

Native Oak trees - *Quercus ssp.* Family: Fagaceae

by Hope Leeson

Rhode Island hosts 10 native species of oak, 5 hybrids, 1 possibly historic species, and 1 non-native European species. The species range in height from 2 meters (dwarf) to nearly 30 meters, growing in habitats flooded by spring rivers, on slopes washed with salt spray, and out of little more than fissures in bedrock outcroppings. Humans have long worshipped oak trees, and some scholars link the etymology of the word “druid” to the Irish name for oak, “daur,” and the Indo-European root, “wid,” meaning “to know.” Perhaps the tenacity of these long-lived trees gave inspiration to the druids.

Oaks are found throughout the world’s temperate and mountainous regions, with species numbering from 400 to 450, including deciduous, marcescent (with desiccated leaves that hang on until spring), and evergreen forms. *Quercus* is the largest woody taxon in North America, with about 85 species. Why are the species numbers estimated, you might be wondering? Oak DNA is relatively flexible. When oaks grow in close proximity, the ovaries of one species can accept the wind-blown pollen of closely related species. Often, the timing of maturation in pollen and ovules among species is staggered, reducing the potential for hybridization.

The tendency for hybridization can make species identification tricky in some instances. When pondering an oak, first look at the distinctive bark. Follow the trunk from the base up to the smaller-diameter branches to take in how the bark changes

as the stem diameter grows. Then look at the leaves for the general characteristics of the species, but with the understanding that leaves are highly variable among branches, and their shape reflects the amount of sunlight they receive. The combined morphology of buds, acorns, and acorn caps, along with the bark pattern and leaf shape, will provide you with the information you need to determine the species. Buds for the next year’s growth begin forming in mid-summer, and acorns are fully formed by late summer. All members of the genus *Quercus* have simple alternate leaves with pinnate veins ranging from deeply lobed to un-lobed, with or without bristle tips at the apex of each lobe or vein. Flowers are separated into male and female clusters on the same tree (Monoecious), with male flowers arranged in wispy catkins. Ovaries are surrounded by a scaled involucre, which forms a cupule (cap) at the base.



Oak species are divided into two groups: white oaks and red oaks. White oak species have leaves without bristle tips. The bark flakes off in linear plates and is light grey in color. The wood is white-yellow with fine pores (a feature that contributed to the suitability of *Quercus alba* barrel staves for export to Spain and Portugal for wine casks). Acorns mature in one year and fall from the tree in a non-dormant state, which allows them to extend a root into the soil shortly after landing.

Red oak species have leaves that are bristle-tipped. The bark of mature trees is a dark grey color with deep linear furrows. The inner bark color (red or yellow) seen between the furrows, can be helpful in distinguishing species of this group. The inner wood is red with large pores, which make the wood easy to distinguish from that of other trees. Acorns in the red oak group require two years to mature on the tree. They fall to the ground in a dormant state, and must pass through 2 to 3 months of moist cold to break dormancy and begin the process of germination.

In a given year, you’ll begin to notice acorns falling from the trees in late August. Many of

<i>Quercus alba</i>	Eastern white oak
<i>Quercus x jackiana</i>	E. white oak and swamp white oak hybrid
<i>Quercus x saulii</i>	E. white oak and mt. chestnut oak hybrid
<i>Quercus bicolor</i>	Swamp white oak
<i>Quercus coccinea</i>	Scarlet oak
<i>Quercus x robbinsii</i>	Scarlet oak and scrub oak hybrid
<i>Quercus silicifolia</i>	Scrub oak
<i>Quercus x rederi</i>	Scrub oak and black oak hybrid
<i>Quercus macrocarpa</i>	Burr oak (possibly historic in RI)
<i>Quercus montana</i>	Mountain chestnut oak
<i>Quercus palustris</i>	Pin oak
<i>Quercus prinoides</i>	Dwarf chestnut oak
<i>Quercus x stelloides</i>	Dwarf chestnut Oak and post oak hybrid
<i>Quercus robur</i>	English oak (European origin)
<i>Quercus rubra</i>	Northern red oak
<i>Quercus velutina</i>	Black oak

these are not ripe and are being aborted by the tree because of lack of viability or damage by acorn weevils (*Conotrachelus posticus*). You will notice that these acorns are largely still green in color. Acorns of white oaks mature earlier (September and October) than those of the red oak group and will be mottled yellow to light brown in color when mature. Acorns in the red oak group will be ripe in mid to late fall (October and November). At this point, they will be golden to dark brown in color.

With both groups, the best indicator of ripeness is a cap that breaks off easily. When collecting the acorns of scrub oak (*Quercus ilicifolia*), for example, I use the “thumb test” – if the acorn pops easily out of the cap on the tree, I collect it; if not I leave it for the blue jays to eat later. When collecting from the ground, look for acorns with a deep lustrous color. Collect acorns with the caps on, as the scales and the shape of the cap will provide important morphological clues as to the species you are collecting.

Acorns of both groups are described as recalcitrant seed, which means they do not tolerate drying out. Drying for as few as 3-5 days can cause seeds to lose viability. After you have identified the species of acorn, pop the cap off. The scar left behind at the attachment point should be bright in color. The texture should be hard. Any with soft or dark-colored cup scars are infested with a weevil or mold. Temporarily (a few weeks for white oaks, longer for red species) store the acorns you have collected in a 4 to 6 mil. plastic bag in the refrigerator.

When you are ready to sow your acorns or stratify them to begin the process of bringing them out of dormancy, place them in a bowl of fresh water for 24 hours. Discard any that float. You may notice an insect larva coming out of one or two after they’ve been submerged. This is likely an acorn weevil, one of the many insects whose life cycle is intricately tied to that of oak trees. Even though these acorns may sink, they are not likely to germinate, so send them back out for the mice or deer to find.

At this point, you can place acorns into pots about 1 foot deep to over-winter. The white oaks will put out a single root, which will hold the acorn in place through the winter. Red oaks will do the same in the spring when the soil temperature warms.

Alternatively, you can return the acorns to a plastic bag and add enough moistened vermiculite to cover the seeds. Refrigerate at 35 to 40 degrees F, checking periodically for germinating acorns (particularly white oaks). This process will simulate winter and allow you to keep acorns from freezing. In spring, plant all that have begun to split open and send out a taproot.

As the acorns germinate, you will see that they are primarily a giant set of cotyledons. This is an adaptation that pro-

vides the seedlings with ample nutrients until the roots become established and the leaves begin photosynthesizing. It is an adaptation that allows oaks to grow in some of the harshest environments. But it is also a prized source of food for small rodents, so protect your oak seedlings with ¼-inch hardware cloth for the first year.

Propagation from acorns yields the highest success rates and the greatest potential for genetic diversity. Experimentation for propagation from cuttings and grafting is ongoing, as horticulturalists seek production methods that ensure progeny with desirable form and color characteristics. However, success has been variable among species propagated from cuttings, and grafting often results in losses after several years of growth. For more information on these methods, see the articles by John Drew and Michael Dirr cited below and those found on the website of the International Oak Society.

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Rhode Island Wild Plant Society