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Georgia chestnuts will need more than blight resistance

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One down, one to go.

The American Chestnut Foundation has worked for decades to develop a blight-resistant chestnut tree with American characteristics that could be planted in the wild. They believe they've now achieved that goal.

But although the blight wiped out most of the giant trees that once dominated Georgia's forests, it was actually the second wave of the foreign attack.

In Georgia's Piedmont region, with its warm weather and lower elevation, many chestnuts were killed off by root rot during the 1800s before the blight even arrived. And Clemson University researchers have found that the new hybrid chestnuts remain very susceptible to root rot.

So the American Chestnut Foundation is just beginning the process of selecting plants to breed for root rot resistance, with the intent of making chestnuts resistant to both of its most devastating threats, the foundation's director of operations told a large group of Georgia foresters in Macon recently.

Jeff Donahue, who heads up the chestnut breeding program for the foundation in Virginia, updated Georgia Forestry Commission foresters about progress at restoring chestnuts to the Eastern forests.

Foresters asked many questions about root rot, and Donahue asked them to help identify surviving American chestnuts in the Georgia woods. These foresters, who provide guidance to private forest owners, would likely be on the front lines of spreading the species.

Scott Griffin, a commission staff forester in Gainesville, told foresters that the commission planted a test orchard of chestnuts near Dawsonville this year, finding the site suitable for a large planting of the new, blight-resistant hybrids in fall 2013.

"We're excited about the possibility of getting some of those seedlings," he said. "Hopefully, if it got to where (chestnuts) had blight and root rot resistance, we'd work with landowners and researchers on how to establish it in the wild.

"It can be difficult to establish a slower-growing tree in the forest, but what we learn at that orchard could be part of the answer."

However, Donahue told foresters that although the "Restoration 1.0" chestnut has been bred for blight resistance, "a good amount of seed coming out of these orchards is still not resistant."

This first generation released for wild planting probably has an intermediate resistance to blight, said Martin Cipollini in an earlier interview. Cipollini is a Berry College professor who coordinates the Georgia chestnut breeding program for the Georgia chapter of the American Chestnut Foundation.

He explained that scientists used parent trees with varying amounts of blight resistance -- not just the most resistant ones -- to try to broaden the gene pool and prevent the pitfalls of inbreeding.

"The hope is that they'll breed with wild chestnuts and capture their genetic diversity," he added.

Dozens of Georgia sites

Although the national foundation has been working on its "restoration chestnut" for decades, Georgia's own foundation chapter is working on its own regional chestnut lines, too. It crosses the American Chestnut Foundation hybrid trees with surviving Georgia chestnut trees like the ones at Pine Mountain, Cipollini said.

The state program is 5 to 10 years away from having its own blight-resistant chestnut with genetic material from Georgia trees, he said.

"In Georgia we have 100 or more sites where we've planted chestnuts, including hybrids," he said. Among them was a demonstration planting of South Carolina chestnuts last year on the Dry Branch farm owned by Rolling Stones keyboardist Chuck Leavell.

In addition, Georgia is already home to two large plantings of the foundation's restoration chestnut trees, Cipollini said. The first, near Lake Allatoona, includes 500 trees. A second was planted near Blairsville in November. The North Georgia planting included about 700 trees, said Tom Saielli, Southern Regional Science Coordinator for the American Chestnut Foundation.

These plantings will be monitored to keep tabs on their success, but they'll be allowed to survive or fail on their own, Donahue said.

Georgia scientists are helping preserve the hybrids so their genetic material remains available even if they do struggle initially in the wild. Scott Merkle at the University of Georgia said he has cloned some of the new restoration chestnut genetic material, and the cloned plants are growing in pots now.

Merkle's lab became part of the Forest Health Initiative in 2009, which focuses on genetic work instead of breeding. The initiative has accelerated work on identifying blight-resistant genes and inserting them into American chestnuts.

The initiative is funded by Duke Energy, the U.S. Forest Service, and the U.S. Endowment for Forestry and Communities, which provided Merkle's lab with $1 million over three years. Merkle said he is in the process of applying for renewed funding now.

Some of the trees with genes inserted for blight-resistance have been planted in a test orchard in Athens, he said, but trees with the most promising genes will probably move outside the greenhouse for the first time next year.

The initiative also seeks to understand whether people will accept these transgenic chestnuts and how the federal approval process for them would work. Eventually, cloning techniques could allow commercial timber companies to generate enough seeds to plant 1 billion trees a year, Merkle said.

"Restoration 1.0" is a big step forward, but success remains unclear.

"It's not over," Cipollini said. "The goal is to restore the American chestnut to its native range. ... The goal is not, and never has been, to generate a perfect tree and everyone can plant it in their backyard."

The bigger issue, he said, is whether restoration can truly be sustained.

"If this organization can pull this off, it could be a template for the recovery of other species" such as hemlocks, which are being wiped out by an Asian bug.

Lakeside on Allatoona, August 2011

Corps Working to Re-establish American Chestnuts
By Chris Purvis
Park Ranger

The American Chestnut tree was an essential component of the entire eastern United States ecosystem. A late-flowering, reliable, and productive tree, unaffected by seasonal frosts, it was the single most important food source for a wide variety of wildlife from bears to birds. In the early 20th Century, a disease known as the Chestnut Blight was introduced to the North America Chestnut population. The blight, imported to the U.S. on Asian Chestnut trees, is a fungus dispersed via spores in the air, raindrops or animals. The blight successfully wiped out almost the entire Chestnut population in the eastern US, a population once as numerous as the Oak.

While the American Chestnut trees died, the root systems of chestnut's still lived and provided new trees where the old ones once grew. These trees too are susceptible to the blight and usually live to an average age of 5-10 years old. It's from these trees though, that the American Chestnut Foundation created a backcross breeding program that took Chinese Chestnut trees, naturally resistant to the blight, and crossed them with their American cousins. New blight resistant trees are now being colonized basically made up of 75% or more of American Chestnut and 25% or less of Asian Chestnut.

The U.S. Army Corps of Engineers at Allatoona Lake are currently working in partnership with the Georgia Chapter of the American Chestnut Foundation on the Allatoona Lake Chestnut Restoration Project. The project will consist of the American Chestnut Foundation providing both blight resistant seeds and backcrossed trees for planting. The society will also offer expert analysis and advice on the project including soil testing, test orchards, and assistance with backcrossed orchards. The U.S. Army Corps of Engineers at Allatoona would provide areas suitable for planting, such as a backcross orchard on the north side of the lake and a demonstration site near the Allatoona Operations Project Management Office where the public can find out more about the tree. This is the first large program in the State Georgia committed to restoring the American Chestnuts to its previous glory. Questions concerning the program should be directed to the Corps Office at 678-721-6700.

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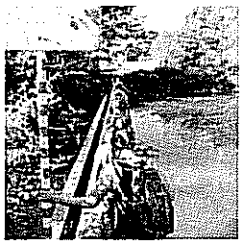

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Conservation Project: American Chestnut Restoration (/node/338530)

Submitted by slouis.corps on Sat, 07/07/2012 - 19:47 Progress Reports from the Field (/category/corps-post-type/progress-reports-field)

We woke up early in anticipation of our conservation day. Earlier in the month we were notified that our conservation project at Allatoona Lake was going to be TOP SECRET. We were working with hybrid chestnuts at **LOCATION REMOVED** and pretty much tending to them. The hybrid chestnuts are a backcross of Chinese and American Chestnuts. Before the 1900's American chestnuts were a main part of the hardwoods in the eastern United States. Chinese chestnuts were brought from Asia for landscaping purposes and brought with them a fungus that would eventually kill off most of the American chestnuts in the Eastern U.S. While American chestnuts used to be upwards to 60-100 feet tall, they are now small shrubs that end up dying off before producing fruit. The chestnut blight has since been on the run and the American chestnut foundation has been looking for solutions to the problem. They have since created these hybrids. The newest hybrid is located at Allatoona Lake at **LOCATION REMOVED** and is the only orchard in the U.S. The trees are the product of decades of hard work and the Army Corps along with the American Chestnut Foundation are monitoring them in hopes of them producing fruit and nuts which then can be transferred into the forests. Our job is to water about 300 of these plants, weed the surrounding areas, and record data about their status. The day started off early and we met around 9 with Park ranger Shea to start our work. I came out with my camera and snapped pictures of blue tubes with tiny plants. We started weeding with weed whackers and recording data while the sun came up. The area was tall with weeds and it took eight hours to get the job done. By three, we were all hot and exhausted. This work is hard especially under the summer sun. The finished product was happy trees and a clean area.

Written by Angela

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Partners and volunteers at work at the Chestnut restoration site.

Partners and volunteers at work at the Chestnut restoration site.

Top – Ranger Shea Sennett with Partners and Volunteers.

Bottom – Interpretive panel at the Demonstration Site.

Left –Exhibit in the Allatoona Visitor Center.

Below – The Chestnut Restoration site in Bartow County, GA.