



The West Virginia Chapter of The American Chestnut Foundation NEWSLETTER



In the heart of American chestnut's natural range

February 2021

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New Look

A new year, a new look. I started the WV chapter newsletter in 2016 using a template from *Microsoft Word*, with the iconic large American chestnut trees in the header. It was a quick and easy way to start our first newsletter. After a few years, I felt that the newsletter needed a header that was specific to the State of West Virginia. I was still using *Word* to produce the newsletters and, with the help of Jules Smith at the national office, I developed a new header that included an outline of the State of WV and a chestnut leaf. In recent months, a good friend of mine informed me of a powerful tool, *Adobe InDesign*, that I should use to produce our newsletters. My initial reaction to *InDesign* was it is way too complex for me to grasp. I struggeld mightily and I was ready to give up and continue with the easy-to-use template in *Word*. However, my friend encouraged me to learning something new. After all, *InDesign* is a very powerful program, used to make magazines, advertisements, etc. I have spent hours on tutorials trying my best to learn enough to use *InDeisgn*. While I have not mastered more than 10% of the features, I believe I have learned enough to give the new program a fair shake. Bear with me as I continue to learn.

--Editor

Potential New WV State Champion Tree

The old adage goes, "If a tree falls in the forest and on one is around to hear it, does it make a sound?" Does the same hold true for a state champion American chestnut? If there is a large American chestnut in the forest and no one knows about it, is it a state champion? With the aid of WV chapter member, **Richard Wernicke**, WV Department of Forestry forester for Randolph County, a potential new state champion American chestnut has been documented in southern Randolph County. The tree is blight-free and 80' tall. It has a DBH of 19.5", a circumference of 65" and a canopy spread of 55.5'. On a cold day in late January, **Amy Metheny** from the Division of Plant and Soil Sciences, her husband and arborist, **Rob Eckenrode**, Randolph County forester, Richard Wernicke and WV chapter president, **Mark Double**, took a drive to southern Randolph County to meet with the landowner, **John Dearborn**. According the John, the tree was in a large thicket of Eastern Hemlock. The invasive pest, wooly adelgid, killed the hemlocks and John cut them down. Only when the hemlocks were removed did the American chestnut become

visible. John knew immediately that the hidden tree was a chestnut, but he was unsure if it was an American chestnut or not. With the expertise of the visitors, the tree was identified as an American, based on leaves (collected from the snow on the ground and buds from root sprouts).

The tree, seen below, had copious burs, but they were not fertilized, since there is not another American chestnut within pollinating distance. John's father-in-law who lives nearby has a Chinese chestnut, so John was urged to keep a close eye on the potential new state champion tree for any signs of cankers.

A member of the WV Big Tree program will measure the tree before confirmation can be made.



Pictured are (L to R) are Amy Metheny, landowner John Dearborn (standing) and Randolph County forester, Richard Wernicke.

Chestnut Chats

In the age of Covid-19, we have all learned to adapt to the pandemic. One of the adaptations made by the TACF at the national level is **Chestnut Chats**. For those members who have not "tuned in", I urge you to take advantage of this newly crafted information platform. Not everyone can tune in live to the events, generally scheduled Fridays at 11:30 am, but the sessions are taped, and you can watch them at your convenience. Upcoming chestnut chats include: "Controversies of American chestnut restoration" (19 March) by a panel of TACF members; "Cruddy bark and the complex world of blight cankers" (16 April) by Mark Double, WV chapter and Laurel Rogers, Shenandoah University; and "Phytophthora root rot" (21 May) by "to be determined". If you would like to listen to prerecorded sessions, they can be found on TACF's website at: acf.org/resources/chestnut-chat-series/.



Spotlight on a WV Chapter Board Member Dr. Melissa Thomas-Van Gundy



"I have formal research on-going at two experimental plantings on the Monongahela National Forest, one near Cowen and one near St George".

This new column focuses on the background of some of the board members of the WV chapter. The first focus is **Dr. Melissa Thomas Van Gundy**, research forester with the USDA Forest Service, Northern Research Station in Parsons, WV (Tucker County).

Where were you born and where did you attend school (high school and college).

I was born in Columbus, Ohio but we moved to, New Holland, PA when I was young where I went to Garden Spot High School. I came to WV on a camping trip as a kid and wanted to go to college in

WV, so I came to Davis and Elkins College in Elkins for my undergraduate degree. Then to the State University of New York, College of Environmental Science and Forestry in Syracuse for a master's, and finally West Virginia University for a Ph.D.

Where do you work and what are your job responsibilities?

I am a research forester with the USDA Forest Service, Northern Research Station, Parsons WV. My research includes stand- and landscape-level projects at both long- and short-term time scales. Most of this work is focused on the restoration and sustainable management of forested ecosystems. This includes the use of prescribed fire in oak forests and management practices for red spruce forests. I am also the scientist in charge of the Fernow Experimental Forest, including long-term research of forest management and supervise six employees.

How did you become interested in American chestnut?

The story of the loss of American chestnut is one I heard many times in my formal education. When I came to the Monongahela National Forest as a forester in the early 1990s, I was asked to collect American chestnut leaves for a genetic research study by a forester in the Southern Region. This opened my eyes to how many American chestnuts were still in the forest. I didn't join TACF till a bit later, but as I thought about the past forests and fire regimes of WV, American chestnut looms large.

Are you currently involved in chestnut research? If so, provide a few details about your work.

Yes I am. I have formal research on-going at two experimental plantings on the Monongahela Na-

tional Forest, one near Cowen and one near St George. At both sites, an area was clearcut, fenced, and planted with a variety of hybrid, American and Asian chestnuts. These seedlings were supplied by TACF and the foundation had input into the development of the research goals, namely tracking the growth and health of these trees to determine if the third-generation hybrid has the form of the American chestnut and the blight resistance of the Asian chestnut. We are about to take another round of diameter measurements for these sites and determine 10-year mortality. There were about 875 trees planted at each site.

What one thing about American chestnut do you find fascinating or enjoy?

I wonder about how fire regimes were different when American chestnuts were a part of the oak-pine forests and were the trees "farmed" or otherwise managed by Native Americans in WV.

Editor's New Email Address

Like anything else, technology is wonderful when it works correctly and horrible when it does not. I have used my personal email address for 15 or more years. In early January, my email was hacked and many people on my email list were sent a message that I was in trouble and needed assistance. I was not in trouble and I did not require assistance. The hackers were eventually looking to make money off my email contacts. If you received such a message, I apologize. I opened a new email account. If you need to get in touch with me, my new address is: mdouble122@gmail.com

Potting Chestnuts for the 2021 Season

It is time to begin planning for the 2021 planting season. Many members put the chestnuts they harvested last fall into cold storage to stratify the nuts. Stratification is nature's way of preparing the nut for germination. For members planning to pot their germinating nuts, March is a good time to begin the process. Any pot will do, but the larger the better. Make sure there are drainage holes in the pot so not to accumulate water. Fill pots with a potting mixture and add the nut on top with the flat side down—not the pointed end with the radical. The cotyledon will emerge from the same area as the root, so if planted with the root down, the cotyledon has that much further to grow to get to the surface of the soil. Many times, people plant the germinating nuts too deep and the emerging seedling runs out of energy (from the nut meat) and it never makes it to sunlight.



The correct orientation of a germinating nut in a pot is to place the nut on its side with the radical on the side, not pointed down. The nut is covered with less than an inch of potting mixture

After placing the nut on top of the potting mix, add enough mix to cover the nut. Water well and wait. Once the seedling emerges, it will need light. It has been our practice to keep the seedlings in the greenhouse for about two months before outplanting. Direct seeding into the ground also works, but you have to protect the nut from animal predation. A solid chestnut makes a fine meal for a chipmunk or squirrel. Use hardware cloth that is secured in place to protect the nut.

The WV chapter receives germinating nuts from the national organization's research farm in Meadowview, VA. For the last many years, a group of member volunteers have gathered at the Plant and Soil Sciences greenhouse on the campus of West Virginia University to pot germinating nuts. The plan is to gather on **Saturday, March 13 at 11:00 am** at the greenhouse. In past years, a group of volunteers has potted up 600-700 nuts in 2 hours. Our order of 800 pots and 25 bags of potting mix has been ordered and it's on site. **If you can assist this year, email Mark Double and you will be added to the list of volunteers.** Having a list of people is necessary in the event plans change due to weather. If needed, directions to the greenhouse can be supplied. Covid-19 protocols will be followed, so masks are mandatory.



The group of volunteers from 2020.

Plans for New Germplasm Conservation Orchards in WV

Long-time WV chapter members have read about germplasm conservation orchards (GCOs) in previous newsletters and in TACF's *Chestnut* magazine. In short, a GCO is an orchard of pure American chestnut trees. The plan is to plant 100 American chestnuts, 10 each from 10 different native trees. That provides each orchard with trees of varying genetics. Each source of 10 trees will be native to WV and thus aid in our goal of producing resistant trees that are adapted to WV. GCOs in all 16 state chapters will have trees that are native to their state. TACF has been involved in a breeding program since 1983 and we cannot expect trees that are native to Maine to grow well in South Carolina. Thus, each state has GCOs with trees native to their area.

Why plant pure American chestnuts if they will all become infected with the chestnut blight fungus and die? It is true that all American chestnuts planted in a GCO will become infected and die back to the ground. However, it has been shown that about 50% of the dead trees will have root systems that are sufficient to send up new shoots. Many of the new shoots will grow and eventually flower. It is the flowers that are the goal of a GCO. The pollen from trees native to WV can be used to pollinate TACF's advanced backcross trees and/or the genetically engineered trees from the State University of New York (SUNY) that contain the gene that breaks down oxalic acid (one of the acids responsible for the fungus attacking chestnut

trees and breaking down the tree's vascular cambium). The end result is that nuts from these crosses can then be outplanted throughout the state. We should have trees, resistant to the chestnut blight fungus, that are adapted and can grow in West Virginia.

We have an ambitious schedule planned for 2021. We hope to install at least seven GCOs this year at the following locations:

- **Sutton Dam, in conjunction with the Army Corps of Engineers (Braxton County)**
- **Terra Alta (Preston County)**
- **Oak Hill School complex (Fayette County)**
- **Franklin (Pendleton County)**
- **Summit Bechtel Reserve (Fayette County)--two sites**
- **University Forest (Preston County)**

What is involved in establishing a GCO? First, we will need plenty of volunteers. Second, we will only be planting about 30 trees at each site this year as we only have pure American chestnuts from three sources. Third, the planting will involve laying out the planting with a tape measure (trees are 10' apart), installing flags for tree sites, digging holes, planting seedlings, mulching seedlings after planting, cutting and installing wire caging for each seedling and watering. The plantings will likely be in late May/early June. Look for more information on exact times and dates.

For those members who have been anxious to get their hands dirty and assist with an important

project that aids the WV chapter, this will be a great opportunity.

Virtual WV Chapter Meeting

Since Covid-19 still remains an issue in WV, the spring chapter meeting will be virtual. The meeting will be held from **10:00 am until noon** (if needed) on **Saturday, April 10, 2021**. To participate in the meeting, you can join either via computer or telephone. The link for the Zoom meeting from your desktop: <https://us02web.zoom.us/j/2818213656>

Dial In Details:

+1 301 715 8592 (Washington DC)

+1 312 626 6799 US (Chicago)

+1 929 205 6099 US (New York)

Meeting ID : 281 821 3656

Password Required: 1904

Dates to Remember:

- **March 13, Pot chestnuts, 10:00 am until noon at the WVU Greenhouse**
- **April 10, WV chapter meeting 10:00 until noon. See links listed above.**

Future Articles

If there are articles that you would like to see in future newsletters, or if you would like to write an article, contact the editor, Mark Double at mdouble122@gmail.com.

Update on Clements Tree Nursery

The only forest tree nursery in the State of WV is the Clements Tree Nursery in Mason County. Last year, there was rumor that the nursery might be forced to close. Thousands of chestnut seedlings

are raised by Jason Huffman, the nursery superintendent, and planted across the state. WV chapter members, **Drs. Joe Golden and Lewis Cook** met with the **WV Secretary of Commerce, Ed Gaunch** and **Tom Cover, from the WV Division of Forestry**.

Joe and Lewis suggested that better marketing of seedlings could greatly benefit the financial situation of the nursery. In a recent email, Secretary Gaunch stated that Tom Cover is working to gather more information and he will convene another discussion meeting with interested parties as soon as possible. It should be noted that Secretary Gaunch is very quick to respond to the WV chapter.



Secretary Ed Gaunch

Backcross Breeding from TACF's 2020 annual report

At Meadowview Research Farms, TACF staff completed selection of the 1% most blight resistant backcross trees in two seed orchards. It has taken more than 18 years to plant, inoculate, and assess over 60,000 trees in these seed orchards for blight resistance. As of 2019, there were approximately 3,500 trees remaining in these orchards. Over the last two winters, Meadowview Research Farm staff culled approximately 2,200 trees to complete selection of the most blight-resistant trees in both seed orchards. Through DNA analysis, we learned that the selected backcross

tree inherited between 60% and 99% (average 80%) of their genome from American chestnut. The selected trees have blight resistance that is slightly less than F1 (50/50) hybrids between Chinese chestnut and American chestnut. Results imply that blight resistance is controlled by more genes than previously assumed and that backcross trees inherited different subsets of these genes. The good news is that many of the blight resistance genes from the Chinese chestnut founders are likely still present in the American chestnut backcross populations. By crossing the most resistant from the current generation together and stringently and accurately selecting for blight resistance among their progeny, we will continue to improve the blight resistance in these populations. To speed up additional generation(s) of selection, we have begun testing a non-destructive method to screen backcross seedlings for blight resistance that was developed by Martin Cipollini at Berry College in Georgia. Using this method, we cut off a portion of the central leader of the seedlings, inoculate the stem tips with the chestnut blight fungus, measure canker growth after three months, and then cut off the blighted portion of the stem prior to planting in the field (see photo on next page). We hope this method can help identify and eliminate at least half of the most susceptible seedlings prior to planting in the field without killing the more resistant seedlings. In TACF's chapter breeding programs, we are assessing long-

term blight resistance of American chestnut backcross trees to more stringently select the most resistant parents.



The alternative small stem assay whereby we inoculate stem tips with chestnut blight, measure the cankers after 90 days, and cut off the cankers. This method potentially enables us to eliminate the most susceptible seedlings prior to planting in the field. (Alternative small stem assay method developed by Martin Cipollini.)

Since 1996, our chapters have inoculated more than ten thousand third and fourth generation American chestnut backcross trees with the chestnut blight fungus. To date, approximately 10% or 1,000 trees have been selected based on canker severity six months to a year after inoculation. We intend to further narrow down the chapter backcross population by removing trees that demonstrate signs of susceptibility that typically take two or more years to develop, such as the death of the main inoculated stem. Backcross trees that we do not select may harbor genetic diversity from unique American chestnut parents. We plan to conserve this diversity by crossing the non-selected backcross trees with blight-tolerant Darling 58 transgenic trees.

Dispelling the myth that transgenic chestnuts might become overly competitive, or “weedy”

By Tom Saielli, Mid-Atlantic Regional Science Coordinator

Over the years, there has been some concern that if restoration efforts are successful, transgenic American chestnut may become overly competitive or “weedy” relative to other hardwood species. The idea that reintroducing an American chestnut that is capable of resisting infections caused by the blight fungus (*Cryphonectria parasitica*) could in some way create a more competitive tree than the once co-dominant American chestnut is compelling; however, the evidence does not support such a conclusion.

I have devoted the last thirteen years of my life and my career to the study of American chestnut. I began my work in Vermont, where I studied chestnut silviculture for four years, then spent four more years as the Southern Regional Science Coordinator for the American Chestnut Foundation, and since 2016 I have been the Mid-Atlantic Regional Science Coordinator. In all that time, I have paid close attention to naturally occurring stands of wild-type chestnuts, as well as established hybrid chestnut forests. What I have consistently noticed is that there is little or no recruitment in the understory and no observable natural spread of the populations. Others in our organization have noted the same thing – chestnuts populations do not appear to regenerate or spread at a significant rate – oppo-

site of a “weedy” species.

This is true for naturally occurring populations of American chestnut, as well as for mixed hybrids planted in forest trials. For example, in 2019 a group of chestnut researchers and myself spent an afternoon assessing a large population of naturally occurring American chestnuts growing at Savage River State Park in Maryland. Though there were hundreds of chestnut trees and dozens of trees producing seeds, we only found two seedlings in the understory – only two out of hundreds of wild chestnut trees! Similarly, at the Virginia Department of Forestry hybrid chestnut research forest at Lesesne State Park, Virginia, thousands of hybrid chestnut trees were established in the 70’s and 80’s and now the population exists as a mature chestnut forest. We have spent many days searching the understory for recruitment and have so far found none. No regeneration out of thousands of flowering chestnut trees. This is a consistent pattern observable throughout dozens of natural and hybrid chestnut sites throughout the species’ range. Many researchers have made similar observations: significantly little recruitment occurs in chestnut stands, both native and hybrid plantings. At a 2015 Chestnut Conference in Asheville, North Carolina, Doug Jacobs, Professor of Forest Biology and Associate Head in the Department of Forestry and Natural Resources at Purdue University, presented findings suggesting that limited recruitment, heavy browsing and slow spread rates would necessitate aggressive management of chestnut hybrids in order to achieve establishment,

and natural spread of hybrid chestnuts would be expected to take millennia. Eric J. Gustafson, et al (2017) found “that it could take a millennium or more for chestnut to fully occupy landscapes without aggressive restoration efforts”, and Dalglish, et al (2015) determined that “while climate change could facilitate northward expansion, limited seed reproduction makes this unlikely without assisted migration”.

So, why was American chestnut considered such a dominant hardwood tree prior to the 20th century? One possible explanation is, once established, American chestnut is a large, long lived, fast growing tree (Buttrick 1925, Kuhlman 1978). In other words, chestnut trees effectively stood their ground. Over thousands of years, this may have helped American chestnut outcompete and outlive other co-occurring species, to the extent that even with incrementally slow recruitment, chestnuts became an established foundation species in many parts of their range.

Additional hypotheses suggest that fire may have played a significant role in the spread and the dominance of American chestnut, as well as direct management of chestnut stands by indigenous people and European settlers. Indeed, research has shown that fire improves chestnut competitiveness and recruitment, whether naturally occurring or intentionally set, fires can alter the forest in ways that benefit American chestnut

(Belair, et al 2014, Clark, et al 2014, Vaughan 2017). Cory McCament and Brian McCarthy (2005) found that by manipulating light availability and reducing competition through controlled burns definitively increases American chestnut survival and growth over co-occurring species, indicating the significant role fire likely played in the chestnuts rise to dominance in some parts of Appalachia. Other forest management practices, such as timber harvest may have contributed to chestnut’s expanded range. Faison and Foster (2014) reported that “with increasing timber harvesting in the nineteenth and early twentieth centuries, chestnut’s dominance increased in the northern part of its range in heavily cut-over forestland”. In other words, when a site is cleared of all the timber, chestnut responds more vigorously than competitors, giving American chestnuts advantage in those sites - increasing the species dominance over time. These interventions were almost certainly related to the dominance of the species and without human intervention, chestnut may not have been as dominant or had as significant a range.

However, it is also important to note that although chestnuts may have been dominant in some parts of its range, primarily in the Appalachian Mountains, some stories of chestnut being the most dominant tree are probably exaggerated. Faison and Foster (2014) also note “specifically that chestnut appears to have had a relatively restricted niche (mountainous) rather than being generally abundant throughout the landscape, and to have been secondary in importance to oaks (*Quercus*)”. With centuries of fire and aggressive management involved in pre-20th century, chestnut numbers did increase and the range expanded, but this ap-

pears to have taken considerable human intervention. The otherwise naturally slow spread rate and limited dominance of the species should be assumed a key aspect of the species and genetically blight-resistant trees will not act differently. As restoration attempts move forward – aggressive management is key to chestnut reintroduction in localized areas and spread will be minimal and likely to take centuries, if not millennia. In other words, reintroduced chestnut will not become “weedy”. Indeed, for the successful reintroduction of American chestnut, we should expect to follow the advice of Doug Jacobs and plan for aggressive, concerted management, without fear of hybrids or GE trees suddenly spreading across the landscape uncontrolled. Because of the very slow nature of chestnut regeneration, we can confidentially manage our reintroduction efforts.



With thousands of nut-bearing chestnut trees planted at the Lesesne State Forest, it is amazing that thorough searches have yielded no naturally-occurring seedlings in the understory.

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Linda McGuigan from SUNY holds two rare chestnut seedlings found at Savage River State Park in MD. Only two seedlings were found among hundreds of nut-producing, wild-type chestnut trees.



Wild seedlings arise from an old root system. More often than not, seedlings we find in the understory are attached to old root systems - resprouts from long dead trees, not newly germinated seedlings.