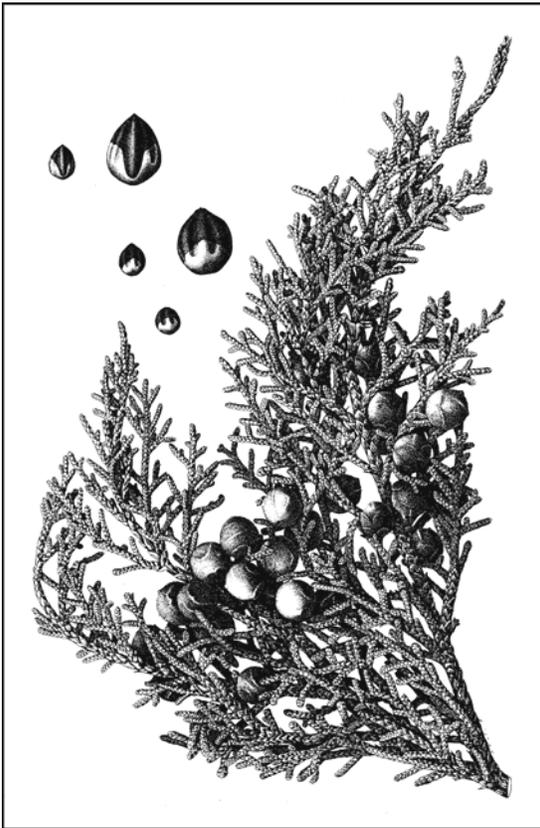


***Juniperus osteosperma* (Torr.) Little**  
CYPRESSACEAE

Utah juniper

Synonyms: *Juniperus utahensis* (Engelm.) Lemmon  
*Juniperus californica* Carr. ssp. *osteosperma* (Torr.) E. Murr.  
*Juniperus californica* Carr. var. *utahensis* Engelm.  
*Juniperus knightii* A. Nels.  
*Juniperus megalosperma* Sudworth  
*Juniperus occidentalis* Hook. var. *utahensis* (Engelm.) Kent  
*Sabina osteosperma* (Torr.) Antoine



**General Description.**—Utah juniper, also known as cedar, desert cedar, sabina, and sabina morena, has a habit between that of shrub and tree. Although slow-growing and long-lived, rare individual plants attain large diameters (record tree: 217 cm diameter breast height and height 11.6 m, American Forests 1998). The species is short statured, (mainly 2 to 4 m tall), (Welsh and others 1987), usually has multiple stems (limbs arising near the ground that become codominant with the original central stem), and becomes reproductively mature at small sizes. The bark is gray-brown or gray, thin, fibrous, and shredding.

Sapwood is white and the heartwood is yellow-brown with narrow annual rings. It is relatively soft, brittle, and has a dry-weight specific gravity of 0.553 g/cm<sup>3</sup> (Paettie 1953). The wood and all other parts are aromatic. Crowns tend to be branchy, rounded to flat-topped, and sometimes dense; old trees often have bleached, dead limbs. Utah junipers have deep taproots and lateral roots that may extend as much as 30 m, a few cm below the soil surface. The roots are colonized by vascular-arbuscular mycorrhizae. The photosynthetic organs are yellow-green branchlets with opposite (or whorled), reduced scale-like leaves. The species is monoecious with small, separate male and female flowers. Fruits are subglobose, 6- to 12-mm diameter, leathery cones (“berries”), brownish to blue-purple at maturity. They have a strong, resinous flavor and contain one (sometimes two) hard seed (Abrams 1940, Welsh and others 1987, Zlatnik 1999).

**Range.**—Utah juniper occurs as large populations and scattered disjuncts in southern Idaho, southern Montana, Wyoming, western Colorado, Utah, Nevada, Arizona, eastern and southern California, northeastern New Mexico, and Chihuahua and Durango in Mexico (Natural Resources Conservation Service 2003, Secretaría de Medio Ambiente y Recursos Naturales 2003, Tree Guide 2003). The species is not known to have naturalized outside its native range. It hybridizes with *J. occidentalis* Hook. where the species grow together (Terry and others 2000).

**Ecology.**—Utah juniper grows on a wide variety of well-drained soils. It accommodates all the soil textures, pH's of 6.5 to 8.2, high free calcium carbonate, but does not tolerate salty soils (Natural Resources Conservation Service 2003). It is commonly found on rocky, gravelly, and sandy sites, usually originating from igneous (Stuart and

Sawyer 2001) and sedimentary (sandstone and limestone) rocks, at 900 to 2,500 m above sea level (Zlatnik 1999). Mean annual precipitation varies from 300 to 510 mm, but the species can withstand severe droughts (Natural Resources Conservation Service 2003) and is a fierce competitor for the little available moisture in its habitat. It has a specific leaf area of 18 cm<sup>2</sup>/g (Grier and others 1992). Utah juniper also tolerates cold and heat well. However, the species is intolerant of shade and does not survive under the canopy of taller vegetation. It is alleged to exert an allelopathic effect on some understory grass species. Utah juniper is a climax species in many vegetation types with species such as *Artimisia tridentata* Nutt., *Pinus edulis* Engelm., and *Pinus monophylla* Torr. & Frém. The range of Utah juniper is known to have expanded since European colonization, and stands have changed from open, savanna types to dense stands probably because of reduction of fine fuels by livestock grazing, fire suppression, and changes toward warmer and drier climates (Tausch 1999). Utah juniper is easily killed by fire, both by scorching the top or heat-girdling through the thin bark. However, the habitat seldom has sufficient fine fuels to sustain a fire. Stands most at risk are young stands with scattered trees in brush and grass, and continuous stands of large, decadent trees during high winds (Zlatnik 1999). Utah juniper is sometimes heavily infested by the mistletoes, *Phoradendron juniperinum* Engelm. ex Gray and *P. bolleanum* (Seem.) Eichl. (Zlatnik 1999). The larvae of *Eurytoma juniperina* Marcovitch attack the seeds (Bonner 2003).

**Reproduction.**—Utah juniper flowers from January to April (depending on site) and is wind pollinated. Fruits ripen in the second year and germinate the following spring or the second spring after dispersal (Zlatnik 1999). Fruits may be collected by hand from the shrubs or low trees or picked up by hand after they have fallen. Seed should be extracted by maceration with water before the fruits dry out. Cleaned seed from Arizona ranged from 7,900 to 15,700 seeds/kg. Seed should be dried to about 10 percent moisture and can be stored at 5 to -18 °C for several years. Moist stratification at 3 to 5 °C for 30 to 180 days is necessary for good germination. Drilled or broadcast in a nursery bed, seeds should be covered with 6 mm of fine soil or sand. Germination ranges from 50 to 64 percent (Bonner 2003).

**Growth and Management.**—Utah juniper grows slowly, usually only 0.13 cm/year in diameter. An 86-year-old stand in Utah had 17.2 percent canopy cover and a basal area of 7.7 m<sup>2</sup>/ha (Zlatnik 1999). Poor site conditions may result in 15 cm-tall plants over 50 years old. Individuals of the species may live 650 years or longer. Closing Utah juniper stands eliminate most forage plants; killing trees can result in a doubling of herbaceous cover (Zlatnik 1999). Controlling Utah juniper has been attempted with fire, but fires on these sites are difficult to start under humid, still conditions and hard to control under dry, windy conditions. Controlled burns can be done with the greatest precision in late winter or early spring when the wood is low in water content (personal communication with Stanley Kitchen, Shrub Sciences Laboratory, USDA Forest Service, Provo, UT). The shrubs and trees can be killed with chainsaws or herbicides, but the preferred method is “chaining,” dragging sections of anchor chain between two bulldozers. Many young trees are not killed, but the treatment does open stands and allows greater shrub and herbaceous growth (Plummer and others 1968, Stevens 1999).

**Benefits.**—Utah juniper is a major constituent of semidry ecosystems of the West. It protects the soil from wind erosion but in some instances may aggravate sheet erosion from rains by suppressing understory grasses, forbs, and shrubs. The species furnishes cover and reproductive habitat for many species and is a major source of food for wildlife, especially during winter. Many birds, rodents, as well as jackrabbits (*Lepus californicus*) and coyotes (*Canis latrans*) eat the fruits and mule deer (*Odocoileus hemionus*), and elk (*Cervus elaphus*) browse the foliage when better food is not available. It is not eaten by cattle and is browsed to a limited extent by domestic sheep (Stuart and Sawyer 2001, Zlatnik 1999). The forage is of low quality because of low digestibility (44 percent) and low protein content (6 to 8 percent) (Zlatnik 1999). The wood is used for firewood, charcoal, and novelties (Secretaría de Medio Ambiente y Recursos Naturales 2003). The bark is used as tinder and formerly was used as a “slow match” to maintain and transport fire (Plants For a Future 2003). Native Americans used the bark to make sandals, mats, bedding, baskets, thatch, and cordage, and they made meal from the fruits (Peattie 1953). The wood is highly decay resistant, which makes it desirable for fence posts and rude construction despite its poor form (Zlatnik 1999). Tissues of Utah juniper are not high enough in cedarwood oil to be commercially

valuable. Heartwood contains 1.19 percent oil, principally thujopsene (40 percent) and cedrol (13.2 percent) (Adams 1987). The species was used by Native Americans to treat bladder and kidney troubles, wounds, and mouth sores (Plants for a Future 2003). Utah juniper has been used to a limited extent in revegetation projects and xeriscape gardening.

## References

- Abrams, L. 1940. Illustrated flora of the Pacific States. Vol. 1. Stanford University Press, Stanford, CA. 538 p.
- Adams, R.P. 1987. Investigation of *Juniperus* species of the United States for new sources of cedarwood oil. *Economic Botany* 41(1): 48-54.
- American Forests. 1998. National register of big trees 1998-1999. *American Forests* 104(1): 24-46.
- Bonner, F.T. 2003. *Juniperus* L., juniper. In: F.T. Bonner and R.G. Nisley, eds. *Woody Plant Seed Manual*. U.S. Department of Agriculture, Forest Service, Washington, DC. 15 p.
- Grier, C.C., K.J. Elliot, and D.G. McCullough. 1992. Biomass distribution and productivity of *Pinus edulis-Juniperus monosperma* woodlands of north-central Arizona. *Forest Ecology and Management* 50(3-4): 331-350.
- Natural Resources Conservation Service. 2003. Plants profile: *Juniperus osteosperma* (Torr.) Little, Utah juniper. [http://plants.usda.gov/cgi\\_bin/plant\\_search.cgi?mode=Scientific+Nave&keywordquery=Juniperus+osteosperma&earl=plant\\_sea](http://plants.usda.gov/cgi_bin/plant_search.cgi?mode=Scientific+Nave&keywordquery=Juniperus+osteosperma&earl=plant_sea). 5 p.
- Peattie, D.C. 1953. *A natural history of Western trees*. Houghton Mifflin Company, Boston, MS. 749 p.
- Plants For a Future. 2003. Plants for a future: database search results: *Juniperus osteosperma*. Plants for a Future, Cornwall, UK. [http://www.ibiblio.org/pfaf/cgi-bin/arr\\_html?Juniperus+osteosperma&CAN=LATIND](http://www.ibiblio.org/pfaf/cgi-bin/arr_html?Juniperus+osteosperma&CAN=LATIND). 8 p.
- Plummer, A.P., D.R. Christensen, and S.B. Monson. 1968. Restoring big-game range in Utah. Publication 68-3. Utah Division of Fish and Game, Salt Lake City, UT. 183 p.
- Secretaría de Medio Ambiente y Recursos Naturales. 2003. Especies con usos no maderables en bosques de Encino, pino y pino-encino: *Juniperus osteosperma* (Torr.) Little. <http://www.semarnat.gob.mx/pfnm/JuniperusOsteosperma.html>. 2 p.
- Stevens, R. 1999. Mechanical chaining and seeding. In: S.B. Monson and R. Stevens, comps. *Proceedings: ecology and management of pinyon-juniper communities within the Interior West*; Sep. 15-18, 1997. Provo, UT. PMRS-P-9. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT. p. 281-284.
- Stuart, J.D., and J.O. Sawyer. 2001. *Trees and shrubs of California*. University of California Press, Berkeley, CA. 467 p.
- Tausch, R.J. 1999. Historic pinyon and juniper woodland development. In: S.B. Monson and R. Stevens, comps. *Ecology and management of pinyon-juniper communities within the Interior West*. Proc. RMRS-P-9. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT. p. 12-19.
- Terry, R.G., R.S. Nowark, and R.J. Tausch. 2000. Genetic variation in chloroplast and nuclear ribosomal DNA in Utah juniper (*Juniperus osteosperma*, Cupressaceae): evidence of interspecific gene flow. *American Journal of Botany* 87: 250-258.
- Tree Guide. 2003. Treeguide species details: Utah juniper. <http://www.treeguide.com/Species.asp?SpeciesID=544>. 3 p.
- Welsh, S.L., N.D. Atwood, S. Goodrich, and L.C. Higgins, eds. 1987. *A Utah flora*. Brigham Young University, Provo, UT. 894 p.
- Zlatnik, E. 1999. *Juniperus osteosperma*. In: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. *Fire Effects Information System*. <http://www.fs.fed.us/database/feis/plants/tree/junost/all.html>. 33 p.

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