



Fall 2018

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Leaf Collection for Landscape Genomics Project

The American Chestnut Foundation is collecting a range-wide sample of leaves from 1,000 American chestnut trees for a landscape genomics study. The objectives of the study are to:

1. Quantify geographic patterns of genetic diversity in remnant American chestnut populations, and
2. Test for associations between genetic variation in chestnut trees and climate and soil variables across its historical range.

Results will inform TACF's efforts to incorporate trees into our breeding program that represent the genetic diversity and adaptive capacity within *C. dentata* post-chestnut blight. In addition, it is an article of faith that chestnuts, even though they are the same species, have a lot of local adaptation in their genetics throughout their native range. When it comes time to begin reforestation in earnest, understanding which progeny are adapted to which types of site will help ensure a successful reintroduction.

The summer's goal was to collect leaves from 200 wild, surviving chestnuts from the 40 different sites, from the coast to the mountains, from the northern to southern borders. The number of American chestnut trees from which we collected leaves was proportional to the fraction of the historical range area represented by Virginia

multiplied by the density of American chestnut stems.

Samples from contrasting sites within each state include high elevation vs. low elevation, east vs. west of the Appalachian Mountains, and unique isolated populations of American chestnut. Sampling trees from contrasting environments increases the power to test for associations between environmental variables and DNA sequence variation.

Photographs, diameter, height, GPS coordinates and other data from each tree in



Tom Saielli explains the differences in leaves

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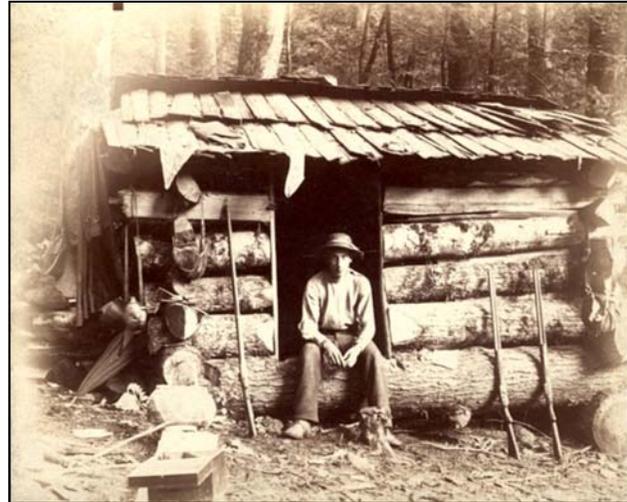
Fall 2018 President's letter

By Cathy Mayes, Virginia Chapter President

Readers of this newsletter know there are many reasons for restoring American chestnut—benefits to forest health; addition to plant biodiversity; a reliable, nutritious mast crop for forest wildlife; and capturing carbon. You also know restoring American chestnut will boost the Appalachian economy, offering jobs in forestry, nut production and timbering. There are also benefits to restoring chestnut on land that is not currently forested, especially in areas that are unsuited for agriculture. Here, the primary benefit is environmental health. There is little doubt that deforestation of the earth has increased soil temperatures and atmospheric carbon and reduced soil moisture, contributing to global climate change.

But the same reasons can be said for many native plant projects. What makes American chestnut uniquely worth saving is the emotional connection people have with the tree. Mostly that connection today is second hand: few people are old enough to remember the chestnut culture in Virginia before it ended, but quite a few of us remember their stories. Nostalgia can pass from one generation to another, although with each passing, it wanes. We have to teach the history of Virginia to keep the stories alive.

Europeans who settled the mountains ate chestnuts boiled, ground, roasted, and raw. They found the American nut smaller but much sweeter than those they were used to from the Old World. Settlers also depended on the wood: it was light, strong, easy to work and resistant to decay, making it suitable for almost everything they had to construct: furniture, houses, outbuildings, fencing, coffins, musical instruments, and later, railroad ties and tele-



graph poles.

Pioneers sold things made from forest resources for cash to buy what they couldn't make or forage. Chestnut wood was a stand-out for making crafts and case goods.

Chestnuts themselves had no cash value until there was a way to get them to market. The scale of the chestnut trade varied widely depending on local transportation systems. Railroads built to haul timber brought about a huge expansion of the trade, shipping large volumes of nuts to population centers in the north. Some communities collected tens of thousands of pounds of nuts and shipped them to urban areas. For a couple decades, chestnut shipments were the largest source of revenue for Virginia railroads. People near rail lines started managing chestnut groves to make it easier to gather large quantities of burs. These groves were naturally occurring or remnants of the era when Indian managed the forests: trees were not planted, but were managed by removing competing woody plant species.

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Chestnut wood itself being so common was not initially considered economically valuable, so there was little competition between the timber and nut producers. Loggers cut the prime trees; but only later did the practice of clear-cutting become economic. Then a method was developed to extract tannin from the wood, making chestnut wood vitally important to the tanning industry. In 1914 there were 9 chestnut extract plants in Virginia. We will never know whether people would have continued to protect their chestnut groves if the profits brought about by clear-cutting had not been cut short by the blight pandemic.

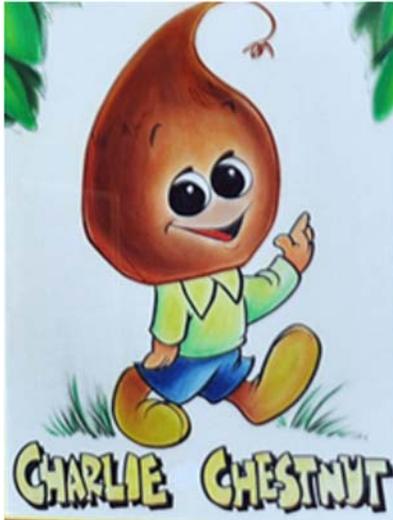
Descriptions of the blight impact are chilling. People remember that during wind storms, the noise of dead chestnut branches cracking and big trees falling was worse than the wind. For a few years, there were massive salvage operations to harvest the wood before insects and fungi could devour them. After that, only moonshine and apples remained to sustain the poor, subsist-

ence farmers of Appalachia. Eventually, other species colonized the vacant woods, but residents who once could live off the chestnut were forced to take wage jobs in cotton mills, coal fields, and furniture factories. When we restore chestnut to the Appalachian forest, we may not return to subsistence farming, but gathering and whittling chestnut may once again be fun pastimes.



Using Charlie Chestnut to teach kids about the American Chestnut Tree!

Charlie Chestnut is now the star in a new kid's workbook meant to teach children in grades 3 and 4 the story of the American chestnut tree, as well as the efforts to restore this magnificent tree to the forest.



“Bringing Back a King of the American Forest” by Doris A. Goldman is a short story coloring book that begins by giving the young reader an overview of the American chestnut tree and its keystone position in the Eastern American Forest. The book goes on to provide an easy-to-understand description of “Back-Crossing” to explain how a blight-resistant American chestnut tree can be created via this method.

After learning the basics of Back-Crossing (or in other words Mendel Genetics!), children can have fun with Charlie Chestnut by helping him find his American chestnut words in a fun word search puzzle, find his way to a seed orchard through a maze, or con-

struct their own Charlie Chestnut by connecting dots!

The Virginia Chapter will be compiling workbooks to distribute to 3rd and 4th grade teachers throughout the state. Requests can be sent to Cindy Ingram at ingramcx@dukes.jmu.edu or workbooks can be downloaded from the VA TACF Educational Materials Page and put into folders as a DIY project. We welcome feedback on the worksheets as well as suggestions for new pages for the workbooks!

Annual Meeting November 10

The TACF annual meeting will be held on November 10 at the Nelson Center in Lovingson, VA. The Board Meeting will be held at 10:00, with a general membership meeting starting at 1:00 pm. The purpose of the meeting will be to report on the 2018 breeding season and to elect officers and directors. The program includes a tour of the chestnut grove at Lesesne State Forest. The speaker will be Rob Farrell, Virginia's State Forester, who will talk about “Looking Forward at the Virginia Department of Forestry.”



Lesesne State Forest

Inoculating at New Kent

We had a great day on July 20th at the New Kent Forestry Center! It was a gorgeous day and we stayed cool enough in the shade of the ops building. With 24 folks working, we were able to inoculate about 1400 chestnut seedlings in under five hours. That's pretty impressive and it shows how much progress we can make when you are willing to volunteer to help out!



Volunteers inoculating seedlings at New Kent Forestry Center

The best part is how much fun it was working with great folks. We had a really



Tom Wild and Warren Laws work with volunteers inoculating seedlings at New Kent

great day doing exciting research. Fingers crossed, we will learn important and exciting things about the ability of these chestnut trees to survive when replanted.

The next step will be to rate cankers resulting from the inoculations. Any volunteers interested in helping with that will be welcome.



Having a great team of volunteers made it a successful day!

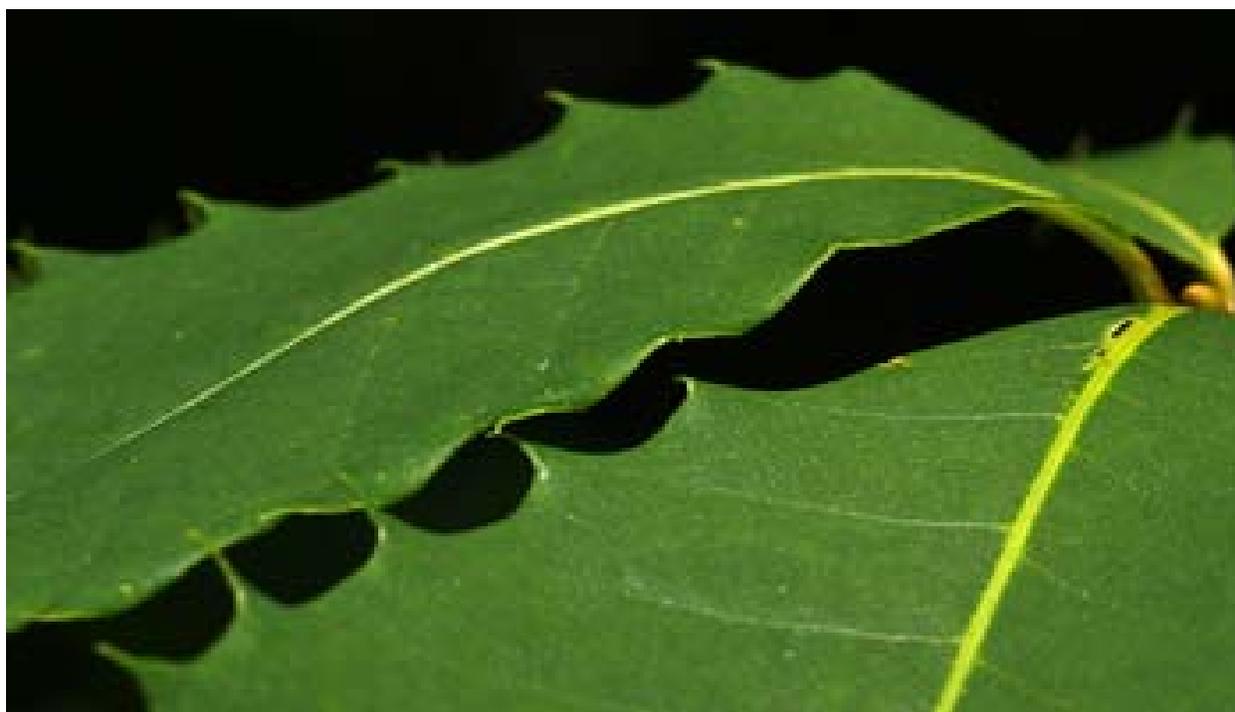
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the sample were recorded using the TreeSnap application for smart phones (<https://treesnap.org/>).



The project was initiated by generating a list of wild American trees in the national chestnut data base (called, appropriately, dentataBase for the species' botanical name). Not surprisingly, a fair number of the trees we had located in past years are no longer surviving, although some had new sprouts, so we were able to capture the genetics of those.

For volunteers, one of the pleasures of the project was contacting local foresters, master naturalists, park managers, and our own members for help finding living specimens. People who have surviving chestnuts are uniformly proud of their trees, even if they are sometimes misshapen and scrawny.



New Greenhouses at Meadowview By Eric Jenkins

If you have visited Meadowview Research Farms in recent months, you might have noticed three new structures, a greenhouse and two shade houses.

Discussions began in February 2017 about facilities that were needed to improve production of containerized seedlings. Previously, we had a simple outdoor “grow pad” that was vulnerable to nut predation by birds and other wildlife. A heated greenhouse would allow us to start seedlings perhaps as early as January, rather than waiting until the risk of frost has passed. Having greater control over irrigation and environmental conditions would be another benefit.

We ultimately decided on a 30' x 96' greenhouse and two 20' x 96 cold frames. The cold frames will serve as shade houses for “hardening off” seedlings started in the greenhouse. Materials and design were purchased from Stuppy, Inc. The greenhouse was built using their “Rainbow Plus” design and the cold frames using their “PowerHouse” design (<https://www.stuppy.com/>).

In addition, the decision was made to drill a well for the water supply. The average well-depth for our area is about 150-250 feet, but the ultimate depth for our well was 410 feet. Chestnut seedlings prefer a low pH environment, but in our region most well-water is somewhat basic (has a pH value above 7), so we added an acid-feed system to the design to lower the pH of the irrigation water.

The new greenhouse has been filled to capacity this year. In March over 4,800 nuts were planted for small stem assay

tests. These were inoculated in June and evaluated in August by volunteers and staff. An additional 3,000 seedlings for field progeny tests and seed orchards were started in the greenhouse and are now growing in the shade houses.

Initial funding for the project came from the Virginia Chapter through a bequest left by George Cole with remaining funds from donations to TACF's 2017 Spring Appeal. A dedication ceremony was held on March 22, 2018 honoring TACF chairman emeritus, Richard S. Will.



Meadowview shadehouse

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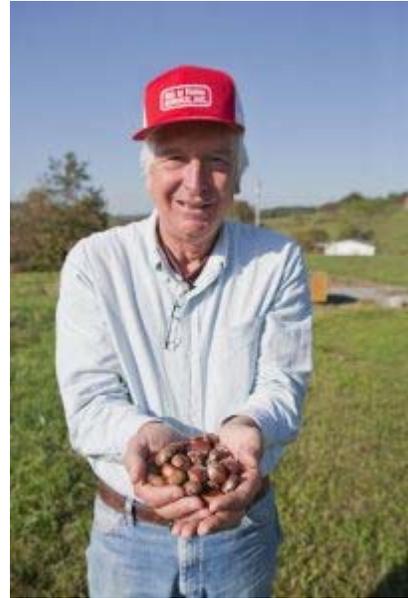
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Volunteer Profile—Fred Hebard

The chapter's Vice President for Science is the retired Scientist Emeritus of The American Chestnut Foundation, Dr. Fred Hebard. Hebard is a gray-haired, wiry man strong enough to wrestle a chain saw 10 hours a day and such an outdoorsman that he can't tell you whether it's raining or frigid cold.

Hebard can tell you every tree in the Virginia breeding orchards and who its parents were. His are the brains that tell us which seed to plant where, which tree to save, and which pollen to use to make sex with each tree. He carries in his mind the vision of the Eastern forest restored with four billion chestnut trees. "One of my great revelations was when I got poked in the eye by a chestnut twig," he says. "It was that they didn't give a [expletive] that I was trying to help them."

A graduate of Virginia Tech, Fred was hired by The American Chestnut Foundation to start its breeding and restoration program on a small leased farm in southwest Virginia. For the next more than two dozen years, he was the face of chestnut breeding science in America and around the world. Retirement freed him to get out of the lab and the front office, back into the fields of growing saplings. He is our muse, our mentor and may well be the savior of our mighty chestnut.



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Virginia Chapter

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