

**Project/Activity Number:** NCCC-212

**Project/Activity Title:** Small Fruit and Viticulture Research

**Period Covered:** Oct. 27, 2016 – Oct. 26, 2017

**Date of This Report:** December 19, 2017

**Annual Meeting Date(s):** October 24-26, 2017

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#### **Brief summary of minutes of the annual meeting:**

On October 24, participants toured the Global Headquarters of Accuweather, Inc., where they learned about operations of the facility and business. Following the tour, participant either took part in a Seed Extraction Workshop led by Jill Bushakra of the USDA-ARS, or toured the Russell E. Larson Agricultural Research Center at Rock Springs. Lunch was hosted by Rita Graef at the Pasto Agricultural Museum where participants heard a brief history of the museum and its displays. Participants then toured the Small Fruit and Viticulture research plots consisting of blueberry, wine grape and strawberry research trials, and the High Tunnel research and extension facility where a significant amount of work related to a multi-state SCRI project is taking place. Afterwards, the annual meeting of the Small Fruits Crop Germplasm Committee was held, while other NCCC-212 attendees participated in a discussion of experiences related to multi-institutional research projects with the goal of finding ways to optimize interactions.

On October 25, Kathy Demchak greeted members and introduced Dr. Erin Connolly, Head of Penn State's Department of Plant Science, who gave an overview of agriculture and the small fruit production industry in Pennsylvania. Afterwards, state reports were distributed. Reports on

research, industry, and Extension activities were given by representatives from OR, WV, VA, NC, Ontario, MI, NY, MN, PA, WA, USDA (Corvallis, OR; and Beltsville, MD), AR, ND, Nova Scotia, British Columbia, ME, and NJ. The business meeting was also held in early afternoon on this date.

On October 26, participants discussed impacts of the project, and identified project participants whom could provide needed expertise for proposals in development. This was followed by attendance of a seminar hosted by the Dept. of Plant Science, and a lunchtime discussion with David Hughes of the Departments of Biology and Entomology on the development of an artificial intelligence app for identifying strawberry plant issues. The meeting concluded with a tour of Bee Tree Berry Farm in Bellefonte, PA, and Blackberry Bottom Farm in Bedford, PA.

### **Business Meeting Minutes**

Kathy Demchak (PSU) called the meeting to order at 1:20 pm Eastern time on October 25, 2017. Lisa DeVetter (WSU) called in remotely and served as Secretary -- WSU will be the host institution for the 2018 NCCC-212 meeting. The agenda for this year's annual meeting was reviewed. A request for additional agenda items was made by Kathy Demchak but none added.

#### *Old Business*

The 2016 minutes were circulated electronically before the meeting and reviewed. A typo was corrected ("M" instead of "N" in "NCCC-212). The minutes were otherwise approved.

The email list of potential NCCC-212 participants was circulated and reviewed. Additions or corrections to the email list should be sent to Kathy Demchak or Lisa DeVetter ([efz@psu.edu](mailto:efz@psu.edu) and [lisa.devetter@wsu.edu](mailto:lisa.devetter@wsu.edu), respectively). Kim Lewers suggested sharing the email list of NCCC-212 participants either at meetings or on the NCCC-212 website. There was preference to have this information on the website.

Travel support for members located at Agriculture Experiment Stations was discussed. Participants at institutions with an Experiment Station may be eligible to receive funding to defray travel costs and serve as a representative for that station. However, the Experiment Station must confirm the official representative. Individuals should see their Experiment Station office for additional information on how to utilize this prospective opportunity.

Participation was discussed, as it is essential for the function of NCCC-212. Attendance is tracked and is important for the renewal process. To increase attendance, moving the meeting time to September was discussed. Marvin Pritts and Kathy Demchak reviewed why the meeting routinely gets scheduled for late October; specifically that the meeting needs to be held late enough to be after the field research season, classes need to be well underway before instructors feel that they can leave, and conflicts with holidays need to be avoided.

There was discussion about making videoconferencing more available in order to increase attendance and information exchange. It was agreed that calling-in via a videoconferencing

system does not replace the value of face-to-face interactions, but may be a good tool to allow some who may not otherwise be able to attend to participate.

The topic of industry participation was re-visited. This topic was discussed last year in Virginia as well. Industry participation is welcomed, but industry groups should be able to share as well as receive information within this information exchange group.

A discussion on extending invitations to other institutions and county extension agents that work with small fruits but don't attend NCCC-212 meetings followed. It was agreed that inviting these groups/individuals was a good path to pursue, particularly those that are located at or near hosting sites.

It was suggested that future reporting should focus more on collegial interactions and formed collaborations, while the content of the research reports could be reduced. This was a topic that was also discussed at previous meetings. It was agreed that meeting time should be used for both state reports and to discuss potential collaborations. It was noted that requests to discuss potential collaborations during the NCCC-212 meeting should be sent to the organizer so that they can allot time in the agenda for this activity.

There was also discussion about moving the Crop Germplasm Committee (CGC) meeting to the last day of the NCCC-212 meeting (i.e., not the first day) to allow more time at the beginning of the meeting to discuss potential collaborations. The 2018 organizer will organize the meeting to allow for more discussion of collaborative work across the country and continent.

Project renewal will require a team effort. The next renewal is due in 2021 and this will take time, effort, and coordination to put together. Kathy Demchak reminded the group that we previously agreed to start working on the renewal in 2019.

#### *New Business*

Lisa DeVetter and Pat Moore at Washington State University will host the meeting Oct. 23-25, 2018 in Mount Vernon, WA. Plans are underway for the 2018 meeting and activities were discussed. Mary Rogers with the University of Minnesota will host the meeting in 2019. Hamid Ashrafi and Mark Hoffman at North Carolina State University will host the meeting in 2020.

Pat Moore made a motion to approve the 2016 meeting minutes which was seconded by Harlene Hatterman-Valenti. Marvin Pritts made a motion to adjourn the meeting and Pat Moore seconded. The meeting ended at 2:24 Eastern time.

#### **Accomplishments:**

Short-term Outcomes: Many of the participants in this project have extension in addition to research responsibilities, and thus one of the most common benefits of the project is increased knowledge that is readily conveyed to growers. Growers become familiar with advances made through publication of extension articles in grower newsletters, through presentations at local and regional meetings such as the Great Lakes Expo, Mid-Atlantic Fruit and Vegetable

Convention, or New England Fruit and Vegetable Growers Convention, through webinars and information published on web sites, and through extension publications.

Outputs: Work conducted under this project has resulted in the release of numerous new cultivars or development of germplasm with specific needed characteristics. For example, breeding programs at USDA-Beltsville have produced cultivars that stand up to rainy conditions, an important quality for eastern growers, and work at AAFC-Nova Scotia has resulted in development of strawberry germplasm with resistance to angular leaf spot, a bacterial disease of strawberries for which only minimally effective controls exist and for which there are currently no resistant cultivars. Several projects related to use of protected culture (high tunnels and low tunnels) are producing strong evidence that certain disease and insect problems can be greatly reduced in strawberry or raspberry production, while others can become more problematic. See also “Publications”.

Activities - Collaborative projects:

Over 50 other projects that fall under the umbrella of this project are underway in addition to the ones listed below. Those listed below highlight multi-state collaborations.

*As related to Objective 1 - Develop improved small fruit germplasm through cooperative breeding and evaluation programs:*

Strawberry Cultivar Development and Selection Testing -- K. Lewers, USDA-ARS, Beltsville MD with collaborators B. Smith, USDA-ARS-Poplarville, MS; M. Newell, Univ. of Maryland - WREC; J. Strang and S. Wright, Univ. of Kentucky; D. Handley, Univ. of Maine; B. Amyotte, AAFC-Kentville, Nova Scotia; K. Demchak, Penn State Univ.; J. Samtani and R. Flanagan, Virginia Tech; C. Weber, Cornell University; G. Fernandez, North Carolina State Univ.; C. Finn, USDA-ARS-Corvallis; V. Whitaker, University of Florida. Industry Cooperators: L. Ponce, Lassen Canyon Nursery, Redding, CA; R. Swanekamp Jr., Kube-Pak, Allentown, NJ; C. Keddy, Keddy Nursery, Inc., Kentville, NS, Canada; B. Krohne, Krohne Plant Farms, Inc. Hartford, MI; S. Irwin, Indiana Berry and Plant Co. LLC., Plymouth, IN; T. Nourse, Nourse Farms, Whately, MA; F. Laforge, Luc Lareault, Inc., Lavatrie, QC, Canada; P. Stewart, Driscoll’s Strawberry Associates, Watsonville, CA; L. Moore, Larriland Farms, Woodbine, MD; S. Butler, Butler’s Orchard, MD.

RosBREED: Combining Disease Resistance with Horticultural Quality in New Rosaceous Cultivars -- A. Iezzoni (PI), Michigan State Univ.; Nahla Bassil, USDA-ARS; R. Bell, USDA-ARS; R. Bernardo, Univ. of Minnesota; S. Brown, Cornell Univ.; D. Byrne, Texas A&M; J. Clark, Univ. of Arkansas; C. Crisosoto, UC Davis; T. Davis, Univ. of New Hampshire; L. DeVetter and K. Evans, Washington State Univ.; C. Finn, USDA-ARS; K. Gasic, Clemson Univ.; T. Gradziel, UC Davis; J. Hancock, Michigan State Univ.; S. Hokanson, Univ. of Minnesota; K. Ivors, Cal Poly; S. Kresovich, Clemson Univ.; A. Lawton-Rauh, Clemson Univ.; D. Layne, Washington State Univ.; J. Luby, Univ. of Minnesota; D. Main, Washington State Univ.; V. McCracken, Washington State Univ.; J. Norelli, USDA-ARS; M. Olmstead, Univ. of Florida; N. Oraguzie, Washington State Univ.; C. Peace, Washington State Univ.; G. Reighard, C. Saski, G. Schnabel, Clemson Univ.; V. Whitaker, Univ. of Florida; and C. Yue, Univ. of Minnesota

Short-day Strawberry Breeding - Traditional Breeding for Matted-row Production -- led by C. Weber (Cornell Univ.) includes material from K. Lewer, USDA-Beltsville; J. Luby, Univ. of Minnesota; V. Whitaker, Univ. of Florida; and the breeding program at the UC-Davis as well as international varieties from A. Jamieson, AAFC-Nova Scotia, England, Spain and France.

Enhancing the Genetic Resources of Small Fruit Crops (*Fragaria*, *Rubus*) for Commercial Growers (AAFC project: 2017-2019) -- Andrew Jamieson (succeeded by B. Amyotte), AAFC-Nova Scotia; with collaborators B. Strick, Oregon State Univ.; B. Bors, Univ. of Saskatchewan; J. Hancock, Michigan State Univ.; and M. Dossett, British Columbia Berry Cultivars, Inc.

Evaluation and Testing of Blueberry Cultivars and Selections for Adaptation, Production, and Potential Machine Harvest in Primarily North-Temperate Areas – M. Ehlenfeldt, USDA-Beltsville with K. Demchak, Penn State Univ.; H. Ashrafi, NCSU.; C. Finn, USDA-Corvallis; S. Stringer, USDA-Poplarville; E. Garcia, Univ. of Arkansas; P. Edger, Michigan State Univ.

*As related to Objective 2* - Develop practices for small fruit production tailored for climatic and market needs of growers:

Optimizing Protected Culture Environments for Berry Crops -- E. Hanson (lead PI), R. Isaacs, A. Schilder, Michigan State Univ.; K. Demchak, B. Lamont, K. Kelley, R. Marini, D. Decoteau, Penn State Univ.; E. Hoover, M. Rogers, Univ. of Minn; M. Pritts, L. Levitan, Cornell Univ.; D. Conner, Univ. of Vermont; B. Sideman, Univ. of New Hampshire; K. Lewers, USDA-Beltsville; M. Glenn, USDA-Kearneysville; N. Paul and C. Halsall, Lancaster Univ., U.K.

Florican and Primocane Red Raspberry Breeding - Traditional Breeding for Temperate Climates and High Tunnel Production -- led by Courtney Weber (Cornell Univ.) includes varieties and selections from Cornell Univ., and collaborators P. Moore, Washington State Univ., G. Fernandez, North Carolina State Univ. and C. Finn, USDA/ARS ORUS programs.

### **Impacts:**

An overarching goal of the project is to give berry growers needed tools to adapt changing conditions and new challenges, thus improving food security as related to berry crop productivity. Negative effects on crop growth resulting from increasing weather variability, extreme weather events and emerging pests can be mitigated by work conducted on this project. Through the coordinated efforts that this project encourages, as well as by providing opportunities for increased communication and contributions of knowledge, project participants continue to work towards developing and testing new germplasm and cultivars that can be grown under a range of conditions, as well as developing new cultural production techniques that provide growers additional control over growing conditions and pests. Specific examples of impacts from participants in various states are provided below.

Washington State: Small fruit plant sales in the Pacific Northwest (PNW) for 2017 were voluntarily reported by commercial plant propagators. The PNW public breeding programs developed small fruit cultivars that comprise 79% of the raspberry PNW plant sales, 59% of the strawberry plant sales and 90% of the blackberry plant sales. The value of production for 2016

in Oregon and Washington was \$17.2 million for strawberries, \$71.1 million for raspberries and in 2015, \$38.0 million for blackberries.

New York: Developing productive, high quality raspberry varieties for cold climate areas strengthens local economies and enhances the local food movement. Cornell varieties currently allow from growers in NY and surrounding states to produce raspberries from mid-June to November by utilizing varieties with varying production seasons and protected production systems like high tunnels and/or rain shields. Varieties are being developed with larger, better tasting fruit with longer shelf life to allow growers to access a wider market for their fruit.

Maryland (USDA-Beltsville): Three strawberry breeding selections are being prepared for release by the USDA-ARS at Beltsville. All three have high yield, great flavor, low incidence of fruit rots in the field, and long shelf-life. 'Flavorfest' and two of the new selections scheduled for release were tolerant of 2017's very heavy rains. Cultivars from this breeding program have historically been heavily utilized by growers in the Northeast, Mid-Atlantic, and Midwestern U.S.

Arkansas: The major impact of the small fruit breeding effort is in plantings of released blackberry cultivars. Major increases in primocane-fruiting cultivars has occurred in recent years, and this late summer to fall crop has become a component of the domestic blackberry marketing season. The production is for both the shipping and local markets.

Maine: Recent program evaluations by growers indicate that nearly all participants have reduced pesticide applications (83% of growers) and costs (100% of growers) as a result of the Strawberry Integrated Pest Mgt Program. Additionally, growers now time sprays in response to pest monitoring results, and most have adopted at least one non-chemical alternative pest management strategy.

## **Publications:**

### **Refereed/Peer-reviewed Journal Articles**

Almutairi, K.F., D. Bryla, and B.C. Strik. 2017. Potential of deficit irrigation, irrigation cut-offs, and crop thinning to maintain yield and fruit quality with less water in northern highbush blueberry. *HortScience* 52:625-633.

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