

Chestnut Tree

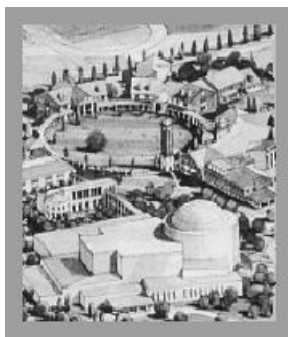
The Pennsylvania Chapter of
The American Chestnut Foundation



Pennsylvania Chapter
The American Chestnut Foundation
PA-TACF
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The Grower's Meeting and Member's Spring Meeting at Hershey, PA March 23 and 24

The Agriculture and Environmental Education Center of the **Milton Hershey School** in Hershey, PA will host both our Grower's Meeting, March 23rd, and our annual Spring Meeting on March 24th.



The Grower's meeting where we discuss our planting plans and dispense planting supplies and chestnut seed will meet at the Horticulture Center. **All County and Regional Coordinators are invited** to this meeting which will help focus on planting and pollinating programs in each county.

The Member's Spring Meeting will meet at the Environmental Center. Bring your chestnut items for a silent auction. We have some exciting new speakers and workshops as well as discussions of our Chapter chestnut breeding program and organization for 2001. The agenda for each meeting, a listing of motels, directions and map of Hershey is on Page 8.

Pennsylvania Chapter Happenings

The Grants are Rolling In! Thanks to our Grants Committee Chairman, **Larry Patchel**, we have been awarded a grant of \$17,250 by the National Tree Trust. These funds will be principally applied to the breeding program. **Ann Leffel** was also successful in procuring a \$4,290 grant from the Plywood Veneer Association for our planting at Penn State University this year.

New South Central Region Coordinator, Chandis Klinger has generously volunteered for this position which was vacated by **Lee Saufley** who was recently elected to the PA-TACF Board. Congratulations Chandis and Lee!

The Pennsylvania Farm Show was Great!

During a cold week in January, the PA Chapter participated in the 85th PA Farm Show. Our 20 volunteers listened to a lot of chestnut stories and explained the American chestnut recovery progress to hundreds of interested attendees. This was the first year for the Chapter to set up our display in the main exhibit area and we were very pleased with the attendance and activity.

Member **Chris Ditlow** donated a beautiful solid chestnut dry sink as well as a set of chestnut library steps for raffle at the show. Chris is also an owner of the Oak Park Cabinetry Inc. and has been very generous in donating chestnut pieces to the PA Chapter for raffle and auction. The raffled dry sink was also displayed in the Farm Show's Scholarship Foundation Art Show. The raffle and wood sales brought in over \$800 during Farm Show week.



Dry Sink made of American Chestnut wood by Chris Ditlow

On Thursday January 11, we drew the names of the raffle winners. Second prize, the library steps, went to Mr. Mike Phillips of Mertztown, Pa. We were pleasantly surprised to pull the name of **Barney Barnhart**, who purchased 50 tickets, as the winner of the dry sink. Barney and his wife Charlotte have been generous supporters of PA-TACF for many years. Enjoy your prize Barney and Charlotte!

Calendar of Events:

March 23 Chapter Growers Meeting- Hershey, PA
March 24 Chapter Member's Meeting- Hershey, PA
April & May Planting Season
June Volunteering—Meadowview, VA
August 14,15&16 AG Progress Days, PSU, Centre Co.

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The Next Steps in Pennsylvania Chapter Organization – Delegating Tasks to Committees and Action Personnel

(You can help by volunteering for some of the positions still vacant)

In the years 1999 and 2000, we successfully reorganized our PA-TACF board into functional coordinators as shown in the chart below. A new Executive Committee consisting of the officers and board coordinators was elected by the chapter membership last October.

To insure a fully efficient and functioning Chapter, we are in the process of recruiting volunteers to perform the various tasks of the chapter under the functional concentration of the board coordinators. The Executive Committee met at **Blair and Mary Carbaugh's** home on November 3rd and set priorities for filling the action positions. We've had excellent initial progress so far filling some high priority positions:

Grants Committee. In order to build our finances to support operations, we began with this committee. Fortunately, **Larry Patchel**, an experienced, and successful grant writer, agreed to step away from the Western Region Coordinator position and chair the Grants Committee. He will be assisted by four members who have had success in grants and non-profit work, **Kris Soderberg** of Warren County, **Richard Latty** of Maryland, **Jerry Nichols** of Lancaster County and **Timothy McKechnie** from the TACF Staff. This committee will meet in early February.

Treasurer. Our current Treasurer, **Tracey Coulter** who did an outstanding job has been elected to the position of Board Coordinator for Education. Member **Ed Stup** of Dauphin County generously volunteered to become the new Treasurer. We will transfer the database and books to Ed in February.

Orchard Manager. A high priority was established to provide an orchard manager to the Breeding Coordinator, **Ann Leffel** to do the myriad tasks of overseeing the planning, planting, maintenance and documentation of the hybrid orchards throughout Pennsylvania. Recently retired from

Mobile/Exxon, **Tom Pugel** enthusiastically agreed to fill this vital position. Tom has had a long successful history of doing all these tasks since 1995 and he will be a tremendous asset to Ann.

WANTED – More Volunteers for these Positions:

Data Manager. Someone who can manage the hardware and software programs that we use for the tree breeding program, financial program, newsletter publication, membership program, etc. Volunteers can contact **Blair Carbaugh** (570) 275-7848.

Newsletter Publisher. A person to write, gather articles and prepare the newsletter for assembly prior to editing. Volunteers can contact **Greg Yochum** (412) 471-5808.

Tree Breeding Program Personnel. Individuals are needed to manage the following: Tree Identification, Mother Tree Inventory Manager, Supply and Equipment Manager, and a Pollination Program Manager. Volunteers can contact **Ann Leffel** (717) 927-9557

New Years' Resolutions?

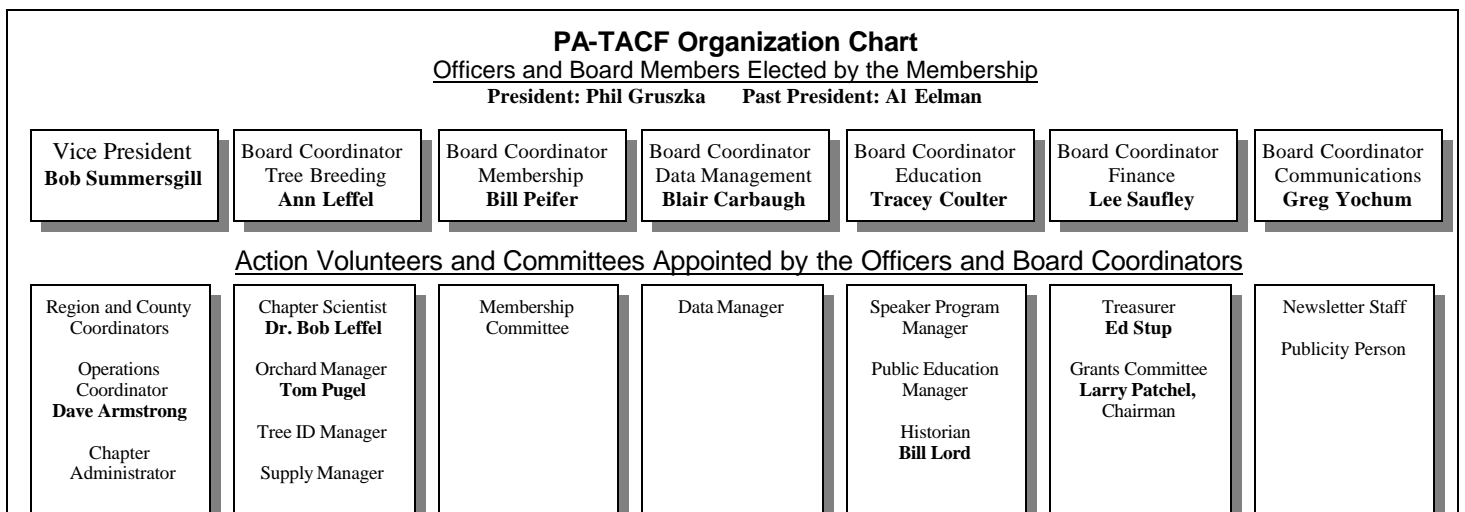
PA-TACF President Phil Gruszka's Comments:

I am not the type of person to make New Year resolutions. However, by membership in PA-TACF, I am a small part in a collective resolution that will last millenniums. There is a new Board of Directors, new members and new challenges in this new millennium.

The previous board worked diligently towards reorganization of the Chapter. Current Board members committees, and action groups address particular needs of the organization. By design, there is a continuum of expertise flowing through the action groups, directors and presidential positions. I am particularly pleased with the formation of these action groups.

For those new members, please get involved and discover the rewards of volunteering for such a worthy cause. I am not good at quoting scholars or texts, but I need to convey several thoughts and cannot do so other-

(Continued on page 3)



wise: "things that we do for ourselves, go with us; things that we do for society, become eternal". "The body is made-up of many parts; those that are feet, make us walk, those that are eyes, make us see". I am proud to be a member in this organization. When asked to become involved with the operations of the chapter, I could have easily declined because I am too busy or too something another. Becoming involved is the best thing that has happened to me in years. It does require time and effort but look at the rewards. Words cannot describe the emotions that stir within us as we work with and discuss the American chestnut tree, but the sparkle in the eye is very noticeable. Thank you all for participating, individually we are insignificant, collectively, we are making tremendous advancements in the State and National efforts.

The challenges are numerous, as we continue to develop the chapter organization, we need to plant chestnut trees and maintain those we currently have growing. We may soon have a breeding nursery with 20,000 trees. The National Board of the American Chestnut Foundation is looking for individuals interested in functioning at their level. We need folks to present the Chestnut story to Garden Clubs, schools, conservancies, etc. I am not going any further, please contact Dave Armstrong, your county coordinator or any board member to volunteer. **The Chestnut Tree needs YOU.**

VIP-Coverts Picnic - July 14, 2001 by: Ann Leffel

Big doings in York County on July 14 and 15! Bob and Ann Leffel will host the Annual VIP Picnic at their farm on Saturday, July 14, 2001. The VIPs are the group of volunteers from around the state who complete the Pennsylvania Forest Stewardship Training Program sponsored by Penn State Extension and Ruffed Grouse Society. More than 230 forest land owners have graduated from the program since it began 10 years ago. The 40-hour training, given over two weekends, teaches participants about tree identification, ecology, forest and wildlife management, and how to promote forest stewardship in their communities. About 70% of Penn's Woods are owned by individual owners. This great resource needs to be sustained and used wisely. Forests can thrive under good management and still provide the products that we all need. Each summer the VIP's gather for continuing education and updates on what's new in forestry. Many PA-TACF members are also VIP's. The mission of the American Chestnut Foundation will be presented to the VIP's as well as other forestry topics. The afternoon will include tours of the chestnut breeding orchard, one of the state's first, and the small wood lot with a management plan. Demonstrations of portable sawmill, trail development, selecting trees to be cut both for good management and owner's objectives are other activities that are being planned. The following day an open house will be offered to the community to promote the chestnut breeding program and best forest practices. Chapter members who would like to help with the activities, especially those living in York Co. are needed. Contact PA-TACF office if you can participate in the planning and hosting the weekend.

Joe Beebe by Ann Leffel

It is with great sorrow that we report the death of member Joseph J. Beebe (2 April 1913 to 10 November 2000) of Towanda. Born in Scranton, PA, he graduated in 1936 from East Stroudsburg State Teachers College and taught school, one year in Puerto Rico and then two years in the American Virgin Islands. He was a 100% disabled WW II veteran, but eventually became owner/operator of the Spring Lake Café in Wyalusing (1956 to 1961). He then became a farmer in Liberty Corners, producing crown vetch seed for over 30 years. Over the last several years, with great determination, he was occupied with planting the farm in hardwoods by gathering and planting thousands of seeds from various hardwood trees. He also managed to



Ruth and Joe Beebe

find time to serve as the County Coordinator for PA-TACF. He encouraged others to collect seed from the Bradford County forests, to be sure that trees from that county would be included in the PA chestnut breeding program. Some were planted last spring, and more were sent in fall of 2000 from Robwood Mountain for inclusion in chapter orchards.

Joe was an extraordinarily energetic man - self assured with a keen wit. When we first met him at a chestnut meeting, he wanted to help with the project. He and wife Ruth drove all the way down from Bradford County to York County one morning for a demonstration on how to hand pollinate his American chestnut tree. Satisfied with the demonstration he immediately turned around and drove back home. We were aghast when he told us that when he had difficulty reaching the flowering limbs from his tractor, he promptly installed a ladder on the roof of the tractor so he could reach higher into the tree. He was only 84 at the time!

Joe was dedicated to preserving and enhancing the environment. In his last letter to me of 8 December 1999 he reported on the year's activity: *"We planted 20 quarts of black cherries, 6 ton black walnuts, 5 bushel butternuts, 20 - 5 gal. pails acorns, 15 - 5 gal. pails hickory nuts. As usual we had equipment failures and weather problems. Also help. It was very hard to find anyone to assist. I use a converted tree planter to plant. I made bins that hold about 10 bushel. A man sits and drops the nuts down the tube behind the furrow opener and before the furrow closes. The man is essential. We try to get the nuts 6" apart. And this year the rows are about 2 ft. apart. The closer the better. The problem is to establish the seedlings and get a canopy as soon as possible. We spray for weeds.*

The work you are doing is important and appreciated..... Keep up the good work!" Joe Beebe.

The chapter cannot succeed without the dedication and encouragement of the likes of Joe Beebe. He will be greatly missed.

Ruth Beebe currently resides at the Laurel Hill Nursing Home in Stroudsburg, PA. The family asked that Joe's interest in chestnut restoration be continued through memorial donations to the Pennsylvania Chapter of The American Chestnut Foundation at 800 E. King St., York, PA 17403.

Woodnotes in World History - Plight of possibly the biggest, oldest American chestnut

By: An Article from *World of Wood*, December 2000 Issue - Submitted by **Chris Ditlow**.

In the Pennsylvania Bureau of Forestry's file on big and historical trees, the following article illustrates the immense size of an American chestnut (*Castanea dentata*) that had existed in PA.

The article was printed in the July 1919 magazine issue of the DuPont Chemical Company in the state of Delaware. The chestnut blight had killed possibly the biggest and oldest American chestnut in the USA on a farm near Quakertown in Montgomery County, PA. Age estimates at the time were between 300 and 400 years, but its true age was not known.

The amazing part was its immense size, having measurements of 34 feet, six inches, in circumference and 11 feet in diameter at the base.



This picture of an old champion chestnut tree was published in 1889. It is 25 feet, 2 inches in girth (about 8 feet DBH) and was growing in North Brook, Chester County, PA.

Word of its size spread and it gradually attained more than local fame. It was stated at the time that it was the largest tree of any kind in the country excepting the redwoods and giant sequoias.

As far back as 1876, the farmer who owned the tree was offered \$250 for a six-inch cross section by the officials of the Philadelphia Centennial Commission for their forestry display.

The tree died in 1917 because of the blight, and there was no longer any need for the owner to allow it to stand. Removing the tree seemed a difficult task. A cross-cut saw with a blade long enough to fell the tree was not available, and chopping it by hand would take forever to accomplish the task.

The farmer's next idea was to use dynamite. Du-

Pont company representatives were contacted for the job. The company responded by sending a crew with explosives and equipment to remove the tree from its upright position.

At the tree site, the crew drilled four holes at an angle toward the center to a depth of eight feet under the trunk. Each hole was then loaded with a one-half cartridge of 40 percent dynamite. The charges were ignited to "spring" or enlarge the openings to hold the larger charges that were necessary to blast the tree.

Earth was removed from the holes and then each hole was filled with 25 pounds of 20 percent dynamite, 1000 pounds in all. The experts knew this was more than needed, but wanted to do a good job.

The crew's next procedure was to drill 20 holes three feet in depth, spaced 15-20 feet from the tree's base. Each hole was then loaded with a one-half pound charge to cut the lateral roots and allow the main charge to lift the tree out of the ground.

With the necessary precautions taken, the charge was touched off with about 200 people watching. When the smoke cleared, the tree stood no more. In its place was a crater 12 feet deep and 30 feet across.

Meadowview Volunteers for 2001

In June 2001 we plan to participate in the bagging, pollination and farm activities at the TACF Farm at Meadowview, Virginia. We usually send four to six volunteers down to VA during two separate weeks. It gives our volunteers hands-on experience and an excellent opportunity to learn from the experts in our business, Dr. Fred Hebard and Dr. Paul Sisco.

Depending upon the readiness of the chestnut tree flowers, we will probably deploy our volunteers during the weeks of June 4th and June 18th.

An additional project this year will be the preparation of dry chestnut pollen which will be used throughout PA and TACF for hybridizing local trees. Let me know if you are interested in volunteering. Dave Armstrong, Chapter Operations, (717) 852-0035, or pachapter@acf.org.

PP&L Montour Preserve Meeting

The PA Chapter attended our fall meeting in Montour County near Washingtonville. We were well hosted by PP&L Montour Preserve who shared their recently remodeled facility. We were provided use of their land to conduct inoculation, mudpacking and tree planting workshops. Many thanks to Kevin Drewencki and Jon Beam of the Preserve for making our meeting successful.

New President **Phil Gruszka** installed our new board and officers at the meeting and concluded the meeting with a few remarks thanking the membership for the great volunteering effort in the tree breeding program.



The Grower's Corner

Tips on and Experiences of Planting, Pollinating, Harvesting and Nut Storage from around Pennsylvania

Planting Chestnuts - My Technique by: Dave Armstrong

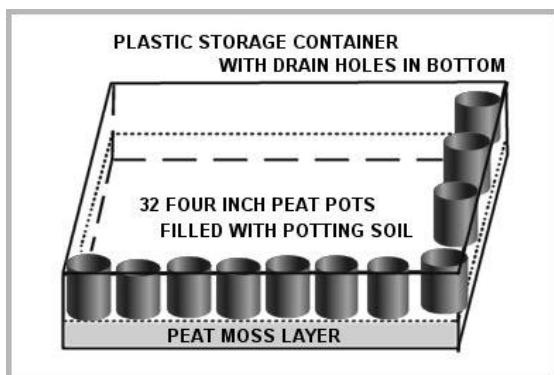
There has been a lot of discussion about which method is better for planting chestnuts; growing seedlings first or planting the nuts directly into a field location. Growing seedlings has the advantages of: 1) Getting an earlier start with plant development; 2) Identifying which nuts are going to germinate before field planting; 3) Avoiding rodent damage to germinating nuts; and 4) Control of the sun, water and providing frost protection.

Direct field planting has the advantages of: 1) Placing the nut into its growing environment without the potential shock of a transplant; 2) Avoids the process of adapting an indoor grown seedling to the direct sun; and 3) Avoids the cost of equipment, time, labor and facilities for growing seedlings and transplanting.

An approach I found to work well for spring planting is combining the best of these two methods using the "peat pot in a storage container" technique.

After receiving the nuts at the growers meeting, I prepare enough storage containers to accommodate all the nuts. These are plastic containers, eight inches deep which will hold 32 peat pots. By planting the nuts immediately, it gets them into the soil, starts their growth, and gives me some flexibility in transferring them to the field.

I cover the bottom of the containers with peat moss so the peat pots are level with the top edge of the storage box. This layer of peat holds moisture and a place for the roots if they should protrude below the peat pot. Potting soil is used to fill each peat pot and the nut is laid on top with about ½ inch of soil covering the nut.



I water the pots initially and sparingly thereafter. The storage containers are set outside if the temperature is above 40 degrees in the sun. By germinating the nuts in the sun, I avoid the problem of new plant sunburn. When frost

threatens, I carry the storage containers into my garage. When I decide to plant into the field, the storage containers are easily transported. The greatest advantage of this method is transplanting without shock to the germinating nuts. I simply place the peat pot into a field location hole. If the seedling has grown beyond 2 inches, I pick the peat pot up with some extra peat moss from the container to protect any protruding root system.

With this method, I have a wide window of time available for transferring the nuts into the field and it gives the tree a great start in life.

By using this method last year my chestnut germination rate was over 94%. Or...Maybe I was just lucky.

Breeding Program Update

by: Ann Leffel, Breeding Program Coordinator

"Good Fortune" has smiled on our volunteers once again!! The great deal of work and dedication of our members and friends have had everything to do with it.

Pollination Report: The weather was troublesome (remember all that spring rain) and the selected pollen (Graves) came in at Meadowview Virginia before our American trees were ready to pollinate. This required the collection and preparation of dried pollen which was done by our summer intern Sara Fitzsimmons. Also, pollination was more tedious because of the research data we were collecting on dry pollen vs. catkin application of pollen. It was further complicated by the study we are conducting on male sterility in F-1's which required reciprocal crossing of American and Chinese chestnuts which do not necessarily come into bloom at the same time. All of this led to a very time consuming pollinating season and a great amount of record keeping.

The good news is: the Chapter produced 157 Graves BC4 seed, 2115 Graves BC3 seed, and 1042 F-1 seed. The backcross seed resulted in 14 lines with 75 or more seed, and 6 partial lines (less than 75 but greater than 14 seed), incorporating 30 PA American mother trees and 12 different pollen parents in the crosses. Four other pollen parents yielded little or no seed. Diversity is what we are about.

Planting Plans: All or most of the third backcross seed will be planted at Penn State University by the School of Forest Resources. Dr. Kim Steiner and Timothy Phelps will oversee the planting. A planting date is not yet set. Any members interested in helping with this large planting should contact the Centre County Coordinator: Shawn Wood at 814-466-3065. His e-mail address is: sdw63pa@hotmail.com. He will keep a list of those interested so you will be notified of planting plans. This will be a great opportunity for members in the Centre County and adjacent areas.

The F-1 seed will be planted in a number of locations for four different purposes: (1) to test for male sterility in reciprocal crosses, (2) a repository of different sources of resistance for future breeding, (3) standards for blight canker measurements in backcross nurseries, and (4) potential male steriles for future backcrosses in established American nurseries.

Members who have expressed interest in becoming a grower of a breeding program orchard will be contacted about the upcoming Grower's Meeting by letter.

Seed Collecting: It appeared that the harvest would be late, particularly with the cool wet spring and cool summer. Growth of the burs was slow. But in a final burst, the nuts filled and the harvest was ready at the usual time - some even earlier than usual. The grand effort by individuals and teams led to a harvest of 6594 open-pollination (OP) nuts from native American trees; 65 OP nuts from Chinese trees; and 453 miscellaneous OP nuts from Japanese, Chinquapin, and assorted hybrid trees. The chapter acknowledges and thanks all those who participated in our best harvest yet. Several of our veteran collectors worked with teams of folks whose names we don't have, but whose contribution is valued: **Bob Leffel Team, Lee Saufley Team, Eugene Dougherty Team, David Armstrong Team, Bob Summersgill Team, and Tom Pugel Team.** Other collectors include: **Jack Caruthers, Dan Snyder, Don Franks, Jim Lasik, Lennart Swenson, Paul Hishman, Barbara Bartusik, Larry Patchel, Jim Walizer, Harold Floyd, Karl Swanson, Francis Blair, John McKay, Fred Gunther, Robert Vedaa, Josephine Vidic, Blair and Mary Carbaugh, Tracey Coulter, Shawn Wood, David Holman, Doris Goldman, Phil Varndell, Mike Waldron, Bart and Judi Hogan, Joe Strosnyder** and many, many more. The harvest teams and the pollinating teams could not have been successful without the help of those who provided bucket trucks and drivers, **Moshannon State Forest District, Forbes State Forest District, and Weatherly Municipality.** Seeds were collected from all eight regions in PA plus WV, MD, and NH. Seed came from the following counties: Bradford, Butler, Centre, Clearfield, Cameron, Carbon, Cumberland, Franklin, Fulton, Lebanon, McKean, Schuylkill, Somerset, Warren, Westmoreland, and York. We still need help from the tier of states north of I-80 except for Clearfield and Clinton, and the counties along the eastern and western state borders. We'd like to have every county represented in the breeding program for local adaptation. **WANTED!! MORE FLOWERING AMERICAN CHESTNUT TREES!!**

About 1000 American seed have been given to TACF which will be sold to members as seeds and seedlings to help finance the national organization. Two thousand nuts were provided to Penn State University for studies on cultural practices, such as growing medium, fertilization, water, and light requirements, etc. for chestnut opti-

imum health and growth. Many of the rest of the seed will be planted as newly established American orchards or replacement seed in existing orchards.

Don't forget the requirements for growth, sun and well-drained acid soil; sloping rather than flat terrain; deer and rodent protection.

Breeding Program Challenges

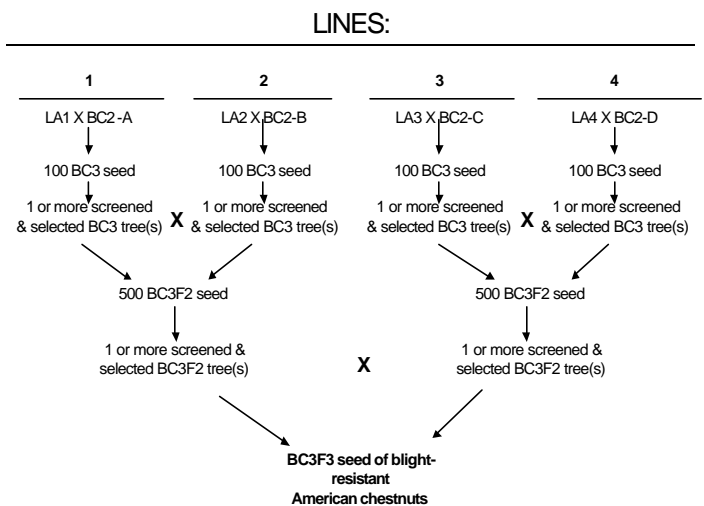
By: Bob Leffel, PA-TACF Breeding Program Scientist



*“Backyard” breeding can contribute to regional adaptation!
Controlled crossing vs. open-pollination in isolation?*

In September 2000 issue of PA-TACF's newsletter, *Chestnut Tree*, I discussed the establishment of BC3F2 orchards, after Hebard*. The BC3 lines are produced by crossing 20 or more regionally adapted American chestnut trees, each to a different BC2 paternal parent with resistance from a single source, e.g. 'Clapper'.

The task of developing a 20-line regionally adapted, blight-resistant American chestnut population can be subdivided into 5 units of 4 lines each, and a unit of 4 lines can be conducted by 1 to 4 “backyard” breeders, across state lines, etc., within a “Region”. Consider the 4-line unit, where LA = local American and BC2 = backcross generation 2 tree screened and selected for blight resistance and American chestnut characteristics:



The resulting BC3F3 population above is via controlled pollination, similar to a double-double cross in corn involving 8 parental lines. The performance in BC3F3 should be satisfactory because inbreeding has been avoided, but the performance of the BC3F4 generation from 4 BC3 lines is

unknown.

The theory of a minimum of 20 BC3 lines per source of resistance traces to the “Coefficient of Inbreeding”, a quantitative measure of the intensity of inbreeding inversely related to the number of lines utilized. This Coefficient of Inbreeding measures the rate of approach to homozygosity each generation of inter-mating. This theory has led to such guidelines in plant and animal breeding as: “The rate of increase in homozygosity in populations of more than sixteen individuals is so slow, when maximum avoidance of inbreeding is practiced, that it is of little importance” (R.W.Allard 1960); and “Mating of cousins less closely related than first cousins produces inbreeding so slight that they are scarcely worth considering as inbreeding” (J.L. Lush 1948). The 20-line population can be obtained by bulking equal amounts of BC3F2 or BC3F3 seed of each of the five 4-line populations. Thus “backyard” breeders can achieve blight-resistant American chestnuts for their “backyard” (4-line BC3F3) and also contribute seed from their population for a regionally adapted population.

Dr. Burnham’s original proposal utilized open-pollination in isolation for production of both BC3F2 and BC3F3 seed. TACF Science Audit of 1999 recommended single crosses via controlled pollinations to produce the BC3F2 generation, to avoid inbreeding and to provide both male and female parentages of resulting progeny. The task in producing a proposed BC3F2 population of 1280 seed for each of 10 single crosses, a total of 12,800 seed*, will require an estimated 128 days of controlled pollinations (100 seed per day per hybridizer) for each source of resistance. (I reduced the number of BC3F2 seed to 500 seed per double cross above, but this reduces our option to select more stringently for blight resistance and desirable American chestnut characteristics). Assuming 3 burs per bag and potential of 3 seed per bur, our controlled crosses average about 1 seed per bag versus the potential of 9 seed via open-pollination. We don’t know the genetics of self – and cross – incompatibilities in chestnuts, and can fail to obtain seed set with some single crosses? The use of ladders/ bucket trucks for emasculation and bagging, pollination, and harvest, vs. open-pollination pose additional risks and liabilities.

Is there “A Way Out of the Woods” with chestnuts if controlled single crosses for BC3F2 are too difficult?! Chestnuts resemble characteristics of many perennial forage species: self-incompatible, largely wind-pollinated, and subject to great forces of natural selection resulting in survival of relatively few individuals in a stand. In forage crop breeding, polycrosses are widely used. A polycross is produced by open-pollination of a number of genotypes in isolation, in such a way as to provide random mating among the genotypes. Can we move 1 screened BC3 tree per line via hydraulic spade to a new location, providing inter-pollination of the 4 (or more) trees in isolation and

maximum seed set? As many plantings of 4 (or more) BC3 trees (1 per line) can be established as desired, limited by the number of trees available, producing polycrosses. Since each tree is self-incompatible, seed harvested from tree 1 will be the intercrosses of 1x2, 1x3, 1x4; seed harvested from tree 2 will be the intercrosses 2x1, 2x3, 2x4, etc. – a total of the 12 possible intercrosses among 4 lines including reciprocal crosses. These crosses will also provide an estimate of “General Combining Ability”, the average performance of a line in a series of crosses. Will a screened, selected BC3 tree ready to begin its 6th year of growth, but possibly weakened by inoculation, withstand the “shock” of transplanting via hydraulic spade? This appears to be a key question – and opinions vary! The first PA-TACF BC3 trees that can be made available for transplanting in year 2001 were inoculated in year 2000 and their current measurements are as great as 3 inches DBH, 15 feet in height, with spread of about 10 feet. We should transplant some of these trees this spring to determine the feasibility of transplanting. Subsequent to intercrosses by open-pollination among BC3 lines, utilize equal amounts of seed from each tree of a line and seed the resulting BC3F2 seed in a BC3F2 orchard, maintaining maternal tree identification. Relocation of screened, selected BC3F2 trees via hydraulic spade should be easier in the BC3F2 generation, if desired, as we plan to inoculate in the 3rd year of growth and should be able to transplant in the 4th year. We’ll be selecting 1/64th or fewer (3-gene hypothesis for resistance) of the BC3F2 trees. All possible combinations among the 12 single crosses made among 4 BC3 trees via open-pollination will be possible in the BC3F3 generation. And we don’t know possible roles of sib-mating, half-sib mating, selection for pollen tube growth and fertilization from non-related trees vs. related, etc. (But the West Salem stand originated from 9 trees, and we don’t know the parentage of the 9 trees involved!). If significant inbreeding depression occurs in the BC3F3 generation, we select for vigor – our goal of complete resistance to chestnut blight has been obtained. Again, bulking of equal amounts of BC3F2 or BC3F3 seed from each of 20 or more lines, and maintaining identification by maternal tree, will establish a population for regional adaptation.

Thus the BC3F2 generation may be produced by either controlled-pollination single crosses or polycrosses via open-pollination in isolation. The choice of method will depend up the composition and location of our BC3 orchards and the desires and capabilities of our cooperators. And remember, we are doing something never previously accomplished in the history of plant breeding: breeding blight-resistant, timber-type chestnuts for Pennsylvania!!

* BC3F2 plot design at TACF’s Wagner Research Farm: Design for controlled pollinations from a circular mating used to produce the BC3F2’s. Mimeo, TACF 1999 Annual Meeting, Canton, Ohio.



Pennsylvania Chapter
The American Chestnut Foundation
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York, PA 17403-1772
The Chestnut Tree Newsletter

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Chestnut Grower's Meeting - March 23rd
At the Horticulture Center, Milton Hershey School
Agenda

- 12 pm to 1 pm Reception and Coffee
- 1 pm to 3 pm Conference Room Planting Discussions
- 3 pm to 5 pm Seed Nut Distribution
- 5 pm to 6 pm Catered Dinner
- 6 pm until ? Planting Supplies Pick-up & Coordination

Directions

From Route 322, turn North on Meadow Lane and go 1/4 mile and turn right at the Horticulture Center (with greenhouses) around the circle and park in the front parking lot.

Spring Member's Meeting - March 24th
At the Environmental Center, Milton Hershey School
We will have a silent Auction—so please bring your chestnut crafts and other items for the auction. The proceeds help support the PA-TACF operations.

Agenda

- 8 am to 9 am Reception, Coffee and Donuts
- 9 am to 9:30 Introductions and President's Remarks
- 9:30 to 10:30 PA Chestnut Breeding Program. An update by Dr. Bob Leffel
- 10:30 to 11:30 Game Commission information about Game Lands and Fencing Information
- 11:30 to 12 pm Chapter Operations
- 12 pm to 1 pm Catered Lunch (\$5 donation requested)
- 1 pm to 3:30 Workshops: We plan to present workshops on Planting Techniques, Pollination Techniques, Inoculation, Basic Chestnut Breeding and Chestnut Identification
- 3:30 to 4:30 Member Idea Sharing, Suggestions, Questions and Auction Winners

Directions

From Route 322, turn North on Meadow Lane and go 3/4 mile and turn right on Crest Lane. The Environmental Center is in the white barn on the left.

Accommodations

Holliday Inn Express 717-583-0500 ; Red Carpet Inn 717-534-1600; Rodeway Inn 717-533-7054; Days Inn 717-534-2162; Parkside Hotel 717-534-1774

