

44. PEGAEOPHYTON Hayek & Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss.

Kl. 59: 245. 1922.

单花芥属 dan hua qi shu

Herbs perennial, with simple or branched caudex. Trichomes absent or simple. Stems reduced to tiny portions added annually to apex of caudex or its branches. Basal leaves fleshy or not, rosulate, simple, entire or toothed. Cauline leaves absent. Flowers solitary, borne on pedicels from axils of rosette leaves. Fruiting pedicels ascending, straight, reflexed in geocarpic taxa. Sepals broadly ovate or oblong, ascending or spreading, glabrous or pubescent, base not saccate. Petals white, pink, purple, blue, or rarely bright yellow, longer than sepals; blade broadly obovate or suborbicular, rarely spatulate, apex rounded or subemarginate; claw often absent. Stamens 6, erect or spreading, subequal; filaments dilated at base; anthers ovate or oblong, obtuse at apex. Nectar glands confluent, subtending bases of all stamens. Ovules 2–15 per ovary. Fruit dehiscent silicles, rarely siliques, oblong, ovate, orbicular, ovoid, or globose, terete, latiseptate, or angustiseptate, geocarpic or not, sessile or stipitate; valves membranous or papery, not veined or obscurely veined, smooth, glabrous or pubescent; replum flattened; septum absent; style obsolete or to 3 mm, subconical; stigma discoid, entire. Seeds uniseriate, wingless, oblong, ovate, or suborbicular, plump or flattened; seed coat obscurely reticulate, not mucilaginous when wetted; cotyledons accumbent.

Six species: Bhutan, China, India, Kashmir, Myanmar, Nepal, Pakistan, Sikkim; four species (one endemic) in China.

- 1a. Fruit angustiseptate, geocarpic; valves ± carinate; fruiting pedicel strongly recurved; replum narrow, wingless; gynophore absent 4. *P. angustiseptatum*
- 1b. Fruit subterete or latiseptate; valves flat; fruiting pedicels usually straight; replum wide, winged; gynophore present.
 - 2a. Fruiting pedicels pubescent along 1 side, persisting for more than one season; fruit narrowly oblong; sepals apically ciliate 1. *P. minutum*
 - 2b. Fruiting pedicels glabrous or distally pubescent on all sides, not persistent; fruit oblong, ovate, orbicular, ovoid, or subglobose; sepals not ciliate.
 - 3a. Fruit ovoid or subglobose; valves membranous, puberulent apically; sepals 1.1–1.3 mm; petals 1.6–2(–2.5) mm; seeds plump, 1–1.1(–1.3) × 0.5–0.6(–0.8) mm 3. *P. nepalense*
 - 3b. Fruit oblong, orbicular, or ovate, flattened; valves papery, glabrous; sepals (2–)2.5–6(–10) mm; petals (3.5–)5–12(–15) mm; seeds flattened, 1.5–3.5(–4) × 1–2.5(–3) mm 2. *P. scapiflorum*

1. Pegaeophyton minutum H. Hara, J. Jap. Bot. 47: 270. 1972.

小单花芥 xiao dan hua qi

Pegaeophyton garhwalense H. J. Chowdhery & Sur. Singh.

Herbs with slender, branched caudex 0.75–2 mm in diam. Petiole (3–)5–10(–15) mm; leaf blade obovate, spatulate, ovate, oblong, or oblanceolate, 1–4(–5) × (0.5–)1–1.5(–2) mm, somewhat fleshy, adaxially sparsely puberulent with trichomes 0.02–0.08 mm, rarely glabrous, abaxially glabrous, base cuneate or subattenuate, margin entire, apex obtuse to subrounded. Fruiting pedicels slender, puberulent along 1 side of entire length with trichomes 0.02–0.08 mm, (1–)1.5–2.5(–4) cm, persistent. Sepals broadly ovate, 1.2–2 × 0.8–1.2 mm, free, glabrous, distally ciliate with flattened trichomes to 0.05 mm. Petals white, lilac, or violet, broadly obovate or suborbicular, (1.5–)2–3 (–4.5) × 1.5–2.5(–3) mm, tapering to clawlike base 0.7–1.5 mm. Filaments dilated at base, (0.9–)1–1.5 mm; anthers broadly ovate or suborbicular, 0.3–0.4 mm. Fruit latiseptate, not geocarpic, narrowly oblong, 3–5 ×

1–1.2 mm; valves nearly flat, extending along part of fruit length; gynophore 0.25–0.5 mm; style 0.3–0.4 mm. Seeds 3–5, broadly ovate, brown, plump, 1–1.2 × 0.6–0.7 mm. Fl. May–Jul.

Mossy wet ledges, hillsides, mossy granite or boulders, steep grassy slope; 3700–4200 m. Xizang [Bhutan, India (Uttar Pradesh), Nepal, Sikkim].

2. Pegaeophyton scapiflorum (J. D. Hooker & Thomson) C. Marquand & Airy Shaw, J. Linn. Soc., Bot. 48: 229. 1929.

单花芥 dan hua qi

Herbs with slender or stout, apically branched or unbranched caudex (0.1–)0.3–1.5(–3) cm in diam. Petiole 1–8 (–13) cm; leaf blade ovate, oblong, elliptic, obovate, spatulate, oblanceolate, or narrowly linear, (1–)1.5–8(–10) × 0.2–1.2 (–2.5) cm, somewhat fleshy or not, glabrous or adaxially sparsely pubescent with trichomes 0.2–0.5 mm, abaxially glabrous, base cuneate or subattenuate, margin entire or dentate, sometimes minutely ciliate, apex obtuse or acute. Fruiting pedicels slender or stout, glabrous or rarely sparsely pubescent apically all around with trichomes 0.2–0.5 mm, (1.2–)2.5–15(–20) cm, not persistent. Sepals ovate or oblong,

(2–)2.5–6(–10) × 1.5–3.5(–4.5) mm, glabrous or sparsely pubescent, not ciliate. Petals white, pink, or blue, sometimes white with greenish or bluish center, broadly obovate, spatulate, or suborbicular, (3.5–)5–12(–15) × (1.5–)2–9(–10) mm, tapering to clawlike base (0.5–) 1–3(–3.5) mm. Filaments dilated at base, (2.5–)3–5(–7) mm; anthers oblong to narrowly so, (0.5–)1–1.5(–2) mm, sagittate at base. Fruit latiseptate, not geocarpic, oblong, ovate, or orbicular, (4–)5–13(–20) × (2–)4–8(–10) mm; valves nearly flat, extending along part of fruit length, papery, glabrous; gynophore (0.5–)2–5 mm; style 1–2(–3) mm. Seeds (1–)3–10(–12), broadly ovate, brown, flattened, 1.5–3.5(–4) × 1–2.5(–3) mm.

Alpine tundra, alpine meadows, alpine brooks, muddy gravelly slopes, dry slopes, gravel near glaciers, grassy slopes, lake shores, moist pastures, stony slopes with unconsolidated screes, wet screes and seepage areas in screes, moss by streamlets, among rocks, rock crevices, gravel in stream beds, boggy ground by lakes, sandy stream edges, by melting snow or running water, swampy ground, glacier stream beds, peaty soil; 3500–5400(–5600) m. Gansu, Qinghai, Sichuan, Xinjiang, Xizang, Yunnan [Bhutan, India (Assam), Kashmir, Myanmar, Nepal, Sikkim].

- 1a. Petals (6–)8–12(–15) × (5–)6–9(–10) mm, length (1–)1.2–1.5 × width; caudex stout, simple or rarely branched at apex; seeds (2–)2.5–3.5(–4) × (1.5–)2–2.5(–3) mm 2b. subsp. *robustum*
- 1b. Petals (3.5–)5–7 × (1.5–)2–3(–3.5) mm, length (1.8–)2–2.5(–3) × width; caudex slender, few to many branched, rarely simple and stout; seeds 1.5–2(–2.5) × 1–1.6(–1.8) mm 2a. subsp. *scapiflorum*

2a. Pegaeophyton scapiflorum subsp. *scapiflorum*

单花芥(原亚种) dan hua qi (yuan ya zhong)

Cochlearia scapiflora J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 5: 154. 1861; *Pegaeophyton scapiflorum* var. *pilosicalyx* R. L. Guo & T. Y. Cheo. Caudex slender, 1–8(–12) mm in diam., few to many branched, sometimes simple and somewhat stout. Petals (3.5–) 5–7 × (1.5–)2–3(–3.5) mm, length (1.8–)2–2.5(–3) × width. Seeds 1.5–2(–2.5) × 1–1.6(–1.8) mm. Fl. May–Sep, fr. Jul–Oct.

Alpine tundra, alpine meadows, muddy gravelly slopes, gravel near glaciers, grassy slopes, lake shores, moist pastures, stony slopes with unconsolidated screes, seepage areas in screes, moss by streamlets, rock crevices, boggy ground by lakes, sandy stream edges, by melting snow or running water; 4000–5400(–5600) m. Gansu, Qinghai, Sichuan, Xinjiang, Xizang, Yunnan [Bhutan, India (Assam), Kashmir, Myanmar, Nepal, Sikkim].

2b. Pegaeophyton scapiflorum subsp. *robustum* (O. E. Schulz) Al-Shehbaz et al. in Al-Shehbaz, Edinburgh J. Bot. 57: 164. 2000.

粗壮单花芥 cu zhuang dan hua qi

Pegaeophyton sinense (Hemsley) Hayek & Handel-Mazzetti var. *robustum* O. E. Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 477. 1926; *Braya sinensis* Hemsley; *P. scapiflorum* var. *robustum* (O. E. Schulz) R. L. Guo

& T. Y. Cheo; *P. sinense* (Hemsley) Hayek & Handel-Mazzetti.

Caudex mostly stout, (5–)8–20(–30) mm in diam., simple or rarely branched at apex. Petals (6–)8–12(–15) × (5–)6–9 (–10) mm, length (1–)1.2–1.5 × width. Seeds (2–)2.5–3.5(–4) × (1.5–)2–2.5(–3) mm. Fl. Apr–Oct, fr. Jul–Nov.

Among rocks, gravel in stream beds, dry slopes, alpine brooks, wet gravel, swampy ground, glacier stream beds, peaty soil, wet screes; 3500–4800 m. Sichuan, Xizang, Yunnan [Bhutan].

3. Pegaeophyton nepalense Al-Shehbaz et al., Novon 8: 327. 1998.

尼泊尔单花芥 ni po er dan hua qi

Herbs with slender caudex ca. 1 mm in diam. Leaves 5–12 per caudex; petiole (2–)6–10(–14) mm, slender at base, glabrous or with few trichomes; blade suborbicular or broadly obovate, 2–4(–5) × 1.5–3.5(–4.5) mm, somewhat fleshy, adaxially moderately pubescent with trichomes 0.3–0.5 mm, abaxially glabrous, base obtuse, margin entire, apex rounded or subrounded. Flowers 3–8 per plant. Pedicels slender, distally pubescent all around with trichomes 0.3–0.5 mm, 2–5 mm at anthesis, not elongated in fruit. Sepals oblong, 1.1–1.3(–1.5) × 0.5–0.7 mm, free, spreading or ascending, not saccate, pubescent on distal half with trichomes to 0.3 mm, membranous margin 0.05–0.1 mm wide, obtuse. Petals white, broadly obovate or suborbicular, slightly emarginate, 1.6–2(–2.5) mm; blade 0.8–1.5 × 0.8–1.5 mm; claw 0.8–1.2 mm.

Filaments erect, white, slightly dilated at base, 1.2–1.5 mm, persistent to fruit maturity; anthers suborbicular, 0.2–0.3 mm, slightly sagittate at base. Fruit latiseptate, not geocarpic, broadly ovoid or subglobose, 2–3 × 1.8–2 mm; valves membranous, rounded, extending along part of fruit length, glabrous or minutely puberulent distally; gynophore 0.1–0.2 mm; replum strongly flattened, 0.4–0.5 mm wide, glabrous; septum absent; style 0.5–0.7 mm; stigma entire. Seeds 2–4, oblong, brown, plump, 1–1.1(–1.3) × 0.5–0.6(–0.8) mm. Fl. Jun–Sep, fr. Aug–Sep.

Stable moraine, among moss, under rocks by stream, damp or gravelly scree, alpine grassland, wet sand; 3900–5100 m. Xizang [Bhutan, Nepal, Sikkim].

4. Pegaeophyton angustiseptatum Al-Shehbaz et al. in Al-Shehbaz, Edinburgh J. Bot. 57: 167. 2000.

窄隔单花芥 zhai ge dan hua qi

Herbs with thick, unbranched caudex 3–6 mm in diam. Petiole 1.5–4.5 cm, glabrous; leaf blade spatulate or oblanceolate, 1–2.5 cm × 2–10 mm, not fleshy, sparsely pilose adaxially with simple trichomes, glabrous abaxially, base cuneate or subattenuate, margin entire or obscurely 1- or 2-toothed on each side, sparsely ciliate with trichomes to 1 mm, apex obtuse or subrounded. Fruiting pedicels slender, sparsely to densely pubescent with spreading trichomes along distal half, strongly recurved to the ground, to 7 cm.

Sepals broadly ovate, $2.5\text{--}3 \times 1.5\text{--}1.8$ mm, sparsely pubescent with trichomes $0.1\text{--}0.3$ mm, not ciliate.

Petals white, broadly obovate, $4\text{--}5 \times 2.5\text{--}3$ mm, tapering to clawlike base ca. 2 mm. Filaments $2\text{--}2.5$ mm; anthers ovate, $0.5\text{--}0.6$ mm. Fruit angustiseptate, geocarpic, dehiscent, suborbicular or broadly oblong, $4\text{--}7 \times 4\text{--}5$ mm, rounded at base and apex; valves carinate, extending along full fruit length, minutely papillate at apex; gynophore absent; style $1.5\text{--}2$ mm. Seeds brown, up to 10, broadly ovate or suborbicular, compressed, $1.6\text{--}1.9 \times$ ca. 1.2 mm. Fl. and fr. Jul.

- Open moist pastures. Yunnan.

