

3. AMENTOTAXUS Pilger, Bot. Jahrb. Syst. 54: 41. 1916.

穗花杉属 sui hua shan shu

Shrubs or small trees dioecious; branchlets opposite, base with bud scales not persistent; winter buds tetragonal-ovate, acute, glossy, scales, decussate, in 3–5 whorles of 4, ridged adaxially. Leaves decussate, but brought into a single plane by twisting of petioles; blade straight or slightly falcate, usually more than 5 mm wide, adaxial surface mottled when fresh, rarely smooth, rugose or ± so when dry, resin canal present below sheath of vascular bundle, sclereids present, rarely absent, base decurrent, margin slightly downcurved. Pollen cones aggregated into (1 or)2–6(–10) long, slender, compound racemes or spikes arising from bract axil near apex of branches; individual cones opposite, sessile or subsessile, ellipsoid or subglobose; microsporophylls numerous, ± shield-shaped; pollen sacs 3–8, arranged radially, or adaxially and abaxially. Seed-bearing structures compressed-tetragonal or flattened abaxially, basal part with 6–10 pairs of decussate bracts arranged in 4 rows each of 3–5 bracts; ovule 1, sessile, erect. Seed ripening in 1st year, long pedunculate, ellipsoid or obovoid-ellipsoid, enclosed except for apex in a saclike aril which is bright red or reddish yellow when ripe; bracts persistent at base.

Five or six species: China, Vietnam; three species (one endemic) in China.

*Amentotaxus* has been placed in its own tribe (Amentotaxaceae W. C. Cheng & C. D. Chu) or family, Amentotaxaceae. Although Page (in Kubitzki, Fam. Gen. Vasc. Pl. 1: 299–302. 1990) included it in the Cephalotaxaceae, molecular data indicate very strongly that it is the sister genus of *Torreya*, which is similar in the size and shape of its seed and in usually having bilaterally symmetric clusters of pollen sacs.

*Amentotaxus assamica* D. K. Ferguson (Kew Bull. 40: 115. 1985) was described from SE Xizang, in temperate rainforests on steep, north-facing slopes, associated with species of *Magnolia*, *Quercus*, *Rhododendron*, etc. It is apparently similar to *A. argotaenia*, but differs in having leaves without sclereids, the adaxial surface smooth or with only longitudinal striations (due to shrinkage) when dry. Further collections are needed to establish whether it is truly distinct from *A. argotaenia*.

1a. Stomatal bands on abaxial leaf surface 2/3 to 1.5 × as wide as green marginal bands ..... 3. *A. argotaenia*

1b. Stomatal bands on abaxial leaf surface 2 × as wide as green marginal bands.

2a. Leaves linear, linear-lanceolate, or linear-elliptic, 8–15 mm wide, usually straight, apex tapered or obtuse, abaxial stomatal bands pale brown or pale yellowish white; pollen cone racemes 4 or more, 10–15 cm; seed ellipsoid, 2.2–3 cm ..... 1. *A. yunnanensis*

2b. Leaves lanceolate or linear-lanceolate, 5–10 mm wide, usually slightly falcate, tapered distally, apex long acuminate, stomatal bands white; pollen cone racemes usually 2–4, less than 5 cm; seed usually obovoid-ellipsoid, 2–2.5 cm ..... 2. *A. formosana*

1. *Amentotaxus yunnanensis* H. L. Li, J. Arnold Arbor. 33: 197. 1952.

云南穗花杉 yun nan sui hua shan

*Amentotaxus argotaenia* (Hance) Pilger var. *yunnanensis* (H. L. Li) P. C. Keng.

Trees to 15 m tall; trunk to 25 cm d.b.h.; main branches spreading to form a broad, ovoid crown. Leafy branchlets ascending, broadly oblong-ovate in outline, ca. 8 × 12 cm, axis green in 1st year, thereafter light yellow to light yellowish brown, ridged. Leaves borne at ca. 60° to branchlet axis, subsessile, linear, linear-lanceolate, or linear-elliptic, usually straight, sometimes slightly falcate distally, 3.5–10(–15) × 0.8–1.5 cm, thick and leathery, midvein prominently raised adaxially, 1–2 mm wide abaxially, stomatal bands brown or pale yellowish white when dry, 3–4 mm wide, at least 2 × as wide as marginal bands, very dense, in ca. 40 rows, marginal bands 1.5–2 mm wide, base broadly cuneate or obtuse, margin slightly downcurved, apex obtuse on basal 1–3 leaves of each branchlet, tapered on others. Pollen-cone racemes borne 4–6 together, 10–15 cm; bracts 16–20 in 4 rows of 4(or 5), keeled, distal bract 8–9 × 4–5 mm; pollen sacs (4–)6 or 7(or 8). Aril reddish purple when ripe, slightly white powdery, 2.2–3

× 1.4–1.5 cm. Seed ellipsoid, shortly beaked at apex; peduncle ca. 1.5 cm, relatively thick, flattened proximally but quadrangular distally. Pollination Apr, seed maturity Oct.

Forming small patches of pure forest on limestone mountains; 1000–1600 m. SW Guizhou (Xingyi Xian), SE Yunnan [N Vietnam]. An endangered species in China. The wood is used in house building, in making furniture and agricultural implements, and as a carving material; the species is also cultivated as an ornamental tree.

2. *Amentotaxus formosana* H. L. Li, J. Arnold Arbor. 33: 196. 1952.

台湾穗花杉 tai wan sui hua shan

*Amentotaxus yunnanensis* H. L. Li var. *formosana* (H. L. Li) Silba.

Trees to 10 m tall; trunk to 3 cm d.b.h.; main branches few. Leafy branchlets broadly ovate-rectangular in outline, (2.5–)7–12 × 14–18 cm, axis green in 1st and 2nd years, becoming brown striped in 3rd year, quadrangular or subterete. Leaves borne at 55–70° to branchlet axis, subsessile; petiole (if present) thick, to 1 mm; blade dark green adaxially, lanceolate or linear-lanceolate, usually slightly but distinctly falcate, 5–8.5 cm × 5–10 mm, leathery, midvein 1–1.5 mm wide abaxially, with a narrow, green band ca. 0.5 mm wide

on either side, stomatal bands white, ca. 2 mm wide, very dense (ca. 30 rows), ca. 2 × as wide as marginal bands, marginal bands 0.6–1.6 mm wide, base broadly cuneate or obtuse, margin revolute, apex long acuminate. Pollen-cone racemes borne (1–)3 or 4(or 5) together, ca. 3 cm; cones in 7–9 pairs, close together, sessile (peduncle less than 1 mm), subglobose; bracts usually 7(–11) in 2–4 rows, keeled distal ones ca. 15 × 5 mm; microsporophylls ca. 10, 1.5–2 cm, recurved at maturity, each with 5–8 pollen sacs. Aril reddish yellow when ripe. Seed finally reddish purple, obovoid-ellipsoid, 2–2.5 × 0.9–1.1 cm, apex mucronulate; peduncle 1.5–2 cm, recurved at maturity; 2 rows of basal scales persistent. Pollination Feb, seed maturity Dec.

• Scattered in damp, shady places in tropical rainforests and broad-leaved subtropical forests, ravines, cliffs; 500–1300 m. SE Taiwan.

The wood is used for making furniture, farm implements, utensils, and handicrafts; the species is also cultivated as an ornamental tree.

**3. *Amentotaxus argotaenia*** (Hance) Pilger, Bot. Jahrb. Syst. 54: 41. 1916.

穗花杉 sui hua shan

Shrubs or small trees to 7 m. Leafy branchlets ascending or suberect, broadly rectangular to oblong-elliptic in outline, 4.5–8 × 8–15 cm, axis green in 1st year, greenish yellow to yellowish red in 2nd and 3rd years, quadrangular or subterete in cross section. Leaves borne at 45–95° to branchlet axis, sessile or petiole to 3 mm, dark green adaxially, linear or linear-lanceolate, falcate or ± straight, 2–11 cm × 5–11 mm, leathery, with sclereids, mottled adaxially when fresh, rugose with transverse striations at ca. 90° to midvein when dry, midvein raised adaxially, scarcely so abaxially, 1–1.2 mm wide with a very narrow, indistinct green band 0.15–0.2 mm wide on either side, whole midvein band 1.2–2 mm wide, stomatal bands white, 1–2 mm wide, narrower than marginal bands, of 15–25 rows, marginal bands 1.4–3 mm wide, base cuneate to attenuate, asymmetric, margin flat or very narrowly revolute, apex dark, callose, rounded to sharply triangular, obtuse on basal 1–4 (often more) leaves of each branchlet, often acuminate on others. Pollen-cone racemes borne (1 or)2–4(–10) together, 1.5–6.5 cm; cones in ca. 12 pairs, ovoid, ca. 3.5 × 2.5–3.2 mm; bracts ca. 6 at base of otherwise naked peduncle, distal bract ca. 2.5 × 2 mm, keeled; microsporophylls 6–8, peltate, each with (2 or)3(–5) pollen sacs. Seed-bearing structures with peduncle to ca. 2/3 × length of subtending leaf. Aril bright red when ripe. Seed finally red, narrowly obovoid-ellipsoid, 1.9–2.6 × 1–1.3 cm, with small, mucronulate apex; peduncle 1.1–1.4 cm, compressed-quadrangular, dilated below bracts, naked. Pollination Apr, seed maturity Oct.  $2n = 24$ .

Limestone mountains, forests, ravines, shady and damp stream banks; 300–1100 m. Fujian, S Gansu, Guangdong, Guangxi, Guizhou, W

Hubei, Hunan, Jiangsu, NW Jiangxi, C and SE Sichuan, Taiwan, SE Xizang, S Zhejiang [N Vietnam].

A vulnerable species in China.

H. L. Li (J. Arnold. Arbor. 33: 195. 1952) separated plants from W Hubei and Sichuan as *Amentotaxus cathayensis*, on the basis of leaf shape and length, and the stomatal bands being narrower (15–20 rows of stomata), instead of broader (22–25 rows in *A. argotaenia*), than the marginal bands. *Amentotaxus cathayensis* has not usually been accepted because these characters are not constant, although the stomatal band character did usually separate the two taxa in the sample examined by the authors. They can also be differentiated by presence (*A. cathayensis*) or absence (*A. argotaenia*) of a distinct petiole 1–3 mm. More research is needed to settle the status of *A. cathayensis*, which is here included provisionally in the synonymy of var. *argotaenia*.

- 1a. Leaves 3–11 cm × 6–11 mm; pollen cone racemes borne (1 or)2–4 together, 5–6.5 cm; seed-bearing structures with peduncle up 1/3 × length of subtending leaf. 3a. var. *argotaenia*
- 1b. Leaves 2–3.7 cm × 5–7 mm; pollen cone racemes borne up to 10 together, 1.5–5.5 cm; seed-bearing structures with peduncle ca. 2/3 × length of subtending leaf ... 3b. var. *brevifolia*

**3a. *Amentotaxus argotaenia* var. *argotaenia***

穗花杉(原变种) sui hua shan (yuan bian zhong)  
*Podocarpus argotaenia* Hance, J. Bot. 21: 357. 1883;  
*Amentotaxus argotaenia* var. *cathayensis* (H. L. Li) P. C. Keng; *A. cathayensis* H. L. Li; *Cephalotaxus argotaenia* (Hance) Pilger; *Podocarpus insignis* Hemsley.

Leaves 3–11 cm × 6–11 mm. Pollen-cone racemes borne (1 or)2–4 together, 5–6.5 cm. Seed-bearing structures with peduncle to 1/3 × length of subtending leaf.

Forests, ravines, shady and damp stream banks; 300–1100 m. Fujian, S Gansu, Guangdong, Guangxi, Guizhou, W Hubei, Hunan, Jiangsu, NW Jiangxi, C and SE Sichuan, Taiwan, SE Xizang, ?Zhejiang [N Vietnam].

**3b. *Amentotaxus argotaenia* var. *brevifolia*** K. M. Lan & F. H. Zhang, Acta Phytotax. Sin. 22: 492. 1984.

短叶穗花杉 duan ye sui hua shan

Leaves 2–3.7 cm × 5–7 mm. Pollen-cone racemes borne up to 10 together, 1.5–5.5 cm. Seed-bearing structures with peduncle ca. 2/3 × length of subtending leaf.

• Limestone mountains; ca. 900 m. S Guizhou.

