

The Gymnosperms of Oregon

Stephen C. Meyers

Key to Families

- 1a. Shrubs without functional leaves; stems photosynthetic, green.....Ephedraceae
- 1b. Shrubs or trees with green functional leaves; stems generally not photosynthetic
 - 2a. Leaves awl-like or scale-like.....Cupressaceae (in part)
 - 2b. Leaves needle-like
 - 3a. Seed cone a soft, red aril; 1 seed per cone.....Taxaceae
 - 3b. Seed cones woody or blue to bluish-black and berry-like; seeds per cone 1-many
 - 4a. Seed cones blue to bluish-black and berry-like.....Cupressaceae (*Juniperus*)
 - 4b. Seed cones woody.
 - 5a. Seed cone scales peltate; leaves of two kinds, needle-like and awl-like; trees giant..... Cupressaceae (*Sequoia*)
 - 5b. Seed cones imbricate; leaves of one kind; trees not giant.....Pinaceae

Cupressaceae Bartlett Cypress family

Trees or **shrubs**, evergreen, monoecious. **Bark** smooth to fibrous and furrowed. **Leaves** needle-like, awl-like or scale-like, simple, alternate or opposite, 2 or 4 ranked or in whorls of 3. **Pollen cones** maturing annually, solitary, terminal. **Seed cones** woody or berry-like, terminal; scales of woody cones imbricate or peltate. **Seeds** 1-many per scale, not winged.

Temperate regions worldwide. Genera ca. 25 (6 in Oregon).

Although some authorities segregate Taxodiaceae from Cupressaceae, most current researchers unite the families. Among the conifers, Cupressaceae has the widest distribution, occurring on all continents but Antarctica.

- 1a. Seed cones fleshy, berry-like; scales fused; seeds retained.....*Juniperus*
- 1b. Seed cones woody, not-berry like; scales distinct; seeds shed
 - 2a. Leaves alternate, of 2 kinds, linear or awl-like*Sequoia*
 - 2b. Leaves opposite in 4 ranks, of 1 or 2 kinds, scale-like or awl-like
 - 3a. Seed cones oblong or elongated; scales not peltate.
 - 4a. Seed cones pendent, 2-2.5 cm long, scales in 3 pairs, middle pair fertile, leaves appearing 4-whorled; seed wings unequal.....*Calocedrus*
 - 4b. Seed cones erect to reflexed, 1-1.5 cm long, scales in 4-6 pairs, middle 2-3 pairs fertile, leaves opposite in 4 ranks; seed wings unequal.....*Thuja*
 - 3b. Seed cones round; scales peltate.
 - 5a. Branchlets in nearly cylindrical 3-dimensional clusters; seeds 5-20 per scale, wing < width of body.....*Callitropsis* (in part)
 - 5b. Branchlets in flat clusters; seeds 2-4 per scale, wing \geq width of body
 - 6a. Branchlets glaucous; underside of branchlets with a white pattern of x's; seed cone with 7-10 scales; bark fibrous.....*Chamaecyparis*
 - 6b. Branchlets not glaucous; underside without a white pattern of x's; seed cone with 4-6 scales; bark scaly.....*Callitropsis* (in part)

Callitropsis Oersted Cypress

Trees, evergreen. **Branchlets** in nearly cylindrical 3-dimensional or flat clusters. **Leaves** opposite, 4-ranked, scale-like, appressed, overlapping. **Pollen cones** yellow. **Seed cones** maturing in 1-2 years, pendent, globose to nearly globose; scales 4-8, peltate, umbos present, glaucous or not, persistent. **Seeds** 2-20 per scale, lenticular, 2-winged.

North temperate regions. Species ca. 8 (2 in Oregon).

The nomenclatural history of the *Callitropsis* is slightly complex. Traditionally most species in this genus had been assigned to *Cupressus*. However, a recent study found that North American species of *Cupressus* are more closely related to the Asian genus *Xanthocyparis* than to Old World *Cupressus*. As a result, all North American *Cupressus* were transferred to *Xanthocyparis*. Unfortunately, according to botanical nomenclatural rules, an older and previously overlooked name, *Callitropsis* has priority over *Xanthocyparis*. Therefore, all North American *Cupressus* taxa should be referred to as *Callitropsis*. To further complicate matters, another recent study has found that *Callitropsis nootkatensis* (previously *Chamaecyparis nootkatensis*) is more closely related to all *Callitropsis* species than to any *Chamaecyparis* species.

- 1. Branchlets in nearly cylindrical 3-dimensional clusters; seeds 5-20 per scale, wing less than width of body; seed cone 1.0-2.0 cm wide.....*C. bakeri*
- 1b. Branchlets in flat clusters; seeds 2-4 per scale, wing greater than or equal to width of body; seed cone 8-12 mm wide.....*C. nootkatensis*

Callitropsis bakeri (Jepson) D.L. Little Modoc cypress

Trees to 25 m tall but usually much shorter; trunk to 0.4 m in diameter; mature crown in a column. **Bark** dark reddish-brown, smooth when young, separating into long thin scales with age. **Branches** often crooked. **Branchlets** in nearly cylindrical 3-dimensional clusters, less than 2.5 mm in diameter. **Leaves** gray-green to dark green, approximately 1.5 mm long, glaucous, slightly resinous. **Pollen cones** approximately 2.5 mm long. **Seed cones** globose, silvery, not glaucous, 1-2 cm wide; scales 6-8, umbos present. **Seeds** 5-20 per scale, 2-4 mm wide, tan to brown; wing less than width of the body.

Habitat: Mixed evergreen forests.

Range: Oregon and California.

This species is rarely used as a source for timber or as an ornamental. *Callitropsis bakeri* can be distinguished from *C. nootkatensis* by its 3-dimensional clusters of branchlets.

Callitropsis nootkatensis (D. Don) D.L. Little Alaska-cedar, yellow-cypress

Trees to 40 m tall; trunk to 2 m in diameter; mature crown conic. **Bark** grayish-brown, up to 2 cm thick, fissured to expose a bright brown inner bark. **Branches** spreading and drooping. **Branchlets** in flat clusters, less than 3.5 mm in diameter. **Leaves** green to bluish-green, 1.5-2.5 mm long, not glaucous, rarely resinous. **Pollen cones** 2-5 mm long. **Seed cones** nearly globose, dark red-brown, glaucous, resinous, 0.6-1.2 cm wide; scales 4-6, umbos present. **Seeds** 2-4 per scale, 2-6 mm wide, sharp-pointed, somewhat flattened, reddish-brown; wing greater than or equal to width of body.

Habitat: Mid-elevation mountainous slopes.

Range: Oregon, California, Washington and north to Alaska.

Callitropsis nootkatensis is not normally harvested for timber in Oregon but is of commercial importance in other states where its numbers are more numerous. This species is distinguished from *C. bakeri* by its flat clusters of branchlets.

Calocedrus Kurz Incense-cedar

Trees monoecious, evergreen; mature crown broadly conic. **Branchlets** in flattened sprays. **Leaves** opposite in 4 ranks, appearing 4-whorled, overlapping, closely appressed, scale-like. **Pollen cones** sessile, ovate. **Seed cones** maturing in 1 year, pendent, woody;

scales thin, persistent, in 3 overlapping pairs, middle pair fertile. **Seeds** 2 per scale, unequally 2-winged.

Western North America and East Asia. Species 3 (1 in Oregon).

Calocedrus is most easily distinguished from other false-cedars by the shape of its pendent cones which resemble duck bills or a flying goose.

Calocedrus decurrens (Torrey) Florin Incense-cedar

Trees to 50 m tall; trunk to 3.5 m in diameter. **Bark** bright reddish-brown, up to 2 cm thick, fibrous, furrowed. **Branches** slender, drooping below, erect toward the top. **Branchlets** 2 times longer than wide, twigs somewhat flattened, yellow-green when young, becoming round, brown and marked with circular scars with age. **Leaves** 3-12 mm long, oblong or obovate, decurrent; lateral leaves keeled, glandular, overlapping inner leaves; inner leaves compressed; apex acute to mucronate. **Pollen cones** yellow, 5-7 mm long. **Seed cones** oblong, 1.8-2.5 cm long, light reddish-brown; scales ovate-oblong, slightly convex, approximately as long as cone. **Seeds** 8-12 mm long, light brown to reddish-brown.

Habitat: Mountain forests.

Range: Oregon, California, Nevada and south to Mexico.

Although the wood of *Calocedrus decurrens* is soft and pliable, it is often infected with a white fungus; therefore it is seldom used for typical lumber applications. It is, however, the most widely used wood for the manufacture of pencils.

Chamaecyparis Spach White-cedar, false-cypress

Trees, evergreen; trunks often swollen at base. **Branchlets** in flat clusters. **Leaves** opposite, 4-ranked, scale-like, appressed, overlapping. **Pollen cones** red to dark brown. **Seed cones** maturing in 1 year, pendent to slightly erect, globose; scales 7-10, peltate, umbos absent, glaucous, persistent. **Seeds** 2-4 per scale, lenticular, equally 2-winged.

North temperate regions. Species ca. 5 (1 in Oregon).

Although no true cedars are native to Oregon, *Chamaecyparis* is one of three genera known collectively as the false-cedars. *Chamaecyparis* is most easily distinguished from other false-cedars by the shape of its cones, which resemble soccer balls.

Chamaecyparis lawsoniana (A. Murray bis) Parlatore Port-Orford cedar

Trees to 60 m tall; trunk to 3 m in diameter above the swollen base; mature crown conic. **Bark** reddish-brown, smooth when young, up to 25 cm thick with age, ridged and splitting into long thin shreds. **Branches** horizontal to somewhat drooping. **Branchlets** in flattened clusters. **Leaves** light green, approximately 1.5-3 mm long, acute, abaxial surface glaucous producing an X-shaped pattern on the underside of sprays. **Pollen cones** 2-4 mm long, staminate flowers red. **Seed cones** globose, reddish-brown, glaucous, 0.8-1.1 cm wide; scales 7-10, apex flat or sunken. **Seeds** 2-4 per scale, 2-4 mm wide, light brown; wing greater than or equal to width of body.

Habitat: Coast range forests but occasionally inland.

Range: Oregon and California.

This species is closely related to the *Chamaecyparis obtusa* or Hinoki, which is considered sacred to some in Japan. As a result, the wood of this species is highly prized by Japanese wood merchants. Overharvesting and a rot caused by *Phytophthora* are current threats to this species.

Juniperus Linnaeus Juniper

Trees or **shrubs**, evergreen, monoecious or dioecious; mature crown depressed to rounded or conic. **Branchlets** angled, not in flattened sprays. **Leaves** opposite or in whorls of 3, closely appressed or divergent, of 1 or 2 kinds, needle-like and/or scale-like, resinous or not. **Pollen cones** small. **Seed cones** globose to nearly globose, fleshy, berry-like, seeds retained; scales fused. **Seeds** 1-3 per cone, wingless.

Northern hemisphere. Species ca. 60 (4 in Oregon).

Commercially, junipers in Oregon are not of high economic importance. Worldwide junipers are best known for being the prime flavoring in gin. Among the gymnosperms in Oregon, junipers are easily recognized by their bluish-black, berry-like cones.

- 1a. Leaves of one kind, needle-like, not closely appressed; seed cones axillary; mature plants generally less than 1 m tall.....*J. communis* var. *saxatilis*
- 1b. Leaves of two kinds, most leaves scale-like, closely appressed, a few leaves needle-like; seed cones terminal; mature plants generally greater than 1 m tall.
 - 2a. Scale-like leaves in whorls of 3, very resinous, margins finely serrated.....*J. occidentalis* var. *occidentalis*
 - 2b. Scale-like leaves generally opposite, not resinous, margins entire.
 - 3a. Scale-like leaves not overlapping or barely so; bark exfoliating in plates.....*J. scopulorum*
 - 3b. Scale-like leaves overlapping by at least 1/4 their length; bark exfoliating in

strips.....*J. virginiana* var. *virginiana*

Juniperus communis Linnaeus var. *saxatilis* Pallas Common juniper

Shrubs, dioecious, to 1 m tall, spreading, sometimes mat-like; mature crown depressed, occasionally conic. **Bark** reddish-brown to brown, smooth when young, ridged and exfoliating in thin strips when mature. **Branches** spreading. **Branchlets** erect. **Leaves** of one kind, needle-like, linear-lanceolate, in whorls of 3, 0.5-1.5 cm long, approximately 2 mm wide, divergent, margins entire; adaxial surface white, glaucous, slightly concave, stomata numerous; abaxial surface dark green, keeled; apex acute, rarely obtuse. **Pollen cones** 3-6 mm long. **Seed cones** nearly globose, maturing in 2-3 years, 6-9 mm wide, bluish-black, glaucous, short stalked, 1-3 seeded. **Seeds** 3-5 mm wide, brown.

Habitat: Coastal bluffs, dry rocky soils and mountain summits.

Range: Oregon, California, Washington, British Columbia and Greenland.

Juniperus communis contains 5 subspecies, two of which (varieties. *communis* and *hemisphaerica*) do not occur in North America. Variety *megistocarpa* is restricted to the Canadian Maritimes and variety *depressa*, although widespread in North America, has not been collected in Oregon.

Juniperus occidentalis Hooker var. *occidentalis* Western Juniper

Trees, monoecious or dioecious, to 20 m tall; trunk to 1 m in diameter; mature crown rounded. **Bark** light reddish-brown to brown, smooth when young, ridged and exfoliating in thin strips or plates when mature. **Branches** spreading. **Branchlets** erect. **Leaves** of two kinds, the less numerous leaves needle-like, 3-6 mm long; scale-like leaves in whorls of 3, 1-3 mm long, closely appressed, light green, margins finely serrated; adaxial surface very resinous, concave; apex acute. **Pollen cones** 2-4 mm long. **Seed cones** globose to nearly globose, maturing in 2 years, 6-8 mm wide, bluish-black, glaucous, resinous, 2-3 seeded. **Seeds** 2-4 mm wide, sharp pointed, grooved, brown.

Habitat: Dry, rocky soils, foothills, mountain slopes and bases.

Range: Oregon, California, Idaho, Nevada and Washington.

Juniperus occidentalis is the most common of *Juniper* species in Oregon. The single other variety, *J. o.* var. *osteosperma* occurs only in the mountains of California and Nevada. This taxon is not widely harvested for its timber, however it is used occasionally for fence posts, fire wood and carved, novelty artwork.

Juniperus scopulorum Sargent Rocky mountain juniper

Trees, dioecious, to 20 m tall; trunk to 1 m in diameter, often branched; mature crown rounded. **Bark** reddish-brown to reddish-gray, smooth when young, becoming narrowly ridged and covered with long fibrous scales when mature, exfoliating in plates. **Branches** spreading to ascending. **Leaves** of two kinds; needle-like leaves 3-6 mm long; scale-like leaves opposite, 1-3 mm long, not or barely overlapping, closely appressed, light green to blue-gray, sometimes glaucous, margins entire; adaxial surface somewhat concave, not resinous; apex generally acute. **Pollen cones** 2-3 mm long. **Seed cones** globose, maturing in 2 years, 6-8 mm wide, light blue to bluish-black, glaucous, resinous to fibrous, usually 2 seeded. **Seeds** 4-5 mm wide, sharp pointed, angled, brown.

Habitat: Rocky soils on hills and slopes.

Range: Oregon, Idaho, Nevada, Washington, north to Alaska, east to North Dakota and southeast to Texas and Mexico.

In Oregon, this species is found only in the Wallowa Mountains. Morphologically it is very similar to *Juniperus virginiana*, but can be distinguished from the latter by its non-overlapping or barely overlapping leaves.

Juniperus virginiana Linnaeus var. *virginiana* Eastern red-cedar

Trees, dioecious, to 30 m tall; trunk to 1.5 m in diameter; mature crown conic or dome shaped. **Bark** brown to reddish-brown, smooth when young, fissured and exfoliating in long strips when mature. **Branches** spreading to ascending. **Leaves** of two kinds; needle-like leaves 3-6 mm long; scale-like leaves usually opposite, rarely in whorls of 3, 2-4 mm long, overlapping by more than 1/4 of their length, closely appressed, green, margins entire; adaxial surface slightly concave, not resinous; apex acute. **Pollen cones** 2-3 mm long. **Seed cones** globose to nearly globose, maturing in 1 year, 4-7 mm wide, bluish-black, glaucous, resinous, 1-2 (-3) seeded. **Seeds** 2-4 mm wide, sharp pointed, round, brown.

Habitat: In Oregon, in wet remnant prairies.

Range: Oregon and eastern North America.

Juniperus virginiana is a recent introduction to Oregon having first been reported to escape cultivation in 1988. Currently this taxon has only been recorded as established in a few localities in the Willamette Valley and one unconfirmed locality in Union County.

Sequoia Endlicher Redwood

Trees giant, evergreen; mature crown cylindrical. **Branches** slender, round in cross section. **Leaves** alternate, in 2 ranks, of 2 kinds, linear and awl-like, divergent to appressed. **Pollen cones** yellow to brown. **Seed cones** maturing in 1 year, pendent, woody; scales persistent, peltate. **Seeds** 2-7 per scale, marginally 2-winged.

Western North America. Species 1.

This genus is named for Chief Sequoyah, a leader within the Cherokee tribe in the early 19th century and creator of the Cherokee alphabet.

Sequoia sempervirens (D. Don) Endlicher Redwood, coast redwood

Trees to 110 m tall; trunks to 9 m in diameter, bases swollen, buttressed and somewhat fluted. **Bark** reddish-brown, up to 35 cm thick, deeply furrowed with broad round ridges. **Branches** drooping below, erect toward the top, lower portion of trunk usually devoid of branches. **Leaves** of higher branchlets awl-like, appressed, less than 6 mm long; leaves of mature branchlets linear, spreading, 6-20 mm long, somewhat curved; adaxial surface dark green, shiny; abaxial surface slightly revolute, ribbed, with prominent white stomatal bands, margins entire; apex acute, often sharply stiff pointed. **Pollen cones** ovoid, 2-5 mm long, short stalked. **Seed cones** oblong, reddish-brown, 2.0-3.5 cm long; scales 15-25. **Seeds** lenticular, 3-6 mm wide.

Habitat: Coastal forests.

Range: Oregon and California.

Redwoods are one of the few conifers that are able to reproduce vegetatively from their stumps, an ability that helps them regenerate after fires. Due to its color and resistance to decay, lumber from this species is popular for both interior and exterior building applications. Collectively, *Sequoia sempervirens* and *Sequoiadendron giganteum* are the state trees of California.

Thuja Linnaeus Arborvitae

Trees, monoecious, evergreen. **Branches** spreading, horizontal. **Branchlets** in flat clusters, generally horizontal. **Leaves** opposite in 4 ranks, closely appressed, scale-like. **Pollen cones** ovate. **Seed cones** maturing in 1 year, erect to reflexed, woody; scales persistent, overlapping, oblong, basifixed, middle 2-3 pairs fertile. **Seeds** 1-3 per scale, equally 2-winged.

Northern North America and East Asia. Species 5 (1 in Oregon).

As rot resistant wood, *Thuja* is a popular choice for shingles, siding and outdoor decks. *Thuja* is most easily distinguished from other false-cedars by the shape of its cones, which resemble rose-buds or the bowl of a smoker's pipe.

Thuja plicata Donn ex D. Don in Lambert Western redcedar

Trees to 75 m tall; trunk to 5 m in diameter; mature crown narrowly conic. **Bark** grayish-brown to bright brownish-red, 1.0-2.5 cm thick, fissured, separating into long fibrous shreds. **Branches** horizontal, ends often drooping; twigs 4-sided, flattened, yellowish-green when young, reddish-brown when mature. **Leaves** of mature branchlets (1-) 2-6 mm long, ovate, margins entire; adaxial surface bright green; abaxial surface white glaucous producing a butterfly shaped pattern on underside of sprays; apex acute. **Pollen cones** 1-3 mm long, brown to reddish-brown. **Seed cones** ellipsoid, 1.0-1.5 cm long, light brown to brown; scales leathery, tips usually with a stout, short bristle. **Seeds** 4-6 mm wide, lenticular, light brown.

Habitat: Moist, mixed coniferous forests.

Range: Oregon, California, Idaho, Washington, North to Alaska and east to Montana.

Thuja plicata was a tree of great importance to the native peoples of the Pacific Northwest. Among its numerous products made from this species were lodges, boats, clothing, baskets, fishing nets and ropes. Western redcedar is the provincial tree of British Columbia.

Ephedraceae Dumortier

Mormon tea

Shrubs, erect, dioecious. **Bark** cracked and fissured, usually gray; **Branches** grooved, green, photosynthetic, glaucous. **Roots** fibrous. **Leaves** scale-like, not green, not photosynthetic. **Pollen cones** compound, short stalked. **Seed cones** compound, sessile or short stalked. **Seeds** angled at top, brown.

Habitat: Dry areas in temperate regions.

Genus 1, species ca. 60 (2 in Oregon).

Rich in alkaloids, particularly ephedrines, many *Ephedra* species have been used medicinally as stimulants, anti-viral, anti-bacterial, and cough medicines. A tea made from the stems of American *Ephedra* species is mildly stimulant, hence the common name Mormon tea.

Ephedra Linnaeus

- 1a. Twigs pale green to bluish-green; leaf bases gray, deciduous.....*E. nevadensis*
 1b. Twigs bright green to yellowish-green; leaf bases brown to black, persistent
*E.*
viridis

Ephedra nevadensis S. Watson Nevada ephedra

Shrubs 0.25-1.0 m. **Branches** alternate or whorled; angle of divergence about 45 degrees, twigs pale green to bluish-green, fading to gray, glaucous when young. **Buds** conic, apex obtuse. Leaves opposite, rarely in whorls of three, 2-6 mm, deciduous. **Pollen cones** 1-5 per node, 4-8 mm, ellipsoid. **Seed cones** 1-several per node, 5-10 mm, globose; bracts opposite, 3-5 pairs, circular, margins entire, brown to green center. **Seeds** 1-2, 6-9 mm, globose to ellipsoid, smooth.

Habitat: Dry, rocky slopes and sandy flats.

Range: Oregon, California, Nevada and southeast to Arizona.

Typically coning in late winter to early spring, *Ephedra nevadensis* is most easily distinguished from our only other *Ephedra* species, *E. viridis*, by the bluish-green color of its twigs.

Ephedra viridis Coville Green ephedra

Shrubs 0.5-1.0 m. **Branches** alternate or whorled; angle of divergence about 30 degrees, twigs bright green to yellowish-green, fading to yellow, persistent. **Buds** conic, apex obtuse. **Leaves** opposite 2-5 mm, persistent. **Pollen cones** 2-6 per node, 5-7 mm, ovoid. **Seed cones** 2-several per node, 6-10 mm, ovoid, bracts opposite 6-10 pairs, ovate, margins entire, yellow center. **Seeds** 2, 5-8 mm, ellipsoid, smooth.

Habitat: Dry, rocky slopes, canyons and sagebrush scrub.

Range: Oregon, California, Nevada, east to Colorado and southeast to New Mexico.

Ephedra viridis typically cones in spring and is easily distinguished by its yellowish-green twigs.

Pinaceae Lindley
 Pine family

Trees, evergreen (deciduous in *Larix*), monoecious. **Bark** smooth to scaly or furrowed. **Leaves** needle-like, simple, alternate or spirally arranged. **Pollen cones** maturing annually, axillary. **Seed cones** woody, maturing in 1-3 seasons; scales imbricate. **Seeds** 2 per scale, winged or wingless.

Primarily Northern Hemisphere. Genera 10 (6 in Oregon).

Of major economic importance, the members of this family are used as ornamentals and as a source of turpentine, tars, essential oils and food. Additionally, most of the world's softwood timber is harvested from Pinaceae species. Primarily a Northern Hemisphere family, only one species, *Pinus merkusii*, is found south of the equator.

- 1a. Leaves in bundles of 2 or more, bundles not scaly sheathed
 - 2a. Leaves deciduous, in clusters of 10 or more.....*Larix*
 - 2b. Leaves evergreen, in clusters of 2-5*Pinus*
- 1b. Leaves borne singly, not scaly sheathed at base
 - 3a. Leaf tips sharp pointed or acute, more or less square shaped, triangular or somewhat flattened in cross section.....
.....*Picea*
 - 3b. Leaf tips rounded or notched, flattened in cross section
 - 4a. Seed cones erect, scales and bracts deciduous.....*Abies*
 - 4b. Seed cones pendent, scales and bracts persistent
 - 5a. Twigs with peg-like projections after leaves fall, seed cone bracts shorter than scales.....*Tsuga*
 - 5b. Twigs without peg-like projections, seed cone bracts longer than scales
.....*Pseudotsuga*

Abies Miller Fir

Trees, large to medium sized, evergreen. **Bark** initially smooth, generally becoming furrowed with age. **Branches** short, horizontal to drooping, those bearing cones may be ascending; leaf scars prominent. **Leaves** borne singly, persisting at least 5 years, 1 or 2-ranked, sessile, sheath absent. **Pollen cones** grouped. **Seed cones** maturing in 1 season, erect, cylindrical or oblong cylindrical, not falling as a whole; scales fan-shaped, deciduous. **Seeds** winged.

North temperate regions: Species ca. 44 (6 in Oregon).

Firs are a major component of Pacific Northwest coniferous forests. In addition to providing food and habitat for many animals, several species are cut for lumber. Firs are also grown on a large scale for use as ornamentals and Christmas trees. Although most major fir species are readily identifiable, hybrid taxa may pose a challenge in distinguishing them from their parental taxa.

- 1a. Seed cones with bracts longer than the scales; leaves somewhat to fully 4-sided.
 - 2a. Bracts of seed cones covering more than 90% of the cone surface, strongly reflexed; seed cones 10-15 cm long.....*A. procera*
 - 2b. Bracts of seed cones covering less than 25% of the cone surface, usually reflected; seed cones 15-20 cm long.....*A. magnifica* X *procera*

- 1b. Seed cones with bracts no longer than scales; leaves flat.
 - 3a. Upper and lower surface of leaves usually uniformly grayish to bluish green.
 - *A. lasiocarpa* var. *lasiocarpa*
 - 3b. Upper surface of leaves dark green, lower surface white except midrib
 - 4a. Leaves curved strongly upward and forward; seed cones purple leaves 1.5-2 cm long.....*A. amabilis*
 - 4b. Leaves spreading or curving upward; seed cones usually green, rarely purple; leaves 1.5-6 cm long.
 - 5a. Scales of seed cones equal in length and width; leaves spreading, those on lower branches often notched at tip.....*A. grandis*
 - 5b. Scales of seed cones smaller in length than width; leaves spreading to curving upward, those on lower branches rarely notched at tip.
 -*A. concolor* X *grandis*

Abies amabilis Douglas ex J. Forbes Pacific silver fir, silver fir.

Trees up to 75 m tall; trunk to 2.6 m in diameter; mature crown steeple-like. **Bark** gray, smooth and scaly with age. **Branches** at right angles to trunk; twigs generally opposite, pubescence tan. **Leaves** usually 2-ranked, curved upward, flexible, 1-2.5 cm long, 1-3 mm wide, cross section flat; adaxial surface dark green, grooved; abaxial surface white, dark midrib with 5-6 stomatal rows on each side; apex notched to round. **Pollen cones** red to reddish yellow. **Seed cones** cylindrical, purple, 8-15 cm long; scales puberulent; bracts included, approximately 1/3 the length of the scales. **Seeds** 10-12 mm long, 4 mm wide, tan; wing nearly as long as body.

Habitat: Subalpine forests.

Range: Oregon, California, Washington and north to British Columbia.

The white, glaucous coating on the abaxial side of *Abies amabilis* leaves give this species a “silver” appearance, hence the common name, silver fir.

Abies concolor (Gordon and Glend.) Lindley ex. Hildebr. X *grandis* (Douglas ex D. Don) Lindl. California white fir, Sierra white fir

Trees up to 75 m tall; trunk to 1.5 m in diameter, furrowed; mature crown steeple-like. **Bark** white to gray, smooth. **Branches** spreading, drooping; twigs generally opposite, glabrous or with yellow to brown pubescence. **Leaves** 2-ranked or if 1-ranked only on adaxial branches, spreading to erect and curving upward, flexible, 1.5-6 cm long, 1.5-3 mm wide, cross section flat; adaxial surface grayish to bluish green, grooved, with 0-12 stomatal rows; abaxial surface grayish to bluish green, occasionally with white glaucous bands, 4-7 stomatal rows on each side of midrib; apex generally rounded, rarely notched on abaxial branches. **Pollen cones** red, purple, yellow or green. **Seed cones** cylindrical,

usually green, rarely purple, 6-12 cm long; scales pubescent; bracts included, shorter than the scales. **Seeds** 7-12 mm long, 3 mm wide, tan; wing 1.5-2 times long as body.

Habitat: Mid-elevation forests.

Range: Oregon and California.

Morphological and molecular DNA evidence indicates that no pure *Abies concolor* may exist in Oregon. Rather, all previously known populations of *A. concolor* are now assigned as *A. concolor* X *A. grandis*. These populations vary in their degree of morphological intermediacy between *A. concolor* and *A. grandis*. However, specimens of *A. concolor* X *A. grandis* can be distinguished from pure *A. grandis* by seed cone scale and leaf morphology.

Abies grandis (Douglas ex D. Don in Lambert) Lindley Grand fir

Trees up to 75 m tall; trunk to 1.5 m in diameter, mature crown conic. **Bark** gray, becoming brown with age, shallow-furrowed. **Branches** spreading, drooping; twigs generally opposite, pubescent. **Leaves** 2-ranked, spreading, flexible, 1.5-5 cm long, 1.5-3 mm wide, longer and shorter leaves intermixed, cross section flat; adaxial surface light to dark green, grooved; abaxial surface white with 5-7 stomatal rows on each side of midrib; apex generally notched. **Pollen cones** red, purple, yellow or green. **Seed cones** cylindrical, usually green, rarely purple or gray, 8-15 cm long; scales pubescent; bracts included, shorter than the scales. **Seeds** 6-8 mm long, 3-4 mm wide, tan with red tinge, wing 2 times as long as body.

Habitat: Lower elevation mixed evergreen forests.

Range: Oregon, California, Washington, north to British Columbia and east to Montana.

Stands of pure *Abies grandis* are very uniform morphologically. However, in southern Oregon, stands of *A. concolor* X *A. grandis* may be found.

Abies lasiocarpa (Hooker) Nuttall var. *lasiocarpa* Subalpine fir

Trees up to 30 m tall; trunk to 1 m in diameter, mature crown steeple-like. **Bark** gray, smooth, furrowed with age. **Branches** straight; twigs opposite to whorled, puberulent for several years. **Leaves** spiraled, erect and curving upward, flexible, 2-3.5 cm long, 1.5-2 mm wide, cross section flat; adaxial surface grayish to bluish green, glaucous, grooved, 4-6 stomatal rows; abaxial surface grayish to bluish green, often with white glaucous bands, 4-5 stomatal rows on each side of midrib; apex rounded to notched. **Pollen cones** bluish to purplish-green. **Seed cones** cylindrical, purple, 6-12 cm long; scales pubescent; bracts included, shorter than the scales. **Seeds** 5-6 mm long, 2-3 mm wide, tan to light brown; wing 1.5 times as long as body.

Habitat: Subalpine forests.

Range: Oregon, California, Washington and north to Alaska.

All *Abies lasiocarpa* specimens found in our state are *A. lasiocarpa* var. *lasiocarpa*. The single other variety, *A. lasiocarpa* var. *arizonica* is endemic to Arizona, New Mexico and Colorado.

Abies magnifica A. Murray bis X *procera* Rehder California red fir, Shasta fir

Trees to 60 m tall; trunk to 2.5 m in diameter; mature crown narrow and conic. **Bark** gray, smooth, bark of abaxial trunk deeply furrowed with reddish plates. **Branches** ascending in crown, descending abaxial; twigs opposite to whorled, pubescent 1st year, glabrous after 1st year. **Leaves** usually 1-ranked, occasionally 2-ranked on abaxial branches, curving upward, flexible, 2-3.5 cm long, 2-2.5 mm wide, cross section 4-sided, occasionally 3-sided; adaxial surface bluish-green, glaucous, often with 2 whitish bands, not or weakly grooved, 8-10 stomatal rows; abaxial surface bluish-green, glaucous, with 8-10 stomatal rows; apex rounded to acute. **Pollen cones** purple. **Seed cones** oblong-cylindrical, purple to greenish-brown, 15-20 cm long; scales pubescent; bracts exerted and reflexed over scales, covering 25% of cone at maturity. **Seeds** 14-16 mm long, 5-7 mm wide, red; wing approximately same length as body.

Habitat: Mid-elevation to subalpine forests.

Range: Oregon and California.

Morphological and molecular DNA evidence indicates that no pure *Abies magnifica* is likely to exist in Oregon. As a result, all previously described populations of *A. magnifica* are now assigned to *A. magnifica* X *A. procera*. Specimens of *A. magnifica* X *A. procera* can be easily distinguished from pure *A. procera* by seed cone and seed cone bract morphology.

Abies procera Rehder Noble fir

Trees to 80 m tall; trunk to 2.5 m in diameter; mature crown steeple-like, the top rounded. **Bark** gray, smooth when young, furrowed and reddish-brown with age. **Branches** at right angles to trunk; twigs opposite to whorled, pubescent for several years. **Leaves** 1-ranked, curving upward, flexible to stiff, 1-3.5 cm long, 1.5-2 mm wide, cross section 4-angled, occasionally weakly 4-angled; adaxial surface bluish-green, glaucous, often with 2 whitish bands, 0-14 stomatal rows; abaxial surface bluish-green, glaucous, with 2-4 whitish bands, 12-28 stomatal rows; apex rounded to notched. **Pollen cones** reddish. **Seed cones** oblong-cylindrical, purple to green, 10-15 cm long; scales pubescent; bracts exerted and reflexed over scales, covering 90% of cone at maturity. **Seeds** 11-13 mm long, 2-4 mm wide, tan to brown; wing slightly longer than body.

Habitat: Mid-elevation to subalpine forests.

Range: Oregon, California and Washington.

Abies procera grows in isolated populations on mountains. As a result of this isolation, morphology may vary greatly between populations. In addition, stands of *A. magnifica* X *A. procera* are known to exist in Oregon. However, *A. procera* is easily distinguished by its seed cone bracts which cover over 90% of the cones.

Larix Miller Larch, tamarack

Trees, deciduous; trunks straight, slender. **Bark** initially smooth, becoming furrowed with age. **Branches** slender, ascending to drooping; leaf pegs prominent. **Leaves** in dense clusters of 10-30, soft, turning yellow before dropping, sheath absent. **Pollen cones** solitary. **Seed cones** maturing in 1 season, erect, oblong-ovoid, falling as a whole; scales orbicular, persistent. **Seeds** winged.

Cold north temperate regions. Species 10 (1 in Oregon).

The deciduous needle-like leaves of *Larix* species are unique among the gymnosperms. The hard, heavy, rot resistant wood of *Larix* species is often utilized for outdoor applications such as rail road ties, pilings and fence poles.

Larix occidentalis Nuttall Western larch

Trees to 40 m tall; trunk to 2 m in diameter; mature crown conic. **Bark** reddish-brown, thin when young, thick and furrowed with age, scaly, flaky. **Branches** somewhat ascending on upper branches to drooping on lower branches, in forests often without branches for most of height; twigs stout, orange-brown pubescent when young, becoming glabrous, with prominent leaf pegs. **Leaves** soft, flexible, 2-4.5 cm long, 0.5-1.0 mm wide, triangular in cross section; adaxial surface pale green, with a convex midrib; abaxial surface pale green, keeled; apex sharp pointed. **Pollen cones** ovate-oblong, less than 1 cm long, sessile or on short stalks, yellow. **Seed cones** reddish-brown, oblong-ovoid, 2.5-4 cm long, on short curved stalks; scales ovate; bracts exerted several millimeters beyond the scales, tipped with awns to 3 mm. **Seeds** 3-6 mm long, reddish-brown; wing twice as long.

Habitat: Mid-elevation forests.

Range: Oregon, Idaho, Washington, north to British Columbia and east to Montana.

The largest of the American *Larix* species, this species produces one of the most valuable timbers in the western United States. Trees of this species may live over 500 years.

Picea A. Dietrich Spruce

Trees evergreen; crown conic to narrowly conic; top most shoots erect. **Bark** whitish-gray to reddish-brown, thin, scaly, becoming furrowed with age. **Branches** whorled, horizontal to drooping, leaf scars prominent. **Leaves** rigid, borne singly, persisting 4-10 years, spreading in all directions, 4-sided to flattened or 3-sided, apex sharp to bluntly pointed, sheath absent. **Pollen cones** grouped. **Seed cones** maturing in 1 season, pendent, oblong to cylindrical; scales elliptic or diamond shaped to fan-shaped, persistent; bracts included.

North temperate regions. Species ca. 35 (3 in Oregon).

As a result of their symmetrical conic growth habit of spruce species are popular as ornamentals and Christmas trees. In the past, spruce woods were highly valued in aircraft manufacturing. Notably, the first Wright Brothers aircraft and the Hughes H-4 Hercules, nicknamed the “Spruce Goose” were constructed from the wood of this genus.

- 1a. Branches conspicuously lax and drooping; leaves blunt apexes; seed cone scales with usually entire margins, fan-shaped.....*P. breweriana*
- 1b. Branches generally spreading, not lax and drooping or if drooping only somewhat; leaves with sharp apexes; seed cone scales with usually erose margins, elliptic to diamond-shaped.
 - 2a. Leaves 4-sided or nearly so, stomatal bands conspicuous on both adaxial and abaxial surfaces; seed cone bracts less than 1/4 the length of the scales*P. engelmannii*
 - 2b. Leaves flattened or 3-sided, stomatal bands conspicuous on adaxial surface only (stomatal bands on abaxial surface, if present, weak); bracts greater than 1/4 the length of the scales.....*P. sitchensis*

Picea breweriana S. Watson Weeping spruce, Brewer spruce

Trees to 40 m tall; trunk to 1.3 m in diameter; mature crown conic. **Bark** whitish gray to brown, scaly, becoming furrowed with age. **Branches** lax and drooping; twigs slender, pendant, grayish-brown, pubescent. **Leaves** spreading in all directions, somewhat rigid, 1.5-3 cm long, 1-2 mm wide, flattened, triangular or rounded triangular in cross section; adaxial surface whitish-green, flattened, glaucous, ridged, with conspicuous stomatal bands; abaxial surface dark green, shining, angled or rounded, without stomatal bands; apex blunt. **Pollen cones** purple to reddish, 1-2 cm long. **Seed cones** cylindrical, rigid, purple to orange-brown, glaucous when young, 6-12 cm long, narrowed at both ends; scales fan-shaped, 1.5-2 cm long, 1.5-2 cm wide, margins usually entire; bracts less than 1/4 the length of the scales. **Seeds** 2.5-3.5 mm long, brown; wing 4 times as long as body.

Habitat: Montana and subalpine ridges.

Range: Oregon and California.

The rarest of the North American spruces, this species is not generally harvested for lumber. However, *Picea breweriana* is utilized as an ornamental, particularly in northern Europe, where it is popular because of its drooping branches and twigs, unique among the spruces.

Picea engelmannii Parry ex Engelmann Engelmann's spruce

Trees to 55 m tall; trunk to 2 m in diameter; mature crown narrowly conic. **Bark** gray to reddish-brown, scaly, deeply furrowed with age. **Branches** horizontal to somewhat drooping; twigs stout, not pendant, greenish-yellow to dark yellow-brown, pubescent. **Leaves** spreading in all directions, rigid, 2-3 cm long, 1-1.5 cm wide, 4-angled in cross section; adaxial surface blue-green, glaucous when young, ridged, with 2 obvious white stomatal bands; abaxial surface blue-green, glaucous when young, ridged, with 2 obvious white stomatal bands; apex sharply pointed. **Pollen cones** 1-2 cm long, purplish to reddish. **Seed cones** ovoid-oblong, flexible, light green when young, light brown when mature, 3-7 cm long, broadest near middle; scales elliptic to diamond shaped, 1-2 cm long, 1-1.5 cm wide, margins usually erose; bracts less than 1/4 the length of the scales. **Seeds** 2.5-3.5 mm long, brown; wing twice as long as body.

Habitat: Montana and subalpine forests.

Range: Oregon, California, Idaho, Nevada, Washington, north to British Columbia, south to Mexico and east from Montana to New Mexico.

As a weak, knotty wood *Picea engelmannii* is utilized mainly for pulp and low grade lumber. Slow growing, high altitude trees are used occasionally for musical instruments. Among the Oregon spruces *P. engelmannii* is the only species with 4-sided leaves.

Picea sitchensis (Bongard) Carrière Sitka spruce

Trees to 70 m tall; trunk to 5 m in diameter; mature crown narrowly conic. **Bark** grayish-brown to reddish brown, thin, scaly. **Branches** horizontal to somewhat drooping; twigs stout, not pendant, yellowish to reddish-brown, glabrous. **Leaves** spreading in all directions, rigid, 1-3 cm long, 1-1.5 mm wide, flattened, triangular or rounded triangular in cross section; adaxial surface whitish-green, flattened, glaucous, ridged, with conspicuous stomatal bands; abaxial surface yellow-green to blue-green, angled or rounded, with faint or absent stomatal bands; apex sharp pointed. **Pollen cones** 2-4 cm long, reddish. **Seed cones** oblong, rigid, yellow to reddish-brown, 5-10 cm long, scales elliptic to diamond shaped, 1.5-2.0 cm long, 1-1.5 cm wide, margins usually erose; bracts

greater than 1/4 the length of the scales. **Seeds** 1.5-2.5 mm long, red-brown wing 6 times as long as the body.

Habitat: Coastal forests.

Range: Oregon, California, Washington and north to Alaska.

As a result of its high strength to weight ratio *Picea sitchensis* is valued as lumber for musical instruments, boats and in the past, aircraft. Only found in wet coastal forests, *P. sitchensis* is distinguished from other spruces in our area by the combination of its flat to 3-sided leaves and spreading branches.

Pinus Linnaeus Pine

Trees, monoecious, evergreen; mature crowns conic to irregular. **Bark** smooth when young, becoming fissured with age. **Branches** whorled, ascending to decending; twigs generally resinous. **Leaves** simple, alternate, in clusters of 2 – 5, square in cross section or 2 – 3 angled and rounded on abaxial surface, apex acute, sheath deciduous or persistent. **Pollen cones** in clusters. **Seed cones** maturing in 2 (-3) years, pendent to erect, conic to cylindrical; scales persistent; bracts included.

North temperate and mountain regions. Species ca. 100 (10 in Oregon).

In Oregon, *Pinus* species are readily indentified by their leaves in clusters of 2 – 5. Only one other gymnosperm genus in Oregon (*Larix*) has clustered leaves. However, the leaves of *Larix* are in clusters of 10 or more and are deciduous.

1a. Leaves in clusters of 5

2a. Leaves straight; seed cones usually 15 cm long or longer; stalks greater than 2 cm long

3a. Seed cones generally greater than 25 cm long; conspicuous stomatal lines on all surfaces of leaves.....*P. lambertiana*

3b. Seed cones shorter than 25 cm long; conspicuous stomatal lines only on two surfaces of leaves.....*P.*

monticola

2b. Leaves curved; seed cones less than 15 cm long; stalks absent or less than 2 cm

4a. Leaves 1.5-4 cm long; seeds wingless or nearly so, umbos central
.....*P. balfouriana*

4b. Leaves 3-7 cm long; seed wings as long or longer than body; umbos terminal

5a. Mature seed cones 8 cm long or less, ovate to nearly globose, remaining closed at maturity; scales often broken off by animals.....*P.*

albicaulis

5b. Mature seed cones 7 cm long or greater, oblong to lance-cylindrical, opening at maturity; scales attached.....*P. flexilis*

1b. Leaves in clusters of less than 5

- 6a. Leaves in clusters of 2, less than 8 cm long
 - 7. Base of cones asymmetric..... *P. contorta*
 - 7b. Base of seed cones symmetric or nearly symmetric.....*P. sylvestris*
- 6b. Leaves in clusters of 3, greater than 8 cm long
 - 7a. Seed cones strongly asymmetrical at base, remaining closed for many years after maturity; leaves 9-15 cm long.....*P. attenuata*
 - 7b. Seed cones symmetrical or nearly so at base, opening at maturity; leaves 12-32 cm long
 - 8a. Seed cones less than 15 cm long..... *P. ponderosa* var.
 - 8b. Seed cones usually greater than 15 cm long
 - 9a. Seed cone apophyses continuous with umbos forming long, up-curving claws; buds resinous.....*P. sabiniana*
 - 9b. Seed cone apophyses not continuous with umbos and not forming long, up-curving claws; buds not resinous.....*P. jeffreyi*

Pinus albicaulis Engelman White-bark pine

Trees to 20 m tall; trunk to 1.5 m in diameter, straight to contorted and twisted; mature crown compact and conic or rounded, sometimes deformed by wind. **Bark** whitish to gray, smooth when young, fissured into scales with age; inner bark reddish. **Branches** horizontal to ascending, usually persistent to base; twigs orange to dark reddish-brown when young, gray to gray-brown when mature, slightly roughened by scars. **Buds** ovoid, light red-brown, not resinous. **Leaves** in clusters of 5, 3-7 cm long, 1-2 mm wide, usually up-curved, margins entire, dark green to yellow-green; adaxial surfaces whitened by stomatal bands; apex sharply stiff-pointed; sheaths deciduous. **Pollen cones** ovoid, 10-15 mm long, dark red. **Seed cones** maturing in 2 years, ovoid to sub-globose, 4-9 cm long, gray to dark purple, erect, symmetric, sessile to short stalked, remaining closed, generally opened by animal activity; umbos terminal, short, tip acute, prickled. **Seeds** obovoid, sharp pointed, 7-12 mm long, dark brown, wingless.

Habitat: Montane forests.

Range: Oregon, California, Idaho, Nevada, Washington, north to British Columbia and east to Wyoming.

One of the most distinguishing features of *Pinus albicaulis* are its cones. The cones remain closed and are generally ripped open by animals. In this manner the seeds are dispersed.

Pinus attenuata Lemmon Knob-cone pine

Trees to 30 m tall; trunk to 1 m in diameter, straight; mature crown conic to rounded, often many branched. **Bark** purplish to dark brown, smooth when young, shallowly fissured into scaly plates when mature. **Branches** ascending; twigs dark yellow brown, roughened by bud-scales. **Buds**, oblong-ovoid, dark brown, resinous. **Leaves** in clusters of 3, 8-14 cm long, 1-2 mm wide, straight to slightly curved, twisted, margins serrulate, yellowish-green; all surfaces with white stomatal bands; apex sharp callous-tipped; sheaths persistent. **Pollen cones** ellipsoid, 10-15 mm long, light brown to orange brown. **Seed cones** maturing in 2 years, oblique-ovoid, 6-15 cm long, light brown to reddish-brown, reflexed to recurved, very asymmetric, stalks less than 1 cm long, remaining closed for several decades or opening at burning; umbos central, pyramidal, sharp pointed, prickled. **Seeds**, oblong-oval, sharp pointed, 6-7 mm long, black, wing three times as long as body.

Habitat: Chaparral

Range: Oregon, California and south to Mexico.

Pinus attenuata is easily identified by knob-like umbos on its cones. The cones of this species will generally not open unless exposed to the heat of fire.

Pinus balfouriana Greville & Balfour in A. Murray bis Foxtail pine

Trees to 22 m tall; trunk to 2 m in diameter, straight; mature crown compact conic to irregular. **Bark** gray to reddish-brown, somewhat smooth when young, irregularly fissured and often divided into irregular square, scaly plates when mature. **Branches** ascending or descending, often contorted; twigs reddish-brown to gray, occasionally puberulent, roughened by scars. **Buds** ovoid-acuminate, reddish-brown, resinous. Leaves in clusters of 5, 1.5-4 cm long, 1.0-1.5 mm wide, up-curved, margins entire, bluish-green to yellow-green; adaxial surfaces with white stomatal bands; abaxial surfaces with resin bands; apex acute and sharp-pointed; sheaths deciduous. **Pollen cones** ellipsoid, 6-10 mm long, reddish. **Seed cones** maturing in 2 years, ovoid-cylindrical, 6-12 cm long, purple to reddish-brown, pendent, symmetric, stalks less than 1.5 cm long, opening at maturity; umbos central, depressed or less than 1 mm, prickles very short or absent. **Seeds** ovoid, rounded at apex, 7-10 mm long, brown with purple or red spots, wing approximately equal to body.

Habitat: Subalpine to alpine forests.

Range: Oregon and California.

To date, *Pinus balfouriana* has only been collected once in Oregon, in Josephine County, within 1 mile of the California/Oregon border.

Pinus contorta Loudon Lodgepole pine

Trees to 45 m tall; trunk to 0.8 m in diameter, straight to contorted; mature crown variable. **Bark** orange-brown to reddish-brown, fissured to plated. **Branches** descending to ascending; twigs yellowish-orange when young, dark reddish-brown with age, roughened by bud scales. **Buds** ovoid, reddish-brown, resinous. **Leaves** in clusters of 2, 2-8 cm long, 0.7-2.5 mm wide, straight to slightly curved, twisted, margins finely serrulate, dark green to yellow-green; all surfaces with fine stomatal bands; apex usually acute; sheaths persistent. **Pollen cones** ellipsoid to cylindrical, 0.5-1.5 cm long, orange-red. **Seed cones** maturing in 2 years, ovoid to sub-globose, 2-5 cm long, light brown to reddish-brown, pendent, asymmetric, stalks less than 1 cm long, opening at maturity; umbos central, triangular, less than 5 mm, prickles less than 5 mm long. **Seeds** obovoid, oblique and tapering at apex and base, 2-6 mm long, brown or reddish-brown with black spots; wing at least twice as long as body.

Subspecies 3 (2 in Oregon).

With the exception of *Pinus sylvestris*, which one is unlikely to encounter in the wild, *P. contorta* is the only 2 needled pine species found in Oregon.

- 1a. Leaves dark green, usually less than 1 mm wide; mature bark furrowed; seed cones strongly asymmetrical, often in whorls.....*P. contorta* var. *contorta*
- 1b. Leaves yellow-green, usually 1 mm wide or greater; mature bark not furrowed; seed cones asymmetrical, usually solitary or in 2s.....*P. contorta* var. *latifolia*

Pinus contorta Loudon var. *contorta* Shore pine

Trees to 10 m tall, sometimes shrub formed by wind and salt spray; trunk to 0.5 m in diameter, straight inland, contorted and bent near ocean; mature crown irregular or flat. **Bark** furrowed and divided into small scaly plates. **Branches** often contorted. **Leaves** 2-7 cm long, 0.7-1.0 mm wide, dark green. **Seed cones** often in whorls.

Habitat: Maritime forests.

Range: Oregon, California, Washington and north to Alaska.

This subspecies is found only in coastal forests. Often specimens of this subspecies have a distorted and contorted appearance due to the harsh, windy environment in which they grow.

Pinus contorta Loudon ssp. *latifolia* Engelman in S. Watson Lodgepole pine

Trees to 45 m tall, trunk to 0.8 m in diameter, straight; mature crown conic. **Bark** not furrowed, separated into loose plates. **Branches** usually horizontal. **Leaves** 5-8 cm long, 1.0-2.5 mm wide, dark green. **Seed cones** solitary or in pairs.

Habitat: Montane forests from low to high elevations.

Range: Oregon, Idaho, Washington, north to Alaska, southeast to Wyoming and east to South Dakota.

The straight slender trunks of this subspecies were popular with Native Americans for use in lodges and teepees, hence the common name.

Pinus flexilis E. James Limber pine

Trees to 20 m tall; trunks to 2 m in diameter, straight, sometimes contorted; mature crown conic to rounded. **Bark** gray, smooth, becoming ridged with rectangular scaly plates with age. **Branches** horizontal to ascending, usually persistent to base; twigs reddish-brown and pubescent when young, becoming gray with age, smooth or nearly so with some bud scars. **Buds** ovoid, reddish-brown, resinous. **Leaves** in clusters of 5, 3-6 cm long, 1.0-1.5 mm wide, up-curved, margins entire to finely serrulate, dark green; adaxial surfaces obvious stomatal bands; abaxial surfaces with faint stomatal bands; apex acute; sheaths deciduous. **Pollen cones** ellipsoid-cylindrical, 1.2-1.6 cm long, red or yellow. **Seed cones** maturing in 2 years, ovoid to ovoid-cylindrical, 7-15 cm long, light brown, horizontal to pendent, symmetric, sessile to less than 2 cm long, opening at maturity; umbos terminal, less than 2 mm, prickles absent. **Seeds** oval, compressed, 6-12 mm long, brown to reddish-brown, sometimes with spots, wingless or nearly so.

Habitat: High altitude montane forests.

Range: Oregon, California, Idaho, Nevada, Washington, north to Alberta, southeast to New Mexico and east to Nebraska.

In Oregon *Pinus flexilis* is found only in the Wallowa Mountains. Morphologically it is similar to *P. albicaulus*, but is distinguished from the latter by its larger cones that open at maturity.

Pinus jeffreyi Greville & Balfour Jeffery pine

Trees to 60 m tall; trunk to 2.3 m in diameter, straight; mature crown conic to rounded. **Bark** yellow-brown to reddish-brown, deeply furrowed, forming large irregular scaly plates. **Branches** horizontal to ascending; twigs purplish-brown, usually glaucous, roughened by bud scars. **Buds** ovoid, light brown to reddish-brown, not resinous. **Leaves** in clusters of 3, 12-25 cm long, 1.5-2.0 mm wide, straight, slightly twisted, margins finely serrulate, bluish-green to yellow-green; all surfaces with fine stomatal lines; apex acute; sheaths persistent. **Pollen cones** lance-cylindrical, 2.0-3.5 cm long, yellow to brown. **Seed cones** maturing in 2 years, oblong, (12-)15-30 cm long, brown to reddish-brown, horizontal to pendent, slightly asymmetric, stalks less than 3 cm long, opening at

maturity; umbos central, raised, prickles reflexed. **Seeds** ovoid, 8-12 mm long, brown with black spots, wing twice as long as body.

Habitat: Dry forests.

Range: Oregon, California, Nevada and south to Mexico.

Morphologically *Pinus jeffreyi* is very similar to *P. ponderosa* and the two species are known to hybridize. *P. jeffreyi* can be differentiated from *P. ponderosa* by its cones which are generally longer than 15 cm and have reflexed prickles. Conversely *P. ponderosa* cones are less than 15 cm long and have straight prickles. Some claim that the two species have unique smells. Allegedly, *P. jeffreyi* trees have a banana, pineapple or vanilla scent, whereas *P. ponderosa* trees have a turpentine scent.

Pinus lambertiana Douglas Sugar pine

Trees to 70 m tall; trunk to 3 m in diameter, straight; mature crown conic to broad and flattened with horizontal branches. **Bark** smooth and gray when young, brown to reddish-brown, furrowed with long scaly plates when mature. **Branches** horizontal to ascending, lower branches sometimes drooping; twigs green to brown and pubescent when young, becoming glabrous and gray with age, smooth with bud scars flush to surface or nearly so. **Buds** ovoid, reddish-brown, resinous. **Leaves** in clusters of 5, 5-9 cm long, 1-2 mm wide, straight, slightly twisted, margins finely serrulate, bluish-green; adaxial surfaces with obvious white stomatal lines; abaxial surfaces with faint stomatal lines; apex acute; sheaths deciduous. **Pollen cones** ellipsoid-cylindrical, 10-15 mm long, yellow. **Seed cones** maturing in 2 years, cylindrical, 30-45 cm long, pendent, symmetric, stalks 5-16 cm long, opening at maturity; umbos terminal, slightly excurved; prickles absent. **Seeds** ovoid, 10-20 mm long, brown; wing twice as long as body.

Habitat: Montane forests.

Range: Oregon, California, Nevada and south to Mexico.

Pinus lambertiana is the largest of all pine species. Its large cones, often weighing several pounds, in combination with leaves in clusters of 5, easily distinguish it from all other pine species in Oregon.

Pinus ponderosa Douglas ex Lawson var. *ponderosa* Ponderosa pine

Trees to 70 m tall; trunk to 2.5 m in diameter, straight; mature crown conic to rounded. **Bark** yellow-brown to reddish-brown, deeply furrowed, forming large irregular scaly plates. **Branches** descending to ascending; twigs orange-brown, roughened by bud scars. **Buds** ovoid, light brown to reddish-brown, resinous. **Leaves** in clusters of 3, 12-25 cm long, 1.5-2.0 mm wide, straight, slightly twisted, margins finely serrulate, yellow-green;

all surfaces with fine stomatal lines; apex acute; sheaths persistent. **Pollen cones** lance-cylindrical, 2.0-3.5 cm long, yellow to reddish-brown. **Seed cones** maturing in 2 years, oblong, 5-15 cm long, brown to reddish-brown, horizontal to pendent, slightly asymmetric, stalks less than 2 cm long, opening at maturity; umbos central, raised; prickles straight. **Seeds** ovoid, 6-9 mm long, brown with black spots; wing about 4 times as long as body.

Habitat: Dry forests (with the exception of trees found in the Willamette Valley).

Range: Oregon, California, Nevada, Washington and north to British Columbia.

The number of, and characteristics within, varieties or subspecies of *Pinus ponderosa* varies depending on the authority. Conservatively, however, only one variety of *P. ponderosa* is present in Oregon. *P. ponderosa* var. *ponderosa* is mainly distinguished from other varieties by the number of needles in its clusters, which is consistently 3, as opposed to varieties *scopularum* and *arizonica* which are 2-3 and 4-5, respectively.

Pinus sabiniana Douglas ex D. Don in Lambert Gray pine, foothill pine

Trees to 24 m tall; trunks to 1.2 m in diameter, straight to contorted or forked; mature crown sparse, open and round. **Bark** dark brown to black, irregularly furrowed with rounded ridges; inner bark orangish. **Branches** usually ascending; twigs brown to black, glaucous, slightly roughened by bud scars. **Buds** ovoid, reddish-brown, resinous. **Leaves** in clusters of 3, 15-30 cm long, 1-2 mm wide, straight, slightly twisted, margins serrulate, dull bluish-green; all surfaces with stomatal lines; apex acute; sheaths persistent. **Pollen cones** ellipsoid, 10-15 mm long, yellow. **Seed cones** maturing in 2 years, oblong-ovoid, light reddish-brown, pendent, nearly symmetric, stalks 1-5 cm long, opening at maturity; umbos continuous with apophyses to form long up-curving claws. **Seeds** oblong, 1.5-2.0 cm long, dark brown to black; wing about 1/2 the length of the body.

Habitat: Dry mixed forests.

Range: Oregon and California.

Only two *Pinus sabiniana* specimens have been collected in Oregon. Both are from northern Jackson County. A third locality, in southern Jackson County, has been reported by a US Forest Service worker, but currently no voucher exists as confirmation.

Pinus sylvestris Linnaeus Scots pine

Trees to 40 m tall; trunks to 0.5 m in diameter, usually straight; mature crown conic to flattened. **Bark** reddish-brown to gray, furrowed, scaly. **Branches** horizontal to ascending; twigs green to gray-brown, not glaucous, roughened by bud scars. **Buds** ovoid, reddish-brown, resinous. **Leaves** in clusters of 2, 3-6 cm long, 1.5-2.0 mm wide,

straight to slightly curved, twisted, margins entire to finely serrulate, bluish-green to yellow-green; all surfaces with stomatal lines; apex acute; sheaths deciduous. **Pollen cones** ovoid, 5-10 mm long, yellow to pink. **Seed cones** maturing in 2 years, ovoid, yellow-brown to gray-brown, nearly symmetric, stalks less than 1 cm long, opening at maturity; umbos central, less than 3 mm; prickles absent. **Seeds** obovoid, 3-5 mm long, gray to black; wing 3 times as long as body.

Habitat: Various, escaped from cultivation.

Range: Native to Europe, escaped in many North American states and provinces.

Pinus sylvestris is widely planted in North America for pulpwood and Christmas trees and has escaped cultivation in many states and provinces. In Oregon, this species has only been documented to have escaped in Wallowa County, although future occurrences are likely.

Pseudotsuga Carrière Douglas-fir

Trees, evergreen; crown conic; topmost shoots generally erect. **Bark** reddish-brown, with resin blisters, smooth when young, becoming furrowed with age. **Branches** whorled, ascending to slightly drooping, leaf scars flush with twigs. **Leaves** borne singly, persisting up to 8 years, alternate, flattened, apex bluntly pointed, sheath absent. **Pollen cones** axillary. **Seed cones** maturing in 1 season, pendent, oblong-ovoid; scales orbicular, persistent; bracts exserted.

North temperate region. Species 5 (1 in Oregon).

Commercially, *Pseudotsuga* is the most important tree genus in Oregon. In the past this genus has been considered a part of *Abies*, *Picea*, *Pinus* and *Tsuga*. This taxonomic confusion is reflected in both its common name (Douglas-fir) and latin name, which means false hemlock.

Pseudotsuga menziesii (Mirbel) Franco Douglas-fir

Trees to 100 m; trunks to 4 m diameter; mature crown conic. **Bark** reddish-brown, smooth when young, becoming thick and furrowed with age; twigs slender, pubescent and orange-yellow when young, becoming glabrous and reddish-brown to gray with age. **Leaves** usually spreading, linear, 1.5-3 cm long, 1.0-1.5 mm wide, flattened in cross section, yellow-green to bluish-green, adaxial surface rounded or grooved; abaxial surface ridged and somewhat glaucous, apex bluntly pointed, rarely acute. **Pollen cones** yellow-red to red, 1-2.5 cm long. **Seed cones** 4-10 cm long, 3-3.5 cm wide; scales orbicular, about 2 cm long, margins slightly irregularly toothed; bracts 2.5-3.5 cm long,

conspicuously exerted, inversely arrow shaped. **Seeds** 5-6 mm long, reddish-brown to dark brown; wing twice as long as seed body.

Subspecies 2 (2 in Oregon).

Pseudotsuga menziesii is the most commercially important tree in North America. Uses range from pulp, lumber and mulch to Christmas trees. The species is most easily recognized from other coniferous species by the bracts of its seed cones which resemble the tail of a mouse diving into a hole. This species is the state tree of Oregon.

1a. Seed cones 6-10 cm long; leaves yellow-green.....*P. menziesii* var. *menziesii*

1b. Seeds cones 4-7 cm long; leaves blue or grey-green to dark green.

.....*P. menziesii* var. *glauca*

Pseudotsuga menziesii (Mirbel) Franco var. *glauca* (Mayr) Franco

Rocky Mountain Douglas-fir

Trees to 50 m; trunks to 1.1 m diameter. **Leaves** blue or grey-green to dark green. **Seed cones** 4-7 cm long; bracts spreading.

Habitat: Coniferous forests east of the Cascade Mountains.

Range: Oregon, Idaho, Nevada, Washington, north to British Columbia, east to Wyoming and southeast to Texas and Mexico.

Pseudotsuga menziesii (Mirbel) Franco var. *menzeisii* Coast Douglas-fir

Trees to 100 m; trunks to 4 m diameter. **Leaves** yellow-green. **Seed cones** 6-10 cm long; bracts appressed.

Habitat: Coniferous forests from the crest of the Cascade Mountains west.

Range: Oregon, California, Nevada, Washington and north to British Columbia.

While the two varieties of *Pseudotsuga menziesii* are occasionally sympatric in British Columbia and Washington, this has not been reported in Oregon.

Tsuga (Endlicher) Carrière Hemlock

Trees evergreen; mature crowns pyramidal; uppermost branches usually drooping. **Bark** gray to reddish-brown, scaly, furrowed. **Branches** horizontal and arching downward; twigs usually with rough peg-like projections from previous leaf bundles. **Leaves** borne singly, appearing 2-ranked or radiating in all directions, flattened to 4-sided, set in peg-

like projections, sheath absent. **Pollen cones** solitary. **Seed cones** maturing in 1 season, pendent, sessile or on very short stalks. **Seeds** winged.

Northern hemisphere: Species ca. 10 (2 in Oregon).

Hemlocks are most easily identifiable from other coniferous trees in Oregon by their short leaves and conspicuously drooping uppermost branches.

1a. Leaves appearing 2-ranked; upper branches of trees very lax and drooping; seed cones less than 2.5 cm long.....*T. heterophylla*

1b. Leaves radiating in all directions; upper branches of trees moderately dropping; seed cones over 3 cm long.....*T. mertensiana*

Tsuga heterophylla (Rafinesque) Sargent Western hemlock

Trees to 50 m tall; trunk to 2.5 m in diameter; mature crown narrow pyramidal. **Bark** gray-brown to reddish brown, smooth, scaly, becoming furrowed with age. **Branches** horizontal, upper branches obviously drooping; twigs pubescent, yellow-brown. **Leaves** appearing 2-ranked, 0.8-2 cm long, 1.5-2 mm wide, flattened; adaxial surface bright green, grooved; abaxial surface light green, glaucous, with 2 whitish stomatal bands; margins minutely dentate; apex blunt to rounded. **Pollen cones** 3-4 mm long on a stalk of equal length, globose, brown. **Seed cones** oblong-cylindrical while immature, ovoid when mature, 1-2.5 cm long, 1-2.5 cm wide, scales ovate, thin and flexible, longer than bracts. **Seeds** 2-4 mm long, wing about 3 times as long as body.

Habitat: Coastal to mid-elevation forests.

Range: Oregon, Idaho, Washington and north to Alaska.

Tsuga heterophylla can resemble *T. mertensiana*, especially at higher elevations. However, this species' 2-ranked appearing leaves and short seed cones are reliable for identification. *T. heterophylla* is the state tree of Washington.

Tsuga mertensiana (Bongard) Carrière Mountain hemlock

Trees to 40 m tall; trunk to 1.5 m in diameter; mature crown very narrow pyramidal. **Bark** dark gray to reddish brown, scaly, fissured. **Branches** horizontal, upper branches moderately drooping; twigs glabrous to puberulent, yellow-brown. **Leaves** radiating in all directions, 1-2.5 cm long, 1-2 mm wide, curved near apex, usually flattened, occasionally rounded to 4-sided in cross section; adaxial surface green, glaucous, with faint stomatal bands; abaxial surface green, glaucous, with faint stomatal bands; margins entire; apex rounded. **Pollen cones** 6-8 mm long on a stalk of equal or slightly greater length, globose, brown. **Seed cones** oblong-cylindrical, 3-7 cm long, 1.5-3 cm wide, scales obovate, stiff, longer than bracts. **Seeds** 3-5 (-6) mm long, wing about 4 times as long as body.

Habitat: Subalpine to alpine forests.

Range: Oregon, California, Idaho, Nevada, Washington and north to Alaska.

This species exhibits varied morphology dependent on the elevation at which it is found. For example, at high, exposed elevations this species may exhibit a short, prostrate morphology (Krummholz form). *Tsuga mertensiana* is always readily identifiable, however, by its radiating leaves and cones over 3 cm long.

Taxaceae Gray Yew family

Small trees or shrubs, evergreen, dioecious. **Bark** scaly, reddish-brown. **Leaves** needle-like, simple, alternate, appearing 2-ranked, not in bundles; apex mucronate. **Pollen cones** globose, yellow. **Seed cones** arils, open at top, maturing in 1 season, axillary. **Seeds** partially enclosed by a red aril.

Northern Hemisphere. Genera 5 (1 in Oregon).

Within Oregon only one genus and species, within this family, is native (*Taxus brevifolia*). Although several other Taxaceae species are widely cultivated none have, thus far, been reported to have escaped.

Taxus Linnaeus Yew

Small shrubs or trees. **Branches** horizontal to drooping; twigs alternate. **Leaves** flexible, persisting for 4-5 years; apex not sharp to touch. **Seed cones** cup-shaped, soft, fleshy, mucilaginous. **Seeds** brown.

North American *Taxus* species, until recently, were of conservation concern as the result of overharvesting. The reason being the bark of the North American members of this genus is a source of paclitaxel, a chemotherapeutic drug used to treat breast and lung cancer. However, this drug is now produced synthetically, eliminating the need to harvest wild stands of *Taxus*.

Taxus brevifolia Nuttall Pacific yew

Small trees or shrubs to 20 m tall; trunk to 1 m in diameter, usually much smaller, often irregular in shape and lacking a distinctive form. **Bark** scaly, shredding. **Branches**

horizontal to drooping; twigs green, becoming bright brown with age. **Leaves** linear, flexible, 1-2.5 cm long, 1-3 mm wide, flattened in cross section; adaxially yellow-green; abaxially pale green, with a yellowish midrib, usually revolute; apex mucronate but soft to touch. **Pollen cones** less than 1 cm long. **Seed cones** 0.5-1.5 cm long, thick, fleshy, red. **Seeds** ovoid, 0.5-1.0 cm long, brownish-red.

Habitat: Along streams, valley bottoms and lower slopes under the shade of other coniferous trees.

Range: Oregon, California, Idaho, Washington, north to Alaska and east to Montana.

The solitary representative of the family Taxaceae in Oregon, *Taxus brevifolia* is most easily distinguished from other gymnosperms by its red, fleshy arils which are open at the top, exposing the seed.