THE
# Journal
OF THE AMERICAN CHESTNUT FOUNDATION

SEPTEMBER/OCTOBER 2011 | ISSUE 5 VOL. 25

## *PHYTOPHTHORA*: THE STEALTHY KILLER PART II

## PROTECT YOUR CHESTNUT SEEDLINGS: KEEPING HUNGRY WILDLIFE AT BAY

# Now You Can Grow Your Own American Chestnuts and Help The American Chestnut Foundation at the Same Time!

Join Our Annual Sponsor Program and We Will Ship You Our Latest Restoration Chestnut Seeds

Imagine planting these fast-growing, beautiful, potentially blight-resistant chestnuts on your property. Still quite rare, these Restoration Chestnuts are the product of 28 years of scientific research and testing.

Even better, every penny of your donation helps fund research and programs to restore the American Chestnut to our eastern forests.

Chestnut Annual Sponsors ($300) receive two seeds,
Bronze Annual Sponsors ($500) receive three seeds and
Silver Leaf Annual Sponsors ($1,000) receive four seeds.

## Become part of our science team!

These seeds are intended for testing and evaluation. Your feedback on seedling performance is critical to helping our scientists improve resistance to pathogens and pests, increase genetic diversity, and optimize forest competitiveness in the future. Participants will be required to sign a germplasm agreement limiting seed distribution. TACF does not guarantee the trees to be immune to blight or disease.

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**Deadline to Order is Feb 01, 2012 - Seeds will Ship in March, 2012**

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Or mail your check (payable to TACF) to:
160 Zillicoa Street, Suite D, Asheville, NC 28801

# THE AMERICAN CHESTNUT FOUNDATION®

## The Mission of The American Chestnut Foundation

The mission of THE AMERICAN CHESTNUT FOUNDATION is to restore the American chestnut tree to its native range within the woodlands of the eastern United States, using a scientific research and breeding program developed by its founders. The American Chestnut Foundation is restoring a species - and in the process, creating a template for restoration of other tree and plant species.

We harvested our first potentially blight-resistant nuts in 2005, and the Foundation is beginning reforestation trials with potentially blight-resistant American-type trees. The return of the American chestnut to its former range in the Appalachian hardwood forest ecosystem is a major restoration project that requires a multi-faceted effort involving 6,000 members and volunteers, research, sustained funding and most important, a sense of the past and a hope for the future.

## About Our Cover Photo:

TACF Chief Scientist Fred Hebard holds a handful of this year's crop of Restoration Chestnuts at Meadowview Farms in Virginia. Photo by Paul Franklin


### TACF National Office

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THE Journal OF THE AMERICAN CHESTNUT FOUNDATION

# INSIDE THIS ISSUE

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# The Fall Harvest is More Than Seeds!

Glenn Rea, TACF chairman of the board

TACF Chairman
Glen Rea

I love fall. Here in Maine, fall quickly transitions from cool days and glorious, colored forests to a long, cold winter. To many, the start of college football gets us thinking about the coming of fall. For me, however, the annual chestnut harvest is what signifies the start of the fall season. I always enjoy harvesting chestnuts. To me they represent both the promise of the future and the fruits of labor from the collective energy and commitment of many volunteers here at The American Chestnut Foundation.

For TACF, the fall season represents another type of harvest - our annual harvest campaign. All of TACF's board members believe raising funds for TACF is an important board member role, and on behalf of the board, I ask for your support during this year's harvest campaign.

Thanks to you, the 2010/2011 fiscal year was one of the best fundraising years ever for TACF. The economic climate over the last several years has been dire. Many fine non-profits have either gone into hibernation or completely gone out of existence. Yet thanks to your support, TACF has grown in spite of challenging economic times.

This support allowed TACF to accomplish many key objectives this year: we funded the necessary scientific equipment for the Glen C. Price research lab, we provided over $65,000 toward our external grants program to fund critical research on the chestnut, and we were able to provide significant financial support to help our state chapters. All this is possible thanks to the support of our volunteers and partners.

Later this fall, you will receive TACF's annual harvest campaign appeal. This campaign is absolutely critical to help the organization further its mission. Last October, TACF launched our new Restoration Campaign. This three-year campaign, known as the One-Million-and-Seven campaign, will allow TACF to test and evaluate one million of our potentially blight-resistant trees during the next seven years. Based on TACF's ten-year plan, this campaign will also provide critical support to many aspects of our science programs, from state chapter support, to investments in our external grants program, to scientific support for our chapters and the Meadowview Research Farms.

Contributing to our annual fall campaign is just one way you can support our efforts. TACF offers many possible avenues to fulfill your philanthropic goals, including planned giving, sponsorship of our Legacy Tree orchard, and opportunities to support our Life and Annual sponsorship programs. I hope you will call our Asheville office to learn more, or check out our website at www.acf.org. We need everyone's support….from the $5 donor to the million-dollar donor. Everyone can play a role.

Our mission to restore the American chestnut is something most thought impossible. We will get there, but we have a long way to go. Even though we are now testing our first line of potentially blight-resistant trees, this move really represents the beginning of a long journey. Together we can make this historic restoration, which once began as a vision, a reality.

# News From TACF

## *Field & Stream* Magazine Honors Maryland Volunteer Ron Kuipers

*Field & Stream* magazine, a leading voice of the outdoors and conservation, recently selected TACF volunteer Ron Kuipers as one of six 2011 "Heroes of Conservation." Ron was chosen for "his work to bring the once dominant American chestnut tree back to the forests of Maryland and the eastern US." Ron is the orchard manager for the Maryland Chapter, responsible for the state's 15 orchards and over 6,000 chestnut trees." Retired from the National Security Agency, Ron spends thousands of hours of volunteer time planting trees, measuring their growth, collecting pollen, harvesting nuts and caring for the orchards.

Boasting a circulation of over nine million readers, *Field & Stream* magazine's "Heroes of Conservation" program began in 2006. The six Heroes chosen for 2011 have each been awarded a $5,000 cash prize from program co-sponsor Toyota, and in October, 2011, one will be chosen as *Field & Stream's* "Conservation Hero of the Year." The finalist will win a new Toyota Tundra truck.

A *Field & Stream* video featuring Ron Kuipers and *Field & Stream* editor-at-large Eddie Nickens is available at http://www.acf.org/video.php

## Innovative Project Brings American Chestnuts Back to Old Mine Lands

The American Chestnut Foundation (TACF) has recently received a Conservation Innovation Grant (CIG) that will fund a new initiative to restore the American chestnut tree to sites previously mined for coal. This project, in partnership with the Natural Resources Conservation Service (NRCS) will open a new chapter for forestry and wildlife conservation in the Appalachian coal region.

Over the next three years, project cooperators will reforest 12 sites using high-quality native hardwood species that include potentially blight-resistant chestnut trees recently developed by TACF. In addition to the NRCS, The American Chestnut Foundation will work with the Appalachian Regional Reforestation Initiative (ARRI) to locate old mine lands owned by private landowners in Pennsylvania, Ohio, West Virginia, Virginia and Kentucky.

"This $1.1 million project is poised to make a big difference in the eastern US coal region," says Dr. Patrick Angel with the US Office of Surface Mining Reclamation and Enforcement and a major driving force in ARRI. "The ARRI science team along with TACF scientists have invested many decades of research to develop innovative techniques to return the mine sites back to diverse, healthy, productive forests."

A chestnut growing on an ARRI reclaimed mine site

## Mila Kirkland Joins TACF's Communications Department

TACF is proud to announce the promotion of Mila Kirkland to the position of Communications Specialist. Mila graduated from Erskine College with a BS in Biology in 2006 and has held numerous positions with TACF since returning from the Peace Corps in March of 2009. She began working for TACF as a farm hand at the Meadowview Research Farms and later became a Meadowview research technician. She also participated in the formation of the Southwest Virginia Restoration Branch. After moving to Asheville, NC, Mila has been working part time as an administrative assistant with the National Office. Her new position will have her working to share her extensive knowledge of chestnuts and TACF with the public and media. "Mila's enthusiasm and knowledge of chestnuts is impressive," says TACF President and CEO Bryan Burhans. "And her ability to communicate with people from all walks of life is going to make her an invaluable asset to our Communications Department."

Mila Kirkland has been promoted to Communications Specialist at TACF's National Office. Photo by Paul Franklin

## Phytophthora Claims TACF Seedlings

Meadowview has been producing increasing numbers of B3-F3, "Restoration Chestnuts" over the past 6 years, which has made it an exciting time. Our plantings in the forest are mostly done with 1-year-old seedlings grown in nurseries. We chose to grow these seedlings at the Virginia Department of Forestry's Augusta County Forestry Center in part to avoid infestations of *Phytophthora cinnamomi* that can plague forest nurseries located farther south. Unfortunately, this year the fungus appears to have moved north to the Augusta Center. May was wet and cold, ideal weather for damping off of seedlings. Out of more than 10,000 B3-F3 nuts, over 8,500 were killed by damping off (when fresh seedling tissue is killed by fungi). Damping off can be incited by numerous pathogens, but *P. cinnamomi* was isolated from one of the afflicted seedlings by Mary Ann Hansen of Virginia Tech's Plant Disease Clinic. The disease organism can spread on infected or infested seedlings from the nursery to the forest, which would be very undesirable and irresponsible since *P. cinnamomi* can affect numerous species of plants. So we will be unable to use the few remaining seedlings from the afflicted area for forest plantings. This has been a rather stunning setback for all of us, but we'll bounce back next year. (See this month's feature article on *Phytophthora* on page 16).

Submitted by TACF Chief Scientist Fred Hebard

# In Memory of and In Honor of our TACF Members

### In Memory of

**Irvin H. Doyle**
*Rebecca Doyle*
*Hoosier National Forest*
*Angie Krieger*
*Dave and Teena Ligman*
*Bruce and Kelley Whittredge*

**George A. Graham**
*Knox Family Foundation*

**Karl Pfister**
*Margaret and John Pennypacker*

**Scott Stickley**
*Raymond and Margaret Feierabend*

**Donald Riker**
*Bette Bauer*
*Bob and Carla Cohen*
*Beth and Dale Howell*
*John and Marilyn Palmer*

**Victor S. Larsen**
*Laura Ferrera*

### In Honor of

**In Honor of:**

**Rufin Van Bossuyt**
*Orleans Conservation Trust*

**In Celebration of Glenn Thompson's Birthday**
*Linda Thompson*
*Elena Sheina*
*Tracy Shearer*
*Albert and Barbara Zadroga*

TACF President and CEO Bryan Burhans

# Restoration Plan: One Year Later

by Bryan Burhans, CEO

Last October, The American Chestnut Foundation launched a comprehensive planning process called the Restoration Plan. The sheer magnitude of this plan is daunting, to say the least. TACF's scientists, volunteers, and partners have worked as a team to develop a long range plan clearly defining how the organization will move forward to achieve its mission of restoring the American chestnut.

Chaired by Rex Mann, the planning process provided a platform for volunteers, scientists, and partners to contribute their expertise in developing the Restoration Plan. We kicked off our planning process with four regional planning workshops in Pennsylvania, Virginia, New Hampshire, and Tennessee during early spring of 2011. These regional workshops provided the opportunity for volunteers and partners to provide valuable input into the development of the plan. This bottom-up approach ensures we capture the vast talents and expertise available to the organization as we create a workable and functional plan.

In addition to the regional workshops, TACF hosted four technical workshops addressing the critical portions of the plan: 1) breeding and testing, 2) reintroduction and testing, 3) a business plan, and 4) resistance to ink disease. These workshops involved specialists with specific background and training to lend their expertise in helping TACF address the technical aspects of our program.

## Specifically, the technical workshops addressed:

**Breeding and testing** – Chaired by TACF Science Cabinet Chair Dr. Kim Steiner, this workshop collected input from participating scientists on the organization's future breeding efforts and examined how we will test and evaluate the effectiveness of our breeding program.

**Ecology and reintroduction of the American chestnut** – Chaired by TACF Science Cabinet member Dr. Brian McCarthy, this workshop outlined strategies to successfully reintroduce the chestnut, and indentified the key ecological issues to evaluate. Borrowing from the scientific disciplines of ecology, silviculture, forestry, and wildlife management, TACF is defining a plan detailing how our scientists, volunteers and partners will begin the reintroduction of the chestnut to our forests and manage the subsequent ecological implications of this project.

**Business plan/development** – This workshop, chaired by TACF board member Michael Doochin, gathered key information to help the organization develop a business plan to support our science programs. Not only must the business plan provide the needed framework for gathering financial resources, it needs to address issues such as ownership of germplasm, future staffing needs, and additional infrastructure needed for our state chapters and our Meadowview Research Farms.

**Resistance to ink disease** – The southern range of the chestnut is challenged by another lethal pathogen, called *Phytophthora*. Hosted by Regional Science Coordinator William White, a team of scientists and volunteers examined strategies to breed for resistance to ink disease, which this summer claimed most of TACF's bare-root seedlings planted in northern Virginia.

**We've posted notes from most of the workshops on TACF's website (www.acf.org), and invite written comments**. You can find information on the website listed under "Regional Restoration Workshops."

TACF is now in the process of reviewing comments on the information gathered from the various workshops, and is in the initial phases of actually writing the plan. The development of TACF's restoration plan is a critical next step for the organization. With this plan in hand, TACF can move forward to achieve the impossible: restore the American chestnut.

Connecticut's Jack Ostroff and TACF New England Regional Science Coordinator Kendra Gurney enjoy the shade of a large Japanese chestnut near Jack's home in Old Lyme, CT. Photo courtesy of Sarah Fitzsimmons

# TACF Honors Its Volunteers

by Daniel Hale

**Member Profile: Jack Ostroff**
**Connecticut Chapter Board of Directors, TACF Tree Database**

When asked about his volunteer role with TACF, Jack Ostroff will tell you right off that he's "difficult to classify." But others don't necessarily share this view. TACF New England Regional Science Coordinator Kendra Gurney is quick to say, "He's easy to classify - he's awesome! Jack is a tireless and gifted volunteer and his dedication to the development of our Trees Database has been invaluable - on top of that, he's fun to hang out with!"

An M.D. with a background in pharmaceuticals and computer science, Jack took early retirement from a career at Pfizer. Ten years ago, he happened upon a TACF booth at a local agricultural fair in Connecticut, joined, and enjoyed the magazines that came in the mail. Two years later, he received a personal phone call from the Connecticut Chapter president, urging him to attend the Chapter's annual meeting. Since then, Jack began volunteering at orchard work parties and attending chapter meetings. As he became more involved with the chapter's field work, he would stay after chapter meetings to listen to board meetings. Four years ago, the board invited him to become a board member himself.

In addition to his service with the Connecticut Chapter, Jack now applies his computer science background to the TACF's database project, which will soon upload and store the organization's tree data to a centralized online database.

Beyond his work with TACF, Jack volunteers his computer expertise for the AARP Tax-Aide program, which provides free tax counseling for seniors. He and his wife train three Shelties for dog agility competitions, are skilled home chefs, and have a soft spot for bad movies.

**Member Profile: Eric Evans**
**Maine Chapter Vice-President and Breeding Coordinator, TACF Science Cabinet Member**

Eric Evans first learned about American chestnut at age 15 when he walked through the skeleton of a chestnut grove in the Blue Ridge Mountains. The evidence of massive species destruction made a lasting impression.

In 1995, Eric discovered and joined TACF. Three years later, Eric and forester Welles Thurber co-founded the Maine Chapter of TACF (the country's fifth state chapter). Since the chapter's formation, Eric has helped to establish ten orchards throughout Maine. Three of these have now been inoculated with blight (the first step in the selection process), and the first intercross generation of seeds is now being collected from the state's first breeding orchard in Camden. Aside from his duties as chapter vice-president, Eric focuses on the science and breeding of chestnuts as the Maine chapter's breeding coordinator and TACF Science Cabinet member.

When not consumed with chestnut work, he is busy working in a fifteen-member community garden started on his property. He also started a small fruit and nut orchard, which includes Chinese and American chestnuts he will eventually harvest for food. Lately he's taken an interest in swimming and snorkeling, discovering a "whole other world" below the surface. Eric is semi-retired, working part-time as an energy auditor.

Maine Chapter Vice-President Eric Evans prepares a chestnut trunk for blight inoculation. Photo courtesy of Sarah Fitzsimmons

# Protecting Chestnut Seedlings Outdoors

by Dan Stiles

A hungry whitetail deer eyes the chestnut trees on the author's West Virginia farm

Above right: A screen made from 1/4" hardware cloth is the first line of defense for the seedling. The screening is pushed 4" into the soil to protect from burrowing mice and voles.

When you read about the many fine qualities of American chestnut trees, there is always a mention of how dependable they are as a source of food for all kinds of wildlife. In fact, one of the greatest challenges would-be chestnut growers face is keeping a veritable army of wildlife and pests from turning beloved chestnut seedlings into an afternoon snack.

After planting several hundred red and white oak seedlings and hundreds of acorns on my remote farm in Morgan County, West Virginia, I decided to try growing American chestnuts. But in our area we have an abundance of marauding woodchucks, squirrels, rabbits, chipmunks, crows, and song birds, as well as burrowing mice, moles, and meadow voles. And that says nothing of our plentiful white-tail deer. A single deer can consume over a ton of browse every year. I knew I would need to plan ahead to protect my chestnut seedlings.

**Getting the Seedlings Started**

On March 22, 2010 I planted five Restoration Chestnuts an inch deep within five half-gallon orange juice cartons filled with a mixture of peat moss, perlite, and vermiculite (1/3rd each). On April 6, three cotyledons surfaced. The next day number four appeared, and a day later the last one broke through into the sunlight (15, 16, and 17 days after planting.

In early April 2010 I dug five holes about forty-feet apart in an open field of soil classified as Monongahela silt loam. Each hole was thirty-inches deep and twenty inches in diameter, and I filled each with a mixture of pine bark mulch, peat moss, potting soil, vermiculite, perlite, and some of the original, rich top soil.

**Planting With Protection in Mind**

I surrounded each seedling with a tubular wire "cage" made of 1/4 inch galvanized hardware cloth, positioned 16 inches above the ground and four inches below the surface (for mole/mice root protection). This cage was approximately eight inches in diameter. I then made five additional cages of heavy concrete reinforcing wire (6" x 6") that were five feet tall and 24 inches in diameter.

My hope was that the 1/4 inch metal cages would protect the seedlings from smaller animals while the heavy wire cages protected the

> In our area we have an abundance of marauding woodchucks, squirrels, rabbits, chipmunks, crows, and song birds, as well as burrowing mice, moles, and meadow voles. And that says nothing of our plentiful white-tail deer.

seedlings from the numerous white-tailed deer on our property. To reinforce the structure, I drove three 3/4 inch PVC pipes, each five feet long, 18 inches into the ground around each seedling and secured the heavy wire cage to them. Finally, I wrapped several strips of fluorescent tape around the cages to be sure everyone was aware of their location.

**Care and Feeding**

Throughout the spring and extraordinarily dry summer, I regularly watered the seedlings and mixed in Miracle Grow® fertilizer at the rate of one tablespoon per gallon. I also sprayed the seedling leaves about once every two weeks with the insecticide Sevin®, following the label's recommendations. Oak seedlings grow in three or four short bursts, or "flushes," throughout the spring and summer. These American chestnut seedlings, however, appear to grow continuously - a little every day.

**Adding More Protection**

On July 12, a cottontail rabbit somehow managed to get its head through an opening in the exterior wire cage to severely damage one seedling in the night. It neatly clipped the seedling's terminal off at the height of the inner galvanized cylinder, reducing this vigorously-growing seedling to the height of the cylinder - 16 inches. It was not a fatal injury, but a major setback. To prevent this from happening again, I added a layer of fine screen to the outside of the outer wire fence.

Properly planted and cared for, American chestnuts grow at an astonishing rate. At the end of their first growing season, counting from number one to five, they measured 27, 31, 22, 22, and 16 inches tall apiece. All survived the winter unscathed. By mid May, my best seedling was about 46 inches tall. By mid June it was 60 inches tall, so I needed to surround the exterior cages with additional deer-proof galvanized wire fencing up to the six-foot level.

In early August 2011, two of my 15-month-old American Restoration Chestnut seedlings were over seven feet tall! This makes these the fastest growing trees I have ever had the pleasure to raise. And a pleasure it is. Like an anxious parent checking for any signs of trouble, I've worn a path pacing back and forth between my five seedlings. But it is rewarding to contemplate what these trees will look like ten years from now, when I have successfully gotten them past the threat of being a snack for the local deer.

*A member of TACF since 1992, Dan Stiles is a retired forester and wildlife manager who worked for the U.S. Fish and Wildlife Service for 37 years. In addition to growing chestnuts on his West Virginia farm, he is an active beekeeper.*

All photos: Dan Stiles

# Who Will Remember the Chestnut?

by Bryan Burhans

Few people today can remember firsthand the joy of gathering chestnuts or walking through a chestnut grove.

One of the great joys of working with The American Chestnut Foundation is the people I meet and stories that I get to hear. The best stories come from those special people who can recall, first hand, when chestnuts flourished in the forest. These special individuals developed a deep love for the chestnut and remember what an important role this tree played in everyday life.

One of these special people is Ed Hutchison. At 88, Ed remembers clearly the chestnut tree of his youth.

"When I was a teenage boy I started to pay attention to the chestnut's dying off," said Ed. "I really didn't realize what was taking place."

Ed's memories of the chestnut are very similar to other stories I have listened to. The chestnut was both very common in the forest, and collecting nuts during the fall was a common ritual. "We really didn't talk about the chestnut very much. The chestnut was always there and we never thought it would not be a part of our lives," remarked Ed. "I can recall picking up chestnuts with my father on the Black Moshannon State Park in Pennsylvania during the 1930s. Collecting nuts was a typical Sunday outing and we would literally collect gallons of chestnuts. We would roast and eat the nuts, they were a real treat." Unfortunately, the chestnut's days were numbered. The chestnut blight decimated the standing American chestnuts.

Ed recalls some early efforts to try and save the chestnut. "I worked with a man named Mr. Oliver who worked on the Monongahela National Forest near Elkins, WV. We tried everything we could to save the chestnut," said Ed. The two men would search the forest looking for any surviving chestnuts, hoping they would discover a tree that could withstand the chestnut blight. When they did find a tree that was still surviving, the two would take scions off the tree and place the scion on Chinese chestnut stock; it didn't work.

D-Day veteran and outdoorsman Ed Hutchison loved gathering chestnuts as a youth. Ed's nephew, Steve Antoline, recently sponsored a legacy tree in Ed's name.

Ed not only witnessed the loss of the American chestnut, he participated in an epic chapter in our nation's history. On June 6, 1944, Ed was part of the legendary D-Day assault that landed and fought on the beaches of Normandy, France. From the time he hit the beach, he and his comrades fought for 72 hours straight before they could catch their breath. This battle came at a high price in human lives, but it ultimately led to Nazi Germany's defeat. We can only imagine what Ed experienced, serving his country on this beach and the many battles that followed. This guy was tough. Ed needed to be tough more than half a century later, when his son Mark Hutchison was one of ten soldiers killed in an explosion on the USS Iwo Jima during Desert Storm. Mark made the ultimate sacrifice to ensure our country's freedom, but it was Ed who had to carry the memory of loss

I got to know Ed through his nephew, Steve Antoline. It was quite obvious Ed was a very important part of Steve's life, and Steve had graciously decided to sponsor one of The American Chestnut

# With Your Gift, We Can Plant the **Future.**

THE AMERICAN CHESTNUT FOUNDATION®

**TACF is on the Brink of Our Long Held Dream – Actual Reintroduction of the American Chestnut to the Forest**

This year, our Harvest Appeal will drive the first steps of "One Million and Seven," an ambitious program to plant one million Restoration Chestnuts in our eastern forests over the next seven years.

Stop for just a moment and imagine children you know today being able to walk among wilderness stands of mature chestnuts in their lifetime.

**Your Generous Contribution Can Make This Possible.**

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**Three easy ways to give:**

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**Phone: (828) 281-0047**

**By Mail: Send Check Payable to The American Chestnut Foundation**
**160 Zillicoa Road, Asheville NC 28801**

Legacy Trees are our most advanced tree, and are the source of "Restoration Chestnuts". By sponsoring a Legacy Tree, you help support the restoration of the American chestnut in our forests. If you would like to sponsor a Legacy Tree in your name, or for a spouse, family member or friend, just call our office at (828) 281-0047.

Foundation's Legacy Trees at our research farms in Meadowview, VA to honor his uncle Ed. This tree will eventually be part of an orchard of 200 of TACF's most blight-resistant trees - the trees that produce the Restoration Chestnuts that will help bring the American chestnut back to the eastern forests. The funding derived from these sponsorships is used to help TACF continue and expand our science programs.

"My uncle loved the chestnut," Steve told me several days later, "he has talked about the chestnut his entire life. This Legacy Tree is very special to him." Steve decided to surprise Ed with a photo of the plaque with Ed's name engraved on it around the Christmas holiday. This plaque is displayed in front of Ed's tree at Meadowview. Steve handed Ed the photo and the book and explained that there was now a very special chestnut tree growing at Meadowview Farms, dedicated in his honor, and that the seeds from that tree would one day give rise to hundreds, and perhaps thousands, of new chestnut trees, growing in the mountain forests that Ed loved. Steve related how the room grew quiet and the eyes of this tough old man who had seen so much of life misted over as he imagined a future day when his beloved chestnuts would grow again as they had when he was young.

Steve's story moved me, and so when he called again the other day, the conversation quickly turned to an update on his uncle.

"Uncle Ed told me several months ago that he dreamed about visiting one of our favorite fly fishing spots of my youth where he had taught me to fly fish," Steve said. "The location was in a remote wilderness. At his age, Ed is not quite as spry as he once was, and we weren't sure how we would get him back to his favorite remote camping spot. Although he insisted on walking a portion of the trip, a group of 14 of his hunting and fishing buddies, including his son and grandsons, organized a trip with a local outfitter to take him by horse and buggy back to his favorite fishing spot"

"Something very special happened after we set up camp and settled in," said Steve. "We were all sitting around camp talking when my uncle pulled from his pack something neatly wrapped in a white plastic bag. Carefully opening the bag, he pulled out his *Mighty Giants* book and started telling the story of the American chestnut with everyone in camp. It made the day very special."

Steve's story of his uncle Ed's powerful memories of chestnut trees made me realize that those of us born after the demise of the American chestnut probably will never fully understand the true loss our country experienced. We are so fortunate to have with us those individuals who can still tell the story of the chestnut in first person. Those fortunate few, like Ed, have experienced firsthand the gifts that chestnuts brought to people and the environment, and they lived through the tragic loss of these magnificent trees. They now can share in the joy of knowing that we are working to return the chestnut to our forests.

These are very special people.

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The Journal is searching for the stories of those who knew the American Chestnut firsthand. if you or a family member or a friend have personal stories of the American chestnut and what it meant to you, just write it up and send it to our editor: Paul Franklin TACF, 160 Zillicoa Street, Asheville, NC 28787 email: pfranklin@acf.org

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# Chestnut anthology makes a great gift for nature enthusiasts everywhere

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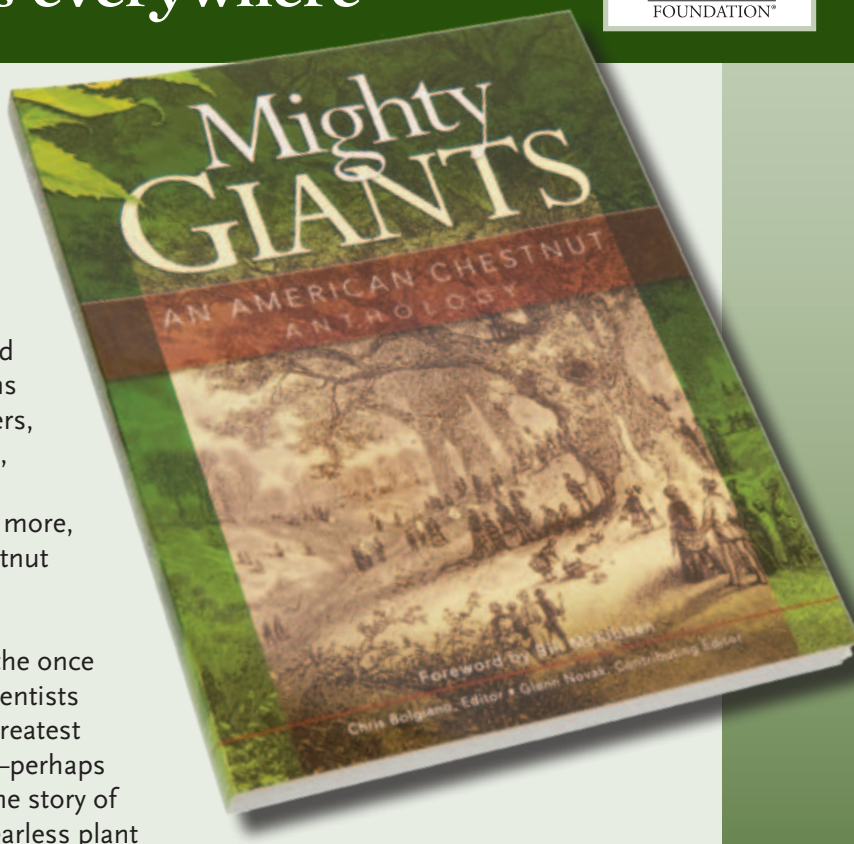


**The perfect gift for the nature enthusiast in your life.** *Mighty Giants: An American Chestnut Anthology* is the inspiring story of an American symbol and the struggle to save it from the brink of extinction, the saga of a unique and exceptional tree that supported a way of life, that fed and sheltered our ancestors, and "touched almost every phase of our existence." From Indians and early explorers, to colonists, naturalists, loggers, industrialists, and beyond, from presidents, poets, and artists, including Jefferson, Lincoln, Carter, Thoreau, Frost, Homer, Andrew Wyeth, and many more, the story of our once mighty, towering native chestnut tree is a lesson for our times.

The book tells, in images and words, the story of the once mighty monarch of the eastern forests and the scientists who engaged in the struggle against "one of the greatest natural disasters in the history of forest biology"—perhaps the deadliest plant blight ever encountered. It is the story of the dedicated few who refused who give up: the fearless plant explorer who tracked down the blight in war-torn China, the plant pathologists and geneticists who labored long and valiantly to understand the blight and find a way to thwart it. It is also a story of hope, of small but vital triumphs, as the secrets of the American chestnut and its deadly nemesis are gradually revealed.

Notable contributors to the book include former President Jimmy Carter, author Barbara Kingsolver, Nobel Peace Prize laureate Norman Borlaug and Bill McKibben, author of "The End of Nature." The 296-page full color book is available in hardback for $50 and paperback for $25.

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Top: A healthy chestnut seedling at Joe James' farm prior to being inoculated with *P. cinnamomi* Photo by the author

Bottom: A seedling after being inoculated with *P. cinnamomi*. The resulting disease, Phytophthora root rot has destroyed the plant's root system, and with it the plant's ability to acquire water and nutrients from the soil, resulting in the death of the crown shown here. Photo by the author

# *Phytophthora*: the Stealthy Killer Part 2

## The Challenge to Develop a *Phytophthora*-Resistant Chestnut

by Dr. Joe James

*In our last issue we introduced Phytophthora root rot as a disease presenting a challenge to restoring American chestnut in its southern range. In this article we asked Joe James to describe the* Phytophthora *research that has taken place at his farm,* Chestnut Return *and elsewhere.-Ed.*

I have often said that one of the most fortunate things that happened to me at my farm, *Chestnut Return*, is that so many of my first chestnut trees died so quickly. I had planted a wide variety of hybrids and nuts from open pollinated sources. Because they were hybrids, I expected a fairly high level of blight resistance. But one after another, (and sometimes in bunches) my chestnut seedlings wilted and died. The fact that so many trees died so quickly caused me to start investigating the cause.

### Coming to Grips With *Phytophthora*

After digging up one of the seedlings, I found the roots to be black and necrotic. I contacted a friend of mine, Dr. Pat Layton, the chair of the Forest Resources Department at Clemson University. She came out and looked at the trees and said, "You know, Joe, it looks like *Phytophthora* to me."

I had never heard the word *Phytophthora* (full name *Phytophthora cinnamomi,* or *P. cinnamomi* for short) and had to have her spell it for me. I quickly became fascinated with this disease whose effects on chestnuts (and so many other valuable trees and crops) was so devastating, and I began reading all the scientific and technical writings I could find on the subject.

*Phytophthora cinnamomi* arrived in this country from Southeast Asia around 1780, and it has spread throughout much of the southeast range of the American chestnut. Its advance has been stopped only by the extreme cold of the northern range or the higher altitudes in the southern Appalachians (See *Journal* July/August 2011). As is the case with chestnut blight, Asian chestnut trees are largely resistant to Phytophthora root rot (Prr), whereas it has been uniformly fatal to American chestnuts and chinkapins in tests so far.

Dr. Layton soon introduced me to Dr. Steve Jeffers, Plant Pathologist at Clemson University and a world-renowned expert on diseases of ornamentals and agricultural crops incited by various species of *Phytophthora*. He agreed to collaborate with me on research into Phytophthora root rot of chestnut. One of the first concrete steps occurred when Dr. Jeffers cultured the roots of my dying and dead trees and isolated *P. cinnamomi*. Today, we still use that same strain of the fungus to screen seedlings for disease resistance at *Chestnut Return*.

### All in the Families

The research began with a single, simple question: **Since the Chinese chestnut had a significant level of resistance to Prr, was it possible that some of that resistance could be found in the hybrid backcross chestnuts being developed at Meadowview?** In the early days, this idea was experimental and Meadowview could not expend any of their more valuable advanced backcrosses for us to test. This turned out to be a lucky break, since the open-pollinated B2F2s they could spare had a higher percentage of Chinese parentage that insured the survival of more plants in our first test. And at this early stage what we really wanted was to discover which families might offer some, if any, resistance to Prr.

In 2003, testing began in earnest when we planted 507 seeds from five B2F2 families in tubs, arranged by family. When the seedlings were 80 days old, the soil was inoculated with the pure culture of *P. cinnamomi* grown in Dr. Jeffers' lab at Clemson that was originally isolated from trees at *Chestnut Return*. Unlike blight, which can take quite a while to show results in chestnut, Prr develops quickly and within 60 days most of the seedlings had wilted and died. About 20% of the seedlings tested showed some resistance to the pathogen and about 6% showed almost complete resistance. This was the "eureka" moment – when it became clear that a few backcrossed chestnuts from the Meadowview program carried not only genes for blight resistance, but also genes for Prr resistance.

It was the start of much more extensive testing. In subsequent years, TACF scientists Dr. Paul Sisco and Dr. Fred Hebard pushed for screening of as many families as possible in order to assess the potential of TACF's breeding stock for developing trees with resistance to both blight and Prr. Thus the project grew from 2 tubs in 2004 to 14 tubs in 2011, each tub containing over 160 seedlings. In addition Drs. Sisco and Jeffers have been invaluable record keepers, without whose help this project could never have achieved the success that it has.

To date we have screened over 11,000 seedlings from ~165 hybrid families for resistance to Prr. Over time it became apparent that there were different levels of resistance present, and Dr. Jeffers and I developed a 0-3 resistance category system to reflect how resistant a seedling was:

0= no visible lesions

1= one or two lesions on the root system

2= more than two lesions but seedling is still alive

3= seedling dead

**What we have learned:**
This screening is ongoing, but the primary result has been the creation of a substantial record of resistance by family (see chart).

## RESULTS: HYBRID FAMILIES

| Year Screened | Number of Families | Number of Families With Resistance | Overall Percentage of Survival |
|---|---|---|---|
| 2004 | 5 | 3 | 6% |
| 2005 | 20 | 9 | 10% |
| 2006 | 23 | 5 | 1% |
| 2007 | 41 | 5 | 20% |
| 2008 | 22 | 4 | 25% |
| 2009 | 32 | 8 | 32% |
| 2010 | 54 | 6 | 28% |

In 6 to 8 instances we retested a given family a second time and discovered that the screening tests were highly repeatable, with a variance of less than 10-15% from the mean. This gave us confidence that our resistance data were biologically significant.

Seedling mortality in the initial testing in the tubs ran about 70-75%. Survivors of the tub tests are transferred to pots in an adjacent dirt mound or "berm." In their second year another 12% of the surviving seedlings usually die, and 4% of the remainder die in their third year. Generally, trees that survive three years after being exposed to *P. cinnamomi* have survived long term when outplanted from berm to field.

Chestnut seedling with Phytophthora root rot: roots have been killed and the infection is moving up the trunk. Photo courtesy of Steve Jeffers

**Finding the Genetic Keys**

When we had finished with the first round of screening, I was left with survivors and had no plan for what to do with them. Not wanting to destroy them, I planted the best survivors that year and subsequent years in orchards segregated by generational type, *i.e.*, B1s, B2s, B3s, and B4s. This turned out to be very fortuitous, since rapid advances in genetic analysis such as gene sequencing now offer tremendous advantages if one has lots of material with known ancestry. The surviving orchard trees provide an excellent "germ bank" of screened material from meticulously recorded family lines.

In 2008, upon request of Dr. Paul Sisco, we devoted one tub to a single B1 family for genetic analysis. Results of this small test have already led to the identification of two closely-linked major regions for Prr resistance (see sidebar and Olukolu et al. 2011). This work may lead to molecular tests for resistance to Prr or even to the direct insertion of Chinese genes for resistance into American chestnut trees via genetic engineering. Already, using DNA sequences from these regions, Drs. William Powell, Charles Maynard and Scott Merkle are genetically engineering American chestnut. But tests of much larger populations also were needed to define these two loci more precisely and to search for other genes for Prr resistance.

This past summer, in cooperation with the laboratory of Dr. Albert Abbott, a geneticist at Clemson, and Dr. Dana Nelson, a geneticist with the USDA Forest Service, we collected two leaves from each of over 1,700 trees and carefully labeled each seedling and associated leaf sample. Fifteen hundred of these trees are B4s. In addition, Dr. Fred Hebard at Meadowview bred a larger B1 population than the one from 2008, and we are testing those progeny this year. By comparing which trees live or die to their respective genotypes, the geneticists may be able to infer exactly which genes are responsible for conveying resistance to Prr.

**Inter Crossing The Survivors**

Another major ongoing effort at *Chestnut Return* is the intercrossing of trees that survived the screening process to develop trees that are highly resistant to Prr and (hopefully) to blight as well. Just as is the case with blight, we suspect that resistance to Prr is not completely dominant, so two trees with intermediate resistance must be crossed to develop trees with a high level of resistance, B1F2s, B2F2s, B3F2s, and B4F2s. But regardless of the dominance, F2s homozygous for

## Identifying Genes for Resistance to Phytophthora root rot

By Dr. Paul Sisco

The excellent tub screening technique developed by Drs. James and Jeffers has already resulted in the identification of two closely-linked genes for resistance to Phytophthora root rot in the Chinese chestnut cultivar 'Nanking'. In 2007 I sent pollen from a 'Nanking' F1 tree at Meadowview (GL158) to Mike French, who crossed it on to the large Adair County, KY, American chestnut tree to create a B1 family of seeds. In 2008, Joe James and I devoted one of his tubs to planting these seeds, which were spread out in the center of the tub, with a row of control Chinese and American seed along the border. Leaf tissue was collected from each resulting seedling and labeled. In late summer, after the seedlings had been inoculated and death had occurred, Joe James and Dr. Laura Georgi of Clemson scored 51 seedlings as either "dead," "struggling," or "alive and well." Dr. Tom Kubisiak of the USDA Forest Service isolated DNA from each seedling and did a series of genetic analyses. Along with Dr. Bode Olukolu of Clemson, Dr. Kubisiak identified two closely-linked genes for resistance on one of the chestnut chromosomes. By comparison with a similar region of the peach genome, Dr. Albert Abbott at Clemson was able to identify a known gene for Prr resistance (Olukolu et al. 2011). Dr. William Powell at SUNY-ESF and Dr. Scott Merkle at the University of Georgia are now cloning the gene into American chestnut to see if it confers resistance to Prr. Meanwhile a much larger group of backcross families is being tub-tested this summer to verify the 2008 experiment and more precisely locate genes for Prr resistance.

resistance would be true breeding for it; their progeny could only inherit genes for resistance and so all would possess the trait.

As with the backcross breeding at Meadowview, each backcross cycle lowers the amount of Chinese genetic material by a factor of 50%, including the resistances to both chestnut blight and Prr. At *Chestnut Return*, B2 families inoculated with *P. cinnamomi* have an average 20% survival rate as compared to 5% for B3s and less than 1% for B4s. BUT – cross two surviving B2s and the survival rate of their B2F2 offspring jumps to an amazing 60%. Intercrossing B3s results in B3F2s with a respectable 40% survival rate.

The success of this program led to an obvious question. Could we screen quantities of advanced seeds from the backcross breeding program at Meadowview to find those with high resistance to both Prr and blight?

This spring I started with 500 B3F3 Restoration Chestnut seeds from the Clapper and Graves Legacy seed orchards at TACF's Meadowview Research Farms. One half of those, or 250, were planted in tubs for screening using our proven method,, and the other 250 were planted as seeds directly into the field under irrigation. In the field planting, the 250 nuts were divided into 2 rows, and the germination rate was 83%. One row was inoculated with *P. cinnamomi* and the other was not, relying on natural inoculum that might be present in the field. As of 10/03/11, in the non-inoculated row 80 of 103 sprouts still survive. In the inoculated row 21 of 94 sprouts still survive. The combined tub tests were slightly harder on the seedlings with 20 of 117 surviving - a similar rate of survival to that in the inoculated field row. Trees in the tubs are noticeably smaller than trees in the field. Survivors from this program could yield important answers in the fight against *Phytophthora*.

This year TACF Science Cabinet is developing a long-range plan for the restoration of the American chestnut. Part of that plan will address developing a chestnut that is resistant to both Phytophthora root rot and blight. We have proven that building resistance in chestnut to *P. cinnamomi* is feasible; and with luck and dedication, the possibility of restoring the chestnut to its rightful place in its traditional southern range will become a reality.

Joe James leads a tour of his *Phytophthora* test field plantings on his farm, *Chestnut Return*, in Seneca, SC. Photo by Paul Franklin.

*Joe James is a retired orthopedic surgeon and has recently been named an adjunct professor of Forestry at Clemson University. He is a past President of TACF's Carolinas Chapter and presently sits on TACF's science cabinet. Joe has been actively involved with chestnut trees since 1983 and in 2003 he began developing a* Phytophthora *screening program for hybrid chestnuts and chinquapins.*

Jeffers, S.N., James, J.B. and P.H. Sisco. 2009. Screening for resistance to *Phytophthora cinnamomi* in hybrid seedlings of American chestnut. pp. 188-194 In: E.M. Goheen and S.J. Frankel, eds. Phytophthoras in Forests and Natural Ecosystems. Proceedings of the Fourth Meeting of the International Union of Forest Research Organizations (IUFRO) Working Party S07.02.09. August 26-31, 2007. Monterey, CA.

Jeffers, S. 2011. Resistance to *Phytophthora cinnamomi* among seedlings from backcross families of hybrid American chestnut. Fourth International Workshop on the Genetics of Host-Parasite Interactions in Forestry, Eugene, OR. July 31 – August 5, 2011. http://ucanr.org/sites/tree_resistance_2011conference/Home/

Olukolu, B.A., Nelson, C.D. and A.G. Abbott. 2011. Genomics assisted breeding for resistance to *Phytophthora cinnamomi* in chestnut (Castanea sp.) Fourth International Workshop on the Genetics of Host-Parasite Interactions in Forestry, Eugene, OR. July 31 – August 5, 2011. http://ucanr.org/sites/tree_resistance_2011conference/Home/

# TACF Awards $64,930 in Research Grants

Submitted by Lisa Sousa, TACF director of grants and agreements

In China: Dr Bill Powell of SUNY-ESF prepares chestnut stem segments for later RNA and DNA testing. Behind him Andy Newhouse uses a bore to create the stem segments. Photo courtesy of Sara Fitzsimmons

Research is the cornerstone of TACF's mission to restore the American chestnut. The Foundation recently awarded $64,930 in grants for chestnut research:

- $11,000 to the USDA Forest Service and the University of Tennessee for **"Analysis of the First Test Plantings Using BC3F3 Seedlings on National Forests in the Southern Region."** This project will test field performance for each generation of chestnut breeding material in the nursery and on National Forests in the Southern Region.

- $14,000 to PA-TACF, University of Kentucky and University of Arkansas for **"Enhancing the American Chestnut Breeding Program by Better Understanding Chinese Chestnut Species and Chestnut Blight in Their Native Range."** TACF scientists will travel to China to study Chinese chestnut species with partners at Peking University and Beijing Forestry University.

- $10,500 to The Carolinas Chapter of TACF and Clemson University for **"The Establishment of a Genetically Diverse Population of Hybrid American Chestnut Trees Resistant to both Chestnut Blight Incited by *Cryphonectria Parasitica* and to Ink Disease Incited by *Phytophthora Cinnamomi.*"** The goal of this project is to develop a genetically-diverse population of hybrid American chestnut trees resistant to chestnut blight and ink disease.

- $2,730 to West Virginia University for **"Maintenance of a Backcross Orchard Planting to Assess the Integration of Host Resistance and Hypovirulence."** This project will evaluate the enhanced control of chestnut blight that results when we combine trees with increased levels of blight resistance with hypovirulent strains of *C. Parasitica*.

- $7,600 to West Virginia University, Michigan State University, and Wisconsin Department of Natural Resources for **"Survival and Recovery of American Chestnut Trees Historically Treated with Hypovirus."** The goal of this project is to continue efforts to document the recovery of trees in Wisconsin's West Salem stand that were treated with hypovirus.

- $2,500 to University of Kentucky for **"Continued Monitoring of American Chestnut Restoration Sites on Surface Mined Land in Kentucky."** This project will develop reforestation/restoration guidelines and recommendations for reestablishing stands of TACF's American chestnuts within the Appalachian region.

- $16,600 to The Research Foundation of State University of New York for **"Evaluating the Genetic and Genomic Basis for Varying Levels of Blight Resistance Among Chinese Trees (*Castanea Henryi* and *Castanea Sequinil*)."** A team of researchers will travel to China to collect wild Chinese chestnut samples to be used in genomic DNA and RNA extractions.

# Europe Discovers the Chinese Chestnut

*Castanea mollissima* Blume, Mus. Bot. 1: 286 (1851)

by Bill Lord

Carl Ludwig Blume 1789-1862 was a botanist known for his work collecting and identifying plants in Indonesia

The Chinese chestnut was known in Europe a half century before it was so recognized in America. Carl Ludwig Blume, 1789-1862, first described it in 1851 in his *Museum botanicum Lugduno-Batavum*, a long chronicle of descriptive botany written 1849-1857.

Blume was born in Braunschweig, a German city about 100 miles west of Berlin, but spent his entire professional career in the service of the Dutch government. Trained as a physician, he was sent in 1823 to the island of Java in the Dutch East Indies for a principal role in the island's health administration. Shortly after his arrival at the capital city, Batavia [Jakarta], he was appointed Superintendent of the Botanic Garden at Buitenzorg [Bogar] just south of Batavia.

Blume applied himself enthusiastically to plant collecting and identification and before leaving Java in 1826 had accrued a collection of about 3,000 species. He probably would have remained longer but in 1824 he and a group of collectors became ill with a severe fever that killed most of his party and seriously weakened Blume. Recurrent attacks of fever debilitated him thereafter most of his life.

Immediately on his return to Holland he became a professor and director of the Royal Botanic Gardens of Leiden [Leyden] University. He wrote and published plant descriptions, primarily of southeast Asia, continuously from 1825-1857. Fellow botanists in England's Linnean Society remember him affectionately as one who overcame a lack of botanical training with professional dedication:

"In descriptive botany the name of Dr. Blume deservedly ranks high. In the early part of his career, his want of acquaintance with the literature of the science and with the great collections of Europe led him into the commission of numerous errors . . . . . but it is his great merit to have done more than any other botanist….. for the elucidation of the flora of the great Malayan Archipelago, which constitutes the bulk of the Dutch possessions in Eastern Asia." — The Proceedings of the Linnean Society, Zoology Part VI, London, 1862, xciii, Foreign Members.

Taxonomists in their own jargon describe those who identify the least number of species per genus as "lumpers," and those who describe the greatest number of species as "splitters." Blume qualifies as a splitter. In the *World Checklist and Bibliography of Fagales* by R. Govaerts and D. G. Frodin, Blume is the author of only one species and one variety synonym for *Castanea mollissima*, but he rings the bell with 21 varietal synonyms for *C. crenata*. Apparently the two other Asiatic species, *C. henryi* and *C. sequini*, were unknown to him.

Blume applied himself enthusiastically to plant collecting and identification and before leaving Java in 1826 had accrued a collection of about 3,000 species

Compared to Blume, Charles S. Sargent, 1841-1927, the director of Harvard's Arnold Arboretum, was a lumper, at least concerning the chestnut. Writing in 1890, he described the chestnut as one species in three geographic areas. "…the Chestnut-tree of North America, the Chestnut-tree of the Mediterranean Basin and of the Caucasus, and the Chestnut-tree of Japan, are so nearly identical in all characters which distinguish one species from another that they may

be regarded as the same tree." He had no knowledge of any chestnut species in China. "It [the chestnut-tree] is not found in the forests of the Himalaya or China, although it is more than probable that further investigation of the flora of the mountain regions of the western part of the empire will bring to light the presence of forests of Chestnut-trees similar to those which occur in Japan." [Sargent, C. S., The Chestnut-Tree, *Garden and Forest*. Vol. III, pp 353-354, The Garden and Forest Publishing Co, 1890.] Commencing in the latter half of the 19th century, men like Augustus Henry, 1857-1930, and numerous French Catholic missionaries were avid plant collectors in China and sent specimens of the three Chinese *Castanea [mollissima, henryi, and seguinii]* to Europe.

In the mean time, American botanists stayed apparently blissfully ignorant of Chinese chestnut until the opening days of the twentieth century. According to J. W. McKay and F. H. Berry of the U. S. Department of Agriculture, "The Chinese chestnut, *Castanea mollissima,* was first successfully introduced into the United States in 1903 and first distributed in 1907." [Introduction and Distribution of Chinese chestnuts in the United States, J. W. McKay and F. H. Berry, *Northern Nut Growers Annual Report*, #51, 1960, p31.] This statement indicates that there may have been prior introductions of Chinese chestnut, but without permanent result.

A Chinese chestnut stands bathed in morning mist at Meadowview Farms in Virginia.

# Chestnut Dressing

Jim Casada from www.jimcasadaoutdoors.com

With the holiday season approaching, what could be more traditional than chestnut dressing? American chestnuts are hard to find, but Chinese chestnuts do well. I have close to a dozen trees in my yard. The nut meats aren't quite as sweet as those of the American chestnut. We have chestnut dressing every Thanksgiving as a part of our festive meal.

Chestnut dressing is a perfect dish for the holidays.

Ingredients:

½ cup butter

1 cup finely chopped celery

1 cup finely chopped onion

1 cup cooked, chopped chestnuts

6-8 cups crumbs from homemade cornbread (use slow-ground meal)

1 egg, beaten

2 (or more) cups chicken broth

Salt, pepper, and sage to taste

Melt butter in skillet and sauté celery, onion and chestnuts. Cook slowly over low heat for 10 minutes; stir frequently as this burns easily. Add to cornbread crumbs in mixing bowl. Add beaten egg and broth; mix well. Dressing must be VERY moist; add more liquid if necessary. Season and bake in casserole dish at 350 degrees for 30-45 minutes or until golden brown. If you like, top the dish off with fresh parsley as shown here.

Photo by Torrey Witherspoon from www.livinginthewoodsandmakingstuff.com

# Chestnut Moments

*Now is the time for chestnuts. A stone cast against the tree shakes them down in showers upon one's head and shoulders. . . . These gifts should be accepted, not merely with gentleness but with a certain humble gratitude. . . . Old trees are our parents, and our parents' parents, perchance. If you would learn the secrets of Nature, you must practice more humanity than others.*

Henry David Thoreau

Excerpt from
*The Writings of Henry David Thoreau*,
Houghton Mifflin, 1906

**Sunlight on a September morning warms dew-laden, newly opened chestnut burs at Meadowview Farms in Virginia.**

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