

SAXIFRAGACEAE

虎耳草科 hu er cao ke

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Herbs or shrubs, rarely trees or vines. Leaves simple or compound, usually alternate or opposite, usually exstipulate. Flowers usually in cymes, panicles, or racemes, rarely solitary, usually bisexual, rarely unisexual, hypogynous or ± epigynous, rarely perigynous, usually biperial, rarely monochlamydeous, actinomorphic, rarely zygomorphic, 4- or 5(-10)-merous. Sepals sometimes petal-like. Petals usually free, sometimes absent. Stamens (4 or) 5–10 or many; filaments free; anthers 2-loculed; staminodes often present. Carpels 2, rarely 3–5(-10), usually ± connate; ovary superior or semi-inferior to inferior, 2- or 3–5(-10)-loculed with axile placentation, or 1-loculed with parietal placentation, rarely with apical placentation; ovules usually many, 2- to many seriate, crassinucellate or tenuinucellate, sometimes with transitional forms; integument 1- or 2-seriate; styles free or ± connate. Fruit a capsule or berry, rarely a follicle or drupe. Seeds albuminous, rarely not so; albumen of cellular type, rarely of nuclear type; embryo small.

About 80 genera and 1200 species: worldwide; 29 genera (two endemic), and 545 species (354 endemic, seven introduced) in China. During the past several years, cladistic analyses of morphological, chemical, and DNA data have made it clear that the recognition of the Saxifragaceae *sensu lato* (Engler, Nat. Pflanzenfam. 18a: 74–226. 1928) is untenable. Among the angiosperm families, Saxifragaceae *sensu lato* may in fact represent the most extreme example of a polyphyletic assemblage. For example, recent analyses of DNA sequence data indicate that these taxa represent at least ten separate evolutionary lines, many of which are only distantly related to one another (Morgan & Soltis, Ann. Missouri Bot. Gard. 80: 631–660. 1993; Soltis & Soltis, Amer. J. Bot. 84: 504–522. 1997). Furthermore, very large molecular phylogenetic analyses of hundreds of angiosperms indicate that these separate lineages are distributed among four of the six traditionally recognized subclasses of dicotyledons (Savolainen et al., Syst. Biol. 49: 306–362. 2000; Soltis et al., Nature 402: 402–404. 1999). These recent studies have also greatly clarified how this phylogenetically diverse assemblage should be divided into families and treated taxonomically (see The Angiosperm Phylogeny Group (APG), Ann. Missouri Bot. Gard. 85: 531–553. 1998). Recent studies of DNA sequence data have clarified both the circumscription and affinities of a narrowly defined Saxifragaceae (*Saxifragaceae sensu stricto*) and Hydrangeaceae (Soltis et al., Amer. J. Bot. 82: 504–514. 1995; Savolainen et al., loc. cit.; Soltis et al., loc. cit. 1999). Saxifragaceae *sensu stricto* should consist only of Saxifragoideae, a group of about 30 herbaceous genera. Members of Saxifragaceae *sensu stricto* from the Chinese flora include *Astilbe*, *Astilboides*, *Bergenia*, *Chrysosplenium*, *Mitella*, *Mukdenia*, *Oresitrophe*, *Rodgersia*, *Saxifraga*, *Tanakaea*, *Tiarella*, and the recently described *Saniculiphyllum*. Close relatives of Saxifragaceae *sensu stricto* include *Itea*, *Penthorum*, and *Ribes*. These genera, the sole members of Iteoideae, Penthoraceae, and Ribesioideae, respectively, are also best treated in separate families: Iteaceae, Penthoraceae, and Grossulariaceae (see APG, loc. cit.). These taxa, as well as several others, such as Crassulaceae, are basal to a large assemblage of taxa, most of which were traditionally placed in Rosidae. Sequence data also indicate that *Parnassia* (the sole member of the Parnassioideae) is a more derived member of the rosid alliance, most closely related to *Brexia* and *Lepuropetalon* (also part of Saxifragaceae *sensu lato*) and Celastraceae. *Parnassia* and *Lepuropetalon* should be placed in Parnassiaceae with *Brexia* part of an expanded Celastraceae (APG, loc. cit.).

Both morphological and molecular data indicate that Hydrangeoideae and Escallonioidae are, in contrast, allied with taxa traditionally placed in Asteridae. Hydrangeoideae are a well-defined, monophyletic lineage that should be treated as Hydrangeaceae. In China they include *Cardiandra*, *Decumaria*, *Deinanthe*, *Deutzia*, *Dichroa*, *Hydrangea*, *Kirengeshoma*, *Philadelphus*, *Pileostegia*, *Platycrater*, and *Schizophragma*, and are closely allied with families such as Cornaceae, Loasaceae, and Nyssaceae. Escallonioidae appear to be polyphyletic, and this group of approximately 14 genera is in need of thorough study. Members of this subfamily are allied with several different lineages of higher asterids. *Polyosma*, the only member of Escallonioidae in China, appears closely allied with Caprifoliaceae (Xiang & Soltis in Boufford & Ohba, Sino-Japanese Flora: its Characteristics and Diversification, 1998).

Nevertheless, in the present account, the Saxifragaceae are retained in the sense of FRPS, using the same sequence of genera and indicating the subfamilies in the key below, in order to facilitate comparison with that flora.

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The genus *Changi dendron* R. H. Miao (Acta Sci. Nat. Univ. Sunyatseni 34: 65. 1995) and its single species, *C. guangxiense* R. H. Miao (loc. cit.: 66), was described from Guangxi (Napo Xian) and stated to belong to the Iteaceae (i.e., Iteoideae). However, Peng (Acta Bot. Yunnan. 18: 299–300. 1996) demonstrated that *C. guangxiense* is a synonym of *Sabia parviflora* Wallich (Sabiaceae).

Pan Jin-tang. 1992. Saxifragaceae (1) [Penthoraceae, Saxifragoideae]. In: Pan Jin-tang, ed., Fl. Reipubl. Popularis Sin. 34(2): 1–309; Hwang Shu-mei, Wei Chao-fen, Lu Ling-ti, Ku Tsue-chih & Jin Shu-ying. 1995. Saxifragaceae (2) [Parnassioideae, Hydrangeoideae, Escallonioidae, Iteoideae, Ribesioideae]. In: Lu Ling-ti & Hwang Shu-mei, eds., Fl. Reipubl. Popularis Sin. 35(1): 1–406.

- 1a. Plants woody or herbs; leaves opposite or alternate, rarely subverticillate or cespitose.
 - 2a. Stamens as many as sepals; leaves usually alternate, opposite or subopposite in *Polyosma*.
 - 3a. Leaves opposite or subopposite; fruit a 1-seeded berry (*Escallonioidae*) 27. *Polyosma*
 - 3b. Leaves alternate; fruit a capsule or many-seeded berry.
 - 4a. Leaves never lobed; stipules present, linear; sepals not petal-like; petals narrow; ovary 2-loculed; fruit a capsule (*Iteoideae*) 28. *Itea*
 - 4b. Leaves often palmately lobed; stipules absent, spines or prickles sometimes present; sepals usually petal-like; petals usually scalelike; ovary 1-loculed; fruit a berry (*Ribesioideae*) 29. *Ribes*
 - 2b. Stamens ca. 2 × as many as sepals, sometimes more; leaves usually opposite or verticillate, alternate or fascicled in *Cardiandra* (*Hydrangeoideae*).
 - 5a. Herbs; leaf blade palmately lobed; stamens 3 × as many as petals 16. *Kirengeshoma*
 - 5b. Shrubs, scandent shrubs, or herbs; leaf blade not palmately lobed; stamens numerous or 2 × as many as petals.
 - 6a. Filaments subulate, flat, apex 2-dentate or 2-lobed; shrubs; calyx lobes never enlarged and petaloid.
 - 7a. Leaves often stellate hairy; petals 5; stamens 10(–15); capsule 3–5-valved, loculicidally dehiscent 17. *Deutzia*
 - 7b. Leaves not stellate hairy; petals 4; stamens 20–40; capsule 4-valved, loculicidally or septically dehiscent 18. *Philadelphus*
 - 6b. Filaments linear, neither subulate nor flat; herbs or shrubs; calyx lobes sometimes enlarged and petaloid.
 - 8a. Inflorescences with all flowers fertile; calyx lobes never petaloid.
 - 9a. Styles 2–6.
 - 10a. Fruit a fleshy berry 21. *Dichroa*
 - 10b. Fruit a capsule 26. *Hydrangea*
 - 9b. Style 1.
 - 11a. Sepals and petals 7–10, apex free; stamens 20–30; stigma discoid 19. *Decumaria*
 - 11b. Sepals and petals 4 or 5, apex connate and forming a calyptra; stamens 8–10; stigma conical 20. *Pileostegia*
 - 8b. Inflorescences with both fertile and sterile flowers (except *Schizophragma crassum*); calyx lobes ± petaloid.
 - 12a. Leaves alternate; anthers obcordate, apex truncate, connective dilated 22. *Cardiandra*
 - 12b. Leaves opposite or verticillate; anthers oblong, ellipsoid, or subglobose, apex obtuse to subrounded, connective not dilated.
 - 13a. Style 1; sterile flowers (if present) with 1(–3 in *Schizophragma integrifolium*) enlarged calyx lobe 24. *Schizophragma*
 - 13b. Styles 2 or more; sterile flowers (if present) with more than 1 enlarged calyx lobe.
 - 14a. Sterile flowers with connate, enlarged, petaloid calyx lobes 23. *Platycrater*
 - 14b. Sterile flowers with free, enlarged, petaloid calyx lobes, or sterile flowers absent.
 - 15a. Herbs perennial or subshrubs, with horizontal rhizomes; stem simple; petals imbricate in bud; styles 5, connate into a column 25. *Deinanth*
 - 15b. Shrubs or subshrubs, sometimes scandent, rarely small trees; stems often branched; petals valvate in bud; styles 2–5, free or connate only at base 26. *Hydrangea*
 - 1b. Plants herbs; leaves usually alternate.
 - 16a. Flower solitary; stamens 5, staminodes 5, conspicuous, spreading into a lamina, usually distally lobed, inserted opposite petals; ovary 1-loculed (*Parnassioideae*) 15. *Parnassia*

- 16b. Flowers usually in cymes, racemes, or panicles, sometimes solitary; stamens 4–14, staminodes absent; ovary 1–5-loculed.
- 17a. Leaves membranous; inflorescence a helicoid cyme; stamens (6–)10; ovary 5-loculed (*Penthoroideae*) 1. *Penthorum*
- 17b. Leaves usually not membranous; inflorescence often not helicoid; stamens 4–14; ovary usually less than 5-loculed, rarely more (*Saxifragoideae*).
- 18a. Leaves usually compound, rarely simple; sepals 4 or 5, sometimes 1–3 or absent; carpels 2 or 3(or 4); ovary 2- or 3(or 4)-loculed with axile placentation or 1-loculed with marginal placentation.
- 19a. Leaves simple, leaf blade peltate, margin palmatilobed; petals 4 or 5; stamens (6–)8; carpels 2(–4), ovary 2(–4)-loculed 2. *Astilboides*
- 19b. Leaves usually compound (or, if simple, leaf blade not peltate), usually 3–5-lobed; petals 1–5 or absent; stamens (5–)8–10(–14); carpels 2 or 3, ovary 1–3-loculed.
- 20a. Leaves palmately, pinnately, or subpinnately compound; bract absent; sepals (4 or)5(–7); petals usually absent; stamens 10(–14); ovary 2- or 3-loculed with axile placentation 3. *Rodgersia*
- 20b. Leaves ternately compound, rarely simple; bracts conspicuous; sepals (4 or)5; petals 1–5, sometimes more or absent; stamens (5–)8–10; ovary 2(or 3)-loculed with axile placentation or 1-loculed with marginal placentation 4. *Astilbe*
- 18b. Leaves simple; petals 5(or 6) or absent; carpels 2(–5); ovary 2(–5)-loculed with axile placentation, or 1-loculed with marginal or parietal placentation, sometimes proximally with 2 terminal, parietal placentas and distally with marginal placentation.
- 21a. Leaves all basal; bracts absent; sepals 5–7 or absent; stamens 5 or 6 or 10–14.
- 22a. Leaf blade ovate to cordate, glandular hairy abaxially, glabrous adaxially, margin irregularly dentate; sepals 5–7, unequal, many veined; petals absent; stamens 10–14 5. *Oresitrophe*
- 22b. Leaves broadly ovate to orbicular, glabrous on both surfaces, margin palmately 5–7(–9)-cleft, lobes serrate; sepals 5 or 6, subequal, 1-veined; petals 5 or 6(or 7), white; stamens 5 or 6(or 7) 6. *Mukdenia*
- 21b. Leaves all basal or both basal and cauline; bracts conspicuous; sepals 4 or 5(–7); petals 5 or absent; stamens 4–10.
- 23a. Carpels 2 or 3, ovary 2- or 3-loculed 7. *Saniculiphyllum*
- 23b. Carpels 2, ovary 1- or 2-loculed, or proximally 2-loculed and distally 1-loculed.
- 24a. Sepals 5; petals 5; stamens 10; ovary 2-loculed with axile placentation or 1-loculed with marginal placentation.
- 25a. Herbs perennial, rarely annual or biennial; inflorescence a cyme or flower solitary; flowers usually actinomorphic, rarely zygomorphic; receptacle cyathiform or saucer-shaped; fruit a capsule, rarely a follicle 10. *Saxifraga*
- 25b. Herbs perennial; inflorescence a cyme; flowers actinomorphic; receptacle cyathiform; fruit a capsule.
- 26a. Leaves all basal, petiole short, broad, sheathing at base, leaf blade not peltate, margin entire or dentate; hypanthium scarcely adnate to ovary; petals white, red, or purple, margin entire; ovary subsuperior, proximally 2-loculed with axile placentation and distally 1-loculed with marginal placentation; seeds angular 8. *Bergenia*
- 26b. Leaves both basal and cauline, stipules membranous, leaf blade peltate, margin palmatilobed; hypanthium proximally adnate to ovary; petals yellowish, margin usually sparsely denticulate;

- ovary semi-inferior,
2-loculed with axile placentation; seeds tuberculate 9. *Peltoboykinia*
- 24b. Sepals 4 or 5(–7); petals 5 or absent; stamens 4–10; ovary usually 1-loculed with 2 parietal placentas, or proximally 2-loculed with axile placentation and distally 1-loculed with marginal placentation.
- 27a. Stipules conspicuous; sepals 5; petals 5, sometimes absent; stamens 5 or 10.
- 28a. Leaves simple or trifoliolate; inflorescence terminal or axillary, racemose or paniculate; petals entire; stamens 10; fruit with 2 distinctly unequal carpels 11. *Tiarella*
- 28b. Leaves simple; inflorescence terminal, racemose; petals usually pinnatifid, rarely entire; stamens 5 or 10; fruit with 2 subequal carpels 12. *Mitella*
- 27b. Stipules absent; sepals 4 or 5(–7); petals absent; stamens 4–10.
- 29a. Cauline leaves alternate or opposite; inflorescence usually cymose; sepals 4(or 5); stamens 4–8(–10); ovary subsuperior or semi-inferior to subinferior 14. *Chrysosplenium*
- 29b. Cauline leaves absent; inflorescence paniculate or racemose;
sepals (4 or)5(–7); stamens 8–10; ovary subsuperior . 13. *Tanakaea*

1. PENTHORUM Linnaeus, Sp. Pl. 1: 432. 1753.

扯根菜属 che gen cai shu

Pan Jintang (潘锦堂); Douglas E. Soltis

Herbs perennial, erect, fibrous rooted. Stems terete, glabrous proximally to finely pubescent and widely branched distally. Leaves alternate, shortly petiolate; leaf blade lanceolate or narrowly so, thin, apex long acuminate. Flowers numerous, arranged in terminal and axillary, scorpioid (or corymblike) cymes, bisexual, yellow-green, small. Sepals 5(–8). Petals 5(–8) or absent. Stamens 10(–16), in 2 whorls. Carpels 5(–8), connate near base; ovules many; styles short. Capsule 5(–8)-lobed; carpels rostrate at apex. Seeds many, small.

Two morphologically very similar species: one in E Asia, the other in E North America; one species in China.

Recent studies have demonstrated that *Penthorum* is not part of Saxifragaceae, but is actually most closely related to Haloragaceae.

1. *Penthorum chinense* Pursh, Fl. Amer. Sept. 1: 323. 1814.

扯根菜 che gen cai

Penthorum humile Regel & Maack; *P. intermedium* Turczaninow; *P. sedoides* Linnaeus subsp. *chinense* (Pursh) S. Y. Li & K. T. Adair; *P. sedoides* var. *chinense* (Pursh) Maximowicz.

Herbs perennial, large, 40–65(–90) cm tall. Rhizome branched. Stems usually simple, rarely branched at base, proximally glabrous, distally sparsely brown glandular hairy. Leaves sessile or subsessile; leaf blade lanceolate to narrowly so, 4–10 cm × 4–12 mm, glabrous, margin serrulate, apex acuminate. Cyme 1.5–4 cm; branches brown glandular hairy; bracts ovate to narrowly so,

small; pedicels 1–2.2 mm, brown glandular hairy.

Flowers yellowish, small. Sepals 5, triangular, ca. 1.5 × 1.1 mm, leathery, glabrous, 1-veined. Petals 5 or absent. Stamens 10, ca. 2.5 mm. Pistil ca. 3.1 mm; carpels 5(or 6), connate near base; ovary 5(or 6)-loculed; styles 5(or 6). Capsule red-purple, 4–5 mm in diam. Seeds ovoid-oblong, tuberculate. Fl. and fr. Jul–Aug. *2n* = 16.

Forests, scrub meadows, wet places along rivers in lowlands, by water; 100–2200 m. Anhui, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Sichuan, Yunnan [Japan, Korea, Laos, Mongolia, Russia, Thailand, Vietnam].

2. ASTILBOIDES Engler in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 18a: 116. 1930.

大叶子属 da ye zi shu

Pan Jintang (潘锦堂); James Cullen

Herbs perennial. Rhizome thick. Basal leaves long petiolate; leaf blade peltate, palmatilobed. Inflorescence a terminal panicle. Flowers small. Sepals 4 or 5. Petals 4 or 5. Stamens (6–)8; filaments filiform. Carpels 2(–4), proximally connate; ovary semi-inferior, 2(–4)-loculed; ovules many; styles 2–4. Capsule 2–4-valved. Seeds narrowly ovoid, winged.

One species: China, Korea.

1. *Astilboides tabularis* (Hemsley) Engler, Pflanzenr. 69(IV. 大叶子 da ye zi
117. II): 675. 1919.

Saxifraga tabularis Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 23: 269. 1887; *Rodgersia tabularis* (Hemsley) Komarov.

Herbs 1–1.5 m tall. Rhizome brown, to 35 × 2–3 cm, with adventitious roots at nodes. Stem simple, proximally sparsely rigidly glandular hairy. Basal leaf 1; petiole 30–60 cm, spinose glandular hairy; leaf blade 1.8–6(–10) cm in diam., lobes broadly ovate, both surfaces rigidly hairy or rigidly glandular hairy, margin incised-dentate and irregularly serrate, apex acute or

shortly acuminate. Cauline leaves smaller than basal one, 3–5-palmatilobed, base cuneate or truncate. Panicle 15–20 cm, many flowered. Sepals ovate, ca. 2 × 1.7–1.8 mm, leathery, abaxially sparsely sessile glandular hairy, adaxially and marginally glabrous, veins 5, apically confluent, apex obtuse or retuse. Petals white or lilac, obovate-oblong. Filaments 2.4–2.5 mm. Capsule 6.5–7 mm. Seeds ca. 2.2 mm. Fl. Aug–Sep. 2n = 34, 36.

Forests on slopes, valleys. Jilin, Liaoning [Korea].

3. RODGERSIA A. Gray, Mem. Amer. Acad. Arts, n.s., 6: 389. 1858.

鬼灯檠属 *gui deng qing shu*

Pan Jintang (潘锦堂); James Cullen

Herbs perennial. Rhizomes usually transversely elongating, thick, scaly. Leaves long petiolate, palmately, pinnately, or subpinnately compound; leaflets 3–9(or 10), base sessile, margin doubly serrate, apex usually shortly acuminate. Inflorescence a paniculate cyme, ebracteate, many flowered. Sepals (4 or)5(–7), spreading, white, pink, or red. Petals usually absent, very rarely 1, 2, or 5 vestigial ones present. Stamens 10(–14). Ovary subsuperior, rarely semi-inferior, 2- or 3-loculed; placentation axile; ovules many; styles 2 or 3. Capsule 2- or 3-valved.

Five species: E Asia, Himalayas: four species (two endemic) in China.

Rodgersia nepalensis T. A. Cope ex Cullen was recorded from Xizang by Pan (in C. Y. Wu, Fl. Xizang. 2: 517–518. 1985). This species might well occur in W Xizang, but no specimens from China have been seen by the present authors; further study is required.

- 1a. Sepals pinniveined, veins not confluent at apex, or arcuate and pinnate veined, veins not or partly to completely confluent at apex; leaves palmately compound, with 3–7 leaflets.
 - 2a. Leaflets 3(–5)-lobed at apex, glabrous adaxially; sepals 5–7, sparsely glandular hairy abaxially and at margin, glabrous adaxially, pinniveined, veins not confluent at apex, apex acuminate 1. *R. podophylla*
 - 2b. Leaflets not lobed at apex, sparsely sessile glandular hairy adaxially; sepals (4 or)5(or 6), shortly glandular hairy and pilose abaxially and at margin, glabrous or sessile glandular hairy adaxially, arcuate and pinnate veined, veins not or partly to completely confluent at apex, apex shortly acuminate 2. *R. aesculifolia*
- 1b. Sepals arcuate veined, veins confluent at apex; leaves pinnately or subpinnately compound, with 3–9(or 10) leaflets.
 - 3a. Basal and proximal cauline leaves pinnate, usually with 3 terminal leaflets and 6 or 7 lateral, usually opposite, rarely alternate leaflets; sepals sparsely tawny paleaceous hairy abaxially, glabrous adaxially 3. *R. sambucifolia*
 - 3b. Basal and proximal cauline leaves subpinnate, usually with 6–9 leaflets, of which terminal ones 3–5, verticillate ones 3 or 4; sepals tawny pubescent and sessile glandular hairy abaxially, sparsely sessile glandular hairy adaxially only near base 4. *R. pinnata*

1. *Rodgersia podophylla* A. Gray, Mem. Amer. Acad. Arts, n.s., 6: 389. 1858.

鬼灯檠 *gui deng qing*

Rodgersia japonica A. Gray ex Regel.

Herbs 60–100 cm tall. Rhizomes transversely elongating, thick. Stems glabrous. Basal leaves palmately compound; petiole 15–30 cm, pilose, both sheathlike and long ciliate at base; leaflets 5(–7), subobovate, 15–30 × 10–25 cm, apex 3–5-lobed; lobes pilose abaxially along veins, glabrous adaxially, margin serrate, apex acuminate. Cauline leaves alternate, smaller than basal ones. Panicle terminal, 15–30 cm, many flowered; branches and pedicels densely paleaceous hairy, hairs sometimes with glandular heads. Sepals 5–7, white, subovate, ca. 2.1 × 1.1 mm,

abaxially and marginally sparsely glandular hairy, adaxially glabrous, pinniveined; veins not confluent at apex, apex acuminate. Petals absent. Stamens usually 10, ca. 4 mm. Carpels 2, proximally connate; ovary subsuperior, ovoid, ca. 1.5 mm; styles ca. 1.3 mm. Capsule many seeded. Fl. Jun–Jul. 2n = 30. Shaded slopes. Jilin, Liaoning [Japan, Korea].

2. *Rodgersia aesculifolia* Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 96. 1893.

七叶鬼灯檠 *qi ye gui deng qing*

Herbs 0.8–1.2 m tall. Rhizomes transversely elongating, columnar, 3–4 cm in diam., pale purple inside. Stems angular, subglabrous. Leaves palmately compound; petiole 15–40 cm, sheathlike and long hairy at base; leaflets 5–7, obovate to oblanceolate, 7.5–30 × 2.7–12

cm, herbaceous or thinly leathery, abaxially long pilose along veins, adaxially sparsely subsessile glandular hairy along veins, base cuneate and sessile, margin doubly serrate, apex shortly acuminate. Pleiochasium paniculate, ca. 26 cm; branches and pedicels white paleaceous hairy and sparsely glandular hairy. Sepals (4 or)5(or 6), spreading, subtriangular, 1.5–2 × ca. 1.8 mm, abaxially and marginally pilose and shortly glandular hairy, adaxially glabrous or subsessile glandular hairy, veins arcuate and pinnate, not or partly to completely confluent at apex, apex shortly acuminate. Stamens 1.2–2.6 mm. Ovary subsuperior, ca. 1 mm; styles 2, 0.8–1 mm. Capsule ovoid, rostrate. Seeds many, brown, fusiform, 1.8–2 mm. Fl. and fr. May–Oct. $2n = 60$.

Forests, forest margins, scrub, meadows, rock clefts; 1100–3800 m. SE Gansu, ?Hebei, W Henan, W Hubei, S Ningxia, Shaanxi, Sichuan, Xizang, Yunnan [Myanmar].

1a. Leaflets herbaceous 2a. var. *aesculifolia*
1b. Leaflets thinly leathery 2b. var. *henrici*

2a. *Rodgersia aesculifolia* var. *aesculifolia*

七叶鬼灯檠(原变种) *qi ye gui deng qing* (yuan bian zhong)

Rodgersia platyphylla Pax & K. Hoffmann.

Leaflets herbaceous. Sepals 5(or 6), adaxially glabrous or with 1–3 subsessile glandular hairs; veins arcuate and pinnate, not or partly to completely confluent at apex.

• Forests, scrub, meadows, rock clefts; 1100–3400 m. SE Gansu, W Henan, W Hubei, S Ningxia (Jingyuan Xian), Shaanxi, Sichuan, Yunnan.

2b. *Rodgersia aesculifolia* var. *henrici* (Franchet) C. Y. Wu ex J. T. Pan, Acta Phytotax. Sin. 29: 189. 1991.

滇西鬼灯檠 *dian xi gui deng qing*

Astilbe henrici Franchet in Prince Henri d'Orleans, Du Tonkin aux Indes, 378. 1896; *Rodgersia henrici* (Franchet) Franchet.

Leaflets thinly leathery. Sepals (4 or)5(or 6), adaxially more subsessile glandular hairy; veins arcuate, confluent at apex.

Forests, forest margins, scrub, alpine meadows; 2300–3800 m. Xizang, W Yunnan [Myanmar].

3. *Rodgersia sambucifolia* Hemsley, Gard. Chron., ser. 3, 39: 115. 1906.

西南鬼灯檠 *xi nan gui deng qing*

Herbs 0.8–1.2 m tall. Stems glabrous. Leaves pinnately compound; petiole 3.4–28 cm, brown long pilose at base; leaflets 3–9(or 10), obovate or oblong to lanceolate, 5.6–20 × 1.7–9 cm, abaxially pilose along veins, adaxially strigose or glabrous, base cuneate, margin doubly serrate, apex shortly acuminate. Basal and proximal cauline leaves usually with 3 terminal leaflets and 6 or 7 lateral, usually opposite, rarely alternate leaflets. Pleiochasium paniculate, 13–38 cm; branches 5.3–12 cm, densely paleaceous hairy; pedicels 2–3 mm, densely paleaceous hairy. Sepals 5, subovate, ca. 2 × 1.5–1.8 mm, abaxially sparsely tawny

paleaceous hairy, adaxially glabrous, apex shortly acuminate. Petals absent. Stamens ca. 3 mm. Carpels 2, proximally connate, ca. 3 mm; ovary semi-inferior; styles 2. Fl. and fr. May–Oct. $2n = 60^*$.

• Forests, scrub, meadows, rock clefts; 1800–3700 m. W Guizhou, SW Sichuan, N Yunnan.

1a. Leaflets strigose adaxially 3a. var. *sambucifolia*
1b. Leaflets glabrous adaxially 3b. var. *estrigosa*

3a. *Rodgersia sambucifolia* var. *sambucifolia*

西南鬼灯檠(原变种) *xi nan gui deng qing* (yuan bian zhong)

Spiraea holorhodantha H. Léveillé.

Leaflets strigose adaxially. Fl. and fr. May–Oct.

• Forests, scrub, meadows, rock clefts; 1800–3700 m. W Guizhou (Weining Yi-Hui-Miao Zu Zizhixian), SW Sichuan, N Yunnan.

3b. *Rodgersia sambucifolia* var. *estrigosa* J. T. Pan, Acta Phytotax. Sin. 29: 189. 1991.

光腹鬼灯檠 *guang fu gui deng qing*

Leaflets glabrous adaxially. Fl. and fr. May–Aug.

• Forests, rock clefts on slopes; 2000–3700 m. SW Sichuan (Yanbian Xian), N Yunnan (Huize Xian, Lijiang Naxi Zu Zizhixian).

4. *Rodgersia pinnata* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 10: 176. 1888.

羽叶鬼灯檠 *yu ye gui deng qing*

Herbs 25–150 cm tall. Stems glabrous. Leaves subpinnately compound; petiole 3.5–32.5 cm, base brown long pilose. Basal and proximal cauline leaves usually with 6–9 leaflets, among which terminal ones 3–5, verticillate ones 3 or 4; distal cauline leaves with 3 leaflets; leaflets elliptic or oblong to narrowly obovate, 6.5–32 × 2.7–12.5 cm, abaxially brown pilose along veins, adaxially glabrous or strigose, base gradually narrowed, margin doubly serrate, apex acuminate. Pleiochasium paniculate, 12–31 cm, many flowered; branches 3.5–22 cm, paleaceous hairy, sometimes also shortly glandular hairy; pedicels 1.5–3.5 mm. Sepals 5, subovate, 2–2.7 × ca. 2 mm, leathery, abaxially tawny pilose and subsessile glandular hairy, adaxially sparsely subsessile glandular hairy near base, veins 3, arcuate, confluent at apex, apex shortly acuminate. Petals absent. Stamens 10, 2.8–4 mm. Carpels 2, ca. 3 mm, connate at base; ovary subsuperior; styles 2. Capsule purple, ca. 7 mm. Fl. and fr. Jun–Aug. $2n = 60^*$, ca. 75*.

• Forests, forest margins, scrub, shaded grassy slopes, alpine meadows, rock clefts; 2000–3800 m. Guizhou, E and S Sichuan, Yunnan.

1a. Leaves glabrous adaxially 4a. var. *pinnata*
1b. Leaves strigose adaxially 4b. var. *strigosa*

4a. *Rodgersia pinnata* var. *pinnata*

羽叶鬼灯檠(原变种) *yu ye gui deng qing* (yuan bian zhong)

Astilbe pinnata (Franchet) Franchet.

Leaf blade glabrous adaxially.

• Forests, forest margins, scrub, alpine meadows, rock clefts; 2400–3800 m. Guizhou, E Sichuan (Wushan Xian), Yunnan.

4b. *Rodgersia pinnata* var. *strigosa* J. T. Pan, Acta Phytotax. Sin. 29: 189. 1991.
伏毛鬼灯檠 fu mao gui deng qing

Leaflets strigose adaxially.
• Shaded grassy slopes; ca. 2000 m. S Sichuan (Meigu Xian).

4. ASTILBE Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 210. 1825.

落新妇属 luo xin fu shu

Pan Jintang (潘锦堂); Hideaki Ohba

Herbs perennial. Rhizomes thick. Stems brown paleaceous hairy or long pilose. Leaves alternate, long petiolate, 2–4 × ternately compound, rarely simple; stipules membranous; leaflets lanceolate, ovate, or broadly ovate to elliptic, margin dentate. Inflorescence a terminal panicle, bracteate. Flowers white, lilac, or purple, bisexual or unisexual, rarely plants polygamous or dioecious. Sepals (4 or)5. Petals usually 1–5, sometimes more or absent. Stamens usually (5 or)8–10. Carpels 2(or 3), ± connate or free; ovary subsuperior or semi-inferior, 2(or 3)-loculed with axile placentation or 1-loculed with marginal placentation; ovules many. Fruit a capsule or follicle. Seeds small.

About 18 species: Asia, North America: seven species (three endemic) in China.

1a. Inflorescence sparsely flowered; petals 1–5 and obsolescent, or absent.

2a. Sepals 5, subleathery, glandular hairy abaxially; petals 2–5 and obsolescent, or absent 6. *A. macrocarpa*

2b. Sepals 4 or 5, submembranous, glabrous abaxially; petals absent, sometimes 1(–5) and obsolescent 7. *A. rivularis*

1b. Inflorescence densely flowered; petals 5, not obsolescent.

3a. Sepals glabrous at margin; petals spatulate to oblanceolate.

4a. Plants 32–150 cm tall; sepal margin entire, apex obtuse; petals usually oblanceolate, 1-veined, obtuse

or retuse at apex 4. *A. longicarpa*

4b. Plants 15–30 cm tall; sepal margin sparsely dentate distally, apex truncate or rounded; petals usually

spatulate, 4–6-veined, acute at apex 5. *A. macroflora*

3b. Sepals glandular ciliate at margin; petals linear or linear-oblanceolate.

5a. Sepals glandular hairy abaxially 3. *A. rubra*

5b. Sepals glabrous abaxially.

6a. Panicle scarcely 12 cm in width, branches densely brown long crisped hairy; leaflets usually acute to shortly acuminate at apex 1. *A. chinensis*

6b. Panicle to 17 cm in width, branches glandular pilose; leaflets usually shortly acuminate to

acuminate at apex 2. *A. grandis*

1. *Astilbe chinensis* (Maximowicz) Franchet & Savatier, Enum. Pl. Jap. 1: 144. 1873.

落新妇 luo xin fu

Hoteia chinensis Maximowicz, Prim. Fl. Amur. 120.

1859; *Astilbe chinensis* var. *dauidii* Franchet; *A. dauidii* (Franchet) L. Henry.

Herbs 50–100 cm tall. Rhizomes dark brown, thick, with many fibrous roots. Stems glabrous. Basal leaves 2 or 3 × ternately compound; common petiole brown pilose near leaf axil; lateral and terminal leaflets rhombic-elliptic or ovate to elliptic, 1.8–8 × 1.1–4 cm, abaxially sparsely rigidly hairy and glandular hairy along veins, adaxially rigidly hairy along veins, base cuneate or subcordate to rounded, margin doubly serrate, apex acute to shortly acuminate. Cauline leaves 2 or 3, smaller than basal ones. Panicle 8–37 × 3–4(–12) cm, densely flowered; proximal branches 4–11.5 cm, densely brown long crisped hairy; bracts ovate. Sepals 5, ovate, 1–1.5 × ca. 0.7 mm, both surfaces glabrous, margin glandular puberulous distally. Petals 5, lilac to purple, linear, 4.5–5 × 0.5–1 mm, 1-veined. Stamens 10, 2–2.5 mm. Carpels 2, base connate.

Capsule ca. 3 mm. Seeds brown, ca. 1.5 mm. Fl. and fr. Jun–Sep. 2n = 14.

Forests, forest margins, meadows, valleys, riversides; 400–3600 m. ?Anhui, SE Gansu, ?Guangdong, ?Guangxi, ?Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangxi, Jilin, Liaoning, ?Nei Mongol, SE Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang [Japan, Korea, Russia].

2. *Astilbe grandis* Stapf ex E. H. Wilson, Gard. Chron., ser. 3, 38: 426. 1905.

大落新妇 da luo xin fu

Astilbe austrosinensis Handel-Mazzetti; *A. chinensis* (Maximowicz) Franchet & Savatier var. *koreana* Komarov; *A. koreana* (Komarov) Nakai; *A. leucantha* Knoll.

Herbs 40–120 cm tall. Rhizomes thick. Stems usually simple, brown long hairy and glandular hairy. Leaves 2 or 3 × ternately to pinnately compound; common petiole 3.5–32.5 cm, ± glandular hairy, long pilose near leaf axil; petiolules 0.2–2.2 cm; leaflets ovate or narrowly ovate to oblong (terminal ones sometimes rhombic-elliptic), 1.3–9.8 × 1–5 cm, abaxially shortly glandular hairy, sometimes also long pilose along veins, adaxially glandular strigose, base cordate or oblique to cuneate, margin doubly serrate, apex shortly

acuminate to acuminate. Panicle terminal, 16–40 × 17 cm; branches glandular hairy. Sepals 5, ovate or broadly ovate to elliptic, 1–2 × 1–2.2 mm, both surfaces glabrous but glandular puberulous at apex, margin membranous, apex obtuse or retuse. Petals 5, white or purple, linear, 2–4.5 × 0.2–0.5 mm, 1-veined, apex acute. Stamens 10, 1.3–5 mm. Carpels 2, base connate; ovary semi-inferior; styles divergent. Fl. and fr. Jun–Sep. $2n = 28$.

Forests, scrub, damp ravines; 400–2000 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Heilongjiang, Hubei, Jiangsu, Jiangxi, Jilin, Liaoning, Shandong, Shanxi, Sichuan, Zhejiang [Korea].

3. *Astilbe rubra* J. D. Hooker, Bot. Mag. 83: t. 4959. 1857.
腺萼落新妇 xian e luo xin fu

Herbs 0.9–1.5 m tall. Stems sparsely brown long crisped glandular hairy. Basal leaves 3 × ternately compound; common petiole ca. 60 cm, sparsely brown long crisped glandular hairy; leaflets ovate to broadly so, 2.3–5 × 1.8–4.6 cm, glandular hairy, base cordate to broadly cuneate, margin doubly serrate, apex acute. Cauline leaves smaller than basal ones. Panicle 24–28 cm; branches brown long crisped glandular hairy; pedicels 0.5–2 mm, glandular hairy. Sepals 5, ovate, 1.5–2 × ca. 1 mm, abaxially and marginally glandular hairy, adaxially glabrous, 1-veined. Petals 5, pink to red, linear, 4–5 × 0.3–0.5 mm, 1-veined. Stamens 10, ca. 3 mm. Pistil ca. 5.7 mm; carpels 2, base connate; ovary semi-inferior, styles divergent. Fl. Jun–Jul.

Forest margins; ca. 2400 m. ?Fujian, ?Hubei, S Xizang, NW Yunnan [India].

4. *Astilbe longicarpa* (Hayata) Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 106. 1911.

长果落新妇 chang guo luo xin fu

Astilbe chinensis (Maximowicz) Franchet & Savatier var. *longicarpa* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25(19): 86. 1908.

Herbs 32–150 cm tall. Stems glabrous. Leaves 2-pinnately compound; common petiole brown long pilose; leaflets narrowly ovate to lanceolate, 3–9 × 1.2–3.5 cm, both surfaces sparsely hairy, base cuneate to cordate (usually oblique on lateral leaflets), margin doubly serrate, apex acute. Panicle 6.5–28 cm; branches and pedicels glandular hairy. Sepals 5, elliptic, ca. 1.4 × 0.6 mm, glabrous, margin entire, apex truncate or rounded. Petals 5, usually oblanceolate, 3–3.2 × 0.8–1 mm, 1-veined, apex obtuse or retuse. Stamens 10, 3–4.5 mm. Pistil ca. 3 mm; carpels 2, free; ovary subsuperior. Fl. and fr. Jul–Nov.

• Low to medium altitudes. Taiwan.

5. *Astilbe macroflora* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25(19): 86. 1908.

阿里山落新妇 a li shan luo xin fu

Herbs 15–30 cm tall. Stems long pilose. Leaves ternately or 2-pinnate-ternately compound; common petiole and petiolules long pilose and glandular hairy; leaflets broadly ovate, 2.4–3.8 × 2.3–3.2 cm, abaxially

glandular hairy and long pilose along veins, adaxially glandular strigose, base cordate or obliquely so, margin doubly serrate, glandular hairy, apex acute. Panicle 4–8 cm; branches brown long pilose; pedicels brown long pilose and glandular hairy. Sepals 5, ovate to narrowly so, 2–2.5 × ca. 1 mm, both surfaces glabrous, margin sparsely dentate distally, apex acute. Petals 5, usually spatulate, 3–3.4 × ca. 1 mm, 4–6-veined, apex acute. Stamens 10, 2.5–4 mm. Pistil ca. 5 mm; carpels 2, mostly free; ovary semi-inferior; styles divergent. Capsule ca. 5 mm. Seeds small. Fl. Jul–Aug.

• High peaks; 3200–3800 m. C Taiwan.

6. *Astilbe macrocarpa* Knoll, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 118: 73. 1909.

大果落新妇 da guo luo xin fu

Herbs 1–1.3 m tall. Stems brown long pilose and glandular hairy. Leaves 1 or 2 × ternately compound or pinnately compound; common petiole and petiolules brown long pilose and glandular hairy; leaflets rhombic-elliptic or broadly to narrowly ovate, rarely oblong, (2.8–)6–17.5 × (1.6–)2.8–10.6 cm, glandular hairy, base obliquely cordate to obliquely rounded, margin doubly serrate, sometimes 2-lobed, apex acuminate. Panicle (13–)25–40 cm; branches and pedicels brown glandular hairy; bracts subulate, 1.6–3.2 × 0.2–0.5 mm, abaxially glandular hairy, adaxially glabrous. Sepals 5, ovate, 1.5–2.2 × 1–1.5 mm, subleathery, abaxially and marginally tawny glandular hairy, adaxially glabrous, 1-veined, apex usually shortly acuminate. Petals 2–5 and obsolescent, or absent, white, linear or spatulate-linear to subulate, 1–1.5 × 0.1–0.2 mm, 1-veined, apex acute. Stamens 8–10, 1.3–3.5 mm. Pistil 1.5–4 mm; carpels 2, base connate; ovary subsuperior; styles 2, divergent. Fl. and fr. Jun–Sep.

• Scrub and meadows in ravines; 500–1600 m. Anhui, Fujian, Hunan, Zhejiang.

7. *Astilbe rivularis* Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 211. 1825.

溪畔落新妇 xi pan luo xin fu

Herbs 0.6–2.5 m tall. Stems brown long glandular hairy. Leaves 2- or 3-pinnately compound; common petiole and petiolules brown long pilose; leaflets lanceolate, narrowly to broadly ovate, elliptic or broadly so, rhombic-elliptic, narrowly rhombic-obovate, or obovate, 4–14.5 × 1.7–8.4 cm, abaxially brown long pilose and glandular hairy along veins, adaxially sparsely brown glandular strigose, base obliquely cordate or rounded to cuneate, margin doubly serrate, apex acuminate. Panicle to 42 cm, many flowered; branches 1–18 cm, brown crisped glandular hairy; bracts 3, subelliptic, 1.1–1.4 × 0.2–0.6 mm, brown pilose, margin entire or dentate; pedicels 0.6–1.8 mm. Sepals 4 or 5, green, ovate or elliptic to oblong, 1.2–1.5 × ca. 1 mm, submembranous, abaxially subconvex, adaxially subconcave, glabrous, 1-veined. Petals absent, sometimes 1(–5) and obsolescent. Stamens 5–10(–12),

0.2–2.4 mm. Pistil ca. 2 mm; carpels 2, base connate; ovary subsuperior; styles divergent. Fl. and fr. Jun–Nov.

Forests, forest margins, scrub, meadows, by water, ravines; 900–3200 m. SE Gansu, Guizhou, Henan, Hubei, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, N India, Indonesia, Kashmir, Laos, N Myanmar, Nepal, Thailand, Vietnam].

- 1a. Leaflets lanceolate or narrowly ovate to narrowly rhombic-obovate 7c. var. *angustifoliolata*
- 1b. Leaflets ovate or broadly so to broadly elliptic, or rhombic-elliptic or obovate.
 - 2a. Leaflets usually ovate or broadly so to broadly elliptic 7b. var. *myriantha*
 - 2b. Leaflets rhombic-elliptic or obovate (terminal ones), or ovate (lateral ones) 7a. var. *rivularis*

7a. *Astilbe rivularis* var. *rivularis*

溪畔落新妇(原变种) xi pan luo xin fu (yuan bian zhong)

Leaflets rhombic-elliptic or obovate (terminal ones), or ovate (lateral ones). Petals absent. Fl. and fr. Jul–Oct. 2n = 28.

Forests, forest margins, scrub, meadows; 900–3200 m. Henan, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, N India, Indonesia, Kashmir, Laos, Nepal, Thailand, Vietnam].

7b. *Astilbe rivularis* var. *myriantha* (Diels) J. T. Pan, Acta Phytotax. Sin. 23: 438. 1985.

多花落新妇 duo hua luo xin fu

Astilbe myriantha Diels, Bot. Jahrb. Syst. 36(Beibl. 82): 48. 1905; *A. heteropetala* Mattfeld; *A. virescens* Hutchinson.

Leaflets usually ovate or broadly so to broadly elliptic. Petals absent, sometimes 1(–5) and obsolescent. Fl. and fr. Jun–Oct.

• Forests, scrub, shaded ravines; 1100–2500 m. SE Gansu, Guizhou, W Henan, Hubei, Shaanxi, Sichuan, ?Xizang.

7c. *Astilbe rivularis* var. *angustifoliolata* H. Hara, J. Jap. Bot. 51(5): 133. 1976.

狭叶落新妇 xia ye luo xin fu

Astilbe rivularis var. *angustata* C. Y. Wu ex J. T. Pan. Leaflets lanceolate or narrowly ovate to narrowly rhombic-obovate. Petals usually absent, sometimes 1 and obsolescent. Fl. and fr. Sep–Nov.

Forests, forest margins, ravines, by water; 1500–2800 m. NW Yunnan [N Myanmar].

5. ORESITROPHE Bunge, Enum. Pl. China Bor. 31. 1833.

独根草属 du gen cao shu

Pan Jintang (潘锦堂); Douglas E. Soltis

Herbs perennial. Rhizomes thick, scaly. Leaves all basal, petiolate; leaf blade cordate to ovate, margin irregularly dentate. Inflorescence cymose, ebracteate. Hypanthium adnate to ovary at base. Sepals 5(–7), white, petaloid. Petals absent. Stamens 10(–14). Carpels 2, proximally connate; ovary 1/4 subsuperior, proximally 1-loculed with axile placentation, distally with marginal placentation. Fruit a capsule, dehiscing between styles. Seeds numerous, small.

• One species.

Oresitrophe is most closely related to the monotypic *Mukdenia*. Its other close relatives are *Astilboides*, *Bergenia*, *Darmera* Voss, and *Rodgersia*.

1. *Oresitrophe rupifraga* Bunge, Enum. Pl. China Bor. 31. 1833.

独根草 du gen cai

Oresitrophe rupifraga var. *glabrescens* W. T. Wang. Plants 12–28 cm tall. Leaves 2 or 3; petiole 11.5–13.5 cm, glandular hairy; leaf blade 3.8–9.7(–25.5) × 3.4–9(–22) cm, abaxially and marginally glandular hairy, base cordate, margin irregularly dentate, apex shortly acuminate. Inflorescence 5–16 cm, densely glandular

hairy, many flowered; pedicels 0.3–1 cm, glandular hairy. Sepals ovate to narrowly so, unequal, 2–4.2 × 0.5–2 mm, glabrous, many veined, margin entire, apex acute or shortly acuminate. Stamens 3.1–3.3 mm. Carpels ca. 4 mm; styles ca. 2 mm. Fl. May–Sep.

• Ravines, cliffs, rock crevices; 600–2100 m. Hebei, W Liaoning, E Shanxi.

6. MUKDENIA Koidzumi, Acta Phytotax. Geobot. 4: 120. 1935.

槭叶草属 qi ye cao shu

Pan Jintang (潘锦堂); Douglas E. Soltis

Aceriphyllum Engler.

Herbs perennial. Rhizome brown, thick, scaly. Leaves all basal, long petiolate; leaf blade broadly ovate to orbicular, base cordate, margin 5–7(–9)-cleft, lobes serrate at margin. Inflorescence cymose, ebracteate, many flowered. Flowers showy. Sepals 5 or 6. Petals 5 or 6(or 7), shorter than sepals. Stamens 5 or 6(or 7), alternate with and shorter than petals. Carpels 2, proximally connate; ovary subsuperior, proximally 2-loculed with axile placentation, distally 1-loculed with marginal placentation; ovules many; styles 2. Fruit a capsule. Seeds numerous, small.

One species: China, Korea.

A second species, *Mukdenia acanthifolia* Nakai (J. Jap. Bot. 17: 684. 1941), has been described from Korea, but it is doubtfully distinct from *M. rossii*.

1. *Mukdenia rossii* (Oliver) Koidzumi, Acta Phytotax. Geobot. 4: 120. 1935.

槭叶草 qi ye cao

Saxifraga rossii Oliver, Hooker's Icon. Pl. 13: 46, t.

1258. 1878; *Aceriphyllum rossii* (Oliver) Engler.

Plants 20–36 cm tall. Petiole 7–15.5 cm, glabrous; leaf blade 10–14.3 × 12–14.5 cm; lobes subovate, both surfaces glabrous, apex acute. Inflorescence 1–14 cm,

sparsely glandular hairy; axillary branches to 10 cm; pedicels glandular hairy. Hypanthium glandular hairy. Sepals white, ovate-oblong, 3–5 × ca. 2 mm, glabrous, 1-veined. Petals white, lanceolate, ca. 2.5 × 1 mm, 1-veined. Stamens ca. 2 mm. Carpels ca. 4 mm. Capsule ca. 7.5 mm; carpels recurved in fruit. May–Jul. $2n = 34$. Rocky slopes, ravines. Jilin, Liaoning [Korea].

7. *SANICULIPHYLLUM* C. Y. Wu & T. C. Ku, Acta Phytotax. Sin. 30: 194. 1992.

变豆叶草属 bian dou ye cao shu

Pan Jintang (潘锦堂); Douglas E. Soltis

Herbs perennial. Rhizomes long, creeping. Stems scapiform. Basal leaves petiolate, exstipulate, palmatifid. Inflorescence cymose, many flowered; bracts conspicuous. Sepals 5. Petals 5. Stamens 5; filaments short. Disc 10-lobed. Carpels 2 or 3, connate; ovary inferior, 2- or 3-loculed; placentation axile; ovules many; styles 2 or 3, short. Fruit a capsule. Seeds numerous, small.

• One species.

1. *Saniculiphyllum guangxiense* C. Y. Wu & T. C. Ku, Acta Phytotax. Sin. 30: 194. 1992.

变豆叶草 bian dou ye cao

Plants 11–18 cm tall. Basal leaf petiole 7.5–8.8 cm, sparsely brown papillate; leaf blade reniform-cordate to ovate-cordate, 6–8.3 × 6.6–8.6 cm, both surfaces sparsely brown hairy or papillate, margin dentate. Cyme 3.5–7.3 cm, 7–10-flowered; bracts suboblong, 2–3 × 0.9–2 mm. Sepals reniform, ca. 1.3 × 2.1 mm,

glabrous, 5-veined, margin sometimes brown papillate, apex obtuse. Petals green, subrhomboid, ca. 2.5 × 2.3 mm, 5-veined, base broadly cuneate, margin entire, apex obtuse. Fl. Apr.

• Shaded scrub on sides of ravines; 600–1300 m. NW Guangxi (Tianlin Xian), SE Yunnan (Funing Xian).

This little-known species has rarely been collected or observed. Its current status is unknown.

8. *BERGENIA* Moench, Methodus, 664. 1794, nom. cons.

岩白菜属 yan bai cai shu

Pan Jintang (潘锦堂); Douglas E. Soltis

Herbs perennial, forming large clumps. Rhizomes creeping, large, thick, scaly. Leaves all basal, ± persistent, simple, waxy, often leathery; petiole short, broad, sheathing at base; leaf blade thick, margin entire, crenate, or dentate. Inflorescences cymose, bracteate. Flowers showy, large. Sepals 5. Petals 5, white, pink, red, or purple. Stamens 10. Carpels 2, basally connate; ovary 1/4 subsuperior, proximally 2-loculed with axile placentation and distally 1-loculed with marginal placentation; styles 2; ovules many. Fruit a capsule. Seeds numerous, dark brown, small.

Ten species: Asia; seven species (three endemic) in China.

At least two species (*Bergenia crassifolia* and *B. pacumbis*) are cultivated as ornamentals and for medicinal use, and they have been considerably hybridized. *Bergenia* is most closely related to *Mukdenia* and *Oresitrophe*; other close relatives are *Astilboides*, *Darmera* Voss, and *Rodgersia*.

1a. Sheathing petiole base and leaf blade glabrous at margin.

2a. Pedicels, hypanthia, and sepals glabrous 1. *B. scopulosa*

2b. Pedicels, hypanthia, and sepals ± glandular hairy.

3a. Inflorescence branches, pedicels, hypanthia, and sepals sparsely sessile glandular 2. *B. crassifolia*

3b. Inflorescence branches, pedicels, hypanthia, and sepals densely long glandular hairy .. 3. *B. purpurascens*

1b. Sheathing petiole base and often also leaf blade ciliate at margin.

4a. Leaf blade narrowly obovate, margin entire, not ciliate; petals narrowly obovate 4. *B. emeiensis*

4b. Leaf blade orbicular, broadly ovate, or obovate, margin subentire, obscurely crenate, dentate, serrate, or doubly serrate, ciliate; petals subspatulate, elliptic, or orbicular.

5a. Leaf blade orbicular or broadly ovate to broadly obovate, margin subentire or obscurely crenate; inflorescence branches and pedicels sparsely sessile glandular; sepals spreading, glabrous,

apex sometimes sparsely dentate; petals orbicular 5. *B. pacumbis*

- 5b. Leaf blade obovate to broadly so, margin dentate, serrate, or doubly serrate; inflorescence branches and pedicels long glandular hairy; sepals glandular hairy, apex not dentate; petals subspatulate or elliptic.
- 6a. Leaf blade dentate and serrate, subsessile glandular, margin only proximally ciliate; sepals subsessile glandular, veins mostly confluent at apex, margin glabrous; petals elliptic 6. *B. tianquanensis*
- 6b. Leaf blade serrate or doubly so, glabrous, margin ciliate; sepals abaxially long glandular hairy, veins not confluent at apex, margin denticulate-ciliate; petals subspatulate 7. *B. stracheyi*

1. *Bergenia scopulosa* T. P. Wang, Fl. Tsinling. 1(2): 607. 1974.

秦岭岩白菜 qin ling yan bai cai

Herbs perennial, 10–50 cm tall. Rhizomes thick, scaly. Leaves all basal; petiole 1.5–13 cm, sheathing base glabrous at margin; leaf blade orbicular or broadly ovate to broadly elliptic, (5–)16.5–25 × (4–)13.2–22 cm, leathery, glabrous, both surfaces minutely glandular pitted, base usually rounded, rarely broadly cuneate, margin sinuate or sinuate-dentate, sometimes subentire, apex obtuse. Inflorescence cymose, many flowered; pedicels 5–9 mm, glabrous. Hypanthium purple, glabrous. Sepals ovate to broadly so, 4–4.5 × 3.3–5 mm, leathery, both surfaces glabrous, veins many, apex obtuse. Petals elliptic or broadly ovate to orbicular, 8–9 × 6–7.8 mm, veins pinnate, base gradually narrowed into a claw ca. 1 mm, apex obtuse. Stamens 4.5–5 mm. Ovary ovoid, ca. 4.5 mm; styles 2, ca. 5 mm. Fl. May–Sep.

• Forests, rock crevices; 2500–3600 m. S Shaanxi (Qin Ling).

2. *Bergenia crassifolia* (Linnaeus) Fritsch, Verh. Zool.-Bot. Ges. Wien 39: 587. 1889.

厚叶岩白菜 hou ye yan bai cai

Saxifraga crassifolia Linnaeus, Sp. Pl. 1: 401. 1753; *Bergenia bifolia* Moench, nom. illeg. (included *S. crassifolia*); *B. cordifolia* (Haworth) Sternberg; *B. coreana* Nakai; *B. crassifolia* var. *cordifolia* (Haworth) A. Borissova; *S. cordifolia* Haworth; *S. crassifolia* var. *elliptica* Ledebour; *S. crassifolia* var. *obovata* Seringe. Herbs perennial, 15–30 cm tall. Rhizomes thick, scaly. Leaves all basal; petiole 3–9 cm, sheathing base glabrous at margin; leaf blade narrowly to broadly obovate or elliptic, 5–12.5 × 3.5–9.5 cm, leathery, both surfaces glabrous and ± glandular pitted, base usually cuneate, rarely rounded, margin sinuate-dentate, apex obtuse. Inflorescence cymose, 3.5–13 cm, many flowered; branches and pedicels subsessile glandular. Hypanthium subsessile glandular. Sepals erect, obovate to broadly triangular-obovate, 3–4 × 2–4 mm, leathery, abaxially subsessile glandular, veins many, margin glabrous, apex obtuse or retuse. Petals purple, elliptic to broadly ovate, 7–8 × 4.6–5 mm, veins many, base narrowed into a claw ca. 1 mm, apex retuse. Stamens ca. 4.5 mm. Ovary ovoid, ca. 2.5 mm; styles 2, ca. 2.5 mm. Fl. May–Sep. $2n = 34$.

Forests, rock crevices on shaded slopes; 1100–1800 m. Xinjiang [N Korea, N Mongolia, Russia].

3. *Bergenia purpurascens* (J. D. Hooker & Thomson) Engler, Bot. Zeitung (Berlin) 26: 841. 1868.

岩白菜 yan bai cai

Saxifraga purpurascens J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 61. 1858; *Bergenia delavayi* (Franchet) Engler; *B. purpurascens* f. *delavayi* (Franchet) Handel-Mazzetti; *B. purpurascens* var. *delavayi* (Franchet) Engler & Irmscher; *B. purpurascens* var. *macrantha* (Franchet) Diels; *S. delavayi* Franchet; *S. purpurascens* var. *macrantha* Franchet.

Herbs perennial, 13–50 cm tall. Rhizomes thick, scaly. Leaves all basal; petiole 2–7 cm, sheathing base glabrous at margin; leaf blade obovate or narrowly so to subelliptic, rarely broadly obovate to suboblong, 5.5–16 × 3–9 cm, leathery, both surfaces glabrous and glandular pitted, base cuneate, margin sinuate-dentate to entire, apex obtuse. Inflorescence cymose, 3–23 cm; branches and pedicels densely long glandular hairy. Hypanthium densely long glandular hairy. Sepals narrowly ovate, 6.5–7 × 2–4 mm, leathery, abaxially densely long glandular hairy, margin glabrous, apex obtuse. Petals purple, broadly ovate, 1–1.7 cm × 7–7.8 mm, veins many, base narrowed into a claw 2–2.5 mm, apex obtuse or retuse. Stamens 6–11 mm. Ovary ovoid, 6.7–7.5 mm; styles 2, 5.3–7.5 mm. Fl. May–Oct. $2n = 34$.

Forests, scrub, alpine meadows, alpine rock crevices; 2700–4800 m. SW Sichuan, E and S Xizang, N Yunnan [N Bhutan, NE India, N Myanmar, Nepal, Sikkim].

This species is used medicinally and is a source of the drug bergenin.

4. *Bergenia emeiensis* C. Y. Wu in J. T. Pan, Acta Phytotax. Sin. 26: 124. 1988.

峨眉岩白菜 e mei yan bai cai

Herbs perennial, ca. 35 cm tall. Rhizomes thick, scaly. Leaves all basal; petiole 3–4.7 cm, sheathless part 1.3–2 cm, sheathing base rigidly ciliate at margin, cilia sometimes glandular tipped; leaf blade narrowly obovate, 9.5–16.5 × 4–8.3 cm, leathery, glabrous, base cuneate, margin entire, apex obtuse. Inflorescence cymose, ca. 18 cm; branches and pedicels sparsely subsessile glandular. Sepals spreading, subovate, ca. 6 × 5 mm, leathery, glandular hairy, veins many, apex obtuse. Petals white or reddish, narrowly obovate, 2.7–2.8 × 1–2.1 cm, base gradually narrowed into a claw ca.

3 mm, apex obtuse. Stamens ca. 1.7 cm. Ovary ovoid, ca. 9.5 mm; styles 2, ca. 1.1 cm. Fl. May–Sep.

- Forests, shaded slopes, rock crevices; 1600–4200 m. C and W Sichuan.

1a. Petals white 4a. var. *emeiensis*
 1b. Petals reddish 4b. var. *rubellina*

4a. *Bergenia emeiensis* var. *emeiensis*

峨眉岩白菜(原变种) e mei yan bai cai (yuan bian zhong)

Petals white. Fl. May–Jun.

- Rock crevices; ca. 1600 m. C Sichuan (Emei Shan, Guan Xian).

4b. *Bergenia emeiensis* var. *rubellina* J. T. Pan, Acta Phytotax. Sin. 32: 573. 1994.

淡红岩白菜 dan hong yan bai cai

Petals reddish. Fl. May–Sep.

- Forests, shaded slopes, rock crevices; 3500–4200 m. W Sichuan.

5. *Bergenia pacumbis* (Buchanan-Hamilton ex D. Don) C. Y. Wu & J. T. Pan in J. T. Pan, Acta Phytotax. Sin. 26: 126. 1988.

舌岩白菜 she yan bai cai

Saxifraga pacumbis Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 209. 1825; *Bergenia ciliata* (Haworth) Sternberg f. *ligulata* Yeo; *B. himalaica* A. Borissova; *B. ligulata* Engler; *S. ligulata* Wallich (1820), not Murray (1781); *S. ligulata* var. *densiflora* Seringe; *S. ligulata* var. *minor* Wallich ex de Candolle.

Herbs perennial, ca. 17 cm tall. Rhizomes thick, scaly. Leaves all basal; petiole 3–10 cm or longer, sheathless part ca. 1 cm, sheathing base rigidly ciliate at margin; leaf blade orbicular or broadly ovate to broadly obovate, 7–15 × 6.6–13.2 cm, leathery, both surfaces glabrous, base rounded, margin entire or obscurely crenate, rigidly ciliate, apex obtuse. Inflorescence cymose, ca. 7.5 cm; branches and pedicels sparsely subsessile glandular. Hypanthium sparsely glandular hairy. Sepals spreading, broadly ovate, 3–3.5 mm, leathery, glabrous, veins many, apical margin sometimes sparsely dentate. Petals white or pink, orbicular, ca. 8.5 × 6 mm, veins many, base narrowed into a claw ca. 2 mm, apex obtuse. Stamens ca. 5.5 mm.

Ovary ovoid, ca. 4 mm; styles 2, ca. 4 mm. Fl. Jun–Aug. $2n = 34$.

- Forests, rock crevices; 2300–2400 m. S Xizang, W Yunnan (Lincang Daxue Shan) [Afghanistan, Bhutan, NE India, Kashmir, Nepal, Pakistan, Sikkim].

6. *Bergenia tianquanensis* J. T. Pan, Acta Phytotax. Sin. 32: 571. 1994.

天全岩白菜 tian quan yan bai cai

Herbs perennial, ca. 25 cm tall. Rhizomes dark brown, thick, scaly. Leaves all basal; petiole pilose, sheathless part ca. 1.5 cm, sheathing base rigidly ciliate at margin; leaf blade obovate to broadly so, 4.9–8.4 × 4.3–8.8 cm, leathery, both surfaces subsessile glandular, base cuneate, margin dentate and serrate, rigidly ciliate, apex obtuse. Inflorescence cymose, 7–11.5 cm; branches and pedicels glandular hairy. Sepals erect, subligulate, 9–10 × 4–5.6 mm, leathery, subsessile glandular, veins mostly confluent at apex, margin glabrous, apex obtuse. Petals reddish, elliptic, ca. 1.6 × 1 cm, veins many, base narrowed into a claw ca. 3 mm, apex obtuse. Stamens ca. 1.2 cm; filaments subulate. Ovary semi-inferior, ovoid, ca. 6 mm; styles 2, ca. 1 cm. Fl. May–Jun.

- Rock crevices; 2200–3300 m. C Sichuan (Tianquan Xian).

7. *Bergenia stracheyi* (J. D. Hooker & Thomson) Engler, Bot. Zeitung (Berlin) 26: 842. 1868.

短柄岩白菜 duan bing yan bai cai

Saxifraga stracheyi J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 61. 1858; *S. milesii* Baker. Herbs perennial, ca. 20 cm tall. Rhizomes thick. Leaves all basal; petiole 1–1.8 cm, sheathless part to 1 cm, sheathing base rigidly ciliate at distal margin; leaf blade obovate, 7–7.5 × 4.2–4.6 cm, both surfaces glabrous, base cuneate or rounded, margin serrate or doubly so, rigidly ciliate, apex obtuse. Inflorescence cymose, 5–8 cm; branches and pedicels long glandular hairy. Hypanthium glandular hairy. Sepals subovate, 5–6 × 3.5–4 mm, fleshy, abaxially glandular hairy, veins many, not confluent at apex, margin denticulate-ciliate. Petals red, subspatulate, ca. 9.5 × 4–5 mm, base gradually narrowed into a claw 2–3 mm, apex obtuse. Stamens 6–7 mm. Ovary ovoid, ca. 6 mm; styles 2, ca. 7 mm. Fl. Jun–Oct. $2n = 34$.

- Forests, rock crevices; 3900–4500 m. SW Xizang [E Afghanistan, N India, Kashmir, Nepal, W Pakistan, Tajikistan].

9. PELTOBOYKINIA (Engler) H. Hara, Bot. Mag. (Tokyo) 51: 251. 1937.

涧边草属 jian bian cao shu

Pan Jintang (潘锦堂); Douglas E. Soltis

Boykinia Nuttall sect. *Peltoboykinia* Engler in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 18a: 120. 1930.

Herbs perennial. Rhizomes spreading, short, thick. Leaves alternate, simple. Basal leaves long petiolate, peltate or orbicular-cordate, large, palmately lobed; stipules membranous. Cauline leaves few, similar to basal ones but much smaller. Inflorescence cymose; bracts small. Hypanthium proximally adnate to ovary. Sepals 5. Petals 5, yellowish, margin usually sparsely denticulate. Stamens 10. Carpels 2, connate; ovary 1/2 subinferior, 2-loculed; placentation axile; ovules numerous; styles 2, free. Fruit a capsule. Seeds numerous, small, tuberculate.

Two species: China, Japan; one species in China.

This genus is most closely related to *Chrysosplenium*.

1. *Peltoboykinia tellimoides* (Maximowicz) H. Hara, Bot. Mag. (Tokyo) 51: 252. 1937.

润边草 jian bian cao

Saxifraga tellimoides Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 16: 215. 1871; *Boykinia tellimoides* (Maximowicz) Engler.

Plants 20–100 cm tall. Rhizomes 1.5–2 cm in diam. Leaves mostly basal. Basal leaves usually 1 or 2, green; petiole 20–35 cm, glabrous or pilose; leaf blade 15–25 cm in diam., margin palmately 7–9-lobed; lobes broadly triangular-ovate or obliquely triangular, 4–7 × 5–8 cm, glabrous to pilose, margin irregularly serrate, apex acute to shortly acuminate. Cauline leaves few,

usually 2 or 3, much smaller than basal leaves. Inflorescence 40–80 cm; bracts linear, 1–3 mm; pedicels 5–10 mm, sparsely glandular hairy. Sepals ovate-triangular, 2.5–4 mm, sparsely glandular hairy. Petals pale yellow, narrowly oblong, 0.6–1.4 cm × 3.5–5 mm, sparsely glandular hairy, margin sparsely dentate distally, apex shortly acuminate. Filaments short, thick; anthers oblong. Ovary 1.2–1.4 cm × ca. 8 mm; stigmas ellipsoid or subovoid. Seeds ellipsoid, 0.8–1 mm. Fl. Jul–Oct. $2n = 22$.

Shaded places in ravines and forest understories; 1100–1900 m. N Fujian (Chong'an Xian) [Japan].

10. SAXIFRAGA Linnaeus, Sp. Pl. 1: 398. 1753.

虎耳草属 hu er cao shu

Pan Jintang (潘锦堂); Richard Gornall, Hideaki Ohba

Herbs perennial, rarely annual or biennial. Stem cespitose or simple. Leaves both basal and cauline, petiolate or not; leaf blade simple, entire, margin dentate or lobate; cauline leaves usually alternate, rarely opposite. Inflorescence a solitary flower or few- to many-flowered cyme, bracteate. Flowers usually bisexual, sometimes unisexual, actinomorphic, rarely zygomorphic; receptacle cyathiform or saucer-shaped. Sepals (4 or)5(or 7 or 8). Petals (4 or)5, yellow, orange, white, or red to purple, callose or not, distinctly veined, margin usually entire. Stamens (8 or)10; filaments subulate or clavate. Carpels 2, usually connate at least in placental region; ovary superior to inferior, usually 2-loculed; placentation usually axile; ovules many; integuments 1 or 2; nectary disc sometimes well developed, annular or semiannular. Fruit a 2-valved capsule. Seeds many.

About 450 species: Asia, Europe, North America, South America (Andes), mainly in alpine areas; 216 species (139 endemic) in China. Two of the present authors (Gornall and Ohba) prefer to segregate *Micranthes* from *Saxifraga* on the basis of certain morphological differences (Webb & Gornall, Saxifrages of Europe, 1987) and data from DNA gene sequences (Soltis et al., Amer. J. Bot. 83: 371–382. 1996; and pers. comm.). However, for the purposes of this floristic treatment, *Micranthes* is treated as *S.* sect. *Micranthes*.

1a. Flowering stem leafless; all leaves arranged in a compact, basal rosette, containing crystals; stamen filaments clavate or linear to subulate.

2a. Flowers actinomorphic; seed surface usually longitudinally ribbed, ribs ribbonlike or pectinate; carpel

placentas united for less than 1/2 their length 1. *S.* sect. *Micranthes*

2b. Flowers zygomorphic; seed surface not ribbed; carpel placentas united for more than 1/2 their length 2. *S.* sect. *Irregulares*

1b. Flowering stem leafy; leaves distributed along stem, sometimes aggregated toward base, or sometimes forming columnar rosettes, lacking crystals; stamen filaments linear to subulate.

3a. Rhizomes with bulbils; basal leaves petiolate 5. *S.* sect. *Mesogyne*

3b. Rhizomes without bulbils; basal leaves petiolate or sessile.

4a. Leaves with chalk glands (calcium-secreting pores), bearing deposits of chalk 6. *S.* sect. *Porphyron*

4b. Leaves without chalk glands.

5a. Leaves lobed; flower solitary, sessile; petals white; ovary inferior or subinferior . 7. *S.* sect. *Saxifraga*

5b. Leaves usually entire; flowers 1 to several; petals usually yellow; ovary superior to semi-inferior.

6a. Leaf surfaces shiny, glabrous; petals white or cream; sepals erect 3. *S.* sect. *Trachyphyllum*

6b. Character combination not as above 4. *S.* sect. *Ciliatae*

1. *Saxifraga* sect. *Micranthes* (Haworth) D. Don, Trans. Linn. Soc. London 13: 345. 1822.

小花组 xiao hua zu

Micranthes Haworth, Syn. Pl. Succ. 320. 1812.

Herbs perennial, usually evergreen. Rhizomes short, slender or thick, scaly, fibrous rooted. Stem cespitose or simple. Leaves alternate, all basal in rosettes, distinctly petiolate or tapered at base into a broad, indistinct petiole; leaf blade often carnose or leathery, margin often crenate, serrate, or dentate, rarely entire; hydathodes set in leaf margin, equidistant between abaxial and adaxial surfaces, not secreting chalk; foliar crystals present as druses. Flowering stem scapose, sometimes with leaflike bracts; inflorescence cymose, either lax or often much congested and restricted to apex of stem, usually several flowered. Flowers bisexual, usually actinomorphic. Sepals 5. Petals 5(or 7 or 8), usually white, rarely purplish, sometimes with yellow, orange, or purple spots. Stamens 10; filaments linear,

subulate, or clavate; pollen 2-nucleate; exine tectum reticulate. Carpels 2, ovuliferous part united only at base or for up to 1/2 its length; styles free; nectary a band or fleshy disc adnate to and encircling base of ovary; ovary superior to more than 1/2 inferior, markedly expanding in fruit; integument 1. Fruit follicular (when carpels united only at base and placentation marginal) or a 2-loculed capsule (when ovuliferous portions united for up to 1/2 their length and placentation axile proximally and marginal distally), often inflated, dehiscent to middle or base. Seeds many, ellipsoid to fusiform, with longitudinal, ribbonlike, undulating or distinctly pectinate ribs, occasionally ribs indistinct or absent.

About 70 species: Asia, Europe, North America, mainly in montane areas; 13 species (six endemic) in China.

1a. Stamen filaments clavate.

2a. Leaves reniform to cordate; petiole slender, radially symmetric.

3a. Stamens shorter than or equaling petals 1. *S. nelsoniana*

3b. Stamens longer than petals 2. *S. manchuriensis*

2b. Leaves cuneate to truncate; petiole broad, flattened.

4a. Basal leaves spatulate.

5a. Plants at least 6 cm tall; inflorescence more than 7-flowered; carpels strongly divergent in fruit 3. *S. davidii*

5b. Plants to 6 cm tall; inflorescence 2- or 3-flowered; carpels not strongly divergent in fruit 4. *S. clavistaminea*

4b. Basal leaves ovate to oblong-ovate.

6a. Inflorescence 4–13-flowered 5. *S. pallida*

6b. Inflorescence 1- or 2-flowered, flower nodding if solitary 6. *S. parvula*

1b. Stamen filaments linear or subulate.

7a. Leaf blade glabrous on both surfaces, margin entire 8. *S. dungbooi*

7b. Leaf blade glabrous or pubescent on both surfaces, margin crenate-dentate.

8a. Petals not overlapping, narrowly ovate, less than 1.8 mm wide.

9a. Inflorescence ± cylindric; petals red or purple 10. *S. lumpuensis*

9b. Inflorescence corymbose; petals white or pink.

10a. Petals white or pink, 1-veined 11. *S. zekoensis*

10b. Petals white, 3-veined 12. *S. divaricata*

8b. Petals overlapping, ovate to broadly so, more than 1.8 mm wide.

11a. Ovary broadly ovoid, broader than long; petals white, rarely red or purple 7. *S. melanocentra*

11b. Ovary ovoid, at least as long as broad; petals white, red, or purple.

12a. Inflorescence cylindric 9. *S. atrata*

12b. Inflorescence ± corymbose.

13b. Basal leaf margin coarsely 5–8-toothed toward apex; sepals to 2.5 mm 13. *S. laciniata*

13a. Basal leaf margin crenate-serrate, not coarsely toothed; sepals at least 2.9 mm 7. *S. melanocentra*

1. *Saxifraga nelsoniana* D. Don, Trans. Linn. Soc. London 13: 355. 1822.

斑点虎耳草 *ban dian hu er cao*

Micranthes aestivalis (Fischer & C. A. Meyer) Small;

M. nelsoniana (D. Don) Small; *Saxifraga aestivalis*

Fischer & C. A. Meyer; *S. punctata* Linnaeus subsp.

nelsoniana (D. Don) Hultén; *S. punctata* var.

nelsoniana (D. Don) Engler.

Stem 22–33 cm tall, glandular pilose. Petiole 4–10.7 cm, glandular pilose; leaf blade reniform, 1.6–5.5 × 1.9–

6.5 cm, adaxially glandular pubescent, palmately

veined, margin 19–21-dentate, glandular ciliate, teeth

broadly ovate. Inflorescence paniculate, 5–15 cm, 30–

52-flowered; branches and pedicels glandular hairy.

Hypanthium ca. 0.6 mm, glabrous. Sepals reflexed,

ovate to broadly so, 0.7–1.3 × 0.7–1 mm, glabrous, 1-

veined. Petals white or lilac, ovate, 2.1–2.7 × 1.6–1.8

mm, 1-veined, base contracted into a claw 0.5–0.7 mm,

apex retuse. Stamens 2–3 mm; filaments clavate.

Carpels subsuperior to superior, united only at base,

purple or green, conical, with a basal, annular nectary;

styles erect or slightly spreading, 0.2–0.5 mm; follicles

erect or slightly divergent, bottle-shaped, 5–6 mm. Fl.

Jul, fr. Aug. $2n = 28, 30, 32, 40, ca. 60, 70, 76, 80, 84,$
ca. 88.

Pinus koraiensis forests, forest margins, rock crevices; 1700–2300 m. Heilongjiang, Jilin, Nei Mongol [Korea, Mongolia, Russia; North America].

The name *Saxifraga punctata* Linnaeus has become hopelessly confused in the literature and, following Webb (Repert. Spec. Nov. Regni Veg. 69: 153–154. 1964), the present authors have abandoned it as a *nomen confusum*. The type of *S. punctata* actually belongs to the species known widely as *S. davurica* Willdenow. The next available name for the species under consideration is *S. nelsoniana*.

2. *Saxifraga manchuriensis* (Engler) Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 22: 415. 1903.

腺毛虎耳草 *xian mao hu er cao*

Saxifraga punctata Linnaeus var. *manchuriensis* Engler, Monogr. *Saxifraga*, 139. 1872.

Stem 24–40 cm tall, crisped glandular villous. Petiole 6–17 cm, glandular piliferous; leaf blade reniform to orbicular-cordate, 3–5.7 × 3.8–8 cm, abaxially and marginally pubescent or glandular pubescent, palmately veined, margin 24–26-crenate. Inflorescence paniculate,

3–6 cm; pedicels glandular pubescent. Sepals 7(or 8), reflexed, sublanceolate, 1.3–1.5 × 0.4–0.5 mm, subcarinose, glabrous on both surfaces, 1-veined, margin glandular ciliate, apex subobtuse. Petals white, oblong-ob lanceolate, 2.3–3 × ca. 1 mm, 1-veined, base gradually contracted into a claw 0.3–0.5 mm, apex emarginate. Stamens 11–13, 1.4–4.5 mm; filaments clavate. Carpels superior, united only at base, purple or green, conical, with a basal, annular nectary; styles erect or slightly spreading, 1–1.2 mm; follicles erect or slightly divergent, bottle-shaped, 3.5–5 mm. Fl. Jul–Aug, fr. Sep. $2n = 30$ –32.

Forest meadows, rock crevices on slopes. Heilongjiang, E Jilin [Korea, Russia].

3. *Saxifraga davidii* Franchet, *Nouv. Arch. Mus. Hist. Nat.*, sér. 2, 8: 229. 1886.

双喙虎耳草 *shuang hui hu er cao*

Micranthes birostris (Engler & Irmscher) Losinskaja; *M. davidii* (Franchet) Losinskaja; *M. leptarrhenifolia* (Engler & Irmscher) Losinskaja; *S. birostris* Engler & Irmscher; *S. leptarrhenifolia* Engler & Irmscher.

Stem 7.5–30 cm tall, crisped glandular villous. Petiole ca. 1.5 cm, margin villous; leaf blade obovate, 2.5–8.5 × 1.5–4 cm, glandular pubescent, pinniveined, base cuneate, margin crenate to dentate-serrate, apex obtuse. Inflorescence paniculate, elongate, 7–30-flowered; branches to 4.5 cm, glandular pubescent; pedicels ca. 8 mm, glandular pubescent. Sepals reflexed, subtriangular to ovate, ca. 2 × 1.1–1.2 mm, glabrous, veins 3, confluent into a verruca, apex subobtuse or acute. Petals white, with a yellow spot at base, elliptic to ovate, 3.2–3.6 × 1.3–1.6 mm, 3- or 4-veined, base with a claw 0.2–0.3 mm, apex obtuse or retuse. Stamens ca. 2.3 mm; filaments clavate; anthers brown. Carpels subsuperior to superior, united only at base, conical, with a basal, narrow, annular nectary; stigmas sessile; follicles widely divergent, bottle-shaped, ventrally convex, 5–9 mm. Fl. Apr–May.

Rock crevices in ravines; 1500–2400 m. W Sichuan [N Myanmar].

4. *Saxifraga clavistaminea* Engler & Irmscher, *Notes Roy. Bot. Gard. Edinburgh* 5: 124. 1912.

棒蕊虎耳草 *bang rui hu er cao*

Micranthes clavistaminea (Engler & Irmscher) Losinskaja; *S. blinii* H. Léveillé.

Stem 4.2–5.5 cm tall, glandular villous. Sterile branches present. Petiole ca. 6 mm, margin villous; leaf blade obovate-elliptic, 2–2.4 × 1.2–1.9 cm, abaxially glandular villous near midvein, adaxially glandular pubescent, margin doubly serrate and multicellular glandular ciliate, apex obtuse or acute. Inflorescence 2- or 3-flowered; pedicels pilose. Sepals reflexed, ovate, ca. 3.1 × 1.4 mm, glabrous, veins 3, confluent into a verruca at apex. Petals white, proximally with 2 yellow and 3 purple spots, ovate, 4.3–4.6 × 2–2.1 mm, 3-

veined, base with a claw 0.3–0.5 mm, apex obtuse. Stamens ca. 3 mm; filaments clavate. Carpels subsuperior to superior, united only at base, conical, with a basal, thick, annular nectary; stigmas sessile; follicles bottle-shaped. Fl. May–Jul.

• Forests, rock crevices in valleys; 2300–3600 m. WC Sichuan (Shimian Xian), C and W Yunnan (Dali Xian, Jingdong Xian, Luquan Xian).

5. *Saxifraga pallida* Wallich ex Seringe in de Candolle, *Prodr.* 4: 38. 1830.

多叶虎耳草 *duo ye hu er cao*

Micranthes pallida (Wallich ex Seringe) Losinskaja; *M. pallidiformis* (Engler) Losinskaja; *Saxifraga clavistamineoides* T. C. Ku; *S. himalaica* N. P. Balakrishnan; *S. micrantha* Edgeworth (1846), not Fischer ex de Candolle (1830); *S. micrantha* var. *micrantha* f. *corymbiflora* Engler & Irmscher; *S. micrantha* var. *micrantha* f. *foliosa* Engler & Irmscher; *S. micrantha* var. *micrantha* f. *minor* Engler & Irmscher; *S. micrantha* var. *monbeigii* Engler & Irmscher; *S. micrantha* var. *yunnanensis* Franchet; *S. micranthoides* Engler; *S. pallida* Wallich ex Seringe f. *bracteosa* Engler & Irmscher; *S. pallida* f. *corymbiflora* Engler & Irmscher; *S. pallida* f. *foliosa* Engler & Irmscher; *S. pallida* f. *geoides* J. Anthony; *S. pallida* var. *monbeigii* Engler & Irmscher; *S. pallidiformis* Engler.

Stem 3.5–33 cm tall, piliferous. Petiole 1–10 cm, adaxially and marginally piliferous; leaf blade narrowly to broadly ovate, rarely obovate, 1.3–8 × 0.7–3.7 cm, adaxially piliferous, base cuneate or truncate to subcordate, margin 11–25-crenate or obtusely dentate, ciliate, apex obtuse. Inflorescence paniculate, 4–20 cm, 4–13-flowered; branches and pedicels pubescent; most proximal bract ovate to narrowly so, 1.2–4 × 0.5–2 cm, adaxially pubescent, base with a stalk 2–7 mm, margin dentate, ciliate, apex acute. Sepals spreading to reflexed, ovate to narrowly so, 3.3–3.8 × 1–2 mm, both surfaces usually glabrous, rarely abaxially pilose, veins 3–7, confluent at apex, margin pilose at base. Petals white, proximally with 2 yellow spots, ovate, 4–4.4 × 2–3 mm, 3–7-veined, base with a claw 0.6–0.9 mm, apex acute, obtuse, or retuse. Stamens 2.5–4 mm; filaments clavate; anthers purple. Ovary up to 1/3 inferior, green or tinged purple, ovoid, 1.6–3 mm, with an annular nectary; styles 1–1.5 mm. Capsule 5–8 mm; carpels divergent distally. Fl. and fr. Jul–Oct. $2n = 22^*$, 44, 66*.

Forests, alpine scrub, alpine meadows, alpine rock crevices; 3000–5000 m. S Gansu, W Sichuan, SE Xizang, NW Yunnan [Bhutan, N India, Kashmir, Nepal, Sikkim].

Saxifraga pallida is a variable species. Two of the present authors (Gornall and Ohba) believe that there are at least two varieties that may or may not correspond in some way with the variation in chromosome number. Diploid plants ($2n = 22$) have small leaf blades (usually less than 3 cm); they also exist as two morphs: one Chinese, with petals more than 3 × 2 mm, and the other Himalayan, with petals less than 3 × 1.5 mm. Tetraploid plants ($2n = 44$) have longer leaf blades more than 3 cm, but are also represented by two variants each with its own distinctive karyotype. Preliminary cytological details

have been published by Wakabayashi (Newsl. Himalayan Bot. 21: 9–13. 1997). Further work is needed to devise a taxonomy that reflects the complex pattern of variation.

6. *Saxifraga parvula* Engler & Irmscher, Notes Roy. Bot. Gard. Edinburgh 5: 127. 1912.

微虎耳草 *wei hu er cao*

Micranthes parvula (Engler & Irmscher) Losinskaja.

Stem 2.7–4 cm tall, slender, crisped villous. Leaves spatulate, 1.4–1.8 cm × 6.5–8 mm, leathery, crisped villous abaxially and adaxially distally, base gradually narrowed, margin 7–9-serrate, ciliate, apex subobtuse. Inflorescence 1- or 2-flowered; pedicels 5–13 mm, crisped villous. Sepals spreading, ovate to triangular-ovate, 2.5–2.8 × 2.3–3 mm, subcarnose, veins 3, confluent into a verruca at apex, margin sparsely ciliate, apex subobtuse. Petals white, proximally 2-spotted, ovate to elliptic, 3–3.5 × 2.4–2.6 mm, 3-veined, base with a claw ca. 0.5 mm, apex subobtuse. Stamens ca. 2 mm; filaments ± clavate; anthers black. Ovary up to 1/3 inferior, tinged purple, broadly ovoid; nectary indistinct; styles ca. 0.3 mm thick. Capsule ovoid, ca. 7.5 mm; carpels divergent distally. Fl. Jul–Aug.

• Alpine scrub meadows, alpine rock crevices; 3800–5700 m. NW Yunnan.

7. *Saxifraga melanocentra* Franchet, J. Bot. (Morot) 10: 263. 1896.

黑蕊虎耳草 *hei rui hu er cao*

Micranthes melanocentra (Franchet) Losinskaja; *M. pseudopallida* (Engler & Irmscher) Losinskaja; *Saxifraga atrata* Engler var. *subcorymbosa* Engler; *S. gageana* W. W. Smith (1911), not Engler & Irmscher (1912); *S. melanocentra* f. *angustispathulata* Engler; *S. melanocentra* f. *franchetiana* Engler & Irmscher; *S. melanocentra* f. *pluriflora* Engler & Irmscher; *S. paludosa* J. Anthony; *S. pseudopallida* Engler & Irmscher; *S. pseudopallida* f. *bracteata* Engler & Irmscher; *S. pseudopallida* f. *foliosa* Engler & Irmscher; *S. sulphurascens* Handel-Mazzetti.

Stem 3.5–22 cm tall, crisped glandular villous. Petiole 0.7–3.6 cm, pilose; leaf blade rhombic-ovate or broadly to narrowly ovate to oblong, 0.8–4 × 0.7–1.9 cm, both surfaces pilose or glabrous, base cuneate, rarely cordate, margin crenate-serrate, glandular ciliate, apex subobtuse or acute. Inflorescence corymbose, 1.5–8.5 cm, 2–17-flowered; bracts ovate or elliptic to oblong, 0.5–1.5 cm × 1.1–11 mm, both surfaces glabrous or pilose, base cuneate, rarely broadly so, margin entire or dentate, apex acute. Sepals spreading to reflexed, triangular-ovate to narrowly ovate, 2.9–6.5 × 1.2–3 mm, glabrous or pilose, veins 3–8, confluent into a verruca at apex, apex obtuse or acuminate. Petals white, rarely red to purple, proximally with 2 yellow spots, or base red to purple, broadly ovate or ovate to elliptic, 3–6.1 × 2.1–5 mm, 3–9(–14)-veined, base contracted into a claw 0.5–1 mm, apex obtuse or retuse. Stamens 2.2–5.5 mm; filaments linear; anthers black. Ovary semi-inferior, dark purple, broadly ovoid, 2.8–4 mm, with an

obscurely lobed, annular nectary; styles 0.5–3 mm.

Capsule ovoid, 7–11 mm. Fl. and fr. Jul–Sep. $2n = 22^*$, 66, 88, 99, 110.

Alpine scrub, meadows, rock crevices, streamsides, bogs; 3000–5300 m. S Gansu, Qinghai, Shaanxi (Taibai Shan), W Sichuan, NW Yunnan, Xizang [Bhutan, Kashmir, Nepal, Sikkim].

Saxifraga melanocentra, as circumscribed in the present account, is polymorphic. Some of the variation is apparently correlated with chromosome number, while some is possibly associated with putative hybrids with *S. pallida*. Plants from SW China are smaller and have better-developed nectary discs than their counterparts in Nepal. Preliminary cytological details have been published by Wakabayashi (Newsl. Himalayan Bot. 21: 9–13. 1997).

Two of the present authors (Gornall and Ohba) regard *Saxifraga gageana* and *S. paludosa* as distinct species of *Micranthes*.

8. *Saxifraga dungbooi* Engler & Irmscher, Bot. Jahrb. Syst. 50 (Beibl. 114): 39. 1914.

邓波虎耳草 *deng bo hu er cao*

Stem 8–12 cm tall, pale brown crisped glandular villous. Petiole 1–3 cm; leaf blade ovate-oblong to oblong-elliptic, 1–1.5 cm × 5–7 mm, glabrous or sparsely hairy, base cuneate, margin entire, apex subacute.

Inflorescence paniculate, 3–7-flowered; branches 1.5–3 cm; bracts linear to linear-oblong, 0.5–1.5 cm × 1–2.5 mm; pedicels glandular hairy. Sepals spreading, ovate or triangular-ovate, 2.5–3.5 × 1.5–2 mm, glabrous, veins 3, confluent into a verruca at apex, apex subacute. Petals white, ovate to obovate-oblong, 4.5–7 × 2.2–3.5 mm, 3–5-veined, base contracted into a short claw, apex obtuse. Stamens 2–3.5 mm; filaments subulate. Ovary semi-inferior, dark purple, broadly ovoid, with an indistinct, annular nectary; stigmas subsessile. Capsule ovoid. Fl. and fr. Aug.

S Xizang [Sikkim].

9. *Saxifraga atrata* Engler, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 29: 117. 1883.

黑虎耳草 *hei hu er cao*

Micranthes atrata (Engler) Losinskaja.

Stem simple or cespitose, 7–23 cm tall, sparsely white crisped villous. Petiole 1–2 cm; leaf blade ovate to broadly so, 1.2–2.5 × 0.8–1.8 cm, both surfaces subglabrous, margin crenate-serrate, ciliate, apex subobtuse or acute. Inflorescence usually cylindric, 3–15 cm, 7–25-flowered; pedicels pilose. Sepals reflexed, ovate or triangular-ovate, 2.4–3.2 × 1.5–2 mm, glabrous, veins 3–7, confluent into a verruca at apex, apex acute or subacuminate. Petals white, ovate to elliptic, 2.8–4 × 1.8–2.2 mm, base contracted into a claw 0.8–1 mm, 5–7-veined, apex obtuse or retuse. Stamens 3–5.9 mm; filaments subulate; anthers dark purple. Ovary up to 1/3 inferior, dark purple, broadly ovoid, 1–3.4 mm, with a broad, annular nectary; styles 1–2.5 mm. Capsule ovoid, ca. 7 mm; styles erect. Fl. and fr. Jul–Aug.

• Alpine meadows, rock crevices; 3000–4200 m. SE Gansu, NE Qinghai.

10. *Saxifraga lumpuensis* Engler, Repert. Spec. Nov. Regni Veg. Beih. 12: 394. 1922.

道孚虎耳草 *dao fu hu er cao*

Micranthes lumpuensis (Engler) Losinskaja.

Stem 5–27 cm tall, white pilose. Petiole 1–5.7 cm, pilose; leaf blade ovate, broadly so, or oblong, 0.6–2.5 × 0.6–2.1 cm, adaxially pilose, base truncate or cuneate to cordate, margin crenate and ciliate, rarely subentire, apex obtuse. Inflorescence narrowly paniculate to ± cylindric, 3–17 cm, 11–56-flowered; branches and pedicels white pilose; bracts ovate to narrowly so, 0.6–2.5 × 0.5–2.7 cm, adaxially pilose, base cordate to truncate, margin crenate, apex acute. Sepals spreading to reflexed, lilac, triangular-ovate, 1.5–3 × 1–1.6 mm, glabrous, 1-veined, apex acute or subacuminate. Petals red or purple, ovate to narrowly so, 2.4–4.3 × 0.7–1.3 mm, 1(or 3)-veined, base contracted into a claw 0.2–1 mm, apex acute. Stamens 1.2–1.5 mm; filaments subulate. Ovary semi-inferior, ovoid, with a thick, annular, 10-lobed nectary; styles ca. 0.8 mm. Capsule subglobose, ca. 3.5 × 3 mm; carpels distally divergent. Fl. Jun–Jul.

• Forests, slopes, alpine meadows, by water; 3500–4100 m. S Gansu, W Sichuan.

11. *Saxifraga zekoensis* J. T. Pan, Acta Phytotax. Sin. 16(2): 21. 1978.

泽库虎耳草 *ze ku hu er cao*

Stem 15–19 cm tall, white crisped villous. Petiole 1.7–2.5 cm, sparsely crisped villous; leaf blade ovate to lanceolate-oblong, 1.5–3 × ca. 1.4 cm, both surfaces ± pilose, pinniveined, margin serrate, sparsely ciliate, apex acute. Inflorescence corymbose, 10–11 cm, 21–29-flowered; branches 2–8 cm, 2–4-flowered; bracts linear, ca. 1.5 cm × 2.5 mm, both surfaces glabrous, margin crisped villous; pedicels densely white crisped villous. Sepals spreading, triangular-ovate, 3.2–3.5 × 1.8–2 mm, glabrous, veins 4–8, confluent into a verruca at apex, apex acute. Petals white or pink with lilac claw, narrowly ovate to suboblong, 2.5–3 × 1–1.3 mm, 1-veined, base contracted into a claw 0.5–2 mm, apex subobtuse or acute. Stamens ca. 3.5 mm; filaments ?linear. Ovary up to 1/3 inferior, dark purple, ovoid; styles ca. 1 mm. Capsule ca. 7.5 mm; carpels divergent distally. Fl. and fr. Jul–Sep.

• Alpine meadows; ca. 3000 m. E Qinghai (Zêkog Xian).

2. *Saxifraga* sect. *Irregulares* Haworth, Misc. Nat. 158. 1803.

石荷叶组 *shi he ye zu*

Diptera Borkhausen.

Herbs perennial, forming erect individuals, lacking basal bulbils. Leaves alternate, all basal, petiolate; leaf blade herbaceous or leathery, lacking chalk glands, margin lobed; foliar crystals present mainly as druses. Flowering stem usually scapose; inflorescence cymose. Flowers bisexual, zygomorphic, 5-merous. Petals white or pink, not callose. Filaments clavate; pollen 2-nucleate, exine tectum smooth. Carpels connate at least proximally, dehiscent distally in fruit. Ovary superior. Integuments 2.

About ten species: China, Japan; seven species (four endemic) in China.

12. *Saxifraga divaricata* Engler & Irmscher, Bot. Jahrb. Syst. 50(Beibl. 114): 41. 1914.

叉枝虎耳草 *cha zhi hu er cao*

Micranthes divaricata (Engler & Irmscher) Losinskaja.

Stem 3.7–10 cm tall, white crisped glandular villous. Petiole 1.7–3 cm, glabrous; leaf blade ovate to oblong, 0.7–2.4 cm × 3–13 mm, glabrous, base cuneate, margin serrate or entire, apex obtuse or acute. Inflorescence paniculate, 5–14-flowered; branches markedly spreading, 1–4 cm; bracts oblong to oblong-linear, 3.5–7 × 1–1.5 mm; pedicels densely crisped glandular villous. Sepals spreading, triangular-ovate, 1–3.8 × 0.9–2.5 mm, glabrous, veins 3 to many, confluent at apex, apex obtuse. Petals white, ovate to elliptic, 2.3–3 × 1–1.7 mm, 3-veined, base contracted into a claw 0.5–0.9 mm, apex obtuse or retuse. Stamens 1.5–4 mm; filaments subulate; anthers purple. Ovary semi-inferior, dark purple, broadly ovoid, ca. 2.5 mm, with an annular nectary; styles 0.5–2 mm. Capsule oblong-ovoid, 4–5 mm; carpels divergent distally. Fl. and fr. Jul–Aug.

• Scrub meadows, marsh meadows; 3400–4500 m. SE Qinghai, W Sichuan, Xizang.

13. *Saxifraga laciniata* Nakai & Takeda in Nakai, Bot. Mag. (Tokyo) 28: 305. 1914.

长白虎耳草 *chang bai hu er cao*

Saxifraga takedana Nakai.

Stem 6–26 cm tall, glandular piliferous. Leaves usually spatulate, 1.3–3 cm × 4–10 mm, subcarnose, adaxially glandular piliferous, margin entire proximally, coarsely 5–8-serrate distally, glandular ciliate, apex acute. Inflorescence corymbose, 1.7–13 cm, 5–7-flowered; branches and pedicels glandular pubescent; bracts lanceolate or linear, 2–12 mm. Sepals reflexed, ovate, 2.3–2.5 × ca. 1.5 mm, subcarnose, glabrous, veins 3, confluent at apex, apex acute. Petals white, proximally with 2 yellow spots, ovate or narrowly so to oblong, 3–4.5 × 1.8–2 mm, 3–5-veined, base contracted into a claw 1–1.1 mm, apex subobtuse or acute. Stamens ca. 3 mm; filaments subulate. Ovary subsuperior, green, ovoid, 2–2.5 mm; styles ca. 0.2 mm. Capsule 5–7 mm. Fl. and fr. Jul–Aug. $2n = 20$.

Meadows, rock crevices; 2300–2600 m. Jilin [Japan, Korea, Russia (Sakhalin)].

- 1a. Stolons arising from axils of basal leaves, filiform 20. *S. stolonifera*
 1b. Stolons absent.
 2a. Leaf blade peltate or ovate to broadly so, or elliptic to oblong, abaxially sometimes brown spotted.
 3a. Leaf blade peltate or ovate to broadly so, abaxially brown spotted 18. *S. mengtzeana*
 3b. Leaf blade elliptic to oblong 14. *S. kwangsiensis*
 2b. Leaf blade reniform to orbicular, abaxially usually concolorous.
 4a. Leaf blade with foliar embryos in sinus adaxially 19. *S. epiphylla*
 4b. Leaf blade without foliar embryos.
 5a. Longest petal serrate at margin 17. *S. fortunei*
 5b. Longest petal entire at margin.
 6a. Flowering stem and inflorescence reddish long glandular villous 15. *S. rufescens*
 6b. Flowering stem and inflorescence shortly glandular pubescent 16. *S. imparilis*

14. *Saxifraga kwangsiensis* Chun & F. C. How ex C. Z. Gao & G. Z. Li, Guihaia 3: 20. 1983.

龙胜虎耳草 long sheng hu er cao

Saxifraga longshengensis J. T. Pan.

Plants ca. 32 cm tall. Rhizomes extremely short. Leaves all basal; petiole 3–7.5 cm, glandular strigose; leaf blade elliptic to oblong, 2.4–6.5 × 1.1–2.2 cm, both surfaces strigose, base cuneate, distal margin serrate, apex acute. Scape sparsely glandular hairy. Inflorescence ca. 11 cm, ca. 16-flowered; branches slender, to 8 cm; pedicels ca. 1.2 cm, slender, glandular pilose. Sepals 5, spreading, subovate, 2–2.3 × ca. 1.2 mm, glandular pilose, veins 3, partly confluent at apex, apex obtuse. Petals 5, white; shortest 3 petals ovate, 3.5–4 × 2–2.4 mm, base with a claw ca. 0.4 mm, apex acute; longest 2 petals linear, 1.7–2 cm × 2–2.2 mm, veins 3, partly confluent at apex, base with a claw 1–1.5 mm, apex acute. Stamens ca. 5 mm. Carpels ca. 4.5 mm; ovary ovoid, ca. 2 mm; styles divergent, ca. 2.5 mm. Fl. and fr. Jul–Oct.

• Rock crevices by water; ca. 800 m. NE Guangxi (Longsheng Ge Zu Zizhixian).

15. *Saxifraga rufescens* I. B. Balfour, Trans. Bot. Soc. Edinburgh 27: 74. 1916.

红毛虎耳草 hong mao hu er cao

Plants 16–40 cm tall. Rhizomes rather long. Petiole 3.7–1.6 cm, red-brown glandular villous; leaf blade reniform or orbicular-reniform to cordate, 2.4–10 × 3.2–12 cm, glandular hairy, base cordate to reniform or cuneate to truncate, margin 9–11-lobed, apex obtuse; lobes broadly ovate, margin irregularly dentate, sometimes 3-lobed. Scape densely red-brown glandular hairy. Inflorescence paniculate, 6–18 cm, 10–31-flowered; branches slender, 2.2–9 cm, 2–4-flowered, glandular hairy; bracts linear, 2.3–6 × 0.5–1.1 mm, margin glandular villous; pedicels 0.6–2.5 cm, glandular hairy. Sepals spreading to reflexed, ovate to narrowly so, 1.3–4 × 0.5–1.8 mm, abaxially and marginally glandular hairy, veins 3, confluent at apex, apex obtuse or shortly acuminate. Petals 5, white to pink; usually shortest 4 petals lanceolate to narrowly so, 4–4.5 × 1–2.3 mm, arcuately 3–5(–8)-veined or 1-veined, base with a claw 0.3–0.6 mm, margin ± glandular ciliate or glabrous, apex subacuminate; longest petal lanceolate to linear, 1–1.9 cm × 1.3–4.6

mm, arcuately 3–9-veined or 1-veined, base with a claw 0.8–1 mm, margin ± glandular ciliate or glabrous, apex obtuse or acuminate. Stamens 4.5–5.5 mm. Ovary ovoid, 1.3–2.5 mm; styles 1.6–3 mm. Fl. Apr–Jun.

• Forests, forest margins, scrub, alpine meadows, rock crevices, slopes, wetlands at sides of valleys; 600–4000 m. W Hubei, Sichuan, SE Xizang, Yunnan.

- 1a. Base of leaf blade cuneate to truncate 15c. var. *flabellifolia*
 1b. Base of leaf blade cordate to reniform.
 2a. Margin of petals glandular ciliate, veins at least 3 15a. var. *rufescens*
 2b. Margin of petals glabrous, vein 1 15b. var. *uninervata*

15a. *Saxifraga rufescens* var. *rufescens*

红毛虎耳草(原变种) hong mao hu er cao (yuan bian zhong)

Diptera sinensis Losinskaja; *Saxifraga sinensis* Engler & Irmscher (1919), not *S. chinensis* Loureiro (1790); *S. sinensis* var. *discolor* Engler & Irmscher.

Leaf blade cordate at base. Petals glandular ciliate at margin; shortest 4 petals 3(–7)-veined, longest petal 3–9-veined.

• Forests, forest margins, scrub, alpine meadows, alpine rock crevices; 1000–4000 m. W Hubei, Sichuan, SE Xizang (Zayü Xian), Yunnan.

15b. *Saxifraga rufescens* var. *uninervata* J. T. Pan, Acta Phytotax. Sin. 29: 7. 1991.

单脉红毛虎耳草 dan mai hong mao hu er cao

Leaf blade cordate at base. Petals 1-veined, margin glabrous.

• Slopes; ca. 2400 m. SC Sichuan (Hongxi).

15c. *Saxifraga rufescens* var. *flabellifolia* C. Y. Wu & J. T. Pan in J. T. Pan, Acta Phytotax. Sin. 29: 7. 1991.

扇叶虎耳草 shan ye hu er cao

Saxifraga flabellifolia Franchet, J. Bot. (Morot) 8: 295. 1894, not R. Brown ex Torrey & A. Gray (1840); *S. zhejiangensis* Z. Wei & Y. B. Chang.

Leaf blade usually cuneate to truncate at base. Petals 3–5 (–8)-veined.

- Forests, wetlands at sides of valleys, rock crevices; 600–2100 m. NE Sichuan, W Yunnan (Kunming Shi).

This variety probably deserves recognition at specific rank on account of its very distinctive leaf shape. In that case, the correct name for the taxon would be *Saxifraga zhejiangensis*.

16. *Saxifraga imparilis* I. B. Balfour, Trans. Bot. Soc. Edinburgh 27: 73. 1916.

大字虎耳草 da zi hu er cao

Saxifraga martini H. Léveillé & Vaniot.

Plants ca. 17 cm tall. Petiole 7–10.5 cm, glabrous; leaf blade reniform, 3.5–4.2 × 3.2–5 cm, adaxially and marginally glandular hairy, base cordate, margin 10- or 11-lobed, apex obtuse; lobes irregularly dentate at margin. Cyme panicle, ca. 12.5 cm, ca. 16-flowered; branches slender, 4.5–6 cm, sparsely glandular hairy; pedicels 1.5–1.8 cm, shortly brown glandular hairy. Sepals reflexed, subovate, ca. 1.7 × 1 mm, abaxially and marginally sparsely brown glandular hairy, veins 3, confluent into a verruca at apex. Petals 5, white; shortest 3 petals narrowly ovate, 3.6–4 × ca. 1 mm, 1-veined, base with a claw 0.6–0.7 mm, apex acute; longer petal linear-lanceolate, ca. 6.3 × 1 mm, base with a claw ca. 0.8 mm, 3-veined; longest petal linear-lanceolate, 1.3–1.5 cm × ca. 1 mm, arcuately 3–5-veined, base with a claw 0.8–1.5 mm. Stamens ca. 5 mm. Ovary ovoid; styles divergent. Fl. and fr. Jul–Oct.

- Scrub, shaded wet rock crevices; 1800–4000 m. C and SE Yunnan.

This species is closely related to *Saxifraga rufescens* var. *rufescens*.

17. *Saxifraga fortunei* J. D. Hooker, Bot. Mag. t. 5377. 1863.

齿瓣虎耳草 chi ban hu er cao

Plants 24–40 cm tall. Petiole 5–18.5 cm, glandular villous; leaf blade reniform to subcordate, 3.3–16 × 3.8–20 cm, abaxially glandular villous, palmately veined, base cordate, margin 7–11-lobed; lobes broadly ovate, margin irregularly dentate, glandular ciliate, apex obtuse or acute. Scape red-brown crisped glandular villous. Inflorescence panicle, 11.5–32 cm, ca. 35-flowered; branches slender, 6–6.5 cm, glandular hairy; bracts narrowly triangular, 7–8 mm, abaxially and marginally glandular villous. Sepals spreading to reflexed, subovate, 1–3.5 × 0.9–1.5 mm, abaxially (or both surfaces) and marginally glandular hairy, veins 3 and confluent at apex or 1, apex obtuse or acute. Petals 5, white to reddish; shortest 3 petals ovate, 1.3–4.1 × 0.9–1.7 mm, 3-veined, base rounded, with a claw 0.2–0.3 mm, margin glandular ciliate or glabrous, apex subacuminate or acuminate; longer petal narrowly ovate, 0.7–1.7 cm × 2–5.3 mm, 3–7-veined, base with a claw 0.2–0.6 mm, margin glandular ciliate or glabrous, apex acuminate; longest petal narrowly ovate, 1.2–2.4 cm × 2.8–6.5 mm, 3–8(–14)-veined, base gradually contracted into a claw 0.6–1.5 mm, margin serrate or

entire, glandular ciliate or glabrous, apex acuminate or subacuminate. Stamens 4–5 mm. Carpels 3.2–4 mm; ovary ovoid; styles divergent. Fl. Jun–Jul.

Forests, rock crevices; 2200–2900 m. Hubei, S Jilin, Liaoning, Sichuan [Korea].

- 1a. Margin of petals serrate or glandular ciliate; sepals 3-veined 17a. var. *fortunei*
- 1b. Margin of petals entire, glabrous; sepals 1-veined 17b. var. *koraiensis*

17a. *Saxifraga fortunei* var. *fortunei*

齿瓣虎耳草(原变种) chi ban hu er cao (yuan bian zhong)

Saxifraga cortusifolia Siebold & Zuccarini var. *fortunei* (J. D. Hooker) Maximowicz.

Sepals glandular hairy abaxially and at margin, adaxially glabrous, 3-veined. Petals serrate or glandular ciliate at margin.

- Forests, rock crevices; 2200–2900 m. Hubei, Sichuan.

17b. *Saxifraga fortunei* var. *koraiensis* Nakai, J. Jap. Bot. 16: 277. 1938.

镜叶虎耳草 jing ye hu er cao

Sepals glandular hairy on both surfaces and at margin, 1-veined. Petals entire and glabrous at margin.

Forests, rock crevices at brooksides. S Jilin (Ji'an Xian), Liaoning [Korea].

18. *Saxifraga mengtzeana* Engler & Irmscher, Notizbl. Bot. Gart. Berlin-Dahlem 6: 36. 1913.

蒙自虎耳草 meng zi hu er cao

Diptera mengtzeana (Engler & Irmscher) Losinskaja;

Saxifraga aculeata I. B. Balfour; *S. geifolia* I. B.

Balfour (1916), not Saint-Lager (1880); *S. henryi* I. B.

Balfour; *S. lancangensis* Y. Y. Qian; *S. mengtzeana* var.

cordatifolia Engler & Irmscher; *S. mengtzeana* var.

peltifolia Engler & Irmscher; *S. ovatocordata* Handel-Mazzetti.

Plants 21–25 cm tall. Rhizomes rather short. Stem glandular piliferous. Basal leaves with petiole 1.1–1.2 cm, densely glandular piliferous; leaf blade peltate or ovate to broadly so, 1.5–7.6 × 1.2–6 cm, leathery, abaxially sparsely hispid and brown spotted, base ± cordate, without a foliar embryo in sinus, margin crenate, apex acute. Cauline leaves lanceolate, ca. 4.5 × 1 mm, margin glandular ciliate. Inflorescence panicle, ca. 8.7 cm, 16–18-flowered; branches 2.4–5 cm, glandular pubescent, 2- or 3-flowered; pedicels slender, 1.3–3 cm, glandular pubescent. Sepals spreading to reflexed, narrowly ovate, ca. 3 × 1 mm, abaxially and marginally glandular hairy, veins 3, confluent into a verruca at apex. Petals 5, white; shortest 3 petals triangular-ovate, 3.2–3.4 × 2–2.2 mm, 3-veined, base rounded to cordate, with a claw ca. 1 mm, apex acute to shortly acuminate; longer petal narrowly ovate, ca. 9 × 2.2 mm, 3-veined, base with a claw ca. 1.4 mm, apex acuminate; longest petal sublanceolate, ca. 1.9 cm × 3.4 mm, 8-veined, base gradually contracted into a claw ca. 1.5 mm,

margin sparsely denticulate. Stamens ca. 6 mm. Ovary ovoid, ca. 4 mm; styles divergent, ca. 1.8 mm. Fl. and fr. May–Oct.

• Forests, slopes; 1100–1900 m. Guangdong, SE Yunnan (Mengzi Xian, Yanshan Xian).

In FRPS, the names *Saxifraga mengtzeana* and *S. aculeata* were applied to taxa without and with foliar embryos, respectively. However, the holotype of *S. aculeata* (Henry 10316B (E), which lacks foliar embryos) is an isosytype and the designated lectotype (Gornall et al., Novon 10: 376. 2000) of the earlier name *S. mengtzeana*, of which *S. aculeata* is therefore a synonym. The taxon with foliar embryos is dealt with below as *S. epiphylla*.

19. *Saxifraga epiphylla* Gornall & H. Ohba in Gornall et al., Novon 10: 375. 2000.

卵心叶虎耳草 luan xin ye hu er cao

Plants 20–36 cm tall. Rhizomes rather short. Stem simple, brown glandular hairy. Basal leaves with petiole 1.5–12 cm, brown glandular hairy; leaf blade usually ovate, rarely broadly ovate to reniform, 1.2–10 × 1–8.4 cm, leathery, both surfaces glandular hispid and spotted, base cordate, with a foliar embryo in sinus, margin undulate, thickly dentate, glandular ciliate, apex obtuse or acute. Cauline leaves 1–4, lanceolate to ovate, 2.5–5 × ca. 1.1 mm, abaxially and marginally glandular hairy, 1-veined. Inflorescence paniculate, 13–22 cm, 12–30-flowered; branches 3–9.5 cm, glandular hairy, 2–4-flowered; pedicels slender, 0.6–2 cm, sparsely glandular hairy. Sepals spreading to reflexed, ovate, 1.6–4 × 1–1.6 mm, abaxially and marginally glandular hairy, veins (2 or)3, confluent into a verruca at apex, apex obtuse or acute. Petals 5, white; shortest 3 petals ovate, 2–4.5 × 1.3–2.2 mm, (1–)3–5-veined, base with a claw 0.2–1 mm, apex acute to shortly acuminate; longer petal lanceolate to linear-lanceolate, 0.3–1.8 cm × 1.2–2 mm, 3–5(–12)-veined, base with a claw 0.3–1 mm; longest petal linear-lanceolate to lanceolate, 1.3–2.9 cm × 2.2–7.5 mm, 5–9(–15)-veined, base gradually contracted into a claw 0.2–2 mm, apex acute to subacuminate. Stamens 4.5–5.5 mm. Carpels 4.5–5.1 mm; ovary ovoid, 2–3.3 mm; styles 1.8–3.2 mm. Fl. and fr. May–Oct.

Forests, rock crevices; 800–3800 m. NE Guangdong, NE Guangxi, W Sichuan, Yunnan [Vietnam].

20. *Saxifraga stolonifera* Curtis, Philos. Trans. 64(1): 308, no. 2541. 1774.

虎耳草 hu er cao

Diptera sarmentosa (Linnaeus f.) Losinskaja; *Ligularia sarmentosa* (Linnaeus f.) Haworth; *Rupifraga sarmentosa* (Linnaeus f.) Rafinesque; *Saxifraga chaffanjonii* H. Léveillé; *S. chinensis* Loureiro (1790), not *S. sinensis* Engler & Irmischer (1919); *S. cuscutiformis* Loddiges; *S. dumetorum* I. B. Balfour; *S. fortunei* J. D. Hooker var. *tricolor* Lemaire; *S. iochanensis* H. Léveillé; *S. ligulata* Murray (1781), not Wallich (1820); *S. sarmentosa* Linnaeus f.; *S. sarmentosa* var. *cuscutiformis* (Loddiges) Seringe; *S. sarmentosa* var. *immaculata* Diels; *S. sarmentosa* var. *tricolor* (Lemaire) Maximowicz; *S. stolonifera* Meerburgh (1775), not Curtis (1774); *S. stolonifera* f. *cuscutiformis* (Loddiges) M. C. Tebbitt; *S. stolonifera* var. *immaculata* (Diels) Handel-Mazzetti; *S. veitchiana* I. B. Balfour; *Sekika sarmentosa* (Linnaeus f.) Moench. Plants 8–45 cm tall. Stolons filiform, densely crisped glandular villous, with scaly leaves. Stem glandular villous. Basal leaves with petiole 15–21 cm, glandular piliferous; leaf blade spotted, subcordate or reniform to orbicular, 1.5–7.5 × 2–12 cm, (5–)7–11-lobed, glandular hairy, base subtruncate or rounded to cordate, margin irregularly dentate, apex obtuse or acute. Cauline leaves and bracts 1–4, lanceolate, ca. 6 × 2 mm. Inflorescence 7–61-flowered. Sepals spreading to reflexed, ovate, 1.5–3.5 × 1–1.8 mm, abaxially and marginally glandular hairy, 3-veined; veins confluent at apex. Petals 5, white, spotted, of which largest two lanceolate-oblong, 0.6–1.5 cm × 2–4 mm, base clawed, apex acute, pinniveined; smallest three petals ovate, 2–4.4 × 1.3–2 mm. Stamens 4–5.2 mm. Ovary ovoid, with a semiannular nectary disc; styles divergent. Fl. and fr. Apr–Nov. $2n = 30, 36^*, 54$.

Forests, scrub, meadows, shaded rock crevices; 400–4500 m. Anhui, Fujian, SE Gansu, Guangdong, Guangxi, Guizhou, WC Hebei (Xiaowutai Shan), Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shanxi, E Sichuan, Taiwan, E and SW Yunnan, Zhejiang [Japan, Korea].

3. *Saxifraga* sect. *Trachyphyllum* (Gaudin) W. D. J. Koch, Syn. Fl. Germ. Helv. 270. 1836.

糙叶组 cao ye zu

Saxifraga [unranked] *Trachyphyllum* Gaudin, Fl. Helv. 3: 85. 1828.

Herbs perennial, forming low cushions or sprawling mats, lacking basal bulbils. Leaves alternate; petiole scarcely differentiated; leaf blade leathery, lacking chalk glands and crystals, margin usually entire, occasionally toothed or lobed. Flowering stem leafy; inflorescence cymose. Flowers bisexual, actinomorphic, 5-merous. Petals white to cream, sometimes spotted red or orange, not callose. Filaments subulate to linear; pollen 2-nucleate, exine tectum coarsely striate. Carpels connate for most of placental region, dehiscing distally in fruit; ovary subsuperior. Integuments 2.

About ten species: Asia, Europe, North America, mainly in arctic and montane regions; one species in China.

21. *Saxifraga bronchialis* Linnaeus, Sp. Pl. 1: 400. 1753.

刺虎耳草 ci hu er cao

Ciliaria bronchialis (Linnaeus) Haworth; *Leptasea bronchialis* (Linnaeus) Komarov.

Plants 10–20 cm tall. Shoots numerous, with dense rosette leaves. Flowering stem slender, glandular pubescent or glabrous. Rosette leaves linear-lanceolate, 7.5–9 × 1.4–1.6 mm, leathery, glabrous except margin

cartilaginous ciliate and apex cartilaginous aristate. Cauline leaves linear, 5.2–6 × 0.8–1 mm, leathery, margin cartilaginous ciliate, apex cartilaginous aristate. Cyme 3–5-flowered; branches slender, glandular pilose, sometimes with buds in bract axils. Sepals spreading, ovate, ca. 1.8 × 1.2 mm, subcarnose, abaxially and marginally glandular pilose, veins 3 or 4, free, apex acute. Petals yellowish white, crimson spotted, oblong-elliptic, 5–6 × 2–2.5 mm, not callose, 3-veined, base ± truncate, clawless, apex acute. Stamens ca. 5 mm.

Ovary subsuperior, ovoid, 2–3 mm; styles ca. 1.5 mm. Fl. and fr. Jun–Aug. $2n = 26, 28, 38, \text{ca. } 44, 48, 66, \text{ca. } 80, 92, 112, 150.$

Rock crevices on slopes; 800–1500 m. Heilongjiang, Nei Mongol [Mongolia, Russia; North America].

This is a polymorphic taxon, of which many variants have been treated as segregate species. The Chinese plants described above appear to belong to subsp. *bronchialis*. Further work on the whole complex throughout its range is needed in order to clarify the situation.

4. Saxifraga sect. **Ciliatae** Haworth, Misc. Nat. 160. 1803.

山羊臭组 shan yang xiu zu

Hirculus Haworth.

Herbs mostly perennial, some possibly annual, biennial, or monocarpic perennial (suspected rather than demonstrated), forming erect individuals, caespitose clumps, cushions, or sprawling mats, lacking basal bulbils. Leaves alternate, very rarely opposite, petiolate or not; leaf blade herbaceous or carnose, lacking chalk glands and crystals, margin usually entire, occasionally toothed or lobed. Flowering stem usually leafy; inflorescence cymose or flower solitary. Flowers sometimes unisexual, actinomorphic, 5-merous. Petals usually yellow or orange, occasionally white, pink, or red, sometimes spotted orange, red, or purple, very often with callosities. Filaments subulate to linear; pollen 3-nucleate, exine tectum finely striate. Carpels connate for most of placental region, dehiscing distally in fruit; ovary subsuperior to subinferior. Integuments 2.

About 175 species: Asia, Europe, North America, mainly in arctic and montane regions; 166 species (112 endemic) in China.

- 1a. At least proximal stem nodes and petiole bases with brown, crisped, villous hairs (mostly eglandular).
 - 2a. Leaves often glaucous, with prominent, submarginal vein running from proximal to distal ends; basal or proximal leaves glandular pilose abaxially, ± glabrous adaxially Key 5
 - 2b. Leaves not glaucous, with veins set in from, and none obviously associated with, margin; leaf pubescence variable.
 - 3a. Pedicels with short, glandular hairs, glands brown or black, occasionally present together with brown, long, crisped, villous hairs, or glabrous Key 6
 - 3b. Pedicels with brown, long, crisped, villous hairs Key 3
- 1b. Stem nodes with straight, glandular hairs, glands brown or black.
 - 4a. Rosette leaves producing axillary, filiform stolons Key 1
 - 4b. Rosette leaves, if any, not producing axillary stolons.
 - 5a. Leaves often shiny, leathery; leaf buds produced in axils of cauline leaves, sometimes developing into short, sterile shoots; petals white or yellow Key 2
 - 5b. Leaves not shiny, carnose; long, sterile shoots sometimes arising from axils of basal leaves; petals yellow.
 - 6a. Plants with branched stem, forming mats or cushions of leafy shoots, or simple with a single stem, but in either case without a well-defined, basal leaf rosette; inflorescence 1 (or 2–5)-flowered Key 7
 - 6b. Plants forming well-defined basal leaf rosettes at anthesis; inflorescence usually several flowered Key 4

Key 1

- 1a. Petals shorter than or only slightly exceeding sepals.
 - 2a. Basal leaves glabrous adaxially.
 - 3a. Stolons arising from axils of basal leaves; glands on cauline leaves with clavate heads . 185. *S. consanguinea*
 - 3b. Stolons arising from axils of median leaves; glands on cauline leaves with globose heads . 184. *S. tentaculata*
 - 2b. Basal leaves glandular pubescent adaxially.
 - 4a. Cauline leaves to 2 mm wide 187. *S. angustata*
 - 4b. Cauline leaves more than 2 mm wide.
 - 5a. Petals not overlapping, to 1.5 mm wide 186. *S. microgynea*
 - 5b. Petals overlapping, more than 2 mm wide.
 - 6a. Sepal veins confluent into a verruca at apex 182. *S. degenensis*
 - 6b. Sepal veins not confluent at apex 183. *S. nangxianensis*
 - 1b. Petals at least 1.5 × as long as sepals.
 - 7a. Median leaves forming a rosette with stolons arising from axils 181. *S. flaccida*

- 7b. Basal leaves forming a rosette with stolons arising from axils.
 - 8a. Pedicels at least 3 × as long as cauline leaves; cyme lax, many flowered.
 - 9a. Capsule subglobose; petals at least 3 mm wide; sepals spreading 178. *S. brunonis*
 - 9b. Capsule narrowly ovoid; petals less than 2.5 mm wide; sepals spreading to reflexed 179. *S. josephii*
 - 8b. Pedicels mostly less than 2 × as long as cauline leaves; cyme corymbose, compact, or flower solitary.
 - 10a. Margin of basal leaves coarsely eglandular setose-ciliate, longest bristles 0.5–1 mm.
 - 11a. Inflorescence not clearly umbellate, 2–5-flowered or flower solitary; stolons slender; cauline leaves shorter than or equaling basal leaves 176. *S. mucronulata*
 - 11b. Inflorescence umbellate, more than 5-flowered; stolons robust; cauline leaves equaling or longer than basal leaves 177. *S. mucronulatoides*
 - 10b. Margin of basal leaves slender ciliate, often glandular, longest hairs less than 0.5 mm.
 - 12a. Cauline leaves ca. 4 × as long as internodes, both surfaces glabrous 180. *S. loripes*
 - 12b. Cauline leaves up to 2 × as long as internodes, both surfaces glandular pubescent.
 - 13a. Stem usually more than 5 cm tall; petals more than 8 mm; ovary superior 174. *S. stenophylla*
 - 13b. Stem usually less than 5 cm tall; petals less than 8 mm; ovary semi-inferior 175. *S. parkaensis*

Key 2

- 1a. Leaf margin coarsely toothed or lobed.
 - 2a. Leaf buds conspicuous in axils of bracts; sepals reflexed in fruit; petals white 108. *S. strigosa*
 - 2b. Leaf buds conspicuous or inconspicuous in axils of proximal leaves; sepals erect or spreading in fruit; petals yellow.
 - 3a. Median leaves distributed evenly along stem, each usually with 3(or 5) apical lobes; inflorescence branches 1-flowered 106. *S. hispidula*
 - 3b. Median leaves aggregated, often into a rosette, each with several teeth; inflorescence branches 2- or more flowered 107. *S. substrigosa*
- 1b. Leaf margin entire.
 - 4a. Leaves pubescent adaxially.
 - 5a. Leaf margin eglandular setose-ciliate; petals white 109. *S. gemmipara*
 - 5b. Leaf margin glandular hairy; petals yellow 105. *S. balfourii*
 - 4b. Leaves glabrous adaxially.
 - 6a. Proximal leaves scalelike, with leaf buds in axils, median leaves best developed.
 - 7a. Leaves linear, less than 1 mm wide.
 - 8a. Stem many branched; leaf buds present in leaf and bract axils; pedicels glandular hairy; sepals glandular hairy abaxially; petals 2–4-callose 111. *S. filicaulis*
 - 8b. Stem simple; leaf buds absent in leaf and bract axils; pedicels glabrous; sepals glabrous on both surfaces; petals not callose 112. *S. wenchuanensis*
 - 7b. Leaves ovate, oblanceolate, occasionally linear, but more than 1 mm wide.
 - 9a. Leaves oblong to narrowly subobovate, largest more than 8 mm, margin recurved 110. *S. oreophila*
 - 9b. Leaves suboblong or subspatulate, largest to 8 mm, margin flat 113. *S. macrostigmatoides*
 - 6b. Proximal leaves nearly as well developed as median ones.
 - 10a. At least some leaves aggregated into an apparently basal rosette, distal cauline leaves ca. 1/2 size of rosette leaves 121. *S. cinerascens*
 - 10b. Leaves distributed ± evenly along stem, size differences gradual.
 - 11a. Plants less than 3 cm tall; flower solitary, apparently sessile 120. *S. erinacea*
 - 11b. Plants more than 5 cm tall; flowers solitary or more than 1, pedicel at least 5 mm.
 - 12a. Petal margin glandular ciliate or eglandular laciniate.
 - 13a. Flower solitary 119. *S. wardii*
 - 13b. Flowers 2 or 3 in a compact corymb 118. *S. gouldii*
 - 12b. Petal margin entire, glabrous.
 - 14a. Leaf margin not cartilaginous; leaf buds developing shoots more than 5 mm by anthesis 113. *S. macrostigmatoides*
 - 14b. Leaf margin cartilaginous; leaf buds ± undeveloped by anthesis.
 - 15a. Broadest leaves at least 3 mm wide 114. *S. wallichiana*
 - 15b. Broadest leaves to 3 mm wide.
 - 16a. Pedicels glabrous 116. *S. brachypodoidea*
 - 16b. Pedicels glandular hairy.
 - 17a. Distal cauline leaves glandular hairy abaxially 117. *S. zayuensis*
 - 17b. Distal cauline leaves glabrous abaxially 115. *S. brachypoda*

Key 3

- 1a. Margin of petals brown crisped villous 89. *S. ciliatopetala*
- 1b. Margin of petals glabrous.
 - 2a. Basal leaves absent at anthesis.
 - 3a. Inflorescence a compact cyme of several flowers 91. *S. congestiflora*
 - 3b. Inflorescence 1-flowered 96. *S. nangqenica*
 - 2b. Basal leaves present at anthesis.
 - 4a. Basal leaves brown crisped villous adaxially.
 - 5a. Petals purple, at least 1.2 cm 95. *S. bergenioides*
 - 5b. Petals yellow, to 1 cm.
 - 6a. Apex of basal leaves long aristate 101. *S. gongshanensis*
 - 6b. Apex of basal leaves obtuse to acute.
 - 7a. Sepals glabrous abaxially 97. *S. hirculoides*
 - 7b. Sepals pubescent abaxially.
 - 8a. Margin of sepals densely brown crisped villous 86. *S. sinomontana*
 - 8b. Margin of sepals glandular pilose 87. *S. isophylla*
 - 4b. Basal leaves glabrous adaxially.
 - 9a. Apex of basal leaves aristate, sometimes 3-aristate.
 - 10a. Petals 1.5–2.5 mm 104. *S. culcitosa*
 - 10b. Petals 4–6 mm.
 - 11a. Plants to 2 cm tall; apex of some basal leaves 3-aristate 102. *S. triaristulata*
 - 11b. Plants 4–9 cm tall; apex of basal leaves acute or 1-aristate 79. *S. aristulata*
 - 9b. Apex of basal leaves obtuse or acute.
 - 12a. Rosette leaves without a well-defined petiole, blade linear-oblong, to 1 mm wide 103. *S. saginoides*
 - 12b. Rosette leaves petiolate, blade narrowly elliptic to ovate or lanceolate, more than 1 mm wide.
 - 13a. Ovary with a conspicuous, annular nectary disc; petals purple abaxially, yellow adaxially.
 - 14a. Inflorescence 1-flowered 94. *S. tibetica*
 - 14b. Inflorescence 2- or more flowered.
 - 15a. Sepals erect at anthesis, later reflexed; inflorescence usually more than 8-flowered 92. *S. tangutica*
 - 15b. Sepals reflexed by anthesis; inflorescence 2–6-flowered 93. *S. przewalskii*
 - 13b. Ovary without a conspicuous nectary disc; petals yellow on both surfaces.
 - 16a. Margin of sepals glabrous or glandular pilose.
 - 17a. Margin of sepals densely glandular ciliate; petals to 6.4 mm 100. *S. parva*
 - 17b. Margin of sepals glabrous or sparsely glandular ciliate; petals more than 6 mm 98. *S. elliptica*
 - 16b. Margin of sepals brown crisped villous.
 - 18a. Sepals reflexed at anthesis 88. *S. hirculus*
 - 18b. Sepals erect to spreading at anthesis.
 - 19a. Petals abaxially and marginally brown crisped villous proximally 99. *S. montanella*
 - 19b. Petals abaxially and marginally glabrous.
 - 20a. Margin of sepals densely brown crisped villous; inflorescence often several flowered 86. *S. sinomontana*
 - 20b. Margin of sepals sparsely brown crisped villous; inflorescence often 1-flowered 90. *S. heleonastes*

Key 4

- 1a. Basal leaves pubescent adaxially.
 - 2a. Hairs on adaxial surface of basal leaves setose or eglandular 158. *S. gyalana*
 - 2b. Hairs on adaxial surface of basal leaves glandular.
 - 3a. Basal or proximal cauline leaves with at least 3 forward-pointing, triangular lobes.
 - 4a. Basal leaves with at least 3 forward-pointing, triangular lobes 173. *S. candelabrum*
 - 4b. Basal leaves entire 172. *S. dielsiana*
 - 3b. Basal and cauline leaves entire.
 - 5a. Flowering stem leafless, bearing bracts only 169. *S. lixianensis*
 - 5b. Flowering stem leafy.
 - 6a. Petals yellow; plants often forming a mat of basal leaf rosettes 170. *S. sediformis*
 - 6b. Petals abaxially purple, adaxially lilac near base and yellow near apex; plants usually with a single basal leaf rosette 171. *S. daochengensis*
 - 1b. Basal leaves glabrous adaxially.
 - 7a. Basal leaves adaxially pustulate distally.
 - 8a. Inflorescence 2- or 3-flowered or flower solitary; petals pale yellow to yellow or ivory 163. *S. punctulata*
 - 8b. Inflorescence 2–10-flowered; petals yellow or white.
 - 9a. Margin of basal leaves entire 166. *S. umbellulata*

- 9b. Margin of basal leaves setose-ciliate.
 - 10a. Petals white, purple spotted, to 7 mm 164. *S. punctulatooides*
 - 10b. Petals yellow, purple spotted, more than 7 mm 165. *S. yushuensis*
- 7b. Basal leaves adaxially smooth (or wrinkled on drying).
 - 11a. Margin of basal leaves entire.
 - 12a. Petals yellow, orange spotted; inflorescence cymose 155. *S. unguiculata*
 - 12b. Petals yellow, unspotted; inflorescence subumbellate 166. *S. umbellulata*
 - 11b. Margin of basal leaves setose- or denticulate-ciliate.
 - 13a. Petals red, pink, or white on both surfaces or only abaxially.
 - 14a. Petals more than 7 × 2.5 mm 166. *S. umbellulata*
 - 14b. Petals less than 7 × 2.5 mm.
 - 15a. Petals deep red abaxially or on both surfaces 167. *S. sanguinea*
 - 15b. Petals white or pinkish on both surfaces 161. *S. signatella*
 - 13b. Petals yellow on both surfaces.
 - 16a. Basal leaf rosettes usually at least 2 cm in diam.
 - 17a. Petals unspotted 166. *S. umbellulata*
 - 17b. Petals adaxially purple spotted proximally 168. *S. signata*
 - 16b. Basal leaf rosettes rarely to 2 cm in diam.
 - 18a. Longest cauline leaves at least 7 mm.
 - 19a. Sepals glabrous 157. *S. taraktophylla*
 - 19b. Sepals glandular pilose abaxially and marginally.
 - 20a. Proximal internodes ca. 2.5 mm 155. *S. unguiculata*
 - 20b. Proximal internodes 3.5–4 mm 156. *S. pellucida*
 - 18b. Longest cauline leaves less than 7 mm.
 - 21a. Pedicels glabrous; petals less than 3.5 mm 160. *S. elatinoides*
 - 21b. Pedicels (e)glandular pilose, at least sparsely so; petals more than 4 mm.
 - 22a. Sepals spreading at anthesis 162. *S. brunneopunctata*
 - 22b. Sepals reflexed at anthesis.
 - 23a. Cauline leaves markedly overlapping 155. *S. unguiculata*
 - 23b. Cauline leaves remote, scarcely, if at all, overlapping 159. *S. heterotricha*

Key 5

- 1a. Basal leaves caducous, mostly absent by anthesis.
 - 2a. Proximal and median cauline leaves sessile.
 - 3a. Cauline leaves orbicular to elliptic or ovate; petals 8–11 mm 42. *S. kingdonii*
 - 3b. Cauline leaves lanceolate to ovate or oblong; petals 5–8.5 mm.
 - 4a. Base of cauline leaves rounded to obtuse, amplexicaul 47. *S. subamplexicaulis*
 - 4b. Base of cauline leaves cordate, ± amplexicaul.
 - 5a. Cauline leaves pandurate (narrowed at middle) 43. *S. moorcroftiana*
 - 5b. Cauline leaves ovate to narrowly so 44. *S. kingiana*
 - 2b. Proximal and median cauline leaves petiolate.
 - 6a. Cauline leaves less than 1.5 cm.
 - 7a. Sepals glandular pilose abaxially; petals brown spotted 50. *S. giraldiana*
 - 7b. Sepals glabrous abaxially; petals orange spotted or unspotted.
 - 8a. Petals elliptic, orange spotted 35. *S. smithiana*
 - 8b. Petals ovate, unspotted.
 - 9a. Pedicels densely glandular pilose 49. *S. stellariifolia*
 - 9b. Pedicels glabrate, or at most sparsely glandular pilose 51. *S. egregioides*
 - 6b. Cauline leaves at least 1.5 cm.
 - 10a. Stem glabrous proximally, except at nodes.
 - 11a. Petals at least 7 mm; petiole of proximal leaves 0.5–1 cm 41. *S. haplophyloides*
 - 11b. Petals to 7 mm; petiole of proximal leaves 0.7–6 cm.
 - 12a. Apex of proximal leaves acuminate 34. *S. insolens*
 - 12b. Apex of proximal leaves acute 33. *S. cardiophylla*
 - 10b. Stem glandular pilose or brown crisped pilose.
 - 13a. Sepals spreading 36. *S. eglandulosa*
 - 13b. Sepals reflexed.
 - 14a. Sepals glabrous 35. *S. smithiana*
 - 14b. Sepals glandular pilose abaxially and sometimes marginally.
 - 15a. Leaves smaller distally on stem; inflorescence 3–12-flowered 30. *S. implicans*
 - 15b. Leaves not much smaller distally on stem; inflorescence 6–30-flowered.

- 16a. Stem zigzagged 32. *S. omphalodifolia*
 16b. Stem straight 38. *S. subaequifoliata*
- 1b. Basal leaves persistent, mostly present at anthesis.
- 17a. Basal leaf blade rounded, obtuse, or cuneate at base.
- 18a. Sepals erect to spreading.
- 19a. Proximal cauline leaves sessile, pandurate 43. *S. moorcroftiana*
 19b. Proximal cauline leaves petiolate, ovate 40. *S. gedangensis*
- 18b. Sepals reflexed.
- 20a. Petals purple, spotted purple-black 46. *S. pardanthina*
 20b. Petals yellow, spotted or unspotted.
- 21a. Basal leaf blade to 2.4 cm 48. *S. pratensis*
 21b. Basal leaf blade at least 2.4 cm.
- 22a. Petals spotted 45. *S. sheqilaensis*
 22b. Petals unspotted 39. *S. glaucophylla*
- 17b. Basal leaf blade cordate at base.
- 23a. Proximal median cauline leaves sessile.
- 24a. At least some cauline leaves ovate, base cordate, ± amplexicaul; sepals erect to spreading.
- 25a. Petals to 8 mm 29. *S. parnassiifolia*
 25b. Petals at least 8 mm 28. *S. sphaeradena*
- 24b. Cauline leaves narrowly elliptic, base rounded, not amplexicaul; sepals reflexed.
- 26a. Inflorescence cymose, 2- or 3-flowered, or flower solitary; basal leaf blade 1.1–2 cm 23. *S. dianxibeiensis*
 26b. Inflorescence corymbiform, 5–17-flowered; basal leaf blade 1.5–5 cm 22. *S. diversifolia*
- 23b. Proximal median cauline leaves petiolate.
- 27a. Sepals reflexed.
- 28a. Petals yellow, heavily purple spotted in proximal 1/2 27. *S. tigrina*
 28b. Petals yellow, unspotted.
- 29a. Proximal median cauline leaves ovate 24. *S. egregia*
 29b. Proximal median cauline leaves ovate-cordate 22. *S. diversifolia*
- 27b. Sepals erect to spreading.
- 30a. Median cauline leaf blade larger than basal one 31. *S. subomphalodifolia*
 30b. Median cauline leaf blade smaller than or equaling basal one.
- 31a. Petiole of basal leaves at least 5 cm; cauline leaves 1–3 25. *S. erectisepala*
 31b. Petiole of basal leaves to 4.5 cm; cauline leaves 3–6.
- 32a. Base of distal cauline leaves cordate, ± amplexicaul 26. *S. maxiongouensis*
 32b. Base of distal cauline leaves rounded, not amplexicaul 37. *S. hookeri*

Key 6

- 1a. Basal leaves caducous, mostly absent by anthesis.
- 2a. Cauline leaves mostly distributed in proximal 2/3–3/4 of stem.
- 3a. Sepals reflexed at anthesis; leaves usually glabrous adaxially 54. *S. brachyphylla*
 3b. Sepals erect at anthesis; leaves pubescent adaxially 55. *S. peplidifolia*
- 2b. Cauline leaves distributed along stem as far as inflorescence.
- 4a. Cyme congested, 1.5–2 cm.
- 5a. Leaves sessile, lanceolate to narrowly ovate, base of median ones cordate 52. *S. auriculata*
 5b. Leaves sessile to subsessile, ovate, base rounded 53. *S. bulleyana*
- 4b. Cyme lax, more than 5 cm, or flower solitary.
- 6a. Pedicels glandular pilose 56. *S. hypericoides*
 6b. Pedicels glandular pilose, intermixed with a few brown, crisped, villous hairs 57. *S. yezhiensis*
- 1b. Basal leaves persistent, mostly present at anthesis.
- 7a. Basal leaves glabrous adaxially.
- 8a. Pedicels glandular pilose, intermixed with brown, crisped, villous hairs 74. *S. gonggashanensis*
 8b. Pedicels glandular pilose.
- 9a. Cyme 2- or more flowered.
- 10a. Cyme racemiform, 2–14-flowered, flowers secund 64. *S. nigroglandulifera*
 10b. Cyme 2- or 3-flowered, flowers erect.
- 11a. Margin of sepals glabrous 83. *S. nakaoides*
 11b. Margin of sepals glandular ciliate.
- 12a. Sepals glabrous abaxially 84. *S. heteroclada*
 12b. Sepals glandular pilose abaxially 85. *S. heterocladoides*
- 9b. Flower solitary.
- 13a. Flowering stem apparently leafless (cauline leaves, if present, immersed in basal foliage).

- 14a. Petals 2-callose 65. *S. diapensia*
 14b. Petals not callose 66. *S. caveana*
 13b. Flowering stem leafy.
 15a. Apex of basal leaves aristulate 79. *S. aristulata*
 15b. Apex of basal leaves obtuse to acute.
 16a. Petals at least 5.5 mm.
 17a. Sepals glabrous abaxially 84. *S. heteroclada*
 17b. Sepals glandular pilose abaxially 85. *S. heterocladoides*
 16b. Petals to 4 mm.
 18a. Petals obovate, 2–2.8 mm wide 80. *S. lepidostolonosa*
 18b. Petals elliptic to obovate, to 2 mm wide.
 19a. Petals yellow; pedicels glandular pilose 82. *S. subspathulata*
 19b. Petals orange; pedicels usually glabrous, rarely sparsely glandular pilose ... 81. *S. sublinearifolia*
 7b. Basal leaves variously pilose adaxially.
 20a. Basal leaves with long (ca. 0.75 mm), slightly wavy, eglandular hairs adaxially and marginally.
 21a. Sepals glabrous abaxially.
 22a. Petals more than 1 cm 73. *S. cordigera*
 22b. Petals to 0.75 cm.
 23a. Pedicels glabrous, very rarely with a very few glandular hairs 72. *S. forrestii*
 23b. Pedicels glandular pilose 70. *S. chumbiensis*
 21b. Sepals glandular pilose abaxially.
 24a. Inflorescence corymbiform, 3–16-flowered 71. *S. diffusicallosa*
 24b. Inflorescence 2- or 3-flowered or flower solitary.
 25a. Apex of basal and cauline leaves aristate 75. *S. rizhaoshanensis*
 25b. Apex of basal and cauline leaves obtuse to acute.
 26a. Petals abaxially with a few glandular hairs proximally, base truncate, neither tapered nor contracted into a claw 69. *S. subsangchanensis*
 26b. Petals glabrous, base tapered or contracted into a claw.
 27a. Petals elliptic to obovate, 5–8 × 2.5–3.7 mm 68. *S. tsangchanensis*
 27b. Petals broadly elliptic to broadly obovate, 0.7–1.3 cm × 5–9 mm 67. *S. nigroglandulosa*
 20b. Basal leaves shortly glandular pubescent or eglandular hispid adaxially.
 28a. Petals ovate or elliptic to obovate, to 2 × as long as wide.
 29a. Basal leaves eglandular hispid adaxially.
 30a. Pedicels and sepals glandular pilose; cauline leaves lanceolate to oblong, ca. 1 mm wide 77. *S. peraristulata*
 30b. Pedicels and sepals glabrous; cauline leaves oblanceolate to ovate, 2–3 mm wide ... 76. *S. glabricaulis*
 29b. Basal leaves shortly glandular pubescent adaxially.
 31a. Basal leaf blade ca. 1.5 mm wide; petals to 5 mm; pedicels 2–2.5 mm 78. *S. linearifolia*
 31b. Basal leaf blade ca. 2.5 mm wide; petals at least 6 mm; pedicels 3–14 mm 59. *S. litangensis*
 28b. Petals oblong to narrowly obovate, ca. 3 × as long as wide.
 32a. Basal leaves spatulate, without a ± well-defined petiole; inflorescence 2- or 3-flowered or flower solitary.
 33a. Petals oblong, to 9 × 2.7 mm 62. *S. lychnitis*
 33b. Petals obovate, at least 10 × 4 mm 63. *S. oresbia*
 32b. Basal leaves petiolate; inflorescence 2–14-flowered or flower solitary.
 34a. Apex of leaves aristate 60. *S. cacuminum*
 34b. Apex of leaves subobtusate.
 35a. Basal leaf blade at least 1.5 cm; leaves subglabrous; flowers secund 64. *S. nigroglandulifera*
 35b. Basal leaf blade less than 1.5 cm; leaves glandular pubescent; flowers erect.
 36a. Petals glabrous 58. *S. pseudohirculus*
 36b. Petals glandular pilose abaxially and marginally 61. *S. yarlungzangboensis*

Key 7

- 1a. Margin of basal leaves glabrous or apparently so.
 2a. Flowers with conspicuous nectary disc surrounding ovary; pedicels white eglandular pilose.
 3a. Leaves alternate; petals broadly elliptic, 3–4 × 2–2.5 mm 139. *S. engleriana*
 3b. At least some leaves opposite; petals elliptic, ca. 2 × 1.1 mm 140. *S. contraria*
 2b. Flowers without conspicuous nectary disc; pedicels brown glandular pilose or glabrous.
 4a. Pedicels sparsely glandular pilose; petals broadly elliptic, 7–8 × 5–6 mm 132. *S. drabiformis*
 4b. Pedicels glabrous; petals elliptic or narrowly ovate to suboblong, 2–7 × 1–3 mm.
 5a. Petals 1-veined 152. *S. uninervia*
 5b. Petals at least 3-veined.

- 6a. Leaves to 4 mm, tightly imbricate; plants forming a compact cushion; petals 2–3 mm 141. *S. atuntsiensis*
 6b. Leaves at least 4.5 mm, laxly imbricate; plants erect or forming a mat; petals at least 4 mm.
 7a. Petals purple abaxially and yellow adaxially, or yellow throughout 149. *S. glacialis*
 7b. Petals yellow abaxially.
 8a. Plants usually less than 7 cm tall; apex of cauline leaves mucronate 150. *S. flexilis*
 8b. Plants at least 7 cm tall; apex of cauline leaves obtuse 146. *S. carnosula*
- 1b. Margin of basal leaves ciliate.
 9a. Margin of basal leaves glandular ciliate distally.
 10a. Flowering stem submerged in foliage.
 11a. Leaves glabrous adaxially 129. *S. jainzhuglaensis*
 11b. Leaves glandular pilose adaxially.
 12a. Basal leaves with long, glandular hairs, apex aristate 128. *S. Jacquemontiana*
 12b. Basal leaves with short, glandular hairs, apex glandular but not aristate 127. *S. paiguensis*
 10b. Flowering stem visible, overtopping foliage.
 13a. Basal leaves with long, curly, glandular and eglandular hairs at least at margin 135. *S. llonakhensis*
 13b. Basal leaves with short, glandular hairs.
 14a. Petals 5.5–7 mm 130. *S. finitima*
 14b. Petals to 5 mm.
 15a. Leaves very sparsely glandular ciliate; leaves to 1 mm wide 143. *S. medogensis*
 15b. Leaves densely glandular ciliate; leaves at least 1 mm wide.
 16a. Pedicels 6–9 mm; leaf margin denticulate-ciliate 148. *S. nanella*
 16b. Pedicels usually at least 1 cm; leaf margin pilose-ciliate 131. *S. stella-aurea*
- 9b. Margin of basal leaves eglandular setose-ciliate or fimbriate-ciliate distally, occasionally so only proximally.
 17a. Flowers with conspicuous nectary disc surrounding ovary; pedicels white eglandular pilose.
 18a. Leaves alternate; petals broadly elliptic, 3–4 × 2–2.5 mm 139. *S. engleriana*
 18b. At least some leaves opposite; petals narrowly elliptic, ca. 2 × 1.1 mm 140. *S. contraria*
 17b. Flowers without conspicuous nectary disc; pedicels brown glandular pilose or glabrous.
 19a. Apical margin of basal leaves fimbriate, hairs often united to form a scarious margin.
 20a. Flowering stem submerged in foliage 124. *S. hemisphaerica*
 20b. Flowering stem short, but overtopping foliage.
 21a. Basal leaves abaxially convex distally, adaxially concave (spoonlike) 122. *S. perpusilla*
 21b. Basal leaves ± flat 123. *S. zhidoensis*
- 19b. Apical margin of basal leaves setose-ciliate or glabrous.
 22a. Flowering stem not overtopping leaves 125. *S. sessiliflora*
 22b. Flowering stem overtopping leaves.
 23a. Cyme 2–5(–12)-flowered.
 24a. Distal cauline leaves longer than proximal ones, aggregated to form a “rosette” subtending inflorescence.
 25a. Petals 4–5 mm 148. *S. nanella*
 25b. Petals 6–7 mm 145. *S. prattii*
 24b. Distal cauline leaves smaller than or subequalling median and proximal ones, not aggregated.
 26a. Pedicels glabrous.
 27a. Petals red or purple abaxially, yellow and unspotted adaxially 149. *S. glacialis*
 27b. Petals yellow abaxially, yellow and brown spotted adaxially 150. *S. flexilis*
 26b. Pedicels glandular pilose, sometimes sparsely so.
 28a. Sepals reflexed at anthesis.
 29a. Margin of sepals glandular pilose, sometimes sparsely so 154. *S. densifoliata*
 29b. Margin of sepals glabrous 153. *S. aurantiaca*
 28b. Sepals erect or spreading at anthesis.
 30a. Base of petals obtuse, neither tapered nor contracted into a claw 147. *S. dshagalensis*
 30b. Base of petals tapered or contracted into a claw.
 31a. Proximal cauline leaves setose-ciliate along entire margin 154. *S. densifoliata*
 31b. Proximal cauline leaves setose-ciliate at distal margin only 151. *S. tatsienluensis*
- 23b. Flower solitary.
 32a. Axils of cauline leaves with leaf buds 142. *S. gemmigera*
 32b. Axils of cauline leaves without leaf buds.
 33a. Petals to 5 mm.
 34a. Petals red or purple abaxially, yellow and unspotted adaxially 149. *S. glacialis*
 34b. Petals yellow abaxially, yellow and orange spotted adaxially.
 35a. Pedicels pale eglandular pilose.

- 36a. Basal leaves to 4 mm 137. *S. baimashanensis*
- 36b. Basal leaves at least 5 mm 136. *S. miralana*
- 35b. Pedicels glandular pilose or glabrous.
 - 37a. Plants to 4 cm tall 148. *S. nanella*
 - 37b. Plants at least 4 cm tall 52. *S. auriculata*
- 33b. Petals at least 5 mm.
 - 38a. Margin of sepals ciliate.
 - 39a. Margin of sepals setose-ciliate.
 - 40a. Basal leaves 3–4 mm; sepals erect; petals 5–8 mm 126. *S. brevicaulis*
 - 40b. Basal leaves ca. 6 mm; sepals spreading to reflexed; petals 5–6 mm ... 133. *S. chrysanthoides*
 - 39b. Margin of sepals glandular ciliate.
 - 41a. Sepals reflexed, at least 3 mm 138. *S. draboides*
 - 41b. Sepals spreading or reflexed, to 2.5 mm.
 - 42a. Proximal cauline leaves ciliate distally 151. *S. tatsienluensis*
 - 42b. Proximal cauline leaves ciliate at least proximally 145. *S. prattii*
 - 38b. Margin of sepals entire, glabrous.
 - 43a. Margin of cauline leaves glabrous 134. *S. filifolia*
 - 43b. Margin of cauline leaves ciliate.
 - 44a. Pedicels glabrous.
 - 45a. Cauline leaves 5.7–5.9 mm, distal ones subequalling proximal ones 150. *S. flexilis*
 - 45b. Cauline leaves 2–5 mm, distal ones larger than proximal ones 145. *S. prattii*
 - 44b. Pedicels glandular or eglandular pilose.
 - 46a. Pedicels eglandular pilose 136. *S. miralana*
 - 46b. Pedicels glandular pilose.
 - 47a. Petals apparently without callosities 145. *S. prattii*
 - 47b. Petals with 2–5 callosities.
 - 48a. Sepals erect to spreading.
 - 49a. Base of petals obtuse, neither tapered nor contracted into a claw 147. *S. dshagalensis*
 - 49b. Base of petals tapered or contracted into a claw 151. *S. tatsienluensis*
 - 48b. Sepals reflexed.
 - 50a. Sepal veins free, not confluent at apex; petals to 2.6 mm wide 153. *S. aurantiaca*
 - 50b. Sepal veins confluent at apex; petals at least 3 mm wide 144. *S. nanelloides*

22. *Saxifraga diversifolia* Wallich ex Seringe in de Candolle, Prodr. 4: 44. 1830.

异叶虎耳草 yi ye hu er cao

Herbs perennial, 16–43 cm tall. Stem proximally brown crisped villous or glabrous, distally shortly glandular hairy. Basal leaves with petiole 3–9 cm, abaxially and marginally brown villous; leaf blade ovate-cordate to narrowly ovate, 1.5–5 × 1.2–2.6 cm, abaxially and marginally brown pubescent, adaxially glabrous or brown pilose near base, base cordate, apex acute. Cauline leaves 8–12; petiole 0.5–4 cm, brown crisped villous; leaf blade subcordate or ovate-cordate to narrowly ovate, 1–6.3 × 0.4–4 cm, base cordate or subcordate, apex obtuse or acute; proximal leaf blades larger, abaxially and marginally brown pilose or glandular pilose, adaxially glabrous or subglabrous; distal leaf blades smaller, usually glabrous on both surfaces, glandular hairy at margin. Cyme corymbose, 3–14 cm, 5–17-flowered; pedicels 6–12 mm, glandular hairy. Sepals reflexed, narrowly to broadly ovate, 3–4.2 × 1.3–3.5 mm, abaxially glandular hairy or glabrous on both surfaces, veins 3(–5), not or partly confluent at apex, margin membranous, glandular ciliate, apex obtuse or acute, rarely erose. Petals yellow, elliptic, obovate, or ovate to narrowly so, rarely oblong, 5–8 × 2–5 mm, usually not callose, rarely 4–6-callose, (3–)5–

7(–9)-veined, base narrowed into a claw 0.5–1.3 mm, apex obtuse. Stamens 4–5.6 mm. Ovary subsuperior, ovoid, 3–4.2 mm; styles 1–1.6 mm. Fl. and fr. Aug–Oct. $2n = 16$, (?20).

Forests, forest margins, scrub, alpine meadows, rock crevices; 2700–4300 m. W Sichuan, SE Xizang, N Yunnan [Bhutan, Kashmir, Myanmar, Nepal, Sikkim].

Saxifraga diversifolia is extremely polymorphic. Many of the variants have been published as species, which are accepted as such in the present account because a very narrow species concept has been adopted in classifying the variation. However, many botanists would prefer to see rather more “lumping,” and comments relating to how this might be done are made in relevant places.

- 1a. Most distal cauline leaf at least 1 cm wide 22a. var. *diversifolia*
- 1b. Most distal cauline leaf to 0.5 cm wide 22b. var. *angustibracteata*

22a. *Saxifraga diversifolia* var. *diversifolia*

异叶虎耳草(原变种) yi ye hu er cao (yuan bian zhong) *Hirculus diversifolius* (Wallich ex Seringe) Losinskaja; *Saxifraga diversifolia* f. *amplexifolia* Irmscher; *S. diversifolia* f. *foliata* Engler & Irmscher; *S. diversifolia* f. *haematophylla* (Franchet) Engler & Irmscher; *S. diversifolia* var. *haematophylla* Franchet; ?*S. diversifolia* var. *lanceolata* Seringe.

Leaves gradually smaller from base to apex of stem, most distal cauline leaf ovate, 1.5–2 × 1–1.8 cm. Sepals usually glandular hairy abaxially. Petals not callose. Fl. and fr. Aug–Oct.

Forests, forest margins, scrub, alpine meadows, rock crevices; 2800–4300 m. W Sichuan, SE Xizang, N Yunnan [Bhutan, Kashmir, Nepal, Sikkim].

22b. *Saxifraga diversifolia* var. *angustibracteata* (Engler & Irmscher) J. T. Pan in C. Y. Wu & J. T. Pan, Acta Phytotax. Sin. 28: 64. 1990.

狭苞异叶虎耳草 xia bao yi ye hu er cao

Saxifraga diversifolia f. *angustibracteata* Engler & Irmscher, Notes Roy. Bot. Gard. Edinburgh 5: 139. 1912.

Leaves abruptly smaller from base to proximal part of stem, most distal cauline leaf narrowly elliptic or linear, 1.1–1.7 × 0.2–0.5 cm. Sepals usually glabrous on both surfaces, rarely sparsely glandular hairy abaxially.

Petals usually not callose, rarely 4–6-callose. Fl. and fr. Aug–Oct.

• Forests, forest margins, alpine meadows, rock crevices; 2700–3300 m. SW Sichuan (Yanbian Xian), SE Xizang, NW Yunnan.

23. *Saxifraga dianxiensis* J. T. Pan in C. Y. Wu & J. T. Pan, Acta Phytotax. Sin. 28: 59. 1990.

滇西北虎耳草 dian xi bei hu er cao

Saxifraga diversifolia Wallich ex Seringe f. *alpina* Engler & Irmscher, Notes Roy. Bot. Gard. Edinburgh 5: 138. 1912.

Herbs perennial, densely caespitose, 12.5–18.5 cm tall. Stem proximally brown villous at leaf axils, distally dark brown glandular hairy. Basal leaves with petiole 1–2.6 cm, brown villous at margin; leaf blade cordate to ovate-cordate, 1.1–2 × 1–1.6 cm, brown pilose, base cordate, apex obtuse or acute. Proximal cauline leaves with petiole 2–16 mm, margin brown pilose; leaf blade cordate to ovate or narrowly so, 1.4–1.8 cm × 6.5–7 mm, base cordate to rounded, apex subobtusely or acute; distal cauline leaves sessile, lanceolate to oblong, 1.2–1.4 cm × 3–4.5 mm, both surfaces glabrous, base rounded to cuneate, margin brown pilose, apex subobtusely or acute. Flower solitary or cyme 2- or 3-flowered; pedicels 1.5–3 cm, dark brown glandular hairy. Sepals spreading to reflexed, ovate to broadly so, 3.3–4.8 × 2–3.2 mm, abaxially glabrous or sparsely glandular hairy, veins 5–9, not, partly, or fully confluent at apex, margin dark brown glandular ciliate, apex obtuse. Petals yellow, elliptic or broadly so to broadly ovate, 6–6.4 × 4.2–5 mm, 8- or 9-callose or obscurely so, 4–12-veined, base contracted into a claw 0.5–1 mm, apex obtuse. Stamens 3–5 mm. Ovary subsuperior, broadly ovoid, 2.5–4.2 mm; styles 1.2–1.3 mm. Fl. and fr. Jul–Oct.

• Alpine meadows, rock crevices; 3800–4500 m. NW Yunnan (Lijiang Naxi Zu Zizhixian).

This taxon may merely be a dwarf variant of *Saxifraga diversifolia*, much as was believed by Engler and Irmscher (loc. cit.).

24. *Saxifraga egregia* Engler, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 29: 113. 1883.

优越虎耳草 you yue hu er cao

Herbs perennial, 9–32 cm tall. Stem proximally brown crisped pilose, rarely glabrous, distally shortly glandular hairy. Basal leaves with petiole 1.9–5 cm, margin crisped glandular villous; leaf blade cordate or cordate-ovate to narrowly ovate, 1.6–3.3 × 1.2–2 cm, abaxially and marginally brown villous, adaxially subglabrous. Cauline leaves (3–)7–13; proximal ones with petiole 1.5–19 mm, brown crisped villous; leaf blade cordate-ovate to cordate, 1.2–2.6 × 0.8–2 cm, abaxially and marginally glabrous or subvillous, adaxially glabrous or subglabrous, base cordate, apex subobtusely or acute; most distal cauline leaf with petiole 2–3 mm, leaf blade lanceolate to oblong, 0.9–1.6 cm × 3–7 mm, both surfaces brown glandular hairy or glabrous, base cuneate to rounded, margin brown crisped glandular villous and shortly glandular hairy, apex subobtusely or acute. Pleiochasium corymbose, 1.9–8 cm, 3–9-flowered; branches 1–5.3 cm, 1–3-flowered; pedicels 0.4–6 cm, shortly glandular hairy. Sepals reflexed, ovate to broadly so, 2–3.8 × 1.2–2 mm, abaxially and marginally glandular hairy or margin glabrous, veins 3–6, not, partly, or fully confluent at apex, apex obtuse. Petals yellow, elliptic to ovate, 5.3–8 × 2.3–3.5 mm, (2–)4–6(–10)-callose, 3–6(or 7)-veined, base cuneate to rounded, with a claw 0.4–1.1 mm, apex obtuse or subacute. Stamens 4–6 mm. Ovary subsuperior, ovoid, 2.5–3.8 mm; styles 1–1.5 mm. Fl. and fr. Jul–Oct.

• Forests, wet places in forest understories, scrub, alpine meadows, rock crevices; 2000–4600 m. S Gansu, E and S Qinghai, W Sichuan, E Xizang, NW Yunnan.

1a. Sepals 3-veined, veins partly or fully confluent at apex 24c. var. *xiaojinensis*

1b. Sepals 3–6-veined, veins not confluent at apex.

2a. Sepals glandular hairy at margin 24a. var. *egregia*

2b. Sepals glabrous at margin 24b. var. *eciliata*

24a. *Saxifraga egregia* var. *egregia*

优越虎耳草(原变种) you yue hu er cao (yuan bian zhong)

Hirculus egregius (Engler) Losinskaja; *Saxifraga diversifolia* Wallich ex Seringe var. *soulieana* Engler & Irmscher; *S. zogangensis* T. C. Ku.

Sepals glandular hairy at margin, 3–6-veined, veins not confluent at apex. Fl. Jul–Sep.

• Forests, scrub, alpine meadows, rock crevices; 2800–4500 m. S Gansu, E and S Qinghai, E Xizang, NW Yunnan.

24b. *Saxifraga egregia* var. *eciliata* J. T. Pan in C. Y. Wu, Fl. Xizang, 2: 476. 1985.

无睫毛虎耳草 wu jie mao hu er cao

Saxifraga zogangensis var. *pilosa* T. C. Ku.

Sepals glabrous at margin, 3–6-veined, veins not confluent at apex. Fl. and fr. Aug–Oct.

- Wet places in forest understories; 2000–4600 m. W Sichuan (Dèrong Xian), SE Xizang, NW Yunnan (Gongshan Drung-Nu Zu Zizhixian).

24c. *Saxifraga egregia* var. *xiaojinensis* J. T. Pan, Acta Phytotax. Sin. 29: 11. 1991.

小金虎耳草 xiao jin hu er cao

Saxifraga xiaojinensis T. C. Ku, Bull. Bot. Res., Harbin 9(4): 5. 1989.

Sepals 3-veined, veins partly or fully confluent at apex. Fl. and fr. Jul–Aug.

- Alpine meadows; ca. 4000 m. W Sichuan (Xiaojin Xian).

Saxifraga egregia var. *xiaojinensis* and *S. xiaojinensis* are based on different types collected on the same date at the same locality.

25. *Saxifraga erectisepala* J. T. Pan, Acta Phytotax. Sin. 28: 384. 1990.

直萼虎耳草 zhi e hu er cao

Herbs perennial, 15–30 cm tall. Stem proximally brown crisped villous only at leaf axils, distally shortly brown glandular hairy. Basal leaves with petiole 5.5–10 cm, sparsely crisped villous only at margin near base; leaf blade cordate to ovate-cordate, 2.8–4.8 × 1.7–3.8 cm, glabrous, base cordate, apex obtuse or acute. Cauline leaves 1–3; proximal ones petiolate, similar to basal leaves; most distal one sessile, elliptic, ca. 2.8 × 1.7 cm, glabrous, base cordate, semiamplexicaul. Cyme 6.5–17.3 cm, 3–15-flowered; branches 3.5–10.5 cm, shortly dark brown glandular hairy, 2- or 3-flowered; bracts lanceolate or oblong to linear, 1.4–1.8 cm × 2.5–7.5 mm, abaxially subglabrous, adaxially and marginally dark brown glandular hairy; pedicels 0.5–2.7 cm, shortly dark brown glandular hairy. Sepals erect, ovate to ligulate-ovate, 4.5–6.2 × 2.1–3.6 mm, abaxially and marginally dark brown glandular hairy, veins 3–7, not confluent at apex. Petals yellow, obovate or elliptic to broadly ovate, 0.8–1.4 cm × 4–7 mm, not or indistinctly 2- or 3-callose, 5–9-veined, base with a claw 0.5–1.1 mm, apex obtuse. Stamens 3.5–6.5 mm. Ovary subsuperior, ovoid, 2.5–4.5 mm; styles 1–1.4 mm. Fl. Aug–Sep.

- *Abies* or *Cupressus* forests, forest margins, alpine meadows; 3300–4200 m. Xizang.

26. *Saxifraga maxiongouensis* J. T. Pan in C. Y. Wu & J. T. Pan, Acta Phytotax. Sin. 28: 57. 1990.

马熊沟虎耳草 ma xiong gou hu er cao

Herbs perennial, ca. 26 cm tall. Stem brown pilose proximally, glabrous in median part, shortly dark brown glandular hairy distally. Basal leaves with petiole 2.3–3 cm, adaxially and marginally sparsely brown glandular villous; leaf blade ovate-cordate, 2.3–3.3 × 1.8–2.8 cm, abaxially and marginally brown glandular hairy, base cordate, apex obtuse. Cauline leaves ca. 6; proximal ones petiolate, similar to basal leaves; distal ones sessile, ovate-cordate to ovate, 1.6–4.2 × 0.6–3 cm;

most distal one adaxially and marginally shortly dark brown glandular hairy; others ± glandular pilose, base cordate, amplexicaul, apex obtuse. Cyme corymbose, ca. 6.5 cm, ca. 10-flowered; pedicels densely shortly dark brown glandular hairy. Sepals spreading, ovate, 3.2–3.3 × 2–2.2 mm, abaxially and marginally shortly dark brown glandular hairy, veins 3, not confluent at apex, apex obtuse. Petals yellow, ovate to broadly so, ca. 6 × 4.1–4.2 mm, 4-callose, 5- or 6-veined, base subcordate, contracted into a claw 0.6–0.7 mm, apex subobtuse or acute. Stamens ca. 4.6 mm. Ovary subsuperior, broadly ovoid, ca. 3 mm; styles thick, ca. 0.7 mm. Fl. Jul–Sep.

- Meadows at riversides; 3700–3800 m. W Sichuan (Xiangcheng Xian).

This species is apparently very close to *Saxifraga implicans*.

27. *Saxifraga tigrina* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 233. 1960.

米林虎耳草 mi lin hu er cao

Saxifraga minlingensis J. T. Pan.

Herbs perennial, caespitose, ca. 45 cm tall. Stem simple, brown crisped glandular villous. Basal leaves sometimes caducous, broadly ovate to elliptic, ca. 4 × 3 cm, base cordate, truncate, or cuneate, tapered into a petiole. Cauline leaves 4–8, abruptly smaller distally on stem; petiole of median leaves 0.2–4 cm, sparsely brown crisped glandular villous; leaf blade ovate to elliptic, 2.0–3.4 × 1.8–2.4 cm, brown glandular hairy, glabrate adaxially, base rounded to cordate, margin eglandular villous, apex acute or acuminate; most distal leaf sessile, ovate to narrowly so, 1.5–2 cm × 3–7 mm, abaxially and marginally dark brown glandular hairy, adaxially glabrate. Inflorescence 7–8 cm, 5–20-flowered; branches usually 2-flowered; pedicels dark brown glandular hairy. Sepals reflexed, triangular-ovate, 5–6 × 2.8–3 mm, abaxially glabrous, veins 3–6, not confluent at apex, margin membranous, apex glandular ciliate, erose. Petals yellow, adaxially purple spotted, ovate or broadly so to elliptic, 3.8–7 × 2.6–4.9 mm, 8-callose, 3-veined, base contracted into a claw 0.3–1 mm, apex obtuse or acute. Stamens 5–5.5 mm; anthers purple. Ovary subsuperior, ovoid, 3.5–3.6 mm; styles 1.4–1.5 mm. Fl. Jul–Aug.

- Slopes, by water, rock crevices; 3000–3600 m. SE Xizang.

28. *Saxifraga sphaeradena* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 235. 1960.

秃叶虎耳草 tu ye hu er cao

Herbs perennial, caespitose, 10–17 cm tall. Stem glabrous proximally, shortly dark brown glandular hairy distally. Basal leaves with petiole 2–5 cm, brown pilose at margin; leaf blade cordate-ovate, (1–)2.1–3.1 × (0.7–)1.6–1.9 cm, glabrous on both surfaces or brown pilose abaxially, base cordate, margin brown pilose, apex acute. Cauline leaves 3–8, sessile, cordate, 1.2–2.2 × 0.5–1.5 cm, glabrous on both surfaces (or proximal leaves brown pilose abaxially, most distal leaf brown glandular pilose adaxially), base cordate, partly amplexicaul, margin glandular pilose on proximal

leaves, shortly dark brown glandular hairy on distal leaves. Flower usually solitary, occasionally cyme 2–5-flowered; pedicel shortly glandular hairy. Sepals spreading, ovate, 3–4 × 2.2–3 mm, glabrous on both surfaces or shortly dark brown glandular hairy abaxially, margin shortly dark brown glandular hairy, veins 3–6, confluent into a verruca at apex, apex obtuse. Petals yellow, orange spotted, orbicular to elliptic, 8–10 × 4–7 mm, not callose or subcolumnar 4-callose, ca. 7-veined, base contracted into a claw ca. 2 mm, apex obtuse. Stamens 3.5–4 mm. Ovary subsuperior, globose, 3–4 mm; styles ca. 1.3 mm. Fl. Jul–Sep. $2n = 16$.

Forest margins, scrub, rock crevices; 3300–4100 m. S Xizang [Nepal, Sikkim].

- 1a. Leaves and sepals glabrous on both surfaces 28a. subsp. *sphaeradena*
 1b. Leaves brown pilose abaxially; sepals glandular hairy abaxially 28b. subsp. *dhwojii*

28a. *Saxifraga sphaeradena* subsp. *sphaeradena*

秃叶虎耳草(原亚种) tu ye hu er cao (yuan ya zhong)
 Basal and cauline leaves and sepals glabrous on both surfaces. Fl. Jul–Sep.

Forest margins, rock crevices; 3300–4100 m. S Xizang (Cona Xian, Nyalam Xian) [Nepal, Sikkim].

28b. *Saxifraga sphaeradena* subsp. *dhwojii* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 236. 1960.

隆茄虎耳草 long jia hu er cao

Basal and proximal cauline leaves brown pilose abaxially; most distal cauline leaf brown glandular pilose abaxially. Sepals shortly dark brown glandular hairy abaxially. Fl. Aug–Sep.

Scrub; 3800–3900 m. S Xizang (Nyalam Xian) [Nepal].

This subspecies is very close to *Saxifraga parnassifolia*.

29. *Saxifraga parnassifolia* D. Don, Trans. Linn. Soc. London 13: 405. 1822.

梅花草叶虎耳草 mei hua cao ye hu er cao

Saxifraga diversifolia Wallich ex Seringe var. *parnassifolia* (D. Don) Seringe; *S. parnassifolia* var. *obscuricallosa* J. T. Pan.

Herbs perennial, caespitose, 11.5–24 cm tall. Stem branched, densely brown crisped glandular villous. Basal leaves with petiole 1.3–2.7 cm, crisped glandular villous; leaf blade cordate-ovate, 1.5–4 × 1.3–3 cm, crisped villous on both surfaces and at margin or glabrous adaxially, base cordate, apex acute. Cauline leaves 6 or 7, sessile, ovate to cordate, 0.9–3.5 × 0.5–2.3 cm, base cordate, semiamplexicaul, apex obtuse or acute; proximal leaves glandular villous on both surfaces and at margin or glabrous adaxially; distal leaves shortly glandular hairy on both surfaces, margin shortly glandular hairy and glandular villous. Pleiochasium 2–2.5 cm, 6–11-flowered; pedicels shortly glandular hairy. Sepals erect to spreading, ovate to broadly so, 3–4 × 1.5–2.9 mm, shortly brown glandular hairy abaxially, adaxially distally, and at margin and apex, veins 5–7, confluent into a verruca at apex. Petals

yellow, obovate to broadly ovate, 5–7.9 × 3.5–4 mm, subcolumnar 4–6-callose, not or indistinctly 2- or 3-callose, 5–7-veined, base contracted into a claw 0.6–1.7 mm, apex obtuse. Stamens 2.5–4 mm. Ovary subsuperior, ovoid, 1.6–2.5 mm; styles 1–2 mm. Fl. Jul–Sep. $2n = 16$.

Abies forest margins, slopes; 2700–4000 m. S Xizang (Nyalam Xian, Zayü Xian) [Bhutan, India, Nepal, Sikkim].

Saxifraga parnassifolia var. *obscuricallosa*, which was accepted in FRPS, cannot be distinguished reliably because of intermediates.

30. *Saxifraga implicans* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 231. 1960.

藏东虎耳草 zang dong hu er cao

Saxifraga implicans var. *weixiensis* C. Y. Wu.

Herbs perennial, (6–)11–50 cm tall. Stem proximally brown crisped pilose or glabrous, distally shortly glandular hairy. Basal leaves caducous, similar to proximal cauline leaves. Cauline leaves 5–13; proximal ones with petiole 1.2–4 cm, brown pilose; leaf blade ovate-cordate, 1.9–4 × 1.5–2.7 cm, abaxially and marginally brown pilose, adaxially glabrous or brown pilose, base cordate, apex subobtuse or acute; distal leaves with petiole gradually shorter to absent, leaf blade ovate-cordate, 1.5–3.5 × 0.5–2.1 cm, abaxially glabrous or subglabrous, adaxially and marginally shortly glandular hairy, base cordate, amplexicaul. Cyme 3–6 cm, 3–12-flowered; pedicels 4–15 mm, shortly glandular hairy. Sepals reflexed, ovate to narrowly so, 2.5–4 × 1.4–2 mm, abaxially and marginally glandular hairy except at apex, veins 3, not confluent at apex, apex suberose. Petals yellow, small orange spotted, elliptic or narrowly so to ovate, 5–8 × 2.3–4 mm, not callose or 6–8-callose near base, 3(–6)-veined, base cuneate-rounded, contracted into a claw 0.4–0.9 mm, apex obtuse or acute. Stamens 4–5 mm. Ovary superior, ovoid, 3–3.5 mm; styles 1–1.6 mm. Fl. and fr. Aug–Oct. $2n = 16^*$, 32^* , 48^* .

• Forests, forest margins, alpine meadows and rock crevices on slopes; 3500–4200 m. SW Sichuan, E Xizang, NW Yunnan.

Plants from Weixi Xian, in NW Yunnan, have been separated as *Saxifraga implicans* var. *weixiensis* on account of its stem being glabrous proximally, but since the stem hairs on this species are known to be glabrescent (Smith, loc. cit.), it seems probable that this very minor variation is related to age or environment.

31. *Saxifraga subomphalodifolia* J. T. Pan in C. Y. Wu & J. T. Pan, Acta Phytotax. Sin. 28: 57. 1990.

川西南虎耳草 chuan xi nan hu er cao

Herbs perennial, ca. 30 cm tall. Stem simple, glabrous. Basal leaves with petiole ca. 3.2 cm, margin brown villous or glandular villous; leaf blade cordate, ca. 1.7 × 1.4 cm, abaxially and marginally brown villous, base cordate, apex obtuse. Cauline leaves ca. 4, similar to basal leaves but larger, most distal one with petiole ca. 1.3 cm, margin brown pilose; leaf blade cordate, ca. 3.3 × 3 cm, brown pilose. Cyme paniculate, ca. 18-flowered; most proximal branch ca. 6.2 cm, ca. 3-flowered; pedicels glandular hairy. Sepals spreading,

subelliptic to ovate, 4–4.3 × 2.5–3 mm, abaxially and marginally glandular hairy, veins 5–7, not confluent at apex, apex obtuse or subacuminate. Petals orange, ovate to narrowly so, 7.8–8 × 4–4.3 mm, 6-callose, 6- or 7-veined, base contracted into a claw 0.8–1 mm, apex obtuse. Stamens 6–7 mm. Ovary subsuperior, ellipsoid, ca. 4 mm; styles ca. 2 mm. Fl. Jul–Aug.

• Forests; ca. 4200 m. W Sichuan (Daocheng Xian).

This species appears to be closely related to *Saxifraga diversifolia*.

32. *Saxifraga omphalodifolia* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 57: 53. 1920.

无斑虎耳草 wu ban hu er cao

Saxifraga omphalodifolia var. *callosa* C. Y. Wu; *S. omphalodifolia* var. *retusopetala* J. T. Pan.

Herbs perennial, 22–34 cm tall. Stem zigzagged, densely dark brown crisped villous, eglandular proximally, glandular distally. Basal leaves caducous by anthesis, petiolate; leaf blade cordate. Cauline leaves with petiole 0.7–3.5 cm, glandular villous; leaf blade usually cordate to ovate-cordate, 1.5–3.7 × 2–3.4 cm, glandular hispid, base cordate, apex subacute. Cyme paniculate, 7–8.5 cm, 9–11-flowered; pedicels glandular hispid. Sepals reflexed, elliptic to ovate, ca. 4 × 2.5 mm, abaxially and marginally glandular hairy or margin glabrous, veins 3, not confluent at apex, margin membranous, apex obtuse. Petals yellow, narrowly ovate to suboblong, 5.4–7.2 × 2–3.4 mm, obscurely 6-callose, or 4–8-callose, or not callose, 3–5-veined, base contracted into a claw 0.6–0.7 mm, apex obtuse or retuse. Stamens 4.5–5.5 mm. Ovary subsuperior, subovoid, ca. 2.5 mm; styles ca. 1 mm. Fl. and fr. Jul–Sep.

• *Pinus* forests, alpine meadows; 3800–4200 m. SW Sichuan, Xizang, Yunnan.

The varieties recognized in FRPS, which are treated as synonyms in the present account, are based on minor variations in petal callosities and hairiness of the sepal margin.

33. *Saxifraga cardiophylla* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 230. 1886.

心叶虎耳草 xin ye hu er cao

Hirculus cardiophyllus (Franchet) Losinskaja.

Herbs perennial, 16–36 cm tall. Stem glabrous proximally, shortly dark brown glandular hairy distally. Basal leaves caducous by anthesis; basal and proximal cauline leaves with petiole 0.7–6 cm, abaxially and marginally brown villous or glandular villous; leaf blade cordate to ovate-cordate, 1.6–4.5 × 1.1–3.2 cm, abaxially and marginally brown villous or glandular villous, base cordate, apex acute; distal cauline leaves with petiole 1–10 mm, brown glandular villous, leaf blade ovate to lanceolate, 1.3–3.2 × 0.5–1.7 cm, abaxially and marginally glandular pilose, adaxially glabrous or glandular pilose, base cuneate or rounded, apex acute or subacuminate; most distal cauline leaf glandular villous and shortly glandular hairy at margin. Cyme compact, 1.5–6(–15) cm, 4–13-flowered; pedicels 0.5–

2.5 cm, shortly dark brown glandular hairy. Sepals reflexed, ovate or subelliptic to suboblong, 3–4 × 1.7–2.1 mm, abaxially and marginally dark brown glandular hairy, veins 3, not confluent at apex, apex obtuse. Petals yellow, elliptic to narrowly ovate, 6–7.5 × 2.5–3.6 mm, 6(or 7)-callose, 3–5-veined, base subcordate to rounded, with a claw 0.5–1 mm, apex obtuse or acute. Stamens 4.5–5.5 mm. Ovary subsuperior, ovoid, 2.5–3 mm; styles 1–1.5 mm. Fl. and fr. Jul–Oct. $2n = 48^*$.

• Forests, forest margins, fields on slopes; 2500–4300 m. C and W Sichuan (Baoping Xian, Xiangcheng Xian), NE and W Yunnan (Dali Xian, Qiaojia Xian).

34. *Saxifraga insolens* Irmscher, Notes Roy. Bot. Gard. Edinburgh 18(90): 269. 1935.

贡山虎耳草 gong shan hu er cao

Herbs perennial, ca. 48 cm tall. Stem glabrous. Basal leaves caducous before anthesis. Cauline leaves with petiole 0.7–3 cm, proximally brown pilose at margin; leaf blade ovate-cordate to narrowly ovate, 1.8–4 × 0.8–2.1 cm, glabrous, base cordate, apex acute to acuminate; proximal leaves with petiole longer; distal leaves gradually shorter to absent. Inflorescence corymbose, 6.5–10 cm, 14–16-flowered; branches 3–5.5 cm, dark brown glandular hairy, 2- or 3-flowered; pedicels dark brown glandular hairy. Sepals reflexed, ovate, 3–3.4 × 1.5–2.3 mm, abaxially dark brown glandular hairy, veins 3–5, not, partly, or fully confluent at apex, apex obtuse or acute. Petals yellow, usually elliptic, 5.1–6 × 2.5–2.6 mm, not callose, 4–6-veined, base contracted into a claw 0.6–0.7 mm, apex obtuse. Stamens ca. 4.2 mm. Ovary subsuperior, subellipsoid, ca. 3 mm; styles ca. 1.2 mm. Fl. Aug–Sep.

• Alpine meadows; 3800–4000 m. NW Yunnan.

This species is closely related to *Saxifraga diversifolia*.

35. *Saxifraga smithiana* Irmscher, Notes Roy. Bot. Gard. Edinburgh 18(90): 268. 1935.

剑川虎耳草 jian chuan hu er cao

Herbs perennial, 26–34 cm tall. Stem brown pilose proximally, brown glandular hairy distally. Basal and proximal cauline leaves caducous; distal cauline leaves with petiole 0.2–2.5 cm, gradually shorter distally on stem until nearly absent, brown pilose at margin; leaf blade cordate-ovate to narrowly ovate, 1.1–2.7 × 0.4–1.7 cm, glabrous or brown pilose only at margin, base cordate to rounded, apex subacuminate. Flower solitary or cyme 2.3–4.5 cm and 5–7-flowered; pedicels 0.7–1.3 cm, brown glandular hairy. Sepals reflexed, subovate, 3.3–4 × ca. 2 mm, glabrous or subglabrous, veins 4 or 5, not confluent at apex, apex erose. Petals yellow, orange spotted, elliptic to broadly so, 5.6–6.5 × 3.3–4.8 mm, 6-callose, 3-veined, base contracted into a claw ca. 0.8 mm, apex obtuse. Stamens ca. 2.5 mm. Ovary subsuperior, broadly ovoid, ca. 2.7 mm; styles ca. 1.3 mm. Fl. Aug–Sep.

• Alpine meadows, rock crevices on slopes; 3700–4000 m. NW Yunnan (Jianchuan Xian, Lijiang Naxi Zu Zizhixian).

36. *Saxifraga eglandulosa* Engler, Bot. Jahrb. Syst. 48: 576. 1912.

长毛梗虎耳草 chang mao geng hu er cao

Saxifraga rockii Irmscher, Notes Roy. Bot. Gard. Edinburgh 18: 267. 1935, not Mattfeld (1931).

Herbs perennial, caespitose, 8.5–15 cm tall. Stem brown crisped villous. Basal leaves not well developed, small, caducous; petiole ca. 1.4 cm; leaf blade narrowly ovate, ca. 1 × 0.6 cm. Cauline leaves ca. 6; most proximal one with petiole ca. 1.2 cm, crisped glandular villous; leaf blade ovate, ca. 1.8 × 1 cm, ± brown glandular villous, apex acute; median leaves sessile, ovate, ca. 1.6 × 1 cm, base rounded, apex acute; most distal leaf ovate-cordate, ca. 1.3 cm × 7.5 mm, base cordate, amplexicaul, apex acuminate. Flower solitary or cyme 2- or 3-flowered; pedicels 1.3–2.3 cm, brown crisped glandular villous. Sepals spreading, orbicular to elliptic, 4.2–6 × 3.3–3.8 mm, both surfaces glabrous or glandular pilose, veins 6 or 7, confluent into a verruca at apex, margin brown crisped glandular villous. Petals yellow, broadly elliptic to orbicular, 6.2–8 × 6–7 mm, not callose, 6- or 7-veined, base with a claw ca. 0.7 mm or clawless. Stamens ca. 6 mm. Ovary superior, subglobose; styles ca. 2 mm. Fl. Jul–Aug.

• Alpine meadows, rock crevices; 3600–4500 m. S Xizang, NW Yunnan.

37. *Saxifraga hookeri* Engler & Irmscher, Bot. Jahrb. Syst. 48: 582. 1912.

近优越虎耳草 jin you yue hu er cao

Saxifraga corymbosa J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 70. 1858, not Lucé (1823), nor Boissier (1843); *S. hookeri* var. *aequifolia* C. Marquand & Airy Shaw; *S. hookeri* var. *glabrisepala* Engler & Irmscher; *S. hookeri* var. *smithii* Engler & Irmscher.

Herbs perennial, 9.5–23.5 cm tall. Stem brown crisped glandular villous. Basal leaves with petiole 3.5–4.3 cm, abaxially and marginally brown crisped glandular villous; leaf blade ovate, 1.9–2.1 × ca. 1.3 cm, abaxially and marginally brown villous, base cordate, apex acute. Cauline leaves 3–5; petiole 0.2–3.1 cm; leaf blade ovate, 1–2.2 cm × 5–13 mm; proximal ones brown villous abaxially and marginally; most distal one glandular villous adaxially and marginally. Cyme strongly corymbiform, 2.4–3.8 cm, 3–6-flowered or flower solitary; pedicels glandular hairy. Sepals erect to spreading, ovate, 3.3–3.8 × 2–2.3 mm, abaxially and marginally dark brown glandular hairy, veins 3–5, confluent at apex, apex acute. Petals yellow, oblong to broadly elliptic, 5–8.1 × 2–5.7 mm, (3 or) 4-callose, 3–5-veined, base contracted into a claw 0.6–1 mm, apex obtuse. Stamens 2.5–5.5 mm. Ovary subsuperior, ovoid to ellipsoid, ca. 2–3.4 mm; styles 1.1–1.8 mm. Fl. and fr. Aug–Oct. $2n = 16$.

Forests, slopes, by water; 3300–4200 m. E Xizang [Bhutan, Nepal, Sikkim].

38. *Saxifraga subaequifoliata* Irmscher, Notes Roy. Bot. Gard. Edinburgh 18(90): 270. 1935.

近等叶虎耳草 jin deng ye hu er cao

Herbs perennial, 18.5–37 cm tall. Stem brown glandular pilose. Cauline leaves 10–13; proximal ones with petiole 0.3–3.3 cm, glandular pilose, gradually shorter to absent distally on stem; leaf blade ovate-cordate or ovate to narrowly so, 2.4–3.5 × 0.7–2.5 cm, ± glandular hairy, base cordate to rounded, apex subobtuse or acute. Pleiochasium paniculate, 3.2–14 cm, 6–30-flowered; most proximal branch 6–7 cm, 2- or 3-flowered; pedicels shortly dark brown glandular hairy. Sepals reflexed, ovate or broadly so to narrowly triangular-ovate, (1.1–)2.5–3 × 2–2.2(–4.8) mm, abaxially shortly glandular hairy, adaxially glabrous or distally sparsely glandular hairy, veins 3(–7), not confluent at apex, margin membranous, ± glandular ciliate, apex obtuse or acute. Petals yellow, purple spotted, usually ovate to elliptic, rarely broadly ovate to broadly elliptic, 4.5–6.8 × 2.6–3.6 mm, 4–6(–8)-callose or obscurely so, 3- or 4(–8)-veined, base contracted into a claw 0.5–1 mm, apex obtuse or acute. Stamens 3–5.5 mm. Ovary subsuperior, broadly ovoid, 2.2–4.2 mm; styles 0.5–1.5 mm. Fl. and fr. Jul–Oct.

• Forests, scrub meadows, alpine meadows, rock crevices; 3000–4200 m. W Sichuan (Daocheng Xian), SE Xizang (Médog Xian), NW Yunnan.

39. *Saxifraga glaucophylla* Franchet, Pl. Delavay. 239. 1890.

灰叶虎耳草 hui ye hu er cao

Saxifraga cymiformis T. C. Ku; *S. diversifolia* Wallich ex Seringe f. *parviflora* (Franchet) Engler & Irmscher; *S. diversifolia* var. *parviflora* Franchet; *S. dunniana* H. Léveillé.

Herbs perennial, 19–42 cm tall. Stem brown pilose proximally, shortly glandular hairy distally. Basal leaves with petiole 1–4 cm, brown pilose; leaf blade ovate-oblong, 2.4–7 × 1–2.5 cm, ± brown pilose, base truncate, rounded, or cuneate, apex acute. Proximal cauline leaves similar to basal ones, petiolate; distal ones sessile, oblong to ovate, 0.8–5 × 0.3–2.5 cm, both surfaces brown pilose or glabrous, base rounded or subamplexicaul, margin glandular hairy, apex subobtuse or acute. Cyme 2.5–24 cm, 5–30-flowered; branches and pedicels shortly dark brown glandular hairy. Sepals reflexed, ovate or subovate, 2.5–3.5 × 1–2 mm, abaxially and marginally dark brown glandular hairy or margin glabrous, veins 3 or 4, not confluent at apex, apex obtuse or acute. Petals yellow, ovate to subelliptic, 4–6.5 × 2–2.9 mm, 4–6-callose near base, 3–5-veined, base contracted into a claw 0.5–0.8 mm, apex obtuse or acute. Stamens 3.5–4.5 mm. Ovary subsuperior, ovoid, 2.2–4 mm; styles 0.7–1 mm. Capsule ca. 5 mm. Fl. and fr. Jul–Aug.

• Forests, forest margins, alpine meadows, rock crevices on slopes; 2600–3900 m. SW Sichuan, C and NW Yunnan.

40. *Saxifraga gedangensis* J. T. Pan, Acta Phytotax. Sin. 28: 386. 1990.

格当虎耳草 *ge dang hu er cao*

Herbs perennial, 23–25 cm tall. Stem simple, proximally glabrous, distally glandular pilose. Basal leaves with petiole 3.5–5 cm, adaxially and marginally glandular hairy; leaf blade ovate, 3.6–4.4 × 2.1–2.6 cm, glabrous, base rounded, apex obtuse or acute. Cauline leaves ca. 4; leaf blade lanceolate to subovate, 1.3–2.9 cm × 7–10 mm, base rounded to subcordate, apex acute; proximal leaves similar to basal ones but with petiole longer, proximally glandular hairy, leaf blade glabrous; distal leaves with petiole shortened to absent, leaf blade shortly dark brown glandular hairy at margin; most distal leaf ± shortly dark brown glandular hairy on both surfaces. Pleiochasium corymbose, 6–3.7 cm, ca. 9-flowered; pedicels dark brown glandular hairy. Sepals erect, narrowly ovate, 3.5–4.5 × 1.2–1.6 mm, abaxially and marginally glandular hairy, veins 3, not confluent at apex, apex subobtuse or acute. Petals yellow, obovate, 7–7.3 × ca. 3.5 mm, adaxially (8 to) numerous callose, ca. 7-veined, base clawless, apex obtuse. Filaments subulate, ca. 5.5 mm. Ovary subsuperior, narrowly ovoid, ca. 4.5 mm; styles ca. 1 mm. Fl. Jul–Sep.

• Meadows among *Abies* forests; ca. 3400 m. SE Xizang (Médog Xian).

41. *Saxifraga haplophyloides* Franchet, Pl. Delavay. 238. 1890.

六痂虎耳草 *liu jia hu er cao*

Hirculus haplophyloides (Franchet) Losinskaja;
Saxifraga turfosa Engler & Irmscher.

Herbs perennial, 12–45 cm tall. Stem brown pilose proximally mainly at nodes, dark brown glandular hairy distally. Basal leaves caducous, often absent at anthesis. Cauline leaves ovate, 1.3–4.4 × 0.6–1.9 cm, base truncate to cuneate, apex acute; proximal leaves sometimes caducous, petiole 5–10 mm, abaxially glabrous or brown pilose, sparsely brown glandular villous at margin or glabrous; most distal leaf sessile, glandular hairy on both surfaces and at margin or abaxially glabrous, base cuneate to subcordate. Cyme corymbose, 3–8 cm, 3–13-flowered; pedicels 1–2 cm, densely dark brown glandular hairy. Sepals reflexed, triangular-ovate, 3–4.6 × 1.5–3 mm, abaxially and marginally dark brown glandular hairy, veins 3–5, confluent or not at apex, apex acute. Petals yellow, elliptic to broadly ovate, 7–7.6 × 4.3–5.3 mm, 6-callose, 3–5-veined, base contracted into a claw 0.4–0.6 mm, apex obtuse. Stamens 3–5 mm. Ovary subsuperior, ovoid, ca. 3.7 mm; styles ca. 1 mm. Fl. Jul–Aug.

• Alpine meadows; 3600–3700 m. NW Yunnan.

42. *Saxifraga kingdonii* C. Marquand, J. Linn. Soc., Bot. 48: 179. 1929.

金冬虎耳草 *jin dong hu er cao*

Saxifraga riagdomensis T. C. Ku.

Herbs perennial, 5–30 cm tall. Basal leaves mostly caducous. Cauline leaves ± isomorphic on stem, sessile, orbicular to elliptic or ovate, 1.4–3 × 0.7–1.3 cm, both surfaces pilose, sometimes densely so, margin

similarly pilose, apex obtuse. Flower usually solitary or cyme 2-flowered; pedicel glandular villous. Sepals erect to spreading, ovate, 6.5–10 × 2.7–7 mm, abaxially and marginally glandular or eglandular villous, veins 3–5, partly confluent at apex. Petals yellow to orange, elliptic to broadly so, 8–11 × 6–9 mm, several callose, 5–7-veined, base truncate, with a short claw. Stamens ca. 6 mm. Ovary subsuperior, broadly ovoid. Fl. Jul–Oct.

Cliffs, bare rock faces; 4000–4800 m. Xizang [Myanmar].

In FRPS, this species was treated as a synonym of *Saxifraga eglandulosa*. However, it is a most distinct taxon, with some of the largest flowers in the group.

43. *Saxifraga moorcroftiana* (Seringe) Wallich ex Sternberg, Revis. Saxifrag. Suppl. 2: 28. 1831.

聂拉木虎耳草 *nie la mu hu er cao*

Saxifraga diversifolia Wallich ex Seringe var. *moorcroftiana* Seringe in de Candolle, Prodr. 4: 44. 1830; *Hirculus moorcroftianus* (Seringe) Losinskaja; *S. kuana* Zhmylev; *S. lysimachioides* Klotzsch; *S. nyanangensis* J. T. Pan; *S. reflexa* T. C. Ku (1989), not Hooker (1832), nor Saint-Lager (1880).

Herbs perennial, 18–50 cm tall. Stem proximally brown crisped glandular villous, glabrous in median part, distally brown glandular pilose. Basal leaves usually deciduous at anthesis; petiole ca. 3.2 cm, abaxially and marginally sparsely brown glandular villous; leaf blade pandurate-elliptic to oblong, ca. 2.2 × 1.1 cm, abaxially and marginally brown glandular pilose, apex acute. Cauline leaves usually sessile; proximal ones oblong to pandurate, 1.6–6 × 0.8–2 cm, abaxially and marginally glandular pilose, base cordate, semiamplexicaul, apex rounded or acute; most distal leaf ovate to ovate-elliptic, ca. 2.7 × 1.5 cm, both surfaces glabrous, base cordate, amplexicaul, margin sparsely glandular ciliate, apex obtuse. Cyme corymbose, 2.5–7.3 cm, 2–12-flowered; bracts elliptic, ca. 7 × 2 mm, glandular ciliate at margin; pedicels 1–5 cm, shortly dark purple glandular hairy. Sepals erect to spreading, ovate-elliptic, 4.5–5.5 × 2.5–3 mm, abaxially shortly dark purple glandular hairy or glabrous, margin shortly dark purple glandular hairy, veins 5–7, confluent into a verruca at apex, apex obtuse. Petals yellow, obovate, 8–8.5 × 3.5–5.2 mm, 5–7-veined, base clawless, apex obtuse. Stamens 5.2–5.5 mm. Ovary subsuperior, ovoid, 2.7–3.6 mm; styles 1–1.3 mm. Capsule ca. 9 mm. Fl. and fr. Aug–Sep. $2n = 16$.

Forest margins, scrub, by water; 3500–4400 m. SE Sichuan, S Xizang, NW Yunnan [Bhutan, India, Kashmir, Nepal, Sikkim].

44. *Saxifraga kingiana* Engler & Irmscher, Bot. Jahrb. Syst. 48: 610. 1912.

毛叶虎耳草 *mao ye hu er cao*

Saxifraga gageana Engler & Irmscher, Bot. Jahrb. Syst. 48: 574. 1912, not W. W. Smith (1911).

Herbs perennial, 70–75 cm tall. Stem brown crisped villos. Basal leaves caducous. Cauline leaves ca. 10, lanceolate-ovate or ovate to cordate, 1.6–5.1 × 1.1–2.4 cm, both surfaces and margin villous, base cordate, amplexicaul, apex shortly acuminate or acute; proximal leaves smaller, distal ones gradually larger, most proximal one caducous. Cyme ca. 14.5 cm, ca. 14-flowered; branches 5.5–6 cm, 1- or 2-flowered; pedicels 0.8–1.5 cm, brown glandular villous. Sepals spreading, ovate, 4.5–5 × 3–4 mm, brown glandular pilose abaxially, adaxially distally, and marginally, veins 5 or 6, confluent into a verruca at apex. Petals yellow, adaxially lilac spotted, orbicular or broadly elliptic to broadly obovate, 6.8–7 × 5.3–6.4 mm, not callose, ca. 7-veined, base contracted into a claw 0.5–0.7 mm, apex obtuse. Stamens ca. 5.9 mm. Ovary subsuperior, globose, ca. 4.2 mm in diam.; styles ca. 1.2 mm. Fl. Jul–Aug.

Slopes; 3700–3900 m. S Xizang (Nyalam Xian) [Bhutan, Nepal, Sikkim].

45. *Saxifraga sheqilaensis* J. T. Pan, Acta Phytotax. Sin. 28: 388. 1990.

舍季拉虎耳草 she ji la hu er cao

Herbs perennial, 29–45 cm tall. Stem proximally brown crisped villous, distally glandular hairy. Basal leaves with petiole 2.1–2.3 cm, adaxially and marginally brown crisped glandular villous; leaf blade subelliptic, 2.6–2.9 × 1.2–1.4 cm, adaxially proximally and marginally glandular pilose, base rounded, apex obtuse or acute. Proximal cauline leaves similar to basal ones; petiole long, gradually shorter to absent distally on stem; leaf blade lanceolate to narrowly ovate, 1.8–3.6 cm × 5–10 mm, ± glandular pilose or shortly glandular hairy, base cuneate to subamplexicaul. Cyme 6–9 cm, 7–13-flowered; branches and pedicels shortly glandular hairy, glands dark brown. Sepals reflexed, ovate, 3.2–4.1 × 1.5–1.9 mm, glandular hairy abaxially and at proximal margin, veins 3, not confluent at apex, apex subobtuse, sometimes erose. Petals yellow, spotted, elliptic to obovate-elliptic, 6–6.2 × 3.5–4 mm, 6- or 7-callose, 5-veined, base contracted into a claw 0.5–0.7 mm, apex obtuse. Stamens ca. 5.3 mm. Ovary subsuperior, ellipsoid, ca. 4 mm; styles ca. 1 mm. Fl. Jul–Sep.

• Forest margins, rock crevices; ca. 4100 m. SE Xizang (Nyingchi Xian).

46. *Saxifraga pardanthina* Handel-Mazzetti, Symb. Sin. 7: 418. 1931.

豹纹虎耳草 bao wen hu er cao

Saxifraga atrosanguinea J. Anthony.

Herbs perennial, 20–50 cm tall. Stem distally glandular hairy and glandular. Basal and proximal cauline leaves with petiole 0.3–2.3 cm, ± glandular villous; leaf blade elliptic or oblong to oblong-lanceolate, 2.2–7 × 0.9–2.8 cm, abaxially glabrous or glandular villous, margin glandular villous, apex subobtuse; distal cauline leaves sessile, oblong to narrowly so, 1.4–2.8 cm × 3–11.5 mm, abaxially and marginally sparsely glandular hairy. Inflorescence 4–11-flowered; branches glandular hairy

and glandular. Sepals reflexed, elliptic, 4.5–5 × 2.4–2.5 mm, abaxially and marginally glandular hairy, veins 3, free, apex obtuse. Petals purple, black-purple spotted, ovate, 5–6 × 3–4 mm, not callose, 4- or 5-veined, base cordate, clawless. Stamens ca. 5.8 mm. Ovary semi-inferior, ovoid; styles divergent. Fl. and fr. Jul–Sep. $2n = 16^*$.

• Mixed forests, alpine meadows, rock crevices on slopes; 3000–3900 m. SW Sichuan, NW Yunnan.

47. *Saxifraga subamplexicaulis* Engler & Irmscher, Notes Roy. Bot. Gard. Edinburgh 5: 133. 1912.

近抱茎虎耳草 jin bao jing hu er cao

Hirculus subamplexicaulis (Engler & Irmscher) Losinskaja.

Herbs perennial, ca. 30 cm tall. Stem brown pilose only at leaf axils. Basal and proximal cauline leaves caducous; median cauline leaves sessile, narrowly ovate, ca. 3 × 1.9 cm, brown pilose, base amplexicaul, apex obtuse; bracteal leaves lanceolate, ca. 1.2 × 0.5 cm, abaxially and marginally brown pilose, apex acute.

Inflorescence corymbose, ca. 5.5 cm, 3–10-flowered; branches and pedicels black glandular hairy. Sepals spreading, subovate, 3–3.6 × 2–2.4 mm, adaxially black glandular hairy, veins 3, confluent or not at apex, margin membranous and glandular ciliate, apex obtuse. Petals yellow, elliptic to subobovate, 5–7.2 × 3–4 mm, base rounded, with a claw 0.8–1 mm, apex obtuse. Stamens ca. 5 mm. Ovary semi-inferior, broadly ovoid, ca. 5.3 mm; styles thick. Fl. Jul–Sep.

• Mountain valleys, rock crevices, wastelands; 2900–3900 m. NW Yunnan.

48. *Saxifraga pratensis* Engler & Irmscher, Bot. Jahrb. Syst. 50(Beibl. 144): 42. 1914.

草地虎耳草 cao di hu er cao

Hirculus pratensis (Engler & Irmscher) Losinskaja.

Herbs perennial, 11–14 cm tall. Stem brown pilose. Basal leaves with petiole 2–3 cm, brown villous; leaf blade ovate, 5–11 × 3–8 mm, abaxially glabrous, adaxially ± brown pilose, base rounded, margin brown ciliate. Cauline leaves with petiole gradually shorter distally on stem, 2–6 mm, brown villous; proximal leaf blades similar to basal ones; distal leaf blades lanceolate to linear, 4–14 × 1.5–2.5 mm, brown pilose or glandular hairy. Cyme subumbellate, 4.5–6.3 cm, 2- or 3-flowered or flower solitary; pedicels 1.5–4 cm, shortly dark brown glandular hairy. Sepals reflexed, ovate, 2–2.5 × 1–1.2 mm, veins 3, not confluent at apex, margin dark brown glandular hairy, apex obtuse. Petals yellow, elliptic to ovate, 4–5 × 2.3–2.8 mm, 4–6-callose near base, 4- or 5-veined, base contracted into a claw 0.5–0.8 mm, apex rounded. Stamens ca. 7 mm. Ovary subsuperior, ovoid, ca. 3 mm; styles erect, ca. 0.7 mm. Fl. and fr. Jul–Sep.

• Alpine scrub meadows, rock crevices on slopes; 3800–4800 m. W Sichuan, S Xizang, NW Yunnan.

Saxifraga subrhombifolia Irmscher was cited as a synonym of *S. pratensis* in FRPS, but the former species is a much larger plant (as

reflected in the FRPS description) and is probably synonymous with *S. diversifolia*.

49. *Saxifraga stellariifolia* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 231. 1886.

繁缕虎耳草 fan lu hu er cao

Hirculus stellariifolius (Franchet) Losinskaja.

Herbs perennial, cespitose, 7–35 cm tall. Stem brown crisped glandular villous. Basal and proximal cauline leaves deciduous at anthesis; median and distal ones with petiole 2–10 mm, margin brown glandular villous at base; leaf blade ovate, 3–12 × 1.9–7 mm, abaxially and marginally glandular pilose, adaxially glabrous or glandular pilose, base usually rounded, apex subobtusate or acute. Flower solitary, or cyme corymbose, 1–2.5 cm, and 2–6-flowered; pedicels 2–12 mm, brown glandular pilose. Sepals spreading to reflexed, subelliptic to ovate, 2.9–4.5 × 2–2.5 mm, both surfaces glabrous, veins 3–5, not confluent at apex, margin glabrous or glandular ciliate, apex obtuse. Petals yellow, ovate to elliptic, 5–8 × 3–3.6 mm, 4–6-callose, 3–5-veined, base contracted into a claw 0.6–1.1 mm, apex obtuse or acute. Stamens 4.7–6 mm. Ovary subsuperior, ovoid, 3–4.2 mm; styles 1–1.8 mm. Capsule ca. 8.6 mm; seeds ovoid, ca. 1 mm. Fl. and fr. Jul–Sep.

• Forests, alpine meadows; 3000–4300 m. W Sichuan, NW Yunnan.

50. *Saxifraga giraldiana* Engler in Diels, Bot. Jahrb. Syst. 29: 365. 1900.

秦岭虎耳草 qin ling hu er cao

Hirculus giraldianus (Engler) Losinskaja; *Saxifraga giraldiana* var. *biondiana* Engler; *S. giraldiana* var. *hupehensis* Engler; *S. hastigera* H. Léveillé.

Herbs perennial, cespitose, 8.5–21.5 cm tall. Stem brown crisped villous. Basal and proximal cauline leaves deciduous at anthesis; distal cauline leaves with petiole 2.5–12 mm, brown glandular villous at margin, hairs denser near base; leaf blade ovate or broadly so to linear-oblong, 5–13 × 2–11.5 mm, both surfaces glabrous or ± glandular pilose, base rounded to cuneate, margin sparsely crisped glandular villous, apex acute. Flower solitary, or cyme corymbose, 1.2–1.7 cm, and 2–6-flowered; pedicels 3–16 mm, densely brown pubescent. Sepals spreading at anthesis, reflexed in fruit, ovate to narrowly so, 2.5–3.6 × 1–2 mm, abaxially and marginally ± glandular pilose, veins 3–5, not confluent at apex, apex obtuse. Petals yellow, brown spotted, ovate or elliptic to oblong, 5.6–7.1 × 3–3.8 mm, (2–)4–6-callose, 3–5(–7)-veined, base contracted into a claw 0.6–1.2 mm, apex obtuse or acute. Stamens 4.5–5.5 mm. Ovary superior, ellipsoid to ovoid, 2.6–4 mm; styles 1.2–1.3 mm. Fl. and fr. Jul–Oct.

• Forests, alpine meadows, rock crevices; 1000–4000 m. W Hubei (Badong Xian, Shennongjia Linqu), S Shaanxi (Guangtou Shan, Taibai Shan), C Sichuan (Emei Shan, Li Xian, Maowen Qiang Zu Zizhixian), NE Yunnan (Qiaojia Xian).

Saxifraga giraldiana and *S. stellariifolia* are doubtfully distinct. The distinction based on the hairiness of the sepals (glandular pilose abaxially in *S. giraldiana* vs. glabrous abaxially in *S. stellariifolia*) is

insufficient because certain collections of *S. giraldiana* have some glabrous sepals and others have sepals with only one or two hairs.

51. *Saxifraga egregioides* J. T. Pan, Acta Phytotax. Sin. 28: 388. 1990.

矮优越虎耳草 ai you yue hu er cao

Herbs perennial, 8.5–13.5 cm tall. Stem glandular pilose proximally, glabrous distally. Cauline leaves with petiole 1.2–7.5 mm, gradually shorter toward apex of stem, adaxially and marginally crisped glandular villous, only so at base on proximal leaves; leaf blade ovate-cordate to cordate, 8.5–10 × 6–8.5 mm, both surfaces glabrous, base cordate, margin glandular pilose, apex obtuse. Flower solitary or cyme 2-flowered; pedicels 0.9–1.7 cm, sparsely glandular hairy. Sepals reflexed, ovate, ca. 2.6 × 2 mm, both surfaces glabrous, veins 3, not confluent at apex, margin shortly glandular hairy, apex obtuse. Petals yellow, subobovate, 5–5.3 × 3.5–3.8 mm, 4-callose, 4–6-veined, base gradually contracted into a claw ca. 0.8 mm, apex obtuse. Stamens ca. 4.5 mm. Ovary superior, ovoid, ca. 3 mm; styles ca. 1 mm. Fl. Aug–Sep.

• *Abies* forests; ca. 3400 m. SE Xizang (Mêdog Xian).

52. *Saxifraga auriculata* Engler & Irmscher, Bot. Jahrb. Syst. 48: 578. 1912.

耳状虎耳草 er zhuang hu er cao

Herbs perennial, 26–35 cm tall. Stem simple, proximally white glandular villous, distally glandular pubescent. Basal leaves caducous, absent at anthesis. Proximal cauline leaves smaller than others; petiole 1.7–3 mm; leaf blade ovate to lanceolate, 5–6 × 3–4 mm, both surfaces glandular pubescent, base rounded, apex subobtusate to acute; median leaves sessile or subsessile, narrowly ovate, larger, 1.3–1.7 cm × 7–9 mm, base cordate to truncate, amplexicaul, apex acute; distal leaves oblong, smaller. Cyme congested, 3–11-flowered; pedicels densely glandular pubescent. Sepals erect, subovate, 3–4 × 1–1.5 mm, abaxially and marginally glandular pubescent, veins 3 or 5–15, not confluent at apex, apex obtuse, entire, sometimes erose. Petals yellow, suboblong, ca. 6 × 1.5–2 mm, 2-callose near base or distinctly 6-callose, 3- or 4-veined, base abruptly contracted into a claw, apex obtuse. Stamens overtopping pistil. Ovary ovoid; styles rather short. Fl. and fr. Jul–Sep.

• Shaded and wet places in forests, alpine meadows; 3200–4700 m. W Sichuan, S Xizang.

- 1a. Sepals 5–15-veined, apex entire; petals 2-callose near base 52a. var. *auriculata*
- 1b. Sepals 3-veined, apex erose; petals distinctly 6-callose 52b. var. *conaensis*

52a. *Saxifraga auriculata* var. *auriculata*

耳状虎耳草(原变种) er zhuang hu er cao (yuan bian zhong)

Hirculus auriculatus (Engler & Irmscher) Losinskaja.

Sepals 5–15-veined, margin glandular pubescent, apex obtuse. Petals suboblong, 2-callose near base. Fl. Jul–Aug.

• Alpine meadows; 3200–4700 m. W Sichuan.

52b. *Saxifraga auriculata* var. *conaensis* J. T. Pan in C. Y. Wu, Fl. Xizang. 2: 471. 1985.

错那虎耳草 *cuo na hu er cao*

Sepals 3-veined, margin membranous, glabrous or sparsely glandular hairy, apex erose. Petals obovate to elliptic, distinctly 6-callose. Fl. and fr. Jul–Sep.

• Shaded and wet places in forests; 3200–3600 m. S Xizang (Cona Xian).

53. *Saxifraga bulleyana* Engler & Irmscher, Notes Roy. Bot. Gard. Edinburgh 5: 130. 1912.

小泡虎耳草 *xiao pao hu er cao*

Hirculus bulleyanus (Engler & Irmscher) Losinskaja. Herbs perennial, densely cespitose, 9.5–30 cm tall. Stem densely brown glandular hairy and brown crisped glandular villous. Basal and proximal cauline leaves caducous, usually absent at anthesis; distal cauline leaves sessile, ovate-elliptic, 0.9–1.5 cm × 3.5–8.5 mm, both surfaces white glandular hairy, base rounded, apex subobtusely. Cyme 1.5–2 cm, (1 or)2–5-flowered; pedicels 4–8 mm, dark brown crisped glandular villous and brown glandular hairy. Sepals erect, ovate to narrowly so, 4–5 × 2–3.2 mm, dark brown glandular hairy abaxially, adaxially distally, and marginally, veins 6 or 7, confluent into a verruca at apex, apex subobtusely or acute. Petals yellow, elliptic to broadly ovate, 6–7 × 3–5 mm, 2–4-callose, 3–6-veined, base contracted into a claw 0.4–1.5 mm, apex obtuse or acute. Stamens 4–5 mm. Ovary subsuperior, ovoid, 3–3.6 mm; styles 1–1.5 mm. Fl. Jul–Aug.

• Alpine meadows, cliff ledges, rock crevices; 3000–4600 m. NW Yunnan.

54. *Saxifraga brachyphylla* Franchet, Pl. Delavay. 237. 1890.

短叶虎耳草 *duan ye hu er cao*

Saxifraga swertiiflora H. Léveillé.

Herbs perennial, cespitose, 11–50 cm tall. Stem proximally brown crisped glandular villous, distally dark brown glandular hairy and leafless. Basal leaves caducous; petiole 6–9 mm, crisped glandular villous at margin; leaf blade subobovate to elliptic, 4.6–8 × 2.5–3.5 mm, glabrous, sometimes pilose. Cauline leaves sessile or subsessile; most proximal one caducous; median ones denser, ovate, 4–6 × 3–4 mm, glabrous except sometimes glandular hairy at basal margin, base truncate, apex acute; distal leaves sparser, lanceolate to oblong, ca. 6 × 2 mm, glandular hairy, apex acute. Cyme 1.7–9 cm, 2–14-flowered; pedicels 3–14 mm, glandular hairy. Sepals reflexed, ovate, 2.1–2.5 × 1.2–1.5 mm, dark brown glandular hairy abaxially and sparsely so at distal margin, veins 3, not confluent at apex, apex acute. Petals yellow, oblong, 4–5 × 2–2.1

mm, 4-callose, 3-veined, base contracted into a claw 0.4–0.6 mm, apex subobtusely. Stamens 3–3.4 mm. Ovary subsuperior, broadly ovoid, 1.9–2 mm; styles 0.8–1 mm. Fl. Aug–Oct.

• Wet meadows, slopes; 2500–3700 m. Yunnan (Dongchuan Shi, Eryuan Xian, Lijiang Naxi Zu Zizhixian).

55. *Saxifraga peplidifolia* Franchet, Pl. Delavay. 234. 1890.

耳源虎耳草 *er yuan hu er cao*

Hirculus peplidifolius (Franchet) Losinskaja; *H. petrophilus* (Franchet) Losinskaja; *Saxifraga hypericoides* Franchet f. *latifolia* (Engler & Irmscher) J. T. Pan ex T. C. Ku; *S. hypericoides* var. *likiangensis* (Engler & Irmscher) J. T. Pan; *S. macrostigma* Franchet var. *cordifolia* W. W. Smith; *S. macrostigma* var. *hypericoides* (Franchet) Engler & Irmscher f. *latifolia* Engler & Irmscher; *S. macrostigma* var. *hypericoides* subvar. *macrantha* Engler & Irmscher; *S. peplidifolia* var. *foliata* Franchet; *S. petrophila* Franchet; *S. petrophila* var. *likiangensis* Engler & Irmscher.

Herbs perennial, densely cespitose, 2–13.5 cm tall. Stem brown crisped glandular villous, hairs denser at leaf axils. Basal leaves caducous; petiole 2–7 mm, brown glandular villous; leaf blade elliptic to oblong, 4–6 × 1.9–2.3 mm, adaxially ± glandular hairy, apex acute. Proximal cauline leaves with petiole 1.2–3.6 mm, glandular villous at margin; leaf blade elliptic to oblong, 5–6.5 × 1.9–2.1 mm, adaxially ± glandular hairy; distal leaves subsessile to sessile, oblong to narrowly ovate, 7–12 × 2–4 mm, adaxially and marginally subglandular hairy, sometimes glabrous on both surfaces. Flower solitary or cyme 2- or 3-flowered; pedicels 2.2–17 mm, glandular hairy. Sepals erect, then spreading to reflexed, subovate to elliptic, 3–4 × 1.5–2.1 mm, ± glandular hairy abaxially and at margin near apex, glandular hairy adaxially distally, veins 3–5, not confluent at apex, apex obtuse, sometimes erose. Petals yellow, elliptic, rarely ovate-elliptic, 4.2–6.1 × 2.4–3.5 mm, 2-callose near base, 3–5(or)6-veined, base with a claw 0.3–1 mm, apex retuse or obtuse. Stamens 3–4.1 mm. Ovary subsuperior, ovoid, 2.5–3.7 mm; styles 2–2.5 mm. Fl. and fr. Jul–Sep.

• Forests, alpine scrub meadows, alpine meadows, rock crevices; 2700–4600 m. SW Sichuan, NW Yunnan.

One of the present authors (Gornall) considers that the synonyms *Saxifraga hypericoides* f. *latifolia*, *S. macrostigma* var. *hypericoides* f. *latifolia*, and *S. macrostigma* var. *hypericoides* subvar. *macrantha* belong not under this species but under *S. hypericoides* var. *hypericoides*.

56. *Saxifraga hypericoides* Franchet, J. Bot. (Morot) 10: 261. 1896.

金丝桃虎耳草 *jin si tao hu er cao*

Herbs perennial, densely cespitose, 11.5–19 cm tall. Stem brown crisped glandular villous (hairs denser near

nodes) and shortly glandular hairy. Basal leaves numerous, caducous; petiole 1.5–4 mm, brown crisped glandular villous at margin; leaf blade oblong to linear or elliptic, 2.5–3 × 0.8–1 mm, brown pubescent, sometimes glandular, apex acute. Cauline leaves with petiole 1.2–2 mm, abaxially glandular hairy, margin brown crisped glandular villous at base; leaf blade oblanceolate to narrowly oblong or elliptic to oblong, 0.8–1.3 cm × 1.9–4 mm, glandular pubescent on both surfaces and at margin, base gradually tapered, apex acute or mucronate. Cyme 2–4(–8)-flowered or flower solitary; pedicels slender, 0.6–2.9 cm, glandular hairy. Sepals erect to spreading, broadly ovate or subelliptic to narrowly ovate, 1.9–2.6 × 1.2–1.5 mm, abaxially glandular hairy, veins 3, not confluent at apex, margin usually glabrous, occasionally glandular hairy, apex obtuse, sometimes erose. Petals yellow or orange, narrowly ovate to oblong, 4–5.3 × 1.7–2 mm, 2-callose near base, sometimes obscurely so, 3- or 4(or 5)-veined, base rounded or obtuse, or cordate and contracted into a claw 0.2–0.4 mm, apex obtuse or acute. Stamens 1.7–4.8 mm. Ovary subsuperior, ovoid, 2–2.5 mm; styles 1.5–5 mm. Fl. and fr. Jun–Sep.

- Forests, forest margins, alpine scrub meadows, alpine meadows, rock crevices; 2700–5300 m. Sichuan, Yunnan.

Saxifraga hypericoides var. *glabrescens* T. C. Ku (Bull. Bot. Res., Harbin 9(4): 3. 1989) was described from SW Sichuan (Yanyuan Xian) as a glabrous-leaved variant. Two of the present authors (Gornall and Ohba) do not believe it belongs in this species because *S. hypericoides*, despite its great variability, always has pubescent leaves; var. *glabrescens* requires further study to ascertain its relationships and status.

- 1a. Flower solitary; petals orange 56c. var. *aurantiascens*
- 1b. Cyme 2–4(–8)-flowered; petals yellow.
 - 2a. Base of petals rounded or obtuse 56b. var. *rockii*
 - 2b. Base of petals cordate .. 56a. var. *hypericoides*

56a. *Saxifraga hypericoides* var. *hypericoides*

金丝桃虎耳草(原变种) jin si tao hu er cao (yuan bian zhong)

Saxifraga hypericoides f. *longipetala* T. C. Ku; *S. hypericoides* f. *longistyla* (Franchet) J. T. Pan ex T. C. Ku; *S. hypericoides* var. *longistyla* (Franchet) J. T. Pan; *S. longistyla* Franchet; *S. macrostigma* Franchet var. *hypericoides* (Franchet) Engler & Irmscher; *S. macrostigma* var. *hypericoides* subvar. *longistyla* (Franchet) Engler & Irmscher; *S. peplidifolia* Franchet var. *angustipetala* T. C. Ku.

Cyme 2–4(–8)-flowered. Sepals usually entire at apex, sometimes erose. Petals yellow, base cordate. Styles 1.5–2 or 4–5 mm. Fl. and fr. Jul–Sep.

- Forests, forest margins, alpine scrub meadows, alpine meadows, rock crevices; 2700–4600 m. W Sichuan, NW Yunnan.

56b. *Saxifraga hypericoides* var. *rockii* (Mattfeld) J. T. Pan & Gornall in Gornall et al., Novon 10: 377. 2000.

贡嘎虎耳草 gong ga hu er cao

Saxifraga rockii Mattfeld, Notizbl. Bot. Gart. Berlin-Dahlem 11: 302. 1931, not Irmscher (1935).

Cyme 2–4(–8)-flowered. Sepals entire at apex. Petals yellow, base rounded or cuneate. Style 1.5–2 mm. Fl. Jun–Aug.

- 3700–5300 m. Sichuan.

56c. *Saxifraga hypericoides* Franchet var. *aurantiascens* (Engler & Irmscher) J. T. Pan & Gornall in Gornall et al., Novon 10: 376. 2000.

橙瓣虎耳草 cheng ban hu er cao

Saxifraga macrostigma var. *aurantiascens* Engler & Irmscher, Notes Roy. Bot. Gard. Edinburgh 5: 132.

1912; ?*Hirculus trinervius* (Franchet) Losinskaja; ?*S. trinervia* Franchet.

Flower solitary. Sepals erose or entire at apex. Petals orange, base cordate, contracted into a claw. Styles 1.5–2 mm. Fl. and fr. Aug–Sep.

- Alpine meadows; 3200–4600 m. Sichuan, Yunnan.

57. *Saxifraga yezhiensis* C. Y. Wu in C. Y. Wu & J. T. Pan, Acta Phytotax. Sin. 28: 54. 1990.

叶枝虎耳草 ye zhi hu er cao

Herbs perennial, 6.5–11 cm tall. Stem brown crisped glandular villous and shorter glandular hairy. Basal leaves caducous; petiole ca. 7 mm, margin glandular villous; leaf blade ca. 4 × 2 mm, glandular hairy, apex obtuse-acuminate. Cauline leaves subsessile, proximal ones smaller, distal ones larger; leaf blade oblong, 6–9 × 1.5–2.8 mm, both surfaces and margin glandular hairy, base cuneate, basal margin sparsely glandular villous, apex acute. Flower solitary or cyme 2- or 3-flowered; pedicels brown crisped glandular villous and shorter straight glandular hairy. Sepals erect-spreading, ovate, 3.2–3.9 × 1.9–2 mm, glandular hairy abaxially, adaxially distally, and marginally, veins 8–11, not confluent at apex, apex subacuminate or acute. Petals yellow, oblong to narrowly ovate, 4.8–5.3 × 2.1–2.3 mm, 2-callose near base, 5-veined, base with a claw ca. 1 mm, apex acute. Stamens 3.5–3.9 mm. Ovary subsuperior, ovoid, ca. 2.3 mm; styles divergent, ca. 2.3 mm. Fl. Jul–Aug.

- Slopes; ca. 3600 m. NW Yunnan (Weixi Xian).

58. *Saxifraga pseudohirculus* Engler, Bot. Jahrb. Syst. 48: 590. 1912.

狭瓣虎耳草 xia ban hu er cao

Saxifraga hirculoides Engler in Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 29: 112. 1883, not Decaisne (1844); *Hirculus pseudohirculus* (Engler) Losinskaja; *S. balongshanensis* T. C. Ku; *S. hirculoides* f. *abbreviata* Engler; *S. longipetala* T. C. Ku; *S. pseudohirculus* var. *shensiensis* Engler & Irmscher; *S. pseudohirculus* var. *tenuiflora* H. Smith; *S. selgenensis* K. S. Hao; *S. spathulifolia* T. C. Ku. Herbs perennial, caespitose, 4–17 cm tall. Stem proximally brown crisped glandular villous and

glandular pubescent, distally dark brown glandular hairy. Basal leaves with petiole 0.6–2.3 cm, margin brown crisped glandular villous; leaf blade lanceolate or oblanceolate to narrowly oblong, 2–11 × 0.6–2.5 mm, glandular hairy, apex subobtusate. Cauline leaves with petiole 2–12 mm, gradually shorter to absent distally on stem, margin brown crisped glandular villous; leaf blade suboblong to oblanceolate, 0.8–3.5 cm × 1.9–3.5 mm, glandular pubescent, apex subobtusate. Cyme 2–12-flowered or flower solitary; pedicels 0.5–3.8 cm, dark brown glandular hairy. Sepals erect to spreading, broadly to narrowly ovate, 2–4 × 1–2.9 mm, abaxially and marginally dark brown glandular hairy, adaxially sparsely glandular hairy or glabrous, veins 3–5(–7), not confluent at apex, apex obtuse or acute. Petals yellow, lanceolate or narrowly oblong to ensiform, 4–11 × 1.3–3 mm, 2-callose, 3–5(–7)-veined, base with a claw 0.4–1.2 mm, apex obtuse to acute. Stamens 1.5–5 mm. Ovary semi-inferior, broadly ovoid, 2.6–4.6 mm; styles 1.1–2.8 mm. Fl. and fr. Jul–Sep.

• Forests, scrub, alpine meadows, rock crevices; 3100–4600 (–5600) m. S Gansu, E and S Qinghai, S Shaanxi (Qin Ling), W Sichuan, E and S Xizang.

59. *Saxifraga litangensis* Engler, Repert. Spec. Nov. Regni Veg. Beih. 12: 396. 1922.

理塘虎耳草 *li tang hu er cao*

Hirculus litangensis (Engler) Losinskaja; *Saxifraga litangensis* f. *minor* Engler.

Herbs perennial, densely caespitose, 3.5–7.5 cm tall. Stem shortly brown glandular hairy, crisped glandular villous at leaf axils. Basal leaves with petiole ca. 7.5 mm, proximally brown crisped glandular villous, distally glandular hairy; leaf blade suboblong, ca. 6 × 2.5 mm, brown glandular hairy. Cauline leaves sessile, oblong to linear-oblong, 0.8–1.4 cm × 2–3 mm, crisped glandular villous at base, brown glandular hairy elsewhere. Cyme 2- or 3-flowered or flower solitary; pedicels 3–7(–14) mm, shortly brown glandular hairy. Sepals erect to spreading, ovate to elliptic, 2.1–3.8 × 1.8–2.2 mm, abaxially and marginally dark brown glandular hairy, veins 4–7, not confluent at apex. Petals yellow, ovate or subobovate to suboblong, 6–7 × 3–3.3 mm, 2-callose, 5–7-veined, base subcordate, with a claw 0.5–0.8 mm, apex obtuse to acute. Stamens 3–4.3 mm. Ovary subsuperior, ovoid to broadly so, 2.8–3.8 mm; styles divergent, 1–3 mm. Fl. and fr. Aug–Oct.

• Alpine scrub, alpine meadows, rock crevices; 4000–5400 m. W Sichuan, S Xizang.

60. *Saxifraga cacuminum* H. Smith, Acta Horti Gothob. 1: 13. 1924.

顶峰虎耳草 *ding feng hu er cao*

Hirculus cacuminum (H. Smith) Losinskaja.

Herbs perennial, densely caespitose, 2–5.5 cm tall. Stem pale brown glandular hairy. Basal leaves aggregated; petiole 4–5 mm, margin glandular villous; leaf blade

lanceolate to oblong-linear, 5–10 × 0.9–2.5 mm, abaxially glabrous, adaxially and marginally hispid, apex aristate. Cauline leaves narrowly lanceolate to oblong-linear, 0.5–1.2 cm × 1–1.5 mm, glandular hairy, apex aristate. Flower solitary; pedicel 1.8–2 cm, dark brown glandular hairy. Sepals spreading, triangular-ovate, 3–3.7 × 1.8–2.5 mm, abaxially glandular hairy, adaxially and marginally glabrous, veins 3, not confluent at apex, apex obtuse. Petals yellow, oblong, 6–8 × 1.5–3 mm, 2-callose, 3-veined, base with a claw ca. 0.5 mm, apex subobtusate or acute. Stamens ca. 5 mm. Ovary semi-inferior, ovoid, ca. 4 mm; styles divergent, ca. 2.5 mm. Fl. Jul–Aug.

• Alpine meadows; 4700–5200 m. W Sichuan.

61. *Saxifraga yarlungzangboensis* J. T. Pan, Acta Phytotax. Sin. 16(2): 26. 1978.

雅鲁藏布虎耳草 *ya lu zang bu hu er cao*

Herbs perennial, caespitose, 3.5–12 cm tall. Stem simple, brown glandular hairy and brown crisped villous at leaf axils. Basal leaves with petiole 6–9 mm, abaxially and marginally brown crisped glandular villous; leaf blade subelliptic, 5–7 × 2.5–2.7 mm, brown glandular hairy, apex subobtusate. Cauline leaves with petiole 2–5.5 mm, gradually shorter to nearly absent distally on stem, margin brown crisped glandular villous; leaf blade oblong, 8–8.5 × 2–2.7 mm, densely brown glandular hairy, apex subobtusate. Flower solitary or cyme 2- or 3-flowered; pedicels densely dark brown glandular hairy. Sepals erect, then spreading, ovate to narrowly so, 4.2–4.8 × 2–2.6 mm, dark brown glandular hairy, veins 5–7, confluent or not at apex, apex obtuse or acute. Petals yellow, narrowly oblong or lanceolate to ensiform, 0.9–1.3 cm × 2.6–3 mm, abaxially and marginally densely glandular hairy, adaxially glabrous or sparsely glandular hairy, not callose, 5–7-veined, base with a claw 1–1.8 mm, apex obtuse or acute. Stamens 3.8–4 mm. Ovary subinferior, ca. 3.6 mm, with an annular nectary disc; styles ca. 2.5 mm. Fl. Aug–Sep.

• Alpine meadows; 4300–4800 m. E and S Xizang (Biru Xian, Nang Xian, Yadong Xian).

The spelling of the specific epithet follows the protologue; in FRPS, it was given as “*Saxifraga yaluzangbuensis*.” The species differs from the closely related (but Himalayan) *S. viscidula* J. D. Hooker & Thomson in its glandular hairy petals.

62. *Saxifraga lychnitis* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 68. 1858.

燃灯虎耳草 *ran deng hu er cao*

Hirculus lychnitis (J. D. Hooker & Thomson)

Losinskaja.

Herbs perennial, 3–15 cm tall, caespitose. Stem simple, purple, dark purple glandular hairy. Basal leaves aggregated into a rosette; leaf blade spatulate, 1.1–1.5 cm × 4.2–4.5 mm, both surfaces and margin glandular villous, apex obtuse. Cauline leaves with petiole ca. 2 mm (on proximal leaves); leaf blade oblong, 9–10 × ca. 3.1 mm, both surfaces and margin glandular hairy, apex

subobtuse. Flower solitary or cyme 2-flowered, nodding especially in bud; bracts oblong, ca. 8×2 mm, dark brown glandular hairy, apex subobtuse; pedicels ca. 3 mm, dark purple glandular hairy. Sepals erect, narrowly ovate to oblong, ca. 5×2 mm, subcarnose, abaxially and marginally densely dark purple glandular hairy, veins 3, not confluent at apex, apex obtuse or acute. Petals yellow, oblong, $8.5\text{--}9 \times 2.6\text{--}2.7$ mm, not callose, 3- or 4-veined, base with a claw $0.7\text{--}0.8$ mm, apex retuse. Stamens $3.3\text{--}4.5$ mm. Ovary semi-inferior, ca. 4 mm; styles ca. 1.8 mm. Fl. Jul–Sep. $2n = 16$.

Wet alpine meadows; 4300–5500 m. E Qinghai (Caka), W Sichuan (Daocheng Xian). S Xizang [Bhutan, N India, Kashmir, Nepal, Sikkim].

63. *Saxifraga oresbia* J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 28. 1933.

山生虎耳草 shan sheng hu er cao

Herbs perennial, caespitose, 6.5–15 cm tall. Basal leaves aggregated into a rosette; leaf blade obovate-spatulate, ca. 9×4.5 mm, leathery, both surfaces and margin glandular hairy, apex subobtuse. Cauline leaves lanceolate or oblong to elliptic, $6\text{--}11 \times 3\text{--}7$ mm, both surfaces and margin glandular hairy, apex subobtuse. Flower solitary or cyme 2- or 3-flowered; pedicels densely glandular hairy. Sepals erect, ovate to narrowly so, $5.4\text{--}5.5 \times 2\text{--}3$ mm, carinose, glandular hairy abaxially, adaxially distally, and marginally, veins 5, not confluent at apex, apex subacute. Petals yellow, narrowly obovate, $1\text{--}1.3 \times 4\text{--}4.2$ mm, not callose, 5-veined, base contracted into a claw ca. 1.3 mm, apex obtuse or acute. Stamens $3.4\text{--}5$ mm. Ovary semi-inferior, ovoid, $2.5\text{--}2.7$ mm; styles ca. 1 mm. Fl. Jul–Sep.

• Hill tops, alpine lakesides; 4200–4500 m. SW Sichuan.

64. *Saxifraga nigroglandulifera* N. P. Balakrishnan, J. Bombay Nat. Hist. Soc. 67: 59. 1970.

垂头虎耳草 chui tou hu er cao

Saxifraga nutans J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 69. 1858, not D. Don (1822), nor Adams (1834); *Hirculus nutans* Losinskaja; *S. nutans* f. *swertioides* Engler.

Herbs perennial, 5–36 cm tall. Stem simple, proximally dark brown villous only at leaf axils, distally shortly dark brown glandular hairy. Basal leaves with petiole 1.8–6 cm, margin crisped glandular villous; leaf blade broadly elliptic to ovate or suboblong, $1.5\text{--}4 \times 1\text{--}1.7$ cm, abaxially glabrous, adaxially glabrous or sometimes sparsely glandular hairy, margin sparsely brown crisped glandular villous, apex obtuse or acute. Cauline leaves with petiole 2–17 mm, gradually shorter to absent distally on stem, margin brown glandular villous; leaf blade lanceolate to oblong, $1.3\text{--}7.5 \times 0.3\text{--}2.2$ cm, both surfaces subglabrous, margin brown glandular villous, apex obtuse or acute. Cyme

racemiform, 2–12.5 cm, 2–14-flowered; flowers usually nodding and secund; pedicel 5–6 mm, densely dark brown glandular hairy. Sepals erect, triangular-ovate or ovate to lanceolate, $3.5\text{--}5.4 \times 1.4\text{--}3$ mm, abaxially and marginally dark brown glandular hairy, veins 3–6, not confluent at apex, apex obtuse or acute. Petals yellow, subspatulate to narrowly obovate, $7.4\text{--}9.6 \times 2.5\text{--}3$ mm, not callose, 3–5-veined. Stamens 4–7 mm. Ovary semi-inferior, 2–4.8 mm; styles 1.2–1.4 mm. Fl. and fr. Jul–Oct.

Forests, forest margins, scrub, alpine meadows, stony hillsides, alpine lakesides; 2700–5000(–5400) m. W Sichuan, S Xizang, NW Yunnan [Bhutan, Nepal, Sikkim].

65. *Saxifraga diapensia* H. Smith, Acta Horti Gothob. 1: 10. 1924.

岩梅虎耳草 yan mei hu er cao

Hirculus diapensia (H. Smith) Losinskaja.

Herbs perennial, caespitose, 1–8(–12) cm tall. Stem brown glandular pilose. Basal leaves aggregated into a rosette; petiole sheathlike at base, 2.2–8 mm, brown crisped glandular villous; leaf blade subelliptic to narrowly ovate or lanceolate, $5\text{--}12 \times 2\text{--}5$ mm, glabrous, base cuneate, apex acute. Cauline leaves ca. 2, sometimes hidden in basal rosette, sublinear to linear-oblong; leaf blade $6\text{--}15 \times 1\text{--}2$ mm, subcarnose, base crisped glandular villous, margin glandular hairy. Flower solitary; pedicel 0.8–12 mm, brown glandular hairy. Sepals erect-spreading, ovate, gibbous, $3\text{--}7 \times 2\text{--}4$ mm, subcarnose, both surfaces glabrous, veins 3–7, confluent into a verruca at apex, margin \pm brown glandular ciliate. Petals yellow, sometimes orange spotted, ovate or elliptic to suboblong, $6.2\text{--}11 \times 3\text{--}7$ mm, 2-callose near base, 3–5 (–7)-veined, base contracted into a claw 0.5–1.2 mm, apex retuse. Stamens 3–5.6 mm. Ovary subsuperior, broadly subglobose, 2.5–5 mm; styles 0.9–1.8 mm. Fl. Jul–Aug.

• Alpine meadows, rocky grasslands, screes, cliff ledges, rock crevices; 3500–5300 m. W Sichuan, E Xizang, Yunnan.

This species is very closely related to *Saxifraga caveana*, which is a slightly smaller plant distributed to the S of the more robust *S. diapensia*.

66. *Saxifraga caveana* W. W. Smith, Rec. Bot. Surv. India 4 (5): 193. 1911.

近岩梅虎耳草 jin yan mei hu er cao

Herbs perennial, caespitose, 2.5–4.5 cm tall. Stem dark brown glandular hairy, leafless but with bracts. Basal leaves with petiole 6–10 mm, margin crisped glandular villous; leaf blade oblong to ovate, $4\text{--}10 \times 1.1\text{--}5$ mm, glabrous, base cuneate, apex subacute. Flower solitary; pedicel 1–2(–7) cm, dark brown glandular hairy. Sepals spreading to reflexed, ovate or lanceolate, gibbous, $4.6\text{--}6 \times 2.7\text{--}4$ mm, abaxially and marginally dark brown glandular hairy or glabrous, veins (3 or)5, partly confluent at apex, apex subobtuse. Petals yellow, elliptic to obovate-elliptic, $8\text{--}10 \times 5\text{--}6$ mm, not callose, 3- or 6-veined, base contracted into a claw 0.8–1 mm, apex retuse. Stamens 5–6 mm. Ovary subsuperior, subglobose, ca. 4.5 mm; styles ca. 1.3 mm. Fl. Jul–Aug.

Alpine meadows, rocky slopes; 4500–4800 m. S Xizang [Bhutan, Nepal, Sikkim].

- 1a. Sepals ovate, abaxially and marginally dark brown glandular hairy, 5-veined; petals 6-veined 66a. var. *caveana*
1b. Sepals lanceolate, glabrous, 3-veined; petals 3-veined 66b. var. *lanceolata*

66a. *Saxifraga caveana* var. *caveana*

近岩梅虎耳草(原变种) jin yan mei hu er cao (yuan bian zhong)

Sepals ovate, abaxially and marginally dark brown glandular hairy, 5-veined. Petals 6-veined. Fl. Jul–Aug.

Alpine meadows; 4500–4800 m. S Xizang (Cona Xian, Mêdog Xian) [Bhutan, Nepal, Sikkim].

66b. *Saxifraga caveana* var. *lanceolata* J. T. Pan, Acta Phytotax. Sin. 28: 389. 1990.

狭萼虎耳草 xia e hu er cao

Sepals lanceolate, glabrous, 3-veined. Petals 3-veined. Fl. Jul–Aug.

- Rocky slopes; ca. 4500 m. SE Xizang (Mainling Xian).

67. *Saxifraga nigroglandulosa* Engler & Irmscher, Notes Roy. Bot. Gard. Edinburgh 5: 135. 1912.

黑腺虎耳草 hei xian hu er cao

Hirculus maximowiczii (Losinskaja) Losinskaja; *H. nigroglandulosus* (Engler & Irmscher) Losinskaja; *Saxifraga hirculus* Linnaeus var. *platypetala* Franchet; *S. maximowiczii* Losinskaja.

Herbs perennial, caespitose, 5–10(–12) cm tall. Stem densely dark brown glandular hairy. Basal leaves with petiole 0.6–1.8 cm (on proximal leaves), margin brown crisped eglandular villous; leaf blade ovate to narrowly so, 0.6–1.4 cm × 3–6 mm, usually glabrous, apex subobtusate or acute. Cauline leaves 2–5; petiole 3–6 mm, longer in proximal leaves, reduced or absent in distal leaves, margin dark brown glandular villous; leaf blade lanceolate to linear, 1–2 cm × 1.5–6 mm, abaxially glabrous, adaxially often and margin always with dark brown, long (ca. 0.75 mm), eglandular hairs, apex subobtusate or acute. Flower solitary, rarely 2; pedicel 1–3 cm, densely black glandular hairy. Sepals erect, then spreading to reflexed, ovate or elliptic to broadly elliptic, 4–6.5 × 2.7–5.5 mm, abaxially and marginally black glandular hairy, veins 3–9, partly or fully confluent at apex, apex obtuse. Petals yellow or orange-yellow, elliptic or broadly so to broadly obovate, 0.7–1.3 cm × 5–8.8 mm, 2–11-callose, 5–9-veined, base contracted into a claw 0.6–1.2 mm, apex obtuse or retuse. Stamens 5.5–6 mm. Ovary subsuperior, subglobose, 3.2–6.2 mm; styles 1–2 mm. Fl. and fr. Jun–Sep.

Forests, scrub, alpine meadows, rock crevices; 3300–4800 m. W Sichuan (Daocheng Xian), SE Xizang, NW Yunnan [Myanmar].

68. *Saxifraga tsangchanensis* Franchet, Pl. Delavay. 233. 1890.

苍山虎耳草 cang shan hu er cao

Hirculus tsangchanensis (Franchet) Losinskaja; *Saxifraga crinalis* Franchet; *S. quadricalloso* Handel-Mazzetti.

Herbs perennial, densely caespitose, 3.5–15 cm tall. Stem proximally brown villous at leaf axils, distally dark brown glandular hairy. Basal leaves with petiole 0.6–3.2 cm, margin brown villous; leaf blade ovate or elliptic to oblong, 6–12 × 2–5 mm, adaxially and marginally brown pilose, apex acute. Proximal cauline leaves with petiole 2–10 mm, brown villous; leaf blade oblong or lanceolate to ovate, 5–13 × 1.2–3 mm, adaxially and marginally with dark brown, long (ca. 0.75 mm), eglandular hairs, apex obtuse to acute; distal leaves with petiole gradually shorter to absent, leaf blade linear-lanceolate to linear, 0.4–1.7 cm × 1.2–2 mm, both surfaces glabrous, rarely glandular pilose adaxially, margin brown glandular villous. Flower solitary or cyme 2- or 3-flowered; pedicels 0.4–1.8 cm, dark brown glandular hairy. Sepals erect to spreading, ovate to elliptic, 2.4–4.9 × 1.6–2.8 mm, abaxially and marginally dark brown glandular hairy, rarely glabrous abaxially, veins 3–5, partly to fully confluent at apex, apex obtuse. Petals yellow, pale orange spotted, elliptic to obovate, 5.3–8 × 2.6–3.7 mm, 2–11-callose, 5–8-veined, base contracted into a claw 0.3–0.9 mm, apex obtuse or retuse. Stamens 3–5 mm. Ovary subsuperior, subovoid, 1.7–3.2 mm; styles 0.8–2 mm. Capsule ca. 4 mm; carpels 2, divergent. Fl. and fr. Jul–Sep.

- Scrub meadows, rocky hillsides, screes, rock crevices; 3000–4600 m. SE Xizang, NW Yunnan.

Material named *Saxifraga quadricalloso* Handel-Mazzetti (Symb. Sin. 7: 419. 1931), provisionally treated in synonymy in the present account, needs further study.

69. *Saxifraga subtsangchanensis* J. T. Pan, Acta Phytotax. Sin. 28: 389. 1990.

藏东南虎耳草 zang dong nan hu er cao

Herbs perennial, caespitose, 4–4.5 cm tall. Stem simple, proximally brown glandular pilose near nodes, distally dark brown glandular hairy. Basal leaves with petiole 5.5–11 mm, brown glandular pilose at margin; leaf blade subovate to elliptic, 5.5–6.5 × 2–3.5 mm, adaxially and marginally brown pilose, apex subobtusate. Cauline leaves linear-oblong to lanceolate, 7.5–10 × 1.2–3.5 mm, adaxially and marginally brown pilose, apex subobtusate; proximal leaves with petiole 2–6 mm, distal ones sessile. Flower solitary; pedicel 5–11 mm, adaxially and marginally dark brown glandular hairy. Sepals erect, subovate to subelliptic, 4.5–5 × ca. 2 mm, abaxially and marginally dark brown glandular hairy, veins 5, confluent into a verruca at apex, apex obtuse. Petals yellow, obovate, 7.5–8 × 3.8–4 mm, abaxially sparsely glandular hairy near base, 7- or 8-veined, base

clawless, apex retuse. Stamens ca. 4.5 mm. Ovary sub-superior, subovoid, ca. 3 mm; styles ca. 1 mm. Fl. and fr. Jul–Oct.

• Alpine scrub meadows, rock crevices; 4100–4300 m. SE Xizang (Bomi Xian, Mêdog Xian).

70. *Saxifraga chumbiensis* Engler & Irmischer, Bot. Jahrb. Syst. 48: 582. 1912.

春丕虎耳草 chun pi hu er cao

Herbs perennial, cespitose, 6.5–10.5 cm tall. Stem brown glandular pilose. Basal leaves with petiole 0.6–2 cm, adaxially and marginally brown pilose; leaf blade elliptic to oblong, 5–12 × 2.5–4.5 mm, adaxially and marginally pilose, base subcuneate, apex acute. Cauline leaves with petiole 0.2–0.8 mm; leaf blade elliptic or oblong to lanceolate, 5–10 × 2.5–4 mm, adaxially and marginally brown pilose, base subcuneate, apex acute. Flower solitary; pedicel 0.5–1.5 cm, brown pilose. Sepals erect to spreading, ovate, 4–5.5 × 2–2.9 mm, both surfaces glabrous, veins 5, confluent at apex, margin brown glandular pilose, apex acute. Petals yellow, obovate, 6–7.5 × 4–4.2 mm, not callose, 5-veined, base with a claw 1–1.3 mm, apex retuse. Stamens ca. 4.5 mm. Ovary broadly ovoid, ca. 2.8 mm; styles divergent, ca. 1.9 mm. Fl. Jul–Aug.

Rock crevices on slopes; 4600–5800 m. S Xizang (Yadong Xian) [Bhutan, Sikkim].

71. *Saxifraga diffusicallosa* C. Y. Wu, Fl. Xizang. 2: 472. 1985.

散痂虎耳草 san jia hu er cao

Saxifraga taylorii H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 247. 1960, not Calder & Savile (1959). Herbs perennial, 17–26 cm tall. Stem sparsely brown villous proximally, brown glandular hairy distally. Basal leaves with petiole 1.2–3 cm, abaxially and marginally pale brown villous; leaf blade elliptic to ovate, 10–14 × 4–5 mm, abaxially pilose, sometimes glandular. Proximal cauline leaves similar to basal ones; most distal one sessile, lanceolate to ovate, 5–10 × 1–2.5 mm, glabrous or very sparsely glandular hairy. Inflorescence corymbose, 2.4–6.3 cm, 3–16-flowered; branches 1.3–6 cm, 1–4-flowered; pedicels 0.5–1.5 cm, glabrous or sparsely glandular hairy. Sepals erect to spreading, triangular-ovate to narrowly ovate, 2.4–4.5 × 1.1–1.6 mm, abaxially dark brown glandular hairy, veins 3–7, not confluent at apex, apex subobtusate or acute. Petals yellow, obovate to elliptic, 6–8 × 2.5–4.5 mm, adaxially diffusely 6- or 7-callose, 3–9-veined, base with a claw 0.4–1.5 mm, apex obtuse. Stamens 4.5–5.5 mm. Ovary subsuperior, ovoid, 2–3.5 mm; styles 0.9–1.5 mm. Fl. Aug–Sep.

• Scrub, screes, rock crevices; 3200–4000 m. S Xizang.

72. *Saxifraga forrestii* Engler & Irmischer, Notes Roy. Bot. Gard. Edinburgh 5: 137. 1912.

玉龙虎耳草 yu long hu er cao

Hirculus forrestii (Engler & Irmischer) Losinskaja.

Herbs perennial, cespitose, 5–13 cm tall. Stem slender, proximally brown pilose (hairs sometimes glandular), distally sparsely shortly glandular hairy. Basal leaves with petiole 6–13 mm, crisped glandular villous at base and margin; leaf blade ovate or subobovate to elliptic, 1.5–8 × 1–4 mm, adaxially and marginally brown glandular villous, apex obtuse. Proximal cauline leaves with petiole ca. 4 mm, brown glandular villous at margin; leaf blade linear-lanceolate to linear-oblong, 3.4–5.5 × 0.2–1.1 mm, leathery, adaxially and marginally brown glandular villous (hairs to 1 mm); distal leaves sessile, linear, ca. 7.5 × 0.9 mm, subcarnose, margin glandular pilose or glabrous. Cyme 4.5–6 cm and 2–4-flowered or flower solitary; pedicels slender, 0.9–3 cm, glabrous or sometimes sparsely black glandular hairy. Sepals reflexed, subelliptic to ovate, 2–3 × 1–1.8 mm, both surfaces glabrous, veins 3, not confluent at apex, distal margin glandular ciliate or glabrous, apex obtuse. Petals yellow, oblong-ovate to oblong, 4–7 × 1.5–3.1 mm, distinctly or indistinctly 4-callose near base, 3-veined, base contracted into a claw 0.6–0.8 mm, apex subacute. Stamens 2.5–3.6 mm. Ovary subsuperior, ovoid, 2.5–3 mm; styles 0.5–2 mm. Fl. Aug–Sep.

• Meadows, rock crevices; 2700–3900 m. NW Yunnan (Lijiang Naxi Zu Zizhixian, Zhongdian Xian).

73. *Saxifraga cordigera* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 68. 1858.

心虎耳草 xin hu er cao

Herbs perennial, cespitose, 4–6 cm tall. Stem slender, brown glandular villous. Basal leaves with petiole long ciliate; leaf blade ovate or obovate, ca. 3 × 2.5 mm, adaxially and marginally brown villous. Cauline leaves sessile, ovate to broadly so, 4–6 × 4–5 mm, both surfaces and margin long ciliate, base cordate, apex obtuse. Flower solitary. Sepals erect, subelliptic to ovate, ca. 5.5 mm, veins 3–5, confluent into a verruca at apex, margin ciliate, apex obtuse. Petals yellow, obovate, ca. 1.1 cm, not callose, 5–7-veined, base contracted into a claw, apex obtuse. Stamens ca. 5.7 mm. Ovary ovoid; styles erect, then divergent. Fl. and fr. Jul–Sep. $2n = 16$.

Gravel by alpine streams; 4000–5000 m. S Xizang [Nepal, Sikkim].

74. *Saxifraga gonggashanensis* J. T. Pan in C. Y. Wu & J. T. Pan, Acta Phytotax. Sin. 28: 66. 1990.

贡嘎山虎耳草 gong ga shan hu er cao

Herbs perennial, cespitose, 13–17 cm tall. Stem tawny crisped glandular villous, hairs denser near nodes. Basal leaves with petiole ca. 1 cm, abaxially glandular pilose, margin brown crisped glandular villous; leaf blade suboblong, ca. 6 × 1.5 mm, abaxially and marginally brown glandular or eglandular pilose, apex 1- or 2-crisped aristate glandular villous (hairs sometimes deciduous). Proximal cauline leaves similar to basal ones; petiole ca. 6 mm, abaxially and marginally glandular pilose; leaf blade oblong to narrowly ovate, ca. 6.6 × 2 mm, abaxially and marginally glandular

pubescent; distal leaves subsessile, leaf blade narrowly ovate to oblong, ca. 1 cm × 3.5 mm, brown crisped glandular villous near base, both surfaces glandular pubescent, apex with 1–4 aristate, glandular hairs. Flower solitary or cyme 2-flowered; pedicels 1.2–3 cm, brown glandular hairy and crisped glandular villous. Sepals erect to spreading, ovate to subelliptic, ca. 4 × 2.5–2.8 mm, abaxially glandular hairy, veins 5, not confluent at apex, margin membranous, apex erose. Petals orange, elliptic to ovate, 5.5–5.6 × ca. 3.5 mm, 2-callose near base, 5–7-veined, base with a claw 0.3–0.5 mm, apex obtuse. Stamens 3–3.5 mm. Ovary broadly ovoid, ca. 2.5 mm; styles divergent, ca. 2.5 mm; stigma rather large. Fl. Jul–Aug.

• Alpine scrub meadows; ca. 4600 m. W Sichuan (Daocheng Xian).

75. *Saxifraga rizhaoshanensis* J. T. Pan, Acta Phytotax. Sin. 28: 386. 1990.

日照山虎耳草 *ri zhao shan hu er cao*

Herbs perennial, caespitose, 6.5–7.5 cm tall. Stem dark brown glandular hairy, crisped glandular villous near base. Basal leaves dense; petiole 2–2.5 mm, margin brown crisped glandular villous; leaf blade narrowly elliptic to oblong, ca. 2 × 0.5–1.2 mm, adaxially and marginally pilose, apex acute, with 1 brown, aristate hair. Proximal cauline leaves with petiole ca. 2 mm, margin brown crisped glandular villous; leaf blade linear-oblong, ca. 6 × 1 mm, glandular or eglandular hispid, apex with 1 aristate hair; distal leaves sessile, linear, ca. 6.6 × 1 mm, dark brown glandular hairy. Cyme 2-flowered; pedicels 1–1.7 cm, dark brown glandular hairy. Sepals erect to spreading, ovate to broadly so, ca. 2.5 × 1.6–2 mm, abaxially dark brown glandular hairy, veins 3, not confluent at apex, margin membranous, apex erose, sometimes ± dark brown glandular hairy. Petals yellow, suboblong, ca. 4.2 × 1.7 mm, 2-callose near base, 3-veined, base contracted into a claw ca. 0.5 mm, apex acute. Stamens ca. 2.4 mm. Ovary subsuperior, ovoid, ca. 2 mm; styles divergent, ca. 2 mm. Fl. Jul–Aug.

• Alpine meadows, rock crevices; 4300–4500 m. W Sichuan (Dêrong Xian, Xiangcheng Xian).

76. *Saxifraga glabricaulis* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 241. 1960.

光茎虎耳草 *guang jing hu er cao*

Saxifraga palpebrata J. D. Hooker & Thomson var. *parceciliata* Engler & Irmscher.

Herbs perennial, densely caespitose, 2–4 cm tall. Stem glabrous. Rosette leaves ovate-lanceolate, 4–6 × 1.5–3 mm, adaxially and marginally hispid, base contracted into a petiole ca. 1.5 cm, apex obtuse. Cauline leaves with petiole reduced to absent distally on stem; leaf blade oblanceolate to narrowly ovate, 6–8 × 2–3 mm, adaxially and marginally hispid, apex obtuse. Flower solitary; hypanthium glabrous. Sepals narrowly ovate to lanceolate, 3–4 mm, glabrous, veins 3–6, confluent into a verruca at apex, apex obtuse. Petals yellow, elliptic to

orbicular, to 8 × 5.5 mm, 5-veined, base abruptly narrowed into a claw ca. 1.5 mm. Male flowers: stamens 2–3.5 mm; anthers ca. 0.8 mm, with pollen; ovary ovoid-conical, ca. 2 mm; styles rather bent, 0.7 mm; stigma obscure. Female flowers: stamens ca. 2.5 mm; anthers small, without pollen; ovary ca. 3 mm, with an annular nectary disc; styles divergent, thick, ca. 1.5 mm; stigma thick. Fl. and fr. Jul–Aug. $2n = 16$.

Near snow lines; ca. 4800 m. SE Xizang [Bhutan, Nepal, Sikkim].

77. *Saxifraga peraristulata* Mattfeld, Notizbl. Bot. Gart. Berlin-Dahlem 11: 304. 1931.

川滇虎耳草 *chuan dian hu er cao*

Herbs perennial, densely caespitose, 2.5–5.5 cm tall. Stem glandular pilose. Basal leaves with petiole 2.7–8 mm, margin brown glandular or eglandular villous; leaf blade narrowly elliptic to oblong or lanceolate, 3.5–7 × 0.9–1.5 mm, ± hispid on both surfaces or adaxially only, margin brown glandular or eglandular villous, apex 1-aristate. Cauline leaves narrowly lanceolate or linear, 4–10 × 0.9–1.2 mm, adaxially and marginally ± brown glandular villous, apex 1-aristate; proximal leaves with petiole ca. 1.4 mm, brown glandular villous at margin, distal leaves sessile. Flower solitary; pedicel slender, 0.9–2.5 cm, brown glandular pilose. Sepals spreading, subelliptic, 2.2–3 × 1–2 mm, abaxially glandular hairy, veins 3, not confluent at apex, margin glabrous, apex erose. Petals yellow, oblong to narrowly ovate, 5–5.5 × 2.2–2.5 mm, 2-callose near base, 3–5-veined, base contracted into a claw ca. 0.5 mm, apex subobtuse. Stamens 3.5–4 mm. Ovary subsuperior, broadly ovoid, ca. 2 mm; styles 1.5–2.5 mm. Fl. Jul–Aug.

• Alpine meadows, rock crevices; 4100–4700 m. W Sichuan, NW Yunnan.

In FRPS, this species was treated under the name *Saxifraga trinervia*, which appears, however, to be a different taxon (possibly *S. hypericoides* var. *aurantiascens*). Two synonyms were cited in FRPS under *S. trinervia*: *S. peraristulata* and *S. triaristulata*. Careful scrutiny of the types and other material shows that the name *S. peraristulata* should be applied to the taxon described above, whereas the name *S. triaristulata* refers to another species in the group with rufous villous pedicels and is described later in the present account.

78. *Saxifraga linearifolia* Engler & Irmscher, Bot. Jahrb. Syst. 48: 583. 1912.

条叶虎耳草 *tiao ye hu er cao*

Herbs perennial, densely caespitose, small, 3–5 cm tall. Stem brown glandular villous. Basal leaves aggregated into a rosette; petiole 4.5–5.5 mm, margin brown glandular villous; leaf blade oblong to elliptic, 3.5–4 × 1–1.5 mm, adaxially and marginally glandular hairy, base cuneate, apex subobtuse. Cauline leaves with petiole reduced to absent distally on stem, base glandular villous; leaf blade oblong to oblanceolate, 3.6–5 × 1.2–1.3 mm, both surfaces and margin glandular hairy. Flower solitary; pedicel 2–2.5 mm, long and shortly glandular hairy. Sepals spreading, subelliptic or oblong, 1.5–2.5 × 1–1.7 mm, glabrous or glandular hairy abaxially, veins 3 or 4, not confluent at

apex, margin membranous, apex obtuse and erose, glabrous or sparsely glandular ciliate on 1 lateral side. Petals yellow, obovate to elliptic, 2.5–5 × 1.6–3.5 mm, not callose, 3–5-veined, base contracted into a claw 0.2–0.3 mm, apex obtuse. Stamens ca. 1.2 mm. Ovary subsuperior, ovoid, ca. 1.6 mm; styles ca. 1 mm. Fl. and fr. Jul–Sep.

• Alpine meadows, rock crevices; 3900–4200. W Sichuan (Kangding Xian), NW Yunnan (Lijiang Naxi Zu Zizhixian).

79. *Saxifraga aristulata* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 68. 1858.

小芒虎耳草 xiao mang hu er cao

Herbs perennial, densely caespitose, 2–8.5(–11) cm tall. Stem ± brown crisped glandular villous. Basal leaves with petiole 4–6 mm, margin brown crisped glandular villous; leaf blade narrowly ovate, oblong, or linear, 4–8.2 × 0.7–1.3 mm, both surfaces glabrous, sometimes margin glandular ciliate, apex acute, often aristate, sometimes glandular. Proximal cauline leaves larger than distal ones; petiole 1.5–2 mm, margin brown crisped glandular villous; leaf blade linear, 6–7.5 × 0.5–1.8 mm, both surfaces glabrous, sometimes margin glandular ciliate, apex aristate, sometimes glandular; distal leaves sessile, linear, 3.8–7.5 × 0.5–3 mm, abaxially sometimes sparsely brown glandular hairy, margin glandular ciliate, apex shortly aristate, sometimes glandular. Flower solitary or rarely cyme 2-flowered; pedicel 0.7–12 mm, dark brown glandular hairy, rarely brown crisped glandular villous. Sepals erect, then spreading to reflexed, elliptic or ovate to broadly ovate, 2–2.5 × 1.2–2 mm, glabrous, rarely glandular at margin, veins 3 or 4, not confluent at apex, apex obtuse or acute. Petals yellow, ovate, obovate, or elliptic to oblong, 4–6 × 1.9–2 mm, 2-callose near base, 3–5-veined, base with a claw 0.4–1 mm, apex obtuse to acute. Stamens 2.5–5 mm. Ovary subsuperior, ovoid, 2.4–2.5 mm; styles 1.4–1.6 mm. Fl. and fr. Jul–Oct. 2n = 16.

Forests, forest margins, alpine meadows, rocky hillsides, stony ground, rock crevices; 3000–5000 m. SW Sichuan, Xizang, N Yunnan [Bhutan, N India, Nepal, Sikkim].

Two varieties may be recognized. Two of the present authors (Gornall and Ohba) believe that *Saxifraga macrostigma* should be treated as a third variety of *S. aristulata*.

1a. Plants slender, usually 2–5 cm tall;
cauline leaves 0.5–1 mm wide. 79a. var. *aristulata*

1b. Plants robust, usually 4–11 cm tall;
cauline leaves more than 1 mm wide. 79b. var. *longipila*

79a. *Saxifraga aristulata* var. *aristulata*

小芒虎耳草(原变种) xiao mang hu er cao (yuan bian zhong)

Hirculus aristulatus (J. D. Hooker & Thomson) Losinskaja; *H. macrostigma* (Franchet) Losinskaja; *Saxifraga aristulata* var. *microcephala* Engler & Irmscher; *S. macrostigma* Franchet; *S. macrostigma* var. *georgeana* Engler & Irmscher; *S. macrostigma* var. *gracillima*

Engler & Irmscher; *S. macrostigma* f. *hastifolia* Engler & Irmscher.

Plants slender, usually 2–5 cm tall. Cauline leaves 0.5–1 mm wide. Pedicel brown glandular hairy. Fl. and fr. Jul–Oct.

Forests, forest margins, rocky hillsides, stony ground; 4000–5000 m. Xizang [Bhutan, N India, Nepal, Sikkim].

79b. *Saxifraga aristulata* var. *longipila* (Engler & Irmscher) J. T. Pan, Fl. Reipubl. Popularis Sin. 34(2): 91. 1992.

长毛虎耳草 chang mao hu er cao

Saxifraga macrostigma var. *georgeana* f. *longipila*

Engler & Irmscher, Notes Roy. Bot. Gard. Edinburgh 5: 132. 1912; *S. aristulata* f. *longipila* (Engler & Irmscher) J. T. Pan ex T. C. Ku; *S. oligophylla* T. C. Ku.

Plants robust, usually 4–11 cm tall. Cauline leaves more than 1 mm wide. Pedicel brown crisped glandular villous. Fl. and fr. Jul–Sep.

• Alpine meadows, rock crevices; 3000–4600 m. SW Sichuan (Muli Zang Zu Zizhixian), N Yunnan.

80. *Saxifraga lepidostolonosa* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 240. 1960.

异条叶虎耳草 yi tiao ye hu er cao

Herbs perennial, caespitose, ca. 4.5 cm tall. Stem brown glandular piliferous, crisped glandular villous at leaf axils. Basal leaves with petiole ca. 8 mm, crisped glandular villous at margin; leaf blade narrowly oblanceolate, 8–10 × 1–1.2 mm, glabrous, apex obtuse. Cauline leaves sessile, oblong to linear, 4–10 × 1–1.1 mm, brown crisped glandular villous only near base. Flower solitary; pedicel ca. 1.1 cm, dark brown glandular hairy. Sepals erect or spreading, ovate-elliptic, 2–3 × 1–1.5 mm, glabrous, veins 3 or 4, not confluent at apex, apex obtuse. Petals yellow, obovate, 3.8–4.5 × 2–2.8 mm, not callose, 3- or 4-veined, base abruptly contracted into a claw ca. 0.4 mm, apex obtuse. Stamens ca. 3.5 mm. Ovary subsuperior, ca. 3 mm; styles 0.6–1.5 mm. Fl. and fr. Jul–Sep.

Alpine meadows; ca. 4700 m. S Xizang (Cona Xian) [Bhutan].

The present authors have provisionally retained *Saxifraga lepidostolonosa*, described from Bhutan, as the name for this species. It is not clear whether *S. lepida* H. Smith (loc. cit.: 239), described from Bhutan and Nepal, is distinct. The two taxa appear to differ chiefly in that the former produces stolons from the basal leaf rosettes (although examination of the type specimen shows that not every plant does this). There are other minor differences in sepal orientation (spreading but sometimes reflexed in *S. lepida*) and in sexuality (dioecious in *S. lepida* but apparently hermaphroditic in *S. lepidostolonosa*). Despite this, there would appear to be a case for merging the two taxa, as was done by Grierson (Fl. Bhutan 1(3): 510. 1987), who recorded the (merged) species from S Xizang (Chumbi, i.e., Yadong Xian). For the purposes of priority, the choice of the first author to unite them must be followed, because the two names were published simultaneously. Grierson (loc. cit.) chose *S. lepida*.

81. *Saxifraga sublinearifolia* J. T. Pan, Acta Phytotax. Sin. 28: 385. 1990.

四川虎耳草 si chuan hu er cao

Saxifraga aristulata J. D. Hooker & Thomson var. *earistulata* T. C. Ku.

Herbs perennial, 1.7–4.2 cm tall. Stem brown crisped villous near base and at leaf axils. Basal leaves with petiole 2.5–4 mm, brown crisped glandular villous; leaf blade suboblong, 2–4 × 0.4–1 mm, glabrous, apex obtuse. Cauline leaves linear-oblong to linear-oblong, 3.2–3.6 × ca. 0.6 mm, sparsely brown crisped glandular villous only near base, apex obtuse; proximal leaves with petiole ca. 2.3 mm, brown crisped glandular villous; distal leaves sessile. Flower solitary; bract linear-oblong, ca. 3 × 0.6 mm, sparsely brown crisped glandular villous near axil; pedicel 3.7–7 mm, usually glabrous, rarely sparsely glandular hairy. Sepals spreading, subovate, 1.5–1.8 × ca. 1 mm, glabrous, veins 3 or 4, not confluent at apex, apex obtuse. Petals orange, subelliptic, 2.9–3.2 × 1.3–1.6 mm, 2-callose near base, 3-veined, base abruptly contracted into a claw 0.3–0.4 mm, apex subobtusate. Stamens ca. 3 mm. Ovary subsuperior, ovoid, ca. 1.5 mm; styles ca. 1 mm. Fl. Jul–Aug.

• W Sichuan.

82. *Saxifraga subspathulata* Engler & Irmscher, Bot. Jahrb. Syst. 48: 584. 1912.

近匙叶虎耳草 *jin chi ye hu er cao*

Saxifraga subspathulata var. *kumaunensis* Engler & Irmscher.

Herbs perennial, caespitose, 4–7 cm tall. Stem slender, proximally brown glandular or eglandular villous, distally sparsely glandular hairy. Basal leaves with petiole 6–13 mm, crisped glandular villous at margin and leaf axils; leaf blade spatulate to lanceolate, ca. 3 × 1–1.5 mm, glabrous, apex obtuse. Cauline leaves sessile, linear-lanceolate, 2–4 × 0.5 mm, glabrous. Flower solitary; pedicel black glandular hairy. Sepals spreading, oblong, ca. 1.5 mm, glabrous, veins 3, not confluent at apex, apex obtuse. Petals yellow, obovate, ca. 3.5 × 2 mm, not callose, 3–5-veined, base tapered, apex subacute. Stamens 2.5–3.5 mm. Ovary subsuperior, ovoid, 2.5–3 mm; styles 0.5–1 mm. Fl. Aug–Sep. Rocky places; ca. 3500 m; SE Xizang [Bhutan, N India, Sikkim].

83. *Saxifraga nakaooides* J. T. Pan in C. Y. Wu, Fl. Xizang. 2: 485. 1985.

平脉腺虎耳草 *ping mai xian hu er cao*

Herbs perennial, 6–6.5 cm tall. Stem purple, brown crisped glandular villous at leaf axils, elsewhere subglabrous. Basal leaves with petiole ca. 6.5 mm, margin brown crisped glandular villous; leaf blade elliptic, 5–6.7 × 2.1–3.5 mm, glabrous, apex subobtusate. Cauline leaves oblong, 4.7–8 × 1.5–2.5 mm, margin brown crisped glandular villous at base. Cyme ca. 2 cm, 2- or 3-flowered; pedicels 5–10 mm, dark brown glandular hairy. Sepals erect, ovate, 2.4–2.7 × 1.8–2.1 mm, abaxially brown glandular hairy proximally, veins 3, not confluent at apex, apex subobtusate. Petals yellow, obovate, 8–9.7 × 3.9–4.5 mm, 6-callose near base, 5-veined, base gradually contracted into a claw 1.5–1.7 mm, apex retuse. Stamens 2–3.5 mm. Ovary

subsuperior, ovoid, 1.7–3.4 mm; styles 0.5–1.5 mm. Fl. Jul–Aug.

• Alpine meadows; ca. 4200 m. S Xizang (Cona Xian).

84. *Saxifraga heteroclada* H. Smith var. *aurantia* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 245. 1960.

异枝虎耳草 *yi zhi hu er cao*

Herbs perennial, caespitose, 2.5–18.5 cm tall. Stem simple, sparsely brown crisped glandular villous, with axillary leaf buds. Basal leaves caducous; petiole 4–7 mm, margin crisped glandular villous; leaf blade subelliptic to oblong, 3–3.5 × 1–1.1 mm, subcarnose, glabrous, apex subacute. Cauline leaves sessile, linear, 0.9–1.4 cm × 1–2 mm, subcarnose, both surfaces glabrous, margin crisped glandular villous at base. Flower solitary or cyme 2- or 3-flowered; pedicels 6–2.2 cm, dark brown glandular hairy. Sepals erect, subelliptic to broadly ovate, 3–4.1 × 2–3.1 mm, subcarnose, both surfaces glabrous, veins 3–5, not confluent at apex, margin dark brown glandular ciliate, apex obtuse or retuse. Petals yellow, elliptic, 5.5–8.2 × 3–5 mm, (4–) 6-callose near base, (3–) 5–7-veined, base contracted into a claw 0.2–0.5 mm, apex retuse. Stamens 3.6–5 mm. Ovary subsuperior, broadly ovoid, 3–3.5 mm; styles 1–1.5 mm; stigma large. Fl. and fr. Jul–Sep.

Forests, alpine scrub meadows, rock crevices; 3500–4200 m. SE Xizang [N Myanmar].

Saxifraga heteroclada var. *aurantia* is supposed to differ from var. *heteroclada* in its more numerous cauline leaves, glabrous pedicels, sepals with glandular margin, and larger (to 9 × 5 mm), orange petals. It seems from the above description that not all these characters are correlated, and it remains to be seen whether the two varieties can be maintained. Both taxa were described from N Myanmar.

85. *Saxifraga heterocladoides* J. T. Pan in C. Y. Wu, Fl. Xizang. 2: 474. 1985.

近异枝虎耳草 *jin yi zhi hu er cao*

Herbs perennial, caespitose, 6.5–18.5 cm tall. Stem proximally sparsely crisped glandular villous (hairs denser near leaf axils), distally brown glandular hairy. Basal leaves usually caducous by anthesis; petiole 6.2–9.2 mm, base sheathlike, margin brown crisped glandular villous; leaf blade elliptic, 4–5.2 × 2–2.3 mm, glabrous, base cuneate, apex subobtusate. Cauline leaves oblong to lanceolate, 0.8–1.2 cm × 1.3–2 mm, both surfaces glabrous, margin brown crisped glandular villous at base, dark brown glandular hairy on distal leaves. Cyme 1.5–2.2 cm and 2- or 3-flowered or flower solitary; pedicels 0.9–1.3 cm, brown glandular hairy. Sepals erect, elliptic to broadly so, 3.4–3.6 × 2.2–3 mm, abaxially and marginally dark brown shortly glandular hairy, veins 3–5, not or partly confluent at apex, apex retuse. Petals yellow, elliptic to obovate-elliptic, 7.2–10 × 3.8–5.1 mm, 6- or 7-callose near base, 5-veined, base rounded, contracted into a claw 0.4–0.8 mm, apex obtuse. Stamens 2–3.2 mm. Ovary subsuperior, broadly ovoid, 2.9–3.2 mm; styles 0.8–1 mm. Fl. Jul–Aug.

• *Abies* forests, rock crevices; ca. 4000 m. SE Xizang (Bomi Xian).

86. *Saxifraga sinomontana* J. T. Pan & Gornall in Gornall et al., *Novon* 10: 377. 2000.

山地虎耳草 shan di hu er cao

Herbs perennial, caespitose, 4.5–35 cm tall. Stem sparsely brown crisped villous. Basal leaves with petiole 0.7–4.5 cm, margin brown crisped villous; leaf blade elliptic or oblong to linear-oblong, 0.5–3.4 cm × 1.5–5.5 mm, glabrous or adaxially brown crisped eglandular villous, apex obtuse or acute. Cauline leaves lanceolate to linear, 0.9–2.5 cm × 1.5–5.5 mm, abaxially and marginally glabrous or villous; proximal leaves with petiole 0.3–2 cm, distal ones sessile. Cyme 1.4–4 cm, 2–8-flowered, rarely flower solitary; pedicels 0.4–1.8 cm, brown crisped villous. Sepals erect, subovate to subelliptic, 3.8–5.2–3.3 mm, abaxially sometimes pilose, veins 5–8, not confluent at apex, margin crisped villous, apex obtuse. Petals yellow, obovate, elliptic, oblong, or pandurate to narrowly obovate, 0.8–1.3 cm × 3.3–6.9 mm, 2-callose near base, 5–15-veined, base with a claw 0.2–0.9 mm, apex obtuse or acute. Stamens 4–6 mm. Ovary subsuperior, 3.3–5 mm; styles 1.1–2.5 mm. Fl. and fr. May–Oct.

Scrub, alpine meadows, marshy meadows, rock crevices, calcareous rocks; 2700–5300 m. S Gansu, Qinghai, S Shaanxi, W Sichuan, Xinjiang, E and S Xizang, NW Yunnan [Bhutan, N India, Kashmir, Nepal, Sikkim].

Saxifraga sinomontana is an extraordinarily variable species. However, there always seem to be intermediates between the numerous variants, or their diagnostic characters show reticulate variation. Therefore, the present authors have refrained from recognizing any varieties, except in one case, described below, where there does appear to be a genuine discontinuity.

1a. Basal leaves glabrous adaxially 86a. var. *sinomontana*

1b. Basal leaves brown crisped eglandular villous adaxially 86b. var. *amabilis*

86a. *Saxifraga sinomontana* var. *sinomontana*

山地虎耳草(原变种) shan di hu er cao (yuan bian zhong)

Saxifraga montana H. Smith, *Acta Horti Gothob.* 1: 9. 1924, not (Small) Fedde (1906); *Hirculus montanus* Losinskaja; *S. hirculus* Linnaeus var. *indica* C. B. Clarke; *S. hirculus* var. *kansuensis* Kanitz; *S. hirculus* f. *vestita* Engler; *S. montana* f. *densifolia* T. C. Ku; *S. montana* f. *humilis* H. Smith; *S. montana* var. *splendens* H. Smith.

Basal leaves glabrous adaxially. Fl. and fr. May–Oct. Scrub, alpine meadows, marshy meadows, rock crevices; 2700–5300 m. S Gansu, Qinghai, S Shaanxi (Taibai Shan), W Sichuan, Xinjiang, E and S Xizang, NW Yunnan [Bhutan, N India, Kashmir, Nepal, Sikkim].

86b. *Saxifraga sinomontana* var. *amabilis* H. Smith ex J. T. Pan in Gornall et al., *Novon* 10: 377. 2000.

可观山地虎耳草 ke guan shan di hu er cao

Basal leaves brown crisped eglandular villous adaxially. Fl. Aug–Sep.

• Calcareous rocks; 4500–4700 m. W Sichuan (Dawu Xian).

87. *Saxifraga isophylla* H. Smith, *Bull. Brit. Mus. (Nat. Hist.), Bot.* 2: 247. 1960.

林芝虎耳草 lin zhi hu er cao

Herbs perennial, caespitose, 4–24 cm tall. Stem brown crisped glandular villous. Basal leaves mostly caducous; petiole 7–12 mm, margin glandular villous; leaf blade elliptic to oblong, 5–10 × 2.3–3 mm, glandular villous. Cauline leaves 13–23; petiole 0.5–4 mm, margin glandular villous; leaf blade lanceolate to linear-oblong, 0.8–1.3 cm × 2.2–5 mm, long and shortly glandular pilose. Cyme corymbose, 1.6–4.5 cm, 2–9-flowered; pedicels 9–9.3 mm, dark brown glandular villous. Sepals erect, ovate to narrowly so, 4–5.6 × 2–3 mm, abaxially and marginally brown glandular hairy, veins 3–5, not, partly, or fully confluent at apex, apex acute. Petals yellow, subelliptic or obovate-oblong to subpandurate, 7–9.8 × 3–4.2 mm, 4–8-callose, 5–8-veined, base cordate to subtruncate, with a claw 0.8–1 mm, apex retuse. Stamens 4–5 mm. Ovary subsuperior, ovoid, 2.5–4 mm; styles 2–2.1 mm; stigmas prominent. Fl. Jul–Oct.

• Forest margins, scrub, alpine meadows, earthy slopes, rock crevices; 3700–4700 m. SE Xizang (Médog Xian, Nyingchi Xian).

88. *Saxifraga hirculus* Linnaeus, *Sp. Pl.* 1: 402. 1753.

山羊臭虎耳草 shan yang xiu hu er cao

Herbs perennial, 6.5–21 cm tall. Stem sparsely brown crisped villous. Basal leaves with petiole 1.2–2.2 cm, margin brown crisped villous; leaf blade elliptic, lanceolate, or oblong to linear-oblong, 1.1–2.2 cm × 3–10 mm, both surfaces glabrous, margin brown pilose or glabrous. Cauline leaves lanceolate to oblong, 0.4–2.2 cm × 1–6 mm, both surfaces glabrous, margin brown crisped villous; proximal ones larger with petiole longer, distal ones smaller with petiole gradually shorter to absent. Flower solitary or cyme 2–3.7 cm and 2–4-flowered; pedicels 0.9–1.3 cm, brown crisped villous. Sepals erect, then spreading to reflexed, elliptic, or ovate to narrowly so, 3–6.1 × 1.5–3.5 mm, abaxially and marginally brown crisped villous or glabrous on both surfaces, veins 3–11(–13), not confluent at apex, apex obtuse or acute. Petals yellow, elliptic or obovate to narrowly ovate, 7.9–10.3 × 2.9–6.8 mm, 2-callose, 7–11(–17)-veined, base with a claw 0.3–0.5 mm, apex subobtusate or acute. Stamens 4–5.5 mm. Ovary subsuperior, ovoid, 2–5 mm; styles 1–1.8 mm. Fl. and fr. Jun–Sep. $2n = 16, 32$.

Forests, alpine meadows, rock crevices; 2100–5000 m. Shanxi, W Sichuan, Xinjiang, Xizang, NW Yunnan [Kashmir, Kazakstan, Mongolia, Russia, Sikkim, Tajikistan; C and N Europe, ?North America].

1a. Stem more than 10 cm tall; flower solitary or

cyme 2–4-flowered; sepals abaxially and marginally brown crisped villous 88a. var. *hirculus*

1b. Stem usually less than 10 cm tall; flower

solitary; sepals glabrous 88b. var. *alpina*

88a. *Saxifraga hirculus* var. *hirculus*

山羊臭虎耳草(原变种) shan yang xiu hu er cao (yuan bian zhong)

Leptasea hirculus (Linnaeus) Small; *Saxifraga aizoides* Linnaeus var. *autumnalis* (Linnaeus) Engler & Irmscher; *S. autumnalis* Linnaeus; *Saxifraga hirculus* f. *intermedia* Engler & Irmscher; *S. hirculus* f. *major* Engler & Irmscher; *S. hirculus* var. *major* (Engler & Irmscher) J. T. Pan; *S. montana* H. Smith f. *oblongipetala* T. C. Ku; *S. nutans* Adams (1834), not D. Don (1821), nor J. D. Hooker & Thomson (1857). Stem more than 10 cm tall. Flower solitary or cyme 2–4-flowered. Sepals abaxially and marginally brown crisped villous. Fl. and fr. Jun–Sep.

Forests, alpine meadows, rock crevices; 2100–4600 m. Shanxi, W Sichuan (Daocheng Xian), Xinjiang, Xizang, NW Yunnan (Dêqên Xian) [Kashmir, Kazakstan, Mongolia, Russia, Tajikistan; C and N Europe].

88b. *Saxifraga hirculus* var. *alpina* Engler, Monogr. Saxifraga, 124. 1872.

高山虎耳草 gao shan hu er cao

Saxifraga hirculus subsp. *alpina* (Engler) Podlech; *S. hirculus* var. *alpina* f. *elata* Engler & Irmscher; *S. hirculus* var. *alpina* f. *humilis* Engler & Irmscher; *S. hirculus* subsp. *compacta* K. O. Hedberg; *S. hirculus* f. *minor* Engler & Irmscher.

Stem usually less than 10 cm tall. Flower solitary. Sepals glabrous on both surfaces. Fl. Jul–Sep.

Wet alpine meadows; 4500–5000 m. SW Xizang [Kashmir, Russia, Sikkim; N Europe, ?North America].

89. *Saxifraga ciliatopetala* (Engler & Irmscher) J. T. Pan in C. Y. Wu, Index Fl. Yunnan. 1: 235. 1984.

毛瓣虎耳草 mao ban hu er cao

Saxifraga hirculus Linnaeus var. *alpina* Engler f. *ciliatopetala* Engler & Irmscher in Engler, Pflanzenr. 67(IV. 117. I): 111. 1916; *S. ciliatopetala* var. *ciliata* J. T. Pan; ?*S. ovatifetala* T. C. Ku.

Herbs perennial, caespitose, 7.5–30 cm tall. Stem brown crisped villous. Basal leaves with petiole 0.8–2.3 cm, margin brown crisped villous; leaf blade ovate to lanceolate. Cauline leaves oblong or lanceolate to linear-oblong, 1.2–2 cm × 2–6 mm, brown crisped villous; proximal leaves with petiole 1–8 mm, brown crisped villous; distal leaves sessile. Cyme corymbose, 1.5–6 cm, 2–5-flowered, rarely flower solitary; branches 2.3–3.5 cm; pedicels 5–18 cm, densely brown crisped villous. Sepals erect, then spreading to reflexed, elliptic or broadly so to suboblong, 3.1–5.3 × 1.5–3 mm, abaxially and marginally brown crisped villous, veins 3–9, not confluent at apex. Petals yellow, obovate, elliptic, or orbicular to oblong, 6.6–9.6 × 3–6.3 mm, brown crisped villous at margin, sometimes also abaxially proximally, 2-callose near base, 5–10(–14)-veined, base with a claw 0.3–1.2 mm, apex obtuse.

Stamens 3.2–6 mm. Ovary subsuperior, ovoid, 2.2–4 mm; styles 1–2 mm. Fl. and fr. Jul–Oct.

Forests, scrub, alpine meadows, marshes, streamsides, rock crevices; 3900–5100 m. SW Sichuan, E and S Xizang, SW Yunnan [Nepal].

90. *Saxifraga heleonastes* H. Smith, Acta Horti Gothob. 1: 5. 1924.

沼地虎耳草 zhao di hu er cao

Hirculus heleonastes (H. Smith) Losinskaja.

Herbs perennial, 4–28.5 cm tall. Rhizomes short. Stem sparsely brown crisped piliferous. Basal leaves with petiole 1–4 cm, brown crisped villous; leaf blade oblong to lanceolate, 1.2–3.7 cm × 2–9 mm, abaxially sometimes sparsely brown crisped villous, adaxially glabrous, margin sparsely brown crisped villous, sometimes glandular, apex obtuse or acute. Cauline leaves lanceolate or oblanceolate to linear, 0.8–2.2 cm × 4.5–7 mm, abaxially and marginally glabrous or sparsely brown crisped villous, apex subobtusely. Cyme 3.3–4.3 cm and 2–5-flowered or flower solitary; pedicels densely brown crisped villous. Sepals erect to spreading, ovate or narrowly so to subelliptic, 1.5–6 × 0.9–4 mm, veins 3–5, not confluent at apex, margin brown crisped villous. Petals yellow, narrowly obovate, ovate, or elliptic to oblong, 4.1–12 × 1.9–7 mm, glabrous, 2-callose near base, 5–11-veined, base contracted into a claw 0.2–1 mm, apex obtuse or acute. Stamens 4.4–5 mm. Ovary subsuperior, 2–4 mm; styles divergent, 1.9–2.7 mm. Fl. and fr. Jul–Oct.

• Forest margins, scrub, alpine meadows, marshes; 3600–4800 m. S Shaanxi (Taibai Shan), Sichuan, S Xizang (Gyaca Xian, Lhünzhub Xian), Yunnan.

91. *Saxifraga congestiflora* Engler & Irmscher, Bot. Jahrb. Syst. 50 (Beibl. 114): 41. 1914.

密花虎耳草 mi hua hu er cao

Hirculus congestiflorus (Engler & Irmscher) Losinskaja. Herbs perennial, 16–28 cm tall. Stem simple, densely brown crisped villous. Basal leaves caducous. Cauline leaves sessile or subsessile, oblong-lanceolate, 2–2.8 cm × 2–3 mm, both surfaces glabrous, margin brown crisped villous. Inflorescence a compact, corymbose cyme of 6–10 flowers; branches ascending, 1–2 cm, 1- or 2-flowered; pedicels densely brown crisped villous. Sepals erect to spreading, ovate-oblong, 2.3–3.8 × 1–1.3 mm, abaxially and marginally brown crisped villous, veins 3, not confluent at apex, apex obtuse. Petals yellow, oblong-elliptic, 5–6 × 1.5–1.8 mm, callose, base contracted into a short claw. Stamens ca. 3.5 mm. Ovary subsuperior, ovoid, ca. 3 mm; styles ca. 1.5 mm. Fl. and fr. Aug–Sep.

• Rocky alpine meadows; 3700–4300 m. Sichuan.

92. *Saxifraga tangutica* Engler, Bull. Acad. Imp. Sci. Saint-Pétersbourg, Sér. 3, 29: 114. 1883.

唐古特虎耳草 tang gu te hu er cao

Herbs perennial, caespitose, 3.5–31 cm tall. Stem brown crisped villous. Basal leaves with petiole 1.7–2.5 cm, margin sparsely brown crisped villous; leaf blade

ovate or lanceolate to oblong, 0.6–3.3 cm × 3–11 mm, both surfaces glabrous, margin brown crisped villous, apex obtuse or acute. Cauline leaves oblong to narrowly so or lanceolate, 0.7–3.5 cm × 2.3–10 mm, brown crisped villous abaxially proximally and at margin. Inflorescence 1–7.5 cm, (2–)8–24-flowered; pedicels densely brown crisped villous. Sepals erect, then spreading to reflexed, ovate to narrowly so or elliptic, 1.7–3.3 × 1–2.2 mm, both surfaces usually glabrous, abaxially sometimes brown crisped villous proximally, veins 3–5, not confluent at apex, margin brown crisped villous, apex obtuse. Petals yellow on both surfaces or purple abaxially and yellow adaxially, ovate to narrowly so or elliptic, 2.5–4.5 × 1.1–2.5 mm, 2-callose, 3–5(–7)-veined, base with a claw 0.3–0.8 mm, apex obtuse. Stamens 2–2.2 mm. Ovary subinferior, with an annular nectary disc; styles ca. 1 mm. Fl. and fr. Jun–Oct.

Forests, scrub, alpine scrub meadows, alpine meadows, rock crevices; 2900–5600 m. S Gansu, Qinghai, N and W Sichuan, Xizang [Bhutan, Kashmir, Nepal, Sikkim].

Saxifraga lamashanensis K. S. Hao (Repert. Spec. Nov. Regni Veg. 40: 214. 1936) is known only from the type collection (from Gansu), which is now lost. It may be related to *S. tangutica* (see FRPS, p. 202). The variation of *Saxifraga tangutica* is such that the two varieties described below are simply the extremes of a continuum.

- 1a. Leaves narrow, basal ones 0.6–3.3 cm × 3–8 mm, cauline ones 0.7–1.7 cm × 2.3–6.5 mm 92a. var. *tangutica*
 1b. Leaves broad, basal ones 1.2–3 cm × 5–11 mm, cauline ones 1.5–3.5 cm × 3–10 mm 92b. var. *platyphylla*

92a. *Saxifraga tangutica* var. *tangutica*

唐古特虎耳草(原变种) tang gu te hu er cao (yuan bian zhong)

Hirculus flagrans (H. Smith) Losinskaja; *H. tanguticus* (Engler) Losinskaja; *Saxifraga flagrans* H. Smith; *S. hirculus* Linnaeus var. *subdioica* C. B. Clarke; *S. montana* H. Smith var. *subdioica* (C. B. Clarke) C. Marquand; *S. subdioica* (C. B. Clarke) Engler ex W. W. Smith & Cave; *S. tangutica* var. *minutiflora* Engler. Basal leaves 0.6–3.3 cm × 3–8 mm; cauline leaves 0.7–1.7 cm × 2.3–6.5 mm. Fl. and fr. Jun–Oct.

Forests, scrub, alpine meadows, alpine rock crevices; 2900–5600 m. S Gansu, Qinghai, N and W Sichuan, Xizang [Bhutan, Kashmir, Nepal, Sikkim].

92b. *Saxifraga tangutica* var. *platyphylla* (H. Smith) J. T. Pan, Acta Phytotax. Sin. 29: 18. 1991.

宽叶虎耳草 kuan ye hu er cao

Saxifraga flagrans var. *platyphylla* H. Smith, Acta Horti Gothob. 1: 5. 1924.

Basal leaves 1.2–3 cm × 5–11 mm; cauline leaves 1.5–3.5 cm × 3–10 mm. Fl. and fr. Jul–Aug.

• Alpine scrub meadows, alpine meadows, rock crevices; 4300–4800 m. W Sichuan.

93. *Saxifraga przewalskii* Engler in Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 29: 115. 1883.

青藏虎耳草 qing zang hu er cao

Hirculus przewalskii (Engler) Losinskaja.

Herbs perennial, caespitose, 4–11.5 cm tall. Stem simple, brown crisped villous. Basal leaves with petiole 1–3 cm, margin brown crisped villous; leaf blade ovate or elliptic to oblong, 1.5–2.5 cm × 4–8 mm, abaxially usually glabrous, margin brown crisped villous.

Cauline leaves ovate to elliptic, 1.5–2 cm, distal ones smaller. Cyme corymbose, 2–6-flowered, rarely flower solitary; pedicels 0.5–1.9 cm, densely brown crisped villous. Sepals reflexed, ovate to narrowly so, 2.5–4.2 × 1.5–2 mm, both surfaces glabrous, veins 3–5, not confluent at apex, margin brown crisped villous, apex obtuse. Petals purple abaxially, yellowish and proximally red spotted adaxially, ovate or narrowly so to suboblong, 2.5–5.2 × 1.5–2.1 mm, 2-callose, 3–5(–7)-veined, base with a claw 0.5–1 mm, apex obtuse. Stamens 2–3.6 mm. Ovary semi-inferior, with an annular nectary disc; styles 1–1.5 mm. Fl. Jul–Aug.

• Forests, alpine meadows, rock crevices; 3700–5000 m. W Gansu (Qilian Shan), E Qinghai (Haibei Zang Zu Zizhizhou, Hainan Zang Zu Zizhizhou, Huangnan Zang Zu Zizhizhou), Sichuan, S Xizang (Gyaca Xian).

94. *Saxifraga tibetica* Losinskaja, Izv. Glavn. Bot. Sada SSSR 27: 597. 1928.

西藏虎耳草 xi zang hu er cao

Hirculus tibeticus (Losinskaja) Losinskaja.

Herbs perennial, densely caespitose, (1–)2–16 cm tall. Stem densely brown crisped villous. Basal leaves with petiole 2–3 cm, margin brown crisped villous; leaf blade elliptic to oblong, 8–10 × 2–6.5 mm, glabrous, apex obtuse. Cauline leaves with petiole 1–1.3 cm proximally on stem, gradually shorter to absent distally on stem; leaf blade narrowly ovate or lanceolate to oblong, 0.6–1.4 cm × 1.5–6 mm, glabrous or margin brown crisped villous. Flower solitary; bract 1, narrowly ovate or narrowly lanceolate to oblong, 3.5–9 × 1–3.5 mm, both surfaces glabrous, margin brown crisped villous; pedicel ca. 5 mm, brown crisped villous. Sepals reflexed, subovate to narrowly ovate, 3.2–4.1 × 1.5–2.5 mm, both surfaces glabrous, veins 3–5, not confluent at apex, margin brown crisped villous, apex obtuse. Petals purple abaxially, proximally purple and distally yellow adaxially, ovate to narrowly so, 4–5 × 1.9–2.1 mm, 2-callose, 3–5-veined, base with a claw 0.5–1.4 mm, apex obtuse. Stamens 2–3.5 mm. Ovary ovoid, ca. 2 mm, with an annular nectary disc; styles ca. 1.5 mm. Fl. and fr. Jul–Sep. $2n = 16^*$.

• Rocky alpine meadows, marshes, rock crevices; 4300–5600 m. SW Qinghai, Xinjiang, Xizang.

95. *Saxifraga bergenioides* C. Marquand, J. Linn. Soc., Bot. 48: 176. 1929.

紫花虎耳草 zi hua hu er cao

Saxifraga haematochroa H. Smith.

Herbs perennial, densely cespitose, (4–)13–20(–30) cm tall. Stem simple, densely brown crisped villous. Basal leaves with petiole ca. 4.3 cm, brown crisped villous; leaf blade subelliptic, ca. 2.3 cm × 9 mm, both surfaces and margin brown crisped villous. Cauline leaves sessile, oblong, 1.5–2.3 cm × 4–6 mm, both surfaces and margin brown crisped villous, apex obtuse. Flower solitary or cyme 2.8–3.5 cm and 2–4-flowered, ± nodding; pedicels brown crisped villous, sometimes sparsely so. Sepals erect, purple, subovate, ca. 7 × 3.6–4 mm, abaxially and marginally brown crisped brown villous, veins 5, not confluent at apex, apex obtuse. Petals purple, oblanceolate to narrowly so, 1.4–1.5 cm × 2.6–4 mm, not callose, 5-veined, base crisped villous, apex retuse. Stamens ca. 6 mm. Ovary subsuperior, ovoid, ca. 3.5 mm; styles divergent, ca. 1.5 mm. Fl. Jul–Sep.

Scrub, alpine meadows, boulder screes, rock crevices; 4200–5000 m. SE Xizang [Bhutan].

Saxifraga haematochroa is simply a dwarf variant that is only sparsely brown crisped villous.

96. *Saxifraga nangqenica* J. T. Pan, Acta Phytotax. Sin. 28: 392. 1990.

囊谦虎耳草 nang qian hu er cao

Herbs perennial, 3.5–5 cm tall. Stem branched. Flowering stem brown crisped glandular villous. Cauline leaves oblong to narrowly subobovate, 5–7.8 × 1.8–2.5 mm, largest near middle of stem, both surfaces glabrous on proximal leaves, margin brown pilose on distal leaves, apex obtuse. Flower solitary; pedicel 1.4–1.6 cm, brown crisped glandular villous. Sepals erect, broadly subovate, ca. 4 × 3 mm, abaxially pilose, adaxially and marginally glabrous, veins 3, confluent at apex, apex subacute. Petals yellow, ovate, ca. 6.5 × 4 mm, not callose, ca. 7-veined, base clawless, apex obtuse. Stamens ca. 5 mm. Ovary subsuperior, broadly ovoid, ca. 3.4 mm; styles ca. 2 mm. Fl. Jul–Aug.

• Alpine rock crevices; ca. 5200 m. S Qinghai (Nangqên Xian).

97. *Saxifraga hirculoides* Decaisne in Jacquemont, Voy. Inde 4(Bot.): 67. 1844.

唐古拉虎耳草 tang gu la hu er cao

Saxifraga hirculus Linnaeus var. *hirculoides* (Decaisne) C. B. Clarke; *S. tanggulaensis* J. T. Pan.

Herbs perennial, 1.3–15(–30) cm tall. Stem simple, brown crisped villous. Basal leaves with petiole 0.7–1.6 cm, brown crisped villous; leaf blade ovate to narrowly elliptic, 7.5–9 × 3.5–3.6 mm, margin brown crisped villous. Cauline leaves 3–6, shortly petiolate proximally on stem, sessile distally on stem; leaf blade oblong, 5.5–7.5 × 1.3–2.5 mm, margin brown crisped villous only proximally. Flower solitary; pedicel 3–4 mm, brown crisped villous, sometimes sparsely so. Sepals erect, broadly ovate to broadly elliptic, 2.4–3 × 2.2–2.5 mm, veins 4–7, not confluent at apex, margin crisped

villous. Petals yellow, elliptic or ovate to obovate, 3.5–6 × 2–3.3 mm, not callose, 4–7-veined, base with a claw 0.2–0.6 mm, apex obtuse. Stamens 3–3.5 mm. Ovary subsuperior, ovoid, 3–4.4 mm; styles 1.4–1.5 mm. Fl. and fr. Jul–Sep.

Alpine meadows, rock crevices; 4000–5600 m. SW Qinghai (Tanggula Shan), Xizang [N India, Kashmir, Mongolia, Nepal].

98. *Saxifraga elliptica* Engler & Irmscher, Bot. Jahrb. Syst. 48: 585. 1912.

光萼虎耳草 guang e hu er cao

Saxifraga diapensia H. Smith var. *glabrisepala* J. T. Pan.

Herbs perennial, cespitose, 3–7 cm tall. Stem brown crisped glandular villous. Basal leaves with petiole 3–7.5 mm, brown crisped glandular villous at margin; leaf blade elliptic to ovate-lanceolate, 5–9 × 2–4 mm, glabrous, apex obtuse or acute. Cauline leaves ca. 4; petiole ca. 4 mm proximally on stem, absent distally on stem, margin brown crisped glandular villous; leaf blade linear-oblong to oblong, (2–)4–5 × 1–2 mm. Flower solitary; pedicel 3–14 mm, brown crisped glandular villous. Sepals erect, then spreading to reflexed, broadly ovate to elliptic or oblong, 2–3.2 × 1–2.2 mm, leathery, glabrous or sometimes glandular pilose at margin, veins 3–5, not confluent at apex. Petals yellow, obovate to broadly so or broadly elliptic, (4–)6–8.6 × (2.5–)4–5.3 mm, 2-callose, 6–9-veined, base with a claw 1.1–1.2 mm, apex retuse. Stamens ca. 5 mm. Ovary subsuperior, ovoid, ca. 3 mm; styles ca. 2 mm. Fl. Jul–Aug.

Alpine meadows; 4000–4800 m. S Xizang (Gyaca Xian, Nyingchi Xian, Yadong Xian) [Nepal, Sikkim].

99. *Saxifraga montanella* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 238. 1960.

类毛瓣虎耳草 lei mao ban hu er cao

Herbs perennial, cespitose, 3–8.3 cm tall. Stem brown crisped villous. Basal leaves with petiole ca. 7 mm, margin brown crisped villous; leaf blade ovate to lanceolate, 5–11.5 × 1.5–6 mm, glabrous, apex acute. Cauline leaves sessile, elliptic to oblong, 8.5–11 × 1.7–5 mm, margin crisped villous, apex subobtusate. Flower solitary; pedicel 5–11 mm, brown crisped villous. Sepals spreading, ovate to elliptic, 2.8–7 × 2.4–3.8 mm, abaxially glabrous or brown pubescent, veins 3–9, not confluent at apex, margin brown crisped villous. Petals yellow, obovate to narrowly ovate, 0.8–1.3 cm × 3.8–8.2 mm, ± brown crisped villous abaxially and at margin near base, 2-callose, 8–13-veined, base with a claw 0.2–0.6 mm or clawless, apex obtuse or retuse. Stamens 2–6 mm. Ovary subsuperior, ovoid, 3–5 mm; styles 0.7–2.3 mm. Fl. and fr. Jul–Oct. *2n* = 16.

Scrub, alpine meadows, stony grasslands, rocks, cliffs, near snow lines; 3300–5200 m. E and S Qinghai, Sichuan, E and S Xizang, NW Yunnan [Bhutan, Nepal].

1a. Sepals abaxially glabrous; petals

obtuse at apex 99a. var. *montanella*

1b. Sepals abaxially brown pubescent;
petals retuse at apex 99b. var. *retusa*

99a. *Saxifraga montanella* var. *montanella*

类毛瓣虎耳草(原变种) lei mao ban hu er cao (yuan
bian zhong)

Saxifraga latipetala T. C. Ku; *S. latipetala* var.
speciosa (J. Anthony) T. C. Ku; *S. montana* H. Smith
var. *speciosa* J. Anthony.

Sepals abaxially glabrous. Petals obtuse at apex. Fl. and
fr. Jul–Oct.

Scrub, alpine meadows, stony grasslands, rocks, cliffs; 3300–5200 m.
E and S Qinghai (Gangca Xian, Yushu Xian), Sichuan, E and S
Xizang, NW Yunnan [Bhutan, Nepal].

99b. *Saxifraga montanella* var. *retusa* J. T. Pan in C. Y. Wu,
Fl. Xizang. 2: 482. 1985.

凹瓣虎耳草 ao ban hu er cao

Sepals abaxially brown pubescent. Petals retuse at apex.
Fl. Aug–Sep.

• Alpine meadows, near snow lines; 4900–5000 m. S Xizang
(Gongbo'gyamda Xian, Lhasa Shi)

100. *Saxifraga parva* Hemsley, J. Linn. Soc., Bot. 30: 112.
1894.

小虎耳草 xiao hu er cao

Saxifraga hirculus Linnaeus var. *tafeliana* Engler &
Irmischer.

Herbs perennial, caespitose, 0.7–4.5 cm tall. Stem simple,
brown crisped glandular villous. Basal leaves with
petiole 4–9 mm, sparsely crisped glandular villous at
margin; leaf blade ovate-elliptic or narrowly ovate to
oblong, 4–4.5 × 1.5–2 mm, glabrous or margin brown
crisped glandular villous, apex obtuse. Cauline leaves
3–10; proximal ones with petiole 2–4.5 mm, margin
crisped glandular villous at base; leaf blade ovate to
oblong, 3.5–7 × 1.5–2 mm, glabrous or margin sparsely
brown crisped piliferous; distal leaves sessile, oblong or
lanceolate to linear-oblong, 5.2–7.8 × 1.2–3.2 mm,
margin crisped glandular villous. Flower solitary;
pedicel brown crisped glandular villous. Sepals erect,
elliptic or broadly so to subovate, 2–3.6 × 1–2.3 mm,
both surfaces glabrous, veins 3, not confluent at apex,
margin glandular ciliate, apex obtuse. Petals yellow,
obovate to broadly so or elliptic, 2.3–6.4 × 1.3–4.7 mm,
2-callose near base, 3–5-veined, base with a claw 0.2–1
mm, apex obtuse. Stamens 3–5 mm. Ovary subsuperior,
ovoid, 2–2.7 mm; styles 0.5–2 mm. Fl. Jul–Aug.

Alpine scrub meadows, marsh meadows, rock crevices; 4200–4900 m.
S Qinghai (Yushu Xian, Zhidui Xian), Xinjiang, E Xizang (Amdo
Xian, Mainling Xian) [Bhutan, Nepal].

101. *Saxifraga gongshanensis* T. C. Ku, Bull. Bot. Res., Har-
bin 9(4): 9. 1989.

小剛毛虎耳草 xiao gang mao hu er cao

Saxifraga rupestris T. C. Ku (1989), not Salisbury
(1796, nom. illeg., included *S. hypnoides* Linnaeus); *S.*
setulosa C. Y. Wu; *S. yuana* Zhmylev.

Herbs perennial, 5–6 cm tall. Stem brown glandular vil-
lous. Basal leaves with petiole 4–10 mm, glandular
villous at margin; leaf blade ovate to oblong, 3–4 ×
1.5–1.6 mm, adaxially and marginally sparsely brown
glandular villous, apex acute with 1 long, aristate,
glandular hair. Proximal cauline leaves with petiole 1–4
mm, glandular villous at margin; leaf blade lanceolate
to oblong, ca. 5 × 1.6 mm, adaxially and marginally
glandular villous; distal leaves subsessile, leaf blade
oblong, ca. 4 × 1.1 mm, margin glandular villous, apex
with 1 aristate, glandular, villous hair. Flower solitary;
pedicel 7–10 mm, crisped glandular villous. Sepals
spreading, elliptic, abaxially and marginally glandular
hairy, veins 3(–6), not confluent at apex, apex obtuse.
Petals yellow, elliptic to obovate, ca. 5 × 3.1–3.6 mm,
4-callose near base, 5-veined, base abruptly contracted
into a claw ca. 0.5 mm, apex obtuse. Stamens 3.5–4
mm. Ovary subsuperior, ovoid, ca. 2.1 mm; styles ca.
0.8 mm. Fl. Aug–Oct.

• Alpine rock crevices; 3700–4000 m. NW Yunnan (Dêqên Xian,
Gongshan Drung-Nu Zu Zizhixian).

102. *Saxifraga triaristulata* Handel-Mazzetti, Anz. Akad.
Wiss. Wien, Math.-Naturwiss. Kl. 60: 114. 1923.

三芒虎耳草 san mang hu er cao

Herbs perennial, caespitose, to 2 cm tall. Stem brown
glandular villous. Basal leaves oblong-spatulate, 3.5–
4.5 × 1–1.3 mm, both surfaces glabrous, apex 1–3-
aristate, sometimes acute. Cauline leaves lanceolate to
linear, 4–6 × 0.8–1 mm, both surfaces glabrous or very
sparsely glandular hairy, margin with long, brown,
villous hairs. Flower solitary; pedicel ca. 5 mm, brown
glandular villous. Sepals ovate, ca. 2.5 × 1.5 mm,
sparsely glandular abaxially, margin glabrous, apex
obtuse, sometimes slightly erose. Petals yellow, elliptic,
ca. 5 × 2 mm, 3-veined, base truncate with a claw ca.
0.3 mm. Ovary subsuperior, ovoid; styles ca. 0.2 mm. Fl.
Aug.

• Rocks; ca. 4700 m. Sichuan.

This puzzling species seems to be allied to *Saxifraga gongshanensis*
and *S. saginoides*. The description above is based on the type spe-
cimen only; no other material has been seen.

103. *Saxifraga saginoides* J. D. Hooker & Thomson, J. Proc.
Linn. Soc., Bot. 2: 68. 1858.

漆姑虎耳草 qi gu hu er cao

Hirculus saginoides (J. D. Hooker & Thomson)
Losinskaja.

Herbs perennial, densely caespitose, cushion-shaped,
0.9–1.5 cm tall. Stem extremely short, 3–9 mm, brown
crisped glandular villous. Basal leaves with petiole 3–
4.8 mm, margin brown crisped glandular villous; leaf
blade suboblong, 3–4 × ca. 1 mm, glabrous, apex
subobtuse. Cauline leaves linear, thick, 4.9–6.8 × 0.8–1
mm, both surfaces glabrous, margin brown crisped
glandular villous at base. Flower solitary; pedicel 0.7–3
mm, densely brown crisped glandular villous. Sepals
erect, ovate to subelliptic, 2.1–2.6 × ca. 1 mm, glabrous,
veins 3 or 4, not confluent at apex, margin sometimes

brown crisped glandular pilose at base, apex obtuse or acute. Petals yellow, ovate to narrowly so, 3.4–4.4 × 1.5–1.9 mm, not or obscurely 2-callose, 3-veined, base contracted into a claw 0.7–0.8 mm, apex obtuse. Stamens 1.5–2.9 mm. Ovary subsuperior, subovoid, ca. 1.5 mm; styles ca. 1.4 mm. Fl. and fr. Jul–Sep. $2n = 32$. Alpine scrub meadows, alpine meadows, rock crevices; 4300–5500 m. S Xizang [Bhutan, N India, Nepal, Sikkim].

104. *Saxifraga culcitosa* Mattfeld, Notizbl. Bot. Gart. Berlin-Dahlem 11(104): 303. 1931.

枕状虎耳草 zhen zhuang hu er cao

Saxifraga kangdingensis T. C. Ku.

Herbs perennial, densely caespitose, ca. 1 cm tall. Shoots much branched, with leaf rosettes. Flowering stem extremely short, scarcely overtopping foliage, with 1 bract concealed among basal leaves, crisped glandular villous. Basal leaves with petiole 2–2.8 mm, margin crisped glandular villous; leaf blade suboblanceolate, abaxially convex, adaxially rather concave, 2.2–3 × 0.5–0.8 mm, subcarnose, both surfaces glabrous, 3-veined, apex acute or aristate. Flower solitary; bract linear, ca. 3.3 × 0.5 mm, both surfaces glabrous, 1-veined, margin brown glandular villous at base, apex mucronate; pedicel ca. 1.5 mm, brown glandular villous. Sepals erect, narrowly ovate to suboblong, ca. 2.3 × 0.6 mm, glabrous, veins 2 or 3, not confluent at apex, apex obtuse. Petals orange, narrowly ovate, 1.5–2.3 × 0.6 mm, 2-callose near base, 1- or 3-veined, base contracted into a claw ca. 0.6 mm, apex acute. Stamens ca. 2 mm. Ovary semi-inferior, ca. 1.4 mm; styles ca. 0.5 mm. Fl. Jul–Aug.

• Alpine meadows, rock crevices; 4000–5100 m. W Sichuan.

105. *Saxifraga balfourii* Engler & Irmscher, Notes Roy. Bot. Gard. Edinburgh 5: 141. 1912.

马耳山虎耳草 ma er shan hu er cao

Hirculus balfourii (Engler & Irmscher) Losinskaja. Stem branched or simple, 6–18 cm tall, glandular or eglandular pilose. Leaf buds prominent in axils at proximal nodes. Proximal cauline leaves often scalelike, less than 1/2 size of median ones, ca. 3 mm. Median cauline leaves elliptic, 0.7–2.9 cm × 3–13 mm, both surfaces densely strigose, margin entire, eglandular or glandular hairy, apex acute. Flower solitary or cyme 2–5-flowered; pedicels glandular hairy. Sepals erect, then spreading, ovate to subelliptic, 3–3.6 × 1.8–2.1 mm, abaxially glandular hairy, veins 4–7, confluent at apex, margin ± glabrous, apex acute. Petals yellow, elliptic to obovate, 6–7.7 × 2.5–4.2 mm, 4–6(–8)-callose, sometimes obscurely so, 3–7-veined, base contracted into a claw 1–1.2 mm, apex obtuse. Stamens 3.5–4 mm. Ovary subsuperior, 1.8–2.2 mm; styles ca. 1.6 mm. Fl. and fr. Jul–Sep. $2n = 32^*$, 48^* .

• Mixed forests, alpine meadows, rock crevices; 2300–4600 m. NW Yunnan (Heqing Xian, Lijiang Naxi Zu Zizhixian).

106. *Saxifraga hispidula* D. Don, Trans. Linn. Soc. London 13: 380. 1822.

齿叶虎耳草 chi ye hu er cao

Hirculus hispidulus (D. Don) Losinskaja; *Saxifraga evolvuloides* Wallich ex Seringe; *S. hispidula* var. *dentata* Franchet; *S. hispidula* var. *doniana* Engler; *S. potentilliflora* H. Léveillé.

Stem usually branched, 4.5–22.5 cm tall, glandular pilose. Leaf buds present in axils at proximal nodes. Proximal cauline leaves caducous, less than 1/2 size of median ones, margin entire. Median cauline leaves subelliptic to ovate, 0.5–2 cm × 2.5–10 mm, both surfaces strigose, margin with 3–5 acute lobes toward apex. Flower usually solitary, or cyme 2–4-flowered; pedicel 0.6–2.1 cm, long glandular hairy. Sepals erect or somewhat spreading, ovate, 2.3–4 × 1.4–2.3 mm, glandular or eglandular hairy abaxially, adaxially distally, and marginally, veins 3–8, confluent at apex. Petals yellow, elliptic to broadly so or obovate, 4–7.3 × 2.9–5 mm, 2–16-callose, 3–10-veined, base contracted into a claw 0.6–1.7 mm, apex obtuse. Stamens 3–4.5 mm. Ovary subsuperior, ovoid to broadly so, 1.6–2.2 mm; styles 1.5–1.8 mm. Fl. and fr. Jul–Sep. $2n = 16$, 24^* .

Rocks and rock crevices in forests, forest margins, scrub, alpine meadows, and on cliffs; 2300–5600 m. C Sichuan (Baoping Xian, Tianquan Xian), S Xizang, NW Yunnan [Bhutan, N India, N Myanmar, Nepal, Sikkim].

Many plants from Sikkim have entire leaves (*Saxifraga hispidula* var. *hispidula*), but no such plants have been seen among specimens from China.

107. *Saxifraga substrigosa* J. T. Pan in C. Y. Wu, Fl. Xizang. 2: 463. 1985.

疏叶虎耳草 shu ye hu er cao

Saxifraga substrigosa var. *gemmaifera* J. T. Pan.

Stem usually simple, sometimes branched proximally, 5–30 cm tall, proximally eglandular villous, distally glandular hairy. Leaf buds present in axils of at least proximal leaves, sometimes developing into sterile, leafy shoots by anthesis. Proximal cauline leaves caducous, less than 1/2 size of median ones. Median cauline leaves ovate or obovate to oblong, 0.8–4.3 cm × 3–13 mm, both surfaces strigose, base cuneate, margin sparsely 5- or 6-serrate or 2- or 3-denticulate, apex acute. Cyme 2–7 cm and 2–10-flowered or flower solitary; primary branches 2–5 cm, 1–4-flowered; pedicels 0.6–1.4 cm, glandular hairy. Sepals erect or spreading, ovate, 2.6–3 × 1.4–1.8 mm, abaxially glandular hairy, adaxially and marginally glabrous, veins 5–8, confluent at apex. Petals yellow, obovate, 6.4–7 × 3.1–4.3 mm, 4–6(–9)-callose, 3–8-veined, base gradually narrowed into a claw 1.5–1.8 mm, apex obtuse. Stamens 3.5–4 mm. Ovary subsuperior; styles 1.4–1.6 mm. Fl. and fr. Jul–Sep.

Mixed forests, *Picea* forests, forest margins, alpine meadows, rock crevices; 2700–4200 m. Xizang, Yunnan [Nepal].

108. *Saxifraga strigosa* Wallich ex Seringe in de Candolle, Prodr. 4: 41. 1830.

伏毛虎耳草 fu mao hu er cao

Hirculus strigosus (Wallich ex Seringe) Losinskaja; *Saxifraga echinophora* H. Léveillé; *S. strigosa* f. *ramosa* Engler & Irmscher; *S. strigosa* f. *simplex* Engler & Irmscher; *S. strigosa* f. *subsexualis* Engler & Irmscher.

Stem branched or simple, 5.5–28 cm tall, proximally densely crisped eglandular villous, distally glandular hairy. Leaf buds present in axils of rosette leaves and bracts, often replacing flowers. Proximal cauline leaves less than 1/2 size of median ones, ca. 3 mm. Median cauline leaves aggregated into a rosette; petiole 2–10 mm, margin long glandular hairy; leaf blade ovate, obovate, or elliptic to oblong, 0.6–2.7 cm × 4–13 mm, both surfaces strigose, base tapered into petiole, margin 2- or 3(-9)-dentate. Proximal and distal cauline leaves more remote and smaller than median ones, 3–8.5 × 1.2–4 mm. Flower solitary or cyme 3–10-flowered; branches often 1-flowered; bracts lanceolate, ca. 1.5 × 0.5 mm, strigose; pedicels 0.6–1.9 cm, dark purple glandular hairy. Sepals erect to spreading, ultimately reflexed, ovate to elliptic, 2–3 × 0.9–2.6 mm, abaxially strigose, veins 3–7, confluent into a verruca at apex, margin ± glabrous, apex acute. Petals white, spotted reddish brown, ovate to broadly so or elliptic, 3.8–5.5 × 1.4–2.6 mm, 2–4-callose, 3–7-veined, base contracted into a claw 0.7–1.3 mm, apex obtuse to acute. Stamens 2.3–4.5 mm. Ovary subsuperior, ovoid to broadly so, 1.3–2.2 mm; styles 0.5–2 mm. Fl. and fr. Jul–Oct. $2n = 16^*$, 32^* .

Forests, forest margins, scrub, meadows, rock crevices; 1800–4200 m. W Sichuan, S Xizang, Yunnan [Bhutan, N India, Myanmar, Nepal, Sikkim].

109. *Saxifraga gemmipara* Franchet, J. Bot. (Morot) 10: 262. 1896.

芽生虎耳草 ya sheng hu er cao

Hirculus gemmiparus (Franchet) Losinskaja; *Saxifraga gasterostens* H. Léveillé.

Stem many branched, (5–)9–24 cm tall, proximally eglandular villous, distally glandular hairy. Leaf buds present in axils of proximal, median, or distal cauline leaves. Proximal cauline leaves often scalelike, less than 1/2 size of median ones, ca. 3 mm. Median cauline leaves often aggregated into a loose rosette, sessile; leaf blade narrowly obovate or oblong to linear-oblong, 0.6–2.9 cm × 1.2–9 mm, strigose at least adaxially, base cuneate, margin eglandular setose-ciliate, apex acute. Cyme usually corymbose, laxly branched, 2–9 cm, 2–12-flowered; pedicels 0.6–2.4 cm, glandular hairy. Sepals erect, then spreading, ultimately reflexed, subovate, 2–4 × 1–2 mm, abaxially glabrous, variably glandular, or eglandular hairy, veins 3–7, confluent at apex, margin glabrous or sometimes glandular hairy at

base, apex acute. Petals white, spotted yellow or purple, ovate or narrowly so, elliptic, or oblong, 2(-4)-callose, 3–7-veined, base contracted into a claw 1–1.5 mm, apex subobtuse or acute. Stamens 2–6 mm. Ovary subsuperior, ovoid, 2–3.5 mm; styles 0.8–3 mm. Fl. and fr. Jun–Nov.

Forests, forest margins, scrub, meadows, rock crevices; 1700–4900 m. W Sichuan, Yunnan [N Thailand].

110. *Saxifraga oreophila* Franchet, J. Bot. (Morot) 10: 260. 1896.

刚毛虎耳草 gang mao hu er cao

Hirculus oreophilus (Franchet) Losinskaja.

Stem many branched, 7–12 cm tall, proximally eglandular hairy, distally glandular hairy. Leaf buds present in axils of proximal, median, or distal cauline leaves and bracts. Proximal cauline leaves scalelike, 1–2 mm. Median cauline leaves sessile, oblong or narrowly so to narrowly subobovate, 0.5–1.5 cm × 1–1.5 mm, both surfaces glabrous, margin recurved, eglandular or glandular ciliate, apex rigidly aristate. Flower solitary or cyme 2–4-flowered; pedicels 8–12 mm, glandular hairy. Sepals erect, ovate, 3–3.5 × 1–1.5 mm, abaxially glandular hairy, veins 5–7, confluent into a verruca at apex, margin ± glabrous, apex obtuse or acute. Petals yellow, ovate or elliptic, 4.5–5 × 2–2.7 mm, 2–4-callose, 4–7-veined, base contracted into a claw ca. 1 mm, apex subobtuse or acute. Stamens 3.5–5 mm. Ovary subsuperior, ovoid, 1.5–2.5 mm; styles 2–3 mm. Fl. Aug–Sep.

• Rocky slopes and crevices; 2600–3200 m. N Yunnan (Eryuan Xian, Lijiang Naxi Zu Zizhixian, Qiaojia Xian).

111. *Saxifraga filicaulis* Wallich ex Seringe in de Candolle, Prodr. 4: 46. 1830.

线茎虎耳草 xian jing hu er cao

Hirculus filicaulis (Wallich ex Seringe) Losinskaja; *Saxifraga mairei* H. Léveillé.

Stem many branched, 9.5–24 cm tall, proximally sparsely eglandular hairy, distally glandular hairy. Leaf buds present in axils of leaves and bracts, those at median nodes often developing into sterile shoots by anthesis. Proximal cauline leaves scalelike, ca. 3 mm. Median and distal cauline leaves linear to ensiform, 3–12 × 0.6–2.1 mm, both surfaces usually glabrous, rarely sparsely glandular hairy abaxially, margin recurved, ± glandular ciliate. Flower solitary or cyme 2- or 3-flowered; bracts lanceolate, ca. 2 × 0.5 mm, margin glandular ciliate; pedicels glandular hairy. Sepals erect, ovate to triangular-ovate, 1.5–3 × 1–2 mm, abaxially glandular hairy, veins 3–5, confluent into a verruca at apex, margin glandular ciliate or glabrous, apex obtuse. Petals yellow, ovate or elliptic to obovate, 4–8 × 2.3–3.1 mm, 2–4-callose, 3–7-veined, base contracted into a claw 1–2.3 mm, apex obtuse or acute. Stamens 2.5–5.3

mm. Ovary subsuperior, ovoid, 2–2.5 mm; styles 1.5–3 mm. Fl. and fr. Jun–Oct. $2n = 24^*$, 32^* .

Forests, forest margins, scrub, alpine meadows, cliff faces, rock crevices; 2100–4800 m. EC Shaanxi (Hua Xian), W Sichuan, S Xizang, E and NW Yunnan [Bhutan, India, Kashmir, Nepal, Sikkim].

112. *Saxifraga wenchuanensis* T. C. Ku, Bull. Bot. Res., Harbin 9(4): 16. 1989.

汶川虎耳草 wen chuan hu er cao

Herbs perennial, caespitose, 7–9 cm tall. Stem simple, proximally sparsely glandular hairy, distally glabrous. Leaf buds absent in axils of leaves and bracts. Basal leaves absent; cauline leaves lanceolate, 5.5–8 × 1–1.5 mm, both surfaces glabrous, base rounded, margin cartilaginous glandular ciliate, apex acute, aristate-mucronate. Flower solitary; pedicel ca. 1.5 mm, glabrous. Sepals erect, subovate, ca. 4 × 2 mm, leathery, both surfaces glabrous, veins 3, confluent at apex, margin cartilaginous glandular ciliate, apex mucronate. Petals yellow, obovate, ca. 5.8 × 3 mm, not callose, 3–5-veined, base contracted into a claw ca. 1 mm, apex rounded. Stamens ca. 5 mm. Ovary ovoid, ca. 2 mm; styles ca. 1.8 mm. Fl. Jun–Aug.

• Alpine passes; ca. 4300 m. NC Sichuan (Wenchuan Xian).

113. *Saxifraga macrostigmatoides* Engler, Repert. Spec. Nov. Regni Veg. Beih. 12: 395. 1922.

假大柱头虎耳草 jia da zhu tou hu er cao

Hirculus macrostigmatoides (Engler) Losinskaja; *Saxifraga oreophila* Franchet var. *dapaoshanensis* J. T. Pan.

Stem 2.5–7 cm tall, proximally eglandular pubescent, distally glandular hairy. Leaf buds conspicuous in axils of proximal and median cauline leaves, developing into sterile shoots by anthesis. Leaves of sterile shoots suboblong, ca. 4 × 1.2 mm, both surfaces glabrous, margin sparsely setose-ciliate, apex mucronate or aristate. Proximal cauline leaves subspatulate, ca. 6 × 1.5 mm, both surfaces glabrous, margin sparsely setose-ciliate; median leaves larger than proximal and distal ones; distal leaves oblong to linear-oblong, 6–7.4 × 1.5–2.2 mm, both surfaces glabrous, margin glandular ciliate, apex aristate-mucronate. Flower solitary; pedicel 0.8–1.3 cm, glandular hairy. Sepals erect or spreading, ovate to subelliptic, 3–4 × 1.5–2.5 mm, abaxially and marginally glandular hairy, veins 3–7, not partly, or fully confluent at apex, apex obtuse or subacute. Petals yellow, obovate, (5–)7–8 × 2–4 mm, 2–4-callose, 3–6-veined, base contracted into a claw 0.6–1 mm, apex obtuse. Stamens 4.5–6 mm. Ovary subsuperior; styles 1.3–3 mm. Fl. Jul–Aug.

• Alpine meadows, scrub, rock crevices; 3900–5000 m. W Sichuan (Batang Xian, Kangding Xian, Litang Xian), Xizang, NW Yunnan (Dêqên Xian, Gongshan Drung-Nu Zu Zizhixian, Zhongdian Xian).

114. *Saxifraga wallichiana* Sternberg, Revis. Saxifrag. Suppl. 2: 21. 1831.

流苏虎耳草 liu su hu er cao

Saxifraga brachypoda D. Don var. *fimbriata* (Wallich ex Seringe) Engler & Irmscher; *S. fimbriata* Wallich ex Seringe; *S. oligantha* Zhmylev; *S. pauciflora* T. C. Ku (1989), not Sternberg (1822); *S. phaenophylla* Franchet.

Stem simple, 10–30 cm tall, proximally glabrous or sparsely eglandular hairy, only most distal part glandular hairy. Leaf buds present in axils of proximal, median or (especially) distal cauline leaves. Basal leaves absent. Cauline leaves crowded along stem, shiny, ovate or narrowly so to lanceolate, 0.8–1.8 cm × 1.5–8 mm, both surfaces glabrous, base cordate, semi-amplexicaul, margin cartilaginous eglandular or glandular ciliate, apex acute. Cyme 2–4-flowered or flower solitary; pedicels 2–8 mm, glandular hairy. Sepals erect, ovate, 1.6–5.3 × 0.7–2.5 mm, glabrous or abaxially and marginally ± glandular hairy, veins 3–7, partly or fully confluent at apex, apex acute. Petals yellow, ovate or obovate to elliptic, 4.3–6.6 × 1.6–3.1 mm, 2-callose near base, 3–9-veined, base abruptly contracted into a claw 0.3–1.1 mm, apex obtuse to acute. Stamens 3.5–5.5 mm. Ovary subsuperior, ovoid to broadly so, 1.8–2.2 mm; styles 1.1–3 mm. Fl. and fr. Jul–Nov. $2n = 24$.

Forests, forest margins, scrub, alpine meadows, rock crevices; 2000–5000 m. W Sichuan, E and S Xizang, N Yunnan [Bhutan, India, Myanmar, Nepal, Sikkim].

The gross morphology of *Saxifraga wallichiana* sometimes approaches that of *S. brachypoda*, especially in the Himalayas, but the former species is distinguished from the latter by the presence of petal callosities. Therefore, the two species are kept separate in the present account. Both Chinese and Nepalese *S. wallichiana* have petals 2-callose. The petal margin is different (entire in Chinese plants, very finely lacinate in Nepalese plants), but plants from the two countries cannot be distinguished by other characters.

115. *Saxifraga brachypoda* D. Don, Trans. Linn. Soc. London 13: 378. 1822.

短柄虎耳草 duan bing hu er cao

Hirculus brachypodus (D. Don) Losinskaja; *Saxifraga glandulosa* Wallich ex Seringe.

Stem simple, 5.5–19 cm tall, proximally glabrous, distally glandular hairy. Leaf buds present in leaf axils. Basal leaves absent. Cauline leaves crowded along stem, shiny, lanceolate to linear-lanceolate, 5–12 × 0.4–2.8 mm, leathery, rigid, both surfaces glabrous, margin setose-ciliate or glabrous, apex acute, rigidly aristate; median leaves larger than proximal and distal ones. Flower solitary or cyme 2- or 3-flowered; pedicels 0.5–1.8 cm, glandular hairy. Sepals erect, ovate or triangular-ovate to subelliptic, 3.5–5 × 1.6–3 mm, glabrous, or abaxially and marginally eglandular or glandular hairy, veins 3–7, not partly, or fully confluent at apex, apex obtuse or acute. Petals yellow, obovate or elliptic to ovate, 5.5–9 × 2.3–5.2 mm, not callose, 5–8-veined, base with a claw 0.3–1 mm, apex obtuse. Stamens 2.9–5 mm; anthers dark brown. Ovary

subsuperior, ovoid to ellipsoid, 2.2–2.9 mm; styles 1–2 mm. Fl. and fr. Jul–Sep. $2n = 16, 24$.

Forests, scrub, alpine meadows, steep gullies, rock crevices; 3000–5000 m. C and N Sichuan (Baoxing Xian, Songpan Xian), S Xizang, NW Yunnan [Bhutan, N India, Myanmar, Nepal, Sikkim].

116. *Saxifraga brachypodoidea* J. T. Pan, Acta Phytotax. Sin. 28: 391. 1990.

光花梗虎耳草 *guang hua geng hu er cao*

Stem simple, 5–7.5 cm tall, glabrous. Leaf buds present in leaf axils. Leaves crowded along stem, narrowly ovate or lanceolate to oblong, 5–7 × 1.8–2 mm, leathery, rigid, margin eglandular setose-ciliate on proximal and median leaves, glabrous on distal ones, apex setose-aristate. Flower solitary; pedicel glabrous. Sepals erect, subovate to subelliptic, 3.6–4 × 2–2.2 mm, carnose, glabrous, veins 3 or 4, not or partly confluent at apex, apex acute. Petals yellow, subspatulate, 5.2 × 1.6–1.8 mm, not callose, 3-veined, base gradually tapered into a claw, apex acute. Stamens ca. 4.5 mm. Ovary subsuperior, ovoid, ca. 3.5 mm; styles ca. 2.5 mm. Fl. and fr. Jul–Oct.

• Alpine meadows; 4200–4300 m. SE Xizang (Mêdog Xian).

117. *Saxifraga zayuensis* T. C. Ku, Bull. Bot. Res., Harbin 9(4): 12. 1989.

云岭虎耳草 *yun ling hu er cao*

Saxifraga yunlingensis C. Y. Wu; *S. zayuensis* f. *angustipetala* T. C. Ku.

Stem simple, 3–7 cm tall, glandular pilose. Leaf buds present in leaf axils. Proximal leaves few, scalelike, lanceolate, 5.7–6 × 1–1.2 mm, both surfaces glabrous, distal margin cartilaginous setose-ciliate, apex acute. Median cauline leaves crowded; petiole ca. 2 mm, margin ciliate; leaf blade oblong to narrowly so, 5–10.5 × 1.5–2.1 mm, both surfaces glabrous, base tapered into petiole, margin cartilaginous setose-ciliate, apex acute, rigidly aristate; distal leaves with petiole shortened to absent, leaf blade glandular hairy abaxially and at margin. Flower solitary or cyme 2-flowered; pedicels 0.5–1.5 cm, glandular pilose. Sepals erect to rather spreading, narrowly ovate, 3.5–5 × 1.5–2 mm, leathery, abaxially and marginally glandular hairy, veins 3, confluent at apex, apex rigidly aristate. Petals yellow, elliptic or ovate to narrowly obovate, 5.5–7 × 2–3.5 mm, 6–9-callose, 4- or 5-veined, margin sometimes with a few glandular hairs at base, base with a claw 0.6–1 mm, apex obtuse or acute. Stamens 4.4–6.5 mm. Ovary subsuperior, ovoid, 2–3 mm; styles 1–2 mm. Fl. Jul–Aug.

• *Abies* forests, forest margins, alpine scrub meadows, rock clefts; 3800–4400 m. NW Yunnan (Dêqên Xian).

118. *Saxifraga gouldii* C. E. C. Fischer, Kew Bull. 1939: 664. 1940.

顶腺虎耳草 *ding xian hu er cao*

Stem simple, 7–25 cm tall, proximally glabrous, distally glandular hairy. Leaf buds present only in axils of

rhizome scales. Cauline leaves sessile, shiny, lanceolate to linear, 8–11 × 1.5–2 mm, both surfaces glabrous, margin cartilaginous eglandular setose-ciliate, apex acute, rigidly aristate. Cyme corymbose, compact, 2- or 3-flowered; pedicels 5–7 mm, glandular hairy. Sepals erect, ovate to broadly so, 4–6.5 × 2–5 mm, abaxially and marginally glandular hairy, veins 5 or 6, not or partly confluent at apex, apex acute. Petals yellow, obovate to spatulate, 8–11 × 4–6 mm, not callose, 5–9-veined, base tapered into a claw 1–2 mm, distal margin glandular ciliate or eglandular laciniate, apex rounded. Stamens 4–5.5 mm. Ovary subsuperior, 3–4.5 mm; styles 2.5–3.5 mm. Fl. Jul–Sep.

Rocky or stony hillsides; 4000–4200 m. Xizang [Bhutan, N India (Darjiling), E Nepal, Sikkim].

Two apparently allopatric varieties may be distinguished: var. *gouldii*, occupying the W part of the range of the species, and var. *eglandulosa*, occupying the E part.

One of the present authors (Ohba) as well as Akiyama et al. (Bull. Natl. Sci. Mus., Tokyo, B, 26: 75–93. 2000) believe that *Saxifraga gouldii* var. *gouldii* and var. *eglandulosa* are varieties of *S. brachypoda*. The types of var. *eglandulosa* are similar to *S. brachypoda* in plant size, leaf shape, sepals, and petals. However, the two taxa differ in the absence in var. *eglandulosa* of axillary buds in the middle and apical parts of the stem. *Saxifraga gouldii* var. *gouldii* is characterized by having petals with a single row of sessile or shortly stipitate, small, black glands that are continued for a varying distance along the margin. With the exception of these glands, var. *gouldii* does not differ from var. *eglandulosa*.

1a. Petals glandular ciliate at distal margin

..... 118a. var. *gouldii*

1b. Petals eglandular laciniate at distal

margin 118b. var. *eglandulosa*

118a. *Saxifraga gouldii* var. *gouldii*

顶腺虎耳草(原变种) *ding xian hu er cao* (yuan bian zhong)

Saxifraga brachypoda D. Don var. *gouldii* (C. E. C. Fischer) S. Akiyama et al.

Petals glandular ciliate at distal margin.

Xizang [Bhutan].

118b. *Saxifraga gouldii* var. *eglandulosa* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 249. 1960.

无顶腺虎耳草 *wu ding xian hu er cao*

Saxifraga brachypoda var. *eglandulosa* (H. Smith) S. Akiyama et al.

Petals eglandular laciniate at distal margin.

Rocky or stony hillsides; 4000–4200 m. SE Xizang [Bhutan, N India (Darjiling), E Nepal, Sikkim].

119. *Saxifraga wardii* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 134. 1913.

腺瓣虎耳草 *xian ban hu er cao*

Stem simple, 2.5–9.5 cm tall, proximally glabrous, distally glandular hairy or glabrous. Leaf buds present only in axils of rhizome scales. Leaves crowded along stem, sessile, ovate or oblong to linear-oblong, 5–11 × 3–6 mm, both surfaces glabrous, margin cartilaginous eglandular setose-ciliate, apex acute, rigidly aristate. Flower solitary; pedicel 5–7 mm, glandular hairy or glabrous. Sepals erect, ovate to broadly so, 4–6.5 × 2–5 mm, abaxially and marginally glandular hairy or glabrous, veins 5 or 6, not or partly confluent at apex, apex acute. Petals yellow, broadly ovate to orbicular, 6–11 × 4.5–9 mm, not callose, 5–9-veined, base abruptly contracted into a claw 1–2 mm, margin glandular ciliate, eglandular setose-ciliate, or glabrous, apex rounded. Stamens 4–5.5 mm. Ovary subsuperior, 3–4.5 mm; styles 2.5–3.7 mm. Fl. Jul–Sep. $2n = 16^*$.

• Alpine meadows and scrub, rock crevices; 1200–4800 m. SE Xizang, NW Yunnan.

1a. Pedicels and sepals glandular hairy; petals glandular ciliate at margin 119a. var. *wardii*

1b. Pedicels and sepals glabrous; petals setose-ciliate or glabrous at margin 119b. var. *glabripedicellata*

119a. *Saxifraga wardii* var. *wardii*

腺瓣虎耳草(原变种) xian ban hu er cao (yuan bian zhong)

Saxifraga megalantha C. Marquand.

Distal part of stem, pedicels, and sepals glandular hairy. Petals glandular ciliate at margin. Fl. Jul–Sep.

• Alpine meadows and scrub, rock crevices; 3500–4800 m. SE Xizang, NW Yunnan (Dêqên Xian).

119b. *Saxifraga wardii* var. *glabripedicellata* J. T. Pan, Acta Biol. Plat. Sin. 1: 29. 1982.

光梗虎耳草 guang geng hu er cao

Stem, pedicels, and sepals glabrous. Petals setose-ciliate or glabrous at margin. Fl. Jul–Aug.

• Alpine meadows, rock crevices; ca. 1200 m. SE Xizang (Bomi Xian, Mêdog Xian).

120. *Saxifraga erinacea* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 250. 1960.

獾状虎耳草 wei zhuang hu er cao

Stem simple, 1.5–2.5 cm tall, glabrous. Leaf buds present in axils of proximal nodes, developing into sterile shoots by anthesis. Leaves crowded along stem, shiny, oblong to linear-oblong, 5–6.5 × 1.3–1.5 mm, rigid, both surfaces glabrous, base gradually narrowed, margin cartilaginous eglandular setose-ciliate, apex acute, aristate-mucronate. Flower solitary, subsessile; pedicel glabrous. Sepals erect, narrowly ovate to linear-lanceolate, 4.5–5.5 × 1–1.9 mm, both surfaces glabrous, veins 4 or 5, confluent at apex, margin cartilaginous glandular ciliate, apex aristate-mucronate. Petals yellow, oblong to oblanceolate, 7–7.5 × 2–3 mm, not callose, 5-

or 6-veined, base cordate with a claw 2.2–3.1 mm, apex acute. Stamens 4.3–4.4 mm. Ovary subsuperior; styles 1.4–2.6 mm. Fl. Jul–Aug.

Alpine meadows, rock clefts; 4000–4600 m. S Xizang (Cona Xian, Qonggyai Xian) [Bhutan].

121. *Saxifraga cinerascens* Engler & Irmscher, Notes Roy. Bot. Gard. Edinburgh 5: 142. 1912.

灰虎耳草 hui hu er cao

Ciliaria cinerascens (Engler & Irmscher) Losinskaja; *Saxifraga cinerascens* f. *major* Engler & Irmscher.

Stem simple, 5–8.5 cm tall, glandular hairy. Leaf buds present in axils of proximal nodes, developing by anthesis into sterile shoots clustered below primary leaf rosette. Supraproximal leaves aggregated into a rosette, gray; petiole broad; leaf blade oblong to oblanceolate, 1.1–1.2 cm × 1.9–2 mm, leathery, rigid, both surfaces glabrous, margin cartilaginous eglandular (occasionally glandular) setose-ciliate, apex cartilaginous aristate. Distal cauline leaves sessile, gray, oblong, usually smaller than rosette leaves, 5–7 × 1.5–2 mm, leathery, rigid, abaxially occasionally with a few eglandular hairs, adaxially glabrous, margin cartilaginous glandular hairy, apex cartilaginous aristate. Cyme 2–4-flowered or flower solitary; pedicels 6–10 mm, glandular hairy. Sepals erect to spreading, subovate to subelliptic, ca. 2 × 1.5 mm, leathery, rigid, glabrous or abaxially and marginally glandular hairy, veins 3 or 4, confluent at apex, apex acute. Petals yellow, obovate to subpandurate, ca. 6 × 4 mm, 2-callose near base, 5–7-veined, base contracted into a claw 1–1.5 mm. Stamens 2.5–4 mm. Ovary subsuperior, ovoid, ca. 2 mm; styles ca. 1 mm. Fl. and fr. Aug–Sep.

• Alpine meadows, cliff ledges, rock crevices; 2800–4400 m. NW Yunnan.

122. *Saxifraga perpusilla* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 72. 1858.

矮小虎耳草 ai xiao hu er cao

Herbs perennial, 1–2 cm tall. Shoots crowded, forming cushions. Flowering stem scapose, 0.6–1.6 cm, mostly embedded among rosette leaves, visible part 2.8–10 mm, glandular hairy. Shoot leaves imbricate, aggregated into a rosette, subspatulate, abaxially convex, adaxially concave, 2.2–3.6 × 0.8–1 mm, subcarnose, colorless fimbriate hairy abaxially distally and at distal margin. Flower solitary; pedicel glandular hairy. Sepals erect or ascending, ovate to broadly so, abaxially subconvex, adaxially subconcave, 1–1.8 × 1–1.4 mm, abaxially ± glandular hairy, adaxially glabrous, veins 3, confluent into a verruca at apex, margin glandular hairy or glabrous, apex usually scarious fimbriate, rarely mucronate. Petals yellow, proximally orange spotted, elliptic to narrowly so or ovate, 2.5–3.5 × 1–1.8 mm, not callose, 3–5-veined, base with a claw 0.3–0.5 mm or clawless, apex obtuse. Stamens 2–2.8 mm. Ovary semi-inferior, ovoid, ca. 1 mm; styles ca.

0.8 mm. Capsule ca. 3.5 mm; carpels connate proximally, divergent distally. Fl. Jul–Aug.

Alpine meadows, rocky hillsides, rock crevices; 3700–5800 m. S Xizang (Burang Xian, Gyaca Xian, Zhongba Xian), Yunnan [Bhutan, Nepal, Sikkim].

123. *Saxifraga zhidoensis* J. T. Pan, Acta Phytotax. Sin. 16(2): 32. 1978.

治多虎耳草 zhi duo hu er cao

Herbs perennial, 1–2 cm tall. Shoots numerous, crowded, forming cushions. Flowering stem ca. 7 mm, glandular hairy. Shoot leaves imbricate, aggregated into a dense rosette, subspatulate, 3.5–3.6 × 1.1–1.2 mm, subcarnose, both surfaces glabrous, margin proximally ciliate or glandular ciliate, apex obtuse, scarious fimbriate. Cauline leaves remote. Flower solitary; pedicel ca. 0.7 mm, glandular hairy. Sepals erect, elliptic-ovate, ca. 2.5 × 1.5 mm, both surfaces glabrous, veins 5, confluent at apex, margin proximally ciliate or glandular ciliate, apex fimbriate. Petals yellow, ovate, ca. 2.4 × 1.3 mm, 3-veined, base clawed, margin ± serrulate, apex subobtuse or acute. Stamens 2–2.5 mm. Ovary subinferior, with an annular nectary disc; styles ca. 1 mm. Fl. Jun–Aug.

• Alpine meadows, rock crevices; 4900–5000 m. S Qinghai (Nangqên Xian, Zhidoi Xian).

124. *Saxifraga hemisphaerica* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 62. 1858.

半球虎耳草 ban qiu hu er cao

Herbs perennial, 2–5 cm tall. Shoots crowded, forming cushions. Flowering stem embedded among rosette leaves, not visible, 3.2–4.5 mm, sparsely glandular hairy. Shoot leaves imbricate, aggregated into a rosette, subspatulate, abaxially subconvex, adaxially subconcave, 4–5.6 × 1.2–1.8 mm, subcarnose, both surfaces glabrous, margin proximally ciliate, distally colorless fimbriate. Cauline leaves remote, embedded among rosette leaves, rarely visible, narrowly obovate to oblanceolate, 2.4–4 × 1–1.4 mm, both surfaces glabrous, margin setose-ciliate proximally, apex colorless fimbriate. Flower solitary; bracts 1 or 2, oblong-linear, ca. 3 × 0.6 mm, both surfaces glabrous, margin ciliate, apex obtuse; pedicel 0.2–0.3 mm, glandular hairy. Sepals erect, ovate to subelliptic, abaxially convex, adaxially concave, 2.2–2.6 × 1–1.6 mm, subcarnose, abaxially sparsely glandular hairy or glabrous, adaxially glabrous, veins 3–7, confluent into a verruca at apex, margin glandular ciliate proximally, apex scarious fimbriate. Petals yellow, ovate or narrowly so to narrowly obovate, 2.5–3.5 × 0.9–1 mm, 2-callose, 3-veined, base with a claw 0.6–1.3 mm, apex obtuse or acute. Stamens 2–2.5 mm. Ovary inferior, ca. 1.3 mm, with an annular nectary disc; styles 0.8–0.9 mm. Fl. Jun–Aug.

Alpine rock crevices; 4500–5000 m. S Qinghai (Nangqên Xian, Yushu Xian, Zadoi Xian), E Xizang (Dêngqên Xian) [Bhutan, India, Nepal, Sikkim].

125. *Saxifraga sessiliflora* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 102. 1958.

加查虎耳草 jia cha hu er cao

Saxifraga gyacaensis J. T. Pan.

Herbs perennial, 2–3 cm tall. Shoots numerous, with leaf rosettes. Rosette leaves imbricate, narrowly obovate-spatulate, abaxially convex, adaxially concave, 4–6 × 1.4–2.5 mm, both surfaces glabrous, margin setose-ciliate, apex obtuse, aristate. Flower solitary, sessile or subsessile; pedicel 0–1 mm, glandular hairy. Sepals erect, ovate, 3–4 × 2–3 mm, both surfaces glabrous, veins 3, not confluent at apex, margin setose-ciliate, apex obtuse. Petals white, pink at base, broadly elliptic to broadly ovate, 5–9 × 3–5 mm, not callose, 5-veined, base gradually narrowed into a claw 1–2.5 mm, apex rounded or retuse. Stamens ca. 3 mm. Ovary subsuperior, ovoid, ca. 2.5 mm; styles ca. 2.2 mm. Fl. Jul–Aug.

• Alpine scrub, meadows, rock crevices; 4200–5000 m. S Xizang (Gyaca Xian, Lhasa Shi, Lhünzê Xian).

126. *Saxifraga brevicaulis* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 102. 1958.

短茎虎耳草 duan jing hu er cao

Herbs perennial, 2–4 cm tall. Shoots numerous, with leaf rosettes. Stem slender, glandular hairy. Rosette leaves imbricate, narrowly obovate-spatulate, abaxially convex, adaxially concave, 3–4 × 1–1.5 mm, both surfaces glabrous, margin setose-ciliate, apex acute, aristate. Cauline leaves 3 or 4, obovate, oblong, or linear, 3–4 × 1–1.5 mm, both surfaces glabrous, margin setose-ciliate, apex acute, aristate. Flower solitary; bracts similar to cauline leaves, ca. 3.4 × 1.8 mm; pedicel 0.5–1.5 cm, densely glandular hairy. Sepals erect, ovate to oblong, 3–3.5 × 1.5–2.5 mm, both surfaces glabrous, veins 3, not confluent at apex, margin setose-ciliate, apex obtuse. Petals white, pink at base, obovate to narrowly so, 5–8 × 2.5–4 mm, not callose, 3–5-veined, base gradually narrowed into a claw 1–1.2 mm, apex rounded or retuse. Stamens ca. 3 mm. Ovary subsuperior, ovoid, ca. 2.5 mm; styles ca. 2.2 mm. Fl. Jul–Aug.

• Rocky hillsides; 4400–4700 m. SE Xizang.

127. *Saxifraga paiquensis* J. T. Pan, Acta Phytotax. Sin. 28: 394. 1990.

派区虎耳草 pai qu hu er cao

Herbs perennial, caespitose, 1–1.5 cm tall. Shoots extremely crowded, forming cushions. Flowering stem hidden among rosette leaves, ca. 9 mm, yellow glandular hairy. Leaves imbricate, aggregated, subelliptic to suboblong, 3.5–4 × 1.5–2 mm, carnose, yellow glandular hairy, apex obtuse. Flower solitary, sessile; bracts tightly appressed to sepals. Sepals erect, subovate, ca. 3 × 2 mm, subcarnose, yellow glandular hairy, veins 8 or 9, confluent at apex, apex obtuse. Petals yellow, obovate to elliptic, ca. 5 × 3–3.2 mm, 2-callose, 6- or 7-veined, base contracted into a claw ca. 0.4 mm, apex obtuse. Stamens ca. 3.5 mm. Ovary subsuperior, ovoid, ca. 2.5 mm; styles ca. 1 mm. Fl. Jul–Aug.

• Alpine rock crevices; 4400–4800 m. SE Xizang (Mainling Xian).

128. *Saxifraga jacquemontiana* Decaisne in Jacquemont, Voy. Inde 4(Bot.): 68. 1844.

隐茎虎耳草 yin jing hu er cao

Herbs perennial, ca. 2 cm tall. Shoots crowded, forming cushions, lignified. Flowering stem 3–4 mm, embedded among rosette leaves, not visible, glandular hairy, with 1 or 2 leaves. Shoot leaves imbricate, aggregated into a rosette, subspatulate, 5–5.2 × 1.5–1.7 mm, carnose, abaxially glabrous or distally glandular, adaxially and marginally glandular pilose, apex rounded to obtuse, long hairy. Cauline leaves elliptic, ca. 3.6 × 1.9 mm, carnose, abaxially glabrous or distally glandular, adaxially and marginally glandular pilose, apex rounded to obtuse, long hairy. Flower solitary; bract 1, suboblong, ca. 3 × 1.3 mm, both surfaces glabrous, margin glandular ciliate; pedicel ca. 0.5 mm, glandular pubescent. Sepals erect, ovate to narrowly so, ca. 3 × 1.2–2 mm, carnose, abaxially and marginally glandular hairy, veins 3, confluent at apex, apex acute. Petals yellow, obovate to elliptic, ca. 5 × 3 mm, 4- or 5-callose, 3–5-veined, base gradually narrowed into a claw 0.5–0.9 mm, apex retuse. Stamens ca. 3.5 mm. Ovary semi-inferior, ovoid, ca. 2.6 mm; styles ca. 1.5 mm. Fl. Jul–Aug. $2n = 16$.

Alpine rock crevices; 4000–5200 m. SE Xizang (Mainling Xian, Mêdog Xian) [Bhutan, India, Kashmir, Nepal, Sikkim].

129. *Saxifraga jainzhuglaensis* J. T. Pan, Acta Phytotax. Sin. 29: 18. 1991.

金珠拉虎耳草 jin zhu la hu er cao

Herbs perennial, dwarfish. Shoots numerous branched, crowded, forming cushions. Flowering stem embedded among rosette leaves, 1–2 mm, glandular hairy, with 1 or 2 leaves, gemmiferous at leaf axils. Shoot leaves imbricate, aggregated into a rosette, narrowly subovate, 6–6.8 × 2–2.5 mm, subcarose, both surfaces glabrous, margin glandular ciliate, apex subobtuse. Cauline leaves subelliptic, ca. 5.9 × 3.6 mm, subcarose, both surfaces glabrous, margin glandular ciliate, apex obtuse. Flower solitary, sessile. Sepals spreading, broadly ovate, ca. 2.5 × 2–2.2 mm, subcarose, abaxially and marginally glandular hairy, veins 3, confluent at apex, apex obtuse. Petals yellow, broadly obovate to elliptic, 2.5–2.7 × 1.8–2 mm, not callose, 3-veined, base clawless, apex retuse. Stamens ca. 2.2 mm. Ovary semi-inferior, ovoid; styles ca. 1 mm. Capsule ellipsoid, ca. 4 mm. Fl. and fr. Jul–Aug.

• Alpine scrub meadows; 3900–4200 m. SE Xizang (Mêdog Xian). In the protologue, the specific epithet was spelled as both “*Saxifraga jainzhuglaensis*” and, as an apparent typographical error, “*jainzhulaensis*.”

130. *Saxifraga finitima* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 133. 1913.

区限虎耳草 qu xian hu er cao

Herbs perennial, caespitose, 2.5–5 cm tall. Shoots numerous branched, forming cushions, with leaf rosettes. Flowering stem apparently scapose, brown glandular hairy. Rosette leaves subspatulate to

suboblong, adaxially concave, 4.5–5.5 × 1.6–2.2 mm, subcarose, abaxially glandular hairy distally and at margin, adaxially rarely glandular hairy distally, apex obtuse. Cauline leaves and bracts in total 1–3 or absent, remote, sometimes hidden in leaf rosette, linear-oblong to -oblanceolate, 4–6.6 × 0.8–1.1 mm, subcarose, glandular hairy, apex obtuse. Flower solitary; pedicel 0.8–4.5 cm, glandular hairy. Sepals reflexed, subelliptic to subovate, 3–4.2 × 1.5–2.5 mm, abaxially and marginally ± glandular hairy, adaxially glabrous or distally glandular hairy, veins 3–7(–9), confluent at apex, apex obtuse. Petals yellow, proximally spotted brown or red, ovate or obovate to elliptic, 5.5–7 × 2.4–4 mm, obscurely 2-callose, 3–7-veined, base contracted into a claw 0.5–1 mm, apex obtuse. Stamens 4.5–5 mm. Ovary superior, subellipsoid, 1.5–3 mm; styles 0.5–1.5 mm. Fl. and fr. Jul–Sep.

• Scrub, alpine scrub meadows, rock crevices; 3500–4900 m. W Sichuan (Litang Xian, Xiangcheng Xian), E Xizang, NW Yunnan (Dêqên Xian, Weixi Xian).

131. *Saxifraga stella-aurea* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 72. 1858.

金星虎耳草 jin xing hu er cao

Saxifraga jacquemontiana Decaisne var. *stella-aurea* (J. D. Hooker & Thomson) C. B. Clarke; *S. pumila* H. Smith; *S. tsarongensis* J. Anthony.

Herbs perennial, caespitose, 1–8 cm tall. Shoots branched, sometimes forming cushions, with leaf rosettes. Stem scapiform, glandular hairy. Rosette leaves subspatulate, subelliptic, or suboblong to subsensate, 2–5 × 1–2 mm, carnose, both surfaces usually glabrous or sometimes glandular hairy distally, margin glabrous or sparsely glandular hairy, apex usually obtuse, rarely acute. Flower solitary; bracts absent; pedicel slender, 0.7–2(–4) cm, glandular hairy. Sepals reflexed, elliptic to broadly so or subovate, 2.0–3.5 × 1.2–2.5 mm, abaxially and marginally usually ± glandular hairy, veins 3–6, not, partly, or fully confluent at apex, apex obtuse or acute. Petals yellow, proximally orange spotted, ovate to narrowly so or elliptic, 4–7 × 1.5–3.4 mm, obscurely 2-callose, 3–6-veined, base with a claw 0.4–1 mm, apex obtuse. Stamens 4.1–4.3 mm. Ovary subsuperior, broadly ovoid to ellipsoid, 1.7–2 mm; styles 1.2–1.3 mm. Fl. and fr. Jul–Oct.

Alpine scrub meadows, alpine meadows, rock crevices; 3000–5800 m. S Qinghai (Yushu Xian), W Sichuan, Xizang, W Yunnan (Dêqên Xian, Gongshan Drung-Nu Zu Zizhixian, Yangbi Xian) [Bhutan, India, Nepal, Sikkim].

132. *Saxifraga drabiformis* Franchet, Pl. Delavay. 235. 1890.

葶苈虎耳草 ting li hu er cao

Hirculus drabiformis (Franchet) Losinskaja.

Herbs perennial, caespitose, 6–9.5 cm tall. Shoots branched. Sterile branches with leaf rosettes. Flowering stem glabrous proximally, dark brown glandular hairy distally. Rosette leaves spatulate-oblanceolate, 5–6.2 ×

ca. 1.5 mm, carnose, glabrous, base gradually narrowed, apex subobtusate. Flowering stem leaves remote, narrowly obovate to oblong, 5.6–10 × 1.5–3 mm, largest near middle of stem, carnose, both surfaces glabrous on proximal leaves, margin dark brown glandular hairy on distal leaves, apex subobtusate. Flower solitary; pedicel 1.5–3 cm, sparsely dark brown glandular hairy. Sepals reflexed, broadly ovate to broadly subelliptic, abaxially and marginally sparsely dark brown glandular hairy, veins 5–7, partly or fully confluent at apex, apex obtuse or subacute. Petals yellow, broadly elliptic to broadly ovate, 7.3–8 × 5–6 mm, 4–6(–7)-callose, 3–6-veined, base contracted into a claw 0.8–1.1 mm, apex obtuse. Stamens 5.5–6 mm. Ovary superior, subglabrous, 3–3.6 mm in diam.; styles 1.2–1.9 mm. Fl. and fr. Jul–Sep.

• Rock crevices and screes; 3300–4900 m. NW Yunnan (Lijiang Naxi Zu Zizhixian, Zhongdian Xian).

133. *Saxifraga chrysanthoides* Engler & Irmischer, Notes Roy. Bot. Gard. Edinburgh 5: 145. 1912.

拟黄花虎耳草 ni huang hua hu er cao

Saxifraga chrysantha Franchet, Pl. Delavay. 236. 1890, not A. Gray (1877); *Hirculus chrysanthoides* (Engler & Irmischer) Losinskaja.

Herbs perennial, 1–3 cm tall. Shoots branched, with leaf rosettes. Flowering stem brown pilose. Rosette leaves suboblanceolate, ca. 6 × 1.5 mm, carnose, both surfaces glabrous, 3-veined, margin cartilaginous setose-ciliate distally, apex obtuse to acute, mucronate. Cauline leaves linear to narrowly oblanceolate, 4–8 × 1–1.3 mm, carnose, both surfaces glabrous, 3-veined, margin cartilaginous setose-ciliate distally, apex mucronate. Flower solitary; pedicel 5–10 mm, brown pilose. Sepals spreading to reflexed, oblong, 2.9–4 × ca. 1.5 mm, subcarnose, both surfaces glabrous, veins 5, confluent at apex, margin often setose-ciliate distally. Petals yellow, elliptic, 5–6 × 2–3 mm, not callose, 5-veined, base abruptly narrowed into a claw ca. 0.8 mm, apex obtuse. Stamens 2–3 mm. Ovary subsuperior, broadly ovoid, 2–2.5 mm; styles ca. 1 mm. Fl. Jul–Aug.

• Rock crevices and screes; 2700–5300 m. NW Yunnan (Lijiang Naxi Zu Zizhixian, Zhongdian Xian).

134. *Saxifraga filifolia* J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 29. 1933.

细叶虎耳草 xi ye hu er cao

Herbs perennial, 3–7 cm tall. Shoots branched, with leaf rosettes. Flowering stem glabrous or sparsely glandular hairy. Rosette leaves oblong to spatulate, 3–5 × 0.5–1 mm, carnose, both surfaces glabrous, margin setose-ciliate, apex mucronate. Cauline leaves few, remote, linear to narrowly obovate, 2–4 × 0.5–0.75 mm, carnose, both surfaces and margin glabrous, apex acute. Flower solitary; pedicel 1–2.5 cm, glabrous or sparsely glandular hairy. Sepals reflexed, 1.5–2.7 × 1–1.5 mm, subcarnose, both surfaces and margin glabrous, veins 3, confluent at apex. Petals yellow or orange, narrowly

elliptic, 6–7 × 1.5–2.5 mm, 3-veined, base tapered into a short claw ca. 0.25 mm, apex obtuse. Stamens 3–4 mm. Ovary subsuperior, broadly ovoid, ca. 2.5 × 2 mm; styles ca. 0.5 mm. Fl. Jul–Oct.

Mossy rocks and screes; 3000–4300 m. Xizang, Yunnan [Myanmar].

135. *Saxifraga llonakhensis* W. W. Smith, Rec. Bot. Surv. India 4(5): 192. 1911.

近加拉虎耳草 jin jia la hu er cao

Saxifraga stella-aurea J. D. Hooker & Thomson var. *ciliata* C. Marquand & Airy Shaw.

Herbs perennial, caespitose, 4.2–9 cm tall. Shoots branched, with leaf rosettes. Flowering stem dark brown glandular hairy. Rosette leaves oblanceolate-linear, 5.2–8 × ca. 1 mm, subcarnose, both surfaces glabrous or glandular or eglandular villous, margin and apex setose-villous, apex mucronate. Cauline leaves with leaf blade oblong to linear, 2.8–5 × 0.6–1.6 mm, carnose, both surfaces glabrous or dark brown glandular hairy, margin dark brown glandular ciliate, apex obtuse. Flower solitary, rarely cyme 2- or 3-flowered; pedicel slender, 0.8–1.5 cm, dark brown glandular villous. Sepals erect, broadly ovate to triangular-ovate, 2–2.5 × 1.2–2.3 mm, leathery, abaxially and marginally dark brown glandular hairy, veins 3–5, not confluent at apex. Petals yellow, obscurely orange-yellow spotted, pandurate-oblong, 6.2–9.2 × 2–3.1 mm, 4–6-callose, 3-veined, base usually rounded to cuneate, with a claw 0.2–1 mm, apex obtuse. Stamens ca. 4.5 mm. Ovary subsuperior, ovoid, ca. 2.1 mm; styles ca. 1.9 mm. Fl. and fr. Jul–Sep.

Picea forests, rock crevices; 3700–4600 m. E Xizang (Qamdo Xian, Riwoqê Xian, Zayü Xian), NW Yunnan (Gongshan Drung-Nu Zu Zizhixian) [N Myanmar, Nepal, Sikkim].

136. *Saxifraga miralana* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 254. 1960.

白毛茎虎耳草 bai mao jing hu er cao

Herbs perennial, 4–4.5 cm tall. Stem pale pilose. Basal leaves aggregated into a rosette; leaf blade spatulate, 5–6 × ca. 1.5 mm, carnose, both surfaces glabrous, margin setose-ciliate. Cauline leaves linear-oblong, 3–4.5 × ca. 1 mm, subcarnose, both surfaces glabrous, margin setose-ciliate, apex obtuse. Flower solitary; pedicel 1.1–2.5 cm, pale pilose. Sepals spreading or reflexed, ovate, ca. 2 × 1.5 mm, carnose, abaxially pale pilose or glabrous, adaxially and marginally glabrous, veins 3–5, partly or fully confluent at apex, apex obtuse. Petals yellow, proximally orange spotted, narrowly ovate to suboblong, 4.5–5.1 × ca. 2 mm, not or obscurely 2-callose, 3–5-veined, base contracted into a claw ca. 0.5 mm, apex acute. Stamens ca. 3.1 mm. Ovary subsuperior, ca. 2 mm; styles ca. 0.6 mm. Fl. Jul–Aug.

• Scrub, alpine meadows, screes, rock crevices; 4100–5100 m. E Xizang.

137. *Saxifraga baimashanensis* C. Y. Wu in C. Y. Wu & J. T. Pan, Acta Phytotax. Sin. 28: 62. 1990.

白马山虎耳草 *bai ma shan hu er cao*

Herbs perennial, caespitose, 3.5–4.5 cm tall. Shoots few branched, with leaf rosettes. Flowering stem pale crisped piliferous. Rosette leaves subspatulate, ca. 3.7 × 1.2 mm, subcarnose, both surfaces glabrous, margin cartilaginous setose-ciliate, apex mucronate. Cauline leaves spatulate-oblong, ca. 3.3 × 1 mm, carnose, both surfaces glabrous, margin cartilaginous setose-ciliate, apex mucronate. Flower solitary; pedicel slender, ca. 1.7 cm, pale pilose. Sepals spreading to reflexed, orbicular, ca. 2 mm, carnose, abaxially pale pilose, adaxially and marginally glabrous, veins 5, partly confluent at apex. Petals yellow, proximally orange spotted, ovate, ca. 4.6 × 2.3 mm, obscurely 2-callose, 5-veined, base with a claw ca. 0.3 mm, apex acute. Stamens ca. 3.4 mm. Ovary subsuperior, broadly ovoid, ca. 2 mm; styles ca. 1 mm. Fl. Jul–Aug.

• Alpine rock crevices; 4600–4700 m. NW Yunnan (Dêqên Xian, Lijiang Naxi Zu Zizhixian).

138. *Saxifraga draboides* C. Y. Wu in C. Y. Wu & J. T. Pan, *Acta Phytotax. Sin.* 28: 64. 1990.

中甸虎耳草 *zhong dian hu er cao*

Herbs perennial, laxly caespitose, 2.5–5 cm tall. Shoots branched. Sterile branches with terminal leaf rosettes. Flowering stem densely dark brown glandular hairy, proximally with a leaf rosette. Rosette leaves spatulate, 4–5 × 1.3–1.4 mm, carnose, both surfaces glabrous, margin sparsely setose-ciliate distally, apex mucronate. Cauline leaves above rosette leaves remote, suboblong or narrowly spatulate-obovate to spatulate, 3–6 × 1–2.3 mm, carnose, both surfaces glabrous or abaxially sparsely dark brown glandular hairy distally, margin dark brown glandular ciliate, apex obtuse. Flower solitary; pedicel 5–10 mm, dark brown glandular hairy. Sepals reflexed, subovate, abaxially convex, adaxially concave, 3–3.8 × 1.9–2 mm, abaxially dark brown glandular hairy, adaxially glabrous, veins 3–5, confluent into a verruca at apex, margin glandular ciliate, apex obtuse. Petals yellow, broadly elliptic or broadly ovate to broadly obovate, 5.5–8 × 4–5.1 mm, obscurely 2–8-callose, 3–7-veined, base contracted into a claw 1–1.1 mm, apex obtuse. Stamens 4.3–5 mm. Ovary superior, subglobose, 1.7–2.7 mm in diam.; styles 1.1–1.5 mm. Fl. and fr. Jul–Sep.

• Alpine rock crevices; 3800–4700 m. W Sichuan (Xiangcheng Xian, Xiaojin Xian), NW Yunnan (Zhongdian Xian).

139. *Saxifraga engleriana* H. Smith, *Repert. Spec. Nov. Regni Veg.* 20: 16. 1924.

藏南虎耳草 *zang nan hu er cao*

Saxifraga zangnanensis J. T. Pan.

Herbs perennial, 1.5–3.5 cm tall. Shoots branched. Flowering stem brown crisped villous. Cauline leaves clustered into a rosette near middle of stem, remote proximally and distally on stem, subspatulate or narrowly subobovate to broadly elliptic, 2.2–5.2 × 1–2.2 mm, carnose, both surfaces glabrous on proximal

leaves, margin proximally setose-ciliate on distal leaves, apex obtuse to subobtuse. Flower solitary; pedicel 4.1–7 mm, whitish crisped pilose. Sepals erect, then spreading, broadly ovate to subelliptic, abaxially convex, adaxially concave, 1.9–2.6 × 1.2–1.7 mm, carnose, glabrous, veins 3, confluent at apex, apex obtuse. Petals yellow, elliptic to broadly so, 3–4.1 × 2–2.5 mm, 2-callose, 3- or 4-veined, base with a claw 0.4–1 mm, apex obtuse. Stamens 2.5–4.2 mm. Ovary semi-inferior, broadly conical, 2.3–4 mm, with an annular nectary disc; styles 1.2–2 mm. Fl. Jun–Jul. $2n = 16$.

Alpine meadows, screes, rock crevices; 4100–4700 m. S Xizang [Bhutan, Nepal, Sikkim].

140. *Saxifraga contraria* H. Smith, *Bull. Brit. Mus. (Nat. Hist.), Bot.* 2: 252. 1960.

对叶虎耳草 *dui ye hu er cao*

Herbs perennial, caespitose, 1–5 cm tall. Shoots many branched. Flowering stem glabrous proximally, white pilose distally. Leaves opposite, occasionally some alternate on young shoots, aggregated into a rosette; leaf blade elliptic, ca. 2 × 1.1 mm, carnose, both surfaces glabrous, margin glabrous, occasionally setose-ciliate, apex obtuse. Flower solitary; bracts 2, opposite, elliptic, ca. 2 × 1 mm, carnose, margin usually glabrous, apex obtuse; pedicel 1–5 mm, white pubescent; hypanthium scrotiform at base. Sepals spreading, subovate, 1.5–1.8 × 1–1.5 mm, carnose, glabrous, veins 3, not confluent at apex, apex obtuse. Petals yellow, narrowly ovate to elliptic, 2–3.5 × 1–1.3 mm, 2-callose near base, 3-veined, base contracted into a claw ca. 0.5 mm, apex retuse. Stamens ca. 2 mm. Ovary semi-inferior, broadly ovoid, ca. 1.4 mm, with a lobed, annular nectary disc; styles ca. 0.5 mm. Fl. Jul–Aug.

Rocky hillsides, alpine rock crevices; 4200–4800 m. S Xizang (Lhasa Shi, Mainling Xian) [Bhutan, Nepal].

141. *Saxifraga atuntsiensis* W. W. Smith, *Notes Roy. Bot. Gard. Edinburgh* 8: 132. 1913.

阿墩子虎耳草 *a dun zi hu er cao*

Hirculus crassulifolius (Engler) Losinskaja; *Saxifraga crassulifolia* Engler.

Herbs perennial, caespitose, forming cushions, 0.5–2 cm tall. Shoots branched. Flowering stem glabrous proximally, glandular hairy distally. Cauline leaves aggregated into a rosette, spatulate, 3.5–4 × 1.6–1.8 mm, carnose, glabrous, 3-veined, apex obtuse, triquetrous; distal leaves remote, suboblong, 4.3–5.4 × 1–2 mm, glabrous, 5-veined, apex obtuse. Flower solitary; pedicel slender, 4–6 mm, glandular hairy. Sepals reflexed, suboblong, 1–1.5 × ca. 0.7 mm, subcarnose, glabrous, veins 3, confluent at apex, apex obtuse. Petals yellow, elliptic to ovate, 2–3 × ca. 1 mm, obscurely 4-callose, 3- or 4-veined, base contracted into a claw ca. 0.5 mm, apex obtuse or acute. Stamens 1.5–2.5 mm.

Ovary subsuperior, broadly ovoid, ca. 1.5 mm; styles 0.5–1 mm. Fl. Jul–Aug.

• Alpine meadows, rock crevices; 4300–5200 m. N and W Sichuan (Daocheng Xian, Kangding Xian, Songpan Xian), NW Yunnan (Dèqên Xian).

142. *Saxifraga gemmiger* Engler in Diels, Bot. Jahrb. Syst. 29: 366. 1900.

芽虎耳草 ya hu er cao

Herbs perennial, caespitose, 4.5–17 cm tall. Stem simple or branched, with leaf rosettes. Flowering stem glabrous proximally, glandular hairy distally, with axillary leaf buds. Bud scales subspatulate to obovate, 1.4–2 × ca. 1 mm, carnos, glabrous or sparsely ciliate. Rosette leaves obovate to subspatulate, 3–5 × 1–2 mm, carnos, both surfaces glabrous, margin sparsely cartilaginous setose-ciliate, apex obtuse or mucronate. Cauline leaves ovate or narrowly so to oblong-linear, 3–6.5 × 1–2 mm, leathery, both surfaces glabrous on proximal and sometimes also median leaves, abaxially glandular hairy on distal leaves, margin glandular ciliate or setose-ciliate, apex cartilaginous mucronate. Flower solitary; pedicel slender, 1–1.8 cm, glandular hairy. Sepals reflexed, ovate to broadly so, 1.5–2 × 1–2 mm, carnos, abaxially glandular hairy, adaxially and marginally glabrous, veins 3–5, not confluent at apex, apex subacute. Petals yellow, elliptic to subovate or narrowly ovate, 4–4.6 × 1.4–3 mm, not callose or 2-callose, 3- or 4-veined, base contracted into a claw 0.5–1 mm, apex obtuse. Stamens 2.5–3.5 mm. Ovary subsuperior, ovoid to subovoid, ca. 2 mm; styles ca. 0.5 mm. Fl. and fr. Jun–Sep.

• Alpine meadows, rock crevices by streams; 3100–4700 m. Gansu, Qinghai, S Shaanxi, Sichuan.

- 1a. Cauline leaves narrowly ovate to oblong-linear; petals narrowly ovate 142a. var. *gemmigera*
 1b. Cauline leaves ovate; petals elliptic to subovate 142b. var. *gemmauligera*

142a. *Saxifraga gemmiger* var. *gemmigera*

芽虎耳草(原变种) ya hu er cao (yuan bian zhong)

Hirculus gemmiger (Engler) Losinskaja.

Cauline leaves narrowly ovate to oblong-linear, 5.1–6.5 mm, margin setose-ciliate or glandular ciliate. Petals narrowly ovate, ca. 4 × 1.4–1.5 mm, not callose, 3-veined, base contracted into a claw 0.9–1 mm.

• Alpine meadows; 3100–3700 m. S Shaanxi (Miaowang Shan, Taibai Shan).

142b. *Saxifraga gemmiger* var. *gemmauligera* (Engler) J. T. Pan & Gornall in Gornall et al., Novon 10: 376. 2000.

小芽虎耳草 xiao ya hu er cao

Saxifraga unguiculata Engler var. *gemmauligera* Engler in Maximowicz, Bull. Acad. Imp. Sci. Saint-Pétersbourg, Sér. 3, 29: 116. 1883; *Hirculus gemmauliger* (Engler) Losinskaja; *Saxifraga gemmauligera* (Engler) Engler.

Cauline leaves ovate, 3–4.8 × 1–1.7 mm, margin glandular ciliate. Petals elliptic to subovate, 4.4–4.6 × 2.9–3 mm, usually 2-callose, 3- or 4-veined, base contracted into a claw ca. 0.5 mm.

• Alpine meadows, rock crevices by streams; 3500–4700 m. Gansu, Qinghai, Sichuan.

143. *Saxifraga medogensis* J. T. Pan, Acta Phytotax. Sin. 28: 392. 1990.

墨脱虎耳草 mo tuo hu er cao

Herbs perennial, ca. 4.5 cm tall. Stem glabrous proximally, dark brown shortly glandular hairy distally. Leaves aggregated, ensiform, 2.8–3 × 0.8–1 mm, carnos, both surfaces glabrous, margin sparsely glandular ciliate, apex acute. Flower solitary; pedicel slender, ca. 2 cm, sparsely dark brown shortly glandular hairy. Sepals reflexed, ovate, ca. 2 × 1 mm, carnos, abaxially sparsely glandular pubescent, adaxially and marginally glabrous, veins 3, confluent into a verruca at apex, apex acute. Petals yellow, ovate to narrowly so, 4.2–4.4 × 2–2.6 mm, 4- or 5-callose, 3-veined, base contracted into a claw ca. 1 mm, apex acute. Stamens 3.4–3.9 mm. Ovary superior, ovoid, ca. 2.6 mm; styles ca. 0.6 mm. Fl. and fr. Jul–Sep.

• Scrub meadows; ca. 3700 m. SE Xizang (Médog Xian).

144. *Saxifraga nanelloides* C. Y. Wu in C. Y. Wu & J. T. Pan, Acta Phytotax. Sin. 28: 62. 1990.

拟光缘虎耳草 ni guang yuan hu er cao

Herbs perennial, sparsely caespitose, 2.5–3 cm tall. Shoots branched. Sterile branches with terminal leaf rosettes. Flowering stem brown glandular hairy distally. Flowering stem leaves narrowly oblanceolate, 4.5–6.3 × 0.7–1 mm, carnos, both surfaces glabrous, apex obtuse, glabrous; proximal leaves remote, smaller, margin setose-ciliate; distal leaves arranged in a dense rosette, larger, margin glandular ciliate. Flower solitary; pedicel 1–1.8 cm, brown glandular hairy. Sepals reflexed, subelliptic, ca. 3.4 × 1.7 mm, carnos, glabrous, veins 3–5, confluent into a verruca at apex, apex obtuse. Petals yellow, ovate to elliptic, ca. 5.6 × 3–3.1 mm, 3–5-callose, 3–5-veined, base contracted into a claw ca. 0.4 mm, apex subacute. Stamens ca. 3.5 mm. Ovary superior, ca. 2.7 mm; styles ca. 1.8 mm. Fl. Jul–Aug.

• Alpine rock crevices; ca. 4000 m. NW Yunnan (Dèqên Xian).

145. *Saxifraga prattii* Engler & Irmscher, Bot. Jahrb. Syst. 50(Beibl. 114): 44. 1914.

康定虎耳草 kang ding hu er cao

Herbs perennial, sparsely caespitose, 2.5–6 cm tall. Shoots subterranean, creeping, short, slender; cataphylls obovate, 1–1.5 mm. Sterile branches 1.5–2.5 cm; cataphylls remote, obovate to oblong-obovate, 1–2 mm; terminal leaves aggregated into a rosette, shortly spatulate, margin ciliate. Flowering stem glabrous or glandular hairy distally. Proximal cauline leaves smaller than distal ones, margin ciliate, apex reflexed; distal leaves spatulate, 2–5 × 1.2–1.7 mm, apex obtuse

or acute. Cyme 2-flowered or flower solitary; pedicels 2–2.5 cm, glabrous or black glandular hairy. Sepals spreading to reflexed, broadly ovate, 1.5–2 mm, glabrous or abaxially and marginally \pm glandular hairy, veins 3–7, confluent into a verruca at apex, apex rounded. Petals yellow, obovate or ovate, 6–7 \times 3–4 mm, 5–8-veined, base cuneate or with a claw ca. 0.2 mm, apex subacute. Stamens 3–4.5 mm. Ovary subsuperior, ovoid; styles short. Fl. Jul–Aug.

• Subalpine and alpine regions, rock crevices on slopes; 2500–5300 m. W Sichuan, Xizang, Yunnan.

- 1a. Flowering stem and pedicels sparsely glandular hairy or glabrous; sepals 5–7-veined; petals obovate, base cuneate 145a. var. *prattii*
1b. Flowering stem and pedicels densely glandular hairy; sepals 3–5-veined; petals ovate, base with a claw ca. 0.2 mm 145b. var. *obtusata*

145a. *Saxifraga prattii* var. *prattii*

康定虎耳草(原变种) kang ding hu er cao (yuan bian zhong)

Hirculus prattii (Engler & Irmscher) Losinskaja.

Flowering stem and pedicels sparsely glandular hairy or glabrous. Sepals sparsely glandular hairy or glabrous, 5–7-veined. Petals obovate, 8-veined, base cuneate. Fl. Jul–Aug.

• Subalpine and alpine regions; 2500–4000 m. W Sichuan, Xizang, Yunnan.

145b. *Saxifraga prattii* var. *obtusata* Engler, Repert. Spec. Nov. Regni Veg. Beih. 12: 398. 1922.

毛茎虎耳草 mao jing hu er cao

Flowering stem distally and pedicels densely glandular hairy. Sepals \pm glandular hairy abaxially and marginally, 3–5-veined. Petals ovate, 5–7-veined, base with a claw ca. 0.2 mm. Fl. Jul–Aug.

• Rock crevices on slopes; 4200–5300 m. W Sichuan, E Xizang (Qamdo Xian).

One of the present authors (Ohba) believes that this variety is not separable from typical *Saxifraga prattii*.

146. *Saxifraga carnosula* Mattfeld, Notizbl. Bot. Gart. Berlin-Dahlem 11: 305. 1931.

肉质虎耳草 rou zhi hu er cao

Herbs perennial, caespitose, 7–12 cm tall. Shoots few branched, with leaf rosettes. Flowering stem slender, glabrous, leafy. Shoot leaves spatulate, ca. 5.5 \times 1.5 mm, carnose, glabrous, 3-veined. Cauline leaves oblong-linear, 5.5–11.5 \times 1–2 mm, subcarnose, both surfaces glabrous, 3-veined, margin setose-ciliate, apex obtuse. Flower solitary or cyme 2-flowered; pedicels slender, 1.4–2.7 cm, glabrous. Sepals spreading to reflexed, ovate to subelliptic, 1.4–2.5 \times 0.6–1.4 mm, carnose, glabrous, veins 3 or 4, not confluent at apex, apex subobtuse or acute. Petals yellow, narrowly ovate to suboblong, 3.9–6 \times 1.9–2.2 mm, 2-callose near base, 3-veined, base contracted into a claw 0.6–1 mm, apex subobtuse. Stamens 4.5–5.4 mm. Ovary subsuperior,

ovoid to ellipsoid, 2–3.5 mm; styles divergent, 1.5–1.7 mm. Fl. and fr. Jun–Sep.

• Forests, alpine scrub, rock crevices; 3000–4900 m. W Sichuan, NW Yunnan (Dêqên Xian).

This species is possibly not distinct from *Saxifraga prattii*.

147. *Saxifraga dshagalensis* Engler, Repert. Spec. Nov. Regni Veg. Beih. 12: 398. 1922.

无爪虎耳草 wu zhao hu er cao

Saxifraga prattii Engler & Irmscher var. *trinervia* Engler.

Herbs perennial, caespitose, 4.5–7.5 cm tall. Shoots branched, with leaf rosettes. Flowering stem glabrous proximally, dark brown glandular hairy distally. Rosette leaves spatulate, ca. 5 \times 1.7 mm, both surfaces glabrous, margin setose-ciliate, apex acute. Cauline leaves narrowly oblong or ensiform- to spatulate-oblong, 6.6–8.2 \times 1.2–1.6 mm, both surfaces glabrous or distal leaves abaxially sparsely brown glandular hairy, margin setose-ciliate on proximal leaves, dark brown glandular ciliate on distal leaves, apex acute, mucronate. Flower solitary or cyme 2-flowered; pedicels 0.7–2.2 cm, dark brown glandular hairy. Sepals erect, then spreading, subovate, 2.4–2.5 \times 1.9–2 mm, abaxially sparsely dark brown glandular hairy, adaxially and marginally glabrous, veins 4 or 5, not or partly confluent at apex, apex obtuse or acute. Petals yellow, proximally orange spotted adaxially, suboblong, 5.1–6.9 \times 2.3–2.9 mm, obscurely 2-callose near base, 3–5-veined, base clawless, apex obtuse or acute. Stamens ca. 3.6 mm. Ovary subsuperior, 2.5–3 mm; styles ca. 1 mm. Fl. Jul–Aug.

• Alpine rock crevices; 5000–5600 m. W Sichuan (Batang Xian, Litang Xian), C and E Xizang (Amdo Xian, Dêngqên Xian, Xainza Xian).

148. *Saxifraga nanella* Engler & Irmscher, Bot. Jahrb. Syst. 50(Beibl. 144): 44. 1914.

光缘虎耳草 guang yuan hu er cao

Herbs perennial, caespitose, 1.2–4 cm tall. Shoots branched, sometimes forming cushions. Flowering stem brown glandular hairy. Shoots with terminal leaves aggregated into a rosette. Leaves subspatulate to suboblong or subovate, 3–8 \times 1.5–3 mm, subcarnose, both surfaces glabrous, margin glandular ciliate, glabrous, or proximally sparsely setose-ciliate, apex obtuse, glabrous. Flower solitary or cyme 2–5-flowered; pedicels glandular hairy or glabrate. Sepals spreading to reflexed, ovate to broadly so, 1.5–2.5 \times 1.2–2 mm, carnose, abaxially glandular hairy or glabrous, adaxially and marginally glabrous, veins 3–5, partly or fully confluent at apex, apex obtuse. Petals yellow, proximally orange spotted, elliptic to ovate, 4.1–5 \times 2–2.2 mm, 2-callose or not callose near base, 5-veined, base with a claw 0.5–0.6 mm, apex obtuse or acute. Stamens ca. 3.5 mm. Ovary subsuperior, broadly ovoid, ca. 3 mm; styles ca. 1 mm. Fl. Jul–Aug.

Alpine meadows, alpine scrub meadows, rock crevices; 3000–5800 m. Qinghai, S Xinjiang, Xizang, NW Yunnan [Nepal].

The following two varieties are possibly not distinct.

- 1a. Pedicel glandular hairy; sepals glandular hairy abaxially 148a. var. *nanella*
1b. Pedicel glabrate; sepals glabrous on both surfaces 148b. var. *glabrisepala*

148a. *Saxifraga nanella* var. *nanella*

光缘虎耳草(原变种) *guang yuan hu er cao* (*yuan bian zhong*)

Shoots branched. Leaf blade subspatulate to suboblong, both surfaces glabrous, margin glandular ciliate, apex obtuse, glabrous. Pedicel glandular hairy. Sepals glandular hairy abaxially, glabrous adaxially and marginally. Fl. Jul–Aug.

Alpine meadows, alpine scrub meadows, rock crevices; 3000–5800 m. Qinghai, S Xinjiang, Xizang, NW Yunnan (Gongshan Drung-Nu Zu Zizhixian) [Nepal].

148b. *Saxifraga nanella* var. *glabrisepala* J. T. Pan in C. Y. Wu, Fl. Xizang. 2: 503. 1985.

秃萼虎耳草 *tu e hu er cao*

Shoots sometimes crowded, forming cushions. Leaf blade subovate, both surfaces glabrous, margin glabrous or proximally sparsely setose-ciliate. Pedicel glabrate. Sepals glabrous on both surfaces. Fl. Jul–Aug.

• Alpine meadows, rock crevices; 4200–4900 m. E and S Xizang.

149. *Saxifraga glacialis* H. Smith, Acta Horti Gothob. 1: 14. 1924.

冰雪虎耳草 *bing xue hu er cao*

Hirculus glacialis (H. Smith) Losinskaja; *Saxifraga glacialis* var. *rubra* J. Anthony; *S. vilmoriniana* Engler & Irmscher var. *yunngningensis* Handel-Mazzetti.

Herbs perennial, caespitose, 2.3–7 cm tall. Stem glabrous, with leaf rosettes. Rosette leaves spatulate to spatulate-lanceolate, 4.5–10 × 1.2–2.3 mm, carnose, both surfaces glabrous, margin glabrous or sparsely setose-ciliate, apex rounded. Cauline leaves remote, ensiform, 4–6.6 × 1–1.5 mm, carnose, glabrous. Cyme 2–6-flowered or flower solitary; pedicels slender, 4–15 mm, glabrous. Sepals spreading, ovate, 1.5–3 × 1–2 mm, carnose, glabrous, veins 3, confluent or not at apex, apex obtuse. Petals yellow or abaxially purple and adaxially yellow, elliptic or ovate to narrowly so, 3–5 × 1.5–2.5 mm, 2-callose, 3-veined, base tapered into a claw 0.5–1 mm, apex obtuse or acute. Stamens 3–4 mm. Ovary subsuperior, dark purple, broadly ovoid, ca. 2.5 mm; styles ca. 2 mm. Fl. and fr. Jul–Sep.

• Alpine meadows, rock crevices; 4100–5000 m. SE Qinghai (Jigzhi Xian), N and W Sichuan, NW Yunnan (Weixi Xian).

150. *Saxifraga flexilis* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 134. 1913.

曲茎虎耳草 *qu jing hu er cao*

Saxifraga rupinarum J. Anthony.

Herbs perennial, caespitose, 4–8.5 cm tall. Shoots branched, with leaf rosettes. Flowering stem glabrous. Rosette leaves spatulate, 5.5–7 × 1.5–2 mm, subcarnose, both surfaces glabrous, margin sparsely setose-ciliate, apex mucronate. Cauline leaves oblong-linear, 5.7–5.9 × 1–2 mm, subcarnose, margin distally setose-ciliate on proximal leaves, glabrous on distal leaves, apex mucronate. Flower solitary or cyme 2- or 3-flowered; pedicels slender, flexuous, 0.7–3.1 cm, glabrous. Sepals spreading to reflexed, ovate to broadly so, 2–2.5 × 1.4–2 mm, glabrous, veins 3–5, not, partly, or fully confluent at apex, apex obtuse or acute. Petals yellow, proximally spotted, elliptic to oblong, 5–7 × 2–3 mm, obscurely 2-callose, 3–5-veined, base tapered into a claw 0.5–0.8 mm, apex obtuse or acute. Stamens ca. 4.5 mm. Ovary subsuperior, broadly ovoid, 2–2.9 mm; styles 0.8–1 mm. Fl. and fr. Jul–Sep.

• Alpine scrub meadows, alpine meadows, alpine lakesides, screes, rock crevices; 4100–4700 m. SW Sichuan, NW Yunnan.

151. *Saxifraga tatsienluensis* Engler, Repert. Spec. Nov. Regni Veg. Beih. 12: 398. 1922.

打箭虎耳草 *da jian lu hu er cao*

Herbs perennial, 5.5–9 cm tall. Stem sparsely glandular hairy, proximally sometimes with glands deciduous. Proximal cauline leaves subspatulate, 4.5–5 × 1.3–1.5 mm, subcarnose, both surfaces glabrous, margin cartilaginous setose-ciliate distally, apex obtuse; median leaves lanceolate to linear-lanceolate, 4.7–5 × 1–1.5 mm, glabrous except sparsely cartilaginous setose at apex; most distal leaf narrowly ovate, ca. 4.6 × 1.9 mm, abaxially and marginally sparsely glandular hairy, apex acute, cartilaginous mucronate. Cymes 2–4-flowered or flower solitary; pedicels slender, 1.3–2.3 cm, sparsely glandular hairy. Sepals spreading, ovate to broadly so, 2.1–2.3 × 1.6–1.8 mm, subcarnose, abaxially sparsely glandular hairy, veins 4 or 5, not confluent at apex, margin glandular ciliate or glabrous, apex subacute. Petals yellow, narrowly ovate to suboblong, 6.2–6.7 × 2.5–2.8 mm, 2-callose near base, 3-veined, base contracted into a claw 0.8–1 mm, apex subobtuse or acute. Stamens ca. 4 mm. Ovary subsuperior, ovoid, ca. 2 mm; styles ca. 1 mm. Fl. and fr. Jul–Sep.

• Rock crevices; 3800–4000 m. W Sichuan (Kangding Xian).

152. *Saxifraga uninervia* J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 31. 1933.

单脉虎耳草 *dan mai hu er cao*

Herbs perennial, 3–4 cm tall. Shoots branched. Flowering stem glabrous. Proximal leaves reduced toward median cluster of rosette leaves, narrowly obovate, 5–8 × 1–2 mm, carnose, both surfaces and margin glabrous, apex obtuse. Cauline leaves narrowly obovate, 6–8 × 1–2 mm, carnose, both surfaces and margin glabrous, apex obtuse. Flower solitary or cyme 2–4-flowered; pedicels ca. 3 mm, glabrous. Sepals erect or spreading, ovate, 2.5–3 × 1.5–2 mm, glabrous, veins 3, confluent at apex, apex obtuse. Petals yellow, elliptic,

4–5 × 2.5 mm, 1-veined, base tapered into a short claw, apex obtuse. Stamens ca. 2.5 mm. Ovary subsuperior, ovoid, ca. 2 mm; styles divergent, ca. 2 mm. Fl. Aug.

• Rocks, cliffs; ca. 5000 m. Yunnan.

153. *Saxifraga aurantiaca* Franchet, Pl. Delavay. 236. 1890.

橙黄虎耳草 cheng huang hu er cao

Hirculus confertifolius (Engler & Irmscher) Losinskaja; *H. gatogombensis* (Engler) Losinskaja; *Saxifraga biflora* T. C. Ku (1989), not Allioni (1785), nor Ledebour (1844); *S. confertifolia* Engler & Irmscher; *S. confertifolia* var. *glabrifolia* Engler & Irmscher; *S. gatogombensis* Engler; *S. wangiana* Zhmylev.

Herbs perennial, caespitose, 4–10.5 cm tall. Shoots branched, with leaf rosettes. Flowering stem branched, brown glandular hairy, leafy. Rosette leaves elliptic to spatulate-oblong, 3–6 × 1–1.6 mm, carnose, glabrous on both surfaces or abaxially sparsely setose, margin setose-ciliate, apex acute, mucronate. Cauline leaves oblong or lanceolate to linear, 4–7 × 0.5–2 mm, largest near middle of stem, carnose, both surfaces glabrous, margin eglandular ciliate on proximal leaves, glandular ciliate on distal leaves, sparsely setose-ciliate near apex, apex obtuse or acute, mucronate. Cyme 2–12-flowered, occasionally flower solitary; pedicels slender, 0.6–1.7 cm, proximally dark brown glandular hairy. Sepals reflexed, ovate, 1.4–2.3 × 1–1.4 mm, carnose, glabrous or sparsely glandular hairy, veins 3, not confluent at apex, apex obtuse or acute. Petals yellow, proximally purple or orange spotted, ovate to suboblong, 3.3–5.9 × 1.5–2.6 mm, 2-callose near base, 3–5-veined, base narrowed into a claw 0.3–1 mm, apex obtuse or acute. Stamens 1.5–4 mm. Ovary subsuperior, broadly ovoid, 1.5–2.2 mm; styles 0.3–1.5 mm. Fl. and fr. Jul–Sep.

• Alpine meadows, rock crevices; 3000–4200 m. W Sichuan, C Shaanxi (Hua Xian, Mei Xian), NW Yunnan.

154. *Saxifraga densifoliata* Engler & Irmscher, Bot. Jahrb. Syst. 48: 570. 1912.

密叶虎耳草 mi ye hu er cao

Herbs perennial, 4.5–10 cm tall. Stem dark brown glandular pilose, often eglandular pilose proximally. Proximal cauline leaves subspatulate, 3–4.4 × 1–1.5 mm, carnose, both surfaces glabrous, margin setose-ciliate; median leaves aggregated, narrowly oblong, ca. 8 × 1.7 mm, both surfaces glabrous, margin setose-ciliate, apex mucronate; distal leaves remote, narrowly lanceolate, ca. 7 × 1.5 mm, both surfaces glabrous or glandular hairy distally, margin glandular ciliate, apex acute. Cyme 2–7-flowered; pedicels slender, dark brown glandular hairy. Sepals reflexed or spreading, ovate or subovate, 1.5–2.5 × 1–1.3 mm, abaxially glandular hairy, veins 3, not confluent at apex, margin sparsely glandular ciliate proximally, apex obtuse and erose or acute. Petals yellow, proximally obscurely orange spotted, oblong, 6–6.5 × 1.5–2 mm, 4-callose or not callose, 3-veined, base contracted into a claw ca. 0.5 mm, apex acute.

Stamens 4–4.5 mm. Ovary subsuperior, ellipsoid, ca. 2 mm; styles ca. 1.1 mm. Fl. Jun–Aug.

• *Cupressus* forests, alpine meadows, rock crevices; 4000–4500 m. NC and W Sichuan, S Xizang, NW Yunnan.

1a. Sepals reflexed, apex obtuse, erose; petals 4-callose 154a. var. *densifoliata*

1b. Sepals spreading, apex acute; petals not callose 154b. var. *nedongensis*

154a. *Saxifraga densifoliata* var. *densifoliata*

密叶虎耳草(原变种) mi ye hu er cao (yuan bian zhong)

Hirculus densifoliatius (Engler & Irmscher) Losinskaja.

Sepals reflexed, apex obtuse, erose. Petals 4-callose. Fl. Jun–Aug.

• Alpine meadows, rock crevices; 4100–4500 m. NC and W Sichuan (Kangding Xian, Li Xian, Maowen Qiang Zu Zizhixian), NW Yunnan (Zhongdian Xian).

154b. *Saxifraga densifoliata* var. *nedongensis* J. T. Pan in C. Y. Wu, Fl. Xizang. 2: 473. 1985.

乃东虎耳草 nai dong hu er cao

Sepals spreading, apex acute. Petals not callose. Fl. Jul–Aug.

• *Cupressus* forests; ca. 4000 m. S Xizang (Nêdong Xian).

155. *Saxifraga unguiculata* Engler, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 29: 115. 1883.

爪瓣虎耳草 zhao ban hu er cao

Herbs perennial, caespitose, 2.5–13.5 cm tall. Shoots branched, with leaf rosettes. Flowering stem leafy, proximally glabrous, distally brown glandular pilose. Rosette leaves spatulate to narrowly subobovate, 4.5–8 × ca. 1.5 mm, subcarnose, both surfaces usually glabrous, margin setose-ciliate or glabrous, apex mucronate. Cauline leaves remote, oblong or lanceolate to ensiform, 4.4–15 × 1–2.3 mm, carnose, both surfaces usually glabrous, rarely sparsely glandular hairy abaxially, margin glandular or eglandular ciliate, apex mucronate. Flower solitary, or cyme corymbose, 2–8-flowered, 2–6 cm; pedicels slender, 0.3–3 cm, brown glandular hairy. Sepals erect, then spreading to reflexed, ovate to narrowly so, 1.5–3 × 1–2.1 mm, carnose, abaxially brown glandular hairy, adaxially glabrous, veins 3–5, not, partly, or fully confluent at apex, margin glabrous or ± glandular ciliate, apex obtuse or acute. Petals yellow, proximally orange spotted, narrowly ovate, subelliptic, or oblong to lanceolate, 4.5–7.5 × 1.5–2.9 mm, 1- or 2-callose near base, sometimes obscurely so, or not callose, 3–7-veined, base with a claw 0.1–1 mm, apex subobtusely or acute. Stamens 2.8–4.3 mm. Ovary subsuperior, broadly ovoid, 2.3–3.8 mm; styles 0.5–2 mm. Fl. and fr. Jul–Sep.

• Forests, scrub, alpine meadows, rock crevices; 1800–5600 m. S Gansu, WC Hebei, Qinghai, Nei Mongol, Ningxia, N Shanxi, W Sichuan, Xizang, NW Yunnan.

The *Saxifraga unguiculata* / *S. vilmoriniana* complex requires further examination. The chief distinctions between the two taxa are supposed to lie in plant height, cauline leaf shape, and petal base shape. Plant height varies enormously and cannot be used to distinguish the taxa. Similarly, cauline leaf shape is variable, and the distinction is at best subtle: oblong in *S. unguiculata* but narrowly linear in *S. vilmoriniana*, according to Engler and Irmscher (in Engler, Pflanzenr. 67(IV. 117. I): 142, 149. 1916). The difference in petal base shape is perhaps worthy of more consideration: abruptly contracted into a claw in *S. unguiculata* but cuneate in *S. vilmoriniana*. However, the occurrence of intermediates makes even this distinction unclear and, in one of the syntype collections of *S. vilmoriniana* (Pratt 575, BM, E, GH, K), the petals are basally contracted into a claw. The two taxa are united in the present account because a satisfactory key to distinguish them could not be written. It should also be noted that *S. unguiculata* var. *limprichtii* may deserve recognition as a distinct species because of the differences in basal leaf morphology, usually fewer flowers, and associated, distinct geographical distribution.

- 1a. Margin of rosette leaves setose-ciliate 155a. var. *unguiculata*
 1b. Margin of rosette leaves usually glabrous 155b. var. *limprichtii*

155a. *Saxifraga unguiculata* var. *unguiculata*

爪瓣虎耳草(原变种) zhao ban hu er cao (yuan bian zhong)

Hirculus unguiculatus (Engler) Losinskaja; *H. vilmorinianus* (Engler & Irmscher) Losinskaja; *Saxifraga aurantiaca* Franchet f. *lanceolata* T. C. Ku; *S. serpyllifolia* Pursh var. *pallasiana* Hance; *S. unguiculata* f. *auctiflora* (Engler) Engler & Irmscher; *S. unguiculata* var. *auctiflora* Engler; *S. unguiculata* var. *auctiflora* subvar. *aurea* Engler; *S. unguiculata* var. *subglabra* Engler; *S. vilmoriniana* Engler & Irmscher. Margin of rosette leaves setose-ciliate. Sepals brown glandular hairy abaxially, glabrous adaxially and marginally. Fl. Jul–Aug.

• Forests, scrub, alpine meadows, rock crevices; 3000–5600 m. S Gansu, Nei Mongol, Qinghai, W Sichuan, Xizang, NW Yunnan.

155b. *Saxifraga unguiculata* var. *limprichtii* (Engler & Irmscher) J. T. Pan, Fl. Reipubl. Popularis Sin. 34(2): 178. 1992.

五台虎耳草 wu tai hu er cao

Saxifraga limprichtii Engler & Irmscher, Notizbl. Bot. Gart. Berlin-Dahlem 6: 36. 1913; *Hirculus limprichtii* (Engler & Irmscher) Losinskaja.

Margin of rosette leaves usually glabrous. Sepals usually ± glandular ciliate at margin. Fl. Jul–Aug.

• Rock crevices on slopes; 1800–3300 m. WC Hebei (Xiaowutai Shan), Ningxia (Helan Shan, Jingyuan Xian), N Shanxi (Wutai Shan).

156. *Saxifraga pellucida* C. Y. Wu in C. Y. Wu & J. T. Pan, Acta Phytotax. Sin. 28: 61. 1990.

透明虎耳草 tou ming hu er cao

Herbs 9–20 cm tall. Stem slender, brown glandular hairy. Basal leaves caducous, when present aggregated

into a rosette; leaf blade spatulate, 4.5–5 × 1.2–1.5 mm, margin setose-ciliate. Proximal cauline leaves with petiole 1–1.5 mm, glandular hairy; leaf blade narrowly elliptic or sublinear-oblong to linear-oblong, 6.5–8.5 × 1.5–2 mm, glandular hairy, apex acute; distal leaves sessile, suboblongate, ca. 8.5 × 3 mm, glandular hairy, base cuneate, apex acute. Cyme 2–7-flowered; pedicels slender, 1.7–3 cm, glandular pilose. Sepals reflexed, elliptic, 1.9–2 × ca. 1 mm, abaxially and at distal margin sparsely glandular hairy, veins 3, not confluent at apex, apex obtuse. Petals yellow, proximally orange spotted, elliptic to pandurate-obovate, 4–6 × 1.8–2.5 mm, 4-callose near base, 3-veined, base contracted into a claw 0.4–0.9 mm, apex obtuse. Stamens ca. 3.6 mm. Ovary subsuperior, subellipsoid, ca. 2 mm; styles ca. 1 mm. Fl. and fr. Jul–Sep.

• Oak forests, alpine meadows; 2700–3400 m. Xizang, NW Yunnan (Dêqên Xian).

157. *Saxifraga taraktophylla* C. Marquand & Airy Shaw in C. Marquand, J. Linn. Soc., Bot. 48: 182. 1929.

线叶虎耳草 xian ye hu er cao

Herbs perennial, caespitose, 12–15 cm tall. Sterile branches with leaf rosettes. Flowering stem dark brown glandular hairy distally. Sterile branch rosette leaves spatulate-linear, 8–9.7 × ca. 1 mm, both surfaces glabrous, margin setose-ciliate. Proximal cauline leaves aggregated into a rosette; leaf blade narrowly obovate, ca. 5 × 1.7 mm, abaxially setose distally and at margin; distal leaves sometimes forming a secondary rosette subtending inflorescence, leaf blade linear, 6–7.6 × 1.1–1.5 mm, adaxially and marginally ± glandular hairy. Cyme 2.5–6.9 cm, 2–7-flowered or flower solitary; pedicels slender, 1.5–2.2 cm, sparsely dark brown glandular hairy. Sepals reflexed, ovate, ca. 2 × 1.2 mm, glabrous, veins 3, not confluent at apex, apex subobtuse. Petals yellow, oblong, ca. 6.1 × 2.1–2.2 mm, 2-callose near base, glabrous, 3-veined, base contracted into a claw ca. 0.9 mm, apex acute. Stamens ca. 3.9 mm. Ovary subsuperior, ovoid, ca. 2 mm; styles ca. 1.8 mm. Fl. and fr. Jul–Sep.

• Oak forests, rock crevices; 3500–3900 m. E Xizang (Gonjo Xian, Nyingchi Xian).

158. *Saxifraga gyalana* C. Marquand & Airy Shaw in C. Marquand, J. Linn. Soc., Bot. 48: 177. 1929.

加拉虎耳草 jia la hu er cao

Herbs perennial, caespitose, 5–9 cm tall. Shoots branched, with leaf rosettes. Flowering stem dark brown glandular hairy. Rosette leaves oblanceolate- to spatulate-linear, 5–8.6 × 1–1.7 mm, subcarnose, setose abaxially distally, adaxially, and marginally, apex obtuse. Cauline leaves oblong to spatulate-oblong, 3.6–4.5 × 1–1.5 mm, subcarnose, abaxially glabrous or sparsely glandular hairy, adaxially distally and marginally brown glandular hairy, apex obtuse or acute. Cyme 1–2.7 cm, 2–6-flowered, rarely flower solitary;

pedicels 0.8–1.5 cm, dark brown glandular hairy. Sepals spreading to reflexed, ovate to broadly so, abaxially convex, adaxially concave, 2–2.1 × 1.1–1.5 mm, abaxially dark brown glandular hairy, adaxially glabrous, veins 3, not confluent at apex, margin glandular ciliate, apex obtuse or acute. Petals yellow, proximally orange or spotted orange, lanceolate to oblong, 5–6.8 × 1.8–2.4 mm, 6–8-callose, 3-veined, base subcordate, with a claw 0.4–1 mm, apex obtuse or acute. Stamens 3.8–4 mm. Ovary subsuperior, ovoid, 1.6–2.5 mm; styles 1–1.1 mm. Fl. and fr. Jun–Sep.

• Forests, rock crevices; 2300–4100 m. E Xizang.

159. *Saxifraga heterotricha* C. Marquand & Airy Shaw in C. Marquand, J. Linn. Soc., Bot. 48: 177. 1929.

异毛虎耳草 yi mao hu er cao

Herbs 6–12 cm tall. Stem simple or sparsely branched, distally sparsely dark brown glandular or mostly eglandular hairy. Basal leaves aggregated into a rosette; leaf blade narrowly ovate to oblong or spatulate, 3–5.2 × 1.2–2.1 mm, carinose, both surfaces glabrous, margin cartilaginous setose-ciliate, apex acute, aristulate. Cauline leaves remote, ovate to obovate or oblong, 3–7 × 1–3.2 mm, carinose, both surfaces glabrous, margin dark brown glandular ciliate, apex subobtusate or acute. Cyme 3.5–4.5 cm, 2–6-flowered or flower solitary; pedicels slender, 1.8–2.2 cm, dark brown glandular hairy. Sepals reflexed, subovate, 1.6–2 × 0.8–1.4 mm, glabrous or abaxially dark brown glandular hairy, veins 3, not confluent at apex, apex obtuse or acute. Petals yellow, proximally orange spotted, narrowly ovate to oblong, ca. 4.8–6.2 × 1.4–2.5 mm, 4–6-callose, 3-veined, base tapered, or contracted into a claw 0.7–1.1 mm, apex subobtusate or acute. Stamens 3–4.5 mm. Ovary subsuperior, narrowly ovoid to ellipsoid, 2–2.5 mm; styles 1–2 mm. Fl. and fr. Jun–Sep.

• Forests, screes, rock crevices; 3000–4400 m. S Xizang.

- 1a. Flowering stem with glandular hairs 159a. var. *heterotricha*
- 1b. Flowering stem with mostly eglandular hairs 159b. var. *anadena*

159a. *Saxifraga heterotricha* var. *heterotricha*

异毛虎耳草(原变种) yi mao hu er cao (yuan bian zhong)

Flowering stem with glandular hairs. Petals 4.8–5 mm, base usually tapered.

• Forests, screes, rock crevices; 3000–4200 m. S Xizang (Gongbo'gyamda Xian, Mainling Xian).

159b. *Saxifraga heterotricha* var. *anadena* (H. Smith) J. T. Pan & Gornall in Gornall et al., Novon 10: 376. 2000.

波密虎耳草 bo mi hu er cao

Saxifraga anadena H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 258. 1960.

Flowering stem with mostly eglandular hairs. Petals 5–6.2 mm, base contracted into a claw 0.7–1.1 mm.

• Rock crevices on slopes; 3600–4400 m. S Xizang (Bomi Xian, Gongbo'gyamda Xian).

160. *Saxifraga elatinoides* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 60: 115. 1923.

沟繁缕虎耳草 gou fan lu hu er cao

Herbs perennial, 2–6 cm tall. Stem slender, glabrous. Basal leaves aggregated into a rosette; leaf blade spatulate, ca. 3 × 0.9–1 mm, subcarinose, both surfaces glabrous, distal margin sparsely setose-ciliate. Cauline leaves lanceolate to narrowly oblong, 2.3–3.5 × 0.5 mm, subcarinose, glabrous or distally glandular ciliate, apex subobtusate. Flower solitary; pedicel slender, 0.9–1.6 cm, glabrous. Sepals reflexed, subelliptic, ca. 2 × 1 mm, subcarinose, glabrous, veins 3, not, partly, or fully confluent at apex, apex obtuse. Petals yellow, elliptic to suboblong, 4.5–5 × 1.9–3 mm, not callose, 3-veined, base gradually narrowed into a claw ca. 0.2 mm, apex acute. Stamens 3–3.5 mm. Ovary superior, ellipsoid, ca. 2 mm; styles ca. 0.6 mm. Fl. May–Aug.

• Rock crevices; 3000–4700 m. SW Sichuan, NW Yunnan.

161. *Saxifraga signatella* C. Marquand, J. Linn. Soc., Bot. 48: 182. 1929.

藏中虎耳草 zang zhong hu er cao

Herbs 2.5–7.5 cm tall. Stem simple, densely dark brown glandular hairy. Basal leaves aggregated into a rosette; leaf blade usually spatulate, 6–9.2 × 1.6–2.8 mm, subcarinose, both surfaces glabrous, margin usually cartilaginous setose-ciliate distally, apex mucronate. Cauline leaves remote, oblong to lanceolate, 3.5–5.5 × 0.8–1.7 mm, subcarinose, adaxially and marginally dark brown shortly glandular hairy, apex acute. Cyme 2.4–4.5 cm, 2–12-flowered, rarely flower solitary; pedicels slender, 1–2.5 cm, densely dark brown glandular hairy. Sepals spreading, ovate to broadly so, 2–2.6 × 1–2.4 mm, abaxially dark brown glandular hairy, veins 3–5, confluent or not at apex, margin proximally dark brown glandular hairy or glabrous, apex obtuse or acute. Petals white or pink, proximally purple spotted, oblong to lanceolate, 4–7 × 1.6–2.2 mm, 2-callose, 3–5-veined, base gradually narrowed into a claw 0.5–0.9 mm, apex acute. Stamens 3–3.3 mm. Ovary subsuperior, dark purple, broadly ovoid, 1.6–2.8 mm; styles ca. 1 mm. Fl. and fr. Jul–Sep.

• Alpine meadows, alpine marsh meadows, rock crevices; 3900–5400 m. S Xizang (Lhasa Shi, Mêdog Xian, Namling Xian).

162. *Saxifraga brunneopunctata* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 257. 1960.

褐斑虎耳草 he ban hu er cao

Herbs 2–6 cm tall. Stem simple, densely dark brown glandular hairy. Basal leaves aggregated into a rosette; leaf blade oblong to spatulate, rhombic distally, 5–7 × 2–2.5 mm, subcarinose, both surfaces glabrous, margin cartilaginous setose-ciliate distally, apex mucronate.

Cauline leaves remote, linear, 4–7 × 1–1.5 mm, subcarinose, adaxially and marginally dark brown shortly glandular hairy, apex acute. Cyme 1.5–4 cm, 2–11-flowered, rarely flower solitary; pedicels slender, 1–2 cm, densely dark brown glandular hairy. Sepals spreading, ovate, ca. 2 × 1–1.3 mm, abaxially and at proximal margin dark brown glandular hairy, veins 3–5, confluent into a verruca at apex, apex subobtusate. Petals yellow, proximally brown spotted, narrowly elliptic, ca. 5 × 1.6 mm, 2-callose, 3-veined, base gradually narrowed into a claw 0.5–0.9 mm, apex subobtusate. Stamens 3–4 mm. Ovary subsuperior, dark purple, subglobose, ca. 2 mm; styles ca. 1 mm. Fl. and fr. Jul–Sep.

• Rocky hillsides, cliff ledges, rock crevices; 4000–4900 m. Xizang.
163. *Saxifraga punctulata* Engler, Bot. Jahrb. Syst. 48: 601. 1912.

小斑虎耳草 *xiao ban hu er cao*

Herbs perennial, cespitose, 1.5–6 cm. Stem dark purple glandular hairy. Basal leaves aggregated into a rosette; leaf blade spatulate, 3.5–4 × ca. 1.4 mm, carinose, both surfaces glabrous, adaxially pustulate distally, margin cartilaginous pustulate and ciliate, apex obtuse. Cauline leaves aggregated, subs spatulate, ca. 4.9 × 1.4 mm, carinose, dark purple glandular hairy, adaxially pustulate distally, apex obtuse. Flower solitary or cyme 2- or 3-flowered; pedicels 1.3–3 cm, dark purple glandular hairy. Sepals erect, ovate, ca. 2.7 × 1.6 mm, subcarinose, abaxially and at proximal margin dark purple glandular hairy, veins 5, confluent into a verruca at apex, apex acute. Petals ivory to pale yellow or yellow, proximally yellow, orange, crimson, or purple spotted, elliptic, 7–9 × 2.5–5.5 mm (or less than 3.5 × 2 mm), not or obscurely callose, 5-veined, base abruptly narrowed into a claw 0.6–1.1 mm, apex obtuse. Stamens ca. 4 mm. Ovary subsuperior, broadly ovoid, ca. 2.2 mm; styles ca. 1 mm. Fl. Jul–Sep.

Alpine meadows, cushion vegetation, screes, rock crevices; 4600–5800 m. S Xizang [Nepal, Sikkim].

1a. Plants at least 2.8 cm tall; petals more than 7 mm 163a. var. *punctulata*

1b. Plants less than 2.8 cm tall; petals to 3.5 mm 163b. var. *minuta*

163a. *Saxifraga punctulata* var. *punctulata*

小斑虎耳草(原变种) *xiao ban hu er cao* (yuan bian zhong)

Plants 2.8–6 cm tall. Petals ivory or pale yellow, 7–9 × 2.5–5.5 mm, not callose. Fl. Aug–Sep.

Alpine meadows, screes, rock crevices; 4600–5400 m. S Xizang [Nepal, Sikkim].

163b. *Saxifraga punctulata* var. *minuta* J. T. Pan in C. Y. Wu, Fl. Xizang. 2: 492. 1985.

矮小斑虎耳草 *ai xiao ban hu er cao*

Plants 1.5–2.7 cm tall. Petals yellow, to 3.5 × 2 mm, sometimes obscurely callose. Fl. Jul–Aug.

• Alpine meadows, cushion vegetation, rock crevices; 4800–5800 m. SW Xizang (Burang Xian, Zhongba Xian).

164. *Saxifraga punctulatoides* J. T. Pan in C. Y. Wu, Fl. Xizang. 2: 493. 1985.

拟小斑虎耳草 *ni xiao ban hu er cao*

Herbs 3–5.5 cm tall. Stem dark purple shortly glandular hairy. Basal leaves aggregated into a rosette; leaf blade spatulate, ca. 9 × 3.1 mm, subcarinose, both surfaces glabrous, adaxially pustulate distally, margin cartilaginous pectinate distally, apex subobtusate.

Cauline leaves subsensate, ca. 1 cm × 1.6 mm, abaxially and marginally dark purple glandular hairy, apex mucronate. Inflorescence ca. 2.5 cm, 3–10-flowered; pedicels 0.7–1.8 cm, densely dark purple glandular hairy. Sepals spreading, subovate, 3–4 × 1.5–2.4 mm, carinose, abaxially and marginally dark purple glandular hairy, veins 5, confluent into a verruca at apex, apex acute. Petals white, proximally purple spotted, elliptic to ovate, 5.5–7 × 2.7–3.5 mm, obscurely 2-callose, 5–7-veined, base rounded and narrowed into a claw 0.6–1 mm, apex acute. Stamens ca. 4.1 mm. Ovary subsuperior, dark purple, ca. 4.4 mm; styles ca. 1.4 mm. Fl. Jul–Aug.

• Alpine meadows, rock crevices; 4800–5100 m. S Xizang (Cona Xian, Lhünzê Xian, Nêdong Xian).

165. *Saxifraga yushuensis* J. T. Pan, Acta Phytotax. Sin. 16(2): 29. 1978.

玉树虎耳草 *yu shu hu er cao*

Herbs perennial, 4.5–6 cm tall. Stem densely glandular hairy. Basal leaves aggregated into a rosette; leaf blade spatulate, 6–8.4 × 1.9–3 mm, abaxially glabrous, adaxially pustulate distally, margin cartilaginous pustulate and rigidly ciliate. Cauline leaves remote, oblong-linear, 1–1.3 cm. 1.6–2.5 mm, glandular hairy, apex acute. Inflorescence corymbose, 2.3–3.7 cm, 2–10-flowered; pedicels 1–1.5 cm, densely glandular hairy. Sepals erect to spreading, triangular-ovate, 2.5–4 × 1.8–2 mm, abaxially and marginally glandular hairy, veins 5 or 6, confluent or not at apex, apex subacute. Petals yellow, proximally purple spotted, elliptic-obovate, 7.3–7.6 × 4.3–4.5 mm, not callose, ca. 7-veined, base tapered, apex obtuse. Stamens ca. 3 mm. Ovary subsuperior, broadly ovoid, ca. 2 mm; styles divergent, ca. 0.5 mm. Fl. Jul–Aug.

• Alpine rock crevices; 4300–4400 m. S Qinghai (Yushu Xian).

166. *Saxifraga umbellulata* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 71. 1858.

小伞虎耳草 *xiao san hu er cao*

Herbs perennial, 5.5–10 cm tall. Stem simple, brown glandular hairy. Basal leaves aggregated into a rosette; leaf blade spatulate, 0.8–1.4 cm × 2–3 mm, adaxially smooth or sometimes subpustulate distally, glabrous or margin sometimes cartilaginous setose-ciliate, apex obtuse. Cauline leaves oblong to subs spatulate, 4.5–6.6 × 1.5–2 mm, both surfaces brown glandular hairy or

adaxially glabrous, margin brown glandular hairy. Cyme umbelliform or compoundly so, 3–5.5 cm, 2–23-flowered; pedicels slender, 0.7–1.7 cm, brown glandular hairy. Sepals usually erect, ovate to narrowly triangular-ovate, 2.2–3.5 × ca. 1.3 mm, abaxially and marginally ± brown glandular hairy, veins 3, not confluent at apex, apex subobtusate or acute. Petals yellow, pale yellow, white, or pink, pandurate to pandurate-oblong, 6.5–9 × 2.9–3.2 mm, 2-callose, 3–5-veined, base contracted into a claw 0.4–0.5 mm, apex obtuse to acute. Stamens ca. 3 mm. Ovary subsuperior, broadly ovoid, ca. 1 mm; styles ca. 0.5 mm. Fl. Jun–Sep. $2n = 16^*$.

Forests, scrub, marshlands, alpine rock crevices, sunny cliffs; 3000–4700 m. E and S Xizang [Nepal, Sikkim].

Two of the present authors (Gornall and Ohba) believe that at least three species should be recognized within this complex: *Saxifraga lhasana*, *S. pasumensis* (possibly with *S. muricola* as a variety), and *S. umbellulata*. *Saxifraga lhasana* and *S. pasumensis* can be distinguished from *S. umbellulata* by having basal leaves adaxially smooth (vs. subpustulate distally) and margin cartilaginous setose-ciliate; *S. lhasana* can be further distinguished by having white (vs. yellow) petals.

1a. Margin of basal leaves glabrous 166a. var. *umbellulata*

1b. Margin of basal leaves cartilaginous

setose-ciliate.

2a. Petals yellow 166b. var. *pectinata*

2b. Petals pale yellow or white, sometimes pink 166c. var. *muricola*

166a. *Saxifraga umbellulata* var. *umbellulata*

小伞虎耳草(原变种) xiao san hu er cao (yuan bian zhong)

Basal leaves glabrous at margin. Petals yellow. Fl. Jun–Sep.

Marshlands, alpine rock crevices; 3100–4400 m. S Xizang [Nepal, Sikkim].

166b. *Saxifraga umbellulata* var. *pectinata* (C. Marquand & Airy Shaw) J. T. Pan, Fl. Reipubl. Popularis Sin. 34(2): 165. 1992.

萹齿虎耳草 bi chi hu er cao

Saxifraga umbellulata f. *pectinata* C. Marquand & Airy Shaw in C. Marquand, J. Linn. Soc., Bot. 48: 183. 1929; *S. obovatipetala* T. C. Ku; *S. pasumensis* C. Marquand & Airy Shaw; *S. pasumensis* f. *gracilis* C. Marquand & Airy Shaw.

Basal leaves cartilaginous setose-ciliate at margin.

Petals yellow. Fl. and fr. Jun–Sep. $2n = 16^*$.

• Forests, scrub, alpine rock crevices; 3000–4100 m. E Xizang.

166c. *Saxifraga umbellulata* var. *muricola* (C. Marquand & Airy Shaw) J. T. Pan in C. Y. Wu, Fl. Xizang. 2: 494. 1985.

白小伞虎耳草 bai xiao san hu er cao

Saxifraga muricola C. Marquand & Airy Shaw in C. Marquand, J. Linn. Soc., Bot. 48: 180. 1929; *S. lhasana* H. Smith; *S. lhasana* var. *decapitula* H. Smith; *S. muricola* var. *brachypetala* C. Marquand & Airy Shaw;

S. muricola var. *quinquenervis* C. Marquand & Airy Shaw.

Basal leaves cartilaginous setose-ciliate at margin.

Petals pale yellow or white, sometimes pink. Fl. Jun–Aug.

• Rock crevices by water, sunny cliffs; 3000–4700 m. E and S Xizang.

167. *Saxifraga sanguinea* Franchet, J. Bot. (Morot) 8: 295. 1894.

红虎耳草 hong hu er cao

Hirculus sanguineus (Franchet) Losinskaja.

Herbs perennial, 5–15 cm tall. Stem purple, densely purple glandular hairy. Basal leaves aggregated into a rosette, spatulate to subspatulate, 5.5–13 × 1.5–3 mm, carnosely, both surfaces glabrous, margin cartilaginous setose-ciliate, apex deflexed, obtuse. Cauline leaves remote, oblanceolate to linear-lanceolate, 3.5–11 × 2–2.5 mm, leathery, adaxially and marginally purple-brown glandular hairy, apex obtuse. Cyme 2.7–6.5 cm, 3–23-flowered; branches slender, 2.5–6 cm, 1–3-flowered; pedicels 0.6–1.7 cm, densely purple-brown glandular hairy. Sepals spreading, then reflexed, ovate to lanceolate, 2.5–5.7 × 1.5–2.1 mm, purple-brown glandular hairy abaxially, adaxially distally, and marginally, veins 5–7, confluent into a verruca at apex, apex subobtusate or acute. Petals adaxially pale yellow, proximally purple spotted, abaxially red, or red on both surfaces, lanceolate to narrowly elliptic, 5–7.3 × 2–2.3 mm, 2-callose, 3-veined, base rounded, with a claw 1.3–1.8 mm, apex acute. Stamens ca. 4.5 mm. Ovary subsuperior, broadly ovoid to subellipsoid, ca. 2 mm; styles ca. 1 mm. Fl. Jul–Aug.

• Rocky hillside meadows, limestone crevices; 3300–4500 m. SE Qinghai (Jigzhi Xian), W Sichuan, S Xizang (Sa'gya Xian, Xigazê Xian), NW Yunnan (Zhongdian Xian).

168. *Saxifraga signata* Engler & Irmscher, Notes Roy. Bot. Gard. Edinburgh 5: 143. 1912.

西南虎耳草 xi nan hu er cao

Hirculus signatus (Engler & Irmscher) Losinskaja; *Saxifraga signata* var. *lancepetala* Handel-Mazzetti.

Herbs perennial, (5–)10–20 cm tall. Stem dark brown glandular hairy. Basal leaves aggregated into a rosette; leaf blade spatulate, 1.5–1.6 cm × 2.1–3 mm, carnosely, both surfaces glabrous, margin setose-ciliate. Cauline leaves remote, oblong to oblong-obovate, ca. 1 cm × 3 mm, dark brown glandular hairy, margin entire, apex recurved, acute. Inflorescence corymbose, 3.5–8 cm, 4–24-flowered; branches 3–8 cm, 2- or 3-flowered; pedicels 1.5–1.8 cm, dark brown glandular hairy. Sepals spreading to reflexed, triangular-ovate to narrowly so, 4–9 × 2–3.5 mm, dark brown glandular hairy abaxially, adaxially distally, and marginally, veins 5–7, confluent at apex, apex subobtusate. Petals yellow, adaxially purple spotted proximally, ovate to subovate, 5.8–8.7 × 2.5–4 mm, 2-callose, 3–7-veined, base

usually truncate, with a distinct claw 1–1.6 mm, apex acute. Stamens 4–5 mm. Ovary subsuperior, broadly ovoid, ca. 2.1 mm; styles ca. 1.4 mm. Fl. and fr. Jul–Sep.

• Alpine meadows, rock crevices; 2800–4600 m. S Qinghai (Yushu Xian), W Sichuan, E Xizang, NW Yunnan.

169. *Saxifraga lixianensis* T. C. Ku, Bull. Bot. Res., Harbin 9(4): 17. 1989.

理县虎耳草 li xian hu er cao

Saxifraga subseidiformis J. T. Pan.

Herbs perennial, 4.5–6.7 cm tall. Stem tawny glandular villous. Cauline leaves absent, but not bracts. Basal leaves aggregated into a rosette, spatulate, ca. 9.5 × 2.3–3.5 mm, adaxially and marginally glandular hairy, apex obtuse. Inflorescence corymbose, 2.5–4.5 cm, 13–15-flowered; bracts linear, 3.1–4.5 × 0.5–0.8 mm, adaxially and marginally glandular villous; pedicels slender, tawny glandular hairy. Sepals reflexed, ovate to elliptic-ovate, 1.9–2 × 1–1.1 mm, abaxially and marginally glandular hairy, veins 3 or 4, not confluent at apex, apex obtuse. Petals yellow, orange spotted at base, suboblong, ca. 4.9 × 2.9 mm, 2-callose near base, 3-veined, base contracted into a claw ca. 0.4 mm, apex subacute. Stamens ca. 3.5 mm. Ovary subsuperior, broadly subellipsoid, ca. 2.3 mm; styles divergent, ca. 1 mm. Fl. Jun–Aug.

• Rock crevices on grassy slopes. NC Sichuan (Li Xian).

170. *Saxifraga sediformis* Engler & Irmscher, Notes Roy. Bot. Gard. Edinburgh 5: 144. 1912.

景天虎耳草 jing tian hu er cao

Hirculus sediformis (Engler & Irmscher) Losinskaja.

Herbs perennial, (5–)7–20 cm tall. Stem tawny glandular hairy. Basal leaves aggregated into a rosette, subspatulate to oblong, 0.5–2 cm × 1.4–5.5 mm, subcarinose, adaxially and marginally tawny glandular hairy, apex obtuse or acute. Cauline leaves remote, elliptic or broadly so to oblong, 3–14 × 2.3–7 mm, adaxially and marginally tawny glandular hairy, apex acute. Inflorescence corymbose, 2.5–11.7 cm, 5–33-flowered; branches 2–8.5 cm, 2–4-flowered; pedicels 0.9–1.2 cm, tawny glandular hairy. Sepals spreading to reflexed, lanceolate, 3.4–5 × 1.2–1.7 mm, abaxially and marginally tawny glandular hairy, veins 3, confluent into a verruca at apex, apex acute. Petals yellow, elliptic to narrowly ovate, 6–7.5 × 2.4–3 mm, 2-callose, 3-veined, base subcordate, narrowed into a claw 0.8–1.4 mm. Stamens 3.2–5.5 mm. Ovary superior, ovoid, 2.2–3.5 mm; styles 1–1.5 mm. Fl. and fr. Jul–Oct.

• Forests, scrub, alpine rock crevices; 2700–4600 m. SW Sichuan (Huili Xian, Miyi Xian, Xiangcheng Xian), SE Xizang (Zayü Xian), E and NW Yunnan.

171. *Saxifraga daochengensis* J. T. Pan, Acta Phytotax. Sin. 28: 394. 1990.

稻城虎耳草 dao cheng hu er cao

Herbs 17–18 cm tall. Stem much branched distally, densely glandular pubescent. Basal leaves in a dense rosette, spatulate, 1.6–2.3 cm × 4.5–8 mm, leathery, glandular hairy, apex acute. Cauline leaves elliptic to obovate, 1–2.6 cm × 5.5–12 mm, glandular hairy, margin entire, apex acute. Inflorescence 7.5–12.5 cm, 19–28-flowered; branches glandular hairy. Sepals spreading, lanceolate, 5.5–6 × ca. 2 mm, glandular hairy abaxially, adaxially distally, and marginally, veins ca. 9, confluent into a verruca at apex, apex acute. Petals abaxially purple, adaxially yellow near apex and lilac near base, broadly ovate to broadly elliptic, ca. 5 × 4 mm, 2-callose near base, 5-veined, base cordate with a claw 1.2–1.5 mm, apex acute. Stamens ca. 4.5 mm. Ovary superior, ovoid, ca. 4 mm; styles ca. 1.1 mm. Fl. Jul–Aug.

• Rock crevices of *Picea* forest understories; ca. 3600 m. W Sichuan (Daocheng Xian, Xiaojin Xian).

172. *Saxifraga dielsiana* Engler & Irmscher, Bot. Jahrb. Syst. 48: 597. 1912.

川西虎耳草 chuan xi hu er cao

Hirculus dielsianus (Engler & Irmscher) Losinskaja.

Herbs 12–15 cm tall. Stem brown pilose. Basal leaves aggregated into a rosette; leaf blade spatulate, 1.7–2.2 cm × 7.5–8.5 mm, both surfaces and margin brown glandular hairy, margin entire, apex acute. Cauline leaves spatulate to subobovate, 1.5–1.9 × 0.9–1.2 cm, both surfaces and margin brown glandular hairy, margin 4- or 5-dentate on proximal leaves, entire on distal leaves, apex acute. Inflorescence ca. 10 cm, up to 31-flowered; branches 2.1–5.7 cm, brown glandular hairy, 2- or 3-flowered; pedicels 3–5 mm, brown glandular hairy. Sepals suberect, lanceolate, 5–5.2 × 1.5–1.7 mm, brown glandular hairy, veins 5 or 6, confluent into a verruca at apex, apex acute. Petals yellow, sublanceolate to suboblong, ca. 7 × 2.5 mm, 2-callose, 5- or 6-veined, base abruptly narrowed into a claw ca. 0.7 mm, apex obtuse or acute. Stamens 3.5–4.5 mm. Ovary superior, ovoid, ca. 2 mm; styles ca. 1.3 mm. Fl. Jul–Aug.

• Rock crevices; 2100–2600 m. W Sichuan (Kangding Xian), NW Yunnan (Gongshan Drung-Nu Zu Zizhixian).

173. *Saxifraga candelabrum* Franchet, Pl. Delavay. 232. 1890.

灯架虎耳草 deng jia hu er cao

Hirculus bonatianus (Engler & Irmscher) Losinskaja; *H. candelabrum* (Franchet) Losinskaja; *Saxifraga bonatiana* Engler & Irmscher; *S. candelabrum* var. *patentiramea* Engler & Irmscher.

Herbs 15–38 cm tall. Stem brown glandular hairy. Basal leaves aggregated into a rosette; leaf blade spatulate to obovate, 1.5–6 cm × 5.3–14 mm, both surfaces and margin brown glandular hairy, margin 3–7-dentate distally. Cauline leaves remote, subspatulate, 1.5–2.7 cm × 5.8–12 mm, both surfaces and margin brown glandular hairy, margin 3–8-dentate. Inflores-

cence paniculate, 10–14 cm, 19–29-flowered; branches 4.5–9 cm, densely brown glandular hairy, 1–3-flowered; pedicels 0.8–1.5 cm, densely brown glandular hairy. Sepals spreading to reflexed, lanceolate to narrowly ovate, 4–7 × 1.5–2.1 mm, brown glandular hairy abaxially, adaxially distally, and marginally, veins 3–5, confluent into a verruca at apex, apex acute. Petals yellowish, proximally spotted orange or purple, narrowly ovate to suboblong, 5.9–6.1 × 2.3–3.1 mm, 2-callose near base, 3–5-veined, base cordate, with a claw 1–1.3 mm, apex acute. Stamens 3.5–5.5 mm. Ovary superior, subglabrous, 2–4 mm in diam.; styles 1–1.5 mm. Fl. and fr. Jul–Sep.

• Forests, forest margins, alpine meadows, rock crevices; 2000–4200 m. NW Sichuan (Garzê Zangzu Zizhizhou), N Yunnan.

174. *Saxifraga stenophylla* Royle, Ill. Bot. Himal. Mts. 227. 1835.

大花虎耳草 da hua hu er cao

Saxifraga flagellaris Willdenow ex Sternberg subsp. *stenophylla* (Royle) Hultén; *S. flagellaris* var. *stenosepala* Trautvetter; *S. flagellaris* var. *stenosepala* f. *alta* Engler & Irmscher; *S. flagellaris* var. *stenosepala* f. *humilis* Engler & Irmscher; *S. flagellaris* var. *stenosepala* f. *pauciflora* Engler & Irmscher. Stem 5–17.5 cm tall, densely glandular hairy. Stolons arising from axils of basal leaves, 4–12 cm, sparsely glandular hairy, gemmiferous at apex. Basal leaves aggregated into a rosette, narrowly elliptic to subspatulate, somewhat convex abaxially, concave adaxially, 0.8–1.3 cm × 2–4.5 mm, leathery, both surfaces ± glandular pubescent, margin glandular ciliate, apex acute, glandular. Cauline leaves remote, 5.5–11 × 1.5–3 mm, leathery, both surfaces ± glandular hairy, margin glandular ciliate, apex glandular. Cyme 1.5–3 cm, (1 or) 2- or 3-flowered; pedicels 0.6–1.4 cm, densely glandular hairy. Sepals erect, ovate to lanceolate, 4–6.2 × 1.2–2.8 mm, subcarnose, abaxially and marginally dark brown glandular hairy, adaxially glabrous or rarely sparsely glandular hairy, veins 5–9, partly or fully confluent at apex, apex usually mucronate. Petals yellow, obovate to broadly so or elliptic, 0.8–1.2 cm × 4.5–7.5 mm, not callose, 8–11-veined, clawless, apex obtuse. Stamens 4–5.7 mm. Ovary subsuperior, ellipsoid, 2.5–3.5 mm; styles ca. 1.5 mm. Fl. Jul–Aug.

Scrub, alpine meadows, among rocks; 3700–5000 m. W Sichuan, E Xizang (Baxoi Xian, Mainling Xian, Zayü Xian), NW Yunnan (Zhongdian Xian) [India, Kashmir, Nepal, Pakistan, Sikkim, Tajikistan].

Saxifraga stenophylla is part of the polymorphic *S. flagellaris* complex. In the present account, the taxa belonging to this complex are treated as narrowly defined species.

175. *Saxifraga parkaensis* J. T. Pan, Exp. Rep. Anim. Pl. Ngari Diqu Xizang, 129. 1979.

巴格虎耳草 ba ge hu er cao

Stem 1.5–4 cm tall, glandular hairy, glands globose. Stolons arising from axils of basal leaves, ca. 10 cm, glandular hairy, apex gemmiferous. Basal leaves

aggregated into a rosette, narrowly obovate or subspatulate to oblong, 6–8 × 2.2–2.6 mm, subcarnose, glandular hairy (glands globose), apex mucronate. Cauline leaves remote, suboblanceolate, 9–10 × ca. 2.3 mm, subcarnose, usually glandular hairy, rarely glabrous adaxially, apex mucronate. Flower solitary or cyme 2- or 3-flowered; pedicels 5.6–7.5 mm, glandular hairy. Sepals erect, ovate or lanceolate to oblong-lanceolate, 3.3–5 × 1.4–2 mm, subcarnose, abaxially and marginally glandular hairy (glands globose), adaxially glabrous or distally glandular hairy, veins 3–5, not, partly, or fully confluent at apex, apex obtuse or acute. Petals yellow, obovate to oblanceolate, 6.8–8 × 2.2–4 mm, 2-callose, 5–10-veined, base with a claw 0.2–1.3 mm, apex obtuse. Stamens 2.5–4.4 mm. Ovary semi-inferior, 2.8–6.4 mm, with an annular nectary disc; styles 1.5–2 mm. Fl. Jul–Aug.

• Alpine meadows, rock clefts; 5100–5300 m. SW Xizang (Burang Xian).

176. *Saxifraga mucronulata* Royle, Ill. Bot. Himal. Mts. 1: 227. 1835.

小短尖虎耳草 xiao duan jian hu er cao

Saxifraga flagellarioides Engler; *S. flagellaris* Willdenow ex Sternberg subsp. *megistantha* Handel-Mazzetti; *S. flagellaris* var. *mucronulata* (Royle) C. B. Clarke; *S. flagellaris* subsp. *mucronulata* (Royle) Engler & Irmscher; *S. spinulosa* Royle (1835), not Adams (1817).

Stem 2–4 cm tall, densely glandular pubescent. Stolons arising from axils of basal leaves, densely glandular hairy. Basal leaves aggregated into a rosette, spatulate to linear-spatulate, 8–9.5 × 1.6–2 mm, carnose, both surfaces glabrous, margin eglandular setose-ciliate, longest bristles 0.5–1.1 mm, apex mucronate. Cauline leaves linear, ca. 6.2 × 1 mm, abaxially and marginally glandular hairy, apex mucronate. Cyme compact, 7–14 mm, 2–5-flowered, or flower solitary; pedicels to 3 mm, glandular hairy. Sepals erect, ovate to narrowly so, ca. 2.5 × 1 mm, abaxially and marginally glandular hairy, veins 3, not or partly confluent at apex, apex subacuminate. Petals yellow, obovate to elliptic, 4.3–4.4 × 2–2.2 mm, not callose, 5- or 6-veined, base abruptly narrowed into a claw 0.4–0.5 mm, apex obtuse. Stamens 1.1–1.5 mm. Ovary semi-inferior, ovoid; styles divergent, ca. 1 mm. Fl. Jul–Aug.

Rocky alpine meadows, cliff ledges, boulders; 2800–5400 m. Sichuan, S Xizang (Tingri Xian, Yadong Xian), Yunnan [India, Kashmir, Nepal, Sikkim].

Saxifraga mucronulata is much confused with other members of the *S. flagellaris* complex. Specimens from Sichuan and Yunnan identified by Hultén (Svensk. Bot. Tidskr. 58: 93. 1964) as *S. flagellaris* subsp. *setigera* (Pursh) Tolmachev (*S. setigera* Pursh) have been referred in the present account to *S. mucronulata*. Further study of the whole group is required.

Saxifraga flagellaris subsp. *megistantha*, treated as a synonym of *S. stenophylla* in FRPS, is regarded in the present account as synonymous with *S. mucronulata*. The type of subsp. *megistantha* has coarsely eglandular setose-ciliate basal leaves and therefore does not correspond with *S. stenophylla*.

177. *Saxifraga mucronulatoides* J. T. Pan, Acta Phytotax. Sin. 29: 23. 1991.

珈虎耳草 jia hu er cao

Saxifraga flagellaris Willdenow ex Sternberg subsp. *sikkimensis* Hultén, Svensk Bot. Tidskr. 58: 99. 1964; *S. mucronulata* Royle subsp. *sikkimensis* (Hultén) H. Hara. Stem ca. 21 cm tall, densely glandular pubescent, glands globose. Stolons arising from axils of basal leaves, glandular hairy. Basal leaves aggregated into a rosette, suboblanceolate, ca. 1.1 cm × 3 mm, both surfaces glabrous, margin eglandular setose-ciliate, longest bristles 0.5–1.0 mm, apex cartilaginous mucronate. Cauline leaves oblong-linear, ca. 1.1 cm × 2.1 mm, glandular hairy, apex cartilaginous mucronate. Pleiochasmus ca. 12-flowered; pedicels and hypanthium tawny glandular hairy. Sepals erect, narrowly ovate, 2.6–2.8 × ca. 1 mm, abaxially and marginally glandular hairy, glands globose, veins 4 or 5, confluent at apex, apex acute. Petals yellow, subpandurate, 5.6–6 × 3.5 mm, 2-callose, 5–7-veined, base abruptly narrowed into a claw ca. 0.5 mm, apex obtuse. Stamens 2–3 mm. Ovary semi-inferior, ca. 1.6 mm; styles ca. 0.8 mm. Fl. Jun–Aug.

Stony places on slopes and in gorges; 3400–5200 m. S Xizang (Tingri Xian) [Bhutan, Nepal, Sikkim].

178. *Saxifraga brunonis* Wallich ex Seringe in de Candolle, Prodr. 4: 45. 1830.

须弥虎耳草 xu mi hu er cao

Hirculus brunonianus Losinskaja; *Saxifraga brunoniana* Sternberg, nom. illeg. (included *S. brunonis*); *S. brunoniana* var. *majuscula* Engler & Irmscher; *S. brunoniana* var. *majuscula* subvar. *exunguiculata* Engler & Irmscher; *S. brunoniana* var. *majuscula* subvar. *unguiculata* Engler & Irmscher. Stem purple-brown, 6–16 cm, proximally glabrous, distally sparsely dark purple shortly glandular hairy. Stolons arising from axils of basal leaves, purple-brown, 4–24 cm, sparsely dark purple glandular hairy. Basal leaves aggregated into a rosette, gray-green, shiny, oblong-ensiform, 1–1.3 cm × 1.9–2.5 mm, carnose, rigid, both surfaces glabrous, margin cartilaginous setose-ciliate, apex cartilaginous aristate. Cauline leaves remote, oblong-ensiform or subsensate to suboblong, 0.7–1.3 cm × 1.9–2.5 mm, carnose, rigid, both surfaces glabrous, margin cartilaginous setose-ciliate, apex cartilaginous aristate. Cyme lax, 1–7 cm, 3–9-flowered; branches to 6.5 cm, sparsely dark brown shortly glandular hairy, 2- or 3-flowered; pedicels slender, 0.7–2.4 cm, sparsely dark brown shortly glandular hairy. Sepals spreading, ovate to broadly so, 2–2.3 × 1.2–2 mm, usually glabrous, rarely with 2 or 3 dark purple, glandular hairs abaxially proximally, veins 3–5, not, partly, or fully confluent at apex, apex subobtusate or acute. Petals yellow, elliptic or oblong to lanceolate, 5–8 × 2.5–4 mm, obscurely 2-callose, 3–5-veined, base subclawed or with a claw ca. 1 mm, apex subobtusate or acute. Stamens 4.5–4.6 mm. Ovary

subsuperior, ellipsoid, 1.9–2 mm; styles 1–1.2 mm. Capsule subglobose. Fl. and fr. Jun–Oct. $2n = 16$.

Mossy rocks in woods, hillsides, alpine gullies; 2800–4000 m. SW Sichuan (Muli Zang Zu Zizhixian), S Xizang, W Yunnan (Dali Xian) [Bhutan, India, Kashmir, Myanmar, Nepal, Sikkim].

179. *Saxifraga josephii* Engler in Diels, Bot. Jahrb. Syst. 29: 366. 1900.

太白虎耳草 tai bai hu er cao

Hirculus josephii (Engler) Losinskaja.

Stem slender, 10–12.5 cm tall, sparsely glandular pubescent. Stolons arising from axils of basal leaves, sparsely glandular hairy or subglabrous. Rosette leaves shiny, oblong-ensiform to subsensate, 1.2–1.4 cm × 1.8–2 mm, leathery, rigid, both surfaces glabrous, margin cartilaginous eglandular setose-ciliate, apex cartilaginous aristate. Cauline leaves remote, oblong-ensiform, 7–10 × 1–1.5 mm, both surfaces glabrous, margin cartilaginous glandular ciliate, apex cartilaginous aristate. Cyme laxly branched, 2–4.5 cm, 3–5-flowered; pedicels slender, 1–2 cm, sparsely brown glandular pubescent. Sepals spreading to reflexed, ovate, 1.8–2 × 1–1.5 mm, glabrous, veins 3–5, confluent at apex, apex subobtusate or acute. Petals yellow, ovate to narrowly so, 4–6 × ca. 2 mm, 2- or 3-callose, sometimes obscurely so, 3-veined, base gradually narrowed into a claw 0.6–1 mm, apex subobtusate or acute. Stamens 2–3 mm. Ovary superior, ca. 2 mm; styles 0.2–1 mm. Capsule narrowly ovoid. Fl. and fr. Jul–Sep.

• Shaded damp rock crevices; 1300–2100 m. Henan, C and S Shaanxi (Guangtuo Shan, Hua Shan, Taibai Shan).

One of the present authors (Ohba) regards this species as synonymous with the extremely similar *Saxifraga brunonis*.

180. *Saxifraga loripes* J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 31. 1933.

鞭枝虎耳草 bian zhi hu er cao

Stem 4–11 cm tall, glandular pubescent. Stolons arising from axils of basal leaves, sparsely glandular hairy. Basal leaves aggregated into a rosette, obovate to oblanceolate, 0.5–10 cm, both surfaces glabrous, margin glandular ciliate, apex acute. Cauline leaves subelliptic to linear-oblong, 12–20 × 2.0–3.5 mm, both surfaces glabrous, margin glandular ciliate, apex acute, mucronate. Cyme corymbose, compact, 2–4-flowered, or flower solitary; pedicels ca. 1 mm, sparsely glandular hairy. Sepals spreading, oblong, 4.5–5 × ca. 2 mm, glabrous, veins 3–5, confluent into a verruca at apex, apex obtuse. Petals yellow, broadly elliptic to obovate, 5–7 × 3.5–5 mm, 2-callose, 5-veined, base abruptly narrowed into a claw ca. 1 mm, apex obtuse. Stamens ca. 2.5 mm. Ovary subsuperior, ca. 2 mm; styles ca. 1.5 mm. Fl. Jun–Aug.

• Cliffs, humus-covered boulders; 3700–4000 m. SW Sichuan (Muli Zang Zu Zizhixian).

181. *Saxifraga flaccida* J. T. Pan in C. Y. Wu, Fl. Xizang. 2: 506. 1985.

柔弱虎耳草 rou ruo hu er cao

Stem slender, 2–4 cm tall, brown glandular hairy. Stolons arising from axils of median cauline leaves, sparsely glandular hairy. Proximal cauline leaves remote, with axillary gemmae; median cauline leaves arranged in dense rosettes, subspatulate to narrowly subobovate, 5–10 × 1.6–3.2 mm, leathery, both surfaces glabrous, margin ± glandular hairy (glands globose), apex obtuse or acute; distal cauline leaves remote. Flower solitary or cyme 2- or 3-flowered; pedicels 1.2–1.4 cm, densely glandular hairy. Sepals spreading, ovate, 2–2.5 × 1–2 mm, glabrous or abaxially sparsely glandular hairy proximally, veins 3–5, not or partly confluent at apex, apex obtuse. Petals yellow, narrowly ovate to lanceolate, 4.2–4.6 × ca. 1.5 mm, 2-callose, 3-veined, base gradually narrowed into a claw 0.8–1 mm, apex acute. Stamens ca. 3 mm. Ovary subsuperior, ca. 1.5 mm; styles ca. 1 mm. Fl. Jul–Aug.

• Alpine rock crevices; ca. 5000 m. S Xizang (Gyirong Xian).

182. *Saxifraga degenensis* C. Y. Wu in C. Y. Wu & J. T. Pan, Acta Phytotax. Sin. 28: 66. 1990.

德钦虎耳草 de qin hu er cao

Stem 3–5.7 cm tall, glandular hairy, glands globose. Stolons arising from axils of basal leaves, glandular pilose. Basal leaves aggregated into a rosette, oblong-ob lanceolate, 1–1.6 cm × 3.5–4 mm, subcarnose, glandular pilose (glands globose), apex acute. Cauline leaves dense, suboblong, ca. 1.1 cm × 3.6–3.8 mm, subcarnose, glandular pilose, apex acute. Cyme 3–5-flowered; pedicels 2–3 mm, glandular pilose. Sepals erect, subovate, ca. 2.6 × 1.8 mm, subcarnose, abaxially and marginally glandular hairy, glands globose, veins 3, confluent into a verruca at apex, apex subobtuse or acute, glabrous. Petals yellow, obovate to broadly so, 3.5–3.8 × 2–2.4 mm, 2-callose near base, ca. 6-veined, base with a claw 0.4–0.7 mm, apex obtuse. Male flowers: stamens ca. 2.4 mm; pistil degenerate. Female flowers: stamens degenerate; ovary subinferior, with a thick, annular disc; styles stout. Fl. Jul–Aug.

• Alpine rock crevices; 4500–4600 m. NW Yunnan (Dêqên Xian, Zhongdian Xian).

One of the present authors (Ohba) believes that this species may be synonymous with *Saxifraga parkaensis*.

183. *Saxifraga nangxianensis* J. T. Pan, Acta Phytotax. Sin. 16(2): 30. 1978.

朗县虎耳草 lang xian hu er cao

Stem 2.5–10 cm tall, glandular pubescent. Stolons arising from axils of basal leaves, 4.5–12 cm, glandular pubescent, apex gemmiferous. Basal leaves aggregated into a rosette, narrowly obovate to subspatulate, 6–8.3 ×

2.3–3 mm, carnosose, brown glandular hairy, apex obtuse or acute. Cauline leaves remote, oblong to subspatulate, 6–10 × 1.9–3 mm, subcarnose, brown glandular hairy. Cyme 9–12 mm, 4–9-flowered; pedicels 1–6.2 mm, glandular pubescent. Sepals erect, ovate to subelliptic, abaxially somewhat convex, adaxially somewhat concave, 1.5–2.7 × 0.8–1.5 mm, subcarnose, abaxially glandular hairy, adaxially usually glabrous, rarely glandular hairy near apex, veins 3 or 4, not confluent at apex, margin glandular hairy, apex acute. Petals yellow to purple, obovate or broadly so to elliptic, 2.5–3.8 × 1.7–2.5 mm, 2-callose, 5–9-veined, base abruptly narrowed into a claw 0.5–0.8 mm, apex obtuse or acute. Stamens 1–2.5 mm. Ovary subinferior, ca. 1.9 mm, with an annular nectary disc; styles ca. 0.9 mm. Fl. Jul–Aug.

• Alpine scrub, alpine meadows, rock crevices; 4500–5500 m. S Xizang.

184. *Saxifraga tentaculata* C. E. C. Fischer, Bull. Misc. Inform. Kew 1940: 295. 1941.

秃茎虎耳草 tu jing hu er cao

Stem purple after drying, slender, 2.5–6 cm tall, glabrous. Stolons arising from axils of median cauline leaves, lilac, ca. 22 cm, glabrous. Leaves sessile, aggregated proximally and distally in stem, remote near middle of stem, oblong or elliptic-oblong to spatulate, apex obtuse or subacute; proximal and median leaves 4–8 × 3–4 mm, glabrous; distal leaves lilac, ca. 1.2 cm × 3–4 mm, shortly glandular hairy. Flower solitary or cyme 2-flowered; pedicel lilac, 1.5–8 mm, purple shortly glandular hairy; hypanthium broadly mitriform, ca. 1.5 mm, sparsely glandular hairy. Sepals elliptic to triangular or broadly ovate, 2.5–3 × 1.5–2.8 mm, purple glandular hairy, 3-veined, apex obtuse. Petals yellow, broadly obovate, 3–3.2 × 2–2.6 mm, 5-veined, apex obtuse. Stamens ca. 2.8 mm. Ovary subinferior, broadly conical, ca. 2 mm above hypanthium; styles short. Fl. Jul–Aug.

4000–4600 m. S Xizang (Nêdong Xian, Yadong Xian) [Bhutan, Nepal, Sikkim].

185. *Saxifraga consanguinea* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 132. 1913.

棒腺虎耳草 bang xian hu er cao

Hirculus propaguliferus (H. Smith) Losinskaja; *Saxifraga muliensis* Handel-Mazzetti; *S. propagulifera* H. Smith.

Stem 0.6–8.5 mm, glandular hairy, glands clavate. Stolons arising from axils of basal leaves, 3–12 cm, sparsely glandular pilose, apex usually gemmiferous. Basal leaves aggregated into a rosette, narrowly elliptic or narrowly obovate to subspatulate, 4.5–9 × 1.6–3 mm, subcarnose, both surfaces glabrous, margin eglandular or glandular ciliate (glands clavate), apex mucronate. Cauline leaves remote, oblong or lanceolate to oblanceolate-linear, 5–10 × 1.0–2.5 mm, subcarnose, both surfaces glabrous or abaxially glandular hairy,

margin glandular ciliate, apex mucronate. Flower solitary, or cyme corymbose, 2–10-flowered, 0.8–2.5 cm; branches 1.8–2.3 cm, 2- or 3-flowered; pedicels 2–6 mm, glandular hairy. Sepals erect, broadly to narrowly ovate, 1.8–3.8 × 1–2 mm, carnose, abaxially and marginally glandular hairy, glands clavate, veins 3–6, confluent or not at apex, apex obtuse or acute. Petals red, pink, or yellow, elliptic, or ovate to broadly so or broadly obovate, 1.2–2.6 × 1–2 mm, leathery, 2-callose, 3-veined, base abruptly narrowed into a claw 0.2–0.8 mm, apex usually obtuse, rarely acute. Male flowers: stamens 1.6–2 mm; pistil degenerate. Female flowers: stamens degenerate, 0.6–1 mm; ovary semi-inferior, 3–3.5 mm, with an annular nectary disc; styles ca. 1 mm. Fl. and fr. Jun–Sep.

Picea forests, scrub, stony alpine meadows, boulders, screes, rock crevices; 3000–5400 m. S Qinghai, W Sichuan, E and S Xizang, NW Yunnan [Nepal].

Saxifraga consanguinea is extremely close to the Himalayan *S. pilifera* J. D. Hooker, from which it differs chiefly in having basal leaves adaxially glabrous (vs. glandular pubescent). However, further study may show that the two taxa cannot be distinguished.

186. *Saxifraga microgyna* Engler & Irmscher, Bot. Jahrb. Syst. 48: 604. 1912.

小果虎耳草 xiao guo hu er cao

Hirculus microgynus (Engler & Irmscher) Losinskaja;
Saxifraga microgyna var. *ramosior* Engler & Irmscher;
S. microgyna f. *uniflora* T. C. Ku.

Stem 3.5–20 cm tall, glandular pilose. Stolons arising from axils of basal leaves, brown glandular hairy, apex gemmiferous. Basal leaves aggregated into a rosette, elliptic-obovate or narrowly obovate to oblong, 5–7.3 × 1.5–3.2 mm, subcarnose, both surfaces and margin glandular hairy, more sparsely so abaxially, apex acute. Cauline leaves remote, narrowly elliptic to narrowly obovate, 5–15(–20) × 2–6 mm, both surfaces and margin glandular hairy, apex acute. Cyme laxly corymbose, 0.6–1.5 cm, (1–)3–15-flowered; pedicels 1.8–3.5 mm, glandular pilose. Sepals erect, then

spreading, ovate or narrowly so to oblong, 1.6–3.2 × 0.8–1.3 mm, subcarnose, abaxially and marginally glandular pubescent, veins 3–5, not or partly confluent at apex, apex acute. Petals yellow to pink, elliptic, ovate or narrowly so, or oblong, 2–3.2 × 1–1.4 mm, 2-callose, 1–3-veined, base clawless, or with a claw 0.4–1 mm, apex acute. Male flowers: stamens ca. 1.5 mm; pistil degenerate. Female flowers: stamens degenerate, 0.4–0.5 mm; ovary inferior, 1.4–1.5 mm, with an annular nectary disc; styles ca. 1 mm. Fl. and fr. Jul–Sep.

• Forest margins, rocky alpine meadows, rock crevices; 3000–4900 m. SE Qinghai (Jigzhi Xian), W Sichuan, S Xizang (Comai Xian), NW Yunnan (Dêqên Xian, Zhongdian Xian).

187. *Saxifraga angustata* H. Smith, Acta Horti Gothob. 1: 17. 1924.

狭叶虎耳草 xia ye hu er cao

Hirculus angustatus (H. Smith) Losinskaja.

Stem 8–12 cm tall, glandular pilose. Stolons arising from axils of basal leaves, sparsely glandular hairy, apex gemmiferous. Basal leaves aggregated into a rosette, suboblanceolate to narrowly linear, 10–15 × 1.0–1.5 mm, subcarnose, both surfaces and margin glandular hairy, apex acute. Cauline leaves remote, narrowly linear, 13–17 × 1.8–2 mm, both surfaces and margin glandular hairy, apex acute. Cyme laxly corymbose, 5- or 6-flowered; pedicels 5–10 mm, glandular pilose. Sepals erect, then spreading, oblong or narrowly ovate, 2.5–4 × 1.5–2 mm, subcarnose, abaxially and marginally sparsely glandular pubescent, veins 3–5, partly or fully confluent at apex, apex acute. Petals red or pink when dry, narrowly elliptic, 3–3.5 × 1.5–2 mm, 2-callose, 3–5-veined, base tapered into a claw ca. 0.6 mm, apex acute. Male flowers: stamens ca. 1.5 mm; pistil degenerate. Female flowers: stamens degenerate, 0.4–0.5 mm; ovary inferior, ca. 3 mm, with an annular nectary disc; styles 1–1.5 mm. Fl. (?and fr.) Jul–Sep.

• Moist alpine meadows, cliff faces; 4200–4300 m. W Sichuan.

5. *Saxifraga* sect. *Mesogyne* Sternberg, Revis. Saxifrag. Suppl. 2: 29. 1831.

球茎组 qiu jing zu

Herbs perennial, forming erect individuals, with bulbils present in axils of at least basal leaves. Leaves alternate, petiolate; leaf blade herbaceous, lacking chalk glands and crystals, margin toothed or lobed. Flowering stem leafy; inflorescence cymose. Flowers bisexual, actinomorphic, 5-merous. Petals white, rarely reddish, not callose. Filaments subulate to linear; pollen 2-nucleate, exine tectum coarsely striate. Carpels connate for most of placental region, dehiscent distally in fruit; ovary subsuperior. Integuments 2.

About eight species: Asia, Europe, North America, mainly in arctic and montane regions; three species in China.

1a. Bulbils restricted to rhizome, none present in axils of cauline leaves or bracts 188. *S. sibirica*

1b. Bulbils present in axils of cauline leaves and/or bracts.

2a. Bulbils present in axils of cauline leaves only, not replacing flowers 189. *S. granulifera*

2b. Bulbils present in axils of cauline leaves and (where replacing flowers) bracts 190. *S. cernua*

188. *Saxifraga sibirica* Linnaeus, Syst. Nat., ed. 10, 2: 1027. 球茎虎耳草 qiu jing hu er cao
1759.

Lobaria sibirica (Linnaeus) Haworth; *Saxifraga pekinensis* Maximowicz; *S. sibirica* var. *bockiana* Engler; *S. sibirica* var. *eusibirica* Engler & Irmscher; *S. sibirica* var. *pekinensis* (Maximowicz) Engler & Irmscher; *S. sibirica* var. *pycnoloba* Franchet; *S. sibirica* var. *schindleri* Engler & Irmscher.

Stem 6.5–25 cm tall, densely glandular pilose. Basal leaves with petiole 1.2–4.5 cm, glandular pilose; leaf blade reniform, 0.7–1.8 × 1–2.7 cm, margin 7–9-lobed; lobes ovate or broadly so to broadly orbicular, glandular pilose. Cauline leaves with petiole 1–9 mm; leaf blade reniform or broadly ovate to broadly orbicular, 4.5–15 mm × 0.5–2 cm, glandular pilose, margin 5–9-lobed, base reniform or cuneate to truncate. Cyme corymbose, 2.3–17 cm, 2–13-flowered, rarely flower solitary; pedicels slender, 1.5–4 cm, glandular pilose. Sepals erect, lanceolate to oblong, 3–4 × 0.6–1.8 mm, abaxially and marginally glandular pubescent, veins 3–5, not, partly, or fully confluent at apex, apex obtuse or acute. Petals white, obovate to narrowly so, 0.6–1.5 cm × 1.5–4.7 mm, 3–8 veined, base gradually contracted into a claw. Stamens 2.5–5.5 mm. Carpels connate proximally, 2.6–4.9 mm; ovary ovoid, 1.8–3 mm; styles 0.8–2 mm; stigma small. Fl. and fr. May–Nov. $2n = 16, 26$.

Forests, scrub, alpine meadows, rock clefts; 800–5100 m. S Gansu (Wen Xian), NW Hebei, N Heilongjiang (Heihe Shi), W Hubei, Hunan (Xinglong), Nei Mongol, S Shaanxi, C Shandong (Tai Shan), E Shanxi, Sichuan, Xinjiang (Hami Xian, Shawan Xian, Taxkorgan Tajik Zizhixian), Xizang, NW Yunnan [India, Kashmir, Mongolia, Nepal, Russia].

189. *Saxifraga granulifera* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 259. 1960.

珠芽虎耳草 zhu ya hu er cao

Saxifraga sibirica Linnaeus var. *bulbillifera* H. Smith. Stem simple or branched, 10–25 cm tall, glandular pilose, with 1–3 minute bulbils 0.2–0.5 mm in axils of cauline leaves. Basal leaves with petiole 1.5–2.5 cm, glandular pilose; leaf blade reniform to suborbicular, 0.8–1 × 1–1.1 cm, margin 7–9-lobed; lobes broadly ovate to triangular-ovate, adaxially glabrous or sparsely glandular pilose, margin glandular pilose. Cauline leaves with petiole 0.3–3 cm; leaf blade reniform or broadly ovate to broadly orbicular, 0.4–1 × 0.4–1.5 cm, glandular pilose, base reniform or cuneate to truncate, margin 5–7-lobed. Cyme corymbose, 2–10 cm, 1–10-

flowered; pedicels slender, 0.5–3 cm, glandular pilose. Sepals erect, ovate to narrowly so, 1.2–2.5 × ca. 1 mm, abaxially and marginally glandular pubescent, veins 3–5, not, partly, or fully confluent at apex, apex acute. Petals white or yellowish, narrowly obovate-cuneate, 5–8 × 1.7–2.5 mm, 3–8 veined, base gradually tapered into a claw. Stamens 2.5–3 mm. Carpels connate proximally, 2.5–5 mm; ovary ovoid, 2–3 mm; styles ca. 1.3 mm. Fl. and fr. Jun–Sep.

Alpine grasslands, cliff ledges, mossy rocks; 3100–4600 m. Sichuan, SE Xizang, Yunnan [Bhutan, India (Uttar Pradesh), Nepal, Sikkim].

190. *Saxifraga cernua* Linnaeus, Sp. Pl. 1: 403. 1753.

零余虎耳草 ling yu hu er cao

Lobaria cernua (Linnaeus) Haworth; *Saxifraga cernua* f. *bulbillosa* Engler & Irmscher; *S. cernua* var. *linnaeana* Seringe; *S. cernua* f. *ramosa* J. G. Gmelin; *S. cernua* f. *simplicissima* Ledebour.

Stem branched or simple, 6–25 cm tall, glandular pubescent, with conspicuous, red or brown bulbils in axils of cauline leaves. Basal leaves with petiole 3–8 cm, crisped glandular villous near base, elsewhere glandular pubescent; leaf blade reniform, 0.7–1.5 × 0.9–1.8 cm, margin generally 5–7-lobed; lobes broadly ovate, glandular pubescent. Proximal cauline leaves with petiole 0.3–3.4 cm, glandular pubescent; leaf blade reniform, 0.8–2 × 1–2.4 cm, glandular pubescent, margin 5–7(–9)-lobed; distal cauline leaves with petiole shorter, leaf blade 3-lobed at margin. Cyme 2–5-flowered or flower solitary; bulbils present in bract axils; pedicels 0.6–3 cm, glandular pubescent. Sepals erect, elliptic or ovate to suboblong, 3–3.7 × 1–2.8 mm, abaxially and marginally glandular pubescent, veins 3(–7), not, partly, or fully confluent at apex, apex subobtusely or acute. Petals white or yellowish, obovate to narrowly so, 4.5–10.5 × 2.1–4.1 mm, 3–8(–10)-veined, base gradually contracted into a claw 1.2–1.8 mm, apex retuse or obtuse. Stamens 4–5.5 mm. Ovary subsuperior, ovoid; styles 0.9–2 mm. Fl. and fr. Jun–Sep. $2n = 36, 48, 50, 52, 56, 60–70$.

Forests, forest margins, alpine meadows, alpine rock crevices; 2200–5500 m. WC Hebei (Xiaowutai Shan), S Jilin (Fusong Xian), E Nei Mongol, N Ningxia (Helan Shan), Qinghai, S Shaanxi (Taibai Shan), N Shanxi (Ningwu Xian), W Sichuan, Xinjiang (Bogda Shan), Xizang, NW Yunnan [India, Japan, Korea, Mongolia, Russia; Europe, North America].

6. *Saxifraga* sect. **Porphyron** Tausch, Hort. Canal. 1. 1823.

垫状组 dian zhuang zu

Antiphylla Haworth.

Herbs perennial, forming dense cushions or mats, lacking basal bulbils. Leaves alternate or opposite; petiole scarcely differentiated; leaf blade leathery, usually stiff and hard, usually coated with a white deposit of calcium carbonate derived from chalk glands set submarginally (rarely marginally) in pits in adaxial surface, margin entire but often denticulate-ciliate proximally; foliar crystals absent. Inflorescence cymose or flower solitary. Flowers bisexual, actinomorphic, 4- or 5-merous. Petals white, pink, or red, rarely yellow, not callose. Filaments subulate to

linear; pollen 2-nucleate, exine tectum coarsely striate. Carpels connate proximally or for most of placental region, dehiscent distally in fruit; ovary subsuperior to subinferior. Integuments 2.

About 90 species: primarily in Asia and Europe, mainly Himalayan and montane, also extending into North America; 25 species (17 endemic) in China.

- 1a. Shoot leaves opposite; flower solitary.
 - 2a. Shoot leaves with 1(–3) chalk glands.
 - 3a. Leaves of a pair meeting at an acute angle, margin denticulate-ciliate proximally; all flowers 5-merous 211. *S. georgei*
 - 3b. Leaves of a pair confluent at base, margin glabrous; all or most flowers 4-merous.
 - 4a. Petals 2–3 × as long as sepals; leaves with 1–3 chalk glands 213. *S. decussata*
 - 4b. Petals less than 2 × as long as sepals; leaves with 1 chalk gland 215. *S. nana*
 - 2b. Shoot leaves with 3–7 chalk glands.
 - 5a. Leaves of a pair meeting at an acute angle, margin denticulate-ciliate proximally; all flowers 5-merous.
 - 6a. All leaves in opposite pairs 210. *S. oppositifolia*
 - 6b. Some leaves on vigorous shoots 3-verticillate 212. *S. subternata*
 - 5b. Leaves of a pair confluent at base, margin glabrous; all or most flowers 4-merous.
 - 7a. Flowering stem 0.7–1.5 cm, with 1 or 2 pairs of opposite cauline leaves 214. *S. monantha*
 - 7b. Flowering stem absent to 5 mm 213. *S. decussata*
- 1b. Shoot leaves alternate; flowers 1 to several.
 - 8a. Petals yellow.
 - 9a. Cyme 2- or 3-flowered 196. *S. rotundipetala*
 - 9b. Flower solitary.
 - 10a. Flowering stem more than 2 cm 194. *S. kongboensis*
 - 10b. Flowering stem to 1 cm.
 - 11a. Stamens equaling or exceeding petals; basal 2/3 of leaf margin denticulate-ciliate 195. *S. nambulana*
 - 11b. Stamens much shorter than petals; basal 1/3 of leaf margin minutely setose-ciliate 193. *S. elliotii*
 - 8b. Petals white, pink, or red.
 - 12a. Corolla shorter than or subequaling calyx.
 - 13a. Flower solitary, sessile or borne on a stem to 1 cm 192. *S. rupicola*
 - 13b. Flowers 2–7, borne on a stem 1–4 cm 191. *S. chionophila*
 - 12b. Corolla at least 1.5 × as long as calyx.
 - 14a. Cyme 2- to several flowered.
 - 15a. Cyme apparently sessile, embedded among leafy shoots; petals white 200. *S. clivorum*
 - 15b. Cyme elevated above leafy shoots on a stem 1.5–7 cm; petals reddish, pink, or white.
 - 16a. Sepals without chalk glands.
 - 17a. Styles less than 2.5 mm 197. *S. afghanica*
 - 17b. Styles more than 4 mm 201. *S. pulchra*
 - 16b. Sepals with 1–3 chalk glands.
 - 18a. Petals pink or purple 199. *S. decora*
 - 18b. Petals white, rarely pale pink 198. *S. andersonii*
 - 14b. Flower solitary.
 - 19a. Leaves with 1 chalk gland.
 - 20a. Petals more than 2 mm wide 208. *S. subsessiliflora*
 - 20b. Petals less than 2 mm wide 209. *S. pulvinaria*
 - 19b. Leaves with more than 1 chalk gland.
 - 21a. Flowering stem ± absent 207. *S. likiangensis*
 - 21b. Flowering stem present.
 - 22a. Sepals glabrous abaxially 204. *S. saxicola*
 - 22b. Sepals glandular hairy abaxially.
 - 23a. Petals purple or reddish.
 - 24a. Petals at least 9 mm 203. *S. ludlowii*
 - 24b. Petals 4–4.5 mm 206. *S. saxatilis*
 - 23b. Petals white.
 - 25a. Petals less than 5 mm 206. *S. saxatilis*
 - 25b. Petals at least 6 mm.
 - 26a. Flowering stem to 1 cm 202. *S. doyalana*
 - 26b. Flowering stem more than 2 cm 205. *S. unguipetala*

191. *Saxifraga chionophila* Franchet, J. Bot. (Morot) 10: 265. 1896.

雪地虎耳草 xue di hu er cao

Saxifraga schneideri Engler.

Plants many branched, 2.5–7 cm tall, forming a compact cushion of leafy shoots. Flowering stem 1–4 cm, proximally densely leafy, distally more sparsely so, brown glandular hairy. Shoot leaves imbricate, aggregated into a rosette distally on shoot, spatulate to narrowly obovate, (5–)8–9 × (1.5–)2.3–3 mm, leathery, both surfaces glabrous, chalk glands 5–7, margin denticulate-ciliate basally, apex subacute. Cauline leaves subspatulate, 4–8 × 1–2 mm, leathery, abaxially and marginally glandular hairy proximally, chalk glands 5, apex recurved, subobtuse. Cyme corymbose, 2–7-flowered; branches 1–1.5 cm, brown glandular hairy; bract tightly appressed to hypanthium, linear, 2–5 × ca. 1 mm, abaxially and marginally brown glandular hairy, chalk glands 2, apex acute; pedicels absent. Sepals erect to ascending, ovate, 1.5–3 × 1.2–1.8 mm, abaxially and marginally colorless glandular hairy, chalk glands 3, veins 3 or 4, confluent or not at apex, apex obtuse. Petals red, obovate to oblong-oblancheolate, 1.8–3 × 0.8–1 mm, subleathery, abaxially and marginally pale hairy, adaxially glabrous, chalk glands 1–3, veins 3–5, partly confluent at apex, apex acute. Stamens ca. 2 mm. Ovary semi-inferior; styles very short. Fl. and fr. Jun–Sep.

• Alpine meadows, cliffs, rock crevices; 2700–5000 m. SW Sichuan (Muli Zang Zu Zizhixian), SE Xizang (Zayü Xian), W Yunnan (Dali Xian, Lijiang Naxi Zu Zizhixian, Zhongdian Xian).

192. *Saxifraga rupicola* Franchet, J. Bot. (Morot), 10: 264. 1896.

崖生虎耳草 ya sheng hu er cao

Plants many branched, forming a compact cushion of leafy shoots. Flowering stem 6–8 mm, distally with leaves evenly distributed, crisped glandular hairy. Shoot leaves densely imbricate, forming tight rosettes distally; leaf blade deflexed, spatulate or narrowly obovate, 4–5 × 1.5–2.5 mm, leathery, both surfaces glabrous, margin sparsely eglandular ciliate proximally, chalk glands 3–5(–7), apex obtuse. Proximal cauline leaves spatulate, 3–3.5 × 1–1.2 mm, chalk glands 3, margin sparsely ciliate at base, apex obtuse. Flower solitary, sessile; pedicel very short, glandular crisped hairy. Sepals erect, oblong, 2.6–2.8 × 1.3 mm, chalk gland 1, veins 3, not confluent at apex, margin sparsely glandular ciliate, apex reflexed, obtuse. Petals greenish yellow, oblong-lanceolate, 2.3–2.5 × 0.7 mm, nearly equaling sepals, 1-veined, base tapered. Stamens equaling petals. Ovary 1/3 inferior, with an annular nectary disc; styles very short. Fl. and fr. Jun–Jul.

• Calcareous rocks; ca. 3500 m. Yunnan.

193. *Saxifraga elliotii* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 109. 1958.

索白拉虎耳草 suo bai la hu er cao

Saxifraga buceras H. Smith.

Plants caespitose. Shoots many branched, elongate, to 6 cm. Flowering stem short, 0.2–3.5 cm, glandular pilose. Shoot leaves densely imbricate, sometimes

subopposite, suberect or subrecurved, narrowly obovate to obovate-oblong, 4–6 × 1.5–2 mm, leathery, both surfaces glabrous, chalk glands 5–7, margin cartilaginous denticulate-ciliate proximally, apex obtuse or subacute. Cauline leaves absent or 1–7, remote, similar to shoot leaves, abaxially and marginally glandular pilose. Flower solitary; pedicel short or nearly absent; hypanthium usually black glandular hairy. Sepals ovate to broadly so, 2.5–4 × 2–2.7 mm, glandular pilose abaxially and marginally, chalk gland 1, veins 3–5, partly to fully confluent at apex, apex acute, glabrous. Petals yellow, obovate, 5–10 × 3.5–6.5 mm, ca. 8-veined, base gradually narrowed into a short claw, apex obtuse. Stamens 3–8 mm. Carpels connate proximally; ovary subsuperior, ca. 3.5 mm; styles erect, ca. 2 mm. Fl. Jul–Aug.

• Rocky hillsides, streamsides, cliff faces; 2800–3600 m. SE Xizang (Nyingchi Xian).

Saxifraga buceras agrees in a large number of important details of leaf and floral morphology with *S. elliotii*. Such differences as there are involve chiefly the height of the flowering stem (to 3.5 cm in *S. buceras* and to 0.5 cm in *S. elliotii*), and possibly also the length of the petals (to 10 mm in *S. buceras* and to 7 mm in *S. elliotii*). There may also be a difference in the shape of the fruit, but this is as yet unclear (styles widely divergent in *S. buceras*, but mature fruits not seen in *S. elliotii*). Since *S. elliotii* is known to vary somewhat, it seems justifiable under the circumstances to regard *S. buceras* as a synonym.

194. *Saxifraga kongboensis* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 113. 1958.

九窝虎耳草 jiu wo hu er cao

Plants many branched, to 7 cm tall. Flowering stem to 2.5 cm, glandular pilose. Shoot leaves imbricate, aggregated into a rosette, linear to suboblong, 5–7(–10) × 1.5–1.9(–2.5) mm, both surfaces glabrous, chalk glands 7–11, margin cartilaginous ciliate proximally, apex mucronate. Cauline leaves 3–5, abaxially and marginally glandular pilose, chalk gland 1. Flower solitary; pedicel glandular pilose. Sepals erect, ovate, ca. 3.5 × 2.5 mm, abaxially and marginally glandular pilose, adaxially glabrous, chalk gland 1, veins 4, not confluent at apex, apex obtuse or subacute, glabrous. Petals yellow, broadly obovate to orbicular, ca. 1 × 0.85 cm, ca. 15-veined, base abruptly narrowed into a claw 2–2.5 mm, margin subundulate. Stamens ca. 7.5 mm. Carpels connate proximally; ovary subsuperior; styles divergent, ca. 3 mm. Fl. May–Aug.

• Rock crevices; 2400–2900 m. SE Xizang (Nyingchi Xian).

195. *Saxifraga nambulana* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 108. 1958.

南布拉虎耳草 nan bu la hu er cao

Plants many branched, to 3 cm tall, with crowded shoots forming cushions. Flowering stem barely 1 cm, glandular villous. Shoot leaves imbricate, long persistent even when dead, spatulate to narrowly obovate, ca. 5.5 × 2 mm, leathery, thickened in distal 1/3, both surfaces glabrous, chalk glands 5, margin cartilaginous denticulate-ciliate proximally, apex usually mucronate and glabrous. Cauline leaves 4–6, ca.

5 mm, subleathery, glandular pilose abaxially and at proximal margin, chalk gland 1, apex acute. Flower solitary; pedicel and hypanthium densely glandular villous. Sepals broadly ovate, ca. 4×3 mm, glandular pilose abaxially and at margin, veins 3, confluent at apex, apex subacute or acute, glabrous. Petals yellow, elliptic to obovate, ca. 7×3 mm, 3- or 4-veined, base contracted into a claw ca. 1.5 mm, apex obtuse. Stamens ca. 7 mm. Carpels connate proximally; ovary subsuperior; styles erect, ca. 2 mm. Fl. Jul–Aug.

• Rock faces; ca. 4200 m. SE Xizang (Nyingchi Xian).

196. *Saxifraga rotundipetala* J. T. Pan in C. Y. Wu, Fl. Xizang, 2: 513. 1985.

圆瓣虎耳草 *yuan ban hu er cao*

Plants many branched, ca. 7 cm tall, with crowded shoots forming cushions. Flowering stem glandular hairy. Shoot leaves subimbricate, forming rosettes, subspatulate, abaxially convex, adaxially subconcave, $6.8\text{--}7 \times$ ca. 2 mm, chalk glands 3–5 (or 6), margin setose-ciliate proximally. Cauline leaves remote, subspatulate, $6.5\text{--}7.3 \times 1.8\text{--}1.9$ mm, glandular hairy abaxially and at proximal margin, chalk gland 1. Cyme 2- or 3-flowered; pedicels 2–3 mm, glandular hairy. Sepals erect, subelliptic, $4\text{--}5 \times 2.5\text{--}3$ mm, glandular hairy abaxially and at margin, veins 3–5, partly or fully confluent at apex, apex glabrous. Petals yellow, orbicular, $4.6\text{--}5.5 \times 4\text{--}4.7$ mm, 7–9-veined, base with a claw 1–1.3 mm, apex obtuse or retuse. Stamens 1.8–4 mm. Ovary semi-inferior, ca. 5.5 mm; styles divergent. Fl. Jul–Aug.

• About 3900 m. SE Xizang (Médog Xian).

197. *Saxifraga afghanica* Aitchison & Hemsley in Aitchison, J. Linn. Soc., Bot. 18: 56. 1880.

具梗虎耳草 *ju geng hu er cao*

Plants many branched, with crowded shoots forming cushions. Flowering stem 0.8–2.5 cm, glandular hairy, leafy. Shoot leaves aggregated into a rosette, oblong to subspatulate, $4\text{--}7 \times 1.3\text{--}2$ mm, leathery, both surfaces glabrous, chalk glands 5, margin denticulate-ciliate proximally or glabrous, apex recurved, obtuse. Cauline leaves lanceolate-oblong, $3.5\text{--}5 \times$ ca. 1 mm, chalk gland 1, margin glandular hairy proximally, apex obtuse or acute. Cyme (2 or)3- or 4-flowered, rarely flower solitary; branches ca. 1 cm. Sepals erect, purple, oblong to sub lanceolate, $2\text{--}3 \times 1\text{--}1.4$ mm, abaxially and marginally sparsely glandular pilose, veins 3, not confluent at apex, apex acute. Petals usually pink, obovate, ca. $5 \times 2.5\text{--}3.3$ mm, 5-veined, base gradually narrowed into a short claw, apex obtuse. Stamens 3–3.5 mm. Ovary semi-inferior; styles 1.5–2.2 mm. Fl. Jun–Aug. $2n = 26$.

Alpine rock crevices; 4200–4500 m. S Qinghai (Nangqên Xian, Zadoi Xian), S Xizang (Lhasa Shi) [Afghanistan, Kashmir, Nepal, Pakistan].

In FRPS, *Saxifraga afghanica* was described as having solitary flowers. The belief that this species normally has 1-flowered cymes originates from the drawing provided by Engler and Irmscher (in Engler, Pflanzenr. 69(IV. 117. II): 567, fig. 116, F. 1919). This is not

the usual condition, as the protologue makes clear when it refers to the cymes being (2 or)3- or 4-flowered.

198. *Saxifraga andersonii* Engler & Irmscher, Bot. Jahrb. Syst. 48: 609. 1912.

短瓣虎耳草 *duan ban hu er cao*

Plants many branched, 2.5–9 cm tall, with crowded shoots forming cushions. Flowering stem ca. 5 mm initially, embedded among rosette leaves and not visible, elongating to 2.5–3 cm after anthesis and then 1–2 cm taller than rosette leaves, glandular hairy, with 4 or 5 leaves. Shoot leaves subimbricate, aggregated into a rosette, obovate or oblong to oblanceolate-linear, abaxially convex, adaxially concave, $5\text{--}10 \times 1.2\text{--}2.6$ mm, leathery, both surfaces glabrous, chalk glands 3(–7), margin cartilaginous ciliate, apex somewhat reflexed, thickened, glabrous. Cauline leaves remote, suboblong or suboblanceolate to oblanceolate-ensiform, $3\text{--}9.3 \times 1.1\text{--}1.6$ mm, both surfaces usually glabrous, abaxially sometimes glandular hairy proximally, chalk glands 1–3, margin glandular hairy, apex thickened, glabrous. Cyme 2–5-flowered, rarely flower solitary; branches 1.5–4 mm; bracts lanceolate, ca. 4×1 mm, abaxially and marginally glandular hairy, apex acute; pedicels nearly absent. Sepals erect, ovate to broadly so, $1.5\text{--}3 \times 1\text{--}2$ mm, abaxially and marginally glandular hairy, veins 3, partly or fully confluent at apex, apex obtuse, glabrous. Petals white or pink, obovate to broadly so, $1.3\text{--}5 \times 1.2\text{--}3.2$ mm, 3–5-veined, base contracted into a claw 0.6–1.6 mm, apex obtuse. Stamens 3–3.8 mm. Ovary semi-inferior, with an annular nectary disc; styles 0.2–2.4 mm. Fl. Jun–Aug. $2n = 26$.

Alpine meadows, rock crevices; 4100–4700 m. S Xizang [Bhutan, Nepal, Sikkim].

The specific epithet was spelled “*Anderssonii*” in the protologue, although the type specimen was cited as “*T. Anderson 596*.” The correct spelling of the collector’s name is “Anderson,” so “*Anderssonii*” should be treated as a typographical error.

199. *Saxifraga decora* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 122. 1958.

滇藏虎耳草 *dian zang hu er cao*

?*Saxifraga lamarum* H. Smith.

Plants many branched, 3.5–6 cm tall, with crowded shoots forming cushions. Flowering stem 1.5–3.4 cm, densely dark brown glandular hairy. Shoot leaves aggregated into a rosette, subspatulate to suboblong, $3.3\text{--}5 \times 1.1\text{--}2$ mm, leathery, both surfaces glabrous, chalk glands 3–7, margin cartilaginous ciliate proximally, apex rather recurved, obtuse. Cauline leaves 4–6, linear to subspatulate, abaxially convex, adaxially subconcave, $4.5\text{--}5 \times 0.9\text{--}2$ mm, leathery, abaxially glandular hairy, adaxially glabrous, chalk glands 3–5, margin glandular hairy, apex obtuse, glabrous. Cyme corymbose, 3- or 4-flowered; pedicels glandular hairy. Sepals erect, subovate, $2\text{--}2.8 \times 1.2\text{--}2$ mm, leathery, abaxially and marginally dark brown glandular hairy, chalk glands 1–3, veins 3, confluent or

not at apex, apex obtuse. Petals pink or purple, spatulate to narrowly obovate, 3–5.1 × 1.3–3 mm, 3–5-veined, base usually gradually narrowed into a claw, apex obtuse. Stamens ca. 5 mm. Ovary semi-inferior, broadly ovoid, 2–3 mm; styles 1–2.8 mm. Fl. May–Aug.

• Cliffs, alpine rock crevices; 3500–4800 m. E and S Xizang (Baxoi Xian, Lhasa Shi), NW Yunnan (Dêqên Xian, Zhongdian Xian).

The Chinese plants identified in FRPS as the NW Himalayan *Saxifraga meeboldii* Engler & Irmscher evidently belong to *S. decora*. The description in FRPS states that the petals are “pink or purple,” but in true *S. meeboldii* they are yellow. It appears that the description applies to one or both of the synonyms that were listed under *S. meeboldii*, namely *S. decora* and *S. lamarum*. Although most of the characters distinguishing the latter two taxa are encompassed by the description in FRPS, the glandular hairy sepal surface clearly points to *S. decora* (*S. lamarum* has sepals abaxially glabrous). Therefore, the present authors have provisionally taken *S. decora* to be the species intended in FRPS under *S. meeboldii*. It remains to be seen whether *S. lamarum* is synonymous.

200. *Saxifraga clivorum* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 122. 1958.

截叶虎耳草 jie ye hu er cao

Plants many branched, 1.5–2 cm tall, with crowded shoots forming cushions. Flowering stem ca. 4 mm, embedded among rosette leaves and not visible, glandular hairy. Shoot leaves subimbricate, aggregated into a rosette, narrowly obovate, abaxially convex, adaxially concave, 6.5–6.7 × 2.3–2.6 mm, both surfaces glabrous, chalk glands 3, margin glandular ciliate proximally, apex truncate. Cauline leaves narrowly subobovate, abaxially subconvex, adaxially subconcave, ca. 5 × 1.8 mm, abaxially glandular hairy proximally, adaxially glabrous, chalk glands 3, margin cartilaginous glandular ciliate, apex subacute, glabrous. Cyme usually 3-flowered; bracts tightly appressed to hypanthium, linear, chalk gland 1; pedicels nearly absent. Sepals erect, broadly ovate, 1.8–2 × ca. 1.5 mm, both surfaces glabrous, veins 3, not confluent at apex, margin cartilaginous glandular ciliate, apex obtuse, glabrous. Petals white, broadly obovate to orbicular, 4–4.2 × 3–3.6 mm, 5–7-veined, base with a claw 0.5–0.9 mm, apex obtuse. Stamens ca. 2.5 mm. Ovary semi-inferior; styles ca. 2 mm. Fl. Jun–Aug.

Cushion vegetation, cliffs, rocks; 4700–5000 m. S Xizang (Dinggyê Xian) [Bhutan, Sikkim].

201. *Saxifraga pulchra* Engler & Irmscher, Notes Roy. Bot. Gard. Edinburgh 5: 146. 1912.

美丽虎耳草 mei li hu er cao

Chondrosea pulchra (Engler & Irmscher) Losinskaja. Plants many branched, ca. 3.9 cm tall, with shoots forming cushions. Flowering stem 1.5–3.5 cm, dark brown glandular hairy. Shoot leaves aggregated into a rosette, ovate-oblong, 5.5–7 × ca. 2.5 mm, leathery, both surfaces glabrous, chalk glands 7–11, margin setose-ciliate proximally, apex rather recurved, acute.

Cauline leaves subspatulate, ca. 5.7 × 1 mm, leathery, abaxially and marginally brown glandular hairy proximally, chalk glands 5–8, apex acute. Cyme compact, ca. 6-flowered; bracts oblong, ca. 4.4 × 1.4 mm, leathery, abaxially and marginally brown glandular hairy proximally, chalk gland 1, apex acute; pedicels ca. 1 mm, sparsely glandular hairy. Sepals erect, ovate to subelliptic, 2.4–3 × 1.5–2 mm, abaxially sparsely glandular hairy proximally, veins 3–5, not confluent at apex, margin usually glabrous, rarely sparsely glandular ciliate, apex obtuse or acute. Petals pink or purple, narrowly obovate, 4–5 × 2–2.7 mm, 3-veined, base contracted into a claw ca. 1.5 mm, apex obtuse. Stamens 3–4.3 mm. Ovary semi-inferior; styles 5–7 mm. Fl. and fr. Apr–Sep.

• *Abies* forests, scrub, rock crevices; 2500–4600 m. W Sichuan (Daocheng Xian), Xizang, NW Yunnan (Lijiang Naxi Zu Zizhixian, Zhongdian Xian).

202. *Saxifraga doyalana* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 118. 1958.

白瓣虎耳草 bai ban hu er cao

Plants many branched, to 2 cm tall, with shoots forming cushions. Flowering stem ca. 1 cm, glandular pilose. Shoot leaves subobovate, ca. 4 × 2 mm, thickened distally, both surfaces glabrous, chalk glands 5–7, margin densely shortly ciliate proximally, apex not or rather recurved, subobtuse. Flower solitary; hypanthium glandular pilose. Sepals broadly subovate, ca. 1.8 mm, abaxially and marginally densely glandular pilose, usually with chalk glands, veins 3, not confluent at apex, apex thickened, glabrous. Petals white, broadly obovate, ca. 6 × 4.2 mm, ca. 6-veined, base gradually narrowed into a claw ca. 1.5 mm. Stamens 3–3.5 mm. Carpels connate proximally; ovary subsuperior; styles ca. 1.5 mm. Fl. Jul–Aug.

• Stony ground; ca. 4800 m. S Xizang.

203. *Saxifraga ludlowii* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 113. 1958.

红瓣虎耳草 hong ban hu er cao

Plants many branched, 3–4 cm tall, with crowded shoots forming cushions. Flowering stem ca. 1.1 cm, overtopping rosette leaves, glandular hairy. Shoot leaves aggregated into a rosette, lanceolate-oblong, abaxially convex, adaxially concave, ca. 5.5 × 1.6 mm, leathery, both surfaces glabrous, chalk glands 3, margin denticulate-ciliate, apex recurved, acute, glabrous. Cauline leaves ensiform, ca. 5 × 1 mm, glandular hairy, chalk gland 1, apex subacute, glabrous. Flower solitary; pedicel ca. 2 mm, purple-black glandular hairy. Sepals erect, subovate, ca. 4 × 2–2.6 mm, abaxially and marginally glandular hairy, veins 4, not confluent at apex, apex obtuse. Petals purple, obovate, ca. 9 × 5 mm, ca. 7-veined, base gradually narrowed into a short claw, apex obtuse. Stamens ca. 6.2 mm. Ovary semi-inferior; styles ca. 5 mm. Fl. Jul–Aug.

- Alpine scrub, rock crevices; 4300–4800 m. E and S Xizang (Baxoi Xian, Gongbo'gyamda Xian).

204. *Saxifraga saxicola* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 116. 1958.

岩生虎耳草 *yan sheng hu er cao*

Plants many branched, with shoots forming cushions. Flowering stem ca. 1.5 cm, white eglandular hairy throughout, with 4 or 5 leaves. Shoot leaves linear, ca. 4 × 1.5 mm, distally leathery, chalk glands 5–7, margin denticulate-ciliate proximally, apex ± recurved, subobtuse. Cauline leaves linear, 5–6 mm, distally leathery, eglandular hairy abaxially and at proximal margin, chalk gland 1. Flower solitary; pedicel and hypanthium long eglandular hairy. Sepals subsquare, ca. 3 × 2.5 mm, abaxially glabrous, veins 3–5, not confluent at apex, margin eglandular ciliate. Petals white, obovate-spatulate, ca. 9 × 6 mm, base tapered into a claw ca. 2 mm. Carpels connate only at base; ovary superior; styles ca. 6 mm. Fl. Jun.

- Calcareous rocks; ca. 2800 m. Sichuan.

205. *Saxifraga unguipetala* Engler & Irmscher, Bot. Jahrb. Syst. 48: 610. 1912.

鄂西虎耳草 *e xi hu er cao*

Chondrosea unguipetala (Engler & Irmscher) Losinskaja; *Saxifraga kansuensis* Mattfeld.

Plants many branched, ca. 5 cm tall, with crowded shoots forming cushions. Flowering stem 2–3.7 cm, densely glandular hairy. Shoot leaves arranged in dense rosettes, suboblong-spatulate, abaxially subconvex, adaxially subconcave, (5–)7.3–9.5 × 1.5–2 mm, leathery, both surfaces glabrous, pinnately veined, chalk glands 5–9, margin cartilaginous ciliate proximally, apex recurved, obtuse or acute. Cauline leaves 5–7, narrowly oblong to oblong-spatulate, 4.6–6 × 1–1.3 mm, abaxially glandular hairy near base, adaxially glabrous or proximally glandular hairy, chalk glands 1–5, margin glandular ciliate, apex acute, glabrous. Flower solitary; pedicel densely glandular hairy. Sepals erect, broadly ovate, 3–4 × 2–3 mm, leathery, abaxially and marginally glandular hairy, chalk gland 1, at apex of midvein, veins 8 or 9, not or partly confluent at apex, apex acute or subacuminate. Petals white, obovate to broadly so or elliptic, 6–6.5(–11) × 3.3–3.5(–8) mm, 6–9-veined, base gradually narrowed into a short claw, apex rounded. Stamens (3.5–)7–8 mm. Ovary semi-inferior, broadly ovoid, ca. 3 mm, with an obscure nectary disc; styles ca. 2.1 mm. Fl. Jul–Aug.

- Alpine rock crevices; 3200–4300 m. S Gansu (Min Shan), W Hubei.

206. *Saxifraga saxatilis* H. Smith, Acta Horti Gothob. 1: 20. 1924.

灰岩虎耳草 *hui yan hu er cao*

Chondrosea saxatilis (H. Smith) Losinskaja.

Plants many branched, with shoots forming cushions. Flowering stem 1–2.5 cm, brown crisped hairy, eglandular hairy proximally, glandular hairy distally, with 5–7 leaves. Shoot leaves obovate-linear, 3.5–5 × 1.5–2 mm, leathery, both surfaces glabrous, chalk glands 5–7, margin denticulate-ciliate proximally, apex recurved, obtuse, thickened. Cauline leaves glabrous adaxially, margin ciliate. Flower solitary; pedicel glandular hairy. Sepals erect, ovate, ca. 2.2 × 2 mm, abaxially glandular hairy, veins 3–5, not confluent at apex, margin sparsely glandular ciliate proximally, apex rounded. Petals reddish or whitish, obovate to spatulate, 4–4.5 × 2.5 mm, 5–7-veined, base cuneate, apex rounded. Stamens shorter than petals. Carpels connate proximally; ovary subsuperior; styles to 1 mm.

- Limestone rocks; 4200–4300 m. N Sichuan.

In FRPS, this species was treated as a synonym of *Saxifraga unguipetala*, from which it is clearly distinguished by its smaller leaves and smaller petals.

207. *Saxifraga likiangensis* Franchet, J. Bot. (Morot) 10: 266. 1896.

丽江虎耳草 *li jiang hu er cao*

Chondrosea likiangensis (Franchet) Losinskaja; *Saxifraga calcicola* J. Anthony; *S. mundula* H. Smith. Plants many branched, 1.5–4.5 cm tall, with shoots forming cushions. Flowering stem initially embedded among rosette leaves and rarely visible, elongated after anthesis and in fruit and then ca. 1.1 cm taller than rosette leaves, glandular hairy. Shoot leaves subimbricate, aggregated into a rosette; leaf blade subobpandurate-oblong to narrowly ovate or narrowly obovate, abaxially convex, adaxially concave, 3–5.6 × 1–2.1 mm, leathery, both surfaces glabrous, chalk glands 3, margin ± setose-ciliate, apex ± recurved, acute or mucronate. Cauline leaves 4–8, spatulate- or oblanceolate-oblong to oblong, abaxially convex, adaxially subconcave, 3.3–5.3 × 1–1.5 mm, leathery, abaxially ± glandular hairy, adaxially glabrous, chalk glands 1(–3), margin glandular ciliate, apex ± recurved, obtuse or acute. Flower solitary; pedicel initially nearly absent, then elongated, to 2 mm, glandular hairy; bracts oblong to spatulate-oblong, 3.3–4 × ca. 1 mm, leathery, glandular hairy abaxially proximally and at margin, glabrous adaxially, chalk gland 1, apex acute, glabrous. Sepals erect, ovate to broadly so, 2.1–4 × 1.5–2.8 mm, leathery, abaxially and marginally glandular hairy, adaxially glabrous, chalk glands (1 or)3, veins 3–7, not, partly, or fully confluent at apex, apex usually obtuse, rarely mucronate, glabrous. Petals usually white, rarely yellowish, obovate or broadly so or elliptic to orbicular, 3.3–9 × 2.3–5 mm, 5–9-veined, base gradually narrowed into a claw 0.9–2 mm, apex obtuse. Stamens 1.1–6.2 mm. Carpels 2–6.3 mm; ovary semi-inferior, with an annular nectary disc; styles 1–2 mm. Fl. and fr. May–Sep.

Forests, scrub, alpine rock crevices; 3000–5600 m. S Qinghai (Nangqên Xian), C Sichuan (Baoping Xian), E and S Xizang, NW Yunnan [Bhutan, Myanmar].

A very broad view of *Saxifraga likiangensis* has been adopted in the present account.

208. *Saxifraga subsessiliflora* Engler & Irmscher in Engler, Pflanzendr. 69(IV. 117. II): 573. 1919.

单窝虎耳草 dan wo hu er cao

Saxifraga lolaensis H. Smith; *S. matta-florida* H. Smith. Plants many branched, 2.5–4 cm tall, with crowded shoots forming cushions. Flowering stem embedded among rosette leaves and not visible, ca. 1 mm, glabrous. Shoot leaves aggregated into a rosette, ovate, elliptic, or narrowly obovate to subspatulate, abaxially convex, adaxially subconcave, 3–6 × 1–2.5 mm, subleathery, both surfaces glabrous, chalk gland 1, margin ciliate, glandular ciliate on distal leaves, apex obtuse or acute, glabrous. Cauline leaf usually 1, embedded among rosette leaves, suboblong, 3–3.3 × ca. 1 mm, both surfaces glabrous, chalk gland 1, margin glandular ciliate, apex obtuse, glabrous. Flower solitary, sessile; bracts 2, tightly appressed to hypanthium, narrowly ovate, ca. 3.5 × 1.6 mm, subleathery, both surfaces glabrous, chalk gland 1, margin glandular ciliate, apex acute, glabrous. Sepals erect or spreading-erect, ovate to broadly so, 1.5–2.5 × 1.3–2.3 mm, both surfaces glabrous, chalk gland 1, veins 3 or 4, confluent or not at apex, margin glandular ciliate, apex obtuse, glabrous. Petals white, obovate, 3–5 × 1.9–4.5 mm, 3–6-veined, base gradually narrowed into a claw ca. 0.7 mm, apex obtuse. Stamens 2–2.3 mm. Ovary semi-inferior; styles short, thick. Fl. Jun–Aug. $2n = 26$.

Alpine meadows, rock crevices; 3900–4800 m. W Sichuan (Daocheng Xian), Xinjiang (Kunlun Shan, Taxkorgan Tajik Zizhixian), S Xizang (Cona Xian, Lhünzê Xian, Mêdog Xian), NW Yunnan (Zhongdian Xian) [Bhutan, Sikkim].

A broad view of the limits of *Saxifraga subsessiliflora* has been adopted in the present account. While *S. lolaensis* and *S. matta-florida* are undoubtedly very closely related to each other and could be regarded as variants of a single species, one of the present authors (Gornall) would like to point out that they differ from *S. subsessiliflora* in having a triquetrous (vs. flat) leaf apex in which the chalk gland is sunken (vs. submarginal).

209. *Saxifraga pulvinaria* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 105. 1958.

垫状虎耳草 dian zhuang hu er cao

Saxifraga imbricata Royle, Ill. Bot. Himal. Mts. 1: 226. 1835, not Lamarck (1779), nor Bertoloni (1830).

Plants many branched, 4.5–6 cm tall, with crowded shoots forming cushions. Flowering stem embedded among rosette leaves and not visible, 1.4–1.9 mm, glabrous. Shoot leaves imbricate, aggregated into a rosette, narrowly elliptic, ca. 3.3 × 1.4 mm, leathery, both surfaces glabrous, chalk gland 1, margin cartilaginous ciliate, apex acute, glabrous. Cauline leaves 3 or 4, linear-oblong, 3.5–4 × 0.8–1 mm, both surfaces

glabrous, chalk gland 1, margin cartilaginous ciliate, apex acute, glabrous. Flower solitary; bract suboblong, ca. 2.8 × 0.9 mm, both surfaces glabrous, margin glandular ciliate, apex acute; pedicel ca. 0.3 mm. Sepals erect, subtriangular-ovate to broadly ovate, 1.6–2 × ca. 1.4 mm, leathery, both surfaces glabrous, veins 3, confluent at apex, margin glandular ciliate, apex obtuse or acute, glabrous. Petals white, obovate or oblanceolate to oblong, 3.5–5.3 × (1.5–)2–3 mm, 5- or 6-veined, base gradually narrowed into a claw, apex retuse or obtuse. Stamens ca. 2.2 mm. Ovary subinferior, ca. 2 mm, with an annular nectary disc; styles ca. 1.5 mm. Fl. Jun–Jul.

Rock crevices; 3900–5200 m. SW Xinjiang (Taxkorgan Tajik Zizhixian), SW Xizang (Burang Xian), NW Yunnan (Gongshan Drung-Nu Zu Zizhixian, Zhongdian Xian) [Bhutan, India, Kashmir, Nepal, Sikkim].

210. *Saxifraga oppositifolia* Linnaeus, Sp. Pl. 1: 402. 1753.

挪威虎耳草 nuo wei hu er cao

Antiphylla asiatica (Hayek) Losinskaja; *A. oppositifolia* (Linnaeus) Fourreau; *Saxifraga asiatica* Hayek; *S. oppositifolia* subsp. *asiatica* (Hayek) Engler & Irmscher.

Plants many branched, ca. 6 cm tall, with shoots forming mats or cushions. Flowering stem brown pilose. Shoot leaves decussate, imbricate, aggregated into a rosette, gemmiferous at leaf axils, subobovate, 3.5–4 × 1.6–2.3 mm, subleathery, both surfaces glabrous, chalk gland 1, margin pilose, apex obtuse. Cauline leaves opposite, remote, subobovate, 4.2–4.5 × 2.6–2.9 mm, subleathery, both surfaces glabrous, chalk gland 1, margin pilose, apex obtuse. Flower solitary; pedicel ca. 3 mm, brown pilose. Sepals erect, ovate to elliptic-ovate, ca. 5 × 3 mm, leathery, both surfaces glabrous, veins 6 or 7, partly or fully confluent at apex, margin pilose, apex obtuse. Petals purple, narrowly obovate-spatulate, ca. 1.2 × 0.5 cm, ca. 7-veined, base gradually narrowed into a claw ca. 3.5 mm, apex retuse. Stamens ca. 7 mm. Ovary subellipsoid, ca. 2.7 mm, with an obscure nectary disc; styles ca. 6.5 mm. Fl. Jul–Aug. $2n = 26, 52$.

Alpine rock crevices, cliff ledges; 3900–5600 m. Xinjiang (Kunlun Shan, Taxkorgan Tajik Zizhixian, Tomar), W Xizang [Kashmir, Mongolia, Russia; Europe, North America].

211. *Saxifraga georgei* J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 33. 1933.

对生叶虎耳草 dui sheng ye hu er cao

Plants many branched, caespitose, with crowded shoots forming cushions. Shoot leaves opposite; leaf blade ovate, ca. 3 × 2 mm, rather thick, glabrous, chalk gland 1, apex subacute. Flower solitary, sessile. Sepals erect, broadly ovate, ca. 2 × 2 mm, abaxially and marginally glandular pilose, chalk gland 1, veins 3, confluent at

apex, apex subobtusely, glabrous. Petals white, obovate, ca. 5×3 mm, 3–5-veined, base contracted into a claw, apex obtuse. Stamens longer than sepals. Ovary ovoid; styles rather long. Fl. Jul–Aug.

Rock crevices on cliffs; 3600–4100 m. SW Sichuan (Muli Zang Zu Zizhixian), SE Xizang, NW Yunnan (Zhongdian Xian) [Bhutan, Nepal, Sikkim].

212. *Saxifraga subternata* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 97. 1958.

对轮叶虎耳草 *dui lun ye hu er cao*

Plants many branched, dwarfish, densely caespitose. Shoots to 12 cm. Flowering stem ca. 3 mm, glandular pilose. Shoot leaves in opposite pairs with bases connate-perfoliate on slender shoots, 3-verticillate with bases partly connate-perfoliate on thick shoots, imbricate, subelliptic, $3-4 \times 1.5-2$ mm, both surfaces glabrous, chalk glands 3–7, margin cartilaginous denticulate-ciliate proximally, apex usually recurved, subacute. Flower solitary; hypanthium glandular pilose. Sepals subrecurved, broadly triangular-ovate, ca. 2.5×3 mm, abaxially and marginally glandular pilose, chalk gland 1, veins 3, confluent at apex, apex obtuse, subleathery, glabrous. Petals white, obovate to narrowly so, $6-7 \times ca. 3$ mm, 5-veined, base gradually narrowed into an obscure claw, margin subundulate, apex obtuse. Stamens ca. 4.5 mm; anthers black. Carpels connate proximally; ovary semi-inferior; styles ca. 2.5 mm. Fl. Jul–Aug.

• Rock crevices; 3400–3500 m. SE Xizang (Mainling Xian).

213. *Saxifraga decussata* J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 33. 1933.

矮生虎耳草 *ai sheng hu er cao*

Plants many branched, 2–3 cm tall, forming cushions, with buds in leaf axils. Leaves decussate, densely imbricate; leaf blade obovate to elliptic, $2.5-3.4 \times 2.5-2.6$ mm, leathery, glabrous, chalk glands (2 or) 3 on proximal leaves, 1 on distal leaves, bases connate-perfoliate and decurrent, forming a tube 1–2.5 mm, margin cartilaginous glandular ciliate near base on distal leaves, apex obtuse, thickened. Flower solitary; bracts 2, opposite, obovate to elliptic, $2-2.5 \times ca. 1.6$ mm, leathery, chalk gland 1, margin glandular ciliate near base, apex thickened; pedicel ca. 0.4 mm, glabrous. Sepals 4, erect, \pm semiorbicular, $1.2-1.3 \times ca. 2$ mm, leathery, both surfaces glabrous, veins 5, partly confluent at apex, margin sparsely glandular ciliate proximally. Petals 4, yellowish, obovate to broadly so,

$2.1-2.6 \times 1.6-2$ mm, 3- or 4-veined, base subclawed, margin recurved, apex obtuse. Stamens 8, 0.8–1.6 mm. Ovary inferior, ovoid, with an annular nectary disc; styles ca. 1 mm. Fl. Jun–Jul.

• Alpine scrub, alpine rock crevices; 3000–4100 m. C Gansu (Tianzhu Zhang Zu Zizhixian), E Qinghai (Huzhu Tu Zu Zizhixian), Yunnan.

214. *Saxifraga monantha* H. Smith, Bull. Brit. Mus. (Nat. Hist.), Bot. 2: 94. 1958.

四数花虎耳草 *si shu hua hu er cao*

Plants many branched, 2–7 cm tall, with shoots sparsely caespitose. Flowering stem slender, to 1.5 cm, glandular pilose. Shoot leaves opposite, imbricate, obovate-elliptic, ca. $5 \times 2.5-3.7$ mm, glabrous, chalk glands 3–7, bases connate-perfoliate, apex subobtusely or acute. Cauline leaves 4, opposite, linear, 2.2–3 mm, glandular pilose abaxially proximally and at margin, chalk gland 1, bases free, apex obtuse. Flower solitary, 4-merous; hypanthium glandular pubescent. Sepals broadly ovate, ca. $2 \times 2-2.2$ mm, abaxially and marginally glandular hairy, veins 3, confluent into a verruca at apex or not, apex obtuse, glabrous. Petals white, obovate, ca. $6.5 \times 4-4.5$ mm, ca. 11-veined, base gradually narrowed into an indistinct claw, apex obtuse. Carpels connate proximally; ovary semi-inferior; styles ca. 3 mm. Fl. May–Aug.

• Damp rock crevices; ca. 3900 m. S Xizang (Nang Xian).

215. *Saxifraga nana* Engler, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 29: 118. 1883.

青海虎耳草 *qing hai hu er cao*

Antiphylla nana (Engler) Losinskaja; *A. octandra* (H. Smith) Losinskaja; *Saxifraga octandra* H. Smith; *S. qinghaiensis* J. T. Pan.

Plants many branched, 1–1.5 cm tall, with numerous, crowded shoots forming cushions. Flowering stem scapose, 5–6 mm, glandular pubescent. Rosette leaves imbricate, subspatulate-oblong, $3-4 \times 0.9-1$ mm, leathery, glabrous, chalk gland 1, obscure, vein 1, apex \pm reflexed, thickened. Flower solitary. Sepals erect, then spreading to reflexed, subelliptic to ovate, $1.4-1.5 \times ca. 1$ mm, subleathery, glabrous, veins 3, confluent into a verruca at apex, apex obtuse. Petals (if present) white, elliptic, ca. 2.5×1.4 mm, 3-veined, base contracted into a claw ca. 0.4 mm, apex obtuse. Stamens ca. 2.8 mm. Ovary subsuperior, ovoid, ca. 1.2 mm; styles erect, ca. 0.7 mm. Fl. Jul–Aug.

• Lake shores, alpine rock crevices; 4200–4900 m. Gansu, S Qinghai (Maqên Xian, Yushu Xian), W Sichuan (Daocheng Xian).

7. *Saxifraga* sect. *Saxifraga*

虎耳草组 *hu er cao zu*

Herbs perennial, forming mats or cushions, lacking basal bulbils (in China). Leaves alternate; petiole scarcely differentiated (in China); leaf blade herbaceous, lacking chalk glands and crystals, margin lobed or entire. Flowering

stem leafy; inflorescence cymose or flower solitary. Flowers bisexual, actinomorphic, 5-merous. Petals white, not callose. Filaments subulate to linear; pollen 2-nucleate, exine tectum smooth. Carpels connate for most of placental region, dehiscing distally in fruit; ovary inferior. Integuments 2.

About 75 species: primarily in Europe, mainly montane, also extending into Asia and North America; one species in China.

216. *Saxifraga coarctata* W. W. Smith, Rec. Bot. Surv. India 4: 194. 1911.

矮虎耳草 ai hu er cao

Saxifraga humilis Engler & Irmscher.

Herbs perennial, caespitose, 1.4–4 cm tall. Flowering stem very short at anthesis, embedded among rosette leaves and not visible, gradually elongating to 3 cm after anthesis and in fruit, densely glandular hairy. Basal leaves aggregated into a rosette, subspatulate, 0.6–1.6 cm × 1.3–4 mm, both surfaces usually glabrous, margin entire or 2- or 3-dentate, glandular pilose, apex acute. Cauline leaves 5.6–12 × 1.5–3.4 mm, abaxially and marginally usually glandular pilose, base sometimes gemmiferous in leaf axil, apex acute. Flower

solitary or cyme 2-flowered; bracts oblong, 3–6.5 × 0.7–2.4 mm, abaxially and marginally glandular pilose, apex acute; pedicels initially 1.3–2 mm, elongating to 1.2 cm in fruit, glandular pubescent. Sepals erect, ovate or broadly so to subelliptic, 1.5–2.7 × 1–2 mm, abaxially and marginally glandular hairy, veins 3, not partly, or fully confluent at apex, apex obtuse. Petals white, broadly to narrowly obovate to subelliptic, 3–5.6 × 1–3.4 mm, not callose, 3–6-veined, base clawless, apex obtuse. Stamens 1.5–3 mm. Ovary subinferior, 2–2.2 mm; styles 1.1–1.5 mm. Fl. and fr. Jun–Sep.

Alpine scrub meadows, rock crevices; 3800–4700 m. Sichuan, Xizang, NW Yunnan [Bhutan, Nepal, Sikkim].

11. TIARELLA Linnaeus, Sp. Pl. 1: 405. 1753.

黄水枝属 huang shui zhi shu

Pan Jintang (潘锦堂); Douglas E. Soltis

Herbs perennial. Rhizome short, slender. Leaves mainly basal, cauline ones few, small; stipules small; leaf blade simple and trilobed or subtrifoliolate. Inflorescence a raceme or panicle, simple or sparsely branched; bracts small. Flowers small; hypanthium adnate to ovary at base. Sepals 5, usually petaloid. Petals 5, sometimes absent. Stamens 10, visible above corolla. Carpels 2, connate basally; ovary 1-loculed; placentation parietal; styles 2, slender, elongate. Fruit a capsule; carpels unequal, one ca. 1/2 as long as the other. Seeds few, black, small, smooth.

Three species: one in China, the Himalayas, and Japan and one each in E and W North America: one species in China.

The two North American species are more closely related to each other than to either of the Asian species.

1. *Tiarella polyphylla* D. Don, Prodr. Fl. Nepal. 210. 1825.

黄水枝 huang shui zhi

Herbs 20–45 cm tall. Rhizomes creeping, dark brown, 3–6 mm in diam. Stems simple, densely glandular hairy. Leaves mostly basal; cauline leaves few. Basal leaves with petiole 2–12 cm, densely glandular hairy, base sheathlike; leaf blade cordate, 2–8 × 2.5–10 cm, palmately 3–5-lobed, both surfaces glandular hairy, base cordate, margin irregularly dentate, apex acute. Cauline leaves 2 or 3, similar to basal leaves but smaller and petiole shorter. Raceme 8–25 cm, densely glandular hairy. Flowers whitish, small; pedicel ca. 1

cm, glandular hairy. Sepals erect, ovate, ca. 1.5 × 0.8 mm, abaxially and marginally shortly glandular hairy, 3- to many veined, apex subacuminate. Petals absent. Stamens ca. 2.5 mm; filaments subulate. Carpels unequal, connate proximally; ovary shallowly subsuperior, appearing almost completely superior. Capsule 7–12 mm. Seeds few, dark brown, ellipsoid, ca. 1 mm. Fl. Apr–Nov. $2n = 14$.

Moist forests, shady wet places; 1000–3800 m. SE Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, S Shaanxi, Sichuan, Taiwan, S Xizang, Yunnan [Bhutan, N India, Japan, N Myanmar, Nepal, Sikkim].

12. MITELLA Linnaeus, Sp. Pl. 1: 406. 1753.

喷呐草属 suo na cao shu

Pan Jintang (潘锦堂); Douglas E. Soltis

Herbs perennial. Rhizomes creeping, short. Leaves mainly basal, long petiolate, cauline ones few or absent; stipules scarious; leaf blade simple, cordate or ovate- to reniform-cordate, margin lobed or incised. Inflorescence terminal, racemose, bracteate. Flowers small. Sepals 5. Petals sometimes absent, margin usually pinnately cleft, rarely entire. Stamens 5 or 10. Carpels 2, connate; ovary appearing subsuperior to inferior, 1-loculed; placentas 2, parietal; styles 2. Fruit a capsule, dehiscing between styles. Seeds numerous, ovoid or narrowly ellipsoid, usually tuberculate.

About 20 species: E and N Asia, North America, one species (*Mitella nuda*) nearly circumboreal; two species (one endemic) in China.

As currently circumscribed, *Mitella* is not a natural group, but comprises several distinct lineages that should ultimately be treated as distinct genera. *Mitella nuda* is most closely related to *M. diphylla* from E North America, whereas *M. formosana* is most closely related to other Asian species of *Mitella* that appear to form a lineage distinct from all other species currently placed in the genus.

- 1a. Inflorescences with leaves; petal margin pinnately 5–7-cleft; stamens 5 2. *M. formosana*
 1b. Inflorescences usually without leaves; petal margin pinnately ca. 9-cleft; stamens 10 1. *M. nuda*

1. *Mitella nuda* Linnaeus, Sp. Pl. 1: 406. 1753.

唢呐草 suo na cao

Herbs perennial, 9–24 cm tall. Rhizomes elongate, slender. Stems glandular hairy. Basal leaves 1–4; petiole 1–8.3 cm, rigidly glandular hairy; leaf blade orbicular to cordate to reniform-cordate, 0.8–3.7 × 0.8–3.9 cm, both surfaces rigidly glandular hairy, base cordate, margin dentate, obscurely 5–7-lobed. Cauline leaves usually 1 or absent, shortly petiolate; leaf blade ca. 1.6 × 1.4 cm, rigidly glandular hairy. Inflorescence a raceme, 2–11 cm, several flowered; pedicels 1–5 mm, shortly glandular hairy. Sepals subovate, 1.6–2 mm, 1-veined, apex subacuminate. Petals yellowish green, ca. 4 mm, margin deeply pinnately ca. 9-cleft; segments linear. Stamens 10, shorter than sepals. Carpels 2, connate; ovary semi-inferior, broadly ovoid; stigmas 2-lobed. Fruit a capsule; carpels distally free, glandular hairy. Seeds few, black, shiny, narrowly ellipsoid, ca. 1 mm. Fl. Jun–Sep. $2n = 14, 28$.

Wet forests, bogs; 700–1100 m. Heilongjiang, Jilin, Nei Mongol [Japan, Korea, Mongolia, Russia; North America].

2. *Mitella formosana* (Hayata) Masamune, J. Soc. Trop. Agric. 4: 77. 1932.

台湾唢呐草 tai wan suo na cao

Mitella japonica Miquel var. *formosana* Hayata, Icon. Pl. Formos. 3: 101. 1913.

Herbs perennial, 14.5–24 cm tall. Rhizomes elongate, slender. Leaves all basal; petiole 7–13 cm, densely brown crisped glandular villous; leaf blade ovate-cordate, 3.5–7 × 3.3–5 cm, both surfaces glandular strigose, base cordate, margin irregularly dentate, obscurely 5–7-lobed, apex acute. Raceme slender, 3–10 cm, glandular villous, many flowered; pedicels 2–4 mm, glandular hairy. Sepals broadly ovate, ca. 1.2 × 1.3 mm, abaxially glandular hairy, 1-veined, apex acute. Petals ca. 3.6 mm, margin deeply pinnately 5–7-cleft; segments linear, glandular dotted. Stamens 5, ca. 0.9 mm. Carpels 2, connate; ovary ca. 1/2 subinferior, broadly ovoid; styles ca. 0.5 mm; stigmas 2-lobed. Fruit a capsule. Seeds numerous, ellipsoid-fusiform, ca. 1 mm. Fl. Apr–Aug. $2n = 14^*$.

• Forests along ravines; 2900–3000 m. Taiwan.

13. TANAKAEA Franchet & Savatier, Enum. Pl. Jap. 2: 352. 1878.

峨屏草属 e ping cao shu

Pan Jintang (潘锦堂); Douglas E. Soltis

Herbs perennial, evergreen. Rhizomes creeping, slender. Leaves all basal, petiolate; stipules absent; leaf blade elliptic or broadly to narrowly ovate, leathery, margin serrate. Panicle or raceme with small bracts. Sepals (4 or)5(–7). Petals absent. Stamens (8–)10; anthers distinctive in comprising only 2 microsporangia. Carpels 2, connate proximally; ovary very shallowly subsuperior, appearing almost superior, proximally 2-loculed with axile placentation and distally 1-loculed with marginal placentation. Fruit a capsule. Seeds numerous, small, acute at both ends.

One species: China, Japan.

Tanakaea is closely related to the monotypic *Leptarrhena* R. Brown (from the Pacific Northwest of North America), which possesses the same distinctive anther morphology.

1. *Tanakaea radicans* Franchet & Savatier, Enum. Pl. Jap. 2: 352. 1878.

峨屏草 e ping cao

Tanakaea omeiensis Nakai; *T. omeiensis* var. *nanchuanensis* W. T. Wang.

Herbs 6.5–12.5 cm tall. Rhizomes transversely elongate, ca. 2 mm in diam. Leaves all basal; petiole 1.1–6.5 cm, dark brown villous, sometimes hairs glandular tipped; leaf blade abaxially pale green, adaxially bright green, ovate to broadly so or elliptic, 1.1–3 × 0.8–2.9 cm, subleathery, both surfaces brown glandular hairy (sometimes hairs glandular tipped), base rounded or

subcordate, margin serrate, apex acute. Inflorescence cymose, dense, 2.8–3.5 cm, brown glandular villous. Flowers whitish, small, apetalous. Sepals narrowly ovate to lanceolate, 1.5–1.9 × 0.4–0.6 mm, glabrous except margin sparsely glandular hairy, 1-veined, apex acute. Filaments 3.3–3.5 mm. Carpels ca. 4 mm, connate proximally; ovary very shallowly subsuperior, appearing almost superior; styles 2. Capsule ca. 4 mm; carpels divergent. Fl. Apr–Oct. $2n = 14^*$.

Wet shaded rocks. S Sichuan (Emei Xian, Nanchuan Xian, Pingshan Xian) [Japan].

14. CHRYSOSPLENIUM Linnaeus, Sp. Pl. 1: 398. 1753.

金腰属 jin yao shu

Pan Jintang (潘锦堂); Hideaki Ohba

Herbs perennial, small, usually with stolons, bulbs, or bulbils. Leaves alternate or opposite, petiolate, exstipulate, simple. Inflorescence a cyme surrounded by bracteal leaves, rarely flower solitary. Hypanthium \pm adnate to ovary. Sepals 4(or 5), imbricate in bud. Petals absent. Disc absent, obscure, or distinctly (4 or)8-lobed, sometimes surrounded by brown papillae. Stamens 4 or 8(or 10); filaments subulate; anthers 2-loculed, laterally dehiscent; pollen grains minute, 3-colporoidate, with fine reticulum. Carpels 2, usually connate proximally; ovary subsuperior, semi-inferior, or subinferior, 1-loculed; placentas 2, parietal; ovules many; styles 2, free; stigmas punctate. Fruit a capsule, with 2 subequal or distinctly unequal carpels. Seeds many, ovoid to ellipsoid, smooth, papillose, tuberculate, puberulous, sulcate, or other texture.

About 65 species: Africa, America, Asia, Europe; 35 species (20 endemic) in China.

1a. Cauline leaves opposite; bulbs and bulbils absent.

2a. Capsule not truncate at apex, carpels subequal then erect or divergent.

3a. Stems and leaves pilose; seeds with undulate, transverse lines 26. *C. hebetatum*

3b. Stems and leaves glabrous, but sparsely brown papillose at axils and on leaves adaxially; seeds smooth, glabrous 25. *C. nepalense*

2b. Capsule subtruncate and retuse at apex, carpels subequal, horizontal; if capsule apex not truncate then carpels distinctly unequal and divaricate.

4a. Capsule truncate at apex, carpels distinctly unequal, divaricate.

5a. Seeds sulcate, ridges papillose 30. *C. pilosum*

5b. Seeds not sulcate, papillose or puberulous.

6a. Disc distinct; ovary usually semi-inferior 29. *C. cavaleriei*

6b. Disc obscure or absent; ovary semi-inferior or subsuperior.

7a. Terminal sterile branch leaves sometimes brown papillose abaxially; cauline leaves, flowering stems, inflorescence branches, pedicels, and bracteal leaves glabrous 27. *C. sinicum*

7b. Terminal sterile branch leaves not brown papillose abaxially; flowering stems, inflorescence branches, and pedicels brown pilose; cauline leaves and bracteal leaves glabrous except margin \pm ciliate 28. *C. lectus-cochleae*

4b. Capsule subtruncate and retuse at apex, carpels subequal, horizontal.

8a. Flowering stems brown pilose; cauline leaves brown pilose adaxially; seeds smooth, glabrous 31. *C. ramosum*

8b. Flowering stems glabrous or brown papillose; cauline leaves glabrous or brown papillose adaxially; seeds 13–16-sulcate, ridges marked by transverse lines (?except in *C. lixianense*).

9a. Cauline leaves sparsely brown papillose on both surfaces; flowers unisexual (plants dioecious); female flowers with stamens absent and disc 8-lobed, surrounded by sparse, brown papillae; male

flowers with pistil obsolete and disc not surrounded by papillae 35. *C. biondianum*

9b. Cauline leaves glabrous; flowers bisexual.

10a. Stolons arising from leaf axils, glabrous; cauline leaves distinctly obtusely 7–9-dentate 34. *C. qinlingense*

10b. Stolons absent; cauline leaves obscurely 7–12-crenate.

11a. Cauline leaves broadly ovate or orbicular to flabellate, sparsely brown papillose abaxially; bracteal leaves sparsely brown papillose abaxially; sepals broadly suborbicular, apex retuse, with 1 brown papilla 32. *C. delavayi*

11b. Cauline leaves reniform to broadly orbicular, glabrous; bracteal leaves glabrous; sepals broadly ovate to broadly orbicular, apex obtuse to acute 33. *C. lixianense*

1b. Cauline leaves alternate, sometimes only 1 or absent; bulbs or bulbils sometimes present.

12a. Seeds smooth, glabrous.

13a. Disc distinctly 8-lobed.

14a. Stolons arising from leaf axils; proximal cauline leaves scalelike, distal ones ovate to broadly so or subspatulate to broadly obovate.

15a. Distal cauline leaves ovate to broadly so, base rounded-cuneate; cyme remotely flowered or flowers solitary at leaf axils, pedicel barely 1.9 cm; sepals spreading, subrhombic 11. *C. axillare*

15b. Distal cauline leaves subspatulate to broadly obovate, base cuneate; cyme 7–10-flowered, pedicel barely 0.7 cm; sepals erect, broadly orbicular 12. *C. carnosum*

14b. Stolons absent; leaves reniform or broadly orbicular-reniform.

16a. Plants 8.5–32.7 cm tall; stems glabrous; cauline leaves glabrous on both surfaces 9. *C. griffithii*

16b. Plants 5–6.3 cm tall; stems brown crisped villous; cauline leaves brown pilose on both surfaces 10. *C. fuscopunctulosum*

13b. Disc obscure or absent.

- 17a. Leaves not reniform.
- 18a. Distal cauline leaves lanceolate to narrowly oblanceolate; sepals retuse at apex; styles and capsular carpels embedded in calyx, not visible 8. *C. absconditicasulum*
- 18b. Distal cauline leaves broadly obovate or broadly ovate; sepals obtuse at apex; styles or capsular carpels partly visible above calyx.
- 19a. Distal cauline leaves broadly obovate; stamens 1.6–2.2 mm, visible above calyx .. 6. *C. oxygraphoides*
- 19b. Distal cauline leaves broadly ovate; stamens 1–1.5 mm, not visible above calyx 7. *C. sikangense*
- 17b. Leaves reniform.
- 20a. Stolons absent.
- 21a. Plants to 20 cm or more tall; stem brown pilose and papillose at leaf axils, elsewhere glabrous, with
1 leaf; basal leaves shallowly 15–26-dentate at margin; sepals subspreading 1. *C. forrestii*
- 21b. Plants barely 10 cm tall; stem brown pilose or papillose, usually without leaves; basal leaves shallowly 7–15-dentate at margin; sepals erect 2. *C. nudicaule*
- 20b. Stolons present.
- 22a. Bulbs absent; stolons usually subterranean, scaly; basal leaves pilose adaxially, cauline leaf usually
1, ± pubescent 3. *C. serreanum*
- 22b. Bulb 1, subterranean; stolons above ground, glabrous; leaves glabrous.
- 23a. Leaves, bracteal leaves, and sepals distinctly brown spotted; flower solitary or cyme
2- or 3-flowered 5. *C. uniflorum*
- 23b. Leaves, bracteal leaves, and sepals not distinctly brown spotted; cyme 6–15-flowered 4. *C. giraldianum*
- 12b. Seeds papillose or puberulous.
- 24a. Disc obscure or absent.
- 25a. Stems glabrous; basal leaves reniform to orbicular-reniform 13. *C. chinense*
- 25b. Stems brown villous; basal leaves broadly ovate to orbicular, or obovate to elliptic, sometimes oblong.
- 26a. Sterile branches absent; basal leaf margin 20–36-crenate, sometimes obscurely so; stamens shorter
than sepals; capsule rostrums ca. 0.5 mm 16. *C. glossophyllum*
- 26b. Sterile branches arising from proximal cauline leaf axils; basal leaf margin (7–)13–17-crenate, or undulate-crenulate to entire; stamens subequaling or longer than sepals; capsule rostrums 1–4 mm.
- 27a. Basal leaves broadly ovate to broadly subelliptic, (0.5–)2.1–4.2 × (0.7–)2–3.7 cm, brown pilose on both surfaces along veins and at margin, base usually subtruncate to subcordate, margin (7–)13–17-crenate; sepals usually orbicular; stamens 1–2 mm, subequaling sepals; capsule rostrums ca. 1 mm 14. *C. davidianum*
- 27b. Basal leaves obovate, 2.3–19 × 1.3–11.5 cm, glabrous abaxially, brown pilose adaxially, base cuneate, margin undulate-crenulate or entire; sepals subovate to broadly ovate; stamens 4–6.5 mm, distinctly longer than sepals; capsule rostrums 3–4 mm 15. *C. macrophyllum*
- 24b. Disc distinct, if obsolete then surrounded by dense, brown papillae.
- 28a. Disc usually obsolete, surrounded by dense, brown papillae.
- 29a. Sterile branches present; stolons absent; basal leaves present; cauline leaf margin 5–9-crenate, teeth obtuse at apex 22. *C. lanuginosum*
- 29b. Sterile branches absent; stolons sometimes present; basal leaves absent; cauline leaf margin shallowly 7–9-dentate, teeth retuse at apex.
- 30a. Stolons arising from proximal cauline leaf axils; leaves subflabellate to ± semiorbicular, brown
pilose and papillose adaxially near base and at sinus, base broadly cuneate to truncate, margin shallowly 7–9-dentate; bracteal leaves flabellate to nearly semiorbicular, brown pilose adaxially near base; disc obsolete, surrounded by dense, brown papillae 24. *C. taibaishanense*
- 30b. Stolons absent; leaves subreniform, brown pilose on both surfaces and at margin, base cordate,
margin shallowly 9-dentate; bracteal leaves subreniform to broadly suborbicular, glabrous on both surfaces; disc 8-lobed, surrounded by sparse, brown papillae 23. *C. jienningense*
- 28b. Disc usually 8-lobed, rarely 4-lobed, not surrounded by brown papillae.

- 31a. Stems glabrous; cauline leaf petiole glabrous; basal leaves reniform to orbicular-reniform or broadly ovate to subreniform, cauline leaves broadly suborbicular or broadly ovate.
- 32a. Stolons arising from basal leaf axils; basal leaves reniform to orbicular-reniform, pilose adaxially, margin obtusely 12–18-dentate; cauline leaves broadly suborbicular, margin obtusely 5-dentate; inflorescence branches and pedicels glabrous; seeds sparsely puberulous . 20. *C. flagelliferum*
- 32b. Stolons absent; basal leaves broadly ovate to subreniform, glabrous on both surfaces, margin 8-crenate, teeth usually overlapping at margin; cauline leaves usually broadly subovate, margin 7- or 8-crenate; inflorescence branches and pedicels \pm brown papillose; seeds densely papillose 21. *C. microspermum*
- 31b. Stems \pm brown pilose; petiole brown villous at base; leaves orbicular to reniform.
- 33a. Plants ca. 27 cm tall; basal leaves brown spotted; petiole 2.5–14 cm; leaf blade 2.3–8.5 \times 2.4–8.5 cm, glabrous on both surfaces, margin undulate or 34–37-crenate, teeth colorless and narrow at margin; flowers 5–6 mm in diam. 17. *C. hydrocotylifolium*
- 33b. Plants 8–15.5 cm tall; basal leaves unspotted; petiole 1.5–8 cm; leaf blade 0.6–2.2 \times 0.9–2.5 cm, glabrous abaxially, pilose adaxially, margin shallowly 15–17-dentate or obscurely crenate; flowers ca. 3 mm in diam.
- 34a. Stems pilose; leaves subglabrous abaxially, margin shallowly dentate; inflorescence branches pilose; stamens (2 or)4(or 8); disc usually 4-lobed 18. *C. japonicum*
- 34b. Stems pilose near base, elsewhere glabrous; leaves glabrous abaxially, margin crenate or obscurely so; inflorescence branches glabrous; stamens 8; disc not 4-lobed 19. *C. wuwenchenii*

1. *Chrysosplenium forrestii* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 282. 1912.

贡山金腰 gong shan jin yao

Herbs (3.5–)8.4–22.8 cm tall. Stems brown pilose and papillose at leaf axils, elsewhere glabrous. Basal leaves with petiole (2.3–)9–13 cm; leaf blade reniform, (1.4–)3–5.2 \times (1.7–) 3–7 cm, abaxially and at sinus brown pilose and papillose, adaxially glabrous, margin shallowly 15–26-dentate, teeth retuse at apex. Cauline leaf 1; petiole 0.6–9 cm, sparsely brown papillose; leaf blade reniform, (1.1–)2–3.4 \times (1.5–)4.1–5.2 cm, abaxially and at sinus sparsely brown papillose, adaxially glabrous, margin shallowly 22–29-dentate, teeth mainly not overlapping at margin and apex retuse. Cyme 3.3–4.3 cm; bracteal leaves reniform to flabellate, 0.7–2.8 \times 0.8–3.5 cm, abaxially brown pilose, adaxially glabrous, brown papillose and pilose at sinus, margin shallowly 5–15-dentate, teeth retuse at apex. Pedicel 0.3–4 mm. Sepals subspreading, \pm overlapping, broadly orbicular, ca. 2.1 \times 2–3 mm, apex obtuse. Stamens shorter than sepals; filaments ca. 0.9 mm. Ovary semi-inferior; styles ca. 0.3 mm. Capsule ca. 3 mm, apex subtruncate, retuse; rostrums ca. 0.4 mm. Seeds dark brown, shiny, ovoid, 0.9–1 mm, smooth, glabrous. Fl. and fr. May–Oct.

Forests, alpine scrub meadows, alpine rock clefts; 3600–4700 m. SE Xizang, NW Yunnan [Bhutan, N India, N Myanmar, Nepal].

2. *Chrysosplenium nudicaule* Bunge in Ledebour, Fl. Altaic. 2: 114. 1830.

裸茎金腰 luo jing jin yao

Herbs 4.5–10 cm tall. Stems sparsely papillose and pilose, usually leafless. Basal leaves with petiole 1–7.5 cm, proximally brown pilose; leaf blade reniform, ca. 0.9 \times 1.3 cm, leathery, both surfaces glabrous, brown pilose and papillose at sinus, margin shallowly (7–)11–15-dentate, teeth broadly orbicular, ca. 3 \times 4 mm,

usually overlapping at margin, retuse and 1-verrucose at apex. Cyme dense, ca. 1.1 cm, subglabrous; bracteal leaves broadly ovate to flabellate, 3–6.8 \times 2.8–8.1 mm, leathery, abaxially glabrous, adaxially sparsely brown pilose, brown pilose at sinus, shallowly 3–9-dentate, teeth broadly orbicular, \pm overlapping at margin, 1-verrucose at apex. Hypanthium brown pilose. Sepals erect, \pm overlapping, broadly orbicular, 1.8–2 \times 3–3.5 mm, brown pilose and papillose at sinus, apex obtuse. Stamens 8, ca. 1.1 mm. Carpels subequal; ovary semi-inferior; styles 0.6–0.8 mm. Capsule ca. 3.4 mm, apex retuse; carpels subequal; rostrums ca. 0.7 mm. Seeds dark brown, shiny, ovoid, 1.3–1.6 mm, smooth, glabrous.

Rock clefts; 2500–4800 m. Gansu, Qinghai, ?Shaanxi, Xinjiang, E Xizang, NW Yunnan [Mongolia, Nepal, Russia].

3. *Chrysosplenium serreanum* Handel-Mazzetti, Oesterr. Bot. Z. 80: 341. 1931.

五台金腰 wu tai jin yao

Chrysosplenium alternifolium Linnaeus subsp. *sibiricum* (Seringe) Hultén; *C. alternifolium* var. *sibiricum* Seringe; *C. sibiricum* (Seringe) Kharkevich.

Herbs 6.5–19.5 cm tall, not brown spotted. Stolons with scalelike leaves brown pilose at margin. Basal leaves with petiole 2.5–4 cm, pilose; leaf blade reniform to orbicular-reniform, 0.8–2.5 \times 1–3 cm, both surfaces and margin pilose, sometimes glabrous abaxially, margin 8–11-crenate, teeth 1-verrucose at apex. Cauline leaf usually 1, rarely absent; petiole 1.5–4 cm, brown pilose; leaf blade reniform, 0.4–1 \times 0.7–1.7 cm, \pm pilose, base subcordate to cordate, margin 5–9-crenate. Cyme 1.5–3 cm; bracteal leaves brown pilose and papillose at axil, leaf blade ovate or broadly subovate to broadly orbicular, 0.4–1.5 \times 0.3–2 cm, glabrous, base

cuneate to broadly so, margin 2–7-crenate, rarely entire. Flowers yellow, 3–4 mm in diam.; pedicel glabrous or pilose. Sepals erect, broadly ovate to orbicular, 1.5–2 × 1.4–2 mm, glabrous, apex obtuse. Stamens 8, ca. 1 mm. Ovary semi-inferior; styles erect or divergent, ca. 0.7 mm. Capsule 2.6–3 mm, apex retuse; carpels subequal; rostrums 0.5–0.7 mm. Seeds dark brown, shiny, ovoid, 0.9–1 mm, smooth, glabrous. Fl. and fr. May–Jul.

Forests, riversides; 1700–2800 m. Hebei, Heilongjiang, Nei Mongol, Shanxi [Japan, Korea, Mongolia, Russia].

4. *Chrysosplenium giraldianum* Engler, Bot. Jahrb. Syst. 36 (Beibl. 82): 49. 1905.

纤细金腰 xian xi jin yao

Herbs 7–17 cm tall, not distinctly brown spotted. Bulb 1, subterranean. Stolons above ground, glabrous. Basal leaves absent. Cauline leaves with petiole 1.4–2.4 cm; leaf blade usually reniform, 0.7–2.3 × 0.9–3 cm, glabrous, base usually cordate, rarely broadly cuneate, margin 7–17-crenate, teeth retuse and 1-verrucose at apex. Cyme 1–2.5 cm, 6–15-flowered; bracteal leaves with petiole 0.2–1.8 cm, brown papillose at axil, leaf blade broadly ovate to reniform, 0.3–2.5 × 0.3–3 cm, glabrous, base usually cordate, margin 5–13-crenate, teeth retuse (sometimes entire) and 1-verrucose at apex. Flowers green, ca. 3.7 mm in diam.; pedicel 1.2–1.8 mm. Sepals erect, broadly ovate, 1.2–1.6 × 1.2–1.9 mm, glabrous, apex obtuse. Stamens 8, ca. 0.5 mm. Ovary semi-inferior; styles horizontal, ca. 0.2 mm. Disc absent. Capsule 1.8–2.7 mm, apex truncate, retuse; carpels subequal; rostrums ca. 0.8 mm. Seeds dark brown, shiny, subovoid, 0.8–1 mm, smooth, glabrous. Fl. and fr. Jun–Sep.

• Forests, shaded and wet places in ravines; 1400–2200 m. S Gansu, NW Henan, Shaanxi.

5. *Chrysosplenium uniflorum* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 27: 472. 1881.

单花金腰 dan hua jin yao

Herbs (2–)6.5–15 cm tall. Bulb 1, subterranean. Stolons arising from leaf axils, filiform, glabrous. Stems glabrous; internodes sometimes very short. Leaves alternate, brown spotted, proximal ones scalelike, margin entire, distal ones with petiole 1–1.9 cm, brown papillose at axil; leaf blade reniform, 0.8–1.3 × 0.9–1.7 cm, both surfaces glabrous, base ± cordate, margin 7–11-crenate, teeth brown papillose at sinus, retuse and 1-verrucose at apex. Flower solitary or cyme 2- or 3-flowered; bracteal leaves brown papillose at axil, leaf blade ovate to orbicular-cordate, 3–13 × 2.5–13 mm, both surfaces glabrous, base rounded to cordate, margin 5–11-crenate. Pedicel nearly absent. Sepals erect, broadly ovate to broadly subobovate, 2–3 × 2.2–3 mm, brown papillose at sinus, elsewhere glabrous, apex obtuse or retuse. Stamens 8; filaments 1–1.6 mm. Pistil 2.6–4.1 mm; ovary semi-inferior, styles 0.9–1.1 mm. Disc obscure. Capsule ca. 3 mm, apex retuse; rostrums ca. 1 mm. Seeds dark brown, shiny, ovoid, ca. 1 mm, smooth, glabrous. Fl. and fr. Jul–Aug.

Forests, alpine meadows, alpine rock clefts; 2400–4700 m. Gansu, Qinghai, S Shaanxi (Taibai Shan), W Sichuan, E Xizang, NW Yunnan [Nepal].

6. *Chrysosplenium oxygraphoides* Handel-Mazzetti, Symb. Sin. 7: 428. 1931.

鸦跖花金腰 ya zhi hua jin yao

Chrysosplenium ludlowii H. Hara.

Herbs 1–1.5 cm tall. Rhizomes thick. Sterile branches well developed, arising from leaf axils together with stolons. Stems thick, subcarnose, brown papillose at leaf axils, elsewhere glabrous. Cauline leaves 2 or 3, alternate; petiole 2–2.5 mm, margin brown glandular pilose; leaf blade broadly obovate, 3.6–3.8 × 4.1–4.4 mm, leathery or subcarnose, glabrous, base cuneate, margin 5-crenate. Cyme usually 3-flowered; bracteal leaves with petiole ca. 1 mm, brown papillose at axil, leaf blade ovate to broadly so, 4.1–4.4 × 3–5.3 mm, base cuneate, margin 5-crenate. Flowers sessile, yellow, 4.5–5.2 mm in diam. Sepals orbicular to broadly so, 1.5–1.6 × 1.2–3 mm, glabrous, apex obtuse. Stamens 8, 1.6–2.2 mm, longer than sepals. Ovary semi-inferior, ca. 1.9 mm; styles divergent, ca. 2 mm. Fl. and fr. May–Aug.

• Alpine rock clefts, meadows by water; 3200–4300 m. SW Sichuan, SE Xizang.

7. *Chrysosplenium sikangense* H. Hara, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 7: 75. 1957.

西康金腰 xi kang jin yao

Herbs 3.5–4.5 cm tall. Stems brown papillose at leaf axils, elsewhere glabrous. Leaves alternate; petiole 1–3.1 mm; leaf blade broadly ovate, 2–4 × 2.5–6 mm, glabrous, base broadly cuneate, margin 6-crenate. Cyme 0.8–1.1 cm, ca. 3-flowered; bracteal leaves with petiole 2–3 mm, brown papillose at axil, leaf blade broadly ovate to flabellate, 4–4.6 × 4.2–5.6 mm, subcarnose, base broadly cuneate, margin 5- or 6-crenate. Pedicel very short, glabrous. Sepals erect, orbicular-square to broadly suborbicular, 1.5–1.9 × 2–3 mm, glabrous, apex subtruncate. Stamens 1–1.5 mm. Ovary semi-inferior. Disc obscure. Capsule 4–4.4 mm; carpels subequal; rostrums ca. 0.6 mm. Seeds dark brown, shiny, ovoid, ca. 1 mm, smooth, glabrous. Fl. and fr. Jul–Sep.

• Scree slopes; 3700–4100 m. SE Xizang, NW Yunnan.

8. *Chrysosplenium absconditicapsulum* J. T. Pan in C. Y. Wu, Fl. Xizang. 2: 450. 1985.

蔽果金腰 bi guo jin yao

Herbs caespitose, 3.4–4.4 cm tall, glabrous except brown papillose at leaf and bracteal leaf axils. Stems much branched; stolons 2 or 3, arising from leaf axils. Distal sterile branch leaves with petiole 1–1.4 mm; leaf blade ovate, 4.7–5.4 × 2.2–2.6 mm, base cuneate, margin 5-crenate. Cauline leaves alternate, sessile, narrowly ovate or lanceolate to narrowly oblanceolate, 4.4–6.7 × 1.5–2 mm, margin irregularly 14–17-dentate on proximal leaves, 5-dentate on distal ones, teeth 1-

verrucose at apex. Pleiochasium 1.3–2.8 cm, ca. 9-flowered; bracteal leaves narrowly ovate, ca. 4.5 × 2.1 mm, base gradually narrowed into a petiole ca. 1.7 mm, margin 3–5-crenate. Flowers green, campanulate; pedicel 0.8–1.5 mm. Sepals subelliptic to orbicular-square, 1.5–1.6 × 1.4–2.4 mm, apex retuse. Stamens 8; filaments 0.8–0.9 mm. Ovary subinferior, ca. 2.7 mm; styles erect, ca. 1 mm. Disc absent. Capsule with carpels subequal, embedded in calyx, not visible. Seeds dark brown, shiny, subellipsoid, ca. 1 mm, smooth, glabrous. Fl. and fr. Jun–Aug.

• About 3700 m. S Xizang (Lhasa Shi).

9. *Chrysosplenium griffithii* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 74. 1858.

肾叶金腰 shen ye jin yao

Herbs caespitose, (3–)8.5–33 cm tall. Stems simple, glabrous or brown pilose, sometimes also brown papillose. Basal leaf 1 or absent; petiole 7.3–8.7 cm, sparsely brown papillose and pilose; leaf blade reniform, 0.7–3 × 1.2–4.6 cm, margin 7–9-lobed, lobes broadly subovate, 2–8.5 × 3–6 mm, mainly not overlapping at margin. Cauline leaves alternate; petiole 3–5 cm, brown papillose and pilose at axil; leaf blade reniform, 2.3–5 × 3.2–6.5 cm, both surfaces glabrous, margin 11–15-lobed, lobes subelliptic to subovate, 0.6–1.5 cm × 6–11 mm, sometimes brown papillose and pilose at sinus, usually retuse and 1-verrucose at apex, rarely 3-crenate. Cyme 38–100 cm, remotely many flowered; bracteal leaves with petiole 0.8–1.5 cm, brown papillose and pilose at axil, leaf blade reniform, flabellate, or broadly ovate to orbicular, 0.3–3 × 0.4–4.3 cm, sometimes brown papillose and pilose at sinus, margin 3–12-lobed, lobes subovate to subelliptic, 2–13 × 2–11 mm. Flowers yellow, 4.2–4.6 mm in diam.; pedicel 0.3–1.1 cm, brown papillose and pilose. Sepals spreading, orbicular to broadly rhombic-ovate, 1.3–2.6 × 1.5–3 mm, margin usually entire, rarely irregularly dentate, apex obtuse. Stamens 8; filaments 0.3–0.5 mm. Ovary semi-inferior; styles ca. 0.4 mm. Disc 8-lobed. Capsule ca. 3 mm, apex subtruncate, retuse; carpels horizontal, subequal; rostrums ca. 0.4 mm. Seeds dark brown, shiny, ovoid, 0.7–1 mm, smooth, glabrous. Fl. and fr. May–Sep.

Forests, forest margins, alpine meadows, alpine rock clefts; 2500–4800 m. S Gansu, S Qinghai, S Shaanxi, N and W Sichuan, SE Xizang, N Yunnan [Bhutan, N India, N Myanmar, Nepal, Sikkim].

1a. Stems glabrous; leaf blade thinly herbaceous 9a. var. *griffithii*

1b. Stems brown pilose; leaf blade thickly leathery 9b. var. *intermedium*

9a. *Chrysosplenium griffithii* var. *griffithii*

肾叶金腰(原变种) shen ye jin yao (yuan bian zhong)

Plants 8.5–33 cm tall. Stems glabrous. Leaf blade thinly herbaceous. Fl. and fr. May–Sep.

Forests, forest margins, alpine meadows, alpine rock clefts; 2500–4800 m. S Gansu, S Shaanxi (Taibai Shan), N and W Sichuan, SE Xizang, N Yunnan [Bhutan, N India, N Myanmar, Nepal, Sikkim].

9b. *Chrysosplenium griffithii* var. *intermedium* (H. Hara) J. T. Pan, Acta Phytotax. Sin. 24: 92. 1986.

居间金腰 ju jian jin yao

Chrysosplenium nudicaule Bunge var. *intermedium* H. Hara, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 7: 65. 1957.

Plants 3–14 cm tall. Stems brown pilose, sometimes also brown papillose. Leaves thickly leathery. Fl. and fr. Aug–Sep.

Forest margins, alpine meadows, alpine rock clefts; 3100–4800 m. S Qinghai, NW Sichuan, SE Xizang, NW Yunnan [Bhutan, Nepal].

10. *Chrysosplenium fuscopunctulosum* Z. P. Jien, Acta Phytotax. Sin. 8: 339. 1963.

褐点金腰 he dian jin yao

Herbs 5–6.3 cm tall. Stems simple, brown crisped villous. Basal leaf 1 or absent; petiole ca. 1.7 cm, brown pilose; leaf blade broadly orbicular-reniform, 3–8 × 5–12 mm, both surfaces glabrous, base cordate, margin ca. 13-crenate, teeth retuse at apex, with 1 brown, short hair. Cauline leaves 1 or 2, alternate; petiole 5–6 mm, brown crisped villous; leaf blade subreniform, 4.5–7 × 7–8 mm, both surfaces brown pilose, base ± cordate, margin 5–9-crenate. Cyme 1.1–2.1 cm, 3–11-flowered; bracteal leaves with petiole 1.2–3.5 mm, glabrous or brown pilose, leaf blade broadly ovate to broadly orbicular, 2.7–3 × 3.2–4 mm, both surfaces glabrous or brown pilose, sometimes papillose, base broadly cuneate to truncate, margin (2 or)3–6-crenate, teeth retuse and 1-verrucose at apex. Flowers 4.2–4.5 mm in diam.; pedicel brown pilose. Sepals spreading, brown spotted, broadly rhombic-orbicular, 1.3–1.8 × 1.4–2.4 mm, margin entire, apex obtuse. Stamens 8; filaments ca. 0.5 mm. Ovary semi-inferior; styles erect or divergent, 0.5–0.6 mm. Disc 8-lobed. Capsule ca. 2 mm, apex retuse; carpels subequal; rostrums ca. 0.8 mm. Seeds dark brown, shiny, ellipsoid, smooth, glabrous. Fl. and fr. Jun–Jul.

• Rock clefts in forest understories; ca. 3600 m. NW Yunnan.

11. *Chrysosplenium axillare* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 23: 341. 1877.

长梗金腰 chang geng jin yao

Chrysosplenium tianschanicum Krassnov.

Herbs 18–30 cm tall. Sterile branches arising from leaf axils. Stems glabrous. Basal leaves absent. Cauline leaves several, alternate, proximal ones smaller, scalelike, sessile, distal ones with petiole 0.4–1.9 cm, glabrous; leaf blade ovate to broadly so, 0.9–2.9 × 1–1.7 cm, glabrous, base rounded-cuneate, margin ca. 12-

crenate. Cyme remotely flowered or flowers solitary at bracteal leaf axils; bracteal leaves with petiole 1–7 mm, leaf blade ovate to broadly so, 2.8–15 × 1.2–12 mm, glabrous, base broadly cuneate to rounded, margin 10–12-crenate, teeth brown 1-verrucose at apex. Flowers green, ca. 7.2 mm in diam.; pedicel slender, 0.6–1.9 cm, glabrous. Sepals spreading, subrhombic, 1.9–2.8 × 2.8–3.3 mm, glabrous, apex obtuse or retuse, brown 1-verrucose. Stamens ca. 1.2 cm. Ovary semi-inferior; styles 0.5–0.9 mm. Disc distinctly 8-lobed. Capsule retuse at apex; carpels subequal; rostrums ca. 0.7 mm. Seeds dark brown, shiny, subovoid, ca. 1.6 mm, smooth, glabrous. Fl. and fr. Jul–Sep.

Forests, scrub, rock clefts; 2800–4500 m. S Gansu, SE Qinghai, S Shaanxi (Taibai Shan), Xinjiang [Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan].

12. *Chrysosplenium carnosum* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 73. 1858.

肉质金腰 rou zhi jin yao

Chrysosplenium tibeticum Limpricht.

Herbs 9–10 cm tall. Stolons arising from leaf axils. Stems brown papillose at leaf axils, elsewhere glabrous. Basal leaves absent. Cauline leaves alternate, proximal ones scalelike, ca. 5.2 × 2 mm, distal ones with petiole ca. 3 mm; leaf blade subspatulate to broadly obovate, ca. 8 × 8 mm, both surfaces glabrous, base broadly cuneate, margin ca. 7-crenate, teeth brown 1-verrucose at apex. Cyme 3–5 cm, remotely 7–10-flowered; branches ± brown papillose; bracteal leaves with petiole 1.2–2.2 mm, ± brown papillose at axil, leaf blade broadly ovate, 7–12 × 6–10 mm, both surfaces glabrous, base broadly cuneate, margin 5–9-crenate, teeth brown 1-verrucose at apex. Flowers green; pedicel nearly 7 mm. Sepals erect, broadly orbicular, ca. 1.2 × 1.9–2.2 mm, glabrous, apex subtruncate. Stamens 8, ca. 0.8 mm. Ovary semi-inferior; styles ca. 0.5 mm. Disc obscurely 8-lobed. Capsule 3–4 mm, apex subtruncate, retuse; carpels horizontal, subequal; rostrums shorter. Seeds red-brown, shiny, ovoid, 0.9–1 mm, smooth, glabrous. Fl. and fr. Jul–Aug.

Alpine scrub meadows, alpine rock clefts; 4400–4700 m. W Sichuan, E Xizang [Bhutan, N India, N Myanmar, Nepal, Sikkim].

13. *Chrysosplenium chinense* (H. Hara) J. T. Pan, Acta Phytotax. Sin. 24: 93. 1986.

乳突金腰 ru tu jin yao

Chrysosplenium alternifolium Linnaeus var. *chinense* H. Hara, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 7: 74. 1957.

Herbs 6.5–15.5 cm tall. Stolons present. Stems glabrous. Basal leaves with petiole 0.5–8.5 cm, red-brown pilose; leaf blade reniform to orbicular-reniform, 0.7–1.6 × 0.9–1.85 cm, both surfaces and margin glabrous, base cordate, margin shallowly 5–9-dentate, teeth usually retuse and brown 1-verrucose at apex. Cauline leaf 1 or absent; petiole 5–10 mm, brown pilose near axil; leaf

blade broadly ovate to broadly orbicular, 5–8 × 6–12 mm, base broadly cuneate to subtruncate, margin shallowly 5–7-dentate. Cyme 1–4.5 cm; bracteal leaves with petiole 1.5–5 mm, brown papillose or pilose near axil, leaf blade ovate or broadly so to broadly obovate, 3–11 × 2.5–12 mm, base cuneate to broadly so, margin entire or 2–5-crenate. Flowers yellow-green, ca. 4 mm in diam.; pedicel very short, usually pilose. Sepals suberect, broadly ovate to orbicular, 1.1–2 × 2–2.2 mm, glabrous, apex obtuse. Stamens 8; filaments 0.5–1.1 mm. Ovary semi-inferior; styles ca. 1 mm. Disc absent. Capsule ca. 2.5 mm, apex retuse; carpels subequal; rostrums ca. 0.4 mm. Seeds dark brown, shiny, ovoid, ca. 1 mm, papillose. Fl. and fr. May–Aug.

• Shaded and wet places in forest understories, rock clefts in ravines. N Hebei, N Shanxi (Wutai Shan).

14. *Chrysosplenium davidianum* Decaisne ex Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 23: 343. 1877. 锈毛金腰 xiu mao jin yao

Chrysosplenium briquetii Terracciano; *C. davidianum* var. *alpinum* H. Hara.

Herbs caespitose, (1–)3.5–19 cm tall. Rhizomes transversely elongate, densely brown villous. Sterile branches well developed. Stems brown crisped villous. Basal leaves with petiole 1–3 cm, densely brown crisped villous; leaf blade broadly ovate to broadly subelliptic, (0.5–)2.1–4.2 × (0.7–)2–3.7 cm, both surfaces brown villous along veins and margin, base subtruncate to subcordate, margin (7–)13–17-crenate. Cauline leaves (1 or)2–5, alternate; petiole 5–6 mm, brown pilose; leaf blade broadly ovate to subflabellate, 3–7 × 3.5–7 mm, both surfaces and margin brown pilose, base broadly cuneate, margin 7–9-crenate, apex obtuse. Cyme 0.5–4 cm, many flowered; bracteal leaves with petiole 1.2–3.5 mm, pilose, leaf blade orbicular-flabellate, 3.1–11.2 × 3.1–9 mm, pilose to subglabrous, base broadly cuneate, margin 3–7-crenate. Flowers yellow; pedicel 1–5 mm, brown pilose. Sepals usually orbicular, 1–2.6 × 1.1–3.1 mm, glabrous, apex obtuse or retuse. Stamens 8, 1–2 mm. Ovary semi-inferior; styles 0.8–2 mm. Disc absent. Capsule ca. 3.8 mm, apex subtruncate, retuse; carpels horizontal, subequal; rostrums ca. 1 mm. Seeds dark brown, ovoid, ca. 1 mm, papillose. Fl. and fr. Apr–Aug. $2n = 72^*$.

• Shaded and wet grassy places in forest understories, rock clefts in ravines; 1500–4100 m. ?Guizhou, W Sichuan, N and W Yunnan.

15. *Chrysosplenium macrophyllum* Oliver, Hooker's Icon. Pl. 18: t. 1744. 1888.

大叶金腰 da ye jin yao

Chrysosplenium barbeyi Terracciano; *Triplostegia mairei* H. Léveillé.

Herbs 17–21 cm tall. Sterile branches 23–35 cm. Stems brown pilose. Basal leaves several, petiolate; leaf blade obovate, 2.3–19 × 1.3–11.5 cm, leathery, abaxially glabrous, adaxially brown pilose, base cuneate, margin entire or obscurely undulate-crenulate, apex obtuse.

Cauline leaf usually 1; leaf blade narrowly elliptic, 1.2–1.7 × 0.5–0.75 cm, abaxially glabrous, adaxially and marginally brown pilose, margin usually ca. 13-crenate. Pleiochasium 3–4.5 cm; branches brown pilose or subglabrous; bracteal leaves with petiole 3–10 mm, leaf blade ovate to broadly so, 0.6–2 cm × 5–14 mm, base cuneate, margin usually 9–15-crenate, sometimes obscurely so, apex subacute. Sepals subovate to broadly ovate, 3–3.2 × 2.5–3.9 mm, glabrous, apex retuse. Stamens longer than sepals, 4–6.5 mm. Ovary semi-inferior; styles erect, ca. 5 mm. Disc absent. Capsule 4–4.5 mm, apex neither truncate nor retuse; carpels subequal; rostrums 3–4 mm. Seeds dark brown, subovoid, ca. 0.7 mm, densely papillose. Fl. and fr. Apr–Jun.

• Forests, shaded and wet places in ravines; 1000–2200 m. S Anhui, ?Fujian, N Guangdong, ?Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, E Sichuan, E Yunnan, Zhejiang.

16. *Chrysosplenium glossophyllum* H. Hara, J. Jap. Bot. 17: 19. 1941.

舌叶金腰 she ye jin yao

Chrysosplenium guangxiense H. G. Ye & G. C. Zhang. Herbs 14.5–26 cm tall. Stems brown pilose. Basal leaves with petiole 2.5–8 cm, brown pilose; leaf blade subelliptic, 4.3–8.5 × 2.7–4.3 cm, abaxially glabrous, adaxially brown hispid, base rounded to subcordate, margin 20–36-crenate, sometimes obscurely so. Pleiochasium 5–9.5 cm, remotely flowered; branches brown pilose proximally; proximal bracteal leaves with petiole 1.3–1.8 cm, brown pilose, leaf blade subovate, 2.7–3 × 1.7–1.9 cm, abaxially glabrous, adaxially and marginally brown hispid, base broadly cuneate, margin ca. 15-crenate; distal bracteal leaves with petiole 1.5–6 mm, leaf blade ovate to broadly obovate, 2.5–15 × 2–10 mm, glabrous, margin 5–9-crenate, teeth brown 1-verrucose at apex. Pedicel 1.5–5 mm, glabrous. Sepals broadly orbicular, ca. 2 × 2.6–3.1 mm, glabrous, apex obtuse. Stamens 8, ca. 0.7 mm. Ovary semi-inferior; styles short. Disc absent. Capsule ca. 3 mm, apex subtruncate, retuse; carpels horizontal, subequal; rostrums ca. 0.5 mm. Seeds dark brown, shiny, subovoid, ca. 0.5 mm, papillose. Fl. and fr. Apr–Jul.

• Shaded and wet places in ravines; 1000–1400 m. NW Guangxi (Tianlin Xian), C Sichuan (Guan Xian).

17. *Chrysosplenium hydrocotylifolium* H. Léveillé & Vaniot in H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 441. 1911.

天胡荽金腰 tian hu sui jin yao

Herbs ca. 27 cm tall. Stems brown pilose, usually leafless. Basal leaves with petiole 2.5–14 cm, proximally mostly brown villous; leaf blade brown spotted, orbicular, 2.3–8.5 × 2.4–8.5 cm, both surfaces glabrous, sometimes pilose adaxially or on both surfaces, base reniform, margin undulate or 34–39-crenate, teeth narrowly colorless at margin, retuse and 1-verrucose at apex. Pleiochasium 10–12 cm; branches barely 7.5 cm, brown pilose; bracteal leaves with petiole 3.5–9 mm, brown villous at axil, leaf blade broadly ovate, 0.5–1.6 × 0.5–1.4 cm, glabrous,

sometimes pilose adaxially on proximal leaves, base cuneate, margin 5–8-crenate. Flowers green, 5–6 mm in diam. Sepals spreading, brown spotted, broadly orbicular, ca. 1.8 × 2.4 mm, glabrous, apex obtuse, brown 1-verrucose. Stamens 8; filaments ca. 0.3 mm. Ovary subinferior; styles ca. 0.3 mm. Disc 8-lobed. Capsule 5–5.5 mm, apex subtruncate, retuse; carpels subequal; rostrums ca. 0.2 mm. Seeds dark brown, shiny, subovoid, ca. 1 mm, papillose. Fl. and fr. Apr–Nov.

• Forests, shaded places on limestone hills, limestone clefts; 1300–2400 m. N Guangdong, ?Guangxi, Guizhou, C and SE Sichuan, E Yunnan.

1a. Leaf blade and bracteal leaf

blade glabrous 17a. var. *hydrocotylifolium*

1b. Leaf blade and proximal bracteal

leaf blade pilose, at least adaxially.

2a. Leaf blade and proximal bracteal

leaf blade pilose adaxially 17b. var. *emeiense*

2b. Leaf blade pilose on both

surfaces 17c. var. *guangdongense*

17a. *Chrysosplenium hydrocotylifolium* var. *hydrocotylifolium*

天胡荽金腰(原变种) tian hu sui jin yao (yuan bian zhong)

Chrysosplenium esquirolii H. Léveillé.

Leaf blade and bracteal leaf blade glabrous on both surfaces. Fl. and fr. Apr–Jul.

• Limestone clefts; 1300–2400 m. ?Guangxi, Guizhou, E Yunnan.

17b. *Chrysosplenium hydrocotylifolium* var. *emeiense* J. T. Pan, Acta Phytotax. Sin. 24: 94. 1986.

峨眉金腰 e mei jin yao

Leaf blade and proximal bracteal leaf blade pilose adaxially. Fl. and fr. May–Nov.

• Forests; ca. 1500 m. C and SE Sichuan (Emei Shan, Pengshui Xian).

17c. *Chrysosplenium hydrocotylifolium* var. *guangdongense* S. J. Xu & Z. X. Li, Acta Phytotax. Sin. 32: 364. 1994.

广东金腰 guang dong jin yao

Leaf blade pilose on both surfaces.

• Shaded places on limestone hills. N Guangdong (Ruyuan Yao Zu Zizhixian).

18. *Chrysosplenium japonicum* (Maximowicz) Makino, Bot. Mag. (Tokyo) 23: 71. 1909.

日本金腰 ri ben jin yao

Herbs caespitose, 8.5–15.5 cm tall. Bulbils present or not near stem base. Stems pilose. Basal leaves with petiole 1.5–8 cm, pilose; leaf blade reniform, 0.6–1.6 × 0.9–2.5 cm, abaxially subglabrous, adaxially pilose, base cordate, reniform, subtruncate, or cuneate, margin shallowly ca. 15-dentate, teeth retuse at apex. Cauline leaves alternate, similar to basal ones; petiole ca. 2 cm, pilose; leaf blade ca. 1.1 × 1.3 cm, abaxially sub-

glabrous, adaxially pilose, margin shallowly ca. 11-dentate. Cyme 1.5–4 cm, densely flowered; branches pilose; bracteal leaves with petiole 0.5–6 mm, pilose, leaf blade ovate to subflabellate, 5–12 × 5–14 mm, glabrous, base broadly cuneate, margin 3–9-dentate. Flowers subsessile, green, ca. 3 mm in diam. Sepals erect, broadly ovate, 0.6–1.4 × 1–1.4 mm, glabrous, apex obtuse or acute. Stamens usually (2 or)4(or 8), 0.3–0.4 mm. Ovary subinferior; styles 0.2–0.3 mm. Disc usually 4-lobed. Capsule 4–5 mm, apex subtruncate, retuse; carpels horizontal, subequal; rostrums ca. 0.2 mm. Seeds dark brown, ellipsoid, 0.6–0.7 mm, puberulous. Fl. and fr. Mar–Jun.

Forests, ravine forests, wet places in ravines; 400–600 m. Anhui, Jiangxi, Jilin, Liaoning, Zhejiang [Japan, Korea].

- 1a. Bulbils present near stem base; leaf blade cordate or reniform at base 18a. var. *japonicum*
 1b. Bulbils absent near stem base; leaf blade subtruncate or cuneate at base 18b. var. *cuneifolium*

18a. *Chrysosplenium japonicum* var. *japonicum*

日本金腰(原变种) ri ben jin yao (yuan bian zhong)

Chrysosplenium alternifolium Linnaeus var. *japonicum* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 23: 343. 1877.

Bulbils present near stem base. Leaf blade cordate or reniform at base. $2n = 24$.

Forests, wet places in ravines; ca. 500 m. Anhui, Jiangxi, Jilin, Liaoning, Zhejiang [Japan, Korea].

18b. *Chrysosplenium japonicum* var. *cuneifolium* X. H. Guo & X. P. Zhang, Acta Phytotax. Sin. 36: 365. 1998.

楔叶金腰 xie ye jin yao

Bulbils absent near stem base. Leaf blade subtruncate or cuneate at base.

• Ravine forests; 400–600 m. N and SE Anhui (Banqiao, Ningguo Xian).

19. *Chrysosplenium wuwenchenii* Z. P. Jien, Acta Phytotax. Sin. 8: 337. 1963.

韞珍金腰 yun zhen jin yao

Herbs 8–12.5 cm tall. Sterile branches arising from stem base. Stems cespitose, proximally pilose, distally glabrous. Basal leaves with petiole 2.5–3 cm, proximally pilose; leaf blade reniform to orbicular-reniform, 0.8–2.2 × 0.9–2.5 cm, abaxially glabrous, adaxially pilose, base reniform, margin obscurely 15–17-crenate. Cauline leaf usually 1; petiole 1.8–2.5 cm, proximally pilose, brown glandular hairy at axil; leaf blade reniform, 0.6–1.3 × 1–1.5 cm, abaxially and marginally glabrous, adaxially pilose, margin 9–13-crenate (teeth 1-verrucose at apex), apex obtuse. Cyme 4–12.5 cm; branches glabrous; bracteal leaves with petiole 0.5–3 mm, glabrous except papillose at axil, leaf blade broadly subovate to broadly suborbicular, 3.8–7 × 4.1–10 mm, glabrous, base truncate-rounded to broadly cuneate, margin obscurely 4–9-undulate-dentate or entire. Flowers yellow-green; pedicel glabrous. Sepals

broadly subovate, 1.2–1.3 × 1.5–2 mm, apex obtuse or acute. Stamens 8; filaments ca. 1 mm. Ovary subinferior; styles ca. 0.8 mm. Disc distinct. Capsule ca. 2.4 mm, apex subtruncate, retuse; carpels horizontal, subequal; rostrums ca. 0.8 mm. Seeds dark brown, subovoid, ca. 0.8 mm, papillose. Fl. and fr. May–Jun.

• Rock clefts; 2000–2500 m. SE Sichuan (Nanchuan Xian).

20. *Chrysosplenium flagelliferum* F. Schmidt, Reis. Amurland., Bot. 134. 1868.

蔓金腰 man jin yao

Herbs cespitose. Stolons arising from basal leaf axils. Stolon leaves alternate, subreniform, larger apically on stolons, 0.6–1 × 1–1.9 cm, adaxially pilose, margin obtusely 5–8-dentate. Stems glabrous. Basal leaves with petiole 3–13 mm; leaf blade reniform to orbicular-reniform, 1.2–3.8 × 1.5–5.3 cm, abaxially glabrous, adaxially pilose, base cordate, margin obtusely 12–18-dentate. Cauline leaves 3 or 4, alternate; petiole 0.6–1 cm; leaf blade broadly suborbicular, 4–8 × 5–10 mm, glabrous, margin obtusely 5-dentate. Cyme 3.5–6.3 cm, remotely flowered; branches glabrous; bracteal leaves with petiole 1.6–3 mm, pilose, leaf blade broadly ovate or obovate to broadly orbicular, 2–7 × 1.8–8.3 mm, base subcuneate to obliquely cuneate, margin obtusely 3–5-dentate. Flowers ca. 4.6 mm in diam.; pedicel glabrous. Sepals subspreading, ovate to subrhombic, 1.9–2 × 1.2–2 mm, glabrous, apex obtuse or acute. Stamens 8, ca. 0.9 mm. Ovary semi-inferior; styles ca. 0.7 mm. Disc distinct. Capsule ca. 3 mm, apex subtruncate, retuse; carpels subequal; rostrums ca. 0.7 mm. Seeds dark brown, shiny, ellipsoid, 0.7–0.8 mm, sparsely puberulous. Fl. and fr. May–Jul. $2n = 24$.

Shaded and wet places in forest understories, riversides; 400–500 m. ?Hebei, Heilongjiang, Jilin, Liaoning [Japan, Korea, Mongolia, Russia].

21. *Chrysosplenium microspermum* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 3, 2: 109. 1890.

微子金腰 wei zi jin yao

Herbs (1.3–)5–12 cm tall. Sterile branches arising from basal leaf axils, slender, with alternate leaves. Stems glabrous except brown papillose at leaf axils. Basal leaves with petiole ca. 8.4 mm, glabrous; leaf blade broadly ovate to subreniform, ca. 4 × 5.3 mm, both surfaces glabrous, base reniform or subtruncate, sinus brown papillose, margin 8-crenate, teeth usually broadly orbicular, overlapping at margin. Cauline leaves usually 3, alternate; petiole 7–8 mm, glabrous; leaf blade usually broadly subovate, 4.1–6 × ca. 5 mm, both surfaces glabrous, margin 7- or 8-crenate, teeth brown 1-verrucose at sinus. Cyme 0.8–1.1 cm, 5–9-flowered; branches brown papillose; bracteal leaves with petiole 0.7–5 mm, leaf blade broadly ovate, 1.8–6 × 1.5–6.3 mm, base broadly cuneate, margin 3–5-crenate. Flowers ca. 2.5 mm in diam.; pedicels ± brown papillose. Sepals ovate to broadly so, 0.9–1 × 1–1.2 mm,

apex obtuse. Stamens 8; filaments ca. 0.3 mm. Ovary semi-inferior; styles ca. 0.4 mm. Disc 8-lobed. Capsule ca. 2.4 mm, apex subtruncate, retuse; carpels horizontal, subequal; rostrums ca. 0.4 mm. Seeds brown, subovoid, ca. 0.4 mm, tuberculate. Fl. and fr. Apr–Sep.

• Wet places in ravines; 1800–2900 m. W Hubei, S Shaanxi (Taibai Shan), E Sichuan.

22. *Chrysosplenium lanuginosum* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 74. 1858.

绵毛金腰 mian mao jin yao

Herbs 7–22 cm tall. Rhizomes to 20 cm. Sterile branches arising from basal leaf axils, 5–25 cm, brown villous. Stems brown pilose or subglabrous. Basal leaves with petiole 0.8–5 cm, sometimes only 4–6 mm, brown villous; leaf blade ovate or broadly so to subelliptic, 0.4–4.5 × 0.3–2.9 cm, both surfaces and margin ± brown pilose, sometimes densely brown crisped villous adaxially, base usually broadly cuneate, rarely subcordate, margin obscurely 9–17-undulate-crenate or shallowly 5–8-dentate, teeth retuse and 1-verrucose at apex. Cauline leaves 1–3, alternate; petiole 0.5–1.7 cm, brown villous; leaf blade broadly ovate or flabellate to elliptic, 2–10 × 1.6–10 mm, both surfaces and margin ± brown pilose, sometimes glabrous abaxially, base cuneate, margin 5–9-crenate. Cyme 5–9.5 cm, remotely flowered; branches glabrous or pilose; bracteal leaves with petiole 1.5–7 mm, glabrous or pilose, leaf blade obliquely broadly ovate or subflabellate to obovate, 3–11 × 4–12 mm, glabrous on both surfaces, but brown pilose adaxially on most proximal leaf, base broadly cuneate to truncate, margin 5–11-crenate, teeth sometimes with 1 brown hair at apex. Flowers green, 4.2–6.2 mm in diam. Sepals spreading, brown spotted, broadly ovate to broadly reniform-orbicular, 1.5–2.2 × 2.2–3 mm, apex obtuse or shortly acuminate, sometimes retuse and then margin sparsely brown ciliate. Stamens 8, ca. 0.8 mm. Ovary subinferior; styles 0.6–0.7 mm. Disc obsolete, surrounded by brown papillae. Capsule 3.2–3.5 mm, apex subtruncate, retuse; carpels subequal; rostrums ca. 0.8 mm. Seeds dark brown, subovoid, 0.6–1 mm, papillose. Fl. and fr. Apr–Jul.

Forests, wet places and rock clefts in ravines; 1100–3800 m. ?Guangdong, ?Guangxi, Guizhou, Hubei, Sichuan, Taiwan, Xizang, Yunnan [Bhutan, N India, N Myanmar, Nepal, Sikkim].

- 1a. Basal leaf blade shallowly dentate at margin..... 22d. var. *gracile*
 1b. Basal leaf blade crenate or undulate-crenate at margin, sometimes minutely or obscurely so.
 2a. Basal leaf blade densely narrowly brown crisped villous at margin 22b. var. *pilosomarginatum*
 2b. Basal leaf blade sparsely villous on both surfaces and at margin.
 3a. Sepals sparsely brown ciliate at margin, apex retuse .. 22c. var. *ciliatum*

- 3b. Sepals not ciliate at margin, apex obtuse.
 4a. Basal leaf blade usually elliptic, rarely broadly ovate, margin obscurely 9–17-undulate-crenate 22a. var. *lanuginosum*
 4b. Basal leaf blade ovate to orbicular-ovate, margin 8–10-crenate .. 22e. var. *formosanum*

22a. *Chrysosplenium lanuginosum* var. *lanuginosum*

绵毛金腰(原变种) mian mao jin yao (yuan bian zhong) *Chrysosplenium adoxoides* J. D. Hooker & Thomson ex Maximowicz; *C. dunnianum* H. Léveillé & Vaniot; *C. henryi* Franchet; *C. lanuginosum* var. *dunnianum* (H. Léveillé & Vaniot) H. Hara; *C. lanuginosum* var. *yunnanense* H. Hara.

Plants 8–22 cm tall. Basal leaves with petiole 0.8–5 cm; leaf blade usually elliptic, rarely broadly ovate, 1.3–4.5 × 1.2–2.9 cm, both surfaces and margin sparsely villous, base broadly cuneate, rarely subcordate, margin obscurely 9–17-undulate-crenate. Sepals not ciliate at margin, apex obtuse. Fl. and fr. Apr–Jun.

Rock clefts in ravines; 1100–1600 m. Guizhou, Hubei, Sichuan, Xizang, Yunnan [Bhutan, N India, N Myanmar, Nepal].

22b. *Chrysosplenium lanuginosum* var. *pilosomarginatum* (H. Hara) J. T. Pan, Acta Phytotax. Sin. 24: 96. 1986.

毛边金腰 mao bian jin yao

Chrysosplenium pilosomarginatum H. Hara, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 7: 78. 1957.

Basal leaf blade margin minutely or obscurely crenate or undulate-crenate, densely narrowly brown crisped villous. Fl. and fr. May–Jun.

• Wet places in ravines; ca. 1800 m. NE Yunnan (Yiliang Xian).

22c. *Chrysosplenium lanuginosum* var. *ciliatum* (Franchet) J. T. Pan, Acta Phytotax. Sin. 24: 96. 1986.

睫毛金腰 jie mao jin yao

Chrysosplenium ciliatum Franchet, Bull. Soc. Philom. Paris 8(2): 120. 1890.

Basal leaf blade sparsely villous on both surfaces and at margin, margin minutely or obscurely crenate or undulate-crenate. Sepals sparsely brown ciliate at margin, apex retuse. Fl. and fr. Apr–Jul.

Forests, rock clefts in ravines; 1600–2500 m. W Hubei, Sichuan, Yunnan [Sikkim].

22d. *Chrysosplenium lanuginosum* var. *gracile* (Franchet) H. Hara, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 7: 82. 1957.

细弱金腰 xi ruo jin yao

Chrysosplenium gracile Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 234. 1886.

Plants slender, 7–11 cm tall. Basal leaves few; petiole 4–6 mm; leaf blade broadly subovate, 0.4–1.2 × 0.3–1.1 cm, base broadly cuneate, not subcordate, margin

shallowly 5–8-dentate, teeth retuse and 1-verrucose at apex.

• Forests; 2200–3800. Sichuan, E Xizang.

22e. *Chrysosplenium lanuginosum* var. *formosanum* (Hayata) H. Hara, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 7: 83. 1957.

台湾金腰 tai wan jin yao

Chrysosplenium formosanum Hayata, Icon. Pl. Formos. 3: 103. 1913.

Basal leaf blade ovate to orbicular-ovate, 1–1.8 × 0.7–1.3 cm, both surfaces and margin sparsely villous, base often broadly cuneate, margin 8–10-crenate. Bracteal leaf blade orbicular-ovate, margin obtusely 4–6-crenate. Sepals not ciliate at margin, apex obtuse.

• Forests. Taiwan.

23. *Chrysosplenium jienningense* W. T. Wang in W. T. Wang & M. X. Nie, Bull. Bot. Res., Harbin 2(1–2): 48. 1981.

建宁金腰 jian ning jin yao

Herbs 11.5–12.5 cm tall. Sterile branches absent. Stems distally branched, brown crisped villous. Cauline leaves 2 or 3, alternate; petiole 1–1.2 cm, brown crisped villous; leaf blade subreniform, 0.6–0.8 × 0.7–1.3 cm, both surfaces and margin brown pilose, base cordate, margin ca. 9-crenate (teeth retuse and 1-verrucose at apex), apex obtuse. Cyme remotely flowered; branches glabrous; bracteal leaves with petiole 0.8–3 mm, brown glandular pilose at axil, elsewhere glabrous, leaf blade subreniform to broadly suborbicular, 2.5–5.5 × 3–8 mm, both surfaces glabrous, base subcordate to rounded-truncate, margin 5–7-crenate, teeth sparsely brown ciliate at margin, 1-verrucose at apex. Flowers yellow-green, ca. 5 mm in diam. Sepals spreading, broadly ovate to broadly orbicular, 1.3–1.7 × 1.9–2.3 mm, apex obtuse. Stamens 8; filaments ca. 0.4 mm. Ovary subinferior; styles ca. 0.3 mm. Disc 8-lobed, surrounded by brown papillae. Fl. Jun.

• Shaded places at riversides; ca. 700 m. W Fujian (Jianning Xian), ?Zhejiang.

24. *Chrysosplenium taibaishanense* J. T. Pan, Acta Phytotax. Sin. 24: 97. 1986.

太白金腰 tai bai jin yao

Herbs 7–11 cm tall. Stolons arising from proximal leaf axils. Stems brown pilose. Basal leaves absent. Cauline leaves alternate; petiole 0.9–1.4 cm, brown papillose and pilose adaxially and at axil; leaf blade subflabellate to nearly semiorbicular, 0.4–1 × 0.6–1.5 cm, abaxially glabrous, adaxially brown papillose and pilose near base, base broadly cuneate to truncate, margin shallowly 7–9-dentate (teeth retuse at apex), apex obtuse. Cyme 2- or 3-flowered; branches glabrous; bracteal leaves with petiole 1.5–3 mm, adaxially brown pilose, brown papillose and pilose at axil, leaf blade flabellate to nearly semiorbicular, 0.6–1.2 × 0.7–1.5 cm, abaxially glabrous, adaxially brown pilose near base,

margin shallowly 3–9-dentate (teeth retuse at apex), apex obtuse. Flowers ca. 5 mm in diam.; pedicel barely 0.5 mm. Sepals spreading, broadly ovate to orbicular, 1.5–2 × 1.9–2 mm, adaxially with a transverse line of brown papillae, apex obtuse or acute. Stamens 8; filaments ca. 0.4 mm. Ovary subinferior; styles ca. 0.3 mm. Disc obsolete. Capsule ca. 3 mm, apex subtruncate, retuse; carpels subequal; rostrums ca. 0.5 mm. Seeds dark brown, subovoid, ca. 0.8 mm, tuberculate. Fl. and fr. Jun–Aug.

• Ravines; ca. 2100 m. S Shaanxi (Taibai Shan).

25. *Chrysosplenium nepalense* D. Don, Prodr. Fl. Nepal. 210. 1825.

山溪金腰 shan xi jin yao

Chrysosplenium guebriantianum Handel-Mazzetti; *C. nepalense* var. *yunnanense* (Franchet) Franchet; *C. sulcatum* Maximowicz; *C. yunnanense* Franchet.

Herbs 5.5–21 cm tall. Sterile branches arising from leaf axils. Stems glabrous. Leaves opposite; petiole 2–15 mm, brown papillose adaxially and at axil; leaf blade ovate to broadly so, 0.3–1.8 × 0.5–1.8 cm, abaxially glabrous, adaxially sometimes brown papillose, base broadly cuneate to subtruncate, margin 6–16-crenate, apex obtuse. Cyme 1.3–6 cm, 8–18-flowered; bracteal leaves brown papillose at axil, leaf blade broadly ovate, 3.2–6.8 × 3.2–6.5 mm, base usually broadly cuneate, rarely oblique, margin 5–10-crenate. Flowers yellow-green, ca. 3 mm in diam.; pedicel glabrous. Sepals erect, broadly subovate, 1.1–1.3 × 1–1.2 mm, glabrous, apex obtuse. Stamens 8, ca. 0.5–1 mm. Ovary subinferior; styles ca. 0.2 mm. Disc absent. Capsule ca. 2.6 mm; carpels subequal; rostrums ca. 0.4 mm. Seeds red-brown, ellipsoid, ca. 1 mm, smooth, glabrous. Fl. and fr. May–Jul. $2n = 24$.

Forests, meadows, rock clefts; 1500–5900 m. Sichuan, Xizang, Yunnan [Bhutan, N India, N Myanmar, Nepal, Sikkim].

26. *Chrysosplenium hebetatum* Ohwi, Repert. Spec. Nov. Regni Veg. 36: 52. 1934.

大武金腰 da wu jin yao

Herbs 4–10 cm tall. Rhizomes elongate. Sterile branches arising from leaf axils, villous. Stems sparsely villous. Basal leaves petiolate; leaf blade broadly ovate, 0.7–1.5 × 0.7–1.5 cm, sparsely villous, base broadly cuneate, margin obscurely 6–8-crenate. Cauline leaves 4–6, opposite; petiole 2–4 mm, villous; leaf blade broadly orbicular-ovate or subrhombic to flabellate, 5–10 × 5–10 mm, pilose, base broadly cuneate, margin 4–6-crenate. Cyme few flowered; bracteal leaves obovate, small, base cuneate, margin 2–6-crenate. Flowers green, 2–3 mm in diam. Sepals erect, broadly ovate to orbicular, 1.5–2 mm, apex obtuse. Stamens 8; filaments ca. 1 mm. Capsule with carpels erect; rostrums 0.5–0.8 mm. Seeds dark brown, subellipsoid, ca. 0.5 mm, glabrous, with transverse, undulate lines. Fr. Apr–May.

• Forests. Taiwan.

27. *Chrysosplenium sinicum* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 23: 348. 1877.

中华金腰 zhong hua jin yao

Chrysosplenium chamaedryoides Engler ex Diels; *C. chingii* H. Hara ex E. Walker; *C. lushanense* W. T. Wang; *C. pseudofauriei* H. Léveillé; *C. trachyspermum* Maximowicz.

Herbs (3–)10–20(–33) cm tall. Sterile branches well developed, arising from proximal leaf axils, glabrous. Stems glabrous. Leaves usually opposite; petiole 6–10 mm, sometimes brown papillose near axil; leaf blade orbicular to broadly ovate, 6–10.5 × 7.5–11.5 mm, glabrous, base broadly cuneate, margin obtusely 12–16-dentate, apex obtuse. Cyme 2.2–3.8 cm, 4–10-flowered; branches glabrous; bracteal leaves with petiole 1–7 mm, brown papillose near axil, leaf blade narrowly to broadly ovate, 0.4–1.8 cm × 9–10 mm, glabrous, base broadly cuneate to oblique, margin obtusely 5–16-dentate. Flowers yellow-green; pedicel glabrous. Sepals erect, ± broadly ovate, 0.8–2.1 × 1–2.4 mm, apex obtuse. Stamens 8, ca. 0.4 mm. Disc absent. Capsule 7–10 mm; carpels divaricate, distinctly unequal; rostrums 0.3–1.2 mm. Seeds dark brown, shiny, ellipsoid to broadly ovoid, 0.6–0.9 mm, papillose. Fl. and fr. Apr–Aug.

Forests, shaded and wet places in ravines; 500–3600 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Jiangxi, Jilin, Liaoning, Qinghai, Shaanxi, Shanxi, Sichuan, ?Zhejiang [Korea, Mongolia, Russia].

28. *Chrysosplenium lectus-cochleae* Kitagawa, Bot. Mag. (Tokyo) 48: 909. 1934.

林金腰 lin jin yao

Chrysosplenium amabile Kitagawa; *C. baicalense* Maximowicz var. *lectus-cochleae* (Kitagawa) A. I. Baranov & Skvortzov; *C. sphaerospermum* Maximowicz var. *amabile* (Kitagawa) A. I. Baranov & Skvortzov.

Herbs 11–15 cm tall. Sterile branches arising from proximal cauline leaf axils, brown crisped villous. Stems brown pilose. Cauline leaves opposite; petiole 3–8 mm, brown pilose; leaf blade brown spotted, subflabellate, 0.4–8 × 0.3–11 mm, glabrous except brown ciliate at margin, base cuneate, margin 5–9-crenate. Cyme 1.3–3.5 cm; branches pilose; bracteal leaves with petiole 4–6 mm, brown papillose at axil, leaf blade brown spotted, broadly ovate or broadly obovate to flabellate, 0.6–2 × 0.4–1.7 cm, both surfaces glabrous, base oblique or cuneate to rounded, margin shallowly 5–7-dentate, ciliate. Flowers yellow-green; pedicel pilose. Sepals erect, broadly subovate, 1.1–2.5 × 1.8–2.6 mm, apex obtuse. Stamens 8; filaments 0.5–0.8 mm. Ovary subsuperior; styles ca. 0.5 mm. Disc absent. Capsule 2.4–6 mm; carpels distinctly unequal; rostrums 0.8–1 mm. Seeds dark brown, subovoid, 0.8–1 mm, papillose. Fl. and fr. May–Aug.

• Forests, shaded and wet places or rock clefts at forest margins; 400–1800 m. Heilongjiang, Jilin, Liaoning.

29. *Chrysosplenium cavaleriei* H. Léveillé & Vaniot, Repert. Spec. Nov. Regni Veg. 9: 441. 1911.

滇黔金腰 dian qian jin yao

Chrysosplenium nepalense D. Don var. *cavaleriei* (H. Léveillé & Vaniot) H. Hara; *C. nepalense* var. *vegetum* H. Hara.

Herbs 9–22 cm tall. Sterile branches arising from near stem base. Stems glabrous. Cauline leaves opposite; petiole 0.7–1 cm, sparsely brown papillose; leaf blade broadly ovate to subflabellate, 0.9–1.3 × 1–1.4 cm, adaxially (rarely abaxially) sparsely brown papillose, base broadly cuneate to subtruncate, brown 1-papillate at sinus, margin obtusely 14–19-dentate. Pleiochasmus 1.7–6.5 cm, many flowered; branches glabrous; bracteal leaves with petiole 1–2 mm, sparsely brown papillose adaxially and at axil, leaf blade broadly ovate, 3–12 × 3.3–12 mm, adaxially (rarely abaxially) sparsely brown papillose, base broadly cuneate or subtruncate to oblique, brown 1-papillate at sinus, margin obtusely 5–15-dentate. Flowers yellow-green, 3.8–6.5 mm in diam.; pedicel glabrous. Sepals spreading, broadly ovate or broadly subelliptic to broadly orbicular, 1–2.5 × 1–4 mm, apex obtuse. Stamens 8, 0.1–1 mm. Ovary semi-inferior; styles 0.2–0.3 mm. Disc distinct, surrounded by brown papillae. Capsule ca. 5.4 mm; carpels unequal; rostrums ca. 0.2 mm. Seeds dark brown, subovoid, 0.8–0.9 mm, densely papillose. Fl. and fr. Apr–Jul.

• Wet places in forest understories, rock clefts in ravines; 1300–3000 m. Guizhou, Hubei, EC Hunan (Heng Shan), Sichuan, Yunnan.

30. *Chrysosplenium pilosum* Maximowicz, Prim. Fl. Amur. 122. 1859.

毛金腰 mao jin yao

Herbs 14–16 cm tall. Sterile branches arising from proximal cauline leaf axils, densely brown hairy. Stems brown pilose. Cauline leaves opposite; petiole ca. 3.5 mm, brown pilose; leaf blade flabellate, ca. 0.85 × 1.1 cm, both surfaces and margin glabrous or brown pilose, base cuneate, margin obscurely 6-undulate-crenate or distinctly obtusely dentate, apex subtruncate. Cyme ca. 2 cm; branches glabrous; bracteal leaves with petiole 1–2 mm, pilose, leaf blade subflabellate, 1–1.3 cm × 8.5–11 mm, both surfaces and margin glabrous or pilose, margin obscurely 3–5-undulate-crenate or distinctly obtusely dentate, apex obtuse to subtruncate. Pedicel glabrous. Sepals brown spotted, broadly ovate to broadly subelliptic, 1.8–2.2 × ca. 2 mm, apex obtuse. Stamens 8, ca. 1 mm. Ovary semi-inferior; styles ca. 1 mm. Disc absent. Capsule ca. 5.5 mm; carpels unequal; rostrums ca. 1 mm. Seeds dark brown, broadly ellipsoid, ca. 1 mm, ca. 17-sulcate, ridges papillose. Fl. and fr. Apr–Jun. $2n = 24$.

Shady and wet places in forest understories, rock clefts in ravines; 1500–3500 m. ?Anhui, S Gansu, ?Guangdong, Hebei, Heilongjiang, Hubei, EC Hunan, Jilin, Liaoning, ?Nei Mongol, E Qinghai, Shaanxi, Shanxi, E Sichuan, E Zhejiang [Korea, Russia].

- 1a. Cauline and bracteal leaves brown pilose abaxially and marginally, margin distinctly obtusely dentate. 30b. var. *valdepilosum*
- 1b. Cauline and bracteal leaves glabrous abaxially and marginally, margin obscurely undulate-crenate.
- 2a. Leaves brown pilose adaxially 30c. var. *pilosopetiolum*
- 2b. Leaves glabrous on both surfaces 30a. var. *pilosum*

30a. Chrysosplenium pilosum var. **pilosum**

毛金腰(原变种) mao jin yao (yuan bian zhong)

Chrysosplenium umbellatum Kitagawa.

Cauline and bracteal leaves glabrous on both surfaces and marginally, margin obscurely undulate-crenate. Seeds deeply sulcate.

Shaded and wet places in forest understories. Heilongjiang, Jilin, Liaoning [Korea, Russia].

30b. Chrysosplenium pilosum var. **valdepilosum** Ohwi, Rept. Spec. Nov. Regni Veg. 36: 52. 1934.

柔毛金腰 rou mao jin yao

Chrysosplenium villosum Franchet.

Cauline and bracteal leaves brown pilose abaxially and marginally, glabrous adaxially, margin distinctly obtusely dentate. Seeds shallowly sulcate.

Shady and wet places in forest understories, rock clefts in ravines; 1500–3500 m. ?Anhui, S Gansu, Hebei, Heilongjiang, Hubei, Jilin, Liaoning, E Qinghai (Xunhua Salar Zu Zizhixian), Shaanxi, Shanxi, E Sichuan, E Zhejiang (Tiantai Shan) [Korea].

30c. Chrysosplenium pilosum var. **pilosopetiolum** (Z. P. Jien) J. T. Pan, Acta Phytotax. Sin. 24: 206. 1986.

毛柄金腰 mao bing jin yao

Chrysosplenium pilosopetiolum Z. P. Jien, Acta Phytotax. Sin. 8: 339. 1963.

Cauline and bracteal leaves glabrous abaxially and marginally, brown pilose adaxially, margin obscurely undulate-crenate.

• ?Guangdong, EC Hunan (Heng Shan).

31. Chrysosplenium ramosum Maximowicz, Prim. Fl. Amur. 121. 1859.

多枝金腰 duo zhi jin yao

Herbs 12.5–22 cm tall. Sterile branches well developed, brown pilose. Stems slender, brown pilose. Cauline leaves opposite; petiole ca. 5 mm, brown pilose adaxially, marginally, and at axil; leaf blade broadly ovate, ca. 6 × 6.5 mm, adaxially brown pilose, base rounded, margin ca. 12-crenate, teeth brown 1-ciliate at apex. Cyme ca. 3.6 cm, ca. 14-flowered; branches glabrous; bracteal leaves with petiole 0.7–2 mm, brown papillose at axil, leaf blade broadly ovate to broadly suborbicular, 4–6.7 × 4–8 mm, glabrous, base broadly cuneate or oblique to subtruncate, margin obscurely 4–8-crenate. Flowers ca. 3.4 mm in diam. Sepals spreading, broadly elliptic, 0.9–1.3 × 1–1.3 mm, brown papillose at sinus, apex obtuse or acute. Stamens 8;

filaments ca. 0.5 mm. Ovary subinferior; styles ca. 0.4 mm. Disc distinctly 8-lobed, surrounded by sparse, brown papillae. Capsule subtruncate and retuse at apex; carpels horizontal, subequal; rostrums ca. 0.4 mm. Seeds black, narrowly subvoid, ca. 1 mm, smooth, glabrous. Fl. and fr. May–Aug. $2n = 12, 24$.

Wet places in forest understories; 900–1000 m. Heilongjiang, Jilin, ?Liaoning [Japan, Russia].

32. Chrysosplenium delavayi Franchet, Bull. Soc. Bot. France 32: 7. 1885.

肾萼金腰 shen e jin yao

Chrysosplenium holochlorum Ohwi; *C. pumilum* Franchet; *C. subargenteum* H. Léveillé & Vaniot.

Herbs 4.5–13 cm tall. Sterile branches arising from proximal cauline leaf axils. Stems glabrous. Cauline leaves with petiole 3–7 mm, brown papillose and pilose at axil; leaf blade broadly ovate or orbicular to flabellate, 2.2–15 × 3–16 mm, abaxially sparsely brown papillose, adaxially glabrous, base broadly cuneate, margin 7–12-crenate (teeth obscure, brown 1-papillate at apex), apex obtuse. Flower solitary or cyme 2–5-flowered, 1–1.4 cm; branches glabrous; bracteal leaves with petiole 2–5.6 mm, brown papillose near axil, leaf blade usually broadly ovate, 2–5 × 2.4–5 mm, abaxially (rarely adaxially) sparsely papillose, margin 6–9-crenate, teeth brown 1-papillate at apex. Flowers yellow-green, ca. 8.7 mm in diam.; pedicel 0.3–1.9 cm, glabrous. Sepals spreading, broadly suborbicular, 1.9–3 × 3–5 mm, margin sometimes overlapping, apex retuse, brown 1-papillate. Stamens 8, ca. 0.6 mm. Ovary subinferior; styles ca. 0.4 mm. Disc 8-lobed, surrounded by sparse, brown papillae. Capsule subtruncate and retuse at apex; carpels horizontal, subequal; rostrums ca. 0.4 mm. Seeds dark brown, ovoid, 0.7–1 mm, 13–15-sulcate, ridges with transverse lines. Fl. and fr. Mar–Jun.

Forests, scrub, rock clefts in ravines; 400–2800 m. SE Anhui (Ningguo Xian), ?Guangdong, Guangxi, Guizhou, Hubei, Hunan, ?Jiangsu, Sichuan, Taiwan, Yunnan [N Myanmar].

33. Chrysosplenium lixianense Z. P. Jien ex J. T. Pan, Acta Phytotax. Sin. 24: 207. 1986.

理县金腰 li xian jin yao

Herbs 13–17 cm tall. Sterile branches arising from leaf axils. Stems glabrous, sometimes sparsely brown papillose. Cauline leaves opposite; petiole 6–12 mm, brown papillose at axil; leaf blade subreniform to broadly orbicular, 6.5–10 mm × 1–1.3 cm, both surfaces glabrous, base subcordate to broadly cuneate, margin 8–10-crenate (teeth brown 1-verrucose at sinus), apex obtuse. Cyme 2–4-flowered; bracteal leaves papillose at axil, leaf blade subreniform, 4–6 × 4–9.5 mm, both surfaces glabrous, base subcordate, margin 6–10-crenate, teeth usually brown 1-papillate at sinus and brown 1-verrucose at apex. Pedicel 3–8 mm, glabrous. Sepals spreading, broadly ovate to broadly orbicular,

1.3–1.5 × 1.5–2 mm, apex obtuse or acute. Stamens 8, ca. 0.6 mm. Ovary subinferior; styles ca. 0.5 mm. Disc distinctly 8-lobed, surrounded by brown papillae. Fl. and fr. Jun–Jul.

• NC Sichuan (Li Xian, Maowen Qiang Zu Zizhixian).

34. *Chrysosplenium qinlingense* Z. P. Jien ex J. T. Pan, Acta Phytotax. Sin. 24: 208. 1986.

陕甘金腰 shan gan jin yao

Herbs 5.5–9.5 cm tall. Stolons arising from leaf axils, glabrous. Stems glabrous. Cauline leaves 2–4, opposite; petiole 0.3–1 cm, brown papillose at axil; leaf blade flabellate, 4–14 mm × 0.9–2 cm, both surfaces glabrous, base broadly cuneate to subtruncate, margin obtusely 7–9-dentate (teeth retuse and 1-verrucose at apex), apex obtuse. Cyme ca. 3 cm; branches glabrous; bracteal leaves with petiole 1.1–1.2 mm, globose tuberculate at axil, leaf blade broadly suborbicular or flabellate to broadly ovate, 2–7 × 2–7.5 mm, both surfaces glabrous, base cuneate to broadly so, margin obtusely 3–7-dentate, teeth usually retuse and 1-verrucose at apex. Flowers ca. 4.7 mm in diam. Sepals spreading, broadly ovate, 1.4–1.7 × 1.7–1.8 mm, apex obtuse or acute. Stamens 8; filaments ca. 0.6 mm. Ovary subinferior; styles ca. 0.5 mm. Disc distinctly 8-lobed, surrounded by sparse, brown papillae. Capsule ca. 2.8 mm, apex subtruncate, retuse; carpels subequal; rostrums ca. 0.5 mm. Seeds black, ovoid, ca. 1 mm, ca. 16-sulcate, ridges with transverse lines. Fl. and fr. Jul–Aug.

• Shaded and wet places in forest understories in ravines; 1600–2600 m. S Gansu (Tianshui Shi), S Shaanxi (Taibai Shan).

35. *Chrysosplenium biondianum* Engler, Bot. Jahrb. Syst. 36 (Beibl. 82): 50. 1905.

秦岭金腰 qin ling jin yao

Chrysosplenium duplocrenatum Handel-Mazzetti.

Herbs 8–28 cm tall. Sterile branches arising from leaf axils. Stems glabrous. Cauline leaves opposite; leaf blade subflabellate, 0.9–2 cm × 5–12 mm, both surfaces sparsely brown papillose, base gradually narrowed into a petiole, margin obtusely 8–12-dentate (teeth retuse at apex), apex obtuse. Cyme 2.2–3.3 cm; branches glabrous; bracteal leaves with petiole 0.7–3 mm, leaf blade broadly subobovate to subflabellate, 2.8–9 × 3–9 mm, both surfaces glabrous, base cuneate, margin obtusely 3–7-dentate (teeth retuse at apex), apex subtruncate or obtuse. Flowers unisexual (plants dioecious). Male flowers: stamens 8, ca. 0.6 mm; pistil obsolete; disc 8-lobed, not surrounded by brown papillae. Female flowers: yellow-green, 5–6 mm in diam.; sepals spreading, broadly ovate to broadly suborbicular, 1.7–2 × 2–2.5 mm, apex obtuse; stamens absent; ovary subinferior; styles 0.2–0.6 mm; disc 8-lobed, surrounded by sparse, brown papillae. Capsule ca. 4 mm, apex subtruncate, retuse; rostrums ca. 0.6 mm. Seeds dark brown, ovoid, ca. 0.9 mm, sulcate, ridges with transverse lines. Fl. and fr. May–Jul.

• Shaded and wet places in forest understories; 1000–2000 m. S Gansu, SW Shaanxi.

15. PARNASSIA Linnaeus, Sp. Pl. 1: 273. 1753.

梅花草属 mei hua cao shu

Gu Cuizhi (谷粹芝 Ku Tsue-chih); Ulla-Maj Hultgård

Herbs perennial, glabrous. Rhizome sympodial, robust. Stems (scapes) 1 to several, 1- or 2- or several leaved, rarely leafless. Basal leaves 2 or several, forming a rosette; stipules membranous; petiole usually long; leaf blade entire. Cauline leaves 1 to several or absent, often sessile and semiamplexicaul. Flower solitary, terminal; hypanthium free or fused with ovary proximally. Sepals 5, usually imbricate. Petals 5, imbricate, white or yellowish, rarely greenish, margin fimbriate, erose, or entire. Stamens 5, inserted opposite sepals, a few species with anther connective projected into a lanceolate appendage; staminodes 5, inserted opposite petals, terete and entire or flat and divided into lobes or filiform rays, apically somewhat glandular or with a distinct, globose gland. Pistil 1; ovary superior or semi-inferior, 1-loculed; placentation parietal; ovules numerous. Fruit a capsule, superior or semi-inferior, sometimes longitudinally angled, loculicidally dehiscent on abaxial suture into 3 or 4 valves. Seeds numerous, brown, obovoid or oblong, very small, 1–2 mm; testa thin, membranous, reticulate, smooth; endosperm thin or absent. About 70 species: temperate regions of the N hemisphere, mainly in S and SE Asia; 63 species (49 endemic) in China.

Key 1

1a. Staminodes 3–5- or 7–23-branched, branches with globose glands at apex.

2a. Staminodes 7–23-branched 63. *P. palustris*

2b. Staminodes 3- or 5-branched.

3a. Staminodes 3-branched; cauline leaves 2 or more.

4a. Leaf blade broadly oblanceolate to narrowly ovate; petals rhomboid, margin subentire or undulate 53. *P. rhombipetala*

4b. Leaf blade reniform; petals not rhomboid, margin fimbriate proximally or throughout.

5a. Petal margin fimbriate proximally; cauline leaves 3–6 54. *P. amoena*

5b. Petal margin fimbriate throughout; cauline leaves 2–8.

6a. Petals oblanceolate or oblong, marginal fimbriae turgid at apex, becoming clavate; cauline leaves

usually 2–5 55. *P. noemiae*

- 6b. Petals ovate or triangular-ovate, marginal fimbriae not turgid at apex; cauline leaves usually more than 3 56. *P. foliosa*
- 3b. Staminodes (3–)5(or 7)–branched; cauline leaf 1.
- 7a. Petal margin fimbriate throughout; staminodes divided for 1/3–1/2 their length.
- 8a. Leaf blade ovate-cordate, thick textured, base cordate 61. *P. perciliata*
- 8b. Leaf blade ovate or reniform, thin textured, base often truncate or subcordate 62. *P. davidii*
- 7b. Petal margin slightly undulate, or fimbriate proximally and undulate or entire distally; staminodes divided for up to 1/2 their length or more.
- 9a. Petal margin slightly undulate; basal leaf blade ovate to oblong-ovate 57. *P. guilinensis*
- 9b. Petal margin fimbriate proximally, undulate or entire distally; basal leaf blade ovate-cordate to broadly orbicular.
- 10a. Basal leaf blade broadly orbicular, obviously wider than long 60. *P. longshengensis*
- 10b. Basal leaf blade ovate-cordate, about as long as wide.
- 11a. Staminodes divided nearly to base 58. *P. gansuensis*
- 11b. Staminodes divided for ca. 1/2 their length 59. *P. simaensis*
- 1b. Staminodes terete and divided at apex or not, or flat and 5–7-dentate or 2- or 3- or 5-lobed at apex, apex usually eglandular.
- 12a. Staminodes terete, apex divided or not.
- 13a. Staminodes terete, apex 2-lobed and \pm 2-labiate.
- 14a. Basal leaf blade 6–15 mm, broadly obovate, broadly ovate, or broadly rhomboid-ovate; staminodes 2-lobed, posterior lobes 2- or 3-lobed 11. *P. faberi*
- 14b. Basal leaf blade 2–3 mm, rhomboid, ovate-rhomboid, or suborbicular; staminodes 2-lobed, posterior lobes 2–5-lobed 12. *P. labiata*
- 13b. Staminodes terete, apex entire, rounded or discoid.
- 15a. Basal leaves numerous, forming a rosette.
- 16a. Petals broadly elliptic; staminodes knoblike at apex; sepals oblong; cauline leaf borne near middle of stem 9. *P. petitmenginii*
- 16b. Petals narrowly obovate-spatulate; staminodes sublingulate at apex; sepals lanceolate; cauline leaf borne near apex of stem 10. *P. esquirolii*
- 15b. Basal leaves few, 3–5(–8), not forming a rosette.
- 17a. Basal leaf blade reniform or deeply cordate, rarely cordate at base; petals green.
- 18a. Plants 15–30 cm tall; petals lanceolate to oblong-lanceolate, 14.5–22.5 \times 4.5–5.5 mm; leaf blade 2–6 \times 5–9.5 cm 1. *P. longipetala*
- 18b. Plants 5–11 cm tall; petals broadly obovate, 4–8 \times 3–6 mm; leaf blade 0.8–2.5 \times 1.3–3 cm 2. *P. tenella*
- 17b. Basal leaf blade ovate-cordate, ovate-reniform, or ovate-triangular, cordate or attenuate at base; petals white or green.
- 19a. Petals green or yellow-green.
- 20a. Petals yellow-green; cauline leaf cordate-reniform; basal leaf blade ovate-reniform 5. *P. longipetaloides*
- 20b. Petals green; cauline leaf oblong or ovate-lanceolate; basal leaf blade ovate-cordate or ovate-reniform.
- 21a. Petals densely purple-brown punctate; staminodes rounded at apex; basal leaf blade \pm ovate-cordate 3. *P. angustipetala*
- 21b. Petals not punctate; staminodes truncate or emarginate at apex; basal leaf blade mostly ovate-reniform 4. *P. yulongshanensis*
- 19b. Petals white or yellowish.
- 22a. Petals minutely purple-brown punctate, often emarginate at apex; staminodes often indistinctly 3-crenate at apex or entire 6. *P. yunnanensis*
- 22b. Petals not punctate, acute or rounded at apex; staminodes rounded at apex.
- 23a. Staminodes broad and flat; basal leaf blade ovate-cordate, base cordate; cauline leaf borne near apex of stem, much smaller than basal leaves; petals yellowish 7. *P. yanyuanensis*

- 23b. Staminoles thin and long; basal leaf blade ovate-triangular, base attenuate; cauline leaf borne near base of stem, slightly smaller than or subequaling basal leaves; petals white 8. *P. humilis*
- 12b. Staminoles flat, apex 5–7-dentate or (2 or)3(or 5)-lobed, usually eglandular.
- 24a. Staminoles 5–7-dentate at apex.
- 25a. Petals broadly spatulate or obovate, margin erose or subentire, base with a claw ca. 1 mm wide; leaf blade cuneate or subcordate at base 13. *P. degeensis*
- 25b. Petals triangular-ovate, margin long fimbriate proximally, base with a long claw; leaf blade deeply cordate at base 14. *P. farreri*
- 24b. Staminoles (2 or)3(–5)-lobed at apex.
- 26a. Staminoles 2- or 5-lobed at apex.
- 27a. Staminoles 2-lobed at apex, lobes subequal; cauline leaves 2 46. *P. bifolia*
- 27b. Staminoles 5-lobed at apex, lobes equal or unequal; cauline leaf 1.
- 28a. Petal margin sparsely and shortly fimbriate throughout; stem not more than 10 cm 52. *P. omeiensis*
- 28b. Petal margin long fimbriate proximally; stem more than 10 cm.
- 29a. Staminoles 5-lobed or 5-parted at apex, lobes unequal.
- 30a. Petals yellow-white; leaf blade reniform 50. *P. yiliangensis*
- 30b. Petals white; leaf blade ovate-cordate 51. *P. chengkouensis*
- 29b. Staminoles 5-lobed to middle, lobes subequal.
- 31a. Basal leaf blade oblong-cordate or broadly cordate 49. *P. monochoriifolia*
- 31b. Basal leaf blade broadly cordate, broadly orbicular, or suborbicular.
- 32a. Basal leaf blade broadly orbicular, rarely suborbicular, usually wider than long, rarely as wide as long; cauline leaf broadly ovate or reniform 48. *P. dilatata*
- 32b. Basal leaf blade reniform, broadly cordate, or broadly ovate, about as wide as or wider than long; cauline leaf similar in shape to basal ones 47. *P. wightiana*
- 26b. Staminoles 3(–5)-lobed at apex, lobes usually eglandular, rarely inconspicuously glandular at apex.
- 33a. Connective of anther apically projected into a lanceolate appendage.
- 34a. Basal leaf blade ovate-cordate or ovate; staminoles 3-lobed for 1/4–1/3 their length, central lobe narrower than lateral ones; styles usually short, not exerted beyond staminoles, occasionally longer 43. *P. brevistyla*
- 34b. Basal leaf blade reniform or suborbicular; staminoles 3-lobed or -parted, lobes subequal; styles usually long, exerted beyond staminoles, rarely shorter.
- 35a. Staminoles 3-lobed to middle or almost so; basal leaf blade reniform or suborbicular 44. *P. delavayi*
- 35b. Staminoles 3-parted beyond middle; basal leaf blade reniform 45. *P. leptophylla*
- 33b. Connective of anther not apically projected.
- 36a. Cauline leaves absent.
- 37a. Staminoles lobed for ca. 1/3 their length, lobes narrow; petals yellow, apex emarginate or 2-lobulate; leaf with 3 parallel veins 15. *P. lutea*
- 37b. Staminoles lobed for ca. 1/5 their length, lobes short and broad, central one longer than lateral ones; petals white, apex rounded-obtuse; leaf usually with 5 parallel veins 16. *P. scaposa*
- 36b. Cauline leaves 1 or 2.
- 38a. Cauline leaves 2 42. *P. lijiangensis*
- 38b. Cauline leaf 1.
- 39a. Staminoles 3-lobed at apex, lobes unequal.
- 40a. Central lobe of staminode much shorter than lateral ones; petals greenish, narrowly oblong, margin sparsely and shortly fimbriate; cauline leaf borne distally on stem 39. *P. cooperi*
- 40b. Central lobe of staminode longer than lateral ones; petals white, obovate, rarely subspatulate, margin entire; cauline leaf borne near base of stem 40. *P. laxmannii*
- 39b. Staminoles 3(–5)-lobed at apex, lobes equal or subequal.
- 41a. Petal margin long fimbriate proximally.
- 42a. Basal leaf blade obovate or oblong-obovate 41. *P. obovata*
- 42b. Basal leaf blade reniform, orbicular, broadly ovate-orbicular, ovate-cordate, or occasionally other shapes.

- 43a. Basal leaf blade ovate-cordate, 2–4.5 × 1.8–3.5 cm, thick textured, subleathery 19. *P. crassifolia*
- 43b. Basal leaf blade reniform, orbicular, or broadly ovate-orbicular, rarely ovate-cordate.
- 44a. Basal leaf blade orbicular or broadly ovate-orbicular, base cordate with a deep sinus, apex obtuse and apiculate; cauline leaf much smaller than basal ones; petals oblanceolate, with 2 green, oblong glands near base, apex acute 17. *P. yui*
- 44b. Basal leaf blade reniform, rarely ovate-cordate, apex rounded, rarely subobtusate or emarginate; cauline leaf about as large as basal ones; petals obovate, eglandular, apex emarginate 18. *P. chinensis*
- 41b. Petal margin entire or shortly fimbriate and erose proximally.
- 45a. Petal margin shortly fimbriate proximally.
- 46a. Sepals and petals purple-brown punctate; petals 5–6 × 3–4 mm; basal leaf blade 9–10 × 8–9 mm 21. *P. venusta*
- 46b. Sepals and petals not punctate; petals 7.8–9.5 × 5.2–6.1 mm; basal leaf blade 1–1.5 cm × 9–14 mm 20. *P. epunctulata*
- 45b. Petal margin erose or entire.
- 47a. Ovary superior.
- 48a. Basal leaf blade oblong or elliptic, truncate or cuneate at base.
- 49a. Basal leaf blade oblong, 8–9 × 4–5 mm; petals spatulate 23. *P. filchneri*
- 49b. Basal leaf blade elliptic, 1.8–6 × 1–2.5 cm; petals suborbicular or elliptic 24. *P. xinganensis*
- 48b. Basal leaf blade ovate-reniform, -cordate, -oblong, or broadly ovate, cordate at base.
- 50a. Petals green, lanceolate, margin minutely and densely purple punctate, densely erose, apex acuminate 25. *P. lanceolata*
- 50b. Petals white, obovate, margin sparsely erose or entire, apex rounded or cleft.
- 51a. Basal leaf blade ovate-reniform; plants not more than 4 cm tall 26. *P. kangdingensis*
- 51b. Basal leaf blade ovate-cordate, ovate-oblong, or broadly ovate; plants usually more than 4 cm tall.
- 52a. Petals usually cleft or emarginate at apex; staminodes 3-lobed for ca. 1/3 or occasionally ca. 1/2 their length 27. *P. mysorensis*
- 52b. Petals rounded at apex; staminodes shallowly 3-lobed for ca. 1/6 their length.
- 53a. Plants 16–27 cm tall; basal leaf blade ovate-oblong or broadly ovate, deeply cordate at base, 2–9-veined; staminodes 3(–6)-lobed, lobes truncate at apex, central one narrower than lateral ones 28. *P. submysorensis*
- 53b. Plants 7–10 cm tall; basal leaf blade ovate, densely brown punctate, with 5–7 arcuate veins; staminodes 3-lobed, lobes rounded at apex 29. *P. cacuminum*
- 47b. Ovary semi-inferior.
- 54a. Basal leaf blade ovate-cordate to reniform, base usually cordate.
- 55a. Stem usually more than 28 cm; basal leaf blade ovate-cordate, 3–4.1 cm, deeply cordate at base 30. *P. cordata*
- 55b. Stem usually 2–8 cm, occasionally to 20 cm; basal leaf blade not more than 2 cm.
- 56a. Petals pale yellow-green 22. *P. qinghaiensis*
- 56b. Petals white.
- 57a. Basal leaf blade reniform, rarely ovate-cordate; cauline leaf borne near middle of stem; staminode lobes lanceolate 31. *P. pusilla*
- 57b. Basal leaf blade ovate-cordate; cauline leaf borne near base of stem; staminode lobes oblong.
- 58a. Petals broadly obovate, purple punctate; stem less than 6 cm; basal leaf petiole ca. 1 cm, leaf blade usually cordate at base 35. *P. subscaposa*
- 58b. Petals obovate, not or indistinctly punctate; stem 8–20 cm; basal leaf petiole (1.5–)3–6 cm, leaf blade usually truncate at base 36. *P. deqenensis*
- 54b. Basal leaf blade oblong, base not cordate.
- 59a. Stem relatively low; basal leaves small.

- 60a. Petals white; basal leaf petiole 8–15(–40) mm, leaf blade usually cuneate at base 37. *P. trinervis*
 60b. Petals green; basal leaf petiole (1–)15–25 mm, leaf blade usually subcordate at base 38. *P. viridiflora*
 59b. Stem relatively tall; basal leaves large.
 61a. Stamines 3-parted for ca. 2/3 their length, lobes parallel, to 3.2 mm . 32. *P. oreophila*
 61b. Stamines 3-lobed for 1/5–1/4 their length.
 62a. Stamines broad, lobes linear, ca. 1 mm; petals yellow 33. *P. tibetana*
 62b. Stamines narrow, lobes lanceolate or ovate-lanceolate, ca. 1.5 mm; petals white 34. *P. nubicola*

Key 2

- 1a. Cauline leaves absent.
 2a. Petals yellow, emarginate or 2-lobulate at apex; leaf blade with 3–5 parallel veins; stamines 3-lobed for ca. 1/3 their length, lobes equal, narrow 15. *P. lutea*
 2b. Petals white, rounded-obtuse at apex; leaf blade usually with 5 parallel veins; stamines 3-lobed for ca. 1/5 their length, central lobe longer than lateral ones 16. *P. scaposa*
 1b. Cauline leaves 1–3 or more.
 3a. Cauline leaves 2 or 3 or more.
 4a. Cauline leaves 2; stamines 2- or 3-lobed and eglandular at apex.
 5a. Stamines 2-lobed at apex; stem 10–50 cm 46. *P. bifolia*
 5b. Stamines 3-lobed at apex; stem 4–6 cm 42. *P. lijiangensis*
 4b. Cauline leaves 3 or more; stamines branched, branches with globose glands at apex.
 6a. Petals rhomboid, margin subentire or undulate 53. *P. rhombipetala*
 6b. Petals not rhomboid, margin fimbriate proximally or throughout.
 7a. Petal margin fimbriate proximally 54. *P. amoena*
 7b. Petal margin fimbriate throughout.
 8a. Petals oblanceolate or oblong, marginal fimbriae turgid at apex; stamine branches not parallel; cauline leaves usually 2–5 55. *P. noemiae*
 8b. Petals ovate or triangular-ovate, marginal fimbriae not turgid at apex; stamine branches parallel; cauline leaves usually more than 3 56. *P. foliosa*
 3b. Cauline leaf 1.
 9a. Basal leaves 10 or more, cespitose.
 10a. Stamines entire and rounded at apex.
 11a. Petals broadly elliptic; sepals oblong; cauline leaf borne near middle of stem 9. *P. petitmenginii*
 11b. Petals broadly oblanceolate; sepals lanceolate; cauline leaf borne near apex of stem 10. *P. esquirolii*
 10b. Stamines 2-lobed and 2-labiate at apex.
 12a. Basal leaf blade broadly obovate, broadly ovate, or broadly rhomboid-ovate, 6–15 mm 11. *P. faberi*
 12b. Basal leaf blade rhomboid, ovate-rhomboid, or suborbicular, 2–3 mm 12. *P. labiata*
 9b. Basal leaves usually 3–5(–12), not cespitose.
 13a. Anther connective apically projected into a lanceolate appendage.
 14a. Basal leaf blade ovate-cordate or ovate; stamines 3-lobed for 1/4–1/3 their length, central lobe narrow, lateral ones wider; style short, not exerted beyond stamines, occasionally longer 43. *P. brevistyla*
 14b. Basal leaf blade reniform or suborbicular; stamines 3-lobed for 1/2 their length or slightly more; style usually longer, exerted beyond stamines, rarely shorter.
 15a. Stamines divided for 2/5–1/2 their length; basal leaf blade reniform or suborbicular . 44. *P. delavayi*
 15b. Stamines divided for ca. 2/3 their length; basal leaf blade reniform 45. *P. leptophylla*
 13b. Anther connective not apically projected.
 16a. Basal leaf blade elliptic, obovate, or broadly orbicular.
 17a. Basal leaf blade elliptic or ovate.
 18a. Basal leaf blade elliptic, rarely obovate-elliptic; stamines 3-cleft at apex 24. *P. xinganensis*
 18b. Basal leaf blade ovate or oblong-ovate; stamines 5-branched, branches globose glandular at apex 57. *P. guilinensis*
 17b. Basal leaf blade obovate or broadly orbicular.
 19a. Basal leaf blade densely purple-brown punctate, broadly orbicular, apex emarginate 60. *P. longshengensis*
 19b. Basal leaf blade not punctate, obovate, oblong-obovate, broadly orbicular, or suborbicular.

- 20a. Basal leaf blade obovate or oblong-obovate, 2–4 × 1.5–2.6 cm; staminodes 3- or 4(or 5)-lobed
for ca. 1/3 their length 41. *P. obovata*
- 20b. Basal leaf blade broadly orbicular or suborbicular, 1.2–2 × 1.4–2.5 cm; staminodes (3 or)4- or
5-lobed for 1/3–1/2 their length 48. *P. dilatata*
- 16b. Basal leaf blade reniform, ovate-reniform, or ovate-cordate.
- 21a. Staminodes terete, entire, apex rounded or discoid.
- 22a. Basal leaf blade reniform, base deeply cordate; petals green.
- 23a. Stem 15–30 cm; petals lanceolate or oblong-lanceolate, 10–20 × ca. 5 mm; basal leaf
blade 3–6 × 5–9.5 cm 1. *P. longipetala*
- 23b. Stem 5–11 cm; petals flabellate, 4–8 × 3–6 mm; basal leaf blade 5–25 × 13–30 mm 2. *P. tenella*
- 22b. Basal leaf blade ovate-cordate, base cordate; petals white or green.
- 24a. Petals green or yellow-green.
- 25a. Petals yellow-green; cauline leaf ovate-reniform; basal leaf blade ovate-reniform;
staminodes indistinctly 3–6-dentate at apex 5. *P. longipetaloides*
- 25b. Petals green; cauline leaf oblong or ovate-lanceolate; basal leaf blade ovate-cordate or
ovate-reniform.
- 26a. Petals densely purple-brown punctate; staminodes rounded at apex; basal leaf blade
usually
ovate-cordate 3. *P. angustipetala*
- 26b. Petals not punctate; staminodes truncate or emarginate at apex; basal leaf blade
usually
ovate-reniform 4. *P. yulongshanensis*
- 24b. Petals white or yellowish.
- 27a. Petals distinctly purple-brown punctate, obovate-oblong, often emarginate at apex;
staminodes
often indistinctly 3-crenate at apex, or entire 6. *P. yunnanensis*
- 27b. Petals indistinctly purple punctate, oblong or narrowly oblanceolate, acute or rounded at
apex; staminodes rounded at apex.
- 28a. Basal leaf blade ovate-cordate, base cordate; cauline leaf borne near apex of stem,
much
smaller than basal leaves; petals yellowish 7. *P. yanyuanensis*
- 28b. Basal leaf blade ovate-triangular, base not cordate; cauline leaf borne near base of
stem,
about as large as basal leaves; petals white 8. *P. humilis*
- 21b. Staminodes branched, or flat with apex dentate or lobed.
- 29a. Staminodes branched.
- 30a. Staminodes 7–23-branched 63. *P. palustris*
- 30b. Staminodes (3 or)5(or 7)-branched.
- 31a. Petal margin fimbriate proximally, entire or undulate distally.
- 32a. Staminodes divided almost to base 58. *P. gansuensis*
- 32b. Staminodes divided for ca. 1/2 their length 59. *P. simaoensis*
- 31b. Petal margin fimbriate throughout; staminodes divided for 1/3–1/2 their length.
- 33a. Basal leaf blade ovate-cordate, thick textured, base cordate 61. *P. perciliata*
- 33b. Basal leaf blade reniform, thin textured, base subcordate or truncate 62. *P. davidii*
- 29b. Staminodes flat, apex dentate or lobed.
- 34a. Staminodes (3–)5–7-dentate at apex.
- 35a. Cauline leaf borne near base of stem 22. *P. qinghaiensis*
- 35b. Cauline leaf borne near middle of stem or distally.
- 36a. Petals broadly spatulate or obovate, base broadly and shortly clawed (claw ca. 1 mm),
margin erose or subentire; basal leaf blade cuneate or subcordate at base 13. *P. degeensis*
- 36b. Petals triangular-ovate, base long clawed (claw 2–2.5 mm), margin long fimbriate
proximally; basal leaf blade deeply cordate at base 14. *P. farreri*
- 34b. Staminodes 3- or 5-lobed at apex.
- 37a. Staminodes 5-lobed at apex.
- 38a. Petal margin sparsely and shortly fimbriate throughout; stem less than 10 cm . 52. *P. omeiensis*
- 38b. Petal margin long fimbriate proximally; stem more than 10 cm.
- 39a. Staminode lobes subequal.
- 40a. Basal leaf blade broadly cordate, about as long as wide, 2.5–4.5(–5) × 3.8–5.5 cm;
petals shortly clawed 47. *P. wightiana*

- 40b. Basal leaf blade oblong-cordate, nearly 2 × as long as wide, to 7 cm; petals long clawed 49. *P. monochoriifolia*
- 39b. Staminode lobes unequal.
- 41a. Central 3 staminode lobes ca. 3 × as long as lateral ones; petals yellow-white; basal leaf blade reniform 50. *P. yiliangensis*
- 41b. Staminode lobes subequal, central 3 parted, lateral ones very shallowly lobed; petals white; basal leaf blade ovate-cordate 51. *P. chengkouensis*
- 37b. Staminodes 3-lobed at apex.
- 42a. Staminode lobes unequal.
- 43a. Central staminode lobe much shorter than lateral ones; petals greenish, narrowly oblong, margin sparsely and shortly fimbriate; cauline leaf borne distally on stem 39. *P. cooperi*
- 43b. Central staminode lobe ca. 0.6 mm longer than lateral ones; petals white, obovate, rarely subspatulate, margin entire; cauline leaf borne near base of stem 40. *P. laxmannii*
- 42b. Staminode lobes subequal.
- 44a. Petal margin long fimbriate proximally.
- 45a. Basal leaf blade ovate-cordate, larger, thick textured 19. *P. crassifolia*
- 45b. Basal leaf blade reniform, orbicular, or broadly ovate-orbicular, occasionally ovate-cordate, thin textured.
- 46a. Petals oblanceolate, with 2 green, oblong glands near base, apex acute; basal leaf blade 1.2–2.4 × 1.2–2.4 cm, much larger than cauline leaf 17. *P. yui*
- 46b. Petals broadly obovate, eglandular, apex emarginate; basal leaf blade 6–11 × 7.5–14 mm, subequaling cauline leaf 18. *P. chinensis*
- 44b. Petal margin shortly fimbriate or erose proximally, or entire.
- 47a. Petal margin shortly fimbriate proximally.
- 48a. Sepals and petals purple-brown punctate; petals 5–6 × 3–4 mm; basal leaf blade 9–10 × 8–9 mm 21. *P. venusta*
- 48b. Sepals and petals not punctate; petals 7.8–9.5 × 5.2–6.1 mm; basal leaf blade 1–1.5 cm × 9–14 mm 20. *P. epunctulata*
- 47b. Petal margin erose or entire.
- 49a. Ovary superior.
- 50a. Basal leaf blade broadly elliptic, attenuate into petiole at base; petals yellow, spatulate or spatulate-oblanceolate 23. *P. filchneri*
- 50b. Basal leaf blade ovate-reniform or ovate-cordate, cordate at base; petals white or green, obovate or lanceolate.
- 51a. Petals green, minutely purple punctate, lanceolate, margin densely erose, apex acuminate 25. *P. lanceolata*
- 51b. Petals white, obovate, margin sparsely erose or entire, apex rounded or 2-lobed.
- 52a. Basal leaf blade ovate-reniform; stem to 4 cm 26. *P. kangdingensis*
- 52b. Basal leaf blade ovate-cordate; stem usually more than 4 cm.
- 53a. Petals 2-lobed or emarginate at apex; staminodes 3-lobed for ca. 1/3 their length 27. *P. mysorensis*
- 53b. Petals rounded at apex; staminodes shallowly 3(–6)-lobed for ca. 1/6 their length.
- 54a. Stem 7–10 cm; basal leaf blade densely brown punctate, ovate, with 5–7 arcuate veins, base cordate; staminode lobes rounded at apex, subequal 29. *P. cacuminum*
- 54b. Stem 16–27 cm; basal leaf blade not distinctly punctate, ovate-oblong, 7–9-veined, base deeply cordate; staminode lobes truncate at apex, central one narrower than lateral ones 28. *P. submysorensis*
- 49b. Ovary semi-inferior.
- 55a. Basal leaf blade ovate-cordate or reniform.
- 56a. Basal leaf blade ovate-cordate or reniform, longer than wide base cordate 31. *P. pusilla*

- 56b. Basal leaf blade ovate-cordate, about as long as wide, base deeply cordate.
 57a. Stem 8–13 cm; basal leaf blade 5–15 × 7–15 mm, cordate or subcordate at base 27. *P. mysorensis*
 57b. Stem 23–32 cm; basal leaf blade 3–4.1 × 3–4.1 cm, deeply cordate at base 30. *P. cordata*
- 55b. Basal leaf blade ovate-oblong.
 58a. Stem (13–)17–40 cm; basal leaf blade ovate-oblong or ovate-triangular, truncate, subcordate, or sometimes decurrent at base.
 59a. Staminode lamina 3-parted for (1/2–)2/3 its length 32. *P. oreophila*
 59b. Staminode lamina 3-lobed for 1/5–1/4(–1/2) its length.
 60a. Staminodes ca. 3.2 mm, lobes shortly linear; petals yellow 33. *P. tibetana*
 60b. Staminodes 4–5 mm, lobes lanceolate or ovate-lanceolate; petals white 34. *P. nubicola*
- 58b. Stem 6–21 cm; basal leaf blade ovate-cordate, not truncate at base.
 61a. Petals obovate or broadly so.
 62a. Petals purple punctate, broadly obovate; stem less than 6 cm; basal leaf petiole ca. 1 cm, leaf blade usually cordate at base 35. *P. subscaposa*
 62b. Petals not or indistinctly punctate, obovate; stem 8–21 cm, rarely shorter; basal leaf petiole (1.5–)3.5–6 cm, leaf blade usually truncate at base 36. *P. degenensis*
- 61b. Petals lanceolate or oblong-lanceolate.
 63a. Petals white; basal leaf petiole 8–15 mm, occasionally to 4 cm 37. *P. trinervis*
 63b. Petals green; basal leaf petiole (1–)5–25 mm 38. *P. viridiflora*

1. *Parnassia longipetala* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 60: 182. 1924.

长瓣梅花草 chang ban mei hua cao

Stems 1 or 2, 12–30 cm, often with 1 leaf near middle. Basal leaves usually 1, rarely 2; petiole 4–11 cm; leaf blade abaxially greenish, adaxially deep green, reniform, 3–6 × 5–9.5 cm, inconspicuously arcuate veined abaxially, base deeply cordate, apex rounded. Cauline leaf sessile, reniform, 0.8–2 × 1.5–3.5 cm, base sometimes with a few rusty brown, hairlike appendages. Flower 2.5–3.2 cm in diam.; hypanthium turbinate. Sepals semiorbicular or ovate, 4–6 × 2–4 mm, margin serrulate, apex obtuse. Petals green, lanceolate or narrowly oblong-lanceolate, (1–)1.5–2.5 cm × 4–5.5 mm, base cuneate into a claw 2–2.5 mm, margin densely serrulate or shortly fimbriate, apex acute. Anthers oblong, ca. 1.2 mm; filaments 5–6 mm; staminodes dark purple, terete, discoid, 3.5–4 mm, shorter than stamens, stalk ca. 2 × 1 mm, apex of lamina rounded, entire, occasionally indistinctly dentate. Ovary superior, depressed globose, with 3 or 4 slightly thickened angles; style ca. 1.5 mm; stigma 3-lobed, lobes spreading, obovate. Capsule depressed globose. Seeds brown, glossy, oblong. Fl. Jul, fr. Aug.

• *Tsuga* forests, forest margins, *Rhododendron* scrub, alpine meadows; 2400–3900 m. SE Xizang, NW Yunnan.

1a. Petals 1.5–2.5 cm × 4–5.5 mm; stem 15–30 cm; basal leaf blade 3–6 × 5–9.5 cm 1a. var. *longipetala*

1b. Petals to 1 cm; stem ca. 12 cm; basal leaf blade relatively small 1b. var. *brevipetala*

1a. *Parnassia longipetala* var. *longipetala*

长瓣梅花草(原变种) chang ban mei hua cao (yuan bian zhong)

Stem 15–30 cm. Basal leaf blade 3–6 × 5–9.5 cm. Petals 1.5–2.5 cm × 4–5.5 mm.

• *Tsuga* forests, forest margins, alpine meadows; 2400–3900 m. SE Xizang, NW Yunnan.

1b. *Parnassia longipetala* var. *brevipetala* Z. P. Jien ex T. C. Ku, Bull. Bot. Res., Harbin 7(1): 23. 1987.

短瓣梅花草 duan ban mei hua cao

Stem ca. 12 cm. Basal leaf blade relatively small. Petals to 1 cm.

• *Rhododendron* scrub; 3500–3600 m. NW Yunnan (Dêqên Xian).

2. *Parnassia tenella* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 80. 1858.

青铜钱 qing tong qian

Stems 1 or 2, slender, (3.5–)5–11 cm, with 1 leaf near middle or distally. Basal leaves 1 or 2; stipules brown fimbriate at margin; petiole 2–8 cm; leaf blade abaxially greenish and purple punctate, adaxially deep green, reniform, 0.8–2.5 × 1.3–3 cm, conspicuously arcuate veined, base deeply cordate, apex rounded, often emarginate, minutely apiculate. Cauline leaf sessile, similar to basal ones but smaller, 2–4 × 3–5 mm, base often with several caducous, rusty brown, hairlike appendages. Flower 0.5–1.5 cm in diam.; hypanthium turbinate. Sepals semiorbicular, ovate, or triangular-ovate, 3–5 × 1–2 mm, margin erose, apex rounded. Petals green, sparsely purple punctate, broadly obovate, 4–8 × 3–6 mm, parallel 7–9-veined, base cuneate into a short claw, margin densely erose or denticulate, apex rounded. Anthers oblong, 0.5–1 mm; filaments 4–6 mm; staminodes terete, discoid, ca. 1/2 as long as stamens, stalk longer than lamina, apex of lamina entire, occasionally minutely crenate. Ovary superior, purple punctate, globose; style ca. 1 mm; stigma 3-lobed. Capsule broadly obcordate, 3-angled, 3-valved. Seeds brown, glossy, oblong. Fl. Aug, fr. Sep.

Mixed forests, forest margins; 2800–3400 m. W Sichuan, Xizang (Linzhi), NW Yunnan [Nepal, Sikkim].

3. *Parnassia angustipetala* T. C. Ku, Bull. Bot. Res., Harbin 7(1): 23. 1987.

窄瓣梅花草 zhai ban mei hua cao

Stem 1, 2.5–4 cm, with 1 leaf usually distally or near apex. Basal leaves 6–9, forming a rosette; stipules brown fimbriate at margin; petiole to 1 cm; leaf blade abaxially greenish, adaxially deep green, usually ovate-cordate, 5–7 × ca. 4 mm, inconspicuously 3-veined abaxially at base, base cordate, sometimes subtruncate, apex rounded. Cauline leaf sessile, semiamplexicaul, similar to basal ones but much smaller, base sometimes with a few rusty brown appendages. Flower 6–8 mm in diam.; hypanthium shortly campanulate. Sepals inconspicuously purple punctate, oblong or ovate-lanceolate, 3–4 × ca. 1.5 mm, margin entire, apex obtuse. Petals green, densely purple-brown punctate, spatulate or ovate-oblong, 5–7 × ca. 1.5 mm, base abruptly contracted into a claw ca. 1.5 mm, margin entire, indistinctly erose, or undulate, apex obtuse or acute. Anthers ellipsoid, ca. 0.5 mm; filaments 3–4 mm; staminodes terete, discoid, ca. 1.5 mm, shorter than stamens, stalk ca. 0.5 × 0.8 mm, lamina dark purple, ca. 1 × 1.5 mm, apex rounded, entire. Ovary superior, ovoid; style ca. 1–1.5 mm; stigma 3-lobed, lobes reflexed, obovate. Capsule ovoid. Seeds brown, glossy. Fl. Jul.

• Forest margins, alpine meadows; ca. 2900 m. SW Sichuan (Muli Zang Zu Zizhixian).

In habit, this species resembles the two varieties of *Parnassia yunnanensis*. However, *P. yunnanensis* differs in having white, obovate petals; var. *longistipitata* differs in having longer-stalked staminodes; and var. *yunnanensis* differs in having apically inconspicuously 3-dentate staminodes.

4. *Parnassia yulongshanensis* T. C. Ku, Bull. Bot. Res., Harbin 7(1): 25. 1987.

玉龙山梅花草 yu long shan mei hua cao

Stem usually 1, 1.5–2 cm, with 1 leaf near apex. Basal leaves 2–5; petiole ca. 1 cm; leaf blade abaxially greenish, adaxially deep green, ovate-reniform, rarely ovate-cordate, 4–5 × 4–6 mm, inconspicuously 5-veined abaxially, base cordate, apex rounded or obtuse. Cauline leaf sessile, semiamplexicaul, ovate-lanceolate, ca. 4 × 1.5–2 mm, often with 2 or 3 rusty brown appendages at base. Flower 8–9 mm in diam.; hypanthium shortly campanulate. Sepals oblong, rarely ovate, ca. 2.5 × 1.8 mm, base often with rusty brown appendages, margin entire, apex rounded or obtuse. Petals green, oblong, ca. 3 × 1.5 mm, 3-veined, base attenuate into a broad claw ca. 0.5 mm, margin erose proximally, apex rounded. Anthers oblong, ca. 0.8 mm; filaments 0.5–2.8 mm; staminodes dark purple, terete, discoid, ca. 1.5 mm, shorter than stamens, stalk ca. 0.8 × 0.7 mm, lamina ca. 0.6 × 0.9 mm, apex truncate or emarginate, often 1- or 2-dentate centrally. Ovary superior, ovoid. Capsule unknown. Fl. Jul.

• Alpine meadows; 4100–5300 m. NW Yunnan (Lijiang Naxi Zu Zizhixian).

5. *Parnassia longipetaloides* J. T. Pan, Acta Phytotax. Sin. 23: 222. 1985.

似长瓣梅花草 shi chang ban mei hua cao

Stems 1 or 2, 2.7–4 cm, usually with 1 leaf distally. Basal leaves 5 or 6; petiole 0.9–2.2 cm; leaf blade abaxially greenish, adaxially deep green, ovate-reniform, 4.5–6.5 × 4.1–7 mm, 3-veined abaxially, base cordate, apex obtuse. Cauline leaf sessile, amplexicaul, cordate-reniform, 4–6 × 4–5 mm, base sometimes with a few rusty brown appendages. Flower 3.5–5.5 mm in diam.; hypanthium campanulate. Sepals erect at anthesis, ovate-elliptic, 2.5–3 × 1.9–2 mm, 3-veined, base with several rusty brown appendages, margin entire, apex obtuse. Petals yellow-green or brown-green, oblong or lanceolate, 3.2–4.1 × 1.5–2 mm, base abruptly contracted into a claw ca. 1 mm, sometimes with several rusty brown, hairlike appendages, margin indistinctly erose proximally, apex acute. Anthers ellipsoid, ca. 0.8 mm; filaments ca. 3 mm; staminodes terete, ca. 1.5 mm, stalk ca. 0.5 × 0.6 mm, lamina apically discoid, disc 0.8 mm in diam., rim indistinctly 4–6-dentate. Ovary mostly superior; style ca. 0.5 mm; stigma 3-lobed. Capsule unknown. Fl. Jul.

• Alpine meadows; 3600–4200 m. NW Yunnan (Eryuan Xian, Lijiang Naxi Zu Zizhixian).

6. *Parnassia yunnanensis* Franchet, J. Bot. (Morot) 10: 266. 1896.

云南梅花草 yun nan mei hua cao

Plants caespitose. Stems 1–3, 4–8 cm, with 1 leaf distally or near apex. Basal leaves 3–5, forming a rosette; petiole 0.5–2 cm; leaf blade abaxially greenish, glaucous, and densely purple-brown punctate, adaxially deep green, broadly ovate, 6–11 × 6–11 cm, base deeply cordate, apex obtuse. Cauline leaf sessile, semiamplexicaul, ovate or semiorbicular, 2–3 mm, base sometimes with a few rusty brown appendages. Flower 0.7–1.4 cm in diam.; hypanthium hemispheric. Sepals ovate-oblong or semiorbicular, ca. 4 × 2 mm, margin sometimes shallowly erose, apex rounded. Petals white or whitish green, densely purple-brown punctate or not, obovate-oblong, ca. 7 mm, margin densely erose or shortly fimbriate, apex emarginate. Anthers oblong, 0.5–1 mm; filaments 3–4 mm; staminodes terete, 1–1.5 mm, stalk 0.7–1 mm, lamina apically discoid, disc ca. 1.2 mm in diam., rim undulate. Ovary superior, globose; stigma 3-lobed. Capsule depressed globose. Fl. Jul–Aug, fr. Sep.

• Forests, marshy meadows, grassy slopes, streamsides; 3300–4300 m. W Sichuan, NW Yunnan.

- 1a. Staminodes ca. 1 mm, stalk ca. 0.7 mm; petals whitish green, densely purple-brown punctate 6a. var. *yunnanensis*
 1b. Staminodes ca. 1.5 mm, stalk ca. 1 mm; petals white, not punctate 6b. var. *longistipitata*

6a. *Parnassia yunnanensis* var. *yunnanensis*

云南梅花草(原变种) yun nan mei hua cao (yuan bian zhong)

Petals whitish green, densely purple-brown punctate. Stamines ca. 1 mm, stalk ca. 0.7 mm.

• Forests, grassy slopes, streambanks; 3500–4000 m. NW Yunnan.

6b. *Parnassia yunnanensis* var. *longistipitata* Z. P. Jien, *Acta Phytotax. Sin.* 8: 255. 1963.

长柄云南梅花草 *chang bing yun nan mei hua cao*

Petals white, not punctate. Stamines ca. 1.5 mm, stalk ca. 1 mm.

• Marshy meadows, grassy places; 3300–4300 m. W Sichuan (Kangding Xian, Qianning).

7. *Parnassia yanyuanensis* T. C. Ku, *Bull. Bot. Res.*, Harbin 7(1): 26. 1987.

盐源梅花草 *yan yuan mei hua cao*

Stems 1(or 2), 3–4 cm, with 1 leaf distally or near apex.

Basal leaves 4–7; petiole 1.5–2.8 cm; leaf blade abaxially greenish, adaxially deep green, ovate-cordate, 6–11 × 6–9 mm, inconspicuously 3-veined abaxially at base, base cordate, apex obtuse. Cauline leaf very shortly petiolate; leaf blade ovate-lanceolate, ca. 7 × 4 mm, base truncate or subcordate, often with several rusty brown appendages. Flower ca. 1 cm in diam.; hypanthium shortly campanulate. Sepals long elliptic, 2.5–2.8 × ca. 2 mm, base often with 2 or 3 rusty brown appendages, margin entire, apex obtuse. Petals yellowish, inconspicuously purple punctate, obovate-oblong, 4–4.8 × ca. 2 mm, base attenuate into a claw ca. 1 × 0.8 mm, margin entire or indistinctly erose, apex rounded. Anthers oblong, ca. 0.8 mm; filaments 3–4 mm; staminodes terete, discoid, ca. 1.1 × 0.2 mm, shorter than stamens, stalk ca. 0.2 × 0.8 mm, lamina ca. 0.7 × 0.2 mm, apex rounded. Ovary superior, ovoid; stigma 3-lobed. Capsule unknown. Fl. Jul.

• Rock fissures on mountain slopes; ca. 4000 m. SW Sichuan (Yanyuan Xian).

In habit, this species resembles both *Parnassia angustipetala* and *P. yulongshanensis*. However, the former species differs in having sepals oblong or ovate-lanceolate, and petals green, densely purple-brown punctate, spatulate or ovate-lanceolate. The latter species differs in having green petals and apically truncate or emarginate staminodes.

8. *Parnassia humilis* T. C. Ku, *Bull. Bot. Res.*, Harbin 7(1): 27. 1987.

矮小梅花草 *ai xiao mei hua cao*

Stems 1–3, 3–5 cm, with 1 leaf near base. Basal leaves 7–9, forming a rosette; petiole ca. 0.5 × 1 cm; leaf blade abaxially greenish, adaxially deep green, ovate-triangular, 0.8–1.4 cm × 6–9 mm, conspicuously brown 3–5-veined abaxially, base attenuate, apex acuminate. Cauline leaf similar to basal ones but often smaller, base sometimes with a few caducous, rusty brown appendages. Flower ca. 1 cm in diam.; hypanthium inconspicuous. Sepals ovate-lanceolate, 3.5–4 × ca. 1.8 mm, conspicuously 3-veined, margin entire, apex obtuse. Petals white, indistinctly punctate, elliptic or oblong, 6–7 × ca. 2 mm, 3-veined, base with a short claw ca. 1 × 0.8 mm, margin sparsely fimbriate proximally, erose or subentire distally, apex acute. Anthers subglobose, 0.5–1 mm; filaments ca. 2.5 mm;

staminodes terete, discoid, ca. 2 mm, shorter than stamens, stalk ca. 1.2 × 0.5 mm, lamina ca. 0.8 × 1.2 mm. Ovary superior. Capsule unknown. Fl. Jul.

• Riverside meadows; ca. 5000 m. EC Xizang (Amdo Xian).

In habit, this species resembles both *Parnassia angustipetala* and *P. yunnanensis*. However, the former species differs in having basal leaf blades usually ovate-cordate, with a cordate, sometimes subtruncate base, and petals green, densely purple-brown punctate, spatulate or ovate-oblong. The latter species differs in having basal leaf blades broadly ovate, with a deeply cordate base, and petals white or whitish green, often densely purple-brown punctate, obovate-oblong.

9. *Parnassia petitmenginii* H. Léveillé, *Repert. Spec. Nov. Regni Veg.* 8: 285. 1910.

贵阳梅花草 *gui yang mei hua cao*

Stems 1–3, slender, 4–7 cm. Basal leaves numerous; petiole long, broadly winged along both sides; leaf blade abaxially dark green, adaxially deep green, spatulate, 5–10 mm, base cuneate, attenuate, apex rounded. Cauline leaf sessile, amplexicaul, small. Flower small, 5–8 mm in diam. Sepals oblong, ca. 1/2 as long as petals, apex obtuse. Petals white, broadly elliptic, veined, margin entire. Anthers white, subglobose; staminodes brown, ca. 1/2 as long as stamens, margin entire. Ovary conical.

• C Guizhou (Guiyang Shi).

The present authors have seen no specimens of this species; the above description is based on the protologue.

10. *Parnassia esquirolii* H. Léveillé, *Repert. Spec. Nov. Regni Veg.* 13: 258. 1914.

龙场梅花草 *long chang mei hua cao*

Stems 3–12, slender, to 6 cm, with 1 leaf near apex. Basal leaves 12–25, forming a rosette; petiole 1–2 cm; leaf blade orbicular- or obovate-spatulate or spatulate, 0.7–1.5 cm × 5–9 mm, base attenuate, apex obtuse or subacute, apiculate. Cauline leaf subsessile, broadly obovate, ca. 3 mm wide, 3-veined, apex obtuse. Flower 6–8 mm in diam. Sepals linear-lanceolate, ca. 4 × 1 mm, 1-veined, apex obtuse. Petals white, narrowly obovate-spatulate, ca. 5 × 2 mm, base attenuate into a claw ca. 1 mm, margin entire, apex acute. Anthers broadly ellipsoid, ca. 0.5 mm; staminodes flat, distally sublingulate, ca. 1/2 as long as stamens, ca. 1.25 × 0.3 mm, margin entire, apex obtuse. Ovary superior, conical, ca. 3 × 1.5 mm; stigma 3-lobed. Capsule trigonous-globose, ca. 3 mm in diam., apex acutely trigonous. Seeds ovoid-ellipsoid, ca. 0.4 mm, smooth.

• Guizhou (Longchang).

The present authors have seen no specimens of this species; the above description is based on Evans (*Notes Roy. Bot. Gard. Edinburgh* 13: 173. 1921).

11. *Parnassia faberi* Oliver, *Hooker's Icon. Pl.* 18: t. 1778. 1888.

峨眉梅花草 *e mei mei hua cao*

Parnassia faberi f. *abbreviata* Engler; *P. faberi* f. *ramosa* Engler.

Stems 2 or 3, short or occasionally branched and elongate, 5–8 cm, with 1 leaf near middle. Basal leaves numerous; petiole 5–8 mm; leaf blade abaxially greenish, adaxially purple-green, broadly ovate, broadly rhomboid-ovate, or broadly obovate, 0.6–1.5 cm × 5–14 mm, base cuneate, apex rounded or obtuse, sometimes apiculate. Cauline leaf sessile, semiamplexicaul, oblong or obovate, sometimes rhomboid, 2–3 mm, base often with a few rusty brown appendages. Flower ca. 1 cm in diam.; hypanthium inconspicuous. Sepals purple punctate, ovate-lanceolate, oblong, or elliptic, 4–5 × 2–3 mm, margin entire, apex obtuse. Petals white, indistinctly punctate, obovate-oblong, 3–5 × ca. 3 mm, 3-veined, base abruptly contracted into a stalk ca. 0.5 mm, margin entire, apex acuminate. Anthers ellipsoid, ca. 0.5 mm; filaments ca. 0.5 mm; staminodes with stalk ca. 2 mm, lamina turgid distally, 2-lobed and 2-labiate, abaxial lobe entire, adaxial lobe 2- or 3-lobed. Ovary superior, ovoid or ellipsoid; stigma 3-lobed, lobes ovate. Capsule subglobose. Seeds brown, glossy, oblong. Fl. Jul–Sep, fr. Sep.

• Moist shaded forest understories, moist rocky places, roadsides; 1100–1900 m. C Sichuan (Emei Shan, Mabian Xian), NE Yunnan (Yiliang Xian).

12. *Parnassia labiata* Z. P. Jien, Acta Phytotax. Sin. 8: 253. 1963.

宝兴梅花草 bao xing mei hua cao

Stem 1 or 2(or 3), occasionally branched, elongate, 5–12 cm, with 1 leaf near middle. Basal leaves forming a rosette; petiole 1.5–3 × as long as leaf blade; leaf blade abaxially greenish, inconspicuously brown punctate, adaxially deep green, rhomboid, ovate- or obovate-rhomboid, or suborbicular, 2–3 mm, arcuate 5-veined abaxially, base cuneate, apex subobtuse, often minutely apiculate. Cauline leaf sessile, amplexicaul, rhomboid-elliptic, ca. 2 mm, base with several brown, membranous appendages. Flower 5–10 mm in diam.; hypanthium inconspicuous. Sepals spreading, oblong-lanceolate or triangular-lanceolate, ca. 3 × 1 mm, midvein conspicuous, margin entire, apex rounded. Petals white, brown punctate, broadly elliptic or ovate-elliptic, ca. 5 × 3 mm, 3-veined, base rounded, abruptly contracted into a claw ca. 1 mm, margin entire, apex obtuse or apiculate. Anthers ellipsoid, ca. 0.8 mm; filaments unequal; staminodes minutely red punctate, stalk slender, lamina 2-lobed, 2-labiate, abaxial lobe entire and ligulate, adaxial lobe flat, digitately 2–5-fid. Ovary superior, ovoid or oblong; style usually conspicuous; stigma 3- or 4-lobed. Capsule ovoid, ca. 3 mm. Seeds brown, glossy. Fl. Aug–Sep, fr. Sep.

• Grassy slopes; ca. 1000 m. W Sichuan (Baoping Xian).

13. *Parnassia degeensis* T. C. Ku, Bull. Bot. Res., Harbin 7(1): 30. 1987.

德格梅花草 de ge mei hua cao

Stems 1 or 2, ca. 6 cm, with 1 leaf distally. Basal leaves 3 or 4; petiole 1–2 cm, flat; leaf blade abaxially greenish, adaxially deep green, broadly ovate, 5–7 × 6–7 mm, 5(–7)-veined abaxially, base cuneate or subcordate, apex rounded. Cauline leaf sessile, semiamplexicaul, ovate, ca. 2 mm, base sometimes with a few rusty brown appendages. Flower 6–8 mm in diam.; hypanthium shortly turbinate. Sepals oblong, ca. 4 × 2.5 mm, margin entire, apex rounded. Petals green, densely purple-brown punctate, broadly spatulate or obovate, 7–8 × 3.5–4 mm, brownish 5–7-veined with veins confluent apically, base attenuate into a claw ca. 1 mm, margin erose or subentire, apex rounded. Anthers oblong, ca. 0.8 mm; filaments ca. 8 mm; staminodes flat, ca. 2.8 mm, stalk ca. 1.2 mm, lamina undulate or 5–7-dentate at apex. Ovary ovoid; style 0.8–1 mm; stigma 3-lobed, lobes spreading, semiorbicular. Capsule unknown. Fl. Aug.

• Rock fissures. NW Sichuan (Dêgê Xian).

14. *Parnassia farreri* W. E. Evans, Notes Roy. Bot. Gard. Edinburgh 13: 174. 1921.

长爪梅花草 chang zhao mei hua cao

Stems 1 or 2, slender, 4–10 cm, with 1 leaf near middle or distally. Basal leaves 2 or 3(–5); petiole slender, 1–3 cm; leaf blade abaxially greenish, densely brown punctate, adaxially deep green, orbicular, rarely reniform, 2–9(–14) × 2–9(–14) mm, base deeply cordate, apex rounded, rarely obtuse. Cauline leaf sessile or subsessile, purple-brown punctate, ovate-triangular or ovate, ca. 4 × 3.5 mm, base not cordate, often with a few rusty brown appendages, apex acute. Flower 8–11 mm in diam.; hypanthium turbinate. Sepals purple-brown punctate, ovate or oblong, ca. 2.5 × 1.8 mm, margin entire, apex obtuse or acute. Petals white, densely purple-brown punctate, triangular-ovate, 4.5–6 × ca. 2 mm, base abruptly contracted into a claw 2–2.5 × ca. 0.5 mm, margin long fimbriate proximally, entire or undulate distally, apex rounded-obtuse. Anthers ellipsoid, 0.5–1 mm; filaments 2–2.5 mm; staminodes broadly spatulate, flat, ca. 0.8 × 1.2 mm, stalk ca. 0.5 × 1.2 mm, margin dentate or undulate distally, apex rounded. Ovary superior, broadly ovoid; style ca. 0.8 mm; stigma 3-lobed, lobes long ovate. Capsule depressed ovoid. Seeds brown, glossy, oblong. Fl. Aug–Sep, fr. Oct.

Forests, valleys, rock fissures; 3000–3400 m. NW Yunnan (Gongshan Drung-Nu Zu Zizhixian) [Myanmar].

15. *Parnassia lutea* Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 14: 320. 1895.

黄花梅花草 huang hua mei hua cao

Stems 1–3(–7), 13–20 cm, leafless. Basal leaves 2–4; petiole 1.2–2.5(–4) cm, with 3 brownish striations; leaf blade ovate or oblong-ovate, 0.8–1.3(–2.5) cm × 5–9(–15) mm, 3(–5)-veined with veins prominent abaxially and impressed adaxially, base attenuate or subcordate,

apex rounded. Flower 1.8–2.3 cm in diam.; hypanthium shortly turbinate. Sepals lanceolate, ca. $7 \times 2\text{--}5$ mm, 3(or 5)-veined, margin entire, apex obtuse or subacute. Petals deep yellow, obovate, $1.2\text{--}1.4$ cm \times $5\text{--}8$ mm, base contracted into a claw ca. 4×1.5 mm, curved 5-veined with veins branched, margin entire, apex rounded and cleft. Anthers oblong, ca. 1.5 mm; filaments ca. 4 mm; staminodes flat, ca. 3.5 mm, 3-lobed at apex, lobes linear, ca. 1.2 mm, rounded and slightly thickened at apex. Ovary semi-inferior, long ovoid; style very short; stigma 3-lobed, lobes spreading, oblong, nearly equaling style. Capsule ovoid, 3-valved. Seeds brown, glossy, oblong. Fl. Jul–Aug, fr. Aug.

• Scrub, alpine meadows, under rocks; 3500–4100 m. NE Qinghai.

16. *Parnassia scaposa* Mattfeld, Notizbl. Bot. Gart. Berlin-Dahlem 11: 306. 1931.

白花梅花草 bai hua mei hua cao

Parnassia aphylla T. C. Ku.

Stem usually 1, 10–20 cm, leafless. Basal leaves 4 or 5; petiole 5–14(–23) cm; leaf blade elliptic or obovate, $1.2\text{--}2.5 \times 0.8\text{--}1.3$ cm, 3- or 5-veined with veins prominent abaxially and impressed adaxially, base attenuate, apex rounded. Flower 1.8–2.5 cm in diam.; hypanthium shortly turbinate. Sepals ovate-lanceolate, ca. 8×2.5 mm, distinctly 3-veined, margin entire, apex obtuse. Petals white or white-yellow, obovate, ca. 1.4 cm \times $7\text{--}8$ mm, base cuneate into a claw ca. 2.5×2 mm, apex rounded or emarginate. Anthers ellipsoid, ca. 1.5 mm; filaments ca. 4 mm; staminodes flat, ca. 3.5 mm, stalk ca. 2.8×1 mm, lamina divided for $1/5\text{--}1/3$ its length into 3 lobes, central lobe linear, ca. 0.6 mm, longer than lateral ones, apex truncate, slightly thickened. Ovary semi-inferior, ovoid; style short; stigma 3-lobed. Capsule unknown. Fl. Aug.

• Scrub, alpine meadows; 3700–4500 m. S Qinghai, W Sichuan, S Xizang (Gongbo'gyamda Xian).

17. *Parnassia yui* Z. P. Jien, Acta Phytotax. Sin. 8: 256. 1963.

俞氏梅花草 yu shi mei hua cao

Stems 1 or 2(–4), 6–14 cm, usually with 1 leaf near middle. Basal leaves usually 2; petiole slender, 1.5–3 cm; leaf blade abaxially greenish, adaxially deep green, orbicular or broadly ovate-orbicular, $1.2\text{--}2.4 \times 1.2\text{--}2.4$ cm, arcuate 7-veined, base deeply cordate, apex rounded-obtuse, distinctly apiculate. Cauline leaf sessile or subsessile, ovate or triangular, very small, 1–4 mm, base truncate or broadly cuneate, often with several rusty brown appendages ca. 1 mm. Flower 0.8–1.3 cm in diam.; hypanthium shortly turbinate. Sepals brown punctate on both surfaces, oblong-lanceolate, ca. 3×1.2 mm, 3-veined, margin entire, apex subobtusely acute, acuminate. Petals white, purple-brown punctate on both surfaces, oblanceolate, $4.5\text{--}6 \times 1.8\text{--}2.5$ mm, 1- or 3-veined, base attenuate into a claw 1–1.5 mm, with 2 green, oblong glands, margin fimbriate proximally, apex acute to acuminate. Anthers oblong, 0.5–1 mm; filaments ca. 3 mm; staminodes flat, ca. 2×2.4 mm, 3-

lobed, central lobe narrower than lateral ones. Ovary ovoid, proximally sunken into hypanthium for ca. $1/4$ its length; style 1–1.2 mm; stigma 3-lobed, lobes oblong. Capsule ovoid. Seeds brown, glossy, oblong. Fl. Aug.

• Beneath bamboos; ca. 3000 m. NW Yunnan (Gongshan Drung-Nu Zu Zizhixian).

18. *Parnassia chinensis* Franchet, Bull. Soc. Bot. France 44: 252. 1897.

中国梅花草 zhong guo mei hua cao

Stems 1–4, 8–16 cm, with 1 leaf near middle. Basal leaves usually 3–8; petiole 1.5–3.5(–5) cm; leaf blade abaxially gray-green, purple punctate, adaxially brown-green, usually reniform or ovate-reniform, occasionally ovate-cordate, $0.6\text{--}1.1 \times 0.75\text{--}1.4$ cm, distinctly 3–5-veined abaxially, base deeply cordate, apex rounded, sometimes obtuse or emarginate. Cauline leaf sessile, semialexicaul, abaxially densely purple-brown punctate, ovate-cordate, $4\text{--}9 \times 4\text{--}8$ mm, base often with several rusty brown appendages. Flower 1–1.4 cm in diam.; hypanthium turbinate. Sepals densely purple punctate, ovate or oblong, $3\text{--}5 \times 2.5\text{--}3.5$ mm, margin subentire, apex acute. Petals white, brown punctate, broadly obovate, $1\text{--}1.15$ cm \times ca. 6 mm, base attenuate into a claw 1.2–2 mm, margin densely long fimbriate or lacerate-fimbriate proximally, entire, undulate, or irregularly crenate distally, apex emarginate. Anthers oblong, ca. 0.8 mm; filaments 4–6 mm; staminodes broadly spatulate, flat, ca. 2.5 mm, stalk ca. 1.5×1.2 mm, lamina ca. 1×1.8 mm, 3-lobed at apex. Ovary depressed globose, apex abruptly contracted into style; style ca. 1.2 mm; stigma 3-lobed. Capsule unknown. Fl. Jul–Aug.

Scrub, alpine meadows, slopes; 3600–4200 m. C Sichuan, SE Xizang, NW Yunnan [Bhutan, N Myanmar, Nepal, Sikkim].

- 1a. Basal leaf blade reniform, occasionally ovate-cordate; petal margin long fimbriate proximally, basal claw 1.5–2 mm 18a. var. *chinensis*
- 1b. Basal leaf blade ovate-reniform; petal margin lacerate-fimbriate proximally, basal claw ca. 1.2 mm 18b. var. *sechuanensis*

18a. *Parnassia chinensis* var. *chinensis*

中国梅花草(原变种) zhong guo mei hua cao (yuan bian zhong)

Basal leaf blade reniform, occasionally ovate-cordate. Petal margin long fimbriate proximally, basal claw 1.5–2 mm.

Scrub, alpine meadows, slopes; 3600–4200 m. SE Xizang, NW Yunnan [Bhutan, N Myanmar, Nepal, Sikkim].

18b. *Parnassia chinensis* var. *sechuanensis* Z. P. Jien, Acta Phytotax. Sin. 8: 255. 1963.

四川梅花草 si chuan mei hua cao

Basal leaf blade ovate-reniform. Petal margin lacerate-fimbriate proximally, basal claw ca. 1.2 mm.

• C Sichuan (Baoping Xian, Emei Shan).

19. *Parnassia crassifolia* Franchet, Bull. Soc. Bot. France 44: 253. 1897.

鸡心梅花草 *ji xin mei hua cao*

Stem 1(or 2), 17–55 cm, with 1 leaf near middle. Basal leaves 2–4(or 5); petiole (4–)7–12 cm; leaf blade abaxially greenish, densely brown punctate, adaxially deep greenish, ovate-cordate, 2–4.5 × ca. 3.5 cm, leathery, midvein conspicuous, base cordate or subcordate, apex acute or acuminate. Cauline leaf sessile, semiamplexicaul, densely purple-brown punctate, ovate-cordate, 1.3–2.1 cm, base cordate, often with several rusty brown appendages. Flower 1.5–2.5 cm in diam.; hypanthium turbinate. Sepals densely purple-brown punctate, broadly ovate, 5–6 × 2–4 mm, margin entire or erose proximally, apex obtuse or acute. Petals white, densely purple-brown punctate, broadly spatulate, 1–2 cm × 6–8 mm, 3-veined, base with a claw 3–3.5 mm, margin entire or long fimbriate proximally, erose distally, apex rounded. Anthers ellipsoid, ca. 1.8 mm; filaments ca. 8 mm; staminodes flat, ca. 5 mm, 3-lobed to middle, lobes linear, ca. 3 mm, apex rounded. Ovary densely purple-brown punctate, ovoid; style short; stigma 3-lobed. Capsule ovoid, with 3 thickened, longitudinal angles. Seeds brown, glossy, oblong. Fl. Jul–Aug, fr. Sep.

- Streamsides, moist places in valleys; 2500–3300 m. W Sichuan, N Yunnan.

In habit, this species resembles *Parnassia wightiana*, which differs in having thinner, subtriangular-ovate, ovate-cordate, broadly cordate, or reniform basal leaf blades and 5-lobed staminodes.

20. *Parnassia epunctulata* J. T. Pan, Acta Phytotax. Sin. 23: 220. 1985.

无斑梅花草 *wu ban mei hua cao*

Stems 1–3(–5), 9–13 cm, with 1 leaf proximally. Basal leaves 3–5(–8); petiole 1.5–3.2 cm; leaf blade abaxially greenish, adaxially deep green, cordate, rarely ovate-cordate, 1–1.5 × 0.9–1.4 cm, midvein conspicuous, base deeply cordate, apex rounded or subobtusate. Cauline leaf sessile, semiamplexicaul, ovate-cordate, 6–11 × 6–7 mm, base with a few rusty brown appendages. Flower 1.5–1.9 cm in diam.; hypanthium shallow. Sepals erect at anthesis, oblong, 3–4 × 1.5–2 mm, 3-veined with veins confluent apically, base with a few rusty brown appendages, margin entire, apex subobtusate. Petals white, spatulate-ovate, 7.8–9.5 × 5.2–5.4 mm, base attenuate into a claw ca. 1.7 mm, margin shortly fimbriate proximally, undulate or dentate distally, apex rounded or emarginate. Anthers oblong, 0.8–1.2 mm; filaments ca. 3 mm; staminodes spatulate, flat, 3-lobed to middle, lobes sometimes unequal, stalk ca. 1.5 × 1 mm. Ovary ovoid; style ca. 0.8 mm; stigma 3-lobed. Capsule unknown. Fl. Jul.

- Alpine meadows; 3400–3800 m. NW Yunnan.

In habit, this species resembles *Parnassia mysorensis*, which differs in having petals with margin entire, erose, or serrate proximally and apex emarginate or 2-cleft, and staminodes with subequal lobes.

21. *Parnassia venusta* Z. P. Jien, Acta Phytotax. Sin. 8: 257. 1963.

娇媚梅花草 *jiao mei mei hua cao*

Stem usually 1, 3–8 cm, with 1 leaf near middle or distally. Basal leaves 3–5(–8); petiole slender, 1.5–3.5 cm; leaf blade abaxially greenish, adaxially deep green, reniform, 9–10 × 8–9 mm, arcuate 3–5 veined, base deeply cordate, apex rounded-obtusate, apiculate. Cauline leaf sessile, semiamplexicaul, ovate-cordate or ovate-triangular, ca. 3 mm, base often with a few caducous, rusty brown appendages. Flower 6–10 mm in diam.; hypanthium shortly turbinate. Sepals spreading, brown punctate, ovate-oblong or oblong, 3–4 × 1.5–2 mm, 1-veined, base attenuate, apex obtuse. Petals white, brown punctate, obovate-lanceolate, 5–6 × 3–4 mm, base contracted into a claw 1–1.2 mm, margin shortly fimbriate proximally, entire or erose distally, apex rounded-obtusate, sometimes emarginate or indistinctly crenate. Anthers ellipsoid, ca. 0.8 mm; filaments ca. 2 mm; staminodes broadly spatulate, flat, ca. 2.5 mm, lamina ca. 1.2 mm, slightly shorter than stalk, 3-lobed, central lobe narrower than lateral ones. Ovary ovoid, proximally sunken into hypanthium for ca. 1/3 its length; style short; stigma 3-lobed. Capsule unknown. Fl. Aug–Sep.

- Grassy slopes; 3600–4000 m. NW Yunnan (Dêqên Xian, Gongshan Drung-Nu Zu Zizhixian).

22. *Parnassia qinghaiensis* J. T. Pan in T. N. Ho et al., Novon 6: 188. 1996.

青海梅花草 *qing hai mei hua cao*

Stems several, ca. 2 cm, glabrous, with 1 leaf near base. Basal leaves 8 or 9; petiole 8–10 mm, base broadened into a membranous sheath, margin brown ciliate; leaf blade brown punctate, cordate-reniform, 4–6 × 5–8 mm, leathery, glabrous, base cordate, apex obtuse. Cauline leaf petiolate; petiole to 1 mm, margin brown ciliate; leaf blade subcordate, 3.3–3.5 mm, glabrous. Hypanthium ca. 2 mm. Sepals brown punctate, subovate, 3–3.3 × 2–2.5 mm, 5- or 6-veined with veins apically confluent, glabrous on both surfaces, apex obtuse. Petals pale yellow-green, obovate, 4.3–5 × 3–3.5 mm, base truncate to auriculate, with a claw adnate to hypanthium and staminodes, margin erose, apex retuse. Stamens to 4.3 mm; filaments subulate, base adnate to hypanthium; staminodes subspatulate, 2–2.2 × 0.8–1 mm, apex 3–5-dentate. Ovary semi-inferior, ovoid, ca. 2.5 mm; style to 1.5 mm; stigma 3-lobed. Capsule opening when ripe to expose seeds in an apparent splash cup.

- Dense turf in alpine meadows; ca. 4200 m. S Qinghai (Darlag Xian, Yushu Xian).

The present authors have seen no specimens of this species; the above description is based on the protologue, in which it was said to be allied to *Parnassia venusta*. *Parnassia qinghaiensis* differs from that species in having the cauline leaf borne near the stem base, sepal veins apically confluent, petal and filament bases adnate to the hypanthium, staminodes 3–5-dentate at the apex, and the ovary semi-inferior.

23. *Parnassia filchneri* Ulbrich, Repert. Spec. Nov. Regni Veg. 2: 65. 1906.

藏北梅花草 *zang bei mei hua cao*

Stems ca. 4 cm, with 1 leaf near base. Basal leaves long petiolate; petiole ca. 1 cm; leaf blade oblong, 8–9 × 4–5 mm, 3-veined, base attenuate. Cauline leaf sessile, amplexicaul, ca. 1 cm. Flower ca. 7 mm in diam.; hypanthium turbinate, ca. 3 mm. Sepals ca. 3.5 mm, narrowly ovate, apex obtuse. Petals yellow, spatulate or spatulate-lanceolate, 5–6 × 2.5 mm, apex obtuse. Anthers ellipsoid, ca. 0.5 mm; filaments filiform; staminodes broadly spatulate, ca. 2.5 mm, 3-lobed at apex, lobes short, truncate at apex.

• SC Qinghai (Madoi Xian).

The present authors have seen no specimens of this species; the above description is based on the protologue.

24. *Parnassia xinganensis* C. Z. Gao & G. Z. Li, Guihaia 3: 19. 1983.

兴安梅花草 xing an mei hua cao

Stems 2–8, 6–15 cm, with 1 leaf proximally or near middle. Basal leaves 4 or 5(–11); petiole 1.5–8.5 cm; leaf blade abaxially greenish, brown punctate, adaxially deep green, elliptic, rarely obovate-elliptic, 1.8–7 × 1–2.5 cm, 5-veined basally, midvein prominent, base rounded or cuneate, apex acute, obtusely apiculate. Cauline leaf ovate or ovate-triangular, 1–1.8 × 0.5–1.1 cm, base rounded or cuneate, with several rusty brown appendages. Flower 1.5–2 cm in diam.; hypanthium shortly turbinate. Sepals elliptic or ovate, rarely obovate, 4–5 × 2.5–3.5 mm, 5-veined, margin entire, apex rounded. Petals spreading, white, elliptic, 9–10 × 7–8 mm, 5-veined basally, base attenuate into a claw ca. 2 mm, margin entire, apex rounded. Anthers ellipsoid, ca. 1 mm; filaments ca. 5 mm; staminodes flat, 3–3.5 mm, stalk ca. 1.8 × 0.5 mm, lamina ca. 1.5 mm wide, 3-lobed, lobes lanceolate. Ovary superior, ovoid; style ca. 1.5 mm; stigma 3-lobed, lobes oblong. Capsule unknown. Fl. Jul–Aug.

• Streamsides in valleys; ca. 1200 m. NE Guangxi (Xing'an Xian).

25. *Parnassia lanceolata* T. C. Ku, Bull. Bot. Res., Harbin 7 (1): 34. 1987.

披针瓣梅花草 pi zhen bai mei hua cao

Stem 1, 3–7 cm, with 1 leaf near middle. Basal leaves 3–5; petiole 1.5–3.5 cm; leaf blade abaxially greenish, purple punctate, adaxially deep green, ovate-reniform or ovate-cordate, 4–14 × 5–12 mm, base cordate, apex acuminate. Cauline leaf sessile, semiamplexicaul, similar to basal leaves but smaller, base often with a few rusty brown appendages. Flower 5–6 mm in diam.; hypanthium shortly turbinate. Sepals purple punctate on both surfaces, lanceolate, 2–2.5 × 0.8–1 mm, margin entire, apex obtuse. Petals green, densely purple-brown punctate on both surfaces, lanceolate or oblong, ca. 4 × 1.2 mm, base truncate, abruptly contracted into a claw ca. 1.2 mm, margin densely and acutely serrulate, apex acuminate or obtuse. Anthers oblong, 0.5–1 mm; filaments ca. 5 mm; staminodes flat, ca. 0.9 mm, stalk ca. 0.3 mm, lamina 3-lobed at apex. Ovary superior,

ovoid; style ca. 0.8 mm; stigma 3-lobed. Capsule unknown. Fl. Jul.

• *Picea* forests, grassy slopes near forests, alpine scrub and meadows; 3600–3900 m. W Sichuan, NW Yunnan.

In habit, this species resembles *Parnassia angustipetala*, which differs in having terete, discoid staminodes rounded and entire at the apex.

1a. Petals lanceolate, apex acuminate 25a. var. *lanceolata*

1b. Petals oblong, apex obtuse 25b. var. *oblongipetala*

25a. *Parnassia lanceolata* var. *lanceolata*

披针瓣梅花草(原变种) pi zhen bai mei hua cao (yuan bian zhong)

Petals lanceolate, apex acuminate.

• *Picea* forests, grassy slopes near forests; 3600–3900 m. W Sichuan.

25b. *Parnassia lanceolata* var. *oblongipetala* T. C. Ku, Acta Phytotax. Sin. 29: 82. 1991.

长圆瓣梅花草 chang yuan ban mei hua cao

Petals oblong, apex obtuse.

• Alpine scrub and meadows; ca. 3600 m. NW Yunnan (Eryuan Xian).

26. *Parnassia kangdingensis* T. C. Ku, Bull. Bot. Res., Harbin 7(1): 35. 1987.

康定梅花草 kang ding mei hua cao

Stem usually 1, 1.5–3.5 cm, with 1 leaf near apex. Basal leaves 3 or 4(or 5); petiole 1–1.2 cm; leaf blade abaxially greenish, adaxially brown-green, ovate-reniform, ca. 4–6 mm, nearly as long as wide, base cordate, apex rounded. Cauline leaf sessile, semiamplexicaul, abaxially purple-brown punctate, similar to basal leaves, often with a few rusty brown appendages at base. Flower 6–7 mm in diam.; hypanthium inconspicuous. Sepals purple-brown punctate near margin, ovate-oblong, ca. 2.2 × 1.8 mm, margin entire, apex rounded. Petals white, purple-brown punctate, obovate, ca. 4 × 1.8 mm including claw, base attenuate into a claw ca. 0.8 mm, margin densely serrulate, apex rounded. Anthers oblong, 0.5–1 mm; filaments ca. 1.8 mm; staminodes flat, ca. 1.2 mm, stalk ca. 0.6 mm, lamina nearly equaling stalk, 3-lobed to middle, lobes lanceolate, margin entire, apex truncate. Ovary superior, ovoid; style very short; stigma 3-lobed. Capsule unknown. Fl. Jul.

• W Sichuan (Kangding Xian).

27. *Parnassia mysorensis* F. Heyne ex Wight & Arnott, Prodr. Fl. Ind. Orient. 35. 1834.

凹瓣梅花草 ao ban mei hua cao

Stems 1 or 2, 8–13 cm, with 1 leaf near base or in proximal 1/3. Basal leaves 2–4(or 5); petiole to 2 cm; leaf blade abaxially greenish, adaxially deep green or brown-green, ovate-cordate, broadly ovate, or ovate-oblong, 0.5–1.5 × 0.7–1.5 cm, base cordate, subcordate, or truncate, apex rounded-obtuse. Cauline leaf sessile, semiamplexicaul, similar to basal ones but smaller, base often with several rusty brown appendages. Flower 1.8–2 cm in diam.; hypanthium campanulate. Sepals oblong or semiobovate, 4–5 × ca. 3.5 mm, margin

entire, apex obtuse. Petals white, broadly spatulate, ca. 8×5 mm, base attenuate into a claw ca. 1.5 mm, margin entire, erose, or serrate proximally and entire distally, apex emarginate or 2-cleft. Anthers ellipsoid, 0.8–1 mm; filaments ca. 5 mm; staminodes broadly spatulate, flat, $3\text{--}3.5 \times$ ca. 1.5 mm, stalk ca. 1 mm, lamina ca. 2 mm, 3-lobed for ca. 1/3 its length, lobes subequal. Ovary superior, ovoid; stigma 3-lobed. Capsule ovoid, 3-valved. Seeds brown, glossy, oblong. Fl. Jul–Aug, fr. Sep.

Mixed forests, scrub, meadows, grassy places, grassy or open slopes; 2500–3600 m. Guizhou, Sichuan, Xizang, Yunnan [N India, Sikkim].

- 1a. Basal leaf blade ovate-cordate or broadly ovate, base cordate or subcordate 27a. var. *mysorensis*
 1b. Basal leaf blade ovate-oblong, base subcordate or truncate 27b. var. *aucta*

27a. *Parnassia mysorensis* var. *mysorensis*

凹瓣梅花草(原变种) ao ban mei hua cao (yuan bian zhong)

Parnassia affinis J. D. Hooker & Thomson, p.p.

Basal leaf blade ovate-cordate or broadly ovate, base cordate or subcordate.

Mixed forests, scrub, meadows, grassy places, open slopes; 2500–3600 m. Guizhou, Sichuan, Xizang, Yunnan [N India, Sikkim].

The original material of *Parnassia affinis* is heterogeneous, also including plants identifiable as *P. pusilla*.

27b. *Parnassia mysorensis* var. *aucta* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 281. 1912.

锐尖凹瓣梅花草 rui jian ao ban mei hua cao

Parnassia affinis J. D. Hooker & Thomson var. *aucta* (Diels) Nekrassova.

Basal leaf blade ovate-oblong, base subcordate or truncate.

- Scrub, grassy slopes; 3200–3300 m. NW Yunnan.

28. *Parnassia submysorensis* J. T. Pan, Acta Phytotax. Sin. 23: 221. 1985.

近凹瓣梅花草 jin ao ban mei hua cao

Stems 2 or 3, 16–27 cm, with 1 leaf near middle or distally. Basal leaves 2 or 3; petiole 4–7 cm; leaf blade abaxially greenish, adaxially deep green, ovate-oblong or broadly ovate, $2\text{--}3 \times 2\text{--}3$ cm, arcuate 7–9-veined, base cordate or deeply so, apex acuminate. Cauline leaf sessile, semiamplexicaul, similar to basal ones but smaller, often with rusty brown appendages at base. Flower 2.3–2.8 cm in diam.; hypanthium turbinate. Sepals densely punctate, oblong, 8–10 \times 4–5 mm, parallel veined with veins confluent apically, margin entire, apex rounded. Petals white, sparsely purple-brown punctate, obovate, ca. 1.4 cm \times 8 mm, 3–5-veined, base attenuate into a claw ca. 2 mm, margin erose-dentate, apex rounded. Anthers oblong, ca. 1.5

mm; filaments ca. 5 mm; staminodes flat, ca. 3 mm, stalk ca. 1 \times 0.8 mm, lamina ca. 2 \times 2.5 mm, 3(–6)-lobed. Ovary superior, depressed globose; style ca. 1.5 mm; stigma 3-lobed, lobes ovate, ca. 1 mm. Capsule unknown. Fl. Jul.

- Among shrubs in forests, shaded slopes; 3400–3600 m. NW Yunnan (Zhongdian Xian).

29. *Parnassia cacuminum* Handel-Mazzetti, Symb. Sin. 7: 433. 1931.

高山梅花草 gao shan mei hua cao

Parnassia cacuminum f. *yushuensis* T. C. Ku.

Stem 1, (4–)7–10 cm, with 1 leaf near apex. Basal leaves numerous, usually 5–7; petiole 1.5–3 cm; leaf blade abaxially greenish, densely brown punctate, adaxially deep green or brown-green, ovate or ovate-cordate, 1–1.5 cm \times 8–11 mm, arcuate 5(–7)-veined, base cordate, apex rounded. Cauline leaf sessile, semiamplexicaul, ovate, 5–8 mm, often with several rusty brown appendages at base. Flower 1.1–1.5 cm in diam.; hypanthium shallowly campanulate. Sepals densely purple-brown punctate or indistinctly punctate on both surfaces, broadly oblong or ovate, 5–6 \times ca. 3.5 mm, margin entire, apex rounded. Petals white, yellow-green, or whitish green, densely purple-brown punctate or indistinctly punctate on both surfaces, spatulate, 8–9 \times 3–4 mm, base cuneate into a short claw ca. 1 mm, margin erose, apex rounded. Anthers oblong, 0.5–1 mm; filaments ca. 4.5 mm; staminodes green, flat, 3-lobed, central lobe slightly longer than lateral ones, lateral lobes truncate at apex. Ovary superior, long ovoid, apex abruptly contracted into a short style; stigma 3-lobed. Capsule unknown. Fl. Jun–Jul.

- Moist grassy places in or at margins of scrub, shaded moist places near streams; 3400–4300 m. S Qinghai (Yushu Xian), W Sichuan.

30. *Parnassia cordata* (Drude) Z. P. Jien ex T. C. Ku, Bull. Bot. Res., Harbin 7(1): 37. 1987.

心叶梅花草 xin ye mei hua cao

Parnassia nubicola Wallich ex Royle var. *cordata* Drude, Linnaea 39: 316. 1875.

Stems 1–3, 28–32 cm, often with 1 leaf near middle. Basal leaves (2 or)3–7; petiole brown striate, slender, 4–16 cm; leaf blade ovate-cordate, 3–4.1 \times 3–4.1 cm, arcuate 7-veined with veins prominent abaxially, base deeply cordate, apex rounded, apiculate. Cauline leaf sessile, semiamplexicaul, cordate, 2–3 cm, base with several rusty brown appendages. Flower 2–2.5 cm in diam.; hypanthium campanulate. Sepals oblong, ca. 6 \times 4 mm, conspicuously arcuate 7-veined, margin entire, apex obtuse. Petals white, purple-veined, densely punctate, obovate-oblong, 1.3–1.5 cm \times 8–10 mm, base cuneate, margin shortly fimbriate or erose in proximal 1/3, entire in distal 2/3, apex rounded. Anthers oblong, 0.8–1.4 mm; filaments ca. 7 mm; staminodes flat, ca. 3 mm, stalk ca. 1.5 \times 1.3 mm, lamina 3-lobed to middle, lobes lanceolate. Ovary semi-inferior, ovoid; styles ca.

2 mm; stigma 3-lobed, lobes oblong. Capsule depressed globose, ca. 1 cm in diam. Seeds brown, glossy. Fl. Jul–Aug, fr. Sep.

Alpine meadows; 3200–4100 m. NW Yunnan (Bijiang Xian) [India]. *Parnassia cordata* was originally described by Drude (loc. cit.) as a variety of *P. nubicola*. However, the present authors treat *P. cordata* as a distinct species because it strongly differs from *P. nubicola* in having slender stems and ovate-cordate basal leaf blades with a deeply cordate base.

31. *Parnassia pusilla* Wallich ex Arnott, Companion Bot. Mag. 2: 315. 1837.

类三脉梅花草 lei san mai mei hua cao

Parnassia affinis J. D. Hooker & Thomson, p.p. Stem usually 1, 4–10 cm, with 1 leaf near middle or distally. Basal leaves 2–4; petiole 7–9 cm; leaf blade abaxially purple-brown punctate, reniform or ovate-cordate, 4–7 × 3–5 mm, (3–)5-veined abaxially, base cordate, margin entire, apex rounded-obtuse. Cauline leaf sessile, semiamplexicaul, similar to basal ones but smaller, base sometimes with a few rusty brown appendages. Flower 6–8 mm in diam.; hypanthium turbinate. Sepals oblong, ca. 1.5 × 1.2 mm, midvein conspicuous, base often with 1 or 2 rusty brown appendages, apex rounded. Petals white, brownish punctate on both surfaces, obovate, 5–6(–8) × ca. 3.5 mm, midvein conspicuous, base cuneate into a claw ca. 0.1 mm, margin sparsely and shortly fimbriate proximally, erose or undulate distally, apex rounded. Anthers subglobose, ca. 0.3 mm; filaments ca. 1.7 mm; staminodes flat, ca. 1.5 mm, shortly stalked, 3-lobed at apex, lobes lanceolate, 0.3–0.4 mm, central one somewhat narrower than lateral ones. Ovary semi-inferior, ovoid; style short; stigma 3-lobed. Capsule unknown. Fl. Jul–Aug.

S Xizang [Bhutan, N India, Nepal, Sikkim].

The original material of *Parnassia affinis* is heterogeneous, also including plants identifiable as *P. mysorensis* var. *mysorensis*.

32. *Parnassia oreophila* Hance, J. Bot. 16: 106. 1878.

细叉梅花草 xi cha mei hua cao

Parnassia setchuenensis Franchet.

Stems (1 or) 2–9 or more, 17–30 cm, with 1 leaf proximally or near middle. Basal leaves 2–8; petiole 2–5(–10) cm; leaf blade ovate-oblong or triangular-ovate, 2–3.5 × 1–1.8 cm, conspicuously 3–5-veined with veins prominent abaxially, base often truncate or subcordate, sometimes attenuate, apex rounded, sometimes apiculate. Cauline leaf sessile, semiamplexicaul, ovate-oblong, 2.5–4.5 × 1–2.5 cm, often with several rusty brown appendages at base. Flower 2–3 cm in diam.; hypanthium campanulate. Sepals lanceolate, 6–7 × ca. 2 mm, 3-veined, margin entire, apex obtuse. Petals white, purple-brown veined, broadly spatulate or obovate-oblong, 1–1.5 × 0.6–0.8 cm; 5-veined, base attenuate into a claw ca. 2 mm, margin entire, apex rounded. Anthers oblong, ca. 1.5 mm; filaments ca. 4.5 mm; staminodes flat, 4.5–5 mm, stalk ca. 1.5 mm, lamina ca.

4 × 1.8 mm, 3-parted for (1/2–)2/3 its length, lobes linear, ca. 2 mm, apex somewhat glandular, but without a distinct, globose gland. Ovary semi-inferior, long ovoid; style ca. 1 mm; stigma 3-lobed. Capsule long ovoid, 5–7 mm in diam. Seeds brown, glossy. Fl. Jul–Aug, fr. Sep.

• Alpine meadows at forest margins, moist slopes, roadsides; 1600–3000 m. Gansu, Hebei, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan.

33. *Parnassia tibetana* Z. P. Jien ex T. C. Ku, Bull. Bot. Res., Harbin 7(1): 38. 1987.

西藏梅花草 xi zang mei hua cao

Stems 1 or 2, ca. 12 cm, with 1 leaf proximally. Basal leaves usually 2 or 3(or 4); petiole ca. 1.5 cm; leaf blade abaxially greenish, adaxially brown-green, ovate-oblong, 1.5–2.3 × 1–1.4 cm, base truncate or broadly cuneate, apex acute. Cauline leaf sessile, semiamplexicaul, similar to basal ones, often with several rusty brown appendages at base. Flower ca. 1 cm in diam.; hypanthium campanulate. Sepals ovate, ca. 6 × 3 mm, 5-veined, margin entire, apex rounded. Petals yellow, obovate or oblong, 8–10 × 5–6 mm, 5–7-veined, margin entire, apex rounded. Anthers oblong, 0.5–1 mm; filaments flat; staminodes flat, ca. 3.2 mm, stalk ca. 1.2 mm, lamina ca. 2 × 2.8 mm, 3-lobed for 1/5–1/4(–1/2) its length, lobes shortly linear, apex truncate or rounded. Ovary ovoid; styles ca. 1 mm, 3-lobed at apex. Capsule unknown. Fl. Aug.

• *Tsuga* forests; ca. 3700 m. S Xizang.

34. *Parnassia nubicola* Wallich ex Royle, Ill. Bot. Himal. Mts. 1: 227. 1835.

云梅花草 yun mei hua cao

Stems 3 or 4(or 5), (5–)13–40 cm, with 1 leaf near base or in proximal 1/4. Basal leaves 3–8; petiole 3–7(–13) cm; leaf blade abaxially greenish, adaxially deep green or brown-green, elliptic or ovate-oblong, rarely oblong, (2–)2.5–7.5 × (1.5–)2–3.8 cm, thick textured or thin and papery, base subcuneate, sometimes truncate, apex acute or shortly acuminate. Cauline leaf similar to basal ones but smaller, often with a few rusty brown appendages at base. Flower 2.8–3.4 cm in diam.; hypanthium campanulate. Sepals densely brown punctate, ovate-oblong or ovate-lanceolate, ca. 8 × 3 mm, margin entire, apex obtuse. Petals white, purple-brown punctate, broadly ovate, 1.2–1.6 cm × 8–10 mm, base contracted into a claw 2–3 mm, margin entire or erose proximally, apex rounded. Anthers ellipsoid, 0.8–1.1 mm; filaments ca. 4.5 mm; staminodes flat, 4–5 mm, stalk ca. 2 × 1 mm, lamina 3-lobed for 1/5–1/4(–1/2) its length, lobes lanceolate or ovate-lanceolate. Ovary semi-inferior, ovoid; style ca. 2 mm; stigma 3-lobed. Capsule ovoid, 3- or 4-lobed. Seeds brown, glossy, oblong. Fl. Aug–Sep, fr. Sep. 2n = 18.

Abies or *Betula* forests, streamsides near forests, moist places in scrub, meadows in glacial valleys; 2700–3900 m. SE Xizang, NW Yunnan [Afghanistan, Bhutan, India, Kashmir, Nepal, Pakistan].

1a. Stems 13–40 cm; basal leaf blade 2.5–7.5 × 2–3.8 cm, thick textured 34a. var. *nubicola*

1b. Stems 5–8(–13) cm; basal leaf blade ca. 2×1.5 cm, thin textured, papery 34b. var. *nana*

34a. *Parnassia nubicola* var. *nubicola*

云梅花草(原变种) *yun mei hua cao* (*yuan bian zhong*)
Stems 13–40 cm. Basal leaf blade $2.5\text{--}7.5 \times 2\text{--}3.8$ cm, thick textured.

Abies or *Betula* forests, streamsides near forests; 2700–3900 m. SE Xizang, NW Yunnan (Dêqên Xian) [Afghanistan, Bhutan, India, Kashmir, Nepal, Pakistan].

34b. *Parnassia nubicola* var. *nana* T. C. Ku, *Acta Phytotax.* Sin. 29: 82. 1991.

矮云梅花草 *ai yun mei hua cao*

Stems 5–8(–13) cm. Basal leaf blade ca. 2×1.5 cm, thin textured, papery.

• Moist places in scrub, meadows in glacial valleys; 3000–3900 m. SE Xizang (Zayü Xian), NW Yunnan (Dêqên Xian).

35. *Parnassia subscaposa* C. Y. Wu ex T. C. Ku, *Bull. Bot. Res.*, Harbin 7(1): 40. 1987.

倒卵瓣梅花草 *dao nuan bai mei hua cao*

Stem 1, ca. 6 cm, with 1 leaf near base. Basal leaves 2–4; petiole 5–11 mm; leaf blade densely purple-brown punctate, ovate-cordate, ca. $1 \text{ cm} \times 3\text{--}8$ mm, arcuate 5-veined, base cordate, apex rounded-obtuse. Cauline leaf shortly petiolate or semiamplexicaul, similar to basal ones but much smaller, base often with several rusty brown appendages. Flower ca. 1.6 cm in diam.; hypanthium turbinate. Sepals oblong or ovate-oblong, ca. 3.1×1.5 mm, base often with several rusty brown appendages, margin entire, apex rounded. Petals white, densely purple punctate, broadly obovate, ca. 8×5 mm, 5-veined, base cuneate, occasionally sparsely and shortly fimbriate, margin sparsely erose, apex truncate, emarginate, or indistinctly cleft. Anthers ellipsoid, ca. 1 mm; filaments unequal; staminodes flat, ca. 1.6 mm, stalk ca. 0.5 mm, lamina ca. 1.1 mm, 3-lobed to middle, lobes oblong. Ovary semi-inferior, ovoid; style ca. 0.5 mm; stigma 3-lobed, lobes obovate, becoming reflexed. Capsule unknown. Fl. Aug.

• Grassy slopes; ca. 4200 m. NW Yunnan (Dêqên Xian).

In habit, this species most closely resembles *Parnassia trinervis*, which differs in having taller stems, 7–20(–30) cm, a sessile cauline leaf, and oblanceolate petals, rounded and entire at the apex.

36. *Parnassia deqenensis* T. C. Ku, *Bull. Bot. Res.*, Harbin 7(1): 41. 1987.

德钦梅花草 *de qin mei hua cao*

Stem usually 1(or 2), 8–20 cm, with 1 leaf near base. Basal leaves 2–4(–6); petiole slender, (1.5–)3.5–6 cm; leaf blade abaxially greenish, adaxially deep green, ovate-cordate, $0.6\text{--}1.9 \times 0.8\text{--}1.3$ cm, base cordate or subtruncate, apex obtuse. Cauline leaf sessile, semiamplexicaul, similar to basal ones but smaller, often with a few rusty brown, hairlike appendages at

base. Flower ca. 1.2 cm in diam.; hypanthium shortly turbinate. Sepals sparsely purple-brown punctate, oblong-lanceolate, ca. 4×1.8 mm, 3-veined, margin entire, apex rounded. Petals white, purple-brown veined, densely purple-brown punctate, obovate, ca. 8×4 mm, 3-veined, base attenuate, margin sparsely erose. Anthers ellipsoid, ca. 0.8 mm; filaments (0.6–)4 mm; staminodes flat, ca. 2 mm, stalk ca. 1×0.5 mm, lamina ca. 1 mm wide, 3-lobed to middle, lobes oblong. Ovary ovoid; style ca. 1.5 mm; stigma ca. 3-lobed, lobes capitate. Capsule unknown. Fl. Jul–Aug.

• Alpine meadows, grassy slopes; 2900–4200 m. SE Xizang, NW Yunnan.

37. *Parnassia trinervis* Drude, *Linnaea* 39: 322. 1875.

三脉梅花草 *san mai mei hua cao*

Stems (1 or)2–4(–8), 7–20(–30) cm, with 1 leaf near base. Basal leaves 7–9; petiole brown-striate, 0.8–1.5(–4) cm; leaf blade oblong, oblong-lanceolate, or ovate-oblong, $0.8\text{--}1.5 \text{ cm} \times 5\text{--}12$ mm, arcuate 3–5-veined with veins prominent abaxially, base subcordate, truncate, or attenuate, apex acute. Cauline leaf sessile, semiamplexicaul, similar to basal ones but smaller, sometimes with a few rusty brown, hairlike appendages at base. Flower ca. 1 cm in diam.; hypanthium turbinate. Sepals lanceolate or oblong-lanceolate, ca. 4×1.5 mm, 3-veined abaxially, margin entire, apex obtuse. Petals white, oblanceolate, ca. 7.8×2 mm, 3-veined, base cuneate into a claw ca. 1.5 mm, margin entire, apex rounded, entire. Anthers ellipsoid; filaments 1.5–2 mm; staminodes flat, ca. 2.5 mm, stalk ca. 1×0.7 mm, lamina ca. 1.3 mm wide, 3-lobed, lobes shortly clavate. Ovary semi-inferior, oblong; style ca. 0.5 mm; stigma 3-lobed. Capsule 3-valved. Seeds brown, glossy, oblong. Fl. Jul–Aug., fr. Sep.

• Moist places in valleys, marshy meadows, river beaches; 3100–4500 m. Gansu, Qinghai, Sichuan, Xizang.

38. *Parnassia viridiflora* Batalin, *Trudy Imp. S.-Peterburgsk. Bot. Sada* 12: 168. 1892.

绿花梅花草 *lu hua mei hua cao*

Parnassia laxmannii Pallas var. *viridiflora* (Batalin) Diels; *P. rumicifolia* Brieger ex Limpricht; *P. trinervis* Drude var. *viridiflora* (Batalin) Handel-Mazzetti.

Stems 1–5, 9.5–20.5 cm, with 1 leaf near base. Basal leaves (1 or)2–4(or 5); petiole (1–)1.5–2.5 cm; leaf blade purple punctate or not, ovate-elliptic or triangular-ovate, rarely ovate-cordate, $1\text{--}2.5 \times 0.6\text{--}1.5$ cm, arcuate 5–7-veined with veins prominent abaxially, base broadly cuneate, subtruncate, or attenuate, apex obtuse or subacute. Cauline leaf sessile, semiamplexicaul, similar to basal ones but much smaller, sometimes with a few rusty brown appendages at base. Flower 1.3–1.8 cm in diam.; hypanthium turbinate. Sepals inconspicuously minutely brown punctate abaxially, ovate-lanceolate or oblong-lanceolate, 3.5–5

× 1.5–1.8 mm, 3-veined abaxially, margin entire, apex obtuse. Petals green, purplish veined, occasionally purple punctate, oblong-lanceolate or narrowly oblong, 7–8 × 2–2.5 mm, 5-veined, base attenuate into a claw 1.5–2 mm, margin entire, apex rounded. Anthers ellipsoid, ca. 1 mm; filaments ca. 3.5 mm; staminodes flat, ca. 2.5 mm, stalk ca. 1 × 0.8 mm, lamina ca. 1.5 × 1.5 mm, 3-lobed, lobes truncate at apex. Ovary semi-inferior, ellipsoid; style ca. 0.5 mm; stigma 3-lobed, lobes obovate. Capsule ellipsoid. Seeds brown, glossy, oblong. Fl. Aug. and fr. Sep.

• Scrub, alpine meadows; 3600–4100 m. Qinghai, Shaanxi, Sichuan, Yunnan.

One of the present authors (Hultgård) believes that this species would be better treated as a variety of *Parnassia laxmannii*, on account of the green petals being practically the only distinguishing character.

39. *Parnassia cooperi* W. E. Evans, Notes Roy. Bot. Gard. Edinburgh 13: 172. 1921.

指裂梅花草 zhi lie mei hua cao

Stems 1–4, 14–19 cm, with 1 leaf distally. Basal leaves 2 or 3; petiole 5–9 cm; leaf blade abaxially greenish, adaxially brown-green, reniform or ovate-cordate, 1.6–3.5 × 2.5–4 cm, arcuate 7–9-veined, base deeply cordate, apex rounded, obtusely apiculate. Cauline leaf sessile, semiamplexicaul, ovate-cordate, 1.2–2.9 × 1–2.5 cm, base deeply cordate, sometimes with a few rusty brown appendages. Flower 2.5–5 cm in diam.; hypanthium shallowly campanulate. Sepals adaxially purple punctate, ovate-lanceolate or lanceolate, 6–7 × 2.5 mm, midvein distinct abaxially, margin entire, apex rounded. Petals white or yellowish green, narrowly lanceolate, 1.2–1.5 cm × (2–)3–3.8 mm, 3-veined, base with a distinct claw 2.5–4 mm, margin sparsely long fimbriate, apex acuminate. Anthers oblong, ca. 1.2 mm; filaments 6–7 mm; staminodes flat, stalk ca. 1.8 × 1.1 mm, lamina 3-lobed, lateral lobes lanceolate, to 1.5 mm, 2–3 × as long as central lobe. Ovary superior; style ca. 1.8 mm; stigma 3-lobed. Capsule obconical-ovoid, trigonous, 3-valved. Seeds black-brown, glossy, oblong. Fl. Jul–Aug, fr. Sep.

Tsuga forests on slopes, sandy banks; 2400–2800 m. SE Xizang (Médog Xian) [Bhutan, Sikkim].

40. *Parnassia laxmannii* Pallas ex Schultes in Roemer & Schultes, Syst. Veg. 4: 696. 1820.

新疆梅花草 xin jiang mei hua cao

Parnassia subacaulis Karelina & Kirilov.

Stems 2 or 3(–5), 7.5–25 cm, with 1 leaf near base. Basal leaves (2–)4; petiole 0.5–1.8 cm; leaf blade abaxially greenish, adaxially deep green, ovate or long ovate, 1–2.5 × 0.6–1.5 cm, conspicuously 3–5-veined abaxially, base truncate, subcordate, or attenuate, apex obtuse. Cauline leaf sessile, semiamplexicaul, similar to basal ones but slightly smaller, occasionally with a few caducous, rusty brown, hairlike appendages at base. Flower ca. 2 cm in diam.; hypanthium campanulate. Sepals lanceolate, ca. 3.5 × 1.5 mm, 3-veined, margin

entire, apex obtuse. Petals white, brown veined, obovate, rarely spatulate, 0.6–1.3 cm × 5–6 mm, 5-veined, base attenuate into a claw ca. 1.5 mm. Anthers oblong, ca. 1.2 mm; filaments ca. 3 mm; staminodes flat, 2–2.7 mm, stalk 0.7–0.8 mm, lamina ca. 1.9 × 1 mm, 3-lobed, lobes parallel, clavate, central one ca. 0.6 mm, longer than lateral ones, truncate or rounded at apex. Ovary semi-inferior, ovoid or ovoid-pyriform; style very short; stigma 3-lobed, lobes oblong. Capsule brown punctate. Seeds brown, glossy, oblong. Fl. Jul–Aug, fr. Sep. $2n = 18, 36$.

Picea forest margins, shaded places, meadows by streams in valleys; 2500–2600 m. C Xinjiang [Kazakhstan, Mongolia, Russia (Siberia)]. In habit, this species resembles *Parnassia nubicola* and *P. trinervis*. However, *P. laxmannii* differs in having the central staminode lobe ca. 0.6 mm, longer than the lateral ones, with the apex truncate or rounded.

41. *Parnassia obovata* Handel-Mazzetti, Sinensia 2: 134. 1932.

倒卵叶梅花草 dao nuan ye mai hua cao

Stems (2 or)3(or 4), 19–22 cm, with 1 leaf near middle or distally. Basal leaves 4–6(–12), forming a rosette; petiole 5–11 cm; leaf blade abaxially greenish, adaxially deep green, obovate or oblong-obovate, 2–4 × 1.5–2.6 cm, 5–7-veined with veins parallel in proximal 2/3, prominent abaxially, and impressed adaxially, base cuneate, apex rounded, often obtusely apiculate. Cauline leaf sessile, semiamplexicaul, ovate or broadly so, 1.2–2 × 1.5–2.4 cm, base subcordate, often with several rusty brown appendages. Flower ca. 2.4 cm in diam.; hypanthium turbinate. Sepals adaxially densely purple-brown punctate, ovate or oblong, ca. 6 × 3–4 mm, margin sparsely denticulate, apex acute. Petals white, densely purple-brown punctate on both surfaces, oblong or obovate, ca. 1.2 cm × 4–5 mm, 5-veined basally, base cuneate, margin long fimbriate proximally, entire or undulate distally. Anthers ellipsoid, ca. 3.5 mm; filaments ca. 6 mm; staminodes flat, ca. 5 mm, 3–5-lobed, with inconspicuous glands at apex. Ovary superior, obovoid-trigonous, depressed at apex; style ca. 1.5 mm; stigma 3-lobed. Capsule obconical, with 3 or 4 slightly thickened angles. Seeds brown, glossy, oblong. Fl. Oct.

• Streamsides, moist places. Guizhou (Changling, Langdai).

In floral structure, this species is close to *Parnassia dilatata* and *P. wightiana*. However, *P. obovata* is easily distinguished by its peculiar, obovate or oblong-obovate basal leaf blade, with cuneate base and rounded, often obtusely apiculate apex.

42. *Parnassia lijiangensis* T. C. Ku, Bull. Bot. Res., Harbin 7(1): 43. 1987.

丽江梅花草 li jiang mei hua cao

Stems usually 1 or 2, slender, 4–6 cm, with 2 leaves near middle. Basal leaves 3–5; petiole 4–10 mm; leaf blade abaxially greenish, adaxially deep green, ovate-cordate or broadly ovate, 5–8 × 4–9 mm, base subcordate, apex rounded or obtuse. Cauline leaves sessile, semiamplexicaul, similar to basal ones but

smaller, often with several caducous, rusty brown appendages at base. Flower 1–1.3 cm in diam.; hypanthium turbinate. Sepals abaxially densely brown punctate, oblong, ca. 3×1.3 mm, inconspicuously 3-veined, margin entire, apex rounded-obtuse. Petals white, densely brown punctate on both surfaces, oblong-obovate, ca. 5×3 mm, 3–5-veined, base attenuate, margin entire, apex 2-lobulate or emarginate. Anthers oblong; filaments ca. 2.5 mm; staminodes flat, ca. 2.7 mm, stalk ca. 1 mm, lamina 3-lobed to middle, rarely irregularly 4- or 5-lobed, lobes linear. Ovary superior, obovoid, depressed at apex; style ca. 8 mm; stigma 3-lobed, lobes oblong. Capsule unknown. Fl. Aug.

• NW Yunnan (Lijiang Naxi Zu Zizhixian).

43. *Parnassia brevistyla* (Brieger) Handel-Mazzetti, Symb. Sin. 7: 434. 1931.

短柱梅花草 duan zhu mei hua cao

Parnassia delavayi Franchet var. *brevistyla* Brieger ex Limpricht, Repert. Spec. Nov. Regni Veg. Beih. 12: 400. 1922; *P. appendiculata* A. Batalin; *P. souliei* Franchet ex Nekrassova.

Stems 1–5, 11–23 cm, with 1 leaf near middle or distally. Basal leaves 2–6; petiole 3–14 cm; leaf blade abaxially greenish, adaxially deep green, ovate-cordate or ovate, $1.8\text{--}2.5 \times 1.5\text{--}3.5$ cm, 5–7(–9)-veined abaxially, base deeply cordate, apex acute. Cauline leaf sessile, semiamplexicaul, similar to basal ones but usually smaller, base often with several rusty brown appendages sometimes connate into small lamellae. Flower 1.8–3(–5) cm in diam.; hypanthium shallow. Sepals adaxially often purple-brown punctate, oblong, ovate, or obovate, $4\text{--}11 \times 3\text{--}8$ mm, midvein conspicuous, margin entire, apex rounded. Petals white, purple veined, densely purple punctate, broadly obovate or oblong-obovate, $1\text{--}1.5(2.5) \times 0.5\text{--}1$ cm, 5–7-veined, base attenuate into a claw 1.8–4 mm, margin shortly fimbriate in proximal 1/3, irregularly erose in distal 2/3, apex rounded. Anthers ellipsoid, ca. 2 mm, connective projected at apex into a lanceolate appendage ca. 5 mm; filaments ca. 5 mm; staminodes flat, 2.5–4 mm, stalk 2.5–4 mm, lamina ca. 4.5 mm wide, 3-lobed, lobes lanceolate or oblong, lateral one often 2-lobulate. Ovary superior, ovoid; style short; stigma 3-lobed, lobes short. Capsule obovoid-globose. Seeds brown, glossy, oblong. Fl. Jul–Aug, fr. Sep.

• Moist forests, canopy openings in *Picea* forests, forest margins, grassy slopes, riverside meadows; 2800–4400 m. Gansu, S Shaanxi, N and W Sichuan, NE Xizang, NW Yunnan.

44. *Parnassia delavayi* Franchet, J. Bot. (Morot) 10: 267. 1896.

突隔梅花草 tu ge mei hua cao

Parnassia mairei H. Léveillé; *P. nana* W. Griffith; *P. schmidtii* Zenker; *P. wightiana* Wallich ex Wight & Arnott var. *brachyloba* Franchet; *P. wightiana* var. *flavida* Franchet; *P. wightiana* var. *microblephara* Franchet.

Stem 1, 12–40 cm, with 1 leaf proximally or near middle. Basal leaves 3 or 4(–7); petiole (3–)5–16 cm; leaf blade abaxially greenish, adaxially deep green or brown-green, reniform or suborbicular, $2\text{--}4 \times 2.5\text{--}4.5$ cm, 5–7(–9)-veined with veins prominent abaxially, base deeply cordate, apex rounded, apiculate, or obtusely apiculate. Cauline leaf sessile, semiamplexicaul, similar to basal ones but smaller, rarely larger, often with 2 or 3 caducous, rusty brown appendages at base. Flower 3–3.5 cm in diam.; hypanthium obconical. Sepals densely brown punctate, oblong, ovate, or obovate, $6\text{--}8 \times 4\text{--}6$ mm, 3–5(–7)-veined, margin entire, apex rounded-obtuse. Petals white, purple veined, densely purple-brown punctate, oblong- or spatulate-obovate, (1–)1.2–2.5 \times 0.6–0.9 cm, 5-veined, base attenuate, margin sparsely and shortly fimbriate in proximal 1/3, apex rounded or acute. Anthers ellipsoid, connective projected at apex into a lanceolate appendage, to 5 mm; filaments 1–5.5 mm; staminodes flat, 3.5–4 mm, 3-lobed, lobes 1.5–1.8 mm. Ovary superior, depressed globose; style ca. 1.8 mm; stigma 3-lobed, lobes obovate. Capsule obovoid. Seeds brown, glossy, oblong. Fl. Jul–Aug, fr. Sep.

Abies forests, mixed forests, open woods, moist grassy beaches, gravelly slopes; 1800–3800 m. Gansu, Hubei, Shaanxi, Sichuan, Yunnan [Bhutan].

45. *Parnassia leptophylla* Handel-Mazzetti, Oesterr. Bot. Z. 90: 120. 1941.

细裂梅花草 xi lie mei hua cao

Stems 1–3, 11–28 cm, with 1 leaf distally. Basal leaves 2–4; petiole 4–14 cm; leaf blade purple-brown punctate, reniform, $2\text{--}5.5 \times 2.5\text{--}7$ cm, 7–9-veined with veins prominent abaxially, base deeply cordate, apex rounded, apiculate. Cauline leaf sessile, semiamplexicaul, similar to basal ones but smaller, sometimes with 2 or 3 caducous, rusty brown appendages at base. Flower 2.5–3.5 cm in diam.; hypanthium shallow. Sepals adaxially brownish punctate, oblong or obovate-oblong, $6\text{--}12 \times 4\text{--}8$ mm, 3–5-veined, margin entire, apex rounded. Petals white, brownish veined, purple punctate, oblong-obovate, $1.5\text{--}2 \text{ cm} \times 7\text{--}9$ mm, 5-veined, base cuneate, margin shortly fimbriate in proximal 1/3, irregularly erose distally, apex acuminate. Anthers ellipsoid, ca. 1.5 mm, connective projected at apex into a lanceolate appendage to 5 mm; filaments 1.5–6.5 mm; staminodes flat, ca. 5×3.5 mm, 3-lobed for ca. 2/3 their length, central lobe lanceolate, lateral ones falcate, narrower than central one. Ovary superior, globose; style ca. 1 mm; stigma 3-lobed, lobes short. Capsule unknown. Fl. Jul–Aug.

• Alpine meadows; 2200–3600 m. S and W Sichuan.

46. *Parnassia bifolia* Nekrassova in B. Fedtschenko, Fl. Asiat. Ross. 11: 39. 1917.

双叶梅花草 shuang ye mei hua cao

Stem 1(or 2), 10–50 cm, with 2 leaves proximally or near middle. Basal leaves 2–7, sometimes forming a rosette; petiole 3–7 cm; leaf blade abaxially greenish,

densely purple-brown punctate, adaxially deep green, oblong-ovate, 1.5–3.5 × 1–2.1 cm, 5(–7)-veined with veins prominent abaxially and impressed adaxially, base subcordate or subtruncate, apex rounded-obtuse, sometimes apiculate. Cauline leaves alternate, sessile or mostly shortly petiolate, inconspicuously brown punctate, similar to basal ones but (0.6–)1–2.9 × (0.5–)1.5 cm, 3–5-veined, with 2 or 3 caducous, rusty brown appendages at base. Flower 2–2.9 cm in diam.; hypanthium turbinate. Sepals purple-brown punctate, lanceolate, 7–9 × 2–2.5 mm, 5(–7)-veined, margin entire, apex acuminate. Petals erect, white, spatulate, 1.4–1.7 cm × 6–8 mm, base cuneate into a claw ca. 2 mm, margin entire, apex rounded. Anthers ellipsoid, ca. 1.5 mm; filaments 5–6 mm; staminodes deep brown, flat, ca. 5 mm, stalk ca. 1.5 × 1 mm, lamina 3–3.5 × ca. 2 mm, 2-lobed, lobes lanceolate or oblong, 1.5–2 mm. Ovary ovoid-globose; style short; stigma 3-lobed, lobes short. Capsule unknown. Fl. Jul–Aug, fr. Aug.

Forests, shaded slopes, streamsides; 2200–2800 m. Xinjiang [Russia].

47. *Parnassia wightiana* Wallich ex Wight & Arnott, Prodr. Fl. Ind. Orient. 35. 1834.

鸡脬草 *ji zhun cao*

Parnassia ornata Wallich ex Arnott; *P. wightiana* var. *ornata* (Wallich ex Arnott) Drude.

Stems 2–4(–7), 18–24(–30) cm or less, with 1 leaf near middle or distally. Basal leaves 2–5; petiole 3–10(–13) cm; leaf blade abaxially greenish, adaxially green, subtriangular-ovate, ovate-cordate, broadly cordate, or reniform, 2.5–4(–5) × 3.8–6.3 cm, 7–9 veined, base deeply cordate to subcordate, truncate, or occasionally subtruncate, apex rounded, obtuse, or apiculate. Cauline leaf sessile, semiamplexicaul, similar to basal ones but sometimes smaller, often with several rusty brown appendages at base. Flower 1.5–4 cm in diam.; hypanthium shortly turbinate. Sepals densely purple-brown punctate on both surfaces, ovate-lanceolate, 5–9 × 3–3.5 mm, base often with several rusty brown appendages, margin entire, apex rounded-obtuse. Petals white, oblong, obovate, or subpandurate, 8–11 × 4–9 mm, base cuneate into a claw 1.5–2.5 mm, margin long fimbriate proximally, erose-dentate or rarely erose distally. Anthers oblong, ca. 1.5 mm; filaments 5–7 mm; staminodes flat, 3–5 mm, 5-lobed for up to 1/2 their length, lobes narrowly linear, occasionally with inconspicuous glands at apex. Ovary superior, densely small brown punctate, obovoid; style ca. 1.5 mm; stigma 3-lobed. Capsule obovoid. Seeds brown, glossy, oblong. Fl. Jul–Aug, fr. Sep. $2n = 36$.

Open valley forests, valleys, grassy areas, roadsides; 600–2000 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, N India, Nepal, Sikkim, N Thailand].

Parnassia wightiana is a very variable species. Populations in E Sichuan have basal leaf blades usually reniform, wider than long, with base cordate, deeply cordate, or occasionally subtruncate, apex apiculate, flower (2–)4 cm in diam., and staminodes usually divided to the middle, rarely shallowly lobed. Populations in NE Yunnan have stems low, basal leaf blades mostly ovate-cordate, nearly as long as

(rarely longer than) wide, smaller, with base cordate, flower 1.5–2.5 cm in diam., and staminodes divided to the middle. Other populations in C and NE Yunnan have basal leaf blades mostly reniform, with base often cordate and apex apiculate. Populations in Guangdong have stems of moderate height, basal leaf blades subtriangular-ovate, larger, with base usually truncate or occasionally subcordate, apex obtuse, and flower larger. Because intermediate forms occur in various regions, and the characters all show ± continuous variation, the varieties and forms described by some authors are difficult to distinguish. Therefore none is recognized in the present account.

This species is used medicinally.

48. *Parnassia dilatata* Handel-Mazzetti, Sinensia 2: 135. 1932.

宽叶梅花草 *kuan ye mei hua cao*

Stems 2–4, 8–10 cm, with 1 leaf proximally. Basal leaves several; petiole slender, 2–4 cm; leaf blade abaxially greenish, densely brown punctate, adaxially deep green, broadly orbicular, rarely suborbicular, 1.2–2 × 1.4–2.5 cm, conspicuously 5–7-veined on both surfaces, base truncate, apex truncate, apiculate.

Cauline leaf sessile, semiamplexicaul, broadly ovate or reniform, ca. 1 × 1.5 cm, base truncate or subcordate, often with several rusty brown appendages. Flower ca. 1.5 cm in diam.; hypanthium turbinate. Sepals densely purple-brown punctate on both surfaces, oblong or ovate, ca. 4.5 × 3 mm, margin entire, apex obtuse.

Petals white, densely purple-brown punctate, spatulate, ca. 8 × 4 mm, base cuneate, margin long fimbriate in proximal 2/3, apex rounded or obtuse. Anthers subglobose, ca. 2 mm; filaments ca. 5.5 mm; staminodes flat, ca. 4.5 mm, (3 or) 4- or 5-lobed, lobes often with inconspicuous, globose glands at apex.

Ovary ovoid; style ca. 2 mm; stigma 3-lobed, lobes short. Capsule unknown. Fl. Sep–Oct.

• Riversides. SW Guizhou (Anlong Xian).

49. *Parnassia monochoriifolia* Franchet, Bull. Soc. Bot. France 44: 260. 1897.

大叶梅花草 *da ye mei hua cao*

Stems 2–4, ca. 24 cm, with 1 leaf near middle. Basal leaves petiolate; leaf blade abaxially greenish, adaxially deep green, oblong-ovate, to 7 cm, 7-veined abaxially, base cordate, apex acute. Cauline leaf sessile, semiamplexicaul, similar to basal ones but much smaller. Flower ca. 3 cm in diam.; hypanthium inconspicuous. Sepals unequal, larger ones to 1.2 cm. Petals white, spatulate, base attenuate into a long claw, margin fimbriate with fimbriae capitate at apex, apex rounded. Staminodes 5-lobed, lobes narrowly oblong. Style inconspicuous; stigma spreading.

• NE Yunnan (Yanjin Xian).

The present authors have seen no specimens of this species; the above description is based on the protologue and a photograph of the type specimen.

50. *Parnassia yiliangensis* T. C. Ku, Bull. Bot. Res., Harbin 7(1): 48. 1987.

彝良梅花草 yiliang mei hua cao

Stems ca. 3, ca. 10 cm, with 1 leaf proximally. Basal leaves ca. 6; petiole 2.5–3.5 cm; leaf blade abaxially greenish, densely purple punctate, adaxially deep green, reniform, 1.5–2.5 × 1.8–3 cm, conspicuously arcuate 7–9-veined abaxially, base deeply cordate, apex rounded, apiculate. Cauline leaf sessile, semiamplexicaul, similar to basal ones but smaller, base sometimes with a few caducous, rusty brown appendages. Flower ca. 1.8 cm in diam.; hypanthium inconspicuous. Sepals oblong, ca. 5 × 2.5 mm, conspicuously parallel veined adaxially, margin entire, apex rounded. Petals white, spatulate, ca. 1.1 cm × 5 mm, base cuneate into a claw ca. 1.2 mm, margin long fimbriate in proximal 2/3, entire or repand in distal 1/3, apex rounded. Anthers oblong, ca. 2 mm; filaments 1.6–5.5 mm; staminodes flat, ca. 4 mm, 5-parted, 3 central lobes ca. 2.5 mm, 2 lateral ones ca. 0.8 mm. Ovary superior, densely purple punctate, obovoid; style ca. 1.8 mm; stigma 3-lobed, lobes short. Capsule unknown. Fl. Aug–Sep.

• Moist streamsides on slopes; 1800–1900 m. NE Yunnan (Yiliang Xian).

51. *Parnassia chengkouensis* T. C. Ku, Bull. Bot. Res., Harbin 7(1): 49. 1987.

城口梅花草 cheng kou mei hua cao

Stems 3 or 4, 14–20 cm, with 1 leaf proximally or near middle. Basal leaves 3 or 4; petiole 5–10 cm; leaf blade abaxially pale green, inconspicuously brown punctate, adaxially brown-green, ovate-cordate, 2.5–4.4 × 2.5–4.2 cm, 7–9-veined, base deeply cordate, apex acute. Cauline leaf sessile, semiamplexicaul, similar to basal ones but smaller, base cordate, sometimes with a few rusty brown appendages. Flower ca. 1.5 cm in diam.; hypanthium shortly turbinate. Sepals densely brown punctate, oblong-lanceolate, ca. 5 × 3 mm midvein conspicuous, margin entire, apex acuminate. Petals white, obovate-oblong, ca. 9 × 3.5 mm, base attenuate into a claw ca. 1 mm, margin long fimbriate in proximal 2/3, entire in distal 1/3. Anthers oblong, 0.5–1 mm; filaments ca. 5 mm; staminodes flat, ca. 3 mm, (3–)5-lobed, lobes unequal, with inconspicuous glands at apex. Ovary ovoid; style ca. 1.8 mm; stigma 3-lobed, lobes ovate. Capsule ovoid. Seeds brown, glossy, oblong. Fl. Aug–Sep, fr. Sep.

• Grasslands. NE Sichuan (Chengkou Xian).

In habit, this species resembles *Parnassia crassifolia*, which differs in having a larger flower, 1.5–2.5 cm in diam., and staminodes 3-lobed to the middle. In leaf shape, *P. chengkouensis* is similar to *P. percliata*, which differs in having a larger flower, 1.5–3 cm in diam., and petal margins long fimbriate throughout.

52. *Parnassia omeiensis* T. C. Ku, Bull. Bot. Res., Harbin 7(1): 47. 1987.

金顶梅花草 jin diang mei hua cao

Stems 1 or 2, ca. 10 cm, with 1 leaf proximally. Basal leaves 6 or 7; petiole 2.5–3.5 cm; leaf blade abaxially greenish, purple-brown punctate, adaxially brown-green, cordate, rarely ovate-cordate, 6–7 × 6–7 mm, base deeply cordate, apex acuminate. Cauline leaf similar to basal ones but smaller, abaxially densely brown punctate, base often with several rusty brown appendages sometimes connate into small lamellae. Flower ca. 1.3 cm in diam.; hypanthium inconspicuous. Sepals oblong, 3.5–4 × 1.8–2 mm, 5-veined abaxially, margin entire, apex rounded-obtuse. Petals white, densely purple-brown punctate on both surfaces, broadly obovate, ca. 6 × 4 mm, 5-veined on both surfaces, base cuneate, margin sparsely and shortly fimbriate, apex rounded. Anthers oblong, ca. 1.8 mm; filaments ca. 4 mm; staminodes deep purple, flat, ca. 1.8 mm, 5-lobed, lobes unequal. Ovary superior, ovoid; style short; stigma 3-lobed, lobes ovate. Capsule unknown. Fl. Aug.

• Shaded and moist places on grassy slopes; ca. 3100 m. C Sichuan (Emei Shan).

In habit, this species most closely resembles *Parnassia chinensis* var. *sechuanensis*, which is easily distinguished by its apically 3-lobed staminodes.

53. *Parnassia rhombipetala* B. L. Chai, J. Sichuan Univ., Nat. Sci. Ed. 28(3): 375. 1991.

叙永梅花草 xu yong mei hua cao

Stems 2–5, 8–12 cm, with 3 or 4 leaves. Basal leaves 2 or 3; petiole 2.5–9 cm; leaf blade abaxially greenish, adaxially brown-green, broadly oblanceolate or narrowly ovate, 1.5–5.5 × 1.2–3 cm, 7-veined abaxially, base narrowed or subtruncate, apex acute. Cauline leaves sessile, not amplexicaul, lanceolate, ca. 1/2 as long as basal leaves, base with sparse, rusty brown appendages. Flower 1–1.5 cm in diam.; hypanthium inconspicuous. Sepals brown punctate, oblong or narrowly ovate, 6–7 × ca. 4 mm, 3-veined, margin entire, apex obtuse. Petals white, brown punctate, rhomboid, 1–1.2 × ca. 1 cm, many veined, base cuneate into a claw ca. 1 mm, margin subentire or undulate. Anthers oblong, ca. 1 mm; filaments 4–5 mm; staminodes 3–4 mm, divided into 3 filiform rays with globose glands at apex. Ovary superior; style short; stigma 4-lobed. Capsule unknown. Fl. Jul–Aug.

• Forests by streams; ca. 1000 m. S Sichuan (Xuyong Xian).

The present authors have not seen the type specimen of *Parnassia rhombipetala*, and the above description is translated from the protologue. It is noteworthy that this species has some peculiar morphological characters, e.g., oblanceolate or narrowly ovate basal leaf blades and rhomboid petals subentire or undulate at the margin.

54. *Parnassia amoena* Diels, Bot. Jahrb. Syst. 29: 370. 1900.

南川梅花草 nan chuan mei hua cao

Stems 1–5, 10–20 cm, with 3–6 leaves. Basal leaves 3–5, forming a rosette; petiole slender, 2.5–4.5 cm; leaf blade abaxially greenish, adaxially deep green, reniform, 1.1–2.3 × 1.2–2.6 cm, 5–7-veined with veins prominent abaxially, base deeply cordate, apex rounded, apiculate.

Cauline leaves subreniform or suborbicular, subequal, ca. 5 × 8–10 mm, smaller than basal ones, base deeply cordate, sometimes with a few rusty brown appendages. Flower 1–1.6 cm in diam.; hypanthium inconspicuous. Sepals purple punctate, oblong or long elliptic, 3.5–5 × 2–2.2 mm, 3-veined, margin entire, apex rounded-obtuse. Petals snow white, purple punctate, oblong-lanceolate or ovate-oblong, ca. 7.5 × 2.5 mm, 3-veined, base cuneate, margin long fimbriate in proximal 2/3, apex rounded, sometimes sparsely erose. Anthers ellipsoid, ca. 1 mm; filaments ca. 4.5 mm; staminodes ca. 9 mm, divided for 2/5 their length into 3 filiform rays with globose glands at apex. Ovary superior, subglobose; style ca. 0.4 mm; stigma 3- or 4-lobed. Capsule depressed globose. Seeds brown, glossy, oblong. Fl. Aug–Sep, fr. Sep.

• Moist rocks in forests; 1500–1800 m. SE Sichuan (Nanchuan Xian).
55. *Parnassia noemiae* Franchet, J. Bot. (Morot) 10: 281. 1896.

棒状梅花草 *bang zhuang mei hua cao*

Stems 1–3, 15–20 cm, with 2–5 leaves. Basal leaves 2–4; petiole slender, 3–5.5 cm; leaf blade abaxially greenish, adaxially deep green, reniform, 1.2–2.2 × 1.8–3 cm, 7-veined abaxially, base deeply cordate, apex rounded, apiculate. Cauline leaves reniform or suborbicular, 0.4–1.8 × 0.6–1.8 cm, base deeply cordate, sometimes with a few caducous, rusty brown appendages. Flower ca. 1.5 cm in diam.; hypanthium inconspicuous. Sepals lanceolate or ovate-lanceolate, ca. 3.5 × 1.5 mm, 3-veined, margin entire, apex acuminate. Petals white, oblanceolate or oblong, ca. 5.5 × 1.2 mm, base attenuate, margin fimbriate throughout with fimbriae turgid at apex and becoming clavate, apex rounded. Anthers ellipsoid, ca. 1.2 mm; filaments ca. 5 mm; staminodes 3–4 mm, divided into 3 rays or narrowly linear lobes 1.2–1.5 mm with globose glands at apex. Ovary superior, ovoid; style very short; stigma 3- or 4-lobed. Capsule densely purple punctate, depressed globose. Seeds brown, glossy, oblong. Fl. Jul–Aug, fr. Sep.

• Shaded moist grassy slopes, roadsides; 2000–2500 m. C and NE Sichuan (Baoping Xian, Chengkou Xian, Wenchuan Xian).

56. *Parnassia foliosa* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 79. 1858.

白耳菜 *bai er cai*

Parnassia nummularia Maximowicz ex Drude.

Stems 1–4, 15–40 cm, usually with 4–8 leaves. Basal leaves 3–6, forming a rosette; petiole 5–8 cm; leaf blade abaxially greenish, adaxially deep green, reniform, 1.5–4(–5) × 2.4–6(–7) cm, arcuate 7–9-veined with veins prominent abaxially and impressed adaxially, base cordate, apex rounded, often obtusely apiculate. Cauline leaves reniform, rarely ovate-cordate, smaller than basal leaves, equal or distal ones smaller, base cordate. Flower 2–3 cm in diam.; hypanthium conspicuous. Sepals brown punctate, ovate or oblong, ca. 7 × 5

mm; parallel veined, margin entire, apex rounded-obtuse. Petals white, purple veined, purple punctate, ovate or triangular-ovate, ca. 8 mm, base attenuate, margin long fimbriate throughout with fimbriae not turgid at apex. Anthers ellipsoid, ca. 2.5 mm; filaments ca. 6.5 mm; staminodes 4–5 mm, divided proximally into 3 filiform rays with globose glands at apex. Ovary superior, depressed ovoid or ovoid-globose; style ca. 2 mm; stigma 3-lobed. Capsule depressed globose, 3- or 4-valved. Seeds brown, glossy, oblong. Fl. Aug–Sep, fr. Sep.

Slopes, streamsides, moist roadsides; 1100–2000 m. S Anhui (Huang Shan), W Fujian (Jianning Xian), N and W Jiangxi (Lu Shan, Wugong Shan), NW Zhejiang (Tianmu Shan) [N India, Japan].

This species is used medicinally.

57. *Parnassia guilinensis* G. Z. Li & S. C. Tang, Guihaia 19: 341. 1999.

桂林梅花草 *gui lin mei hua cao*

Stems 1 or 2, 10–20 cm, usually with 1 leaf near middle. Basal leaves (7 or)8(–13); petiole 1–9 cm; leaf blade abaxially gray-white, adaxially green, ovate to oblong-ovate, (1–)2.5–4.5(–5.5) × (0.8–)1.5–2.5(–3) cm, inconspicuously 5–7-veined on both surfaces, base rounded or subtruncate, apex obtuse or acute. Cauline leaf sessile, semiamplexicaul, similar to basal ones but smaller. Flower ca. 2 cm in diam.; hypanthium inconspicuous. Sepals green, ovate, ca. 5 × 4 mm. Petals white, broadly obovate, ca. 1.2 cm × 8 mm, base with a claw ca. 3 mm, margin slightly undulate, apex emarginate. Anthers ellipsoid; filaments 2–7 mm; staminodes ca. 3 mm, 5-branched to middle, branches globose glandular at apex. Ovary superior, yellowish, ovoid, ca. 1.5 cm; styles ca. 1 mm; stigma slightly cleft. Fl. Aug.

• Streamsides; ca. 600 m. NE Guangxi (Xing'an Xian).

The present authors have seen no specimens of this species; the above description is based on the protologue.

58. *Parnassia gansuensis* T. C. Ku, Bull. Bot. Res., Harbin 7(1): 52. 1987.

甘肃梅花草 *gan su mei hua cao*

Stems 1–8, 12–30 cm, usually with 1 leaf near middle. Basal leaves 2 to several; petiole slender, 2–9 cm; leaf blade abaxially greenish, occasionally purple punctate, adaxially deep green, ovate-cordate, 1–2.2 × 1.3–2 cm, arcuate 5–7-veined abaxially, base deeply cordate, apex acute. Cauline leaf sessile, amplexicaul, similar to basal ones but smaller, base with rusty brown, filiform appendages sometimes adnate to blade. Flower 1.5–2.1 cm in diam.; hypanthium shortly turbinate. Sepals reflexed and persistent after anthesis, densely purple punctate, obovate or oblong, 3–6 × 3–4 mm, 1–3-veined, margin entire, apex rounded. Petals white, obovate-lanceolate or oblong-lanceolate, ca. 1 cm × 5

mm, base attenuate, margin fimbriate proximally, entire or undulate distally, apex rounded. Anthers ellipsoid, ca. 2 mm; filaments ca. 8 mm; staminodes 4–9 mm, divided almost to base into 5 filiform rays with globose glands at apex. Ovary slightly sunken into hypanthium, ovoid, ca. 5 mm; style 1.5–2 mm; stigma 3-lobed, lobes ovate. Capsule unknown. Fl. Jul–Aug.

- Streamsides, shaded and moist places; 1300–3500 m. S Gansu.

59. *Parnassia simaoensis* Y. Y. Qian, Bull. Bot. Res., Harbin 17: 305. 1997.

思茅梅花草 si mao mei hua cao

Stem 1, 8–22 cm, with 1 leaf proximally. Basal leaves 5–12; petiole 1–3 cm; leaf blade abaxially green, adaxially gray-green, conspicuously punctate on both surfaces, ovate-cordate, 0.7–2 × 0.6–1.9 cm, (5–)7-veined basally, base deeply cordate, apex acute. Cauline leaf sessile, amplexicaul, similar to basal ones but smaller, base often with several rusty brown appendages. Flower 1.8–2.2 cm in diam.; hypanthium shortly turbinate. Sepals reflexed and persistent after anthesis, pale green, brown punctate, ovate, 3–5 × 2–3 cm, 1–3-veined, margin fimbriate proximally, apex rounded. Petals white, brownish punctate, obovate or narrowly so, 6–12 × 3–6 mm, base attenuate into a claw ca. 1 mm, margin long fimbriate proximally, sparsely fimbriate to undulate distally, apex rounded. Anthers ellipsoid; 2–2.5 mm; staminodes 3.5–4 mm, divided for ca. 1/2 their length into 5 filiform rays, apex with globose glands. Ovary slightly sunken into hypanthium, ovoid, 3–4 mm; style 2–2.5 mm; stigma 3-lobed, lobes oblong. Capsule depressed trigonous when young. Fl. Sep–Nov, fr. Oct–Nov.

- Bogs; ca. 1400 m. S Yunnan (Simao Xian).

The present authors have seen no specimens of *Parnassia simaoensis*; the above description is based on the protologue, in which it was compared with *P. gansuensis*, which differs in having staminodes divided almost to the base.

60. *Parnassia longshengensis* T. C. Ku, Bull. Bot. Res., Harbin 7(1): 54. 1987.

龙胜梅花草 long sheng mei hua cao

Stems 5 or 6, 15–28 cm, with 1 leaf near middle or distally. Basal leaves often 6–8, forming a rosette; petiole slender, 9.5–13 cm; leaf blade abaxially greenish, adaxially deep green, broadly orbicular, 2–3 × 2.7–4.5 cm, arcuate 7–9-veined with veins prominent abaxially and inconspicuous adaxially, base subcordate, apex concave and apiculate. Cauline leaf sessile, semiamplexicaul, similar to basal ones but smaller, base often with several rusty brown appendages sometimes connate into small lamellae. Flower 2–2.3 cm in diam.; hypanthium very short. Sepals reflexed and persistent after anthesis, densely purple punctate, oblong, 6–7 × 3–5 mm, midvein conspicuous, margin entire, apex obtuse, sometimes apiculate. Petals white, densely purple punctate, obovate-lanceolate, 1–1.2 cm × 4–5 mm, 3–5-veined, base attenuate, margin long fimbriate

in proximal 2/3, undulate in distal 1/3. Anthers ellipsoid, ca. 2 mm; filaments ca. 7.5 mm; staminodes 4–5 mm, divided for up to 1/2 their length into 5 branches with globose glands at apex. Ovary slightly sunken into hypanthium, trigonous; style ca. 1.8 mm; stigma 3-lobed, lobes ovate. Capsule trigonous. Seeds brown, glossy, oblong. Fl. Jul–Aug, fr. Sep–Nov.

- Woods, moist places, rocks by streams. NE Guangxi (Longsheng Ge Zu Zizhixian, Xiang Xian).

In habit, this species somewhat resembles *Parnassia dilatata*, which differs in having smaller basal leaf blades, 1.2–2 × 1.4–2.5 cm, with shorter petioles, 2–4 cm, and flat, (3 or)4- or 5-lobed staminodes, with inconspicuous, globose glands at the apex.

61. *Parnassia perciliata* Diels, Bot. Jahrb. Syst. 29: 369. 1900.

厚叶梅花草 hou ye mei hua cao

Stems 3–5, robust, slightly curved, 18–30 cm, with 1 leaf distally. Basal leaves 3–5, forming a rosette; petiole robust, 8–19 cm; leaf blade sparsely purple punctate, densely so along veins, ovate-cordate, 3.5–6.5 × 2.5–5.5 cm, 7-veined adaxially with midvein prominent abaxially, base deeply cordate, apex acuminate, often apiculate. Cauline leaf sessile, semiamplexicaul, similar to basal ones but 2.2–4 × 2–3 cm, base often with rusty brown appendages sometimes connate into small lamellae. Flower 1.5–3 cm in diam.; hypanthium very short. Sepals reflexed and persistent after anthesis, brown punctate on both surfaces, oblong or oblong-lanceolate, ca. 1 cm × 5 mm, 1-veined, margin with sparse, rusty brown appendages proximally, entire distally, apex obtuse. Petals white, purple veined, sparsely purple punctate, obovate-oblong or oblong, 0.8–1.3 cm × 5–8 mm, 3-veined, base abruptly contracted into a claw, margin long fimbriate throughout, apex rounded or acute. Anthers ellipsoid, ca. 3 mm; filaments 6–8 mm; staminodes ca. 4 mm, branches 5(–7), with globose glands at apex. Ovary superior, ovoid; style ca. 1.8 mm; stigma 3-lobed, lobes short. Capsule unknown. Fl. Jul–Aug.

- Rocky places; ca. 1100 m. SE Sichuan (Nanchuan Xian).

62. *Parnassia davidii* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 237. 1885.

大卫梅花草 da wei mei hua cao

Stems 2 or 3, ca. 23 cm, with 1 leaf near middle or distally. Basal leaves 4 or 5; petiole 4–6 cm; leaf blade abaxially greenish, adaxially deep green, densely purple-brown punctate, reniform, ovate, or suborbicular, 1.8–2 × 2.2–2.5 cm, base subcordate, subtruncate, truncate, or rarely subcuneate, apex rounded, often apiculate. Cauline leaf sessile, semiamplexicaul, similar to basal ones but smaller, base often with several rusty brown appendages sometimes connate into small lamellae. Flower ca. 2.5 cm in diam.; hypanthium inconspicuous. Sepals adaxially densely purple-brown punctate, oblong, ca. 5 × 3 mm, margin entire, apex rounded. Petals white, densely purple-brown punctate, oblong, ca. 1.4 cm × 6.5 mm, conspicuously 3-veined, base cuneate, margin fimbriate, apex rounded. Anthers

oblong, ca. 2.2 mm; filaments ca. 8 mm; staminodes ca. 4.5 mm, 3–7-branched to middle. Ovary superior, depressed globose; style ca. 1.2 mm; stigma 3-lobed, lobes reflexed and persistent after anthesis. Capsule unknown. Fl. Jul–Aug.

• About 1200 m. Sichuan.

1a. Basal leaf blade reniform, base subcordate or subtruncate; staminodes 3–7-branched

1b. Basal leaf blade ovate or suborbicular, base truncate or subcuneate; staminodes (4 or)5-branched 62b. var. *arenicola*

62a. *Parnassia davidii* var. *davidii*

大卫梅花草(原变种) da wei mei hua cao (yuan bian zhong)

Basal leaf blade reniform, base subcordate or subtruncate. Staminodes 3–7-branched.

• S and W Sichuan

62b. *Parnassia davidii* var. *arenicola* Z. P. Jien, Acta Phytotax. Sin. 8: 255. 1963.

喜砂梅花草 xi sha mei hua cao

Basal leaf blade ovate or suborbicular, base truncate or subcuneate. Staminodes (4 or)5-branched.

• About 1200 m. E Sichuan (Wan Xian).

63. *Parnassia palustris* Linnaeus, Sp. Pl. 1: 273. 1753.

梅花草 mei hua cao

Stems 2–4(–7), 12–20(–30) cm, usually with 1 leaf near middle. Basal leaves 3 to numerous; petiole 3–6(–8) cm; leaf blade abaxially greenish, often purple punctate, adaxially deep green, ovate or long ovate, occasionally triangular-ovate, 1.5–3 × 1–2.5 cm, base subcordate, apex rounded-obtuse or acuminate, often apiculate. Cauline leaf sessile, semiamplexicaul, similar to basal leaves, base often with several rusty brown appendages. Flower 2.2–3(–3.5) cm in diam.; hypanthium inconspicuous. Sepals densely purple-brown punctate, elliptic or oblong, 5–8 × 3–5 mm, margin entire, apex obtuse. Petals white, often purple punctate, broadly ovate or obovate, 1–1.5 (–1.8) × 0.7–1(–1.3) cm, base with a short claw, margin entire or occasionally

inconspicuously erose, apex rounded-obtuse or shortly acuminate. Anthers ellipsoid, ca. 3 mm; filaments 2.2–7 mm; staminodes to 1 cm, divided into (7–)9–21 filiform rays with globose glands at apex. Ovary superior, ovoid; style very short; stigma 4-lobed. Capsule ovoid. Seeds brown, glossy, oblong. Fl. Jul–Sep, fr. Oct. $2n = 18$, (27), 36.

Moist grassy slopes, streamsides, shaded moist places in valleys, grassy fields; 1200–2200 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Shanxi, N Xinjiang [Japan, Kazakstan, Korea, Mongolia, Russia; Europe, North America].

1a. Staminodes (7–)9–11(–13)-branched 63a. var. *palustris*

1b. Staminodes 13–21-branched 63b. var. *multisetata*

63a. *Parnassia palustris* var. *palustris*

梅花草(原变种) mei hua cao (yuan bian zhong)

Parnassia mucronata Siebold & Zuccarini; *P. palustris* f. *nana* T. C. Ku.

Staminodes (7–)9–11(–13)-branched.

Moist grassy slopes, streamsides, shaded moist places in valleys; 1600–2000 m. N Xinjiang [Kazakstan, Russia; Europe, North America].

63b. *Parnassia palustris* var. *multisetata* Ledebour, Fl. Ross. 1: 263. 1842.

多枝梅花草 duo zhi mei hua cao

Parnassia multisetata (Ledebour) Fernald.

Staminodes 13–21-branched.

Shaded places in valleys, streamsides, grassy fields; 1200–2200 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Shanxi [Japan, Korea, Russia].

Losina-Losinskaja (in Komarov, Fl. URSS 9: 217. 1939) divided *Parnassia palustris* into four forms. However, after examining a large number of Chinese specimens of this species, the present authors have found that *P. palustris* is highly variable in many morphological characters, e.g., height of stem, number, shape, and size of basal leaves, position, shape, and size of cauline leaf, punctate marking, shape, and venation of sepals and petals, and number and length of staminode branches. It is not possible to classify Losina-Losinskaja's forms according to these characters. On the other hand, the present authors accept the two varieties of *P. palustris* described by Ledebour (Fl. Ross. 1: 262. 1842) based on the number of staminode branches. In the present account, according to Ledebour's delimitation, the population in Xinjiang is identified as var. *palustris* and the populations in N and NE China as var. *multisetata*.

16. KIRENGESHOMA Yatabe, Bot. Mag. (Tokyo) 4: 433. 1890.

黄山梅属 huang shan mei shu

Huang Shumei (黄淑美 Hwang Shu-mei); Bruce Bartholomew

Herbs perennial. Rhizomes robust, short. Stems simple, erect, 4-angled. Leaves opposite, petiolate, exstipulate; leaf blade palmately lobed, papery. Inflorescences terminal or axillary, cymose. Flowers bisexual. Calyx tube adnate to ovary; lobes 5. Petals 5, inserted at base of calyx tube, alternate with calyx lobes. Stamens 15, 3-seriate, outermost series longest, innermost one shortest; filament slightly adnate to petal base; anthers medifixed, dehiscing laterally. Ovary semi-inferior, 3- or 4-loculed; placentation axile; ovules numerous, many seriate, flattened. Styles 3 or 4, free, filiform; stigma capitate. Fruit a capsule, dehiscing loculicidally. Seeds numerous, flat, surrounded by an oblique wing; endosperm fleshy; embryo straight; cotyledons ovate.

Two species: China, Japan, Korea; one species in China.

1. **Kirengeshoma palmata** Yatabe, Bot. Mag. (Tokyo) 4: 1. 1890.

黄山梅 huang shan mei

Herbs 0.8–1.2 m tall. Stems purplish. Petiole 1–25 cm; leaf blade near base of stem orbicular, 10–20 × 10–20 cm, palmately veined, base cordate, margin 3–10-lobed; leaf blade near apex of stem ovate to lanceolate, 3–7 × 3–7 cm, white appressed hairy on both surfaces, base subcordate, margin slightly lobed, apex acuminate. Inflorescences (1–)3-flowered. Flowers at center of

inflorescence largest, ebracteolate; lateral flowers with a linear bracteole; pedicel 1–3(–4) cm. Calyx tube hemispheric, 7–10 mm in diam.; lobes deltoid. Petals 5, yellow, irregularly oblong-obovate to subovate, 2.5–3.5 × 10–15 mm. Outer series of stamens equaling petals; inner series shorter. Style ca. 2 cm. Capsule broadly ellipsoid to subglobose, ca. 1.3 cm in diam., smooth; style persistent. Seeds pale yellow, 7–10 × 3–5 mm. Fl. Apr–Mar, fr. May–Aug.

Moist forests in valleys; 700–1800 m. S Anhui (Huang Shan), NW Zhejiang (Tianmu Shan) [Japan].

17. DEUTZIA Thunberg, Nov. Gen. Pl. 19. 1781.

溲疏属 sou shu shu

Huang Shumei (黄淑美 Hwang Shu-mei); Hideaki Ohba; Shinobu Akiyama

Neodeutzia Small.

Shrubs stellate hairy. Branchlets opposite; buds enclosed by imbricate scales. Leaves opposite, exstipulate, subdeciduous. Inflorescences racemose, paniculate, corymbose, or cymose, rarely a solitary flower. Calyx tube adnate to ovary, campanulate, 5-lobed. Petals 5, induplicate, valvate, or imbricate. Stamens 10(–15), 2-seriate; filaments subulate, flat, or dilated and apex 2-dentate; anthers shortly stalked, subglobose. Ovary inferior, rarely subinferior, 3–5-loculed; ovules numerous, in many series on fleshy placenta. Styles 3(–5), free; stigma terminal or decurrent. Fruit a capsule, subglobose, 3(–5)-valved, dehiscent loculicidally or between styles. Seeds numerous, oblong, compressed; testa membranous, reticulate, apex winged; embryo borne in middle of fleshy endosperm.

About 60 species: warm temperate regions of the N hemisphere; 50 species (41 endemic, two introduced) in China.

Several species are cultivated as ornamentals.

1a. Petals imbricate, usually broadly ovate, obovate, or orbicular.

2a. Filaments subulate, toothless or only inner ones dentate; petals white, rarely pink.

3a. Plants glabrous, except bud scales and leaf blades sometimes stellate hairy adaxially 1. *D. glabrata*

3b. Plants ± stellate hairy.

4a. Leaf blade adaxially 5(or 6)-rayed stellate hairy, abaxially 6–12-rayed stellate hairy; filaments subulate,

toothless or only inner 2 dentate; petals white 2. *D. parviflora*

4b. Leaf blade adaxially 4- or 5(or 6)-rayed stellate hairy, abaxially 5–8-rayed stellate hairy, central rays usually long; filaments subulate, toothless; petals pink 3. *D. mollis*

2b. Outer filaments dentate, inner ones variable, usually apex acuminate or 2-lobed; petals pink, rarely white.

5a. Teeth of outer filaments subequaling or longer than anther stalks; inflorescences 5–15(–21)-flowered; stellate

hairs of inflorescences and leaf blade veins without papilliform base.

6a. Leaf blade abaxially glaucous, glabrous or 3–5-rayed stellate hairy; petals white or pinkish at apex; branchlets and inflorescences glabrous 4. *D. hypoglauca*

6b. Leaf blade abaxially greenish, 5- or 6(or 7)-rayed stellate hairy; petals pink; branchlets and inflorescences stellate hairy.

7a. Pedicel slender, 1–2 cm; inflorescences 5–10-flowered; leaf blade oblong or ovate-oblong, rarely lanceolate, apex acute; flowering branchlets usually 4-leaved 5. *D. rubens*

7b. Pedicel robust, 8–12 mm; inflorescences 11–21-flowered; leaf blade ovate-lanceolate or elliptic-lanceolate, apex acuminate; flowering branchlets usually 6-leaved 6. *D. muliensis*

5b. Teeth of outer filaments shorter than anther stalks; inflorescences 15–80-flowered; stellate hairs of inflorescences and leaf blade veins with papilliform base.

8a. Outer anther stalks ca. 2 mm, ca. 1/2 as long as filaments; inner anther stalks borne between filament

teeth 9. *D. bomiensis*

8b. Outer anther stalks 1–1.5 mm, less than 1/2 as long as filaments; inner anther stalks borne at middle of

filaments abaxially.

9a. Leaf blade abaxially sparsely 6–8-rayed stellate hairy, hairs of 2 types (minute and larger ones)

..... 7. *D. compacta*

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- 9b. Leaf blade abaxially densely 8–10(–15)-rayed stellate hairy, hairs uniform 8. *D. hookeriana*
- 1b. Petals induplicate or valvate, oblong or ovate-oblong, rarely obovate.
- 10a. Filaments all 2-dentate at apex, teeth not reaching anthers or, if longer, horizontal or recurved, falcate; anthers borne between filament teeth.
- 11a. Flowering branchlets to 4 cm; inflorescences 1–3(–5)-flowered; filament teeth horizontal or recurved, falcate, exceeding anthers.
- 12a. Leaf blade abaxially densely 7–11-rayed stellate hairy, indumentum continuous 20. *D. grandiflora*
- 12b. Leaf blade abaxially sparsely 5- or 6(or 7)-rayed stellate hairy, indumentum discontinuous 21. *D. baroniana*
- 11b. Flowering branchlets more than 4 cm; inflorescences more than 5-flowered; filament teeth not reaching anthers.
- 13a. Inflorescences cymose; calyx lobes subequalling or longer than tube, rarely shorter.
- 14a. Leaf blade abaxially greenish gray, elliptic-lanceolate or oblong-lanceolate, 5–10 × 2–3 cm; filament teeth acute at apex 18. *D. discolor*
- 14b. Leaf blade abaxially gray, ovate or elliptic-ovate, 3–5 × 1.5–2 cm; filaments teeth obtuse at apex 19. *D. silvestrii*
- 13b. Inflorescences paniculate, racemose, or cymose paniculate; calyx lobes ca. 1/2 as long as calyx tube.
- 15a. Leaf blade adaxially 3- or 4-rayed stellate hairy, abaxially 4- or 5(or 6)-rayed stellate hairy.
- 16a. Inflorescences slender, racemose or narrowly paniculate, glabrous; calyx sparsely hairy; filaments 2-dentate at apex or outer ones toothless 10. *D. gracilis*
- 16b. Inflorescences robust, cymose paniculate, hairy; calyx densely hairy; filaments all 2-dentate at apex.
- 17a. Petiole less than 2 mm on flowering branchlets or almost absent; hairs on leaf blade veins with long central rays and papilliform base 11. *D. faberi*
- 17b. Petiole 2–4 mm on flowering branchlets; hairs on leaf blade veins with neither long central rays nor papilliform base 12. *D. taiwanensis*
- 15b. Leaf blade adaxially 4- or 5(–7)-rayed stellate hairy, abaxially 10–22-rayed stellate hairy, rarely glabrous on both surfaces or only abaxially sparsely stellate hairy.
- 18a. Flowering branchlets glabrous; leaf blade abaxially glabrous, or if hairy then rather sparsely so 13. *D. glauca*
- 18b. Flowering branchlets stellate hairy; leaf blade hairy on both surfaces, abaxially more densely so.
- 19a. Leaf blade abaxially grayish green, densely stellate hairy, indumentum continuous.
- 20a. Petiole 5–15 mm on flowering branchlets; leaf blade adaxially 6–12-rayed stellate hairy; petals 10–12 mm; capsule 6–7 mm in diam. 14. *D. pulchra*
- 20b. Petiole 1–2 mm on flowering branchlets; leaf blade adaxially 4–7(or 8)-rayed stellate hairy; petals 5–8 mm; capsule 4–5 mm in diam. 15. *D. ningpoensis*
- 19b. Leaf blade abaxially green, sparsely stellate hairy, indumentum discontinuous.
- 21a. Calyx yellowish brown stellate hairy; calyx tube ca. 2.5 × 2 mm, lobes ovate 16. *D. crenata*
- 21b. Calyx grayish green stellate hairy; calyx tube ca. 3 × 4 mm, lobes deltoid 17. *D. schneideriana*
- 10b. Only outer filaments 2-dentate at apex, teeth ± level with or exceeding anthers, rarely shorter; inner filaments not 2-dentate at apex; anthers borne at middle or near apex of filaments abaxially.
- 22a. Capsule globose or subglobose, with persistent, incurved calyx lobes.
- 23a. Leaf blade adaxially reticulate rugose when dry 44. *D. crassifolia*
- 23b. Leaf blade adaxially not rugose when dry.
- 24a. Leaf blade abaxially grayish, densely 8–16-rayed stellate hairy, indumentum continuous 45. *D. multiradiata*
- 24b. Leaf blade abaxially greenish or grayish green, sparsely 5–9(or 10)-rayed stellate hairy, indumentum discontinuous.
- 25a. Leaf blade glossy, leathery, margin thorny serrate 46. *D. coriacea*
- 25b. Leaf blade not glossy, papery or membranous, margin serrulate.
- 26a. Stellate hairs of branchlets and leaf blades with long central rays; calyx lobes ovate or lanceolate; petiole 1–3 mm 47. *D. pilosa*

- 26b. Stellate hairs of branchlets and leaf blades without long central rays, except those on leaf blade
veins; calyx lobes deltoid or ovate deltoid; petiole 3–5 mm.
- 27a. Leaf blade narrowly lanceolate, 2.5–4.5 × 0.4–0.6(–1.2) cm, base rounded 48. *D. esquirolii*
- 27b. Leaf blade ovate, ovate-oblong, or -lanceolate, 3–7(–12) × 1.5–3 cm, base rounded or broadly cuneate.
- 28a. Stellate hairs of abaxial leaf surface with papilliform base 50. *D. setchuenensis*
- 28b. Stellate hairs of abaxial leaf surface without papilliform base.
- 29a. Leaf blade abaxially densely grayish green stellate hairy, reticulate veins conspicuously elevated; petals 3–4.5 mm 49. *D. cinerascens*
- 29b. Leaf blade abaxially sparsely yellow-green or greenish stellate hairy, reticulate veins inconspicuous; petals 5–12 mm 50. *D. setchuenensis*
- 22b. Capsule hemispheric, rarely obconical or campanulate, with persistent, erect, rarely recurved calyx lobes.
- 30a. Calyx lobes shorter than tube.
- 31a. Inflorescences 3–5(–11)-flowered; leaf blade abaxially greenish, sparsely 5–8(–10)-rayed stellate hairy.
- 32a. Inflorescences corymbose cymes, pedicels 1–2 cm; teeth of outer filaments exceeding anthers 23. *D. cymuligera*
- 32b. Inflorescences cymes, pedicels 3–5 mm; teeth of outer filaments ± level with anthers 22. *D. rehderiana*
- 31b. Inflorescences 6–25-flowered; leaf blade abaxially grayish green, densely 8–14-rayed stellate hairy.
- 33a. Styles slightly longer than stamens; inner anthers borne near apex of filaments abaxially.
- 34a. Petals pink; calyx tube 3.5–4 × 4–4.5 mm, lobes deltoid or broadly ovate; styles 4(or 5) 31. *D. wardiana*
- 34b. Petals white; calyx tube ca. 3 × 2.5 mm, lobes ovate or ovate-oblong; styles 3(or 4).
- 35a. Capsule hemispheric, persistent calyx lobes erect; margin of leaf blade regularly serrulate 29. *D. staminea*
- 35b. Capsule obconical or obcampanulate, persistent calyx lobes recurved; margin of leaf blade alternately coarsely serrate and serrulate 30. *D. crassidentata*
- 33b. Styles shorter than or subequaling stamens; inner anthers borne at middle of filaments abaxially, rarely between teeth.
- 36a. Leaves dimorphic, suborbicular on basal flowering branchlets; petals 13–14 mm 28. *D. heterophylla*
- 36b. Leaves monomorphic, not suborbicular on basal flowering branchlets; petals 6–12 mm.
- 37a. Leaf blade subleathery; petals narrowly elliptic, obovate-oblong, or oblong, ca. 3 × as long as wide.
- 38a. Apex of outer filaments shouldered, subrounded, or 2-lobed with lobes not reaching anthers 24. *D. obtusilobata*
- 38b. Apex of outer filaments 2-dentate, teeth oblong, ± level with anthers 25. *D. monbeigii*
- 37b. Leaf blade papery; petals broadly elliptic or obovate, ca. 2 × as long as wide.
- 39a. Petals 10–12 × 5–6 mm; stellate hairs of leaf blade with long central rays 26. *D. yunnanensis*
- 39b. Petals ca. 8 × 4 mm; stellate hairs leaf of blade without long central rays 27. *D. breviloba*
- 30b. Calyx lobes subequaling or longer than tube.
- 40a. Styles shorter than inner stamens; petals 4.5–7 mm.
- 41a. Leaf blade abaxially gray-white, densely stellate hairy, indumentum continuous; calyx lobes narrowly lanceolate, base less than 1 mm wide 32. *D. albida*
- 41b. Leaf blade abaxially greenish, sparsely stellate hairy, indumentum discontinuous; calyx lobes lanceolate, base ca. 1 mm wide 33. *D. taibaiensis*
- 40b. Styles subequaling or longer than stamens; petals more than 7 mm.
- 42a. Stellate hairs of branchlets and inflorescences with papilliform base.
- 43a. Leaf blade 3–10 × 1.5–3 cm, abaxially 5–9(–11)-rayed stellate hairy, indumentum discontinuous; calyx lobes subequaling tube, leathery 34. *D. aspera*
- 43b. Leaf blade 1–2.5 × 0.7–1.4 cm, abaxially densely stellate hairy, indumentum continuous; calyx lobes longer than tube, membranous 35. *D. glaucophylla*
- 42b. Stellate hairs of branchlets and inflorescences without papilliform base.
- 44a. Leaf blade 2–5(–8) × 0.6–2 cm; inflorescences 3–4(–5) cm in diam.

- 45a. Calyx lobes lanceolate, membranous; leaf blade abaxially greenish, indumentum discontinuous 36. *D. glomeruliflora*
- 45b. Calyx lobes subulate, subleathery; leaf blade abaxially grayish green, indumentum continuous 37. *D. subulata*
- 44b. Leaf blade (3–)5–12(–15) × (1–)1.5–3 cm; inflorescences 4.5–8 cm in diam.
- 46a. Calyx lobes 5–8 mm, ca. 2 × as long as tube, membranous 43. *D. calycosa*
- 46b. Calyx lobes 2.5–5 mm, subequaling or slightly longer than tube, leathery.
- 47a. Leaf blade papery or thinly leathery, abaxially sparsely stellate hairy.
- 48a. Leaf blade oblong-lanceolate or lanceolate, adaxially 4–6-rayed stellate hairy, abaxially yellowish brown, 7–9(–13)-rayed stellate hairy, indumentum appressed . 41. *D. nanchuanensis*
- 48b. Leaf blade broadly ovate-lanceolate or ovate-oblong, adaxially 4- or 5-rayed stellate hairy, abaxially greenish, 4–8(–10)-rayed stellate hairy, indumentum not appressed 42. *D. purpurascens*
- 47b. Leaf blade leathery, abaxially densely stellate hairy.
- 49a. Leaf blade ovate; flowering branchlets 18–22 cm; petals white 40. *D. zhongdianensis*
- 49b. Leaf blade lanceolate or elliptic-lanceolate; flowering branchlets 5–15 cm; petals purplish.
- 50a. Leaf blade adaxially 4–6(or 7)-rayed stellate hairy, abaxially 8–12-rayed stellate hairy, hairs along veins with long central rays 38. *D. longifolia*
- 50b. Leaf blade adaxially 6–8-rayed stellate hairy, abaxially 12–16-rayed stellate hairy, hairs without long central rays 39. *D. squamosa*

1. *Deutzia glabrata* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 22: 433. 1904.

光萼溲疏 *guang e sou shu*

Shrubs ca. 3 m tall. Flowering branchlets red-brown, 6–8 cm, 4–6-leaved, glabrous. Petiole 2–4 mm or very short to absent; leaf blade ovate to ovate-lanceolate, 5–10 × 2–4 cm, membranous, abaxially glabrous, adaxially glabrous or 3- or 4(or 5)-rayed stellate hairy, veins in 3 or 4 pairs, base broadly cuneate or subrounded, margin serrulate, apex acuminate. Inflorescences corymbose, 3–8 cm in diam., 5–20(–30)-flowered, glabrous; pedicels 1–1.5 cm. Calyx tube cupular, ca. 2.5 × 3 mm, glabrous; lobes ovate-deltoid, ca. 1 mm, apex obtuse. Petals imbricate, white, orbicular or broadly obovate, ca. 6 × 4 mm, base attenuate, apex obtuse. Stamens 4–5 mm; filaments subulate. Styles 3, subequaling stamens. Capsule globose, 4–5 mm, glabrous. Fl. Jun–Jul, fr. Aug–Sep. Mixed forests, thickets, mountain slopes; 300–1300 m. Heilongjiang, Henan, ?Hubei, Hunan, Jilin, ?Liaoning, Shaanxi, Shandong [Korea, Russia].

- 1a. Leaf blade ovate or ovate-lanceolate, adaxially sometimes 3- or 4(or 5)-rayed stellate hairy; petiole 2–4 mm 1a. var. *glabrata*
- 1b. Leaf blade broadly ovate-lanceolate, glabrous on both surfaces; petiole very short to absent 1b. var. *sessilifolia*

1a. *Deutzia glabrata* var. *glabrata*

光萼溲疏(原变种) *guang e sou shu* (*yuan bian zhong*)
Deutzia fauriei H. Léveillé; *D. glaberrima* Koehne.
Petiole 2–4 mm; leaf blade ovate or ovate-lanceolate, adaxially sometimes 3- or 4(or 5)-rayed stellate hairy. Fl. Jun–Jul, fr. Aug–Sep.

Mixed forests, mountain slopes; 300–1300 m. Heilongjiang, Henan, Jilin, Shandong [Korea, Russia].

1b. *Deutzia glabrata* var. *sessilifolia* (Pampanini) Zaikonnikova, Deitsii-Dekorat Kust. [Ornamental Trees & Shrubs] (Monogr. *Deutzia*) 21. 1966.

无柄溲疏 *wu bing sou shu*

Deutzia sessilifolia Pampanini, Nuovo Giorn. Bot. Ital., n.s., 18: 119. 1911.

Petiole very short to absent; leaf blade broadly ovate-lanceolate, glabrous on both surfaces.

• Thickets, mountain slopes. Henan, ?Hubei, Hunan, Shaanxi, Shandong.

2. *Deutzia parviflora* Bunge, Enum. Pl. China Bor. 31. 1833.
小花溲疏 *xiao hua sou shu*

Shrubs ca. 2 m tall. Flowering branchlets 3–8 cm, 4–6-leaved, stellate hairy. Petiole grayish brown or gray, 3–8 mm; leaf blade elliptic-ovate or ovate-lanceolate, 3–6(–10) × 2–4.5 cm, papery, abaxially 6–12-rayed stellate hairy, hairs along midvein usually with long central rays, adaxially 5(or 6)-rayed stellate hairy, base broadly cuneate or rounded, margin serrulate, apex acute or acuminate. Inflorescences corymbose, 2–5 cm in diam., usually many flowered; peduncle villous or stellate hairy; pedicels 2–12 mm. Calyx tube cupular, ca. 3.5 × 3 cm, densely stellate hairy; lobes deltoid, shorter than tube, apex obtuse. Petals imbricate, white, broadly ovate or suborbicular, 2.5–7.5 mm, hairy on both surfaces, base attenuate, apex obtuse. Outer stamens 4–4.5 mm; inner stamens 3–4 mm; filaments subulate, toothless or inner ones 2-dentate, teeth (if present) not reaching anthers; anthers stalked, globose. Styles 3, shorter than stamens. Capsule hemispheric, 2–3 mm in diam. Fl. Apr–Jun, fr. Jul–Oct.

Mixed forests and thickets, mountain slopes, valleys; 300–1800 m. Gansu, Hebei, Heilongjiang, Henan, Hubei, Jilin, Liaoning, Nei Mongol, Shaanxi, Shanxi [Korea, Russia].

- 1a. Stellate hairs of leaf blade abaxial midvein without long central rays 2c. var. *amurensis*
 1b. Stellate hairs of leaf blade abaxial midvein with long central rays.
 2a. Petals 2.5–3.5 mm; filaments all toothless 2b. var. *micrantha*
 2b. Petals (3–)4–7.5 mm; filaments all toothless or inner ones 2-dentate 2a. var. *parviflora*

2a. *Deutzia parviflora* var. *parviflora*

小花溲疏(原变种) xiao hua sou shu (yuan bian zhong)

Deutzia corymbosa R. Brown ex G. Don var. *parviflora* (Bunge) C. K. Schneider; *D. parviflora* var. *mongolica* Franchet; *D. parviflora* var. *ovatifolia* Rehder.

Stellate hairs of leaf blade abaxial midvein with long central rays. Inflorescences many flowered. Petals (3–)4–7.5 mm. Filaments all toothless or inner ones 2-dentate. Fl. Apr–Jun, fr. Aug–Oct.

Mixed forests, mountain slopes, valleys; 1000–1500 m. Gansu, Hebei, Henan, Hubei, Jilin, Liaoning, Nei Mongol, Shaanxi, Shanxi [Korea, Russia].

2b. *Deutzia parviflora* var. *micrantha* (Engler) Rehder, J. Arnold Arbor. 5: 157. 1924.

碎花溲疏 sui hua sou shu

Deutzia micrantha Engler in Diels, Bot. Jahrb. Syst. 36 (Beibl. 82): 51. 1905.

Stellate hairs of leaf blade abaxial midvein with long central rays. Inflorescences many flowered. Petals 2.5–3.5 mm. Filaments all toothless. Fl. Jun, fr. Jul–Sep.

• Mixed thickets, valleys; 1100–1800 m. Hebei, Henan, Shaanxi, Shanxi.

2c. *Deutzia parviflora* var. *amurensis* Regel, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 4(4): 63. 1861.

东北溲疏 dong bei sou shu

Deutzia amurensis (Regel) Airy Shaw; *D. parviflora* var. *bungei* Franchet.

Stellate hairs of leaf blade abaxial midvein without long central rays. Inflorescences few flowered. Petals 5–7.5 mm. Filaments all toothless or inner ones 2-dentate. Fl. Jun, fr. Sep.

• Mixed forests, thickets, mountain slopes; 300–800 m. Jilin, Liaoning.

3. *Deutzia mollis* Duthie, Gard. Chron., ser. 3, 40: 238. 1906.

钻丝溲疏 zuan si sou shu

Shrubs 1–2 m tall. Flowering branchlets red-brown, 6–12 cm, 4–6-leaved, sparsely stellate hairy. Petiole 3–6 mm; leaf blade ovate-lanceolate or broadly lanceolate, 5–10 × 2.5–5.5 cm, papery, abaxially densely 5–8-

rayed stellate hairy, hairs with long central rays, adaxially 4- or 5(or 6)-rayed stellate hairy, hairs usually with long central rays, indumentum continuous, base broadly cuneate or subrounded, margin serrulate, apex acute or acuminate. Inflorescences corymbose, 5–8 cm in diam., 60–100-flowered; pedicels ca. 1 mm. Calyx tube ca. 3.5 × 3 mm; lobes ovate or broadly so, shorter than tube. Petals imbricate, pink, broadly obovate, ca. 4.5 × 4 mm. Stamens 4–5 mm; filaments subulate, toothless; anthers shortly stalked. Styles 3, subequaling stamens. Capsule hemispheric, ca. 5 mm in diam. Fl. Apr–Aug.

• Thickets, cliffs, mountain slopes; 1000–1800 m. W Hubei (Xingshan Xian).

4. *Deutzia hypoglauca* Rehder in Sargent, Pl. Wilson. 1: 24. 1911.

粉背溲疏 fen bei sou shu

Shrubs ca. 2.5 m tall. Branchlets red-brown, 8–14 cm, 4–8-leaved, glabrous. Petiole purplish, 2–5 mm; leaf blade abaxially green or grayish green and glaucous, ovate- or elliptic-lanceolate, 3–9 × 0.7–2.5 cm, subpapery, abaxially glabrous or 3- or 4-rayed stellate hairy, adaxially 3–5-rayed stellate hairy, base rounded to broadly cuneate, margin serrulate, apex acuminate. Cymes 3–6 cm in diam., 5–15-flowered, glabrous; pedicels 0.5–1.5 cm. Calyx tube ca. 2.5 mm in diam.; lobes broadly ovate, shorter than tube. Petals imbricate, white or pinkish apically, ovate, 6–10 × 5–6 mm. Outer stamens 6–7 mm; filaments 2-dentate at apex, teeth ± level with anthers; anthers borne between filament teeth, stalked. Inner stamens 5–6 mm; filaments obtuse or 2-lobed at apex; anthers borne near middle of filaments abaxially. Styles 3, 6–7 mm. Capsule hemispheric, 3–4 mm in diam. Fl. Mar–Jul, fr. Aug–Oct. $2n = 26^*$.

• Dense forests, thickets, mountain slopes; 1000–2500 m. Gansu, W Hubei, S Shaanxi, Sichuan.

- 1a. Leaf blade abaxially grayish green, glaucous, glabrous; corolla 1.5–2 cm in diam. 4a. var. *hypoglauca*
 1b. Leaf blade abaxially green, 3- or 4-rayed stellate hairy; corolla less than 1 cm in diam. 4b. var. *shawiana*

4a. *Deutzia hypoglauca* var. *hypoglauca*

粉背溲疏(原变种) fen bei sou shu (yuan bian zhong)

Leaf blade abaxially grayish green, glaucous, glabrous. Corolla 1.5–2 cm in diam. Fl. Apr–Jul, fr. Aug–Oct.

• Thickets, mountain slopes; 1000–2200 m. Gansu, W Hubei, S Shaanxi, Sichuan.

4b. *Deutzia hypoglauca* var. *shawiana* (Zaikonnikova) Zaikonnikova, Deitsii-Dekorats. Kust. [Ornamental Trees & Shrubs] (Monogr. *Deutzia*) 23. 1966.

青城溲疏 qing cheng sou shu

Deutzia shawiana Zaikonnikova, Bot. Zhurn. (Moscow & Leningrad) 47: 207. 1962; *D. hypoglauca* var. *viridissima* S. M. Hwang.

Leaf blade abaxially green, 3- or 4-rayed stellate hairy. Corolla less than 1 cm in diam. Fl. Mar–May.

• Dense forests; 1800–2500 m. Sichuan.

5. *Deutzia rubens* Rehder in Sargent, Pl. Wilson. 1: 13. 1911.
粉红溲疏 fen hong sou shu

Shrubs ca. 1 m tall. Flowering branchlets red-brown, 4–6 cm, ca. 4-leaved, stellate hairy. Petiole 2–4 mm; leaf blade abaxially greenish, oblong or ovate-oblong, rarely lanceolate, 4–7 × 1.5–3 cm, membranous, abaxially 5- or 6(or 7)-rayed stellate hairy, adaxially 4- or 5-rayed stellate hairy, base broadly truncate or subrounded, margin serrulate, apex acute. Inflorescences cymose, 5–10-flowered, stellate hairy; pedicels slender, 1–2 cm. Calyx tube ca. 4.5 × 4 mm; lobes purple, ovate. Petals imbricate, pink, obovate, 5–10 × 7–8 mm. Outer stamens ca. 7 mm; filaments 2-dentate at apex; anthers borne between filament teeth, shortly stalked. Inner stamens shorter than outer ones; filaments rounded or emarginate at apex; inner anthers borne at middle of filaments abaxially. Styles 3, subequaling stamens. Capsule 4–5 mm in diam. Fl. Apr–Jul, fr. Aug–Oct.

• Thickets, mountain slopes; 2100–3000 m. Gansu, Hubei, Shaanxi, Sichuan.

6. *Deutzia muliensis* S. M. Hwang, Acta Bot. Austro Sin. 8: 1. 1992.

木里溲疏 mu li sou shu

Shrubs ca. 1.5 m tall. Flowering branchlets brown, 4–9 cm, ca. 6-leaved, sparsely stellate hairy. Petiole 1–2 mm; leaf blade ovate- or elliptic-lanceolate, 1.5–4.5 × 0.8–1.5 cm, papery, abaxially 5- or 6-rayed stellate hairy, adaxially 4- or 5-rayed stellate hairy, base rounded or subtruncate, margin serrulate, apex acuminate. Corymbose cymes 3–5 cm in diam., 11–21-flowered; pedicels robust, 0.8–1.2 cm. Calyx tube ca. 3 × 3.5 mm; lobes ovate-deltoid, shorter than tube. Petals imbricate, pink, broadly obovate or suborbicular, ca. 0.7 × 1.5 cm. Outer stamens 4–5 mm; filaments 2-dentate at apex, teeth ± level with or exceeding anthers; anthers stalked, globose. Inner stamens shorter than outer ones; filaments obtuse at apex; anthers borne at middle of filaments abaxially. Styles 3, subequaling stamens. Capsule unknown. Fl. Jul.

• Mixed forest margins; ca. 3000 m. Sichuan.

7. *Deutzia compacta* Craib, Bull. Misc. Inform. Kew 1913: 264. 1913.

密序溲疏 mi xu sou shu

Shrubs 2–3 m tall. Flowering branchlets brown or reddish brown, 10–12 cm, 6–10(–12)-leaved, stellate hairy. Petiole ca. 1 mm; leaf blade ovate-lanceolate or oblong-lanceolate, 1.5–6.5 (–10) × 0.8–2.5(–4) cm, papery, abaxially 6–8-rayed stellate hairy, hairs of 2 types (numerous, minute, contiguous ones and less numerous, larger ones with long central rays when along leaf veins), base rounded or broadly cuneate, margin serrulate, apex acute or acuminate.

Inflorescences terminal, corymbose, 5–10 cm in diam., 20–80-flowered, stellate hairy, hairs with papilliform base; pedicels 3–10 mm. Calyx tube ca. 2.5 × 2 mm; lobes broadly ovate, ca. 1.5 mm. Petals imbricate, pink, broadly obovate or suborbicular, ca. 6 × 5 mm. Outer stamens 4–5 mm; filaments 2-dentate at apex; anthers globose, stalk 1–1.5 mm. Inner stamens 3–4 mm; filaments 2-lobed or acuminate at apex; anther stalks borne at middle of filaments abaxially. Styles 3 or 4, ca. 4 mm. Capsule hemispheric, ca. 3 mm in diam. Fl. Apr–May, fr. Jun–Jul. $2n = 26^*$.

• Mixed forest margins, mountain slopes; 2000–4200 m. S Xizang, NW Yunnan.

8. *Deutzia hookeriana* (C. K. Schneider) Airy Shaw, Bull. Misc. Inform. Kew 1934: 180. 1934.

西藏溲疏 xi zang sou shu

Deutzia corymbosa R. Brown ex G. Don var.

hookeriana C. K. Schneider, Mitt. Deutsch. Dendrol.

Ges. 13: 184. 1904; *D. compacta* Craib var.

multiradiata J. T. Pan; *D. corymbosa* var. *purpurascens*

C. K. Schneider; *D. corymbosa* var. *yunnanensis*

Franchet ex Rehder; *D. hookeriana* var. *macrophylla* S.

M. Hwang; *D. hookeriana* var. *ovatifolia* S. M. Hwang.

Shrubs ca. 2 m tall. Flowering branchlets reddish brown,

5–15 cm, 6–8-leaved, stellate hairy, hairs with conical,

papilliform base. Petiole 1–4 mm; leaf blade ovate- or

oblong-lanceolate, elliptic- or oblong-ovate, or ovate,

or 2–8 × 1–4 cm, papery, abaxially densely 8–10(–15)-

rayed stellate hairy, adaxially densely 4–6(–8)-rayed

stellate hairy, indumentum continuous and grayish, base

rounded or broadly cuneate, margin serrulate, apex

acuminate or acute. Inflorescences corymbose, 6–12 cm

in diam., 20–80-flowered, stellate hairy, hairs with pa-

pilliform base; pedicels 3–10 mm. Calyx tube ca. 2 ×

2.5 mm; lobes broadly ovate, ca. 2 × 2 mm. Petals

imbricate, white, broadly ovate, 6–7 × 5–6 mm. Outer

stamens 6–7 mm; filaments 2-dentate at apex; anthers

globose, stalks 1–1.5 mm. Inner stamens shorter than

outer ones; filaments 2-lobed or truncate at apex;

anthers borne near middle of filaments abaxially. Styles

3 or 4, ca. 4 mm. Capsule ca. 4 mm in diam. Fl. May–

Aug, fr. Jul–Sep.

Mixed forest margins, thickets; 2000–3500 m. S Xizang, NW Yunnan [Bhutan, ?Myanmar, Sikkim].

9. *Deutzia bomiensis* S. M. Hwang, Acta Bot. Austro Sin. 8: 3. 1992.

波密溲疏 bo mi sou shu

Deutzia bomiensis var. *dinggyensis* (J. T. Pan) S. M.

Hwang; *D. corymbosa* R. Brown ex G. Don var.

dinggyensis J. T. Pan.

Shrubs ca. 1.5 m tall. Flowering branchlets brownish,

4–9 cm, 6–10-leaved, stellate hairy, hairs with

papilliform base. Petiole 1–3 mm; leaf blade ovate or

ovate-lanceolate, 10–30 × 5–15 cm, papery, abaxially 8–

10(–13)-rayed stellate hairy, adaxially 4–6(or 7)-rayed

stellate hairy, indumentum continuous, base broadly

cuneate, margin serrulate, apex acute. Inflorescences

corymbose, 3–4 cm in diam., 9–40-flowered, stellate hairy, hairs with papilliform base; pedicels ca. 5 mm. Calyx tube 1.5–1.2 mm; lobes broadly ovate, 1–1.7 mm. Petals imbricate, white, ovate or broadly so, ca. 5 × 4 mm, margin erose, apex rounded. Outer stamens 3–4 mm; filaments 2-dentate or truncate at apex, teeth (if present) not reaching anthers; anthers globose, stalk ca. 2 mm. Inner filaments 2–3 mm, apex unequally 2-lobed; anther borne between filament teeth, stalked. Styles 3 or 4, subequaling stamens. Capsule globose, ca. 2.5–3 mm in diam. Fl. Jun, fr. Aug–Oct.

• Forests, thickets, mountain slopes; ca. 2500 m. S Xizang (Bomi Xian, Dinggyê Xian).

10. *Deutzia gracilis* Siebold & Zuccarini, Fl. Jap. 1: 22. 1835.

细梗溲疏 xi geng sou shu

Shrubs ca. 1.5 m tall. Flowering branchlets brown, 5–17 cm, ca. 4-leaved, glabrous. Petiole 2–4 mm; leaf blade lanceolate, elliptic-lanceolate, or broadly ovate-lanceolate, 3–3.5 × 1–1.2 cm, papery, abaxially appressed 4- or 5(or 6)-rayed stellate hairy, adaxially 3- or 4-rayed stellate hairy, veins in 3 or 4 pairs, base cuneate, margin serrulate, apex acuminate. Inflorescences racemose or narrowly paniculate, 8–12 cm, 12–25-flowered, glabrous; pedicels slender, 5–10 mm. Calyx tube 2.5–3 × ca. 2.5 mm; lobes ovate or ovate-deltoid, ca. 1.5 cm, glabrous or sparsely hairy. Petals imbricate, white, oblong or oblong-lanceolate, 10–12 × 4–6 mm. Outer stamens 5–6 mm; filaments 2-dentate at apex or subulate and toothless, teeth (if present) not reaching anthers; anthers stalked, ovoid. Inner filaments all 2-dentate at apex. Styles 3, subequaling or longer than outer stamens. Capsule hemispheric, ca. 5 mm in diam. Fl. Mar–Apr.

Cultivated. Shaanxi, Zhejiang [native to Japan].

11. *Deutzia fabri* Rehder in Sargent, Pl. Wilson. 1: 18. 1911.

浙江溲疏 zhe jiang sou shu

Shrubs 1–2 m tall. Flowering branchlets purple-brown, 4–8 cm, 4–6-leaved, stellate hairy. Petiole 2–4 mm, on flowering branchlets less than 2 mm or almost absent; leaf blade oblong, ovate-oblong, or ovate-lanceolate, 4–8 × 1.5–2.5 cm, membranous or subpapery, both surfaces 3- or 4(or 5)-rayed stellate hairy, hairs along veins with long central rays and papilliform base, veins in 7–9 pairs, base subcordate, rounded, or cuneate, margin serrulate, apex acute or acuminate. Cymose panicles 7–10 × 3–5 cm, many flowered; pedicels 3–5 mm. Calyx tube ca. 3 × 5 mm; lobes deltoid, densely 6- or 7-rayed stellate hairy. Petals induplicate, white, oblong, 6–8 × 5–4 mm. Outer stamens 6–8 mm; filaments 2-dentate or shouldered at apex, teeth (if present) not reaching anthers; anthers stalked, oblong. Inner stamens shorter than outer ones; filaments all 2-dentate at apex. Styles 3 or 4, longer than outer stamens, hairy. Capsule hemispheric, ca. 3 mm. Fl. Apr–May, fr. Aug–Oct.

• Thickets, mountain slopes; 1000–1700 m. Zhejiang.

12. *Deutzia taiwanensis* (Maximowicz) C. K. Schneider, Mitt. Deutsch. Dendrol. Ges. 13: 177. 1904.

台湾溲疏 tai wan sou shu

Deutzia crenata Siebold & Zuccarini var. *taiwanensis* Maximowicz, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 10: 23. 1867; *D. cordatula* H. L. Li; *D. gracilis* Siebold & Zuccarini subsp. *arisanensis* Zaikonnikova; *D. kelungensis* Hayata.

Shrubs 3–5 m tall. Flowering branchlets purplish red, 8–14 cm, 4–6-leaved, stellate hairy. Petiole 6–8 mm, those on flowering branchlets 2–4 mm; leaf blade ovate-oblong or -lanceolate, 5–8 × 2–3 cm, papery or thinly leathery, both surfaces appressed 4- or 5(or 6)-rayed stellate hairy, veins in 4–6 pairs, base cuneate or rounded, margin irregularly serrulate, apex acuminate. Cymose panicles 6–8 × 3–4 cm, many flowered; pedicels 3–5 mm. Calyx tube ca. 2.5 × 3 mm; lobes deltoid, densely 8–12-stellate hairy. Petals induplicate, white, oblong, 9–13 × 3–4 mm. Outer stamens ca. 1.2 cm; filaments 2-dentate at apex, teeth not reaching anthers; anthers borne between filament teeth, stalked, oblong. Inner stamens shorter than outer ones. Styles 3 or 4, longer than outer stamens. Capsule hemispheric, ca. 3.5 mm in diam. Fl. Mar–Jul, fr. Aug–Oct.

• Mixed forests, thickets, mountain slopes; 300–2500 m. Taiwan.

13. *Deutzia glauca* Cheng, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 10: 71. 1935.

黄山溲疏 huang shan sou shu

Shrubs 1.5–2 m tall. Flowering branchlets gray-brown or purplish brown, 8–20 cm, 4–6 leaved, glabrous. Petiole 5–9 mm, glabrous; leaf blade ovate-oblong, -elliptic, or -lanceolate, 5–10 × 2–4.5 mm, papery, abaxially glabrous or rather sparsely 10–16(–18) rayed stellate hairy, adaxially sparsely 5- or 6(–8)-rayed stellate hairy, veins in 4–8 pairs, base cuneate or rounded, margin serrulate, apex acute or acuminate. Panicles narrow, 5–10 × ca. 4 cm, many flowered; pedicels 2–5 mm. Calyx tube sometimes purple spotted, ca. 3 × 4 mm, densely 12–19-rayed stellate hairy, glabrous, or only lobes sparsely stellate hairy; lobes broadly deltoid, ca. 1.5 × 2.5 mm, apex acute. Petals induplicate, white, oblong or narrowly elliptic, 10–15 × 5–6 mm, apex obtuse or acute. Outer stamens ca. 8 mm; filaments 2-dentate at apex, teeth not reaching anthers; anthers borne between filament teeth, stalked, oblong. Inner stamens ca. 5 mm. Styles 3, ca. 1.2 cm. Capsule hemispheric, ca. 4 × 7 mm. Fl. May–Jul, fr. Aug–Sep.

• Mixed forests, mountain slopes, valleys; 600–1200 m.

Anhui, ?Fujian, Henan, Hubei, Jiangxi, Zhejiang.

- 1a. Calyx tube purple spotted, glabrous or only lobes sparsely stellate hairy 13b. var. *decalvata*
- 1b. Calyx tube unspotted, densely 12–19-rayed stellate hairy 13a. var. *glauca*

13a. *Deutzia glauca* var. *glauca*

黄山溲疏(原变种) huang shan sou shu (yuan bian zhong)

Calyx tube unspotted, densely 12–19-rayed stellate hairy. Fl. May–Jul, fr. Aug–Sep.

• Mixed forests, mountain slopes; 600–1200 m. Anhui, Henan, Hubei, Jiangxi, Zhejiang.

13b. *Deutzia glauca* var. *decalvata* S. M. Hwang, Acta Bot. Austro Sin. 8: 22. 1992.

斑萼溲疏 ban e sou shu

Calyx tube purple spotted, glabrous or only lobes sparsely stellate hairy. Fl. Jun–Jul.

• Forests, valleys; ca. 600 m. Zhejiang.

One of the present authors (Ohba) believes that var. *decalvata* is only an extreme form of *Deutzia glauca*.

14. *Deutzia pulchra* S. Vidal, Revis. Pl. Vasc. Filip. 124. 1886.

美丽溲疏 mei li sou shu

Deutzia acuminata Merrill; *D. bartlettii* Yamamoto; *D. hayatae* Nakai; *D. pulchra* var. *bartlettii* (Yamamoto) S. S. Ying; *D. pulchra* var. *formosana* Nakai; *D. pulchra* var. *hayatae* (Nakai) Zaikonnikova.

Shrubs or small trees 2–3 m tall. Flowering branchlets gray-brown, 10–18 cm, 4–6-leaved, stellate hairy. Petiole 0.5–1.5 cm; leaf blade abaxially grayish green, adaxially greenish, ovate-oblong or oblong, 5–12 × 2.5–4.5 cm, subleathery, abaxially densely 18–22-rayed stellate hairy, indumentum continuous, adaxially sparsely 6–12-rayed stellate hairy, veins in 8–12 pairs, reticulate veins indistinct on both surfaces, base cuneate or subrounded, margin crenate or subentire, apex acuminate. Cymose panicles ca. 15 × 3–4 cm, many flowered; pedicels ca. 8 mm. Calyx tube ca. 2.5 × 5 mm; lobes deltoid, ca. 1 × 1 mm, densely 18–22-rayed stellate hairy. Petals induplicate, white, oblong or narrowly elliptic, 10–12 × 3–4 mm. Outer stamens ca. 1 cm; filaments 2-dentate at apex, teeth horizontal, not reaching anthers; anthers borne between filament teeth, stalked, oblong. Inner stamens shorter than outer ones. Styles 5, longer than stamens. Capsule hemispheric, ca. 4 × 6–7 mm, densely stellate hairy. Fl. Mar–May, fr. Aug–Sep. $2n = 104^*$.

Mixed forests; 300–2500 m. Taiwan [Philippines].

15. *Deutzia ningpoensis* Rehder in Sargent, Pl. Wilson. 1: 17. 1911.

宁波溲疏 ning bo sou shu

Deutzia chunii Hu; *D. ningpoensis* f. *integrifolia* D. T. Liu & J. Han.

Shrubs 1–2.5 m tall. Flowering branchlets red-brown, 10–18 cm, ca. 6-leaved, stellate hairy. Petiole 5–10 mm, those on flowering branchlets 1–2 mm; leaf blade abaxially grayish green, adaxially greenish, ovate-oblong or -lanceolate, 3–9 × 1.5–3 cm, papery, abaxially densely 12–15-rayed stellate hairy, indumentum continuous, hairs sometimes with central rays, adaxially sparsely 4–7(or 8)-rayed stellate hairy, veins in 5 or 6 pairs, base rounded or broadly cuneate,

margin sparsely serrate or subentire, apex acuminate or acute. Cymose panicles narrow, 5–12 × 2.5–6 cm, many flowered; pedicels 3–5 mm. Calyx tube 3–4 × ca. 3 mm; lobes ovate or deltoid, 1.5–2 × 1.5–2 mm, densely 10–15-rayed stellate hairy. Petals induplicate, white, oblong, 5–8 × ca. 2.5 mm. Outer stamens 3–4 mm; filaments 2-dentate at apex, teeth horizontal, not reaching anthers; anthers borne between filament teeth, stalked, globose. Inner stamens shorter than outer ones. Styles 3 or 4, ca. 6 mm. Capsule hemispheric, 4–5 mm in diam., densely stellate hairy. Fl. May–Jul, fr. Sep–Oct.

• Mixed forests, mountain slopes, valleys; 500–800 m. Anhui, Fujian, Hubei, Jiangxi, Shaanxi, Zhejiang.

16. *Deutzia crenata* Siebold & Zuccarini, Fl. Jap. 1: 19. 1835.

齿叶溲疏 chi ye sou shu

Deutzia scabra Thunberg var. *crenata* (Siebold & Zuccarini) Maximowicz.

Shrubs 1–3 m tall. Flowering branchlets red-brown, 8–12 cm, 4–6-leaved, stellate hairy, hairs sometimes with central rays. Petiole 3–8 mm; leaf blade abaxially green, ovate or ovate-lanceolate, 5–8 × 1–3 cm, papery, abaxially sparsely 10–15-rayed stellate hairy, indumentum discontinuous, hairs along veins usually with central rays, adaxially sparsely 4- or 5-rayed stellate hairy, veins in 3–5 pairs, base rounded or broadly cuneate, margin serrulate and slightly revolute, apex acuminate or abruptly so. Cymose panicles 5–10 × 3–6 cm, many flowered; pedicels 3–5 mm. Calyx tube ca. 2.5 × 2 mm; lobes ovate, ca. 1.2 × 1 mm, densely yellow-brown stellate hairy. Petals induplicate, white, narrowly elliptic, 0.8–1.5 cm × ca. 6 mm. Outer stamens 8–10 mm; filaments 2-dentate at apex, teeth horizontal, not reaching anthers; anthers borne between filament teeth, stalked, oblong. Inner stamens shorter than outer ones; filaments 2-dentate at apex, rarely ligulate. Styles 3(or 4), longer than stamens. Capsule hemispheric, ca. 4 mm in diam., sparsely stellate hairy. Fl. Apr–May, fr. Aug–Oct. $2n = 130$.

Cultivated, sometimes naturalized. Anhui, Fujian, Hubei, Jiangsu, Shandong, Yunnan, Zhejiang [native to Japan].

17. *Deutzia schneideriana* Rehder in Sargent, Pl. Wilson. 1: 7. 1911.

长江溲疏 chang jiang sou shu

Deutzia schneideriana var. *laxiflora* Rehder.

Shrubs 1–2 m tall. Flowering branchlets purplish red, 8–12 cm, 4–6-leaved, sparsely stellate hairy. Petiole 3–4 mm; leaf blade abaxially grayish-ovate-obovate or elliptic-ovate, 3.5–7 × 1.5–3 cm, papery, abaxially 12–15-rayed stellate hairy, indumentum discontinuous, hairs along veins with central rays, adaxially sparsely 5- or 6-rayed stellate hairy, veins in 4–6 pairs, base

rounded or broadly cuneate, margin serrulate, apex acute or abruptly acuminate. Cymose panicles 3–15 × 3–4 cm; pedicels 3–8 mm. Calyx tube ca. 3 × 4 mm, densely greenish gray stellate hairy; lobes deltoid, ca. 1 × 1 mm. Petals induplicate, white, oblong, 1–1.2 cm × 4–5 mm, apex acute. Outer stamens 8–10 mm; filaments 2-dentate at apex, teeth not reaching anthers; anthers borne between filament teeth, stalked, oblong. Inner anthers borne between filament teeth or near middle of filaments abaxially. Styles 3, slender, longer than stamens. Capsule grayish brown, hemispheric, 5–7 mm in diam., stellate hairy. Fl. May–Jun, fr. Aug–Oct.

• Thickets; 600–2000 m. Anhui, Gansu, Hubei, Hunan, Jiangxi, ?Zhejiang.

18. *Deutzia discolor* Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 23: 275. 1887.

异色溲疏 yi se sou shu

Deutzia densiflora Rehder; *D. discolor* var. *bicruristylis* P. He; *D. discolor* f. *compacta* Diels; *D. discolor* var. *gannanensis* L. C. Wang & X. G. Sun; *D. discolor* var. *major* Veitch; *D. globosa* Duthie; *D. longifolia* Franchet var. *farreri* Airy Shaw; *D. reflexa* Duthie; *D. vilmorinae* Lemoine & Bois.

Shrubs 2–3 m tall. Flowering branchlets brownish, 5–15 cm, 2–4(–6) leaved, sparsely stellate hairy. Petiole 3–6 mm; leaf blade abaxially greenish gray, adaxially greenish, elliptic-lanceolate or oblong-lanceolate, 5–10 × 2–3 cm, papery, abaxially densely 10–12(or 13)-rayed stellate hairy, adaxially sparsely 4–6-rayed stellate hairy, hairs with central rays on both surfaces, veins in 5 or 6 pairs, base cuneate or broadly so, margin serrulate, apex acute. Cymes 6–10 × 5–8 cm, 12–20-flowered; pedicels 1–1.5 cm. Calyx tube 3–3.5 × 3.5–4 mm, densely 10–12-rayed stellate hairy; lobes oblong-lanceolate, subequaling or slightly longer than tube. Petals induplicate, white, elliptic, 10–12 × 5–6 mm. Outer stamens 5.5–7 mm; filaments 2-dentate at apex, teeth not reaching anthers, acute at apex; anthers stalked, ovoid or globose. Inner stamens 3.5–5 mm. Styles 3 or 4, subequaling or slightly longer than stamens. Capsule brown, hemispheric, 4.5–6 mm in diam., with persistent, recurved calyx lobes. Fl. Jun–Jul, fr. Aug–Oct.

• Mixed thickets, mountain slopes, stream banks; 1000–2500 m. Gansu, Henan, Hubei, Shaanxi, Sichuan.

19. *Deutzia silvestrii* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 17: 282. 1910.

红花溲疏 hong hua sou shu

Shrubs ca. 2 m tall. Flowering branchlets purplish brown, 5–7(–11) cm, ca. 4-leaved, sparsely stellate hairy. Petiole 3–4 mm, stellate hairy; leaf blade abaxially gray, adaxially grayish green, ovate or elliptic-ovate, 3–5 × 1.5–2 cm, papery, abaxially somewhat densely 5–8(–10)-rayed stellate hairy, hairs along veins with long central rays, adaxially sparsely 3–

5-rayed stellate hairy, veins in 4 or 5 pairs, base cuneate or rounded, margin serrulate, apex acuminate. Cymes 1.5–1.8 × 3–6.5 cm, 15–40 (–100)-flowered; pedicels 3–5 mm. Calyx tube 3–3.5 × 2.5–3 mm, 14–17-rayed stellate hairy; lobes ovate-deltoid, 1.5–2.5 mm. Petals induplicate, pink, elliptic, 6.5–7(–9) × 1.7–2.5(–3.5) mm. Outer stamens 4–6 mm; filaments 2-dentate or shouldered at apex, teeth (if present) not reaching anthers, obtuse at apex; anthers borne between filament teeth, stalked, ovoid. Inner stamens 2–4 mm. Styles 3(or 4), subequaling outer stamens. Capsule hemispheric, ca. 3.5 mm, with persistent, incurved calyx lobes. Fl. Jun–Jul.

• Mixed forests; 300–1900 m. Hubei.

No specimens of *Deutzia silvestrii* have been seen by the present authors, one of whom (Ohba) doubts the distinctness of this species.

20. *Deutzia grandiflora* Bunge, Enum. Pl. China Bor. 30. 1833.

大花溲疏 da hua sou shu

Deutzia baroniana Diels var. *insignis* Pampanini; *D. grandiflora* var. *glabrata* Maximowicz; *D. grandiflora* var. *minor* Maximowicz.

Shrubs ca. 2 m tall. Flowering branchlets yellow-brown, very short initially, elongating to ca. 4 cm, 2–4-leaved, stellate hairy, hairs with central rays. Petiole 1–4 mm; leaf blade abaxially grayish, ovate-rhomboid or elliptic-ovate, 2–5.5 × 1–3.5 cm, papery, abaxially appressed 7–11-rayed stellate hairy, indumentum continuous, hairs along veins with central rays, adaxially 4–6-rayed stellate hairy, veins in 5 or 6 pairs, base cuneate or broadly so, margin irregularly serrulate, apex acute. Cymes 1–3 × 1–3 cm, 1–3(–5)-flowered; pedicels 3–12 mm. Calyx tube ca. 2.5 × 4 mm, densely gray-yellow stellate hairy, hairs sometimes with central rays; lobes linear-lanceolate, longer than tube, 1–1.5 mm wide. Petals induplicate, white, oblong or ovate-oblong, ca. 1.5 × 7 mm. Outer stamens 6–7 mm; filaments 2-dentate at apex, teeth horizontal or recurved, falcate; anthers stalked, ovoid-oblong. Inner stamens shorter than outer ones. Styles 3(or 4), subequaling stamens. Capsule hemispheric, 4–5 mm in diam., stellate hairy, with persistent, recurved calyx lobes. Fl. Apr–Jun, fr. Sep–Nov.

• Thickets, mountain slopes, valleys; 800–1600 m. Gansu, Hebei, Henan, ?Hubei, Hunan, ?Jiangsu, Liaoning, ?Nei Mongol, Shaanxi, Shandong, Shanxi.

21. *Deutzia baroniana* Diels, Bot. Jahrb. Syst. 29: 372. 1900.

钩齿溲疏 gou chi sou shu

Deutzia grandiflora Bunge var. *baroniana* (Diels) Rehder; *D. hamata* Koehne ex Gilg & Loesener; *D. hamata* var. *baroniana* (Diels) Zaikonnikova; *D. prunifolia* Rehder.

Shrubs 0.3–1 m tall. Flowering branchlets brownish, 1–4 cm, 2–4 leaved, stellate hairy. Petiole 3–5 mm, stellate hairy; leaf blade ovate-rhomboid or ovate-elliptic, 2–5(–7) × 1.5–3 (–4) cm, abaxially sparsely 5- or 6(or 7)-rayed stellate hairy, indumentum discontinuous, hairs along veins with central rays, adaxially 4- or 5-rayed stellate hairy, veins in 4 or 5 pairs, base cuneate or broadly so, margin irregularly serrulate or with alternating large and small teeth, apex acute. Cymes 1–1.5 × 1–1.5 cm, (1 or)2- or 3-flowered. Calyx tube ca. 2 × 4 mm, densely 4–6-rayed stellate hairy, hairs with central rays; lobes linear-lanceolate, 5–9 mm. Petals induplicate, white, obovate-oblong or lanceolate, 1.5–2.0 × 5–7 mm. Outer stamens 6–7 mm; filaments 2-dentate at apex, teeth horizontal or recurved, falcate; anthers stalked, oblong. Inner stamens 3.5–4.5 mm. Styles 3 or 4, ca. 1.2 cm. Capsule hemispheric, ca. 4 mm in diam., with persistent, recurved calyx lobes. Fl. Apr–May, fr. Sep–Oct.

• Thickets, mountain slopes; 500–1200 m. Hebei, Henan, Jiangsu, Liaoning, Shaanxi, Shandong, Shanxi.

22. *Deutzia rehderiana* C. K. Schneider, Bot. Gaz. 63: 398. 1917.

灌丛溲疏 *guan cong sou shu*

Deutzia dumicola W. W. Smith; *D. setosa* Zaikonnikova.

Shrubs ca. 2 m tall. Flowering branchlets brown, 1–2(–3) cm, 2–4-leaved; sterile branchlets to 20 cm, 14–16-leaved; all branchlets densely stellate hairy, hairs with papilliform base. Petiole 1–3 mm; leaf blade ovate, broadly so, or elliptic-ovate, 1.5–2.5 × 0.8–1.8 cm, papery, abaxially densely 5–8(–10)-rayed stellate hairy, adaxially sparsely 4–6(or 7)-rayed stellate hairy, veins in 3 or 4 pairs, base rounded or broadly cuneate, margin serrulate, apex obtuse to acute. Cymes 1–2(–3) × ca. 2 cm, (1–)3–5(–11)-flowered; pedicels 3–5 mm. Calyx tube ca. 3 × 3 mm, densely 8–10-rayed stellate hairy; lobes ovate or oblong, ca. 1.5 × 1 mm. Petals induplicate, white, obovate-elliptic, 6–7 × ca. 3 mm. Outer stamens ca. 3.5 mm; filaments 2-dentate at apex, teeth ± level with anthers. Inner stamens ca. 3 cm; filaments acute or irregularly 2-lobed at apex; anthers borne at middle of filaments abaxially, stalked. Styles 3(or 4), ca. 2 mm. Capsule hemispheric, 3–4 mm in diam., with persistent, erect calyx lobes. Fl. May, fr. Jul–Aug.

• Thickets, mountain slopes; 500–2000 m. Guizhou, Sichuan, Yunnan.

23. *Deutzia cymuligera* S. M. Hwang, Acta Bot. Austro Sin. 8: 6. 1992.

小聚花溲疏 *xiao ju hua sou shu*

Shrubs ca. 1.5 m. Flowering branchlets 0.5–1 cm, 2–4-leaved. Petiole ca. 2 mm; leaf blade ovate or elliptic-ovate, 2–2.5 × 1–1.3 cm, papery, abaxially slender 4(or 5)-rayed stellate hairy, indumentum continuous, adaxially 3- or 4-rayed stellate hairy, veins in 3 or 4

pairs, base broadly cuneate, margin serrulate, apex acute or acuminate. Corymbose cymes 1.5–2.5 × 2–3 cm, 3–5-flowered; pedicels slender, 1–2 cm. Calyx tube ca. 2.5 × 3 mm, 7–10-rayed stellate hairy; lobes ovate, ca. 1 mm, apex acute. Petals induplicate, white, elliptic or broadly so, 6–7 × 4–5 mm, margin crisped. Outer stamens ca. 3 mm; filaments 2-dentate at apex, teeth slightly exceeding anthers; anthers shortly stalked, ovoid. Inner stamens shorter than outer ones; filaments acuminate at apex, unequally 2-lobed; anthers borne at middle of filaments abaxially, shortly stalked. Styles 3, ca. 3 mm. Capsule unknown. Fl. May.

• Thickets, valleys. E Sichuan (Wuxi Xian).

24. *Deutzia obtusilobata* S. M. Hwang, Acta Bot. Austro Sin. 8: 4. 1992.

钝裂溲疏 *dun lie sou shu*

Shrubs ca. 1.5 m tall. Flowering branchlets red-brown, 6–10 cm, 6–8-leaved. Petiole 2–3 cm; leaf blade abaxially grayish green, ovate or elliptic-ovate, 2–4 × 1.6–1.8 cm, subleathery, abaxially densely 8–11-rayed stellate hairy, indumentum continuous, adaxially sparsely 5–8(or 9)-rayed stellate hairy, veins in 3 or 4 pairs, base broadly cuneate, margin slightly serrate, apex acute. Cymes lax, 5–8 × 3–5 cm, 9–15-flowered; pedicels 1–2 cm. Calyx tube ca. 2.5 × 3 mm; lobes ovate or ovate-deltoid, ca. 1.5 × 1.5 mm, densely 8–11-rayed stellate hairy. Petals induplicate, white, oblong or obovate-elliptic, 7–9 × 2–3 mm. Outer stamens ca. 4 mm; filaments subrounded, shouldered, or 2-lobed at apex, lobes (if present) not reaching anthers; anthers stalked, ovoid. Inner stamens ca. 2 mm; filaments slightly 2-lobed at apex; anthers borne between filament lobes or near apex of filaments abaxially. Styles 3, subequaling stamens. Capsule unknown. Fl. Mar.

• Mixed forests; ca. 2000 m. W Sichuan (Jiulong Xian).

One of the present authors (Ohba) doubts the distinctness of this species.

25. *Deutzia monbeigii* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 11: 205. 1919.

维西溲疏 *wei xi sou shu*

Deutzia monbeigii var. *lanceolata* S. M. Hwang.

Shrubs 1–1.5 m tall. Flowering branchlets brown, 3–8 cm, 4–6-leaved. Petiole 1–2 mm; leaf blade abaxially grayish green, ovate, ovate-elliptic, or lanceolate, 1–3.5(–5) × 0.3–1.8(–2) cm, subleathery, abaxially densely 11–14-rayed stellate hairy, indumentum continuous, hairs usually with central rays, adaxially scabrous and sparsely 5–8-rayed stellate hairy, hairs usually with papilliform base, veins in 3 or 4 pairs, base broadly cuneate, margin serrulate, apex obtuse, acute, or acuminate. Cymes 3–6 × 3–4 mm, 5–15-flowered; pedicels 5–10 mm. Calyx tube ca. 2.5 × 3 mm, densely stellate hairy; lobes ovate-oblong, ovate, or lanceolate, 1–2 mm, apex acute. Petals induplicate, white, narrowly

elliptic or obovate-oblong, 10–12 × 3.5–4 mm, margin entire or crisped. Outer stamens ca. 5 mm; filaments 2-dentate at apex, teeth oblong; anthers stalked, ovoid. Inner stamens shorter than outer ones; filaments acute or 2- or 3-lobed at apex; anthers borne near middle of filaments abaxially. Styles 3 or 4, shorter than stamens. Capsule gray-yellow, hemispheric or subcampanulate, 3–4 mm in diam., with persistent, erect calyx lobes. Fl. May, fr. Sep.

• Thickets; 2000–3000 m. Sichuan, Xizang, Yunnan.

26. *Deutzia yunnanensis* S. M. Hwang, Acta Bot. Austro Sin. 8: 9. 1992.

云南溲疏 *yun nan sou shu*

Shrubs. Flowering branchlets brown, 3–5 cm, ca. 4-leaved, stellate hairy. Petiole 3–5 mm; leaf blade abaxially grayish green, ovate or ovate-oblong, 2–4.5 × 1.2–1.8 cm, papery, abaxially 8–10(–12)-rayed stellate hairy, hairs usually with long central rays, adaxially 4- or 5-rayed stellate hairy, veins in 3–5 pairs, base broadly cuneate, margin serrulate, apex acute or acuminate. Cymes or corymbose cymes 2–4 × 1.5–2.5(–3) cm, 9–12-flowered; pedicels 5–8 cm. Calyx tube ca. 3 × 2.5 mm, densely 12–15-rayed stellate hairy; lobes ovate or ovate-oblong, ca. 2 × 1 mm. Petals induplicate, broadly elliptic, 1–1.2 cm × 5–6 mm, margin crisped. Outer stamens ca. 6 mm; filaments 2-dentate at apex, teeth ± level with anthers; anthers stalked, ovoid or globose. Inner stamens shorter than outer ones; filaments oblong or ligulate, 2- or 3-lobed or obtuse at apex; anthers borne near middle of filaments abaxially. Styles 3, shorter than inner stamens. Capsule hemispheric, 4–5 mm in diam., with persistent, erect calyx lobes.

• Thickets. NW Yunnan.

27. *Deutzia breviloba* S. M. Hwang, Acta Bot. Austro Sin. 8: 11. 1992.

短裂溲疏 *duan lie sou shu*

Shrubs ca. 1 m tall. Flowering branchlets gray-brown, 4–5 cm, ca. 4-leaved, stellate hairy. Petiole 3–5 mm, sparsely stellate hairy; leaf blade abaxially grayish green, ovate or ovate-lanceolate, 1.5–3 × 0.6–1.3 cm, papery, abaxially densely 8–14-rayed stellate hairy, adaxially sparsely 5–7-rayed stellate hairy, base broadly cuneate, margin serrulate, apex acuminate. Cymes ca. 2 × 3 cm, 6–9-flowered; pedicels 8–10 mm. Calyx tube ca. 2.5 × 3 mm, densely 10–14-rayed stellate hairy; lobes deltoid or ovate-deltoid, 1–1.5 mm. Petals white, obovate or broadly elliptic, ca. 8 × 4 mm, margin crisped, apex obtuse. Outer stamens ca. 4 mm; filaments 2-dentate at apex, teeth ± level with anthers. Inner stamens ca. 3 mm; filaments subacute or unequally 2-lobed at apex; anthers borne near middle of filaments abaxially. Styles 3(or 4), shorter than stamens. Capsule hemispheric, ca. 3 mm in diam., with persistent, erect calyx lobes. Fl. Mar, fr. Jun.

• *Pinus* forests, stream banks; 1200–3100 m. Sichuan.

28. *Deutzia heterophylla* S. M. Hwang, Acta Bot. Austro Sin. 8: 8. 1992.

异叶溲疏 *yi ye sou shu*

Shrubs ca. 2 m tall. Flowering branchlets 7–9 cm, ca. 6-leaved. Petiole 3–4 mm; leaf blade dimorphic: those of basal branchlets suborbicular, 0.8–2.5 × 0.8–2.5 cm, base truncate, margin irregularly serrulate; those of middle and distal branchlets abaxially grayish green, ovate or ovate-lanceolate, 3–5 × 1.5–2.5 cm, papery, abaxially densely 8–12-rayed stellate hairy, adaxially sparsely 4–8-rayed stellate hairy, veins in 3 or 4 pairs, base cuneate or broadly so, apex obtuse or acuminate. Corymbose cymes 3–4 × ca. 4 cm, 9-flowered; pedicels slender, 1–1.2 cm. Calyx tube ca. 4 × 4 mm, densely 10–14-rayed stellate hairy; lobes ovate-lanceolate, ca. 3 mm, apex acuminate. Petals valvate, white, elliptic, 1.3–1.4 cm × 8 mm, apex obtuse. Outer stamens ca. 6 mm; filaments 2-dentate at apex, teeth ± level with anthers, obtuse at apex; anthers stalked. Inner stamens ca. 4 mm; filaments 2-lobed at apex; anthers borne at middle of filaments abaxially. Styles 3, shorter than stamens. Capsule unknown. Fl. Aug.

• Mixed forests, valleys; ca. 2300 m. SW Sichuan (Muli Zang Zu Zizhixian).

29. *Deutzia staminea* R. Brown ex Wallich, Pl. Asiat. Rar. 2: 82. 1831.

长柱溲疏 *chang zhu sou shu*

Deutzia brunoniana Wallich ex G. Don; *D. staminea* var. *brunoniana* (Wallich ex G. Don) J. D. Hooker & Thomson; *D. staminea* var. *sikkimensis* C. K. Schneider. Shrubs 2–5 m tall. Flowering branchlets 2–5 cm, 2–6-leaved. Petiole 1.5–2.5 mm; leaf blade abaxially grayish green, adaxially green, ovate or narrowly so, 2.5–5 × 1–3.5 cm. papery, abaxially densely 9–14-rayed stellate hairy, indumentum continuous, hairs usually with long central rays, adaxially 4–6-rayed stellate hairy, veins in 4–6 pairs, base rounded or broadly cuneate, margin serrulate, apex obtuse or subacute. Cymes 2–4 cm, 9–25-flowered; pedicels 2–2.5 mm. Calyx tube ca. 3 × 2.5 mm, gray-yellow stellate hairy; lobes ovate or ovate-lanceolate, 1–2 cm, apex acute. Petals induplicate, white, oblong or elliptic, 6–8 × 3–4 mm, apex obtuse. Outer stamens ca. 5 mm; filaments unequally 2-dentate at apex, teeth exceeding anthers; anthers stalked, globose. Inner stamens ca. 2.5 mm; filaments unequally 2- or 3-lobed at apex; anthers borne near apex of filaments abaxially, stalked. Styles 3 or 4, ca. 7 mm. Capsule hemispheric, 3.5–4 mm, with persistent, erect calyx lobes. Fl. Jun, fr. Aug. $2n = 26^*$.

Thickets, mountain slopes; 2000–3000 m. SW Sichuan. (Muli Zang Zu Zizhixian), S Xizang, NW Yunnan [Bhutan, Kashmir, Nepal, Sikkim].

30. *Deutzia crassidentata* S. M. Hwang, Acta Bot. Austro Sin. 8: 12. 1992.

粗齿溲疏 *cu chi sou shu*

Shrubs ca. 2 m tall. Flowering branchlets 4–6 cm, ca. 4-leaved. Petiole 3–5 mm; leaf blade abaxially grayish

green, ovate or elliptic-ovate, 2–5.5 × 1.5–3.5 cm, papery, abaxially densely 8–10-rayed stellate hairy, hairs along veins usually with central rays, adaxially sparsely 4- or 5-rayed stellate hairy, base rounded or broadly cuneate, margin alternately coarsely serrate and serrulate, apex acute; leaf blade on sterile branchlets usually large, margin alternately coarsely serrate and serrulate. Cymes 4–6 × 3–5 cm, 5–15-flowered; pedicels 0.8–1.2 cm. Calyx tube grayish, ca. 3 × 2.5 mm, densely 10–12-rayed stellate hairy; lobes ovate-lanceolate, ca. 2 × 1 mm. Petals induplicate, white, ovate-oblong or elliptic, 6–10 × 4–5 mm, apex obtuse or acute. Outer stamens ca. 4 mm; filaments 2-dentate at apex, teeth ± level with anthers, obtuse at apex; anthers subovoid or globose. Inner stamens ca. 3 mm; filaments 2- or 3-lobed at apex; anthers borne near apex of filaments abaxially. Styles 3 or 4, 4.5–5 mm. Capsule obconical or obcampanulate, 3–4 × ca. 3 mm, with persistent, recurved calyx lobes. Fl. Jul–Sep.

• Thickets, stream banks; 2000–2300 m. Sichuan.

One of the present authors (Ohba) believes that this species may be synonymous with *Deutzia staminea*.

31. *Deutzia wardiana* Zaikonnikova, Deitsii-Dekorat Kust. [Ornamental Trees & Shrubs] (Monogr. *Deutzia*) 97. 1966.

宽萼溲疏 kuan e sou shu

Shrubs 2–3 m tall. Flowering branchlets brown, 4–7 cm, angular, ca. 4-leaved. Petiole 3–5 mm; leaf blade abaxially grayish green, ovate-lanceolate or elliptic-ovate, 4.5–7 × 1.7–2.5 cm, abaxially densely 9–13-rayed stellate hairy, indumentum continuous, hairs on young leaf blade with central rays, adaxially 4- or 5-rayed stellate hairy, veins in 4 or 5 pairs, base rounded or broadly cuneate, margin serrulate, apex acuminate; leaf blade on proximal branchlets ovate, small, apex acute. Cymes or paniculate cymes ovate or pyramidal, 3–5 × 3–6 cm, 9–15-flowered; pedicels 5–10 mm. Calyx tube broadly cupular, 3.5–4 × 4–4.5 mm, densely 16–18-rayed stellate hairy; lobes broadly ovate or deltoid, ca. 1.5 × 1.5 mm. Petals induplicate, pink, elliptic, ca. 1.3 cm × 7 mm. Outer stamens 6–8 mm; filaments 2-dentate at apex; anthers stalked, globose. Inner stamens shorter than outer ones; filaments unequally 2- or 3-lobed at apex; anthers borne near apex of filaments abaxially. Styles 4 (or 5), 9–10 mm. Capsule hemispheric, ca. 4 mm in diam., with persistent, erect calyx lobes. Fl. Apr–May, fr. Jun–Aug.

Coniferous forests, thickets, valleys; 1500–2000 m. Xizang [India].

32. *Deutzia albida* Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 97. 1893.

白溲疏 bai sou shu

Deutzia discolor Hemsley var. *albida* (Batalin) C. K. Schneider.

Shrubs ca. 3 m tall. Flowering branchlets brown, 4–6 cm, 4–6-leaved, stellate hairy. Petiole 2–3 mm; leaf blade abaxially gray-white, ovate or elliptic-ovate, 4–

6.5 × 1.2–3 cm, abaxially densely 5–9-rayed stellate hairy, indumentum continuous, adaxially sparsely 4- or 5-rayed stellate hairy, hairs with central rays, veins in 4 or 5 pairs, conspicuously elevated abaxially, base rounded or broadly cuneate, margin serrulate, apex obtuse or acute. Cymes 3–4 × 4–5 cm, 9–30-flowered; pedicels slender, 3–10 mm. Calyx tube ca. 2.5 × 2.5 mm; lobes narrowly lanceolate, 2.5–3 mm, less than 1 mm wide at base, apex acuminate. Petals induplicate, white, elliptic or obovate-elliptic, ca. 7 × 4 mm, margin crisped, apex acute. Outer stamens 3–3.5 mm; filaments 2-dentate at apex, teeth slightly divergent, ± level with or exceeding anthers; anthers stalked, globose. Inner stamens 2–2.5 mm; filaments obtuse or 2- or 3-lobed at apex; anthers borne near middle of filaments abaxially. Styles 3, ca. 1.5 mm. Capsule hemispheric, 3–3.5 mm, with persistent, recurved calyx lobes. Fl. Jun, fr. Sep.

• Mixed forests; 1300–1700 m. S Gansu, ?Shaanxi (Qin Ling).

33. *Deutzia taibaiensis* W. T. Wang ex S. M. Hwang, Acta Bot. Austro Sin. 8: 14. 1992.

太白溲疏 tai bai sou shu

Shrubs 1–2 m tall. Flowering branchlets brownish, 4–6 (–12) cm, ca. 6-leaved, stellate hairy, hairs with papilliform base. Petiole 1–3 mm; leaf blade abaxially greenish, ovate, elliptic-ovate, or ovate-lanceolate, 4–6 × 1.5–2.5 cm, papery, abaxially sparsely 5–7 (or 8)-rayed stellate hairy, indumentum discontinuous, hairs along veins with papilliform base, adaxially 4- or 5-rayed stellate hairy, hairs with central rays, veins in 4 or 5 pairs, elevated abaxially, base rounded or broadly cuneate, margin serrulate, apex obtuse or acute. Cymes 3–8 × 4–6 cm, 9–40-flowered; pedicels 3–5 mm. Calyx tube 2.5–3 × ca. 1 mm; lobes lanceolate, 2.5–3 × ca. 1 mm. Petals white, elliptic or obovate-elliptic, 4.5–7 × 3.5–5 cm, margin erose, apex obtuse. Outer stamens 2.5–3.5 mm; filaments 2-dentate at apex, teeth exceeding anthers; anthers stalked, ovoid. Inner stamens 1.5–2 mm; filaments 2- or 3-lobed or obtuse at apex; anthers borne at middle of inner filaments abaxially. Styles 3, ca. 1 mm. Capsule hemispheric, 3–3.5 mm in diam., with persistent, recurved calyx lobes. Fl. May–Jun, fr. Aug–Sep.

• Forests; ca. 1200 m. Gansu, Shaanxi.

34. *Deutzia aspera* Rehder in Sargent, Pl. Wilson. 1: 149. 1912.

马桑溲疏 ma sang sou shu

Deutzia aspera var. *fedorovii* (Zaikonnikova) S. M. Hwang; *D. fedorovii* Zaikonnikova.

Shrubs 2–3 m tall. Flowering branchlets 5–15 cm, 4–6-leaved, stellate hairy, hairs with papilliform base. Petiole 4–5 mm; leaf blade ovate, ovate-elliptic or lanceolate, or oblong, 3–10 × 1.5–3 cm, thinly leathery

or papery, abaxially sparsely 5–9(–11)-rayed stellate hairy, indumentum discontinuous, adaxially (3 or) 4–6-rayed stellate hairy, veins in 5 or 6 pairs, base broadly cuneate or rounded, margin serrulate, apex acuminate. Cymes 3–7 × 4–5 cm, 9–45-flowered; pedicels 3–5 mm. Calyx tube ca. 3 mm in diam., 8–14-rayed stellate hairy; lobes lanceolate or oblong-lanceolate, ca. 3 × 2 mm, leathery, 1-veined. Petals induplicate, white or pink, broadly elliptic or obovate-elliptic, 0.7–1.4 cm × 4–6 mm. Outer stamens 5–8 mm; filaments 2-dentate at apex, teeth ± level with anthers; anthers stalked. Inner stamens 3.5–4 mm; filaments obtuse or acuminate at apex; anthers borne near middle of filaments abaxially. Styles 3(or 4), subequaling stamens. Capsule hemispheric, ca. 5 mm in diam., with persistent, erect calyx lobes. Fl. Apr–Nov, fr. Nov–Dec.

• Thickets, forests, mountain slopes; 500–2500 m. S Xizang, Yunnan.
35. *Deutzia glaucophylla* S. M. Hwang, Acta Bot. Austro Sin. 8: 16. 1992.

灰绿溲疏 hui lu sou shu

Shrubs ca. 2 m tall. Flowering branchlets brown, 3–8 cm, 4–6-leaved, stellate hairy, hairs with papilliform base. Petiole 2–3 mm; leaf blade abaxially grayish green, ovate-lanceolate or elliptic-lanceolate, 1–2.5 × 0.7–1.4 cm (basal ones broadly ovate and smaller), papery, abaxially densely 12–14-rayed stellate hairy, indumentum continuous, adaxially sparsely 4- or 5-rayed stellate hairy, veins in 3 or 4 pairs, base broadly cuneate, margin serrulate, apex acuminate. Cymes 2–4 × 2–4 cm, 9–12-flowered; pedicels slender, 0.5–1.5 cm, stellate hairy, hairs with papilliform base. Calyx tube ca. 3 × 3.5 mm, densely 8–12-rayed stellate hairy; lobes oblong-lanceolate, ca. 5 mm, membranous, midvein prominent. Petals induplicate, white or pink, obovate-elliptic, 8–10 × 5–6 mm. Outer stamens 4–6 mm; filaments 2-dentate at apex, teeth exceeding anthers; anthers stalked. Inner stamens shorter than outer ones; filaments obtuse or 2- or 3-lobed at apex; anthers borne at middle of filaments abaxially. Styles 3(or 4), subequaling stamens. Capsule gray, hemispheric, ca. 3 mm in diam. Fl. Jun–Jul, fr. Aug–Sep.

• Thickets; 2000–2500 m. Sichuan, Xizang.

36. *Deutzia glomeruliflora* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 236. 1886.

球花溲疏 qiu hua sou shu

Deutzia glomeruliflora var. *lichiangensis* (Zaikonnikova) S. M. Hwang; *D. longifolia* Franchet var. *sikangensis* (W. P. Fang) P. He; *D. purpurascens* (Franchet ex L. Henry) Rehder var. *lichiangensis* Zaikonnikova; *D. sikangensis* W. P. Fang; *D. subsessilis* Rehder.

Shrubs 1–2 m. Flowering branchlets red-brown, 3–12 cm, 4–6-leaved, stellate hairy. Petiole 1–5 mm; leaf blade abaxially greenish, ovate lanceolate or lanceolate, 2–5(–8) × 0.6–1.5(–2) cm, papery, abaxially 4–10-rayed stellate hairy, indumentum continuous, hairs with or without long central rays, adaxially sparsely 4–6(or

7)-rayed stellate hairy, veins in 3–6 pairs, base broadly cuneate, margin serrulate, apex acuminate. Cymes aggregate, short, 3–8 × 3–4 cm, 3–18-flowered; pedicels 5–10 mm. Calyx tube ca. 3 × 3 mm, densely stellate hairy, hairs with central rays; lobes purplish or green, lanceolate, subequaling tube, membranous. Petals induplicate, white, obovate-elliptic, 8–12 × 4–5 mm. Outer stamens 5–6 mm; filaments 2-dentate at apex, teeth exceeding anthers; anthers oblong. Inner stamens 3–4 mm; filaments irregularly 2- or 3-lobed at apex; anthers borne near middle of filaments abaxially. Styles 3, subequaling stamens. Capsule brown, hemispheric, ca. 4.5 mm in diam., with persistent, recurved calyx lobes. Fl. Apr–Jun, fr. Aug–Oct.

• *Picea* forests, mixed forests, thickets; 2000–3600 m. W Sichuan, N Yunnan.

37. *Deutzia subulata* Handel-Mazzetti, Symb. Sin. 7: 439. 1931.

钻齿溲疏 zuan chi sou shu

Deutzia glomeruliflora Franchet var. *forrestiana* Zaikonnikova.

Shrubs 1–2.5 m tall. Flowering branchlets 3–10 cm, 2–4(–6)-leaved, stellate hairy. Petiole 1.5–2.5 mm; leaf blade abaxially grayish green, ovate-lanceolate or lanceolate, ovate or broadly so on basal branchlets, 2.5–5 × 1–2 cm, papery, abaxially densely 7–11(–14)-rayed stellate hairy, indumentum continuous, hairs along veins and on young leaf blade usually with central rays, adaxially 5- or 6-rayed stellate hairy, veins in 4–6 pairs, base cuneate or broadly so, margin serrulate, apex acute or acuminate. Cymes aggregate, 5–7 × 3–4 cm, 9–20-flowered; pedicels 3–10 mm. Calyx tube ca. 3.5 × 3 mm; lobes subulate, subequaling tube, slightly leathery, apex acuminate. Petals white, narrowly elliptic, 8–12 × 3–5 mm, margin crisped, apex acute. Outer stamens 5–7 mm; filaments 2-dentate at apex, teeth ± level with or exceeding anthers; anthers stalked, oblong. Inner stamens 4–6 mm; filaments obtuse or acute at apex; anthers borne near apex of filaments abaxially. Styles 3 or 4, 4–6 mm. Capsule gray-brown, hemispheric, 4–4.5 mm in diam., with persistent, recurved calyx lobes. Fl. Jun–Jul, fr. Aug–Oct.

• Forest margins, thickets, mountain slopes; 2000–2500 m. S Sichuan, NW Yunnan.

38. *Deutzia longifolia* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 235. 1886.

长叶溲疏 chang ye sou shu

Shrubs 2–2.5 m tall. Flowering branchlets 5–15(–20) cm, 4–6-leaved. Petiole 3–8 mm; leaf blade abaxially grayish green, lanceolate or elliptic-lanceolate, 3–11 × 1–4 cm, leathery, abaxially densely 8–12-rayed stellate hairy, hairs along veins with central rays, adaxially sparsely 4–6(or 7)-rayed stellate hairy, veins in 4–6 pairs, base cuneate or broadly so, margin serrulate, apex acuminate. Cymes 4.5–8 × 2.5–6 cm, 9–12-flowered; pedicels 3–12 mm. Calyx tube 3.5–4.5 × 3–4 mm,

densely grayish 12–14-rayed stellate hairy; lobes lanceolate, oblong-lanceolate, deltoid, or long deltoid, shorter than or subequaling tube, leathery, 1–3-veined. Petals purplish, elliptic or obovate-elliptic, 1–1.3 cm × 6–8 mm. Outer stamens 5–9 mm; filaments 2-dentate at apex, teeth ± level with or exceeding anthers; anthers stalked, oblong. Inner stamens 4–7 mm; filaments obtuse or unequally 2- or 3-lobed at apex; anthers borne near middle of filaments abaxially. Styles 3 or 4(–6), subequaling stamens. Capsule brown, hemispheric, ca. 5 mm in diam., with persistent, recurved calyx lobes. Fl. Jun–Aug, fr. Sep–Nov.

• Forests, thickets, mountain slopes, stream banks; 1800–3200 m. Gansu, Guizhou, Sichuan, Yunnan.

- 1a. Leaf blade 5–11 × 1.5–4 cm; corolla 2–2.4 cm in diam.; calyx tube ca. 4.5 × 4 mm, lobes lanceolate or oblong-lanceolate, subequaling tube 38a. var. *longifolia*
 1b. Leaf blade 3–5 × 1–1.2 cm; corolla 1.5–2 cm in diam.; calyx tube ca. 3.5 × 3 mm, lobes deltoid or long deltoid, shorter than tube 38b. var. *pingwuensis*

38a. *Deutzia longifolia* var. *longifolia*

长叶溲疏(原变种) chang ye sou shu (yuan bian zhong)

Deutzia longifolia var. *elegans* Rehder; *D. longifolia* var. *veitchii* Rehder.

Leaf blade 5–11 × 1.5–4 cm. Calyx tube ca. 4.5 × 4 mm; lobes lanceolate or oblong-lanceolate, subequaling tube. Corolla 2–2.4 cm in diam. Fl. Jun–Aug, fr. Sep–Nov.

• Forests, thickets, mountain slopes; 1800–3200 m. Gansu, Guizhou, Sichuan, NE Yunnan.

38b. *Deutzia longifolia* var. *pingwuensis* S. M. Hwang, Acta Bot. Austro Sin. 8: 22. 1992.

平武溲疏 ping wu sou shu

Leaf blade 3–5 × 1–1.2 cm. Calyx tube ca. 3.5 × 3 mm; lobes deltoid or long deltoid, shorter than tube. Corolla 1.5–2 cm in diam.

• Thickets, mountain slopes, stream banks; 2300–2900 m. Sichuan, Yunnan.

39. *Deutzia squamosa* S. M. Hwang, Acta Bot. Austro Sin. 8: 19. 1992.

鳞毛溲疏 lin mao sou shu

Deutzia longifolia Franchet var. *densitomentosa* P. He & L. C. Hu.

Shrubs 1–2 m tall. Flowering branchlets 5–15 cm, 4–6-leaved. Petiole 3–5 mm; leaf blade abaxially grayish, lanceolate or elliptic-lanceolate, 5–8 × 1–1.5 cm, leathery, abaxially densely 12–16-rayed stellate hairy, indumentum continuous, hairs without long central rays, adaxially sparsely 6–8-rayed stellate hairy, veins in 4 or 5 pairs, base cuneate, margin serrulate, apex acuminate. Cymes aggregate, 4.5–5 × 3–6 cm, 9–18-flowered; pedicels 1–1.5 cm. Calyx purplish; tube ca. 3 × 3 mm,

densely 12–18 rayed stellate hairy; lobes ovate-lanceolate, subequaling tube, leathery, midvein prominent. Petals induplicate, pink, obovate-elliptic, 8–10 × 4–6 mm. Outer stamens ca. 6 mm; filaments 2-dentate at apex, teeth exceeding anthers; anthers stalked, oblong. Inner stamens shorter than outer ones; filaments acute at apex; anthers borne near middle of filaments abaxially. Styles 3, subequaling stamens. Capsule brown, hemispheric, ca. 5 mm in diam., with persistent, recurved calyx lobes. Fl. Jun.

• Mixed forests; ca. 2000 m. S Sichuan (Leibo Xian).

40. *Deutzia zhongdianensis* S. M. Hwang, Acta Bot. Austro Sin. 8: 18. 1992.

中甸溲疏 zhong dian sou shu

Shrubs ca. 1 m tall. Flowering branchlets 18–22 cm, ca. 6-leaved, Petiole 5–10 mm; leaf blade abaxially brownish, ovate, 5–10 × 2–5 cm, leathery, abaxially densely 8–10(–12)-rayed stellate hairy, hairs along veins with central rays, adaxially sparsely 4- or 5-rayed stellate hairy, veins in 4 or 5 pairs, prominently elevated abaxially, base rounded, rarely broadly cuneate, margin serrulate, apex acuminate. Panicle cymes 6–7 × 5–6 cm, many flowered; pedicels 2–4 mm. Calyx tube ca. 3 × 4 mm, densely 10–12-rayed stellate hairy; lobes oblong-lanceolate, 4–5 mm, leathery. Petals induplicate, white, obovate or elliptic, 7–8 × 4–5 mm, margin crisped, apex obtuse. Outer stamens 6–7 mm; filaments 2-dentate at apex, teeth ± level with anthers, obtuse at apex; anthers stalked, oblong. Inner stamens 4–5 mm; filaments obtuse or 2- or 3-lobed at apex; anthers borne near middle of filaments abaxially. Styles 3, shorter than stamens. Capsule unknown.

• Thickets; 2100–3500 m. NW Yunnan (Zhongdian Xian).

41. *Deutzia nanchuanensis* W. T. Wang, Bull. Bot. Res., Harbin 3(2): 85. 1983.

南川溲疏 nan chuan sou shu

Deutzia jinyangensis P. He & L. C. Hu.

Shrubs 1.5–2.5 m tall. Flowering branchlets purplish, 5–8 cm, 4–6 leaved. Petiole 2.5–5(–10) mm; leaf blade abaxially yellowish brown, oblong-lanceolate or lanceolate, 5–7(13) × 1.6–3(–4.5) cm, thinly leathery or papery, abaxially sparsely appressed 7–9(–13)-rayed stellate hairy, indumentum discontinuous, hairs along veins with central rays, adaxially sparsely 4–6-rayed stellate hairy, veins in 5 or 6 pairs, base cuneate or broadly so, margin serrulate, apex acute or abruptly acuminate. Cymes 3–8 × 4–7 cm, 15–50-flowered; pedicels 3–14 mm. Calyx purplish; tube ca. 3.5 × 3 mm, gray stellate hairy; lobes lanceolate or elliptic-lanceolate, ca. 3.5 mm, leathery, midvein prominent. Petals induplicate, pink, oblong, 1–1.2 cm × 4–5 mm, margin crisped, apex rounded or acute. Outer stamens 6–7 mm; filaments 2-dentate at apex, teeth ± level with

or exceeding anthers; anthers stalked. Inner stamens shorter than outer ones; filaments 2-lobed or obtuse at apex; anthers borne near middle of filaments abaxially. Styles 3, subequaling stamens. Capsule brown, hemispheric, ca. 4 mm, with persistent, recurved calyx lobes. Fl. Jun.

• Forests, mixed thickets, mountain slopes. SE Sichuan, NE Yunnan.
42. *Deutzia purpurascens* (Franchet ex L. Henry) Rehder in Sargent, Pl. Wilson. 1: 19. 1911.
 紫花溲疏 *zi hua sou shu*

Deutzia discolor Hemsley var. *purpurascens* Franchet ex L. Henry, Jardin 8: 147. 1894.

Shrubs 1–2 m tall. Flowering branchlets 5–12 cm, 2–4-leaved. Petiole 2–6 mm; leaf blade abaxially greenish, broadly ovate-lanceolate or ovate-oblong, 4–9.5 × 2–2.8 cm, thinly leathery or papery, abaxially sparsely 4–8(–10)-rayed stellate hairy, hairs along veins with central rays, adaxially sparsely 3–5-rayed stellate hairy, hairs with central rays, veins in 4 or 5 pairs, base broadly cuneate or rounded, margin serrulate, apex acuminate, rarely acute. Corymbose cymes 4–6 × 5–7 cm, 3–12-flowered; pedicels 0.5–3 cm. Calyx tube 2.5–3.5 × ca. 4 mm; lobes lanceolate or oblong-lanceolate, 4–4.5 mm, leathery. Petals induplicate, pink, obovate or oblong, 1.2–1.7 cm × 5–8 mm, apex obtuse. Outer stamens 5–8 mm; filament teeth exceeding anthers; anthers stalked, oblong. Inner stamens shorter than outer ones; filaments 2-lobed at apex; anthers borne near middle of filaments abaxially. Styles 3 or 4, subequaling stamens. Capsule hemispheric, ca. 4.5 mm in diam., with persistent, recurved calyx lobes. Fl. Apr–Jun, fr. Jun–Oct.

Thickets; 2600–3500 m. Sichuan, SE Xizang, Yunnan [India, Myanmar].

43. *Deutzia calycosa* Rehder in Sargent, Pl. Wilson. 1: 149. 1912.

大萼溲疏 *da e sou shu*

Shrubs ca. 2 m tall. Flowering branchlets purplish brown, 5–7.5 cm, 2–4-leaved. Petiole 3–5 mm; leaf blade abaxially grayish green or gray, adaxially greenish, ovate-lanceolate, ovate-oblong, ovate, or broadly ovate, 1.5–8(–10) × 0.8–3.5 (–4.5) cm, leathery, papery, or thinly papery, abaxially sparsely 7–10(–12)-rayed stellate hairy, adaxially sparsely 4–6-rayed stellate hairy, hairs sometimes with central rays on both surfaces, veins in 5 or 6 pairs, base rounded or broadly cuneate, margin sparsely serrate or densely serrulate, apex acuminate. Corymbose cymes aggregate or spreading, 3–4 × 4–5 cm, 9–12-flowered; peduncle elongate and slender, sometimes obscure; pedicels 0.5–1.5(–2) cm. Calyx tube 3–3.5 × 3.5–4 mm, densely 8–10-rayed stellate hairy; lobes lanceolate or oblong-lanceolate, 5–8 × ca. 1.5 mm, membranous. Petals induplicate, white or pink, ovate-oblong, 0.8–1.5 × 0.4–1.1 cm. Outer stamens 6–8 mm; filaments 2-dentate at apex, teeth spreading, ± level with anthers. Inner

stamens shorter than outer ones; filaments obtuse, acuminate, or 2-lobed, at apex; anthers borne near middle of filaments abaxially. Styles 3(or 4), subequaling stamens. Capsule globose, ca. 4 mm in diam., with persistent, recurved calyx lobes. Fl. Mar–Apr, fr. Jul–Aug.

• Mixed forests, forest margins, thickets, mountain slopes; 1400–3000 m. SW Sichuan, Yunnan.

1a. Leaf blade papery or leathery; petals

1.2–1.5 × 0.8–1.1 cm 43c. var. *macropetala*

1b. Leaf blade thinly papery; petals

0.8–1.2 × 0.4–0.8 cm.

2a. Leaf blade ovate-lanceolate or ovate-oblong, 5–8(–10) × 1.2–3.5(–4.5) cm, margin sparsely serrate 43a. var. *calycosa*

2b. Leaf blade ovate or broadly so,

1.5–2.7 × 0.8–1.2 cm, margin densely serrulate 43b. var. *xerophyta*

43a. *Deutzia calycosa* var. *calycosa*

大萼溲疏(原变种) *da e sou shu* (yuan bian zhong)

Deutzia calycosa var. *brachytricha* Handel-Mazzetti; *D. calycosa* var. *longisepala* Zaikonnikova.

Leaf blade ovate-lanceolate or ovate-oblong, 5–8(–10) × 1.2–3.5(–4.5) cm, thinly papery, margin sparsely serrate. Petals 0.8–1.2 × 0.4–0.8 cm. Fl. Mar–Apr, fr. Jul–Aug.

• Mixed forests, thickets, mountain slopes; 2000–3000 m. SW Sichuan, W Yunnan.

43b. *Deutzia calycosa* var. *xerophyta* (Handel-Mazzetti) S. M. Hwang, Acta Bot. Austro Sin. 8: 26. 1992.

旱生溲疏 *han sheng sou shu*

Deutzia longifolia Franchet var. *xerophyta* Handel-Mazzetti, Symb. Sin. 7: 440. 1931; *D. glomeruliflora* Franchet var. *xerophyta* (Handel-Mazzetti) Zaikonnikova.

Leaf blade ovate or broadly so, 1.5–2.7 × 0.8–1.2 cm, thinly papery, margin densely serrulate. Petals 0.8–1.2 × 0.4–0.8 cm.

• Forest margins, thickets; 1400–1900 m. SW Sichuan (Yanyuan Xian).

43c. *Deutzia calycosa* var. *macropetala* Rehder, J. Arnold Arbor. 1: 208. 1920.

大瓣溲疏 *da ban sou shu*

Deutzia longifolia var. *grandiflora* Franchet ex H. Léveillé; *D. longifolia* var. *macropetala* (Rehder) Zaikonnikova.

Leaf blade papery or leathery, abaxially stellate hairy, hairs without central rays. Calyx similarly stellate hairy. Petals 1.2–1.5 × 0.8–1.1 cm.

• Forests; 1400–2300 m. Yunnan.

44. *Deutzia crassifolia* Rehder in Sargent, Pl. Wilson. 1: 148. 1912.

厚叶溲疏 hou ye sou shu

Deutzia crassifolia var. *pauciflora* (Rehder) S. M. Hwang; *D. pauciflora* (Rehder) Zaikonnikova; *D. purpurascens* (Franchet ex L. Henry) Rehder var. *pauciflora* Rehder.

Shrubs semievergreen, 1–3 m tall. Flowering branchlets 2–4 cm, stellate hairy, hairs with papilliform base. Petiole 1–5 mm; leaf blade abaxially red-brown, adaxially green, ovate or oblong-ovate, 1.5–9 × 1–4.5 cm, leathery or papery, abaxially 5–8-rayed stellate hairy, adaxially reticulate rugose when dry, 4- or 5-rayed stellate hairy, veins in 5 or 6 pairs, elevated abaxially, impressed adaxially, base rounded, margin thorny serrate or serrulate, apex acuminate. Cymes 2–3 × 3–4 cm, 1–35-flowered; pedicels 3–10 mm. Calyx tube gray-green, ca. 3.5 × 2.5 mm, appressed 7- or 8-rayed stellate hairy; lobes ovate or deltoid, rarely ovate-oblong, 1.5–2 × ca. 2 mm, apex obtuse or acute. Petals induplicate, white, elliptic or oblong, 6–8 × 3–5 mm. Outer stamens 5–6 mm, filaments 2-dentate at apex, teeth ± level with or exceeding anthers. Inner stamens 4–5 mm; anthers borne near middle of filaments abaxially, stalked. Styles 3 or 4, 2.5–3 mm, glabrous. Capsule dark gray, subglobose, ca. 4 mm in diam., with persistent, incurved calyx lobes. Fl. Mar–Apr, fr. May–Jun.

• Forests, valleys; 1700–2400 m. Xizang, S Yunnan.

45. *Deutzia multiradiata* W. T. Wang, Bull. Bot. Res., Harbin 3(2): 84. 1983.

多辐线溲疏 duo fu xian sou shu

Deutzia nitidula W. T. Wang.

Shrubs ca. 3 m tall. Flowering branchlets purplish brown, terete, 4–12 cm, 4–6-leaved. Petiole 3–5 mm; leaf blade abaxially grayish, adaxially glossy, ovate-lanceolate or ovate, 3.5–5.5 × 1.7–2.3 cm, leathery, abaxially densely 8–16-rayed stellate hairy, indumentum continuous, adaxially 5–7-rayed stellate hairy, veins in 4 or 5 pairs, reticulate veins sparsely conspicuous on both surfaces, base rounded or broadly cuneate, margin sparsely serrulate or slightly revolute, apex acuminate or caudate. Cymes 3–4 × 3–4.5 cm, 12–19-flowered; pedicels 3–6 mm. Calyx tube ca. 2.5 × 3 mm, densely 12–16-rayed stellate hairy; lobes deltoid, ca. 1 × 1 mm. Petals induplicate, white, oblong, ca. 6 × 3 mm. Outer stamens ca. 4 mm; filaments 2-dentate at apex, ± level with anthers. Inner stamens ca. 3.5 mm; anthers borne near middle of filaments abaxially, stalked. Styles 3, ca. 3.5 mm. Capsule unknown. Fl. Apr–Jun.

• Mixed forests, mountain slopes, roadsides; 500–1600 m. SE Sichuan (Nanchuan Xian).

46. *Deutzia coriacea* Rehder in Sargent, Pl. Wilson. 1: 9. 1911.

革叶溲疏 ge ye sou shu

Shrubs ca. 1 m tall. Flowering branchlets grayish brown or yellow-brown, angular, glabrous. Petiole 5–7 mm; leaf blade abaxially yellow-green, adaxially glossy, ovate or ovate-lanceolate, 3–5.5 × 2–3 cm, leathery, abaxially sparsely 5–7-rayed stellate hairy, adaxially glabrous or sparsely 4- or 5-rayed stellate hairy, veins in 4–6 pairs, base rounded or broadly cuneate, margin thorny serrate and slightly revolute, apex acuminate or caudate. Flowers unknown. Fruiting cymes ca. 3 × 2 cm, 9–18-fruited. Capsule globose, ca. 4 mm, with persistent, incurved or erect calyx lobes; pedicel 1–1.5 cm. Fr. Jun.

• Thickets, mountain slopes, calcareous soils; ca. 600 m. E Sichuan (Wuxi Xian).

47. *Deutzia pilosa* Rehder in Sargent, Pl. Wilson. 1: 8. 1911.

褐毛溲疏 he mao sou shu

Deutzia pilosa var. *longiloba* P. He & L. C. Hu; *D. pilosa* var. *longiloba* W. T. Wang ex S. M. Hwang (1992), not P. He & L. C. Hu (1990).

Shrubs 1–1.8 m. Flowering branchlets 6–8 cm, 4–6-leaved, stellate hairy, hairs with long central rays. Petiole 1–3 mm; leaf blade abaxially greenish, ovate, ovate-lanceolate, or oblong-ovate, 3–9.5 × 1.5–5 cm, papery, abaxially 6- or 7(or 8)-rayed stellate hairy, hairs with long central rays, adaxially 4- or 5(or 6)-rayed stellate hairy, veins in 3 or 4 pairs, reticulate veins slightly sparse, elevated abaxially, base rounded or broadly cuneate, margin serrulate, apex acuminate or caudate. Corymbose cymes 3–5 × 4–6 cm, 3- or 4-flowered; pedicels 3–10 mm. Calyx tube ca. 3 × 3.5 mm, densely 8–12-rayed stellate hairy, hairs with central rays; lobes ovate or ovate-lanceolate, 1.5–4 mm, apex acute or acuminate. Petals induplicate, white, ovate-oblong, 8–10 mm. Outer stamens 4–5 mm; filaments 2-dentate at apex, teeth spreading, exceeding anthers. Inner stamens 3–4 mm; filaments 2-lobed or acuminate at apex; anthers borne near middle on filaments abaxially. Styles 3(or 4), ca. 2.5 mm. Capsule subglobose, ca. 5 mm in diam., with persistent, incurved calyx lobes. Fl. Apr–May, fr. Jun–Aug.

• Forest margins, mountain slopes; 400–2000 m. Gansu, Guizhou, ?Shaanxi (Qin Ling), Sichuan, Yunnan.

48. *Deutzia esquirolii* (H. Léveillé) Rehder, J. Arnold Arbor. 14: 202. 1933.

狭叶溲疏 xia ye sou shu

Styrax esquirolii H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 446. 1911; *Deutzia chaffanjonii* H. Léveillé; *D. lanceifolia* Rehder.

Shrubs 1–2 m tall. Flowering branchlets purple, 8–11 cm, 4–6-leaved, sparsely stellate hairy. Petiole 3–4 mm;

leaf blade abaxially greenish, lanceolate or narrowly so, 2.5–4.5 cm × 4–6(–12) mm, papery, abaxially 5–7-rayed stellate hairy, indumentum discontinuous, adaxially sometimes rugose, sparsely 4(or 5)-rayed stellate hairy, veins in 4 or 5 pairs, base cuneate, margin serrulate, apex acuminate or narrowly so. Cymes 1.5–5 × 2–3 cm, 3–5(–9)-flowered; peduncle slender; pedicels 4–8 (–15) mm. Calyx tube ca. 4 × 4 mm, densely 4–8-rayed stellate hairy; lobes deltoid, 1–2 mm. Petals induplicate, white, ovate-oblong, 5–8 × 4–5 mm. Outer stamens 4–5 mm; filament teeth exceeding anthers; anthers stalked, globose. Inner stamens 3–4 mm; filaments acuminate or unequally 2- or 3-lobed at apex; anthers borne near middle of filaments abaxially. Styles 3, 2–3 mm. Capsule subglobose, ca. 3 mm in diam., densely 5–10-rayed stellate hairy, with persistent, incurved calyx lobes. Fl. Apr–May, fr. Sep–Oct.

• Mixed forests, mountain slopes; 1000–2000 m. C Guizhou (Guiyang Shi).

49. *Deutzia cinerascens* Rehder in Sargent, Pl. Wilson. 1: 146. 1912.

灰叶溲疏 *hui ye sou shu*

Shrubs ca. 2 m tall. Flowering branchlets 2–6(–20) cm, 4–6-leaved. Petiole 3–5 mm; leaf blade abaxially grayish green, ovate or ovate-oblong, 3–9 × 1.5–4 cm, papery, abaxially densely 5- or 6-rayed stellate hairy, hairs along veins with central rays, adaxially slightly rugose, 4- or 5(or 6)-rayed stellate hairy, veins in 6–8 pairs, reticulate veins conspicuously elevated abaxially, base rounded or subcordate, margin serrulate, apex acuminate. Cymes aggregate, 1.5–8 × 3–10 cm, 12–100-flowered; pedicels 1–2 mm. Calyx purple; tube ca. 3 × 3 mm; lobes ovate-deltoid or ovate, 1–1.5 mm, apex acute or acuminate. Petals induplicate, white, ovate-oblong, 3–4.5 mm, margin erose. Outer stamens 2–2.5 mm; filament teeth ± level with anthers; anthers stalked, ovoid. Inner stamens shorter than outer ones; filaments obtuse, erose, or 2-lobed at apex; anthers borne near middle or near apex of filaments abaxially. Styles 3, 2–2.5 mm, subequaling stamens. Capsule unknown.

• Thickets, river banks. W Guizhou (Zhenning Bouyei-Miao Zu Zizhixian).

50. *Deutzia setchuenensis* Franchet, J. Bot. (Morot) 10: 282. 1896.

四川溲疏 *si chuan sou shu*

Shrubs ca. 2 m tall. Flowering branchlets brown or yellow-brown, 8–12(–20) cm, 4–6-leaved. Petiole 3–5 mm; leaf blade abaxially yellow-green or greenish when dry, ovate, ovate-oblong, or -lanceolate, 3–8 × 1–5 cm, papery or membranous, abaxially 4–7(or 8)-rayed stellate hairy, hairs with papilliform base, adaxially 3–5(or 6)-rayed stellate hairy, hairs rarely with central rays, veins in 3 or 4 pairs, conspicuously elevated abaxially, base rounded or broadly cuneate, margin serrulate, apex acuminate. Cymes few to many

branched, 1.5–6 × 2–8 cm, 6–50-flowered; peduncle slender; pedicels 3–10 mm. Calyx tube ca. 3 × 3 mm, densely 10–12-rayed stellate hairy; lobes broadly deltoid, ca. 1.5 × 2–3 mm, apex acute. Petals induplicate, white, ovate-oblong, 5–12 × 2–3 mm. Outer stamens 5–6 mm, filament teeth spreading, oblong or lanceolate, ± level with or exceeding anthers. Inner stamens shorter than outer ones; filaments 2-lobed at apex; anthers borne near middle of filaments abaxially. Styles 3. Capsule globose, 4–5 mm in diam., with persistent, incurved calyx lobes. Fl. Apr–Jul, fr. Jun–Sep.

• Dense forests, thickets, mountain slopes; 300–2000 m. W Fujian, N Guangdong, N Guangxi, Guizhou, Hubei, Hunan, Jiangxi, W Sichuan, NW Yunnan.

1a. Cymes many branched, 4–6 × 5–8 cm, 12–50-flowered 50c. var. *corymbiflora*

1b. Cymes few branched, 1.5–4 × 2–5 cm, 6–12-flowered.

2a. Outer filament teeth oblong, ± level with anthers 50a. var. *setchuenensis*

2b. Outer filament teeth lanceolate, exceeding anthers 50b. var. *longidentata*

50a. *Deutzia setchuenensis* var. *setchuenensis*

四川溲疏(原变种) *si chuan sou shu* (yuan bian zhong)

Deutzia bodinieri Rehder; *D. cyanocalyx* H. Léveillé; *D. leiboensis* P. He & L. C. Hu; *D. pilosa* Rehder var. *ochrophloeos* Rehder.

Cymes few branched, 1.5–4 × 2–5 cm, 6–12-flowered. Outer filament teeth oblong, ± level with anthers. Fl. Apr–Jul, fr. Jun–Sep.

• Thickets, mountain slopes; 300–2000 m. W Fujian, N Guangdong, N Guangxi, Guizhou, Hubei, Hunan, Jiangxi, NW Yunnan.

50b. *Deutzia setchuenensis* var. *longidentata* Rehder in Sargent, Pl. Wilson. 1: 8. 1911.

长齿溲疏 *chang chi sou shu*

Cymes few branched, 1.5–4 × 2–5 cm, 6–12-flowered. Outer filament teeth lanceolate, exceeding anthers. Fl. Apr–Jul.

• Thickets, mountain slopes. W Sichuan.

50c. *Deutzia setchuenensis* var. *corymbiflora* (Lemoine ex André) Rehder in Sargent, Pl. Wilson. 1: 9. 1911.

多花溲疏 *duo hua sou shu*

Deutzia corymbiflora Lemoine ex André, Rev. Hort. 69: 401. 1898; *D. fargesii* Franchet.

Cymes many branched, 4–6 × 5–8 cm, 12–50-flowered. Fl. May, fr. Jul–Aug.

• Dense forests; 800–1500 m. Hubei, Sichuan.

18. PHILADELPHUS Linnaeus, Sp. Pl. 1: 470. 1753.

山梅花属 shan mei hua shu

Huang Shumei (黄淑美 Hwang Shu-mei); Hideaki Ohba, Shinobu Akiyama

Shrubs erect, rarely climbing, rarely spinescent. Branchlets opposite. Leaves opposite, exstipulate, veins 3–5, basifugal, margin entire or serrate. Inflorescences racemose, paniculate, or cymose, rarely 1-flowered. Flowers fragrant. Calyx tube campanulate or turbinate, adnate to ovary; lobes 4(or 5). Petals 4(or 5), white, contorted. Stamens 13–90; filaments flat, free or basally connate; anthers ovoid or oblong, rarely globose. Ovary inferior or subinferior, 4(or 5)-loculed; placentation axile; ovules numerous, pendulous. Style (3 or)4(or 5)-lobed; stigmas clavate or spatulate. Fruit a capsule, 4(or 5)-valved, dehiscing by valves; epicarp papery; endocarp corky. Seeds numerous.

About 70 species: mainly in temperate regions of the N hemisphere; 22 species (17 endemic) in China.

- 1a. Style slender; stigma mallet-shaped, rarely clavate, 1–1.5 mm, shorter and narrower than anthers; racemes usually 3–7(–14)-flowered, lowest ones 1–3-flowered.
- 2a. Pedicel and calyx densely appressed white hairy.
- 3a. Leaf blade abaxially glabrous or villous to glabrescent when young, apex acute; calyx densely erect
villous 11. *P. dasycalyx*
- 3b. Leaf blade abaxially hairy, apex abruptly acuminate; calyx densely appressed strigose.
- 4a. Anthers glabrous 9. *P. incanus*
- 4b. Anthers setose 10. *P. reevesianus*
- 2b. Pedicel and calyx glabrous or sparsely hairy.
- 5a. Inflorescence rachis and calyx purple or dark brown; calyx obscurely veined, sometimes glaucous.
- 6a. Calyx sparsely pubescent to glabrescent, tube urn-shaped 7. *P. purpurascens*
- 6b. Calyx sparsely strigose, tube campanulate 8. *P. kansuensis*
- 5b. Inflorescence rachis and calyx yellowish green or yellowish brown when dry; calyx conspicuously veined, not glaucous.
- 7a. Style slightly divided, glabrous; disc glabrous.
- 8a. Calyx sparsely villous 3. *P. tenuifolius*
- 8b. Calyx glabrous.
- 9a. Leaf blade glabrous on both surfaces or only abaxially hairy at vein axils; racemes 5–7-flowered, rachis 3–5 cm 1. *P. pekinensis*
- 9b. Leaf blade strigose adaxially and villous abaxially at vein axils; racemes 3–5-flowered, rachis 2–2.5(–4) cm 2. *P. brachybotrys*
- 7b. Style divided for 1/2 its length or more, base hairy; disc glabrous or sometimes hairy.
- 10a. Petals suborbicular, hairy near base abaxially 6. *P. laxiflorus*
- 10b. Petals obovate or oblong-obovate, glabrous.
- 11a. Racemes 5–7-flowered; leaf blade elliptic-ovate or ovate 4. *P. schrenkii*
- 11b. Racemes 9–14-flowered; leaf blade broadly ovate or broadly ovate-elliptic 5. *P. tsianschanensis*
- 1b. Style robust; stigma clavate, oar-shaped, or spatulate, subequaling or longer than anthers; racemes (5–)7–11(–30)-flowered, usually lowest ones (2–)4- or 5-flowered in cymes or panicles.
- 12a. Leaf blade densely hairy abaxially.
- 13a. Calyx densely gray-yellow strigose 12. *P. kunmingensis*
- 13b. Calyx glabrous or sparsely hairy, sometimes hairy only along angles of tube.
- 14a. Leaf blade caudate-acuminate at apex.
- 15a. Style apically divided for 1/3–2/3 its length; leaf blade margin remotely serrulate 13. *P. tomentosus*
- 15b. Style entire or only slightly divided; leaf blade margin coarsely triangular serrate 14. *P. lushuiensis*
- 14b. Leaf blade acute or acuminate at apex.
- 16a. Calyx tube 4-angled in cross section, pubescent along angles 16. *P. tetragonus*
- 16b. Calyx tube not angled in cross section, glabrous 15. *P. delavayi*
- 12b. Leaf blade hairy abaxially or only along veins.
- 17a. Calyx glabrous.
- 18a. Leaf blade adaxially strigose; branchlets, inflorescence, and calyx yellow-brown or brown, not glaucous 21. *P. zhejiangensis*

- 18b. Leaf blade adaxially glabrous or bristly; branchlets, inflorescence, and calyx purple, glaucous 22. *P. calvescens*
- 17b. Calyx hairy.
- 19a. Calyx lobes oblong-lanceolate, apex caudate, tail 2–3 mm; leaf blade membranous, base rounded or subcordate 17. *P. caudatus*
- 19b. Calyx lobes ovate or ovate-lanceolate, apex acuminate or acute, acumen 1–1.5 mm; leaf blade papery, base cuneate or broadly so.
- 20a. Calyx tube golden yellow or grayish yellow villous; style hairy as calyx; leaf blade villous abaxially along veins 18. *P. subcanus*
- 20b. Calyx tube white bristly or strigose; style glabrous, rarely hairy; leaf blade scabrid-hirsute abaxially along veins.
- 21a. Leaf blade ovate, ovate-oblong, or lanceolate 19. *P. henryi*
- 21b. Leaf blade elliptic or elliptic-lanceolate, rarely ovate-elliptic 20. *P. sericanthus*

1. *Philadelphus pekinensis* Ruprecht, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg 15: 365. 1857.

太平花 tai ping hua

Deutzia chanetii H. Léveillé; *Philadelphus coronarius* Linnaeus var. *pekinensis* (Ruprecht) Maximowicz; *P. pekinensis* f. *lanceolatus* S. Y. Hu; *P. rubricaulis* Carrière.

Shrubs 1–2 m tall. Branches of previous year brown, glabrous, those of current year yellow-brown. Petiole 5–12 mm; leaf blade ovate, broadly elliptic, or lanceolate, 4–9 × 1–4.5 cm, or elliptic or lanceolate and 2.7–5 × 1–2.5 cm on flowering shoots, both surfaces glabrous, occasionally bearded at vein axils, veins 3–5, basifugal, base cuneate or broadly so, margin serrate, rarely entire, apex acuminate or long acuminate. Racemes 5–7(–9)-flowered; rachis yellowish green, 3–5 cm, glabrous; pedicels 3–6 mm, glabrous. Calyx yellowish green when dry, glabrous; lobes ovate, 3–4 × ca. 2.5 mm, veined, apex acute. Corolla discoid; petals obovate, 0.9–1.2 × ca. 0.8 cm. Stamens 25–28, longest ones ca. 1.7 cm. Disc and style glabrous. Style distally slightly divided, slender, 4–5 mm; stigmas mallet-shaped, ca. 1 mm, shorter than anthers, adaxially short or broad. Capsule subglobose or obconical, 5–7 mm in diam. Seeds 3–4 mm, shortly tailed. Fl. May–Jul, fr. Aug–Oct.

Mixed forests, thickets, mountain slopes; 700–900 m. Hebei, ?Hubei, ?Jiangsu, Liaoning, Shaanxi, Shanxi, ?Zhejiang [Korea].

In FRPS, two varieties were recognized: var. *pekinensis* and var. *lanceolatus* S. Y. Hu. However, those names were actually published as forms by Hu (J. Arnold Arbor. 36: 95. 1955) and have never been validly published at varietal rank.

2. *Philadelphus brachybotrys* (Koehne) Koehne in Sargent, Pl. Wilson. 1: 5: 1911.

短序山梅花 duan xu shan mei hua

Philadelphus pekinensis Ruprecht var. *brachybotrys* Koehne, Mitt. Deutsch. Dendrol. Ges. 13: 84. 1904.

Shrubs 2–3 m tall. Branchlets of previous year brownish gray, those of current year villous, glabrescent. Petiole 5–8 mm; leaf blade ovate or ovate-oblong, 2–6 × 1–3 cm, abaxially villous along veins, adaxially strigose, veins 3–5, basifugal, base broadly

cuneate or rounded, margin sparsely serrate or subentire, apex acute. Racemes 3–5-flowered; rachis 2–2.5(–4) cm, sparsely villous; pedicels 3–8 mm, glabrous. Calyx yellowish green when dry; tube glabrous; lobes ovate, 4–6 × 3–4 mm, apex acute. Corolla discoid; petals white, broadly elliptic or broadly obovate, 1–1.5 × 1–1.4 cm, veined. Stamens 32–42, longest ones ca. 8 mm. Disc and style glabrous. Style slightly divided at apex, slender, subequaling stamens; stigmas mallet-shaped, ca. 1.5 mm, shorter than anthers. Capsule ellipsoid, 7–10 × 5–7 mm. Seeds 3–4 mm, shortly tailed; tail 1.5–2 mm. Fl. Apr–Jul, fr. Aug–Sep.

• Thickets; 200–400 m. ?Fujian, Jiangsu, Jiangxi, Zhejiang. This species is cultivated as an ornamental.

3. *Philadelphus tenuifolius* Ruprecht ex Maximowicz, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg 15: 133. 1856.

薄叶山梅花 bo ye shan mei hua

Shrubs 1–3 m tall. Branchlets of previous year gray-brown, those of current year brownish, pubescent. Petiole 3–8 mm; leaf blade ovate or ovate-elliptic, 3–11 × 2–6 cm, abaxially usually villous along veins, adaxially sparsely villous, base subrounded or broadly cuneate, margin remotely serrate or dentate, apex acute or acuminate; leaf blade on flowering shoots ovate or ovate-elliptic, 3–6 × 2–3 cm, base rounded or obtuse, margin subentire, apex acuminate. Racemes 3–7(–9)-flowered; rachis 3–5 cm, sparsely hairy; pedicels 3–10 cm. Calyx tube yellowish green when dry, sparsely villous; lobes ovate, ca. 5 mm. Corolla discoid; petals white, ovate-oblong or suborbicular, 1–1.5 × 0.6–1.3 cm, apex rounded, slightly 2-lobed. Stamens 20–30, longest ones ca. 1 cm. Disc glabrous. Style slightly divided, slender, glabrous; stigmas mallet-shaped, ca. 1.5 mm, shorter than anthers. Capsule obconical, 4–6 × 4–5 mm. Seeds 2.5–3 mm, shortly tailed. Fl. Jun–Jul, fr. Aug–Sep.

Thickets; 100–900 m. Heilongjiang, Jilin, Liaoning, ?Nei Mongol [Korea, SE Russia].

1a. Petals ovate-oblong, 1–1.5 × 0.6–1.3 cm

..... 3a. var. *tenuifolius*

1b. Petals suborbicular, ca. 1 × 0.95 cm 3b. var. *latipetalus*

3a. *Philadelphus tenuifolius* var. *tenuifolius*

薄叶山梅花(原变种) bo ye shan mei hua (yuan bian zhong)

Philadelphus coronarius Linnaeus var. *tenuifolius* (Ruprecht ex Maximowicz) Maximowicz.

Leaf blade ovate or ovate-elliptic, 8–11 × 5–6 cm, base subrounded or broadly cuneate, margin remotely serrate or dentate, apex acute. Petals ovate-oblong, 1–1.5 × 0.6–1.3 cm. Fl. Jun–Jul, fr. Aug–Sep.

Thickets; 100–900 m. Heilongjiang, Jilin, Liaoning, ?Nei Mongol [Korea, SE Russia].

3b. *Philadelphus tenuifolius* var. *latipetalus* S. Y. Hu, J. Arnold Arbor. 36: 351. 1955.

宽瓣山梅花 kuan ban shan mei hua

Leaf blade ovate, ca. 11 × 6 cm, base rounded or obtuse, margin serrulate; apex acuminate. Petals suborbicular, ca. 1 × 0.95 cm. Fl. Jun.

• NE China (precise distribution unknown).

This variety is apparently known only from the type, *B. V. Skvortzov s.n.* (A), collected in “Manchuria” in 1925.

4. *Philadelphus schrenkii* Ruprecht, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 15: 365. 1857.

东北山梅花 dong bei shan mei hua

Shrubs 2–4 m tall. Branchlets of previous year grayish brown or gray, glabrous, those of current year brown, villous. Petiole 3–10 mm; leaf blade ovate or elliptic-ovate, 7–13 × 4–7 cm on vegetative shoots, 4.5–7.5 × 1.5–4 cm on flowering shoots, abaxially villous along veins, adaxially glabrous, veins 3–5, basifugal, base cuneate or broadly so, margin serrate, apex acuminate. Racemes 5–7-flowered; rachis yellowish green, 2–5 cm, sparsely villous; pedicels 6–12 mm. Calyx yellowish green when dry; tube sparsely pubescent; lobes ovate, 4–7 mm, conspicuously veined. Corolla discoid; petals white, obovate or oblong-obovate, 1(–1.8) × (0.7–)1.2 cm, glabrous. Stamens 25–30, longest ones ca. 1 cm. Disc subconcave. Style divided for 1/2 its length or more, hirtellous; stigmas mallet-shaped, 1–1.5 mm, shorter than anthers. Capsule ellipsoid, 8–9.5 × 3.5–4.5 mm. Seeds 2–2.5, shortly tailed. Fl. Jun–Jul, fr. Aug–Oct.

Mixed forests; 100–1500 m. Hebei, Heilongjiang, Jilin, Liaoning, Shaanxi [Korea, SE Russia].

1a. Leaf blade broadly ovate, base rounded, apex acute 4c. var. *mandshuricus*

1b. Leaf blade ovate or elliptic-ovate, base cuneate or broadly so, apex acute or acuminate.

2a. Calyx tube moderately villous 4a. var. *schrenkii*

2b. Calyx tube with tufted hairs only between lobes 4b. var. *jackii*

4a. *Philadelphus schrenkii* var. *schrenkii*

东北山梅花(原变种) dong bei shan mei hua (yuan bian zhong)

Leaf blade ovate or elliptic-ovate, base cuneate or broadly so, apex acute or acuminate. Calyx tube moderately villous. Petals oblong-obovate, 1.5–1.8 × 1–1.2 cm. Disc glabrous. Style hirtellous. Fl. Jun–Jul, fr. Aug–Sep.

Mixed forests; 100–1500 m. Heilongjiang, Jilin, Liaoning [Korea, SE Russia].

4b. *Philadelphus schrenkii* var. *jackii* Koehne, Repert. Spec. Nov. Regni Veg. 10: 127. 1911.

河北山梅花 he bei shan mei hua

Leaf blade ovate or elliptic-ovate, base cuneate or broadly so, apex acute or acuminate. Calyx tube with tufted hairs only between lobes. Petals oblong-obovate, 1–1.5 × 0.7–1 cm. Disc and style villous. Fl. Jun–Jul, fr. Aug–Oct.

Hebei, Jilin, Shaanxi [Korea].

4c. *Philadelphus schrenkii* var. *mandshuricus* (Maximowicz) Kitagawa, Lin. Fl. Manshur. 253. 1939.

毛盘山梅花 mao pan shan mei hua

Philadelphus coronarius Linnaeus var. *mandshuricus* Maximowicz, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 10: 41. 1867; *P. mandshuricus* (Maximowicz) Nakai.

Leaf blade broadly ovate, base rounded, apex acute. Petals suborbicular, 1.2–1.5 cm in diam. Disc and style villous. Fl. Jun.

Mixed forests. Jilin, Liaoning [Korea, SE Russia].

5. *Philadelphus tsianschanensis* Wang & Li in Liou, Ill. Fl. Lign. Pl. N. E. China, 561. 1955.

千山山梅花 qian shan shan mei hua

Shrubs ca. 1.5 m tall. Branchlets of previous year gray-brown, those of current year brown, pubescent. Petiole 5–8 mm; leaf blade broadly ovate or broadly ovate-elliptic, 5–10 × 3–6.5 cm, both surfaces glabrous or villous along veins, veins 3–5, basifugal, base rounded, margin sparsely serrate, apex shortly acuminate. Racemes 9–14-flowered; rachis yellowish green, 5–6 cm; pedicels 5–8 mm. Calyx yellowish green when dry; tube slightly 4-angled, sparsely villous; lobes ovate, ca. 5 × 3.5 mm, conspicuously veined, apex acute. Petals white, obovate or oblong-obovate, ca. 1.2 × 0.8 cm, glabrous. Stamens 24–26, longest ones 6–8 mm. Disc and style sparsely hirsute. Style divided nearly to base, subequaling longest stamens; stigmas mallet-shaped, ca. 1.5 mm, shorter than anthers. Capsule subglobose, 4–5 mm in diam. Seeds 3–4 mm, shortly tailed. Fl. May.

• Mixed forests; 400–600 m. Liaoning.

6. *Philadelphus laxiflorus* Rehder, J. Arnold Arbor. 5: 152. 1924.

疏花山梅花 *shu hua shan mei hua*

Shrubs 2–3 m tall. Branchlets of previous year grayish brown or brown, those of current year brown, glabrous. Petiole 5–8 mm; leaf blade long elliptic or ovate-elliptic, 3–8 × 1.6–3 cm, abaxially glabrous or white villous along veins, adaxially strigose, veins 3–5, basifugal, base cuneate, margin serrate, apex acuminate or caudate. Racemes 7–9(–11)-flowered, lowest ones usually 3-flowered and cymose; rachis 3–12 cm; pedicels 5–12 mm. Calyx yellowish brown when dry; tube cupular, glabrous or strigose; lobes ovate, ca. 6 × 4 mm, conspicuously veined, apex acute. Corolla discoid; petals white, suborbicular, ca. 1.6 cm, hairy near base abaxially. Stamens 30–35, longest ones ca. 9 mm. Disc margin and style glabrous or sparsely white villous. Style divided for ca. 1/2 its length; stigmas clavate, 1–1.5 mm, shorter than anthers. Capsule ellipsoid, ca. 6 × 6.5 mm. Seeds ca. 3 mm, shortly tailed. Fl. May–Jun, fr. Aug.

• Mixed forests, thickets in valleys, mountain slopes; 800–2000 m. Gansu, Henan, Qinghai, Shaanxi.

7. *Philadelphus purpurascens* (Koehne) Rehder, Mitt. Deutsch. Dendrol. Ges. 24: 220. 1916.

紫萼山梅花 *zi e shan mei hua*

Shrubs 1.5–4 m tall. Branchlets of previous year gray or grayish brown, those of current year purple, white villous or glabrescent. Petiole 2–6 mm; leaf blade ovate or elliptic, 3.5–7 × 2.5–4.5 cm, both surfaces glabrous, or abaxially sparsely villous along veins or densely white villous, base cuneate or broadly so, margin entire or serrate distally, apex acute or acuminate; leaves on flowering shoots with petiole 2–3 mm, leaf blade ovate, elliptic-lanceolate, or ovate-lanceolate, 1.5–4 × 0.5–1.5 cm, veins 3, basifugal, base cuneate or broadly so, margin subentire, apex obtuse or acute. Racemes 5–7(–9)-flowered; rachis purple, 2–10 cm, glabrous or sparsely pilose; pedicels 3–5 mm, glabrous. Calyx purple or dark brown; tube glaucous, spotted, urn-shaped, sparsely pubescent to glabrescent; lobes ovate, ca. 5 × 3.5 mm, apex acute. Corolla discoid; petals white, elliptic-obovate or broadly obovate, 1–1.5 × 8–13 mm, apex emarginate. Stamens 25–33, longest ones ca. 7 mm. Disc sometimes sparsely white villous. Style slightly divided or entire, ca. 6 mm, glabrous or sometimes sparsely villous; stigmas clavate, 1–1.5 mm, shorter than anthers. Capsule ovoid, 6–8 × 4–6 mm. Seeds ca. 3 mm, shortly tailed. Fl. May–Jun, fr. Jul–Sep.

• Mixed forests, thickets, mountain slopes; 2200–3500 m. Sichuan, Yunnan.

1a. Calyx tube dark brown; raceme rachis 4–10 cm *7c. var. szechuanensis*

1b. Calyx tube purple; raceme rachis 2–4.5 cm.

2a. Branchlets and leaf blade abaxially glabrous or sparsely villous along veins; leaf blade on flowering shoots elliptic-

lanceolate or ovate-lanceolate, base cuneate, apex acuminate *7a. var. purpurascens*

2b. Branchlets and leaf blade abaxially densely white villous; leaf blade on flowering shoots ovate, base broadly cuneate, apex acute *7b. var. venustus*

7a. *Philadelphus purpurascens* var. *purpurascens*

紫萼山梅花(原变种) *zi e shan mei hua* (yuan bian zhong)

Philadelphus brachybotrys (Koehne) Koehne var. *purpurascens* Koehne in Sargent, Pl. Wilson. 1: 6. 1911.

Branchlets and leaf blade abaxially glabrous or sparsely villous along veins. Leaf blade on flowering shoots elliptic-lanceolate or ovate-lanceolate, base cuneate, apex acuminate. Raceme rachis 2–4.5 cm. Calyx tube purple. Fl. May–Jun, fr. Jul–Sep.

• Thickets, mountain slopes; 2600–3500 m. NW Sichuan.

7b. *Philadelphus purpurascens* var. *venustus* (Koehne) S. Y. Hu, J. Arnold Arbor. 36: 331. 1955.

美丽山梅花 *mei li shan mei hua*

Philadelphus venustus Koehne, Mitt. Deutsch. Dendrol. Ges. 15: 53. 1906.

Branchlets and leaf blade abaxially densely white villous. Leaf blade on flowering shoots ovate, base broadly cuneate, apex acute. Raceme rachis 2–4.5 cm. Calyx tube purple. Fl. Jun.

• Thickets, mountain slopes; 2200–2400 m. Sichuan, Yunnan.

7c. *Philadelphus purpurascens* var. *szechuanensis* (W. P. Fang) S. M. Hwang, Acta Bot. Austro Sin. 7: 4. 1991.

四川山梅花 *si chuan shan mei hua*

Philadelphus szechuanensis W. P. Fang, Acta Sci. Nat. Univ. Szechuan. 1: 36. 1955.

Branchlets and leaf blade glabrous. Leaf blade on flowering shoots ovate-lanceolate, base cuneate, apex acute. Raceme rachis 4–10 cm. Calyx tube dark brown. Fl. Jun.

• Mixed forests, mountain slopes; ca. 2800 m. Sichuan, Yunnan.

8. *Philadelphus kansuensis* (Rehder) S. Y. Hu, J. Arnold Arbor. 36: 356. 1955.

甘肃山梅花 *gan su shan mei hai*

Philadelphus pekinensis Ruprecht var. *kansuensis* Rehder in Rehder & E. H. Wilson, J. Arnold Arbor. 9: 49. 1928.

Shrubs 2–7 m tall. Branchlets of previous year gray-brown, those of current year dark purple, sparsely puberulous to glabrescent. Petiole 2–8 mm; leaf blade ovate or ovate-elliptic, 5–10 × 3–6.5 cm, or 3–5 × 1–2(–3) cm on flowering shoots, both surfaces glabrous or adaxially strigose, abaxially villous only along veins, veins 3–5, basifugal, base rounded or broadly cuneate, margin subentire or sparsely dentate, apex acuminate. Racemes 5–7-flowered; rachis purple, 2–8 cm, sparsely strigose; pedicels 4–8 mm. Calyx purple; tube

campanulate, sparsely strigose; lobes ovate-deltoid, ca. 4 × 3 mm, apex acute. Corolla discoid; petals white, oblong-ovate, 1.2–1.5 × 1–1.3 cm. Stamens 28–30, longest ones ca. 9 mm. Disc setose at rim. Style divided for ca. 1/2 its length, 6–7 mm, base sometimes hairy; stigmas clavate, ca. 1 mm, shorter than anthers. Capsule obovoid, 6–8 × 4–5 mm. Seeds ca. 3 mm, shortly tailed. Fl. Jun–Jul, fr. Oct–Nov.

• Thickets; 2400–3500 m. Gansu, Qinghai, Shaanxi.

9. *Philadelphus incanus* Koehne, Gartenflora 45: 562. 1896.

山梅花 shan mei hua

Shrubs 1.5–3.5 m tall. Branchlets of previous year gray-brown, those of current year brown or purple, villous to glabrescent. Petiole 5–10 mm; leaf blade ovate or broadly so, 6–12.5 × 8–10 cm, abaxially densely white villous, adaxially bristly, hairs appressed, base rounded, margin sparsely serrate, apex abruptly acuminate; leaf blade on flowering shoots ovate-elliptic to lanceolate, 4–8.5 × 3.5–6 cm, veins 3–5, basifugal, base broadly cuneate or subrounded. Racemes 5–7(–11)-flowered, lowest pair usually at axils of normal leaves; rachis 0.2–0.3 or 5–7 cm, strigose or glabrous; pedicels 5–10 mm. Calyx tube campanulate, densely white appressed strigose; lobes ovate, ca. 5 × 3.5 mm, apex abruptly acuminate. Corolla discoid; petals white, ovate or suborbicular, 1.3–1.5 × 0.8–1.3 cm. Stamens 30–35, longest ones ca. 1 cm. Disc glabrous. Style slightly divided at apex, ca. 5 mm, glabrous; stigmas clavate, ca. 1.5 mm, shorter than anthers. Capsule obovoid, 7–9 × 4–7 mm. Seeds 1.5–2.5 mm, shortly tailed. Fl. May–Jun, fr. Jul–Aug.

• Thickets; 1200–1700 m. ?Fujian, ?Hebei, Henan, Hubei, W Hunan, Shaanxi, Shanxi, Sichuan.

This species is cultivated as an ornamental.

- 1a. Racemes aggregate, 5–7-flowered, rachis 0.2–0.3 cm, pedicels 1–2 mm 9c. var. *baileyi*
 1b. Racemes lax, 7–11-flowered, rachis 4–7 cm, pedicels 5–10 mm.
 2a. Disc and style glabrous; leaf blade abaxially densely hairy 9a. var. *incanus*
 2b. Disc and style sparsely white villous; leaf blade abaxially sparsely hairy 9b. var. *mitsai*

9a. *Philadelphus incanus* var. *incanus*

山梅花(原变种) shan mei hua (yuan bian zhong)

Leaf blade abaxially densely hairy. Racemes lax, 7–11-flowered; rachis 4–7 cm; pedicels 5–10 mm. Disc and style glabrous. Fl. May–Jun, fr. Jul–Aug.

• Thickets; 1200–1700 m. Henan, Hubei, Shaanxi, Shanxi, Sichuan.

9b. *Philadelphus incanus* var. *mitsai* (S. Y. Hu) S. M. Hwang, Acta Bot. Austro Sin. 7: 4. 1991.

米柴山梅花 mei chai shan mei hua

Philadelphus mitsai S. Y. Hu, J. Arnold Arbor. 36: 342. 1955.

Leaf blade abaxially sparsely hairy. Racemes lax, 7–11-flowered; rachis 4–7 cm; pedicels 5–10 mm. Disc and style sparsely white villous.

• Thickets. S Henan, W Hunan.

9c. *Philadelphus incanus* var. *baileyi* Rehder, Gentes Herb. 1: 27. 1920.

短轴山梅花 duan zhou shan mei hua

Leaf blade abaxially sparsely hairy. Racemes aggregates, 5–7-flowered; rachis 0.2–0.3 cm; pedicels 1–2 mm. Disc and style glabrous.

• Thickets; ca. 1600 m. Henan, Shaanxi.

10. *Philadelphus reevesianus* S. Y. Hu, J. Arnold Arbor. 36: 340. 1955.

毛药山梅花 mao yao shan mei hua

Shrubs 3–4 m tall. Branchlets of previous year gray, those of current year strigose. Petiole 3–5 mm; leaf blade elliptic or ovate-elliptic, 4–9 × 2–5 cm, both surfaces strigose, abaxially appressed hairy, adaxially erect hairy, base obtuse or rounded, margin serrate, apex abruptly acuminate, acumen 0.5–1.5 cm. Inflorescences 7–9-flowered; rachis 2–6 cm, strigose; pedicels 4–5 mm, strigose. Calyx tube appressed white strigose; lobes ovate, ca. 6 × 3–3.5 mm, apex acuminate. Corolla subcruciform; petals white, oblong, ca. 1.6 × 1 cm. Stamens ca. 40; anthers oblong, connective setose. Disc pubescent. Style divided at apex, ca. 5 mm, glabrous or hirtellous; stigmas clavate, shorter or narrower than anthers. Capsule subglobose, ca. 7 mm in diam., with persistent calyx lobes subapically. Seeds 2–3 mm, shortly tailed. Fl. Jun–Jul.

• Thickets. Hubei.

11. *Philadelphus dasycalyx* (Rehder) S. Y. Hu, J. Arnold Arbor. 36: 341. 1955.

毛萼山梅花 mao e shan mei hua

Philadelphus pekinensis Ruprecht var. *dasycalyx* Rehder, J. Arnold Arbor. 1: 197. 1920.

Shrubs subscandent, ca. 3 m tall. Branchlets of previous year grayish brown, glabrous, those of current year brownish. Petiole 5–10 mm; leaf blade ovate or ovate-elliptic, 3–6(–8) × 1.2–3.5(–5) cm, abaxially glabrous or sparsely villous to glabrescent when young, adaxially glabrous or sparsely strigose on flowering shoots, veins 3–5, slightly basifugal, base broadly cuneate or obtuse, margin serrate, apex acute. Racemes 5–6(–8)-flowered, lowest ones rarely 3-flowered; rachis 2.5–5.5 cm, sparsely white villous; pedicels 4–5 mm, white villous. Calyx tube densely erect grayish white villous; lobes ovate, 5–6 × 2.5–3 mm, sparsely villous to glabrous, apex acute. Corolla discoid; petals white, obovate or broadly so, 1.2–1.5 × 1–1.2 cm. Stamens 25–34, longest ones ca. 7 mm. Disc and style glabrous, rarely villous. Style slightly divided at apex, ca. 6 mm; stigmas clavate, ca. 1.5 mm, shorter than anthers. Capsule obovoid, ca. 6 × 4.5 mm, with persistent calyx lobes at apex. Seeds ca. 3 mm, shortly tailed. Fl. May–Jun, fr. Jul–Sep.

• Coniferous forests, thickets; 700–2500 m. Gansu, Henan, Shaanxi, Shanxi.

12. *Philadelphus kunmingensis* S. M. Hwang, J. Trop. Subtrop. Bot. 8: 263. 2000.

昆明山梅花 *kun ming shan mei hua*

Shrubs ca. 4 m tall. Branchlets of previous year dark purple, glabrous, those of current year purple, densely gray-yellow villous. Petiole 5–10 mm; leaf blade ovate or ovate-lanceolate, rarely narrowly lanceolate, 2–6 × 1–3 cm, abaxially densely villous, adaxially sparsely so, veins 3–5, slightly basifugal, base rounded, margin entire or sparsely serrulate, apex acuminate or abruptly so. Racemes 5–8 cm, (5–)7–13-flowered, lowest ones usually 3-flowered cymes; rachis and pedicels densely gray-yellow strigose; pedicels 1–12 mm, distal ones usually shorter. Calyx tube densely gray-yellow strigose; lobes ovate or ovate-lanceolate, 4–5 × 3–3.5 mm, apex acuminate, acumen ca. 1 mm. Corolla discoid; petals white, obovate or suborbicular, 4–5 × 3.5 mm. Stamens 27–30, longest ones ca. 7 mm. Style entire or slightly divided, robust, slightly shorter than longest stamens, glabrous; stigmas clavate, 1.5–2 mm, subequaling anthers. Capsule gray-brown, turbinate, ca. 7 × 6 mm. Seeds ca. 2.5 mm, shortly tailed. Fl. Jun.

• Thickets; 2000–2100 m. Yunnan.

Philadelphus kunmingensis and its var. *parvifolius* were previously published by Hwang (Acta Bot. Austro Sin. 7: 5–7. 1991), but were invalid because no type was cited (St. Louis Code, Art. 37.1).

- 1a. Leaf blade 4–6 × 1.5–3 cm; corolla 2.5–3 cm in diam. 12a. var. *kunmingensis*
 1b. Leaf blade 2–3 × 1–1.5 cm; corolla 1–1.5 cm in diam. 12b. var. *parvifolius*

12a. *Philadelphus kunmingensis* var. *kunmingensis*

昆明山梅花(原变种) *kun ming shan mei hua* (*yuan bian zhong*)

Leaf blade 4–6 × 1.5–3 cm. Corolla 2.5–3 cm in diam.

• Thickets; ca. 2100 m. Yunnan.

12b. *Philadelphus kunmingensis* var. *parvifolius* S. M. Hwang, J. Trop. Subtrop. Bot. 8: 263. 2000.

小叶山梅花 *shao ye shan mei hua*

Leaf blade 2–3 × 1–1.5 cm. Corolla 1–1.5 cm in diam.

• Thickets; 2000–2100 m. Yunnan.

13. *Philadelphus tomentosus* Wallich ex G. Don, Gen. Hist. 2: 807. 1832.

绒毛山梅花 *yong mao shan mei hua*

Philadelphus coronarius Linnaeus var. *tomentosus* (Wallich ex G. Don) J. D. Hooker & Thomson.

Shrubs 2–3 m tall. Branchlets of previous year gray-brown, those of current year black-brown, glabrous or sparsely villous. Petiole 5–8 mm; leaf blade ovate or ovate-lanceolate, 4–10 × 2–5 cm, abaxially densely gray-yellow villous, adaxially glabrous, veins 5–7,

slightly basifugal, base rounded or broadly cuneate, margin remotely serrulate, apex caudate-acuminate, acumen 1.5–2.5 cm. Racemes 5–7-flowered, lowest 1 or 2 pairs 3-flowered; rachis 5–10 cm, glabrous; pedicels 6–11 mm, villous or glabrous. Calyx tube sparsely villous or glabrescent; lobes ovate, 4–5 × 2.5–3.5 mm, apex acuminate. Corolla cruciform; petals white, obovate-oblong, 5–10 × 5–8 mm. Stamens 20–25, longest ones ca. 8 mm. Disc glabrous. Style apically divided for ca. 1/3 its length, ca. 7 mm; stigmas clavate, 1.5–2 mm, longer than anthers. Capsule ellipsoid, ca. 1 × 0.7 cm. Seeds ca. 4 mm, shortly tailed. Fl. Jun–Jul, fr. Aug–Sep.

Forests, thickets; 2500–4400 m. Xizang, Yunnan [Bhutan, India, Kashmir, Nepal, Sikkim].

14. *Philadelphus lushuiensis* T. C. Ku & S. M. Hwang in T. C. Ku, Acta Phytotax. Sin. 29: 80. 1991.

泸水山梅花 *lu shui shan mei hua*

Shrubs ca. 3 m tall. Branchlets of previous year brownish, glabrous, those of current year purple-brown, glabrous. Petiole ca. 5 mm, densely yellow-brown pubescent; leaf blade ovate, 5–12 × 3–6.5 cm, abaxially densely yellow-brown pubescent, adaxially sparsely yellow pubescent, veins 3–5, slightly basifugal, base rounded, margin coarsely triangular serrate, apex caudate-acuminate. Racemes 5–12-flowered, lowest pairs usually 3-flowered; rachis 5–8 cm, glabrous; pedicels ca. 5 mm, glabrous. Calyx tube glabrous; lobes ovate, ca. 5 × 4 mm, apex shortly acuminate. Corolla discoid; petals white, broadly obovate or broadly obovate-oblong, ca. 1.4 × 8 mm. Stamens ca. 30, longest ones ca. 8 mm. Disc glabrous. Style entire or slightly divided, ca. 4.5 mm, glabrous; stigmas clavate, ca. 1.5 mm, glabrous. Capsule unknown. Fl. May.

• Thickets; 2300–2400 m. Yunnan.

15. *Philadelphus delavayi* L. Henry, Rev. Hort. 1903: 12. 1903.

云南山梅花 *yun nan shan mei hua*

Shrubs 2–4 m tall. Branchlets of previous year gray-brown or gray, those of current year purple-brown, glaucous, glabrous or villous. Petiole 3–5 mm; leaf blade oblong- or ovate-lanceolate, 4.5–6 × 3–8 cm, abaxially densely gray villous, adaxially strigose, veins 3–5, slightly basifugal, base rounded or cuneate, margin serrulate or subentire, apex acuminate, rarely acute. Racemes 5–9(–21)-flowered, lowest pairs 3–5-flowered; rachis 5–9 cm, glabrous; pedicels 5–10(–13) mm, glabrous. Calyx purple, black-purple, or brown; tube glaucous, glabrous; lobes ovate, 5–6 × 3–4 mm, apex acute. Corolla discoid or cruciform; petals white, oblong, ovate-oblong, or broadly obovate, 1.2–1.5 × 1–1.2 cm, margin subcrisped, apex rounded, sometimes 2-lobed. Stamens 30–35, longest ones ca. 9 mm; anthers oblong, ca. 1.5 mm. Disc and style glabrous. Style slightly divided or entire, 7–8 mm; stigmas clavate, 1.8–2 mm, longer than anthers. Capsule obovoid, 8–10 × 7–7.5 mm. Seeds ca. 4 mm, shortly tailed. Fl. Jun–Aug, fr. Sep–Nov.

Mixed forests, thickets, mountain slopes; 700–3800 m. Sichuan, Xizang, Yunnan [Myanmar].

Three varieties occur in China. In FRPS, a fourth variety was recognized: var. *cruciflorus* S. Y. Hu. However, that name was actually published as a form by Hu (J. Arnold Arbor. 36: 329. 1955) and has never been validly published at varietal rank. It is treated in the present account as a synonym of var. *melanocalyx*.

- 1a. Branchlets of current year villous;
pedicels villous 15c. var. *trichocladus*
1b. Branchlets of current year glabrous;
pedicels glabrous.
2a. Petals suborbicular, overlapping for
most of their length and forming an
almost orbicular disc; calyx tube
purple, glaucous 15a. var. *delavayi*
2b. Petals oblong or ovate-oblong, over-
lapping only at base and forming a
cross; calyx tube black-purple
or brown, not glaucous 15b. var. *melanocalyx*

15a. *Philadelphus delavayi* var. *delavayi*

云南山梅花(原变种) yun nan shan mei hua (yuan bian zhong)

Branchlets of current year glabrous. Pedicels glabrous. Calyx tube purple, glaucous. Petals suborbicular, overlapping for most of their length and forming an almost orbicular disc.

Mixed forests; 700–3800 m. Sichuan, Xizang, Yunnan [Myanmar].

15b. *Philadelphus delavayi* var. *melanocalyx* Lemoine ex L. Henry, Rev. Hort. 1903: 14. 1903.

黑萼山梅花 hei e shan mei hua

Philadelphus delavayi f. *cruciflorus* S. Y. Hu; *Philadelphus delavayi* f. *melanocalyx* (Lemoine ex L. Henry) Rehder.

Branchlets of current year glabrous. Pedicels glabrous. Calyx tube black-purple or brown, not glaucous. Petals oblong or ovate-oblong, overlapping only at base and forming a cross.

• Thickets, mountain slopes; 2500–2800 m. Yunnan.

15c. *Philadelphus delavayi* var. *trichocladus* Handel-Mazzetti, Symb. Sin. 7: 438. 1931.

毛枝山梅花 mao zhi shan mei hua

Branchlets of current year villous. Pedicels villous. Calyx tube purple, glaucous. Petals ovate-suborbicular, overlapping for most of their length and forming an almost orbicular disc.

• Thickets, mountain slopes; ca. 2600 m. Sichuan, Yunnan.

16. *Philadelphus tetragonus* S. M. Hwang, Acta Bot. Austro Sin. 7: 7. 1991.

四棱山梅花 si leng shan mei hua

Shrubs ca. 3 m tall. Branchlets of previous year dark purple, glaucous, glabrous. Petiole 0.8–1.2 cm, villous; leaf blade ovate or broadly so, 7–10 × 4–6 cm, or 4–5 × 2–3.5 cm on flowering shoots, abaxially densely gray villous, adaxially sparsely strigose, veins 3–5, basifugal, base rounded or broadly cuneate, margin sparsely serrate, apex acute or acuminate. Racemes 7–9-flowered; rachis 4–8 cm, glabrous; pedicels 0.8–1.5

cm, 4-angled. Calyx dark purple; tube 4-angled, grayish pubescent along angles; lobes ovate, 4–5 × 3–4 mm, apex acute. Corolla discoid; petals white, broadly ovate or suborbicular, 1.2–1.5 × 0.8–1.2 cm. Stamens 24–29, longest ones ca. 8 mm; anthers oblong, ca. 1.5 mm. Disc glabrous. Style divided at apex, glabrous; stigmas clavate, ca. 1.5 mm. Capsule unknown. Fl. Jun.

• Mixed forests; ca. 3200 m. Sichuan.

17. *Philadelphus caudatus* S. M. Hwang, Acta Bot. Austro Sin. 7: 7. 1991.

尾萼山梅花 wei e shan mei hua

Shrubs ca. 2 m tall. Branchlets of previous year dark purple, angular, glabrous, those of current year densely villous. Petiole 8–10 mm; leaf blade ovate, 4–6 × 2–3.5 cm, membranous, abaxially villous along veins, adaxially sparsely strigose, veins ca. 5, slightly basifugal, base rounded or subcordate, margin serrate, apex acuminate. Racemes 3–6 cm, 3–19-flowered, lowest 2 or 3 pairs 2- or 3-flowered; rachis densely villous; lowest pedicel 5–8 mm, distal ones shorter. Calyx tube strigose; lobes oblong-lanceolate, 4–5 × 1.5–2 mm, apex caudate, tail 2–3 mm. Corolla discoid; petals oblong or elliptic-ovate, 1–1.2 × 5–7 mm. Stamens 28–31, longest ones ca. 7 mm; anthers subglobose or ovoid-oblong, 1–1.5 mm. Disc glabrous. Style ca. 7 mm, glabrous or sparsely villous at base; stigmas clavate, 1.5–2 mm. Capsule unknown. Fl. Jun–Aug.

• Thickets; ca. 1900 m. Yunnan.

18. *Philadelphus subcanus* Koehne, Mitt. Deutsch. Dendrol. Ges. 13: 83. 1904.

毛柱山梅花 mao zhu mei hua

Shrubs 3–6 m tall. Branchlets of previous year gray-brown, those of current year purple, sparsely white villous or glabrous. Petiole 5–10 mm; leaf blade ovate or broadly so, 6–14 × 3–7 cm, ovate or ovate-lanceolate and 3–12 × 2–5 cm on flowering shoots, papery, abaxially sublanate-villous or villous only along veins, adaxially sparsely hirsute, veins 3–5, basifugal, base cuneate or broadly so, margin sparsely serrulate, apex acute or acuminate. Racemes 9–11-flowered, occasionally paniculate and 5–25-flowered on vigorous shoots; rachis 2.5–15 cm; pedicels 5–10(–15) mm, densely villous. Calyx tube golden yellow or gray-yellow villous, with underlying surface visible; lobes ovate or ovate-lanceolate, 6–7 × 3–4 mm, apex acute or acuminate, acumen 1–1.5 mm. Corolla discoid; petals white, obovate or elliptic, rarely ovate-elliptic, 1–1.8 × 0.7–1.3 cm. glabrous to setose. Stamens 25–33, longest ones ca. 1 cm; anthers oblong, ca. 1.5 mm. Disc and style golden yellow villous at base. Style apically slightly divided or divided for ca. 2/3 its length, ca. 6 mm; stigmas spatulate, 1.5–2 mm, longer than anthers. Capsule obovoid, 8–10 × ca. 6 mm, with persistent calyx lobes subapically. Seeds 3–3.5 mm, with tail ca. 1 mm. Fl. Jun–Jul, fr. Aug–Oct.

• Mixed forests, thickets; 500–2300 m. Hubei, Sichuan, Yunnan.

- 1a. Leaf blade abaxially sublanate-villous 18c. var. *dubius*
 1b. Leaf blade abaxially villous only along veins.
 2a. Style apically slightly divided; calyx tube golden yellow villous 18a. var. *subcanus*
 2b. Style apically divided for ca. 2/3 its length; calyx tube sparsely gray-yellow villous 18b. var. *magdalенаe*

18a. *Philadelphus subcanus* var. *subcanus*

毛柱山梅花(原变种) mao zhu mei hua (yuan bian zhong)

Philadelphus paniculatus Rehder; *P. sericanthus* Koehne var. *rehderianus* Koehne; *P. subcanus* var. *wilsonii* (Koehne) Rehder; *P. wilsonii* Koehne.

Shrubs 3–6 m tall. Leaf blade ovate or ovate-lanceolate, 3–12 × 2–5 cm, abaxially villous only along veins.

Calyx tube golden yellow villous. Petals setose. Style apically slightly divided. Fl. Jun–Jul, fr. Aug–Oct.

• Mixed forests, thickets; 1800–2300 m. Hubei, Sichuan, Yunnan.

18b. *Philadelphus subcanus* var. *magdalенаe* (Koehne) S. Y. Hu, J. Arnold Arbor. 36: 355. 1955.

城口山梅花 cheng kou mei hua

Philadelphus magdalенаe Koehne, Mitt. Deutsch. Dendrol. Ges. 13: 83. 1904.

Shrubs to 4 m tall. Leaf blade ovate, 3–6 × 1–3 cm, abaxially ± appressed villous only along veins. Calyx tube sparsely gray-yellow villous. Petals glabrous. Style apically divided for ca. 2/3 its length. Fl. Jun.

• Thickets; 1200–2000 m. Hubei, Sichuan.

18c. *Philadelphus subcanus* var. *dubius* Koehne in Sargent, Pl. Wilson. 1: 4. 1911.

密毛山梅花 mi mao shan mei hua

Shrubs 1.5–3 m tall. Leaf blade ovate, 3–6 × 1–3 cm, abaxially yellow or brown sublanate-villous. Calyx tube long sublanate-villous. Petals subglabrous, base with a few hairs. Fl. Jun.

• Mixed forests; 500–1200 m. Sichuan.

This variety is known only from the type collection, *Wilson 4044* (holotype, A).

19. *Philadelphus henryi* Koehne, Repert. Spec. Nov. Regni Veg. 10: 126. 1911.

滇南山梅花 dian nan shan mei hua

Shrubs 1.5–2.5 m tall. Branchlets of previous year dark brown, those of current year dark purple, white villous or gray pubescent. Petiole 3–7 mm; leaf blade ovate, ovate-oblong, or lanceolate, 4–8 × 1.5–4 cm, papery, abaxially scabrid-bristly along veins, adaxially scabrid, veins 3–5, basifugal, base broadly cuneate, margin serrate, apex abruptly acuminate; leaf blade on flowering shoots ovate or ovate-lanceolate, base rounded, apex acute or acuminate. Inflorescences racemose, rarely paniculate, 5–22-flowered, rarely 1-flowered on weak branchlets; rachis purple, 3–11 cm; pedicels 2–6 mm. Calyx tube white, strigose or bristly;

lobes dark purple or brown, ovate or ovate-lanceolate, 4.5–5 × 2.5–3 mm, apex abruptly acuminate, acumen ca. 1.5 mm, subglabrous. Corolla subdiscoid; petals white, orbicular or oblong, 1–1.3 cm × 8–11 mm. Stamens 35–38, longest ones ca. 7 mm; anthers ovoid-oblong, ca. 1.5 mm. Disc and style glabrous or sparsely setose at base. Style 5–6 × 5–7 mm. Capsule obovoid, 5–6 × 5–7 mm, with persistent calyx lobes at apex. Seeds ca. 2.5 mm, shortly tailed. Fl. Jun–Jul, fr. Aug–Oct.

• Thickets, mountain slopes; 1300–2500 m. Guizhou, Yunnan.

- 1a. Branchlets and inflorescences white villous; leaf blade ovate or ovate-oblong; style glabrous 19a. var. *henryi*
 1b. Branchlets and inflorescences densely gray pubescent; leaf blade lanceolate; style sparsely setose at base 19b. var. *cinereus*

19a. *Philadelphus henryi* var. *henryi*

滇南山梅花(原变种) dian nan shan mei hua (yuan bian zhong)

Branchlets and inflorescences white villous. Leaf blade ovate or ovate-oblong. Pedicels and calyx subglabrous or sparsely villous. Style glabrous. Fl. Jun–Jul, fr. Aug–Oct.

• Thickets, mountain slopes; 1300–2200 m. Guizhou, Yunnan.

19b. *Philadelphus henryi* var. *cinereus* Handel-Mazzetti, Symb. Sin. 7: 438. 1931.

灰毛山梅花 hui mao shan mei hua

Branchlets and inflorescences densely gray pubescent. Leaf blade lanceolate. Pedicels and calyx densely gray strigose. Style sparsely setose at base. Fl. Jun.

• Thickets; 2000–2500 m. Yunnan.

20. *Philadelphus sericanthus* Koehne, Gartenflora 45: 561. 1896.

绢毛山梅花 juan mao shan mei hua

Shrubs 1–3 m tall. Branchlets of previous year yellow-brown, those of current year brown, glabrous or sparsely pubescent. Petiole 0.8–1.2 cm; leaf blade elliptic, elliptic-lanceolate, or rarely ovate-elliptic, 3–11 × 1.5–5 cm, papery, abaxially villous only along veins, adaxially sparsely strigose or glabrous, veins 3–5, basifugal, base cuneate or broadly so, margin serrate or coarsely 9–12-dentate, apex acuminate. Inflorescences racemose or paniculate; 3–15(–30)-flowered; rachis 5–15 cm; pedicels 0.6–1.4 cm, strigose. Calyx tube sparsely strigose; lobes ovate, 6–7 × 3–3.5 mm, apex acuminate, acumen ca. 1.5 mm. Corolla discoid; petals white, obovate or oblong, 1.2–1.5 × 0.8–1 cm, apex rounded, sometimes erose. Stamens 30–35, longest ones ca. 7 mm; anthers oblong, ca. 1.5 mm. Disc and style glabrous or sparsely white villous-setose. Style apically slightly divided, ca. 6 mm; stigma spatulate or oar-shaped, 1.5–2 mm. Capsule obovoid, ca. 7 × 5 mm.

Seeds 3–3.5 mm, shortly tailed. Fl. May–Jun, fr. Aug–Sep.

• Mixed forests, thickets, mountain slopes; 300–3000 m. Anhui, ?Fujian, Gansu, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Yunnan, ?Zhejiang.

- 1a. Leaf blade elliptic or elliptic-lanceolate, adaxially strigose, margin minutely serrate 20a. var. *sericanthus*
 1b. Leaf blade ovate-elliptic, adaxially glabrous or subglabrous, margin sharply and prominently 9–12-serrate 20b. var. *kulingensis*

20a. *Philadelphus sericanthus* var. *sericanthus*

绢毛山梅花(原变种) juan mao shan mei hua (yuan bian zhong)

Philadelphus coronarius Linnaeus var. *chinensis* H. Léveillé; *P. hupehensis* (Koehne) S. Y. Hu; *P. incanus* Koehne var. *sargentianus* Koehne f. *hupehensis* Koehne; *P. sericanthus* var. *bockii* Koehne; *P. sericanthus* var. *rosthornii* Koehne.

Leaf blade elliptic or elliptic-lanceolate, adaxially strigose, margin minutely serrate. Racemes 7–15(–30)-flowered; rachis 5–15 cm. Corolla 2.5–3 cm. Fl. May–Jun, fr. Aug–Sep.

• Mixed forests, thickets, mountain slopes; 300–3000 m. Anhui, ?Fujian, Gansu, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Yunnan, ?Zhejiang.

20b. *Philadelphus sericanthus* var. *kulingensis* (Koehne) Handel-Mazzetti, Symb. Sin. 7: 439. 1931.

牯岭山梅花 gu ling shan mei hua

Philadelphus incanus var. *sargentianus* f. *kulingensis* Koehne, Repert. Spec. Nov. Regni Veg. 10: 126. 1911.

Leaf blade ovate-elliptic, adaxially glabrous or subglabrous, margin sharply and prominently 9–12-serrate. Racemes 5–10-flowered; rachis 3–10 cm. Corolla 2–2.5 cm. Fl. Jun.

• Mixed forests; ca. 1200 m. Jiangxi, ?Zhejiang.

21. *Philadelphus zhejiangensis* S. M. Hwang, Acta Bot. Austro Sin. 7: 10. 1991.

浙江山梅花 zhe jiang shan mei hua

Philadelphus pekinensis Ruprecht var. *laxiflorus* Cheng, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 10: 113. 1936, not *P. laxiflorus* Rehder (1924); *P. brachybotrys* (Koehne) Koehne var. *laxiflorus* S. Y. Hu.

Shrubs 1–3 m tall. Branchlets of previous year yellow-brown or brown, those of current year brown, glabrous. Petiole 5–10 mm, glabrous; leaf blade elliptic or elliptic-lanceolate, 5–10 × 2–6 cm, abaxially hirsute along veins, adaxially sparsely strigose, veins 3–5, basifugal, base cuneate or broadly so, margin serrate, apex acuminate. Racemes 5–9(–13)-flowered, lowest ones 3-flowered; rachis 5–13 cm, glabrous; pedicels 5–12 mm. Calyx tube brown or yellow-brown, glabrous; lobes ovate or ovate-lanceolate, 4–6 × 3–4 mm, apex acuminate. Corolla discoid; petals white, elliptic or broadly so, 1.2–1.8 × 1–1.2 cm, apex rounded, sometimes retuse. Stamens 31–39, longest ones ca. 1.2 cm; anthers ovoid-oblong, ca. 1.5 mm. Disc and style glabrous. Style apically divided; stigma spatulate, 1.5–2 mm. Capsule 6–8 × 4–5 mm. Seeds ca. 2.5 mm, shortly tailed. Fl. May–Jun, fr. Jul–Sep.

• Thickets, valleys; 700–1700 m. Anhui, Fujian, Jiangsu, Zhejiang.

22. *Philadelphus calvescens* (Rehder) S. M. Hwang, Acta Bot. Austro Sin. 7: 11. 1991.

丽江山梅花 li jiang shan mei hua

Philadelphus delavayi L. Henry var. *calvescens* Rehder, J. Arnold Arbor. 1: 196. 1919; *P. calvescens* var. *compositus* S. M. Hwang; *P. henryi* Koehne var. *lissocalyx* Handel-Mazzetti.

Shrubs 2–5 m tall. Branchlets of previous year purple, those of current year dark purple, glaucous, glabrous or sparsely hairy. Petiole 5–7(–15) mm; leaf blade ovate or broadly so, 6–15 × 4–7 cm, abaxially glabrous or villous only along veins, adaxially bristly or glabrous, veins 3–5, basifugal, base rounded, margin sparsely serrulate, apex caudate-acuminate, acumen 1–1.5 cm. Racemes 5–9-flowered, sometimes lowest ones 2- or 3-flowered, rarely inflorescences paniculate, 9–15-flowered; rachis purple, glaucous, 5–8 cm; pedicels ca. 1 cm. Calyx tube purple, glaucous, glabrous; lobes ovate, 5–7 × 4–5 mm. Corolla discoid; petals white, broadly obovate or orbicular, 1.5–2 cm, apex retuse or obtuse. Stamens 25–30, longest ones ca. 8 mm; anthers oblong or ovoid, ca. 1.5 mm. Disc and style glabrous. Style ca. 5 mm; stigma clavate, 1.5–2 mm. Capsule obovoid, 7–9 × ca. 5 mm. Seeds ca. 3 mm, shortly tailed. Fl. Jun–Jul, fr. Aug–Oct.

• Thickets, valleys; 2400–3500 m. SW Sichuan, NW Yunnan.

19. DECUMARIA Linnaeus, Sp. Pl., ed. 2, 2: 1663. 1763.

赤壁木属 chi bi mu shu

Huang Shumei (黄淑美 Hwang Shu-mei); Bruce Bartholomew

Shrubs evergreen, climbing, with aerial rootlets. Leaves opposite, petiolate, stipulate; leaf blade margin entire or dentate. Inflorescence terminal, a corymbose panicle. Flowers bisexual, small. Calyx tube adnate to ovary; lobes 7–10. Petals 7–10, valvate in bud. Stamens 20–30; filaments slender; anthers 2-loculed, dehiscing by longitudinal slits. Ovary inferior; ovules numerous. Style robust; stigma flat, discoid. Fruit a capsule, dehiscing along ribs; carpels free from columella. Seeds numerous, membranous winged at both ends.

Two species: one in China, one in E North America.

1. *Decumaria sinensis* Oliver, Hooker's Icon. Pl. 18. t. 1741. 1888.

赤壁木 *chi bi mu*

Shrubs 2–5 m tall. Branchlets gray-brown, terete, pubescent when young; nodes slightly swollen. Petiole 1–2 cm; leaf blade obovate to elliptic, 3.5–7 × 2–3.5 cm, leathery, glabrous or sparsely villous when young, secondary veins 4–6 on both sides of midvein, base cuneate, margin entire, sparsely serrate, or undulate distally from middle, apex obtuse to acute. Inflorescences 3–4 × 4–5 cm; peduncle 1–3 cm; pedicels

5–10 mm or longer in fruit, sparsely villous. Calyx tube turbinate, ca. 2 mm, glabrous; lobes ovate to ovate-deltoid, ca. 1 mm. Petals white, oblong-elliptic, 3–4 mm. Filaments 3–4 mm; anthers ovoid to subovoid. Ovary 5–10-loculed. Style less than 1 mm; stigma 7–10-lobed. Capsule brown, campanulate to turbinate, ca. 6 × 5 mm, 10–12-angled, apex truncate, with persistent style and stigma. Seeds ca. 3 mm; wings white. Fl. Mar–May, fr. Aug–Oct.

• Thickets on mountain slopes, rock crevices; 600–1300 m. Gansu, Guizhou, Hubei, Shaanxi, Sichuan.

20. *PILEOSTEGIA* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 57. 1858.

冠盖藤属 *guan gai teng shu*

Huang Shumei (黄淑美 *Hwang Shu-mei*); Bruce Bartholomew

Shrubs evergreen, climbing, with aerial rootlets. Leaves opposite, petiolate; leaf blade margin entire or dentate. Inflorescence terminal, a corymbose panicle. Flowers bisexual, small. Calyx tube adnate to ovary, conical; lobes 4 or 5, imbricate in bud, minute. Petals 4 or 5, valvate in bud, connate apically and forming a calyptra, falling early. Stamens 8–10, epigynous; filaments slender; anthers subglobose, 2-loculed, dehiscing longitudinally. Ovary inferior, 4–6-loculed; ovules numerous. Style short, robust; stigma 4–6-lobed. Fruit a capsule, 4- or 5-valved, dehiscing irregularly along ribs. Seeds numerous, oblong, slightly compressed, membranous winged at both ends.

Three species: China, E India, Japan; two species (one endemic) in China.

- 1a. Branchlets, leaves, and inflorescences glabrous, rarely stellate pubescent; leaf blade elliptic-oblancheolate to narrowly elliptic, base truncate 1. *P. viburnoides*
 1b. Branchlets, leaves, and inflorescences densely rusty brown tomentose; leaf blade oblong to obovate-oblong, base shallowly cordate 2. *P. tomentella*

1. *Pileostegia viburnoides* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 76. 1858.

冠盖藤 *guan gai teng*

Shrubs ca. 15 m tall. Branchlets decussate, gray to gray-brown, glabrous or sparsely stellate pubescent. Petiole 1–3 cm; leaf blade elliptic-oblancheolate to narrowly elliptic, 7–15(–18) × 2.5–6 cm, leathery, abaxially glabrous or sparsely stellate pubescent, adaxially glabrous and lustrous, secondary veins 7 or 8 on both sides of midvein, base cuneate, margin entire, apex acute. Inflorescences 7–20 × 15–25 cm, glabrous or pubescent; bracts linear-lanceolate, 4–5 × 0.8–3 cm. Flowers small; pedicel 3–5 mm. Calyx tube ca. 1.5 mm; lobes 4 or 5, deltoid, glabrous. Petals white, ca. 2.5 mm. Stamens 8–10; filaments 3–6 mm. Ovary 4–6-loculed. Style stout, ca. 1 mm; stigma much dilated, 4–6-lobed. Capsule conical-turbinate, ca. 4 × 2–3 mm, 5–10-ribbed, apex truncate, with persistent style. Seeds ca. 2 mm. Fl. May–Aug, fr. Sep–Dec.

Forests in valleys; 600–1000 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan].

- 1a. Branchlets, leaves, and inflorescences glabrous 1a. var. *viburnoides*

- 1b. Branchlets, leaves, and inflorescences sparsely stellate pubescent 1b. var. *glabrescens*

1a. *Pileostegia viburnoides* var. *viburnoides*

冠盖藤(原变种) *guan gai teng* (*yuan bian zhong*)

Branchlets, leaves, and inflorescences glabrous. Fl. Jul–Aug, fr. Sep–Dec.

Forests in valleys; 600–1000 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan].

1b. *Pileostegia viburnoides* var. *glabrescens* (C. C. Yang) S. M. Hwang, Acta Bot. Austro Sin. 7: 33. 1991.

柔毛冠盖藤 *rou mao guan gai teng*

Pileostegia tomentella Handel-Mazzetti var. *glabrescens* C. C. Yang, Acta Phytotax. Sin. 20: 477. 1982.

Branchlets, leaves, and inflorescences sparsely stellate pubescent. Fl. May.

• 800–1000 m. Hainan.

2. *Pileostegia tomentella* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 59: 55. 1922.

星毛冠盖藤 *xing mao guan gai teng*

Shrubs ca. 16 m tall. Branchlets, leaves, and inflorescences densely brownish to rusty brown 3–6-rayed stellate hairy. Petiole 1.2–1.5 cm; leaf blade oblong to obovate-oblong, 5–10 (–18) × 2.5–5 (–8) cm, leathery, abaxially densely rusty brown stellate tomentose or pubescent, adaxially sparsely stellate hairy when young and gray-greenish when dry, secondary veins 8–13 on both sides of midvein, base rounded, shallowly cordate, or rarely broadly cuneate, margin entire and slightly revolute, irregularly undulate

distally from middle, or sparsely serrate, apex acute. Inflorescences 10–25 × 10–25 cm; bracts linear to subulate, 5–10 × 1–2 mm; pedicels ca. 2 mm. Calyx tube ca. 2 mm; lobes deltoid, stellate hairy. Petals white, ovate, ca. 2 mm, falling early. Stamens 8–10; filaments 5–6 mm. Style ca. 1.5 mm; stigma conical, 4–6-lobed. Capsule dark brown, turbinate, ca. 4 mm in diam., 5–10-ribbed, apex truncate, with persistent style. Seeds ca. 2 mm. Fl. Mar–Aug, fr. Sep–Dec.

• Forests in valleys; 300–700 m. Fujian, Guangdong, Guangxi, Hunan, Jiangxi.

21. *DICHROA* Loureiro, Fl. Cochinch. 1: 301. 1790.

常山属 *chang shan shu*

Huang Shumei (黄淑美 *Hwang Shu-mei*); Bruce Bartholomew

Shrubs or subshrubs. Leaves opposite, rarely alternate apically on stem. Inflorescence terminal, a corymbose cyme or panicle. Flowers bisexual. Calyx tube adnate to ovary, obconical; lobes 5 (or 6). Petals 5 (or 6), variously colored, induplicate-valvate in bud. Stamens 4–10 (–20); filaments filiform or subulate; anthers ellipsoid to ovoid, 2-loculed. Ovary semi-inferior to subinferior, incompletely 3–5-loculed; placentation parietal; ovules numerous. Styles 2–6, free or connate only at base, divergent; stigma oblong to subglobose. Fruit a fleshy berry, 1-valved, slightly dry. Seeds ovoid, minute; seed coat membranous, reticulate; embryo surrounded by fleshy endosperm.

Twelve species: mainly in E Asia and adjacent islands; six species (four endemic) in China.

1a. Ovary semi-inferior; flower buds subglobose; styles (2 or) 3 (or 4), stigma subglobose; filaments subulate.

2a. Leaf blade densely villous abaxially, glabrous adaxially; inflorescence a corymbose cyme, 5–7 cm 5. *D. mollissima*

2b. Leaf blade crisped pubescent on both surfaces; inflorescence a corymbose panicle, 10–22 cm 6. *D. yunnanensis*

1b. Ovary inferior to 3/4 so; flower buds obovoid to oblong-obovoid; styles 4–6 (sometimes 3 in *D. hirsuta*), stigma oblong; filaments filiform.

3a. Branchlets, petioles, and leaf veins crisped pubescent or glabrous; inflorescence a corymbose panicle 1. *D. febrifuga*

3b. Branchlets, petioles, and leaf veins both crisped pubescent and pellucid villous; inflorescence a corymbose cyme.

4a. Calyx lobes obtusely deltoid, ca. 1 mm, glabrous 2. *D. daimingshanensis*

4b. Calyx lobes lanceolate, 2.5–6 mm, hirsute.

5a. Petals densely hirsute on both surfaces; anthers glabrous; leaf blade apex acute 3. *D. yaoshanensis*

5b. Petals glabrous or sparsely hirsute abaxially; anthers with filiform hairs or glabrous; leaf blade

apex acuminate to caudate 4. *D. hirsuta*

1. *Dichroa febrifuga* Loureiro, Fl. Cochinch. 1: 301. 1790.

常山 *chang shan*

?*Cyanitis sylvatica* Reinwardt ex Blume; ?*Dichroa sylvatica* (Reinwardt ex Blume) Merrill.

Shrubs 1–2 m tall. Branchlets, petioles, and veins glabrous or crisped pubescent. Petiole 1.5–5 cm; leaf blade sometimes purplish abaxially, elliptic, obovate, elliptic-oblong, or lanceolate, 6–25 × 2–10 cm, papery, abaxially glabrous or crisped pubescent along veins, rarely sparsely hirsute, adaxially glabrous, secondary veins 8–10 on both sides of midvein, base cuneate, margin serrate to coarsely so, rarely undulate, apex acute to acuminate. Inflorescence a corymbose panicle, 3–20 cm. Flower buds obovoid, 6–10 mm; pedicel 3–5 mm. Calyx lobes 4–6, broadly deltoid, apex acute. Petals reflexed at maturity, blue or white, oblong-elliptic, slightly fleshy. Stamens 10–20; filaments

connate when young, free at maturity, filiform; anthers ellipsoid. Ovary inferior to 3/4 so. Styles 4 (–6), clavate; stigma oblong. Berry dark blue when mature, 3–7 mm in diam. Seeds ca. 1 mm. Fl. Feb–Apr, fr. May–Aug.

Mixed forests on mountain slopes or in valleys; 200–2000 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Taiwan, Xizang [Bhutan, Cambodia, N India, ?Indonesia, Laos, Myanmar, Nepal, Sikkim, Thailand, Vietnam].

Dichroa sylvatica, from Indonesia, may be synonymous with *D. febrifuga*.

Dichroa febrifuga is used medicinally.

2. *Dichroa daimingshanensis* Y. C. Wu, Bot. Jahrb. Syst. 71: 179. 1940.

大明常山 *dai ming chang shan*

Subshrubs 1–3 m tall. Branchlets, petioles, and veins crisped pubescent and pellucid villous. Petiole ca. 1.3

cm; leaf blade elliptic-oblong to obovate-elliptic, 7–16 × 2.5–7 cm, papery, abaxially sparsely villous, adaxially appressed hirsute, secondary veins 6–9 on both sides of midvein. Inflorescence a corymbose cyme, 5–10 × 3–5 cm; peduncle 1–2 cm. Flower buds oblong-obovoid, ca. 5 mm; pedicel ca. 4 mm. Calyx tube sparsely villous; lobes 5 or 6, obtusely deltoid, ca. 1 mm, glabrous. Petals 5 or 6, blue-white, broadly lanceolate to oblong-ovate, 5–6 × 1.5–2 mm, slightly fleshy, glabrous on both surfaces, margin recurved at maturity, apex acute. Stamens 10–12; filaments filiform, ca. 5 mm; anthers dimorphic: reflexed oblong-ellipsoid and erect ovoid, sparsely villous. Ovary subinferior. Styles 4(–6), clavate, ca. 3.5 mm; stigmas oblong, oblique. Berry subglobose, ca. 5 mm, glabrous or sparsely villous. Seeds brownish, pyriform, ca. 0.8 mm. Fl. Mar–May, fr. Sep–Oct.

• Forests in valleys; 400–800 m. Guangxi, Guizhou.

3. *Dichroa yaoshanensis* Y. C. Wu, Bot. Jahrb. Syst. 71: 180. 1940.

罗蒙常山 *luo meng chang shan*

Subshrubs basally prostrate, ca. 3 m tall. Branchlets, petioles, veins, and inflorescences adherent crisped pubescent and slightly pellucid villous. Petiole slender, 1–7 cm; leaf blade elliptic to ovate-elliptic, 5–17 × 3–7.5 cm, papery, both surfaces hirsute except along veins, secondary veins 5–11 on both sides of midvein, base cuneate to obtuse, margin serrate, apex acute. Inflorescence a corymbose cyme, aggregate, 2–4(–6) cm wide; peduncle 5–10 mm. Flower buds blue, oblong-obovoid, 5–7 mm; pedicel ca. 5 mm. Calyx lobes 5 or 6, lanceolate, 2.5–6 mm, densely hirsute. Petals oblong-lanceolate, 4–5 × 1.7–2 mm, densely hirsute on both surfaces. Stamens 10–12, ca. 7 mm; filaments filiform, unequal; anthers ellipsoid to ovoid, glabrous. Ovary subinferior. Styles 4 or 5, ca. 4 mm; stigmas oblong, oblique. Berry subglobose, 4–5 mm, sparsely villous. Fl. May–Jul, fr. Sep–Nov.

• Mixed forests in valleys; 500–1200 m. Guangdong, Guangxi, Hunan, Yunnan.

4. *Dichroa hirsuta* Gagnepain in Lecomte, Fl. Indo-Chine 2: 690. 1920.

硬毛常山 *ying mao chang shan*

Shrubs 2–2.5 m tall. Branchlets, petioles, veins, and inflorescences crisped pubescent and pellucid villous. Petiole 1–1.5 cm; leaf blade lanceolate to elliptic-lanceolate, 10–15 × 3.5–6 cm, papery, abaxially densely hispidulous, adaxially hirsute, secondary veins 8–10 on both sides of midvein, base attenuate, margin serrate, apex acuminate to caudate. Inflorescence a corymbose cyme, aggregate, 3–5 cm wide; peduncle 3–5 mm. Flower buds obovoid, ca. 3 mm in diam.; pedicel ca. 2 mm. Calyx tube hirsute; lobes 5 or 6, lanceolate, 4–6 mm, hirsute. Petals 5, ovate-lanceolate, ca. 3 × 2 mm, abaxially glabrous or sparsely hirsute. Stamens 10–12; filaments filiform, often partly curved; anthers with filiform hairs. Ovary ca. 3/4 inferior. Styles 3–5;

stigmas oblong. Berry 3–4 mm, hirsute. Fl. Apr–May, fr. Jul–Oct.

Mixed forests; 400–1500 m. Guangxi, Yunnan [Vietnam].

5. *Dichroa mollissima* Merrill, Philipp. J. Sci. 23: 245. 1933.

海南常山 *hai nan chang shan*

Shrubs ca. 2 m tall. Branchlets, petioles, and adaxial surface of leaf blades villous. Branchlets gray-yellow to brown, terete, glabrescent. Petiole 2–4 cm; leaf blade oblong-elliptic to -obovate, 8–16 × 2.5–6.5 cm, papery, abaxially densely villous, adaxially glabrous, secondary veins 5–8 on both sides of midvein, tertiary veins adaxially elevated, base cuneate, margin sparsely serrate distally from middle, apex acuminate to caudate. Inflorescence a corymbose cyme, 5–7 × ca. 10 cm. Flower buds subglobose, ca. 2.5 cm. Calyx tube cupular, ca. 1.5 mm; lobes 5, ovate, ca. 1 mm, glabrous, apex acute to acuminate. Petals white or blue. Stamens 10–12; filaments subulate, 1.2–2 mm; anthers reflexed, ovoid-ellipsoid, adnate to filament in bud. Ovary semi-inferior. Styles 3 or 4, robust, ca. 1.5 mm; stigma subglobose. Berry oblong, ca. 4.5 × 6 mm, pubescent or glabrous. Seeds ellipsoid, slightly oblique. Fl. Jun–Jul, fr. Sep–Dec.

• Mixed forests in valleys; 1000–1800 m. Hainan.

6. *Dichroa yunnanensis* S. M. Hwang, Acta Phytotax. Sin. 25: 387. 1987.

云南常山 *yun nan chang shan*

Shrubs 1.5–2 m tall. Branchlets terete, pubescent. Petiole 3–5 cm; leaf blade oblong-elliptic to -lanceolate, 20–25 × 8–10 cm, papery, abaxially crisped pubescent especially along veins, adaxially sparsely crisped pubescent and hirsute, secondary veins 8–10 on both sides of midvein, abaxially elevated, tertiary veins sparse, base broadly cuneate, margin serrulate, apex shortly acuminate. Inflorescence a corymbose panicle, 10–20 × 3–5 cm, densely crisped pubescent, many flowered. Flower buds subglobose; pedicel 3–5 mm. Calyx tube cupular, sparsely crisped pubescent; lobes 5, deltoid, ca. 1 mm, glabrous. Petals 5, blue or white, ovate-oblong to -lanceolate, ca. 2 mm, glabrous, margin reflexed at maturity, apex acute. Stamens 10; filaments subulate, ca. 2 mm; anthers ovoid, ca. 2 mm. Ovary semi-inferior, 4-loculed. Styles (2 or)3(or 4), ca. 2 mm, villous; stigmas subglobose. Berry dark blue when mature, globose, ca. 5 mm in diam. Seeds brownish, obliquely ovoid-globose, less than 1 mm. Fl. May–Jun, fr. Jul–Aug.

• Forests; ca. 2000 m. Yunnan.

Although one of the present authors (Huang) considers *Dichroa yunnanensis* to be a distinct species, Bartholomew feels that additional study is needed to determine if it is really distinct from *D. febrifuga*.

22. **CARDIANDRA** Siebold & Zuccarini, Fl. Jap. 1: 119. 1839.草绣球属 *cao xiu qiu shu*Wei Zhaofen (卫兆芬 *Wei Chao-fen*); Bruce Bartholomew

Subshrubs or shrubs, rhizomatous. Stems simple. Leaves alternate or 4–8-fascicled, exstipulate; leaf blade simple. Inflorescence often terminal, a thyrse or corymbose cyme. Sterile flowers few, large; sepals 2 or 3, free or sometimes basally slightly connate, petaloid. Fertile flowers numerous, small. Calyx tube adnate to ovary, forming a hypanthium; teeth small, valvate in bud. Petals (4 or)5, imbricate in bud. Stamens very numerous, multiseriate; filaments filiform; anthers obcordate, 2-loculed, dehiscing longitudinally, apex truncate; connective broadly obtriangular. Ovary subinferior, incompletely 2- or 3-loculed. Styles 2–4; stigmas small, subcapitate. Fruit a capsule, subinferior, dehiscing apically, apex with persistent calyx teeth and styles. Seeds numerous, small, compressed, winged at both ends; seed coat reticulate; embryo small, surrounded by fleshy endosperm.

About four species: mainly in subtropical E Asia; two species (one endemic) in China.

- 1a. Leaves sparsely scattered along stem, alternate 1. *C. moellendorffii*
 1b. Leaves borne distally on stem, usually 4–8-fascicled 2. *C. formosana*

1. *Cardiandra moellendorffii* (Hance) Migo, J. Jap. Bot. 18: 419. 1942.

草绣球 *cao xiu qiu*

Subshrubs 0.3–1 m tall. Stems brownish when dry, slightly striate. Leaves sparsely scattered along stem, alternate, sessile or petiolate; petiole 1–3(–7) cm; leaf blade elliptic to obovate-oblong, 6–22 × 3–10 cm, papery, abaxially sparsely pubescent to subglabrous, adaxially sparsely strigillose, secondary veins 7–9 on both sides of midvein, abaxially slightly prominent, base cuneate to narrowly so, margin roughly dentate-serrate, apex acuminate to shortly so. Inflorescence terminal, a corymbose cyme; bracts and bracteoles narrowly lanceolate to linear, persistent. Sterile flowers with sepals 2 or 3, white or pinkish, broadly ovate to suborbicular, 0.5–1.5 cm, base subtruncate. Fertile flowers with calyx tube cupular, 1.5–2 mm; teeth broadly ovate, apex rounded to obtuse. Petals pinkish or white, broadly elliptic to suborbicular, 2.5–3 mm. Stamens 15–25, slightly shorter than petals. Styles 3, ca. 1 mm in fruit. Capsule subglobose, 3–3.5 × 2.5–3 mm. Seeds brown, oblong to ellipsoid, 1–1.4 mm; wings opaque or translucent, darker to lighter than color of seed body. Fl. Jul–Aug, fr. Sep–Oct.

Dense to sparse forests in valleys or on mountain slopes; 700–1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Zhejiang [Japan (Ryukyu Islands)].

- 1a. Seed wings opaque, darker than or similar to color of seed body 1a. var. *moellendorffii*
 1b. Seed wings translucent, lighter than color of seed body 1b. var. *laxiflora*

1a. *Cardiandra moellendorffii* var. *moellendorffii*

草绣球(原变种) *cao xiu qiu (yuan bian zhong)*

Hydrangea moellendorffii Hance, J. Bot. 12: 177. 1874;
Cardiandra alternifolia Siebold & Zuccarini subsp.

moellendorffii (Hance) H. Hara & H. Ohba; *C. alternifolia* var. *moellendorffii* (Hance) Engler; *C. sinensis* Hemsley.

Seed wings opaque, darker than or similar to color of seed body. Fl. Jul–Aug, fr. Sep–Oct.

Dense to sparse forests in valleys or on mountain slopes; 700–1500 m. Anhui, Fujian, Jiangxi, Zhejiang [Japan (Ryukyu Islands)].

1b. *Cardiandra moellendorffii* var. *laxiflora* (H. L. Li) C. F. Wei, Acta Bot. Austro Sin. 10: 8. 1995.

疏花草绣球 *shu hua xiu qiu*

Cardiandra laxiflora H. L. Li, J. Arnold Arbor. 26: 61. 1945.

Seed wings translucent, lighter than color of seed body. Fl. Jul.

• 700–1000 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan.

Ohba (J. Jap. Bot. 60: 8. 1985) considered this variety to be synonymous with var. *moellendorffii*, which he recognized as *Cardiandra alternifolia* subsp. *moellendorffii*.

2. *Cardiandra formosana* Hayata, Bot. Mag. (Tokyo) 20: 54. 1906.

台湾草绣球 *tai wan cao xiu qiu*

Cardiandra alternifolia Siebold & Zuccarini subsp. *moellendorffii* (Hance) H. Hara & H. Ohba var. *binata* F. Maekawa; *C. densifolia* C. F. Wei.

Subshrubs 30–70 cm tall. Stems sparsely pubescent or glabrous. Leaves borne distally on stem, usually 4–8-fascicled; petiole (0.5–)2–5 cm; leaf blade elliptic, narrowly so, or oblong-obovate, (5–)10–15 × (2–)3–6 cm, thinly papery, both surfaces sparsely pubescent, glabrescent, secondary veins 6–11 on both sides of midvein, slender, flat on both surfaces, base narrowly cuneate, margin shortly serrate, apex shortly caudate-acuminate. Inflorescence usually terminal, a corymbose cyme; peduncle elongate. Sterile flowers with sepals 2, ovate, unequal, larger one 1.5–2.5 cm, smaller one ca. 1/2 as large. Fertile flowers with calyx tube cupular, ca. 1 mm; teeth ovate, ca. 0.7 mm. Petals 4 or 5, ovate to

broadly so, ca. 3 mm. Stamens 15–19, slightly unequal, subequaling petals. Styles 2 or 3, 1–1.3 mm in fruit. Capsule ovoid, ca. 3 × 2.5 mm. Seeds brown, broadly oblong, broadly ovoid, or broadly obovoid, 0.5–0.7 mm;

wings yellowish white, translucent, conspicuously lighter than color of seed body, 0.2–0.3 mm. Fl. Aug–Sep, fr. Oct.

• Forests in shade; medium altitudes. Taiwan, Zhejiang.

23. *PLATYCRATER* Siebold & Zuccarini, Fl. Jap. 1: 62. 1837–1838.

蛛网萼属 *zhu wang e shu*

Wei Zhaofen (卫兆芬 *Wei Chao-fen*); Bruce Bartholomew

Shrubs deciduous. Stems erect or prostrate, sometimes rooting from nodes; bark peeling off. Winter bud scales in 2 or 3 pairs, membranous. Leaves opposite, decussate; leaf blade simple. Inflorescence terminal, a corymbose cyme, few branched; bracts persistent. Sterile flowers few, large. Fertile flowers numerous, small. Calyx tube adnate to ovary; teeth persistent. Petals 4, free, valvate in bud, fleshy, falling early. Stamens very numerous, multiseriate; filaments basally slightly connate; anthers basifixed, broadly oblong, apex subrounded. Ovary inferior, 2-loculed; ovules numerous. Styles 2, erect or spreading; stigmas papillose or adaxially oblique. Fruit an apically poricidal capsule, obconical, 2-valved. Seeds numerous, small, winged at both ends.

One species: China, Japan.

1. *Platycrater arguta* Siebold & Zuccarini, Fl. Jap. 1: 64. 1837–1838.

蛛网萼 *zhu wang e*

Shrubs 0.5–3 m tall. Branchlets brown, subglabrous. Petiole 1–7 cm; leaf blade lanceolate to elliptic, 9–15 × 3–6 cm, membranous to papery, both surfaces pubescent or adaxially subglabrous, secondary veins 7–9 on both sides of midvein, slender, abaxially slightly prominent, base narrowly cuneate, slightly decurrent, margin roughly serrate to serrulate. Inflorescence subglabrous; bracts linear. Sterile flowers with sepals 3 or 4, broadly ovate, connate from base to middle and forming a triangle or square 2.5–2.8 cm in diam. in fruit, translucent and thinly net veined. Fertile flowers with calyx tube turbinate, 4–5 mm; teeth 4 or 5, triangular-

ovate to narrowly triangular, 4–5.5 mm, to 7 mm in fruit. Petals ovate, ca. 7 mm. Filaments filiform; anthers subglobose, ca. 1 mm in diam. Styles slender, ca. 1 cm in fruit; stigmas small. Capsule 8–9 mm, apically 6–8 mm in diam., striate. Seeds dark brown, compressed ellipsoid, 0.6–0.8 mm, thinly striate, shortly winged. Fl. Jul, fr. Sep–Oct.

Sparse forests or thickets in valleys, stream banks, mountain slopes; 400–1800 m. Anhui, Fujian, Jiangxi, Zhejiang [Japan].

The Chinese plants were described as *Platycrater arguta* var. *sinensis* H. Hara (J. Jap. Bot. 61: 70. 1986), which differs from the Japanese plants (var. *arguta*) in having leaf blades abaxially glabrous or sparsely pubescent with appressed hairs along veins (vs. abaxially densely hairy with spreading hairs along veins), and both calyx and ovary glabrous (see Katsuyama, J. Jap. Bot. 74: 317–319. 1999).

24. *SCHIZOPHRAGMA* Siebold & Zuccarini, Fl. Jap. 1: 58. 1837–1838.

钻地风属 *zuan di feng shu*

Wei Zhaofen (卫兆芬 *Wei Chao-fen*); Bruce Bartholomew

Shrubs often scandent, deciduous. Stems prostrate or climbing, with aerial roots. Winter bud scales in 2–4 pairs, dark brown, pubescent. Leaves opposite; leaf blade simple, margin entire, slightly serrulate, or roughly serrate. Inflorescence terminal, corymbose or forming a thyrse. Flowers both fertile and sterile or fertile only. Sterile flowers usually with 1 expanded sepal, petaloid, margin entire. Fertile flowers small. Calyx tube adnate to ovary; teeth persistent. Petals free, valvate in bud, falling early. Stamens 10, free; filaments filiform; anthers ovoid, apex obtuse. Ovary subinferior, obconical to turbinate, 4- or 5-loculed; placentation axile; ovules numerous. Style 1, short; stigma capitate, 4- or 5-fissured. Fruit a loculicidal capsule, obconical to turbinate, striate, apex projected or truncate. Seeds very numerous, fusiform, with long, narrow wings at both ends.

About ten species: China, Japan, Korea; nine species (endemic) in China.

1a. Flowers fertile only 9. *S. crassum*

1b. Flowers both fertile and sterile.

2a. Leaf blade abaxially densely granulate glandular.

3a. Secondary leaf veins usually unbranched; leaf blade elliptic, base cuneate to subobtusate .. 8. *S. elliptifolium*

3b. Secondary leaf veins usually 1–4-branched; leaf blade narrowly or broadly ovate, base rounded

or
subcordate.

4a. Leaf blade narrowly ovate, abaxially glabrous or sometimes barbate at vein axils .. 6. *S. hypoglaucum*

4b. Leaf blade broadly ovate, abaxially densely brownish pubescent along veins 7. *S. fauriei*

2b. Leaf blade abaxially not granulate glandular.

5a. Leaf blade margin distally serrate-dentate from middle; sterile flower pedicels less than 1 cm 5. *S. corylifolium*

- 5b. Leaf blade margin entire or sometimes shortly and acutely denticulate; sterile flower pedicels more than 1 cm.
 6a. Leaf blade abaxially densely pubescent, especially along veins 4. *S. molle*
 6b. Leaf blade abaxially glabrous, slightly pilose along veins, or densely pubescent only along both sides of midvein, sometimes barbate.
 7a. Capsule apex truncate 3. *S. choufenianum*
 7b. Capsule apex projected.
 8a. Capsule campanulate to turbinate, 6–8 mm, base broadly cuneate; leaf blade abaxially glabrous or slightly pubescent along midvein 1. *S. integrifolium*
 8b. Capsule obconical, 8–12 mm, base acute to narrowly cuneate; leaf blade abaxially usually densely pubescent along both sides of midvein 2. *S. megalocarpum*

1. *Schizophragma integrifolium* Oliver, Hooker's Icon. Pl. 20: t. 1934. 1890.

钻地风 zuan di feng

Shrubs scandent. Branchlets brown, glabrous. Petiole 2–9 cm, glabrous; leaf blade abaxially green or glaucous, adaxially glossy green, elliptic, narrowly so, or broadly ovate, 8–20 × 3.5–12.5 cm, thickly or thinly papery, abaxially glabrous or sometimes sparsely pubescent along veins or barbate at vein axils, adaxially glabrous, secondary veins 7–9 on both sides of midvein, base broadly cuneate, rounded, or shallowly cordate, margin entire or serrulate, apex acute to acuminate. Inflorescences corymbose, densely appressed brown pubescent, glabrescent. Sterile flowers with expanded sepal 1(–3), yellow-white, ovate-lanceolate, lanceolate, or broadly elliptic, 3–7 × 2–3 cm in fruit. Fertile flowers with calyx tube turbinate, 1.5–2 × 1–1.5 mm, base subacute; teeth triangular, ca. 0.5 mm. Petals narrowly ovate, 2–3 mm, apex obtuse. Stamens subequal, 4.5–6 mm at anthesis; anthers subglobose, ca. 0.5 mm. Style and stigma ca. 1 mm. Capsule campanulate to turbinate, 6–8 × 3.5–4.5 mm, base broadly cuneate, projected apical part shortly conical, ca. 1.5 mm. Seeds brown, compressed, 3–4 mm including wings; wings 1–1.5 mm. Fl. Jun–Jul, fr. Oct–Nov.

• Dense to sparse forests in valleys or on mountain slopes or summits; 200–2000 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan, Zhejiang.

1a. Leaf blade abaxially green, thick 1a. var. *integrifolium*
 1b. Leaf blade abaxially glaucous, thin 1b. var. *glaucescens*

1a. *Schizophragma integrifolium* var. *integrifolium*
 钻地风(原变种) zuan di feng (yuan bian zhong)

Schizophragma amplum Chun; *S. integrifolium* var. *denticulatum* Rehder; *S. macrosepalum* Hu.

Leaf blade abaxially green, thick. Fl. Jun–Jul, fr. Oct–Nov.

• Dense to sparse forests in valleys or on mountain slopes or summits; 200–2000 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan, Zhejiang.

1b. *Schizophragma integrifolium* var. *glaucescens* Rehder in Sargent, Pl. Wilson. 1: 42. 1911.

粉绿钻地风 fen lu zuan di feng

Leaf blade abaxially glaucous, thin. Fl. Jun, fr. Oct.

• 600–1800 m. Guangdong, Guangxi, Guizhou, Hubei, Sichuan, Zhejiang.

2. *Schizophragma megalocarpum* Chun, Acta Phytotax. Sin. 3: 164. 1954.

大果钻地风 da guo zuan di feng

Shrubs scandent. Branchlets gray-brown, subglabrous, striate. Petiole 2.5–9 cm, subglabrous; leaf blade abaxially yellow-brown and adaxially brown when dry, broadly ovate, 11–15 × 8–11 cm, papery, abaxially pubescent along veins, especially on both sides of midvein and at vein axils, adaxially glabrous, secondary veins 7 or 8 on both sides of midvein, usually 1- or 2-branched, curved, base truncate or subcordate, margin slightly reflexed and entire or distally sparsely serrulate from middle, apex acute to acuminate. Inflorescences corymbose, densely brown pubescent when young, glabrescent on peduncle and proximal branches. Sterile flowers with expanded sepal 1, ovate-lanceolate, 2.5–6 × 1.5–4 cm. Fertile flowers with calyx tube obconical, ca. 3 mm; teeth ovate-triangular, ca. 0.5 mm. Petals oblong, 2.5–3 × 1–1.5 mm, apex acute, hood-shaped. Stamens to 5 mm, subequal; anthers oblong, ca. 0.8 mm. Style ca. 1 mm. Capsule obconical, 8–12 × 3–5 mm, base acute to narrowly cuneate, projected apical part broadly conical, 1.5–2 mm. Seeds 5–7 mm; wings 2–3 mm. Fl. Jul, fr. Oct–Nov.

• Forests in valleys; ca. 600 m. C Sichuan (Baoping Xian, Tianquan Xian).

3. *Schizophragma choufenianum* Chun, Acta Phytotax. Sin. 3: 169. 1954.

临桂钻地风 lin gui zuan di feng

Shrubs scandent. Branchlets brown, smooth; bark peeling off when old. Petiole 8–11 cm, adaxially canaliculate; leaf blade abaxially yellow-brown and adaxially dark brown when dry, elliptic, 14–19 × 8–12 cm, papery, abaxially pubescent along veins, glabrescent, adaxially glabrous, secondary veins 7 or 8 on both sides of midvein, sometimes 1- or 2-branched, base broadly cuneate, margin entire or apically sparsely serrulate, apex acuminate. Inflorescences corymbose, subglabrous in fruit, many flowered; branches spreading. Sterile flowers with expanded sepal 1, narrowly ovate, 3.2–4 × 1–1.9 cm. Fertile flowers unknown. Capsule obconical, 4–5 × 3–4 mm including style, apex truncate; persistent calyx teeth triangular, ca. 0.5 mm; persistent

style and stigma ca. 1 mm. Seeds brown, slightly compressed, 2–2.5 mm including wings; apical wing broader than basal one, 0.5–1 mm. Fr. Nov.

• Moist forests in valleys, rock faces; ca. 600 m. NE Guangxi (Lingui Xian).

4. *Schizophragma molle* (Rehder) Chun, Acta Phytotax. Sin. 3: 167. 1954.

柔毛钻地风 rou mao zuan di feng

Schizophragma integrifolium Oliver var. *molle* Rehder in Sargent, Pl. Wilson. 1: 42. 1911; *S. molle* var. *grande* Chun; *S. molle* var. *rubidum* N. Chao & C. C. Yang. Shrubs scandent. Branchlets red-brown to dark brown, glabrous or pubescent. Petiole 1.5–8 cm, pubescent, glabrescent; leaf blade gray-green, brown, or red-brown on both surfaces when dry, ovate to elliptic, 10–20 × 6–12 cm, papery to subleathery, abaxially densely brownish to gray-brown pubescent especially along veins, adaxially glabrous or slightly pubescent only along veins, secondary veins 7–9 on both sides of midvein, abaxially elevated, base shallowly cordate, truncate, or obtuse-rounded, margin slightly reflexed and entire or apically sparsely denticulate, apex acute to shortly acuminate. Inflorescences corymbose, slightly arcuate apically, 10–25 cm wide, densely ferruginous pubescent. Sterile flowers with expanded sepal 1, yellow-white, ovate to narrowly elliptic, 2.5–6 × 1–3.5 cm. Fertile flowers with calyx tube obconical, 1.5–2 mm; teeth triangular, less than 1 mm. Petals ovate, slightly concave, 2–2.5 mm, adaxially pilose. Stamens subequal; anthers broadly oblong to subglobose. Style ca. 0.5 mm. Capsule narrowly obconical, 5–6 mm, 10-striate, projected apical part conical, 1–1.5 mm. Seeds brown, ca. 4 mm including wings; wings ca. 1.5 mm, lighter than color of seed body. Fl. Jun–Jul, fr. Sep–Oct.

• Forests on roadsides, cliffs in valleys; 500–2100 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangsu, Jiangxi, Yunnan.

5. *Schizophragma corylifolium* Chun, Acta Phytotax. Sin. 3: 170. 1954.

秦榛钻地风 qin zhen zuan di feng

Shrubs scandent. Branchlets gray-brown, sparsely pubescent when young, glabrescent. Petiole 2–10 cm, pubescent when young, glabrescent; leaf blade abaxially gray-yellow and adaxially dark yellow-brown when dry, broadly ovate, broadly obovate, or suborbicular, 6.5–11 × 4–8 cm, papery, abaxially villous along veins, adaxially glabrous or sometimes pilose along midvein, secondary veins 6–8 on both sides of midvein, branched, obliquely ascending, base shallowly cordate to subrounded, margin distally roughly serrate from middle, apex cuspidate or shortly acuminate. Inflorescences corymbose, 8–17 cm wide, villous when young, glabrescent. Sterile flowers with expanded sepal 1, ovate, 2.5–3.1 × 1.4–2 cm. Fertile flowers with calyx tube obconical, ca. 2 mm; teeth triangular, ca. 0.5 mm. Petals oblong, 1.8–2 mm. Stamens subequal, ca. 3 mm at anthesis; anthers

subglobose, ca. 0.5 mm. Style apically 5-fissured.

Capsule (immature) obconical, 4–5 mm, glabrous, apex slightly projected and resembling a convex lens. Fl. May–Jun.

• Mixed forests in valleys along stream banks; 100–1200 m. Anhui, Zhejiang.

6. *Schizophragma hypoglauca* Rehder in Sargent, Pl. Wilson. 1: 43. 1911.

白背钻地风 bai bei zuan di feng

Shrubs scandent. Branchlets brown-red, glabrous. Petiole 2–6 cm, glabrous; leaf blade abaxially glaucous, slightly yellow when dry, adaxially dark green, narrowly ovate, 8–15 × 4–8 cm, papery, abaxially densely granulate glandular, glabrous or sometimes barbate at vein axils, adaxially glabrous, secondary veins 7 or 8 on both sides of midvein, often 1–4-branched, curved, base rounded to broadly cuneate, margin slightly reflexed and entire or apically sparsely denticulate, apex narrowly acuminate. Inflorescences corymbose; peduncle and branches subglabrous. Sterile flowers with expanded sepal 1, narrowly ovate to lanceolate, 2–6 × 1–3 cm, base cuneate, apex obtuse. Fertile flowers with calyx tube obconical, 1–1.5 mm; teeth triangular, ca. 0.5 mm. Petals oblong, ca. 2 × 1–1.4 mm. Stamens unequal, some slightly longer than petals, others ca. 2 × as long as petals; anthers subglobose, ca. 0.5 mm in diam. Style and stigma ca. 1 mm. Capsule narrowly obconical, 5–7 × 2.5–3 mm including style, projected apical part shortly conical, 0.5–1 mm. Seeds narrowly fusiform, slightly compressed, 2.5–3 × ca. 0.4 mm; apical wing ca. 1.5 mm. Fl. Jun–Jul, fr. Sep–Oct.

• Dense forests on mountain slopes, open rocky places; 1000–1200 m. Guangdong, Hunan, Sichuan.

7. *Schizophragma fauriei* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 22: 131. 1906.

圆叶钻地风 yuan ye zuan di feng

Schizophragma hydrangeoides Siebold & Zuccarini var. *fauriei* (Hayata) Hayata; *S. integrifolium* Oliver var. *fauriei* (Hayata) Hayata.

Shrubs scandent. Branchlets brown, densely appressed brown pubescent. Petiole 2.5–7 cm, pubescent; leaf blade abaxially gray-white, adaxially dark green, broadly ovate, 6.5–11 × 4.5–8 cm, papery, abaxially densely granulate glandular and brownish pubescent along veins, especially along midvein or at vein axils, adaxially glabrous or sparsely pubescent only along veins, secondary veins 7–9 on both sides of midvein, 1- or 2-branched, abaxially elevated, base rounded to subcordate, margin slightly reflexed and entire or sparsely denticulate, apex shortly acuminate.

Inflorescences corymbose; peduncle, branches, and pedicels densely brown appressed pubescent. Sterile flowers with expanded sepal 1, yellow in fruit, oblong to lanceolate, 2–4 × 0.9–2.5 cm. Fertile flowers unknown. Capsule black-brown, obconical, 5–7 × 2.5–3

mm including style; persistent calyx teeth triangular, ca. 1 mm; persistent style very short, stigma ca. 0.5 mm. Seeds brown, slightly compressed, 2.5–3 × 0.5–0.7 mm; apical wing ca. 1 mm, broader than basal one. Fr. Sep–Oct.

• Dense forests on mountain slopes; 1500–2500 m. Fujian, Taiwan.

8. *Schizophragma elliptifolium* C. F. Wei, Guihaia 14: 202. 1994.

椭圆钻地风 tuo yuan zuan di feng

Shrubs scandent. Branchlets brown-red, terete, glabrous. Petiole 1.5–6.5 cm, glabrous; leaf blade abaxially gray-green, adaxially dark green, elliptic, 7–12 × 3–7 cm, thickly papery, abaxially densely granulate glandular, glabrous except slightly barbate at vein axils, adaxially glabrous, secondary veins 8–10 on both sides of midvein, unbranched, curved, base cuneate to obtuse, margin entire, slightly reflexed, apex acute to shortly acuminate. Inflorescences corymbose, densely brown pubescent when young, glabrescent. Sterile flowers with expanded sepal 1, yellow-white, oblong to lanceolate, 2–4.5 × 0.9–1.9 cm, both ends obtuse to subacute. Fertile flowers with calyx sparsely pubescent; tube obconical, ca. 1 mm; teeth triangular, ca. 0.5 mm. Petals yellowish, oblong to ovate, 2–2.5 × 1–1.3 mm, apex subacute. Stamens subequal, 8–10 mm; anthers subglobose, ca. 0.5 mm in diam. Style ca. 1 mm; stigma small. Capsule obconical, 4.5–5.5 × ca. 2.5 mm including style, projected apical part shortly conical, ca. 0.5 mm. Seeds brown, slightly compressed, 2–2.8 mm including wings; wings 0.5–1 mm, basal one yellowish white, subulate, shorter than apical one. Fl. Jul, fr. Oct.

• Sparse forests or thickets on mountain slopes and ridges, rocks in valleys; 1400–2100 m. Guizhou, Sichuan, Yunnan.

The spelling of the specific epithet follows the protologue; in FRPS, it was given as “*Schizophragma ellipsophyllum*.”

9. *Schizophragma crassum* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 59: 247. 1922.

厚叶钻地风 hou ye zuan di feng

Shrubs scandent. Stems to 3 cm in diam.; branchlets slightly purple, densely brown hispid when young, glabrescent. Petiole thick, 0.9–4 cm, brown tomentose; leaf blade abaxially glaucous, adaxially dark green, elliptic to narrowly ovate or broadly ovate to suborbicular, 6.5–16 cm, thickly papery, abaxially densely gray tomentose or yellow-brown pubescent,

25. *DEINANTHE* Maximowicz, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 10(16): 2. 1867.

叉叶蓝属 cha ye lan shu

Wei Zhaofen (卫兆芬 Wei Chao-fen); Bruce Bartholomew

Herbs perennial, with horizontal rhizomes. Leaves opposite, usually 2- or 4-crowded apically on stem. Inflorescence terminal, an umbellate or corymbose cyme, few flowered; involucre and bracts deciduous or occasionally persistent. Sterile flowers small, borne at margin of inflorescence. Fertile flowers large. Calyx tube hemispheric to turbinate, adnate to ovary; lobes 5, imbricate in bud, petaloid, persistent. Petals 5–8, imbricate in bud. Stamens inserted on periphery of disc; filaments slender; anthers basifixed, broadly ellipsoid. Ovary semi-inferior; placentation parietal;

adaxially slightly long pilose only along veins, secondary veins 8–10 on both sides of midvein, abaxially prominent, base rounded to broadly cordate or broadly cuneate to obtuse, margin serrulate, apex acute to shortly acuminate. Thyrses 10–15 cm wide, many flowered; peduncle short; pedicels 1.5–2 mm, hirsute. Sterile flowers absent. Fertile flowers with calyx teeth triangular, ca. 0.5 mm, hirsute. Petals white, lanceolate, ca. 2 mm, apex acute. Stamens nearly equaling petals. Ovary turbinate, apex slightly projected and forming a short cone. Style thick. Capsule conical-turbinate, ca. 5 mm. Fl. Jun, fr. Oct.

• Forests; 2300–2900 m. NW Yunnan.

- 1a. Leaf blade broadly ovate to suborbicular, abaxially densely gray tomentose, basal 2 or 3 pairs of secondary veins spreading at almost 90° to midvein, base rounded to broadly cordate 9a. var. *crassum*
- 1b. Leaf blade elliptic to narrowly ovate, abaxially densely yellow-brown pubescent, secondary veins all obliquely ascending from midvein, base broadly cuneate to obtuse 9b. var. *hsitaoanum*

9a. *Schizophragma crassum* var. *crassum*

厚叶钻地风(原变种) hou ye zuan di feng (yuan bian zhong)

Leaf blade broadly ovate to suborbicular, abaxially densely gray tomentose, basal 2 or 3 pairs of secondary veins spreading at almost 90° to midvein, base rounded to broadly cordate. Fl. Jun.

• Forests; 2300–2500 m. NW Yunnan (Nu Jiang valley).

9b. *Schizophragma crassum* var. *hsitaoanum* (Chun) C. F. Wei, Guihaia 14: 203. 1994.

维西钻地风 wei xi zuan di feng

Schizophragma hsitaoanum Chun, Acta Phytotax. Sin. 3: 172. 1954.

Leaf blade elliptic to narrowly ovate, abaxially densely yellow-brown pubescent, secondary veins all obliquely ascending from midvein, base broadly cuneate to obtuse. Fr. Oct.

• Forests in valleys; 2600–2900 m. NW Yunnan (Weixi Xian).

ovules numerous. Styles 5, connate or apex 6-fissured; stigmas small. Fruit a capsule, semi-inferior, dehiscent between valves. Seeds numerous, small, winged at both ends.

Two species: China, Japan; one species (endemic) in China.

1. *Deinanthus caerulea* Stapf, Bot. Mag. 137: t. 8373. 1911.

叉叶蓝 cha ye lan

Herbs 30–50 cm tall. Rhizomes rough, nodose, with fibrous roots. Stem solitary. Leaves usually 4, crowded apically on stem; leaf blade broadly elliptic, ovate, or obovate, 10–25 × 6–16 cm, membranous, abaxially subglabrous except sparsely strigose along veins, adaxially sparsely strigose, secondary veins 7–9 on both sides of midvein, almost flat on both surfaces, base obtuse to narrowly cuneate, margin roughly and acutely dentate, apex entire or deeply 2-lobed with lobes 5–6 cm. Inflorescence a pedunculate, corymbose cyme, 9–15 cm, glabrous; bracts alternate, lanceolate, 1.5–2.5 cm, margin denticulate. Sterile flowers with sepals 3 or 4, greenish to blue, ovate to orbicular, subequal, ca. 1.4 cm wide. Fertile flowers usually nodding; pedicel rough,

0.5–1.5 cm. Calyx blue or slightly red; tube ca. 4 mm; lobes 5, ovate to suborbicular, 5–8 mm, apex subacute to cuspidate. Petals 6–8, blue or slightly red, obovate, suborbicular, or broadly orbicular, 1–1.4 cm wide. Stamens very numerous; filaments and anthers slightly blue; anthers ellipsoid, apex obtuse. Ovary incompletely 5-loculed. Styles terete, 5–6 mm, apex deeply 5-cleft. Capsule subglobose, ca. 1 cm in diam. Seeds brown (immature). Fl. Jun–Jul.

• Moist forests in valleys; 700–1600 m. W Hubei.

Deinanthus caerulea is similar to the Japanese species *D. bifida* Maximowicz. However, *D. caerulea* differs in having leaves usually 4, crowded at the stem apex, both surfaces with sparse, simple hairs, and flowers in a corymbose cyme.

26. *HYDRANGEA* Linnaeus, Sp. Pl. 1: 397. 1753.

绣球属 xiu qiu shu

Wei Zhaofen (卫兆芬 Wei Chao-fen); Bruce Bartholomew

Subshrubs, shrubs, or small trees, erect or climbing, deciduous or evergreen. Branchlets, leaves, and inflorescences variously hairy. Leaves opposite, rarely verticillate, exstipulate; leaf blade simple, margin entire, serrate, or rarely pinnately lobed. Inflorescence terminal, occasionally axillary, a corymbose cyme, umbellate cyme, or thyrse; bracts deciduous. Flowers fertile or sterile. Sterile flowers few (more numerous in cultivated varieties), sometimes absent, borne at margin of inflorescence, with sepals 2 or 5, petaloid, and enlarged. Fertile flowers usually very numerous, bisexual, small; pedicel short. Calyx tube adnate to ovary, 4- or 5-dentate, persistent. Corolla lobes 4 or 5, free, rarely connate and forming a calyptra, ovate or spatulate, valvate. Stamens (8 or) 10 (or 25), inserted on disc; filaments linear; anthers oblong to subglobose, apex subrounded to obtuse. Ovary inferior to 2/3 superior, imperfectly or perfectly 2–4 (or 5)-loculed; placentation parietal or axile; ovules numerous. Styles 2–4 (or 5), free or basally connate, persistent; stigmas terminal or decurrent along style adaxially. Fruit a capsule, dehiscent apically among styles, hemispheric to turbinate, small, apex projected or truncate. Seeds numerous, small, winged or wingless; seed coat thin, with reticulate or striate veins.

About 73 species: mainly in E Asia, a few species in SE Asia and the New World; 33 species (25 endemic) in China.

The Japanese species *Hydrangea macrophylla* (Thunberg) Seringe is cultivated as an ornamental. Records of *H. macrophylla* var. *macrophylla* from China (e.g., in FRPS) are probably all from cultivated plants. One of the present authors (Bartholomew) believes that records of *H. macrophylla* var. *normalis* E. H. Wilson from China (e.g., in FRPS) are probably referable to related taxa such as *H. caudatifolia*, *H. chungii*, or *H. stylosa*. However, Wei believes that wild-growing *H. macrophylla* occurs in Guangdong, Guizhou, and Sichuan, with var. *normalis* in Zhejiang.

One of the present authors (Bartholomew) feels that the three species complexes in *Hydrangea* would be better treated as the widespread, variable species *H. chinensis* (to include *H. davidii*, *H. linkweiensis*, and *H. mangshanensis*), *H. heteromalla* (to include *H. bretschnideri*, *H. dumicola*, *H. hypoglauca*, *H. macrocarpa*, *H. sungpanensis*, and *H. xanthoneura*), and *H. aspera* (to include *H. coacta*, *H. kawakamii*, *H. longipes* var. *fulvescens*, and *H. longipes* var. *lanceolata*). Bartholomew believes that, with the recognition of these three species in the broader sense, as well as a number of other reductions (*H. coenobialis* to include *H. candida* and *H. gracilis*, *H. chungii* to include *H. caudatifolia*, and *H. robusta* to include *H. longipes* var. *longipes*), there are probably about 18 recognizable species of *Hydrangea* (nine endemic) in China; Wu Zhengyi (editor's note) agrees.

1a. Ovary completely inferior; capsule apex truncate.

2a. Petals apically connate and forming a calyptra; seed wing encircling seed 33. *H. anomala*

2b. Petals free; seeds winged at both ends.

3a. Leaf blade margin entire; bracts closely enveloping inflorescence in bud, ovate-orbicular; vines climbing 32. *H. integrifolia*

3b. Leaf blade margin serrate; bracts not enveloping inflorescence in bud, lanceolate; shrubs or small trees.

4a. Branchlets with branched hairs.

- 5a. Branchlets, petiole, and peduncle with translucent hairs; leaf blade ovate, oblong-ovate, or elliptic, submembranous or thinly papery 30. *H. sargentiana*
- 5b. Branchlets, petiole, and peduncle without translucent hairs; leaf blade lanceolate, papery or subleathery 31. *H. longifolia*
- 4b. Branchlets glabrous or with simple hairs.
- 6a. Seeds with transverse veins between striate veins 29. *H. kawakamii*
- 6b. Seeds without transverse veins.
- 7a. Branchlets 4-angled; petiole long and thick 28. *H. robusta*
- 7b. Branchlets terete or obscurely 4-angled; petiole usually long and thin or short and thick.
- 8a. Fertile flowers white; petiole long and thin, leaf blade membranous to thinly papery .. 26. *H. longipes*
- 8b. Fertile flowers rose, purple-red, or purple-blue; petiole short and thick; leaf blade papery or thickly so.
- 9a. Leaf blade abaxially strigose 25. *H. strigosa*
- 9b. Leaf blade abaxially densely felty tomentose and hirsute, or densely pubescent or villous.
- 10a. Leaf blade abaxially densely felty tomentose and hirsute 27. *H. coacta*
- 10b. Leaf blade abaxially densely pubescent or villous 24. *H. aspera*
- 1b. Ovary 1/3–2/3 superior; capsule apex projected up calyx tube.
- 11a. Projected apical part of capsule conical; free part of petal base truncate; seeds longitudinally striate veined,
long winged at both ends; stamens unequal, longer ones inflexed in bud.
- 12a. Cymes thyrsoïd; leaves opposite or 3-verticillate 16. *H. paniculata*
- 12b. Cymes corymbose; leaves opposite.
- 13a. Leaf blade abaxially densely tomentose or velutinous.
- 14a. Leaf blade abaxially densely velutinous; capsule 2.5–3.5 mm in diam. 17. *H. heteromalla*
- 14b. Leaf blade abaxially densely tomentose; capsule 3–4 mm in diam. 23. *H. macrocarpa*
- 13b. Leaf blade abaxially glabrous, subglabrous, pubescent, villous, or acerose hairy.
- 15a. Leaf blade abaxially glandular granular or glandular papillate.
- 16a. Leaf blade abaxially glandular granular; styles subulate or not in fruit 18. *H. hypoglauca*
- 16b. Leaf blade abaxially glandular papillate; styles clavate in fruit 19. *H. sunpanensis*
- 15b. Leaf blade eglandular on both surfaces.
- 17a. Anthers purple-blue 22. *H. dumicola*
- 17b. Anthers yellow.
- 18a. First and 2nd year's branchlets without lenticels; leaf blade abaxially gray-white villous or glabrescent 20. *H. bretschnideri*
- 18b. Second and sometimes 1st year's branchlets with conspicuous lenticels; leaf blade abaxially glabrous except grayish pubescent to densely slightly crisped villous along veins 21. *H. xanthoneura*
- 11b. Projected apical part of capsule not conical; free part of petal base clawed; seeds net veined,
wingless
or sometimes very shortly winged; stamens subequal, longer ones not inflexed in bud.
- 19a. Ovary less than 1/2 superior; seeds wingless or sometimes very shortly winged at one or both ends.
- 20a. Leaf blade lanceolate, margin slightly reflexed, entire or sparsely serrulate distally; inflorescence branches unequal 11. *H. kwangsiensis*
- 20b. Leaf blade elliptic to broadly so or obovate to obovate-orbicular, margin not reflexed, serrate or roughly long dentate; inflorescence branches subequal.
- 21a. Leaf blade densely roughly villous or pubescent on both surfaces, hairs erect, spread along veins.
- 22a. Leaf blade densely roughly villous on both surfaces especially abaxially; capsule 2.5–3 mm in diam. 12. *H. chungii*
- 22b. Leaf blade pubescent on both surfaces; capsule 1.5–2 mm in diam. 13. *H. caudatifolia*
- 21b. Leaf blade glabrous on both surfaces or sparsely crisped pubescent along veins.
- 23a. Capsule oblong-ovoid; styles short and thick, ca. 1 mm in fruit; anthers yellow 14. *H. zhewanensis*
- 23b. Capsule subglobose; styles slender, 2.5–3 mm in fruit; anthers blue 15. *H. stylosa*
- 19b. Ovary at least 1/2 superior; seeds wingless.
- 24a. Inflorescence with sterile flowers.
- 25a. Second year's or older branchlets gray-white, bark not peeled off.
- 26a. Leaf blade elliptic to suboblong, membranous, adaxially sparsely villous and pubescent; lowest inflorescence branch subtended by a leaf; petals elliptic-rhomboid, 2–2.5 × ca. 1 mm 4. *H. mangshanensis*
- 26b. Leaf blade linear-lanceolate to lanceolate, papery, adaxially glossy and glabrous; lowest inflorescence branch not subtended by a leaf; petals elliptic to narrowly so, 3–4 × 1–1.5 mm 5. *H. stenophylla*
- 25b. Second year's or older branchlets purplish, red-brown, or brown, bark peeled off into irregular fragments.

- 27a. Inflorescence with a 3–5 cm peduncle, branches 3, central branch usually shorter and thinner 3. *H. linkweiensis*
 27b. Inflorescence without a peduncle, branches 3 or 5, equal or central one longer and thicker.
 28a. Styles erect or slightly spreading in fruit; inflorescences umbellate or subcorymbose; petals yellow 1. *H. chinensis*
 28b. Styles curved outward in fruit; inflorescences corymbose; petals deep blue 2. *H. davidii*
 24b. Inflorescence without sterile flowers.
 29a. Leaf blade dark purple-red to dark brown and glossy on both surfaces when dry, or abaxially pearly gray and adaxially yellowish, both surfaces glabrous or abaxially sparsely appressed pubescent along midvein and secondary veins.
 30a. Leaf blade usually dark purple-red to dark brown and glossy on both surfaces when dry, narrowly elliptic to lanceolate, papery, both surfaces glabrous; stigmas not curved outward, not or slightly decurrent along style adaxially 6. *H. lingii*
 30b. Leaf blade abaxially pearly gray and adaxially yellowish when dry, elliptic to oblong, membranous, both surfaces glabrous or abaxially sparsely appressed pubescent along midvein and secondary veins; stigmas curved outward, decurrent along style adaxially 7. *H. candida*
 29b. Leaf blade neither dark purple-red on both surfaces when dry nor abaxially pearly gray, one or both surfaces densely villous, sparsely pubescent, or puberulous.
 31a. Leaf blade densely villous 10. *H. kwangtungensis*
 31b. Leaf blade sparsely pubescent or puberulous.
 32a. Leaf blade 3–8.5 × 1–3 cm, membranous or thinly papery, both surfaces sparsely pubescent or abaxially subglabrous; branchlets slender; inflorescence 2–6 cm wide, branches slender 8. *H. gracilis*
 32b. Leaf blade 9–20 × 2.5–5 cm, papery to thickly so, abaxially sparsely puberulent except along veins; branchlets thick; inflorescence 7–12 cm wide, branches thick 9. *H. coenobialis*

1. *Hydrangea chinensis* Maximowicz, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 10(16): 7. 1867.

中国绣球 *zhong guo xiu qiu*

Hydrangea angustipetala Hayata; *H. angustipetala* var. *major* W. T. Wang & M. X. Nie; *H. chloroleuca* Diels; *H. jiangxiensis* W. T. Wang & M. X. Nie; *H. macrosepala* Hayata; *H. obovatifolia* Hayata; *H. scandens* (Linnaeus f.) Seringe subsp. *chinensis* (Maximowicz) E. M. McClintock; *H. umbellata* Rehder. Shrubs 0.5–4 m tall. First and 2nd years' branchlets red-brown to brown, pubescent when young, glabrescent. Petiole 0.5–2 cm, glabrous or pubescent; leaf blade lanceolate, narrowly elliptic, or obovate, 5–12 × 1.5–4 cm, papery to thinly so, both surfaces sparsely pubescent or glabrous except along veins, abaxially usually barbate at vein axils, secondary veins 4–7 on both sides of midvein, abaxially slightly elevated, base cuneate to subacute, margin subentire to roughly serrate, apex caudate-acuminate to acute. Inflorescences umbellate or subcorymbose, 3–7 cm, 10–14 cm wide in fruit, apex flat or slightly arcuate; branches 3 or 5, equal or central one longer and thicker, pubescent. Sterile flowers with sepals 3 or 4, elliptic, obovate, ovate-orbicular, or broadly orbicular, 1.1–3 × 1–3 cm in fruit, margin entire, undulate, or few denticulate. Fertile flowers with calyx tube cupular to campanulate, 0.5–1.5 × 1.5–2 mm; teeth lanceolate to triangular-ovate, 0.5–2

mm. Petals yellow, elliptic to oblanceolate, 2.5–3.5 × 1–1.2 mm, base with a claw ca. 0.5 mm, apex subacute. Stamens 8–11, subequal, 2–4.5 mm; anthers oblong, 0.6–1 mm. Ovary ca. 1/2 or more superior. Styles 3 or 4, erect or slightly spreading, 1–2 mm in fruit; stigmas usually enlarged, decurrent along both sides of style. Capsule fusiform to ovoid-globose, 3.5–5 × 2.4–3.5 mm, projected apical part 1.5–2.5 mm, equaling or slightly longer than calyx tube. Seeds brownish, ellipsoid, ovoid, or subglobose, slightly compressed, 0.5–1 × 0.4–0.5 mm, wingless; seed coat net veined. Fl. Mar–Aug, fr. May–Oct.

Sparse to dense forests on mountain slopes, mountain tops, or in valleys; 300–2000 m. Anhui, Fujian, Guangxi, Hunan, Jiangxi, Taiwan, Zhejiang [Japan].

Hydrangea chinensis is a very common and widespread taxon that forms a species complex out of which a number of segregate species have been recognized. One of the present authors (Bartholomew) feels that species nos. 2–4 below all fall within the pattern of variation found in *H. chinensis*, in the synonymy of which they would be better treated.

2. *Hydrangea davidii* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 227. 1885.

西南绣球 *xi nan xiu qiu*

Hydrangea arbostiana H. Léveillé; *H. yunnanensis* Rehder.

Shrubs 1–3 m tall. First year's branchlets brown to dark red-brown, densely yellowish pubescent when young,

glabrescent. Second year's branchlets yellowish brown; bark peeled off into irregular fragments. Petiole 1–1.5 cm, slightly crisped pubescent to long pilose; leaf blade abaxially yellow-green and adaxially yellow-brown when dry, oblong to narrowly elliptic, 7–15 × 2–4.5 cm, papery, abaxially subglabrous except pilose along veins and fasciculate pubescent at vein axils, adaxially sparsely minutely strigose with hairs denser and slightly crisped along veins, base cuneate to subacute, margin roughly serrate to serrulate, apex caudate-acuminate. Inflorescences corymbose cymes, 7–10 cm wide, to 14 cm wide in fruit, apex slightly arcuate to truncate; branches 3, unequal with central one usually longer and thicker, densely yellow-brown pubescent. Sterile flowers with sepals 3 or 4, broadly ovate, triangular-ovate, or broadly orbicular, unequal, larger ones 1.3–2.3 × 1.1–3 cm, margin entire or few denticulate, apex subrounded to subacute. Fertile flowers with calyx tube cupular, ca. 1 × 1.5 mm; teeth narrowly lanceolate to triangular-ovate, 0.5–1.5 mm. Petals deep blue, narrowly elliptic to obovate, 2.5–4 × ca. 1 mm, base with a claw 0.5–1 mm, apex obtuse to acuminate. Stamens 8–10, subequal, 1.5–2.5 mm, longer ones not inflexed in bud; anthers broadly oblong to subglobose, 0.5–0.8 mm. Ovary ca. 1/2 superior. Styles 3 or 4, curved outward, 1.5–2 mm in fruit; stigmas enlarged, decurrent along style adaxially. Capsule subglobose, 2.5–3.5 mm in diam., projected apical part 1.2–2 mm, equaling calyx tube. Seeds brownish, obovoid to ellipsoid, 0.5–0.6 mm, wingless; seed coat net veined. Fl. Apr–Jun, fr. Sep–Oct.

• Mixed forests on mountain slopes or in valleys; 1400–2400 m. SC Guizhou, SC Sichuan, Yunnan.

3. *Hydrangea linkweiensis* Chun, Acta Phytotax. Sin. 3: 125. 1954.

临桂绣球 *lin gui xiu qiu*

Hydrangea angustipetala Hayata var. *subumbellata* W. T. Wang; *H. linkweiensis* var. *subumbellata* (W. T. Wang) C. F. Wei.

Shrubs to 3 m tall. Branchlets dark purple-brown, sparsely pubescent when young, glabrescent; bark peeled off into irregular fragments. Petiole 4–10 mm, densely villous; leaf blade dark red-brown on both surfaces or lighter abaxially when dry, lanceolate to ovate-lanceolate, slightly asymmetric, 5–14 × 1.7–4 cm, thinly papery, abaxially glabrous or sparsely puberulent with hairs denser along veins, adaxially glabrous or subglabrous, base broadly cuneate to obtuse, margin sparsely denticulate to serrate, apex caudate-acuminate to falcate acuminate. Inflorescences corymbose cymes, apex truncate; peduncle 3–5 cm; branches 3, unequal with central one shorter and lateral ones longer, 5–8 cm, spreading and appressed pubescent. Sterile flowers with sepals 3, triangular-ovate to broadly ovate, unequal, 1.5–2.5 × 1.5–2.7 cm in fruit, margin entire. Fertile flowers with calyx tube cupular, ca. 1 × 1.5 mm, slightly pilose; teeth ovate-lanceolate, 1.5–2.5 mm.

Petals yellow, oblanceolate to oblong-obovate, 3.5 × 1.2–1.7 mm, with 1 midvein, base with a claw ca. 0.5 mm. Stamens subequal; anthers oblong, 1–1.2 mm. Ovary ca. 1/2 superior. Styles 3 or 4, slightly spreading, 1.5–2 mm in fruit; stigmas enlarged, decurrent along style adaxially. Capsule ovoid to ellipsoid, 3–4.5 × 2.3–4 mm, projected apical part ca. 1.5 mm, equaling calyx tube. Seeds brown, oblong, obovoid, or subglobose, ca. 0.6 × 0.3–0.5 mm, wingless; seed coat net veined. Fl. May–Jun, fr. Aug–Oct.

• Dense to sparse forests or thickets on mountain slopes or in valleys; 700–1100 m. E Guangxi, SW Hubei.

4. *Hydrangea mangshanensis* C. F. Wei, Guihaia 14: 106. 1994.

莽山绣球 *mang shan xiu qiu*

Shrubs 1–2 m tall. First year's branchlets purplish brown, densely crisped pubescent. Second year's branchlets gray-white, glabrous; bark not peeled off. Petiole 1–2 cm, adaxially densely crisped pubescent along both sides of channel; leaf blade abaxially greenish, adaxially deep green, elliptic to suboblong, 7–11 × 2.5–4 cm, membranous, abaxially glabrous, adaxially pubescent and long hairy, hairs denser and crisped along veins, secondary veins ca. 6 on both sides of midvein, abaxially slightly elevated, base broadly cuneate, margin distally serrate, apex shortly to long acuminate. Inflorescences corymbose cymes, 4–7 cm wide, densely crisped pubescent, apex truncate to slightly arcuate; branches 3, thin. Sterile flowers with sepals 3 or 4, rhomboid-elliptic to triangular-ovate, 1.5–2 mm in fruit, margin entire. Fertile flowers with calyx tube cupular, ca. 0.7 × 1.5 mm; teeth triangular, ca. 0.5 mm. Petals elliptic-rhomboid, 2–2.5 × ca. 1 mm, membranous, base shortly clawed, apex slender acuminate. Stamens 10, subequal, 1.5–2.5 mm; anthers oblong, less than 1 mm. Ovary nearly 1/2 superior. Styles 3 or 4, slightly spreading, ca. 1 mm in fruit; stigmas hemispheric in fruit, enlarged. Capsule subglobose, 2.5–3 mm in diam., projected apical part 1.2–1.5 mm, subequaling calyx tube. Seeds brownish, subglobose to obovoid, slightly compressed, ca. 0.5 × 0.5 mm, wingless; seed coat net veined. Fl. May–Jun, fr. Oct–Nov.

• Dense to sparse forests in valleys, on mountain slopes, or on trailsides; 300–1500 m. N Guangdong, SE Hunan.

5. *Hydrangea stenophylla* Merrill & Chun, Sunyatsenia 1: 58. 1930.

柳叶绣球 *liu ye xiu qiu*

Shrubs 0.8–2 m tall. First year's branchlets purplish, brownish when dry. Second year's branchlets usually white, glabrous, without lenticels; bark not peeled off. Petiole 1–2 cm, glabrous; leaf blade abaxially usually purple-red, purplish green when dry, adaxially yellow-green when dry, lanceolate to narrowly so, 8–20 × 1–2.7(–4.5) cm, abaxially sparsely appressed puberulous, adaxially glabrous, secondary veins 7–10 on both sides

of midvein, slightly conspicuous on both surfaces, base narrowly cuneate to subacute, margin slightly reflexed, sparsely serrulate, apex obtusely acuminate. Inflorescences corymbose cymes, 5–12 wide, apex truncate to slightly arcuate; peduncle 4–12 cm; branches 3, pubescent. Sterile flowers with sepals 3 or 4, ovate, broadly so, or suborbicular, unequal, 1–1.8 × 0.9–1.5 cm, margin entire or few denticulate. Fertile flowers with calyx tube shallowly cupular, ca. 1 × 2 mm, pilose; teeth lanceolate to ovate-lanceolate, 1.5–2.5 mm. Petals green-white, elliptic to narrowly so, 3–4 × 1–1.5 mm, base with a claw ca. 0.5 mm, apex subacute. Stamens 8–10, subequal, 2.5–3 mm; anthers broadly oblong, 1–1.5 mm. Ovary nearly 1/2 superior. Styles 3 or 4, erect or slightly spreading, 1.5–2 mm in fruit; stigmas capitate, small. Capsule broadly ellipsoid, 2.5–4 mm in diam., projected apical part 2–2.5 mm, slightly longer than calyx tube. Seeds brownish, ovoid-globose to ellipsoid, 0.6–0.8 mm, wingless; seed coat net veined. Fl. May–Jun, fr. Sep–Oct.

• Dense to sparse forests or thickets in valleys or on mountain slopes; 700–800 m. N and W Guangdong, SW Jiangxi.

6. *Hydrangea lingii* G. Hoo, Acta Phytotax. Sin. 1: 195. 1951. 狭叶绣球 xia ye xiu qiu

Dichroa tristyla W. T. Wang & M. X. Nie; *Hydrangea minnanica* W. D. Han; *H. vinicolor* Chun.

Shrubs 0.7–2.5 m tall. Branchlets dark purple-brown, terete, glabrous or slightly crisped pubescent when young; bark peeled off into fragments when old. Petiole 5–10 mm, sparsely pubescent or glabrous; leaf blade dark purple-red to dark brown on both surfaces when dry, adaxially glossy, lanceolate to narrowly elliptic, 5–9(–18) × 1.5–2.5(–4.5) cm, papery, both surfaces glabrous, secondary veins 5–7 on both sides of midvein, abaxially slightly elevated, adaxially inconspicuous, base cuneate to obtuse, margin sparsely serrulate, apex caudate-acuminate. Inflorescences corymbose cymes, 5–7 cm wide, densely pubescent. Sterile flowers absent. Fertile flowers few. Calyx tube cupular, ca. 1 mm; teeth ovate-triangular to lanceolate, 0.5–2 mm. Petals yellowish, narrowly elliptic, obovate, or broadly so, 2.5–3 mm, with 1 midvein and sometimes 2 secondary veins, base with a claw ca. 1 mm. Stamens 8–10, subequal, 2.5–4 mm; anthers oblong, ca. 1.5 mm. Ovary ca. 1/2 superior. Styles 3, erect or slightly spreading, 1.5–2 mm in fruit; stigmas not to slightly decurrent along style adaxially. Capsule cupular, 3–4 mm in diam., projected apical part 1.5–2 mm, subequaling calyx tube. Seeds brown, ellipsoid, obovoid, or subglobose, 0.5–0.7 × 0.4–0.5 mm, wingless; seed coat net veined. Fl. Apr–May, fr. Aug–Nov.

• Dense to sparse forests or thickets in valleys or on mountain slopes; 200–900 m. W Fujian, EC Guangdong, E Guangxi, Guizhou, Hunan, Jiangxi.

7. *Hydrangea candida* Chun, Acta Phytotax. Sin. 3: 128. 1954.

珠光绣球 zhu guang xiu qiu

Shrubs ca. 1.5 m tall. Branchlets terete; bark white, peeled off into fragments when old. Petiole thin, 0.5–1 cm, abaxially appressed pilose; leaf blade abaxially slightly glossy and pearly gray when dry, adaxially yellowish, ovate to elliptic, 5–12 × 2.5–5 cm, membranous, both surfaces glabrous or sparsely appressed pubescent along veins, secondary veins 7–9 on both sides of midvein, thin, abaxially elevated, base broadly cuneate to obtuse, margin sparsely serrulate, apex shortly caudate-acuminate. Inflorescences corymbose cymes, ca. 7 cm wide, apex slightly arcuate; peduncle present; branches thick, densely crisped pubescent. Sterile flowers absent. Fertile flowers unknown. Capsule subglobose, 3–4 mm in diam., projected apical part longer than calyx tube; persistent calyx tube shallowly cupular, 1–2 mm, teeth lanceolate to triangular, 0.8–1.5 mm; persistent styles 3, ca. 1.5 mm, stigmas curved outward, decurrent. Seeds brownish, wingless; seed coat net veined. Fr. Jul–Aug.

• Dense forests in valleys; ca. 1000 m. S Guangxi (Shiwan Dashan).

One of the present authors (Bartholomew) believes that this species is not distinct from *Hydrangea coenobialis*.

8. *Hydrangea gracilis* W. T. Wang & M. X. Nie, Bull. Bot. Res., Harbin 1(1–2): 49. 1981.

细枝绣球 xi zhi xiu qiu

Shrubs 0.3–1 m tall. Branchlets purple-red to red-brown, slender, terete, sparsely crisped pubescent when young, glabrescent; bark peeled off into fragments when old.

Petiole 3–12 mm, sparsely pubescent; leaf blade abaxially pale to purplish, adaxially yellow-green, lanceolate, ovate-lanceolate, or elliptic, 3–8.5 × 1–3 cm, membranous to thinly papery, both surfaces sparsely pubescent or glabrescent, secondary veins 4–6 on both sides of midvein, thin, abaxially slightly conspicuous, base cuneate to subacute, margin irregularly serrate from base or middle to distal part or sometimes subentire, apex shortly caudate-acuminate.

Inflorescences corymbose cymes, 2–6 × 2–6 cm; peduncle short or absent; branches (1–)3, slender, sparsely pubescent. Sterile flowers absent. Fertile flowers few. Calyx tube shallowly cupular, ca. 1 mm; teeth ovate-lanceolate to ovate, 1–1.5 mm. Petals yellow-green, narrowly elliptic to oblanceolate, 3–4 × 0.7–1 mm, base shortly clawed. Stamens 10, subequal, slightly shorter than petals; anthers oblong, ca. 1.5 mm. Ovary ca. 1/2 superior. Styles 3 or 4, erect or slightly spreading, 1–1.5 mm in fruit; stigmas capitate, enlarged. Capsule cupular, 3–4 mm in diam., projected apical part 1.5–2.5 mm, equaling or slightly longer than calyx tube. Seeds yellowish, oblong to obovoid, ca. 0.5 × 0.3–0.5 mm, wingless; seed coat net veined. Fl. May, fr. Oct.

• Dense forests or thickets in valleys or on mountain slopes; 400–700 m. Hunan, Jiangxi.

One of the present authors (Bartholomew) believes that this species is not distinct from *Hydrangea coenobialis*.

9. *Hydrangea coenobialis* Chun, Acta Phytotax. Sin. 3: 131. 1954.

酥醪绣球 *su lao xiu qiu*

Hydrangea coenobialis var. *acutidens* Chun; *H. stenophylla* Merrill & Chun var. *decorticata* Chun. Shrubs 1–3 m tall. Branches purple-red to dark purple-red, terete, thick, glabrous; bark peeled off into fragments when old. Petiole thick, 1–2 cm, glabrous; leaf blade abaxially greenish, adaxially dark green, ovate-lanceolate, lanceolate, or elliptic, 9–20 × 2.5–5 cm, papery to thickly so, abaxially sparsely appressed puberulous, adaxially glabrous, secondary veins 8–11 on both sides of midvein, abaxially elevated, base obtuse to broadly cuneate, margin serrulate to long sharply serrate, apex acuminate to caudate-acuminate. Inflorescences corymbose cymes, 7–12 cm wide, apex truncate to slightly arcuate; branches 3, thick, densely pubescent. Sterile flowers absent. Fertile flowers with calyx tube funnellform, ca. 1.5 × 2 mm; teeth ovate to ovate-triangular, ca. 1 mm. Petals yellowish, oblanceolate to obovate-oblanceolate, 2.5–4 × 1–1.2 mm. Stamens 8, subequal, ca. 3 mm; anthers oblong, 1–1.5 mm. Ovary ca. 1/2 superior. Styles 3, erect or slightly spreading, ca. 2 mm in fruit; stigmas hemispheric, enlarged. Capsule cupular, 3.5–4 mm in diam., projected apical part 2–2.5 mm, subequaling calyx tube; pedicel 0.6–1.4 cm. Seeds brownish, obovoid to subglobose, ca. 0.5 × 0.4–0.5 mm, wingless; seed coat net veined. Fl. May, fr. Sep.

• Stream banks in dense to sparse valley forests, trailsides on mountain slopes; 200–800 m. NC Guangdong, E Guangxi.

10. *Hydrangea kwangtungensis* Merrill, J. Arnold Arbor. 8: 7. 1927.

广东绣球 *guang dong xiu qiu*

Hydrangea kwangtungensis var. *elliptica* Chun; *H. scandens* (Linnaeus f.) Seringe subsp. *kwangtungensis* (Merrill) E. M. McClintock; *H. shaochingii* Chun. Shrubs 1–2 m tall. Branchlets brown to red-brown, terete, densely translucent yellow-green villous, glabrescent. Petiole 4–13 mm, villous; leaf blade abaxially gray-green, adaxially dark yellow-green, oblong to elliptic, 5–13.5 × 1.5–4 cm, thinly papery to submembranous, both surfaces densely villous or adaxially glabrous, secondary veins 6 or 7 on both sides of midvein, abaxially slightly elevated, base cuneate to obtuse, margin sparsely serrate to serrulate or sometimes subentire, apex caudate-acuminate. Inflorescences terminal, corymbose cymes, ca. 8 cm wide, apex slightly arcuate or truncate. Sterile flowers absent. Fertile flowers with pedicel slender. Calyx tube shallowly cupular, 0.5–1 mm, pilose; teeth oblong-ovate to lanceolate, 1.4–2 mm, abaxially sparsely villous, apex subacute. Petals white, elliptic to oblanceolate, 2.5–4 × 1–1.4 mm, base with a claw 0.5–1 mm, apex obtuse to acuminate. Stamens 10, unequal or subequal, 1.5–3 mm; anthers broadly oblong, less than 1 mm. Ovary 1/2 or more superior. Styles 3 or 4,

erect or slightly spreading, 1.5–2 mm in fruit; stigmas enlarged or not, slightly decurrent along styles adaxially. Capsule subglobose, 3–3.5 mm in diam., projected apical part 1.5–1.7 mm, equaling calyx tube. Seeds yellow, ellipsoid, wingless; seed coat net veined. Fl. Apr–May, fr. Nov.

• Dense to sparse forests in valleys, on mountain tops, or along streams; 700–1100 m. NE Guangdong, SW Guangxi, S Jiangxi.

11. *Hydrangea kwangsiensis* Hu, J. Arnold Arbor. 12: 152. 1931.

粤西绣球 *yue xi xiu qiu*

Hydrangea brevipes Chun; *H. hedyotideae* Chun; *H. kwangsiensis* var. *hedyotideae* (Chun) C. M. Hu ex C. F. Wei.

Shrubs 1–3 m tall. Branchlets brownish, terete, glabrous. Petiole 1–3 cm, base enlarged and enveloping stem; leaf blade lanceolate to broadly so, slightly asymmetric, 9–20 × 1.5–5.5 cm, papery, abaxially slightly appressed puberulous, adaxially glabrous, secondary veins 6–8(–11) on both sides of midvein, thin, abaxially conspicuous, margin slightly reflexed and subentire or sparsely denticulate, apex caudate-acuminate. Inflorescences corymbose cymes, apex truncate; peduncle 6–12 cm; branches 3, spreading with central one much shorter than others, densely appressed pubescent or glabrous. Sterile flowers with sepals (3 or)4(or 5), white, ovate, unequal, 1–3 × 1–2 cm, margin entire, apex rounded to emarginate. Fertile flowers with calyx tube long turbinate, pubescent; teeth ovate to ovate-lanceolate, 0.7–2 × 1–1.2 mm. Petals reflexed after flowering, blue to purple-red, long elliptic, 3–3.5 × 1.5–2 mm. Stamens 10, equaling or slightly longer than petals; anthers oblong, 1–1.5 mm. Ovary ca. 1/5 superior. Styles 3, spreading to suberect, subulate, 2–2.5 mm in fruit; stigmas capitate, small. Capsule long turbinate, 3–4.3 × 2–3 mm, projected apical part 0.5–0.8 mm. Seeds brown-yellow, ovoid, obovoid, or ellipsoid, 0.4–0.5 mm, wingless or sometimes shortly winged at one or both ends; seed coat net veined. Fl. May–Jul, fr. Aug–Nov.

• Dense to sparse forests in valleys, trailsides on mountain slopes; 600–1500 m. N Guangdong, N Guangxi, SE Guizhou, SE Hunan.

This species is very close to *Hydrangea stenophylla*; the relationship between the two species needs further study.

12. *Hydrangea chungii* Rehder, J. Arnold Arbor. 12: 69. 1931.

福建绣球 *fu jian xiu qiu*

Hydrangea macrophylla (Thunberg) Seringe subsp. *chungii* (Rehder) E. M. McClintock.

Shrubs small, 0.3–0.7 m tall. Branchlets densely spreading, terete, translucent roughly villous when young, glabrescent; bark pale, easily peeled off. Petiole thick, 1–4 cm; leaf blade elliptic to oblong-elliptic, 12–20 × 4.5–8.5 cm, membranous, both surfaces densely roughly villous, abaxially more densely so, secondary veins 8–10 on both sides of midvein, slightly prominent on both surfaces, base narrowly to broadly cuneate,

margin roughly serrate, apex acuminate. Inflorescences corymbose cymes, 11–15 cm wide, densely roughly villous; peduncle short; branches 3, subequal. Sterile flowers with sepals 3 or 4, suborbicular to broadly orbicular, 1.5–1.7 × 1.5–2 cm in fruit, apex rounded to emarginate. Fertile flowers with calyx tube ca. 1.5 mm, pubescent; teeth triangular, ca. 1 mm. Petals blue-purple, elliptic, ca. 2 mm in bud. Stamens 10, subequal. Ovary less than 1/2 superior. Styles 3 or 4, spreading, 1–1.5 mm in fruit; stigmas subcapitate to nearly hemispheric. Capsule subglobose, 2.5–3 mm in diam., projected apical part 0.7–1 mm, shorter than calyx tube. Seeds brown, broadly obovoid to broadly ellipsoid, 0.3–0.4 mm, wingless or sometimes shortly winged at both ends; seed coat net veined. Fl. Jun–Jul, fr. Sep–Oct.

• Dense forests or thickets on mountain slopes or on trailsides; 200–800 m. NW Fujian.

13. *Hydrangea caudatifolia* W. T. Wang & M. X. Nie, Bull. Bot. Res., Harbin 1(1–2): 54. 1981.

尾叶绣球 wei ye xiu qiu

Shrubs ca. 1 m tall. Young branchlets, petioles, peduncles, and pedicels densely yellowish pubescent. Branchlets yellowish, terete, glabrescent. Petiole thick, 2–3 cm; leaf blade elliptic to obovate-oblong, 7–19.5 × 2.5–8.5 cm, membranous, both surfaces pubescent, more densely so abaxially, secondary veins 7–9 on both sides of midvein, slender, abaxially slightly prominent, base broadly cuneate, margin roughly long serrate, apex caudate-acuminate. Inflorescences corymbose cymes, to 13 cm wide in fruit, apex slightly arcuate; peduncle short; branches 3, subequal. Sterile flowers with sepals (3 or)4(or 5), suborbicular to broadly orbicular, 1.2–1.7 × 1.1–2 cm, margin entire or apically few denticulate. Fertile flowers small. Calyx tube ca. 1 mm; teeth triangular, 0.5–0.8 mm. Petals purple, long ovate, 3–3.5 mm. Stamens 10, 3–5 mm. Ovary less than 1/2 superior. Capsule subglobose, 1.5–2 mm in diam., projected apical part 0.5–0.7 mm, ca. 1/3 as long as capsule body. Seeds brownish, oblong to globose, 0.4–0.5 × 0.3–0.4 mm, wingless or sometimes shortly winged at one or both ends; seed coat net veined. Fl. Jun, fr. Oct.

• Bamboo forests; 600–700 m. E Jiangxi (Lichuan Xian).

One of the present authors (Bartholomew) believes that this species is not distinct from *Hydrangea chungii*.

14. *Hydrangea zhewanensis* P. S. Hsu & X. P. Zhang, Investig. Stud. Nat. Mus. Hist. Nat. Shanghai. 9: 12. 1987.

浙皖绣球 zhe wan xiu qiu

Shrubs small, 0.7–1.5 m tall. Branchlets brownish, terete or slightly 4-angled, densely crisped pubescent when young, glabrescent; bark peeled off into fragments. Petiole 1–4 cm, crisped pubescent; leaf blade brownish on both surfaces when dry or adaxially darker, elliptic to rhomboid-elliptic, 6–19 × 3–8 cm, thinly papery, both surfaces glabrous, glabrescent, or crisped pubescent only along veins, secondary veins 6–8 on both sides of midvein, arcuate, slender, abaxially

plane, base cuneate to broadly so, margin serrate, apex caudate-acuminate. Inflorescences corymbose cymes, 8–14 cm wide, apex slightly arcuate; peduncle and branches short, densely crisped pubescent. Sterile flowers with sepals 3 or 4, bluish, ovate to broadly so, unequal, 1–2 × 1–1.8 cm in fruit, margin entire or apically few denticulate. Fertile flowers with calyx tube campanulate, 1.2–1.5 mm, glabrous; teeth ovate-triangular, ca. 2.5 mm. Petals reflexed after flowering, blue, oblong-ovate, 2.5–3 mm. Stamens 10, 3–5 mm; anthers yellow, broadly oblong, ca. 0.6 mm. Ovary less than 1/2 superior. Styles (2 or)3(or 4), thick, ca. 1 mm in fruit; stigmas slightly enlarged. Capsule oblong-ovoid, ca. 3 mm in diam., projected apical part 1.2–1.5 mm, ca. 1/3 as long as capsule body. Seeds brown, ellipsoid to oblong, compressed, 0.5–0.7 mm, shortly winged at both ends; seed coat net veined. Fl. Jun–Jul, fr. Oct–Nov.

• Sparse forests or thickets along stream banks in valleys or on mountain slopes; 600–1500 m. SE Anhui (She Xian), N Zhejiang. One of the present authors (Bartholomew) believes that this species needs further study. It is close to *Hydrangea macrophylla* (Thunberg) Seringe and *H. stylosa*, and may belong to either of these species.

15. *Hydrangea stylosa* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 75. 1858.

长柱绣球 chang zhu xiu qiu

Hydrangea macrophylla (Thunberg) Seringe subsp. *stylosa* (J. D. Hooker & Thomson) E. M. McClintock; *H. taronensis* Handel-Mazzetti.

Shrubs ca. 1.5 m tall. First year's branchlets sparsely pubescent. Second year's branchlets gray-white. Petiole 1.5–3 cm, brownish pubescent; leaf blade elliptic, 6–14 × 3–7 cm, papery, both surfaces glabrous or midvein crisped pubescent, secondary veins 6–8 on both sides of midvein, abaxially slightly prominent, base cuneate to subrounded, margin serrate, apex shortly acuminate. Inflorescences corymbose cymes, 5–10 cm wide, apex truncate; peduncle 3–7 cm; branches 3, subequal, brownish pubescent. Sterile flowers with sepals 3 or 4, broadly ovate to broadly elliptic, unequal, 0.5–2 cm, margin few denticulate. Fertile flowers with calyx tube campanulate; teeth ovate to suborbicular, 1–1.5 mm, apex obtuse. Petals reflexed after flowering, blue, oblong, slightly unequal, 2.5–3.5 mm. Stamens 10, subequal, longer ones longer than petals; anthers blue, oblong, ca. 1 mm. Ovary ca. 1/3 superior. Styles 3–5, spreading, slender, 2.5–3 mm in fruit; stigmas capitate, small. Capsule subglobose, ca. 2.7 mm in diam., projected apical part ca. 1 mm, ca. 1/3 as long as capsule body. Seeds brown, ellipsoid to oblong, 0.5–0.8 mm, shortly winged at one or both ends; seed coat net veined. Fl. Jun–Jul, fr. Sep–Oct.

Dense forests; 2700–3000 m. W Yunnan [Bhutan, Myanmar, Sikkim].

16. *Hydrangea paniculata* Siebold, Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 14(2): 691. 1829.

圆锥绣球 yuan zhui xiu qiu

Hydrangea verticillata W. H. Gao.

Shrubs or small trees, 1–5 m tall. Branchlets dark brown to gray-brown, pilose, glabrescent, with orbicular lenticels. Leaves 2-opposite or 3-verticillate; petiole 1–3 cm; leaf blade ovate to elliptic, 5–14 × 6–6.5 cm, papery, abaxially appressed villous along veins, adaxially glabrous or sparsely strigose, secondary veins 6 or 7 on both sides of midvein, erect proximally, base rounded to broadly cuneate, margin serrulate, apex acute to acuminate. Inflorescences paniculate cymes, pyramidal, to 26 cm; peduncle and branches densely pubescent. Sterile flowers with sepals 4, white, broadly elliptic to suborbicular, unequal, 1–1.8 × 0.8–1.4 cm in fruit, margin entire. Fertile flowers with calyx tube turbinate, ca. 1.1 mm; teeth triangular, ca. 1 mm. Petals white, ovate to ovate-lanceolate, 2.5–3 mm. Stamens unequal, longer ones ca. 4.5 mm, others slightly shorter than petals; anthers subglobose, ca. 0.5 mm. Ovary ca. 1/2 superior. Styles 3, subulate, ca. 1 mm; stigmas capitate, small. Capsule ellipsoid, 3–3.5 mm in diam., projected apical part conical, 2–2.7 mm, equaling calyx tube. Seeds brown, fusiform, compressed, narrowly winged at both ends; wings 2.5–3 mm; seed coat striate veined. Fl. Jul–Aug, fr. Oct–Nov.

Sparse forests or thickets in valleys or on mountain slopes or tops; 300–2100 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang [Japan, Russia (Sakhalin)].

17. *Hydrangea heteromalla* D. Don, Prodr. Fl. Nepal. 211. 1825.

微绒绣球 *wei rong xiu qiu*

Hydrangea heteromalla var. *parviflora* C. Marquand & Airy Shaw; *H. khasiana* J. D. Hooker & Thomson; *H. mandarinorum* Diels; *H. vestita* Wallich.

Shrubs or small trees, 2–5 m tall or more. Branchlets red-brown to brownish, pubescent, glabrescent, with a few elliptic lenticels. Petiole purplish red, 2–4 cm, pilose; leaf blade elliptic, broadly ovate, or oblong-ovate, 6–15 × 3–8 cm, papery or at base of inflorescence membranous, abaxially densely gray-white velutinous, adaxially yellow-brown strigose to subglabrous, secondary veins 7–9 on both sides of midvein, base shallowly cordate, obtuse, or truncate, margin densely serrulate or doubly serrate, apex acute to acuminate. Inflorescences corymbose cymes, 15–20 cm wide, to 27 cm wide in fruit, apex arcuate; peduncle present; branches 3, pubescent; bracts and bracteoles lanceolate to linear. Sterile flowers with sepals 4, white or yellowish, elliptic, broadly ovate, or broadly orbicular, 0.7–1.6 × 0.5–1.4 cm, base rounded to shallowly cordate, margin entire. Fertile flowers with calyx tube nearly funnelliform to campanulate, 1–1.5 mm; teeth triangular, 0.5–1.5 mm. Petals white or yellowish, oblong-ovate, 1.8–2 mm. Stamens 10, unequal; anthers subglobose, ca. 0.6 mm. Ovary up to 1/2 superior. Styles 3 or 4, erect, subulate, 1–1.3 mm in

fruit; stigmas small. Capsule ovoid-globose to subglobose, 2.5–3.5 mm in diam., projected apical part conical, 0.8–1.2 mm, ca. 1/3 as long as capsule body. Seeds yellow-brown, ellipsoid to oblong, slightly compressed, 0.7–1 mm, winged at both ends; wings 0.2–0.5 mm; seed coat striate veined. Fl. Jun–Jul, fr. Sep–Oct.

Forests or thickets on mountain slopes or tops; 2400–3400 m. Sichuan, S Xizang, Yunnan [Bhutan, NE India, Nepal, Sikkim]. *Hydrangea heteromalla* forms a species complex out of which a number of segregate species have been recognized. One of the present authors (Bartholomew) feels that species nos. 18–23 below all fall within the pattern of variation found in *H. heteromalla*, in the synonymy of which they would be better treated.

18. *Hydrangea hypoglauca* Rehder in Sargent, Pl. Wilson. 1: 26. 1911.

白背绣球 *bai bei xiu qiu*

Hydrangea bretschneideri Dippel var. *giraldii* (Diels) Rehder; *H. giraldii* Diels; *H. hypoglauca* var. *giraldii* (Diels) C. F. Wei; *H. hypoglauca* var. *obovata* Chun. Shrubs 1–3 m tall. Branchlets red-brown, glabrous or sparsely shortly and thickly hairy when young; bark peeled off into fragments when old. Petiole thin, 1.5–3 cm; leaf blade abaxially gray-white, ovate or oblong-ovate or oblong-obovate, 7–12 × 2.8–6.5 cm, papery, abaxially densely glandular granular and roughly long hairy, glabrous, or subglabrous except pubescent along veins, adaxially glabrous or sparsely appressed shortly and thickly hairy along veins, secondary veins 7 or 8 on both sides of midvein, erect and obliquely ascending, abaxially elevated, base rounded to subacute, margin serrulate, apex acuminate. Inflorescences corymbose cymes, 10–14 cm wide, apex slightly arcuate; branches 3, sparsely appressed long hairy. Sterile flowers with sepals 3 or 4, white, obovate, broadly ovate, or broadly orbicular, ca. 1.1 × 2 cm. Fertile flowers with calyx tube campanulate, ca. 1 mm; teeth ovate-triangular, 0.5–1 mm. Petals white, oblong-ovate, 2–2.5 mm. Stamens unequal, longer ones inflexed in bud, ca. 3 mm; anthers subglobose, less than 0.5 mm. Ovary up to 1/2 superior. Styles 3, basally connate, subulate or not, 1–1.5 mm; stigmas not enlarged to subcapitate. Capsule ovoid-globose, ca. 3 mm in diam., projected apical part conical, ca. 1.5 mm, subequaling calyx tube. Seeds brownish, fusiform, winged at both ends; wings 0.5–0.7 mm; seed coat striate veined. Fl. Jun–Jul, fr. Sep–Oct.

• Dense to sparse forests on mountain slopes or tops, thickets in valleys or on mountain slopes; 200–4000 m. NE Guizhou, W Hubei, NW Hunan, SW Shaanxi, E Sichuan, NW Yunnan.

19. *Hydrangea sunpanensis* Handel-Mazzetti, Symb. Sin. 7: 444. 1931.

松潘绣球 *song pan xiu qiu*

Shrubs or small trees, 3–10 m tall. Branchlets brown to gray-brown, thick, strigose, glabrescent, with lenticels; bark thick, peeled off into fragments. Petiole 2–6 cm; leaf blade abaxially dark yellow-green and adaxially

brownish when dry, oblong-elliptic, oblong-ovate, or broadly ovate, 9–19 × 4–14 cm, papery to thickly so, abaxially densely glandular papillate and and crisped pilose, adaxially shortly strigose along veins, secondary veins 8–10 on both sides of midvein, erect or slightly curved near margin, plane on both surfaces, base broadly cuneate, rounded, or subtruncate, margin serrulate, apex acute to shortly acuminate.

Inflorescences corymbose cymes, 12–25 cm wide; peduncle short; branches 3, thick, pubescent. Sterile flowers with sepals 3–5, pinkish to yellowish, ovate, obovate, or suborbicular, subequal, 1.2–2.5 × 1.2–2.4 cm, margin entire or apically few denticulate. Fertile flowers with calyx tube campanulate, ca. 1.2 mm; teeth triangular, ca. 1 mm. Petals greenish, oblong-ovate, 2.5–3 mm. Stamens 10, unequal; anthers subglobose, ca. 0.7 mm. Ovary almost 1/2 superior. Capsule ovoid-globose, ca. 3.5 mm in diam., projected apical part conical, ca. 1.5 mm, slightly shorter than calyx tube; persistent styles 3 or 4, clavate, ca. 1 mm. Seeds brown, narrowly ellipsoid to fusiform, slightly compressed, 1.5–2 mm including long wings at both ends; seed coat striate veined. Fl. Jul, fr. Sep.

• Dense to sparse forests on mountain slopes or tops; 2300–3500 m. Sichuan, Yunnan.

20. *Hydrangea bretschneideri* Dippel, Handb. Laubholzk. 3: 320. 1893.

东陵绣球 *dong ling xiu qiu*

Hydrangea bretschneideri var. *glabrescens* Rehder; *H. xanthoneura* Diels var. *glabrescens* (Rehder) Rehder. Shrubs 1–3(–5) m tall. First year's branchlets red-brown to brown, long pilose, glabrescent. Second year's branchlets lighter in color, without lenticels; bark thin, peeled off into fragments. Petiole 1–3.5 cm, pilose; leaf blade ovate, ovate-oblong, obovate-oblong, or elliptic-oblong, 7–16 × 2.5–7 cm, papery, abaxially densely gray-white crisped to suberect villous, glabrescent, adaxially glabrous except shortly pilose along veins, secondary veins 7 or 8 on both sides of midvein, erect and obliquely ascending, abaxially slightly prominent, base broadly cuneate to subrounded, margin serrate, apex acuminate. Inflorescences corymbose cymes, 8–15 cm wide, apex truncate to slightly arcuate; branches 3, slightly unequal with central one usually shorter than others, densely pubescent. Sterile flowers with sepals 4, elliptic, ovate, obovate, or suborbicular, 1.3–1.7 × 1–1.6 cm, margin entire. Fertile flowers with calyx tube cupular, ca. 1 mm; teeth triangular, 1–1.5 mm. Petals white, ovate-lanceolate to oblong, 2.5–3 mm. Stamens 10, unequal; anthers subglobose, 0.5–0.6 mm. Ovary less than 1/2 superior. Styles 3, 1–1.5 mm in fruit. Capsule ovoid-globose, 3–3.5 mm in diam., projected apical part conical, ca. 1.5 mm, slightly shorter than calyx tube. Seeds brownish, narrowly ellipsoid, winged at both ends; wings 0.5–0.6 mm; seed coat striate veined. Fl. Jun–Jul, fr. Sep–Oct.

• Dense to sparse forests along stream banks in valleys or on mountain slopes; 1200–2800 m. Gansu, Hebei, Henan, Ningxia, Qinghai, Shaanxi, Shanxi.

21. *Hydrangea xanthoneura* Diels, Bot. Jahrb. Syst. 29: 373. 1900.

挂苦绣球 *gua ku xiu qiu*

Hydrangea pubinervis Rehder; *H. xanthoneura* var. *lancifolia* Rehder; *H. xanthoneura* var. *setchuenensis* Rehder; *H. xanthoneura* var. *sikangensis* Chun; *H. xanthoneura* var. *wilsonii* Rehder.

Shrubs or small trees, 1–7 m tall. First year's branchlets black-brown to gray-brown, glabrous or pilose, glabrescent, sometimes with lenticels. Second year's branchlets with lenticels; bark thick, not easily peeled off. Petiole 1.5–5 cm, pilose; leaf blade abaxially greenish, adaxially yellowish green, elliptic, oblong-ovate, or oblong-obovate, 8–18 × 3–10 cm, papery to thickly so, abaxially glabrous except grayish pubescent to densely slightly crisped villous along veins, adaxially strigose along veins, secondary veins 7 or 8 on both sides of midvein, erect and obliquely ascending, yellowish, base broadly cuneate to subrounded, margin densely serrate, apex acute to shortly acuminate.

Inflorescences corymbose cymes, 10–20 cm wide, apex arcuate; branches 3, unequal with central one usually longer than others, pubescent. Sterile flowers with sepals 4(or 5), yellowish green, broadly elliptic to suborbicular, 1–3.5 × 1–2.5 cm. Fertile flowers with calyx tube shallowly cupular, ca. 1 mm; teeth triangular, equaling calyx tube. Petals white to greenish, oblong-ovate, ca. 2.5 mm. Stamens 10–13, unequal; anthers subglobose, ca. 0.5 mm. Ovary less than 1/2 superior. Styles 3 or 4, ca. 1 mm in fruit; stigmas narrowly ellipsoid, slightly enlarged. Capsule ovoid-globose, ca. 3 mm in diam., projected apical part conical, ca. 1 mm, ca. 1/3 as long as capsule body. Seeds brown to brownish, narrowly ellipsoid, ca. 2 mm, winged at both ends; wings ca. 0.5 mm; seed coat striate veined. Fl. Jun–Jul, fr. Sep–Oct.

• Dense to sparse forests or thickets on mountain slopes or tops or trailsides; 1600–3200 m. Guizhou, NW Hubei, Sichuan, Yunnan.

22. *Hydrangea dumicola* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 39. 1917.

银针绣球 *yin zhen xiu qiu*

Shrubs 2.5(–5) m tall. Branchlets black-brown, terete, glabrous or sparsely acicular hirsute, with elliptic lenticels. Petiole 2–4.5 cm, long pilose; leaf blade narrowly elliptic, ovate-lanceolate, or broadly ovate, slightly asymmetric, 13–16 × 4–5 cm, papery, abaxially sparsely appressed white acicular hirsute along veins, more densely so along midvein and secondary veins, adaxially sparsely strigose, secondary veins 7 or 8 on both sides of midvein, abaxially prominent, base cuneate to subacute, margin densely serrulate, apex acute to shortly acuminate. Inflorescences corymbose cymes, ca. 19 cm wide; peduncle short; branches 3, roughly long hairy; bracteoles linear. Sterile flowers with sepals 4, yellowish, broadly elliptic, broadly ovate,

or broadly orbicular, 1–1.6 × 1–1.9 cm, margin entire. Fertile flowers with calyx teeth triangular, less than 1 mm in bud, slightly longer in fruit. Petals deep yellow, oblong, ca. 2 mm in bud. Stamens 10, unequal; anthers purple-blue. Ovary less than 1/2 superior. Styles 3, ca. 1 mm in fruit, apex subacute. Capsule ovoid-globose, ca. 2.5 mm in diam., projected apical part conical, ca. 1 mm, ca. 1/3 as long as capsule body. Seeds brown, fusiform, long and narrowly winged at both ends; seed coat striate veined. Fl. Jun–Jul, fr. Sep.

• Sparse forests or thickets in valleys or on mountain slopes; 1900–2500 m. W Yunnan.

23. *Hydrangea macrocarpa* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 62: 144. 1925.

大果绣球 da guo xiu qiu

Hydrangea heteromalla D. Don var. *mollis* Rehder; *H. mollis* (Rehder) W. T. Wang.

Shrubs or small trees, 3–4 m tall. Young branchlets, petioles, and inflorescences slightly yellowish brown to gray-white tomentose. Second year's branchlets dark gray-brown, thick, glabrescent, with oblong lenticels. Petiole thick, 2–8 cm; leaf blade adaxially dark yellow-brown when dry, oblong-ovate to elliptic, 9–22 × 5–11 cm, papery to thinly so, abaxially densely gray-white long tomentose, adaxially sparsely strigose with denser hairs along veins, secondary veins 7–9 on both sides of midvein, base shallowly cordate, broadly truncate, or obtuse, margin densely serrulate, apex acuminate. Inflorescences corymbose cymes, 10–16 cm wide, to 28 cm wide in fruit, apex truncate; branches thick; bracts lanceolate, ca. 2 cm, abaxially densely yellow-brown tomentose. Sterile flowers with sepals 4, broadly ovate to suborbicular, 1.4–2.5 × 1–2 cm in fruit. Fertile flowers with calyx tube campanulate, ca. 1.5 mm, pilose; teeth acutely triangular, 1.5–2 mm. Petals oblong-ovate, ca. 2 mm, base truncate. Stamens 10, unequal; anthers subglobose. Ovary less than 1/2 superior. Styles 3 or 4, erect to slightly spreading, subulate, 1–1.5 mm in fruit; stigmas small. Capsule ovoid-globose to subglobose, 3–4 mm in diam., projected apical part conical, 1.5–2 mm, shorter than calyx tube; persistent calyx teeth narrowly triangular, 1.5–2 mm; persistent styles 3(–5), erect, thick, ca. 1.5 mm, stigmas decurrent. Seeds red-brown to dark brown, narrowly ellipsoid to fusiform, compressed, 1–2 mm, winged at both ends; seed coat striate veined. Fl. Jun–Jul, fr. Sep–Oct.

• Mixed forests or thickets along stream banks in valleys or on mountain slopes; 2500–3500 m. S Sichuan, N Yunnan.

24. *Hydrangea aspera* D. Don, Prodr. Fl. Nepal. 211. 1825.

马桑绣球 ma sang xiu qiu

Hydrangea aspera f. *emasculata* Chun; *H. aspera* var. *strigosior* Diels; *H. aspera* var. *velutina* Rehder; *H. glabripes* Rehder; *H. villosa* Rehder; *H. villosa* var. *delicatula* Chun; *H. villosa* f. *sterilis* Rehder; *H. villosa*

var. *strigosior* (Diels) Rehder; *H. villosa* var. *velutina* (Rehder) Chun.

Shrubs or small trees, 1–4(–10) m tall. Branchlets terete or obscurely 4-angled, densely yellow- to gray-white shortly strigose, pubescent, and villous; bark brown. Petiole 1–4.5 cm, densely strigose or glabrous; leaf blade lanceolate, ovate-lanceolate, ovate-oblong, ovate, or elliptic-oblong, 5–25 × 2–8 cm, papery, abaxially densely gray-white pubescent to long villous, adaxially sparsely to densely strigose, secondary veins 6–10 on both sides of midvein, base broadly cuneate to rounded, margin serrate to doubly so, apex long acuminate. Inflorescences corymbose cymes, 8–25 cm wide, apex arcuate; branches densely gray-yellow pubescent. Sterile flowers with sepals 4 or 5, greenish white, pinkish, or red, broadly ovate, obovate-orbicular, or orbicular, 1–3.3 × 0.9–2.7 cm, margin acutely dentate, crenulate, or entire. Fertile flowers with calyx tube campanulate to cupular, 1–1.5 mm; teeth broadly triangular to ovate-triangular, 0.5–1 mm. Petals purple-blue or purple-red, oblong-ovate to ovate, 1.5–2.5 mm, base truncate. Stamens 10, unequal; anthers subglobose, ca. 0.5 mm. Ovary inferior. Styles 2 or 3, recurved, ca. 1–2 mm in fruit; stigmas slightly enlarged. Capsule urn-shaped, 3–3.5 mm in diam., base subacute, apex truncate. Seeds brown, fusiform, ellipsoid, or subglobose, slightly compressed, 0.4–0.5 mm, winged at both ends; wings ca. 0.2 mm; seed coat striate veined. Fl. Jul–Sep, fr. Sep–Nov.

Dense forests or thickets in valleys or on mountain slopes; 700–4000 m. SE Gansu, Guangxi, Guizhou, SW Hubei, SW Hunan, Jiangsu, Shaanxi, Sichuan, Yunnan [NE India, Nepal, Sikkim, Vietnam].

25. *Hydrangea strigosa* Rehder in Sargent, Pl. Wilson. 1: 31. 1911.

蜡莲绣球 la lian xiu qiu

Hydrangea aspera D. Don var. *angustifolia* Hemsley; *H. aspera* var. *macrophylla* Hemsley; *H. aspera* var. *sinica* Diels; *H. aspera* subsp. *strigosa* (Rehder) E. M. McClintock; *H. strigosa* var. *angustifolia* (Hemsley) Rehder; *H. strigosa* var. *macrophylla* (Hemsley) Rehder; *H. strigosa* var. *purpurea* C. C. Yang; *H. strigosa* var. *sinica* (Diels) Rehder; *H. strigosa* f. *sterilis* Rehder.

Shrubs 1–3 m tall. Branchlets gray-brown, terete or obscurely 4-angled, densely strigose; bark usually peeled off into fragments. Petiole 1–7 cm, strigose; leaf blade abaxially sometimes purplish red to reddish when fresh but gray-brown to gray-green when dry, adaxially black-brown, oblong, ovate-lanceolate, or obovate-oblong, 8–28 × 2–10 cm, papery, abaxially densely gray-brown glandular granular and gray-white strigose, adaxially sparsely strigose to subglabrous, secondary veins 7–10 on both sides of midvein, abaxially prominent, base obtuse, cuneate, or rounded, margin serrulate, apex acuminate. Inflorescences corymbose cymes, to 28 cm wide, apex slightly arcuate; branches spreading, gray-white strigose. Sterile flowers

with sepals 4 or 5, white to purplish red, broadly ovate, broadly elliptic, suborbicular, or broadly orbicular, margin entire to denticulate. Fertile flowers with calyx tube campanulate, ca. 2 mm; teeth triangular, ca. 0.5 mm. Petals purplish red, oblong-ovate, 2–2.5 mm. Stamens 10, unequal, 3–6 mm; anthers oblong, ca. 0.5 mm. Ovary inferior. Styles 2, erect to recurved, slightly clavate, ca. 2 mm in fruit. Capsule urn-shaped, 3–3.5 mm in diam., apex truncate. Seeds brown, broadly ellipsoid, 0.3–0.5 mm, winged at both ends; wings 0.2–0.3 mm; seed coat striate veined. Fl. Jul–Aug, fr. Oct–Dec.

• Dense to sparse forests or thickets in valleys, trailsides on mountain slopes; 500–1800 m. NW Guizhou, W Hubei, NW Hunan, S Shaanxi, Sichuan.

26. *Hydrangea longipes* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 227. 1885.

蕤兰绣球 chun lan xiu qiu

Shrubs 1–3 m tall. Branchlets yellowish to brown, terete, pubescent. Petiole 3–15 cm, sparsely pilose to subglabrous; leaf blade usually greenish on both surfaces when dry, lanceolate, oblong-ovate or -obovate, broadly ovate, or broadly obovate, 4–22 × 3–12 cm, membranous to papery, abaxially sparsely appressed pubescent, or densely tomentose-villous with hairs spreading, brown, longer, and thicker along secondary veins and especially midvein, adaxially sparsely strigose, secondary veins 6–8 on both sides of midvein, abaxially elevated, base broadly cuneate, truncate, or shallowly cordate, margin irregularly roughly serrate, apex acute to acuminate. Inflorescences corymbose cymes, 7–20 cm wide, apex truncate to slightly arcuate; branches short, densely shortly hairy, hairs thick. Sterile flowers with sepals 4, white, obovate, broadly so, or suborbicular, 0.8–2.2 × 0.9–2.2 cm, margin entire or few denticulate. Fertile flowers with calyx tube cupular; teeth triangular, ca. 0.5 mm. Petals white, oblong-ovate. Stamens 10, unequal; anthers broadly oblong to subglobose. Ovary inferior. Styles 2, usually recurved, 0.5–1.5 mm in fruit. Capsule cupular, 2.5–3.5 mm in diam., apex truncate. Seeds brownish, narrowly ellipsoid to oblong-obovoid, rarely subglobose, compressed, shortly winged at both ends; seed coat striate veined. Fl. Jul–Aug, fr. Sep–Oct.

• Dense to sparse forests or thickets along stream banks, in valleys, or on mountain slopes; 1300–2800 m. Gansu, Guizhou, Hebei, Henan, Hubei, Hunan, Shaanxi, Sichuan, Yunnan.

One of the present authors (Bartholomew) believes that *Hydrangea longipes* var. *longipes* is not distinct from *H. robusta* and that var. *fulvescens* and var. *lanceolata* are not distinct from *H. aspera*.

- 1a. Leaf blade lanceolate 26c. var. *lanceolata*
 1b. Leaf blade oblong-ovate or -obovate, broadly ovate, or broadly obovate.
 2a. Leaf blade abaxially densely tomentose-villous, secondary veins and especially midvein

- with spreading, brown, long, thick hairs 26b. var. *fulvescens*
 2b. Leaf blade abaxially sparsely appressed pubescent, veins without spreading, brown, long, thick hairs 26a. var. *longipes*

26a. *Hydrangea longipes* var. *longipes*

蕤兰绣球(原变种) chun lan xiu qiu (yuan bian zhong)

Hydrangea aspera D. Don var. *longipes* (Franchet) Diels; *H. discocarpa* C. F. Wei; *H. hemsleyana* Diels; *H. hemsleyana* var. *pavonliniana* Pampanini.

Leaf blade oblong-ovate or -obovate, broadly ovate, or broadly obovate, abaxially sparsely appressed pubescent, veins without spreading, brown, long, thick hairs. Fl. Jul–Aug, fr. Sep–Oct.

• Dense to sparse forests or thickets in valleys or on mountain slopes; 1300–2800 m. Gansu, Guizhou, Hebei, Henan, Hubei, Hunan, Shaanxi, Sichuan, Yunnan.

26b. *Hydrangea longipes* var. *fulvescens* (Rehder) W. T. Wang ex C. F. Wei, Guihaia 14: 116. 1994.

绣毛绣球 xiu mao xiu qiu

Hydrangea fulvescens Rehder in Sargent, Pl. Wilson. 1: 39. 1911; *H. fulvescens* var. *rehderiana* (C. K. Schneider) Chun; *H. rehderiana* C. K. Schneider.

Leaf blade oblong-ovate or -obovate, broadly ovate, or broadly obovate, abaxially densely tomentose-villous, secondary veins and especially midvein with spreading, brown, long, thick hairs. Fl. Jul–Aug, fr. Sep–Oct.

• Dense to sparse forests along stream banks in valleys or on mountain slopes; 1500–2700 m. Gansu, Henan, Hubei, Shaanxi, Sichuan.

26c. *Hydrangea longipes* var. *lanceolata* Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 23: 274. 1887.

披针绣球 pi zhen xiu qiu

Leaf blade lanceolate, 2–22 × 3–4.8 cm. Fr. Sep–Oct.

• Forests; ca. 1800 m. W Hubei, SW Shaanxi.

27. *Hydrangea coacta* C. F. Wei, Guihaia 14: 116. 1994.

毡毛绣球 zhan mao xiu qiu

Shrubs. Young branchlets, petioles, and inflorescences densely gray-white to slightly yellow hirsute. Branchlets red-brown, longitudinally striate, glabrescent. Petiole thick, 0.5–1.5 cm; leaf blade oblong-ovate to ovate-lanceolate, 9–14.5 × 3.5–6 cm, thickly papery, abaxially densely gray-white hirsute and brownish tomentose with both types of hairs felted together and carpetlike, secondary veins 6 or 7 on both sides of midvein. Inflorescences corymbose cymes, lax, ca. 15 cm wide, apex arcuate. Sterile flowers with sepals 4, purplish red, suborbicular, 1–1.5 cm, margin obtusely denticulate. Fertile flowers unknown. Capsule cupular, ca. 2.5 × 3 mm, apex truncate; persistent calyx teeth obtusely triangular, ca. 0.5 mm; persistent styles 2, reflexed, stigmas hemispheric. Seeds brownish,

oblong to broadly ellipsoid, compressed, winged at both ends; wings ca. 0.3 mm; seed coat striate veined. Fr. Sep.

- Barren areas on mountain slopes; ca. 1300 m. SW Shaanxi (Nanzheng Xian).

One of the present authors (Bartholomew) believes that this species is not distinct from *Hydrangea aspera*.

28. *Hydrangea robusta* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 76. 1858.

粗枝绣球 cu zhi xiu qiu

Hydrangea aspera D. Don subsp. *robusta* (J. D. Hooker & Thomson) E. M. McClintock; *H. longialata* C. F. Wei; *H. maximowiczii* H. Léveillé; *H. rosthornii* Diels; *H. rotundifolia* C. F. Wei.

Shrubs or small trees, 2–3(–6) m tall. Branchlets, petioles, and inflorescences densely yellow-brown shortly hispid to spreading hirsute. Branchlets brown, usually 4-angled, glabrescent. Petiole thick, 3–15 cm; leaf blade elliptic, broadly so, or oblong-ovate to broadly ovate, 9–35 × 5–22 cm, papery, abaxially densely gray-white pubescent to sparsely brownish hispidulous, hairs sometimes longer and thicker along veins especially midvein, adaxially strigose, secondary veins 8–13 on both sides of midvein, base obtuse, truncate, rounded, or subcordate, margin irregularly doubly serrate, apex acute to acuminate. Inflorescences corymbose cymes, lax, long, to 30 cm wide in fruit; peduncle thick, 4-angled. Sterile flowers with sepals 4(or 5), purplish to white, broadly ovate, orbicular, or broadly orbicular, 1.2–3.8 × 1.3–3.5 cm, margin entire, dentate, or serrate. Fertile flowers with calyx tube cupular, 1–1.5 mm; teeth ovate-triangular, 0.5–1 mm. Petals purple, ovate-lanceolate, 2–3 mm. Stamens 10–14, unequal, longer ones 6–6.5(–10) mm. Ovary inferior. Styles 2, spreading to recurved, 1–2 mm in fruit. Capsule cupular to campanulate, 3–4.5 × 3.5–5 mm, apex truncate; persistent styles spreading to recurved. Seeds red-brown, fusiform, ellipsoid, or subglobose, 0.4–0.6 mm; wings 0.1–0.6 mm; seed coat striate veined. Fl. Jul–Aug, fr. Sep–Feb.

Dense to sparse forests or thickets in valleys, along stream banks, or on mountain slopes or tops; 700–2800 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, SE Xizang, Yunnan, Zhejiang [Bangladesh, Bhutan, N India, Myanmar, Sikkim].

29. *Hydrangea kawakamii* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25: 90. 1908.

蝶萼绣球 die e xiu qiu

Shrubs climbing. Young branchlets, petioles, and inflorescences densely yellow-brown pubescent. Branchlets dark gray, terete, glabrescent. Petiole 2–9 cm; leaf blade oblong-ovate to elliptic, 9–12 × 4.5–10 cm, papery, abaxially densely slightly crisped

pubescent, adaxially sparsely strigose, secondary veins 6 or 7 on both sides of midvein, abaxially prominent, base broadly cuneate to rounded, margin irregularly doubly serrate, apex acute to shortly acuminate. Inflorescences corymbose cymes, lax, 10–14 cm wide, apex truncate to slightly arcuate. Sterile flowers with sepals 3 or 4, suborbicular, 1–2 cm, margin acutely dentate. Fertile flowers with calyx tube cupular, ca. 1.5 mm; teeth broadly triangular, ca. 1 mm. Petals oblong-ovate, ca. 2 mm. Stamens 10, unequal, longer ones ca. 5 mm; anthers subglobose, ca. 0.5 mm. Ovary inferior. Styles 2(or 3), ca. 1.5 mm in fruit. Capsule hemispheric, 2–3 × 3–4 mm, apex truncate. Seeds fusiform, shortly winged at both ends; seed coat striate veined with thin, transverse veins in-between. Fl. Jul, fr. Oct–Nov.

- Dense forests; 2200–2300 m. Taiwan.

One of the present authors (Bartholomew) believes that this species is not distinct from *Hydrangea aspera*.

30. *Hydrangea sargentiana* Rehder in Sargent, Pl. Wilson. 1: 29. 1911.

紫彩绣球 zi cai xiu qiu

Hydrangea aspera D. Don subsp. *sargentiana* (Rehder) E. M. McClintock.

Shrubs 2–3 m tall. Branchlets, petioles, and peduncles with dense, purple, semitranslucent, long, apically forked and acute hairs. Branchlets thick. Petiole thick, 3–9 cm; leaf blade abaxially gray-green to slightly purple when fresh, adaxially dark green, elliptic, oblong-ovate, or broadly ovate, 9–30 × 6–16 cm, submembranous to thinly papery, abaxially densely slightly curved villous, adaxially densely translucent strigose, secondary veins 8–11 on both sides of midvein, abaxially prominent, base rounded to shallowly cordate, margin irregularly triangular dentate to denticulate, apex acuminate. Inflorescences corymbose cymes, 10–16 cm wide, apex arcuate; branches numerous, crowded together at apex of peduncle. Sterile flowers with sepals 4, white, obovate-orbicular to broadly orbicular, 0.9–1.4 × 0.8–1.7 cm in fruit, margin entire. Fertile flowers with calyx tube campanulate, ca. 1 mm; teeth triangular, ca. 0.5 mm. Petals purplish blue, ovate, ca. 2 mm. Stamens unequal, some of shorter ones equaling petals, longer ones ca. 4 mm. Ovary inferior. Styles 2, ca. 1.5 mm in fruit; stigmas capitate, small. Capsule hemispheric, 3–4 mm in diam., apex truncate. Seeds brown, ellipsoid, slightly compressed, winged at both ends; seed coat striate veined. Fl. Jul, fr. Sep.

- Dense forests in valleys or on mountain slopes; 700–1800 m. W Hubei.

31. *Hydrangea longifolia* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25: 91. 1908.

长叶绣球 chang ye xiu qiu

Hydrangea involucrata Siebold var. *longifolia* (Hayata) Y. C. Liu; *H. strigosa* Rehder var. *longifolia* (Hayata) Chun.

Shrubs erect. Branchlets, petioles, leaf blades, and inflorescences densely appressed hairy with both simple and 2-branched hairs. Branchlets dark brown-red, terete or slightly obtusely angled near apex. Petiole thin, 1.5–2 cm; leaf blade lanceolate, 10–20 × 3–4.5 cm, papery, adaxially with more 2-branched hairs than simple hairs, abaxially with fewer 2-branched hairs than simple hairs, secondary veins 8–10 on both sides of midvein, slender, abaxially prominent, base obtuse to cuneate, margin aristate serrulate, apex caudate-acuminate. Inflorescences corymbose cymes, ca. 9 × 11–14 cm; bracts ovate, ca. 2 × 1.5 cm, densely puberulous and enveloping immature inflorescence before falling. Sterile flowers with sepals 4, elliptic to broadly ovate, 1.5–1.8 × 1.1–1.5 cm in fruit. Fertile flowers unknown. Capsule campanulate, ca. 3 × 3.5–4 mm, with simple hairs and a few 2-branched hairs, apex truncate; persistent calyx teeth triangular, ca. 0.5 mm; persistent styles 2, erect to recurved, 1.5–2 mm, distally enlarged. Seeds brown, ellipsoid, compressed, ca. 0.5 mm, winged at both ends; wings 0.2–0.4 mm; seed coat striate veined. Fl. Jan.

• Forests in high mountains. Taiwan.

This species is closely related to *Hydrangea involucrata* Siebold, from Japan. However, the distinctive, 2-branched hairs of *H. longifolia* easily differentiate the two species.

32. *Hydrangea integrifolia* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 22: 131. 1906.

全缘绣球 *quan yuan xiu qiu*

Hydrangea integrifolia Hayata.

Shrubs climbing. Branchlets brown-red, subglabrous. Petiole 1.5–4.5 cm, subglabrous; leaf blade elliptic, oblong-elliptic, or obovate, 7–22 × 3.5–8 cm, leathery, both surfaces glabrous, secondary veins 7–10 on both sides of midvein, curved, abaxially prominent, base subacute to cuneate, margin slightly reflexed, entire, apex acuminate. Inflorescences terminal, corymbose cymes, 8–10 cm wide, to 17 cm wide in fruit, apex subtruncate; peduncle and branches densely yellow-brown stellate hairy and pilose; branches crowded together at apex of peduncle. Sterile flowers with sepals 2–4, suborbicular to broadly orbicular, 1–1.5 × 0.8–2 cm, margin entire to sinuate. Fertile flowers with calyx tube cupular, ca. 1 mm; teeth 4 or 5, broadly ovate, less

than 1 mm. Petals oblong, ca. 2.5 mm. Stamens 10, subequal, 3.5–4 mm in fruit; anthers subglobose, ca. 0.5 mm. Ovary inferior. Styles 2(or 3), reflexed, ca. 1.5 mm in fruit; stigmas not enlarged. Capsule campanulate, ca. 2.5 × 2.5–4 mm, apex truncate. Seeds brown, ellipsoid to oblong, ca. 0.5 mm, very shortly and slightly obliquely winged at both ends; seed coat striate veined. Fl. Jul, fr. Oct–Dec.

Dense forests on rocky mountain slopes; 1000–2800 m. Taiwan [Philippines].

33. *Hydrangea anomala* D. Don, Prodr. Fl. Nepal. 211. 1825. 冠盖绣球 *guan gai xiu qiu*

Hydrangea altissima Wallich; *H. anomala* var. *sericea* C. C. Yang; *H. glabra* Hayata; *H. glaucophylla* C. C. Yang; *H. glaucophylla* var. *sericea* (C. C. Yang) C. F. Wei.

Shrubs climbing, 2–4 m tall or more. Branchlets gray-brown, robust, glabrous; bark thin, loose, peeled off into fragments when old. Petiole 2–8 cm, glabrous or pilose; leaf blade yellow-brown on both surfaces when dry, elliptic, oblong-ovate, or ovate, 6–17 × 3–10 cm, papery, both surfaces glabrous or abaxially sometimes sparsely brownish pubescent along veins and barbulate at vein axils, secondary veins 6–8 on both sides of midvein, abaxially prominent, base cuneate, subrounded, or sometimes shallowly cordate, margin densely serrulate, apex acuminate. Inflorescences corymbose cymes, to 30 cm wide in fruit, pubescent, apex arcuate. Sterile flowers with sepals 4, broadly obovate to suborbicular, 1–2.2 × 1–2.2 cm, margin entire except for a few obtuse teeth. Fertile flowers with calyx tube campanulate, 1–1.5 mm; teeth broadly ovate to triangular, 0.5–0.8 mm. Petals apically connate and forming a calyptra, apex rounded to subacute. Stamens 9–18, subequal; anthers subglobose, small. Ovary inferior. Styles 2(or 3), recurved, ca. 1.5 mm in fruit. Capsule urn-shaped, 3–4.5 mm in diam., apex truncate. Seeds brownish, ellipsoid to oblong, compressed, 0.7–1 mm; wing encircling seed. Fl. May–Jun, fr. Sep–Oct.

Dense to sparse forests in valleys, along stream banks, or on rocky mountain slopes; 500–2900 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, India, Myanmar, Nepal, Sikkim].

The leaves are used medicinally.

27. POLYOSMA Blume, Bijdr. 658. 1826.

多香木属 *dou xian mu shu*

Jin Shuying (靳淑英); Hideaki Ohba

Trees or shrubs. Leaves opposite or subopposite, petiolate, exstipulate; leaf blade simple, turning black when dry, leathery or membranous, margin entire or ± dentate, apex acuminate. Bracts 3. Flowers fragrant. Calyx tube fused to ovary; lobes 4, persistent. Petals 4, reflexed by anthesis, yellow-white or green, oblong to linear, valvate, both surfaces pubescent. Stamens 4; anthers basifixed, oblong; filaments hairy. Ovary inferior, 1-loculed; placentation lateral; ovules numerous. Style cylindrical; stigma simple. Fruit a 1-seeded berry.

About 60 species: SE Asia, Australia; one species in China.

1. *Polyosma cambodiana* Gagnepain, Notul. Syst. (Paris) 3: 223. 1916.

多香木 *dou xian mu*

Trees ca. 20 m tall. Young branchlets puberulous. Leaves opposite, usually clustered at apex of branchlets; petiole 1–1.5 cm; leaf blade elliptic-oblancheolate or long elliptic, 7–15 × 3–5 cm, thinly leathery, abaxially puberulous or glabrous, adaxially glabrous, lateral veins in 8–12 pairs, base cuneate, margin entire, rarely dentate, apex acute. Bracts linear, small. Pedicel 3–4 mm, puberulous. Calyx tube puberulous; lobes ovate-triangular, minute. Petals white, linear, ca. 1 cm, apex acute. Stamens shorter than petals. Ovary pubescent.

Style shorter than or subequalling corolla. Berry black when dry, ovoid, ca. 1 × 0.7 cm.

Mountain rainforests, evergreen forests; 1000–2400 m. ?Guangdong, Guangxi, Hainan, S Yunnan [Cambodia, Thailand, Vietnam].

The Chinese *Polyosma* is very similar to *P. integrifolia* Blume (from W Malesia to Thailand and Vietnam), but differs from that species in having leaves narrower, usually less than 5 cm wide (vs. (4–)5–11 cm wide), pedicels longer, to 4 mm (vs. 1.5–2 mm), secondary veins not prominently looping near the margin, and fruit smaller, ca. 1 × 0.7 cm (vs. 1–1.8 × 0.7–1 cm). The Chinese plants may fall within the range of variation of *P. integrifolia*, but the present authors cannot be certain with the limited data and materials available to them. Therefore, the name *P. cambodiana* is retained for the time being. Further study is also needed to compare the Chinese plants with *Polyosma* in Indonesia.

28. ITEA Linnaeus, Sp. Pl. 1: 199. 1753.

鼠刺属 *shu ci shu*

Jin Shuying (靳淑英); Hideaki Ohba

Shrubs or trees. Leaves alternate, petiolate; stipules deciduous or evergreen, small, pinnately veined; leaf blade simple, elliptic to lanceolate, secondary veins spreading or curved, margin glandular dentate or spinose dentate, rarely crenate or entire. Inflorescence terminal or axillary, a raceme or racemose panicle, many flowered. Flowers bisexual or also unisexual, small. Calyx tube adnate to base of ovary; lobes 5, persistent. Petals 5, perigynous, erect or reflexed at anthesis, white or yellowish green, valvate. Stamens 5, inserted at margin of disc; filaments filiform-subulate; anthers ovoid to oblong. Disc ringlike. Ovary superior or semi-inferior, attached to disc, 2-carpellate, long ellipsoid; placentation central; ovules numerous, 2-seriate. Style simple or sometimes divided to middle, striate; stigma capitate. Fruit a capsule, conical to linear-oblong, apex cleft, with persistent calyx lobes and petals. Seeds numerous and narrowly fusiform or few and flattened oblong; seed coat glossy; embryo cylindrical, large.

About 27 species: mainly in SE Asia and the Himalayas to China and Japan, one species in North America; 15 species (ten endemic) in China.

- 1a. Inflorescences terminal, erect or slightly curved to pendulous; ovary semi-inferior; stamens usually shorter than petals.
- 2a. Petals reflexed at anthesis; inflorescences erect; leaf blade narrowly lanceolate, distal margin 4–8-glandular dentate on both sides, secondary veins in 6–8 pairs 4. *I. amoena*
- 2b. Petals erect at anthesis; inflorescences erect or slightly curved to pendulous; leaf blade usually elliptic to broadly so, ovate, obovate, or rarely lanceolate or oblanceolate, margin serrate or dentate with more than 10 teeth on both sides, secondary veins in 4–6 pairs.
- 3a. Leaves often crowded at apex of branchlets, subclustered, leaf blade margin glandular dentate; inflorescences erect; petals triangular-lanceolate 1. *I. riparia*
- 3b. Leaves remotely alternate on branchlets, leaf blade margin rather curved spinose serrate or crenate-dentate; inflorescences nodding to pendulous; petals linear-lanceolate.
- 4a. Leaf blade elliptic or ovate, thinly leathery, margin spinose serrate; calyx and pedicels puberulous 2. *I. yunnanensis*
- 4b. Leaf blade elliptic-oblong or broadly elliptic to orbicular, thickly leathery, margin laxly spinose dentate; calyx and pedicels glabrous 3. *I. ilicifolia*
- 1b. Inflorescences axillary, rarely terminal, erect; ovary superior or semi-inferior; stamens usually longer than petals, sometimes shorter.
- 5a. Ovary semi-inferior; stamens shorter than or subequalling petals.
- 6a. Petals reflexed at anthesis; filaments and ovary glabrous; leaf blade broadly ovate to broadly elliptic, glabrous on both surfaces 5. *I. macrophylla*
- 6b. Petals erect at anthesis; filaments and ovary puberulous; leaf blade oblong or oblong-elliptic, barbellate at vein axils abaxially 6. *I. kiukiangensis*
- 5b. Ovary superior; stamens longer than petals.
- 7a. Leaf blade thickly leathery.

- 8a. Leaf blade glabrous on both surfaces, margin remotely coarsely dentate or subentire ... 10. *I. oldhamii*
- 8b. Leaf blade sparsely glandular or sparsely or densely glandular punctate on both surfaces, margin moderately to densely serrate or crenate.
- 9a. Branchlets, inflorescence rachis, pedicels, and calyx glandular; leaf blade sparsely glandular abaxially 7. *I. glutinosa*
- 9b. Branchlets glabrous; inflorescence rachis, pedicels, and calyx puberulous; leaf blade glandular punctate on both surfaces.
- 10a. Leaf blade elliptic or oblong-obovate, ca. $13 \times 3-5$ cm, apex acute or shortly so; petiole stout, 1.5–2.5 cm 8. *I. coriacea*
- 10b. Leaf blade oblong or oblong-elliptic, $5.5-7 \times 1.7-2.5$ cm, apex rounded or obtuse; petiole slender, to 0.7 cm 9. *I. yangchunensis*
- 7b. Leaf blade thinly leathery, papery, or membranous.
- 11a. Leaf blade papery or membranous, hairy on both surfaces or at least barbellate at vein axils.
- 12a. Branchlets usually glabrous; inflorescence rachis and pedicels glabrous; leaf blade lanceolate or oblong-lanceolate, membranous or thinly papery, base cuneate or rarely obtuse, margin \pm crenulate-serrate or repand, rarely entire 15. *I. parviflora*
- 12b. Branchlets densely pubescent; inflorescence rachis and pedicels villous; leaf blade elliptic to oblong-elliptic, papery, base rounded to obtuse, margin serrulate to subentire 14. *I. indochinensis*
- 11b. Leaf blade thinly leathery, glabrous on both surfaces.
- 13a. Leaf blade narrowly lanceolate, secondary veins in ca. 9 pairs, margin entire proximally, remotely glandular mucronulate in distal $1/3-1/2$, apex acuminate, glandular mucronulate; filaments glabrous 11. *I. kwangsiensis*
- 13b. Leaf blade oblong to ovate-elliptic or obovate, secondary veins in 5–7 pairs, margin proximally shallowly crenate or conspicuously and densely serrulate, distally obscurely crenate-dentate, rarely repand or subentire, apex acute, not mucronulate; filaments pilose.
- 14a. Leaf blade obovate or ovate-elliptic, secondary veins in 4 or 5 pairs, base cuneate, margin shallowly crenate, rarely subentire; bracts linear-subulate, shorter than pedicels 12. *I. chinensis*
- 14b. Leaf blade oblong, rarely elliptic, secondary veins in 5–7 pairs, base rounded or obtuse-rounded, margin conspicuously densely serrulate; bracts leaflike, much longer than pedicels 13. *I. omeiensis*

1. *Itea riparia* Collett & Hemsley, J. Linn. Soc., Bot. 28: 57. 1890.

河岸鼠刺 he an shu ci

Itea thorelii Gagnepain.

Shrubs 1–6 m tall. Branchlets yellow-green, striate, glabrous. Leaves usually crowded at apex of branchlets, subclustered; petiole 5–8 mm, glabrous; leaf blade abaxially gray-green, adaxially green, elliptic to lanceolate or obovate-elliptic, $5-10 \times 1.5-3$ cm, thinly leathery, both surfaces glabrous, secondary veins in 4 or 5 pairs, arcuate, confluent near margin, slightly raised abaxially, obscure adaxially, base cuneate, margin curved cartilaginous glandular dentate, apex acute or acuminate. Racemes terminal, pendulous, usually longer than leaves, 10–18 cm; rachis puberulous; bracts linear-lanceolate, ca. 3–5 mm. Flowers numerous, rather crowded, often 3-clustered; pedicel 3–5 mm, puberulous. Calyx shallowly cupular; lobes erect at anthesis, triangular-lanceolate, ca. 4 mm. Stamens ca. 3

mm; filaments glabrous; anthers dorsifixed, ovoid.

Ovary semi-inferior, glabrous. Style simple. Capsule ovoid-conical, ca. 5 mm, glabrous. Fl. and fr. May–Feb. $2n = 22$.

Wet places on stream banks; 400–900 m. S Yunnan [Myanmar, Thailand].

2. *Itea yunnanensis* Franchet, J. Bot. (Morot) 10: 268. 1896.

滇鼠刺 dian shu ci

Itea bodinieri H. Léveillé; *I. esquirolii* H. Léveillé; *I. forrestii* Y. C. Wu; *I. mengtzeana* Engler.

Shrubs or small trees, 1–10 m tall. Young branchlets yellow-green, striate; old branchlets dark brown, glabrous. Petiole 0.5–1.5 cm, sulcate adaxially, glabrous; leaf blade abaxially pale green, adaxially dark green or glossy, ovate or elliptic, $5-10 \times 2.5-5$ cm, thinly leathery, both surfaces glabrous, midvein distinctly raised abaxially, impressed adaxially, secondary veins in 4 or 5 pairs, arcuate, reticulate veins prominent, base obtuse or rounded, margin slightly

curved spinose serrate, apex acute or shortly acuminate. Racemes terminal, nodding to pendulous, to 20 cm; rachis puberulous; bracts subulate, ca. 1 mm. Flowers numerous, often 3-clustered; pedicel spreading at anthesis, pendulous in fruit, ca. 2 mm, puberulous. Calyx shallowly cupular; lobes triangular-lanceolate, 1–1.5 mm, puberulous, rarely subglabrous. Petals erect at anthesis, slightly curved apically, pale green, linear-lanceolate, ca. 2.5 mm. Stamens usually shorter than petals; filaments ca. 2 mm, glabrous; anthers oblong. Ovary semi-inferior, glabrous. Style simple; stigma capitate. Capsule conical, 5–6 mm, glabrous. Fl. and fr. May–Dec. $2n = 22^*$.

• Coniferous, broad-leaved, or mixed forests, streamsides, rocks; 1100–3000 m. Guangxi, Guizhou, SW Sichuan, SE Xizang, Yunnan. In habit, this species is similar to, and is often confused with, *Itea ilicifolia*. However, *I. yunnanensis* differs in having narrower leaf blades, usually more than $2 \times$ as long as wide, with a more densely spinose serrate margin.

3. *Itea ilicifolia* Oliver, Hooker's Icon. Pl. 16: t. 1538. 1886. 冬青叶鼠刺 dong qin shu ci

Shrubs 2–4 m tall. Branchlets glabrous. Petiole 5–10 mm, glabrous; leaf blade abaxially pale green, adaxially dark green and glossy, elliptic-oblong to broadly elliptic, rarely suborbicular, 5–9.5 \times 3–6 cm, thickly leathery, both surfaces glabrous or barbellate only at vein axils, midvein and secondary veins prominently raised abaxially, secondary veins in 5 or 6 pairs, ascending, reticulate veins obscure, base obtuse or rounded, margin often revolute when dry, laxly spinose serrate, apex acute or spinose. Racemes terminal, pendulous, 25–30 cm; rachis puberulous; bracts subulate, ca. 1 mm. Flowers numerous, usually 3-clustered; pedicel ca. 1.5 mm, glabrous. Calyx shallowly cupular; lobes erect at anthesis, slightly incurved apically, triangular-lanceolate, ca. 2.5 mm, apex mucronulate. Stamens ca. $1/2$ as long as petals; filaments ca. 1.5 mm, glabrous; anthers oblong. Ovary semi-inferior. Style simple; stigma capitate. Capsule pendulous, ovoid-lanceolate, ca. 5 mm, glabrous. Fl. May–Jun, fr. Jul–Nov. $2n = 22^*$.

• Forests on mountain slopes, thickets, streamsides and roadsides in valleys; 1500–1700 m. Guizhou, W Hubei, SW Shaanxi, E Sichuan.

4. *Itea amoena* Chun, Sunyatsenia 1: 238. 1934.

秀丽鼠刺 xiu li shu ci

Shrubs evergreen, small, 1.5–2 m tall, glabrous or sometimes slightly puberulent on inflorescences. Flowering branchlets yellow-green, striate, elongate, slender; fruiting branchlets dark brown. Petiole slender, 1–1.5 cm, narrowly sulcate adaxially; leaf blade narrowly lanceolate, 5–11 \times 1.2–2 cm; thinly leathery, both surfaces glabrous, midvein impressed adaxially, secondary veins in 6–8 pairs, arcuate ascending, reticulate veins prominent, dense, base subacute or cuneate, margin revolute when dry, 4–8-crenate-dentate on both sides proximally, entire distally, apex acuminate or long acuminate. Racemes terminal or

axillary, solitary or 2- or 3-clustered, erect, 7–18 cm or more; rachis striate, puberulous; bracts subulate, ca. 1 mm, deciduous. Flowers numerous; pedicel erect or erect-spreading, 4–5 mm, puberulous. Calyx shallowly cupular; lobes narrowly lanceolate, ca. 2 mm, puberulous. Petals reflexed at anthesis, white, oblong-lanceolate, ca. 4–5 \times ca. 2 mm, puberulous. Stamens shorter than petals, ca. 4 mm; filaments glabrous; anthers oblong. Ovary semi-inferior, glabrous. Stigma capitate. Capsule suboblong-conical, 8–10 mm, glabrous. Fl. Jun, fr. Jul–Nov.

• Streamsides on mountain slopes, shaded places in valleys; 100–800 m. ?Guangdong, S Guangxi.

This species is easily distinguished from other native species in having leaf blades narrowly lanceolate, sparsely glandular dentate distally, acuminate apically, and petals reflexed at anthesis.

5. *Itea macrophylla* Wallich in Roxburgh, Fl. Ind. 2: 419. 1824.

大叶鼠刺 da ye shu ci

Itea maesifolia Elmer; *I. luzonensis* Elmer; *I. puberula* Craib; *Kurrimia macrophylla* (Wallich) Wallich ex Meisner.

Trees 8–10 m tall. Branchlets striate, glabrous. Petiole stout, 1–2.5 cm, glabrous; leaf blade elliptic or broadly ovate, 10–20 \times 5–12 cm, thinly leathery, both surfaces glabrous, midvein and secondary veins distinctly raised abaxially, midvein impressed adaxially, secondary veins in 7–10 pairs, tertiary veins parallel, fine, reticulate veins slightly prominent abaxially, base rounded-obtuse, margin glandular serrate, apex acute or acuminate. Racemes axillary, usually 2- or 3-clustered, rarely solitary, erect, 10–15(–20) cm; bracts subulate. Calyx cupular; lobes triangular-lanceolate, ca. 1.5 mm, puberulous. Petals reflexed at anthesis, white, narrowly lanceolate, 3–4 mm, apex subacute. Stamens ca. $1/2$ as long as petals; filaments glabrous; anthers dorsifixed, oblong. Ovary semi-inferior, glabrous. Stigma capitate. Capsule spreading or pendulous, striate, narrowly conical, 7–8 mm, glabrous. Fl. and fr. Apr–Jun. $2n = 22$.

Dense or sparse forests, roadsides on mountain slopes; 500–1500 m. Guangxi, Hainan, S Yunnan [Bhutan, India, Indonesia, Myanmar, Philippines, Sikkim, Thailand, Vietnam].

The fibers of the stems and bark are used for making ropes.

6. *Itea kiukiangensis* C. C. Huang & S. C. Huang, Fl. Yunnan. 1: 105. 1977.

球江鼠刺 qiu jiang shu ci

Trees to 10 m tall. Young branchlets yellow-green; old branchlets yellow-brown, striate, glabrous, with sparse lenticels. Petiole stout, 1–1.7 cm, sulcate adaxially, glabrous or sparsely puberulous; leaf blade oblong or oblong-elliptic, 1–13 \times 2.8–6.8 cm, thinly leathery, both surfaces glabrous except barbellate at axils of reticulate veins, midvein and secondary veins prominently raised abaxially, impressed adaxially, secondary

veins in 5–8(–10) pairs, arcuate ascending, tertiary veins subparallel, reticulate veins prominent, base rounded-obtuse, margin slightly sharply serrulate, apex acute or acuminate. Racemes rarely axillary, often 1 or 2, 9–17 cm; rachis yellow puberulous; bracts ca. 1 mm. Pedicel 2–3 mm, yellow puberulous. Calyx cupular; lobes triangular, ca. 1 mm, puberulous. Petals erect at anthesis, white, linear-lanceolate. Stamens shorter than or subequaling petals; filaments hairy; anthers subglobose. Ovary semi-inferior, sparsely puberulous. Stigma capitate. Capsule pendulous, 4–6 mm. Fl. and fr. Jul–Aug.

• Mixed forests; 1500–2300 m. SE Xizang, NW Yunnan.

7. *Itea glutinosa* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 58: 91. 1921.

腺鼠刺 xian shu ci

Shrubs or small trees, 3–6 m tall. Branchlets robust, olive green or chestnut brown; bark densely glandular. Petiole stout, 1.2–2 cm, sulcate adaxially, glabrous; leaf blade abaxially pale green, adaxially distinctly green, oblong-elliptic, 8–16 × 4–7 cm, thickly leathery, both surfaces glabrous, abaxially sparsely glandular, midvein slightly impressed adaxially, broad, secondary veins in 6 or 7 pairs, arcuate ascending, reticulate veins prominent on both surfaces, base rounded-obtuse, margin irregularly spinose serrate except near base, apex acute or shortly acuminate. Racemes axillary, solitary, erect, shorter than leaves, 7–13 cm; rachis, bracts, pedicels, and calyces sparsely puberulous and sessile or substipitate reddish glandular; bracts leaflike, sometimes conspicuously elongate, to 1 cm. Flowers numerous; pedicel spreading to pendulous, 2–3 mm. Calyx shallowly cupular; lobes linear-lanceolate, shorter than or subequaling petals, 3–3.5 mm. Petals erect at anthesis, slightly curved apically, white, lanceolate, 3–4 mm, margin puberulous, sometimes sparsely glandular. Stamens conspicuously longer than petals and ovary, ca. 5 mm; filaments puberulous; anthers ovoid. Ovary superior, glabrous. Capsule ca. 7 mm. Fl. and fr. Jun–Nov.

• Forests and thickets on mountain slopes, roadsides. Fujian, Guangxi, Guizhou, Hunan.

This species is distinguished by having leaf blades thickly leathery, branchlets, raceme rachis, pedicels, bracts, and calyces with sessile or substipitate, reddish glands, and stamens conspicuously longer than the petals.

8. *Itea coriacea* Y. C. Wu, Bot. Jahrb. Syst. 71: 177. 1940.

厚叶鼠刺 hou ye shu ci

Itea chinensis Hooker & Arnott var. *coriacea* (Y. C. Wu) Z. P. Jien.

Shrubs or rarely small trees, to 10 m tall. Branchlets yellow-green when dry, purple-brown when old, conspicuously striate, terete, glabrous. Petiole stout,

1.5–2.5 cm, sulcate adaxially, glabrous; leaf blade abaxially pale green, adaxially yellow-green, elliptic or obovate-oblong, 6–13 × 3–5 cm, thickly leathery, midvein distinctly raised abaxially, slightly impressed adaxially, to 1 mm wide, secondary veins in 5 or 6 pairs, arcuate ascending, reticulate veins prominent, base obtuse or broadly cuneate, margin crenate-dentate except near base where sparsely glandular mucronulate, apex acute or shortly so. Racemes axillary, rarely also terminal; rachis puberulous; bracts linear-subulate, ca. 1 mm. Flowers numerous, 2(or 3)-clustered, rarely solitary; pedicel spreading or pendulous by anthesis, 2.5–4 mm, puberulous. Calyx yellow-green, shallowly cupular, puberulous; lobes triangular-lanceolate, ca. 2 mm. Petals erect, white, adaxially and marginally sparsely puberulous, apex acuminate. Stamens conspicuously longer than petals, ca. 4 mm; filaments slender, 3.5–4 mm, puberulous at base; anthers ellipsoid-globose. Ovary superior, puberulous. Capsule conical, ca. 7 mm, sparsely puberulous, apex reflexed.

• Dense or sparse forests, mountain thickets, valleys, streamsides, roadsides; 600–1500 m. Guangdong, Guangxi, Guizhou, Hainan, Jiangxi.

This species differs from *Itea omeiensis* in having stout petioles, thickly leathery leaf blades, and sparsely hairy petals.

9. *Itea yangchunensis* S. Y. Jin, Acta Phytotax. Sin. 33: 497. 1995.

阳春鼠刺 yan chu shu ci

Shrubs or small trees. Branchlets terete, glabrous. Petiole stout, 6–7 mm, glabrous; leaf blade abaxially pale green, adaxially dark green, oblong or oblong-elliptic, 5.5–7 × 1.7–2.5 cm, thickly leathery, both surfaces glabrous, conspicuously glandular punctate, secondary veins in ca. 5 pairs, arcuate curved, tertiary veins both parallel and reticulate, secondary and reticulate veins prominent on both surfaces, margin ± revolute when dry, densely serrulate except near base, apex rounded or obtuse. Racemes axillary, often longer than leaves, 3–5 cm; rachis and pedicels sparsely puberulous; bracts early deciduous. Flowers few, usually 2- or 3-clustered, rarely solitary. Calyx shallowly cupular; lobes oblong-lanceolate, ca. 3 mm, glabrous. Capsule turning black when dry, conical, ca. 6 mm, sparsely puberulous or subglabrous. Fr. Nov.

• Streamsides. SW Guangdong (Yangchun Xian).

This species is similar to *Itea coriacea*, but differs in having leaves smaller, shorter than the racemes, with a short, stout petiole and a glandular blade with prominent secondary and reticulate veins and a rounded or obtuse apex.

10. *Itea oldhamii* C. K. Schneider, Ill. Handb. Laubholz. 1: 396. 1906.

台湾鼠刺 tai wan shu ci

Itea chinensis Hooker & Arnott var. *subserrata* Maximowicz; *I. formosana* H. L. Li.

Shrubs or rarely small trees, evergreen. Branchlets stout, young ones sparsely pilose, old ones glabrous. Petiole 5–10 mm, glabrous; leaf blade ovate to ovate-elliptic,

6–9 × 3.5–5.5 cm, thickly leathery, both surfaces glabrous, midvein raised abaxially, impressed adaxially, secondary veins in 5–7 pairs, arcuate ascending, reticulate veins prominent, base obtuse or cuneate, margin remotely 2–10-dentate on both sides, apex shortly acute or acuminate, rarely obtuse. Racemes axillary or terminal, 3–5 cm, often pubescent; bracts 1–2 mm. Flowers numerous, solitary or 2-clustered; pedicel spreading, 2–4 mm, puberulous. Calyx shallowly cupular; lobes triangular-lanceolate, ca. 1/2 as long as petals. Petals white, lanceolate, ca. 2.5 × 1 mm. Stamens longer than petals; filaments hairy; anthers ellipsoid-globose. Ovary superior, puberulous. Capsule conical, 5–6 mm, slightly pubescent, with persistent sepals at base. $2n = 22$.

Thickets, valleys; 300–500 m. N Taiwan (Taibei) [Japan (Ryukyu Islands)].

The wood is hard and slightly peach-colored and is used for making furniture.

11. *Itea kwangsiensis* H. T. Chang, J. Sun Yatsen Univ., Nat. Sci. 1959(2): 30. 1959.

子农鼠刺 *zi nong shu ci*

Itea chingiana S. Y. Jin.

Shrubs 5–6 m tall. Branchlets yellow-green, conspicuously striate, terete, glabrous. Petiole stout, ca. 2.5 cm, sulcate, glabrous; leaf blade abaxially pale green, adaxially yellow-green, narrowly lanceolate or oblong-lanceolate, 10–15 × 1.8–3.5 cm, thinly leathery, both surfaces glabrous, midvein raised abaxially, distinctly impressed adaxially, secondary veins in ca. 9 pairs, arcuate curved upward, connected near margin, raised abaxially, reticulate veins prominent, base rounded or broadly cuneate, margin often reflexed when dry, usually entire proximally and remotely glandular serrulate in distal 1/3–1/2, apex acuminate, glandular mucronulate. Racemes axillary, solitary, stout, 6–6.5 cm; rachis puberulous; bracts subulate, early deciduous. Flowers numerous, usually 2- or 3-clustered, rarely solitary; pedicel 2–2.5 mm, puberulous. Calyx cupular or shallowly so; lobes shortly triangular-lanceolate, ca. 1.5 mm, sparsely puberulous. Petals erect at anthesis, white, ovate-lanceolate, ca. 3 mm. Stamens conspicuously longer than petals; filaments 3–4 mm, glabrous; anthers oblong-globose. Ovary superior, glabrous. Style simple; stigma capitate. Capsule (immature) brown, striate, ca. 6 mm, glabrous, with persistent sepals and petals at base. Fl. and fr. May.

• Thickets; ca. 400 m. N Guangxi (Luocheng Xian).

This species is distinguished by having narrowly lanceolate leaf blades remotely glandular serrulate in the distal 1/3–1/2 of the margin and mucronulate at the apex, short, stout racemes, and striate capsules.

12. *Itea chinensis* Hooker & Arnott, Bot. Beechey Voy. 189. 1833.

鼠刺 *shu ci*

Shrubs or small trees, 4–10 m tall, rarely much taller. Young branchlets yellow-green, glabrous; old branchlets brown, striate. Petiole 1–2 cm, glabrous, sulcate adaxially; leaf blade abaxially pale green, adaxially deep green, obovate or ovate-elliptic, 5–12(–15) × 3–6 cm, thinly leathery, both surfaces glabrous, midvein distinctly raised abaxially, impressed adaxially, secondary veins in 4 or 5 pairs, arcuate curved upward, connected near margin, base cuneate, margin obscurely crenate-serrulate distally, repand, or subentire, apex acute. Racemes axillary, solitary or rarely 2- or 3-fascicled, erect, usually shorter than leaves, 3–6(–9) cm, glabrous; rachis puberulous; bracts linear-subulate, 1–2 mm. Flowers numerous, 2- or 3-clustered, rarely solitary; pedicel slender, ca. 2 mm, puberulous. Calyx shallowly cupular, sparsely pubescent; lobes triangular-lanceolate, ca. 1.5 mm, puberulous. Petals erect at anthesis, white, lanceolate, 2.5–3 mm, glabrous, apex emarginate. Stamens subequaling or slightly longer than petals; filaments puberulous. Ovary superior, densely villous. Stigma capitate. Capsule striate, oblong-lanceolate, 6–9 mm, puberulous. Fl. Mar–May, fr. May–Dec. $2n = 22$.

Sparse forests, mountain slopes, valleys, streamsides, roadsides; 100–2400 m. Fujian, Guangdong, Guangxi, Hunan, SE Xizang, NW Yunnan [Bhutan, India, Laos, N Myanmar, Thailand, Vietnam]. This is a widespread species variable in the shape, size, and marginal dentation of the leaf blades.

13. *Itea omeiensis* C. K. Schneider in Sargent, Pl. Wilson. 3: 421. 1917.

峨眉鼠刺 *e mei shu ci*

Itea chinensis Hooker & Arnott var. *oblonga* (Handel-Mazzetti) Y. C. Wu; *I. longibracteata* Hu; *I. oblonga* Handel-Mazzetti; *I. stenophylla* H. T. Chang.

Shrubs or small trees, 1.5–10 m tall, rarely much taller. Young branchlets yellow-green, glabrous; old branchlets brown, striate. Petiole stout, 1–1.5 cm, glabrous; leaf blade abaxially pale green, adaxially deep green, oblong, rarely elliptic, 6–12 (–16) × 2.5–5(–6) cm, thickly leathery, both surfaces glabrous, midvein and secondary veins distinctly raised abaxially, secondary veins in 5–7 pairs, connected near margin, reticulate veins prominent, base rounded or obtuse, margin conspicuously densely serrulate except subentire near base, apex acuminate or caudate. Racemes axillary, solitary or 2- or 3-fascicled, slightly curved distally, usually longer than leaves, 12–13 cm, rarely only 2–3 cm; bracts leaflike, triangular-lanceolate or oblanceolate, ca. 1.1 cm × 1 mm. Pedicel 2–3 mm, puberulous. Calyx shallowly cupular, sparsely puberulous; lobes triangular-lanceolate, 1.5–2 × ca. 1 mm. Petals erect at anthesis, slightly curved apically, white, lanceolate, 3–3.5 mm, sparsely puberulous. Anthers oblong-globose. Ovary superior, densely villous. Capsule 6–9 mm, pubescent. Fl. Mar–May, fr. Jun–Dec.

• Sparse forests, thickets in valleys, mountain slopes, roadsides; 300–1700 m. Anhui, Fujian, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang.

14. *Itea indochinensis* Merrill, Univ. Calif. Publ. Bot. 8: 134. 1926.

毛鼠刺 mao shu ci

Shrubs or trees, to 10(–15) m tall. Young branchlets black-brown or black-green, densely pubescent; old branchlets striate, glabrescent or glabrous. Petiole 1–1.7 cm, sulcate adaxially, pubescent; leaf blade abaxially pale green, adaxially olive green, elliptic to oblong-elliptic, 10–15(–19) × 4.5–8 cm, papery, abaxially densely pubescent and glandular punctate, more densely so along veins, or barbellate only at vein axils, adaxially sparsely puberulous or glabrous, midvein and secondary veins raised abaxially, secondary veins in 6–11 pairs, arcuate ascending, connected near margin, tertiary veins parallel, base rounded or obtuse, margin serrulate to subentire, apex obtuse to shortly acuminate. Racemes axillary, usually 3- or 4-fascicled, 4–7(–8) × ca. 1 cm; rachis densely villous. Pedicel ca. 2 mm, densely villous. Calyx cupular, villous; lobes triangular-lanceolate, ca. 1/2 as long as petals. Petals erect at anthesis, white, lanceolate, 2.5–4 mm, pubescent. Stamens subequaling or longer than petals, 4–5 mm; filaments villous at base. Ovary semi-inferior, puberulous. Capsule ca. 8 mm, puberulous, dehiscent from base when ripe. Fl. Mar–May, fr. May–Dec.

Dense or sparse forests, forest margins, thickets, streamsides, roadsides; 200–2100 m. Guangdong, Guangxi, Guizhou, Yunnan [Vietnam].

This species is distinguished from *Itea chinensis* by having leaf blades abaxially densely pubescent or at least barbellate at vein axils (vs. glabrous), with secondary veins in 6–11 (vs. 4 or 5) pairs.

- 1a. Leaf blade abaxially densely pubescent, more densely so along veins 14a. var. *indochinensis*
 1b. Leaf blade abaxially barbellate only at vein axils 14b. var. *pubinervia*

14a. *Itea indochinensis* var. *indochinensis*

毛鼠刺(原变种) mao shu ci (yuan bian zhong)

Itea chinensis Hooker & Arnott var. *indochinensis* (Merrill) Lecompte; *I. homalioides* H. T. Chang; *I. quizhouensis* H. T. Chang.

Leaf blade abaxially densely pubescent, more densely so along veins. Fl. Mar–May, fr. May–Dec.

Dense or sparse forests, forest margins, thickets, streamsides; 200–1400 m, Guangxi, Guizhou, S Yunnan [Vietnam].

14b. *Itea indochinensis* var. *pubinervia* (H. T. Chang) C. Y. Wu, Fl. Yunnan. 1: 106. 1977.

毛脉鼠刺 mao mei shu ci

Itea chinensis var. *pubinervia* H. T. Chang, Acta Phytotax. Sin. 2: 126. 1953.

Leaf blade abaxially barbellate only at vein axils.

• Sparse forests, streamsides, roadsides; 1000–2100 m. Guangdong, Guangxi, Guizhou, Yunnan.

15. *Itea parviflora* Hemsley, Ann. Bot. (London) 9: 153. 1895.

小花鼠刺 xiao hua shu ci

Itea arisanensis Hayata; *I. arisanensis* var. *longifolia* Yamamoto; *I. arisanensis* var. *parvifolia* Yamamoto; *I. chinensis* Hooker & Arnott var. *arisanensis* (Hayata) Masamune; *I. parviflora* var. *arisanensis* (Hayata) H. L. Li; *I. parviflora* var. *latifolia* H. L. Li.

Shrubs or small trees, evergreen, to 5 m tall. Branchlets slender, glabrous or glabrescent. Petiole slender, 1–1.5 cm; leaf blade abaxially pale green, adaxially dark green or brown, lanceolate to oblong-lanceolate, 8–12 × 2.5–3.5 cm, membranous or thinly papery, both surfaces glabrous except barbellate at vein axils, midvein raised abaxially, slightly impressed adaxially, secondary veins in 5–8 pairs, arcuate curved, reticulate veins prominent, base cuneate or rarely obtuse, margin ± crenulate-serrate or repand, rarely entire, apex acuminate or subcaudate. Racemes axillary, to 3 cm, many flowered; rachis glabrous or sometimes puberulous; bracts slightly spreading, linear-subulate. Pedicel slender, 2–3 mm, glabrous. Calyx shallowly funnelform; lobes triangular, glabrous. Petals white, narrowly ovate-lanceolate, ca. 2 × 1.5–1 mm, glabrous, apex acuminate. Stamens subequaling or slightly longer than petals; filaments pilose; anthers oblong-globose. Ovary superior, sparsely puberulous. Capsule ca. 4.5 mm, slightly puberulous, many seeded. Fl. and fr. May–Jun. $2n = 22^*$.

• Sparse forests; low to medium altitudes. Taiwan.

This species is sometimes cultivated.

29. RIBES Linnaeus, Sp. Pl. 1: 200. 1753.

茶藨子属 cha biao zi shu

Lu Lingdi (陆玲娣 Lu Ling-ti); Crinan Alexander

Grossularia Miller; *Ribesium* Medikus.

Shrubs, rarely small trees, deciduous, rarely evergreen or semievergreen, sometimes epiphytic. Branchlets spiny, prickly, or unarmed; spines sometimes verticillate below nodes. Buds with several scarious, papery, or herbaceous scales. Leaves alternate, rarely fascicled, petiolate, exstipulate; leaf blade palmately lobed or rarely entire, folded or rarely convolute in bud. Inflorescences many- or few-flowered racemes, rarely corymbs or subsessile umbels, sometimes flowers clustered or solitary. Bracts ovate to lanceolate, rarely ligulate or linear. Flowers bisexual, or unisexual and shrubs dioecious. Calyx tube rotate to cylindrical or tubular, basally adnate to ovary; lobes (4 or)5, erect or reflexed at anthesis, petaloid, sometimes changing in fruit. Petals (4 or)5, concolorous, alternate with and often smaller than calyx lobes, sometimes absent. Stamens (4 or)5, alternate with petals and inserted on rim of calyx tube

or slightly lower, often vestigial or with undeveloped pollen in female flowers. Ovary inferior, rarely semi-inferior, shortly stalked, 1-loculed, vestigial or absent in male flowers; ovules many. Style 2-lobed or divided for almost 1/2 its length, rarely entire. Fruit a juicy berry, with persistent calyx apically. Seeds many, albuminous; testa and endosperm gelatinous; embryo cylindrical, minute.

About 160 species: mainly in cold and temperate regions of the N hemisphere, abundant in E Asia; 59 species (25 endemic, five introduced) in China.

Key 1

- 1a. Flowers bisexual.
 - 2a. Branchlets with spines, prickles, or both.
 - 3a. Flowers 4–20 in racemes more than 2 cm 1. *R. horridum*
 - 3b. Flowers solitary, 2 or 3 in clusters, or in racemes less than 2 cm.
 - 4a. Style and calyx tube adaxially villous 2. *R. reclinatum*
 - 4b. Style and calyx tube adaxially glabrous.
 - 5a. Fruit oblong, 2–2.5 cm 3. *R. stenocarpum*
 - 5b. Fruit globose, rarely ellipsoid, 0.8–1.5 cm.
 - 6a. Spines at nodes slender, basally less than 1 mm in diam.
 - 7a. Leaf blade glabrous except at vein axils; style divided for ca. 1/2 its length 4. *R. aciculare*
 - 7b. Leaf blade pubescent, some hairs glandular; style entire or only stigma 2-lobed 5. *R. fuyunense*
 - 6b. Spines at nodes robust, basally more than 1 mm in diam.
 - 8a. Calyx tube cylindrical, 7–10 mm 6. *R. formosanum*
 - 8b. Calyx tube campanulate, to 6 mm.
 - 9a. Style 2-lobed at apex; anthers not exerted 7. *R. burejense*
 - 9b. Style divided for ca. 1/2 its length; anthers exerted 8. *R. alpestre*
 - 2b. Branchlets with neither spines nor prickles.
 - 10a. Flowers solitary or 2 per fascicle 9. *R. ambiguum*
 - 10b. Flowers in racemes.
 - 11a. Shrubs low, creeping, or procumbent, to 40 cm tall, rarely semierect to 1 m tall.
 - 12a. Leaf blade with scattered, sessile, yellow glands abaxially 10. *R. procumbens*
 - 12b. Leaf blade without scattered, sessile, yellow glands abaxially, sometimes with glandular hairs.
 - 13a. Racemes pendent, lax, (3–)5–7-flowered; calyx purple to red 11. *R. triste*
 - 13b. Racemes erect, dense, 5–15-flowered; calyx yellowish white 12. *R. palczewskii*
 - 11b. Shrubs erect, usually more than 1 m tall.
 - 14a. Racemes short, 2- or 3-flowered 13. *R. fargesii*
 - 14b. Racemes (2–)4–30(–40) cm, (4–)8–40(–50)-flowered.
 - 15a. Calyx tube cylindrical, 1.2–1.5 cm 14. *R. odoratum*
 - 15b. Calyx tube campanulate or cupular, or if cylindrical then less than 0.7 cm.
 - 16a. Leaf blade with scattered, sessile, yellow glands abaxially.
 - 17a. Calyx and ovary with scattered, sessile, yellow glands 15. *R. nigrum*
 - 17b. Calyx and ovary without scattered, sessile, yellow glands 16. *R. americanum*
 - 16b. Leaf blade without scattered, sessile, yellow glands abaxially, sometimes with glandular hairs.
 - 18a. Calyx lobes reflexed at or soon after anthesis.
 - 19a. Racemes lax, rachis clearly visible at anthesis.
 - 20a. Petiole 6–8 cm, leaf lobes acuminate at apex; calyx lobes not ciliate; fruit red, 0.8–1.2 cm 17. *R. griffithii*
 - 20b. Petiole 3–5 cm, leaf lobes obtuse to acute at apex; calyx lobes ciliate; fruit purple-black, 0.5–0.7 cm 18. *R. altissimum*
 - 19b. Racemes dense, rachis almost hidden at anthesis.
 - 21a. Racemes spreading then pendulous, fewer than 30-flowered; calyx purple, without warts at base of calyx tube adaxially 19. *R. soulieanum*
 - 21b. Racemes erect then pendulous, usually more than 30-flowered; calyx green to yellow, with 5 warts at base of calyx tube adaxially.
 - 22a. Leaf lobes coarsely sharply serrate or doubly serrate at margin, acute or shortly acuminate at apex; warts on adaxial surface of calyx tube not joined by a raised ring 20. *R. mandshuricum*
 - 22b. Leaf lobes coarsely crenate-serrate or doubly serrate at margin, obtuse or acute at apex; warts on adaxial surface of calyx tube joined by a raised ring 21. *R. multiflorum*
 - 18b. Calyx lobes erect or incurved at anthesis.
 - 23a. Calyx lobes ciliate or dentate at margin.

- 24a. Racemes lax, rachis clearly visible at anthesis; calyx tube pelviform, 1–1.5 mm 22. *R. pubescens*
 24b. Racemes dense, rachis almost hidden at anthesis; calyx tube campanulate to shortly
 cylindric, 1.5–3.5 mm.
 25a. Petals not ciliate at margin; leaf blade to 12 × 15 cm, petiole 5–8 cm 23. *R. latifolium*
 25b. Petals ciliate at margin; leaf blade to 10 × 10 cm, petiole 2.5–5 cm.
 26a. Leaf blade and raceme rachis stalked glandular; petals subspatulate to flabellate;
 stamens inserted level with petals 24. *R. himalense*
 26b. Leaf blade and raceme rachis not stalked glandular; petals narrowly cuneate to
 linear;
 stamens inserted below petals 25. *R. meyeri*
- 23b. Calyx lobes neither ciliate nor dentate at margin, at most erose.
 27a. Racemes initially erect, 2–6 cm, 5–15-flowered; calyx tube pelviform or shallowly
 cupular,
 1–2 mm.
 28a. Calyx green to greenish brown; petals purplish; raceme rachis and pedicels sparsely
 shortly glandular hairy 26. *R. rubrum*
 28b. Calyx yellowish white; petals yellowish; raceme rachis and pedicels pubescent at
 anthesis, glabrous in fruit 12. *R. palczewskii*
- 27b. Racemes nodding to pendulous, 5–40 cm, 9–50-flowered; calyx tube campanulate to
 shortly cylindric, 2–6 mm.
 29a. Racemes lax, 15–40-flowered; pedicels 3–10(–15) mm; calyx tube 4–6 mm;
 stamens exserted 27. *R. longiracemosum*
 29b. Racemes dense, 5–30(–50)-flowered; pedicels absent or very short; calyx tube
 2–4 mm; stamens included.
 30a. Buds glabrous, apex obtuse; leaf blade adaxially sparsely coarsely glandular hairy;
 calyx lobes not incurved, apex obtuse; stamens inserted level with petals 28. *R. moupinense*
 30b. Buds puberulent, apex acute; leaf blade adaxially densely pubescent; calyx lobes
 incurved, apex acute; stamens inserted below petals 29. *R. setchuense*
- 1b. Flowers unisexual (shrubs dioecious).
 31a. Shrubs deciduous, though in leaf for most of year; flowers in subsessile umbels or fascicles, rarely
 solitary 30. *R. fasciculatum*
 31b. Shrubs deciduous, semievergreen, or evergreen; flowers in racemes.
 32a. Shrubs evergreen, rarely semievergreen, unarmed; leaf blade margin entire, rarely 3-lobed near
 apex.
 33a. Branchlets and petioles glandular bristly; petioles 3–8 mm.
 34a. Leaf blade narrowly elliptic to sublanceolate, ca. 3 × as long as wide; calyx purplish green,
 glabrous 31. *R. tianquanense*
 34b. Leaf blade elliptic to obovate-elliptic, ca. 2 × as long as wide; calyx greenish white, stalked
 glandular 32. *R. henryi*
- 33b. Branchlets glabrous; petioles 0.5–4 cm, glabrous or sparsely glandular hairy.
 35a. Leaf blade orbicular to reniform-orbicular, about as long as wide; calyx purple to purplish
 green 33. *R. hunanense*
 35b. Leaf blade obovate to elliptic, longer than wide; calyx greenish white or yellowish green.
 36a. Leaf blade 2–5 × 1.5–3 cm; male racemes erect; fruit 0.8–1.1 × 0.6–0.8 cm 34. *R. davidii*
 36b. Leaf blade 5–10 × 2.5–4.5 cm; male racemes pendulous; fruit 1.5–2 × 0.7–1 cm 35. *R. laurifolium*
- 32b. Shrubs deciduous, unarmed or with 2 small prickles at each node; leaf blade margin lobed.
 37a. Nodes each with 2 small spines; internodes minutely prickly or unarmed.
 38a. Petioles pubescent to glandular hairy, rarely glabrescent; leaf blade margin 3–5-lobed.
 39a. Female racemes up to 6-flowered; calyx tube 2–3 mm; fruit pubescent then glabrescent 36. *R. giraldii*
 39b. Female racemes at least 8-flowered; calyx tube 1.5–2 mm; fruit glabrous 37. *R. pulchellum*
 38b. Petioles glabrous, rarely puberulent; leaf blade margin 3-lobed.
 40a. Shrubs low, to 1 m tall; leaf blade puberulent, remaining so at margin and sometimes
 abaxially 38. *R. saxatile*
 40b. Shrubs erect, to 3 m tall; leaf blade glabrous.
 41a. Petioles 0.5–1 cm; leaf blade 1–1.5 cm; male racemes 7–11-flowered 39. *R. glabrifolium*
 41b. Petioles 1–2 cm; leaf blade 1.5–3.5 cm; male racemes 10–15-flowered 40. *R. diacanthum*
- 37b. Nodes and internodes unarmed.
 42a. Terminal leaf lobe shorter than or rarely equaling lateral ones, apex obtuse, rarely acute.
 43a. Leaf blade glabrous or margin ciliate, rarely viscid glandular; ovary and fruit glabrous 41. *R. heterotrichum*
 43b. Leaf blade pubescent, or viscid or stalked glandular, or both; ovary and young fruit pubescent
 and glandular pubescent.

- 44a. Calyx green, sometimes tinged reddish brown 42. *R. kialanum*
 44b. Calyx purple or purplish brown.
 45a. Leaf blade orbicular to reniform-orbicular, pubescent and glandular, lobes coarsely obtusely serrate at margin, obtuse at apex; calyx pubescent and glandular 43. *R. orientale*
 45b. Leaf blade broadly ovate, glandular but not pubescent, lobes sharply serrate at margin, obtuse to acute at apex; calyx glabrous, rarely puberulent 44. *R. xizangense*
 42b. Terminal leaf lobe equaling or longer than lateral ones, apex acute, acuminate, or caudate.
 46a. Leaf blade to 2 cm, terminal lobe slightly longer than lateral ones.
 47a. Calyx pubescent; fruit black or reddish black 45. *R. pseudofasciculatum*
 47b. Calyx glabrous; fruit red.
 48a. Calyx purple; leaf blade glabrous, rarely sparsely glandular hairy adaxially; inflorescences glabrous 46. *R. humile*
 48b. Calyx green or yellow-green; leaf blade and inflorescences minutely pubescent and stalked glandular 47. *R. glabricalycinum*
 46b. Leaf blade more than 2 cm, terminal lobe usually much longer than lateral ones.
 49a. Calyx hairy or glandular or both.
 50a. Fruit black.
 51a. Calyx green, sometimes tinged reddish brown, tube cupular; fruit sparsely stalked glandular, sometimes hairy 48. *R. vilmorinii*
 51b. Calyx dark red or purple, tube saucer-shaped, rarely shallowly cupular; fruit glabrous 49. *R. rubrisepalum*
 50b. Fruit yellowish green, red, or reddish brown.
 52a. Fruit densely villous and stalked glandular.
 53a. Leaf blade 2.5–5 cm, margin acutely serrate or doubly serrate; male racemes lax, 6–7 cm, 10–15-flowered 50. *R. franchetii*
 53b. Leaf blade 6–10 cm, margin obtusely dentate or doubly dentate; male racemes dense, 7–15 cm, 15–30-flowered or more 51. *R. maximowiczii*
 52b. Fruit glabrous, pubescent, or sparsely stalked glandular.
 54a. Leaf blade 5–9 cm, margin deeply doubly serrate, terminal lobe longer than lateral ones, apex acuminate; calyx reddish brown 52. *R. takare*
 54b. Leaf blade 2–5 cm, margin irregularly crenate-dentate or doubly dentate, rarely subentire, terminal lobe subequaling lateral ones; calyx green, sometimes tinged reddish brown 42. *R. kialanum*
 49b. Calyx glabrous.
 55a. Inflorescences stalked glandular, otherwise glabrous.
 56a. Leaf blade glabrous, rarely sparsely stalked glandular, terminal lobe acute at apex; calyx green 53. *R. komarovii*
 56b. Leaf blade coarsely appressed hairy adaxially, terminal lobe acuminate at apex; calyx yellowish brown 54. *R. maximowiczianum*
 55b. Inflorescences hairy and stalked glandular.
 57a. Fruit black.
 58a. Terminal leaf lobe usually less than 2 × as long as lateral ones 55. *R. luridum*
 58b. Terminal leaf lobe usually more than 2 × as long as lateral ones.
 59a. Male racemes 1.5–2.5 cm; pedicels 1–2 mm; calyx green, sometimes slightly tinged reddish brown 48. *R. vilmorinii*
 59b. Male racemes 3–5 cm; pedicels 2–6 mm; calyx reddish brown 56. *R. tenue*
 57b. Fruit red or dark purple.
 60a. Leaf blade base rounded to subtruncate; calyx tube shallowly cupular 57. *R. glaciale*
 60b. Leaf blade base truncate to cordate, sometimes subtruncate; calyx tube saucer-shaped.
 61a. Calyx green to yellowish green; leaf blade margin with mostly simple teeth, rarely with some double teeth 58. *R. viridiflorum*
 61b. Calyx reddish brown or purplish brown; leaf blade margin with double teeth, or both double and simple teeth mixed.

- 62a. Leaf blade oblong-ovate, rarely suborbicular, terminal lobe more than 2 × as long as lateral ones, apex acuminate to caudate 56. *R. tenue*
- 62b. Leaf blade broadly ovate to suborbicular, terminal lobe less than 2 × as long as lateral ones, apex acute to shortly acuminate 59. *R. laciniatum*

Key 2

- 1a. Flowers bisexual; bracts short and minute, ovate or suborbicular, rarely ligulate, oblong, or lanceolate.
- 2a. Branchlets armed with prickles.
- 3a. Racemes 2–9 cm, 4–20-flowered; bracts lanceolate or ligulate, 1-nerved; calyx tube pelviform or pentagonal; style 2-parted 1. *R. horridum*
- 3b. Racemes 1–1.5 cm or slightly more, 2–8-flowered, sometimes flowers solitary; bracts ovate or suborbicular, rarely oblong, 3-nerved; calyx tube campanulate or cylindrical; style 2-lobed or 2-parted.
- 4a. Calyx tube at base adaxially and style villous; fruit globose 2. *R. reclinatum*
- 4b. Calyx tube at base adaxially and style glabrous; fruit globose, rarely ellipsoid or oblong.
- 5a. Fruit oblong, 2–2.5 cm 3. *R. stenocarpum*
- 5b. Fruit globose, rarely ellipsoid, 0.8–1.5 cm.
- 6a. Fruit stalked glandular or minutely prickly.
- 7a. Ovary and fruit unarmed, stalked glandular; branchlets armed with 3 robust prickles below petiole at nodes; style divided to middle; anthers with apical nectary 8. *R. alpestre*
- 7b. Ovary and fruit minutely prickly, not stalked glandular; branchlets armed with 3–7 verticillate, robust prickles below petiole at nodes; style 2-lobed only at apex; anthers without apical nectary 7. *R. burejense*
- 6b. Fruit glabrous.
- 8a. Leaf blade, inflorescences, and calyx glabrous; fruit 1.2–1.5 cm 4. *R. aciculare*
- 8b. Leaf blade, inflorescences, and calyx pubescent; fruit 0.8–1 cm.
- 9a. Branchlets with unarmed internodes and 3 robust prickles below petiole at nodes; calyx tube cylindrical; style shorter than stamens, apex 2-lobed; fruit red 6. *R. formosanum*
- 9b. Branchlets with minutely spiny internodes and 3–7 verticillate, acicular prickles below petiole at nodes; calyx tube campanulate; style subequaling stamens, entire or only stigma slightly 2-lobed; fruit black 5. *R. fuyunense*
- 2b. Branchlets unarmed.
- 10a. Flowers solitary or 2-fascicled 9. *R. ambiguum*
- 10b. Flowers in racemes.
- 11a. Racemes 2- or 3-flowered 13. *R. fargesii*
- 11b. Racemes (4–)8–40(–50)-flowered.
- 12a. Flowers yellow; calyx tube cylindrical; style entire or only stigma 2-lobed 14. *R. odoratum*
- 12b. Flowers green, yellowish white, or red; calyx tube pelviform, cupular, campanulate, or shortly cylindrical; style 2-lobed, rarely entire.
- 13a. Leaf blade, calyx, ovary, and fruit yellow glandular, rarely eglandular.
- 14a. Shrubs low, trailing, 20–40 cm tall; leaf blade orbicular-reniform, abaxially glabrous, rarely sparsely pubescent along veins, yellow glandular; inflorescence axis and pedicels glabrous; fruit purple-brown 10. *R. procumbens*
- 14b. Shrubs erect, 1–2 m tall; leaf blade broadly ovate or suborbicular, abaxially pubescent and glandular; inflorescence axis and pedicels pubescent; fruit black.
- 15a. Calyx yellowish green, reddish, or glaucous, pubescent and yellow glandular, tube subcampanulate; style apically 2-lobed; ovary sparsely pubescent and glandular 15. *R. nigrum*
- 15b. Calyx yellowish white, pubescent, eglandular, tube shortly cylindrical-campanulate; style entire or only stigma 2-lobed; ovary glabrous, eglandular 16. *R. americanum*
- 13b. Leaf blade, calyx, ovary, and fruit eglandular, rarely stalked glandular.
- 16a. Calyx tube pelviform or shallowly cupular.
- 17a. Calyx lobes reflexed, not ciliate at margin.

- 18a. Leaf lobes coarsely sharply serrate or doubly serrate at margin, acute or shortly acuminate
at apex; calyx tube adaxially at base with 5 warts not connected by an elevated ring 20. *R. mandshuricum*
- 18b. Leaf lobes coarsely crenate-serrate or doubly serrate at margin, subacute or subobtusate
at apex; calyx tube adaxially at base with 5 warts connected by an elevated ring 21. *R. multiflorum*
- 17b. Calyx lobes erect, ciliate or not at margin.
- 19a. Shrubs low, subcreeping, to 40(–80) cm tall 11. *R. triste*
- 19b. Shrubs erect, to 100 cm tall or more.
- 20a. Calyx lobes ciliate at margin 22. *R. pubescens*
- 20b. Calyx lobes not ciliate at margin.
- 21a. Leaf blade reniform-orbicular, rarely suborbicular, abaxially pubescent;
inflorescence
rachis and pedicels pubescent; calyx yellow-white; petals yellowish 12. *R. palczewskii*
- 21b. Leaf blade suborbicular, glabrous on both surfaces or abaxially sparsely pubescent;
inflo-
rescence rachis and pedicels glabrous; calyx greenish or greenish brown; petals
purplish 26. *R. rubrum*
- 16b. Calyx tube campanulate to shortly cylindric-campanulate.
- 22a. Calyx lobes reflexed, tube campanulate.
- 23a. Leaf blade glabrous on both surfaces, lobes subacute or subobtusate at apex; calyx lobes
ciliate
at margin; stamens inserted below petals 18. *R. altissimum*
- 23b. Leaf blade pubescent abaxially, lobes acuminate or shortly so at apex, rarely acute;
calyx
lobes not ciliate at margin; stamens inserted level with petals.
- 24a. Racemes lax, 7–15 cm, 10–20-flowered; anthers ovoid or oblong-ovoid, apex acute,
with
a nectary 17. *R. griffithii*
- 24b. Racemes dense, 4–6 cm, 5–25-flowered; anthers globose or subglobose, apex obtuse,
slightly impressed, without a nectary 19. *R. soulieanum*
- 22b. Calyx lobes erect, tube campanulate to shortly cylindric-campanulate.
- 25a. Calyx lobes not ciliate at margin.
- 26a. Calyx tube shortly cylindric-campanulate; stamens and style longer than calyx lobes;
racemes lax, 15–25(–30) cm 27. *R. longiracemosum*
- 26b. Calyx tube campanulate; stamens and style shorter than calyx lobes; racemes dense,
5–12(–16) cm.
- 27a. Branchlets and leaf blade glabrous or leaf blade abaxially pubescent along veins;
calyx
lobes apically obtuse but not incurved; stamens inserted level with petals . 28. *R. moupinense*
- 27b. Branchlets and leaf blade pubescent; calyx lobes apically subacute and incurved;
stamens inserted below petals 29. *R. setchuense*
- 25b. Calyx lobes ciliate at margin.
- 28a. Branchlets and petioles both pubescent and shortly stalked glandular; calyx puberulent,
lobes dentate; petals not ciliate at margin 23. *R. latifolium*
- 28b. Branchlets and petioles glabrous or subglabrous; calyx glabrous, lobes not dentate;
petals
ciliate at margin or apex.
- 29a. Leaf blade stalked glandular; calyx tube campanulate; stamens inserted level with
petals 24. *R. himalense*
- 29b. Leaf blade not stalked glandular; calyx tube shortly cylindric-campanulate; stamens
inserted below petals 25. *R. meyeri*
- 1b. Flowers unisexual (shrubs dioecious); bracts narrow, ligulate, oblong, elliptic, lanceolate, or linear.
- 30a. Inflorescences ± subsessile, 2–9-flowered umbels, or flowers few and fascicled, rarely solitary;
shrubs
deciduous 30. *R. fasciculatum*
- 30b. Inflorescences racemes; shrubs deciduous or evergreen, rarely semievergreen.
- 31a. Shrubs evergreen, rarely semievergreen; branchlets unarmed; leaf blade margin entire.
- 32a. Fruit glabrous; leaf blade glabrous.
- 33a. Leaf blade obovate-elliptic or broadly elliptic, petiole 0.5–1.5 cm, stalked glandular; calyx
green-white
or yellow-green 34. *R. davidii*

- 33b. Leaf blade suborbicular or reniform-orbicular, petiole 1–4 cm, eglandular; calyx purplish or greenish purple 33. *R. hunanense*
- 32b. Fruit usually pubescent or stalked glandular; leaf blade glabrous or stalked glandular.
- 34a. Fruit stalked glandular 32. *R. henryi*
- 34b. Fruit pubescent.
- 35a. Leaf blade narrowly elliptic or sublanceolate, rarely broadly elliptic, abaxially glandular bristly along midvein and at margin, petiole 0.3–0.8 cm, glandular bristly; calyx purple-green, glabrous; fruit green 31. *R. tianquanense*
- 35b. Leaf blade ovate, ovate-oblong, or elliptic, glabrous, petiole 0.7–1.8 cm, glabrous; calyx yellowish green, pubescent or glabrous; fruit purple 35. *R. laurifolium*
- 31b. Shrubs deciduous; branchlets unarmed or with 2 small prickles at nodes; leaf blade margin lobed.
- 36a. Branchlets with 2 small prickles at nodes, sparsely minutely spiny or unarmed at internodes; staminate racemes (2–)3–7 cm, 7–20-flowered.
- 37a. Racemes glabrous 40. *R. diacanthum*
- 37b. Racemes pubescent.
- 38a. Fruit stalked glandular 36. *R. giraldii*
- 38b. Fruit glabrous.
- 39a. Leaf blade glabrous 39. *R. glabrifolium*
- 39b. Leaf blade pubescent on both surfaces or at margin.
- 40a. Leaf blade obovate, pubescent only at margin or sometimes abaxially puberulent, base truncate, petiole glabrous 38. *R. saxatile*
- 40b. Leaf blade broadly ovate, pubescent on both surfaces, base subtruncate or shallowly cordate, petiole pubescent 37. *R. pulchellum*
- 36b. Branchlets unarmed; staminate racemes (1–)5–15 cm, (4–)10–30-flowered.
- 41a. Terminal leaf lobe subequaling lateral ones, apex obtuse, rarely acute.
- 42a. Fruit glabrous 41. *R. heterotrichum*
- 42b. Fruit pubescent and stalked glandular.
- 43a. Leaf blade suborbicular or reniform-orbicular, pubescent, both viscous glandular and shortly stalked glandular, lobes coarsely obtusely serrate at margin, obtuse at apex; calyx pubescent and shortly stalked glandular 43. *R. orientale*
- 43b. Leaf blade broadly ovate, glabrous, either viscous glandular or shortly stalked glandular (not both), lobes sharply serrate at margin, acute at apex; calyx glabrous, rarely puberulent 44. *R. xizangense*
- 41b. Terminal leaf lobe longer than, rarely equaling, lateral ones, apex acute, acuminate, or caudate.
- 44a. Leaf blade 1–2 cm, terminal lobe slightly longer than lateral ones, apex acute; calyx lobes spreading or reflexed.
- 45a. Calyx pubescent; fruit black or red-black 45. *R. pseudofasciculatum*
- 45b. Calyx glabrous; fruit red.
- 46a. Calyx purple; leaf blade and inflorescences glabrous 46. *R. humile*
- 46b. Calyx green or yellow-green; leaf blade and inflorescences minutely pubescent and shortly stalked glandular 47. *R. glabricalycinum*
- 44b. Leaf blade 2–10 cm, terminal lobe usually much longer than lateral ones, apex acuminate or shortly so to caudate, rarely acute; calyx lobes erect, sometimes reflexed.
- 47a. Calyx pubescent.
- 48a. Fruit black.
- 49a. Calyx green or slightly stained red-brown, tube cupular, lobes always reflexed; fruit sparsely stalked glandular 48. *R. vilmorinii*
- 49b. Calyx scarlet or purple, tube saucer-shaped, rarely shallowly cupular, lobes erect; fruit glabrous 49. *R. rubrisepalum*
- 48b. Fruit red or red-brown.
- 50a. Fruit pubescent and stalked glandular.

- 51a. Leaf blade 2.5–5 cm, coarsely sharply incised serrate or doubly serrate; male racemes lax, 6–7 cm, 10–15-flowered; calyx red; fruit 4–6 mm in diam. 50. *R. franchetii*
- 51b. Leaf blade 6–10 cm, coarsely obtusely serrate or doubly serrate; male racemes dense, 7–15 cm, 15–30-flowered or more; calyx yellow-green, slightly tinged red; fruit 7–10 mm in diam. 51. *R. maximowiczii*
- 50b. Fruit glabrous and only sparsely stalked glandular.
- 52a. Leaf blade 5–9 cm, glabrous or sparsely stalked glandular, margin deeply incised, terminal lobe longer than lateral ones, apex acuminate; calyx red-brown, lobes erect, 3-veined 52. *R. takare*
- 52b. Leaf blade 2–5 cm, pubescent and stalked glandular, margin lobed or subentire, terminal lobe subequaling lateral ones, apex obtuse or acute; calyx green or slightly suffused reddish brown, lobes reflexed or spreading, obscurely 5-veined 42. *R. kialanum*
- 47b. Calyx glabrous.
- 53a. Inflorescences glabrous.
- 54a. Leaf blade glabrous, rarely sparsely stalked glandular, terminal lobe acute at apex; calyx green 53. *R. komarovii*
- 54b. Leaf blade coarsely appressed pubescent, terminal lobe acuminate at apex; calyx yellow-brown 54. *R. maximowiczianum*
- 53b. Inflorescences pubescent and stalked glandular.
- 55a. Fruit black 55. *R. luridum*
- 55b. Fruit red.
- 56a. Leaf blade rounded to subtruncate at base; calyx tube shallowly cupular 57. *R. glaciale*
- 56b. Leaf blade truncate to cordate at base; calyx tube saucer-shaped.
- 57a. Calyx green or yellow-green; leaf margin coarsely and sharply simply serrate or rarely also with double teeth 58. *R. viridiflorum*
- 57b. Calyx red-brown or purple-brown; leaf margin incised doubly serrate or also with coarse, simple teeth.
- 58a. Branchlets and petioles pubescent and stalked glandular; leaf blade broadly ovate to suborbicular, terminal lobe slightly longer than lateral ones, apex acute to shortly acuminate; calyx lobes lanceolate or narrowly oblong 59. *R. laciniatum*
- 58b. Branchlets and petioles not pubescent or only sparsely stalked glandular; leaf blade oblong-ovate, rarely suborbicular, terminal lobe 2–3 × as long as lateral ones, apex acuminate to caudate; calyx lobes ovate or ligulate 56. *R. tenue*

1. *Ribes horridum* Ruprecht ex Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9: 117. 1859.

密刺茶藨子 mi ci cha biao zi

Ribes lacustre (Persoon) Poiret var. *horridum* (Ruprecht ex Maximowicz) Janczewski.

Shrubs 0.8–1.5 m tall. Branchlets laxly spreading; nodal spines numerous, verticillate, robust, needlelike, to 1 cm; internodes with dense, brownish yellow, needlelike spines. Buds ovoid, apex obtuse; scales papery. Petiole 1–4(–5) cm, spiny-bristly and sparsely pubescent; leaf blade broadly ovate to suborbicular, 2–4 cm, glabrous, sparsely spiny, base cordate; lobes (3–)5(–7), margin coarsely serrate or doubly serrate, apex obtuse or acute; terminal lobe rhombic, slightly longer than lateral ones. Racemes nodding, 2–9 cm, 4–20-flowered; rachis and pedicels pubescent and glandular hairy; bracts broadly lanceolate to ligulate, 2–3 mm, 1-veined, margin ciliate. Flowers bisexual; pedicel 5–7 mm. Calyx glabrous; tube greenish brown or purplish brown, pelviform, 2–3 mm; lobes spreading, rarely reflexed, flabellate to

suborbicular. Petals greenish white to yellowish green, flabellate, ca. 2 mm. Ovary pyriform, glandular hairy. Style equaling or longer than stamens, glabrous, 2-cleft. Fruit black, globose, 0.8–1.2 cm, stalked glandular. Fl. May–Jun, fr. Jul–Aug.

Coniferous forests, forest margins; 1500–2100 m. S Jilin (Changbai Shan) [Japan, Korea, Russia].

2. *Ribes reclinatum* Linnaeus, Sp. Pl. 1: 201. 1753.

欧洲醋栗 ou zhou cu li

Grossularia reclinata (Linnaeus) Miller; *G. vulgaris* Spach; *Ribes grossularia* Linnaeus.

Shrubs 1–1.5 m tall. Branchlets pubescent when young; nodal spines 1–3, robust; internodes with sparse, needlelike spines, rarely unarmed. Buds oblong-ovoid to ovoid-lanceolate, 4–5 mm, apex acute to shortly acuminate; scales scarios. Petiole 1–2 cm, pubescent, plumose hairy near base; leaf blade orbicular to subreniform, 2–4(–6) cm, subleathery, pubescent, base truncate or shallowly cordate; lobes 3–5, margin coarsely obtusely dentate, apex obtuse. Flowers axillary,

solitary or 2 or 3 in short racemes, bisexual; bracts ovate to orbicular, 1.5–2 mm, 3-veined, pubescent; pedicel 5–7 mm, pubescent or shortly stalked glandular. Calyx greenish white tinged red, rarely reddish, pubescent; tube shortly campanulate, 3–5 mm, villous adaxially; lobes reflexed at anthesis, oblong to ligulate, rarely obovate-oblong, 5–7 mm. Petals greenish white, rarely red, subflabellate to broadly obovate, 1.5–2.5 mm, pubescent. Stamens erect, 3–5 mm; filaments usually white; anthers ovoid. Ovary and fruit pubescent and glandular hairy, rarely glandular hairy only. Style clavate, villous, 2-lobed. Fruit yellowish green or red, globose, to 1.4 cm. Fl. May–Jun, fr. Jul–Aug.

Widely naturalized in forests and thickets; medium altitudes. Hebei, Heilongjiang, Jilin, Liaoning, Shandong, Xinjiang, probably elsewhere [native to Europe].

3. *Ribes stenocarpum* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 27: 475. 1881.

长果茶藨子 *chang guo cha biao zi*

Grossularia stenocarpa (Maximowicz) Berger. Shrubs 1–2(–3) m tall. Branchlets pubescent when young, gradually glabrescent; nodal spines 1–3, robust, 0.8–2 cm; internodes sparsely minutely prickly or unarmed. Buds ovoid; scales scarious. Petiole (1–)2–3 cm, pubescent and sparsely glandular hairy; leaf blade broadly ovate to suborbicular, 2–3 × 2.5–4 cm, pubescent, gradually glabrescent, sometimes sparsely shortly stalked glandular along veins, base truncate to subcordate; lobes 3–5, margin coarsely obtusely dentate, apex obtuse. Flowers axillary, solitary or 2 or 3 in short racemes, bisexual; bracts paired, broadly ovate, 2–3 mm, 3-veined, margin sparsely glandular hairy; pedicel 3–5 mm, sparsely glandular hairy. Calyx green to greenish brown, glabrous; tube campanulate, 4–6 mm, glabrous adaxially; lobes spreading or reflexed at anthesis, usually erect in fruit, ligulate to oblong, 5–7 mm. Petals white, oblong to ligulate, 4–6 mm. Stamens equaling or slightly longer than petals; filaments white; anthers ovoid to ovoid-oblong. Ovary oblong, glabrous. Style longer than stamens, divided for almost 1/2 its length. Fruit red, or green tinged red, oblong, 2–2.5 × ca. 1 cm, glabrous. Fl. May–Jun, fr. Jul–Aug.

• Coniferous or mixed forests, thickets on mountain slopes, ravines; 2300–3300 m. Gansu, E and S Qinghai, Shaanxi, NW Sichuan.

4. *Ribes aciculare* Smith in Rees, Cycl. 30: 372. 1819.

阿尔泰醋栗 *a er tai cu li*

Grossularia acicularis (Smith) Spach.

Shrubs to 1 m tall or slightly more. Branchlets glabrous; nodal spines 3–7, verticillate, needlelike, to 1 cm; internodes spiny. Buds oblong, 4–6 mm, apex acute; scales scarious. Petiole to 3 cm, glabrous to sparsely puberulent; leaf blade broadly ovate to suborbicular, 1.5–3 × 3–5 cm, mostly glabrous, abaxial vein-axils sparsely puberulent, base truncate to cordate; lobes 3–5, margin coarsely acutely serrate, apex obtuse or acute; terminal lobe subequaling lateral ones. Flowers solitary or 2 or 3 in short racemes, bisexual; rachis 1–1.2 cm;

bracts ovate to narrowly so, 2–3.5 mm, 3-veined, usually glabrous; pedicel 3–6 mm, glabrous or sparsely stalked glandular. Calyx greenish white tinged yellow or pink; tube broadly campanulate, 4–6 mm, glabrous on both surfaces; lobes reflexed, spreading or erect in fruit, oblong to spatulate, 5–6 mm. Petals white, obovate, 2–3.5 mm. Stamens slightly longer than petals; filaments white; anthers ovoid-ellipsoid. Ovary glabrous, rarely sparsely stalked glandular. Style glabrous, divided for ca. 1/2 its length. Fruit red, globose, 1.2–1.5 cm, glabrous or sparsely stalked glandular. Fl. May–Jun, fr. Jul–Aug.

Forest margins, thickets, rocky slopes; 1500–2100 m. N Xinjiang (Altay Shan) [Mongolia, Russia].

5. *Ribes fuyunense* T. C. Ku & Konta, Guihaia 9: 287. 1989.

富蕴茶藨子 *fu yun cha biao zi*

Shrubs 1–2 m tall. Branchlets pubescent; nodal spines 3–7, verticillate, needlelike, to 1 cm; internodes minutely sparsely prickly. Buds yellowish brown, oblong to ovoid, 4–6 × 2–3 mm, pubescent, apex obtuse or acute. Petiole 1.5–3 cm, minutely pubescent, sparsely stalked glandular near base; leaf blade broadly ovate to suborbicular, 1.5–2.5 cm, sparsely pubescent, usually also with small glands, base rounded to subcordate; lobes 3–5, margin coarsely serrate, apex obtuse or acute; terminal lobe subequaling or slightly longer than lateral ones. Flowers solitary or 2 or 3 in short racemes, bisexual; bracts ovate to suborbicular, 1.5–2.5 mm, pubescent, margin shortly stalked glandular; pedicel 2–4 mm, minutely pubescent and sparsely stalked glandular. Calyx pubescent then glabrescent; tube campanulate, 4–6 mm, glabrous adaxially; lobes reflexed, oblong to ligulate, 5–7 mm. Petals obovate-oblong to ligulate, 1.5–2.5 mm. Stamens longer than petals. Ovary glabrous. Style slightly shorter than or subequaling stamens, apex entire or stigma 2-lobed. Fruit purple-black, globose, 0.8–1 cm, glabrous. Fl. May–Jun, fr. Jul–Aug.

• Moist mountain slopes, dry foothills, rock crevices; 900–1900 m. N Xinjiang.

6. *Ribes formosanum* Hayata, Bot. Mag. (Tokyo) 20: 56. 1906.

台湾茶藨子 *tai wan cha biao zi*

Shrubs to 2 m tall. Branchlets stout, glabrous to sparsely pubescent; nodal spines 3, robust, to 1.3 cm; internodes unarmed. Buds ovoid, 2–4 mm, apex acute; scales scarious. Leaves 1–3-clustered at branchlet apex; petiole 1–2 cm, minutely pubescent; leaf blade suborbicular, 1.5–2 cm, sparsely puberulent, base truncate to shallowly cordate; lobes 3–5, reaching about halfway to leaf blade base, margin coarsely obtusely dentate, apex obtuse; terminal lobe slightly longer than lateral ones. Flowers often 1 per leaf axil, bisexual; bracts 2 per node, ovate, 2–4 mm, 3-veined, margin stalked glandular; pedicel 1–1.5 cm, sparsely pubescent

or stalked glandular. Calyx minutely pubescent; tube cylindric, 7–10 mm, glabrous adaxially; lobes reflexed, spreading in fruit, oblong to elliptic, 7–9 mm. Petals scalelike, 4–5 mm. Stamens slightly longer than petals. Ovary subglobose, glabrous. Style glabrous, apex 2-lobed. Fruit red, globose, 0.8–1 cm, glabrous. Fl. May–Jun, fr. Jul–Aug.

- Coniferous or mixed forests; 2500–3800 m. Taiwan.

7. *Ribes burejense* Fr. Schmidt, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 12(2): 42. 1868.

刺果茶藨子 *ci guo cha biao zi*

Shrubs 1–1.5(–2) m tall. Branchlets pubescent when young, becoming glossy; nodal spines 3–7, stout, to 1 cm; internodes with dense, needlelike spines. Buds oblong, apex acute; scales scarious. Petiole 1.5–3 cm, pubescent and sparsely glandular hairy; leaf blade broadly ovate, 1.5–4 × 1.5–5 cm, pubescent when young, gradually glabrescent, abaxial veins sparsely glandular hairy, base truncate to cordate; lobes 3–5, margin coarsely obtusely dentate, apex obtuse to acute. Flowers axillary, solitary or 2 or 3 in short racemes, bisexual; bracts broadly ovate, 3–4 mm, pubescent, 3-veined; pedicel 5–10 mm, subglabrous, sometimes glandular hairy. Calyx brown to reddish brown, subglabrous; tube broadly campanulate, 3–4 mm; lobes spreading or reflexed, erect in fruit, oblong to spatulate, 6–7 mm. Petals white to pinkish, oblong to spatulate, 4–5 mm. Stamens subequalling petals; anthers ovoid-ellipsoid, without nectary at apex. Ovary glabrous, but with minute, yellowish brown spines. Style subequalling stamens, apex 2-lobed. Fruit reddish black when mature, globose, ca. 1 cm, glabrous, rarely villous, with numerous minute, yellowish brown spines. Fl. May–Jun, fr. Jul–Aug.

Coniferous, broad-leaved, and mixed forests, open woods, forest margins, thickets and stream banks in mountain regions; 900–2300 m. Gansu, Hebei, Heilongjiang, W Henan, E and S Jilin, E Liaoning, S Nei Mongol, SE Shaanxi, Shanxi [N Korea, Mongolia, Russia].

- 1a. Fruit not villous, but with numerous minute, yellowish brown spines 7a. var. *burejense*
1b. Fruit villous and with numerous minute, yellowish brown spines .. 7b. var. *villosum*

7a. *Ribes burejense* var. *burejense*

刺果茶藨子(原变种) *ci guo cha biao zi* (yuan bian zhong)

Grossularia burejensis (Fr. Schmidt) Berger; *Ribes grossularioides* Hemsley; *R. macrocalyx* Hance.

Fruit not villous, but with numerous minute, yellowish brown spines.

Coniferous, broad-leaved, and mixed forests, forest margins, thickets and stream banks in mountain regions; 900–2300 m. Gansu, Hebei, Heilongjiang, W Henan, E Jilin, E Liaoning, S Nei Mongol, SE Shaanxi, Shanxi [N Korea, Mongolia, Russia].

7b. *Ribes burejense* var. *villosum* L. T. Lu, in Acta Phytotax. Sin. 31: 452. 1993.

长毛茶藨子 *chang mao cha biao zi*

Fruit villous and with numerous minute, yellowish brown spines.

- Shady broad-leaved forests, open woods; 900–1000 m. S Jilin (Changbai Shan).

8. *Ribes alpestre* Wallich ex Decaisne in Jacquemont, Voy. Inde 4(Bot.): 64. 1844.

长刺茶藨子 *chang ci cha biao zi*

Shrubs 1–3 m tall. Branchlets puberulent when young; nodal spines 3, verticillate, stout, 1–3 cm; internodes sparsely and minutely prickly or stalked glandular. Buds ovoid; scales scarious. Petiole 2–3.5 cm, puberulent or sparsely glandular hairy; leaf blade broadly ovate, 1.5–3 × 2–4 cm, puberulent, more densely so along veins, glabrescent, base subtruncate to cordate; lobes 3–5, margin coarsely obtusely serrate or doubly serrate, apex obtuse; terminal lobe subequalling or slightly longer than lateral ones. Flowers axillary, solitary or 2 or 3 in short racemes, bisexual; bracts paired, broadly ovate to ovate-triangular, 2–3 mm, 3-veined; pedicel 5–8 mm, glabrous or sparsely glandular hairy. Calyx greenish or reddish brown, pubescent and sparsely stalked glandular, rarely glabrous; tube campanulate, 5–6 mm, glabrous adaxially; lobes reflexed, erect in fruit, oblong to ligulate, 5–7 mm. Petals white, elliptic to oblong, rarely obovate, 2.5–3.5 mm. Stamens ca. 4–5 mm; anthers exerted, ovoid, apex with cupular nectary. Ovary glabrous, rarely pubescent, usually stalked glandular. Style clavate, divided for almost 1/2 its length. Fruit purple, globose to ellipsoid, 1.2–1.5 × 1–1.2 cm, usually stalked glandular. Fl. Apr–Jun, fr. Jun–Sep.

Broad-leaved or coniferous forests, undergrowth of sparse forests on sunny slopes, forest margins, foothills, grasslands in ravines, river banks; 1000–3900 m. Gansu, SE Ningxia, Qinghai, Shaanxi, Shanxi, W Sichuan, SE Xizang, W Yunnan [Afghanistan, Bhutan, Kashmir]. The fruit can be made into soft drinks and wine or eaten raw.

- 1a. Spines stout, to 3 cm; calyx glabrous or subglabrous 8c. var. *giganteum*
1b. Spines 1–2 cm; calyx pubescent.
2a. Ovary and fruit stalked glandular 8a. var. *alpestre*
2b. Ovary and fruit not stalked glandular; ovary pubescent; mature fruit glabrous 8b. var. *eglandulosum*

8a. *Ribes alpestre* var. *alpestre*

长刺茶藨子(原变种) *chang ci cha biao zi* (yuan bian zhong)

Spines 1–2 cm. Calyx pubescent. Ovary and fruit stalked glandular.

Undergrowth of sparse forests on sunny slopes, forest margins, grasslands in ravines, river banks; 1000–3900 m. Gansu, Qinghai, Shaanxi, Shanxi, W Sichuan, SE Xizang, W Yunnan [Afghanistan, Bhutan, Kashmir].

8b. *Ribes alpestre* var. *eglandulosum* L. T. Lu, Acta Phytotax. Sin. 31: 451. 1993.

无腺茶藨子 *wu xian cha biao zi*

Spines 1–2 cm. Calyx pubescent. Ovary and fruit not stalked glandular. Ovary pubescent. Mature fruit glabrous.

• Forests, forest margins, foothills, river banks; 2400–3500 m. W Sichuan, SE Xizang.

8c. *Ribes alpestre* var. ***giganteum*** Janczewski, Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1910: 72. 1910.

大刺茶鉿子 da ci cha biao zi

Spines stout, to 3 cm. Calyx glabrous or subglabrous. Ovary and fruit glabrous, not stalked glandular.

• Broad-leaved or coniferous forests and forest margins on shady slopes; 2500–3700 m. E Gansu, SE Ningxia, E Qinghai, E Shanxi, W Sichuan.

9. *Ribes ambiguum* Maximowicz, Bull. Acad. Imp. Sci. Saint-Pétersbourg, Sér. 3, 19: 251. 1874.

四川蔓茶鉿子 si chuan man cha biao zi

Shrubs often epiphytic, to 1 m tall. Branchlets brown to grayish brown, glabrous, unarmed. Buds brown, ovoid, small, glabrous when old. Petiole to 4 cm, pubescent, rarely sparsely glandular hairy near base; leaf blade suborbicular to orbicular, 3–4.5 cm, pubescent on both surfaces, rarely subglabrous, abaxially viscous glandular, base cordate; lobes 3–5, broadly ovate to triangular-ovate, margin obtusely crenate-dentate, apex obtuse; terminal lobe subequaling lateral ones. Flowers 1 or 2, bisexual, 10–12 mm in diam.; bracts 2, to 2 mm, glabrous or sparsely stalked glandular at margin; pedicel to 1 cm, to 2 cm in fruit, pubescent or subglabrous. Calyx green, glabrous; tube pelviform, 1–2 mm; lobes always erect, ligulate to elliptic, 5–7 mm. Petals subspatulate, 2.5–3.5 mm. Stamens longer than petals; anthers globose. Ovary subobovoid, glabrous, long stalked glandular. Style subequaling stamens, entire. Fruit green, subglobose, 1–1.2 cm, long stalked glandular. Seeds numerous, brown, ovoid, small. Fl. Apr–May, fr. Jul–Aug.

E Sichuan [Japan].

10. *Ribes procumbens* Pallas, Fl. Ross. 1(2): 35. 1789.

水葡萄茶鉿子 shui pu tao cha biao zi

Shrubs prostrate, spreading, rooting, 0.2–0.4 m tall. Branchlets yellowish brown or brownish when young, later grayish brown, glabrous, sparsely yellow glandular, unarmed. Buds brown, oblong-ovoid to ellipsoid, 4–7 mm, apex obtuse or acute; scales pubescent at margin. Petiole 2–4 cm, glabrous or sparsely pubescent when young, yellow glandular or with some glandular hairs; leaf blade orbicular-reniform, 2.5–6 × 5–8 cm, glabrous on both surfaces or abaxially sparsely fragrant yellow glandular, rarely puberulent along veins, base truncate to shallowly cordate; lobes 3–5, ovate, margin deeply obtusely dentate, apex obtuse; terminal lobe subequaling lateral ones. Racemes 2–4 mm, 6–12-

flowered; rachis and pedicels glabrous; bracts broadly triangular-ovate, 0.7–1.5 mm, sometimes absent.

Flowers bisexual; pedicel 2–6 mm. Calyx pubescent and sparsely glandular; tube greenish, pelviform, 1–1.5 mm; lobes reflexed, purple, ovate to ovate-elliptic, 2–3.5 mm, 3-veined. Petals subflabellate to obovate, 1–1.5 mm. Stamens subequaling petals; anthers subglobose. Ovary glabrous or sparsely yellow glandular. Style entire or stigma 2-lobed. Fruit purple-brown, ovoid-globose, 1–1.3 cm in diam., glabrous, sparsely yellow glandular. Fl. May–Jun, fr. Jul–Aug.

Coniferous or mixed forests, river banks; low altitudes. N Heilongjiang, NE Nei Mongol [Japan, N Korea, N Mongolia, Russia].

11. *Ribes triste* Pallas, Nova Acta Acad. Sci. Imp. Petrop. Hist. Acad. 10: 378. 1797.

矮茶鉿子 ai cha biao zi

Shrubs low, almost creeping, to 0.4 m tall, rarely erect to 0.8 m tall. Branchlets spreading, glabrous or puberulent when young, unarmed. Buds brown, ovoid, 4–6 mm, sparsely pubescent, apex acute. Petiole (1.5–)3–6 cm, puberulent, scattered stalked glandular; leaf blade reniform to orbicular-reniform, 3–6 × 4–7(–8) cm, glabrous or pubescent along veins abaxially, base shallowly cordate or subtruncate; lobes 3(–5), broadly triangular, margin coarsely sharply serrate, apex obtuse; terminal lobe slightly longer than lateral ones. Racemes pendent, lax, 2–4 cm, (3–)5–7-flowered; rachis and pedicels pubescent and sparsely glandular hairy; bracts ovate-orbicular, rarely oblong, 1.5–2 mm. Flowers bisexual; pedicel 2.5–4 mm. Calyx purple, glabrous; tube shallowly cupular to subpelviform; lobes erect, purple or red tinged yellowish green, spatulate-orbicular, 1.5–2.5 mm. Petals red or purple, subflabellate to obovate or square, sometimes subcuneate, 0.7–1.3 mm. Stamens subequaling petals. Ovary glabrous. Style stout, subequaling stamens, deeply divided for ca. 1/2 its length or more. Fruit red, ovoid, 0.7–1 cm in diam., glabrous. Fl. May–Jun, fr. Jun–Aug.

Coniferous or mixed forests, forest margins, mossy rocky slopes; 1000–1500 m. Heilongjiang, E Jilin, SE Liaoning, E Nei Mongol [Japan, Korea, Russia; North America].

1a. Leaf blade thin, to 6 cm; petiole 3–6 cm 11a. var. *triste*

1b. Leaf blade thick, 3–4.5 cm; petiole 1.5–2.5 cm 11b. var. *repens*

11a. *Ribes triste* var. ***triste***

矮茶鉿子(原变种) ai cha biao zi (yuan bian zhong)

Coreosma tristis (Pallas) Lunell; *Ribes albinervium* Michaux; *R. melancholicum* Sievers ex Pallas; *R. propinquum* Turczaninow.

Leaf blade thin, to 6 cm; petiole 3–6 cm.

Coniferous or mixed forests; 1000–1500 m. N Heilongjiang, E Jilin, SE Liaoning, E Nei Mongol [Japan, Korea, Russia; North America].

11b. *Ribes triste* var. *repens* (A. I. Baranov) L. T. Lu in L. T. Lu & S. M. Hwang, Fl. Reipubl. Popularis Sin. 35(1): 320. 1995.

伏生茶藨子 fu sheng cha biao zi

Ribes repens A. I. Baranov, Acta Soc. Harb. Invest. Nat. & Ethnogr. 12: 31. 1954.

Leaf blade thick, 3–4.5 cm; petiole 1.5–2.5 cm.

• Coniferous forests, forest margins, mossy rocky slopes; 1000–1300 m. S Heilongjiang, NE Jilin, NE Nei Mongol.

12. *Ribes palczewskii* (Janczewski) Pojarkova, Trudy Prikl. Bot. 22(3): 341. 1929.

英吉利茶藨子 ying ji li cha biao zi

Ribes rubrum Linnaeus var. *palczewskii* Janczewski, Mém. Soc. Phys. Hist. Nat. Genève 35. 3: 290. 1907; *R. densiflorum* Liou (1955), not Philippi (1856); *R. liouanum* Kitagawa; *R. pubescens* Komarov (1903), not (Swartz ex Hartman) Hedlund (1901).

Shrubs 0.5–1 m tall. Branchlets puberulent then glabrous, unarmed. Buds grayish brown, ovoid, 4–6 mm, pubescent, apex acute. Petiole 2–5 cm, sparsely shortly stalked glandular and sparsely long stalked glandular near base; leaf blade reniform-orbicular, rarely suborbicular, 3.5–6 × 4–7 cm, abaxially sparsely pubescent, adaxially glabrous, base shallowly cordate to subtruncate; lobes 3–5, broadly triangular to ovate-triangular, margin coarsely sharply serrate, apex obtuse to acute; terminal lobe subequaling or slightly longer than lateral ones. Racemes erect, dense, 2–5 cm, 5–15-flowered; rachis and pedicels pubescent, glabrous in fruit; bracts broadly ovate to ovate-orbicular, 1.5–2 mm. Flowers bisexual, 3–3.5 mm in diam.; pedicel 1–3 mm. Calyx yellowish white, glabrous; tube shallowly cupular, 1.5–2 mm; lobes erect, obovate to obovate-ligulate, 1.5–2.5 mm. Petals yellowish, subtruncate, ca. 1.2 mm. Stamens subequaling petals. Ovary glabrous. Style subequaling stamens, 2-lobed. Fruit red, subglobose, 0.7–0.9 cm, glabrous. Fl. May–Jun, fr. Jul–Aug.

Coniferous and mixed forests, *Larix* forests on mountain slopes, thickets along river and stream banks; 600–1500 m. Heilongjiang, Nei Mongol [Russia].

13. *Ribes fargesii* Franchet, Bull. Soc. Linn. Paris, n.s., 1: 86. 1898.

花茶藨子 hua cha biao zi

Shrubs to 2 m tall. Branchlets short, stout, glabrous, unarmed. Buds brown, oblong-ovoid to ovoid, 3–6 mm, glabrous, apex acute. Petiole 0.7–1.5 cm, usually red glandular hairy near base; leaf blade suborbicular to subovate, 3–4.5(–6) cm, glabrous, base rounded to subtruncate; lobes 3, shallow, margin coarsely serrate; terminal lobe triangular to ovate-triangular, 3–5 × as long as lateral ones, apex obtuse or acute; lateral lobes

4–6 mm, apex obtuse. Racemes short, 2–3-flowered; rachis and pedicels glabrous; bracts linear to lanceolate, glabrous, caducous. Flowers bisexual, 4–5 mm in diam.; pedicel short, 3–5 mm in fruit. Calyx green, sometimes tinged red, glabrous; tube pelviform, 1–1.5 mm; lobes erect, ligulate; 2.5–4 mm. Petals poorly developed or nearly absent, obtriangular. Stamens inserted below petals; anthers globose, apex with nectary. Ovary glabrous. Style short, 2-lobed. Fruit subglobose to broadly ellipsoid, 0.6–0.7 cm in diam. Seeds more than 20, oblong. Fl. Apr–May, fr. Jun–Jul.

• About 1800 m. E Sichuan.

14. *Ribes odoratum* Wendland in Bartling & Wendland, Beitr. Bot. 2: 15. 1825.

香茶藨子 xiang cha biao zi

Chrysobotrya odorata (Wendland) Rydberg; *Coreosma longifolia* Lunell; *C. odorata* (Wendland) Nieuwland; *Ribes fragrans* Loddiges (1830), not Pallas (1797).

Shrubs 1–2 m tall. Branchlets pubescent when young, glabrescent, unarmed. Buds brown to purplish brown, ovoid to narrowly so, 5–7 × 3–4 mm, pubescent, apex obtuse or acute. Petiole (0.5–)1–2 cm, pubescent; leaf blade obovate to orbicular-reniform, 2–5 cm, pubescent and glandular, later glabrescent, base cuneate, rarely subrounded or truncate; lobes 3–5, margin coarsely obtusely dentate, apex obtuse; terminal lobe equaling or slightly longer than lateral ones. Racemes often nodding, 2–5 cm, 5–10-flowered; rachis and pedicels pubescent; bracts ovate-lanceolate to elliptic-lanceolate, 5–7 mm, pubescent. Flowers bisexual, fragrant. Calyx yellow, glabrous; tube sometimes slightly greenish, cylindric, 12–15 × 1.5–2.5 mm; lobes spreading or reflexed, oblong to spatulate, 5–7 mm. Petals pinkish, subspatulate to broadly obovate, 2.5–3.5 mm, glabrous. Stamens shorter than or equaling petals; anthers oblong. Ovary glabrous. Style 11–14 mm, entire or green stigma 2-lobed. Fruit black, globose to broadly ellipsoid, 0.8–1 cm, glabrous. Fl. May, fr. Jul–Aug. Cultivated as an ornamental. Heilongjiang, Liaoning, probably elsewhere in NE China [native to North America].

15. *Ribes nigrum* Linnaeus, Sp. Pl. 1: 201. 1753.

黑茶藨子 hei cha biao zi

Botrycarpum nigrum (Linnaeus) A. Richard; *Grossularia nigra* (Linnaeus) Ruprecht; *Ribes cyathiforme* Pojarkova; *R. pauciflorum* Turczaninow ex Ledebour.

Shrubs 1–2 m tall. Branchlets pubescent when young, glabrescent. Buds brown or yellowish brown, oblong-ovoid to ellipsoid, (3–)4–7 mm, pubescent, apex acute. Petiole 1–4 cm, pubescent, rarely sparsely glandular, sometimes plumose hairy near base; leaf blade suborbicular, 4–9 × 4.5–11 cm, abaxially pubescent and yellow glandular, adaxially puberulent when young, glabrescent, base cordate; lobes 3–5, broadly triangular,

margin irregularly coarsely sharply serrate, apex acute; terminal lobe somewhat longer than lateral ones. Racemes arching or nodding, 3–5(–8) cm, 4–12-flowered; rachis and pedicels pubescent, often sparsely yellow glandular; bracts lanceolate or ovate, 1–2 mm, pubescent. Flowers bisexual, 5–7 mm in diam.; pedicel 2–5 mm. Calyx yellowish green to pinkish, pubescent and yellow glandular; tube subcampanulate, 1.5–2.5 mm; lobes spreading or reflexed, ligulate, 3–4 mm. Petals ovate to ovate-elliptic, 2–3 mm. Stamens subequaling petals; anthers ovoid, apex with nectary. Ovary sparsely pubescent and glandular. Style not equaling stamens, 2-lobed, rarely subentire. Fruit black, subglobose, 0.8–1(–1.4) cm, sparsely glandular. Fl. May–Jun, fr. Jul–Aug.

Naturalized in coniferous or mixed forests on slopes, moist valleys, ditch banks. Heilongjiang, NE Nei Mongol, N Xinjiang [native to Europe].

16. *Ribes americanum* Miller, Gard. Dict., ed. 8, *Ribes* no. 4. 1768.

美洲茶鉿子 mei zhou cha biao zi

Coreosma americana (Miller) Nieuwland; *C. florida* (L'Héritier) Spach; *Ribes floridum* L'Héritier; *R. recurvatum* Michaux.

Shrubs 1–2 m tall. Branchlets slender, pubescent, yellow glandular, unarmed. Buds brown, ovoid, 2.5–5 mm, pubescent and glandular, apex obtuse. Petiole 2–5 cm, pubescent and sparsely yellow glandular, sometimes plumose hairy near base; leaf blade broadly ovate to suborbicular, 2.5–6 × 3–7(–8) cm, abaxially pubescent along veins, adaxially glabrous, yellow glandular on both surfaces, base cordate or subtruncate; lobes 3–5, ovate to triangular-ovate, margin deeply serrate or doubly serrate, apex acute; terminal lobe slightly longer than lateral ones. Racemes pendulous, (4–)5–8 cm, 8–20-flowered or more; rachis and pedicels pubescent; bracts lanceolate to linear, 6–10 mm, pubescent, rarely sparsely glandular. Flowers bisexual; pedicel 2–4 mm. Calyx yellowish white, pubescent; tube campanulate to shortly cylindric, 3–5 mm; lobes spreading then reflexed, oblong to ligulate, 3.5–6 mm. Petals yellowish white, ligulate, 2.5–4.5 mm. Stamens subequaling petals; anthers oblong, apex with nectary. Ovary glabrous. Style equaling or slightly longer than stamens, entire or stigma 2-lobed. Fruit black, subglobose, 0.8–1 cm, glabrous. Fl. May, fr. Jun–Jul.

Forests along river banks in mountain regions, grasslands. N China (precise distribution unknown) [native to North America].

17. *Ribes griffithii* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 88. 1858.

曲萼茶鉿子 qu e cha biao zi

Shrubs 2–3 m tall. Branchlets stout, glabrous, unarmed. Buds brown, ovoid, 5–7 mm, pubescent, apex acute. Petiole 6–8 cm, glabrous or puberulent, sometimes sparsely long stalked glandular near base; leaf blade suborbicular, 5–7(–9) × 6–10 cm, sparsely shortly stalked glandular on both surfaces, sometimes pubescent along veins abaxially when young, base deeply or shallowly cordate; lobes (3–)5, ovate-triangular, margin deeply or shallowly incised doubly serrate, apex acuminate; terminal lobe slightly longer than lateral ones. Racemes nodding, lax, 7–15 cm, 10–20-flowered; rachis and pedicels pubescent; bracts ligulate or lanceolate to ovate, (2–)5–7 mm, pubescent. Flowers bisexual, 5–6 mm in diam.; pedicel 1–2 mm. Calyx yellowish green tinged purple or red, glabrous; tube campanulate, 1.5–2.5 mm; lobes reflexed, elliptic to ligulate or oblong, 2–3 mm. Petals subspatulate to subflabellate, 1–2 mm. Stamens inserted level with petals and equaling or slightly longer than them; anthers ovoid to narrowly so, apex with nectary. Ovary subglobose, glabrous. Style equaling or slightly longer than stamens, subentire or 2-lobed. Fruit red, ovoid-globose, 0.8–1.2 cm in diam., glabrous. Fl. May–Jun, fr. Jul–Sep.

Forests and forest margins in mountain regions, foothill thickets; 2600–4200 m. W Sichuan, Xizang, NW Yunnan [Bhutan, NE India, Nepal].

- 1a. Leaf blade shallowly cordate at base, lobes deeply incised doubly serrate at margin 17a. var. *griffithii*
- 1b. Leaf blade deeply cordate at base, lobes shallowly incised doubly serrate at margin 17b. var. *gongshanense*

17a. *Ribes griffithii* var. *griffithii*

曲萼茶鉿子(原变种) qu e cha biao zi (yuan bian zhong)

Ribes moupinense Franchet f. *incisoserratum* T. C. Ku

Leaf blade shallowly cordate at base, lobes deeply incised doubly serrate at margin.

Forests and forest margins in mountain regions, foothill thickets; 2600–4200 m. W Sichuan, Xizang, NW Yunnan [Bhutan, NE India, Nepal].

17b. *Ribes griffithii* var. *gongshanense* (T. C. Ku) L. T. Lu in L. T. Lu & S. M. Hwang, Fl. Reipubl. Popularis Sin. 35(1): 309. 1995.

贡山茶鉿子 gong shan cha biao zi

Ribes gongshanense T. C. Ku, Guihaia 9: 285. 1989.

Leaf blade deeply cordate at base, lobes shallowly incised doubly serrate at margin.

• Coniferous forests; below 3200 m. NW Yunnan (Gongshan Drung-Nu Zu Zizhixian).

18. *Ribes altissimum* Turczaninow ex Pojarkova, Trudy Bot. Inst. Akad. Nauk SSSR, Ser. 1, Fl. Sist. Vyssh. Rast. 2: 179. 1936.

高茶鋁子 gao cha biao zi

Shrubs (1–)2–3 m tall. Branchlets glabrous, rarely sparsely shortly glandular hairy, unarmed. Buds brown, ovoid to narrowly so, pubescent, apex obtuse or acute. Petiole 3–5 cm, glabrous, rarely sparsely puberulent or shortly glandular hairy; leaf blade suborbicular, 3–6 cm, glabrous, sometimes sparsely shortly stalked glandular along veins abaxially, base cordate; lobes 3–5, ovate-triangular, margin deeply and sharply doubly serrate, sometimes with some simple teeth, apex obtuse or acute; terminal lobe equaling or slightly longer than lateral ones. Racemes slightly pendulous, 3–8 cm, 10–25-flowered; rachis and pedicels pubescent and shortly stalked glandular; bracts broadly ovate, margin sparsely glandular hairy. Flowers bisexual, 4–5 mm in diam.; pedicel 1–3 mm. Calyx yellowish, often spotted purple, glabrous; tube campanulate, 1.5–2.5 mm; lobes reflexed, subligulate to narrowly obovate, 1.5–2.5 mm, margin ciliate. Petals subflabellate to obovate, 0.8–1.5 mm. Stamens inserted below petals and subequaling them. Ovary glabrous. Style broadly conical, apex 2-lobed. Fruit purplish black, subglobose, 0.5–0.7 cm, glabrous. Fl. Jun, fr. Jul–Aug.

Coniferous or mixed forests and forest margins on mountain slopes; below 2000 m. N Xinjiang (Burqin Xian, Fuhai Xian) [N Mongolia, Russia (Siberia)].

19. *Ribes soulieanum* Janczewski, Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1906: 4. 1906.

滇中茶鋁子 dian zhong cha biao zi

Shrubs 1–2 m tall. Branchlets stout, glabrous or puberulent. Buds purple, narrowly ovoid, 5–7 mm, apex acute. Petiole 4–6 cm, puberulent when young, sparsely long stalked glandular near base; leaf blade suborbicular, 4–7 × 4.5–8 cm, glabrous or abaxially pubescent along veins, base cordate; lobes 3(–5), ovate-triangular, margin deeply and sharply doubly serrate, also with some simple teeth, apex acute or shortly acuminate; terminal lobe slightly longer than lateral ones. Racemes spreading then pendulous, dense, 4–6 cm, 15–25-flowered; rachis and pedicels pubescent; bracts lanceolate, puberulent, margin slightly glandular hairy. Flowers bisexual, 5–7 mm in diam.; pedicel 0.5–2 mm. Calyx purple, glabrous; tube campanulate, 2–3 mm; lobes reflexed, ovate-ligulate, 2–3.5 mm. Petals erect, red, subreniform to reniform-orbicular, 1–2 mm. Stamens inserted level with and equaling or slightly longer than petals; anthers subglobose, apex without nectary. Ovary ellipsoid, glabrous. Style longer than stamens, 2-lobed. Fruit red, globose, 0.6–0.8 cm, glabrous. Fl. Apr–May, fr. Jun–Aug.

• Forest margins, foothills; below 3000 m. Xizang, NW Yunnan.

20. *Ribes mandshuricum* (Maximowicz) Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 22: 437. 1903.

东北茶鋁子 dong bei cha biao zi

Shrubs 1–3 m tall. Branchlets pubescent or subglabrous, unarmed. Buds brownish, ovoid to oblong, 4–7 mm,

puberulent, apex obtuse or acute. Petiole 4–7 cm, pubescent; leaf blade 5–10 cm, appressed-pubescent on both surfaces or adaxially glabrous when young, glabrescent, rarely villous or tomentose, base cordate; lobes 3(–5), ovate-triangular, margin irregularly coarsely sharply serrate or doubly serrate, apex acute to shortly acuminate; terminal lobe slightly longer than lateral ones. Racemes erect then nodding, (3–)7–16(–20) cm, 40–50-flowered; rachis and pedicels densely pubescent; bracts ovate, glabrous or puberulent. Flowers bisexual, 3–5 mm in diam.; pedicel 1–3 mm. Calyx greenish or tinged yellow, glabrous or hairy; tube pelviform, 1–1.5(–2) mm, with 5 unconnected warts adaxially at base; lobes reflexed, obovate-ligulate to ligulate, (1–)2–3 mm. Petals yellowish green, subspatulate, 1–1.5 mm. Stamens longer than petals. Ovary glabrous or hairy. Style shorter than or equaling stamens, 2-lobed or sometimes divided for almost 1/2 its length. Fruit globose, red, 0.7–0.9 cm, glabrous or hairy. Fl. Apr–Jun, fr. Jul–Aug.

Coniferous or mixed forests or thickets on mountain slopes or in valleys, ravines; 300–1900 m. E Gansu, Hebei, Heilongjiang, W Henan, E Jilin, Liaoning, Nei Mongol, NE Shandong, SW Shaanxi, C Shanxi [N Korea, Russia (Siberia)].

- 1a. Calyx, ovary, and young fruit villous; leaf blade abaxially densely tomentose, adaxially villous 20c. var. *villosum*
- 1b. Calyx glabrous or subglabrous; ovary and fruit glabrous; leaf blade appressed-pubescent to glabrous.
 - 2a. Leaf blade appressed-pubescent on both surfaces when young, glabrescent; racemes 7–16(–20) cm; calyx lobes 2–3 mm 20a. var. *mandshuricum*
 - 2b. Leaf blade abaxially slightly pubescent along veins, more densely so at vein axils, adaxially glabrous when young; racemes 3–8 cm; calyx lobes 1–2 mm 20b. var. *subglabrum*

20a. *Ribes mandshuricum* var. *mandshuricum*

东北茶鋁子(原变种) dong bei cha biao zi (yuan bian zhong)

Ribes multiflorum Kitaibel ex Schultes var. *mandshuricum* Maximowicz, Bull. Acad. Imp. Sci. Saint-Pétersbourg, Sér. 3, 19: 258. 1874.

Leaf blade appressed-pubescent on both surfaces when young, glabrescent. Racemes 7–16(–20) cm. Calyx glabrous or subglabrous; lobes 2–3 mm. Ovary and fruit glabrous.

Coniferous or mixed forests or thickets on mountain slopes or in valleys; 300–1800 m. E Gansu, Hebei, Heilongjiang, SW Henan, E Jilin, Liaoning, Nei Mongol, SW Shaanxi, WC Shanxi [N Korea, Russia (Siberia)].

20b. *Ribes mandshuricum* var. *subglabrum* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 22: 439. 1903.

光耀北茶鋁子 guang ye dong bei cha biao zi

Leaf blade abaxially slightly pubescent along veins, more densely so at vein axils, adaxially glabrous when young. Racemes 3–8 cm. Calyx glabrous or subglabrous; lobes 1–2 mm. Ovary and fruit glabrous.

Forests on mountain slopes, ravines; 800–1900 m. Hebei, SW Heilongjiang, W Henan, E Jilin, NE Liaoning, NE Shandong, SC Shanxi [N Korea].

20c. *Ribes mandshuricum* var. *villosum* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 22: 438. 1903.

内蒙茶藨子 *nei meng cha biao zi*

Leaf blade abaxially densely tomentose, adaxially villous. Calyx, ovary, and young fruit villous.

• Ravines, slopes; low altitudes. NE Nei Mongol.

21. *Ribes multiflorum* Kitaibel ex Schultes in Roemer & Schultes, Syst. Veg. 5: 493. 1819.

多花茶藨子 *duo hua cha biao zi*

Ribes vitifolium Host.

Shrubs to 2 m tall. Branchlets robust, pubescent when young, unarmed. Buds purplish black or purplish brown, ovoid to oblong-ovoid, 7–9 mm, pubescent, apex acute. Petiole 3–5(–8) cm, pubescent, sometimes plumose hairy near base; leaf blade suborbicular, 5–10 cm, pubescent, more densely so abaxially, base truncate to shallowly cordate; lobes 3–5, broadly triangular, margin coarsely crenate-dentate, usually with some double teeth, apex obtuse or acute. Racemes erect then pendent, dense, 5–8(–12) cm, up to 50-flowered; rachis and pedicels pubescent; bracts ovate-orbicular, 1–2 mm, puberulent. Flowers bisexual, 5–6 mm in diam.; pedicel 2–4 mm. Calyx yellowish green, glabrous; tube pelviform to shallowly cupular, 1–1.5 mm, with 5 warts adaxially at base connected by a raised ring; lobes reflexed after anthesis, ligulate to obovate-ligulate, 1.5–2.5 mm. Petals reflexed, subspatulate to obovate, 1–1.5 mm. Stamens longer than petals. Ovary glabrous. Style subequaling stamens, 2-lobed for almost 1/2 its length. Fruit dark red, subglobose, 0.7–0.9 cm, glabrous. Fl. Apr–May, fr. Jun–Jul.

Widely introduced and escaped in N China (precise distribution unknown) [native to SE Europe].

22. *Ribes pubescens* (Swartz ex Hartman) Hedlund, Bot. Not. 1901: 100. 1901.

毛茶藨子 *mao cha biao zi*

Ribes rubrum Linnaeus var. *pubescens* Swartz ex Hartman, Handb. Skand. Fl. 112. 1820.

Shrubs 1–2 m tall. Branchlets pubescent, later glabrous, unarmed. Buds brown, ovoid to oblong-ovoid, 4–6 mm, pubescent, apex obtuse to acute. Petiole red, 2–5(–7) cm, pubescent; leaf blade suborbicular to reniform-orbicular, 3–6 cm, abaxially densely pubescent, adaxially sparsely so, base shallowly cordate, rarely subtruncate; lobes (3–)5, broadly triangular to ovate-triangular, margin coarsely serrate, with some double teeth; terminal lobe subequaling lateral ones. Racemes erect then nodding, lax, 4–9(–11) cm, 8–22-flowered;

rachis and pedicels pubescent or sparsely glandular hairy; bracts broadly ovate to orbicular-ovate, 1–1.5 mm. Flowers bisexual, 4–5 mm in diam.; pedicel 3–5 mm. Calyx green, spotted brown or brownish red, glabrous; tube pelviform, 1–1.5 mm; lobes erect, spatulate-orbicular to obovate-ligulate, 1.5–2.5 mm, margin ciliate. Petals green tinged brown or brownish red, cuneate to subflabellate, 1–1.5 mm. Stamens subequaling petals. Ovary glabrous. Style not longer than stamens, 2-lobed. Fruit red, globose, 0.7–0.9 cm, glabrous.

Thickets on poor dry mountain slopes, bare rocky mountain tops. N Heilongjiang (Da Hingan Ling), NE Nei Mongol [N Mongolia, Russia; NC Europe].

23. *Ribes latifolium* Janczewski, Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1906: 4. 1906.

阔叶茶藨子 *kuo ye cha biao zi*

Shrubs 1–2 m tall. Branchlets pubescent, usually also sparsely stalked glandular, unarmed. Buds purplish brown, oblong-ovoid, 5–7 mm, pubescent, apex acute. Petiole 5–8 cm, sparsely pubescent and glandular hairy; leaf blade thin, 7–12 × 8–15 cm, glabrous or sparsely puberulent, base cordate; lobes 3–5, triangular to ovate-triangular, margin coarsely and sharply serrate, apex acute to shortly acuminate; terminal lobe equaling or slightly longer than lateral ones. Racemes erect or slightly pendent, 3–6 cm, 6–20-flowered; rachis and pedicels pubescent and sparsely stalked glandular; bracts ovate, 1–1.5 mm, puberulent. Flowers bisexual, 5–7 mm in diam.; pedicel 1.5–3 mm. Calyx dark purple, glabrous or puberulent; tube subcampanulate, 2.5–3.5 mm; lobes erect, spatulate to obovate-oblong, 2–3 mm, margin ciliate, dentate. Petals subflabellate to subspatulate, 1.5–2 mm. Stamens equaling or slightly longer than petals. Ovary glabrous. Style subequaling stamens, 2-lobed. Fruit red, globose, 0.7–0.9 cm, glabrous. Fl. May–Jun, fr. Jul–Aug.

Larix forests and forest margins, roadsides; 1100–1500 m. S Jilin (Changbai Shan) [Japan, Russia].

24. *Ribes himalense* Royle ex Decaisne in Jacquemont, Voy. Inde 4(Bot.): 66. 1844.

糖茶藨子 *tang cha biao zi*

Shrubs 1–2 m tall. Branchlets glabrous, unarmed. Buds purplish brown, ovoid to oblong, 3–5 mm, glabrous or puberulent at scale margins, apex acute. Petiole red, 3–5 cm, glabrous or minutely pubescent, sparsely glandular hairy or tuberculate near base; leaf blade ovate to suborbicular, 5–10 × 6–10 cm, sparsely glandular hairy or tuberculate on both surfaces, with or without eglandular hairs, base cordate; lobes 3–5, ovate-triangular, margin roughly sharply doubly serrate, also with some simple teeth, apex acute to shortly acuminate; terminal lobe slightly longer than lateral ones. Racemes dense, (2.5–)5–10 cm, 8–20-flowered; rachis and pedicels pubescent or sparsely stalked glandular; bracts ovate, rarely oblong to sublanceolate, 1–2 mm or slightly longer, puberulent. Flowers bisexual, 4–6 mm in diam.; pedicel 1.5–3 mm. Calyx green tinged

purple or purplish red, glabrous or puberulent; tube campanulate, 1.5–2 mm; lobes erect, obovate-spatulate to suborbicular, 2–3.5 mm, margin ciliate. Petals red or green tinged purplish, subspatulate to flabellate, 1–1.7 mm, margin ciliate. Stamens inserted level with petals and subequalling them. Ovary glabrous. Style subequalling stamens, apex 2-lobed. Fruit red, turning purplish black after maturity, globose, 0.6–0.7 cm, glabrous. Fl. Apr–Jun, fr. Jul–Aug.

Mixed, coniferous, or broad-leaved forests and forest margins, thickets on mountain slopes, river banks, or in ravines, grasslands on mountain slopes, mountain valleys, stream banks, roadsides; 1200–4100 m. Gansu, Hebei, NW Henan, W Hubei, Nei Mongol, SE Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, NW Yunnan [Bhutan, Kashmir, Nepal, Sikkim].

Five varieties may be recognized in China. *Ribes himalense* var. *salwinense* J. Anthony (Notes Roy. Bot. Gard. Edinburgh 18: 24. 1933), recorded from SE Xizang, NW Yunnan, and N Myanmar, might represent a sixth variety. In the protologue, it was said to differ from var. *himalense* in having leaf blades hairy on both surfaces; however two of the three cited specimens, *Forrest 14957* and *Forrest 14985* (both at E), are densely hairy only abaxially, while the third, *Forrest 24913* (E), seems no hairier than var. *himalense*.

- 1a. Calyx pubescent 24e. var. *pubicalycinum*
 1b. Calyx glabrous.
 2a. Petiole and leaf blade densely pubescent and sparsely tuberculate 24d. var. *trichophyllum*
 2b. Petiole and leaf blade glabrous, rarely puberulent or sparsely shortly glandular hairy.
 3a. Petiole and abaxial leaf blade veins distinctly tuberculate and sometimes sparsely shortly stalked glandular . 24c. var. *verruculosum*
 3b. Petiole and abaxial leaf blade veins not tuberculate.
 4a. Branchlets, petiole, leaf blade, and inflorescence usually not stalked glandular, rarely inconspicuously shortly stalked glandular 24a. var. *himalense*
 4b. Branchlets, petiole, leaf blade, and inflorescence sparsely or densely shortly stalked glandular 24b. var. *glandulosum*

24a. *Ribes himalense* var. *himalense*

糖茶鉿子(原变种) tang cha biao zi (yuan bian zhong)

Ribes emodense Rehder.

Branchlets, petiole, leaf blade, and inflorescence usually not stalked glandular, rarely inconspicuously shortly stalked glandular. Petiole and abaxial leaf blade veins not tuberculate. Calyx glabrous.

Coniferous forests and forest margins, thickets on river banks, mountain valleys; 1200–4000 m. W Hubei, Sichuan, SE Xizang, NW Yunnan [Bhutan, Kashmir, Nepal, Sikkim].

24b. *Ribes himalense* var. *glandulosum* Janczewski, Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1910: 69. 1910.

疏腺茶鉿子 shu xian cha biao zi

Branchlets, petiole, leaf blade, and inflorescence sparsely or densely shortly stalked glandular. Petiole and abaxial leaf blade veins not tuberculate. Flowers dark purple. Calyx glabrous.

• Coniferous forests, thickets on mountain slopes; 2500–3400 m. SW Shaanxi, W Sichuan.

24c. *Ribes himalense* var. *verruculosum* (Rehder) L. T. Lu in L. T. Lu & S. M. Hwang, Fl. Reipubl. Popularis Sin. 35(1): 306. 1995.

瘤糖茶鉿子 liu tang cha biao zi

Ribes emodense var. *verruculosum* Rehder, J. Arnold Arbor. 5: 162. 1924; *R. kansuense* K. S. Hao.

Petiole and abaxial leaf blade veins distinctly tuberculate and sometimes sparsely shortly stalked glandular. Inflorescences 2.5–5 cm. Calyx glabrous.

• Coniferous or broad-leaved forests and forest margins in valleys, thickets on mountain slopes; 1600–4100 m. Gansu, Hebei, NW Henan, Nei Mongol, SE Ningxia, Qinghai, Shaanxi, Shanxi, W Sichuan, E Xizang, NW Yunnan.

24d. *Ribes himalense* var. *trichophyllum* T. C. Ku, Guihaia 9(4): 288. 1989.

异毛茶鉿子 yi mao cha biao zi

Petiole and leaf blade densely pubescent and sparsely tuberculate. Calyx glabrous.

• Mixed or coniferous forests in valleys, thickets in ravines, grasslands on mountain slopes, roadsides; 1700–3800 m. E Gansu, NW Hebei, E Qinghai, Shaanxi, NW Shanxi, Sichuan.

24e. *Ribes himalense* var. *pubicalycinum* L. T. Lu & J. T. Pan, Acta Phytotax. Sin. 31: 452. 1993.

毛萼茶鉿子 mao e cha biao zi

Calyx pubescent.

• Coniferous forests, roadside thickets on mountain slopes, stream banks; 2600–3800 m. W Sichuan, Xizang.

25. *Ribes meyeri* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 19: 260. 1874.

天山茶鉿子 tian shan cha biao zi

Shrubs 1–2 m tall. Branchlets glabrous or slightly puberulent, rarely sparsely shortly stalked glandular, unarmed. Buds brown, ovoid to oblong, 2.5–4.5 mm, glabrous or puberulent, apex acute. Petiole 2.5–5 cm, sparsely glandular hairy near base, rarely with some eglandular hairs; leaf blade suborbicular, 3–7 cm, glabrous or abaxially pubescent, base shallowly cordate, rarely truncate; lobes (3–)5, triangular to ovate-triangular, margin coarsely serrate, apex obtuse or acute; terminal lobe equaling or longer than lateral ones. Racemes nodding, dense, 3–5(–6) cm, 7–17-flowered;

rachis and pedicels pubescent or subglabrous; bracts ovate, 1–2 mm, puberulent. Flowers bisexual, 3.5–5(–6) mm in diam.; pedicel 1–2.5 mm. Calyx purple or brownish, dotted purple, glabrous; tube campanulate to shortly cylindric, 2–3 mm; lobes erect after anthesis, spatulate to obovate, 2.5–3.5 mm, margin ciliate. Petals narrowly cuneate to linear, 1–1.5 mm, margin sometimes slightly ciliate. Stamens inserted slightly below petals and slightly longer than them. Ovary glabrous. Style longer than stamens, apex 2-lobed. Fruit purplish black, globose, 0.7–0.8(–1) cm, glabrous. Fl. May–Jun, fr. Jul–Aug.

Forests and forest margins on mountain slopes, river banks, or in valleys, thickets in valleys or on roadsides, rock crevices in gullies, streamsides; 1200–3900 m. Xinjiang [Mongolia, Russia].

- 1a. Branchlets and leaf blade abaxially glabrous or sparsely pubescent; fruit 0.7–0.8 cm 25a. var. *meyeri*
 1b. Branchlets and leaf blade abaxially densely pubescent; fruit 0.8–1 cm 25b. var. *pubescens*

25a. *Ribes meyeri* var. *meyeri*

天山茶鉸子(原变种) tian shan cha biao zi (yuan bian zhong)

Grossularia atropurpurea Osten-Sacken & Ruprecht.

Branchlets and leaf blade abaxially glabrous or sparsely pubescent. Fruit 0.7–0.8 cm.

Coniferous forests on river banks, open forests on mountain slopes, thickets on roadsides; 1400–3900 m. Xinjiang [Mongolia, Russia].

25b. *Ribes meyeri* var. *pubescens* L. T. Lu, Acta Phytotax. Sin. 31: 453. 1993.

北疆茶鉸子 bei jiang cha biao zi

Branchlets and leaf blade abaxially densely pubescent. Fruit 0.8–1 cm.

• Forests and forest margins on slopes or in valleys, thickets in valleys, rock crevices in gullies, streamsides; 1200–2000 m. Xinjiang.

26. *Ribes rubrum* Linnaeus, Sp. Pl. 1: 200. 1753.

红茶鉸子 hong cha biao zi

Ribes scandicum Hedlund; *R. spicatum* E. Robson; *R. sylvestre* Syme.

Shrubs 1–1.5 m tall. Branchlets glabrous or scattered shortly stalked glandular, unarmed. Buds purplish brown, oblong-ovoid to oblong, 5–7 mm, apex obtuse or acute. Petiole 3–6 cm, sometimes puberulent, glandular hairy near base; leaf blade suborbicular, 3–7 × 4–9 cm, glabrous, rarely puberulent abaxially or sparsely stalked glandular along veins, base cordate, rarely subtruncate; lobes 3–5, broadly ovate-triangular, margin coarsely sharply serrate, apex obtuse to acute; terminal lobe subequalling lateral ones. Racemes erect then nodding, 2–6 cm, 5–15-flowered; rachis and pedicels sparsely shortly stalked glandular; bracts broadly ovate, rarely suborbicular, 1–2 mm, glabrous. Flowers bisexual, 6–8 mm in diam.; pedicel 3–5 mm.

Calyx greenish or greenish brown, glabrous; tube pelviform, 1–1.5 mm; lobes erect, spatulate-orbicular, 2–2.5 mm. Petals purplish, subspatulate to subflabellate, 0.5–1 mm. Stamens equaling or longer than petals. Ovary glabrous. Style equaling or longer than stamens, 2-lobed. Fruit red, globose, rarely ellipsoid, 0.8–1.1 cm in diam., glabrous. Fl. May–Jun, fr. Jul–Aug.

NE China (precise distribution unknown) [N Asia; Europe].

This species is cultivated as an ornamental in cold regions and is also used for making fruit drinks and wine.

27. *Ribes longiracemosum* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 238. 1886.

长序茶鉸子 chang xu cha biao zi

Shrubs 2–3 m tall. Branchlets stout, glabrous, sometimes glandular hairy, unarmed. Buds brown, ovoid to oblong, 4–6 mm, glabrous, apex obtuse or acute. Petiole 4.5–8(–10) cm, glabrous or sparsely puberulent when young, sometimes glandular hairy near base; leaf blade ovate, 5–12 cm, glabrous or slightly pubescent at vein axils at base abaxially, rarely pubescent on both surfaces, base deeply cordate; lobes 3(–5), ovate to triangular-ovate, margin irregularly coarsely serrate, sometimes also with sparse, double teeth; terminal lobe longer than lateral ones. Racemes pendulous, lax, 15–35(–40) cm, 15–20(–25)-flowered; rachis and pedicels puberulent; bracts suborbicular or ovate to ovate-lanceolate, rarely oblong, (1.5–)3–7 mm, glabrous or puberulent. Flowers bisexual, 5–6 mm in diam.; pedicel 3–10(–15) mm. Calyx green tinged purple, glabrous, rarely pubescent; tube tinged red, campanulate to shortly cylindric, 4–6 mm; lobes erect, green, oblong to subligulate, 2–3 mm. Petals subflabellate, ca. 1/2 as long as calyx lobes. Stamens inserted below petals, longer than calyx lobes and exerted; anthers white. Ovary glabrous, rarely pubescent. Style slightly longer than stamens, entire or stigma 2-lobed. Fruit black, globose, 0.7–0.9 cm, glabrous or sparsely pubescent. Fl. Apr–May, fr. Jun–Aug.

• Forests or thickets on mountain slopes or in valleys, mixed forests in gullies; 1100–3800 m. SE Gansu, W Hubei, E Shaanxi, Sichuan, Yunnan.

- 1a. Leaf blade pubescent.
 2a. Leaf blade, calyx, and fruit pubescent 27d. var. *pilosum*
 2b. Leaf blade sparsely to densely pubescent abaxially; calyx and fruit glabrous 27c. var. *davidii*
 1b. Leaf blade glabrous, rarely slightly pubescent at vein axils at base abaxially.
 3a. Racemes to 35 cm, pedicels 10–15 mm; branchlets and abaxial leaf blade veins usually shortly glandular hairy .. 27b. var. *gracillimum*
 3b. Racemes 15–25(–30) cm, pedicels 4–10 mm; branchlets and abaxial

leaf blade veins usually not
shortly glandular hairy 27a. var. *longiracemosum*

27a. *Ribes longiracemosum* var. *longiracemosum*
长序茶藨子(原变种) chang xu cha biao zi (yuan bian zhong)

Ribes longiracemosum var. *wilsonii* Janczewski.
Branchlets and abaxial leaf blade veins usually not
shortly glandular hairy. Racemes 15–25(–30) cm;
pedicels 4–10 mm.

• Forests or thickets on mountain slopes or in valleys, mixed forests
in gullies; 1700–3800 m. W Hubei, Sichuan, Yunnan.

**27b. *Ribes longiracemosum* var. *gracillimum* L. T. Lu, Acta
Phytotax. Sin. 31: 452. 1993.**

纤细茶藨子 xian xi cha biao zi

Ribes gracillimum K. S. Hao, Repert. Spec. Nov. Regni
Veg. 40: 214. 1936, not Coville & Britton (1908); *R.*
haoi C. Y. Yang & Han.

Branchlets and abaxial leaf blade veins usually shortly
glandular hairy. Racemes slender, to 35 cm; pedicels
10–15 mm.

• Forests in mountain valleys, thickets on mountain slopes; 2300–
2700 m. SE Gansu, E Shaanxi (Xigu).

**27c. *Ribes longiracemosum* var. *dauidii* Janczewski, Bull.
Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1910: 71. 1910.**

腺毛茶藨子 xian mao cha biao zi

Leaf blade sparsely to densely pubescent abaxially.
Racemes to 40 cm. Calyx and fruit glabrous.

• Mixed forests, shady thickets on mountain slopes, gullies; 1100–
3400 m. W Sichuan, Yunnan.

**27d. *Ribes longiracemosum* var. *pilosum* T. C. Ku, Guihaia
9(4): 288. 1989.**

毛长串茶藨子 mao chang chuan cha biao zi

Leaf blade, calyx, and fruit pubescent.

• Coniferous forests on mountain slopes; below 2800 m. NW Yunnan.

**28. *Ribes moupinense* Franchet, Nouv. Arch. Mus. Hist. Nat.,
sér. 2, 8: 238. 1886.**

宝兴茶藨子 bao xing cha biao zi

Shrubs 2–3(–5) m tall. Branchlets dark purplish brown
to brown, glabrous, unarmed. Buds brown, ovoid to
oblong, 4–5 × 2–3 mm, glabrous, apex obtuse. Petiole
3–9 cm, puberulent, sparsely glandular hairy near base;
leaf blade ovate to broadly triangular-ovate, 5–9 cm,
abaxially pubescent or minutely stalked glandular along
veins and at vein axils, adaxially glabrous or sparsely
coarsely glandular hairy, base cordate or deeply so,
rarely subtruncate; lobes 3–5, narrowly ovate to
narrowly triangular, margin irregularly sharply serrate
or doubly serrate, apex acute to long acuminate;
terminal lobe subequaling or longer than lateral ones.
Racemes nodding, dense, 5–10(–12) cm, 9–25-flowered;
rachis pubescent; bracts narrowly ovate to lanceolate-
ovate or broadly ovate to suborbicular, 1.5–4 mm,
glabrous or margin sparsely ciliate. Flowers bisexual,
4–6 mm in diam.; pedicel usually short or absent. Calyx
green tinged red, glabrous; tube campanulate, 2.5–4
mm; lobes not incurved, ovate to ligulate, 2–3.5 mm,
margin not ciliate. Petals obtriangular-flabellate, 1–1.8

mm. Stamens inserted level with petals and subequaling
them; anthers globose. Ovary glabrous, rarely
pubescent. Style not equaling stamens, apex 2-lobed.
Fruit black, globose, 0.5–0.7 cm, glabrous, rarely
pubescent. Fl. May–Jun, fr. Jul–Aug.

• Coniferous or mixed forests and forest margins on mountain slopes
and in valleys, thickets, rocky and high mountain slopes; 1400–4700
m. SW Anhui, Gansu, NE Guizhou, W Hubei, Shaanxi, Sichuan,
Yunnan.

1a. Ovary and fruit pubescent 28d. var. *pubicarpum*
1b. Ovary and fruit glabrous.

2a. Leaf blade lobed less than halfway
to base, lobes narrowly triangular
to narrowly triangular-ovate;
fruiting pedicel very short or
absent 28a. var. *moupinense*

2b. Leaf blade lobed more than
halfway to base, lobes broadly or
narrowly ovate-lanceolate to narrowly
triangular-ovate; fruiting pedicel very
short or 5–8 mm

3a. Leaf lobes 3, narrowly ovate-
lanceolate to narrowly triangular-
ovate; fruiting pedicel very
short 28b. var. *tripartitum*

3b. Leaf lobes 5, broadly ovate-
lanceolate; fruiting pedicel
5–8 mm 28c. var. *muliense*

28a. *Ribes moupinense* var. *moupinense*

宝兴茶藨子(原变种) bao xing cha biao zi (yuan bian zhong)

Leaf blade lobed less than halfway to base; lobes
narrowly triangular to narrowly triangular-ovate;
terminal lobe longer than lateral ones. Ovary and fruit
glabrous. Fruiting pedicel very short or absent.

• Mixed forests on mountain slopes, forests in valleys, rocky slopes;
1400–4700 m. SW Anhui, Gansu, NE Guizhou, W Hubei, Shaanxi,
Sichuan, Yunnan.

**28b. *Ribes moupinense* var. *tripartitum* (Batalin)
Janczewski, Mém. Soc. Phys. Hist. Nat. Genève 35. 3: 300.
1907.**

三裂茶藨子 san lie cha biao zi

Ribes tripartitum Batalin, Trudy Imp. S.-Peterburgsk.
Bot. Sada 11: 488. 1890.

Leaf blade lobed more than halfway to base, base
deeply cordate; lobes 3, narrowly ovate-lanceolate to
narrowly triangular-ovate; terminal lobe subequaling
lateral ones, apex long acuminate. Ovary and fruit
glabrous. Fruiting pedicel very short.

• Coniferous or mixed forests and forest margins in mountain valleys,
thickets, rocky slopes; 1500–2900 m. E Gansu, W Hubei, Sichuan,
NW Yunnan.

**28c. *Ribes moupinense* var. *muliense* S. H. Yu & J. M. Xu,
Acta Phytotax. Sin. 28: 327. 1990.**

木里茶藨子 mu li cha biao zi

Petiole long; leaf blade lobed more than halfway to
base; lobes 5, broadly ovate-lanceolate, margin sharply

serrate. Ovary and fruit glabrous. Fruiting pedicel 5–8 mm.

- High mountain slopes; ca. 4700 m. SW Sichuan (Muli Zang Zu Zizhixian).

28d. *Ribes moupinense* var. *pubicarpum* L. T. Lu, Acta Phytotax. Sin. 31: 452. 1993.

毛果茶藨子 mao guo cha biao zi

Ovary and fruit pubescent.

- Coniferous forest margins on rocky slopes; ca. 3500 m. NW Yunnan (Zhongdian Xian).

29. *Ribes setchuense* Janczewski, Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1906: 3. 1906.

四川茶藨子 si chuan cha biao zi

Shrubs 1.5–2 m tall. Branchlets robust, pubescent, unarmed. Buds dark brown, oblong-ovoid to oblong, 4–6 mm, puberulent, apex acute. Petiole 4–7 cm, pubescent; leaf blade ovate to broadly triangular-ovate, 4.5–8 × 5–9 cm, abaxially pubescent, gradually glabrescent, sometimes sparsely glandular hairy, adaxially densely pubescent, base cordate; lobes 3(–5), narrowly triangular-ovate, margin irregularly coarsely sharply serrate; terminal lobe subequaling or longer than lateral ones. Racemes pendulous, dense, 5–10 cm, 15–30(–50)-flowered; rachis pubescent; bracts ovate to orbicular, 1–2 mm, puberulent. Flowers bisexual, 4–5 mm in diam.; pedicel very short or absent. Calyx greenish, glabrous; tube campanulate, 2–3 mm; lobes erect, incurved apically, ligulate, 2–2.5 mm, margin not ciliate, apex acute. Petals obtriangular-flabellate, 1.2–1.7 mm. Stamens inserted below petals and not longer than them; anthers yellowish white, subglobose. Ovary glabrous. Style not longer than stamens, apex 2-lobed. Fruit sessile, red, globose, 0.5–0.7 cm, glabrous. Fl. Apr–May, fr. Jun–Jul.

- Mixed forests on shady slopes, coniferous forests or thickets in ravines, grasslands; 2100–3100 m. SE Gansu, Sichuan.

30. *Ribes fasciculatum* Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(2): 189. 1845.

簇花茶藨子 cu hua cha biao zi

Shrubs deciduous, though in leaf for most of year, dioecious, to 1.5 m tall, most parts glabrous or pubescent. Branchlets unarmed. Buds brownish, ovoid to oblong-ovoid, 2–5 mm, glabrous, apex acute. Petiole 1–3 cm, rarely glabrous; leaf blade suborbicular, (2–)3–4(–8) × (2.5–)3.5–5(–10) cm, base truncate to shallowly cordate; lobes 3–5, broadly ovate, margin coarsely obtusely serrate, apex obtuse or acute; terminal lobe subequaling or slightly longer than lateral ones. Flowers fragrant, male ones 2–9 in umbels, female ones 2–4(–6) in fascicles, rarely solitary; bracts oblong, 5–8 mm, puberulent, 1-veined, caducous; pedicel (3–)5–9 mm. Calyx yellowish green, glabrous; tube cupular, 2–3 mm; lobes reflexed at anthesis, ovate to ligulate, 2–4 mm. Petals suborbicular to flabellate, 1.5–2 mm. Stamens longer than petals. Ovary pyriform. Fruit reddish brown, subglobose, 0.7–1 cm. Fl. Apr–May, fr. Jul–Sep.

Forests and forest margins, bamboo woods, foothills, stony slopes, roadsides; 700–2400 m. Anhui, E Gansu, NW Guizhou, W Henan, NW Hubei, Jiangsu, N Jiangxi, Shaanxi, NE Shandong, N Zhejiang [Japan, Korea].

1a. Branchlets and leaf blade glabrous or sparsely pubescent when young, later subglabrous 30a. var. *fasciculatum*

1b. Branchlets and leaf blade densely pubescent.

2a. Ovary and fruit glabrous; leaf blade to 10 cm 30b. var. *chinense*

2b. Ovary and fruit pubescent when young, later subglabrous; leaf blade to 6 cm 30c. var. *guizhouense*

30a. *Ribes fasciculatum* var. *fasciculatum*

簇花茶藨子(原变种) cu hua cha biao zi (yuan bian zhong)

Branchlets and leaf blade glabrous or sparsely pubescent when young, later subglabrous. Ovary and fruit glabrous.

- Mixed forests on slopes, bamboo woods, roadsides; low altitudes. Anhui, SW Jiangsu, N Zhejiang [Japan, Korea].

30b. *Ribes fasciculatum* var. *chinense* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, Sér. 3, 19: 264. 1874.

华蔓茶藨子 hua man cha biao zi

Ribes billiardii Carrière; *R. chifuense* Hance.

Branchlets and leaf blade densely pubescent. Leaf blade to 10 cm. Ovary and fruit glabrous.

- Forests, forest margins, stony slopes; 700–1300 m. SE Anhui, E Gansu, W Henan, NW Hubei, Jiangsu, N Jiangxi, Shaanxi, NE Shandong, N Zhejiang [Japan, Korea].

30c. *Ribes fasciculatum* var. *guizhouense* L. T. Lu, Acta Phytotax. Sin. 31: 462. 1993.

贵州茶藨子 gui zhou cha biao zi

Branchlets and leaf blade densely pubescent. Leaf blade to 6 cm. Ovary and fruit pubescent when young, later subglabrous.

- Foothills; ca. 2400 m. NW Guizhou.

31. *Ribes tianquanense* S. H. Yu & J. M. Xu, Acta Phytotax. Sin. 28: 325. 1990.

天全茶藨子 tian quan cha biao zi

Shrubs evergreen, dioecious, 0.4–1(–2) m tall. Branchlets glandular bristly, unarmed. Buds brownish, oblong-ovoid to ovoid, 7–9 mm, glabrous, apex acute. Leaves 2–4-clustered at branchlet apex; petiole stout, 3–8 mm, glandular bristly; leaf blade narrowly elliptic to sub lanceolate, rarely broadly elliptic, 5–13 × 1.5–4.5 cm, leathery, glabrous or abaxially glandular bristly along midvein and at margin, 3-veined, base cuneate, margin unlobed, irregularly serrate, apex acute to acuminate. Male racemes 4–7 cm, 5–11-flowered, female ones almost as long, to 5 cm in fruit, 5–7-fruited; rachis and pedicels purple, pubescent or glandular hairy; bracts elliptic, 9–14 mm, 1-veined, margin ciliate.

Pedicel 3–7 mm. Calyx purplish green, glabrous; tube pelviform, 2–3 mm; lobes ovate to suborbicular, 2.5–3.5 mm. Petals cuneate-spatulate to subflabellate, ca. 1.5 mm. Stamens not equaling or subequaling petals. Ovary pubescent. Stigma 2-lobed. Fruit green, ellipsoid to oblong, 1–1.5 × 0.8–0.9 cm, pubescent. Fl. May–Jun, fr. Jul–Aug.

• Forests, rocks on grassy slopes; 1400–2200 m. W Sichuan.

32. *Ribes henryi* Franchet, Bull. Soc. Linn. Paris 1898: 87. 1898.

华中茶藨子 *hua zhong cha biao zi*

Shrubs evergreen, dioecious, 0.3–1 m tall. Branchlets densely glandular bristly, unarmed. Buds oblong-ovoid, 4–6 mm, apex acute to shortly acuminate; scales brown, slightly glandular hairy. Leaves 2- or 3-clustered at branchlet apex; petiole 5–8 mm, densely glandular bristly; leaf blade elliptic to obovate-elliptic, 5–10 × 2.5–5.5(–7) cm, somewhat leathery, abaxially usually glandular, glandular hairy along veins, base cuneate, margin unlobed, remotely minutely serrate, ciliate, apex acute. Male racemes 2–5 cm, usually 5–10-flowered, female ones shorter, 3–5-flowered, 1–3 cm in fruit, 1–3-fruited; rachis and pedicels densely glandular hairy and sparsely pubescent; bracts greenish or yellowish green, elliptic to lanceolate, 6–11 × 2.5–5 mm, 1-veined, margin ciliate. Pedicel 4–6 mm. Calyx greenish white stalked glandular; tube pelviform, 2–3 mm; lobes broadly ovate, rarely suborbicular, 2–3.5 mm. Petals cuneate-spatulate to subflabellate, about 1/3 as long as calyx lobes. Stamens not equaling petals. Ovary obovoid-oblong, densely stalked glandular. Style 2-lobed. Fruit green, obovoid-oblong, 1.5–2 × ca. 1 cm, glandular hairy. Fl. May–Jun, fr. Jul–Aug.

• Forests on mountain slopes, rocks; ca. 2300 m. Hubei, W Sichuan.

33. *Ribes hunanense* C. Y. Yang & C. J. Qi, Bull. Bot. Res., Harbin 5(1): 177. 1985.

湖南茶藨子 *hu nan cha biao zi*

Ribes guangxiense C. Z. Gao

Shrubs semievergreen, epiphytic, dioecious, 0.6–1.5 m tall. Branchlets glabrous, unarmed. Buds purple, oblong-ovoid, 7–10 mm, glabrous. Leaves 2–4-clustered at branchlet apex; petiole purple, 1–4 cm, glabrous; leaf blade suborbicular to reniform-orbicular, 2.5–7 cm, somewhat leathery, glabrous, 5-veined, base rounded or truncate to shallowly cordate, margin unlobed, undulate, or sharply 5–7-lobed; lobes (or leaf blade) irregularly obtusely dentate at margin, apex obtuse. Male racemes 4–7 cm, 10–45-flowered, female ones 4–5 cm, 10–15-flowered; rachis puberulent, sometimes sparsely shortly stalked glandular; bracts oblong to elliptic, 8–12 mm, 1-veined, margin ciliate. Pedicel 5–7 mm, glabrous. Calyx purplish or greenish purple, glabrous; tube campanulate, 3–4 mm; lobes oblong, 3–4.5 mm. Petals cuneate-spatulate, 1.5–2 mm. Stamens subequaling petals. Ovary subglobose, glabrous. Style 2–3 mm, 2-lobed. Fruit subglobose to

ellipsoid, 0.5–0.6 cm in diam. (immature), glabrous. Fl. Apr–May, fr. Jun–Jul.

• Forests and valleys in mountain regions; 1000–2500 m. NE Guangxi, SW Hunan (Tongdao Dong Zu Zizhixian, Xinning Xian).

34. *Ribes davidii* Franchet, Pl. David. 2: 58. 1888.

革叶茶藨子 *ge ye cha biao zi*

Shrubs evergreen, dioecious, 0.3–1 m tall. Branchlets spreading, glabrous, unarmed. Buds ovoid to oblong-ovoid, 3–6 mm, apex acute to shortly acuminate; scales herbaceous, glabrous. Leaves 2–5-clustered at branchlet apex; petiole 0.5–1.5 cm, glandular hairy; leaf blade obovate-elliptic to broadly elliptic, 2–5 × 1.5–3 cm, leathery, glabrous, prominently 3-veined, base cuneate, margin unlobed or 3-lobed; lobes (or leaf blade) coarsely crenate-dentate at distal margin, apex obtuse or acute. Male racemes erect, 2–4(–6) cm, 5–18-flowered, female ones often axillary, 2–3 cm, 2–3(–7) flowered; rachis and pedicels pubescent and stalked glandular, glabrescent; bracts elliptic to broadly so, 7–9 mm, glabrous or margin sparsely ciliate, 1-veined. Calyx greenish white or yellowish green, glabrous; tube pelviform, 2–4 mm; lobes broadly ovate to obovate-oblong, 2.5–4 mm. Petals cuneate-spatulate to obovate, ca. 1/2 as long as calyx lobes. Stamens subequaling petals. Ovary glabrous. Style 2-lobed. Fruit purple, ellipsoid, rarely subglobose, 0.8–1.1 × 0.6–0.8 cm, glabrous. Fl. Apr–May, fr. Jun–Jul.

• Deciduous and mixed forests, ravine forests, shady and moist places on mountain slopes, cliffs, rocks, roadsides; 900–2700 m. N Guizhou, SW Hubei, SW Hunan, Sichuan, NW Yunnan.

1a. Leaf blade base broadly cuneate, margin

3-lobed 34c. var. *lobatum*

1b. Leaf blade base cuneate to narrowly so, margin unlobed.

2a. Leaf blade margin long ciliate 34b. var. *ciliatum*

2b. Leaf blade margin not ciliate 34a. var. *davidii*

34a. *Ribes davidii* var. *davidii*

革叶茶藨子(原变种) *ge ye cha biao zi (yuan bian zhong)*

Ribes pachysandroides Oliver.

Leaf blade base cuneate to narrowly so, margin unlobed, not ciliate.

• Shady and moist places on mountain slopes, cliffs, rocks, roadsides; 900–2700 m. N Guizhou, SW Hubei (Hefeng Tujia Zu Zizhixian), SW Hunan (Xinning Xian), Sichuan, NW Yunnan (Gongshan Drung-Nu Zu Zizhixian).

34b. *Ribes davidii* var. *ciliatum* L. T. Lu, Acta Phytotax. Sin. 31: 453. 1993.

睫毛茶藨子 *jie mao cha biao zi*

Leaf blade base cuneate to narrowly so, margin unlobed, long ciliate.

• Deciduous and mixed forests, rocks, roadsides; 1900–2300 m. W Sichuan.

34c. *Ribes davidii* var. *lobatum* L. T. Lu, Acta Phytotax. Sin. 31: 454. 1993.

浅裂茶藨子 *qian lie cha biao zi*

Leaf blade base broadly cuneate, margin 3-lobed, not ciliate.

• Ravine forests; below 2600 m. W Sichuan.

35. *Ribes laurifolium* Janczewski, Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1910: 79. 1910.

桂叶茶藨子 *gui ye cha biao zi*

Shrubs evergreen, dioecious, much branched, usually climbing on trees, rarely small trees to 1.5 m tall. Branchlets smooth, glabrous, unarmed. Buds ovoid to narrowly so, apex acute to shortly acuminate; scales brown, ovate, glabrous or margin ciliate. Leaves 2–4-clustered at branchlet apex; petiole robust, 7–18 mm, remotely glandular hairy; leaf blade ovate to ovate-oblong or elliptic, 5–10 × 2.5–4.5 cm, leathery, glabrous, 3–5-veined, base broadly cuneate to rounded, margin unlobed, coarsely sharply serrate, apex acute. Male racemes pendulous, 3–6 cm, up to 12-flowered, female ones erect, nodding in fruit, 2–3 cm; rachis pubescent and often shortly stalked glandular; bracts greenish, oblong, 10–12 mm, 1-veined, margin sparsely glandular hairy. Male flowers 10–12 mm in diam., female ones 6–8 mm in diam.; pedicel 3–7 mm, pubescent or glabrous. Calyx yellowish green, pubescent or glabrous; tube cupular; lobes broadly oblong to suborbicular, ca. 4 mm. Petals cuneate-spatulate, ca. 2 mm. Stamens subequaling petals. Ovary oblong, pubescent or glabrous. Style 2-lobed. Fruit purple, ellipsoid to oblong, 1.5–2 × 0.7–1 cm, pubescent or glabrous. Fl. Apr–Jun, fr. Aug–Oct.

• Forests, slopes, river banks, rocks; 2100–3600 m. Guizhou, W Sichuan, Yunnan.

1a. Pedicels, calyx, and fruit pubescent 35a. var. *laurifolium*

1b. Pedicels, calyx, and fruit glabrous 35b. var. *yunnanense*

35a. *Ribes laurifolium* var. *laurifolium*

桂叶茶藨子(原变种) *gui ye cha biao zi* (yuan bian zhong)

Cavaleria enkianthoidea H. Léveillé.

Pedicels, calyx, and fruit pubescent.

• Forests, slopes, river banks; below 2500 m. Guizhou, W Sichuan, Yunnan.

35b. *Ribes laurifolium* var. *yunnanense* L. T. Lu, Acta Phytotax. Sin. 31: 454. 1993.

光果茶藨子 *guang guo cha biao zi*

Pedicels, calyx, and fruit glabrous.

• Forests, rocks; 2100–3600 m. Yunnan.

36. *Ribes giraldii* Janczewski, Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1906: 289. 1906.

陕西茶藨子 *shan xi cha biao zi*

Shrubs dioecious, 2–3 m tall, most parts pubescent and stalked glandular. Branchlets pubescent and glandular hairy; nodal spines 2, rigid, sometimes absent;

internodes unarmed or with sparse, slender spines. Buds grayish yellow, oblong, small, apex acute; scales puberulent at margin. Petiole 0.8–2 cm, pubescent and glandular hairy; leaf blade broadly ovate, rarely suborbicular, 1.5–3 cm, base subtruncate to shallowly cordate, sometimes cuneate; lobes 3–5, margin coarsely obtusely dentate and glandular hairy, apex obtuse; terminal lobe rhombic to rhombic-ovate, longer than lateral ones. Male racemes erect, lax, 3–7 cm, 8–20(–25)-flowered, female ones 2–3 cm, 2–6-flowered; bracts lanceolate to oblong, equaling or longer than pedicels. Calyx yellowish green, sometimes not stalked glandular; tube shallowly cupular to saucer-shaped, 2–3 × 3–4.5 mm; lobes spreading at anthesis, reflexed in fruit, obovate-elliptic to ligulate, 3–4 mm. Petals obovate to subligulate, 1–1.5 mm. Stamens subequaling petals. Ovary sometimes not stalked glandular. Style slightly longer than stamens, apex 2-lobed. Fruit red, globose, 0.6–0.8 cm, pubescent, later glabrescent, stalked glandular or not. Fl. Apr–May, fr. Jun–Sep.

• Forests on seashores, thickets on slopes, ravines, ditch banks, roadsides; sea level to medium altitudes. E Gansu, Liaoning, Shaanxi, SW Shanxi.

1a. Leaf blade base subtruncate to shallowly cordate; fruit stalked glandular 36a. var. *giraldii*

1b. Leaf blade base cuneate to subtruncate; fruit not stalked glandular.

2a. Leaf blade base broadly cuneate to subtruncate; male racemes usually 10–25-flowered 36b. var. *polyanthum*

2b. Leaf blade base cuneate; male racemes 8–10-flowered 36c. var. *cuneatum*

36a. *Ribes giraldii* var. *giraldii*

陕西茶藨子(原变种) *shan xi cha biao zi* (yuan bian zhong)

Leaf blade base subtruncate to shallowly cordate. Fruit stalked glandular.

• Thickets on slopes, ravines, roadsides; low to medium altitudes. E Gansu, Shaanxi, SW Shanxi.

36b. *Ribes giraldii* var. *polyanthum* Kitagawa, Bot. Mag. (Tokyo) 49: 226. 1935.

旅顺茶藨子 *lu shun cha biao zi*

Leaf blade base broadly cuneate to subtruncate. Male racemes usually 10–25-flowered. Fruit not stalked glandular.

• Ditch banks, roadsides; 100–200 m. Liaoning.

36c. *Ribes giraldii* var. *cuneatum* Wang & Li in Liou, Ill. Fl. Lign. Pl. N. E. China, 562. 1955.

滨海茶藨子 *bin hai cha biao zi*

Leaf blade base cuneate. Male racemes 8–10-flowered. Fruit not stalked glandular.

• Forests on seashores. S Liaoning (Dalian Shi).

37. *Ribes pulchellum* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 5: 191. 1832.

美丽茶藨子 *mei li cha biao zi*

Shrubs dioecious, 1–2.5 m tall. Branchlets pubescent, later glabrescent; nodal spines 2; internodes unarmed or with sparse, slender spines. Buds brown, ovoid, 3–4 mm, pubescent when young, apex obtuse or acute. Petiole (0.5–)1–2 cm, pubescent, sometimes also shortly stalked glandular, rarely subglabrous; leaf blade broadly ovate, (1–)1.5–3 cm, pubescent, rarely subglabrous, base broadly cuneate or subtruncate to shallowly cordate; lobes 3(–5), margin coarsely obtusely or acutely serrate, sometimes also with double teeth. Male racemes lax, 5–7 cm, 8–20-flowered, female ones dense, 2–3 cm, 8–10 flowered or more; rachis and pedicels pubescent or subglabrous, sparsely shortly glandular hairy; bracts lanceolate to narrowly oblong, 3–4 mm, sparsely pubescent or shortly glandular hairy, 1-veined. Pedicel 2–4 mm. Calyx greenish yellow to pinkish brown, glabrous or subglabrous; tube saucer-shaped, 1.5–2 mm; lobes broadly ovate, 1.5–2 mm, longer than petals. Petals scalelike, 1–1.5 mm. Stamens longer than petals. Ovary subglobose, glabrous. Style 2-lobed at apex. Fruit red, globose, 0.5–0.8 cm, glabrous. Fl. May–Jun, fr. Aug–Sep.

Forests in ravines, thickets on open slopes, hills, ravines, rocky slopes; 300–3800 m. Gansu, Hebei, Nei Mongol, N Ningxia, E Qinghai, W Shaanxi, Shanxi [NE Mongolia, Russia (Siberia)].

- 1a. Petiole, leaf blade, and inflorescence pubescent; leaf blade base subtruncate to shallowly cordate 37a. var. *pulchellum*
 1b. Petiole, leaf blade, and inflorescence subglabrous; leaf blade base broadly cuneate 37b. var. *manshuriense*

37a. *Ribes pulchellum* var. *pulchellum*

美丽茶藨子(原变种) mei li cha biao zi (yuan bian zhong)

Petiole pubescent; leaf blade pubescent, base subtruncate to shallowly cordate. Inflorescences pubescent.

Rocky slopes, hills, thickets on open slopes, ravines; 300–3800 m. Gansu, Hebei, Nei Mongol, N Ningxia (Yinchuan Shi), E Qinghai, W Shaanxi, Shanxi [NE Mongolia, Russia (Siberia)].

37b. *Ribes pulchellum* var. *manshuriense* Wang & Li in Liou, Ill. Fl. Lign. Pl. N. E. China, 562. 1955.

东北小叶茶藨子 dong bei xiao ye cha biao zi

Petiole subglabrous; leaf blade subglabrous, base broadly cuneate. Inflorescences subglabrous.

• Forests in ravines. N Nei Mongol (Manzhouli Shi).

38. *Ribes saxatile* Pallas, Nova Acta Acad. Sci. Imp. Petrop. Hist. Acad. 10: 376. 1797.

石生茶藨子 shi sheng cha biao zi

Ribes cuneatum Karelin & Kirilov.

Shrubs dioecious, 0.5–1 m tall. Branchlets glabrous or puberulent; nodal spines 2, small; internodes unarmed or with sparse, needlelike spines. Buds narrowly ovoid, 3–5 mm, puberulent then glabrescent, apex acute.

Petiole 1–2 cm, glabrous; leaf blade obovate, 1–2.5 cm, puberulent only at margin when old and sometimes also abaxially, base cuneate; lobes 3, distal, margin coarsely obtusely dentate, apex obtuse or acute; terminal lobe slightly longer than lateral ones. Male racemes erect, 3–6 cm, female ones 3–5 cm, 10-flowered or more; rachis and pedicels pubescent then glabrescent; bracts oblong to ligulate, 4–6 mm, 1-veined, margin puberulent. Pedicel 2–3 mm. Calyx greenish, glabrous; tube pelviform to shallowly cupular, 1.5–2 mm; lobes reflexed, ligulate to obovate, 2–3 mm. Petals flabellate, smaller than calyx lobes. Stamens subequaling petals. Ovary glabrous. Style 2-lobed. Fruit dark red, globose, 0.5–0.7 cm, glabrous. Fl. May–Jun, fr. Jul–Aug.

Thickets on dry slopes, stony slopes; low altitudes. N Xinjiang [Russia].

39. *Ribes glabrifolium* L. T. Lu, Acta Phytotax. Sin. 31: 460. 1993.

光叶茶藨子 guang ye cha biao zi

Shrubs dioecious, 1–2 m tall. Branchlets pubescent; nodal spines 2, small; internodes usually unarmed. Buds brown, ovoid to narrowly so, 3–5 mm, glabrous or puberulent, apex acute. Petiole 0.5–1 cm, glabrous; leaf blade rhombic-ovate to suborbicular, 1–1.5 cm, thick, glabrous, base broadly cuneate to subrounded; lobes 3, margin irregularly obtusely dentate, apex obtuse or acute; terminal lobe longer than lateral ones. Male racemes 2.5–4 cm, 7–11-flowered, female ones slightly shorter, to 4 cm in fruit; rachis and pedicels pubescent, sometimes also sparsely shortly stalked glandular; bracts oblong, glabrous, caducous. Pedicel 2–4 mm. Calyx yellow to yellowish green, glabrous; tube shallowly cupular, 1.5–2 mm; lobes spreading or reflexed, broadly ovate, 2–3 mm. Petals flabellate to obovate, smaller than calyx lobes. Stamens somewhat longer than petals. Ovary glabrous. Style 2-lobed at apex. Fruit red, globose, 0.5–0.7 cm, glabrous. Fl. May–Jun, fr. Jul–Sep.

• Thickets along roadsides, mountain valleys, river banks; below 900 m. W Hubei, S Shaanxi.

40. *Ribes diacanthum* Pallas, Reise Russ. Reich. 3: 722. 1776.

双刺茶藨子 shuang ci cha biao zi

Shrubs dioecious, 1–2(–3) m tall. Branchlets slightly angled, glabrous; nodal spines 2, 3–5 mm; internodes unarmed or with sparse, slender prickles. Buds brownish, ovoid, 3–5 mm, glabrous, apex acute. Petiole 1–2 cm, glabrous, rarely sparsely puberulent; leaf blade obovate to rhombic-obovate, 1.5–3.5 × 1–3 cm, glabrous, base cuneate; lobes 3, margin deeply serrate, apex obtuse or acute. Male racemes nodding, 3–6 cm, 10–20-flowered, female ones 1–2.5 cm, 10–15-flowered; rachis and pedicels sparsely shortly glandular hairy; bracts lanceolate to ligulate, 4–6 mm, glabrous,

1-veined. Pedicel 2–4 mm. Calyx yellowish green, glabrous; tube rotate to saucer-shaped, 1–1.5 mm; lobes erect, ovate, rarely elliptic, 1.5–2 mm. Petals cuneate-orbicular, 0.5–1 mm. Stamens subequalling petals. Ovary subglobose, glabrous. Style 2-lobed at apex. Fruit red to reddish black, globose to ovoid-globose, 0.5–0.9 cm in diam., glabrous. Fl. May–Jun, fr. Aug–Sep.

Sandy hilly areas, sandy grasslands, river banks; below 1500 m. N Heilongjiang (Da Hinggan Ling), E Jilin, Nei Mongol [N Korea, NE Mongolia, Russia (Siberia)].

41. *Ribes heterotrichum* Meyer in Ledebour, Fl. Altaic. 1: 270. 1829.

圆叶茶藨子 *yuan ye cha biao zi*

Ribes orientale Desfontaines var. *heterotrichum* (Meyer) Janczewski.

Shrubs dioecious, 1–1.5 m tall. Branchlets stout, angled, puberulent then glabrescent, unarmed. Buds ovoid-lanceolate to oblong, 4–5 mm, apex acute; scales brown, 1-veined, margin sparsely shortly glandular hairy. Petiole 5–10 mm, puberulent; leaf blade suborbicular, 1–3 cm, glabrous or margin ciliate, rarely sparsely viscid glandular, base broadly cuneate to truncate; lobes 3(–5), margin coarsely obtusely dentate, apex obtuse or acute; terminal lobe subequalling lateral ones. Racemes erect, male ones 2–5 cm, female ones 2–3 cm, 6–10-flowered; rachis and pedicels pubescent, sometimes sparsely shortly stalked glandular; bracts ovate-lanceolate to oblong, 4–5 mm, 1-veined, margin sparsely glandular hairy. Pedicel 2–3 mm. Calyx purple or brownish red, glabrous or puberulent; tube shallowly cupular, 1.5–2.2 mm; lobes erect, ovate, 2–2.5 mm. Petals subflabellate. Stamens slightly longer than petals. Ovary glabrous. Style 2-lobed. Fruit red or red-yellow, sweet tasting, globose, 0.4–0.6 cm, glabrous. Fl. May–Jun, fr. Jul–Aug.

Thickets on rocky mountain slopes, ravines, streamsides; 1200–2500 m. N Xinjiang [Mongolia, Russia].

42. *Ribes kialanum* Janczewski, Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1909: 63. 1909.

康边茶藨子 *kang bian cha biao zi*

Shrubs dioecious, 1.5–3 m tall, most parts pubescent and glandular hairy. Branchlets stout, unarmed. Buds brown, ovoid to oblong-ovoid, 4–7 mm, pubescent, apex acute. Petiole 1–3.5 cm; leaf blade suborbicular to broadly ovate, 2–5 cm, base subtruncate to shallowly cordate; lobes 3–5, rarely almost absent, margin irregularly crenate-dentate or doubly dentate, apex obtuse or acute; terminal lobe broadly triangular-ovate, slightly shorter to longer than broadly ovate lateral ones. Racemes erect, male ones dense, 3.5–7 cm, female ones slightly shorter; bracts lanceolate to oblong, 4–8 mm, 1-veined. Pedicel 2–4 mm. Calyx green, sometimes tinged reddish brown, pubescent, usually also glandular hairy; tube cupular to hemispheric, 2–3 mm; lobes reflexed or spreading, ovate to ligulate, 2–3.5 mm,

inconspicuously 5-veined. Petals green tinged reddish purple, subflabellate to cuneate-spatulate. Stamens slightly longer than petals. Ovary glandular hairy. Style 2-lobed at apex. Fruit red to reddish brown, subglobose to ellipsoid, 0.5–0.8 cm in diam., shortly glandular hairy. Fl. Apr–May, fr. Jul–Sep.

• Coniferous forest margins, foothill thickets, ditch banks, roadsides; 2500–4000 m. W Sichuan, NW Yunnan.

43. *Ribes orientale* Desfontaines, Hist. Arb. 2: 88. 1809. 东方茶藨子 *dong fang cha biao zi*

Ribes leptostachyum Decaisne; *R. punctatum* Lindley (1810), not Ruiz & Pavón (1802).

Shrubs usually dioecious, 0.5–2 m tall, vegetative parts pubescent, sticky glandular and/or shortly stalked glandular. Branchlets stout, unarmed. Buds reddish brown, ovoid to oblong, 5–6 mm, apex obtuse or acute. Petiole 1–2(–3) cm; leaf blade suborbicular to reniform-orbicular, 1–3(–4) cm, base truncate to shallowly cordate; lobes 3–5, margin irregularly coarsely dentate or doubly dentate, apex obtuse or acute; terminal lobe subequalling lateral ones. Inflorescences and most flower parts pubescent and glandular pubescent; male racemes erect, 2–5 cm, 15–30-flowered, female ones 2–3 cm, 5–15-flowered, to 4 cm in fruit; bracts lanceolate to elliptic, 5–9 mm, 1-veined. Flowers rarely bisexual; pedicel 2–3 mm. Calyx purple to purplish brown; tube broadly saucer-shaped to rotate, 1–2 mm; lobes erect, ovate to subligulate, 2–2.5 mm, usually obscurely 3-veined. Petals subflabellate to subspatulate, 0.5–1 mm, ± pubescent. Stamens slightly longer than petals. Ovary ovoid. Style 2-lobed. Fruit red to purple, globose, 0.7–0.9 cm, pubescent and shortly stalked glandular. Fl. Apr–May, fr. Jul–Aug.

Forests, forest margins, rock crevices, roadsides; 2100–4900 m. W Sichuan, Xizang, NW Yunnan [Bhutan, India, Kashmir, Nepal, Russia; SW Asia, SE Europe].

44. *Ribes xizangense* L. T. Lu, Acta Phytotax. Sin. 31: 454. 1993.

西藏茶藨子 *xi zang cha biao zi*

Shrubs dioecious, 1–3 m tall. Branchlets smooth, pubescent, unarmed. Buds purple or brown, narrowly ovoid, 6–8 mm, apex obtuse or acute. Petiole 1.5–2 cm, glabrous or puberulent and sparsely glandular pubescent; leaf blade broadly ovate, 1.5–3 × 1.8–4 cm, sticky glandular or stalked glandular, base subtruncate to shallowly cordate; lobes 3–5, triangular to ovate, margin irregularly serrulate or doubly serrulate; terminal lobe equaling or slightly longer than lateral ones. Racemes erect or slightly pendulous, male ones 2–5 cm, 5–15(–20)-flowered, female ones 2–3 cm, 5–9-flowered; rachis and pedicels pubescent and glandular pubescent; bracts elliptic, rarely obovate-oblong, 4–7 mm, pubescent, 1-veined. Flowers 4–6 mm in diam.; pedicel 2–4 mm. Calyx dark purple, glabrous, rarely puberulent; tube pelviform, 1.4–1.8 mm; lobes erect, ligulate to ovate, 2–3(–3.5) mm. Petals purple,

subflabellate. Stamens slightly longer than petals. Ovary puberulent and glandular pubescent. Style 2-lobed. Fruit orange-red to purple, globose, 0.6–0.9 cm, puberulent and glandular pubescent then glabrescent. Fl. May–Jun, fr. Jul–Aug.

• Forests, thickets on high mountain slopes, mountain valleys; 3500–4600 m. Xizang.

45. *Ribes pseudofasciculatum* K. S. Hao, Repert. Spec. Nov. Regni Veg. 40: 213. 1936.

青海茶鉿子 qing hai cha biao zi

Ribes uniflorum T. C. Ku.

Shrubs dioecious, 0.5–1.5 m tall. Branchlets smooth, pubescent. Buds brown or brownish, oblong-ovoid, 4–6 mm, puberulent, apex acute. Petiole to 1 cm, pubescent, often shortly stalked glandular; leaf blade broadly ovate, 1.5–2 cm, thick, pubescent, eglandular, base cordate, rarely subtruncate; lobes 5, margin doubly serrate, apex acute; terminal lobe narrowly triangular-ovate, slightly longer than lateral ones. Male racemes 1–2 cm, 3–7-flowered, female ones shorter, (1 or)2–5-flowered; rachis and pedicels pubescent and glandular hairy; bracts oblong to obovate-oblong, longer than pedicels, pubescent, sometimes also shortly glandular hairy, 1-veined. Pedicel 2–3 mm. Calyx purple, pubescent; tube pelviform, 1–2 mm; lobes reflexed or spreading, oblong to ovate, 1.5–2.5 mm. Petals spatulate or flabellate, minute. Stamens subequaling petals; anthers broadly obovoid. Ovary glabrous. Style equaling or slightly longer than stamens, 2-lobed. Fruit black or reddish black, glossy, globose, 0.5–0.6 cm, glabrous. Fl. Jun–Aug, fr. Aug–Oct.

• Coniferous forests and thickets in high mountain regions, stony slopes, roadsides along ravines; 3000–4600 m. Qinghai, W Sichuan, E Xizang.

46. *Ribes humile* Janczewski, Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1910: 73. 1910.

矮醋栗 ai cu li

Shrubs dioecious, tufted, to 1 m tall, rarely more. Branchlets slender, glabrous, unarmed. Buds brown, ovoid, 3–4 mm, glabrous, apex acute. Petiole 5–10 mm, glabrous; leaf blade suborbicular to ovate, 1–2 cm, glabrous, rarely adaxially sparsely glandular hairy, base truncate to shallowly cordate; lobes 3, triangular-ovate, margin coarsely obtusely dentate, apex obtuse or acute; terminal lobe slightly longer than lateral ones. Male racemes 1.5–3.5 cm, 7–10-flowered, female ones shorter and fewer flowered; rachis and pedicels sparsely glandular pubescent; bracts oblong or elliptic, 3–5 × 1–2 mm, glabrous or margin sparsely stalked glandular. Pedicel 2–4 mm. Calyx purple, glabrous; tube cupular, 2–3 mm; lobes erect to spreading, rarely reflexed, ovate, 1.5–2.5 mm. Petals subflabellate to subobovate, very small. Stamens slightly longer than petals. Ovary glabrous. Style 2-lobed. Fruit red, globose, 0.5–0.7 cm, glabrous. Fl. May–Jun, fr. Jul–Aug.

• Forests by roadsides, thickets on mountain slopes; 1000–3300 m. Sichuan.

47. *Ribes glabricalycinum* L. T. Lu, Acta Phytotax. Sin. 31: 457. 1993.

光萼茶鉿子 guang e cha biao zi

Shrubs dioecious, to 1 m tall, rarely more. Branchlets glossy, pubescent then glabrous, unarmed. Buds oblong-ovoid, 3–6 mm, apex acute; scales herbaceous, puberulent or subglabrous. Petiole 0.5–1 cm, pubescent and sparsely glandular pubescent; leaf blade broadly ovate, 1–2 cm, pubescent, usually also glandular or adaxially shortly stalked glandular, base subtruncate to cordate; lobes 3–5, margin obtusely doubly dentate, apex acute, rarely obtuse; terminal lobe broadly ovate or rhombic, slightly longer than lateral ones. Male racemes 1–2.5 cm, 7–15-flowered, female ones shorter, (1–)3–5-flowered; rachis pubescent and sparsely glandular hairy; bracts oblong to obovate-oblong, 4–7 mm, pubescent or subglabrous, 1-veined, margin sparsely ciliate. Pedicel 2–5 mm, pubescent or subglabrous, sometimes remotely stalked glandular. Calyx green to yellow-green, glabrous; tube pelviform, 1–2 mm; lobes spreading, rarely reflexed at anthesis, ovate to ligulate, 1.5–2.5 mm. Petals obovate to flabellate, smaller than calyx lobes. Stamens longer than petals; anthers subglobose. Ovary glabrous. Style longer than stamens, 2-lobed. Fruit red, globose, 0.6–0.7 cm, glabrous. Fl. May–Jun, fr. Jul–Aug.

• Coniferous forests and thickets in high mountain regions, scrub along roadsides, plateau slopes; 2800–3800 m. W Sichuan.

48. *Ribes vilmorinii* Janczewski, Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1906: 290. 1906.

小果茶鉿子 xiao guo cha biao zi

Shrubs dioecious, 1–3 m tall. Branchlets pubescent, rarely subglabrous, unarmed. Buds brown to reddish brown, ovoid, 3–5 mm, glabrous or puberulent, apex obtuse to acute. Petiole 1–2 cm, sparsely stalked glandular; leaf blade ovate to suborbicular, 2–4 cm, abaxially glabrous or glandular hairy along veins and at margin, adaxially sparsely stalked glandular, base truncate, rarely shallowly cordate; lobes 3–5, ovate to narrowly triangular-ovate, margin irregularly coarsely obtusely dentate, apex acute to shortly acuminate, rarely obtuse; terminal lobe much longer than lateral ones. Male racemes erect, 1.5–2.5 cm, up to 10-flowered, female ones shorter, 1–1.5 cm, 2–7-flowered; rachis and pedicels pubescent and glandular hairy; bracts elliptic to elliptic-lanceolate, 2–5 mm, margin shortly glandular hairy. Pedicel 1–2 mm. Calyx green, sometimes slightly tinged reddish brown, pubescent, rarely subglabrous; tube cupular, 1.5–2 mm; lobes reflexed, suboblong, rarely broadly ovate, 2–2.5 mm, 3-veined. Petals flabellate to suborbicular, ca. 1.5 mm. Stamens not equaling or subequaling petals. Ovary ovoid, glabrous or pubescent and shortly stalked glandular. Style deeply divided. Fruit black, ovoid to globose, 0.4–0.6 cm in diam., glabrous or pubescent and sparsely stalked glandular. Fl. May–Jun, fr. Aug–Sep.

• Coniferous and mixed forests on mountain slopes, thickets in mountain valleys; 1600–4000 m. Hebei, W Sichuan, NW Yunnan.

1a. Ovary and fruit glabrous 48a. var. *vilmorinii*

1b. Ovary and fruit pubescent 48b. var. *pubicarpum*

48a. *Ribes vilmorinii* var. *vilmorinii*

小果茶藨子(原变种) xiao guo cha biao zi (yuan bian zhong)

Ovary and fruit glabrous.

• Coniferous and mixed forests on mountain slopes, thickets in mountain valleys; 1600–3900 m. Hebei, W Sichuan, NW Yunnan.

48b. *Ribes vilmorinii* var. *pubicarpum* L. T. Lu, Acta Phytotax. Sin. 31: 458. 1993.

康定茶藨子 kang ding cha biao zi

Ovary and fruit pubescent.

• *Abies* forests; ca. 4000 m. W Sichuan (Kangding Xian).

49. *Ribes rubrisepalum* L. T. Lu, Acta Phytotax. Sin. 31: 458. 1993.

红萼茶藨子 hong e cha biao zi

Shrubs dioecious, 1–3 m tall. Branchlets robust, glabrous or sparsely shortly glandular hairy, unarmed. Buds brown to purplish brown, ovoid, 4–6 mm, glabrous, apex obtuse. Petiole 1.5–2.5 cm, glabrous or sparsely stalked glandular; leaf blade broadly ovate to suborbicular, 2.5–4.5 cm, glabrous, sometimes shortly stalked glandular, base cordate; lobes 3–5, margin sharply incised serrate or doubly serrate, apex acuminate or shortly so; terminal lobe narrowly ovate to narrowly triangular-ovate, longer than subovate lateral ones. Male racemes erect, 3–5.5 cm, 14–20-flowered, female ones 2–4 cm, fewer than 15-flowered; rachis and pedicels pubescent and shortly glandular hairy; bracts lanceolate to oblong, 4–6 mm, 1-veined, margin sparsely shortly stalked glandular. Pedicel 2–4 mm. Calyx dark-red to purple, pubescent; tube saucer-shaped, rarely shallowly cupular, 1–2 mm; lobes erect, ligulate to ovate, 2–2.5 mm, 3-veined. Petals subflabellate, ca. 1 mm. Stamens purple, slightly longer than petals. Ovary puberulent when young. Style 2-lobed at apex. Fruit black, subglobose, 0.5–0.9 cm, glabrous. Fl. Apr–May, fr. Jul–Aug.

• Mixed forests on mountain slopes, coniferous forest margins, streamsides; 2200–4100 m. S Gansu, S Shaanxi (Taibai Shan), W Sichuan, NW Yunnan.

50. *Ribes franchetii* Janczewski, Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1909: 64. 1909.

鄂西茶藨子 e xi cha biao zi

Shrubs dioecious, 1–3 m tall, vegetative parts villous. Branchlets later glabrescent, unarmed. Buds brown, ovoid to narrowly so, 4–7 mm, apex acute. Petiole 1.5–3 cm, sometimes sparsely stalked glandular; leaf blade broadly ovate to suborbicular, 2.5–5 cm, more densely villous along veins abaxially, base truncate to shallowly cordate; lobes 3–5, margin deeply acutely serrate or doubly serrate, apex acuminate; terminal lobe rhombic-ovate, much longer than ovate-triangular lateral ones.

Male racemes lax, 6–7 cm, 10–15-flowered, female ones dense, shorter; rachis pubescent; bracts elliptic to elliptic-lanceolate, 6–8 mm, pubescent. Pedicel 2–4 mm, pubescent, sometimes sparsely glandular hairy. Calyx red, villous; tube cupular; lobes erect, ovate to obovate, 2.5–3.5 mm. Petals red, subflabellate. Stamens slightly longer than petals; filaments shorter than anthers in female flowers. Ovary densely villous and glandular hairy. Style 2-lobed at apex. Fruit reddish brown, globose, 0.4–0.6 cm, villous and stalked glandular. Fl. May–Jun, fr. Jul–Aug.

• Forest margins, thickets on shady slopes, rocks; 1400–2100 m. W Hubei (Badong Xian), S Shaanxi (Pingli Xian), Sichuan.

51. *Ribes maximowiczii* Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 11: 487. 1890.

华西茶藨子 hua xi cha biao zi

Ribes jessoniae Stapf.

Shrubs dioecious, 2–3 m tall. Branchlets stout, densely villous, stalked glandular, unarmed. Buds purple-brown, oblong-ovoid, 4–7 mm, pubescent, apex acute. Petiole 3–4 cm, villous and glandular hairy; leaf blade broadly ovate, 6–10 × 4.5–9 cm, abaxially villous, adaxially scattered pubescent, base shallowly cordate; lobes 3(–5), triangular-ovate, margin irregularly obtusely dentate or doubly dentate; terminal lobe much longer than lateral ones, apex acuminate; lateral lobes acute at apex. Racemes erect, male ones dense, 7–15 cm, 15–30-flowered, female ones 4–10 cm, fewer flowered; rachis and pedicels densely villous and long stalked glandular; bracts lanceolate, 6–8 mm, villous, margin sparsely ciliate. Pedicel 2–4 mm. Calyx yellowish green, slightly tinged red, villous and long glandular hairy; tube shallowly cupular to saucer-shaped, 1.5–2 mm; lobes ovate-orbicular to obovate, ca. 3 mm. Petals subflabellate, ca. 1 mm. Stamens somewhat longer than petals. Ovary globose, villous and long glandular hairy. Style 2-lobed. Fruit red or tinged yellow, ovoid-globose, 0.7–1 cm in diam., densely villous and long stalked glandular. Fl. Jun–Jul, fr. Aug.

• Forests or thickets in mountain valleys; 2500–3000 m. E Gansu, E Shaanxi.

52. *Ribes takare* D. Don, Prodr. Fl. Nepal. 208. 1825.

渐尖茶藨子 jian jian cha biao zi

Shrubs dioecious, 1–3 m tall. Branchlets reddish brown to brownish, stout, glabrous or slightly glandular hairy. Buds reddish brown, ovoid, 4–6 mm, apex acute; scales glabrous or puberulent at margin. Petiole 3–5 cm, glabrous, pubescent, or sparsely glandular hairy; leaf blade broadly ovate to suborbicular, 5–9 × 4–9 cm, sparsely glandular hairy, rarely pubescent, base cordate, rarely subtruncate; lobes 3–5, margin irregularly deeply doubly serrate; terminal lobe triangular-ovate, longer than lateral ones, apex acuminate; lateral lobes acute or shortly acuminate at apex. Male racemes erect, 6–10 cm, female ones robust, shorter; rachis and pedicels pubescent and shortly glandular hairy; bracts lanceolate, 4–7 mm, 1-veined, margin coarsely glandular hairy or ciliate. Pedicel 3–5 mm. Calyx reddish brown, sparsely

pubescent; tube cupular to pelviform, 1.5–2.5 mm; lobes erect or spreading in fruit, ligulate to oblong, 2–3 mm, 3-veined. Petals subflabellate or cuneate-orbicular, smaller than calyx lobes. Stamens exserted. Ovary obovoid, glabrous or sparsely pubescent. Style 2-lobed at apex. Fruit yellowish green turning reddish brown, ovoid to globose, 0.5–0.7 cm in diam., glabrous or pubescent. Fl. Apr–May, fr. Jul–Aug.

Forests or thickets on slopes or in mountain valleys, river banks in mountain valleys, roadsides; 1400–4000 m. SE Gansu, E Guizhou, SW Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, N India, Kashmir, Myanmar, Nepal, Sikkim].

- 1a. Branchlets and leaf blade sparsely glandular hairy, without eglandular hairs; raceme with both glandular and eglandular hairs; fruit glabrous, rarely puberulent when young 52a. var. *takare*
 1b. Branchlets, leaf blade, raceme, and fruit with both glandular and eglandular hairs 52b. var. *desmocarpum*

52a. *Ribes takare* var. *takare*

渐尖茶藨子(原变种) *jian jian cha biao zi* (yuan bian zhong)

Ribes acuminatum Wallich ex G. Don.

Branchlets and leaf blade sparsely glandular hairy, without eglandular hairs. Raceme with both glandular and eglandular hairs. Fruit glabrous, rarely puberulent when young.

Forests or thickets on slopes, river banks in mountain valleys; 1400–3300 m. SE Gansu, E Guizhou, SW Shaanxi, Sichuan, SE Xizang, NW Yunnan [Bhutan, N India, Kashmir, Myanmar, Nepal, Sikkim].

52b. *Ribes takare* var. *desmocarpum* (J. D. Hooker & Thomson) L. T. Lu in L. T. Lu & S. M. Hwang, Fl. Reipubl. Popularis Sin. 35(1): 351. 1995.

束果茶藨子 *shu guo cha biao zi*

Ribes desmocarpum J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 87. 1858.

Branchlets, leaf blade, raceme, and fruit with both glandular and eglandular hairs.

Coniferous forests and thickets in mountain valleys, slopes, roadsides; 2000–4000 m. W Sichuan, Xizang, Yunnan [Bhutan, N India, Myanmar, Nepal, Sikkim].

53. *Ribes komarovii* Pojarkova, Trudy Bot. Inst. Akad. Nauk SSSR, Ser. 1, Fl. Sist. Vyssh. Rast. 2: 209. 1936.

长白茶藨子 *chang bai cha biao zi*

Shrubs dioecious, 1.5–3 m tall. Branchlets glabrous, unarmed. Buds brown or brownish red, oblong-ovoid, 5–8 mm, apex acuminate; scales glabrous or puberulent at margin. Petiole 6–17 mm, glabrous, sometimes sparsely stalked glandular; leaf blade broadly ovate to suborbicular, sometimes narrower, 2–6 × 2–5 cm, sparsely glandular hairy, base subrounded to truncate, rarely shallowly cordate to cuneate; lobes usually 3, margin irregularly crenate-dentate, apex obtuse or acute; terminal lobe much longer than lateral ones. Racemes erect, male ones 2–5 cm, more than 10-flowered, female ones 1.5–2.5 cm, 5–10-flowered; rachis and pedicels shortly stalked glandular; bracts brownish,

elliptic, 4–6 mm, glabrous or margin sparsely glandular hairy. Pedicel 2–4 mm. Calyx green, glabrous; tube cupular, 1.5–2.5 mm; lobes erect, ovate to narrowly so, subequaling tube. Petals obovate to subflabellate, minute, not equaling calyx lobes. Stamens somewhat longer than petals. Ovary glabrous. Style 2-lobed. Fruit red, obovoid-globose to globose, 0.7–0.8 cm, glabrous. Fl. May–Jun, fr. Aug–Sep.

Forests, forest margins, thickets, stony slopes; 400–2100 m. Gansu, W Hebei, SE Heilongjiang, W Henan, Jilin, Liaoning, Shaanxi, Shanxi [N Korea, Russia].

- 1a. Leaf blade broadly ovate to suborbicular, 2–6 cm, base subrounded to truncate, rarely shallowly cordate 53a. var. *komarovii*
 1b. Leaf blade narrower, 3–5 cm, base cuneate 53b. var. *cuneifolium*

53a. *Ribes komarovii* var. *komarovii*

长白茶藨子(原变种) *chang bai cha biao zi* (yuan bian zhong)

Ribes maximowiczianum Komarov var. *saxatile* Komarov

Leaf blade broadly ovate to suborbicular, 2–6 cm, base subrounded to truncate, rarely shallowly cordate.

Forests by roadsides, thickets, stony slopes; 700–2100 m. Gansu, W Hebei, SE Heilongjiang, W Henan, Jilin, Liaoning, Shaanxi, Shanxi [N Korea, Russia].

53b. *Ribes komarovii* var. *cuneifolium* Liou, Ill. Fl. Lign. Pl. N. E. China, 562. 1955.

楔叶长白茶藨子 *xie ye chang bai cha biao zi*

Leaf blade narrower, 3–5 cm, base cuneate.

• Broad-leaved forests and forest margins on slopes; 400–800 m. E Jilin, E Liaoning.

54. *Ribes maximowiczianum* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 22: 443. 1903.

尖叶茶藨子 *jian ye cha biao zi*

Ribes distans Janczewski; *R. tricuspe* Nakai.

Shrubs dioecious, to 1 m tall. Branchlets glabrous, unarmed. Buds brownish, ovoid, 4–7 mm, apex acuminate; scales glabrous or margin puberulent. Petiole 5–10 mm, glabrous or sparsely glandular hairy; leaf blade broadly ovate to suborbicular, 2.5–5 × 2–4 cm, abaxially usually coarsely appressed hairy only along veins, adaxially coarsely appressed pubescent, base broadly cuneate to rounded, rarely truncate; lobes 3, margin coarsely obtusely serrate; terminal lobe subrhombic, longer than lateral ones, apex acuminate; lateral lobes ovate-triangular, apex acute. Male racemes 2–4 cm, more than 10-flowered, female ones shorter, fewer than 10-flowered; rachis and pedicels sparsely shortly glandular hairy; bracts elliptic-lanceolate, 3–5 mm, glabrous or margin ciliate. Pedicel 1–3 mm. Calyx yellowish brown, glabrous; tube saucer-shaped, 1.5–2 mm; lobes erect, narrowly ovate, 1.5–2.5 mm. Petals obovate, minute. Stamens equaling or longer than petals, reduced ones clavate in female flowers; anthers subequaling filaments. Ovary glabrous. Style 2-lobed.

Fruit red, subglobose, 0.6–0.8 cm, glabrous. Fl. May–Jun, fr. Aug–Sep.

Forests and thickets in valleys, mountain slopes; 900–2700 m. Heilongjiang, Jilin, E Liaoning [Japan, Korea, Russia].

55. *Ribes luridum* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 87. 1858.

紫花茶鉚子 *zi hua cha biao zi*

Shrubs dioecious, 1–3 m tall. Branchlets glabrous, unarmed. Buds ovoid to oblong-ovoid, 4–6 mm, glabrous, apex acute. Petiole 1–3 cm, glabrous or puberulent, sparsely shortly stalked glandular; leaf blade broadly ovate to suborbicular, 2–5 cm, sparsely obscurely glandular pubescent, adaxially also eglandular pubescent, base subtruncate to shallowly cordate; lobes 3–5, ovate to rhombic-ovate, margin coarsely obtusely dentate, sometimes with some double teeth, apex obtuse or acute; terminal lobe slightly longer than lateral ones. Male racemes 3–5 cm, 8–20(–25)-flowered, female ones shorter, fewer flowered; rachis pubescent and sparsely glandular pubescent; bracts lanceolate to oblong, 4–7 mm, puberulent, 1-veined, margin sparsely glandular hairy. Pedicel 1–3 mm, puberulent or sparsely stalked glandular. Calyx purple to brownish red, glabrous; tube shallowly cupular, 1.5–2 mm; lobes erect, ovate, rarely ligulate, 2–2.5 mm. Petals subflabellate to cuneate-spatulate, 0.5–0.7 mm. Stamens longer than petals. Ovary glabrous. Style longer than stamens, apex 2-lobed. Fruit black, subglobose, 0.5–0.7 cm in diam., glabrous. Fl. May–Jun, fr. Aug–Sep.

Forests, forest margins, slopes, river banks; 2800–4100 m. W Sichuan, NW Yunnan [E Himalayas].

56. *Ribes tenue* Janczewski, Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1906: 290. 1906.

细枝茶鉚子 *xi zhi cha biao zi*

Shrubs dioecious, 1–4 m tall. Branchlets slender, usually stalked glandular, unarmed. Buds purplish brown, ovoid to oblong-ovoid, 4–6 mm, apex acute. Petiole 1–3 cm, glabrous or sparsely glandular pubescent; leaf blade narrowly ovate, rarely suborbicular, 2–5.5 × 2–4 cm, pubescent then glabrescent, base truncate to cordate, margin lobed or parted; lobes or segments 3–5, margin incised doubly serrate, sometimes also with remote, coarse, sharp, simple teeth; terminal lobe or segment rhombic-ovate, 2–3 × as long as ovate or rhombic-ovate lateral ones, apex acuminate to caudate. Male racemes 3–5 cm, 10–20-flowered, female ones 1–3 cm, 5–15-flowered; rachis and pedicels pubescent and sparsely glandular hairy; bracts brown, lanceolate to oblong-lanceolate, 4–7 mm, 1-veined, margin shortly glandular hairy. Pedicel 2–6 mm. Calyx reddish brown, glabrous; tube saucer-shaped, 1–1.5 mm; lobes erect, ligulate to ovate, 2–3.5 mm. Petals dark red, cuneate-spatulate to subobovate, ca. 1 mm. Stamens subequaling petals; filaments subequaling anthers. Ovary glabrous. Style 2-lobed, shortly clavate in male flowers. Fruit dark red, rarely black,

globose, 0.4–0.7 cm, glabrous. Fl. May–Jun, fr. Aug–Sep.

Forests or thickets on mountain slopes and in valleys, thickets in grasslands, ditch banks along roadsides; 1300–4200 m. E Gansu, W Henan, W Hubei, NW Hunan, SW Shaanxi, Sichuan, Yunnan [Himalayas].

At least some of the records of *Ribes tenue* from the Himalayas may refer to the similar and closely related *R. laciniatum*.

1a. Leaf blade margin lobed; fruit usually dark red 56a. var. *tenue*

1b. Leaf blade margin parted; fruit black 56b. var. *incisum*

56a. *Ribes tenue* var. *tenue*

细枝茶鉚子(原变种) *xi zhi cha biao zi* (yuan bian zhong)

Ribes coeleste Janczewski.

Leaf blade margin lobed. Fruit usually dark red.

Thickets on mountain slopes and in valleys, ditch banks along roadsides; 1300–4000 m. E Gansu, W Henan, W Hubei, NW Hunan, SW Shaanxi, Sichuan, Yunnan [Himalayas].

56b. *Ribes tenue* var. *incisum* L. T. Lu, Acta Phytotax. Sin. 31: 458. 1993.

深裂茶鉚子 *shen lie cha biao zi*

Leaf blade margin parted. Fruit black.

• Coniferous forests on mountain slopes, thickets in grasslands; 2200–4200 m. W Sichuan, NW Yunnan (Zhongdian Xian).

57. *Ribes glaciale* Wallich in Roxburgh, Fl. Ind. 2: 513. 1824.

冰川茶鉚子 *bing chuan cha biao zi*

Shrubs dioecious, 2–3(–5) m tall. Branchlets glabrous or slightly pubescent, unarmed. Buds brownish red, oblong, 4–7 mm, apex acute; scales herbaceous, glabrous. Petiole pinkish, 1–2 cm, glabrous or sparsely stalked glandular; leaf blade narrowly ovate, rarely suborbicular, 3–5 × 2–4 cm, abaxially puberulent along veins, adaxially glabrous or sparsely glandular hairy, base rounded to subtruncate; lobes 3–5, margin coarsely serrate, sometimes with some double teeth; terminal lobe narrowly triangular-ovate, 3–4 × as long as ovate lateral ones, apex acuminate. Male racemes 2–5 cm, 10–30-flowered, female ones 1–3 cm, 4–10-flowered; rachis and pedicels pubescent, shortly stalked glandular; bracts ovate-lanceolate to oblong-lanceolate, 3–5 mm, 1-veined, margin ciliate. Pedicel 2–4 mm. Calyx brownish red, glabrous; tube shallowly cupular, 1–2 mm; lobes erect, ovate to ligulate, 1–2.5 mm. Petals subflabellate to cuneate-spatulate, not equaling calyx lobes. Stamens equaling or longer than petals. Ovary obovoid-oblong, glabrous, rarely sparsely glandular hairy. Style 2-lobed at apex. Fruit red, sour tasting, subglobose to obovoid-globose, 0.5–0.7 cm in diam., glabrous. Fl. Apr–Jun, fr. Jul–Sep.

Forests and thickets in mountain valleys, mountain slopes, rocks; 1900–3000 m. SE Gansu, Henan, W Hubei, Shaanxi, Sichuan, SE Xizang, NW Yunnan [Bhutan, N India, Kashmir, N Myanmar, Nepal, Sikkim].

58. *Ribes viridiflorum* (Cheng) L. T. Lu & G. Yao in L. T. Lu & S. M. Hwang, *Fl. Reipubl. Popularis Sin.* 35(1): 345. 1995.

绿花茶鉶子 lu hua cha biao zi

Ribes tenue Janczewski var. *viridiflorum* Cheng, *Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot.* 10: 120. 1936.

Shrubs dioecious, 1–3 m tall. Branchlets smooth, glabrous, unarmed. Buds brownish, ovoid to oblong-ovoid, 4–6 mm, apex obtuse to acute. Petiole 1.5–3 cm, long glandular hairy; leaf blade broadly ovate to suborbicular, rarely narrowly ovate, 2–7 × 2–6 cm, pubescent, later glabrescent, adaxially sparsely appressed stalked glandular, base subtruncate to cordate; lobes 3–5, margin coarsely sharply serrate, sometimes with some double teeth; terminal lobe rhombic-ovate to rhombic, longer than ovate lateral ones, apex shortly acuminate. Male racemes 4–9 cm, 8–20-flowered, female ones shorter, 6–18-flowered; rachis and pedicels pubescent, sometimes stalked glandular; bracts oblong to oblong-lanceolate, 5–9 mm, 1-veined, margin shortly ciliate. Pedicel 2–5 mm. Calyx green to yellowish green, glabrous; tube saucer-shaped, 1.5–2 mm; lobes erect, oblong to ligulate, 2–3 mm. Petals greenish white, suborbicular. Stamens subequaling petals. Ovary glabrous. Style 2-lobed at apex. Fruit red, globose, 0.6–0.8 cm, glabrous. Fl. Apr–May, fr. Jun–Jul.

• Forests on mountain slopes, rocks, roadsides; 500–1200 m. N Zhejiang.

59. *Ribes laciniatum* J. D. Hooker & Thomson, *J. Proc. Linn. Soc., Bot.* 2: 87. 1858.

裂叶茶鉶子 lie ye cha biao zi

Shrubs dioecious, 1–3 m tall. Branchlets pubescent and sparsely stalked glandular, unarmed. Buds purplish brown, oblong to oblong-ovoid, 5–7 mm, glabrous, apex shortly acuminate. Petiole 1–2.5 cm, pubescent and sparsely glandular hairy; leaf blade broadly ovate to suborbicular, 2–5 × 1.8–4.5 cm, abaxially pubescent (and sometimes glandular hairy) only along veins, adaxially pubescent and appressed glandular hairy, base truncate to cordate; lobes 3–5, margin incised doubly serrate, often also with some large, simple teeth, apex acute to shortly acuminate; terminal lobe rhombic to ovate, slightly longer than lateral ones. Male racemes erect, 3–5 cm, 9–20-flowered, female ones almost as long, fewer flowered; rachis and pedicels pubescent and glandular pubescent; bracts lanceolate to elliptic-lanceolate, 3–6 mm, 1-veined, margin shortly ciliate. Pedicel 2–4 mm. Calyx reddish or purplish brown, glabrous; tube saucer-shaped, 1–2 mm; lobes erect, lanceolate to narrowly oblong, 2–3.2 mm. Petals purple, flabellate to subcuneate-orbicular, 0.5–0.6 mm. Stamens slightly longer than petals. Ovary ca. 0.6 mm, glabrous. Style 2-lobed. Fruit red to dark purple, globose 0.5–0.7 cm. Fl. Jun–Jul, fr. Aug–Oct.

Coniferous or broad-leaved forests on mountain slopes, thickets, grasslands, streamsides, mountain valleys; 2700–4300 m. Xizang, Yunnan [Bhutan, N India, N Myanmar, Nepal, Sikkim].