

An Update on Efforts to Restore the American Chestnut

By: Matt Brinckman, The American Chestnut Foundation

It wasn't too long ago that many people felt the American chestnut would remain merely an artifact in our history books; nothing more than a black-and-white photo and a memory that would vanish with time. But The American Chestnut Foundation® (TACF) is writing a different story.

Like any good story of triumph, this one starts with adversity in the form of a fungal blight that took out one-quarter of the dominant trees in the eastern deciduous forest in less than fifty years. Discovered first in the New York Zoological Park in 1904, chestnut blight, or *Cryphonectria parasitica*, started killing chestnuts and moved through the native range incredibly fast, at a pace of 20 to 50 miles per year. Tiny spores from this invasive fungus brought over on a Chinese or Japanese chestnut can travel easily, being carried by wind and animals. Spores enter the tree through openings in the bark (injuries or natural splitting during growth) and infect the vascular cells that transport water and nutrients to the tree, eventually resulting in death. This effective pathogen is here to stay in our eastern woodlands, as it is hosted by some species of oak, though they are largely unaffected by it.



TACF backcross hybrid displaying a high resistance to chestnut blight. Arrows indicate points that were inoculated with *Cryphonectria parasitica*. Photo by: Matt Brinckman, TACF.

This year, TACF celebrates 25 years of chestnut research and breeding at Meadowview Research Farms, our national research station located in southwestern Virginia. TACF was established in 1983 by a group of scientists and laypersons with the mission to restore the American chestnut to its former glory through a genetic breeding process called backcross breeding. In 1989, foundation leadership established the Meadowview Research Station to undertake the monumental task of breeding blight-resistant trees.

Through the generosity of many donors and volunteers, the research station has rapidly progressed from one research farm operated by a single staff person to five research farms and a state-of-the-art laboratory run by over ten full-time and part-time staff. Our breeding efforts are further advanced by a growing troop of more than 5,000 dedicated members and volunteers who manage nearly 500 chestnut plantings and orchards spread across the native range of the tree.

In 2005, Meadowview Farms seed orchards started producing the generation of trees that are currently being tested for release into the wild, Restoration Chestnuts 1.0, or B3F3's as they are known to many. Based on data starting to come in from test plantings, Meadowview will continue culling out bad trees from our seed orchard over the next 5-10 years and average blight resistance among genetic lines should increase.



Controlled pollination is used for breeding blight-resistant chestnuts (left) at Meadowview Research Farm (right).
Photos by: Matt Brinckman, TACF.

The Virginia Chapter of TACF (VATACF) was established in 2006 to carry out the mission of TACF in Virginia. Each state in the chestnut's native range has a TACF State Chapter and most of them are conducting their own breeding programs. This is jump-started by breeding with an advanced generation at Meadowview and incorporating increased genetic diversity and adaptability by locating reproductively mature native chestnut trees to breed within each respective state.

VATACF is currently working on breeding about 20 genetically unique breeding lines each of two sources of resistance. The source of resistance refers to the naturally blight-resistant Chinese chestnut tree that is used in the first of six crosses. Yes, that's six generations of breeding before we hit our target of a blight-resistant, 15/16 American chestnut. Over 20 lines have been bred and are growing in orchards for the first source and nearly ten lines for the second source have been bred. These are all fourth-generation trees, so two away from the sixth and hopefully final generation. Locating mature, wild American chestnuts to breed with is one of the main barriers to developing more lines. Well, that and time.

During our first decades, we have advanced mightily in addressing our mission. A crowning achievement during this time was demonstrating that we could indeed produce a chestnut resistant to chestnut blight. As TACF looks to the future, the next chapter in our history will contain more stories of success; a realization that the power of dedicated volunteers, skilled scientists, and a strong donor base and vision can make almost anything happen.

Our next chapter will surely influence other ecological restoration challenges; in many respects it already has.

Nuts and Bolts

Has TACF developed a blight resistant American chestnut yet? Our latest generation, Restoration Chestnuts 1.0 are still under testing and are only potentially blight-resistant for the time being until we can cull out the worst seed trees in our seed orchards. Though we have witnessed some trees with high resistance, this generation currently has an average of moderate blight resistance, something we hope to see move much closer towards the resistance found in Asian species as we cull our seed orchard.

How can I get a Restoration Chestnut 1.0? Our production of this generation is far below our demand. Only long-time members and Annual Sponsors can get access to a few of these seeds to plant for now. Learn more about becoming a member and our Annual Sponsorship Program at <http://www.acf.org/join.php>.

Do you need land for orchards or research plantings? We occasionally need sites to host breeding orchards and test plantings. We generally look for landowners willing to cover the cost of deer fencing, planting materials, and cover maintenance. If interested, contact Matt Brinckman. Just remember the need for sites is very occasional!

Can I go see native or hybrid chestnuts growing near where I live? YES! There are native chestnuts growing throughout most of the state, especially in the mountains. Look for them on well drained, acidic sites and especially in areas with some light getting into the understory such as along the Appalachian Trail, forest roads, woods edges, etc. To see our hybrids, you can visit our Meadowview Farms anytime during the work week and many of our State Chapter orchards are on accessible public land. Visit the state chapter website at <http://vachestnut.org/> for more information.

Where does the funding for TACF come from? We operate primarily on the generous donations of private individuals and foundations. To donate or become a member, visit <http://www.acf.org>.

Can I volunteer to help with restoring the American chestnut with TACF? Please Do!! There is a very wide variety of areas in which we need volunteers to accomplish our goals including planting and care of trees, data collection and management, outreach and education, fundraising, and organizational tasks. If interested, contact Matt Brinckman.

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Editor's note: The Virginia Department of Forestry also has a long-running American chestnut backcross breeding program at the Lesesne and Matthews State Forests. Learn more here: <http://www.dof.virginia.gov/research/index.htm>.