# News from the Connecticut Chapter of The American Chestnut Foundation

Winter/Spring 2024



Our mission is restoration of the American chestnut in the State of Connecticut

### President's Letter



CT-TACF Chapter President Jack Swatt during the TACF 40<sup>th</sup> anniversary celebration at Lockwood Farm in Hamden. Photo by Florian Carle.

Over the past few years, we have been expressing our optimism that the transgenic chestnuts in the Darling 58 line would offer us the chance to have a potentially blight tolerant chestnut tree available for planting in the near future. While the deregulatory process has been long and drawn out, we kept patiently waiting for the final decision that would make pollen from these trees available to our chapter for pollination. The events of the past few months have shown that the Darling line may not be the magic bullet we were hoping it would be. This may be a big setback, but it will not deter us from continuing our efforts to find a solution.

Even though the Darling line of transgenic trees did not meet our expectations, much was learned in the process. The darling line used a promoter region, a section of genetic code that acts like a switch, that was continually in the "on" position. This meant that every cell in the plant was producing oxalate oxidase at a significant metabolic cost to the plant. SUNY-ESF has already developed a new transgenic line, Darwin, that uses a wound inducible promoter that only turns on oxalate oxidase production locally when the plant experiences a wound to its bark. Darwin will have to go through the same testing and deregulation process that Darling did, but research and outcrossing can be continued in controlled orchards. Since this is a newer line, it will still take several years until we can reach the same expectation that we will be able to work with it in our orchards, however, the work that has already been done with Darling may speed

that process up. Future advances are also hopeful that a blight-inducible promoter region may be developed that will turn on oxalate oxidase production and/or other resistance genes in the presence of a blight infection. This will not only decrease the metabolic cost to the plant, but also more closely mimic the natural disease response. We have to remember that these are still experimental processes and continued research will help get us to point where the chestnut trees we plan on restoring to the forests will be successful.

The efforts we have performed in planting backcross orchards, seed orchards and germplasm conservation orchards have not been done in vain. The backcross trees that have been selected for the best resistance are still surviving, and being crossed with other highly resistant trees that will provide nuts for us to continue planting in seed orchards. The trees growing in our Germplasm Conservation Orchards will continue to grow and will be there as a source of genetic diversity when a healthy transgenic American chestnut tree is deregulated and available for outcrossing. Until then, when these American chestnut trees flower and cross-pollinate, they will produce more genetically diverse American chestnut seeds that we can continue to plant and expand the ever-growing pool of surviving American chestnuts. The more American chestnut trees we have growing in favorable conditions, the better off the chances will be that the species will survive.

Fack Swatt

President, CT-TACF

### Celebrating the 40 years of TACF in Hamden



Happy harvesters came to celebrate and left with their pockets full of chestnuts! - Photos by Florian Carle

As you know, 2023 was a year of celebration for The American Chestnut Foundation! Founded in 1983, the foundation celebrated its 40 years of research and restoration!

Our state is a privileged place for chestnut research. Well before the creation of the foundation, Connecticut was planting chestnuts in Lockwood Farm. As early as 1941, the Connecticut Agricultural Experiment Station in Hamden became an active center of chestnut research in response to the blight.

We owe the incredible collection of trees to the CAES scientists, including Arthur H. Graves, Richard Jaynes and Sandra Anagnostakis, who planted an incredible variety of species over the years, studies these trees, and created hybrids and crossings. CAES has been an incredible partner for the Foundation, allowing fruitful collaborations between their scientists and TACF. It was therefore the ideal place for our chapter to celebrate this anniversary amongst their multitudes of chestnut orchards!

On a sunny but brisk Sunday of October, members of the CT Chapter and chestnut afficionados met to at



Arthur H. Graves in 1953

Sandra Anagnostakis in the South Lot, 80 years after the first photo

Jack Swatt collecting samples from Mahogany for DNA extraction in 2019





Scan to read "The chestnuts at Chestnut Lane" by Sandra Anagnostakis, and learn more about the trees in the CAES orchards at Sleeping Giant. You can find the article page 6 & 7 of the February 2016 Newsletter of the Sleeping Giant Park Association.



the Farm for an afternoon of activities. Guided by the Susanna Keriö, part of the new generation of CAES chestnut scientists, attendees wandered through the orchards, learned about the different hybrids, and harvested a lot of chestnuts!

The afternoon continued with an outside screening of TACF's documentary film Clear Day Thunder: Rescuing the American Chestnut outside, under the farm's pavilion. I have hosted and attended a number of screenings for this documentary during the year but watching it outside, amongst the chestnut trees, had something of magical. And to finish the day, the most inclined came to the West Lot of Sleeping Giant State Park to hike and see the most significant chestnut trees this plot birthed, like "Sleeping Giant", "Graves", or "Mahogany".

The celebration continued a few days after for a Shucking Party at the Connecticut Forest & Park Association in Rockwell. Armed with gloves and delicious chestnut baked goods, attendees helped us cracked open all the burrs collected during the harvest season to select, list and track all the nuts coming from our CT chestnut trees to send to TACF for controlled plantings and research purposes. Special mention to Jack Swatt's chestnut and squash soup, and Florian Carle's chestnut and chocolate truffles which kept troops motivated in front of the mountain of burrs collected this year!

This celebration was a delight, and we wish TACF another 40 years of success in their (our!) mission to bring American Chestnut back to our forests! And you can read more about the aquatic celebrations of TACF's anniversary on page 7!



### **Backcross Breeding Program Update**

While most of our emphasis over the last few years has been on the transgenic program, our chapter has still been very busy continuing to finish the long process of breeding potentially blight tolerant hybrid trees in our backcross breeding program. From 2006 to 2012 seven backcross orchards were planted with nuts obtained from crossing Connecticut wild American chestnuts with pollen from third generation backcross (B3) trees bred by TACF. The original backcross plan was for these trees to be tested for blight tolerance by inoculating their bark with the fungus and selecting the most resistant trees. Non-resistant trees were removed from the orchard and the remaining trees

would be allowed to cross pollinate and the nuts that were collected (B4F2s) would be planted in seed orchards. Those trees in the seed orchards would also be tested against the blight and the resistant trees would be allowed to open pollinate and produce B4F3 nuts which would be considered our Restoration Chestnuts. Two of our backcross orchards, Swann Farm in Ellington and the Woodbridge orchard went through the selection process and nuts from several trees were planted in our three seed orchards starting in 2017.

Since the backcross breeding program in other states had started earlier, some early results of the resistance in the seed orchards was found to be significantly less than expected. Refinements were made to the backcross breeding program to apply more stringent selection criteria to the trees that passed the inoculation test. Each tree was tested for genetic composition of American and Chinese chestnut genes and several phenotypic characteristics of the trees were recorded. Trees that still retained more than 5% of their Chinese ancestor's genes and displayed characteristics of superior blight resistance were given a blight1 or blight2 rating. The best chance of retaining the most blight resistance genes from our backcross orchards will be by manually pollinating the blight1 or blight2 rated trees with pollen from

other blight1 or blight2 trees. Only nuts from these crosses will continue to be planted in the Seed orchards. These trees will also go through blight testing and genetic analysis to again select the most resistant trees for future breeding.

Since this change to the backcross breeding program took place, three more of our backcross breeding orchards have gone through resistance testing with challenge from the blight fungus. These are the Wigwam Brook orchard in Litchfield, Great Mountain Forest orchard in Canaan, and the Salem orchard. Samples have been collected for genetic testing and we are waiting to see which trees will be selected for the blight1 or blight2 rating. Once that has been determined, we will perform the manual pollinations on those trees with pollen from the blight1 or blight2 rated trees from our other orchards, or orchards from other regional states. We also have one more orchard in Middletown waiting to undergo inoculation for blight

## Planting Chestnuts in a Colonial Setting

This past year we have partnered with several organizations with an interest in planting American chestnut trees in order to recreate the feel of what the forests looked like during colonial times. Although these trees will not be able to achieve the stature of the trees from that time, having American chestnuts mixed in with the other trees in their landscape, gives them a sense of restoration to that time. Even though many trees were cleared for farms, some



Jack Morris, Donna Brown, and John Cantelmo planting chestnut samplings at the Denison Orchard - Photo by Jack Swatt

resistance testing which hopefully will occur this year.

Since our Seed orchards were already planted with nuts from our older backcross orchards prior to the program change, we had to come up with a plan on how to manage these trees. Each Seed orchard had one plot that was planted with nuts collected from trees that were given the blight1 or blight2 rating. At the South Kent and the Norcross orchard in Stafford, the trees were mature enough to be inoculated for blight resistance this past summer. The remaining plots were thinned out to give the healthier trees more room to grow. Since they contain germplasm from wild American trees originating in Connecticut, they will be saved for germplasm conservation and can still be used for outcrossing transgenic chestnut lines in the future.

Our backcross breeding orchards are continuing to grow and produce potentially blight tolerant chestnut trees. With the change to the design of

chestnut trees would have been kept around these farms for their bounty of nuts. While many colonial farms have been returned to forestlands in our state, the locations of chestnut trees on those properties can still be identified by chestnut sprouts continuing to emerge from the roots.

One of these colonial settings is at the Denison Homestead Museum in Mystic. The original homestead was built in 1654 by Captain George Denison, but the original home burned and the current manor was rebuilt in 1717. The family had cultivated the Dennison heirloom apple and the museum wanted to build an orchard to help conserve the unique variety. They also contacted our chapter to see if they can help in chestnut restoration as well. Several plans were made for constructing an orchard, but when the site of the original family orchard was determined by historical maps, the orchard was placed on the original footprint of the historic orchard. We began planting American chestnuts



Kendra Collins inoculating a chestnut tree in the Norcross Orchard - Photo by Jack Swatt

the program, we will be putting more effort into doing manual controlled pollinations. We will continue to hold pollination workshops so that our volunteers will become proficient in performing this vital process. With the current delay in the transgenic program, we will have the opportunity to focus on continuing our work with the backcross and seed orchards, and hopefully have success with breeding trees that can survive infection from the blight.

as part of a Germplasm Conservation Orchard in spring of 2023 and plan for more plantings this year. The Denison Homestead volunteers are busy grafting the heirloom apple to root stock that will eventually join the chestnuts in the orchard.

The Huntington Homestead Museum in Scotland is the family home of Samuel Huntington, one of Connecticut's delegates to the Continental Congress, signer of the Declaration of Independence and the Articles of Confederation. He also served as President of the United States under the Articles and was the first Governor of Connecticut under the state Constitution. The museum volunteers are actively restoring the house, researching the family history and managing the five acres of forest and fields surrounding the home. They were also looking for a way to help with American chestnut restoration since they knew the tree was an important commodity during colonial times. They also wanted to honor one of their



Pauline Merrick, John Spencer, Janet Lussier, and Kevin Ring (left to right) on October 21 - Photo by Jack Swatt

longtime volunteers, John Spencer, who is a retired forester from the Dept of Environmental Protection (now called DEEP). An upland site in one of their managed fields was chosen to plant a demonstration planting of 6 American chestnut seedlings. On Saturday, October 21st they held an open house with demonstrations of colonial life, and dedicated the "John Spencer Chestnut Grove". The final location for planting American chestnuts is at the Greenwich Audubon Center Historic Forest Plot. Their stewardship team developed a plan for a historical forest demonstration plot as a means for public education and a way to diversify the plant communities and habitat types. American chestnut was incorporated into the planting given its importance to the historical forest composition. This past fall, a dozen American chestnut seedlings propagated from wild American chestnut parents in Connecticut were provided for this project. Although these chestnut trees may eventually become out competed by some of the other tree plantings, we're hopeful that we can eventually supply some blight tolerant American chestnut seedlings that will continue to demonstrate the historical forest composition.

### Breeding Phytophthera cinamoni Resistance into our Chestnut Orchards

The story of the chestnut bark blight and its decimation of the American chestnut is well known in our circles The American chestnut has survived because the blight fungus does not attack the tree's root system, allowing the tree to continually send up new sprouts that eventually also succumb to the blight. But, there is another non-native fungus affecting American chestnuts, Phytophthera cinamoni, which causes root rot disease, also known as ink disease. It has been responsible for the deaths of many chestnut trees in the southern Appalachian foothills. Death of these trees started in the 1820s, but it was not recognized as the pathogen responsible until 1932. While chestnut blight, Cryphonectria parasitica, spares the root systems so the trees can survive.

P. cinamoni infection results in the death of the tree's roots leaving no hope of resprouting. It is believed that our cold winters in the northeast are preventing *P. cinamoni* from advancing northward but with climate change, it is predicted that over the next few decades, it may spread into our area and infect our orchards and our wild American chestnuts.

Some trees within the Backcross Breeding Program have been shown to have P. cinamoni resistance which was inherited from their Chinese chestnut ancestor. Trees that descended from the "Graves" Chinese-American hybrid tree can have this resistance, however, all the trees that we have planted in our Backcross and Seed Orchards have come from the "Clapper" ChineseAmerican hybrid line, which does not show any P. cinamoni resistance. In preparation for P. cinamoni's arrival to Connecticut, we began crossing our best selected backcross trees in the Woodbridge orchard with pollen from a pair of trees in the Granville, MA backcross orchard which contain the genes for the Phytophthera resistance. The nuts obtained will be planted in our Seed orchards this spring. We hope to continue using pollen from Phytophthera resistant trees to add these resistance genes into our Seed orchards, as well as our Germplasm Conservation Orchards, so that the trees we plant in the future may have a chance at surviving in the next several decades after P. *cinamoni* does arrive.

### Volunteer Opportunities



Jerry Graham and Florian Carle volunteering at the 2023 CAES Plant Science Day at CAES in Hamden - Photo by Kitty Prapayotin-Riveros

This past year, TACF celebrated its 40 year anniversary. In 1991, a group of Connecticut volunteers joined together to form the second state chapter of TACF. All the work that has been done over these past 40 years to organize our chapter, search for wild American chestnuts, plant our orchards, and educate the public about our cause was performed entirely by our Connecticut volunteers. I can't express enough our gratitude for all the volunteer efforts that our members have contributed to get us to where we are now. As we enter our 5th decade, we will continue to offer opportunities for all our members and volunteers to help further progress towards chestnut restoration.

We are continuing to find or learn about flowering wild American chestnuts and have assembled willing volunteers into our Germplasm Committee. Volunteers are needed throughout the state to help search for new sources of Germplasm as well as monitoring known chestnut trees for flowering to determine the optimal time for pollination. In the fall, help is also needed to organize and perform harvesting of these as well as open-pollinated nuts. When springtime comes around we also rely on volunteers, from our chapter as well as host organizations, to help us plant the germinating chestnuts into our Germplasm Conservation Orchards and Seed Orchards. We organize many outreach events throughout the year that rely on volunteers to help, and even the newsletter that you are now reading was created by volunteers.

As our roles are expanding, TACF will be rolling out two new programs this spring that will help us enlist new volunteers and keep track of volunteer hours. On the TACF web site is a VOLUNTEER page under the ENGAGE tab. There, new volunteers can fill out an online application which will be directed to our chapter. The link will also continue to a volunteer waiver form which can be signed electronically. We will encourage existing volunteers to go to the page and fill out those forms. While the volunteer application will be optional, the volunteer waiver form will be required. The forms can be filled out online prior to a volunteer event, but we will have printed copies available for people to sign which can be scanned in a later time. The volunteer waiver form will only need to be filled out once and will be applied to any volunteer event. Also on this web page is a link to software that will record volunteer hours. People who perform other

### The CT chapter is on Facebook

Hosted under The American Chestnut Foundation Facebook Page, this community group allows every member to ask questions, share articles, info, and upcoming events that might interest Chestnut enthusiasts!

Join us at: www.facebook.com/groups/cttacf

volunteer work will be familiar with these processes as they are commonly used by other organizations, and we will be updating our chapter to current standard practices.

These programs were developed with the help of our Regional Outreach Coordinator, Catherine Martini. She explained the benefits of this program as follows. "We know recording hours is a cultural change for many of you, but we're aiming to make this as easy as possible before we transition to a software that will help all of us communicate and keep track of the valuable work you're doing. This volunteer recorder is simple to use – you can fill out your hours for the whole season at once, or enter your hours as you go so you don't forget or lose what you've done. The data from this will help chapters and national plan appropriately for future work days, make better decisions about where to allocate resources, and give us more accurate information when applying for grants. It's long past time we recognize all the long hours you dedicate to American chestnut restoration!"

### CT-TACF Officers and Board of Directors Officers

President – Jack Swatt Vice President – Fred Behringer Treasurer – Dr. Jack Ostroff Secretary & Research Coordinator – Dr. Florian Carle Board of Directors (term ending) Renée Allen (2024) Dr. Phill Arnold (2024) John Baker (2024) Dr. David Bingham (2024) Fred Behringer (2024) Michael Gaffey (2023) Jim Gage (2024) David Liedlich (2024) Dr. Bert Malkus (2024) Jack Morris (2024) Dr. Lindsay Rush (2025) Mark Vollaro (2024) E. Woods Sinclair (2025)

<u>Contact</u> CTChapter@tacf.org

### Charlie, the rowing chestnut: Celebrating TCAF 40th anniversary with the flow!

Over the summer, our chapter members had a brainstorming session about ways to celebrate the 40th anniversary of TACF. Each chapter in the native range of The American Chestnut trees were planning activities and events and it hit me. I will be spending every single weekends in October racing at rowing regattas in the northeast, along the same native range! This was an obvious sign, my two passions (rowing and chestnuts) needed to somehow merge for this celebration! What if my boat, which would be

traveling from Boston to Philadelphia, sport the colour of Charlie Chestnut, the mascot of TACF educational youth program? After all, not unlike American chestnut trees, my rowing shell is tall, straight, and (mostly) rot-resistant!

During the Fall, I did as much rowing as I did some chestnut outreach, handing over TACF 40th anniversary pins, stickers and Charlie Chestnut temporary tattoos. You can read the full article in the Winter 2024 edition of "Chestnut Magazine".



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Florian would like to thank Pam & Dave Raila for geneoursly lending me their boat, and Kathy McGuire for her vinyl mastery!



# The Connecticut Chapter of The American Chestnut Foundation

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All of the events scheduled are subject to possible change. Please check our online calendar at tacf.or/ct for any updates.

#### **CT Flower and Garden Show, Hartford**

#### February 22-25, 2024

Stop by our table in the CT Federated Garden exhibit to see the work of the Foundation.

#### Annual Membership Meeting, Rockfall

#### March 24, 2024 - 10 AM

Join us for our Annual Membership Meeting in person, at the Connecticut Forest & Park Association in Rockfall/ Middletown. featuring a talk by Sara Fitzsimmons. The Spring Board Meeting will also follow the Annual Membership Meeting.

#### **Orchard Plantings, throughout CT**

#### May, 2024

We will need volunteers to help with planting American chestnut seeds in

several new Germplasm Conservation Orchards throughout the state Details will be made available as it gets closer to planting season.

#### **Chestnut Hikes**

#### June/July, 2024

Late June and early July are great times to look for chestnut trees when their fragrant cream-colored blooms make the trees more visible. A schedule of hikes will be sent via chapter email and posted on our website as it gets closer to that time. If you would be interested in leading a hike to known or potential chestnut locations, contact us at CTChapter@acf.org.

#### **CAES Plant Science Day, Hamden**

#### August 7, 2024

Join us at the lovely Lockwood Farm in Hamden for the 114<sup>th</sup> CAES Plant Science Day where we will welcome you with an exhibit on the Foundation work, surrounded by a wide variety of chestnut trees!

#### Exhibit at the Durham Fair

#### September 26-29, 2024

The Durham Fair is one of the largest fairs in CT. We host an exhibit educating people about the American chestnut and our mission in the Discovery Center. Stop by, shuck chestnuts harvested a few days before the fair, and come ask all your questions!

#### **TACF Fall Meeting, Cromwell**

#### October 24-27, 2024

This year, Connecticut will host TACF annual meeting! More information to come.

