

5. TAXODIUM Richard, Ann. Mus. Natl. Hist. Nat. 16: 298. 1810.

落羽杉属 *luo yu shan shu*

Trees deciduous or semievergreen, monoecious; main branches persistent; lateral branches alternate and deciduous in winter; winter buds globose, small. Leaves spirally arranged, alternate, dimorphic: those on main branches persistent, inclined or curved upward and ± appressed to branchlets, subulate; those on annual branchlets deciduous together with branchlet as a unit, 2-ranked, linear or usually subulate. Pollen cones borne in long, pendulous, catkinlike racemes or panicles, ovoid; microsporophylls 6–many, spirally arranged; pollen sacs 4–9. Seed cones solitary, attached laterally by minute peduncle to apex of previous year's growth, globose or ellipsoid but faceted; bracts and cone scales falling at maturity, spirally arranged; bracts attached to a conical axis, not overlapping, peltate, rhombic, each almost completely connate with its cone scale but with free, protruding, triangular, acute apex; ovules 2 per bract axil; cone scales shield-shaped, woody at maturity, apex irregularly quadrangular. Seeds 2 per cone scale, irregularly triquetrous, large, strongly keeled, wingless, water dispersed. Cotyledons 4–9. Germination epigeal. *2n* = 22.

Two species: Guatemala, Mexico, United States; both introduced in China.

The number of distinct species of *Taxodium* is open to dispute: *T. mucronatum* might be better treated as a variety of *T. distichum*. The genus is similar in vegetative characters to *Metasequoia*, differing in its alternate (not opposite) branching and leaf arrangement. It also resembles *Glyptostrobus*, differing chiefly in its seeds which are strongly 3-angled and wingless (instead of 1-winged).

*Taxodium* is now important in the afforestation of low lying river deltas with waterlogged soils, especially in SE China.

- 1a. Trees deciduous; leaves 10–15 mm, those on annual branchlets 2-ranked; pollen cones borne in crowded, short, dense racemes or panicles; seed cones dull, lacking glaucous bloom (but white powdery) ..... 1. *T. distichum*
- 1b. Trees semievergreen or evergreen; leaves 7–11 mm, those on annual branchlets spirally arranged and scattered; pollen cones borne in long, slender, lax, spikelike panicles; seed cones glaucous ..... 2. *T. mucronatum*

1. *Taxodium distichum* (Linnaeus) Richard, Ann. Mus. Natl. Hist. Nat. 16: 298. 1810.

落羽杉 *luo yu shan*

Trees deciduous, to 50 m tall; pneumatophores present or absent around trunk; trunk swollen and buttressed at base, strongly tapered upward, to 2 m d.b.h.; bark brown, reddish brown, or gray, peeling off in long strips; crown conical, finally broadly conical, or relatively narrow and pyramidal; main branches spreading horizontally or ascending; lateral branchlets 2-ranked, axis green in 1st year, turning brown or brownish red in 1st winter. Leaves 2-ranked on annual branchlets or not, light green adaxially, yellowish green or grayish green abaxially, turning dark reddish brown in autumn, linear and flat or subulate, 4–15 × ca. 1 mm, midvein depressed adaxially, raised abaxially, stomatal lines 4–8, apex acute or sharply pointed. Pollen cones borne in terminal, crowded, short, dense racemes or panicles 5–12 cm, shortly pedunculate, ovoid. Seed cones brownish yellow or white powdery, not glaucous, globose, oblong-globose, or ovoid, (1.4–)2–4 × (1.3–)1.8–3 cm; cone scales shield-shaped, woody, ± conspicuously longitudinally grooved at apex. Seeds brown or reddish brown, irregularly triangular-pyramidal, 1.2–2.6 × 0.5–2.3 cm, sharply ridged. Pollination Mar–Apr, seed maturity (Jul–)Oct.

Used for afforestation on marshy soils, and cultivated as an ornamental. Anhui, Fujian, Guangdong, Guangxi, Henan, Hubei, Jiangsu, Jiangxi, Sichuan, Yunnan, Zhejiang [native to SE United States].

The wood is used in buildings, ship construction, furniture manufacture, etc.

- 1b. Main branches spreading horizontally; leaves on annual branchlets 2-ranked, linear, flat ..... 1a. var. *distichum*
- 1a. Main branches ascending; leaves on annual branchlets not 2-ranked, mostly subulate, a few linear and flat ..... 1b. var. *imbricatum*

1a. *Taxodium distichum* var. *distichum*

落羽杉(原变种) *luo yu shan (yuan bian zhong)*

*Cupressus disticha* Linnaeus, Sp. Pl. 2: 1003. 1753; *Taxodium distichum* var. *nutans* Carrière (1867), not (Aiton) Sweet (1827).

Main branches spreading horizontally. Leaves on annual branchlets 2-ranked, linear, flat.

Used for afforestation on marshy soils, and cultivated as an ornamental. Mainly S of the Chang Jiang valley: Anhui, Fujian, Guangdong (Guangzhou Shi), Guangxi, Henan (Jigong Shan), Hubei (Wuhan Shi), Jiangsu (Nanjing Shi), Jiangxi (Lu Shan), Sichuan, Yunnan, Zhejiang (Hangzhou Shi) [native to SE United States].

1b. *Taxodium distichum* var. *imbricatum* (Nuttall) Croom, Cat. Pl. New Bern, ed. 2, no. 3048. 1837.

池杉 *chi shan*

*Cupressus disticha* var. *imbricata* Nuttall, Gen. N. Amer. Pl. 2: 224. 1818; ?*C. disticha* var. *nutans* Aiton; *Glyptostrobus lineatus* (Poiret) Druce; *Taxodium ascendens* Brongniart; ?*T. ascendens* var. *nutans* (Aiton) Rehder; ?*T. distichum* var. *nutans* (Aiton) Sweet (1827), not Carrière (1867); *T. imbricatum* (Nuttall) R. M. Harper; *Thuja lineata* Poiret.

Main branches ascending. Leaves on annual branchlets not 2-ranked, mostly subulate, a few linear and flat.

Used for afforestation on marshy soils. Anhui, Fujian, Henan (Jigong Shan), Hubei (Wuhan Shi), Jiangsu (Nanjing Shi, Nantong Shi), Jiangxi, Zhejiang (Hangzhou Shi) [native to SE United States]. Vegetative material of var. *imbricatum* is superficially almost indistinguishable from *Glyptostrobus pensilis*. However, the appressed, subulate leaves of the former are more distinctly alternate, softer in texture, and with an incurved apex; while the spreading, linear leaves lack the thin, winglike margin along their trailing edge that is a feature of *G. pensilis*.

**2. *Taxodium mucronatum*** Tenore, Ann. Sci. Nat., Bot., sér. 3, 19: 355. 1853.

墨西哥落羽杉 mo xi ge luo yu shan

*Taxodium distichum* (Linnaeus) Richard var. *mexicanum* (Carrière) Gordon; *T. distichum* var. *mucronatum* (Tenore) A. Henry; *T. mexicanum* Carrière.

Trees deciduous in cooler areas or semievergreen in warmer areas, to 50 m tall; trunk swollen at base, strongly tapered, to 4 m d.b.h.; bark peeling off in long strips; crown broadly conical; main branches spreading horizontally; branchlets pendulous on mature trees, lateral ones spirally arranged. Leaves spirally arranged and scattered on annual branchlets, borne at 25–45° to axis, 0.6–0.7 mm apart, forming an elliptic branchlet outline 4–10 × 0.7–1.4 cm, linear, distally tapered, flat, 7–11 × 0.8–1 mm, soft and thin, midvein 0.15–0.25 mm wide, stomatal bands of 4 or 5 well-separated lines, marginal bands 0.2–0.3 mm wide, apex mucronate. Pollen cones borne in long, slender, lax, spikelike panicles (5–)13–25 cm, almost sessile, ovoid. Seed cones glaucous, ovoid, 1.5–2.5 cm.

Used for afforestation on marshy soils in subtropical areas. Hubei (Wuhan Shi), Jiangsu, Jiangxi, Sichuan, Zhejiang [native to Guatemala, Mexico, S United States].

The wood has similar uses to that of *Taxodium distichum*.

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