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Planting a comeback

FOES FIGHT CHESTNUT TREE BLIGHT



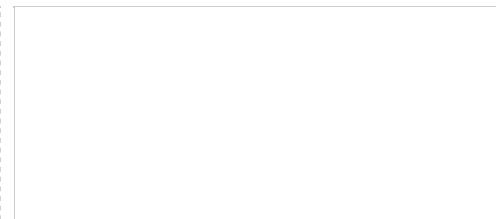
Denis Melican, supervisor of Moore State Park, in the chestnut tree plantation that was started there in 2003. The tallest tree now is 27 feet high. (T&G Staff / JIM COLLINS)

By **Bradford L. Miner TELEGRAM & GAZETTE STAFF**

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PAXTON — For decades the American chestnut — an icon of Americana and vital component of Eastern U.S. forest ecology and economy — seemed lost for all time.

Even the combined resources of the federal government, state environmental agencies and plant



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scientists had failed to eradicate or slow the airborne pathogen that had killed billions of chestnut trees since first being identified in New York City in 1904.

But in 1983, a cadre of prominent plant scientists took another look at the American chestnut and its remorseless foe.

Founding The American Chestnut Foundation, their goal was to develop a seed or nut that would produce a healthy chestnut tree with fully American chestnut characteristics, but for one thing: Built into the chestnut's genetic makeup would be the blight resistance that allowed its cousin, the Chinese chestnut, to thrive throughout Asia, where the blight fungus originated.

The foundation hoped to work with state chapters in spreading resistant seeds, seedlings and nuts throughout the previous range of the American chestnut — Maine to Florida, the Piedmont to the Ohio Valley — resetting the clock to pre-blight time, returning the American chestnut to prominence in the Eastern landscape.

If not, then the American chestnut, much like the village smithy romanticized by Henry Wadsworth Longfellow in 1841, would be relegated to the pages of poetry and history.

It now appears the foundation was successful.

Lois Breault-Melican, a board member of the Massachusetts Chapter of The American Chestnut Foundation and a park interpreter with the state Department of Conservation and Recreation, said that at the national level, the foundation is ready to begin reforestation in forests that originally constituted the range of the American chestnut.

The state chapter is not quite that far along, she said, but hopes to establish a seed production orchard in Granville, in Hampden County, by planting the most blight-resistant of genetically crossed nuts from the foundation's research farm in Virginia.

The foundation's path to success was predicated on breeding blight resistance from the Chinese chestnut tree into the American chestnut tree, while maintaining the American chestnut's characteristics.

The foundation began with a cross of American and Chinese chestnuts for a 50-50 mix. Those hybrids were then crossed back to an American chestnut again and again until the only Chinese characteristic present in the hybrid was resistance to the blight.

When Bruce Spencer of New Salem retired in March 2006 from the state's Division of Watershed Protection as chief forester of the Quabbin and Ware, he wasn't ready to walk away from forestry entirely.

Mr. Spencer joined the foundation that year and in 2007 established a chestnut research orchard on his Cooleyville Road property.

"To achieve our ultimate goal of restoring the chestnut



Saving the American chestnut tree

Chestnuts for roasting are now imported from Europe, primarily Italy, or Asia because very few American chestnut trees reach sexual maturity. Most are killed in the sapling stage by an Asian fungus, *Endothia parasitica*, that causes "chestnut blight." Almost all remaining American chestnuts are root sprouts from trees whose primary shoots were killed by the fungus in the 1920s and 30s. The root sprouts are already infected with the blight and the young trees are doomed before they even begin to grow. Scientists are hoping to use the Chinese chestnut tree's resistance to the blight to help a comeback of the American Chestnut tree.

American chestnut <i>Castanea dentata</i>	Leaves	Chinese chestnut <i>Castanea mollissima</i>
American leaves are more narrow. American has longer, more arching teeth	Fruit	Chinese has fine hair on the lower surface and on the petiole (leaf stalk)
Contained in burrs. American is 1/2 to 1 inch in diameter	Twig	Chinese is gray-brown in color and is covered with fine fuzz, especially near the tip
American chestnut-brown in color and hairless	Bark	Chinese is gray-brown to brown, rapidly becoming furrowed, but without distinguishable patterns
Smooth and chestnut is brown in color when young, later shallowly fissured into flat ridges	Form	Chinese tends to be more spreading
American tends to be more upright	Range	Florida to Canadian border in U.S. China, Korea and Taiwan in Asia

Source: Virginia Tech T&G Staff/DON LANDGREN JR.

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The chestnut blight on one of the trunks of an infected tree. (T&G Staff / JIM COLLINS)

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to its former place of prominence, we first had to diversify the American chestnut gene pool, establishing those traits that bolster resistance to chestnut blight," Mr. Spencer said.

"I can say it's been a long process, each year building upon the success of the prior growing season," he said.

Massachusetts chapter members have begun inoculating trees in some of the older research orchards with more potent strains of chestnut blight fungus to determine the degree of disease resistance, said Mr. Spencer.

"In all of the orchards inoculated so far, most of the trees either died or became seriously infected," Mr. Spencer said.

Of the few that do survive, seeds are gathered and pollinated and become the basis for the next step — transition from research orchard to seed production orchard.

"These survivor seeds represent the best hope we have today of restoring the American chestnut to mixed hardwood forests, where they were once a dominant species," Mr. Spencer said.

Before the blight, wildlife species from birds to bears had come to rely on the productive chestnut's annual nut harvest. Humans competed for the same harvest, gathering chestnuts in bushel baskets to use or sell as inexpensive food for livestock, or for their own consumption.

In rural communities, the chestnut lumber industry flourished with the straight-grained and easily worked, lightweight and rot-resistant wood an ideal material for fashioning into fence posts, rail ties, barn beams, home construction and fine furniture.

Mr. Spencer said annual data he sends to the foundation include tree growth measurements and tree mortality, including cause.

He said he was not surprised when one chestnut succumbed to the blight this year and immediately sprouted back from the roots to become the tallest tree in the orchard.

"The growth was the result of having a root system already in place, and the tree grew 4 to 5 feet in a single season," he said.

Denis Melican, DCR supervisor at 400-acre Moore State Park in Paxton, learned about The American Chestnut Foundation in 2003 and got involved.

"That summer, we planted 233 back-crossed germinated seedlings in our research orchard here at Moore State Park," Mr. Melican said.

"The germinated seeds resembled very young tomato plants for the first couple of years, but with the addition of some rustic rope fencing, and a growth



A 2010 picture of the first successful chestnut to have grown on one of the Moore State Park trees. (T&G Staff / JIM COLLINS)
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The chestnut tree plantation at Moore State Park. Supervisor Denis Melican says it has the lowest mortality rate of any in Massachusetts. (T&G Staff / JIM COLLINS)
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spurt or two, there's more definition to the orchard, and more curiosity on the part of visitors."

People have become attached to this project, he said, because it's a comeback story and the rate of tree growth has accelerated. The tallest chestnut is 27 feet.

"I think what also makes us very proud is the fact that the Moore Park orchard has the lowest tree mortality rate of any of the 29 orchards in Massachusetts. I'm not sure why that's the case, but it is," Mr. Melican said.

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An American chestnut tree sprouts from an old chestnut tree killed in the chestnut blight at Harvard Forest in Petersham. (T&G Staff / TOM RETTIG)
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“ These survivor seeds represent the best hope we have today of restoring the American chestnut to mixed hardwood forests. ”

-- BRUCE SPENCER, ORCHARD OWNER