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Vermont/New Hampshire Chestnut Notes

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The Canaan Chestnut By Gary Robertson

With sadness and hope I report the former New Hampshire State Champion American chestnut tree (20 inches DBH, 80 feet tall) was cut down in March.

For me, it started in 2011 when TACF New England Regional Science Coordinator Kendra Collins asked me to help pollinate the Canaan tree. Of course I said, "Yes!" Its location was secret then, as it was on private land. Eight years later I am still going to Canaan to visit this group of wild American chestnuts.

Last fall, property owner Jean Townsend wrote to say that the State Champion tree had finally given up and died. She hoped we would harvest the tree and use its wood to further TACF's mission. One last gift from the tree, and from our good friends, the Townsends.

State Champ American chestnut tree in flower in July 2011.

Volunteers, interns, and even a NHPR reporter worked with me on the Canaan tree, including Kendra Collins, Todd Ross, and interns Dan Hale and Jamie Van Clief. We gathered thousands of nuts for the backcross breeding program. Hundreds of were from controlled-pollination with blight resistant pollen, while the rest were open or naturally pollinated by wind or insects. A third chestnut is now almost large enough to flower,

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President's Corner

By VT/NH Chapter President Yurij Bihun

It was another eventful and productive year for the VT/NH Chapter. We moved one step closer to completing our backcrossing breeding program with the establishment of a second seed orchard. It was planted in spring 2018 at the State of Vermont Forests, Parks, and Recreation (FP&R) regional office in Essex Junction, VT on the former site of the Vermont State Tree Nursery. This was a collaborative effort of the VT/NH Chapter, VT FP&R, and the Center for Technology, Essex (CTE) in Essex Junction. High school students from CTE were involved in all aspects of the seed orchard establishment from site prep, germinating chestnuts, planting, weeding, and orchard site management. We even salvaged some lovely chestnut lumber from the roughest, gnarliest chestnut boltwood from branches in the crown of the Berlin American chestnut harvested in 2014. It had been sitting under some tin roofing at the UVM Jericho Research Forest for four years. Brian Japp, Instructor in the Natural Resource Forestry Program at CTE, helped saw usable blanks, which will be used in construction of kiosks for interpretative signage at the Essex and Jericho sites.
We are also working with the Society for the Preservation of New Hampshire Forests (SPNHF) to establish a seed orchard at a SPNHF property, the Tom Rush Forest in Deering, NH. SPNHF foresters are taking a lead role in scouting the site, soil testing, and site preparation in terms of access. They will organize volunteers for planting, which is anticipated this spring.

VT/NH Chapter Board member Doug McLane has been actively establishing and maintaining a "garden plot nursery" next to his Plymouth, NH home. Doug's knowledge of nursery management including germinating, transplanting, containers, and root pruning has grown exponentially as his growing stock increased. Through his commitment and interest, we have a functional nursery with American and potentially blight-resistant (PBR) seedlings and sapling-sized trees ready for planting at educational sites in 2019 and beyond.

The Chapter is also moving closer to TACF efforts to conserve native American chestnut germplasm through the establishment of a system of Germplasm Conservation Orchards (GCO) throughout the range of American chestnut. One of the first GCOs will be in the Plymouth area. Doug is working to find suitable land and germplasm for the plantings. The VT/NH Chapter is developing a strategy to establish GCOs in Vermont and New Hampshire. We will need help from members to make this happen.

Thanks to the hard work of VT/NH Chapter Board member Curt Laffin and his wife Carol Wallace, longstanding efforts to establish an email marketing program hit pay dirt. The Chapter started using an email program called Constant Contact, and now can reach two-thirds of our members. As a result, membership grew by 5%, half way to our goal to grow membership by 10% as stated in our Strategic Plan. If you would like to be added to the email list for information about volunteer opportunities, events, educational plantings, and outreach see page 6.

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The Canaan Chestnut *Continued from page 1*

which will create conditions for open pollination again. It may be that the Townsends will continue to contribute to chestnut restoration efforts into another decade. Such a long term contribution is rarely possible as the virulence of the blight often results in only one or two years of use before the tree is lost.

Consulting Forester John O'Brien from Orford, New Hampshire obtained a special exemption from the Town Road Agent to bring in heavy equipment after March 1, the weather this year still being quite cold. They cut the tree, skidded it across the field with a bulldozer, and piled the logs by the barn. Later, a log truck came to take them for transport.

Loading one of six 10-foot saw logs.

Ed Witt, a forestry professional from Madison, New Hampshire, volunteered to handle the logs for milling. To get them from Canaan to Madison is a journey of 75 miles. Ed arranged for the chestnut logs to ride piggyback on top of a load of John's white pine logs going to Madison for milling. The chestnut logs will be unloaded first at Ed's house, where Ed has a portable mill. The pine will continue to the mill. Most of this whole chain of effort will be done at no cost to TACF, except for trucking expenses and the feller.

This wonderful collaboration, with donations of time, labor, storage, handling, felling, cutting, and sawing with people freely giving their time, effort, and expense is awe-inspiring. Kudos to Chuck and Jean Townsend, Ed Witt, and John O'Brien for making it happen for the benefit of chestnut restoration!

President's Corner *Continued from page 2*

Another milestone in 2018 was the Chapter's active and sometimes contentious discussion on transgenics that led to a new policy on the use of transgenic materials in the restoration of American chestnut (see page 7). Backcross breeding continues to be the backbone of the TACF restoration efforts but TACF is exploring all methods that will move us closer to the restoration of American chestnut. The current statement is not immutable but it is in synch with TACF goals and reflects an agreement by the VT/NH Board of Directors. It will act as placeholder until we hear otherwise from the membership. We will revisit the issue as we get closer to integrating transgenic material into the breeding program.

We are grateful for support from the Merkle Family Fund, and other generous donations, as well as our dedicated membership. You can help to support the chapter with your continued membership and becoming active in our programs promoting of the mission of TACF in your workplace and communities.

I hope to see you at the Eleventh Annual Meeting on April 27 at the Marsh-Billings-Rockefeller National Historic Park in Woodstock, VT.

American Chestnut Backcross Hybrids are Part of the Adaptive Silviculture for Climate Change Project

By Peter Clark and Tony D'Amato

Global climate change impacts on forested ecosystems have been documented and include changes in species ranges, changes in frequency and magnitude of disturbance, and declines in ecosystem services. The rate and scale of such ecosystem changes are accelerating, leading to greater uncertainty about the functioning of future forest ecosystems. The dynamics and ability of complex systems like forested ecosystems to adapt are unclear, leading to ambiguity for forest managers attempting to prepare for future changes.

The Adaptive Silviculture for Climate Change project (ASCC) is a collaborative effort to establish a series of operational-scale, silviculture experiments across a network of different forest ecosystem types throughout the United States. The experiment is co-developed through a process in which scientists, land managers, and other partners develop experimental treatments to address the projected impacts of climate change and invasive species so as to evaluate a range of climate change adaptation actions and their impacts on ecosystem processes (Figure 1). The northeastern ASCC study is led by Tony D'Amato at the University of Vermont (UVM) and Chris Woodall (US Forest Service). It is a 400-acre experiment installed in 2017 as the largest, replicated silvicultural study in the northeastern United States, located on Dartmouth's Second College Grant, a 27,000-acre forest in northern NH. This collaborative effort includes scientists and land managers from the UVM, Dartmouth College, University of New Hampshire, University of Maine, University of Massachusetts, and the Forest Service and Department of Interior Northeast Climate Adaptation Science Center.

The primary objectives of ASCC are to: 1) create a multi-region study with locally-suited climate change adaptation treatments using input from an expert panel of regional scientists and local managers; and

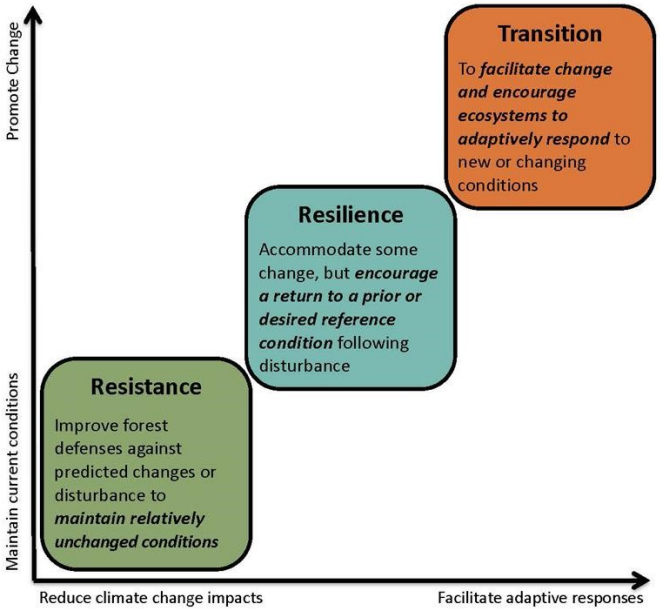

Figure 1: ASCC treatments, résistance, resilience, transition, and an unharvested control.

2) introduce natural resource managers to concepts, approaches, and tools that help integrate climate change considerations into resource management and silvicultural decision making.

In forest ecology, a large body of research has focused on understanding and managing for ecological adaptation under resilience and resistance, while comparatively few evaluations of transitional approaches have been done. In transitional treatments, harvest activities actively facilitate change in response to new or changing conditions. Since the pace of rising global temperatures is likely to outpace actual shifts in tree species ranges resulting in potentially detrimental effects on ecosystem functioning, transitional silvicultural treatments aim to actively shift species composition to better capture future assemblages. Among

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Climate Change Project *Continued from page 4*

research objectives are to increase the dominance of species adapted to future change that are currently on site (e.g., yellow birch, red maple, beech) and to increase the proportion of species not currently on site but projected to be adapted to future climate change and disturbance regimes through planting.

Within each of the four, 25-acre harvest units, eight tree species (Black birch, Bitternut hickory, Red spruce, Eastern white pine, Bigtooth aspen, Black cherry, Northern red oak, Eastern hemlock) were planted as seedlings as well as American chestnut B_3F_3 backcrossed hybrids which were sown from seed. These seedlings and seeds were planted in two different sized harvest openings: quarter acre or full acre. Overall, 720 seedlings of each species and 960 American chestnut from four backcrossed hybrid sources were planted across the entire study. Plantings occurred in late May-June 2018 as close to leaf-out as possible.

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Early Results Following the First Growing Season

- No significant differences between treatment opening sizes (quarters and acres), although generally higher mortality in acres.
- Survival across species is staggered but the rank order is consistent between treatments.
- Initial stock size appears to drive survival (higher survival for larger diameter stock), although significantly higher dieback was observed in larger sized seedlings (results not shown).
- American chestnut hybrids had a ~60% germination rate but those that germinated had a 93.5% survival.
- There were no statistically significant differences in survival between the four chestnut backcrosses, however higher growth rates were observed in Clapper 2 compared to both Graves backcrosses.

Keynote Speaker Peter Clark

Peter Clark is a PhD candidate working with Dr. Tony D'Amato in the Silviculture and Applied Forest Ecology Lab at the Rubenstein School of Environment and Natural Resources, at the University of Vermont. Much of Peter's research addresses adaptive silvicultural strategies for global climate change, specifically examining migration and potential future distributions of forest trees. Part of his research tests the growth performance of American chestnut backcrosses near range margins and under simulated climate change. His academic training at West Virginia University and Hampshire College in biogeography and paleoecology provides a foundation for this work. Outside of his research, he is keenly interested in American chestnut and has used reclaimed timbers in numerous fine furniture and woodworking projects.

Question: How Important is Outreach?

Answer: Very By Curt Laffin and Carol Wallace

Implementation of TACF strategy requires a large work force of equally dedicated supporters and volunteers. Most volunteers are organized in 16 Chapters covering 20 states within the historic American chestnut range. Volunteers find surviving wild American chestnuts, pollinate trees, harvest nuts, create and maintain orchards, and accomplish other actions required for restoration.

In addition to field work, education and outreach play a critical role in restoration. Chestnut restoration advocates, volunteers, and supporters are people who believe in TACF's mission, and that TACF has the strategy, people, and resources to accomplish that mission. People who have not heard the American chestnut story and are not aware of TACF, do not become advocates for restoration. Outreach fills this gap by telling the story and explaining what TACF hopes to accomplish. This is why outreach is important.

To do its part, the VT/NH Chapter uses a variety of outreach tools.

- Face to Face Presentations—Presentations to explain the American chestnut story and the restoration program are available to interested groups. Finding interested groups can be difficult due to a lack of awareness. Chestnut restoration is not a common household term. Initial contact with potentially interested groups is often necessary to stimulate requests for speakers. The VT/NH Chapter does four to five presentations each year.
- Display at Events—VT/NH Chapter volunteers participate in at least two expositions annually: The Vermont Farm Show in Essex, and the New Hampshire Farm & Forest EXPO in Manchester. Display panels convey the American chestnut message and volunteers are on hand to discuss details with attendees. Visitors are invited to provide their contact information if they would like to be added to our email communications.
- Educational Plantings—An effective way to inspire involvement in American chestnut restoration is to show people living trees and convey our message at the planting site. To create these Educational Plantings, the VT/NH Chapter partners with an interested group or community to plant five or six potentially blight resistant trees at a highly visited site. The host is asked to organize local publicity; find volunteers to work on planting day; and to purchase and install a customized interpretive sign designed by TACF that tells the chestnut story.
- Signage at Orchards—The VT/NH Chapter currently manages 11 chestnut breeding or seed orchards and plans to create more. Each one is roughly one acre. Some are at highly visible locations such as state parks and others are on private land. A sign explaining the orchard's function in the chestnut restoration effort is placed near the entrance at most orchards.
- Electronic Communication—The VT/NH Chapter has over 200 members and a list of potential members who have provided their contact information. These people are scattered widely across Vermont and New Hampshire making face-to-face interaction impractical. Electronic communication helps to overcome this deficiency. Periodic announcements about chestnut restoration progress, upcoming activities, and volunteer opportunities are distributed to members via email.

To sign up to receive VT/NH Chapter emails, send your email address to Curt Laffin: calaffin@comast.net

Updated Science Program Policy

On November 17, 2018, The Board of Directors of the VT/NH Chapter of the American Chestnut Foundation voted to modify its policy on the chapter's participation in TACF science programs and approved the following policy statement:

The VT/NH Board of The American Chestnut Foundation endorses the policy of '3BUR' Proposal for Integrated Research" as adopted on November 11, 2016 by TACF's National Science Oversight Committee. The 3B's are: Breeding, Biocontrol and Biotechnology. The 'U and R' stand for 'United for Restoration.' Our chapter is committed to using all viable methodologies for advancing the health and reintroduction of the American chestnut tree.

Endorsement of biotechnology as a viable methodology may include integrating the blight-resistant transgenic tree, produced by the State University of NY (SUNY) at Syracuse in partnership with the NY Chapter of TACF, into our restoration program. This tree has not been approved for public distribution and needs final approval from APHIS, EPA, USDA, and FDA. If approved, a diverse source wild American chestnut trees will be needed for integration into the transgenic breeding program. In anticipation of transgenic trees supplementing our backcross breeding program, our chapter has begun developing Germplasm Conservation Orchards (GCOs) to conserve additional wild trees. Capturing the genetic diversity of our local wild American chestnut stock is important for many reasons and we anticipate establishing several GCOs in the VT/NH Chapter over the coming years.

Climate Change Project *Continued from page 5*

Seedling protection collars were placed around half of the plantings to control for pressure from wildlife and were predetermined and evenly distributed among species and rows.

Additional Research and Future Work

The ASCC installation at the Second College Grant is monitoring a wide range of ecosystem responses to these adaptation strategies beyond forest regeneration responses, including small mammal, pollinator, and bird communities, decomposition rates, soil carbon dynamics, and stand and landscape-level functional and structural complexity. In relation to planted seedling responses, weeding treatments will be applied to 50% of seedlings using brush saws. Every seedling will be measured at the beginning and the end of the season and tracked annually for the first five years, but followed over the course of this multi-decade experiment. In addition to measurements of survival, height and diameter, we will measure the amount of winter injury and other phenological traits such as bud break.

In addition to the ASCC project, we are examining the germination and growth response of American chestnut and a suite of 11 other tree species under various climate change scenarios. Four precipitation treatments ranging from drought, episodic pulses, and frequent inundation are being used to examine how shifts in precipitation regime may influence future forest composition and demographics.

Vermont/New Hampshire Chapter of
The American Chestnut Foundation

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Find this newsletter online!

https://www.acf.org/vt-nh/

Join Us on April 27 for Our Eleventh Annual Meeting

Join us for the Eleventh Annual Meeting of the VT/NH Chapter of the American Chestnut Foundation on **Saturday, April 27, 2019,** at the **Forest Center at the Marsh-Billings-Rockefeller National Historic Park (M-B-R NHP) in Woodstock, Vermont**. See *https://www.nps.gov/mabi/learn/historyculture/forest-center.htm*.

Directions: M-B-R NHP is at 54 Elm Street in Woodstock. From Interstate 89, take Exit 1. Follow Route 4 West for 13 miles, through Quechee and Taftsville to Woodstock. Turn right onto Route 12 North. Bear right after the iron bridge, continuing 1/4 mile. Park in the Billings Farm & Museum parking lot. There is no parking at the Forest Center. After parking, take the path to the Park and make the first right. Follow Pogue Carriage Road to the Forest Center.

The meeting will begin at 10:00 a.m.

Coffee, water, and pastries will be provided starting at 9:30 a.m. Bring a bag lunch or reserve sandwiches and drinks from Jake's Quechee Market (pay $12 at the door, cash or check). **To purchase lunch, contact Jim Talbot by April 22 at 802-598-2055.**

Kyle Jones, Director of Forest Conservation at M-B-R NHP will give a short presentation. Keynote Speaker Peter Clark, PhD researcher at UVM's Rubenstein School of Environment and Natural Resources, will speak about the American chestnut in the Dartmouth College Second College Grant's Adaptive Silviculture for Climate Change (ASCC) Project.

After the Annual Meeting and lunch, join us for a field tour of M-B-R NHP and visit a wild, American chestnut tree growing in the park.

Following that, the VT/NH Board of Directors will conduct its quarterly meeting at the Forest Center. All members are invited to attend.