

1. TILLAEA Linnaeus, Sp. Pl. 1: 128. 1753.

东爪草属 *dong zhao cao shu*

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Herbs often annual, small, usually glabrous. Roots fibrous. Stems erect or ascending, sometimes ± stoloniferous at base. Leaves opposite, fused at base to form short sheath, flat or terete, margin entire. Inflorescences axillary, cymose, often shorter than subtending leaf, 1- to few flowered. Flowers bisexual, (3 or)4- or 5-merous, inconspicuous. Sepals free, spurless. Petals inconspicuous, free, dull white, greenish, pinkish, or yellowish, often translucent, sometimes shorter than sepals. Stamens as many as petals; filaments filiform. Carpels free. Stigma terminal. Follicles 1- to many seeded, dehiscent along adaxial suture. Seeds smooth, papillate, or striate.

About 16 species: almost worldwide; five species (two endemic) in China.

- 1a. Flowers sessile; sepals ovate, shorter than petals 1. *T. aquatica*
- 1b. Flowers pedicellate; sepals linear-lanceolate to lanceolate, shorter or longer than petals.
 - 2a. Carpels 5 5. *T. schimperii*
 - 2b. Carpels 4.
 - 3a. Stems ascending; nectar scales broadly obconical; seeds papillate 2. *T. mongolica*
 - 3b. Stems erect; nectar scales linear to spatulate; seeds longitudinally striate.
 - 4a. Flowers in cymules; pedicels variable in length, always some much longer than sepals; petals shorter than sepals, apex acute 3. *T. alata*
 - 4b. Flowers solitary; pedicels ca. 1/2 as long as sepals; petals longer than sepals, apex obtuse 4. *T. likiangensis*

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1. *Tillaea aquatica* Linnaeus, Sp. Pl. 1: 128. 1753.

东爪草 *dong zhao cao*

Herbs 2–6 cm tall. Roots fibrous. Stems branched from base, erect or ascending. Leaf blade linear-lanceolate, 4–8 × ca. 1 mm, base connate, apex acute. Flowers axillary or rarely terminal, sessile, 4- or rarely 5-merous. Sepals ovate, ca. 0.5 mm, apex obtuse. Petals white, ovate-oblong, ca. 1 mm, apex obtuse. Stamens shorter than petals. Nectar scales spatulate-linear, ca. 1.5 × as long as carpels. Carpels ovoid-oblong. Styles short. Follicles more than 10-seeded. Seeds brown, cylindrical, ca. 0.5 mm, longitudinally striate. Fl. May–Jul.

Sandy areas along rivers or river banks. Heilongjiang, Nei Mongol [Japan, Korea, Mongolia, Russia; Europe, North America].

2. *Tillaea mongolica* (Franchet) S. H. Fu, Acta Phytotax. Sin., Addit. 1: 112. 1965.

承德东爪草 *cheng de dong zhao cao*

Crassula mongolica Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 6: 16. 1883.

Herbs 2.5–5 cm tall, glabrous. Stems branched from middle, ascending. Leaf blade lanceolate, 2–3 mm, apex often reflexed. Flowers axillary, 4-merous; pedicel longer than sepals in fruiting material. Sepals erect, violet striate adaxially, lanceolate, apex obtuse. Petals brown striate, shorter than sepals, base connate, apex hooded. Stamens with anthers ovoid. Nectar scales broadly obconical, ca. 1/4 as long as carpels. Styles shortly acuminate. Follicles gibbous, 7- or 8-seeded. Seeds yellow, cylindrical-ovoid, densely rounded tuberculate.

• Edges of ponds. NE Hebei (Chengde).

This species needs comparison with *Tillaea decumbens* (Thunberg) Willdenow, which was originally described from S Africa but is now known to be adventive elsewhere.

3. *Tillaea alata* Viviani, Pl. Aegypt. Dec. 4: 16. 1830.

云南东爪草 *yun nan dong zhao cao*

Crassula alata (Viviani) Berger; *Tillaea yunnanensis* S. H. Fu.

Herbs 3.5–5.5 cm tall, glabrous. Stems branched from base and middle, erect. Leaf blade lanceolate, 3–4(–7) × 0.5–1(–2) mm, apex extended into a pale bristle. Flowers in very condensed axillary cymes shorter than subtending leaf, 3- or 4(or 5)-merous on densely leafy axillary shoots usually shorter than subtending leaves; pedicel filiform, to 4 mm. Sepals linear-lanceolate, ca. 1.5 × 0.2 mm. Petals yellow, lanceolate, ca. 1 mm. Stamens to 1 mm. Nectar scales linear to spatulate, ca. 0.3 mm. Styles short. Follicle 2-seeded. Seeds brown, oblong, 0.4–0.5 mm. Fl. Sep.

Slopes; ca. 2700 m. NW Yunnan (Dèqèn Xian) [India, Pakistan; NE Africa, SW Asia].

The Chinese material of *Tillaea alata* is described as having yellow petals but is otherwise not distinguishable from the Indian and African material which has white to pale red petals. Material from tropical Africa has consistently 5-merous flowers and is included in subsp. *pharnaceoides* (C. A. Meyer) Wickens & Bywater.

4. *Tillaea likiangensis* H. Chuang, Acta Bot. Yunnan. 19: 225. 1997.

丽江东爪草 *li jiang dong zhao cao*

Herbs green occasionally flushed purplish, 2–5 cm tall. Roots fibrous. Stems often simple, erect or ascending from a prostrate rhizome. Leaf blade linear, 3–6 × ca. 0.5 mm, base connate for 0.5–0.8 mm, apex acute. Flowers solitary in leaf axils, 4- or 5-merous; pedicel ca. 0.5 mm. Sepals triangular, 0.8–1 mm, apex obtuse. Petals pink, narrowly ovate, 1.4–1.6 × 0.5–0.8 mm, apex obtuse. Stamens 0.7–0.8 mm. Nectar scales very small. Carpels narrowly ovoid, ca. 1.5 mm. Style very short. Seeds narrowly cylindrical, ca. 0.5 × 0.2 mm, longitudinally striate.

• Marshes; ca. 2700 m. NW Yunnan (Lijiang Naxi Zu Zizhixian).

This species is known to the present authors only from the protologue.

5. *Tillaea schimperii* (C. A. Meyer) M. G. Gilbert et al., Novon 10: 366. 2000.

五蕊东爪草 *wu rui dong zhao cao*

Crassula schimperii C. A. Meyer in Fischer et al., Index Sem. Hort. Petrop. 8: 56. 1842; *C. pentandra* (Royle ex Edgeworth) Schönland; *Tillaea pentandra* Royle ex Edgeworth.

Herbs 2–7 cm tall. Roots fibrous. Stems branched mostly from base, erect or ascending. Leaf blade linear-lanceolate to oblong, 3–5 × 1–2 mm, margin often hyaline, apex acute to shortly acuminate. Flowers in very condensed axillary cymes shorter than subtending leaf, (4 or)5-merous; pedicel shorter than sepals, sometimes almost absent. Sepals narrowly triangular, 1.5–1.8 × ca. 0.6 mm, apex long acuminate and aristate. Petals dull white to purplish, ovate-lanceolate, 0.7–1.6 × 0.2–0.6 mm, apex long acuminate and aristate. Stamens ca. 0.6 mm. Nectar scales spatulate-linear, ca. 0.6 mm. Carpels oblong-ovoid. Styles short. Follicles brown, 2-seeded. Seeds brown, cylindrical-ovoid, ca. 0.5 × 0.3 mm, smooth or obscurely longitudinally ribbed. Fl. Jul–Aug, fr. Sep.

Among rocks on grassy slopes; 3000–4800 m. Xizang [Bhutan, India, Kashmir, Nepal, Pakistan; tropical Africa, SW Asia].

The Chinese material belongs to subsp. *schimperii*. Two further subspecies are recognized in Africa.

