SUMMER 2015 ~ ISSUE 2 VOL. 29

Chestnut

THE NEW JOURNAL OF THE AMERICAN CHESTNUT FOUNDATION

A BENEFIT TO MEMBERS

THE AMERICAN CHESTNUT FOUNDATION®

TACF Annual Meeting ~ Inoculation Best Practices ~ Flight 93 National Memorial ~ Fire Effects on Sprout Populations

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Lisa Thomson

President and CEO

DEAR CHESTNUT FRIENDS,

Since I last wrote, I have had the great pleasure to meet many of you in person and experience the amazing work on the ground in our effort to restore the American chestnut to our eastern forests. Thanks to each and every one of you for all you do to help move the mission forward and for the warm welcome I have received. I am humbled to lead such an amazing organization with its unique and positive mission and look forward to serving in the years ahead.

Dedicated volunteerism is at the very core of our organizational values. Since I began in January, I have been from Quechee, Vermont to Guntersville, Alabama and many parts in between to learn and listen to those key individuals who are the lifeblood of our work: our chapter volunteers and committed supporters.

Our mission is a very long-range one, unusual in this fast-paced world. The back-breeding process continues to be an intensive and deliberate scientific endeavor to discover the genes responsible for blight resistance, but our dedicated corps of science staff and field volunteers is building on the visionary work of our founders. To honor our past, please look to future issues of *Chestnut* for a new feature that profiles the individuals who built this organization.

Dr. Frederick V. Hebard

The American Chestnut Foundation would not be where it is today without the perseverance of one key staff member, our longest tenured employee, Dr. Frederick V. Hebard. After decades of dedication to our cause, Dr. Hebard is retiring this month and will assume the title of Chief Scientist Emeritus. Dr. Hebard began his career at TACF in 1989, at which time he implemented the famed Burnham Plan, breeding pure American chestnut trees with Chinese chestnuts to capture the latter's blight resistant genes. This "back-breeding" process was carefully conducted for nearly 3 decades under Dr. Hebard's leadership and watchful eye, primarily on TACF's Glenn C. Price Research Lab and Farms in Meadowview, Virginia. Dr. Hebard's expertise includes both tree pathology and breeding. Dr. Hebard's contributions to the restoration of this species include countless hours of research and the planting of over 130,000 chestnuts on the farms. His tenacity and commitment to this endeavor has resulted in the development of populations of trees that average 15/16 American chestnut and are our most advanced, blight-resistant generation to date.

Please join TACF in congratulating Dr. Hebard upon his retirement and title, thanking him for his tireless efforts to save the American chestnut tree from the verge of extinction, and for his many contributions to the organization.

Lisa Thomson

Lisa Thomson
President and CEO
The American Chestnut Foundation

Follow me on Twitter (@MadameChestnut).

"Chestnut Spring"

2014 Photo Contest Winner

Taken at the Riverbanks Zoo in Columbia, SC. Photo by Brian Fox.

THE AMERICAN CHESTNUT FOUNDATION®

WHAT WE DO

The mission of The American Chestnut Foundation is to restore the American chestnut tree to our eastern woodlands to benefit our environment, our wildlife, and our society.

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A cub scout, along with another scout's sister, from Pack 117 in Meadowview, VA, assists with site preparation prior to the chestnut seedlings planting. Photo by Krystal Lee.

PLANTING AMERICAN CHESTNUT TREES IN National Forests

By Lisa Sousa, Director of Grants & Agreements

In a heavy November downpour, The American Chestnut Foundation (TACF) volunteers battled mud and cold to install deer cages around chestnut seedlings in the Jefferson National Forest. These tenacious volunteers were part of TACF's project "Planting American Chestnut Trees in National Forests," funded in part by the National Forest Foundation's 2014 Matching Awards Program. This generous grant provided TACF with the supplies needed to successfully plant 1,150 Restoration Chestnut 1.0 seedlings in the Jefferson National Forest in Virginia and the Allegheny National Forest in Pennsylvania.


A crew of Forest Service staff, student interns and local volunteers receive planting instructions from silviculturist and project leader Scott Tepke. The seedlings are part of a study testing the chestnuts ability to compete with natural regeneration. Photo by Scott Tepke.

Thirty-three community volunteers participated in this project by getting their hands dirty with on-the-ground work in our national forests. Volunteers helped with a variety of tasks from site preparation to planting the trees, instilling in each person an enthusiasm for being stewards of our national forests.

The Restoration Chestnuts 1.0 planted as part of this project are TACF's first line of potentially blight-resistant American chestnuts, the result of 30 years of backcross breeding. TACF is now in a phase of rigorous testing of these trees in forest and orchard environments. Test plantings established in national forests will allow TACF and the USDA Forest Service to evaluate the resilience of these trees in a forest environment with natural competition.

For this project, seeds were harvested from TACF's Meadowview Research Farms, grown into seedlings, and then delivered to the respective national forests. Sara Fitzsimmons, TACF's North Central Regional Science Coordinator, and Jeff Donahue, TACF's Director of Farm Operations, worked alongside the USDA Forest Service and community volunteers to establish these plantings.

Jefferson National Forest

In August, TACF staff worked with 17 volunteers at Meadowview Research Farms in Virginia to prepare for this planting. Volunteers cut rolls of fence into 6-foot pieces, which were later used to make deer protection cages around the trees. Volunteers also cut rolls of weed mat into pieces to be placed around the planted trees. Donahue visited the planting site at the Jefferson National Forest to determine where trees will be planted and to help lay out the rows. Site preparation continued in October when volunteers helped with site flagging and fence prepping.

In November, TACF planted 500 seedlings with the help of nine volunteers. In December the fence was installed with the help of 12 volunteers. An additional 100 trees were planted in April 2015 for a total of 600 chestnuts planted at this site.

Cub scouts from Pack 117 in Meadowview, Virginia participated during one of the planting days. The scouts removed debris from the site, collected and placed rocks at each tree to hold the vegetation control mats down, and distributed tree protection cages after the adult volunteers constructed them.

Cubmaster Bill Miller said of the experience: "We usually do at least one tree planting project each year in order to teach the boys about conservation. Working with TACF was a tremendous opportunity for the pack and the boys immensely enjoyed it."

TACF's Southwest Virginia Restoration Branch (SVRB), an active group of volunteers who work on local American chestnut projects, played a major role in this project. All the volunteers who participated in this project were either members of the SVRB, or were recruited from the branch's list of 200 community volunteers it maintains. TACF is grateful for such an enthusiastic and dedicated group

"We usually do at least one tree planting project each year in order to teach the boys about conservation. Working with TACF was a tremendous opportunity..." *Cubmaster Bill Miller, Pack 117*

Marienville District Silviculturist Jerry Jordan works with Pathways Student Intern Alexa Lalusky in planting chestnut seedlings. Alexa is a Forestry student at Pennsylvania College of Technology.
Photo by Scott Tepke.

of volunteers who were willing to help in adverse weather conditions to make this planting a success.

Allegheny National Forest

In May of 2014, 550 Restoration Chestnuts 1.0 were planted in the Allegheny National Forest by USDA Forest Service staff with the help of four volunteers from the community. An additional 250 trees were planted in May of 2015.

This planting is part of a study to test the chestnuts' ability to compete with natural regeneration. Fitzsimmons coordinated with USDA Forest Service Forester Scott Tepke to complete this planting. As a long-term project, TACF will return each year with volunteers to monitor the site.

The Allegheny National Forest is a very interesting site for American chestnut restoration. The forest has a large number of native American chestnuts that have sprouted up, some have even survived to be large trees. It is rare to find this many naturally occurring American chestnut sprouts in the northern tier of Pennsylvania because this glaciated area often has wet, compacted soil. However the Alleghany National Forest site is an anomaly. The forest is also known for growing the world's best black cherry trees. TACF staff hypothesize that there is something about the soil in the Allegheny National Forest that allows black cherry, as well as chestnut, to thrive. This is the third planting TACF has established in the Allegheny National Forest; the first installed in 1995 and the second in 2006. TACF is excited to have been able to establish a third planting in this exceptional forest.

Partnering with the USDA Forest Service

The USDA Forest Service is one of TACF's largest long-term partners, providing the use of national forest land and the assistance of personnel to establish research plantings of American chestnut. Because TACF is still in a phase of testing our potentially blight-resistant American chestnuts and refining our breeding program, we do not expect all the trees planted to survive without succumbing to the blight. However, there is a good chance that some will survive and potentially create a self-sustaining stand of American chestnuts. These surviving American chestnuts will help to increase the biodiversity of our national forests and will provide a nutritious food source for wildlife.

The American Chestnut Foundation is grateful for the generous support received from the National Forest Foundation's Matching Awards Program, which provided funding for these plantings. And for the 33 community volunteers who helped get these trees in the ground, some withstanding a rainstorm to make sure the seedlings were protected.

About the National Forest Foundation

Founded by Congress in 1991, the National Forest Foundation works to conserve, restore and enhance America's 193-million-acre National Forest System. Through community-based strategies and public-private partnerships, the NFF helps enhance wildlife habitat, revitalizes wildfire-damaged landscapes, restores watersheds, and improves recreational resources for the benefit of all Americans.

THE AMERICAN CHESTNUT FOUNDATION AND OWEN MIDDLE SCHOOL JOIN FORCES FOR

Conservation and Education

Tom Saielli, Regional Science Coordinator, instructs Owen Middle School students on how to plant an American chestnut seedling in the campus orchard.
All photos courtesy of Brittany Krasutsky.

TACF has partnered with Charles D. Owen Middle School in Swannanoa, NC as part of the school's Natural Impact Initiative. The goal of this unique program is to connect students to their natural Appalachian heritage through outdoor ecological sites designed for exploratory learning. This tremendous collaboration promises long-term opportunities for education, restoration and conservation within both organizations.

Students and teachers worked with TACF scientists and volunteers on April 16 to begin installation of a germplasm conservation orchard located behind the school. Germplasm is hereditary material, like genes. The ultimate goal of a germplasm conservation orchard is to preserve native germplasm, and in this case, native germplasm of the American chestnut tree.

The first phase of the project included planting 10 trees: 3 wild American seedlings transplanted from surrounding mountains in the area; 2 F1 hybrids which are 50% American chestnut and 50% Chinese chestnut; 3 *Castanea henryi* or Chinese chinquapins; and 2 Chinese chestnuts which will be used to provide control stock (primarily to make F1 controls). The trees are very important to the Foundation's breeding program and will eventually be incorporated into the breeding process.

TACF Regional Science Coordinator Tom Saielli worked with School Counselor Carl Firley and Seventh Grade Science Teacher Brittany Krasutsky to implement this hands-on learning experience. Krasutsky also serves as Chair of the Natural Impact Initiative. TACF's germplasm conservation orchard is a perfect fit for both organizations because it provides opportunities for TACF to advance

"This important conservation work fits in well with our school mission and vision, along with complimenting North Carolina educational standards."

Brittany Krasutsky, Owen Middle School Seventh Grade Science Teacher

its breeding program, and it also provides tremendous educational opportunities for students to learn about and participate in the breeding process – helping to plant and care for the seedlings, assisting with controlled pollinations, and treating early blight cankers with mud packing techniques.

Krasutsky stated, "This important conservation work fits in well with our school mission and vision, along with complimenting North Carolina educational standards. In 7th grade, students study cell structure and function, followed by our unit on genetics. This program will facilitate a deeper understanding of these topics through being involved in an ongoing experiment designed to save a piece of their native Appalachian heritage." In addition, the project will serve as a public demonstration orchard with informational signage, making the learning opportunity available to everyone who visits. She added, "Owen Middle School's partnership with TACF is beneficial to our students and the community as a whole."

Saielli stated, "This orchard, if successful, will be very treasured. All of the genotypes planted at Owen Middle School serve a critical role in TACF's breeding program. Having these trees in one location makes controlled pollinations much easier to accomplish and allows for tremendous learning opportunities. Over the years, we will continue to add trees to the site – especially more wild Americans – and as they grow, we will pollinate in the spring and harvest nuts in the fall. I can't think of anything better!"

TACF will continue to work with Owen Middle School to care for and expand this project. "We are excited about a long-term partnership with TACF," stated Dr. Heidi Von Dohlen, Principal. The goal is to plant pure species of Castanea (primarily American chestnuts from interesting local sources) as well as a variety of other species, such as Chinese and Japanese chestnut. By spreading the seedlings out, planting them over time and pampering them, the trees will grow quickly. All will be used in TACF's genetic breeding program in order to make a wide variety of important crosses for the restoration of the American chestnut.

Ezekiel Bauer, 7th-grade student, shows off his muddy hands.

Ms. Krasutsky's homeroom came out in the rain to participate in the initial planting.

Planting Chestnuts

AT THE FLIGHT 93 NATIONAL MEMORIAL

By Lisa Sousa, Director of Grants & Agreements

On April 17-18, The American Chestnut Foundation (TACF) was honored to participate in "Plant-a-Tree at Flight 93."

This annual event is organized by the National Park Service, the Friends of Flight 93, and the National Park Foundation as part of a major reforestation effort that will ultimately result in large areas of new forest at the Flight 93 National Memorial.

The Flight 93 National Memorial is a national park created to commemorate the passengers and crew of United Airlines Flight 93 who, on September 11, 2001, courageously gave their lives by thwarting a planned attack on our nation's capital. The memorial is near Shanksville, Pennsylvania, where Flight 93 crashed, resulting in the loss of its 40 passengers and crew.

More than 500 volunteers helped prepare and plant 22,000 seedlings, including 1,500 Restoration Chestnuts 1.0 on 32 acres of reclaimed mined land which is part of the Memorial. This year, there was an added focus on removing invasive plants that are threatening trees planted in past years. Volunteers included friends and family members of the victims of the terrorist attack, college students and professors, forestry professionals, and the general public.

TACF Forester Michael French helped organize the chestnut plantings, working with the Appalachian Regional Reforestation Initiative (ARRI), Green Forests Work (GFW), and many other partners. French says of the event, "The Flight 93 National Memorial Reforestation effort is always a highlight of the planting season. The National Park Service staff and the volunteers are wonderful to work with and it's rewarding to return each year to see the growth of seedlings from the plantings of previous years."

TACF's President & CEO, Lisa Thomson, joined the planting efforts this year: "This was my first volunteer planting as President of TACF and one I won't ever forget. I was moved by the setting and the dedication of the National Park Service and their partners to honor the memories."

The Flight 93 National Memorial is the largest mixed hardwood/American chestnut reforestation effort that TACF has been involved with to date. Since 2012, TACF has planted more than 3,400 chestnuts across 100+ acres. A project of this scope heightens the visibility of American chestnut restoration. Symbolically, the addition of TACF's potentially blight-resistant Restoration Chestnuts 1.0 to the site is a powerful statement of renewal and hope. We are proud to be able to provide trees for this purpose and look forward to participating in years to come. TACF is grateful to the Richard King Mellon Foundation for generously providing funding for this project.

For more information, visit: flight93friends.org.


US Airways volunteers plant seedlings on April 18 for the Flight 93 Memorial.


Scott Eggerud of the Office of Surface Mining Reclamation and Enforcement gives team leaders and planters final instructions before they hit the field.


TACF Forester Michael French and President & CEO Lisa Thomson brave the rain during the first day of planting at the Flight 93 Memorial.

All photos submitted by Michael French and Lisa Thomson.

A black ant crawls across the stump of an American chestnut tree located in the backcross orchard at Cataloochee Ranch in North Carolina.
Photo by Jimmy Summers.

THE AMERICAN CHESTNUT FOUNDATION'S

2015 CHESTNUT PHOTO CONTEST

Send your best chestnut-themed photos to TACF! The winning photo will be featured on an upcoming cover of the new journal of The American Chestnut Foundation, *Chestnut*. The winner will also receive a TACF T-shirt and a complimentary one-year TACF membership.

HOW TO ENTER & CONTEST TERMS:

Photos should be sent digitally (submitted on disk or flash drive, or via e-mail or Drop Box) no later than September 1, 2015.

- Include your name, address, and telephone number with your submission, as well as the words: "Entry for TACF Photo Contest."
- All photos must have been taken by you and not previously published or submitted to any other contest.
- All entries must be submitted with full caption information including names of subjects, locations, etc.
- All photos must in some way relate to the American chestnut.
- Entries must be at least 2500 x 3430 pixels and in a .jpeg or a .tiff format.
- If a person in the photo is recognizable, you must secure a model release from the subject or in the case of a minor from a parent or guardian and enclose it with your entry.

SEND ENTRIES TO:

The American Chestnut Foundation, 50 North Merrimon Avenue, Suite 115, Asheville, NC 28804
Attn: Catherine Farist (e-mail: Catherine@acf.org)

*By entering the contest, entrants grant The American Chestnut Foundation a royalty-free, worldwide, perpetual, nonexclusive 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 on its website, exhibition, and commercial products, including but not limited to 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.

“Jack exemplifies how an inspired volunteer can push our mission forward with his enthusiasm, commitment, and perseverance.”

THOMAS SAIELLI, SOUTHERN REGIONAL SCIENCE COORDINATOR

DR. JOHN (JACK) AGRICOLA

Dr. John (Jack) Agricola has always loved a challenge. The Alabama chapter member earned his doctoral degree in art, and he says that the restoration of the American chestnut is akin to the study of art because both require a special breed of perseverance.

Agricola became involved with the American chestnut nearly a decade ago when a colleague gifted him the book *Mighty Giants*. He was instantly captivated by its artwork, writing, stories, and personalities. Soon thereafter, he decided he wanted to see a chestnut orchard firsthand so he scheduled a visit to Meadowview Research Farms in Virginia.

Upon arrival, Agricola received the complete ‘Dr. Fred Hebard tour.’ As TACF’s pathologist, Hebard has been instrumental with Meadowview’s breeding program since 1989. Agricola reflected, “I had reached my limits of understanding what this man was saying after the first thirty minutes, but I was enraptured by the personality who was the personification of the personages in *Mighty Giants*. The book had come to life… and so had the chestnut.”

Agricola has now been a dedicated TACF member for eight years. As one who is always quick to jump into leadership roles, he helped orchestrate what Southern Regional Science Coordinator Thomas Saielli called, “one of the most successful progeny test plantings in the southern region,” at Sewanee: The University of the South. This planting established the first large-scale progeny orchard in the southern region, planting 800 Restoration Chestnut 1.0 seedlings over a span of two days.

“Jack has been a driving force behind the Alabama chapter. He developed an important partnership with NASA, pushed the breeding program forward, and coordinated the state’s first extensive restoration planting,” said Saielli. “Jack exemplifies how an inspired volunteer can push our mission forward with his enthusiasm, commitment, and perseverance.”

Agricola’s favorite activities include: working in the yard, trimming bushes, or having Carolinas Chapter President Doug Gillis educate him about the Civil War during TACF conferences. Chestnutting occupies his spare time, as he finds there is always work to be done.

“Undoubtedly, I find the best part of TACF to be the individuals and people involved in such an altruistic enterprise. Inspirational are the dedicated staff members of TACF who keep the ship righted. I have seen chestnutters in the field sacrifice basic levels of health and comfort to get the job, whatever it might call for, accomplished.”

In 2014 Agricola concluded his two-year governance as Alabama chapter president and is excited to see his successor, David Swinford, tackle initiatives on the chapter’s horizon. He will continue to be active in the chapter, stating: “It is truly rewarding to join the legions of environmentally sensitive individuals in the bonded belief that our efforts will one day make a difference.”

Professionally, he first served as a chairman in the art department of a small Methodist liberal arts college in Mississippi. After that, he began working as a residential land developer, creating environmentally friendly formulas for new-age subdivisions. This easily melded toward his chestnut restoration efforts later in life. “My fast shift from the pure world of art to the purest form of restoration is linked by a single constant: a seminal sense of guilt; devastating the landscape for art or rehabilitating the devastated landscape as art. So I see the process of chestnut restoration much like the process of art.”

PENN STATE SERVES AS PERMANENT HOME FOR

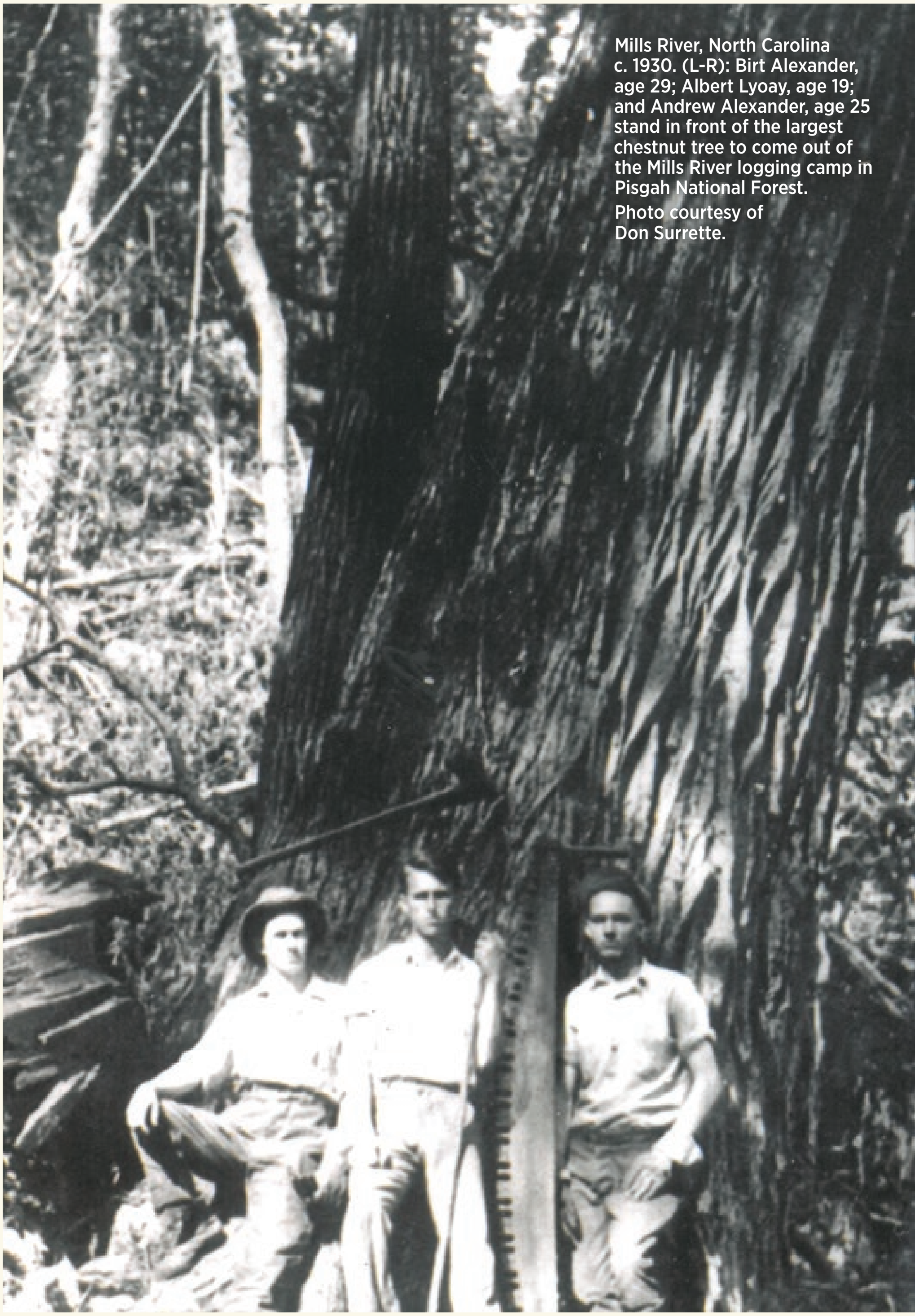
Foundation Archives

The American Chestnut Foundation (TACF) is pleased to announce the formal debut of The American Chestnut Foundation Archives. After five years in production, this important project was largely brought to life through the efforts of Dr. William Lord and Dr. Kim Steiner. The foundation is very appreciative for their shared vision and dedication to this historical documentation. The collection has a permanent home in The Penn State University Archives, and Steiner was integral in securing its final location.

The project itself is long in the making. In fact, Lord became involved with the archive in 1996 when he received a request from past TACF President L.L. (Bud) Coulter. Coulter felt it was extremely important to begin recording the foundation's history and Lord agreed wholeheartedly. "Contributing to TACF is something that is very dear to my heart. I am in awe of the efforts volunteers, supported by a responsive and on-the-mark staff, have made on behalf of chestnut restoration."

The Penn State University Archives officially became part of this project in May 2010. In an email correspondence with Steiner, the University Archivist Jackie Esposito wrote: "The Penn State University Archives [is] delighted to host the American Chestnut Foundation archives. Penn State's long-standing history of chestnut research affords the University a unique perspective on the development, preservation, and importance of this significant and unique species."

Stephen Hoy, orchard manager of the PA chapter, found the sheer volume of archive material to be daunting, but the scope and diversity to be profound. "Perhaps the most



Mills River, North Carolina c. 1930. (L-R): Birt Alexander, age 29; Albert Lyoay, age 19; and Andrew Alexander, age 25 stand in front of the largest chestnut tree to come out of the Mills River logging camp in Pisgah National Forest.

Photo courtesy of Don Surrette.

TACF wants to continue building this historical library. If you have items you would like to contribute to The American Chestnut Foundation Archives, please contact the TACF National Office at (828) 281-0047 or via email at chestnut@acf.org.

notable and moving pieces were the memories that members submitted about their experiences with chestnut trees while growing up. Reading through some of those accounts made me understand the immense impact the loss of this species had in the rural range of Appalachia. To shift from these memories of sadness and despair to a scientific article touting the progress being made to restore the American chestnut was a unique and enlightening experience. To be able to see the humble beginnings of this foundation and the impact it has had was very inspiring!"

Hoy and PA chapter intern Ethan Mansfield spent countless hours physically sifting through and organizing the files. Mansfield found it very memorable to see the knowledge collected in finding a solution to return the American chestnut to its native range. "One of the most interesting articles I discovered was "The Chestnut's Chemical Arsenal" which pertained to the trees' ability to contain a natural herbicide. This natural herbicide is located in American chestnut leaves and contributes to the reduction of many species that prospered since the chestnut's decline, including eastern hemlock and rhododendron. I hope organizing these important articles will allow current and future TACF members to find necessary information, expand their knowledge, and teach others about the efforts being made to restore the American chestnut."

Deb Ridgeway serves as secretary for the Raystown Restoration Branch. She explained that the initial goal of the archive project was to establish a permanent location and preservation methodology for historical records of TACF and the PA chapter. "These materials have continuing value to researchers seeking information about The American Chestnut Foundation and the science that stands behind the organization's critical work".

The American Chestnut Foundation Archives would not exist without the tremendous efforts of the following staff, interns, and volunteers: Stephanie Bailey, Mark Banker, Vicki Brownell, Sara Fitzsimmons, Rebecca Hirsch, Stephen Hoy, Meghan Jordan, Tyler Kulfan, Ethan Mansfield, Deb Ridgeway, and Aryk Strunk.

The general public may access The American Chestnut Foundation Archives in the Special Collections section of the Paterno Library at Penn State University in State College.

(L-R): Founding TACF members Phil Rutter, Fred Hebard, and Bill Raoul deliberate over a chestnut tree at Meadowview Research Farms, c. 1990.
Photo courtesy of John Herrington.

The TACF Archive currently contains the following materials:

- 2000+ pages of handwritten, typed, and e-mail correspondence
- 100+ photos of chestnut trees, research farms, plantings, meetings, and other projects
- 50+ binders of meeting notes, articles, and information
- 500+ articles about chestnut trees, research, and the efforts of TACF to restore species

These materials were generously made available through the following donations:

- Dr. Bill Lord's collection of board meeting minutes, his writings, scientific articles, magazines, and newspaper clippings;
- Tracey Coulter's collection from her father, Bud Coulter, that includes board meetings minutes, his writings, personal correspondence with Charles Burnham, slides and photographs, and magazine and newspaper clippings;
- PA/NJ Chapter collections including videos, photographs, magazine and newspaper clippings, board meeting minutes, and chapter newsletters;
- TACF National office collections including videos, organizational papers, board meeting minutes, and various publications (Journals, Barks, Chapter newsletters).

MARYLAND CHAPTER'S BATTLE WITH THE Ambrosia Beetle

By Jim Curtis, Maryland Chapter


An ambrosia beetle.
Photo by Stephen Ausmus, USDA, Creative Commons, May 2012


A three-year-old recently infected B3 tree. Take note of the frass tubes.


A close up view of the ambrosia beetle frass tubes.

All photos by Jim Curtis.

Since 2011, the Maryland Chapter has been fighting the Ambrosia beetle (*Xylosandrus sp.*) within several orchards. While not yet successful in eliminating the damage these insects cause, we have begun a program of detection and spraying to reduce the effects of the infestations.

With guidance from Stanton Gill, extension IPM specialist for the University of Maryland, and Matt Brinckman, mid-Atlantic regional science coordinator, we have set up alcohol baited beetle traps and closely examined the trees for the borings markings at most of our orchards. If the beetles are detected early enough, or if there is a history of beetle infestation, the trees are sprayed with Permethin. The Permethrin spray is usually effective for two to three weeks.

Tiny boreholes, usually wet with sap, are the first noticeable signs of an infected tree. However, if the white termite droppings, or frass tubes, are easily spotted, it could mean that it is too late to spray. If there are a significant number of frass tubes, the tree will be removed to prevent the eggs from hatching. Egg hatching takes place about 55 days after they are deposited. We have found that most damage occurs in the spring, usually just before leaf-out, and the beetles typically attack the trees within the 1-2 inch diameter class. Many times the infected trees show delayed leaf-out, if not killed outright.

One small consolation in our struggle with the ambrosia beetles is that they only seem to attack the trees in April and May. And while we are aware that there is a second, and potentially a third generation that could emerge, we have not seen them in our orchards. For that reason, we have stopped spraying Permethrin after May. This saves us a great deal of work and spares further destruction of beneficial insects.

To date, there has been ambrosia beetle damage documented at nine of our seventeen orchards. In the worst reported case, more than 100 trees were affected, but so far, this amount of damage has only occurred in two of our orchards. The other less infected orchards reported fewer than ten trees damaged.

Presently, we are investigating the use of repellants such as Verbenone or Disrupt Micro-Flake VBN, along with other new pest control methods. With these tools and continued diligence, we hope to see our efforts reduce the beetle damage to a tolerable level.

HISTORIC TENNESSEE PARK NOW NEW SITE FOR RESTORATION CHESTNUTS 1.0

The Winstead Hill Park located in Franklin, TN now displays seven Restoration Chestnut 1.0 seedlings. This demonstration planting was made possible by TACF's Tennessee Chapter, Franklin Arborist Todd Snackenburg, the Franklin Tree Commission, and the Franklin Parks Department.

"Many thanks to Todd Snackenburg, Franklin City Arborist, for the many hours he spent making this happen. And I can assure everyone, these trees will be well cared for by Todd's team; perhaps the most "babied" trees in North America," boasts Greg Weaver of the Tennessee Chapter.

The 61-acre park is a quiet preserve with historical exhibits and a popular trail route. During the November 30, 1864 Battle of Franklin, Winstead Hill was the site of Confederate General John Bell Hood's field headquarters. The chestnut grove is about 200 yards downslope from the headquarters site, at the junction of two walking trails, so this planting presents a great opportunity to educate residents and tourists about TACF's important work.

Tennessee Chapter members Michael Johnson and Tim Phelps prep the area for Restoration Chestnuts 1.0. Photo courtesy of Greg Weaver.

WEST VIRGINIA UNIVERSITY STUDENTS ESTABLISH CHESTNUT RIDGE PLANTING

Photo courtesy of William MacDonald.

Mark Double of the West Virginia Chapter worked with a group of students representing Student Chapters of the Society of American Foresters and the Student Society of Arboriculture of West Virginia University (WVU) to establish a planting of advanced generation-American chestnut seeds. The planting took place on "Chestnut Ridge" at the WVU Forest in April.

"I must brag about the students. They were committed, enthusiastic and took remarkable initiative," said William MacDonald, TACF Board member and WV Chapter member. MacDonald and his team anticipate adding additional trees to the site this fall, with a follow-up report to be presented at the Fall WV-TACF meeting in Rowlesburg.

UNIVERSITY OF MAINE STUDENTS BUILD 3,000 TREE SHELTERS

Sacrificing a precious Saturday, University of Maine students banned together at the Nutting Hall Forestry building to assemble nearly 3,000 individual tree shelters for the Maine Chapter of TACF. These shelters will protect Maine Chapter seedlings located in the state orchards as well as seedlings used for science.

Dr. Brian Roth of the Maine Chapter organized and managed this great effort. He said, "The restoration effort is sure to be successful with students like these with such energy and continued interest in the project".

Photo courtesy of Brian Roth.

Restoration Field Testing

COLD-HARDINESS VERSUS BLIGHT RESISTANCE IN MAINE

By Jeanne Siviski and Dr. Brian Roth


Dr. Brian Roth works with a volunteer to record data at the Ladd Forest in Vienna, Maine.

The Maine Chapter is a little over five years from producing the first B_3F_3 seeds from seed orchards established with crosses from pure American sources from Maine. Maine is on the northernmost limit of the American chestnut's historical range and cold-hardiness, along with blight resistance, is a big concern. Earlier experimentation in Vermont by Tom Saielli, Kendra Gurney and others with the US Forest Service Northern Research Station and University of Vermont, examined the effects of genetics and silviculture on winter cold injury. In 2015, Dr. Brian Roth at the University of Maine initiated a series of two large field trials designed to test extreme combinations of genetic improvement for blight resistance with seed sources from warm and cold temperature zones.

Nearly 1,300 seeds from native American, Chinese, B_3F_2, and B_3F_3 sources from warm and cold temperature zones across the native range of American chestnut were planted by volunteers. "Collecting the seed needed for this test was truly a regional effort, with many Chapters mailing me seeds from as far away as GA and NY," states Dr. Roth.

One of the findings from the earlier experiments in Vermont was the benefit of under-planting in a recently harvested shelterwood. The remaining trees in the overstory offer some protection from cold temperatures and desiccating winds, while still letting in enough light for chestnuts to become established. One installation in Maine was planted in a recently harvested shelterwood at the Ladd Forest, owned by the Small Woodland Owners Association of Maine (SWOAM) in Vienna, ME. The other installation was planted in an open field at the Thurston Memorial Forest, owned by the New England Forestry Foundation in the town of Knox, ME. Each research area is approximately one acre in size, with small replicated 'blocks' of 36 trees within each genetic and temperature zone source, planted as seed on 8-foot spacing. Each 'block' contains a mix of four to six seed sources from within that zone.


Maine Chapter President Al Faust lends a hand to Brian Roth at the Ladd Forest.

Kendra Gurney, New England Regional Science Coordinator for TACF, said that Dr. Roth's tests would provide data about "how well-adapted the trees from our breeding efforts may be at the northern edge of the native range, as well as what management or planting practices might be best in these harsher environments." In terms of cold-hardiness, extreme events, such as record-setting cold temperatures this February, are of more concern than what happens year to year. According to Dr. Roth, "In an experiment of this size and complexity, there is always something we learn that we were not expecting." Finding an ideal mix of cold-hardiness and blight resistance is Dr. Roth's ultimate goal. "It's a needle in a haystack," he said. "Somewhere out there is the right combination of genes adapted for Maine's forests."

[1]Saielli, T.M., P.G. Schaberg, G.J. Hawley, J.M. Halman, and K.M. Gurney. 2014. Genetics and silvicultural treatments influence the growth and shoot winter injury of American chestnut in Vermont. Forest Science. 60(6):1068 –1076.

TACF FACT SHEETS

THE AMERICAN CHESTNUT FOUNDATION®

The TACF website (acf.org/resources.php) now contains a variety of printer-friendly "Fact Sheets." Authored by TACF's science staff, these documents are designed to be short, informative resources on a variety of chestnut topics. Please check the above link to stay informed as new Fact Sheets are added to our library of member resources.

American Chestnut: Identification

Help TACF Programs with Proper Identification Practices

Identifying American Chestnut

American chestnut, *Castanea dentata*, is a simple and alternate-leafed deciduous tree in the beech family. In North America they share a genus with both Allegheny and Ozark chinquapin, and are close relatives of both American beech and native oaks. American chestnuts produce three nuts per burr, distinguishing them from the one nut per bur chinquapins. In addition, many exotic and hybrid chestnuts may be found in the US, including Chinese, Japanese, and European chestnuts, as well as many named cultivars and hybrid varieties.

Figure 1. Typical American chestnut leaf found in the wild. Photo courtesy of Kendra Gurney.

The buds of the American chestnut are small, with just a few scales, and stick out from the stem at about a 45° angle. They are usually pointed, or pyramid-shaped, and may be red, orange or yellow, depending on the time of year. The buds are hairless. The stem, or twig, is also hairless and often reddish-brown in color, with small white lenticels or speckles.

Species Identification is Not an Exact Science

As with any biological system, especially one based on morphology, these traits are guidelines. Not every specimen is going to follow the rules! It's important to remember that the presence or absence of any one trait does not always

American chestnut can be identified using a range of traits. The leaves are long and canoe-shaped, with equal taper at both tips. They exhibit distinct toothy dentations along the leaf margin that hook over, like a breaking ocean wave (Figure 1). The leaf surface is generally dull, though may become somewhat waxy or glossy when grown in full sun. The underside surface of the leaf is hairless, with only a few long hairs on the mid-rib and other leaf veins.

In addition, there are microscopic glandular hairs, or trichomes (Figure 2), that are distinct to the American species and can be used for identification. American chestnut trichomes are 4-celled and shaped like a hot-cross bun or donut.

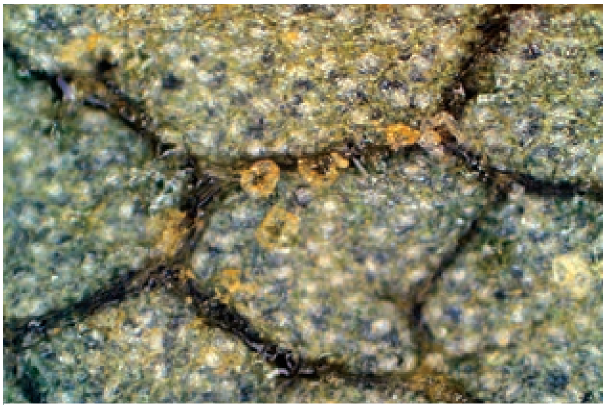


Figure 2. Characteristic American chestnut glandular hair, called trichomes. Photo courtesy of Stephen Baumann.

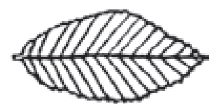
dictate the species identification, rather it's a matter of looking at several traits and coming up with the best fit. This means that morphologic species identification, like many of aspects of biology, is not always an exact science and can require some practice.

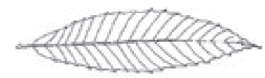
A good example is to look at sun leaves vs. shade leaves. Many of the traits we look for with chestnut species identification are much more obvious on sun leaves than shade leaves. For example, sun leaves tend to be narrower, because they don't need to try too hard to get enough sun to make food. A shaded American chestnut leaf may look a little "fatter" than the canoe shape we are looking for, so we would take that into consideration when determining the species. The hairs and trichomes on the underside of the leaf also tend to form more on sun leaves than shade leaves.

Each species of chestnut has a different characteristic trichome, as well as different types of hairs we might expect to see. If there are going to be indications that the tree is a species other than American chestnut, or might be a hybrid, we have the best shot of making that determination with a sample collected from a sunlit part of the tree.

Major Trait Differences Between Two Species of Chestnut

There are about seven species of chestnut, but in the eastern US, you will most commonly run into two species, the American and Chinese chestnuts. The chart on the right shows the major trait differences on sun leaves found between the two.





TRAIT	CHINESE	AMERICAN
Leaf Shape	Oval	Canoe
Color on top	Shiny	Dull
Dentation	Wedge	Breaking Ocean Wave
Lenticels	Large	Small
Twigs	Green / tan & hairy	Red, not hairy
Underside of Leaf	Hairy	Not hairy
Bud	Yellowish, round/oval	Reddish, conical

Use of American Chestnuts in TACF's Programs

Flowering American chestnut on the Appalachian Trail.

Reporting American chestnut trees to TACF can help us advance our program in several ways. First, locating American chestnuts helps us expand our ever-growing inventory of known trees. This inventory allows us to better characterize the existing population of American chestnuts on the landscape. Wild American chestnuts may also be used in our breeding program, in an effort to increase the overall diversity and regional adaptability of our trees. American chestnuts may also be sources of open-pollinated nuts, or other germplasm, that can be used to help expand species conservation efforts. TACF often works with researchers to help supply them with appropriate material for various chestnut-related projects.

Knowing what trees are out there can help us better facilitate making those connections. Of course, the location or presence of your tree will never be shared with anyone outside of TACF without your permission, and you are not committing to using your tree in our program by submitting a sample or making a report. For more information about submitting a leaf sample and Tree Locator report, please visit: acf.org/find_a_tree.php.

Sober Chestnut Farm: Coleman Kimball Sober was the owner and innovator of the Sober Chestnut Stock Farm that created his chestnut empire reign from 1896 until 1913.
Photo courtesy of Dr. William Lord

The Paragon Chestnut

PEDIGREE AND HISTORY

By Dr. William Lord, Pennsylvania Chapter and Honorary Board of Directors

The Paragon chestnut was the established favorite in eastern America among those engaged in raising chestnuts for food before it was eliminated by the chestnut blight. First noted in New York City in 1904, this fatal fungus spread rapidly in all directions throughout the Appalachian range of the American chestnut and within five decades, eliminated it as a timber tree. The Paragon, believed by most current authorities, to be a hybrid of the American and European chestnuts, was eliminated with equal finality.

Paragon chestnut:
Illustration by Julius Bien & Co., Lith., N.Y.; Courtesy of Division of Illustrations, U.S. Department of Agriculture.

There are four chestnut tree species that have been used for nut production: American, European, Japanese, and Chinese chestnuts. Prior to the blight, the European and the Japanese species were preferred, primarily due to a larger sized nut. The sweet but small nut producing American was used as stock for grafts and for producing hybrids, primarily with the European. "The Chinese chestnut, *Castanea mollissima*, was first successfully introduced into the United States in 1903 and the first distributed I 1907" [J. W. McKay and F. H. Berry, Northern Nut Growers Association Annual Report # 51, 1960, pp 31-36] It was not a component of American nut orchards before the blight. The Chinese and the Japanese, in contrast to the European and American, are blight resistant and their progeny plus some Asiatic-European hybrids now produce most of the current nut harvest in America.

The Paragon nut orchards are gone but not forgotten, particularly by the members of the Pennsylvania Chapter of the American Chestnut Foundation. Our primary mission is to develop a blight resistant, timber type American chestnut and reestablish it in Appalachia. This is a work in progress in the initial stages of reforestation. Regarding the Paragon, we have an abiding interest in its history and pedigree. It is a Pennsylvania phenomenon. The productivity of the tree and the size and taste of its nut are legend. Scions grafted to American root stock produced nuts in two years. The delicious nuts grew three to five in the bur; the largest covered a silver dollar and most covered a half dollar. Just prior to the blight, Pennsylvania orchards were shipping nuts by the railroad car load. Regarding Paragon history and pedigree, I have availed the internet for commentary by orchardists and scientists that worked with and knew the Paragon. My personal interest relates to its pedigree. Was it a European chestnut or a European/American hybrid? Here's the evidence, you decide.

William L. Schaffer, 1809-1884, a wealthy businessman and horticulturist obtained a chestnut seed from a friend and planted it on his estate in Germantown, a residential area of Philadelphia. The date is not certain, but a single reference places the time in the late 1840's. [G. H. Powell, see below] The chestnut was just one of many plants that Schaffer grew. He was most interested in fruit trees. But he soon became aware that his chestnut was something to be proud of. It produced large, sweet nuts in an enormous bur at a very early age. In common with early producers, it did not grow very tall. Its energy was programmed for reproduction rather than growth. Schaffer was the president of the Pennsylvania Horticultural Society the last 16 years of his life and in 1879 he entered his prodigy tree in a Society competition. As reported in the hand-written Society minutes, "Your Committee also notice [sic] a small bunch of the American Chestnut tree, containing 6 clusters of 3 burs each of very large sized fruit. This productive variety should be more generally planted. It was grown by President Schaffer." The term, "American Chestnut" is not correct but according to his colleague and neighbor, Thomas Meehan, 1826-1901, the nut given to Schaffer was represented as an American chestnut. Schaffer did not question its identity and referred to his tree as "The Great American."

Thomas Meehan was a prominent horticulturist of the 19th century. Born in England, he came to America in 1848 following a two-year stint at London's renowned Kew Gardens. He settled in the Germantown section of Philadelphia and there lived with his family the rest of his

All photos courtesy of USDA, and thanks to Alex Day.


Full view of the Sober Chestnut Grove Stock Farm in 1911.

life. "Meehan's researches in botany led to his being the editor of *The Gardener's Monthly* (1859-1888), and then of Meehan's Monthly (1891-1902), two horticultural journals with the largest circulation at that time. Meehan wrote his own agriculture columns for five newspapers."

In 1885, a year after Schaffer died, Meehan focused his attention on the origin of the Paragon, as published in his *Meehan's Monthly*. An unidentified "eminent authority," had appeared in print in an un-authoritative manner. Meehan set the matter straight. As a friend and fellow horticulturist of William Schaffer, he knew the origin of the Paragon. "'Origin of the Paragon chestnut', a paper by an eminent authority, on the origin and character of certain varieties of the Spanish chestnut has the following: – 'Paragon: origin uncertain,– said to have been raised from a foreign nut, in the garden of a gentleman residing in Philadelphia.' There need be no uncertainty in the history of this nut. It was raised by William L. Schaeffer, [sic] formerly president of the Giraud Bank of Philadelphia, and for a number of years the esteemed president of the Pennsylvania Horticultural Society. He had a fine farm and country seat at Mt. Airy, near Philadelphia. The nut was given to him by a friend, having been obtained from an American chestnut tree. It was evident to everyone familiar with the species of chestnut, that this was a mistake. Few species are more easily distinguished than the *Castanea vesca* [synonym of *C. sativa*] of Europe, and the *Castanea Americana* [synonym of *C. dentata*] of our country. Still, Mr. Schaeffer not being a botanist, and with full faith in the history of the nut as given by his friend who handed him the original, used to exhibit the fruit at the meetings of the Pennsylvania Horticultural Society as a product of the American species of chestnut. Notwithstanding all these accounts, Mr. H. M Engle, of Marietta, Pennsylvania, was desirous of introducing it. He wrote to the writer of this paragraph to obtain for him grafts from Mr. Schaeffer. This was done, and the stock named by Mr. Engle the Paragon, and it was first sent out as a wonderful advancement in the development of the American chestnut. Everyone familiar with the different species has seen that this was a mistake, and it is no longer pressed in this line. It is a remarkable variety of the Spanish chestnut, and that is all. The grounds of Mr. Schaeffer have now been purchased for an Institute, and the original Paragon chestnut tree will undoubtedly be in the way of buildings ultimately, but up to the last year it was still standing there."

Growing chestnut as a nut crop was an expanding post Civil War enterprise, particularly in Pennsylvania, New Jersey, Delaware and portions of New York. Henry M. Engle, the family head of a thriving nursery in Marietta, Lancaster County, Pennsylvania, acquired scions from Schaffer circa 1875-78. He implemented a method to produce a chestnut grove wherein, "...the hillsides and slopes with [chestnut] timber will be cut and a proper portion of the sprouts grafted with choice varieties, and all the rest of the sprouts and underbrush destroyed. By such method, chestnut groves will be established without planting, and by their rapid growth will make bearing trees in a comparatively short time. This plan is not altogether speculative since 4-5 years of practical work of this kind justifies me in making such statements and, if I am not mistaken, the boom in chestnut culture will be by such methods." [Nut Culture in the United States embracing native and introduced species, USDA, 1896, compiled by W.P. Corsa., p 79.] By definition, orchards were planted and groves were produced by grafting scions onto on site stock.

The European chestnut was well established in the Philadelphia area as of the early 19th century. "Trees from

continued on page 24

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continued from page 21

The gathered Paragon chestnuts, ready to be threshed.

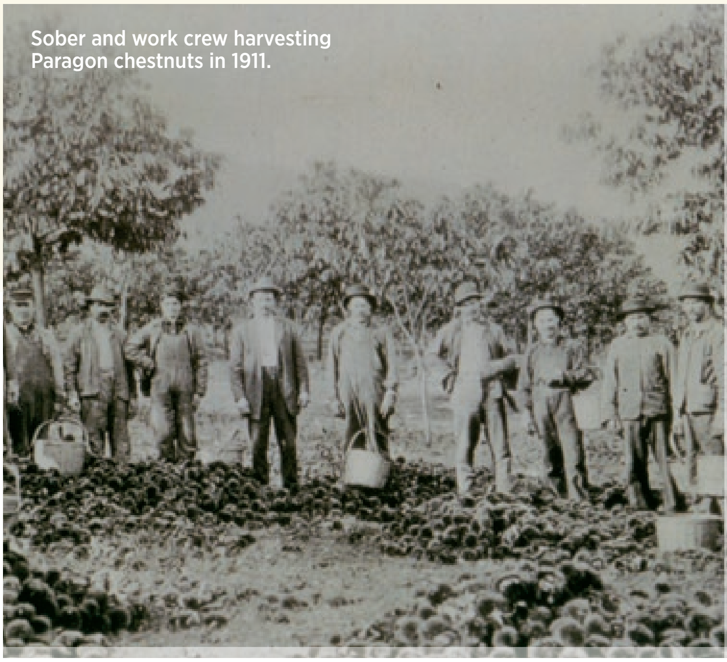
nuts imported from France and Spain have been fruiting for at least a half century near Philadelphia, Pa. and Wilmington, Del........from nuts borne by these scattered trees, several trees of much promise have been grown, one of which, at least, the Paragon, shows some indication of partial American parentage. They are superior to the imported trees in hardiness and the nuts of some of them are of better quality than the imported nuts." [Ibid, p 26]

The above quoted source recognizes that some doubt existed about the Paragon pedigree. However in its description of the Paragon, it is described as European. "Paragon (Great American, pl 2) This is one of the best varieties of the European type. The nuts are large, measuring from 2-4 inches in circumference, more pubescent than either Numbo or Ridgeley [cultivars]. The skin is quite astringent. The quality is good, fully equal to the biggest of its species. The tree is hardy and productive in Lancaster County, Pa. The original tree was, according to Thomas Meehan, grown by W. L. Shaffer, of Germantown, Pa., from a nut of one of the Spanish chestnut trees then in bearing in the old gardens around Philadelphia. Mr. Shaffer supposed it to have 'some American blood,' but Mr. Meehan sees no evidence of this in either tree or fruit. The variety was introduced to the trade by H. M. Engle of Marietta, Pa., about 1888." [Ibid p 87]

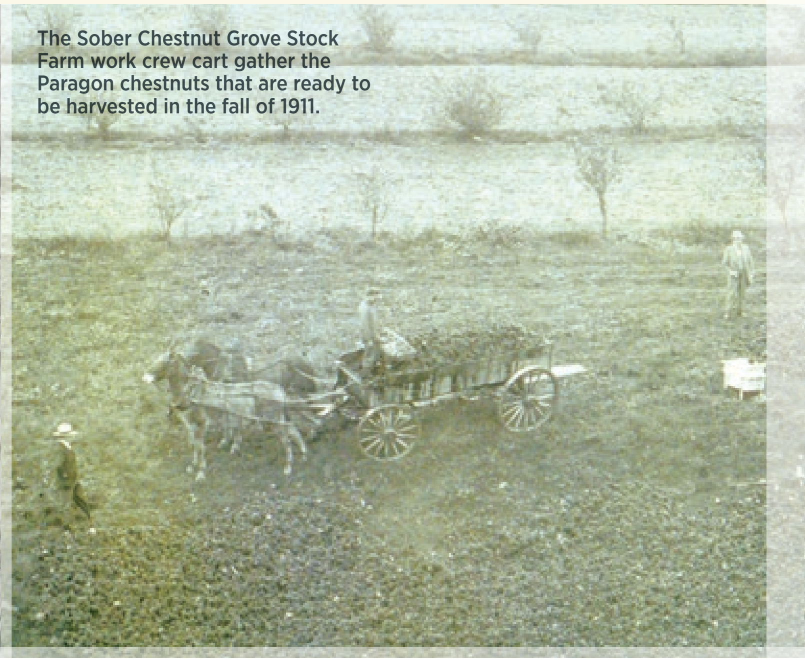
As is apparent from the above quotation, some authorities did not agree with the confident declaration of Thomas Meehan that the Paragon was, ".....a remarkable variety of the Spanish chestnut, and that is all."

One careful skeptic was Andrew Fuller, a contemporary nut orchardist. His comment has a special bearing regarding a suggestion for proper recognition of Schaffer that never came to pass. "Mr. Andrew Fuller says of the Paragon Chestnut, in the Nut Culturist, 1896, 'Burs of immense size, often five inches and more in lateral diameter, distinctly flattened on the top, or cushion shape, spines an inch in length, widely and irregularly branching from a stout stem, springing from a thick, fleshy husk, the whole making an involcure or bur out of proportion to the nuts within; nuts of large size, slightly depressed at the top, and they are usually broader than long; shell very dark brown, slightly ridged, and covered with a fine – but not very conspicuous pubescence, kernel sweet, fine grained and of superior flavor for one of this species. Tree hardy, exceedingly precocious and productive when grafted on strong, healthy stock, a four year old tree being loaded. This is one of the best of its class; origin somewhat in doubt, but it is claimed that the late W. L. Shaffer, of Philadelphia raised it from a foreign nut, planted in his garden, and who some eighteen years or more ago, gave scions to H. M. Engle, of Marietta, Pennsylvania. [This article was published in 1896, evidence that Engle received scions from Schaffer around 1878] Mr. Engle has since propagated and disseminated this variety quite extensively under its present name, but should further investigation prove it to be distinct, and that it was raised by Mr. Shaffer, then it should certainly bear his name, and 'Paragon' become a synonym. No more appropriate monument could possibly be erected in honor of a distinguished horticulturist like the late Mr. Shaffer, than a chestnut tree, nor could his memory be perpetuated under more pleasant and agreeable surroundings than to have his name linked inseparably with such an excellent and valuable variety.'" [Chestnut Culture in Pennsylvania, , Nelson F. Davis, Pa. Dept. of Agri., Bltn # 123, 1904, pp 14-15.]

E. A. Sterling, of the New York Forest, Fish and Game Commission, does not weigh in on the Paragon pedigree, but he adds to Paragon history. Re Seventh Report, 1903, "Undoubtedly the best variety for general planting produced up to date is the Paragon. The tree is hardy within the range of the native chestnut, ripening moderately early; in Central Pennsylvania, about October 1st, and comes into bearing very young, and is exceedingly prolific. In fact, the young trees are such heavy bearers that it is almost a drawback to their value. They will exhaust their vitality and die, or lose their vigor of growth, if unrestrained. Paragon grafts take exceedingly well on American stocks, and have been known

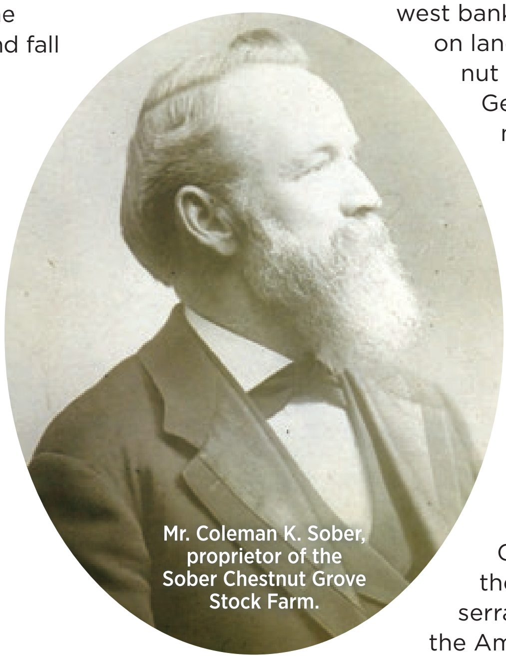


Sober and work crew harvesting Paragon chestnuts in 1911.



The Sober Chestnut Grove Stock Farm work crew cart gather the Paragon chestnuts that are ready to be harvested in the fall of 1911.

to grow well when grafted on red oak sprouts; while not free from insect attacks, the Paragon is much less affected by the weevil than are other varieties. A not serious reduction of its many good qualities is the tendency of the burs to remain closed and fall to the ground with the nuts still retained. They open readily, however, if spread in the sun; hence the only detriment is a slightly additional cost of harvesting. It saves, on the other hand, however, the loss and difficulty occasioned by picking the nuts from the grass and debris beneath the trees. For planting in this State (New York), the Paragon can be safely recommended above all others." [Ibid. p 15.]



Mr. Coleman K. Sober, proprietor of the Sober Chestnut Grove Stock Farm.

G. H. Powell of the Delaware College Agricultural Experimental Station gave a thorough botanical description of the Paragon. He discussed the Paragon's pedigree and concluded on the side of Thomas Meehan. He acknowledges Meehan as the source of his Paragon history. The European mother tree is described and given a tie-in with George Washington.

"Bur immense, flattened, spines very long, branched, husk fleshy; nuts large, three or more in a bur, apex broad, depressed, 34 mm broad, 30 long, 23 thick, pubescent at tip, and slightly over two-thirds, dull dark brown, ridged, quality excellent, tree hardy, spreading, vigorous, foliage distinct, narrow, coarsely serrate, tapering gradually at the point, base narrow, subject to leaf blight; enormously productive, ripens at Parry, NJ Oct 10- 15.

"Probably a seedling of a European chestnut, popularly supposed to have been planted by George Washington, [1732-99] standing at the first of this century on the west bank of the Schuylkill, above Philadelphia, on land owned by Richard Peters. The parent nut was obtained by the late W. L. Shaffer, Germantown, PA, and was planted there more than fifty years ago (exact date unknown) on land now occupied by the Deaf and Dumb Asylum. [This article was published 1899 dating the planting of the original Paragon in the late 1840's.] About 1875, the date H. M. Engle, Marietta, PA obtained grafts through Mr. Thomas Meehan and introduced the nut in the early eighties, first as *Great American*, from its supposed American origin, it being referred to the American type in its early references. Bailey, in 1891, (Am. Garden), classed it as an American from the tapering form, and broad, deep serrations of the leaf, which are similar to the American foliage.

"The form of the leaves alone support the supposed American origin of the 'Paragon' but the thickness of the foliage, which I have found a much less variable character than form, is distinctly European; the narrow base of the leaf is more European than American, and the low spreading tree is distinctly European. It Is not unlikely that the parent nut resulted from American pollen on the European pistil, for the Americans and Europeans readily cross; or, what is equally probable, the form of the foliage may be a varietal variation from the type. I am personally inclined to the latter

The grove in winter with Mr. Sober standing among four and five year old chestnut trees.

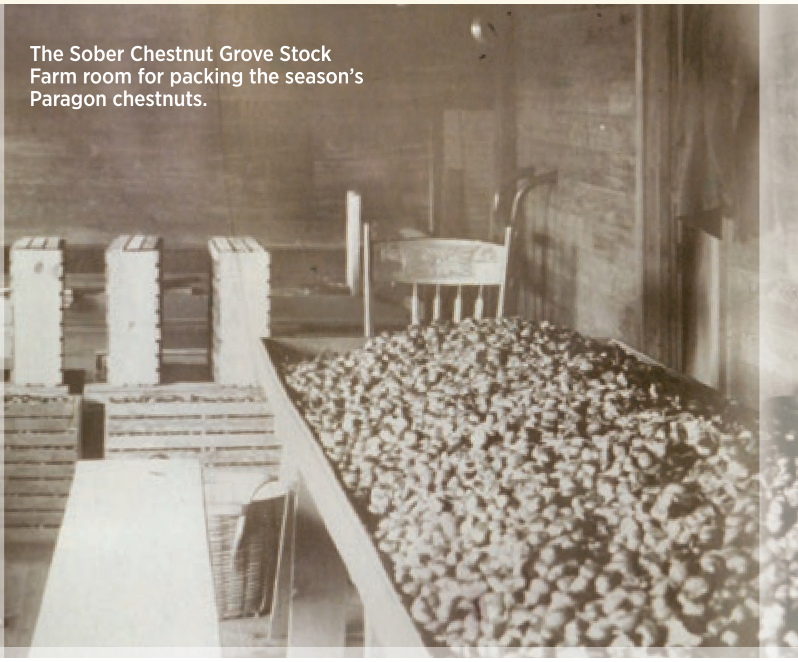
view, as I find many gradations in form in the foliage of the European type, the same tree, as the 'Ridgely', or 'Styer' often producing leaves which vary from the abrupt to the narrow, long, tapering point.

"I am indebted to Mr. Thomas Meehan for the facts concerning the parentage and early history of the Paragon.'" [G. H. Powell, The 11th Annual Report, 1899, Delaware College Agricultural Experiment Staion, p. 126. [Powell also wrote *The European and Japanese Chestnuts In The Eastern United States*, Delaware Agricultural Experiment Station, Bulletin 42, 1898. On page 18 he lists the Paragon as a European variety, along with the Numbo. It is important to note that Powell makes no reference to the Chinese chestnut.]

The acknowledgment by Powell to Meehan as an authority on Paragon history indicates his stature among contemporary horticulturists. This was evident in a tour guide on the rare and notable plants to be seen on Germantown estates published in 1904. The late Thomas Meehan is feted as the "Author of the greatest books upon our native flora, and the Nestor of American Horticulture and printer of Meehan's monthly." The tour guide stops at the site of the Paragon and describes it, as Meehan would, as a European chestnut, but apparently in the past tense, indicating that it had become a victim of new construction. ".....the celebrated 'paragon' chestnut of William Schaeffer, a variety of Spanish chestnut (*Castanea vesca*) which originated on what is now the institute for the Deaf and Dumb grounds, and obtained wide celebrity." [Edwin C. Jellot, Germantown, Old and New, It's Rare and Notable Plants, Germantown Independent Gazette, 1904, p 97]

The Paragon originated in Germantown, the home site of the Meehan nurseries. Why didn't Meehan propagate the Paragon? Presumably, he had other priorities. He was known for popularizing the Japanese maple and for the rediscovery of the pink dogwood. But he willingly intervened on behalf of Engle who wanted to graft Paragon scions to native chestnut stock and commence and expand chestnut enterprise. Engle, in turn, solved a problem for the man who became the greatest chestnut entrepreneur, Coleman K. Sober, 1842-1921. He worked his first 18 years on the family homestead in Northumberland County, north of Harrisburg. Coleman learned grafting from his father, particularly for their fruit trees. The chestnut, along with oak and pine, was common and one old tree near the home grew comparatively larger nuts. He asked his father to show him how to graft its scions. "Who ever heard of grafting chestnut?" And that was it. Years later a now wealthy Coleman bought the homestead, 400 plus acres of cut over mountain land, a dismal terrain of stumps, brush and worthless logs. Nonetheless, it was alive with chestnut sprouts. The old, "big nut" chestnut was still around and Coleman fulfilled his boyhood and grafted some scions onto chestnut sprouts. But the real answer for reclaiming so called worthless land lay with Engle. Coleman obtained Paragon scions, "...a cultivar of a European chestnut much favored by orchardists" and established the Chestnut Grove Stock Farm, implementing the Engle plan. In 1900 Sober perfected his own method of grafting and most of the bearing trees dated from that time. His grove was kept meticulously clean, guarded against fire, disease and parasites. The trees were pruned to maintain a low crown and thus aid in harvesting the nuts. Sober invented a threshing machine, saving his employees the time and pain of handling the spiny burs. Grass, rather than weeds, grew among his trees, kept mowed by cattle and sheep. Pigs fattened on nuts that escaped the harvesters. Chickens patrolled the grounds for injurious grubs and insects. In 1903 the grove covered 300 acres, growing 75,000 Paragon.

The workmen access the gathered Paragon chestnuts as they prepped to be processed and threshed.



The Sober Chestnut Grove Stock Farm room for packing the season's Paragon chestnuts.

[The 75,000 figure from Chestnut Importations into the US, S. L. Anagnostakis. Dec. '07, Page 4, Connecticut Agricultural Experiment Station]

The chestnut blight was a ruination. On February 21, 1912, Nelson F. Davis, a professor at Bucknell University and a friend and biographer of Sober, gave brave words on the survival of the Chestnut Grove Stock Farm at a blight control conference held in Harrisburg. "Mr. Sober and I have been fighting enemies for ten years.....In spite of the blight and in spite of everything, he ....expects to see chestnut trees as long as he lives, and if we could come back in two years, I think we would find chestnut trees here." [The Pennsylvania Chestnut Blight Conference Proceedings, pp 83-99, as contained in the Publications of the Pennsylvania Chestnut Blight Commission, 1911-1913, produced by the Mann Library, Cornell Univ., Ithaca, N.Y., 1993.] Mr. Sober was out of the chestnut business the following year, deluged by the blight. Today the lone remnant of a palatial homestead is the hulking weatherboard gray chestnut barn. Creaking doors open to cobwebs and empty bins.

The blight also victimized the efforts of Walter van Fleet, 1857-1921. A man of many endeavors, he retired at 35 as a practicing physician. Plant breeding became a particular interest and in 1894 he dusted Paragon, "of the European species," with "....pollen from a native sweet chestnut bearing good sized nuts....The idea was to improve the quality of the Paragon nuts even at the expense of size." The seedlings, grown at Little Silver, N.J. grew rapidly and by 12 years, "the trees were shapely and bid fair to become extremely productive." Sadly the blight arrived about '07-'08. "The work of destruction was very rapid and by the third year all were hopelessly crippled...." [Walter van Fleet, Chestnut Work at Bell Experiment Plot, NNGA 11th Annual Meeting, 1920, pp 16-23]

There is a possibility that the Paragon may have survived as represented by the research and observations of two well known chestnut orchardists and historians, Greg Miller of Ohio and Michael Nave of California. The evidence is at least putative if not finite. As recalled by Greg during a phone conversation in May, 2010, he learned of a chestnut orchard called the Caha planting near Lincoln, Nebraska, while he was a student at Iowa State. He visited the site in the mid 1980's and located a tree he believes could be a Paragon. The planting was established in the early 1900's and contained several different trees including chestnut, hickory and walnut. The tree Greg saw was barely alive, about 20' tall with bushy branches down to the ground. He estimated it to be 60-70 years old and had died back and re-grown. There was no evidence of blight. He collected scions that he grafted at his Empire Chestnut Orchard in Carroll County, Ohio, and has maintained it as a cultivar. It does not survive blight infection, but is perpetuated by grafting scions. [empirechestnut@gotsky.com]

As told by Michael Nave by email, "There is a tree that is probably Paragon or a Paragon seedling, or Sober's Paragon, growing in an old chestnut orchard [about 5 acres?] planted between 1915 and 1920 in Brown's Valley, [Yuba County] California. The trees were planted by an engineer called Major Emil A. Hoeppner. He brought the best chestnut varieties he could find from around the U.S." [Michaelnave@comcast.net to wg.lord@comcast.net, 5-27-10.] Michael has propagated several scions. Michael and Greg have compared notes and believe the trees they describe may be the original Paragon. Each states that their Paragon is an American/European hybrid. In neither case is there any correspondence or record stating that the trees were Paragon.

WHY SHOULD WE RESTORE THE

American Chestnut Tree?

By Rex Mann, Kentucky Chapter and Board of Directors

The smoke from the small camp fire drifted upward toward the tree tops in a sheltered mountain cove. The flickering firelight highlighted the rapt expressions of the six young boys as they listened to a grandfather's stories. He was telling them about a tree – not just any tree, but a special tree: the American chestnut tree.

He told them tales of shooting squirrels out of chestnut trees, of raking leaves and chestnuts into a pile and then burning the pile to roast chestnuts, and of stomping the chestnut burs with his bare feet to get to the nuts.

As I stood behind watching my Dad talk about the loss of the American chestnut, I could see something the grandkids did not…a solitary tear sliding down his cheek. For the first time, I truly understood what the American chestnut tree had meant to this tough old mountain man.

35 years later, I recalled this scene as a fellow TACF board member shared a question his young daughter, a college student, had asked: "Dad, why should people of my generation be concerned with restoring the American chestnut? When I drive through the mountains, I see plenty of beautiful green trees. Most of us have never seen a chestnut tree."

I believe this question must be answered. Inevitably, her generation will inherit the job of restoring the American chestnut. Why should young people be inspired to restore a tree once thought to be forever gone?

If you ask those of us who are working to restore this tree why we are involved, you'll hear a variety of answers, such as "I'm a forester," or

(L-R:) Buddy (Rex) Mann at 4 years old with his dad, Howard Mann, in Silver Springs, Florida, c. 1948. Photo submitted by Rex Mann.

Courtesy of Herbert M. Webster Photo Collection from the University of Tennessee Library.

Dad, why should people of my generation be concerned with restoring the American chestnut?

"I love wildlife," or "I just love trees or the outdoors." Or perhaps, the most common answer, "I remember hearing chestnut stories from my dad or grandfather." Although none of us saw this magnificent tree before the blight struck, many of us saw the gray skeletons standing in the forest after their death.

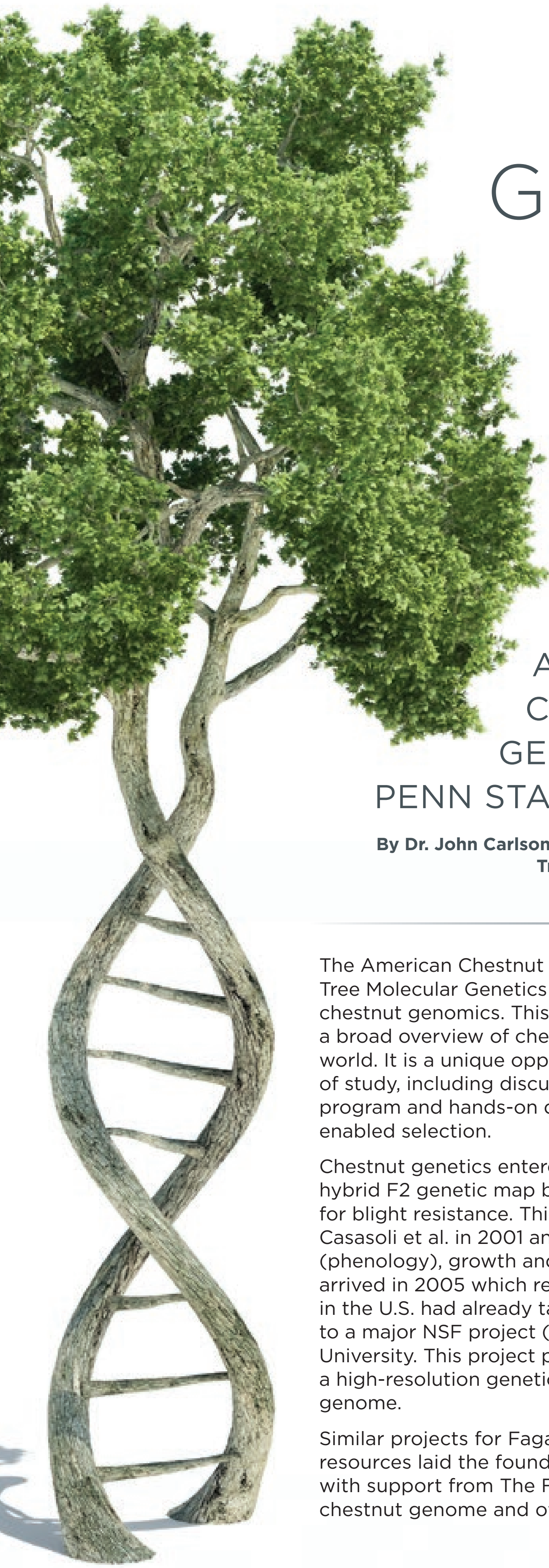
The American chestnut was just as important in the early history of our nation as the American Eagle or the Liberty Bell. Billions of American chestnut trees once grew along the eastern forests from Maine to Alabama and westward across the Appalachian Mountains. American chestnut trees provided dependable and nutritious food for settlers, their livestock, and the abundant native wildlife, which was a significant component of the pioneers' diet. The rot-resistant trees provided valuable building materials for cabins, barns, fencing, and furniture. Given the absolute dependence of our ancestors on the land, American chestnuts played a vital, but understated role in the successful settlement of the United States.

As a nation, we pride ourselves in our ethnic and cultural diversity, and we also understand that this diversity contributes to our national strength. The same rule applies to our environment. When we lose a previously viable species, the resiliency of the forest is greatly diminished.

Each succeeding generation is increasingly separated from the land. Only a small percentage of Americans are in the business of farming or homesteading. We have been gifted with the highest level of technology and our younger generations have embraced it like no generation before them.

Each generation matures, leaving their positive impact on the world and rising to the challenge of further strengthening our nation. As we blaze forward with restoration, we must reach out to the younger generations. We must share our passion, mentor them, and appeal to their deepest core values.

Ultimately, restoring the American chestnut is an act of love for our children and the generations that follow. We cannot deny them the opportunity to know and benefit from this American icon – this vital part of their natural heritage.



INTEGRATING GENOMICS TOOLS IN AMERICAN CHESTNUT RESTORATION

THE ANNUAL MEETING OF THE AMERICAN CHESTNUT FOUNDATION IN COOPERATION WITH THE SCHATZ TREE GENETICS COLLOQUIUM IS BEING HELD AT PENN STATE UNIVERSITY ON OCTOBER 23-24TH.

By Dr. John Carlson, Professor of Molecular Genetics and Director of The Schatz Center for Tree Molecular Genetics, Pennsylvania State University

The American Chestnut Foundation (TACF) has teamed up with The Louis W. Schatz Center for Tree Molecular Genetics at Penn State University to present a state-of-the-art workshop on chestnut genomics. This program is specifically designed for TACF members and guests to provide a broad overview of chestnut genome resources and related research by experts from around the world. It is a unique opportunity to learn more about the history and future of this emerging field of study, including discussions on how to best incorporate genomics tools into the TACF breeding program and hands-on demonstrations to familiarize attendees with the steps involved in genome-enabled selection.

Chestnut genetics entered the genomics era early, with the publication of the Chinese x American hybrid F2 genetic map by Kubisiak, Hebard, Nelson, et al. in 1997 which identified the 3 major loci for blight resistance. This publication was followed by genetic maps for European chestnut by Casasoli et al. in 2001 and 2004 which revealed loci for important adaptive traits such as bud flush (phenology), growth and water use efficiency. A new generation of DNA sequencing technology arrived in 2005 which revolutionized and democratized genomics. By 2006, chestnut researchers in the U.S. had already tapped into these new technologies, with a TACF seed grant quickly leading to a major NSF project ("Genomics Tools for the Fagaceae") led by Ron Sederoff at NC State University. This project produced gene sequence databases for American and Chinese chestnut, a high-resolution genetic map, and an integrated genetic-physical map of the Chinese chestnut genome.

Similar projects for Fagaceae species, including chestnut, were conducted in the EU. These resources laid the foundation for the chestnut genome sequencing project beginning in 2010 with support from The Forest Health Initiative. Completion of the first draft of the Chinese chestnut genome and of the individual blight resistance QTLs was announced at a conference

Quantitative trait loci (QTLs) refer to DNA sequences at specific locations in the genome that are statistically associated with variation in a trait. QTLs are mapped by characterizing DNA sequence variation at markers dispersed throughout the genome. A QTL associated with a trait often represents millions of base pairs and hundreds of genes. Thus QTL mapping is an imprecise method for discovering the specific genes or DNA sequence variants that influence a trait.

in January of 2014. A TACF grant in 2014 permitted Margaret Staton and my labs to complete analysis of the genome, to characterize genes in the QTL regions, and to establish browsers (websites) for the public to view and to query genes in the QTLs. The Staton and Carlson labs also collaborated on the identification of species-specific SNP alleles by genome-wide sequence comparisons among American chestnut and Chinese chestnut genotypes.

Construction and characterization of a genome should not be considered the end of genomics research for the chestnut, but rather the beginning. Great advances are sure to continue with the new generation of genomics and bioinformatics experts joining the chestnut community. The table is now set to focus on the use of new genomics tools to empower chestnut breeding. This applied phase of chestnut genomics requires direct involvement of TACF members in order to be successful. The organizers of this workshop have provided a tremendous platform for both genomics researchers and TACF members to take this important next step together.

Please visit acf.org/AM2015.php for registration information and a printable schedule of events.

SPEAKERS & PRESENTATION TOPICS

SATURDAY NIGHT KEYNOTE: **Antoine Kremer, Ph.D.**, Senior Scientist, National Institute for Agricultural Research, Bordeaux, France; and **Ronald Sederoff, Ph.D.**, Distinguished University Professor and the Edwin F. Conger Professor of Forestry and Environmental Resources, North Carolina State University; "Major events in the molecular genetics of forest trees: past present and future"

PRESENTERS:

ALBERT ABBOTT, PH.D.
Biological Research Team Leader, Forest Health Research and Education Center, University of Kentucky; "Leveraging forest tree genomics and genetics resources to mark and identify genes for resistance to important forest tree pathogens and pests"

CATHERINE BODÉNÈS, PH.D.
Researcher, National Institute for Agricultural Research (INRA), France; "Comparative genomics between oak and chestnut"

NATHANIEL CANNON
Doctoral Candidate, Integrative Biosciences, Penn State University; "Comparison of the Genomes of Chestnut Species"

JOHN CARLSON, PH.D.
Professor of Molecular Genetics; Director, Schatz Center for Tree Molecular Genetics, Department of Ecosystem Science and Management, Penn State University; "The Chestnut Genome"

RITA COSTA, PH.D.
Senior Researcher and Head of Biology Laboratory of Forest Research, Portuguese National Institute for Agricultural and Veterinary Research (INIAV); "How genetic and genomic tools may improve resistance to *Phytophthora cinnamomi* in chestnut"

ANGUS DAWE, PH.D.
Associate Department Head and Associate Professor of Molecular Mycology, New Mexico State University; "Banquet-omics: Looking at genomes to understand how pathogens make a meal out of chestnut"

JASON HOLLIDAY, PH.D.
Assistant Professor of Forest Genetics and Biotechnology, Forest Resources and Environmental Conservation Department, Virginia Tech; "Genomic selection to advance backcross breeding in American chestnut"

NURUL ISLAM-FARIDI, PH.D.
Research Molecular Cytogeneticist, Southern Institute of Forest Genetics, Southern Research Station, USDA Forest Service; "Chestnut Molecular Cytogenetics – an update"

SCOTT MERKLE, PH.D.
Associate Dean of Research and Professor, Warnell School of Forestry and Natural Resources, University of Georgia; "Don't call them clones: How hybrid backcross chestnut varieties can enhance TACF's restoration mission"

C. DANA NELSON, PH.D.
Supervisory Research Geneticist and Project Leader, USDA Forest Service, Southern Research Station, Southern Institute of Forest Genetics; Co-Director, Forest Health Research and Education Center, University of Kentucky; "Mapping Disease Resistance QTLs in Chestnuts"

WILLIAM POWELL, PH.D.
Professor and Director, Counsel on Biotechnology in Forestry College of Environmental Science and Forestry, State University of New York; "Screening putative resistance-enhancing genes in transgenic American chestnut"

JEANNE ROMERO-SEVERSON, PH.D.
Professor of Quantitative Genetics and Genomics, Biological Sciences Department; Director, Tree Genetics Core Facility, Forest Conservation and Tree Genetics Program, University of Notre Dame; "Seed orchard DNA fingerprinting: The double-edged sword of the open access gene pool"

MARGARET STATON, PH.D.
Assistant Professor, Department of Entomology and Plant Pathology, University of Tennessee, Institute of Agriculture; "Online Genomic Resources for Chestnuts and other Hardwood Trees"

JARED WESTBROOK, PH.D.
Quantitative Geneticist, The American Chestnut Foundation; "Overview of TACF Meadowview and State Chapter Breeding and Research Programs"

FIORELLA VILLANI, PH.D.
Senior Researcher, Institute of Agroenvironmental and Forest Biology, National Research Council, Italy; "Chestnut Genomics Research in Italy"

Inoculation

BEST PRACTICES

By Laura Georgi and Sara Fitzsimmons

Inoculation represents a critical evaluation step in TACF's breeding program. This step must be performed consistently and accurately in order to provide reliable information about each inoculated tree's susceptibility to blight, so we can make the right selections for the breeding program. At Meadowview Research Farms, we inoculate in June. This avoids failures when inoculation is followed by a period of cold, wet weather, which can occur in May in our area.

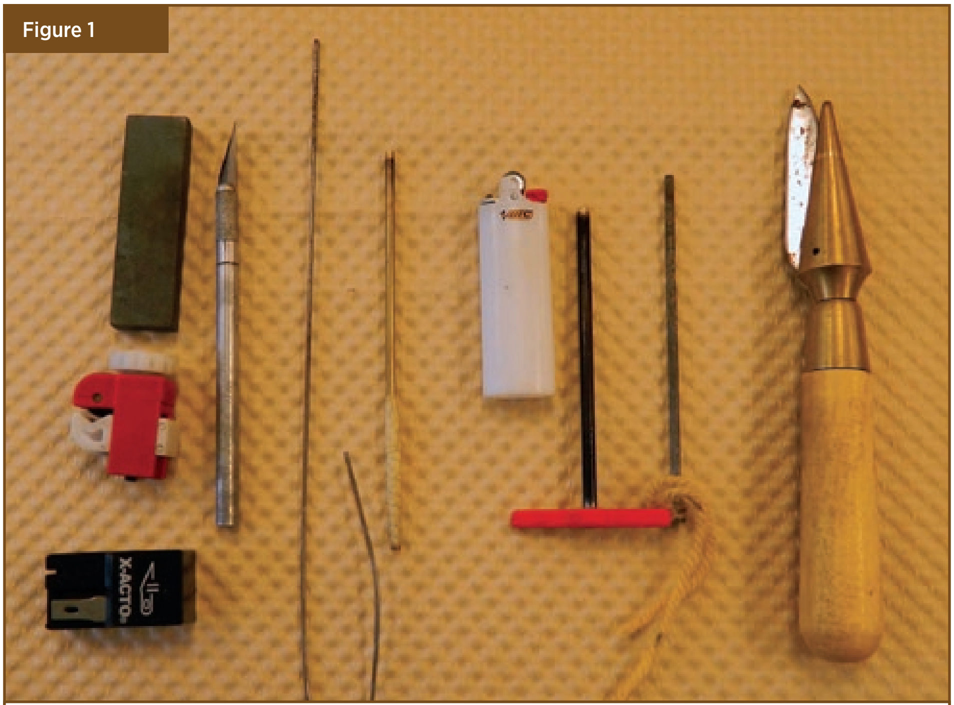
Materials

Materials needed for inoculation include cork borers, sharpeners, a test tube of 95% ethanol and cigarette lighters for sterilizing tools, a pint jar of 70% ethanol and a rag for sanitizing bark, petri dishes of fungal inoculum, spatulas, ½ inch masking tape, and a caddy to carry all of these items **(Figures 1 and 2)**. It is desirable to have an extra caddy with spares of everything, plus a stone for squaring off ends of damaged borers before re-sharpening. A permit from the Animal and Plant Health Inspection Service (APHIS) is needed to transport inoculum across state lines.

We traditionally have used #1 cork borers for routine inoculations. Recently, however, it has become virtually impossible to buy a sharpener capable of sharpening this size of borer. Vendors continue to display images of "good" cork borer sharpeners, and claim that their product is capable of sharpening #1 diameter borers, but we have repeatedly been disappointed with the product that they actually ship **(Figure 3)**. Occasionally, good cork borers and sharpeners are offered for sale on eBay. If finding or sharpening cork borers is problematic, Maryland Chapter member Gary Carver (who is a carver of wood by profession, not just by name) has suggested using a "hollow punch" instead. A hollow punch is used to make holes in metal, wood, or leather. To expedite inoculations, the punch can be used with a heavy-duty cordless drill. A single fully charged battery on a DeWalt drill will last for several hundred trees but make sure to have extra charged batteries on hand. Sets of hollow punches are available from various suppliers. Just pick ones that have the diameters you need, and if you wish to use them with a power drill, be sure to get a set that is designed for that use. Originally, hollow punches were intended to be struck with a hammer, and this style is still offered for sale. A #1 cork borer corresponds to a 3/16″ hollow punch. Smaller, 1/8″ punches are available for small tree inoculations.

For inoculating smaller trees at Meadowview, we use 1/8″ brass tubing, which is available on Amazon.com (catalog number B000FN40U8). As shipped, these are 36″ long, so you will need a small pipe cutter to cut them into reasonable lengths, say, 6″ or so. Too long, and they tend to bend and eventually break; too short, and they are a misery to use. In contrast to the cork borers, the brass tubing is sharpened from the inside, using a number 11 X-ACTO blade (you will need a handle for the blade), with the back edge of the blade flush against the inside of the tubing, and twisting gently, so as not to flare the tubing or roll back the edge. This produces the broadest bevel achievable with this setup; broad is desirable, since the narrower the bevel, the faster the edge goes dull. The initial sharpening is particularly hard on the X-ACTO blade. Continue shaving the inside surface without using excessive pressure, until the sharpened edge of the tubing no longer has any flat spots anywhere, but is still level around the circumference. You may need to "kiss" the outside of the sharpened tubing on a fine sharpening stone to remove brass burs, but do not use the stone to sharpen. The other use for the stone is to square off the end if it gets too cock-eyed; then you have to start over to re-sharpen the tubing. Only sharpen one end, to avoid punching holes in your hand as well as the trees. Wrapping some tape around the middle of the tubing can make it

Figure 1



Stone, pipe-cutter, X-ACTO blades, knife, cleaning wire, 1/8″ brass tubing, lighter, cork borer, and cleaning rod.

Figure 2

Caddy with inoculation tools and supplies.

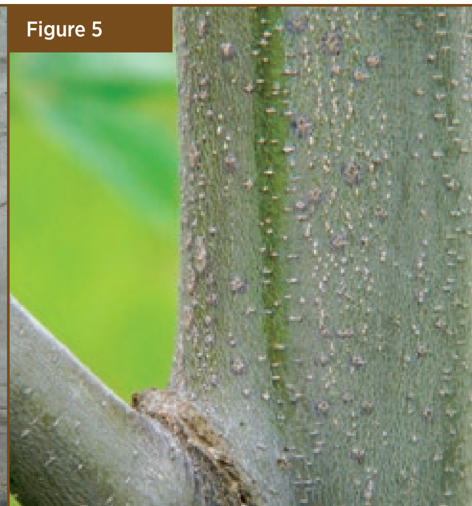
Figure 3

Preferred cork borer.

Figure 4

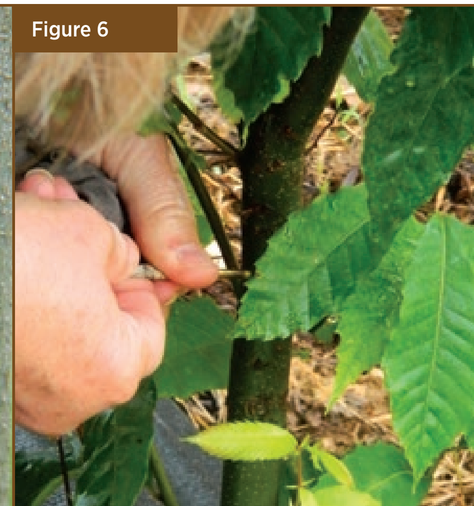
Five-day-old culture of *Cryphonectria parasitica* on acidified PDA.

Figure 5



Chestnut stem showing rhyditome initiator (dark green vertical streak).

Figure 6



Punching small chestnut with 1/8" brass tubing.

easier to get a grip on it for punching holes in trees.

Alternatively, a Dremel attachment can be used to sharpen tubing or even cork borers. This method also works by sharpening from the inside of the tube, so you may not care to use it on borers that were previously sharpened on the outside. There are several attachments that will work depending on the diameter of the tube with which you are working, but in general the "Grinding and Sharpening" line works best. Two models used with success for #1 cork borers or 1/8″ tubing are #952 and #953[1].

We grow inoculum on acidified Potato Dextrose Agar (details available on request). In order to have an abundance of actively-growing fungus, the plates need to be inoculated with actively-growing cultures about three to five days prior to the planned date of use **(Figure 4)**. We only punch disks from the actively-growing margins of the cultures, and since we want the fungus to be in active growth, we do not refrigerate the cultures. Growth rates can be modulated by adjusting the temperature, provided you stay within the range over which the fungus can grow, that is, between 15 and 30° C. Young, small colonies don't yield many disks, but the fungus necessarily stops growing when it hits the side of the plate.

Methods

For routine inoculations using a #1 cork borer, trees should be a couple of inches in diameter, but should not be so large that they are suffering from competition from their neighbors. In our seed orchards, which are planted at an in-row spacing of one foot, and even in our progeny tests (two-foot spacing), we typically inoculate in their third growing season. Even so, with proper fertilization and weed management plus adequate water either from precipitation or irrigation, the trees can be easily more than five feet tall after two growing seasons, and some will be producing catkins and even the occasional female flower. As a concession to their youth and dense spacing we use a sharpened 1/8″ brass tube rather than a cork borer on these trees; furthermore, at this stage, the seed orchard trees only receive a single inoculation with a less aggressive strain of the blight fungus. Under these conditions, even Chinese chestnut seedlings can be killed by inoculating with a highly aggressive strain.

Efficient inoculation is a team effort, requiring one puncher, one to two inoculators, and one to two tapers. If more than one fungal strain is being used, it is best to assign each to a different inoculator. It can be helpful to have a person in charge of the caddy and cigarette lighter. This allows an individual who is not physically able to crawl under hundreds of small trees to assist the process. One individual should be responsible for recording the trees inoculated as well as any deviations from protocol. If volunteers are involved, it is also desirable to keep track of participants and hours worked.

The puncher selects the designated number of inoculation sites, avoiding blighted areas, crotches, and rhytidome initiators, which are involved in bark development and manifest as vertical green stripes along the trunk **(Figure 5)**. Holes should be placed at least 10 cm above ground level, and 15 cm apart **(Figure 6).** You want to leave room for cankers to expand without interference, and inoculation sites too low on the trunk may also encounter antibiosis from resident soil microbes.[2] Sterilize the tree trunk to reduce competition from resident microbes. You can do this in one of two ways. One method involves wiping inoculation sites with a rag moistened with 70% ethanol. Another method, developed by Alan Tumblin of the Pennsylvania Chapter, uses a spray bottle filled with 70% ethanol to spray the trunk without wiping. Either way, be sure that the bark isn't dripping with ethanol when you punch it; you don't want the hole to fill with ethanol.

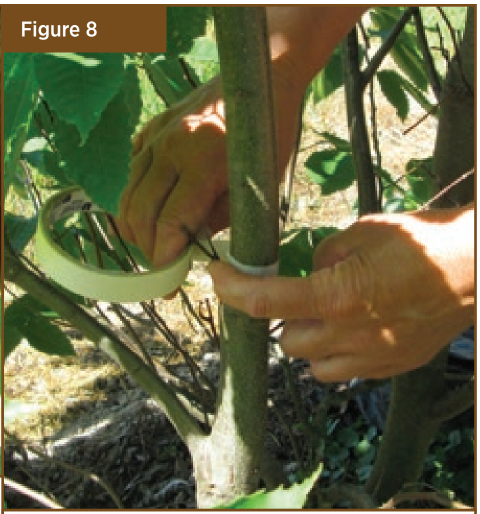
After the stem is sterilized, the next step is to punch out a small disk of bark, exposing the tree's cambium

[1]For a handy guide of available Dremel attachments, please reference this website: http://www.quality-handtool-review.com/support-files/bit-guide-poster.pdf.

This interaction is the basis for treatment of cankers with mudpacks to prolong the life of infected trees.

Chestnut blight fungus ready for inoculation. Note round disks punched around edge of colony.

Plug being inserted into hole punched into tree bark.
Figures 1- 7 courtesy of Laura Georgi.



Applying tape to inoculated stem.
Figure 8 courtesy of Bill Tindall.

layer. Traditionally, this is performed with a cork borer. Dip the cork borer and the cleaning rod into 95% ethanol (not too deeply!) and ignite to sterilize, waving tube gently to promote air movement into the borer to support combustion of the ethanol. You don't want any ethanol inside the borer when you punch the tree. Also, take care not to ignite nearby combustibles with drips of flaming ethanol. Push the sterilized borer into the bark and twist until you hit wood. Usually, the bark plug will come out of the hole, and will need to be pushed out of the borer. Using cork borers, you may be able to get away with punching several trees before pushing out the plugs, but with small (1/8 inch diameter) brass tubing, it is best to clean as you go. A pin/surveyor's flag is a good cleaner. You can punch multiple trees (10 or so) before re-sterilizing the tools, if care is taken not to touch anything else with them. If you inadvertently punch into a canker, you will need to re-sterilize. Don't get too far ahead of inoculators or the holes will dry out. You may also need to point out the holes to the inoculators, and you will need to punch disks of inoculum for them periodically. Always re-sterilize before punching inoculum. Inoculum disks should come from the actively-growing margin of the colony. The plate in the illustration **(Figure 7)** is very nearly too old, but the outer fringe of the colony is still white.

If you are using a hollow punch and cordless drill instead of the traditional cork borer, you will still need to sterilize the punch as described above. An advantage of the hollow punch is that it is self-cleaning: there is a slot on the side through which the bark disks will be pushed as subsequent trees are bored. On the other hand, you will need a tube of the same diameter as your hollow punch to make disks of inoculum. This could be an old cork borer, since it does not have to be as sharp for punching agar disks as for making holes in bark.

The inoculator inoculates the holes made by the puncher. To inoculate, flame the end of the spatula, then scoop up one disk of agar onto the spatula and push it into the hole, fuzzy side in **(Figure 7)**. If the bark is thinner than the agar in the plate, it helps to scoop out just enough of the disk to fill the hole, rather than attempting to mash a full-depth agar disk into a shallow hole. This also makes it less likely that the taper will dislodge the disk from the hole. Flame the spatula after each disk. You may, if you wish, flame both ends of the spatula and alternate between the ends. To minimize contamination, keep petri dishes closed when not cutting or removing disks; and keep them shaded so fungus will not overheat and die. Likewise, do not leave inoculum in closed vehicles parked in the sun.

The taper serves as quality control, making sure that all holes have been properly inoculated, and each hole is covered with masking tape. The tape needs to wrap completely around the trunk, and overlap over the inoculum **(Figure 8)**. Tape sticks to tape; without this overlap, the tape will fall off and the fungus will dry out and die.

Instructions are available on how to evaluate resulting cankers post-inoculation. "Determining Blight Resistance in Chestnut Trees" by Dr. Fred Hebard is available online in the March/April 2012 issue of the Journal: acf.org/journal.php.

If you have trees in need of inoculation, please contact your local TACF chapter and/or your local regional science coordinator for assistance (acf.org/Staff.php).

BASIC TENANTS OF ORCHARD Measurement & Monitoring

By Matthew Brinckman, Mid-Atlantic Regional Science Coordinator

After a full summer of planting, mowing, weeding, pest management, pollinations, and harvest, our volunteers and members work in TACF orchards and test plantings to record another season's progress. It is important to note that TACF is extremely grateful to our "citizen scientists" for their unyielding dedication to field work, and we appreciate the collection of this important data, year after year. Growth data can be used to examine trends across different genetic lines, assess the severity of problems such as frost die back, and determine readiness for inoculation. Frequently, questions come up about how to take measurements and how to record them. Whether you are collecting data for the first time or you have been doing it for years, the following guidelines and tips should help you perform good work and feel confident in your methods.

Women and their Woods volunteers helped plant and tag chestnut seedlings at the Milford Experimental Forest planting in Pennsylvania in April.

Taking Clean Data: Filling Out Your Datasheet

When taking data at an orchard or planting site, diligence is required to obtain an accurate data set and meaningful field notes. It's always important to record the date, the names of the data collectors, and specify all units of measure. Questions about what units to use often arise. With modern software, unit conversions for hundreds or thousands of measurements can be converted almost instantly, but only if the original units have been recorded. Sometimes, units may be a subjective score developed to describe the level of some type of damage, such as Japanese beetle damage. In this case, be sure to include the key to the score on the data sheet and in the column heading of the electronic data.

It's important not to leave any cells blank on your datasheet when

Pictures can be incredibly useful to document the condition of the orchard, trees, and pest or pathogen problems.

collecting data. If the measure is zero, such as zero nuts harvested, make sure to put in a zero, but do not record zero to represent that a measurement cannot be taken, because this skews the data. To keep track of completed observations on the data sheet, put a mark in a cell to indicate that it has been skipped on purpose, or record the reason in the notation column, such as “dead tree.” Do not record growth measurements for dead trees, as this is misleading to the person analyzing the data and will lead to inaccurate averages. Lastly, try to record observations for all trees, even if you are only taking data for a specific purpose, such as recording diameters to determine if the trees are ready for inoculation. This allows for a more complete and accurate analysis.

Field Notations and Documentation

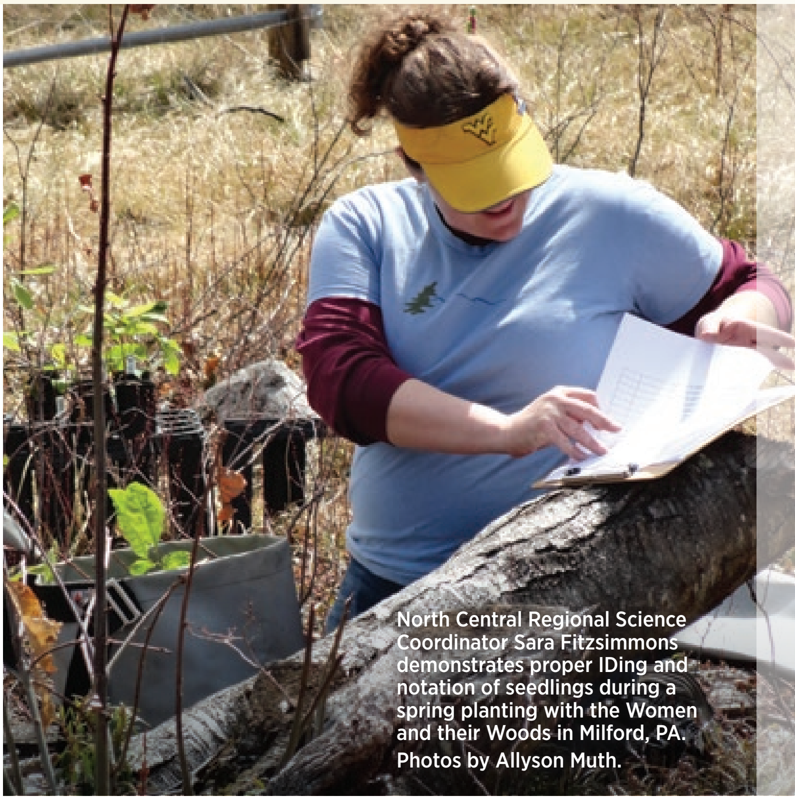
All observations made in the field that explain the condition of the trees or results of data should be noted. If there was any trouble or question about following the data collection protocol, it needs to be recorded along with the employed method. It is important to decide on a standard and apply it consistently.

Pictures can be incredibly useful to document the condition of the orchard, trees, and pest or pathogen problems. These can be shared with those who monitor the orchard and then used to identify potential problems by allowing quick remote evaluations by TACF science staff, state Extension Services, or other technical resources. When taking photographs intended for professional analysis or identification of growth issues such as pest damage, it’s important to take photos that include both a close up view of the damage or issue, and also the entire tree. This provides the best possible remote analysis. Quality photos can result in the identification of the issue, a determination that a follow up visit and sampling are needed, or that no action is needed.

When potential growth issues pop up, it is very helpful to examine trends that may indicate when the problem started and why. Growth measurements should be taken after the end of the growing season (late fall) and before the start of the following season (spring).

Measuring Tree Heights

Tree height is measured vertically from the ground to the tallest living portion of the tree. The tree should not be manipulated to change its height, for example: straightening a bent over leader of a small tree. It’s important to use the appropriate tool for measuring heights. A yardstick works well for very young trees,



North Central Regional Science Coordinator Sara Fitzsimmons demonstrates proper IDing and notation of seedlings during a spring planting with the Women and their Woods in Milford, PA. Photos by Allyson Muth.

while a telescoping height pole may be required for older trees. When measuring taller trees, it is helpful to have a second person, such as the data recorder, to read the measurement at a distance. This allows for an accurate reading. Be sure to measure to the tallest living portion of the tree, even if it does not appear to be the dominant or central stem. If your measurement is cut short due to a dead or broken leader, note this in the notation column.

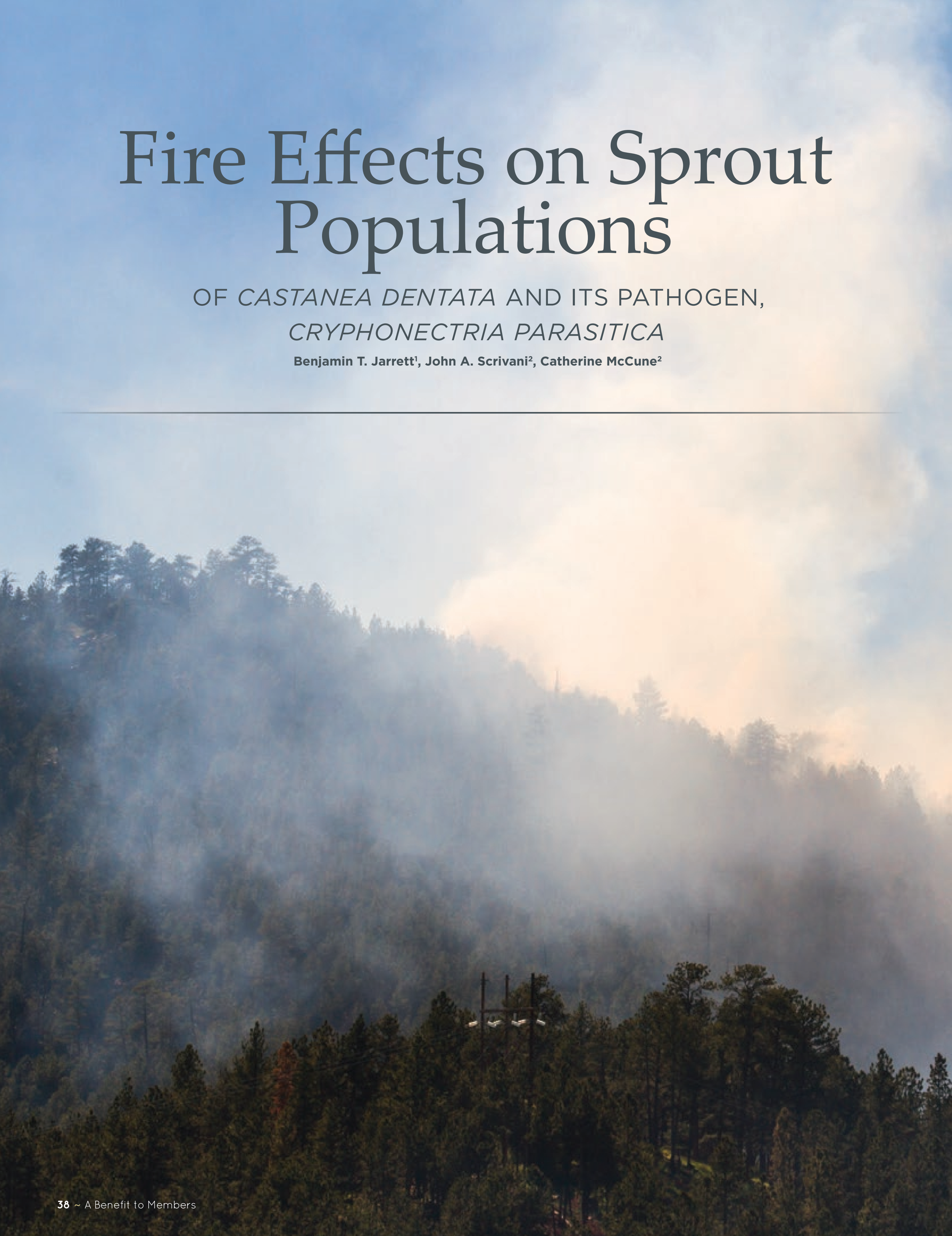
In TACF’s breeding program, diameter is recorded at two vertical points of the tree. The vertical height at which diameter is taken is important because the tree has a natural taper, being wider at the base and skinnier at the top. The first location is 4.5 feet from the ground, referred to as Diameter at Breast Height or DBH. In TACF backcross breeding orchards, trees are not inoculated until they are at least 1.5 inches in DBH. However in TACF seed orchards, diameter is measured in a second location, at one foot from the ground with a goal of one inch at time of inoculation.

Annual growth data collection may seem like a chore, but it’s a great opportunity for volunteers to participate in an important task and a good reason to get more eyes on the orchard to monitor for any potential issues.

Fire Effects on Sprout Populations

OF *CASTANEA DENTATA* AND ITS PATHOGEN, *CRYPHONECTRIA PARASITICA*

Benjamin T. Jarrett[1], John A. Scrivani[2], Catherine McCune[2]



ABSTRACT: American chestnut (*Castanea dentata*) response to fire is unknown and has been long-debated (Wang et al. 2013). The introduced fungal pathogen, *Cryphonectria parasitica*, removed chestnut as an overstory dominant hardwood tree in eastern North American forests in the early 1900s; however, the species has persisted as a population of understory sprouts. While American chestnut's response to clear-cuts, other silvicultural activities, and forest disturbances have been studied (Griffen 1989, McCament and McCarthy 2005), few studies have looked at chestnut and its pathogen's responses to fire. This study uses a 2013 prescribed burn in Shenandoah National Park to determine how fire effects sprout populations. We extended the existing vegetation monitoring being conducted by the Park to include additional sampling of American chestnut sprouts. The FIREMON Rare Species Sampling Method was followed to obtain a sufficient sample of chestnuts. Measurements were made pre- and post-burn to assess top-kill, re-sprouting, growth rates, reproductive effort, and pathogen presence. We found that the burn caused 99.7 percent of all stems sampled to be top-killed. There was an 11 percent decrease in living stems two growing seasons after the burn. While the overall stem count decreased, the average height and diameter of the stems surpassed pre-burn measurements in two growing seasons. The pathogen presence greatly decreased following the burn and likely contributed to the increased growth post-burn. A greater knowledge of the effects of fire on the host-pathogen system provides value to the species restoration effects of The American Chestnut Foundation and others working towards the introduction of blight-resistant American chestnuts into the landscape.

Introduction

Prior to the introduction of chestnut blight (*Cryphonectria parasitica*), the American chestnut (*Castanea dentata*) was considered a dominant hardwood species in eastern North American forests. The introduction of chestnut blight in the early 1900s has caused the American chestnut to disappear as a dominant species throughout its native range (Foster et al. 2002). Today American chestnut trees exist as recurrent stump sprouts that rarely grow large enough to reproduce (Paillet 2002).

As American chestnuts rarely reach sexual maturity, little is understood about the effects fire has on populations of fully-grown American chestnuts or how introduced, blight-resistant American chestnuts could be affected by fire (Wang et al. 2013). Natural fires are not particularly common in eastern North American forests and when they do occur they are typically suppressed by people. However, controlled burns have become an increasingly popular method of forest management. The effect fire has on most hardwoods of eastern North America is well known; however, the effect fire has on American chestnut is lacking. McCarthy (1935) suggested that oak species (*Quercus spp.*) and American chestnut may have similar responses to fire as both oaks and chestnuts share similar life strategies and habitats.

Fire is often cited in early forest literature as negatively affecting chestnuts. Buttrick and Holmes (1913) claim that the thin bark and shallow root system of American chestnut increases their susceptibility to mortality by fire compared to oak and hickory. Furthermore, Hawley and Hawes (1925) and Russell (1987) both suggest that damage caused by fire may also increase the risk of pathogen introduction and insect infestation. However, evidence also suggests that American chestnut populations could be positively effected by fire. American chestnut has the ability to prolifically sprout and it is a fast-growing species that is thought to be favored by periodic disturbances such as fire (Foster et al. 2002). There have also been records of fire events preceding increases in chestnut pollen in sediment records (Palliet 2002). Clearly a better evaluation of fire's effect on American chestnut requires more evidence. The interactions between site conditions, fire intensity, fire frequency, and fire season make predicting reactions to fire for any species difficult (Wang et al. 2013).

The goal of this study is to better understand how fire affects American chestnut as well as how fire affects the host/pathogen relationship between American chestnuts and chestnut blight. Using the April 2013 Jarman Gap prescribed burn in Shenandoah National Park to study these relationships, we looked at chestnut sprout growth, morality rates, reproductive efforts and the

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A typical system of stump sprouts growing post burn. Photo by Ben Jarrett.


Burn day 1: View from lookout that shows one section of the area of Jarman Gap that was burned. Photo by David Munn.

relationship between chestnut and chestnut blight. The National Park Service's (NPS) goals for the Jarman Gap prescribed burn were to reduce hazardous fuels, promote oak and pine regeneration, create additional animal food sources, and increase plant diversity (Hurlbert 2013).

To determine what effects fire has on American chestnut sprout populations and host/pathogen interactions between chestnuts and chestnut blight as well as evaluating the accuracy of McCarthy's (1935) hypothesis of oak and chestnut fire response similarities, this study addresses five main questions. 1) Are American chestnut sprouts top-killed (total stem dieback) by fire in a manor similar to *Quercus spp.*? 2) Do American chestnuts re-sprout after top-kill in a manner similar to *Quercus spp.* after fire? 3) How are growth rates of American chestnut sprouts affected by fire? 4) How are reproductive efforts affected by fire? 5) How are population levels and virulence of chestnut blight affected by fire?

Study Area

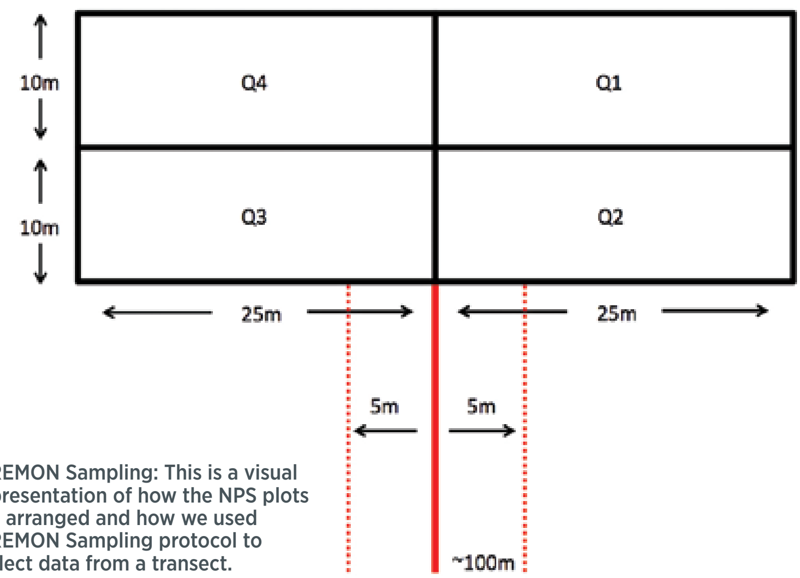
In April 2013, the National Park Service conducted a 500-acre prescribed burn near Jarman Gap in the southern portion of Shenandoah National Park, Virginia. The forest burned at Jarman Gap is characterized by high quality mixed oak forests with areas of pine-oak forest. Pine species include Virginia pine (*Pinus virginiana*), Pitch pine (*Pinus rigida*), and Table pine (*Pinus pungens*) and oak species commonly found throughout Shenandoah National Park include Chestnut oak (*Quercus montana*), Red oak (*Quercus rubra*), White oak (*Quercus alba*), and Scarlet oak (*Quercus coccinea*), and others. The severity of the burn varied across our study site from low to high-moderate. The severity of the burn was determined by qualitative observation of the amount of burned forest floor material and the height of scorch markings on trees.

The NPS uses a standardized fire-monitoring protocol for all prescribed burns to document basic information, detect trends, and ensure that each park meets its fire and resource management objectives. The NPS selected six random sites to construct monitoring plots prior to the Jarman Gap burn. The plots are used to monitor overall forest health and species composition post-burn. The fire monitoring plots are 20m x 50m with 4 equal-sized quadrants within each plot. For each plot, NPS collects data on plant species composition, growth rates, top-kill rates, fuel loads, and other parameters (USDI National Park Service 2003).

Methods

American chestnut sprouts are not found in high enough densities in the NPS plots for this study, so modifications to the NPS Fire Monitoring Protocol were made to better suit our species-specific study. Prior to the burn, a larger sample size of American chestnuts was located using the FIREMON Rare Species Sampling protocol (Version 3). The FIREMON Rare Species Sampling protocol is primarily used for threatened and endangered species and uncommon grass, forb, shrub, and tree species of special interest (Sutherland 2006). FIREMON Rare Species Sampling protocol data calls for the collection of status, stage, size, and reproductive efforts for individuals within range. Per FIREMON protocol, 75 to 100 meter transects were established at the NPS plots and sprouts located within 5 meters of the transect baseline were recorded.

Figure 1 shows the locations of each plot: Xeric Oak 1, Xeric Oak 2, Xeric Oak 3, Pine Oak 4, Pine Oak 5, and Pine Oak 6. The plots are named based on the forest composition of the plot. The Xeric Oak plots are high quality xeric oak forest without the presence of Pinus spp. and Pine Oak plots are mix forest containing *Quercus spp.* and *Pinus spp.* American chestnut was found at five of the six NPS plots. No chestnuts were found at Pine Oak 4.



FIREMON Sampling: This is a visual representation of how the NPS plots are arranged and how we used FIREMON Sampling protocol to collect data from a transect.

Measurements were taken at the five plots with chestnut before and after the burn. Pre-burn measurements are used as a control for our study. Pre-burn conditions are a good control, as it can be assumed that average chestnut heights and diameters are not changing significantly through time as they are continuously dying from blight and re-sprouting from their roots. Measurements were taken post-fire in October 2013 at Xeric Oak 2 and September and October 2014 at all plots. FIREMON sampling protocols were modified slightly to better fit the unique relationship between chestnuts and their pathogen. Data recorded for each individual specimen includes the number of living and dead sprouts in each cluster within the bounds of the transect. A cluster is a group of tree sprouts located less than 0.3 meters apart and are assumed to share the same root system. Within each cluster we recorded the number of living stems, the number of dead stems, the height of the tallest living stem, the height of the tallest dead stem, the diameter of the thickest living stem, and the diameter of the thickest dead sprout. We also recorded the presence of blight within a cluster and if the fungus was present on the largest stem. Lastly, any reproductive efforts made by the sprout were documented.

To determine if fire top-kills oaks and chestnuts in a similar manner, we first calculated the percent of chestnut stems that were top-killed. All living sprouts with fire damage were recorded after the burn. Using the number of living trees with fire damage, we can calculate the percent of chestnuts that were top-killed from the burn compared to the total number of stems before the fire.

To evaluate the effect fire has on the re-sprout rates of chestnut, we compared the number of clusters found before the burn and the number of clusters surviving post-burn. The clusters recorded before the burn but not after were assumed to have died completely from the burn. The percent of chestnut sprouts that re-sprouted post-fire was then compared to Quercus spp. Using data from McCarthy's 2005 study on hardwood regeneration post-fire in southeastern Ohio, we calculated the percent of oak seedlings (individuals <140cm tall) four years after prescribed fire (McCarthy 2005).

To evaluate the influence of fire on growth rates of American chestnut sprout populations, we compared the average height of the tallest living stems after two growing seasons with the average height of the tallest living stems before the burn. The same method was used to compare the average diameter of the thickest stems before and after the burn.

The determine if fire has an influence on reproductive efforts made by chestnut populations, any reproductive efforts made after the burn were recorded and compared to reproductive efforts recorded prior to the burn. Reproductive efforts include the presence of male pollen (catkins), female flowers, burrs, or nuts.

To evaluate how fire affects the host/pathogen relationship between chestnuts and their pathogen, chestnut blight, we compared the percent of clusters with blight and the percent of clusters whose largest stem has blight both pre-burn and post-burn. Over time we can estimate the rate at which the blight infects local populations of American chestnut sprouts post-fire. The percent of trees infected two growing seasons post-fire can be compared to the percent of the chestnut sprout populations with blight in the absence of fire to determine if fire decreases the presence of blight in American chestnut sprout populations after two growing seasons.

Results

Before the burn, across all five transects, 379 living stems were recorded. Out of those 379 stems, only one stem survived post fire and it showed evidence of fire damage. 99.7 percent of stems in the study were top-killed by the burn. *Quercus spp.* of a similar size to the chestnut sprouts (mostly less than 2 meters tall) experienced similar top-kill rates; however, many larger oak trees survived the fire.

In fall 2014, two growing seasons after the fire, the number of living stems across all plots was 337, an 11 percent decrease in overall stem count. Out of 115 clusters found before the burn, 13 percent did not re-sprout after the burn. *Quercus spp.* seedlings (<140cm tall) in McCarthy's 2005 study showed an average decrease of 41.5 percent in overall stem count 4 years post-fire (McCarthy 2005).

The average height of the tallest living sprouts before the burn was 1.86 meters. Two growing seasons

Xeric Oak 2 plot post burn. Photo by John Scrivani.

Xeric Oak 2 plot after two growing seasons. Photo by Ben Jarrett.

after the fire, the average height of the tallest living sprouts was 1.49 meters. The average diameter of the thickest living sprout before the burn was 1.66 cm. Two growing seasons after the fire, the average diameter of the thickest sprout was 1.18 cm.

Before the burn, no sprouts showed any active reproductive efforts (pollen, burrs, or nuts); however, two trees showed evidence of reproductive efforts in the past (burrs on the ground). Since the fire, there have been no reproductive efforts made by any sprouts.

Chestnut blight was present in every transect before the burn. The percent of clusters with blight ranged from 45.5 to 81.8 percent between sites. Every plot has shown a decreased presence of blight in the two ongoing seasons after the burn. The percent of clusters with blight ranges from 0 and 27 percent between sites. The sprout populations at Pine Oak 5 and Pine Oak 6 show no evidence of blight infection after two growing seasons. Xeric Oak 2 was the only plot that was recorded after one growing season. Before the fire, 64 percent of clusters had blight at the site. After one growing season, the pathogen had not returned. After two growing seasons 17.9 percent of clusters were infected with blight.

Discussion

While our results show some agreement with McCarthy's (1935) hypothesis that American chestnuts and oaks respond in a similar manner after fire, it also found some differences. The oak seedling data from McCarthy's (2005) study shows that oak seedlings have a much greater decrease (41.5 percent) in re-sprout rates post-fire than chestnuts (11 percent). However, this comparison is not an accurate comparison because the oak seedlings in McCarthy's (2005) study were not stump-sprouts with large, intact root systems like the chestnuts in this study. Overall, the unique situation of American chestnuts put large constraints on our ability to compare the effects fire has on chestnuts with known effects fire has on other species. Little research has been conducted on growth rates of stump sprouts after fire for oaks and other common hardwood species of eastern North American forests.

It's not surprising that the vast majority of stems were top-killed by the burn as most stems were less than 2 meters tall. Oaks of the same size were also top-killed and potentially completely killed by the burn. Not enough evidence has been gathered yet to conclude that chestnut and oak respond to fire in a similar manner. While small stems were top-killed in a similar manner, there is not enough evidence to say that larger chestnuts will respond in a way similar to overstory oak trees.

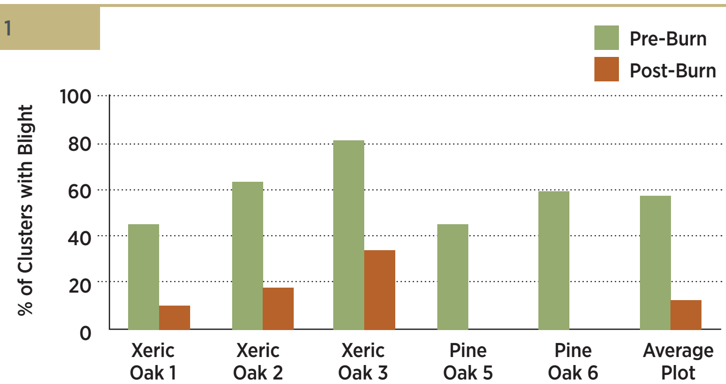
The average heights and diameters of the sprouts before the burn are skewed by three outlying trees which are significantly larger than the rest of the sprouts in the study. Without the three outlying trees skewing the average size, the average height of the tallest pre-burn stems was 1.5 meters and the average diameter was 1.23 cm. Removing the outliers gives us a better comparison of the average tree in the study. Pre-burn and post-burn diameters were found to be not significantly different (p-value 0.8). The same is true for stem heights (p-value 0.12). The relatively similar stem size before and after the burn, the post-burn stems have a more even distribution and the pre-burn trees have more large stems and more very small stems, but few average sized stems. This is likely because fire eliminates competition around the sprout areas and increases the amount of light reaching the sprouts as larger trees died from the fire, creating holes in the canopy of the forest. The more even distribution of sprout size could be caused by the more even distribution of nutrient resources and light. These results could indicates that using controlled burns may be an effective method

Shows the extent of burn damage from one of the largest stems in the study.
Photo by Ben Jarrett.

Appendix

Table 1: Summary table of measurements pre-burn and post-burn across all plots	Pre-Burn	Post-Burn
# of Sprouts	379	337
Average Height, m (± SD)	1.86 (1.49)	1.49 (0.94)
Average Diameter, cm (± SD)	1.66 (2.08)	1.18 (0.84)
Pathogen Presence, percent	57.9	12.5

Figure 1



The change in presence of blight caused by the burn. All plots have shown a reduced presence of the blight fungus.

of encouraging chestnut health and growth in the future when blight-resistant American chestnuts are reintroduced to the landscape.

Since all but one stem died in the fire, most trees are not close to being large enough to show any signs of reproductive efforts after the fire.

The decreased influence of chestnut blight on the sprouts after the burn could be another explanation for the increases in average growth rates after the first two growing seasons post-fire. Fire decreases the presence of blight and allows for better, faster growth of sprouts after the burn.

The decrease in pathogen presence post-burn was expected. However, there was a difference in the level of infection between forest types that was not predicted. Neither of the Pine Oak plots showed signs of the pathogen after two growing seasons, while all three of the Xeric Oak plots did. This is similar to the observations of Griffin (1989) that chestnut sprout survival in clear-cuts was associated with more open canopies and the presence of mountain laurel. While we have insufficient data to explain these results, we conjecture that more open canopies, ericaceous understories, and lower population densities of pathogen-hosting oak species in Pine Oak plots may play roles, independently or in combination, in a slower spread of the pathogen. Further research would have to be done to explore this hypothesis.

While this study provides some evidence that American chestnut sprout population growth is positively-affected by fire, the length of this study was too short to truly discern the long-term effects fire has on the American chestnut and their host/pathogen relationship. The continued monitoring of the existing plots and as well as adding more sites when the NPS conducts future burns in Shenandoah National Park is necessary to better understand the long-term effects of fire on chestnuts and their host/pathogen relationship with chestnut blight. To further understand the effects fire has on the sprout populations, a fire-excluded plot should be established and chestnut sprouts in the plot should be manually top-killed. This manually top-killed, fire-excluded plot would allow for better analysis of current data and to determine if the fire caused the changes in chestnut growth and pathogen interactions or not.

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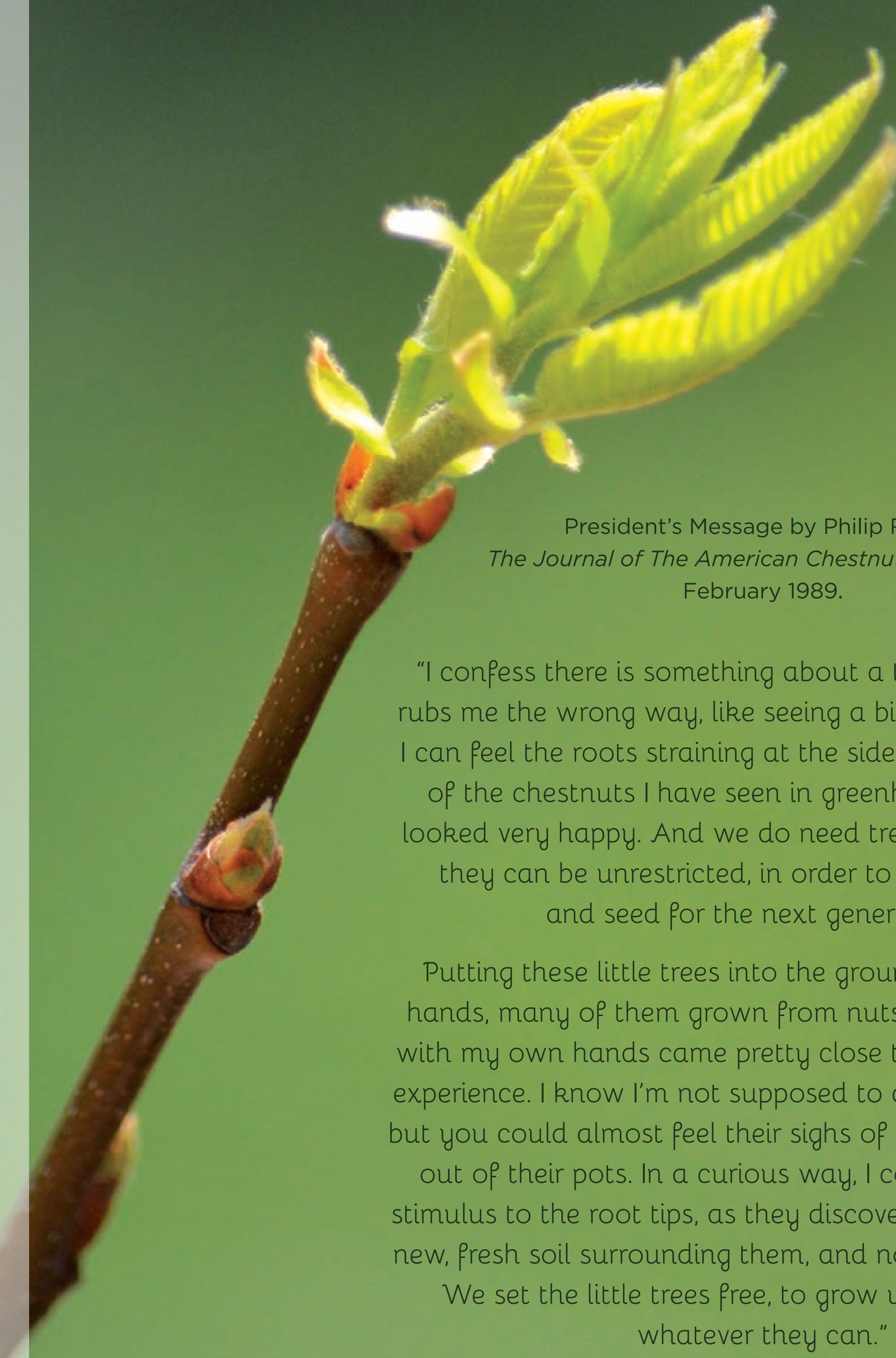

President's Message by Philip Rutter,
The Journal of The American Chestnut Foundation,
February 1989.

"I confess there is something about a tree in a pot that rubs me the wrong way, like seeing a bird in a small cage. I can feel the roots straining at the sides of the pot. Most of the chestnuts I have seen in greenhouses have not looked very happy. And we do need trees growing where they can be unrestricted, in order to get the flowers and seed for the next generations.

Putting these little trees into the ground with my own hands, many of them grown from nuts that I also made with my own hands came pretty close to being a religious experience. I know I'm not supposed to anthropomorphize, but you could almost feel their sighs of relief as they came out of their pots. In a curious way, I could imagine the stimulus to the root tips, as they discovered that there was new, fresh soil surrounding them, and no longer any walls. We set the little trees free, to grow up and become whatever they can."

Philip Rutter is the chief scientist, founder, and CEO of Badgersett Research Farm; founding president of The American Chestnut Foundation; and past president of the Northern Nut Growers Association.

IN MEMORY AND IN HONOR OF OUR TACF MEMBERS

January – May 2015

In Memory of:

Russell Andres
By William and Karen Andres

Dr. Nathaniel P. Brackett, Jr.
By Warren and Pamela Prehmus

Essie Burnworth
By Karen DuVal

Jay Frank Davidson
By Frank Davidson

Janice Garfunkel
By Amy Munich

Mathew James Habersack
By Lora Atwell, Robin Bell, Susanne Berg, Ralph and Marlana Ford, Susan Gay, Carolyn and Peter Jake, James McGrath and Anne Long, Celanese-Katrina McKinney (Celco Family), Joseph Mitchell, Suzanne Myers, Linda Pearrell, Stephen Redding, Charles and Martie Saks, and Jay Stewart

Wayne and Audrey Hypes
By Robert Whitescarver and Jean T. Hoffman

Auden Orion Rafert
By Thomas Moriarty and Ross Tappen

William Webster Richardson
By Carola Haas

Richard Robertson
By Thomas and Susan Stepp

Honorarium (in honor of):

Curtis Laffin
By First Baptist Church, Lexington, MA

Tom Saielli
By Judith Barton

Jim Sevic
By Kalmia Garden Club and Pine and Lake Garden Club

Jay M. Ziegler
By Jordan Myers

We regret any errors or omissions and hope you will bring them to our attention.

Mont Blanc

By Chef Silvia Baldini
silviabaldini.com

Ingredients:

Serves 4

3 lbs of fresh chestnuts
1 vanilla bean
¾ cup of milk
⅓ cups of sugar
1 ½ cups of whipping cream
1 to 2 tbsp. of sugar
1 tsp. of vanilla
2 squares of grated dark chocolate

Instructions:

Place chestnuts in shallow heatproof dish and bake 10 to 15 minutes at 425° or until the skin is dry and peels easily off. Rub the nuts in a rough cloth to remove skins. Place the peeled nuts in saucepan with vanilla bean and milk to cover and bring to a boil over high heat. Reduce heat, cover and simmer for 25 to 30 minutes, or until very tender. Remove vanilla bean. Drain chestnuts, and then put through food mill or sieve, and puree. Put in a pastry bag with a ⅛ plain tube. Beat cream until stiff, and then add sugar and vanilla to taste. Place cream into a pastry bag. Pipe the chestnut puree onto six individual servings of a sponge cake, then pipe the cream mixture over the puree, piling it high. Sprinkle chocolate over whipped cream and chill until serving time.

Photo courtesy of Meg Zimback via Creative Commons.

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INTEGRATING GENOMICS TOOLS IN AMERICAN CHESTNUT RESTORATION

October 23-24, 2015
Penn Stater Conference Center Hotel
State College, PA

In collaboration with the Schatz Tree Genetics Colloquium, TACF is pleased to present its 2015 Annual Meeting. This year's topic looks at the field of genomics and chestnut restoration, offering hands-on learning opportunities such as DNA extraction in the lab and a chestnut genome sequencing workshop with the scientists who actually did the sequencing. Participants are encouraged to ask genetics-based questions during an open panel discussion with some of the world's leading experts.

Register online at: acf.org/AM2015.php.

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