

6. MONOTROPA Linnaeus, Sp. Pl. 1: 387. 1753.

水晶兰属 shui jing lan shu

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Hypopithis Rafinesque (1808); *Hypopitys* Hill (1756); *Monotropion* Saint-Lager.

Herbs perennial, mycoparasitic, lacking chlorophyll. Axis nodding, white to reddish. Leaves absent or reduced to laminar structures. Inflorescence scapose or racemose arising from persistent root system. Flowers solitary or in several-flowered racemes, often nodding at anthesis, usually erect in fruit, bracteate. Sepals 4 or 5, usually appressed to petals. Petals 3–6, oblong, often saccate at base, apex dilated. Stamens 8–12 in two series of alternating unequal lengths; anthers horizontally reniform, with terminal slit. Disk of 8–10 distended paired lobes adnate to base of ovary. Ovary (3–)5(or 6)-loculed, with axile placentation; style base sharply differentiated from ovary. Capsules globose to narrowly ovoid, loculicidally dehiscent, valves with marginal fibers; perianth segments early deciduous at fruiting. Seeds many, fusiform, minute; testa thin, prolonged at both ends, minutely reticulate. *n* = 16, 24.

Two species: cool to temperate regions of the N hemisphere, extending to N South America; two species in China.

One of us (Wallace) notes that several taxa included here in synonymy under species of *Monotropa* and *Monotropastrum* are ambiguous minor variants in numbers of flowers per raceme and degree of pubescence. Numbers of perianth parts often differ among flowers in the same inflorescence or clump. “Features such as color, number of perianth segments, degree of pubescence, numbers of flowers per axis in multiflowered taxa, and floral sizes were found to be extremely variable even among inflorescences from a single root cluster” (Wallace, Taxon 36: 128–130. 1987).

- 1a. Inflorescence pale yellow-brown, racemose, (1 or)2–11-flowered; style slender, about as long as ovary; disk lobes stout 1. *M. hypopitys*
- 1b. Inflorescence white, scapose, 1-flowered; style thick, shorter than ovary; disk lobes slender, elongate 2. *M. uniflora*

1. *Monotropa hypopitys* Linnaeus, Sp. Pl. 1: 387. 1753.

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Hypopitys monotropa Crantz; *H. multiflora* Scopoli; *H. multiflora* var. *glabra* Ledebour; *Monotropa chinensis* Koidzumi; *M. hypophegea* Wallroth; *M. hypopitys* f. *atricha* (Domin) Kitagawa; *M. hypopitys* subvar. *atricha* Domin; *M. hypopitys* var. *glaberrima* H. Hara; *M. hypopitys* var. *glabra* Roth; *M. hypopitys* var. *hirsuta* Roth; *M. hypopitys* subsp. *lanuginosa* (Michaux) H. Hara; *M. lanuginosa* Michaux; *M. multiflora* (Scopoli) Fritsch; *M. taiwaniana* S. S. Ying.

Herbs pale yellow-brown, rather fleshy, becoming brown when dry, usually pubescent on upper part of inflorescence. Inflorescence racemose, (1 or)2–11-flowered, 5–30 cm tall, 1–5 mm in diam. below lowermost flower, emerging from soil in nodding position. Inflorescence bracts below soil level shorter and thicker and more densely crowded on axis than upper bracts. Inflorescence bracts above soil level, sessile, ± erect, ovate to oblong, 7–15 × 3–15 mm, rather fleshy, somewhat pubescent to glabrous, margin entire or erose to irregularly toothed, apex acute to acuminate. Flowers nodding, tubular-campanulate. Bracts 1, rarely to 3, similar to inflorescence bracts in size and shape. Sepals 3–5, occasionally absent, oblong to broadly elliptic, 6–10 × 2–5 mm, shorter than petals, base attenuate, margin irregularly toothed, apex acute or acuminate. Petals 4–6, oblong, 1–1.5 cm × 3–6 mm, abaxially finely pubescent, adaxially long pubescent, base saccate, margin entire and irregularly denticulate or erose in upper part, apex acute or rounded. Stamens 8–12; filaments 7–14 mm, pubescent; anthers hippocrepiform, short, 0.8–1.5 mm, opening by a solitary terminal slit over connate sacs. Ovary 4–8 mm, 3–6 mm in diam. at anthesis, placentae axile; style 2–10 mm, ca. as long as ova-

ry, slender, pubescent, articulation between style and ovary conspicuous. Stigma yellow, funnelform, 1.5–3 mm in diam., often subtended by a ring of short hairs, usually pubescent. Nectary at base of ovary with 8–10 paired lobes directed downward between staminal bases opposite saccate bases of petals. Capsules erect, broadly ellipsoid, 6–10 mm, 4–8 mm in diam. Fl. Jul–Aug, fr. Sep–Oct.

Damp mixed and coniferous forests; 100–2500 m. Anhui, Fujian, Gansu, W Hubei (Shennongjia), Hunan, Jilin, Jiangxi, Liaoning, Qinghai, Shaanxi, Shanxi, N Sichuan (Barkam), Taiwan, Xinjiang, Xizang, Yunnan [Afghanistan, Bhutan, India, Japan, Kashmir, Korea, Mongolia, Myanmar, Nepal, Pakistan, Russia, Sikkim, Thailand; SW Asia, Europe, North America, Central America (Mexico)].

2. *Monotropa uniflora* Linnaeus, Sp. Pl. 1: 387. 1753.

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Herbs white when fresh, fleshy, becoming black when dry, usually glabrous. Inflorescence erect, scapose, 1-flowered, 10–30 cm tall, 1.5–2 mm in diam. below flower, emerging from soil in nodding position. Inflorescence bracts scale-form, below soil level shorter and thicker and more densely crowded than upper bracts. Inflorescence bracts above soil level thin, ± erect,

ovate to oblong, 1–2 cm × 4–8 mm, sessile, usually glabrous, margin entire or erose to irregularly toothed, apex acuminate. Flowers nodding at anthesis, tubular-campanulate. Bracts not distinguishable from upper inflorescence bracts. Sepals 3–5, scalelike, lanceolate to oblong, 1–1.5 cm × 3–5 mm, mostly glabrous, margin irregularly toothed, apex acute to acuminate. Petals 3–8, obovate-oblong, 1.2–2.2 cm × 4–8 mm, fleshy, abaxially glabrous, adaxially usually pubescent, base saccate, margin entire, irregularly denticulate or erose in upper part, apex rounded. Stamens usually 10; filaments 1–1.5 cm, pubescent; anthers yellowish, short, appearing peltate, to 2 mm in diam.; sacs connate, opening by a distal slit. Ovary essentially glabrous, grooved along sides where capsule segments separate; placenta axile; style 2–3 mm, shorter than ovary, thick, articulation between style and ovary conspicuous; stigma yellow-brown, ca. 4 mm in diam., funnelform, glabrous. Nectary at base of ovary usually with 10 paired lobes directed downward between staminal bases. Capsules erect, ellipsoid-globose, 1–1.5 cm. Old spent axes remaining erect throughout season. Fl. (Aug–)Sep–Oct(–Nov), fr. Oct–Nov.

Damp deciduous or mixed forests; 100–1500 m. Anhui, Gansu, Guizhou, Hubei, Jiangxi, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan, Zhejiang [Bangladesh, Bhutan, India, Japan, Korea, ?Myanmar, Nepal, Sikkim; North, Central, and N South America].

