

Maryland Chapter of The American Chestnut Foundation Spring 2017



THE
AMERICAN
CHESTNUT
FOUNDATION®

MARYLAND CHAPTER

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News from Our Orchards

This past fall, we had very specific harvest requirements tied to planting goals for next spring. For the Fox Haven, Dickey and WSSC orchards, our objective was to harvest enough nuts to complete two plots of each family line in each of our Clapper seed orchards.

For unknown reason, possibly including a late April 2016 frost, our trees bore remarkably few burs and seeds this year. Nevertheless, we were able to harvest

Maryland Chapter Spring Meeting

The spring meeting of the Maryland Chapter of The American Chestnut Foundation will be at the Rockville Izaak Walton League of America on **March 18 at 10:30 a.m.** (The address is: 18301 Waring Station Rd, Germantown, MD 20874.)

The meeting is free and open to the public.

The meeting will begin with an update on chestnut restoration science, state chapter progress, and current happenings at TACF by our regional science coordinator, Tom Saielli. Tom will highlight progress and plans of the Maryland Chapter.

Our featured speaker will be TACF forester Michael French. Michael's talk is entitled "Application of the Forestry Reclamation Approach to Restore American Chestnut on Surface-Mined Lands."

enough to fill seed lines for important family lines. In the end, the harvest totals met our seed orchard goals for every family line except SE 831.

Our Musick lines are still in the backcrossing phase. We harvested a small number of Musick nuts from our Monocacy orchard for planting next spring in our backcross orchard at BARC. Because the Monocacy trees are B1s they require hand-pollination using pollen from specific American

chestnut trees. Of the two trees, we pollinated at Monocacy one failed because we bagged the flowers too late and they were contaminated by unknown pollen. The other tree produced only 37 nuts versus the 100 we needed.

In the spring of 2017, we expect to plant about 1,500 seeds at CMREC, nearly as many at WSSC III, and one partial line at BARC. In addition, we collected a few dozen nuts from two special American chestnut trees that will be planted at our Black Hill and IWL-BCC germplasm orchards. Spring plantings usually take place during the last week in March and the first week in April. Planting dates will be scheduled both on weekends and week days and will be announced in advance to enable maximum participation. Meanwhile, there is prepping to be done. The plots were marked out in the fall but we will be announcing volunteer work dates to install stakes and tree shelters and to start punching holes for the seeds.

FamilyLine	Seeds harvested	Seeds needed
FOX HAVEN ORCHARD		
Yater	140	100
SW850	270	100
Manahan	450	300
Knapp	795	600
DICKEY ORCHARD		
Peters	646	525
Prowell	530	300
SE831	377	330
WSSC III ORCHARD		
SE833	2677	600
Peters	700	0

2016 Breeding Program Seed Harvest

Despite the poor harvest in 2016, we will have surplus nuts for several family lines. MDTACF is now discussing using these seeds in a pilot program to prescreen

seedlings for blight resistance in greenhouses using a technique called a “small stem assay.” These trees would then be planted out in our seed orchards and screened for resistance 2 years later using the standard field inoculations. We would compare the results of the two screenings to see if the small stem assay can accurately predict the results of field inoculations. If so, small stem assays could save us a great deal of time as well as improve the quality of the trees in our seed orchards.

Distribution of American Chestnut Seeds

In the fall of 2015, volunteers harvested almost 7000 seeds from three groves of American chestnut trees in Maryland. The trees in these groves are not native to Maryland, but have been growing, flowering, and producing seeds here for many years, despite being infected with blight. The trees are in Hagerstown, on property owned by one of our chapter’s charter members, Tom Scrivener; at the base of Sugarloaf Mountain; and at the University of Maryland’s Western Maryland Research and Education Center in Keedysville, Maryland. After the harvest, the burs were dried and the seeds extracted by another team of volunteers.

American chestnut seeds will only germinate the following spring, after they have endured winter weather (and not been eaten by critters). Therefore, seeds that we collect for planting are given a simulated winter in a refrigerator, a process called “stratification.” They are stored in plastic freezer bags in moist peat moss for at least 60 days before being planted indoors in pots or outdoors when the weather gets warmer.

The seeds and seedlings are used for a variety of purposes that promote education, reforestation, and participation by the public in growing chestnut trees. Here is a summary of the numbers of seeds we collected and where they went:

The largest number of seeds, 4,500, were sent to TACF forester Michael French. Michael has nurseries grow containerized seedlings for use in TACF's "Pure American Program" (TACF members can buy seedlings) and for use, in cooperation with the Office of Surface Mining Reclamation and Enforcement (OSMRE), in strip-mined land reforestation.

Our board member and former president Bruce Levine received 200 seeds for use in his research in a plant fungal disease study at the University of Maryland (See next article.) Eric Jenkins at TACF's Meadowview Research Farms got 200 seeds for use as controls in breeding experiments. Also, various interested people got a few seeds each for planting on their properties.

Another 200 seeds were given to a Monte Kapec, an Army veteran and retired Army officer who has served in Army medicine for over 28 years and currently serves as a Department of Army civilian at the Office of the Army Surgeon General. Monte owns property called The Camp at Elk Tannery in northern Pennsylvania. It is the site of the Sierra Club's Military Outdoors program. Our seeds will be planted at the camp by wounded veterans who participate in the camp's programs.

The rest of the seeds will be distributed in the spring. As we have done for many years, we will send 1000 seeds to the John S. Ayton State Tree Nursery near Preston, Maryland on the eastern shore. These seeds will be

grown in containers and given to the county forestry boards for distribution to interested growers.

Among the remaining seeds, 100 will be used by the inmates at the Maryland Correctional Training Center in Hagerstown, Maryland to grow containerized seedlings that we will give out at events, such as earth day celebrations and chapter meetings. Another several hundred will go to chapter member Dennis Bittenger in Allegany County. Dennis gives seeds to Maryland's Western Correctional Institution, where the inmates grow seedlings, and to the Allegany County Public Schools, where the students grow seedlings in their school greenhouses. Some remaining seeds will be used as controls in our breeding orchards.

Maryland Chapter's New Web Site

As of February 7th, all of the state chapters' websites have been redirected to the new consolidated TACF web site. This will help state chapter site viewers to navigate easily to the TACF site, and to other state chapter websites. The new address will be <https://www.acf.org/md/> but you may still use the MDTACF web address (www.mdtaf.org) to access the new Maryland website. Nearly all the information found on the old web site can be found on the new site, although the format and appearance have changed. There will still be some fine-tuning on the new site in the next few weeks. Please give it a try.

MDTACF Chestnut Material to be Used in Fungal Genetic Study

Why don't chestnut trees get Dutch elm disease, and why don't elm trees get chestnut blight? The answer may seem obvious, but it is not. Plants and their fungal pathogens have been in an co-evolutionary arms race for as long as there have been plants and fungi. Plants have developed complex defenses against pathogens, and fungi have developed complex mechanisms to overcome plant defenses. All of these defenses and virulence mechanisms have a genetic basis. Some genes are common to many plants or fungi, while others are specific to particular species. Identifying the relevant genes, and understanding what they do at the molecular level, helps us understand fungal plant diseases. It can also help us develop new disease-resistant plant varieties.

Dr. Shunyuan Xiao at the University of Maryland's Institute for Bioscience and Biotechnology Research is a renowned expert on the molecular basis of plant-fungal interactions, and is embarking on new research using chestnut blight fungus as a fungal "guinea pig." The new research will study the function of chestnut blight fungus genes which are highly similar to genes in other fungal species. By deleting or disabling these genes, Dr. Xiao's team, including MDTACF board member Bruce Levine, will determine whether the genes affect the virulence of the fungus when it is inoculated into live chestnut tissue. MDTACF provided seeds (from Tom Scrivener's trees) and 2-3 year old stems (pure Americans from the Black Hill orchard) which will be used as experimental hosts in this research.

The study will not only help catalog the function of certain common fungal genes, but could potentially identify key chestnut blight fungus genes essential for causing disease in chestnut, knowledge which we could use to develop new, resistant varieties of chestnut.

Mother Trees in Maryland

Each blight-resistant Restoration Chestnut, also called a B3F3, represents six generations of breeding. The six generations start with the first intercross generation, a hybrid cross of an American chestnut with a Chinese chestnut. Following that, three backcross generations bring the American genetic composition to over 90% in the fourth generation. Fourth-generation trees are intercrossed to make the fifth generation, which are the trees that are planted in our seed orchards. These trees produce the sixth-generation Restoration Chestnut 1.0 trees.

Among the ancestors of each B3F3 seed are sixteen unrelated American chestnut trees. Most of our breeding lines in Maryland were produced using pollen from TACF's research farms in Meadowview, Virginia. We used the pollen on American chestnut trees in Maryland to make the fourth generation (third back cross) trees planted in our breeding orchards. That makes our restoration-seed-producing trees more likely to be acclimated to Maryland's environment.

Since we have about 20 breeding lines of trees in our Maryland orchards, we have had to find and pollinate about 20 different flowering American trees that are accessible

by ladder or bucket truck. Many of the trees are no longer alive.

Typically, we name a tree after the person who reported the tree. What follows is a summary of a few of the earlier trees used in our breeding program.

The Green Tree

Mr. Green's tree was in Baltimore County. He was aware of the tree for a long time and told us that a forester had taken pollen and pollinated another American chestnut tree. Six of the resulting trees were planted nearby. They were tall and doing well in competition with pines that were planted among them. Upon inspection, the six were found to be American-Chinese hybrids.



Using the 24-foot orchard ladder to pollinate the Green tree.

We pollinated the Green tree in 2006. Soon after, the tree declined and died.

The Peters Tree

Mr. Peters discovered the tree along Harpers Farm Road in Columbia, Maryland, near where he lived at the time. It took several months for us to find out that the Columbia Association owned the land. It not only gave us permission to pollinate the tree, but also provided a lift and blocked traffic on one lane of the road three times for bagging, pollination, and harvesting. The Association had a reporter watch and write an article in a Howard County newspaper.

This pollination was also in 2006. Unfortunately, the tree was cut down a few years ago, probably because it was overhanging the road.



Two baggers on the lift at the Peters tree.
The Curtis Tree

The Curtis tree is another tree in Baltimore county that we pollinated in 2010. It is on the edge of a wooded area on a farm. For this pollination, we were fortunate to have the Bartlett Tree Experts provide a bucket truck and allow us to go up in the bucket alone. The tree is mostly, if not completely, dead now.



The Curtis Tree in its prime.

Gary Carver Receives TACF Education Award

President Gary Carver received the TACF Education Award at the annual meeting last November in Louisville, KY. It is for "outstanding work and dedication as a member of the Learning Box team in educational efforts to restore the American chestnut tree." Lisa Thomson, president and CEO of TACF, said, "The learning boxes

would not have happened without you. Thank you and bravo!"

Volunteers needed!

The success of our breeding program is due to the support of many enthusiastic volunteers, including several members who serve as orchard stewards. We always could use more help, especially for orchard maintenance.

The big fall job is harvesting around the end of September. Harvesting and preparing the nuts for winter storage is a lot of fun! Other tasks, such as orchard maintenance and tree culling, are scheduled periodically.

Notice of planned events goes out by email to those volunteers who have indicated that they want to be on the list. If you would like to help, please call Ron Kuipers at 240-838-9992 or email him at m_rkuipers@yahoo.com.

MDTACF Participates in Pilot of New Resistance-Screening Method

On February 20, TACF regional science coordinator Tom Saielli and several MDTACF members planted over 900 potentially resistant B3F2 seeds in pots at a greenhouse belonging to the University of Maryland Center for Environmental

Science's Appalachian Laboratory in Frostburg.

The potted seedlings will be inoculated with blight fungus this June, scored for resistance a few weeks later, and planted in



MDTACF member Dean Yap, regional science coordinator Tom Saielli, and MDTACF members Bruce Levine and Armin Behr (l. to r.) planting seeds at the Appalachian Lab. (Photo: Dave Gill)

MDTACF seed orchards in the fall. They will be retested for resistance two years later using our traditional resistance screening method. The goal of the pilot is to see if early screening in the greenhouse can predict the results of traditional resistance screenings in the field. If so, this method could be used to screen large numbers of seedlings, thereby saving a lot of time and space in orchards, while improving the quality of the trees that we do plant in our seed orchards. Tom Saielli will speak about the small stem assay experiment at our spring meeting.

New Orchard Needed

To complete the planned number of breeding lines for the Musick source of resistance, we need one more breeding orchard. It should be 1 to 2 acres in size. It could be on private land or public property. A memorandum of understanding will be negotiated with the landowner. If you are aware of any possible sites, please let us know.