

CMG GardenNotes #152

Identifying Conifers

Arborvitae, Douglas Fir, Fir, Juniper, Pine, Spruce, and Yew

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Characteristics of Conifers

Leaves

Most conifers (cone bearing plants) are easy to identify to genus, based on leaf type. [Figure 1]

- *Pinaceae* family (pine, spruce, fir and Douglas fir) – needle-like leaves
- *Cupressaceae* family (juniper and arborvitae) – scale-like or awl-like leaves
- *Taxaceae* family (yew) – leaves flat and feather-like in arrangement

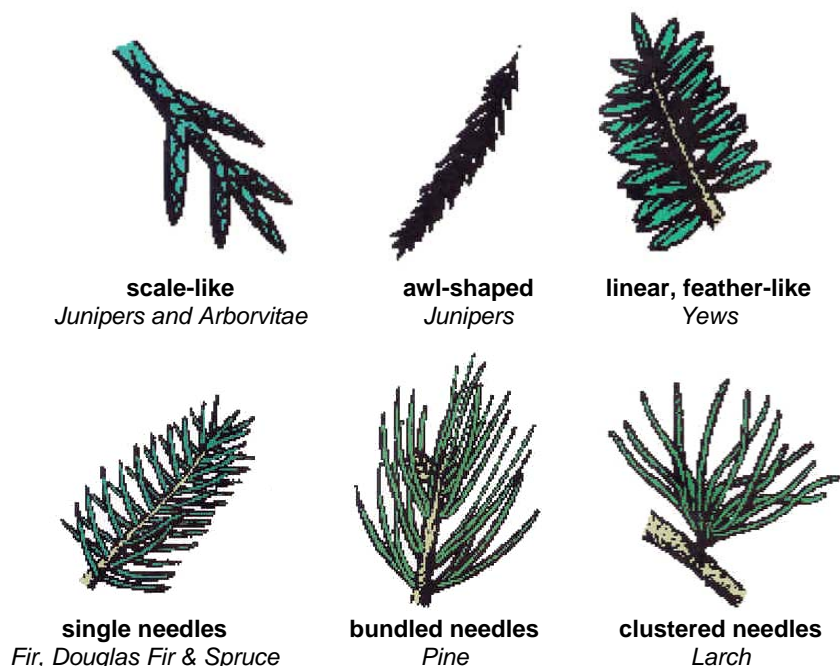


Figure 1. Conifer leaf types

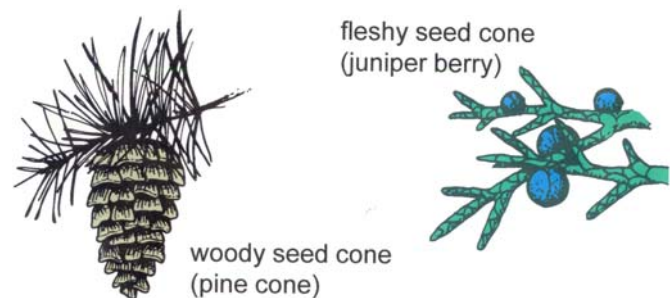
Seed Production

Conifers do not flower; they produce seed in a structure made up of modified leaves called bracts that become the 'cone'. Conifers are part of the *Gymnosperm* taxa (along with ginkgo and cycads). Gymnosperm means "naked seed" and refers to the exposure of the female reproductive structure during pollination rather than the actual seed being naked.

The *Pinaceae* family (pine, spruce, fir, and Douglas fir) and arborvitae are monoecious plants (separate male and female flowers on the same plant). Male cones produce pollen and are normally short lived. Female cones are generally larger and longer lived, remaining on the tree until (or after) the seed matures. Junipers are dioecious plants (separate male and female plants). Yews are generally dioecious.

Cones of pines, spruce, and fir are made up of leathery or woody bracts, which open as the seed matures. The cones of junipers have fused scales, resulting in a more berry-like appearance. [Figure 2]

Figure 2. Woody and fleshy cones of conifers.



Key to Conifers

Key to Conifers

- A. Leaves scale-like or awl-like.** Fruit berry-like cone with scales fused together. – *Cupressaceae* family (junipers and arborvitae)
1. Leaves scale-like or awl-shaped, often closely pressed to the branches. Foliage arranged around the branch, rather than flattened. Cones berry-like with scales pressed together. – ***Juniperus (Junipers)***
 2. Leaves small, scale-like hugging the stem. Foliage in flattened plate-like display. Cones berry like with thick scales – ***Thuja (Arborvitae)***
- B. Leaves needle-like – *Pinaceae* family (pine, spruce, fir, and Douglas fir)**
1. Needles single
 - a) Needles flat in cross-section and flexible
 - 1) Leaf scar oval, bud tips pointed. Cones have three-pronged lobed tongue-like "bract" that extend out beyond the scales. – ***Pseudotsuga menziesii (Douglas Fir)***
 - 2) Leaf scar round, bud tips roundish. Cones grow upright on the branch, usually disintegrating before falling to the ground. – ***Abies (Fir)***
 - b) Needles square in cross-section and stiff. Older twigs studded with the persistent stumps of fallen needles. – ***Picea (Spruce)***
 2. Needles sheathed at the base in bundles of two to five. Cone scales thick and woody with swollen tips – ***Pinus (Pine)***
 3. Short needles in tufts of ten or more. May be deciduous. – ***Larix (Larch)***
- C. Leaves flat, linear-shaped in a feather-like display.** Shrubs with dark green leathery leaves. Red, berry-like fruit. – ***Taxus, (Yew)***
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Key to *Abies* (Fir)

1. Young stems not hairy. Needles usually longer than 1 inch, (but can be misleading). Cones grayish green, 2½ to 5 inches long. Bracts of the cone scales with a short triangular tip. – ***Abies concolor*, (White Fir)**
2. Young stems hairy. Needles usually shorter than 1 inch. Cones dark brown/purple, 2-4 inches long. Bracts of the cone scale long with sublated tip. Native to higher elevations – ***Abies lasiocarpa* or *Abies bifolia*, (Subalpine Fir)**

Key to *Picea* (Spruce)

1. Needles very stiff, sharp, ¾ to 1½ inch long, often bluish, pointing outwards from stem. Stems not hairy. Cones 2½ to 4 inches long. Cone scales papery, furrowed, pointed/ragged. Bark black to dark grey furrowed. Native, generally below 9000 feet elevation – ***Picea pungens*, (Colorado Spruce)**
2. Needles somewhat blunt, not as stiff or sharp, pointed toward end of twig. Young stems somewhat hairy. Cones less than 2½ inches long. Cone scales rounded. Bark smooth, with purplish-brown to russet red scales on mature trees. Native. – ***Picea engelmannii*, (Englemann Spruce)**
3. Needles ¼ to ½ inches long. Each branch very short (2-4 inches long). Landscape shrub. – ***Picea glauca* 'Conica', (Dwarf Alberta Spruce)**

Key to *Pinus* (Pine)

1. Two needles per bundle
 - a) Needles ½-1 inches long, curved, medium green with white lines, some resin droplets. Cones small, rough, without prickles on scale. Seeds large (pine nuts). Shrubby tree. Native to the plateaus and mesas. – ***Pinus edulis*, (Pinon Pine)**
 - b) Needles 1-2 inches long, finely toothed, slightly twisted, curved, dark green, persisting 5 plus years. Branches out abruptly from trunk base, central leader not obvious, more shrub-like. – ***Pinus mugo*, (Mugo Pine)**
 - c) Needles 1-3 inches long, yellowish-green, slightly twisted. Cones small, less than 2 inches long, hard, one-sided with prickled tips on scales. Branches slender, slightly flexible. Bark scaly, not becoming platy. Native in dense forest stands in higher elevations – ***Pinus contorta*, (Lodgepole Pine)**
 - d) Needles 1½ -3 inches long, twisted, persistent 2-4 years. Cones 1½ inches long, scatter throughout the tree, without prickles on the scales. Older bark orange. – ***Pinus sylvestris*, (Scotch Pine, Scots Pine)**
 - e) Needles 3-6 inches long, stiff, dark green, dense on the branch, persisting 4 plus years. Cones 2-3 inches long with small prickles on scales. Buds whitish. Older bark dark gray, furrowed. – ***Pinus nigra*, (Austrian Pine)**
2. Two and three needles per bundle, 3-10 inches long, medium green, crowded at end of branches on older trees, persisting 3 years. Cones 3-5 inches long, armed with sharp prickles on scales. Bark furrowed, eventually breaking into reddish plates. Native from outer foothills to subalpine regions. – ***Pinus ponderosa*, (Ponderosa Pine)**
3. Five needles per bundle – **White Pines**
 - a) White resin dots scattered on dark green needles, 1-1½ inches (25-38 mm) long. Cone scales long, sharp prickles. Native to higher elevations. – ***Pinus aristata*, (Bristlecone Pine)**
 - b) Needles 1-3 inches long, rigid, dark green, often clustered near branch ends, margins smooth, pointing forward, persist for 5-6 years. Cones 4-8 inches long on short stalk, with no prickles on scales. Branches very flexible. Bark silvery white to light gray. Small tree with irregular trunk and branching pattern Native to higher elevation and high plains, often on open sites. – ***Pinus flexilis*, (Limber Pine)**

- c) Needles 2-5 inches long, blue-green, very soft, thin, margin toothed, persistent 2 years. Branches green-brown. Cones 3-8 inches long with 1 inch long stalk. Cone scales thin, don't bend back – ***Pinus strobus*, (Eastern White Pine)**
- d) Needles with a few small teeth near tip, not as soft as Eastern White Pine. Branchlets yellow-brown or red-brown. Cones are short-stalked. Cone scales bend back. Tall tree with straight, unbranched trunks. Native to San Juan Mountains. Sangre de Cristo and Rampart ranges. – ***Pinus strobiformis*, (Southwestern White Pine)**

Key to *Thuja*, (Arborvitae)

- 1. Foliage in vertical plate-like displays – ***Thuja orientalis*, (Oriental Arborvitae)**
- 2. Foliage in horizontal plate-like displays – ***Thuja occidentalis*, American (Eastern Arborvitae)**

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