



The Kentucky Railsplitter

Newsletter of the Kentucky Chapter
of the American Chestnut Foundation

Working to Restore the American Chestnut *Volume 7, Number 1 Spring 2008*

Growing Chestnuts – Volunteer Orchards

by Dr. Anne Myers Bobigian-Louisville Area Coordinator

There are several stages to achieving chestnut restoration. Reforestation of the healthy trees to the wild is the final step. Growing trees in large groups (about 200 together) in orchards is a necessary intermediate step in the process of developing a blight-resistant American tree. Orchards allow us to select for resistance from our Kentucky stocks.

Raising chestnuts trees in orchards is a challenging and fascinating horticultural activity. Basically, you need to end with enough trees from two unrelated parents to have a chance to get several partially resistant trees. These will be parents for the intercross generation. You want to grow them as fast as possible to a size and age where they can be inoculated with blight, be selected and then come into bloom and form nuts.

You hope you can do this in 5-7 years, getting trees to about 3" in diameter in order to inoculate. Then it takes another several years to get the crop of nuts from the remaining trees.

The way to do this is to plant in rows in good sun with enough separation so that the young trees aren't stressed. You need to control competition with grass. You need to fertilize and to water. Chestnuts are drought-tolerant but only after being well-established. You also have to control the intense munching from every creature you can imagine.

From much practical experience, a basic strategy has emerged to keep the cost and labor manageable. It takes roughly six rows of about 210 feet, laid out 20 ft apart, to put in about 200-230 nuts (100 nuts from two separate Kentucky lines and controls). You kill the grass in the rows (using RoundUp is the easiest way.) It is easier and quicker to plant nuts, so you have to deal with the problems of early spring planting. You protect the nut with some kind of collar to keep birds, squirrels and voles from stealing the nuts. You plant the nuts 6 ft apart. All this takes about one acre, and several people working in concert over several weeks. Someone sprays; two people stake out rows. The orchard manager makes a map for planting and collects

Spring Meeting at Bernheim Arboretum

The chapter's annual meeting will be held at the Bernheim Arboretum and Research Forest on Saturday, May 31, from 1:00 p.m. until about 4:00 p.m. We will begin at the Garden Pavilion Building at 1:00 p.m. Members should mention at the entrance kiosk that they are attending the chestnut meeting at the Garden Pavilion to avoid a \$5 vehicle charge. The Garden Pavilion is easy to find. After passing the kiosk, turn right at the first stop sign. The road will lead to the parking lot of the pavilion on the right. Directions to Bernheim are as follows: From I-65 south of Louisville, exit at Exit 112 onto Route 245 east, from Rt 245, turn right into the Arboretum.

Meeting Agenda

- 1:00 p.m. - Chapter Meeting at the Garden Pavilion
 - Discussion of Chapter Strategic Plan
 - Discussion of Restoration Planning
 - Election of Officers
- 2:00 p.m. - Chestnut Pollination Demonstration
 - Learn to Pollinate Chestnut Trees
 - Learn to Identify Chestnut Trees



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Newsletter

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President's Corner – Restoration in our Future

The primary focus of The American Chestnut Foundation (TACF) and all its state chapter members for the past 25 years has been the backcross breeding program. Of course the goal of the breeding program is to produce regionally adapted blight-resistant American chestnut trees for restoration. Some state chapters are further along than others but the very first of the B3F2 seed orchards (see chart) are in the ground in Virginia and Pennsylvania and the trees are producing the B3F3 seeds that go back into the forest. However, it will be many years before the B3F3 seed supply meets the demand for restoration plantings. Instead of waiting 12 to 15 years to begin large-scale restoration with B3F3 seed, TACF board members have decided to make restoration a priority right now.

A select committee of board members chaired by Kentucky's own Rex Mann will develop a national restoration plan template for state chapters to use to develop state specific restoration plans. In lieu of B3F3 seeds, the Kentucky Chapter will begin restoration efforts with pure American seeds.

Why use pure American seeds for restoration if we know that the blight will kill them? One possible solution is based upon research conducted by Gary Griffin and others¹ with the American Chestnut Cooperators' Foundation. In the study, large surviving American chestnut trees in the eastern states

were crossed with each other to produce nuts. Some of the crosses produced progeny with moderate levels of resistance. Unfortunately a moderate level of resistance is not good enough to keep a tree alive. In addition to some resistance, a tree needs to be inoculated with a hypovirulent or reduced virulence strain of the fungus. The weakened fungus cannot kill a tree as quickly, especially a tree with some level of resistance. Site conditions must be managed as well to help trees survive with the blight. Moist hillsides at lower elevations were better sites for maintaining survival compared to higher elevation (> 2,500 feet) sites on dry hillsides. Sunlight is critical to provide the energy trees need to survive. Control of hardwood competition must be part of the restoration plan at planting sites.

Making restoration work with American chestnuts will require some effort on our part. First we will need to produce nuts by crossing our large surviving chestnut trees. Then we will need to choose planting sites carefully and maintain them. All of this needs to be done in addition to continuing the backcross breeding program. Please help out where you can.

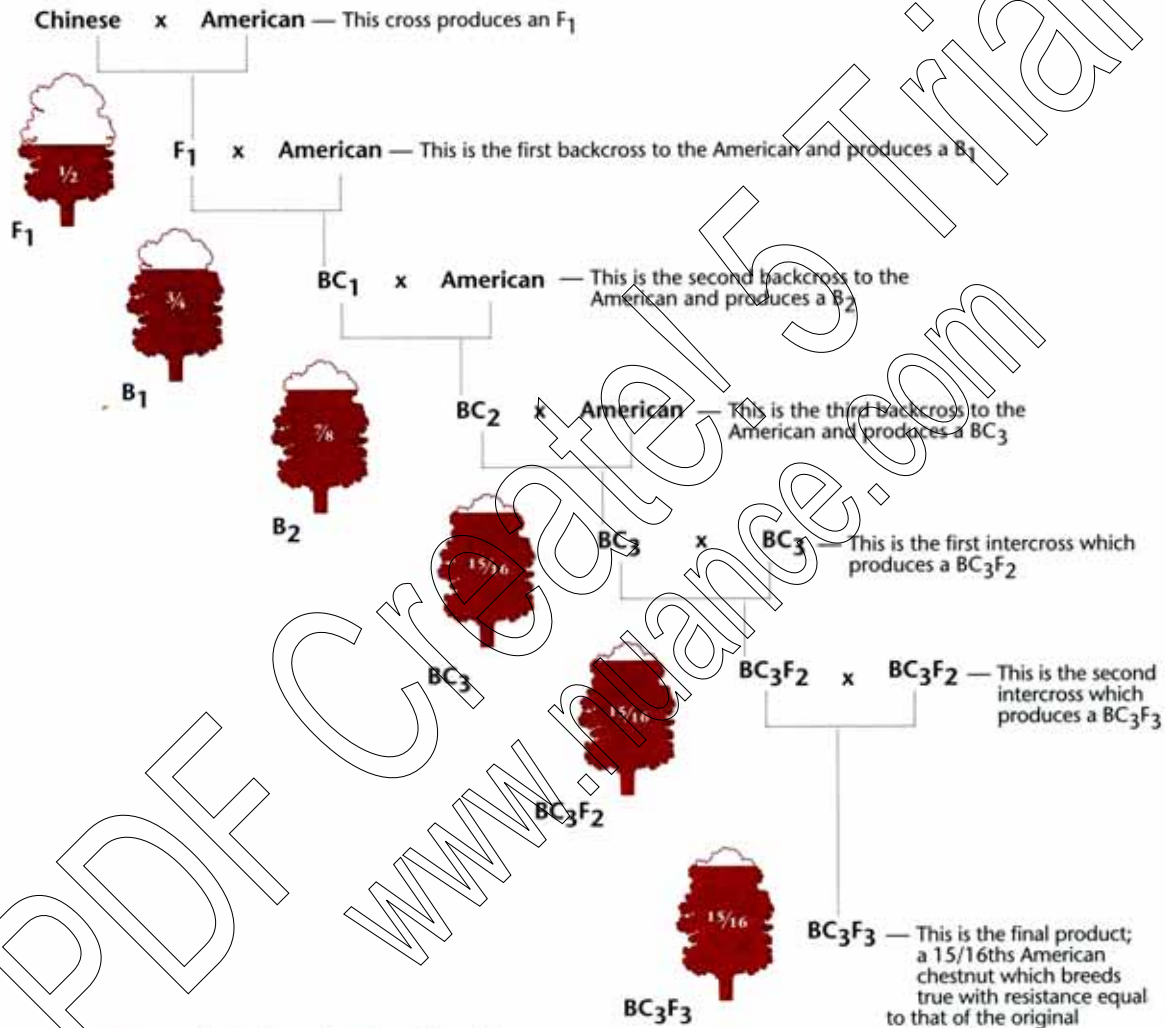
¹ Steiner, K. C. and Carlson, J. E., eds. 2006. Restoration of American Chestnut to Forest Lands – Proceedings of a Conference and Workshop. May 4-6, 2004, North Carolina Arboretum. Natural Resources Report NPS/NCR/CUE/NRR – 2006/001, National Park Service. Washington, DC.

Scott Freidhof
Kentucky Chapter President



THE AMERICAN CHESTNUT FOUNDATION'S BACKCROSS BREEDING PROGRAM

*With each cross, additional American chestnut characteristics are regained.
Only at the final cross, however, is blight resistance equal to that of the
Chinese parent again reintroduced.*



Note: In each step, the Backcross is selected for resistance.
Trees indicate fraction of American genes.

Arbor Day Chestnut Planting With ARRI on Perry County Strip Mine

Students and adults alike learned about chestnuts and forest reclamation practices on strip mines during an Arbor Day celebration in Perry County. International Coal Group, Inc., (ICG) hosted the event at their Tip Top Coal Mine outside of Hazard, in cooperation with the Appalachian Regional Reforestation Initiative (ARRI). About 100 students from area schools planted both American chestnut seedlings and oak seedlings with the assistance of personnel from the state Division of Forestry.

Re-establishing trees on reclaimed strip mines is much more difficult than simply planting seedlings. Thirty-one years ago, the Surface Mining Control and Reclamation Act established uniform standards for regulating surface mining operations. Returning mined lands to the original contour was one requirement of the new law in steep terrain. Unfortunately, the repeated back and forth motion of bulldozers during the reclamation process created severe

soil compaction, which prevented tree roots from penetrating the soil.

ICG prepared the 1-acre tree planting site at the mine by “ripping” the surface of the ground with a large bulldozer and ripper attachment. Ripping loosened the mine soil thereby undoing the heavy soil compaction caused by bulldozers during the reclamation process. A non-compacted growth medium is one step in the Forestry Reclamation Approach (FRA) recommended by the Appalachian Regional Reforestation Initiative (ARRI).

ARRI is working to improve forest reclamation success in Kentucky, Maryland, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia. A comparison of tree growth among compacted mine sites, non-compacted mine sites, and undisturbed forest sites revealed that trees grew larger and faster on non-compacted mine sites. Forest reclamation on surface mines is possible if the FRA is followed. Additional information about ARRI and FRA can be found at <http://arri.osmre.gov/Default.htm>



Students used dibble bars to prepare holes for American chestnut seedlings atop strip mine land in Perry County



Orange flags mark planting rows for students to follow as they plant chestnuts and oaks on reclaimed land.

Orchard Established at Gladie Cultural - Environmental Learning Center in Red River Gorge

Staff from the Cumberland District of the Daniel Boone National Forest and the Kentucky Chapter of TACF cooperatively established an American chestnut orchard at the Gladie Cultural - Environmental Learning Center in the Red River Gorge section of Menifee County. Approximately 120 hybrid 15/16ths American chestnuts from the Lee County tree were planted in the orchard. The trees are back cross three generation trees (BC3).

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materials. On planting day, you need 2-5 people for a day, and hopefully sunshine.

There are two wonderful new orchards in the Louisville area that have gone through this process. They have both had excellent germination despite torrential rains and a cold spring. In Oldham County, the Meades Landing Orchard was planted during a break in the rain on April 3 and April 7th. On May 9th, it had 90% germination with many seedlings already emerging from the protective collars (about 12" tall). In Shelby County, the Wilkins Orchard was planted on April 2 and now has 80% germination. The Wilkins orchard has a heavier clay soil, but excellent drainage, and will be a good experiment in determining how chestnut grows in clay areas and a good comparison to Meades Landing near the Ohio river..

Neither of these sites are in known traditional sites for forest chestnuts, but both will contribute significantly to our knowledge of how to grow chestnuts and help grow out the 20 parents and lines we need for our future seed orchard for reforestation.

Many thanks to our hardy volunteers: Angus MacLean (landowner at Meades Landing) and Dave Wilkins (landowner at Shelbyville), Cary Perkins, Gary Lee (from WildOnes), Hobie Henninger, and Victoria Greer (from KY Fish and Wildlife).

We still have to put in drip irrigation and mulch and work on deer protection and monitor! Please contact Anne Myers Bobigian at annemonique@bellsouth.net or 502-634-1790 if you are interested in working on an orchard or serving as an orchard manager in the Louisville area. We have several other sites available for next year.



**Shelby County Orchard
Near Shelbyville**



**Oldham County Orchard
Meades Landing**

Mother Tree Profiles

Kentucky's "Mother trees" are the flowering pure American survivors used in the breeding program. These trees are fascinating to see and work with. As was begun in the Fall 2007 newsletter, interesting details about Mother trees will be shared in each issue. For clarification, a "line" is 100 hybrid nuts. In future issues, the story behind many of these trees will be shared along with photos.

1) Adair County 1 (Mother Tree)

Tree Diameter - 40 inches
Tree Height - 70 feet
Health - Excellent (with blight)
Year Pollinated - 2001-07
Line Produced - Yes

2) Butler County 1 (Mother and Father tree)

Tree Diameter - 12 inches
Tree Height - 60 feet
Health - Poor
Year Pollinated - 2005-06
Line Produced - Partial

Volunteers Needed For Summer Pollination

Working with Mother trees during the June pollination season is very labor intensive. The second two weeks of June is when most of Kentucky's trees are flowering. The chapter intern does much of the work, but the number of Mother trees is increasing each season. Ideally, a small group of chapter members from each county where Mother trees occur would work together to get the job done.

Pollination requires some coordination. First, after an initial visit to the tree, a decision needs to be made about the best method for reaching the tree canopy. In some cases trees can be reached with a bucket truck. In most cases some other strategy is needed to reach the canopy or to collect male flowers. When the canopy can be accessed, female flowers need to be pre-bagged to prevent pollination by something other than the pollen we bring to the tree. Actual pollination is a time-sensitive process. The flowers have to be ready to receive pollen. Timing is everything.

Please contact us if you are interested and able to assist. Hopefully you will live near enough to a Mother tree to help out. (606-784-5697)



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