

POLYGONACEAE

蓼科 liao ke

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Herbs, shrubs, or small trees, sometimes monoecious or dioecious. Stems erect, prostrate, twining, or scandent, often with swollen nodes, striate, grooved, or prickly. Leaves simple, alternate, rarely opposite or whorled, petiolate or sessile; stipules often united to a sheath (ocrea). Inflorescence terminal or axillary, spicate, racemose, paniculate, or capitate. Pedicel occasionally articulate. Flowers small, actinomorphic, bisexual, rarely unisexual. Perianth 3–6-merous, in 1 or 2 series, herbaceous, often enlarged in fruit or inner tepals enlarged, with wings, tubercles, or spines. Stamens usually (3–)6–9, rarely more; filaments free or united at base; anthers 2-loculed, opening lengthwise; disk annular (often lobed). Ovary superior, 1-loculed; styles 2 or 3, rarely 4, free or connate at lower part. Fruit a trigonous, biconvex, or biconcave achene; seed with straight or curved embryo and copious endosperm.

About 50 genera and 1120 species: worldwide, but primarily N temperate with a few species in tropical regions; 13 genera (two endemic) and 238 species (65 endemic) in China.

All Chinese genera belong to the Polygonoideae, a subfamily of some 790 species defined by the presence of ocreae, a monopodial branching pattern, and the lack of an involucre. The Eriogonoideae (330 species) are found only in the New World.

Chinese genera of economic importance include *Rheum*, which has medicinal uses and is also a food plant (rhubarb) in many other regions, and *Fagopyrum*, which produces a grain (buckwheat).

Fallopia nervosa Loureiro is *Microcos paniculata* Linnaeus (Tiliaceae).

Li Anjen, Kao Tsoching, Mao Zumei & Liu Yulan. 1998. Polygonaceae. In: Li Anjen, ed., Fl. Reipubl. Popularis Sin. 25(1): 1–209.

- 1a. Shrub, rarely a subshrub.
 - 2a. Leaves small, scaly; stamens 12–18; styles 4 8. *Calligonum*
 - 2b. Leaves large, not scaly; stamens 6–8; styles 2 or 3.
 - 3a. Tepals 6; stigmas penicillate 12. *Rumex*
 - 3b. Tepals 5; stigmas capitate.
 - 4a. Achenes with wings 10. *Parapteropyrum*
 - 4b. Achenes without wings.
 - 5a. Stems twining 3. *Fallopia*
 - 5b. Stems erect.
 - 6a. Tepals: inner 3(or 2) enlarged in fruit 9. *Atraphaxis*
 - 6b. Tepals not enlarged in fruit 2. *Polygonum*
 - 1b. Annual or perennial herb.
 - 7a. Achenes with wings.
 - 8a. Tepals 4; achenes biconvex, margin with wings 11. *Oxyria*
 - 8b. Tepals 5 or 6; achenes trigonous, angles with wings.
 - 9a. Tepals 5; achenes 3-horned at base; stems scandent 7. *Pteroxygonum*
 - 9b. Tepals 6; achenes not horned at base; stems erect 13. *Rheum*
 - 7b. Achenes without wings.
 - 10a. Tepals 3 1. *Koenigia*
 - 10b. Tepals 5 or 6, rarely 4.
 - 11a. Tepals 6, rarely 4; stigmas penicillate 12. *Rumex*
 - 11b. Tepals 5, rarely 4; stigmas capitate or fimbriate.
 - 12a. Styles 2, persistent, indurate, elongate in fruit, hooked at apex 5. *Antenoron*
 - 12b. Styles 3, rarely 2, usually deciduous, neither indurate nor elongate in fruit, never hooked at apex.
 - 13a. Stems twining or erect, tepals: outer 3, enlarged in fruit, abaxial surface with wings or keels, rarely not enlarged, without wings or keels.
 - 14a. Stems twining; flowers bisexual; stigmas capitate 3. *Fallopia*
 - 14b. Stems erect; flowers unisexual, plant dioecious; stigmas fimbriate 4. *Reynoutria*

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- 13b. Stems erect; tepals not enlarged in fruit, rarely enlarged, becoming fleshy.
 15a. Achenes trigonous, much longer than or rarely equaling persistent perianth 6. *Fagopyrum*
 15b. Achenes trigonous or biconvex, shorter than or rarely longer than persistent
 perianth 2. *Polygonum*

1. KOENIGIA Linnaeus, Syst. Nat., ed. 12, 2: 71, 104. 1767; Mant. Pl. 1: 3, 35. 1767.

冰岛蓼属 bing dao liao shu

Li Anjen (李安仁 Li An-ren); Alisa E. Grabovskaya-Borodina

Herbs annual. Stems slender, branched. Leaves petiolate, subopposite; ocrea membranous. Inflorescence panicle. Flowers bisexual. Perianth 3(–5)-parted. Stamens 3, alternate with tepals and 3 glandlike staminoids. Ovary ovoid, compressed; styles 2, persistent, very short; stigmas capitate. Achenes narrowly ovoid, biconvex.

About three species: Arctic regions, Asia, N Europe, North America; one species in China.

1. *Koenigia islandica* Linnaeus, Syst. Nat., ed. 12, 2: 104. 1767; Mant. Pl. 1: 35. 1767.

冰岛蓼 bing dao liao

Polygonum islandicum (Linnaeus) J. D. Hooker.

Herbs annual, dwarf. Stems erect, usually tufted, reddish, 3–8 cm tall, slender, glabrous; branches spreading. Leaves alternate, rarely opposite above; petiole 1–3 mm, glabrous; leaf blade broadly elliptic, obovate, or nearly orbicular, 3–5 × 2–4 mm, both surfaces glabrous, sparsely punctulate, base broadly

cuneate, margin entire, apex obtuse; ocrea lax, brown, 1.5–2 mm, thinly membranous. Flowers axillary, fascicled. Perianth greenish, 3-parted; tepals broadly elliptic, ca. 1 mm. Stamens 3, shorter than perianth. Styles 2 or 3, very short; stigmas 2(or 3), capitate. Achenes brown, dull, 1.2–1.5 mm, granular. Fl. Jul–Aug, fr. Aug–Sep. $2n = 28$.

Alpine meadows, wet grasslands, valleys; 2000–4900 m. Gansu, Qinghai, Shanxi (Wutai Shan), Sichuan, Xinjiang, Xizang, Yunnan [Bhutan, NW India, Kashmir, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Sikkim; Arctic regions, N Europe, North America].

2. POLYGONUM Linnaeus, Sp. Pl. 1: 359. 1753, nom. cons.

蓼属 liao shu

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Herbs, rarely subshrubs, or small shrubs, rarely dioecious. Stems erect, prostrate, or ascending, usually with conspicuously swollen nodes, glabrous or pubescent, rarely prickly. Leaves simple, alternate, subsessile; leaf blade variously shaped, margin entire; ocrea tubular, membranous, margin entire or lacerate, apex truncate or oblique. Inflorescence terminal or axillary, racemose, spicate, capitate, or paniculate, sometimes flowers fascicled or solitary in axils of leaves. Pedicel often articulate. Flowers bisexual, rarely unisexual; bracts and bracteoles membranous. Perianth persistent, 5(or 4)-parted. Stamens 7 or 8, rarely 4. Styles 2 or 3, deciduous, mostly elongate. Achenes trigonous or biconvex, rarely biconcave.

About 230 species: worldwide, mostly in N temperate regions; 113 species (23 endemic) in China.

Treatments of *Polygonum* and related genera (subfamily Polygonoideae), e.g., those by Haraldson (Symb. Bot. Upsal. 22(2): 1–95. 1978) and Ronse Decraene & Akeroyd (Bot. J. Linn. Soc. 98: 321–371. 1988), have segregated species of *Polygonum* in the broad sense adopted here into two separate tribes, Polygoneae and Persicariae. As represented in China, the former is restricted to *P.* sect. *Polygonum*, i.e., species 1–16 below (*Polygonum* s.str.), along with various other genera, e.g., *Fagopyrum* (incl. *Pteroxygonum*) by Haraldson, and *Fallopia* (incl. *Reynoutria*) by Ronse Decraene & Akeroyd. The remainder of *Polygonum* in the broad sense (species 17–113 below) is generally assigned to *Persicaria* (or a varying number of segregate genera, such as *Aconogonon* and *Bistorta*) which, with *Antenoron* and *Koenigia* (and *Fagopyrum*, incl. *Pteroxygonum* by Ronse Decraene & Akeroyd), comprises the tribe Persicariae. Of the six sections of *Polygonum* recognized here, the first, *P.* sect. *Polygonum*, represents *Polygonum* in the narrow sense, and the remaining five either fall within a broadly defined genus, *Persicaria*, or are variously recognized as distinct genera, e.g., *Aconogonon* and *Bistorta* by Haraldson. As circumscribed in earlier work (e.g., Meisner in Candolle, Prodr. 14(1), 1856), *P.* sect. *Cephalophilon* included a number of species now treated as belonging to the genus *Koenigia*; Ronse Decraene & Akeroyd (op. cit.) treated the residue of *P.* sect. *Cephalophilon* and *P.* sect. *Echinocaulon* as components of an expanded *Persicaria* sect. *Persicaria*.

- 1a. Flowers in axillary fascicles, if in spikes then with leaves; petioles articulate at base; ocrea membranous, 2-cleft or lacerate; filaments dilated at base (1. *P.* sect. *Polygonum*).
 2a. Subshrub or small shrub.
 3a. Subshrub.
 4a. Stems prostrate or ascending; leaves linear, green, apex spinose 1. *P. paronychioides*
 4b. Stems erect; leaves elliptic or oblong, gray-green, apex not spinose 3. *P. schischkinii*
 3b. Small shrub.

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- 5a. Leaves orbicular or broadly elliptic, 1–1.3 cm wide; achenes densely granular puncticulate, slightly shiny 2. *P. intramongolicum*
- 5b. Leaves oblong or elliptic, 3–4 mm wide; achenes smooth, shiny 4. *P. popovii*
- 2b. Annual or perennial herb.
- 6a. Perennial herb; roots ligneous; petioles 2–5 mm 5. *P. cognatum*
- 6b. Annual herb; roots not ligneous; petioles very short or nearly absent.
- 7a. Leaves linear or subulate.
- 8a. Stems slender, glabrous; perianth membranous, cleft to 3/4; achenes biconvex, smooth, shiny 13. *P. molliforme*
- 8b. Stems not slender, scabrous or papillate; perianth herbaceous, cleft to 1/3 or 1/2; achenes trigonous, punctate, slightly shiny.
- 9a. Perianth cleft to 1/3; achenes densely punctate; flowers 1 or 2 10. *P. polycnemoides*
- 9b. Perianth cleft to 1/2; achenes slightly punctate; flower solitary 15. *P. acerosum*
- 7b. Leaves lanceolate, oblanceolate, elliptic, or oblong.
- 10a. Stems erect; inflorescence spicate, terminal.
- 11a. Leaves caducous; achenes smooth, shiny 12. *P. argyrocoleon*
- 11b. Leaves not caducous; achenes densely punctate, slightly shiny 11. *P. patulum*
- 10b. Stems prostrate, procumbent, ascending, or erect; flowers 1–7, in axillary fascicles.
- 12a. Pedicels articulate at middle; achenes smooth, shiny 9. *P. plebeium*
- 12b. Pedicels articulate at apex; achenes densely punctate or granular-striate, opaque or slightly shiny.
- 13a. Achenes densely granular-striate, opaque.
- 14a. Perianth cleft to 2/3–3/4; achenes included or slightly exceeding persistent perianth 6. *P. aviculare*
- 14b. Perianth cleft to 1/2; achenes included in persistent perianth 8. *P. arenastrum*
- 13b. Achenes densely minutely punctate, slightly shiny.
- 15a. Plant gray-green; ocrea silvery, with inconspicuous veins; achenes included in persistent perianth 14. *P. acetosum*
- 15b. Plant green; ocrea: lower part brownish, upper part white, membranous, with conspicuous veins; achenes exceeding persistent perianth.
- 16a. Ocrea 5–9-veined; leaf blade adaxially with conspicuous midvein and lateral veins 16. *P. rigidum*
- 16b. Ocrea 3- or 4-veined; leaf blade adaxially with conspicuous midvein and inconspicuous lateral veins 7. *P. humifusum*
- 1b. Inflorescence spicate, capitate, or paniculate; ocrea neither 2-cleft nor lacerate; petiole not articulate; filaments not dilated at base.
- 17a. Stems and petioles with retrorse prickles (6. *P. sect. Echinocaulon*).
- 18a. Ocrea expanding into green herbaceous wings at apex.
- 19a. Leaf blade triangular-peltate; perianth accrescent and fleshy in fruit 100. *P. perfoliatum*
- 19b. Leaf blade not triangular-peltate, perianth not accrescent nor fleshy in fruit.
- 20a. Leaves triangular or narrowly triangular.
- 21a. Apex of ocrea with green reniform-orbicular wings; peduncles shortly glandular hairy 104. *P. senticosum*
- 21b. Apex of ocrea with green lanceolate-auriculate wings; peduncles not glandular hairy 105. *P. darrisii*
- 20b. Leaves hastate or narrowly hastate.
- 22a. Leaves narrowly hastate, both surfaces densely stellate hairy; wings of ocrea with dentate margin 101. *P. maackianum*
- 22b. Leaves hastate, both surfaces sparsely bristly, sometimes rarely stellate hairy; wings of ocrea with entire or crenate margin.
- 23a. Perianth 5-parted; achenes trigonous 102. *P. thunbergii*
- 23b. Perianth 4-parted; achenes biconvex 103. *P. biconvexum*
- 18b. Ocrea not expanding into wings at apex.
- 24a. Apex of ocrea oblique, shortly ciliate or not ciliate.
- 25a. Apex of ocrea shortly ciliate; peduncles with glandular hairs; bracts funnel-shaped.
- 26a. Leaves lanceolate or narrowly oblong, base sagittate; apex acute; perianth 4-parted 106. *P. praetermissum*
- 26b. Leaves ovate-elliptic, base hastate or cordate, apex acuminate; perianth 5-parted 107. *P. dissitiflorum*
- 25b. Apex of ocrea not ciliate; peduncles with or without glandular hairs; bracts elliptic.
- 27a. Leaves basally sagittate; styles 3, connate to below middle; achenes ovoid, trigonous 108. *P. sagittatum*
- 27b. Leaves basally cuneate, truncate, or subhastate; styles 2, free, achenes nearly orbicular, biconvex 109. *P. dichotomum*
- 24b. Apex of ocrea truncate, long ciliate.
- 28a. Leaves basally cuneate; spikes interrupted at base; bracts funnel-shaped; peduncles densely glandular hairy 110. *P. bungeanum*
- 28b. Leaves basally not cuneate; spikes not interrupted; bracts elliptic or ovate; peduncles densely

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- pubescent and sparsely glandular hairy.
- 29a. Leaves ovate or oblong-ovate; inflorescence spicate, several spikes aggregated, becoming panicle-like 111. *P. muricatum*
- 29b. Leaves lanceolate or elliptic; inflorescence spicate, not aggregated nor panicle-like.
- 30a. Leaves basally weakly cordate, truncate, or subsagittate; base of ocrea with dense retrorse prickles; pedicels 1–2 mm, glabrous 112. *P. strigosum*
- 30b. Leaves basally sagittate or subhastate; base of ocrea without retrorse prickles; pedicels 4–6 mm, with glandular hairs 113. *P. hastatosagittatum*
- 17b. Stems and petioles without retrorse prickles.
- 31a. Inflorescence spicate.
- 32a. Stems branched, without basal leaves, sometimes with slender horizontal rhizomes; apex of ocrea truncate, usually ciliate; annual or perennial herb (2. *P.* sect. *Persicaria*).
- 33a. Perennial herb.
- 34a. Amphibious plant; leaves of aquatic plants oblong, basally subcordate; those of terrestrial plants lanceolate, basally rounded 17. *P. amphibium*
- 34b. Terrestrial plant; leaves lanceolate, basally cuneate, rarely subrounded.
- 35a. Leaf blade sericeous on both surfaces; cilia of ocrea 4–6 mm.
- 36a. Leaves narrowly cuneate at base; achenes orbicular, biconvex; styles 2, free 18. *P. pulchrum*
- 36b. Leaves cuneate at base; achenes ellipsoid, trigonous; styles 3, connate below middle 19. *P. huananense*
- 35b. Leaf blade appressed hispidulous or pubescent on both surfaces; cilia of ocrea 1–2 cm.
- 37a. Cilia of ocrea 1–1.2 cm; stems glabrous, sometimes sparsely hispidulous; leaf blade sparsely appressed hispidulous on both surfaces; achenes 2.5–3 mm 20. *P. japonicum*
- 37b. Cilia of ocrea 1.5–2 cm; stems pubescent; leaf blade pubescent on both surfaces; achenes 1.5–2 mm 21. *P. barbatum*
- 33b. Annual herb.
- 38a. Plant glabrous throughout 22. *P. glabrum*
- 38b. Plant not glabrous throughout.
- 39a. Peduncles glandular hairy or glandular.
- 40a. Peduncles glandular hairy.
- 41a. Peduncles, stems, and branches densely glandular hairy and hirsute; achenes trigonous 23. *P. viscosum*
- 41b. Peduncles sparsely glandular hairy or glabrous; stems and branches sparsely pubescent or glabrescent; achenes biconvex, rarely trigonous 24. *P. persicaria*
- 40b. Peduncles glandular.
- 42a. Peduncles sparsely viscid-glandular; perianth 5(or 4)-parted; achenes ovoid, trigonous 25. *P. viscoferum*
- 42b. Peduncles glandular; perianth 4(or 5)-parted; achenes broadly ovoid, biconcave 26. *P. lapathifolium*
- 39b. Peduncles not glandular hairy and glandular.
- 43a. Apex of ocrea usually with green leaflike wing; leaf blade 5–12 cm wide 27. *P. orientale*
- 43b. Apex of ocrea without wing; leaf blade 0.3–4 cm wide.
- 44a. Leaves dark blue-green when dry.
- 45a. Leaves ovate or broadly elliptic, apex obtuse or slightly acute; achenes broadly ovoid, trigonous 28. *P. tinctorium*
- 45b. Leaves elliptic-ovate or broadly lanceolate, apex acute; achenes ovoid, biconvex 29. *P. assamicum*
- 44b. Leaves not dark blue-green when dry.
- 46a. Perianth punctate.
- 47a. Leaves ovate, 1–2.5 cm; tepals 4–5 mm 30. *P. paralimicola*
- 47b. Leaves lanceolate, 4–10 cm; tepals 2–3 mm.
- 48a. Stems glabrous; perianth white or pink above; leaves with peppery taste 31. *P. hydro Piper*
- 48b. Stems sparsely hispidulous; perianth red above; leaves without peppery taste 32. *P. pubescens*
- 46b. Perianth not punctate.
- 49a. Spikes dense, not interrupted.
- 50a. Leaves narrowly lanceolate, 4–8 mm wide; achenes biconvex, 1–1.5 mm 37. *P. kawagoeanum*
- 50b. Leaves elliptic-lanceolate or ovate-lanceolate, 10–25 mm wide; achenes trigonous, 2.5–3 mm.
- 51a. Stems erect; leaves 6–10 cm, base cuneate; pedicels 7–8 mm 38. *P. jucundum*
- 51b. Stems stoloniferous, rooting from nodes; leaves 2–4 cm, base broadly cuneate; pedicels 5–6 mm 39. *P. limicola*
- 49b. Spikes lax, slender, interrupted.
- 52a. Cilia of ocrea 6–8 mm, achenes trigonous.
- 53a. Leaves ovate-lanceolate or ovate, apex caudate-acuminate, base broadly cuneate 33. *P. posumbu*

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- 53b. Leaves lanceolate or broadly lanceolate, apex acute or acuminate, base cuneate or rounded 34. *P. longisetum*
- 52b. Cilia of ocrea 0.5–5 mm; achenes biconvex, rarely trigonous.
- 54a. Spikes to 10 cm, pendulous, interrupted; cilia of ocrea 3–5 mm 35. *P. taquetii*
- 54b. Spikes 3–5 cm, erect, interrupted below; cilia of ocrea 0.5–3 mm 36. *P. foliosum*
- 32b. Stems simple, rarely branched, with basal leaves; rhizomes ligneous, large, usually curved; apex of ocrea oblique, not ciliate; perennial herb, subshrub, or small shrub (3. *P.* sect. *Bistorta*).
- 55a. Subshrub or small shrub.
- 56a. Subshrub; leaves oblanceolate or lanceolate; spikes dense, 1–1.5 cm in diam.; tepals obovate 59. *P. affine*
- 56b. Small shrub; leaves elliptic or lanceolate; spikes lax, 0.5–0.8 cm in diam.; tepals elliptic.
- 57a. Leaves elliptic, 1–2 cm; tepals narrowly elliptic; stamens exserted 60. *P. vacciniifolium*
- 57b. Leaves lanceolate, 3–15 cm; tepals broadly elliptic; stamens included 61. *P. emodi*
- 55b. Perennial herb.
- 58a. Inflorescence lower part with bulbils.
- 59a. Basal leaves ovate or narrowly ovate; cauline leaves: upper ones sessile, clasping 40. *P. suffultoides*
- 59b. Basal leaves oblong, ovate-lanceolate or linear; cauline leaves not clasping 41. *P. viviparum*
- 58b. Inflorescence without bulbils.
- 60a. Basal leaves basally decurrent along petiole, forming wings or slightly decurrent.
- 61a. Basal leaves narrowly ovate or orbicular-ovate, 3–7 cm wide.
- 62a. Basal leaves narrowly ovate, apex acute; cauline leaves clasping 42. *P. pacificum*
- 62b. Basal leaves orbicular-ovate, apex obtuse; cauline leaves not clasping 43. *P. honanense*
- 61b. Basal leaves neither narrowly ovate nor orbicular-ovate, 1–3(–5) cm wide.
- 63a. Rhizomes horizontal, not curved; ocrea brown throughout, cleft to base 44. *P. sinomontanum*
- 63b. Rhizomes curved; ocrea: lower part green, upper part brown, cleft to middle.
- 64a. Cauline leaves: upper ones clasping.
- 65a. Leaves glabrous on both surfaces; basal leaves basally cuneate; cauline leaves auriculate; spikes 4–8 cm, ca. 1 cm in diam. 45. *P. manshuriense*
- 65b. Leaves densely gray-white pubescent abaxially; basal leaves basally rounded or subcordate; cauline leaves not auriculate; spikes 2–3 cm, 1–1.5 cm in diam. 46. *P. ochotense*
- 64b. Cauline leaves: upper ones not clasping.
- 66a. Leaves subleathery; perianth purple-red, tepals 4–5 mm; styles 3, connate to below 47. *P. milletii*
- 66b. Leaves papery; perianth pinkish or white, tepals 2–3.5 mm; styles 3, free.
- 67a. Spikes 2–3 cm, 1.5–2 in diam.; tepals 3–3.5 mm 48. *P. ellipticum*
- 67b. Spikes 4–8 cm, 0.8–1.2 in diam.; tepals 2–3 mm.
- 68a. Basal leaves narrowly oblong or oblong-lanceolate, 1–2 cm wide 49. *P. alopecuroides*
- 68b. Basal leaves broadly lanceolate or narrowly ovate, 2–5 cm wide 50. *P. bistorta*
- 60b. Basal leaves basally not decurrent.
- 69a. Stems simple or branched; basal leaves ovate.
- 70a. Rhizomes usually torulose; stems slender; leaf margin not revolute, apex acuminate or acute 51. *P. suffultum*
- 70b. Rhizomes horizontal, not torulose; stems robust; leaf margin slightly revolute, apex long acuminate 52. *P. amplexicaule*
- 69b. Stems simple; basal leaves not ovate.
- 71a. Rhizomes horizontal; spikes lax, nutant; pedicels 10–12 mm, articulate at middle 53. *P. griffithii*
- 71b. Rhizomes curved; spikes erect; pedicels 3–6 mm, articulate at apex.
- 72a. Basal leaves oblong or lanceolate; perianth pinkish or white, tepals 2–3 mm.
- 73a. Spikes 1.5–2.5 cm, 1–1.5 cm in diam.; basal leaves oblong, lanceolate, or linear-lanceolate; anthers black-purple 54. *P. macrophyllum*
- 73b. Spikes 4–6 cm, 0.8–1.2 cm in diam.; basal leaves narrowly oblong or lanceolate; anthers red-brown 55. *P. paleaceum*
- 72b. Basal leaves elliptic, ovate-elliptic, or ovate-lanceolate; perianth red or purple-red, tepals 3–5 mm.
- 74a. Leaf blade yellow-brown tomentose abaxially 56. *P. subscaposum*
- 74b. Leaf blade glabrous or sparsely pubescent.
- 75a. Basal leaves elliptic, veins purple-red; styles 3, connate to below middle 57. *P. purpureonervosum*
- 75b. Basal leaves ovate-elliptic or ovate-lanceolate, veins green; styles 3, free 58. *P. coriaceum*
- 31b. Inflorescence capitate or paniculate.
- 76a. Inflorescence capitate (4. *P.* sect. *Cephalophilon*).
- 77a. Perennial herb.

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- 78a. Leaves palmate 62. *P. palmatum*
78b. Leaves not palmate.
79a. Ocrea glabrous, 1.5–3 cm, apex oblique; perianth accrescent in fruit, fleshy 63. *P. chinense*
79b. Ocrea glandular hairy or pilose, less than 1.2 cm, apex truncate; perianth not accrescent in fruit, not fleshy.
80a. Stems creeping or prostrate.
81a. Stems ligneous at base, tufted; leaves ovate or elliptic; petioles 2–3 mm; ocrea glandular hairy 64. *P. capitatum*
81b. Stems not ligneous at base, not tufted; leaves cordate or ovate-cordate; petioles 1–2 cm; ocrea pilose 65. *P. strindbergii*
80b. Stems erect or decumbent.
82a. Leaves pinnatifid 66. *P. runcinatum*
82b. Leaves entire.
83a. Leaves not decurrent at base; petioles not winged 69. *P. wallichii*
83b. Leaves decurrent at base; petioles winged.
84a. Leaves ovate-oblong, apex long acuminate 67. *P. umbrosum*
84b. Leaves broadly ovate or triangular-ovate, apex acuminate 68. *P. microcephalum*
77b. Annual herb.
85a. Stems prostrate, tufted; leaves narrowly lanceolate or lanceolate 70. *P. criopolitanum*
85b. Stems erect or decumbent; leaves ovate or lanceolate-ovate.
86a. Leaves sparsely long glandular hairy on both surfaces 71. *P. humile*
86b. Leaves pilose, strigose, or glabrous on both surfaces.
87a. Peduncles with glandular hairs; petioles winged.
88a. Leaves sparsely pellucid yellow glandular punctate; petioles winged; bracts glabrous 72. *P. nepalense*
88b. Leaves not glandular punctate; petioles narrowly winged; bracts sparsely glandular hairy 73. *P. glaciale*
87b. Peduncles without glandular hairs; petioles not winged.
89a. Perianth 4-parted.
90a. Leaves obovate or elliptic, 3–6 mm, both surfaces glabrous or sparsely pilose abaxially 77. *P. fertile*
90b. Leaves ovate, 1–1.5 cm, both surfaces pilose 78. *P. sparsipilosum*
89b. Perianth 5-parted.
91a. Leaves ovate, 4–8 mm, glabrous, base cordate; petioles short or nearly absent 74. *P. delicatulum*
91b. Leaves ovate or lanceolate-ovate, 1–3 cm, strigose or pilose, base cuneate or subtruncate; petioles 3–10 mm.
92a. Leaves strigose on both surfaces; stamens 3 or 4 75. *P. filicaule*
92b. Leaves pilose or glabrescent on both surfaces; stamens 8 76. *P. cyanandrum*
76b. Inflorescence paniculate (5. *P.* sect. *Aconogonon*).
93a. Subshrub.
94a. Perianth accrescent and fleshy in fruit, tepals elliptic; leaves elliptic or elliptic-lanceolate, base cuneate 79. *P. molle*
94b. Perianth not accrescent nor fleshy in fruit, tepals obovate; leaves not elliptic nor elliptic-lanceolate, base rounded, cordate, or truncate, but cuneate in *P. tibeticum*.
95a. Branches forked; leaves subsessile, ovate, base rounded or subcordate 80. *P. tortuosum*
95b. Branches not forked; leaves petiolate, lanceolate, elliptic, or oblong, base hastate-cordate, subtruncate, or cuneate.
96a. Panicle spreading; leaves broadly lanceolate or oblong-lanceolate, or narrowly lanceolate or narrowly oblong, 6–17 cm, base hastate-cordate or subtruncate 81. *P. polystachyum*
96b. Panicle not spreading; leaves elliptic or obovate-oblong, 3–5 cm, base cuneate 82. *P. tibeticum*
93b. Perennial herb.
97a. Stems creeping, forming tufts; leaves orbicular or reniform.
98a. Leaves 0.3–0.5 cm in diam., base rounded; tepals elliptic; achenes broadly ovoid, biconvex 83. *P. nummulariifolium*
98b. Leaves 1–4 cm in diam.; base cordate; tepals obovate; achenes ellipsoid, trigonous 84. *P. forrestii*
97b. Stems erect; leaves not orbicular or reniform.
99a. Stems simple, with basal leaves; flowers unisexual and plants dioecious 85. *P. hookeri*
99b. Stems branched, without basal leaves; flowers bisexual.
100a. Leaves ovate.
101a. Perianth red; pedicels articulate at middle 86. *P. songaricum*
101b. Perianth white; pedicels articulate at apex or not articulate.
102a. Pedicels 3–4 mm, not articulate or ?articulate; achenes equaling persistent perianth 87. *P. coriarium*

POLYGONACEAE

- 102b. Pedicels 1–2 mm, articulate at apex; achenes distinctly exceeding persistent perianth.
 103a. Leaves basally cuneate, petioles short or nearly absent; achenes usually erect 88. *P. platyphyllum*
 103b. Leaves basally rounded, petioles 2–4 cm; achenes pendulous 89. *P. limosum*
 100b. Leaves elliptic or lanceolate to linear, or oblong, but narrowly ovate to broadly ovate in *P. campanulatum*.
 104a. Leaves basally usually hastate 90. *P. sibiricum*
 104b. Leaves basally not hastate.
 105a. Tepals obovate, 3–4 mm wide.
 106a. Leaf blade usually constricted below, base truncate or cuneate; bracts 1–1.5 cm; pedicels pubescent 96. *P. pinetorum*
 106b. Leaf blade not constricted below, base broadly cuneate; bracts 2–3 mm; pedicels glabrous.
 107a. Pedicels articulate at apex; styles ca. 2 mm 97. *P. campanulatum*
 107b. Pedicels not articulate at apex; styles ca. 0.5 mm.
 108a. Leaf blade abaxially densely grayish tomentose 98. *P. lichiangense*
 108b. Leaf blade abaxially pilose 99. *P. cathayanum*
 105b. Tepals elliptic, 2–3 mm.
 109a. Achenes distinctly exceeding persistent perianth.
 110a. Stems branched from above middle, usually sparsely hirsute; branches not divaricate; leaves ovate-lanceolate or lanceolate, base broadly cuneate 94. *P. alpinum*
 110b. Stems branched from base, glabrous; branches divaricate; leaves lanceolate or oblong, base cuneate or narrowly cuneate 95. *P. divaricatum*
 109b. Achenes included in persistent perianth.
 111a. Leaves linear, 2–4 mm wide, margin conspicuously revolute 91. *P. angustifolium*
 111b. Leaves lanceolate 5–15 mm wide, margin not revolute.
 112a. Leaves lanceolate or linear lanceolate, 5–8 mm, base narrowly cuneate 92. *P. ocreatum*
 112b. Leaves lanceolate or broadly lanceolate, 8–15 mm wide, base broadly cuneate 93. *P. ajanense*

1. Polygonum sect. Polygonum

蒿蓄组 bian xu zu

Herbs or low shrubs. Petioles articulate at base; ocrea often lacinate. Flowers axillary, solitary or in small clusters, sometimes forming lax leafy spikes. Perianth (4- or)5-parted, not enlarged in fruit. Stamens 5–8, reduced in number in outer whorl; filaments, especially the inner, strongly dilated at base.

Between 50 and 80 species: worldwide; 16 species (one endemic) in China.

1. Polygonum paronychioides C. A. Meyer ex Hohenacker, Bull. Soc. Imp. Naturalistes Moscou 11: 356. 1838.

线叶蒿蓄 xian ye bian xu

Polygonum englerianum H. Gross; *P. himalayense* H. Gross.

Subshrubs prostrate or ascending, 5–15 cm tall, papillate. Petiole short, articulate; leaf blade green, linear, 8–15 × 0.7–1.5 mm, both surfaces scabrous, midvein conspicuous, base narrowly cuneate, margin revolute, apex spinose; ocrea broadly lanceolate, 5–8 mm, thinly membranous, hyaline, margin lacerate, apex acute. Flower solitary, axillary; bracts lanceolate, longer than perianth. Pedicel very short. Perianth pinkish, 5-cleft to 1/2; tepals unequal, outer 2 narrowly lanceolate, ca. 2 mm, apex acuminate, inner 3 elliptic, short, apex obtuse. Stamens 8; filaments dilated at base. Achenes included in persistent perianth, shiny, narrowly ellipsoid, trigonous, ca. 2 mm, smooth. Fl. Jun–Aug, fr. Jul–Sep.

Gravelly mountain slopes; ca. 3500 m. W Xizang (Zanda) [Afghanistan, Kashmir, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

2. Polygonum intramongolicum Borodina, Rast. Tsentral. Azii 9: 102. 1989.

圆叶蒿蓄 yuan ye bian xu

Atraphaxis tortuosa Losinskaja, Izv. Glavn. Bot. Sada SSSR 26: 6. 1927; *Polygonum tortuosum* (Losinskaja) Lovelius (1975), not D. Don (1825).

Shrubs erect, 40–50 cm tall, much branched. Bark gray-brown, exfoliating; branches curved; branchlets densely papillate. Petiole short, base articulate; leaf blade gray-green abaxially, green adaxially, orbicular or broadly elliptic, 1–1.5 × 1–1.3 cm, subleathery, abaxially with prominent midvein and conspicuous lateral veins, adaxially with conspicuous midvein, base broadly cuneate or rounded, margin crisped, apex obtuse; ocrea brown, oblique, membranous, apex acute. Inflorescence terminal, racemose, lax, 3–5 cm; bracts brown, funnel-shaped, membranous, each 2- or 3-flowered. Pedicel 3–4 mm, articulate at middle. Perianth pinkish or white, 5-parted; tepals obovate, ca. 4 mm, veined, apex obtuse. Stamens 8, included; filaments dilated at base. Styles 3, connate to below middle; stigmas 3, capitate. Achenes included in persistent perianth, black-brown, slightly shiny, broadly ovoid, trigonous, 3.5–4 mm, densely

granular puncticulate. Fl. Jun–Jul, fr. Jul–Aug.

Dry mountain slopes, hilly regions; 1000–2300 m. Nei Mongol [Mongolia].

Fu and Zhao (in Fl. Intramongol. 2: 57. 1978) previously published this *nomen novum*; however, it was invalid under Art. 33.3 of the St. Louis Code because they did not give a full and direct reference to the place of publication of the replaced synonym.

3. *Polygonum schischkinii* Ivanova ex Borodina, Rast. Tsentral. Azii 9: 104. 1989.

新疆蒺藜 xin jiang bian xu

Polygonum glareosum Schischkin, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 7: 121. 1938, not Philippi (1895).

Subshrubs erect, 20–30 cm tall, branched from base. Branches curved, angulate, glabrous. Petiole 1–2 mm, articulate at base; leaf blade gray-green, elliptic or oblong, $\times 0.8$ –1.5 cm \times 3–6 mm, leathery, both surfaces glabrous, abaxially with prominent midvein, base cuneate, margin revolute, apex acute or obtuse; ocrea: lower part brown, herbaceous, upper part white, membranous, 2-lobed. Inflorescence racemose, 4–7 cm; bracts green, each 1- or 2-flowered. Pedicel ca. 1.5 mm. Perianth green, margin pinkish or white, 5-parted; tepals narrowly ovate, 2–2.5 mm. Stamens 8; filaments unequal. Styles 3; stigmas capitate. Achenes included in persistent perianth, black-brown, shiny, narrowly ovoid, trigonous, 3–3.5 mm. Fl. Jun–Jul, fr. Jul–Aug.

Gravelly areas, saline places; 600–1500 m. Xinjiang [Mongolia].

4. *Polygonum popovii* Borodina, Rast. Tsentral. Azii 9: 104. 1989.

库车蒺藜 ku che bian xu

Shrubs erect, 20–50 cm tall, branched. Bark brownish, longitudinally exfoliating; branchlets papillate. Leaves alternate, usually fasciculate; petiole 1–2 mm, papillate, articulate; leaf blade green, oblong or elliptic, 0.7–1.5 cm \times 3–4 mm, leathery, abaxially minutely papillate along midvein, adaxially glabrous, with conspicuous midvein on both surfaces, base cuneate, margin revolute, apex obtuse; ocrea: lower part brownish, herbaceous, upper part white, membranous, lacerate. Inflorescence terminal, racemose; bracts 1(or 2)-flowered. Pedicel 1.5–2 mm, apex articulate. Perianth green, margin pinkish, 5-parted, membranous; tepals elliptic, 2–2.5 mm. Stamens 8; filaments dilated at base. Styles 3; stigmas capitate. Achenes black-brown, shiny, ovoid, trigonous, 2–3 mm, smooth. Fl. Jun–Jul, fr. Jul–Aug.

• Dry mountain slopes; 1000–2600 m. Xinjiang (Tian Shan).

5. *Polygonum cognatum* Meisner, Monogr. Polyg. 91. 1826.

岩蒺藜 yan bian xu

Polygonum myriophyllum H. Gross; *P. rupestre* Karelin & Kirilov.

Herbs perennial. Root ligneous, stout, ca. 1.5 cm in diam. Stems prostrate, 8–15 cm, branched from base, angulate, minutely papillate along angles. Petiole 2–5 mm, base articulate; leaf blade elliptic, 1–2 cm \times 5–13 mm, both surfaces glabrous, abaxially with prominent midvein, adaxially with conspicuous

midvein; ocrea silvery, thinly membranous, hyaline, veined, apex lacerate. Flowers 1–5, in axillary fascicles; bracts ca. as long as lower leaves, membranous, apex acuminate. Pedicel 1–3 mm. Perianth green, margin pinkish or white, 5-cleft to 1/2; tepals ovate, 1.5–2 mm, becoming hard in fruit. Stamens 8, included; filaments dilated at base. Styles 3; stigmas capitate. Achenes included in persistent perianth, black, shiny, ovoid, trigonous, 2.5–3 mm. Fl. Jun–Aug, fr. Jul–Sep.

Gravelly mountain slopes, dry riverbeds; 1400–4600 m. Nei Mongol, Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia (Siberia), Tajikistan].

6. *Polygonum aviculare* Linnaeus, Sp. Pl. 1: 362. 1753.

蒺藜 bian xu

Herbs annual. Stems prostrate, ascending, or erect, 10–40 cm tall, much branched from base. Petiole short or nearly absent, articulate at base; leaf blade lanceolate or narrowly elliptic, 1–4 cm \times 3–12 mm, both surfaces glabrous, midvein and lateral veins conspicuous, base cuneate, margin entire, apex acute or nearly obtuse; ocrea: lower part brown, upper part white or throughout brown, membranous, veined, apex lacerate. Flowers 1–5; axillary; bracts thinly membranous. Pedicel slender, articulate at apex. Perianth green, margin white or pinkish, 5-cleft to 2/3–3/4; tepals elliptic, 2–2.5 mm. Stamens 8; filaments dilated at base. Styles 3, free, short; stigmas capitate. Achenes included or slightly exceeding persistent perianth, black-brown, opaque, ovoid, trigonous, 2.5–3 mm, minutely granular striate. Fl. May–Jul, fr. Jul–Aug. $2n = 40, 60$.

Near fields, roadsides, waste places; sea level to 4200 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [widely distributed in N temperate zone; widely naturalized in S temperate zone].

- 1a. Ocrea: lower part brown, upper part white 6a. var. *aviculare*
1b. Ocrea brown throughout 6b. var. *fusco-ochreatum*

6a. *Polygonum aviculare* var. *aviculare*

蒺藜(原变种) bian xu (yuan bian zhong)

Polygonum aviculare var. *heterophyllum* Munshi & Javeid; *P. aviculare* var. *vegetum* Ledebour; *P. heterophyllum* Lindman, nom. illeg. superfl.; *P. monspeliense* Thiebaut ex Persoon.

Ocrea: lower part brown, upper part white.

Near fields, roadsides, waste places; sea level to 4200 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [widely distributed in N temperate zone; widely naturalized in S temperate zone].

This variety is used medicinally.

6b. *Polygonum aviculare* var. *fusco-ochreatum* (Komarov) A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 9. 1998.

褐鞘蒺藜 he qiao bian xu

Polygonum fusco-ochreatum Komarov, Fl. URSS 5: 719. 1936; *P. argenteum* Skvortsov; *P. fusco-ochreatum* f. *stans*

(Kitagawa) C. F. Fang; *P. stans* Kitagawa.

Ocrea brown throughout.

Near fields, roadsides; sea level to 900 m. Heilongjiang, Jilin, Liaoning [Russia (Far East)].

7. *Polygonum humifusum* Merk ex C. Koch, *Linnaea* 22: 205. 1849.

普通蒺藜 pu tong bian xu

Polygonum humifusum f. *yamatutae* (Kitagawa) C. F. Fang; *P. mandshuricum* Skvortsov; *P. yamatutae* Kitagawa.

Herbs annual. Stems prostrate or ascending, 20–30 cm tall. Petiole very short, articulate at base; leaf blade elliptic or oblanceolate, 1–1.5 cm × 3–5 mm, abaxially with slightly prominent midvein and conspicuous lateral veins, adaxially with conspicuous midvein and inconspicuous lateral veins, base narrowly cuneate, apex slightly obtuse or acute; ocrea: lower part brownish, upper part white, membranous, 3- or 4-veined. Flowers 2–5, in axillary fascicles. Perianth green, margin white or pinkish, 5-parted to 2/3; tepals oblong, 1.5–2 mm. Achenes exceeding persistent perianth, dark brown, slightly shiny, narrowly ovoid, trigonous, 2–2.5 mm, densely minutely punctate, apex acute. Fl. Jun–Jul, fr. Aug–Sep.

Near fields, roadsides, in sand by riversides; sea level to 400 m. Heilongjiang, Jilin, Liaoning [Mongolia, Russia; North America].

8. *Polygonum arenastrum* Boreau, *Fl. Centre France*, ed. 3, 2: 559. 1857.

伏地蒺藜 fu di bian xu

Polygonum planum Skvortsov; *P. polyneuron* Franchet & Savatier; *P. prostratum* Skvortsov (1943), not R. Brown (1810), nor Roxburgh ex D. Don (1825).

Herbs annual. Stems procumbent or ascending, 15–30 cm tall, branched from base. Petiole short, articulate at base; leaf blade elliptic or oblanceolate, 0.5–2 cm × 2–5 mm, both surfaces with conspicuous veins, base narrowly cuneate, margin entire, apex usually obtuse; ocrea white, 2–3 mm, membranous, 5–7-veined, lacerate. Flowers 3–5, in axillary fascicles; bracts narrowly ovate, apex acute. Pedicel articulate at apex. Perianth green, 5-cleft to 1/2, veined, margin white; tepals oblong. Stamens 8; filaments dilated at base. Styles 3, very short; stigmas capitate. Achenes included in persistent perianth, dark brown, opaque, narrowly ovoid, trigonous, rarely biconvex, 2–2.5 mm, densely minutely granular striate. Fl. Jun–Aug, fr. Jul–Sep. $2n = 40, 60$.

In sand at riversides, grasslands; 100–300 m. Heilongjiang [Japan, Korea, Mongolia, Russia; Europe, North America; widely introduced elsewhere including Australia].

9. *Polygonum plebeium* R. Brown, *Prodr.* 420. 1810.

铁马鞭 tie ma bian

Polygonum aviculare Linnaeus var. *minutiflorum* Franchet; *P. changii* Kitagawa; *P. humifusum* Pallas ex Ledebour var. *mandshuricum* Skvortsov; *P. parviflorum* Y. L. Chang & S. H. Li (1959), not Schott (1818), nor Gromov (1917); *P. plebeium* subsp. *changii* (Kitagawa) V. N. Voroschilov.

Herbs annual. Stems prostrate, 10–40 cm tall, much branched from base, usually internodes shorter than leaves. Petiole very short or nearly absent; leaf blade narrowly elliptic or oblanceolate, 5–15 × 2–4 mm, both surfaces with conspicuous midvein and inconspicuous lateral veins, base narrowly cuneate, margin entire, apex obtuse or acute; ocrea white, 2.5–3 mm, membranous, apex lacerate. Flowers 3–6, in axillary fascicles; bracts membranous. Pedicels shorter than bracts, articulate at middle. Perianth green, margin white or pinkish, 5-parted; tepals narrowly elliptic, 1–1.5 mm, abaxially with prominent veins. Stamens 5; filaments included, slightly dilated at base. Styles 3, rarely 2, very short; stigmas capitate. Achenes included in persistent perianth, black-brown, shiny, broadly ovoid, trigonous or biconvex, 1.5–2 mm, smooth. Fl. May–Aug, fr. Jun–Sep. $2n = 20$.

Near fields and roads, wet areas; sea level to 2200 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [India, Indonesia, Japan, Kazakhstan, Myanmar, Nepal, Philippines, Russia (Far East), Thailand; N Africa, Australia, ?introduced in Europe].

10. *Polygonum polycnemoides* Jaubert & Spach, *Ill. Pl. Orient.* 2: 30. 1844.

针叶蒺藜 zhen ye bian xu

Herbs annual. Stems prostrate or suberect, 5–20 cm tall, scabrous, internodes shorter than leaves. Petiole very short or nearly absent; leaf blade linear or subulate-linear, 5–13 × 1–1.5 mm, midvein slightly prominent abaxially, conspicuous adaxially, lateral veins inconspicuous on both surfaces, base narrowly cuneate, margin entire, apex acute; ocrea white, narrowly ovate, connate at base, thinly membranous, margin sparsely lacerate, apex 2-lobed. Flowers 1 or 2, axillary. Perianth green, margin white or pinkish, 5-cleft to 1/3, herbaceous, minutely papillate; tepals elliptic, 0.5–1 mm. Stamens 8, included; anthers purple-red. Styles 3, very short; stigmas capitate. Achenes included in persistent perianth, black-brown, slightly shiny, ovoid, trigonous, 1.5–2 mm, densely punctate. Fl. Jun–Jul, fr. Jul–Aug.

Dry slopes, rocky deserts, gravelly grasslands; 600–2200 m. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe].

11. *Polygonum patulum* Marschall von Bieberstein, *Fl. Taur.-Caucas.* 1: 304. 1808.

展枝蒺藜 zhan zhi bian xu

Polygonum bellardii Allioni var. *gracilius* Ledebour; *P. gracilius* (Ledebour) Klokov; *P. patulum* var. *gracilius* (Ledebour) Rouy; *P. patulum* var. *patulum* f. *gracilius* (Ledebour) I. Grint; *P. salinum* Baranov & Skvortsov.

Herbs annual. Stems erect, 20–80 cm tall, usually much branched; branchlets spreading. Leaves persistent; petiole short or nearly absent; leaf blade lanceolate or narrowly lanceolate, abaxially with slightly prominent midvein and conspicuous lateral veins, adaxially with conspicuous midvein and lateral veins, base narrow, apex acute; ocrea: lower part brown, upper part white, tubular, 7–8 mm, membranous, 6- or 7-veined, usu-

ally lacerate. Inflorescence terminal, spicate, interrupted. Pedicel 1.5–2 mm, slender. Perianth green, margin pinkish, 5-parted; tepals elliptic, ca. 1.5 mm. Stamens 8; filaments dilated at base. Styles 3, short; stigmas capitate. Achenes equaling or slightly exceeding persistent perianth, brown, slightly shiny, ovoid, trigonous, 2–3 mm, densely punctate. Fl. Jun–Jul, fr. Aug–Sep.

Ditches, wet areas; 400–1800 m. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan; SW Asia, Europe].

12. *Polygonum argyrocoleon* Steudel ex Kuntze, *Linnaea* 20: 17. 1847.

帚蒿蓄 zhou bian xu

Herbs annual. Stems erect, 50–80 cm tall, glabrous, angulate, much branched; branches ascending, fastigiate, nodes inflated, internodes 3–5 cm. Leaves caducous; petiole short, articulate at base; leaf blade usually caducous, lanceolate or linear-lanceolate, 1.5–4 cm × 6–8 mm, both surfaces with conspicuous veins, base narrowly cuneate, apex acute; ocrea lower part brown, upper part white, tubular, membranous, 6–8-veined, lacerate at apex. Inflorescence terminal, spicate, interrupted. Pedicel slender, articulate at apex. Perianth green, margin pinkish or white, 5-parted; tepals elliptic, ca. 2 mm. Stamens 7 or 8; filaments dilated at base. Styles 3; stigmas capitate. Achenes included in persistent perianth, brown, shiny, ovoid, trigonous, 2–2.5 mm, smooth. Fl. Jun–Jul, fr. Jul–Aug.

Marshy areas, streamsides; 200–2500 m. Gansu, Nei Mongol, Qinghai, Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

13. *Polygonum molliiforme* Boissier, *Diagn. Pl. Orient.*, ser. 1, 7: 84. 1846.

丝茎蒿蓄 si jing bian xu

Herbs annual. Stems erect, usually purple-red, 5–10 cm tall, slender, 3–5 mm in diam., glabrous, internodes 1–1.5 cm. Petiole short; leaf blade spreading or curved, linear or subulate, 7–15 × 0.5–1 mm, both surfaces with conspicuous midvein, base articulate, apex mucronulate; ocrea silvery, narrowly ovate, thinly membranous, pellucid, base connate, margin entire or slightly denticulate, apex acute. Flower solitary, axillary. Pedicel short. Perianth white, 5-cleft to 3/4, membranous; tepals elliptic, 2–3 mm, apex obtuse. Stamens 5, sometimes fertile ones 2 or 3; filaments dilated at base; anthers black. Styles 2, very short; stigmas capitate. Achenes equaling or slightly exceeding persistent perianth, shiny, ovoid, biconvex, ca. 2 mm, smooth, apex acute. Fl. Jun–Jul, fr. Jul–Aug.

In sand at riversides, dry mountain slopes; 300–500 m. Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

14. *Polygonum acetosum* Marschall von Bieberstein, *Fl. Taur.-Caucas.* 1: 304. 1808.

灰绿蒿蓄 hui lu bian xu

Herbs annual. Stems prostrate or ascending, gray-green, 10–30 cm tall, much branched from base. Petiole very short or nearly absent, articulate at base; leaf blade gray-green, oblong-linear, 1–2.5 cm × 3–5 mm, midvein abaxially slightly prominent, adaxially conspicuous, lateral veins inconspicuous on both surfaces, base narrowly cuneate, margin minutely papillate, apex acute; ocrea silvery, ovate-lanceolate, 4–5 mm, membranous, with inconspicuous veins, base connate. Flowers 3–7 in axillary fascicles. Pedicel 1–3 mm, apex articulate. Perianth gray-green, margin white, 5-parted, veined; tepals oblong, 1.5–2 mm. Stamens 7 or 8; filaments dilated at base. Styles 3; stigmas capitate. Achenes included in persistent perianth, brown, slightly shiny, broadly ovoid, trigonous, 2–2.5 mm, densely minutely punctate. Fl. May–Jun, fr. Jun–Jul.

Fields, near ditches; 500–2000 m. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan].

15. *Polygonum acerosum* Ledebour ex Meisner in Candolle, *Prodr.* 14(1): 92. 1856.

松叶蒿蓄 song ye bian xu

Herbs annual. Stems ascending, often pinkish, 15–25 cm tall, papillate, branched from base. Leaves sessile; leaf blade green, linear or linear-lanceolate, 8–20 × 2–3 mm, nearly fleshy, abaxially midvein prominent, adaxially midvein conspicuous, lateral veins inconspicuous on both surfaces, base narrowly cuneate, margin entire, slightly revolute, apex acute, with mucro; ocrea silvery, ovate-lanceolate, 4–5 mm, membranous, base connate, apex lacerate. Flower solitary, axillary. Pedicel very short, articulate at apex. Perianth 5-cleft to 1/2, herbaceous, minutely papillate, margin white; tepals elliptic, 1–1.5 mm. Stamens 7 or 8. Styles 3, very short. Achenes included in persistent perianth, dark brown, slightly shiny, ovoid, trigonous, 2–2.5 mm, punctulate. Fl. May–Jun, fr. Jun–Jul.

Riverbanks, moist valleys; 500–1500 m. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan].

16. *Polygonum rigidum* Skvortsov in Baranov & Skvortsov, *Diagn. Pl. Nov. Mandsh.* 5. 1943.

尖果蒿蓄 jian guo bian xu

Herbs annual. Stems erect or ascending, 30–50 cm tall, much branched, angulate. Petiole short, articulate at base; leaf blade elliptic or oblong, 1–3 cm × 3–7 mm, both surfaces with conspicuous veins, base cuneate, margin entire, apex obtuse or subacute; ocrea: lower part brown, upper part white, 5–9-veined, lacerate. Flowers 2–7 in axillary fascicles. Pedicel 1.5–2 mm, apex articulate. Perianth green, margin white or pinkish, 5-parted to 2/3; tepals oblong, 2–2.5 mm. Stamens 8; filaments dilated at base. Styles 3, short. Achenes exerted from persistent perianth, brown, slightly shiny, ovoid, trigonous, 2.5–3.5 mm, densely minutely punctate, apex long acute. Fl. Jun–Aug, fr. Jul–Sep. $2n = ca. 60$.

Near fields, roadsides, shaded grassy places in valleys; 400–2500 m. Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shaanxi, Shanxi [Mongolia, Russia].

2. *Polygonum* sect. *Persicaria* (Miller) Meisner, *Monogr. Polyg.* 43, 66. 1826.

春蓼组 chun liao zu

Persicaria Miller, *Gard. Dict. Abr.*, ed. 4, [1054]. 1754.

Plants without prickles. Leaves generally narrowly elliptical to ovate, not hastate or sagittate. Inflorescence spicate, spikes usually several. Tepals fused for about 1/3 their length. Nectaries free, globular. Styles 1, bifid or trifid.

About 100 species: cosmopolitan; 23 species (four endemic) in China.

In members of *Polygonum* sect. *Aconogonon*, *P.* sect. *Bistorta*, *P.* sect. *Cephalophilon*, *P.* sect. *Echinocaulon*, and *P.* sect. *Persicaria* (often recognized as belonging to the genus *Persicaria*) the inflorescence is many flowered, the petioles lack articulation, the ocrea is variously entire, ciliate, or pectinate, but not lacinate, the perianth is 4- or 5-parted, the tepals have 3-fid venation, the stamens are 4–8, with reduction in number occurring in the inner whorl, and the filaments are not dilated at the base, but are associated with nipple-like nectaries.

17. *Polygonum amphibium* Linnaeus, Sp. Pl. 1: 361. 1753.

两栖蓼 liang qi liao

Persicaria amphibia (Linnaeus) S. F. Gray; *P. amphibia* var. *terrestris* (Leysser) Munshi & Javeid; *P. amurensis* (Korshinsky) Nieuwland; *P. muhlenbergii* (Meisner) Small; *Polygonum amphibium* var. *amurense* Korshinsky; *P. amphibium* var. *muhlenbergii* Meisner; *P. amphibium* var. *natans* Michaux; *P. amphibium* var. *terrestre* Leysser; *P. amphibium* var. *vestitum* Hemsley.

Herbs perennial, amphibious. Rhizomes horizontal. Aquatic plants: stems floating, glabrous, rooting at nodes; leaves long petiolate, floating; leaf blade oblong or elliptic, 5–12 × 2.5–4 cm, glabrous, base subcordate, margin entire, not ciliate, apex obtuse or slightly acute; ocrea tubular, thinly membranous, apex truncate, not ciliate. Terrestrial plants: stems erect, 40–60 cm tall, simple or branched at base. Petiole 3–5 mm; leaf blade lanceolate or oblong-lanceolate, 6–14 × 1.5–2 cm, both surfaces appressed-hispidulous, base rounded, margin entire, ciliate, apex acute; ocrea tubular, 1.5–2 cm, membranous, sparsely hirsute, apex truncate, shortly ciliate. Inflorescence terminal or axillary, spicate, 2–4 cm; bracts broadly funnel-shaped. Perianth pinkish or white, 5-parted; tepals oblong, 3–4 mm. Stamens usually 5, included. Styles 2, exserted, connate to middle; stigmas capitate. Achenes included in persistent perianth, black, shiny, orbicular, biconvex, 2.5–3 mm in diam. Fl. Jul–Aug, fr. Aug–Sep. *2n* = 66, 96.

In ponds, riverbanks, wet fields, waste areas; sea level to 3700 m. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Very widely distributed: Bhutan, NW India, Japan, Kashmir, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Nepal, Russia, Tajikistan, Turkmenistan, Uzbekistan; Asia, Europe, North America].

18. *Polygonum pulchrum* Blume, Bijdr. Fl. Ned. Ind. 530. 1826.

丽蓼 li liao

Persicaria attenuata subsp. *pulchra* (Blume) K. L. Wilson; *P. pulchra* (Blume) Soják; *Polygonum tomentosum* Willdenow (1799), not Schrank (1789).

Plants perennial, rhizomatous. Stems erect, sometimes prostrate below, 80–100 cm tall, robust, simple, pilose or glabrescent. Petiole 1–2 cm; leaf blade broadly lanceolate, 10–15 × 1.5–3 cm, both surfaces densely sericeous, base narrowly cuneate, margin entire, ciliate, apex long acuminate; ocrea tubular, 1.5–2 cm, membranous, densely pubescent, apex truncate, cilia 4–6 mm. Inflorescence terminal, of paniced spikes, erect, 3–6 cm; bracts ovate, adpressed hispidulous, each 3- or 4-flowered. Pedicels longer than bracts. Perianth white, 5-parted; tepals elliptic, 3–3.5 mm. Stamens 7 or 8, included. Styles 2, free;

stigmas capitate. Achenes included in persistent perianth, black, shiny, orbicular, biconvex, 3–4 mm in diam. Fl. Sep–Oct, fr. Oct–Nov.

In shallow water of swamps, marshy areas; 100–300 m. Guangdong, Guangxi, Taiwan [India, Indonesia, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand; ?Africa, Australia].

19. *Polygonum huananense* A. J. Li, Bull. Bot. Res., Harbin 15: 413. 1995.

华南蓼 hua nan liao

Herbs perennial. Stems erect, 100–150 cm tall, robust, simple, sometimes branched above, densely villous. Petiole 5–10 mm, villous; leaf blade broadly lanceolate, 10–20 × 2–4.5 cm, both surfaces sparsely sericeous, base cuneate, margin shortly ciliate, apex long acuminate; ocrea tubular, 1.5–3 cm, membranous, apex truncate, cilia 4–5 mm. Inflorescence terminal, of paniced spikes, erect; bracts broadly ovate, villous, margin long ciliate, each 2- or 3-flowered. Pedicels longer than bracts, stout, articulate at apex. Perianth white, 5-parted; tepals elliptic, ca. 3 mm. Stamens exserted. Styles 3, connate below middle; stigmas capitate. Achenes included in persistent perianth, black-brown, slightly shiny, ellipsoid, trigonous, ca. 3 mm. Fl. Jul–Aug, fr. Sep–Oct.

• Lake edges, streamsides; ca. 100 m. Guangdong.

20. *Polygonum japonicum* Meisner in Candolle, Prodr. 14(1): 112. 1856.

蚕茧蓼 can jian liao

Herbs perennial. Rhizomes horizontal. Stems erect, 50–100 cm tall, glabrous, sometimes sparsely hispidulous. Petiole short or nearly absent; leaf blade lanceolate, 7–15 × 1–2 cm, thinly leathery, densely minutely punctate, both surfaces sparsely appressed hispidulous, base cuneate, margin entire, hispidulous, apex acuminate; ocrea tubular, 1.5–2 cm, membranous, appressed hirsute, apex truncate, cilia 1–1.2 cm. Inflorescences terminal, spicate, usually numerous, 6–12 cm; bracts green, funnel-shaped, ciliate, each 3–6-flowered. Flowers dimorphic. Pedicel 2.5–4 mm. Perianth white or pinkish, 5-parted, minutely punctate; tepals elliptic, 2.5–3 mm. Stamens 8, exserted. Styles 2 or 3, connate below middle, included or stamens included and styles exserted on separate plant; stigmas capitate. Achenes included in persistent perianth, black, shiny or opaque, ovoid, trigonous or biconvex, 2.5–3 mm.

Marshy areas, ditches, streamsides, riverbanks; sea level to 1700 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Japan, Korea].

- 1a. Perianth 3–4 mm, not glandular dotted;
achenes shiny 20a. var. *japonicum*

- 1b. Perianth 5–6 mm, glandular dotted;
achenes opaque 20b. var. *conspicuum*

20a. *Polygonum japonicum* var. *japonicum*

蚕茧蓼(原变种) can jian liao (yuan bian zhong)

Persicaria japonica (Meisner) H. Gross ex Nakai; ?*Polygonum macranthum* Meisner; *P. martini* H. Léveillé & Vaniot; *P. mysurus* Franchet.

Flowers small. Perianth 3–4 mm, not glandular dotted. Achenes shiny.

Marshy areas, ditches, streambanks; sea level to 1700 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Japan, Korea].

20b. *Polygonum japonicum* var. *conspicuum* Nakai, J. Coll. Sci. Imp. Univ. Tokyo 23: 10. 1908.

显花蓼 xian hua liao

Persicaria conspicua (Nakai) Nakai ex T. Mori; *P. sterilis* (Nakai) Nakai & Ohki; *Polygonum conspicuum* (Nakai) Nakai; *P. japonicum* var. *micranthum* Nakai; *P. japonicum* var. *micranthum* Nakai f. *brevistylum* Nakai; *P. sterile* Nakai; *P. sterile* var. *brevistylum* (Nakai) Nakai.

Flowers large. Perianth 5–6 mm, glandular dotted. Achenes opaque.

Streambanks, riverbanks; sea level to 1500 m. Anhui, Fujian, Jiangsu, Taiwan, Zhejiang [Japan, Korea].

21. *Polygonum barbatum* Linnaeus, Sp. Pl. 1: 362. 1753, nom. cons.

毛蓼 mao liao

Persicaria barbata (Linnaeus) H. Hara; *P. omerostroma* (Ohki) Sasaki; *Polygonum kotoshoense* Ohki; *P. omerostromum* Ohki.

Herbs perennial, rhizomatous. Stems erect, 40–90 cm tall, robust, pubescent, simple or branched above. Petiole 5–8 mm, densely hispidulous; leaf blade lanceolate or elliptic-lanceolate, 7–15 × 1.5–4 cm, both surfaces pubescent, base cuneate, margin ciliate, apex acuminate; ocrea tubular, 1.5–2 cm, membranous, densely hispidulous, apex truncate, cilia 1.5–2 cm. Inflorescence terminal, spicate, erect, 4–8 cm, several spikes aggregated and panicle-like, rarely solitary; bracts funnel-shaped, glabrous, margin ciliate, each 3–5-flowered. Pedicel short. Perianth white or greenish, 5-parted, elliptic, 1.5–2 mm. Stamens 5–8, included. Styles 3; stigmas capitate. Achenes included in persistent perianth, black, shiny, ovoid, trigonous, 1.5–2 mm. Fl. Aug–Sep, fr. Sep–Oct. $2n = 60$.

Streambanks, wet areas; water sides; sea level to 1300 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan [Bhutan, India, Indonesia, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sikkim, Sri Lanka, Thailand, Vietnam].

22. *Polygonum glabrum* Willdenow, Sp. Pl. 2: 447. 1799.

光蓼 guang liao

Persicaria glabra (Willdenow) M. Gomez; *Polygonum densiflorum* Meisner; *P. portoricense* Bertoloni ex Endlicher.

Herbs annual, glabrous throughout. Stems erect, 70–100 cm tall, dilated at nodes, rarely branched. Petiole 8–10 mm, robust; leaf blade lanceolate or oblong-lanceolate, 8–18 × 1.5–3 cm, base narrowly cuneate, margin entire, not ciliate, apex narrowly acuminate; ocrea tubular, 1–3 cm, membranous, veins numerous. Inflorescence terminal, spicate, 4–12 cm, usually with several dense spikes aggregated and panicle-like; bracts funnel-shaped, not ciliate, usually each 3- or 4-flowered. Pedicel large, longer than bracts, articulate at apex. Perianth white or pinkish, 5-parted; tepals elliptic, 3–4 mm, veins slender, furcate at apex, not curved downward. Stamens 6–8. Styles 2, connate to below middle. Achenes included in persistent perianth, black-brown, shiny, ovoid, biconvex, 2.5–3 mm. Fl. Jun–Aug, fr. Jul–Sep.

Riverbanks, streambanks, marshy areas; sea level to 100 m. Fujian, Guangdong, Guangxi, Hainan, Hubei, Hunan, Taiwan [Bangladesh, Bhutan, India, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam; Africa, Australia, North and South America, Pacific Islands].

23. *Polygonum viscosum* Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 71. 1825.

香蓼 xiang liao

Persicaria kuekenthalii H. Léveillé; *P. viscosa* (Buchanan-Hamilton ex D. Don) H. Gross ex Nakai; *Polygonum kuekenthalii* H. Léveillé; *P. viscosum* var. *minus* J. D. Hooker.

Herbs annual, odoriferous. Stems erect or ascending, 50–90 cm tall, much branched, densely hirsute and glandular hairy. Petiole short or nearly absent; leaf blade ovate-lanceolate or elliptical-lanceolate, 5–15 × 2–4 cm, both surfaces hispid, densely so along veins, margin entire, densely shortly ciliate; ocrea tubular, 1–1.2 cm, membranous, densely glandular hairy and hirsute, apex truncate, long ciliate. Inflorescence terminal or axillary, spicate, 2–4 cm, usually several spikes aggregated and panicle-like; peduncles densely hirsute and glandular hairy; bracts funnel-shaped, hirsute and glandular hairy, margin sparsely long ciliate, each 3–5-flowered. Pedicels longer than bracts. Perianth pinkish, 5-parted; tepals elliptic, ca. 3 mm. Stamens 8, included. Styles 3, connate to below middle. Achenes included in persistent perianth, black-brown, shiny, broadly ovoid, trigonous, ca. 2.5 mm. Fl. Jul–Sep, fr. Aug–Oct.

Roadsides, grasslands, by ditches; sea level to 1900 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [India, Japan, Korea, Nepal, Russia (Far East)].

24. *Polygonum persicaria* Linnaeus, Sp. Pl. 1: 361. 1753.

蓼 liao

Herbs annual. Stems erect or ascending, 40–80 cm tall, branched or simple, sparsely pubescent or glabrescent. Petiole 5–8 mm, appressed hispidulous; leaf blade lanceolate or elliptic, often with a dark triangular spot at middle, both surfaces appressed hispidulous, densely so along midvein, base narrowly cuneate, margin largely ciliate, apex acute or acuminate; ocrea tubular, 1–2 cm, membranous, sparsely pubescent, apex trun-

cate, cilia 0.4–3 mm. Inflorescence terminal or axillary, spicate, 2–6 cm, usually several spikes aggregated and panicle-like; peduncle glandular hairy or glabrous; bracts funnel-shaped, ciliate, each 5–7-flowered. Pedicel 2.5–3 mm. Perianth reddish or deep purple, usually 5-parted; tepals oblong, 2.5–3 mm, distinctly veined. Stamens 6 or 7. Styles 2, rarely 3, connate to below middle. Achenes included in persistent perianth, black-brown, shiny or opaque, suborbicular or broadly ovoid, biconvex, rarely trigonous, 2–2.5 mm, smooth. Fl. Jun–Jul, fr. Jul–Sep. $2n = 22, 42$.

Streamsides, wet areas, field margins; 100–1800 m. Anhui, Fujian, Gansu, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, ?Yunnan, Zhejiang [Indonesia, Japan, Kazakhstan, Korea, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan; Africa, Europe, North America].

- 1a. Achenes shiny; ocrea long ciliate, cilia 1–3 mm 24a. var. *persicaria*
 1b. Achenes opaque; ocrea shortly ciliate, cilia 0.4–1 mm 24b. var. *opacum*

24a. *Polygonum persicaria* var. *persicaria*

蓼(原变种) liao (yuan bian zhong)

Persicaria dolichopoda (Ohki) Sasaki; *P. maculata* (Rafinesque) A. Löve & D. Löve; *P. maculosa* S. F. Gray, nom. cons. prop.; *P. vulgaris* Webb & Moquin-Tandon; *Polygonum dolichopodum* K. Ohki; *P. persicaria* f. *humile* S. X. Li & Y. L. Chang; *P. persicaria* f. *latifolium* S. X. Li & Y. L. Chang; *P. shuchengense* Z. Z. Zhou.

Achenes shiny. Ocrea long ciliate, cilia 1–3 mm. $2n = 22$.

Streamsides, wet areas; 100–1800 m. Anhui, Fujian, Gansu, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, ?Yunnan, Zhejiang [Indonesia, Japan, Kazakhstan, Korea, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan; Africa, Europe, North America].

24b. *Polygonum persicaria* var. *opacum* (Samuelsson) A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 23. 1998.

暗果蓼 an guo liao

Polygonum opacum Samuelsson, Lingnan. Sci. J. 14: 299. 1935; *Persicaria opaca* (Samuelsson) Koidzumi.

Achenes opaque. Ocrea shortly ciliate, cilia 0.4–1 mm.

- Streamsides, field margins; 100–200 m. Fujian, Zhejiang.

25. *Polygonum viscoferum* Makino, Bot. Mag. (Tokyo) 17: 115. 1903.

粘蓼 nian liao

Persicaria excurrens (Steward) Koidzumi; *P. viscofera* (Makino) H. Gross ex Nakai; *Polygonum excurrens* Steward; *P. makinoi* Nakai.

Herbs annual. Stems 30–70 cm tall, usually branched above, pubescent. Petiole very short or nearly absent; leaf blade lanceolate or broadly lanceolate, both surfaces hispid, densely so along midvein, long ciliate at margin, base rounded or cuneate, apex acuminate; ocrea tubular, 6–12 mm, membranous, long hispid, apex ?truncate, long ciliate. Inflorescence spicate,

4–7 cm, interrupted at base, several spikes aggregated and panicle-like; peduncle glabrous, sparsely viscid-glandular; bracts green, funnel-shaped, glabrous but ciliate, each 3–5-flowered. Pedicels longer than bracts. Perianth greenish, 5(or 4)-parted; tepals elliptic, 1–1.5 mm. Stamens 7 or 8, included. Styles 3, connate to below middle. Achenes included in persistent perianth, black-brown, shiny, ovoid, trigonous, ca. 1.5 mm, smooth. Fl. Jul–Sep. fr. Aug–Oct. $2n = 24$.

Moist valleys, mountain slopes; 500–1800 m. Anhui, Fujian, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea, Russia (Far East)].

This species shows considerable variation in leaf shape and pubescence. Plants with linear-lanceolate leaves and more or less glabrous stems and abaxial leaf surfaces are often recognized as a distinct variety, *Polygonum viscoferum* var. *robustum* Makino (Bot. Mag. (Tokyo) 17: 116. 1903; *P. viscoferum* subsp. *robustum* (Makino) Kitamura).

26. *Polygonum lapathifolium* Linnaeus, Sp. Pl. 1: 360. 1753.

马蓼 ma liao

Herbs annual. Stems erect, 40–90 cm tall, branched, glabrous, subglabrous, or lanose, swollen at nodes. Petiole 2–5 mm, appressed hispidulous; leaf blade with large blackish spot adaxially, lanceolate or broadly lanceolate, 5–15 × 1–3 cm, abaxially nearly glabrous or densely lanose, adaxially nearly glabrous, sometimes densely lanose on both surfaces, base cuneate, margin ciliate, apex acuminate or acute; ocrea brownish, tubular, 1.5–3 cm, membranous, glabrous, apex truncate, not ciliate or rarely shortly ciliate. Inflorescence terminal or axillary, spicate, erect or nodding, 3–8 cm, densely flowered, several spikes aggregated and panicle-like; peduncles glandular; bracts funnel-shaped, margin sparsely shortly ciliate. Perianth pink or white, 4(or 5)-parted; tepals 2.5–3 mm, veins strongly forked, curved downward near apex. Stamens usually 6. Styles 2, connate at base. Achenes included in persistent perianth, black-brown, shiny, broadly ovoid, biconcave, 2–3 mm. Fl. May–Jul, fr. Jun–Oct. $2n = 22$.

Roadsides, along ditches, field margins, watersides; sea level to 3900 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [Bangladesh, Bhutan, India, Indonesia, Japan, Kazakhstan, Korea, Kyrgyzstan, Malaysia, Mongolia, Myanmar, Nepal, New Guinea, Pakistan, Philippines, Russia (Siberia), Sikkim, Tajikistan, Thailand, Turkmenistan, Uzbekistan, Vietnam; N Africa, Australia, Europe, North America].

- 1a. Plants glabrous or subglabrous 26a. var. *lapathifolium*
 1b. Plants lanose.
 2a. Leaf blade densely lanose abaxially 26b. var. *salicifolium*
 2b. Leaf blade and stem densely lanose 26c. var. *lanatum*

26a. *Polygonum lapathifolium* var. *lapathifolium*

马蓼(原变种) ma liao (yuan bian zhong)

Persicaria lapathifolia (Linnaeus) S. F. Gray; *P. nodosa* (Persoon) Opiz; *P. vaniotiana* H. Léveillé; *Polygonum koma-*

rovii H. Léveillé; *P. lapathifolium* subsp. *nodosum* (Persoon) Weinmann; *P. lapathifolium* var. *xanthophyllum* H. W. Kung; *P. nodosum* Persoon; *P. pyramidale* H. Léveillé; *P. vaniotianum* (H. Léveillé) H. Léveillé.

Plants glabrous or subglabrous. $2n = 22, 24$.

Roadsides, along ditches; sea level to 3900 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [Bangladesh, India, Indonesia, Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Myanmar, Nepal, New Guinea, Pakistan, Philippines, Tajikistan, Thailand, Turkmenistan, Uzbekistan, Vietnam; N Africa, Australia, Europe, North America].

26b. *Polygonum lapathifolium* var. *salicifolium* Sibthorp, Fl. Oxon. 129. 1794.

绵毛马蓼 mian mao ma liao

Persicaria lapathifolia subsp. *pallida* (Withering) S. Ekman & T. Knutsson var. *incana* (Roth) S. Ekman & T. Knutsson; *Polygonum lapathifolium* var. *incanum* Ledebour; *P. nodosum* Persoon var. *incanum* Ledebour; *P. persicaria* var. *incanum* Roth.

Leaf blade densely lanose abaxially. $2n = 22^*$.

Roadsides, watersides; 100–3300 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [India, Indonesia (Java), Japan, Myanmar, Russia (Siberia)].

26c. *Polygonum lapathifolium* var. *lanatum* (Roxburgh) Steward, Contr. Gray Herb., n.s., 5: 46. 1930.

密毛马蓼 mi mao ma liao

Polygonum lanatum Roxburgh, Fl. Ind., ed. 1832, 2: 285. 1832; ?*P. lanigerum* R. Brown var. *crisatum* Hemsley; *Persicaria lanata* (Roxburgh) Tzvelev; *P. lapathifolia* subsp. *lanata* (Roxburgh) Soják; *P. lapathifolia* (Linnaeus) S. F. Gray var. *lanata* (Roxburgh) H. Hara.

Stem and leaf blade densely lanose.

Field margins, along ditches; 200–1100 m. Fujian, Guangdong, Guangxi, Taiwan, Yunnan [Bhutan, India, Indonesia (Java), Malaysia, Myanmar, Nepal, Philippines, Sikkim].

If *Polygonum lanigerum* var. *crisatum* (Hemsley, J. Linn. Soc., Bot. 26: 342. 1891) is indeed synonymous with *P. lapathifolium* var. *lanatum* (1930), then the correct name at varietal rank under *P. lapathifolium* would be a new combination based on var. *crisatum*.

27. *Polygonum orientale* Linnaeus, Sp. Pl. 1: 362. 1753.

红蓼 hong liao

Amblygonum orientale (Linnaeus) Nakai ex T. Mori; *A. orientale* var. *pilosum* (Roxburgh ex Meisner) Nakai ex T. Mori; *Lagunea cochinchinensis* Loureiro; *L. orientalis* (Linnaeus) Nakai; *L. orientalis* var. *pilosa* (Roxburgh ex Meisner) Nakai; *Persicaria cochinchinensis* (Loureiro) Kitagawa; *P. orientalis* (Linnaeus) Spach; *P. pilosa* (Roxburgh ex Meisner) Kitagawa; *Polygonum amoenum* Blume; *P. cochinchinense* (Loureiro) Meisner; ?*P. orientale* var. *discolor* Benthams; *P.*

orientale var. *pilosum* (Roxburgh ex Meisner) Meisner; *P. pilosum* Roxburgh ex Meisner; *P. torquatum* Bruijn.

Herbs annual. Stems erect, 1–2 m tall, robust, much branched above, densely spreading villous. Petiole 2–10 cm, spreading villous; leaf blade broadly ovate, broadly elliptic, or ovate-lanceolate, 10–20 × 5–12 cm, both surfaces densely pubescent, along veins densely villous, base rounded or subcordate, slightly decurrent, margin densely ciliate, apex acuminate; ocrea tubular, 1–2 cm, membranous, villous, margin truncate, long ciliate, usually with green leaflike wing. Inflorescence terminal or axillary, spicate, slightly pendulous, 3–7 cm, several spikes aggregated and panicle-like; bracts green, broadly funnel-shaped, 3–5 mm, pubescent, margin long ciliate, each 3–5-flowered. Pedicels longer than bracts. Flowers dimorphic. Perianth pink or white, 5-parted; tepals elliptic, 3–4 mm. Stamens 7, exerted. Styles 2, connate to below middle, included or stamens included and styles exerted on separate plant; stigmas capitate. Achenes included in persistent perianth, black-brown, shiny, nearly orbicular, biconcave, 3–3.5 mm. Fl. Jun–Sep, fr. Aug–Oct.

Roadsides, near houses, wastelands, usually cultivated in gardens; sea level to 3000 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [Bangladesh, Bhutan, India, Indonesia, Japan, Korea, Myanmar, Philippines, Russia (Far East), Sri Lanka, Thailand, Vietnam; SW Asia, Australia, Europe].

28. *Polygonum tinctorium* Aiton, Hort. Kew. 2: 31. 1789.

蓼蓝 liao lan

Persicaria tinctoria (Aiton) Spach.

Herbs annual. Stems erect, 50–80 cm tall, usually branched. Petiole 5–10 mm; leaf blade green, dark blue-green when dry, ovate or broadly elliptic, 3–8 × 2–4 cm, abaxially sometimes appressed-pubescent along veins, adaxially glabrous, base broadly cuneate, margin shortly ciliate, apex obtuse or slightly acute; ocrea tubular, 1–1.5 cm, membranous, appressed pubescent, apex truncate, long ciliate. Inflorescence terminal or axillary, spicate, dense, 2–5 cm; bracts green, funnel-shaped, ciliate, each 3–5-flowered. Pedicels equal to bracts, slender. Perianth pinkish, 5-parted; tepals ovate, 2.5–3 mm. Stamens 6–8, included. Styles 3, connate at lower part. Achenes included in persistent perianth, brown, shiny, broadly ovoid, trigonous, 2–2.5 mm. Fl. Jun–Sep, fr. Aug–Oct.

Moist valleys, stream banks, widely cultivated; 200–1000 m. Widespread in China [Indo-China; cultivated and occasionally naturalized elsewhere].

This species is used medicinally and for dyeing.

29. *Polygonum assamicum* Meisner in Candolle, Prodr. 14(1): 111. 1856.

阿萨姆蓼 a sa mu liao

Persicaria assamica (Meisn.) Soják.

Herbs annual. Stems ascending or decumbent, 15–30 cm tall, glabrous. Petiole 3–6 mm, sparsely appressed hispidulous; leaf blade green, blue-green when dry, elliptic-ovate or broadly lanceolate, 2.5–6 × 1–2 cm, abaxially appressed hispidulous

along veins, adaxially glabrous, base broadly cuneate, apex acute; ocrea tubular, membranous, sparsely appressed hispidulous along veins, apex truncate, long ciliate. Inflorescence terminal, spicate, solitary or several aggregated and panicle-like; spike lax, 2.5–4 cm, usually decurrent at base; bracts green, herbaceous, ciliate, each 1–3-flowered. Perianth reddish, 5-parted; tepals elliptic, 2.5–3 mm. Stamens 5 or 6, included. Styles 2; stigmas capitate. Achenes included in persistent perianth, narrowly ovoid, biconvex, ca. 2.5 mm. Fl. Jun–Jul, fr. Aug–Sep.

Stream banks, wet valleys; 200–1000 m. Guangxi, Guizhou, Sichuan, Yunnan [N India, Myanmar].

30. *Polygonum paralimicola* A. J. Li, Bull. Bot. Res., Harbin 15: 414. 1995.

湿地蓼 shi di liao

Herbs annual. Stems erect or ascending, 20–30 cm tall, branched at base, glabrous. Petiole 4–5 mm; leaf blade ovate, 1–2.5 × 0.7–1.2 cm, both surfaces pubescent, base broadly cuneate, margin shortly ciliate, apex acute; ocrea tubular, 4–5 mm, membranous, hispidulous, apex truncate, shortly ciliate. Inflorescence terminal, spicate, lax, 1.5–3 cm; bracts funnel-shaped, 2–3 mm, apex obliquely truncate, each 2- or 3-flowered. Pedicel 6–9 mm, articulate at apex. Perianth pinkish, 5-parted; tepals elliptic, 4–5 mm, yellow-brown punctate. Stamens 8, included. Styles 3, connate to below middle; stigmas capitate. Achenes included in persistent perianth, brown, narrowly ovoid, trigonous, 4–4.5 mm, densely pitted. Fl. Jul–Oct, fr. Aug–Nov.

• Mountain streams, grassy slopes; 200–500 m. Hunan, Jiangxi, Zhejiang.

31. *Polygonum hydropiper* Linnaeus, Sp. Pl. 1: 361. 1753.

辣蓼 la liao

Persicaria hydropiper (Linnaeus) Spach; ?*P. hydropiper* var. *diffusa* Kitagawa; *P. hydropiper* var. *vulgaris* (Meisner) Ohki; *P. vernalis* Nakai; ?*Polygonum hydropiper* var. *longistachyum* Y. L. Chang & S. X. Li; *P. hydropiper* var. *vulgare* Meisner; *P. schinzii* J. Schuster.

Herbs annual. Stems erect, 40–70 cm tall, much branched, glabrous, dilated at nodes. Leaves with peppery taste; petiole 4–8 mm; leaf blade lanceolate or elliptic-lanceolate, 4–8 × 0.5–2.5 cm, both surfaces glabrous, densely brown punctate, sometimes appressed hispidulous along midvein, base cuneate, margin ciliate, apex acuminate; cleistogamous flowers present in many leaf axils; ocrea tubular, 1–1.5 cm, membranous, sparsely appressed hispidulous, apex truncate, shortly ciliate. Inflorescence terminal or axillary, spicate, pendulous, interrupted below, usually lax, 3–8 cm, slender; bracts green, funnel-shaped, 2–3 mm, margin membranous, sparsely shortly ciliate, each 3–5-flowered. Pedicels longer than bracts. Perianth greenish, white or pink above, 5(or 4)-parted, brownish pellucid glandular punctate; tepals elliptic, 3–3.5 mm. Stamens 6, rarely 8, included. Styles 2 or 3. Achenes included in persistent perianth, black-brown, opaque, ovoid, biconvex or trigonous, 2–3 mm, densely small pitted. Fl. May–Sep, fr. Jun–Oct. $2n = 18–22$.

Riverbanks, streamsides, wet valleys; sea level to 3500 m. Anhui,

Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [Bangladesh, Bhutan, India, Indonesia, Japan, Kazakhstan, Korea, Kyrgyzstan, Malaysia, Mongolia, Myanmar, Nepal, Russia, Sikkim, Sri Lanka, Thailand, Uzbekistan; Australia, Europe, North America].

32. *Polygonum pubescens* Blume, Bijdr. Fl. Ned. Ind. 532. 1826.

伏毛蓼 fu mao liao

Persicaria flaccida (Meisner) H. Gross; *P. hydropiper* (Linnaeus) Spach subsp. *flaccida* (Meisner) Munshi & Javeid; *P. pubescens* (Blume) H. Hara; *Polygonum donii* Meisner; *P. flaccidum* Meisner; *P. flaccidum* var. *hispidum* (Buchanan-Hamilton ex D. Don) J. D. Hooker; *P. hispidum* Buchanan-Hamilton ex D. Don; *P. hydropiper* var. *flaccidum* (Meisner) Steward; *P. hydropiper* var. *hispidum* (Buchanan-Hamilton ex D. Don) Steward; *P. oryzetorum* Blume.

Herbs annual (?perennial). Stems erect, often reddish, 60–90 cm tall, sparsely hispidulous, branched above, swollen at nodes. Leaves without peppery taste; petiole 4–7 mm, densely hispidulous; leaf blade ovate-lanceolate or broadly lanceolate, 5–10 × 1–2.5 cm, both surfaces densely hispidulous, base broadly cuneate, margin ciliate, apex acuminate or acute; ocrea tubular, 1–1.5 cm, membranous, hispid, apex truncate, stoutly long ciliate. Inflorescence terminal or axillary, spicate, pendulous, lax, 7–15 cm, interrupted below; bracts green, funnel-shaped, margin submembranous, ciliate, each 3- or 4-flowered. Pedicels longer than bracts, slender. Perianth green, red above, 5-parted, densely purplish glandular punctate; tepals elliptic, 3–4 mm. Stamens 8, included. Styles 3, connate to below middle. Achenes included in persistent perianth, black, dull, ovoid, trigonous, 2.5–3 mm, densely pitted. Fl. Aug–Sep, fr. Sep–Oct.

Along ditches, water sides, field margins; sea level to 2700 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning (Dalian), Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, India, Indonesia, Japan, Korea, Sikkim].

33. *Polygonum posumbu* Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 71. 1825.

丛枝蓼 cong zhi liao

Persicaria posumbu (Buchanan-Hamilton ex D. Don) H. Gross; *P. yokusaiana* (Makino) Nakai; *Polygonum caespitosum* Blume; *P. caespitosum* subsp. *yokusaianum* (Makino) Danser; *P. procumbens* Y. L. Chang & S. X. Li (1959), not Gilibert (1792), nor Bruijn (1854), nor Sessé y Lacasta & Mociño (1894); *P. pronum* C. F. Fang; *P. yokusaianum* Makino.

Herbs annual. Stems decumbent, 30–70 tall, slender, branched at base, glabrous, angulate. Petiole 5–7 mm, appressed hispid; leaf blade ovate-lanceolate or ovate, 3–6(–8) × 1–2(–3) cm, papery, both surfaces sparsely appressed hispid or glabrescent, midvein prominent abaxially, base broadly cuneate, margin ciliate, apex caudate-acuminate; ocrea tubular, 4–6 mm, thinly membranous, appressed hispid, apex truncate, cilia 7–8 mm, stout. Inflorescence terminal or axillary, spicate, lax, 5–10 cm, interrupted below; bracts greenish, funnel-shaped,

glabrous, margin ciliate, each 3- or 4-flowered. Pedicel short. Perianth pinkish, 5-parted; tepals elliptic, 2–2.5 mm. Stamens 8, exserted. Styles 3, connate at base; stigmas capitate. Achenes included in persistent perianth, blackish brown, shiny, ovoid, trigonous, 2–2.5 mm. Fl. Jun–Sep, fr. Jul–Oct.

Mixed forests on mountain slopes, moist valleys; 100–3000 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [India, Indonesia, Japan, Korea, Myanmar, Nepal, Philippines, Thailand].

34. *Polygonum longisetum* Bruijn in Miquel, Pl. Jungh. 3: 307. 1854.

长鬃蓼 chang zong liao

Herbs annual. Stems erect, ascending or prostrate at base, 30–60 cm tall, branched from base, glabrous, swollen at nodes. Petiole short or nearly absent; leaf blade lanceolate or broadly lanceolate, 5–13 × 1–2 cm, abaxially appressed hispidulous along veins, adaxially glabrescent, base cuneate to rounded, margin ciliate, apex acute or acuminate; ocrea tubular, 7–8 mm, membranous, sparsely pubescent, apex truncate, cilia 6–7 mm. Inflorescence terminal or axillary, spicate, erect, 2–4 cm, interrupted; bracts funnel-shaped, glabrous, margin long ciliate, each 5- or 6-flowered. Pedicels equaling bracts, 2–2.5 mm. Perianth pink or red-purple, 5-parted; tepals elliptic, 1.5–2 mm. Stamens 6–8, included. Styles 3, connate to below middle; stigmas capitate. Achenes included in persistent perianth, black, shiny, broadly ovoid, trigonous, ca. 2 mm. Fl. May–Jun, fr. Jun–Aug.

Moist valleys, along stream banks, shaded places along ditches, water sides; sea level to 3100 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, ?Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [India, Indonesia, Japan, Kashmir, Korea, Malaysia, Mongolia, Myanmar, Nepal, Philippines, Russia (Far East)].

1a. Leaves basally cuneate 34a. var. *longisetum*
1b. Leaves basally rounded 34b. var. *rotundatum*

34a. *Polygonum longisetum* var. *longisetum*

长鬃蓼(原变种) chang zong liao (yuan bian zhong)

Persicaria blumei (Meisner) H. Gross; *P. buisanensis* (Ohki) Sasaki; *P. caespitosa* (Blume) Nakai var. *longiseta* (Bruijn) C. F. Reed; *P. gentiana* H. Léveillé; *P. longiseta* (Bruijn) Moldenke; *P. manshuricola* Kitagawa; *P. roseoviridis* Kitagawa; *Polygonum blumei* Meisner; *P. buisanense* Ohki; *P. caespitosum* Blume var. *longisetum* (Bruijn) Steward; *P. gentilianum* (H. Léveillé) H. Léveillé; *P. interruptum* Bunge; *P. kinashii* H. Léveillé & Vaniot; *P. posumbu* Buchanan-Hamilton ex D. Don var. *blumei* (Meisner) Herder; *P. roseoviride* (Kitagawa) S. X. Li & Y. L. Chang; *P. roseoviride* var. *manshuricola* (Kitagawa) C. F. Fang.

Leaves basally cuneate. $2n = 40$.

Moist valleys, along stream banks; sea level to 3000 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, ?Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [India, Indonesia, Japan, Kashmir, Korea, Malaysia, Myanmar, Nepal, Philippines, Russia (Far East)].

34b. *Polygonum longisetum* var. *rotundatum* A. J. Li, Bull. Bot. Res., Harbin 15: 418. 1995.

圆基长鬃蓼 yuan ji chang zong liao

Persicaria sungareensis Kitagawa; *Polygonum barbatum* Linnaeus subsp. *gracile* Danser, p.p.; *P. barbatum* var. *gracile* (Danser) Steward, p.p.; *P. koreense* Nakai f. *viridiflorum* S. X. Li & Y. L. Chang; *P. sungareense* (Kitagawa) Kitagawa; *P. sungareense* f. *rubiflorum* S. X. Li & Y. L. Chang.

Leaves basally rounded. $2n = 20$.

Shaded places along ditches, water sides; sea level to 3100 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, ?Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Xizang, Yunnan, Zhejiang [Mongolia].

35. *Polygonum taquetii* H. Léveillé, Repert. Spec. Nov. Regni Veg. 8: 258. 1910.

细叶蓼 xi ye liao

Persicaria taquetii (H. Léveillé) Koidzumi; *Polygonum minutulum* Makino.

Herbs annual. Stems erect, prostrate or ascending at base, 30–50 cm tall, slender, glabrous, much branched, rooting at lower nodes. Petiole very short or nearly absent; leaf blade narrowly lanceolate, 2–4 cm × 3–6 mm, both surfaces sparsely pubescent, base narrowly cuneate, margin entire, apex acute; ocrea tubular, 5–6 mm, membranous, sparsely pubescent, apex truncate, cilia 3–5 mm. Inflorescence terminal or axillary, spicate, pendulous, to 10 cm, slender, interrupted, usually several spikes aggregated and panicle-like; bracts green, funnel-shaped, ca. 2 mm, margin long ciliate, each 3–5-flowered. Pedicels longer than bracts, slender. Perianth pinkish, 5-parted; tepals elliptic, 1.5–1.7 mm. Stamens usually 7, included. Styles 2 or 3, connate to below middle. Achenes included in persistent perianth, brown, shiny, ovoid, biconvex or trigonous, 1.2–1.5 mm. Fl. Aug–Sep, fr. Sep–Oct.

Wet valleys, along ditches, water sides; sea level to 400 m. Anhui, Fujian, Guangdong, Hubei, Hunan, Jiangsu, Jiangxi, Zhejiang [Japan, Korea].

36. *Polygonum foliosum* H. Lindberg, Meddeland. Soc. Fauna Fl. Fenn. 27: 3. 1900.

多叶蓼 duo ye liao

Herbs annual. Stems decumbent, rarely erect, 40–60 cm tall, slender, much branched, glabrous. Petiole very short or nearly absent; leaf blade narrowly lanceolate, 3–6 cm × 3–5 mm, sparsely pubescent, midvein prominent abaxially, lateral veins inconspicuous on both surfaces, base cuneate, broadly cuneate, or rounded, margin entire, not ciliate, apex acute; ocrea tubular, 8–10 mm, membranous, sparsely appressed hispidulous, apex truncate, cilia 0.5–3 mm. Inflorescence terminal or axillary, spicate, erect, lax, 3–5 cm, slender, interrupted below; bracts funnel-shaped, glabrous, margin ciliate, each 1- or 2-flowered. Perianth pinkish, 5-parted; tepals narrowly elliptic, 1.5–2 mm. Stamens 5. Styles 2. Achenes equaling persistent perianth, black, shiny, ovoid, biconvex, 1.2–2 mm, smooth. $2n = 20$.

Water sides, streamsides, along ditches; sea level to 700 m.

Anhui, Heilongjiang, Jiangsu, Jilin, Liaoning, ?Nei Mongol, ?Taiwan [Japan, Korea, Russia].

- 1a. Leaves basally cuneate; cilia of ocrea
0.5–1 mm 36a. var. *foliosum*
1b. Leaves basally broadly cuneate or rounded;
cilia of ocrea 2–3 mm 36b. var. *paludicola*

36a. *Polygonum foliosum* var. *foliosum*

多叶蓼(原变种) duo ye liao (yuan bian zhong)

Persicaria foliosa (H. Lindberg) Kitagawa.

Leaves basally cuneate; cilia of ocrea 0.5–1 mm.

Water sides, streamsides; sea level to 700 m. Anhui, Heilongjiang, Jilin, Liaoning, ?Nei Mongol, ?Taiwan [Japan, Korea, Russia].

36b. *Polygonum foliosum* var. *paludicola* (Makino) Kitamura, Acta Phytotax. Geobot. 20: 207. 1962.

宽基多叶蓼 kuan ji duo ye liao

Polygonum paludicola Makino, Bot. Mag. (Tokyo) 28: 113. 1914; *Persicaria paludicola* (Makino) Nakai.

Leaves basally broadly cuneate or rounded; cilia of ocrea 2–3 mm.

Water sides, along ditches; sea level to 300 m. Anhui, Heilongjiang, Jiangsu, Jilin, Liaoning [Japan, Russia (Far East)].

37. *Polygonum kawagoeanum* Makino, Bot. Mag. (Tokyo) 28: 115. 1914.

柔茎蓼 rou jing liao

Persicaria kawagoeana (Makino) Nakai; *P. tenella* (Blume) H. Hara var. *kawagoeana* (Makino) H. Hara; *Polygonum micranthum* Meisner; *P. minus* Hudson subsp. *micranthum* (Meisner) Danser; *P. minus* subsp. *procerum* Danser; *P. minus* var. *procerum* (Danser) Steward; *P. tenellum* Blume var. *micranthum* (Meisner) C. Y. Wu.

Herbs annual. Stems ascending or decumbent, 20–50 cm tall, slender, usually branched from base, glabrous, rooting at lower nodes; internodes 2–3 cm. Petiole very short or nearly absent; leaf blade narrowly lanceolate, 3–6 cm × 4–8 mm, both surfaces pubescent or glabrate, appressed hispid along midvein, base usually rounded, margin shortly ciliate, apex acute; ocrea tubular, 8–10 mm, membranous, sparsely appressed hispid, apex truncate, ciliate, cilia 2–4 mm. Inflorescence terminal or axillary, spicate, erect, dense, 2–3 cm; bracts funnel-shaped, margin largely ciliate, each 2–4-flowered. Pedicel 1–1.5 mm. Perianth rose-pink, 5-parted; tepals elliptic, 1–1.5 mm. Stamens 5 or 6. Styles 2; stigmas capitate. Achenes black, shiny, ovoid, biconvex, 1–1.5 mm. Fl. May–Sep, fr. Jun–Oct.

Moist valleys, waste areas, field margins; sea level to 1700 m. Anhui, Fujian, Guangdong, Guangxi, Hainan, Jiangsu, Jiangxi, Taiwan, ?Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Japan, Malaysia, Nepal, Sikkim].

38. *Polygonum jucundum* Meisner, Monogr. Polyg. 71. 1826.

愉悦蓼 yu yue liao

Persicaria jucunda (Meisner) Migo; *Polygonum hang-chouense* Matsuda.

Herbs annual, 60–90 cm tall. Stems erect, usually prostrate at base, glabrous, much branched. Petiole 3–6 mm; leaf blade elliptic-lanceolate, 6–10 × 1.5–2.5 cm, both surfaces sparsely appressed-hispidulous or subglabrous, shortly ciliate at margin, base cuneate, margin entire, apex acuminate; ocrea brownish, tubular, 5–10 mm, membranous, sparsely appressed hispidulous, apex truncate, cilia 6–11 mm. Inflorescence terminal or axillary, spicate, dense, 3–6 cm; bracts green, funnel-shaped, cilia 1.5–2 mm, each bract 3–5-flowered. Pedicels longer than bracts, 7–8 mm. Perianth pinkish or white, 5-parted; tepals oblong, 2–3 mm. Stamens 7 or 8, shorter than perianth. Styles 3, connate to below middle, longer than perianth, or stamens longer than perianth and styles shorter than perianth on separate plant; stigmas capitate. Achenes included in persistent perianth, black, shiny, ovoid, trigonous, ca. 2.5 mm. Fl. Aug–Sep, fr. Sep–Nov. $2n = 20^*$.

• Grassy slopes, moist valleys, along ditches; sea level to 2000 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Yunnan, Zhejiang.

39. *Polygonum limicola* Samuelsson in Handel-Mazzetti, Symb. Sin. 7: 178. 1929.

污泥蓼 wu ni liao

Persicaria limicola (Samuelsson) Yonekura & H. Ohashi.

Herbs annual. Stems stoloniferous, 40–80 cm, much branched at base, glabrous, rooting from nodes. Petiole 2–3 mm; leaf blade elliptic-lanceolate or ovate-lanceolate, 2–4 × 1–2 cm, both surfaces sparsely appressed hispid, densely so along midvein, base broadly cuneate, margin shortly ciliate, apex acute; ocrea tubular, 5–10 mm, membranous, apex truncate, cilia 5–8 mm. Inflorescence terminal, spicate, dense, 1.5–3 cm; bracts green, funnel-shaped, ca. 3 mm, cilia 1–1.5 mm. Pedicel 5–6 mm, slender. Perianth pinkish or white, 5-parted; tepals elliptic, 3–3.5 mm. Stamens 8, equaling or shorter than perianth. Styles 3, connate to below middle; stigmas capitate. Achenes included in persistent perianth, black-brown, shiny, ovoid, trigonous, 2.5–3 mm. Fl. Sep–Oct, fr. Oct–Nov.

• Valleys, humid places along ditches; 100–300 m. Guangdong, Guangxi, Hubei, Hunan, ?Yunnan.

3. *Polygonum* sect. *Bistorta* (Miller) D. Don, Prodr. Fl. Nepal. 69. 1825.

拳参组 quan shen zu

Bistorta Miller, Gard. Dict. Abr., ed. 4, [194]. 1754.

Plants without prickles. Leaves lanceolate to ovate or elliptical, margin revolute. Inflorescence a solitary terminal spike. Tepals free or only slightly fused at base. Inner nectaries confluent with inner filament bases. Styles 3, free, entire.

About 50 species: centered in the Arctic and E Asia; 22 species (six endemic) in China.

40. *Polygonum suffultoides* A. J. Li, Bull. Bot. Res., Harbin 15: 415. 1995.

珠芽支柱拳参 zhu ya zhi zhu quan shen

Herbs perennial. Rhizomes black-brown, large, ca. 1 cm in diam. Stems 1–3 from rhizome, erect, 30–60 cm tall, simple. Basal leaves: petiole 4–12 cm; leaf blade greenish abaxially, green adaxially, ovate or narrowly ovate, 3–8 × 2–5 cm, both surfaces pubescent, base cordate, margin entire, apex acuminate or acute. Cauline leaves: petiole short; leaf blade narrowly ovate, base cordate, apex acuminate; upper leaves smaller, sessile, clasping, sometimes with axillary bulbils; ocrea brown, tubular, 1.5–2.5 cm, membranous, apex oblique, not ciliate, dehiscent. Inflorescence terminal, spicate, lax, 2–5 cm, slender, lower part with bulbils; bracts brown, narrowly ovate, 2.5–3 mm, apex long acuminate, each 1- or 2-flowered. Pedicels shorter than bracts, 2–2.5 mm. Perianth white or pinkish, 5-parted; tepals oblong, ca. 2 mm. Stamens 8, equaling perianth. Ovary ovoid, trigonous; styles 3, connate at base; stigma capitate. Fl. and fr. Jul–Oct.

• Forests on mountain slopes, alpine meadows; 3200–4500 m. NW Yunnan.

41. *Polygonum viviparum* Linnaeus, Sp. Pl. 1: 360. 1753.

珠芽拳参 zhu ya quan shen

Herbs perennial. Rhizomes black-brown, contorted, large, 1–2 cm in diam. Stems usually 2 or 3 from rhizome, erect, 15–60 cm tall, simple. Basal leaves long petiolate; leaf blade linear, ovate-lanceolate, or oblong, 3–10 × 0.2–3 cm, leathery, base rounded or cuneate, margin slightly involute, apex acute. Cauline leaves shortly petiolate or subsessile; leaf blade lanceolate smaller than basal ones; ocrea: lower part green, upper part brown, tubular, oblique, membranous, not ciliate. Inflorescence terminal, spicate, lower part with bulbils; bracts ovate, membranous. Perianth white or pinkish, 5-parted; tepals broadly elliptic, 2–3 mm. Stamens usually 8. Styles 3, connate at base. Achenes included in persistent perianth, dark brown, shiny, ovoid, trigonous, ca. 2 mm. Fl. May–Jul, fr. Jul–Sep. $2n = ca. 12^*$.

Forest margins, grassy slopes, alpine steppes; 1200–5100 m. Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Bhutan, India, Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Myanmar, Nepal, Russia, Sikkim, Tajikistan, Thailand; SW Asia, Europe, North America].

- 1a. Leaf blade oblong or ovate-lanceolate,
5–30 mm wide 41a. var. *viviparum*
1b. Leaf blade linear, 2–3 mm wide 41b. var. *tenuifolium*

41a. *Polygonum viviparum* var. *viviparum*

珠芽拳参(原变种) zhu ya quan shen (yuan bian zhong)

Bistorta vivipara (Linnaeus) S. F. Gray; ?*B. vivipara* var. *angustifolia* Nakai; *Persicaria vivipara* (Linnaeus) Ronse Decraene; *Polygonum renii* L. C. Wang.

Leaf blade oblong or ovate-lanceolate, 3–10 × 0.5–3 cm.

Grassy slopes, alpine steppes; 1200–5100 m. Gansu, Guizhou,

Hebei, Heilongjiang, Henan, Hubei, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Bhutan, India, Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Myanmar, Nepal, Russia, Sikkim, Tajikistan, Thailand; SW Asia, Europe, North America].

41b. *Polygonum viviparum* var. *tenuifolium* Y. L. Liu, J. NorthW. Teachers' Coll., Nat. Sci. 3: 45. 1985 or 1987.

细叶珠芽拳参 xi ye zhu ya quan shen

Polygonum tenuifolium H. W. Kung, Contr. Inst. Bot. Natl. Acad. Peiping 3: 367. 1935, not Stephan ex Ledebour (1850); *P. viviparum* var. *angustum* A. J. Li, nom. illeg. superfl.

Leaf blade linear, 2–3 mm wide.

• Forest margins, grassy slopes; 2000–4300 m. Gansu, Qinghai, Shaanxi, Sichuan, Yunnan.

42. *Polygonum pacificum* V. Petrov ex Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 29: 55. 1923.

太平洋拳参 tai ping yang quan shen

Bistorta pacifica (V. Petrov ex Komarov) Komarov ex Kitagawa; *Polygonum bistorta* Linnaeus subsp. *pacificum* (V. Petrov ex Komarov) V. N. Voroschilov.

Herbs perennial. Rhizome black-brown, large, curved, 1.5–3 cm in diam. Stems 1–3 from rhizome, erect, 40–90 cm tall, simple, glabrous, striate. Basal leaves long petiolate; petiole 10–20 cm; leaf blade gray-green abaxially, green adaxially, narrowly ovate, 5–15 × 3–7 cm, abaxially sparsely small papillose, adaxially glabrous, base subcordate or rounded, decurrent along petiole, forming narrow wing, apex acute. Cauline leaves ovate or lanceolate-ovate, base cordate, clasping; upper leaves linear; ocrea: lower part green, upper part brown, tubular, membranous, dehiscent, not ciliate. Inflorescence terminal, spicate, dense, 3–5 cm, 1.2–1.5 cm in diam.; bracts broadly elliptic, 3–4 mm, apex caudate, each 1–3-flowered. Pedicels longer than bracts, slender. Perianth pinkish, 5-parted; tepals elliptic, ca. 2.5 mm. Stamens 8, exerted. Styles 3; stigma capitate. Achenes exceeding persistent perianth, black-brown, shiny, ovoid, sharply trigonous, ca. 3 mm. Fl. Jul–Aug, fr. Aug–Sep.

Slopes, forest margins, meadows; 300–2100 m. Heilongjiang, Jilin, Liaoning, ?Nei Mongol [Korea, Russia (Far East)].

43. *Polygonum honanense* H. W. Kung, Chin. J. Bot. 1(1): 14. 1936.

河南拳参 he nan quan shen

Bistorta honanensis (H. W. Kung) Yonekura & H. Ohashi.

Herbs perennial. Rhizomes subglobose, large. Stems erect, ca. 30 cm tall, glabrous, simple, slenderly striate. Basal leaves: petiole large, 2–3 cm; leaf blade orbicular-ovate, 3–6 × 3–4.5 cm, subleathery, both surfaces glabrous, base subcordate, decurrent along petiole forming a wing, margin slightly revolute, apex obtuse. Cauline leaves shortly petiolate or subsessile; leaf blade ovate or lanceolate; ocrea: lower part green, upper part brown, tubular, membranous, dehiscent, not ciliate. Inflorescence terminal, spicate, dense, 3–4 cm, ca. 1.5 cm in diam.;

bracts brown, ovate or ovate-lanceolate, 4–5 mm, membranous, apex acuminate, each 3-flowered. Pedicels longer than bracts, slender. Perianth pinkish, 5-parted; tepals narrowly elliptic, ca. 3 mm. Stamens 8, exserted. Styles 3; stigmas capitate. Achenes light brown, shiny, ovoid, trigonous, equaling persistent perianth, ca. 3 mm. Fl. Jul–Aug, fr. Aug–Sep.

- Rocky fissures; ca. 2500 m. Henan, ?Shaanxi.

44. *Polygonum sinomontanum* Samuelsson in Handel-Mazzetti, *Symb. Sin.* 7: 177. 1929.

翅柄拳参 chi bing quan shen

Bistorta amplexicaulis (D. Don) Greene subsp. *sinomontana* (Samuelsson) Yonekura & H. Ohashi; *B. sinomontana* (Samuelsson) F. Miyamoto.

Herbs perennial. Rhizomes horizontal, black-brown, large, ca. 12 cm, 1–3 cm in diam. Stems usually numerous from rhizome, erect, 30–50 cm tall, glabrous, simple, sometimes branched at lower part. Basal leaves long petiolate; petiole 4–14 cm; leaf blade broadly lanceolate or lanceolate, 6–16 × 1–3 cm, subleathery, abaxially sometimes puberulent along veins, adaxially glabrous, both surfaces with prominent veins, base cuneate or truncate, decurrent along petiole forming a narrow wing, margin revolute, apex acuminate. Cauline leaves shortly petiolate, lanceolate, smaller; upper leaves subsessile; ocrea brown throughout, tubular, 3–6 cm, membranous, apex oblique, not ciliate, cleft to base. Inflorescence terminal, spicate, 2–6 cm, 1–1.5 cm in diam.; bracts ovate-lanceolate, 3–4 mm, apex acuminate, each 2- or 3-flowered. Pedicel 4–5 mm, slender. Perianth red, 5-parted; tepals oblong, 3–5 mm. Stamens 8, exserted. Styles 3; stigmas capitate. Achenes included in persistent perianth, brown, shiny, broadly ellipsoid, trigonous, 3–4 mm. Fl. Jul–Aug, fr. Sep–Oct.

- Grassy slopes, mixed forests in valleys; 2500–3900 m. Sichuan, Xizang, Yunnan.

45. *Polygonum manshuriense* V. Petrov ex Komarov, *Trudy Imp. S.-Peterburgsk. Bot. Sada* 29: 55. 1923.

耳叶拳参 er ye quan shen

Bistorta manshuriensis Komarov.

Herbs perennial. Rhizomes black, curved, short, ca. 1 cm in diam. Stems usually numerous from rhizome, erect, 60–80 cm tall, simple, glabrous. Basal leaves long petiolate; petiole 8–15 cm; leaf blade gray-green abaxially, green adaxially, oblong or lanceolate, 13–15 × 2–3 cm, papery, both surfaces glabrous, base cuneate, decurrent along petiole forming narrow wing, margin entire, apex acuminate. Cauline leaves sessile; leaf blade lanceolate; upper leaves clasping, auriculate; ocrea: lower part green, upper part brown, tubular, membranous, oblique, not ciliate, cleft to middle. Inflorescence terminal, spicate, 4–8 cm, ca. 1 cm in diam.; bracts ovate, membranous, apex cuspidate, each 2- or 3-flowered. Pedicels longer than bracts, 4–5 mm, articulate at apex. Perianth pinkish or white, 5-parted; tepals elliptic, ca. 3 mm. Stamens 8, exserted. Styles 3; stigmas capitate. Achenes included in persistent perianth, shiny, ovoid, sharply trigonous, 3–3.5 mm. Fl. Jun–Jul, fr. Aug–Sep.

Grassy slopes, forest margins, valleys; 800–1800 m. Heilongjiang, Jilin, Liaoning, Nei Mongol [Korea, Russia (Far East)].

46. *Polygonum ochotense* V. Petrov ex Komarov, *Fl. URSS* 5: 726. 1936.

倒根拳参 dao gen quan shen

Bistorta ochotensis (V. Petrov ex Komarov) Komarov; *Polygonum bistorta* Linnaeus subsp. *ochotense* (V. Petrov ex Komarov) V. N. Voroschilov.

Herbs perennial. Rhizomes black-brown, curved, large. Stems erect, 15–40 cm tall, glabrous. Basal leaves long petiolate; petiole 6–10 cm; leaf blade green, ovate-lanceolate or oblong-lanceolate, subleathery, 5–8 × 1.5–3 cm, abaxially densely gray-white pubescent, adaxially glabrous, base rounded or subcordate, slightly decurrent along petiole, margin revolute, apex acuminate. Cauline leaves smaller; petiole short; leaf blade ovate lanceolate; upper leaves clasping; ocrea: lower part green, upper part brown, tubular, pubescent, not ciliate, cleft to middle. Inflorescence spicate, short, 2–3 cm, 1–1.5 cm in diam.; bracts brown, membranous, apex long acuminate, awned. Pedicel slender, articulate at apex. Perianth pinkish, 5-parted; tepals elliptic, 2.5–3 mm. Stamens 8, exserted; anthers purple. Styles 3, exserted, slender; stigmas capitate. Achenes included in persistent perianth, shiny, ovoid, trigonous, ca. 4 mm. Fl. Jul–Aug, fr. Aug–Sep.

- Mountain slopes; 1500–2500 m. Jilin [Korea, Russia (Far East)].

47. *Polygonum milletii* (H. Léveillé) H. Léveillé, *Cat. Pl. Yun-Nan*, 207. 1916.

大海拳参 da hai quan shen

Bistorta milletii H. Léveillé, *Repert. Spec. Nov. Regni Veg.* 12: 286. 1913; *B. taipaihanensis* (H. W. Kung) Yonekura & H. Ohashi; *Polygonum taipaihanense* H. W. Kung.

Herbs perennial. Rhizomes black, curved, large, 1.5–2 cm in diam. Stems usually 2 or 3 from rhizome, erect, 30–50 cm tall, simple, glabrous. Basal leaves long petiolate; petiole 8–12 cm; leaf blade greenish abaxially, green adaxially, lanceolate or narrowly lanceolate, 10–20 × 1.5–3 cm, subleathery, abaxially glabrous or pubescent, adaxially glabrous, base cuneate, decurrent along petiole forming narrow wing, margin entire, revolute, apex acuminate. Cauline leaves shortly petiolate or subsessile; leaf blade lanceolate, smaller; ocrea: lower part green, upper part brown, tubular, membranous, apex oblique, not ciliate, cleft to middle. Inflorescence terminal, spicate, dense, 2–4 cm, 1–1.5 cm in diam.; bracts brown, ovate-lanceolate, 3–4 mm, membranous, apex acuminate. Pedicels longer than bracts, 4–6 mm, slender. Perianth purple-red, 5-parted; tepals elliptic, 4–5 mm, apex obtuse. Stamens 8, exserted; anthers black-purple. Styles 3, connate to below middle; stigmas capitate. Achenes included in persistent perianth, brown, shiny, ovoid, trigonous, 3–4 mm. Fl. Jul–Aug, fr. Sep–Oct.

- Mountain slopes, meadows, wet valleys; 1700–3900 m. ?Qinghai, S Shaanxi, Sichuan, Yunnan [Bhutan, N India, Nepal].

48. *Polygonum ellipticum* Willdenow ex Sprengel, *Syst. Veg.* 2: 253. 1825.

椭圆叶拳参 tuo yuan ye quan shen

Bistorta major S. F. Gray subsp. *elliptica* (Sprengel) A. Löve & D. Löve; *Polygonum attenuatum* V. Petrov ex Komarov (1936), not R. Brown (1810); *P. bistorta* var. *ellipticum* (Willdenow ex Sprengel) Turczaninow; *P. bistorta* var. *nitens* Fischer & C. A. Meyer; *P. nitens* (Fischer & C. A. Meyer) V. Petrov ex Komarov.

Herbs perennial. Rhizomes black-brown, curved, large, ca. 2 cm in diam. Stems erect, 30–60 cm tall, simple, glabrous. Basal leaves petiolate; petiole 5–9 cm; leaf blade elliptic or nearly oblong, 8–12 × 2–3 cm, papery, abaxially sparsely pubescent or glabrous, adaxially glabrous, base broadly cuneate or subrounded, decurrent along petiole, margin entire, apex acute. Cauline leaves shortly petiolate or sessile; leaf blade lanceolate or linear; ocrea brown or greenish, tubular, membranous, not ciliate. Inflorescence terminal, spicate, 2–3 cm, 1.5–2 cm in diam.; bracts brown, broadly ovate, membranous, apex long acuminate, each 1- or 2-flowered. Pedicels longer than bracts, 4–5 mm. Perianth pinkish, 5-parted; tepals narrowly elliptic, 3–3.5 mm. Stamens 8, exserted. Styles 3, connate at base; stigmas capitate. Achenes included in persistent perianth, brown, shiny, ovoid, sharply trigonous, 3–4 mm. Fl. Jul–Aug, fr. Aug–Sep. $2n = 22$.

Mountain slopes, meadows; 1500–3200 m. Jilin, Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia (Far East, E Siberia), Tajikistan].

49. *Polygonum alopecuroides* Turczaninow ex Besser, Fl. Beibl. 23. 1834.

狐尾拳参 hu wei quan shen

Bistorta alopecuroides (Turczaninow ex Besser) Komarov; *B. alopecuroides* (Turczaninow ex Besser) Komarov f. *pilosa* (C. F. Fang) Kitagawa; *Polygonum alopecuroides* Turczaninow ex Besser f. *pilosum* C. F. Fang.

Herbs perennial. Rhizomes curved, large, 1–2 cm in diam. Stems erect, 50–90 cm tall, simple, glabrous. Basal leaves long petiolate; petiole 10–20 cm; leaf blade gray-green abaxially, green adaxially, narrowly oblong or oblong-lanceolate, 10–15 × 1–2 cm, papery, both surfaces glabrous or pubescent, base cuneate, decurrent along petiole, margin entire, apex acuminate. Cauline leaves shortly petiolate or subsessile, lanceolate, base subrounded or nearly cordate, apex acuminate; ocrea: lower part green, upper part brown, tubular, membranous, dehiscent at middle, not ciliate. Inflorescence terminal, spicate, dense, 4–7 cm, ca. 1 cm in diam.; bracts broadly elliptic, apex caudate, each 2- or 3-flowered. Pedicels longer than bracts, slender. Perianth white or pinkish, 5-parted; tepals narrowly elliptic, 2.5–3 mm. Stamens 8, exserted. Styles 3, free; stigmas capitate. Achenes included in persistent perianth, brown, shiny, narrowly ovoid, sharply trigonous, ca. 3 mm. Fl. Jun–Jul, fr. Jul–Aug.

Mountain slopes, meadows; 900–2300 m. Heilongjiang, Jilin, Liaoning, Nei Mongol [Mongolia, Russia (Far East, Siberia)].

50. *Polygonum bistorta* Linnaeus, Sp. Pl. 1: 360. 1753.

拳参 quan shen

Bistorta lapidosa Kitagawa; *B. major* S. F. Gray; *B. officinalis* Rafinesque; *Persicaria bistorta* (Linnaeus) Sampaio; *Polygonum lapidosum* (Kitagawa) Kitagawa.

Herbs perennial. Rhizomes black-brown, curved, large, 1–3 cm in diam. Stems erect, usually 2 or 3 from a rhizome, 50–80 cm tall, simple, glabrous. Basal leaves long petiolate; petiole 10–20 cm; leaf blade broadly lanceolate or narrowly ovate, 4–18 × 2–5 cm, papery, both surfaces glabrous or abaxially pubescent, base truncate or subcordate, decurrent along petiole forming narrow wing, margin revolute, apex acute or acuminate. Cauline leaves sessile; leaf blade linear or lanceolate; ocrea: lower part green, upper part brown, tubular, membranous, apex oblique, cleft to middle. Inflorescence terminal, spicate, dense, 4–9 cm, 0.8–1.2 cm in diam.; bracts brownish, ovate, membranous, midvein conspicuous, apex acuminate, each 3- or 4-flowered. Pedicels longer than bracts, 5–7 mm, slender. Perianth pinkish or white, 5-parted; tepals elliptic, 2–3 mm. Stamens 8, equaling perianth. Styles 3, free; stigmas capitate. Achenes slightly exceeding persistent perianth, brown, shiny, ellipsoid, trigonous, ca. 3.5 mm. Fl. Jun–Jul, fr. Aug–Sep.

Hilly grasslands, meadows; 800–3000 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Zhejiang [Japan, Kazakhstan, Mongolia, Russia; Europe].

This species is used medicinally.

51. *Polygonum suffultum* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 22: 233. 1877.

支柱拳参 zhi zhu quan shen

Herbs perennial. Rhizomes black-brown, usually torulose, large. Stems usually 3 or 4 from rhizome, erect or ascending, 10–40 cm tall, simple or branched above, slender. Basal leaves long petiolate; petiole 4–15 cm; leaf blade ovate or narrowly ovate, 5–12 × 3–6 cm, both surfaces glabrous or sparsely pubescent, shortly ciliate at margin, base cordate, margin entire, not revolute, apex acuminate or acute. Cauline leaves shortly petiolate; leaf blade ovate, uppermost sessile, clasping; ocrea brown, tubular, 2–4 cm, membranous, apex oblique, not ciliate. Inflorescence terminal or axillary, spicate, dense or lax, 1–2 cm, interrupted at base; bracts narrowly ovate, ca. 3 mm, membranous, apex acuminate, each 2–4-flowered. Pedicels shorter than bracts, 2–2.5 mm, slender. Perianth white or pinkish, 5-parted; tepals obovate or elliptic, 3–3.5 mm. Stamens 8, exserted. Styles 3, connate at base; stigmas capitate. Achenes slightly exceeding persistent perianth, yellowish brown, shiny, broadly ellipsoid, sharply trigonous, 3.5–4 mm. Fl. May–Jun, fr. Jun–Aug.

Slopes, forests, ditches, forest margins, wet valleys; 1300–4000 m. Anhui, Gansu, Guizhou, Hebei, ?Henan, Hubei, Hunan, Jiangxi, Ningxia, Qinghai, Shaanxi, ?Shandong, Shanxi, Sichuan, Xizang, Yunnan, Zhejiang [Japan, Korea].

- 1a. Inflorescence dense 51a. var. *suffultum*
1b. Inflorescence lax, slender, interrupted
at base 51b. var. *pergracile*

51a. *Polygonum suffultum* var. *suffultum*

支柱拳参(原变种) zhi zhu quan shen (yuan bian zhong)

Bistorta franchetiana V. Petrov; *B. majanthemifolia* V. Petrov; *B. suffulta* (Maximowicz) H. Gross; ?*Polygonum con-*

stans Cummins; *P. limprichtii* Lingelsheim; *P. majanthemifolium* (V. Petrov) Steward; *P. marretii* H. Léveillé.

Inflorescence dense.

Slopes, forests, ditches; 1300–4000 m. Anhui, Gansu, Guizhou, Hebei, Hubei, Hunan, Jiangxi, Ningxia, Qinghai, Shaanxi, ?Shandong, Shanxi, Sichuan, Xizang, Yunnan, Zhejiang [Japan, Korea].

51b. *Polygonum suffutum* var. *pergracile* (Hemsley) Samuelsson in Handel-Mazzetti, Symb. Sin. 7: 176. 1929.

细穗支柱拳参 xi sui zhi zhu quan shen

Polygonum pergracile Hemsley, J. Linn. Soc., Bot. 26: 344. 1891; *Bistorta pergracilis* (Hemsley) H. Gross; *B. pseudo-suffulta* V. Petrov; *B. suffulta* subsp. *pergracilis* (Hemsley) Soják.

Inflorescence lax, slender, interrupted at base.

• Slopes, forests, forest margins, wet valleys; 1500–3600 m. Anhui, Gansu, Guizhou, ?Henan, Hubei, Shaanxi, Sichuan, Xizang, Yunnan, Zhejiang.

52. *Polygonum amplexicaule* D. Don, Prodr. Fl. Nepal. 70. 1825.

包茎拳参 bao jing quan shen

Herbs perennial. Rhizomes horizontal, purple-brown, large, ca. 1.5 cm. Stems erect, 40–100 cm tall, robust, branched. Basal leaves long petiolate; petiole 5–10 cm; leaf blade greenish abaxially, green adaxially, ovate or oblong-ovate, 4–10 × 2–5 cm, abaxially sometimes pubescent along veins, adaxially glabrous, base cordate, margin slightly revolute, apex long acuminate. Cauline leaves shortly petiolate; leaf blade narrowly ovate, smaller; uppermost leaves sessile or clasping; ocrea brown, tubular, 2–4 cm, membranous, dehiscent at base, not ciliate. Inflorescence terminal or axillary, spicate, dense or lax, 2–4 cm, 1–1.3 cm in diam.; bracts brown, ovate, membranous, each 2- or 3-flowered. Pedicels longer than bracts, slender. Perianth red, 5-parted; tepals elliptic or narrowly elliptic, 3–5 × 1.5–2.5 mm. Stamens 8. Styles 3, free; stigmas capitate. Achenes slightly exceeding persistent perianth, black-brown, shiny, ellipsoid, trigonous, 4–5 mm, tapered at both ends.

Shaded grassy places in valleys, mixed forests on mountain slopes, grassy slopes, forest margins; 1000–3300 m. Gansu, Hubei, Hunan, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, India, Kashmir, Nepal, Pakistan].

- 1a. Inflorescence dense; tepals ovate-elliptic to elliptic, 4–5 × 2–2.5 mm 52a. var. *amplexicaule*
 1b. Inflorescence lax; tepals narrowly elliptic, 3–4 × 1.5–2 mm 52b. var. *sinense*

52a. *Polygonum amplexicaule* var. *amplexicaule*

包茎拳参(原变种) bao jing quan shen (yuan bian zhong)

Bistorta amplexicaulis (D. Don) Greene; *B. petiolata* (D. Don) V. Petrov; *B. speciosa* (Meisner) Greene; *Persicaria amplexicaulis* (D. Don) Ronse Decraene; *Polygonum ambiguum* Meisner; *P. amplexicaule* var. *speciosum* (Meisner) J. D. Hooker; *P. oxyphyllum* Wallich ex Meisner; *P. petiolatum* D. Don; *P. speciosum* Meisner.

Inflorescence dense. Tepals elliptic, 4–5 × 2–2.5 mm.

Shaded grassy places in valleys, mixed forests on mountain slopes; 1000–3300 m. Hubei, Sichuan, Xizang, Yunnan [Bhutan, India, Kashmir, Nepal, Pakistan].

One of us (Ohba) notes that *Polygonum sinomontanum* differs from this variety by its frequently branched stem in the lower part, winged and undulate petioles, and inflorescence usually flowering downward.

This variety is used medicinally.

52b. *Polygonum amplexicaule* var. *sinense* Forbes & Hemsley ex Steward, Contr. Gray Herb., n.s., 5: 30. 1930.

中华抱茎拳参 zhong hua bao jing quan shen

Bistorta amplexicaulis subsp. *sinensis* (Forbes & Hemsley) Soják; *B. henryi* Yonekura & H. Ohashi (2002), not *B. chinensis* H. Gross (1913).

Inflorescence lax. Tepals narrowly elliptic, 3–4 × 1.5–2 mm.

Grassy slopes, forests margins; 1200–3000 m. Gansu, Hubei, Hunan, Shaanxi, Sichuan, Yunnan [Bhutan, India, Nepal, Pakistan].

53. *Polygonum griffithii* J. D. Hooker, Fl. Brit. India 5: 54. 1886.

长梗拳参 chang geng quan shen

Bistorta griffithii (J. D. Hooker) A. J. C. Grierson; *Polygonum calostachyum* Diels.

Herbs perennial. Rhizomes black-brown, horizontal, large, to 20 cm, 1.5–3 cm in diam. Stems 1 or 2 from rhizome, erect, 20–40 cm tall, simple, glabrous. Basal leaves long petiolate; petiole large, 6–10 cm; leaf blade slightly shiny adaxially, elliptic, 10–15 × 3–5 cm, leathery, glabrous, midvein prominent, yellow-brown pubescent, rarely glabrous abaxially, base broadly cuneate or rounded, margin with thickened vein tips, revolute, apex acuminate or acute. Cauline leaves shortly petiolate; leaf blade ovate-elliptic; uppermost leaves sessile; ocrea tubular, 3–6 cm, membranous, glabrous, apex oblique, not ciliate. Inflorescence terminal or axillary, spicate, nutant, lax, 3–5 cm, 1.5–2 cm in diam.; bracts broadly lanceolate or narrowly ovate, 4–5 mm, each 1- or 2-flowered. Pedicel filiform, 1–1.2 cm, articulate at middle. Perianth purple-red, 5-parted; tepals narrowly elliptic, 5–6 mm. Stamens 8, included. Styles 3; stigmas capitate. Achenes included in persistent perianth, yellow-brown, shiny, narrowly ellipsoid, trigonous, 4–5 mm. Fl. Jul–Aug, fr. Sep–Oct.

Alpine meadows, rocky fissures; 3000–5000 m. Xizang, Yunnan [Bhutan, N Myanmar].

54. *Polygonum macrophyllum* D. Don, Prodr. Fl. Nepal. 70. 1825.

圆穗拳参 yuan sui quan shen

Herbs perennial. Rhizomes curved, large, 1–2 cm in diam. Stems 2 or 3 from rhizome, erect, 8–30 cm tall, simple. Basal leaves petiolate; petiole 3–8 cm; leaf blade gray-green abaxially, green adaxially, oblong, lanceolate, or linear-lanceolate 3–

11 × 0.2–3 cm, abaxially sometimes sparsely pubescent, adaxially glabrous, base subcordate or cuneate, margin with thickened vein tips, revolute, apex acute. Cauline leaves shortly petiolate or subsessile; leaf blade narrowly lanceolate or linear; ocrea: lower part green, upper part brown, tubular, membranous, apex oblique, dehiscent, not ciliate. Inflorescence terminal, shortly spicate, 1.5–2.5 cm, 1–1.5 cm in diam.; bracts ovate, 3–4 mm, membranous, apex acuminate, each 2- or 3-flowered. Pedicel 4–5 mm, slender. Perianth pinkish or white, 5-parted; tepals elliptic, 2.5–3 mm. Stamens 8, exserted; anthers black-purple. Styles 3, connate at base; stigmas capitate. Achenes included in persistent perianth, yellow-brown, shiny, ovoid, trigonous, 2.5–3 mm.

Grassy slopes, alpine meadows; 2000–5000 m. Gansu, Guizhou, Henan, Hubei, Qinghai, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, N India, Nepal, Sikkim].

- 1a. Basal leaves oblong or lanceolate, 10–30 mm wide 54a. var. *macrophyllum*
 1b. Basal leaves linear-lanceolate, 2–5 mm wide 54b. var. *stenophyllum*

54a. *Polygonum macrophyllum* var. *macrophyllum*

圆穗拳参(原变种) yuan sui quan shen (yuan bian zhong)

Bistorta macrophylla (D. Don) Soják; *B. sphaerostachya* (Meisner) Greene; *B. yunnanensis* H. Gross; *Polygonum macrophyllum* f. *tomentosum* Kitamura; *P. sphaerostachyum* Meisner.

Basal leaves oblong or lanceolate, 1–3 cm wide.

Grassy slopes, alpine meadows; 2300–5000 m. Guizhou, Henan, Hubei, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, N India, Nepal, Sikkim].

54b. *Polygonum macrophyllum* var. *stenophyllum* (Meisner) A. J. Li in C. Y. Wu, Fl. Xizang. 1: 613. 1983.

狭叶圆穗拳参 xia ye yuan sui quan shen

Polygonum stenophyllum Meisner, Monogr. Polyg. 52. 1826; *Bistorta macrophylla* var. *stenophylla* (Meisner) F. Miyamoto.

Basal leaves linear-lanceolate, 2–5 mm wide.

Grassy slopes, alpine meadows; 2000–4800 m. Gansu, Qinghai, Shaanxi, Sichuan, Xizang, Yunnan [N India, Nepal].

55. *Polygonum paleaceum* Wallich ex J. D. Hooker, Fl. Brit. India 5: 32. 1886.

草血竭 cao xue jie

Herbs perennial. Rhizomes black-brown, curved, large, 2–3 cm in diam. Stems 1–3 from rhizome, erect, 40–60 cm tall, simple, glabrous, slenderly angulate. Basal leaves long petiolate; petiole 5–15 cm; leaf blade gray-green abaxially, green adaxially, narrowly oblong or lanceolate, 6–18 × 2–3 cm, leathery, both surfaces glabrous or abaxially sparsely curved pubescent, base cuneate, rarely subcordate, margin with thickened vein tips, slightly revolute, apex acute or slightly acumi-

nate. Cauline leaves shortly petiolate, lanceolate; uppermost leaves linear, subsessile; orchreae: lower part green, upper part brown, membranous, not ciliate, dehiscent. Inflorescence spicate, dense, 4–6 cm, 0.8–1.2 cm in diam.; bracts ovate lanceolate, membranous, apex long acuminate. Pedicels spreading, longer than bracts, 5–6 mm, slender. Perianth pinkish or white, 5-parted; tepals elliptic, 2–2.5 mm. Stamens 8; anthers red-brown. Styles 3; stigmas capitate. Achenes included in persistent perianth, shiny, ovoid, sharply trigonous, ca. 2.5 mm.

Grassy slopes, forest margins; 1500–4000 m. Guangxi, Guizhou, Sichuan, Yunnan [NE India, N Thailand].

- 1a. Basal leaves glabrous on both surfaces 55a. var. *paleaceum*
 1b. Basal leaves sparsely curved pubescent abaxially 55b. var. *pubifolium*

55a. *Polygonum paleaceum* var. *paleaceum*

草血竭(原变种) cao xue jie (yuan bian zhong)

Bistorta chinensis H. Gross; *B. paleacea* (Wallich ex J. D. Hooker) Yonekura & H. Ohashi; *B. yunnanensis* H. Gross; *Polygonum yunnanense* (H. Gross) H. Léveillé.

Basal leaves glabrous on both surfaces.

Grassy slopes, forest margins; 1500–3500 m. Guangxi, Guizhou, Sichuan, Yunnan [NE India, N Thailand].

This variety is used medicinally.

55b. *Polygonum paleaceum* var. *pubifolium* Samuelsson in Handel-Mazzetti, Symb. Sin. 7: 174. 1929.

毛叶草血竭 mao ye cao xue jie

Basal leaves sparsely curved pubescent abaxially.

• Grassy slopes, forest margins; 2000–4000 m. Sichuan, Yunnan.

56. *Polygonum subscaposum* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 261. 1912.

大理拳参 da li quan shen

Bistorta subscaposa (Diels) V. Petrov; *Polygonum taliense* Lingelsheim.

Herbs perennial. Rhizomes black-brown, large, 2–3 cm in diam. Stems usually 2 or 3 from rhizome, erect, 15–30 cm tall, glabrous. Basal leaves petiolate; petiole 4–6 cm, glabrous; leaf blade elliptic or elliptic-ovate, 8–13 × 4–6 cm, abaxially yellow-brown tomentose, adaxially glabrous, midvein large, glabrous, base subrounded, margin with thickened vein tips, revolute, apex acuminate. Cauline leaves shortly petiolate or subsessile; leaf blade linear; ocrea: lower part green, upper part brown, tubular, 5–8 mm, membranous, dehiscent, not ciliate. Inflorescence spicate, dense, 2–3 cm, 1.2–1.5 in diam.; bracts brown, ovate, 3–4 mm, membranous, apex acuminate. Pedicel 5–6 mm, articulate at apex. Perianth red, 5-parted; tepals narrowly elliptic, 3–3.5 × 1.5–2 mm. Stamens 8, exserted. Styles 3, connate at base; stigmas capitate. Achenes included in persistent perianth, brown, shiny, narrowly ovoid, sharply trigonous, 2.5–3 mm. Fl. Jul–Aug, fr. Aug–Sep.

- Grassy slopes; 3500–4000 m. Yunnan.

57. *Polygonum purpureonervosum* A. J. Li, Bull. Bot. Res., Harbin 15: 416. 1995.

紫脉拳参 *zi mai quan shen*

Bistorta purpureonervosa (A. J. Li) Yonekura & H. Ohashi.

Herbs perennial. Rhizomes black-brown, curved, large, 1.5–2 cm in diam. Stems erect, purple-red, 15–20 cm tall, simple. Basal leaves petiolate; petiole purple, 3–4 cm, glabrous; leaf blade gray-green abaxially, green and slightly shiny adaxially, elliptic, 3–5 × 2.5–3 cm, leathery, margin with thickened vein tips, revolute, veins purple-red and slightly prominent, base cuneate, apex subobtusate. Cauline leaves shortly petiolate or sessile; leaf blades smaller than basal ones, ovate-elliptic; ocrea: lower part purple-red, upper part brown, tubular, 2.5–4 mm, membranous, apex oblique, not ciliate, dehiscent at middle. Inflorescence shortly spicate, 2–2.5 cm, 1.5–2 cm in diam.; bracts brown, ovate, membranous, apex acuminate. Pedicel 3–4 mm. Perianth purple-red, 5-parted; tepals elliptic, 3–3.5 mm. Stamens 8, exserted. Styles 3, connate to below middle, exserted; stigmas capitate. Achenes included in persistent perianth, black-brown, shiny, ovoid, trigonous, ca. 3.5 mm. Fl. Jul–Aug, fr. Aug–Sep.

- Mixed thickets on mountain slopes, grassy slopes; 4000–4800 m. Sichuan (Daocheng, Xiangcheng).

58. *Polygonum coriaceum* Samuelsson in Handel-Mazzetti, Symb. Sin. 7: 174. 1929.

革叶拳参 *ge ye quan shen*

Bistorta coriacea (Samuelsson) Yonekura & H. Ohashi.

Herbs perennial. Rhizomes black-brown, curved, large. Stems 1 or 2 from rhizome, erect, 15–30 cm tall, glabrous, simple. Basal leaves petiolate; petiole 3–8 cm; leaf blade ovate-elliptic or ovate-lanceolate, 4–14 × 2–4.5 cm, leathery, abaxially sometimes sparsely pubescent, adaxially glabrous, base truncate or subcordate, veins conspicuous, green, margin with thickened vein tips, revolute, apex acute or slightly obtuse. Cauline leaves shortly petiolate; leaf blade ovate-lanceolate, smaller; ocrea tubular, 4–5 cm, membranous, apex oblique, dehiscent, not ciliate. Inflorescence terminal, spicate, dense, 4–5 cm, 1.5–2 cm in diam.; bracts ovate, 3–4 mm, membranous, apex acuminate. Pedicels longer than bracts, 4–5 mm, slender. Perianth purple-red, 5-parted; tepals oblong, 4–5 mm. Stamens 8; anthers blue-black. Styles 3, free; stigmas capitate. Achenes included in persistent perianth, yellow-brown, shiny, ovoid, trigonous, 3–4 mm. Fl. Jul–Aug, fr. Sep–Oct.

- Grassy slopes, thickets, forest margins; 2800–5000 m. Guizhou, Sichuan, Xizang, Yunnan.

59. *Polygonum affine* D. Don, Prodr. Fl. Nepal. 70. 1825.

密穗拳参 *mi sui quan shen*

Bistorta affinis (D. Don) Greene; *Persicaria affinis* (D. Don) Ronse Decraene; *Polygonum donianum* Sprengel.

Subshrubs 10–15 cm tall. Rhizomes horizontal, ligneous.

Branches densely tufted, terete, herbaceous, glabrous. Basal leaves shortly petiolate; leaf blade gray-green abaxially, green adaxially, oblanceolate or lanceolate, 5–10 × 1–1.8 cm, subleathery, both surfaces glabrous, midvein large, base narrowly cuneate, margin revolute, apex acute. Cauline leaves sessile, smaller; ocrea brown, tubular, ca. 1 cm, membranous, veins numerous, glabrous, apex oblique, not ciliate, usually lacerate. Inflorescence terminal, spicate, erect, dense, large, 3–6 cm, 1–1.5 cm in diam.; bracts ovate, membranous. Pedicels longer than perianth. Perianth purple-red, 5-parted; tepals obovate, ca. 4 mm. Stamens 8; anthers purple. Styles 3, connate at base; stigmas capitate. Achenes included in persistent perianth, dark brown, shiny, ellipsoid, trigonous, ca. 3 mm, base narrowly cuneate, apex acute. Fl. Jul–Aug, fr. Aug–Sep.

- Grassy slopes, rocky fissures; 4000–4900 m. Xizang [NW India, Kashmir, Nepal, Pakistan, Sikkim].

60. *Polygonum vacciniifolium* Wallich ex Meisner in Wallich, Pl. Asiat. Rar. 3: 54. 1832.

乌饭树叶蓼 *wu fan shu ye liao*

Bistorta vacciniifolia (Wallich ex Meisner) Greene; *Persicaria vacciniifolia* (Wallich ex Meisner) Ronse Decraene.

Subshrubs densely tufted, 10–20 cm tall, much branched. Bark black-brown, longitudinally exfoliating; branches nearly prostrate; branchlets suberect, dense. Petiole short; leaf blade elliptic, 1–2 × 0.6–1 cm, thinly leathery, midvein prominent abaxially, base narrowly cuneate, margin entire, slightly revolute; ocrea brown, tubular, ca. 1 cm, membranous, veins numerous, large, apex oblique, not ciliate, usually lacerate. Inflorescence terminal, spicate, lax, 4–8 cm, 6–8 mm in diam.; bracts narrowly ovate, membranous, apex acute, each 1- or 2-flowered. Pedicels longer than bracts. Perianth purple-red, 5-parted; tepals narrowly elliptic, 3.5–4.5 mm. Stamens 8, exserted; anthers purple. Styles 3; stigmas capitate. Achenes included in persistent perianth, dull, narrowly ellipsoid, trigonous, 3–4 mm. Fl. Aug–Sep, fr. Sep–Oct.

- Thickets on mountain slopes, mountainous rocky crevices; 3000–4200 m. Xizang [Bhutan, India, Kashmir, Nepal, Pakistan, Sikkim].

61. *Polygonum emodi* Meisner in Wallich, Pl. Asiat. Rar. 3: 51. 1832.

竹叶舒筋 *zhu ye shu jin*

Subshrubs tufted, 10–25 cm tall, much branched. Branches creeping, rooting from nodes; bark black-brown; branchlets erect, simple. Petiole short; leaf blade gray-green abaxially, green adaxially, narrowly lanceolate or broadly lanceolate, 3–15 × 0.3–3.5 cm, longer than internodes, abaxially midvein prominent, adaxially midvein large, slightly immersed, lateral veins conspicuous, base narrowly cuneate, margin conspicuously revolute, apex acute; ocrea tubular, 2–5 cm, membranous, apex acute, dehiscent, not ciliate. Inflorescence terminal, spicate, lax, 2–6 cm, 7–8 mm in diam.; bracts brown, ovate, membranous, apex acuminate, each 1- or 2-flowered. Pedicels longer than bracts, slender. Perianth purple-red, 5-parted; tepals broadly elliptic, 3–3.5 mm. Stamens 8, included. Styles 3, connate to below middle; stigmas capitate. Achenes included in persistent perianth, brown, dull, ovoid, trigonous, ca. 3 mm.

POLYGONACEAE

Rocky fissures on mountain slopes, thickets, forests; 1300–3000 m. Sichuan, Xizang, Yunnan [Bhutan, NW India, Kashmir, Nepal, Sikkim].

- 1a. Plants 10–15 cm tall; leaf blade narrowly lanceolate, 3–7 × 0.3–0.6 cm; inflorescence 2–4 cm 61a. var. *emodi*
 1b. Plants 15–25 cm tall; leaf blade broadly lanceolate, 4–15 × 1–3.5 cm; inflorescence 4–6 cm 61b. var. *dependens*

61a. Polygonum emodi var. emodi

竹叶舒筋(原变种) zhu ye shu jin (yuan bian zhong)

Bistorta emodi (Meisner) V. Petrov.

Plants 10–15 cm tall. Leaf blade narrowly lanceolate, 3–7 × 3–6 mm. Inflorescence 2–4 cm.

Rocky fissures on mountain slopes; 1300–2800 m. Xizang, Yunnan [Bhutan, NW India, Kashmir, Nepal, Sikkim].

61b. Polygonum emodi var. dependens Diels, Notes Roy. Bot. Gard. Edinburgh 5: 256. 1912.

宽竹叶舒筋 kuan zhu ye shu jin

Bistorta emodi (Meisner) V. Petrov subsp. *dependens* (Diels) Soják; *B. emodi* var. *dependens* (Diels) V. Petrov; *B. zigzag* (H. Léveillé & Vaniot) H. Gross; *Polygonum zigzag* H. Léveillé & Vaniot.

Plants 15–25 cm tall. Leaf blade broadly lanceolate, 4–15 × 1–3.5 cm. Inflorescence 4–6 cm.

• Thickets, forests; 2500–3000 m. Sichuan, SE Xizang (Zayü), Yunnan.

4. Polygonum sect. Cephalophilon Meisner in Wallich, Pl. Asiat. Rar. 3: 59. 1832.

头状蓼组 tou zhuang liao zu

Plants ± prostrate, without prickles. Leaves ovate, oblong, or lyrate. Inflorescence capitate. Tepals fused for about 1/3 their length. Nectaries free, globular. Styles 1, bifid or trifid.

Between 20 and 30 species: mainly in E Asia; 17 species (six endemic) in China.

62. Polygonum palmatum Dunn, Bull. Misc. Inform. Kew 1912: 341. 1912.

掌叶蓼 zhang ye liao

Cephalophilon palmatum (Dunn) Borodina; *Persicaria palmata* (Dunn) Yonekura & H. Ohashi; *Polygonum meeboldii* W. W. Smith; *P. pseudopalmatum* G. Hoo.

Herbs perennial. Stems erect, 60–100 cm tall, stout, angulate, much branched upward, strigose, shortly stellate hairy. Petiole 5–12 cm; leaf blade greenish abaxially, green adaxially, orbicular or broadly ovate, 7–15 × 6–14 cm, both surfaces shortly stellate hairy, sparsely strigose, margin sparsely ciliate, sometimes decurrent along petiole forming narrow wing, palmatipartite; lobes 5–7, ovate, base constricted, apex acuminate; ocrea lax, tubular, 1.5–2.5 cm, membranous, shortly stellate hairy, strigose, oblique, margin sparsely ciliate. Inflorescence terminal or axillary, capitate, ca. 1 cm in diam., several capitula aggregated and panicle-like; peduncle densely shortly stellate hairy, sparsely strigose; bracts lanceolate, each 2- or 3-flowered. Pedicels shorter than bracts, glabrous. Perianth pinkish, 5-parted; tepals elliptic, 2.5–3 mm. Stamens 8. Styles 3, connate to below middle. Achenes included in persistent perianth, brown, opaque, ovoid, trigonous, 3–3.5 mm, minutely punctate. Fl. Jul–Aug, fr. Sep–Oct.

Valleys along stream banks, moist forests; 400–1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Yunnan [India].

63. Polygonum chinense Linnaeus, Sp. Pl. 1: 363. 1753.

火炭母 huo tan mu

Herbs perennial. Rhizomes stout. Stems erect, 70–100 cm tall, ligneous at base, much branched, striate, glabrous or retrorsely hispid. Petiole 1–2 cm, usually auriculate at base,

upper leaves sessile; leaf blade ovate, elliptic, or lanceolate, 4–16 × 1.5–8 cm, both surfaces glabrous or hispid, abaxially sometimes pubescent along veins, base truncate or broadly cordate, margin entire, apex shortly acuminate; ocrea tubular, 1.5–2.5 cm, membranous, glabrous, much veined, apex oblique, not ciliate. Inflorescence terminal or axillary, capitate, 3–5 mm, usually several capitula aggregated and panicle-like; peduncle densely glandular hairy; bracts broadly ovate, each 1–3-flowered. Perianth white or pinkish, 5-parted; tepals ovate, accrescent in fruit, becoming blue-black, fleshy. Stamens 8, included. Styles 3, connate to below middle. Achenes included in persistent perianth, black, opaque, broadly ovoid, trigonous, 3–4 mm. Fl. Jul–Nov, fr. Jul–Dec. $2n = 22^*$.

Wet valleys, grassy slopes, mixed forests, thickets in valleys, mountain slopes; sea level to 3000 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Philippines, Sikkim, Thailand, Vietnam].

- 1a. Leaf blade lanceolate to broadly lanceolate, 7–12 × 1.5–2.5 cm 63c. var. *paradoxum*
 1b. Leaf blade ovate to elliptic, 4–16 × 2–8 cm.
 2a. Stems and branches retrorsely hispid; leaf blade hispid on both surfaces 63d. var. *hispidum*
 2b. Stems and branches usually glabrous; leaf blade glabrous on both surfaces, sometimes adaxially along veins sparsely pubescent.
 3a. Leaf blade broadly ovate or elliptic, 10–16 × 2–4 cm ... 63b. var. *ovalifolium*
 3b. Leaf blade ovate or narrowly ovate, 4–10 × 2–4 cm 63a. var. *chinense*

63a. *Polygonum chinense* var. *chinense*火炭母(原变种) *huo tan mu* (*yuan bian zhong*)

Ampelgynonum chinense (Linnaeus) Lindley; *Persicaria chinensis* (Linnaeus) H. Gross; *P. chinensis* var. *siamensis* H. Léveillé; *Polygonum adenopodum* Samuelsson; *P. brachiatum* Poiré; *P. sinense* J. F. Gmelin.

Stems and branches usually glabrous. Leaf blade ovate or narrowly ovate, 4–10 × 2–4 cm. Fl. Jul–Sep, fr. Aug–Oct.

Wet valleys, grassy slopes; sea level to 2400 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Philippines, Sikkim, Thailand, Vietnam].

63b. *Polygonum chinense* var. *ovalifolium* Meisner in Wallich, Pl. Asiat. Rar. 3: 60. 1832.宽叶火炭母 *kuan ye huo tan mu*

Ampelgynonum malaicum (Danser) M. A. Hassan; *Cephalophilon malaicum* (Danser) Borodina; *Persicaria chinensis* (Linnaeus) H. Gross var. *ovalifolia* (Meisner) H. Hara; *Polygonum chinense* var. *malaicum* (Danser) Steward; *P. malaicum* Danser.

Stems and branches glabrous. Leaf blade broadly ovate or broadly elliptic, 10–16 × 6–8 cm. Fl. Jul–Sep, fr. Jul–Nov.

Mixed forests; 1200–3000 m. ?Guizhou, Xizang, Yunnan [India, S Japan, Malaysia, Myanmar, Nepal, Thailand].

63c. *Polygonum chinense* var. *paradoxum* (H. Léveillé) A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 57. 1998.窄叶火炭母 *zhai ye huo tan mu*

Polygonum paradoxum H. Léveillé, Repert. Spec. Nov. Regni Veg. 7: 339. 1909; *P. dielsii* H. Léveillé; *P. jucundum* Diels (1912), not Meisner (1826).

Leaf blade broadly lanceolate, 7–12 × 1.5–2.5 cm. Fl. Jul–Nov, fr. Jul–Dec.

• Grassy slopes, thickets in valleys; 900–2600 m. Guizhou, Sichuan, Yunnan.

63d. *Polygonum chinense* var. *hispidum* J. D. Hooker, Fl. Brit. India 5: 45. 1886.硬毛火炭母 *ying mao huo tan mu*

Polygonum chinense f. *hispidum* (J. D. Hooker) Samuelsson.

Stems and branches retrorsely hispid. Leaf blade ovate to elliptic, both surfaces hispid. Fl. Jul–Oct, fr. Jul–Nov.

Mountain slopes, thickets in valleys; 600–2800 m. Guangxi, Guizhou, Hunan, Sichuan, Yunnan [India, Myanmar, Thailand].

64. *Polygonum capitatum* Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 73. 1825.头花蓼 *tou hua liao*

Cephalophilon capitatum (Buchanan-Hamilton ex D.

Don) Tzvelev; *Persicaria capitata* (Buchanan-Hamilton ex D. Don) H. Gross.

Herbs perennial. Stems creeping, tufted, ligneous at base, sparsely glandular hairy or nearly glabrous, much branched, rooting from nodes, internodes shorter than leaf blades; branchlet suberect, angulate, sparsely glandular hairy. Petiole 2–3 mm, sometimes auriculate at base; leaf blade sometimes with a large blackish spot adaxially, ovate or elliptic, 1.5–3 × 1–2.5 cm, both surfaces glandular hairy, base cuneate, margin entire and glandular hairy, apex acute; ocrea tubular, 5–8 mm, membranous, sparsely glandular hairy, apex truncate, ciliate. Inflorescence terminal, capitate, solitary or geminate, 6–10 mm in diam.; peduncle glandular hairy; bracts narrowly ovate, membranous. Pedicel very short. Perianth pinkish, 5-parted; tepals elliptic, 2–3 mm. Stamens 8, included. Styles 3, connate to below middle, equaling perianth; stigmas capitate. Achenes included in persistent perianth, black-brown, slightly shiny, narrowly ovoid, trigonous, 1.5–2 mm, densely punctate. Fl. Jun–Sep, fr. Aug–Oct.

Mountain slopes, shaded places in valleys; 600–3500 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Xizang, Yunnan [Bhutan, N India, Malaysia, Myanmar, Nepal, Sikkim, Sri Lanka, Thailand, Vietnam].

This species is used medicinally, and is cultivated as an ornamental in other parts of the world (e.g., in Australia).

65. *Polygonum strindbergii* J. Schuster, Bull. Herb. Boiss., sér. 2, 8: 712. 1908.平卧蓼 *ping wo liao*

Herbs perennial. Stems creeping or prostrate, rooting from nodes, not tufted, not ligneous at base, branched, angulate, sparsely pilose; branches suberect, 10–15 cm tall. Petiole 1–2 cm, sparsely pilose, sometimes aculeolate at base; leaf blade cordate or ovate-cordate, 2.5–4 × 2–3 cm, both surfaces sparsely pilose, base cordate, margin entire, ciliate, apex acuminate; ocrea tubular, 5–10 mm, membranous, sparsely pilose, apex truncate, ciliate. Inflorescence terminal or axillary, usually geminate, rarely solitary, 8–10 mm in diam.; peduncle densely glandular hairy; bracts narrowly ovate, ca. 3 mm, membranous, each 2- or 3-flowered. Perianth white or pinkish, 5-parted; tepals elliptic, 3–4 mm. Stamens 6–8. Styles 3, connate to below middle. Achenes included in persistent perianth, opaque, ovoid, trigonous, 2.5–3 mm, glandular. Fl. Apr–May, fr. May–Jun.

• Forests on mountain slopes, wet places in valleys; 2000–3000 m. Xizang, Yunnan.

66. *Polygonum runcinatum* Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 73. 1825.羽叶蓼 *yu ye liao*

Herbs perennial. Rhizomes stout. Stems suberect or ascending, 30–60 cm tall, angulate, pilose or subglabrous, usually nodes retrorsely appressed hispid. Petiole 1–1.5 cm, narrowly winged, base auriculate, upper ones often shortly petiole-late or sessile; leaf blade 4–8 × 2–4 cm, pinnatifid; terminal lobe triangular, large, apex acuminate; lateral lobes 1–3 pairs, smaller, margin shortly ciliate, both surfaces sparsely strigose

or glabrous; ocrea tubular, lax, ca. 1 cm, membranous, pubescent, apex truncate, ciliate. Inflorescence terminal, corymbose or paniculate, capitate, dense, 0.5–1.5 cm in diam.; peduncle glandular hairy; bracts narrowly ovate, margin membranous. Pedicels shorter than bracts, slender. Perianth pinkish or white, 5-parted; tepals narrowly ovate, 3–3.5 mm. Stamens usually 8, included; anthers purple. Styles 3, connate to below middle. Achenes included in persistent perianth, black-brown, opaque, ovoid, trigonous, 2–3 mm. $2n = 22^*$.

Grassy slopes, mountain slopes, wet valleys, thickets in valleys; 800–3900 m. Anhui, ?Fujian, Gansu, Guangxi, Guizhou, Henan, Hubei, Hunan, ?Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, N India, Indonesia (Sumatra), ?Kashmir, Malaysia, Myanmar, Nepal, Philippines, Sikkim, Thailand].

- 1a. Capitulum 1–1.5 cm in diam., usually corymbose; leaf blade sparsely strigose on both surfaces, lateral lobes 1–3 pairs 66a. var. *runcinatum*
 1b. Capitulum 0.5–0.7 cm in diam., several capitula paniculate; leaf blade glabrous or sparsely shortly strigose on both surfaces, lateral lobes in 1 pair 66b. var. *sinense*

66a. *Polygonum runcinatum* var. *runcinatum*

羽叶蓼(原变种) yu ye liao (yuan bian zhong)

Cephalophylon runcinatum (Buchanan-Hamilton ex D. Don) Tzvelev; *Persicaria morrisonensis* (Hayata) Nakai; *P. runcinata* (Buchanan-Hamilton ex D. Don) H. Gross; *Polygonum morrisonense* Hayata; *P. panduriforme* H. Léveillé & Vaniot.

Leaf blade sparsely strigose on both surfaces; lateral lobes 1–3 pairs. Capitulum usually geminate, 1–1.5 cm in diam.

Grassy slopes, wet valleys; 1200–3900 m. ?Fujian, Guangxi, Guizhou, Hubei, Hunan, Sichuan, Taiwan, Xizang, Yunnan [Bhutan, N India, Indonesia (Sumatra), ?Kashmir, Malaysia, Myanmar, Nepal, Philippines, Sikkim, Thailand].

66b. *Polygonum runcinatum* var. *sinense* Hemsley, J. Linn. Soc., Bot. 26: 347. 1891.

赤胫散 chi jing san

Polygonum runcinatum var. *exauriculatum* Lingelsheim.

Leaf blade glabrous or sparsely shortly strigose on both surfaces; lateral lobes in 1 pair. Capitulum 5–7 mm in diam., with several capitula paniculate.

• Mountain slopes, thickets in valleys; 800–3900 m. Anhui, Gansu, Guangxi, Guizhou, Henan, Hubei, Hunan, ?Shaanxi, Sichuan, Xizang, Yunnan, Zhejiang.

This variety is used medicinally.

67. *Polygonum umbrosum* Samuelsson in Handel-Mazzetti, Symb. Sin. 7: 182. 1929.

阴地蓼 yin di liao

Herbs perennial. Stems decumbent, 70–90 cm tall, angulate, glabrous or sparsely shortly bristly; branches slender. Peti-

ole 5–10 mm, winged; leaf blade ovate-oblong, 7–10 × 2–3 cm, papery, both surfaces glabrous, base broadly cuneate, decurrent along petiole forming a wing, margin sparsely shortly setose, apex ?long acuminate; ocrea brown, tubular, 1–1.5 cm, membranous, pilose, apex truncate, ciliate. Inflorescence terminal or axillary, capitate, several capitula aggregated and panicle-like; peduncle glabrous or sparsely shortly glandular hairy; bracts broadly ovate, 1.5–2 mm. Pedicels shorter than bracts. Perianth pinkish, 5-parted; tepals elliptic, 2–2.5 mm. Stamens 6–8, included; anthers purple, elliptic. Styles 3, connate to below middle; stigmas capitate. Achenes included in persistent perianth, yellow-brown, opaque, broadly ovoid, trigonous, ca. 2 mm, densely pitted. Fl. Jul–Aug, fr. Aug–Sep.

• Shaded places in valleys; ca. 2200 m. Yunnan.

68. *Polygonum microcephalum* D. Don, Prodr. Fl. Nepal. 72. 1825.

小头蓼 xiao tou liao

Herbs perennial. Rhizomes stout. Stems erect or decumbent, 40–60 cm tall, angulate, branched. Petiole 1–1.2 cm, winged; leaf blade broadly ovate or triangular-ovate, 6–10 × 2–4 cm, both surfaces glabrous or pilose, base subrounded, decurrent along petiole forming a wing, margin entire, ciliate, apex acuminate; ocrea tubular, lax, 7–10 mm, pubescent, apex truncate, ciliate. Inflorescence terminal, usually geminate, capitate, 5–7 mm in diam.; peduncle glabrous or glandular hairy; bracts ovate, apex acute. Perianth white or pinkish, 5-parted; tepals elliptic, 2–3 mm. Stamens 8, included. Styles 3, connate to below middle; stigmas capitate. Achenes black-brown, opaque, broadly ovoid, trigonous, 2–2.5 mm, punctate.

Forests, grassy places; 500–3200 m. S Gansu, Guizhou, Hubei, Hunan, S Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, India, Nepal, Sikkim].

- 1a. Peduncle glabrous; perianth white 68a. var. *microcephalum*
 1b. Peduncle glandular hairy; perianth pinkish 68b. var. *sphaerocephalum*

68a. *Polygonum microcephalum* var. *microcephalum*

小头蓼(原变种) xiao tou liao (yuan bian zhong)

Persicaria microcephala (D. Don) H. Gross.

Peduncle glabrous. Perianth white.

Mixed forests on mountain slopes, grassy places in valleys; 1000–2000 m. S Gansu, Guizhou, Hubei, Hunan, SW Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, NE India, Nepal, Sikkim].

68b. *Polygonum microcephalum* var. *sphaerocephalum* (Wallich ex Meisner) H. Hara, Bull. Univ. Mus. Univ. Tokyo 2: 23. 1971.

腺梗小头蓼 xian geng xiao tou liao

Polygonum sphaerocephalum Wallich ex Meisner in Wallich, Pl. Asiat. Rar. 3: 60. 1832; *Persicaria sphaerocephala* (Wallich ex Meisner) H. Gross.

Peduncle glabrous. Perianth pinkish.

Forests, grassy slopes; 500–3200 m. Hubei, S Shaanxi, Sichuan, Xizang, Yunnan [India, Nepal].

69. *Polygonum wallichii* Meisner, Monogr. Polyg. 83. 1826.

球序蓼 qiu xu liao

Persicaria microcephala (D. Don) H. Gross var. *wallichii* (Meisner) H. Hara.

Herbs annual. Stems suberect or ascending, 20–30 cm tall, angulate, glabrous. Petiole 1–2 cm, not winged, usually auriculate at base; leaf blade broadly cordate or ovate-cordate, 3–5 × 2–3.5 cm, abaxially sparsely strigose, adaxially subglabrous, base subcordate, margin entire, shortly ciliate, apex acuminate; ocrea tubular, 6–8 mm, membranous, pilose, apex truncate, shortly ciliate. Inflorescence usually geminate, capitate, 5–8 mm in diam.; peduncle glabrous; bracts ovate, apex obtuse, glabrous. Perianth white, 5-parted; tepals broadly elliptic, 2–3 mm. Stamens usually 8. Styles 3, connate to below middle; stigmas capitate. Achenes black, opaque, ovoid, trigonous, 2–2.5 mm, densely punctate. Fl. Jul–Aug, fr. Aug–Oct.

Mixed forests on mountain slopes, wet valleys; 2500–3400 m. Xizang, Yunnan [NE India, Nepal, Sikkim].

70. *Polygonum criopolitanum* Hance, Ann. Sci. Nat., Bot., sér. 5, 5: 238. 1866.

蓼子草 liao zi cao

Persicaria criopolitana (Hance) Migo.

Herbs annual. Stems tufted, prostrate, 10–15 cm tall, rooting from nodes, diffusely branched from base, long strigose, sparsely glandular hairy. Petiole very short or nearly absent; leaf blade narrowly lanceolate or lanceolate, 1–3 cm × 3–8 mm, both surfaces strigose, base narrowly cuneate, margin ciliate with glandular hairs, apex acute; ocrea tubular, membranous, densely strigose, apex truncate, long ciliate. Inflorescence terminal, capitate; peduncle densely glandular hairy; bracts ovate, 2–2.5 mm, densely strigose, margin long ciliate, each 1-flowered. Pedicels longer than bracts, densely glandular hairy, articulate at apex. Perianth purplish red, 5-parted; tepals ovate, 3–4 mm. Stamens 5; anthers purple. Styles 2, connate at middle. Achenes included in persistent perianth, shiny, ellipsoid, biconvex, ca. 2.5 mm. Fl. Jul–Nov, fr. Aug–Dec.

• In sand by riversides, wet ditches; sea level to 900 m. Anhui, Fujian, Guangdong, Guangxi, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Zhejiang.

71. *Polygonum humile* Meisner in Wallich, Pl. Asiat. Rar. 3: 59. 1832.

矮蓼 ai liao

Persicaria humilis (Meisner) H. Hara.

Herbs annual. Stems decumbent, 5–15 cm tall, slender, branched, sparsely long glandular hairy. Petiole 2–3 mm, winged; leaf blade ovate, 5–12 × 3–6 mm, both surfaces sparsely long glandular hairy, base cuneate, decurrent along petiole forming narrow wing, margin long ciliate and sparsely glandular hairy; ocrea tubular, membranous, oblique, sparsely long glandular hairy, not ciliate. Inflorescence terminal, capitate, small, 3–5 mm in diam.; peduncle long, slender, sparsely long glandular hairy; bracts broadly lanceolate, 2.5–3 mm, glabrous, margin membranous, not ciliate, apex acute, each 1-flowered.

Perianth pinkish, 5-parted; tepals elliptic, ca. 1 mm, apex acute. Stamens 5 or 6. Styles 2, connate to below middle; stigmas capitate. Achenes black, opaque, nearly orbicular, biconvex, ca. 1 mm in diam., densely pitted. Fl. Aug–Sep, fr. Sep–Oct.

Grassy slopes, shaded places in valleys; 2400–2800 m. Yunnan [Bhutan, India, Nepal, Sikkim].

72. *Polygonum nepalense* Meisner, Monogr. Polyg. 84. 1826.

尼泊尔蓼 ni bo er liao

Cephalophilon nepalense (Meisner) Tzvelev; *Persicaria alata* (Buchanan-Hamilton ex D. Don) Nakai; *P. nepalensis* (Meisner) H. Gross; *Polygonum alatum* (Buchanan-Hamilton ex D. Don) Sprengel; *P. alatum* var. *nepalense* (Meisner) J. D. Hooker; ?*P. nepalense* var. *adenothrix* Nakai; *P. punctatum* Buchanan-Hamilton ex D. Don (1825), not Elliott (1817), nor Rafinesque (1820); *P. punctatum* Buchanan-Hamilton ex D. Don var. *alatum* Buchanan-Hamilton ex D. Don; *P. quadrifidum* Hayata (1911), not Meisner (1840).

Herbs annual. Stems decumbent or ascending, 20–40 cm tall, much branched at base, rooting at lower nodes. Lower leaves petiolate; petiole 2–3 cm, winged; leaf blade ovate or triangular-ovate, 3–5 × 2–4 cm, both surfaces sparsely setose or glabrous, sparsely yellow pellucid glandular punctate, base broadly cuneate, decurrent along petiole forming wing, margin entire, upper leaves smaller, sessile or clasping; ocrea brownish, tubular, 5–10 mm, membranous, apex obliquely truncate, not ciliate, with recurved seta at base. Inflorescence capitate, included by an involucre leaf; peduncle long, glandular hairy; bracts ovate-elliptic, usually glabrous, margin membranous. Pedicels shorter than bracts. Perianth purplish red or white, usually 4-parted; tepals oblong, 2–3 mm, apex obtuse. Stamens 5 or 6, equaling perianth; anthers black-purple. Styles 2, connate at base; stigmas capitate. Achenes included in persistent perianth, black, opaque, broadly ovoid, biconvex, 2–2.5 mm, densely pitted. Fl. May–Aug, fr. Jun–Oct.

Mountain slopes, moist valleys; 200–4000 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Afghanistan, Bhutan, India, Indonesia, Japan, Korea, Malaysia, Nepal, New Guinea, Pakistan, Philippines, Russia (Far East), Sikkim, Thailand; tropical Africa].

73. *Polygonum glaciale* (Meisner) J. D. Hooker, Fl. Brit. India 5: 41. 1886.

冰川蓼 bing chuan liao

Herbs annual. Stems 10–25 cm tall, slender, glabrous, much branched at base. Petiole 1–2 cm, sometimes narrowly winged; leaf blade ovate or broadly ovate, 0.8–2 × 0.6–1 cm, both surfaces glabrous, base nearly truncate, broadly cuneate, sometimes along petiole decurrent forming narrow wing, margin entire or 2-lobed at base, apex acute or obtuse; ocrea tubular, lax, membranous, glabrous, apex truncate or 2-cleft. Inflorescence terminal or axillary, capitate, small, 5–6 mm in diam.; peduncle glandular hairy in upper portion; bracts green, ovate or broadly ovate, herbaceous, sparsely glandular hairy or glabrous, margin membranous, apex acute. Perianth white or pinkish, 5-parted; tepals elliptic, 0.5–1 mm. Stamens usually 5.

Styles 3, connate at middle; stigmas capitate. Achenes included in persistent perianth, black, opaque, ovoid, trigonous or biconvex, 1–2 mm, finely glandular or pitted.

Grassy slopes, wet valleys; 1300–4300 m. Gansu, Hebei, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan [Afghanistan, India, Nepal, Sikkim].

- 1a. Leaf blade entire; achenes trigonous, 1–1.5 mm, finely granular 73a. var. *glaciale*
 1b. Leaf blade 2-lobed at base, rarely entire; achenes biconvex or trigonous, 1.8–2 mm, finely pitted 73b. var. *przewalskii*

73a. *Polygonum glaciale* var. *glaciale*

冰川蓼(原变种) bing chuan liao (yuan bian zhong)

Polygonum perforatum Meisner var. *glaciale* Meisner in Candolle, Prodr. 14(1): 128. 1856; *Persicaria glacialis* (Meisner) H. Hara.

Leaf blade entire. Achenes trigonous, 1–1.5 mm, finely glandular. Fl. Jun–Jul, fr. Jul–Aug.

Grassy slopes, wet valleys; 2100–4300 m. Gansu, Hebei, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan [Afghanistan, India, Nepal, Sikkim].

73b. *Polygonum glaciale* var. *przewalskii* (A. K. Skvortsov & Borodina) A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 62. 1998.

洼点蓼 wa dian liao

Polygonum przewalskii A. K. Skvortsov & Borodina, Rast. Tsentral. Azii 9: 106. 1989.

Leaf blade 2-lobed at base, rarely entire. Achenes biconvex or trigonous, 1.8–2 mm, finely pitted. Fl. Jun–Jul, fr. Jul–Aug.

Grassy slopes, wet valleys; 1300–3600 m. Gansu, Hebei, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan [Afghanistan, India, Nepal].

74. *Polygonum delicatulum* Meisner in Candolle, Prodr. 14(1): 127. 1857.

小叶蓼 xiao ye liao

Koenigia delicatula (Meisner) H. Hara.

Herbs annual. Stems tufted, erect, 8–15 cm tall, slender, glabrous. Petiole short or nearly absent; leaf blade ovate, 4–8 × 3–5 cm, both surfaces glabrous, base cordate, margin entire, not ciliate, apex acute; ocrea yellow-brown, tubular, membranous, glabrous, 1.5–2 mm, apex 2-cleft. Inflorescence axillary, capitate, small; peduncle very short; bracts ovate, membranous. Pedicel short, articulate at apex. Perianth white, 5-parted; outer tepals 2, smaller, apex obtuse; inner tepals 3, broadly ovate, large, ca. 1.5 mm, apex acute. Stamens 3. Styles 3, ca. 0.3 mm; stigmas capitate. Achenes exceeding persistent perianth, yellow-brown, shiny, narrowly ovoid, trigonous, 2–2.5 mm. Fl. Jul–Aug, fr. Aug–Sep. $2n = 28$.

Alpine meadows, mountain slopes; 2600–4300 m. Sichuan, Xizang, Yunnan [Bhutan, N India, Nepal, Pakistan, Sikkim].

75. *Polygonum filicaule* Wallich ex Meisner in Wallich, Pl. Asiat. Rar. 3: 59. 1832.

细茎蓼 xi jing liao

Koenigia nepalensis D. Don; *Persicaria minuta* (Hayata) Nakai; *Polygonum minutum* Hayata; *P. radicans* Hemsley.

Herbs annual. Stems decumbent, tufted, 10–30 cm tall, slender, much branched, sparsely strigose, with reflexed hairs below nodes. Petiole 3–5 mm, strigose; leaf blade ovate or lanceolate-ovate, 1–3 × 0.5–1 cm, both surfaces densely or sparsely strigose, base cuneate, margin ciliate, apex acute; ocrea tubular, membranous, strigose, ciliate. Inflorescence axillary or terminal, capitate; peduncle strigose; bracts narrowly ovate, membranous, each 1- or 2-flowered. Pedicel ca. 1 mm, articulate at apex. Perianth white or pinkish, 5-parted; tepals elliptic; outer tepals 2, smaller; inner tepals 3, ca. 1.5 mm. Stamens 3 or 4; anthers purple. Styles 3, short; stigmas capitate. Achenes slightly exceeding persistent perianth, yellow-brown, ± shiny, ellipsoid, trigonous, ca. 2 mm, apex acute. Fl. Jul–Aug, fr. Aug–Oct.

Mountain slopes, thickets in valleys; 2000–4000 m. ?Qinghai, Sichuan, Taiwan, Xizang, Yunnan [Bhutan, NW India, Myanmar, Nepal, Pakistan, Sikkim].

76. *Polygonum cyanandrum* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 257. 1912.

蓝药蓼 lan yao liao

Koenigia cyanandra (Diels) Mesicek & Soják.

Herbs annual. Stems erect or decumbent, 10–25 cm tall, slender, slightly angulate, branched at base. Petiole 5–10 mm; leaf blade ovate or narrowly ovate, 1–2 × 0.5–1 cm, papery, both surfaces pilose or nearly glabrous, base subtruncate, margin entire, sparsely ciliate, apex acute; ocrea brown, tubular, membranous, lax, pilose, dehiscent at apex, not ciliate. Inflorescence terminal or axillary, capitate, 5–6 mm in diam.; bracts narrowly ovate, membranous. Perianth white or greenish, 5-parted; tepals obovate or elliptic, ca. 1.5 mm. Stamens 8, included; anthers blue. Styles 3, very short; stigmas capitate. Achenes slightly exceeding persistent perianth, brown, dull, ovoid, trigonous, ca. 2 mm. Fl. Jul–Sep, fr. Aug–Oct.

• Grassy slopes, forests; 2200–4600 m. S Gansu, W Hubei, Qinghai, S Shaanxi, Sichuan, ?Xizang, Yunnan.

77. *Polygonum fertile* (Maximowicz) A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 67. 1998.

青藏蓼 qing zang liao

Koenigia fertilis Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 19: 481. 1874.

Herbs annual, dwarf. Stems erect or ascending, 5–10 cm tall, slender, branched, glabrous. Petiole 2–3 mm, slender; leaf blade obovate or elliptic, 3–6 × 2–4 mm, both surfaces glabrous or abaxially sparsely pilose, base subtruncate or broadly cuneate, margin sparsely ciliate, apex obtuse or subacute; ocrea brown, tubular, membranous, 2-cleft, base pilose, apex acute. Inflorescence axillary or terminal, fascicled. Perianth white, 4-parted; tepals elliptic or obovate, 1–1.5 mm. Stamens 3 or 4. Styles 2 or 3, very short; stigmas capitate. Achenes slightly

exceeding persistent perianth, brown, dull, narrowly ovoid, bi-convex, rarely trigonous, 2–2.5 mm. Fl. Jul–Aug, fr. Aug–Sep.

• Mountain slopes, moist valleys; 2700–4900 m. Gansu, Qinghai, Sichuan, Xizang.

78. *Polygonum sparsipilosum* A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 65. 1998.

柔毛蓼 rou mao liao

Herbs annual. Stems ascending or decumbent, 10–30 cm tall, slender, angulate, branched, pilose or glabrous. Petiole 4–8 mm; leaf blade broadly ovate, 1–1.5 × 0.8–1 cm, papery, both surfaces pilose, base broadly cuneate or subtruncate, margin ciliate, apex obtuse; ocrea tubular, dehiscent, base densely pubescent. Inflorescence terminal or axillary, capitate; bracts ovate, membranous, each 1-flowered. Pedicel short. Perianth white or greenish, 4-parted, with glandular dots or not; tepals broadly elliptic, ca. 2 mm, unequal. Fertile stamens 2–8; anthers yellow. Styles 3, very short; stigmas capitate. Achenes included in persistent perianth, yellow-brown, slightly shiny, ovoid, trigonous, ca. 2 mm. Fl. Jun–Jul, fr. Aug–Sep.

• Grassy slopes, wet valleys; 2300–4300 m. Gansu, ?Nei Mongol, Qinghai, Shaanxi, Sichuan, Xizang.

- 1a. Perianth without glandular dots; fertile stamens 2–5 78a. var. *sparsipilosum*
 1b. Perianth with glandular dots; fertile stamens 8 78b. var. *hubertii*

78a. *Polygonum sparsipilosum* var. *sparsipilosum*

柔毛蓼(原变种) rou mao liao (yuan bian zhong)

Koenigia pilosa Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 27: 531. 1881; *Polygonum pilosum* (Maximowicz) Hemsley (1891), not Roxburgh (1824).

Perianth without glandular dots. Fertile stamens 2–5.

• Grassy slopes, wet valleys; 2300–4300 m. Gansu, ?Nei Mongol, Qinghai, Shaanxi, Sichuan, Xizang.

78b. *Polygonum sparsipilosum* var. *hubertii* (Lingelsheim) A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 65. 1998.

腺点柔毛蓼 xian dian rou mao liao

Polygonum hubertii Lingelsheim, Repert. Spec. Nov. Regni Veg. Beih. 12: 360. 1922.

Perianth with glandular dots. Fertile stamens 8.

• Grassy slopes; 2500–4100 m. Gansu, Qinghai, Shaanxi, Sichuan.

5. *Polygonum* sect. *Aconogonon* Meisner, Monogr. Polyg. 43, 55. 1826.

神血宁组 shen xue ning zu

Aconogonon (Meisner) Reichenbach.

Plants without prickles. Leaves variable, not hastate or sagittate. Inflorescence diffusely paniculate. Perianth 5-parted, sometimes enlarging in fruit. Nectaries broad and confluent at base. Style 1, trifid, or appearing capitate.

Between 20 and 30 species: mainly in the mountains of E Asia; 21 species (five endemic) in China.

For further information, the reader may wish to refer to Hong (Symb. Bot. Upsal. 30(2): 1–118. 1992).

79. *Polygonum molle* D. Don, Prodr. Fl. Nepal. 72. 1825.

绢毛神血宁 juan mao shen xue ning

Subshrubs. Stems erect, sometimes slightly ascending, 0.9–1.5[–3] m tall, much branched, hirsute, retrorsely hirsute or glabrous. Petiole 1–1.5 cm, densely pubescent or glabrous; leaf blade abaxially light green, adaxially green, elliptic or elliptic-lanceolate, 10–20 × 3–6 cm, abaxially sericeous, adaxially sparsely sericeous, densely so along veins or both surfaces glabrous throughout, base cuneate, margin entire, apex acuminate; ocrea dark brown, tubular, 2–3 cm, membranous, oblique, pubescent or glabrous. Inflorescence spreading, paniculate, large; rachis and branches densely pubescent or glabrous; bracts ovate. Pedicel articulate at apex. Perianth white, 5-parted; tepals elliptic, 1.5–2 mm, accrescent and fleshy in fruit, darkened. Stamens 8, included. Styles 3, free; stigmas capitate. Achenes slightly exceeding perianth, black, shiny, ovoid, trigonous, 2–2.5 mm. Fl. Aug–Sep, fr. Sep–Nov.

Slopes, forests, grassy places and thickets in valleys; 1200–3500 m. Guangxi, Guizhou, Xizang, Yunnan [Bhutan, India, Indonesia, N Myanmar, Nepal, Sikkim, Thailand].

- 1a. Stems and leaves glabrous 79c. var. *frondosum*
 1b. Stems hirsute; leaves sericeous.
 2a. Stems long hirsute with appressed,

- ascending hairs 79a. var. *molle*
 2b. Stems long hirsute with appressed, deflexed hairs 79b. var. *rude*

79a. *Polygonum molle* var. *molle*

绢毛神血宁(原变种) juan mao shen xue ning (yuan bian zhong)

Aconogonon molle (D. Don) H. Hara; *Ampelgynon molle* (D. Don) Roberty & Vautier; *Persicaria mollis* (D. Don) H. Gross.

Stems long hirsute with appressed, ascending hairs. Leaves sericeous. Fl. Aug–Sep, fr. Sep–Nov.

Slopes, forests, grassy places in valleys; 1300–3200 m. Guangxi, Guizhou, Xizang, Yunnan [Bhutan, Indonesia (Sumatra), Nepal, Sikkim, Thailand].

79b. *Polygonum molle* var. *rude* (Meisner) A. J. Li in C. Y. Wu, Fl. Xizang. 1: 622. 1983.

倒毛神血宁 dao mao shen xue ning

Polygonum rude Meisner in Candolle, Prodr. 14(1): 137. 1856; *Aconogonon molle* (D. Don) H. Hara var. *rude* (Meisner) H. Hara; *Persicaria rudis* (Meisner) H. Gross; *Polygonum deflexipilosum* Kitamura; *P. esquirolii* H. Léveillé; *P. panicula-*

tum Blume var. *rude* (Meisner) Steward; *P. tsangschangicum* Lingelsheim & Borza.

Stems long hirsute with appressed, deflexed hairs. Leaves sericeous.

Slopes, forests, thickets in valleys; 1400–3500 m. Guangxi, Guizhou, Xizang, Yunnan [Bhutan, India (Assam), N Myanmar, Nepal, Thailand].

79c. *Polygonum molle* var. *frondosum* (Meisner) A. J. Li in C. Y. Wu, Fl. Xizang. 1: 622. 1983.

光叶神血宁 guang ye shen xue ning

Polygonum frondosum Meisner in Candolle, Prodr. 14(1): 137. 1856; *Aconogonon molle* (D. Don) H. Hara var. *frondosum* (Meisner) H. Hara; *A. molle* var. *paniculatum* (Blume) Yonekura & H. Ohashi; *A. paniculatum* (Blume) Haraldson; *Polygonum paniculatum* Blume; *P. paniculatum* var. *frondosum* (Meisner) Steward.

Stems and leaves glabrous.

Thickets in valleys, grassy slopes; 1200–1500 m. Guangxi, Guizhou, Xizang, Yunnan [Bhutan, Indonesia, Nepal, Sikkim].

80. *Polygonum tortuosum* D. Don, Prodr. Fl. Nepal. 71. 1825.

叉枝神血宁 cha zhi shen xue ning

Aconogonon tortuosum (D. Don) H. Hara; *A. tortuosum* var. *tibetanum* (Meisner) S. P. Hong; *Pleuropterypyrum tortuosum* (D. Don) Munshi & Javeid; *Polygonum peregrinatoris* Paulsen; *P. tortuosum* var. *tibetanum* Meisner.

Subshrubs. Roots robust. Stems erect, red-brown, 30–50 cm tall, glabrous or pubescent; branches forked. Petiole very short or nearly absent; leaf blade ovate or narrowly ovate, 1.5–4 × 1–2 cm, subleathery, both surfaces pubescent or glabrous, midvein prominent abaxially, impressed adaxially, base rounded or subcordate, margin entire, ciliate, slightly revolute, nearly undulate, apex acute; ocrea lax, brown, tubular, 1–2 cm, membranous, slightly oblique, densely pubescent. Inflorescence terminal, paniculate, dense; bracts membranous, pubescent. Pedicel articulate. Perianth white, campanulate, 5-parted; tepals obovate, 2.5–3 mm, unequal. Stamens 8, included; anthers purple. Styles 3, very short; stigmas capitate. Achenes included in persistent perianth, brown, ovoid, sharply trigonous, ca. 3 mm. Fl. Jul–Aug, fr. Sep–Oct.

Grassy slopes, thickets, valleys; 3600–4900 m. Xizang [Afghanistan, N India, Nepal, Pakistan; SW Asia].

81. *Polygonum polystachyum* Wallich ex Meisner in Wallich, Pl. Asiat. Rar. 3: 61. 1832.

多穗神血宁 duo sui shen xue ning

Subshrubs. Stems 80–100 cm, much branched, angulate, pubescent, sometimes glabrous. Petiole large, ca. 1 cm; leaf blade gray-green abaxially, green adaxially, broadly lanceolate, oblong-lanceolate, or lanceolate, 6–17 × 3–7 cm, abaxially densely pubescent, adaxially sparsely pubescent, base hastate-cordate or subtruncate, apex acuminate; ocrea lax, dark brown, tubular, oblique, 3–4 cm, membranous, densely pubescent, not ciliate. Inflorescence terminal, paniculate, spreading; rachis and

branches pubescent. Perianth white or pinkish, 5-parted, ca. 4 mm in diam.; tepals unequal; outer 2 tepals small; inner 3 tepals broadly obovate, large, ca. 3 mm; bracts ovate, membranous, pubescent, apex acute. Pedicels longer than bracts, slender, glabrous or sparsely pubescent, apex articulate. Stamens 8, included; anthers purple. Styles 3, free; stigmas capitate. Achenes included in persistent perianth, brown, ovoid, trigonous, ca. 2.5 mm, smooth. Fl. Aug–Sep, fr. Sep–Oct.

Forests, valleys; 2200–4500 m. Sichuan, Xizang, Yunnan [Afghanistan, Bhutan, India, Kashmir, Myanmar, Nepal, Pakistan, Sikkim].

- 1a. Leaf blade broadly lanceolate or oblong-lanceolate 81a. var. *polystachyum*
1b. Leaf blade narrowly lanceolate or linear-oblong 81b. var. *longifolium*

81a. *Polygonum polystachyum* var. *polystachyum*

多穗神血宁(原变种) duo sui shen xue ning (yuan bian zhong)

Aconogonon polystachyum (Wallich ex Meisner) M. Král; *Persicaria polystachya* (Wallich ex Meisner) H. Gross (1913), not Opiz (1852); *P. wallichii* Greuter & Burdet; *Pleuropterypyrum polystachyum* (Wallich ex Meisner) Munshi & Javeid; *Reynoutria polystachya* (Wallich ex Meisner) Moldenke; *Rubrivena polystachya* (Wallich ex Meisner) M. Král.

Leaf blade broadly lanceolate or oblong-lanceolate, 6–17 × 3–7 cm. Fl. Aug–Sep, fr. Sep–Oct.

Mixed forests on mountain slopes, valleys; 2700–4500 m. Sichuan, Xizang, Yunnan [Afghanistan, Bhutan, India, Kashmir, Myanmar, Nepal, Pakistan, Sikkim].

81b. *Polygonum polystachyum* var. *longifolium* J. D. Hooker, Fl. Brit. India 5: 51. 1886.

长叶多穗神血宁 chang ye duo sui shen xue ning

Leaf blade narrowly lanceolate or linear-oblong, 8–15 × 1.5–3 cm.

Forests, valleys; 2200–3800 m. Xizang, W Yunnan [India, Sikkim].

One of us (Hong; see Pl. Syst. Evol. 186: 95–122. 1993) considers this to be a synonym of *Persicaria wallichii* (here treated as a synonym of *Polygonum polystachyum* var. *polystachyum*).

82. *Polygonum tibeticum* Hemsley, Hooker's Icon. Pl. 25: t. 2471. 1896.

西藏神血宁 xi zang shen xue ning

Aconogonon tibeticum (Hemsley) Soják; *A. tortuosum* (D. Don) H. Hara var. *glabrifolium* S. P. Hong.

Subshrubs. Stems erect, purplish, 30–50 cm tall, glabrous, slightly striate, few branched. Petiole 3–4 mm, glabrous; leaf blade elliptic or ovate-oblong, 3–5 × 1.5–2 cm, subleathery, midvein prominent abaxially, impressed adaxially, both surfaces glabrous, base cuneate, margin entire, slightly revolute, ciliate, apex acute or obtuse; ocrea brown, tubular, 1–1.5 cm, membranous, veined, sparsely pubescent, oblique. Inflorescence terminal, paniculate, dense; bracts narrowly ovate, pu-

bescent, each 2- or 3-flowered. Pedicels shorter than bracts, articulate. Perianth pinkish, 5-parted; tepals obovate, ca. 3.5 mm, unequal. Stamens 8, included; anthers yellow. Styles 3, very short; stigmas capitate. Achenes exceeding persistent perianth, yellow-brown, slightly shiny, narrowly ovoid, trigonous, 3–4 mm. Fl. Aug–Sep, fr. Sep–Oct.

• Grassy slopes, wet grasslands near rivers; 4500–5000 m. Xizang.

83. *Polygonum nummulariifolium* Meisner in Candolle, Prodr. 14(1): 127. 1857.

铜钱叶神血宁 tong qian ye shen xue ning

Koenigia nummulariifolia (Meisner) Mesicek & Soják; ?*Polygonum forrestii* Diels var. *pumilio* Lingelsheim.

Herbs perennial, dwarf. Stems creeping, forming matted tufts; branches 1.5–3 cm, internodes short, rooting at nodes. Petiole 2–5 mm, glabrous or pilose; leaf blade orbicular or reniform-orbicular, 3–5 mm in diam., abaxially pilose, adaxially glabrous, midvein conspicuous abaxially, base rounded, margin nearly entire, ciliate, apex obtuse; ocrea tubular, membranous, pilose, oblique. Inflorescence terminal, corymbose, dense. Perianth white, 5-parted; tepals elliptic, equal, ca. 1 mm. Stamens usually 5, included; anthers purple-red. Styles 2, very short; stigmas capitate. Achenes yellow-brown, slightly shiny, broadly ovoid, biconvex, ca. 1.5 mm. Fl. Aug–Sep, fr. Sep–Oct.

Grassy slopes; 3300–4800 m. Xizang, Yunnan [Bhutan, India, Kashmir, Myanmar, Nepal, Sikkim].

One of us (Hong) believes that this taxon would be better treated in the genus *Koenigia*.

84. *Polygonum forrestii* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 258. 1912.

六铜钱叶神血宁 liu tong qian ye shen xue ning

Koenigia forrestii (Diels) Mesicek & Soják.

Herbs perennial. Stems creeping, tufted; branches erect, 5–20 cm tall, villous. Petiole 3–5 cm, long pilose; leaf blade nearly orbicular or reniform, 1–4 cm in diam., both surfaces long pilose or nearly glabrous, base cordate, margin densely ciliate, apex obtuse; ocrea laxly tubular, membranous, pilose, oblique. Inflorescence terminal, corymbose-cymose; bracts oblong, thinly membranous. Pedicels longer than bracts, 4–5 mm, glabrous, apex articulate. Perianth white or yellowish, 5(or 4)-parted; tepals obovate, 4–5 mm, unequal. Stamens 6–8; anthers purple. Styles 3, very short; stigmas capitate. Achenes included in persistent perianth, yellow-brown, dull, narrowly ellipsoid, trigonous, narrow at base, 2–3 mm. Fl. Jul–Aug, fr. Aug–Sep. $2n = 14$.

Grassy slopes, alpine meadows; 3500–4800 m. Guizhou, Sichuan, Xizang, Yunnan [Bhutan, ?Kashmir, Myanmar, Nepal, Sikkim].

One of us (Hong) believes that this taxon would be better treated in the genus *Koenigia*.

85. *Polygonum hookeri* Meisner, Ann. Sci. Nat., Bot., sér. 5, 5: 352. 1866.

硬毛神血宁 ying mao shen xue ning

Aconogonon hookeri (Meisner) H. Hara; *Persicaria acaulis* Gross; *P. hookeri* (Meisner) Ronse Decraene; *Polygonum acaule* J. D. Hooker (1885), not Boissier (1879); *Rheum hirsutifolium* Losinskaja; *R. hirsutum* Maximowicz ex Franchet; *R. nanum* Lingelsheim ex Limpricht (1922), not Sievers ex Pallas (1796).

Herbs perennial, dioecious. Rhizomes robust, ligneous. Stems numerous from rhizome, erect, 10–20(–30) cm tall, sparsely hirsute, simple. Petiole 5–10 mm; leaf blade of basal leaves narrowly elliptic or spatulate, 5–10 × 1.5–3 cm, both surfaces hirsute, abaxially densely hirsute along midvein, base narrowly cuneate, margin entire, densely ciliate, apex rounded; stem leaves smaller; ocrea tubular, membranous, densely hirsute, oblique at apex. Inflorescence terminal, paniculate, sparsely branched; rachis and branches hirsute; bracts narrowly lanceolate, each 1-flowered. Pedicel articulate. Flowers unisexual. Female flower: perianth purple-red, 5-parted, margin yellow-green; tepals oblong, 2–3 mm, veined, apex rounded, unequal. Styles 3; stigmas capitate. Male flower: stamens 8, included; anthers red-purple. Achenes slightly exceeding persistent perianth, brown, shiny, broadly ovoid, trigonous, 2.5–3 mm, constricted at base, apex acute. Fl. Jun–Aug, fr. Aug–Sep.

Grassy slopes, thickets in valleys, alpine meadows; 3500–5000 m. Gansu, Qinghai, Sichuan, Xizang, Yunnan [Bhutan, Sikkim].

The closely related *Aconogonon rhombitepalum* S. P. Hong (Notes Roy. Bot. Gard. Edinburgh 46: 361. 1990) differs in hermaphroditic flowers with slightly longer pedicels and rhomboid, longer, acute tepals.

86. *Polygonum songaricum* Schrenk in Fischer & C. A. Meyer, Enum. Pl. Nov. 1: 8. 1841.

准噶尔神血宁 zhun ga er shen xue ning

Polygonum angustifolium Pallas var. *songaricum* (Schrenk) Steward.

Herbs perennial. Stems erect, 20–60 cm tall, branched above, pilose, striate. Petiole 2–4 cm, pilose; leaf blade greenish abaxially, green adaxially, ovate or broadly ovate, 5–10 × 3–5 cm, abaxially pilose, adaxially glabrous or pilose, base rounded or cordate, slightly decurrent, margin entire or slightly undulate, densely ciliate, apex long acuminate; ocrea brown, tubular, 2–3 cm, membranous, dehiscent above, sparsely villous along veins. Inflorescence terminal or axillary, paniculate, sparsely branched, slightly spreading, nutant in fruit; bracts ovate, membranous, each 1- or 2-flowered. Pedicel 2–3 mm, slender, articulate at middle. Perianth red, margin white or greenish, 5-parted; tepals elliptic, unequal, 2.5–3 mm, enlarged in fruit, ca. 4 mm. Stamens 7 or 8, included. Styles 3; stigmas capitate. Achenes equaling persistent perianth, brown, shiny, ovoid, sharply trigonous, 3.5–4 mm. Fl. Jun–Aug, fr. Jul–Sep.

Grassy slopes, forest margins; 1800–3500 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan].

87. *Polygonum coriarium* Grigorjev, Trudy Bot. Inst. Acad. Nauk SSSR, Ser. 1, Fl. Sist. Vyssh. Rast. 1: 101. 1933.

白花神血宁 bai hua shen xue ning

Aconogonon bucharicum (Grigorjev) Holub; *A. coriarium* (Grigorjev) Soják; *A. coriarium* subsp. *bucharicum* (Grigorjev) Soják; *Pleuropteryrum bucharicum* (Grigorjev) Nevski; *Polygonum bucharicum* Grigorjev.

Herbs perennial. Roots robust. Stems erect, 100–150 cm tall, branched, striate, glabrous. Petiole 3–4 mm; leaf blade greenish abaxially, green adaxially, ovate or ovate-lanceolate, 5–10 × 2–4 cm, abaxially pubescent, adaxially nearly glabrous, base broadly cuneate, margin bristly ciliate, apex acuminate or acute; ocrea caducous, brown, tubular, 1.5–2.5 cm, membranous, sparsely long villous. Inflorescence terminal, paniculate; branches spreading, rachis and branches glabrous; bracts lanceolate, each 1- or 2-flowered. Pedicel 3–4 mm, not articulate, dilated above. Perianth white, 5-parted; tepals obovate, 3–3.5 mm. Stamens 8, included. Styles 3; stigmas capitate. Achenes equaling persistent perianth, shiny, broadly ovoid, trigonous, 3–4 mm, smooth. Fl. Jun–Jul, fr. Aug–Sep.

Mountain slopes, valleys; 1500–2900 m. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan].

88. *Polygonum platyphyllum* S. X. Li & Y. L. Chang, Fl. Pl. Herb. Chin. Bor.-Orient. 2: 108. 1959.

宽叶神血宁 kuan ye shen xue ning

Aconogonon platyphyllum (S. X. Li & Y. L. Chang) Holub; *Pleuroteropyrum platyphyllum* (S. X. Li & Y. L. Chang) Kitagawa.

Herbs perennial. Stems erect, large, to ca. 100 cm tall, glabrous; branches spreading. Petiole short or nearly absent; leaf blade ovate or ovate-lanceolate, 6–10 × 2.5–5 cm, both surfaces pilose, base cuneate or broadly cuneate, margin entire or slightly undulate, densely ciliate; ocrea tubular, membranous, pilose, dehiscent. Inflorescence paniculate, spreading; rachis and branches glabrous; bracts ovate-triangular, apex acuminate, each 2- or 3-flowered. Pedicels erect, equaling bracts, ca. 2 mm, glabrous, apex articulate. Perianth white, 5-parted; tepals elliptic, ca. 2 mm. Stamens 8, included. Styles 3; stigmas capitate. Achenes distinctly exceeding persistent perianth, usually erect, brown, shiny, oblong, trigonous, 4–5 mm. Fl. Jun–Jul, fr. Aug–Sep.

• Mountain slopes; 200–500 m. Liaoning.

89. *Polygonum limosum* Komarov, Izv. Imp. Bot. Sada Petra Velikago 16: 165. 1916.

谷地神血宁 gu di shen xue ning

Polygonum divaricatum Linnaeus var. *limosum* Komarov, Fl. Mansh. 2: 140. 1903; *Aconogonon limosum* (Komarov) H. Hara; *Pleuroteropyrum limosum* (Komarov) Kitagawa.

Herbs perennial. Stems large, 90–150 cm tall, branched above, glabrous or pubescent on nodes. Petiole 2–4 cm; leaf blade greenish abaxially, green adaxially, ovate or lanceolate-ovate, 6–15 × 3–9 cm, papery, both surfaces glabrous or pilose, base rounded, margin ciliate, apex acuminate; ocrea tubular, membranous, dehiscent, pilose. Inflorescence paniculate, spreading, lax; bracts narrowly ovate, apex acute, each 2- or 3-flowered. Pedicels longer than bracts, slender, apex articulate. Perianth white, 5-parted; tepals elliptic, 1.5–2 mm. Stamens 8, included. Styles 3; stigmas capitate. Achenes distinctly exceeding persistent perianth, pendulous, gray-brown, slightly shiny, narrowly ovoid, trigonous, 3–4 mm. Fl. Jul–Aug, fr. Aug–Sep.

Mountain slopes, forest margins, thickets in valleys; 400–1800 m. Jilin [Korea, Russia (Far East)].

90. *Polygonum sibiricum* Laxmann, Nov. Com. Acad. Sci. Petrop. 18: 531. 1773.

西伯利亚神血宁 xi bo li ya shen xue ning

Herbs perennial. Rhizomes slender. Stems decumbent or suberect, 2–25(–43) cm tall, branched from base, glabrous. Petiole 0.8–1.5 cm; leaf blade narrowly elliptic or lanceolate to linear, 3–10 cm × 1.5–15 mm, base hastate or cuneate, margin entire, apex acute or obtuse; ocrea tubular, membranous, apex oblique, not ciliate. Inflorescence terminal, paniculate, lax, interrupted; bracts funnel-shaped, glabrous, each 4–6-flowered. Pedicel short, articulate above middle. Perianth yellow-green, 5-parted; tepals oblong, ca. 3 mm. Stamens 7 or 8, included; filaments dilated at base. Styles 3, short; stigmas capitate. Achenes slightly exceeding persistent perianth, black, shiny, ovoid, trigonous. Fl. and fr. Jun–Sep.

Roadsides, saline deserts, sands, riverbanks, wet places near saline lakes, saline areas by rivers; sea level to 5100 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Afghanistan, Kashmir, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Sikkim, Tajikistan].

- 1a. Stems 10–25(–43) cm tall; leaf blade narrowly elliptic or lanceolate, 5–15 mm wide 90a. var. *sibiricum*
 1b. Stems 2–5(–8) cm tall; leaf blade linear, 1.5–2.5 mm wide 90b. var. *thomsonii*

90a. *Polygonum sibiricum* var. *sibiricum*

西伯利亚神血宁(原变种) xi bo li ya shen xue ning (yuan bian zhong)

Aconogonon sibiricum (Laxmann) H. Hara; *Knorringia sibirica* (Laxmann) Tzvelev; *Persicaria sibirica* (Laxmann) H. Gross; *Pleuroteropyrum sibiricum* (Laxmann) Kitagawa; *Polygonum arcticum* Pallas ex Sprengel.

Stems 10–25(–43) cm tall. Leaf blade narrowly elliptic or lanceolate, 5–15 mm wide. Inflorescence large. Fl. and fr. Jul–Sep.

Roadsides, saline deserts, sands, riverbanks; sea level to 5000 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Kashmir, Kazakhstan, Mongolia, Russia (Far East, Siberia), Sikkim].

90b. *Polygonum sibiricum* var. *thomsonii* Meisner, Ann. Sci. Nat., Bot., sér. 6: 351. 1866.

细叶西伯利亚神血宁 xi ye xi bo li ya shen xue ning

Aconogonon pamiricum (Korshinsky) H. Hara; *A. sibiricum* (Laxmann) H. Hara subsp. *thomsonii* (Meisner) Soják; *Knorringia pamirica* (Korshinsky) Tzvelev; *K. sibirica* subsp. *thomsonii* (Meisner) S. P. Hong; *Polygonum pamiricum* Korshinsky; *P. sibiricum* subsp. *thomsonii* (Meisner) Rechinger & Schiman-Czeika; *P. sibiricum* var. *nanum* Meisner.

Stems short, 2–5(–8) cm tall. Leaf blade linear, narrow, 1.5–2.5 mm wide. Inflorescence small. Fl. and fr. Jun–Sep.

Wet places near saline lakes, saline areas by rivers; 3200–5100 m. Qinghai, Xizang [Afghanistan, Kashmir, Kyrgyzstan, Nepal, Pakistan, Russia, Tajikistan].

91. *Polygonum angustifolium* Pallas, Reise Russ. Reich. 3: 230. 1776.

狭叶神血宁 xia ye shen xue ning

Aconogonon angustifolium (Pallas) H. Hara; *Persicaria angustifolia* (Pallas) Ronse Decraene; *Pleuropterypyrum angustifolium* (Pallas) Kitagawa; *Polygonum acidulum* Willdenow; *P. alpinum* var. *angustissimum* Turczaninow; ?*P. divaricatum* var. *angustissimum* f. *glabrum* Meisner; *P. polymorphum* Ledebour var. *angustissimum* Korshinsky.

Herbs perennial. Stems erect, 20–50 cm tall, branched; branches spreading, striate, glabrous. Petiole very short or nearly absent; leaf blade narrowly linear, 3–6 cm × 2–4 mm, both surfaces glabrous, midvein prominent, lateral veins inconspicuous abaxially, base narrow, margin conspicuously revolute, apex slightly obtuse; ocrea caducous, tubular, membranous, veined, dehiscent. Inflorescence paniculate, lax; rachis and branches glabrous; bracts brown, ovate, membranous, apex acute, each 1–3-flowered. Pedicel 1.5–2 mm, apex articulate. Perianth white or milky white, 5-parted; tepals elliptic, unequal, 2–2.5 mm. Stamens 8, included. Styles 3, short; stigmas capitate. Achenes included in persistent perianth, brown, shiny, ovoid-rhomboid, trigonous, 2–2.5 mm. Fl. Jul–Aug, fr. Aug–Sep.

Grassy slopes, hills; 600–1600 m. Hebei, Heilongjiang, Nei Mongol [Mongolia, Russia (Far East, E Siberia)].

92. *Polygonum ocreatum* Linnaeus, Sp. Pl. 1: 361. 1753.

白山神血宁 bai shan shen xue ning

Aconogonon laxmannii (Lepechin) A. Löve & D. Löve; *A. ocreatum* (Linnaeus) H. Hara; *A. ocreatum* var. *laxmannii* (Lepechin) Tzvelev; *Persicaria laxmannii* (Lepechin) H. Gross; *Pleuropterypyrum laxmannii* (Lepechin) Kitagawa; *Polygonum laxmannii* Lepechin.

Herbs perennial. Stems erect, 30–40(–50) cm tall, branched from base, sparsely pubescent or glabrous, slenderly striate; branches spreading. Petiole 3–5 mm; leaf blade lanceolate or linear-lanceolate, 4–7 cm × 5–8 mm, both surfaces hirsute or abaxially hirsute, base narrowly cuneate, margin entire, shortly ciliate; ocrea tubular, membranous, sparsely hirsute, veined. Inflorescence paniculate, densely flowered; branches spreading; bracts narrowly ovate, pubescent or glabrous, each 1- or 2-flowered. Pedicel 2–2.5 mm, apex articulate. Perianth white, 5-parted; tepals elliptic, 2.5–3 mm. Stamens 8. Styles 3, short; stigmas capitate. Achenes included in persistent perianth, shiny, ovoid, trigonous, 3–3.5 mm. Fl. Jul–Aug, fr. Aug–Sep.

Grassy slopes, wet valleys; 1400–2500 m. Jilin, Nei Mongol [Mongolia, Russia].

93. *Polygonum ajanense* (Regel & Tiling) Grigorjev in Komarov, Fl. URSS 5: 666. 1936.

阿扬神血宁 a yang shen xue ning

Polygonum polymorphum Ledebour var. *ajanense* Regel

& Tiling, Fl. Ajan. 116. 1858; *Aconogonon ajanense* (Regel & Tiling) H. Hara; *Pleuropterypyrum ajanense* (Regel & Tiling) Nakai.

Herbs perennial. Stems erect, 30–40 cm tall, branched from base. Petiole very short; leaf blade lanceolate or broadly lanceolate, 3–5(–7) × 0.7–1.5 cm, on both surfaces or abaxially strigose, base broadly cuneate, margin entire, ciliate, apex acute; ocrea tubular, membranous, pilose or glabrous. Inflorescence paniculate, spreading, lax; bracts ovate, pubescent or glabrous, each 1- or 2-flowered. Pedicel 2–2.5 mm, apex articulate. Perianth white or pinkish, 5-parted; tepals elliptic, 2.5–3 mm. Stamens 8, included; anthers yellow. Styles 3; stigmas capitate. Achenes included in persistent perianth, brown, slightly shiny, ovoid, trigonous. Fl. Jul–Aug, fr. Aug–Sep.

Grassy slopes; ca. 600 m. NE Nei Mongol [Japan, Korea, Russia (Far East, E Siberia)].

94. *Polygonum alpinum* Allioni, Auct. Syn. 42. 1773.

高山神血宁 gao shan shen xue ning

Aconogonon alpinum (Allioni) Schur; *Persicaria alpina* (Allioni) H. Gross; *Pleuropterypyrum alpinum* (Allioni) Kitagawa (1937), not Koidzumi (1916); ?*P. jeholense* Kitagawa; ?*Polygonum jeholense* (Kitagawa) Baranov & Skvortsov ex S. X. Li & Y. L. Chang; *P. undulatum* Murray (1775), not P. J. Bergius (1767).

Herbs perennial. Stems erect, 50–100 cm tall, branched from above middle; branches striate, not divaricate, sparsely hirsute, rarely glabrous. Petiole 5–10 mm; leaf blade greenish abaxially, green adaxially, ovate-lanceolate or lanceolate, 3–9 × 1–3 cm, both surfaces pilose, base broadly cuneate, margin entire, densely shortly ciliate, apex acute, rarely acuminate; ocrea brown, tubular, membranous, sparsely pilose, dehiscent. Inflorescence terminal, paniculate; branches spreading, glabrous; bracts ovate-lanceolate, membranous, each 1- or 2-flowered. Pedicels longer than bracts, 2–2.5 mm, slender, glabrous, apex articulate. Perianth white, 5-parted; tepals elliptic, equal, 2–3 mm. Stamens 8. Styles very short; stigmas capitate. Achenes exceeding persistent perianth, yellow-brown, shiny, ovoid, trigonous, 4–5 mm. Fl. Jun–Jul, fr. Jul–Aug.

Forest margins, grassy slopes; 800–2400 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Qinghai, ?Shandong, Shanxi, Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Russia; SW Asia, Europe].

95. *Polygonum divaricatum* Linnaeus, Sp. Pl. 1: 363. 1753.

叉分神血宁 cha fen shen xue ning

Aconogonon divaricatum (Linnaeus) Nakai ex T. Mori; *Persicaria divaricata* (Linnaeus) H. Gross; *Pleuropterypyrum divaricatum* (Linnaeus) Nakai.

Herbs perennial. Stems erect, 70–120 cm tall, glabrous, branched from base; branches spreading, divaricate. Petiole ca. 5 mm; leaf blade lanceolate or oblong, 5–12 × 0.5–2 cm, both surfaces glabrous or pilose, base cuneate or narrowly cuneate, margin entire, shortly ciliate, apex acute; ocrea tubular, 1–2 cm, membranous, pilose or glabrous, oblique, dehiscent. Inflorescence paniculate; branches spreading; bracts ovate, veined, each

2- or 3-flowered. Pedicels equaling bracts, 2.5–3 mm, apex articulate. Perianth white, 5-parted; tepals elliptic, 2.5–3 mm, unequal. Stamens 7 or 8, included. Styles 3, very short; stigmas capitate. Achenes distinctly exceeding persistent perianth, yellow-brown, shiny, broadly ellipsoid, trigonous, 5–6 mm. Fl. Jul–Aug. fr. Aug–Sep.

Thickets in valleys, grassy slopes; 300–2100 m. Hebei, Heilongjiang, Henan, Hubei, Jilin, Liaoning, Nei Mongol, Qinghai, Shandong, Shanxi [Korea, Mongolia, Russia (Far East, E Siberia)].

96. *Polygonum pinetorum* Hemsley, J. Linn. Soc., Bot. 26: 345. 1891.

松林神血宁 song lin shen xue ning

Persicaria pinetorum (Hemsley) H. Gross; *Polygonum gloriosum* H. Léveillé.

Herbs perennial. Stems erect, 50–120 cm tall, distinctly striate, branched from above middle, pubescent but glabrous basally. Petiole 1–1.5 cm, pubescent; leaf blade abaxially greenish, adaxially green, elliptic or elliptic-lanceolate, 7–12 × 2–5 cm, papery, both surfaces sparsely pubescent, constricted below, base truncate or cuneate, margin entire, densely shortly ciliate, apex long acuminate; ocrea brown, 1–2 cm, membranous, pilose along veins, lacerate, apex oblique. Inflorescence terminal or axillary, paniculate, to 10 cm; rachis and branches pilose; bracts ovate, small, 1–1.5 mm, each 1-flowered. Pedicel 3–4 mm, slender, pubescent, apex articulate. Perianth white or pinkish, 5-parted; tepals caducous, obovate, 3–4 mm, unequal. Stamens 8, included. Styles 3, filiform, 1.5–2 mm; stigmas capitate. Achenes equaling persistent perianth, dark brown, slightly shiny, broadly ovoid, trigonous, 3–4 mm. Fl. May–Jul, fr. Jul–Sep.

• Forests, coniferous forests at mountain summits, thickets in valleys; 1900–3300 m. N Gansu, Hubei, N Shaanxi, Sichuan, Yunnan.

97. *Polygonum campanulatum* J. D. Hooker, Fl. Brit. India 5: 51. 1886.

钟花神血宁 zhong hua shen xue ning

Herbs perennial. Stems suberect, prostrate at base, 60–90 cm tall, branched, striate, pilose, tomentose upward. Petiole 7–10 mm, densely pubescent; leaf blade narrowly ovate or broadly so, 8–15 × 3–5 cm, both surfaces pilose, densely so along veins or abaxially densely brown tomentose, base broadly cuneate or subrounded, margin densely shortly ciliate, apex acuminate or caudate; ocrea tubular, 7–15 mm, membranous, pilose, apex oblique. Inflorescence paniculate; rachis and branches tomentose; bracts ovate, ca. 3 mm, membranous, glabrous, apex acute, sparsely ciliate, each 2- or 3-flowered. Pedicel 1.5–2 mm, apex articulate. Perianth pinkish or white, 5-parted; tepals obovate, ca. 3 mm, unequal. Stamens 8, included; anthers purple. Styles 3, filiform, ca. 2 mm; stigmas capitate. Achenes included in persistent perianth, yellow-brown, slightly shiny, broadly ellipsoid, trigonous, ca. 3.5 mm. Fl. Jul–Aug, fr. Sep–Oct.

Slopes, valleys; 1400–4100 m. Guizhou, W Hubei, Sichuan, Xizang, Yunnan [Bhutan, N Myanmar, Nepal, Sikkim].

1a. Leaves abaxially pilose 97a. var. *campanulatum*

1b. Leaves abaxially densely brown tomentose 97b. var. *fulvidum*

97a. *Polygonum campanulatum* var. *campanulatum*

钟花神血宁(原变种) zhong hua shen xue ning (yuan bian zhong)

Aconogonon campanulatum (J. D. Hooker) H. Hara; *A. campanulatum* var. *oblongum* (Meisner) H. Hara; *Persicaria campanulata* (J. D. Hooker) Ronse Decraene; *Polygonum rumicifolium* Royle ex Babington var. *oblongum* Meisner; *Reynoutria campanulata* (J. D. Hooker) Moldenke.

Leaves abaxially pilose.

Slopes, wet places in valleys; 2100–4000 m. Guizhou, Sichuan, Xizang, Yunnan [Bhutan, N Myanmar, Nepal, Sikkim].

97b. *Polygonum campanulatum* var. *fulvidum* J. D. Hooker, Fl. Brit. India 5: 52. 1886.

绒毛钟花神血宁 rong mao zhong hua shen xue ning

Aconogonon campanulatum (J. D. Hooker) H. Hara var. *fulvidum* (J. D. Hooker) H. Hara; *Persicaria alpina* (Allioni) H. Gross var. *sinica* (Dammer) H. Gross; *P. duclouxii* (H. Léveillé & Vaniot) H. Gross; ?*P. duclouxii* var. *hypoleuca* H. Léveillé; *Polygonum alpinum* Allioni var. *sinicum* Dammer; *P. duclouxii* H. Léveillé & Vaniot; *Reynoutria campanulata* (J. D. Hooker) Moldenke.

Leaves abaxially densely brown tomentose.

Slopes, valleys; 1400–4100 m. Guizhou, W Hubei, Sichuan, Xizang, Yunnan [Nepal, Sikkim].

98. *Polygonum lichiangense* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 197. 1914.

丽江神血宁 li jiang shen xue ning

Aconogonon lichiangense (W. W. Smith) Soják; *Polygonum campanulatum* J. D. Hooker var. *lichiangense* (W. W. Smith) Steward; *Reynoutria lichiangensis* (W. W. Smith) Moldenke.

Herbs perennial. Stems erect, 60–100 cm tall, stout, much branched, striate, densely setose, setae deciduous. Petiole 3–4 mm, densely setose; leaf blade green adaxially, broadly lanceolate or oblong-lanceolate, 6–12 × 2–4 cm, abaxially densely grayish tomentose, adaxially sparsely appressed setose, midvein conspicuous abaxially; ocrea tubular, 2–3 cm, membranous, veined, sparsely long setose, oblique. Inflorescence paniculate, large; rachis and branches densely white pubescent; bracts brown, lanceolate, 2–2.5 mm, each 1- or 2-flowered. Pedicel 3–3.5 mm, slender, articulate. Perianth white, 5-parted; tepals obovate, unequal, 4–5 mm. Stamens 8, included; anthers yellow. Styles 3, ca. 0.5 mm; stigmas capitate. Achenes included in persistent perianth, brown, dull, ellipsoid, trigonous, 3–3.5 mm, smooth. Fl. Jul–Sep, fr. Sep–Oct.

• Grassy slopes, forest margins; 2800–4100 m. Yunnan.

99. *Polygonum cathayanum* A. J. Li, Bull. Bot. Res., Harbin 15: 417. 1995.

华神血宁 hua shen xue ning

Herbs perennial. Stems erect, 50–80 cm tall, branched, striate, glabrous. Petiole 2–3 mm, pilose; leaf blade greenish abaxially, green adaxially, elliptic-lanceolate, 10–15 × 2–3 cm, both surfaces pilose, base broadly cuneate, margin shortly ciliate, apex acuminate; ocrea tubular, 2–3 cm, membranous, pilose along veins, oblique, dehiscent. Inflorescence terminal, paniculate, spreading, 10–15 cm; rachis and branches pilose; bracts ovate, 2–2.5 mm, pilose, each 2- or 3-flowered. Pedicels

shorter than bracts, articulate. Perianth white, 5-parted; tepals obovate, unequal, 3–3.5 mm. Stamens 8, included; anthers yellow. Styles 3, ca. 0.5 mm; stigmas capitate. Achenes equaling persistent perianth, slightly shiny, ovoid, trigonous, ca. 3.5 mm. Fl. Jul–Aug, fr. Aug–Sep.

• Grassy slopes, thickets in valleys, meadows; 3000–4600 m. S Qinghai, Sichuan, Xizang, Yunnan.

6. Polygonum sect. **Echinocaulon** Meisner in Wallich, Pl. Asiat. Rar. 3: 58. 1832.

刺蓼组 ci liao zu

Plants prostrate or climbing, with retrorse prickles on stems and petioles. Leaves hastate to sagittate. Inflorescence capitate to shortly paniculate. Tepals fused for ca. 1/3 their length. Nectaries free, globular. Style 1, bifid or trifid.

Between 20 and 30 species: mainly in E Asia; 14 species (one endemic) in China.

For further information, the reader may wish to refer to Park (Syst. Bot. 12: 167–179. 1987; and Mem. New York Bot. Gard. 47: 1–82. 1988).

100. Polygonum perfoliatum Linnaeus, Syst. Nat., ed. 10, 2: 1006. 1759.

杠板归 gang ban gui

Ampelgoum perfoliatum (Linnaeus) Roberty & Vautier; *Chylocalyx perfoliatum* (Linnaeus) Hasskarl ex Miquel; *Echinocaulon perfoliatum* (Linnaeus) Meisner ex Hasskarl; *Fagopyrum perfoliatum* (Linnaeus) Rafinesque; *Persicaria perfoliata* (Linnaeus) H. Gross; *Tracaulon perfoliatum* (Linnaeus) Greene; *Truellum perfoliatum* (Linnaeus) Soják.

Herbs annual. Stems trailing, red-brown, 0.8–2 m, branched, angulate, with retrorse prickles along angles. Petiole 3–8 cm, sparsely retrorsely prickly; leaf blade triangular-peltate, 4–6 × 5–8 cm, abaxially usually sparsely retrorsely prickly along veins, adaxially glabrous, base truncate or subcordate, apex subacute; ocrea tubular, with green herbaceous orbicular wing at apex, 1.5–3 cm in diam. Inflorescence terminal or axillary, spicate, 1–3 cm; bracts ovate-orbicular, each 2–4-flowered. Perianth white or pinkish, 5-parted; tepals elliptic, ca. 3 mm, in fruit dark blue, accrescent, fleshy. Stamens 8, in 2 whorls, included. Styles 3, connate at middle. Achenes included in persistent perianth, black, shiny, globose, 3–4 mm in diam. Fl. Jun–Aug, fr. Jul–Oct.

Near fields and roads, wet valleys; 100–2300 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, ?Xizang, Yunnan, Zhejiang [Bangladesh, Bhutan, India, Indonesia, Japan, Korea, Malaysia, Nepal, New Guinea, Philippines, Russia (Far East), Sikkim, Thailand, Vietnam; SW Asia; introduced in North America].

101. Polygonum maackianum Regel, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 4(4): 127. 1861.

长戟叶蓼 chang ji ye liao

Persicaria maackiana (Regel) Nakai ex T. Mori; *Polygonum thunbergii* Siebold & Zuccarini var. *maackianum* (Regel) Maximowicz ex Franchet & Savatier; *Tracaulon maackianum* (Regel) Greene; *Truellum maackianum* (Regel) Soják.

Herbs annual. Stems erect or ascending, 30–80 cm tall,

angulate, much branched, retrorsely prickly and densely stellate hairy. Petiole 1–5 cm, retrorsely prickly and densely stellate hairy; leaf blade narrowly hastate, 3–8 × 2–4 cm, both surfaces densely stellate hairy and sparsely prickly, base cordate, apex acute; ocrea tubular, apex with herbaceous wing; wing orbicular, margin dentate. Inflorescence terminal or axillary, capitate; peduncle branched, densely stellate hairy and sparsely glandular hairy; bracts lanceolate, usually densely stellate hairy, each 2-flowered. Pedicels shorter than bracts. Perianth pinkish, 5-parted; tepals broadly elliptic, ca. 4 mm. Stamens 8, in 2 whorls, included. Styles 3, connate to below middle. Achenes included in persistent perianth, deep brown, shiny, ovoid, trigonous, ca. 3.5 mm. Fl. Jun–Sep, fr. Jul–Oct.

Shaded grassy places in valleys; 100–1600 m. Anhui, Guangdong, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, ?Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea, Russia (Far East)].

102. Polygonum thunbergii Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(3): 208. 1846.

戟叶蓼 ji ye liao

Polygonum arifolium Thunberg, Fl. Jap. 168. 1784, not Linnaeus (1753); *Helxine arifolia* Rafinesque; *Persicaria sinica* Migo; *P. thunbergii* (Siebold & Zuccarini) H. Gross; *P. thunbergii* var. *stolonifera* (F. Schmidt) H. Gross ex Nakai; *Polygonum hastatotrilobum* Meisner; *P. pteropus* Hance; *P. sinicum* (Migo) Fang & Zheng; *P. stellatotomentosum* W. W. Smith & Ramas.; *P. stoloniferum* F. Schmidt; *P. thunbergii* var. *stoloniferum* (F. Schmidt) Makino; *Tracaulon thunbergii* (Siebold & Zuccarini) Greene; *Truellum thunbergii* (Siebold & Zuccarini) Soják.

Herbs annual. Stems erect or ascending, 30–90 cm tall, angulate, with recurved prickles, rooting at nodes in lower part. Petiole 2–5 cm, retrorsely prickly; leaf blade hastate, both surfaces sparsely bristly, rarely stellate hairy, base subcordate or truncate, margin shortly ciliate, middle lobe ovate to broadly ovate, apex acuminate, basal lobes smaller, apex acute or obtuse; ocrea tubular, short, membranous, usually apex with green herbaceous wing, margin entire or crenate, shortly ciliate. Inflorescence capitate; peduncle branched, pubescent below, glandular hairy in upper part; bracts lanceolate, margin ciliate,

each 3- or 4-flowered. Pedicels shorter than bracts, glabrous. Perianth pinkish or white, 5-parted; tepals elliptic, 3–4 mm, apex obtuse. Stamens 8, in 2 whorls, included. Styles 3, connate to below middle; stigmas capitate. Achenes included in persistent perianth, yellow-brown, opaque, broadly ovoid, trigonous, 3–3.5 mm. Fl. Jul–Sep, fr. Aug–Oct. $2n = 40^*$.

Wet valleys, grassy slopes; 100–2400 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, ?Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, ?Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, ?Xizang, Yunnan, Zhejiang [Japan, Korea, Russia (Far East)].

103. *Polygonum biconvexum* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25: 184. 1908.

双凸戟叶蓼 *shuang tu ji ye liao*

Persicaria biconvexa (Hayata) Nemoto; *Polygonum hastatotrilobum* Meisner var. *lenticulare* Danser; *P. thunbergii* Siebold & Zuccarini f. *biconvexum* (Hayata) Liu et al.; *Truellum biconvexum* (Hayata) Soják.

Herbs annual. Stems ascending, prostrate at base, 30–80 cm tall, branched, retrorse prickly along angles. Petiole 2–4 cm, often narrowly winged, retrorsely prickly; leaf blade hastate, both surfaces bristly, sparsely shortly stellate hairy, base nearly truncate to cordate, margin ciliate; middle lobe broadly elliptic or ovate, usually contracted near base, margin ciliate, apex acuminate; basal lobes ovate, small, apex acute to obtuse; ocrea tubular, 5–10 mm, apex truncate, sometimes apex with herbaceous wing, ciliate. Inflorescence terminal or axillary, capitate; peduncle glandular hairy; bracts lanceolate, 3.5–4 mm, apex acuminate, ciliate, each 2-flowered. Pedicels shorter than bracts, 2–3 mm. Perianth pinkish, 4-parted; tepals elliptic, 2.5–3.5 mm, apex obtuse. Stamens 5 or 6, in 2 whorls. Styles 2, connate to below middle; stigmas 2, capitate. Achenes included in persistent perianth, brown, opaque, broadly ovoid, biconvex, ca. 3 mm. Fl. Jul–Aug, fr. Sep–Oct.

Slopes, forest margins, wet ditches; 1500–2500 m. Taiwan [Indonesia (Sumatra)].

104. *Polygonum senticosum* (Meisner) Franchet & Savatier, Enum. Pl. Jap. 1: 401. 1875.

刺蓼 *ci liao*

Chylcalyx senticosus Meisner, Ann. Mus. Bot. Lugduno-Batavi 2: 65. 1865; *Persicaria senticosus* (Meisner) H. Gross ex Nakai; *Polygonum babingtonii* Hance; ?*P. senticosum* var. *formosanum* Ohwi; *P. typhoniifolium* Hance; *Truellum japonicum* Houttuyn.

Herbs perennial. Stems trailing or ascending, 1–2 cm tall, much branched, angulate, with retrorse prickles along angles; petiole 2–7 cm, retrorsely prickly; leaf blade triangular or narrowly triangular, 4–8 × 2–7 cm, both surfaces pubescent, abaxially with sparse retrorse prickles along veins, base hastate or broadly cordate, margin retrorsely prickly, apex acuminate; ocrea tubular, 5–10 mm, membranous, apex with green herbaceous reniform-orbicular wing, margin ciliate. Inflorescence terminal or axillary, capitate; peduncles branched, shortly glandular hairy; bracts narrowly ovate, ciliate. Pedicels shorter than bracts, 1.5–2.5 mm, glabrous. Perianth pinkish, 5-parted;

tepals oblong, 3–4 mm. Stamens 8, in 2 whorls. Styles 3, connate to below middle; stigmas capitate. Achenes black, dull, subglobose, 2.5–3 mm. Fl. Jun–Jul, fr. Jul–Sep.

Mountain slopes, moist valleys, mixed forests; 100–1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shandong, Taiwan, Yunnan, Zhejiang [Japan, Korea, Russia (Far East)].

105. *Polygonum darrisii* H. Léveillé, Repert. Spec. Nov. Regni Veg. 11: 297. 1912.

大箭叶蓼 *da jian ye liao*

Persicaria sagittifolia H. Gross; *P. senticosus* (Meisner) H. Gross ex Nakai var. *sagittifolia* Yonekura & H. Ohashi; *Polygonum sagittifolium* H. Léveillé & Vaniot (1902), not Kuntze (1891); *P. senticosum* (Meisner) Franchet & Savatier var. *sagittifolium* C. W. Park; *Truellum darrisii* (H. Léveillé) Soják.

Herbs annual. Stems climbing or scandent, reddish purple, 1–2 cm tall, angulate, with sparse recurved prickles along angles. Petiole 3–6 cm, retrorsely prickly; leaf blade narrowly triangular or triangular-sagittate, 4–10 × 3–5 cm, abaxially sparsely prickly along midvein, adaxially glabrous, base sagittate, margin retrorsely prickly, apex acuminate; ocrea tubular, apex with green herbaceous lanceolate-auriculate wing, margin not ciliate. Inflorescence terminal or axillary, capitate; peduncle usually simple, sparsely prickly; bracts narrowly ovate, apex acuminate, usually each 2-flowered. Pedicels shorter than bracts. Perianth white or pinkish, 5-parted; tepals elliptic. Stamens 8, in 2 whorls, included. Styles 3, connate to middle; stigmas capitate. Achenes included in persistent perianth, black-brown, dull, subglobose, weakly trigonous, ca. 3 mm. Fl. Jun–Aug, fr. Sep–Oct.

• Wet valleys, along ditches; 300–1700 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Yunnan, Zhejiang.

One of us (Park) believes that this taxon should be recognized as a variety of *Polygonum senticosum*.

106. *Polygonum praetermissum* J. D. Hooker, Fl. Brit. India 5: 47. 1886.

疏蓼 *shu liao*

Persicaria auriculata S. K. Dixit et al.; *P. hastatoauriculata* (Makino ex Nakai) H. Gross ex Nakai; *P. praetermissa* (J. D. Hooker) H. Hara; *Polygonum auriculatum* Makino (1903), not Meisner (1826), nor J. D. Hooker & Thomson (1886); *P. birmanicum* Gage; *P. hastatoauriculatum* Makino ex Nakai; *P. thunbergii* var. *hastatotrilobum* subvar. *eciliolatum* H. Léveillé; *Tracaulon praetermissum* (J. D. Hooker) Greene; *Truellum hastatoauriculatum* (Makino ex Nakai) Soják; *T. praetermissum* (J. D. Hooker) Soják.

Herbs annual. Stems decumbent or erect, 30–90 cm tall, branched, angulate, with sparse retrorse prickles along angles. Petiole 5–10 mm, prickly; leaf blade lanceolate or narrowly oblong, 4–8 × 0.5–1.5 cm, both surfaces glabrous or sparsely pubescent, abaxially sparsely prickly along midvein, base sagittate, margin ciliate, apex acute; ocrea tubular, 1–1.5 mm, membranous, base with retrorse prickles, apex oblique, usually

shortly ciliate. Inflorescence terminal or in axils of upper leaves, spicate, lax, interrupted at base; peduncle dichotomously branching, glandular hairy in upper part; bracts funnel-shaped, usually each 2–4-flowered. Pedicels longer than bracts, 3–4 mm, glabrous. Perianth pinkish, 4-parted; tepals broadly elliptic, 3–4 mm. Stamens 4 or 5, included. Styles 3, connate to below middle. Achenes included in persistent perianth, dark brown, dull, subglobose, weakly trigonous at apex, ca. 3 mm. Fl. Jun–Aug, fr. Jul–Sep.

Marshy areas, streamsides; 1400–1800 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, ?Hunan, Jiangsu, Jiangxi, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, India, Japan, Korea, Nepal, Philippines, Sri Lanka; Australia].

107. *Polygonum dissitiflorum* Hemsley, J. Linn. Soc., Bot. 26: 338. 1891.

稀花蓼 xi hua liao

Persicaria dissitiflora (Hemsley) H. Gross ex T. Mori; *P. fauriei* (H. Léveillé & Vaniot) Nakai ex T. Mori; *Polygonum fauriei* H. Léveillé & Vaniot; *P. glanduliferum* Nakai; *Truellum dissitiflorum* (Hemsley) Tzvelev.

Herbs annual. Stems erect or prostrate at base, 70–100 cm tall, branched, sparsely retrorsely prickly, usually with few stellate hairs. Petiole 2–5 cm, stellate hairy, often retrorsely prickly; leaf blade light green abaxially, green adaxially, ovate-elliptic, 4–15 × 3–7 cm, abaxially sparsely stellate hairy and retrorsely prickly along midvein, adaxially sparsely stellate hairy and bristly, base cordate or hastate, margin shortly ciliate, apex acuminate; ocrea tubular, 0.6–1.5 cm, membranous, shortly ciliate, oblique. Inflorescence terminal or axillary, paniculate; peduncles slender, reddish purple glandular hairy; bracts green, funnel-shaped, 2.5–3 mm, margin strongly ciliate, each 1- or 2-flowered. Pedicel 2–3 mm. Perianth pink, 5-parted; tepals elliptic, ca. 3 mm. Stamens 7 or 8, in 2 whorls, included. Styles 3, connate to below middle. Achenes included in persistent perianth, dark brown, somewhat dull, globose, weakly trigonous at apex, ca. 3 mm. Fl. Jun–Aug, fr. Jul–Sep.

Valleys, hilly grasslands, stream banks; 100–1500 m. Anhui, Fujian, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Zhejiang [Korea, Russia (Far East)].

108. *Polygonum sagittatum* Linnaeus, Sp. Pl. 1: 363. 1753, s.l.

箭头蓼 jian tou liao

Helxine sagittata (Linnaeus) Rafinesque; *Persicaria sagittata* (Linnaeus) H. Gross ex Nakai; *P. sagittata* var. *sieboldii* (Meisner) Nakai; *P. sieboldii* (Meisner) K. Ohki; ?*P. sieboldii* var. *brevifolia* Kitagawa; ?*Polygonum belophyllum* Litvinov; ?*P. paludosum* (Komarov) Komarov; *P. sagittatum* var. *boreale* Meisner; *P. sagittatum* Linnaeus subsp. *sieboldii* (Meisner) V. N. Voroschilov; ?*P. sagittatum* var. *paludosum* Komarov; ?*P. sieboldii* var. *pratense* Y. L. Chang & S. X. Li; *P. sagittatum* var. *sibiricum* Meisner; *P. sagittatum* var. *sieboldii* (Meisner) Maximowicz ex Komarov; *P. sieboldii* Meisner; *Tracaulon sagittatum* (Linnaeus) Small; *T. sibiricum* (Meisner) Greene; *T. sieboldii* (Meisner) Greene; *Truellum sagittatum* (Linnaeus) Soják; *T. sibiricum* (Meisner) Soják.

Herbs annual, scandent, 0.3–2 m tall. Stem light green to green, often becoming reddish purple at maturity, simple to extensively branched, glabrous, angulate, with recurved prickles along angles, often decumbent at base, usually producing fibrous roots at lower nodes. Leaves petiolate, upper ones often shortly petiolate or sessile; petiole 0.5–4 cm, glabrous, retrorsely prickly along angles; leaf blade green adaxially, light green abaxially, broadly lanceolate to oblong, 2–8.5 × 1–3 cm, thin, abaxially glabrous, abaxially usually retrorsely prickly near base of midvein, adaxially glabrous to densely pubescent with appressed simple multiserial hairs, base sagittate to deeply cordate with small rounded or triangular lobes, margin ciliate or eciliate, apex acute to subacute or obtuse; ocrea oblique, 0.5–1.3 cm, scarious, glabrous, often weakly ciliate at tip, lower ones often lacerate. Inflorescence terminal or in axils of upper leaves, elongate, 3–15 cm, often slender, usually branched, usually glabrous but sometimes with a few recurved prickles in lower portion; inflorescence bracts resembling ocrea but much reduced, 1.5–3 mm; each inflorescence branch terminated by a dense headlike cluster of many flower fascicles. Flower fascicles usually 2- or 3-flowered, closely spaced; bracts lanceolate to narrowly elliptic, 3–5 mm, glabrous, apex strongly acuminate; bracteoles narrowly elliptic to elliptic, 3–4 mm, glabrous, often ciliate at tip; pedicel short, 1–1.5 mm, glabrous, included in bracteoles. Perianth white to greenish white, often reddish, 3–5 mm, 5-parted; tepals broadly elliptic, not becoming fleshy, apex obtuse. Stamens 8, inserted at base of perianth in 2 whorls; inner stamens 3, ca. 2 mm; outer stamens 5, 1–1.5 mm. Style 1, 3-cleft to middle, ca. 0.5 mm, included; stigmas 3. Achenes dark brown to black, dull to shiny, 3–4 mm, usually ovoid, sharply trigonous, punctate to smooth, apex acute.

In moist grassy situations, often in partial shade, occurring naturally in meadows, pastures, margins of swamps, ponds, and along stream banks, common as a weed along roadsides and other disturbed sites; 100–2200 m. Anhui, Fujian, Gansu, ?Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [N India, Japan, Korea, Mongolia, Russia (Far East) (var. *sieboldii*); E North America: (var. *sagittatum*)].

- 1a. Leaves strongly ciliate at margin; achenes smooth and shiny (in E North America) var. *sagittatum*
- 1b. Leaves eciliate at margin; achenes usually punctate and dull (in E Asia) var. *sieboldii*

Polygonum sagittatum s.l. is an extremely variable species and known from both Asia and North America. Some authors have pointed out, on the basis of differences in achene surface and leaf margin, that North American populations are separable from Asian ones, and have treated them as two distinct varieties of *P. sagittatum*, or as two distinct species: *P. sagittatum* in North America and *P. sieboldii* in eastern Asia. In Park's previous taxonomic monograph of *P. sect. Echinocaulon* (Syst. Bot. 12: 167–179. 1987; and Mem. New York Bot. Gard. 47: 1–82. 1988), *P. sagittatum* and *P. sieboldii* are recognized as conspecific mainly based on flavonoid chemistry and also the observation that North American plants are well within the range of variability of eastern Asian ones. However, the recent molecular analyses of North American and eastern Asian populations of *P. sagittatum* (Park, in prep.) show that these disjunct populations are genetically somewhat divergent from each other. The degree of genetic divergence, however, strongly

suggests that they can be recognized either as a single polymorphic species (*P. sagittatum* s.l.) or two distinct varieties of *P. sagittatum*, but they can hardly be treated as two distinct species.

109. *Polygonum dichotomum* Blume, Bijdr. Fl. Ned. Ind. 529. 1826.

二歧蓼 er qi liao

Persicaria dichotoma (Blume) Masamune; *P. peduncularis* (Wallich ex Meisner) Nemoto; *Polygonum pedunculare* Wallich ex Meisner; *P. strigosum* R. Brown var. *pedunculare* (Wallich ex Meisner) Steward; *P. tetragonum* Blume; *Tracaulon pedunculare* (Wallich ex Meisner) Greene; *T. tetragonum* (Blume) Greene; *Truellum dichotomum* (Blume) Soják.

Herbs annual (?perennial). Stems ascending or erect, 40–100 cm tall, often branched, with sparse retrorse prickles. Petiole 5–10 mm; leaf blade lanceolate or narrowly elliptic, 5–10 × 1–3 mm, both surfaces glabrous, abaxially with retrorse prickly midvein, base cuneate, truncate, or subhastate, margin entire, not ciliate or very shortly ciliate, apex acute; ocrea tubular, 1.5–2 cm, membranous, usually glabrous, apex oblique, not ciliate. Inflorescence terminal or axillary, densely shortly spicate, usually 1 or 2 × dichotomously branched; peduncle glandular hairy; bracts broadly elliptic, 2–3 mm, ciliate, each 2- or 3-flowered. Pedicels shorter than bracts. Perianth pinkish, 5-parted; tepals broadly elliptic, 2–3 mm. Stamens 5, included. Styles 2, free; stigmas capitate. Achenes included in persistent perianth, brown, dull, nearly orbicular, biconvex, 2–2.5 mm. Fl. Jun–Jul, fr. Aug–Oct.

Ditches, marshy areas; 100–1000 m. Fujian, Guangdong, ?Guangxi, Hainan, ?Hubei, Taiwan [India (Assam), Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, Philippines, Thailand, Vietnam; Australia].

One of us (Park) notes that this is an extremely variable species, and consists of two varieties, *Polygonum dichotomum* var. *dichotomum* and var. *angustissimum* (J. D. Hooker) C. W. Park (see Park, Mem. New York Bot. Gard. 47: 75. 1988), but only the typical variety occurs in China.

110. *Polygonum bungeanum* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 13: 77. 1840.

柳叶刺蓼 liu ye ci liao

Polygonum pensylvanicum Bunge, Enum. Pl. China Bor. 57. 1833, not Linnaeus (1753); *Persicaria bungeana* (Turczaninow) Nakai ex T. Mori; *Polygonum chanetii* H. Léveillé.

Herbs annual. Stems erect or ascending, 30–80 cm tall, branched, retrorsely prickly. Petiole 5–10 mm; leaf blade green adaxially, lanceolate or narrowly elliptic, 4–13 × 1–3 cm, abaxially hispidulous, adaxially glabrous, usually hispidulous along midvein, base cuneate, margin ciliate, apex acute or subacuminate; ocrea tubular, 1–1.5 cm, membranous, apex truncate, long ciliate. Inflorescence terminal or axillary, spicate, 5–10 mm, usually branched, interrupted at base; peduncle densely glandular hairy; bracts green, funnel-shaped, not ciliate, glabrous, often with few glandular hairs. Pedicels shorter than bracts. Perianth white or pinkish, 5-parted; tepals elliptic, 3–4 mm. Stamens 8, in 2 whorls, included. Styles 2, connate to below middle; stigmas capitate. Achenes included in persistent

perianth, black, dull, orbicular, biconvex, ca. 3 mm. Fl. Jul–Aug, fr. Aug–Sep. $2n = 20$.

Grassy valleys, near fields, roadsides; sea level to 1700 m. Gansu, Hebei, Heilongjiang, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Shandong, Shanxi [Japan, Korea, Russia (Far East)].

111. *Polygonum muricatum* Meisner, Monogr. Polyg. 74. 1826.

小蓼花 xiao liao hua

Persicaria muricata (Meisner) Nemoto; *P. nipponensis* (Makino) H. Gross ex Nakai; *Polygonum hastatosagittatum* Makino var. *latifolium* Makino; *P. kirinense* S. X. Li & Y. L. Chang; *P. nipponense* Makino; *P. oliganthum* Diels; *P. strigosum* R. Brown var. *muricatum* (Meisner) Steward; *P. thunbergii* Siebold & Zuccarini var. *spicatum* H. Léveillé; *P. uniflorum* Y. X. Ma & Y. T. Zhao; *Tracaulon muricatum* (Meisner) Greene; *Truellum muricatum* (Meisner) Soják; *T. nipponense* (Makino) Soják.

Herbs annual. Stems ascending, nearly prostrate at base, 80–100 cm tall, branched, angulate, with retrorse prickles 0.5–1 mm along angles; petiole 0.7–2 cm, sparsely retrorsely prickly; leaf blade ovate or oblong-ovate, 2.5–6 × 1.5–3 cm, abaxially sparsely stellate pubescent, shortly pubescent, with retrorse prickles along midvein, adaxially usually glabrous or sparsely pubescent, rarely stellate pubescent, base broadly truncate, orbicular, or subcordate, margin ciliate, apex acuminate or acute; ocrea tubular, 1–2 cm, membranous, glabrous, apex truncate, long ciliate. Inflorescence spicate, several spikes aggregated and panicle-like; peduncles densely pubescent, sparsely glandular hairy; bracts broadly elliptic or ovate, 2.5–3 mm, apex acuminate, margin ciliate, usually each 2-flowered. Pedicels shorter than bracts, ca. 2 mm. Perianth white or pinkish, 5-parted; tepals broadly elliptic, 2–3 mm. Stamens 6–8, in 2 whorls, included. Styles 3, free; stigmas capitate. Achenes included in persistent perianth, brown, shiny, ovoid, trigonous, 2–2.5 mm, smooth. Fl. Jul–Aug, fr. Sep–Oct.

Wet valleys, ditches; sea level to 3300 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Sichuan, ?Taiwan, ?Xizang, Yunnan, Zhejiang [India, Japan, Korea, Nepal, Russia (Far East), Thailand].

112. *Polygonum strigosum* R. Brown, Prodr. 420. 1810.

糙毛蓼 cao mao liao

Persicaria strigosa (R. Brown) Nakai; *Polygonum bodinieri* H. Léveillé & Vaniot; *Tracaulon strigosum* (R. Brown) Greene; *Truellum strigosum* (R. Brown) Soják.

Herbs annual. Stems erect or decumbent, 50–100 cm tall, branched, angulate, with retrorse prickles along angles. Petiole 0.5–2 cm, with recurved prickles; leaf blade elliptic or lanceolate, 6–10 × 1–3.5 cm, abaxially usually glabrous, with retrorse prickles along midvein, adaxially glabrous or sparsely shortly strigose, base weakly cordate, truncate, or subsagittate, margin ciliate, apex acuminate or acute; ocrea tubular, 1.5–3 mm, membranous, with dense retrorse prickles at base, apex truncate, long ciliate. Inflorescence spicate; peduncle branched, densely pubescent, sparsely glandular hairy; bracts elliptic or ovate, 2–3 mm, usually strigose, each 2- or 3-flowered. Pedicels

shorter than bracts, 1–2 mm, glabrous. Perianth white or pinkish, 5-parted; tepals elliptic, 2–4 mm. Stamens 5–7, included. Styles 2 or 3; stigmas capitate. Achenes included in persistent perianth, dark brown, dull, nearly orbicular, biconvex or trigonous, ca. 3 mm. Fl. Aug–Sep, fr. Sep–Oct.

Wet valleys, forests; 100–2000 m. Fujian, Guangdong, Guangxi, Guizhou, ?Jiangsu, ?Xizang, Yunnan [Bangladesh, Bhutan, India, Indonesia, Malaysia, Myanmar, Nepal, New Guinea, Sikkin, Thailand, Vietnam; Australia].

113. *Polygonum hastatosagittatum* Makino, Bot. Mag. (Tokyo) 17: 119. 1903.

长箭叶蓼 chang jian ye liao

Persicaria hastatosagittata (Makino) Nakai ex T. Mori; *P. ussuriensis* (Regel) Nakai ex T. Mori; *Polygonum cavaleriei* H. Léveillé; *P. korshinskianum* Nakai; *P. sagittatum* Linnaeus var. *ussuriense* Regel; *P. strigosum* var. *hastatosagittatum* (Makino) Steward; *P. ussuriense* (Regel) Nakai; *Truellum hastatosagittatum* (Makino) Soják; *T. korshinskianum* (Nakai) Soják.

Herbs annual. Stems erect or prostrate at base, 40–90 cm

The following taxa have been described or reported from China, but we have seen no specimens and are therefore unable to treat them in this account. Further revisionary study is necessary.

Polygonum minutissimum Z. Wei & Y. B. Chang (Bull. Bot. Res., Harbin 12: 271. 1992, not L. O. Williams, 1934), described from Zhejiang.

tall, branched, angulate, with retrorse prickles 0.3–1 mm along angles. Petiole 1–2.5 cm, retrorsely prickly; leaf blade lanceolate or elliptic, 3–7(–10) × 1–2(–3) cm, glabrous or pubescent, abaxially with retrorse prickles along midvein, adaxially sometimes stellate pubescent, base sagittate or subhastate, margin shortly ciliate, apex acute or subacuminate; ocrea tubular, 1.5–2 cm, membranous, apex truncate, long ciliate. Inflorescence terminal or in axil of upper leaves, spicate; peduncle dichotomous, densely pubescent, sparsely glandular hairy; bracts broadly elliptic or ovate, 2.5–3 mm, margin ciliate, usually each 2-flowered. Pedicels longer than bracts, 4–6 mm, with glandular hairs. Perianth pinkish, 5-parted; tepals broadly elliptic, 3–4 mm. Stamens 7 or 8, included. Styles 3, connate to below middle; stigmas capitate. Achenes included in persistent perianth, dark brown, shiny, ovoid, trigonous, 3–4 mm. Fl. Aug–Sep, fr. Sep–Oct.

Streamsides, wet areas; sea level to 3200 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Taiwan, Xizang, Yunnan, Zhejiang [Russia (Far East)].

Polygonum pilushanense Y. C. Liu & C. H. Ou (Quart. J. Chinese Forest. 8: 123. 1976), described from Taiwan.

One of us (Ohba) adds the following species described under *Bistorta*; however, one of us (Li) has been unable to examine material because of health reasons. We list them here pending further revisionary work on the family.

Bistorta albiflora Miyamoto & H. Ohba (Bull. Nat. Sci. Mus. Tokyo, ser. B, 28: 141. 2002), described from Sichuan.

Bistorta longispicata Yonekura & H. Ohashi (J. Jap. Bot. 76: 346. 2001), described from Xizang.

Bistorta ludlowii Yonekura & H. Ohashi (J. Jap. Bot. 76: 348. 2001), described from SE Xizang.

Bistorta sherei H. Ohba & S. Akiyama (Alp. Fl. Jaljale Himal. 11. 1992), reported from Xizang (see Bull. Nat. Sci. Mus. Tokyo, ser. B, 28: 145. 2002).

Bistorta tubistipulis Miyamoto & H. Ohba (Bull. Nat. Sci. Mus. Tokyo, ser. B, 28: 143. 2002), described from Sichuan.

3. FALLOPIA Adanson, Fam. Pl. 2: 277, 557. 1763.

首乌属 shou wu shu

Li Anjen (李安仁 Li An-ren); Chong-wook Park

Bilderdykia Dumortier; *Pleuropterus* Turczaninow.

Herbs annual, rarely subshrubs. Stems twining. Leaves simple, alternate, petiolate; leaf blade ovate or cordate, margin entire; ocrea tubular, apex oblique or truncate. Inflorescence racemose or paniculate. Flowers bisexual. Perianth persistent, 5-parted; outer 3 tepals larger, keeled or winged, rarely without keels or wings. Stamens 8. Styles very short; stigmas capitate. Achenes trigonous, ovoid.

Between seven and nine species (but ca. 20 if taken more broadly to include *Reynoutria*): widespread in N temperate zone; eight species (three endemic) in China.

1a. Annual herb; inflorescence a raceme.

2a. Tepals outer 3 keeled or narrowly winged on abaxial surface, slightly accrescent in fruit 1. *F. convolvulus*

2b. Tepals outer 3 winged on abaxial surface, accrescent in fruit.

3a. Wings dentate; perianth (including wings) in fruit obovate; achenes minutely granular-striate, slightly shiny 2. *F. dentatoalata*

3b. Wings entire; perianth (including wings) in fruit orbicular; achenes smooth, shiny 3. *F. dumetorum*

1b. Perennial herb or subshrub; inflorescence paniculate.

- 4a. Subshrub; leaves clustered 4. *F. aubertii*
 4b. Perennial herb; leaf solitary or leaves alternate.
 5a. Leaves alternate; achenes 3.9–4.8 mm 8. *F. forbesii*
 5b. Leaf solitary; achenes to 3 mm.
 6a. Tepals: outer 3 winged on abaxial surface, accrescent in fruit 5. *F. multiflora*
 6b. Tepals not winged, not accrescent in fruit.
 7a. Stems glabrous, sparsely papillate; leaf ovate-triangular; tepals 3–4 mm 6. *F. denticulata*
 7b. Stems densely brown pilose and sparsely hirsute or glabrescent; leaf broadly cordate or broadly hastate-cordate; tepals 1.5–2 mm 7. *F. cynanchoides*

1. Fallopia convolvulus (Linnaeus) A. Löve, Taxon 19: 300. 1970.

蔓首乌 wan shou wu

Polygonum convolvulus Linnaeus, Sp. Pl. 1: 364. 1753; *Bilderdykia convolvulus* (Linnaeus) Dumortier; *Fagopyrum convolvulus* (Linnaeus) H. Gross; *Helxine convolvulus* (Linnaeus) Rafinesque; *Reynoutria convolvulus* (Linnaeus) Shinners; *Tiniaria convolvulus* (Linnaeus) Webb & Miquel.

Herbs annual. Stems twining, to 1–1.5 m, striate, papillate, branched at base. Petiole 1.5–5 cm; leaf blade small papillose abaxially, base cordate, margin entire, apex acuminate; ocrea short, membranous, oblique, not ciliate. Inflorescence axillary, racemose, interrupted; bracts narrowly ovate, apex acute, each 2–4-flowered. Pedicels longer than bracts, slender, margin white; tepals narrowly elliptic, unequal in size, outer 3 larger and keeled or narrowly winged on abaxial surface, slightly accrescent in fruit. Stamens 8. Styles 3, very short, stipitate. Achenes included in persistent perianth, black, opaque, ellipsoid, trigonous, 3–4 mm, finely granular. Fl. May–Aug, fr. Jun–Sep.

Thickets in valleys, stream banks; 100–3600 m. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan [Widely distributed: Afghanistan, Bhutan, India, Japan, Kazakhstan, Korea, Mongolia, Nepal, Pakistan, Russia; Europe; introduced in North America].

2. Fallopia dentatoalata (F. Schmidt) Holub, Folia Geobot. Phytotax. 6: 176. 1971.

齿翅首乌 chi chi shou wu

Polygonum dentatoalatum F. Schmidt in Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9: 232. 1859; *Bilderdykia dentatoalata* (F. Schmidt) Kitagawa; *B. scandens* (Linnaeus) Greene var. *dentatoalata* (F. Schmidt) Nakai; *Fagopyrum scandens* (Linnaeus) H. Gross var. *dentatoalatum* (F. Schmidt) H. Gross; *P. scandens* Linnaeus var. *dentatoalatum* (F. Schmidt) Maximowicz ex Franchet & Savatier; *Tiniaria scandens* (Linnaeus) Nakai var. *dentatoalata* (F. Schmidt) Nakai ex T. Mori.

Herb annual. Stems twining, 1–2 m, striate, papillate; branches few. Petiole 2–4 cm, slender, papillate; leaf blade 3–6 × 2.5–4 cm, both surfaces glabrous, along veins minutely papillate, base cordate, margin entire, apex acuminate; ocrea brownish, 3–4 mm, membranous, oblique, not ciliate. Inflorescence axillary or terminal, racemose, leafy, lax, interrupted, 4–12 cm, usually longer than leaves; bracts funnel-shaped, 2–3

mm, membranous, oblique, apex acute, not ciliate, each 4- or 5-flowered. Pedicel short, elongated in fruit, articulate below middle. Perianth white or greenish, 5-parted; tepals unequal in size, accrescent in fruit, outer 3 much longer, winged on abaxial surface; wings dentate, decurrent near base of pedicels. Perianth (including wings) in fruit obovate, 5–6 mm in diam. Stamens 8, included. Styles very short; stigmas capitate. Achenes included in persistent perianth, black, slightly shiny, ellipsoid, trigonous, 4–4.5 mm, minutely granular striate. Fl. Jun–Sep, fr. Jul–Oct.

Mixed forests in valleys, slopes; 200–2800 m. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan [Japan, Korea, Russia (Far East)].

3. Fallopia dumetorum (Linnaeus) Holub, Folia Geobot. Phytotax. 6: 176. 1971.

篱首乌 li shou wu

Herbs annual. Stems twining, 70–150 cm, striate, papillate, glabrous, much branched. Petiole 1–3 cm, papillate; leaf blade ovate-cordate, 3–6 × 1.5–4 cm, both surfaces glabrous, along veins minutely papillate, base cordate or sagittate, margin entire, apex acuminate; ocrea short, 2–3 mm, membranous, oblique, apex acute, not ciliate. Inflorescence usually axillary, racemose, lax, few or many flowered; bracts 1.5–2 mm, membranous, each 1–6-flowered. Pedicel 3–4 mm, slender, articulate, elongate in fruit. Perianth greenish, 5-parted; tepals elliptic, 2–3 mm, unequal in size, outer 3 larger and winged in fruit; wings entire, slightly decurrent along pedicels. Perianth (including wings) in fruit orbicular, 4–4.5 mm in diam. Stamens 8, included. Styles very short; stigmas capitate. Achenes included in persistent perianth, black, shiny, ellipsoid, trigonous, 3–3.5 mm, smooth. Fl. Jun–Aug, fr. Jul–Sep.

Grassy slopes, thickets and mixed forests in valleys, mountain valleys, fields; 200–2400 m. Hebei, Heilongjiang, Jiangsu, Jilin, Liaoning, Nei Mongol, Shandong, Xinjiang [Bhutan, N India, Japan, Korea, Mongolia, Nepal, Pakistan, Russia; SW Asia, Europe].

- 1a. Flowers few; bracts each 1- or 2(or 3)-flowered 3c. var. *pauciflora*
 1b. Flowers many; bracts each 3–6-flowered.
 2a. Wings continuous 3a. var. *dumetorum*
 2b. Wings interrupted 3b. var. *subalata*

3a. Fallopia dumetorum var. **dumetorum**

篱首乌(原变种) li shou wu (yuan bian zhong)

Polygonum dumetorum Linnaeus, Sp. Pl., ed. 2, 1: 522. 1762; *Bilderdykia dumetorum* (Linnaeus) Dumortier; *Fagopyrum dumetorum* (Linnaeus) Schreber; *Helxine dumetorum*

(Linnaeus) Rafinesque; *P. scandens* Linnaeus var. *dumetorum* (Linnaeus) Gleason; *Reynoutria scandens* (Linnaeus) Shinnars var. *dumetorum* (Linnaeus) Shinnars; *Tiniaria dumetorum* (Linnaeus) Opiz.

Flowers many; bracts each 3–6-flowered. Wings continuous. Fl. Jun–Aug, fr. Jul–Sep.

Grassy slopes, thickets in valleys; 200–2400 m. Hebei, Heilongjiang, Jiangsu, Jilin, Liaoning, Nei Mongol, Shandong, Xinjiang [Bhutan, N India, Japan, Korea, Mongolia, Nepal, Pakistan, Russia; SW Asia, Europe].

3b. *Fallopia dumetorum* var. *subalata* Borodina, Rast. Tsentral. Azii 9: 120. 1989.

略翅首乌 lue chi shou wu

Wings interrupted.

- Mountain valleys, fields. Xinjiang.

3c. *Fallopia dumetorum* var. *pauciflora* (Maximowicz) A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 100. 1998.

疏花篱首乌 shu hua li shou wu

Polygonum pauciflorum Maximowicz, Ind. Sem. Hort. Petrop. 3. 1866; *Bilderdykia pauciflora* (Maximowicz) Nakai; *Fagopyrum pauciflorum* (Maximowicz) H. Gross; *Fallopia pauciflora* (Maximowicz) Kitagawa; *P. convolvulus* var. *pauciflorum* (Maximowicz) V. N. Voroschilov; *Tiniaria pauciflora* (Maximowicz) Nakai ex T. Mori.

Flowers few; bracts each 1- or 2(or 3)-flowered. Fl. Jun–Jul, fr. Jul–Aug.

• Mixed forests in valleys, thickets; 400–1000 m. Hebei, Heilongjiang, Shandong.

One of us (Park) notes that this appears to be a poorly developed form of the typical variety that is often found in harsh environments, and that it can hardly be considered a variety.

4. *Fallopia aubertii* (L. Henry) Holub, Folia Geobot. Phytotax. 6: 176. 1971.

木藤首乌 mu teng shou wu

Polygonum aubertii L. Henry, Rev. Hort. 79: 82. 1907; *Bilderdykia aubertii* (L. Henry) Moldenke; *Reynoutria aubertii* (L. Henry) Moldenke; *Tiniaria aubertii* (L. Henry) Hedberg ex Janchen.

Subshrubs. Stems twining, gray-brown, 1–4 m, glabrous. Leaves clustered, rarely solitary; petiole 1.5–2.5 cm; leaf blade narrowly ovate or ovate, 2.5–5 × 1.5–3 cm, both surfaces subleathery, glabrous, base subcordate, margin entire, apex acute; ocrea brown, membranous, oblique, dehiscent. Inflorescence axillary or terminal, paniculate, few branched; peduncle papillate; bracts membranous, apex acute, each 3–6-flowered. Pedicel 3–4 mm, slender, base articulate. Perianth greenish or white, 5-parted; tepals elliptic, outer 3 larger, accrescent and winged on abaxial surface in fruit; wings decurrent below to pedicels; fruiting perianth obovate, 4–5 mm in diam. Stamens 8; filaments dilated below middle, base pubescent. Styles 3, very short; stigmas capitate. Achenes included in persistent perianth, black, slightly shiny, ovoid, trigonous, 3.5–4 mm,

densely minutely granular. Fl. Jul–Aug, fr. Aug–Sep.

• Slopes, thickets in valleys; 900–3200 m. Gansu, Guizhou, Henan, Hubei, ?Hunan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan.

One of us (Park) notes that this could be conspecific with *Fallopia baldschuanica* (Regel) Holub (see Bailey & Stace, Pl. Syst. Evol. 180: 29–52. 1992).

5. *Fallopia multiflora* (Thunberg) Haraldson, Symb. Bot. Upsal. 22(2): 77. 1978.

何首乌 he shou wu

Herbs perennial. Root tuber black-brown, narrowly elliptic, large, ligneous. Stems twining, 2–4 cm, much branched, striate, glabrous, ligneous at base. Petiole 1.5–3 cm; leaf blade ovate or narrowly ovate, 3–7 × 2–5 cm, both surfaces glabrous or abaxially papillate along veins, base cordate or subcordate, margin entire, apex acuminate; ocrea 3–5 mm, membranous, oblique, glabrous. Inflorescence terminal or axillary, paniculate, spreading, 10–20 cm; peduncle minutely papillate; bracts triangular-ovate, papillate, apex acute, each 2–4-flowered. Pedicel 2–3 mm, slender, articulate at base, elongate in fruit. Perianth white or greenish; tepals elliptic, unequal in size, outer 3 larger, accrescent and winged on abaxial surface in fruit; wings decurrent below to pedicels on abaxial surface in fruit; wings decurrent below to pedicels. Perianth (including wings) in fruit nearly orbicular, 6–7 mm in diam. Stamens 8; filaments dilated at base. Styles 3, very short; stigmas capitate. Achenes included in persistent perianth, black-brown, shiny, ovoid, trigonous, 2.5–3 mm, smooth. Fl. Jun–Oct, fr. Jul–Nov.

Mountain slopes, rock crevices, thickets in valleys; 200–3000 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, ?Hebei, ?Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Qinghai, Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Japan].

- 1a. Leaf blade glabrous abaxially 5a. var. *multiflora*
- 1b. Leaf blade abaxially papillate along veins
..... 5b. var. *ciliinervis*

5a. *Fallopia multiflora* var. *multiflora*

何首乌(原变种) he shou wu (yuan bian zhong)

Polygonum multiflorum Thunberg in Murray, Syst. Veg., ed. 14, 379. 1784; *Aconogonon hypoleucum* (Nakai ex Ohwi) Soják; *Bilderdykia multiflora* (Thunberg) Roberty & Vautier; *Fagopyrum multiflorum* (Thunberg) I. Grinzescu; *Fallopia multiflora* var. *hypoleuca* (Nakai ex Ohwi) Yonekura & H. Ohashi; *Helxine multiflora* (Thunberg) Rafinesque; *Pleuropterus cordatus* (Thunberg) Turczaninow; *P. multiflorum* (Thunberg) Nakai; *Polygonum hypoleucum* Nakai ex Ohwi; *P. multiflorum* var. *angulatum* S. Y. Liu; *P. multiflorum* var. *hypoleucum* (Nakai ex Ohwi) T. S. Liu et al.; *Reynoutria multiflora* (Thunberg) Moldenke.

Leaf blade glabrous abaxially. Fl. Jul–Oct, fr. Aug–Nov.

Mountain slopes, rock crevices, thickets in valleys; 200–3000 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hainan, ?Hebei, ?Heilongjiang, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Japan].

One of us (Park) would prefer to treat *Polygonum multiflorum* var. *angulatum* and *Fallopia multiflora* var. *hypoleuca* as distinct varieties of *F. multiflora*.

5b. Fallopia multiflora var. **ciliinervis** (Nakai) Yonekura & H. Ohashi, J. Jap. Bot. 72: 158. 1997.

毛脉首乌 mao mai shou wu

Pleuropteris ciliinervis Nakai, Repert. Spec. Nov. Regni Veg. 13: 267. 1914; *Fallopia ciliinervis* (Nakai) K. Hammer; *Polygonum ciliinerve* (Nakai) Ohwi; *P. multiflorum* var. *ciliinerve* (Nakai) Steward; *Reynoutria ciliinervis* (Nakai) Moldenke.

Leaf blade abaxially papillate along veins. Fl. Jun–Sep, fr. Jul–Oct.

• Thickets in valleys, mountain slopes; 200–2700 m. Gansu, Guizhou, Henan, Hubei, ?Hunan, Jilin, Liaoning, Qinghai, Shaanxi, Sichuan, Yunnan.

One of us (Park) would prefer to treat this taxon as the distinct species *Fallopia ciliinervis*.

6. Fallopia denticulata (C. C. Huang) J. Holub, Preslia 70(2): 104. 1998.

酱头 jiang tou

Polygonum denticulatum C. C. Huang, Acta Bot. Yunnan. 6: 288. 1984.

Herbs perennial. Rhizomes nearly globose, large, to 20 cm in diam. Stems twining, 2–5 cm, striate, glabrous, sparsely papillate, slightly ligneous at base, much branched; branchlets slender, angulate, minutely papillate. Petiole 2–6 cm, sparsely minutely papillate; leaf blade ovate or ovate-triangular, 4–11 × 3–6 cm, both surfaces glabrous, minutely papillate along veins, base broadly cordate, margin repand or subentire, apex acuminate; ocrea purplish, 4–6 mm, membranous, oblique, apex acute. Inflorescence axillary or terminal, paniculate, lax, 10–15 cm; bracts funnel-shaped, ca. 2 mm, glabrous, each 1- or 2-flowered. Perianth white, 5-parted; tepals narrowly elliptic, 3–4 mm. Stamens 8, included. Styles 3, connate to below middle; stigmas capitate. Achenes included in persistent perianth, ovoid, trigonous. Fl. Jun–Aug, fr. Jul–Sep.

• Thickets in valleys; ca. 2500 m. ?Guizhou, ?Xizang, Yunnan (Gengma).

This species is used medicinally.

7. Fallopia cynanchoides (Hemsley) Haraldson, Symb. Bot. Upsal. 22(2): 78. 1978.

牛皮消首乌 niu pi xiao shou wu

Herbs perennial. Stems twining, terete, 1–1.5 cm, densely brown pubescent and sparsely retrorsely hirsute. Petiole 3–5 cm, densely brown pubescent and sparsely retrorsely hirsute; leaf blade broadly cordate or broadly hastate-cordate, 5–10 × 3–8 cm, abaxially densely brown villous or strigillose along veins, adaxially sparsely strigillose or glabrescent, base deeply cordate; basal lobes rounded or acute at apex, margin entire, long ciliate, apex acuminate; ocrea membranous, densely pilose, apex acute, oblique. Inflorescence axillary or terminal, paniculate, 10–15 cm, densely pubescent and sparsely retrorsely hir-

sute; bracts ovate, 1–1.5 mm, pubescent, apex acuminate, each 2–4-flowered. Pedicel 2–2.5 mm, articulate above middle, sparsely pubescent. Perianth greenish, 5-parted; tepals broadly elliptic, 1.5–2 mm; sepals broadly elliptic, 1.5–2 mm. Stamens 8, included; filaments dilated at base. Styles 3, connate at base; stigmas capitate, densely papillate. Achenes included in persistent perianth, black, shiny, ovoid, trigonous, 2–2.5 mm. Fl. Jul–Sep, fr. Aug–Oct.

• Forests in valleys and on mountain slopes, forest margins; 1100–3000 m. S Gansu, Guizhou, Hubei, Hunan, S Shaanxi, Sichuan, Xizang, Yunnan.

- 1a. Leaves abaxially densely brown villous, adaxially sparsely strigillose 7a. var. *cynanchoides*
1b. Leaves abaxially strigillose along veins, adaxially sparsely strigillose or glabrescent 7b. var. *glabriuscula*

7a. Fallopia cynanchoides var. **cynanchoides**

牛皮消首乌(原变种) niu pi xiao shou wu (yuan bian zhong)

Polygonum cynanchoides Hemsley, J. Linn. Soc., Bot. 26: 338. 1891; *Fagopyrum cynanchoides* (Hemsley) H. Gross.

Leaves abaxially densely brown villous, adaxially sparsely strigillose adaxially. Fl. Aug–Sep, fr. Sep–Oct.

• Thickets in valleys, forests on mountain slopes; 1100–2400 m. S Gansu, Guizhou, Hubei, Hunan, S Shaanxi, Sichuan, Yunnan.

7b. Fallopia cynanchoides var. **glabriuscula** (A. J. Li) A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 104. 1998.

光叶酱头 guang ye jiang tou

Polygonum cynanchoides Hemsley var. *glabriusculum* A. J. Li in C. Y. Wu, Fl. Xizang. 1: 608. 1983.

Leaves abaxially strigillose along veins, adaxially sparsely strigillose or glabrescent. Fl. Jul–Aug, fr. Aug–Sep.

• Forest margins, forests in valleys; 2400–3000 m. Sichuan, Xizang.

8. Fallopia forbesii (Hance) Yonekura & H. Ohashi, J. Jap. Bot. 72: 158. 1997.

华蔓首乌 hua wan shou wu

Polygonum forbesii Hance, J. Bot. 21: 100. 1883; *P. reynoutria* Makino var. *ellipticum* Koidzumi; *P. yunnanense* H. Léveillé; *Reynoutria elliptica* (Koidzumi) Migo ex Nakai; *R. forbesii* (Hance) T. Yamazaki; *R. yunnanensis* (H. Léveillé) Nakai ex Migo.

Herbs perennial, 1–2.5 m tall. Rhizomes well-developed, thick, ca. 1.6 cm in diam., lignified. Stems erect, robust, mostly branched above middle, 0.6–2.1 cm in diam., sparsely pubescent with conic unicellular trichomes, rarely together with 1–4-celled filiform trichomes. Leaves alternate; petiole 0.5–1.8 cm, circular in cross section, with extrafloral nectaries abaxially; ocrea completely surrounding stem, brown, cylindrical, 0.5–1.5 cm, scarious, sparsely pubescent with conic unicellular trichomes, peltate multicellular glandular trichomes and 1–4-celled filiform trichomes, apex truncate; leaf blade orbicular to nearly so, 6.6–11.5 × 5.1–9.4 cm, both surfaces sparsely

pubescent with peltate multicellular glandular trichomes, mid-vein and main veins sparsely pubescent with cornical unicellular trichomes, base rounded, margin entire, apex abruptly acuminate to cuspidate. Inflorescence terminal or axillary, simple or branched, 2–6.2 cm, pubescent with conic unicellular trichomes, 1–4-celled filiform trichomes and peltate multicellular glandular trichomes, panicle-like, consisting of a series of fascicles of 2–6 spirally arranged pedicellate flowers; each flower fascicle subtended by a bract (ocrea); bracts funnel-form, 1.2–1.9 × 1–2 mm, scarious. Flowers functionally unisexual, rarely bisexual, 0.4–1.1 mm, each with bracteoles; bracteoles paired, scarious, fused at base; pedicels 2–3 mm, jointed above middle. Perianth petaloid, white to greenish white, 5-cleft; tepals 5, 3 outer ones keeled, 1.5–2.5 × 1–1.9 mm, with wings developed along main vascular bundle, wings ca. 0.2 wide. Stamens 8, inserted at base of perianth in 2

whorls, outer stamens 3–3.4 mm, inner stamens 3.6–4 mm. Style 1, 0.3–0.5 mm, deeply 3-cleft; stigmas fimbriate. Achenes enclosed in persistent perianth, dark brown, shiny, trigonous, obovate to orbicular, 3.9–4.8 × 2.1–2.9 mm, smooth; perianth wings narrowly tapering to articulated pedicel-joint in fruit. $2n = 66, 88$.

Anhui, Guangdong, Guangxi, Jiangxi, Shandong, Yunnan, Zhejiang [Korea].

The major characteristics that distinguish *Fallopia forbesii* from other, related species are the following: leaves orbicular to suborbicular, short, rounded at base, abruptly acuminate to cuspidate at apex; achenes relatively large (3.9–4.8 × 2.1–2.9 mm); perianth wings narrowly tapering to the articulated pedicel joint in fruit.

One of us (Li) believes that *Fallopia forbesii* is conspecific with *Reynoutria japonica* (see Lauener, Notes Roy. Bot. Gard. Edinburgh 40: 202. 1982).

4. REYNOUTRIA Houttuyn, Nat. Hist. 2(8): 639. 1777.

虎杖属 hu zhang shu

Li Anjen (李安仁 Li An-ren); Chong-wook Park

Herbs perennial, dioecious. Rhizomes thickened. Stems erect, stout, hollow. Leaves simple, alternate, petiolate; leaf blade ovate or ovate-elliptic, margin entire; ocrea oblique. Inflorescence axillary, paniculate. Flowers unisexual. Perianth persistent, 5-parted; outer 3 tepals accrescent and winged on abaxial surface in female flowers. Stamens 8. Styles 3; stigmas fimbriate. Achenes ovoid, trigonous.

About two species: Asia; one species in China.

One of us (Park) believes that this group should be included within the genus *Fallopia* (see Ronse Decraene & Akeroyd, Bot. J. Linn. Soc. 98: 321–371. 1988; and Bailey & Stace, Pl. Syst. Evol. 180: 29–52. 1992).

The hybrid *Reynoutria japonica* × *R. sachalinensis* (*R. ×bohemica*) is probably cultivated and probably also escaped in China.

1. *Reynoutria japonica* Houttuyn, Nat. Hist. 2(8): 639. 1777.

虎杖 hu zhang

Fallopia japonica (Houttuyn) Ronse Decraene; *F. japonica* var. *compacta* (J. D. Hooker) J. Bailey; *Pleuropteris cuspidatus* H. Gross; *Polygonum cuspidatum* Siebold & Zuccarini (1846), not Willdenow ex Sprengel (1825); *Reynoutria henryi* Nakai; *Tiniaria japonica* (Houttuyn) Hedberg.

Herbs perennial. Rhizomes thickened. Stems numerous, erect, 1–2 m tall, stout, branched above, striate, papillate, often with red or purple spots. Leaves often deciduous; petiole 1–2 cm, papillate; leaf blade ovate or broadly elliptic, 5–12 × 4–9 cm, subleathery, both surfaces glabrous, papillate along veins, base broadly cuneate, rounded, or truncate, margin entire, apex

acute or shortly acuminate, not ciliate. Inflorescence axillary, paniculate, 3–8 cm; bracts funnel-shaped, 1–2 mm, oblique, each 2–4-flowered. Pedicels 3–4 mm, slender, articulate below middle. Perianth white or greenish, 5-parted. Male flowers: stamens 8, longer than perianth. Female flowers: 3 outer tepals accrescent and winged on abaxial surface; styles 3; stigmas fimbriate. Achenes included in persistent perianth, black-brown, shiny, ovoid-ellipsoid, 4–5 mm. Fl. Jun–Sep, fr. Jul–Oct. $2n = 44, 52^*$.

Thickets in valleys, field margins, mountain slopes; 100–2000 m. Anhui, Fujian, N Gansu, Guangdong, Guangxi, Guizhou, Hainan, ?Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, ?Liaoning, N Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea, Russia (Far East)]; widely cultivated and becoming a weed in other parts of the world.

5. ANTENORON Rafinesque, Fl. Ludov. 28. 1817.

金线草属 jin xian cao shu

Li Anjen (李安仁 Li An-ren); Chong-wook Park

Sunania Rafinesque; *Tovara* Adanson, nom. rej.

Herbs perennial, monoecious. Rhizomes robust. Stems erect, simple or branched above. Leaves simple, alternate, petiolate; leaf blade elliptic or obovate, margin entire; ocrea membranous. Inflorescence terminal or axillary, racemose, spicate. Pedicel divergent, articulate. Flowers bisexual. Perianth persistent, 4-parted. Stamens 5. Styles 2, persistent, enlarged and indurate at maturity, apex hooked. Achenes ovoid, biconvex.

Three species: Asia, North America; one species in China.

Treatments by Haraldson (Symb. Bot. Upsal. 22(2): 1–95. 1978) and Ronse Decraene & Akeroyd (Bot. J. Linn. Soc. 98: 321–371. 1988), considered *Antenoron* to be a section of *Persicaria*, for which the correct name is *P.* sect. *Tovara*. For further information, the reader may wish to refer to the following studies: Park et al. (Korean J. Bot. 35: 385–392. 1992) and Mun & Park (Pl. Syst. Evol. 196: 153–159. 1995).

1. *Antenoron filiforme* (Thunberg) Roberty & Vautier, Bois-siera 10: 35. 1964.

金线草 jin xian cao

Herbs perennial. Rhizomes stout. Stems erect, 50–80 cm tall, striate, appressed hispid, swollen at nodes. Petiole 1–1.5 cm, appressed hispid; leaf blade elliptic or narrowly elliptic to ovate, rarely obovate, 6–15 × 4–8 cm, both surfaces appressed hispid, base cuneate, margin entire, apex acute or acuminate; ocrea tubular, 5–10 mm, membranous, shortly ciliate. Inflorescence terminal or axillary, 15–35 cm, slender, laxly flowered; bracts funnel-shaped, 2–3 mm, ciliate, 1–3-flowered. Pedicel 3–4 mm. Perianth rose, 4-parted; tepals ovate, ca. 3 mm, accrescent. Stamens usually 5, included. Styles 2, persistent, enlarged and indurate at maturity, 3.5–4 mm, deflexed and hooked at apex, long exerted from perianth. Achenes included in persistent perianth, dark brown, shiny, ovoid, biconvex, smooth. Fl. Aug–Oct, fr. Sep–Nov.

Forests, thickets, valleys; 100–2500 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea, Myanmar, Russia (Far East)].

- 1a. Leaves shortly appressed hispid on both surfaces 1c. var. *neofiliforme*
 1b. Leaves appressed hispid on both surfaces.
 2a. Leaves broadly elliptic to ovate, apex shortly acuminate or acute, base cuneate to rounded 1a. var. *filiforme*
 2b. Leaves narrower, oblong, apex long acuminate, base nearly cuneate 1b. var. *kachinum*

1a. *Antenoron filiforme* var. *filiforme*

金线草(原变种) jin xian cao (yuan bian zhong)

Polygonum filiforme Thunberg in Murray, Syst. Veg., ed. 14, 377. 1784; *Persicaria filiformis* (Thunberg) Nakai; *Polygonum virginianum* Linnaeus var. *filiforme* (Thunberg) Nakai; *P. virginianum* f. *glabratum* Matsuda; *Sunania filiformis* (Thunberg) Rafinesque; *Tovara filiformis* (Thunberg) Nakai; *T. ryukyuensis* Masamune; *T. virginiana* (Linnaeus) Rafinesque var. *filiformis* (Thunberg) Steward.

Leaves broadly elliptic to ovate, both surfaces appressed hispid, base cuneate, apex shortly acuminate or acute. Fl. Aug–Oct, fr. Sep–Nov.

Forests on mountain slopes, valleys; 100–2500 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea, Myanmar, Russia (Far East)].

1b. *Antenoron filiforme* var. *kachinum* (Nieuwland) H. Hara, J. Jap. Bot. 40: 192. 1965.

毛叶红珠七 mao ye hong zhu qi

Tovara virginiana (Linnaeus) Rafinesque var. *kachina* Nieuwland, Amer. Midl. Nat. 2: 182. 1912; *T. filiformis* (Thunberg) Nakai var. *kachina* (Nieuwland) H. L. Li.

Leaves appressed hispid on both surfaces, base nearly cuneate, apex long acuminate. Fl. Aug–Sep, fr. Sep–Nov.

Mixed forests on mountain slopes, thickets in valleys; 500–1300 m. S Yunnan [Myanmar].

One of us (Park) believes that this is a variety of the following taxon, which, in turn, should be treated at specific rank (see Park et al., Korean J. Bot. 35: 385–392. 1992).

1c. *Antenoron filiforme* var. *neofiliforme* (Nakai) A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 108. 1998.

短毛金线草 duan mao jin xian cao

Polygonum neofiliforme Nakai, Bot Mag. (Tokyo) 36: 117. 1922; *Antenoron neofiliforme* (Nakai) H. Hara; *Persicaria neofiliformis* (Nakai) Ohki; *Polygonum filiforme* subsp. *neofiliforme* (Nakai) Kitamura; *P. filiforme* var. *neofiliforme* (Nakai) Ohwi; *Sunania neofiliformis* (Nakai) H. Hara; *Tovara filiformis* (Thunberg) Nakai var. *neofiliformis* (Nakai) Makino; *T. neofiliformis* (Nakai) Nakai.

Leaves oblong, narrow, both surfaces shortly appressed hispid, apex long acuminate. Fl. Aug–Oct, fr. Sep–Nov.

• Forests, moist valleys; 200–2300 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Shandong, Sichuan, Yunnan, Zhejiang.

One of us (Park) believes that this taxon is a closely allied yet distinct species on the basis of results from flavonoid analysis (see Mun & Park, Pl. Syst. Evol. 196: 153–159. 1995).

6. **FAGOPYRUM** Miller, Gard. Dict. Abr., ed. 4, [495]. 1754, nom. cons.

荞麦属 qiao mai shu

Li Anjen (李安仁 Li An-ren); Suk-pyo Hong

Herbs annual or perennial, rarely subshrubs, monoecious. Stems erect, glabrous or pubescent. Leaves simple, alternate, petiolate; leaf blade triangular, cordate, broadly ovate, sagittate, or linear; ocrea membranous, oblique, margin entire, apex acute or truncate. Inflorescence racemose or corymbose. Flowers bisexual. Perianth persistent, 5-parted; tepals 5, not accrescent. Stamens 8. Styles 3, elongate; stigmas capitate. Achenes trigonous, not winged or horned at base.

About 15 species: Asia, Europe; ten species (six endemic) in China.

1a. Subshrub or perennial herb.

POLYGONACEAE

- 2a. Subshrub; leaves sagittate or ovate-triangular, apex long acuminate or caudate 1. *F. urophyllum*
 2b. Perennial herb; leaves broadly ovate or triangular, apex acuminate or acute.
 3a. Stems and branches leafless above; leaves broadly ovate or triangular, 2–3 cm, ocrea apically acute;
 pedicel articulate at apex; achenes ovoid, 2–2.5 mm 2. *F. statice*
 3b. Stems and branches leafy above; leaves triangular, 4–12 cm; ocrea apically truncate; pedicel articulate at
 middle; achenes broadly ovoid, 6–8 mm 3. *F. dibotrys*
 1b. Annual herb.
 4a. Achenes grooved; angles rounded below middle, sharply acute above; pedicel articulate at middle 4. *F. tataricum*
 4b. Achenes not grooved; angles sharply acute; pedicel apically articulate or not articulate.
 5a. Leaves cordate; inflorescence capitate 5. *F. gilesii*
 5b. Leaves not cordate; inflorescence racemose, corymbose, or filiform, terminal spikelike panicle.
 6a. Stems, branches leafless above 6. *F. leptopodium*
 6b. Stems, branches leafy above.
 7a. Leaves triangular or ovate triangular, 1.5–5 cm wide; inflorescence racemose or corymbose.
 8a. Inflorescence lax, interrupted; pedicel articulate at apex; achenes ca. 3 mm; plants wild 7. *F. gracilipes*
 8b. Inflorescence dense, not interrupted; pedicel not articulate; achenes 5–6 mm; plants
 cultivated 8. *F. esculentum*
 7b. Leaves linear, triangular-sagittate, or narrowly sagittate, 0.2–1 cm wide; inflorescence a dense
 or lax filiform terminal spikelike panicle.
 9a. Leaves linear 9. *F. lineare*
 9b. Leaves triangular-sagittate or narrowly sagittate 10. *F. caudatum*

1. *Fagopyrum urophyllum* (Bureau & Franchet) H. Gross, Bull. Acad. Int. Géogr. Bot. 23: 21. 1913.

万年乔 wan nian qiao

Polygonum urophyllum Bureau & Franchet, J. Bot. (France) 5: 150. 1891; *Fagopyrum mairei* (H. Léveillé) H. Gross; *P. mairei* H. Léveillé.

Subshrubs. Stems suberect, 60–90 cm tall, much branched; branches ligneous, bark red-brown, exfoliating, simple, herbaceous, green striate. Petioles 2–5 cm, shortly pubescent; leaf blade greenish abaxially, green adaxially, sagittate or ovate-triangular, 2–8 × 1.5–4 cm, both surfaces shortly pubescent along veins, base broadly sagittate, margin entire, apex long acuminate or caudate; ocrea brown, 4–6 mm, membranous, oblique. Inflorescence terminal, paniculate, 15–20 cm; branches spreading, lax; bracts greenish, narrowly funnel-shaped, 2–2.5 mm, apex acute, each 3- or 4-flowered. Pedicels longer than bracts, 3–3.5 mm, slender, apex articulate. Perianth white; tepals elliptic, 2–3 mm. Stamens included. Styles free; stigmas capitate. Achenes exceeding persistent perianth, black-brown, shiny, broadly ovoid, sharply trigonous, 3–4 mm. Fl. Apr–Sep, fr. May–Nov.

• Grassy or gravelly slopes, thickets in valleys; 900–2800 m. Sichuan, Yunnan.

2. *Fagopyrum statice* (H. Léveillé) H. Gross, Bull. Acad. Int. Géogr. Bot. 23: 26. 1913.

长柄野荞 chang bing ye qiao

Polygonum statice H. Léveillé, Repert. Spec. Nov. Regni Veg. 7: 338. 1909.

Herbs perennial. Rhizomes black, ligneous. Stems 40–50(–65) cm tall, branched at base, glabrous, slenderly striate, leafless above. Petiole 2–4 cm; leaf blade broadly ovate or triangular, 2–3 × 1.5–2.5 cm, both surfaces glabrous, veins rather prominent abaxially, base broadly cordate or nearly trun-

cate, apex acute; ocrea membranous, oblique, margin not ciliate, apex acute. Inflorescence of several spikes aggregated and panicle-like, lax; bracts funnel-shaped, each 2- or 3-flowered. Pedicels longer than bracts, 2–2.5 mm, slender, apex articulate. Tepals elliptic, 1–1.5 mm. Stamens equaling perianth. Styles free; stigmas capitate. Achenes shiny, ovoid, 2–2.5 mm. Fl. Jul–Oct, fr. Aug–Nov.

• Grassy slopes; 1300–2200 m. Guizhou, Yunnan.

3. *Fagopyrum dibotrys* (D. Don) H. Hara, Fl. E. Himal. 69. 1966.

金荞 jin qiao

Polygonum dibotrys D. Don, Prodr. Fl. Nepal. 73. 1825; *?Fagopyrum acutatum* (Lehmann) Mansfeld ex K. Hammer; *Fagopyrum cymosum* (Treviranus) Meisner; *F. megaspartanum* Q. F. Chen; *F. pilus* Q. F. Chen; *?P. acutatum* Lehmann; *P. cymosum* Treviranus; *P. labordei* H. Léveillé & Vaniot; *P. tristachyum* H. Léveillé; *P. volubile* Turczaninow.

Herbs perennial. Rhizomes black-brown, stout, ligneous. Stems erect, green or brownish, 40–100 cm tall, much branched, striate, glabrous. Petiole 2–10 cm; leaf blade triangular, 4–12 × 3–11 cm, both surfaces papillate, base nearly hastate, margin entire, apex acuminate; ocrea brown, 5–10 mm, membranous, oblique, apex truncate, not ciliate. Inflorescence terminal or axillary, corymbose; bracts ovate-lanceolate, ca. 3 mm, margin membranous, apex acute, each 4-flowered, rarely 6-flowered. Pedicels equaling bracts, articulate at middle. Perianth white; tepals narrowly elliptic, ca. 2.5 mm. Stamens included. Styles free; stigmas much exceeding persistent perianth, capitate, opaque. Achenes blackish brown, dull, broadly ovoid, 6–8 mm, trigonous, sometimes narrowly winged, angles smooth to repandous, apex acute. Fl. Apr–Oct, fr. May–Nov. 2n = 24, 32*

Moist valleys, grassy slopes; 300–3200 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Xizang, Yunnan, Zhejiang [Bhutan, India, Kashmir, Myanmar, Nepal, Sikkim, Vietnam].

This species is used medicinally.

4. *Fagopyrum tataricum* (Linnaeus) Gaertner, *Fruct. Sem. Pl.* 2: 182. 1790.

苦荞 ku qiao

Polygonum tataricum Linnaeus, *Sp. Pl.* 1: 364. 1753.

Herbs annual. Stems erect, green, 30–70(–100) cm tall, branched, striate, papillate. Petioles ca. as long as blade; leaf blade broadly triangular, 2–7 × 2–8 cm, both surfaces papillate along veins, base cordate or truncate, margin entire, apex acute; ocrea brown, ca. 5 mm, membranous, oblique. Inflorescence terminal or axillary, racemose, several racemes together paniculate, lax; bracts ovate, 2–3 mm, apex acute, each 2–4-flowered. Pedicel 3–4 mm, articulate at middle. Perianth white or greenish; tepals elliptic, ca. 2 mm. Stamens included. Stigmas capitate. Achenes much exceeding persistent perianth, black-brown, narrowly ovoid, trigonous, 5–6 mm, surfaces grooved; angles rounded below middle, sharply acute above, sometimes sinuate-dentate along angles. Fl. May–Sep, fr. Jun–Oct. $2n = 16^*$.

Wild or cultivated in mountainous regions; 400–3900 m. Gansu, ?Guangxi, Guizhou, Hebei, Heilongjiang, Hubei, Hunan, Jilin, Liaoning, Nei Mongol, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Afghanistan, Bhutan (cultivated), India, Kazakhstan (introduced), Kyrgyzstan (introduced), Mongolia, Myanmar (cultivated), Nepal, Russia (Far East, introduced), Sikkim (cultivated), Tajikistan (introduced); cultivated in Europe and North America].

5. *Fagopyrum gilesii* (Hemsley) Hedberg, *Svensk Bot. Tidskr.* 40: 390. 1946.

心叶野荞 xin ye ye qiao

Polygonum gilesii Hemsley, *Hooker's Icon. Pl.* 18: t. 1756. 1887.

Herbs annual. Stems erect, 10–30(–50) cm tall, branched at base, glabrous, striate. Petioles 1.5–3 cm; leaf blade greenish abaxially, green adaxially, cordate, 1–3 × 0.8–2.5 cm, abaxially small papillate along veins, adaxially glabrous; ocrea 3–5 mm, membranous, glabrous, apex acute, oblique. Inflorescence geminate, capitate, dense; peduncle dichotomous; bracts funnel-shaped, 2.5–3 mm, apex acute, glabrous, each 2- or 3-flowered. Pedicel 3–4 mm, slender, apex articulate. Perianth pinkish; tepals elliptic, 2–2.5 mm. Stamens included. Stigmas capitate. Achenes exceeding persistent perianth, brown, slightly shiny, narrowly ovoid, trigonous, 3–4 mm. Fl. Jul–Aug, fr. Aug–Sep.

Grassy slopes, valleys; 2200–4000 m. Sichuan, Yunnan [Pakistan].

6. *Fagopyrum leptopodum* (Diels) Hedberg, *Svensk Bot. Tidskr.* 40: 390. 1946.

小野荞 xiao ye ye qiao

Herbs annual. Stems 6–30 cm tall, slender, glabrate, branched at base, leafless above. Petiole 1–1.5 cm, slender; leaf blade triangular or triangular-ovate, abaxially papillate along veins, adaxially scabrous, midvein slightly prominent abaxially, base sagittate or nearly truncate, margin entire, apex acute;

ocrea white or brownish, membranous, oblique, apex acute. Inflorescence racemose, dense or very lax, several racemes together large and panicle-like; bracts membranous, oblique, apex acute, each 2- or 3-flowered. Pedicels longer than bracts, ca. 3 mm, slender, apex articulate. Perianth white or pinkish; tepals elliptic, 1.5–2.5 mm. Stamens included. Styles filiform, free; stigmas capitate. Achenes exceeding persistent perianth, yellow-brown, ovoid, trigonous, 2–2.5 mm. Fl. May–Oct, fr. Jun–Nov.

• Mountain slopes, valleys; 1000–3000 m. Sichuan, Yunnan.

- 1a. Raceme dense 6a. var. *leptopodum*
1b. Raceme very lax 6b. var. *grossii*

6a. *Fagopyrum leptopodum* var. *leptopodum*

小野荞(原变种) xiao ye ye qiao (yuan bian zhong)

Polygonum leptopodum Diels, *Notes Roy. Bot. Gard. Edinburgh* 5: 260. 1912.

Raceme dense. Fl. Jul–Sep, fr. Aug–Oct.

• Mountain slopes, valleys; 1000–3000 m. Sichuan, Yunnan.

6b. *Fagopyrum leptopodum* var. *grossii* (H. Léveillé) L. A. Lauener & D. K. Ferguson, *Notes Roy. Bot. Gard. Edinburgh* 40: 195. 1982.

疏穗小野荞 shu sui xiao ye ye qiao

Polygonum grossii H. Léveillé, *Repert. Spec. Nov. Regni Veg.* 11: 297. 1912; *Fagopyrum grossii* (H. Léveillé) H. Gross; *P. leptopodum* Diels var. *grossii* (H. Léveillé) Samuelsson.

Raceme very lax. Fl. May–Oct, fr. Jun–Nov.

• Mountain slopes, valleys; 1000–3000 m. Sichuan, Yunnan.

7. *Fagopyrum gracilipes* (Hemsley) Dammer ex Diels, *Bot. Jahrb. Syst.* 29: 315. 1900.

细柄野荞 xi bing ye ye qiao

Polygonum gracilipes Hemsley, *J. Linn. Soc., Bot.* 26: 340. 1891; *Fagopyrum bonatii* (H. Léveillé) H. Gross; *F. odontopterum* H. Gross; *P. bonatii* H. Léveillé; *P. gracilipes* var. *odontopterum* (H. Gross) Samuelsson; *P. odontopterum* (H. Gross) H. W. Kung.

Herbs annual. Stems erect, 20–70(–80) cm tall, branched at base, striate, sparsely shortly strigose. Petiole 1–3 cm, shortly strigose; leaf blade ovate-triangular, 2–4 × 1.5–3 cm, both surfaces sparsely shortly strigose, base cordate or hastate, apex acuminate; ocrea 4–5 mm, membranous, shortly strigose, oblique, apex acute. Inflorescence axillary or terminal, racemose, interrupted, pendulous, very lax, 2–4 cm, slender; bracts green, funnel-shaped, margin membranous, each 2- or 3-flowered. Pedicels longer than bracts, slender, apex articulate. Perianth pinkish; tepals elliptic, unequal, 2–2.5 mm, with conspicuous green veins. Stamens included. Stigmas capitate. Achenes exceeding persistent perianth, shiny, broadly ovoid, ca. 3 mm, sharply trigonous, sometimes narrowly winged along angles. Fl. Jun–Oct, fr. Jul–Nov.

• Grassy slopes, wet valleys, field margins; 300–3400 m. S Gansu, Guizhou, Henan, Hubei, Shaanxi, ?Shanxi, Sichuan, Yunnan.

8. *Fagopyrum esculentum* Moench, Methodus, 290. 1794.

荞麦 qiao mai

Fagopyrum emarginatum (Roth) Meisner; ?*F. emarginatum* var. *kunawarensis* Meisner; *F. zuogongense* Q. F. Chen; *Polygonum emarginatum* Roth; *P. fagopyrum* Linnaeus.

Herbs annual. Stems green or red when mature, erect, 30–90 cm tall, branched above, glabrous or papillate on one side. Petiole 1.5–5 cm; leaf blade triangular, 2.5–7 × 2–5 cm, both surfaces papillate along veins, base cordate or nearly truncate, apex acuminate; ocrea caducous, ca. 5 mm, membranous, oblique, not ciliate. Inflorescence axillary or terminal, racemose or corymbose; peduncles 2–4 cm, papillate along one side; bracts green, ovate, 2.5–3 mm, margin membranous, each 3- or 5-flowered. Pedicels longer than bracts, not articulate. Perianth pink or white; tepals elliptic, 3–4 mm. Anthers pinkish. Styles heterostylous. Achenes exceeding persistent perianth, dark brown, opaque, ovoid, sharply trigonous, 5–6 mm, surfaces flat. Fl. May–Sep, fr. Jun–Oct. $2n = 16^*$, 32^* .

Probably native to China, but commonly cultivated and easily escaping [cultivated in Bhutan, Korea, Mongolia, Myanmar, Nepal, Russia, and Sikkim; also Australia, Europe, and North America].

9. *Fagopyrum lineare* (Samuelsson) Haraldson, Symb. Bot. Upsal. 22(2): 81. 1978.

线叶野荞 xian ye ye qiao

Polygonum lineare Samuelsson in Handel-Mazzetti, Symb. Sin. 7: 188. 1929.

Herbs annual. Stems erect, 30–40 cm tall, slender, branched at base, glabrous, striate. Petiole 2–4 mm; leaf blade linear, 1.5–3 cm × 2–5 mm, both surfaces glabrous, midvein promi-

nent abaxially, lateral veins inconspicuous, base hastate, margin entire, revolute, apex acute; ocrea 2–3 mm, membranous, oblique, apex acute. Inflorescence racemose, dense, several racemes aggregated and panicle-like; bracts purplish, oblique, ca. 1.5 mm, each 2- or 3-flowered. Pedicels longer than bracts, slender, apex articulate. Perianth white or pinkish; tepals elliptic, ca. 1.5 mm. Stamens included. Stigmas capitate. Achenes exceeding persistent perianth, brown, shiny, broadly ellipsoid, trigonous. Fl. Aug–Oct, fr. Sep–Nov.

• Forest margins, moist valleys; 1700–2200 m. Yunnan.

10. *Fagopyrum caudatum* (Samuelsson) A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 117. 1998.

穗穗野荞 shu sui ye qiao

Polygonum caudatum Samuelsson in Handel-Mazzetti, Symb. Sin. 7: 185. 1929.

Herbs annual. Stems 30–50 cm tall, branched at base; branches decumbent or ascending, slender, striate, internodes 1.5–3 cm, upper internodes ca. 8 cm. Petiole 0.8–1.2 cm; leaf blade triangular-sagittate or narrowly sagittate, 1–3 cm × 4–10 mm, both surfaces glabrous, midvein slightly prominent abaxially, basal lobes lanceolate, apex acute; ocrea yellow-brown, 4–5 mm, membranous, oblique, apex acute. Inflorescence terminal or axillary, racemose, very lax, interrupted, 3–6 cm, several racemes aggregated and panicle-like; bracts yellow-brown, 2–2.5 mm, membranous, oblique, apex acuminate, each 2- or 3-flowered. Pedicel 3–4 mm, slender, apex articulate. Perianth white or pinkish; tepals elliptic, ca. 1.5 mm, apex rounded, accrescent. Anthers elliptic. Stigmas capitate. Achenes exceeding persistent perianth, slightly shiny, broadly ovoid, trigonous, 3–4 mm. Fl. Jun–Oct, fr. Jul–Nov.

• Valleys, mountain slopes; 1000–2200 m. S Gansu, Sichuan, Yunnan.

7. *PTEROXYGONUM* Dammer & Diels, Bot. Jahrb. Syst. 36(Beibl. 82): 36. 1905.

红药子属 hong yao zi shu

Li Anjen (李安仁 Li An-ren); Alisa E. Grabovskaya-Borodina

Herbs perennial. Stems climbing, simple. Leaves simple, alternate, petiolate, triangular or triangular-ovate; ocrea membranous, oblique, margin entire, apex acute. Inflorescence racemose. Flowers bisexual. Perianth persistent, 5-parted, not accrescent. Stamens usually 8. Ovary ovoid; styles 3, persistent; stigmas capitate. Achenes trigonous, ovoid, winged along angles, horned at base.

• One species.

Treatments by Haraldson (Symb. Bot. Upsal. 22(2): 1–95. 1978) and Ronse Decraene & Akeroyd (Bot. J. Linn. Soc. 98: 321–371. 1988) did not consider the winged achene sufficient justification for generic status and included the single species within *Fagopyrum*.

1. *Pteroxygonum giraldii* Dammer & Diels, Bot. Jahrb. Syst. 36(Beibl. 82): 36. 1905.

红药子 hong yao zi

Fagopyrum giraldii (Dammer & Diels) Haraldson.

Herbs perennial. Tuberoïd nearly globose, large, to 15 cm in diam. Stems climbing, terete, more than 3 m, simple, striate, glabrous. Leaves petiolate, 2–4-clustered; petiole 3–7 cm, glabrous, usually curved near base; leaf blade triangular or

triangular-ovate, 4–7 × 3–6 cm, abaxially sparsely pubescent along veins, adaxially glabrous, base broadly cordate or hastate, margin shortly ciliate, apex acuminate; ocrea 4–7 mm, membranous, glabrous but pubescent around base, apex acute, oblique. Inflorescence axillary, racemose, 2–5 cm; peduncle long, usually longer than leaves; bracts greenish, narrowly lanceolate, 4–6 mm. Pedicel 5–8 mm, articulate below middle. Perianth greenish or white; tepals elliptic, 3.5–4 mm. Stamens equaling perianth. Styles connate to below middle; stigmas capitate. Achenes much exceeding persistent perianth, black-

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brown, ovoid, ca. 1 cm, trigonous, winged along angles, 3-horned at base. Fl. Jun–Aug, fr. Jul–Sep.

• Thickets in valleys, slopes; 600–2000 m. Gansu, Hebei, Henan, Hubei, Shaanxi, Shanxi, Sichuan.

8. CALLIGONUM Linnaeus, Sp. Pl. 1: 530. 1753.

沙拐枣属 sha guai zao shu

Bao Bojian (包伯坚); Alisa E. Grabovskaya-Borodina

Shrubs or subshrubs, much branched; woody branches without spines; herbaceous branchlets of current year with leaves and flowers. Leaves simple, opposite, nearly sessile, linear or scale-like, united with ocrea at base or free; ocrea membranous. Inflorescence axillary. Pedicel slender, jointed. Flowers bisexual. Perianth persistent, 5-parted, not accrescent in fruit. Stamens 12–18; filaments connate at base. Ovary tetragonous. Styles 4, short; stigmas capitate. Achenes trigonous, ellipsoid or oblong-ovoid, woody; ribs with wings or bristles, rarely overgrowing a thin bladderlike membrane on surface of reduced wings or bristles.

About 35 species: N Africa, Asia, S Europe; 23 species (eight endemic) in China.

The reader can refer to Borodina (Rast. Tsentral. Azii 9: 122–130. 1989) for taxa in adjacent Central Asian countries.

- 1a. Fruit with wings or bristles membranous-saccate 1. *C. calliphysa*
- 1b. Fruit with wings or bristles not membranous-saccate.
 - 2a. Fruit with wings along ribs; not with bristles; wings entire.
 - 3a. Old branches light gray or yellow; wings nearly membranous, softer 2. *C. leuocladum*
 - 3b. Old branches dark in color, gray-brown, purple-brown, or dark red; wings not membranous.
 - 4a. Old branches gray-brown; wings nearly membranous; perianth white 3. *C. aphyllum*
 - 4b. Old branches dark red or purple-brown; wings subleathery; perianth pink or red 4. *C. rubicundum*
 - 2b. Fruit with bristles on ribs or narrow wings with bristles at margin.
 - 5a. Fruit narrowly winged with bristles; bristles flat at base.
 - 6a. Wings submembranous, entire; bristles soft, simple or forked at tips, slender, setose 5. *C. cordatum*
 - 6b. Wings stiffly subleathery, margin narrowing to bristles; bristles stiff, forked at tips, thick.
 - 7a. Fruit globose or subglobose, densely bristly; achenes coniform 6. *C. densum*
 - 7b. Fruit ovoid or subglobose, sparsely bristly; achenes ellipsoid, ovoid, or oblong.
 - 8a. Fruit less than 1.3 cm in diam.; achenes with bristles and wings at base of ribs, unarmed at apex; bristles ca. as long as or shorter than width of achenes; perianth spreading in fruit 8. *C. squarrosum*
 - 8b. Fruit more than 1.5 cm in diam.; achenes with bristles and wings on entire rib; ca. as long as or longer than width of achenes; perianth reflexed in fruit.
 - 9a. Fruit dark brown, subglobose; wings 1–2 mm wide 7. *C. colubrinum*
 - 9b. Fruit yellow or yellowish brown, rarely red-brown, broadly ovoid; wings 2–3 mm wide 9. *C. klementzii*
 - 5b. Fruit not winged, with bristles on ribs, often not flat at base.
 - 10a. Fruit 1.5–3 cm in diam.
 - 11a. Fruit globose or subglobose, bristles dense 20. *C. caput-medusae*
 - 11b. Fruit ovoid or broadly ovoid, bristles sparse.
 - 12a. Fruit broadly ovoid; achenes ovoid, with 2 or 3 rows of bristles per rib 15. *C. alashanicum*
 - 12b. Fruit ovoid; achenes ellipsoid, with 2 rows of bristles per rib 19. *C. arborescens*
 - 10b. Fruit less than 1.5 cm in diam.
 - 13a. Bristles slender, hair-shaped, breakable or deciduous; fruit ca. 1 mm in diam.
 - 14a. Bristles in 1 row; achenes coiled 13. *C. pumilum*
 - 14b. Bristles in 2 or 3 rows; achenes not coiled.
 - 15a. Fruit broadly ellipsoid; perianth ovate, spreading in fruit; pedicel 1–2 mm, jointed below 10. *C. mongolicum*
 - 15b. Fruit subglobose; perianth broadly elliptic, reflexed in fruit; pedicel 2–4 mm, jointed at middle 18. *C. jeminaicum*
 - 13b. Bristles thick, spiniform; fruit ca. 15 mm in diam.
 - 16a. Bristles in 1 row per rib.
 - 17a. Fruit ellipsoid, less than 1 mm in diam.; bristles shorter than width of achenes, branched from middle; pedicel 1–2 mm, jointed near base 23. *C. yengisaricum*
 - 17b. Fruit broadly ovoid, more than 15 mm in diam.; bristles longer than width of achenes, branched from upper portion; pedicel 3–4 mm, jointed below middle 22. *C. korlaense*
 - 16b. Bristles in 2 or 3 rows per rib.
 - 18a. Bristles in 3 rows per rib.

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- 19a. Fruit subglobose, broadly ellipsoid, or ellipsoid; achenes ellipsoid or broadly ellipsoid; pedicel jointed at middle 12. *C. chinense*
 19b. Fruit broadly ovoid or ovoid; achenes ovoid or oblong; pedicel jointed below middle 16. *C. trifarium*
 18b. Bristles in 2 rows per rib.
 20a. Achenes with long beak; ribs often not prominent; bristles sparse, not enlarged at base, soft 17. *C. ebinuricum*
 20b. Achenes without long beak; ribs prominent; bristles dense, enlarged at base, stiff.
 21a. Achenes oblong, not or slightly coiled; bristles in 2 rows at margin of rib 11. *C. gobicum*
 21b. Achenes broadly ovoid or broadly ellipsoid, usually coiled; bristles in 2 rows at middle of rib.
 22a. Bristles slender, breakable; flowers dense 14. *C. zaidamense*
 22b. Bristles thick, stiff; flowers sparse 21. *C. roborowskii*

1. Calligonum calliphysa Bunge, Hort. Bot. Dorpat. 8. 1839.

泡果沙拐枣 pao guo sha guai zao

Calligonum horridum E. Borszczow.

Shrubs 40–100 cm tall, much branched, spreading. Old branches yellowish gray or light brown; herbaceous branchlets of current year gray-green, jointed; joints 1–3 cm. Leaves linear, 3–6 mm; ocrea light yellow, not united with leaf. Pedicel 3–5 mm, jointed below middle. Flowers often 2–4 at leaf axils, slightly dense. Tepals green with a broad white margin abaxially, ovate, unequal, outer ca. 3 mm. Fruit light red or red when young, light yellow, yellow-brown, or red-brown when mature, membranous-saccate, globose, or broadly ellipsoid, 0.9–2 cm × 7–10 mm. Achenes ellipsoid, not coiled; ribs broad; bristles in 3 rows per rib, dense, soft, membranous. Fl. Apr–Jun, fr. May–Jul. $2n = 18^*$.

Sandy deserts, steppes; 300–800 m. Nei Mongol, Xinjiang [Kazakhstan, Mongolia, Russia (SE European part, W Siberia), Tajikistan, Turkmenistan; SW Asia].

2. Calligonum leucocladum (Schrenk) Bunge, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 7: 485. 1851.

淡枝沙拐枣 dan zhi sha guai zao

Pterococcus leucocladus Schrenk, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 3: 211. 1845; *Calligonum anfractuosum* Bunge; *P. aphyllus* Karelin & Kirilov (1842), not Pallas (1773).

Shrubs 50–120 cm tall. Old branches yellow-gray or gray, tortuous, often inclined-spreading; herbaceous branchlets of current year gray-green, slender; joints 1–3 cm. Leaves easily deciduous, linear, 2–5 mm; ocrea light yellow, not united to leaf. Pedicel 2–4 mm, jointed below middle. Flowers dense, 2–4 at leaf axils. Tepals green with broad white margin, broadly elliptic, 1.2–1.8 × 1–1.6 cm. Fruit narrowly ellipsoid, 1.2–1.8 cm. Achenes narrowly ellipsoid, not or slightly coiled; ribs 4, each with 2 wings; wings light yellow or yellow-brown, sub-membranous, finely veined. Fl. Apr–May, fr. May–Jun. $2n = 18^*$.

Semimobile or stable sand dunes, deserts; 500–1200 m. Xinjiang [Kazakhstan, Russia (W Siberia), Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

3. Calligonum aphyllum (Pallas) Guerke, Pl. Europ. 2: 111. 1897.

无叶沙拐枣 wu ye sha guai zao

Pterococcus aphyllus Pallas, Reise Russ. Reich. 2: 332. 1773; *Calligonum pallasia* L'Héritier; *C. polygonoides* Pallas (1773), not Linnaeus (1753); *C. rigidum* Litvinov.

Shrubs 0.8–2 m tall. Old branches flexuous, grayish brown or purple-brown; herbaceous branchlets of current year green, slender; joints 1–3 cm. Leaves easily deciduous, linear, 2–4 mm; ocrea not united to leaf. Pedicel red, 4–5 mm, jointed below middle. Flowers 1–3, at leaf axils. Tepals white, green, or red, ovate, with broad white margin abaxially, unequal, ca. 3 mm. Fruit yellow or red when young, yellow-brown or dark purple when mature, subglobose or broadly ovoid, 1.5–2 × 1.2–2 cm. Achenes ellipsoid, with 4 obtuse ribs; not or slightly coiled; each rib with 2 wings; wings subglobose, often smooth. Fl. and fr. Jun. $2n = 36^*$.

Mobile or semimobile sand dunes; 500–600 m. Xinjiang [Kazakhstan, Russia (SE European part, W Siberia), Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

4. Calligonum rubicundum Bunge, Hort. Bot. Dorpat. 8. 1839.

红果沙拐枣 hong guo sha guai zao

Calligonum affine Popova; *C. crispum* Bunge; *C. songaricum* Endlicher; *Pterococcus songaricus* C. A. Meyer var. *rubicundus* C. A. Meyer.

Shrubs 0.8–1.5 m tall. Old branches dark red, reddish brown, or gray-brown; herbaceous branchlets of current year gray-green, jointed; joints 1–4 cm. Leaves linear, 2–5 mm; ocrea united to leaves. Pedicel 4–6 mm, glabrous. Flowers 2 or 3 in leaf axil. Tepals reflexed in fruit, pink or red, linear-lanceolate, 2.5–4 mm. Fruit light green, light yellow, or bright red when young, yellow-brown or dark red when mature, ovoid, broadly ovoid, or subglobose, 1.4–2 × 1.4–1.8 cm. Achenes coiled, with ribs; wings on ribs leathery, with veins. Fl. May–Jun, fr. Jun–Jul. $2n = 36^*$.

Semimobile or stable sand dunes, sandy lands; 400–1000 m. Xinjiang [Kazakhstan, Mongolia, Russia (W Siberia)].

5. *Calligonum cordatum* Korovin ex N. Pavlov, Repert. Spec. Nov. Regni Veg. 33: 154. 1933.

心形沙拐枣 xin xing sha guai zao

Shrubs 0.6–2 m tall. Old branches grayish yellow; herbaceous branchlets of current year light green, slender. Leaves linear, 2–3 mm. Flowers 2 or 3, at leaf axils. Tepals reflexed in fruit. Fruit light yellow or red-yellow, cordate-ovoid or ovoid, 1.3–1.8 × 1.1–1.6 cm. Achenes ovoid-oblong, slightly coiled, 8–9 × 4–5 mm, sharply ribbed with wings; wings 2–4 mm wide, submembranous, base subcordate, margin slightly involute; margin of wing toothed; teeth elongating to bristles; bristles somewhat soft, nearly as long as width of wings, not branched or forked at tips. Fl. Apr–May, fr. May. $2n = 18^*$.

Sand dunes; 500–600 m. Xinjiang [Tajikistan, Turkmenistan].

6. *Calligonum densum* E. Borszczow, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 3(1): 36. 1860.

密刺沙拐枣 mi ci sha guai zao

Shrubs 1–2 m tall. Old branches light gray or yellow-gray, slightly twisted; herbaceous branchlets of current year gray-green; joints 1–5 cm. Leaves scale-like, 1–2 mm. Pedicel 2–4 mm, jointed below middle. Flowers usually 2–4, at leaf axil, small. Perianth reflexed in fruit, broadly ovate. Fruit globose or subglobose, 1–2 mm in diam. Achenes coniform, coiled, apex acute, prominently ribbed with 2 row wings; wings 2–3 mm wide, somewhat stiff, with bristles at margin; bristles dense, flat, somewhat stiff, forked at middle, slender at apices, including achenes. Fl. May–Jun, fr. Jun–Jul. $2n = 18^*$.

Semimobile sand dunes; ca. 600 m. Xinjiang [Kazakhstan, Turkmenistan].

7. *Calligonum colubrinum* E. Borszczow, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 3(1): 38. 1860.

褐色沙拐枣 he se sha guai zao

Shrubs 1.5–2 m tall, much branched, spreading. Old branches light gray, rough; herbaceous branchlets of current year light green, smooth, jointed; joints 1–3 cm. Leaves scale-like, 1–2 mm, united with ocrea. Pedicel 5–8 mm, jointed below middle. Flowers small, 2 or 3 at leaf axils. Tepals reflexed in fruit. Fruit dark brown, subglobose, 1.4–2 cm in diam. Achenes ellipsoid, ca. 10 × 5 mm, coiled, ribbed with wings; wings narrow, 1–2 mm wide, somewhat stiff, margin of wings gradually splitting into bristles; bristles 4–6 mm, ca. as long as or longer than width of achenes, slightly stiff, forked at middle or above. Fl. May–Jun, fr. Jun–Jul.

Semimobile or stable sand dunes; ca. 600 m. Xinjiang [Kazakhstan, Turkmenistan].

8. *Calligonum squarrosus* N. Pavlov, Repert. Spec. Nov. Regni Veg. 33: 152. 1933.

粗糙沙拐枣 cu cao sha guai zao

Shrubs 50–80 cm tall, rarely above 1 m tall, much branched, spreading. Old branches light gray; herbaceous branchlets of current year light green; joints 2–5 cm. Leaves linear, curved, 2–5 mm; ocrea light brown, united to leaf. Pedicel 5–10

mm. Flowers 1–3, at leaf axil. Tepals spreading in fruit, red, broadly elliptic, usually 3–4 × 1–3 mm. Fruit broadly ovoid, 1–1.3 × 1.1–1.4 cm. Achenes broadly ellipsoid or broadly ovoid, 1–1.3 cm × 4–5 mm; ribs obtuse, with wings only at base of achenes; wings narrow, 1–2 mm wide, stiff, leathery; margin of wings narrowing to bristles; bristles sparse, flat, ca. as long as or shorter than width of achenes, but 3–5 × as long as width of wings, stiff, spreading and forked at middle or above, apices very short and divaricate. Fl. Jun, fr. Jun–Jul.

Sand dunes; ca. 600 m. Xinjiang [Kazakhstan, Turkmenistan, Uzbekistan].

9. *Calligonum klementzii* Losinskaja, Izv. Glavn. Bot. Sada SSSR 26: 595. 1927.

奇台沙拐枣 qi tai sha guai zao

Shrubs 50–90 cm tall, rarely 1–1.5 m tall, much long branched. Old branches yellow-gray or gray, much flexuous; herbaceous branchlets of current year jointed; joints 1–3 cm. Leaves linear, 2–6 mm; ocrea united to leaf. Pedicel 2–4 mm. Flowers 1–3, at leaf axil. Tepals reflexed in fruit, dark red, broadly elliptic. Fruit light yellow, yellow-brown, or red-brown, broadly ovoid, 1–2 × 1.2–2 cm. Achenes oblong, slightly coiled, not prominently ribbed; wings ca. 2–3 mm wide, nearly leathery, prominently veined; margin of wing irregularly lobate and gradually narrowing to bristles; bristles sparse or dense, flat, ca. as long as or longer than width of achenes, 2.5–3.5 × as long as width of wing, stiff, forked, apices short. Fl. May–Jun, fr. Jun–Jul. $2n = 18^*$, (24*).

• Sand dunes; 600–700 m. Xinjiang.

10. *Calligonum mongolicum* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 5: 204. 1832.

沙拐枣 sha guai zao

Calligonum dielsianum K. S. Hao; *C. potaninii* Losinskaja.

Shrubs 25–150 cm tall. Old branches spreading, flexuous, grayish white or light yellow-gray; herbaceous branchlets of current year gray-green, jointed; joints 0.6–3 cm. Leaves linear, 2–4 mm; ocrea united to leaf. Pedicel 1–2 mm, slender, jointed below middle. Flowers 2 or 3, at leaf axil, white or light red. Tepals spreading in fruit, ovate, ca. 2 mm. Fruit broadly ellipsoid, 0.8–1.2 cm × 7–11 mm. Achenes linear, narrowly ellipsoid, or broadly ellipsoid, not to very coiled; ribs prominent or not, each with 2 or 3 rows of bristles; bristles dense, ca. as long as or slightly longer than width of achenes, slender, breakable, not or slightly enlarged at base, 2- or 3-branched from middle. Fl. May–Jul, fr. Jun–Aug. $2n = 18^*$, (27*).

Mobile, semimobile, or stable sand dunes, deserts; 500–1800 m. Gansu, Nei Mongol, Xinjiang [Mongolia].

11. *Calligonum gobicum* (Bunge ex Meisner) Losinskaja, Izv. Glavn. Bot. Sada SSSR 26: 598. 1927.

戈壁沙拐枣 ge bi sha guai zao

Calligonum mongolicum Turczaninow var. *gobicum* Bunge ex Meisner in Candolle, Prodr. 14(1): 29. 1856; *C. koslovii* Losinskaja.

Shrubs 80–100 cm tall. Older branches long, straight. Herbaceous branchlets of current year gray-green; joints 1.5–3 cm. Leaves linear, 1–5 mm; ocrea united to leaf. Pedicel 2–3 mm, slender, jointed below middle. Flowers red. Tepals reflexed in fruit, broadly elliptic. Fruit broadly ovoid, 1.1–1.8 × 1–1.5 cm. Achenes oblong, not or slightly coiled; ribs obtuse, somewhat broad, deeply canaliculate; bristles in 2 rows at margin of ribs, sparse, ca. as long as or slightly longer than width of achenes, thick, breakable, slightly enlarged, 2-branched from middle or above. Fl. May–Jul; fr. Jun–Aug.

Mobile, semimobile, or stable sand dunes, deserts; 600–1600 m. Gansu, Nei Mongol, Xinjiang [SW Mongolia].

12. *Calligonum chinense* Losinskaja, Izv. Glavn. Bot. Sada SSSR 26: 601. 1927.

甘肃沙拐枣 gan su sha guai zao

Shrubs 50–100 cm tall. Old branches light gray; herbaceous branchlets of current year gray-green, jointed; joints 1–3 cm. Leaves linear, 2–3 mm; ocrea united to leaf. Pedicel 3–4 mm, jointed at middle. Flowers 1–3, at leaf axil. Tepals reflexed in fruit, dark or light red, broadly elliptic. Fruit red-brown or light red when young, brown or yellow-brown when mature, subglobose, broadly ellipsoid or ellipsoid, 1–1.5 × 1–1.4 cm. Achenes ellipsoid or broadly ellipsoid, coiled, 8–11 × 3–5 mm, with ribs and deeply canaliculate; ribs broad, each with 3 rows of bristles, rarely 2 rows. Bristles of margin rows dense, enlarged at base, flat, slightly united or not, thick, stiff, often ca. as long as or shorter than width of achenes, 2- or 3-forked from middle or above; apical branches spreading, short, acute. Fl. May, fr. Jun–Jul.

• Mobile or semimobile sand dunes, stony deserts; 1000–1500 m. Gansu, ?Nei Mongol, Xinjiang.

One of us (Grabovskaya-Borodina) regards this as a synonym of *Calligonum litvinovii* Drobow (see Borodina, Rast. Tsentral. Azii 9: 122–130. 1989).

13. *Calligonum pumilum* Losinskaja, Izv. Glavn. Bot. Sada SSSR 26: 600. 1927.

小沙拐枣 xiao sha guai zao

Calligonum juochiangense Liou f.

Shrubs 30–50 cm tall. Old branches gray or light yellow-gray; herbaceous branchlets of current year gray-green; joints 1–3.5 cm. Leaves 2–3 mm, lanceolate, apex acute. Pedicel 3–4 mm. Flowers 2 or 3 at leaf axil. Tepals reflexed in fruit, light red, broadly ovate. Fruit broadly ellipsoid, 7–12 × 6–8 mm. Achenes ovoid, coiled, permanently ribbed; each rib with 1 row of bristles; bristles free at base, 2- or 3-branched below middle. Fl. Apr–May, fr. May–Sep. $2n = 18^*$.

Sandy and stony deserts; 700–1500 m. Xinjiang [Mongolia].

14. *Calligonum zaidamense* Losinskaja, Izv. Glavn. Bot. Sada SSSR 26: 601. 1927.

柴达木沙拐枣 chai da mu sha guai zao

Shrubs 0.6–2 m tall. Old branches light gray or yellow-gray; herbaceous branchlets of current year gray-green; joints 2–3 cm; branches upward spreading. Flowers dense, 2 or 3 at

leaf axil. Fruit broadly ellipsoid, 1–1.7 × 0.8–1.5 cm. Achenes ovoid, coiled or not; ribs obtuse; bristles in 2 rows at center of ribs, breakable, sparse or dense, flat at base, slightly enlarged, somewhat united or not, 2-forked from middle. Fr. Jul.

• Mobile sand dunes; 1500–2700 m. Qinghai, Xinjiang.

One of us (Grabovskaya-Borodina) regards this as a synonym of *Calligonum litvinovii* Drobow (see Borodina, Rast. Tsentral. Azii 9: 122–130. 1989).

15. *Calligonum alashanicum* Losinskaja, Izv. Glavn. Bot. Sada SSSR 26: 600. 1927.

阿拉善沙拐枣 a la shan sha guai zao

Calligonum przewalskii Losinskaja.

Shrubs 1.5–3 m tall. Old branches gray or yellow-gray; herbaceous branchlets of current year gray-green. Leaves 3.3–4 mm, lanceolate, apex acute. Pedicel 2–3 mm, slender. Flowers 2 or 3 in axis. Tepals reddish, broadly elliptic or subglobose, 2–3 mm. Fruit broadly ovoid, rarely subglobose, 1.8–2.6 × 1.7–2.5 cm. Achenes ovoid, coiled, very permanently ribbed; bristles in 2 or 3 rows on each rib, dense or slightly sparse, longer than width of achenes, slender, flat at base, slightly inflated, free or slightly united, secondarily 2- or 3-branched; apically spreading. Fl. May, fr. Jun–Aug.

• Mobile sand dunes, deserts; 500–1500 m. Gansu, Nei Mongol.

16. *Calligonum trifarium* Z. M. Mao, Acta. Phytotax. Sin. 22: 148. 1984.

三裂沙拐枣 san lie sha guai zao

Shrubs 30–80 cm tall. Old branches light gray; herbaceous branchlets of current year jointed; joints 2–3 cm. Leaves linear, 2–3 mm; ocrea united to leaf. Pedicel 2–4 mm, jointed below middle. Flowers 1–3, at leaf axil. Tepals reflexed in fruit, light red, broadly elliptic. Fruit broadly ovoid, 1–2 × 0.8–1.8 cm. Achenes ovoid, coiled, 7–11 × 4–5 mm, beaked at end; ribs obtuse, inconspicuously with 3 rows (rarely 2 rows) of bristles on each. Bristles dense, stiff, free, not enlarged at base, 2-forked from middle or below, dense or slightly so to bundled at apices of achenes. Fl. May–Jun, fr. Jun–Jul.

• Sand dunes, deserts; ca. 500 m. Xinjiang.

17. *Calligonum ebinuricum* N. A. Ivanova ex Soskov, Izv. Akad. Nauk Turkm. SSSR, Ser. Biol. 5, 6: 55. 1969.

艾比湖沙拐枣 ai bi hu sha guai zao

Shrubs 0.8–1.5 m tall, laxly branched, spreading; young plants subglobose; old plants pyramidal. Leaves linear, 2–4 mm, slightly curved; ocrea united with leaf. Pedicel 3–6 mm, jointed below middle. Flowers 1–3, at leaf axil. Tepals reflexed in fruit, light red, elliptic. Fruit broadly ovoid or ovoid, 1–1.5 × 1–2 cm. Achenes ovoid or oblong, with one 2–4 mm beak, very coiled; ribs not prominent, with 2 rows of bristles on each; bristles 5–7 in each row, very free, slender, soft, secondarily 2- or 3-forked; apical branches straight; bundled at apices of achenes. Fl. Apr–May, fr. May–Jul. $2n = 18^*$.

Semimobile sand dunes, sandy deserts; 500–600 m. Xinjiang [Mongolia].

18. *Calligonum jeminaicum* Z. M. Mao, Acta Phytotax. Sin. 22: 148. 1984.

吉木乃沙拐枣 *ji mu nai sha guai zao*

Shrubs ca. 50 cm tall, much branched, subglobose. Old branches gray or yellow-gray; branchlets of current year light green, with joints 2–3 cm. Leaves linear, 1–2 mm; ocrea united to leaf. Pedicel 2–4 mm, jointed at middle. Flowers 1–3, at leaf axil. Tepals reflexed in fruit, light red or white, broadly elliptic. Fruit subglobose, 10–12 cm in diam. Achenes narrowly ellipsoid or ovoid, 8–10 × 2–3 mm, slightly coiled, not prominently ribbed; bristles in 2 rows per rib, yellow-brown, slender, soft, not at base, free, secondarily 2- or 3-forked; apical branches erect, short. Fl. Jun, fr. Jul.

- Semimobile sand dunes; ca. 900 m. Xinjiang.

19. *Calligonum arborescens* Litvinov, Sched. Herb. Fl. Ross. 2: 28. 1900.

乔木沙拐枣 *qiao mu sha guai zao*

Shrubs 2–4 m tall, often 3- or 4-branched at base of stem. Old branches yellow-white, often longitudinally splitting and with brown stripes; herbaceous branchlets of current year gray-green. Leaves scale-like, 1–2 mm, with a brown mucro; ocrea united with leaf. Pedicel ca. 3 mm, jointed below middle. Flowers 2 or 3, at leaf axil. Tepals broadly linear, apex rounded, reflexed in fruit. Fruit yellow or red when young, becoming light yellow or light brown, ovoid, 1.5–2.5 × 1–2 cm. Achenes ellipsoid, strongly coiled, prominently 4-ribbed; bristles in 2 rows per rib, slightly flat and separate at base, denser and longer at summit, 2- or 3-forked above middle, divaricate, not including achenes. Fl. Apr–May, fr. May–Jun. $2n = 18^*$.

Desert sand dunes; 500–600 m. Gansu, Ningxia, Xinjiang [Kazakhstan, Turkmenistan, Uzbekistan].

20. *Calligonum caput-medusae* Schrenk, Enum. Pl. Nov. 1: 9. 1841.

头状沙拐枣 *tou zhuang sha guai zao*

Shrubs 1–3 m tall, 2–8 cm in diam., branched from base. Old branches light gray or yellow-gray, often longitudinally splitting; herbaceous branchlets of current year gray-green; joints 1–4 cm. Leaves linear, ca. 2 mm; ocrea united with leaf. Flowers 2 or 3, at leaf axil. Tepals reflexed in fruit, purple, ovate, 2–3 mm. Fruit yellow-green, red-brown, or red when young, becoming light yellow, yellow-brown, or red-brown, subglobose, 1–3 cm in diam. Achenes ellipsoid, coiled, prominently ribbed; bristles dense, 2 rows per rib, slightly flat at base, separate or somewhat united, 2- or 3-forked below middle, then repeatedly 2- or 3-forked, spiniform, stiff; apically spreading. Fl. Apr–May, fr. May–Jun. $2n = 36^*$.

Sand dunes, steppes; 300–900 m. Gansu, Ningxia, Xinjiang [Kazakhstan, Turkmenistan].

21. *Calligonum roborowskii* Losinskaja, Izv. Glavn. Bot. Sada SSSR 26: 603. 1927.

塔里木沙拐枣 *ta li mu sha guai zao*

Shrubs 30–80 cm tall, rarely to 1.5 m. Old branches gray-white or light gray; herbaceous branchlets of current year light green; joints 1–3 cm. Leaves scale-like, ca. 1 mm; ocrea united to leaf. Pedicel short, ca. 2 mm, jointed at base. Flowers 1 or 2, at leaf axil. Tepals reflexed in fruit, light red or gray-white, broadly elliptic. Fruit yellow or yellow-brown, broadly ovoid or broadly ellipsoid, 0.8–1.5 × 0.8–1.4 cm. Achenes ovoid, coiled, prominently ribbed; bristles in 2 rows per rib, short, slightly longer than width of achenes, stiff, enlarged at base, separate or somewhat united, 2- or 3-branched from middle or above and then repeatedly branched; apical branches spiniform, short. Fl. May–Jun, fr. Jun–Jul. $2n = 36^*$.

Sandy deserts, stony slopes of foothills; 1500–3000 m. Gansu, Xinjiang [Mongolia].

One of us (Grabovskaya-Borodina) regards this as a synonym of *Calligonum litvinovii* Drobow (see Borodina, Rast. Tsentral. Azii 9: 122–130. 1989).

22. *Calligonum korlaense* Z. M. Mao, Acta Phytotax. Sin. 22: 150. 1984.

库尔勒沙拐枣 *ku er le sha guai zao*

Shrubs ca. 80 cm tall. Old branches gray-white; herbaceous branchlets of current year green; joints 1–4 cm. Pedicel red, 3–4 mm, jointed below middle. Flowers 1–3, at leaf axil. Tepals reflexed in fruit, red, broadly elliptic. Fruit yellow-brown, broadly ovoid, 1.6–1.8 × 1.4–1.6 cm. Achenes narrowly ovoid; apically elongated, coiled, obtusely ribbed; bristles in 1 row per rib, sparse, longer than width of achenes, flat at base, slightly enlarged, separate, 2- or 3-forked and crossed; apical branches short, slender, breakable. Fl. May, fr. May–Jun.

- Stony slopes of foothills; ca. 900 m. Xinjiang.

23. *Calligonum yengisaricum* Z. M. Mao, Acta Phytotax. Sin. 22: 149. 1984.

英吉沙沙拐枣 *ying ji sha sha guai zao*

Shrubs 30–50 cm tall. Old branches yellow-gray; herbaceous branchlets of current year grayish green; joints short, 1–2 cm. Leaves very small, ca. 1 mm, scale-like; ocrea united to leaf. Pedicel red, short, 1–2 mm, jointed at base. Flowers 1 or 2, at leaf axil. Tepals reflexed in fruit, red. Fruit ellipsoid, small, 7–9 × 6–8 mm. Achenes narrowly ellipsoid, coiled, prominently 4-ribbed; bristles in 1 row per rib, yellow, shorter than width of achenes, stiff, flat and enlarged at base, separate or somewhat united, 2- or 3-forked from middle, spiniform. Fl. and fr. Jun–Jul.

- Stony slopes; ca. 1400 m. Xinjiang.

9. ATRAPHAXIS Linnaeus, Sp. Pl. 1: 333. 1753.

木蓼属 *mu liao shu*

Bao Bojian (包伯坚); Alisa E. Grabovskaya-Borodina

Shrubs much branched; woody branches with spines or not, herbaceous branchlets of current year with leaves and flowers.

POLYGONACEAE

Leaves simple, alternate, rarely fascicled, nearly sessile; ocrea membranous, usually with 2 veins, 2-parted at apex. Inflorescence racemose, terminal, or lateral, with dense or sparse axillary flowers. Pedicel slender, jointed. Flowers hermaphroditic. Perianth persistent, 4- or 5-parted, inflated in fruit. Stamens 6 or 8; filaments dilated at base and united into a glandular ring. Ovary lenticularly compressed or trigonous; styles 2 or 3, short; stigmas capitate. Achenes lenticular or trigonous.

About 25 species: N Africa, C, N, and SW Asia, S Europe; 12 species (two endemic) in China.

The reader can refer to Borodina (Rast. Tsentral. Azii 9: 93–97. 1989) for taxa in adjacent Central Asian countries.

- 1a. Tepals 4; stamens 6; styles 2; achenes lenticularly compressed.
 - 2a. Branchlets of current year and leaves with densely papillate hairs 3. *A. canescens*
 - 2b. Branchlets of current year and leaves without papillate hairs.
 - 3a. Leaves fascicled; herbaceous branchlets of current year very short 2. *A. compacta*
 - 3b. Leaves alternate; herbaceous branchlets of current year longer, slender 1. *A. spinosa*
- 1b. Tepals 5; stamens 8; styles 3; achenes trigonous.
 - 4a. Herbaceous branchlets and leaves with papillate hairs; leaves bright green, without raised reticulate veins ... 4. *A. laetevirens*
 - 4b. Herbaceous branchlets and leaves without papillate hairs; leaves with raised reticulate veins.
 - 5a. Leaves grayish green or bluish green.
 - 6a. Woody branches pointed at apex; inflorescence a short raceme ca. 15 mm 5. *A. pungens*
 - 6b. Woody branches obtuse at apex; inflorescence a panicle or raceme.
 - 7a. Shrub 1.5–2 m tall; annual branches lengthened, virgate, dying only in higher part, as a rule branched; inflorescence a panicle with leaves 8. *A. virgata*
 - 7b. Subshrub 30–50 cm tall; annual branches dying for most part, usually not branched; inflorescence a raceme, flowers from ocrea bracteate 9. *A. frutescens*
 - 5b. Leaves green or yellow-green.
 - 8a. Woody branches acuminate into point at apex.
 - 9a. Leaves elliptic or obovate, 15–25 × 10–13 mm, with prominent reticulate veins; pedicel ca. 1 cm, jointed at lower 1/3; perianth light yellow-red 6. *A. pyrifolia*
 - 9b. Leaves linear or lanceolate, 15–30 × 1–3 mm; midvein prominent; pedicel 5–10 mm, jointed at upper 1/3; perianth light green 7. *A. irtyschensis*
 - 8b. Woody branches obtuse at apex, not pointed.
 - 10a. Leaves oblong or elliptic, or lanceolate, prominently veined; outer tepals reniform, spreading in fruit 12. *A. bracteata*
 - 10b. Leaves oblanceolate-oblong or lanceolate to linear, not prominently pinnately veined; outer tepals oblong or oblong-ovate, reflexed in fruit.
 - 11a. Outer tepals oblong-ovate, ca. as long as or slightly shorter than above joint portion of pedicel 10. *A. decipiens*
 - 11b. Outer tepals oblong, longer than above joint portion of pedicel 11. *A. manshurica*

1. *Atraphaxis spinosa* Linnaeus, Sp. Pl. 1: 333. 1753.

刺木蓼 ci mu liao

Atraphaxis spinosa var. *angustifolia* Chang Y. Yang & Y. L. Han.

Shrubs 30–100 cm tall. Stem slender, with gray scabrous bark; woody branches slender, without leaves at ends, spine-pointed; herbaceous branchlets of current year soon becoming lignified, straight or slightly flexuous, slender, glabrous. Leaves gray-green or blue-green, orbicular, elliptic, broadly elliptic, or broadly ovate, rarely obovate, 3–7 × 3–5 mm, leathery, both surfaces glabrous, reticulate veins raised abaxially, base rounded or cuneate, gradually narrowing into a short petiole, margin entire or slightly undulate, apex rounded or obtuse, short acuminate; ocrea brown at base, cylindrical, 2–3 mm, membranous and inconspicuously veined in upper part, cleft into 2 aristate teeth. Pedicel ca. 5 mm, jointed at middle or slightly below. Flowers 2–6 at leaf axil of current year's branchlets. Tepals pink; outer tepals reflexed in fruit, oblong-ovate or ovate, 2–3 mm. Achenes compressed, light brown, shiny, ovoid or broadly ovoid, smooth, base rounded, apex acuminate or obtuse. Fl. and

fr. May–Sep.

Slopes, deserts including the Gobi, roadsides, margins of cultivated land; 400–1800 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

2. *Atraphaxis compacta* Ledebour, Fl. Altaic. 2: 55. 1830.

拳木蓼 quan mu liao

Shrubs 30–50 cm tall, much branched. Stem flexuous, short, stout; bark gray, splitting longitudinally into fibers; woody branches spreading, straight, without leaves at ends and spine-pointed; herbaceous branchlets of current year very short, soon becoming lignified, with leaves and flowers. Leaves clustered on old branches, gray-green to blue-green, orbicular or broadly ovate, 4–7 × 4–5 mm, both surfaces glabrous, reticulate veins prominent abaxially, base rounded or broadly cuneate, apex rounded or obtuse; ocrea brown at base, cylindrical, 1–3 mm, membranous, cleft into 2 long teeth. Pedicel ca. 5 mm, jointed at middle or slightly above. Flowers 2–6 at leaf axil. Tepals 4, pink; outer tepals reflexed in fruit, ovate-oblong, 2–2.5 × 1.5–2 mm, ca. as long as above joint portion of pedicel; inner tepals orbicular-cordate in fruit, 4–5 × 5–6 mm, promi-

nently reticulate-veined. Achenes light brown, shiny, broadly ovoid, ca. 3.5 mm, smooth. Fl. and fr. Jun–Aug.

Deserts, roadsides, sandy steppes, stony slopes; 300–1500 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia].

3. *Atraphaxis canescens* Bunge, Index Sem. Hort. Dorpat. 3. 1839.

糙叶木蓼 cao ye mu liao

Shrubs dwarf, 5–10 cm tall. Stem stout; woody branches without leaves at apex, acuminate to spiny, with gray-brown bark; herbaceous branchlets of current year slender, with dense papillate hairs, apex with leaves or flowers. Leaves gray or gray-green, ovate or broadly elliptic, 5–6 × 4–5 mm, both surfaces with papillate hairs, reticulate veins prominent abaxially, base broadly cuneate and gradually narrowing into a short petiole, apex obtuse, with a short point; ocrea cylindric, 4–5 mm, base green with dense papillate hairs, upper part membranous, cleft into 2 slender teeth. Pedicel 5–6 mm, jointed at upper portion. Flowers in racemes at apices of herbaceous branchlets. Tepals dark pink, with white margins; outer tepals ovate, smaller, ca. as long as or slightly shorter than above joint portion of pedicel; inner tepals orbicular-reniform, 4–5 × 5–6 mm, margin entire, slightly undulate, with raised reticulate veins. Achenes light brown, shiny, ovoid, smooth. Fl. and fr. May–Jun.

Sandhills; 500–1500 m. Xinjiang [Kazakhstan].

4. *Atraphaxis laetevirens* (Ledebour) Jaubert & Spach, Ill. Pl. Orient. 2: 14. 1844.

绿叶木蓼 lü ye mu liao

Tragopyrum laetevirens Ledebour, Fl. Altaic. 2: 75. 1830.

Shrubs 30–80 cm tall. Stem spreading, stout, branched; woody branches flexuous, slender, without spines, with dark gray bark; epidermis splitting fibrously, apex with leaves or flowers; herbaceous branchlets of current year dark brown, slender, with dense papillose hairs. Leaves bright green, orbicular or broadly elliptic, 1.5–2.3 × ca. 1 cm, leathery, abaxially with papillose hairs along midvein and margin, adaxially glabrous, base rounded, margin entire or undulate-crenate, apex rounded or obtuse, with a short point; ocrea brown at base, cylindric, with 2 faint veins, cleft into 2 slender teeth at upper portion. Pedicel ca. 1 cm, jointed at lower 1/3. Flowers fewer in terminal racemes. Tepals 5, pink, with white margins; outer tepals 2, reflexed in fruit, broadly ovate, smaller, ca. 1/2 as long as above-joint portion of pedicel; inner tepals 3, rounded cordate, 5–6 × 6–7 mm. Achenes dark brown, shiny, ovoid or trigonous-ovoid, smooth. Fl. May–Jun, fr. Jul–Aug.

Stony mountain slopes, stony steppes; 900–1500 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia].

5. *Atraphaxis pungens* (Marschall von Bieberstein) Jaubert & Spach, Ill. Pl. Orient. 2: 14. 1844.

锐枝木蓼 rui zhi mu liao

Tragopyrum pungens Marschall von Bieberstein, Fl. Taur.-Caucas. 3: 285. 1819–1820.

Shrubs ca. 1.5 m tall. Stem straight, stout, with gray-brown

bark; epidermis splitting fibrously; woody branches flexuous, apex without leaves and acuminate into spines; herbaceous branchlets of current year short, stout, soon becoming lignified, white, glabrous, apex acuminate, with leaves or flowers. Leaves blue-green or gray-green, broadly elliptic or obovate, 10–20 × 5–10 cm, both surfaces glabrous, reticulate veins prominent abaxially, base rounded or broadly cuneate, narrowing into a short petiole, margin entire or slightly undulate with teeth, apex rounded, with a short point or emarginate; ocrea brown at base, cylindric, membranous, faintly veined, cleft into 2 teeth at upper part. Pedicel long, jointed at or above middle. Flowers in short racemes (ca. 1.5 cm) on lateral herbaceous branchlets of current year. Tepals 5, pink or green-white; outer tepals 2, reflexed in fruit, ovate or broadly elliptic, ca. 3 mm; inner tepals 3, orbicular-cordate in fruit, 5–6 × 6–7 mm, with prominent reticulate veins, margin undulate. Achenes dark brown, shiny, ovoid, ca. 2.5 mm, trigonous, smooth. Fl. and fr. May–Aug.

Stony slopes, gravelly deserts; 500–3400 m. Gansu, Nei Mongol, Qinghai, Xinjiang [India, Kazakhstan, Mongolia, Russia].

6. *Atraphaxis pyrifolia* Bunge, Mém. Acad. Imp. Sci. Saint Pétersbourg Divers Savans 7: 483. 1851.

梨叶木蓼 li ye mu liao

Shrubs ca. 1 m tall, much branched. Stem stout, tortuous, with gray-brown bark; epidermis splitting longitudinally; woody branches grayish white, straight or tortuous, apex without leaves, acuminate or spiny; herbaceous branchlets of current year glabrous, soon becoming lignified, spiny at apex. Petiole short, 1/6–1/3 length of blade; leaf blade green, broadly elliptic or obovate, 1.5–2.5 × 1–1.3 cm, both surfaces glabrous, reticulate veins prominent abaxially, margin entire or slightly crenate; ocrea brown at base, cylindric, membranous and pellucid in upper part, deeply cleft into 2 or 3 lanceolate or broadly lanceolate lobes; veins 2 or 3. Pedicel ca. 1 cm, jointed usually at lower 1/3 or below middle. Flowers dense in racemes at lateral branchlets of current year. Tepals 5, light yellow or yellow-red; outer tepals reflexed in fruit, ovate or narrowly ovate, ca. as long as above-joint portion of pedicel; inner tepals broadly elliptic or orbicular-cordate, 6–7 × 7–8 mm. Achenes light brown, shiny, trigonous-ovoid, smooth. Fl. and fr. May–Jun.

Stony slopes, scrub, *Juniperus* stands, stony deserts; 700–1500 m. Xinjiang [Afghanistan, India, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan].

7. *Atraphaxis irtyschensis* Chang Y. Yang & Y. L. Han, Bull. Bot. Res., Harbin 4(2): 150. 1984 [“*irtyschensis*”].

额河木蓼 e he mu liao

Shrubs 1–1.5 m tall. Stem stout, tortuous, glabrous, with gray-white bark; epidermis splitting longitudinally; woody branches spreading, spiny, apex without leaves; herbaceous branchlets of current year slender, glabrous, apex with leaves or flowers. Leaves fascicled, linear or lanceolate, usually sickle-curved, 1.5–3 cm × 1–3 mm, both surfaces glabrous, midvein prominent, base gradually narrowing into petiole, margin revolute, apex acuminate; ocrea white, cylindric, 5–7 mm, membranous, pellucid, upper part cleft into 2 sharp teeth; veins 2,

prominent. Pedicel 5–10 mm, slender, jointed at above 1/3. Flowers fewer in racemes at apices of branchlets of current year. Tepals 5, light green, with white or pink margins; outer tepals reflexed, smaller, ca. 1/2 as long as above joint portion of pedicel; inner tepals ovate, slightly unequal, 5–6 × 6–7 mm, prominently reticulate veined. Achenes yellow-brown, shiny, ovoid, ca. 5 mm, smooth. Fl. and fr. May–Jun.

- Mobile sand dunes; 300–400 m. N Xinjiang (Altay).

8. *Atraphaxis virgata* (Regel) Krassnov, Scripta Soc. Geogr. Ross. 19 : 295. 1888.

帚枝木蓼 zhou zhi mu liao

Atraphaxis lanceolata var. *virgata* Regel, Trudy Imp. S.-Peterburgsk. Bot. Sada 6: 397. 1879.

Shrubs 1.5–2 m tall. Stem thick, with brown-gray bark, branched. Stem branches slender, straight, without spines. Ocrea white, cylindrical, 2–3 mm, membranous, pellucid, upper part cleft into 2 sharp teeth; veins 2, prominent. Petiole very short, 0.5–1 mm; leaf blade gray-green, oblong-elliptic or oblong-obovate, large, 2–2.5 × 0.7–0.9 cm, both surfaces glabrous, veins conspicuous only abaxially, base narrowing into petiole, flat or slightly downward revolute, apex acuminate. Pedicel 8–10 mm, jointed below middle. Flowers in terminal racemes 10–15 cm. Tepals 5, pink, with white margin or white; inner segments elliptic, 4–5 × 5–6 mm, margin revolute, apex rounded, outer segments pink, rounded. Achenes dark brown, shiny, narrowly ovate, trigonous, ca. 5 mm, smooth, apex acuminate. Fl. and fr. May–Jul.

Steppes and stony desert slopes; 600–1000 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Turkmenistan].

9. *Atraphaxis frutescens* (Linnaeus) Eversmann, Reise Orenbg. Buchara, 115. 1823.

木蓼 mu liao

Shrubs 50–100 cm tall, much branched. Stem stout, with gray-brown bark; epidermis splitting fibrously; woody branches spreading, tortuous, slender, apex obtuse, without spines; herbaceous branchlets of current year straight or slightly flexuous, slowly lignified, glabrous or papillate-hairy, apex with leaves or flowers. Leaves blue-green to gray-green, narrowly lanceolate, lanceolate, or oblong, 1–2.5 × 0.5–1.5 cm, glabrous or papillate-hairy, with prominent midvein and faint pinnate veins, base gradually narrowing into a short petiole, margin often revolute, apex acuminate or obtuse, with a short point; ocrea brown at base, cylindrical, 2–5 mm, membranous, pellucid; upper part cleft into 2 sharp teeth. Pedicel 5–8 mm, jointed at or slightly below middle. Flowers fewer in terminal racemes (4–6 cm). Tepals pink, with white margin; outer tepals broadly ovate, ca. 2/3 as long as above jointed portion of pedicel; inner tepals orbicular or broadly elliptic, rarely oblong, 4–7 × 4–6 mm, base nearly cuneate or cordate, margin entire or revolute, apex rounded or obtuse. Achenes dark brown, shiny, narrowly ovoid, trigonous, smooth, apex acuminate. Fl. and fr. May–Aug.

Stony or dry slopes, sandy areas and pebbly valleys of steppes, sand dunes, margins of cultivated land, stony river banks; 500–3000 m.

Gansu, Nei Mongol, Ningxia, Qinghai, Xinjiang [Kazakhstan, Mongolia, Russia; E Europe].

- 1a. Leaves and herbaceous branchlets of current year glabrous 9a. var. *frutescens*
- 1b. Leaves and herbaceous branchlets of current year densely papillate-hairy 9b. var. *papillosa*

9a. *Atraphaxis frutescens* var. *frutescens*

木蓼(原变种) mu liao (yuan bian zhong)

Polygonum frutescens Linnaeus, Sp. Pl. 1: 359. 1753; *Atraphaxis lanceolata* (Marschall von Bieberstein) Meisner; *Tragopyrum lanceolatum* Marschall von Bieberstein.

Herbaceous branchlets of current year glabrous. Leaves narrowly lanceolate to oblong, narrow, glabrous.

Stony slopes, sandy steppes, sand dunes, margins of cultivated land; 500–3000 m. Gansu, Nei Mongol, Ningxia, Qinghai, Xinjiang [Kazakhstan, Mongolia, Russia; E Europe].

9b. *Atraphaxis frutescens* var. *papillosa* Y. L. Liu, J. North W. Teachers' Coll., Nat. Sci. 3: 51. 1985 or 1987.

乳头叶木蓼 ru tou ye mu liao

Leaves and herbaceous branchlets of current year densely papillate-hairy.

- Dry slopes, stony river banks, pebbly valleys of steppes. Xinjiang.

10. *Atraphaxis decipiens* Jaubert & Spach, Ill. Pl. Orient. 2: 14. 1844.

细枝木蓼 xi zhi mu liao

Shrubs dwarf, much branched. Stem short, stout, flexuous, with gray-brown bark; epidermis splitting longitudinally; woody branches short, stout, flexuous, apex obtuse, without spines; herbaceous branchlets of current year slender, dense, glabrous, apex with leaves or flowers. Leaves green, lanceolate to linear lanceolate, 0.7–1.5 cm × 1–3 mm, leathery, both surfaces glabrous, midvein prominent abaxially, base attenuate, margin slightly undulate, apex obtuse, with a short point; ocrea brown at base, cylindrical, ca. 5 mm, membranous, pellucid, upper part cleft into 2 sharp teeth. Pedicel ca. 5 mm, jointed slightly above middle. Flowers sparsely arranged in terminal racemes of current year's branchlets. Tepals 5, pink; outer tepals 2, reflexed in fruit, oblong-ovate, ca. as long as or shorter than above-joint portion of pedicel; inner tepals 3, broadly elliptic, 4–6 × 4–5 mm. Achenes dark brown, shiny, narrowly ovoid, trigonous, smooth, apex acuminate. Fl. and fr. May–Jul.

Sandy steppes, deserts, roadsides; 600–1000 m. N Xinjiang [Kazakhstan].

11. *Atraphaxis manshurica* Kitagawa, Rep. First Sci. Exped. Manch. 4(4): 75. 1936.

东北木蓼 dong bei mu liao

Shrubs ca. 1 m tall. Stem stout, much branched in upper part, with gray-brown bark; epidermis splitting longitudinally; woody branches straight; bark light brown, splitting fibrously; herbaceous branchlets of current year brown, cylindrical, gla-

brous. Leaves very shortly petiolate, green, lanceolate-oblong or linear, 1.4–4 × 0.2–1.5 cm, leathery, glabrous, reticulate veins prominent, base attenuate, margin entire or slightly crenate, apex obtuse, with a short point; ocrea brown at base, cylindric, membranous, pellucid, with 2 slender veins, oblique in upper part and cleft into 2 teeth. Pedicel stout, jointed above middle. Flowers in terminal racemes on branchlets of current year. Tepals 5, pink; outer tepals reflexed in fruit, oblong, longer than above-joint portion of pedicel; inner tepals elliptic, broadly elliptic, or ovate-elliptic, base broadly wedge-form or rounded, apex obtuse. Achenes dark brown, narrowly ovoid, 4–6 mm, trigonous, glabrous, densely granular-raised. Fl. and fr. Jul–Sep.

• Sand dunes, stony slopes, deserts. Hebei, Liaoning, Nei Mongol, Ningxia, Shaanxi.

One of us (Grabovskaya-Borodina) questions whether this is a good species.

12. *Atraphaxis bracteata* Losinskaja, Izv. Glavn. Bot. Sada SSSR 26: 43. 1927.

沙木蓼 sha mu liao

Atraphaxis bracteata var. *angustifolia* Losinskaja; *A. bracteata* var. *latifolia* H. C. Fu & M. H. Zhao.

Shrubs 1–1.5 m tall. Stem erect, light brown, stout, glabrous; woody branches inclined-spreading, brown, much branched, smooth and glabrous, apex with leaves and flowers. Petiole very short, 1.5–3 mm, glabrous; leaf blade oblong, elliptic, or lanceolate on branchlets of current year, 1.5–3.5 × 0.8–2 cm, leathery, both surfaces glabrous, base rounded or broadly wedge-form, margin slightly undulate, apex obtuse, with a short point; ocrea cylindric, 6–8 mm, membranous, oblique in upper part and cleft into 2 sharp teeth. Racemes terminal on branchlets of current year; bracts lanceolate, ca. 4 mm, membranous, with brown midvein, 2- or 3-flowered. Pedicel ca. 4 mm, jointed at above portion of pedicel. Tepals 5, green-white or pink; outer tepals spreading in fruit, reniform-orbicular, ca. 4 × 6 mm, prominently reticulate-veined; inner tepals ovate, unequal, 7–8 mm in diam., prominently reticulate-veined, margin undulate. Achenes dark brown, shiny, ovoid-trigonous, ca. 5 mm, smooth. Fl. and fr. Jun–Aug.

Semimobile to stable sand dunes; 100–1500. Gansu, Nei Mongol, Ningxia, Qinghai, Shaanxi, Xinjiang [Mongolia].

10. *PARAPTEROPYRUM* A. J. Li, Acta Phytotax. Sin. 19: 330. 1981.

翅果蓼属 chi guo liao shu

Li Anjen (李安仁 Li An-ren); Alisa E. Grabovskaya-Borodina

Shrubs. Leaves simple, clustered, rarely solitary, petiolate; ocrea membranous, oblique. Inflorescence terminal, racemose. Pedicel articulate. Flowers bisexual. Perianth persistent, 5-parted; tepals unequal, outer 2 smaller, accrescent in fruit. Stamens 8; filaments filiform. Ovary ovoid, trigonous; styles 3, free; stigmas capitate. Achenes trigonous, broadly ovoid, ribs with wings.

• One species.

1. *Parapteropyrum tibeticum* A. J. Li, Acta Phytotax. Sin. 19: 330. 1981.

翅果蓼 chi guo liao

Shrubs small, 40–50 cm tall, much branched; bark purple-brown, slightly longitudinally exfoliating; branchlets dense, densely retrorsely hispidulous, spinescent at apex. Leaves clustered, rarely solitary; petiole complanate, 1–2 mm, hispidulous; leaf blade ovate-oblong or oblong, 4–6 × 2–3 mm, subleathery, both surfaces glabrous, midvein prominent abaxially, base subcordate or nearly hastate, margin entire, apex obtuse; ocrea red-brown, ca. 3 mm, membranous, oblique, glabrous, apex acute

or obtuse. Inflorescence terminal, racemose, 1–2 cm; bracts ovate, glabrous, apex acute, each 3–5-flowered. Pedicels longer than bracts, 1.5–2.5 mm, slender, articulate at middle. Perianth yellow-green; tepals elliptic, veined, unequal, outer 2 smaller, reflexed in fruit, inner 3 larger, accrescent, ca. 2.5 mm, appressed in fruit. Stamens unequal. Stigmas capitate. Achenes broadly ovoid, nearly orbicular, 4–5 mm in diam., trigonous, winged along angles, apex acute; wings pinkish, 7–8 × 8–9 mm, thinly membranous, slender veined, margin nearly entire. Fl. Jul–Aug, fr. Aug–Sep.

• Dry riverbanks, thickets in valleys; 3000–3400 m. Xizang (Gyaca, Mainling, Nangxian).

11. *OXYRIA* Hill, Veg. Syst. 10: 24. 1765.

山蓼属 shan liao shu

Li Anjen (李安仁 Li An-ren); Alisa E. Grabovskaya-Borodina

Herbs perennial or weakly defined subshrubs, sometimes dioecious. Rhizomes large. Stems erect, sparsely to densely branched. Leaves simple, alternate, petiolate; leaf blade reniform, orbicular-reniform, or orbicular-cordate, margin entire or nearly so; ocrea tubular, membranous, margin entire, apex oblique or truncate. Inflorescence terminal, paniculate. Pedicel articulate. Flowers bisexual or unisexual. Perianth persistent, accrescent in fruit. Stamens 6. Ovary compressed; styles 2; stigmas penicillate. Achenes biconvex, ovoid, margin broadly winged.

About two species: Asia, Europe, North America; two species (one endemic) in China.

1a. Stems usually glabrous; leaves nearly all basal; leaf blade papery, margin subentire; flowers bisexual 1. *O. digyna*

- 1b. Stems densely hirtellous; leaves not all basal; leaf blade subfleshy, margin undulate; flowers unisexual and plant dioecious 2. *O. sinensis*

1. *Oxyria digyna* (Linnaeus) Hill, Hort. Kew. 158. 1768.

山蓼 shan liao

Rumex digynus Linnaeus, Sp. Pl. 1: 337. 1753; *Oxyria digyna* f. *elatior* R. Brown; *O. elatior* R. Brown ex Meisner; *O. reniformis* Hooker; *O. reniformis* var. *elatior* Regel.

Herbs perennial. Rhizomes stout, 5–10 mm in diam. Stems solitary or several from rhizome, erect, 15–30 cm tall, usually glabrous. Leaves nearly all basal; petiole 3–12 cm; leaf blade reniform or orbicular-reniform, 1.5–3 × 2–4 cm, papery, abaxially sparsely hirtellous along veins, adaxially glabrous, base broadly cordate, margin subentire, apex obtuse; cauline ones usually rudimentary; ocrea shortly tubular, membranous, apex oblique. Inflorescence terminal, paniculate; bracts membranous, each 2–5-flowered. Pedicels slender, articulate below middle. Flowers bisexual. Perianth greenish or pinkish; outer tepals smaller, deflexed; inner ones accrescent in fruit, obovate, appressed. Filaments dilated at base. Achenes ovoid, broadly winged at margin, 4–6 mm in diam.; wings pink, membranous, denticulate. Fl. Jun–Oct, fr. Jul–Nov. $2n = 14, 42$.

Alpine slopes, grasslands, wet valleys; 1300–4900 m. Jilin, Liaoning, Qinghai, Shaanxi, Sichuan, Xinjiang, Xizang, Yunnan [Afghanistan, Bhutan, India, Japan, Kashmir, Kazakhstan, Korea, Kyrgyz-

stan, Mongolia, Nepal, Pakistan, Russia (Far East, Siberia), Sikkim, Tajikistan; SW Asia, Europe, North America].

2. *Oxyria sinensis* Hemsley, J. Linn. Soc., Bot. 29: 317. 1892.

中华山蓼 zhong hua shan liao

Oxyria mairei H. Léveillé.

Herbs perennial, somewhat shrubby, dioecious. Rhizomes stout, 0.7–2 cm in diam., ligneous. Stems erect, 30–50 cm tall, somewhat woody at base, branched, striate, densely hirtellous. Petiole 4–9 cm, densely hirtellous; leaf blade orbicular-cordate or reniform, 3–4 × 4–5 cm, subfleshy, abaxially sparsely hirtellous along veins, adaxially glabrous, base broadly cordate, margin undulate, apex obtuse; ocrea tubular, lax, membranous, apex truncate. Inflorescence paniculate, densely branched; bracts brown, membranous, each 5–8-flowered. Pedicel 4–6 mm, slender, articulate below middle. Flowers unisexual. Male flowers: filaments dilated at base. Female flowers: outer tepals deflexed; inner tepals accrescent in fruit, narrowly obovate, appressed. Achenes broadly ovoid, 6–8 mm in diam., margin broadly winged; wings pink, thinly membranous, irregularly denticulate. Fl. Apr–Oct, fr. May–Nov.

• Steep, often dry, mountain slopes, valleys, grasslands; 1600–3800 m. Guizhou, Sichuan, Xizang, Yunnan.

12. RUMEX Linnaeus, Sp. Pl. 1: 333. 1753.

酸模属 suan mo shu

Li Anjen (李安仁 Li An-ren); Alisa E. Grabovskaya-Borodina, Sergei L. Mosyakin

Herbs perennial or less commonly annual, rarely shrubs, rarely dioecious. Roots usually stout (taproots), or sometimes plants rhizomatous. Stems erect, rarely ascending to prostrate, branched, not hollow or sulcate. Leaves simple, often dimorphic, fugacious or persisting, basal and cauline, alternate, margin entire or undulate; ocrea tubular, membranous, margin entire. Inflorescence usually terminal, sometimes terminal and axillary, racemose or paniculate. Pedicel articulate (the functional pedicel consists of the true pedicel and, below the joint, the narrowed united basal parts of the outer tepals (pseudopedicel)). Flowers bisexual or unisexual (unisexual in dioecious, and rarely in polygamo-monoecious plants). Perianth persistent, tepals 6, becoming enlarged and often hardened in fruit; valve (fruiting inner tepal) margin entire, erose, denticulate, or variously dentate, midvein often transformed into tubercles (tuberculate callosities). Stamens 6. Styles 3, elongate; stigmas penicillate. Achenes trigonous, elliptic to ovate.

About 200 species: widely distributed in N and S temperate zones; 27 species (one endemic) in China.

Rumex s.l. is sometimes subdivided into at least three segregate genera: *Rumex* s.str., *Acetosa* Miller, and *Acetosella* (Meisner) Fourreau, here recognized as subgenera. The generic status of these segregate genera, however, has not been generally accepted by most taxonomists. In some cases intermediate forms exist between them, especially between *Acetosa* and *Acetosella*, and they are evidently more closely related to each other than to any outside genus. This favors the retention of *Rumex* in the traditional broad sense, which is also convenient from the viewpoint of nomenclatural stability.

- 1a. Shrubs flowers polygamous 2. *R. hastatus*

- 1b. Herbs; flowers unisexual or bisexual.

2a. Annual herb.

- 3a. Only 1 valve with tubercles 25. *R. marschallianus*

3b. All valves with tubercles.

- 4a. Margin of valves entire 27. *R. microcarpus*

4b. Margin of valves long dentate, dentate, or denticulate.

- 5a. Only 1 valve with 2 pairs of teeth, others denticulate; teeth 3.5–4 mm, apex usually slightly curved 26. *R. amurensis*

- 5b. All valves dentate or denticulate; teeth 2–4 mm, apically straight.

POLYGONACEAE

- 6a. Stem branched above; valves narrowly triangular, margin long dentate.
 - 7a. Margin of valves with 1 pair of teeth 3–4 mm 22. *R. trisetifer*
 - 7b. Margin of valves with ca. 3 pairs of teeth 2.5–3 mm 23. *R. maritimus*
- 6b. Stem branched from base; valves triangular, margin dentate or denticulate.
 - 8a. Pedicels articulate below middle; valves 4–5 mm, apex acute, margin dentate, teeth 2–3 mm, rather stout 21. *R. dentatus*
 - 8b. Pedicels articulate at base; valves 2–2.5 mm, apex narrowly acute, margin denticulate, teeth 1–1.5 mm, bristle-like 24. *R. similans*
- 2b. Perennial herb.
 - 9a. Flowers unisexual and plants dioecious; basal leaves hastate or sagittate.
 - 10a. Basal or lower stem leaves hastate; rhizomes horizontal; valves shorter than or equaling achenes, without tubercles; pedicel articulate near base of tepals 1. *R. acetosella*
 - 10b. Basal or lower stem leaves sagittate; without rhizomes or shortly rhizomatous; valves distinctly longer than achenes, with small tubercles; pedicel articulate near middle.
 - 11a. Root thin, horizontal or oblique; primary branches of inflorescence usually simple or nearly so 3. *R. acetosa*
 - 11b. Taproot thick, normally vertical or oblique; primary branches of inflorescence repeatedly branched 4. *R. thyrsoflorus*
 - 9b. Flowers bisexual; basal leaves neither hastate nor sagittate.
 - 12a. Valves without tubercles.
 - 13a. Basal leaves triangular-ovate, base deeply cordate, apex obtuse 11. *R. gmelinii*
 - 13b. Basal leaves not as above.
 - 14a. Articulation of pedicels in fruit conspicuous.
 - 15a. Basal leaves lanceolate or narrowly lanceolate 1.5–4 cm wide; valves nearly orbicular or orbicular-cordate, 3.5–4.5 mm 7. *R. pseudonatronatus*
 - 15b. Basal leaves oblong-lanceolate or broadly lanceolate, 5–10 cm wide; valves orbicular-reniform or orbicular-cordate, 5–6 mm 5. *R. longifolius*
 - 14b. Articulation of pedicels in fruit inconspicuous.
 - 16a. Basal leaves oblong-ovate or ovate, base cordate.
 - 17a. Valves ovate, margin nearly entire, base subtruncate 8. *R. aquaticus*
 - 17b. Valves nearly orbicular or orbicular-ovate, margin erose or inconspicuously denticulate, base deeply cordate 9. *R. popovii*
 - 16b. Basal leaves oblong-lanceolate or elliptic, base cuneate.
 - 18a. Basal leaves oblong-lanceolate; valves orbicular-cordate; rachis slightly zigzagged 6. *R. angulatus*
 - 18b. Basal leaves elliptic; valves triangular-cordate; rachis erect 10. *R. yungningensis*
 - 12b. All or 1 or 2 valves with tubercles.
 - 19a. Valve entire to indistinctly erose at margin.
 - 20a. Basal leaves lanceolate or nearly lanceolate, 2–5 cm wide, margin crisped or strongly undulate, base cuneate; valves broadly ovate to ovate-triangular, base nearly truncate 14. *R. crispus*
 - 20b. Basal leaves oblong, oblong-lanceolate, or broadly ovate, 5–10 cm wide, base rounded to nearly cordate, margin undulate; valves broadly cordate, base deeply cordate.
 - 21a. Basal leaves oblong or oblong-lanceolate 12. *R. patientia*
 - 21b. Basal leaves broadly ovate 13. *R. thianschanicus*
 - 19b. Valves erose, denticulate, or dentate at margin.
 - 22a. Valves 1 or 2 or all with tubercles, margin denticulate.
 - 23a. Valves narrowly triangular-ovate; teeth 0.8–1.5 mm, apex straight 18. *R. obtusifolius*
 - 23b. Valves broadly ovate; teeth 1.5–3 mm, apex hooked 20. *R. nepalensis*
 - 22b. All valves with tubercles, margin denticulate.
 - 24a. Basal leaves deeply cordate-triangular, abaxially papillate, apex rounded 15. *R. confertus*
 - 24b. Basal leaves not as above.
 - 25a. Basal leaves lanceolate or narrowly lanceolate, 1.5–4 cm wide, base cuneate; valves triangular, base truncate 17. *R. stenophyllus*
 - 25b. Basal leaves oblong or lanceolate-oblong, 3–10 cm wide, base rounded, cordate, or broadly cuneate; valves broadly cordate or triangular-cordate, base cordate or nearly cordate.
 - 26a. Valves broadly cordate, apex acuminate, base cordate, margin irregularly denticulate; denticles 0.3–0.5 mm 16. *R. japonicus*

- 26b. Valves triangular-cordate, apex acute, base subcordate, margin denticulate; denticles 1–1.5 mm 19. *R. chalepensis*

1. *Rumex acetosella* Linnaeus, Sp. Pl. 1: 338. 1753.

小酸模 xiao suan mo

Acetosa acetosella (Linnaeus) Miller; *Acetosella vulgaris* (Koch) Fourreau; *Rumex acetosella* var. *vulgaris* Koch.

Herbs perennial, dioecious. Rhizomes horizontal, ligneous. Stems usually numerous from rhizome, erect or ascending, 15–35(–45) cm tall, slender, finely grooved, branched above middle. Basal leaves hastate, rarely without basal leaves, 2–4 cm × 3–6(–10) mm, glabrous, central lobe ovate-lanceolate, lanceolate, or linear, basal lobes spreading or curved, sometimes multifid, margin above basal lobes entire, apex acute or obtuse; cauline leaves smaller upward. Petiole short or in upper cauline leaves nearly absent; ocrea fugacious, white, membranous. Inflorescence terminal, paniculate. Flowers unisexual. Pedicel 2–2.5 mm, articulate near base of tepals. Male flower: outer tepals small; inner tepals elliptic, ca. 1.5 mm. Female flower: outer tepals lanceolate, ca. 1 mm, not reflexed in fruit; inner tepals slightly enlarged in fruit; valves ovate, 1–1.6 mm, without tubercles, net veined, base rounded to broadly cuneate, margin entire, apex acute. Achenes brown, shiny, broadly ovoid, trigonous, 1–1.5 mm. Fl. Jun–Jul, fr. Jul–Aug. $2n = 14, 42$.

Hilly grasslands, forest margins, moist valleys; 400–3200 m. Fujian, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangxi, Nei Mongol, Shandong, Sichuan, Taiwan, Xinjiang, ?Yunnan, Zhejiang [India, Japan, Korea, Kazakhstan, Mongolia, Russia; Europe, North America; widely introduced elsewhere].

Rumex acetosella s.l. is a variable and taxonomically complicated, polyploid complex represented by several more or less distinct entities (subspecies and/or segregate species). Despite several painstaking efforts (see Nijs, Feddes Repert. 95: 43–66. 1984; Löve, Bot. Helv. 93: 145–168. 1986; and Akeroyd, Bot. J. Linn. Soc. 106: 97–99. 1991), their taxonomy remains rather confused. At least two of these taxa are represented in China: gymnocarpous *R. acetosella* subsp. *acetosella* and angiocarpous forms referred to subsp. *angiocarpus* (Murbeck) Murbeck (*R. angiocarpus* Murbeck) or subsp. *pyrenaicus* (Pourret ex Lapeyrouse) Akeroyd (*R. pyrenaicus* Pourret ex Lapeyrouse). The distribution and taxonomic relationships of these taxa of *R. acetosella* s.l. in China is still insufficiently known, and because of that no attempt has been made to distinguish them in the present treatment.

2. *Rumex hastatus* D. Don, Prodr. Fl. Nepal. 74. 1825.

戟叶酸模 ji ye suan mo

Rumex dissectus H. Léveillé.

Shrubs 50–90 cm tall. Branches purple-brown, finely grooved; branchlets green, glabrous. Leaves solitary or fasciated; petiole 1.5–3.5 cm; leaf blade hastate, 1.5–3 cm × 1.5–2 mm, subleathery, central lobe linear or narrowly triangular, apex acute, basal lobes curved; ocrea fugacious, membranous. Inflorescence terminal, paniculate, lax. Pedicel slender, articulate below middle. Flowers polygamous. Male flowers: tepals nearly uniform. Female flowers: outer tepals elliptic, reflexed in fruit; inner tepals enlarged in fruit; valves pinkish, orbicular or reniform, membranous, nearly pellucid, with small tubercle at base, base deeply cordate, margin nearly entire, apex obtuse or

retuse. Achenes brown, shiny, ovoid, trigonous, ca. 2 mm. Fl. Apr–May, fr. May–Jun.

Dry mountain slopes, rocky fissures; 600–3200 m. ?Guizhou, Sichuan, SE Xizang, Yunnan [Afghanistan, India, Kashmir, Nepal, Pakistan].

3. *Rumex acetosa* Linnaeus, Sp. Pl. 1: 337. 1753, nom. cons.

酸模 suan mo

Acetosa pratensis Miller.

Herbs perennial, dioecious, with a short and relatively thin horizontal or slightly oblique rootstock, usually not reaching deep into substrate and with rather crowded secondary roots. Stems erect, 40–100 cm tall, grooved, glabrous, usually simple. Basal leaves ovate-lanceolate to lanceolate, base sagittate, 3–12 × 2–4 cm, margin entire, apex acute, basal lobes acute at apices; cauline leaves small; petiole short or nearly absent; ocrea fugacious, white, membranous. Inflorescence terminal, paniculate, lax; branches reddish green, slender, simple or with a few secondary branches. Flowers unisexual. Pedicel slender, articulate at middle. Male flowers: outer tepals erect, small; inner tepals elliptic, ca. 3 mm. Female flowers: outer tepals elliptic, reflexed in fruit; inner tepals enlarged in fruit; valves nearly orbicular (to broadly ovate), 3.5–4 mm in diam., with small recurved tubercles at base of valves, net veined, base cordate, margin entire, apex obtuse. Achenes blackish brown, shiny, ellipsoid, trigonous, ca. 2 mm. Fl. May–Jul, fr. Jun–Aug. $2n = 14^*, 15^*, 22^*$.

Mountain slopes, forest margins, moist valleys; 400–4100 m. ?Anhui, ?Fujian, ?Guangxi, ?Guizhou, Heilongjiang, ?Henan, Hubei, ?Hunan, Jiangsu, Jilin, Liaoning, Nei Mongol, Qinghai, ?Shaanxi, ?Shandong, ?Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, ?Zhejiang [Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Russia; Europe, North America].

4. *Rumex thyrsoiflorus* Fingerhuth, Linnaea 4: 380. 1829.

直根酸模 zhi gen suan mo

Acetosa thyrsoiflora (Fingerhuth) A. Löve & D. Löve; *Rumex acetosa* Linnaeus subsp. *thyrsoiflorus* (Fingerhuth) Čelakovský; *R. haplorhizus* Czernjaev ex Turczaninow; *R. thyrsoiflorus* var. *mandshuricus* A. Baranov & B. Skvortsov.

Herbs perennial, dioecious. Taproots large, thick, with remote secondary roots. Stems erect, 40–120 cm tall, glabrous, grooved. Basal leaves oblong-lanceolate to lanceolate, base sagittate, 4–13 × 1.5–4 cm, both surfaces glabrous or veins minutely papillate, margin entire, apex acute, basal lobes acute at apex; cauline leaves small; petiole short or nearly absent; ocrea fugacious, white, membranous. Inflorescence terminal, paniculate, dense, much branched. Flowers unisexual. Pedicel slender, articulate below middle. Male flowers: outer tepals erect, small; inner tepals elliptic, ca. 2 mm. Female flowers: outer tepals reflexed in fruit; inner tepals enlarged in fruit; valves orbicular to broadly ovate, 3–4 mm in diam., with small recurved tubercles at base of valves, base truncate to cordate, margin nearly entire, apex obtuse. Achenes brown, shiny, ellipsoid, trigonous, ca. 2 mm. Fl. May–Jun, fr. Jun–Jul. $2n = 14, 15$.

Mountain slopes, moist valleys, water sides; 500–2200 m. Heilongjiang, Jilin, Nei Mongol, Xinjiang [Kazakhstan, Mongolia, Russia, Uzbekistan; Europe, North America].

5. *Rumex longifolius* Candolle in Lamarck & Candolle, Fl. Franç., ed. 3, 5(Suppl. 6): 368. 1815.

长叶酸模 chang ye suan mo

Rumex domesticus C. Hartman.

Herbs perennial. Stems erect, 60–120 cm tall, robust, glabrous, grooved, branched above middle. Basal leaves: petiole 5–15 cm; leaf blade oblong-lanceolate or broadly lanceolate, 20–35 × 5–10 cm, abaxially minutely papillate along veins, adaxially glabrous, base cuneate or rounded, margin slightly undulate to weakly crisped, apex acute or subacute; cauline leaves shortly petiolate, lanceolate, small, base narrowly cuneate, apex acute; ocrea fugacious, white, membranous. Inflorescence paniculate. Flowers bisexual. Pedicels slender, articulate below middle; articulation distinctly swollen in fruit. Inner tepals enlarged in fruit; valves broadly orbicular-reniform to orbicular-cordate, 5–6 × 6–7 mm, all without tubercles, sometimes 1 valve with small indistinct tubercle, net veined, base cordate, margin entire, apex obtuse. Achenes brown, shiny, narrowly ovoid, trigonous, 2–3.5 mm. Fl. Jun–Jul, fr. Jul–Aug. $2n = 60$.

Moist valleys, forest margins, mountain slopes; 100–3000 m. Gansu, Hebei, Heilongjiang, Henan, Hubei, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang [Japan, Russia; Europe; introduced in North America and occasionally in other regions of the world].

6. *Rumex angulatus* K. H. Rechinger, Candollea 12: 51. 1949.

紫茎酸模 zi jing suan mo

Herbs perennial. Stems erect, purple-red, 40–60 cm tall, glabrous, grooved. Basal leaves: petiole 3–5 cm; leaf blade oblong-lanceolate, 15–20 × 3–5 cm, both surfaces glabrous, base cuneate, apex acute; cauline leaves shortly petiolate, lanceolate; ocrea fugacious, membranous. Inflorescence terminal, paniculate, dense; rachis slightly zigzagged. Flowers bisexual. Pedicel filiform, slender, articulate below middle. Inner tepals enlarged in fruit; valves orbicular-cordate, ca. 5 × 4 mm, all without tubercles, net veined, base cordate, margin nearly entire or irregularly minutely crenate, apex obtuse. Achenes yellow-brown, shiny, ovoid, trigonous, ca. 3 mm. Fl. Jun–Jul, fr. Jul–Aug.

Watersides, moist valleys; 3000–4200 m. Xizang [Afghanistan, Kashmir, Pakistan].

7. *Rumex pseudonatronatus* (Borbás) Borbás ex Murbeck, Bot. Not. 1899: 16. 1899.

披针叶酸模 pi zhen ye suan mo

Rumex domesticus C. Hartman var. *pseudonatronatus* Borbás, Ertek. Term. Koreb. Mag. Tud. Acad. 11(18): 21. 1880.

Herbs perennial. Roots vertical, large, 1–2 cm in diam. Stems erect, 80–120 cm tall, simple or branched above, grooved, glabrous. Basal leaves lanceolate or narrowly lanceolate, sometimes lanceolate-linear, 15–30 × 1.5–4 cm, abaxially minutely papillate along veins, adaxially glabrous, base cuneate

to narrowly cuneate, margin crisped or undulate, apex acute; cauline leaves shortly petiolate, narrowly lanceolate, small; ocrea fugacious, white, thinly membranous. Inflorescence paniculate, dense in distal part, sometimes interrupted at base, 20–40 cm, narrow. Flowers bisexual. Pedicels slender, articulate below middle, articulation swollen in fruit. Inner tepals enlarged in fruit; valves nearly orbicular or orbicular-cordate, 3.5–4.5 mm, all without tubercles, sometimes 1 valve with 1 indistinct tubercle less than 1–1.3 mm, conspicuously net veined, base slightly cordate, margin entire or weakly erose, apex obtuse. Achenes brown, shiny, narrowly ovoid, trigonous, 2–2.5 mm. Fl. Jun–Jul, fr. Jul–Aug. $2n = 40$.

Forest margins on mountain slopes, moist valleys; 300–3200 m. Gansu, Hebei, Heilongjiang, Jilin, Qinghai, Shaanxi, Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia; Europe; locally naturalized in North America].

8. *Rumex aquaticus* Linnaeus, Sp. Pl. 1: 336. 1753.

水生酸模 shui sheng suan mo

Rumex aquaticus subsp. *protractus* (K. H. Rechinger) K. H. Rechinger; *R. protractus* K. H. Rechinger.

Herbs perennial. Stems erect, 30–120 cm tall, usually branched above (in inflorescence), glabrous, grooved. Basal leaves: petiole 9–28 cm, glabrous or minutely papillate; leaf blade oblong-ovate to ovate-lanceolate, 10–30 × 4–13 cm, both surfaces glabrous or abaxially minutely papillate along veins, base cordate to nearly truncate, margin undulate, apex acute to nearly obtuse; cauline leaves shortly petiolate, oblong or broadly lanceolate, small; ocrea fugacious, membranous. Inflorescence terminal, paniculate, narrow; branches suberect. Flowers bisexual. Pedicel filiform, articulation indistinct, not swollen in fruit. Inner tepals enlarged in fruit; valves ovate, 5–8 × 4–6 mm, all without tubercles, base subtruncate, margin nearly entire, apex acute. Achenes brown, shiny, ellipsoid, trigonous, 3–4.5 mm, base narrow, apex acute. Fl. May–Jun, fr. Jun–Jul. $2n = 140$.

Watersides in valleys, riverbanks; 200–3600 m. Gansu, Heilongjiang, Hubei, Jilin, Ningxia, Qinghai, Shaanxi, Shanxi, NW Sichuan, Xinjiang [Japan, Kazakhstan, Kyrgyzstan, Mongolia, Russia; Europe, North America].

9. *Rumex popovii* Pachomova, Bot. Mater. Gerb. Inst. Bot. Akad. Nauk Uzbeksk. SSR 18: 61. 1967.

中亚酸模 zhong ya suan mo

Rumex aquaticus Linnaeus subsp. *lipschitzii* K. H. Rechinger.

Herbs perennial. Roots large, 0.8–1.5 cm in diam. Stems erect, reddish, 60–100 cm tall, usually branched above, glabrous, grooved. Basal leaves: petiole 7–13 cm, stout; leaf blade oblong-ovate or narrowly ovate, 15–20 × 4–6 cm, both surfaces glabrous, base cordate, margin slightly undulate, apex acute; cauline leaves lanceolate; ocrea fugacious, membranous. Inflorescence paniculate; branches spreading. Flowers bisexual. Pedicel filiform, articulate below middle, articulation indistinct. Inner tepals enlarged in fruit; valves pinkish, nearly orbicular or orbicular-ovate, 4–5 mm in diam., all without tubercles, conspicuously net veined, base deeply cordate, margin inconspicuous

ously denticulate. Achenes brown, shiny, ellipsoid, trigonous, ca. 2 mm. Fl. Jun–Jul, fr. Jul–Aug.

Water sides in valleys, stream banks; 700–3100 m. Xinjiang [Kazakhstan, Mongolia, Tajikistan].

10. *Rumex yungningensis* Samuelsson in Handel-Mazzetti, Symb. Sin. 7: 168. 1929.

永宁酸模 yong ning suan mo

Herbs perennial. Stems erect, 70–120 cm tall, branched, glabrous, grooved. Basal leaves elliptic, 7–15 × 3–5 cm, abaxially minutely papillate along veins, adaxially glabrous, base cuneate, margin entire, apex acute; cauline leaves small; petiole short or nearly absent; ocrea fugacious, brown, thinly membranous. Inflorescence terminal, paniculate; rachis erect. Flowers bisexual. Pedicel filiform, 6–8 mm, articulate at base. Inner tepals enlarged in fruit; valves triangular-cordate, ca. 5 × 4 mm, all without tubercles, net veined, base deeply cordate, margin nearly entire, apex obtuse. Achenes brown, shiny, narrowly ovoid, ca. 2.5 mm, apex acute. Fl. Jun–Jul, fr. Jul–Aug.

• Mountain slopes, valleys; 2500–3000 m. NW Yunnan (Yongning).

One of us (Grabovskaya-Borodina) believes that this is better placed near *Rumex aquaticus*, after *R. popovii*.

11. *Rumex gmelinii* Turczaninow ex Ledebour, Fl. Ross. 3: 508. 1850.

毛脉酸模 mao mai suan mo

Herbs perennial. Stems 40–100 cm tall, robust, glabrous, grooved. Basal leaves: petiole to 30 cm; leaf blade broadly triangular-ovate, 8–25 × 5–20 cm, abaxially densely papillate along veins, adaxially glabrous, base deeply cordate, margin entire or slightly undulate, apex obtuse; cauline leaves shortly petiolate, oblong-ovate, small, base cordate, apex obtuse; ocrea fugacious, membranous. Inflorescence paniculate. Flowers bisexual. Pedicels slender, articulate at base. Outer tepals ca. 2 mm; inner tepals enlarged in fruit; valves elliptic, 5–6 mm, all with tubercles, net veined, base rounded, apex obtuse. Achenes dark brown, shiny, ovoid, trigonous, 2.5–3 mm. Fl. May–Jun, fr. Jun–Jul.

Moist valleys, stream banks; 400–2800 m. Gansu, Hebei, Heilongjiang, Liaoning, Jilin, Nei Mongol, Qinghai, Shaanxi, Shanxi, N Xinjiang (Altay) [Japan, Korea, Mongolia, Russia (Far East, E Siberia)].

12. *Rumex patientia* Linnaeus, Sp. Pl. 1: 333. 1753.

巴天酸模 ba tian suan mo

Rumex callosus (F. Schmidt ex Maximowicz) K. H. Rechinger; *R. interruptus* K. H. Rechinger; *R. patientia* subsp. *callosus* (F. Schmidt ex Maximowicz) K. H. Rechinger; *R. patientia* var. *callosus* F. Schmidt ex Maximowicz; *R. patientia* subsp. *interruptus* K. H. Rechinger; *R. patientia* subsp. *pamiricus* (K. H. Rechinger) K. H. Rechinger; *R. patientia* subsp. *tibeticus* (K. H. Rechinger) K. H. Rechinger; *R. patientia* var. *tibeticus* K. H. Rechinger.

Herbs perennial. Roots vertical, large, to 3 cm in diam. Stems erect, 80–150(–200) cm tall, robust, branched above, grooved. Basal leaves: petiole 5–15 cm, stout; leaf blade oblong

or oblong-lanceolate, 15–30 × 5–10 cm, base rounded, broadly cuneate, or subcordate, margin undulate, apex acute to subacute; cauline leaves shortly petiolate or nearly sessile, lanceolate, small; ocrea fugacious, 2–4 cm, membranous. Inflorescence paniculate, large. Flowers bisexual. Pedicel slender, articulate below middle, articulation swollen and slightly inflexed in fruit. Outer tepals oblong, ca. 1.5 mm; inner tepals enlarged in fruit; valves broadly cordate, 6–7 mm, all or 1 or 2 valves with narrowly ovate tubercles (in *R. patientia* s.str. normally 1 valve has a large tubercle, and two other valves have smaller tubercles), net veined, base deeply cordate, margin entire or indistinctly erose, apex obtuse. Achenes brown, shiny, ovoid, trigonous, 2.5–3 mm, apex acuminate. Fl. May–Jun, fr. Jun–Jul. $2n = 40$.

Along ditches, water sides, moist valleys; sea level to 4000 m. Gansu, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan; Europe; introduced and naturalized in North America and some other parts of the world].

Two of us (Grabovskaya-Borodina and Mosyakin) prefer to accept the subspecific taxa of K. H. Rechinger.

13. *Rumex thianschanicus* Losinskaja in Komarov, Fl. URSS 5: 716. 1936 [*“thjanschanicus”*].

天山酸模 tian shan suan mo

Herbs perennial. Stems erect, 70–130 cm tall, robust, branched, glabrous, grooved. Basal leaves shortly petiolate, broadly ovate, 14–28 × 7–17 cm, thin, both surfaces glabrous, abaxially with prominent veins, base cordate, margin slightly undulate, apex subacute; cauline leaves shortly petiolate, small; ocrea fugacious, membranous. Inflorescence paniculate, lax. Flowers bisexual. Pedicel filiform, 8–16 mm, slender, dilated upward, articulate near base. Inner tepals enlarged in fruit; valves broadly cordate, 5–7 × 6–8 mm, only 1 valve with a tubercle, net veined, base cordate, margin nearly entire, apex acuminate; tubercle elliptic, 2–3 mm. Achenes brownish, ovoid, trigonous, 2–3 mm, apex acuminate. Fl. May–Jun, fr. Jun–Jul.

Moist valleys, forest margins on mountain slopes; 1100–1900 m. Xinjiang (Tian Shan) [Afghanistan, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan; SW Asia].

One of us (Grabovskaya-Borodina) treats this as a synonym of *Rumex paulsenianus* K. H. Rechinger.

14. *Rumex crispus* Linnaeus, Sp. Pl. 1: 335. 1753.

皱叶酸模 zhou ye suan mo

Lapathum crispum (Linnaeus) Scopoli.

Herbs perennial. Roots large. Stems erect, 50–120(–150) cm tall, simple or branched above, glabrous, grooved. Basal leaves shortly petiolate, lanceolate or narrowly lanceolate, 10–25 × 2–5 cm, glabrous or indistinctly papillose along veins below, base usually cuneate to truncate, margin strongly crisped and undulate, apex acute; cauline leaves shortly petiolate, narrowly lanceolate, small; ocrea fugacious, membranous. Inflorescence terminal, paniculate, narrow; branches erect or ascending. Flowers bisexual. Pedicel slender, articulate in proximal third, articulation distinctly swollen. Inner tepals enlarged in

fruit; valves broadly ovate, 3.5–6 × 3–5 mm, all with tubercles, rarely only 1 valve bearing a tubercle, conspicuously net veined, base nearly truncate, margin entire, rarely weakly erose, apex obtuse to subacute; tubercle ovate, 1.5–2 mm. Achenes dark brown, shiny, ovoid, trigonous, ca. 2 mm, apex acute. Fl. May–Jun, fr. Jun–Jul. $2n = 60$.

Field margins, streamsides, waste areas; sea level to 2500 m. Gansu, Guizhou, ?Hainan, Heilongjiang, Hebei, Henan, Hubei, Hunan, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, ?Zhejiang [Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Myanmar, Russia, Thailand; Europe, North America; widely naturalized elsewhere].

The typical variety, *Rumex crispus* var. *crispus*, has valves with 3 tubercles; the less common variety with 1 tubercle, *R. crispus* var. *unicallosus* Petermann, also sporadically occurs in China. Forms currently recognized as *R. crispus* subsp. *fauriei* (K. H. Rechinger) Mosyakin & W. L. Wagner (*R. fauriei* K. H. Rechinger) probably also occur in China (see Mosyakin & Wagner, Bishop Mus. Occas. Pap. 55: 39–44. 1998), but their distribution is insufficiently known.

15. *Rumex confertus* Willdenow, Enum. Hort. Berol. 397. 1809.

密生酸模 mi sheng suan mo

Herbs perennial. Stems erect, 40–50 cm tall, branched above, grooved, papillose-pubescent. Basal leaves with petiole longer than leaf blade; leaf blade deeply cordate-triangular, 8–10 × 15–20 cm, slightly longer than wide, abaxially papillate, adaxially glabrous, margin undulate, basal lobes and apex rounded. Inflorescence paniculate, 5–6 × 18–20 cm; rachis flexuous; branches arcuate at base. Flowers bisexual. Pedicel slender, articulate below middle. Inner tepals enlarged in fruit; valves broadly cordate, acutely reniform, 5–6 × 7–8 mm, one valve with a small tubercle, conspicuously net veined, margin with indistinct teeth near base. Fl. May–Jun.

Meadows in river valleys. N Xinjiang [Kazakhstan, Russia; Europe, North America]

16. *Rumex japonicus* Houttuyn, Nat. Hist. 2(8): 394. 1777.

羊蹄 yang ti

Rumex cardiocarpus Pampanini; *R. crispus* Linnaeus subsp. *japonicus* (Houttuyn) Kitamura; *R. crispus* var. *japonicus* (Houttuyn) Makino; *R. hadroocarpus* K. H. Rechinger; *R. regelii* F. Schmidt.

Herbs perennial. Stems erect, 50–100 cm tall, branched above, grooved, glabrous. Basal leaves: petiole 6–15 cm; leaf blade oblong or lanceolate-oblong, 8–25 × 3–8 cm, abaxially minutely papillate along veins, adaxially glabrous, base rounded, cordate, or broadly cuneate, margin slightly undulate, apex acute or obtuse; cauline leaves shortly petiolate, narrowly oblong, small; ocrea fugacious, white, membranous. Inflorescence paniculate. Flowers bisexual. Pedicel slender, articulate below middle, articulation distinct. Inner tepals enlarged in fruit; valves broadly cordate, 4–5 × 5–6 mm, all valves with narrowly ovate tubercles, conspicuously net veined, base cordate, margin irregularly denticulate, apex acute; denticles 0.3–0.5 mm. Achenes dark brown, shiny, broadly ovoid, sharply trigonous, ca. 2.5 mm, base narrow, apex acute. Fl. May–Jun, fr. Jun–Jul.

Field margins, stream banks, wet valleys; sea level to 3400 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Zhejiang [Japan, Korea, Russia (Far East)].

This species is used medicinally.

17. *Rumex stenophyllus* Ledebour, Fl. Altaic. 2: 58. 1830.

狭叶酸模 xia ye suan mo

Rumex odontocarpus Sandor ex Borbás; *R. stenophyllus* var. *ussuriensis* (Losinskaja) Kitagawa; *R. ussuriensis* Losinskaja.

Herbs perennial. Roots vertical, large, to 1 cm in diam. Stems erect, 40–80(–120) cm tall, usually branched above, glabrous, grooved. Basal leaves shortly petiolate, lanceolate or narrowly lanceolate, 10–18 × 1.5–4 cm, glabrous or indistinctly papillose along veins below, base cuneate, margin crisped, occasionally nearly flat and entire, apex acute; cauline leaves shortly petiolate or nearly sessile, narrowly lanceolate, small; ocrea fugacious, membranous. Inflorescence paniculate, narrow. Flowers bisexual, dense. Pedicel slender, articulate below middle (in proximal third). Inner tepals enlarged in fruit; valves triangular, 3–4(–5) mm × ca. 3.5 mm, all valves with narrowly ovate tubercles, base truncate to indistinctly cordate, margin denticulate, apex acute; denticles 0.5–1.5 mm, 4–10 at each side. Achenes brown, shiny, ellipsoid, 2.5–3 mm, sharply trigonous, base narrow, apex acute. Fl. May–Jun, fr. Jun–Aug. $2n = 20, 22, 60$.

Water sides, field margins, moist valleys; 200–1200 m. Heilongjiang, Jilin, Nei Mongol, Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia; Europe].

18. *Rumex obtusifolius* Linnaeus, Sp. Pl. 1: 335. 1753.

钝叶酸模 dun ye suan mo

Rumex obtusifolius subsp. *agrestis* (Fries) Danser; *R. obtusifolius* var. *agrestis* Fries.

Herbs perennial. Roots vertical, large, to 1.5 cm in diam. Stems erect, 60–120(–150) cm tall, grooved, branched above middle or in upper 2/3, glabrous. Basal leaves: petiole 6–12 cm, minutely papillate; leaf blade broadly ovate to oblong-ovate or narrowly ovate, 15–30 × 6–15 cm, base cordate, abaxially sparsely minutely papillate, adaxially glabrous; cauline leaves shortly petiolate, narrowly ovate, small; ocrea fugacious, membranous. Inflorescence broadly paniculate, large; branches ascending. Flowers bisexual, dense. Pedicel filiform, slender, articulate below middle (in proximal third, rarely near middle). Inner tepals enlarged in fruit; valves narrowly triangular-ovate, 4–6 × 2–3 mm, usually 1 valve with tubercles, sometimes 3 valves with tubercles, but then 1 tubercle distinctly larger than other 2, base truncate, each margin with 2 or 5 teeth, apex obtuse to subacute; teeth 0.8–1.5 mm, apex straight. Achenes dark brown, shiny, ovoid, sharply trigonous, ca. 2.5 mm. Fl. May–Jun, fr. Jun–Jul. $2n = 40$.

Field margins, moist valleys; sea level to 100 m. Anhui, Gansu, Hebei, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan,

Taiwan, Zhejiang [Japan, Russia; N Africa, Europe; introduced and naturalized in North America and other regions of the world].

One of us (Grabovskaya-Borodina) suggests that these plants may, in fact, be *Rumex chalepensis*.

19. *Rumex chalepensis* Miller, Gard. Dict., ed. 8, *Rumex* no. 11. 1768.

网果酸模 wang guo suan mo

Rumex dictyocarpus Boissier & Buhse; *R. drobovii* Korovin.

Herbs perennial. Roots black-brown, large, to 2.5 cm in diam. Stems erect, 30–60 cm, grooved, branched. Basal leaves: petiole 3–4 cm; leaf blade oblong, 5–20 × 3–8 cm, both surfaces glabrous, midvein prominent abaxially, base rounded or subcordate, margin slightly undulate, apex obtuse or acute; cauline leaves shortly petiolate, small; ocrea fugacious, membranous. Inflorescence paniculate, large, lax. Flowers bisexual. Pedicel articulate below middle. Outer tepals elliptic; inner tepals enlarged in fruit; valves triangular-cordate, 5–6 mm, all valves with tubercles, conspicuously net veined, base subcordate, margin denticulate, apex acute; denticles 1–1.5 mm; tubercles oblong, ca. 2 mm. Achenes brown, shiny, ellipsoid, sharply trigonous, 2.5–3 mm, base narrow, apex acute. Fl. Apr–May, fr. May–Jun.

Along ditches, moist valleys; 100–1500 m, Anhui, Gansu, Hebei, Henan, Hubei, Jiangsu, Shaanxi, Shandong, Shanxi, Xinjiang, Zhejiang [Afghanistan, Kazakhstan, Kyrgyzstan, Pakistan, Kashmir, Turkmenistan; SW Asia, Europe].

20. *Rumex nepalensis* Sprengel, Syst. Veg. 2: 159. 1825.

尼泊尔酸模 ni bo er suan mo

Herbs perennial. Roots large. Stems erect, 50–100 cm tall, branched above, glabrous, grooved. Basal leaves: petiole 4–10 cm; leaf blade broadly ovate, 10–15 × 4–8 cm, both surfaces glabrous or abaxially minutely papillate along veins, base cordate, margin entire, apex acute; cauline leaves shortly petiolate, ovate-lanceolate; ocrea fugacious, membranous. Inflorescence paniculate. Flowers bisexual. Pedicel articulate below middle. Outer tepals elliptic, ca. 1.5 mm; inner tepals enlarged in fruit; valves broadly ovate, 5–6 mm, valves all or 1 or 2 with tubercles, base truncate, each margin with 7 or 8 teeth, apex acute; teeth 1.5–3 mm, apex hooked or straight. Achenes brown, shiny, ovoid, sharply trigonous, ca. 3 mm, base truncate, apex acute. Fl. Apr–May, fr. Jun–Jul.

Grassy slopes, moist valleys, along ditches; 1000–4300 m. S Gansu, Guangxi, Guizhou, Henan, Hubei, Hunan, SW Qinghai, S Shaanxi, Sichuan, Xizang, Yunnan [Afghanistan, Bhutan, India, Indonesia, Japan (introduced), Myanmar, Nepal, Pakistan, Sikkim, Tajikistan, Vietnam; SW Asia].

- 1a. Valves with long denticles; denticles 2.5–3 mm, apex hooked 20a. var. *nepalensis*
 1b. Valves with short denticles; denticles 1.5–2 mm, apex straight, sometimes hooked 20b. var. *remotiflorus*

20a. *Rumex nepalensis* var. *nepalensis*

尼泊尔酸模(原变种) ni bo er suan mo (yuan bian zhong)

Rumex esquirolii H. Léveillé; *R. ramulosus* Meisner.

Valves with long denticles 2.5–3 mm and hooked apex.

Grassy slopes, moist valleys; 1000–4300 m. S Gansu, Guangxi, Guizhou, Henan, Hubei, Hunan, SW Qinghai, S Shaanxi, Sichuan, Xizang, Yunnan [Afghanistan, Bhutan, India, Indonesia, Japan (introduced), Myanmar, Nepal, Pakistan, Sikkim, Tajikistan, Vietnam; SW Asia].

20b. *Rumex nepalensis* var. *remotiflorus* (Samuelsson) A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 161. 1998.

疏花酸模 shu hua suan mo

Rumex remotiflorus Samuelsson in Handel-Mazzetti, Symb. Sin. 7: 167. 1929.

Valves with short denticles 1.5–2 mm, apex straight, sometimes hooked.

- Along ditches; 2700–2800 m. Yunnan.

21. *Rumex dentatus* Linnaeus, Mant. Pl. 2: 226. 1771.

齿果酸模 chi guo suan mo

Rumex dentatus subsp. *halacsyi* (K. Rechinger) K. H. Rechinger; *R. dentatus* subsp. *klotzschianus* (Meisner) K. H. Rechinger; *R. ×halacsyi* K. Rechinger; *R. klotzschianus* Meisner; *R. nipponicus* Franchet & Savatier.

Herbs annual, rarely biennial. Stems erect, 30–70 cm tall, branched from base, grooved; branches ascending to nearly divaricate, glabrous. Lower leaves: petiole 3–5 cm; leaf blade oblong to narrowly elliptic, 4–12 × 1.5–3 cm, both surfaces glabrous, or papillose along veins below, base rounded, truncate, or subcordate, margin slightly undulate, apex obtuse or acute; cauline leaves smaller; ocrea fugacious, membranous. Inflorescence racemose, several racemes aggregated and panicle-like. Flowers bisexual. Pedicel articulate below middle (in proximal third). Outer tepals elliptic, ca. 2 mm; inner tepals enlarged in fruit; valves triangular-ovate, 4–5 × 2.5–3 mm, all valves with tubercles 1.5–2 mm (in some infraspecific taxa of *R. dentatus* only 1 or 2 valves with tubercles), conspicuously net veined, base rounded, each margin with 2–4 teeth, apex acute to subacute; teeth 1.5–2 mm. Achenes yellow-brown, shiny, ovoid, sharply trigonous, 2–2.5 mm, base narrow, apex acute. Fl. May–Jun, fr. Jun–Jul. $2n = 40$.

Moist valleys, mountain slopes; sea level to 2500 m. Anhui, Fujian, Gansu, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Taiwan, Yunnan, Zhejiang [Afghanistan, India, Kazakhstan, Kyrgyzstan, Nepal, Russia; N Africa, SE Europe].

Rumex dentatus is an extremely variable species represented in N Africa, Asia, and Europe by several quite distinct races, recognized taxonomically mostly as subspecies. A taxon native mostly to E and S Asia (China, India, Japan, and Korea) is usually recognized as *R. dentatus* subsp. *klotzschianus*. *Rumex dentatus* subsp. *halacsyi* (*R. ×halacsyi*) is native to the E Mediterranean region, the Caucasus, SE Europe, and parts of C and SW Asia, and probably also occurs in China. This subspecies differs from subsp. *klotzschianus* in having broader, triangular (not rounded) valves, and longer teeth (to 3 mm). However, subspecies of *R. dentatus* are still insufficiently understood taxonomically and insufficiently delimited geographically.

22. *Rumex trisetifer* Stokes, Bot. Mat. Med. 2: 305. 1812.

长刺酸模 chang ci suan mo

?Rumex chinensis Campdera.

Herbs annual. Roots large. Stems erect, 30–80 cm tall, grooved, glabrous; branches spreading. Lower leaves: petiole 3–5 cm; leaf blade oblong or lanceolate-oblong, 8–20 × 2–5 cm, both surfaces glabrous, base cuneate, margin undulate, apex acute; cauline leaves shortly petiolate, narrowly lanceolate, smaller than basal ones; ocrea fugacious, membranous. Inflorescence terminal or axillary, racemose, several racemes aggregated and large panicle-like. Flowers bisexual. Pedicel slender, articulate near base. Outer tepals lanceolate, small; inner tepals enlarged in fruit; valves narrowly trigonous-ovate, 3–4 × 1.5–2 mm, all valves with tubercles, base truncate, margin with 1 pair of narrow teeth, apex narrowly acute; teeth 3–4 mm, straight. Achenes yellow-brown, shiny, ellipsoid, sharply trigonous, 1.5–2 mm, base narrow, apex acute. Fl. May–Jun, fr. Jun–Jul.

Field margins, moist valleys, water sides; sea level to 1300 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, India, Laos, Myanmar, Thailand, Vietnam].

23. *Rumex maritimus* Linnaeus, Sp. Pl. 1: 335. 1753.

刺酸模 ci suan mo

Rumex longisetus A. Baranov & B. Skvortzov.

Herbs annual, rarely biennial, especially in S regions. Stems erect, 15–60 cm tall, branched below middle, grooved, glabrous or weakly shortly papillose. Lower leaves: petiole 1–2.5 cm; leaf blade lanceolate or lanceolate-oblong, 4–15(–20) × 1–3(–4) cm, both surfaces glabrous or shortly papillose below, base narrowly cuneate, margin entire and smooth, or occasionally slightly undulate, apex acute, cauline leaves shortly petiolate or nearly sessile, smaller than basal ones; ocrea fugacious, membranous. Inflorescence paniculate. Flowers bisexual. Pedicel filiform, articulate at base or slightly above base, articulation indistinctly swollen. Outer tepals elliptic, ca. 2 mm; inner tepals enlarged in fruit; valves narrowly triangular-ovate, 2.5–3.5 × 0.8–1.5 mm wide, all valves with tubercles, base truncate, each margin with 2 or 3(or 4) teeth, apex acute; teeth 2.5–3 mm, narrow; tubercles oblong, ca. 1.5 mm. Achenes yellow-brown, shiny, ellipsoid, sharply trigonous, 1.5–2 mm. Fl. May–Jun, fr. Jun–Jul. $2n = 40$.

Field margins, riverbanks, streamsides; sea level to 1800 m. ?Fujian, ?Guangxi, ?Guizhou, ?Hainan, Hebei, Heilongjiang, Henan, ?Hubei, ?Jiangsu, Jilin, Liaoning, Nei Mongol, Shaanxi, ?Shandong, Shanxi, ?Taiwan, Xinjiang [Kazakhstan, Mongolia, Myanmar, Russia (Far East, Siberia); Europe; introduced in North America].

Rumex maritimus s.str. is native to Asia and Europe, but it is nearly absent from E Asia, where it is substituted by closely related and/or similar species. Previous records of *R. maritimus* from North America (except several localities of introduced plants) were also mainly based on misidentifications of related taxa (mostly *R. persicarioides* Linnaeus and *R. fueginus* Philippi). Because of that, earlier literature records of *R.*

maritimus should be critically verified. Distribution patterns of *R. maritimus* and similar taxa (see below) in China need clarification.

24. *Rumex similans* K. H. Rechinger, Candollea 12: 133. 1949.

蒙新酸模 meng xin suan mo

Rumex marschallianus var. *brevidens* Bongard & C. A. Meyer.

Herbs annual. Stems erect, purplish red, 15–30 cm tall, branched from base, finely grooved. Lower leaves: petiole 1–3 cm; leaf blade oblong or lanceolate-oblong, 3–7 × 0.8–2 cm, both surfaces glabrous, with conspicuous midvein, base rounded or broadly cuneate, margin slightly crisped, apex acute, cauline leaves shortly petiolate or nearly sessile, small, upper ones linear-lanceolate; ocrea fugacious, membranous. Inflorescence terminal, racemose, leafy. Flowers bisexual. Pedicel articulate at base. Outer tepals lanceolate, ca. 0.5 mm; inner tepals enlarged in fruit; valves triangular-ovate, 2–2.5 × 1–1.5 mm, all valves with tubercles, base rounded, each margin with 3 or 4 pairs of narrow teeth, apex narrowly acute; teeth 1–1.5 mm. Achenes shiny, ovoid, 1–1.5 mm, sharply trigonous, apex acute. Fl. Jun–Jul, fr. Jul–Aug.

Waste areas, saline deserts and sands; 400–1000 m. Nei Mongol, Xinjiang [Kazakhstan, Mongolia, Russia (SW Siberia); SE Europe].

25. *Rumex marschallianus* Reichenbach, Iconogr. Bot. Pl. Crit. 4: 58. 1826.

单瘤酸模 dan liu suan mo

Herbs annual. Stems erect, 10–30(–50) cm tall, branched from base, glabrous, finely grooved. Lower leaves: petiole 1–1.5 cm, slender; leaf blade lanceolate or elliptic-lanceolate, 1.5–5 × 0.7–1.5 cm, both surfaces glabrous, midvein conspicuous, base cuneate or rounded, margin slightly crisped, apex acute; cauline leaves small, with short petiole 3–5 mm. Inflorescence racemose, several racemes aggregated and panicle-like, leafy. Flowers bisexual. Pedicel slender, articulate at base. Outer tepals elliptic; inner tepals enlarged in fruit; valves ovate-triangular, 2.5–3 mm, only 1 valve with tubercle, base rounded, each margin with 2 or 3 narrow teeth (ca. 1.5 or)4–5 mm, apex narrowly acute; others without tubercles, with shorter teeth, or all valves with subequal teeth. Achenes brown, shiny, ovoid, sharply trigonous, ca. 1 mm, base truncate, apex acute. Fl. Jun–Jul, fr. Jul–Aug.

Riverbanks, waste areas, in sand of lakeshores, moist valleys; 300–1000 m. Nei Mongol, Xinjiang [Kazakhstan, Mongolia, Russia].

26. *Rumex amurensis* F. Schmidt ex Maximowicz, Prim. Fl. Amur. 228. 1859.

黑龙江酸模 hei long suan mo

Herbs annual. Stems erect, 10–30 cm tall, branched from base, glabrous. Lower leaves: petiole 1–2.5 cm, slender; leaf blade oblanceolate or narrowly oblong, 2–7 × 0.3–1.2 cm, both surfaces glabrous, midvein conspicuous, base narrowly cuneate, margin slightly crisped, apex obtuse or acute; cauline leaves with short 2–5 mm petiole, leaf blade linear-lanceolate; ocrea

fugacious, membranous. Inflorescence racemose, several racemes aggregated and panicle-like, leafy. Flowers bisexual. Pedicel articulate at base. Outer tepals elliptic, smaller; inner tepals enlarged in fruit; valves triangular-ovate, all with tubercles; only 1 valve with 2 pairs of narrow teeth; teeth 3.5–4 mm, straight or slightly curved at apex, other valves shortly denticulate. Achenes brownish, shiny, ellipsoid, sharply trigonous, ca. 1.5 mm, base narrow, apex acute. Fl. May–Jun, fr. Jun–Jul.

Streamsides, ditches, wet areas; sea level to 300 m. Anhui, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Shandong [Russia (Far East)].

27. *Rumex microcarpus* Campdera, Monogr. Rum. 143. 1819.

小果酸模 *xiao guo suan mo*

Rumex wallichianus Meisner; *R. wallichii* Meisner.

Herbs annual. Stems erect, 40–80 cm tall, branched above, glabrous, grooved. Lower leaves: petiole 2–4 cm; leaf blade oblong, 10–15 × 2–5 cm, both surfaces glabrous, midvein large, base cuneate, margin entire, apex acute or subobtusate; cauline leaves shortly petiolate, narrowly elliptic; ocrea fugacious, membranous. Inflorescence paniculate, usually leafy. Flowers bisexual. Pedicel slender, articulate near base. Perianth yellow-green; outer tepals lanceolate, ca. 1 mm; inner tepals enlarged in fruit; valves narrowly triangular-ovate, 3–4 × 1.5–2 mm, all valves with tubercles, base truncate, margin entire, apex acute; tubercles oblong, 1.5–2 mm. Achenes brown, shiny, ovoid, sharply trigonous, 1–2 mm. Fl. Apr–Jun, fr. May–Jul.

Moist valleys, field margins; sea level to 2200 m. Guangxi, Guizhou, ?Hainan, Hebei, Henan, Hubei, Jiangsu, Liaoning, Taiwan, Yunnan [India, Vietnam].

13. **RHEUM** Linnaeus, Sp. Pl. 1: 371. 1753.

大黄属 *da huang shu*

Bao Bojian (包伯坚); Alisa E. Grabovskaya-Borodina

Herbs perennial. Roots long, stout. Stem erect, hollow, sulcate, glabrous or strigose. Leaves basal and cauline, simple, sinuate-dentate or palmate, the basal ones sparse, dense, or in a rosette, larger than the alternate cauline leaves, the latter sometimes lacking; ocrea usually large, membranous, margin entire. Inflorescence simple or branched, usually paniculate, or spikelike or spherical. Pedicel articulate. Flowers bisexual or polygamo-monoecious. Perianth persistent, tepals 6. Stamens usually 9 (6+3), rarely 7 or 8. Styles 3, short, horizontal; stigmas inflated, recurved. Achenes trigonous, winged.

About 60 species: temperate and subtropical Asia; 38 species (19 endemic) in China.

- 1a. Panicle usually similar to spike or capitulum; stem absent or solitary, stout, with dense leaves and large bracts, nodes inconspicuous.
 - 2a. Stem stout, simple, with leaves and large bracts; panicle not similar to spike or capitulum; stamens longer than perianth.
 - 3a. Plant 1–2 m tall; stem leaves ovate to orbicular; fruit broadly ovoid 37. *R. nobile*
 - 3b. Plant short, 0.4–0.8 m tall; stem leaves ovate to narrowly ovate; fruit rhomboid-ellipsoid 38. *R. alexandrae*
 - 2b. Stem absent; panicle, similar to spike or capitulum; stamens subequal to perianth.
 - 4a. Plant very short, less than 10 cm; panicle similar to capitulum; fruit broadly ovoid, slightly constricted at both sides 36. *R. globulosum*
 - 4b. Plant short, 10–30 cm; panicle similar to spike; fruit ellipsoid or ovoid.
 - 5a. Panicle deliquescently branched (with side branches).
 - 6a. Leaves ovate or nearly rhomboid, glabrous, rarely hairy abaxially; panicles 2–4-branched; tepals broadly ovate, ca. 1.5 × 1.3 mm 33. *R. przewalskyi*
 - 6b. Leaves ovate, long hairy abaxially; panicles straight, 1–3-branched from lower part; tepals narrowly elliptic, 2–2.5 × 0.8–1.2 mm 34. *R. rhizostachyum*
 - 5b. Panicle not deliquescently branched (without side branches).
 - 7a. Leaves rhombic, abaxially hairy; perianth purple-red 32. *R. rhomboideum*
 - 7b. Leaves ovate or triangular-ovate, abaxially glabrous or hairy; perianth green or yellow-white.
 - 8a. Leaves broadly ovate or ovate-elliptic, both surfaces hairy, apex obtuse; fruit ellipsoid; perianth green 30. *R. spiciforme*
 - 8b. Leaves ovate or triangular-ovate, glabrous or hairy abaxially, apex obtuse to acute; fruit ovoid or broadly ovoid; perianth yellow-white.
 - 9a. Leaves ovate, glabrous; panicle 2–4(or 5)-branched from base; fruit ovoid, 7–8 × 5–6 mm, wings 1–1.5 mm wide 31. *R. moorcroftianum*
 - 9b. Leaves triangular-ovate, pubescent abaxially; panicle much branched from base; fruit broadly ovoid, 7.5–8.5 × 7–8 mm, wings ca. 2.5 mm wide 35. *R. reticulatum*
 - 1b. Panicle terminal, without leaves or with bracts, not spicate or headlike; nodes usually inflated, stem rarely absent.
 - 10a. Stem without leaves; leaves leathery or nearly so.
 - 11a. Leaves papery, orbicular to cordate-orbicular; inflorescence 3-branched; joint of pedicel at upper part 29. *R. tataricum*

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- 11b. Leaves leathery or nearly so, elliptic or ovate to orbicular; inflorescence 1(or 2)-branched; joint of pedicel beneath middle.
- 12a. Stem absent; inflorescence usually 2-branched.
- 13a. Leaves papery, longer than wide, ovate to narrowly ovate, palmate-pinnately veined; inflorescences caespitose from base 26. *R. uninerve*
- 13b. Leaves leathery, ca. as long as wide, reniform-orbicular to orbicular, conspicuously palmately veined; inflorescence solitary from base.
- 14a. Leaves reniform-orbicular to orbicular, 6–14 × 8–16 cm; fruit shorter than wide, reniform-orbicular, 10–12 × 12–14 mm 27. *R. nanum*
- 14b. Leaves cordate to cordate-orbicular, 12–20 × 13–21 cm; fruit ca. as long as wide, ovoid, 8–10 mm 28. *R. tibeticum*
- 12b. Stem with conspicuous nodes; inflorescence 1(or 2)-branched.
- 15a. Plant tall, 20(–30)–70 cm; leaves (5–)8–20 cm, abaxially glabrous or hairy.
- 16a. Leaves narrowly ovate to broadly lanceolate, glabrous, ca. 2 × as long as wide; fruit ovoid-ellipsoid 21. *R. sublanceolatum*
- 16b. Leaves ovate or triangular ovate, abaxially hairy or glabrous, slightly longer than wide; fruit ellipsoid or orbicular.
- 17a. Plant high, 50–70 cm; leaves glabrous; fruit elliptic, narrow 20. *R. racemiferum*
- 17b. Plant short, 20–35 cm; leaves hairy abaxially; fruit orbicular, broad 22. *R. inopinatum*
- 15b. Plant shorter, 10–30 cm; leaves 2–10 cm, abaxially at least hairy.
- 18a. Leaves 6–10 × 4–7 cm, triangular-cordate or triangular ovate, apex acuminate; inflorescence broad 25. *R. subacaule*
- 18b. Leaves 2–6 × 1–5 cm, elliptic, ovate-elliptic, or oblong-elliptic, apex obtuse; inflorescence narrow.
- 19a. Fruit triangular to triangular-ovoid, 5–6 mm; basal leaves ovate-elliptic, 1.5–5 × 1–3 cm 23. *R. pumilum*
- 19b. Fruit cordate-orbicular, 8–9 mm in diam.; basal leaves oblong-elliptic or ovate-elliptic, 3–6 × 2.5–5 cm 24. *R. delavayi*
- 10b. Stem leafy; leaf blade not leathery or papery.
- 20a. Plant 0.4–0.8 m tall, stem leaves 1 or 2(or 3), cordate, reniform-cordate, or triangular-cordate, margin entire; inflorescence a lax panicle, 1- or 2-branched.
- 21a. Plant 50–80 cm tall; leaves 13–28 × 12–25 cm; inflorescence usually 2-branched.
- 22a. Stem and petioles purple-red or green, without spots; leaves cordate to broadly cordate, longer than wide; inflorescence branched from middle 16. *R. acuminatum*
- 22b. Stem and petioles green, with dense purple spots; leaves reniform or broadly cordate, ca. as long as wide or shorter; inflorescence branched from upper part 17. *R. maculatum*
- 21b. Plant 30–55 cm tall; leaves less than 10 cm; inflorescence 1- or 2-branched.
- 23a. Flower large, pedicel 4–7 mm, shortly hairy; tepals 3–4 mm; leaves reniform-cordate or broadly cordate; fruit more than 10 mm 18. *R. yunnanense*
- 23b. Flower small, pedicel 2–3 mm, glabrous; tepals ca. 1.5 mm; leaves ovate-cordate or triangular-cordate; fruit 7–8 mm 19. *R. kialense*
- 20b. Plant 0.5–2 m tall; stem leaves many, triangular-ovate; inflorescence large, more than 2-branched.
- 24a. Leaves lobed, parted to lacinate.
- 25a. Leaves lobed, lobed part triangular.
- 26a. Lobed parts of blade broadly triangular; flowers large, perianth white; fruiting branches divaricate 12. *R. officinale*
- 26b. Lobed parts of blade narrowly triangular; flowers small, perianth purple-red; fruiting branches connivent 13. *R. palmatum*
- 25b. Leaves parted, lobed part narrow, triangular-lanceolate, or linear.
- 27a. Lobed parts of blade narrowly lanceolate; perianth usually purple-red, tepals entire at margin 14. *R. tanguticum*
- 27b. Lobed parts of blade linear; perianth white, tepals slightly sinuate at margin 15. *R. laciniatum*
- 24b. Leaves entire, with crispate or sinuate margin.
- 28a. Leaves with sinuate margin.
- 29a. Fruit 9–12 × 7–11 mm, wings broad, 4–5 mm 5. *R. wittrockii*
- 29b. Fruit less than 1 cm, with narrow or broad wings.
- 30a. Leaves with 5–7 basal veins; leaf blade narrowly triangular to broadly ovate, not cordate.

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- 31a. Perianth white-green or yellow-white; rachis of panicle papilliferous 1. *R. rhabarbarum*
- 31b. Perianth purple-red; rachis of panicle densely pubescent 2. *R. australe*
- 30b. Leaves with 5 basal veins; leaf blade cordate or broadly ovate.
 - 32a. Leaf blade reniform-cordate or cordate, usually shorter than wide; perianth yellow-white 3. *R. webbianum*
 - 32b. Leaf blade ovate-cordate or broadly ovate, usually longer than wide; perianth green 4. *R. hotaoense*
- 28b. Leaf margin sinuate or slightly so.
 - 33a. Fruit 5.5–8 × 4.5–7 mm.
 - 34a. Leaves ovate-cordate, apex not acuminate, margin sinuate; tepals yellow-white 6. *R. altaicum*
 - 34b. Leaves cordate-obovate to broadly ovate, apex acuminate, margin nearly entire; tepals purple at margin 11. *R. glabricaule*
 - 33b. Fruit 9–12 × 7–11 mm.
 - 35a. Tepals lanceolate; basal veins 5–9 7. *R. forrestii*
 - 35b. Tepals broad, ovate or elliptic, not lanceolate; basal veins 5–7.
 - 36a. Stem, inflorescence, and branches densely white hispid; leaves broadly ovate or ovate 8. *R. likiangense*
 - 36b. Stem, inflorescence, and branches glabrous or short hairy at nodes; leaves triangular-ovate or ovate-cordate.
 - 37a. Plant high 30–70 cm; leaves triangular to triangular-ovate; margin of tepals and anthers purple; fruit orbicular 9. *R. lhasaense*
 - 37b. Plant ca. 1 m high; leaves ovate-cordate; perianth yellow-white; fruit ellipsoid to oblong-ellipsoid 10. *R. compactum*

1. *Rheum rhabarbarum* Linnaeus, Sp. Pl. 1: 372. 1753.

波叶大黄 bo ye da huang

Rheum franzenbachii Münter; *R. franzenbachii* var. *mongolium* Münter; *R. undulatum* Linnaeus; *R. undulatum* var. *longifolium* C. Y. Cheng & T. C. Kao.

Herbs large, 50–150 cm tall. Stem stout, hollow, glabrous, or pilose at nodes. Petiole of basal leaf stout, usually shorter than blade, pubescent; leaf blade light green or dark purple-red abaxially, dark green adaxially, triangular-ovate, subovate, broadly cordate, or narrowly triangular, large, 12–40(–57) × 10–30(–61) cm, abaxially pubescent, adaxially glabrous or sparsely pubescent near veins, basal veins 5–7, base cordate, margin crispate or sinuate, apex obtuse or acute. Stem leaves smaller, triangular or ovate-triangular. Panicle large, jointed at lower part. Flowers 3–8-fascicled, 2.5–4 mm. Tepals 6, not spreading, white-green or yellow-white, outer 3 smaller, inner 3 very broad to orbicular, ca. 2 mm. Ovary broadly ellipsoid to oblong-ellipsoid; style short; stigma inflated. Fruit triangular-ovoid to oblong-ellipsoid; wings narrow, 1.5–2 mm. Seeds brown, ovoid or ovoid-ellipsoid, ca. 3 mm. Fl. Jun, fr. after Jul. $2n = 44$.

Slopes; 1000–1600 m. Hebei, Heilongjiang, Hubei, Jilin, Nei Mongol, Shanxi [Mongolia, Russia (E Siberia); cultivated in Europe].

2. *Rheum australe* D. Don, Prodr. Fl. Nepal. 75. 1825.

藏边大黄 zang bian da huang

Rheum emodi Wallich ex Meisner.

Herbs large, 0.7–2 m tall. Rhizomes and roots stout. Stem sulcate, glabrous, pubescent only at nodes. Petiole of basal leaf equal to blade or slightly longer, pubescent; leaf blade ovate-elliptic or broadly ovate, large, 20–50 × 18–40 cm, abaxially pilose, basal veins 5–7, base cordate, margin entire, sinuate, apex obtuse. Stem leaves ovate, narrow; ocrea large, pubescent, clasping. Panicle large, 2- or 3-branched, densely papilliferous. Pedicel muricate, jointed below middle. Perianth spreading, purple-red, 3–3.5 mm; outer 3 smaller, oblong-elliptic, ca. 1.5 × 1 mm; inner 3 very broadly elliptic or rarely orbicular, ca. 2.5 × 2 mm. Filaments subulate. Ovary rhomboid-obovoid; stigma oblate, muricate. Fruit ovoid-ellipsoid or broadly ellipsoid, 9–10 × 7–8.5 cm, base subcordate, apex retuse or not; wings purple-red, ca. 2.5 mm wide; longitudinal veins near margin. Seeds ovoid. Fl. Jun–Jul, fr. Aug or later.

Grassy slopes; 3400–4300 m. Xizang [India, Myanmar, Nepal, Pakistan, Sikkim].

3. *Rheum webbianum* Royle, Ill. Bot. Himal. Mts. 1: 318. 1839.

须弥大黄 xu mi da huang

Herbs large, 0.5–1.5 m tall. Stem stout, hollow, finely sulcate, glabrous or papilliferous on upper part. Petiole of basal leaf shorter than blade, stout, papilliferous; leaf blade green adaxially, reniform-cordate to cordate, 20–25 × 25–30 cm, shorter than wide, nearly leathery, adaxially muricate, basal veins 5, base broadly cordate, margin slightly sinuate, apex obtuse. Stem leaves ovate, smaller. Panicle large, 1- or 2-branched. Flowers small. Tepals yellow-white, elliptic, jointed below middle of pedicel. Fruit broadly ellipsoid or orbicular, 1–1.2 cm, ca. as long as wide, both ends slightly retuse; wings ca. 3.5 mm, broad, longitudinal veins near margin. Seeds narrowly ovoid-ellipsoid, ca. 4 mm wide. Fr. Aug–Sep. $2n = 44$.

Slopes; 3500–3600 m. SW Xizang [NW India, Kashmir, Nepal, Pakistan].

4. *Rheum hotaoense* C. Y. Cheng & T. C. Kao, Acta Phytotax. Sin. 13(3): 79. 1975.

河套大黄 he tao da huang

Herbs large, 0.8–1.5 m tall. Rhizomes and roots brown-yellow, stout. Stem straight, glabrous, muricate near nodes. Petiole of basal leaf 17–25 cm, glabrous or muricate; leaf blade dark green or blue-green, ovate-cordate or broadly ovate, large, 25–40 × 23–28 cm, glabrous, basal veins 5, base cordate, margin sinuate, apex obtuse or acute. Stem leaves shorter petiolate, ovate or ovate-triangular, smaller; ocrea 5–8 cm, clasping. Panicle large, more than 2-branched; rachis and branches glabrous, papilliferous only near nodes. Pedicel 4–5 mm, slender; jointed below middle. Flowers large. Tepals 6, outer 3 subequal to inner 3, elliptic, 2–2.5 mm, sparsely reticulate-veined, abaxially light green with white margin. Stamens equal to perianth. Ovary broadly ellipsoid; styles 3, short; stigmas inflated. Fruit ± orbicular, 7.5–8.5 mm, base circular or slightly cordate, apex retuse; wings 2–2.5 mm wide, with longitudinal veins at middle. Seeds broadly ovoid. Fl. May–Jul, fr. Jul–Sep.

• Slopes, gullies; 1000–1800 m. Gansu, Shaanxi, Shanxi.

5. *Rheum wittrockii* C. E. Lundström, Acta Horti Berg. 5(3): 23. 1914.

天山大黄 tian shan da huang

POLYGONACEAE

Herbs large, 50–100 cm tall. Rhizomes dark brown, slender. Stem hollow, finely sulcate, glabrous or papilliferous near nodes. Basal leaves 2–4; petiole ca. as long as blade, slender, sparsely papilliferous or glabrous; leaf blades ovate to triangular-ovate, 15–26 × 10–20 cm, abaxially pubescent near veins, adaxially glabrous, basal veins 5–7, base cordate, margin sinuate, apex obtuse or acute. Stem leaves 2–4, shortly petiolate, smaller than basal ones, longer than wide; ocrea 4–8 cm, abaxially pubescent, clasping. Panicle large, sparsely branched. Pedicel ca. 3 mm, jointed below middle. Flowers small, ca. 2 mm. Tepals white-green, outer 3 smaller and narrower; inner 3 slightly larger, obovate or broadly elliptic, ca. 1.5 mm. Stamens equal to perianth. Styles 3; stigmas large, mucronate. Fruit orbicular or oblong, broader than long, ca. 1.2 × 1.5 cm, both ends cordate; wings broad, 4–5 mm, with longitudinal veins at middle. Seeds ovoid, ca. 6 mm wide. Fl. Jun–Jul, fr. Aug–Sep.

Grassy slopes, forests, gullies; 1200–2600 m. Xinjiang [Kazakhstan, Kyrgyzstan].

6. *Rheum altaicum* Losinskaja, Trudy Bot. Inst. Acad. Nauk SSSR, Ser. 1, Fl. Sist. Vyssh. Rast. 3: 87. 1937.

阿尔泰大黄 a er tai da huang

Rheum rhaponticum Herder.

Herbs large, 50–100 cm tall. Stem erect, hollow, finely sulcate, glabrous. Petiole of basal leaf ca. as long as blade, slender, glabrous; leaf blade ovate-cordate or triangular-ovate, 15–30 × 13–22 cm, abaxially papilliferous or pubescent, adaxially glabrous, base cordate, margin slightly sinuate, apex obtuse. Stem leaves 1–3, shortly or very shortly petiolate, smaller, sometimes ca. as long as wide; ocrea brown, 3–6 cm, abaxially with very short hairs, clasping. Panicle narrowly ovate, large. Pedicel slender, jointed below middle. Flowers small, 4–7-fascicled. Tepals yellow-white, oblong or narrowly elliptic, inner 3 larger, ca. 1.5 × 1 mm. Stamens equal to perianth. Fruit oblong-ellipsoid, small, 5.5–7.5 × 4.5–6 mm, rarely retuse at both ends; wings narrow, 1–1.5 mm wide, with longitudinal veins at middle. Seeds black-brown, broadly ovoid. Fl. Jun–Jul, fr. Jul–Aug.

Forests, valleys; 1900–2400 m. N Xinjiang [Kazakhstan, Mongolia, Russia (Altai)].

7. *Rheum forrestii* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 262. 1912.

牛尾七 niu wei qi

Herbs 60–80 cm tall. Roots stout, 3–4 cm in diam. Stem erect, hollow, 0.8–1.4 cm in diam. at base, glabrous at lower part, yellow-white pubescent at upper part, especially at nodes. Basal leaves 3–5; petiole light green, subterete, ca. 1/2 as long as to subequal leaf blade, shortly hispid; leaf blade broadly ovate or ovate, 12–20 × 10–18 cm, abaxially densely hispid, adaxially pubescent, or to glabrous, basal veins 5–9, conspicuously raised abaxially, base cordate, margin entire, apex obtuse. Stem leaves 1 or 2, shortly petiolate, ovate or narrowly ovate, small; ocrea short, membranous when dry. Panicle branched from middle. Pedicel 2–3 mm, slender, jointed below middle. Flowers densely fascicled. Tepals yellow-green, broadly lanceolate, outer 3 smaller, ca. 1.8 × 1 mm, inner 3 larger, with a dark green longitudinal vein at middle. Stamens 8 or 9, shorter than perianth; filaments ca. 1 mm; anthers light purple-red, elliptic, ca. 1 mm. Ovary obovoid; stigma slightly inflated. Fruit very broadly ellipsoid or orbicular, 9–10 × 8–9.5 mm, base cordate, apex rounded; wings brown, narrow, ca. 1.5 mm wide, with longitudinal veins at middle. Seeds yellow-brown, ovoid-ellipsoid, 6–7 mm wide. Fl. Jun–Jul, fr. Aug–Sep.

• Slopes; ca. 3000 m. ?Sichuan, Xizang, Yunnan.

8. *Rheum likiangense* Samuelsson, Svensk Bot. Tidskr. 30: 720. 1936.

丽江大黄 li jiang da huang

Rheum ovatum C. Y. Cheng & T. C. Kao.

Herbs 40–70(–90) cm tall. Stem 7–12 mm in diam. at base, densely white hispid, especially at nodes, sparsely hispid or glabrous at fruiting. Basal leaves 2–4; petiole subterete, shorter than perianth, 2.5–8 cm, stout, pubescent; leaf blade dark purple abaxially, broadly ovate to orbicular, rarely ovate, 8–16 × 8–14 cm, nearly leathery, abaxially with dense white hairs, adaxially glabrous or shortly hispid only near veins, basal veins 5–7, stout, conspicuously raised, base cordate, margin entire, apex obtuse or acute. Stem leaves 1–3, ovate, small. Panicle 1- or 2-branched, with white hairs. Pedicel 2.5–3 mm, slender, jointed below middle. Flowers fascicled; bracts linear, 3–5 mm, membranous when dry. Tepals white-green, outer 3 slightly smaller, broadly elliptic, inner 3 orbicular or very broadly elliptic, 2–2.2 mm. Stamens equal to perianth. Ovary rhomboid-circular; style slender. Fruit ovoid, 8.5–9 × 7–7.5 mm; wings ca. 2 mm wide, with longitudinal veins at middle. Seeds ovoid, ca. 3 mm wide. Fl. Jul, fr. Aug–Sep.

• Forests, shrubby meadows; 2500–4000 m. SW Sichuan, E Xizang, NW Yunnan.

9. *Rheum lhasaense* A. J. Li & P. K. Hsiao in C. Y. Wu, Fl. Xizang. 1: 598. 1983.

拉萨大黄 la sa da huang

Herbs 30–70 cm tall. Stems glabrous, or pubescent on nodes, 7–10 mm in diam. near base. Petiole of basal leaf subterete, 3–7 cm, papilliferous; leaf blade narrowly triangular or triangular-ovate, rarely narrowly ovate, 8–20 × 6–13 cm, abaxially shortly hispid, adaxially glabrous, basal veins 5, base cordate, margin slightly sinuate, apex obtuse or acute. Stem leaves 1 or 2, very shortly petiolate, small; ocrea short, membranous. Panicles narrow, 2-branched only from lower part; bracts very small. Pedicel 2.5–3 mm, jointed below middle. Tepals light green with purple margin, broadly ovate. Fruit spherical, 8–9 mm in diam.; wings narrow, 1.5–2 mm wide, with longitudinal veins near middle. Seeds orbicular or ovoid, large, ca. 5 mm in diam. Fl. Jul–Aug, fr. Sep–Oct.

- Grassy slopes; 4200–4600 m. Xizang (Lhasa).

10. *Rheum compactum* Linnaeus, Sp. Pl., ed. 2, 1: 531. 1762.

密序大黄 mi xu da huang

Rheum nutans Pallas.

Herbs large, ca. 1 m tall. Rhizomes and roots dark brown, stout. Stem erect, hollow, glabrous. Petiole of basal leaf subterete, shorter than or ca. as long as blade, muricate beneath; leaf blade ovate-cordate, rarely ovate, large, 20–30 cm in diam., sometimes slightly longer than wide, abaxially pubescent, adaxially glabrous, basal veins 5–7, base cordate, margin entire, apex obtuse. Stem leaves shorter petiolate, small; ocrea short, glabrous or slightly muricate. Panicle large, densely branched. Pedicel slender, jointed below middle. Flowers fascicled. Tepals yellow, elliptic, subequal, ca. 2 mm. Fruit broadly ellipsoid to oblong-ellipsoid, ca. 1.2 × 1.1 cm, both ends cordate; wings narrower than seeds, ca. 3 mm wide, with longitudinal veins at middle. Seeds dark brown, ovoid to broadly ovoid. Fl. Jun–Jul, fr. Aug. $2n = 22, 44$.

- Slopes; ca. 2000 m. N Xinjiang [Kazakhstan, Mongolia, Russia (Far East, Siberia)].

11. *Rheum glabricaule* Samuelsson, Svensk Bot. Tidskr. 30: 714. 1936.

光茎大黄 guang jing da huang

Herbs large, ca. 1 m tall. Stem glabrous. Petiole of basal leaf longer than blade, glabrous; leaf blade cordate-ovate, large, 11–25 × 10–17 cm, abaxially pubescent especially along veins, adaxially glabrous, margin entire, apex acuminate. Stem leaves (absent or 1 or) 2, shortly petiolate, small. Panicle narrow, sparsely branched, glabrous. Tepals subequal, ovate, 1.5–2 mm, abaxially green with purple margin. Anthers purple, globose-ovate, 0.7–1 mm. Fruit purple, oblong-ovoid, 5–8 mm; wings 2.5–3.5 mm, with longitudinal veins near middle. Seeds ovoid. Fl. Jun–Jul, fr. Aug–Sep.

- Among rocks; 3000–3500 m. Gansu.

12. *Rheum officinale* Baillon, Adansonia 10: 246. 1871.

药用大黄 yao yong da huang

Herbs large, 1.5–2 m tall. Rhizomes and roots stout. Stem stout, hollow, finely sulcate, with white hairs, especially above and at nodes. Petiole of basal leaf terete, ca. as long as blade or slightly shorter, pubescent; leaf blade orbicular, rarely broadly ovate, large, 30–50 cm in diam., or longer than wide, abaxially pubescent, adaxially glabrous, rarely pubescent along veins, basal veins 5–7, base subcordate; palmatilobate, apex subacute. Stem leaves smaller upward; ocrea large, to 15 cm, broad, outside with dense hairs. Panicles large; branches spreading. Pedicel 3–3.5 mm, slender, jointed below middle. Flowers 4- or 5-fascicled. Tepals 6, green to yellow-white, elliptic or narrowly elliptic, 2–2.5 × 1.2–1.5 mm. Stamens shorter than perianth. Style deflexed; stigma inflated. Fruit oblong-ellipsoid, 8–10 × 7–9 mm; wings ca. 3 mm wide, with longitudinal veins near margin. Seeds broadly ovoid. Fl. May–Jun, fr. Aug–Sep.

- Hills, forests; 1200–4000 m. ?Fujian, Guizhou, SW Henan, W Hubei, Shaanxi, Sichuan, Yunnan.

The roots and rhizomes used medicinally.

13. *Rheum palmatum* Linnaeus, Syst. Nat., ed. 10, 2: 1010. 1759.

掌叶大黄 zhang ye da huang

Rheum potaninii Losinskaja; *R. qinlingense* Y. K. Yang et al.

Herbs large, 1.5–2 m tall, stout. Rhizomes and roots stout. Stem hollow, sulcate, subglabrous or muricate on nodes. Petiole of basal leaf terete, ca. as long as blade, densely papilliferous; leaf blade large, ca. as long as wide, 40–60 cm, abaxially densely pubescent, adaxially sulcate to papilliferous, basal veins 5, base cordate, palmately divided into pinnatisect lobes, apex acuminate or narrowly acute. Stem leaves smaller above; ocrea large, to 15 cm, outside muricate. Panicle large; branches connivent, densely pubescent. Pedicel 2–2.5 mm, jointed below middle. Flowers small. Tepals 6,

purple-red, rarely yellow-white, outer 3 elliptic to orbicular, smaller, 1–1.5 mm. Stamens not exceeding perianth. Ovary rhomboid-ovoid; style slightly deflexed; stigma inflated. Fruit oblong-ellipsoid to oblong, 8–9 × 7–7.5 mm, both ends retuse; wings ca. 2.5 mm wide, with longitudinal veins near margin. Seeds brown-black, broadly ovoid. Fl. Jun, fr. Aug.

- Slopes, valleys; 1500–4400 m. Gansu, Hubei, Nei Mongol, Qinghai, Shaanxi, Sichuan, Xizang, Yunnan [cultivated in Russia].

The roots and rhizomes are used medicinally.

14. *Rheum tanguticum* (Maximowicz ex Regel) Maximowicz ex Balfour, Trans. Bot. Soc. Edinburgh 13(App.): cxlvi. 1879.

鸡爪大黄 ji zhua da huang

Herbs large or short, (0.6–)1.5–2 m tall. Rhizomes and roots yellow, stout. Stem stout, hollow, finely sulcate, glabrous or pubescent. Basal leaves orbicular or broadly ovate, large, 30–60 cm, abaxially pubescent, adaxially papilliferous or muricate, basal veins 5, base subcordate, palmately 5-lobed, middle 3 lobes pinnatisect, apex narrowly acute. Stem leaves few, much parted; ocrea large, abaxially pubescent, clasping. Panicle large; branches connivent. Pedicel 2–3 mm, slender, jointed below middle. Flowers small. Tepals purple-red, rarely light red, orbicular, inner 3 larger, ca. 1.5 mm. Ovary broadly ovoid; style short; stigma inflated. Fruit oblong-ovoid to oblong, 8–9.5 × 7–7.5 mm; wings 2–2.5 mm wide, with longitudinal veins near margin. Seeds black, ovoid. Fl. Jun, fr. Jul–Aug.

- Valleys; 1600–3000 m. Gansu, Qinghai, Shaanxi, Xizang.

One of us (Grabovskaya-Borodina) indicates that this is a synonym of *Rheum palmatum*.

- 1a. Plant tall, 1.5–2 m high; stem glabrous or strigose at nodes of upper part; inflorescence much branched 14a. var. *tanguticum*
 1b. Plant short, 0.6–1 m high; stem densely pubescent; inflorescence less branched 14b. var. *liupanshanense*

14a. *Rheum tanguticum* var. *tanguticum*

鸡爪大黄(原变种) ji zhua da huang (yuan bian zhong)

Rheum palmatum Linnaeus var. *tanguticum* Maximowicz ex Regel, Gartenflora 23: 305. 1874; *R. palmatum* subsp. *dissectum* Stapf; *R. tanguticum* var. *viridiflorum* Y. K. Yang & D. K. Zhang.

Plants 1.5–2 m tall. Stem glabrous or strigose at nodes of upper part. Basal leaves orbicular or broadly ovate, large, 30–60 cm. Panicle much branched; branches connivent.

- Valleys; 1600–3000 m. Gansu, Qinghai, Shaanxi, Xizang.

14b. *Rheum tanguticum* var. *liupanshanense* C. Y. Cheng & T. C. Kao, Acta Phytotax. Sin. 13(3): 81. 1975.

六盘山鸡爪大黄 liu pan shan ji zhua da huang

Herbs 0.5–1 m tall. Stem slender, 6–8 mm in diam., smooth, pubescent. Leaves small. Panicle usually branched only once, or only lower part with branchlets.

- Gansu.

One of us (Grabovskaya) suggests that further studies should compare this with *Rheum palmatum*.

15. *Rheum laciniatum* Prain, Bull. Misc. Inform. Kew 1908: 182. 1908.

条裂大黄 tiao lie da huang

Herbs large, ca. 1 m tall. Petiole of basal leaf subterete, shorter than to about as long as blade, shortly strigose; leaf blade large, subovate, 25–36 × 20–24 cm, palmately divided into pinnatisect lobes, all lobes lanceolate or nearly linear, apex acute; ocrea ca. 7 cm, abaxially muricate. Stem leaves smaller. Panicle triangular, large. Pedicel 1.5–2 mm, jointed at base. Tepals yellow-white or green-white, obovate-elliptic or broadly elliptic; inner 3 larger, ca. 2.5 mm, margin irregular. Flower disk irregularly circular, fleshy. Ovary subovoid; stigma irregularly inflated. Fruit unknown.

- Hills; ca. 3000 m. N Sichuan.

One of us (Grabovskaya-Borodina) believes that this is a synonym of *Rheum palmatum*.

16. *Rheum acuminatum* J. D. Hooker & Thomson, Bot. Mag. 81: t. 4877. 1855.

心叶大黄 xin ye da huang

Rheum orientalexizangense Y. K. Yang, J. K. Wu & Gasang.

POLYGONACEAE

Herbs 50–80 cm tall. Roots slender. Stem erect, purple-red, 7–10 mm in diam. at base, hollow, glabrous; nodes inflated. Basal leaves 1–3; petiole purple-red, ca. as long as blade, subterete, glabrous or pilose near blade; leaf blade purple-red abaxially, dark green adaxially, broadly cordate or cordate, 13–20 × 12–19 cm, abaxially pubescent, adaxially glabrous, basal veins usually 5, base cordate, margin entire, apex acuminate or long acuminate, rarely obtuse. Stem leaves 1–3, smaller upward, broadly ovate to ovate-cordate; ocrea ca. 2 cm, glabrous or muciculate, scarious when dry, clasping. Panicle usually 2-branched at middle, sparsely arranged, glabrous. Pedicel ca. 3 mm, slender, jointed below middle. Flowers nearly 10-fascicled. Tepals 6, purple-red, outer 3 smaller, broadly elliptic, ca. 1.8 × 1.3 mm; inner 3 orbicular or broadly ovate, 2–2.5 mm. Stamens shorter than perianth; filaments purple-red, ca. 2 mm; anthers black-purple. Ovary rhomboid-ellipsoid; style short; stigma large. Fruit oblong-ovoid or broadly ovoid, 7–8 × 6.5–7 mm; wings purple-red when fresh, narrow, with longitudinal veins near middle. Seeds brown, ovoid or narrowly ovoid. Fl. Jun–Jul, fr. Aug–Sep.

Slopes, forests; 2800–4000 m. S Gansu, Sichuan, Xizang, Yunnan [Bhutan, India, Kashmir, Myanmar, Nepal, Sikkim].

17. *Rheum maculatum* C. Y. Cheng & T. C. Kao, Acta Phytotax. Sin. 13(3): 81. 1975.

斑茎大黄 ban jing da huang

Herbs 50–80 cm tall. Stem erect, green, with dense purple-red spots, hollow, slender, 5–6 mm in diam. at base. Petiole of basal leaf slender, 14–18 cm, with purple-red spots; leaf blade reniform-cordate or broadly cordate, large, 18–28 cm, scarious when dry, abaxially with white hairs, adaxially glabrous, basal veins 5, base cordate, margin entire, apex acuminate. Stem leaf 1, at upper part; petiole 2.5–4 cm, nearly reniform, 4–9 × 4.5–11.5 cm, apex acuminate; ocrea ca. 1.5–2.5 cm, nearly glabrous, clasping. Panicle terminal, small, 7–8 cm, broad, few branched, with yellow hairs on peduncle. Pedicel linear, ca. 2 mm, jointed at base. Flowers small. Tepals 6, light red, orbicular, subequal, 1–1.5 mm. Stamens slightly longer than perianth; anthers purple, subglobose. Ovary broadly ellipsoid; style short; stigma inflated. Fl. Jun.

• Sichuan.

18. *Rheum yunnanense* Samuelsson, Svensk Bot. Tidskr. 30: 713. 1936.

云南大黄 yun nan da huang

Herbs short, 30–60 cm tall. Stem 3–6 mm in diam. at base, pubescent or papilliferous. Basal leaves 1–3; petiole 5–8 cm, slender, pubescent; leaf blades reniform-cordate or broadly cordate, 5–7 × 6–8.5 cm, abaxially pubescent mainly near veins and margin, adaxially glabrous, basal veins 5, base cordate, margin entire, apex acuminate or long acuminate. Stem leaves 2 or 3, shortly petiolate, subcordate, small; ocrea 1.5–2.5 cm, membranous when dry. Panicle 1- or 2-branched, slightly spreading, pubescent. Pedicel 4–7 mm, jointed below middle, hispidulous above. Flowers large, 1–3(or 4)-fascicled. Tepals 6, spreading, purple, ovate or broadly elliptic, 5–7 mm in diam.; outer 3 smaller, 3–3.5 mm, abaxially hispidulous or long papilliferous. Stamens shorter than perianth; filaments 1.5–2 mm; anthers purple-red, subglobose. Ovary narrowly ellipsoid. Fruit purple-red, ellipsoid or ovoid-ellipsoid, ca. 1.3 × 1 cm; wings slightly broad, with longitudinal veins near margin. Fl. Jul–Aug, fr. Sep–Oct.

Slopes; ca. 4000 m. NW Yunnan [Myanmar].

19. *Rheum kialense* Franchet, Bull. Mus. Hist. Nat. (Paris) 1: 212. 1895.

疏枝大黄 shu zhi da huang

Rheum micranthum Samuelsson; *Rumex cacaliifolius* H. Léveillé.

Herbs short, 25–55 cm tall. Roots black-brown, slender, ca. 1 cm in diam., few branched. Stem slender, hollow, 3.5–5 mm in diam., internode very long, not branched, slightly muciculate, sparsely hispidulous. Basal leaves 1–3; petiole ca. as long as to 2 × as long as blade, slender, yellow hispidulous; leaf blade light green abaxially, green adaxially, ovate-cordate, triangular-ovate, or triangular-cordate, 6–11 × 4–8.5 cm, papery, abaxially sparsely hispidulous, with densely yellow hairs especially near margin, basal veins 5, middle one stout, base cordate, margin entire, apex slightly acuminate. Stem leaves 1 or 2, shortly petiolate, small; ocrea subovate, 1.5–2 cm, abaxially with white hairs, membranous when dry, not clasping. Panicle few branched, pubescent. Pedicel 2–3 mm, jointed at or below middle. Flowers small, 2–5-fascicled. Tepals 6, not spreading, white-green, rarely light purple, small, outer 3 smaller, nearly elliptic, inner 3 broadly elliptic, ca. 1.5 mm. Stamens 9 or fewer, slightly longer than perianth; anthers purple-red. Ovary rhomboid-ellipsoid or obovoid-ellipsoid; stigma inflated. Fruit broadly ovoid or subovoid, 6.5–8 mm, base cordate, apex retuse; wings red, narrow, ca. 1.5 mm wide, with longitudinal veins at middle. Seeds yellow-brown, with lanceolate black stripes at middle, narrowly ovoid, ca. 3 mm wide at base. Fl. Jun–Jul, fr. Jul–Aug.

• Slopes, forests; 2800–3900 m. Gansu, Sichuan, Yunnan.

20. *Rheum racemiferum* Maximowicz, Bull. Acad. Imp. Sci. Saint-Pétersbourg 26: 503. 1880.

总序大黄 zong xu da huang

Herbs 50–70 cm tall. Roots black-brown, straight. Stem erect, brown-red, hollow, ca. 1 cm in diam., glabrous. Basal leaves 2–5; petiole usually purple-red, short, 4–9 cm, stout, compressed or compressed-terete, glabrous; leaf blade cordate or broadly ovate, 10–20 cm wide, leathery or nearly so, glabrous, palmate veins 3–5(–7), middle one very stout, base subcordate, margin very sinuate, apex obtuse. Stem leaves 1 or 2(or 3); ocrea dark brown, short, to 1.5 cm, glabrous. Panicle usually once branched, rarely branched again at basal branches. Pedicel longer than flowers, jointed below middle. Flowers fascicled. Tepals 6, inner 3 larger, elliptic to narrowly elliptic, 1.5–2 mm. Stamens equal to perianth; anthers oblong. Style very short; stigma muricate. Fruit ellipsoid to oblong-ellipsoid, rarely ovoid-ellipsoid, ca. 1.2 cm × 8.5–9.5 mm; wings light brown, with longitudinal veins near margin. Seeds dark brown, ovoid-ellipsoid. Fl. Jun–Jul, fr. Jul–Aug.

- Slopes, grasslands; 1300–2000 m. Gansu, Nei Mongol, Ningxia [?Mongolia].

21. *Rheum sublanceolatum* C. Y. Cheng & T. C. Kao, Acta Phytotax. Sin. 13(3): 82. 1975.

窄叶大黄 zhai ye da huang

Herbs 30–55 cm tall. Stem erect, hollow, 5–8 mm in diam. at base, glabrous. Basal leaves 3–5; petioles short, 3–6 cm, glabrous; leaf blade purple-red abaxially, narrowly ovate or broadly lanceolate, 5–15 × 3–5.5 cm, leathery, glabrous, basal veins 3–5, palmate, middle one stout, base rounded, margin entire or rarely sinuate, apex acute. Stem leaves 1 or 2 or absent, very shortly petiolate, nearly lanceolate or ovate-triangular, small; ocrea ca. 1 cm, membranous when dry, glabrous, clasping. Panicle narrow, 18–25 cm, only once branched, sparse, glabrous or sparsely papilliferous. Pedicel 2.5–3 mm, jointed below middle. Flowers 4- or 5-fascicled. Tepals 6, narrowly elliptic, outer 3 smaller, ca. 1.5 mm. Filaments subequal to perianth, slightly compressed. Ovary ellipsoid or obovoid; stigma inflated. Fruit ovoid-ellipsoid, 7.5–8.5 × 6–6.5 mm, base subcordate, apex round; wings red, narrow, ca. 1.5 mm wide, slightly membranous, with longitudinal veins at middle. Seeds brown, ovoid. Fl. Jun, fr. Aug.

- Slopes; 2400–3000 m. Gansu, Qinghai, Xinjiang.

22. *Rheum inopinatum* Prain, Bot. Mag. 134: t. 8190. 1908.

红脉大黄 hong mai da huang

Herbs short, 20–35 cm tall. Roots stout, 2–3 cm in diam. Stem finely striped, 3–5 mm in diam., muricate, with white hairs. Basal leaves 3–5 in a rosette; petiole red, short, 2–4 cm, densely white hispidulous; leaf blade green adaxially, triangular-ovate or ovate, 7–13.5 × 5–9.5 cm, leathery, glabrous, rarely hispidulous along veins, usually with 5 palmate, light red veins, base cordate or truncate, margin sinuate, apex obtuse. Stem leaves 1(or 2) or absent. Panicle terminal, branched only once, pubescent. Pedicel 2.5–3.5 mm, jointed below middle. Flowers large. Tepals 6, yellow-white; outer 3 smaller, narrowly elliptic, ca. 2 mm; inner 3 elliptic to broadly elliptic. Stamens equal to perianth. Ovary ovoid. Fruit orbicular, 9–10 × 8–9.5 mm; wings purple-red, with longitudinal vein at middle, persistent inner perianth enlarged, ca. 5 × 4 mm. Seeds ovoid. Fl. Jul, fr. Aug–Sep.

- Slopes; 4000–4200 m. C and S Xizang.

23. *Rheum pumilum* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 26: 503. 1880.

小大黄 xiao da huang

Herbs short, 10–25 cm tall. Stem erect, finely striped, slender, pilose. Basal leaves 2 or 3; petiole subterete, ca. as long as blade or slightly longer, hairy; leaf blades ovate-elliptic, 1.5–5 × 1–3 cm, subleathery, abaxially pilose, adaxially glabrous, rarely pilose at base of midvein, basal veins 3–5, middle one stout, base cordate, margin entire, apex obtuse. Stem leaves 1 or 2, nearly lanceolate, small; ocrea short, ca. 5 mm, membranous when dry, glabrous, not clasping. Panicle narrow, sparsely branched, pilose. Pedicel 2–3 mm, slender, jointed at base. Flowers 2- or 3-fascicled. Tepals not spreading, with purple-red margin, elliptic or broadly elliptic, 1.5–2 mm. Stamens 9 or fewer, shorter than perianth. Ovary broadly ellipsoid; stigma nearly inflated. Fruit triangular or triangular-ovoid, 5–6 mm; wings narrow, 1–1.5 mm wide, with longitudinal vein at middle. Seeds ovoid, 2–2.5 mm wide. Fl. Jun–Jul, fr. Aug–Sep.

- Slopes; 2800–4500 m. Gansu, Qinghai, Sichuan, Xizang.

24. *Rheum delavayi* Franchet, Bull. Mus. Hist. Nat. (Paris) 1: 212. 1895.

滇边大黄 dian bian da huang

Rheum strictum Franchet.

Herbs short, 15–28 cm tall. Stem erect, dark purple, usually not hollow, 3–5 mm in diam. at base, pilose. Basal leaves 2–4; petiole purple, subterete, ca. as long as blade or slightly longer, slender, pubescent; leaf blade light green abaxially, dark green adaxially, oblong-elliptic or ovate-elliptic, rarely orbicular, 3–6 × 2.5–5 cm, nearly leathery, abaxially

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hispidulous especially along veins or margin, adaxially glabrous or hispidulous along main vein, basal veins 3–5, middle one stout, base subcordate, margin entire to slightly sinuate, apex obtuse. Stem leaves 1 or 2, linear above, small; ocrea short, membranous when dry, glabrous, not clasping. Panicle narrow, branched once, usually purple hispidulous. Pedicel 3–4.5 mm, slender, jointed below middle. Flowers large, ca. 5 mm, 3- or 4-fascicled. Tepals narrowly elliptic, outer 3 smaller, 1.5–2 × ca. 1 mm, inner 3 ca. 2.5 × 1.5 mm, with dark purple-red margin. Filaments purple, short, 1–1.5 mm; anthers purple, broadly elliptic to subglobose. Style reflexed; stigma purple, compressed. Fruit cordate-orbicular, 8–9 mm in diam.; wings ca. 2.5 mm wide, with longitudinal vein at middle. Seeds ovoid. Fl. Jun–Jul, fr. Aug–Sep.

Slopes; 3000–4800 m. W Sichuan, N Yunnan [Bhutan, Nepal].

25. *Rheum subacaule* Samuelsson, Svensk Bot. Tidskr. 30: 712. 1936.

垂枝大黄 *chui zhi da huang*

Herbs short, 15–20 cm tall. Roots slender, ca. 1 cm in diam. Stem very short, densely pubescent. Basal leaves 3 or 4; petiole green-purple, subterete, ca. as long as to 1.5 × as long as blade, pilose; leaf blade purple abaxially, dark green adaxially, triangular-cordate or triangular-ovate, 6–10(–12) × 4–7 cm, abaxially yellow hispidulous, adaxially glabrous, basal veins 3–5, middle one stout, base cordate, margin entire, apex acuminate. Stem leaves 1 or 2, small, 3–4 cm; ocrea spreading, 3–4 cm, membranous, glabrous, not clasping. Panicles 2–4 from base, sparsely branched from base, densely hispidulous. Pedicel short, ca. 2 mm, jointed below middle. Flowers 3–5-fascicled. Tepals 6, purple-red, ovate or elliptic, outer 3 smaller, ca. 1.5 mm. Stamens ca. as long as perianth or slightly longer; anthers ellipsoidal. Ovary ellipsoid; stigma inflated. Fruit broadly cordate or cordate, 7.5–8.5 × 8.5–9.5 mm, base retuse; wings purple-red, ca. 2.5–3 mm, broad, with longitudinal vein at middle. Seeds red-brown with a lanceolate black-brown stripe, triangular-ovoid. Fl. Jul, fr. Aug–Sep.

• Hilltops, slopes; 3500–4300 m. W Sichuan.

26. *Rheum uninerve* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 26: 503. 1880.

单脉大黄 *dan mai da huang*

Herbs short, 15–30 cm tall. Roots slender. Stem absent. Basal leaves 2–4; petiole short, 3–5 cm, glabrous or rarely papilliferous; leaf blade ovate or narrowly ovate, 8–12 × 4–7.5 cm, papery, glabrous, main vein 1, lateral veins 8–10, base rounded or very broadly cuneate, margin sinuate, apex obtuse or obtuse-acute. Panicle narrow, from apex of rhizome, 2–5 mm in diam., 1- or 2-branched, glabrous. Pedicel ca. 3 mm, slender, jointed at base. Flowers 2–4-fascicled; bracteole lanceolate, 1–2 mm. Tepals purple-red, elliptic, outer 3 smaller, 1–1.5 mm; disk circular, fleshy. Stamens 8 or 9, shorter than perianth; filaments very short, less than 1 cm. Ovary nearly rhomboid-ovoid; style long, reflexed; stigma inflated. Fruit broadly oblong-ellipsoid, 1.4–1.6 × 1.3–1.5 cm, base cordate, apex obtuse or retuse; wings purple-red, ca. 5 mm wide, membranous, with longitudinal veins near margin. Seeds dark brown, narrowly ovoid, ca. 3 mm wide. Fl. May–Jul, fr. Aug–Sep.

Slopes, roadsides; 1100–2300 m. Gansu, Nei Mongol, E Qinghai [Mongolia].

27. *Rheum nanum* Sievers ex Pallas, Neueste Nord. Beytr. Phys. Geogr. Erd.-Völkerbeschreib. 7: 264. 1796.

矮大黄 *ai da huang*

Rheum cruentum Sievers ex Pallas; *R. leucorrhizum* Pallas.

Herbs short, 20–35 cm tall, stout. Roots straight or bent, 2–4 cm in diam. Stem absent. Basal leaves 2–4; petiole short, 2–4.5 cm, 7–9 mm in diam., glabrous; leaf blade light green abaxially, yellow-green adaxially, reniform or orbicular, 6–14 × 8–16 cm, rarely larger, leathery, abaxially glabrous, adaxially tuberculate, basal veins 3–5, base rounded or subcordate, margin nearly entire, apex rounded. Panicle broad, from tip of rhizome, branched at middle, glabrous. Pedicel 1.5–3 mm, stout, not jointed. Flowers densely fascicled; bracteole scale-like. Tepals yellow-white, nearly fleshy, outer 3 smaller, lanceolate, 2–2.5 × ca. 1 mm; inner 3 larger, broadly elliptic to broadly ovate, ca. 3.5 × 2.5–3 mm. Stamens short. Ovary rhomboid-ellipsoid; stigma inflated. Fruit red, reniform, 1–1.2 × 1.2–1.4 cm, with longitudinal veins near margin. Seeds ovoid, ca. 5 mm wide. Fl. May–Jun, fr. Jul–Sep.

Slopes, valleys; 700–2000 m. Gansu, C and W Nei Mongol, NE Xinjiang [Kazakhstan, Mongolia, Russia (W Siberia)].

28. *Rheum tibeticum* Maximowicz ex J. D. Hooker, Fl. Brit. India 5: 56. 1886.

西藏大黄 *xi zang da huang*

Herbs short, 15–25 cm tall. Rhizome stout. Petiole of basal leaf short, 3–5(–10.5) cm, muricate, pubescent, or glabrous; leaf blade subcordate or cordate, 12–20(–28) × 13–21(–27) cm, leathery, abaxially pubescent near veins, adaxially glabrous, basal veins 5, base cordate or rounded, margin entire, apex obtuse. Panicle from tip of rhizome, branches spreading, pubescent or nearly glabrous; bracts very small. Pedicel short, 2–3.5 mm. Tepals light purple-red to

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yellowish green, elliptic, ca. 2.5 mm. Anthers yellow or dark brown. Fruit ovoid, ca. 10 × 8–9 mm, both ends retuse; wings red-brown to light brown, broader than achene, with longitudinal veins near margin. Seeds black-brown, narrowly ovoid. Fl. Jul, fr. Aug. $2n = 22$.

Slopes; 4000–4600 m. Xizang [Afghanistan, Kashmir, Pakistan].

29. *Rheum tataricum* Linnaeus f., Suppl. Pl. 229. 1782.

圆叶大黄 yuan ye da huang

Rheum caspicum Pallas; *R. songaricum* Schrenk.

Herbs 35–50 cm tall. Roots stout. Stem erect, short, hollow, glabrous. Basal leaves procumbent, large; petiole short, subterete, glabrous; leaf blade cordate-orbicular or orbicular, usually slightly wider than long, 20–35 × 27–50 cm, papery, abaxially glabrous or papilliferous, base cordate, margin serrulate, apex obtuse. Stem leaves orbicular, small, 5–6 cm in diam. Panicle 3-branched at middle, glabrous or papilliferous above. Pedicel 2.5–5 mm, slender, jointed above middle. Flowers 1- or 2-fascicled; bracteole scale-like. Tepals yellow-white, broadly elliptic, ca. 2 × 1.5 mm, outer 3 smaller. Stamens slightly shorter than perianth. Anthers oblong; filaments inflated forward to base, ca. 1 mm; disk adnate to base of perianth. Ovary triangular-ovoid; style slender, reflexed; stigma discoid. Fruit purple-red, ovoid, sometimes triangular-ovoid or ovoid-ellipsoid, 1–1.2 cm × 6–9 mm, base cordate, apex retuse; wings narrow, ca. 1.5 mm wide, with longitudinal vein near margin. Seeds dark brown, ovoid, ca. 5 mm wide. Fl. May, fr. Jun–Jul.

Grasslands, deserts, plains; 500–1000 m. W Xinjiang [Afghanistan, Kazakhstan, Russia (European part)].

30. *Rheum spiciforme* Royle, Ill. Bot. Himal. Mts. 1: 318. 1839.

穗序大黄 sui xu da huang

Rheum scaberrimum Lingelsheim ex Limpricht.

Herbs short, stout. Stem absent. Petiole of basal leaf purplish red, subterete, 3–10 cm, stout, glabrous or papilliferous; leaf blade purple-red abaxially, dark green or yellow-green adaxially, ovate or broadly ovate-elliptic, 10–20 × 8–15 cm, nearly leathery, both surfaces papilliferous or abaxially glabrous, basal veins 5, base rounded or subcordate, margin entire and slightly sinuate, apex obtuse. Panicle spiciform; rachis 2–4-branched from tip of rhizome, 10–30 cm, papilliferous. Pedicel ca. 3 mm, slender, jointed at base. Tepals light green, elliptic or oblong-elliptic, outer 3 smaller, 1.8–2 × ca. 1 mm. Stamens subequal to perianth; anthers yellow. Ovary nearly obovoid; stigma large, raised on surface. Fruit oblong-ellipsoid, 8–10 × 7–9 mm, apex rounded or retuse; wings 2.5–3.5 mm wide, with longitudinal vein at middle. Fl. Jun, fr. Aug.

Slopes; 4000–5000 m. W Xizang [Afghanistan, Bhutan, Kashmir, Pakistan, Sikkim].

31. *Rheum moorcroftianum* Royle, Ill. Bot. Himal. Mts. 1: 315, 318. 1839.

卵果大黄 luan guo da huang

Herbs dwarf, procumbent. Stem absent. Basal leaves 3–6, forming a rosette; petiole finely striped, short, 3–6 cm, glabrous; leaf blade dark purple abaxially, green adaxially, ovate or triangular ovate, 6–12 × 4–8.5 cm, abaxially glabrous, rarely papilliferous along veins, adaxially glabrous, basal veins 5, leathery, base rounded or slightly cordate, margin entire, palmately divided to pinnate, apex obtusely acute. Panicle spiciform; rachis 2–5, nearly equal to leaf. Pedicel ca. 2 mm, slender. Tepals yellow-white or with some red, narrowly oblong or oblong-elliptic, inner 3 larger, ca. 2 mm. Anthers purple-red. Fruit ovoid or broadly ovoid, 7–8 × 5–6 mm; wings narrow, 1–1.5 mm, with longitudinal veins at middle. Seeds ovoid, ca. 3 mm wide. Fl. Jul, fr. Aug–Sep.

Slopes, river banks; 4500–5300 m. C and W Xizang [Afghanistan, India, Nepal, Pakistan, E Tajikistan].

32. *Rheum rhomboideum* Losinskaja, Trudy Bot. Inst. Acad. Nauk SSSR, Ser. 1, Fl. Sist. Vyssh. Rast. 3: 116. 1937.

菱叶大黄 ling ye da huang

Herbs dwarf, procumbent. Roots ca. 5 cm in diam. Stem absent. Petiole of basal leaf shorter than blade, subterete, 2–7 cm, papilliferous or glabrous; leaf blade rhombic or rhombic-elliptic, 10–16 × 8.4–14 cm, nearly leathery, abaxially densely papilliferous, adaxially glabrous, basal veins 5, base cuneate or broadly cuneate, margin entire, apex obtuse or obtusely acute. Panicle spiciform; rachis mostly from apex of rhizome, shorter than leaf, 10–15 cm. Tepals purple-red, narrowly oblong-elliptic, 1.5–2 mm. Stamens subequal to perianth. Fruit broadly cuneate, 5.5–12.5 × 5.5–15 mm, base slightly cordate, apex retuse; wings 3–5 mm wide, with longitudinal veins at middle. Seeds ovoid, 3–5 mm wide. Fl. Jun–Jul, fr. Aug–Sep.

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- Slopes, grasslands; 4700–5400 m. C and E Xizang.

33. *Rheum przewalskyi* Losinskaja, Trudy Bot. Inst. Acad. Nauk SSSR, Ser. 1, Fl. Sist. Vyssh. Rast. 3: 115. 1937.

歧穗大黄 qi sui da huang

Herbs short, stout. Stem absent. Ocreae usually at tip of rhizome, brown, membranous or papery, glabrous. Basal leaves 2–4; petiole purple-red, subterete, 4–10 cm, stout, glabrous or muricate; leaf blade purple-red abaxially, yellow-green adaxially, broadly ovate or rhombic-ovate, 10–20 × 9–17 cm, leathery, abaxially glabrous or papilliferous, adaxially glabrous, basal veins 5–7, base subcordate, margin entire, rarely slightly sinuolate, apex obtuse. Panicles 2 or 3, spiciform; rachis from tip of rhizome, subequal to leaves, 2–4-branched, 5–7 mm in diam. at base, glabrous or sparsely papilliferous. Pedicel ca. 2 mm, jointed below middle. Tepals not spreading, yellow-white, broadly ovate or ovate, outer 3 smaller, ca. 1.2 mm. Stamens subequal to perianth, slightly longer than perianth; filaments connected to disk. Ovary broadly ellipsoid; style reflexed, long; stigma inflated to disk. Fruit broadly ovoid or ovoid, 8.5–10 × 7–8.5 mm, base subcordate, apex obtuse, rarely retuse or slightly raised; wings ca. 3 mm wide, with longitudinal veins near middle. Seeds dark brown, ovoid, ca. 3 mm wide. Fl. Jul, fr. Aug.

- Slopes, forests; 1500–5000 m. Gansu, Qinghai, NW Sichuan.

34. *Rheum rhizostachyum* Schrenk, Bull. Acad. Imp. Sci. Saint-Petersbourg 10: 254. 1842.

直穗大黄 zhi sui da huang

Rheum aplostachyum Karelin & Kirilov.

Herbs ca. 30 cm tall, stout. Rhizome with large ocrea; roots stout. Petiole of basal leaf nearly subterete, short, 3–6 cm, 5–9 mm in diam., papilliferous; leaf blade broadly ovate or ovate, 12–25 × 10–22 cm, leathery, abaxially densely papilliferous, basal veins 5–7, purple-red, stout, base narrowly cordate or rounded, margin entire, slightly sinuolate, apex obtuse. Panicles 2–5, spiciform; rachis from apex of rhizome, 12–28 cm, 4–8 mm in diam., hollow, 1–3-branched from lower part or not, papilliferous. Pedicel ca. 3 mm, jointed below middle. Tepals yellow-white, narrowly elliptic, outer 3 smaller, 1.8–2 × 0.8–1 mm. Filaments ca. 1.5 mm; anthers broadly elliptic. Fruit ovoid or ellipsoid-ovoid, 1–1.1 cm × 7–8 mm, base subcordate, apex obtuse; wings ca. 2 mm wide, with longitudinal veins at middle. Seeds ovoid. Fl. Jun, fr. Aug–Sep.

- Slopes; 2600–4200 m. Xinjiang [Kazakhstan].

35. *Rheum reticulatum* Losinskaja, Trudy Bot. Inst. Acad. Nauk SSSR, Ser. 1, Fl. Sist. Vyssh. Rast. 3: 112. 1937.

网脉大黄 wang mai da huang

Herbs short. Roots stout, ca. 3.5 cm in diam.; rhizome with remaining ocrea at apex. Petiole of basal leaf usually purple-red, short, 2–5 cm, compressed, glabrous or muricate; leaf blade purple-red abaxially, ovate to triangular-ovate, 5–18 × 5–9 cm, leathery, abaxially papilliferous, adaxially glabrous, basal veins 5, raised abaxially, base rounded or subcordate, margin slightly sinuolate, apex acute. Panicle spiciform; rachis to 10 cm from apex of rhizome, shorter than leaves. Pedicel short, 1.5–2 mm, jointed below middle. Flowers dense. Tepals yellow-white, elliptic, outer 3 smaller, ca. 1 mm. Stamens 7–9, subequal to perianth. Ovary obovoid-ellipsoid; style short; stigma inflated. Fruit broadly ovoid, 7.5–8.5 × 7–8 mm, base subcordate, apex obtuse or retuse, wings ca. 2.5 mm wide, with longitudinal veins near middle. Seeds ovoid. Fl. Jun, fr. Jul–Aug.

- Slopes; 2900–4200 m. Qinghai, Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan].

36. *Rheum globulosum* Gage, Bull. Misc. Inform. Kew 1908: 181. 1908.

头序大黄 tou xu da huang

Herbs short, 2–8 cm tall. Roots stout, 1–3 cm in diam. Stem absent. Basal leaves 1, rarely 2; leaf blade purple-red abaxially, dark green adaxially, reniform-orbicular, 2–3 × 3–4 cm, leathery, abaxially glabrous or muricate, basal veins 5–7, stout, conspicuously raised abaxially, base cordate, margin entire, apex obtuse, rarely retuse. Panicle headlike, 1–2 cm in diam.; rachis solitary, ca. 5 cm, 1.5–2.5 mm in diam., glabrous or muricate. Pedicel short. Flowers dense. Tepals 6, not spreading, light green with white margin, obovate or oblong, subequal, 3–3.5 × ca. 2 mm, fleshy. Stamens 8 or 9, subequal to

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perianth; filaments adnate to disk; anthers oblong-elliptic, ca. 1 mm. Ovary nearly rhomboid; style lateral spreading, not reflexed; stigma inflated. Fruit broadly ovoid, with marks on both sides at upper part; wings narrow. Fl. Jun–Jul, fr. Aug–later.

Slopes; 4500–5000 m. C and S Xizang [Sikkim].

37. *Rheum nobile* J. D. Hooker & Thomson, Ill. Himal. Pl. t. 19. 1855.

塔黄 ta huang

Herbs large, 1–2 m tall. Roots and rhizomes stout, ca. 8 cm in diam. Stem erect, finely striped, stout, 2–3 cm in diam., glabrous, simple. Basal leaves in a rosette. Stem leaves dense; petiole stout, shorter than blade, 5–15 cm, glabrous; leaf blade large, orbicular, ovate, or cordate-ovate, 20–30 cm, nearly lea-thery, abaxially glabrous or pilose, adaxially glabrous, basal veins 5–7, conspicuously raised abaxially, base rounded or subcordate, margin entire, apex obtuse; distal leaves smaller upward, orbicular, 5–13 cm; ocrea red, broadly lanceolate, large, 10–15 cm, both surfaces glabrous. Panicle 5–8-branched, 5–9 cm, rarely with branchlets, glabrous; bracts light yellow, membranous when dry. Pedicel 2–3 mm, slender, jointed at middle or slightly below. Flowers 5–9-fascicled. Tepals 6 or fewer, connected at base, not spreading, elliptic, inner 3 larger, yellow-green, ca. 2 × 1 mm. Stamens (8 or)9; anthers compressed, oblong-elliptic; filaments compressed, base inflated, 3–3.5 mm. Ovary ovoid; style short; stigma inflated. Fruit broadly ovoid or ovoid, 6–7 × 5–6 mm, base rounded to slightly truncate, apex obtuse; wings dark brown, less than 1 mm, narrow, with longitudinal veins near margin. Seeds black-brown, cordate-ovoid. Fl. Jun–Jul, fr. Sep.

Slopes; 4000–4800 m. S Xizang [Afghanistan, Bhutan, India, Myanmar, Nepal, Pakistan, Sikkim].

38. *Rheum alexandrae* Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 384. 1894.

水黄 shui huang

Herbs 40–80 cm tall. Rhizomes and roots straight, stout. Stem straight, usually yellow-green, finely striped, stout, hollow, glabrous, simple. Basal leaves 4–6. Petiole of basal leaf ca. as long as blade or longer, subterete, glabrous; leaf blade ovate to ovate-elliptic, 9–14 × 6.5–9 cm, both surfaces glabrous, rarely papilliferous along main vein and margin, basal veins 5–7, middle 3 stout; ocrea brown, large, ca. 7 cm, membranous when dry, clasping; leaves usually light green adaxially, narrowly ovate, membranous when dry, shortly petiolate or sessile. Panicle 2- or 3-branched, erect, 3–6 cm, glabrous. Pedicel 2.5–4 mm, slender, jointed near base, glabrous. Flowers fascicled, small. Tepals (4 or 5 or)6, green, connected at base to cup, ca. 1.5 mm. Stamens 7–9; filaments 2.5–3 mm, from perianth; anthers oblong-elliptic. Ovary rhomboid-obovoid; styles 3 or 2, short, reflexed; stigma inflated. Fruit rhomboid-ellipsoid, 7–8 × 5–6 mm, base cuneate or broadly cuneate, apex retuse; wings dark brown, ca. 0.5 mm, very narrow, smooth. Fl. Jun–Jul, fr. Sep.

• Slopes; 3000–4600 m. W Sichuan, E Xizang, NW Yunnan.