Maryland Chapter of The American Chestnut Foundation
Fall 2014

THE AMERICAN CHESTNUT FOUNDATION

Officers
President: Bruce Levine
Vice President: Gary Carver
Secretary: Barbara Knapp
Treasurer: Emilie Crown

Board of Directors:

Armin Behr
James Benton
Dennis Bittinger
Ron Clements
Jim Curtis
Stephen Dodge
Dr. Katia Englehardt
Paul Eriksson
Stan Fisher
David Gill
David Jacobson
Darryl Johnson
Ron Kuipers
Matt Lustig
Jen Miller
Robb Newman
Shelley Packard
Stephen Peck
Susan Proper
Tom Scrivener
Mark Vollaro

Maryland Chapter Fall Meeting

Our annual meeting will be on Sunday, October 26, 2014 from 1-4 pm. The meeting will be at the Izaak Walton League, Rockville Chapter located at 18301 Waring Station Road, Germantown, MD 20874.

In addition to holding our annual elections, we will hear from speakers Dr. Katia Englehardt, from the U. of Maryland Center for Environmental Science, and Matthew Brinckman, TACF Science Advisor will speak on restoration efforts.

Free American chestnut seedlings too!

2014 Orchard Activities in Review

Our Chapter maintains 17 orchards, of which 13 are for backcross breeding, three are "mother tree" orchards that contain mainly pure American chestnuts, and one (Fort Detrick) that contains mainly B3F3 "Restoration 1.0" chestnuts.

In early April we planted seeds in four orchards, adding 107 B3F3s at Fort Detrick, one line of 100 Musick BC3s plus 30 check seeds at the State Highway Administration near Hampstead, and a total of 61 Americans from six different American parents at Black Hill and Izaak Walton/BCC.

April and May were busy months for several of our volunteers who combatted ambrosia beetles. This year we maintained traps and sprayed at a record seven orchards. Perhaps because of our stepped up defenses we detected little damage during April when infestations usually peak. We saw smaller infestations in mid-May when beetles killed some trees at the Fort Detrick and Black Hill orchards.

Gall wasps and tent caterpillars took over first place among our insect pests this year. Gall wasps can now be found in nearly all our orchards where they can damage and may even kill the largest trees. We've been advised that the only defense is that eventually a parasitic wasp will show up and will keep the gall wasps under control. To our great relief, a researcher at the University of Kentucky, who examined sample branches from two of our orchards, reported that the parasitic wasps have finally arrived in this area. (As Asian gall wasps spread throughout the natural range

of American chestnut, and if the parasites do not keep the problem in check, it may be necessary to breed resistance against this pest into our trees. (C. Ozarkensis or C. Henryi are sources of resistance.)

In early May, Jim Curtis reported that the State Highway Administration orchard was crawling with tent caterpillars and that they were eating the tiny shoots. We removed the caterpillars and then placed netting material over the tubes. We now have only 40 trees from the original 100 seeds that were planted. We have had to make new crosses to replace the losses.

In June our first big project was to inoculate about 900 trees in six orchards -- Fox Haven, Monocacy, IWL/Damascus, WSSC, Hashawha and Dickey. These trees will be evaluated for their blight resistance this fall and again next spring. Only a small number in each orchard will be saved for breeding the next generation. Removing the trees that are not selected is a year-round activity.

By the second week of June several members began monitoring the trees that were candidates for pollination this year. From June 13 to June 29 we placed 300 bags on five trees in the Thorpewood and Monocacy orchards and on one wild American tree. Our goal is to obtain 600 seeds for our WSSC seed orchard and up to 130 seeds to finish filling the State Highway Administration backcross orchard.

Eagle Scout Project Provides Water for Seed Orchard

Chestnut trees are relatively drought-tolerant. Nevertheless, the new seedlings in our orchards have much better survival rates if they are watered during dry spells, particularly in their first summer, before they grow deep root systems. Until this year all watering in our orchards has been done by volunteers hauling water in jugs, pails and barrels.

These labor-intensive methods are not practical for our new seed orchard located on Washington Suburban Commission property near the Triadelphia Reservoir. One reason is that a seed orchard has many more trees than any of our backcross orchards. If all goes as planned, we will plant 600 seeds there in 2015 and that many or more in each succeeding year until it reaches its capacity of 6,000 trees. The second obstacle to hauling in water is that the seed orchard is a half-mile down a rutted trail from the nearest road.

The answer to this water supply problem was provided by Nick Butler, a 16-year old Eagle Scout candidate from Boy Scout Troop 1397 in Damascus Maryland. When Nick approached us to say he would like to do an Eagle project that supported chestnut restoration, TACF member Mark Vollaro

suggested a rainwater collection facility at the seed orchard.

Nick and his supporting team took it from there. Nick designed a 12' by 16' sloped roof structure with a gutter and downspouts and four 55 gallon barrels on elevated supports, each with a faucet at its base. Most of the construction materials were donated by family, other troop family members, TACF members and local businesses. Nick organized and directed the construction team, consisting of other scouts and parents.

The structure was completed in May, 2014. It performs flawlessly. Its current storage capacity of 220 gallons was filled with the first 2" rainfall.

If it becomes necessary in future years it will be fairly simple to add more barrels to the system. Also, now that we have a framed structure it is tempting to imagine that there is another scout out there who could convert a water collector into a storage shed for orchard supplies.

Maryland Seeds in Canadian Research Project

In the fall of 2013, the Maryland Chapter provided 25 local pure American seeds to Christie Lovat, a doctoral candidate in the Plant Science Department, MacDonald Campus of McGill University for use in her research on tissue culture. Here's how Ms. Lovat explains how these seeds are being used to develop new means of propagating and inducing genetic changes in American chestnut:

Trees in Test Tubes (by Christie Lovat)

Traditional plant breeding, with the associated flower crossing and tree climbing, has historically been the method of choice for increasing disease tolerance in the American chestnut (Castanea dentata). However several labs across USA and Canada have recently been trying a different approach, using tissue culture technology to breed trees without ever having to step foot in the field. In tissue culture, small parts of plants are grown in test tubes in the laboratory and through the use of growth regulators, can be induced to develop into a wide range of different plant tissues. So for example, a small piece of leaf can be transformed into a complete plant. The particular recipe of growth regulators and other culturing conditions is specific to each plant species, and finding just the right mix for each species has been the greatest challenge for researchers working in tissue culture.

For breeding purposes, tissue culture has some unique benefits. Ph.D. student Christie Lovat has been working in McGill University's Plant Tissue Culture Facility under the supervision of Dr. Danielle Donnelly to investigate just one of these uses through a technique known as somatic embryogenesis. In this particular tissue culture technique, a small cutting from a tree is induced to develop into a complete plant embryo, which then germinates as would a normal embryo from a seed. Numerous embryos can be induced to develop from a single plant cutting, making this a valuable technique for producing large numbers of plants from only a few cuttings. However the real value of this technique to plant breeders involves the genetic changes which often occur in these newly generated embryos during this unusual process. These genetic changes are random and a consequence of embryo development through somatic embryogenesis. Despite the random nature of mutation, many studies done with various plant species have noted that genetic changes frequently resulted in increased disease

tolerance. Miss Lovat hopes to repeat this success with American chestnut.

With over 500 seeds at her disposal, donated by both private individuals and public agencies in USA and Canadian, Miss Lovat is currently attempting to transform cuttings from leaves, stems, and buds of American chestnut into somatic embryos. She will then take the grown trees created from these embryos and test their tolerance to the pathogens responsible for chestnut blight (Cryphonectria parasitica) and the resurging ink disease (principally Phytophthora cinnamomi and P. cambivora). Any difference in response between these lab-derived trees and the original trees the cuttings came from will indicate that genetic mutations with increased disease tolerance did occur. Research is currently underway. If this technique is amenable to chestnut, it could be used to create numerous pure American chestnut trees with increased disease tolerance!

Global Ecology Awards

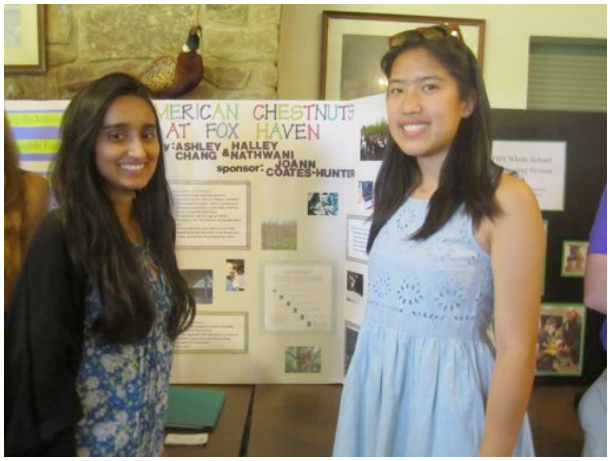
On 19 May, 2014 Education Committee Chair Stan Fisher presented awards to two groups of Poolesville High School, Global Ecology Program students for projects which advanced the cause of the TACF.

The first award was presented to Jordon Bloem and Deepti Konduru for their project titled Chestnut Orchards in Science Education. The excellent efforts in research, interviewing and filming were evident in the film "Chestnuts in Science Education", posted on YouTube. The film did an excellent job of documenting the thinking, planning and execution of an American chestnut program in the Carroll County school system. This effort may be used as a model for future programs of this type to inspire students, educate them and further the cause of the restoration of the American chestnut. Their efforts materially advanced restoration of the American chestnut tree to Maryland's forests.

Jordon Bloem and Deepti Konduru with their chestnut project

The second award was presented to Ashley Chang and Halley Hathwani for their project titled American chestnut: Fox Haven Organic Farm and Learning Center. This project demonstrated excellent understanding of American Chestnut

history and current restoration efforts. They effectively interviewed and filmed the MD TACF efforts in the Fox Haven American chestnut orchard. They recently posted "Chestnuts in Science Education" on YouTube. The film presented the interaction of the Fox Haven Organic Farm and Learning center with the MDTACF efforts in planning, planting and promoting the production of chestnut blight resistant chestnut trees, aimed at a future restoration of the American chestnut into our native forests. Their efforts have detailed Maryland chapter efforts, motivated our volunteers and advanced restoration of the American chestnut tree to Maryland's forests.



Ashley Chang and KalleyKatawain in from of their project

Some links to these products are as follows:
Fox Haven video:
http://youtu.be/m3yrD7WQPjA

Caroll County education video
http://youtu.be/LrsbfwsX3V8.

Chestnut Tree Measurements

On 24 April 2014 the chestnut tree orchard at Black Hill Regional Park was visited by students from the Poolesville High School Global Ecology Program. After an orientation on the American chestnut restoration efforts and the TACF, the students were instructed in the measurement and assessment of chestnut trees and in the determination of ambrosia beetle damage. They were given measurement instruments and proceeded to measure height, diameter at breast height, overall condition and the presence of ambrosia beetle damage. There were 40 students, several adults and two Black Hill Regional Park staff. Maryland Chapter Black Hill Regional Park orchard steward Stan Fisher and chapter member Mark Vollaro were present to instruct and guide the students.


Poolesville Global Ecology students at Black Hills Orchard

Boy Scout Troop Event

On 17 May 2014 a Boy Scout troop visited the chestnut orchard at Black Hill Regional Park. The event was sponsored by Ron Kuipers. Stan Fisher told the scouts were about the TACF effort to restore the American chestnut to our forests. There were 7 scouts and 5 parents present. They proceeded to help to weed and mulch the newly planted and other smaller chestnut trees.

Volunteers needed!

The success of our breeding program has resulted from the support of many enthusiastic volunteers, including several members who have volunteered to be orchard stewards. We always could use more help, including for routine, unscheduled orchard maintenance. The next big jobs this fall will be harvesting around the end of September and tree culling, which is scheduled periodically. Notice of scheduled events goes out by email to those members who have indicated that they want to be on the list. If you want to help with routine maintenance in an orchard call Ron Kuipers at 240-838-9992 or email him at m_rkuipers@yahoo.com .