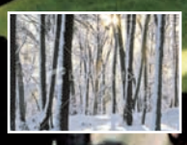
THE Journal
OF THE AMERICAN CHESTNUT FOUNDATION
November 2010 | Issue 3 Vol.24



Life in the Cold - Another Challenge to Restoration?

Tips from an Expert
How to Harvest and Store Chestnuts

- Teaching Kids about Chestnuts

2010 HARVEST APPEAL

PLEASE HELP US RESTORE THIS MIGHTY GIANT
TO ITS NATIVE FORESTS

DONATE TODAY!

THE
AMERICAN
CHESTNUT
FOUNDATION

www.ACF.org

The American Chestnut Foundation, 2010 Harvest Appeal
160 Zillicoa Street, Suite D, Asheville, NC 28801 or call (828) 281-0047 to make a gift by phone

THE AMERICAN CHESTNUT FOUNDATION®

The Mission of The American Chestnut Foundation

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

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

About Our Cover Photo:

This issue's cover photo was taken by Dr. Paul Sisco, former Southern Regional Science Coordinator for TACF. The photo recently earned first place in TACF's annual photo contest and it shows a spectacular display of color for an American chestnut seedling. If you have a photo that you think might look good on the cover of TACF's magazine, send it to meghan@acf.org.

TACF Locations & Staff

TACF Headquarters
160 Zillicoa Street, Suite D
Asheville, NC 28801
(828) 281-0047
Bryan Burhans, President and CEO
Judy Antaramian, Administrative Assistant
Betsy Gamber, V.P. of Operations
Meghan Jordan, Director of Communications
Dennis Kimball, Staff Accountant
Sarah Spooner, Program Manager for Grants and Agreements
Marshal Case, President Emeritus

Meadowview Research Farms
14005 Glenbrook Avenue
Meadowview, VA 24361
(276) 944-4631
Dr. Fred Hebard, Chief Scientist, David Bevins, Research Technician, William White, Southern Appalachian Regional Science Coordinator; Robert Caudell, Technician, Danny Honaker, Farmer; George Sykes, Farmer

Mid-Atlantic Regional Office
Virginia Chapter Office, P.O. Box 158, Marshall, VA 20116, Katy McCune, Mid-Atlantic Regional Science Coordinator

Northern Appalachian Regional Office
Pennsylvania State University
School of Forest Resources
206 Forest Resources Lab
University Park, PA 16802
(814) 863-7192
Sara Fitzsimmons, Northern Appalachian Regional Science Coordinator

New England Regional Office
USFS Northern Research Station
705 Spear Street
South Burlington, VT 05403
(802) 999-8706
Kendra Gurney, New England Regional Science Coordinator

Journal
OF THE AMERICAN CHESTNUT FOUNDATION

Inside This Issue:

Tis' the Season

by TACF Chairman Glen Rea

The holiday season is now upon us. Our fall harvest of chestnuts is complete, and our thoughts will soon turn to planting chestnuts for next year. As TACF volunteers, many of us enjoy planting, growing and nurturing chestnuts.

The biblical adage "you reap what you sow" is so applicable to our TACF volunteers. Our membership is large and diverse. Our members financially contribute to the organization's efforts and, without this support, the development of a blight-resistant chestnut would be impossible. Many members, like me, also support our efforts by spending countless hours working in local breeding orchards planting, weeding, pollinating and harvesting nuts. Others serve on their state boards helping provide leadership within our state chapters. And some help spread the word about our monumental mission. How much each of us "sows" into the TACF mission is dependent upon each individual, but the collective investment in TACF by all of our members is what makes us strong. Everyone is important…from regular members to the largest of donors. We need everybody's help.

No doubt our current economy is hitting everyone hard. Despite the turmoil, TACF members continue to financially support our efforts. And this support is absolutely critical. Although TACF is a nonprofit organization, we still must find the funding necessary to support our breeding and science programs. In other words, from an organizational view, we must maintain our financial stability and even grow in the face of uncertainty.

Your national board of directors continues to make sure that TACF operates as a sound business. We keep our costs to a minimum, we focus our resources, we make decisions based on the science and we recognize that the most valuable asset we have is our members. We are always looking for creative ways to improve services to our members and expand our science program.

This third issue of our new, full-color magazine you are now reading is an example of these efforts. *The Journal of the American Chestnut Foundation* magazine was actually a cost savings to the organization as compared to the cost of the previous Journal and Bark publications. Not only did moving to a full-color magazine streamline overhead costs, but it dramatically improved our ability to effectively communicate and service our membership. This has, in turn, allowed us to put more funding into our science programs.

TACF Chairman Glen Rea

There are many ways in which you can contribute to TACF. Obviously, your financial support is very important, especially during these challenging economic times. Please consider giving to our Annual Fall Appeal, which you should be receiving in the mail about now. You can always become a member of our Chestnut Legacy Society by pledging to remember TACF in your will. And you can raise your membership level by supporting us as an Annual or even a Life Sponsor member. Unlike many nonprofit organizations during this economic downturn, TACF has continued to grow. But we need your dedicated support to keep us moving forward. After all, TACF is your organization.

Consider contacting your state chapter and offering to volunteer in a breeding orchard near you. We are always looking for volunteers to help maintain our breeding orchards, assist with pollination and inoculation, plant chestnuts in the spring and harvest nuts in the fall. It's a lot of work, but you'll make new friends and take a front-row seat in our tree breeding efforts.

If your gifts align more on the organizational and social end of the spectrum, consider starting a TACF Branch in your area or volunteer to serve on your state board. Again, the strength of TACF lies within the diversity of our membership. There is a place for everyone within the ranks of TACF. We need you!

News From TACF

MeadWestvaco Gift to the Legacy Tree Orchard

MeadWestvaco (MWV) is the first global company to sponsor a Legacy Chestnut Tree. The company's $10,000 contribution will support continuation of the breeding efforts conducted by TACF, which are focused on developing trees with resistance to the blight. The progeny of these resistant chestnut trees will then be used in a chestnut restoration program throughout the tree's native range.

"MWV has long been in the forefront of promoting the sustainable management of our forests," says MWV Forestry Division President, Gene Hundley. "We are excited to continue our partnership with TACF by supporting the Legacy Tree Program, which is aimed at restoring one of the most majestic and important trees in the East."

TACF Awarded Charity Navigator's Top Rating

For the fourth straight year, TACF has earned Charity Navigator's 4-Star rating. Charity Navigator is one of the country's leading organizations to evaluate the fiscal and mission effectiveness of charities. This award, which is the highest possible from the organization, indicates that TACF outperformed the majority of nonprofits in the United States with respect to fiscal responsibility.

"We are proud to announce that The American Chestnut Foundation has earned our fourth consecutive Four-Star rating for its ability to efficiently grow and manage its finances. Only eight percent of the charities we've rated have received at least four consecutive Four-Star ratings," says Charity Navigator's President Ken Berger.

"TACF is honored that Charity Navigator, America's premier charity evaluator, has given us this award," says TACF President and CEO Bryan Burhans. "With the generous support of our members and partners, TACF was able to allocate a remarkable portion of our income—87%—to our programs alone. This means more trees in the ground, more hope for restoring the American chestnut to its native forests and more forests that are healthy."

New York Chapter Plants First Transgenic Seedlings

In June, the New York State Chapter planted approximately 50 American chestnut trees, some of which are test transgenics. Drs. Charles Maynard and William Powell from the College of Environmental Science and Forestry, SUNY, in Syracuse, developed these American chestnut trees, which contain different gene constructs in their DNA, in an effort to enhance resistance to the chestnut blight.

The trees will be tested for resistance to this deadly blight as they mature. The test site will hold up to 300 trees when completed, which will allow testing of many potential resistance-enhancing genes.

In Memory of and In Honor of Our TACF Members

In Honor of

Dr. Paul Sisco
Alma Spicer

In Memory of

Michael Ferguson
Judy Ferguson

George A. Graham
Knox Family Foundation

Larry Recknagel
Joseph & Beverly Accomando
Walt and Marilyn Szwarc

Valerie Schindler
Anton Schindler

David Jeffries
Michael and Patricia Andresino
Reed and Barbara Anthony
Peter Jeffries and Jeanne Arnold
Robbie and Linda Butler
John T. Hemenway
Benjamin and Lorraine Jeffries
Jonathan White

Arthur C. Peterson
Carren & Ron Boyce, Jr.
Shirley Boyce
Central Jersey Gastroenterology Associates PA
Essextec
William Nagle
Doris Rickles
Daniel Ryan

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

TACF Awards $50,000 in Grants

$50,000 in External Grants for Chestnut Researchers

Chestnut research is the cornerstone of TACF's program and the Foundation recently awarded nearly $50,000 in external grants to support this research. Listed below are the grant recipients and a brief description of their research.

China Partnership—University of Kentucky, TACF and University of Arkansas

Chinese and American scientists will work together over the next three years to enhance the American chestnut breeding program by better understanding the blight-resistant Chinese chestnut species in their native ranges. TACF's staff will help lead the American team of scientists. They will work with Chinese scientists to find blight-resistant material that will be incorporated into TACF's national science program. TACF scientists will work with scientists from Peking University and Beijing Forestry University to understand the ecology of the Chinese chestnut species. The groups will also initiate an exchange of genetic materials and test blight resistance of TACF's trees.

Effects of *Phytophthora cinnamomi* Rands on American chestnut seedlings—Purdue University

The project will evaluate the incidence of *Phytophthora cinnamomi* Rands under varying pH levels and will examine the growth, nutrient uptake and water relations of American chestnut seedlings. The seedlings will also receive *Phytophthora cinnamomi* Rands inoculation treatments.

Maintenance of backcross orchard planting—West Virginia University and TACF

The maintenance of a backcross orchard planting will help assess the level of blight-resistance. The main goal of the project is to evaluate the enhanced control of chestnut blight that results when trees with various levels of blight resistance are combined with diminished virulence of the blight from a hypovirus infection.

Monitoring American chestnut restoration sites on surface mined land in Kentucky—University of Kentucky

Scientists will monitor established sites in Kentucky to fully evaluate field trials on surface mined lands. By monitoring existing American chestnut restoration sites, scientists will be able to develop reforestation/restoration guidelines and recommendations for reestablishing stands of TACF's American chestnut.

Establishment of genetically diverse population of hybrid American chestnuts resistant to chestnut blight and Ink Disease—Clemson University and TACF

Scientists will evaluate blight-resistant sixth generation selections at Meadowview Research Farms to see which trees also carry resistance to Ink Disease caused by *Phytophthora cinnamomi*. This will be done by test-crossing each selection to pure American chestnut trees in Pennsylvania. The test cross families will then be screened for Ink Disease resistance in South Carolina.

Optimizing American chestnut seedling root morphology—University of Georgia

Scientists will determine the optimal handling of American chestnut nuts to produce seedlings with well-developed root systems. With well-developed root systems, the seedlings will be able to maximize their survival and growth following their out-planting. The study also includes a comparison of fall- versus spring-planted chestnuts.

Establishment and monitoring first test plantings of sixth-generations seedlings on national forests in the Southern region—USDA Forest Service and University of Tennessee

This project will determine the effects of breeding generation, genetic family and chestnut size on the growth of chestnut seedlings in a commercial tree nursery. Scientists will also evaluate the differences in one-, two- and three-year post-planting survival, growth and blight resistance. This is done in the forest.

Nothing Beats Owning Your Own American Chestnut by Bryan Burhans, CEO

TACF President and CEO Bryan Burhans

For nearly 30 years, The American Chestnut Foundation operated on a promise and a prayer built upon solid science, a dedicated volunteer base and a skilled cadre of scientists. Based on a breeding protocol developed by Dr. Charles Burnham, TACF volunteers and scientists embarked on an historic endeavor to develop a blight-resistant American chestnut. The breeding protocol was scientifically sound, well thought out and implemented effectively by TACF state chapters and at our Meadowview Research Farms in southwestern Virginia.

Almost three decades later, TACF scientists, volunteers and partners are now testing our first line of potentially blight-resistant chestnuts we call Restoration Chestnuts. We still don't know if these trees will have the required American growth characteristics and resistance to the blight, but boy is it fun to finally have a tree in hand to work with!

TACF recognized the importance of getting these Restoration Chestnuts into the hands of our volunteers. After all, there are few things more fun than planting, nurturing and growing your own chestnut trees. And, unlike the pure American chestnut, which are sadly guaranteed to die from the blight, our new Restoration Chestnuts have a great chance for survival.

TACF started distributing these very scarce Restoration Chestnuts in early 2009 to our members based on their length of membership. This distribution of Restoration Chestnuts to our longest supporting members continues today.

As seed production from TACF's Legacy Tree orchard continued to increase, TACF implemented an Annual Sponsor program that continues to offer Restoration Chestnuts to sponsors as an incentive to membership. Annual Sponsors receive between two and four seeds depending on their sponsorship level. This new sponsorship program has significantly helped TACF through a horrible economy, while not negatively impacting seed availability to our long-term members or our science program. TACF must continue to find ways to leverage the necessary funding to expand our science program at the national and state levels.

Our Legacy Tree orchard, located at our research farms, is truly a sight to see. The orchard contains 200 of TACF's most blight-resistant trees, which produce the Restoration Chestnuts we distribute to our members, chapters and partners.

Thanks to the vision of past board chairman Richard Will, members can sponsor their own Legacy Tree as a way to leave their own legacy in support of the future restoration of the American chestnut. As a benefit, Legacy Tree sponsors receive their own Restoration Chestnuts for planting. All of the funding received through these sponsorships goes directly back to support our science efforts at the national and state levels.

Recently, MeadWestvaco (MWV) stepped up to the plate and sponsored their own Legacy Tree as a challenge to other forestry companies to support our efforts. MWV is the first global forest products company to sponsor a Legacy Chestnut Tree. The company's $10,000 contribution will support our continuing breeding efforts.

The day has finally come when our members can finally start planting their own potentially blight-resistant chestnuts. TACF wants to see these trees get into our members' hands, while ensuring that we maintain our ability to grow the organization's important programs. The Restoration Chestnuts being planted today are not the end product, but rather represent a monumental step down the long road toward restoring the American chestnut.

Every Picture Tells a Story

The History Behind a Classic Chestnut Photo by Paul Sisco

For many years the cover of TACF's brochure featured a photo of five large old-growth chestnut trees with two men standing beneath them. Questions have been raised from time to time about where this photo was taken, whether the trees were indeed chestnuts and who took the photograph. While working with the staff of the Forest History Society in Durham, N.C., Kenneth Summerville, was able to track down the original publication of the photo in an article in the January 15, 1910, issue of *American Lumberman* magazine.

The Whiting Brothers

The classic chestnut photo on TACF's brochure was from an article advertising the purchase of a huge property in southwestern North Carolina by William S. and Frank R. Whiting. By 1910, they were able to purchase several large tracts in Graham County, N.C., southwest of what is now the Great Smoky Mountains National Park. The 50-page article in the January 15, 1910, issue of *American Lumberman* is entitled "Whiting Timber and Mill Interests," and it contains many photos of the virgin timber on the tract. The photo of chestnut used in TACF's brochure appears on page 74 of the magazine

Where was the Photo Taken?

As mentioned previously, the article is an advertisement for the Graham County tract of land. All of these watersheds had large poplar trees, which are visible in the photo along with the trees believed to be chestnuts. That means the photo could have been taken in any one of them. The poplars in the Little Santeelah Creek watershed have been preserved as part of the Joyce Kilmer Memorial Forest.

Are the Trees in the Photo Chestnut?

For two reasons, I think the answer to this question is a resounding "yes." First, the caption in the article states, "A characteristic growth of chestnut in a poplar cove." The big trees in the background in the center of the illustration are poplar. The five large ones in the foreground are chestnut." Secondly, the bark of the chestnut trees in the article's photos is different from the bark of the poplar trees.

Who was the Photographer?

Who actually took the photo is also a contentious issue, and, unfortunately, I have not been able to clear the matter up either. The photo itself credits "Am. Lumberman Photo and Eng." Perhaps the most likely creator of the image was the photographer Sidney V. Streator, who was a staff photographer for *American Lumberman* from the early 1900s until he retired in 1937.

Postscript

Whether it was Sidney Streator or one of the Gennett brothers who took the photo, it's clear that Andrew Gennett, Sr. took the lead in preserving the old-growth trees in part of the Whiting Tract. The Whiting Brothers never harvested much if any timber from this piece of property. Instead, they divided it up and sold it to three other companies in the early 1920s. Gennett Lumber Company bought the section including the Little Santeelah Creek watershed, and it was this watershed, containing an old-growth forest of hemlock and tulip poplar, that Andrew Gennett insisted be preserved when it was later sold to the U.S. Forest Service. It was named the Joyce Kilmer Memorial Forest after the author of the poem "Trees." Kilmer was killed in the First World War. As Kilmer poignantly wrote, "Poems are made by fools like me, but only God can make a tree."

Dr. Paul Sisco currently serves on TACF's board of directors. He retired in 2008 as TACF's Southern Regional Science Coordinator but continues to volunteer much of his time to restoring the American chestnut.

Harvesting, Handling & Storing Chestnuts

by Dave Armstrong, Pennsylvania Chapter

Harvest is as critical as any other part of the yearly chestnut growing process. Chestnuts are eaten by almost everything that crawls, walks and flies as soon as the bur opens. Even if your tree has never had viable nuts before, blue jays and squirrels will find the opening burs immediately and steal your valuable nuts before they ever hit the ground.

Consider an Early Harvest

As soon as nut-bearing burs begin to open, pick all of the burs, which may possibly have a nut inside. The seeds should still be viable and will continue to ripen inside the burr. (See the paragraph titled "Opening Burs and Removing Nuts" for more information.)

Identifying Pollinated and Unpollinated Nuts

Chestnut trees develop burs whether they contain viable nuts or not, which can make it difficult to find the good nuts. Burs which have not been pollinated will start to open and drop nuts as much as a week before the fruitful bur.

Luckily, when many of the unpollinated burs are opening, you can often spot the fruitful burs. They will still be closed and will also commonly be bright green in contrast to the brownish color of the empty burs.

The state of the fruitful burs can be assessed by carefully opening one or two (if there are many available to work with). When the developing fertilized nuts begin to show brown

color, you can expect the burs to start opening very soon. However, trees may start to drop nuts while the nuts are still white. Even if they are completely white, these nuts will often germinate if not damaged. Save them, preferably by leaving them attached to the bur and waiting for them to turn brown before storage.

Timing the Harvest

Start looking at the trees in early- to mid-September. When nuts inside closed burs are averaging 50-80 % brown, or fruitful burs are just starting to split open start picking. You can pick the burs early, even when the seams begin to show, but if you wait beyond seam splitting, the nuts become vulnerable to predation by rodents and other animals.

Harvesting

Smart preparation can make harvest an easier and safer undertaking. Experienced chestnut gatherers harvest nuts wearing thick leather gloves as bur spines can puncture skin, break off and, later, cause a festering wound. Another idea is to use a fruit picker basket on a pole, which will reach many burs without requiring a ladder. Remember to line the basket with mesh, so loose nuts from partially opened burs cannot fall through. A mesh bag works well for this. Some nut growers also suggest using a long window-washing pole with a hook attached to harvest the burs. Try not to remove or damage the stem on which the burs are held. Stem damage can reduce harvest the following year or even as far out as two years later.

Keep Detailed Records

If you want to use any of the nuts you harvest for planting new trees, be sure to keep burs and nuts from different trees in separately labeled bags. Send records of the mother trees you find to your TACF chapter's science contact or regional science coordinator, so their history can be tracked over time.

Opening Burs and Removing Nuts

Once you've harvested the unopened burs, place them in a simple container. Plastic or paper bags, trash bags, bushel baskets or laundry baskets are all good choices. Whatever container you use, leave the top open to allow the burs to breathe (burs generate a lot of moisture) and label them for source identification. If the bags tip over and spill together you may not be able to maintain an accurate count for each of your nut sources. Look through the bags on a regular basis and remove nuts as they ripen.

If bags are stored in a cool, dark place, check them every four days; if stored in light at room temperature, check them at least every two days as they will ripen and dry faster. If there are still unopened burs after about 10 days, you can open, or shuck, the unopened burs and the seed will usually be viable. Again, don't forget to wear gloves.

Dave Armstrong is the former Executive Director and Operations Coordinator for the Pennsylvania Chapter of TACF. He has been involved in the effort to restore the American chestnut since 1997 and in 2009, reported more than 600 volunteer hours of chestnut work.

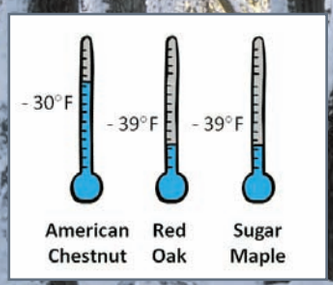
Storing Nuts

If the nuts are to be saved for planting, place them in damp (not soaking) peat moss as soon as they are removed from the burs, as this is the best way to preserve them and keep them viable. The peat moss should be damp enough that you can squeeze it into a ball, but not so damp you can squeeze water out of it. Create an even distribution of nuts within the peat. It's very important to use sterile peat, not potting mix or other dense media. If you do not use sterile peat, or if you use peat moss that is too wet, you will encourage the growth of damaging mold.

Place the nuts and peat in a plastic bag or Tupperware container that has been punched with holes. This allows the nuts to breath, and also reduces the risk of mold by limiting the amount of moisture that can collect in the container. Label the bags with the number of nuts contained inside and the identity of the mother tree and/or cross from which the nuts were harvested. At this point, you should ship them to your TACF chapter's science contact or regional science coordinator for storage, or store the nuts yourself in the refrigerator. The ideal storage temperature for chestnuts is approximately 34°F, and even at this cold temperature the nuts will probably sprout by late winter or early spring.

Life in the Cold

Another Challenge to American Chestnut Restoration?



by Kendra Gurney (TACF) and Paul Schaberg (USDA Forest Service)

During the winter, American chestnut was found to be 9°F less cold hardy than both red oak and sugar maple. Laboratory methods used to measure cold tolerance, while necessary to evaluate differences among species and sources, can produce fairly conservative results that seem to overestimate the cold tolerance of actual shoots in the field.

Credit: Paula Murakami, USDA Forest Service

The restoration of the American chestnut is a goal that unites chestnut enthusiasts from Maine to Georgia, from the East Coast to the Ohio River, and even beyond the boundaries of this majestic species' native range. But while our goal is the same—to restore this tree to its former place in the forest—the obstacles vary with each location this effort is undertaken.

In the northern and colder reaches of the American chestnut's native range, hardiness to low temperatures may be a challenge to returning this tree to the forest. If you look at a range map, it seems likely that the American chestnut was originally limited in its northern range by low temperatures. Considering this, in colder locations it may be necessary to develop and plant American chestnuts that are resistant to not just one, but two ecological threats—one introduced (blight) and one native (cold).

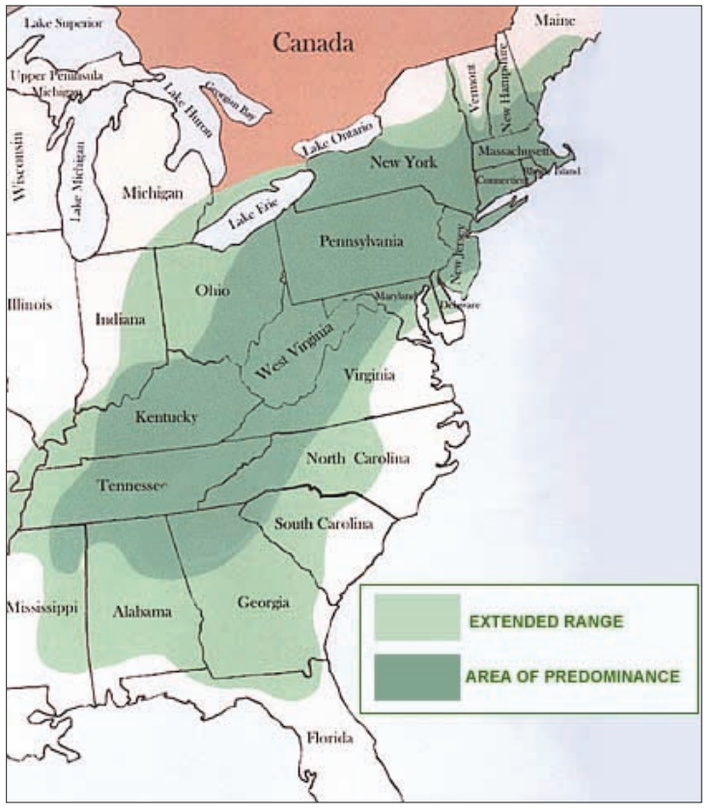
In 2005, TACF began working with a collaborative research group at the U.S. Forest Service Northern Research Station and the University of Vermont. Their first round of investigations focused on the cold tolerance of the woody shoots of American chestnut and backcross chestnut. Shoots, a tree's small woody stems, are exposed to the elements year-round and can become damaged, or even killed, by

low temperatures. Shoots from American and Vermont backcross chestnut, red oak and sugar maple were sampled from two sites in Vermont during the fall, winter and spring of 2006-2007 and then tested in the laboratory to assess their cold tolerance. While both sugar maple and red oak grow farther north than American chestnut, and are thus expected to be more cold tolerant, both species were chosen to represent fairly standard northern hardwood competition.

By testing the cold tolerance of shoots throughout the fall, winter and spring, it's possible to get a better picture of when trees start to acclimate to the cold, what their cold threshold is during the winter, and when they drop their guard in the spring. By April of 2007, it was clear at one of the sampling sites that many of the trees had been damaged by low winter temperatures. The tips of many terminal and lateral shoots had died back 6-12 inches, causing lateral buds on injured shoots to be released and resulting in a bush-like appearance of injured plants.

This kind of injury can be visually assessed, and field measures of shoot winter injury were made in the spring of 2007 on the same chestnut, oak and maple saplings used in laboratory assessments. Again, it was found that the chestnuts were less cold hardy. While there was significant winter injury measured on most of the chestnuts, none was observed on the oak or maple sampled from the same area. It's interesting to note that while the laboratory assessments identified a damaging winter temperature of -30°F, actual lows measured at this site were only -18°F, 12 degrees warmer than predicted to cause injury.

While the shoots of a tree are always exposed to the elements, there are other tissue types that must also survive the winter in order to aid natural regeneration. When considering the reintroduction, regeneration and spread of blight-resistant stock (the goal of American chestnut restoration), it is reasonable to wonder—are the nuts cold hardy enough to hold up to northeastern winter temperatures and successfully sprout in the spring? In order to answer this question, a preliminary nut cold tolerance experiment was conducted.



The range of the American chestnut. In New England, American chestnut trees may be found in a few exceptionally cold pockets, but in general it's limited to areas where milder temperatures predominate, such as lake and river valleys and lower elevations. Credit: Sara Fitzsimmons, TACF

American chestnuts from throughout the range were laboratory tested for cold tolerance in a manner similar to shoots. Red oak acorns were also tested as a comparison. While this preliminary experiment did not uncover any regional or elevation patterns for the cold tolerance of chestnuts, it was found that chestnuts were about two degrees Fahrenheit less cold hardy than red oak acorns (-10°F and -12°F, respectively). Interestingly, neither chestnuts nor acorns were cold tolerant enough to survive ambient low air temperatures typical to the northeast. Thus, it is likely that the burial of nuts by rodents or the protection of winter snowpacks is needed to shelter both chestnuts and acorns from freezing damage and keep them viable through long northern winters.

Results from these first experiments highlighted the limited cold tolerance of American chestnut relative to ambient temperature lows and potential species competitors in the North Country. These results also raised new questions about how to best guide chestnut restoration in colder climates.

Chestnut shoots killed by winter temperatures are easy to spot in the spring. The bark is darker, sunken and cracked at the site of injury. As the growing season progresses, the buds do not swell and leaves do not emerge on winter-injured shoots. Basically the shoot is, and appears, dead. While laboratory assessments predicted a damaging temperature of -30°F, temperature lows measured at this site were 12 degrees warmer than predicted to cause injury. It's likely that damage was observed at higher temperatures in the field because temperatures in the natural environment can fluctuate drastically in a short period of time. This creates rapid freeze-thaw stresses that are often more damaging than the slow-freeze conditions of laboratory tests. Credit: Kendra Gurney, TACF

A large experimental planting established on the Green Mountain National Forest in Vermont in 2009 hopes to answer these new questions. American chestnuts from sources representing a large portion of the species' native range were planted in replicated plots under different levels of canopy cover. This larger collection of geographically diverse sources will allow for a more thorough look at the variation in American chestnut shoot cold tolerance associated with the genetic source of trees. In addition, the different levels of canopy cover used in the study should help to determine the best planting environment to provide optimal cold tolerance, growth and survival in colder climates.

These investigations into American chestnut cold tolerance were designed to improve restoration efforts, as well as to increase the body of knowledge about this important tree species. The first experiments have highlighted limited cold tolerance as a potential complication to restoration efforts in more northern climates. However, work continues to determine the best way to overcome this limitation. It's likely that laboratory and field tests will identify genetic sources of American chestnut that are significantly more cold tolerant than typical species averages. The targeted use of these sources in breeding efforts in the north could measurably increase overwintering survival and growth for a better overall outlook for the American chestnut across its traditional range and beyond.

Paul Schaberg is a Research Plant Physiologist at the Northern Research Station of the U.S. Forest Service in South Burlington, VT and is founding member of the VT/NH chapter and a current board member of that state chapter.

Kendra Gurney is TACF's New England Regional Science Coordinator, based in South Burlington, Vermont. She earned a BS in Environmental Conservation Science with a self-designed minor in plant and forest health at the University of New Hampshire.

Do Beavers Eat Chestnut Trees?

by Bruce Wakeland

Apparently, beavers do eat them in northern Indiana. Beavers putting together their winter stash of food found their way to my BC_3F_1 orchard and cut down about 12 trees before I found the activity. We had already made our selections from that orchard, and I quickly put a cage around our best selection, which fortunately they did not damage. The trees they cut down were rejects that I was leaving for nut production for wildlife.

Because I am considering using the chestnuts produced from these trees for a roasting chestnuts promotional idea, I dragged some large dead trees between the marsh and the chestnut orchard hoping the beavers will not want to cut and drag trees across other downed trees in their way. I enjoy the beavers in my marsh, but over the years the score has become Beavers 49, Wakeland 27.

Bruce Wakeland is a longtime member of TACF. He is past president of the Indiana Chapter and is a consulting forester in Culver, Indiana.

American Chestnut Biotech

Polymerized Peat Plugs Improve American Chestnut Somatic Embryo Germination in Vitro



Dr. Scott Merkle is Professor of Forest Biology at the Warnell School of Forestry and Natural Resources at the University of Georgia. His research interests include biotechnology for the restoration of tree species and in vitro propagation of forest trees.

Lake Maner is an undergraduate research assistant at the Warnell School of Forestry and Natural Resources at the University of Georgia.

LAKE MANER AND SCOTT MERKLE, Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA, 30602.

Abstract: One significant bottleneck remaining in the process of clonal propagation of American chestnut via somatic embryogenesis is the conversion of somatic embryos to somatic seedlings that continue vigorous growth following transfer to potting mix in the greenhouse. Currently, chestnut somatic embryos are germinated on gelled Germination Medium (GM) and grown in vitro for several weeks prior to potting in peat-based potting mix and acclimatization to greenhouse conditions. Upon removal from gelled medium, root systems of chestnut somatic seedlings are usually small and lack branching. We believe the underdeveloped root systems are largely responsible for the slow growth of our chestnut somatic seedlings relative to zygotic chestnut seedlings. Therefore, we tested alternative approaches to germinating the embryos on gelled medium to see if these approaches might improve somatic seedling production efficiency and quality.

In two experiments, hundreds of embryos representing five embryogenic American chestnut culture lines were given a cold pre-germination treatment, transferred to vessels containing gelled GM and incubated for two weeks to initiate germination. Then, embryos of each line were divided into four groups and the different groups were transferred to different treatments to complete germination. In addition to the standard germination treatment on gelled GM, treatments included direct sowing on potting mix or on polymerized peat plugs ex vitro or transfer to autoclaved polymerized peat plugs saturated with liquid GM in sterilized vessels (in vitro). Embryos on plugs maintained in vitro were fed with 5 ml of liquid GM every 2-3 weeks.

While conversion rates were low for all of the embryos and results varied with line, overall the highest frequency of somatic seedlings was obtained using the polymerized peat plugs in vitro. Furthermore, root systems of somatic seedlings in plugs in vitro were larger and had more lateral roots than those grown on gelled medium. Somatic seedlings in plugs removed from in vitro conditions and rinsed free of GM were successfully acclimatized in a hardening-off chamber. Following transfer to potting mix, they continued growth in the greenhouse.

For the full scientific study, visit:
http://www.acf.org/News_Room.php

Holiday Season Brain Teaser

Test Your Chestnut Song Knowledge

Chestnuts Roasting on an Open Fire

1 How many recording artists have sung "Chestnuts Roasting on an Open Fire?"

a. 25-50

b. 51-100

c. 101-150

d. More than 150

2 The song was originally released in which year?

a. 1940

b. 1944

c. 1948

d. 1952

3 Who wrote "Chestnuts Roasting on an Open Fire?"

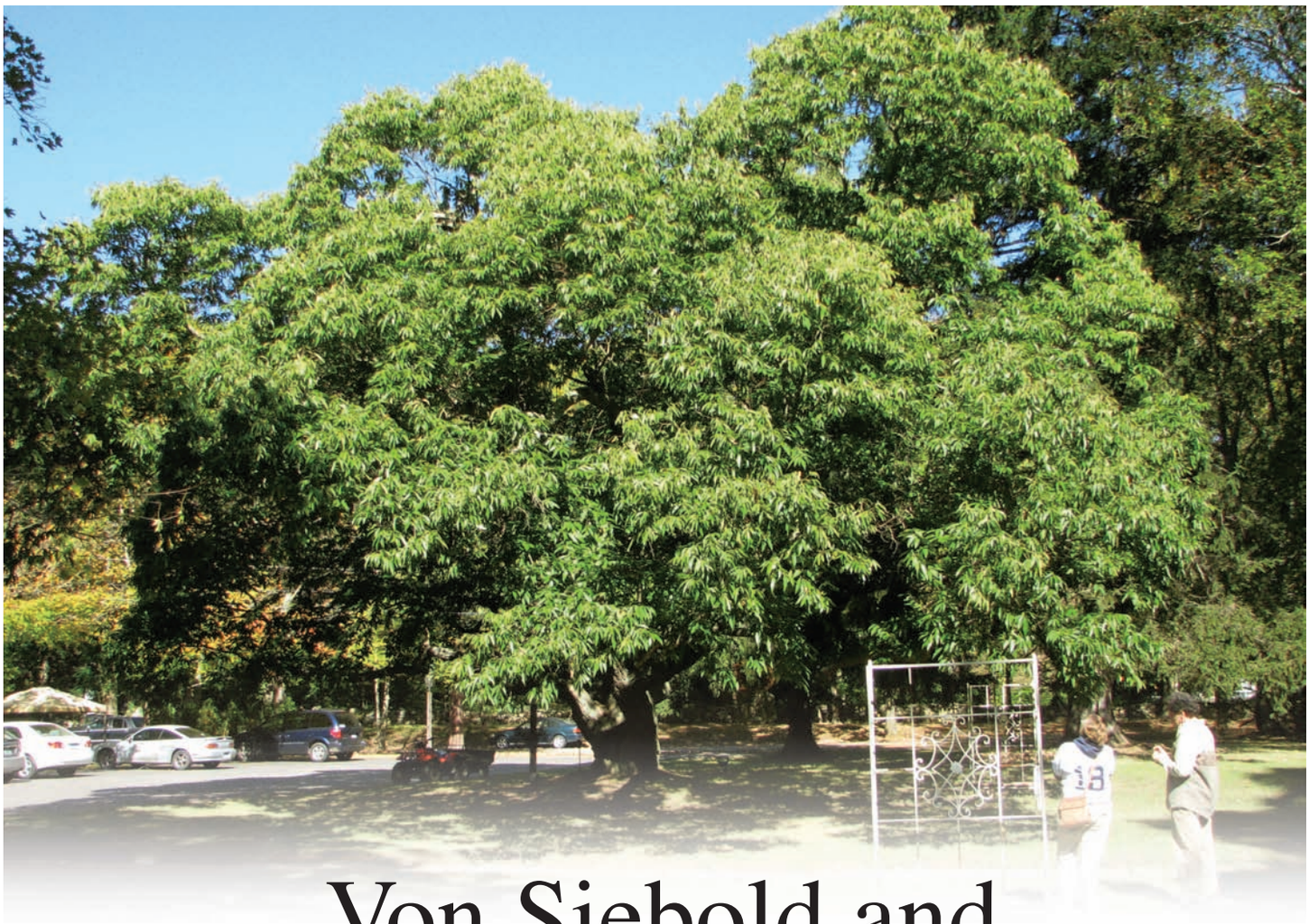
a. Mel Torme and Nat King Cole

b. Nat King Cole and Natalie Cole

c. Mel Torme and Bob Wells

d. Bob Wells and Natalie Cole

Answers: 1. D 2. B 3. C



Von Siebold and the Japanese Chestnut

Castanea crenata Siebold & Zucc., Abh. Math.-Phys. Cl. Kienigl. Bayer. Akad.k Wiss. 4(3):324 (1846)

By William Lord

The Japanese chestnut, *Castanea crenata*, was one of many plant discoveries made in Japan by Philipp Franx von Siebold, (1796-1866), a German physician in the service of the Dutch government. He was stationed on a trading post, (Deshima, 1823-29), an artificial island next to Nagasaki where the insular Japanese required foreigners to live. Siebold developed a rapport with native medical practitioners. He taught them the advances of western medicine and was an eager and appreciative student of their culture. He gained favor by curing an influential officer and was permitted to travel ashore and treat Japanese patients. He began a medical school with 50 Japanese students who learned and studied western methods. This expanded into the so called Rangaku movement whereby the Dutch language served as a conduit for the absorption of Western science into Japan.

Siebold's botanical collections from his years in Japan may be seen today in Belgium, Holland, Germany and, of course, Japan.

Japanese chestnut tree at Fort Defiance, NC. Photo by Paul H. Sisco.

In addition to his duties as a physician, Siebold was equally responsible to the Dutch government as a biologist. His medical students were essential aides to him in collecting and organizing plant and animal specimens, illustrated by local artists.

In 1828, Siebold traveled to Edo (now Tokyo) and collected many plants and animals. He also secretly acquired some maps of Japan, in violation of Japanese law. This was discovered and he was forced to leave the country. However he had made many influential friends and he was permitted to retain possession of thousands of plant and animal specimens, his library and his maps. He arrived in Europe in 1830, where his botanical collections are seen today in Ghent, Belgium, in Lieden, Holland and Wurzburg, Germany. He is remembered most prominently in Nagasaki, the location of Japan's Siebold Memorial Museum.

Siebold remained in Europe until 1859, writing volumes on the natural history and culture of Japan. The Japanese chestnut was first described as *Castanea crenata* in 1846, in Abhandelungen der mathematisch-physikalischen Classe der Koniglich Bayerischen Akademie der Wissenschaften, which he co-wrote with Joseph Gerhard Zuccarini, (1797-1848), a professor of botany at the University of Munich. Siebold wrote of the Japanese chestnut:

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

> *"(Loosely translated): Leaves with rounded base, oblong, tapering at the tip. Leaf margins crenate [scalloped], rounded' with bristle tips. Lower side of veins with hairs, young leaves grayish with short hairs [pubescent]. Catkins elongate, graceful. Styles 7-8."*

Siebold was able to earn respect and admiration from his Japanese associates not only because of his professional skills, but also because of his deep appreciation for their culture. He was not so regarded by the Dutch government. He proposed a "cultural" approach to the Japanese, as opposed to a "mercantile" approach. This provoked Dutch denial and he was recalled, returning to Japan only for a visit in 1859.

YOUTH
AND THE AMERICAN CHESTNUT
Instilling a Love of Nature in the Next Generation

By Jim Casada

All of us who cherish the good earth, and that likely includes everyone who reads this publication, care deeply about the future of the natural world in general, and the American chestnut in particular. That concern for nature translates into a need, indeed a duty, to nurture outdoor awareness and appreciation for this wonderful tree in the next generation.

Fortunately, youngsters in today's world have a realistic opportunity to play an integral part in a grand conservation success story—the return of this great tree, which once graced forests up and down the spine of the Appalachians and beyond. Perhaps a personal anecdote is both permissible and appropriate at this point, because my own boyhood was filled with tales revolving around the sad saga of the American chestnut.

My Grandpa Joe was a hickory-tough old man, hardened by a lifetime of arduous work eking out a living in the rugged hills and hollows of North Carolina's Great Smokies. He wasn't a man much given to demonstration of emotion, but whenever the vanished giant of the forests he had known as a boy and man was mentioned, there would be a catch in his voice and a tear in his eyes.

"Son," he said to me countless times in rocking chair sessions on his front porch looking out over the mountains, "the chestnut was life's blood to mountain folks during my youth and the prime of my years. It gave us sustenance in more ways than you can imagine, and when that awful blight struck it was like the Biblical plague had come to the high country."

He would reminisce about the way the chestnut was an integral part of life for him, his family and countless others living in similar circumstances in the Appalachians.

"We fattened our hogs on chestnut mast; gathered the nuts by the bushel to get cash money, ate them raw, roasted, in soup, in bread and in dressing; cut trees for acid wood (a favored source of tannic acid); made split-rail fences and roofing shingles out of them; built barns and sheds from rough lumber; and hunted squirrels, deer and turkeys, which fed on them." The tree, as a foodstuff and a lumber source, was central to Grandpa's livelihood.

He would bemoan the fact that the American chestnut belonged to a world we had lost and comment with great sadness, "You'll never know the wonder of chestnut woodlands." Turns out that, for all Grandpa Joe's acumen, his gloomy prophesy in regard to the American chestnut was wrong. It's now moving along the comeback trail. Personally, I will have to herald its return from the perspective of someone approaching the same stage in life my grandfather had reached when the apparent demise of the chestnut was observed. At least I can take pleasure in introducing youth to this grand tree and its history.

In that regard, remembering the historian's adage, "you can't know where you are going if you don't know where you've been," seems par-

Maryland Chapter Highlights Chestnut Education

The Chestnut Learning Box, developed in Maryland, is an effective educational tool for nature centers and public schools. It has enabled regional parks and schools to provide detailed, hands-on workshops and lessons to elementary school children, teens and adults on topics including chestnut trees, the properties of wood, parasites and related topics. The contents of the Learning Box and guidance on how to use it may be seen on the Maryland Chapter website, www.mdtacf.org, under "Student Program."

The Maryland Chapter also promotes American chestnut education through its three demonstration orchards, where rows of different kinds of chestnuts and different backcross generations are planted with descriptive signage to encourage self-guided tours and comparisons.

The chapter's seven-year partnership with the Carroll County Public School System has produced a comprehensive chestnut curriculum for grades 6-12, which may be shared with any schools that are interested. Thanks to the Maryland Chapter's support, there are 16 chestnut orchards at Carroll County schools, giving students field experience and opportunities for individual research projects. This spring, chapter members met with supervisors and teachers from Washington and Garrett counties' schools who are starting plantings and lessons in some of their schools.

If you want to find out more about the chapter's education projects or if you wish to participate on the national Education Committee, please contact Maryland Chapter President Gary Carver (carver@fred.net) or the Chair of the Education Committee, Kathy Marmet (kathymarmet@gmail.com).

When dealing with impressionable youngsters and their relatively short attention spans there is no substitute for hands-on, direct involvement.

ticularly appropriate. In fact, you might use this phrase and tell a youthful sidekick (or, for that matter, a whole classroom of youngsters) that such thoughts are sometimes called "old chestnuts."

That somewhat hokey approach is one primary school children will find appealing; or at least that has been my impression when talking to my granddaughter's classes on multiple occasions. Certainly, introducing youth to the American chestnut begins with awareness.

A good starting point comes with providing some understanding of the tree's historic importance as the dominant species in eastern hardwood forests; and the manner in which settlers, and before them, Native Americans, utilized the chestnut. Next might come a brief overview of what happened to the tree and the "recovery" process, which now presents a realistic expectation that the one-time monarch of our forests will return to some of its former glory.

Yet the most meaningful approach doesn't involve talking, sharing history or discussing the chestnut in an abstract sense. When dealing with impressionable youngsters and their relatively short attention spans there is no substitute for hands-on, direct involvement. There are many ways to approach this—show-and-tell using a piece of furniture or a bowl made from wormy chestnut; a walk around a building where chestnut was used in construction or in the "shakes" of the roof; a stroll through the forest pointing out stumps or logs of long dead chestnuts; checking out sprouts from old trees and noting the shape of the leaves while discussing how they die back after a few years of growth.

Activities of this nature are educational and entertaining, but when it comes to instilling a lifelong love for the American chestnut, there's no substitute for giving your youthful understudy a proprietary interest in a particular tree. In other words, let them grow their own chestnut tree. When a child views a seedling as "my tree," there will be continuing interest.

This was made clear to me a few years back when a specific volunteer blueberry plant (my granddaughter takes great delight in the fact it was sowed by a bird) took on a special identity as "Ashlyn's blueberry." Ashlyn is my granddaughter, and while the plant is on my property, and I have the responsibility for the minimal care it requires, she takes a keen interest in it. Any visit, no matter what the season, demands a detailed check of the plant's health, progress and status in general. Come blueberry time, the joy of plucking a pint or two of nature's delicious bounty is an exercise in pure delight.

The same sort of approach is possible when it comes to planting the latest generation of blight-resistant chestnut seedlings. Give a youngster an opportunity to plant a chestnut tree, or better still several of them, and that child has a tangible, meaningful investment in the future. The tree will, through the years, provide a physical symbol of a link to the land, as well as something to nurture and cherish. Just think of the joy of watching the tree grow with each returning spring, or the pure delight of the first crop of chestnuts. Trees planted by today's youth represent an investment in the future and a triumph over the American chestnut's adversity in the past. When that can happen in a setting that provides a measure of quiet pleasure, it is soul-satisfying and sustaining. For all of us who cherish the American chestnut and herald its return, passing on its legacy to the next generation is perhaps our most meaningful obligation.

Editor's Note: Jim Casada is a native of North Carolina's high country, who has had a life-long love affair with the American chestnut. A widely published writer, he is the author or editor of more than 50 books and contributes regularly to regional and national magazines. To learn more about his work or to sign up to receive his free monthly e-newsletter, visit his web site at www.jimcasadaoutdoors.com.

Chestnut Custard Tart

A Dessert Full of Christmas Cheer

From Jonathan Sepponara Sills

Chestnut Custard Tart

Ingredients:

For the sweet pastry dough:

- 1/2 cup room temperature unsalted butter, cut into pieces
- 2 cups of all-purpose (plain) flour, sifted
- 1 whole egg
- 1/2 cup confectioner's sugar
- 1/8 tsp baking powder

For the pastry cream/custard:

- 2 cups whole milk
- 2-3 tsp of vanilla
- 1/3 cup plus 1 tbsp plain flour, sifted
- 1/2 cup granulated white sugar
- 6 to 8 tbsp chestnut puree
- 4 egg yolks

Cooking Directions:

For the pastry:

- *In a bowl, combine the butter and sugar. Using an electric mixer on low, beat until smooth.*
- *Add the egg and beat until creamy. With a spatula, fold in the flour and baking powder, then beat with the electric mixer, again on low, until dough is evenly mixed and clings together.*
- *Shape dough into a ball, cover in plastic wrap and refrigerate for at least two hours.*
- *Bring to room temperature before use.*

For the pastry cream/custard::

- *In a large bowl, combine egg yolks and sugar with a whisk. Whisk in flour and set aside.*
- *In a large saucepan over high heat, combine the milk and the vanilla and bring to a boil.*
- *As soon as milk boils, remove from heat and whisk half of hot milk into egg mixture.*
- *Return milk to burner. As soon as milk comes to boil again, add egg-milk mixture and whisk vigorously.*
- *Stir mixture over high heat until it thickens and starts to boil again.*
- *Remove from heat, pour into a bowl and press plastic wrap directly onto the surface of the custard to stop a skin from forming.*

Allow to cool completely before using.

Assembly:

- *Preheat oven to 350 F*
- *Remove dough from fridge and allow to come to room temperature.*
- *Flour work surface and rolling pin before turning out dough. Roll dough into a rough circle, about ¼-inch thick and wide enough to line a 10-inch pie dish. Pick up dough by rolling it around pin. Lay onto pie dish.*
- *Press dough gently onto dish and trim edges with a knife. Remove custard from fridge and immediately, using a spatula, dump and smooth so it's about ½-inch deep.*
- *Very carefully do the same with the chestnut puree, making sure not to disturb the custard. It's best to do this when custard is still cold as this makes it less likely that you'll mix the puree and custard together while you spread one on top of the other.*
- *Bake for 40-50 minutes or until chestnut puree has bubbled, thickened and looks shiny. Allow to cool thoroughly before serving at room temperature sprinkled with powdered sugar and with a scoop of vanilla ice cream or dollop of whipped cream.*