

December, the Doorway to Winter: Our Common Conifers

Evergreens have been symbols of protection, hope, and rebirth for thousands of years. In the Northern hemisphere, the shortest day of the year falls on Dec. 21, which we call the Winter Solstice. This marks the beginning of winter, the season of dread which many ancient people believed was caused by the deity of the sun becoming weary and weak. They celebrated the solstice to encourage the sun to regain its strength and return in spring to warm the earth. Evergreen boughs reminded them of all the new life that would sprout and flourish again when the sun's health was renewed.

<u>Early history</u> shows that ancient Egyptians brought palm fronds into the home at solstice to honor their sun god, Ra. Ancient Romans brought evergreen boughs indoors at solstice to provide protection from hunger and illness through the winter months as they celebrated, Saturn, the god of Agriculture. The Celtic Druids used evergreens as sacred symbols of rebirth



and protection as they hung holly, ivy, and pine around their homes at solstice. On the longest night, they made bonfires to symbolize the return of the light and warmth of the sun. This is how the yule log tradition began.

In the 1600's the tradition of bringing entire evergreen trees into the home got its start with Germanic Christians in Europe. Later, when Germans immigrated to the U.S. in the 1800's, they brought that tradition with them. And we can thank British Queen Victoria and her beloved Prince Albert for inspiring over the top December decorating with holly, ivy, evergreen boughs, and indoor candle lit trees that continues to this day.

Pine, Spruce, and Fir

There are many kinds of evergreen **conifers** but in general, most of the conifers that we encounter in our landscapes and woodlands fall within three categories: pine, spruce and fir. In the early 1900's, J.B. Duke planted thousands of pines, spruces, and firs at Duke Farms. Today those that survive from those early days tower over the landscape and add a palette of forest green to the grays of winter.

All three types of conifers are members of the family Pinaceae and all have leaves that we call **needles**. The word conifer refers to the woody reproductive structures called **cones**



Century-old pine and spruce trees tower over Duke Farms' landscape.



that grow from the uppermost branches. The word cone refers to the overall geometric shape of the seed-bearing structures.

There are female cones and male cones. The male cone (**microstrobilus**) produces pollen sacs that contain the **pollen**. They usually grow on the lower branches and when they release pollen, they produce clouds of green dust that are carried by the wind, hopefully contacting female cones in the upper branches on other trees.



Immature female cones are green Male cones releasing pollen

The female cone (**megastrobilus**), called the seed cone, contains **ovules** which when fertilized by pollen produce **seeds**. The seeds mature inside the closed green cone and when ripe, the cone opens up to release the seeds. The mature cones are woody and reveal individual scales like the shingles on a roof. The mature seeds are naked, meaning they are not protected in a fruit and sit precariously on the open scales. In this way conifer seeds are mostly dispersed by wind or gravity. Female cones vary greatly from one kind of conifer to another and are unique to the species of conifer.

Eastern White Pine (Pinus strobus)

Pine trees are evergreen conifers that are native to most of the Northern Hemisphere. There are hundreds of species that can take the shape of shrubs or small to very large trees. They produce woody seed cones that can persist for many years. Pines can be distinguished from other types of conifers by their needles. If you look closely at pine tree needles, you see that they are attached to the branches in small bundles of multiple needles, called **fascia**. There is always more than one.

Our most common pine is *Pinus strobus*, the <u>eastern white pine</u>. It is easy to identify as it is the only native pine tree with 5 needles in a bundle. It is the largest conifer of the eastern forests, reaching 150 feet in height.

White pines have pyramid shaped crowns with long, soft looking branches that undulate in the wind. On young growth, the bark remains rather thin, smooth, and greenish brown in color. On older trees the bark becomes deeply fissured and dark grayish brown.







White pines have needles in bundles of 5. The cones are woody and persist on trees.

Its evergreen needles are bluish-green and grow in clusters of 5. They are soft, flexible and are 2 1/2 to 5 inches long. Its cones are about 4 to 8 inches long with curved scales that are often rimmed with sticky sap. These are pendulous and remain attached for 1 to several months after ripening in the autumn of the second season. The seeds are critical winter food for small mammals and birds.

White pines are rarely sold as trees to bring indoors, but their branches are used for garlands, etc. The pine that is most oftenbrought indoors is the <u>Scots pine</u> which has two needles in a bundle and small roundish pine cones.

Norway Spruce (Picea abies)

There are about 35 species of spruce trees and are most abundant on mountain slopes of the far north latitudes. They are easily identified by their needles which tend to be short, stiff, and sharply pointed (ouch!). Unlike the needles of pine that grow in bundles, spruce needles grow from a single origin point on a branch and are attached to the branch by small stalk-like woody pegs. The needles have angles and can easily be rolled between the fingertips when removed from a branch. A cross section of a needle is a square shape when viewed under a microscope or hand lens.

There are spruces (black, white, and red spruce) that are native to northwestern New Jersey, but they are not common and are rarely planted in our landscapes. Oddly, <u>blue spruce</u> (*Picea pungens*) which is native to the Colorado Rockies is planted all the time. In fact, J.B. Duke grew blue spruce in his tree nursery to sell to the northeastern landscape market in the early 1900's and it's still an incredibly popular tree. However, the most planted spruce in almost every landscape is the non-native <u>Norway spruce</u>.



Picea abies is a large pyramidal evergreen conifer that is native to the mountains of northern and central Europe. In its native European habitat, it typically grows to 100 to 200 feet tall. Because of its rapid growth, this spruce has been widely planted in temperate regions of North American where it typically matures to a mere 100 feet. Norway spruces often end up in New York City for the Rockefeller Center holiday display. This is because the trees are harvested from suburban yards where they grow way too humongous for their location.



Primary branches are slightly upturned and extend like arms reaching for the sky. As the trees age, the secondary branches become long and pendulous. The four-sided deep green needles are arranged spirally around the branches. The cylindrical seed-bearing cones are pendulous and grow up to 9 inches long. In excess of 150 cultivars (mostly dwarf) have been developed over the years. Cultivars can be very difficult to identify.

Norway spruce and blue spruce are often grown on tree farms and sold as trees for bringing indoors. Both are a really poor choice for this purpose. These cold loving trees lose their needles and dry out soon after bringing them inside. They are often a mistake when planted in suburban landscapes as they are susceptible to blights, quickly grow too tall, and often topple in strong storms posing a hazard to homes and property. With climate change they may soon meet the same fate in their northern forest homes.



Norway spruce needles are square in crosssection and easily roll between the fingers.



Norway spruce cones and branches are long and pendulous.

Fraser Fir (Abies fraseri)

Abies fraseri, commonly called Fraser fir, is native to a very small area of the Appalachian Mountains in

North Carolina and Tennessee extending a somewhat into the southwestern corners of Virginia and West Virginia. It is typically found at elevations ranging from 4500 to 7000 feet and is the only fir that is native to the Great Smoky Mountains. Although it only grows in a very small area, Fraser fir is one of the most popular trees for indoor decorating and is commonly grown on tree farms for that purpose. Other firs grown on farms include noble fir, concolor fir and Douglas fir.

Fraser fir is a narrow evergreen conifer with a pyramid shape when young. It's smaller than most pines and spruces reaching only 30 to 50 feet in height. It is very similar to <u>balsam fir</u> (*Abies balsamea*), the evergreen used to provide the classic evergreen fragrance for candles and potpourri. The needles of Fraser fir also have a strong fragrance when crushed.





The needles are flat and do not roll in the fingers the way spruce needles do. They are shiny, dark green (to 1" long) with whitish bands on the undersides. Needles are borne individually on resinous stems and feel soft to the touch. The seed cones are purple with conspicuously protruding bracts. As is distinctive with the firs, the cones grow upright on the branches.

There are some Fraser firs planted near cottages at Duke Farms, but there are very few firs that survive from the original plantings in the early 1900's. The common name of this tree honors John Fraser (1750-1811), a Scottish botanist and plant collector, who discovered this tree and introduced it to Britain.



Fir cones stand upright on the branches.



Fraser firs are grown on tree farms.



Fir needles are soft and flat. They do not roll between the fingers like spruce.



Activity: Identify the Three Most Common Types of Conifers*

Analyze the images and see if you can decide what kind of conifer is in each photo based on the needles.









Activity: Conifer Identification in the Field

Take a nature walk and take a close look at the evergreen conifers you encounter. What are the needles like? Are they in groups or attached individually to a branch? Are they soft to the touch or pinchy? Does the tree have cones on it? If so, do they hang down or stand upright on a branch? Can you find cones on the ground? Can you identify the tree as a Pine, Spruce or Fir?

Now Download a tree identification app such as <u>Leafsnap</u> or <u>INaturalist</u> for your mobile device.

Snap photos of the conifer needles and cones and see if you can identify the species of pine, spruce, or fir that you are observing using the mobile app. It's important to note that there are other species evergreen conifers in addition to pines, spruces, and firs. Use a mobile tree id app to observe evergreens that do not fit into one of those three groups. Can the App help you identify them?

Don't forget to look for <u>wildlife</u> that may be taking refuge in the evergreens. They are important places of protection and sources of food for vulnerable birds and mammals in winter!



Additional References

- Is it Pine, Spruce, or Fir?
- Identifying Pine, Spruce, and Fir
- Identifying Conifers
- History of Christmas Trees
- Best Evergreens for Christmas Trees
- <u>Wildlife Benefits of Conifers</u>

Photos

Duke Farms landscape, white pine, spruce photos courtesy of Mrs. Bird Mature Fraser fir, fir cone courtesy of Virginia Tech Dendrology Fraser fir tree on tree farm; Google Free Images Fir needles and ID Activity courtesy of Mrs. Bird

Answers to Identification Activity

- 1. Fir (Douglas fir)
- 2. Spruce (Norway spruce)
- 3. Pine (Eastern white pine)