

77. AVENA Linnaeus, Sp. Pl. 1: 79. 1753.

燕麦属 yan mai shu

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Annuals. Culms erect, fairly robust. Leaf blades linear, flat; ligule membranous. Inflorescence a large loose panicle. Spikelets large, pendulous, oblong to gaping, florets 2 to several, the uppermost reduced; rachilla pilose or glabrous, disarticulating below each floret or only below the lowest, or not disarticulating (cultivated species); glumes lanceolate to elliptic, usually subequal and as long as spikelet, rarely strongly unequal or shorter than spikelet, herbaceous to membranous, 7–11-veined, back rounded, smooth, apex acuminate; floret callus acute to pungent, bearded; lemmas lanceolate-oblong, usually leathery, occasionally papery, back rounded, 5–9-veined, glabrous to hispid, awned usually from near middle of back, apex papery, 2-toothed to 2-fid, lobes sometimes extended into fine bristles, awn geniculate with twisted column, sometimes reduced or absent (cultivated species); palea usually shorter than lemma, keels ciliate. Ovary densely hairy. Caryopsis with long linear hilum.

About 25 species: centered on the Mediterranean region and SW Asia, extending to N Europe and N Asia, widely introduced to other temperate and cold regions; five species (all introduced) in China.

*Avena* includes several species cultivated as cereal crops (oats) and is also used for fodder and fiber production. A few species have become widespread as weeds of crops in temperate regions.

*Avena barbata* Pott ex Link and *A. eriantha* Durieu, native from the Mediterranean to C Asia, are mentioned (FRPS 9(3): 168. 1987) as cultivated in China.

- 1a. Rachilla tough, spikelets not regularly disarticulating; cultivated plants.
  - 2a. Glumes as long as spikelet; lemmas leathery, distinctly veined in upper half; rachilla internodes short, straight; grains not free threshing ..... 1. *A. sativa*
  - 2b. Glumes conspicuously shorter than spikelet; lemmas papery, distinctly veined throughout; rachilla internodes elongate, sometimes sinuous; grains free threshing.
    - 3a. Spikelets 2.5–3.5(–4.5) cm, florets 3–7; lemma apex shortly and obtusely 2–4-toothed; grain ca. 8 mm .... 2. *A. chinensis*
    - 3b. Spikelets 2–2.5(–3.5) cm, florets 2–4; lemma apex with 2 slenderly acuminate teeth; grain ca. 6 mm ..... 3. *A. nuda*
- 1b. Rachilla disarticulating below each floret, or at least below lowest; wild plants.
  - 4a. Rachilla disarticulating only below lowest floret, only lowest floret with a basal callus.
    - 5a. Lower glume ± equal to upper glume ..... 4. *A. sterilis*
    - 5b. Lower glume much shorter than upper glume ..... *A. eriantha* (see note above)
  - 4b. Rachilla disarticulating below each floret, each floret with a basal callus.
    - 6a. Lemma apex 2-toothed or 2-fid, but lacking apical bristles ..... 5. *A. fatua*
    - 6b. Lemma apex 2-fid, each lobe with a fine apical bristle ..... *A. barbata* (see note above)

1. *Avena sativa* Linnaeus, Sp. Pl. 1: 79. 1753.

燕麦 yan mai

Annual. Culms solitary or tufted, erect, 40–180 cm tall, unbranched. Leaf sheaths usually glabrous; leaf blades 15–30 cm, 4–10 mm wide, glabrous, margins sometimes scabrous; ligule 3–6 mm. Panicle loose and open or contracted, 20–40 cm, nodding; branches spreading or contracted. Spikelets 2–3 cm, florets 2(or 3); rachilla ± glabrous, straight, not disarticulating or fracturing irregularly at maturity, florets lacking a basal bearded callus, internodes short, less than 0.5 mm; glumes lanceolate, subequal, as long as spikelet, 7–9-veined; lemmas 1.2–2.5 cm, leathery in lower half, herbaceous and distinctly veined above, glabrous or nearly so, apex minutely and irregularly 2–4-denticulate; awn 2.5–3.5 cm, weakly geniculate or rudimentary or absent. Grain adherent to lemma and palea at maturity.  $2n = 42$ .

Widely cultivated in China [of cultivated origin].

This species is cultivated as a cereal crop (oats) in north-temperate regions of the world, and also as a green fodder crop. Genetic evidence

points to *Avena sterilis* as the wild ancestor of *A. sativa*, and *A. fatua* as a weedy derivative. Hybrids between *A. sativa* and *A. fatua* with hairy florets or well-developed awns may occur where the two species grow together.

2. *Avena chinensis* (Fischer ex Roemer & Schultes) Metzger, Eur. Cereal. 53. 1824.

莠麦 you mai

*Avena nuda* Linnaeus var. *chinensis* Fischer ex Roemer & Schultes, Syst. Veg. 2: 669. 1817; *A. sativa* subsp. *chinensis* (Fischer ex Roemer & Schultes) Janchen ex Holub.

Annual. Culms 60–100 cm tall. Leaf blades 8–40 cm, 3–16 mm wide, scabrid. Panicle open, 12–20 cm; branches scabrid. Spikelets 2.5–3.5(–4.5) cm, florets 3–7; rachilla glabrous, not disarticulating at maturity, florets lacking a basal bearded callus, internodes elongate, sinuous, upper sometimes strongly curled; glumes broadly lanceolate, subequal, conspicuously shorter than spikelet, 1.5–2.5 cm, 7–11-veined; lemmas 2–2.5 cm, papery, distinctly veined throughout, glabrous, awned from upper 1/4 of lemma, apex with 2–4 small obtuse teeth; awn 1–2

cm, straight or bent, rarely awnless. Grain ca. 8 mm, free from lemma and palea at maturity (free threshing). Fl. and fr. Jun–Aug.

Cultivated, or naturalized along roadsides and on arable land; 1000–3200 m. Hebei, Henan, Hubei, Xinjiang, Yunnan [Russia; Europe].

More work is needed on *Avena chinensis*. It is very close to *A. nuda*, and may not be distinct from it. These naked wheats may be no more than free-threshing forms of *A. sativa*, caused by occasional mutations, and are perhaps better placed at infraspecific rank within *A. sativa*.

The name *Avena gracillima* Keng (Bull. Fan Mem. Inst. Biol., Bot. 7: 36. 1936), described from Hebei, is based on a very depauperate specimen with a panicle of only 1 or 2 spikelets. The spikelets are 1.4–1.8 mm long with herbaceous, glabrous lemmas and rudimentary awns. It is clearly a cultivated species, growing as a weed on grassy slopes, most likely referable to *A. chinensis*. The type has not been seen.

**3. *Avena nuda* Linnaeus, Demonstr. Pl. 3. 1753.**

裸燕麦 *luo yan mai*

*Avena sativa* Linnaeus var. *nuda* (Linnaeus) Koernicke.

Annual. Culms 45–90 cm tall. Leaf blades up to 20 cm, 3–7 mm wide, scaberulous. Panicle somewhat contracted, up to 25 cm. Spikelets 1.8–2.5(–3.5) cm, florets 2–4, lower 1 or 2 florets awned, upper florets awnless; rachilla glabrous, not disarticulating at maturity, florets lacking a basal bearded callus; glumes lanceolate, subequal, conspicuously shorter than spikelet, 7–9-veined; lemmas 1.5–2 cm, papery, distinctly veined throughout, glabrous, awned from ca. upper 1/3, apex 2-toothed, teeth slenderly acuminate, up to 4 mm; awn 1.5–2 cm, bent but not twisted. Grain ca. 6 mm, free from lemma and palea at maturity (free threshing).  $2n = 42$ .

Cultivated; 2300–3300 m. Hubei, C and N Yunnan [Russia; Europe].

This is a minor crop, seldom cultivated nowadays. It is used for flour and also for animal fodder. It is a European species, but has been recently recorded as cultivated in Yunnan.

The place of publication of this species is sometimes cited as Amoen. Acad. 3: 401. 1756. The *Amoenitates Academicae* are a collection of reissued Linnaean dissertations. *Avena nuda* was validly published in the original dissertation in 1753.

**4. *Avena sterilis* Linnaeus subsp. *ludoviciana* (Durieu) Nyman, Consp. Fl. Eur. 810. 1882.**

长颖燕麦 *chang ying yan mai*

*Avena ludoviciana* Durieu, Actes Soc. Linn. Bordeaux 20: 41. 1855.

Annual. Culms solitary or tufted, erect or ascending, 50–120 cm tall, unbranched, 2–4-noded. Leaf sheaths glabrous or basal sheaths puberulous; leaf blades up to 60 cm, 4–13 mm wide, scaberulous, glabrous; ligule 3–4 mm. Panicle loose, open, pyramidal, 13–30 cm, nodding; branches coarsely scabrid. Spikelets 2–3 cm, florets 2 or 3, 2-awned; rachilla disarticulating only below lowest floret, florets falling together at maturity, only lowest floret with a bearded callus, internodes glabrous; glumes narrowly elliptic-oblong, subequal, as long as

spikelet, 7–9-veined, apex finely acuminate; callus hairs up to 5 mm; lemmas 1.8–2.5 cm, leathery, hispid, finally brown in lower half, green and scabrid above, awned at about lower 1/3, apex finely 2-fid; awn 3–6 cm, fairly slender, strongly geniculate, column dark brown, pubescent.  $2n = 42$ .

Arable weed, adventive. Yunnan [native to SW Asia and Europe].

This is a noxious weed of arable land, especially fields of cereals, native to the Mediterranean region and SW Asia, but now widespread in warm-temperate regions of the world. It has been recorded in China only from Yunnan.

The typical subspecies, *Avena sterilis* subsp. *sterilis*, is distinguished by its larger, 3–5 cm spikelets with 3–5 florets, 9–11-veined glumes, and stouter, 6–9 cm awns. Both subspecies occur over the whole range of the species.

**5. *Avena fatua* Linnaeus, Sp. Pl. 1: 80. 1753.**

野燕麦 *ye yan mai*

Annual. Culms erect or geniculate at base, 50–150 cm tall, unbranched, 2–4-noded. Leaf sheaths glabrous or basal sheaths puberulous; leaf blades 10–30 cm, 4–12 mm wide, scabrid or adaxial surface and margins pilose; ligule 1–5 mm. Panicle narrowly to broadly pyramidal, 10–40 cm, nodding; branches scabrid. Spikelets 1.7–2.5 cm, florets 2 or 3, all florets awned; rachilla easily disarticulating below each floret at maturity, each floret with a bearded callus, internodes hirsute or glabrous; glumes lanceolate, subequal, herbaceous, 9–11-veined, apex finely acute; callus hairs up to 4 mm; lemmas 1.5–2 cm, leathery, glabrous to densely hispid in lower half, green and scaberulous above, awned from near middle, apex shortly 2–4-toothed; awn 2–4 cm, geniculate, column twisted, blackish brown. Fl. and fr. Apr–Sep.  $2n = 42$ .

Weed of cultivated fields, grassy mountain slopes, roadsides and other disturbed places; below 4300 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Nei Mongol, Ningxia, Qinghai, Shaanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [Afghanistan, Bhutan, India (Sikkim), Kazakhstan, Kyrgyzstan, Nepal, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; N Africa, SW Asia, Europe].

This is a noxious weed, especially in fields of wheat and cultivated oats, native to Europe and C and SW Asia, but now spread throughout temperate regions of the world.

1a. Lemmas hispid in lower half, dark brown at maturity ..... 5a. var. *fatua*

1b. Lemmas glabrous, yellow at maturity ..... 5b. var. *glabrata*

**5a. *Avena fatua* var. *fatua***

野燕麦(原变种) *ye yan mai* (yuan bian zhong)

*Avena fatua* subsp. *meridionalis* Malzev; *A. meridionalis* (Malzev) Roshevitz.

Lemmas densely to sparsely hispid below middle with white or brownish hairs, becoming dark brown at maturity. Fl. and fr. Apr–Sep.

Disturbed places and as an arable weed; below 4300 m. Distribution as for the species.

**5b. *Avena fatua* var. *glabrata*** Petermann, Fl. Bienitz 13. 1841.

光稃野燕麦 *guang fu ye yan mai*

*Avena fatua* var. *mollis* Keng.

Lemmas glabrous (callus often bearded), yellowish at maturity.

Grassy mountain slopes, roadsides, farmlands; below 4300 m. Distribution as for the species.

Glabrous forms may be found growing with hairy forms, and are of little taxonomic importance.

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