

The West Virginia Chapter of The American Chestnut Foundation NEWSLETTER



In the heart of American chestnut's natural range

September 2023

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Report from OH-TACF

TACF's chapter president's meeting in August featured a report from **Stephen Rist**, president of the Ohio chapter. Stephen, who works for the Ohio Division of Forestry, Department of Natural Resources, indicated the OH chapter began in 2006. They have about 220 members, and their chapter has one annual meeting, generally in September.

The OH chapter began a small grants program in 2016, and they have funded 15 grants to date. The grants of up to \$1,000 have funded demonstration plantings, signage, and research projects. Some of the funded projects include: (1) chestnut dissemination (holes were drilled into a wooden plate and filled with white and red oak acorns, chestnuts, etc to see what nuts birds prefer; (2) leaf litter and fuel loads (how chestnut leaves burn compared to maple and oak; (3) wildlife (do chestnut leaves pose any changes in amphibians); and (4) follow-up to previous chestnut plantings.

Stephen reported that the OH and WV chapters work closely at the Clements nursery in Mason, WV, just across the Ohio River from Pomeroy, Ohio. Stephen and his forestry crew brought in a skid-steer loader this summer to clear away some of the undergrowth. The alleys between the rows are much clearer. A huge thanks to Stephen and his crew from Ohio for their efforts. The two chapters will harvest nuts at the site in late September.



Photos of some of the clearing done by the OH Division of Forestry (courtesy of S. Rist).

Stephen reported on a demonstration orchard at Camp Palmer (north-central OH) that was initiated 5-6 years ago. The orchard contains 5 trees each of Chinese, American, Japanese chestnut and Allegheny chinquapin.

The OH-TACF chapter was recognized at the **Forest of Honor** Induction in 2021. Recognition was for their influence in forestry for the State of Ohio. This is a well deserved honor.

Since 2015, the OH-TACF has planted 11,200 trees at 75 locations. The trees have been planted on: public property; OH-DNR; Army Corps of Engineers; universities; OH Department of Agriculture; and metro parks.

In 2023, 3,000 chestnut seedlings were planted at 22 locations.

After Stephen's presentation, TACF's new President and CEO, **Dr. Will Pitt**, provided a few updates. He started on July 31, so his main focus has been on internal staff. He hopes to visit all 16 state chapters in TACF in the next year. The transition has been going well. **Lisa Thomson** has been acting as an advisor as she has 7 years of institutional knowledge, and she can provide introductions to key people. Will's goal is to meet donors and members individually. He is currently in a listening/learning mode.

Fall WV-TACF Chapter Meeting

The WV fall chapter meeting will be held, **Sunday, October 8** on the second floor of the Historic Rowlesburg School (Szilagyi Center) in Rowlesburg, WV. The meeting, open to the public, will be held from **noon-2:00 pm** on the school's second floor. For those unable to attend the meeting, use the following Zoom link. We have had technical difficulties at past meetings; we hope to avoid any glitches this year.

Join Zoom Meeting

<https://us02web.zoom.us/j/88083565124>

Meeting ID: 880 8356 5124

Passcode: 1904

A technical session follows the chapter meeting from **3:00-4:30 pm** in the same room. This year's speakers are **Cassie Stark**, TACF's Mid-Atlantic Regional Science Coordinator, and **Dr. Lewis Cook**, WV chapter board member.

There are events all day from 9:00 am-4:00 pm in both the Rowlesburg Park and in the Rowlesburg School (WV Route 72). Some of the events include:

- Cannon Hill Historic Site will be open for self-guided tours
- River City Cafe

- World War II Museum
- River City Art Room
- Preston County Sports Museum
- River City Pottery Studio
- Historic B&O Centenary Bridge Exhibit

Also available in the park are:

- Chestnuts roasted on the grill
- Sale of chestnut seedlings
- Arts and craft vendors
- Avian Conservation Center of Appalachia
- Music in the pavilion
- Chestnut furniture and wooden items

TACF's Documentary film: **Clear Day Thunder: Rescuing the American Chestnut** will be shown on the hour beginning at 11:00 am in a classroom on the second floor. This 53-minute video has been years in production and includes interviews with **President Jimmy Carter, Dolly Parton** and **Chuck Leavell** (keyboardist for the Rolling Stones).



The Gala Banquet in the School Auditorium begins at 5:30 pm. The meal will include local wine, an entree featuring chestnuts, dessert and drink. Tickets for the banquet are \$15. As part of TACF's 40th Anniversary, each state chapter has been tasked with providing a local celebration. This year, we will have the premier showing of the WV chapter's documentary film: **The Once and Future Tree**, filmed and produced by **Robert Tinnell** and his students at the **Douglas Education Center** in Monessen, PA. Film students interviewed several older individuals about their recollection of American chestnut and the aftermath of the chestnut blight pandemic.



Robert Tinnell is an American writer, film director and producer. Robert directed such films as **Feast of the Seven Fishes** (2019), **Frankenstein and Me** (1996), **Kids**

of the Round Table (1995), *Back Fork* (2019), and *The Hunted* (2013).

Mr. and Mrs. Chestnut will be crowned during the gala dinner. This year, we crown **Bernie and Linda Coyle** from Keyser. Congratulations Coyles!

TACF Ornament to Hang from Christmas Tree at U.S. Capitol

As part of the 50+ year USDA Forest Service tradition, the Monongahela National Forest is providing the Christmas tree for the U.S. Capitol in 2023. The 63' Norway Spruce will grace the west lawn of the Capitol along with smaller trees for Federal offices in Washington, DC. The goal is 10,000 ornaments, all from West Virginians. Ornaments can be of various topics: Appalachian Culture; Famous West Virginians; Iconic Spots in WV and the Monongahela National Forest; WV Flora and Fauna; History; and State Symbols. The ornaments are to showcase "Endlessly Wild and Wonderful" West Virginia.

The WV Chapter supplied four ornaments from an American chestnut sprout. The ornaments will be displayed not only on the **U.S. Capitol tree** but also in the offices of **U.S. Senators Joe Manchin** and **Shelly Moore Capito**, and the **U.S. Forest Service** building. Many thanks for to **Sam Muncy**, our WV chapter treasurer. Sam cut disks from a stem he had in storage and then took the disks to Bridgeport for laser printing on both sides. Sam delivered the ornaments to Julie Fosbender in Elkins at the Monongahela National Forest Office. A huge thanks to Sam for all his efforts. Below are pictured the two sides of the ornament.



Other ornaments were made by artisans and children who colored pictures of the Seal of the State of WV. For those visiting the U.S. Capitol this winter, look for our TACF ornaments.

It's Officially, tacf.org

The TACF website is now officially tacf.org. The former acf.org website made its debut on 13 Apr 1997, not long after the internet was born. This means that acf.org has existed for more than 26 years.

If you are searching for something on TACF's website and mistakenly type in acf.org, that website for work for another year. It's similar to the U.S. Postal Service that will forward mail for a year after an address change. But as of August 2023, you can now use tacf.org!

Multi-State Research Project

A group of scientists who work on chestnut have been meeting annually since 1982 to exchange ideas and present data. This is a USDA award-winning group; twice the U.S. Department of Agriculture has awarded this group with its highest honor.

The two-day meeting this year was held on 8-9 Sep 2023 in Chattanooga, TN and hosted by **Dr. Hill Craddock** of the University of Tennessee, Chattanooga. The following is a brief excerpt of several of the presentations.

Forest Progeny Test. This study was conducted at John's Creek Mountain, Craig County, Va. The objectives were comparing the blight resistance and forest competitiveness of B3F3 families to that of positive and negative controls to determine whether they:

- Grew as well as American chestnut and better than Chinese chestnut;
- Resisted blight as well as Chinese and better than American.

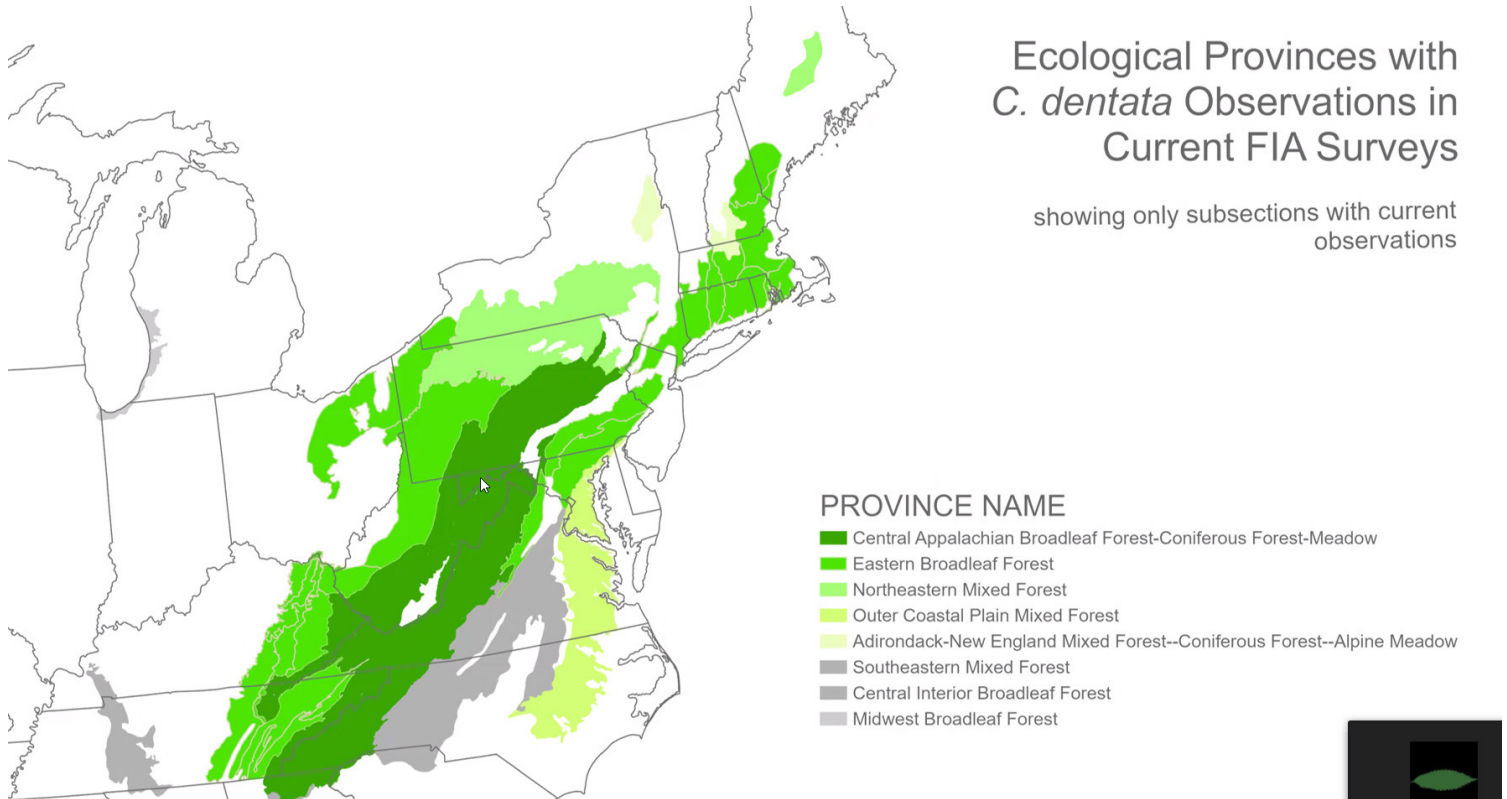
Of the 615 trees planted in 2012, survival plunged from 89% in 2018 to 62% in 2023. The trees averaged 20' tall after ten years. The American family had the worst blight severity, as expected. The B3F3 families were not better than the B3F2 controls which was unexpected when testing of B3F3s began. Chestnut blight was associated with 54% of the mortality. A cause for the primary death of the remaining trees could not be identified. The family with the best blight severity had the largest number of uninfected members. One of the best families was D5-17-80 (a family that several WV chapter members have received).

The gold standard for determining chestnut blight resistance is a plant's appearance after several decades; is it a

tree or a bush? For trees, lumber quality is an additional consideration, depending on the number and severity of cankers.

Descriptive Statistics of Current Wild-Type American Chestnut Populations from Forest Inventory Analysis Data.

Despite chestnut blight, there are still many American chestnuts in our eastern hardwood forests. Below is a map of data from the U.S. Forest Inventory Analysis (from John Scrivani, VA-TACF). There is some bias in the survey as some states have higher percentages of forested lands. Trees had to be 1" in diameter to be counted. (Apologies for the poor quality of the map.)



In the Central Appalachians, there are more than 200 million American chestnut sprouts that are at least 1" in diameter. In the 1"-4.5" class, there are 27 million trees, and 475,000 trees that are greater than 4.5". Thus, there are still quite a number of small-diameter chestnut seedlings in our eastern forests. Interestingly, across the entire range of American chestnut, there are 15,000 trees that are in the 17"-19" class size.

Notes from the University of New England, in Biddeford, Maine.

There are numerous germplasm conservation orchards (GCOs) in Maine, many of which are 4-7 years old. One such orchard is pictured on the following page. Many areas in Maine suffered a killing frost on 23 May 2023 that killed all the chestnut flowers. The 30-degree temperature was the coldest since 1963 and the latest frost since 2002. Some area of the state saw temperatures in the 23-27-degree range. These low temperatures also killed all the blueberry flowers.

The University of New England is part of a common garden study (same plants planted in different areas). The experiment was duplicated at three sites: Cape Elizabeth, Maine; State University of New York at Syracuse; and, TACF's Meadowview Farm in Virginia. More than 470 transgenic trees (and controls) were planted at each site on a 10' X 5' spacing. The Cape Elizabeth site was split into two sections, east and west. Both sites were watered during periods of drought with a 3,000 gallon water tank. Seedling survival at two sites varied greatly. The eastern side has 45% survival while the western side has 90% survival. Exhaustive studies were conducted: pH; water conductivity; soil composition; sunlight/shade, and no differences were found that could explain the differing survival rates.



A 7-year-old American chestnut orchard in Maine (photo T. Klak).

Below is a picture of the 470-transgenic tree orchard planted in Maine as part of a common garden study (photo T. Klak).



The University of New England (UNE) also is studying high-light to force transgenic trees to flower early. Some of the early-flowering trees were outplanted to test if these trees would grow outdoors and still produce catkins. The answer was yes; the trees survived and continued to produce pollen. This finding may speed up the breeding process, as trees forced to flower under high-light in the greenhouse also can be outplanted in orchards.

Another related study conducted at UNE was pollen production of transgenic trees. The UNE group produced 100 vials of transgenic pollen in 2020. After four years of pollen production, they now have confirmed methods: lighting of 16 hr/day under full spectrum LED lights; temperature of a maximum of 80 degrees; humidity of 40-50%; water pH, adjusted to 5.5; fertilization every two days; pot size (7 gallons is better than 2 gallons); and a soil mixture that includes less peat moss. Of all the variables, the factor that influenced pollen production the most was control of pests and pathogens. They have had major problems with green and white aphids, spider mites, mealy bugs and fungus gnats. If pests and pathogens are well controlled, then pollen production can be maximized.

Phytophthora Research at Clemson University.

Phytophthora is a root disease of chestnut and it is commonly referred to as PRR, *Phytophthora* Root Rot. The *Phytophthora* testing facility was moved from Clemson, SC to the US Forest Service facility at Bent Creek, Asheville, NC. To test seedlings for their resistance/susceptibility to PRR, a variety of *P. cinnamomi* isolates are used to ensure the inoculum is virulent. Clemson University also conducts a service whereby landowners can send soil samples to be tested for PRR. Soils are mixed and weighed out in 25 ml batches that are then covered with 100 ml of water. Susceptible leaves are floated on top of the water and zoospores of *Phytophthora* then infect the leaves, if the fungus is present. The landowner is then informed of the results. In 2023, soil samples from the Waddell orchard in Kingwood were sent to Clemson University, and the results were positive for *P. cinnamomi*.

Fungicide trial results were presented. Eight fungicides were tested and the results varied greatly. The three best fungicides in the trials were: **Aliette** (Aluminum tris-o-ethyl phosphonate) from Bayer; **Reliant** (potassium salt of phosphorous acid) from Quest Products; and **Subdue Maxx** (mefenoxem) from Syngenta Crop Products. Seedlings were grown in large tubs, allowed to reach a height of 6-8" and then flooded with spores of mixed isolates of *P. cinnamomi*. Seedlings are then pulled from the soil, and the roots are rated on a 0-3 basis, where 0=uninfected; 1=lesions on feeder roots; 2=lesions on tap roots; and 3=dead.



Healthy roots (top); infected roots (bottom) (photo S. Jeffers)

Update on 'Darling 58', the genetically-modified American chestnut tree.

In the plans for American chestnut reforestation, one approach is genetic engineering. Back in the 1980s, scientists at the State University of New York (SUNY) began experimenting with genes that affect oxalic acid, the compound produced by the chestnut blight fungus that kills tissues in the trees' vascular cambium. The SUNY group eventually chose a gene from wheat, oxalate oxidase (OXO), that breaks down oxalic acid into hydrogen peroxide, water and carbon dioxide. This gene was inserted into one of the twelve chromosomes of an American chestnut tree. This gene does not kill the chestnut blight fungus, but simply disarms the fungus as it begins to grow in chestnut tissues. Over the last several years, SUNY and TACF have been working together to produce documents for three Federal agencies: USDA-APHIS (US Department of Agriculture, Animal Plant Health Inspection Service); EPA; and the FDA. These agencies have spent the better part of two years pouring over the data and documents supplied by SUNY and TACF. There have been two open-comment periods that offered the general public's views on deregulation of the genetically-modified tree, 'Darling 58', named after **Herb Darling**, former president of NY-TACF, who spearheaded the work at SUNY.

Both USDA-APHIS and the EPA informed TACF that a decision on deregulation would be made in 2023. That deadline has been extended, and final decisions do not have a definitive date.

What we do know is that if and when deregulation occurs, there will be limitations on 'Darling 58' distribution. There will probably be acreage and geographic limitations. Thus, do not expect obtaining a 'Darling 58' tree any time in the near future. In recent testing, some 'Darling 58' trees have shown to be more resistant than Chinese chestnut, while others are worse. The OXO gene seems to be present in some trees, but not in others. As in many areas of science, not everything is black and white,

Let's say that 'Darling 58' is deregulated at some point. Is this tree the end step? The short answer is, no. 'Darling 58' is probably the first step as many questions remain as to how well 'Darling 58' will perform in the wild. There are questions on:

- Species restoration (will the tree grow and thrive in the forest?)

- Ecosystem restoration (what other factors like wildlife will impact its success?)
- Conservation (can we conserve and restore this species?)
- Fire resilience (how will the tree respond to fires?)
- Invasive species (how will the tree be impacted by invasive species that were not present 100 years ago?)
- Climate adaptation (how will warming temperatures affect the trees' growth and survival?)

Restoration of American chestnut is a process, not a product. As new techniques come along, 'Darling 58' is just the first in what may be many steps in restoration.

Restoration is: research; implementation; and production. There is no recipe for adaptive management. External factors change, so TACF may have to adapt and alter its course.

If deregulation occurs, what will be necessary to begin restoration of this species? An American chestnut will have to have sufficient, heritable disease-resistance. The traits of a successful tree must perform functions in the ecosystem that are similar to wild-type American chestnut in terms of its ability to feed wildlife, insects, etc. There also must be sufficient genetic diversity for adaptation to environmental changes that may occur.

How do we go about reforesting our eastern forests? The goal is to reforest 34-100 million acres. If 500,000 acres are planted each year with 330 trees/acre, it will take 80-100 years to reforest American chestnut. That is a lofty goal, and TACF is not set up as a nursery that can produce millions of seedlings each year. Thus, partnerships must be established with companies in the eastern U.S. that can assist with seedling production.

Any tree that has traits to be successful, whether it is a backcross tree or a genetically-modified tree, will have to have resistance to both the chestnut blight fungus (*Cryphonectria parasitica*), and to *Phytophthora*. The latter organism pre-dates chestnut blight, as it was recorded killing chestnut trees in the late 1700s/early 1800s in southeastern U.S. Work on developing a chestnut tree that has reforestation capabilities is ongoing on many fronts.