

Key to *Juniperus* of Eastern Hemisphere rev. 8-1-08

- 1a. All leaves acicular (subulate), jointed at the base, in whorls of 3, cones borne axillary
(sections *Caryocedrus* and *Juniperus*)
- 2a. Seed cones 20-25 mm, seeds united to form a stone; male cones in axillary fascicles
.....*J. drupacea*
- 2b. Seed cones 6-15 mm, seeds free, male cones solitary, axillary
- 3a. Seed cones blue, bluish-black, black when mature (2 -3 yrs.), may be reddish when
immature (*J. formosana*)
- 4a. Leaves with 1 white stomatal band on the adaxial surface
- 5a. Leaves 4 - 10 (-15) mm x 1 mm or more wide, nearly flat to curved in cross
section, white stomatal band wider than green margins.....*J. communis*
- 5b. Leaves 7 - 25 mm x 0.5 - 0.9 mm wide, 'U' or 'V' shaped in cross section, with a
keel (ridge) on the abaxial side, deeply grooved, white stomatal band narrower
than green margins
- 6a. Low procumbent shrub on sands at seashores; cones 8-12 mm; leaves 10-22
mm. long*J. rigida* var. *conferta*
- 6b. Upright shrub or tree; dry areas in mountains; cones 6-9 mm; leaves 12-25
mm. long.....*J. rigida* var. *rigida*
- 4b. Leaves with 2 white stomatal bands on the adaxial surface
- 7a. Leaves with mucronate tips, flat to U shaped, 12 - 20 mm; Taiwan, e. China
.....*J. formosana*
- 7b. Leaves with acute to obtuse tips, boat shaped, 7 - 12 mm, Japan
- 8a. Leaves with acute to apiculate tips; boat-shaped, 7 - 10 mm and wide (1.1 - 1.5
mm), endemic to Ryukyu Islands and s. coast of Shizuoka Pref., Oshima
(Island), Japan.....*J. taxifolia* var. *lutchuensis*
- 8b. Leaves with acute to obtuse tips, boat-shaped, 8 - 12 (-14) mm; endemic to
Bonin Islands.....*J. taxifolia*
- 3b. Seed cones reddish-brown, red, copper-red, reddish purple when mature
- 9a. Fastigiate shrubs to 2 m; seed cones red when mature, 7 - 10 mm; leaves about as
long as seed cone diam., Pliocene sands near the sea coast of w. Portugal
.....*J. navicularis*
- 9b. Shrubs or trees; seed cones reddish-brown, to dark purple when mature; leaves up to
25 mm.
- 10a. Mature seed cones 12 - 15 mm, purple, with 3 distinct leaf impressions (from
fused cone scales); leaves 2 - 2.5 mm wide, near the sea coast.....*J. macrocarpa*
- 10b. Mature seed cones 8 - 10 mm, reddish- brown to red, globose, without cone
scale impressions; leaves 1 - 2 mm wide.
- 11a. Leaves curved, shorter than mature seed cones; shrubs; endemic to
Azores.....*J. brevifolia*
- 11b. Leaves straight, longer than mature seed cones
- 12a. Mature seed cones copper-red, not glaucous; leaves closely spaced;
endemic to Canary and Madeira Islands, trees to 30 m, shrubs at high
elevations.....*J. cedrus*
- 12b. Mature seed cones reddish-brown, dark red, reddish-purple, glaucous;
leaves loosely spaced, shrubs or trees to 6 m

- 13a. Leaves narrowing at the base of attachment, stomatal bands sunken; seed cones without raised cone scale tips, seed cones globose, shrubs and trees with round crowns; France, Spain, Portugal, Algeria, Morocco
.....**J. oxycedrus**
- 13b. Leaves with base of attachment nearly as wide as the blade, stomatal bands scarcely sunken; seed cones with raised cone scale tips, with shrub and trees with pyramidal crown, Italy, Greece, Turkey and eastward.....**J. deltoides**
- 1b. Leaves decurrent (not subulate, not jointed at the base), both scale-like and whip (decurrent with free tips) leaves, only whip-leaves on juvenile plants and at the tips of adult foliage, leaves in pairs or whorls of 3; cones borne terminal (section **Sabina**)
- 14a. (1-) 2 - 9 seeds per globose cone or 2-3 (-4) seeds per bi-lobed cone
 - 15a. All leaves of one kind, decurrent, with a blade (that is free) and a sheath (that the stem), procumbent shrubs, 2 - 3 seeded, sea shores, Japan, Korea.....
.....**J. procumbens**
 - 15b. Leaves of 2 kinds: scale like and whip (decurrent with free blade tips) leaves
 - 16a. Whip-leaves found only on juvenile plants or at the ends of rapidly growing (juvenile) branchlets, otherwise, all leaves are scale-like
 - 17a. Seed cones bi-lobed (occasionally globose on the same tree), 6 - 9 mm, 2 - 3 (-4) seeds, trees with strong central axis
 - 18a. Scale-leaves mostly flat, scarcely overlapping, giving the ultimate branchlets a smooth appearance, glands on whip-leaves not conspicuous, not generally raised.....**J. semiglobosa**
 - 18b. Scale-leaves beaked, overlapping by about 1/4, giving the ultimate branchlets a rough appearance, glands on whip-leaves conspicuous, generally raised.....**J. jarkendensis**
 - 17b. Seed cones globose to subglobose
 - 19a. Seed cones small, 4 - 6 mm, irregularly globose, (1-) 2 seeds per cone, shrubs or trees
 - 20a. Trees, seed cones 4 - 5 mm, very fine foliage (0.6 - 0.9 mm in diam.).
.....**J. erectopatens**
 - 20b. Shrubs, seed cones 5 - 6 mm, fine foliage (0.8 - 1 mm in diam.).**J. sabina**
- 19b. Seed cones large 7 - 14 mm diam.
 - 21a. Twigs distichously arranged; seed cones dark purple, glaucous; 2 - 4 seeds per cone.....**J. thurifera**
 - 21b. Twigs irregularly arranged; seed cones reddish brown, dark blue, purplish-black; black, 1 - 8 seeds per cone
 - 22a. 1-2 (-3) seeds per cone; scale-leaf tips often free, scale-leaves 2 - 2.7 mm; leaves with a fetid odor, ultimate branchlets 1.2 - 1.7 mm diam., seed cones almost black.....**J. foetidissima**
 - 22b. 3 - 6 (-8) seeds per cone
 - 23a. Seed cones copper-red to dark red when mature, 3 - 9 seeds per cone, leaf margins serrate (at 40X), Mediterranean.....**J. phoenicea**
 - 23b. Seed cones reddish-brown, bluish-red, blue, purple or black when mature, 2 - 8 seeds per cone, leaf margins smooth (at 40X)
 - 24a. Ultimate branchlets 0.6 - 1 mm diam.; scale-leaves 0.5 - 1 mm; 2 - 5 seeds per cone, seed cones reddish-brown to purple-black; trees with pendulous foliage; endemic to e. Africa, Arabian Peninsula.....
.....**J. procera**

- 24b. Ultimate branchlets 0.7 - 1 mm, scale-leaves 0.6 - 1.6 mm long, 3 - 6 (-8) seeds per cone, reddish-brown to purple black, trees and shrubs, foliage erect to pendulous
- 25a. Ultimate branchlets 0.7 - 1 mm diam.; scale-leaves very small, 0.6 - 1.1 mm long, appressed; seed cones 6 - 11 mm diam, globose.
.....*J. excelsa*
- 25b. Ultimate branchlets 1 - 1.3 mm diam.; scale-leaves coarse, 1.2 - 1.6 mm long, appressed or apex free; seed cones 8 - 14 mm diam, globose.....*J. polycarpus*
- 16b. Both scale and whip-leaves found on mature plants, interspersed on a single branchlet, not just at the ends of rapidly growing branchlets. Occasionally, one type leaves predominates.
- 26a. Both scale and whip-leaves interspersed in mature foliage; decumbent shrubs, glands conspicuous on whip-leaves and some scale-leaves, n. Mongolia, far e. Russia.....*J. sabina var. davurica*
- 26b. Whip-leaves in clumps next to clumps of scale-leaves in mature foliage; shrubs, trees (very variable taxon), glands on scale and whips leaves usually not conspicuous, e. China, Korea, Japan, Taiwan.....*J. chinensis*
- 14b. Seed cones 1 seeded, subglobose to turbinate, often with a pointed tip
- 27a. All leaves whip (decurent with free tips), no scale-leaves (or scale-leaves appearing decurent in *J. carinata*).
- 28a. Leaf tips (blades) appressed to stem giving the ultimate branchlets a smooth rope appearance
- 29a. Foliage pendulous and recurved, blades long and narrow, and very tightly recurved or appressed to the stem.
- 30a. Single white stomatal band on adaxial side of leaves.....*J. recurva*
- 30b. Two white stomatal bands on adaxial side of leaves.....*J. coxii*
- 29b. Foliage not pendulous, blades shorter and wider, not so appressed
- 31a. Trees with strong central axis in boreal forests, leaves with abaxial keel and narrow grooves next to the keel (or a raised oil gland in some cases).....
.....*J. pingii*
- 31b. Shrubs at timberline, leaves without abaxial keel and without narrow grooves.....*J. pingii var. carinata*
- 28b. Leaf tips (blades) free and divergent from stem giving the ultimate branchlets a thorny appearance
- 32a. Plants of mainland China.....*J. squamata*
- 32b. Plants endemic to Taiwan.....*J. morrisonicola*
- 27b. Leaves of two kinds: scale-like and whip (decurent) with free tips, whip-leaves only on juvenile plants or on fast growing branchlets
- 33a. Gland at the base of scale-leaves on abaxial surface
- 34a. Branchlets quadrangular (leaves opposite), curved, seed cones 4 - 8 mm.....
.....*J. saltuaria*
- 34b. Branchlets terete, straight, rarely curved, seed cones 8 - 13 mm.
- 35a. Branchlets tapering, ultimate branchlets gradually shorter toward the apex of branch; leaves without noticeable cuticular wax (glaucous) covering, foliage weeping (pendulous), seed cones 8 - 10 mm.....*J. komarovii*

- 35b. Branchlets not tapering, ultimate branchlets of equal length or irregularly equal; leaves with noticeable cuticular wax (glaucous) covering, foliage erect (except for var. *pendula*), seed cones 8 - 13 mm diam., scale-leaves with hyaline margins.....***J. przewalskii***
- 33b. Gland centrally positioned on scale-leaves on abaxial surface
- 36a. Ultimate branchlets thin, less than 1 mm diam.; seed cones small, 5 - 8 mm, globose
- 37a. Seed cones 5 mm diam.....***J. microsperma***
- 37b. Seed cones 7 - 8 mm diam.....***J. convallium***
- 36b. Ultimate branchlets stout, more than 1 mm diam.; seed cones large, 8 - 16 mm, turbinate
- 38a. Branchlets terete with a few branchlets quadrangular (leaves opposite), limbs on trees upturned at the tips reminiscent of the roofs of Tibetan temples..
.....***J. tibetica***
- 38b. Branchlets quadrangular (leaves opposite), a few branchlets terete, limbs not upturned at the tips
- 39a. Scale-leaves overlapping by 1/4, with scarious border, whip-leaves with oval to elliptical glands, and gland ray usually absent or extending less than 1/2 the distance to the leaf tip, green foliage.....***J. pseudosabina***
- 39b. Scale-leaves not overlapping, without scarious border, whip-leaves with oval to elliptical glands with a gland ray (narrow groove) that extends more than 1/2 the distance to the leaf tip, dark green foliage
- 40a. Monoecious, shrubs or shrubby trees.....***J. indica***
- 40b. Dioecious, trees with a strong central axis.***J. indica* var. *rushforthiana***