

## DROSERACEAE

茅膏菜科 mao gao cai ke

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Herbs perennial or annual, mostly terrestrial or rarely aquatic, carnivorous. Stem with much reduced leaf blades that function as rhizoids below ground, with or without tubers or rhizomes. Leaves basal and rosulate, or alternate, rarely whorled, stipulate or exstipulate; leaf blade with sticky, glandular hairs, or with sensitive hairs that trigger closing of blade to trap small animals, juvenile leaf blade circinate. Flowers axillary, lateral or terminal, usually borne in a cincinnus, rarely in a raceme or solitary, bisexual, actinomorphic, 4- or 5-merous. Sepals 4 or 5 (or 6–8), persistent. Petals as many as sepals or more. Stamens 4 or 5, hypogynous, free, alternate with petals; anthers 2-loculed, dehiscent by longitudinal slits. Ovary superior or nearly so, globose or ovoid, 2–5-carpellate, 1–3-loculed; placentation parietal or basal; styles (2 or )3–5 (or 6), simple or branched; stigma simple or multifid. Fruit a capsule, dehiscent or indehiscent. Seeds few to numerous; endosperm fleshy; embryo straight.

Four genera and more than 100 species: temperate and tropical regions of both hemispheres; two genera and seven species (one endemic) in China.

Ruan Yun-zhen. 1984. Droseraceae. In: Fu Shu-hsia & Fu Kun-tsun, eds., Fl. Reipubl. Popularis Sin. 34(1): 14–30.

- 1a. Herbs terrestrial; leaves basal and rosulate, or alternate, leaf blade with sticky, glandular hairs; ovary 2–5-carpellate; capsule dehiscent ..... 1. *Drosera*  
1b. Herbs aquatic; leaves whorled, leaf blades with sensitive hairs that trigger closing of leaf blades; ovary 5-carpellate; capsule indehiscent ..... 2. *Aldrovanda*

### 1. DROSEREA Linnaeus, Sp. Pl. 1: 281. 1753.

茅膏菜属 mao gao cai shu

Herbs perennial or annual, with rhizomes, fibrous roots, or tubers with a vertical stolon below ground. Stem very short, long and erect, or climbing. Leaves basal and rosulate, or alternate, petiolate, with glandular, papillose hairs. Flowers bisexual, actinomorphic. Sepals (4 or)5 (or 6–12), free or connate at base, persistent. Petals 5, free, closing and contorted after anthesis, persistent. Stamens as many as petals. Ovary superior, 1-loculed, 2–5-carpellate; placentation parietal; styles (2 or)3–5 (or 6), free or connate at base, persistent. Capsule dehiscent, 2–6-valved. Seeds numerous, ellipsoid or linear, sometimes winged.

About 100 species: tropical to tundra regions, especially concentrated in Australia; six species (one endemic) in China.

- 1a. Stem elongate; leaves alternate, not stipulate; inflorescence axillary or terminal.  
2a. Leaves linear; stem not forming tubers below ground ..... 2. *D. indica*  
2b. Leaves peltate; stem forming tubers below ground ..... 6. *D. peltata*  
1b. Stem short; leaves basal in a dense rosette, stipulate; inflorescence scapiform.  
3a. Leaves orbicular or suborbicular, shorter than wide; testa pouch-shaped ..... 5. *D. rotundifolia*  
3b. Leaves not orbicular, longer than wide, testa not pouch-shaped.  
4a. Stipule adnate to petiole at base; bracts hastate, 3–5-parted; styles 5, incurved; placentas 5 1. *D. burmanni*  
4b. Stipule not adnate to petiole at base; bracts subulate or linear; styles 3 or 4, deeply 2-parted, not incurved; placentas 3 (or 4).  
5a. Leaves circinate 1-folded toward stipule when young, leaf blade spatulate, obovate, or cuneate, 0.9–2.8 cm; peduncle and sepals abaxially densely glandular hairy; styles shorter than ovary 3. *D. spatulata*  
5b. Leaves circinate 2-folded toward stipule when young, leaf blade orbicular to oblanceolate, elliptic, or linear, 1.5–4.6 cm; peduncle and sepals glabrous; styles subequaling ovary 4. *D. oblanceolata*

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**1. Drosera burmanni** Vahl, Symb. Bot. 3: 50. 1794.  
锦地罗 jin di luo

Herbs annual or biennial, with few fibrous roots. Stem unbranched, extremely short, sometimes to 1 cm when growing in shade, not forming a tuber below ground. Leaves forming a flat rosette, subsessile or petiolate; stipule 3–7 mm, connate with petiole at base, 3-fid, lobes laciniate; petiole short or absent; leaf blade yellowish green or red to reddish violet, cuneate to obovate-spatulate, 6–10 × 5–7 mm, base attenuate, with glandular trichomes or glabrous, apex fimbriate. Inflorescence scapiform; racemes 1 or 2, 6–22 cm, glabrous or with white or red to reddish violet glands, 2–19-flowered; bracts simple, hastate, 1–3 mm; pedicels erect, 1–7 mm. Sepals 5, united at base, light green, red, or reddish violet, narrowly oblong, 2–3 mm, striate, tuberculate, abaxially with short, glandular hairs and white glands. Petals white to light red to reddish violet, obovate, ca. 4 × 2–3 mm. Stamens 5, ca. 3 mm. Ovary subglobose, glabrous; placentas 5(or 6); styles 5(or 6), filiform, 2–3 mm, incurved; stigma toothlike. Capsule 5- or 6-valved. Seeds dark-brown to black, veined. Fl. and fr. all year.  $2n = 20^*$ .

Shaded wet places, ridges between rice fields, soggy soils, lowland to mountain areas; sea level to 1500 m. S Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan [E and SE Asia, Australia].  
This species is used medicinally.

**2. Drosera indica** Linnaeus, Sp. Pl. 1: 282. 1753.

长叶茅膏菜 chang ye mao gao cai

*Drosera makinoi* Masamune.

Herbs annual, with fibrous roots. Stem unbranched, erect or procumbent, 2–50 cm, not forming tubers below ground, pubescent with short, glandular hairs. Leaves cauline, alternate, sparse; stipule absent or reduced and hairlike; petiole 5–10 mm, flattened or narrowed, glabrous; leaf blade simple, light green or red, narrowly linear, 2–12 cm × 1–3 mm, pubescent or glabrous, apex acute. Inflorescence axillary or leaf opposed, 6–50 cm, glandular; raceme 1–30-flowered; peduncle to 12 cm; bracts linear, 6–8 mm; pedicels 0.6–1.5 cm. Sepals 5, united near base, yellowish green, lanceolate to narrowly oblong, 3–5 × 1–2 mm, glandular, margin entire. Petals white, light red, orange, or reddish violet, obovate to oblanceolate, 5–10 × 3–4 mm, veined. Stamens 5, 3–5 mm, papillose. Ovary terete, obovate, or subglobose, 1–2 mm; placentas 3; styles 3, deeply 2-parted nearly to base, usually incurved; stigma simple, 2–3 mm. Capsule globose-obovoid, 3-valved, 4–6 mm. Seeds black, small; venation thick and scrobiculate. Fl. and fr. all year.  $2n = 28^*$ .

Wet places, soggy soils; sea level to 600 m. Fujian, Guangdong, Guangxi, Hainan, Taiwan [Africa, E and SE Asia, Australia].

**3. Drosera spathulata** Labillardière, Nov. Holl. Pl. 1: 79. 1804.

匙叶茅膏菜 chi ye mao gao cai

*Drosera loureiroi* Hooker & Arnott; *D. spathulata* var. *loureiroi* (Hooker & Arnott) Y. Z. Ruan.

Herbs perennial, with 1 or 2 black, fibrous roots. Stem short, sometimes to 0.5 cm when growing in *Sphagnum* moss, forming a tightly rosulate bulb during winter in temperate climates, not forming a tuber below ground. Leaves forming a dense, flat rosette, circinate 1-folded toward stipule when young; stipule light red, narrow, 4–8 mm, scarious, apex fimbriate, setaceous; petiole flattened, gradually dilated distally, 8–10 mm, glandular hairy; leaf blade obovate, spatulate, or cuneate, 0.9–2.8 cm × 2–5 mm, glandular hairy. Inflorescences 1–6, scapiform, sometimes branched, 4–25 cm; peduncle densely glandular hairy; racemes 1-sided, 10–20-flowered; bracts subulate to linear-lanceolate, ca. 2 mm or more, 3-parted; pedicels 0.5–3 mm. Sepals 5, united at base, green, lanceolate or narrowly ovate, 1.5–4 mm, margin entire or 1-toothed, densely glandular hairy abaxially. Petals white or pink to reddish violet, obovate, 2–6 mm or more. Stamens 5, 2.5–6 mm; filaments flat, ca. 5 mm; anthers oblong, ca. 1.5 mm. Ovary ellipsoid-globose; placentas 3(or 4); styles 3(or 4), ca. 2.5 mm, each style deeply 2-parted to base, sometimes again parted distally; stigma simple, persistent. Capsule 3(or 4)-valved, ca. 1.5 mm; valves obdeltoid, incurved. Seeds black, ovoid or ellipsoid, small; venation thick and scrobiculate. Fl. and fr. Mar–Sep.  $2n = 20, 40, 60$ .

Sunny wet newly cut roadside slopes, meadows, bogs. C and W Fujian, Guangdong, S Guangxi, Taiwan [S Japan, W Malaysia, Indonesia, Philippines; E Australia (including Tasmania), Pacific Islands (New Zealand)].

**4. Drosera oblanceolata** Y. Z. Ruan, Acta Phytotax. Sin. 19: 340. 1981.

长柱茅膏菜 chang zhu mao gao cai

Herbs perennial, with fibrous roots. Stems unbranched, short, not forming a tuber below ground. Leaves basal, dense, petiolate, circinate 2-folded toward stipule when young; stipule light red, 1.5–4.6 cm, scarious, deeply 3-parted, middle lobe 2- or 3-fid; petiole 3–7 mm; leaf blade orbicular to oblanceolate, elliptic, or linear, 1.5–4.6 cm × (1–)2–4 mm, pilose with glandular hairs, ciliate. Inflorescences 1 or 2, scapiform, 5–9 cm; peduncle glabrous; cincinnus corymbose, 8–10-flowered; bracts linear, ca. 2 mm; pedicels 3–5 mm. Sepals 5, united at base, green, narrowly obovate to oblong, ca. 4 mm, glabrous, persistent. Petals pink, obovate to cuneate. Stamens 5. Ovary ellipsoid-globose to globose, ca. 2 mm; placentas 3; styles 3, 2–3 mm; stigma multifid. Capsule 3-valved. Seeds black, ellipsoid-globose, ca. 0.3 mm; venation scrobiculate. Fl. and fr. May–Oct.

• Sunny meadows and bogs. SW Guangdong (including coastal islands), SE Guangxi.

**5. Drosera rotundifolia** Linnaeus, Sp. Pl. 1: 281. 1753.

圆叶茅膏菜 yuan ye mao gao cai

*Drosera rotundifolia* var. *furcata* Y. Z. Ruan.

Herbs perennial, with few fibrous roots. Stem unbranched, short, sometimes to 5 cm when growing in *Sphagnum* moss, forming a bulb at shoot tip during winter, not forming a tuber below ground. Leaves basal, dense, long petiolate; stipule 5–7-fid, 6–8 mm, scarious, closely adnate to petiole at base; petiole flat, 1–7 cm; leaf blades yellowish green or green to red, orbicular, suborbicular, or weakly reniform, 3–10 mm × 0.5–2 cm, with red, long capitate, sticky, glandular hairs. Inflorescences erect, scapiform, slender, 8.5–30 cm, glabrous; cincinni 1 or 2, 3–30-flowered; bracts subulate to linear, 6. ***Drosera peltata*** Smith ex Willdenow, Sp. Pl. 1: 1546. 1797.

茅膏菜 mao gao cai

*Drosera lobbiana* Turczaninow; *D. lunata* Buchanan-Hamilton ex de Candolle; *D. peltata* var. *glabrata* Y. Z. Ruan; *D. peltata* var. *lunata* (Buchanan-Hamilton ex de Candolle) C. Clarke; *D. peltata* var. *multisejala* Y. Z. Ruan.

Herbs perennial, forming aerial portion only for a few months during early summer. Stem erect or climbing, branched distally, 9–32 cm, forming a tuber to 8 mm in diam. below ground, glabrous or with black, papillose glands. Basal leaves densely whorled, or absent in some populations, exstipulate, yellowish green to green; petiole 2–8 mm; leaf blade peltate, orbicular to suborbicular, 2–4 × 6–8 mm; some leaves reduced, linear, ca. 2 mm. Cauline leaves alternate, remote, exstipulate, yellowish green; petiole 0.8–1.3 cm; leaf

small; pedicels 1–3 mm. Sepals 5, united near base, green, ovate to oblong, ca. 4 × 1.5 mm, glandular, margin serrate. Petals white or tinged with pink, spatulate, 5–6 × ca. 3 mm. Stamens 5, 4–5 mm. Ovary ellipsoid-globose, ca. 3 mm; placentas 3; styles 3 or 4, deeply parted to base or entire, clavate; stigma simple. Capsule 3- or 4-valved. Seeds ellipsoid-globose; testa pouch-shaped, extended at each end.  $2n = 20$ .

Forest understories, wet meadows, bogs, high moors, wet sunny open areas; sea level to 1500 m. Fujian, Guangdong, Heilongjiang, Hunan, Jiangxi, Jilin, Zhejiang [Asia, C and N Europe, North America].

blade peltate or lunate to semiorbicular, 2–3 × 4–5 mm, margin glandular hairy. Inflorescence terminal; cincinnus 2–6 cm, 3–22-flowered; bracts cuneate to oblanceolate or subulate; pedicels 0.6–2 cm. Sepals 5–7, united near base, yellowish green, lanceolate to ovate, 2–4 mm × ca. 1.5 mm, glabrous to glandular hairy, apex 5–7-fid. Petals usually white, rarely pink or red, oblong-cuneate, 4–6 × 2–3 mm. Stamens 5, 2–4 mm. Ovary subglobose, ca. 1.5 mm in diam.; placentas 3; styles 3, 2–5-parted, ca. 0.8 mm; stigma 2- or 3-fid. Capsule subglobose, (2 or)3(–5)-valved, 2–4 mm. Seeds ellipsoid-ovoid to globose, ca. 0.4 mm; venation scrobiculate. Fl. and fr. Jun–Sep.  $2n = 32, 40$ .

Sparse *Pinus* forests, scrub, meadows, streamsides, sunny open places, roadsides; sea level to 3700 m. Anhui, Gansu, Guangdong, Guangxi, W Guizhou, Hubei, Hunan, Jiangxi, SW Sichuan, Taiwan, S Xizang, Yunnan, Zhejiang [E and SE Asia; Australia].

The characters of this species are highly variable.

## 2. ALDROVANDA Linnaeus, Sp. Pl. 1: 281. 1753.

貉藻属 he zao shu

Herbs perennial, aquatic, carnivorous, apparently without roots, freely floating during growing season, forming a bulb at shoot tip during winter. Leaves whorled, exstipulate, united at base; petiole cuneate, with 4–8 lacinate bristles; leaf blade articulated at base into 2 segments forming a trap for small, aquatic animals. Stem simple or sometimes branched, with sensitive hairs and numerous digestive glands. Flower axillary, solitary on short scape 0.5–1.5 cm. Sepals 5, united at base, ovate-elliptic to elliptic-lanceolate, 2–4 × 1–1.5 mm. Petals 5, white or greenish white, oblong. Stamens 5, 3–4 mm; filaments subulate. Ovary superior, subglobose, 5-carpellate; styles 5; stigma multifid. Capsule subglobose, indehiscent. Seeds 5–8 or fewer, ovoid-globose.

One species: Africa (including Madagascar), E, N and SE Asia, C and S Europe, N Pacific Islands.

1. ***Aldrovanda vesiculosa*** Linnaeus, Sp. Pl. 1: 281. 1753.

貉藻 he zao

Stem 6–15 cm. Leaf whorls 1–2 cm in diam., 6–9-leaved; leaves yellowish green to green; petiole 3–6 × ca. 1.8 mm, apex with 4–8 bristles, bristles 5–7 mm, extending slightly beyond leaf blade; leaf blade segments reniform-orbicular, concave, 2–6 × 6–10 mm, forming a trap with segments rising upward on stimulation then closing together and narrowing, becoming elliptic or elliptic-oblong, 3–4 mm. Petals oblong, 3–4 × ca. 2.5 mm. Ovary 2–2.5 mm in diam.; placentas 5, parietal; ovules 2. Seeds 6–8, black.  $2n = 38, 48$ .

Lakes, swamps, still waters of rivers, ditches. Heilongjiang, Nei Mongol [Africa (including Madagascar), E, N, and SE Asia, C and S Europe, N Pacific Islands].

