

**Minutes of the NC140 technical committee meeting held in Geneva, New York  
November 13-14, 2019**

**Chairs:** Dr. Terence Robinson, Cornell University, Geneva, NY

Dr. Gennaro Fazio, USDA-ARS, Geneva, NY

**Recording Secretary:** Dr. Ioannis Minas, Colorado State University, Fort Collins, CO

**Wednesday November 13, 2019 (morning)**

**Welcome**

The meeting started with a welcome from Dr. Terence Robinson of Cornell University.

**Administrative Business and Updates**

-Members and guests were introduced and the agenda for the meeting was approved.

-There were 25 attendees in total (members and guests, see full list of participants at the end of the minutes report).

-The 2018 NC140 meeting minutes prepared by Terence Robinson were approved.

-A new member from Maryland University Dr. Macarena Faruch was introduced and accepted as an official member of the project by a vote of the members.

-Dr. Ioannis Minas presented information regarding the 2020 NC140 technical committee meeting to be held in Colorado in the newly established Colorado State University's Western Campus in Grand Junction, CO. Dr. Minas proposed November 4<sup>th</sup> and 5<sup>th</sup>, 2020 as the meeting days with November 3<sup>rd</sup> and 6<sup>th</sup> being the travel days. There was a discussion on whether one extra day should be added to allow time for the proposal re-write effort and the Root-to-Fruit project group members to meet.

-For the selection of site for the 2021 meeting a vote between AL, VE and NM was held. The group decided to move the meeting to AL in 2021. Dr. Elina Coneva will be the host and the recording secretary in CO in 2020.

-The project's administrative adviser, Dr. Rich Marini of Penn. State University gave a report on project funding status and the need for appropriate writing of impact statement in the annual report as well as in the state reports. A workshop session in one of the upcoming meetings with an officer from USDA will be helpful to the group.

-Then Dr. Marini opened the discussion of the future NC140 project re-write effort which is due September 2021. The group decided that Greg Lang on Michigan State University will lead this effort as chair of the project re-write committee. Genaro Fazio, Brent Black, Todd Einhorn, Esmaeil Fallahi and Megan Muehlbauer, Suzan Blatt will serve as members of the project re-write committee. The group decided to request couple 2-hours block during the meeting in CO to resume re-write effort.

-Dr. Stefano Musacchi of Washington State University presented the most recent updates on the upcoming XII Orchards Systems and Rootstock Symposium of ISHS to be held in Wenatchee, WA from July 26-July 31, 2020. He is the convener and presented the symposium website and the important dates for abstract, registration and full text submission and the tentative program of the meeting. Dr. Musacchi proposed to the group that trial coordinators should lead the effort of submitting abstracts and conference papers on historic information on NC140 apple, sweet cherries and peach rootstock trials.

## **Website Report - Jon Clements and Win Cowgill**

There was a discussion on where each state should be providing a paragraph with the summary of the previous year's accomplishments to help the organizer of the meeting with writing the annual report. They should provide a list of the publications related to the project. It could be up to the organizer of the meeting to request this paragraph per state. Stefano Musacchi mentioned that NC140 does not have a solid format for publications reporting. Then Jon and Win encouraged people to include the link of the published papers so they can be shared through the website.

Jon Clements presented the way each member uploads reports in the website. He also presented website statistic data that are available in the nc140.org, and he highlighted that there is a lot of interest from China for NC140 information. There might be some problems with email lists and whoever is not receiving emails should contact Jon Clements. Part of the registration fee goes for the support of the web site and Jon's and Win's travel to the meeting. Jon also mentioned that eXtension website is lacking NC140 rootstock information. The group might consider working closer with eXtension as an effort through the new proposal.

## **Current Rootstock Trial Reports from Coordinators**

### **• 2009 Peach rootstock trial – Greg Reighard**

Greg Reighard announced that the final paper was accepted and will be published JAPS in January issue. He highlighted the importance reporting the accurate units. Survival is the most important trait in peach. For western states like CO and Utah with high calcium and pH in the soil Prunus hybrids performing best. Plum rootstocks that outperformed in Massachusetts did not survive in South East. Most European roots did not perform in South East. Almond hybrids were the best in west. If there are replant or fungi or bacterial problems peach rootstocks are performing the best. This trial was the most impactful in CO industry due to the performance of Krymsk®86 in the state was highlighted by Dr. Minas. However, it suffers from bacterial canker in the East and it is not acclimating quickly in the fall in Intermountain. Brent Black is considering a parallel paper to be submitted in JAPS focusing on iron chlorosis performance among rootstocks.

### **• 2010 Apple rootstock trial – Wes Autio**

The 'Honeycrisp' manuscript is on the review process and the 'Fuji' is 3/4 in the writing process. Dr. Autio recommended to not use so many genotypes in one trial. Broad variation in vigor was also an issue. There were significant differences and mix up in G.202 between stool bed and tissue culture. G.11 was the best performing tree in the trial, G.4004 (semi-dwarf) looks good, whereas, no Budagovski was good in any of the trials. Comparing by size category is critical for size controlling rootstocks. Yield projection for the years 6-13 based on TSCA will be helpful as an economic aspect. Even it is challenging to calculate they should be always considered. As vigor is inferior to productivity over the time, mentioned by Dr. Robinson.

### **• 2010 Sweet cherry rootstock x training systems trial – Greg Lang**

Two papers are planned the first 5 years (establishment and precocity) and the second 5 years (mature production and whole tree renewal). There was a discussion whether the rest trial members are planning to keep the trial or not. NY and MI will keep it. Originally started with 13 sites and ended with 5. Nursery damage was inferior to the performance of the trial across various locations. Gi3 looked good in MI not in NY.

### **• 2013 Pear training/spacing/rootstock trial - Todd Einhorn**

Seventh leaf in the trial. There is a thought to look multiple factors in pear production using OR, CA, NY sites. Following an early in frost 2014 in the OR site collapsed due to bacterial canker and fire blight. Now NY and CA are the only ones available to finish up with the mature stage paper. OHxF 69 was more vigorous than OHxF 87. Tighter spacing at 3 ft caused dwarfing effect especially in Anjou with is the most vigorous. A 5-year paper will be prepared.

- *2014 Apple rootstock trial – John Cline*

John Cline has posted the protocol in the website. Cooperators must be checking the accuracy of their data and formatting. Some of these sites are being used to study bitter pit under the root-to-fruit project.

- *2015 Organic apple rootstock trial – Wes Autio*

Cooperators must be checking the accuracy of their data and formatting even things have been improved. 4<sup>th</sup> leaf data still but the trial is doing poorly across all sites except WI. Modi is not a good quality fruit in MI due to excessive rusting. VM has issues with disease management some years and low vigor. Nitrogen input is an issue. Except of copper some sulfur might help with disease management. Data should be submitted using the templated by January 15<sup>th</sup>. Nitrogen inputs through compost and chicken manure application should be increased. Organic options for weed management could be suppress, limonene. Copper application must be reduced.

- *2017 Peach rootstock trial – Ioannis Minas*

Some states were not reporting but now most of the sites are reporting. 2<sup>nd</sup> leaf data. Survival has been relatively high except NY. MP-29 and Rootpac40 are showing high mortality. Most vigorous AL, least vigorous CO. Guardian, Lovell and Rootpac20 are the most vigorous. There might be an issue with the vigor of Rootpac20 and 40. Rootpac40 should be more vigorous than 20 which is not the case in the trial. Controller 6 looks like a promising semi-dwarf rootstock. Protocol was uploaded in the website. Coordinators must report 2019 data earlier so Dr. Minas can prepare a 3-year abstract for the Orchard Systems and Rootstocks meeting.

- *2017 Tart cherry rootstock trial – Greg Lang*

Initial issues with the nursery in this trial. So far, the focus was on establishment training. Fruiting data will start coming in 2020 and more observations are just coming up.

- *2017 Sweet cherry systems x rootstock trial – Greg Lang*

Similarly, the focus was to develop the canopies of TSA, KGB and Bi-UFO. ID is doing well on training those trees.

- *2019 Apple rootstock trial - Todd Einhorn*

Protocol will be shared. TSCA, suckers, survival should be recorded. There were some issues IFO with the source of the genotype and their request for trial visits and publications. The trial is still in establishment.

- At this time Greg Lang requested to add the Black Pearl Sweet Cherry trial in the normal list of trials. Gi3, Gi5, Gi6, Gi12 and MxM14 and Mahaleb. Based on the rootstock vigor the number of leaders should be determined. Various planting spacing and number of upright leaders will be applied.

## **Future Trial Reports**

- *2020-2021 Apricot rootstock trial – Greg Lang*

Wavit rootstock will be tested. ONT, CA might be a collaborator to propagate the rootstocks but, a list of 10 rootstocks is being formed (2 Spanish, 2 French, Wavit, K86, seedling). Six states interested. Cultivar selection is a challenge.

• *2021 Pear and quince rootstock trial – Todd Einhorn*

*Amelanchier* will be the focus due to dwarfness and hardiness. Quince rootstocks of interest are some from Romania.

• *2021 Cherry rootstock trial – Greg Lang*

2021-2022 estimated planting for 13 rootstocks Weigi 1, 2, 3 (coming soon out of quarantine), Gi13, Gi17 (coming soon out of quarantine), Krymsk and some new from Dave Weil's.

• *2022 Cider apple rootstock trial - Greg Peck*

Dr. Peck shared a handout with the group. Focus more on slight modification of high-density for mechanical shacking. Looking for strong scion/rootstock combination to withstand shacking. Focus also in fruit quality and analysis from SSC up to Greg's Lab for phenolics. Juice quality is of interest, but fermentation could be considered.

• *2023 Peach systems x rootstock trial - Ioannis Minas*

A systems x rootstock trial to be planted in 2023. 3 training systems were proposed single leader, bi-axis or U and multileader (W with 3 or more leaders). The intent is to find optimum rootstocks for each canopy style but all of them will end up to a fruit wall. Dr. Minas believes that we have the genetic material to support such approach. 3-5 rootstocks semi-dwarf rootstocks (Controller 6, Rootpac and some of Dave Weil's Russian Trio). The group was positive with the approach and 12 states expressed interested with WA, NY, MI, PA, SC, NC, KY, UT, VA, AL, GA, CO. A similar trial was established in CO to help establish a very firm protocol of management by the year of planting.

**Wed Nov. 13, 2019 (afternoon)**

A technical tour in research and rootstock trials of Cornell University at Geneva Research Facilities was held in the afternoon after the business meeting. The tour included:

- The Geneva Apple Rootstock Breeding plots - Gennaro Fazio
- And the Geneva NC140 Research Plots - Terence Robinson

**Thursday November, 14, 2019 (morning)**

Participants delivered highlights of state reports (24 states/provinces). The reports can be found on the [www.nc140.org](http://www.nc140.org) website.

**Thursday Nov. 14, 2019 (afternoon)**

An optional post meeting Commercial Orchard Tour in Wayne County, NY was held. The group visited: Vanderwalle fruit Farm, Furber farm and Nursery, Chip Bailey nursery and Instant Orchard.

**Participants**

Autio, Wesley (autio@umass.edu) – University of Massachusetts;

Black, Brent (brent.black@usu.edu) – Utah State University;

Blatt, Suzanne (suzanne.blatt@canada.ca) – Agriculture and Agri-Food Canada;

Bradshaw, Terence (tbradsha@uvm.edu) – University of Vermont;  
Carter Kathryn (kathryn.carter@ontario.ca) - Ontario Ministry of Food, and Agriculture;  
Cheng, Lailiang (lc89@cornell.edu) - Cornell University;  
Clements, Jon (jon.clements@umass.edu) – University of Massachusetts;  
Cline, John (jcline@uoguelph.ca) - University of Guelph, Ontario;  
Cowgill, Win (wincowgill@mac.com) – Rutgers, The State University, Emeritus;  
Crassweller, Rob (rmc7@psu.edu) – Pennsylvania State University;  
Fallahi, Esmail (efallahi@uidaho.edu) – University of Idaho;  
Faruch, Macarena (mfaruch@umd.edu) - University of Maryland;  
Fazio, Gennaro (gennaro.fazio@ars.usda.gov) – USDA-ARS, Geneva, NY;  
Kon, Tom (tom\_kon@ncsu.edu - North Carolina State University;  
Krupa Jim (jkrupa@psis.umass.edu) - University of Massachusetts;  
Lang, Gregory (langg@msu.edu) – Michigan State University;  
Marini, Richard (rpm12@psu.edu) - Pennsylvania State University;  
Minas, Ioannis (ioannis.minas@colostate.edu) – Colorado State University;  
Muehlbauer, Megan (muehlbauer@njaes.rutgers) – Rutgers, The State University;  
Musacchi, Stefano (stefano.musacchi@wsu.edu) – Washington State University;  
Reighard, Gregory (grghrd@clermson.edu) – Clemson University;  
Robinson, Terence (tlr1@cornell.edu) - Cornell University;  
Peck, Gregory (gmp32@cornell.edu)  
Todd, Einhorn (einhorn@msu.edu) – Michigan State University;  
Warmund, Michele (warmundm@missouri.edu) - University of Missouri;  
Wolfe, Dwight (dwolfe@uky.edu) – University of Kentucky;  
Yao, Shengrui (yaos@nmsu.edu) - University of New Mexico;  
Yoder, Keith (ksyoder@vt.edu) - Virginia Tech;

Respectively submitted,

Ioannis Minas, Recording Secretary NC140 project for 2019  
Assistant Professor, Department of Horticulture and Landscape Architecture,  
Colorado State University, Fort Collins, CO 80523