

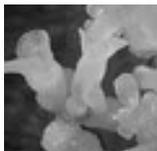
# Chestnut Mast



Volume 6, Issue 1    Newsletter of the Carolinas Chapter of The American Chestnut Foundation    Pollination 2004

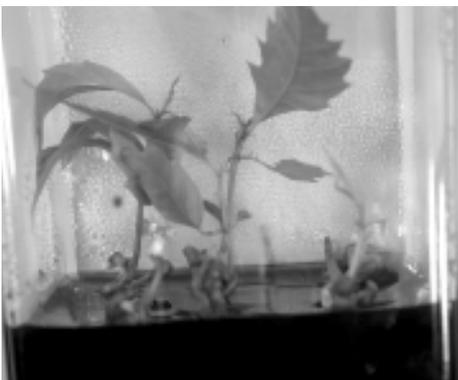
## Chestnut Biotechnology

Ever since chestnut blight was first identified in the U.S., numerous approaches have been attempted to combat the disease and restore the American chestnut. Currently, TACF's hybrid breeding program with Chinese chestnut offers the most promise for a near-term solution, and research with hypovirulence in the chestnut blight fungus also appears promising. An alternative approach that may supplement these approaches is being developed in my lab at The University of Georgia (UGA) and in labs at the State University of New York College of Environmental Science and Forestry (SUNY-ESF). We are working toward genetically engineering American chestnut with genes conferring resistance to the fungus. In order to produce transgenic American chestnut trees, a tissue culture system capable of regenerating trees from single cells first had to be developed. In 1990, we began developing such a system using somatic embryogenesis, a tissue culture system which produces clonal populations of structures resembling seed embryos, which in turn can be germinated to produce seedling-like plants called somatic seedlings. Embryogenic



*Somatic embryos of chestnut*

See *Biotechnology*, page 6



*Chestnut seedlings germinated from somatic embryos growing in vitro.*

## 2004 Spring Plantings

Several new chapter volunteers have offered land for planting this spring. If any others are interested, here's what we are looking for:

**Well-drained silt loam or sandy loam soil.** Chestnut trees do best where the soil is very well drained. Dig a hole, fill it with water, and see how fast it drains out. If it drains fairly quickly, that's good soil for chestnut. If the water sits there for hours, it is not good chestnut land.

**Acid soil with a pH between 5.5 and 6.5.** Your local county extension office can provide you with soil kits for testing, and North Carolina does the testing for free! Chestnuts will tolerate soil as acidic as pH 4.5, but they prefer 5.5 to 6.5.

**Land that is actively managed.** We're most enthusiastic about land that is right next to the person's house who will be taking care of the trees. Chestnut seedlings need to be protected from voles, rabbits, deer, and other predators, and the area around the seedlings needs to be kept free of grass and other weeds. Our best tree growers are the ones who can check on the trees daily. About a half acre minimum is needed.

**Land that is gently sloping.** The slope aids in drainage, but it cannot be too steep, because we will need to pollinate the trees even-

See *Spring Plantings*, page 3



*A successful 3-year-old orchard in Haywood County, NC – trees over 10 feet tall!*

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## CC-TACF 2004 Spring Meeting

The Spring 2004 meeting of the Carolinas Chapter of The American Chestnut Foundation will be held at the park headquarters of Crowders Mountain State Park from 10:00AM to 2:00PM, Saturday, April 24. Crowders Mountain State Park is located in Gaston County, North Carolina, 25 miles west of Charlotte and six miles southwest of Gastonia, NC. Registration fees for the meeting are \$15 for individuals and \$20 for couples. Lunch and refreshments will be provided as part of the meeting. Bring the whole family and enjoy hiking, camping, picnicking, rock climbing and canoeing.

See page 6 for information about Crowders Mountain State Park and for directions.



THE AMERICAN CHESTNUT FOUNDATION

## Carolinan Chapter The American Chestnut Foundation

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## President's Message

### "Sail On.....Sail Strong"



from Walt Whitman.)

My Dad was in the Navy and I have a great respect for him and the service he provided to our country. To this day, he still brings me great pride and drives me to give something of myself to a worthy cause. I remember when we started the Carolinas Chapter. At the time, I was ready for a new adventure. We had no homeport and only a hand-drawn treasure map of where to set sail. In the beginning, our boat was a small row-boat and the water was very choppy when we set sail. The original passengers did a good job of gathering the necessary supplies for a long voyage. After a few early sponsors and eager passengers to join our voyage, we had to build a larger boat because word was getting out of the great places we had been and the future treasures yet to come. After working the compass and building a stronger sailing boat, I decided to take the helm and guide us to a favorable climate. "Aboard at ship's helm, a young steersman steering with care. The beautiful and noble ship with all her precious wealth speeds away gaily and safe. Ship of body, ship of the soul, voyaging, voyaging, voyaging." If only we could get more people to take advantage of their boarding pass and get more people to row together! Oh the places we could go! Our bounty has grown thanks to new sponsors

and loyal supporters of this ship "Castanea." Recent donations have provided strong sailing winds to propel us along on our chartered course. Raise the Main Sail! Lash the Mast! "Oh Captain! My Captain! Rise-up and hear the bells; Rise-up for you the Flag is flung." What our Chapter can become rests solely on the participation and contributions from our membership.

Trade winds are in place for the Carolinas Chapter clipper to visit more cities, more ports, and more trees this year. Our finances are very strong and we continue to build new partnerships. An exciting development is for the Carolinas Chapter along with the Tennessee & Kentucky Chapters to work together on breeding efforts to advance certain breeding lines in less time than if done separately. This is truly the cooperative spirit

that unites us all to bring back the American chestnut while having fun and making new friends. I am not too concerned about the time it takes to get to the magic 20 lines. I am more interested in our journey along the way and the places or people we meet. Our journey has only just begun! Our National

*"Our bounty has grown thanks to new sponsors and loyal supporters of this ship 'Castanea.'"*

meeting is coming this year to NC. [Asheville, NC, October 29-31.] I hope you will attend the meeting to show your support and how strong the Carolinas Chapter has become and will continue to be with your help. "Now voyager depart, much, much for thee is yet in store. Embrace thy friends, leave all in order. To port and hawser's tie no more returning, Depart upon thy noble cruise, Chestnut Sailor." It has truly been an honor and a rewarding experience to serve as your Captain for the past two years. Sail On....Sail Strong!

Ron Myers, Chapter President

### Chestnuts in the News

U.S. Rep. Charles Taylor, R-Brevard helped The America Chestnut Foundation obtain a \$250,000 appropriation from Congress. A story about it appeared in the January 6, 2004, Asheville Citizen-Times. Read the story at:

<http://cgi.citizen-times.com/cgi-bin/story/news/47848>

### Chestnut Videos Available

Copies of the Turner South videotape entitled *The American Chestnut*, on "The Natural South" program #301 are now available. The 30 minute video includes shots of chestnut harvest on Wayah Bald and Dr. Hill Craddock's chestnut orchard near Chattanooga. The producers have allowed us to copy it for private viewing or for viewing by civic groups, but not for rebroadcast.

Requests for copies should be sent long with checks for \$10 made out to "Carolinan Chapter - TACF" to:

Dr. Paul Sisco  
Carolinan Chapter of TACF  
One Oak Plaza, Suite 308  
Asheville, NC 28801

## Survey of Flowering Chestnut in Great Smoky Mountains National Park

During the summer of 2003, a park-wide survey of remaining flowering American chestnut trees was undertaken in the Great Smoky Mountains National Park in order to expand existing chestnut records.

Earliest park records of American chestnut decline and survival through re-sprouting began in the early 1930s by the park's first naturalist, Arthur Stupka. He continued to record a wealth of natural history observations in the park until his retirement around 1960. Following his retirement, American chestnut observations in the park became infrequent and usually involved sightings by park employees or visitors. In the late 1980s and early 1990s, some locations of flowering chestnut were recorded as part of a blight resistance project conducted by the University of Tennessee's Department of Forestry.

Currently, with the possible development of a blight resistant chestnut, the park could potentially use flowering chestnut location information to begin a breeding program. The 2003 survey has provided the park with baseline data concerning chestnut distribution, and it will provide the first step in consideration for possible future restoration of the American chestnut.

Locations for the 2003 survey were selected from the park's existing chestnut database, compiled from all previous recorded chestnut observations. Seasonal Forestry Technician, Matthew Wood, was in charge of this project and not only conducted all field surveys, but also completed the final report. Trails with known flowering chestnut locations were surveyed to confirm the presence of existing trees and to look for previously unrecorded trees. Additional surveys were made on trails with similar aspect, elevation and forest type.

All chestnuts with visible flowers present and all chestnut trees measuring 10 cm in diameter or greater were recorded. The total survey covered over 800 miles of trail. For each tree the following information was also recorded: diameter at breast

height (DBH), height, aspect, percent slope and canopy density. Presence of flowers, fruit, sprouts and blight were also recorded. Presence of all associate trees and shrubs in the overstory (all dominate and co-dominate trees) and midstory (all intermediate to sapling size trees and shrubs) were recorded within 20 m of each chestnut. Locations and elevations of each individual tree were recorded with a Garmin GPS 3 Plus unit.

A total of 288 individual chestnut trees were documented, and of those 157, or 54.5%, were flowering. Site factors such as slope, aspect, canopy cover and elevation may help in predicting appropriate conditions for flowering. The associate tree and shrub species show a similar pattern to earlier studies on natural replacement of chestnut, and may provide a basis for predicting chestnut occurrence by forest types.

Since this study focused on trailside surveys, many potential off-trail areas have gone unmapped. Data could be analyzed through GIS for predictive modeling of American chestnut occurrence in the park. This would provide a set of likely off-trail locations which best fit site factors present at known points such as elevation, slope and aspect. A GIS model efficiently produces clearly mapped potential sites, which can then be downloaded into a GPS unit and field checked.

Using the current location data on flowering chestnut and any future off-trail data that may be collected, a harvesting program could be established to create a seed orchard. This would mean a readily available source of Great Smoky Mountains chestnut genotypes for future use in blight resistance breeding programs. It is possible that through these efforts chestnut could some day be restored to the park. – Marion Kloster and John Matthew Wood, Forestry Technicians, GSMNP



Map of Great Smoky Mountains National Park indicating by black triangles locations of American chestnut.

*Spring Plantings, continued from page 1*

tually using either ladders or bucket trucks.

**Land that is accessible to trucks.** We will have to bring in bucket trucks to pollinate the trees when they start blooming, so accessibility is very important.

**Land that has been in pasture or that has been cleared of vegetation.** Our chestnut orchards at this stage are a farm operation, not



Kate Nunez and her planting crew at Newland, NC

a forest operation. So we need open space to plant the nuts or seedlings.

**We will plant pure American chestnut seed or seedlings the first year to test the land.** Even if conditions seem ideal, we sometimes run into problems with root rot disease or other unforeseen conditions. So we plant pure American, blight-susceptible trees the first year to see how well they grow and how well they are taken care of before we plant our backcross trees for the breeding program.

**Landowners will need to sign the Germplasm Agreement of TACF before they can plant our backcross trees.** TACF is trying to keep control of its nation-wide breeding program so that only the best quality seed eventually reach the public. Therefore, landowners who wish to participate in the program will need to sign a legal document called "The Germplasm Agreement." Copies of this agreement can be obtained from the Southern Appalachian Regional Office in Asheville. Call 828-281-0047 or e-mail paul@acf.org. The commitment for a BC3 orchard is for 10 years.

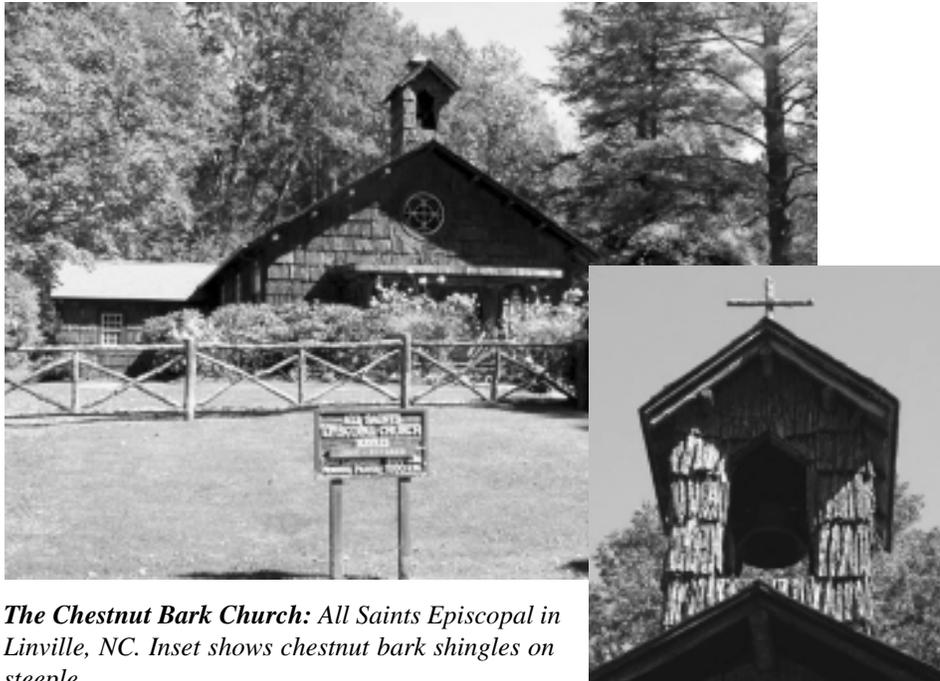
We are very grateful to the following landowners who will participate in our breeding program for the first time this year: Kate Nunez of Newland, NC, Grover DeHart and Becky Brookshire of Marshall, NC, Chuck Rank of Fairview, NC, Carroll Parker of Brevard, NC, and Sandy Schenck of the Green River Preserve in Henderson County, NC.

Paul Sisco, Southern Regional Science Coordinator

## Bark and Wood: A Tale of Chestnut and Two Churches in Western North Carolina

Chestnut bark and chestnut wood – each has unique features that make it attractive, and each is showcased in the architecture of two outstanding churches in western North Carolina.

**All Saints Episcopal Church** in Linville, NC, completed in 1913, was the last chestnut bark building designed by Henry Bacon, famous as the architect of the Lincoln Memorial in Washington, DC. Many houses and buildings in Linville, including Eseeola Lodge, are covered with chestnut bark in what has been called the “Linville style.” The truly amazing part of the church is the interior, which is also completely covered, walls and ceiling, in chestnut bark, giving it a rustic look. The fact that the chestnut bark has held up over 90 years is testimony to its rot resistance! To find out more about this church and see some



*The Chestnut Bark Church: All Saints Episcopal in Linville, NC. Inset shows chestnut bark shingles on steeple.*

beautiful photos, go to the following website: [www.ecva.org/exhibition/acs/linville\\_2.html](http://www.ecva.org/exhibition/acs/linville_2.html)

A gorgeous example of the use of chestnut wood in church architecture is the **First Baptist Church** in downtown Asheville (*see back page*). Completed in 1927, this church was designed in the art deco style by Douglas Ellington, who was also architect of the beautiful Asheville City Hall. Ellington used as a model the Cathedral of Santa Maria del Fiore in Florence, Italy, and the church is listed in the National Register of Historic Places. Alden Angeline, Associate Pastor of the church at the time, knew of the last large quantity of chestnut wood available in the area and requisitioned it for construction of much of the church's interior. This year the church is celebrating its 175th anniversary. Many thanks to Vernon Stroupe of the church's historical committee for supplying these photos. For more information, go to the church's website: [www.fbca.net/History.htm](http://www.fbca.net/History.htm)

*Paul Sisco, Southern Regional Science Coordinator*

*Huge carved doors of chestnut wood lead to the First Baptist Church sanctuary, Asheville, NC. See additional photos on back page.*



## Chestnut Connections: Stories, Recollections and Profiles from Members

*This new feature shares inspiring chestnut stories and memories. Please send yours to [chestnutmast@bellsouth.net](mailto:chestnutmast@bellsouth.net).*

### Doug Gillis

My interest in the American chestnut started with my father, Glen Gillis. He was born in 1913 and was raised in the Big Ivy Community of northern Buncombe/southern Madison County. He saw firsthand the demise of the great American chestnut trees in the area where he lived. He left home in 1933 to make a career of the Army, yet returned often to visit relatives in the mountains. He instilled in me a love of nature and told me on many occasions about the mighty American chestnut. It may be no coincidence that in 1959, he picked a house in Chestnut Hills in Raleigh, NC, in which to move his family. The tree in the front yard was a Chinese chestnut, the only available substitute for the American chestnut at the time.

I saw firsthand at the age of 12 the evidence of the chestnut blight. In 1959, my father and I were at a sawmill located on the Harris Dairy Farm in Barnardsville, NC. My uncle, Charles Harris, had recently had the woods on the 800-acre farm selectively cut. Pieces of wormy chestnut planks, some 20 inches wide, lay discarded at the sawmill. My father arranged to salvage the wood, have it milled, and hauled to Raleigh. Wormy chestnut paneling still lines the walls of the den in the home in Chestnut Hills that I helped him build.

I have great interest in the research being done to develop blight resistant American chestnut trees that will provide the stock to be reintroduced into the eastern forests. I am interested in helping educate others about the story of the American chestnut and to help instill the knowledge in the younger generations that the tree still lives, is not extinct, and will be brought back into the forest in time in abundance.

### Alma Spicer

*Long-time chapter member, Alma Spicer, remembers her father talking passionately about chestnut trees. Alma has attended nearly every chapter meeting. She likes to hear people tell their stories about chestnut and likes what the organization is doing. She hopes that we can bring the chestnut back. Here are some of her recollections in her own words.*

It was through my father that I became interested [in the chestnut tree] and perhaps I should give you some of his background.

## Nominees for CC-TACF Board of Directors

*Elections for CC-TACF Board of Directors will be held during the Spring 2004 meeting at Crowders Mountain State Park.*

### New Candidates

**Carol R. Namkoong, Leicester, NC** – Carol is a mother of three, and grandmother of two wonderful girls who live in Oregon. She grew up in Pennsylvania, and during her childhood lived in a house where all the woodwork was chestnut. She worked for the N.C. Department of Labor in Raleigh, where she was a program manager and technical writer. She retired from that position when her husband accepted a position at the University of British Columbia in Vancouver, British Columbia in 1993. Her interest in TACF began when her late husband, Gene, was asked to give a speech at the annual meeting in Virginia in 2000. In 1994 Gene was awarded the prestigious Marcus Wallenberg Prize, the highest award given to a forester, for his work in population genetics and gene conservation around the world.

**Douglas Gillis, Charlotte, NC** – Doug received engineering degrees from NCSU and worked for the North Carolina Traffic Engineering Department from 1970 until 1974 as an Urban Traffic Engineer. He then worked with the Charlotte Department of Transportation until his retirement in 2001, retiring as Assistant Director/Chief Traffic Engineer. He is a Registered Professional Engineer, a Registered Land Surveyor and a Licensed General Contractor in North Carolina. His current activities include Vice-Chair, Board of Trustees, Sharon United Methodist Church, Charlotte, and Habitat for Humanity Volunteer. Organizations he belongs to are: American Society of Civil Engineers, Institute of Transportation Engineers, Sierra Club, and United Methodist Men. He is married to Marsha Finch Gillis and has two daughters.

### Running for Re-election

**Ron Myers, Clayton, NC** – Ron is a forester specializing in hardwood silviculture. He has served the Carolinas Chapter since its inception, as a member of the steering committee, as a director on the board and as a tree pollinator. He was coordinator of the chapter's Mother Tree Project, from 1999-2000, and has been serving as President from 2002 to the present. TACF National named him a 2003 Honoree at the Fall '03 meeting. He is involved in many field-related activities, workshops, and projects that include chestnut and other Appalachian hardwoods.

**Paul Sisco, Asheville, NC** – Paul holds a Ph.D. in Plant Breeding and Genetics (Cornell 1982) and was USDA/ARS Professor of Crop Science at North Carolina State University, 1983-97. He was TACF Staff Geneticist from 1998 to 2002, and is currently TACF Southern Regional Science Coordinator. He served on the board of directors of Bent Creek Townhomes (Raleigh, NC) from 1986 through 1989 and was its board president, 1988-89 (Bent Creek had over 350 townhomes and an annual budget of over \$250,000). He has served as chapter treasurer for the last two years along with serving as a liaison to the Carolinas Chapter regarding National cooperative projects and grants.

**Gene Spears, Banner Elk, NC** – Gene is professor of biology and head of the science/math department at Lees-McRae College in Banner Elk. He holds a Ph.D. from the University of Florida, and has a professional background in plant reproductive ecology and pollination biology. His hobby interest is in fruit and nut tree growing and home mini-orchards. He has been a member of NAFEX (N.A. fruit explorers) for 12 years and of TACF for 5 years. He has currently served as the Chapter secretary for the last two years and has hosted several well-attended CC-TACF Annual meetings.

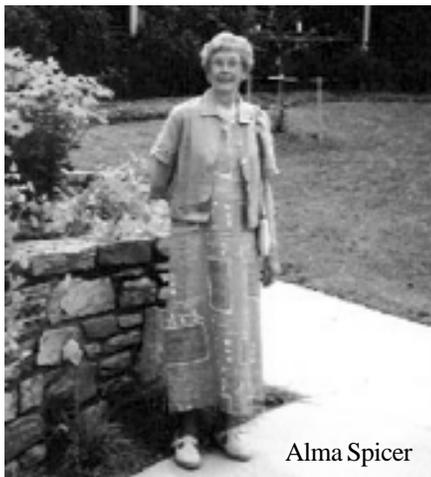
**Kenneth O. Summerville, Garner, NC** – K. O. holds a B.S. in Forest Management (NCSU 1959) and retired from the NC Division of Forest Resources after 36 years. He helped develop a genetic tree improvement program in loblolly, longleaf, and other pines and firs. He has conducted research on vegetative propagation of various commercial hardwood tree species, conducted seed orchard management studies of several pine and fir trees, and has established silvicultural studies with longleaf pine and Atlantic white cedar. A member of the Society of American Foresters (Triangle Chapter Treasurer, 1987-90; NC Division Chair, 1995), he currently serves as Appalachian Society of American Foresters Natural Areas Committee Chair. He has served on the CC-TACF Endowment committee and is a member of the Science Cabinet for National.

His parents were German immigrants who had good jobs in Philadelphia. However, his father wanted to be independent and when he saw an advertisement for cheap land in the North Carolina mountains, he, his brother and two other German friends came to Black Mountain on the train. My grandfather bought 50 acres of land for three dollars an acre 8 miles from Black Mountain at Chestnut Hill at the head of Broad River. They knew nothing about farming and had a hard time making a living. My Dad, Ewald Kirstein was born in 1889.

About 1895 my grandfather bought 75 acres down on Flat Creek to be close to a school since my father was school age. They worked hard and my father helped skin tan bark from chestnut trees and haul them to Black Mountain where they were sent to the tanneries. They also cut crossties for the railroad and hauled them to Black Mountain.

Later my grandfather and a friend were partners in a sawmill. They bought a boundary of timber on Broad River about 8 miles from where they lived. They built a shack, had a cook stove and went home on Saturdays. Ewald, my father, was about 12 or 13 and did the work of a man.

My father began working for the Southern Railroad in 1905, when he was 16 years old. He worked his way from fireman to engineer. He married a former schoolmate from Fairview, Levia McBrayer. I was born and grew up in Asheville, graduated from Lee Edwards High School and from UNCG (then it was Women's College of the University of North Carolina) with a degree in Public School Music. I taught for several years until I married George Thurston Spicer from Providence, Rhode Island. We had two children, a daughter who is now a naturalist in Maryland and a son, who is a hydrological engineer in Chicago. My husband died in 1988. We had many good years hiking in Pisgah National Forest and traveling in England, Switzerland, Austria, Canada and the United States.



Alma Spicer

cultures make excellent target material for gene transfer and we were able to demonstrate stable transformation of the cultures using microprojectile bombardment. However, no transgenic trees were regenerated from these cultures. The ability to produce somatic seedlings from our cultures remained a major bottleneck to this approach for several years. We renewed our efforts to produce transgenic American chestnut trees two years ago when we received funding from ArborGen LLC and the Institute for Forest Biotechnology, and have since made good progress improving production of American chestnut somatic seedlings. Meanwhile, collaborators at SUNY-ESF have used *Agrobacterium tumefaciens* to successfully engineer chestnut cultures with marker genes. Once we demonstrate that we can reliably regenerate American chestnut somatic seedlings engineered with these marker genes, we can begin testing anti-fungal genes in the tree. – *Scott Merkle*



*Dr. Scott A. Merkle will be the featured speaker for the CC-TACF spring meeting at Crowders Mountain State Park. Dr. Merkle is Professor in the Warnell School of Forest Resources at the University of Georgia.*



*His lab has developed embryogenic regeneration systems for over a dozen forest tree species and hybrids, including American chestnut. His research also involves genetic engineering, artificial seeds, cryopreservation and phyto-remediation. Dr. Merkle teaches courses in dendrology and forest biotechnology. He received his B.S. in Biology from the College of William and Mary in 1976 and his M.S. and Ph.D. in Forestry from Virginia Tech in 1978 and 1982, respectively, and has been a faculty member at UGA since 1987.*

## Crowders Mountain State Park: Site of the Spring 2004 Meeting

**Natural History** Crowders Mountain State Park, established in 1974, encompasses over 2,000 acres, and shares a border with Kings Mountain National Military Park and Kings Mountain State Park, both in South Carolina. Crowders Mountain State Park has two major summits, Crowders Mountain at 1,625 feet and King's Pinnacle at 1,705 feet. Both peaks are quite visible from I-85, rising over 800 feet above the surrounding countryside. The peaks are classified as kyanite-quartzite monadnocks, and are part of a chain of monadnocks that continues on southwestward into South Carolina. They are the erosion resistant remnants of mountain peaks believed to be 500 million years old. Both peaks have sheer cliffs of 100 to 150 feet, and those on Crowders Mountain are used often by rock-climbers.

The dominant tree species within the park is chestnut oak, though at higher elevations, Virginia pine and other conifers are found. The understory consists of dogwood, mountain laurel, and a variety of ferns. The park contains the southernmost known locations of bear oak. It is probable that American chestnut was the dominant hardwood in the park until the arrival of the chestnut blight early in the 20th century. There are still a few blight-infested specimens of American chestnut on both peaks. Some have produced nuts over the last few years, primarily as a result of stress from the blight. At lower elevations, a number of shrub-sized American chestnuts can be found beneath the chestnut oak canopy.

**Human History** The peaks within the park marked the boundary between the hunting lands of the Catawba and the Cherokee, and a major trading route of the Cherokee crossed Crowders Mountain. European settlement in the area began in the mid-18th century.

The Battle of Kings Mountain occurred on October 7, 1780, just over the South Carolina border in what is now King's Mountain National

Military Park. This battle was a turning point in the British Southern Campaign of the Revolutionary War. The American Continental Army had suffered successive defeats in the summer of 1780. By that fall, only voluntary Patriot militia units remained in the field to oppose the armies of General Cornwallis. Cornwallis sent Major Patrick Ferguson into the western Carolinas to raise a loyal militia army and suppress the remaining Patriot militia. The Overmountain Men gathered from Tennessee, Virginia, and North Carolina and met with other Patriot militiamen from Georgia and the Carolinas at Cowpens and then marched to Kings Mountain to engage Ferguson's Loyalists. The battle was a major victory for the Patriots, forcing Cornwallis to retreat from Charlotte and began a series of British setbacks leading to their eventual surrender at Yorktown.

Following the Revolutionary War, gold was discovered north of Charlotte, and a number of gold mines were put into production near Crowders Mountain. The importance of these mining operations shrank with the discovery of gold in California in 1849. In the 20th century, kyanite, used as a refractory and ceramic material, was strip mined near Crowders Mountain. The area also contains most of the known US reserves of lithium, although lithium mining operations in the area ended with the discovery of less expensive sources in South America in the last few decades.

**Nearby Sites of Interest** You may want to visit King's Mountain National Military Park after the meeting. The park has an interpretive 1 mile walk around the site of the famous battle. Directions to the National Park and a map can be obtained at Crowders Mountain Park Headquarters.

You may also like to visit the Schiele Museum of Natural History and Planetarium in Gastonia. This museum is regarded as North Carolina's premier museum of natural history. It is open weekends 1-5 pm, and is located at 1500 E. Garrison Blvd in Gastonia. (704-866-6900).

*Steve Barilovits*

### Don't miss the next Chapter Meeting at Crowders Mountain State Park!!!

Park headquarters are: 22 Park Office Lane, Kings Mountain, NC 28086, 704-853-5375, [www.ils.unc.edu/parkproject/visit/crmo/home.html](http://www.ils.unc.edu/parkproject/visit/crmo/home.html)

#### Directions to Crowders Mountain State Park

**From I-85 Southbound (Raleigh, Greensboro, Charlotte):** Take Exit 13 (Edgewood Road). At end of exit ramp, turn left on Edgewood Road. Go 0.7 mi., turn right on US 74 southbound. Go 1.8 mi., turn left on Sparrow Springs Rd. Go 2.5 mi., turn right (follow signs to Crowders Mountain State Park) to stay on Sparrow Springs Rd. Go 0.5 mi., turn right on State Park Lane. Go 0.1 mi., turn right on Park Office Lane.

**From I-85 Northbound (Greenville, Spartanburg, Asheville via I-26):** Take Exit 8 (NC-161) and turn right on York Road/NC-161. Go 0.4 mi., turn left on Lake Montonia Road. Go 1.3 mi., continue straight on Pinnacle Road. Go 2.0 mi., turn left on Sparrow Springs Road. Go 1.3 mi., turn left on State Park Lane. Go 0.1 mi., turn right on Park Office Lane.

**From US 74 Eastbound (Tryon, Shelby):** About 1 mi. after the interchange with I-85, turn right on Sparrow Springs Rd. Go 2.5 mi., turn right (follow signs to Crowders Mountain State Park) to stay on Sparrow Springs Rd. Go 0.5 mi., turn right on State Park Lane. Go 0.1 mi., turn right on Park Office Lane.

## Phytophthora: The Original Chestnut Blight

The American chestnut was once prevalent in the forest ecosystems throughout the eastern United States, where it was prized for both its mast and its timber value. The demise of the American chestnut by the chestnut blight was dramatic to say the least; for generations to come, this catastrophe will likely remain the poster child of a species destroyed by an introduced disease. But while the blight wiped out the chestnut from the hills and the mountains, many people today do not realize that before the blight, another disease had already wiped out chestnuts that were growing in the warmer regions of its range which extended even into the Coastal Plain!

This disease is commonly known in chestnuts as “ink disease,” since it causes a blackish, inky substance to exude from the base of infected trees. The pathogen, or cause of the disease, is a fungus called *Phytophthora cinnamomi*. The problem with this disease is that most, if not all, infected chestnuts were killed – that is, the American chestnut has little or no resistance to *Phytophthora*.

*P. cinnamomi* was introduced into the United States supposedly through a southern port in the 1700s. From there, it spread slowly northward. Along the way, this soil-born fungus infected many tree species and consistently caused mortality when it infected American chestnut. In the late 1800s and early 1900s, serious concern arose for chestnut’s plight due to *Phytophthora*. Unfortunately, a fresh disease was soon raging throughout the East, and concern due to the blight quickly overshadowed the importance of *Phytophthora*. In fact, so many trees were being destroyed by the blight that the *Phytophthora* studies were lost.

Besides the comparative drama of the blight and *Phytophthora*, there are several other major differences between the two diseases. First, *Phytophthora* is a root rot; it attacks and causes decay of the feeder roots of a tree, eventually moving to the major support roots and destroying them as well. Because its roots are dead, a susceptible tree that is infected will die. The blight, on the other hand, only causes dieback of the tree crown. The root system is unharmed, which is why blight-infected trees, but not *Phytophthora*-infected trees, can produce stump sprouts.

Second, *P. cinnamomi* is generally limited to warmer, more moist climates. Its threat is, therefore, limited mostly to the South. The blight, on the other hand, is not deterred by climatic variation and has been the bane of chestnut from Maine to Georgia.

Third, *P. cinnamomi* is a fungus that is found in the soil, and can be carried through the ground by water, while the blight is often transported by the wind above ground. While *P. cinnamomi* generally spreads much more slowly across a region than blight does, its effect can be said to be more permanent.

Because the blight caused such a dramatic demise, much attention has been placed on breeding blight resistance into American chestnut. This is being done by the Foun-



Mollie Bowles at Meadowview Research Farms with TM287, a chestnut tree to be used in controlled crosses for her research.

dation by crossing American chestnut with Chinese chestnut and then backcrossing the progeny to American chestnut. Hybrids and backcrosses are mainly selected for blight resistance and American growth habits, vigor, and morphological characteristics (such as leaf shape and twig color). This way, the final selections that will be reintroduced into the wild will essentially be blight-resistant American chestnuts.

Unfortunately, *P. cinnamomi* is still present in a good portion of the original chestnut range so that unamended restoration efforts in these areas are likely to fail, at least partially. In fact, several instances of *Phytophthora* mortality in research trials in Tennessee and the Carolinas have already confirmed this. Thus, some breeding lines of chestnut possessing resistance to both blight and *Phytophthora* are needed to en-

sure successful chestnut restoration in the southern part of its range.

My graduate research at N.C. State University will investigate inheritance of *Phytophthora* resistance in chestnut toward this end. Preliminary results using controlled inoculations of greenhouse-grown seedlings with *P. cinnamomi* suggest that Chinese chestnut is resistant while American chestnut is largely susceptible. Interspecific F1 hybrids are also resistant indicating that genetic control of resistance is dominant. Resistance segregation patterns in B1 and B1-F2 crosses suggest control by a single locus; however, sample sizes to date have been relatively small.

Upcoming research will use molecular genetic markers to verify the type of inheritance of *Phytophthora* resistance in chestnut and develop a map of the resistance locus (or loci). Hopefully, this work will yield a reliable, but non-lethal method of identifying *Phytophthora* resistant seedlings. Additionally, it will provide knowledge needed to design and implement new resistance screening strategies. These strategies will be aimed at developing breeding lines of American chestnut that are resistant to both blight and *Phytophthora*. Thus, this research should provide valuable tools toward long-term restoration of American chestnut throughout its *real* original range.

Mollie Bowles

Mollie E. Bowles is a CC-TACF member and a student in the Department of Forestry at NCSU. She is studying for her Master of Science degree under Drs. John Frampton, Henry Amerson and Larry Grand. She graduated from Samford University in Birmingham, Alabama, in 2003 with a Bachelor’s degree in Environmental Science. The extreme ecological significance of the American chestnut lured her attention, and she is greatly enjoying her opportunity to play a part in the restoration of this magnificent species.

### Congratulations CC-TACF!

Brooke Haworth reports that we have our first “grandchild” from a mother tree orchard. Nuts that were collected in 2000 from Wayah Bald and Scaly Mountain mother trees were sown in 2001 at the NCSU Mountain Horticultural Research Station in Fletcher. Three year later, two of the seedling progeny of the Wayah E tree had burs. Thanks to Joe James who located the original mother tree.



Art Deco Exterior of First Baptist Church, Asheville, NC



All the interior woodwork of the sanctuary is chestnut

## Growers' Tips

### Is your plastic helping or hurting?

Recently I found time to look over my chestnut planting and hammer in the stakes to the plastic tree shelters that the wind had blown over during the winter, now that the ground is thawed. Only about a dozen had fallen. I think the tree shelters are a bad choice for plantings that are exposed to the wind. That site is particularly blustery in the winter. A few of the shelters had destroyed the seedlings by blowing around in the wind and scraping bark off of seedlings. All in all, however, it looks like the planting has wintered rather well. I didn't see any evidence of vole damage. Probably the plastic was responsible for generating so many voles last year. I tore all of it out this year. I have frequently seen hawks hunting in that field, so I think that without the plastic to hide under and with much of the grass suppressed with herbicide, the voles will naturally be kept to a minimum.

– **Louis Acker**, Ashe County, NC (*Paul Sisco adds: Remember that chestnut seedlings can resprout from the root collar, so if the seedling looks damaged, you can clip the stem off at ground level, and it may well resprout and grow rather quickly.*)

### The TIP System

Chestnuts are often grown in tubes to provide protection from herbicides, weeds and animal browsing. However, tubes sometimes create problems such as tree bending and excessive heat build-up during the summer. Jim Walizer has developed a method called the TIP (Tree Incubation and Protection) system to help circumvent these problems. It uses a plastic tube 16 inches tall to protect from spraying plus a four foot high plastic fence with a two inch grid to protect against browsing and heat-build-up. For more information contact Jim at 813-282-2622 or walizer304@june.com. – Source: **Jim Walizer** (*Alternatively, 18 inch plastic tubes can be obtained from TreePro (www.treepro.com, 800-875-8071) and four foot high green mesh can be purchased at a home improvement store in 50 foot rolls.*)



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