

THE Journal OF THE AMERICAN CHESTNUT FOUNDATION

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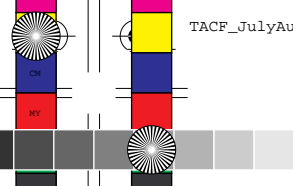
Phytophthora - The Stealthy Killer That Attacks Southern Chestnuts



Don't Miss This Year's Exciting TACF Annual Meeting. Information and Registration, p.12



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Calling All Chestnut Photographers

2011 CHESTNUT PHOTO CONTEST



Chestnut Seedlings
Photographed by 2010
TACF Photo Contest
Winner Paul Sisco

Submit your best American chestnut-related photos to TACF. The top 10 entries will be featured at the 2011 Annual Meeting in Java Center, N.Y. Meeting attendees will vote for the winning photos. The winning photo will be featured on an upcoming cover of TACF's magazine *The Journal of The American Chestnut Foundation*. The winner will receive a TACF T-shirt, a copy of *Mighty Giants, A Chestnut Anthology*, and a one-year complimentary TACF membership.

How to Enter and Contest Terms

- Photos should be sent digitally (burned onto a CD and sent to TACF) by September 31, 2011.
- Send your discs to TACF, 160 Zillicoa Street, Suite D, Asheville, NC 28801. Attention: Paul Franklin.
- Write your name, address, and telephone number on the CD, as well as "Entry for TACF Photo Contest."
- All photos must have been taken by you and not previously published or submitted to any other contest.
- All photo entries must be submitted with caption information including names of subjects, locations, etc.
- All photos must in some way relate to the American chestnut.
- Entries must be at least 1920 x 1080 pixels and in a .jpeg or a .tiff format.
- Entries that do not meet these terms are subject to disqualification.
- If a person in the photo is recognizable, you must secure a model release from the subject or in the case of a minor, a parent or guardian and enclose it with your entry.

By entering the contest, entrants grant The American Chestnut Foundation a royalty-free, worldwide, perpetual, non-exclusive license to display, distribute, reproduce and create derivative works of the entries, in whole or in part, in any media now existing or subsequently developed, for any TACF purpose, including, but not limited to advertising and promotion in publications and its website, exhibition and commercial products, including but not limited to TACF publications. Photographs may appear on TACF's website and in TACF publications. Any photograph reproduced will include a photographer credit. TACF will not be required to pay any additional consideration or seek any additional approval in connection with such uses.



THE
AMERICAN
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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.



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No cover photo provided...

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Journal

OF THE AMERICAN CHESTNUT FOUNDATION

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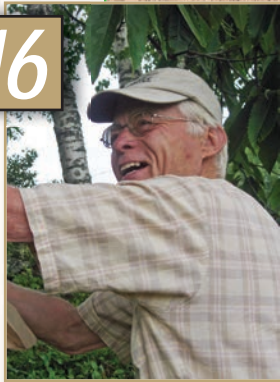
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Restoration Branches Help Build TACF's Future

by TACF Chairman Glen Rea

TACF's Restoration Branches have been hard at work. Each Restoration Branch holds an annual event, which provides an opportunity for community members to come together, share in fellowship and learn about TACF's efforts to restore the chestnut. On June 17, the Maine Chapter of TACF held our first Restoration Branch event in Bangor, hosted by Rick and Beth Warren and organized by a committee of three – Bucky and Sue Owen and my wife, Ann.


And what an exciting gathering it was! The event brought together a diverse mix of individuals: local business people, state and local civic leaders, foresters, ecologists, journalists, and others. We had a wonderful meal, shared the activities of the Maine Chapter with the participants and made new friends. To top it off, the chapter raised \$14,500 to support Maine's breeding program. We also gained 30 new members.

Beyond these annual events, our branches are actively working throughout the year to fulfill TACF's mission. The Southwest Virginia Branch held their first event in April 2010 at the Meadowview Research Farms and Glenn C. Price Laboratory. Since then, branch members have helped with American chestnut breeding activities, hosted a chestnut roast for the local community and provided school programs on the American chestnut. Just a few weeks ago, several branch volunteers worked together to give our new laboratory some beautiful landscaping (see page XX). Their hard work and talent has given our lab a beautiful facelift.

Farther north, the Pennsylvania State Chapter's Sewickley Branch hosted one of TACF's four regional planning workshops at the Fern Hollow Nature Center (www.fhnc.org/). In addition, TACF volunteer and a founding member of the Sewickley Branch, Thad Jones, has been busy at work sharing the American chestnut story with local schools, planting a pure American chestnut orchard with a school group, and even helping secure partners for a future chestnut planting in the area.

The Pennsylvania State Chapter's Raystown Lake Restoration Branch held their first event last summer, and their new army of volunteers has been hard at work managing a breeding orchard located on Army Corps of Engineers property (www.raystown.nab.usace.army.mil). Last year's Restoration Branch event sold out, so the group was forced to move their event to a larger facility this year. Not a bad problem to have!

North Carolina's Cataloochee Branch has focused their efforts on maintaining a breeding orchard on the Cataloochee Ranch (www.cataloocheeranch.com). The Cataloochee Branch held their first event in September 2010 and even raised \$10,396.00 to support the chapter's activities. They are now busy at work planning this fall's event. Also in North Carolina, the Charlotte Branch held their first event this past June at the Daniel Stowe Botanical Garden. The Charlotte Branch had a wonderful turnout for their first event and picked up the Daniel Stowe Botanical Garden (www.dsb.org) as a new and exciting partner.

TACF's network continues to evolve and grow as we expand our reach and engage additional volunteers to support our state chapters. These very volunteers allow TACF to move our programs forward. Just think, we launched the Branch Program only 18 months ago. Imagine where we will be in five years! 



TACF Chairman
Glen Rea

In 2010, the Cataloochee Branch event raised \$10,396. Critical to this success is (front l-r) Jon Taylor, Judy Ferguson, Judy Sutton, Anne Budde, Linda Boyd, Judy Coker, (back l-r) Richard Coker and Paul Sisco. Photo by Bryan Burhans.



News From TACF



Paul Franklin, TACF's
new Director of
Communications
Photo by Marcia L. Getto

New Director of Communications at TACF

TACF is proud to announce the hiring of Paul Franklin as its new director of Communications. Paul has extensive experience developing communications and public relations programs for private, public and nonprofit ventures. He also has more than 20 years experience as a journalist working in the travel and eco-tourism industry.

"Paul's wide-ranging communications skill and broad background in both traditional and new media are going to be a tremendous asset to TACF," says TACF CEO Bryan Burhans.

Aljazeera Visits Meadowview

On June 27, a news crew from Aljazeera English visited Meadowview farm. Reaching more than 280 million English speaking homes internationally, Aljazeera English is one of the fastest growing news outlets in the world.

"The story of the loss of the American chestnut and TACF's work to restore them is very compelling. It's an environmental story with a positive outlook. We don't get to cover many like this," said director Tom Szypulski. With him were journalist Imran Garda and cameraman Ryan Jackson. They arrived at Meadowview early, capturing scenes of morning mist drifting across the farmlands. As the day progressed,

they interviewed and filmed farm employees and volunteers. They also did an extended interview with Meadowview Chief Scientist, Dr. Fred Hebard.

The story aired on July 30th and can be seen online at <http://english.aljazeera.net/video/Search> for "chestnuts"

Chuck Leavell Pens a New Book

Legendary Rolling Stones keyboardist Chuck Leavell says his friends call him "a tree farmer in his heart and a musician in his soul." This year marks the tenth anniversary of the publishing of Leavell's landmark work on small scale silvaculture, *FOREVER GREEN: The History and Hope of the American Forest*. This book is a favorite of anyone who manages or owns forestland or simply loves trees. In 2011, Leavell planted four potentially blight-resistant American chestnuts at his beloved Charlane Plantation. The tree farm Chuck tends on his plantation has been called a model of sustainable forestry. Chuck's newest book, *Growing a Better America*, whose subject is smart and sustainable growth, also debuted this year. With a current population of some 310 million people in the United States and expected to reach 400 million by the year 2040, now is the time for us to think long and hard about how we are going to handle growth going forward. *Growing a Better America* goes into subjects such as transportation, energy issues, home building and renovation, community design and much, much more.




News From TACF

New Lab Landscaped by Restoration Branch

In May and June of 2011, the Southwest Virginia Restoration Branch and the Washington County Master Gardeners combined forces and resources to landscape the Glenn C. Price Research Lab. The project was greatly assisted by the fact that several of the Restoration Branch members are certified Master Gardeners. Working together, they created a design for low-maintenance flowerbeds of native plants that will produce interesting color throughout the year, benefit wildlife and be an educational asset. The success of the garden as a wildlife habitat became evident immediately after it was planted, when a pair of tree swallows moved into the blue bird house that was part of the project. Birds continue to be attracted to the garden by seed from pink muhly grass, broomsedge and maxmillion sunflower and berries from spice bush, ninebark, beautyberry, dogwood and large-berry cranberry. Butterflies



and moths will find specific host plants, including spicebush (Eastern tiger and swallowtail), red milkweed (monarch and queen) and dogwood (spring azure). Most of the other plants also provide food and shelter for a variety of wildlife; hopefully they won't be too attractive for deer and rabbits. 

— Gail and Dick Olson

The Price Lab Landscape work party included (front) Cordelia Meyer, Gail Olson, Steve Riemann, (back) Tommie Waters, Janet Kirby, Margie Dean, Jim Forrester, Helen Forrester, Terrie Riemann and Dick Olson. Photo by Dick Olson

In Memory of and In Honor of Our TACF Members

In Memory of

D'Arcy Brent

Louis and Barbara Arborio
Diane Dixson

Henry Granju

Laura Simeon

Warren F. Halstead

John Bozeman
Keith Halstead
Heather Randall

Raymond Houghton

Gregory Dale

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Cynthia Denis
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Francis Kohanski

Dr. John R. Leahy

Robert & Jean Lincoln

Jack Mansfield

Richard Munschauer

Dr. David J. Merrell

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Joseph N. Pew III

Curtis Barnette
Charles Briggs
Kathy & Dave Deibert
Sharon Kelly
New Life Bible Fellowship Church
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Walter Seibert
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Jill Widseth

Nick Soprano

Carolyn Worsley

Arthur Tucker

Gilmer & Phyllis Tucker

In Honor of

Mac & Marge Foster

Dr. & Mrs. Stephen Corwin

Kay Murray

Dorothy Gordon

Please consider making a gift in honor of or in memory of a loved one. Gifts may be directed to TACF, 160 Zillicoa Street, Suite D, Asheville, NC 28801

Volunteers & Scientists, Partners in Science

by Bryan Burhans, CEO



TACF President and CEO
Bryan Burhans

The success of TACF is rooted in the work of talented scientists that use the best available science to develop a blight-resistant chestnut tree. From Dr. Charles Burnham's development of the current back-cross breeding program to the cutting-edge biotechnology solutions currently being developed by scientists at the State University of New York in partnership with our New York Chapter, science has provided the foundation for TACF's work.

Today, TACF benefits from the vision and hard work of many talented scientists, including TACF Science Director Dr. Al Ellingboe and Vice Chair of the Science Cabinet Dr. Kim Steiner, our chief scientist Dr. Fred Hebard and our regional science coordinators. Our science cabinet is filled with talented scientists, many of whom serve as faculty at various universities; Dr. Paul Sisco, Dr. Marty Cipollini and Dr. Brian McCarthy just to name a few.


But an equally important resource to TACF's success is a veritable army of talented and passionate volunteers who, working under the guidance of our research scientists, are making vital contributions to our science programs. For example, the work of Dr. Joe James, a retired surgeon, and TACF Treasurer Steve Barilovits, trained in engineering, have spearheaded TACF's efforts to develop a chestnut resistant to ink disease (see article pg. 16).

Chandis Klinger from Pennsylvania uses the woods behind his home to examine innovative and creative ways to actually reintroduce the American chestnut back into our forests. Mr. Klinger's work has looked at everything from planting in light gaps in the forest to using various protective methods to deter deer from eating chestnut trees. Also in Pennsylvania, Jim Walizer is working on biomass studies and the effects of tree shelters on chestnuts.

In Maryland, Kathy Marmet, trained as a lawyer, helped spearhead TACF's involvement in the MEGA-Transect Project, and along with

many other volunteers, such as Dr. Gary Carver of Maryland, also helped the organization move forward with the Chestnut Learning Box. TACF Secretary Essie Burnworth, a retired manager at Northrop Grumman Corporation, has worked to involve the Maryland State Chapter in work with hypovirulence and the development of the mobile biolab for Carroll County Schools. Also hailing from Maryland, Ron Kuipers has been leading some groundbreaking work investigating methods to control ambrosia beetles in chestnut orchards.

Further north, Roger Willby of Maine has been working to update the chestnut range map that includes pre-ink disease distribution. Alan Markert, also from Maine, has been working on various grafting experiments. And Rufin Van Bossuyt, from Massachusetts, a retired forester, has been experimenting with various forest planting methods to help TACF reintroduce the American chestnut.

The list of talented individuals assisting TACF efforts is obviously much longer than this column will allow, but the passion, diversity and commitment of TACF's volunteers truly make the organization what it is today. The partnership between TACF's passionate volunteers and our research scientists has resulted in a unique and amazingly effective restoration effort second to none. 

News Flash: *Field & Stream Magazine*, a leading voice in conservation, recently announced that it had chosen TACF Maryland Chapter volunteer Ron Kuipers as one of six "Heroes of Conservation" for 2011. He was selected for his tireless efforts to restore the American chestnut to the eastern forests. "Hunters and fishermen have never been afraid to roll up their sleeves and get to work in the name of protecting America's wildlife and wild places," says Anthony Licata, Editorial Director of *Field & Stream*, "and Ron is a great example of that ethos hard at work." From all of us here at TACF, a hearty hat's-off to Ron and all the hardworking TACF volunteers.

Phytophthora: The Stealthy Killer

Invasive Pathogen Challenges Chestnut Restoration in the Southern Range

Editors Note: After chestnut blight, Phytophthora cinnamomi presents the greatest challenge to chestnut reforestation in the southern half of its range. Dr. Joe James has been working on his farm, Chestnut Return, in Seneca, SC, with TACF and Clemson University scientists since 2004 to develop backcross American chestnut trees resistant to Phytophthora root rot. In this issue, Dr. James offers an overview of Phytophthora cinnamomi. Next issue he will present a look at developments in the fight against Phytophthora on his farm and elsewhere.

What is *Phytophthora cinnamomi*?

One of the world's most invasive and damaging species, *Phytophthora cinnamomi* Rands has been identified in over 70 countries worldwide. *P. cinnamomi* looks and behaves like a mold, but is related to brown algae. It attacks not only American chestnut but well over a thousand other plants and trees including white pine, Fraser fir, and in warmer climates, avocado, eucalyptus and pineapple. The genus, *Phytophthora*, was first described by the "father" of plant pathology, Anton de Bary, in 1875. Since then, scientists have identified over 100 species of *Phytophthora*, but it is believed that many species have yet to be discovered and the number may reach 500 (see Brasier in Goheen & Frankel, 2009). Many of the known species are highly destructive, including *P. infestans*, the incitant of late blight of potato, which led to the devastating Irish Potato Famine in the late 1840s.

A Long History

P. cinnamomi first came to North America from Southeast Asia around 1780 to 1800. It was most likely brought here in potted plants from the Far East that were planted around the homes of wealthy landowners near Charleston, SC, and in the surrounding countryside. The soil that came with the potted plants contained all sorts of exotic micro-organisms, one of which was *P. cinnamomi*. When *P. cinnamomi* reached North America, it found itself in a sea of sus-

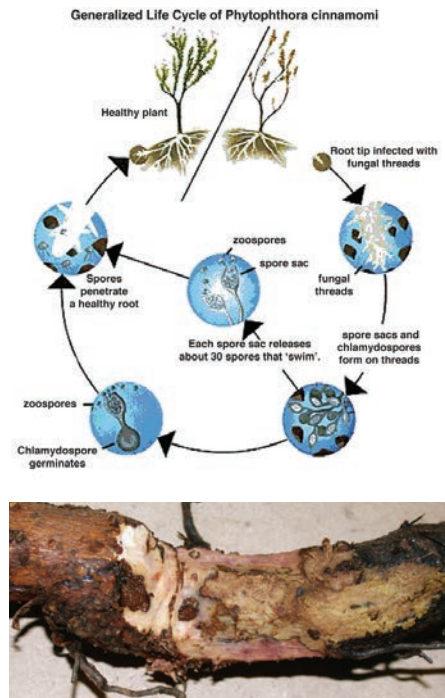
ceptible plants that allowed it to flourish, travel and explode in population.

P. cinnamomi went virtually undetected throughout its early history. It was only isolated in the 1920s on the island of Sumatra and, interestingly enough, it was found in a cinnamon grove. There, a wealthy planter who was developing cinnamon production in Sumatra began to lose trees left and right. So, he called in a biologist, Dr. R.D. Rands to find out the cause of the disease. The biologist then isolated *P. cinnamomi* and gave it its name.

The cinnamon tree evolved in the jungles of the Amazon where there was no *P. cinnamomi*. Therefore, it also had little or no resistance to *P. cinnamomi*. In this case, they brought an exotic, the cinnamon tree, into the natural environment of the pathogen. This sequence of events brought *P. cinnamomi* to the forefront to be identified.

In the 1940s, three scientists, Crandall, Gravatt, and Ryan (1945) tested *P. cinnamomi* against several thousand species in North America. They found it to be either a lethal pathogen or a very severe pathogen to 800 different species of North American plants. These include both timber trees and herbaceous plants. Unfortunately, the implications of their work were not immediately applied to the early recovery efforts for the American chestnut.

By the time this recovery work had begun, *P. cinnamomi* had already been in North America for over 200 years. Although it is a matter of lively debate among chestnut experts, I agree with those (Fei, S. 2007) who have theorized



Chestnut root infected by *Phytophthora cinnamomi*: the dark line marks the edge of the advancing lesion with healthy tissue to the left and diseased tissue to the right



Joe James leads a tour of Chestnut Return Farm where he is working to develop a *Phytophthora*-resistant American chestnut.
Photo by P. 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.

that the range of the chestnut may have once extended well into the piedmonts of Virginia, the Carolinas, Georgia and Alabama, (indeed today, small pockets of American chestnuts still exist here and there on the piedmont) but that *Phytophthora* likely wiped out or severely reduced these southern populations, effectively moving the modern accepted core range of the chestnut northward. By the early 1900s the chestnut was often referred to by southern piedmont residents as a "mountain tree", belying the fact that it may well have been a common resident of their own piedmont forests.

Phytophthora Gets Around

Unlike the chestnut blight, which is mostly airborne, *P. cinnamomi* travels more slowly. It moves most quickly in water, floating downhill in flowing water, establishing itself wherever it is carried. It can also travel in soil, and before the industrial age, likely traveled in short jumps, carried on a horse's hoof or in soil stuck to a wagon wheel, moving with European settlers as they expanded into the wilderness. With the advent of mechanized travel, *P. cinnamomi* has spread more quickly. Fortunately, it is limited by freezing cold, which kills the hyphae and some of the spores. In areas where the ground freezes solid down to bedrock, the soils will eventually become free of *P. cinnamomi*. Particularly in the southeastern U.S., the winters are not cold enough to entirely destroy *P. cinnamomi* in a given area, since the soil only freezes 2-3 inches deep. In contrast, mountaintops are sometimes spared, because of their shallow soils and cold winters, although deep

soils in mountain valleys can have *P. cinnamomi*. TACF chestnut orchards as high as 4,000 feet, are sometimes affected, although as a general rule, in the southern Appalachians, *P. cinnamomi* does not extend to altitudes above 3,500 ft.. The further north you go, the colder it gets. So in the northern regions, even low-lying areas, below 500 ft. elevation, are devoid of *P. cinnamomi*. Combining these factors of cold weather, soil depth and altitude defines a limit of northward extension at somewhere around the 40th parallel (the southern portion of Pennsylvania) or roughly the southern 50% of the American chestnut range (Balci, 2007).

A Stealthy Killer

Although it travels slowly, *P. cinnamomi* is a relentless invader. Once the organism is present in a given location it tends to stay there permanently. What makes *P. cinnamomi* so resilient is its ability to produce spores and withstand hostile environments. During drought or other negative conditions, the organism can survive as dormant chlamydospores. When conditions improve, the chlamydospores germinate to form hyphae and sporangia. Eventually, the sporangia release zoospores that enter the tree roots behind the tip of the root. Once established, hyphae grow throughout the root structure, destroying root tissue and preventing the root from taking up water. The early warning signs include wilting and yellowing of leaves. Roots dug up and examined will have dark streaks within them or be completely necrotic (black) leading to the disease's common names: "*Phytophthora* root rot" and "ink disease." Testing at Chestnut Return Farm of over 1,000 American chestnuts and chinquapins has shown 100% mortality within three years of initial infection by *P. cinnamomi*. Most will die within 3 months.

Phytophthora Treatments and Outlook

For the small scale chestnut grower who has just one, or even a few trees, there are treatments for *P. cinnamomi*. But one must realize that these treatments are only temporary and must be repeated at least 3 times per year. Once the treatment is stopped, the tree(s) will die. One approach that has been tested in the Carolinas' Chapter by Steve Barilovits and myself involves the use of one of three fungicides con-

taining either potassium phosphite, urea phosphite or aluminum phosphite, in that order of relative efficacy. This works best as a preventative but can have a positive effect with infected trees if applied early.


Obviously, spraying individual trees does not offer a practical solution for protecting entire forests from *P. cinnamomi*, so when we look at the challenge of restoring the American chestnut in its southern range, we must look at solutions that involve breeding trees that are resistant to both *P. cinnamomi* and blight.

There are currently two methods under development for achieving this goal. The first is to ride the coattails of the backcross breeding method that TACF developed to breed blight-resistance into the American chestnut. The Chinese chestnut contains not only blight resistance, but also a substantial resistance to *P. cinnamomi*. This is to be expected, since both *P. cinnamomi* (or a close relative) and the blight fungus co-existed with the Chinese chestnut tree in Asia for millions of years.

The current backcross breeding program for blight resistance creates an intercross hybrid of Chinese and American chestnuts then backcrosses the hybrid with another American, repeating the backcross for 3 additional generations to reach the B3F1 trees. These generations are tested along the way and selected for blight-resistance, until a tree is created that is mostly an American chestnut, but retains resistance to blight.

The *Phytophthora* resistance program started with the hope that a few of the blight-resistant hybrids might have also retained enough resistance to *Phytophthora* root rot from their great-great or great-great-great Chinese grandparent to survive the disease. Indeed, this has been the case. In fact, when two trees that have survived *Phytophthora* root rot are bred together, the nuts produced have a 4X to 8X increase in their survival rate. It is my hope that, by inoculating large enough numbers of advanced hybrid seedlings and growing the survivors, a genetically diverse population of trees resistant to both diseases could be produced within three or four years.

The second method for developing *Phytophthora*-resistance is to employ genetic engineering to try to isolate the exact gene sequence that has resistance. This is being done in several locations; notably by Dr. Scott Merkle at the

University of Georgia and by Dr. Bill Powell at SUNY. Dr. Dana Nelson of the USFS and Dr. Bert Abbott of Clemson University are also making huge contributions. The genes are then produced in a laboratory and injected via agrobacteria into the embryonic cells of the American chestnut. These cells are then grown into seedlings. This process was in its infancy five years ago but has made and is making tremendous strides. In the next issue of *The Journal*, I will offer a look at where both of these breeding programs stand today and what the future holds as we approach restoring the American chestnut in the southern half of its traditional range. 

Further Reading

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The American Chestnut Foundation

28th Annual Meeting

October 21-23, 2011

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TACF 28th ANNUAL MEETING*

OCTOBER 21ST-23RD • 2011

Friday October 21st

1:30 PM – 4:00 PM	STATE CHAPTER MEETING (All Members Welcome)
4:00 PM – 6:00 PM	REGISTRATION OPEN
6:00 PM – 7:00 PM	KICK-OFF DINNER AND RECEPTION
7:15 PM – 7:30 PM	COMMENTS FROM NY CHAPTER PRESIDENT
7:30 PM – 8:00 PM	TALK: TBD
8:00 PM – 9:00 PM	SOCIAL TIME
(7:00 PM – 9:00 PM – Harvest Nut Exchange for New York Members)	

Saturday October 22nd

7:00 AM – 9:00 AM	BREAKFAST
7:30 AM – 9:00 AM	REGISTRATION
8:30 AM - 8:40 AM	OFFICIAL WELCOME: CHAIRMAN OF THE BOARD
8:40 AM - 9:15 AM	TALK: BACKCROSS BREEDING – LOOKING TOWARD THE FUTURE
9:15AM – 10:00 AM	TALK: SUNY TRANSGENETICS RESEARCH UPDATE
10:00 AM – 10:30 AM	BREAK
10:30 AM - 11:15 AM	TALK: TBD
11:15 AM – 12:00 NOON	TALK: <i>PHYTOPHTHORA</i>
12:00 NOON – 1:00 PM	LUNCH
1:00 PM – 1:45 PM	TALK: APPALACHIAN REGIONAL REFORESTATION INITIATIVE
1:00 PM – 1:45 PM	WORKSHOP: HAZELNUT DISEASE PREVENTION
1:00 PM – 1:45 PM	WORKSHOP: LESSONS FROM THE LEARNING BOX
1:00 PM – 1:45 PM	WORKSHOP: INTRO TO CHESTNUT BLIGHT
2:00 PM – 4:30 PM	WILLIAM WHITE ORCHARD TOUR
2:30 PM – 3:30 PM	WORKSHOP: CHESTNUT LEAF IDENTIFICATION
2:30 PM – 3:30 PM	WORKSHOP: GRANTWRITING TIPS FOR CHAPTERS
2:30 PM – 3:30 PM	WORKSHOP: PHOTOGRAPHY
5:00 PM – 6:00 PM	SOCIAL TIME
6:00 PM – 7:00 PM	DINNER
7:00 PM – 7:30 PM	KEYNOTE ADDRESS: DR. DONALD J. LEOPOLD
7:30 PM - 8:15 PM	TACF AWARDS PRESENTATION
8:15 PM – 9:00 PM	AUCTION
9:00 PM – 10:00 PM	SOCIAL TIME

Sunday October 23rd

7:00 AM – 9:00 AM	BREAKFAST
8:00 AM – 9:00 AM	BUSINESS MEETING
9:00 AM – 10:00 AM	NY CHAPTER BUSINESS MEETING
9:00 AM – 10:00 AM	TALK(REPEAT): APPALACHIAN REGIONAL REFORESTATION
9:00 AM – 10:00 AM	WORKSHOP: CHESTNUT PESTS AND DISEASES
9:00 AM – 10:00 AM	WORKSHOP: COLLECTING HERBARIUM SPECIMENS
10:00 AM – 10:30 AM	BREAK
10:30 AM – 11:30 AM	WORKSHOP: ORGANIZING A TACF EVENT
10:30 AM – 11:30AM	(REPEAT) WORKSHOP: GRANTWRITING TIPS FOR CHAPTERS
10:30 AM – 11:30AM	(REPEAT) WORKSHOP: PHOTOGRAPHY
11:30 AM – 1:00 PM	LUNCH

*schedule subject to change

END OF CONFERENCE – SEE YOU NEXT YEAR!



Talks And Workshops

Keynote Address

Natural Communities as Templates for Restoring Sustainable Landscapes

Dr. Donald J. Leopold

Distinguished Teaching Professor and Chair, Faculty of Environmental and Forest Biology, SUNY-ESF, Syracuse, NY

Natural plant communities can guide the restoration of badly degraded sites and establishment of new forests. In this presentation, Dr. Leopold will review basic ecological principles underlying the abundance of plant species in various natural communities of the eastern US and discuss applications including plantings for the new ESF biology building which include an oak-chestnut forest and associated trees, shrubs, and herbaceous species to create a sustainable landscape.

Dr. Donald J. Leopold earned his Ph.D. in forest ecology from Purdue University in 1984, and was promoted to Distinguished Teaching Professor in 1998. He is the recipient of numerous prestigious awards for his work in education. Dr. Leopold has published six books; four are major treatments of trees in North America. His fifth book, *Native Plants of the Northeast: A Guide for Gardening and Conservation* (Timber Press, Portland, OR) was given the Garden Writers Association Silver Media Award for excellence in horticultural writings. His current research focuses on examining drivers of diversity and rarity at micro to macro scales, the restoration of unique plant communities on alkaline industrial wastes in urban areas, and applications of this research to sustainable, urban landscape elements.

TALKS

TACF's Backcross Breeding Program:

Looking to the Future

Dr. Kim Steiner, Professor of Forest Biology, Director of The Arboretum, Penn State University

TACF's breeding program has been modeled from the beginning on a plan first outlined by Dr. Charles Burnham in 1981. We are close enough to completion of the Burnham plan in our Meadowview operations that we must, for the first time, seriously consider what the next phase of our science program should look like. In this presentation Dr. Steiner will review the status of today's backcross breeding program and will offer a look at the unique challenges and exciting opportunities that lay before us.

Research Update from SUNY-ESF

Chuck Maynard and Bill Powell, Co-Directors of the NYS American Chestnut Research & Restoration Center

For over 20 years, Dr. Maynard, Dr. Powell, and their lab team in collaboration with other labs have been pursuing a biotechnology approach to producing blight-resistant, and

more recently, *Phytophthora* (ink disease) resistant American chestnut trees. This summer they will be testing resistance levels of the first two American chestnut lines out of more than 50 new lines containing various genes, combinations of genes, and gene expression levels. Dr. Powell and Dr. Maynard will be reporting on their current research status as well as describing new trees that are in development.

Chestnut Commodity and Program Development in Michigan *Dr. Dennis Fulbright, Professor of Plant Pathology at Michigan State University*

In the 1980s, while working on the biological control of chestnut blight on American chestnut trees in Michigan, it became obvious that a fledging chestnut program was beginning to evolve in the state. This talk will cover the development of this effort into a small but growing industry in the United States including the discovery and development of germplasm, a for-profit grower cooperative, a value-added product line, and some new research that can impact both forest and orchard chestnuts.

Phytophthora Update

Dr. Joe James, Chestnut Return Farm, Seneca, SC
Phytophthora (Phytophthora cinnamomi), or ink disease, continues to present a serious challenge to chestnut reforestation in the Southeastern and Mid-Atlantic regions. In this talk, Dr. Joe James will present an overview of *Phytophthora cinnamomi*, its history and characteristics, as well as a summary of recent results from research being done on his South Carolina farm, Chestnut Return, and elsewhere.

Appalachian Regional Reforestation Initiative Update

Patrick Angel, Senior Forester/Soil Scientist, ARRI

In recent years, the Appalachian Regional Reforestation Initiative (ARRI) has helped such divergent factions as environmental groups and coal companies to find common ground in the planting of trees on abandoned and active mine sites throughout the Eastern coalfields. This talk will offer an overview of the successes and challenges encountered in planting of chestnuts on mined land through "Operation Springboard."

William White Orchard Transgenic Tour

Started in 1991, The William W. White plantation now is home to over 1700 trees from over 30 different American chestnut lines. Even more exciting - in 2010 and 2011, some of the first transgenic American chestnut seedlings were planted here. This tour offers those interested in planting and growing chestnuts a great chance to learn more about site selection and proper orchard maintenance. You can also be among the first to see these new transgenic lines created by SUNY-ESF and NY-TACF.

WORKSHOPS

Eastern Filbert Blight Resistant Hazelnuts: Are We There Yet?

Dr. Tom Molner, Assistant Professor, Plant Biology and Pathology Dept, Rutgers University

Eastern filbert blight (EFB) is caused by the fungus *Anisogramma anomala*, which is native to the eastern United States. While our native hazelnut is highly tolerant, the European hazelnut of commerce, *Corylus avellana*, is highly susceptible to EFB. At Rutgers University, we have been studying this disease and breeding for resistance since 1996. This talk will present an overview of hazelnuts and our progress developing EFB-resistant plants suitable for production in the eastern United States.

Chestnut Pests and Diseases

Sara Fitzsimmons, TACF Regional Science Coordinator Supervisor

A great workshop for anyone interested in growing chestnut trees, this workshop will cover major and minor pests and diseases, how to identify possible problems and take action to keep your trees healthy and thriving.

Education: The American Chestnut Learning Box

Kathy Marmet TACF Development Cabinet and Education Committee

TACF's Education Committee has been developing an American Chestnut Learning Box to facilitate hands-on learning about the American chestnut and TACF's restoration efforts. This session will share what we have learned and will highlight some learning activities that have been developed by TACF volunteers.

Introduction to Chestnut Blight Fungus

William White, TACF Southern Regional Science Coordinator

Regional Science Coordinator, William White, will give a brief overview about the lethal pathogen, *Cryphonectria parasitica*. This will include the history of the pathogen in the US, the reproduction and spread, use of the fungus in controlled inoculations and the rating of backcross trees, an overview of hypovirulence and *Phytophthora cinnamomi*.

Chestnut Leaf Identification

Kendra Gurney, TACF New England Regional Science Coordinator

Katy McCune, TACF Mid-Atlantic Regional Science Coordinator

How well do you know your chestnuts? This workshop will cover the basics of chestnut species ID using morphologic traits, as well as macro and microscopic traits. We will use hands-on examples, look at some chestnut hybrids and examine some of the most commonly-confused species.

Grantwriting Tips for Chapters

Lisa Sousa, TACF Director of Grants and Agreements

This workshop will cover basic tips for writing successful grant proposals and how to research funding opportunities for your chapter. We will cover strategies for obtaining foundation funding and how funding efforts by TACF's national office can compliment regional chapter funding. Come prepared with any grant funding questions you might have.

Organizing a TACF Event

Bryan Burhans, President & CEO of The American Chestnut

Foundation, Paul Franklin, TACF Director of Communications and
Dennis Kimball, TACF Staff Accountant

Forming a local Restoration Branch of The American Chestnut Foundation (TACF) is both a fun and rewarding experience and way for local communities to get involved with chestnut restoration. Workshop attendees will learn how to establish and host a Branch event, and help generate interest in the chestnut in their community.

How to Shoot a Chestnut and Live to Tell the Tale

Paul Franklin, TACF Director of Communications

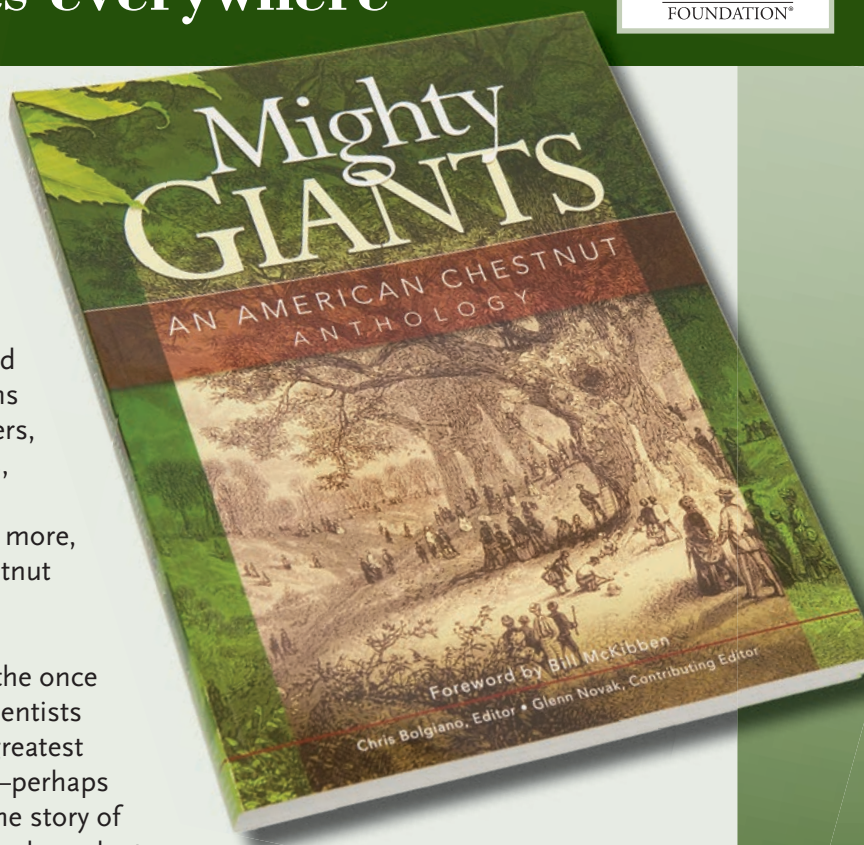
An award-winning photographer, Paul will host this lighthearted workshop for beginning and intermediate photographers who want to take better pictures of chestnut trees, as well as TACF events and people.



Chestnut anthology makes a great gift for nature enthusiasts everywhere



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 to 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.

TACF hats are back!

Don't come to the Annual Meeting without one! Order yours today at www.acf.org or call 828-281-0047.

The baseball hat is tan and made with 100% cotton. The Mossy Oak camouflage hat is made with 60% cotton and 40% poly twill. Both have embroidered TACF logos on the front and adjustable closures in back.

TACF Camo Cap: \$16.00 TACF Ball Cap: \$14.00



TACF Success Rooted in Work of Talented Volunteers

Beginning with this issue of the Journal, we will highlight the stories and accomplishments of some of our outstanding volunteers. Volunteers are the very lifeblood of The American Chestnut Foundation. They power our growth and provide the energy, creativity and hard work that will one day lead to the successful restoration of the American chestnut. On behalf of the TACF staff, board, scientists and partners, we would like to deeply thank all of TACF's remarkable and hard-working volunteers. – Eds.



Terry does it all for the Vermont/New Hampshire Chapter! Here, he helps pollinate a tree for the breeding program. Photo by Leila Pinchot

Terry Gulick

As a boy growing up in Springfield, Vt., Terry Gulick discovered a small tree unlike any he had seen before. With a little research and confirmation by the county forester, he learned that the tree was an American chestnut, and he was struck by its story. Over the years he kept an eye out for young sprouts and eventually planted some Chinese and hybrid chestnuts on his property in Springfield, enjoying the reliable nut production.

Ten years ago, Terry discovered an article on TACF in the Rutland Herald and made a visit to the former national office in Bennington, Vt. He was thrilled to learn about the organization's work and set out to help recruit interest in forming a Vermont/New Hampshire Chapter. When his hard work came to fruition, Terry described the chapter's acceptance at the 2007 TACF Annual Meeting in Burlington, Vt., as one of the "greatest moments in my world of chestnuts."

As founding Vermont/New Hampshire Chapter board member, Terry works hard for the American chestnut – helping to find mother trees, conducting pollinations, planting orchards and sharing the story at events like the Vermont Farm Show. He even gives the occasional presentation to local clubs or school groups. In addition, Terry volunteers with the Vermont Farm Bureau, plays piano at a health care home and with a bluegrass band and also serves on the board of the Windsor County Maple Producers. – Kendra Gurney, TACF New England Regional Science Coordinator

Hardworking TACF volunteer, Jeff Krause, is a wildlife biologist for the U.S. Army Corps of Engineers. Photo by Pennsylvania Chapter, TACF

Jeff Krause

A wildlife biologist for the U.S. Army Corps of Engineers, Jeff Krause manages the American and CMS BC1 orchard at the Army Corps of Engineers site at Raystown Lake, Pa., which will eventually include Graves BC3F2s. First established in 1999 with 100 pure American seedlings, the orchard has come a long way from its initial state. Jeff has been instrumental in securing a grant to expand fencing at the orchard, build a well and a storage shed and create outreach materials and a chestnut education kiosk at the Lake Raystown Visitor Center.

Jeff also assists with plantings at the Penn State University (PSU) orchards and encourages Juniata College and Army Corps of Engineers interns to gain experience by volunteering with chestnut plantings, inoculations and monitoring at PSU. Jeff is helping to pilot the implementation of the American Chestnut Learning Box, and uses his involvement in several environmental organizations to give chestnut presentations.

Jeff and his wife, Lori, initiated the first Raystown Branch event. Held Aug. 21, 2010, the event brought 76 new members aboard and generated awareness and enthusiasm in the local community to support chestnut restoration. Jeff and the Raystown Branch are gearing up for their second event Sept. 25. – Sue Oram, Administrative Assistant for the Pennsylvania TACF.



Plantings Around the Range

Chestnut planting news from up and down the East Coast



An American Chestnut Grows at Arlington National Cemetery

On April 29, Mary Ann Lancaster and her family sponsored the planting of a potentially blight resistant American chestnut tree at Arlington National Cemetery (ANC) in honor of her beloved husband, Robert William Lancaster CDR USN (Ret.), and all the veterans buried in the cemetery. In what is becoming a family tradition, this is the third annual planting of a tree the Lancaster family has sponsored at ANC, with another planting planned for this fall.

"I read about the work of TACF and their development of a blight-resistant American chestnut," said Mrs. Lancaster. "I thought ANC would be a good place for such a tree and my family was very supportive." The chestnut seedling was planted in Section 31 along Roosevelt Drive. The event was attended by the Lancaster family and representatives from Arlington National Cemetery and TACF.

Massachusetts Fish and Wildlife Sponsors Planting in Westboro Massachusetts

On June 15, a successful planting of five Restoration American chestnut trees took place at the Massachusetts Fish and Wildlife's Westboro field office. Director Wayne MacCallum said "the Division had successfully helped to bring back osprey, eagles and peregrine falcons to the state, and now wanted to help restore the American chestnut."

The Massachusetts Division of Fish and Wildlife manages 180,000 acres of wildlife lands in the state. The event was attended by mem-

bers of the Division of Fish and Wildlife, TACF members, members of several environmental organizations as well as reporters from the Worcester Telegram and Gazette, Metro West News, and the local Westboro cable station.

—*Rufin Van Bossuyt*

The Chestnut Tree Comes Full Circle

This fall, the New York Botanical Garden will add five transgenic American chestnut trees to their arboretum collection. The historic symbolism of this planting is powerful as the new blight-resistant trees will be located within a stone's throw of the very spot where chestnut blight was first identified in 1904. These trees were developed with the support of NY- TACF at the SUNY College of Environmental Science & Forestry in Syracuse, N.Y. The trees will be individually tagged and incorporated into the garden's Plant Records database. This project will include an interpretive sign with information on the Chestnut Project for the public's view.

The New York Botanical Garden receives more than 700,000 visitors every year. This is an absolutely tremendous opportunity to increase public awareness of the Chestnut Project. The ceremonial planting will take place as part of the dedication of the garden's Native Forest as well as the garden's tribute to the United Nations' "International Year of the Forests" celebration. Members of the TACF who wish to attend this historic event will need to purchase a general admission day-pass and pay for parking.

To learn more, contact the Botanical Garden: www.nybg.org

—*Dale Travis & Chuck Maynard*



◀ Mary Ann Lancaster and Family sponsored the planting of a blight resistant American Chestnut. Photo by TACF

Benenson Ornamental Conifers at the New York Botanical Garden Photo by Robert Benenson, Courtesy of NYBG

On the Road in the Carolinas

A Chestnut Scientist's Journal

Editor's Note: We asked hardworking chestnut scientist and volunteer, Dr. Paul Sisco, who probably logs more miles than a long-haul trucker as he works with chestnuts in the Carolinas, to give us an idea of what his days in the field are like. This is his story.

Chestnut inoculation and pollination season in the Carolinas is long and drawn out. It starts about May 20 and ends in mid-July. It's a very long season because of the large differences in elevation. Surviving American chestnut trees are located from 1,200 feet in the Piedmont to 5,300 feet in the mountains. By the end of the season I don't want to drive anywhere – even to the grocery store! But the scenery and the people make all the driving worth it. Here's the story of three sites I visited during this year's nine-week ordeal and the people that are the most important factor in making chestnut breeding a success.

Carolina Apple Country

Henderson County, just south of Asheville, is the heart of North Carolina's apple country. And on what was once an orchard of sheepsnose apples is now one of our best chestnut plantings in North Carolina. It's at the home of Scott and Nancy Pryor. Two families of Clapper BC trees have grown rapidly and with excellent survival, along with some pure American chestnut trees from seeds collected throughout western North Carolina. We inoculated the 5-year-old trees last year with two doses of blight strains SG2-3 and EP155, measured the cankers last fall and

dug up all but the most resistant BC trees this spring. William White, TACF's Southern Regional Science Coordinator, worked late one evening to score all the surviving trees for American chestnut morphological traits, such as leaf hair abundance and type. So we were ready to make BCF2 seed this year for our high-elevation Clapper seed orchard. Interns Steve Barilovits IV and Matthew Egan made controlled pollinations between the best trees from each of the two BC families. We will plant these seeds on the same site next year, surrounded as it is by both beautiful scenery and a \$15,000, 8-foot deer fence. (Thank you National Forest Foundation!)

So what are the advantages of working in apple country? For one thing, the farmers know how to grow trees. And they have equipment! When Dr. Fred Hebard at Meadowview needed to move a large chestnut tree from southwest Virginia to the White House, it was Scott Pryor's brother-in-law and apple grower Boyd "Bub" Hyder, who was able to provide a large enough tree spade and at a very reasonable rate.

Rambling In Christmas Tree Country

The northwestern part of North Carolina is a high plateau, where even the valleys are at a 3,000-foot elevation. This has made it an ideal location for growing Fraser firs, the nation's premier Christmas tree, with soft needles, beautiful form and a fragrant balsam aroma. One of the long-time Fraser fir growers, Ted Farmer of Newland, N.C., is a walking encyclopedia of chestnut lore. Thirty years ago he was helping scientists find surviving American chestnut trees in his area when they were first studying the phenomenon



Fraser fir grower, Ted Farmer holds an American Chestnut
Photo by Dr. Paul Sisco

of hypovirulence – the weakening of the chestnut blight fungus by a viral infection. More recently he has been a great help to me in locating large surviving American chestnut trees to pollinate to make seed for screening for resistance to ink disease. One of the trees we pollinated this year is the second-largest American chestnut tree that we know of in North Carolina. Rodney Purser, the owner,

was happy for us to use the tree. Tony Hunter of Hunter Tree Service provided the tall bucket truck, without which we could not have done the work. Ted Farmer appreciates the work that Joe James and Steve Jeffers are doing, because *Phytophthora cinnamomi* also kills Fraser fir Christmas trees. Ted's daughter-in-law told me he's got such a green thumb that he can "plant a tire and grow a car." That's the kind of person we need growing our chestnut trees!

Couples that Pollinate Together Stay Together

My longest trip in any season is to the orchard of Steve and Jane Motsinger in State Road, N.C.; a three-hour drive one-way from my home near Asheville. Luckily for me, Steve and Jane are skilled orchard managers with green thumbs. And their orchard is right in their backyard – easily visible from the deck of their house. It's an ideal situation for a chapter chestnut orchard. Nevertheless, when we first planted on their land I was worried. Their home is in the Piedmont at a lower elevation than the mountains, and I feared their trees might be killed by ink disease. But Steve, who comes from a family of Fraser fir Christmas tree growers, assured me that his soil had excellent drainage and that ink disease would not likely be a problem. He was right. In 2009, we inoculated their larger trees with two strains of chestnut blight, and this year the selected trees had enough flowers to make cross-pollinations between the best trees of two backcross families to make BC3F2 seed for our chapter



seed orchard. Steve rented a two-person lift to make pollination easier, and Jane, who had never been in a lift, got to join her husband for pollinations. Her one-word summary of the experience: "Cool!"

Dr. Paul Sisco holds a Ph.D. in plant breeding and genetics from Cornell University. He joined TACF in 1986 at the urging of Dr. Charles Burnham. Now retired, he works as a volunteer breeding coordinator for the Carolinas Chapter.



Top, left Image: Steve and Jane Motsinger perform controlled pollination on the large surviving American chestnut known as the Squirrel Hollow Tree, near Newland, NC. Photo by Dr. Paul Sisco

Top, right Image: Steve and Jane Motsinger take a ride in a bucket truck to pollinate their American chestnut tree orchard in State Road, NC. Photo by Dr. Paul Sisco

Steve and Jane Motsinger take a ride in a bucket truck to pollinate their American chestnut tree orchard in State Road, NC. Photo by Dr. Paul Sisco

Spring Activities in Western Pennsylvania

The American Chestnut finds a wealth of support in the Quaker State

by Sue Oram and Sara Fitzsimmons



FOREST Workshop participants learn to use clinometers to measure tree height. Photo by Sara Fitzsimmons

A Thousand Trees Planted

This spring, PA-TACF partnered with the Pennsylvania Game Commission (PGC) and the Pennsylvania Department of Conservation and Natural Resources (DCNR) to initiate an American chestnut progeny test. As part of the test, approximately one thousand seedlings and seed were planted in April on Chestnut Ridge in the southwestern part of the state. The plan calls for more chestnut trees to be planted at the site in the future. The chestnuts were grown by the Pennsylvania Game Commission for the project. Volunteers from PGC and DCNR helped with the planting. The chapter would like to thank Mike DiRinaldo, DCNR service forester, and Art Hamley and Barry Zaffuto of the PGC for their volunteer coordination.

Training Volunteers to be Forest Restoration Specialists

Starting in the spring of 2011, a pilot program called FOREST (FOrest REStoration Specialist Training) was begun in the Ligonier


area. Funded by the Richard King Mellon Foundation, the FOREST program works to train volunteers in an area to help install, maintain, monitor and manage restoration plots of advanced backcross material from TACF.

Each of the four TACF Regional Science Coordinators helped to design and teach specialized aspects at each of the workshops.

The first workshop, "Planting and Management of American Chestnut" was held at Carnegie Mellon's Powdermill Nature Center in Ligonier, April 1-2. The second session, "Pre- and Post-Monitoring Techniques for Restoration" was conducted April 22- 23 at TACF member Bob Summersgill's

farm in Stahlstown, Pa. Two recent graduates of the Penn State Mont Alto forestry program, Derek Furry and Tyler Wagner, assisted at the workshop.

The third class, "Biology of the American Chestnut" was held June 24-25 at the DCNR District office in Laughlintown. The final session "Field ID" is scheduled, with the help of Charles Bier of the Western Pennsylvania Conservancy, for mid-August. More information may be found at the training's website: <http://sfr.psu.edu/public/chestnut/meetings/FOREST>

Those going through the training learn about planting basics, genetics, leaf and wood identification, forest ecology, soil science, fungal biology and forest mensuration, just to name a few of the topics covered in the FOREST workshops. If further funding and interest can be gained, these workshops will be held in another location. We are currently working with our southern regional coordinator to establish a set of the same four workshops in the Southeast. 

Gregor Mendel, Father of Modern Genetics

Mendel's work may have resulted in genetic discoveries, but that wasn't his intention

The science of genetics is fundamental to The American Chestnut Foundation's breeding program. Gregor Mendel (1822-1884) is regarded as the father of genetics based on a paper he present-

ed in 1865 at the Natural History Society of Brünn, Austro-Hungary (now Brno in the Czech Republic). Mendel's subject, Experiments on Plant Hybrids, was given before the discovery of the gene and the allele, so how could Mendel be the father of genetics? The answer is discussed in Gregor Mendel's Experiments on Plant Hybrids, 1992, by Alain F. Corcos and Floyd V. Monaghan of Michigan State University, containing Mendel's 1865 paper with explanatory comment.

Mendel, a Catholic priest, grew and studied the breeding characteristics of the common garden pea, *Pisum sativum*. Why the garden pea? The petals of the garden pea flower conjoin to form a housing that completely encloses the male and female sexual organs. As a result, the garden pea is self-pollinating and therefore less labor intensive for breeding experiments.

There are also interbreeding varieties with differing traits, e.g. one variety with purple flowers and one variety with white ones. Each variety breeds true for flower color.

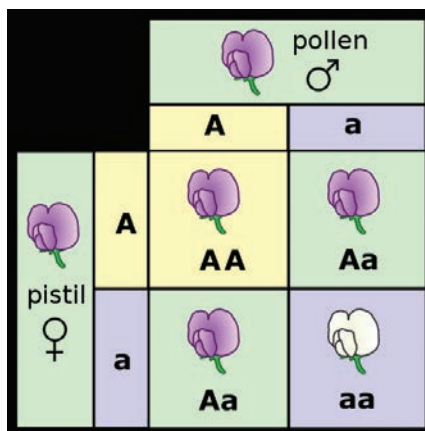
To make crosses between purple- and white-flowered pea plants, Mendel snipped out the pollen producing [male] anthers from all purple flowering plants, thus preventing self-pollination. He then collected pollen from the anthers

of a white flowering plant and brushed the pollen onto the [female] stigma of the purple flowering plant. Mendel planted hundreds of seed from such crosses and found that all hybrid plants had purple flowers. Had the white disappeared? No. When Mendel planted self-pollinated seeds of the purple hybrids they produced offspring with a ratio of three plants with purple flowers to one plant with white flowers. All the plants either had one flower color or the other. No plant had both colors on the same plant.

Mendel reasoned that the hybrid garden pea seed received a unit for color from the male pollen and a unit for color from the female ovule. The reason all of the first generation hybrids had purple flowers was that the purple unit was dominant over the recessive white. Mendel represented dominance with a capital "A," and recessive with a small "a". The color trait of the hybrid was represented as "Aa". The male pollen and the female ovules each contained one unit for color, half of them A and half of them "a". In the self-pollinated offspring these factors combined into pairs of four

types, "AA", "Aa", "aA" and "aa". Therefore, "AA", "Aa" and "aA" would produce purple flowers and "aa" white flowers, a ratio of 3 plants with purple flowers to one plant with white flowers.

Mendel's paper had no impact until 1900, when it was read by scientists who were then in the process of discovering heredity involving the gene and the allele. Corcos and Monaghan wondered how Mendel could be called the



Gregor Mendel, 1822-1884 (above)


This box, a Punnett Square, shows all the possible combinations of alleles that occur from an F1 x F1 (Aa x Aa) cross. Each square represents an equally probable product of fertilization. (below)

Bill Lord, a retired veterinarian, is a naturalist and author who spends much of his time in libraries, researching material with a focus on chestnuts.



father of genetics when his paper was on hybridization reasoning. “The most likely answer is....in the formation of hybrids, characters must be passed from parent plants to their offspring. Since this is basic to inheritance, Mendel’s data could be interpreted as being about heredity. But...the data was not interpreted in that way by him.” Despite any misgivings in the scientific community about Mendel’s personal in-

terpretation of his work, Mendel’s work on heredity has since been celebrated as a cornerstone of the modern study of genetics due to its (now) obvious implications.

Mendel’s pure reasoning places him among the all time greats of science. I wonder if he ever had a “Eureka” moment like Archimedes. Mendel wrote as a mathematician for botanists who did not understand him. Genetics is proud to claim him as its founder. 

Cherokee Chestnut Bread

Recipe and Photo Courtesy of Doug Gillis, President of the Carolinas Chapter of TACF

Cherokee Chestnut Bread



Native Cherokee enjoy this bread made from a recipe handed down through the generations. Chinese or European chestnuts often are substituted, but if you can find American chestnuts, use a bit less sugar as the American chestnuts are naturally sweet.

Ingredients:

- 6 corn blades, washed and scalded in boiling water
- 2 cups hulled, peeled chestnuts, chopped
- 1 cup coarsely ground cornmeal (such as yellow corn grits)
- 1 cup of plain, ground cornmeal
- ¼ tsp salt
- ¼ tsp soda
- ½ cup sugar
- 1 cup water

Shred one corn blade (leaf) from end to end to create narrow, one-inch wide strips.

To make the bread dough, mix the cornmeal, salt, soda and sugar. (Use of yellow corn grits will add texture to the cooked bread.) Add the chopped, fresh chestnuts. Add water slowly to make stiff bread dough, a full cup may not be needed. Place a portion of dough on the wide end of a corn blade. Wrap the leaf around the mixture, first the sides and then the large end, molding the dough into a rectangular shape about two inches wide, four inches long and one inch thick. Be sure the dough is completely covered by the leaf. Leave the narrow end of the corn blade free and unwrapped for the next step.

Split the narrow end of the corn blade into two strands and wrap each strand in opposite directions around the rest of the wrapped bundle. Tie the two strands into a knot to securely bind the chestnut cornmeal mixture within the leaf wrapping. Tie with additional one-inch strips (from first step, above) if necessary. Gently drop the wrapped packets in boiling water and simmer for 60 minutes. After boiling, remove the packets, drain and allow to cool just a little. Unwrap the packets while still warm and serve with butter. Leftover bread can be reheated in a skillet and served warm with butter.



Chestnut Moments

My Dear Lester:

I hope I may get a letter from you soon.

There is a new disease here called

Influenza. There is a good many cases at Brevard and several at Cherryfield.

Several more of the boys have got their war papers. Joe Lance, Rufus Barton, Frank Turner and Odd Bryson.

A lot of the people here think the war will soon end and I hope and trust it

will. A crowd of us girls went up on

Kirkendoll Creek a chestnut hunting last Thursday. We sure had a nice time

only wish you could have been with us.

--Nora Ross

Excerpt from a letter written by Nora Ross to a friend in October of 1918. America was embroiled in World War I, influenza was about to become the most deadly disease in the country's history and people still took pleasure in hunting for chestnuts. Letter Courtesy of Transylvania Heritage Museum, Brevard NC, Submitted by Don Surrette. Read original letter online at www.acf.org.



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