

**2016 NC-140 Regional Rootstock Project
Annual Business Meeting Minutes
Ramada State College Hotel and Conference Center
1450 South Atherton Street, State College, PA, 16801
November 9 – 10, 2016**

2016 Chair and Co-Hosts: Rob Crassweller and Rich Marini, Department of Plant Science, Penn State University

2017 Hosts: Mike Parker and Tom Kon, North Carolina State University, Mills River, NC

2018 Chair Elect and Host: Stefano Musacchi, Washington State University

Secretary: Tom Kon and Mike Parker, North Carolina State University

Wednesday, November 09, 2016

Welcome

Rich Marini greeted the group and introduced Dr. Gary Thompson, the Associate Dean for Research and Graduate Education Director in Penn State's College of Agricultural Sciences. Dr. Thompson welcomed the group to State College and described the current status of the Pennsylvania tree fruit industry. Dr. Thompson indicated the industry is strong, well organized, and has been very supportive of Penn State's Research and Extension programs. For example, The State Horticultural Association of Pennsylvania recently funded onsite housing for graduate students and visiting scientists at Penn State's Fruit Research and Extension Center in Biglerville, PA. Rich asked for each of the attendees to introduce themselves. Forty-one members and guests attended the meeting.

Erin Connolly, the Department Head of the Plant Science Department at Penn State was introduced to the group. Dave Ferree, one of the founding members of the NC-140 project, retired and now residing outside of State College, was introduced.

Future Meeting Sites

The location and dates for the 2017 Annual Meeting were discussed. Mike Parker offered to host the meeting at Mills River, NC on November 14 and 15. Michele Warmund made the motion to accept the offer which was seconded by Mosbah Kushad. The motion was approved by the group.

Brent Black suggested that Washington State should be considered as the location for the 2018 meeting. Stefano Musacchi verbally agreed to host the meeting. Greg Lang made the motion to accept the offer which was seconded by Essie Fallahi. The motion was approved.

Rich introduced Lailiang Cheng, who made a brief presentation about the recently funded USDA-SCRI Project (i.e. Root2Fruit) entitled, "Accelerating the Development, Evaluation, and Adoption of New Apple Rootstock Technologies to Improve Apple Growers Profitability and Sustainability." The project cooperators would like to welcome interaction with NC-140 to report progress and elicit feedback/guidance. Since a goal of this project is to extend findings to all apple growing states, Lailiang invited all NC-140 members to attend the advisory meeting next year and would like coordination and

collaboration with NC-140. The role of the advisory committee is to provide feedback on project progress in research and extension. Starting next year, the scientific advisory group plans to meet on the day/afternoon prior to the NC-140 Regional Rootstock Project Annual Meeting. Stakeholder advisory committee meetings will occur on a separate date. Lailiang asked for any feedback/suggestions from the group. Gerry Neilsen and Stefano commented that several factors, such as crop load, fruit size and environmental conditions are influential in bitter pit susceptibility and wondered if degree days between years could be utilized as a variable. Lailiang agreed and mentioned 'Honey Crisp' fruit has approximately half of the calcium when compared to 'Gala' and indicated that fruit cuticle thickness may play a role. Fruit Ca sampling procedures were also discussed. Denise Neilsen asked if meso- and macro-fauna will be evaluated in respect to rootstock resistance/susceptibility to bitter pit. Gennaro Fazio indicated that this would be evaluated. Rich Marini encouraged anyone interested in serving on the advisory committee should contact Lailiang.

Administrative Update – Dr. Ron Perry, NC 140 Administrative Advisor, NCRA

Dr. Perry recognized Dave Ferree as a mentor and for his contributions to NC-140. Dr. Perry indicated that there have been some web system challenges/ changes with NIMS, however specific issues with submissions were not observed/reported.

Dr. Perry officially retired on September 1, 2016 from Michigan State University, but continues to work part time teaching a course, conducting limited research and serving as Administrative Advisor of NC 140 for an undeclared amount of time into the future. Dr. Perry indicated that he is happy to continue to serve, but the group may want to proceed differently. Retirees can still serve the group in an administrative role, but Ron wanted feedback from the group. The group was very supportive and appreciative of Dr. Perry's service and it was suggested that his continued service would be beneficial due to his long term involvement. On behalf of the re-write committee, Mike Parker felt that it would be ideal if Ron would continue to serve as the administrative advisor through the project re-write, at a minimum.

Dr. Perry asked for feedback/discussion regarding two topics: 1) how to spend the award money received from the Excellence in Multistate Research Award (\$15,000) and 2) the internal protocol for AES and internal members to have open discussions with the private nursery industry.

Since the award money must be used by October 2017, the group must identify potential needs/uses and develop a budget. Dr. Perry suggested that a potential use of this funding could help cover costs associated with travel to speaking at conferences. A subcommittee volunteered to develop suggestions for use of award money over lunch. An internal policy to minimize private businesses (i.e. nurseries, consultants, etc.) from active participation in NC-140 Annual Meetings has been in place since the inception of the regional project. There is a need to determine if commercial nurseries should be involved. Rich Marini indicated that the nursery industry was not originally included as part of the NC-140 Regional Rootstock Project, especially with concerns that preliminary data could be misused. However, in recent years, Rich has changed his stance. Rich suggested that nurserymen are aware of propagation challenges we are not. Rich suggested that the group should consider inviting nurseries.

Mike Parker raised the question if consultants should be included. Jim Schupp indicated that commercial partners have intellectual property that the project may not be able to access and suggested that the project should be more inclusive. Dr. Perry described an existing multistate project has included private industry (NCCC22). Dr. Perry was impressed at how open the private breeders are within this group, and felt that positive benefits were conferred due to inclusion of industry members. Jon Baugher (Adams County Nursery) did not think that the industry would move too rapidly using preliminary information generated by NC-140. Jon felt that that there was value in including the nursery industry in this group, as they may be able to offer a different perspective (ex. challenges observed with G.30 performance in the nursery).

The group clearly valued the opinions and perspective of the nursery industry regarding this project. However, there was little consensus regarding the mechanics/inclusiveness of inviting the nursery industry to participate in NC-140 and/or how to increase the involvement of the industry in this project. After a prolonged discussion, Rob Crassweller made the motion that a subcommittee should meet over lunch to develop options for the group to somehow enhance interaction with the nursery industry and Gennaro seconded the motion. Rob Crassweller offered to chair the subcommittee and Greg Peck and Jon Clements were willing to participate. The motion was accepted.

Industry involvement in NC-140

NC 140 Committee has in past meetings limited or restricted attendance at annual meetings to members and allied members associated with various research and extension institutions. Non institutional representatives have been barred from attending. The aforementioned subcommittee reported on opening-up an invitation to participate in NC-140 to commercial nurseries. There was discussion to invite specific nurseries to become members who would pay membership fees and participate. This sparked a long and circular discussion about the mechanics of industry membership and how the industry could be involved in NC-140. Several members questioned the concept of only inviting a select group to participate. Others indicated that the regional project may become obsolete if industry is not formally included.

At one point Jon Baugher asked, "What are you looking for from the industry?" He indicated that if the group was interested in starting a dialogue with the industry, then e-mail would be effective. He felt that the industry would be very responsive to surveys.

In an effort to determine the level of interest in including industry in NC-140 meetings, a vote was taken as to whether the industry should be involved in NC-140 Annual Meetings (voting members only).

Opposed: 16; In favor: 4

Emily Hoover suggested that NC-140 members representing each crop should contact nursery industry with a simple survey regarding research needs, concerns, etc. She indicated that this may be a good way to start a dialogue and we may be able to use this information with publications, etc. The Administrative Advisor, Ron Perry, would send out a letter to survey the nursery industry for input, concerns and their biggest challenges.

Spending funds from the Excellence in Multistate Research Award - Emily Hoover

On behalf of the sub-committee, Emily proposed the following options:

- 1) Funds could be used to support travel for graduate students to the 2017 NC-140 Meeting in North Carolina. They would give a lightning presentation about their research. The funds could be used to pay for expenses related to registration, lodging, and transportation. Due to the timing that these funds must be spent, airline tickets would need to be purchased far in advance of the event. Funding would be available for 8 or 9 students. Emily and Rich could develop a short application that would be due by Dec. 19th.
- 2) Funds could be used to support member Travel Expenses to speak at IFTA. A 20 minute time slot to talk about the NC-140 project could be available. Essie was interested delivering this presentation. The presentation would be broad in scope, and would cover all apple trials. Rich Marini has a presentation that could be utilized and shared with Essie.
- 3) Web site improvement - \$2500. See discussion below.

Dr. Perry suggested that the members consider an award of \$1,000 per graduate student. Based on the number of student applicants, Emily will determine a contingency plan for funds after Dec. 19th, if needed. A motion was put forward to spend the award money based on Emily's suggestions, and this motion was seconded by Greg Peck. The motion passed.

Emily Hoover already created a form for grad student applications for 2017 NC-140 Meeting in North Carolina and shared it with the group via e-mail. Rich Marini wants to develop a plan to identify new coordinators in the future, since many members will likely retire in the next 5 years.

Website Update

In general, Jon Clements would like more information from all trials to be posted to the website. Jon felt that Wes Autio has a set a great example for presentation of information to the public and requested that all cooperators use his website as a template. All coordinators should review and revise their contributions to the website. Jon suggested that links should be provided to the abstract/full text of project publications if possible. Jon asked that coordinators include hyperlinks in the future.

Jon Clements, Ron Perry, and Win Cowgill (now retired from Rutgers) had a meeting to discuss the site format and priorities and Jon made some changes to the website based on this meeting and feedback from last year. Contact information now comes from NIMS (official members). However; some individuals indicated that they are not on the list.

Win stated that the west coast tree fruit industry has great interest in these reports and commended Jon for making some great changes to the website. The history of NC-140 will be published in the January JAPS, Jon and Win wondered if this paper could be posted to the website. Michele W. said that she would talk to Penny Perkins-Veazie to see if this would be appropriate/permisible.

Project Rewrite Committee Report – Mike Parker

Mike Parker posted the proposal to the website and encouraged all members to review. Mike indicated that the citations still need to be completed prior to submission. Mike encouraged members to provide feedback, but reminded the group that the objectives were reviewed and approved at last year's meeting.

Everyone should have received an invitation to participate in the regional project. Mike Parker will send out a reminder and will follow up with Christina Hamilton, Administrative Associate, NCRA. There was some confusion about the invitation and signing-up, and very few present recalled receiving the invitation. Emily Hoover found the invitation and planned to share it with the group via email. Rachel Elkins mentioned that members of non-land grant institutions will have to contact Mike specifically (ex: Canada and USDA). The full proposal is due December 1st.

When reviewing the draft, Mike encouraged the group to review the objectives and methods to see where/if each member should be included. Also, where appropriate, members needed to complete Appendix E's. Jon Clements reaffirmed the importance of cooperator submission of Appendix E. Mike Parker reminded the group that the propagation objective was removed since no one has worked on it recently. Rich Marini and Ron Perry commended Mike Parker and Wes Autio for contributions to current and former project re-writes, given the significant work required.

Discussion on this topic continued into the following day, Nov 10. Mike Parker indicated that revisions would be accepted until November 17th. Rob Crassweller made a motion to accept the proposed project update and Essie Fallahi seconded the motion. The motion to accept the proposal was approved. Mike Parker reminded the group that the 2017 NC-140 Meeting will occur on November 14-15th in Mills River, NC. The Root2Fruit Advisory Committee Meeting will occur on November 13th.

Additional Business

Michelle discussed the APS Wilder Award. While this award has mostly gone to plant breeders in the past, it is not exclusive to breeders. Individuals can be nominated by an individual or a group. Michelle proposed the nomination of Dave Ferree. Given his contributions to NC-140, Michelle felt that it would be appropriate for NC-140 to nominate Dave Ferree for this award. Rich indicated that he would be happy to write-up the nomination and already has an existing packet of supporting documents. Dave was a founding member and was a coordinator for the first two NC-140 trials. A motion to nominate Dave for the APS Wilder Award was made by Michelle with a second by Brent Black. The motion passed.

Michelle also discussed the 2017 ASHS Annual Conference in Hawaii and plans for an APS workshop. Michelle proposed having an event before or after meeting, for example: meeting with Hawaiian subtropical group (\$50 per person), or visiting a germplasm repository. Michelle wanted to talk to members that planned to attend. Greg R. suggested holding an event before the meeting and Rachel E. agreed.

Existing Rootstock Trial Reports by Crop Coordinators

2009 Peach Rootstock – Greg Reighard

Greg R. announced a Peach Symposium will occur next summer in Romania. Papers for the meeting in Turkey are due in Sept 2017, which is a little earlier than normal. Michele wanted to know if any NC-140 papers would be presented at this meeting. Greg has plans for 2 papers from this trial – one was presented at the Orchard Systems Symposium in Bologna and a 5 year report in the Journal of the American Pomological Society (JAPS). However, Greg is still finding data issues and the 5 year publication has been delayed. The data set has been analyzed three times.

Rich Marini encouraged all cooperators to proof their data sets. For trial coordinators, data analysis is easy but data proofing takes a lot of time and can be very frustrating. Greg R. wants to continue the peach trial for one more year (a total of 9 years of data), which would result in another publication in two years. Results in years 7 and 4 were very similar. Guardian was the best producer. In general, a lot of tree death was observed in the southeast due to bacterial canker. European selections did not perform well. Utah was an atypical site (alkaline soil) and observed different results. Protocol is online and hard copies were provided. Data is due by Feb 1st. Brent Black asked about the timing of project termination. A brief vote occurred regarding timing of project removal. Two of thirteen cooperators voted to remove the trial early. Greg indicated that he would be flexible and willing to work with all cooperators if removal was necessary. Michele Warmund reminded all authors that publish in JAPS that ASHS handles business and the corresponding author is ultimately responsible for payment of page charges. It is the lead author's responsibility to inform ASHS who needs to be billed.

2009 Peach Physiology: Rich Marini

The report is posted on the website. Rich was interested in collecting an additional year of data and results were discussed. Rich asked participants if they were willing to collect data for an extra year (ID, KY, MD, NY, and SC – 5 locations total). All participants that were present agreed to participate.

2010 Apple Rootstock – Wes Autio

Wes reported that quality of data was poor last year and encouraged participants to check data and review the protocol. Wes echoed Rich's comments regarding proofing of data sets and reminded cooperators that data is due by Jan 15th. A 5 year report was written, accepted, and will be published in April. Based on the data Wes wondered if there may be some mix-ups with tissue cultured G202 vs. non-TC G202, as unexpected responses/trends were observed between 'Fuji' and 'Honeycrisp'. Gennaro stated that some scion/rootstock interactions that could influence vigor and indicated that he could compare genetics to determine if there was a mistake during propagation. There are several excessively vigorous rootstocks in the trial. An extended discussion regarding potential removal of excessively vigorous trees in trial occurred. Stefano questioned the entire premise of keeping the trial after potential removal of several trees. Participants agreed to keep all trees and terminate the trial after 2017, the 8th year.

2010 Sweet Cherry Rootstock and Training Systems – Greg Lang

After 7 years, Greg L. felt that the project was starting to generate some very interesting information. Yield efficiency (kg/TCSA) was a relatively useless measure in this trial, especially when comparing planar vs. 3-D training systems. British Columbia collected NDVI data with a drone this year and poor relationships were observed. In terms of tree vigor, Geisla 3<5<6. When considering yield efficiency per hectare, Gisela 3 was the most productive rootstock. SSA was the most precocious system, but yields were low when compared to other systems. KGB had low yields in early years, but productivity has been “catching-up” to systems with simplified canopy architectures. Greg L. is working on a paper to summarize the first five years of the planting. A second paper was presented in Italy at the 2016 Orchard Systems Symposium. Greg L. hopes to keep the plantings for 10 years if possible. Greg L. described efforts to test whole tree renewal in sweet cherry systems. While growers were initially “horrified” by these efforts, they are starting to accept/appreciate this management practice. Rapid renewal growth was observed and all wood is very uniform. However, some sylleptic shoot formation has been observed on renewal wood, which is undesirable.

2013 Pear Training/Spacing/Rootstock - Todd Einhorn, presented by Rachel Elkins

Contrary to the agenda, Rachel Elkins confirmed that the 2009 Pear Rootstock Planting does not exist. In all likelihood, this minor error was propagated from last year’s minutes. The report was uploaded to the website. Despite his recent relocation, Todd, recently moved to Michigan State University, will still be the coordinator for this trial. While Todd’s position is currently vacant at Oregon State University, Steve Castagnoli will make sure that trial will continue. OSU is making an effort to prioritize re-filling Todd’s former position. Rachel speculated that low yields may be attributed to chilling issues observed two years ago. Poor/insufficient chill was observed and Rachel wondered if physiological responses were delayed. While bloom was supra-optimal, fruit set was poor. Rachel was hopeful for greater productivity in 2017.

2014 Apple Rootstock - John Cline

Data and protocol was circulated and are posted to the website, and the trial was briefly described. John was missing data from two sites. As indicated in the protocol, the same data will be collected in 2017 as 2016. Some sites carried a small crop in year two, while others did not. Given the challenges observed with Ca deficiencies in plantings with ‘Honeycrisp’, Rich wondered if bitter pit incidence should be quantified in this trial. A discussion regarding quantifying bitter pit across all sites, sampling procedures, and/or the inclusion/exclusion of standard management practices for fruit Ca in rootstock trials ensued. There were no changes made to the protocol. Greg R. made some general observations about his SC planting, specifically: 1) he was very disappointed in the poor red fruit color with Aztec Fuji, and 2) the Vineland series rootstocks were excessively vigorous at this location.

2015 Modi Organic Apple Rootstock – Wes Autio

Wes briefly described the trial and indicated that the protocol for this trial is online. Data is due Jan. 15th 2017. In an attempt to encourage timely/accurate submission of data, Wes provided a brief description of the “wall of shame”, and suggested that he may develop a “hall of fame” for cooperators that consistently meet or exceed expectations for data submission and quality.

Future Trials

2017 Peach Rootstock – Greg Reighard

Greg R. described the trial and details are on the website. There are only 10 cooperators so far. The cooperating nursery may be short on some rootstocks, so cooperators were urged to contact Greg if no longer interested. There are some issues/concerns with movement of rootstock material to Canada. For example, John Cline won't be able to use MP29. All cooperators should email Greg R. a billing and shipping address and phone number by the end of the meeting. There was some discussion about tree spacing and systems to be used in this trial. A brief vote was conducted on tree in-row spacing. A 1.8 m X 4.5 or 5.5 m planting was agreed upon. If interested in extra trees, cooperators should contact Greg directly. Brent Black expressed interest in taking some extra trees.

2017 Cherry plantings – Greg Lang

Greg L. reported there was a major loss in site numbers - the proposed planting is down to 3 sites for the sweet cherry trial. However, CO verbally agreed to accept this planting. Greg L. anticipates this trial will include 8 rootstocks, including some rootstocks from Amy Iezzoni. Denise Neilsen reiterated the need to work on clean plants for Canada in the future.

2019 Pear Trial - Todd Einhorn, presented by Rachel Elkins

More detailed information is included in the online report which Rachel read. PA, WA, MI, Nova Scotia, and NY plan to participate. Sierra Gold nursery has initiated propagation of trees for this trial. The trees may be sent as sleeping eyes in 2018 or as whips in 2019. A separate trial to evaluate *Amelanchier* rootstocks is planned for 2019 or 2020. Cooperators that have expressed interest include members from PA, WA, CA, NY, CO, and OSU.

2019 Apricot Trial – Greg Lang

Greg L. conducted an informal poll to identify interested participants. Members from WA, CO, UT, MI, NY, and CA expressed interest. Plum, peach, and nanopack rootstocks would be considered and Greg R. discussed alternative stocks that may work. A 2019 planting would be the earliest that a trial could be established.

2018 Apple Trial – Stefano Musacchi

Stefano M. led a discussion on future apple trials. He indicated that some promising rootstocks from New Zealand were requested for evaluation. He contacted Gennaro Fazio to identify new Geneva rootstocks to evaluate. A minimum of 10 rootstocks will be evaluated (3 from NZ; 6 from Gennaro; and M.9 and/or M.26). The method of propagation was still being determined (bench grafting or chip budding). Stefano suggested that the group should utilize a scion cultivar that is not 'Honeycrisp', 'Gala', or 'Fuji', since these cultivars have been repeatedly used in recent trials. An extended discussion about cultivar occurred. After much debate, 'Crimson Crisp' was agreed upon as the cultivar for the 2018 Apple Rootstock Trial. Stefano then discussed the future coordinator for the 2018 trial. Greg and Stefano indicated that Todd Einhorn agreed to be the trial coordinator. On behalf of the Canadian cooperators, Susan Blatt wanted to know more information about the proposed nurseries that would be used to

propagate the trees. To ensure that Canada can continue to participate in rootstock trials, Blatt indicated that the genetic material used must be certified virus tested.

Plum rootstock planting – Poliana Francescatto

The group deferred coordination/planning of this planting to Terrence Robinson (not present). Poliana indicated that she would try to help select/identify rootstocks that will be used in this trial with a target of 2019 or 2020 for a planting date. Japanese and European plums may be included in this trial.

Field Tour Penn State Nov 10, 2016

After State Reports concluded, the group travelled to the Horticulture Research Farm at Rock Springs to have lunch and visit multiple NC-140 apple plantings. Emily Lavelly, Rich Marini's graduate student, described ongoing research projects that focus on apple tree root growth. Then, the group travelled to Ridgetop Orchards in Bedford County, PA for a tour of the 400+ acre farm. The tour was led by Mark and Dan Boyer, who used this opportunity to discuss potential causes of production issues with multiple apple blocks and a sweet cherry block. Following the tour, the group had dinner at the Omni at the Bedford Springs Resort in Bedford, PA. Prior to the conclusion of the meeting, Mike Parker made the motion to write a letter to formally thank Rich and Rob for doing a great job of hosting the meeting which was seconded by Greg Lang and unanimously approved. Mike encouraged the group to attend the meeting in North Carolina in 2017.