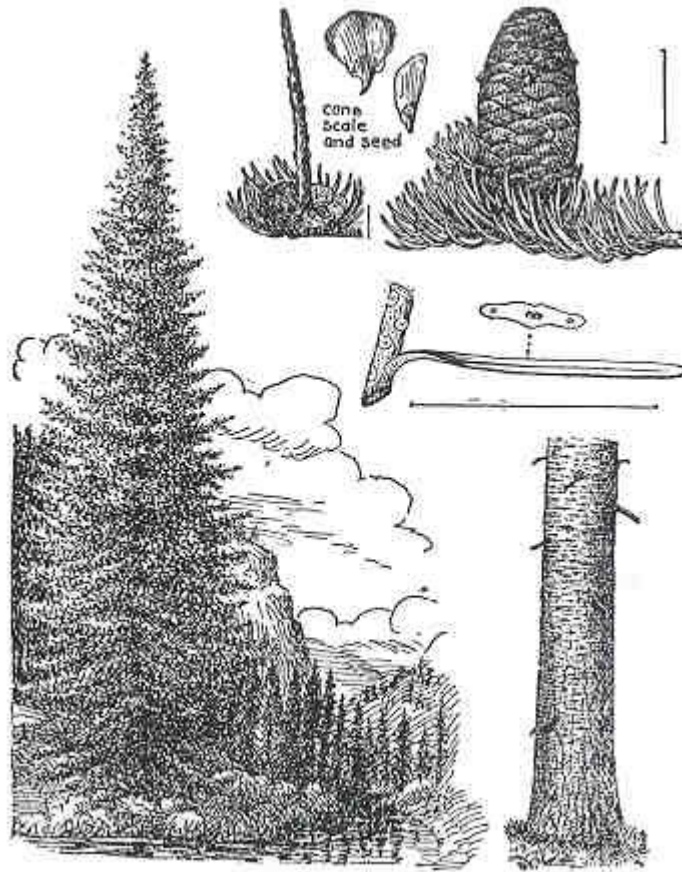


## Subalpine Fir



Subalpine fir is the tall, very slender, evenly tapering, spire-like tree of the high forests of Colorado. It is found at elevations from 8000 feet (2400 m) to timberline, commonly from 9300 to 11000 feet (2800 to 3400 m), growing to 20 to 100 feet (6 to 30 m) tall, and is often completely covered in foliage starting at the ground. The trunk tapers from the ground up. The upper crown is dense and the branches are short. Sometimes the tree only a few inches across near the top, and the entire tree can be very slender.

Subalpine fir is tolerant of the shade of other trees, and with the Engelmann spruce it creates the largest undisturbed forests in Colorado, the spruce-fir forests below timberline. Subalpine fir is also found with Lodgepole pine, Limber pine, Bristlecone pine, Corkbark fir, and aspen. Near timberline Subalpine fir may form prostrate shrubs. "Flag trees" occur at timberline where the winds are so strong that branches survive only on the downwind side of the trunk, creating a sheet of twigs and foliage.

In the spruce-fir forest there are more Subalpine fir seedlings than Engelmann spruce seedlings. The fir seedlings grow better in the shade and in forest floor litter than spruce. But young fir has a higher mortality rate, being especially susceptible to heart rot and wind fall, and surviving trees rarely live beyond 300 years, so the proportion of spruce to fir stays constant. There are more large old spruce trees than old fir trees.

## Subalpine fir

Fir trees can reproduce by layering, when low branches touch the soil and take root. This is prone to begin when lower branches are weighed down by snow. Some firs grow in spots where wind-drifted snow banks persist until mid-summer.

Subalpine fir is slow-growing; a tree of 15 inches (38 cm) diameter may be 175 years old. The climate is cold and the growing season is short in the high forests.

During the winter photosynthesis stops in firs and spruces of the high forests. The water in the ground is frozen, and sometimes the water inside tree cells freezes! The trees combat the severe threat of freezing and winter water loss by developing tough cell walls, antifreeze-like sap, and a waxy coating on the needles. The tough cell wall prevents splitting when ice crystals form inside the cells; the waxy coating reduces water loss by evaporation. Cessation of photosynthesis also retards water loss. In the winter the fir trees are alive, and green, but not growing.

The seeds are eaten by many species of birds, and mountain sheep. Deer browse the foliage and young shoots. The tree has little commercial value for lumber.

The Subalpine fir was first recognized as a new tree by Lewis and Clark in the Bitterroot Mountains of northern Idaho in 1805. It was given its first scientific description by Thomas Nuttall who traveled across the continent in 1837 with a party of mountain men.

The scientific name is "*Abies bifolia* A. Murray" (also listed as *Abies lasiocarpa*).

Note that fir tree cones disintegrate at maturity and do not fall intact to the forest floor. They grow upright near the tops of the trees, but about the only way to get one is to find a cut or blown-down tree, before the cones are mature.

### **Identifying features of Subalpine Fir**

#### Needles

Single, flat, soft and usually blunt-tipped or notched at the tip, 1 to 1 3/4 inches (2.5 to 4.5 cm) long, mostly about 1 inch (2.5 cm) on lower branches; shorter on upper branches (1/2 inch; 12 mm), deep blue-green. Needles may be much shorter (3/8 to 3/4 inch; 9 to 18 mm) on trees near timberline. Needles flare directly into the stem without a base or woody peg to stand on, unlike Engelmann spruce.

Needles tend to stick out horizontally, or sweep upwards in a slight curve, unlike Engelmann spruce needles which stick straight out in all directions. A quick glance and a grasp of a twig of needles will usually separate Engelmann spruce, Subalpine fir, and Blue spruce.

Occasionally with obvious white parallel pairs of lines on both the upper and lower surface, especially on new growth. This can impart the whitish- or pale- blue-green color most commonly seen on Blue spruce. This color is not nearly so common on subalpine fir as on Engelmann spruce, or even on Douglas fir.

The lower end of each needle is bent over to make a sort of base which fits into a socket on the twig. When the needles fall this leaves a shallow round scar on the twig, and a twig without needles is fairly smooth, unlike pine or spruce twigs.

## Subalpine fir

### Cones

Mature cones, found in the upper part of the tree, are blunt rounded upright cylinders; in color greenish, brown or dark purple; covered with pitch, and 2 to 4 inches (5 to 10 cm) high. They disintegrate at maturity at the end of the growing season, the scales falling from the tree and the center upright spike remaining for some time on the branch. Some years no cones are produced.

### Bark

Smooth gray bark with horizontal resin blisters on trees less than about 12 inches (30 cm) diameter. On older trees the bark becomes fissured and gray or gray-brown, but can't peel off scales as in spruce or pine. Very old Subalpine fir trees' bark can be cinnamon red in sections. As usual the varieties of bark in some cases provide poor guidance for identification.

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