

**41. ASPARAGUS** Linnaeus, Sp. Pl. 1: 313. 1753.

天门冬属 *tian men dong shu*

Chen Xinqi (陈心启 *Chen Sing-chi*); Kamilla G. Tamanian<sup>1</sup>

Herbs perennial or subshrubs, dioecious or hermaphroditic, usually with short rhizomes. Main stems erect or climbing, generally branched, with cladodes (leaflike stems) in axils of main stems and branches. Cladodes borne in clusters, rarely solitary, green, flat, 3-angled, or subterete. Leaves appressed to stem, not green, scalelike, base spurred, spurs often extended into spines. Inflorescence an axillary cluster of flowers, rarely a solitary flower, sometimes a raceme or umbel. Pedicel articulate, subtended by membranous bracteoles. Perianth campanulate or subglobose; segments free or occasionally connate at base. Stamens 6; filaments usually adnate to perianth segments in varying degrees; anthers dorsifixed. Ovary 3-loculed; ovules few per locule. Fruit a berry. Seeds 1 to few.

Between 160 and 300 species: widespread in temperate and tropical regions of Africa, Asia, and Europe; 31 species (15 endemic, two introduced) in China.

- 1a. Inflorescence an axillary raceme; plants hermaphroditic.
  - 2a. Spines 15–20 mm on main stems and 5–10 mm on branches ..... 1. *A. racemosus*
  - 2b. Spines 3–5 mm on main stems and indistinct on branches ..... 2. *A. densiflorus*
- 1b. Inflorescence a solitary flower or sessile cluster of flowers; plants dioecious (hermaphroditic in *A. setaceus*).
  - 3a. Cladodes flat with a distinct midvein or 3-winged.
    - 4a. Stems without sharp spines.
      - 5a. Plants ± climbing; branches sparsely cartilaginous denticulate ..... 12. *A. subscandens*
      - 5b. Plants erect; branches not cartilaginous denticulate.
        - 6a. Cladodes 3-winged basally; stamens equal, filaments free ..... 7. *A. schoberioides*
        - 6b. Cladodes flat; stamens unequal, filaments adnate to perianth segments for ca. 1/2 their length.
          - 7a. Pedicels 10–20 mm ..... 4. *A. filicinus*
          - 7b. Pedicels 1–6 mm.
            - 8a. Cladodes (1 or)2 or 3 per fascicle, 5–12 × (1–)2–3 mm ..... 5. *A. lycopodineus*
            - 8b. Cladodes 5–10 per fascicle, 3–4 × ca. 0.5 mm ..... 6. *A. yanbianensis*
      - 4b. Stems with sharp spines.
        - 9a. Male flowers subglobose, 1–1.5 mm ..... 13. *A. yanyuanensis*
        - 9b. Male flowers subcampanulate, 1.5–5 mm.
          - 10a. Branches and branchlets generally without sharp spines; flowers developing after cladodes.
            - 11a. Cladodes usually 3 per fascicle; filaments free ..... 8. *A. cochinchinensis*
            - 11b. Cladodes 6–9 per fascicle; filaments adnate to perianth segments for ca. 1/2 their length .... 9. *A. taliensis*
          - 10b. Branches and branchlets with woody, sharp spines; flowers developing before or with cladodes.
            - 12a. Cladodes 2–5(–7) per fascicle; stems not striate-ridged; spines on branches shorter than or equaling pedicels ..... 10. *A. munitus*
            - 12b. Cladodes (3–)6–14 per fascicle; stems distinctly striate-ridged; spines on branches longer than pedicels ..... 11. *A. myriacanthus*
    - 3b. Cladodes subterete, sometimes slightly flattened, but without clear midvein.
      - 13a. Plants hermaphroditic; cladodes 10–13 per fascicle, filiform, 4–5 mm; secondary branches and cladodes arranged in 1 plane, frondlike ..... 3. *A. setaceus*
      - 13b. Plants dioecious (but flowers sometimes with aborted stamens or pistil); cladodes 1–10(–25) per fascicle.
        - 14a. Stems with sharp spines 2–3 mm.
          - 15a. Branches and cladodes ± cartilaginous denticulate.
            - 16a. Plants climbing; roots tuberous, 7–15 mm thick, fleshy ..... 21. *A. brachyphyllus*
            - 16b. Plants erect or suberect; roots sometimes with swollen, tuberous part near tip, 2–4 mm thick, rather slender.
              - 17a. Plants dwarf subshrubs; branches with woody, sharp spines 2–4 mm; pedicels ca. 1 mm; roots with tuberous part ..... 30. *A. kansuensis*
              - 17b. Plants tall herbs; branches without pungent spines; pedicels 7–15 mm; roots without tuberous part.
                - 18a. Branches strongly reflexed basally and ascending distally; pedicels 1.2–1.6 cm ..... 25. *A. trichophyllus*
                - 18b. Branches not as above; pedicels 0.6–1.3 cm ..... 24. *A. longiflorus*
          - 15b. Branches and cladodes generally not cartilaginous denticulate.
            - 19a. Male flowers 2–4 mm; branches spiny.

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- 20a. Plants suberect; stem indistinctly striate; perianth of male flowers purplish red, subcampanulate, 3–4 mm in diam.; filaments adnate to perianth segments for ca. 1/4 their length ..... 23. *A. tibeticus*
- 20b. Plants climbing; stem not striate; perianth of male flowers greenish white, subglobose, 2–2.5 mm in diam.; filaments free ..... 29. *A. acicularis*
- 19b. Male flowers 6–9 mm; branches unarmed.
  - 21a. Pedicels (1–)1.5–2 cm; perianth yellowish green ..... 26. *A. oligoclonos*
  - 21b. Pedicels 0.5–1.3 cm; perianth purplish.
    - 22a. Plants suberect; stem cartilaginous denticulate distally; spines straight; pedicels 6–13 mm ..... 24. *A. longiflorus*
    - 22b. Plants climbing or nearly so; stem not cartilaginous denticulate; spines curved; pedicels ca. 5 mm ..... 22. *A. sichuanicus*
- 14b. Stems and branches unarmed or, if spiny, spines very short, not sharp, and appressed to branches.
  - 23a. Plants climbing.
    - 24a. Pedicels 6–25 mm; branches not cartilaginous denticulate ..... 20. *A. breslerianus*
    - 24b. Pedicels 2–6 mm; branches usually cartilaginous denticulate.
      - 25a. Roots tuberous, 7–15 mm thick, fleshy ..... 21. *A. brachyphyllus*
      - 25b. Roots not tuberous, 2–5 mm thick ..... 16. *A. trichoclados*
  - 23b. Plants erect.
    - 26a. Pedicels more than 1 cm.
      - 27a. Branchlets ± cartilaginous denticulate.
        - 28a. Branches strongly reflexed basally and ascending distally; pedicels 1.2–1.6 cm ..... 25. *A. trichophyllus*
        - 28b. Branches not as above; pedicels 0.6–1.3 cm ..... 24. *A. longiflorus*
      - 27b. Branchlets not cartilaginous denticulate.
        - 29a. Male flowers ca. 3 mm; filaments free; stem striate-ridged distally; cladodes slightly tetragonous or sometimes irregularly trigonous ..... 14. *A. mairei*
        - 29b. Male flowers 5–9 mm; filaments adnate to perianth segments for 1/2–3/4 their length; stem not or minutely striate; cladodes indistinctly grooved or angled.
          - 30a. Stems and branches soft, usually ± pendulous apically; male flowers 5–6 mm; anthers 1–1.5 mm ..... 27. *A. officinalis*
          - 30b. Stems and branches rather rigid; male flowers 7–9 mm; anthers ca. 2 mm ..... 26. *A. oligoclonos*
    - 26b. Pedicels less than 1 cm.
      - 31a. Young branches cartilaginous denticulate.
        - 32a. Pedicels usually more than 6 mm ..... 24. *A. longiflorus*
        - 32b. Pedicels 3–5 mm.
          - 33a. Roots with tubers; stem and branches densely cartilaginous denticulate; male flowers ca. 2 mm ..... 15. *A. meioclados*
          - 33b. Roots without tubers; stem and branches not or only slightly cartilaginous denticulate; male flowers more than 3 mm.
            - 34a. Plants dwarf subshrubs; stems strongly zigzagged toward apex, rigid; cladodes rigid, spinescent ..... 18. *A. gobicus*
            - 34b. Plants tall herbs; stems straight or slightly flexuous; cladodes rather soft, never spinescent ..... 17. *A. dauricus*
    - 31b. Young branches not cartilaginous denticulate.
      - 35a. Pedicels more than 8 mm.
        - 36a. Male flowers ca. 3 mm; filaments free; stem striate-ridged distally ..... 14. *A. mairei*
        - 36b. Male flowers 5–6 mm; filaments adnate to perianth segments for ca. 1/2 their length; stem not striate-ridged ..... 27. *A. officinalis*
      - 35b. Pedicels 2–6 mm.
        - 37a. Stems with cladodes (except near base), usually covered with stripelike remains of whitish, hyaline periderm when old ..... 28. *A. neglectus*
        - 37b. Stems with cladodes only near apex, without stripelike remains of periderm when old.
          - 38a. Plants with creeping, stolonlike rhizomes to 2 mm thick; stems usually simple; cladodes in fascicles of 5–7, falcate ..... 31. *A. przewalskyi*
          - 38b. Plants with thick, abbreviated rhizomes 4–20 mm thick; stems always branched; cladodes in fascicles of 1–6, usually straight.
            - 39a. Roots slender, ca. 2 mm thick; cladodes usually spreading upward at an acute angle ..... 17. *A. dauricus*

39b. Roots rather thick, 4–5 mm thick; cladodes spreading downward at an obtuse angle ..... 19. *A. angulofractus*

**1. *Asparagus racemosus*** Willdenow, Sp. Pl. 2: 152. 1799.

长刺天门冬 *chang ci tian men dong*

Subshrubs hermaphroditic. Stems climbing, branched, to 2 m; branches usually distinctly striate-ridged, ridges ± cartilaginous denticulate. Cladodes in fascicles of 3–6(–8), linear, 1–2.5 cm × ca. 1 mm, flat, midvein distinct. Leaf spur spinescent; spine straight or subrecurved, 1.5–2 cm on main stems, 5–10 mm on branches, woody, sharp. Inflorescences developing after cladodes, axillary, each a many-flowered raceme or panicle 1–4 cm; bracts ca. 1 mm. Pedicel 1.5–3 mm, slender, articulate at middle. Perianth campanulate, 2–3 mm. Stamens equal, ca. 0.7 mm; anthers yellow, minute. Fl. Nov.  $2n = 20^*$ , 48.

Broad-leaved forests along streams or valleys; 2100–2200 m. S Xizang [Bhutan, India, Malaysia, Myanmar, Nepal, Pakistan, Sikkim; Africa, Australia].

**2. *Asparagus densiflorus*** (Kunth) Jessop, Bothalia 9: 65. 1966.

非洲天门冬 *fei zhou tian men dong*

*Asparagopsis densiflora* Kunth, Enum. Pl. 5: 96. 1850; *Asparagus sprengeri* Regel.

Subshrubs hermaphroditic. Stems ± climbing, branched, to 1 m; branches distinctly striate-ridged. Cladodes in fascicles of 1–5, linear, 1–3 cm × 1.5–2.5 mm, flat. Leaf spur spinescent; spine slightly hooked, 3–5 mm and sharp on main stems, very short and not sharp on branches, woody. Inflorescences developing after cladodes, solitary or paired, axillary, each a many-flowered raceme or panicle 2–2.5 cm; bracts linear, 2–5 mm. Pedicel ca. 2 mm, articulate at middle. Perianth white; segments oblong-ovate, ca. 2 mm. Stamens shorter than perianth; anthers minute. Berry red, 8–10 mm in diam., 1- or 2-seeded. Fl. throughout year.  $2n = 40$ , 60.

Commonly cultivated and occasionally becoming naturalized [native to S Africa].

**3. *Asparagus setaceus*** (Kunth) Jessop, Bothalia 9: 51. 1966.

文竹 *wen zhu*

*Asparagopsis setacea* Kunth, Enum. Pl. 5: 82. 1850; *Asparagus plumosus* Baker.

Herbs hermaphroditic. Stems climbing, much branched, to several meters, slightly woody near base; branches spreading horizontally, with branchlets and cladodes arranged in 1 plane, frondlike. Cladodes in fascicles of 10–13, 4–5 mm, very slender, slightly trigonous. Leaf spur short, occasionally spinescent on main stems. Inflorescences developing after cladodes. Flowers solitary or in clusters of 2 or 3; pedicel short, articulate at middle. Perianth white; segments widely spreading, lanceolate-oblong, ca. 7 mm. Berry purplish black, 6–7 mm in diam., 1–3-seeded. Fl. Jun.  $2n = 20^*$ .

Commonly cultivated and occasionally becoming naturalized [native to S Africa].

The foliage is much used by florists.

**4. *Asparagus filicinus*** D. Don, Prodr. Fl. Nepal. 49. 1825.

羊齿天门冬 *yang chi tian men dong*

*Asparagus filicinus* var. *giraldii* C. H. Wright; *A. filicinus* var. *megaphyllus* F. T. Wang & Tang; *A. qinghaiensis* Y. Wan.

Herbs dioecious. Stems erect, unarmed. Rootstock a short rhizome with a cluster of fusiform roots; roots swollen at base. Stems much branched, 50–70 cm, subsmooth; branches generally striate-ridged, ridges sometimes slightly cartilaginous denticulate. Cladodes in fascicles of 5–8, linear, falcate, 3–15 × 0.8–2 mm, flat, midvein distinct. Leaf spur short, not spinescent. Inflorescences developing with cladodes or very soon afterward. Flowers of both sexes solitary or paired; pedicel 1–2 cm, articulate near middle. Male flowers: perianth pale green or sometimes tinged with pale purple, campanulate, ca. 2.5 mm; filaments free; anthers ovate, ca. 8 mm. Berry deep green, 5–6 mm in diam., 2- or 3-seeded. Fl. May–Jun, fr. Jul–Aug.  $2n = 18^*$ , 20.

Forests, thickets, shady and moist places along valleys; 1200–3000 m. Gansu, Guizhou, Henan, Hubei, Hunan, Shaanxi, Shanxi, Sichuan, Yunnan, Zhejiang [Bhutan, India, Myanmar, Thailand].

**5. *Asparagus lycopodineus*** (Baker) F. T. Wang & Tang, Bull. Fan Mem. Inst. Biol. 7: 291. 1937

短梗天门冬 *duan geng tian men dong*

*Asparagus filicinus* D. Don var. *lycopodineus* Baker, J. Linn. Soc., Bot. 14: 605. 1875; *A. lycopodineus* var. *sessilis* F. T. Wang & Tang.

Herbs dioecious. Roots usually with swollen, tuberous part 1.5–3.5 cm × 5–8 mm. Stems erect, 45–100 cm, unarmed, smooth or slightly striate, sometimes narrowly winged distally; branches narrowly winged. Cladodes in fascicles of 3, linear, falcate, (2–)5–12 × 1–3 mm, flat, midvein distinct. Leaf spur short. Inflorescences developing after cladodes. Flowers of both sexes solitary or in clusters of 2–4; pedicel 1–1.5 mm or less. Male flowers: perianth white, campanulate, 3–4 mm; stamens unequal; filaments adnate to perianth segments for ca. 1/4 their length. Female flowers: perianth ca. 2 mm. Berry 5–6 mm in diam., 2- or 3-seeded. Fl. May–Jun, fr. Jul–Aug.

Forests, thickets; 500–2600 m. Gansu, Guangxi, Guizhou, Hubei, Hunan, Shaanxi, Sichuan, Yunnan [Bhutan, India, Myanmar].

**6. *Asparagus yanbianensis*** S. C. Chen, Acta Phytotax. Sin. 26: 139. 1988.

盐边天门冬 *yan bian tian men dong*

Herbs dioecious. Stems erect, to more than 40 cm, unarmed, smooth or indistinctly striate; branches striate-ridged. Cladodes in fascicles of 5–10, linear, falcate, 3–4 × ca. 0.5 mm, flat, midvein distinct. Leaf spur short. Inflorescences developing after cladodes. Female flowers: usually paired, subsessile; perianth yellowish green, campanulate, ca. 3 mm; aborted stamens 6, outer ones with filaments and anthers, inserted at middle of outer perianth segments, inner ones nearly without fila-

ments, inserted distally on inner segments; style ca. 1 mm. Fl. Jun.

• Evergreen broad-leaved forests along valleys; ca. 2200 m. SW Sichuan.

**7. *Asparagus schoberioides* Kunth, Enum. Pl. 5: 70. 1850.**

龙须菜 long xu cai

*Asparagus schoberioides* var. *subsetaceus* Franchet; *A. sieboldii* Maximowicz.

Herbs dioecious. Roots 2–3 mm thick, slender. Stems erect, to 1 m, unarmed, distinctly striate-ridged distally; branches angled or sometimes narrowly winged. Cladodes usually in fascicles of 3 or 4, linear, falcate, 1–4 cm × ca. 1 mm, flat, basally 3-angled, midvein distinct. Leaf spur short. Inflorescences developing after cladodes, axillary. Flowers of both sexes in clusters of 2–4, subequal; pedicel ca. 1 mm or less. Male flowers: perianth yellowish green, campanulate, 2–2.5 mm; filaments free. Berry red, ca. 6 mm in diam., usually 1- or 2-seeded. Fl. May–Jun, fr. Aug–Sep.  $2n = 20^*$ .

Forests, grassy slopes; 400–2300 m. Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Shaanxi, Shandong, Shanxi [Japan, Korea, Mongolia, Russia (Far East, Kurile Islands, Sakhalin, Siberia)].

**8. *Asparagus cochinchinensis* (Loureiro) Merrill, Philipp. J. Sci. 15: 230. 1919.**

天门冬 tian men dong

*Melanthium cochinchinense* Loureiro, Fl. Cochinch. 1: 216. 1790; *Asparagopsis sinica* Miquel; *Asparagus cochinchinensis* var. *longifolius* F. T. Wang & Tang; *A. dauricus* Link var. *elongatus* Pampanini; *A. gaudichaudianus* Kunth; *A. insularis* Hance; *A. lucidus* Lindley; *A. sinicus* (Miquel) C. H. Wright.

Herbs dioecious. Roots with swollen, tuberous part 3–5 × 1–2 cm. Stems climbing, 1–2 m, slightly woody proximally; branches angled or narrowly winged. Cladodes usually in fascicles of 3, subfalcate, 0.5–8 cm × 1–2 mm, flat or slightly 3-angled. Leaf spur sometimes spinescent; spine 2.5–3.5 mm on main stems, minute or indistinct on branches. Inflorescences developing after cladodes, axillary. Flowers of both sexes usually paired, subequal; pedicel 2–6 mm, articulate at middle. Male flowers: perianth greenish, campanulate, 2.5–3 mm; filaments free. Berry green, 6–7 mm in diam., 1- or 2-seeded. Fl. May–Jun, fr. Sep.  $2n = 20^*$ .

Thinly forested slopes, roadsides, waste fields; near sea level to 1700 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Japan, Korea, Laos, Vietnam].

The tuberous roots are used medicinally.

**9. *Asparagus taliensis* F. T. Wang & Tang ex S. C. Chen, Acta Phytotax. Sin. 16(1): 91. 1978.**

大理天门冬 da li tian men dong

Herbs, sometimes slightly subshrubby, dioecious. Stems climbing, to 1 m, slightly woody proximally, indistinctly stri-

ate-ridged; branches angled. Cladodes in fascicles of 6–9, linear, 6–13 × ca. 0.5 mm, acutely 3-angled. Leaf spur spinescent; spine 4–6 mm on main stems, very short or indistinct on branches, woody, sharp. Inflorescences developing after cladodes, axillary. Flowers of both sexes paired, subequal; pedicel ca. 2 mm, articulate at middle. Male flowers: perianth yellowish, campanulate, 3–3.5 mm; filaments adnate to perianth segments for ca. 1/2 their length; aborted ovary shortly rostrate apically. Berry red, 6–7 mm in diam., usually 1-seeded. Fl. Jun–Aug, fr. Jul–Aug.

• Grassy slopes; 1800–2000. Yunnan.

**10. *Asparagus munitus* F. T. Wang & S. C. Chen in S. C. Chen, Acta Phytotax. Sin. 16(1): 91. 1978.**

西南天门冬 xi nan tian men dong

Subshrubs dioecious. Stems climbing, to 1 m, becoming yellowish when dried; branches distinctly striate-ridged. Cladodes in fascicles of 2–5(–7), 0.5–1.5 cm × 0.5–0.8 mm, acutely 3-angled. Leaf spur spinescent; spine straight, 5–7 mm on main stems, 1.5–2 mm on branches, rather thick, woody. Inflorescences developing with cladodes. Male flowers: paired; pedicel 3–4.5 mm, articulate above middle or near apex; perianth yellowish, campanulate, 4–5 mm; filaments adnate to perianth segments for ca. 1/2 their length. Berry ca. 7 mm in diam., 1–4-seeded. Fl. Apr–May.

• Forest margins, thickets; 1900–2400 m. SW Sichuan, Yunnan.

**11. *Asparagus myriacanthus* F. T. Wang & S. C. Chen in S. C. Chen, Acta Phytotax. Sin. 16(1): 92. 1978.**

多刺天门冬 duo ci tian men dong

Subshrubs dioecious. Roots ca. 3 mm thick, rather slender. Stems slightly diffuse or climbing, 1–2 m, densely striate-ridged; branches angled. Cladodes in fascicles of (3–)6–14, 0.6–2 cm × 0.5–1 mm, acutely 3-angled. Leaf spur spinescent; spine nearly straight, 4.5–8 mm on main stems, 2.5–5 mm on branches, woody, sharp. Inflorescences developing with cladodes. Male flowers: in clusters of 2–4; pedicel 1.5–2.5 mm, articulate above middle; perianth yellowish green, campanulate, 1.5–2.5 mm; filaments adnate to perianth segments for ca. 1/2 their length. Berry 5–6 mm in diam., 2- or 3-seeded. Fl. May, fr. Sep.

• Thickets, open slopes, sandy banks; 2100–3100 m. SE Xizang, NW Yunnan.

**12. *Asparagus subscandens* F. T. Wang & S. C. Chen in S. C. Chen, Acta Phytotax. Sin. 16(1): 92. 1978.**

滇南天门冬 dian nan tian men dong

Herbs dioecious. Roots with swollen, tuberous part ca. 5 × 1.2 cm. Stems ± climbing, to 1 m, slightly angled when young; branches angled, slightly cartilaginous denticulate. Cladodes in fascicles of 3–7, falcate, 3–6 × ca. 0.6 mm, flat or slightly 3-angled. Leaf spur not spinescent. Inflorescences developing after cladodes, axillary. Flowers of both sexes solitary or paired, subequal; pedicel 1.5–2 mm, articulate at middle. Male flowers: perianth yellowish green, campanulate, 3–4 mm; stamens unequal; filaments adnate to perianth segments for ca. 1/2 their

length. Berry ca. 5 mm in diam. Fl. Jul–Aug, fr. Aug.  $2n = 20^*$ .

- Forests, thickets; 800–1700 m. S Yunnan.

**13. *Asparagus yanyuanensis*** S. C. Chen, Acta Phytotax. Sin. 19: 501. 1981.

盐源天门冬 *yan yuan tian men dong*

Herbs dioecious. Roots ca. 3 mm thick, slightly fleshy. Stems climbing, to more than 30 cm, slightly striate; branches angled. Cladodes in fascicles of 4–6,  $4-7 \times$  ca. 0.4 mm (immature), 3-angled. Leaf spur spinescent; spine slightly curved, ca. 5 mm on main stems, much shorter on branches. Inflorescences developing with cladodes. Male flowers: paired; pedicel ca. 2 mm, articulate at middle; perianth yellowish green, subglobose, 1–1.5 mm; stamens equal; filaments adnate to perianth segments for ca. 1/2 their length; anthers suboblong, ca. 1 mm. Fl. May.

- Forests along streams. SW Sichuan.

**14. *Asparagus mairei*** H. Léveillé, Repert. Spec. Nov. Regni Veg. 7: 339. 1909.

昆明天门冬 *kun ming tian men dong*

Herbs dioecious. Stems erect, to 60 cm, striate-ridged distally; branches distinctly striate-ridged. Cladodes usually in fascicles of 4–9,  $5-12 \times$  ca. 0.7 mm, subterete, slightly flattened, irregularly grooved. Leaf spur shortly spinescent. Inflorescences developing after cladodes. Flowers of both sexes generally paired; pedicel 9–12 mm, articulate distally. Male flowers: perianth campanulate, ca. 3 mm; filaments free. Berry 6–7 mm in diam., 1- or 2-seeded. Fl. May, fr. Aug.

- Yunnan (Kunming Shi).

**15. *Asparagus meiocladus*** H. Léveillé, Repert. Spec. Nov. Regni Veg. 8: 59. 1909.

密齿天门冬 *mi chi tian men dong*

*Asparagus mairei* H. Léveillé (Jan 1913 and Jul 1913, not 1910); *A. vaniotii* H. Léveillé; *A. yunnanensis* H. Léveillé.

Herbs dioecious. Roots with tuberous part. Stems erect, to 1 m, angled, densely cartilaginous denticulate; branches strongly angled, cartilaginous denticulate except apically and on branchlets. Cladodes usually in fascicles of 5–10,  $3-5(-8) \times$  0.3–0.5 mm, subterete, slightly flattened, irregularly grooved, generally not cartilaginous denticulate. Leaf spur indistinctly spinescent. Inflorescences developing after cladodes. Male flowers: solitary or in clusters of 2 or 3; pedicel ca. 2 mm; perianth yellowish green, narrowly campanulate, ca. 2 mm; filaments adnate to perianth segments for ca. 1/2 their length. Berry red, 5–6 mm in diam., usually 1- or 2-seeded. Fl. May–Jul, fr. Aug.

- Forests, grassy slopes along valleys and streams; 1300–3500 m. Guizhou, Sichuan, Yunnan.

**16. *Asparagus trichocladus*** (F. T. Wang & Tang) F. T. Wang & S. C. Chen in F. T. Wang & Tang, Fl. Reipubl. Popularis Sin. 15: 111. 1978.

细枝天门冬 *xi zhi tian men dong*

*Asparagus meiocladus* H. Léveillé var. *trichocladus* F. T. Wang & Tang, Bull. Fan Mem. Inst. Biol. 7: 290. 1937.

Herbs dioecious. Stems climbing, long, slightly woody proximally, smooth; branches angled, densely cartilaginous denticulate. Cladodes in fascicles of 4–8, filiform,  $2-7 \times$  ca. 0.2 mm, slightly flattened, irregularly grooved. Leaf spur indistinctly and shortly spinescent. Inflorescences developing after cladodes. Flowers unknown. Berry 4–5 mm in diam., 1- or 2-seeded; pedicel ca. 2 mm, articulate at middle. Fr. Nov.

- Sparse forests, open grassy slopes; 1100–1400 m. C Yunnan.

**17. *Asparagus dauricus*** Link, Enum. Hort. Berol. Alt. 1: 340. 1821.

兴安天门冬 *xing an tian men dong*

*Asparagus gibbus* Bunge; *A. tuberculatus* Bunge ex Iljin.

Herbs dioecious. Roots slender. Stems erect, 30–70 cm, unarmed, striate; branches striate, younger ones cartilaginous denticulate. Cladodes in fascicles of 1–6, usually spreading upward at an acute angle,  $1-4(-5) \text{ cm} \times$  ca. 0.6 mm, subterete, slightly flattened, irregularly grooved, rather soft, sometimes cartilaginous denticulate. Leaf spur short, not spinescent. Inflorescences developing after cladodes. Flowers of both sexes paired. Male flowers: pedicel 3–5 mm; perianth yellowish green, ca. 4 mm; filaments adnate to perianth segments for ca. 4/5 their length. Female flowers: pedicel ca. 2 mm; perianth ca. 1.5 mm. Berry 6–7 mm in diam.,  $2-4(-6)$ -seeded. Fl. May–Jun, fr. Aug–Sep.

Sandy wastelands, arid slopes; near sea level to 2200 m. Hebei, Heilongjiang, Jiangsu, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi [Korea, Mongolia, Russia (Far East, Siberia)].

**18. *Asparagus gobicus*** N. A. Ivanova ex Grubov, Bot. Mater. Gerb. Bot. Inst. Komarova Acad. Nauk SSSR 17: 9. 1955.

戈壁天门冬 *ge bi tian men dong*

*Asparagus angulofractus* Iljin var. *scabridus* Kitagawa.

Subshrubs dioecious. Roots slender. Stems suberect, usually flexuous distally, 15–45 cm, rigid,  $\pm$  covered with stripelike remains of whitish, hyaline periderm; branches strongly flexuous, slightly striate-ridged, sparsely cartilaginous denticulate. Cladodes in fascicles of 3–8, usually spreading horizontally or downward at an obtuse angle,  $0.5-2.5 \text{ cm} \times$  ca. 1 mm, subterete, irregularly grooved, rather rigid. Leaf spur short, not spinescent. Inflorescences developing after cladodes. Flowers of both sexes solitary or paired; pedicel 2–4 mm. Male flowers: perianth campanulate, 5–7 mm; filaments adnate to perianth segments for ca. 1/2 their length. Female flowers slightly smaller than male ones. Berry red, 5–7 mm in diam., 3–5-seeded. Fl. May, fr. Jul–Oct.

Sandy wastelands, sands; 1600–2600 m. Gansu, Nei Mongol, Ningxia, Qinghai, Shaanxi [Mongolia].

**19. *Asparagus angulofractus*** Iljin in Komarov, Fl. URSS 4: 746. 1935.

折枝天门冬 *zhe zhi tian men dong*

*Asparagus soongoricus* Iljin.

Herbs dioecious. Roots 4–5 mm thick. Stems erect, 30–80 cm, smooth; branches usually slightly flexuous, sometimes indistinctly striate. Cladodes in fascicles of 1–5, generally spreading horizontally or downward at an obtuse angle, usually straight, 1–2.5 cm × 1–1.5 mm, subterete, slightly flattened, sometimes irregularly grooved. Leaf spur short, not spinescent. Inflorescences developing after cladodes. Flowers of both sexes paired. Male flowers: pedicel 4–6 mm; perianth yellowish green, campanulate, 4–5 mm; filaments adnate to perianth segments for ca. 1/2 their length. Female flowers: pedicel 5–7 mm, articulate at or near apex; perianth 3–4 mm. Fl. May–Jun.

Sandy soil; 1300–2000 m. SW Xinjiang [Kazakstan].

**20. *Asparagus breslerianus*** Schultes & J. H. Schultes in Roemer & Schultes, Syst. Veg. 7: 323. 1829.

西北天门冬 xi bei tian men dong

Herbs dioecious. Roots 2–3 mm thick, rather slender. Stems climbing, 30–100 cm; branches not or only slightly striate. Cladodes in fascicles of 4–8, generally straight, 0.5–1.5 (–3.5) cm × 0.4–0.7 mm, subterete, slightly flattened, grooved. Leaf spur short, not or only slightly spinescent. Inflorescences developing after cladodes. Flowers of both sexes in clusters of 2–4; pedicel 6–18 mm, usually articulate above middle. Male flowers: perianth reddish purple or greenish white, campanulate, ca. 6 mm; filaments adnate to perianth segments for ca. 1/2 their length; anthers apiculate. Female flowers: perianth ca. 3 mm. Berry red, ca. 6 mm. in diam., 5- or 6-seeded. Fl. May, fr. Jul–Sep.  $2n = 40^*$ .

River banks, wastelands, saline soil; near sea level to 2900 m. Gansu, Ningxia, Qinghai, Xinjiang [Kazakstan, Mongolia, Russia, Turkmenistan, Uzbekistan, SW Asia].

This species was misidentified in FRPS as *Asparagus persicus* Baker.

**21. *Asparagus brachyphyllus*** Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 13: 78. 1840.

攀援天门冬 pan yuan tian men dong

*Asparagus trichophyllus* Bunge var. *trachyphyllus* Kunth.

Herbs dioecious. Roots tuberous, subcylindric, 0.7–1.5 cm thick, fleshy. Stems climbing, 20–100 cm; branches striate-ridged, ridges usually cartilaginous denticulate. Cladodes in fascicles of 4–10, 4–12 × ca. 0.5 mm, subterete, slightly flattened, irregularly grooved, usually cartilaginous denticulate. Leaf spur not or only slightly spinescent; spine 1–2 mm. Inflorescences developing after cladodes. Flowers of both sexes in clusters of 2–4; pedicel 3–6 mm. Male flowers: perianth pale purplish brown, campanulate, ca. 7 mm; filaments adnate to perianth segments for ca. 1/2 their length. Female flowers: perianth ca. 3 mm. Berry red, 6–7 mm in diam., 4- or 5-seeded. Fl. May–Jun, fr. Aug.  $2n = 40^*$ .

Thickets, open grassy slopes, field margins; 800–2000 m. Hebei, Jilin, Liaoning, Ningxia, Shaanxi, Shanxi [Kazakstan, Korea, Mongolia, Tajikistan, Turkmenistan, Uzbekistan].

**22. *Asparagus sichuanicus*** S. C. Chen & D. Q. Liu, Acta Phytotax. Sin. 22: 418. 1984.

四川天门冬 si chuan tian men dong

Herbs slightly subshrubby, dioecious. Stems climbing, much branched, to 40 cm or more, slightly striate; branches spreading; branchlets occasionally cartilaginous denticulate. Cladodes in fascicles of 6–8(–16), ± appressed to branches, 5–9 × ca. 0.4 mm, subterete, slightly flattened, occasionally cartilaginous denticulate. Leaf spur spinescent; spine 2–3 mm on main stems, indistinct on branches, sharp. Inflorescences developing with cladodes. Male flowers: paired; pedicel ca. 5 mm; perianth purplish brown, campanulate; filaments adnate to perianth segments for 1/3–3/4 their length; anthers ca. 2 mm. Berry red, 9–10 mm in diam., 4- or 5-seeded. Fl. Apr–May, fr. Aug–Sep.

• Sparse forests, grassy slopes, roadsides; 1500–3300 m. Sichuan, Xizang.

**23. *Asparagus tibeticus*** F. T. Wang & S. C. Chen in S. C. Chen, Acta Phytotax. Sin. 16(1): 93. 1978.

西藏天门冬 xi zang tian men dong

Subshrubs dioecious. Stems suberect, 30–60 cm, indistinctly striate, yellowish when dried, ± covered with stripelike remains of whitish, hyaline periderm; branches slightly striate. Cladodes in fascicles of 4–7, slightly curved, 5–10 × ca. 0.5 mm, subterete, slightly flattened, irregularly grooved. Leaf spur spinescent; spine slightly hooked, 4–6 mm on main stems, 3.5–4 mm on branches, woody, sharp. Inflorescences developing with cladodes. Male flowers: in clusters of 2–4; pedicel 3–4 mm, articulate below middle; perianth purplish red, subcampanulate, ca. 3.5 mm; filaments adnate to perianth segments for ca. 1/4 their length. Berry 6–7 mm in diam. Fl. May–Jun, fr. Jul.

• Hillsides, river flats; 3800–4000 m. Xizang.

**24. *Asparagus longiflorus*** Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 7: 110. 1884.

长花天门冬 chang hua tian men dong

Herbs dioecious. Roots rather slender. Stems suberect, 20–170 cm, slightly striate-ridged distally; branches distinctly striate-ridged, ridges usually cartilaginous denticulate, particularly on young branches. Cladodes in fascicles of 4–12, straight, 6–15 × ca. 0.6 mm, subterete, slightly flattened, irregularly grooved, usually cartilaginous denticulate. Leaf spur slightly spinescent; spine 1–5 mm on main stems, very short on branches. Inflorescences developing after cladodes. Flowers of both sexes paired; pedicel usually 6–13 mm. Male flowers: perianth purplish, 6–7 mm; filaments adnate to perianth segments for ca. 1/2 their length. Female flowers: perianth ca. 3 mm. Berry red, 7–10 mm in diam., ca. 4-seeded. Fl. Apr–May, fr. Jun–Aug.

• Forests, thickets, grassy slopes; 2400–3300 m. Gansu, Hebei, Henan, Qinghai, Shaanxi, Shandong, Shanxi.

**25. *Asparagus trichophyllus*** Bunge, Enum. Pl. China Bor. 65. 1833.

曲枝天门冬 qu zhi tian men dong

Herbs dioecious. Roots rather slender. Stems suberect, strongly flexuous distally, 60–100 cm, sometimes sparsely cartilaginous denticulate; branches strongly reflexed basally, ascending distally; branchlets ± cartilaginous denticulate. Cla-

dodes in fascicles of 5–8, usually appressed to branches, filiform, 0.7–1.8 cm × ca. 0.3 mm, irregularly grooved. Leaf spur slightly spinescent; spine 1–3 mm on main stems, indistinct on branches. Inflorescences developing after cladodes. Flowers of both sexes paired; pedicel 1.2–1.6 cm. Male flowers: perianth yellowish green, usually tinged with pale purple, campanulate, 6–8 mm; filaments adnate to perianth segments for ca. 1/2 their length. Female flowers: perianth 2.5–3.5 mm. Berry 6–7 mm in diam., 3–5-seeded. Fl. May, fr. Jul–Sep.  $2n = 30^*$ .

Grassy slopes, roadsides, field margins, waste lands; near sea level to 2100 m. Hebei, Liaoning, Nei Mongol, Shanxi [Mongolia, Russia (E Siberia)].

**26. *Asparagus oligoclonos*** Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9: 286. 1859.

南玉带 nan yu dai

*Asparagus oligoclonos* var. *purpurascens* X. J. Xue & H. Yao; *A. tamaboki* Yatabe.

Herbs dioecious. Roots 2–3 mm thick, rather slender. Stems erect, 40–80 cm, sometimes slightly striate; branches rather rigid, striate. Cladodes in fascicles of 5–12, 1–3 cm × ca. 0.5 mm, subterete, slightly flattened, irregularly grooved. Leaf spur short or indistinct, rarely shortly spinescent. Inflorescences developing after cladodes. Flowers of both sexes solitary or paired; pedicel (1–)1.5–2 cm. Male flowers: perianth yellowish green, campanulate, 7–9 mm; filaments adnate to perianth segments for ca. 3/4 their length; anthers ca. 2 mm. Female flowers: perianth ca. 3 mm. Berry 8–10 mm in diam. Fl. Apr–May, fr. Jul–Sep.  $2n = 20$ .

Forests, meadows, moist places; near sea level to 500 m. Hebei, Heilongjiang, Henan, Jilin, Liaoning, Shandong [Japan, Korea, Mongolia, Russia (Far East, Siberia)].

**27. *Asparagus officinalis*** Linnaeus, Sp. Pl. 1: 313. 1753.

石刁柏 shi diao bai

*Asparagus officinalis* var. *altilis* Linnaeus; *A. polyphyllus* Steven.

Herbs dioecious. Roots 2–3 mm thick, rather slender. Stems suberect, to 1 m, usually slightly pendent apically; branches soft. Cladodes in fascicles of 3–6, 0.5–3 cm × ca. 0.4 mm, subterete, slightly flattened, irregularly grooved. Leaf spur slightly spinescent or indistinct. Inflorescences developing after cladodes. Flowers of both sexes solitary or in clusters of 2–4; pedicel 0.8–1.2(–1.4) cm. Male flowers: perianth yellowish green, campanulate, 5–6 mm; filaments adnate to perianth segments for ca. 1/2 their length; anthers 1–1.5 mm. Female flowers: perianth ca. 3 mm. Berry red, 7–8 mm in diam., 2- or 3-seeded. Fl. May–Jun, fr. Aug.  $2n = 20^*$ , 40.

Steppes. NW Xinjiang [Kazakhstan, Mongolia, Russia; NW Africa, C and SW Asia, Europe, widely cultivated elsewhere].

A very variable species; some cultivars are grown as a vegetable in China.

**28. *Asparagus neglectus*** Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 14: 750. 1841.

新疆天门冬 xin jiang tian men dong

Herbs dioecious. Roots slender. Stems suberect, densely branched, to 1 m, usually slightly striate, usually covered with stripelike remains of whitish, hyaline periderm when old; branches slightly striate when young. Cladodes usually in fascicles of 7–25, filiform, 0.5–1.7 cm × ca. 0.3 mm, irregularly grooved, usually several fascicles at each node of stem. Leaf spur slightly spinescent; spine 2–3 mm on main stems, very short or indistinct on branches. Inflorescences developing after cladodes. Flowers of both sexes solitary or paired; pedicel 1–1.5 cm. Male flowers: perianth campanulate, 5–7 mm; filaments adnate to perianth segments for ca. 1/2 their length. Female flowers: perianth ca. 3 mm. Berry red, 6–7 mm in diam., 1–3-seeded. Fl. May–Jun, fr. Aug.

Thickets, grassy slopes, river banks, sandy flats of rivers; 600–1700 m. N Xinjiang [Afghanistan, Kazakstan, Mongolia, Pakistan, Russia (E Siberia), Tajikistan, Turkmenistan, Uzbekistan].

One of us (Tamanian) notes that *Asparagus neglectus* is very similar to, and may be synonymous with, *A. trichophyllus*.

**29. *Asparagus acicularis*** F. T. Wang & S. C. Chen in S. C. Chen, Acta Phytotax. Sin. 16(1): 93. 1978.

山文竹 shan wen zhu

Herbs dioecious. Roots 2–4 mm thick basally, thickening toward tip. Stems climbing, to 1 m or more; branches slender. Cladodes in fascicles of 3–7, needlelike, 6–12(–15) × ca. 0.3 mm, irregularly grooved. Leaf spur spinescent; spine 4–6 mm on main stems, 1–2 mm on branches, woody, sharp. Inflorescences developing with cladodes. Male flowers: paired; pedicel 4–5 mm, articulate at middle; perianth greenish white, subglobose, ca. 2 mm in diam.; filaments free. Berry 5–6 mm in diam., usually 1-seeded. Fl. Jun–Jul, fr. Aug.

• Thickets, grasslands, lake margins; near sea level to 200 m. Guangdong, Guangxi, Hubei, Hunan, Jiangxi.

**30. *Asparagus kansuensis*** F. T. Wang & Tang ex S. C. Chen, Acta Phytotax. Sin. 16(1): 94. 1978.

甘肃天门冬 gan su tian men dong

Subshrubs dioecious. Roots with subterminal tuber 2–3 cm thick. Stems erect, much branched, 17–27 cm, densely noded; stem and branches striate-ridged, ridges cartilaginous denticulate. Cladodes in fascicles of (3–)5–10, needlelike, 5–8 × ca. 0.4 mm, irregularly grooved. Leaf spur spinescent; spine spreading horizontally, straight, 2–5 mm on main stems, slightly shorter toward base of plant, slender, sharp. Inflorescences developing after cladodes. Flowers of both sexes solitary or paired; pedicel ca. 1 mm. Male flowers: perianth campanulate, 2–2.5 mm; filaments adnate to perianth segments for ca. 1/4 their length. Fl. Jun.

• Slopes; 900–1600 m. S Gansu.

The tuberous roots are edible.

**31. *Asparagus przewalskyi*** N. A. Ivanova ex Grubov & T. V. Egorova, Rast. Tsent. Azii, Mater. Bot. Inst. Komarova 7: 81. 1977.

北天门冬 bei tian men dong

*Asparagus borealis* S. C. Chen; *A. dolichorhizomatus* J. M. Ni & R. N. Zhao.

Herbs dioecious. Rhizomes creeping, stolonlike, 1.2–1.8 mm thick., with spaced roots. Stems erect, usually simple, 10–30 cm, striate or striate-ridged. Cladodes in fascicles of 5–7, spreading, falcate, 0.4–2(–3.2) cm × ca. 0.7 mm, subterete, slightly flattened, indistinctly grooved. Leaves scarcely spurred. Inflorescences developing after cladodes. Flowers of both sexes paired; pedicel 3.5–4 mm, articulate distally. Male flowers: perianth pale purple, ca. 7 mm; stamens unequal, outer ones longer than inner, filaments adnate to perianth segments for ca. 3/4 their length. Female flowers: perianth ca. 4 mm; aborted stamens 6. Berry ca. 7 mm in diam., ca. 3-seeded. Fl. May, fr. Aug.

- Thickets; 2200–2300 m. Qinghai.



