

SCIENCE AND TECHNOLOGY COMMITTEE MEETING – [LINK TO ALL MEETING MATERIALS HERE](#)

Date: Wednesday, October 27, 2021

Time: 10:00 AM EST

Zoom Recorded Call

S&T COMMITTEES MEMBERS IN ATTENDANCE:	Steve Barilovits, Chair, Dr. Jared Westbrook, Staff Liaison, Sara Fitzsimmons, Recorder, Dr. Gary Carver, Jay Cude, Tracey Coulter, Nathan Cude, Mandy Cromwell, Dr. Deborah Delmer, John Dougherty, Dr. John French, Dr. John Hempel, Laurence Grossman, Dr. Thomas Klak, Bruce Levine, Dr. Gregory Miller, David Morris, Rose Marie Muzika, Dr. C. Dana Nelson, Allen Nichols, Dr. Jeanne Romero-Severson, Jim Searing, Ross Whetten, Don Willeke
NOT IN ATTENDANCE:	Dr. Hill Craddock, Eric Evans, Patrick Flaherty, Hugh Irwin, Dr. Douglass Jacobs, Dr. Joe James, Dr. Carolyn Howes Keiffer, Dr. Brian McCarthy, Dr. William McDonald, Dr. Fredrick Paillet, Dr. Ronald Phillips, Vicki Pierson, Phillip Rutter, Dr. Kim Steiner, Brad Stanback

CALLED TO ORDER AT 10:00 AM

OPENING COMMENTS / APPROVAL OF PREVIOUS MINUTES STEVE BAROLOVITS

- Roll Call – taken via zoom
- Minutes from September unanimously approved by committee
- Introducing new Chair member Dr. Deborah Delmer followed by the reading of her CV

LANDSCAPE GENOMICS OF AMERICAN CHESTNUT– ALEX SANDERCOCK

Objective 1: Re-sequence 384 American chestnut samples sent in by volunteers and staff and re-describe the genome using two SNPs for genetic markers and IDELs

- Final dataset consisted of ~21 million high quality SNPs

Objective 2: Describe population structure and the demographic history

- Past studies have come up with multiple conclusions on origins of diversity:
 - One study using DAPC model confirms that there are two distinct populations one in the north, one in the south
 - One study using ADMIXTURE models indicated that there are three distant population, and there is one more in the north
 - Studies agree the south is the most diverse part of the range
- Current evidence shows that American chestnuts went through a major bottleneck event through glaciation.
- Appalachian Mountains were barriers to gene flow. Stopping gene transfer over the mountains.
- The southwest was a glacial refugium- older population likely survived the glacial movements as indicated by more diversity

Objective 3: Genes associated with local adaptation

- Largest variation in the genome has strong correlation with temperature and precipitation
- More research needs to be done as there are over 6000 potential candidates for adaptation

Future items and research questions:

- Identify genes related to local adaptation
- Estimate American chestnut future range shifts due to climate change
- Develop germplasm conservation and breeding strategy

Q&A

Why is Alabama showing lack of diversity in northeast? Why is the NE as diverse as the south?

The analysis is highly sensitive to a few samples to homozygous samples and are likely being weighed down.

How many individual trees are needed to cover the genomic diversity?

Hard to tell right now. Our best guess now says 675 trees, but that may change

Would you be able to tell where a sample came from?

Yes, there is enough variation in the populations to make a guess as we move forward.

How much of the diversity is impacted by human movement?

Unsure. An example case is in Indiana where there is clearly NE genetics that should not be there. Hard to explain other than explained by human movement.

TIMELINE FOR NEW FOUNDER OXO LINES- SCOTT MERKLE

Goal: To produce regionally adapted American chestnut founder lines for expressing Oxo gene

Current status:

- Overall, it is troublesome to get plants out of the cultures. UGA is currently screening to seeing which ones are best at creating somatic embryos.
- SUNY ESF and UGA have decided to move forward with two promoters, neither are the base of Darling 58. These transgenic events use constitutive and wound inducible promoters.
- 104 new embryonic cultures.
- 1/3 screened for production
- All lines are in cyrostorage
- 8 most promising representatives from all 5 regions. These have been shared with ESF.
- Coming off a 5-year hiatus for transformations as lab had moved to other things.

Q&A

How will the 100s of embryos be tested for blight resistance?

If the embryos are stained showing they have Oxo was introduced. That indicates there is ideally resistance.

Beyond that there is no plan. Note that no Oxo trees are being planted at UGA. ESF or TACF will be in charge of looking into the correlation of blight resistance.

SMALL GRANT PROPOSALS- SARA FITZSIMMONS

Committee reviewed the proposals and board agreed on the chart found in Meeting Materials.

Overall, the request is under budget and thoroughly reviewed.

Board:

Steve B, Jay and Ross W have moved to bring this to the board as approved by committee. Unanimously approved.

LIST OF PRIORITIES WITH FY21 FUNDS- JARED WESTBROOK

Budget requires us to have need to have one year in reserve. FY21 an excess of funds and the board has agreed to push the science forward.

The proposed funds are in three buckets. Totaling 8 items.

1. Infrastructure at Meadowview
- \$126, 000 Deer fences for Duncan and Wagner

- \$10,350 Backup generator and propane tank for greenhouse. Allowing staff to sow in January
- \$10,000 Backup generator for Price lab. Consistent temperatures for samples.
- 2. Database upgrades
 - \$26,000 Keep a part time software developer. 1/3 of the cost of developers. 10 hours a week for one year. On board for smaller upgrades and bugs while we wait for next big pot of money for upgrades.
- 3. Research
 - \$85,000 PRR RNA sequence time course. How does the CH chestnut respond to infection? To help ID candidate genes for future breeding. Clemson, PSU, UKY are the collaborators.
 - \$75,000 antibody test strips of OxO. Rapid test to detect OxO allowing volunteers and citizen scientist to do this. Will allow for us to scale up production. Aim to have them ready by next year, asking for TACF funds as this is mission critical.
 - \$20,000 sequence backcross trees to assess adaptive diversity. This will allow us to prioritize areas that are underrepresented. Ideally, we have all the funding needed. This is more of a placeholder to make sure if there are more samples, we have the funds needed. Ideally, we can test 10-20 from each AM chestnut line. Jason and team are looking into that down the line.

Q&A:

Won't a dollar a strip cost us thousands?

Yes, but this will mainly be for external use. Internally we will continue to do traditional testing.

How does cost compare to current method?

Unsure, likely about 500 a kit in upfront cost. Minimal from there, but very high staff time.

Will you need to core a nut for strips?

Yes, if you want to test the nuts, but you can also do leaves too. More flexible. This will also allow us to track the OxO gene for those critical of GE

Board:

Steve B – Overall the projects total around \$353,000 and suggest to move it as one capital request to the board.

Bruce Levine- objects as the last two items. The strips and sequencing are not fully thought out. Need more before approval.

Jay – Less on the science, but approves the process. However, agreeing with Bruce says the test strips are not fully thought out. Suggest we approve on contingent until we have more.

Steve B- Vote to approve up to \$350,000 for FY22. All approve with expectation of one nay from Bruce Levine.

MEETING ADJOURNED AT 12:01PM

Minutes respectfully submitted by Jamie Van Clief and Cherin Marmon-Saxe - recorder