



The West Virginia Chapter of The American Chestnut Foundation NEWSLETTER



In the heart of American chestnut's natural range

March 2022

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Chapter's Committee

The committee structure of the national organization includes the Chapter's Committee--comprised of chapter presidents from the 16 state chapters:

New England: Connecticut, Massachusetts/Rhode Island, Maine and Vermont/New Hampshire

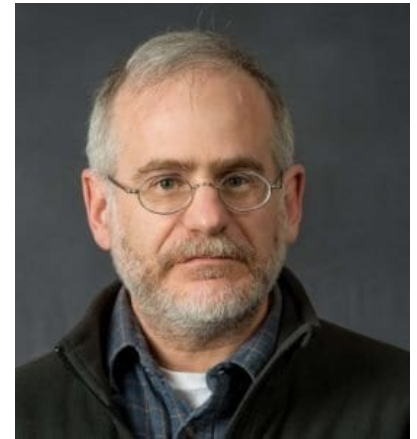
North-Central: Indiana, New York, Ohio and Pennsylvania/New Jersey

Mid-Atlantic: Kentucky, Maryland, Virginia and West Virginia

Southern: Alabama, Carolinas, Georgia and Tennessee.

The Chapter's committee met initially in 2021 and decided to hold monthly meetings. It was decided that at each meeting one chapter will give an update on their chapter. The chapter update will be followed by a 30-minute session on a topic of interest. The topics for upcoming meetings are: (1) Denta base (a spreadsheet listing trees in plantings, orchards and native trees; (2) Membership; (3) Leadership; (4) Chapter Insurance; (5) Social Media Uses; (6) and Grants. The first meeting of 2022 was held virtually on 28 January.

At the January meeting, **Bruce Levine** president of the Maryland chapter highlighted his chapter's ongoing research with some results.



Bruce covered the following topics: (1) Small stem assays (SSAs). Small stem assays are just what they appear to be--small chestnut stems that are inoculated to assess their reaction to the chestnut blight fungus. The original SSAs were developed at the State University of New York. A small incision is made on greenhouse seedlings and a plug of the chestnut blight fungus is affixed to the incision. After several weeks, the length of the developing cankers is measured. Large lesions indicate the seedling has little resistance. A small lesion with callus is indicative that the seedling has some resistance. This method was developed to speed up the breeding process. Assessments of seedling resistance can be made in the greenhouse rather than wait until outplanted trees are challenged several years post-planting.

Bruce detailed a refined approach to his SSA. Rather than using agar plugs to inoculate the stems, he uses

a slurry of fungus and water.



Scalpel to make incision on young seedling

In the greenhouse, the Maryland chapter uses pots that are 4" x 4" x 13". The minimum diameter of seedlings for inoculation in the SSA trees is 4.5 mm. Bruce outplanted 700 trees in 2017 after the SSA was conducted to see if the SSA test is precise enough. To test this, he took data in 2021 from the 700 SSA trees and compared the data from those SSA trees with trees in an already established orchard. The orchard trees were inoculated in the field for the first time. There were some problems with the results as many of the tags on the trees were lost as was a hard copy of the tree layout. The results of the 100 trees for which he had labels showed a weak correlation of the SSA data vs the standard field method. All the susceptible trees died as expected in both tests, while the other trees varied among the two tests.

(2) Bruce compared the above standard SSA with a method developed by Dr. Martin Cipollini at Berry College in Georgia. This revised Cipollini method cuts off the top of 4-to-5 mm-diameter stems,

inoculates them with the chestnut blight fungus and covers the wound with plastic sleeves. This method was designed to be simple to implement, to consistently induce cankering, and to better enable seedlings to recover by developing shoots from the lower stem. Standard SSAs delay removal of blighted stems until late in the growing season.

To test the two SSA methods (standard vs. Cipollini), Bruce did both tests in the greenhouse. Both methods produced good correlation, but Bruce feels the standard method may be slightly better as it had a correlation rating score of 0.7 to 0.8.



Photo courtesy of GA-TACF
Cipollini method of removing seedling top

(3) RESMAP (Resistance mapping). Seedlings from SSAs, representing 16 seed lots, were assayed at four different locations and all trees were outplanted at Galax, VA. There was consistency of data from the trees that were tested at the four different labs.

(4) Improving selection methods--phenotyping parent trees. Bruce Levin, Tom Saielli and Fred Hebard met to assess 200 large chestnut trees, using

phenotyping (assessing morphological characteristics). They used their data to select the best trees for conducting Best X Best pollination. Pollen was collected from the best 30 trees and the pollen was sent to Tom Saielli in Charlottesville. Tom conducted controlled pollinations on pre-screened SSA trees. We will await the results.

(5) *Phytophthora* resistance. The Maryland chapter is testing long-term resistance in a Maryland orchard infected with *Phytophthora*. They took custody of chestnut trees at the Bent Creek Experimental Forest in Asheville, North Carolina and replanted them at an orchard in Beltsville, MD. The *Phytophthora* resistant trees were inoculated with the same strain of *Phytophthora* that was present in the MD orchard. These trees will be continuously challenged by the same *Phytophthora* strain.

(6) Replanting mature backcross orchards. The Maryland chapter is replanting open-pollinated trees, challenged via SSAs. This process keeps landowners informed and connected.

The second Chapter's committee meeting was held on 25 February. **Dr. Hill Craddock** of the University of Tennessee, Chattanooga provided an update on the TN chapter.



Hill Craddock

WV Chapter Grant Awardee

This is the inaugural year of our chapter's grant program. The chapter board members who served on the grant committee were: **Dr. Brian Perkins; Dr. Melissa Thomas Van-Gundy; and Sam Muncy.**

The grant was awarded this year to **West Virginia University's Science Adventure School (SAS)**. This program is a four-day, three-night residential program that 6th grade students attend with their public school classmates. SAS was specifically developed to address some of the biggest issues facing the students in West Virginia. Research shows that these students, compared to the national averages, repeat grades more frequently, do not proceed to post-secondary education, live in communities significantly lacking amenities, have a 5% higher overdose rate, are more likely to end up in correctional facilities, and live in poverty without a biological parent, among many other challenges. We seek to change these statistics through uplifting WV youth and helping them to create brighter futures. While we are a multifaceted program, we are requesting support from the WV-TACF to expand our current STEM and environmental education curricula to include a new set of lessons focused on the American chestnut.

SAS focuses on delivering three main areas of curriculum: STEM education, environmental education, and positive youth development. Within the STEM blocks of programming, students learn physical science core concepts and then apply their new

Hill talked about many efforts taking place in TN. The overarching goal for TN's chapter is conservation. They have been particularly interested in conserving germplasm from *Castanea* individuals on the southern and western fringes of the range.

Conservation of rare *Castanea* genetic resources depends on:

- Discovery and mapping of trees near the southernmost and westernmost fringes of the range where diversity is greatest;
- Characterization of diversity, including at the DNA level;
- Propagation of rare plants via seeds;
- Hybridization with blight tolerant selections *in situ* or *ex situ*.

The TN chapter is installing backcross orchards using open-pollinated F2 seed.

Tennessee is included in a common garden study that includes: TN, MD, VA, GA and PA. This study (also known as the RESMAP study) incorporates trees from each of the five states. The trees were selected via SSAs and they planted a resistant and susceptible tree from each source. A total of 700 trees were planted at sites in each participating state. They also included susceptible American and resistant Chinese chestnut trees as controls. The plan is to allow the trees to grow and in 2-4 years, inoculate each tree with the chestnut blight fungus. They can then see if their original predictions about resistance/susceptibility were correct.

The TN chapter is installing germplasm conservation orchards using open-pollinated F2 trees as they have limited access to pure American chestnut seed. The trees are BC1-BC4.

They had a great deal of loss last year

from *Phytophthora*. They conducted tub tests (hundreds of trees were planted in large troughs and then inoculated with *Phytophthora* isolates.). The trees that survived the tub tests were planted back into orchards that are *Phytophthora* infected. To date, he has had good growth of the pre-screened material. These trees are at the BC1 level.

Hill is conducting a lot of grafting. He uses 3-gallon containers and with lots of sunlight, fertilization and water, almost all of his trees produce pollen.

Hill is particularly interested in chinquapins. There are areas in Alabama, northern Georgia and western Tennessee where chinquapins have introgressed with American chestnut. Hill is collaborating with Jason Holliday at Virginia Tech to assay DNA from chloroplasts. Hill is interested to know if these chinquapins have adapted centuries ago or if the hybridization between chestnut and chinquapin is more modern.

The TN chapter had a bumper crop of chestnuts in 2021, collecting 26,000 nuts. They will be grown at the state nursery for plantings in TN and NC.

Cherin Marmon-Saxe provided an update on the new website for TACF for the remainder of the meeting. There has been a lot of cleanup from the current website--much more than they anticipated. They want only current stories posted, as stale stories do not represent the foundation well. Cherin hopes to migrate all the state chapter stories/postings/dates by mid-March with a launch of the new website by July 1.

knowledge through participation in an adventure sport. Lessons always begin with small scale, hands-on experiments and discussions to illustrate the concept before putting it into practice. Once students grasp material, they then move on to apply it through an adventure activity. For example, students may learn about a physics concept such as momentum, before moving to the climbing wall to discuss and practice how momentum is expressed through movement and climbing style in rock climbing. Our STEM lessons currently cover science concepts incorporated into rock climbing, canoeing, BMX, archery, and ziplining.

The environmental education curriculum is developed around the intention of empowering students' innate curiosity in inquiry-based lessons. Students are encouraged to wonder, ask questions, and brainstorm answers with the support of their teachers and SAS environmental educators. Students learn about the natural world through lessons that cover wetland ecosystems, forest ecology, and freshwater streams. They engage in hands-on experiments and data collection and participate in activities that include learning to test water quality, collecting macroinvertebrate specimens, and observing and identifying animal tracks. Our goal is to spark the desire to become stewards of nature through discovery and exploration.

These curricula are further reinforced by our positive youth development curriculum which focuses on the social and emotional growth of students. Through group activities and discussions, we focus on building quality relationships among peers and their teachers,

help them challenge themselves, and become more resilient. We want students to return home feeling capable of anything and with a support system of people at their school who care about them.

A primary reason for choosing the American chestnut for our curriculum expansion project is because it will help us build a greater connection between our students and the positive aspects of being a West Virginian. Youth in the state have a complicated relationship with both natural resources and building a positive state identity. The history of the reforestation in the state and story of the care that has gone into efforts to replenish and restore the American chestnut to its historic range can be a source of pride and inspiration to our students as well as foster a sense of stewardship for their native environment.

While we specifically intend to explore the story of the American chestnut through this new set of lessons, we want these lessons to primarily be grounded in environmental science with linkages to the physical science topics covered in our STEM curriculum. With that goal in mind, we plan for the new chestnut centric unit to cover multiple natural science-based areas including at least two or more of the following topics: invasive species, plant pathology, tree identification, organism adaptation, and the importance of native species. We are currently seeking to hire an Environmental Education Coordinator to our team who will take lead on this project, so we do not want to prescribe exactly what this new unit will look like without their input. However, we feel that they will have enough freedom

with the topics above to develop a robust set of lessons. The new chestnut unit will also link to one of our STEM units, potentially the Science Behind Zip Lining as there is a natural connection with trees and forest health.

In our 2021 season, SAS served just under 700 students and their teachers. In 2022, we plan to serve 1,600 students and their teachers. Our eventual goal is to reach all 6th grade students in the state (approximately 18,000 students). While this is a lofty goal, it has already been done in Oregon, and other states are beginning to explore similar program models. As such, we expect to serve increasing numbers of students each year as we grow our programming and reach. Currently our programming locations include the BSA's Summit Bechtel Reserve, the WVU Outdoor Education Center, and Jackson Mill 4H camp, which allows us to reach students in multiple parts of the state.

Our new Environmental Education Coordinator is anticipated to start in March 2022, and development of the chestnut unit would be one of the first projects they will be given. This will allow us to test the lessons during the fall during program operations and finalize them shortly after. As we want to give our upcoming new employee freedom to develop this unit, we cannot provide a specific line-item budget on how the funds will be spent. However, all funds will be spent on purchasing supplies for the lessons, which may include items such as microscopes and slide making materials, tree identification books, scientific models, and similar supplies.

In summary, we know that our program benefits the students and teachers who participate, but that there is still more that we can do to connect students to their landscapes. We feel, that with the help of the WV-TACF, we can expand our curricula to include lessons on the American chestnut that will help us further develop our students' pride in their local environment, build a sense of stewardship, and introduce scientific concepts that connect on a personal level.

The grant award was \$1,000. One of the expectations of the grant program is each recipient is expected to present a summary of the results of the funded project to the West Virginia Chapter at a chapter meeting within two years of the award. Congratulations to the Science Adventure School. We look forward to a report detailing some successful outcomes.

WV Chapter Members Gather to Pot Chestnuts

On Saturday, March 12, seven members of the WV chapter gathered at the WVU greenhouse in Morgantown to pot 1,050 nuts. They braved one of the worst snow storms of the season to make their way to the greenhouse. The nuts included pure Americans, backcross trees from Meadowview and open-pollinated nuts from the Clements Nursery in Mason County and the Waddell orchard in Preston County.



Robert Sybolt, Mark Double, Linda Coyle, Blaise Hollot and Bernie Coyle among the potted nuts.

WV Chapter Representative on the WV Agriculture and Forestry Hall of Fame Committee

Each year since 1975, West Virginia has inducted individuals into its Hall of Fame at a ceremony at Jackson's Mill. This year, **Robert Sybolt**, a Board of Director member of the WV chapter, has been asked to serve on the nomination committee. It is a nice honor for the chapter that they requested one of our members to select the next class for induction. We thank Robert for his willingness to serve.



Robert Sybolt

Change of Date for the WV Chapter Spring Meeting

Due to a conflict, the spring meeting of the WV chapter has been changed to **Saturday, April 2, 2022**. The meeting will begin at 1:00 pm in a second-floor classroom in the Waco Center on the campus of Glenville State College in Glenville, WV. To access the classroom, park behind the Waco Center (on the left-hand side of the building) and enter through the open door. Proceed up the stairs to the second floor.

For those unable to attend in person, join us via the Zoom Meeting Link at:

<https://us02web.zoom.us/j/5806622929>

Meeting ID: 580 662 2929
Passcode: 1904
Dial In Only: 929 205 6099

Following the meeting, Rick Sybolt will conduct a tour of a sawtooth oak planting.