

American Chestnut Field
Trial Final Report
Project #FNEOO-326



American Chestnut tree blooms in Roane County, West Virginia.

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GOALS:

The main goal of my project is to provide a natural area for the reestablishment of the native American Chestnut. This area is the Boggs farm, in Spencer, West Virginia, Roane County, owner Larry Boggs.

American Chestnut trees were a large part of the economy and history of Appalachia. The Boggs Farm has a long association with the American Chestnut. The barns and fence posts still attest to the longevity of this valuable wood. If Chestnut trees returned to the woodlands of West Virginia, this would be a major economic boom for the farmers and timbermen of this area. Professional environmentalists and foresters also realize the importance that this species held for erosion control. The very make-up of our soils in the Appalachians is due in part to the American Chestnut. For thousands of years it was the dominant tree species here. The burrs on the forest floor would catch and hold leaves and other organic matter. This resulted in slower water runoff and better erosion control. The limbs or trees that would fall to the forest floor would not rot away, in many instances for decades. The nuts were a major source of food for wildlife. In their normal forest state, these trees would produce abundant crops of nuts every year, unlike the unpredictable crops of nuts produced by other native forest species, such as oak and beech.

The American Chestnut, (*Castanea dentata*), made up 25 percent of the eastern hardwood forest when the blight attacked it in the early 1900's. By 1940, over 350 billion American Chestnut trees were dead. Over 250 million acres of Appalachian forests were effected. The Chestnut blight is the only know disease that has caused almost total extinction of a tree species. Scientists and ecologists all agree that the death of the American Chestnut is the greatest single natural catastrophe in the history of United States Forestry.

A cure, or a variety resistant to the blight, must be found. Many universities and research facilities are working in the laboratory, and in field research, to find an answer. I have been interested in this research for many years. I know that genetic adaptation needs to occur. Many great scientific minds are working on this problem. I wanted to give Mother Nature a natural opportunity for genetic adaptation within the central range of the American Chestnut.

I noticed that there were still many American Chestnut sprouts on my property. If one sapling grew tall enough to bloom, there was not another tree close enough to cross pollinate, and there was no opportunity for genetic adaptation. Trees set empty husks. This bothered me and I have set out to provide enough American Chestnut trees on my property to insure natural cross pollination. I have done this on my own, at my own expense, for many years. The Sustainable Agriculture Research and Education (SARE) Farmer/Grower grant has provided me with the funds to expand my efforts. My farm now has over 400 American Chestnut trees, one over 50 foot tall, which produce viable nuts. One of these nuts may produce the resistant tree.

My farm also is used to educate the public about the American Chestnut. It is surprising how many people do not realize the important role that this tree played in our American history. Pioneers and farmers fattened their livestock on the sweet nuts. The superior, decay resistant wood was used for many things such as barns, homes, fence, fence posts, furniture, etc. The rails that Abe Lincoln split were undoubtedly American Chestnut.

Farm Information:

My grassland farm consists of approximately 1200 acres in two large blocks. The main farm is about 900 acres, some of it prime farmland. The landcover is approximately 60 percent woodland, 25 percent pasture, and 15 percent hayland. The farm is a cow-calf operation, with a herd of about 100 hereford/angus mixed cows, and two angus bulls. I also raise Tennessee Walkers. Most of my Tennessee Walkers are bred directly from World Champions and World Grand Champions. I have been raising and showing these horses for 20 years, and have produced many fine show horses.

This area of West Virginia has an overpopulation of whitetail deer, which can be a big problem to farmers. These deer can do tremendous damage to row crops, hayland, and forest regeneration. The WV Division of Natural Resources has estimated that there are up to 90 deer per square mile. Row crops and even home gardens are almost out of the question due to deer damage. Browse lines are evident throughout the woodland.

The whitetail deer go after my saplings with a vengeance. The American Chestnut was a major part of their diet for thousands of years, and they will find any way possible to feed on both the nuts and the vulnerable young trees. In the Spring of 2001, my nursery was fenced, and had 1499 American Chestnut seedlings that were grown from the 2000 nut crop. Shortly after these sprouted, within one week, the deer jumped the fence and ate almost all the saplings. Only four have survived.

I moved my nursery location last Fall to the garden spot near my home, in order to try to protect the new seedlings from deer damage. I have since encountered a new problem; field mice. I had very few sprout, and noticed some were dying a week or two after sprouting. When I weeded and watered the nursery, I discovered the nursery was completely undermined by field mice. The mice have virtually destroyed my nursery. I have already contacted a professional nursery about starting my seedlings for this Fall.

Cooperators:

The main cooperator I had was Rob Pate, Resource Soil Scientist from the USDA-Natural Resources Conservation Service, (Robert.Pate@wv.usda.gov). Rob, at one time, was working on the soil survey of Roane County, WV. He was instrumental in building my knowledge about the American Chestnut, and helping me find it in the woods. We also worked on other experimental plantings on my farm, (gobbler sawtooth oaks, and dwarf willow bundles).

Another cooperator on this project was my close friend and neighbor Rick Batten, (304) 927-1448. Rick has been closely tied to this project and has helped me on many occasions.

David Hedges, editor of the local newspaper, The Roane County Reporter, (304)927-2360, has supported my educational efforts with good newspaper coverage.

Lucille Griffin, Executive Director of the American Chestnut Cooperators Foundation, www.accf-online.org/, 2667 Forest Service Road 708, Newport VA 24128, has supplied me with much help and advice.

Joe Taylor, Roane County Forester, (304) 927-0965, P.O. Box 52, Spencer, WV 25276, has helped me with many contacts.

WVDNR Conservation Officer, Terry Cummings, (304) 927-1996, P.O. Box 351, Spencer, WV 25276, has helped me with deer crop damage permits, and wildlife management procedures.

WV State Nursery at Clements, Superintendent David McCurdy, (304) 675-1820, 101 Allison Drive P.O. Box 8, West Columbia, WV 25287, has supplied seedlings and advice about plant genetics.

WV Commissioner of Agriculture, Gus R. Douglass, (304) 558-2210, 1900 Kanawha Blvd East, Charleston, WV 25305-0170, has given me the history of the American Chestnut conservation efforts in West Virginia, and has supported me total cooperation from his Department of Agriculture.

David Holm, dholm@zoo.uvm.edu, (802) 656-0471, Northeast Region SARE, University of Vermont, Hills Building, Burlington, VT 05405-0082, has helped me complete my grant applications and final report.

Project Methods:

As I mentioned before, I had been working on this project for some time before I applied for this SARE grant. The project has evolved into the following steps:

-Obtaining American Chestnut tree saplings. Saplings have been purchased from the WV Division of Forestry, dug from the State Nursery at Clements, and donated from the American Chestnut Cooperators Foundation.

-Planting these saplings in historically suitable areas on my farm. Planting these saplings is a tremendous workload. Some trees may need to be cut down to provide enough sunlight through the canopy for growth. Brush and weeds need to be removed. Most importantly, stakes and wire fence need to be put around the new saplings to protect them from deer damage. I need equipment to do this, chainsaw, weed eater, shovel, pick, sledgehammer, fencing tools, four wheeler and cart to move my trees and supplies into inaccessible areas. I also tag and document each tree location. A GPS unit would be a great advantage to me in tree location and documentation. My old 4 wheeler is simply not big enough or powerful enough to move supplies and workers to our planting sites. In the spring of 2001, I replaced 2 sets of tires because of rock cuts and thorn damage. The used 4 wheeler that I purchased, on my own, has made work more efficient and productive, although it has about outlived its usefulness.

-Monitoring tree growth and nut production. Near the close of every year, I check every tree for growth and production, and document the data. A clinometer would be a help in determining tree height. I also need to harvest any nuts and store them for planting. It is a major accomplishment to collect the nuts before the wildlife gets them.

-Planting the seeds. I have to prepare the seed bed, and protect the nursery from deer damage. I really need to obtain an electric fence and charger for my nursery. This is almost a necessity in order to protect the young seedlings.

-Education. My working farm is open to farm visits and media coverage to help the public understand the importance of this project. I usually have an article in the local paper once a year, and I am planning a farm field day for our local elementary school. I receive many calls at home, and I believe that I have educated many individuals about the importance of the American Chestnut.

Findings and Accomplishments:

Every year I have more trees that produce nuts. I have various strains, some have a rapid growth rate, and others slower. My trees, on average, produce 3 nuts per burr. I have one tree that produces 6 to 8 nuts per burr. I have successfully accomplished a modified bark graft, to old root stock.

I have found that seedlings do best in deep soils, where they are not overtaken by weeds and brush. The first three years are the most vulnerable. The American Chestnut is a taproot tree; therefore, they must be planted into their permanent location after the first growing season. The nuts are must be planted within 3 weeks after harvest, and kept cool during that period.

The American Chestnut is a "self-sterile" tree, it cannot pollinate itself. Therefore, another tree must be fairly close in order to achieve good pollination. Small trees can pollinate other blooming trees up to 50 yards away. Large trees can pollinate up to 200 yards distance. I have also experimented with controlled pollination in the past 2 years, although results are difficult to measure.

In addition to my purchasing, grafting, and sprouting superior saplings, I have also worked with native trees that continue to exist on my farm. I have found that some native Roane County trees, that have sprouted from old dormant roots, have shown good blight resistance. They have large swollen cankers, yet continue to grow and grow fast. Some of my trees grow as fast as yellow poplar that are planted on the same site. Of course, these trees that grow from once dormant roots have no genetic variation, and are still susceptible to the blight. I hope to work more with these native trees in the future.

The genepool of this species is, year by year, getting smaller. I know of no natural forest reproduction of this species, only reproduction by research plantings or assisted in some way by man. Without scientists, researchers, breeders, and growers, this species might soon become extinct.

Site Conditions:

The soils on my farm are weathered from siltstones, shales, and sandstones of the Pennsylvanian age Monongahela Group. The climate is temperate, with about 44 inches of precipitation each year. The soils were very rich and fertile when the area was first pioneered. The rich silt loam soils were cleared and cropped, even on very steep hillsides. This led to massive erosion gullies being formed. Roane County, more specifically Reedy Creek, was one of the first erosion control project areas in the 1930's, for the newly formed Soil Erosion Service, which later became the Soil Conservation Service, now the Natural Resources Conservation Service.

The severely eroded hillsides are now mostly forested with only an inch or two of topsoil left before you hit heavy clay subsoil. This does not hinder forest growth because the subsoil and base rocks have high fertility. The bottomlands are mostly one continuous deposit of brown silt loam, which has washed from surrounding hillsides. The typical farm is a cow/calf operation, and has hillside pasture and bottomland hayland.

The American Chestnut tree can grow in any of these conditions. It is very adapted to growing on dry south facing slopes, but also does well in richer soils. This tree has the odds against it at all stages of development. The blight fungus is airborne and lives on many species of trees although it only kills the American Chestnut. The danger from the blight, combined with the strain of transplanting, and a dry Spring, makes survival tough. Under normal Spring conditions, survival rate is 80 percent or better. As the years pass, only the genetically resistant varieties survive.

Economic Findings:

My American Chestnut Field Trial, project FNEOO-326, has no direct economic improvement to my overall farm income. In fact, it has cost me a lot of out-of-pocket money over the years. It does provide an opportunity for economic improvement over the whole Appalachian region if a resistant tree is ever discovered. It provides a land area, in the central part of the historic range American Chestnut, for research and education, which cannot be measured purely by economics.

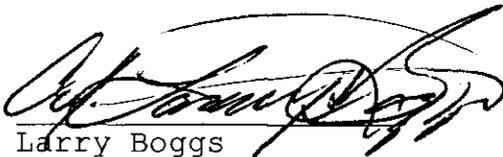
There has been tremendous interest from people wanting to buy seedlings from me. I have not reached a point yet where I feel that I am ready to sell a superior seedling. Maybe sometime in the near future.

The Next Step:

I have reached the point of nut production and seedling production from new genetics in my nursery. I will continue this project, and will probably apply for a 2003 SARE Farmer/Grower grant. I need to protect my nursery from deer and field mice damage with an electric fence and a subsoil barrier. I need some tools to help with this project, such as a cultivator in the nursery, and four wheeler, in order to get saplings, tools, water, and labor to inaccessible areas. I would like a GPS unit to document tree locations, and a clinometer to measure tree height. This is a lifelong project, which I hope my children continue. The SARE grant has helped me a little with the money to work on this project, but also has given me a platform to document my project.

Outreach:

There is usually an article in the local weekly paper every year about my project. There seems to be tremendous interest when nuts are produced. WSAZ-TV3, ran a newscast about my farm and the American Chestnut trees in the Charleston and Huntington WV newscasts, on October 31st, 2000. I have had farm visits from David Holm, and others, who have come out to my farm to see the American Chestnut trees. A lot of individual, one on one conversations has been my major outreach forum. A farm field day for the local elementary school may also be on the horizon.



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July 20, 2002
date



American Chestnut trees in bloom.



American Chestnut trees in bloom.



American Chestnut nursery, 1500 nuts planted.



First year saplings.



American Chestnuts compared to a quarter.



American Chestnut stump graft.