

# 1. ZOSTERA Linnaeus, Sp. Pl. 2: 968. 1753.

大叶藻属 da ye zao shu

Rhizome monopodial, with 2 vascular bundles in cortex. Shoots short, with several leaves; flowering stems usually elongated, with several spathes. Leaves linear, with 3–11 parallel veins, margin entire or rarely minutely denticulate; sheaths membranous or subleathery, with an auricle, ligulate. Spadix axillary, sessile, axis flattened, without or only with inconspicuous projections (retinacula). Plants monoecious; flowers unisexual, small. Anthers 2-celled. Style short; stigmas 2, filiform or subulate. Fruit ovoid, with a short beak.

About 12 species: best represented along shores of N temperate regions; five species in China.

- 1a. Leaves 3-veined; sheaths open; projections present on each side of spadix axil ..... 5. *Z. japonica*
- 1b. Leaves 5–11-veined; sheaths closed; projections usually absent.
  - 2a. Rhizomes slightly erect, with very short internodes; sheaths slightly leathery, persistent; leaf apex retuse ..... 2. *Z. caespitosa*
  - 2b. Rhizomes creeping, internodes elongated; sheaths usually membranous, not persistent; leaf apex obtuse or mucronate, rarely retuse.
    - 3a. Seeds longitudinally ribbed; leaves 5–7-veined ..... 1. *Z. marina*
    - 3b. Seeds smooth on surface; leaves 5–11-veined.
      - 4a. Leaves 5–8 mm wide, apex obtuse or mucronate; fruit ca. 4 mm ..... 3. *Z. caulescens*
      - 4b. Leaves 1–1.5 cm wide, apex truncate or retuse; fruit 5–6.5 mm ..... 4. *Z. asiatica*

## 1. *Zostera marina* Linnaeus, Sp. Pl. 2: 968. 1753.

大叶藻 da ye zao

*Alga marina* (Linnaeus) Lamarck.

Rhizomes creeping, 2–4 mm in diam., with elongated internodes. Leaves on non-flowering shoots 5–8, linear, longer than 50 cm, 3–6 mm wide, 5–7-veined, margin entire, apex rounded or mucronate; sheaths closed, tubular, membranous, splitting irregularly when old; auricle ca. 1 mm; ligule ca. 0.5 mm; intravaginal squamules 2 or 4, linear. Flowering stems ca. 1 m, branched; spathes with flattened stalk, narrower than leaves; spadix without projections. Anthers 4–5 mm. Ovary 2–3 mm; style 1.5–2.5 mm; stigmas ca. 3 mm. Fruit ellipsoid, ca. 4 mm. Seeds longitudinally ribbed. Fl. and fr. Mar–Jul.  $2n = 12$ .

On fine gravel, sand, or mud near low tide mark. Coasts of Hebei, Liaoning, Shandong [coasts of Japan, Korea, Myanmar, Russia, Thailand; N Africa, Europe, North America].

## 2. *Zostera caespitosa* Miki, Bot. Mag. (Tokyo) 46: 780. 1932.

丛生大叶藻 cong sheng da ye zao

Rhizomes slightly erect, with very short internodes. Leaves on non-flowering shoots 3 or 4, linear, ca. 60 cm × 3–6 mm, 5–7-veined, margin entire or sometimes minutely denticulate, apex retuse; sheaths closed, tubular, slightly leathery, persistent, splitting irregularly when old; auricle ca. 1 mm; ligule ca. 0.5 mm; intravaginal squamules 2, linear. Flowering stems 30–60 cm, branched; spathes with flattened stalk, narrower than leaves; spadix without projections. Anthers 4–5 mm. Ovary ca. 2.5 mm; style ca. 2 mm; stigmas subulate, ca. 2 mm. Fruit ellipsoid, ca. 3.5 mm. Seeds with 16–20 longitudinal ribs. Fl. and fr. Apr–Jun.  $2n = 12$ .

Bottoms of shallow seas. Coast of Liaoning (Dalian) [coasts of Japan and Korea].

## 3. *Zostera caulescens* Miki, Bot. Mag. (Tokyo) 46: 779. 1932.

具茎大叶藻 ju jing da ye zao

Rhizomes creeping, 2–3.5 mm in diam., internodes 1–2 cm. Leaves on non-flowering shoots several, linear, ca. 50 cm × 5–8 mm, 5–9-veined, margin entire, apex obtuse or mucronate; sheaths closed, tubular, membranous, splitting irregularly when old; auricle ca. 2 mm; ligule 1–1.5 mm; intravaginal squamules 2, linear. Flowering stems ca. 1 m, branched, usually lower branches with spathes, upper ones with leaves; spathes with flattened stalk, narrower than leaves; spadix without projections. Anthers 4.5–6 mm. Ovary ca. 2 mm; style ca. 2 mm; stigmas 2.5–3 mm. Fruit narrowly ellipsoid, ca. 4 mm. Seeds slightly smooth. Fl. and fr. Apr–Jun.  $2n = 12$ .

Bottoms of shallow seas. Coast of Liaoning [coasts of Japan and Korea].

## 4. *Zostera asiatica* Miki, Bot. Mag. (Tokyo) 46: 776. 1932.

宽叶大叶藻 kuan ye da ye zao

Rhizomes creeping, internodes 1–2 cm. Leaves on non-flowering shoots several, linear, ca. 1 m × 1–1.5 cm, 7–11-veined, apex truncate or obtuse; sheaths closed, tubular, membranous, splitting irregularly when old; auricle obtuse; ligule very short; intravaginal squamules 2, linear. Flowering stems ca. 1 m, branched; spathes with flattened stalk, narrower than leaves, apex retuse; spadix without projections. Anthers ca. 4 mm. Ovary 2–3 mm; style 1–1.5 mm; stigmas ca. 2.5 mm.

Fruit narrowly ellipsoid, 5–6.5 mm. Seeds smooth. Fl. and fr. Jul–Mar.  $2n = 12$ .

Bottoms of shallow seas. Rarely along coast of Liaoning [coasts of Japan, Korea, Russia (Far East)].

**5. *Zostera japonica*** Ascherson & Graebner in Engler, Pflanzenr. 31(IV. 11): 32. 1907.

矮大叶藻 ai da ye zao

*Nanozostera japonica* (Ascherson & Graebner) Tomlinson & Posluszny.

Rhizomes creeping, 0.5–1.5 mm in diam., internodes 0.5–3 cm. Leaves on non-flowering shoots 2–4, linear, 5–35 × 1–2 mm, 3-veined, apex obtuse or retuse; sheaths open, 2–10 cm, margin membranous; auricle obtuse, ca. 0.5 mm; intravaginal squamules 2, lanceolate. Flowering stems 10–30 cm; spathes with flattened stalk, ca. as broad as or narrower than leaves, apex obtuse, mucronate, rarely retuse; spadix with projections. Anthers ca. 2 mm. Ovary ca. as long as style; stigmas subulate. Fruit ellipsoid to narrowly cylindrical, ca. 2 mm. Seeds smooth. Fl. and fr. Jun–Sep.  $2n = 12$ .

Bottoms of shallow seas. Coasts of Hebei, Liaoning, Shandong, Taiwan [coasts of Japan, Korea, Russia (Far East), Vietnam; Africa, Asia, Europe, North America].

