

FRASER FIR

COMMON NAME



Abies fraseri

SCIENTIFIC NAME



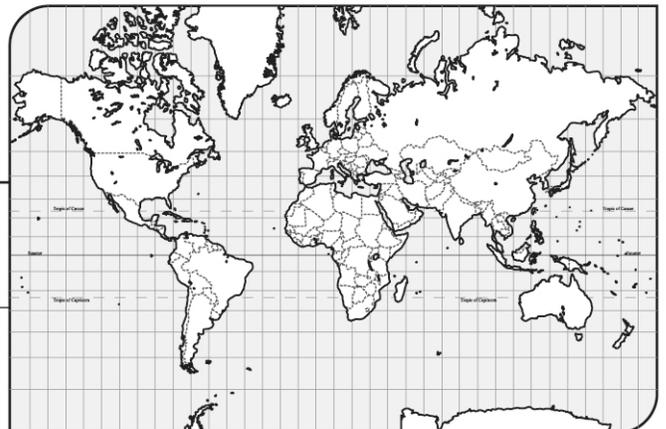
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Photo Credit: Bill Cook

Importance

Fraser fir (*Abies fraseri*), also called southern balsam fir and she-balsam, is a small- to medium-size tree endemic to the Appalachian Mountains; the species is restricted to the high elevations in these mountains and is not found naturally elsewhere. The largest tree on record measures almost 34 inches (86 cm) in diameter at breast height, is 87 feet (26.5 m) tall, and has a crown spread of 52 feet (15.8 m). Because of the high elevation at which Fraser fir grows, its primary value is for watershed protection and scenic attraction.

The remaining natural stands of Fraser fir have very limited commercial value. However, their location in the cool climate of the loftiest peaks and ridges makes them extremely valuable for controlling erosion in southern watersheds, as they hold the shallow soil to the steep wet slopes. They are a unique scenic attraction in a region of growing recreational appeal and Fraser fir seeds and terminal buds are eaten extensively by the red squirrel. It is one of only two fir species endemic to southern Appalachian Mountains and is a key component of these ecosystems.



Pine Family (*Pinaceae*)

FAMILY

Vulnerable

RED LIST CATEGORY

In cultivation, growing and harvesting this species for Christmas trees and boughs is a multimillion-dollar business in the southern Appalachians. Because of its thick green foliage, beautiful shape, fragrance, and needles that are retained unusually well, Fraser fir is unequalled as a Christmas tree, and has been designated "The Cadillac of Christmas Trees" (Dirr 1998). It is also used widely as an ornamental landscape tree.

Description

Form: Fraser fir is a small to medium size tree up to 80 feet, with a very narrow, spire-like crown.

Leaf: The leaves are flattened, like those of hemlock (*Tsuga*), but are directly attached to the twigs, instead of attached on short bases. Hemlock grows at much lower elevations. The flattened needles are 0.75 inches (2 cm) long, blunt or notched at the end, shiny dark green above and silvery below. Needles are generally more dense than on the very similar balsam fir. Crushed or dried leaves are extremely fragrant, with a balsamy aroma

Flower: Fraser fir is monoecious; that is, the male and female flowers exist on the same plant. Flower buds usually open from mid-May to early June. Female flowers are borne mostly in the top few feet of the crown and on the outer ends of branches, and are purple and inconspicuous. Male flowers are yellow to purple, and are borne below female flowers, but mostly in the top half of the crown.

Fruit: Resinous cones are borne upright on the branches, 1.4 to 2.4 in (3.5 to 6 cm) long and 1.0 to 1.6 in (2.5 to 4 cm) wide. Cones are cylindrical, green to purple, with pointed, toothed bracts protruding from the cone scales; scales are deciduous with seed

dispersal in fall. The strongly reflexed bracts, much longer than the scales, distinguish Fraser fir from balsam fir.

Bark & Twig: The bark is silvery gray-brown, smooth except for resin blisters, largest stems may become a bit scaly. Twigs are yellow-green, later turning gray; buds round, reddish brown, resinous; leaf scars are flat and rounded.

Habitat and Ecology

Fraser fir is distributed in separated populations on mountaintops. It is restricted to high elevations in the southern Appalachian Mountains of southwestern Virginia, western North Carolina, and eastern Tennessee. Small populations are known from six peaks, including the Smoky Mountains National Park. Under natural circumstances, this tree usually lives for approximately 150 years.

Fraser fir grows at elevations as low as 4,500 ft (1,372 m) on north slopes and protected coves but is found mostly between elevations of 4,900 to 6,500 ft (1,500 to 2,000 m). It has been found as high as 6,684 ft (2,037 m) on top of Mount Mitchell, the highest point in eastern North America. Fraser fir grows well in highly acidic, shallow, and rocky soils and there is considerable variation in the soils that support this tree. The cold, moist cool-temperate rain forest climate of these elevations, known for well distributed regular rainfall, regular fog, and moderate temperatures, is key to this tree's health.

At lower elevations, Fraser fir is a minor component of the forest, increasing in frequency with altitude to form nearly pure stands at elevations above 6,300 ft (1,920 m). At middle and lower elevations, red spruce

(*Picea rubens*) is a common associate of Fraser fir, while at the highest elevation, mountain-ash (*Sorbus americana*) is practically the only canopy associate. Fraser fir is classified as very tolerant to shade and is considered a climax species – a species that thrives when the environment has not been disturbed for a long time.

The root system of Fraser fir is usually shallow because it customarily occupies shallow soils. Because of these shallow soils and shallow root systems, Fraser fir is subject to windfall, and patches of wind-thrown trees are a common sight on exposed ridges. Root growth is more rapid and rooting depth greater, however, than that of its frequent associate, red spruce. Roots are able to penetrate to depths greater than to feet where soil is available, permitting fir to occupy somewhat drier sites than red spruce.

Threats

Populations are small, windswept and unhealthy. Regeneration appears to be poor, with few seedlings surviving to replace mature trees. In many areas, most or all of the adult Fraser fir trees have been killed by a combination of factors, leaving behind skeleton forests. The main factor leading to the massive die-off is infestation by the introduced balsam woolly adelgid (*Adelges piceae*). Their feeding causes the tree to form thickened cell walls that interfere with water and nutrients uptake, ultimately starving the tree. As our climate changes, environments conducive to the increased spread of the balsam woolly adelgid are created and the remaining populations in the Appalachian Mountains are threatened due to the infestation. Air pollution in the form of ozone and acid rain may also contribute to the decline of this species.

Conservation Action

To protect and preserve Fraser fir, seed collection is a top priority. Collecting seed from the remnant natural populations will preserve genetic variations within populations. This seed bank also serves as a resource for potential reintroduction to natural habitats. Management of balsam woolly adelgid populations and protection of the existing tree populations will also help conservation of this species.

References

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