

**The American Chestnut: Is There Hope?
From September/October 2005 Issue**

**AN AWAKENING GIANT:
THE AMERICAN CHESTNUT**

by Gwen S. Clarke



A Giant. This healthy chestnut was discovered in Jackson County, Tenn. in 2003 – closer to Nashville than to the mountains. Paul Sisco, regional science coordinator with the American Chestnut Foundation, guesstimates that five to 10 chestnuts of this size exist in the southeast. Blight resistant? The ACF is testing that, but most likely they've survived because they're at the edge of the chestnut's range, and distanced from blight.

PHOTO BY Joe Schibig

Shifting tectonic plates aren't the only stirrings around us. Along with the reshaping of global alliances, geographic boundaries, and international currencies, the forest profiles that dominate our very horizons are in flux, as well. The long-dead American chestnut tree could soon be in a position to reclaim its place in the American scene as more familiar, contemporary species fight for their survival. Livelihoods based on this most useful of forest monarchs, lost for a century, may soon be a consideration. The times, they are a'changin'.

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Until 1904, the American chestnut (*Castanea dentata*) was the dominant tree in the Appalachian range. Its wood was invaluable for its durability and versatility, the nut meat called "a free subsistence crop" and "manna from God." Then the accidental introduction of *Cyphonectria parasitica* – the chestnut blight – altered the vistas, livelihoods, and futures of a population dependent on the tree. This biological disaster denuded forests from Maine to Alabama of 3.5 billion trees in the space of a generation.

As we chalk off one hundred years since the chestnut's death-knell, there is concern that more species are at risk. Pine, hemlock, dogwood and American elm are dead or dying. The oak, one of the primary trees to fill the void left by the chestnut, has demonstrated its susceptibility to a pathogen that could potentially echo the devastation of the previous century (see Sept/Oct 2004).

Questions abound. With governmental and academic plant scientists at full gallop, what remedies will work? If they fail to save an extant species, could the American chestnut reemerge to take its place? What has been learned, and what's next?

In its May/June 1997 issue, Blue Ridge Country examined the history of the chestnut blight, its devastation and its impact. Disparate organizations, institutions and individuals continue to be involved in the bifurcated quest for both a marketable



Chestnut Burrs. The trees bore marketable nuts after seven years. photo courtesy the american chestnut foundation

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nut and a massive forest hardwood.

For growers and marketers of the chestnut meat itself – given the existing science – crossing the blight-resistant Chinese chestnut with the more desirable American tree has been a workable but slowly evolving solution. The Dunstan cross, a chestnut hybrid developed and marketed by Chestnut Hill Nursery of Alachua, Fla. was then, and remains the industry standard orchard tree for the Blue Ridge region, according to nursery President Dr. Robert Wallace. In 1997, some 2,000 grove owners had committed fewer than 500 acres to the Dunstan cross. Currently, there are more than 3,000 grove sites.



Branches. Chestnut leaves help the tree absorb both sunlight and water.
photo by erik gerhardt

“The difference,” says Wallace, “is the tree farms are each much larger as the planters can see the practicality and feasibility of the crop. There is enough confidence on the part of the growers to justify large-scale commitments. The uphill battle is now a wave; growers are past the need to test the waters.”

Wallace feels the unique attraction of the chestnut’s snowballing popularity combines nostalgia, science and good business. Considering the agricultural vacuum created by declining tobacco acreage, “it’s the right time for the chestnut,” he adds.



Blight. The Asian fungus was first discovered in 1904 in New York City. By 1950, it had wiped out virtually all chestnuts in the eastern U.S. forests.
photo courtesy the american chestnut foundation

Virginia grower Bert Wilson has added 1,500 trees (minus some recent bear and 17-year cicada damage, he notes) to the 1,000 he had at the time of the previous story. The trees’ nut production has exceeded his expectations, he says, anticipating a maximum yield of 20 tons annually, with sales contracts already in place.

Sadly, Wilson’s success did not extend to 100 bare-root pure American chestnut trees that he planted in 1995, working with the American Chestnut Cooperators’ Foundation, an enthusiastic grass roots movement.

In 1997, Bert Wilson still had 45 trees of his original 100 all-American inter-crosses. At present, only 15 remain.

This all-volunteer foundation was formed in 1985 to restore the pure, uncrossed American chestnut to its native forest environment. In the southern reaches, before the blight, American chestnut trees at altitudes above 2,000 feet commonly grew to heights of 120 feet, with seven-foot diameters.

By comparison, orchard-sized Chinese-cross trees like the Dunstan rarely achieve heights above 25 feet, so the thrust of this aspect of the academic/scientific community is to develop a blight-resistant American chestnut that can establish itself again as a giant in the eastern forest. Helping to achieve that end are service groups such as the 4-H, for supervised trials on public land, and independent growers like Wilson. The ACCF staff of five, working in conjunction with Virginia Tech and West Virginia’s Concord College, has expanded the reach of its experimentation to every state in the continental United States with the exception of the three bordering the Pacific, where importation is banned.

Because some of the chestnut trees that remained intact in out-of-the-way locations have shown blight resistance, and because even blighted trees left living roots behind, there exists an American chestnut lifeline. It is through such living tissue that propagation has been possible. By the time of the 1997 story, just short of 50,000 hard-won seed nuts and seedlings had been distributed, a number that has virtually trebled in the subsequent years. This large scale distribution is resulting in natural selection, where blight-resistant offspring (generally about 10 percent of parent trees) can, with ACCF breeding strategy, be further reproduced to achieve regularly inheritable blight resistance.

Looking toward the future, Virginia Tech professor Gary Griffin says, “It is not beyond the grasp of science to restore the (pure) American chestnut to economic importance. It could be accomplished within 50 years. It’s a slow

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Our Cover:

A raccoon in Cades Cove, on the Tennessee side of Great Smoky Mountains National Park.

“I saw the raccoon go into the hollow log,” writes photographer Bill Lea. “Then once he realized I was not a threat, he emerged from the log and I was able to get a few photos.”

process because it's a tree, not a corn plant."

A second approach to the restoration of the American giant is being undertaken by The American Chestnut Foundation. Since its founding in 1983, the non-profit TACF, with the support of the National Forest Foundation, has been back-crossing the American chestnut with the Chinese. The "ideal" that the foundation has been striving for has recently been achieved, a tree that is 94 percent American chestnut, which their scientists believe will have no Chinese characteristic other than blight resistance.

Headquartered in Bennington, Vt., with research farms in Meadowview, Va., the TACF has more than 17,000 trees in various stages of breeding evolution over its 60-plus acres of land. In addition, a partnership has been formed with laboratories at Penn State University's School of Forest Resources and the United States Forest Service Southern Institute at Gulfport, Ala. to breed climatic diversity into the emerging 15/16 cross.



Young Trees. American Chestnut suckers emerge after a fire in Virginia's Shenandoah National Park.
photo by jim waite

From his Asheville, N.C. headquarters, Dr. Paul Sisco, Regional Science Coordinator for The American Chestnut Foundation, oversees the breeding program throughout the south. With a Ph.D. in plant genetics, Sisco is the Johnny Appleseed of chestnut culture. He and his workers, like arboreal match-makers, perch in cherry-pickers, bagging individual blossoms on select "mother trees." Pollen from the Meadowview farms is introduced into the blossoms and the marriage is sealed against interference.

A "memorandum of understanding" between the U. S. Department of Agriculture's Forest Service and The American Chestnut Foundation was signed in 2004, as the ideal 15/16 cross was being realized. The agreement puts the strength of the Forest Service's research organization (the world's largest), its technical and financial resources, and its 191 million acres of national forest lands into the chestnut equation at the centennial of the blight's introduction. Paul Prichard, development manager for the Asheville TACF facility, refers to the timing of the memorandum as "a wonderful instance of synchronicity."

Just as all roads lead to Rome, all chestnut inquiries invariably lead to Dr. Fred Hebard, staff pathologist at the foundation laboratory at Meadowview, Va. The chestnut science pioneer recalls that his interest began in 1970 when, as a college student at Columbia, he had a summer job on a Connecticut dairy farm. While searching the woods for lost heifers, Hebard and the dairy farmer came across some blighted chestnut roots struggling to sprout. Hearing the heartbreaking story of the biological lost cause pointed the young man toward the quest that would shape his career.

"I thought, 'Let's see if we can do something about that,'" he says in a masterpiece of understatement.



Once An Orchard. Stumps are all that remain on a farm west of Blue Grass, Va. that sold chestnuts in the early 20th century.
photo by sandy hevener

"If we're lucky, we'll have made enough progress by 2010 to start releasing our third generation 15/16 crosses for testing in the forest," he says.

"If we're really lucky, we'll have chestnut forests by 2050. I'm looking forward to seeing that," the 57-year-old Hebard adds with a chuckle.

Arbor Day, April 30, 2005, appropriately marked a giant step toward the realization of Hebard's aim. Stating that the occasion marked "the beginning of the greatest environmental achievement of this century," Marshal Case, president of The American Chestnut Foundation joined President George W. Bush in the planting of a 16-foot, seven-year-old Meadowview-grown chestnut on the North Lawn of the White House.

Today's generation of students who might otherwise think of chestnut as merely the color of a horse, is being awakened to what has been, and what within their lifetime might again be.

A unique classroom curriculum has been

incorporated into 18 Carroll County, Md. schools, an innovation of Essie Burnworth, president of the Maryland chapter of TACF. With the enthusiastic partnership of county science supervisor, Brad Yohe, himself a chestnut grower, the education of grades seven through 12 has embraced chestnut science in a multi-disciplinary approach involving life science, bio-forestry, plant genetics, ecology, and economics. Using facilities of nearby Sugarloaf Mountain as a living laboratory, the students are involved in the nuts (pun intended) and bolts of planting, transplanting, pollinating and record-keeping as they learn about the keystone forest tree that disappeared with their great-great-grandparents.

The Carroll County high school students have the additional advantage of a mobile lab, staffed by scientists from the Biotechnology Institute of the University of Maryland, which allows them to do sophisticated experiments such as sampling blight cankers and delving into the genes that determine the nut's biodiversity.

The students' overwhelming interest in participating in real-life science prompted teacher Robert Foor-Hogue to observe, "It's in high school where you make Ph.D.s."

The flux that affected the human condition in the early 20th century as a result of the chestnut's death – a major cash crop lost – was echoed on the forest floor. There, nature joined its storied battle against the vacuum, populating the vast vacancies with opportunistic oaks, hemlocks and others. Given the present arboreal dilemmas, where might "home" be for the returning American chestnut in the 21st century?

Within the body that is dedicated to introducing a blight-resistant chestnut into the American forest, two new phrases, "restoration ecology" and "carbon sequestration," are emerging.

The former is defined as the process of assisting in the recovery of an ecosystem that has been degraded, damaged or destroyed. Unlike physical sites like over-logged watersheds and strip-mined lands that cry out for massive rehabilitation, the reclamation of the stricken American chestnut affords its field-soldiers a more doable goal with fewer obstacles. In a win-win scenario, planting the rapid-growing chestnut in blighted areas is one obvious solution for land improvement.

Carbon sequestration refers to capturing the carbon dioxide emissions that have resulted from the use of fossil fuels, thereby reducing atmospheric greenhouse gasses. The means of achieving this is right up the alley of chestnut restorers. It involves planting the lush trees in areas where their photosynthesis can contribute to the requisite cleansing action, thereby involving the degraded land in a reforestation-for-carbon-sequestration solution.

For hunting clubs, conservationists and others managing land for game, restoring the chestnut to the land promises to be a boon, according to Dr. Greg Miller, an Ohio orchardist and plant scientist. "It would be hard to find anything wildlife likes better than chestnuts," he says.

Perhaps the most promising of all chestnut progress is occurring in the mountains of Tennessee.

Since 1991, Tennessee's Cherokee National Forest has been a living laboratory for the first American chestnut restoration project on public land. By 1997, 600 seedlings were growing in the forest's Nolichucky District through the inspiration and guidance of Denise Ashworth, a retired U. S. Forest Service landscape architect. Approaching her 88th birthday, Ashworth is pursuing a Ph.D. at the University of Tennessee.

Thanks to the help of volunteers gleaned from newspaper ads, the Greenville Hiking Club and, most recently, ecology-minded local high school students, the tree count now exceeds 1,100.

Annual surveys reveal that the majority of the trees are still growing with no evidence of blight in spite of drought, animal damage and a recent fire that swept through the Camp Creek area. Trees older than five years are producing chestnuts.

"I'm hoping the squirrels will help by broadcasting the seeds even further," says Ashworth.

No longer are the seedlings here cosseted by the tubular tree guards recommended by The American Chestnut Foundation.

"They called attention to the chestnuts,"

Ashworth explains. "People dug them up, realizing they were something special."

With endangered and dying hemlocks currently furnishing much of the local understory and predominating in ravines and campgrounds, the focus on chestnut trees reclaiming their rightful place is intensified, she adds.

Eleven hundred trees in a national forest may not seem like much progress against a century of tragedy. At the time the chestnut blight arrived to alter the American landscape, our flag had 45 stars, only 14 percent of our homes had bathtubs and a man could expect to live out his life in 47 years.

The times have been changin' all along – may the next century's changes bring King Chestnut back to its rightful place in our forests.



An "Arboreal Matchmaker." Blossoms on a tree near Asheville, N.C. are bagged to help in pollen hybridization. photo courtesy the american chestnut foundation

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In a Nutshell – Chestnut Trivia

- One of the earliest tree crops to be domesticated, the chestnut was mentioned in Chinese poetry more than 5,000 years ago.
- 500-year-old grafted chestnuts still exist in China.
- Conditions favorable to peach cultivation also favor chestnut growth.
- The chestnut grows 25 to 50 percent faster than the oak.
- Currently, the largest living American chestnut, at 80 feet, is in W. Salem, Wisc., among a 50-acre stand of 5,000 chestnuts. Sadly, it is beginning to show signs of blight.
- The chestnut bears marketable nuts in seven years.
- The largest recorded American chestnut was 17 feet in diameter (height unknown), in Haywood County, N.C.
- U.S. chestnut production is less than one percent of worldwide output, as of 2004.

–GSC