THE BUR

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Herb Darling Honored
with Feinstone Environmental Award

Pictured (from left to right): Inger Darling, Karen Kraatz, Jane Darling, Buck Darling, Kathy Weaver, Herbert F. Darling, Jr., and Tom Weaver

By John Neumann, TACF-NY Secretary

On October 15th, Herbert F. Darling, Jr. was honored by the SUNY College of Environmental Science and Forestry as the recipient of the 2015 Feinstone Environmental Award at a special reception and dinner at the SUNY-ESF Gateway Center, in Syracuse, NY. This prestigious award was presented to Herb for singular achievement in advancing the cause of the environment by Dr. Quentin D. Wheeler, President of SUNY-ESF. Upon receiving the award, Herb received a standing ovation.

Herb Darling's outstanding dedication to restoring the American chestnut to our eastern forests was cited. A printed program included a short biography, along with a description of Herb's tireless work on behalf of the American Chestnut and his leadership of TACF New York State Chapter, and its partnership with ESF for the research that has yielded the world's first blight resistant transgenic American chestnut trees. A video, created for the occasion, was shown and can be seen at http://www.esf.edu/feinstone/. It included interviews with Herb, Jane Darling, Chuck Maynard, Allen Nichols, Bill Powell, Dick Radel and Dale Travis.

Herb's family was there to join in the festivities. In addition to his wife Jane, were son, Herbert Darling, III (Buck) and his wife, Inger; daughter and her husband, Kathy and Tom Weaver; daughter, Karen Kraatz, her husband Stephen was at work and unable to attend. Also attending was Dr. Kim Steiner, Chairman of the Board of The American Chestnut Foundation.

Inside this issue:

The American Chestnut Foundation
New York State Chapter
302 Bateman Road
Laurens, NY 13796
http://www.acf.org/Chapters_ny.php

Founded in 1990, the New York State Chapter (TACF-NY) is the oldest chapter of The American Chestnut Foundation, Inc., a non-profit 501 (c) (3) membership organization. TACF-NY, in partnership with the State University of New York College of Environmental Science and Forestry, is working to restore the American chestnut tree to our eastern forests by developing truly blight-resistant American chestnut trees through biotechnology. Membership information may be found on the back page of *The Bur*.

President's Message

I am excited to report that the progress being made here in New York towards the restoration of a truly blight resistant American chestnut tree looks very positive. After the Fall meeting at the State University of New York College of Environmental Science and Forestry (SUNY-ESF) in Syracuse, I feel extremely confident in the future of the New York program. The knowledge, enthusiasm and dedication of all the staff and students is beyond outstanding.

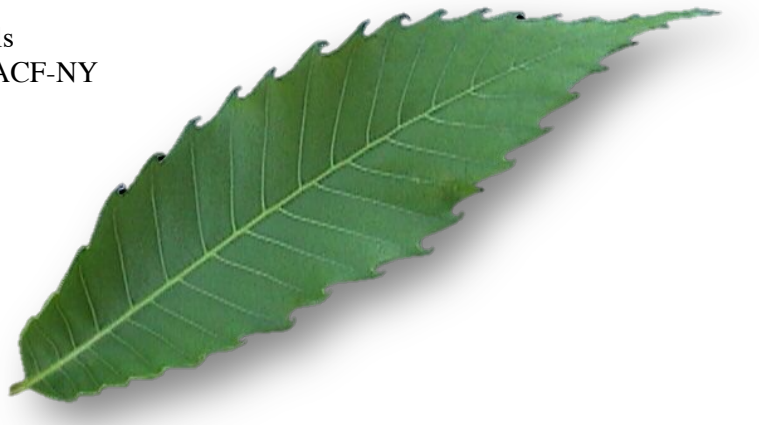
As for the members of TACF-NY, I am very impressed by the work and support they are contributing to the future success of the program. Beyond the financial support, we have a very large number of our members that are directly supporting the program by planting wild type trees so they will have a tree to cross with the blight resistant tree when it is available. We have a little over 500 members in the New York chapter of The American Chestnut Foundation and I have sent almost 3,000 nuts to over 200 of them already in 2016! Last year I sent nuts to over 250 members, and this is the 4th year I have been doing this.

The "hands on" work by the members to plant and grow these "mother" trees is an integral part of the program to reintroduce a blight resistant American chestnut back into the forest. The reintroduction program could not succeed without it and there is no way we could possibly do this without the members' efforts.

The interest and support for the New York program is also spreading nationwide, as 25% of the new members in 2016 have been from other states and all of these members are planting "mother" trees.

Everyone involved with the New York program, financial donors, planters and the SUNY-ESF staff and students, all are to be commended for their dedication and vision of restoring the American chestnut to its rightful position back in the forest.

Allen Nichols
President, TACF-NY



$200 Reward for Largest American Chestnut Tree Found in NY State

A $200 reward plus a blight-resistant seedling, pending approval, will be given to the person who finds the largest healthy American chestnut tree over 18" DBH not previously recorded by TACF-NY. A $50 reward will be given to all trees found over 14" DBH. The tree must be found in New York State in 2016 and the property owner must allow TACF-NY access for pollination and/or seed collection. The tree must also be identified by TACF-NY as pure American chestnut.

What to look for: Open burs lying on the ground near the tree. The burs will be light brown with long sharp spines and measure around 3 inches across. The leaves are slender; 6 to 9 inches long with pinpointed teeth that have a fishhook profile. They are similar to a beach leaf, except longer and more pointed on each end.

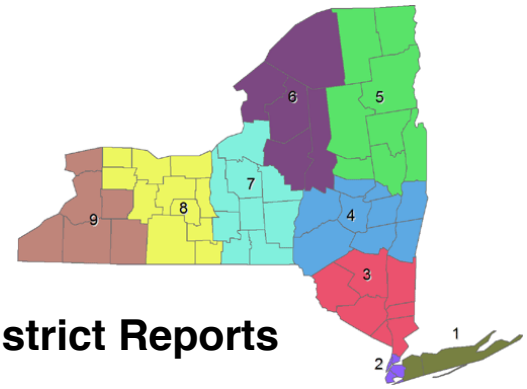
For further information or identification of a tree contact President and District 4 director, Allen Nichols at 607-263-5105 or by e-mail, fajknichols.75@gmail.com

Clockwise from top left: John Schallert, David Pringle, Harry Nichols and Allen Nichols.

Preparing for Regulatory Review

By Andy Newhouse, Ph.D. scholar, the State University of New York College of Environmental Science and Forestry

Here at SUNY-ESF, we are preparing for the government regulatory process. Through this process, we seek approval from the USDA, EPA, and FDA to distribute our blight-resistant transgenic American chestnut trees. This is a long, complex, and expensive process, but we are making progress. In the last few months, we have been working closely with regulatory advisors who have invaluable experience with the EPA regulatory process, and we are in the process of filling out applications to begin that process. We also have completed nutritional analysis of transgenic compared to non-transgenic nuts, which will be part of the FDA regulatory process. As expected, there are no significant changes between transgenic chestnuts and non-transgenic chestnuts that people already eat. We are also updating our current planting permits, which allow transgenic trees to be planted outdoors at certain locations. The paperwork and complex regulatory framework are not as exciting as doing research or planting trees, but they're important parts of the restoration process.



District Reports

Dale Travis, District 2

We are pretty much in a holding pattern waiting for government approvals. We have plantings of both pure American chestnut and B3F3s in Prospect Park that are beginning to die from the blight. There are younger American chestnuts growing in a NYC nursery and we have the demonstration planting of transgenic trees at the New York Botanical Gardens. We are anxiously awaiting Andy Newhouse's success in Washington so we don't have to prune off the male buds. We also have 18 pure American seedlings waiting for some warm sunshine on our terrace. These will most likely be planted in District 3 or elsewhere, like Vermont. Many District 2 members like myself have a second home outside of NYC. That's how we ended up with the especially nice planting of 12 trees last year in Dutchess County by the Harlem Valley Rail Trail. The public sign describing the history and the ESF collaboration with TACF-NY will be installed this spring.

Allen Nichols, District 4

As director and president I have been busy. Besides phone calls and emails, I have been sending out nuts for "mother" trees. We secured funding from the state again this year which should help with growing the seedlings for release to the members as soon as we get approval. I gave presentations and handed out seedlings at meetings with the local Trout Unlimited chapter, The NY Forest Owners Association's local chapter and the Susquehanna chapter of The Adirondack Mountain Club. I will have a booth at two local fairs as well as the Deposit Lumberjack Festival and the Catskill Mountain Forest Association. In April, I attended the Spring meeting for TACF in Abington, VA. TACF is working on how best to incorporate our transgenic tree into their program. I started over 100 seedlings this spring and have distributed over 30 locally. I will be taking some to the local county tree sale. There, they will distribute one to every person who is buying trees.

The Saga of the American Chestnut Tree

By Will Carpenter, Ph.D., Nobel Peace Prize Laureate
www.willdcarpenter.com

When the first settlers came from Europe to North America, they saw some of the most beautiful forests ever to be seen by man. Oak, hickory, pine, chestnuts and many others. Chestnuts?!! Who saw Chestnuts? As a matter of fact, the American Chestnut was the dominant tree in the Eastern North America forests, from Canada to Georgia, to the plains of the West. The mature trees were as impressive as the Giant Sequoias of California. They were huge, and outnumbered both oak and hickory. They were the primary source of food for the forest dweller, who in turn were the food for the forest predators. The wood was unmatched for construction of homes, barns, railroad ties, fences, etc. For years, railroad cars filled with chestnuts would roll into the Eastern cities at Christmas time.

Unfortunately, like in an old time movie, a villain appeared which virtually eliminated the magnificent trees. The villain was a fungus imported from China on some Chinese Chestnuts around 1900, and the American Chestnut had absolutely no resistance to the disease. By 1920, only a few scattered pockets of trees were left from the billions that were present when the settlers came.

Small groups of dedicated scientists, farmers and others have spent decades trying to find ways to bring back this glorious tree, but to no avail. But recently, just as the hero in the movies saved the day, science has been able to bring back the American Chestnut. After all conventional methods failed, a gene from wheat was found to provide a way to destroy the poison of the fungus that killed the tree. There are now chestnut trees which are resistant to the fungus, and under the guidance of the EPA, USDA, and FDA, our grandchildren and their grandchildren will see the beautiful, huge, wonderful trees in our forests farms AND cities, which have been missing for far too long. The dedicated scientists who have devoted their lives to bringing back these wonders will never see them back to their full glory, but their hard work and diligence will insure that the American Chestnut is once again thriving in all its grandeur.

Chuck Maynard is Retiring!

By Linda McGuigan, SUNY-ESF Tissue Culture Lab Manager

Dr. Charles (Chuck) Maynard is retiring after 36 years of teaching at SUNY-ESF and 27 years of collaborating with Dr. William (Bill) Powell on the American Chestnut Project. Chuck received his B.S., M.S., and Ph.D. at Iowa State University and came to SUNY-ESF in the fall of 1980. During the 1980s, Phil Rutter, then president of The American Chestnut Foundation, gave a seminar on the American chestnut at SUNY-ESF. After hearing Phil's talk, Chuck was hooked. In 1989, he began collaborating with Bill, a new professor at the time who was also working with American chestnut. Chuck used his knowledge of plant tissue culture and genetic engineering to help develop a protocol to transform American chestnut with blight resistance genes. Thanks to his expertise, we now have a blight-resistant American chestnut tree!

Chuck was co-founder, co-director, and a vital member of the American Chestnut Research and Restoration Project. His mild manner, wisdom, and enthusiasm have made him a beloved member of both the college and chestnut communities. He has mentored numerous graduate, undergraduate, and high school students; authored many publications and book chapters; and presented to multiple scientific and general audiences. He received TACF-NY Board of Directors Award in 2006, Special Recognition Award for "having positively influenced the college experience of three 2012 SUNY-ESF graduates", and was co-recipient with Bill Powell of SUNY-ESF's Exemplary Researchers award, 2014-15.

Thank you Chuck, we will miss you.

"We expect to have resistant chestnut trees within five years" – *Chuck Maynard, 1989*

"How we select for bight resistance is really simple; Bill gives me the gene he wants to try out, my group puts it into chestnut embryos, and regenerates them into whole plants. We give these back to Bill's team, they inoculate them with the blight fungus, and all the trees die! Then we do it all over again." – *Chuck Maynard, circa 2011*

"Because we think it's *that* important" – *Chuck Maynard, 2016*

Casey Middle School Students Grow American Chestnut Trees

Substitute teacher Nicole Shepard-Justen (left) and Science teacher Jeanine S. Justen (right) pose next to American chestnut trees their students will plant this summer.

Middle school students at Casey Middle School in East Amherst, NY have grown over 150 American chestnut trees this year to take home and plant on Father's Day. Science teacher Jeanine Justen has been growing American chestnut trees with her students for the past 17 years. It can be lonely and daunting at times to plant, water, and tend to so many trees says Mrs. Justen but she tells her students this is a lesson in patience. She states "It is an intrinsically driven project, not extrinsic. We are part of the propagation group keeping the DNA alive, because this is our American tree. We're doing it because it is the right thing to do."

A few facts over the years:

1. The trees go home on Father's Day weekend. The first fifteen years they were decorated exclusively for Father Day.
2. Last year, the students started decorating the trees with small American flags stuck in the soil. They then had the choice of decorating with a Father's Day theme or an American Flag theme. Mrs. Justen came up with the idea because her son, Robert Justen, served two tours in Kandahar, Afghanistan as a security forces officer, Air force MP. It dawned on her that "we have a very patriotic tree here".
3. Students who have graduated from the local high school have come back asking for one of the "extra trees." She always gives them at least two trees so they might cross pollinate (American chestnuts cannot self pollinate). One student had actually graduated college, bought land, and came back just to ask if he could start a field of any extra American Chestnut trees at his new home. Knowing he would be a good steward, she gave him eight trees. He was thrilled.

The American Chestnut Research and Restoration Program at the ESF

Yokshitha (Yoks) Reddy Bathula is a full-time international student at SUNY-ESF. She is a first year Masters student majoring in Plant Science and Biotechnology, and is currently working on her research under the guidance of Dr. William Powell. She handles three of the transgenic American chestnut events; one with an Acid Phosphatase (AP) gene, one with a Cystatin (CY) gene, and one with a Lipid Transferase (LT) gene inserted. Her masters thesis concentrates on the AP event, to determine if the gene can aid the plant in taking higher amounts of phosphorus from the soil. All results will be compared with the non-transformed Ellis #1, the mother tree and also to the CY and LT events. She grows all her events, including Ellis #1, in tissue culture. The experiments will be performed using both tissue culture plantlets and whole plants.

Masters student **Vern Coffey** won the Zabel Graduate Scholarship award which will fund his research on endophytic bacteria in American chestnuts. Endophytes are microorganisms that live inside plant tissue without causing disease. In many cases, they help the plant by improving growth and enhancing disease resistance. In nature, plants often live in symbiosis with endophytes; hundreds of species can exist in a single plant. Vern's research will look at introducing these bacteria into seedling and tissue culture plants to see if they will have a beneficial effect on the tree's health.

Vern and fellow Masters student Tyler Desmarais have also been experimenting with several grafting techniques to propagate American chestnut trees on either American, Chinese, or hybrid chestnut rootstock. Grafting, along with tissue culture, will be used to grow trees for seed orchards that will cross ESF's blight resistant tree with wild-type trees. It is expected that 50% of the seeds produced will inherit the resistance gene and be fully blight resistant.

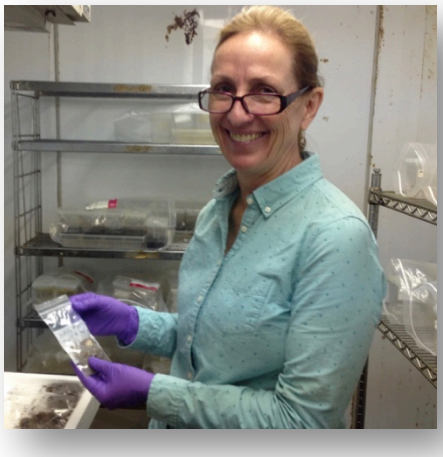
Tyler Desmarais is a Masters student at SUNY-ESF studying plant science and biotechnology. He has a background in horticulture, nurseryman-ship and orchard crop production. He worked at Rhode Island Nurseries as container production manager before returning to graduate studies. His research area of focus is in improving the quality of shoots in tissue culture as well as improving survival and quality of plants going through acclimatization. His core investigation will be exploring the effects of LED lights on the multiplication and rooting survival of micropropagated American chestnut.

Dakota Matthews is currently quantifying oxalate oxidase (OxO) in various plant tissues. This wheat gene has been transformed into our lead events and confers resistance to the blight by detoxifying oxalic acid, converting it into hydrogen peroxide and carbon dioxide. By manipulating this enzymatic reaction in the lab environment, OxO quantities in various plant tissues can be measured relative to a standard curve. We are quantifying this OxO enzyme to make comparisons between different transgenic American chestnut tissues (i.e. root, shoot, nut, leaf). We will also compare OxO quantities in the transgenic American chestnut with regularly consumed food products such as wheat, banana, and barley. These results will be reported to regulatory agencies as we move through the governmental approval process.

State University of New York College of Environmental Science and Forestry

Linda McGuigan is performing more transformations on American chestnuts using putative blight resistant genes. Our lead event contains the Oxalate Oxidase (OxO) gene and we are looking into other possible gene combinations to combat both the blight and *Phytophthora*. One combination in the pipeline includes the OxO gene with a wound inducible promoter (a promoter is like a switch to turn the gene on – in this case it would only turn the gene on when the plant is wounded) plus the OxO gene with a vascular promoter (the gene expression would only show up in the vascular tissue). In addition, she is establishing new clonal lines of non-transgenic American chestnuts in tissue culture to use for controls. Finally, Linda is now in charge of the planting maps, having taken over for Andy Newhouse who is busy with regulations.

Allison Oakes successfully defended her dissertation, entitled "An Investigation of Micropropagation Techniques for American Chestnut" in December 2015. She is currently a postdoctoral research associate and maintains the production of micropropagated American chestnut shoots of over one hundred transgenic event lines, eight wild-type lines, and six hybrid lines. She is also investigating the effect of different growth regulator concentrations on shoot development, and is continuing her dissertation research focus on improving rooting and acclimatization of American chestnut shoots. In addition, she has initiated, multiplied, and rooted Ozark chinquapin (*Castanea pumila*), a related North American species which is also killed by *Cryphonectria parasitica*. Allison has experiments underway to generate somatic embryos from tissue cultured leaf slices of both Ozark chinquapin and a wild-type American chestnut tree from Ontario, Canada, which would allow for future transformations for blight resistance.



Kristen Russell-Stewart "officially" joined the team again in September of 2105. Her work mostly entails testing for gene presence and expression through DNA and RNA analysis. She is currently working on flanking sequences and gene walking with our lead events. In February of this year, Kristen presented in Townsville, Queensland Australia, as an invited guest, at a Human-Assisted Evolution workshop. Twenty invitees from around the world participated in discussions and a public forum sponsored by the Australian Institute of Marine Science (AIMS) in partnership with the Paul G. Allen Family Foundation and the University of Hawaii. A paper will be published in the near future, highlighting the American Chestnut Research and Restoration Project as a "success story", working with GM strategies that can be used to restore genetic diversity. Developing these relationships with other scientists around the world are of great importance to explore the application of genetic direction and conservation. Kristen is maintaining a close relationship with AIMS, while assisting in the development of this scientific paper.

Recent talks and publications:

Pulitzer Prize winner Elizabeth Kolbert wrote an article in *The New Yorker* about saving reefs and forests, including the American chestnut. http://goo.gl/rX16uj

Andy Newhouse presented at the North American Forest Insect Work Conference in Washinton D.C. It is summarized by Richard Levine in *Entomology Today*. https://goo.gl/tykv3V

Allison Oakes published an article in *HortScience* about how to improve rooting and shoot tip survival of micropropagated American chestnut. http://goo.gl/BIiT62

Bill Powell wrote an article in *The Converstaion*. https://goo.gl/JEECys

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The American Chestnut Foundation
New York State Chapter
C/O Fran Nichols
302 Bateman Road, Laurens, NY 13796

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The American Chestnut Foundation Inc.
50 North Merrimon Avenue, Suite 115, Asheville, NC 28804

Enclosed please find my $40 membership in support of TACF-NY. I would like to make an additional $_____ gift to the New York State Chapter. Total amount enclosed: $_____

All memberships to TACF include TACF publications, a car decal, membership to one of the state chapters as well as opportunities to participate in local chestnut activities. Visit www.acf.org or call (828) 281-0047 for more information.

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NY Chapter membership includes the Newsletter *The Bur*. The NY Chapter helps guide research at SUNY-ESF and maintains plantings to keep the American Chestnut gene pool. TACF & TACF- NY Chapter are 501 (c) (3) non-profit organizations. Except for the membership services portion of your contribution (valued at $15) your gift is tax deductible to the full extent allowed by law.