

**Key to *Juniperus* of Eastern Hemisphere**

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- 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 (not united), 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, scarcely glaucous; leaves closely spaced;  
endemic to Canary and Madeira Islands, trees to 30 m, shrubs at high  
elevations.
          - 12a.1 Stomatal bands about as wide as midrib, mature seed cones about as  
long as leaves, endemic to Madeira Island.....*J. maderensis*
          - 12a.2 Stomatal bands wider than midrib, mature seed cones longer than  
leaves, endemic to the Canary Islands.....*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.....***J. indica***