Maryland Chapter of The American Chestnut Foundation
FALL 2017

THE AMERICAN CHESTNUT FOUNDATION®

MARYLAND CHAPTER

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Maryland Chapter Annual Meeting

The annual meeting of the Maryland Chapter of TACF will be Saturday, Oct. 21, from 11:30 a.m. until 2:30 p.m. at the Urbana Library, 9020 Amelung St., Frederick, MD. The meeting is free and open to the public and includes a free, light buffet lunch and snacks. A limited number of free chestnut seeds and seedlings will be available.

The keynote speaker will be Dr. Fred Hebard, TACF chief scientist emeritus. Dr. Hebard's talk is titled "Forty-Five Years Working to Develop Blight Resistance in American Chestnut. " He will focus on the status of the TACF backcross breeding program and its prospects.

He will also discuss the role of hypovirulence in blight control and the biology of large American chestnut trees, some of which have survived the blight for more than 85 years.

News from our Orchards

Our Clapper breeding program has almost completely transitioned from our fourth-generation BC3 backcross orchards to our fifth-generation intercross seed orchards. This year we finished selecting the best trees for breeding, and we are close to culling the rest. This means that five of our seven breeding orchards are now producing nuts by open pollination among the selected trees. One orchard, IWL-Damascus, requires controlled, hand pollination because there are Chinese chestnuts growing nearby. Another, Thorpewood, contains Clapper BC3's together with Musick B1's.

So far, the Thorpewood, Fox Haven, Dickey and WSSC-l orchards have contributed more than 5,000 seeds in 13 family lines for our seed orchards. This past spring, our volunteers planted 1,250 nuts in the WSSC seed orchard and 1,500 nuts in the CMREC seed orchard. This fall, we harvested 200-300 nuts from a hand-pollinated tree at IWL-Damascus and 600 open-pollinated nuts from our third and final line at WSSC-l. For the first time, we will also have a fall planting, using the seedlings that are part of the small-stem-assay project in Frostburg.

In our Musick line breeding program, we are still planting B3F1 breeding orchards. Our current goal is to develop three Musick B3F1 orchards containing 10 family lines. We have two orchards already: the State Highway orchard at Hampstead is full, with three lines, and the Beltsville Agricultural Research Center orchard contains three full lines and a partial line, which we will complete next spring with seeds that

were harvested at Monocacy this fall. This summer we began work on a new orchard (see next article). Almost every day, in one orchard or another, our orchard stewards and other volunteers are fixing fences, weeding, watering, mowing, spraying for Ambrosia beetles or for weeds, and generally paying the kind of attention that can make an ordinary orchard into something spectacular. If you have a favorite orchard or a nearby orchard where you would like to be more involved, contact the orchard steward, or our orchard coordinator, Ron Kuipers.

Lyles Orchard is Chapter's Newest

The Lyles family farm on Brighton Dam Road in Howard County dates back generations and is entering its latest life as the Chapter's newest orchard. The farm, which during the mid-1900a provided vegetables for Baltimore and Washington markets, will eventually host three different lines of 100 B3F1 seedlings each as part of the Chapter's Musick line breeding program. The first 100 will be planted in the spring, another 100 the following year, and the final 100 in spring 2020. The best trees from each of the three lines will be open-pollinated to feed into our the B3F3 seed orchards.

Like the WSSC-1 orchard, the Lyles orchard is part of the chapter's cooperative program with the Washington Suburban Sanitary Commission (WSSC). The WSSC acquired the property to help protect the Triadelphia Reservoir watershed after the death its last owner Ianthia Lyles at the age of 98. WSSC has aided in fencing the new orchard and will continue to help with orchard maintenance. Ianthia's son, Remus Lyles, a retired WSSC supervisor, lives next to the orchard and has agreed to keep the orchard mowed. Remus' brother Howard also lives ajacent to the new orchard.

To date, in addition to the partially completed fence, the rows for next spring's planting of seedlings have been cleared and a daikon radish cover crop has been planted in the rows. These radishes (with which sushi lovers will be familiar) enrich and break-up the soil and cover the rows blocking sunlight to weeds. The chestnut seeds to be planted at Lyles will come from crosses between B2F1 trees at our Monocacy orchard and pure American chestnuts located near Darnestown and Lake Needwood.

Radishes mark where chestnuts will be planted at the Lyles orchard. (Photo: Larry Grossman)

Small Stem Assay Project Underway

On July 25, twelve volunteers met at the University of Maryland's Center for Environmental Science's Appalachian Lab in Frostburg to inoculate about 800 potentially blight-resistant (B3F3) seedlings planted in a greenhouse there in March.

The work is part of a pilot project The American Chestnut Foundation is carrying out in several states to test whether inoculations of seedlings in their first year can determine which trees carry the genes for resistance.

Each tree was carefully labelled, measured and inoculated through a 5 mm incision in its stem. Over the next two months or so, TACF volunteers will monitor the trees and record when each begins to show symptoms of blight. As of the first week of September, about 25% of the seedlings were beginning to wilt from the inoculation point up.

This fall, we will remove the infected portions of the stem and replant these seedlings in our seed orchards, where we expect them to re-sprout next

spring. The trees will be raised under conditions identical to trees planted directly from seed in the orchard, and evaluated for blight resistance using our standard field inoculation at age two. The results of the standard inoculations will be compared to the results from the small-stem inoculations. If the results correlate, it will confirm that small-stem inoculations can be used to pre-screen trees for blight resistance, which could save a great deal of time and effort and improve the resistance levels of the trees in our orchards. It was five hours of fussy, detailed work, but if the experiment proves successful, it will be well worth the effort. Many thanks to all who participated.

SSA volunteer, from left: Barbara Kreily, Regina Trott, Kristin Ratliff, Rhonda Schwinabart, Ray Price, Sue Tripp, Katrina Somers, Perry Cregan, Peggy MacDonald, Katherine Niederhelman and Raisa Niederhelman. (Not shown: Ken Price and Bruce Levine)

A Radish Farm?

The initial years of an American Chestnut seedling can be critical to its robust health and growth in the future. The Chapter, therefore, takes great care in trying to give the new plantings the best chance for success by analyzing the soil, adding soil amendments (fertilizer, sulphur, etc.) and special planting mixes, watering, and pest control. In the quest to find better ways, we have embarked on an experiment with daikon radishes. (Daikon is a Japanese word that means "big root.")

So how can a radish give our young trees a better start in life? Various university studies have shown the daikon radish to be effective in de-compacting soil because of its long, large roots. We have experienced situations in our orchards where the seeds get off to a good start then slow their growth when they encounter compacted soil. The Daikon radish is known for helping alleviate soil compaction and "mellowing" out the soil. Extensive roots provide new channels for nutrients and water. Additionally, as the tubers decay, they become wonderful food for microscopic life that bring health to our soils.

Daikon radishes planted at CMREC seed orchard in August 2017.

The Chapter is experimenting with the radishes at the Central Maryland Research & Education Center (CMREC) and the Washington Suburban Sanitary Commission seed orchards as well as our new Lyle Farm breeding orchard where we will plant next spring's seeds.

In early August, as part of the preparations for next spring's plantings at the three orchards, we tilled a two-foot strip in each of the future rows where seeds will be planted. We tilled the soil to a depth of about four inches and planted two rows of radishes about 1 inch deep in each two-foot row. The radishes will continue to grow until the first frost. Then they will start to die back and de -compose. The de-composition will put nutrients into the soil and the long roots will aerate and de-compact the soil.

During the summer of 2018, we will take measurements of the new plantings to determine if our efforts have a beneficial effect on our trees' growth. We will keep you apprised of our results.

The Buffet Is Open

American chestnut trees have a number of natural enemies and today we introduce you to one of their adversaries, the yellow-necked caterpillar *Datana ministra* (Drury) (*Notodontidae).*

Considered to be a pest, these caterpillars defoliate one branch then move to another. On large trees with ample foliage, only a few branches may be defoliated but small trees with limited foliage can be completely stripped of leaves by a single colony. Healthy trees usually survive and recover; however, defoliation can cause dieback of branches and twigs, loss of growth, or even tree mortality.

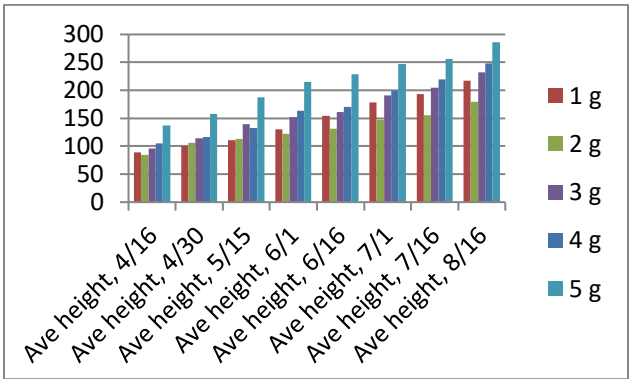
At first glance, your reaction might be to douse the caterpillars with pesticides in hopes of ending the carnage. Usually such extreme actions aren't needed, unless there is a widespread outbreak in the orchard. The infestations are generally located on a small number of trees and can be resolved quickly with a pail of soapy water and a deft hand at removing the caterpillars. Early detection is extremely helpful in minimizing the defoliation of the trees.

The amount of defoliation can influence the development of young seedlings, especially during their first year of growth. Observations of such damage at the CMREC orchard was that when young saplings that were defoliated by 80% in the first year were compared with unaffected trees, they lagged in growth by about 25%.

Bigger Seeds Yield Faster-growing Seedlings

This season Bruce Levine is growing 80 pure Americans from seeds taken from one of Tom Scrivener's pure American trees. The mother tree is unusual in that it produces seeds that vary widely in size (from less than 1 to over 6 grams) so he decided to test something he had noticed in previous years: whether large seeds sprout and emerge from the soil sooner than smaller ones. It turns out that they do not – there was no correlation between seed size and

the date of emergence from the soil in the test he did. Nor was there any significant difference in mortality rates. But over the summer he discovered something else. Once the seedlings do emerge from the soil, those that come from larger seeds grow faster than those from smaller seeds.



Average seedling height in mm of seedlings grown from seeds of varying sizes, April-August.

This stands to reason: larger seeds have more stored food that can give a young seedling a head start reaching above competing vegetation. Still, it is useful to know that when transplanting seedlings, we could be inadvertently select for seed size if we choose the tallest seedlings in our population.

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**

BARC Orchard Challenges

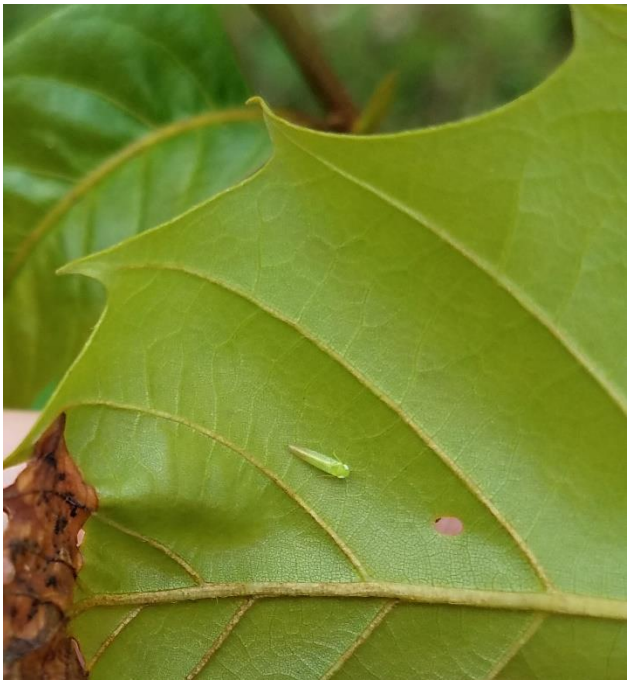
Ron Kuipers, Dr. Perry Cregan and Peggy MacDonald are stewards of the backcross chestnut orchard at the Beltsville Agricultural Research Center (BARC). It was planted in March 2016. Roughly 382 nuts were planted in March, about seven feet apart in rows spaced ten feet apart. It comprises the Musick line of resistance.

The first year of growth went well. Most trees were two to three feet tall by September 2016. Germination was excellent and most of the trees thrived. This spring, 36 more nuts were planted.

By early this summer though, we noticed that the young leaves on most of the year-old trees were turning black, especially at the tips. Pictures of the damage were sent to Dr. Fred Hebard, (TACF chief scientist, emeritus). Fred said most likely it was damage caused by leafhoppers. These sucking insects are usually found on the backsides of developing leaves, where they feed on the veins of the leaves, causing the tips to die. This damage is often followed by fungi such as *Pestalotia* spp. Peggy went back to the orchard and, sure enough, the first leaf she turned over had leafhoppers. We chose not to spray insecticide on the trees, to see what would happen. The next flush of growth seemed to be unaffected. Perry saw that the Chinese chestnut control trees were much less damaged by the leafhoppers than the Americans and most of the hybrids.

The next challenge happened in late August 2017. Perry and Ron noticed a significant number of formerly healthy trees, four to five feet tall, were dead or dying. The trunks of the trees did not show any damage that would be indicative of ambrosia beetle infestation. *Phytophthora*, a soil-borne pathogen, was suspected, especially since many of the affected trees were in a swale that runs in the middle of the field. Whole trees were removed and taken to the University of Maryland, Plant Diagnostic Laboratory for a complete analysis. Dr. Karen Rane, the Laboratory Director, found cankers on the crowns of the diseased trees. She suspected *Phytophthora* as well, and ran a serological assay (Agdia's

immunostrip). After a week, the test came back positive for *Phytophthora*, ruling out similar pathogens such as *Pythium*. The next test will identify the species of *Phytophthora* through sequencing specific DNA regions of the pathogen. *Phytopthora cinnamomi* has become a serious problem with chestnuts, especially in warmer areas and in wetter soils. This summer has been unusually wet, which could be the reason for this organism to become a problem. We may have to avoid planting more trees in the lower, potentially wetter part of the field.



Leafhopper on underside of leaf.

Leaf damage after leafhopper feeding.

Chestnuts infected with phytophthora in the BARC orchard.

Although no bylines are shown, we thank the authors of the articles. They include Bruce Levine, Ron Kuipers, and Peggy MacDonald.