

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 caespitose 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. *Porphyrion*
 - 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 caespitose 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.
 - 13a. Basal leaf margin coarsely 5–8-toothed toward apex; sepals to 2.5 mm 13. *S. laciniata*
 - 13b. 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, sub lanceolate, 1.3–1.5 × 0.4–0.5 mm, subcarnose, glabrous on both surfaces, 1-veined, margin glandular ciliate, apex subobtusely. 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 subobtusate 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 subobtusate. 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, subcarinate, veins 3, confluent into a verruca at apex, margin sparsely ciliate, apex subobtusate. 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 subobtusate. 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 caespitose, 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 cylindrical, 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 ± cylindrical, 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 subobtusate 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 (Zèkog Xian).

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 subobtusate 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)].

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.

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. Lévillé & 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 paniculate, 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 paniculate, 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 paniculate, 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 isosyntyple 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. $2n = 26, 28, 38, ca. 44, 48, 66, ca. 80, 92, 112, 150.$

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. microgyna*
 - 5b. Petals overlapping, more than 2 mm wide.
 - 6a. Sepal veins confluent into a verruca at apex 182. *S. deqenensis*
 - 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. mucronulatooides*
- 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 lacinate.
- 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. punctulatoides*
 - 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, \pm 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. haplophylloides*
 - 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. eglanulosa*
 - 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. maxionggouensis*
 - 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. yezihiensis*
- 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. subtsangchanensis*
 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 subobtuse.
 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. paiquensis*
 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 subequaling 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 subequaling 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 dianxibeiensis* 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 cespitose, 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 (Dêrong 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 subobtusate 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.

隆伽虎耳草 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, cespitose, 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 sub-superior, 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 (Baoxing 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 subobtusate 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.

六痲虎耳草 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 villous. 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, caespitose, 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 subobtuse 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, caespitose, 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 subobtuse 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 subobtusate. 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 subobtusate 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 subobtusate. 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 sessile to subsessile, 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 sessile, 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 yaluzangboensis*.” 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 subobtusate. Flower solitary or cyme 2-flowered, nodding especially in bud; bracts oblong, ca. 8 × 2 mm, dark brown glandular hairy, apex subobtusate; 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, 8.5–9 × 2.6–2.7 mm, not callose, 3- or 4-veined, base with a claw 0.7–0.8 mm, apex retuse. Stamens 3.3–4.5 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, 6–11 × 3–7 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, 5.4–5.5 × 2–3 mm, carinose, glandular hairy abaxially, adaxially distally, and marginally, veins 5, not confluent at apex, apex subacute. Petals yellow, narrowly obovate, 1–1.3 cm × 4–4.2 mm, not callose, 5-veined, base contracted into a claw ca. 1.3 mm, apex obtuse or acute. Stamens 3.4–5 mm. Ovary semi-inferior, ovoid, 2.5–2.7 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, 1.5–4 × 1–1.7 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, 1.3–7.5 × 0.3–2.2 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, 3.5–5.4 × 1.4–3 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, 7.4–9.6 × 2.5–3 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, 5–12 × 2–5 mm, glabrous, base cuneate, apex acute. Cauline leaves ca. 2, sometimes hidden in basal rosette, sublinear to linear-oblong; leaf blade 6–15 × 1–2 mm, subcarinose, base crisped glandular villous, margin glandular hairy. Flower solitary; pedicel 0.8–12 mm, brown glandular hairy. Sepals erect-spreading, ovate, gibbous, 3–7 × 2–4 mm, subcarinose, both surfaces glabrous, veins 3–7, confluent into a verruca at apex, margin ± brown glandular ciliate. Petals yellow, sometimes orange spotted, ovate or elliptic to suboblong, 6.2–11 × 3–7 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, 4–10 × 1.1–5 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, 4.6–6 × 2.7–4 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, 8–10 × 5–6 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. quadricullosa* 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 quadricullosa* 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 subsuperior, 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 & Irmscher, Bot. Jahrb. Syst. 48: 582. 1912.

春丕虎耳草 chun pi hu er cao

Herbs perennial, caespitose, 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, caespitose, 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, subcarinate, 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, caespitose, 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, caespitose, 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, cespitose, 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 cespitose, 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 cespitose, 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 cespitose, 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 cespitose, 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 0.7–1.2 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-oblanceolate 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 subsessile. 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 subobtuse. 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 subspatulate 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 nakaoides* 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 subobtusely. 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 subobtusely. 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 subobtusely. 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 glandular 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 glandular 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 subobtuse 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. D): 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-Petersbourg, 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 caespitose, (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 screens, 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 & Irsmscher, 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, caespitose, 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, caespitose, 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 & Irmscher.

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., Harbin 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 villous. 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 specimen 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 & Irmischer, Notes Roy. Bot. Gard. Edinburgh 5: 141. 1912.

马耳山虎耳草 ma er shan hu er cao

Hirculus balfourii (Engler & Irmischer) 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. *gemmaefera* 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 & Irmischer; *S. strigosa* f. *simplex* Engler & Irmischer; *S. strigosa* f. *subsexualis* Engler & Irmischer.

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, $6-7.4 \times 1.5-2.2$ 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, $3-4 \times 1.5-2.5$ mm, abaxially and marginally glandular hairy, veins 3–7, not partly, or fully confluent at apex, apex obtuse or subacute. Petals yellow, obovate, $(5-7)-8 \times 2-4$ 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, $0.8-1.8 \text{ cm} \times 1.5-8$ 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, $1.6-5.3 \times 0.7-2.5$ mm, glabrous or abaxially and marginally \pm glandular hairy, veins 3–7,

partly or fully confluent at apex, apex acute. Petals yellow, ovate or obovate to elliptic, $4.3-6.6 \times 1.6-3.1$ 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, $5-12 \times 0.4-2.8$ 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, $3.5-5 \times 1.6-3$ 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, $5.5-9 \times 2.3-5.2$ 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 (Baoping 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, $5-7 \times 1.8-2$ 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, $3.6-4 \times 2-2.2$ mm, carnosely glabrous, veins 3 or 4, not or partly confluent at apex, apex acute. Petals yellow, subspatulate, $5.2 \times 1.6-1.8$

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 (Médog 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.

猓状虎耳草 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, sessile; 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 scarios 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, scarios 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 subobtusate 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 mm, 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.

隱茎虎耳草 *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, $6\text{--}6.8 \times 2\text{--}2.5$ mm, subcarnose, both surfaces glabrous, margin glandular ciliate, apex subobtuse. Cauline leaves subelliptic, ca. 5.9×3.6 mm, subcarnose, both surfaces glabrous, margin glandular ciliate, apex obtuse. Flower solitary, sessile. Sepals spreading, broadly ovate, ca. $2.5 \times 2\text{--}2.2$ mm, subcarnose, abaxially and marginally glandular hairy, veins 3, confluent at apex, apex obtuse. Petals yellow, broadly obovate to elliptic, $2.5\text{--}2.7 \times 1.8\text{--}2$ 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 spatulate to suboblong, adaxially concave, $4.5\text{--}5.5 \times 1.6\text{--}2.2$ mm, subcarnose, 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, $4\text{--}6.6 \times 0.8\text{--}1.1$ mm, subcarnose, glandular hairy, apex obtuse. Flower solitary; pedicel 0.8–4.5 cm, glandular hairy. Sepals reflexed, subelliptic to subovate, $3\text{--}4.2 \times 1.5\text{--}2.5$ mm, abaxially and marginally \pm 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, $5.5\text{--}7 \times 2.4\text{--}4$ 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 spatulate, subelliptic, or suboblong to subensate, $2\text{--}5 \times 1\text{--}2$ mm, carnosae, 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, $2.0\text{--}3.5 \times 1.2\text{--}2.5$ mm, abaxially and marginally usually \pm 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, $4\text{--}7 \times 1.5\text{--}3.4$ 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, Gongsan 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, $5\text{--}6.2 \times$ ca. 1.5 mm, carnosae, glabrous, base gradually narrowed, apex subobtuse. Flowering stem leaves remote, narrowly obovate to oblong, $5.6\text{--}10 \times 1.5\text{--}3$ mm, largest near middle of stem, carnosae, both surfaces glabrous on proximal leaves, margin dark brown glandular hairy on distal leaves, apex subobtuse. 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, $7.3\text{--}8 \times 5\text{--}6$ 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 screens; 3300–4900 m. NW Yunnan (Lijiang Xian, Zu Zizhixian, Zhongdian Xian).

133. *Saxifraga chrysanthoides* Engler & Irmscher, 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 & Irmscher) 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 \times 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 \times ca. 1.5 mm, subcarnose, both surfaces glabrous, veins 5, confluent at apex, margin often setose-ciliate distally. Petals yellow, elliptic, 5–6 \times 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 \times 0.5–1 mm, carnose, both surfaces glabrous, margin setose-ciliate, apex mucronate. Cauline leaves few, remote, linear to narrowly obovate, 2–4 \times 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 \times 1–1.5 mm, subcarnose, both surfaces and margin glabrous, veins 3, confluent at apex. Petals yellow or orange, narrowly elliptic, 6–7 \times 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 \times 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 \times 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 \times 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 \times 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 \times 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 \times ca. 1.5 mm, carnose, both surfaces glabrous, margin setose-ciliate. Cauline leaves linear-oblong, 3–4.5 \times 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 \times 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 \times 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 \times 1.2 mm, subcarnose, both surfaces glabrous, margin cartilaginous setose-ciliate, apex mucronate. Cauline leaves spatulate-oblong, ca. 3.3 \times 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 \times 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 cespitose, 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, cespitose, 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, cespitose, 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 (Dêqên Xian).

142. *Saxifraga gemmigera* Engler in Diels, Bot. Jahrb. Syst. 29: 366. 1900.

芽虎耳草 *ya hu er cao*

Herbs perennial, cespitose, 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, carnose, glabrous or sparsely ciliate. Rosette leaves obovate to subspatulate, 3–5 × 1–2 mm, carnose, 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 some-

times 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, carnose, 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 gemmigera* var. *gemmigera*

芽虎耳草(原变种) ya hu er cao (yuan bian zhong)

Hirculus gemmigerus (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 gemmigera* 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 gemmuligerus* (Engler) Losinskaja; *Saxifraga gemmuligera* (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, carnose, 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, carnose, 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 (Mèdog 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 cespitose, 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, carnose, 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, carnose, 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 cespitose, 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 ± glandular hairy, veins 3–7, confluent into a verruca at apex, apex rounded. Petals yellow, obovate or ovate, 6–7 × 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 ± 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 × 1.5 mm, carnosule, glabrous, 3-veined. Cauline leaves oblong-linear, 5.5–11.5 × 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 × 0.6–1.4 mm, carnosule, glabrous, veins 3 or 4, not confluent at apex, apex subobtusate or acute. Petals yellow, narrowly ovate to suboblong, 3.9–6 × 1.9–2.2 mm, 2-callose near base, 3-veined, base contracted into a claw 0.6–1 mm, apex subobtusate. 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 × 1.7 mm, both surfaces glabrous, margin setose-ciliate, apex acute. Cauline leaves narrowly oblong or ensiform- to spatulate-oblong, 6.6–8.2 × 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 × 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 × 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 × 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 × 1.2–2 mm, carnosule, 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 × 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. *yungningensis* 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

• Alpine scrub meadows, alpine meadows, alpine lakesides, screes, rock crevices; 4100–4700 m. SW Sichuan, NW Yunnan.

near middle of stem, carnos, 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, carnos, 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, carnos, 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, cespitose, 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, subcarnos, 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, carnos, 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, carnos, 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 subobtuse 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. D): 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, carnosose, both surfaces glabrous, margin cartilaginous setose-ciliate, apex acute, aristulate. Cauline leaves remote, ovate to obovate or oblong, 3–7

× 1–3.2 mm, carnose, 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, subcarnose, both surfaces glabrous, distal margin sparsely setose-ciliate. Cauline leaves lanceolate to narrowly oblong, 2.3–3.5 × 0.5 mm, subcarnose, glabrous or distally glandular ciliate, apex subobtusate. Flower solitary; pedicel slender, 0.9–1.6 cm, glabrous. Sepals reflexed, subelliptic, ca. 2 × 1 mm, subcarnose, 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, subcarnose, 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, subcarnose, 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, subcarnose, both surfaces glabrous, margin cartilaginous setose-ciliate distally, apex mucronate. Cauline leaves remote, linear, 4–7 × 1–1.5 mm, subcarnose, 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, caespitose, 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, carnose, both

surfaces glabrous, adaxially pustulate distally, margin cartilaginous pustulate and ciliate, apex obtuse. Cauline leaves aggregated, subspatulate, ca. 4.9 × 1.4 mm, carnosely 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, subcarnose, 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, subcarnose, both surfaces glabrous, adaxially pustulate distally, margin cartilaginous pectinate distally, apex subobtusely. Cauline leaves subsessile, 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, carnosely, 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 subspatulate, 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 subobtusely 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.

蔻齿虎耳草 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 subs spatulate, 5.5–13 × 1.5–3 mm, carnose, 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, carnose, 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 subsediformis 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, $0.5\text{--}2$ cm \times $1.4\text{--}5.5$ mm, subcarnose, adaxially and marginally tawny glandular hairy, apex obtuse or acute. Cauline leaves remote, elliptic or broadly so to oblong, $3\text{--}14 \times 2.3\text{--}7$ mm, adaxially and marginally tawny glandular hairy, apex acute. Inflorescence corymbose, $2.5\text{--}11.7$ cm, 5–33-flowered; branches $2\text{--}8.5$ cm, 2–4-flowered; pedicels $0.9\text{--}1.2$ cm, tawny glandular hairy. Sepals spreading to reflexed, lanceolate, $3.4\text{--}5 \times 1.2\text{--}1.7$ mm, abaxially and marginally tawny glandular hairy, veins 3, confluent into a verruca at apex, apex acute. Petals yellow, elliptic to narrowly ovate, $6\text{--}7.5 \times 2.4\text{--}3$ mm, 2-callose, 3-veined, base subcordate, narrowed into a claw $0.8\text{--}1.4$ mm. Stamens $3.2\text{--}5.5$ mm. Ovary superior, ovoid, $2.2\text{--}3.5$ mm; styles $1\text{--}1.5$ 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, $1.6\text{--}2.3$ cm \times $4.5\text{--}8$ mm, leathery, glandular hairy, apex acute. Cauline leaves elliptic to obovate, $1\text{--}2.6$ cm \times $5.5\text{--}12$ mm, glandular hairy, margin entire, apex acute. Inflorescence $7.5\text{--}12.5$ cm, 19–28-flowered; branches glandular hairy. Sepals spreading, lanceolate, $5.5\text{--}6 \times$ 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 $1.2\text{--}1.5$ 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, $1.7\text{--}2.2$ cm \times $7.5\text{--}8.5$ mm, both surfaces and margin brown glandular hairy, margin entire, apex acute. Cauline leaves spatulate to subobovate, $1.5\text{--}1.9 \times 0.9\text{--}1.2$ 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 $2.1\text{--}5.7$ cm, brown glandular hairy, 2- or 3-flowered; pedicels $3\text{--}5$ mm, brown glandular hairy. Sepals suberect, lanceolate, $5\text{--}5.2 \times 1.5\text{--}1.7$ 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 $3.5\text{--}4.5$ 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. *parentiramea* Engler & Irmscher.

Herbs 15–38 cm tall. Stem brown glandular hairy. Basal leaves aggregated into a rosette; leaf blade spatulate to obovate, $1.5\text{--}6$ cm \times $5.3\text{--}14$ mm, both surfaces and margin brown glandular hairy, margin 3–7-dentate distally. Cauline leaves remote, subspatulate, $1.5\text{--}2.7$ cm \times $5.8\text{--}12$ mm, both surfaces and margin brown glandular hairy, margin 3–8-dentate. Inflorescence paniculate, $10\text{--}14$ cm, 19–29-flowered; branches $4.5\text{--}9$ cm, densely brown glandular hairy, 1–3-flowered; pedicels $0.8\text{--}1.5$ cm, densely brown glandular hairy. Sepals spreading to reflexed, lanceolate to narrowly ovate, $4\text{--}7 \times 1.5\text{--}2.1$ 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, $5.9\text{--}6.1 \times 2.3\text{--}3.1$ mm, 2-callose near base, 3–5-veined, base cordate, with a claw $1\text{--}1.3$ mm, apex acute. Stamens $3.5\text{--}5.5$ mm. Ovary superior, subglabrous, $2\text{--}4$ mm in diam.; styles $1\text{--}1.5$ 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, carnosose, 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.

痢虎耳草 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. Pleiochasium 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 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 subobtuse 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 subobtuse 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 subobtuse 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 subobtuse 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 (Guangtou 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-oblancheolate, 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 subobtusate 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, carnosae, 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, carnosae, 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, screens, 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. 1759.

球茎虎耳草 qiu jing hu er cao

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 subobtuse 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-ob lanceolate, 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 glandular 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, subsessile; 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, 6.8–7 × ca. 2 mm, chalk glands 3–5(or 6), margin setose-ciliate proximally. Cauline leaves remote, subspatulate, 6.5–7.3 × 1.8–1.9 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, 4–5 × 2.5–3 mm, glandular hairy abaxially and at margin, veins 3–5, partly or fully confluent at apex, apex glabrous. Petals yellow, orbicular, 4.6–5.5 × 4–4.7 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 (Mêdog 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, 4–7 × 1.3–2 mm, leathery, both surfaces glabrous, chalk glands 5, margin denticulate-ciliate proximally or glabrous, apex recurved, obtuse. Cauline leaves lanceolate-oblong, 3.5–5 × 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 sublanceolate, 2–3 × 1–1.4 mm, abaxially and marginally sparsely glandular pilose, veins 3, not confluent at apex, apex acute. Petals usually pink, obovate, ca. 5 × 2.5–3.3 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. ID): 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, 5–10 × 1.2–2.6 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, 3–9.3 × 1.1–1.6 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, 1.5–3 × 1–2 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, 1.3–5 × 1.2–3.2 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, 3.3–5 × 1.1–2 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, 4.5–5 × 0.9–2 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, 2–2.8 × 1.2–2 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 & Imscher, Notes Roy. Bot. Gard. Edinburgh 5: 146. 1912.

美丽虎耳草 *mei li hu er cao*

Chondrosea pulchra (Engler & Imscher) 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 spatulate, 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, subobtusate. 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, subobtusate. 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, Pflanzenr. 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, $1.5\text{--}2.5 \times 1.3\text{--}2.3$ 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, $3\text{--}5 \times 1.9\text{--}4.5$ 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, $3.5\text{--}4 \times 0.8\text{--}1$ 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, $1.6\text{--}2 \times$ 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, $3.5\text{--}5.3 \times (1.5\text{--})2\text{--}3$ 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, $3.5\text{--}4 \times 1.6\text{--}2.3$ mm, subleathery, both surfaces glabrous, chalk gland 1, margin pilose, apex obtuse. Cauline leaves opposite, remote, subobovate, $4.2\text{--}4.5 \times 2.6\text{--}2.9$ 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 subobtuse, 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, $3\text{--}4 \times 1.5\text{--}2$ 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 × 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 × 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 × ca. 1.6 mm, leathery, chalk gland 1, margin glandular ciliate near base, apex thickened; pedicel ca. 0.4 mm, glabrous. Sepals 4, erect, ± semiorbicular, 1.2–1.3 × 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 × 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 cespitose. Flowering stem slender, to 1.5 cm, glandular pilose. Shoot leaves opposite, imbricate, obovate-elliptic, ca. 5 × 2.5–3.7 mm, glabrous, chalk glands 3–7, bases connate-perfoliate, apex subobtuse 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 × 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 × 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 × 0.9–1 mm, leathery, glabrous, chalk gland 1, obscure, vein 1, apex ± reflexed, thickened. Flower solitary. Sepals erect, then spreading to reflexed, subelliptic to ovate, 1.4–1.5 × 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, cespitose, 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, $3-6.5 \times 0.7-2.4$ 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, $1.5-2.7 \times 1-2$ 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, $3-5.6 \times 1-3.4$ 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].

