

- 20a. Leaves ovate or ovate-elliptic, 3–4 × 1.5–3 cm, base broadly rounded to cuneate, often oblique; petals obovate-orbicular 1. *P. alboreticulata*
 20b. Leaves oblong or obovate-oblong, (3–)5–7 × 2.5–3.5(–4) cm, base cuneate; petals ovate-oblong 8. *P. decorata*
 19b. Leaves without white stripes over veins adaxially, or inconspicuous if present.
 21a. Leaf margin crenate; petiole more than 1.5 × as long as leaf blade 18. *P. morrisonensis*
 21b. Leaf margin entire or sinuate; petiole less than 1.5 × as long as leaf blade.
 22a. Leaves narrowly oblong, leaf blade 2.5–3 × as long as wide, apex acute 9. *P. elegantula*
 22b. Leaves suborbicular, broadly ovate to elliptic, leaf blade less than 2 × as long as wide, apex obtuse to rounded.
 23a. Sepals lanceolate-triangular; style 1.1–1.3 cm; bracts linear-lanceolate 11. *P. japonica*
 23b. Sepals narrowly lanceolate to ovate-lanceolate or ligulate; style shorter than 1 cm; bracts lanceolate or long ligulate.
 24a. Sepals lanceolate.
 25a. Flowers 0.8–1 cm in diam.; sepals ca. as long as or slightly longer than petals 12. *P. macrocalyx*
 25b. Flowers 1.5–2 cm in diam.; sepals ca. 1/2–2/3 as long as petals 20. *P. rotundifolia*
 24b. Sepals ligulate or ovate-lanceolate.
 26a. Leaves light green abaxially; flowers ca. 1 cm in diam.; sepals 3–4 mm, margin sparsely slightly denticulate 7. *P. dahurica*
 26b. Leaves often glaucous abaxially; flowers 1.5–2 cm in diam.; sepals 5–7.5 mm, margin entire 4. *P. calliantha*

1. *Pyrola alboreticulata* Hayata, Icon. Pl. Formos. 3: 142. 1913.

花叶鹿蹄草 hua ye lu ti cao

Herbs to 20 cm tall. Leaves approximate to remote; petiole 3–4 cm; leaf blade deep green with pale veins adaxially, ovate or ovate-elliptic, 3–4 × 1.5–3 cm, leathery, base rounded, abruptly decurrent, margin with remote, minute teeth, apex acute, mucronulate. Scape ca. 10 cm; scales basal; raceme 1–4-flowered, 2–4 cm. Pedicel ca. 4 mm; bract linear, 8–10 mm. Flowers semipendent, 1.5–1.8 cm in diam. Sepals narrowly oblong, 5–6 × ca. 2.5 mm, apex obtuse. Petals white, obovate-orbicular, 7–7.5 × ca. 6 mm, apex rounded. Filaments complanate, yellow, 3–3.5 × 1–1.2 mm, tubules present. Style exerted, 8–10 mm, upper part curved, dilated at apex, without ring of lobes. Capsules 7–8 mm in diam. Fl. and fr. Jan.

• Middle elevations. Taiwan.

2. *Pyrola asarifolia* Michaux subsp. *incarnata* (de Candolle) E. Haber & H. Takahashi, Bot. Mag. (Tokyo) 101: 492. 1988.

红花鹿蹄草 hong hua lu ti cao

Pyrola rotundifolia Linnaeus var. *incarnata* de Candolle, Prodr. 7: 773. 1839; *P. asarifolia* var. *incarnata* (de Candolle) Fernald; *P. incarnata* (de Candolle) Freyn; *P. incarnata* var. *ovatifolia* Y. Z. Zhao; *P. rotundifolia* subsp. *incarnata* (de Candolle) Krylov; *P. rotundifolia* var. *purpurea* Bunge.

Herbs 1–5 cm tall. Rhizome creeping, long, somewhat thick, 0.7–2 mm in diam., branched, with sparse fine roots. Stems ascending. Leaves appearing radical, 3–8, in 2 or 3 subverticils of 3 or 4 each; petiole 3–5 cm; leaf blade pale green abaxially, green and shiny adaxially, elliptic or ovate-elliptic, 2–5.5 × 1.5–5.5 cm, base rounded or scarcely cordate, rarely subacute, margin obscurely serrulate, apex rounded to obtuse. Scape erect, 10–25 cm tall, angled, glabrous, with 4 or 5

broadly lanceolate-elliptic membranous basal scales and 1–4 lanceolate scales near middle; raceme densely 7–15-flowered. Bracts broadly lanceolate, membranous, apex acuminate. Flowers drooping, zygomorphic. Sepals narrowly ovate to broadly lanceolate, ca. 2 × as long as wide, 1.7–4.7 × 1.1–2.3 mm, apex acute to acuminate. Petals rose, 5–9 × 3–6 mm. Filaments curved upward; anthers dark purple, gathered above style, 1.4–3 mm, tubules present, opening by narrow terminal pores. Style exerted, curved, 6–10 mm, dilated at apex into a ring; stigma with a collar and 5 erect cylindrical lobes. Capsules 7–8 mm in diam. Fl. Jun, fr. Jul–Oct.

Dry deciduous broad-leaved and coniferous forests; sea level to 2500 m. Hebei, Heilongjiang, ?Henan, Jilin, Liaoning, E Nei Mongol, ?Ningxia, Shanxi, ?Sichuan, Xinjiang [Japan, N Korea, Mongolia, Russia].

3. *Pyrola atropurpurea* Franchet, J. Bot. (Morot) 9: 372. 1895.

紫背鹿蹄草 zi bei lu ti cao

Pyrola atropurpurea var. *gracilis* Andres; *P. gracilis* (Andres) Andres.

Herbs 7–18 cm tall. Rhizome slender, branched. Leaves 2–4, crowded at base of aerial shoots; leaf blade reddish purple abaxially, green adaxially, cordate-ovate, (1–)1.5–3 × (1–)1.2–3 cm, papery, base cordate, margin slightly crenulate, apex obtuse. Scape erect, slender, without scales or 1 or 2 scale-shaped leaves, green-brown, lanceolate, membranous; raceme 2–4(–5) mm, naked or with 1 or 2 minute lanceolate bracts, 2–4-flowered. Pedicel 3–5 mm; bracts ovate, ca. 2 mm. Flowers nodding, cup-shaped, 0.8–1.5 cm in diam. Sepals reddish purple, ovate-triangular, ca. 1.5 × 1.5 mm, apex obtuse. Petals white, oblong-obovate, 5–7 × 3–5 mm, apex obtuse. Filaments glabrous; anthers yellow, ca. 3 × 1.5 mm, tubules present. Style exerted, recurved, 9–11 mm, dilated at apex into ring; stigma thickened, with 5 round lobes. Capsules 5–6 mm in diam. Fl. Jun–Jul, fr. Aug–Sep.

• Montane coniferous forests, mixed forests; 1800–4000 m. Gansu, Henan, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan.

4. *Pyrola calliantha* Andres, Acta Horti Gothob. 1: 173. 1924.

鹿蹄草 lu ti cao

Pyrola andresii Křisa; *P. calliantha* var. *tibetana* (Andres) Y. L. Chou; *P. hopeiensis* Nakai; *P. rockii* Křisa; *P. rotundifolia* Linnaeus subsp. *chinensis* (Andres) Andres; *P. rotundifolia* var. *chinensis* Andres; *P. rotundifolia* var. *communis* Andres; *P. rotundifolia* var. *laurifolia* Andres; *P. rotundifolia* var. *sphaeroides* Andres; *P. rotundifolia* subsp. *tibetana* (Andres) Andres; *P. rotundifolia* var. *tibetana* Andres.

Herbs (10–)15–30 cm tall. Rhizome long, slender, branched, producing adventitious roots and aerial stems at nodes; caudex ribbed, 15–30 cm, with a basal rosette of crowded leaves and 1 or 2 bracts; bracts brownish, oblong-ovate, sheathing, scales. Petiole 2–5.5 cm; leaf blade purplish and often glaucous abaxially, green adaxially, elliptic or ovate, (2.5–)3–6 × 2–3.5 cm, leathery, base broadly cuneate or suborbicular, margin entire or crenate, apex obtuse or rounded. Scape with 1 or 2 ovate-lanceolate or lanceolate scalelike bracts sheathing at base; raceme 9–13-flowered, 12–16 cm. Pedicel 5–8(–10) mm; bracts ligulate, 6–7.5 mm. Flowers spreading or rarely nodding, rotate, 1.5–2 cm in diam. Sepals ligulate, (3–)5–7.5 × (1.5–)2–3 mm, margin entire, apex often acute. Petals pure white, obovate-elliptic or obovate, 6–10 × 5–8 mm. Filaments glabrous; anthers yellow, (2.1–)2.5–4 × 1–1.4 mm, tubules present. Style ± exerted, light red, 6–8(–10) mm, nearly erect or upper part slightly curved upward, dilated at apex into a ring. Capsule 7–9 mm in diam. Fl. Jun–Aug, fr. Aug–Sep.

• Montane coniferous forests, mixed forests; 700–4100 m. Anhui, Fujian, Gansu, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Shandong, Shanxi, Sichuan, Xizang, Yunnan, Zhejiang.

5. *Pyrola chlorantha* Swartz, Kongl. Vetens. Acad. Nya Handl. 190. 1810.

绿花鹿蹄草 lü hua lu ti cao

Pyrola solunica S. D. Zhao; *P. virens* Schweigger; *Thelasia chlorantha* (Swartz) Alefeld.

Herbs 11–18 cm tall. Rhizome long, slender, branched. Aboveground stem very short. Leaves 2–4, basal; petiole 2–5 cm; leaf blade pale abaxially, dark green adaxially, rather dull, suborbicular, 1–1.6 × 1–1.2 cm, leathery, base rounded to acute, margin minutely crenulate, apex rounded. Scape including inflorescence 10–20 cm high, usually with a solitary scale; raceme laxly 2–8-flowered, slightly nutant, nodding, 1.5–3.5 cm. Pedicel 4–5 mm; bracts lanceolate. Flowers cup-shaped, ca. 1 cm in diam. Sepals triangular-ovate, ca. as long as wide, 1–1.5 mm, basal widest 1–1.5 mm, apex ± acute or obtuse. Petals greenish white, ovate or elliptic, 5–6 mm. Filaments dilated at base; anthers yellow, oblong, mucronate at distal end; tubules curved, pores oblique. Style exerted, longer than petals, strongly bent, somewhat thickened upwards, dilated at apex into ring. Capsule ca. 6 mm in diam. Fl. Jun, fr. Aug.

Pinus sylvestris var. *mongolica* forests; below 1000 m. Nei Mongol [Mongolia].

6. *Pyrola corbieri* H. Lévillé, Bull. Acad. Int. Géogr. Bot. 12: 254. 1903.

贵阳鹿蹄草 gui yang lu ti cao

Pyrola chlorantha Swartz subsp. *fallax* Křisa.

Herbs 11–33 cm tall. Rhizome ascending, slender, branched. Leaves 2–6, basal. Scales at stem base 1–3 mm wide, not or slightly sheathing. Petiole 1–3.5 cm; leaf blade dark green with pale veins adaxially, oblong or oblong-ovate, 3.5–7 × 1.5–3.5 cm, slightly leathery, base cuneate or attenuate, margin entire or shallowly crenate, apex subacute. Scape ca. 2 mm in diam., narrowly winged, scalelike leaves 1 or 2, brown, narrowly linear, 1–1.5 cm, base slightly amplexicaul, apex acuminate or acute; raceme 4–9-flowered, short, 1.5–2.5(–4) cm. Flowers nodding, broadly saucer-shaped, relatively large. Pedicel 5–8 mm, bract axillary, narrowly lanceolate, 5–8 mm, longer or ca. as long as pedicel, membranous, apex acuminate. Sepals purplish brown, oblong, ca. 4 × 1.5–2 mm, apex obtuse or acute. Petals white, obovate or orbicular, 5–7 × 4–5 mm. Filaments glabrous; anthers red, ca. 3 mm. Style included or slightly exerted, distinctly curved, dilated at apex into a ring. Capsule 6–8 mm in diam. Fl. Jul–Aug, fr. Sep–Oct.

Streamsides in *Pinus* forests; 2100–2700 m. Guangxi, Guizhou, Sichuan [Bhutan].

7. *Pyrola dahurica* (Andres) Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 39: 96. 1923.

兴安鹿蹄草 xing an lu ti cao

Pyrola americana Swartz var. *dahurica* Andres, Deutsche Bot. Monatsschr. 22: 50. 1911; *P. forrestiana* Andres subsp. *dahurica* (Andres) Křisa; *P. incarnata* (de Candolle) Freyn subsp. *dahurica* (Andres) Křisa; *P. rotundifolia* Linnaeus subsp. *dahurica* (Andres) Andres.

Herbs 15–23 cm tall. Rhizome long, slender, branched. Leaves (2 or)3–6(or 7), crowded at base of caudex; petioles 2.8–4.5 cm; leaf blade light green abaxially, green adaxially, suborbicular or broadly ovate, (2.5–)3–5 × 2.5–4 cm, leathery, base broadly cuneate or orbicular, margin entire or slightly crenate, apex obtuse or rounded. Raceme 5–10-flowered, 4–8(–10) cm. Pedicel 4–5 mm; bracts ligulate or lanceolate, 4–5 mm. Flowers nodding, spreading, ca. 1 cm in diam. Sepals ligulate, rarely lanceolate, 3–4 × ca. 1.5 mm, margin remotely denticulate, apex often acute. Petals white, obovate, 5–7 × 4–5 mm, apex rounded. Filaments short, ca. 5 mm, glabrous; anthers yellow, 2.5–2.7 × 1–1.5 mm, tubules present. Style slightly exerted, 6–7 mm, upper part curved upward, dilated at apex into a ring, conspicuously so at least at fruiting. Capsule ca. 5 mm in diam. Fl. Jul, fr. Aug.

Coniferous forests, mixed forests, becoming dominant in herbaceous layer; 700–1800 m. Heilongjiang, Jilin, Liaoning, Nei Mongol [Mongolia].

8. *Pyrola decorata* Andres, Notes Roy. Bot. Gard. Edinburgh 8: 7. 1913.

普通鹿蹄草 pu tong lu ti cao

Pyrola alba Andres; *P. alba* var. *viridiflora* Andres; *P. de-*

corata var. *alba* (Andres) Y. L. Chou & R. C. Zhou; *P. handeliana* Andres; *P. oreodoxa* Andres.

Herbs 15–35 cm tall. Rootstock long, slender, branched. Leaves 3–6, crowded at base of caudex; petiole 2–3 cm; leaf blade light green and purplish abaxially, deep green with pale veins adaxially, oblong or obovate-oblong, (3–)5–7 × 2.5–4 cm, thinly leathery, base cuneate, decurrent, margin with remote minute teeth, apex acute or mucronulate. Scape slender, with 1 or 2 scalelike leaves at base; raceme 4–10-flowered, 2.5–4 cm. Pedicel 5–9 mm; bract lanceolate, 5–9 mm, membranous. Flowers ± nodding, saucer-shaped, 1–1.5 cm in diam. Sepals ovate-oblong, 3–6 × 2–2.5 mm, apex acute. Petals light green to white, obovate-oblong, 6–8 × 5–7 mm, apex rounded. Filaments glabrous; anthers yellow, 3–4 × 1–1.5 mm, tubules present. Style exserted, 6–10 mm, curved, dilated at apex into a ring. Capsules 7–11 mm in diam. Fl. Jun–Jul, fr. Jul–Aug.

Pinus or broad-leaved forests, scrub; 600–3000 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Xizang, Yunnan, Zhejiang [Bhutan].

9. *Pyrola elegantula* Andres in Handel-Mazzetti, Symb. Sin. 7: 764. 1936.

长叶鹿蹄草 *chang ye lu ti cao*

Pyrola elegantula var. *jiangxiensis* Y. L. Chou & R. C. Zhou.

Herbs 14–25 cm tall. Rhizome long, slender, branched. Leaves 3–6, crowded at base of caudex; petiole 2–3 cm; leaf blade light green abaxially, deep green adaxially, narrowly oblong, 4–8 × 1.5–3 cm, thinly leathery, base cuneate, decurrent to petiole, margin with remote minute teeth, apex acute. Scape slender, with 1 or 2 scalelike leaves; raceme 4–6-flowered, 2–4 cm. Pedicel 4–9 mm; bracts lanceolate, 4–9 mm, membranous. Flowers spreading, broadly cup-shaped, 1–1.5 cm in diam. Sepals narrowly ligulate, 3–6 × 1–2 mm, apex acuminate. Petals white, obovate-oblong, 7–10 × 4–6 mm, apex rounded. Filaments 5–6 mm, glabrous; anthers yellow, 3–4 mm, tubules present. Style exserted, curved, 9–13 mm, dilated at apex into a ring. Capsules 8–10 mm in diam. Fl. Jun, fr. Jul.

• Montane forests; 1200–1800 m. Fujian, Guangdong.

10. *Pyrola forrestiana* Andres, Notes Roy. Bot. Gard. Edinburgh 8: 8. 1913.

大理鹿蹄草 *da li lu ti cao*

Herbs 20–27 cm tall. Rhizome slender, branched. Leaves 3–7; petiole 2–4.5 cm; leaf blade light green abaxially, green adaxially, triangular ovate, obovate, or suborbicular, 2.5–4.5 × 2–3.5 cm, thickly leathery, rough, base rounded or truncate, margin conspicuously crenate, apex obtuse. Scales at base of scape, narrowly oblong, 8–12 × 3–5 mm; raceme 6–9 cm, 9–12-flowered. Pedicel 5–10 mm; bracts oblong-lanceolate, slightly longer than pedicel, membranous, apex acute. Flowers nodding, saucer-shaped, 1–1.5 cm in diam. Sepals triangular or triangular-ovate, 1.5–2.5 × 1.5–2 mm, apex obtuse. Petals greenish yellow, ovate or suborbicular, 7–9 × 5–7 mm. Filaments flattened; anthers yellow, oblong, tubules present. Style exserted, ca. 1 cm, curved at upper part, dilated at apex into a ring. Cap-

sules 5–7 mm in diam. Fl. Jul–Aug, fr. Aug–Sep.

• Moist shaded forests; 1500–3800 m. Hubei, Hunan, Sichuan, Xizang, Yunnan.

11. *Pyrola japonica* Klenze ex Alefeld, Linnaea 28: 57. 1856.

日本鹿蹄草 *ri ben lu ti cao*

Pyrola asarifolia var. *japonica* (Klenze ex Alefeld) Miquel; *P. incarnata* (de Candolle) Freyn var. *japonica* (Klenze ex Alefeld) Koidzumi; *P. japonica* var. *subaphylla* (Maximowicz) Andres; *P. japonica* f. *subaphylla* (Maximowicz) Ohwi; *P. rotundifolia* Linnaeus var. *albiflora* Maximowicz; *P. rotundifolia* f. *subaphylla* (Maximowicz) Makino; *P. subaphylla* Maximowicz.

Herbs 5–30 cm tall. Rhizome descending and sometimes creeping, somewhat thick, 0.8–2 mm in diam., sparsely branched; roots somewhat thick, to 0.5 mm in diam. Stems ascending, sometimes branched. Leaves appearing radical, 3–6, in 1 or 2 subverticils of 1–3 each; petiole 3–8 cm; leaf blade pale green or reddish abaxially, deep green with pale or white veins adaxially, elliptic, broadly elliptic, or obovate, rarely orbicular, (3–)4–7 × 2.5–4.5 cm, somewhat thick, base rounded, obtuse, or subacute, margin rather sparsely and obscurely serrulate, apex rounded to obtuse. Scape erect, (6–)15–30 cm tall, with 3–6 scales near base; scales narrowly to broadly lanceolate or oblanceolate, costate, up to 2 leaflike scales and sometimes 1 smaller, lanceolate scale near middle; raceme rather sparsely 5–12-flowered, 6–10 cm. Pedicel with bracts broadly linear to lanceolate, 5–8 mm, apex long acuminate. Flowers drooping, zygomorphic, 10–12 mm in diam. Sepals broadly lanceolate to narrowly ovate, (1–)2.5–5(–6) × (2–)4–6 mm, apex acute. Petals ovate-elliptic, 3.5–4 × 1.6–2 mm, apex acuminate. Filaments curved upward; anthers creamy white, orange-yellow near apex, 2–3 mm, prolonged into terminal tubules, opening by terminal pores. Style exserted, sometimes scarcely so, curved to somewhat slightly so, 1.1–1.3 cm, dilated at apex but without ring-shaped protuberance; stigma with a collar and 5 erect cylindrical lobes. Capsules 7–8 mm in diam. Fl. Jun–Aug, fr. Sep–Oct.

Common, mainly in dry forests; sea level to 1500 m. Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Taiwan [Japan, Korea].

12. *Pyrola macrocalyx* Ohwi, Acta Phytotax. Geobot. 1: 80. 1932.

长萼鹿蹄草 *chang e lu ti cao*

Herbs 14–21 cm tall. Rhizome long, slender, branched. Leaves 2–6, crowded at base of caudex; petiole 1.5–3.5 cm, often shorter than blade; leaf blade light green with purple abaxially, green adaxially, elliptic, obovate, or ovate, 2.3–4.2 × 1.4–3.8 cm, leathery, base broadly cuneate or orbicular, margin entire or slightly crenate, apex obtuse or rounded. Scape subtended by 1–3 scalelike bracts; raceme 6–10(–15)-flowered, 3–5 cm. Pedicel 3–4 mm; bracts lanceolate, 5–7 × 1.4–1.5 mm, longer than pedicel, membranous. Flowers spreading, saucer-shaped, ca. 1 cm in diam. Sepals lanceolate, 4.5–5 × ca. 1 mm, margin entire, apex acuminate. Petals white, obovate, 5–6 × 3–4 mm, apex acute or obtuse. Filaments glabrous; anthers yellow, 2–2.5 × ca. 1 mm, tubules present. Style not or slightly exsert-

ed, 6–6.5 mm, nearly erect or upper part curved upward, without dilated ring at apex. Capsule 4–6 mm in diam. Fl. Jul–Aug, fr. Aug–Sep.

Betula forests, coniferous forests; 700–2100 m. S Jilin (Changbai Shan) [Korea].

13. *Pyrola markonica* Y. L. Chou & R. C. Zhou, Bull. Bot. Res., Harbin 1(4): 113. 1981.

马尔康鹿蹄草 *ma er kang lu ti cao*

Herbs 8–10 cm tall. Rhizome long, slender, branched. Leaves 4–7, basal, petiole 1–2 cm; leaf blade light green abaxially, deep green adaxially, broadly obovate-elliptic or elliptic, 1.8–2.5 × 1.2–1.7 cm, subleathery, base rounded or broadly cuneate, margin minutely glandular sinuate, apex obtuse. Scape subtended by 2 or 3 ovate-oblong, scalelike leaves; raceme 6–8-flowered, 1.5–2 cm. Pedicel 3–4 mm; bracts lanceolate, 6.5–7 mm, longer than pedicel, membranous. Flowers slightly nodding, broadly cup-shaped, 1–1.5 cm in diam. Sepals oblong, 4–4.5 × 2–2.5 mm, apex cuspidate. Petals purplish red, obovate-oblong, 8–9 × 5–6 mm, apex rounded. Filaments glabrous; anthers yellow, ca. 3 mm, tubules present, with acuminate base and projecting at apex. Style exerted, curved, ca. 7 mm, apex dilated but without ring-shaped protuberance. Capsules ca. 6 mm in diam. Fl. Jul–Aug, fr. Aug–Sep.

• *Abies* and *Picea* forests; ca. 3500 m. Sichuan.

14. *Pyrola mattfeldiana* Andres, Repert. Spec. Nov. Regni Veg. 40: 235. 1936.

贵州鹿蹄草 *gui zhou lu ti cao*

Herbs 20–28 cm tall. Rhizome long, branched, ascending. Leaves 3–7, crowded at base of caudex; petiole usually shorter than blade; leaf blade abaxially brown, adaxially deep green, elliptic or oblong, 5–7.5 × 2–3 cm, thinly leathery, base cuneate, margin entire or with obscure small teeth, apex obtuse. Scapes thick, with 2 or 3 acute bracts; raceme 5–12-flowered, 3.5–5 cm. Pedicel 5–6 mm; bracts ovate-lanceolate, 5–6 mm. Flowers nodding, 7–8 mm in diam., subglobose. Sepals ovate-oblong or ovate-lanceolate, ca. 4 × 2 mm, margin yellowish, apex obtuse. Petals white, oblong, ca. 7 × 6 mm, apex rounded. Filaments glabrous, flattened, ca. 1.5 mm wide at base; anthers yellow, ca. 3 × 1.5 mm, tubules present. Style not exerted, earlier erect, later declined and curved, dilated at apex into a ring. Capsule 7–9 mm. Fl. Jun, fr. Jul.

• Montane forests; 2600–3000 m. Guizhou, Sichuan.

15. *Pyrola media* Swartz, Kongl. Svenska Vetenskapskad. Handl. 257. 1804.

小叶鹿蹄草 *xiao ye lu ti cao*

Amelia media (Swartz) Alefeld; *Thelasia media* (Swartz) Alefeld.

Herbs 10–30(–33) cm tall. Rhizome brown, slender, strongly branched. Leaves 4–6, rosulate; petiole usually longer than blade; leaf blade slightly green abaxially, green adaxially, orbicular or orbicular-ovate, 2.9–3.5 × 2.3–2.6(–3) cm, leathery, base rounded or cuneate-rounded, margin obscurely crenate

with shallow and broad or sometimes flat crenations, apex rounded. Scapes 10–33 cm, with a solitary acute bract at or below middle; raceme 3–5(–7) cm, 5–12-flowered. Pedicels (5–)8–9 mm in fruit; bract oblong, longer than pedicel, 4–6 × 1.5–2.5 mm, apex rounded. Flowers slightly nodding, half-opened, saucer-shaped. Sepals reddish, ovate-lanceolate, margins not overlapping, apex acuminate, often recurved at tip. Petals white or at base pinkish, elliptic or suborbicular, 6–8 × 4.5–6 mm, apex rounded. Filaments connivent around pistil, flattened, glabrous; anther yellow, (1.9–)2.1–2.3(–2.5) mm. Style slightly exerted, somewhat declined, 5–5.5 mm, dilated at apex into a ring; stigma 5-lobed. Capsule compressed-globose, 4–5 × 6.5–8 mm. Fl. Jun–Jul.

Coniferous forests; 1900–2600 m. S Jilin (Changbai Shan), N Xinjiang (Altay Shan) [Mongolia, Russia; C Asia, Europe].

16. *Pyrola minor* Linnaeus, Sp. Pl. 1: 396. 1753.

短柱鹿蹄草 *duan zhu lu ti cao*

Amelia minor (Linnaeus) Alefeld; *Braxilia minor* (Linnaeus) House; *B. parvifolia* Rafinesque; *Erxlebenia minor* (Linnaeus) Rydberg; *E. rosea* Opiz.

Herbs (7–)12–20 cm tall. Rhizome creeping, long, somewhat slender, 0.5–1 mm in diam., branched, with sparse fine roots. Aerial stems ascending, short or somewhat long, 0.5–2.5 cm, not branched. Leaves appearing radical, 4–8, in 2 or 3 subverticils of 2–4 each; petiole 1–2.5 cm; leaf blade pale green abaxially, green adaxially, broadly elliptic to orbicular, 1.5–4.5 × 1.5–3 cm, base obtuse to truncate, margin crenulate to obsolete serrulate, apex obtuse or mucronulate. Scape erect, 8–18 cm tall, angled, glabrous, with 3–5 broadly lanceolate-elliptic or broadly oblanceolate scales at base, up to 2 leafy scales or leaves near base, and up to 2 narrowly lanceolate to broadly linear scales near middle; raceme densely 7–16-flowered, 2–3.5 cm. Pedicel 3–6 mm; bracts broadly linear, 3–6 mm, usually longer than pedicel. Flowers drooping, regular, 6–7 mm in diam. Sepals depressed-deltoid or broadly ovate, 1–2 × 1–2 mm, apex obtuse to acuminate. Petals white, 3–6 mm, apex retuse. Filaments connivent, surrounding pistil, short, thick, glabrous; anthers yellow, 0.9–1.4 mm, without distinct tubules, apex truncate, opening by wide terminal pores. Style included, ca. 2 mm, straight or slightly curved, not dilated at apex into a ring; stigma with a collar and 5 radially arched lobes. Capsules 4–6 mm in diam. Fl. Jul, fr. Aug. $2n = 46$.

Subalpine deciduous broad-leaved forests; 500–2500 m. Heilongjiang, Jilin, Xinjiang, Xizang, Yunnan [Japan, N Korea, Russia; widely distributed in cool N temperate and subarctic zones].

This is a rare species in China.

17. *Pyrola monophylla* Y. L. Chou & R. C. Zhou, Bull. Bot. Res., Harbin 1(4): 111. 1981.

单叶鹿蹄草 *dan ye lu ti cao*

Herbs 11–19 cm tall. Rhizome long, slender, branched. Leaf solitary, basal; petiole ca. 3 cm; leaf blade glaucous abaxially, green adaxially, broadly elliptic or suborbicular, ca. 3 × 2.5 cm, thinly leathery, base subrounded, margin entire or crenulate, apex obtuse or rounded. Scape thick, with 3–5 ovate-lanceolate bracts, sheathed at base; raceme 5- or 6(–9)-flowered,

3–4(–8.5) cm. Pedicel 5–6 mm; bracts oblong-lanceolate, 6–7 mm, membranous. Flowers nodding. Sepals ovate-oblong or triangular-oblong, 3.5–4 × 2–2.5 mm, apex often acute. Petals white, ovate-oblong, 6–7 × 3–3.5 mm. Filaments glabrous; anthers yellow with purple, ellipsoid, 2.6–2.9 mm, tubules present. Style upper part curved upward, short, ca. 4 mm, dilated at apex into a ring; stigma shallowly 5-lobed. Capsule 5–6 mm in diam. Fl. Aug, fr. Sep.

- Montane mixed forests; ca. 2700 m. Yunnan.

18. *Pyrola morrisonensis* (Hayata) Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25(19): 155. 1908.

台湾鹿蹄草 tai wan lu ti cao

Pyrola elliptica Nuttall var. *morrisonensis* Hayata, Bot. Mag. (Tokyo) 20: 18. 1906.

Herbs to 20 cm tall. Rhizome ascending, slender, branched. Leaves 3–8, basal, alternate or subopposite; petiole 5–6 cm, complanate; leaf blade slightly green abaxially, green adaxially, ovate-suborbicular to ovate-rhombic, 2–3 × 2–2.5 cm, base rounded or truncate to subacute, margin crenulate-serrulate, apex rounded, obtuse, or emarginate. Scape 4–8.5(–25) cm; scales narrowed; raceme 6–11-flowered, 10–25 cm. Pedicel 7–8 mm; bracts narrowly oblong, ca. 8 × 3 mm, apex acute. Flowers ± nodding, saucer-shaped, ca. 1.5 cm in diam. Sepals ovate, ca. 2.5 × 2 mm, apex obtuse or acute. Petals white, orbicular-oblong, 6–7 × 5–6 mm, margin obscurely denticulate, apex rounded. Filaments 6–7 mm; anthers yellow, occasionally with purple, 2–2.6 × 1–1.5 mm, tubules present. Style upper part curved upward, 7–9 mm, exserted, dilated at apex into ring. Capsules ca. 5 mm in diam. Fl. and fr. unknown.

- High mountains; 1900–3200 m. Taiwan.

19. *Pyrola renifolia* Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9 [Prim. Fl. Amur.]: 190. 1859.

肾叶鹿蹄草 shen ye lu ti cao

Pyrola soldanellifolia Andres.

Herbs 10–21 cm tall. Rhizome creeping, long, slender, 0.2–0.8 mm in diam., branched, with sparse fine roots. Aerial stems ascending, short, usually ca. 0.5 cm, rarely to 2 cm. Leaves appearing radical, 1–3(–6), in 1 or 2 subverticils, long petiolate; leaf blade pale green abaxially, deep green with paler or white veins adaxially, reniform, 1–3 × 1.5–4 cm, base cordate, often with overlapping margins, margin crenulate or obsolete serrulate, apex rounded or shallowly emarginate. Scapes erect, but nodding earlier, 7–21 cm tall, slender, somewhat angled, glabrous, with 2–4 minute lanceolate or broadly linear or oblanceolate scales at base and sometimes one minute scale near middle; raceme rather sparsely 1–3(–6)-flowered, 1.8–3.5(–5) cm. Pedicel 3–8 mm; bracts linear-lanceolate, 1–2 mm. Flowers drooping, zygomorphic, 1–1.5(–1.5) mm in diam. Sepals suborbicular to depressed-triangular, 1–1.5 × 1.4–2 mm, apex obtuse to rounded. Petals white to greenish, sometimes becoming black when dry, obovate, 5–7 × 3–5.5 mm. Filaments curved upward; anthers creamy white, 2–4 mm, prolonged into terminal tubules, opening by small terminal pores, terminal

tubules orange-yellow. Style exserted, 5–10 mm, curved, slightly dilated at apex into a ring; stigma with a collar and 5 erect cylindrical lobes. Capsules 5–7 mm in diam. Fl. Jun–Jul, fr. Aug–Sep.

Shaded coniferous, mixed, and deciduous broad-leaved forests, mossy soil especially near rotting tree trunks; sea level to 200 m. Hebei, Heilongjiang, Jilin, Nei Mongol, Liaoning [Japan, Korea, Russia (Sakhalin)].

20. *Pyrola rotundifolia* Linnaeus, Sp. Pl. 1: 396. 1753.

圆叶鹿蹄草 yuan ye lu ti cao

Thelasia rotundifolia (Linnaeus) Alefeld.

Herbs 15–25(–30) cm tall. Rhizome long, slender, branched, producing adventitious roots and aerial stems at nodes; aerial stems 15–30 cm, ribbed, with a basal rosette of crowded leaves, and higher up with 1 or 2 oblong-ovate sheathing, scalelike, brownish bracts. Rosulate leaves 4–7, semievergreen; petiole ca. 2 × or ca. as long as blades; leaf blade slightly green abaxially, green adaxially, slightly shiny, orbicular to ovate, (2–)3–6 × (1.5–)2.5–5.5 cm, leathery, base sometimes subcordate, margin obscurely crenate or nearly entire, apex rounded. Rachis-inserted scale-shaped leaves 1 or 2; raceme 8–15-flowered, 6–16 cm. Pedicel 4.5–5 mm; bracts axillary, imbricate, lanceolate, membranous. Flowers spreading or rarely nodding, 1.5–2 cm in diam., widely opened, fragrant (scent of *Convallaria majalis* Linnaeus). Sepals ovate-lanceolate to lanceolate, 3.5–5.5 mm, reflexed at tip, apex rounded. Petals incurved, pure white, orbicular-ovate, 6.5–10 × 4–6 mm, rather thick, apex obtuse. Stamens arched toward upper side of flower; filaments glabrous, anthers yellow, tubules present. Style 7.5–10 mm, deflexed at base and facing lower part of corolla, dilated at apex into a ring. Capsule (6–)7–8 mm in diam. Fl. Jun–Jul, fr. unknown.

Picea forests, mountain thickets, grassy slopes; 1400–3200 m. Gansu, ?Hebei, ?Jiangsu, ?Liaoning, ?Ningxia, ?Shaanxi, Sichuan, N Xinjiang (Altay), Xizang, Yunnan [Japan, Mongolia, Myanmar, Russia; Europe].

According to Haber (Syst. Bot. 8: 277–298. 1983), one of the main areas of taxonomic difficulty in *Pyrola* occurs in *P.* sect. *Pyrola* (see Křiša, Bot. Jahrb. Syst. 90: 476–508. 1971, for sectional subdivisions). The type of the section is *P. rotundifolia* Linnaeus, a white-flowered species common throughout Europe and eastward to just beyond Lake Baikal in Siberia (cf. Hultén, Amphi-Atlantic Pl. map 123. 1958). Numerous taxa, both white- and pink-flowered, have been recognized as segregates of this widespread species, or described as distinct but related to *P. rotundifolia*. The assessment of taxonomic affinities within this “complex” has been problematic because of the lack of clear morphological discontinuities (Haber & Takahashi, Bot. Mag. (Tokyo) 101: 483–495).

21. *Pyrola rugosa* Andres, Repert. Spec. Nov. Regni Veg. 40: 233. 1936.

皱叶鹿蹄草 zhou ye lu ti cao

Herbs 14–27 cm tall. Rhizome ascending, slender, branched. Leaves 3–7; petiole 4.5–6.5 cm; leaf blade reddish abaxially, green and shiny adaxially, broadly ovate or suborbicular, 3–4.5 × 2.5–3.5 cm, thickly leathery, base rounded or truncate, margin conspicuously crenate, apex obtuse. Scape: scales 1 or

2, oblong, 8–10 × 3–4 mm; raceme 5–13-flowered, 4–9 cm. Pedicel 5–7 mm; bracts lanceolate, ca. as long as petiole or slightly longer, membranous. Flowers nodding, saucer-shaped, ca. 1 cm in diam. Sepals lanceolate or lanceolate-triangular, 3–4 × 1.5–2 mm, margin entire or obscurely crenate, apex acuminate. Petals white, ovate-lanceolate or suborbicular, 6–8 × 4–6 mm, apex acute. Filaments flattened, 7–8 mm; anthers yellow, ellipsoid, ca. 3 × 1 mm, tubules present. Style not exerted, 7–10 mm, slightly curved at upper part, dilated at apex into a ring. Capsules 5–9 mm in diam. Fl. Jun–Jul, fr. Aug–Sep.

• Montane coniferous or broad-leaved forests; 1900–4000 m. Gansu, Shaanxi, Sichuan, Yunnan.

22. *Pyrola shanxiensis* Y. L. Chou & R. C. Zhou, Bull. Bot. Res., Harbin 1(4): 112. 1981.

山西鹿蹄草 shan xi lu ti cao

Herbs 16–21 cm tall. Rhizome long creeping, somewhat slender, 0.5–1 mm in diam., branched. Leaves 2–6, appearing radical; petiole 1.8–2 cm; leaf blade pale green abaxially, green adaxially, elliptic or ovate-elliptic, ca. 2.5 × 1.5 cm, thinly leathery, base obtuse to broadly truncate, margin entire or crenulate, apex obtuse. Scape erect, 9–17 cm tall, glabrous, with 1 scalelike leaf at base; raceme 5–8(or 9)-flowered, 5–7 cm. Pedicels shorter than bracts, 3.5–4 mm; bracts broadly linear, 4–5 mm. Flower horizontal. Sepals triangular or ovate-triangular, ca. 2.5 × 2.5 cm, apex acute. Petals white. Style 6–7 mm at fruiting, straight to slightly curved, dilated at apex into a ring. Capsules 7–8 mm in diam. Fl. unknown.

• Forests on shaded mountain slopes; ca. 1800 m. Shanxi.

23. *Pyrola sororia* Andres, Notes Roy. Bot. Gard. Edinburgh 8: 8. 1913.

珍珠鹿蹄草 zhen zhu lu ti cao

Herbs 15–30 cm tall. Rhizome ascending, branched. Scales at stem base 4–8 mm wide, sheathing. Leaves 6–8, basal; petiole 1–3 cm; leaf blade pale green abaxially, green adaxially, broadly ovate or suborbicular, 2.5–3 × 2–2.5 cm, thinly leathery, base rounded, margin remotely sinuate, apex rounded or subacute. Raceme 7–11-flowered, 3–7 cm. Pedicel 3–4 mm; bracts axillary, strap-shaped, longer than pedicel, membranous. Flowers nodding, saucer-shaped, 7–9 mm in diam. Sepals ovate-triangular, 2–2.5 mm, apex retuse. Petals white or yellowish green, broadly ovate or suborbicular, 7–8 × 5–6 mm, apex rounded. Filaments flattened, glabrous; anthers yellow, ca. 2 mm, base usually with mucro. Style slightly exerted, straight or becoming curved in upper half, 3–3.5 mm. Capsules 7–9 mm in diam. Fl. Jul–Aug, fr. Aug–Sep.

• Forests, scrub; 2700–3900 m. Xizang, Yunnan.

24. *Pyrola szechuanica* Andres, Acta Horti Gothob. 1: 170. 1924.

四川鹿蹄草 si chuan lu ti cao

Herbs 15–25 cm tall. Rhizome long, slender, branched. Leaves 3–7, crowded at base of caudex; petiole 6–7.5 cm; leaf blade light green abaxially, green and slightly shiny adaxially,

broadly ovate, ovate, or broadly oblong, 4–5(–6) × (3.5–)4–5(–6.5) cm, thinly leathery, base suborbicular or subcordate, margin with remote teeth, apex obtuse. Scape with 2–4 scalelike leaves at base; raceme 6–12-flowered, 4–6 cm. Pedicel to 1 cm at fruiting; bracts lanceolate, 8–10 mm. Flowers ± nodding, widely opened, saucer-shaped, ca. 1 cm in diam. Sepals ligulate, 4–6 × 1.5–3 mm, apex mucronulate. Petals yellow or yellowish white, broadly ovate, 6–10 × 5–7 mm, apex rounded. Filaments glabrous; anthers yellow, ca. 2 mm. Style exerted, 7–9 mm, curved, dilated inconspicuously at apex into a ring. Capsules 7–8 mm in diam. Fl. Jun–Jul, fr. Aug–Sep.

• Evergreen or mixed forests; 1400–2700 m. Sichuan.

25. *Pyrola tschanbaischanica* Y. L. Chou & Y. L. Chang, Bull. Herb. N.-E. Forest. Acad., Harbin 1: 6. 1959.

长白鹿蹄草 chang bai lu ti cao

Herbs 8–13 cm tall. Rhizome long, slender, branched. Leaves 3–5(or 6); petiole 1.8–4 cm; leaf blade light green abaxially, green adaxially, elliptic, 1.8–2.5 × 1.3–1.9 cm, leathery, base cuneate, margin entire, slightly incurved, apex obtuse or rounded. Scape with 1–3 scalelike leaves at base; raceme 3–5-flowered, 1.5–2.8 cm, with 1–3 scalelike bracts subtending scape. Pedicels 3–4 mm; bracts ovate-lanceolate, 4.3–4.5 mm. Flowers nodding, spreading, broadly saucer-shaped, ca. 1 cm in diam. Sepals oblong or ovate-oblong, ca. 3 × 1.5 mm, apex acute. Petals white, obovate, 5–6 × 3–4 mm, margin entire and incurved, apex obtuse. Filaments glabrous; anthers yellow, ca. 2 × 1 mm. Style exerted, upper part slightly curved, ca. 8 mm, dilated at apex into an inconspicuous ring. Capsule 5–6 mm in diam. Fl. Aug, fr. Sep.

• Alpine tundra; ca. 2100 m. S Jilin (Changbai Shan).

26. *Pyrola xinjiangensis* Y. L. Chou & R. C. Zhou, Bull. Bot. Res., Harbin 1(4): 113. 1981.

新疆鹿蹄草 xin jiang lu ti cao

Herbs 19–21 cm tall. Rhizome ascending, slender. Leaves 6–9, basal; petiole 2.5–4 cm; leaf blade light green abaxially, dark green adaxially, elliptic or suborbicular, 3–4 × 2.5–3.5 cm, thickly leathery, veins raised abaxially, impressed adaxially, base rounded or truncate, margin crisped, entire or remotely glandular, apex obtuse. Scape with 1 scalelike leaf or not at base; raceme 7–11-flowered, 6.5–7.5 cm. Pedicel 5–7 mm; bracts oblong or lanceolate. Flowers nodding, saucer-shaped, ca. 1 cm in diam. Sepals oblong, 3–4 × ca. 2 mm, margin entire or remotely crenate, apex obtuse. Petals 5, white, oblong, ca. 6 × 4 mm, adaxially sparsely hairy, margin dentate, apex rounded. Filaments flattened, ca. 5.5 mm; anthers yellow, ellipsoid, ca. 3 mm, tubules present. Style slightly exserted, ca. 6 mm, curved at upper part, dilated at apex into a ring. Fl. Jul, fr. Aug.

- Montane forests; ca. 1800 m. Xinjiang (Urumqi).

