaflet blades ovate, ovate-lanceolate, or ovate-oblong, 1.5–3 × 0.4–1.5 cm, abaxially with appressed trichomes, adaxially glabrous. Racemes dense, with many flowers; bracts subulate-lanceolate, marcescent, 1/4–2/3 as long as pedicels; peduncle ± as long as to longer than leaves. Pedicel 3–4 mm. Calyx obliquely campanulate, 4–5 mm, pubescent; teeth triangular-subulate, unequal, most abaxial tooth ca. 2 mm and ca. 2 × as long as others. Corolla yellow; standard long obovate, 1.1–1.2 cm; wings as long as to slightly longer than standard; keel 2–3 mm longer than standard. Ovary pubescent. Legume divided into 2–4 loments; loments subglobose to broadly ovoid, (3–)4–5(–6) mm in diam., compressed, pubescent, margin narrow and entire. Fl. Jul–Aug, fr. Aug–Sep.

- Gravelly and stony slopes, forest margins; 1200–3200 m. E and S Gansu, W Hebei, S Nei Mongol, Ningxia, N Shanxi, NW Sichuan.

The roots are used medicinally.

- 1a. Leaflet blades ovate-lanceolate to ovate-oblong, 1.5–2.4 × 0.4–0.6 cm 8a. var. *polybotrys*

- 1b. Leaflet blades ovate,
1.5–3 × 0.6–1.5 cm 8b. var. *alaschanicum*

8a. *Hedysarum polybotrys* var. *polybotrys*

多序岩黄耆(原变种) duo xu yan huang qi (yuan bian zhong)

Leaflet blades ovate-lanceolate to ovate-oblong, 1.5–2.4 × 0.4–0.6 cm. Peduncle ± as long as leaves. Legume divided into 2–4 loments; loments 3–4 mm in diam., sparsely pubescent.

- Gravelly and stony slopes. E and S Gansu, NW Sichuan.

8b. *Hedysarum polybotrys* var. *alaschanicum* (B. Fedtschenko) H. C. Fu & Z. Y. Chu, Fl. Intramongol., ed. 2, 3: 341. 1989.

宽叶岩黄耆 kuan ye yan huang qi

Hedysarum semenovii Regel & Herder var. *alaschanicum* B. Fedtschenko, Trudy Imp. S.-Peterburgsk. Bot. Sada 19: 250. 1902; *H. polybotrys* var. *latifolium* L. Z. Shue; *H. przewalskii* Yakovlev; *H. vicioides* Turczaninow var. *alaschanicum* (B. Fedtschenko) Y. Z. Zhao, R. Sha & R. Cao.

Branchlets pubescent. Leaflet blades ovate, 1.5–3 × 0.6–1.5 cm.

- Forest margins, stony slopes. S Gansu, W Hebei, S Nei Mongol, Ningxia, N Shanxi.

One of us (Choi) has seen no specimens of this variety.

9. *Hedysarum citrinum* E. G. Baker, J. Bot. 73: 296. 1935.

黄花岩黄耆 huang hua yan huang qi

Herbs, perennial, 30–80 cm tall. Stems caespitose, erect. Stipules narrowly lanceolate, 1–1.3 cm, connate farther than middle. Leaves 8–16 cm, 15–19-foliolate; leaflet blades long ovate to ovate-oblong, 1.5–3 × 0.5–1 cm, abaxially sparsely pubescent, adaxially glabrous. Racemes lax, with many flowers; bracts lanceolate, 3–5 mm; peduncle as long as to longer than leaves. Pedicel 5–6 mm. Calyx obliquely campanulate, 5–6 mm, densely pubescent; teeth unequal, most abaxial tooth subulate-lanceolate and ± as long as tube, other 4 teeth lanceolate and ca. 1/2 as long as tube. Corolla yellow; standard long obovate, 1–1.2 cm; wings ± as long as standard; keel ca. 2 mm longer than standard. Ovary glabrous or pubescent. Legume divided into 2–4 loments; loments ellipsoid-obovoid, subglobose, or rhomboid, ca. 2 × 1.5 mm, compressed, glabrous, margin entire or inconspicuous. Fl. Jul–Aug, fr. Aug–Sep. $2n = 14^*$.

- Forests, scrub, stony slopes; 3200–4200 m. W Sichuan, E Xizang.

This is one of the most variable species, particularly in size and shape of parts, which differ between habitats or localities. Even in an individual plant, the loments are usually variable. In the original description, the corolla standard was reported as 1.4–1.5 cm and the loments ca. 6 × 5 mm.

10. *Hedysarum ussuriense* Schischkin & Komarov, Bot. Mater. Gerb. Glavn. Bot. Sada S.S.S.R. 6: 11. 1926.

拟蚕豆岩黄耆 ni can dou yan huang qi

Herbs, perennial, 30–50 cm tall. Stems caespitose, erect.

Stipules broadly lanceolate, 1–1.2 cm, connate farther than middle. Leaves 7–15 cm, 11–19-foliolate; leaflet blades long ovate, 1–2.3 × 0.6–1.1 cm, abaxially pubescent along veins, adaxially glabrous. Racemes dense, with many flowers; bracts lanceolate, slightly shorter than pedicel, caducous; peduncle slightly longer than leaves. Pedicel 5–6 mm. Calyx obliquely campanulate, 5–6 mm, sparsely pubescent; teeth unequal, most abaxial tooth 0.7–1.5 × as long as tube, other 4 teeth triangular and 1/4–1/3 as long as tube. Corolla yellow; standard long obovate, 1.4–1.6 cm; wings ± as long as standard; keel ca. 2 mm longer than standard. Ovary glabrous or pubescent. Legume divided into 2 or 4 loments; loments subglobose to ovoid, 6–7 × 4–5 mm, compressed, glabrous or pubescent, margin narrow and irregularly dentate. Fl. Jul–Aug, fr. Aug–Sep.

Forests, subalpine meadows; 2500–3200 m. Hebei, E Jilin, NE Liaoning, Sichuan [N Korea, Russia (Far East)].

Plants treated as *Hedysarum vicioides* Turczaninow in FRPS (42(2): 190. 1998) belong here.

11. *Hedysarum taibeicum* (Handel-Mazzetti) K. T. Fu, Fl. Tsinling. 1(3): 72. 1981.

太白岩黄耆 tai bai yan huang qi

Hedysarum esculentum Ledebour var. *taibeicum* Handel-Mazzetti, Symb. Sin. 7: 562. 1933; *H. vicioides* Turczaninow var. *taibeicum* (Handel-Mazzetti) Liu ex B. H. Choi & H. Ohashi.

Herbs, perennial, 30–40 cm tall. Stems caespitose, erect. Stipules lanceolate, 1–1.2 cm, connate farther than middle. Leaves 10–13 cm, 15–27-foliolate; leaflet blades long ovate, oblong, or elliptic, 1.2–2 × 0.6–0.9 cm, abaxially pubescent, adaxially glabrous. Racemes dense, with many flowers; bracts narrowly lanceolate, ± as long as pedicel, caducous; peduncle as long as to longer than leaves. Pedicel 3–4 mm. Calyx campanulate, 6–8 mm, candescent; teeth lanceolate, unequal, most abaxial tooth 1.5–2 × as long as tube, lateral 2 teeth ± as long as tube, adaxial 2 teeth ca. 1/2 as long as tube. Corolla yellow; standard long obovate, 1.2–1.4 cm; wings as long as to slightly longer than standard; keel ca. 2 mm longer than standard. Ovary glabrous. Legume divided into 2–5 loments; loments obovoid to globose, 4–5 × 3–4 mm, compressed, glabrous, margin narrow and irregularly dentate. Fl. Jul–Aug, fr. Aug–Sep.

- Stony slopes, meadows; 1500–3300 m. NW Hubei, Shaanxi (Qin Ling).

12. *Hedysarum inundatum* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 11: 366. 1838.

湿地岩黄耆 shi di yan huang qi

Hedysarum connatum (B. Fedtschenko) B. Fedtschenko; *H. obscurum* Linnaeus var. *connatum* B. Fedtschenko; *H. obscurum* var. *inundatum* (Turczaninow) B. Fedtschenko.

Herbs, perennial, 10–15[–40] cm tall. Stems ascending to erect. Stipules lanceolate, 1–1.5 cm, connate farther than middle. Leaves 7–12 cm, 11–17-foliolate; leaflet blades ovate to oblong, 1.2–1.7 × 0.6–0.9 cm, abaxially sparsely pubescent, adaxially glabrous. Racemes dense, with many flowers; bracts lanceolate, slightly longer than pedicel; peduncle slightly longer

than leaves. Pedicel 2–3 mm. Calyx campanulate, 4–5 mm, pubescent; teeth triangular, \pm equal, ca. 1/2 as long as tube. Corolla purple; standard long obovate, 1.4–1.6(–1.8) cm; wings slightly shorter than standard, straight or slightly curved downward at apex; keel shorter than standard and wings. Ovary glabrous. Legume divided into 3 or 4 loments, inconspicuously constricted between loments at abaxial suture; loments ellipsoid, 5–6 \times 4–5 mm, compressed, glabrous, margin entire. Fl. Jun–Jul, fr. Jul–Aug. $2n = 8$.

Subalpine meadows; 2500–3000 m. Hebei (Xiaowutai Shan), N Shanxi [Russia (E Siberia)].

B. Fedtschenko (in Komarov, Fl. URSS 13: 270. 1948) reported this species to be 20–40 cm tall.

13. *Hedysarum alpinum* Linnaeus, Sp. Pl. 2: 750. 1753.

山岩黄耆 shan yan huang qi

Hedysarum alpinum var. *chinense* B. Fedtschenko; *H. chinense* (B. Fedtschenko) Handel-Mazzetti; *H. polybotrys* Handel-Mazzetti var. *robustum* K. T. Fu; *H. smithianum* Handel-Mazzetti.

Herbs, perennial, 50–100 cm tall. Stems numerous, erect. Stipules triangular-lanceolate, 0.8–1.4 cm, connate farther than middle. Leaves 8–12 cm, 9–21-foliolate; leaflet blades ovate-oblong, narrowly elliptic, or oblong-lanceolate, 1.5–3 \times 0.5–0.7 cm, abaxially appressed sparsely pilose to pubescent, adaxially glabrous. Racemes dense, with many flowers; bracts subulate-lanceolate, \pm as long as pedicel; peduncle as long as to longer than leaves. Pedicel 2–4 mm. Calyx campanulate, 3–5 mm, pubescent to pilose; teeth triangular-lanceolate, unequal, most abaxial tooth ca. 2/3 as long as tube, adaxial 2 teeth ca. 1/2 as long as most abaxial one. Corolla purple; standard long obovate, 0.9–1.2 cm; wings as long as to slightly longer than standard; keel 2–3 mm longer than standard. Ovary glabrous or appressed pubescent. Legume divided into 2 or 3(–5) loments; loments ellipsoid to obovoid, 4–8 \times 3–5 mm, compressed, glabrous, margin inconspicuous. Fl. Jun–Aug, fr. Jul–Sep. $2n = 14$.

Swampy meadows, taiga forests, stony slopes, scrub. S Gansu, Hebei, Heilongjiang, S Henan, Jilin, NE Nei Mongol, S Shaanxi, Shanxi, Sichuan [Kashmir, N Korea, N Mongolia, Pakistan, Russia; E and N Europe, North America].

14. *Hedysarum laxiflorum* Benth. ex Baker in J. D. Hooker, Fl. Brit. India 2: 146. 1876.

疏花岩黄耆 shu hua yan huang qi

Hedysarum alpinum Linnaeus subsp. *laxiflorum* (Benth. ex Baker) H. Ohashi & Tateishi.

Herbs, perennial, 30–120 cm tall. Stems numerous, erect. Stipules lanceolate, ca. 7 mm, connate. Leaves 10–15 cm, 17–33-foliolate; leaflet blades elliptic to oblong-elliptic, 1.5–2.5 \times 0.6–1 cm, abaxially pubescent along veins, adaxially glabrous. Racemes lax, with many flowers; bracts ovate, ca. 1/2 as long as pedicel, caducous; peduncle longer than leaves. Pedicel 4–6 mm. Calyx campanulate, 4–6 mm, glabrous or calyx teeth pubescent; teeth lanceolate, unequal, most abaxial tooth longer than others, adaxial and lateral teeth ca. 1/5 as long as tube.

Corolla purple; standard obovate, 1.4–1.5 cm; wings as long as to slightly longer than standard; keel 2–3 mm longer than standard. Ovary glabrous. Legume divided into 3 or 4 loments; loments broadly ellipsoid, 5–6 \times 4–5 mm, compressed, glabrous. Fl. Jul–Aug, fr. Aug–Sep.

W Xizang? [Kashmir, NW Pakistan].

No specimens of this species from China have been seen by the authors. It is likely that the lectotype of *Hedysarum laxiflorum* (Falconer 440), cited as being from near “West Tibet” by Baker (Fl. Brit. India 2: 146. 1846) and by H. Ohashi and Tateishi (Fl. E. Himalaya, 3rd. Rep. 368. 1975), was actually from the Karakoram mountains in NW Pakistan.

15. *Hedysarum nagarzenae* C. C. Ni, Acta Phytotax. Sin. 18: 372. 1980.

浪卡子岩黄耆 lang ka zi yan huang qi

Herbs, perennial, 30–45 cm tall. Stems numerous, erect. Stipules lanceolate, 5–7 mm, connate. Leaves 8–11 cm, 17–23-foliolate; leaflet blades oblong to ovate-elliptic, 10–15 \times 6–8 mm, abaxially pubescent along veins, adaxially glabrous. Racemes somewhat dense, with many flowers; bracts ca. 4 mm; peduncle longer than leaves. Pedicel 5–6 mm. Calyx campanulate, 7–9 mm, pilose; teeth lanceolate, unequal, most abaxial tooth ca. 5 mm and \pm as long as tube, adaxial 2 teeth ca. 4 mm. Corolla purple; standard obovate, 1.6–1.8 cm; wings shorter than standard; keel \pm as long as standard. Ovary glabrous. Legume with 1 or 2 loments; loments obliquely obovoid, 1.5–2 \times 0.8–1 cm, compressed, glabrous, margin entire, apex acute. Fl. Jul–Aug, fr. Aug–Sep.

• Gravelly alpine areas; ca. 4500 m. Xizang (Nagarzê).

16. *Hedysarum kirghisorum* B. Fedtschenko, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 11: 114. 1949.

吉尔吉斯岩黄耆 ji er ji si yan huang qi

Herbs, perennial, 15–30 cm tall. Stems numerous to caespitose, erect. Stipules ovate-lanceolate, 0.8–1.2 cm, connate farther than middle. Leaves 8–12 cm, 9–15-foliolate; leaflet blades broadly lanceolate to oblong-lanceolate, 1.9–2.5 \times 0.6–0.8 cm, abaxially pubescent, adaxially glabrous. Racemes dense, with many flowers; bracts lanceolate, slightly longer than pedicel; peduncle longer than leaves. Pedicel 2–3 mm. Calyx campanulate, 6–8 mm, pubescent; teeth narrowly lanceolate, slightly longer to 1.5[–2.5] \times as long as tube, most abaxial tooth slightly longer than others. Corolla pale red but dark purple at apex; standard obovate, 1.4–1.5 cm; wings \pm as long as to slightly longer than standard; keel ca. 2 mm longer than standard. Ovary pubescent. Legume divided into 2–4 loments; loments globose, compressed, appressed pubescent, margin narrow and dentate. Fl. Jun–Jul, fr. Jul–Aug.

Gravelly areas, meadows, glacial till in alpine areas; 2500–3300 m. Xinjiang (Tian Shan) [Kazakhstan, Kyrgyzstan].

B. Fedtschenko (in Komarov, Fl. URSS 13: 274. 1948) reported the calyx teeth to be 2–2.5 \times as long as the calyx tube.

This species is a good fodder plant.

17. *Hedysarum neglectum* Ledebour, Fl. Altaic. 3: 341. 1831.

疏忽岩黄耆 *shu hu yan huang qi*

Hedysarum obscurum Linnaeus var. *lasiocarpum* B. Fedtschenko; *H. obscurum* var. *neglectum* (Ledebour) Krylov.

Herbs, perennial, 30–60(–90) cm tall. Stems several, erect. Stipules lanceolate, 1.5–9 mm, connate farther than middle. Leaves 8–12 cm, 11–15-foliolate; leaflet blades long ovate to ovate-oblong, 2–3 × 0.8–1.4 cm, abaxially sparsely pubescent, adaxially glabrous. Racemes dense, with many flowers; bracts ca. 2 × as long as pedicel, subequal to calyx teeth; peduncle longer than leaves. Pedicel ca. 2 mm. Calyx campanulate, 5–6 mm, pubescent; teeth triangular-lanceolate, ± as long as tube. Corolla purple; standard obovate, 1.3–1.4 × 0.6–0.8 cm; wings as long as to slightly shorter than standard; keel ca. 2 mm longer than standard. Ovary pubescent. Legume divided into 3 or 4 loments; loments globose to ovoid, 5–6 × 4–5 mm, compressed, appressed pubescent, margin ca. 1 mm and entire. Fl. Jul–Aug, fr. Aug–Sep.

Alpine meadows, scrub, forests; 1200–2600 m. Xinjiang (Altay Shan, W Tian Shan) [Kazakhstan, W Mongolia, E Russia].

18. *Hedysarum falconeri* Baker in J. D. Hooker, Fl. Brit. India 2: 146. 1876.

藏西岩黄耆 *zang xi yan huang qi*

Herbs, perennial, 45–60 cm tall. Stems erect, solid. Stipules connate. Leaves 15–20 cm, (11–)15–21(–27)-foliolate; leaflet blades elliptic, ovate, or oblong-elliptic, 1.5–3 × 0.6–1.5 cm, abaxially pubescent, adaxially glabrous or sparsely pubescent. Racemes with many flowers; bracts lanceolate, (1–)3–10 mm; peduncle longer than leaves. Pedicel 3–5 mm. Calyx campanulate, 7–9 mm, pilose; teeth subulate, most abaxial tooth slightly longer than others. Corolla purple; standard obovate, 1.7–2 cm; wings shorter than standard, with auricle less than 1/2 as long as claw; keel ± as long as standard. Ovary pubescent. Legume divided into 1–3 loments; loments ellipsoid, compressed, pubescent, margin irregularly dentate.

Alpine areas. W Xizang? [N Afghanistan, Kashmir, NW Pakistan].

No specimens of this species from China have been seen by the authors. It is likely that all the specimens, including the lectotype of *Hedysarum falconeri* (*Falconer 441*), that were cited as being from “West Tibet” by Baker (Fl. Brit. India 2: 146. 1846) and by H. Ohashi and Tateishi (Fl. E. Himalaya, 3rd. Rep. 377. 1975) are actually from the Karakoram mountains in NW Pakistan.

19. *Hedysarum campylocarpon* H. Ohashi, J. Jap. Bot. 49: 164. 1974.

曲果岩黄耆 *qu guo yan huang qi*

Herbs, perennial, 50–80 cm tall. Stems numerous, erect. Stipules long ovate, 1–1.5 cm, connate less than to middle. Leaves 10–15 cm, 15–19-foliolate; leaflet blades ovate to long ovate, 2–2.5 × 1.2–1.4 cm, both surfaces sparsely to densely pubescent. Racemes somewhat dense, with many flowers; bracts ± as long as pedicel; peduncle slightly longer than leaves. Pedicel 2–3 mm. Calyx campanulate, 5–6 mm, pubescent; teeth triangular, unequal, slightly longer than tube, adaxial teeth connate

and slightly shorter than others. Corolla dark purple; standard obovate-oblong, 1.4–1.6 cm; wings slightly longer than standard; keel as long as to slightly longer than standard. Ovary pubescent. Legume divided into 2 or 3 loments; loments ellipsoid, 5–7 × 4–5 mm, compressed, appressed pubescent, margin irregularly dentate or entire. Fl. Jul–Aug, fr. Aug–Sep.

Meadows, forests; 3300–4100 m. Xizang (Gyirong) [Nepal].

20. *Hedysarum pseudastragalus* Ulbrich, Repert. Spec. Nov. Regni Veg. Beih. 12: 427. 1922.

紫云英岩黄耆 *zi yun ying yan huang qi*

Hedysarum blepharopterum Handel-Mazzetti.

Herbs, perennial, 3–15 cm tall. Stems ascending to erect but almost acaulescent. Stipules oblong, 0.9–1.5 cm, connate farther than middle. Leaves 4–6 cm, 11–17-foliolate; leaflet blades broadly ovate to suborbicular, 6–10 × 5–10 mm, both surfaces usually sericeous, lateral veins sometimes inconspicuous. Racemes lax, with 5–8 flowers; bracts narrowly elliptic, 4–5 × as long as pedicel; peduncle ca. 2 × as long as leaves. Pedicel 1–2 mm; bracteoles 3.5–5 mm. Calyx campanulate, 0.8–1.4 cm, pilose; teeth narrowly lanceolate, equal, 2–3 × as long as tube. Corolla purple; standard broadly obovate, 1.7–2.1 cm; wings 1–2 mm longer than standard; keel 3–4 mm longer than standard. Ovary pubescent. Legume with 2–4 loments; loments obovoid to ellipsoid, 6–7 × 4–5 mm, compressed, canescent, margin narrow and entire. Fl. Jul–Aug, fr. Aug–Sep.

• Alpine meadows; 4300–5000 m. W Sichuan, SE Xizang, NW Yunnan.

21. *Hedysarum algidum* L. Z. Shue in W. T. Wang et al., Vasc. Pl. Hengduan Mts. 1: 974. 1993.

块茎岩黄耆 *kuai jing yan huang qi*

Herbs, perennial, 5–20 cm tall. Rhizome inflated torose. Stems several, ascending. Stipules lanceolate, 6–10 mm, connate farther than middle. Leaves 4–8 cm, 5–13-foliolate; leaflet blades obovate, elliptic, or suborbicular, 8–10 × 4–7 mm, abaxially appressed pubescent, adaxially glabrous. Racemes lax, with 6–12 flowers; bracts obovate, slightly longer than pedicel, apex obtuse and usually dentate; peduncle conspicuously longer than leaves. Pedicel 3–4 mm. Calyx campanulate, 5–6 mm, pilose; teeth triangular-lanceolate, ± as long to 1.5 × as long as tube, most abaxial tooth slightly longer than others. Corolla purple; standard obovate, 1.3–2.4 cm; wings ± as long as standard; keel slightly longer than standard. Ovary pubescent. Legume divided into 2–4 loments; loments ovoid to ellipsoid, 5–6 × 4–5 mm, compressed, pubescent, margin narrow and denticulate. Fl. Jul–Aug, fr. Aug–Sep.

• Alpine meadows, alpine gravelly areas; 3000–4500 m. SW Gansu, Qinghai, Sichuan, E Xizang, Yunnan.

- 1a. Corolla standard 1.3–1.6 cm; calyx teeth ± as long as tube; leaflet blades obovate to elliptic 21a. var. *algidum*
- 1b. Corolla standard (1.8–)2–2.4 cm; calyx teeth 1.2–1.5 × as long as tube; leaflet blades suborbicular 21b. var. *speciosum*

21a. *Hedysarum algidum* var. *algidum*

块茎岩黄耆(原变种) kuai jing yan huang qi (yuan bian zhong)

Hedysarum algidum var. *thyrsum* Y. H. Wu; *H. tuberosum* B. Fedtschenko (1900), not Roxburgh ex Willdenow (1825).

Leaflet blades obovate to elliptic. Corolla standard 1.3–1.6 cm. Calyx teeth \pm as long as tube.

• Alpine meadows, alpine gravelly areas; 3000–4200 m. SW Gansu, Qinghai, Sichuan.

21b. *Hedysarum algidum* var. *speciosum* (Handel-Mazzetti) Y. H. Wu, Fl. Qinghai. 2: 264. 1999.

美丽岩黄耆 mei li yan huang qi

Hedysarum tuberosum Roxburgh ex Willdenow var. *speciosum* Handel-Mazzetti, Symb. Sin. 7: 567. 1933; *H. speciosum* (Handel-Mazzetti) Yakovlev.

Leaflet blades suborbicular. Corolla standard (1.8–)2–2.4 cm. Calyx teeth 1.2–1.5 \times as long as tube.

• Alpine meadows; 3900–4500 m. SW Gansu, SE Qinghai, Sichuan, E Xizang, Yunnan.

22. *Hedysarum tanguticum* B. Fedtschenko, Bot. Centralbl. 84: 274. 1900.

唐古特岩黄耆 tang gu te yan huang qi

Hedysarum sikkimense Benth. ex Baker var. *megalanthum* H. Ohashi & Tateishi; *H. tongolense* Ulbrich.

Herbs, perennial, 15–30 cm tall. Stems several, erect to ascending from base. Stipules lanceolate, 0.8–1.2 cm, connate farther than middle. Leaves 8–15 cm, 15–25-foliolate; leaflet blades ovate-oblong, narrowly elliptic, or elliptic, 8–15 \times 4–6 mm, abaxially villous, adaxially glabrous. Racemes dense, with many flowers; bracts broadly lanceolate, ca. 2 \times as long as pedicel; peduncle conspicuously longer than leaves. Pedicel 2–3 mm. Calyx campanulate, 6–8 mm, villous; teeth lanceolate, \pm as long as to slightly longer than tube. Corolla pinkish purple; standard broadly obovate, 2.1–2.5 cm; wings as long as standard; keel 3–4(–5) mm longer than standard. Ovary villous. Legume divided into 3 or 5 loments; loments globose to ellipsoid, 4–5 \times 3–4 mm, inflated, villous, margin inconspicuous. Fl. Jul–Aug, fr. Aug–Sep. $2n = 16^*$.

Alpine meadows, alpine scrub; 3300–4200 m. S Gansu, E Qinghai, Sichuan, E Xizang, N Yunnan [N Nepal].

This species is a good fodder plant.

23. *Hedysarum sikkimense* Benth. ex Baker in J. D. Hooker, Fl. Brit. India 2: 145. 1876.

锡金岩黄耆 xi jin yan huang qi

Hedysarum limprichtii Ulbrich; *H. sikkimense* var. *rigidum* Handel-Mazzetti; *H. sikkimense* var. *xiangchengense* L. Z. Shue.

Herbs, perennial, 5–100 cm tall. Stems several to caespitose,

ascending to erect. Stipules broadly lanceolate, 6–8(–12) mm, connate farther than middle. Leaves 5–7(–15) cm, (13–)17–23-foliolate; leaflet blades ovate-oblong, (0.7–)1.3–1.6 \times (0.3–)0.9 cm, abaxially pilose along veins and margin, adaxially glabrous. Racemes secund, dense, with many flowers; bracts lanceolate-ovate, \pm as long as pedicel; peduncle longer than leaves. Pedicel 2–3 mm. Calyx campanulate, 4–6(–8) mm, pilose; teeth narrowly lanceolate, \pm as long as to slightly longer than tube, most abaxial tooth slightly longer than others. Corolla purple to violet; standard long obovate, 1.2–1.4 cm; wings \pm as long as standard; keel 1–3 mm longer than standard. Ovary densely pubescent. Legume with 1 or 2 loments; loments obovoid, 8–9 \times 6–7 mm, compressed, pubescent, margin irregularly dentate. Fl. Jul–Aug, fr. Aug–Sep. $2n = 14^*$.

Alpine gravelly areas, alpine meadows, forests; 3100–4500 m. S Gansu, S Qinghai, W Sichuan, E Xizang, NW Yunnan [Bhutan, India (Sikkim), E Nepal].

24. *Hedysarum longigynophorum* C. C. Ni, Acta Phytotax. Sin. 18: 373. 1980.

长柄岩黄耆 chang bing yan huang qi

Herbs, perennial, 40–80 cm tall. Stems caespitose, erect. Stipules ovate, 8–10 mm, connate farther than middle. Leaves 8–10 cm, 15–21-foliolate; leaflet blades ovate-oblong, 1.7–2.1 \times 0.4–0.6 cm, abaxially sparsely pilose, adaxially glabrous. Racemes lax, with many flowers; bracts lanceolate, \pm as long as pedicel; peduncle conspicuously longer than leaves. Pedicel 3–4 mm. Calyx campanulate, 4–5 mm, pilose; teeth lanceolate, \pm equal, slightly longer than tube. Corolla unknown. Legume divided into 2 or 3 loments, stipe 8–10 mm; loments basally obovoid and apically rhomboid, 12–15 \times 5–7 mm, compressed, pilose, margin irregularly dentate. Fl. Jul–Aug, fr. Aug–Sep.

• Subalpine stony slopes and forests; 3800–4300 m. E Xizang (Gongbo'gyamda).

One of us (Choi) has seen no specimens of this species.

25. *Hedysarum jinchuanense* L. Z. Shue, Bull. Bot. Res., Harbin 5(3): 134. 1985.

金川岩黄耆 jin chuan yan huang qi

Herbs, perennial, 40–80 cm tall. Stems numerous, erect. Stipules long ovate, 8–10 mm, connate farther than middle. Leaves 8–12 cm, 11- or 13-foliolate; leaflet blades broadly ovate, 1.5–1.9 \times ca. 0.8 cm, abaxially sparsely pilose, adaxially glabrous. Racemes dense, with many flowers; bracts lanceolate, \pm as long as pedicel; peduncle as long as to slightly longer than leaves. Pedicel 1.5–2.5 mm. Calyx campanulate, 6–8 mm, pubescent; teeth lanceolate, \pm as long as tube, most abaxial tooth slightly longer than others. Corolla purple; standard long obovate, 1.5–1.7 cm; wings \pm as long as standard; keel 1–3 mm longer than standard. Ovary appressed pubescent. Legume divided into 3 or 4 loments; loments subglobose to ellipsoid, 5–6 \times 4–5 mm, compressed, pubescent, margin inconspicuous. Fl. Jul–Aug, fr. Aug–Sep.

• Stony slopes, scrub, forest margins; ca. 3000 m. NW Sichuan.

One of us (Choi) has seen no specimens of this species.

26. *Hedysarum fistulosum* Handel-Mazzetti, Symb. Sin. 7: 564. 1933.

空茎岩黄耆 kong jing yan huang qi

Herbs, perennial, 40–120 cm tall. Stems numerous, erect to caespitose. Stipules ovate-lanceolate, 1–2.5 cm, connate farther than middle. Leaves 9–16 cm, 15–21-foliolate; leaflet blades long ovate to oblong-ovate, 2–4 × 0.6–1 cm, abaxially densely pubescent, adaxially glabrous. Racemes lax, with many flowers; bracts ± as long as pedicel; peduncle longer than leaves. Pedicel 4–5 mm. Calyx campanulate, 6–7 mm, appressed pubescent; teeth lanceolate, ± equal, as long as or slightly longer than tube. Corolla dark purple; standard obovate, 1.3–1.5 cm; wings 2–3 mm longer than standard; keel ± as long as wings. Ovary pubescent. Legume divided into 1–3 loments; loments ellipsoid to obovoid, 1.3–1.8 × 0.7–0.8 cm, compressed, pubescent, margin irregularly dentate, apex acute. Fl. Jun–Jul.

- Cliffs; ca. 3300 m. NW Yunnan.

27. *Hedysarum xizangense* C. C. Ni, Acta Phytotax. Sin. 18: 373. 1980 [*“xizangensis”*].

西藏岩黄耆 xi zang yan huang qi

Herbs, perennial, 30–40 cm tall. Stems numerous, erect. Stipules triangular, 6–10 mm, connate farther than middle. Leaves 6–10 cm, 9–17-foliolate; leaflet blades oblong to ovate-elliptic, 10–15 × 5–7 mm, abaxially pilose, adaxially glabrous. Racemes lax, with many flowers; bracts ± as long as pedicel; peduncle conspicuously longer than leaves. Pedicel 3–4 mm. Calyx campanulate, 6–8 mm, pilose; teeth triangular-lanceolate, ± as long as to slightly longer than tube, most abaxial tooth slightly longer than others. Corolla dark purple; standard obovate, 1.4–1.5 cm; wings ± as long as standard; keel 2–3 mm longer than standard. Ovary pubescent. Legume divided into 2 or 3 loments; loments (juvenile) densely appressed pubescent. Fl. Jul–Aug, fr. Aug–Sep.

- Scrub; ca. 3100 m. Xizang (Nangxian).

One of us (Choi) has seen no specimens of this species.

28. *Hedysarum taoriparium* B. H. Choi & H. Ohashi, Notes Roy. Bot. Gard. Edinburgh 45: 107. 1988.

洮河岩黄耆 tao he yan huang qi

Herbs, perennial, ca. 40 cm tall. Stems several, slender, erect, pubescent. Stipules lanceolate, 1.5–2 cm, connate farther than middle. Leaves 12–16 cm, 17–19-foliolate; leaflet blades narrowly ovate or ovate, 20–24 × 7–9 mm, abaxially and adaxially tomentose. Racemes dense, with 10–20 flowers; bracts narrowly lanceolate, 7–11 × 0.7–1 mm; peduncle as long as or longer than leaves. Pedicel 2–3.5 mm; bracteoles 0.4–0.7 mm. Calyx campanulate, 8–10 mm, pilose; teeth lanceolate, adaxial teeth slightly shorter than tube, abaxial teeth slightly longer than tube. Corolla dark purple; standard obovate, 1.8–2 cm; wings as long as standard; keel ca. 8 mm longer than standard. Ovary appressed pubescent; ovules 3 or 4. Legume unknown. Fl. Jun–Jul.

- Riverbanks; ca. 3000 m. SW Gansu.

This species was treated by X. Y. Zhu et al. (Legumes China, 416. 2007) as a synonym of *Hedysarum tanguticum*.

29. *Hedysarum dahuricum* Turczaninow ex B. Fedtschenko in Komarov, Fl. URSS 13: 290. 1948.

刺岩黄耆 ci yan huang qi

Herbs, perennial, 20–25 cm tall. Stems numerous, ascending to decumbent. Stipules ovate-lanceolate, 6–8 mm, connate farther than middle. Leaves 8–15 cm, 9–17-foliolate; leaflet blades oblong to lanceolate-ovate, 1.2–2.2 × 0.4–0.6 cm, abaxially densely appressed pubescent, adaxially glabrous. Racemes dense, capitate to ovoid, with many flowers; bracts lanceolate, slightly longer than pedicel; peduncle longer than leaves. Pedicel ca. 1 mm. Calyx campanulate, 5–6 mm, pubescent; teeth lanceolate-subulate, 2–3 × as long as tube. Corolla pale yellow; standard obovate, 1.2–1.3 cm; wings ca. 4/5 as long as standard; keel ca. 1 mm longer than standard. Ovary pubescent. Legume divided into 3–7 loments; loments subglobose, inflated, pubescent, prickly, margin inconspicuous. Fl. Jul–Aug, fr. Aug–Sep.

Gravelly areas in steppes; ca. 1000 m. E Nei Mongol [N Mongolia, E Russia].

This species is a good fodder plant.

30. *Hedysarum brachypterum* Bunge, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 2: 92. 1835.

短翼岩黄耆 duan yi yan huang qi

Herbs, perennial, 15–25 cm tall. Stems caespitose, decumbent. Stipules lanceolate, 3–4 mm, connate farther than middle. Leaves 3–5 cm, 11–19-foliolate; leaflet blades ovate, elliptic, or oblong, 4–6(–10) × 2–3 mm, abaxially appressed pubescent, adaxially glabrous. Racemes dense, ovoid, with many flowers; bracts subulate-lanceolate, ± as long as pedicel; peduncle longer than leaves. Pedicel ca. 1 mm. Calyx campanulate, 5–6 mm, pubescent; teeth lanceolate-subulate, ca. 2 × as long as tube. Corolla purple; standard broadly obovate, 7–9 mm; wings ca. 2/5 as long as standard; keel 2–3 mm longer than standard. Ovary subglabrous. Legume divided into 2–4 loments; loments globose to ellipsoid, inflated, densely pubescent, prickly, margin inconspicuous. Fl. May–Aug, fr. Jul–Sep.

- Steppes; 600–800 m. NW Hebei, C Nei Mongol, Ningxia.

31. *Hedysarum gmelinii* Ledebour, Mém. Acad. Imp. Sci. St. Pétersbourg Hist. Acad. 5: 551. 1812.

华北岩黄耆 hua bei yan huang qi

Hedysarum gmelinii var. *lineiforme* H. C. Fu.

Herbs, perennial, 15–20 cm tall. Stems numerous, decumbent to ascending. Stipules lanceolate, 7–9 mm, connate farther than middle. Leaves 6–10 cm, 11- or 13-foliolate; leaflet blades long ovate, ovate-oblong, or ovate-elliptic, 8–20 × 4–6 mm, abaxially appressed pubescent, adaxially glabrous. Racemes dense, ovoid to oblong, with many flowers; bracts ca. 2 × as long as pedicel; peduncle longer than leaves. Pedicel ca. 1 mm. Calyx campanulate, 7–10 mm, pubescent; teeth subulate-lanceolate, 1.5–2.5 × as long as tube. Corolla pinkish purple; stan-

ard obovate, 1.5–1.7 cm; wings 2/3–3/4 as long as standard; keel slightly longer than standard. Ovary pubescent. Legume divided into 2 or 3 loments; loments globose to broadly ovoid, inflated, pubescent, usually prickly, margin inconspicuous. Fl. May–Aug, fr. Jul–Sep.

Gravelly areas in steppes; 800–1800 m. C Gansu, N Hebei, Henan, Nei Mongol, Ningxia, Shanxi, N Xinjiang [Kazakhstan, Mongolia, E Russia].

Hedysarum gmelinii var. *tongtianhense* Y. H. Wu (Bull. Bot. Res., Harbin 19: 8. 1999), described from Qinghai, is unlikely to belong to this species and may not even be a *Hedysarum*.

32. *Hedysarum songaricum* Bongard, Mém. Acad. Imp. Sci. Saint-Petersbourg, Sér. 6, Sci. Math., Seconde Pt. Sci. Nat. 4: 30. 1841.

准噶尔岩黄耆 zhun ga er yan huang qi

Herbs, perennial, (20–)30–70 cm tall. Stems caespitose, ascending to erect. Stipules triangular-lanceolate, 0.8–1.2 cm, connate less than to middle. Leaves 7–12 cm, 9–17-foliolate; leaflet blades narrowly elliptic to lanceolate, 1–2.5 × 0.3–0.5 cm, abaxially sparsely pilose, adaxially glabrous. Racemes dense, oblong, with many flowers; bracts lanceolate, 1–2 × as long as pedicel; peduncle longer than leaves. Flowers ascending to erect, rarely nodding. Pedicel ca. 2 mm. Calyx campanulate, 6–7 mm, pubescent; teeth lanceolate-subulate or triangular-subulate, 2–3 × as long as tube. Corolla pinkish purple; standard obovate, 1–1.2 cm; wings ca. 1/2 as long as standard; keel slightly shorter than standard. Ovary pubescent. Legume divided into 2 or 3 loments; loments globose-ovoid, 4–5 × 3–4 mm, inflated, pubescent, prickly, margin inconspicuous. Fl. Jun–Jul, fr. Jul–Aug.

Steppes, gravelly areas; 700–1200 m. N Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan].

This species is a good fodder plant.

- 1a. Stems ascending, 30–70 cm tall; flowers ascending to erect; calyx teeth lanceolate-subulate 32a. var. *songaricum*
 1b. Stems erect, 20–30 cm tall; flowers nodding; calyx teeth triangular-subulate 32b. var. *urumqiense*

32a. *Hedysarum songaricum* var. *songaricum*

准噶尔岩黄耆(原变种) zhun ga er yan huang qi (yuan bian zhong)

Stems ascending, 30–70 cm tall. Flowers ascending to erect. Calyx teeth lanceolate-subulate.

Steppes; 700–1200 m. N Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan].

32b. *Hedysarum songaricum* var. *urumqiense* L. Z. Shue, Bull. Bot. Res., Harbin 5(3): 135. 1985.

乌鲁木齐岩黄耆 wu lu mu qi yan huang qi

Stems erect, 20–30 cm tall. Flowers nodding. Calyx teeth triangular-subulate.

- Gravelly areas in steppes; 800–1000 m. N Xinjiang (Ürümqi).

33. *Hedysarum shanense* L. R. Xu & B. H. Choi, **nom. nov.**

山地岩黄耆 shan di yan huang qi

Replaced synonym: *Hedysarum songaricum* Bongard var. *montanum* B. Fedtschenko, Trudy Imp. S.-Peterburgsk. Bot. Sada 19: 281. 1902; *Hedysarum montanum* (B. Fedtschenko) B. Fedtschenko in Komarov, Fl. URSS 13: 292. 1948, not *Hedysarum montanum* (Candolle) Persoon, Syn. Pl. 2: 324. 1807 [*Onobrychis montana* Candolle in Lamarck & Candolle, Fl. Franç., ed. 3, 4: 611. 1805].

Herbs, perennial, 50–90 cm tall. Stems numerous, erect. Stipules triangular-lanceolate, 0.8–1.2 cm, connate less than to middle. Leaves 8–12 cm, 11–17-foliolate; leaflet blades oblong-ovate, 3–3.5 × 0.6–0.7 cm, abaxially sparsely pilose, adaxially glabrous. Racemes dense, oblong, with many flowers; bracts lanceolate, slightly longer than pedicel; peduncle conspicuously longer than leaves. Pedicel 2–3 mm. Calyx campanulate, 6–7 mm, pubescent; teeth lanceolate-subulate, ca. 2 × as long as tube. Corolla pinkish purple; standard 1.5–1.7 cm; wings ca. 1/2 as long as standard; keel ± as long as standard. Ovary pubescent. Legume divided into 2 or 3 loments; loments ellipsoid to globose, 4–5 × 3–4 mm, inflated, pubescent, prickly, margin thickened. Fl. Jun–Jul, fr. Jul–Aug.

Steppes, scrub; 1100–1700 m. NW Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan].

This species is a good fodder plant.

34. *Hedysarum petrovii* Yakovlev, Novosti Sist. Vyssh. Rast. 19: 116. 1982.

贺兰山岩黄耆 he lan shan yan huang qi

Hedysarum alaschanicum Y. Z. Zhao; *H. liupanshanicum* L. Z. Shue.

Herbs, perennial, 8–15 cm tall. Stems abbreviated, inconspicuous. Stipules triangular-lanceolate, 3–5 mm, connate farther than middle. Leaves 4–8 cm, 7–11-foliolate; leaflet blades long ovate to elliptic, 4–7(–9) × 3–5 mm, abaxially densely appressed pilose, adaxially subglabrous to scattered pilose. Racemes dense, ovoid to oblong, with many flowers; bracts lanceolate, 2–3 mm; peduncle longer than leaves. Pedicel less than 1 mm. Calyx campanulate, 0.8–1.2 cm, sericeous; teeth lanceolate-subulate, 2–3 × as long as tube. Corolla pinkish purple; standard obovate, 1.2–1.4 mm; wings 1/4–1/3 as long as standard; keel as long as to slightly longer than standard. Ovary pubescent. Legume divided into 2 or 3 loments; loments ovoid-globose, ca. 3 mm in diam., inflated, densely pubescent, prickly, margin inconspicuously thickened. Fl. Jun–Jul, fr. Jul–Aug.

- Steppes; 1100–1600 m. C Gansu, SW Nei Mongol (Helan Shan), Ningxia, N Shaanxi.

35. *Hedysarum setigerum* Turczaninow ex Fischer & C. A. Meyer, Index Sem. Hort. Petrop. 1: 29. 1835.

短茎岩黄耆 duan jing yan huang qi

Herbs, perennial, 10–15 cm tall. Stems abbreviated, inconspicuous. Stipules lanceolate. Leaves 8–15 cm, 9–13-foliolate; leaflet blades ovate to elliptic, 1.2–1.6 × 0.5–0.7 cm, abaxially

with dense silvery appressed trichomes, adaxially glabrous. Racemes dense, ovoid, with many flowers; bracts ovate-lanceolate, ca. 2 × as long as pedicel; peduncle longer than leaves. Pedicel less than 1 mm. Calyx campanulate, 5–6 mm, pubescent; teeth lanceolate-subulate, 1.5–2 × as long as tube. Corolla pinkish purple; standard obovate, 1–1.2 cm; wings ca. 4/5 as long as standard; keel slightly shorter than standard. Ovary pubescent. Legume divided into 3–5 loments; loments pubescent, prickly. Fl. Jul–Aug, fr. Aug–Sep.

Sandy steppes; ca. 1100 m. E Nei Mongol [Mongolia, Russia].

No specimens have been seen by the authors.

36. *Hedysarum kumaonense* Benth. ex Baker in J. D. Hooker, Fl. Brit. India 2: 145. 1876.

库茂恩岩黄耆 *ku mao en yan huang qi*

Herbs, perennial, 7–12 cm tall. Stems abbreviated, inconspicuous. Stipules lanceolate-ovate, 0.7–1.5 cm, connate farther than middle. Leaves [5–]7–10[–32] cm, 13–25-foliolate; leaflet blades obovate to elliptic-ovate, 7–10 × 5–7 mm, abaxially densely pilose, adaxially glabrous or sparsely pilose. Racemes dense, long ovoid, with many flowers; bracts 1.5–2 × as long as pedicel; peduncle conspicuously longer than leaves. Pedicel 2–3 mm. Calyx campanulate, 6–8 mm, grayish pilose; teeth lanceolate-subulate, ca. 2 × as long as tube. Corolla pinkish purple; standard obovate, 1.2–1.4[–1.6] cm; wings slightly shorter than standard; keel 1–2 mm longer than standard. Ovary pubescent. Legume divided into 1 or 2 loments; loments elliptic, sparsely pubescent, reticulately veined on both surfaces. Fl. Jun–Jul, fr. Jul–Sep.

Alpine steppes; 3500–3600 m. Xizang (Gyirong) [NW India, Nepal].

37. *Hedysarum iliense* B. Fedtschenko, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 7: 14. 1937.

伊犁岩黄耆 *yi li yan huang qi*

Herbs, perennial, ca. 10 cm tall. Stems abbreviated, inconspicuous. Stipules basally on stems ovate, completely connate; stipules apically on stems lanceolate, basally connate. Leaves 3–5 cm, 3–7-foliolate; leaflet blades ovate, 12–14 × 5–8 mm, abaxially densely appressed pubescent, adaxially sparsely appressed pubescent. Racemes dense, long ovoid to oblong, with many flowers; bracts lanceolate; peduncle conspicuously longer than leaves. Pedicel ca. 1 mm. Calyx campanulate, 1.4–1.5 cm, pubescent; teeth linear-subulate, 2–2.5 × as long as tube. Corolla pinkish purple; standard obovate, 1.4–1.5 cm; wings ca. 1/4 as long as standard; keel as long as to slightly longer than standard. Ovary pubescent. Legume divided into 3–5 loments; loments orbicular-elliptic, shortly tomentose, with inconspicuous tubercles. Fl. May–Jul.

Steppes; ca. 600 m. NW Xinjiang [Kazakhstan].

38. *Hedysarum splendens* Fischer ex Candolle, Prodr. 2: 340. 1825.

光滑岩黄耆 *guang hua yan huang qi*

Hedysarum qinggilense Chang Y. Yang & N. Li.

Herbs, perennial, 15–40 cm tall. Stems abbreviated, incon-

spicuous. Stipules broadly lanceolate, 0.8–1.2 cm, connate to middle. Leaves 0.6–1.6 cm, 7- or 9-foliolate; leaflet blades broadly ovate, 1.5–2 × 1–1.6 cm, both surfaces densely silvery pubescent. Racemes lax, with many flowers; bracts lanceolate, ca. 2 × as long as pedicel; peduncle inconspicuously longer than leaves. Pedicel ca. 2 mm. Calyx campanulate, 7–9 mm, pubescent; teeth lanceolate-subulate, 3–4 × as long as tube. Corolla pinkish purple; standard broadly obovate, 1.2–1.5 cm; wings ca. 1/3 as long as standard; keel ± as long as standard. Ovary pubescent. Legume divided into 2 or 3 loments; loments globose, 5–6 mm in diam., inflated, pubescent, with curved prickles, margin thickened. Fl. Jun–Jul, fr. Jul–Aug.

Stony slopes to gravelly areas; 600–800 m. Xinjiang (Altay Shan) [Kazakhstan].

39. *Hedysarum krylovii* Sumnevich, Sist. Zametki Mater. Gerb. Krylova Tomsk. Gosud. Univ. Kuybysheva 1931(4): 2. 1931.

克氏岩黄耆 *ke shi yan huang qi*

Herbs, perennial, 10–20 cm tall. Stems 1–2 cm, ascending. Stipules ovate, 6–8 mm, connate farther than middle. Leaves 1–1.8 cm, 11–15-foliolate; leaflet blades narrowly ovate-lanceolate to lanceolate-elliptic, 12–15 × 4–7 mm, both surfaces densely silvery pubescent. Racemes lax, with many flowers; bracts narrowly lanceolate, ca. 2 × as long as pedicel; peduncle conspicuously longer than leaves. Pedicel 1.5–2 mm. Calyx campanulate, 7–10 mm, pilose; teeth lanceolate-subulate, 3–4 × as long as tube. Corolla pinkish purple; standard obovate, 1.4–1.5 cm; wings ca. 1/2 as long as standard; keel slightly shorter than standard. Ovary subglabrous. Legume divided into 2 or 3 loments; loments subglobose, 4–5 mm in diam., inflated, with densely hyaline scales, margin thickened. Fl. Jun–Jul, fr. Jul–Aug.

Stony slopes, gravelly areas; ca. 1300 m. Xinjiang (W Altay Shan) [Kazakhstan].

This species is a good fodder plant.

40. *Hedysarum ferganense* Korshinsky, Zap. Imp. Akad. Nauk Fiz.-Mat. Otd. 4: 93. 1896.

费尔干岩黄耆 *fei er gan yan huang qi*

Shrublets or perennial herbs, 5–15 cm tall. Stems abbreviated, inconspicuous, sometimes ligneous at base. Stipules triangular-lanceolate, 4–6 mm, connate farther than middle. Leaves 3–10 cm, 7–11(or 13)-foliolate; leaflet blades ovate-oblong to narrowly elliptic, 6–8 × 2–4 mm, abaxially densely appressed pilose, adaxially sparsely pilose. Racemes dense, oblong or capitate, with many flowers; bracts 2–3 × as long as pedicel; peduncle conspicuously longer than leaves. Pedicel ca. 1 mm. Calyx shortly campanulate, 7–8 mm, sparsely pilose; teeth lanceolate-subulate, 2–3 × as long as tube. Corolla pinkish purple; standard obovate, 1.2–1.4 cm; wings ca. 1/4 as long as standard; keel ± as long as standard. Ovary pubescent. Legume divided into 2 or 3 loments; loments subglobose, 3–4 mm in diam., inflated, with hyaline scales, usually papillate prickly, margin inconspicuously thickened. Fl. Jun–Jul, fr. Jul–Aug.

Steppes, gravelly areas; 800–4500 m. Xinjiang [Afghanistan, Kashmir, Kazakhstan, Kyrgyzstan, N Pakistan, Tajikistan, Turkmenistan, Uzbekistan].

Hedysarum jaxartucirdes Y. Liu ex R. Sha (Ann. Bot. Fenn. 44: 157. 2007) was described from Xinjiang (Qinghe, ca. 2400 m) as a species related to *H. ferganense*. The authors have not seen any material of this species and cannot confirm whether or not the species should be recognized.

- 1a. Racemes oblong; plants 10–15 cm tall; leaves 8–10 cm 40a. var. *ferganense*
 1b. Racemes capitate; plants 5–12 cm tall; leaves 3–8 cm.
 2a. Herbs, perennial 40b. var. *poncinsii*
 2b. Shrublets 40c. var. *minjanense*

40a. *Hedysarum ferganense* var. *ferganense*

费尔干岩黄耆(原变种) fei er gan yan huang qi (yuan bian zhong)

Hedysarum polymorphum Ledebour var. *pumilum* Ledebour.

Herbs, perennial, 10–15 cm tall. Stems numerous. Leaves 8–10 cm. Racemes oblong.

Steppes; 800–1700 m. N Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan].

40b. *Hedysarum ferganense* var. *poncinsii* (Franchet) L. Z. Shue, Fl. Reipubl. Popularis Sin. 42(2): 215. 1998.

河滩岩黄耆 he tan yan huang qi

Hedysarum poncinsii Franchet, Bull. Mus. Hist. Nat. (Paris) 2: 344. 1896.

Herbs, perennial, 8–12 cm tall. Stems caespitose. Leaves 6–8 cm. Racemes capitate.

Steppes; 2800–3200 m. SW Xinjiang (S Tian Shan) [Tajikistan].

40c. *Hedysarum ferganense* var. *minjanense* (K. H. Rechinger) L. Z. Shue, Fl. Reipubl. Popularis Sin. 42(2): 217. 1998.

敏姜岩黄耆 min jiang yan huang qi

Hedysarum minjanense K. H. Rechinger, Biol. Skr. 9: 185. 1958.

Shrublets, 5–6 cm tall. Stems densely caespitose, strongly ligneous at base. Leaves 3–5 cm. Racemes capitate.

Gravelly areas; ca. 4500 m. W Xinjiang (Pamir Shan) [Afghanistan, Kashmir, N Pakistan, Tajikistan].

41. *Hedysarum setosum* Vvedensky, Bot. Mater. Gerb. Inst. Bot. Akad. Nauk Uzbeksk. S.S.R. 13: 24. 1952.

刚毛岩黄耆 gang mao yan huang qi

Herbs, perennial, 15–20 cm tall. Stems numerous, abbreviated, inconspicuous. Stipules triangular, 8–10 mm, connate farther than middle. Leaves 6–10 cm, 9–13-foliolate; leaflet blades ovate to ovate-elliptic, 6–9 × 3–5 mm, abaxially densely appressed pilose, adaxially sparsely pilose. Racemes dense, broadly ovoid, with many flowers; bracts lanceolate, 6–8 mm; peduncle conspicuously longer than leaves. Pedicel ca. 1 mm. Calyx campanulate, 8–10 mm, sericeous; teeth subulate-lanceolate, 2–2.5 × as long as tube. Corolla pinkish purple; standard broadly obovate, 1.7–2 cm; wings ca. 1/4 as long as standard; keel dark purple at apex, slightly shorter than standard. Ovary pilose. Legume not seen. Fl. Jul–Aug, fr. Aug–Sep.

Alpine steppes; 3200–3800 m. Xinjiang (S Tian Shan) [Kyrgyzstan].

151. *ONOBRYCHIS* Miller, Gard. Dict. Abr., ed. 4. 1754.

驴食豆属 lü shi dou shu

Xu Langran (徐朗然 Xu Lang-rang); Byoung-Hee Choi

Herbs [or shrublets]. Stipules dry membranous, connate or rarely distinct. Leaves imparipinnate; leaflet blades opposite, margin entire. Racemes axillary, with a long peduncle, with bracts and bracteoles. Calyx campanulate. Corolla purple, pinkish purple, or pale yellow. Stamens diadelphous (9+1); anthers uniform. Ovary sessile, with 1 or 2 ovules; style filiform; stigma capitate. Legume usually with 1 loment, subglobose, inflated, indehiscent, with elevated veins, usually prickly.

About 130 species: N Africa, C and SW Asia, Europe; three species (one introduced) in China.

Species of this genus are good fodder plants.

- 1a. Annuals; loments with a broad membranous margin 1. *O. pulchella*
 1b. Perennials; loments with a non-membranous margin.
 2a. Native species; racemes without caespitose trichomes before anthesis 2. *O. tanaïtica*
 2b. Cultivated species; racemes with caespitose trichomes before anthesis 3. *O. viciifolia*

1. *Onobrychis pulchella* Schrenk in Fischer & C. A. Meyer, Enum. Pl. Nov. 1: 87. 1841.

美丽红豆草 mei li hong dou cao

Herbs, annual, 40–80 cm tall. Stems simple, erect. Stipules broadly triangular, 8–11 mm, hyaline, basally connate. Leaves 6–11 cm, 9–13-foliolate; leaflet blades narrowly lanceolate to linear-oblong, 1.5–3 cm × 2–3 mm, abaxially densely pilose,

adaxially glabrous. Racemes lax, with many flowers; bracts ± as long as pedicel; peduncle inconspicuously longer than leaves. Pedicel ca. 3 mm. Calyx campanulate, 4–4.5 mm, glabrous; teeth subulate, 2–3 × as long as tube, margin pilose. Corolla pinkish purple; standard obovate, 5–6 mm; wings ca. 1/4 as long as standard; keel slightly longer than standard. Ovary glabrous. Legume with 1 loment; loment subglobose, 8–10 mm in diam., subglabrous, margin membranous and entire but repand. Fl. May–Jun, fr. Jun–Jul.

Steppes in low mountains; 600–900 m. Xinjiang (Huocheng) [Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan; N Africa].

2. *Onobrychis tanaitica* Sprengel, Neue Entdeck. Pflanzenk. 2: 162. 1821.

顿河红豆草 *dun he hong dou cao*

Herbs, perennial, 40–60 cm tall. Stems numerous, erect. Stipules triangular-ovate, 6–8 mm, connate farther than middle. Leaves 1–1.5(–2.2) cm, 9–13-foliolate; leaflet blades narrowly elliptic to oblong-linear, 1.2–2.5 × 0.3–0.6 cm, abaxially appressed pubescent, adaxially glabrous. Racemes densely spicate, with many flowers; bracts lanceolate, ca. 2 × as long as pedicel; peduncle conspicuously longer than leaves. Pedicel ca. 1 mm. Calyx campanulate, 6–7 mm, villous; teeth subulate-lanceolate, 2–2.5 × as long as tube. Corolla pinkish purple; standard obovate, 8–10 mm; wings ca. 1/4 as long as standard; keel ± as long as standard. Ovary pubescent. Legume with 1 loment; loment subglobose, 5–6 mm in diam., inflated, pubescent, papillose-prickly, margin narrowly thickening. Fl. Jun–Jul, fr. Jul–Aug.

Meadows, scrub on steppes; 1400–1800 m. N Xinjiang [Kazakhstan, Kyrgyzstan, Russia (W Siberia), Turkmenistan, Uzbekistan; SW Asia, SE Europe].

3. *Onobrychis viciifolia* Scopoli, Fl. Carniol., ed. 2, 2: 76. 1772.

驴食草 *lü shi cao*

Onobrychis sativa Lamarck.

Herbs, perennial, 0.5–1.2 m tall. Stems erect, caespitose. Stipules triangular-ovate, 7–9 mm, connate farther than middle. Leaves 10–18 cm, 13–19-foliolate; leaflet blades oblong-lanceolate to lanceolate, 2–3 × 0.4–1 cm, abaxially appressed pubescent, adaxially glabrous. Racemes densely spicate, with many flowers; bracts lanceolate, ca. 2 × as long as pedicel; peduncle conspicuously longer than leaves. Pedicel ca. 1 mm. Calyx campanulate, 6–8 mm, villous; teeth subulate-lanceolate, 2–2.5 × as long as tube. Corolla pinkish purple; standard obovate, 8–10 mm; wings ca. 1/4 as long as standard; keel ± as long as standard. Ovary densely appressed pubescent. Legume with 1 loment; loment subglobose, 5–6 mm in diam., inflated, margin thickened and adaxially with prickles. Fl. Jun–Jul, fr. Jul–Aug.

Cultivated. Gansu, Hebei, Nei Mongol, Qinghai, Shaanxi, Shanxi [probably native to C Europe].

This species is a good fodder plant and is also important for water and soil conservation in loess plateau areas.

152. **EVERSMANNIA** Bunge in Goebel, Reise Steppen Südl. Russlands 2: 267. 1838.

刺枝豆属 *ci zhi dou shu*

Sun Hang (孙航); Bruce Bartholomew

Shrublets, spiny. Leaves imparipinnate. Racemes axillary, many flowered. Flowers shortly pedicellate. Calyx campanulate-tubular; teeth 5, lanceolate, adaxial one shorter than abaxial ones. Corolla standard oblong-obovate, as long as keel, base tapered; wings small, nearly 1/4 as long as standard; keel oblique. Stamens diadelphous (9+1). Ovary glabrous; style filiform, incurved at apex and with small stigma. Legume broadly linear, compressed, curved, leathery, glabrous; loments 1-seeded, separated from persistent thin sutures at maturity.

Four species: C Asia, E Europe, Russia; one species in China.

1. *Eversmannia subspinosa* (Fischer ex Candolle) B. Fedtschenko, Trudy Imp. S.-Peterburgsk. Bot. Sada 24: 173. 1905.

刺枝豆 *ci zhi dou*

Hedysarum subspinosum Fischer ex Candolle, Prodr. 2: 343. 1825; *Eversmannia astragaloides* Regel & Schmalhausens; *E. hedysaroides* Bunge, nom. illeg. superfl.

Shrublets, 10–60 cm tall. Stems ascending, with yellowish gray peeling bark; branches sparsely spreading, with curved acute prickles to 1.7 cm, entirely covered with appressed short trichomes. Stipules lanceolate, basally nearly connate, apex acute. Leaves imparipinnate, 2–8 cm, 7–15-foliolate; petiole short; petiolules ca. 0.5 mm; leaflet blades oblong-elliptic to

obovate, 0.5–1 × 3–4 cm, base tapering into petiolule, apex acuminate. Racemes many flowered, oblong, 7–10 × 3–3.5 cm; peduncle elongate; bracts oblong, shorter than pedicels, margin scarious, apex obtuse. Flowers shortly pedicellate; bracteoles 2, at base of calyx, linear, ca. 2 mm. Calyx 4–5 × 2.5–3 mm; teeth lanceolate, apex acute. Corolla purple; standard oblong-obovate, 1.2–1.5 × 0.6–0.7 cm, apex retuse; wings lanceolate, 3.5–4 mm, base with elongate oblong auricles. Legume brown, elongate, 3–5 cm, curved, tuberculate-granular. Seeds light brown, ovoid, ± flattened, ca. 3 mm, smooth, shiny. Fl. May–Jun, fr. Jun–Jul. $2n = 16$.

Sandy steppes, dry meadows; 800–3100 m. N Xinjiang (N and W Junggar Pendi) [Afghanistan, Kazakhstan, SE Russia; SW Asia].

153. **ALHAGI** Gagnebin, Acta Helv. Phys.-Math. 2: 59. 1755.

骆驼刺属 *luo tuo ci shu*

Xu Langran (徐朗然 Xu Lang-rang); Kai Larsen

Subshrubs [or perennial herbs]. Stipules subulate. Leaves alternate, 1-foliolate; leaf blade margin entire. Racemes axillary, with bracts and bracteoles. Calyx campanulate; teeth 5, subequal. Corolla red to purple. Stamens diadelphous (9+1); anthers uniform. Ovary with many ovules; stigma capitate. Legume articulate and moniliform, indehiscent.

About five species: C Asia to Mongolia, China, and Nepal, Mediterranean region including N Africa; one species in China.

This genus contains good foliage plants and sand-fixing plants. Sugar secreted on the leaves can be used medicinally for treating headaches.

1. *Alhagi sparsifolia* Shaparenko ex Keller & Shaparenko, Sovetsk. Bot. 3–4: 167. 1993.

骆驼刺 luo tuo ci

Subshrubs, 25–50 cm tall. Stems erect, caespitose. Stipules subulate, ca. 1 mm. Leaves sessile; leaflet blade ovate, obovate, or obovate-orbicular to elliptic, 8–15 × 6–10 mm, glabrous, base cuneate, apex rounded to slightly acute. Racemes lax, 3–8-flowered; peduncle ligneous; rachis hardened, terminating in a strong spine; bracts subulate, ca. 1 mm. Pedicel 1–3 mm; bracteoles 2, at base of calyx. Calyx campanulate, 4–5 mm, pubescent; teeth triangular to subulate-triangular, 1/4–1/3

as long as tube. Corolla reddish purple; standard narrowly obovate, 8–9 mm; wings ca. 3/4 as long as standard; keel subequaling standard. Ovary sessile, glabrous. Legume straight to slightly curved, 1.2–2.5 cm, glabrous. Fl. Jun–Jul, fr. Jul–Aug. $2n = 16$.

Desert plains, low hills; 100–700 m. C and N Gansu, W Nei Mongol, E Qinghai, E Xinjiang [Kazakhstan, Kyrgyzstan, W Mongolia, Tajikistan, Turkmenistan, Uzbekistan].

The calyx teeth are variable, even on the same plant; therefore, it is difficult to distinguish from other species westward in neighboring countries.

154. *CALOPHACA* Fischer ex Candolle, Prodr. 2: 270. 1825.

丽豆属 li dou shu

Zhu Xiangyun (朱相云); Kai Larsen

Shrubs or subshrubs. Stipules lanceolate or broadly lanceolate, large, membranous or herbaceous, adnate to base of petiole. Leaves imparipinnate, 5–27-foliolate; stipules absent; leaflet blades leathery, margin entire. Raceme 4-flowered or more; bracts and bractlets rarely persistent. Calyx tubular, oblique on pedicel; teeth 5, almost equal or adaxial 2 connate. Corolla yellow, large; standard ovate or suborbicular, erect, reflexed at margins; wings obovate-oblong or subfalcate; keel incurved, equal to wings, apex blunt. Stamens diadelphous (9+1); anthers orbicular. Ovary sessile, with glandular trichomes or pubescent; style filiform; stigma small. Legume cylindrical or linear, pubescent or with glandular trichomes, 1-loculed, inside pubescent or glabrous, 2-valved, with persistent calyx. Seeds subreniform, without a caruncle.

Five species: China, Russia; C Asia; three species (two endemic) in China.

Calophaca tianschanica (B. Fedtschenko) Boissier (Trudy Bot. Inst. Akad. Nauk S.S.S.R., Ser. 1, Fl. Sist. Vyssh. Rast. 1: 137. 1933; *C. nigricans* var. *tianschanica* B. Fedtschenko, Trudy Imp. S.-Peterburgsk. Bot. Sada 24: 178. 1905) was recorded from Xinjiang by S. H. Cheng and L. K. Dai (Ill. Treatm. Princ. Pl. China (Leguminosae), 357–359. 1955). However, the present authors found no relevant specimens and therefore could not substantiate the occurrence of this species in China.

- 1a. Legume without glandular trichomes 1. *C. chinensis*
 1b. Legume with glandular trichomes.
 2a. Stipules 0.5–0.8 cm; peduncle densely lanuginous; calyx ca. 1 cm, appressed sericeous; seeds dark brown ... 2. *C. soongorica*
 2b. Stipules ca. 2 cm; peduncle with glandular and white long trichomes; calyx 1.5–2 cm, with glandular and white long trichomes; seeds olive-green 3. *C. sinica*

1. *Calophaca chinensis* Borissova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 21: 243. 1961.

华丽豆 hua li dou

Shrubs, 20–40 cm tall. Stems with many branches; bark bright, glabrous, with pale yellow grains; young branches pale brown, with dense short trichomes. Stipules linear, 4–5 mm, brown, with dense short trichomes, basally connate, apex acuminate. Leaves 2–4 cm, 5–11-foliolate; leaflet blades orbicular to ovate, 4–9 × 3–6 mm, leathery, grayish white, both surfaces with dense appressed trichomes, veins conspicuous, base rounded, apex shortly acute. Inflorescences subcapitate, 4- or 5-flowered; peduncle 3–4 cm, hard, with dense spreading long trichomes; bracts 2–4 mm, base triangular, apex acuminate. Flowers ca. 2 cm; pedicel 1–2 mm, with dense trichomes; bracteoles 2, ovate or oblong, 1–2 mm, caducous, abaxially with dense short trichomes. Calyx broadly campanulate, 7–9 mm, with short white trichomes, base slightly gibbous; teeth tri-

angular-lanceolate, 1/3–1/2 as long as tube, both surfaces with dense trichomes. Corolla yellow; standard ca. 2 cm, outside with dense trichomes, lamina orbicular, ca. 1.5 cm wide, base cuneate and with a ca. 4 mm claw, apex emarginate; wings ca. 1.8 cm, lamina ca. 14 × 5 mm, outside rarely with white trichomes, basally narrowed with ca. 1.5 mm auricles and a ca. 5 mm incurved claw, apically enlarged, apex truncate to obtuse; keel ± as long as wings, outside rarely with white long trichomes, basally with a ca. 7 × 2 mm claw, auricles short and blunt, lamina ca. 6 mm wide, apex truncate. Stamens 1.5–1.8 cm; anthers orbicular, ca. 0.5 mm in diam. Ovary oblong, with appressed white trichomes; style with semiappressed trichomes but glabrous at apex. Legume 1.5–1.8 cm, ca. 5 mm wide in apical part, with dense white short trichomes, apex beaked. Seeds olive-green, ellipsoid-reniform, ca. 3 × 2 mm, glabrous, smooth. Fl. Jul–Aug, fr. Aug.

• Sunny slopes, meadows within *Spiraea*, *Artemisia*, and *Poa*; 900–1400 m. Xinjiang.

2. *Calophaca soongorica* Karelín & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 14: 401. 1841.

新疆丽豆 *xin jiang li dou*

Calophaca hovenii Schrenk.

Shrubs 20–100 cm tall. Stems with many branches; bark pale grayish yellow, glabrous, exfoliating; young branches pale brown, sericeous or lanuginous. Stipules linear-lanceolate, 5–8 mm, membranous, pale brown, rarely with short trichomes. Leaves 3–7 cm, 7–11-foliolate; rachis and petiole rarely with short trichomes; leaflet blades orbicular to narrowly orbicular-elliptical, 4–14 × 4–10 mm, both surfaces bluish gray with a waxy layer and rarely with appressed short trichomes, veins protruding on both surfaces, base rounded, apex shortly acute. Inflorescences 5–8-flowered; peduncle 7–10 cm, hard, densely lanuginous. Flowers ca. 2.5 cm; pedicel 2–4 mm; bracteoles 2, pale brown, triangular, 2–3 mm, with dense silky appressed trichomes. Calyx campanulate, ca. 1 cm, outside rarely densely sericeous, inside rarely appressed sericeous, base oblique; teeth triangular-lanceolate to triangular, ± as long as tube. Corolla yellow, pale brown when dry; standard 2–2.5 cm, outside with dense short trichomes, base shortly clawed, lamina orbicular, apex emarginate; wings slightly shorter than standard, lamina oblong; keel shorter than wings. Legume narrowly cylindrical, 2–3 cm × 6–8 mm, with acute hard glandular appressed trichomes, with short trichomes dorsally, segments disciform. Seeds dark brown, reniform, 3–6 × 2–4 mm, glabrous, smooth. Fl. Jul–Aug, fr. Jul–Aug. $2n = 32$.

Sunny slopes in valleys, among shrubs; 1300–1400 m. Xinjiang [Kazakhstan].

3. *Calophaca sinica* Rehder, J. Arnold Arbor. 14: 210. 1933.

丽豆 *li dou*

Shrubs, 20–40 cm tall. Stems many branched; bark bright, glabrous, with pale yellow grains; young branches pale brown sericeous. Stipules linear, ca. 2 cm, brown, with dense short trichomes, basally connate, apex acuminate. Leaves 2–9 cm, 5–11-foliolate; leaflet blades orbicular to ovate, 1–2.5 × 0.7–1.8 cm, leathery, both surfaces grayish white and with dense appressed trichomes, veins conspicuous, base rounded, apex shortly acute. Inflorescences subcapitate, 4- or 5-flowered; peduncle 5–12 cm, hard, with dense spreading long trichomes; bracts 2–4 mm, base triangular, apex acuminate. Flowers ca. 2.5 cm; pedicel 3–6 mm, with dense trichomes; bracteoles 2, ovate, linear, or oblong, ca. 5 mm, caducous, abaxially with dense short trichomes. Calyx broadly campanulate, 1.5–2 cm, with short white trichomes, base slightly gibbous; teeth triangular-lanceolate, 1/3–1/2 as long as tube, both surfaces with dense trichomes. Corolla yellow; standard ca. 2.5 cm, outside with dense trichomes, lamina orbicular, ca. 1.5 cm wide, base broadly cuneate and with a ca. 4 mm claw, apex emarginate; wings ca. 2.2 cm, lamina ca. 14 × 5 mm, outside rarely with white trichomes, basally narrowed with ca. 1.5 mm auricles and a ca. 5 mm incurved claw, apically enlarged, apex truncate to obtuse; keel ca. as long as wings, outside rarely with long white trichomes, lamina ca. 6 mm wide, basally with short blunt auricles and with a ca. 7 × 2 mm claw, apex truncate. Stamens 1.5–1.8 cm; anthers orbicular, ca. 0.5 mm in diam. Ovary oblong, with white appressed trichomes; style with semiappressed trichomes but glabrous at apex. Legume 1.5–4.5 cm, ca. 9 mm wide in apical part, with dense white short trichomes and with glandular trichomes, apex beaked. Seeds olive-green, ellipsoid-reniform, ca. 3 × 2 mm, glabrous, smooth. Fl. May–Jun, fr. Jun–Aug. $2n = 16^*$.

• N-facing valley slopes, among shrubs, dunes of loess; 900–1800 m. W Hebei, Nei Mongol, Shanxi.

155. CARAGANA Fabricius, Enum., ed. 2, 421. 1763.

锦鸡儿属 *jin ji er shu*

Liu Yingxin (刘焯心 *Liou Yingxin*, Liu Ying-hsin), Chang Zhaoyang (常朝阳); Gennady P. Yakovlev

Shrubs or very rarely small trees. Stipules small, caducous or persistent and spinelike. Leaves paripinnate with rachis often extending beyond last leaflet pair or rachis reduced and leaves apparently digitate, 4–20-foliolate; petiole and rachis persistent or caducous, when persistent often becoming woody and spinelike; leaflet blades with margin entire, apex often cuspidate. Flowers axillary, usually solitary but sometimes 2–5 in a fascicle. Pedicel articulate; bracteoles absent or 1 to many. Calyx tubular or campanulate; teeth 5, adaxial 2 usually smaller, base saccate or not. Corolla yellow, rarely purple, pinkish, or white; standard sometimes pale yellow or orangish red; wings and keel often auriculate. Stamens diadelphous (9+1). Ovary sessile, rarely with a distinct carpodium; ovules many. Legume cylindrical or compressed, sessile or rarely stipitate.

About 100 species: temperate Asia, E Europe; 66 species (32 endemic) in China.

This genus is planted as an ornamental, as a hedge row, for soil and water conservation, for fuels, and for sand-dune stabilization.

1a. Leaves digitate, 4-foliolate.

2a. Leaves on short branchlets subsessile; calyx tube 4–7 mm; claw of corolla wings shorter than limb.

3a. Branches yellowish white, yellow, or golden yellow.

4a. Ovary glabrous; legume 3–3.5 cm, glabrous; plants to 150 cm tall 43. *C. leucophloea*

4b. Ovary densely pubescent; legume 2–3 cm, pubescent when young but glabrescent; plants to 50 cm tall 44. *C. pygmaea*

3b. Branches whitish green, grayish green, yellowish green, dark gray, greenish brown, yellowish brown, brown, or dark brown.

5a. Leaflet blades narrowly obovate to oblanceolate, 2–3 mm wide; auricle of corolla wings 1/5–1/4 as long as claw 45. *C. altaica*

5b. Leaflet blades lanceolate, lanceolate-linear, or linear, 0.5–2 mm wide; auricle of corolla wings longer.

- 6a. Leaflet blades falcate; legume 2.5–4 cm 46. *C. aurantiaca*
 6b. Leaflet blades straight; legume 2–2.5 cm.
 7a. Leaflet blades dark green but abaxially tinged ± reddish; auricle of corolla wings ca. 2/3 as long as claw 47. *C. pumila*
 7b. Leaflet blades green to grayish green; auricle of corolla wings 1/4–1/2 as long as claw.
 8a. Corolla 1.1–1.2 cm; pedicel ca. 5 mm, articulate basally; stipule spines 1–4 mm on long branchlets 48. *C. versicolor*
 8b. Corolla 0.8–1.8(–2) cm; pedicel 5–10 mm, articulate slightly basally from middle; stipule spines 4–7 mm on long branchlets 49. *C. stenophylla*
- 2b. Leaves on short branchlets petiolate (but petiole as short as 1 mm in some species and absent in *C. brachypoda*); calyx tube 6–13 mm; claw of corolla wings as long as or shorter than limb.
 9a. Calyx tube saccate or gibbous.
 10a. Corolla 2.7–3.2 cm; calyx tube 1.2–1.3 cm 50. *C. kirghisorum*
 10b. Corolla 2–2.5(–2.8) cm; calyx tube 0.6–1.1 cm.
 11a. Leaflet blade apices acute.
 12a. Pedicel 2–5 mm, articulate basally; leaflet blades oblanceolate 51. *C. brachypoda*
 12b. Pedicel 5–12 mm, articulate apically; leaflet blades linear-oblanceolate 52. *C. kansuensis*
 11b. Leaflet blade apices rounded, truncate, or emarginate.
 13a. Legume densely villous; corolla 2.5–2.8 cm; standard obovate-oblong; bark dark brown; branchlets grayish brown 53. *C. leveillei*
 13b. Legume glabrous; corolla 2–2.5 cm; standard broadly obovate; bark grayish brown; branchlets bright gray 54. *C. opulens*
- 9b. Calyx tube not or only slightly enlarged (but gibbous in *C. camilloi-schneideri*).
 14a. Corolla pinkish to reddish at least when wilted; standard oblong-obovate 55. *C. rosea*
 14b. Corolla yellow (but some species with an orange spot in middle of standard and some reddish yellow inside); standard broader (obovate, broadly obovate, ovate, broadly ovate, suborbicular, or orbicular).
 15a. Young ovary or both young ovary and young legume pubescent.
 16a. Corolla 1.5–1.8 cm; auricle of corolla wings 1/2–2/3 as long as claw 56. *C. qingheensis*
 16b. Corolla 2–3.1 cm; auricle of corolla wings 1/3–2/5 as long as claw.
 17a. Corolla 2.8–3.1 cm 57. *C. camilloi-schneideri*
 17b. Corolla 2–2.2 cm.
 18a. Pedicel 2–6 mm 60. *C. polourensis*
 18b. Pedicel 6–20 mm.
 19a. Leaflet blades obovate to oblanceolate, both surfaces densely pubescent 58. *C. licentiana*
 19b. Leaflet blades obovate-cuneate, only abaxial surface sparsely pubescent 59. *C. shensiensis*
- 15b. Ovary and legume glabrous (ovary rarely with trichomes in *C. laeta*).
 20a. Corolla 2.6–3.5 cm 65. *C. laeta*
 20b. Corolla 1.3–2.3 cm.
 21a. Corolla standard suborbicular; pedicel 9–21 mm 66. *C. frutex*
 21b. Corolla standard obovate, broadly obovate, or broadly ovate; pedicel 2–8 mm.
 22a. Legume 1–2.5(–3.5) cm; corolla 1.4–1.6 cm 61. *C. brevifolia*
 22b. Legume 3–4.5 cm; corolla 1.6–2.3 cm.
 23a. Auricle of corolla wings nearly as long as claw; standard broadly obovate, apex emarginate 62. *C. chinghaiensis*
 23b. Auricle of corolla wings 1/5–1/3 as long as claw; standard ovate or obovate, apex obtuse.
 24a. Leaflet blades 6–13 mm; legume 3–4 mm in diam. 63. *C. densa*
 24b. Leaflet blades 4–6 mm; legume 4–6 mm in diam. 64. *C. turfanensis*
- 1b. Leaves all pinnate or only pinnate on long branchlets and digitate on short branchlets, 4–20-foliolate.
 25a. All leaves 4-foliolate.
 26a. Leaves on long branchlets pinnate but on short branchlets sessile and digitate; claw of corolla wings ca. 1/3 as long as limb, auricle ± as long as claw 1. *C. dasyphylla*
 26b. Leaves on long and short branches pinnate or sometimes digitate or only on short branches sometimes digitate; claw of corolla wings ca. 1/2 as long as limb, auricle short and obtuse.
 27a. Corolla 2.8–3 cm; calyx tube 1.2–1.4 cm; apical pair of leaflets larger than others 2. *C. sinica*
 27b. Corolla 2.2–2.5 cm; calyx tube 0.6–0.8 cm; leaflets all of equal size 3. *C. ussuriensis*
- 25b. Leaves 4–20-foliolate (at least some leaves on plant with more than 4 leaflets).
 28a. Short branchlets with digitate or pinnate leaves and 4-foliolate, long branchlets with pinnate leaves and 4–8-foliolate.
 29a. Old branches yellow; legume densely villous 4. *C. tragacanthoides*
 29b. Old branches yellowish brown, reddish brown, or greenish brown; legume glabrous or pilose.

- 30a. Leaflet blades 1.5–2(–3) cm 5. *C. spinosa*
 30b. Leaflet blades 0.3–1.2 cm.
 31a. Flowers solitary or 2 or 3 in a fascicle; calyx tube 1–1.3 cm; corolla standard suborbicular 6. *C. pruinosa*
 31b. Flowers solitary or to 4 in a fascicle; calyx tube 0.8–1 cm; corolla standard broadly ovate to oblong-obovate 7. *C. erinacea*
- 28b. All branches with pinnate leaves and 4–20-foliolate.
 32a. Petiole and rachis caducous (only often caducous in *C. boisii*, rarely persistent in *C. turkestanica*).
 33a. Calyx tube campanulate (campanulate-tubular in *C. zahlbruckneri*, tubular to broadly campanulate in *C. manshurica*), length and width nearly equal; leaflet blades often longer than 1 cm.
 34a. Flowers usually in pairs on a peduncle, rarely solitary; leaves 4–8-foliolate; ovary sericeous 27. *C. soongorica*
 34b. Flowers solitary (or 2 in a fascicle in *C. zahlbruckneri*, rarely 2 in a fascicle in *C. fruticosa* and *C. manshurica*, to 3 in a fascicle in *C. boisii*, to 5 in a fascicle in *C. arborescens*); leaves 8–20-foliolate; ovary pubescent or glabrous (densely sericeous in *C. stipitata*).
 35a. Ovary and legume stipitate 28. *C. stipitata*
 35b. Ovary and legume not stipitate.
 36a. Pedicel 0.8–1.5 cm.
 37a. Leaves 10–18-foliolate; current-year branchlets reddish brown; corolla 2.3–2.5 cm 29. *C. zahlbruckneri*
 37b. Leaves 8–12-foliolate; current-year branchlets greenish brown; corolla 1.6–1.9 cm 30. *C. fruticosa*
 36b. Pedicel 1–5 cm.
 38a. Flowers solitary or 2–5 in a fascicle.
 39a. Corolla 1.6–2 cm; spinelike stipules 5–10 mm; trees 2–6 m tall 31. *C. arborescens*
 39b. Corolla 2–2.5 cm; spinelike stipules 8–15 mm; shrubs to 1.3 m tall 32. *C. boisii*
 38b. Flowers solitary (rarely 2 in a fascicle in *C. manshurica*).
 40a. Leaves 10–20-foliolate; limb of corolla keel ± cuneate 33. *C. manshurica*
 40b. Leaves 6–10-foliolate; limb of corolla keel not cuneate 34. *C. turkestanica*
- 33b. Calyx tube campanulate or tubular, length longer than width; leaflet blades often shorter than 1 cm.
 41a. Ovary and legume stipitate.
 42a. Legume falcately curved; old branches brown and glaucous; leaflets, pedicels, and current-year branchlets with dense trichomes, not glabrescent, glaucous 35. *C. davazamcii*
 42b. Legume straight; old branches bright yellow and not glaucous; leaflets, pedicels, and current-year branchlets pubescent, glabrescent, not glaucous 36. *C. purdomii*
 41b. Ovary and legume not stipitate.
 43a. Ovary and legume densely pubescent 37. *C. pekinensis*
 43b. Ovary and legume glabrous, rarely sparsely pubescent.
 44a. Spinelike stipules 10–13 mm; claw of corolla wings ca. 1/3 as long as limb; leaflet blades glabrous 38. *C. litwinowii*
 44b. Spinelike stipules 1.5–7 mm; claw of corolla wings ca. 1/2 as long to almost as long as limb; leaflet blades with trichomes (sometimes glabrous in *C. microphylla*).
 45a. Leaflet blades obovate, obovate-oblong, or rarely almost elliptic, apex obtuse, truncate, or emarginate; legume cylindric, 4–5 cm × 4–5 mm.
 46a. Stipules usually obliquely erect; leaflet blades obovate to obovate-oblong, apex obtuse to truncate; ovary often glabrous 39. *C. microphylla*
 46b. Stipules ± deflexed hooklike; leaflet blades obovate to rarely almost elliptic, apex emarginate; ovary sparsely appressed pubescent 40. *C. potaninii*
 45b. Leaflet blades lanceolate to narrowly oblong or elliptic to obovate-elliptic, apex acute, obtuse, rounded, or rarely truncate; legume lanceolate to oblong-lanceolate, 2–3.5 cm × 5–7 mm.
 47a. Legume 2.5–3.5 cm × 5–6 mm; leaflet blades whitish green, both surfaces villous 41. *C. liouana*
 47b. Legume 2–2.5 cm × 6–7 mm; leaflet blades whitish, both surfaces densely appressed sericeous 42. *C. korshinskii*
- 32b. Petiole and rachis persistent and spinelike at least on long branchlets.
 48a. Spinelike petiole and rachis persistent on long branchlets but caducous on short branchlets.
 49a. Leaves 4–10-foliolate 8. *C. acanthophylla*
 49b. Leaves 8–18-foliolate.
 50a. Leaflet blades obovate-lanceolate, apex acuminate; calyx tube 1–1.5 cm 9. *C. crassispinia*
 50b. Leaflet blades obovate-oblong, oblong, or elliptic, apex obtuse or acute; calyx tube 0.8–1.2 cm.
 51a. Leaflet blade apices obtuse to acute; flowers solitary or in pairs on a peduncle; calyx tube dark brown; corolla standard emarginate at apex; wings with 1 auricle 10. *C. bicolor*
 51b. Leaflet blade apices obtuse; flowers solitary, rarely in pairs on a peduncle; calyx tube yellowish brown; corolla standard either slightly emarginate or not at apex; wings with 2 auricles 11. *C. franchetiana*

- 48b. Spinelike petiole and rachis persistent on both long and short branchlets.
- 52a. Corolla rosy, reddish purple, bright purple, pink, or white; calyx tube 1.4–1.7 cm 12. *C. jubata*
- 52b. Corolla yellow (yellowish white with reddish claws in *C. chumbica*, yellow but standard sometimes purple in *C. roborovskyi*); calyx tube 0.7–1.5 cm (to 2.1 cm in *C. pleiophylla*).
- 53a. Corolla standard villous on both surfaces 13. *C. chumbica*
- 53b. Corolla standard glabrous on both surfaces.
- 54a. Ovary glabrous or nearly so.
- 55a. Leaflet blades lanceolate to oblanceolate, 8–15 × 3–6 mm; legume lanceolate to narrowly obovoid 14. *C. kozlowii*
- 55b. Leaflet blades elliptic, 5–7 × 2–3 mm; legume cylindrical 25. *C. tekesiensis*
- 54b. Ovary distinctly pubescent.
- 56a. Corolla wings narrowly cuneate, auricle short to inconspicuous.
- 57a. Standard oblong; calyx tubular, ca. 1 cm; leaves 6(or 8)-foliolate; leaflet blades oblong, apex acute; plant densely white villous 15. *C. cuneatoalata*
- 57b. Standard suborbicular; calyx campanulate, ca. 1.7 cm; leaves 8–10-foliolate; leaflet blades elliptic-obovate, apex blunt; plant densely fulvous villous 16. *C. aliensis*
- 56b. Corolla wings not cuneate, with a distinct auricle.
- 58a. Legume inside glabrous.
- 59a. Leaves (4 or)6-foliolate, apical pair often largest 23. *C. tangutica*
- 59b. Leaves 6–14-foliolate, all nearly equal.
- 60a. Leaf rachis 1–2.5 cm; calyx tube 10–12 mm; auricle of corolla wings slightly shorter than claw 24. *C. roborovskyi*
- 60b. Leaf rachis 2–3(–6.5) cm; calyx tube 7–10 mm; auricle of corolla wings only ca. 1 mm and much shorter than claw 26. *C. changduensis*
- 58b. Legume inside with trichomes.
- 61a. Leaf rachis glaucous and glabrous or whitish pubescent 17. *C. leucospina*
- 61b. Leaf rachis neither glaucous nor whitish pubescent.
- 62a. Shrubs less than 30 cm tall; claw of corolla wing as long as or longer than limb.
- 63a. Shrubs cushion-shaped; leaflet blades linear, 8–12 mm; flowers subsessile; legume 0.7–0.8 cm 18. *C. tibetica*
- 63b. Shrubs caespitose but not cushion-shaped; leaflet blades oblong-elliptic, 4–5 mm; flowers with a 5–7 mm pedicel; legume 1.5–2 cm 19. *C. aegacanthoides*
- 62b. Shrubs more than 40 cm tall; claw of corolla wing shorter than limb.
- 64a. Pedicel 5–7 mm; calyx 1.5–2.1 cm; legume 3–3.5 cm 20. *C. pleiophylla*
- 64b. Pedicel 2–4 mm; calyx 1–1.3 cm; legume 1.5–2.5 cm.
- 65a. Leaves (4 or)6- or 8(or 10)-foliolate; leaflet blades elliptic to obovate, pubescent on both surfaces; claw of corolla keel shorter than limb; legume lanceolate to narrowly ovoid 21. *C. gerardiana*
- 65b. Leaves 8–12-foliolate; leaflet blades oblong, narrowly oblong, or obovate-oblong, pubescent only on abaxial surface; claw of corolla keel longer than limb; legume cylindrical 22. *C. junatovii*

1. *Caragana dasyphylla* Pojarkova in Komarov, Fl. URSS 11: 400. 1945.

粗毛锦鸡儿 *cu mao jin ji er*

Shrubs to 30 cm tall. Bark grayish brown to bright brown. Leaves 4-foliolate, pinnate on long branchlets, digitate and sessile on short branchlets; petiole 0.8–1.5 cm on long branchlets, persistent; leaflet blades oblanceolate to obovate, 3–12 × 2–3 mm, both surfaces appressed pubescent, base cuneate, apex rounded to truncate. Flowers solitary. Pedicel 2–4 mm, articulate basally. Calyx tube tubular-campanulate, 6–7 mm. Corolla yellow, 1.6–1.8 cm; standard suborbicular to broadly ovate; wings with claw ca. 1/3 as long as limb, auricle ± as long as claw; keel claw ca. 1/2 as long as limb, auricle small. Ovary glabrous. Legume cylindrical, 2–3.5 cm, glabrous. Fl. Apr–May, fr. Jun–Jul.

- Valleys, riverbanks, slopes; 1200–2800 m. Xinjiang.

2. *Caragana sinica* (Buc'hoz) Rehder, J. Arnold Arbor. 22: 576. 1941.

锦鸡儿 *jin ji er*

Robinia sinica Buc'hoz, Pl. Nouv. Decouv. 24. 1784; *Caragana chamlagu* Lamarck; *C. longiunguiculata* C. W. Chang; *C. rosea* Turczaninow ex Maximowicz var. *longiunguiculata* (C. W. Chang) Y. X. Liou.

Shrubs to 2 m tall. Bark dark brown. Current-year branchlets glabrous. Leaves pinnate or sometimes digitate, 4-foliolate; petiole and rachis 0.7–1.5(–2.5) cm, caducous or persistent; leaflet blades obovate to oblong-obovate, 1–3.5 × 0.5–1.5 cm, apical pairs often largest, apex rounded and mucronate. Flowers solitary. Pedicel ca. 1 cm, articulate at middle. Calyx tube campanulate, 1.2–1.4 cm. Corolla yellow, 2.8–3 cm; standard narrowly obovate, claw short; wings basally auriculate, claw nearly as long as limb; keel broadly blunt. Ovary glabrous. Legume cylindrical, 3–3.5 cm. Fl. Apr–May, fr. Jul. *2n* = 16, 24.

Mountain hills; below 400–1800 m. Anhui, Fujian, S Gansu, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Shaanxi, Shandong, Sichuan, Yunnan, Zhejiang [Korea; cultivated and naturalized in Japan].

3. *Caragana ussuriensis* (Regel) Pojarkova in Komarov, Fl. URSS 11: 395. 1945.

乌苏里锦鸡儿 wu su li jin ji er

Caragana frutescens Linnaeus var. *ussuriensis* Regel, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 4(1): 44. 1862.

Shrubs to 2 m tall. Bark dark brown. Current-year branchlets brown, glabrous. Leaves pinnate, on short branchlets sometimes digitate, 4-foliolate; petiole and rachis 2–15 mm, often caducous; leaflet blades oblong-obovate to oblanceolate, 10–17 × 4–7 mm, base cuneate, apex rounded to mucronate. Flowers solitary or rarely 2 in a fascicle. Pedicel 1.2–2 cm, articulate apically from middle. Calyx tube campanulate, 6–8 × 4–5 mm. Corolla yellow, later becoming reddish; standard narrowly obovate, 2.2–2.5 cm, apex slightly emarginate; wings with claw ca. 1/2 as long as limb, auricle small and obtuse; keel claw ca. 1/2 as long as limb, auricle small. Ovary glabrous. Legume 3–3.5 cm, slightly compressed. Fl. May–Jun, fr. Jul–Aug. $2n = 16, 48$.

Hillsides; below 100 m. SE Heilongjiang [Russia (Far East)].

4. *Caragana tragacanthoides* (Pallas) Poiret in Lamarck, Encycl., Suppl. 2: 90. 1811.

中亚锦鸡儿 zhong ya jin ji er

Robinia tragacanthoides Pallas, Nova Acta Acad. Sci. Imp. Petrop. Hist. Acad. 10: 371. 1797; *Caragana hololeuca* Bunge ex Komarov.

Shrubs to 1 m tall. Old branches yellow. Leaves pinnate on long branchlets and 4- or 6-foliolate, pinnate or digitate on short branchlets and 4-foliolate; petiole and rachis 0.8–2.5 cm, arched to spreading, and persistent on long branchlets, 5–12 mm and persistent or caducous on short branchlets; leaflet blades narrowly oblanceolate to elliptic-lanceolate, 6–12(–15) × (1.5–)2–4 mm. Flowers solitary. Pedicel 2.5–4 mm, articulate basally. Calyx tube tubular, 1–1.2 cm. Corolla yellow, 2–2.2 cm; standard obovate, claw ± as long as limb; wings with claw ± as long as limb, auricle ca. 1/2 as long as or slightly shorter than claw; keel claw ± as long as limb, auricle short. Ovary densely pubescent. Legume cylindrical, 1.2–2.5(–3) cm, densely villous. Fl. May, fr. Jul.

Rocky slopes in mountains, scrub in mixed steppes; 700–1300 m. Xinjiang [Kazakhstan, Mongolia, Russia].

Only the typical variety occurs in China. *Caragana tragacanthoides* var. *himalaica* Komarov occurs in Kashmir and Nepal, but its taxonomic status is uncertain.

Plants misidentified as *Caragana bongardiana* (Fischer & C. A. Meyer) Pojarkova in FRPS (42(1): 35. 1993) belong here.

5. *Caragana spinosa* (Linnaeus) Hornemann, Hort. Bot. Hafn. 2: 694. 1815.

多刺锦鸡儿 duo ci jin ji er

Robinia spinosa Linnaeus, Mant. Pl. 2: 269. 1771.

Shrubs to 50 cm tall. Old branches yellowish brown; branchlets reddish brown, pubescent when young. Leaves clustered, pinnate and 6-foliolate on long branchlets, digitate and 4-foliolate on short branchlets; petiole 2–3 mm or absent; rachis 1–5 cm and persistent on long branchlets; leaflet blades narrowly oblanceolate to linear, 1.5–2(–3) cm × 2–4 mm, appressed pubescent. Flowers solitary or 2 in a fascicle. Pedicel 2–4 mm, articulate basally. Calyx tube tubular, 7–10 mm. Corolla yellow, 2–2.2 cm; standard obovate, claw 3–4 mm, apex obtuse; wings with claw ± as long as limb, scarcely auricled; keel claw ± as long as limb, auricle absent, apex acute. Ovary glabrous. Legume 2–2.5 cm × 3–4 mm, glabrous. Fl. Jun–Jul, fr. Sep. $2n = 32$.

Hillsides, riversides, bottomlands; 1200–1300 m. Xinjiang [Kazakhstan, Mongolia, Russia (Siberia)].

6. *Caragana pruinosa* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 265. 1909.

粉刺锦鸡儿 fen ci jin ji er

Shrubs to 1 m tall. Old branches greenish brown to yellowish brown; current-year branchlets brown, pubescent when young. Leaves pinnate on long branchlets and 4- or 6-foliolate, digitate on short branchlets and 4-foliolate; petiole and rachis 1–2 cm and persistent on long branchlets, 3–7 mm and caducous on short branchlets; leaflet blades oblanceolate to obovate-lanceolate, 5–10 × 1–3 mm, apex acute to obtuse. Flowers solitary or to 3 in a fascicle. Pedicel 2–3 mm, articulate basally. Calyx tube tubular, 1–1.3 cm. Corolla yellow; standard suborbicular, 2.2–2.7 cm, claw narrow; wings linear, claw ± as long as limb, auricle ca. 1 mm; keel scarcely auriculate, apex acute to rounded. Ovary pilose or rarely glabrous. Legume cylindrical, 1.5–2 cm, pilose or rarely glabrous. Fl. May, fr. Jul.

Dry hillsides; 1900–3100 m. Xinjiang [Kazakhstan, Kyrgyzstan].

7. *Caragana erinacea* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 268. 1909.

川西锦鸡儿 chuan xi jin ji er

Caragana maximovicziana Komarov; *C. spinifera* Komarov.

Shrubs to 60 cm tall. Old branches greenish brown; current-year branchlets yellowish brown to reddish brown. Leaves pinnate on long branches and 4–8-foliolate, digitate on short branches and 4-foliolate; petiole and rachis 1.5–2 cm and persistent on long branchlets, 2–15 mm and persistent or caducous on short branchlets; leaflet blades linear-oblanceolate to obovate-oblong, 3–12 × 1–2.5 mm, abaxially pilose, adaxially glabrous, apex acute. Flowers solitary or to 4 in a fascicle. Pedicel very short, appressed pubescent or glabrous. Calyx tube tubular, 8–10 mm. Corolla yellow but standard sometimes reddish purple, 1.8–2.5 cm; standard broadly ovate to oblong-obovate; wings with claw ± as long as limb, auricle very small; keel with claw longer than limb. Ovary glabrous or sparsely to densely pubescent. Legume 1.5–2 cm, glabrous or pilose. Fl. May–Jun, fr. Jul–Sep. $2n = 16^*, 32^*$.

• Forest margins, slopes in grasslands, riverbanks, sand dunes; 2000–4600 m. Gansu, Ningxia, Qinghai, W Sichuan, Xizang, NW Yunnan.

8. *Caragana acanthophylla* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 311. 1909.

刺叶锦鸡儿 *ci ye jin ji er*

Caragana acanthophylla subsp. *macrocalyx* Yakovlev; *C. arcuata* Y. X. Liou.

Shrubs to 1.5 m tall. Bark dark gray. Current-year branchlets bright brown. Leaves pinnate, 4–10-foliolate; petiole and rachis 1.5–4 cm, persistent on long branchlets, caducous on short branchlets; leaflet blades obovate, narrowly obovate, or oblong, 4–12 × 3–5 mm, glabrous or appressed pubescent, apex obtuse. Flowers solitary, very rarely 2 in a fascicle. Pedicel 1–2.5 cm, articulate apically or basally from middle. Calyx tube campanulate-tubular, 6–10 mm. Corolla yellow, 2.6–3 cm; standard broadly ovate; wings oblong, claw 1/3–1/2 as long as limb, auricle dentiform; keel with claw ca. 3/4 as long as limb, auricle small. Ovary glabrous. Legume 2–3 cm, glabrous. Fl. Apr–May, fr. Jul. $2n = 16$.

Hillsides, river valleys, sandy areas; 1000–1300 m. Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan].

Caragana arcuata is known only from the type, and it is obviously related to *C. acanthophylla*. The type specimen is depauperate, with only a few leaflets remaining and with a branch probably from the lower part of an old stem. A field study has not found any materials to support this species, thus it is treated here as a synonym of *C. acanthophylla*.

9. *Caragana crassispinia* C. Marquand, J. Linn. Soc., Bot. 48: 170. 1929.

粗刺锦鸡儿 *cu ci jin ji er*

Shrubs to 1.2 m tall. Leaves pinnate, ca. 10-foliolate; petiole and rachis 4–7 cm × ca. 2 mm, persistent on long branchlets, caducous on short branchlets; leaflet blades obovate-lanceolate, 7–15 × 5–7 mm, abaxially pubescent, apex acuminate. Flowers solitary. Calyx tube tubular-campanulate, 1–1.5 cm, base subgibbous. Corolla bright yellow but standard yellow to orangish yellow; standard suborbicular, ca. 2.5 cm; wings bright yellow, limb ca. 12 × 4–6 mm, auricle curved and slightly longer than claw; keel with a broad auricle. Ovary densely villous. Legume linear, ca. 3 cm, densely villous. Fl. Jun–Jul, fr. Aug–Sep. $2n = 16$.

Woodlands, scrub; 2900–3100 m. Xizang [Nepal].

10. *Caragana bicolor* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 299. 1909.

二色锦鸡儿 *er se jin ji er*

?*Caragana limprichtii* Harms.

Shrubs to 3 m tall. Old branches grayish brown to dark gray; current-year branchlets brown. Leaves pinnate, 8–16-foliolate; petiole and rachis 1.5–5 cm, persistent on long branchlets, caducous on short branchlets; leaflet blades obovate-oblong to elliptic, 3–8 × 2–4 mm, appressed pubescent when young but later only abaxially pilose, apex obtuse to acute. Flowers solitary or in pairs on a peduncle. Pedicel 1–2 cm, articulate near middle. Calyx tube dark brown, campan-

ulate, 0.8–1.2 cm. Corolla yellow but standard violet-purple when dry, 2–2.2 cm; standard obovate, claw ca. 1/2 as long as limb, apex emarginate; wings with claw shorter than limb, auricle 1, slender, and slightly shorter than claw; keel with a claw ± as long as limb, auricle dentiform and small. Ovary densely pubescent. Legume cylindrical, 3–4 cm, outside pilose, inside densely pubescent, apex acuminate. Fl. Jun–Jul, fr. Sep–Oct. $2n = 16^*$.

• Slopes, scrub in mixed forests; 2400–3600 m. W Sichuan, E Xizang, NW Yunnan.

Caragana limprichtii from E Xizang may be conspecific with this species but needs to be studied further.

11. *Caragana franchetiana* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 300. 1909.

云南锦鸡儿 *yun nan jin ji er*

Shrubs to 3 m tall. Old branches grayish brown; young branchlets brown. Leaves pinnate, 10–18-foliolate; petiole and rachis 2–5 cm, persistent on long branchlets, caducous on short branchlets; leaflet blades obovate-oblong to oblong, 5–9 × 3–3.5 mm, pubescent when young, apex obtuse. Flowers solitary or rarely in pairs on a peduncle. Pedicel 0.5–2 cm, articulate basally from middle. Calyx tube yellowish brown, tubular, 0.8–1.2 cm, base gibbous. Corolla yellow but standard sometimes purple; standard suborbicular to obovate, ca. 2.3 cm, apex emarginate or not; wings with claw slightly shorter than limb, auricles 2, basal auricle ± as long as claw, apical auricle dentiform or ca. 5 mm; keel with claw ± as long as limb, apex obtuse, auricle dentiform. Ovary densely pubescent. Legume cylindrical, 2–4.5(–5) cm, outside appressed pubescent, inside brown tomentose. Fl. May–Jun, fr. Jul–Aug. $2n = 16^*$.

• Slopes, forest margins; 2800–4000 m. SW and W Sichuan, Xizang, N and NW Yunnan.

- 1a. Corolla standard suborbicular, apex not emarginate; wings with apical auricle dentiform 11a. var. *franchetiana*
- 1b. Corolla standard obovate, apex slightly emarginate; wings with apical auricle ca. 5 mm 11b. var. *gyirongensis*

11a. *Caragana franchetiana* var. *franchetiana*

云南锦鸡儿(原变种) *yun nan jin ji er* (yuan bian zhong)

Caragana gerardiana Benth var. *glabrescens* Franchet; ?*C. oreophila* W. W. Smith.

Corolla standard suborbicular, apex not emarginate; wings with apical auricle dentiform.

• Slopes in scrub, under trees at forest margins; 2800–4000 m. SW and W Sichuan, Xizang, N and NW Yunnan.

Caragana oreophila from NW Yunnan may be conspecific with this species but needs to be studied further.

11b. *Caragana franchetiana* var. *gyirongensis* (C. C. Ni) Y. X. Liou, Fl. Reipubl. Popularis Sin. 42(1): 25. 1993.

吉隆锦鸡儿 *ji long jin ji er*

Caragana gyirongensis C. C. Ni, Acta Phytotax. Sin. 18: 367. 1980; *C. jilungensis* C. C. Ni.

Corolla standard obovate, apex slightly emarginate; wings with apical auricle ca. 5 mm.

- Mountain slopes; ca. 2900 m. Xizang (Gyirong).

12. *Caragana jubata* (Pallas) Poiret in Lamarck, Encycl., Suppl. 2: 89. 1811.

鬼箭锦鸡儿 *gui jian jin ji er*

Shrubs 0.3–2 m tall. Bark dark brown, dark gray, or grayish brown. Leaves pinnate, 8–12-foliolate; petiole and rachis 5–7 cm, persistent; leaflet blades oblong, 11–15 × 4–6 mm, base rounded, apex rounded to acute. Flowers solitary. Pedicel ca. 0.5 mm, articulate basally. Calyx tube tubular, 1.4–1.7 cm. Corolla rosy, reddish purple, bright purple, pink, or white, 2.5–3.9 cm; standard broadly ovate; wings oblong, claw 2/3–3/4 as long as limb, auricles 1 or 2 and linear, subulate, or triangular. Ovary villous. Legume to 3 cm, densely villous. Fl. Jun–Jul, fr. Aug–Sep. $2n = 16$.

Slopes, forest margins; 2400–4700 m. Gansu, Hebei, Nei Mongol, Ningxia, Qinghai, N Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang, N Yunnan [Bhutan, India (Sikkim), Mongolia, Nepal, E Russia].

The distribution of this species is wide. The morphological characters are variable and are found under several varieties.

- 1a. Corolla wings with auricle on claw; flowers reddish purple 12d. var. *recurva*
- 1b. Corolla wings with auricle on limb; flowers rosy.
 - 2a. Corolla wings with 1 auricle 12a. var. *jubata*
 - 2b. Corolla wings with 2 auricles.
 - 3a. Corolla wings with auricles subulate to triangular 12b. var. *czetyrkininii*
 - 3b. Corolla wings with auricles linear 12c. var. *biaurita*

12a. *Caragana jubata* var. *jubata*

鬼箭锦鸡儿(原变种) *gui jian jin ji er (yuan bian zhong)*

Robinia jubata Pallas, Nova Acta Acad. Sci. Imp. Petrop. Hist. Acad. 10: 370. 1797; *Caragana jubata* f. *seczuanica* Komarov.

Corolla rosy; wings with 1 auricle on limb. $2n = 16$.

Slopes, forest margins; 2400–4700 m. Gansu, Hebei, W Nei Mongol, Ningxia, Qinghai, N Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang, N Yunnan [Bhutan, India (Sikkim), Mongolia, Nepal, E Russia].

12b. *Caragana jubata* var. *czetyrkininii* (Sanchir) Y. X. Liou, Acta Phytotax. Sin. 22: 214. 1984.

浪麻鬼箭 *lang ma gui jian*

Caragana czetyrkininii Sanchir, Bot. Zhurn. (Moscow & Leningrad) 59: 232. 1974; *C. forrestii* Sanchir.

Corolla wings with 2 auricles, basal auricle linear and slightly shorter than claw, apical auricle subulate to triangular and 1–2 mm.

- Slopes; 3800–4400 m. Qinghai, Xizang, NW Yunnan.

12c. *Caragana jubata* var. *biaurita* Y. X. Liou, Acta Phytotax. Sin. 22: 214. 1984.

两耳鬼箭 *liang er gui jian*

Leaflet blades 5–7 mm wide. Corolla 3.6–3.9 cm; wings with 2 auricles, longest auricle linear and 2–6 mm.

• Slopes; 3000–4700 m. Hebei (Zhuolu), Nei Mongol, Ningxia, Qinghai, S Xinjiang.

12d. *Caragana jubata* var. *recurva* Y. X. Liou, Acta Phytotax. Sin. 22: 214. 1984.

弯耳鬼箭 *wan er gui jian*

Corolla reddish purple, ca. 2.5 cm; wings with auricle on claw and recurved.

• Slopes; 2700–4600 m. Gansu, Ningxia, Qinghai, W Sichuan, E Xizang.

13. *Caragana chumbica* Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66: 370. 1897.

高山锦鸡儿 *gao shan jin ji er*

Caragana alpina Y. X. Liou.

Shrubs to 1.5 m tall. Old branches dark brown to yellowish brown; current-year branchlets densely villous. Leaves pinnate, 6-foliolate; petiole and rachis 2.5–6 cm, persistent, densely villous when young; leaflet blades linear to narrowly lanceolate, 12–16 × 2–3 mm, villous on both surfaces, apex acute. Flowers solitary. Pedicel 3–4 mm, articulate basally. Calyx tube campanulate-tubular, ca. 8 mm. Corolla yellowish white but petal claws reddish, 2.4–2.5 cm; standard suborbicular, both surfaces villous, claw ca. 1/2 as long as limb; wings with claw ca. 2/5 as long as limb, auricles 2, basal auricle slightly longer than claw, apical auricle triangular to dentiform; keel with claw slightly shorter than limb, auricle not prominent. Ovary densely villous. Legume 2–3 cm, densely villous. Fl. Jun, fl. Jul.

Rocky slopes of alpine mountains; 4600–5000 m. S Xizang [India (Sikkim), Nepal].

Treated as a synonym of *Caragana jubata* by Grierson and Long (Fl. Bhutan 1(3): 713. 1987), this species may just represent a high-elevation form of *C. jubata*.

14. *Caragana kozlowii* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 283. 1909.

沧江锦鸡儿 *cang jiang jin ji er*

Caragana tangutica Maximowicz var. *yushuensis* Y. H. Wu.

Shrubs to 1.5 m tall. Old branches grayish brown to brown. Leaves pinnate, (4 or)6(or 8)-foliolate; petiole and rachis 2–4 cm, persistent; leaflet blades lanceolate to oblanceolate, 8–15 × 3–6 mm, apex acute. Flowers solitary. Pedicel 1–6 mm, articulate basally. Calyx tube tubular-campanulate, 0.9–1.3 cm. Corolla yellow, (1.7–)2–2.3 cm; standard oblong-obovate, claw short, apex rounded; wings with claw as long as limb, auricle ca. 2 mm; keel with claw slightly longer than limb. Ovary glabrous. Legume lanceolate to narrowly ovoid, 2.5–3.5 cm, glabrous. Fl. May–Jul, fr. Aug–Sep.

- River basins, slopes; 3100–4300 m. S Qinghai, E Xizang.

According to the original diagnosis, the leaves have six or eight leaflets, but in the specimens we have seen, the leaflets are never more than six.

15. *Caragana cuneatoalata* Y. X. Liou, Acta Phytotax. Sin. 22: 212. 1984.

楔翼锦鸡儿 xie yi jin ji er

Shrubs to 2 m tall. Old branches bright brown; current-year branchlets villous. Leaves pinnate, 6(or 8)-foliolate; petiole and rachis 2.5–3.5 mm, persistent; leaflet blades oblong, 7–10 × 2–3 mm, both surfaces villous, apex acute. Flowers solitary. Pedicel very short. Calyx tube tubular-campanulate, ca. 1 cm. Corolla 2.7–2.8 cm; standard oblong; wings cuneate, claw ca. 1/2 as long as limb, auricle inconspicuous; keel with claw slightly longer than limb. Ovary densely villous. Legume unknown. Fl. Jul–Aug.

- Slopes, river valleys; ca. 4700 m. Xizang.

This species is dubious in that it is known only from the type specimen.

16. *Caragana aliensis* Y. Z. Zhao, Kew Bull. 63: 345. 2008.

阿里锦鸡儿 a li jin ji er

Shrubs. Bark gray-brown; branches short and crowded together, cinereous. Stipules rufous, ovate, membranous, densely fulvous villous. Leaves paripinnate, 8–10-foliolate; rachis persistent, rigid to springy, 2–4 cm; leaflet blades yellowish green, elliptic-obovate, 6–10 × 3–5 mm, both surfaces densely fulvous villous, apex blunt. Flowers solitary, sessile. Calyx campanulate, ca. 1.7 × 0.7 cm, densely fulvous villous; lobes triangular, ca. 6 mm. Corolla yellow; standard ca. 2.7 cm, limb nearly orbicular ca. 1.8 cm in diam., gradually narrowed at base to claw; wings ca. 2.6 cm, wider in upper part, claw ca. 1/2 as long as limb, auricle short, linear, incurved, ca. 1 mm; keel ca. 2.4 cm, claw slightly shorter than limb, auricle short, tooth-like. Ovary densely fulvous villous outside, glabrous inside. Legume unknown.

- Hillsides. Xizang (Zanda).

Caragana aliensis seems to be related to *C. aegacanthoides*, but whether the former species should be recognized or not requires further study. This treatment is based on the protologue; we have not seen the type specimen (at NWBI).

17. *Caragana leucospina* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 281. 1909.

白刺锦鸡儿 bai ci jin ji er

Shrubs to 1 m tall. Bark yellowish gray. Leaves pinnate, 6–8-foliolate; petiole and rachis ca. 3 cm, persistent, glaucous, glabrous or white pubescent; leaflet blades narrowly elliptic to oblong-lanceolate, (5–)10–16(–17) × 2–4.5(–5) mm, densely pubescent, apex rounded. Flowers solitary. Pedicel 4–6 mm, articulate basally. Calyx tube broadly tubular, ca. 1.3 cm. Corolla yellow, 2.5–3 cm; standard obovate, claw narrow; wings oblong, auricle shortly linear; keel base nearly truncate. Ovary densely pubescent. Legume 2–2.5 cm, outside pubescent, inside with trichomes. Fl. Jun, fr. Jul.

Slopes; 1200–2500 m. Xinjiang [Kyrgyzstan].

18. *Caragana tibetica* (Maximowicz ex C. K. Schneider) Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 282. 1909.

毛刺锦鸡儿 mao ci jin ji er

Caragana tragacanthoides (Pallas) Poiret var. *tibetica* Maximowicz ex C. K. Schneider, Ill. Handb. Laubholz. 2: 100. 1907; *C. ordosica* Y. Z. Zhao, Zong Y. Zhu & L. Q. Zhao.

Shrubs to 30 cm tall, cushion-shaped. Old branches grayish yellow to grayish brown; current-year branchlets bright grayish brown, densely pubescent. Leaves pinnate, 6- or 8-foliolate; petiole and rachis 2–3.5 cm, persistent, densely pubescent when young; leaflet blades linear, 8–12 × 0.5–1.5 mm, densely villous, apex acute. Flowers solitary, subsessile. Calyx tube tubular, 0.8–1.5 cm. Corolla yellow, 2.2–2.5 cm; standard obovate, claw ca. 1/2 as long as limb, apex slightly emarginate; wings with claw as long as or slightly longer than limb; keel with claw slightly longer than limb, auricle dentiform. Ovary densely pubescent. Legume ellipsoid, 7–8 mm, outside pubescent, inside tomentose. Fl. May–Jul, fr. Jul–Aug. $2n = 16$.

Dry slopes, sandy areas; 1400–3500 m. Gansu, W Nei Mongol, Ningxia, Qinghai, N Shaanxi, W Sichuan, Xizang [Mongolia].

Y. Z. Zhao et al. (Bull. Bot. Res., Harbin 25: 385. 2005) believed that *Caragana ordosica* differs from this taxon by having leaflet blades involute, thus tubular in cross section, and auricle of corolla wings obtuse. However, from the general morphology, we believe it is conspecific with *C. tibetica*.

19. *Caragana aegacanthoides* (R. Parker) L. B. Chaudhary & S. K. Srivastava, Taiwania 52: 31. 2007.

萨迦锦鸡儿 sa jia jin ji er

Astragalus aegacanthoides R. Parker, Indian Forester 49: 78. 1923; *Caragana sajaensis* C. C. Ni.

Shrubs 6–10 cm tall, caespitose. Bark grayish yellow, glabrous. Branches short and dense, pubescent. Leaves pinnate, (6–)12- or 14(or 16)-foliolate; petiole and rachis 3–8 cm, persistent, densely pubescent when young, later glabrescent; leaflet blades oblong-elliptic, 4–5 × ca. 2 mm, both surfaces pubescent, apex emarginate to truncate. Flowers solitary. Pedicel 5–7 mm. Calyx tube tubular, 1–1.2 cm, pubescent. Corolla yellow, 2–2.4 cm; standard ovate-oblong, 2.2–2.4 cm, claw ca. 1/2 as long as limb, apex emarginate; wings with limb ca. 1.2 cm, claw distinctly longer than limb; keel with claw distinctly longer than limb, auricle short. Ovary densely pubescent. Legume oblong-ellipsoid, 1.5–2 cm, outside densely pubescent or when mature glabrescent, inside with trichomes. Fl. Jun–Jul, fr. Jul–Aug.

Valleys in grasslands or meadows; 4000–4800 m. S Xizang [N India].

20. *Caragana pleiophylla* (Regel) Pojarkova in Komarov, Fl. URSS 11: 401. 1945.

多叶锦鸡儿 duo ye jin ji er

Caragana tragacanthoides (Pallas) Poiret var. *pleiophylla* Regel, Izv. Imp. Obsc. Ljubit. Estestv. Moskovsk. Univ. 34(2): 19. 1882.

Shrubs to 1 m tall. Old branches yellowish brown; branchlets pubescent. Leaves pinnate, 8–14-foliolate; petiole and rachis 1.5–4(–5.5) cm, persistent; leaflet blades oblong to obovate-oblong, 6–12 × 3–4 mm, both surfaces appressed pubescent when young, base broadly cuneate, apex acute. Flowers solitary. Pedicel 5–7 mm, articulate basally. Calyx tube narrowly tubular, 1.5–2.1 cm. Corolla yellow, 3–3.6 cm; standard elliptic-ovate, claw 1/3–1/2 as long as limb, apex slightly emarginate; wings with claw ca. 2/3 as long as limb, auricle 2/5–1/2 as long as claw and often with an additional apical 1–2 mm auricle; keel with claw ± as long as limb. Ovary densely pubescent. Legume tubular, 3–3.5 cm, outside pubescent, inside with trichomes. Fl. May, fr. Jun–Jul. $2n = 16$.

Rocky slopes, river terraces; 1500–2500 m. Xinjiang [Kazakhstan, Kyrgyzstan, Uzbekistan].

Yakovlev (Rast. Tsentral. Azii 8a: 35. 1988) considered this taxon to be synonymous with *Caragana roborovskiyi*, but it differs from *C. roborovskiyi* by its wing auricle 1/3–1/2 as long as limb, standard elliptic-obovate, calyx 1.5–2.1 cm, and corolla 3–3.6 cm. The latter has wing auricle nearly as long as limb, standard obovate, calyx 1–1.2 cm, and corolla 2.3–2.7 cm.

21. *Caragana gerardiana* Benth in Royle, Ill. Bot. Himal. Mts. 198. 1835.

印度锦鸡儿 yin du jin ji er

Shrubs to 1 m tall. Old branches yellowish brown to gray; branchlets reddish brown, villous. Leaves pinnate, (4 or)6- or 8(or 10)-foliolate; petiole and rachis 1.5–3.5 cm, persistent, densely tomentose; leaflet blades elliptic to obovate, 5–10 × 2–5 mm, both surfaces tomentose, base cuneate, apex rounded to obtuse. Flowers solitary or sometimes 2 in a fascicle. Pedicel 2–4 mm, articulate basally. Calyx tube tubular, 1–1.3 cm. Corolla yellow, 2.3–2.5 cm; standard broadly obovate, claw ca. 1/3 as long as limb, apex emarginate to rounded; wings with claw slightly shorter than limb, auricle shortly dentiform; keel with a claw shorter than limb, auricle orbicular. Ovary tomentose. Legume lanceolate to narrowly ovoid, 1.5–2 cm, turgid, outside and inside tomentose. Fl. May–Jul, fr. Jul–Aug. $2n = 16, 18$.

Slopes in scrub; 3700–4200 m. S Qinghai, W Xizang [Afghanistan, NW India, Kashmir, Nepal, Pakistan; SW Asia].

22. *Caragana junatovii* Gorbunova, Novosti Sist. Vyssh. Rast. 21: 89. 1984.

通天河锦鸡儿 tong tian he jin ji er

Shrubs 40–50 cm tall. Old branches grayish brown; branchlets reddish brown, sparsely villous. Leaves pinnate, 8–12-foliolate; petiole and rachis 2.5–3.5 cm on short branchlets, 3.5–4.5 cm on long branchlets, persistent, villous when young; leaflet blades oblong, narrowly oblong, or obovate-oblong, 6–8 × 3–4 mm, abaxially pilose, apex obtuse to acute. Flowers solitary. Pedicel 2–3 mm. Calyx tube tubular, 1–1.2 cm, pubescent. Corolla yellow; standard obovate, ca. 2.5 cm, apex emarginate; wings as long as standard, claw ca. 3/5 as long as limb, auricle ca. 1/2 as long as claw; keel ca. 2.1 cm, claw longer than limb. Ovary white pubescent. Legume cylindrical, 1.5–2 cm, outside densely pubescent to glabrescent, inside tomentose. Fl. Jun, fr. Jun–Jul.

• Sunny slopes; 3800–4100 m. SW Qinghai.

Plants misidentified as "*Caragana przewalskii*" in FRPS (42: 33. 1993) belong here. Although treated in FRPS, "*C. przewalskii*" is an invalid name that is synonymous with *C. roborovskiyi* (see comment under that species).

23. *Caragana tangutica* Maximowicz in Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 286. 1909.

青甘锦鸡儿 qing gan jin ji er

Caragana leduensis Y. Z. Zhao, Y. H. Wu & L. Q. Zhao.

Shrubs to 4 m tall. Bark exfoliating in sheets. Old branches greenish brown. Leaves pinnate, (4 or)6-foliolate; petiole and rachis 1.5–4 cm, persistent; leaflet blades oblanceolate to oblong-ovate, 8–15 × 3–8 mm, with apical pair often largest, abaxial surface and margin villous, apex acute. Flowers solitary. Pedicel 0.8–1.5 cm, articulate basally. Calyx tube campanulate-tubular, 0.8–1.3 cm. Corolla yellow, 2.3–2.7 cm; standard obovate, apex emarginate; wings with claw slightly shorter than limb, auricle linear and 1/2–3/4 as long as claw; keel with claw ca. 3/4 as long as limb. Ovary densely pubescent. Legume linear, 3–4 cm, outside appressed pubescent, inside glabrous. Fl. May–Jun, fr. Jul–Sep. $2n = 16^*$.

• Shrubby slopes, sunny slopes, woodlands; 2000–4000 m. Gansu, S Ningxia, Qinghai, W Sichuan.

24. *Caragana roborovskiyi* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 280. 1909.

荒漠锦鸡儿 huang mo jin ji er

Shrubs to 1 m tall. Branches yellowish brown, pubescent when young. Leaves pinnate, 6–12-foliolate; petiole and rachis 1–2.5 cm, persistent; leaflet blades broadly obovate to oblong, 4–10 × 3–5 mm, all equal in size, densely pubescent, apex rounded to acute. Flowers solitary. Pedicel ca. 4 mm, articulate near middle to basally. Calyx tube tubular, 1.1–1.2 cm. Corolla yellow but standard sometimes purple; standard obovate, 2.3–2.7 × 1.2–1.3 cm; wings with claw ca. 1/2 as long as limb, auricle linear and slightly shorter than claw; keel with claw ± as long as limb, auricle obtuse and small. Ovary densely pubescent. Legume cylindrical, 2.5–3 cm, outside white villous, inside glabrous. Fl. May, fr. Jun–Jul. $2n = 16^*$.

• Dry slopes, valleys, sunny areas, loess hills; 1200–3100 m. Gansu, W Nei Mongol, Ningxia, E Qinghai, Xinjiang.

"*Caragana przewalskii*" (Pojarkova in Komarov, Fl. URSS 11: 353. 1945) belongs here but was not validly published because no Latin description or diagnosis was provided (*Vienna Code*, Art. 36.1).

25. *Caragana tekesiensis* Y. Z. Zhao & D. W. Zhou, Bull. Bot. Res., Harbin 10(2): 83. 1990.

特克斯锦鸡儿 te ke si jin ji er

Shrubs to 1 m tall. Branches grayish yellow, pubescent when young. Leaves pinnate, 6–12-foliolate; petiole and rachis 1.5–3 cm, persistent, pubescent when young; leaflet blades elliptic, 5–7 × 2–3 mm, densely pubescent. Flowers solitary or to 3 in a fascicle. Pedicel ca. 4 mm, articulate basally. Calyx tube tubular-campanulate, 1–1.5 cm. Corolla yellow; standard

broadly oblanceolate to narrowly obovate, 1.5–2 × 0.6–0.8 cm; wings with claw ca. 1/4 as long as limb, auricle linear and slightly shorter than claw; keel auricle small, dentiform, apex obtuse. Ovary glabrous or nearly so. Legume cylindric, 2.5–4 × ca. 0.4 cm, glabrous. Fl. Jun, fr. Jul.

- Dry slopes; 1200–2000 m. Xinjiang (Tekes, Zhaosu).

26. *Caragana changduensis* Y. X. Liou, Acta Phytotax. Sin. 22: 212. 1984.

昌都锦鸡儿 *chang du jin ji er*

Shrubs to 2 m tall. Old branches yellowish brown to grayish brown. Leaves pinnate, 10–14-foliolate; petiole and rachis tender, 2–3(–6.5) cm, persistent; leaflet blades ovate-oblong to oblong, 5–7 × ca. 2.5 mm, all equal in size, both surfaces pubescent, apex acute. Flowers solitary. Pedicel 2–3 mm, articulate basally. Calyx reddish brown; tube tubular, 7–10 mm. Corolla yellow, 2.2–2.3 cm; standard obovate, apex ± rounded; wings with claw longer than 1/2 to slightly shorter than limb, auricle ca. 1 mm; keel with claw longer than limb, auricle inconspicuous. Ovary densely pubescent. Legume lanceolate, ca. 2.5 cm, outside pubescent, inside glabrous. Fl. Jun, fr. Jul–Aug.

- Slopes in scrub, riverbanks; 3100–4300 m. S Qinghai, NW Sichuan, Xizang.

Y. Z. Zhao (Acta Sci. Nat. Univ. Intramongol. 24: 648. 1993) and Y. H. Wu (Fl. Qinghai. 2: 182. 1999) considered this species to be synonymous with *Caragana Gerardiana* because the inner side of the fruits of this taxon, with or without trichomes, overlaps with those of *C. Gerardiana*. This needs further study.

27. *Caragana soongorica* Grubov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 19: 543. 1959.

准噶尔锦鸡儿 *zhun ga er jin ji er*

Shrubs to 2 m tall. Branches dark gray to purplish black. Leaves pinnate, 4–8-foliolate; petiole and rachis 1.5–4.5 cm, caducous; leaflet blades obovate, 7–15 × 5–9 mm, both surfaces glabrous or abaxially appressed pubescent, apex slightly emarginate to truncate. Flowers usually in pairs or very rarely 1-flowered on a peduncle. Pedicel 1–3.5 cm, articulate apically from middle. Calyx tube campanulate, 7–9 mm. Corolla yellow, 3–3.5 cm; standard broadly ovate, claw ca. 1 cm; wings with claw ca. 1/2 as long as limb, auricle linear and 2–3 mm; keel 3–5 mm shorter than wings, claw ca. 4/5 as long as limb. Ovary sericeous to glabrescent. Legume 4–5.5 cm. Fl. May, fr. Jul–Aug.

- Slopes in scrub, river terraces; 900–1800 m. Xinjiang.

28. *Caragana stipitata* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 343. 1909.

柄荚锦鸡儿 *bing jia jin ji er*

Caragana reticulata Rehder; *C. sericea* Pampanini ex Komarov.

Shrubs to 2 m tall. Branches dark grayish brown to bright brown. Leaves pinnate, 8–12-foliolate; petiole and rachis 3–7 cm, caducous; leaflet blades oblong, elliptic, or ovate-lanceolate, 1.5–2(–2.8) × 0.7–1(–1.5) cm, densely sericeous when young. Flowers solitary. Pedicel 0.6–1.5 cm, articulate apically

from middle. Calyx tube campanulate, 5–7 mm. Corolla yellow, 1.3–1.5 cm; standard rhombic to broadly ovate, claw ca. 1/3 as long as limb; wings with claw ± as long as limb, auricle ca. 1/3 as long as claw; keel with claw slightly longer than limb, auricle spurlike. Ovary densely sericeous, with a carpopodium. Legume lanceolate, 2.5–3 cm, stipe nearly as long as to slightly longer than calyx. Fl. Apr–May, fr. Jun–Jul.

- Slopes, valleys, shrubby forest margins; 1000–2100 m. E Gansu, W Henan, Shaanxi, S Shanxi.

29. *Caragana zahlbruckneri* C. K. Schneider, III. Handb. Laubholz. 2: 96. 1907.

南口锦鸡儿 *nan kou jin ji er*

Shrubs to 1.5 m tall. Branches brownish black to greenish brown; current-year branchlets reddish brown. Leaves pinnate, 10–18-foliolate; petiole and rachis 3–8 cm, caducous; leaflet blades obovate-oblong, oblanceolate, or narrowly oblanceolate, 6–18 × 4–6 mm, nearly glabrous to appressed pubescent, apex rounded to obtuse. Flowers solitary or 2 in a fascicle. Pedicel 0.8–1.5 cm, articulate at or apically from middle. Calyx tube campanulate-tubular, 7–8 mm. Corolla yellow; standard obovate to suborbicular, 2.3–2.5 cm, claw short; wings with claw slightly longer than or equal to limb, auricle dentiform; keel with claw slightly longer than limb, auricle inconspicuous. Ovary glabrous. Legume 4–4.5 cm, glabrous. Fl. May, fr. Jul.

- Slopes in scrub; 500–1900 m. N Hebei, S Heilongjiang, NW Shanxi.

30. *Caragana fruticosa* (Pallas) Besser, Cat. Hort. Cremeneci, 116. 1816.

极东锦鸡儿 *ji dong jin ji er*

Robinia altagana Pallas var. *fruticosa* Pallas, Fl. Ross. 1: 69. 1784.

Shrubs to 2 m tall. Branches grayish green-brown; current-year branchlets greenish brown. Leaves pinnate, 8–12-foliolate, long petiolate; petiole and rachis 2.5–4 cm, caducous; leaflet blades oblong, 10–15 × 4–6 mm, glabrous, apex sometimes emarginate. Flowers solitary or rarely 2 in a fascicle. Pedicel 0.8–1.2 cm, articulate apically. Calyx tube campanulate, 5–6 mm. Corolla bright yellow, 1.6–1.9 cm; standard rhombic to broadly ovate, claw ca. 1/4 as long as limb, apex slightly emarginate; wings oblong, claw ca. 1/2 as long as limb, auricle dentiform; keel with claw nearly as long as limb. Ovary glabrous. Legume cylindric, 3–3.5 cm. Fl. Jun, fr. Jul. *2n* = 16.

Slopes in scrub; below 100–1800 m. Heilongjiang [Korea, E Russia].

31. *Caragana arborescens* Lamarck, Encycl. 1: 615. 1785.

树锦鸡儿 *shu jin ji er*

Robinia caragana Linnaeus, Sp. Pl. 2: 722. 1753; *Caragana fruticosa* (Pallas) Besser var. *multiflora* H. Xie & Y. T. Zhao; *C. sibirica* Medikus.

Trees or large shrubs, 2–6 m tall. Branches dark gray; branchlets green to yellowish brown. Stipules spinelike, 5–10 mm. Leaves pinnate, 8–16-foliolate; petiole and rachis 3–7 cm,

caducous; leaflet blades oblong-obovate to elliptic, 1–2(–2.5) × 0.5–1(–1.3) cm, pubescent when young or only abaxially pubescent, base mostly rounded or rounded-cuneate, apex obtuse. Flowers solitary or to 5 in a fascicle. Pedicel 2–5 cm, articulate apically. Calyx tube often broadly campanulate, 6–8 mm. Corolla yellow, 1.6–2 cm; standard rhombic to broadly ovate, apex rounded-obtuse; wings with claw ca. 3/4 as long as limb, auricle spurlike and no longer than 1/3 length of claw; keel with claw slightly shorter than limb, auricle obtuse to deltoid. Ovary glabrous or appressed pubescent. Legume 3.5–6 cm, glabrous. Fl. May–Jun, fr. Aug–Sep. $2n = 16$.

Forest margins, woodlands; 1000–1900 m. Heilongjiang, Xinjiang [Kazakhstan, Mongolia, Russia (Siberia)].

Caragana sibirica as a pre-Linnaean name was used by Royen (Fl. Leyd. Prodr. 537. 1740) and considered by Linnaeus (loc. cit.) to be a synonym of *Robinia caragana*. Although Fabricius used the name *C. sibirica* (Enum., ed. 2, 421. 1763), which would appear to have priority over *C. arborescens*, only generic names are validly published there, and so the first valid publication of *C. sibirica* as a binomial was in the later publication by Medikus (Vorles. Churpfälz. Phys.-Öcon. Ges. 2: 365. 1787).

32. *Caragana boisii* C. K. Schneider, Ill. Handb. Laubholz. 2: 96. 1907 [“*boisi*”].

扁刺锦鸡儿 *bian ci jin ji er*

Caragana boisii var. *platycarpa* Yakovlev; *C. microphylla* Lamarck var. *crasseaculeata* Bois.

Shrubs to 1.3 m tall. Branches brown; current-year branchlets purplish brown. Stipules spinelike, 0.8–1.5 cm. Leaves pinnate, 8–20-foliolate; petiole and rachis often caducous; leaflet blades elliptic-oblong to obovate-elliptic, 5–18(–20) × 4–12 mm, sericeous when young but later only sericeous along abaxial veins, apex obtuse to emarginate. Flowers solitary or sometimes to 3 in a fascicle. Pedicel 1.5–2.8 cm, articulate apically. Calyx tube campanulate, 6–11 mm. Corolla yellow, 2–2.5 cm; standard broadly ovate, claw ca. 1/2 as long as limb or shorter; wings with claw ± as long as limb, auricle ca. 1/3 as long as claw; keel with claw ± as long as limb. Ovary pubescent. Legume 2.5–5 cm × 4–6 mm, glabrous. Fl. May, fr. Jul–Aug. $2n = 16^*$.

• Slopes, valleys, terraces; 2200–3200 m. S Gansu, S Shaanxi, Sichuan.

33. *Caragana manshurica* (Komarov) Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 336. 1909.

东北锦鸡儿 *dong bei jin ji er*

Caragana microphylla Lamarck f. *manshurica* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 22: 582. 1904.

Shrubs to 2 m tall. Branches brown to grayish brown. Leaves pinnate, 10–20-foliolate; petiole and rachis 4–9 cm, caducous; leaflet blades obovate-elliptic to oblong, 1–2 × 0.6–1 cm, pubescent or glabrous, base mostly cuneate, apex obtuse, truncate, or emarginate. Flowers solitary or rarely 2 in a fascicle. Pedicel 1–3 cm, articulate apically. Calyx tube tubular to broadly campanulate, 8–9 mm. Corolla yellow, ca. 2.3 cm; standard suborbicular, claw ca. 1/3 as long as limb; wings with

claw ca. 1/2 as long as limb, auricle long and dentiform; keel with claw slightly longer than limb, limb ± cuneate. Ovary nearly glabrous. Legume turgid to cylindrical, ca. 5.5 cm, glabrous. Fl. May, fr. Jul–Aug.

Dry slopes, forest margins; ca. 700 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shanxi [Korea, E Russia].

34. *Caragana turkestanica* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 314. 1909.

新疆锦鸡儿 *xin jiang jin ji er*

Shrubs to 2 m tall. Branches gray to grayish green. Leaves pinnate, 6–10-foliolate; petiole and rachis 3–6 cm, caducous or rarely persistent; leaflet blades broadly obovate to elliptic, 1–2 × 0.5–1 cm, glabrous or appressed pilose, apex rounded to truncate. Flowers solitary. Pedicel 2–5 cm, articulate apically from middle. Calyx tube campanulate, 6–8 mm. Corolla yellow; standard broadly ovate, 2.4–2.7 cm, base narrow to shortly clawed; wings 2.7–3 cm, claw ca. 2/5 as long as limb, auricle narrow and ca. 1/3 as long as claw; keel with claw ca. 2/3 as long as limb, auricle short and obtuse. Ovary glabrous. Legume cylindrical, 3–5 cm, glabrous. Fl. May, fr. Jul. $2n = 16$.

Sunny slopes, dry scrub; 1100–1200 m. Xinjiang [Kyrgyzstan].

35. *Caragana davazamcii* Sanchir, Bot. Zhurn. (Moscow & Leningrad) 59: 233. 1974.

沙地锦鸡儿 *sha di jin ji er*

Caragana davazamcii var. *viridis* Y. X. Liou; *C. erenensis* Y. X. Liou; *C. korshinskii* Komarov var. *davazamcii* (Sanchir) Yakovlev.

Shrubs to 1.5 m tall. Leaflets, pedicels, and current-year branchlets with dense trichomes, not glabrescent, glaucous. Old branches brown and glaucous; branchlets bright yellow. Leaves pinnate, 8–18-foliolate; petiole and rachis 2.5–4 cm, caducous; leaflet blades oblong to obovate-lanceolate, 5–10 × 3–6 mm, both surfaces appressed sericeous to pilose, apex rounded. Flowers solitary or 2 in a fascicle. Pedicel 1–2 cm, articulate basally or apically from middle. Calyx tube broadly tubular, 8–10 mm. Corolla yellow, 2–3 cm; standard suborbicular to orbicular-ovate, claw short, apex emarginate; wings 1.4–2 cm, claw long, auricle dentiform to narrowly linear and 1–3 mm; keel 0.9–1.4 cm, claw ± as long as limb. Ovary with a carpopodium, glabrous or appressed pilose. Legume linear, 3.5–5 cm, falcate, stipitate, glabrous. Fl. May–Jun, fr. Jun–Jul.

Sandy areas, sand dunes in desert steppes; 300–1000 m. Liaoning, Nei Mongol [Mongolia].

36. *Caragana purdomii* Rehder, J. Arnold Arbor. 7: 168. 1926.

秦晋锦鸡儿 *qin jin jin ji er*

Shrubs to 3 m tall. Leaflets, pedicels, and current-year branchlets pubescent, glabrescent, and not glaucous. Old branches bright yellow, not glaucous; branchlets dark grayish green to brown. Leaves pinnate, 10–16-foliolate; petiole and rachis 2–4 cm, caducous; leaflet blades obovate, elliptic, or oblong, 3–8 × 3–5 mm, both surfaces pilose, apex rounded, emarginate, or acute. Flowers solitary or to 4 in a fascicle. Pedi-

cel 1–2 cm, articulate apically. Calyx tube campanulate-tubular, 8–10 mm, pubescent to nearly glabrous. Corolla yellow, 2.5–2.8 cm; standard broadly obovate, 2–2.7 cm, claw short; wings with a claw ca. 2/3 as long as limb, auricle spurlike and ca. 1/3 as long as claw; keel with claw nearly as long as limb, auricle obtuse. Ovary with a 2.5–4 mm carpogonium, glabrous. Legume 4–5 cm, stipitate, glabrous. Fl. May, fr. Jul–Sep.

- Sunny slopes, loess hills; 700–1700 m. N Shaanxi, W Shanxi.

Plants misidentified as *Caragana sericea* Pampanini ex Komarov by D. W. Zhou et al. (J. NorthE. Normal Univ. 26: 65. 1994) belong here.

37. *Caragana pekinensis* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 339. 1909.

北京锦鸡儿 bei jing jin ji er

Caragana hopeiensis Yakovlev; *C. zahlbruckneri* C. K. Schneider var. *pekinensis* (Komarov) Yakovlev; *C. zahlbruckneri* var. *pilosa* Yakovlev.

Shrubs to 2 m tall. Branches brown to dark brown. Leaves pinnate, 12–16-foliolate; petiole and rachis 2–6 cm, caducous; leaflet blades elliptic to obovate-elliptic, 5–12 × 5–7 mm, both surfaces appressed pubescent, apex obtuse to rounded. Flowers solitary or 2(–4) in a fascicle. Pedicel 0.6–1.5 cm, articulate apically. Calyx tube tubular-campanulate, 7–8 mm. Corolla yellow, ca. 2.5 cm; standard broadly ovate to broadly elliptic; wings slightly longer than standard, claw ca. 2/3 as long as limb, auricle ca. 3 mm; keel slightly shorter than wings, claw longer than limb, auricle inconspicuous. Ovary sericeous. Legume compressed, 4–6 cm, densely pubescent. Fl. May, fr. Jul. $2n = 16^*$.

- Hillsides, loess hills; 400–1000 m. Hebei, N Shanxi.

38. *Caragana litwinowii* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 340. 1909.

金州锦鸡儿 jin zhou jin ji er

Caragana zahlbruckneri C. K. Schneider subsp. *litwinowii* (Komarov) Yakovlev.

Shrubs to 60 cm tall. Branches bright brown to yellowish gray. Stipules spinelike, 1–1.3 cm. Leaves pinnate, 16–20-foliolate; petiole and rachis caducous; leaflet blades obovate-oblong, 6–7 × 2–4 mm, glabrous, apex acute. Flowers solitary. Pedicel 7–8 mm, articulate near middle. Calyx tube tubular-campanulate. Corolla yellow, ca. 2.2 cm; standard broadly ovate, limb ca. 1.7 × 1.4 cm, claw short; wings oblong, claw ca. 1/3 as long as limb, auricle dentiform and ca. 3 mm; keel with claw ca. 1/2 as long as limb, auricle inconspicuous. Ovary glabrous. Legume not seen. Fl. May.

- Slopes; ca. 500 m. Liaoning (Jinxian).

39. *Caragana microphylla* Lamarck, Encycl. 1: 615. 1785.

小叶锦鸡儿 xiao ye jin ji er

Caragana microphylla f. *cinerea* Komarov; *C. microphylla* f. *daurica* Komarov; *C. microphylla* f. *pallasiana* Komarov; *C. microphylla* f. *viridis* Komarov.

Shrubs to 2(–3) m tall. Branches dark gray to dark green;

branchlets glabrous or tomentose. Stipules spinelike, 1.5–5 mm, usually obliquely erect. Leaves pinnate, 10–20-foliolate; petiole and rachis caducous; leaflet blades obovate to obovate-oblong, 3–10 × 2–8 mm, glabrous, pubescent, or tomentose, apex obtuse to truncate. Flowers solitary. Pedicel ca. 1 cm, articulate near middle. Calyx tube tubular-campanulate, 0.9–1.2 cm, glabrous or tomentose. Corolla yellow, ca. 2.5 cm; standard broadly ovate, claw short, apex minutely emarginate; wings with claw ca. 1/2 as long as limb, auricle short and dentiform; keel with a claw as long as limb, auricle inconspicuous. Ovary often glabrous. Legume cylindric, 4–5 cm × 4–5 mm. Fl. May–Jun, fr. Jul–Aug. $2n = 16$.

Consolidated and semiconsolidated sand dunes, rocky mountain slopes; 1000–2000 m. Jilin, Liaoning, Nei Mongol [Mongolia, Russia (Siberia)].

Caragana microphylla is a polymorphic species and in some cases with transitional forms. Hybrids between this species and *C. korshinskii* may occur where these species are sympatric.

This species is planted for dune stabilization and for soil and water conservation.

40. *Caragana potaninii* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 352. 1909.

五台锦鸡儿 wu tai jin ji er

Caragana microphylla Lamarck var. *potaninii* (Komarov) Y. X. Liou ex L. Z. Shue.

Shrubs, small, thorny. Branches brownish to brownish olive. Stipules spinelike, 1.5–5 mm, ± deflexed hooklike. Leaves pinnate, 8–12(or 14)-foliolate; petiole and rachis caducous; leaflet blades obovate to rarely almost elliptic, 5–17 × 3.5–7 mm, grayish when dry, both surfaces appressed pubescent, apex emarginate. Flowers 1 or 2 in a fascicle. Pedicel 7–12 mm. Calyx usually broadly campanulate to rarely tubular-campanulate, ± pubescent or rarely glabrous. Corolla 2–2.3 cm; standard ovate, gradually or sharply narrowed into a relatively wide to narrow claw; wings with claw shorter than limb; keel with a claw as long as limb. Ovary glabrous or sparsely appressed pubescent. Legume cylindric, 4–6 cm × ca. 5 mm, usually obliquely erect. Fl. Apr–May, fr. Jun–Jul.

- Rocky mountain slopes; 1000–1400 m. N Shanxi (Hunyuan, Wutai).

41. *Caragana liouana* Zhao Y. Chang & Yakovlev, **nom. nov.**

中间锦鸡儿 zhong jian jin ji er

Replaced synonym: *Caragana korshinskii* Komarov var. *ordosica* Yakovlev, Bot. Zhurn. (Moscow & Leningrad) 69: 358. 1984, not *Caragana ordosica* Y. Z. Zhao, Zong Y. Zhu & L. Q. Zhao, Bull. Bot. Res., Harbin 25: 386. 2005.

Shrubs to 1.5(–2) m tall. Branches yellowish gray-green. Stipules spinelike, 4–7 mm. Leaves pinnate, 6–16-foliolate; petiole and rachis 1–5 cm, caducous; leaflet blades elliptic to obovate-elliptic, 3–10 × 4–6 mm, whitish green, both surfaces villous, apex rounded, acute, or rarely truncate. Flowers solitary. Pedicel 1–1.6 cm, articulate apically from middle. Calyx tube campanulate, 7–12 mm. Corolla yellow, 2–2.5 cm; standard broadly ovate to suborbicular, claw ca. 1/4–1/3 as long as

limb; wings oblong, claw nearly as long as limb, auricle not prominent. Ovary glabrous. Legume lanceolate to oblong-lanceolate, 2.5–3.5 cm × 6–7 mm, flat, apex acute. Fl. May, fr. Jun. $2n = 16^*$.

• Consolidated and semiconsolidated sand dunes; 900–2400 m. Gansu, N Hebei, Nei Mongol, Ningxia, Shaanxi, W Shanxi.

Most plants identified in herbaria as *Caragana intermedia* and treated as such in FRPS (42(1): 47. 1993) belong here, but the type of *C. intermedia* is synonymous with *C. korshinskii*. Because the specific epithet “*ordosica*” is already occupied in *Caragana*, a replacement name is used in recognition of Professor Liou Yingxin (刘焯心) for her work on the *Caragana* of China.

42. *Caragana korshinskii* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 351. 1909.

柠条锦鸡儿 ning tiao jin ji er

Caragana intermedia Kuang & H. C. Fu; *C. korshinskii* f. *brachypoda* Y. X. Liou; *C. korshinskii* var. *intermedia* (Kuang & H. C. Fu) M. L. Zhang & G. H. Zhu; *C. microphylla* Lamarck var. *tomentosa* Komarov.

Shrubs or trees, 1–4 m tall. Branches golden yellow, shiny; branchlets pubescent. Stipules spinelike, 3–7 mm. Leaves pinnate, 12–16-foliolate; petiole and rachis 3–5 cm, caducous; leaflet blades lanceolate to narrowly oblong, 7–8 × 2–7 mm, whitish, both surfaces densely appressed sericeous, apex acute to obtuse. Flowers solitary. Pedicel 0.6–1.5 cm, articulate apically. Calyx tube tubular-campanulate, 8–9 mm. Corolla 2–2.3 cm; standard broadly ovate to suborbicular, claw short, apex truncate to slightly emarginate; wings with claw slightly shorter than limb, auricle small and dentiform; keel with long claw, auricle very small. Ovary glabrous. Legume lanceolate, 2–2.5 cm × 6–7 mm, flat. Fl. May–Jun, fr. Jun–Jul. $2n = 16$.

Semiconsolidated sand dunes; 900–2400 m. Gansu, Nei Mongol, Ningxia, Qinghai, W Shanxi, Xinjiang [Mongolia].

Although the type of *Caragana intermedia* is synonymous with *C. korshinskii*, most specimens identified in herbaria as *C. intermedia* and treated as such in FRPS (42(1): 47. 1993) are misidentified and actually are *C. liouana*.

43. *Caragana leucophloea* Pojarkova in Komarov, Fl. URSS 11: 399. 1945.

白皮锦鸡儿 bai pi jin ji er

Caragana aurantiaca Koehne var. *deserticola* Komarov.

Shrubs to 1.5 m tall. Branches yellowish white to yellow; current-year branchlets purplish red. Leaves digitate, 4-foliolate; petiole 5–8 mm and persistent on long branchlets, absent and leaves clustered on short branchlets; leaflet blades narrowly oblanceolate, 4–12 × 1–3 mm, green, pale green, or reddish, both surfaces glabrous or appressed pubescent, apex acute to obtuse. Flowers solitary or 2 in a fascicle. Pedicel 3–15 mm, glabrous, articulate basally or apically from middle. Calyx tube campanulate, 5–6 mm. Corolla yellow; standard broadly obovate, 1.3–1.8 cm, claw short; wings with claw ca. 1/3 as long as limb, auricle ca. 2/3 as long as claw; keel with claw slightly shorter than limb, auricle obtuse and ca. 2 mm. Ovary glabrous. Legume cylindrical, 3–3.5 cm, glabrous. Fl. May–Jun, fr. Jul–Aug.

Dry slopes, desert valleys; 900–2700 m. N Gansu, Nei Mongol, Xinjiang [Kazakhstan, Mongolia].

44. *Caragana pygmaea* (Linnaeus) Candolle, Prodr. 2: 268. 1825.

矮锦鸡儿 ai jin ji er

Shrubs to 50 cm tall. Branches golden yellow, shiny, pubescent when young but gradually glabrescent. Leaves digitate, 4-foliolate; petiole 4–6 mm and persistent on long branchlets, absent and leaves clustered on short branchlets; leaflet blades oblanceolate to linear, (5–)7–17(–30) × 1–3 mm, both surfaces glabrous, apex obtuse to acute. Flowers solitary. Pedicel 0.6–2 cm, articulate basally or apically from middle, glabrous or pubescent. Calyx tube tubular-campanulate, 5–6 mm. Corolla yellow, 1–1.6 cm; standard broadly obovate, claw ca. 1/3 as long as limb; wings oblong, inflated toward apex, auricle short; keel with claw as long as limb, auricle obtuse. Ovary densely pubescent. Legume linear, 2–3 cm, pubescent when young, glabrescent. Fl. May, fr. Jun. $2n = 16$.

Sandy areas, rocky slopes, hilly areas among rocks; 900–1300 m. Hebei, Nei Mongol, Xinjiang [Mongolia, E Russia].

- 1a. Pedicel articulate basally from middle; corolla 1–1.5 cm 44c. var. *parviflora*
- 1b. Pedicel articulate near middle; corolla 1.5–1.6 cm.
 - 2a. Branchlets stout, pubescent when young, gradually glabrescent; leaflet blades narrowly oblanceolate, ca. 3 mm wide 44a. var. *pygmaea*
 - 2b. Branchlets slender, densely pubescent; leaflet blades linear, ca. 1 mm wide 44b. var. *angustissima*

44a. *Caragana pygmaea* var. *pygmaea*

矮锦鸡儿(原变种) ai jin ji er (yuan bian zhong)

Robinia pygmaea Linnaeus, Sp. Pl. 2: 723. 1753; *Caragana pygmaea* f. *longifolia* Komarov.

Branchlets stout, pubescent when young, glabrescent. Leaflet blades narrowly oblanceolate, ca. 3 mm wide. Pedicel articulate near middle. Corolla 1.5–1.6 cm. $2n = 16$.

Sandy areas; ca. 1200 m. Nei Mongol, Xinjiang [Mongolia, E Russia].

44b. *Caragana pygmaea* var. *angustissima* C. K. Schneider, Ill. Handb. Laubholz. 2: 102. 1907.

窄叶矮锦鸡儿 zhai ye ai jin ji er

Caragana stenophylla Pojarkova var. *sericea* H. C. Fu.

Branchlets slender, glaucous, densely pubescent. Leaflet blades linear, 5–10(–30) × ca. 1 mm. Pedicel articulate near middle. Corolla 1.5–1.6 cm.

• Sandy areas; 900–1300 m. Nei Mongol.

44c. *Caragana pygmaea* var. *parviflora* H. C. Fu, Fl. Intramongol. 3: 287. 1978.

小花矮锦鸡儿 xiao hua ai jin ji er

Leaflet blades linear-oblongate, 5–10 mm. Pedicel articulate basally from middle. Corolla 1–1.5 cm.

- Rocky slopes, hilly areas among rocks. Nei Mongol.

45. *Caragana altaica* (Komarov) Pojarkova in Komarov, Fl. URSS 11: 345. 1945.

阿尔泰锦鸡儿 *a er tai jin ji er*

Caragana pygmaea (Linnaeus) Candolle var. *altaica* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 242. 1909; *C. pygmaea* subsp. *altaica* (Komarov) Bondareva.

Shrubs to 1 m tall. Bark yellow. Branchlets whitish green when young, glabrous. Leaves digitate, 4-foliolate; petiole 4–8 mm on long branchlets but absent on short branches; leaflet blades narrowly obovate to oblanceolate, 5–15(–23) × 2–3 mm, pubescent when young and glabrate when mature. Flowers solitary. Pedicel 1.2–2.5 cm, articulate somewhat basally from middle. Calyx tube tubular-campanulate, 5–7 × 4–5 mm. Corolla yellow, 1.8–2 cm; standard obovate to suborbicular, claw 1/4–1/3 as long as limb; wings oblong, somewhat dilated toward apex, claw ca. 1/2 as long as limb, auricle 1/5–1/4 as long as claw; keel with claw 1/3–1/2 as long as limb, auricle short. Legume cylindric, 2–3.5 cm, glabrous. Fl. May–Jun, fr. Jun–Jul. $2n = 16$.

Stony slopes, rocky areas; 800–1300 m. N Xinjiang [Mongolia].

46. *Caragana aurantiaca* Koehne, Deut. Dendrol. 340. 1893.

镰叶锦鸡儿 *lian ye jin ji er*

Caragana aurantiaca var. *conferta* Komarov.

Shrubs to 1 m tall. Bark greenish brown to dark gray, shiny. Branchlets strong and long. Leaves digitate, 4-foliolate; petiole and rachis 3–5 mm on long branchlets but absent on short branchlets; leaflet blades linear to lanceolate-linear, 4–16 × 1–2 mm, falcate, glabrous. Flowers solitary. Pedicel 6–9 mm, articulate basally from middle. Calyx tube campanulate, 6–7 mm. Corolla orange, 1.8–2 cm; standard suborbicular, claw 1/4–1/3 as long as limb, apex rounded to emarginate; wings narrowly oblong, claw ca. 1/2 as long as limb, auricle ca. 3/4 to ± as long as claw; keel with claw shorter than limb, auricle short. Ovary glabrous. Legume cylindric, 2.5–4 cm, slightly compressed, glabrous. Fl. Jun–Jul, fr. Aug. $2n = 16$.

Rocky slopes, bottomlands near riversides, forest margins; 1000–1100 m. Xinjiang [Afghanistan, Kazakhstan, Pakistan, Uzbekistan; SW Asia].

47. *Caragana pumila* Pojarkova in Komarov, Fl. URSS 11: 346. 1945.

草原锦鸡儿 *cao yuan jin ji er*

Shrubs 30–60 cm tall. Branchlets yellowish green with brown stripes, puberulent when young. Leaves digitate, 4-foliolate; petiole 4–6 mm and persistent on long branchlets, absent on short branchlets; leaflet blades narrowly oblanceolate to linear-oblongate, 4–12 × 0.5–1.2 mm, dark green but abaxially tinged ± reddish, pubescent when young. Flowers solitary. Pedicel 0.8–1.5 cm, articulate at or near middle. Calyx tube tubular, 4–6 mm. Corolla yellow, 1.5–2 cm; standard ovate to

obovate, claw 1/6–1/5 as long as limb; wings with claw ca. 1/3 as long as limb, auricle ca. 2/3 as long as claw; keel with claw slightly shorter than limb, auricle small, short, and obtuse. Ovary linear, ca. 1.5 cm, glabrous. Legume ca. 2.5 cm. Fl. May–Jun, fr. Jun–Jul.

Mountain steppes, rocky slopes; 1200–1500 m. Xinjiang (Bole, Wenquan) [Kazakhstan].

48. *Caragana versicolor* Bentham in Royle, Ill. Bot. Himal. Mts. 198. 1835.

变色锦鸡儿 *bian se jin ji er*

Shrubs to 80 cm tall. Bark brown to dark brown. Stipule spines 1–4 mm on long branchlets. Leaves digitate, 4-foliolate; petiole 5–10 mm and persistent on long branchlets, absent on short branchlets; leaflet blades narrowly lanceolate, obovate-cuneate, or linear, 5–7 × 1–1.5 mm, green to grayish green, glabrous. Flowers solitary. Pedicel ca. 5 mm, articulate basally. Calyx tube tubular, 5–6 mm. Corolla yellow, 1.1–1.2 cm; standard suborbicular, abaxially reddish brown, claw ca. 1/2 as long as limb; wings with claw shorter than limb, auricle ca. 1/4 as long as claw; keel with claw ± as long as limb, auricle ca. 1 mm. Legume 2–2.5 cm, apex acute. Fl. May–Jun, fr. Jul–Aug. $2n = 16 + 2B, 18$.

Rocky slopes, riversides, among shrubs; 3000–4900 m. Qinghai, W Sichuan, Xizang [Afghanistan, NW India, Kashmir, Nepal, Pakistan; SW Asia].

49. *Caragana stenophylla* Pojarkova in Komarov, Fl. URSS 11: 397. 1945.

狭叶锦鸡儿 *xia ye jin ji er*

Caragana pygmaea (Linnaeus) Candolle var. *pallasiana* Komarov; *C. stenophylla* var. *parviflora* Zhan Wang & H. C. Fu.

Shrubs to 80 cm tall. Bark grayish green, yellowish brown, or dark brown. Stipule spines 4–7 mm on long branchlets. Leaves digitate, 4-foliolate; petiole 4–7 mm and persistent on long branchlets, absent on short branchlets; leaflet blades linear-lanceolate to linear, 4–11 × 1–2 mm, both surfaces green to grayish green. Flowers solitary. Pedicel 5–10 mm, articulate slightly basally from middle. Calyx tube campanulate-tubular, 4–6 mm. Corolla yellow but standard orangish brown at middle; standard orbicular to broadly obovate, 0.8–1.8(–2) cm, claw broad and short; wings with claw ca. 1/2 as long as limb, auricle elliptic and 1/4–1/2 as long as claw; keel with a claw longer than limb, auricle obtuse. Ovary glabrous. Legume cylindric, 2–2.5 cm. Fl. Apr–Jun, fr. Jul–Aug. $2n = 32$.

Sandy areas, stony slopes, loess hills; 600–2500 m. Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, E Qinghai, Shaanxi, N Shanxi [Mongolia, E Russia].

50. *Caragana kirghisorum* Pojarkova in Komarov, Fl. URSS 11: 396. 1945.

囊萼锦鸡儿 *nang e jin ji er*

Shrubs to 1 m tall. Branches grayish brown; current-year branchlets grayish brown to bright gray. Leaves digitate, 4-foliolate; petiole 4–12 mm and persistent on long branchlets, 1–

3 mm and caducous on short branchlets; leaflet blades obovate, elliptic-obovate, or oblanceolate, 4–9 × 1.5–3 mm, glabrous, base cuneate, apex sharply acute. Flowers solitary or rarely 2 in a fascicle. Pedicel 1.2–1.4 cm, articulate near middle. Calyx tube tubular, 1.2–1.3 cm, base saccate. Corolla yellow but standard and keel purple at anthesis, 2.7–3.2 cm; standard obovate, 1.3–1.7 cm, base gradually narrowing into a claw, apex rounded to slightly emarginate; wings with claw nearly as long as limb, auricle acute; keel with claw longer than limb, auricle obtusely dentiform. Ovary glabrous. Legume linear, 2.5–5 cm, glabrous, apex acuminate. Fl. May–Jun, fr. Jul–Aug.

Rocky slopes on foothills, stony lands, riverbanks; 700–1100 m. Xinjiang [Kazakhstan, Kyrgyzstan].

51. *Caragana brachypoda* Pojarkova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 13: 135. 1950.

矮脚锦鸡儿 ai jiao jin ji er

Shrubs to 30 cm tall. Bark yellowish brown to grayish brown. Current-year branchlets brown to yellowish brown. Leaves digitate, 4-foliolate; petiole 4–10 mm and persistent on long branchlets, absent on short branchlets; leaflet blades oblanceolate, 2–10 × 1–3 mm, both surfaces pubescent, apex acute. Flowers solitary. Pedicel 2–5 mm, articulate basally. Calyx reddish purple to greenish brown, 0.9–1.1 cm, base gibbous. Corolla yellow but with orange or purple at middle, 2–2.5 cm, apex slightly emarginate; wings with claw ± as long as limb, apex obliquely truncate, auricle small and short; keel as long as wings, claw long, auricle short. Ovary glabrous. Legume spindlelike, 2–3.5 cm, turgid, glabrous, apex acuminate. Fl. Apr–May, fr. Jun–Jul. $2n = 16, 32$.

Bases of hills, stony areas, sand dunes; 900–2000 m. Gansu, Nei Mongol, Ningxia, Shaanxi (Dingbian) [S Mongolia].

52. *Caragana kansuensis* Pojarkova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 13: 138. 1950.

甘肃锦鸡儿 gan su jin ji er

Shrubs to 60 cm tall. Branches grayish brown. Leaves digitate, 4-foliolate; petiole 4–10 mm and persistent on long branchlets, 2–4 mm and caducous on short branchlets; leaflet blades linear-oblanceolate, 5–12 × 1–2 mm, both surfaces glabrous or pilose, apex acute. Flowers solitary. Pedicel 5–12 mm, articulate apically. Calyx tube tubular, 6–9 mm, base gibbous. Corolla yellow but standard with straw-colored spots at middle, 2–2.5 cm; standard ovate to broadly ovate, 2–2.5 cm, claw ca. 1/3 as long as limb, apex emarginate; wings ± as long as standard, claw ± as long as limb, auricle ca. 2 mm; keel ± as long as wings, with a longer claw and short auricle. Ovary glabrous. Legume cylindrical, 2–3.5 cm, glabrous, apex acute. Fl. Apr–Jun, fr. Jun–Aug.

- Loess hills, hillsides; 900–1900 m. E Gansu, Ningxia.

Y. Z. Zhao (Acta Sci. Nat. Univ. Intramongol. 22: 97–100. 1991) considered that collections attributed to this species from Nei Mongol, N Shaanxi, and N Shanxi in FRPS (42(1): 57. 1993) are actually representatives of *Caragana opulens*, with leaflet blade narrower and acute at apex. However, they seem more related to *C. licentiana* in their leaflets pubescent and abaxially tinged reddish when dried.

53. *Caragana leveillei* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 207. 1909.

毛掌叶锦鸡儿 mao zhang ye jin ji er

Caragana sinica (Buc'hoz) Rehder var. *longipedunculata* C. W. Chang.

Shrubs to 1 m tall. Bark dark brown. Current-year branchlets grayish brown, densely pubescent. Leaves digitate, 4-foliolate; petiole 4–12 mm, persistent or caducous; leaflet blades obovate, 5–20(–30) × 2–10(–15) mm, densely pubescent, apex rounded, truncate, or emarginate. Flowers solitary. Pedicel 0.8–1.2 cm, articulate basally from middle. Calyx tube ca. 1 cm, base gibbous. Corolla yellow to pinkish, 2.5–2.8 cm; standard obovate-cuneate, claw ca. 5 mm, apex obtuse to emarginate; wings with claw ± as long as limb, auricle small; keel with claw ± as long as limb, auricle small. Ovary densely villous. Legume cylindrical, 2–3(–4) cm, densely villous. Fl. Apr–May, fr. Jun.

- Hilly slopes; 500–1300 m. Hebei, Henan, Shaanxi, Shandong, Shanxi.

54. *Caragana opulens* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 208. 1909.

甘蒙锦鸡儿 gan meng jin ji er

Caragana opulens var. *perforata* Merrgen & Y. Q. Ma; *C. opulens* var. *trichophylla* Z. H. Gao & S. C. Zhang.

Shrubs to 60 cm tall. Bark grayish brown. Branchlets bright gray. Leaves digitate, 4-foliolate; petiole 2–5 mm, persistent on long branchlets, caducous on short branchlets; leaflet blades obovate to oblanceolate, 3–12(–15) × 1–4(–8) mm, glabrous or pubescent, apex rounded to truncate. Flowers solitary. Pedicel 0.7–2.5 cm, articulate apically. Calyx tube campanulate-tubular, 8–10 mm, base gibbous. Corolla yellow but standard sometimes reddish; standard broadly obovate, 2–2.5 cm, apex emarginate; wings with claw slightly shorter than limb, auricle oblong; keel with claw slightly shorter than limb, auricle dentiform. Ovary glabrous. Legume cylindrical, 2.5–4 cm, glabrous, apex acute. Fl. May–Jun, fr. Jun–Jul. $2n = 16^*$.

- Dry slopes, valleys, hills; 1200–4700 m. Gansu, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, W Sichuan, Xizang.

This is a polymorphic species with great variation. Whether *Caragana opulens* var. *perforata* and *C. opulens* var. *trichophylla* should be recognized requires further study.

55. *Caragana rosea* Turczaninow ex Maximowicz, Prim. Fl. Amur. 470. 1859.

红花锦鸡儿 hong hua jin ji er

Shrubs to 1 m tall. Bark greenish brown to grayish brown. Leaves digitate, 4-foliolate; petiole 5–10 mm, caducous or persistent; leaflet blades obovate, 1–2.5 × 0.4–1.2 cm, glabrous, apex obtuse to emarginate. Flowers solitary. Pedicel 0.8–1.9 cm, articulate basally to apically. Calyx tube purplish red, tubular, 7–9 mm. Corolla yellow, purplish red, or pinkish, later reddish, 2–2.5 cm; standard oblong-obovate, apex emarginate; wings oblong-linear, claw slightly shorter than limb, auricle shortly dentiform; keel with claw equal to limb, auricle incon-

spicuous. Ovary glabrous. Legume cylindric, 3–6 cm, apex acuminate. Fl. May–Jun, fr. Jun–Jul. $2n = 16^*$.

• Slopes, valleys; 200–2100 m. Anhui, S Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, N Sichuan.

56. *Caragana qingheensis* Zhao Y. Chang, L. R. Xu & F. C. Shi, *Ann. Bot. Fenn.* 43: 445. 2006.

青河锦鸡儿 qing he jin ji er

Shrubs 50–100 cm tall. Bark yellowish brown, with grayish corky stripes. Leaves digitate, 4-foliolate; petiole 3–5 mm and persistent on long branchlets, 1–3 mm and caducous on short branchlets; leaflet blades obovate to elliptic-obovate, $3-8 \times 2-3.5$ mm, both surfaces pubescent, base cuneate, apex obtuse. Flowers solitary. Pedicel 0.8–1.5 cm, articulate usually apically from middle, densely pubescent. Calyx tube tubular-campanulate, 6–7 mm, pubescent. Corolla yellow, 1.5–1.8 mm; standard broadly ovate, claw $1/6-1/5$ as long as limb, apex emarginate; wings narrowly oblong, claw ca. $1/3$ as long as limb, auricle linear and $1/2-2/3$ as long as claw; keel broader than wings, claw $1/2-2/3$ as long as limb, auricle obtuse. Ovary linear, densely pubescent. Legume oblanceolate when young, 1.5–2 cm, pubescent. Fl. May–Jun, fr. Jun–Jul.

• Rocky mountain slopes; ca. 1300 m. Xinjiang (Qinghe).

57. *Caragana camilloi-schneideri* Komarov, *Trudy Imp. S.-Peterburgsk. Bot. Sada* 29: 217. 1909 [*“camilli-schneideri”*].

北疆锦鸡儿 bei jiang jin ji er

Shrubs to 2 m tall. Bark brown. Leaves digitate, 4-foliolate; petiole 2–10 mm and persistent on long branchlets, caducous on short branchlets; leaflet blades obovate to broadly lanceolate, $1-2(-3) \times 0.6-0.7(-1)$ cm, glabrous, apex obtuse to acute. Flowers solitary or 2 in a fascicle. Pedicel 1–1.5(–2) cm, articulate apically. Calyx tube 9–10 mm, base gibbous. Corolla yellow, 2.8–3.1 cm; standard suborbicular to ovate, claw ca. $1/4$ as long as limb; wings with claw ca. $1/3$ as long as limb, auricle ca. 4 mm; keel with claw \pm as long as limb, auricle inconspicuous. Ovary densely pubescent. Legume cylindric, 4–5 cm, pubescent. Fl. May–Jun, fr. Jul–Aug. $2n = 32$.

Rocky dry slopes, valleys; 600–1800 m. Xinjiang [Kyrgyzstan].

58. *Caragana licentiana* Handel-Mazzetti, *Oesterr. Bot. Z.* 82: 249. 1933.

白毛锦鸡儿 bai mao jin ji er

Caragana opulens Komarov var. *licentiana* (Handel-Mazzetti) Yakovlev.

Shrubs to 60 cm tall. Bark greenish brown to reddish brown. Leaves digitate, 4-foliolate; petiole 2–3 mm, persistent; leaflet blades obovate to oblanceolate, $5-12 \times 2-4$ mm, both surfaces densely pubescent, apex rounded and sometimes emarginate. Flowers solitary or 2 in a fascicle. Pedicel 0.6–2 cm, articulate apically. Calyx tube tubular, 7–10 mm. Corolla yellow but standard with orange spots at middle, 2–2.2 cm; standard broadly obovate to suborbicular, apex emarginate; wings with claw \pm as long as limb, auricle dentiform and ca. 2 mm;

keel with claw longer than limb, auricle dentiform. Ovary densely pubescent. Legume cylindric, 2.5–3.5 cm, pubescent. Fl. Apr–Jun, fr. Jul–Aug. $2n = 32^*$.

• Dry slopes; 1500–2400 m. Gansu, Ningxia, Qinghai.

Yakovlev (*Rast. Tsentral. Azii* 8a: 38. 1988) considers this taxon to be a variety of *Caragana opulens*, although this is not supported by chromosome data. However, between the two taxa there seem to exist hybrids with which it is difficult to deal. At least one variety could be separated whose leaflets are oblanceolate to obcuneate, with apex acute to obtuse. It is often wrongly identified as *C. kansuensis* in major herbaria of China (see also note under *C. kansuensis*, p. 542).

59. *Caragana shensiensis* C. W. Chang, *Acta Phytotax. Sin.* 17(2): 83. 1979.

秦岭锦鸡儿 qin ling jin ji er

Caragana wenhsienensis C. W. Chang; *C. wenhsienensis* var. *inermis* C. W. Chang.

Shrubs to 1.5 m tall. Branches purplish brown; branchlets grayish brown. Leaves digitate, 4-foliolate; petiole 1–1.5 cm, caducous; leaflet blades obovate-cuneate, $1-2.2 \times 0.4-0.7$ cm, with apical ones largest, abaxially sparsely white pubescent, adaxially glabrous, base cuneate, apex rounded to nearly truncate. Flowers solitary. Pedicel 8–9 mm, articulate apically. Calyx tube tubular, ca. 6 mm. Corolla yellow but adaxially reddish yellow; standard orbicular, ca. 2.2 cm, claw broad and short; wings narrowly oblong, ca. 2.4 cm, claw slightly shorter than limb, auricle short; keel broader than wing, auricle obtuse. Ovary pubescent. Legume cylindric, 2.5–3.5 cm, pubescent to glabrescent. Fl. Apr–May, fr. Jun–Jul.

• Riverbanks; 400–900 m. Gansu, Shaanxi.

60. *Caragana polourensis* Franchet, *Bull. Mus. Hist. Nat. (Paris)* 3: 321. 1897.

昆仑锦鸡儿 kun lun jin ji er

Shrubs to 50 cm tall. Branches brown to bright brown. Leaves digitate, 4-foliolate; petiole 8–10 mm and persistent on long branchlets, 4–6 mm and caducous on short branchlets; leaflet blades obovate, $6-10 \times 2-4$ mm, both surfaces appressed pubescent, apex acute, obtuse, or sometimes emarginate. Flowers solitary. Pedicel 2–6 mm, articulate basally to apically. Calyx tube tubular, 8–10 mm. Corolla yellow but standard sometimes with orange spots, ca. 2 cm; standard suborbicular to obovate; wings with claw shorter than limb, auricle short; keel with claw shorter than limb, auricle short. Ovary pubescent. Legume cylindric, 2.5–3.5 cm, pubescent to glabrescent. Fl. Apr–May, fr. Jun–Jul.

• Hillsides, plains; 1700–3200 m. C Gansu, S Xinjiang.

61. *Caragana brevifolia* Komarov, *Trudy Imp. S.-Peterburgsk. Bot. Sada* 29: 211. 1909.

短叶锦鸡儿 duan ye jin ji er

Shrubs to 2 m tall, glabrous. Bark dark grayish brown. Branchlets sometimes arched. Leaves digitate, 4-foliolate; petiole 3–8 mm on long branchlets, nearly absent on short branchlets; leaflet blades lanceolate to obovate-lanceolate, $2-8 \times 1-4$

mm, base cuneate, apex acute. Flowers solitary. Pedicel 5–8 mm, articulate basally to near middle. Calyx tube tubular-campanulate, 5–6 mm, glaucous. Corolla yellow, 1.4–1.6 cm; standard broadly ovate, ca. 1.4 cm, claw ca. 4 mm; wings with claw \pm as long as limb, auricle dentiform and small; keel with claw \pm as long as limb, auricle dentiform. Ovary glabrous. Legume dark brown when mature, cylindrical, 1–2.5(–3.5) cm. Fl. Jun–Jul, fr. Aug–Sep. $2n = 16$.

Riverbanks, valleys, mixed scrub; 1800–3800 m. Gansu, Ningxia, Qinghai, W Sichuan, SE Xizang, NW Yunnan [N India, Kashmir, Pakistan].

62. *Caragana chinghaiensis* Y. X. Liou, Acta Phytotax. Sin. 22: 209. 1984.

青海锦鸡儿 qing hai jin ji er

Shrubs 20–100 cm tall. Branches greenish brown to dark brown. Leaves digitate, 4-foliolate; petiole 5–7 mm, persistent; leaflet blades narrowly oblanceolate, 5–13 \times 0.5–3 mm, glabrous, base cuneate, apex acute to slightly acuminate. Flowers solitary. Pedicel 4–5 mm, articulate basally. Calyx tube campanulate, 5–6 \times ca. 4 mm. Corolla yellow, ca. 1.3 cm or 1.6–2 cm; standard broadly obovate, claw short, apex emarginate; wings oblong, claw slightly shorter than 1/2 of limb, auricle linear and nearly as long as claw; keel with claw slightly longer than 1/2 of limb, auricle inconspicuous. Ovary glabrous. Legume cylindrical, 3–4 cm, glabrous. Fl. May, fr. Sep.

• Terraces, sand dunes, sunny scrub, grasslands; 2600–4100 m. Gansu, Qinghai, Sichuan.

- 1a. Shrubs 50–100 cm tall; leaflet blades 6–13 \times 2–3 mm; calyx tube ca. 6 \times 4 mm; corolla 1.6–2 cm 62a. var. *chinghaiensis*
 1b. Shrubs to 20 cm tall; leaflet blades 5–9 \times ca. 0.5 mm; calyx tube ca. 5 \times 4 mm; corolla ca. 1.3 cm 62b. var. *minima*

62a. *Caragana chinghaiensis* var. *chinghaiensis*

青海锦鸡儿(原变种) qing hai jin ji er (yuan bian zhong)

Shrubs 50–100 cm tall. Leaflet blades 6–13 \times 2–3 mm. Calyx tube ca. 6 \times 4 mm. Corolla 1.6–2 cm.

• Terraces, sand dunes, sunny scrub; 2600–3600 m. Gansu, Qinghai.

62b. *Caragana chinghaiensis* var. *minima* Y. X. Liou, Acta Phytotax. Sin. 22: 209. 1984.

小青海锦鸡儿 xiao qing hai jin ji er

Shrubs to 20 cm tall. Leaflet blades 5–9 \times ca. 0.5 mm. Calyx tube ca. 5 \times 4 mm. Corolla ca. 1.3 cm.

• Grasslands; 3600–4100 m. SE Qinghai, Sichuan.

63. *Caragana densa* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 258. 1909.

密叶锦鸡儿 mi ye jin ji er

Shrubs to 1.5 m tall. Bark dark brown, greenish brown, or yellowish brown. Branchlets arched. Leaves digitate, 4-folio-

late; petiole 1–1.2 cm and persistent on long branchlets, 5–10 mm and caducous on short branchlets; leaflet blades obovate to linear, 6–13 \times 2–3 mm, abaxially sparsely pilose, base narrowly cuneate, apex acute. Flowers solitary. Pedicel 3–4 mm, articulate basally. Calyx tube campanulate, 7–10 mm. Corolla yellow, 1.8–2.3 cm; standard broadly ovate, claw shorter than limb, apex obtuse; wings oblong, claw slightly longer than limb, auricle linear and ca. 1/3 as long as claw; keel with claw \pm as long as limb, auricle small. Ovary glabrous. Legume cylindrical, 3–3.5 cm \times 3–4 mm, glabrous. Fl. May–Jun, fr. Jul–Aug. $2n = 16^*$.

• Dry slopes in mixed woodlands; 1700–4000 m. Gansu, Qinghai, W Sichuan, Xinjiang, NW Yunnan.

64. *Caragana turfanensis* (Krasnov) Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 213. 1909.

吐鲁番锦鸡儿 tu lu fan jin ji er

Caragana frutescens Linnaeus var. *turfanensis* Krasnov, Zap. Russk. Geogr. Obshch. Obshchei Geogr. 19: 336. 1888.

Shrubs to 1 m tall. Branches yellowish brown; branchlets pale brown. Leaves digitate, 4-foliolate; petiole 0.7–1.3 cm and persistent on long branchlets, persistent or caducous on short branchlets; leaflet blades obovate to obovate-cuneate, 4–6 \times 2–3 mm, glabrous or pubescent, apex acute. Flowers solitary. Pedicel 2–5 mm, articulate basally. Calyx tube tubular, 6–8 mm. Corolla yellow; standard obovate, 1.7–2.2 cm, claw 1/3–1/2 as long as limb, apex obtuse; wings linear-oblong, claw more than 1/2 as long as limb, auricle 1/5–1/4 as long as claw; keel with claw shorter than limb, auricle very short. Ovary glabrous. Legume 3–4.5 cm \times 4–6 mm. Fl. May, fr. Jul.

• Slopes, terraces, steep slopes; 1300–2100 m. Xinjiang.

65. *Caragana laeta* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 215. 1909.

阿拉套锦鸡儿 a la tao jin ji er

Shrubs 1–2 m tall. Bark greenish gray or brownish gray. Branchlets brownish yellow, spinose. Leaves digitate, 4-foliolate; petiole (0.5–)0.7–1.3(–1.5) cm and persistent on long branchlets, caducous on short branchlets; leaflet blades broadly obovate, 4–13(–17) \times 2.5–7 mm, base narrowly cuneate, apex rounded to truncate and shortly cuspidate. Flowers solitary or 2 in a fascicle. Pedicel 5–10 mm, articulate near middle. Calyx tube campanulate-tubular or tubular, 10–14 mm. Corolla yellow; standard obovate, 2.6–3.5 cm, claw ca. 1/3 as long as limb; wings sublinear, claw ca. 3/4 as long as limb, auricle 1/5–1/4 as long as claw; keel obtuse, claw nearly as long as limb, auricle small. Ovary glabrous or rarely with trichomes. Legume cylindrical, 3–5 cm, glabrous. Fl. Jul–Aug, fr. Aug. $2n = 16$.

Dry slopes of gullies, stony taluses; 2100–3200 m. Xinjiang [Kazakhstan, Kyrgyzstan].

66. *Caragana frutex* (Linnaeus) K. Koch, Dendrologie 1: 48. 1869.

黄刺条锦鸡儿 huang ci tiao jin ji er

Robinia frutex Linnaeus, Sp. Pl. 2: 723. 1753; *Caragana frutex* var. *latifolia* C. K. Schneider.

Shrubs to 2 m tall. Branches brown, yellowish gray, or dark grayish green. Leaves digitate, 4-foliolate; petiole 2–10 mm and persistent on long branchlets, caducous on short branchlets; leaflet blades obovate-oblongate, 6–10 × 3–5 mm, glabrous or sparsely pilose, apex rounded to emarginate. Flowers solitary or 2 in a fascicle. Pedicel 0.9–2.1 cm, articulate apically. Calyx tube tubular-campanulate, 6–8 mm. Corolla yellow, 2–2.2 cm; standard suborbicular, ca. 1.6 cm

wide, claw ca. 5 mm; wing with claw ca. 1/2 as long as limb, auricle 1/4–1/3 as long as claw, apex emarginate; keel ca. 2.2 cm, claw shorter than limb, auricle inconspicuous. Ovary glabrous. Legume cylindrical, 2–3 cm. Fl. May–Jun, fr. Jul. $2n = 32$.

Dry slopes, woodlands; 1000–2500 m. Xinjiang [Kazakhstan, Mongolia, Russia; E Europe].

156. HALIMODENDRON Fischer ex Candolle, Prodr. 2: 269. 1825.

铃铛刺属 ling dang ci shu

Zhu Xiangyun (朱相云); Kai Larsen

Shrubs, deciduous. Stipules persistent and becoming spines. Leaves paripinnate; rachis and petiole becoming a spine after leaflets have fallen. Raceme on reproductive branchlets, few flowered; peduncle slender. Calyx campanulate, base oblique; teeth 5, very short. Corolla pale purple or purplish red; standard suborbicular, slightly reflexed at margins; wings clawed, claw equal to auricle; keel semicircular, slightly curved, apex blunt at apex. Stamens diadelphous (9+1). Ovary stipitate, inflated; style incurved; stigma small. Legume inflated, valve thick.

One species: China, Mongolia, Russia.

1. Halimodendron halodendron (Pallas) Druce, Rep. Bot. Soc. Exch. Club Brit. Isles 4: 626. 1917.

铃铛刺 ling dang ci

Robinia halodendron Pallas, Reise Russ. Reich. 2: 741. 1773; *Caragana argentea* Lamarck, nom. illeg. superfl.; *C. halodendron* (Pallas) Dumont de Courset; *Halimodendron argenteum* Candolle, nom. illeg. superfl.; *H. argenteum* var. *albiflorum* Karelin & Kirilov; *H. halodendron* var. *albiflorum* (Karelin & Kirilov) Prjachin.

Shrubs, 0.5–2 m tall. Bark dark grayish brown. Branches many, vegetative and reproductive; reproductive branches brown to grayish yellow, sulcate, glabrous; young branches with dense white appressed trichomes. Rachis and petiole persistent,

spine-shaped; petiole and petiolules very short; leaflet blades oblongate, 1.2–3 × 0.6–1 cm, with dense silvery white trichomes at first, glabrescent, base cuneate, apex rounded or emarginate. Racemes 2–5-flowered; peduncle 1.5–3 cm, densely sericeous. Flowers 1–1.6 cm; pedicel 5–7 mm; bracteoles subulate, ca. 1 mm. Calyx 5–6 mm, with dense appressed trichomes, base oblique; teeth triangular. Corolla pale purple or purplish red; standard slightly reflexed at margins, ± as long as wings; wings slightly longer than keel. Ovary glabrous, long stipitate. Legume flattened, 1.5–2.5 × 0.5–1.2 cm, dorsal and ventral line impressed, without septa, apex with a short beak. Seeds reniform. Fl. Jul, fr. Aug. $2n = 16$.

Saline sand, saline soils along rivers, forests. Gansu, Nei Mongol, Xinjiang [Mongolia, Russia].