Minutes of the PA-TACF Science Committee Meeting, August 28, 2003
Penn State University, 303 Forest Resources Lab, University Park, PA

Those in attendance were: Operations Coordinator for PA-TACF, Dave Armstrong; Nursery Operations Manager at Penn Nursery, Alex Day, Professor of Forest Biology at Penn State University, Dr. Kim Steiner, PA-TACF President-elect, Tim Phelps, President of PA-TACF, Bob Summersgill, Science Advisor, Dr. Bob Leffel, PA-TACF Board Member and PA-TACF Tree Breeding Coordinator, Ann Leffel, TACF Tree Breeding Coordinator, Sara Fitzsimmons, PA-TACF Board Member, Tracey Coulter. Sara Fitzsimmons took minutes.

The meeting began at 9:30 am.

1. DISCUSSION OF POTENTIAL ORCHARD(S) AT PENN NURSERY (agenda item 6)

Dave Armstrong spoke on the current status of orchards at Penn Nursery.

Throughout 2003, there had been hope that PA-TACF could have one or two chestnut plantings at Penn Nursery. Until now, legal issues had kept any sort of planting from being established on Penn Nursery property.

The committee discussed that a formal agreement may not be necessary. As long as Nursery workers do the majority of the work, PA-TACF volunteers can come in to assist on any activities, as long as they sign a standard Penn Nursery liability waiver. In general, the waivers cover one to two days of volunteer work.

Amongst the committee, there was general consensus that PA-TACF would be better off not entering into lease agreements (as was proposed earlier), and that liability waivers would suit PA-TACF's insurance company.

The Science Committee agreed to go with a planting at Penn Nursery. Tim Phelps will ready the BC1 seedlings in the Penn State University shadehouse at Forest Resources Laboratory, and Alex Day will take them at the appropriate time for planting.

Mr. Day agreed to plant and work on the volunteer angle. A copy volunteer form would be send to Mr. Dave Armstrong so that PA-TACF will have copies on hand. The form will need to be re-signed on an annual basis. One must be 18 years to sign and work, and the signing will need to be witnessed.

2. DISCUSSION OF ORCHARDS IN ASSOCIATION WITH THE NEW JERSEY CONSERVATION FOUUNDATION (NJCF) (agenda item 6)

Mr. Bob Summersgill distributed a handout from TACF Executive Director, Marshall Case. The document was a draft of an agreement between NJCF and TACF.

It was noted that although the document was currently written as an agreement between PA-TACF (as a chapter) and NJCF, the germplasm being planted on NJCF property was strictly TACF material.

It was discussed and agreed that both PA-TACF and TACF should act as co-signers, but that TACF should act as the principle signatory. Dr. Steiner noted that PA-TACF was mentioned repeatedly as "the chapter" throughout the text. On this, it was discussed and agreed that most instances of "chapter" should be replaced with "TACF". Although TACF would be the major party of the document, it was agreed that the document clearly shows that PA-TACF would be a partner in the agreement with NJCF.

Bob Summersgill requested revisions and agreed to present those revisions to Marshall Case of TACF for further discussion.

3. **DISCUSSION OF ARBORETUM CHESTNUT PLANTATION** (agenda item 1)

Dr. Kim Steiner discussed the current status of the Arboretum at Penn State. Tim Phelps discussed proposals from companies to build fencing around the entire proposed chestnut planting (approximately 7.5 acres) at the Arboretum. Seed to be planted at the Arboretum is being produced at a faster rate than expected. As a result, the currently fence area will not be able to handle next years predicted production.

Mr. Phelps noted that, for deer protection, an 8-foot woven wire fence would be erected. However, the Arboretum planting, consisting of trees of the BC3F2 generation, is situated on land shared with the College of Agriculture's Dairy and Animal Sciences Department. That department currently uses the land as horse pasture, and some concern had been raised that the horses would become tangled up in the woven wire. Therefore, a horse exclosure would also need to be constructed to protect the horses.

While on the topic of fencing, Tim Phelps also discussed the immediate need for fencing at the "Graves" orchard at Ag Progress Days site in Rock Springs, PA. The 5-foot tree shelters currently being used for deer protection are suspected to be the cause of serious dieback to the trees; therefore, the chapter should consider seriously the completion of an 8-foot woven wire fence and the deconstruction of the 5-foot tree shelters into 2-foot shelters (the 2-foot shelters would stay on allowing for protection from herbicide).

Mr. Phelps also explained the ability of PA-TACF to receive fencing material provided by a member in Warren County. The material would be free – the only drawback would be the cost of transporting the material from Warren County to Centre County. The committee agreed, though, that a stockpile of fencing material would be worth the effort. **Mr. Phelps was given the authorization to rent a vehicle with which to transport the fencing materials.**

Agreement among the members of the science cabinet was reached concerning the immediate need for fencing at the "Graves" orchard. The cabinet also agreed that fencing at the arboretum would need to be constructed before the planting of next spring's material.

Dave Armstrong proposed that Tim Phelps go ahead and buy fencing for the Graves orchard. Mr. Armstrong also agreed to revise the budget so that fencing of both Graves and the entire Arboretum could be incorporated (for approval by National Tree Trust and PA Ex. Board).

Ann Leffel noted that Tim has had some trouble in raising the necessary manpower for maintenance at the various chestnut orchards around Penn State. She suggested that he draw up a schedule and send it out at the beginning of the year. By having a calendar, people can simply mark the date on a calendar and few problems with schedule conflicts would arise. Tim Phelps agreed that it would be worth a shot.

Tim Phelps reported on the Arboretum plantings through this year: 331 PA-TACF seedlings were planted this year. Dr. Hebard sent up 274 seed in June that are currently in the greenhouse and will be planted this fall. So, that puts the total arboretum trees to 855.

Discussion of inoculation and selection of the material planted at the Arboretum was initiated by Ann Leffel. Mrs. Leffel raised concern that it may not be possible to select just one superior tree. It was generally agreed that PA-TACF wouldn't be faced with that selection right away. Plantings of genetic lines are completed over years, so we would not need to immediately select the most superior. The worst of the worst would be killed off right away. And we can hold of final selection for a few years before they start producing. Even still it was agreed that selection of the **one** most superior specimen may be difficult, if not impossible.

4. SUMMARY OF REVIEWS ON BOB LEFFEL'S CMS AND TACF BREEDING PROGRAMS (agenda item 3)

Dr. Bob Leffel first summarized the responses he had received to his paper concerning TACF's breeding design that he sent some time ago. He revealed that, out of the 37 people to whom he had sent the paper, he received only 12 responses overall.

- Some serious concerns were raised concerning the overall goals of TACF. Of the responses he received, several felt that TACF must focus on one of three things: 1) reforestation; 2) breeding a blight-resistant American chestnut that is regionally adapted; or 3) breeding a blight-resistant chestnut that is regionally adapted and exhibits good timber type. Some were quite skeptical that number one would even be possible. And most pointed out that the third goal would be the easiest to reach.

Dr. Leffel went on to mention that he, himself, has raised several concerns regarding the sheer number of trees and lines needed for the BC3F2 orchard. Discussion began on whether the focus of TACF on restoring as many American characteristics back to the "TACF" cultivar is wise.

- Perhaps some leaf waxiness could help out against drought stress.
- Maybe leaf hairs would help protect somewhat against insects, especially aphids.
- Point being that a timber-type tree that is blight-resistant should be our main goal.

Dr. Steiner pointed out that there are some purists out there who don't want many, if any, Chinese characteristics in their trees, and that they need to be accommodated. Dr. Steiner also

mentioned that essentially, everyone is following the plan as laid out 20 years ago, and, with the advisement of Fred Hebard, we're going along with it.

Further discussion about the evolution of plants and diseases took place. That discussion boiled down to agreement that the current breeding program is just doing what it can to speed up evolution by a couple hundred thousand years.

5. REVIEW OF TACF JULY SCIENCE CABINET MINUES, AS THEY AFFECT PA-TACF (agenda item 2)

Dr. Steiner reported that he had taken on the task of reviewing and synthesizing the deployment strategies as tossed about during the TACF Science Cabinet meeting in July of 2003. He said that he would send out copies of the "bulleted plan" once a draft is complete.

Discussion concerning PA-TACF's role in regional adaptability was started. Ann Leffel voiced concern over the necessity for chapters to duplicate what Dr. Fred Hebard is doing in Meadowview with regard to the number of replications in the Clapper and Graves BC3F2 nurseries. She argued that our resources are limited, and wondered if the planting of up to 27,000 BC3F2 trees per resistance per region or chapter, as per Dr. Hebard's orchard mating design, was really necessary.

Dr. Steiner noted that we should continue as planned. He described the current BC3F2 planting at the Arboretum. He argued that the chapter will be inoculating and selecting the first families over the next couple of years, and, at that time, will understand Clapper's resistance to some extent. Dr. Steiner went on to argue that, although four or five genetic lines may be all that is need to test resistance, the chapter might not want to stop at that point. He noted that he had read through Dr. Hebard's BC3F2 seed orchard and design and that the numbers seemed reasonable.

Ann Leffel asked about the cabinet's discussion of Fred's proposed 200,000 acre plot. Dr. Steiner mentioned that the cabinet concluded that such a plot would be next to impossible.

Ann Leffel also asked Dr. Steiner to review the possibility of provenance tests as raised at the Science Cabinet meeting. Dr. Steiner noted that those tests would probably not be carried out. Mrs. Leffel wondered if the current plantings of American trees planted throughout PA could be used as a small-scale provenance test. The trees haven't been planted in the most statistically friendly manner, but Dr. Steiner thought some useful information could potentially be extracted. Ann Leffel suggested the variable of leaf emergence and blooming. Dr. Steiner said those variables would be easier and more meaningful than growth statistics. Sara Fitzsimmons will draw up a matrix as suggested by Dr. Steiner to further review the possibility of using the current American plantings to study variables among the various seed sources planted throughout Pennsylvania.

6. Review of PA Plantings (agenda item 5)

Sara Fitzsimmons distributed a handout including: 1) map of plantings visited during 2003; 2) summary of BC3 holdings and survival by genetic line; 3) summary of PA-TACF holdings and

survival by seed type and cross; 4) inoculation plans for 2004; and 5) advanced hybrid pollinations performed during the 2003 season. Later, a handout was distributed further breaking down PA-TACF BC3 genetic line holdings and survival by location of planting.

Sara discussed the orchards she'd visited this summer and their current status. She also discussed the orchards she hasn't visited, and the provisions for the future visitation.

Discussion centered primarily around inoculation plans. Agreement was reached concerning the need to wait for trees to reach at least 1.5" dbh before inoculation is to be started. **The following orchards are to be inoculated next year (2004): Hummelstown 1997, Thorpewood 1999, Moshannon 1998 and 1999, Ober 1998 and 1999, and Red Clay 1999. Only those trees in their 5th growing season and above 1.5" dbh will be inoculated.**

7. REPORT ON CMS STUDIES IN PROGRESS (agenda item 4)

Dr. Bob Leffel spoke on the reviews of the CMS paper he'd sent out with the TACF breeding design paper. In general, the reviews were positive. One flag was raised with concern that some male sterility genes will show up or not depending on the season. But G x E interactions happen. The more genes needed for resurrecting fertility, and the more linkages there are, the longer it will take to restore such fertility.

Dr. Leffel then went on to discuss the planting he has in Maryland. Originally, 300 seed, half American and half F1 material was planted in 2001. Subsequent re-plantings in 2002 and 2003 took place. In 2003, 31 BC1 trees were planted in the orchard. Dr. Leffel noted that the losses had been more severe than he'd like to have seen. Overall, Dr. Leffel was pleased with the performance, and described that the initial fertility data are backing well his initial thoughts on a CMS breeding system. There are 14 trees (American x Chinese) that showed no anthers on their catkins. For the American x Japanese crosses made by Dave Armstrong, only one survived, but the few catkins it produced were sterile.

8. COUNTY COORDINATOR BREEDING PROGRAM ACTIVITIES (agenda item 9)

Dave Armstrong reviewed the pollinations that had taken place through several counties in Pennsylvania linked to the production of F1's for county CMS orchards. 17 total American x Chinese crosses were being completed, for the production of a potential 9 CMS orchards in the following counties: Westmoreland, Somerset, Adams, Lancaster, York, Jefferson, Franklin.

Mr. Armstrong noted that the biggest problem of the chapter would concern the teaching of pollinating practices to the members of PA-TACF. Ann Leffel mentioned that the topic would be perfect for a county meeting and workshop.

9. PSU GRAVES PLANTING AND SILVICULTURE PLANTINGS (agenda item 6).

Tim Phelps gave a review of the silviculture and BC3 Graves planting around Penn State.

- The basic data from the Stone Valley show that tree shelters are beneficial in getting early height growth, with little difference between vented vs. unvented. After three

years of shelters being removed, we are finding that direct seeding is now superior to anything in a shelter.
- But there's little or no deer pressure at Stone Valley. In Tuscarora, the direct seed is not growing at all. Somewhere with a lot of deer pressure, you need tubing, preferably 5-foot tubes.
- The 1999 plantings at Stone Valley and Tuscarora show that nursery stock performs better than containerized material.

There was general consensus that, if possible, direct seeding is the way to go.

Tim Phelps summarized the planting at the Penn State Graves orchard.
- We planted roughly 244 replacements out at graves. It didn't fill up all the holes. Of 1834 positions, we have 1528 trees alive. That's 83% stock. A lot of die back is being attributed to 5-foot tree shelters. The proposed fence will allow the removal of 5-ft shelters.
- Of the seedlings 244 that we replanted, the lowest survival was 96%. As for those seedlings that died after replanting (4%): the seedlings had well-established root systems and should be able to sprout back.

10. ANNUAL MEETING DISCUSSION (agenda items 10 and 11)

Tim Phelps noted that he would need 3 or more knowledgeable people to man the buses during the orchard tours on Saturday of the annual meeting and three or more at tour sites – Dr. Steiner at the Arboretum, Sara and Ann at the Graves Orchard, and Tim Phelps at the Stone Valley silviculture study location. Dave Armstrong suggested using PA-TACF Board members as those "knowledgeable people" on the buses.

It was suggested that a Board meeting be held prior to the Annual meeting. **It was agreed that a Board meeting would be held on Saturday, October 11, 2003, at 10 am. The meeting is tentatively scheduled at Penn State's Forest Resources Lab.**

11. PROVISION FOR 2003 SEED COLLECTION (agenda item 9)

It was discussed and agreed that seed collection would take place during both the PA Board meeting and the Annual meeting. Any harvester not able to make either of those meetings would be dealt with on an individual basis, preferably by having them mail the seed. It was agreed that the seed would be temporarily housed in the Forest Resources Lab, but housed over the winter in the refrigerators at Hershey. Tracey Coulter agreed to assist in seed collection at both meetings.

12. NEWSLETTER (agenda item 12)

Sara Fitzsimmons agreed to edit the newsletter this fall. Science Committee members were encouraged to get reports/articles to Sara ASAP.

MEETING ADJOURNED 3:30 pm.