

223. COIX Linnaeus, Sp. Pl. 2: 972. 1753.

薏苡属 yi yi shu

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Annual or perennial. Culms robust, erect or decumbent, sometimes floating, usually solid. Leaves cauline; leaf blades large, usually broad, flat; ligule membranous. Inflorescences many, fascicled in the upper leaf axils, each subtended by a globose or elongated, bony or sometimes softer modified involucrel spatheole (“utricle”); each inflorescence comprising 2 racemes, a female sessile raceme enclosed within the utricle, and a pedunculate male raceme subtended by a prophyll and exerted from the apical pore of the utricle. Female raceme of 1 sessile fertile spikelet accompanied by 2 free stout pedicels, sometimes bearing vestigial spikelets. Female spikelet: lower glume broad, infolding spikelet, membranous with cartilaginous beak; upper glume narrower, keeled; lower floret reduced to a broad hyaline lemma; upper floret with hyaline lemma and palea; lodicules absent; stigmas 2, elongate, exerted from utricle. Male raceme deciduous at maturity, composed of imbricate spikelets borne in pairs or triads, 1(–2) sessile and 1 pedicelled, pedicelled spikelet often reduced in triads. Male spikelets: glumes subequal, herbaceous; lower glume flat on back, margins keeled, keels winged upward, wings with obvious branching veins; upper glume boat-shaped; both florets staminate, lemma and palea hyaline. Caryopsis orbicular, ventrally furrowed, enclosed in utricle.

Four species: tropical Asia; two species in China.

- 1a. Annual, culms tufted; leaf blades 1.5–7 cm wide, acute; male spikelets mostly paired (except terminal triad) 1. *C. lacryma-jobi*
 1b. Perennial, culms often decumbent and rooting at base; leaf blades 0.3–2.5 cm wide, slenderly acuminate; male spikelets in triads 2. *C. aquatica*

1. *Coix lacryma-jobi* Linnaeus, Sp. Pl. 2: 972. 1753.

薏苡 yi yi

Annual. Culms erect, robust, 1–3 m tall, more than 10-noded, branched. Leaves cauline; leaf sheaths shorter than internodes, glabrous; leaf blades linear-lanceolate, usually glabrous, 10–40 × 1.5–7 cm, midvein stout, base subrounded or cordate, margins scabrous, apex acute; ligule 0.6–1.2 mm. Male raceme 1.5–4 cm, spikelets in pairs with terminal triad; utricle ovoid to cylindrical, usually bony, shiny, 7–11 × 6–10 mm, white, bluish or gray-brown, sometimes with apical beak. Male spikelets oblong-ovate, 6–9 mm; glumes many-veined, lower glume winged on keels, wings 0.4–0.8 mm wide, wing margin ciliate; anthers 4–5 mm. Fl. and fr. Jun–Dec. $2n = 20$.

Streams, marshy valleys, moist fields, by houses, often cultivated. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam].

This species is now widely cultivated in tropical and subtropical regions of the world (Job’s Tears). There are many variants, of which the following are the most distinct.

- 1a. Utricle cylindrical or bottle-shaped, much longer than broad 1b. var. *stenocarpa*
 1b. Utricle spherical to ovoid.
 2a. Utricle soft, striate 1d. var. *ma-yuen*
 2b. Utricle bony, polished.
 3a. Utricle ovoid, 7–11 mm long 1a. var. *lacryma-jobi*
 3b. Utricle globose, 4–5 mm in diam. 1c. var. *puellarum*

1a. *Coix lacryma-jobi* var. *lacryma-jobi*

薏苡(原变种) yi yi (yuan bian zhong)

Coix arundinacea Lamarck; *C. lacryma* Linnaeus, nom. illeg. superfl.; *C. lacryma-jobi* var. *maxima* Makino; *Lithagrostis lacryma-jobi* (Linnaeus) Gaertner.

Utricle beadlike, ovoid, bony, glossy, not beaked, 7–11 × 6–10 mm. Fl. and fr. Jun–Oct.

Streams, marshy valleys, moist fields, by houses. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [India, Indonesia, Laos, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam].

This is widely cultivated in tropical regions for the hard, beadlike utricles. There are many races with utricles in different shapes and colors, used for necklaces and other decorative purposes.

1b. *Coix lacryma-jobi* var. *stenocarpa* (Oliver) Stapf in J. D. Hooker, Fl. Brit. India 7: 100. 1896 [“1897”].

窄果薏苡 zhai guo yi yi

Coix lacryma var. *stenocarpa* Oliver, Hooker’s Icon. Pl. 18: t. 1764. 1888; *C. lacryma-jobi* var. *tubulosa* K. Schumann & Lauterbach; *C. stenocarpa* (Oliver) Balansa; *C. tubulosa* Hackel.

Utricle narrowly cylindrical, bony, glossy, white, bluish or brown, 7–15 × 2–3 mm. Fl. and fr. Oct–Dec.

Cultivated. Yunnan [NE India, Indonesia, Myanmar, New Guinea, Philippines, Vietnam].

This variety is grown in gardens for the ornamental, elongate utricles, which are used for beads.

1c. *Coix lacryma-jobi* var. *puellarum* (Balansa) A. Camus in Lecomte, Fl. Indo-Chine 7(5): 220. 1922.

小珠薏苡 xiao zhu yi yi

Coix puellarum Balansa, J. Bot. (Morot) 4: 77. 1890.

Utricle globose, very hard, bony, white or bluish, 4–5 mm in diam., not beaked.

Moist valley forests; ca. 1400 m. Hainan, Xizang, Yunnan [NE India, Myanmar, Thailand, Vietnam].

This is a form distinguished by its small, globose utricles.

1d. *Coix lacryma-jobi* var. *ma-yuen* (Romanet du Caillaud) Stapf in J. D. Hooker, Fl. Brit. India 7: 100. 1896 [“1897”].

薏米 *yi mi*

Coix ma-yuen Romanet du Caillaud, Bull. Soc. Natl. Acclim. France, Sér. 2, 8: 442. 1881; *Coix chinensis* Todaro ex Balansa; *C. chinensis* var. *formosana* (Ohwi) L. Liu; *C. lacryma-jobi* subsp. *ma-yuen* (Romanet du Caillaud) T. Koyama; *C. lacryma-jobi* var. *formosana* Ohwi; *C. lacryma-jobi* var. *frumentacea* Makino.

Utricle thin, longitudinally striate, pale or dark brown, elliptical to subglobose, constricted to an apical beak, 8–12 × 4–9 mm, brittle and easily broken. Caryopsis white or yellow, oblong, 5–8 × 4–6 mm, rich in starch. Fl. and fr. Jul–Dec.

Roadsides, valleys, often cultivated; below 2000 m. Anhui, Fujian, Guangdong, Guangxi, Hebei, Henan, Hubei, Jiangsu, Jiangxi, Liaoning, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Thailand, Vietnam].

This form with softer utricles is used as a food grain and for medicine. It also provides good forage.

2. *Coix aquatica* Roxburgh, Fl. Ind., 3: 571. 1832.

水生薏苡 *shui sheng yi yi*

Coix gigantea Roxburgh (1832), not Koenig (1788); *C. gigantea* subsp. *aquatica* (Roxburgh) Bhattacharya; *C. gigantea* var. *aquatica* (Roxburgh) Watt; *C. lingulata* Hackel.

Perennial, aquatic. Culms creeping and rooting from nodes at base, sometimes floating, up to 30 m long, ca. 1 cm in diam., flowering stems up to 2 m tall, more than 10-noded. Leaf sheaths smooth, glabrous or upper sheaths tuberculate-hispid; leaf blades narrowly to broadly linear, up to 100 × (0.3–)1–2.5 cm, hispid with tubercle-based hairs on both surfaces or almost glabrous, midvein stout, base rounded, margins scabrous, apex slenderly acuminate; ligule ca. 1 mm, margin ciliate. Male raceme 2.5–7 cm, drooping, spikelets mostly in triads, closely imbricate; utricle ovoid, longer than broad, bony, shiny, 10–14 × 5–7 mm, white or pale brown, sometimes with a median transverse line, apex occasionally extended into a green blade. Male spikelets broadly elliptic, 8–12 mm; glumes many-veined, lower glume winged on keels, wing (0.4–)0.7–1.2(–1.5) mm wide, margin ciliate; anthers 4–5.5 mm. Fl. and fr. Aug–Nov. $2n = 10, 20, 40$.

Lakes, streams, marshy borders, open water; 500–1800 m. Guangdong, Guangxi, Yunnan [Bangladesh, Bhutan, India, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam].

All forms of the variable, perennial, aquatic *Coix* are included here in a single species. Some forms with a supposedly non-creeping habit have been separated as *C. gigantea* Roxburgh (1832), but this name is a later homonym of *C. gigantea* Koenig (1788), a different grass now placed in *Chionachne*. It is, in any case, very uncertain whether this difference in habit, which is usually impossible to determine in herbarium specimens often lacking the basal parts, is real or simply a response to the environment.

This species covers a range of chromosome levels. A form with very narrow leaf blades is the basis of *Coix lingulata*. Similar narrow-leaved specimens have been shown to have a chromosome number of $2n = 10$. The utricle apex is sometimes extended into a leaflike, green blade. The occurrence of this feature is sporadic, and it can vary from a minute vestige to a blade ca. 3 cm or more long, even on the same plant. The leaf blades are often spotted with tubercles, which appear to be glandular and carry a short bristle-hair. These tubercle-hairs vary from dense to very sparse. The male spikelets are tightly packed into a cone-like raceme, and are on average broader with broader marginal wings than in *C. lacryma-jobi*, but there is much variation.

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