

Effort to establish blight-free American chestnut tree switches gears

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UNIVERSITY PARK, Pa. -- The three-decades-old initiative to restore American chestnut trees back into forests in the eastern United States has entered a new phase, according to an expert in Penn State's College of Agricultural Sciences.

The primary focus of the project has transitioned from cross-breeding to testing and reintroduction into forests, noted Sara Fitzsimmons, northcentral region science coordinator for the American Chestnut Foundation and a research support technologist in Penn State's School of Forest Resources.

It may take centuries until American chestnut again grows wild across its original range -- from Maine to Georgia and west to Indiana and Michigan, she said. Still, Fitzsimmons envisions a day when the huge trees again will dominate the forests of Pennsylvania and other states.

"We are continuing a six-generation breeding program that we think has produced trees with both full American character and blight resistance," Fitzsimmons said. "Now that our latest plant material has been introduced into the forests, we know that some of the trees will survive -- but it is the percentage of trees that will survive that is in question.

"We can't know until we get through this testing phase. And the crossbreeding will go on, to strengthen the blight resistance."

The demise of the American chestnut is one of the great ecological disasters of our time, Fitzsimmons pointed out. Through the first half of the 20th century, the species (*Castanea dentata*) -- which was by far the dominant forest tree species in Pennsylvania and the East -- was virtually eliminated from the landscape by an Asian blight fungus (*Cryphonectria parasitica*) carried on exotic plant materials imported by plant explorers in the late 1800s.

The slow process of introducing blight resistance by crossbreeding Chinese chestnut trees with American chestnuts, and then backcrossing the hybrids with American chestnuts to select for desirable American chestnut form and traits is

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close to fruition. The American Chestnut Foundation has been spearheading the effort since the early 1980s.

To date, the American Chestnut Foundation, which has approximately 6,000 members (about 1,000 in Pennsylvania), has produced 25,000 to 30,000 one- to two-year-old, sixth-generation seed and seedlings that should be blight resistant. These seedlings have been planted by the group's members, partners and the U.S Forest Service.

The foundation believes the sixth-generation plant material has a large measure of blight resistance and exhibits almost entirely American chestnut characteristics, Fitzsimmons noted.

"Now, we have started a new paradigm, a new phase of research," she said. "After 28 years of breeding and a little bit of testing, we have started large-scale testing and reintroduction at the same time."

Unlike previous, smaller trials, in which foundation scientists inoculated the young chestnut trees with the blight to see early on which ones would prove resistant, Fitzsimmons explained that in the current phase, natural infection mostly will eliminate trees that are not blight resistant. But it will take time.

In the forest, Fitzsimmons pointed out, it can take more than a decade for an American chestnut tree to be infected by the blight and die. "So it is going to take 10 to 15 years to find out how our sixth-generation plant material is doing," she said. "We will see what survives in the forests and learn if we have solved the resistance puzzle.

"The results will show us what lines are truly blight resistant and which lines we should discard."

Fitzsimmons said she frequently is asked where people can get a blight-resistant chestnut tree. "We currently provide our latest blight-resistant material to members and partners, but we won't be offering our material to garden stores until we are confident that we have a very high level of blight resistance. And that won't be for another 10 or 12 years."

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The public doesn't grasp the enormity of the chestnut-restoration project, Fitzsimmons suggested. But she said it would be difficult to exaggerate the historical importance of the American chestnut in Eastern forests. By around 1900, it comprised up to 25 percent of hardwoods in its huge range.

In virgin forests throughout their range, mature chestnuts are said to have averaged up to 5 feet in diameter and up to 100 feet tall. Many specimens of 8 to 10 feet in diameter were recorded, and there were rumors of trees bigger still.

"Due to their abundance and enormous size, the American chestnut once ranked as the most important wildlife plant in the eastern United States," said Fitzsimmons. "A large American chestnut tree could produce 10 bushels or more of nuts annually.

"Chestnut mast supported many species indigenous to Pennsylvania, including squirrels, wild turkeys, white-tailed deer, black bears, raccoons and grouse, which once depended on chestnuts as a major food source."

Contact

Jeff Mulhollem

Email: jjm29@psu.edu

Chuck Gill

Email: cdg5@psu.edu