

**NH Big Tree of the Month****Chestnut Oak, *Quercus prinus*****By Anne Krantz - UNH Extension Big Tree Team**

An incredible variety of native trees grow on our suburban lot in southern New Hampshire. When we moved here and I explored the little woods surrounding our house, the diversity of tree species stumped me. Confusion between ash leaves and hickory leaves prompted me to learn more, and through UNH Cooperative Extension, I found the Natural Resource Stewards education program back in 1995.

Oak leaves also confounded me; especially the little tree sprouts with canoe shaped leaves and wavy, rounded edges. I eventually noticed the large mother tree across the road with the same wavy leaf edges, which meant it was a kind of white oak.

It has taken years to figure out this tree species, as oaks can hybridize or cross pollinate, making them sometimes difficult to positively ID, even for the experts. But when I discovered a stand of chestnut oaks growing on a dry rocky ridge top in town, their peculiarities were more evident; the distinctive deeply furrowed bark on mature

trees, the leaf shape with the rounded wavy edges, the large acorns with a deep cap, and the often gnarled, crooked trunks. Collectively, these traits make chestnut oaks easy to recognize.

Chestnut oak has evolved and adapted to survive in tough environments like rocky ridge tops, where other species fail. Consequently, it often grows in groves of single species stands on these challenging sites. But at the same time these harsh sites ensure little competition from other trees and the chestnut oaks get all of the sun and energy. Survival on such dry sights indicates that chestnut oaks can out-compete other trees because of root and leaf adaptations to survive drought. As noted in by Robert A. McQuilkin in one of his research papers, "The root system extends over an area approximately five times that of the crown area. The roots of chestnut oak are slightly deeper than those of northern red oak but not as deep as those of white oak." At the same time it needs well drained soils, which distinguish it from its close relative, swamp white oak. Its thick, leathery leaves help chestnut oaks withstand harsh sun, as well as dry air.

On completion of the series of classes, I became a volunteer on the Hillsborough Big Tree Team. Recently, I made arrangements to re-measure a chestnut oak growing nearby on private property. I walked through an overgrown forest behind the 1970s homes built on old farmland. From the remnants of stone walls revealing the land was formerly a very rocky pasture, the forest floor is now covered with poison ivy.

Chestnut oaks grow along the southern New Hampshire border, the northern edge of the chestnut oak range, meaning they struggle to survive in our cold climate. So I was totally astounded when we came over the ridge top and the tree came into view. A true behemoth! One of the biggest trees I have ever seen in New Hampshire. Growing on the western side of the ridge, it appeared to be in excellent condition; very healthy with no dead or broken branches. Nothing like the crooked scraggly chestnut oaks I had seen previously, and definitely worth the trek through the poison ivy to find and re-measure (last measured in 1998).

Although surrounded by young saplings, its symmetrical shape was evident. It is about 100 feet tall with 45-50 foot branches extending in all directions, indicating it has spent its long life in an open area. The horizontal branches are very low to the ground, so it formed its shape as a young tree. But when was that? Its pasture setting and uniform shape means it has always had plenty of sun and probably not much close competition from other trees, and perhaps a lot of fertilizer from grazing animals. But nevertheless white oaks are slow growing, meaning they make excellent, dense firewood.

It must have been close to its present size when the ice storm of 2008 devastated the region. I didn't notice any broken limbs or ice damage. Obviously, it withstood the even worse ice storm of 1998. A very strong, tough tree! If only trees could talk and tell the weather and climate history: it obviously withstood the hurricane of 1938 and all the others since, thanks to its tough structure of trunk, branches and massive root system.

Another adaptation that helped it survive environmental pressures is its thick, deeply furrowed bark. This helps it resist fires because it protects the live cambial tissue from the intense heat of a forest fire. The bark is also barrier to insects including wood borers, and prevents fungal damage to the trunk and branches.

The gypsy moth invasion of early 80s did damage New Hampshire oaks, but not to the point of death. Trees survive disease through redundancy; trees have extra leaves, and can produce a second growth of leaves if needed. So this insect stress period may have slowed the tree's growth, but didn't seriously harm it.

But even more miraculous, this amazing tree defeated the woodcutters and other economic threats. It would have been so tempting to cut it for firewood back in the late 1700s when the farmhouse was built. By the mid -1800s the New Hampshire low lands were virtually cleared for lumber and firewood. How easy to fell this tree and roll the logs down the hill to the house.

But maybe that is what did happen. The present tree has a double trunk that has grown together. Perhaps the original tree was cut by the farm family. Chestnut oak readily sprouts from stumps, and stump sprouts grow very rapidly from the already established root system. As Jon O'Keefe, Harvard Forest, explains in his wonderful book, *New England Forests Through Time*, Harvard University Press, 2000, little woodland remained by the mid-nineteenth century and the resource seemed depleted.

"But the pendulum of economic – and social – change swung yet again and relieved the pressure on local forests. Coal was introduced for heat and industrial uses," and sea and rail transport brought lumber from Maine and afar. So maybe this magnificent tree sprouted in the 1825 –1850 time period, was too little to be harvested for lumber or firewood, and then was saved by the arrival of other fuel sources, and imported lumber in the late 1800s.

Fortunately, it seems safe in its suburban setting, protected by a blanket of poison ivy covering the forest floor. Who would have ever thought there was anything redeeming about poison ivy! A defender of trees!

To learn more about the NH Big Tree program, go to: go to [nhbigtrees.org](http://nhbigtrees.org) where you will find information about how to nominate a tree. Click "State and County Listing of Big Trees." to find the list of state and county champions.