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## **Revival of the chestnuts**

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MEADOWVIEW, Va. --

The Mighty Giants ruled the Appalachian forests until their tragic and costly demise in first half of the 20th century.

An Asian blight, discovered in New York in 1904, swept relentlessly through stand after stand of American chestnuts, killing an estimated four billion trees from Maine to Mississippi, including the western Carolinas.

The massive chestnuts supplied rot-resistant logs for cabins and barns; provided easy-to-work wood for cradles and coffins, fence posts and furniture; yielded bark tannin for tanning leather; produced nuts for food and income and forage for black bears, wild turkeys and other wildlife.

Now, a 19-year-old private program to resurrect the Mighty Giants by breeding trees to resist the deadly blight will reach a milestone in 2009. That's when the first seedlings will be planted outside of orchards, on national forest land in Virginia.

Scientists for decades have been trying to create a tree that will survive the blight, an airborne fungus. A federal effort ended in 1960 without success. In 1983, a group of plant scientists formed the American Chestnut Foundation with a goal to restore the chestnut as a wild forest tree.

Beginning in 1989, under the direction of Dr. Fred Hebard, staff pathologist, the foundation began a long-term breeding program at its Meadowview Research Farms in southwestern Virginia. The program relies on the Chinese chestnut, which is resistant to the blight. The farms now have nearly 34,000 trees of various parentages and ages in orchards. The trees carry blight-resistance genes from Chinese trees and genes from more than 500 American trees.

Breeding began with half-Chinese, half-American hybrids. Hebard and his staff "backcrossed" three generations with American trees. That dilutes out unwanted Chinese characteristics (it grows into the shape of an apple tree) and retains American traits (the forest tree grew to 100 feet).

Sometimes undesirable genes prevail. On a recent tour of the farms, Hebard pointed out a blighted half-Chinese, half-American tree. "It's blight stricken because it's got

susceptibility genes," he said, from its American parent. Hebard eliminates blight vulnerability by intercrossing the fourth generation trees with each other for two more generations. That lets offspring inherit only resistance genes.

The resulting sixth-generation trees consist of 94 percent American and 6 percent Chinese genes, which should make them highly resistant to the blight.

Hebard screens out trees with poor resistance by inoculating them with blight. In nature, the fungus enters through a wound in the bark, killing tissue and choking off the flow of nutrients.

A separate group, the American Chestnut Cooperators' Foundation in Newport, Va., uses only American chestnuts to develop a blight-resistant tree. Cooperators have planted 117,792 seedlings.

Though the pandemic swept through the Carolinas in the 1920s and 1930s, live trees still exist. One of them, showing no signs of blight, lives in Crowders Mountain State Park near Gastonia.

Steve Barilovits of Charlotte, president of the foundation's Carolinas chapter, showed me the 40-foot-high tree near a hiking trail. "It produces lots of flowers," he said, "and the order of about 20 burs a year, all of which are sterile." Chestnuts need a nearby companion tree for wind-blown pollination.

The tree is one of several dozen wild Carolinas parent trees used as a female or pollen parent in the chapter's breeding program. Volunteers have planted nuts from these crosses in 35 plots. Fourteen other state chapters are doing similar work to increase genetic and geographic diversity, growing about 40,000 trees.

Dr. Paul Sisco, plant geneticist in the foundation's Asheville office, said people discover one or two new blooming trees in the Carolinas each year. Isolation often lets wild trees avoid the blight.

Discovering a large surviving blighted tree, however, is akin to finding a gold coin. "We're most excited about that tree that's diseased but still hanging on," he said, because it exhibits resistance.

Next year, 300 seedlings will be planted in Virginia in the first test to see if the offspring of sixth-generation trees can resist the blight and compete in the wild. A site on national forest land hasn't been selected, according to forest spokeswoman JoBeth Brown in Roanoke, Va.

How long will it be before chestnuts could again flourish in mountain forests? The answer is that a comeback could take decades.

The foundation noted in a February statement that the 2009 plantings will be a first step on a long journey. "These breeding lines are still in the testing phase and their value needs to be proven on many forest sites until 2015 or 2020."

Beginning about 2015, the foundation hopes to plant chestnuts on 200,000 acres in the Appalachians over 30 years as an ultimate test of blight resistance. It might be 2050, if all goes well, before scientists can tell if the new trees are like the chestnuts of old.



Steve Barilovits of Charlotte shares a moment with an American chestnut tree in Crowders Mountain State Park near Gastonia.

### **American chestnut facts**

- The largest documented tree measured 17 feet across, which translates into a circumference of 53 feet. It was cut before 1915 near Waynesville.

- The tree hasn't been designated an endangered species because millions of stumps still produce leafy shoots. The blight doesn't kill roots.
- Chestnuts produce up to 6,000 nuts per tree compared to 1,000-2,000 for oaks, according to the National Wild Turkey Federation. The nut is so nutritious that it has been described as "a grain that grows on a tree."

**Want to know more?**

See [www.acf.org](http://www.acf.org), the American Chestnut Foundation, and [www.accf-online.org](http://www.accf-online.org), American Chestnut Cooperators' Foundation. Two informative books are "American Chestnut," by Susan Freinkel, and "Mighty Giants/An American Chestnut Anthology," edited by Chris Bolgiano and Glenn Novak.