

POLLINATION AND PLANTING

Locating Flowering American Chestnut Trees

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There are several ways to generate a breeding population of American chestnut trees. You will be able to order trees from us and grow them in your backyard or in an orchard, or you can go out in the woods and find some flowering American chestnut trees. The advantage of the second approach is that you can start breeding immediately rather than waiting for the trees to grow. This article describes facts of chestnut biology pertinent to locating flowering trees.

The American chestnut tree is very common in many parts of its range. I estimate there are between 100 million and 100 billion living sprouts. As Eyvind Thor said, "It must be almost as common as the passenger pigeon was once." Like the passenger pigeon was once, the American chestnut also is threatened with extinction, in this case by the blight disease.

Most American chestnut sprouts are located in wooded areas of the Appalachian mountains and foothills. Frequently, they will be found just below the top of a hill or on mid-slope benches. Even a small hill only 50 to 100 feet high can have chestnut sprouts on it. When you do locate a chestnut sprout, look directly uphill and downhill for more. Remember that chestnut trees spread by dropping chestnuts, which tend to roll downhill.

Sprouts are not found at all the sites where the tree was originally located. They disappear when a woodlot is grazed continuously by cattle or browsed heavily by deer. Chestnut also tends to be absent from moist coves characterized by rhododendron and/or tulip tree. However, it is common on dry sites characterized by mountain laurel and huckleberry. Chestnut also prefers well-drained, acidic soils, such as sand; you will tend to find more chestnut around red and scarlet oak than around white oak.

Chestnut oak is a distinctive marker for American chestnut. The sharply defined, broadly-angled bark ridges of chestnut oak make it easy to spot. When you enter an area with chestnut oak, American chestnut sprouts frequently will be hiding somewhere nearby.

You may wonder if these chestnut sprouts are surviving because they are resistant to blight. On the contrary, almost all of them are quite susceptible. They are merely escaping infection by the blight fungus because they are small. In mature forests, chestnut sprouts grow under the shade of larger trees of other species. The lack of light keeps them small to the extent that a 1-inch diameter sprout, 6 feet tall, can be over 40 years old. Pencil-sized sprouts with only five or ten leaves can be 20 years old. Most small trees in mature forests escape infection by the blight fungus because there are not enough spores to infect very many of them. The blight fungus produces spores in cankers, or lesions on the bark of stems. The surface area of a canker determines the number of spores that can be produced, and the circumference of a stem limits the maximum area of a canker. Additionally, smaller stems are encircled and killed more rapidly by blight cankers than larger stems; after a stem is killed the fungus stops producing spores. On small sprouts in mature forest, the blight fungus does not produce enough spores to create more than one new canker on the surrounding sprouts.

When chestnut sprouts become exposed to full sunlight, they grow rapidly; their diameter can increase 1/2 inch per year and their height 2 to 5 feet. In cutover areas, 10-year-old sprouts are 4 to 5 inches in diameter. Cankers on such large sprouts are ten times bigger than cankers on small sprouts growing in the shade of mature forest, and the blight fungus in each canker produces ten times as many spores able to form new cankers. Consequently, almost all large chestnut sprouts in cutover areas are blighted by 10 years after cutting. In contrast, only 20 percent of small sprouts in mature forest have blight.

But sunlight does more to chestnut sprouts than nourish their growth. It also encourages them to flower. In addition, blight itself stimulates flowering in chestnut. Thus many sprouts in cutover areas flower between 6 and 10 years after cutting, at a relatively young age. That is where we collect much of our seed of native chestnut and where we do much of our pollinating. When pollinating in cutover areas, you do have to avoid trees with advanced blight, as they may die before bearing. They generally are characterized by a superabundance of early flowering catkins and burs.

If there is a federal or state forest in your neck of the woods, the foresters there should be glad to direct you to cutover areas. This also holds true for wood lots owned by private companies. Be sure you have permission from the land owner before you start pollinating!

One also can find flowering American chestnut trees in areas where gypsy moths have killed most of the oaks, between 5 and 20 years after the devastation. Gypsy moths do not kill all the trees in a mature forest, so most chestnut sprouts are not exposed to full sunlight. Consequently, they grow more slowly than sprouts in cutover areas, and the blight does not spread as rapidly, leading to longer lives for the flowering trees. Unfortunately for us, the trees also tend to be quite large before they flower, making them more difficult to pollinate than trees in cutover areas. The lower amounts of sunlight and blight are the probable causes of this delayed flowering.

In Connecticut, where most areas are cut selectively rather than clearcut, chestnut sprouts also persist for long periods, in a fashion similar to areas devastated by gypsy moths. The patchy nature of the amount of sunlight reaching chestnut sprouts in selectively cut and gypsy-moth-damaged areas leads to great variability in tree size. In Connecticut, it is not uncommon to find 1-inch-diameter trees growing near trees 8 to 10 inches in diameter. In comparison, most trees in cutover areas are killed by blight before they reached such a large size. Only rarely is there enough light in undisturbed forests for sprouts to attain diameters of more than 3 to 4 inches.

A final place to locate flowering American chestnut trees is along roadsides and power lines in wooded areas. Invariably, the agency in charge of the right of way has to clear out encroaching trees. As indicated above, this can lead to rapid growth and flowering of chestnut trees. Be advised that flowering chestnut trees are not frequently encountered along roads, so be prepared to do a lot of driving if you chose this last approach. The best roads to search may be those which have been constructed, widened or cleared 5 to 15 years previously. Many subdivisions are in this category.

Flowering American chestnut trees are most easily located while they are in full bloom, in the weeks around the Fourth or July. The great mass of conspicuous white catkins on larger trees is visible at great distances. The odor is also quite distinctive, especially on still mornings and evenings. Later in summer, bur-laden trees are fairly obvious. In early fall, chestnut leaves turn yellow sooner than the leaves of many other deciduous trees with yellow leaves. In late fall, the brown leaves tend to stay on the trees. To locate flowering trees in fall and winter, look on the ground underneath them for fallen burs. In spring, look for the thin green catkins which emerge soon after the leaves.

American chestnut is not the only species of chestnut you will find in the woods. Chinese, Japanese and hybrid chestnut also have been planted in many areas of the country. Dr. Phil Cordon wrote a key to chestnut species for the last issue of this Journal, Volume V, Number 1. If you are unsure of the identity of your trees, send leaf samples to the ACF Wagner Research Farm, 14005 Glenbrook Ave, Meadowview, VA 24361. In winter, you can send brown fallen leaves collected from around the base of trees.