

# NITRARIACEAE

白刺科 bai ci ke

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Shrubs, 0.5–2 m tall, prostrate or ascending, succulent, sometimes spiny. Branches often spiny at end. Stipules intrapetiolar, distinct, caducous or persistent. Leaves alternate, spiral, or fasciculate, simple, fleshy or succulent, petiolate or sessile, deciduous; leaf blade 1-veined or palmately veined, margin entire or 2- or 3-dentate at apex. Flowers solitary or aggregated in cymes, small, bracteate. Sepals 5, fleshy, imbricate, persistent. Petals 5, white or yellowish green. Stamens (10–)15, both alternate and opposite petals; anthers dorsifixed. Ovary inferior, sessile, 2–6-locular; styles 1; stigma ovoid. Fruit a drupe, purple, red, or yellow, fleshy, 1-seeded; mesocarp fleshy to succulent; endocarp forming a bony stone.

One genus and ca. 11 species: arid and semiarid regions of N Africa, C, N, and W Asia, Australia, and SE Europe; five species (one endemic) in China.

This family was included in Zygophyllaceae in FRPS. However, it differs from the Zygophyllaceae in many morphological characters. Molecular evidence also supports its recognition as a separate family.

Liou Yingxin. 1998. *Nitraria*. In: Xu Langran & Huang Chengchui, eds., *Fl. Reipubl. Popularis Sin.* 43(1): 117–123.

## 1. NITRARIA Linnaeus, *Syst. Nat.*, ed. 10, 1044. 1759.

白刺属 bai ci shu

Morphological characters and geographical distribution are the same as those of the family.

The seeds contain oils.

- 1a. Exocarp dry and membranous, fruit expanding into a ball; stone spindle-shaped; leaf blade linear to oblanceolate-linear ..... 1. *N. sphaerocarpa*
- 1b. Fruit a fleshy drupe; stone narrowly ovoid, ovoid, or oblongly conic; leaf blade broader than linear.
  - 2a. Fruit 8–15 mm in diam.; stone 8–10 mm; leaf blade 7–20 mm wide ..... 2. *N. roborowskii*
  - 2b. Fruit 5–9 mm in diam.; stone 4–7.5(–8) mm; leaf blade 2–8 mm wide.
    - 3a. Fruit nearly globose or ellipsoid; mesocarp dark blue to purplish; stone 4–5 mm; leaves 4–6 in fascicles on young branches; leaf blade oblanceolate ..... 3. *N. sibirica*
    - 3b. Fruit ovoid to sometimes ellipsoid; mesocarp rosy or dark cherry red; stone 5–7.5(–8) mm; leaves 2 or 3 in fascicles on young branches; leaf blade broadly oblanceolate or linear-spatulate.
      - 4a. Fruit 1–1.3 cm, dark red; mesocarp rosy; stone 5–6 mm; leaf blade broadly oblanceolate to oblanceolate, 1.8–2.5 cm × 6–8 mm, apex obtuse ..... 4. *N. tangutorum*
      - 4b. Fruit 0.8–0.9 cm, cherry-colored; mesocarp cherry-colored; stone 6.5–7.5 mm; leaf blade linear-spatulate, (0.5–)1–1.7(–2.5) cm × (1.5–)2–3.5(–5) mm, apex acute to obtuse ..... 5. *N. pamirica*

1. *Nitraria sphaerocarpa* Maximowicz, *Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg* 11: 657. 1883.

泡泡刺 pao pao ci

Shrubs 25–50 cm tall, prostrate. Branches arched, young branches white, sterile branches spiny at apex. Leaves in clusters of 2 or 3, nearly sessile; leaf blade linear to oblanceolate-linear, 5–25 × 2–5 mm, apex acute to obtuse. Inflorescences yellowish gray, 2–4 cm, pubescent. Pedicel 1–5 mm. Sepals green, pubescent. Petals white, ca. 2 mm. Unripe fruit lanceolate, with densely yellowish brown pubescence, apex acuminate; ripe fruit expanding into a ball, ca. 1 cm in diam.; exocarp dry and membranous. Stone spindle-shaped, 6–8 mm, surface cavernous, apex acuminate. Fl. May–Jun, fr. Jun–Jul.

Deserts, foothills, gravelly and sandy areas. NW Gansu, W Nei Mongol, Xinjiang [Kazakhstan, Mongolia].

2. *Nitraria roborowskii* Komarov, *Trudy Imp. S.-Peterburgsk. Bot. Sada* 29(1): 168. 1908.

大白刺 da bai ci

*Nitraria praevisa* Bobrov.

Shrubs 1–2 m tall, prostrate to erect. Young branches white, sterile branches spiny at apex. Leaves in clusters of 2 or 3 on current year branchlets; leaf blade oblong-spatulate to obovate, 2.5–4 × 0.7–2 cm, margin entire or irregularly 2- or 3-dentate at apex, apex rounded, obtuse, or truncate. Flowers sparse. Fruit dark red, ovoid, 1.2–1.8 × 0.8–1.5 cm; mesocarp purplish black. Stone narrowly ovoid, 8–10 × 3–4 mm. Fl. Jun, fr. Jul–Aug.

Lake margins, oases in desert areas; below 3300 m. Gansu, W Nei Mongol, Ningxia, Qinghai, NW Shaanxi, Xinjiang [Mongolia, Russia].

The fruit is edible and the juice used as a beverage.

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**3. *Nitraria sibirica*** Pallas, Fl. Ross. 1: 80. 1784.

小果白刺 xiao guo bai ci

Shrubs 0.5–1.5 m tall, prostrate, arched, or rarely erect. Young branches white, sterile branches spiny at apex. Leaves in fascicles of 4–6 on current year branchlets; leaf blade oblanceolate, 6–15 × 2–5 mm, glabrous or pubescent when young, base cuneate, apex acute to obtuse. Cymes 1–3 cm, pubescent. Sepals 5, green. Petals yellowish green to nearly white, oblong, 2–3 mm. Fruit dark red, ellipsoid to spherical, 6–8 mm in diam., both ends obtuse; mesocarp dark blue to purplish. Stone ovoid, 4–5 mm, apex acute. Fl. May–Jun, fr. Jul–Aug.  $2n = 24, 60$ .

Sandy areas in oases, saline sandy areas, sands along lakeshores; below 3700 m. Gansu, Hebei, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Xinjiang [Mongolia, Russia].

The fruit is edible but not as good as the former species.

**4. *Nitraria tangutorum*** Bobrov, Sovetsk. Bot. 14: 26. 1946.

白刺 bai ci

Shrubs 1–2 m tall, prostrate to spreading, much branched. Branches arched, young branches white, sterile branches spiny at apex. Leaves in fascicles of 2 or 3(or 4) on current year branchlets; leaf blade broadly oblanceolate, 1.8–3 cm × 6–8 mm, base cuneate, margin entire or rarely apically dentate, apex obtuse. Inflorescences and infructescences in dense cymes. Fruit dark red, ovoid to sometimes ellipsoid, 10–13 × 6–9 mm; mesocarp rosy when ripe. Stone narrowly ovoid, 5–6 mm, apex shortly acuminate. Fl. May–Jun, fr. Jul–Aug.

• Sandy areas around lakes, oases, river terraces, sandy plains, aeolian basins, clay deserts, semidesert areas; 1900–3500 m. Gansu, Hebei, W Nei Mongol, Ningxia, Qinghai, N Shaanxi, Xinjiang, NE Xizang.

The specimens reported from China as *Nitraria schoberi* Linnaeus mostly belong here.

**5. *Nitraria pamirica*** L. I. Vassiljeva, Novosti Sist. Vyssh. Rast. 11: 341. 1974.

帕米尔白刺 pa mi er bai ci

Shrubs 12–25(–30) cm tall, prostrate. Branches spreading; old branches grayish white, bark split, glabrous; young branches polished, appressed puberulent, sterile ones spine-formed at apex. Stipules membranous, deciduous. Leaf blade bluish green, linear-spatulate, (0.5–)1–1.7(–2.5) cm × (1.5–)2–3.5(–5) mm, slightly fleshy, both surfaces appressed puberulent or only abaxially pubescent, margin entire, apex acute to obtuse. Inflorescences terminal, scorpioid cymes, 8–20-flowered; peduncle ca. 3.5 cm, pubescent. Pedicel pubescent. Sepals persistent, base connate, lobes widely triangulate, apex acute. Petals oblong-ovate, 3–4 × 1.5–2 mm, apex slightly emarginate. Fruit bright cherry red, blackish when dry, ovoid, 8–9 × 5–6 mm; mesocarp bright cherry red but later dark cherry red. Stone bright grayish yellow, oblongly conic, (5–)6.5–7.5(–8) × 2–3 mm, base rounded, sides with 6(or 7) ridges, reticulate or with irregular dots between ridges. Fr. Aug.

Hills, valleys, terraces, gravel soil, alkaline areas; 3800–4300 m. Xinjiang (upper part of Aksu He) [Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan].