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Balsam Fir

Abies balsamea (L.) Miller

Description:

First described in 1768, balsam fir is a medium-sized tree generally reaching 40-60 feet in height and 1-1 1/2 feet in diameter. It exhibits a relatively dense, dark-green, pyramidal crown with a slender spire-like tip. The scientific name "balsamea" is an ancient word for the balsam tree, so named because of the many resinous blisters found in the bark. Balsam fir and Fraser fir have many similar characteristics, although geographic ranges of the two species do not overlap.

On lower branches needles generally occur as two-ranked (two rows along sides of the branch), 3/4 - 1 1/2 inches long, spreading and not crowded. On older branches, the needles tend to be shorter and curved upward so as to cover the upper sides of the twigs. Individual needles are somewhat flat and may be blunt or notched at the end. Needles have a broad circular base and are usually dark green on the upper surface, lighter on the lower surface. Two silvery bands of stomata (pores) are found on the lower surface.

Balsam fir has both male and female flowers (or strobili) on the same tree. Flowers are receptive in late May to early June. The species is wind pollinated, and cones mature in a single season. At maturity, cones are 2 to 3 1/2 inches long with bracts shorter than scales. The presence of these short cone bracts is a distinguishing feature when balsam fir is compared Fraser fir. Upon ripening in September to November, cones fall apart leaving an erect central core.

Balsam fir bark is thin, ash-gray, and smooth except for numerous blisters on young trees. These blisters contain a sticky, fragrant, liquid resin. Thus, the species has been sometimes referred to as "blister pine". Upon maturity, bark may become up to 1/2 inch thick, red-brown and broken into thin scales.

The species thrives in cooler climates and demands abundant soil moisture and a humid atmosphere. It is generally found in the Canadian



and Hudsonian zones from sea level to about 5,000 feet in elevation. Growth is best on well-drained, sandy loam soils that are somewhat acid. The species is tolerant of shade and may reach 150-200 years of age. Pure stands may be found in swamps, but balsam fir often occurs with white spruce, black spruce and aspen on upland sites.

Chief enemies are the spruce budworm and balsam woolly adelgid (formerly called an aphid), heart-rot fungi, and fire. A shallow root system also renders the trees vulnerable to high winds and heavy spring snow storms.

As a Christmas tree, balsam fir has several desirable properties. It has a dark-green appearance, long-lasting needles, and attractive form. It also retains its pleasing fragrance. Nine to ten years in the field are required to produce a 6-7 foot tree.

Range:

Abies balsamea occurs naturally from northern Alberta to Labrador, southward to Pennsylvania. This geographical distribution is larger than for any other North American fir species. A variety of balsam fir, *phanerolepis*, occurs as far south as West Virginia and Virginia (38 degrees north latitude). This variety is best described as an intermediate form between balsam fir and Fraser fir although classified with balsam fir.

Propagation:

Most propagation is by seeds, although natural layering may occur from lower branches in contact with moist soil. A few selected cultivated forms are commercially propagated by cuttings, and grafting has also been used for special purposes. Propagation via tissue culture has been attempted but not on a large scale.

Uses:

The wood is soft and brittle and has been used primarily for pulpwood. The wood is also used for light frame construction, interior knotty paneling, and crates. Wood resin in the bark blisters is the source of Canada balsam used for making of microscope slides. Resin was sold in stores as a confection prior to the advent of chewing gum, and resinous fir knots were once used as torches. A balm of balsam fir resin was used in Civil War as an external application to the injuries of combat. Balsam fir boughs are often used for stuffing "pine pillows", with the aromatic foliage serving as a deodorant.

Moose and whitetail deer browse the foliage, while chickadees, nutcrackers, squirrels and porcupines eat the seeds. The spruce grouse uses fir forests for cover and obtains food from the needles.

Prepared by Dr. Craig R. McKinley, North Carolina State University

Ohio DNR Division of Forestry Ohio Trees - Norway Spruce

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America's forestry movement actually started in Ohio with the creation of the American Forestry Association in Cincinnati in 1875.

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**Norway Spruce (Picea abies)**

An evergreen tree from the Pine Family (Pinaceae)



zone



mature spread



mature height



growth rate



sun



tree shape



soil type

3-7

40'

80'

medium full/partial
to sun
rapiddense,
symmetricalmoist, well drained,
acidic

Norway Spruce, an evergreen conifer, is found throughout all of Ohio and much of the United States and Canada as perhaps the most common spruce, rivaled only by Colorado Spruce. It is found as an ornamental tree in urban environments, a windbreak and snowbreak in both urban and rural areas, and occasionally in pure stands for future harvest in forests. It is native to central and northern Europe including Norway, for which it is named, and prefers moist, cool climates.

Norway Spruce quickly reaches 80 feet in height by 40 feet in spread with its medium to rapid growth rate, and adapts to a variety of harsh soil and sparse moisture conditions. It is so common, widespread, vigorous, and healthy that most people do not realize that it is not a native of North America, in spite of its common name.

A distinctive trait of Norway Spruce is the strong central leader, horizontal side branches, and vertically pendulous branchlets. As a member of the Pine Family, it is related to other Spruces, as well as the Firs, Larches, Pines, and Hemlocks.

Planting Requirements - Norway Spruce prefers moist but well-drained, acidic soils that may be organic, sandy, or loamy. However, it is perhaps the most adaptable common evergreen tree to harsh conditions, including poor, clay, dry soils of acidic, neutral, or alkaline pH. It thrives under seasonal drought once it is established, and takes well to city pollution. Its only requirement is to not be sited in wet soils, where it will quickly die. It grows in full sun to partial sun in zones 3 to 7.

Potential Problems - Norway Spruce is generally a very healthy tree, even under harsh conditions. Like most spruces, it may suffer needle damage due to feeding by the various spider mites, and mysteriously shaped "cones" that are rarely seen are actually caused by the chewing of cooley spruce gall aphids on the new growth, resulting in their deformity. It is especially drought tolerant, including young transplants that have been root pruned into ball and burlap form.

Leaf Identification Features

Norway Spruce has its dark green needles point forward along the twigs, making this species of spruce easier to grasp

with the hand than the more prickly Colorado Spruce, whose needles radiate outward from the twigs.



With age, the pendulous, dense branchlets in the upper canopy of mature trees hang straight down for several feet, and are called skirts.

While not unique to Norway Spruce (European Larch and Japanese Larch have obvious skirts, while mature White Spruce has subtle skirts), the skirts are

most evident in this evergreen species.

Other Identification Features



Norway Spruce is commonly planted as an ornamental evergreen, either solitary or in groups, as a specimen or as a screen.

Arguably, its looks best when it is relatively young, being extremely dense, symmetrical, and vigorous.



The mature tree remains broadly pyramidal, and may either remain branched to the ground or be limbed up.

With increasing age, symmetry in the upper canopy is lost, and the upper canopy becomes flat-topped to irregular in shape, with a more thin appearance and faded green color.



Norway Spruce is monoecious, with male flowers scattered throughout the canopy serving as a source of pollen for the female flowers, which give rise to perfectly-shaped, purplish-green then brown cones up to seven inches long.

They are distributed in the upper two-thirds of the tree canopy, and fall out soon after releasing their seeds.

A small seed is visible resting on a scale, just below the center of the cone, if one carefully scans the enlarged view option of the image at lower left.



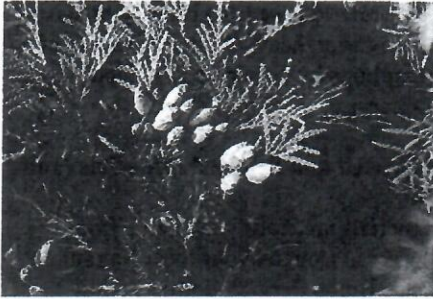
The scaly mature bark of Norway Spruce is gray to brown, and is often speckled with dried white resin that drips from bark blisters and pruned limbs.

NORTHERN WHITE CEDAR

Thuja occidentalis L.

Plant Symbol = THOC2

Contributed by: USDA NRCS National Plant Data Center & the Biota of North America Program



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Botany Dept., NMNH, Smithsonian Institution
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Alternate Names

Eastern arborvitae, American arborvitae, eastern white-cedar, swamp-cedar, Atlantic red cedar, swamp cedar

Uses

Conservation: More than 120 named cultivars of northern white cedar have been named and used as ornamental trees and shrubs, where the name "arborvitae" is usually applied. Selections offer variety in habitat form, color, cold hardiness, heat tolerance. It is often used for hedges and other types of border or shelter plantings. The species was introduced into Europe for cultivation in the 16th century.

Wildlife: Stands of northern white cedar also are valuable for wildlife habitat, particularly in severe winters for white-tailed deer, which use it for both shelter and browse. These trees also provide habitats for many species of birds.

Industry: The wood's light weight and resistance to decay makes it useful for a number of applications. The principal commercial uses of northern white-cedar are for rustic fencing and posts; other important products include cabin logs, lumber, poles, and shingles. Smaller amounts are used for paneling, piling, lagging, pails, potato barrels, tubs, ties, boats

(especially canoes), tanks, novelties, and woodenware. The timbers were used to make the ribs in birchbark canoes. "Cedar leaf oil" is distilled from boughs and used in medicines and perfumes. Boughs are also used in floral arrangements.

Ethnobotanic: The essential oil of northern white cedar is used in cleansers, disinfectants, hair preparations, insecticides, liniment, room sprays, and soft soaps. The Ojibwa are said to have made soup from the inner bark of the young twigs. The twigs are used by some to make teas for relief of constipation and headache.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

Description

General: Cypress family (Cupressaceae). Native shrub or tree growing to 15 (-38) meters tall, the crown narrowly conic to broadly pyramidal, with spreading, densely crowded branches; branchlets flattened, in fan-shaped sprays. Bark is gray to reddish-brown, 6-9 mm thick, fibrous, separated into flat, connected ridges. Leaves are evergreen, scale-like and abruptly pointed, 2 mm long, opposite in alternating pairs (in 4 rows), bright green above and pale green below, sometimes becoming yellow-brown in winter, with a spicy fragrance when crushed. Seed cones are ellipsoid, (6-)9-14 mm long, brown; seeds ca. 8 per cone, 4-7 mm long, with lateral wings about as wide as the body. The common name pertains to its northern distribution, cedar-like appearance, and white wood.

Variation within the species: ecotypic variation within the species has been documented but no naturally occurring variants have been formally recognized. Significant genetic variation has favored the artificial selection of many cultivars, which differ primarily in leaf color and growth habit.

Northern white cedar differs from western red-cedar (*Thuja plicata*) in leaf color (dull yellowish-green on both surfaces), minutely mucronate scales of the seed cones, and geography.

Distribution: The primary range of northern white-cedar is in eastern-southeastern Canada (west to

Manitoba) and adjacent states of New England and the Great Lakes region (west to Minnesota); south of the main range, it occurs in scattered stands and southward along the Appalachians into North Carolina and Tennessee, where it is generally rare or extirpated. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Adaptation

It commonly grows in cool, moist, nutrient-rich sites, on mostly calcareous soils that are neutral or nearly so -- lakes and river shores, uplands, cliffs, and talus, at 0-600 (-900) meters elevation. Although it grows best on well-drained sites, it may be dominant in swamps. In cultivation, it grows in a wide variety of soils.

Establishment

Cones may be produced by northern white-cedars as young as 6 years old, but seed production in large quantities begins when the trees are about 30 years old and is best after 75 years. Good seed crops are produced at intervals of 2 to 5 years, or more frequently in local areas.

Seedbeds of moss-covered, decaying logs and stumps account for more than 70 percent of the northern white-cedar seedlings in undisturbed areas.

Seedlings can be established on burns, if the burn was severe enough to expose favorable, mineral soil seedbeds on uplands or to improve moss seedbeds in swamps. Best root and shoot development occur in full light, but drought-caused mortality of northern white cedar seedlings may be extremely high under any light condition.

Layering may account for a significant portion of northern white-cedar reproduction in swamps, because adventitious roots can be produced from any branch or stem. It is most common in young stands and those with leaning trees, where the lower branches become covered by moss. New trees also develop vegetatively from uprooted trees where roots are formed from vertical branches.

Northern white cedar grows relatively slowly in swamps or on other saturated lowland sites, but it apparently reaches ages of 400 years and greater in these habitats. An individual from Ontario has been dated at more than 1650 years old.

Management

Northern white-cedar forests are stable without major disturbance such as fire, because the trees are long-lived and balsam fir is the only important associate

sufficiently shade tolerant to grow in competition. In stands that have been opened by timber harvesting or severely browsed by white-tailed deer, succession is often to balsam fir or swamp hardwoods, especially black ash. Northern white-cedar responds well to thinning-release after successful establishment, although it is shade tolerant and can withstand severe suppression for several years.

Even-aged management, through shelterwood cutting or clear cutting is recommended for maximum benefit to deer. Satisfactory reestablishment after clearcutting often requires some kind of site preparation, particularly broadcast burning of slash. In some areas, however, heavy winter browsing of seedlings and saplings by deer greatly reduces reproductive success.

Cultivars, Improved and Selected Materials (and area of origin)

These plant materials are readily available from commercial sources. Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

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